Shawnee II High Speed Counter

The solid-state 354B is manufactured from a series of computer-tested plug-in circuit boards and assembled virtually without hand wiring. Because it has no moving parts in its logic circuits, its life expectancy is practically unlimited. Even the load relay—the 354B's only significant mechanical component—has a life expectancy of 100,000,000 operations (no load), while the optional solid-state switch module has a virtually unlimited life expectancy. As a result, the 354B achieves an overall *reliability* that surpasses even the high level achieved by previous Shawnee counters.

CYCLE PROGRESS INDICATION: The Shawnee 354B indicating counter provides cycle progress indication on a four-digit display located immediately above the digital setting number wheels. While the non-indicating Model 354B does not provide true cycle progress indication, 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.

NOISE IMMUNITY: The 354B 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.

PLUG-IN AND DUST-TIGHT: All 354B counters feature true plug-in design and are dust-tight from the front of panel.

100% ACCURATE AND BOUNCE-PROOF: The repeat accuracy of the Shawnee 354B is 100% at all rated speeds, even in the presence of contact bounce. The 354B 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 5,000 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.).

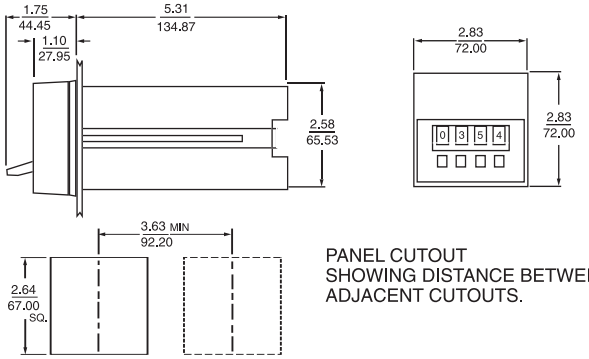
HOUSING, IT OCCUPIES 40% LESS: Packaged in a 72mm² DIN-size housing, the 354B occupies 40% less panel space than previous IC counters. Modern production and assembly techniques have substantially reduced manufacturing costs resulting in a 45% cost saving.

CONTROL VERSATILITY: The 354B 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.

MODEL NUMBER >>>>>>	354B		30	P	
Range					
9,999 Counts	350				
99,990 Counts (units digit blind)	35				
Special	000				
Voltage & Frequency					
120, 50/60 Hz		Q			
240, 50/60 Hz		R			
Arrangement					
With Display (On-Delay)			30		
Features					
Basic plug-in unit				P	
Standard unit					X
With solid-state output module					J
Special					K

ACCESSORIES
0353-260-27-00: Surface mounting bracket kit
0305-265-61-70: Retrofit kit

DIMENSIONS (INCHES/MILLIMETERS)



PANEL CUTOUT
SHOWING DISTANCE BETWEEN
ADJACENT CUTOUTS.

The 354B Directly Replaces 354A.

OPERATION

The Shawnee 354B 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 354B 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 354B provides one of three load control actions depending on how it is wired (see Typical Applications).

When the 354B 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.

SPECIFICATIONS

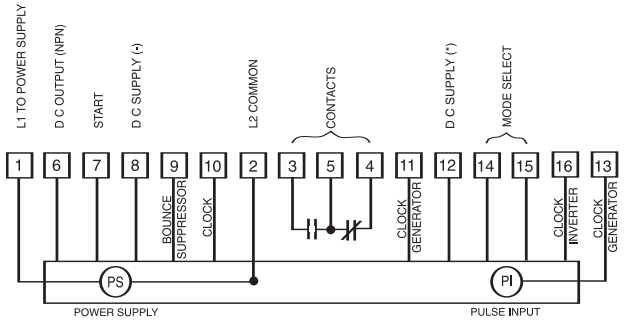
MODELS	Both indicating and non-indicating models of the 354B are available. See ordering code.	
CYCLE PROGRESS INDICATOR	Indicating model only–digit, 0.3 inch, high intensity, blue display	
RANGE	1 to 9999 counts or 10 to 99,990, presettable in 10 count increments.	
PULSE INPUTS	*Isolated Contact Input (Dry)*	
	Min. Open Resistance	1 megohm
	Max. Closed Resistance	20K 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 µSEC
	Min. Open Time	1 mSEC
	Max. Open Time for Any Single Bounce	0.3 mSEC
	Count Rate and Bounce Immunity With maximum bounce immunity–for Precision Switches (Terminal 9 jumpered to 10 and 11)	
	Max. Count Rate	80/ SEC
	Min. Closed Time	30 µSEC
	Min. Open Time	6 mSEC
	Max. Open Time for Any Single Bounce	2.5 mSEC
VOLTAGE INPUTS	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	5K ohms
	Min. ON Time	60 µSEC
	Min. OFF Time	100 µSEC
	Count Rate	5K Hz max.
	Rise and Fall Time Req.	none.
DELAYED MODE	Relay Operate Time (after coincidence)	20 mSEC max.
	Relay Release Mode	20 mSEC max.
INTERVAL MODE	Relay Operate Time	15 mSEC max.
	Relay Release Time (after coincidence)	25 mSEC max.
AUTOMATIC RECYCLE MODE	Pulse On time (with relay)	80 mSEC, + 20 mSEC (may be shortened or lengthened by installing a resistor or capacitor, respectively, across Terminals 12 and 14; see Application section for details)

START (READY/RESET) SIGNAL	*Voltage Requirements*	
	Positive Polarity	ready at 4.5V MIN reset at 1.0V max.
	Max. Continuous Input	40V
	Ripple Voltage	must not go below MIN req.
	Input Impedance	5K ohms
	Ready-to-Count Time	0.5 mSEC max (after application of voltage to Terminal 7)
	Circuit Reset	1 mSEC max.
	Ready-To-Dropout	20 mSEC 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 µSEC
	Max. Duration Start Signal	continuous
	Reset	when signal is removed after count-out.
LOAD RELAY	LIFE	100,000,000 operations (no load)
	Contact Rating	5 A at 120 VAC, 3 A at 28 VDC 1/20 HP at 120 VAC
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-354B)	
DC OUTPUT (Terminal 6)	Voltage	ON– -24V+10% OFF– -1V or less
	Current	with relay –5mA max. without relay –40mA max.
	Impedance	on– 10 ohms max., off–10K ohms.
DC POWER SUPPLY OUTPUT (Terminal 8)	Voltage	24V+10%
	Current	40mA max.
POWER REQUIREMENTS	120V	95 to 132V, 50/60 Hz inrush–0. 4A running–0.04A.
	240V	190 to 264V, 50/60 Hz inrush–0.2A running–0.02A.
TEMPERATURE RATING	32° to 140°F (0 to 60°C)	
MOUNTING ACCESSORIES	Standard	Hardware is provided to mount counter so that it is dust-tight from front of panel.
	Optional	Surface mounting with front-facing terminals.
	NEMA 12 molded case (1 counter)	
WEIGHT	NET: 1 lb., 7 oz.	SHIPPING: 2 lbs.

When the 354B 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.

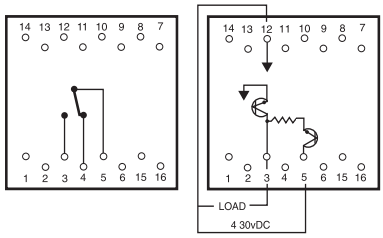
When the 354B is wired as a repeat cycle pulse generator, the output device and the DC signal are both off until the end of the count cycle, at which time they are both on for about 80 mSEC From the instant that the output pulse comes on, the 354B stops counting for 500 µSEC while it resets; it automatically begins a new cycle and starts counting pulses again immediately after reset. The duration of the pulse generated by the 354B can be easily lengthened or shortened by wiring a capacitor or resistor across terminals 12 and 14 (see Typical Applications).

WIRING



Pilot light only on unit without display.

TERMINAL WIRING
SOLID STATE
OUTPUT MODULE



TYPICAL APPLICATIONS

The Shawnee 354B 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 354B 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.

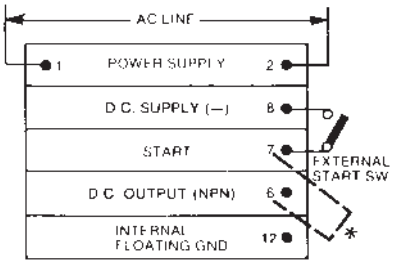
STEP 1 - START CIRCUITS

The 354B 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: 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 354B is ready to count whenever the switch is closed; it resets when the switch is opened.

