



CAT6  
**MHZ**  
500

# POWERMAX500™

CABLING PERFORMANCE AND  
THE ARGUMENT AGAINST LOW  
GRADE CABLING

Providing For Future Requirements



**DINTEK**  
LAN CABLING SYSTEMS





I'VE HAD A GOOD IDEA TO  
SAVE MY COMPANY MONEY !

**THERE ARE GOOD IDEAS  
AND THEN THERE ARE BAD  
IDEAS.**

**BELIEVING THAT 24AWG  
CABLE IS JUST AS GOOD AS  
23AWG CABLE IS A BAD IDEA**

**THINKING CCA COPPER CLAD  
ALUMINIUM CABLE IS JUST AS  
GOOD AS SOLID COPPER IS A  
VERY BAD IDEA**

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## SORTING THROUGH THE MIS-INFORMATION.

### SO LETS LOOK AT WHAT IS GOING ON OUT THERE?

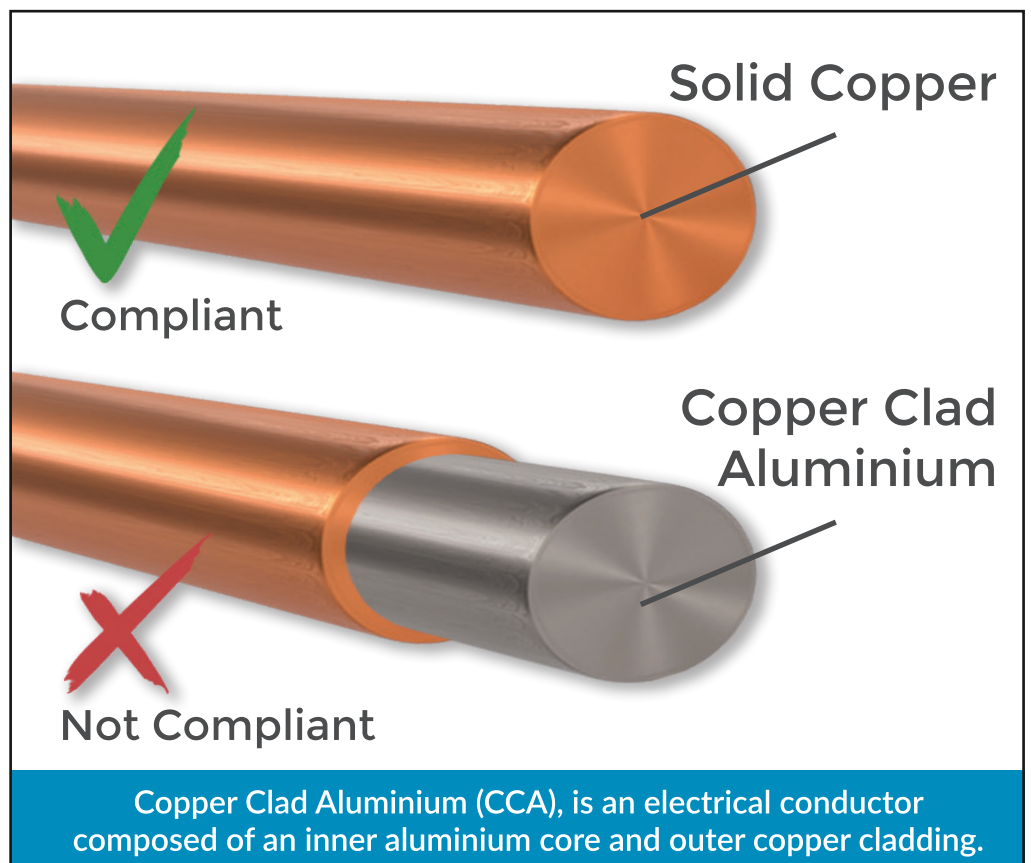
There is so much misinformation in the IT cabling market space nowadays that it hard to know what is fact and what is fiction.

Cable manufacturers desperate to grab market share from developing regions have thrown quality and safety out the window in order to cater to the markets insatiable need for the lowest possible price.

The biggest loser in this constant battle ground inside the data cabling industry is the end user.

They are the ones who will suffer the slower network performance, sometimes very obvious, and sometimes subtle, but definitely impacting productivity and therefore the businesses bottom line.

They are the ones who will go to use their network in the future to make use of developing PoE technologies, only to find out that their cabling is not up to the job, and if they press on, they risk the problems of overheating, fire and all of the ramifications that go with it.



