



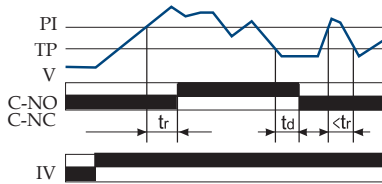
The HLV Series is a single-phase undervoltage monitor designed to protect sensitive equipment from brownout or undervoltage conditions. Time delays are included to prevent nuisance tripping and short cycling. The 30A, 1hp rated, SPDT relay contacts allow direct control of motors, solenoids and valves. The output relay can be ordered with isolated SPDT contact to allow monitoring of one voltage and switching a separate voltage. Two undervoltage trip point ranges allow monitoring of 110 to 120VAC or 208 to 240VAC systems.

For more information see:  
Appendix B, page 165, Figure 2 for dimensional drawing.  
Appendix C, page 169, Figure 15 for connection diagram.

### Operation

Upon application of input voltage the output relay remains de-energized. When the input voltage value is above the pull-in voltage, the restart delay begins. At the end of the restart delay, the output relay energizes. When the input voltage falls below the trip point, the trip delay begins. If the input voltage remains below the pull-in voltage for the entire trip delay the relay de-energizes. If the input voltage returns to a value above the pull-in voltage, during the trip delay, the trip delay is reset and the relay remains energized. If the input voltage falls below the trip point voltage during the restart delay, the delay is reset and the relay remains de-energized. Reset is automatic upon correction of an undervoltage fault.

Reset: Removing input voltage resets the output relay and the time delays.



- tr = Restart Delay
- td = Trip Delay
- PI = Pull-in 105% or trip point
- TP = Trip Point
- V = Monitored Voltage
- IV = Input voltage
- C-NO = Normally Open Contacts
- C-NC = Normally Closed Contacts

### Features:

- Protects against undervoltage in single-phase systems
  - 30A, SPDT, NO output contacts
  - 100 to 240VAC input voltage
  - 70 to 220VAC adjustable undervoltage trip point in 2 ranges
  - Restart delays from 3 - 300s
  - Trip delay 1 - 20s fixed
  - Isolated or non-isolated relay contacts
- Approvals:

### Auxiliary Products:

- **Quick connect to screw adaptor:**  
P/N: P1015-18
- **Female quick connect:**  
P/N: P1015-13 (AWG 10/12)  
P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

### Available Models:

HLVA6123

If desired part number is not listed, please call us to see if it is technically possible to build.

### Order Table:

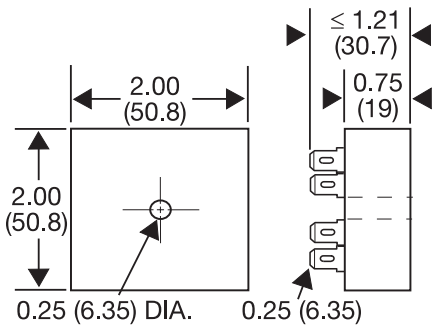
<b>HLVA</b>	<b>X</b>	<b>X</b>	<b>X</b>
	<b>Undervoltage Range</b>	<b>Output Connection</b>	<b>Restart Delay</b>
	4 - 70 to 120VAC	I - Isolated SPDT	2 - Onboard adjustment
	6 - 170 to 220VAC	N - Non-Isolated SPDT	3-300s
			<b>X</b>
			<b>Trip Delay</b>
			Fixed - Specify from 1-20s
			in 1s increments

### Specifications

Input	Ratings	SPDT-N.O	SPDT-NC
Min & Max RMS Voltage	125/240VAC	30A	15A
AC Line Frequency	125/240VAC	30A	15A
Power Consumption	28VDC	20A	10A
Undervoltage Sensing	Motor Load	125VAC	1 hp*
Type	240VAC	2 hp**	1/4 hp**
Ranges	Life	Mechanical - 1 x 10 <sup>6</sup>	Electrical - 1 x 10 <sup>5</sup> , *3 x 10 <sup>4</sup> , **6,000
(4)			
(6)			
Pull-In Voltage	Protection		
Trip Point Accuracy	Surge	IEEE C62.41-1991 Level A	
Time Delay	Circuitry	Encapsulated	
Restart Delays	Isolation Voltage	≥ 1500V RMS input to output; isolated units	
Trip Delay	Insulation Resistance	≥ 100 MΩ	
Repeat Accuracy	Mechanical		
Tolerance (Factory Calibration)	Mounting	Surface mount with one #10 (M5 x 0.8) screw	
Reset Time	Dimensions	.3 x 2 x 1.5 in. (76.7 x 51.3 x 38.1 mm)	
Time Delay vs. Temp. & Voltage	Termination	.025 in. (6.35 mm) male quick connects	
Output	Environmental		
Type	Operating / Storage Temperature	-40° to 60°C / -40° to 85°C	
Form	Humidity	95% relative, non-condensing	
	Weight	≈ 3.9 oz (111 g)	