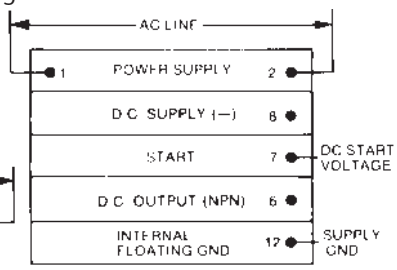
ISOLATED CONTACT START—SUSTAINED (EXTERNAL START SWITCH)

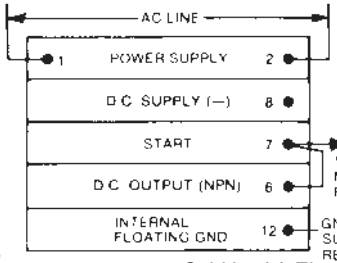
*Jumper for momentary start in interval mode.



B. DC VOLTAGE (sustained start signal) The start voltage stained start signal) The start signal may be momentary or sustained. The 354B is ready to count whenever the start voltage reaches -3VDC. 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 0VDC, when the start signal is sustained.

DC VOLTAGE START (SUSTAINED START)





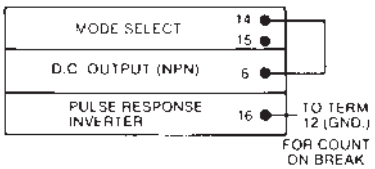
NEGATIVE DC VOLTAGE (MOMENTARY* OR SUSTAINED START)

STEP 2 - PROGRAMMING

The 354B 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 354B 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.

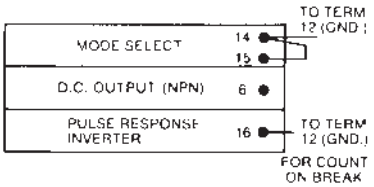
A. DELAYED MODE. The SPDT relay provides one delayed closing and one delayed opening circuit, and the 354B generates a DC signal at Terminal 6 at the end of the cycle.

DELAYED MODE



B. INTERVAL MODE. The SPDT relay provides one interval opening and one interval closing circuit, and the 354B provides must be on throughout the count cycle. The 354B is ready to count whenever the voltage reaches +4.5 or -3VDC; it resets when the voltage drops to + 1 or -1VDC.

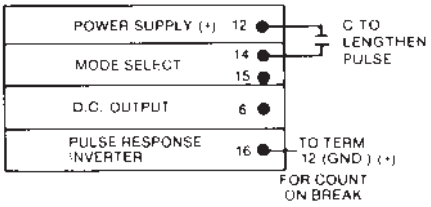
INTERVAL MODE



C. NEGATIVE DC VOLTAGE (momentary* or sustained -24 VDC signal at Terminal 6 during the cycle.

D. REPEAT CYCLE PULSE GENERATOR. In this mode, the 354B generates an output of 80 ms (+20 ms) at the end of the count

REPEAT CYCLE PULSE GENERATOR



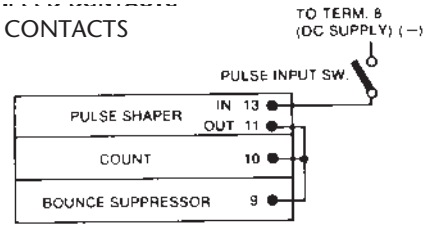
cycle; the length of the output pulse can be adjusted as follows:

To lengthen the pulse, install a capacitor between Terminals 12 and 14 (if a polarized capacitor, install + to 12, -to 14).

STEP 3 - PULSE INPUTS

The 354B 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.

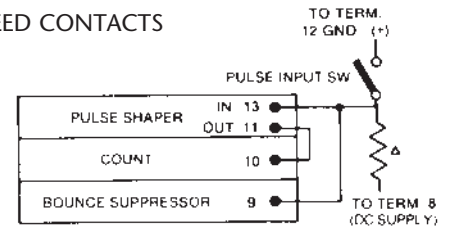
LOW SPEED CONTACTS



A. LOW-SPEED CONTACTS. The 354B counts input pulses from precision switches, relays, limit switches, etc., at speeds up to 80/SEC.

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 354B 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 354B circuits.

HIGH SPEED CONTACTS



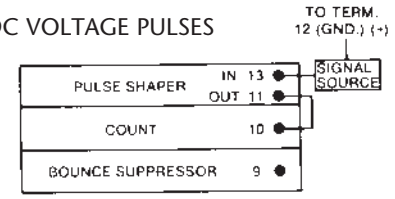
NOTE: With this circuit, to count on break, remove 12-16 jumper, shown in Step 2

Δ Recommended Value – 33K Ω W 10%

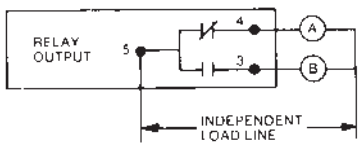
C. DC VOLTAGE PULSES. In this circuit, the 354B counts when the voltage decreases from above +4.5V to below +1V, or from above – 3V to below –1V, with a jumper installed between Terminals 12 and 16 as shown in Section 2; to reverse the action, simply remove the jumper.

STEP 4 -LOAD ACTION

COUNT DC VOLTAGE PULSES



The load action of the 354B depends on the choice of start circuit and programming mode. Loads are always wired to the 354B in the following manner:



If the 354B 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.

DELAY MODE				
	Before Start	During Cycle		End of Cycle
Start SW				Reset to Before Start
LOAD A				
LOAD B				

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

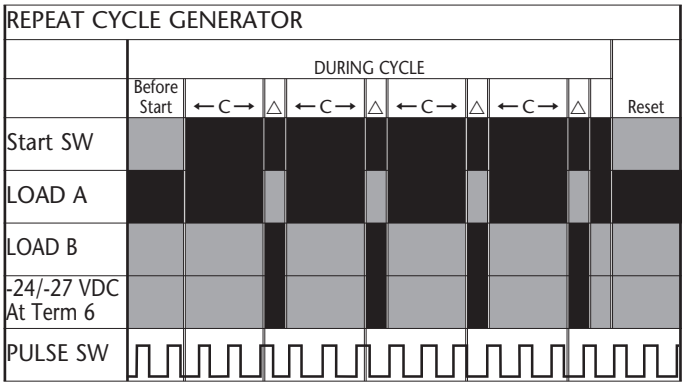
INTERVAL MODE–SUSTAINED START				
	Before Start	During Cycle		End of Cycle
Start SW				Reset to Before Start
LOAD A				
LOAD B				

C. INTERVAL MODE WITH MOMENTARY START. Because of the 354B's electronic latch capability, it can provide interval control with a momentary negative DC voltage start signal, in which event the 354B 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			
	Before Start	During Cycle	End of Cycle
Start SW			
LOAD A			
LOAD B			

D. REPEAT CYCLE PULSE GENERATOR. When this mode is selected, the start signal must remain on continuously. The 354B generates an output pulse at the end of each count cycle, then resets and repeats automatically. At least 500 µs 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 GENERATOR



C=COUNT CYCLE=DIAL SETTING

★=TIMED PULSE OUTPUT

BLACK–CIRCUIT CLOSED

GRAY–CIRCUIT OPEN

Shawnee II Digital Counter

A compact version of the 336 counter, the ATC 356 is its exact functional duplicate. Packaged in a 72mm² DIN-size housing, it occupies 40% less panel space and costs proportionately less. Modern production and assembly techniques have all but eliminated hand wiring, enhancing the reliability and life expectancy of the 356.

FAST, ACCURATE AND BOUNCE-PROOF: The repeat accuracy of the 356 is 100%. It maintains full accuracy even at pulse rates up to 4,000/minute, even with pulses that are as brief as 1 millisecond, and even in the face of severe contact bounce, which it ignores by virtue of an extremely effective anti-bounce circuit.

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.

PLUG-IN AND DUST-TIGHT: All 356 counters feature true plug-in design and can be replaced in seconds without disturbing the housing or disconnecting the wiring. The dial assembly is gasketed so that the counter body is dust-tight from the front of panel.

CYCLE PROGRESS INDICATION: The Shawnee 356 indicating counter provides cycle progress indication on the four-digit display located immediately above the digital setting number wheels. While the non-indicating Model 356 does not provide true cycle progress indication, it can be wired so that the legend light is on during the cycle and the pilot light flashes with each pulse.

MODEL NUMBER >>>>>>	356B		30	P	
Range					
9,999 Counts	350				
99,990 Counts (units digit blind)	35				
Special	000				
Voltage & Frequency					
120, 50/60 Hz		Q			
240, 50/60 Hz		R			
Arrangement					
With Display (On-Delay)			30		
Features					
Basic plug-in unit				P	
Standard unit					X
Special					K

ACCESSORIES
0353-260-27-00: Surface mounting bracket kit
0305-265-61-70: Retrofit kit

The 356B Directly Replaces 356A.