## DO YOU FEEL CONFIDENT ?

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*CCA products look like and are usually advertised to function like standard Category 5e or Category 6 cabling, But beware. There are major differences that could pose network problems, issues affecting business continuity, and safety hazards.*

## IS CCA CABLE SUITABLE FOR STRUCTURED CABLING?

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We know when looking at the costs of IT infrastructure, it can be tempting to cut corners wherever there is an opportunity. One way people see cost savings is through the purchase of copper clad aluminum (CCA) cabling systems. CCA cabling is advertised as a cost effective replacement for solid copper cable. However, while it may be cheaper than traditional copper cabling it is anything but effective

*Section 5.3 of TIA-568-C.2 requires compliance with ANSI/ICEA S5-90-661-2006 and ANSI/ICEA S-102-732, which both include the following: "Solid conductors shall consist of commercially pure, annealed, bare copper ..."*

## TO BE CLASSED AS COMPLIANT STRUCTURED CABLING

**THE CABLING MUST COMPLY WITH THE STANDARDS**

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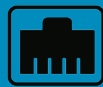
## CCA CABLES ARE NON COMPLIANT

CCA twisted pair cables do NOT comply with UL ,ANSI/TIA or IEC standards, which call for pure solid or stranded copper conductors. CCA twisted pair data cables also lack valid safety listings from the (NEC). Depending on the electrical safety rules in place in your own country, this type of cabling should probably not legally be installed within a building requiring CM, CMG, CMX, CMR or CMP rated cables.



## POOR BEND RADIUS AND LOW FLEXIBILITY

Using CCA cabling affects installers because aluminum wire creates installation issues. Due to the lower tensile strength, aluminum cables can be damaged when being pulled. Single conductors can break, making the cable useless, or the whole cable can snap. Aluminum also has a higher bend radius requirement than pure copper cables. This means you can't bend it as much before it fails. In short, copper clad cables are more fragile than pure copper cables.



PoE

## CCA CABLES ARE NOT SUITABLE FOR POE++

CCA cables have a 55% higher DC resistance. This increases the amount of energy that is transferred into heat and reduces the amount of power that can be transferred. This issue makes them unsuitable for power over Ethernet (PoE) and possibly dangerous when it comes to higher wattage technologies like 60w and 90w PoE++ 803.2bt



## OXIDATION AND CORROSION

When exposed to the air, aluminum is very reactive . The resulting corrosion and oxidation caused by exposure due to bad stripping, faulty termination may cause failed terminations in the network infrastructure, leading to connectivity problems. This is likely to cause loss of productivity through bandwidth issues, and costs in location of faults.



## LONGER CABLES DONT PERFORM WELL

On CCA cable runs that are near the 100-meter maximum, the signal strength is reduced as compared to solid copper cables This can lead to data loss as a result of more packets of data needing to be retransmitted.

## CAN I SAFELY RUN POE++ ON CCA CABLING ?

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No matter what arguments are put forward in defense of CCA twisted pair cabling, it is simply not suitable for a technology which is set to expand rapidly over the next 5 Years.

CCA conductors have a 55% greater DC resistance than copper. This doesn't bode well for PoE applications. Greater resistance causes greater heating of the cable and reduced power available at the PoE device.

Cables that are not installed to take into account ambient temperatures and temperature increases relative to bundling sizes will cause many issues. As we move to higher power PoE Plus applications, DC resistance will become an even greater concern.

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## IS 24AWG COPPER CABLE AS EFFECTIVE AS 23AWG COPPER CABLE?

ONE OF THE MOST IMPORTANT FACTORS OF AN INSTALLED DATA CABLING SYSTEM IS NOT ONLY THE CABLES BANDWIDTH, BUT ALSO THE RESILIENCE OF THE CABLE TO WITH STAND EXTERIOR FACTORS WHICH CAN AFFECT THE PERFORMANCE OF THE CABLE.

WHILE IT IS ENTIRELY POSSIBLE TO EFFECTIVELY UTILIZE A CAT6 CABLE WHICH IS 24AWG, AND THAT CABLE MAY COMPLY WITH CURRENT ANSI/TIA AND ISO STANDARDS, THE CABLE WILL NOT BE AS RESILIENT AS A CABLE DESIGNED WITH A 23AWG CORE SIZE.

BECAUSE THE CORE SIZE OF A 23AWG CABLE IS PHYSICALLY LARGER, THE WIRE WILL EXHIBIT LESS VOLT DROP OVER DISTANCE THAN A 24AWG WIRE WILL. THIS CORE SIZE ALSO MEANS THAT THERE IS LESS RESISTANCE, AND THAT ULTIMATELY RESULTS IN LESS HEAT BUILD UP.

