Vertical Market Product Guide
Heating, Ventilation, Air Conditioning and Refrigeration

Littelfuse
Expertise Applied | Answers Delivered

Protect and control the critical components in Air Handling Units, Rooftop Systems, Compressors, Heat Pumps, Fridge/Freezers, Boilers & AC Condensing Units etc.

	Product descriptions, Littelfuse Part	Product Image	Product Value Statements	Features	Competitor Part #
Voltage Monitors	Three-Phase Voltage Monitors **460**		Protects compressors and blower motors from adverse voltage conditions that can cause damage to the motor windings.	▪ Universal range from 190-480VAC or 475-600VAC & 50/60Hz. ▪ Transient protection meets IEEE & IEC standards. ▪ Four adjustment pots provide versatility for a variety of applications. ▪ Adjustable trip delay & restart delay. ▪ Standard surface or DIN Rail mountable.	Diversified: SLBXXXALEA, SLBXXXALER, SLU100ASD, SLA230ALE, SLCXXXALE, SLJXXXALE, SLMXXXASE, SLIXXXALE, SLMXXXASE Time Mark: Series 263 , 265, 200, 2642, 2652, 2644, 158, 246 Macromatic: PMDU A-1 Components: EAC-800 series Agastat: PMA series Crouzet: UFR2 series Siemens (Furnas): 470A32*X1 (*=D,E, G, H, R) Watsco: EAC-800 Series RK Electronics: PVC400AR
	Three-Phase Voltage Monitor **250A**		Protects compressors and blower motors from adverse voltage conditions that can cause damage to the motor windings.	▪ Protect from low and high voltage, unbalance/single-phase, and reverse-phase conditions. ▪ LED diagnostics for quick visual indicator for cause of trip. ▪ Adjustable trip delay to prevent nuisance tripping. ▪ DPDT relay output	A-1 Components: EAC-800 Series Diversified: SLA*, SLC*, SLI*, SLM* (*If 2 Form C contacts are required), SLJ-XXX-ALE ICM: 401 R-K Electronics: PVCL Time Mark: Series 2522, 2642, 2644, 2652, 2522M Watsco: EAC-800 Series
	Three-Phase Voltage Monitor **455**		Provides all the same voltage/phase protections as the 460 model, but with 3 added advantages listed in the features section.	▪ Second set of voltage inputs for monitoring voltage on the load-side of the motor contactor to detect contact failure. ▪ Keeps history of the past 20 fault causes. ▪ Wirelessly download and view fault history.	ICM Control: ICM450, ICM400 A-1 Components: EAC-8001 Watsco: EAC-8001
	Three-Phase Voltage Monitor **201A**		Protects compressors and blower motors from adverse voltage conditions that can cause damage to the motor windings regardless of size.	▪ Protect from low voltage, voltage unbalance & reversal, harmful power line conditions. ▪ Optional high voltage monitoring.	Diversified: ARB120ACA, ARA120ACA Time Mark: 261DX120, 261DXT120 Macromatic: ARP120A3R Crouzet: PJRXS110A Motor Protection Electronics: 008-120-11S Dayton: 6C052
	Other available voltage monitors commonly used in for HVAC applications are 201A-9,460, 460-575,460-14, 250A, 202, 455,and 460-200-SP.				
Load/Current Sensors	Self-powered GO/NO GO AC current sensor **LSRX-C, LSRX**		The LSRX/LSRX-C Series is designed to energize the output contact whenever 4.5 Amps or greater is present. Used commonly as an AC current proof relay to indicate if a motor is operating.	▪ Self-powered ▪ Quick-connect terminals reduce installation time ▪ Built in current sensor eliminates the need for a stand alone current transformer	Diversified: CMG-0100-20, CMG-0100-24, CMG-0100-28, CMG-0100-32, CMG-0100-36, CMG-0200-20, CMG-0200-24, CMG-0200-28, CMG-0200-32, CMG-0200-36
	Other available Load/Current Sensors commonly used in for HVAC applications are LSR-24, LSR-115, ECS30AC, ECS31AC, ECS40AC, ECS41AC, ECS4HBC				
AC Current Transducers	AC Current Transducers, **TCSA20**		Varies the effective resistance of its output in direct proportion to the current flowing in the conductor it is monitoring.	▪ Monitors 0 - 20A ▪ Loop powered from 10 to 30VDC ▪ Linear output from 4 - 20mA	TCSA-X can closely cross AcuAMP ACT050-42L-S (split core 0-50A), Hawkeye H721HC (0-30 Amp)
	Other available AC current Transducers commonly used in for HVAC applications are TCSA5, TCSA10, TCSA50				

This tool is intended to be used as a guide only. The User will need to verify the part is appropriate for the application.