# Appendix B - Dimensional Drawings

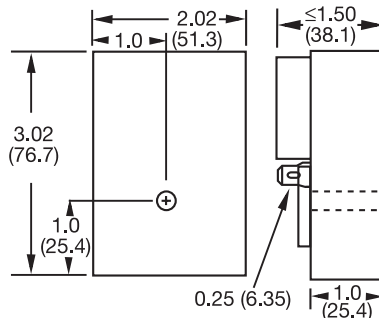
**FIGURE 1**



0.25 (6.35) DIA. 0.25 (6.35)

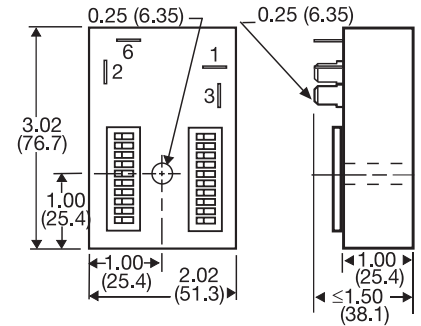
CT; ESD5; ESDR; FS100; FS200; FS300; KR3; KR9;  
KRDB; KRDI; KRDM; KRDR; KRDS; KRPD; KRPS;  
KSD1; KSD2; KSD3; KSD4; KSDB; KSDR; KSDS;  
KSDU; KSPD; KSPS; KSPU; KVM; T2D; TA; TAC1;  
TAC4; TDU; TDUB; TDUI; TDUS; TL; TMV8000;  
TS1; TS2; TS4; TS6; TSB; TSD1; TSD2; TSD3; TSD4;  
TSD6; TSD7; TSDB; TSDR; TSDB; TSDS; TSS; TSU2000

**FIGURE 2**



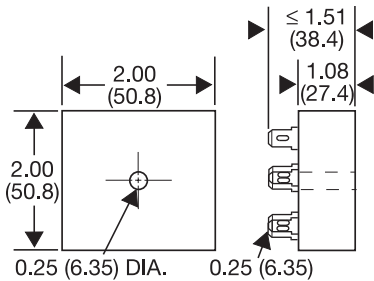
HLV; HRD3; HRD9; HRDB; HRDI;  
HRDM; HRDR; HRDS; HRID; HRIS;  
HRIU; HRPD; HRPS; HRPD; HRV; RS

**FIGURE 3**



HSPZ

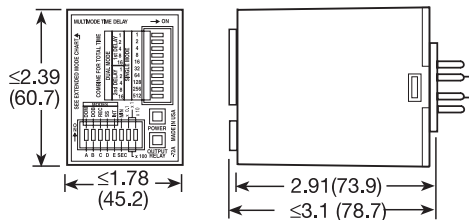
**FIGURE 4**



FA; FS; FSU1000\*; NHPD; NHPS; NHPD;  
NLF1\*; NLF2\*; PHS\*; PTHF\*; SIR1; SIR2;  
SLR1\*; SLR2\*; TH1; TH2; THC; THD1;  
THD2; THD3; THD4; THD7; THDB; THDM;  
THDS; THS

