

**The IP&E
Specialist**

Charging Equipment Application Guide

TTI, Inc., – A Berkshire Hathaway Company



The IP&E Specialist

The Specialist in Electronics Component Distribution

Founded in 1971, TTI has steadily grown to become a world leading specialist distributor of electronic components. The company was founded on the premise that passive component purchasing could be made more efficient by offering product specialization, customer-driven service and proprietary supply chain solutions.

Why TTI?

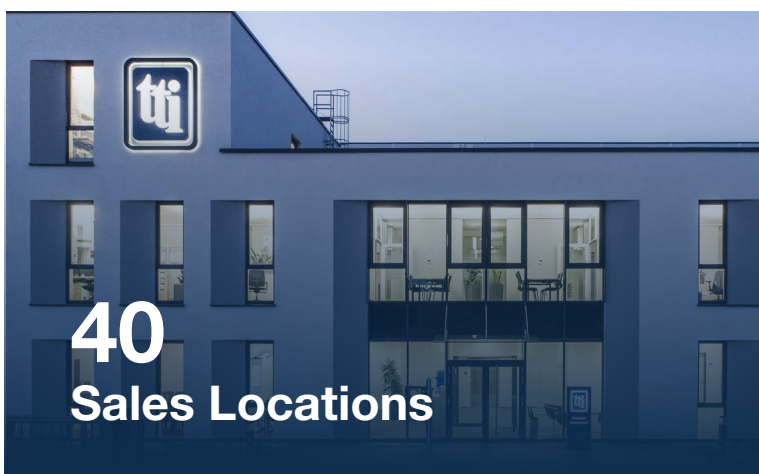
• **Technical Experts** TTI's European team of field-based Sales Engineers and local Product and Technical Specialists are here to support you; from understanding component trends, sustainable sourceability and new product roadmaps, to in depth technical support for your design from our technical engineering experts.

• **Value Added Services** Connector assembly is one of the most important value-added services at TTI, Inc. – Europe. We are specialized in distributing manufacturer controlled and certified connectors and interconnect solutions from globally leading suppliers. Thanks to a large inventory level of connector components, TTI, Inc. – Europe can serve any market requirements.

• **Global Distribution Centers** Our European headquarters is located just outside of Munich, Germany in Maisach-Gernlinden. In total, we have 45.000m² of dedicated warehouse space and local sales and technical support in over 40 locations across Europe. TTI has more than 195.000m² of automated warehousing in North America, Europe and Asia. All are linked into a global warehouse management system that provides superior customer service and overall business efficiencies. Wherever you are in the world, TTI can support you. Year after year, customers rate our inventory availability, on-time delivery and accuracy among the very best in the industry – contact us today to find out what a true specialist has to offer.

• **Quality and Reliability** TTI's global warehouses are all ISO-registered and have received certification to the ISO 9001 and ISO 14001 Standards. TTI Europe is also certified to EN9120/EN9100, IECQ-CECC and ISO/IEC 27001 Standards. Additionally, our European sales branches are ISO 9001 certified. TTI has one global documentation system that ensures that every TTI branch and warehouse in the world follows the same processes.





24/7
Available to Order Online



www.ttieurope.com

Charging Equipment Applications

Charging Infrastructures

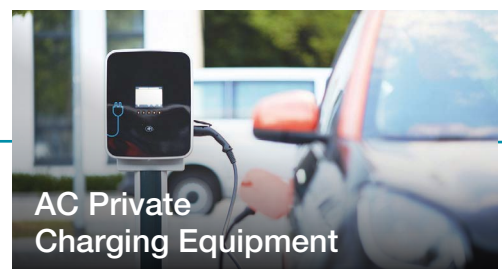
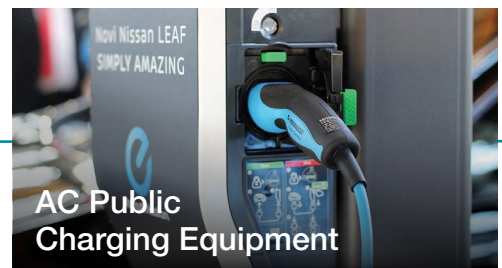
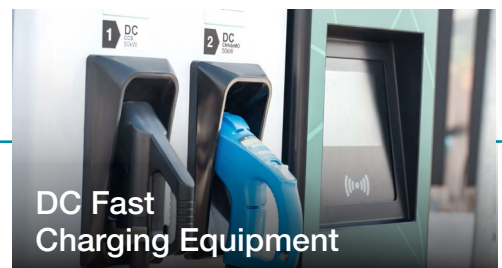
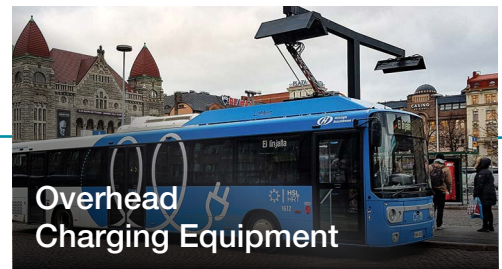
- Fleet charging
- Private charging
- Public charging
- Residential charging
- Workspace charging