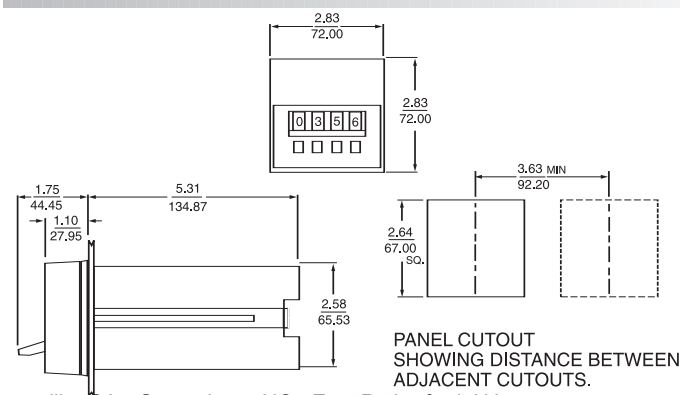
COMPUTER-TESTED RELIABILITY: The solid-state 356 is manufactured from a series of computer-tested plug-in circuit boards and assembled virtually without hand wiring. Because it has no moving parts in its logic circuits, its life expectancy is practically unlimited. Even the load relay – the 356's only significant mechanical component – has a life expectancy of 10,000,000 operations (no load). As a result the 356 achieves an overall reliability that surpasses even that achieved by previous Shawnee counters.

NOISE IMMUNITY: The 356 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.

SAVE 40% IN PANEL SPACE AND COST: Packaged in a 72 mm² DIN-size housing, the 356 occupies 40% less panel space than previous IC timers. Modern production and assembly techniques have substantially reduced manufacturing costs resulted in a 45% cost saving.

LOW INVENTORY COSTS: Each Shawnee 356 covers the active count range of 1 to 9,999, easily satisfying the vast majority of industrial requirements and thus greatly reducing inventory expense especially for large users.

DIMENSIONS (INCHES/MILLIMETERS)



PANEL CUTOUT
SHOWING DISTANCE BETWEEN
ADJACENT CUTOUTS.

OPERATION

The Shawnee 356 operates on a digital logic circuit with three main elements: a pulse circuit; 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 pulse circuit and ROM.

When power is applied (start signal on), two things happen simultaneously; the instantaneous DPDT relay is energized transferring both sets of contacts, and the pulse circuit begins to count each input pulse whose duration is at least 1 millisecond. The pulse circuit accumulates the count and feeds the total continuously to the comparator. When pulse circuit output exactly equals the output of the ROM, the comparator causes the 356 to count out.

At this point, (1) the DPDT delay relay is energized, immediately transferring both sets of contacts and (2) the pulse circuit turns itself off automatically. Since the pulse circuit stops counting even if the start signal remains on, it is not necessary to tie up one of the 356's delayed contacts to do this job.

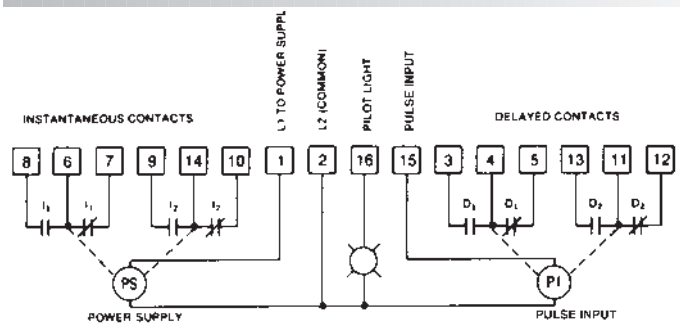
To reset the 356, power must be removed from terminal 1 (L1) for 75 milliseconds or more. The 356 operates in the on-delay mode only, always resetting whenever there is a power outage and starting a new cycle when power is restored.

CYCLE PROGRESS INDICATION: When the counter is in the reset condition, the LED display is blank. During the cycle, the display counts up from 0, thus always indicating the number of counts that have elapsed since the start of cycle. At count-out, the display shows the total elapsed count and thus equals the numbers on the digital setting wheels.

RELAY	CONTACTS	Switching Sequence* Before Start	During Cycle	End of Cycle
Instantaneous	14-9/6-8		■	■
	14-10/6-7	■		
Delayed (D_2)	11-12/4-5	■	■	
	11-13/4-3			■

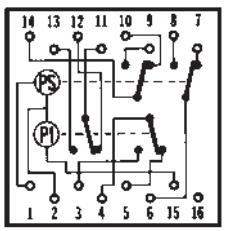
* Assumes a sustained closed start signal (i.e. longer than the setting on the digital display) ■ BLACK–CIRCUIT CLOSED GRAY–CIRCUIT OPEN

WIRING



Pilot light only on unit without display.

TERMINAL WIRING: INDICATING MODEL



SPECIFICATIONS

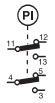
MODELS	Both indicating and non-indicating models of the 356 are available. See ordering code.	
RANGE	1 to 9999 counts or 10 to 99,990. presettable in 10 count increments.	
COUNT INPUT CHARACTERISTICS	2300/MIN with 1:1 on-off time	
	4000/MIN with 1 mSEC on: 13 mSEC off	
	500/MIN with 20 mSEC on and 100 mSEC off	
	Wired for count and repeat operation	
	Min. Pulse ON Time: 1 mSEC	
	Min. Pulse OFF Time: 13 mSEC	
	Ready-To-Count Time	10 mSEC after application of power to terminals 1 and 2
	Bounce Immunity (max. bounce open time)	6 mSEC
	Pulse Contact Req.	20 mA (at line voltage)
CYCLE PROGRESS INDICATOR (indicating Model Only)	4 digit, 0.3 inch, high intensity, blue display.	
REPEAT ACCURACY	100%	
RESET TIME	75 mSEC minimum	
MINIMUM SETTING	1 count	
COUNT CONTROL MODES	Single Cycle	interval or delayed
	Repeat Cycle	pulses
LOAD RELAYS	Number	two, one instantaneous and one delayed; both plug-in, DPDT
	Operate Time	20 mSEC max.
	Release Time	instantaneous –20 mSEC, max. delayed–75 mSEC, max.
	Contact Rating	5A at 120 VAC. 2A at 240 VAC, 0.1A at 125 VDC
	Life	100 million operations (no load.)
PILOT LIGHT	Non-indicating unit only. One pilot light. Both leads brought out to terminal block.	
TEMPERATURE RATING	32° to 140°F (0° to 60°C)	
POWER REQUIREMENTS	120V	95-132V at 50 or 60 Hz inrush -0.4A running —0.08A
	240V	190-264V at 50 or 60z inrush - 0.2A running—0.04A
TERMINALS	16 screw terminals accessible at rear; integral wiring diagram on housing.	
HOUSING	Plug-in design; completely gasketed, dust-tight when panel-mounted.	
MOUNTING ACCESSORIES See Accessory section of catalog	Standard	Hardware is provided to mount timer so that it is dust-tight from front of panel.
	Optional	Surface mounting without and with front-facing terminals.
	NEMA 12 case (1 timer)	
WEIGHT	NET: 1 lb., 7 oz.	SHIPPING: 2 lbs

TYPICAL INSTALLATIONS

KEY SYMBOLS

- PS — POWER SUPPLY
- PI — PULSE INPUT
- ○ — INDEPENDENT LOADS
- ● — DEPENDENT LOADS
- MOMENTARY STARTING CONTACT
- SUSTAINED STARTING CONTACT
- NORMALLY CLOSED RESET CONTACT
- o — LOAD DE-ENERGIZED
- x — LOAD ENERGIZED

DELAYED CONTACTS



Contacts transfer simultaneously when unit "times out" and all digits are zero.

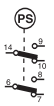
All timers shown in "before start" position. Diagrams shown with power off unless otherwise marked.

Maximum load current through any load carrying contact is 5 amperes.

Pilot light leads are brought out to terminal block. Pilot light can be wired to show practically any desired function; unit energized, cycle running, instantaneous or delayed switch closed, etc.

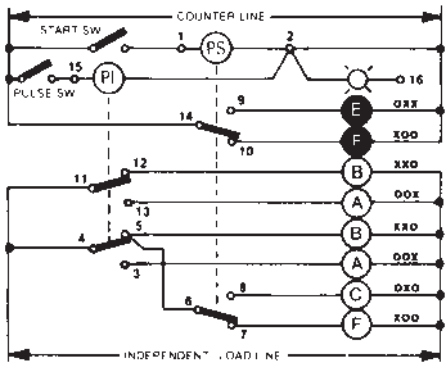
ON DELAY–Reset on power failure.

INSTANTANEOUS CONTACTS

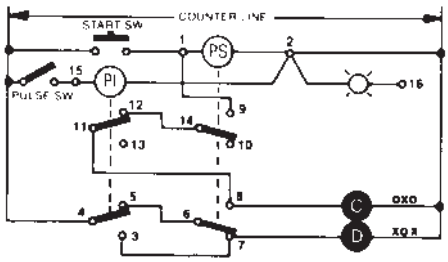


Contacts are transferred when power supply is energized; transferred back, as shown when de-energized.

