

Protocol	Topology	Max distance ¹	Max # devices	Cabling
	Not limited	100 m (328 ft) 300 m (984 ft) Additional distance with multiple parallel repeaters. Tuners and terminators available for special extensions.	31 per network (62 per network with 2.1 Rev and extended addressing)	Unshielded, untwisted 2-wire for data and power (16 AWG is preferred).
	Trunk/drop	500 m @ 125 Kbit/s ⁴ 250 m @ 250 Kbit/s ⁴ 100 m @ 500 Kbit/s ⁴	62	(2) 2-wire with shield (5-wire bundle)
	Trunk with branching or chicken foot	1900 m (6200 ft) 120 m spur ⁵ Using FISCO 1000m	32 (16) ⁶	Shielded twisted pair
	Hart handheld	n/a	1	Direct connection
	4-20 mA multiplexer	3,048 m (10,000 ft)	15	Twisted shielded cable

Legend

	Ethernet		Extra hard usage cable (metal reinforced)
	General usage		Metal clad flexible conduit
	AS-Interface		Liquidtight flexible conduit
	DeviceNet		Rigid metal conduit
	Foundation Fieldbus		Seal fitting
	Intrinsically safe		Quick mini connector
	HART		Quick mini connector with clasp
	PLTC/ITC in cable tray (any color)		Quick micro connector (general purpose cable)
	PLTC/ITC with strut support (any color)		Compression fitting
	PLTC/ITC supported by messenger wire (any color)		

NEC 500 wiring guidelines*

Tray cabling system Class I & II, Division 2

- Conduit/cabling**
- Power Limited Tray Cable (PLTC) rated or Instrument Tray Cable (ITC) rated cable used in cable tray.
 - PLTC or ITC used as open wiring up to 15 m (50 ft) protected by angles, struts or messenger wire and secured at intervals not exceeding 1.8 m (6 ft).
 - PLTC or ITC used in liquidtight or MC flexible conduit.

- Connections**
- PLTC and ITC may be connected using compression fittings installed to avoid tensile stress at termination.
 - Flexible cord and quick connectors suitable provided conditions are met as described for nonincendive equipment.

- Field instruments**
- Must be nonincendive equipment rated.

- Special notes**
- PLTC power supplies (Class 2 approved) limited to 100 watts with maximum of 60 VDC used to limit energy into the circuit.
 - ITC power supplies limited to 5 amps and 150 volts rms.

Nonincendive equipment used in explosionproof and tray cabling systems Class I & II, Division 2 only

- Seal-offs not required.
- Liquidtight conduit or flexible cord for extra hard usage may be used where flexibility is required.
- Field instruments must be nonincendive equipment rated.
- Quick connectors may be used with the following provisions:
 - Power removed before plugging and unplugging.
 - Current does not exceed 3 amps @ 120 VAC.
 - Cord is listed for hard usage with receptacle and plug of the locking ground type and does not exceed 900 mm (3 ft).
 - A label is attached to the receptacle warning against unplugging while energized.

- Special notes**
- Nonincendive components have current interrupting contacts that are hermetically sealed or non-arcing (solid state).
 - Enclosures may be opened while circuits are energized but wiring may not be manipulated until power is removed.

* Reference NEC articles 501, 502 and 504.

Explosionproof system Class I & II, Division 1 & 2

- Conduit/cabling**
- Rigid metal conduit or steel intermediate conduit.
 - MI (Mineral Insulated, Metal Sheathed) or MC (Metal Clad) where flexibility required.
 - Seal-offs for all enclosures (except those with special ratings).

- Connections**
- Fittings must be explosionproof approved.

- Field instruments**
- Complete apparatus must be explosionproof rated.

- Special notes**
- No seal-offs are required for StoneL JM, Quartz and Axiom (AX).
 - Power must be removed before opening enclosures.

Intrinsically Safe (IS) systems Class I & II, Division 1 & 2

- Conduit/cabling**
- General purpose cable.
 - Cable capacitance and inductance must be considered.
 - Barriers (associated apparatus) limit voltage and current.