Charging Technologies

- Autonomous charging
- Battery swapping
- Capacitive charging
- Conductive charging
- DC fast charging
- Hydrogen-powered charging
- Inductive charging
- Liquid cooled charging
- Mobile charging
- Off-grid charging
- Overhead/Pantograph charging
- Robotic charging
- Solar-powered charging
- Vehicle to home/grid charging
- Wireless charging

Charging Standards

- AC Type 1 – SAE
- AC Type 2 – ISO / IEC
- AC GBT
- DC CCS 1 & CCS2 CharIN
- DC CHAdeMO
- DC ChaoJi
- DC GBT
- DC Tesla supercharger
- DC North American Charging Standard (NACS)
- DC Megawatt Charging Standard (MCS)
- Wireless SAE J2954



Technology Trends

Antennas

- Wireless modules supporting Wi-fi & bluetooth
- Internal & External antenna for 4G/5G and GPS / Glonass

Capacitors

- Wider temperature range
- Custom HV Film Capacitors
- Increased use of Hybrid and Polymer Capacitors

Circuit Protection

- Din-rail Surge Protection in DC Chargers
- DC Busbar EMC Filters for DC Fast Chargers
- Residual Current Modules for AC Chargers

Connectors

- New charging standards - NACS / MCS - Up to 1500A
- More use of busbar technology
- Liquid cooling for currents above 500A
- Shutter outlets being used on AC Charging Equipment

Discrete Semiconductors

- 600V & 1200V Mosfet solutions
- Low voltage Mosfets and TVS protection diodes

Electromagnetic

- Custom high power inductors and transformers in DC units
- EMI suppression and filtering

Power Supplies

- New DC charging units exceeding 400kW Capacity
- Fast charge systems using modular rack power supplies
- Din-rail auxiliary power supplies used in AC Chargers

Relays

- 1500V contactors for DC applications
- 4 Pole Relays for AC Applications

Resistors

- Power Metal Strip current sense resistors
- Surface mount Thick Film power resistor technology

Sensors

- Higher current sensors for both cable and busbars
- Energy meters being used to monitor AC & DC Current use

Switches

- Enhanced sealing performance
- Need for emergency stops
- Anti-vandal proof switches



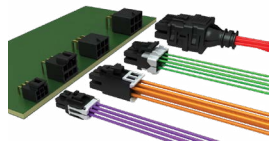
Charging Connectors

Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP
IEC Type 2 Vehicle Connectors	IEC Type 2 Mode 3 Connectors	IEC Type 2 Standard socket-outlet	IEC Type 2 Outlet with Shutter
• 500V AC • 16A, 32A, 1 and 3 Phase • 2.5 to 6mm² • TUV Certified, IP55 Mated	• 500V AC • 16A, 32A, 1 and 3 Phase • 2.5 to 6mm² • TUV Certified, IP55 Mated	• 500V AC • 16A, 32A, 1 and 3 Phase • 2.5 to 10mm² • TUV Certified, IP54 with Cap	• 250V, 32A, 1-Phase • 480V, 32A, 3-Phase • Electronic Lock Available • IEC 62196-2 standard 2-II a
			
Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP
IEC Combo 2 CCS2 Vehicle Connectors	IEC Combo 2 CCS2 Vehicle Connector Plus	IEC Combo CCS 2 - Liquid Cooled	Megawatt Charging Standard
• 1000V DC • Up to 200A • 16 to 70 mm² • TUV Certified, IP44 Mated	• 1000V DC • 400A - Air Cooled • 100 mm² (2 x 50mm²) cables • CE Certified, IP44 Mated	• 1000V DC, 600A Max. • IEC 62196-2, IEC 62196-3 • > 10000 cycles • IP67 Enclosure, IP69	• 1500V DC, 350A • IEC TS 63379 / IEC 61851-23-3 • > 20,000 Mating Cycles • IP67 / IP69
			
Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP	Amphenol INDUSTRIAL PRODUCTS GROUP	• APTIV •
MCS - Liquid Cooled	North American Charging Standard - AC	North American Charging Standard - DC	AC Charging Pigtails – Type 2
• 1500V DC, 350A or 1500A • IEC TS 63379 / IEC 61851-23-3 • Cooling - 1 feed pipe and 2 outlet pipes • IP67 / IP69	• 600V AC, 40A, 50A, 80A • SAE J1772, SAE J3400, UL2251 • > 10,000 Mating Cycles • Type 3S IP67	• 1000V DC, 200A to 600A • SAE J3400, UL2251 • > 20,000 Mating Cycles • IP67 / IP69	• IEC62196 Type II, Up to 32A, • 1- or 3-Phase • Superior product durability • CE Certified Versions
			

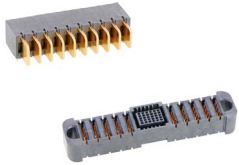
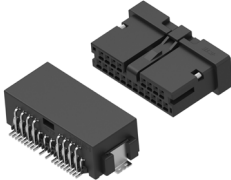
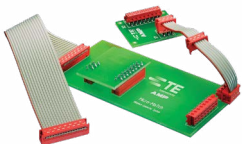
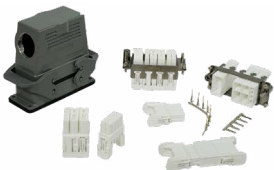
Charging Connectors

• A P T I V • AC Mode 3 Jumper Cables • IEC62196-2-1, IEC62196-2-2 and GB/T 20234 • 14,000 cycles • CE and CQC certification 	• A P T I V • AC Mode 2 Gen2 Charging Plugs • EVSE restarts in the event of power grid fault • IEC62752 standard • IP67 Protection 	HARTING AC Charging Solutions • Standard ISO/IEC 62196-2 • 230 V/400 V, 16 A, 1 / 3 phases • 400 V, 32 A, 3 phases • 400 V, 63 A, 3 phases 	HARTING DC Fast Charging Solutions • 1000V, 80A, 200A, 250A • Tested according to IEC 62196 • Ergonomic functional design • Different lengths available 
ITT cannon AC IEC Type 2 Outlet (ECIER Series) • IEC 62196 Type 2 Connector • EVSE Rear mount outlet • 20A, 32A, 63A • 1 or 3-Phase 	ITT cannon ACI3 Coupler IEC Type 2 Plug • IEC 62196 Type 2 pigtail • 20A, 32A, 63A • 1 or 3-Phase • Custom solutions available 	ITT cannon ACI3-J2 Connection Cable IEC Type 2 Plug (Mode 3) • IEC 62196 Type 2 mode 3 • EVSE to vehicle coupler • 20A, 32A, 63A • 1 or 3-Phase 	ITT cannon AC IEC Type 1 Plug (EJCV Series) • IEC 62196 Type 1 Connector vehicle inlet • 20A, 32A • Single phase (240VAC) 
ITT cannon CCS2 Fast Charging Connectors • 200A, 250A and 300A • Boost mode up to 500A • Exchangeable mating face • Uncooled 	ITT cannon CCS2 - Liquid Cooled • Charging up to 500A at 1,000V • CCS 1 and CCS 2 variants • Dielectric liquid cooled cable • Minimized cable diameter and weight 	JAE KW01C / KW01E Series (CE) • CHAdeMO 1.2 • V2H Guideline 2.1 • IEC62196-3 • 150A (@40°C) / 125A (@50°C), 500 VDC • CE Certified 	JAE KW02C Series • CHAdeMo 1.2 • V2H Guideline 2.1 • IEC62196-3 • 37 A, 500 VDC • CE Certified 

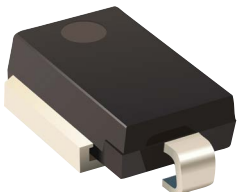
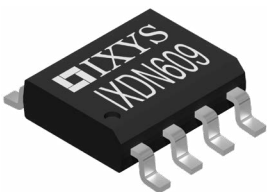
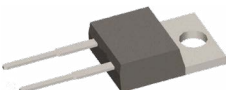
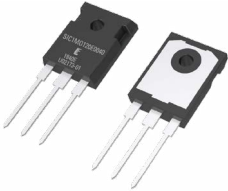
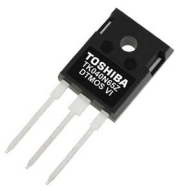
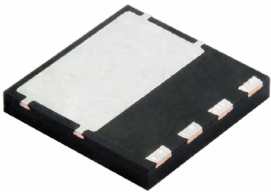
Charging & Power Connectors

