



IP&E News

2nd Quarter 2024

ARROW



Drive progress

With the future of transportation constantly evolving, our solutions help you navigate the road ahead. Learn how to start your journey at [arrow.com](https://www.arrow.com)



ARROW
Five Years Out

Content

| | |
|--|----|
| Arrow | |
| EV Charging Infrastructure Landscape..... | 4 |
| 3M | |
| Effective Machine Vision Interface | 9 |
| Amphenol | |
| DuraEV™ Connectors | 10 |
| Bourns | |
| Magnetic Components for EV Charging | 11 |
| HellermannTyton | |
| Cable clip for edges: the EdgeClip..... | 12 |
| JST | |
| Compact Wire-to-Board Crimp Series BSS | 13 |
| KOA | |
| Precision Chip Resistors | 14 |
| Kyocera AVX | |
| Power Film Capacitors..... | 15 |
| Littelfuse | |
| AEC-Q200 qualified varistor..... | 16 |
| Molex | |
| Evolution of enhanced EV charging..... | 17 |
| Omron | |
| D2FP Ultra Subminiature Basic Switch | 18 |
| Panasonic | |
| Panasonic Industry's DW-Y relay | 19 |
| Panduit | |
| High Voltage Clamps from Panduit..... | 20 |
| TDK | |
| EV DC Fast Charging Solutions | 21 |
| TE Connectivity | |
| ERNI VolTron 1000V Connector | 22 |



EV Charging Infrastructure Landscape

Electric Vehicle Supply Equipment (EVSE)

How the EV charging infrastructure is evolving and key IP&E technologies to consider

Authors:

Nuno Dias, Technology Segment Leader • Supplier Marketing – Marketing
Stefan Borgås, Technology Segment Leader • Supplier Marketing – Marketing

In Europe, we mainly see two main charging options for electric vehicles (EVs):

AC charging (Residential, Workplace, and Public Charging): using single or three phase inputs the power level generally ranges from 3.7 kW to 22 kW, depending on the charging infrastructure and the capabilities of the charging station. There's no power conversion done in these chargers; besides communication and safety, they only provide the AC power to the vehicle's on-board charger (OBC), which then converts AC to DC to charge the battery. The real charging power depends then on the OBC and not

on the AC charger, assuming the AC charger covers the OBC power level. These chargers typically have a charging socket and rely on the user to bring the cable.

DC Fast Charging (Public, Highway, and fleet charging): These charging stations have built-in converters that take the AC power from the grid and convert it to high-voltage DC power that can charge an EV battery quickly, bypassing the OBC, with power levels that typically range from 50 kW to 150 kW. These chargers always have built-in high-power charging cables and connectors, typically including cooling solutions.

Future trends for the EV charging infrastructure

The future of EV charging infrastructure is expected to see several key trends emerge, driven by the ongoing growth of the electric vehicle market:

Focus on faster charging technologies

There will be a push towards faster charging solutions to reduce charging time and improve convenience for EV owners, while also enabling commercial vehicles and heavier transportation (trucks, ships, or planes) to be converted to BEV (Battery Electrical Vehicle). As such, high-power DC charging stations capable of delivering more than 150 kW are becoming more common, allowing for quicker charging times, but requiring even more efficient power conversion and charging technologies to reduce energy losses.

These chargers have higher hardware complexity and requirements, increasing component count and value. One relevant example is the new Megawatt Charging System (MCS) standard, which uses higher voltage, higher current, and a new charging connector for large battery electric vehicles. The new chargers and connectors must be rated for charging at a maximum rate of 3.75 Megawatts (3,000 Amps at 1,250 Volts DC).

It is being advanced by the CharIN organization, with aspirations that it becomes a worldwide standard charging connector for large and medium commercial vehicles. Several EV charger manufacturers in Europe are already developing MCS chargers' prototypes, and while still under development, MCS deployment is expected to pick up pace in the coming years, especially along key freight corridors.

Smart charging and grid integration

The charging infrastructure will become increasingly intelligent, with features like scheduling, dynamic load balancing, flexible tariff charging and smart charging that can optimize energy usage and minimize strain on the power grid. Additionally, advancements in vehicle-to-grid (V2G) technology could allow EVs to interact with the grid, potentially providing electricity back to the grid during peak demand periods. This bi-directional flow of electricity can help stabilize the grid, support renewable energy integration, and potentially provide financial incentives to EV owners.

| | North America (US standard and used early in European cars, usually in imported cars) | Europe (common EU standard, in every new European car) | Japan/Korea (in Europe in older asian cars from Nissan/KIA etc., or in imported cars) | China (only in cars produced for Chinese market) | Tesla (only in US, in Europe new Teslas use Type 2 connector) |
|----|---|---|--|--|---|
| AC | TYPE 1 (SAE J1772 / IEC 62196 - 2)  | TYPE 2 (IEC 62196 - 2)  | TYPE 1 (SAE J1772 / IEC 62196 - 2)  | GB/T (20234.2-2011)  |  |
| DC | CCS TYPE 1 (SAE J1772 / IEC 62196 - 3)  | CCS TYPE 2 (IEC 62196 - 3)  | CHAdEMO  | GB/T (20234.3-2011)  |  |

Standard charging interfaces:

Europe:

Type 2 / CCS Type 2: This is the most widely used charging interface in Europe for both AC and DC charging.

Some older Japanese/Korean or Tesla cars still use CHAdEMO or the Tesla connector, and so most public DC chargers have those options available too. Otherwise, users can use the Type 2 connector with an adapter.

