

January 29, 2006
Revised June 20, 2006



To whom it may concern:

This document addresses the advantages of the Camera Lowering Systems CDP-16HD connector as compared to legacy specifications.

The first camera lowering devices on the market were manufactured by Camera Lowering Systems. Their distributor at that time patented a connector and began competing against Camera Lowering Systems. Camera Lowering Systems then designed a 2nd generation lowering device, capitalizing on the strengths of the original design, and re-engineering other aspects of the system to offer a superior product.

Round support arms are not acceptable

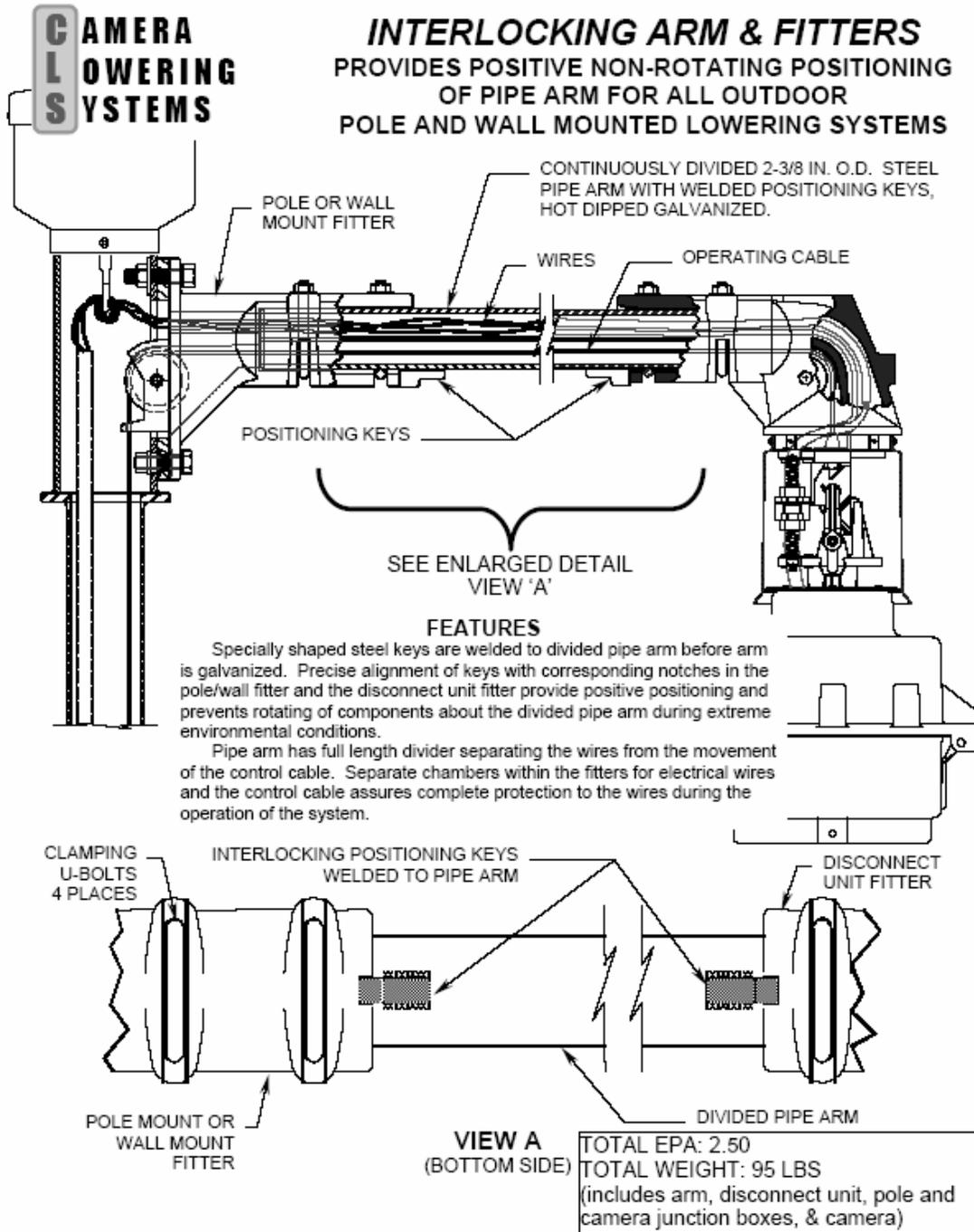
The CLS round support arm is equivalent or superior to a square support arm.

