



# from experience

## Making the Upgrade: Automation Hardware Changes in Classified Hazardous Areas

Electrical installations in a classified hazardous area always present unique challenges to mitigate the possibility of an explosion. Control panels, PLC I/O and associated devices require special care and attention when selecting hardware and designing the associated electrical circuits. A common mitigation method is a design that uses intrinsically safe circuits. An intrinsically safe circuit reduces the amount of energy (power limiting) to a level that inhibits the possibility of generating a spark and, therefore, an explosion. This is accomplished by using a barrier (associated apparatus) installed in the safe non-hazardous area. The device (apparatus), located in the hazardous area, is then connected to the barrier via field wiring.

Upgrades to automation hardware in classified areas are periodically required due to equipment obsolescence or changes to the room functions and electrical classification. Before making wholesale upgrades of the hardware, Hixson recommends considering the following practices:

- Perform a thorough audit of the existing installation to ensure all designs match the current area hazard classification. A Class 1, Div 1 zone is determined by a number of factors including the likelihood of the presence of a flammable vapor or gas concentration and the extent, or distance from the source. Sometimes these factors can be determined conservatively for the original installation, that is “over rating” the area, to provide operational flexibility. If the existing panel or hardware is actually located in a Class 1, Div 2 area it may not have to be relocated or replaced.
- Evaluate the installation using the latest National Electric Code® (NEC®), which dictates the requirements for installations in North America. Refer to NEC 500-510 for electrical installations in classified areas. The requirements for wiring methods and sealing at panels in hazardous areas are very specific for each type of location and method of installation. For intrinsically safe systems, the requirements are less stringent when crossing from a Class 1, Div 1 location to a Class 1, Div 2 location. For intrinsically safe circuits be sure to check NEC 504.20 and 504.70 and follow the code guidelines specific to your installation.
- Evaluate the existing device and associated wiring circuit entity parameters against the new I/O hardware entity parameters to ensure the integrity of the installation. Intrinsically safe hardware is certified and includes entity parameters defined on its specific control drawing.
- Consider the network design. In most control systems today, Ethernet is the preferred choice. Upgrading an existing installation that may have been installed using a different network architecture is usually not that difficult or costly. Typically, an Ethernet infrastructure is already in place and the existing network conduit routing can be reused for the new Ethernet cabling.

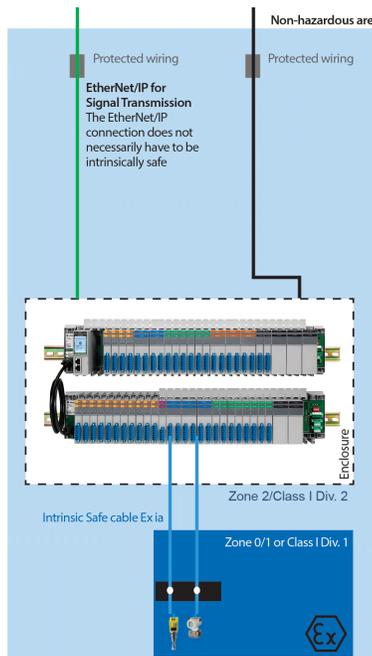


Figure (above): Example Configuration of Barrier in Class 1, Div 2 Rated Enclosure and Devices Installed in a Hazardous Area. Source: Rockwell Automation.

### experience in brief

Hixson ideally prefers specifying I/O modules that provide both the required barrier and an electrical rating for Class 1, Div 1 hazardous areas. This allows the I/O module to be installed close to the device and reduce circuit length, resulting in installation cost savings. This also provides installation flexibility, so that future room classification changes from Class 1, Div 2 to the more rigorous Class 1, Div 1 won't require hardware upgrades as well.

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