














# HVAC Selection Guide

Protect and Control the Critical Components in Your HVAC Systems

	LITTELFUSE PRODUCT & PART NUMBER	BENEFITS	FEATURES	COMPETITOR PART NUMBERS
FUSES, HOLDERS & DISTRIBUTION BLOCKS	<p>Class CC &amp; Midget Fuses <b>CCMR, KLDR, KLKR, KLKD</b></p> 	Provides extreme current-limitation in a space-saving design and are available up to 60 A.	<ul style="list-style-type: none"> <li>■ Ideal for space saving protection</li> <li>■ High-interrupting capacity and excellent current-limitation</li> </ul>	<p><b>Bussmann:</b> LPCC, FNQR, KTKR <b>Mersen:</b> ATDR, ATQR, ATMR, ATM</p>
	<p>Class R fuses <b>FLNR, FLNR</b></p> 	Ideal when cost is a major consideration, UL Class R fuses offer high reliability with their proven, mature design.	<ul style="list-style-type: none"> <li>■ High short-circuit current rating</li> <li>■ Dual-element design</li> <li>■ Available with and without indication</li> </ul>	<p><b>Bussmann:</b> FRNR, FRSR <b>Mersen:</b> TR, TRS</p>
	<p>Class T Fuses <b>JLLN, JLLS</b></p> 	For sensitive electrical components, UL Class T fuses are ideal for places where space and protection are critical. They provide the protection of a Class R fuse but are approximately 1/3 of the size.	<ul style="list-style-type: none"> <li>■ Extremely current-limiting</li> <li>■ 200 kA interrupting rating</li> </ul>	<p><b>Bussmann:</b> JJN, JJS <b>Mersen:</b> A3T, A6T</p>
	<p>Class J Fuses <b>JTD</b></p> 	UL Class J fuses are critical for places where space is at a premium and maximum protection is an imperative. Providing the protection of a class RK1 fuse in a smaller footprint, these fuses can be used for a wider range of applications reducing inventory requirements.	<ul style="list-style-type: none"> <li>■ Superior time-delay and cycling characteristics</li> <li>■ Available with and without indication</li> </ul>	<p><b>Bussmann:</b> LPJ <b>Mersen:</b> AJT</p>
Littelfuse offers a wide variety of UL approved open face, finger safe, and panel mount fuse holders, as well as power distribution blocks. Visit the Littelfuse website to see our full offering.				
SURGE PROTECTIVE DEVICES (SPD)	<p>Type 2 Surge Protective Devices <b>SPD2</b></p> 	Safeguards components from power fluctuations or surges by limiting the fault current to a load or the unit being protected to prevent equipment damage or downtime.	<ul style="list-style-type: none"> <li>■ Capability to clamp and withstand high-energy transients to prevent disruption, downtime, and degradation or damage to equipment</li> <li>■ Thermal protection to eliminate catastrophic failure</li> <li>■ UL Recognized and IEC Compliant in one part number to reduce inventory and support global usage</li> <li>■ DIN-rail mounted and compact footprint to increase panel design flexibility</li> </ul>	<p><b>ABB:</b> OVR T2 80-...s P TS QS, OVR T2 40-...s P TS QS <b>Bourns:</b> 1250, 1420 <b>Citel:</b> DS40, DS40VG, DS70R <b>DEHN:</b> DEHNguard M, DEHNguard S <b>Phoenix Contact:</b> VALVETRAB-SEC-T2 <b>Raycap:</b> ProTec T2</p>
	<p>Type 1 and 2* Surge Protective Devices <b>SPDN</b></p> 	The NEMA-style SPDN series for external panel mount provides equipment protection from transient overvoltage events lasting micro-seconds. By limiting the overvoltage to the equipment during these events, costly damage and downtime can be mitigated.	<ul style="list-style-type: none"> <li>■ More direct modes of protection in a smaller package to increase protection and design flexibility</li> <li>■ Capability to clamp and withstand high-energy transients ensures low-residual voltage during high-energy surge events and higher nominal discharge current to prevent disruption or damage</li> <li>■ Thermally protected MOV eliminates catastrophic failure</li> <li>■ Installs on the line or load side of the circuit breaker to simplify maintenance without impacting the other parts of the electrical system. Note: SPDN-A installs on the load side only</li> </ul>	<p><b>SPDN Series A &amp; B:</b> Schneider/ASCO 425, Eaton SPC, Mersen STXP, Southern Tier 450, IlSCO/SSI XE <b>SPDN Series C &amp; D:</b> Schneider/ASCO 420, Mersen STXR, IlSCO/SSI SE, Citel M50</p> <p>*SPDN-A is a Type 2; SPDN-B, C and D are Type 1</p>