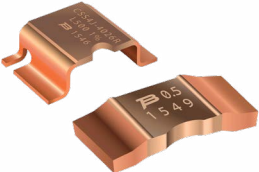
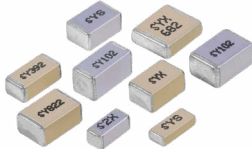
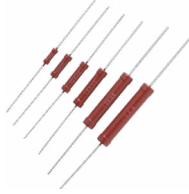
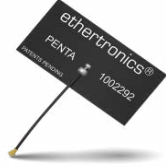
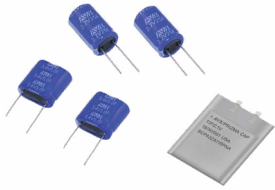
			
KW04 / KW11 / KW21 Series	AC Infrastructure Charging Sockets	CCS Charging Cables	CCS Charging Cables
• CCS Type-2 • IEC62196-3 • 150A; 200A, 1000 VDC • CE Certified (TÜV Rheinland) • Removable front cover	• 250V / 440V, 16A / 32A • 1- or 3-phase • Protective covers available • Optional shutter	• Type 1 and Type 2 versions • Up to 250 kW charging power • Built in temperature sensors • Replaceable mating face • Customizable logo	• Type 1 and Type 2 versions • Up to 250 kW charging power • Built in temperature sensors • Replaceable mating face • Customizable logo
			
			
HPC CCS Charging Cables	HPC Cooling Unit	BarKlip® Series	BarKlip® OCP 48V BK500 IO
• Type 1 and Type 2 versions • Up to 500 kW charging power • Built in temperature sensors • Replaceable mating face • Customizable logo • Cooling equipment required	• Our passive cooling unit provides demand-oriented and efficient cooling for our liquid-cooled HPC charging cables CHARX connect professional.	• 10 points of contact for high reliability • Low halogen housing • Wide operating temperature -40°C to +150°C	• Up to 500A per contact • Supports 48V Power Rack Architecture • Configurable plug-and-play solutions • Ultra-low contact resistance of 0.5mΩ
			
			
PwrMAX® connector	PwrBlade+™ Connectors	Anytek Terminal Blocks	FIT Family Power Connectors
• 100A per contact • Blind-mating • GCS® plating provides low resistance • Press-fit and solder tail termination	• Up to 60A/contact • Modular power+ signal contacts • Low profile improves airflow	• PCB & Pluggable Types • Through-hole and SMT • DIN Rail Terminal Blocks • Barrier Types	• Wide range of power outputs: 8.0 - 23.0A • UL 94V-0 and glow wire compatible • Positive locking
			

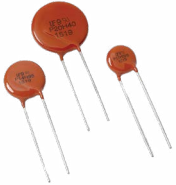
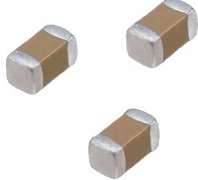
Power Connectors

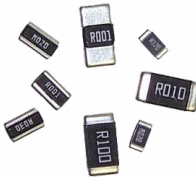
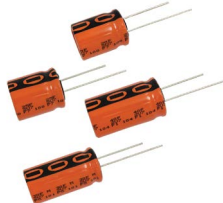
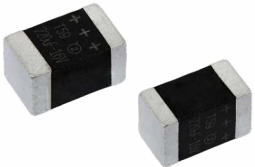
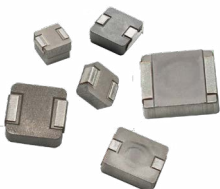
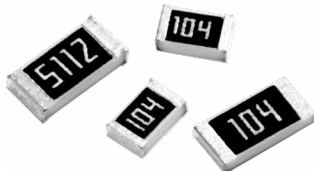
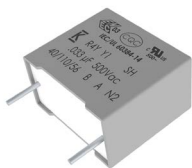
molex	molex	molex	molex
Extreme Guardian	EXTreme Ten60Power	Busbar Capabilities	PowerPlane Busbar Connectors
• 600V, 80.0A, 2-6 circuits • 6 points of contact • Positive locking housing • Isolated receptacle terminals	• Up to 60A per power blade • Available with 0 to 40 signal pins • 10mm low profile height	• Molex offers a range of busbar solutions to meet your specific power and design needs.	• Multiple points of contact • Low-voltage drop • Current: 80.0 to 300.0A • Various termination styles
			
molex	molex		
PowerWize	SW1 Interconnects	Dynamic Mini Series	Dynamic Series Connectors
• Up to 1,000V and 190.0A. • Two sizes, 6.00 and 8.00mm • Headers can be mounted on either PCBs or busbars.	• WtB/Wire-to-Busbar • 6.00mm (120.0A), 8.00mm (185.0A) and 11.00mm (300.0A) • Unique positive-locking design	• Second lock design and protective latch concept • low profile • SMT reflow capability	• Vibration resistant • Housings are keyed, preventing mis-mating and misalignment • Positive audible locking sound
			