THIS BECOMES CRITICALLY IMPORTANT WITH TECHNOLOGIES LIKE POE++ OR IEE 802.3-BT. THESE TECHNOLOGIES WILL CATER FOR THE FUTURE DEVICES REQUIRING 60W AND UP TO 90W. ANYONE IGNORING THESE EMERGING TECHNOLOGIES IN FAVOR OF MAKING FINANCIAL SHORTCUTS NOW , WILL SURELY REGRET THEIR DECISION IN YEARS TO COME.

AS THE 60W AND 90W VERSIONS OF POE++ START TO BE UTILIZED, WE WILL NEED TO FACTOR THIS IN TO OUR CABLING INSTALLATIONS. CABLE BUNDLE SIZES AND WIRE GAUGE SIZING WILL BE FUNDAMENTAL TO KEEPING THE TEMPERATURE RISES TO REQUIRED LIMITS. STANDARDS

# POWER OVER ETHERNET

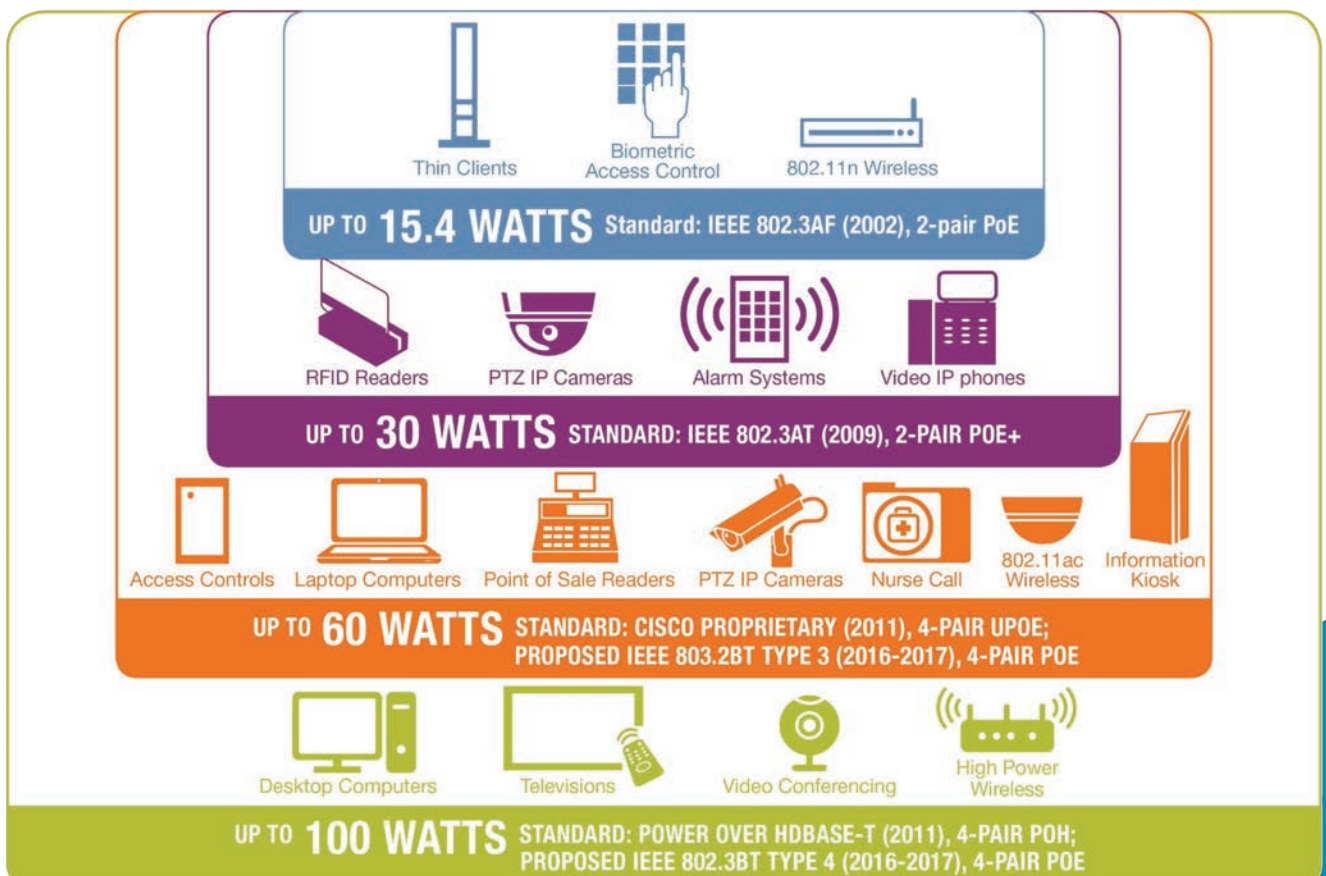
## WHY IS IT SO IMPORTANT ?