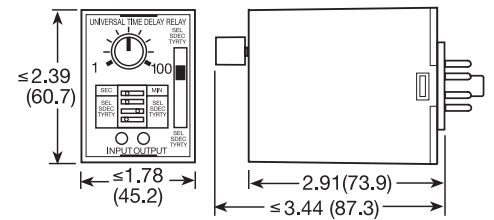
\*If unit is rated @ 1A, see Figure 1

**FIGURE 5**



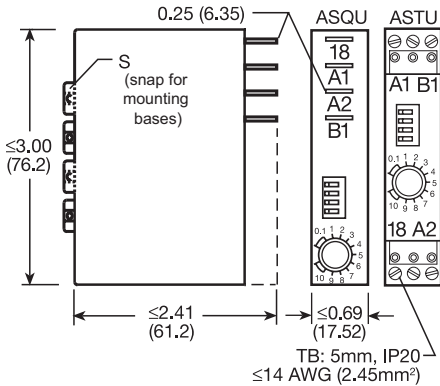
TRDU

**FIGURE 6**



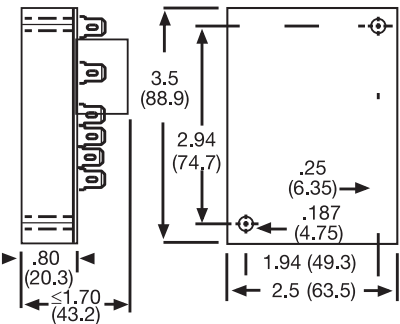
TRU

**FIGURE 7**



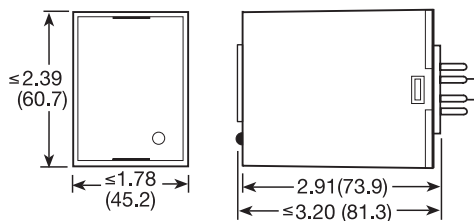
ASQU; ASTU; DSQU; DSTU

**FIGURE 10**



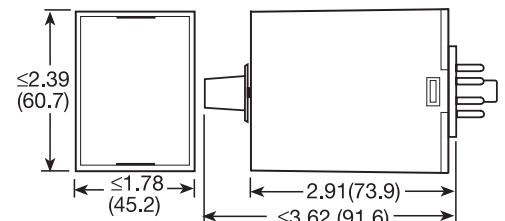
ERD3; ERDI; ERDM

**FIGURE 8**



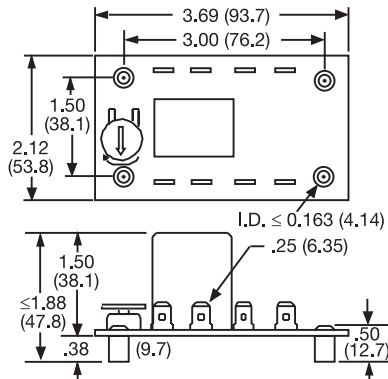
PLM; PLR; TDB; TDBH; TDBL; TDI; TDIH;  
TDIL; TDM; TDMB; TDMH; TDML; TDR;  
TDS; TDSH; TDSL

**FIGURE 9**



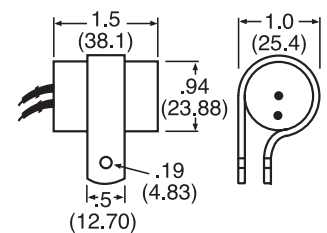
FS500; PRLB; PRM; PRLS; TRB; TRM; TRS

**FIGURE 11**



ORB; ORM; ORS

**FIGURE 12**

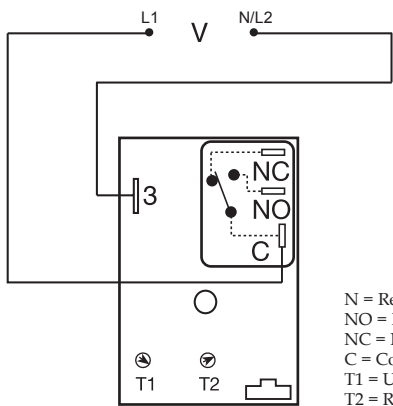


FS100; FS400

inches (millimeters)

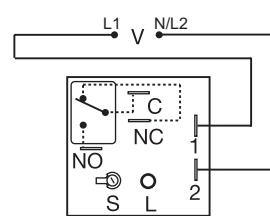
# Appendix C - Connection Diagrams

FIGURE 15 - HLV Series



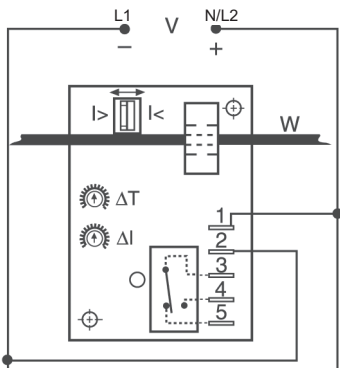
N = Relay contacts are non-isolated.  
 NO = Normally Open  
 NC = Normally Closed  
 C = Common  
 T1 = Undervoltage Trip Point  
 T2 = Restart Delay

FIGURE 16 - KVM Series



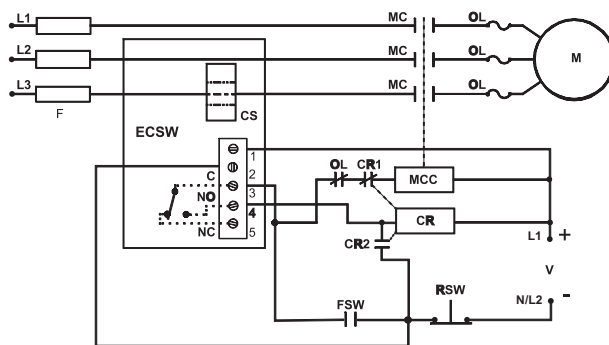
V = Voltage  
 L = LED  
 S = Undervoltage Setpoint  
 NO = Normally Open  
 NC = Normally Closed  
 C = Common, Transfer Contact

FIGURE 17 - ECS Series

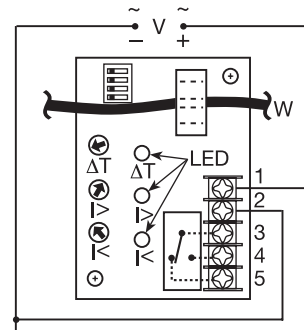


V = Voltage  
 W = Insulated Wire Carrying Monitored Current  
 I > = Overcurrent  
 I < = Undercurrent  
 Relay contacts are isolated.