			
Micro-MaTch Connector Family	Heavy Duty Connectors with Dynamic Inserts	HCM – High Current Modular System	Snap-Lug Quick Disconnect Power Connectors
• Tin plated contact design • One of the smallest systems available at 1.27mm • UL-recognized	• Designed for harsh environments • Improved operational efficiency • Reliable and high density contact	• 250 A / 350 A • Aluminum alloy housing • IP68 protection degree • salt spray resistance of up to 500 H	• Snap-on, quick disconnect • Shrouded design option • Color coded and keyed • Single piece installation
			

Discrete Semiconductors

BOURNS® SM8S-Q TVS Diode Series - Maximum Peak Power Dissipation: 6600 watts - Meets ISO 7637-2 / ISO 16750-2 - Compact DO-218 package 	BOURNS® 15KPA-SD-Q TVS Diode Series - Maximum peak pulse power (10/1000 µs): 15 kW - Maximum peak pulse current (8/20 µs): 1 kA - Standoff Voltage: 16 to 66 volts 	Dialight 621-Series Heavy Duty TriColor PMI - Nonmagnetic, corrosion resistant - Secured to prevent dirt, dust, and water penetration - IP66/IP67, IK10 and NEMA 4X 	 IXDN609 9A Ultrafast MOSFET Driver - Wide Operating Voltage Range: 4.5V to 35V - Matched Rise and Fall Times - Low Propagation Delay Time - Low Output Impedance 
 DMA10I1600PA 1600V Standard Rectifier - Planar passivated chips - Very low leakage current - Very low forward voltage drop - Improved thermal behavior 	 LSIC1MO120E0160 1200v SiC MOSFET - Extremely low gate charge and output capacitance - Low gate resistance for high-frequency switching - Ultra-low on-resistance 	TOSHIBA TW070J120B 1200V SiC MOSFET 1200V / 70mOhm - Embedded 1.35V SiC SBD - Robust gate drive 	TOSHIBA TK040N65Z Si SuperJunction MOSFET - Fast switching, low Qg, low Coss 650V, 40..190mOhm - TO-220(SiS), TO-247(-4), TOLL, DFN8x8 package options 
TOSHIBA TRS8E65F - 650V SiC Schottky Barrier Diodes - Low VF 1.45V 2A single to 24A dual options - TO-220 / TO-247 / DFN8x8 package options 	 SIHH11N60E - 600V Power MOSFET - Low figure-of-merit Ron x Qg - Low input capacitance (Ciss) - Reduced switching & conduction losses - Ultra low gate charge (Qg) 	 VS-E5PX7506L Hyperfast Rectifier - Hyperfast and optimized Qrr - Best in class forward voltage drop and switching losses trade off - Optimized for high speed operation 	 VOMA617A Series VOMA618A Series - AEC-Q101 qualified - High CTR with low input current - SOP-4 low profile package - High collector emitter voltage, VCEO = 80 V 

BOURNS®	BOURNS®	CHEMI-CON	CHEMI-CON
Gas Discharge Tubes	Current Sense Resistors	Nanocrystalline common mode choke coil (FW Series)	Non-flammable Metal Oxide Varistor (SV Series)
- High voltage series - High current series - Fast acting series	- Excellent long term stability - Low inductance - Low thermal EMF - AEC-Q200 compliant - Power rating up to 15 W @ 70 °C	- Style: Toroidal - Category temp range -40°C ~ +130°C - Rated current: 10 ~ 50A - Rated inductance: 1.0~1 5.7mH, 100kHz - Maximum DCR: 1.2 ~ 18 mΩmax - AEC-Q200 qualified	- Style: Radial - Category temp range: -40 ~ +125°C - Varistor voltage: 22 ~ 1,000V - Dimension: Ø5 ~ Ø20 - Non-flammable varistor - AEC-Q200 qualified
			