Power over Ethernet (PoE) is a standard that allows Ethernet cables to simultaneously transmit data and power using a single network cable. This allows system integrators and network installers to deploy powered devices in locations that lack electrical circuitry. PoE eliminates the expense of installing additional electrical wiring which entails hiring professional electrical installers to ensure that strict conduit regulations are followed.

Since its arrival in 2003 as PoE 802.3af, delivering 13W to devices and running currents at 350mA the PoE standards have seen multiple developments and enhancements.

The latest standards for PoE which are PoE++ (802.3bt type 3) and 4PPoE (802.3bt type 4) will be capable of supplying 60w at 600mA (for PoE++) and 90w at 960mA (for 4PPoE)

And while it is possible to run these new PoE standards on most twisted pair cabling types, some cable types will do it at the expense of the cabling systems performance. Some may even cause issues of physical damage.

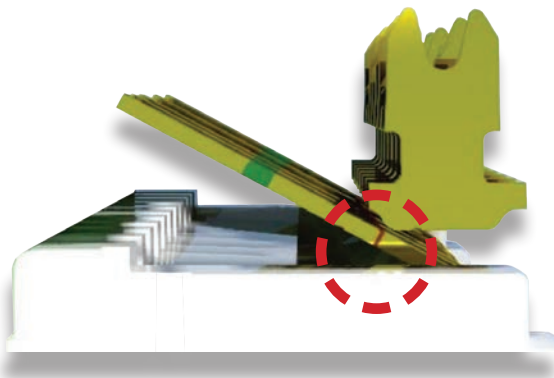


## THE SECOND MAJOR ISSUE ARCING DAMAGE

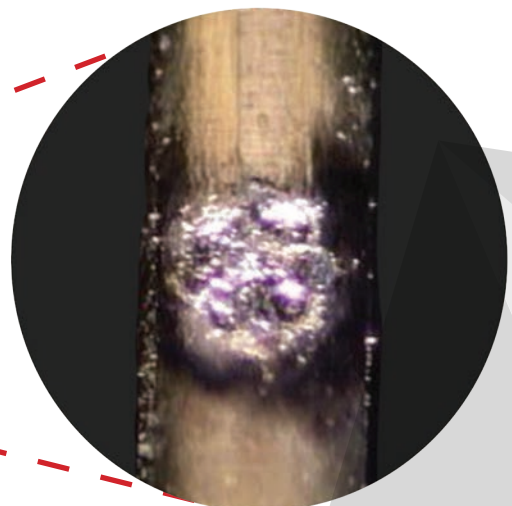
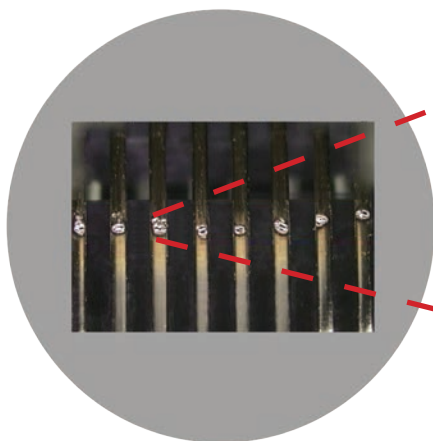
Having the correct cable in place for PoE++ and 4PPoE is great for taking care of heat generation and being able to maximize bundle sizes and reduce insertion loss. But it is only half of the overall equation for putting in place a PoE++ capable structured cabling solution.

The quality and structural integrity of the connecting hardware is equally important and if not adequately taken into consideration will cause severe issues with network downtime as port begin to rapidly fail.

- The PoE is not live until the powered device (PD) and powered sourcing equipment (PSE) handshake
- Therefore there is no arc on initial mating process



- When unplugging live PoE, an arc (or spark) occurs between plug and jack contacts
- The higher the current i.e. 600mA or 960mA the larger the arc will be.