North America:

Type 1 / CCS Type 1 was the standard charging interface. At the same time, Tesla grew exponentially their charging network using their proprietary interface. With the new North American Charging Standard (NACS), the Tesla connector is expected to become the dominating standard in North America as it has been opened for use to other manufacturers in November 2022 and is already being adopted not only by EV charger manufacturers but also automotive OEMs.

China: GB/T:

China has adopted the GB/T standard for electric vehicle charging, which is used for both AC and DC charging.

Japan:

Adopted the CHAdEMO charging standard for DC fast charging and the Type 1 for AC charging.

Key trends for the future of EV charging infrastructure

These trends are expected to accelerate the adoption of electric vehicles by improving the convenience, speed, and flexibility of charging, as well as enabling new uses for electric vehicle batteries.

- Focus on faster charging technologies
- Smart charging and grid integration
- Renewable energy integration and energy storage
- Increased accessibility and ease of use
- Diversification of charging solutions

Renewable energy integration and energy storage

There will be a push to integrate renewable energy sources, such as solar and wind, with charging infrastructure. This will help reduce greenhouse gas emissions associated with charging EVs and contribute to a cleaner energy mix. Adding energy storage solutions will allow to go even further on grid power stabilization, reducing peak power required from the grid as well as improving overall energy utilization.

Increased accessibility and ease of use

As the adoption of electric vehicles continues to grow, there will be an increasing need for more charging stations, that are not only more accessible but also easier to use.

Smart features, like Plug & Charge, will see a rise in development and implementation. Plug & Charge is a new concept introduced by ISO 15118 which specifies the ways the vehicles communicate with charging devices and also defines preconditions for identification, enabling the charging device and the backend service to identify the car and its owner when the vehicle is plugged

in, and allowing automated communication and billing processes between the electric vehicle and the charging station without any need external identification (e. g. RFID cards, Debit/credit cards or charging apps).

It's a future-proof way for seamless EV charging that simplifies the charging process for EV drivers, aiming to make the charging experience even less complicated.

Diversification of charging solutions

Beyond the traditional station model, we might see innovative options like wireless charging pads embedded in roads or parking spaces, offering a seamless charging experience. Additionally, the sharing economy might play a bigger role, with individuals renting out their home chargers to other EV drivers for additional income. Lower power DC bidirectional chargers (typically from 7.4 kW up to 22 kW) might also gain further traction replacing traditional AC wall boxes for home or businesses, not only enabling V2G/V2H but potentially also making the on-board chargers present in most electric vehicles an optional accessory, so that EVs can become cheaper and lighter (no longer need to convert AC to DC inside each car).



| Focus IP&E technologies for EV charger design: | |
|---|--|
|  | EV charging cables, connectors, and sockets , from standard of-the-shelf AC charging cables to customized water-cooled DC charging cables and connectors. |
|  | AC/DC and DC/DC power supply modules , like DIN-rail, panel mount or PCB mount, typically from 5W up to 1kW, with output voltages from 48 VDC down to 3.3 VDC, to power all the peripheral electronics. |
|  | Contactors (DC) and relays (AC) , panel mount or PCB mount |
|  | Thermal management (fans and heatsinks) |
|  | DC-link capacitors , used in DC chargers as part of the power factor correction (PFC) stage followed by an isolated DC-DC conversion stage. |
|  | Filter inductors and EMI filters , used to filter out high-frequency noise and to suppress electromagnetic interference in the charger. |
|  | Transformers , used in the power conversion stages of the chargers. Particularly high-frequency and high-power transformers are becoming increasingly relevant with the growing use of Silicon Carbide (SiC) MOSFETs in DC EV chargers. |
|  | High power fuses and other circuit protection devices (over-voltage, over-temperature, over-current) |
|  | <ul style="list-style-type: none"> • Current sense resistors to measure current levels. • High power / pulse resistors for DC link discharge. |
|  | Switches are used both for the user interface (e.g.: antivandal switches), but also detection switches, for monitoring open cabinet doors or charging connector placement. |
|  | <ul style="list-style-type: none"> • Board to Board connectors and headers, mainly used for communication. • Terminals blocks for grid connection. • Standard and customized low-inductance bus bars and crimp terminals |
|  | Antennas for all forms of wireless communication, from LTE/5G to WiFi or Bluetooth. |

You can find in this issue:



Connectors from Amphenol



Magnetic Components from Bourns



Precision Chip Resistors from KOA



Varistors from Littelfuse



Capacitors from Kyocera AVX



D2FP Ultra Subminiature Basic Switch from Omron



Fast Charging Solutions from TDK



Connectors from TE Connectivity



Effective Machine Vision Interface

The growing need for real-time machine intervention force advancements in signal speed and range for the equipment involved.

The future of machine vision

With a quickly expanding machine vision market, expect user-friendly interfaces to follow. This will accelerate factory automation by enhancing robotic capabilities and data transmission, ultimately taking production to new levels.

The manufacturing industry is undergoing a transformation, embracing automation and artificial intelligence (AI) as part of Industry 4.0. This shift places machine vision at the forefront, driving productivity across a growing range of applications. Mounted on fixed or moving platforms, machine vision systems can minimize operator involvement, gather crucial quality data, detect defects, manage inventory, and even identify emergencies. These capabilities translate to reduced downtime, minimized waste, and enhanced quality control. A variety of new cables and connectors have appeared to meet this need for increased interface capability, offering different options for companies to balance greater reliability with budget constraints during a time of unprecedented labor shortages.

Demand for reliable connections

The unique requirements of each production line call for a variety of different interfaces to achieve optimal performance. Depending on the task, manufacturers might seek out an interface that can carry large amounts of high-resolution data, prioritize the flexibility to carry data from a moving platform (such as a camera mounted on a highly mobile robot arm), aim for reduced delays for machine vision performing real-time tasks, or plan to connect multiple cameras at once.