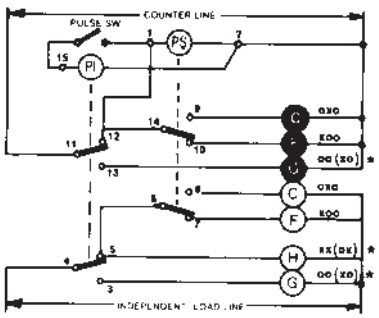
SUSTAINED START



MOMENTARY START/SUSTAINED START



COUNT, PULSE AND REPEAT CYCLE



NOTE: Minimum sw open time: 100 ms.
Minimum sw close time: 20 ms.
Output Pulse length — approx. 50 ms.

Long-Ranger Computing Counter

Based on a powerful built-in microcomputer, the compact 366B is the most versatile and cost-effective counter ATC has ever built. No industrial counter has ever achieved a higher level of reliability and ruggedness than the 366B. It has no moving parts in its electronic logic circuits, only plug-in circuit boards which are computer-tested for reliability and assembled virtually without hand wiring. Its few mechanical components have been selected for reliable service; long life relays with heavy-duty contacts and rotary set point selector switches with extremely low wear characteristics.

CONTACT BOUNCE AND NOISE IMMUNITY: No industrial counter offers greater immunity to noise and contact bounce than the 366B. Most noise encountered in typical industrial environments is blocked by such design features as full-wave bridges and a transformer power supply... so effectively that the 366B does not have to be shielded. Furthermore the 366B's micro-computer employs redundant sampling logic to detect and reject any noise pulse that manages to penetrate its defenses. Through the same powerful technique, the microcomputer also detects and rejects even severe contact bounce. As a result, the 366B maintains absolute count accuracy and is virtually immune to false starts and reset, even in difficult industrial environments.

COMPUTATION: Through its internal microcomputer, the 366B keeps track of the set point throughout the count cycle. Whenever there is a change in set point, even during a cycle, it instantly recomputes the remaining count and accurately determines the number of counts before count-out. This unique capability is especially valuable in the count-down modes as it allows you to shorten or lengthen a cycle without loss of accuracy.

PROGRAMMABLE DISPLAY: The 366B's three-digit cycle progress display will count UP to or DOWN from the set point, depending on the position of an internal jumper. After count-out, the display will either STOP or GO. In the UP & GO program, the display counts up to the set point and continues to count after count-out; in the DOWN & GO mode, it counts down to the set point, then begins to count up (from zero) after count-out.

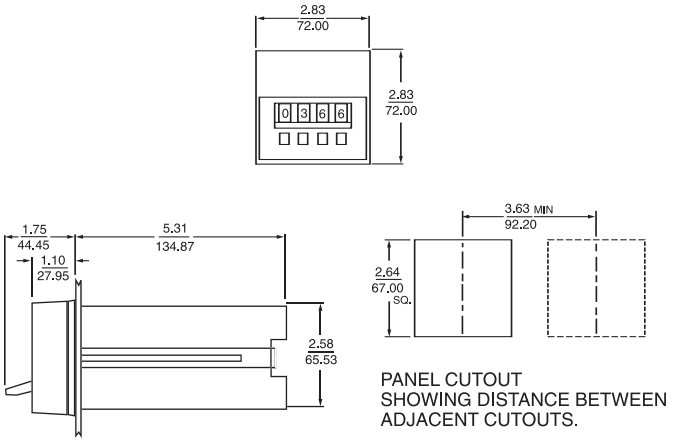
WIDE RANGE: Each 366B Long-Ranger covers the overall span of 1 to 99,900 counts in three switch-selected ranges of 1 to 999, 10 to 9990 or 100 to 99,900. It can be optimized within any selected range simply by removing appropriate selector knobs (e.g. with the counter in the 1 to 999 range, you can obtain a tamper-proof span of 1 to 99 by setting the left selector at 0 and removing the knob.) To the right of the three-digit display, a counting bar (▬) blinks on each time a pulse is received. At left, a marker ▼ turns on when the delayed relay is energized at count-out.

SELF-DIAGNOSTICS: A built-in diagnostic program lets you verify--without using any test instrument--that the counter's functional circuits are operating properly. Just follow the instructions on the flip-up card, using the counter's own display for the test readout. If all self-test displays are correct, any malfunction is almost certainly due to external circuits or to the relays, not the counter.

COMPACT, PLUG-IN AND DUST-TIGHT: Packaged in a 72mm² DIN housing, the 366B occupies 40% less panel space than most other industrial counters. It is a true plug-in counter that can be replaced in seconds without disturbing housing or wiring. The 366B is also fully gasketed and O ring sealed to be dust and water-tight whether panel or surface-mounted.

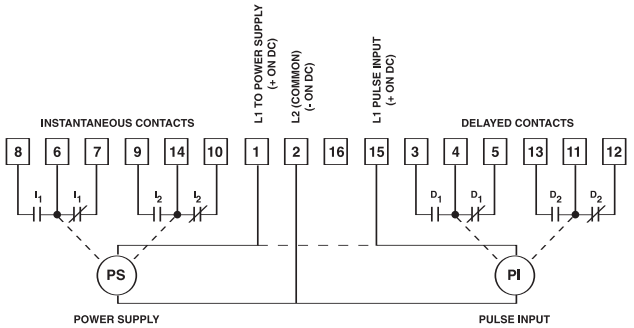
POSITIVE RESET TIME AND PULSE LENGTH: Digitally clocked by the microcomputer, the 366B's reset time is consistently of the same duration, regardless of variations in line voltage, power supply or cycle length. When the 366B operates in repeat-cycle mode, the output pulse is also digitally clocked so that both the time of occurrence and its duration are consistent from cycle to cycle.

DIMENSIONS (INCHES/MILLIMETERS)

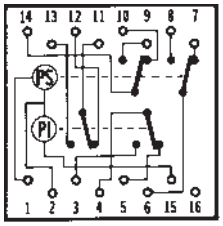


PANEL CUTOUT
SHOWING DISTANCE BETWEEN
ADJACENT CUTOUTS.

WIRING



TERMINAL WIRING:
INDICATING MODEL



OPERATION

As soon as power is applied to terminals 1 & 2 of the counter, the instantaneous relay is energized and changes the states of its associated contacts (8-6-7 & 9-14-10). The counter then looks for terminal 15 (pulse input terminal) to receive input pulses. When the number of pulses received equals the number of counts set on the front face, the delayed relay energize and changes the states of its associated contacts (3-4-5 & 13-11-12).

The counter is reset by removing power from terminal 1 for at least 60 msec. At reset, both relays revert back to their shelf (without power) state. To the right you will find some typical applications.

SETTING SWITCHES: The three digits are set with the rotary switch knobs beneath each digit. These knobs can be rotated in either direction (CW or CCW), and they are "pull" removable if digit set security is desired. When the 366B is in the "Count Down" mode, changing one or more digits, during counting, will instantly be reflected by an equivalent change in the counter's display. In the "Count Up" mode, changing digits immediately changes the count-out set point. Setting all three digits to zero will cause instant count-out in any display mode.

THE DISPLAY: A high intensity blue fluorescent display consists of three digits and a Counting Bar with a special Count-Out symbol. The Counting Bar appears to the right of the digits and blinks once every count, regardless of range. When the delay relay is energized at count-out, a triangular Count-Out symbol appears to the left of the digits.

REMOVE THE 366B FROM ITS HOUSING TO MAKE CHANGES SHOWN BELOW.

COUNTING DISPLAY MODES: Down & Stop (30)
Up & Stop (30)
Down & Go (50)
Up & Go (50)

CHANGING THE RANGE: The 366B has three ranges:
x1 = Counts single pulses to 999
x10 = Counts every tenth pulse to 9,990
12 = Counts every 12th pulse

Each range is selected using finger force on the white plastic lever behind the front face of the counter. In two of the three possible lever positions, an indicator will appear in a range window located on the front face below and between the rotary switch knobs. When nothing appears in these windows, the counter is understood to be in the x 1 range.

MODEL NUMBER >>>>>>	366B			P	X
Range					
1-999, 10-9990 or 100-99900 (switch selected)	400				
Special	000				
Voltage & Frequency					
120, 50/60 Hz		Q			
240, 50/60 Hz		R			
24 VAC, 50 or 60 Hz		T			
24 VDC		N			
Special		K			
Arrangement					
Selectable Count Up or Count Down with Display			30		
Selectable Count Up & Go or Count Down & Go with Display			50		
Features					
Basic plug-in unit				P	
Standard unit					X

ACCESSORIES – 0353-260-27-00: Surface mounting bracket kit
0305-265-61-70: Retrofit kit

TYPICAL INSTALLATIONS

KEY SYMBOLS

- PS POWER SUPPLY
- PI PULSE INPUT
- INDEPENDENT LOADS
- DEPENDENT LOADS
- MOMENTARY STARTING CONTACT
- SUSTAINED STARTING CONTACT
- NORMALLY CLOSED RESET CONTACT
- o LOAD DE-ENERGIZED
- x LOAD ENERGIZED
- DELAYED CONTACTS — Contacts transfer simultaneously when unit "times out" and all digits are zero.
- INSTANTANEOUS CONTACTS — Contacts are transferred when power supply is energized; transferred back, as shown when de-energized.

