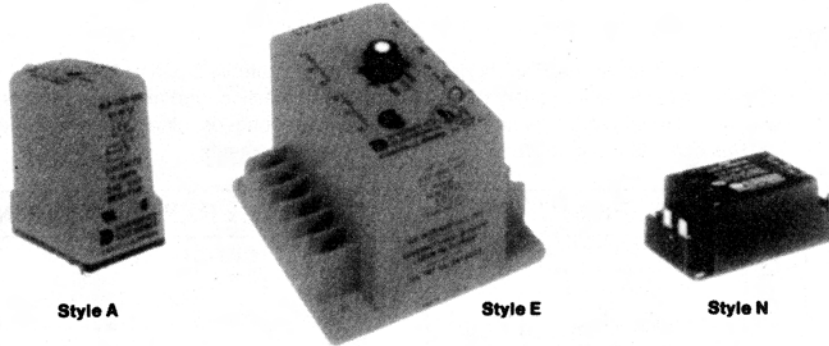




PHASE SEQUENCE & LOSS MONITOR/RELAYS SLA - SERIES

Any system using 3 phase motors needs Phase Monitor protection. These monitors operate independently of motor size or power requirement of the system. When the phase sequence is correct and full line voltage is present on all three phases, the internal relay picks up. When incorrect phase sequence or phase loss occurs or the line voltages fall below the trip point, the relay drops out. Both DELTA and WYE systems may be monitored. In WYE systems, connections to neutral are not required. The LED's glow when all conditions are normal. **NOTE: WHEN A PHASE IS LOST WHILE THE MOTOR IS RUNNING, A CONDITION KNOWN AS REGENERATION OCCURS WHERE A VOLTAGE IS INDUCED INTO THE OPEN PHASE NEARLY EQUAL IN MAGNITUDE TO THE NORMAL PHASE-TO-PHASE VOLTAGE. HOWEVER, WITH THE EXCEPTION OF LIGHTLY LOADED MOTORS, ENOUGH CHANGE IS DETECTED BY THE SLA TO PROVIDE THE REQUIRED PROTECTION WHEN PROPERLY ADJUSTED. PATENT #3,611,050**

VOLTAGE: All Voltages Referenced Are
Phase-to-Phase, 50/60 Hz

DROP OUT:
1 Ø Low: 83% of Setting
3 Ø Low: 90% of Setting

ENCLOSURES

A: Plug In; 1.75" x 2.375" x 3.0"H
E: Surface Mounted; 4.0" x 4.0" x 3.0"H
N: Surface Mounted; 3.7" x 2.18" x 1.5"H

MODEL NUMBER	OPERATING VOLTAGE	DROP OUT		PIN CONFIGURATION	AGENCY APPROVAL	LED	RESET	ENCLOSURE STYLE
		1 Ø LOW	3 Ø LOW					
SLA-120-ASA	95-130 Adj	79-108	85-117	Figure 1	• & CSA	Yes	Auto	A
SLA-230-ASA	190-270 Adj	158-224	171-243	Figure 1	• & CSA	Yes	Auto	A
SLA-440-ASA	430-480 Adj	378-461	410-500	Figure 1	---	Yes	Auto	A
SUA-120-ALA	95-130 Adj	79-108	85-117	Figure 1	• & CSA	Yes	Auto	A
SUA-230-ALA	190-270 Adj	158-224	171-243	Figure 1	• & CSA	Yes	Auto	A
SUA-440-ASA	430-480 Adj	378-461	410-500	Figure 1	• & CSA	Yes	Auto	A
*SUA-120-ALAU	95-130 Adj	79-108	85-117	Figure 1	▲ & CSA	Yes	Auto	A
*SUA-230-ALAU	190-270 Adj	158-224	171-243	Figure 1	▲ & CSA	Yes	Auto	A
SLA-120-ALA	95-130 Adj	79-108	85-117	Figure 2	---	No	Auto	A
SLA-230-ALA	190-270 Adj	158-224	171-243	Figure 2	---	No	Auto	A
SLA-120-ALE	95-130 Adj	79-108	85-117	Figure 3	▲ & CSA	Yes	Auto	E
SLA-230-ALE	190-270 Adj	158-224	171-243	Figure 3	▲ & CSA	Yes	Auto	E
SLA-380-ALE	350-440 Adj	290-365	315-396	Figure 3	▲ & CSA	Yes	Auto	E
SLA-440-ALE	430-480 Adj	357-398	387-432	Figure 3	▲ & CSA	Yes	Auto	E
SLA-575-ALE	525-625 Adj	436-519	473-563	Figure 3	▲ & CSA	Yes	Auto	E
SLA-120-ALER	95-130 Adj	79-108	85-117	Figure 3	▲ & CSA	Yes	Manual	E
SLA-230-ALER	190-270 Adj	158-224	171-243	Figure 3	▲ & CSA	Yes	Manual	E
SLA-380-ALER	350-440 Adj	290-365	315-396	Figure 4	▲ & CSA	Yes	Manual	E
SLA-440-ALER	430-480 Adj	357-398	387-432	Figure 4	▲ & CSA	Yes	Manual	E
SLA-120-AFN	120	100	108	Figure 5	•	No	Auto	N
SLA-208-AFN	208	173	187	Figure 5	•	No	Auto	N
SLA-220-AFN	220	183	198	Figure 5	•	No	Auto	N
SLA-230-AFN	230	191	207	Figure 5	•	No	Auto	N
SLA-240-AFN	240	199	216	Figure 5	•	No	Auto	N

*UL LISTED ONLY WHEN USED WITH RB-08 SOCKET

NOTE: ALL MODELS AVAILABLE WITH FIXED OPERATING VOLTAGES.

