

HVAC SYSTEMS

Fact Sheet

HVAC Defined

- HVAC is an acronym for Heating, Ventilation and Air-Conditioning and is comprised of two primary customer segments – companies that manufacture:
 - Residential and commercial HVAC, and air-purification equipment, as well as commercial refrigeration equipment.
 - Building automation controls and energy management hardware related to the climate control systems

In-the-Know

- HVAC equipment is expected to grow at a market rate of 3%, while controls are forecasted to grow approximately 8% yearly. VRF (Variant Refrigerant Flow) systems, which are easy to scale to different building sizes, and heat pumps with improving efficiencies and technology, are the fastest growing segments of HVAC equipment.
- Residential automation solutions are gaining a foot hold in light commercial and retail applications due to the sophistication of these control systems to meet light commercial needs, while remaining simple enough to be managed by small building facility owners versus professional companies or facility managers.
- The potential for Ethernet and wireless connectivity in HVAC equipment is growing as customers expect cloud based systems. These systems, which drive control integration opportunities, are moving from field installable to “pre-packaged” solutions at HVAC equipment OEMs.
- Valve/damper actuators with embedded sensors/controls are expected to become more prolific with more wireless-controlled products due to reduction of installation time and complexity, especially in building retrofit applications.
- Evolution of LEDs with PoE, sensors, and wireless technologies are expected to reduce end product installation costs and complexities.
- “Big Data” and internet service providers are entering the market, driving innovation in HVAC and building automation control equipment, such as smart thermostats.

Applications for HVAC and HVAC Control Units

- Control Systems
- Auxiliary PCB's
- Environmental Sensors
- Wireless Controls
- Field Wiring
- HVAC Accessories

Target Customers

- OEM HVAC equipment and controls manufacturers
- Building automation and control hardware manufacturers
- Thermostat and environmental sensors manufacturers
- Residential building automation hardware manufacturers

Design Navigator

Sustainability and the search for efficiency in heating and cooling influences the way facilities operate. Whether you are purchasing a new HVAC system or upgrading your old one, know that HVAC systems are becoming more complex in terms of control strategies, which is key to determining maximum efficiency benefits. TE's portfolio of miniature components have become more relevant as controls grow to be more sophisticated. Importantly, TE helps ensure that you are able to have the highest quality, most efficient system on the market.

With an industry focused sales and product development team devoted to helping improve products and designs for the HVAC market, our early involvement can provide a systems approach that safeguards component compatibility and speeds up development cycles. TE's dependable, quick to install and industry-proven innovative product solutions will help you stay ahead of the trends for increased building and comfort control.

Several of TE's featured products include:

- AMPMODU Interconnect System
- W-28 Circuit Breakers
- Universal MATE-N-LOK Connectors
- FASTON & Positive Lock Terminal & Splices
- Power Inductors (Noise Filtering)
- Relays
- Switches

Key Questions to Ask Your Customers

- Does your current control solution need improvement in terms of space savings on the PCB?
- How are you currently servicing or modernizing your equipment?
- Are you interested in reducing the time it takes to install or retrofit an HVAC system?
- Does your design require a space saving unit?
- Would you like to eliminate the amount of noise that stems from your HVAC unit?