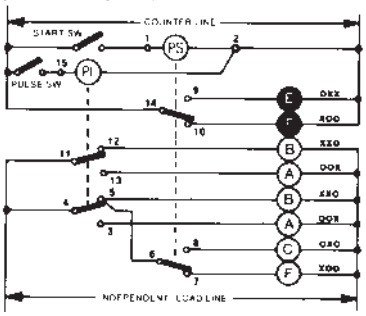
All timers shown in "before start" position. Diagrams shown with power off unless otherwise marked.

Maximum load current through any load carrying contact is 5 amperes.

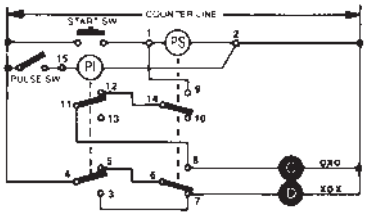
Pilot light leads are brought out to terminal block. Pilot light can be wired to show practically any desired function; unit energized, cycle running, instantaneous or delayed switch closed, etc.

ON DELAY–Reset on power failure.

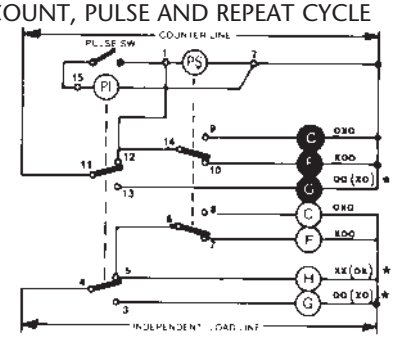
SUSTAINED START



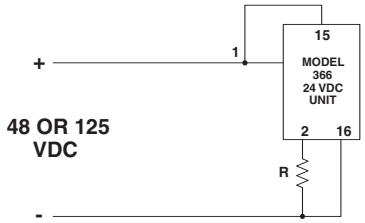
MOMENTARY START/SUSTAINED START



COUNT, PULSE AND REPEAT CYCLE



NOTE: Minimum sw open time: 100 mSEC
Minimum sw close time: 20 mSEC
Output Pulse length — approx. 50 mSEC



48 OR 125 VDC

VDC	R	ATC PART NUMBER
48	150 ohm 20 w	3652602500
125	650 ohm 20 w	3652602600

SPECIFICATIONS

MODELS	Display model only for operation at 120, 240 or 24 VAC; and 24 VDC. Unit counts on break (i.e. when count input switch opens). Unit operates in on delay mode only.	
RANGE	Switch-selectable ranges of 1 to 999, 10 to 9990, and 100 to 99900.	
REPEAT ACCURACY	100% (+0 count on all ranges)	
RESET TIME	Clocked at 40 mSEC	
COUNT INPUT CHARACTERISTICS	AC	
	Max. count rate	1000/MIN (symmetrical input)
	Min. pulse on time	20 mSEC
	Min. pulse off time	30 mSEC
	DC	
	Max. count rate	2000/MIN (symmetrical input)
	Min. Pulse on time	15 mSEC
	Min. Pulse off time	15 mSEC
	Bounce Immunity (max. bounce open time)	5 mSEC
	Pulse Contact Requirement	10 mA at line voltage
COUNT CONTROL MODES	Single Cycle	interval or delayed
	Repeat Cycle	pulse (occurrence and duration 50 mSEC clocked)
DISPLAY	Cycle Progress	3-digit display, 0.3 inch, high-intensity, blue programmable modes: DOWN & STOP, DOWN & GO, UP & STOP or UP & GO.
	Count-Out	▼display; energized at count-out
	Counting Bar	display; blinks on when count switch is closed, when pulse is received
HOUSING	72mm² DIN size; plug-in design; fully gasketed, dust and water-tight in panel mounted installations. NEMA 4 when mounted per installation instructions.	
TERMINALS	16 screw terminals accessible at rear; integral wiring diagram.	

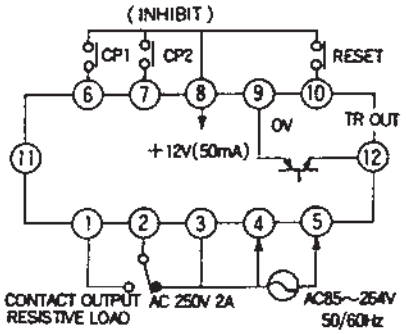
COUNT INPUT (terminal 15)	Voltage Model	
	120 VAC Model	Turn On 60V 3.5 mA (nom.) Turn Off 30V 2.4 mA (nom.) 10 mA max. current at 120V
	240 VAC Model	Turn On 120V 3.5 mA (nom.) Turn Off 60V 2.4 mA (nom.) 10 mA max. current at 240V
	24 VAC Model	Turn On 12V 9.5mA (nom.) Turn Off 4V 3.8 mA (nom.) 30 mA max. current at 24V
	24 VDC Model:	Turn On 15 VDC 2.5 mA (nom.) Turn Off 3 VDC .5 mA (nom.) 5 mA max. current at 24V
LOAD RELAY	Number	one instantaneous and one delayed
	Type	DPDT, Form C
	Operate Time	13 ms, max.
	Release Time	10 ms, max.
	Contact Ratings	7A at 120, 240 or 24 VAC, 1/6 HP. 3A at 24 VDC, 1.5A at 48 VDC, 0.5A at 125 VDC.
	LIFE	100 million operations (no load)
POWER REQUIREMENTS	120V	95 to 132V, 50/60 Hz inrush–0.3A running–0.06A at 120 VAC
	240V	190 to 264V, 50/60 Hz inrush–0.15A running–0.03A at 240 VAC
	24 VAC	19.2 - 26.4 VAC, 50 or 60 Hz Inrush–1 A Running–0.25 A at 24 VAC
	24 VDC	19.2 - 26.4 VDC, 5% ripple Running - .120 A at 24 VDC
TEMPERATURE RATING	32 to 140°F (0 to 60°C)	
MOUNTING ACCESSORIES	Standard	hardware is provided for front-of-panel mounting.
	Optional	Surface-mounting brackets with front-facing terminals
	NEMA 12 molded case (1 counter)	
	NEMA 1 steel case (2 counters)	
WEIGHT	NET: AC - 1 lb., 6oz. DC - 10 oz.	
	SHIPPING: AC - 2 lbs., DC - 1 lb., 4 oz.	

The GX4-P Count Control is a versatile solution to most single level counter applications. The dual 5 digit LED digital displays allow monitoring progress of the process while also showing the 5 digit setpoint. Separate LED lamps on the front panel show whether the unit is functioning as a Counter or Timer and to indicate the Output status. All functions and modes are programmable from the Front Panel Keys. Some of the features include the built-in 5 digit scaling, relay and transistor outputs, 10 count modes, 8 output modes and universal input power of 85 to 264 VAC. The popular 1/16 DIN housing, screw terminal wiring and low cost vs features ratio make the GX4 family very attractive for most applications.

1/16 DIN Dual Display Counter

- Counter or Timer Operation
- Universal Input Power
- 5-Digit Count Display
- 5-Digit Preset Display
- 50mA Sensor Power Available
- 2 Amp Relay and Transistor Outputs
- Built-In 5-Digit Scaler
- 10-Count Input Modes
- 8-Count Output Modes
- Front Panel Mode/Range Selections

WIRING



ORDERING INFORMATION

MODEL NUMBER	GX4–P51E

SPECIFICATIONS

COUNT INPUT SCALING	0.0001 to 99999
COUNT SPEED	Programmable; 30cps, 1000cps, 2000cps or 5000cps
COUNT MODES	Count Up With Inhibit
	Count Down With Inhibit
	Quadrature Up/Down
	Count With Direction
	Separate Up/Down Inputs
NUMBER OF DIGITS	Five
NUMBER OF CONTROL PRESETS	One
COUNTER DECIMAL POINT	Any Position When Scaling
COUNT OUTPUT MODES	Latch Until Reset - Hold Count (N)
	Latch Until Reset - Keep Counting (F)
	Auto Recycle at Start of One Shot Output (C)
	Auto Recycle at End of One Shot Output - Hold Count (R)
	One Shot Output - Keep Counting Until Reset (K)
	Latch Until Next Count Input (P)
	Auto Recycle at End of One Shot Output - Keep Counting (Q)
	One Shot Output-Hold Count Until Reset (A)
ONE SHOT COUNT OUTPUT TIMES	Programmable - 10 mSEC, 50 mSEC, 100 mSEC, 200 mSEC, 500 mSEC, 1 SEC, 2 SEC, 5 SEC
TERMINATION	Built-In Screw Terminals

COUNT/RESET INPUTS	External Contact PNP Sourcing Transistor	
RESET OPTIONS	Front Panel Button	
	External contact	
RESET TIME	0.02 Sec. Min.	
POWER SUPPLY FOR SENSORS	12VDC, 50mA Max.	
OUTPUTS-BOTH RELAY & TRANSISTOR SUPPLIED	Relay	SPDT, 2A @ 240VAC Resistive
	Mechanical Life	10 Million Min.
	Electrical Life	100,000 Min.@ 2A/250VAC
	Transistor	NPN 30VDC @ 100mA Max.
POWER CONSUMPTION	5VA	
OPERATING POWER	85-264VAC, 50/60 Hz.	
SETTING METHOD	Front Panel Keypad for All Functions	
FRONT PANEL DISPLAYS/ INDICATORS	Time/Count Value Display	5 Digit Green LED
	Set Value	5 Digit Red LED
	Time or Count Mode	Red LEDS
	Control Output	Red LED
MEMORY	Lithium Battery	
TEMPERATURE RATING	32° to 120°F (0° to 50°C)	
MOUNTING ACCESSORIES	Front Panel (Mounting Clips Supplied)	
HUMIDITY	35% to 85% RH	
WEIGHT	.46 lb.	