CLS chose a round support arm for several reasons. The current CLS product uses a Schedule 80 steel pipe (app. 1/4" steel wall) for superior strength and support of the system. Additionally, by using a round arm, the EPA (effected projected area) of the system is lower. EPA's are used in calculating the pole specifications due to wind, snow, ice loading. The lower the EPA, the less stress is subjected to the pole. The round arm, in addition to less wind loading, provides less surface area for snow/ice accumulation, reducing any stress or load on the system.

When mounted, the round arm is locked securely in place by use of interlocking positioning keys, preventing any rotation of the arm. When locked in place, the arm cannot rotate.

The only plausible reason that an older specification would prohibit round arms would be to prevent perceived rotation of the system arm due to wind. Due to the utilization of interlocking keys in the design, the CLS cannot rotate once mounted. Therefore, the system is not subject to the problems assumed in the older specifications, and offers the benefit of a lower EPA, less wind resistance and less surface area for snow/ice accumulation.

With over 1000 units installed and operational in the field, there have been no instances of a system arm rotating after installation. Please refer to the drawing below for the details on the interlocking positioning keys.



The lowering device provide shall be able to identify a minimum of 3 previous projects where the purposed system has been installed successfully for over a one-year period of time each

CLS lowering devices are installed and in operation throughout the country – in both hot/humid and cold/snowy climates. A detailed breakout of some of the systems is provided below, showing more than 3 systems operating for more than 1 year.

South Carolina DOT

Mr. Dan Campbell
955 Park Street
DOT building- room G6
Columbia, SC 29201
803-737-1646
campbellde@dot.state.sc.us

Anderson County ITS System : Operating since 2001
Columbia, SC ITS system: Operating since 2001
Cherokee County ITS System: Operating since 2004

Tennessee DOT

Mr. Don Dahlinger
James K. Polk Building
505 Deaderick Street
Suite 700
Nashville, TN 37243-0349
615-741-3033

Nashville ITS System: Since 2002
Knoxville ITS System: Since 2003

Kansas City Scout

Ray M. Webb, PE.
KC SCOUT
600 Northeast Colbern Road
Lee's Summit, MO 64086
816-622-0520

Kansas City Scout Project: Since 2001
Multiple phases

Indiana DOT

Mr. Jay Wasson
100 N. Senate
Room N925
Indianapolis, IN 46204
317-233-9605

Indiana DOT ITS System: Since 2003

Suspension Contact Unit

As mentioned earlier in this letter, CLS manufactured the first camera lowering systems. After their distributor patented a connector, CLS designed and patented a new and improved 2nd generation connector that offers superior performance and installation ease.

Connector blocks made of Hypalon

The CLS connector body is an equivalent or superior to Hypalon.

The first issue to address within the specification is the use of Hypalon in the connector halves. Hypalon is one of many substances suited for outdoor use, but by no means is the only substance/material suited for this application.

CLS, determined to make a new, superior, 2nd generation connector, uses an Elcon connector system. The connector system itself, is water and weather resistant. The actual connector is composed of polyester 30% glassfield (UL94V-0), seated into an injection-molded urethane back cap (the back cap is the blue portion of the connector that you may recall). The back cap is then sealed using cyanoacrylates adhesive, and potted with a thermo-setting, heat and cold resistant material called "Superflex " silicone adhesive rubber sealant. (Superflex provides a tough, waterproof rubber seal formulated to withstand extreme temperatures cycling and severe weather conditions). The result is an entirely sealed system of high quality materials that is durable and does not break, nor is it adversely affected by temperature. CLS obtained a patent on their connector system on July 17, 2001, reference patent #6,262,122.

