

















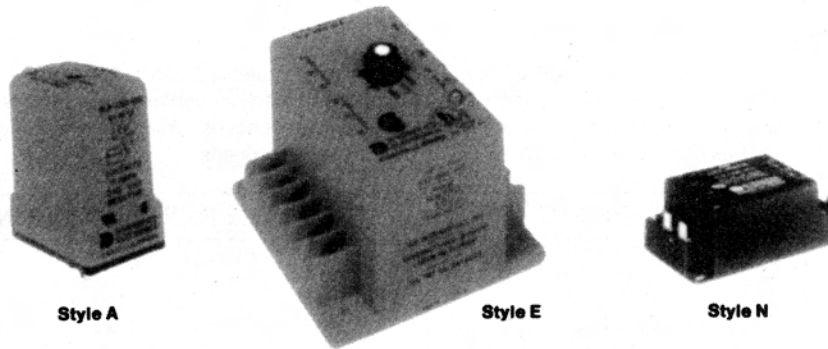
## CONTROL RELAYS

Crouzet offers several variations of Syrelec control relays. Five models for liquid level controls, 3 phase 230V, 380V, 440V and 480V for phase loss or reversal protection, current and voltage detection and control, motion detection, and alternating relays are also available. If a standard control requires modification or a special product is needed to meet your exact needs, please call us or the Crouzet Sales Representative nearest you. Crouzet has controls to meet your CE, UL, and CSA requirements.

# 11

# CONTROLS & SENSORS

	SERIES	FUNCTION	FEATURES		SERIES	FUNCTION	FEATURES
	<b>NNR Series</b> Liquid Level Control	Liquid Level Control	PC Board liquid level control. Pump up/Pump down. 4.7 to 47K ohm sensitivity. SPDT 10A output relay 3.62" x 2.16"		<b>CTD/CTH Series</b> Temperature Controllers	P, PI, PID On/Off Auto Tuning Heat/Cool	Single and dual display models. Thermocouple and RTD inputs. Auto-tuning for PID mod. Soft start function.
	<b>NR Series</b> LLC Pump Down <b>NRU Series</b> LLC Pump Up	Liquid Level Control Pump Down Liquid Level Control Pump Up	Plug-in or Din-Rail mount. 4.7 to 100K ohm sensitivity. 1.89"H x 1.89"W x 3.9"L		<b>WRL Series</b> Phase Monitor	Phase Control Relay Monitors: - Phase Sequence - Loss of Phase - Under Voltage	Plug-in or Din-Rail mount. 3 x 230 VAC, 3 x 380 VAC, 3 x 480 VAC, 1.89"H x 1.89"W x 3.9"L
	<b>EN Series</b> <b>END Series</b> Liquid Level Control	Liquid Level Control	Din-Rail/surface mount. Pump up/Pump down. 5K to 100K ohm sensitivity. 80mmH x 22.5mmW x 100mmL		<b>FW Series</b> Phase Monitor	Monitors: - Phase Loss - Phase Reversal - Undervoltage	Din-Rail or surface mount. 3 x 230 VAC, 3 x 380 VAC, 3 x 480 VAC, 3 x 600 VAC. 45mm wide enclosure. Adjustable time inhibit. LED power on and relay status. 79mmH x 45mmW x 100mmL
	<b>IR.T Series</b> Current Control Relay	Monitors Current with Relay Output	Plug-in or Din-Rail mount. Adjustable inhibit time for start up. LED Relay output indicator. 3mA to 7Amps-AC, 5mA to 10Amps DC. 1.89"H x 1.89"W x 3.9"L		<b>HDU Series</b> Voltage Control Relay	Monitors Voltage. With Relay Output. With LCD Display.	.2 to 600 Volt AC/DC voltage monitoring range. Over and under voltage functions. With LCD display. Shows actual and setpoints. Din-Rail mount. 81mmH x 36mmW x 81mmL
	<b>EIL EIH EIT Series</b> Current Control Relay	Monitors Current with Relay Output	Din-Rail/surface mount. Adjustable time inhibits. 2mA to 10Amps AC/DC. for EIL/EIH .01 to 100Amps for EIT w/transformer. 80mmH x 22.5mmW x 100mmL		<b>HDI Series</b> Current Control Relay	Monitors Current. With Relay Output. With LCD Display.	2mA to 10Amps AC/DC current monitoring range. Over and under current functions. With LCD display. Shows actual and setpoints. Din-Rail mount. 81mmH x 36mmW x 66mmL
	<b>UR Series</b> Voltage Control Relay	Monitors Voltage with Relay Output	Plug-in or Din-Rail mount .1 to 400 Volts AC/DC. With latching function selectable. LED output indication. 1.89"H x 1.89"W x 3.9"L		<b>MCI Series</b> Current Control Relay	Monitors Current. With Relay Output. With Built-in Transformer	1 to 20Amps AC/DC current monitoring range. Built-in transformer. Relay output-SPDT Over and under current functions. 81mmH x 17.5mmW x 83mmL
	<b>EUL, EUH Series</b> Voltage Control Relay	Monitors Voltage with Relay Output	Din-Rail/surface mount. Adjustable time inhibit. .2 to 600 Volts AC/DC. Selectable latching feature. 80mmH x 22.5mmW x 100mmL		<b>F3I Series</b> Motor Protection Relay	Motor Protection for Phase Loss Phase Unbalance Current Surge	8 to 630Amps current range. LED diagnostics. Adjustable trip timers. Phase loss test switch. Front panel reset. 79mmH x 45mmW x 95mmL
	<b>JR Series</b> Alternating Relay	Duplex Alternating Relay	Plug-in style. Designed for dual pump system. Selector switch versions available. 1.89"H x 1.89"W x 3.9"L		<b>FWIT Series</b> Motor Protection Relay	Motor Protection for Phase Loss Phase Unbalance Phase Reversal Current Surge Overheating	7 to 630Amps current range. LED diagnostics. Adjustable trip timers Phase loss test switch. Front panel reset. 80mmH x 78mmW x 99mmL