Digital Counter

The 376B is available as a **Single Preset** or a **Dual Preset Counter.** The Dual Preset Counter can be set as a Batch Counter. Both the Single Preset and the Dual Preset versions have an internal Totalizing Counter which will accumulate counts over numerous cycles. The 376B can be set up for Interval

HIGH SPEED COUNTING: The Single Preset 376B counts at a maximum frequency of 10 kHz. In addition to its high speed capabilities, a debounce circuit can be enabled to limit the count frequency to 100 Hz.

COUNTING MODES: The 376B is available as a Single Preset or a Dual Preset Counter. The Dual Preset Counter can be set as a Batch Counter. Both the Single Preset and the Dual Preset versions have an internal Totalizing Counter which will accumulate counts over numerous cycles. The 376A can be set up for Interval Counting Mode using a separate Start Signal, and can also be set up for Count with Inhibit Mode.

INPUTS/OUTPUTS: Two count inputs are available with the 376B. These inputs can be set to count Uni-and Bi-directionally. They can also be set to accept Quadrature inputs and can multiply the quadrature signals X1, X2 and X4. Input 2 also operates as the Start input in Interval Mode and as the inhibit input in Count with Inhibit Mode.

These two inputs can be set to accept Current Sinking or Sourcing signals, and there is a High/Low Threshold (Bias) setting allowing the input of TTL level signals.

Two types of outputs are available. The Relay outputs are rated for 10 A at 250 VAC and 30 VDC. The NPN Transistor outputs are current sinking and are rated for 100 mA at 30 VDC. These outputs are field replaceable. Each output can be set to either Latch ON, Remain ON for a Time Delay, or turn OFF at a Preset.

SCALE FACTOR: A Prescale value can be set which allows the operator to view and set counts using real units of measure. The Prescale value is a multiplier which is applied to the count inputs to determine the display and preset values. The Prescale value can be set from 0.00001 to 9.99999. The 376B also allows setting of the decimal point position in any of 6 positions.

RESETTING THE COUNTER: The Counter can be reset using the Reset key on the panel or by using the external Reset Inputs. There are three current sinking external inputs. Each one is dedicated to resetting the Process, Batch and Totalizing Counters. In addition, the 376B can be set to either retain its count or reset upon power failure.

OPERATOR PANEL AND HOUSING: The 376B operator panel is dust and water tight and measures a compact 72 mm^2. The panel features a high intensity blue vacuum fluorescent display. The display uses 8 digits for its English language operator prompts and 6 digits to display the count value. For operator use, there are 4 snap action keys which allow the operator to easily view Process Count, Batch Count, Totalizer Count, Presets, Scale Factor, Output Settings and Decimal Point position. The 376B can be set to lock out various displays from the operator. One key is dedicated to Resetting the Counter. This key can also be locked out.

SET-UP: Set-up of the 376B is accomplished using 16 DIP switches which are located inside the unit. These DIP switches give a visual indication of how the Counter is set-up, and eliminate the use of complex programming codes. Field replacement of the unit is quick. To replace a unit, remove the old unit from its housing, set the DIP switches in the new unit to the same positions, and plug the new unit in. It's that simple.

AUXILIARY POWER SUPPLY: To power sensor and encoder inputs, a regulated 12 VDC auxiliary power supply is provided. This supply can provide 120 mA of current, and is short circuit protected.

- 6 Digit Count Display
- Single Preset, Dual Preset, Batch Counting Modes
- Interval Counting Mode with Separate Start
- Count with Inhibit Mode
- Internal Totalizing Counter
- Prescaler 0.00001 to 9.99999
- 6 Decimal Point Positions
- High Intensity Blue V-F Display
- Easy English Language Operator Prompts
- 72mm^2 Panel - Dust, Water Tight
- 4 Snap-Action Keys
- Plug-in Housing (Quick Replacement)
- Sinking, Sourcing, TTL Inputs
- Single, Bidirectional, and Quadrature (X1, X2, X4) Counting
- Relay or Transistor Outputs
- Outputs Latched, Timed, or Off at Presets
- Regulated 12 VDC Aux. Power Supply

OPERATION

The Series 376B Preset Counter is a predetermining counter that will count high speed unidirectional, bi-directional, or quadrature input signals, and will activate an output when the predetermined preset value is reached. The unit is available in both Single and Dual Preset models, and includes an internal totalizer. Also, the 376B counter will operate as a Batch Counter using the second preset as a Batch Preset. The Series 376B comes with a variety of counting modes. The operation of each counting mode is described below.

COUNT UP FROM ZERO TO A GIVEN PRESET: The Output in the Counter is activated when the Count equals the Preset. In the Dual Preset Model, the Counter counts up from zero and Output 1 is activated when Preset 1 is reached and Output 2 is activated when Preset 2 is reached.

COUNT DOWN FROM A PRESET TO ZERO: When Reset is pressed, the Counter is set to the Preset Value. When the Count Value equals zero, the Output is activated. In the Dual Preset Model, the Counter counts down from the High Preset value and activates one Output when it reaches the Low Preset Value; the other Output is activated when the Counter counts down from the Low Preset Value and reaches zero.

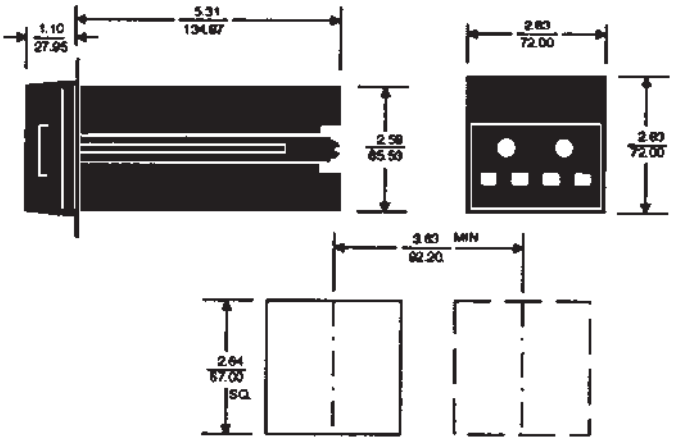
INTERVAL MODE: In this mode, the Counter will not begin counting until Input 2 is turned ON, indicating a Start Signal. Once the Start Signal is received, the Output will turn ON and the Counter will count. The Out- put will then turn OFF at the preset or zero. The Start Signal must be activated each time the process is reset, even when the Counter is set to Auto Reset

BATCH MODE - DUAL PRESET MODELS ONLY: In the Batch Mode, Input 1 is the Count input and will turn ON at Preset 1. Each time Output 1 turns ON, the Batch Counter will record a count. When the Batch Counter value equals the value in Preset 2, Output 2 will turn ON. The Batch Mode must be Manually Reset (unless T2 is set to 00.00 (.5 w/AR) for Auto Reset).

TIMED OUTPUTS: The Outputs can be delayed before turning OFF by setting time delay values for each output. Once the Preset is reached, a time delay, according to the time value set, will occur before the outputs turn OFF. This value can range from 0.00 SEC (OFF at Preset) to 99.99 SEC (Latched ON). In addition, the outputs can also be set to turn OFF upon reaching the preset for the other output in the Dual Preset Model.

SCALE FACTOR: A Prescale value can be set to allow viewing and setting counts using real units of measure. The Prescale value is a multiplier which is applied to the count in-put(s) to determine the count display and preset values. The Prescale value can be set from 0.00001 to 9.99999. In addition, the decimal point can be set on the display to any one of 6 positions.