Brass socket contacts molded into the Hypalon body

The CLS connector offers the same or better weather resistance and functionality as a molded Hypalon body with molded contacts. Gold plated contacts provide superior corrosion resistance.

The CLS product uses copper pins for ultimate conductivity. These pins are then nickel plated for strength, then gold-plated for corrosion resistance, offering far superior performance over brass contacts. Gold plated pins will not corrode due to moisture or corrosive elements, whereas brass is subject to oxidation. Although the pins are not molded into the connector, the entire system is sealed and weather resistant (see the previous item for the connector details), and provide the same protection as a molded connector.

The attached wire leads shall be molded into the Hypalon Body

The CLS connector system is superior to wire leads in a molded body.

One of biggest issues with molded connectors and wire leads is that a pole top splice is required for all leads. Not only does the splice produce signal degradation, it also is a point of failure, and difficult to reach without a bucket-truck or boom-truck should maintenance be required. Another issue is splicing 20-22ga. wires (RG-59, data cable, etc.) to 18AWG wire. Additionally, a challenge is imposed in splicing the coaxial cable center conductor and shield to wire leads.

To prevent this design limitation, CLS incorporated the environmentally sealed, non-molded connector, where the CCTV Composite cable is wired and sealed directly into the connector, providing a splice-free, continuous run from the CLS connector to the CCTV cabinet at the base of the pole (or in the vicinity). The coaxial cable, data and power wires from the composite cable are wired directly into the connector body prior to sealing, eliminating the need for difficult splices. The continuous run of composite cable ensures the highest signal quality possible, and makes installation and maintenance of the system much easier. The composite cable comes from the manufacturer pre-wired and sealed in the connector, and the

length of the cable is provided with the assembly and can be custom ordered to fit the required length for the application.

The number of contacts shall be proportional with the requirements of the camera

CLS meets this requirement.

Most CCTV dome cameras require 9 wires – video center conductor, video shield, power +, power -, transmit +, transmit -, receive +, receive - and ground. The 16HD provides these 9 connections, and offers 7 additional spares for other functions as may be required. CLS also offers other connector options which allow over 20 interconnections for use with non-dome cameras or other unique applications that may require extensive leads.

Two of the pins will be longer to mate and break first

The CLS connector system meets this requirement.

The intent of the specification having two longer pins is to ensure the ground mates first and breaks first, prior to the current carrying pins. On a molded connector, this is accomplished by utilizing two longer pins for the ground. These systems are often not UL approved.

The CLS product is UL approved, and the actual upper and lower connector castings are grounded, providing ground mating and breaking first, prior to the current carrying signal pins.

The current carrying and signal wires shall be 18AWG rubber coated stranded wire

CLS exceeds this requirement.

First, the CLS connector system does not require leads, offering a continuous run to the bottom of the pole. The individual wires/cables inside the composite cable are not exposed to the elements.

By default, the CLS lowering device uses 14AWG wire for power, 18AWG low capacitance shielded, twisted pairs for data, and a standard RG-59 for video. Since these wires are contained inside a composite cable with a PVC outer jacket with UV protection, the wires do not need to be rubber coated as they are not exposed. The composite cable, which is wired directly to the connector system can be customized by an end user to contain any gauge wire that may be desired or required. We have worked with several DOT's to design a cable for their needs. An example is Cat5e for Ethernet interconnection.

Contacts shall be self-wiping with a shoulder at the base of each male contact so that it will recess into the female block, thereby giving an environmental seal when mated.

CLS meets or exceeds this requirement.