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VOLTAGE & PHASE MONITORS	Three-Phase Voltage Monitors <b>460</b> 	Protects compressors and blower motors from adverse voltage conditions that can cause damage to the motor windings.	<ul style="list-style-type: none"> <li>Universal range from 190 to 480 V ac or 475 to 600 V ac and 50/60 Hz</li> <li>Transient protection meets IEEE and IEC standards</li> <li>Four adjustment pots provide versatility for a variety of applications</li> <li>Adjustable trip and restart delays</li> <li>Standard surface or DIN-rail mountable</li> </ul>	<b>Diversified:</b> SLU100ASD <b>Time Mark:</b> Series 158 <b>ICM Controls:</b> ICM 401 up to 480 V ac <b>Macromatic:</b> PMDU <b>Agastat:</b> PMA series <b>Crouzet:</b> UFR2 series <b>Electronics:</b> PVC400AR
	Three-Phase Voltage Monitors <b>250A</b> 	Protects compressors and blower motors from adverse voltage conditions that can cause damage to the motor windings.	<ul style="list-style-type: none"> <li>Protection from low and high voltage, unbalance, single-phase, and reverse-phase conditions</li> <li>LED diagnostics offer quick visual indicator for cause of trip</li> <li>Adjustable trip delay to prevent nuisance tripping</li> <li>DPDT relay output</li> </ul>	<b>A-1 Components:</b> EAC-800 series <b>Diversified:</b> SLA,* SLC,* SLM* <b>R-K Electronics:</b> PVCL <b>Time Mark:</b> Series 2642, 2644 <b>Watsco:</b> EAC-800  <small>*If 2 Form C contacts are required, SLJ-XXX-ALE</small>
	Three-Phase Voltage Monitors <b>455</b> 	Provides all the same voltage/phase protection as the 460 model, but with three added advantages listed in the features section.	<ul style="list-style-type: none"> <li>Second set of voltage inputs for monitoring voltage on the load-side of the motor contactor to detect contact failure</li> <li>Keeps history of the past 20 fault causes</li> <li>Wirelessly download and view fault history</li> </ul>	<b>ICM Controls:</b> ICM450, ICM400 <b>A-1 Components:</b> EAC-8001 <b>Watsco:</b> EAC-8001
	Three-Phase Voltage Monitors <b>201A</b> 	Protects compressors and blower motors from adverse voltage conditions that can cause damage to the motor windings regardless of size.	<ul style="list-style-type: none"> <li>Protection for low voltage, voltage unbalance, phase reversal, and harmful power line conditions</li> <li>Optional high-voltage monitoring</li> </ul>	<b>Time Mark:</b> 253, 257B <b>Macromatic:</b> PMPU-FA8
Other available voltage monitors commonly used for HVAC applications are 201A-9, 460, 460-575, 460-14, 250A, 202, 455, and 460-200-SP				
OVERLOAD RELAY	Enhanced Overload Relay <b>MP8000</b> 	Provides advanced motor protection and is fully programmable via Bluetooth* using the Littelfuse app on an Android* or iOS* mobile device.	<ul style="list-style-type: none"> <li>Programmable voltage and current settings</li> <li>Three selectable restart options</li> <li>Four programmable delay timers</li> <li>Programmable auxiliary relay output</li> </ul>	Contact Littelfuse for more information  <small>*Bluetooth, Android, and iOS are trademarks of their respective owners</small>
CURRENT MONITORING RELAYS	Self-Powered Go/No Go Ac Current Sensors <b>LSRX-C, LSRX</b> 	Energizes 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.	<ul style="list-style-type: none"> <li>Self-powered</li> <li>Quick-connect terminals reduce installation time</li> <li>Built-in current sensor eliminates the need for a stand alone current transformer</li> </ul>	<b>Diversified:</b> 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 <b>TCSA20</b> 	Varies the effective resistance of its output in direct proportion to the current flowing in the conductor it is monitoring.	<ul style="list-style-type: none"> <li>Monitors 0 to 20 A</li> <li>Loop powered from 10 to 30 V dc</li> <li>Linear output from 4 to 20 mA</li> </ul>	<b>AcuAMP:</b> ACT050-42L-S (split core 0 to 50 A) <b>Hawkeye:</b> H721HC (0 to 30 A)
Other available ac current transducers commonly used for HVAC applications are TCSA5, TCSA10, TCSA50				