CHEMI-CON	knowles	KOA	KYOCERA AVXX
Radial supercap (DKH Serie)	High Voltage MLCC	HPC Ceramic Pulse Resistors	1005392F0 – 5G/4G & Wi-Fi FPC Embedded Combo Antenna
- Style: Radial - Category temp range:-20~+85°C - Rated voltage: 3V - Cap tolerance: -10 ~ +10%(K) / 25°C - Endurance: 65°C/ 2,000hrs	- Safety capacitors with 305Vac rating - Safety capacitors with 1kVdc rating - Approvals to TÜV and UL specifications	- Full ceramic body for HV and surge currents 25 kV pulse voltage (HPC 3 - 5) - Power rating up to 5 W - Non-inductive - AEC-Q200 tested	- Flexible substrate for easier integration - High performance and isolation characteristics 114 x 30 x 0.2 mm
			
KYOCERA AVXX	KYOCERA AVXX	Littelfuse®	Littelfuse®
DC Filtering Film Capacitors (FFLI / FFLR Series)	Supercaps	PSR Series	SPDx Surge Protection Devices
- Voltage Range: 600V to 3800V - Capacitance Range: 105uF to 3000uF - Aluminum cylindrical case filled with self extinguishing Polyurethane Resin.	- Superior reliability, passes 4000 hours life tests - Customized options for modules - Molded encapsulation and prismatic case options	- Best-in-class DC performance - Bolted blade-style mounting - Ceramic body material - Extremely current limiting - Fast-acting	This globally-compliant, cost-effective Type 2 Surge Protective Device has higher nominal and total discharge current protection.
			

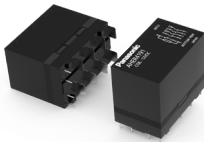
			
HMOV Varistors	Circuit Protection Power Solutions	DE1 Series Safety Caps	High Power Transformers
• High isolation voltage of 2500V • Thermal shock tested from -55°C to +125°C, 1000 cycles • High operating temperature of 125°C • Meets UL 1449 & IEC 60950-1	• Excellent current-limiting • High short-circuit current rating • Precise clamping voltage • No wear-out mechanism	• DIN 60384-14 • EN 60384-14 • UL 60384-14 • IEC 60384-14	• Wide power range options: 30kW to 400kW • Up to 5kV input output isolation, higher isolation possible • Over 99.5% efficiency
			
			
Aluminum Solid Capacitors OS-CON (SVPF series)	Hybrid Aluminum Electrolytic Capacitors (ZA series)	High Temperature Thick Film Chip Resistor (ERJH series)	Hi-Cap MLCC
• Voltage of 16-50 VDC • Capacitance of 10-1000 µF • ESR of 12-40 mΩ	• Operating Voltage Range: 25 to 63 VDC • Rated Capacitance Range: 10 µF to 330µF • Operating Temperature Range: -55°C to +105°C	• High reliability: Metal glaze thick film resistive element • Achieve maximum category temperature 175°C and rated category temperature 105°C	• AEC-Q200 qualified • VW 80808-2 qualified • Improved reliability due to Soft Termination Technology
			
			
3-Phase Filters - FN Series	EMC / RFI Chokes - RT / RV Series	Fuse Holders	2 / 3 / 4 Line EMC Filters
• Broad choice of EMC/RFI filters • Standardized and customer-specific solutions • Improves the immunity and safety of electrical and electronic equipment.	• Rated currents from 6 to 63 A • Up to 600 VAC and VDC • 2- and 3-wire configurations • Horizontal and vertical PCB mounting types	• Holders for a wide range of diverse fuses sizes • SMD or THT variants as well as panel mount • Horizontal and vertical mounting versions	• 2-line up to 1600A, 3-line up to 2500A, 4-line up to 600A • Available with low Y-Cap • EMC support and accredited measurements (IEC 61851-21-2)
			

			
DC Link	PTC Inrush Current Limiters	LRMA Series	EDLC Energy Storage Capacitors
- High reliability for severe ambient conditions - Long life - 50.000h (85°C, rated voltage) - AEC-Q200 qualified capacitors available on request	- Reduction of inrush current during charging process - Circuit protection in failure cases - Resetability	- Metal Alloy 0.5mΩ to 500mΩ, to 0.5% tolerance - High temperature to 170°C - High power & Low thermal EMF versions - AEC-Q200	- High lifetime up to 2000 h at 85 °C - Rated voltage: 3 V - High power density to 6,3 Wh/kg - Capacitance values from 5 F to 100 F
			