The CLS connector halves, male pins and female sockets, are embedded into a connector system that uses chamfered sockets to ensure positive interconnection and weather resistant seal. Please see the following excerpts from the Elcon engineering department regarding the pins and connector system (reference "Elcon-responsetousageofproduct-070705.pdf).

“As stated in my May 18th letter to Northstar Lighting, Elcon Hot-Plug, Crown Band contacts with 30 microinches of gold plating will not deteriorate in conditions of temperature and humidity cycling.

However, we would not recommend standard silver plated contacts for this environment.

The gold plated contacts, using Elcon Crown Bands and the Hot-Plug feature, have the following advantages in such conditions:

A) Corrosion build-up

a) The 30 microinch gold plating passes the Industrial Mixed Flowing Gas test designed to create corrosion underneath the plated surface.

b) Elcon power connectors are designed to provide higher mating forces to ensure good electrical connection; these higher forces bring the contact surfaces into better physical contact with each other, thus resisting ingress of moisture or corrosive elements while the contacts are mated

c) Any build-up of surface contaminants on top of the plated surface will be displaced by the high contact normal forces and the Hot-Plug feature on the power contacts.

d) Elcon Crown Band designed contacts have multiple contact points, further enhancing the reliability of the contact under such conditions.

B) Reduction in Insulation Resistance

Please note that ALL connectors are subject to having corrosive elements deposited on exposed surfaces, potentially reducing Insulator Resistance, but the Lower Drawer connector design has the following advantages in such conditions:

a) Fully shrouded contacts: when the connectors are mated, the mating surfaces of the contacts are covered from the elements.

b) Long creepage paths: the power contacts are recessed into the plastic, increasing the distance between contacts that would need to be covered by any corrosion before performance is reduced.”

Summary

The CLS 16HD connector system meets or exceeds all points questioned in the New Jersey DOT specification. The connector design is newer than the specifications, which appear to be older, legacy specifications from the first lowering systems on the market.

The weather resistant design of the CLS product is summarized below:

Durability:

The CLS product is extremely durable, and history over the past 8 years has proven this case. We have installed over 800 CLS camera lowering devices in the past 3 years alone, and well over 1000 in the past 8 years. To date, we have not had a lowering device that was properly installed to malfunction, corrode or degrade in any manner. The concept that bigger is more

durable is simply no longer true due to the technological advances made over the last two decades in materials and manufacturing processes. Our customers throughout the U.S., in all climates, are very satisfied, and continue to install the CLS units on their projects.

The connector system itself, is water and weather resistant. The actual connector is composed of polyester 30% glassfield (UL94V-0), seated into an injection-molded urethane back cap (the back cap is the blue portion of the connector that you may recall). The back cap is then sealed using cyanoacrylates adhesive, and potted with a thermo-setting, heat and cold resistant material called "Superflex " silicone adhesive rubber sealant. (Superflex provides a tough, waterproof rubber seal formulated to withstand extreme temperatures cycling and severe weather conditions). The result is an entirely sealed system of high quality materials that is durable and does not break, nor is it adversely affected by temperature.

The contacts in the connector block are gold-plated over nickel-plated copper. The nickel-plating gives the copper pins superb durability and strength, while the gold-plating provides the ultimate in corrosion protection.