As operator presence is reduced and production becomes increasingly reliant on machines to identify waste points or downtime events, unreliable machine vision is a risk that factories simply cannot afford to take. Manufacturers seek equipment that is easy to maintain and provide high-quality, reliable performance. Among these requirements, bandwidth and length have always posed the greatest challenge, and cables and connectors that meet those standards can be expensive.

Choosing the correct interface for the application

There are many factors to consider when deciding if an interface is right for a specific application. Vendors can assist in the selection process to determine what interface the network, inventory, and space available on site allow for – and what changes may have to be made to enable higher performance.

Orderable Part Number at arrow.com

- [3M USB3 Vision](#)
- [3M Camera Link Cable Assemblies](#)



Click here or scan QR-Code to find more information on arrow.com

| | GigE Vision® | USB3 Vision® | Camera Link® | CoaXPress (CXP)® |
|---|--------------|--------------|--------------------------------|---------------------------------|
| Bandwidth | 115 MB/s | 400 MB/s | 225MB/s (Base) 680 MB/s (Full) | 600 MB/s (CXP6) 1.2GB/s (CXP12) |
| Cable length | 100 m | 10 m | 8-10 m | 10-35 m |
| Multiple camera connection | Good | Excellent | Fair | Fair |
| Standard PC architecture | Yes | Yes | No | No |
| Need additional hardware (Frame Grabber Board) | No | No | Yes | Yes |
| Realtime triggering | Poor | Fair | Excellent | Excellent |
| Easiness of system integration | High | High | Low | Low |
| System cost | Low | Low | High | High |

DuraEV™ Connectors from Amphenol

Portable and fixed battery charging and discharging connectors.



Amphenol's DuraEV™ is a standard connector solution with cable assemblies offered with 2 power and 4/6 signal pins which employs a patented contact system capable of carrying a consistent 70 A current with 10,000 mating cycles. With an IP67 rating in both mated and unmated states (with IP cap on socket side), the DuraEV™ boasts finger protection along with a first mate last break (FMLB) function for power terminals, alongside connector position assurance (CPA) for reliable locking mechanisms. They come with an IP cap for the socket side and an optional IP cap for the plug side to prevent the ingress of foreign materials. The DuraEV™ is a connector designed specifically for swappable and fixed batteries, setting a new standard in the realm of e-mobility EV charging.

Features

- 10,000 mating cycles
- Hybrid 2 Power, 4/6 signal connector
- Operating temperature from -20 °C to +90 °C
- PokaYoke mating
- Employed UL94V-0 rated materials
- Optional IP cap for plug
- FMLB (First Mate Last Break) for power terminals
- DuraEV provides a consistent 70 A current

Benefits

- Highly durable
- Various range of applications
- Suitable for wide range of application environments
- Easy and efficient assembly during mating
- Ensures application safety
- Prevents ingress of foreign material
- Power sequencing helps for safe plugging

Orderable at arrow.com

- [AU10169535-J24CBLF](https://arrow.com/p/AU10169535-J24CBLF)
- [AU10169534-J24CBLF](https://arrow.com/p/AU10169534-J24CBLF)



Magnetic Components for EV Charging



Particularly well-suited for input filter applications in EV charging systems, Bourns® Model 04770x Common Mode Chokes feature a compact package size with broadband damping characteristics and excellent attenuation for symmetric and asymmetric noise. The Model 04770x Series operates in a wide temperature range of -25 °C to +125 °C and offers a current rating range of 10 A to 14 A and a DC resistance range of 0.0073 Ω to 0.0115 Ω. These halogen-free chokes feature glue-free construction and compliance with EN 138100 standards and RoHS requirements. Typical Model 04770x Series Common Mode Choke applications include frequency converters, drives and control circuits, wall boxes, and power supplies. This series is very well suited for input filter applications in EV charging systems.

Bourns® Model 2300HT Series High Current Toroid Inductors feature low magnetic radiation, high current capacity, high temperature rating up to +200 °C, horizontal or vertical configuration and competitive cost. This series is very well suited for output chokes in EV charging systems.

Bourns® Model PLN0xx Series Planar Transformers are flyback converter transformers operating at a switching frequency of 200 kHz with low leakage inductance at 0.5 μH. The available output voltages are from 3.3 to 24 V with output current from 2.4 to 21 A, all of which can withstand Hi-Pot at 1500 Vrms. The operating temperature range is from -40 °C to +125 °C for these low profile, RoHS compliant, surface mount components. The Model PLN0xx Series has high efficiency with excellent DCR, and is suitable to be used in various applications, including flyback transformers for high power PoE applications, industrial power systems, Switched-Mode Power Supplies (SMPS), LED lighting, and Battery Management Systems (BMS) in EV charging systems.

Orderable at arrow.com

- [04770x](#)
- [2300HT](#)
- [PLN0xx](#)



Click here or scan QR-Code to find more information on arrow.com

Cable clip for edges: the EdgeClip

EdgeClips provide a practical alternative wherever drilling holes, bolting to weld studs or using adhesives is not an option.



Securely fastening cables, wires, hoses or conduits can be a challenge, especially in confined spaces. A growing range of cable clips for edges provides a practical alternative wherever drilling holes, bolting to weld studs or using adhesives is not an option.

EdgeClips are tiny cable tie mounts held in place by u-shaped spring steel claws. They provide practical anchor points on construction edges for securely fastening wire harnesses, cables, hoses or conduits with cable ties, which they come supplied with.

Utilising the component edge makes EdgeClips a flexible solution for engineers designing for secure and efficient cable routing in vehicles, machinery and appliances. They are simple to push on by hand and withstand considerable pull-off forces.

