The OMNI Transmitter

APRIL 2016 NEWSLETTER

- INSTRUMENTATION
- ELECTRICAL SERVICES
- CONTROLS

INSTRUMENTATION ENGINEERS AND CONTRACTORS

A Peek Inside -

NETWORK DO'S & DON'TS by Craig Drabyk

A network is the most important part of a facility's control and process, and if it is not designed, installed, and certified properly, a wide range of problems are likely to occur. Many of these problems may be elusive or intermittent and can cause process interruptions, costing precious time, resources, money and, perhaps, product. Symptoms can include loss of communication on individual devices or an entire network, intermittent loss of segments or devices, bad or frozen values in the control room, excessive low frequency or AC noise on a network segment, and devices sending error messages, retransmits, or bad-quality status.

Here is a list of common issues to avoid in a network installation, or to help identify problems in an existing system:

⇨ **Trunk or spur lines** should not exceed the maximum allowable distance based on specs.

⇨ **Shields** are not grounds and should not be tied to the same ground bus as the power grounds. Shields should only be grounded at one location to avoid ground loops. Multi-point grounds can be used in some situations, but must be done correctly. Heat-shrink bare shield wires to avoid accidentally grounding the shield of one segment to another.

⇨ **Maintain** separation between network cables and high voltage cables.

⇨ **A loose connection** at a terminal block or connector can cause sporadic communication issues with a single instrument or entire segments.

⇨ **Avoid segment overload**. Overloading a segment with too many devices can cause devices to drop off the segment, or pull down the entire segment.

⇨ **Instruments** should be certified and designed for the type of network on which they are being installed.

⇨ **Trunk and spur cables** should be checked for damage, and cables should not exceed the minimum bend radius.

continued on page 2

OMNI INSTRUMENTATION SERVICES, INC.

Omni
112A Sylvania Place
South Plainfield, NJ 07080
PH - 908.412.7130
FX - 908.412.7131
www.omniinst.com

The OMNI Transmitter

APRIL 2016 NEWSLETTER

- INSTRUMENTATION
- ELECTRICAL SERVICES
- CONTROLS

INSTRUMENTATION ENGINEERS AND CONTRACTORS

OMNI TECH TALK: Loop Check & Calibration

Instrument loop checking and calibration are important activities performed at the end of an installation to ensure that all components of a loop function properly and can support successful start-up, commissioning, and qualification procedures. Loop check and calibration are performed concurrently to verify that ranges, scale, and graphics are correct from the front end to the field devices.

Preparation for loop checking and calibration should include the development of loop sheets and step-by-step calibration procedures that specify whether single-point or three-point calibration is to be performed. Calibration sheets must identify critical and non-critical instruments and specify at what intervals the devices will need to be calibrated. Calibration should be scheduled as close to validation as possible.

A thorough walk-down of the installation should be always performed prior to loop check to make sure everything is in place and ready. It is advantageous on larger projects to have a second team follow up and correct identified problems and anomalies on larger projects while the first team continues with loop check and calibration. Close communication, organization, and follow-up are key components to a smooth and successful loop checking and calibration process.

TECH TIDBIT: Cat5e vs. Cat6 vs. Cat6a

Cat6a, the latest standard of twisted pair Gigabit Ethernet cabling, is backward-compatible with Cat6 and Cat5e, but transmission performance is improved, with less signal loss, less cross-talk, and larger frequency bandwidth. Transmission bandwidth for Cat6a is 500 MHz, twice that of Cat6. Categories 6 and 6a allow for two-way communication on each pair of wires, while 5e does not**.** Cat5e speed is rated for 10 Gbps up to 45 meters, Cat6 is 10 Gbps up to 55 meters, and Cat6a is 10 Gpbs for the full 100 meters of distance.

NETWORK INSTALLATION from pg. 1

There are a number of other common-sense steps that should be followed to ensure a healthy network. Pre-test network segments before instruments are connected to save precious time during installation. By confirming that the trunk and backbone hardware are installed properly, they can be eliminated as the source if problems occur after instruments are connected. Certify the network once all devices are installed, powered up and commissioned for accurate network status and to provide a baseline if a problem or fault occurs in the future. Facility personnel should receive network training and be able to perform basic network troubleshooting when issues occur.

The OMNI Transmitter

APRIL 2016 NEWSLETTER

- INSTRUMENTATION
- ELECTRICAL SERVICES
- CONTROLS

INSTRUMENTATION ENGINEERS AND CONTRACTORS

FROM THE PANEL SHOP: Selecting An Enclosure By Mike Kornas

There are a number of factors that must be considered when selecting a control panel enclosure, beginning with size. Enclosures are manufactured in a large variety of standard sizes and types. Though standard-sized enclosures can usually be found to accommodate most facilities' needs, they can also be modified or custom made. Dimensions can range from shoebox size to large free-standing or floor mounted double-door enclosures. It is always advisable to select a panel with at least 20% spare capacity.

Control panel enclosures come in a variety of materials including steel, stainless steel, and aluminum, as well as non-metallic materials such as fiber-glass, ABS, polycarbonate and polyester. The National Electrical Manufacturers Association (NEMA) defines standards for various grades of electrical enclosures according to their ability to prevent ingress or damage due to concerns like liquids, dust and corrosive chemicals. Enclosures should have a NEMA rating appropriate for the facility's primary application and environmental concerns such as excessive heat or cold, moisture, corrosives or contaminants, or if it is to be used in a sterile environment. NEMA ratings include types 4 and 4X (watertight), type 3R (outdoor use), type 12 (indoor general purpose), and types 7 and 8 (explosion proof).

Top Traits Of An Instrumentation Contractor

- Possesses the highest level of technical expertise in their field.
- Multi-disciplined in both electrical and instrumentation.
- Able to fill in design gaps and make quality recommendations to improve a design.
- Works hand-in-hand with a facility's systems integrator and third-party commissioning agents.
- Willing to reach across other disciplines to help systems function properly.
- Financially sound to avoid lags in progress, poor project results, or inability to complete a job.
- Possesses the technical capability to not only identify problems, but to fix them.
- Capable of viewing a facility from an operator's perspective to ensure a user-friendly workspace.
- Can supply numerous quality references.

Omni : 112A Sylvania Place South Plainfield, NJ 07080 : PH - 908.412.7130 : FX - 908.412.7131 : www.omniinst.com