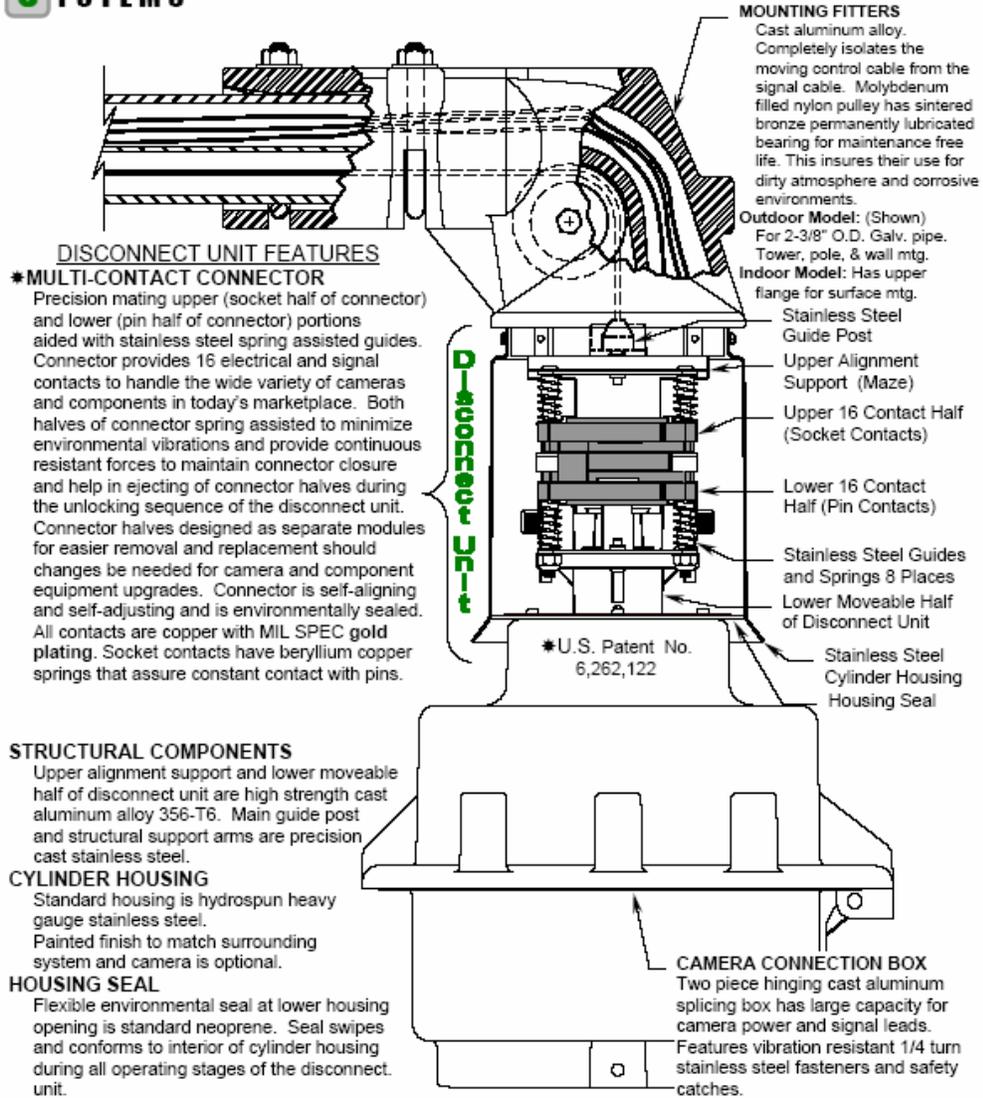
Water-tightness, weather resistance:

The CLS product is totally water and weather resistant, using many features to ensure complete and redundant enclosure of the system.

It is important to stress the advantage of gold-plated pins. Should the pins be subjected to moisture during the lowering process, as would happen with any device in rainy conditions, upon reconnection the gold-plated pins will not corrode, whereas other materials such as silver or brass may be subjected to oxidation and/or corrosion. (Note: it is not my recommendation that cameras be lowered during heavy rain).

The entire lowering device connector assembly is housed in a stainless steel cylindrical housing when in the raised/locked position. A neoprene seal is located on the top of the junction box which rises into the cylindrical housing below the connectors, swiping and conforming to the shape of the housing, providing a watertight seal. See the page from the CLS specifications herein, noting the Housing Seal as identified on the lower right side of the drawing.

**EDU-16HD
ELECTRICAL DISCONNECT UNIT**



The connectors are mated and perfectly aligned every time using multiple alignment posts. The connector halves are then mated and held together with an evenly distributed spring-loading tension (app. 35lbs). The backs of the connectors are permanently sealed as explained above in the durability section.