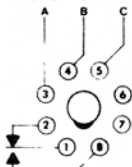


FIGURE 1

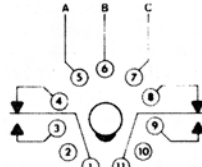


FIGURE 2

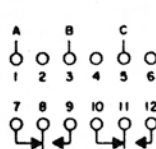


FIGURE 3

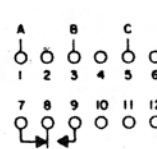


FIGURE 4

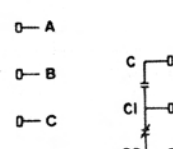


FIGURE 5

FILE NUMBERS
UL: E55826
CSA: LR40123



VOLTAGE MONITOR/RELAYS

VBA SERIES Single Phase & DC Voltage Band Monitor/Relays

MODEL NUMBER	NOMINAL VOLTAGE	LOW LIMIT PICK UP	HIGH LIMIT PICK UP	HYSTERESIS VOLTAGE	ENCLOSURE STYLE
AC ADJUSTABLE					
VBA-24-ALA	24 VAC	19- 24	24- 29	2	A
VBA-120-ALA	120 VAC	90-120	120-150	5	A
VBA-208-ALA	208 VAC	185-208	208-240	8	A
VBA-240-ALA	240 VAC	200-240	240-270	10	A
DC ADJUSTABLE					
VBA-12-DLA	12 VDC	10- 12	12- 15	1	A
VBA-24-DLA	24 VDC	19- 24	24- 29	1	A
VBA-28-DLA	28 VDC	22- 28	28- 34	1	A
VBA-48-DLA	48 VDC	38- 48	48- 58	2	A
VBA-110-DLA	110 VDC	85-110	110-135	5	A
AC FIXED					
VBA-120-AFN	120 VAC	105	135	0	N
VBA-220-AFN	220 VAC	195	245	0	N

The VBA series offers protection to single phase equipment that is required to operate between high and low voltage limits. When the monitored voltage is between the limits, the internal relay picks up. When the voltage goes above or below the preset limits, the relay drops out. This drop out trip point is lower than pick up on the low limit and higher than pick up on the high limit. The hysteresis in some models provides a differential between pick up and drop out. The output relays are rated: Style A-DPDT, 10 amps @ 120 VAC, resistive; Style N-SPDT, 2.5 amps @ 120 VAC, resistive. The relay will pick up in 30 milliseconds and drop out in 0.5 seconds after fault. Power dissipation is approximately 3 watts. Enclosure styles A and N only.



Style A



Style N

DUPLXORS (2-PUMP SYSTEM)

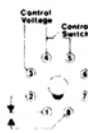
The ARA model features automatic alternations each time the control switch opens. The ARB model features the plus option of locking into one sequence. A three position switch permits the field selection of normal duplexing action, locking in the A-B sequence, or B-A sequence.



ARA



ARB



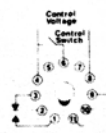
STYLE B
SPDT

ALTERNATIONS
A = Automatic
B = Selectable
CONTROL VOLTAGE
24 = 24 Volts
120 = 120 Volts
240 = 240 Volts
OUTPUT CONFIGURATION
B = SPDT
C = DPDT (Cross-Wired)
D = DPDT
E = DPDT (Cross-wired)

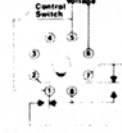
OUTPUT CONFIGURATIONS



STYLE C
Cross-Wired



STYLE D
DPDT



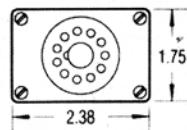
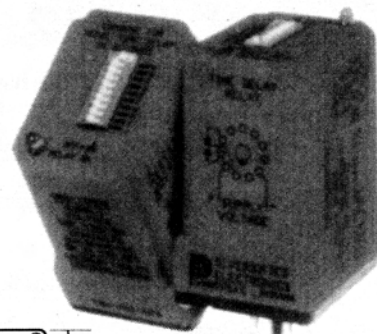
STYLE E
Cross-Wired

Unitimer TBU SERIES

Operation

The TBU Series offers the accuracy of DIP SWITCH delay ranges "A" through "E" as well as the user programmable model, DIP SWITCH delay range "P", with four (4) different ranges obtainable by either leaving two (2) designated terminals unconnected or by connecting them to the appropriate terminals as shown below. The five (5) most common **modes of operation** are easily selected by the use of one or more jumpers applied externally between designated base pins as outlined below. These features coupled with five (5) most popular control voltages, makes this timer the most versatile and cost effective Time Delay Relay available today. The CMOS digital circuitry provides high accuracy, repeatability and fast reset times.

CAUTION: Do not program with power on!



BASE DIMENSIONS
(inches)