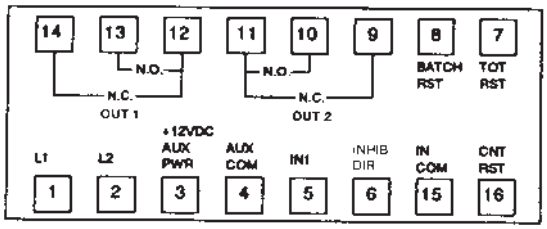
DIMENSIONS (INCHES/MILLIMETERS)



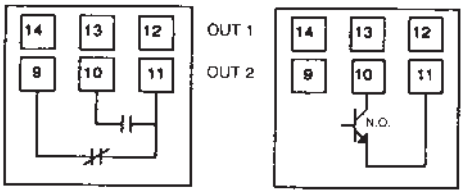
PANEL CUTOUT
SHOWING DISTANCE BETWEEN
ADJACENT CUTOUTS.

WIRING

376 TERMINAL WIRING



OUTPUT WIRING

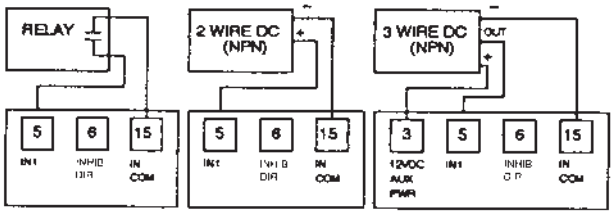


RELAY *

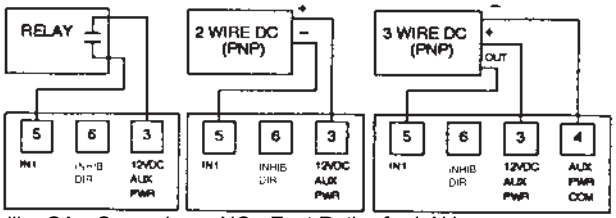
NPN TRANSISTOR
(Open Collector)

* (Contacts to be wired with same polarity)

COUNT INPUT WIRING – *SINK* INPUT SIGNAL



COUNT INPUT WIRING – *SOURCE* INPUT SIGNAL



SPECIFICATIONS

MODELS	Single and Dual Preset with either NPN (Solid State) or Relay Outputs.	
COUNT INPUT MODES (SWITCH SELECTABLE)	Bi-Directional	
	Quadrature X1	
	Quadrature X2	
	Quadrature X4	
	Count with Inhibit	
	Interval with Start Input	
SETTINGS (FRONT OF PANELS	Presets	1 to 999,999
	Scale Factor	0.00001 to 9.99999
	Timed Outputs	00.01 to 99.98 SEC Latched Off at Preset
	Decimal Position	0 to 6
OPERATING FEATURES (SWITCH SELECTABLE)	Count Up or Count Down	
	Count/Go or Count/Stop	
	Sink or Source Count Input	
	High or Low Threshold (Bias)	
	Auto Reset at	High preset (Count Up)
		Zero (Count Down)
		After Timed Output
	Totalizer	
	Dual Preset/Batch mode	
	Security lockout	Access to Presets
		Access to T1, T2, SF, DP
		Front panel Reset
	Reset on Power Up	
COUNT INPUTS	Sink - 9.4K ohm pull up	
	Max. current = 1.25 mA	
	Source - 4.7K ohm pull down	
	Max. voltage = 30 VDC, @ 7 mA	
	High Bias	ViL = 5.5 V Max.
		ViH = 7.5 V Min.
	Low Bias	ViL = 1.5 V Max.
		ViH = 3.75 V Min.
	Debounce - reduces count Input 1 to 100 Hz (Input 2 no debounce.)	
	Interval start requires 15 mSEC minimum pulse. (Can be momentary or sustained.)	

MAXIMUM COUNTING FREQUENCY	10 kHz	Count Up Mode
	9 kHz	Count Down Mode
	Reduce by 3 kHz when Totalizing Counter is enabled	
	Reduce by 2 kHz when Auto Reset is enabled	
	Min. pulse 10 µSEC on; 90 µSEC off.	
REMOTE RESETS	Count, Batch, Totalizer	
	Min. 15 mSEC pulse	
	Pulled to 5V via 8K ohm res.	
	Active Low. ViL = 0.5V Max.	
	Max. current = .625 mA.	
OUTPUT - SOLID STATE	Current Sinking	
	I sink = 100 mA Max.	
	VoL = 1.0 VDC Max.	
	Max. Voltage = 30 VDC	
OUTPUT - RELAY	Life	100 million operations (no load)
	Contact Rating	10 amp @ 30 VDC or 250 VAC, 1/4 HP
DC SUPPLY	12 VDC Regulated, ±4% Max. current = 120 mA	
MEMORY	Non Volatile EEPROM	
	230,000 Power Losses MIN	
	10 Year Retention	
DISPLAY	8 Digit, 14 Segment	
	5 mm x 4.1 mm	
	Blue Vacuum Fluorescent	
OPERATING TEMPERATURE	0° F to 140° F	
HUMIDITY	0% to 80% RH Non-condensing	
POWER REQUIRE-MENTS	120 VAC	95 - 132 VAC
	240 VAC	190 - 264 VAC 50 / 60 Hz
	Max. Power = 8 VA	
TERMINALS	16 screw terminals located accessible from rear	
HOUSING	Plug in, 72mm² DIN Fully Gasketed, Dust and Watertight.	
WEIGHT	0.47 lbs.	

MODEL NUMBER >>>>>>	376B			50		
Presets						
Single Preset		100				
Dual Preset (with batch)		200				
Voltage & Frequency						
120, 50/60 Hz			Q			
240, 50/60 Hz			R			
Function						
Counter with Sealing				50		
Output Type						
NPN Transistor					L	
Relay					R	
Features						
Standard unit						X
Special						K

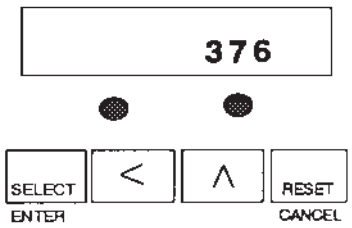
ACCESSORIES
0353-260-27-00: Surface mounting bracket kit
0305-265-61-70: Round Cutout Retrofit kit
0376-320-01-00: Square Cutout Retrofit kit
0376-260-13-00: Magnetic Pickup Input Board
0376-260-14-00: Millisecond timer conversion Board
For prices and further information, consult factory.

SETTING THE COUNTER

To set the Counter, there are four push-button keys located on the front of the unit. These buttons are provided to allow the user to select, change and save various values. These key operations are dependent on the DIP Switch settings of the unit (see below).

In addition to the normal counting modes of the unit, the 376A has the capability of operating as a Batch Counter and a Totalizer Counter. When these modes are activated, the functions of the Counter change accordingly. Pressing the RESET key, with the Count, Batch, or Totalizer value displayed, will reset that value.

This figure shows the front of panel with the Process Count value displayed. Pressing SELECT will scroll through a menu of options.



After one of these options is displayed for a second, the value for this option is automatically displayed. Once the option value is displayed, pressing the < key will move one digit to the left and the ∧ key will increment the value by one. Then the SELECT key must be pressed to save the new value. Pressing RESET will return to the Process Count display. If SELECT is not pressed after a change, RESET will return to the count display and the change will not be entered.

Selections in addition to Process Count are:

Totalizer - counts accumulated since last Totalizer Reset. When the total counts exceed 99,999,999 the Totalizer will blink Pressing RESET will scroll through the actual value, pressing RESET a final time will reset the value to zero. **00000376**

Batch - number of cycles elapsed in Batch Mode. **B 1**

Preset 1/Preset 2 - value compared with the actual count. When the Preset Value is displayed, the Preset LED on the panel will light, indicating which preset is displayed. **000500**

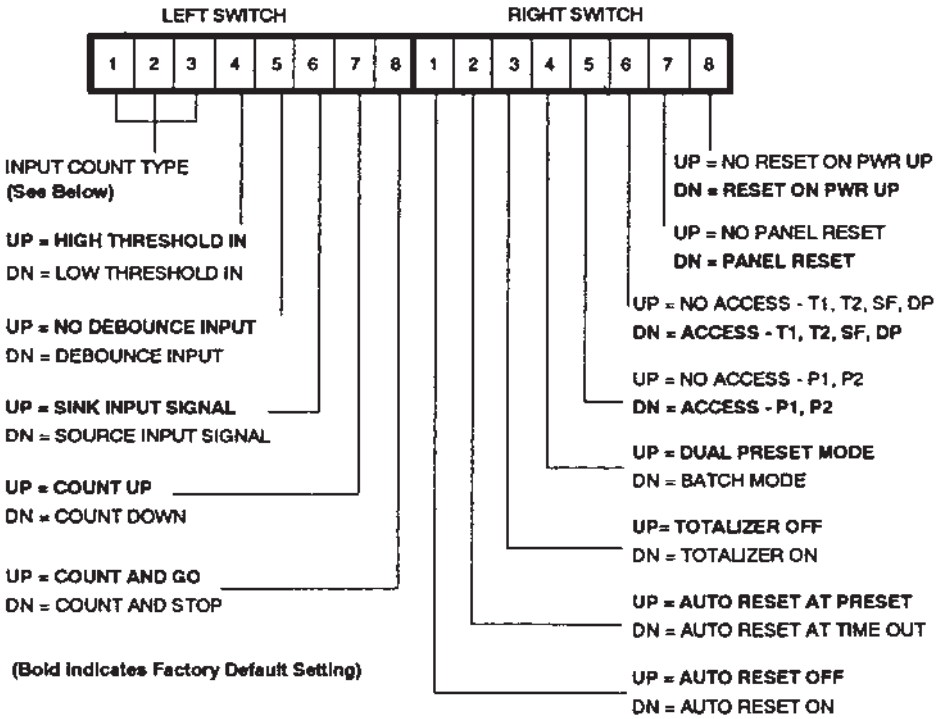
Prescale - this factor will scale the input counts. The count signal is multiplied by the prescale value to determine the count display. The prescale value can range from 0.00001 to 9.99999. **1.00000**
NOTE: If the prescale value is greater than 1, the out put will energize when the count value passes the preset value.