## OUR RECOMMENDATION.

Use PowerMAX500™ Cat.6 or PowerMAX+™ Cat.6A ezi-JACK Solution

1. PowerMAX500™ & PowerMAX+™ ezi-JACKS have been tested and comply with IEEE 60512-99-01 & 60512-99-02

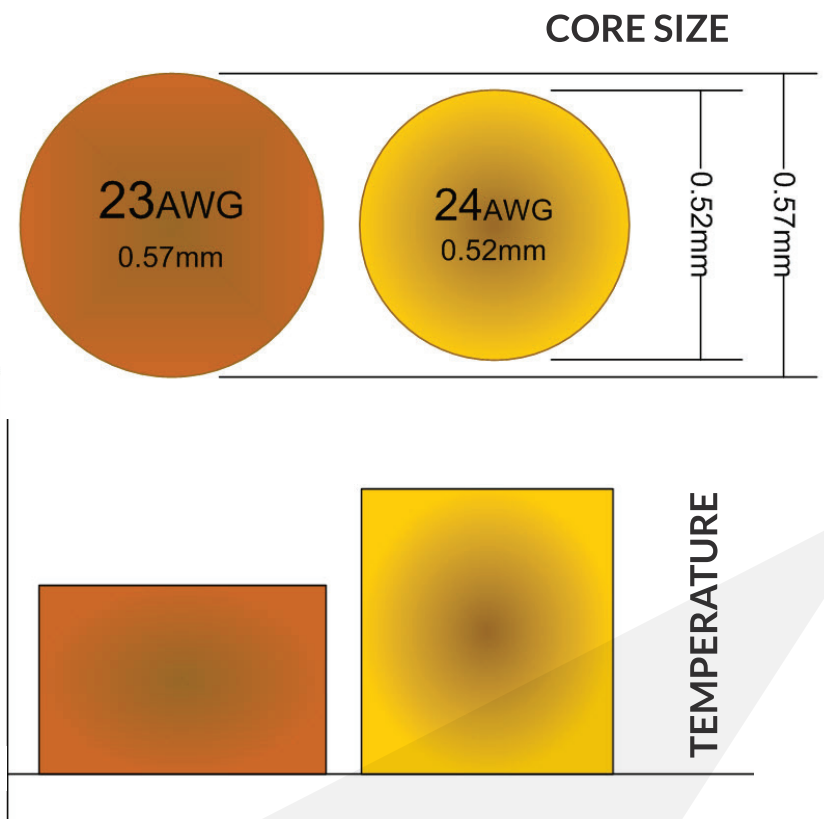


## SO WHAT ARE THE CABLING ISSUES ? HEAT & ARCING

Higher power levels running through a cable can cause performance issues primarily by making the cable hotter. When the cable gets hotter, insertion losses increase. Increased insertion loss means a weaker signal and increased chance of signal corruption. This increases the chances of your business experiencing a productivity killer – downtime. In some cases it may also cause damage to the cable itself.

The best way to reduce the build up of heat is to have a conductor with a larger core size, hence a 23AWG Category 6 conductor is going to allow more current to flow with less build up of heat than a 24AWG conductor. The 23AWG conductor also has the advantage of having less voltage drop over distance than a 24AWG conductor. This helps lessen attenuation.

**IT DOESN'T MATTER HOW MANY TIMES A CABLE MANUFACTURER MAY TELL YOU THAT 24AWG IS JUST AS GOOD AS 23AWG. SIMPLE PHYSICS PROVES THAT IT IS NOT.**



And then there is CCA cable which is a prime example of a bad cable for PoE++ because of the high resistance of Aluminium. This will cause much higher heat generation than in copper which has a lower resistance level.

It then becomes an accumulated effect as bundle sizes grow, with more and more centralized cables heating up and being unable to dissipate heat.

### OUR RECOMMENDATION.

Use PowerMAX500™ Cat.6 or PowerMAX+™ Cat.6A twisted pair cabling.

1. PowerMAX500™ & PowerMAX+™ cables are made from pure annealed copper
2. PowerMAX500™ & PowerMAX+™ cables are 23AWG and have a larger conductor
3. PowerMAX500™ & PowerMAX+™ cables have a temperature rating up to +70°C

**POWERMAX WILL GIVE YOU MAXIMUM POWER**

SO NOW LETS LOOK AT A CABLE THAT IS 23AWG, OUT PERFORMS THE STANDARDS & IS POE++ COMPLIANT

## POWERMAX500™ CAT.6 4 PAIR UTP SOLID CORE CABLE

The DINTEK PowerMAX500™ Category 6 solutions are guaranteed to exceed ClassE channel specifications as set down in International standards. Our PowerMAX500™ solution comprises Category 6 fully compliant patch panels, keystones and patch cords. When combined with DINTEK's Category 6 UTP cable, an end-to-end channel exists that maximises data throughput and provides headroom for all future technologies operating beyond one Gigabit.