## 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	• & CSA	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	• & CSA	No	Auto	A
SLA-230-ALA	190-270 Adj	158-224	171-243	Figure 2	• & CSA	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.

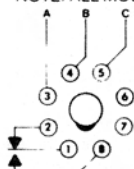


FIGURE 1

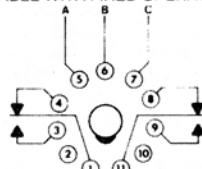


FIGURE 2

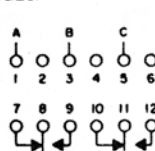


FIGURE 3

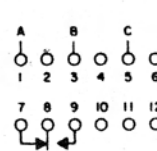


FIGURE 4

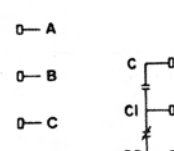


FIGURE 5

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

### DUPLEXORS (2-PUMP SYSTEM)

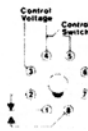
The ARA model features automatic alternations each time the control switch opens. The ARB model features the plus option of locking into one sequence. A three position switch permits the field selection of normal duplexing action, locking in the A-B sequence, or B-A sequence.



ARA



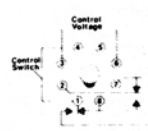
ARB



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)

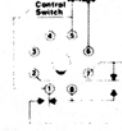
### OUTPUT CONFIGURATIONS



STYLE C  
Cross-Wired



STYLE D  
DPDT



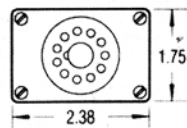
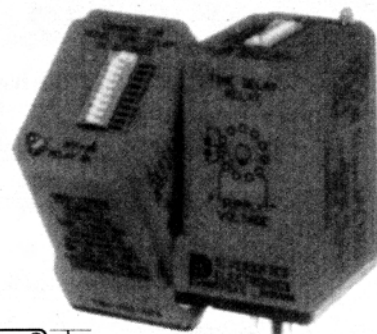
STYLE E  
Cross-Wired

## Unitimer TBU SERIES

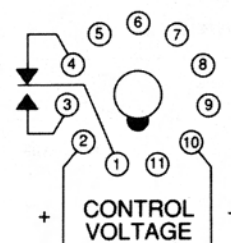
### Operation

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)