			
T59 Ultra-low ESR Polytan Capacitors	IHLP Inductors	MKP 1848 Series - DC Link Film Capacitor	Auto Grade Surge Resistors
100 % surge current tested - Extended voltage range up to 75VDC - Molded case 7343 EIA size - Lead (Pb)-free L-shaped face-down terminations	- Short lead times - good availability - Ten different package sizes in several material compositions - Inductance range up to 100uH	- Flame retardant - High durability - High pulse capabilities - High ripple current capabilities - Low ESL & Low ESR	- AEC-Q200 qualified - Excellent pulse loading performance - EIA case size: 0402 to 2512 - Narrow tolerance down to ±0.5%
			
			
AC Line Filters Dual Mode Coils	Metalized Polypropylene Y1-certified capacitor	Power Inductors	Wireless - Chip Antenna
- Combine two functions, normal mode and common mode, in one coil - High impedance & High permeability	- AC Input/Output EMI filtering - Class Y1 (IEC 60384-14) + THB Grade IIB - AECQ-200	- One turn coil ferrite - Up to +125°C - High switching frequency - Low core loss - Low DCR	- For Sub-GHz, WLAN/BT/ISM, GPS/GNSS, UWB LTCC technology - AEC-Q200 qualified - Technical support for tuning
			

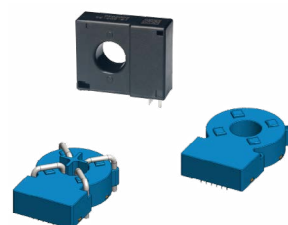
Power Products & Supplies

			
FCM 30 kW Evergreen™ Shelf AC-DC	LCC Series	Surge Protection Device - 1210 Series	Surge Protection Device - SPD2-550-3P0-R
- Instant customization - Fast delivery of tailored solutions - Modularity - Quick power scaling 38 W/in3 - More power in less space > 95% efficiency - Reduced utility costs	250W/ 650W full power - IP64 rating with wide operating range - No fan needed as conduction / convection cooled	100 kA max. discharge current rating - Multi-pole uni-block design - DIN Rail mountable - UL 60691 compliant integrated thermal disconnect	- Capability to clamp and withstand high-energy transients - Compact footprint - Visual life indicator - Pluggable modules
			
			
IRM/MPM Series AC/DC Power Supplies	HDR, TDR, WDR Din Rail Power Supplies	EV100 / EV101 DC Fast Charger	Charx - DC Energy Meters
1-90W miniature encapsulated universal AC input with high efficiency - Wide operating temperature and robust design	- Class I & Class II Isolation - DIN Rail TS 35/ 7.5 or 15 mountable - No load power consumption <0.75W (features can vary per each series)	- Output voltage of 150 to 1,000 – Volts DC (settable) - Maximum output power of 30 kW - Peak efficiency >96%	- Our MID-certified EMpro DC energy meters are suitable for the exact billing of HPC charging processes. - The meters are optimized for e-mobility applications.
			
			
Charx - charging controllers	Charx - Power Electronics & Distribution	Charx - Surge Protection	Energy Meter DRS-100-3P-MOD-01
AC and DC charging controllers with scalable range of functions for private, commercial, and public charging stations	AC/DC and DC/DC converter modules and matching distribution modules for 19" rack mounting for stable supply of fast charging stations – highly efficient, scalable, and quick to install.	Special surge arresters for protecting charging stations and electric vehicles against damage due to lightning strikes and switching operations – for permanent availability.	- MID D Certified - Direct connect to 100 A - Easy to program and Din Rail mount - Accurate and Cost effective
			

Relays & Contactors

			
DCNLEV50	DCNEVT500	G7EB PCB AC-Power Relay	G9KA PCB-Power Relay
• High current (50A) and high voltage (900V) contactor for charging applications • Epoxy resin ensures hermetic sealing • IP67 sealed	• High current (500A) and high voltage (1800V) contactor for charging applications • Ceramic arc chamber • Withstand higher pressures and temperatures longer	• High Power and high temperature type Power Relay with 480 VAC 100 A current	• High Power and high temperature type Power Relay with 800 VAC 200 A current
			
			
G9KC PCB Power Relay	HER Series	HES Series	HVC50 Series
• High Capacity - 480V AC, 40 A • 4-pole High Power Relay • Low contact resistance: 6 mΩ max. • Contact gap: 3.6 mm min.	• High Capacity - 480V AC, 40A • Terminals for a 3-phase system • Compact size • Contact gap: Min. 3.6mm	• Size 2a and 2a1b 40A power relays • Max Switching Current 40A • Contact gap 3.2mm (VDE0126) • EN60947-4-1 mirror contact compliant	• Up to 1500V DC and 600V DC • Dual coil with coil termination • Coil termination with TVS diode • Main terminals without polarity
			