### LETS LOOK AT THE FACTS

- DINTEK uses only solid copper conductors in all of its cables. We will not lower the quality of our product at the risk of the end user performance.
- DINTEK conductor sizes for Category 6 and Category 6A are set at 23AWG. By keeping the gauge size of the conductor larger, there is less heat generation caused and less drop of voltage over distance. Cables simply perform better.
- DINTEK Category 6 and Category 6A exceed current ANSI/TIA and ISO Standards for performance.
- DINTEK Category 6 and Category 6A cabling is capable of handling the latest versions of power over Ethernet including IEEE 802.3-bt versions A & B without the need for derating, required for lower core sizes
- DINTEK Category 6 23AWG Twisted Pair Cable has been tested over 500Mhz and has passed performance testing allowing 10Gbit Ethernet transmission up to a length of 70mtrs

## COMPLETING THE TERMINATION OF THE POWERMAX500™ SYSTEM IS THE DINTEK EZI-JACK

### POWERMAX500™ EZI-JACK SOLUTION

The DINTEK ezi-TOOL™ system is an all-in-one punch down and wire trim process, design to assure even connections, better performance and faster fit off times.

The products in the ezi-TOOL system comprise 90degree and 180degree Cat5e and Cat6 & Cat6A modular keystone jacks.

The jacks work with either the ezi-TOOL or a standard 110 style DINTEK punch down tool, thus avoiding the need to have two different style of jacks.

### FEATURES

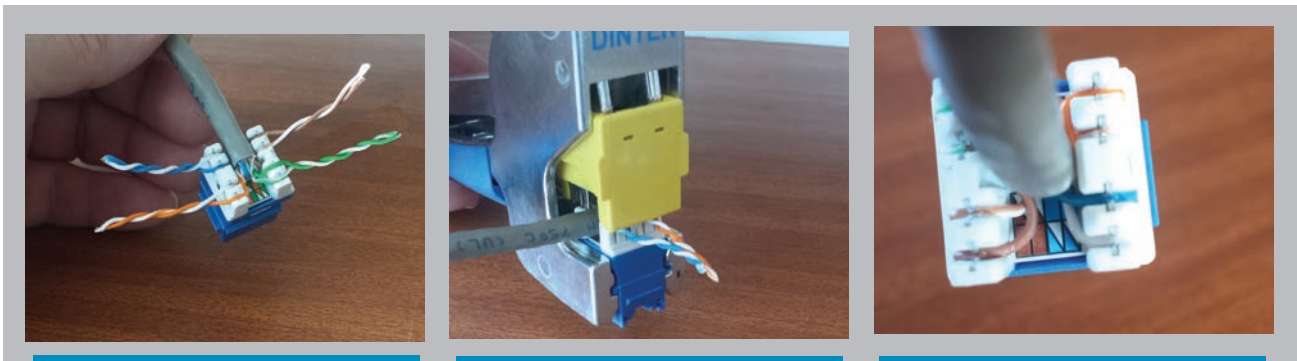
- All-in-one Punch down and wire trim process
- Multi use ezi-JACK (Keystones), can be used in ezi-TOOL and also standard punch down tools
- ezi-TOOL can be used for either Cat5e, Cat6 or Cat6A Keystone ezi-JACKS
- Termination of Jacks can be achieved in much less time that standard punch down alternatives
- Single action, non impact termination protects the gas-tight IDC requirements



# EZI CRIMP AND CUT SOLUTION

Terminating the DINTEK PowerMAX500™ cabling onto ezi-JACKS using the ezi-TOOL system is an extremely quick process. From stripping the cable, placing wires into the jack and terminating using the tool, the entire process should only take an experienced technician approx 1 minute.

Compared to a 2-3 minute termination time using the legacy 110 impacting tool, it is easy to see how the ezi-TOOL system can maximize profits on your jobs.