## PHASE MONITOR RELAYS

Provides microprocessor-based protection for 3 phase systems against phase loss, phase reversal, phase unbalance, and undervoltage. These devices are designed to be compatible with most Wye or Delta systems. In Wye systems, a connection to a neutral is not required. Phase Monitoring Relays protect against unbalanced voltages or single phasing regardless of any regenerative voltages. The relay is energized when the phase sequence and all voltages are correct. Any one of four fault conditions will de-energize the relay. Re-energization is automatic upon correction of the fault condition. An LED indicates normal and tripped conditions. The percent phase unbalance is adjustable from 2-10%, and the undervoltage drop-out can be set at 75-95% of operating voltage. The adjustable time delay dropout on undervoltage (0.1-20 seconds) eliminates nuisance tripping caused by momentary voltage fluctuations. **Output:** 10A SPDT (PMP) or DPDT (PMD) @ 240VAC/30VDC.

**Dimensions:** PMP-1.7"x 2.4" x 3.5". PMD-1.8"x 2.75" x 4.4".



PMP Plug-in



PMD Surface-Mount



File E109461



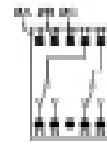
File LR45565



File E109461



File LR45565



Operating Voltage 50/60 Hz	Adjustable Undervoltage Drop-out Range	Product Number Plug-inCase (8 pin octal socket)	Socket	Product Number Surface-Mount Case*
208/240V 480V	180-230V 360-460V	PMP240 PMP480**	70169-D 70175	PMD240 PMD480

\*\*Requires 600V-rated socket

\* No socket required for PMD240 or PMD480

## VOLTAGE MONITOR RELAYS

Provides protection to equipment where an over or under voltage condition is potentially damaging. They monitor either AC single phase (50-400hz) or DC (independent of polarity) voltages. No supply (input) voltage is required. The pick-up voltage setting is user-adjustable from 85-115% of the nominal voltage rating. The drop-out voltage setting is fixed at 3% below the pick-up voltage setting. The relay energizes when the monitored voltage is above the pick-up setting. The relay de-energizes when the monitored voltage is below the drop-out setting. The time delay on drop-out is fixed at 50ms. **Output:** 10A DPDT @ 240VAC/30VDC. **Dimensions:** 1.7" x 2.4" x 2.9".



File E109461

Nominal Voltage	Pick-up Voltage Range	Drop-Out Voltage Range	Product Number	Socket
24V AC	21-27V AC	20-26V AC	VMP024A	8 PIN OCTAL 70169-D
120V AC	102-138V AC	99-134V AC	VMP120A	
240V AC	204-276V AC	198-267V AC	VMP240A	
12V DC	10-14V DC	9-13V DC	VMPO12D	
24V DC	21-27V DC	20-26V DC	VMP024D	



## ALTERNATING RELAYS

Used in special applications where the optimization of load usage is required by equalizing the run time of two loads. They are also used where additional capacity is required in case of excess load requirements. This alternating action is initiated by a control switch, such as a float switch, manual switch, timing relay, pressure switch, or other isolated contact. Each time the initiating switch is opened, the output relay contacts will change state, thus alternating the two loads. Two LED indicators show the status of the output relay. As listed, these units come with a three position selector switch. This allows the unit to alternate the two loads as normal, or lock the relay to one load or the other. By locking the Alternating Relay to one load, the other load can be removed for service without rewiring the first load for continuous operation. The selector switch has a low profile to prevent any accidental changes in status. **Output:** 10A SPDT or DPDT Cross-Wired @ 240VAC/30VDC. **Dimensions:** 1.7" x 2.4" x 2.9".



File E109461

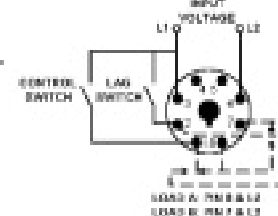


File LR45565

Control Voltage	Product Number		Socket
	SPDT Contacts	DPDT Cross- Wired Contacts	
24V AC	ARP024A6R	ARP024A3R	8 PIN
120V AC	ARP120A6R	ARP120A3R	OCTAL
240V AC	ARP240A6R	ARP241A3R	70169-D



SPDT



DPDT Cross-Wired