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Timers	Delay-on-Make Timer[1] **TMV8000**		Used to delay the blower from turning on, in a heating/ cooling system, to allow time for the system to reach temperature before forcing air through the ventilation ducts. Also used to stagger start multiple compressors within a facility, on start up or after a power outage. This prevents a possible low voltage condition due to excessive loading on the line.	▪ Universal AC/DC operating voltage ▪ Two terminal series connection with the load ▪ Solid state prevents arc and wear out over time. ▪ Encapsulated to protect against shock vibration.	Macromatic: THL-1024U-32 Ametek NCC: Q1T-00600-311 Diversified & Time Mark: Several (Contact tech support)
	Delay-on-Break Timer[2] **TDUB3000A**		Used to delay the blower from turning off, in a heating/ cooling system, after the demand has been met to allow all of the conditioned air to be forced out of the ventilation ducts. This helps maximize the efficiency of the system.	▪ 24 to 120VAC input voltage ▪ User selectable time delay ▪ Solid state prevents arc and wear out over time. ▪ Encapsulated to protect against shock vibration.	Macromatic: THR-11662-31T, THL-8024U-41 Airotronics: TGML10100A1
	HVACR Timers **CT1S45**		The CT Series timers combines a delay-on-make and de-lay-on-break time delay into one unit and may be used to control fan delays in heating and/or cooling equipment.	▪ Delay-on-Make and Delay-on-Break in one unit ▪ Voltage 24VAC input voltage. ▪ Solid state prevents arc and wear out over time. ▪ Encapsulated to protect against shock vibration.	The CT Series timers can replace several competitors' delay-on-make and delay-on-break dual-function HVAC timers. Contact tech supports for cross references.
	Multifunction Timers **TRU1, TRU2 & TRU3**		A multifunction universal time delay relay. Six timing functions includes delay-on-make, interval, single shot, recycling (ON time first, equal recycle delays), delay-on-break, and retriggerable single shot.	▪ Universal input voltage ▪ Knob adjustable time delay ▪ LED Indicators Provide visual indication of input voltage and relay status	**TRU2:** Diversified: All Series of TBD, TBE, TUD-120-AKA, TUE-120-AFA, TUE-120-A. Macromatic: TD-7, TD-8 **TRU3:** Diversified: TBD-XXX-XXX-D, TBE-XXX-XXX-D, TDD-XXX-AKA-XXX,TDE-XXX-AKA-XXX, TDU, 314 IDEC: RTE-PFX, RTE-PSX, RTEL-PFX, RTEL-PSX Macromatic: TD-7, TD-8 ICM: Most of BDR & SDR series by TRU series
UL Class Fuses, Holders and Distribution Blocks	Class CC & Midget Fuses **CCMR, KLDR, KLKR, KLKD**		Littelfuse UL fuses protect your system from overload and over current. Littelfuse fuses are chosen over break-ers due to their higher amperages, quicker response time, easy coordination, and no calibration required.	▪ Fast-acting, Save 45-75% space ▪ High-interrupting capacity & Excellent current-limiting	Bussmann: LPCC, HCTR, KTKR, KLM Mersen: ATDR, ATQR, ATMR, ATM
	Class RK5 Fuses **FLNR, FLSR**			▪ Class RK5's are the most current-limiting fuses available ▪ High short-circuit current rating	Bussmann: FRNR, FRSR Mersen: TR, TRS
	Class T Fuses **JLLN, JLLS**			▪ Extremely current-limiting ▪ 200 kA Interrupting Rating	Bussmann: JJN, JJS Edison: TJN Mersern: A3T, A6T
	Class J Fuses **JTD**			▪ Superior time-delay and cycling characteristics	Bussmann: FRNR, FRSR Mersen: TRNR, TRSR
	Check our cross reference document for a full list of competitor products substitutable with Littelfuse Class CC, RK5 & Class T Fuses.				
	We offer various UL class open face, finger safe and panel mount fuse holders including LFT 30/60 for class T, LFR 60/25 for RK5 & L600 30C, LPSC, 571,572 for class CC. Check our website for full list of blocks and holders				We can crross majority of Fuse Holders and Distribution Blocks from Bussmann, Mersen and Marathon.
	We also have a wide range of Power Distribution Blocks, Check our website for full list of Littelfuse power distribution blocks				

[1] Delay-on-Make Timer: Upon application of input voltage, the time delay (t) begins. The output is de-energized before and during the time delay, but then become energized at the end of the time delay (t).

[2] Delay-on-Break Timer: Once input voltage is applied, the time delay relay is ready to be activated. When the relay is activated, the output is energized. Then when the the relay is deactivated, the time delay begins and the he output remains energized during timing. At the end of the time delay, the output becomes de-energized.

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