## WIRE PLACEMENT

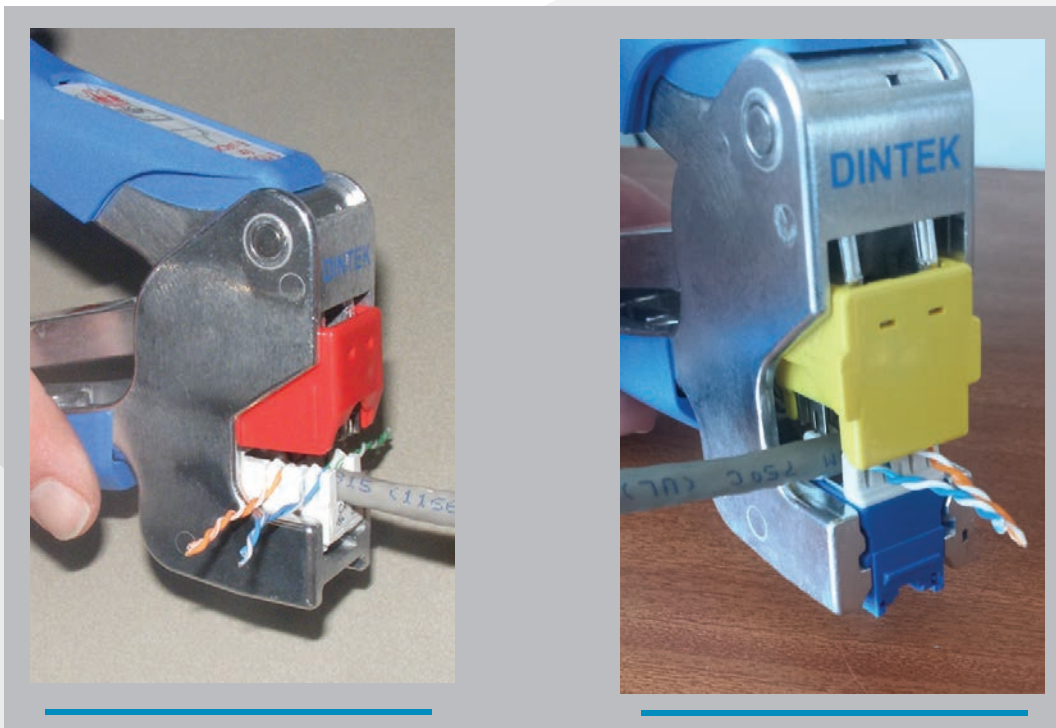
Place wires securely in IDC wire holders, keeping twists right up to the termination points

## TERMINATE WITH EASE

Place ezi-JACK into tool, depress and the tool will crimp all wires evenly and trim excess wires off.

## GAS TIGHT CONNECTION

The resulting termination is pushed through the IDC instead of impacted thus maintains gas tight connection



# POWERMAX500™ ezi-JACK RANGE 100% PERFORMANCE



No structured solution link can perform based on the cabling alone. The culmination of turning a high performing twisted pair cable into an optimal bandwidth delivery medium is the connection of that cable onto a high performing termination hardware.

DINTEK PowerMAX500™ ezi-JACK's are the termination hardware at the heart of the DINTEK PowerMAX500™ tested and verified to handle the latest PoE Standards IEEE802.3bt Type 3 and 4.

The DINTEK PowerMAX500™ Range of jacks come in the following configurations.

UTP - ezi-JACK<sup>90</sup> - Horizontal Style Keystone Jacks



UTP - ezi-JACK<sup>180</sup> - Vertical Style Keystone Jacks

UTP - ezi-JACK<sup>180</sup> - Vertical Style Keystone Shuttered Jacks

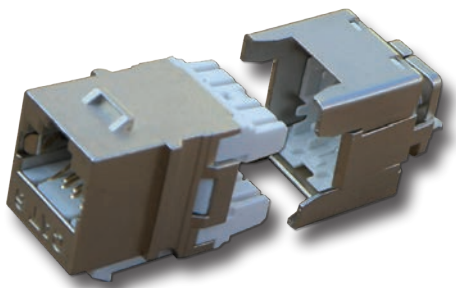
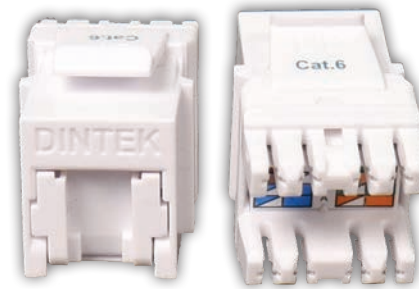