			
HVC45 Series	ECK Series	ECP Series	K1K 1000V/1.000A High Power Relays
• Up to 1000V DC and 300A DC • Bi-directional design • High short circuit handling capability up to 10 kA • Very compact size	• 1000V DC, up to 250A DC • Hermetically sealed with ceramic technology • Switching voltage up to 1000VDC • Bi-directional contacts	• Up to 1500VDC at 1000A • Continuous current capacity of 800A • Hermetically sealed with ceramic technology • Allows bi-directional load	• High Performance in a Compact, Lightweight, Hermetically Sealed Contactor • Designed for up to 1000 V / 1000 A in Harsh Environment
			

Sensors & Switches

Amphenol Advanced Sensors	Amphenol Advanced Sensors	Amphenol Advanced Sensors	PIHER sensing systems an Amphenol® company
Type NKA NTC Chip Thermistors	Type DK & GE Glass Encapsulated NTC Thermistors	WTF083B001 Coolant Temperature Sensors	TMR Current Sensor
- Versatile NTC chip thermistors with SN-coated Alloy 52 leads - Three coating options: Epoxy – max 155°C HTF1 – max 170°C CR1 – max 190°C	- Hermetic glass seal, voltage isolation and excellent stability - Temp. range -40 to + 300 °C - Resistant to corrosive atmospheres and harsh environments	- Versatile coolant temp. sensor - Compact IP67 design with integrated connector - Operating temp. range -40 to +100 °C	- Open loop current transducer based on Hall effect 3-phase busbar mount // 3 simple analog ratiometric outputs - Galvanic separation between power and control
			
APEM an IDEC company	Honeywell	YAGEO GROUP KEMET	Littelfuse
PBA-Series	CSNV1500 Series	FG-RO5 Current Sensors	RCM14 residual current monitor Series
Sealed to IP68 or IP69K, easy to clean robust metal surface	- Measures up to 1500 A - High accuracy, low temperature drift - Excellent stability, reliability and EMC performance - CAN communication	- AC and DC leak current sensor - Digital output fault detection - Complies to IEC62752:2016 - New revisions coming	- Multiple models to support global standards for Level 2 (UL2231-2), Mode 2 (IEC62752) and Mode 3 (IEC62955) AC EV chargers - UL2231-2 compliant model
			
Panasonic INDUSTRY	TE connectivity AUTHORIZED DISTRIBUTOR	TE connectivity AUTHORIZED DISTRIBUTOR	TE connectivity AUTHORIZED DISTRIBUTOR
ESB33 Push Switches	AV Series Vandal Resistant Switches	35H / 1-Position HV Rotary Switches	AST2000H2 series hydrogen pressure transducer
- Automotive qualified - Low profile, h=6.0 mm - SMD type (Embossed taping) available 2-pole 2-throws are available	250VAC and 5A push button switch	Mechanical switch which can handle switching currents up to 550A and a voltage of 1000VDC	- One piece design - All 316L wetted material for optimal compatibility - No oil-filled cavities leave no chance of containment - Digitally compensated
			



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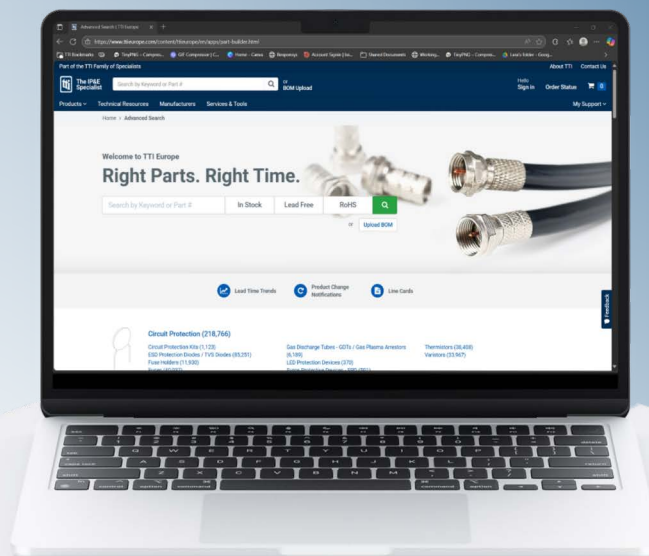
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