Output 1/Output 2 - time delay setting for outputs.

Decimal - the number of decimal positions for the display. **LATCHED**

When the Counter reaches its Presets, the Outputs will activate and the LEDs on the panel will flash, indicating which output is activated. **DP 0**

DIP SWITCH SETUP-To set up the Counter for operation, a series of DIP switches located inside the unit must be set.

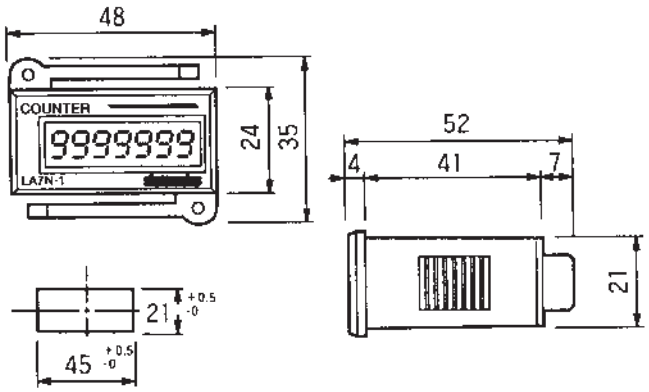


INPUT COUNT TYPE	LEFT SWITCH 1	2	3
BI-DIRECTIONAL COUNTER	UP	UP	UP
QUADRATURE COUNTER	DN	UP	UP
QUADRATURE COUNT X2	UP	DN	UP
QUADRATURE COUNT X4	DN	DN	UP
COUNT WITH INHIBIT	UP	UP	DN
INTERVAL MODE (COUNTER WITH START SWITCH INPUT)	DN	UP	DN

The LA7N product family consists of three (3) models; the LA7N-2 and LA7N-2R which require a switch closure for count input and LA7N-FR which employs a voltage input for count input. Models LA7N-FR and LA7N-2R are equipped with a button for reset on their front panel. Model LA7N-2 can only be reset by a remote switch. All models are compact and are *battery powered* for a broad range of applications. The liquid crystal display is seven figure with zero blanking. Count input speed is 30 CPS and is accomplished through a simple switch closure which is wired to the terminals on the rear of the counter for models LA7N-2R and LA7N-2. Snap switch, push-button or toggle switch, or a reed switch device are common input switches used with these models. Model LA7N-FR requires a voltage count input of 24 to 240 VAC or 6 to 240 VDC. Since the counter is battery powered, it will display count continuously and requires no memory saving attachments or circuitry. Panel mounting hardware is supplied with the counter.

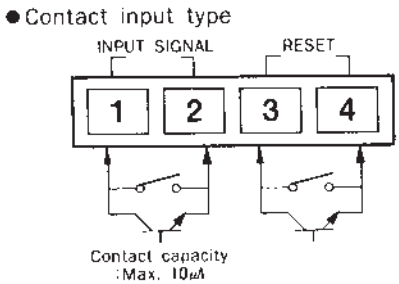
Self-Powered LCD Counters

DIMENSIONS (MILLIMETERS)

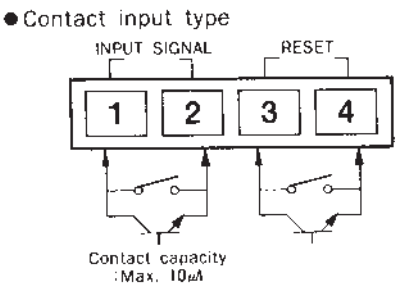


WIRING

LA7N-2 and LA7N-2R



LA7N-FR



SPECIFICATIONS

RESET	Front Panel Button (2R and FR Models)	
	External Contact — All Models	
DISPLAY	LCD, H 7mm, W 3mm, Zero Blanking	
NUMBER OF DIGITS	Seven	
COUNT INPUT	Switch Closure	—2R, —2 Models
	Voltage	24-240VAC, 6-240VDC; —FR Model
COUNT SPEED	30CPS	—2 and —2R Models
	20CPS	—FR Model
OPERATING TEMPERATURE	14° to 131°F (-10° to 55°C)	
OPERATING POWER	Internal Lithium Battery–Est. 7 Yr. Life	
TERMINALS	Rear Mounted Screws	
MOUNTING	Front Panel	
WEIGHT	0.19 lb.	

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
LA7N-2	Switch Input, Remote Reset Only
LA7N-2R	Switch Input, Front Panel & Remote Reset
LA7N-FR	Voltage Input, Front Panel Reset

The MC Counter is a rugged high-speed instrument designed for reliability and long life in industrial environments. It easily withstands 2000V spikes for up to 0.1 ms without damage to its diodes, and its Count Coil is rated for continuous duty. Life expectancy is conservatively rated at 100,000,000 operations.

HIGH SPEED: The MC Counter counts DC inputs at rates up to 25 cps, and AC inputs at 15 cps. Count reliability is typically better than 1 in a million counts.

RUGGED: The MC Counter design and its components were selected for their ability to perform reliably in difficult industrial environments. This is reflected in the counter's unusually good specification and also accounts for its life expectancy of 100,000,000 operations.

The AC model has **push-button reset** and the DC model also has optional electric reset. Both models can be panel-mounted in a 1-15/16 by 1-11/32 inch cutout, or surface-mounted with two screws, using the economical optional mounting socket.

Counter

ORDERING INFORMATION

MC6MS15CPS120VAC	AC type with push button reset and panel socket box.
MC6MS25CPS24VDC	DC type with push button reset and panel socket box.
MCSF0000000	Optional surface mounting socket with solder lugs and mounting hardware

CHARACTERISTICS	AC MODEL	DC MODEL
Max. count speed (on: off = 1:1)	15 cps	25 cps
Min. pulse/break duration	33 mSEC	20 mSEC
Max. residual ripple	—	10%
Continuous energized time	no limit	no limit
Power consumption (approx.)	2 VA	2.6W
Operating voltage	120V, + 10- 15%	24V, :1= 10%
Reset	push button	push button & opt. electrical
Count coil		
Power consumption	2 VA	—
Voltage (nominal)	120VAC	24VDC
Current (nominal)	—	108 mA
Resistance (at 20°C)	—	223 ohms
Reset Coil (DC only)		
Voltage	—	24V:1=10%
Current (nominal)	—	516 mA
Resistance (at 20°C)	—	96.5 ohms
Min. pulse/break duration	—	100 ms
Max. residual ripple	—	10%
Max. continuous energized time	—	1 MIN

SPECIFICATIONS

MODELS	Two models: one for AC and one for DC operation; both count one for each input pulse (1/2 count on make, 1/2 count on break of pulse switch.)	
READOUT	6 digits, each 1/8 by 3/32 inch; lens magnifier.	
VOLTAGE PROTECTION	Withstands 2000V Transients for 0.1 mSEC max.	
LIFE EXPECTANCY	Conservatively rated for 100,000,000 operations; except reset coil; 500,000 operations.	
INSULATION RESISTANCE	More than 100M ohms at 500VDC.	
BREAKDOWN VOLTAGE	1500V rms for one MIN	
TEMPERATURE RATING	-14 to 104°F (6.8° to +40°C)	
TEMPERATURE RISE (coil surface)	Less than 65°C at 110% of nom. voltage.	
SHOCK RESISTANCE	5 G max during operation; 75 G max at rest.	
VIBRATION RESISTANCE	45 cps at 1.5 mm amplitude max during operation.	
PILOT LIGHT	Non-indicating unit only. One pilot light. Both leads brought out to terminal block.	
POWER REQUIRE-MENTS	120V	95-132V at 50 or 60 Hz inrush -0.4A running —0.08A
	240V	190-264V at 50 or 60z inrush - 0.2A running—0.04A
WEIGHT	NET: 6 oz.	SHIPPING: 8 oz.

DIMENSIONS (INCHES/MILLIMETERS)