The EdgeClip product series covers a variety of common edge thicknesses

ranging from 0.5 – 2.5 mm up to 6.0 – 8.0 mm. The smallest EdgeClip can even be secured on edges only 6.0 mm in height.

A variety of EdgeClip geometries makes it possible to align the cable tie vertically or horizontally on, along or across an edge.

Orderable Part Number at arrow.com

- [151-00429](#)
- [150-40591](#)
- [156-01546](#)
- [150-76079](#)
- [156-01543](#)
- [156-05904](#)
- [156-01545](#)
- [150-92600](#)
- [156-01542](#)
- [156-00015](#)
- [156-01797](#)



Compact Wire-to-Board Crimp Series BSS

A new, compact series introduced from JST Deutschland GmbH

JST Deutschland GmbH presents a new, compact wire-to-board crimp series in the pitch of 3.0 mm for the use up to max. 7A (AC/DC) (when using AWG 18 / 4 & 6 pin - pls. see current rating list):

| No. of circuits | wire size (AWG) | | |
|-----------------|-----------------|-----|-----|
| | #18 | #20 | #22 |
| 4 | 7 | 6 | 4 |
| 6 | 7 | 6 | 4 |
| 8 | 6 | 5 | 4 |
| 10 | 6 | 4 | 4 |

The series BSS is characterized by a high current carrying capacity and very compact dimensions:

- Header height 11.5 mm
- incl. female part 15.8 mm
- 6 circuits: 10.8 x 14.0 mm (width x depth)

Using the BSS connector with SMT headers makes DIP process unnecessary. The production time is shortened, which leads to a reduction in costs and soldering effort.

Due to the design of an integrated suction area on the top side of the header, no suction tape is required; the header can thus be equipped automatically.

Two types of keying are available (Type A and Type B for 4 & 6 circuits).

The BSS series has an inertia lock mechanism with a housing lock strength of at least 40N (6 circuits or more).



Features

- Voltage rating: 250 V AC/DC
- current rating: 7.0 A / AWG 18 / 4 & 6
- Applicable wire: AWG 18 – 22 / insulation o.d. 1.5 – 2.1 mm (UL 1007)
- Flammability: UL94V-0

Benefits

- Two types of keying (4 & 6 circuits)
- inertia lock mechanism
- Space saving dual-row layout
- SMT headers top entry with integrated suction area
- Housing Colors: natural & yellow
- Handtool for terminal SBSS-21T-M0.7: YRK-1860

Standards

- TÜV R50541992 (IEC 61984:2008)
- UL E60389

Examples of possible applications

- Air conditioners
- Printers
- Cooking appliances
- Vacuum cleaners
- Power storage systems
- Projectors
- Control equipment's



Click here or scan QR-Code for more information on Series BSS



Click here or scan QR-Code to download full JST product overview



Precision Chip Resistors

High Precision & High Reliability Chip Resistors

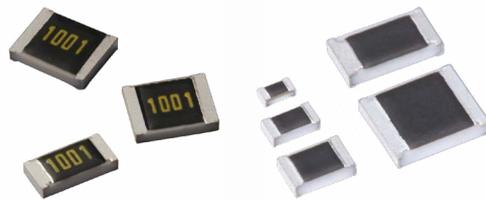
Applications

- Automotive
- Motor controls
- AC adapters
- A/D signal conversion
- Switching boards
- Industrial equipment and measurement
- Medical equipment

Thin Film Technology – RN73R/ RN73H-Series

KOA's RN73H-series thin-film chip resistors have been designed to offer highest precision resistor solutions for tough environments, especially in automotive and industrial applications.

Tolerances are available to $\pm 0.05\%$ and TCR to as low as ± 5 ppm/K. A special protection layer in combination with a high heat resistant epoxy coating on top of the enhanced resistive element yields superior moisture stability.



Features and Benefits

- $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$ or $\pm 1\%$
- T.C.R.: ± 5 , ± 10 , ± 25 , ± 50 or ± 100 ppm/K
- $\pm 0.1\%$ ~ Long term stability
- $10\ \Omega$ to $1.5\ M\Omega$
- 0402, 0603, 0805, 1206, 1210 inch
- Ni/Cr metal thin film resistive element
- Excellent heat resistance, high power rating
- RN73R: NEW standard thin film version
- RN73H: for automotive with improved moisture resistance by additional inner SiO₂ protection
- EU-RoHS compliant, AEC-Q200 tested

Orderable at arrow.com

- [RN73R \(High Precision, High Heat Resistance, High Reliability\)](#)
- [RN73H \(High Precision, High Heat Resistance, High Reliability, Automotive\)](#)

Applications

- High precision circuits for automotive and industrial
- Motor controls
- AC adapters
- A/D signal conversion
- Switching boards
- Industrial equipment & measurement
- Medical equipment

Thick Film Technology – RS73-Series

KOA's new RS73-series are ESD transient tolerant high precision and high reliability resistors using thick film technology. The RS73-series is ideal for precision designs such as high-accuracy sensing or voltage detection circuits, where ESD sensitivity is an issue. This new series also features excellent long term stability. It is an ideal alternative in applications where thin film precision devices cannot be used.