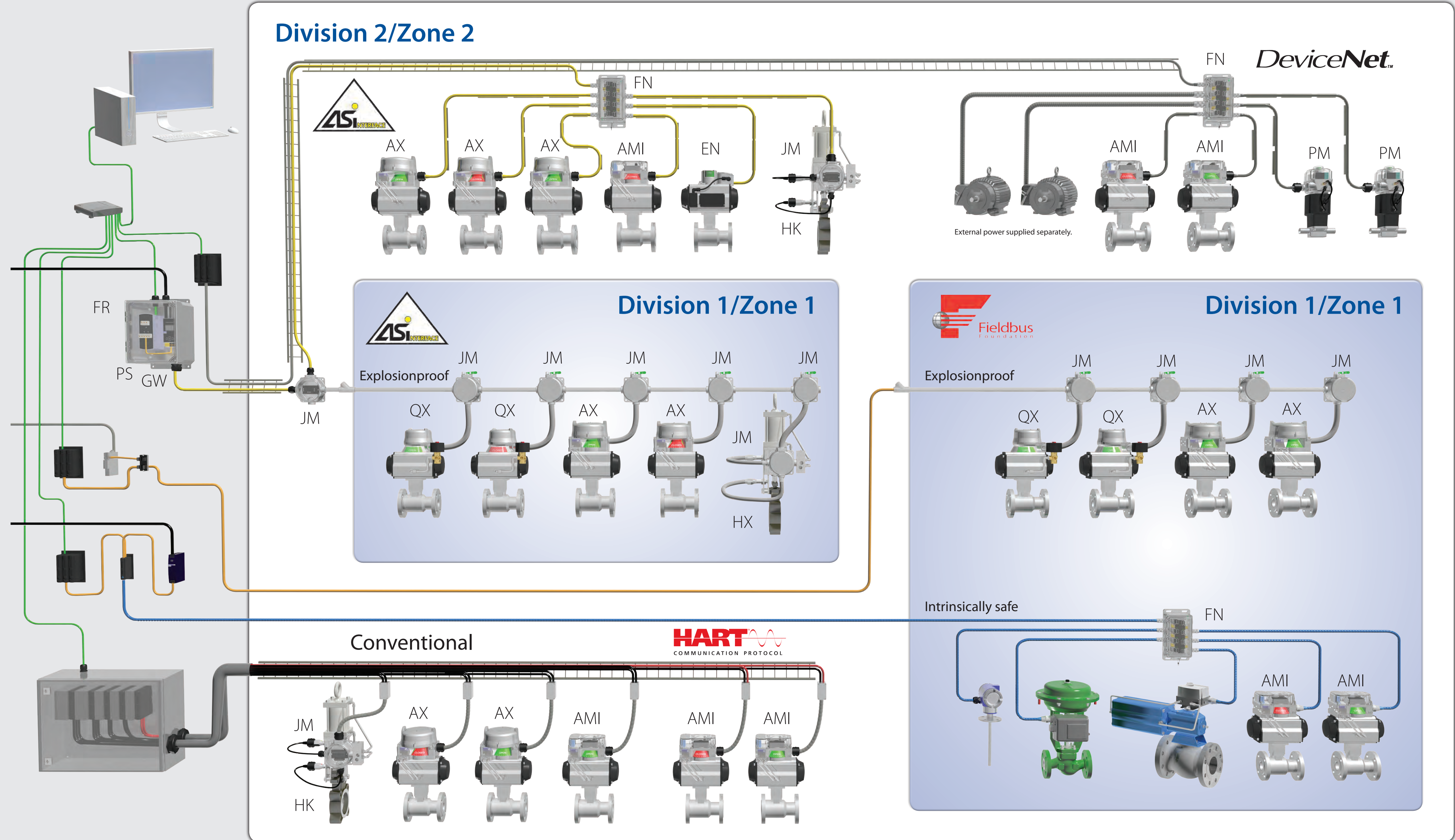
- Connections**
- General purpose connectors.
 - Quick connectors without limitation.

- Field instrument components**
- Field instruments must be classified as simple (non-energy storing) or IS (apparatus).
 - IS devices must be approved per FISCO or entity concept.
 - Parameter matching using entity concept:

IS apparatus	>	Associated apparatus
Lowest Vmax in segment	>	Voc
Lowest Imax in segment	>	Isc
Lowest Pmax in segment	>	Pt
Ctotal (field devices+cable)	<	Ca
Ltotal (field devices+cable)	<	La

- Special notes**
- Parameter matching using FISCO is same as entity concept except cable and device Li & Ci may be ignored (must be within established FISCO values).

- Special notes**
- Instrument wiring may be manipulated while energized.
 - Protected drop connectors are recommended since bus performance will be affected by short circuit on the spur.



Protection concepts shown are for illustration purposes. Final acceptance of installation including wiring practices is subject to the authority having jurisdiction.