So, the connector halves are environmentally sealed together, the back caps of the connector halves are environmentally sealed, and the cylindrical housing in which they reside is also environmentally sealed. Diagrams of these portions of the system can be found on pages 2 and 3 of the CLS specification.

Additionally, the primary advantages of the CLS camera lowering system are provided below:

Conductivity, Strength and Corrosion Resistance

The CLS HD-16 connector system uses gold plated-nickel plated-copper 12ga. pins. Copper pins provide the highest conductivity of electrical signals, an important feature in any connector system to prevent signal degradation of video or data. The copper pins are then plated with nickel to make them strong so that they will not bend. The pins are then gold plated to prevent oxidation and corrosion. Should the lower connector be subjected to moisture during the lowering and raising process (ie: lowering in the rain), the gold plating will ensure that the pins will not corrode once resealed with the top connector.

Weather Resistance

The CLS HD-16 system offers redundant weather resistance to moisture, thermal changes and other elements.

The mating portions of the connector system are protected from weather elements by a spring-loaded mating mechanism, with app. 36 lbs. of spring-loaded force, providing a tight contact that prevents moisture or contaminant intrusion, and prevents signal loss due to vibrations common due to wind and vehicular traffic.

The rear portions of the connector system (where the composite cable enters the system), is also water and weather resistant. The actual connector system is composed of a connector and back-cap that is then potted and sealed with a thermo-setting, heat and cold resistant sealant. This sealant provides a tough, waterproof rubber seal formulated to withstand extreme temperatures cycling and severe weather conditions. The result is an entirely sealed system of high quality materials that is durable and does not break, nor is it adversely affected by temperature.

Finally, in the raised and locked position, the entire connector system assembly is housed inside of a stainless steel, cylindrical housing. A neoprene seal is located on the top of the junction box which rises into the cylindrical housing below the connectors, swiping and conforming to the shape of the housing, providing a watertight seal.

Round Lowering Arm with locking keys

The CLS Lowering Device utilizes a round lowering device arm, which can be locked into place to prevent movement after installation. In addition to providing less wind resistance than square arms, the round arm allows the lowering system to be rotated in the even that the pole is not plumb. The system can also be adjusted for tilt and can be installed in multiple positions around the vertical axis to provide headway for other devices which may be mounted on the pole, such as detection devices.

Camera Junction Box

The CLS Camera Junction box provides an easy access, spacious area for interconnecting the lower connector to the camera cabling. The junction box can be opened by three, vibration resistant 1/4 turn captive screws. A safety latch in the interior prevents the junction box from

swinging open, allowing the technician to safely open the junction box. The interior of the box provides ample room for splices, lightning detection devices, etc. with full access to the entire interior.

The top half of the junction box has an overlapping lip which helps divert water from the lower half of the junction box. The two halves are sealed with a neoprene gasket when locked together.

Finally, the junction box provides a standard 1.5" NPT Receptacle, allowing any dome camera or other device to be mounted without specialized mounting adapters.

Compatibility

The CLS HD-16 lowering device has been used successfully with virtually all major pole manufacturers – Valmont, Union Metal, Value Structures, Northwest Signal, Stresscrete, Accord, etc. The lowering device is independent of the pole, and all major pole manufacturers are experienced in providing poles for the CLS lowering device – allowing the customer to select any pole from any source for the project. CLS will gladly provide a pole when requested, but this is not mandatory.

Composite Cable Assembly

One of the major advantages of the CLS HD-16 lowering device is the fact that the product ships with Composite CCTV cable pre-wired and sealed into the top connector. The length of the cable provided is determined at time of order. This feature allows for easy installation and no pole top splicing is required, providing the highest level of signal quality and no points of failure due to improper splicing.

Installations

The CLS product is extremely durable, and history over the past 8 years has proven this case. There have been over 800 CLS camera lowering devices installed in the past 3 years, and well over 1000 in the past 8 years.