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CONTACTORS	Definite Purpose Contactors <b>HCC, HCD</b> 	Acting as an on/off switch controlled by thermostats, contactors are designed with consistent silver thickness for increased product life, making them ideal for the demands of commercial and residential HVAC applications.	<ul style="list-style-type: none"> <li>Termination options include combo screw, screw with pressure plate, or lug</li> <li>Universal mounting configuration</li> <li>Four adjustment pots provide versatility for a variety of applications</li> <li>Optional auxiliary switches that attached to the contactor on 3P &amp; 4P</li> </ul>	Contact Littelfuse for more information
	Auxiliary Switches for Contactors <b>HCD – Auxiliary Switch</b> 	The HCD auxiliary switch is designed as an accessory to a 3-pole contactor and used to switch an auxiliary load below 10 amperes.	<ul style="list-style-type: none"> <li>Fits all Hartland Controls 3-pole contactors</li> </ul>	Contact Littelfuse for more information
CAPACITORS	Motor Run Capacitors <b>HCK</b> 	Used to improve the starting torque of single-phase electric motors, each hard start kit consists of a start capacitor and a switching mechanism. The start capacitor increases the current through the start winding of the motor and is eventually removed by the switching mechanism once the motor reaches an optimum speed.	<ul style="list-style-type: none"> <li>Single and dual rated values</li> <li>Round or oval case options</li> <li>Aluminum oil-filled construction</li> <li>Designed and manufactured in accordance with UL 810 and EIA standard RS-456</li> <li>Custom configurations available</li> </ul>	Contact Littelfuse for more information
	Motor Hard Start Capacitors <b>HHS</b> 	Engineered to run more efficiently, our transformer line consists of power ratings up to 250 VA with a variety of primary and secondary voltages to 575 V ac and frequencies at 50 and 60 Hertz.	<ul style="list-style-type: none"> <li>Use on 1/2 to 10 HP single phase HVAC compressor or refrigeration unit (HHS 5 and 6)</li> <li>Use on 1 to 4 HP HVAC compressor or refrigeration unit (HHS 7 and 8)</li> <li>Easy 5-wire (HSS 410 and 810) or 2-wire (HHS 5, 6, 7 and 8) installations</li> <li>RU File No. E223408</li> </ul>	Contact Littelfuse for more information
MAGNETICS	Transformers <b>LHCT</b> 	Engineered to run more efficiently, our transformer line consists of power ratings up to 250 VA with a variety of primary and secondary voltages to 575 V ac and frequencies at 50 and 60 Hertz.	<ul style="list-style-type: none"> <li>Provided in three different versions: Class 2 Transformer, General Purpose Transformer, and Autotransformer</li> <li>Termination options include quick connects and lead</li> <li>Various mounting options available</li> <li>UL/cUL recognized 5085</li> </ul>	Contact Littelfuse for more information
MECHANICAL RELAYS	Mechanical Relays <b>HCR-5, HCR-6</b> 	Ideal for HVAC applications, general-purpose relays are actuated with an electro-magnetic current, creating a closed circuit. Available as a single-pole or double-pole unit, these relays can be provided in various contact forms with power or pilot duty ratings	<ul style="list-style-type: none"> <li>SPNO, SPDT, 1 NO and 1 NC (HCR-5)</li> <li>SPNO, SPDT, DPNO &amp; DPDT (HCR-6)</li> <li>0.25" (6.35 mm) quick connect terminals</li> <li>Multi-positional mounting options</li> <li>Dual coil terminals (HCR-6)</li> <li>RU, cRU File No. E227250</li> </ul>	Contact Littelfuse for more information