Features and Benefits

- $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$ or $\pm 1\%$
- T.C.R.: ± 25 or ± 50 ppm/K
- $\pm 0.2\%$ ~ Long term stability
- $10\ \Omega$ to $10\ M\Omega$
- 0402, 0603, 0805, 1206 inch
- Ideal for applications where thin film is not suitable
- Anti-Sulfuration type also available (RS73-RT)
- EU-RoHS compliant, AEC-Q200 tested

Orderable Part Number at arrow.com

- [RS73F: T.C.R. \$\pm 25\$ ppm/K, 0402, 0603, 0805, 1206](#)
- [RS73G: T.C.R. \$\pm 50\$ ppm/K, 0402, 0603, 0805, 1206](#)
- [RS73F RT: Anti-sulfuration, T.C.R. \$\pm 25\$ ppm/K, 0402, 0603, 0805, 1206](#)
- [RS73G RT: Anti-sulfuration, T.C.R. \$\pm 50\$ ppm/K, 0402, 0603, 0805, 1206](#)



Power Film Capacitors

The KYOCERA AVX Series FFVE/FFVI for DC Fast Charging Stations of EVs

Applications

DC filtering, low reactive power

The KYOCERA AVX Series FFVE/FFVI for DC Fast Charging Stations of EVs

Electric vehicles & their infrastructure (Charging Stations) have become prevalent, with hybrid cars being a common sight on roads as individuals seek environmentally-friendly transportation options. Additionally, various commercial and public electric vehicles, including trains, trams, buses, and industrial trucks and equipment, are regularly utilized. The electronic systems and components enabling this diverse range of electric vehicles have undergone significant evolution, including the DC link power capacitor.

Capacitors play a crucial role in electric vehicles by preventing ripple currents from returning to the power source and smoothing out DC bus voltage fluctuations. They are also utilized to safeguard semiconductors, initially thyristors but now predominantly IGBTs. Metallised film has emerged as the preferred capacitor technology for electric vehicles & charging stations (and other medium to high power applications).

One of the KYOCERA AVX Products series which fits perfectly for DC Fast Charging Applications is the FFVE/FFVI Series. The series uses a non-impregnated metallized polypropylene or polyester dielectric, which features a controlled self healing process, specially treated to have a very high dielectric strength

in operating conditions up to 105 °C. The FFV special design gives this series a very low level of stray inductance (18 nH to 40 nH). Furthermore, the performance levels of the FFVE capacitor makes them a very interesting alternative to electrolytic technology, because they can withstand much higher levels of surge voltage, very high rms current ratings, and longer lifetimes.

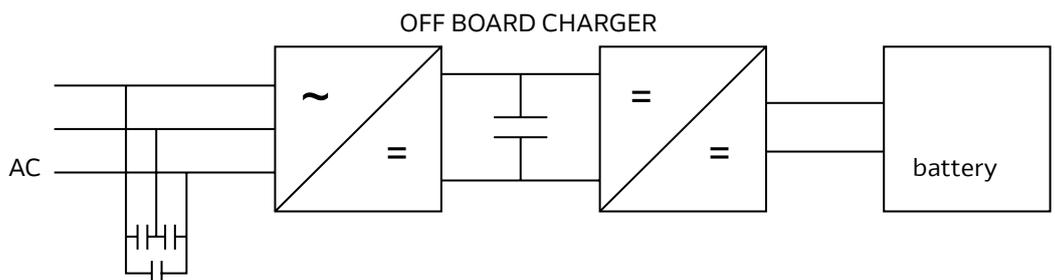
Features & Benefits

- Voltage Range: 300 V to 1900 V
- Capacitance Range: 12 uF to 400 uF
- Female and male threaded

Orderable Part Number at arrow.com

- [Series FFVE](#)
- [Series FFVI](#)

| FFVE / FFVI / FFWE / FFWI | |
|---|----------------------|
|  | |
| Voltage | 1900 Vdc |
| Capacitance | 400 µF |
| Temperature | 105 °C |
| Ripple Current | 110 Arms |
| Standards | IEC61071, IEC61881 |
| RoHS | FFWE & FFWI Versions |
| Technology | Metallized Film, Dry |





AEC-Q200 qualified varistor

SM10 Series is designed to provide superior transient surge protection in automotive electronics, electric vehicles, etc.

SM10 Series is designed to provide superior transient surge protection in automotive electronics and electric vehicles.

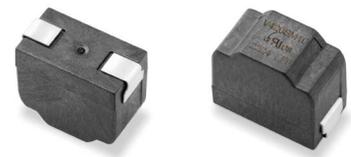
Littelfuse launches SM10 Series Varistor: A Breakthrough in Automotive and Electronics Surge Protection

The SM10 Series Varistor is a game-changer in the industry, offering:

- **High Operating Temperature:** Able to withstand temperatures up to 125 degrees Celsius, ensures reliability in harsh conditions.
- **AEC-Q200 Compliance:** Meets rigorous automotive electronics standards, suitable for Electric Vehicles (EVs) and charging stations.
- **Ultra-High Surge Capability:** Excellent repetitive surge capability handles up to 40 pulses of 6 KV / 3 KA surges, significantly extending product reliability and lifespan.
- **Compact Design:** With dimensions of 15.7 mm x 8.5 mm x 14 mm, it saves valuable PCB surface space and is ideal for automated SMT PCB assembly processes.
- **Wide Voltage Rating:** Ranging from 130 Vac to 625 Vac, accommodating a broad spectrum of electronic applications.