STP - ezi-JACK<sup>180</sup> - Vertical Style Keystone Shielded Jacks

Standards colors options White , Black, Red, Blue, Green, Yellow

\* Other color options on request

## COMPONENT LEVEL PERFORMANCE



VERIFIED TO  
LATEST POE ++  
96W STANDARD  
60512-99-02

*DINTEK PowerMAX500™ Category 6 ezi-Jacks provide performance that exceeds Category 6 connecting hardware performance specifications. They also ensure backwards compatibility with components and systems of lower performing categories. Combined with other DINTEK PowerMAX500™ products, they are the perfect solution to your voice, data communications & PoE needs.*

# COMPLETING THE CHANNEL

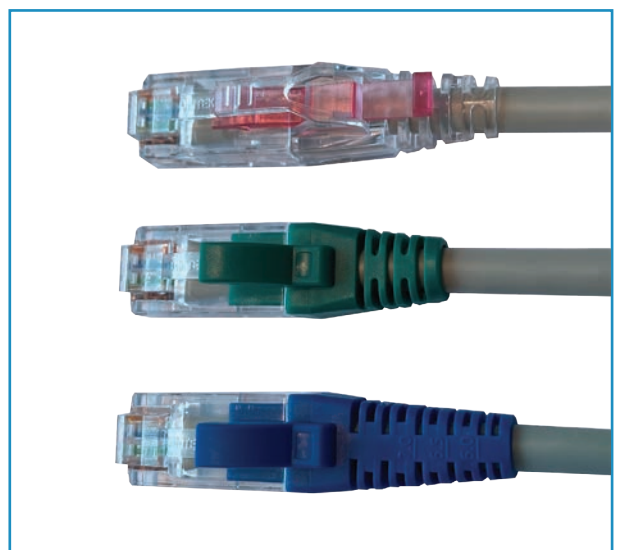
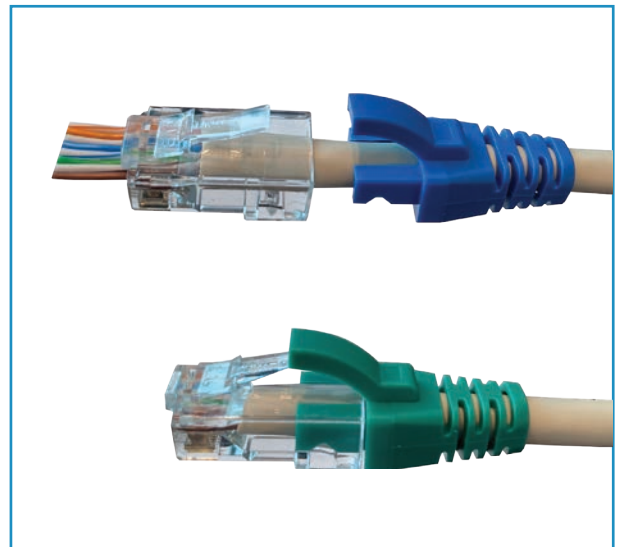
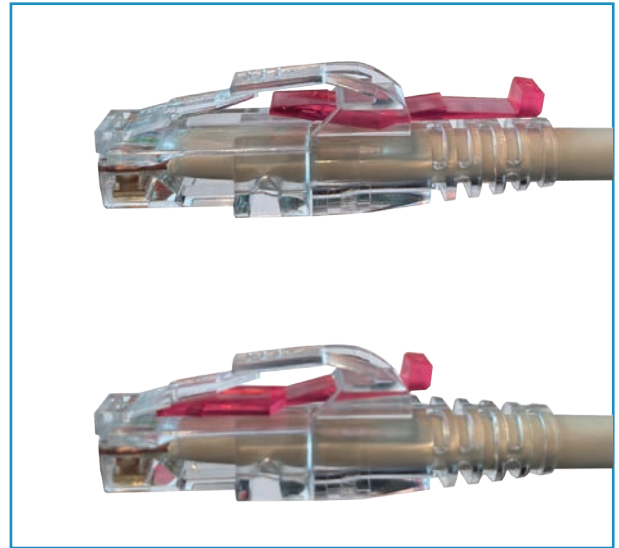
## POWERMAX500™ CAT.6 TWISTED PAIR RJ45 MODULAR PLUGS

The DINTEK PowerMAX500™ Category 6 solutions are guaranteed to exceed ClassE channel specifications as set down in International standards.

In order to complete a channel link requires the use of high quality patch cords at either end terminating to the RJ45 outlet.

Not only does the connection need to provide low return loss and NEXT, but as it is the other side of the PoE connection it needs to be able to withstand disconnection currents up 960mA

## DESIGNED WITH LOW RETURN LOSS AND NEXT PERFORMANCE





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# DINTEK ELECTRONIC LIMITED

LAN CABLING SYSTEMS