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TIME DELAY RELAYS	Delay-on-Make Timers <sup>1</sup> <b>TMV8000</b> 	Delay the blower from turning on, to allow time for the system to reach temperature before forcing air through the ventilation ducts. Also used to stagger start for multiple compressors within a facility, on start up or after a power outage.	<ul style="list-style-type: none"> <li>Universal ac/dc operating voltage</li> <li>Two terminal series connection with the load</li> <li>Solid state prevents arc and wear over time</li> <li>Encapsulated to protect against shock vibration</li> </ul>	<b>Macromatic:</b> THL-1024U-32 <b>Ametek NCC:</b> Q1T-00600-311 <b>Diversified and Time Mark:</b> Several (contact technical support)
	Delay-on-Break Timers <sup>2</sup> <b>TDUB3000A</b> 	Used to delay the blower from turning off, after the demand has been met to allow all of the conditioned air to be forced out of the ventilation ducts.	<ul style="list-style-type: none"> <li>24 to 120 V ac input voltage</li> <li>User selectable time delay</li> <li>Solid state prevents arc and wear over time</li> <li>Encapsulated to protect against shock vibration</li> </ul>	<b>Macromatic:</b> THR-11662-31T, POM <b>Airotronics:</b> TGML10100A1
	HVAC-R Timers <b>CT1S45</b> 	Combines a delay-on-make and delay-on-break time delay into one unit and may be used to control fan delays in heating and/or cooling equipment.	<ul style="list-style-type: none"> <li>Delay-on-make and delay-on-break in one unit</li> <li>Voltage 24 V ac input voltage</li> <li>Solid state prevents arc and wear over time</li> <li>Encapsulated to protect against shock vibration</li> </ul>	Can replace several competitors' delay-on-make and delay-on-break dual-function HVAC timers (contact technical support).
	Multifunction Timers <b>TRU1, TRU2 &amp; TRU3</b> 	A multifunction universal time-delay relay. Six timing functions include delay-on-make, interval, single shot, recycling (ON time first, equal recycle delays), delay-on-break, and retriggerable single shot.	<ul style="list-style-type: none"> <li>Universal input voltage</li> <li>Knob adjustable time delay</li> <li>LED indicators provide visual indication of input voltage and relay status</li> </ul>	<b>TRU2:</b> <b>Diversified:</b> All series of TBD, TBE, TUD-120-AKA, TUE-120-AFA, TUE-120-A <b>Macromatic:</b> TD-7, TD-8  <b>TRU3:</b> <b>Diversified:</b> TBD-XXX-XXX-D, TBE-XXX-XXX-D, TDD-XXXAKA-XXX, TDE-XXX-AKA-XXX, TDU, 314 <b>IDEC:</b> RTE-PFX, RTE-PSX, RTEL-PFX, RTEL-PSX <b>Macromatic:</b> TD-7, TD-8 <b>ICM Controls:</b> ICM500 Series
TEMPERATURE SENSORS	Leaded Discrete, Surface Mount Discrete, Probes & Assemblies <b>NTC Thermistors</b> 	Cost-effective, predictable temperature sensor that enables tighter operating control and diagnostics to achieve energy savings and optimal performance of systems.	<ul style="list-style-type: none"> <li>Exponential resistance-temperature curve</li> <li>Wide operating temperature ranges from -50 °C to 300 °C</li> <li>Metal oxide ceramic compounds</li> </ul>	Contact Littelfuse for more information
	Leaded Discrete, Probes & Assemblies <b>RTDs</b> 	Robust, extremely stable and predictable temperature sensor suitable for a wide range of temperatures that enables tighter operating control and diagnostics to achieve energy savings and optimal performance of systems.	<ul style="list-style-type: none"> <li>Nearly linear resistance-temperature curve provides ease and consistency of measurement</li> <li>Extremely wide temperature ranges, specifically on the higher end, from -50 °C to well above 500 °C</li> <li>Precious metal (typically Pt) on ceramic substrate</li> </ul>	Contact Littelfuse for more information

<sup>1</sup> 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 becomes energized at the end of the time delay (t).  
<sup>2</sup> 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 relay is deactivated, the time delay begins and the output remains energized during timing. At the end of the time delay, the output becomes de-energized.

This tool is intended to be used as a guide only. Check our cross reference document for a full list of competitor products substitutable with Littelfuse Class CC, RK5 & Class T Fuses. The user will need to verify the part is appropriate for the application. Contact our technical support team at 1-800-TEC-FUSE (1-800-832-3873) or [techline@littelfuse.com](mailto:techline@littelfuse.com).

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