The SM10 is ideal for a variety of demanding applications, including:

- Automotive electronics
- Electric vehicles and charging stations
- Building automation
- Appliances
- Consumer electronics
- Power storage systems
- High-end power supplies



Click here or scan QR-Code to find more information on arrow.com

Comparison of SM10 Series with existing Littelfuse product series

| Parameter | New Series SM10 | SM7 | SM20 | AUMOV: V14H |
|---|--|----------------|--------------------------|---------------------------|
| Automotive Grade | AEC-Q200 Compliant | N/A | N/A | AEC-Q200 Compliant |
| Component Mounting | SMD | SMD | SMD | Through Hole |
| Operating Ambient Temperature | Up to 125 °C | Up to 85 °C | Up to 85 °C | Up to 125 °C |
| Maximum Peak Current (8/20 µs 1 Pulse) | 5000 A | 1200 A | 6500 A | 6000 A |
| Nominal Discharge Current (8/20 µs 15 Pulses) | 3000 A | 250 A | 2000 A | 3000 A |
| Repetitive Surge Rating | 130 Vac~230 Vac: 15 pulses of 6 kV / 3 kA; 250 Vac~625 Vac: 40 pulses of 6 kV / 3 kA) | N/A | 6 kV / 3 kA: 7 pulses | 6 kV / 3 kA: 15 pulses |
| Voltage Range | 130 Vac-625 Vac | 50 Vac-510 Vac | 20 Vac-320 Vac | 14 Vac-625 Vac |



Evolution of enhanced EV charging

Explore the key challenges of evolving charging needs as we transition towards more efficient and reliable EV solutions.

As the demand for electric vehicles (EVs) and enhanced EV charging options increases, engineers face design challenges to deploy more charging stations.

A growing global emphasis on transformational energy is converging with consumer expectations in the transportation space involving safety, comfort, convenience and functionality – spurring a revolution in automotive architecture and a shift toward electric vehicles (EVs). With EVs expected to become increasingly prevalent on our roadways, there's also a rising call for broader implementation of both commercial and residential EV charging stations designed to help expedite battery replenishment.

As a result, engineers everywhere are grappling with complex design dynamics as they consider ways to deploy more EV charging stations along streets, on highways, in homes and at workplaces. Since EVs are still an emerging market, brand reputations are riding on these critical decisions. In this environment of intensified awareness, an expanded EV charging infrastructure needs to address important factors like safety, usability, reliability and evolving regulatory standards.

Key design challenges

As regions around the world explore EVs, designs are advancing and the market is slated to gain speed. In fact, according to UBS Investment Bank, EVs are predicted to account for 20 % of new car sales worldwide by 2025 and 50 % by 2030. Similarly, JP Morgan notes that hybrid gas-electric vehicles will represent nearly a quarter of automotive sales worldwide by 2025. Yet several key challenges are still being addressed to help EV charging innovations follow suit. These include:

- Faster charging
- Battery enhancements
- Thermal management

A changing charging landscape

As the need for enhanced EV charging accessibility and efficiency becomes more imperative, additional technological and infrastructural advances are also lending comprehensive support. For example, while the 12 V power model has been an automotive industry standard since the 1950s, changing emissions laws are combining with the dynamics noted above to drive a shift toward 48 V design.

Read on for timely insights regarding EV charging-related challenges and opportunities, along with ever-evolving connectivity innovations from Molex that keep our customers ahead of the curve.



Click here or scan QR-Code to find more information on arrow.com



D2FP Ultra Subminiature Basic Switch



Optical Ultra Subminiature Basic Switches for operations with rapid response and high reliability

Clear click feel recognized as de facto standard of mice main button is inherited from D2FC.

Features

- Rapid, chattering-free response due to contactless operation using photosensors
- High reliability achieved by improved resistance against environment change
- Long durability achieved using a stable spring structure
- Easy mounting achieved by integrating the sensors inside the switch
- Clear click feeling

Benefits

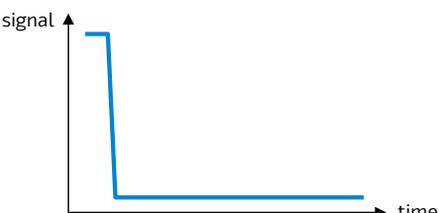
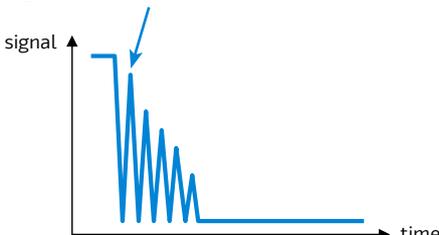
- Fast response time contribute to gamer's victory.
- Extremely high reliability contribute to gamer's high reliable operation.
- Low power consumption contribute to longer mice battery life.
- Clear click feel for good response and reliable pushing.

Characteristics D2FP-FN2

- Operating speed: 1 to 500 mm/s
- Operating frequency Mechanical/ Electrical: 300 operations / 1 min. max.
- Vibration resistance Malfunction: 10 to 55 Hz, 1.5 mm double amplitude
- Shock resistance:
 - Destruction: 1,000 m / s² max.
 - Malfunction: 300 m / s² max.
- Durability: 70,000,000 operations min. (at 300 ops. / 1 min.)
- Ambient operating temperature: +5 to +40 °C (at 60 % RH max.) (with no icing or condensation)
- Weight: Approx. 0.54 g

Orderable Part Number at arrow.com

- [D2FP-FN2](#)

| | D2FP Optical Switch | D2FC Mechanical Switch |
|--|--|---|
| Much faster Light speed | Response time: 0.015 ms (typ.) | Response time: 5 ms (typ.) |
| Much more reliable Optical reliability | No signal bounce  | Signal bounce due to mechanical contact  |



Panasonic Industry's DW-Y relay

Which components inside modern lighting devices enable energy conservation? Let's have a look at Panasonic's new DW-Y relay.



Energy efficiency lies at the heart of modern sustainability efforts, extending to every detail of our technological landscape. Among these details, lighting applications stand as a prominent or even “blueprint” target for energy-saving initiatives. However, which are the crucial components inside modern lighting devices that are paving the way for significant energy conservation? Let's have an exemplary look at Panasonic Industry's new DW-Y relay. In the realm of smart homes and sustainable lighting solutions, the shift towards energy-efficient practices is omnipresent. While current LED technologies offer undeniable benefits, they also pose challenges for electrical components. Particularly concerning high inrush currents generated by capacitive loads in ballasts and drivers. Addressing this issue head-on, Panasonic's new DW-Y relay, specifically designed for high inrush applications up to 320A peak, emerges as a vital asset. Compliant with all necessary normative requirements for lighting in smart home scenarios this relay efficiently switches demanding nominal loads up to 20A. This ensures optimal performance without compromising energy efficiency.