FIGURE 18 - ECSW Series

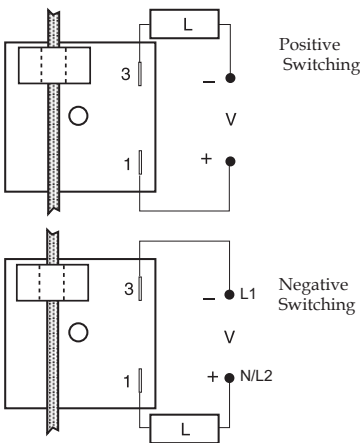


MC = Motor Contactor  
 M = Motor  
 F = Fuses  
 OL = Overload  
 RSW = Reset Switch  
 FSW = Fan or Float Contacts  
 CR = Control Relay  
 CS = Current Sensor  
 MCC = Motor Contactor Coil



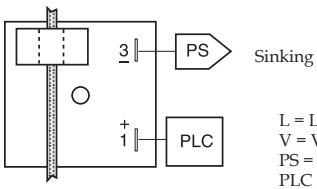
V = Voltage  
 I > = Adjustable Overcurrent  
 I < = Adjustable Undercurrent  
 W = Monitored Wire  
 ΔT = Adjustable Trip Delay

FIGURE 19 - TCS Series



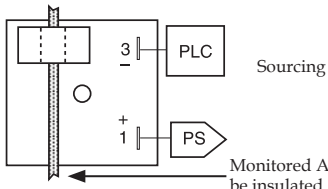
Positive Switching

Negative Switching



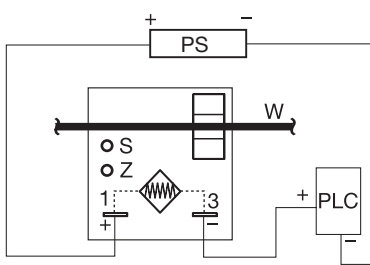
Sinking

L = Load  
 V = Voltage  
 PS = Power Supply  
 PLC = PLC Digital Input Module



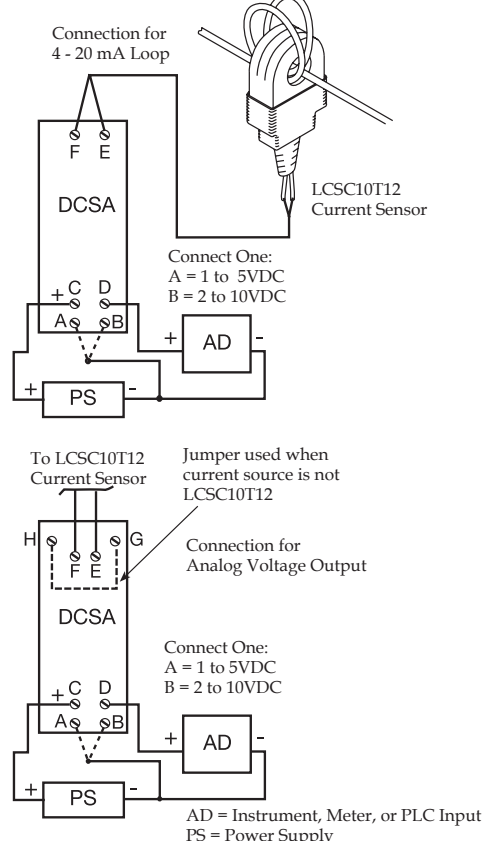
Monitored AC conductor must be insulated.

FIGURE 20 - TCSA Series



4... 20 mA  
 PS = Power Supply  
 Z = Zero Adjust  
 S = Span Adjust  
 W = Insulated Wire Carrying Monitored Current  
 PLC = PLC Analog Input or Meter Input

FIGURE 21 - DCSA Series



Connection for 4 - 20 mA Loop

Connect One:  
 A = 1 to 5VDC  
 B = 2 to 10VDC

Jumper used when current source is not LCSC10T12

Connect One:  
 A = 1 to 5VDC  
 B = 2 to 10VDC

AD = Instrument, Meter, or PLC Input  
 PS = Power Supply