

Selecting I&C Wire and Cable

Responsibilities

The design engineer (an employee or an outside engineering consultant) is responsible for selecting wire and cable types and sizes, and assigning tags in accordance with this guideline.

The project engineer is responsible for ensuring that the guideline procedures are applied as required for all new and revised documentation.

Procedure

Develop new, or review existing, elementary and connection diagrams and assign wire tags.

Develop new, or review existing, conduit plans, conduit, and cable schedules and assign tags.

Select wire (or cable) types.

Verify that there are no duplicates with the existing wire, cable, and conduit tags.

Selecting Wire/Cable Type

Tables 1 through 4 include recommendations for wires and cables that could be used for the identified wet or dry locations.

Table 1. Discrete Wire/Cable for Wet Locations

Wire/Cable Type	Mfr. (Note)	Model #	Number of Wires and Min. Awg Size	Insulation Type	Lead Colors
Single Pair	Belden	83702	2 - #16, Stranded	FEP – Fluorinated Ethylene Propylene	Black, White
Multi-Pair	Belden	83704	4 - #16, Stranded	FEP – Fluorinated Ethylene Propylene	Black, White, Red, Green

Note: All cables installed must be of the manufacturer and model number designated above, or be approved by Gas Station Engineering SCADA and Controls project engineer.

Table 2. Discrete Wire/Cable for Dry Locations

Wire/Cable Type	Mfr. (Note)	Model #	Number of Wires and Min. Awg Size	Insulation Type	Lead Colors
Single Pair	Belden	8471	2 - #16, Stranded, Twisted Pair	PVC- Polyvinyl Chloride	Black, White
Multi-Pair	Belden	9721	8, #16, Stranded	PVC- Polyvinyl Chloride	

Note: All cables installed must be of the manufacturer and model number designated above, or be approved by Gas Station Engineering SCADA and Controls project engineer.



Table 3. Analog Wire/Cable for Wet Locations

Wire/Cable Type	Mfr. (Note 1)	Model #	Number of Wires and Min. Awg Size (Note 2)	Insulation type	Lead colors
Single Pair Cable	Belden	88760	2 - #18, Stranded TSP	FEP – Fluorinated Ethylene Propylene	Red, Black
Multi- Pair Cable	Dekoron	1774-00480	8 - #20, Stranded TSP	Polyethylene	Black White
Single Triad Cable	Belden	88770	3 - #18, Stranded Twisted Shielded Triad	FEP – Fluorinated Ethylene Propylene	Red Black White
Multi-Triad Cable	Dekoron	1784-80482	12 – 18, Stranded Twisted Shielded Triad	Polyethylene	Red Black White
Single Quad Cable	Belden	89418	4 - #18, Stranded Twisted Shielded Quad	FEP – Fluorinated Ethylene Propylene	Red, Black, White, Green
Single Pair J Thermocouple	Belden	83950	2 - #20, Stranded TSP	FEP – Fluorinated Ethylene Propylene	White, Red
Multi-Pair J Thermocouple	Houston Wire & Cable	HW113 2004J	8 - #20, Solid TSP	CPE – Chlorinated Polyethylene	White, Red
Single Pair K Thermocouple	Omega	FF-K-20S-TWSH-UL	2 - #20 Stranded TSP	FEP – Fluorinated Ethylene Propylene	Yellow, Red
Multi-Pair K Thermocouple	Houston Wire & Cable	HW113 2004K	8 - #20, Solid TSP	CPE – Chlorinated polyethylene	White, Red
Communication Bus Cable, (Note 3)	Belden	89182	2 - #22, Stranded TSP	Teflon, FFEP – Foam Fluorinated Ethylene Propylene	Black Jacket Conductors Black, Yellow

- Notes:** 1. All cables installed must be of the manufacturer and model number designated above, or be approved by Gas Station Engineering SCADA and Controls project engineer.
 2. TSP - Twisted shielded pair.

Table 4. Analog Wire/Cable for Dry Locations

Wire/Cable Type	Mfr. (Note 1)	Model #	Number of Wires and Min. Awg Size	Insulation Type	Lead Colors
Single Pair	Belden	8760	2 - #18, Stranded TSP	PVC- Polyvinyl Chloride	Black, Clear
Multi-Pair	Belden	9774	6 - #18, Stranded TSP	PVC- Polyvinyl Chloride	
Single Triad Cable	Houston Wire & Cable	HW101 1801T	3 - #18, Stranded Twisted Shielded Triad	PVC- Polyvinyl Chloride	Black, White, Red
Multi-Triad Cable	Houston Wire & Cable	HW104 01804	12 - #18, Stranded, Twisted Shielded Triad	PVC- Polyvinyl Chloride	Black, White, Red
Single Quad Cable	Belden	9418	4 - #18, Stranded Twisted Shielded Quad	PVC- Polyvinyl Chloride	Red, Black, White, Green
Single Pair J Thermocouple	Omega	EXPP-J-20S-TWSH-UL	2 - #20, Stranded TSP	PVC- Polyvinyl Chloride	White, Red
Multi-Pair J Thermocouple	Omega	4JX20PP	4 #20, Solid	PVC- Polyvinyl Chloride	White, Red
Single Pair K Thermocouple	Omega	EXPP-K-20S-TWSH-UL	2 - #20 Stranded TSP	PVC- Polyvinyl Chloride	Yellow, Red
Multi-Pair K Thermocouple	Omega	4KX20PP	4 - #20 Solid	PVC- Polyvinyl Chloride	Yellow, Red
Data BUS / Profibus	Belden	3076F	2 - #18, Stranded TSP	Polyolefin	Orange Jacket Conductors Blue, Orange
Communication Bus Cable, (Note 3)	Belden	9182	2 - #22, Stranded TSP	Datalene FHDPE – Foam High Density Polyethylene	Black Jacket, Conductors Black, Yellow

- Notes:**
1. All cables installed must be of the manufacturer and model number designated above, or be approved by Gas Station Engineering SCADA and Controls project engineer.
 2. TSP - Twisted shielded pair.
 3. GE Genius Bus Cable, 150 Ohm; Refer to GE Manual GEK-90486 for other applications.