Furthermore, the new DW-Y relay goes beyond mere functionality, embodying the essence of green energy principles. Available in a latching type configuration, it boasts impressive switching capabilities coupled with minimal energy consumption. Unlike conventional relays, the DW relay's permanent magnet design maintains its state without constant energy input, resulting in unparalleled efficiency gains. By opting for polarized relays like the DW series, users can significantly reduce energy wastage, thereby enhancing the overall power consumption profile of their applications.

As the global push towards sustainability intensifies, every component within our technological ecosystem plays a crucial role in achieving energy efficiency goals. Panasonic's new DW-Y high inrush relay stands as a shining example of innovation in this regard, offering not only robust performance in high inrush scenarios but also delivering substantial energy savings. By integrating the DW-Y relay into lighting applications, individuals and industries alike can contribute meaningfully to the advancement of green energy initiatives while simultaneously reaping the benefits of enhanced efficiency and reduced environmental impact.

Orderable Part Number at arrow.com

- [ADW1***YLV](#)
- [ADW8***YLV](#)

| | | ADW1***HLW, ADW8***HLW Inrush 100A | ADW1***YLV, ADW8***YLV Inrush 320A | |
|-----------------|------------------------|--|------------------------------------|--|
| Size | | 24 x 10 x 15.8 | | |
| Standard | TV-8 | 240V | | |
| | Resistive Load | 16A 277V AC | 20A 250V AC | |
| | Electronic ballast | 2A 277V AC, (Inrush 205A) 5A 120V AC, (Inrush 192A) | 5A 277V AC, (Inrush 320A) | |
| Others | SET/RESET time | Max. 15 ms | Max. 10 ms | |
| | Max. Switching current | 16A | 20A | |
| | Dielectric Strength | Open contacts | 1,000V AC | |
| | | Contact and coil | 5,000V AC | |
| | Rated operating power | 400 mW (L2) | 200 mW (L1) | |
| | Ambient temperature | -40° to 70° (8A to 16A) -40° to 85° (8A or less) | -40° to 85° (8A to 20A) | |



High Voltage Clamps from Panduit

High voltage cable clamps are important components in vehicle electrical systems above 25 VAC or 60 VDC.



Features:

- **Integrated anti-rotation points:** Ensure precise positioning and protect against abrasion and overloading.
- **User-friendly:** tool-free design allows easy installation, making the process convenient and accessible for all user.
- **Time-efficient:** quick and easy installation and maintenance, thanks to the push-in mechanism, saving you valuable time and effort.
- **Process reliability:** consistent spacing, prevent cable abrasion, and eliminate potential user errors, enhancing overall process reliability.

Panduit's new high-voltage (HV) cable clamps make it safer and more flexible to install battery cables in electric vehicles.

High voltage cable clamps are important components in vehicle electrical systems above 25 VAC or 60 VDC. These systems have to comply with a number of safety requirements.

The safety of high voltage cables in vehicles depends on three factors: Electric shock, electromagnetic radiation and vibration. Panduit's high-voltage cable clamps are specifically designed to efficiently manage and secure high-voltage battery cable installations and are part of the vehicle's high-voltage electrical system as well as the charging infrastructure, enabling cables to be connected safely and reliably. Made from glass-fibre reinforced high temperature nylon for use from -40 °C to 135 °C, the robust housings have compressible rubber inserts. This protects the delicate outer insulation of the cables from damage - a common problem with other fixing methods. The HV clamps are designed to be connected in pairs. Integrated anti-rotation points prevent rotation or displacement, protecting the cables from excessive strain. The clamps are adjustable up to 4.5 mm, allowing them to be moved freely over the cable until they are positioned over the actual fixing point. In addition, Panduit's HV clamps provide a safe distance between cables, significantly reducing abrasion between adjacent cables and protecting connected

quick disconnects from excessive stress. The HV clamps are available for cable diameters of 25 to 40 mm² (4 to 2 AWG), 50 to 70 mm² (1 to 2/0 AWG) and 85 to 120 mm² (3/0 to 4/0 AWG). In series production of wire harnesses, the HV clamp fits seamlessly into the assembly process and remains securely attached to the wire harness assembly until final assembly. This ensures that all components, including the HV clamps, remain together during the various production stages of the harness and can then be easily secured in their final position. The new HV clamps reduce overall assembly time and improve serviceability, as their push-in locking mechanism makes them easy to release without the need for tools.

Panduit's new HV clamps are specifically designed for high voltage cable management in heavy electric vehicles. With proper installation and maintenance, HV clamps reduce vehicle breakdowns, increase cable life and improve overall harness productivity.