DESIGN NAVIGATOR

SUBSYSTEMS

	1	2	3	4	5	6	Max Current Rating (A) ¹	Max Voltage Rating (V) ¹	Operating Temperature Range (°C)	SMT Compatible	Wire Range (AWG)	Wire-to-Board	Wire-to-Wire	Board-to-Board	Standards
AMP CT & Mini CT Connectors	●	●	●		●		4	125 AC	-40 to +105	●	30-22	●	●		UL, CSA
AMPMODU Interconnect System	●	●					3	250 AC	-65 to +125	●	32-20	●	●	●	UL, CSA
Antenna and Molded Interconnect Device (MID)²				●						●					
Barrier Strips and Tab Accessories	●	●			●		30	600 AC/DC	-40 to +120		30-10	●			
Circuit Breaker W-28	●				●		50	250AC/32DC	-20 to +60						UL, CSA, VDE
Circuit Protection Devices					●	●	Refer below for product details								UL, CSA, TUV
CLOUDSPLITTER Connector System			●		●		1.5 signal 5.0 power	150 AC/20 DC	-40 to +85	●	26-24		●		UL, cUL
Definite Purpose Contactors					●	●	500	900 DC	-40 to +65						UL
DIP switches	●	●	●	●			0.1	50 DC	-30 to +85	●					
Dynamic Series Connectors	●				●		65	630 AC	-55 to +105	●	30-6	●	●	●	UL, RU, CSA, TUV
Economy Power (EP) Connectors	●	●			●		11	600 AC	-25 to +105	●	22-16	●	●		UL, IEC
Eurostyle and Labeled Eurostyle Terminal Blocks	●	●	●				10	300 AC/DC	-30 to +105	●	30-12	●			UL, cUL
FASTON & Positive Lock Terminals & Splices	●	●	●		●	●	48	600 AC/DC	-40 to +250		26-10	●			UL, CSA, IEC
Flexible Printed Circuit (FPC) Connectors			●				1	200 AC	-40 to +85	●		●			VESA
Grace Inertia Connectors	●	●			●		3.5	600 AC/DC	-30 to +105		28-20	●	●		UL, CSA, IEC-GWIT
Heat Shrink Tubing					●				-30 to +250						UL, CSA
High Performance Interconnects (HPI)		●	●				3	250 AC/DC	-25 to +105	●	32-22	●			
Identification - Electrical and Warning	●	●	●	●	●	●			-30 to +120						
Identification - Rating, Rack, Panel and Cabinet	●	●	●	●	●	●			-40 to +150						UL
LCD Coaxial Embedded Display Interface (LCEDI) Connectors			●				1	100 AC	-20 to +85	●	<30	●			UL, VESA
Mass Termination Assembly (MTA), SL & CST Connectors	●	●			●		5	600 AC	-55 to +105	●	26-18	●	●		UL, CSA
Mid-Range Relays RZ, RT, ORWH, PCH, T77, RY, T75, MSR, EJ	●	●	●			●	8	20/100 AC/DC	-40 to +85						UL, CSA, VDE, SEMKO, IEC
Mini Sealed Universal MATE-N-LOK Connectors					●		9.5	600 AC	-55 to +105	●	30-16	●	●		UL, CSA, VDE
Miniature AMP-IN Connectors	●						4	250 AC			24-20	●			UL
Power Double Lock Connectors		●			●		14	300 AC	-30 to +105		20-16, 26-22	●	●		UL, CSA, IEC, VDE
Power Inductors (Noise Filtering)					●		varies*	varies*	varies*	●					
Power Relays, T9A, T92, T9E, PU 9400 and 9100	●	●			●	●	75	400 AC/DC	-40 to +85						UL, CSA, VDE, SEMKO, IEC
Releasable Poke-In Wire Connector			●				6	400 AC/DC	-30 to +105	●	22-18	●			UL, IEC
Resistors	●	●	●				varies*	varies*	varies*	●					
RJ45 Connectors	●						1.5	150 AC	-40 to +85	●	26-22	●			UL, IEC
Signal Double Lock Connectors	●	●			●		3	50 AC/DC	-30 to +105		26-20		●		UL, CSA, VDE
Signal Relays IM, P2	●	●	●			●	2	250 AC/220 DC	-40 to +85	●					UL, VDE, TUV, CQC, Industry
Slide Switches	●	●					3	20 DC	-20 to +80						
SMT Poke-in Connectors			●				5	250 AC/DC	-40 to +105	●	22-18	●			UL
Tactile Switches	●	●	●				0.05	24 DC	-35 to +105	●					
Transformers	●	●			●	●		600 AC							UL
Universal MATE-N-LOK Bulkhead Solutions					●		19	600 AC/ DC	-55 to +105		30-10		●		rUL, CSA
Universal MATE-N-LOK Connectors	●	●			●		19	600 AC	-55 to +105	●	30-10	●	●	●	UL, IEC
Vertical Screwless Inline Connector			●				2	600 AC/DC	-30 to +105		18-16	●			UL

Circuit Protection Devices (CPD)

	Overcurrent Protection						Overvoltage Protection			Overtemperature Protection	Hybrid Protection	
	PolySwitch Devices	Pulse Tolerant	0603 Very Fast Acting	Fast Acting	Slow Blow	2410 Very Fast Acting Fuses	GDT	PESD	SESD	RTP Devices	2Pro Devices	PolyZen Devices
Compressor	●											
Motor	●											
Transformer	●									●	●	
Power Supply	●	●	●	●		●	●		●	●	●	
Display	●	●	●	●	●	●	●	●	●			

- CQC - China Quality Certification
- CSA - Canadian Standard Association
- cUL - Tested to Canadian Standards by Underwriters' Laboratories
- IEC - International Electrotechnical Commission
- Industry - Meets product specific industry standards (see product page on te.com for more detail)
- RU - Recognized Under
- rUL - UL Registered
- SEMKO - Svenska Elektriska Materielkontrollanstalten
- TUV - Technischer Überwachungs-Verein
- UL - Underwriters' Laboratories
- VDE - Verband Deutscher Elektroingenieure
- VESA - Video Electronics Standards Association

¹ May vary based on application and product selection

² TE is a leading developer and manufacturer of high performance embedded and external antennas. Visit www.antenna.te.com to learn more.

* Current rating, voltage rating, and operating temperature range may vary based on application and product selection