Orderable at Arrow

- HV15CC1-C376
- HV15CC2-C376
- HV19CC1-C370
- HV19CC2-C370
- HV23CC1-C378
- HV23CC2-C378



Click here or scan QR-Code to find more information on arrow.com



EV DC Fast Charging Solutions

Available products

- Protection
- Input Filtering
- AC/DC Rectifier
- DC Link
- Conversion
- Output Reactor
- Output Filtering
- Contactor

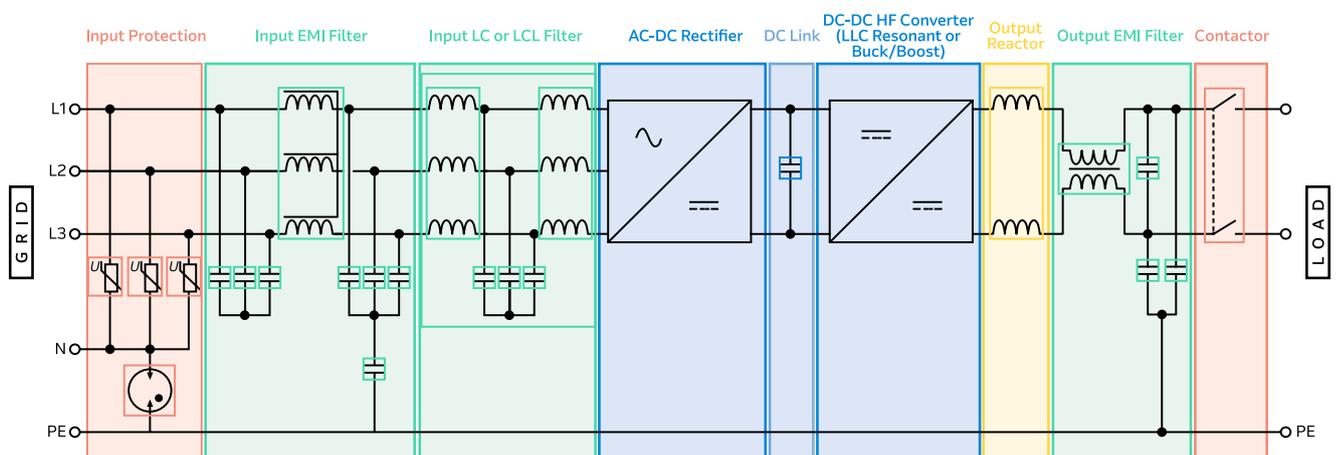


DC fast charging is a vital element that provides drivers with enough energy in the shortest possible charging time, especially on long trips. To achieve this, the efficiency of such charging stations is an important performance maximizing energy output per charger chassis and minimizing cooling requirements. TDK Electronics is a one-stop supplier for passive key components in DC fast chargers.



Click here or scan QR-Code to find more information on arrow.com

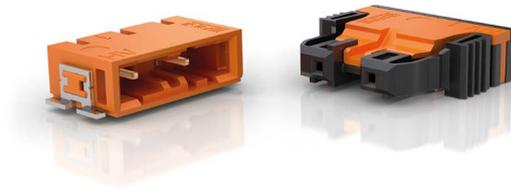
Typical block diagram of 3 Phase Charger





ERNI VolTron 1000V Connector

1000 V HV signal reliability with VolTron1000 Connectors designed to measure voltage across battery architecture and ecosystem



Applications

- Battery Management System (BMS); Battery Disconnect Unit (BDU)
- Integrated power electronics
- In broad range of applications where high voltage needs to be measured on a constant basis

New sensing connector specifically designed to use in the Battery Management System (BMS) and Battery Disconnect Units (BDU). The connector has multiple design features and combines high CTI materials and contact surfaces to help maximize creep and clearance. This results in high-performance value up to 1000 V, strong dielectric strength, and capability to use above 5000 M sea level, with pollution degree 2 according to IEC 60664-1. The connector complies with LV214, LV215, and USCAR automotive standards.

Benefits

- Increased voltage in battery architecture
- Reduced connector height provides more freedom for design of compact BMS
- Suitable to use in harsh environments and automotive standards

Features

- Up to 1000 V signal measurement capability
- Miniaturization grade with low profile
- CTI 600 materials and Au terminal contact surface
- 5000 M altitude compensation

Mechanical

- Vibration severity SG2 (LV214)
- SMT termination
- MaxiBridge crimp contact (LV214 and SMBT approved)
- Primary and secondary locking
- 2 Color and mechanical codings

Electrical

- Up to 1000V operating voltage
- Dielectric strength 2.500 V (LV215) / 3.700 V
- Terminal rated up to 6A (0.35 mm²)
- 500 mating cycle

Orderable Part Number at arrow.com

- [524191-E 2 POS Female Con BK TR](#)
- [524192-E 2 POS Female Con OR TR](#)
- [524197-E 5 POS Female Con BK TR](#)
- [524198-E 5 POS Female Con OR TR](#)
- [524226-E 2 POS 90 HDR SMD BK T+R](#)
- [524227-E 2 POS 90 HDR SMD OR T+R](#)
- [524232-E 5 POS 90 HDR SMD BK T+R](#)
- [524233-E 5 POS 90 HDR SMD OR T+R](#)
- [464762-E MaxiBridge 0.6 REC TERMINAL Au 0.35-0.5 mm 10K](#)
- [464763-E MaxiBridge 0.6 REC TERMINAL Au 0.35-0.5 mm 500](#)



IP&E Linecard

- Connectors
- Antennas, Batteries, Emech
- Passives
- Power Supply



Download here:
[arrow.com/en/ipe/download-area/
arrow-ipe-linecard](https://arrow.com/en/ipe/download-area/arrow-ipe-linecard)



Arrow Electronics, Inc.
Components
Frankfurter Straße 211
63263 Neu-Isenburg, Germany

In Person
+49 (0) 6102 5030 0
Call to talk or set up a face-to-face meeting with one of our knowledgeable representatives.

Online
arrow.com
Visit our website for everything from the latest news to line card information.

©2024 Arrow Electronics, Inc.
Arrow and the Arrow logo are registered trademarks of Arrow Electronics, Inc. Other trademarks and product information are the property of their respective owners.
ARR_Broschuere_IP&E_03/24

ARROW
Five Years Out