



INSTRUMENTATION CABLES

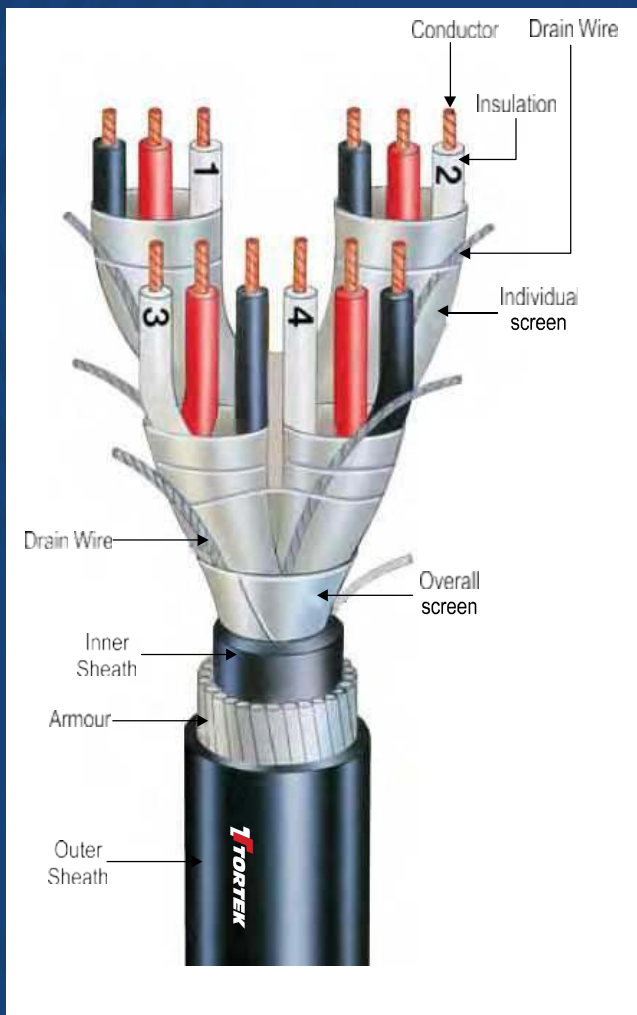
Instrumentation cables are multiple conductor cables that convey Low energy electrical signals used for monitoring or controlling electrical power systems and their associated processes.

These cables are used in diverse applications within industrial process manufacturing plant for control, communication, data (analog/digital) and voice transmission signals, industrial signaling and process control circuit required typically in process industries, oil, gas & petrochemical industry, fertilizers, cement, steel etc.

For Instrumentation cables screening plays a vital role; the AL-Mylar screen of the Instrumentation cables, designed and manufactured by TorteK Cables, captures the external noise pickups. Also, the ATC drain wire earths the noise pickups which would otherwise cause interference in the Low Level signals passed between the measuring end and display units. These cables are designed with a minimum overlap of 25% of the shield that ensures 100% coverage even when the cable is flexed.

The carefully produced stranded copper conductors used in the cable maintain high system accuracy and sensitivity. Maximum rejection of electro-magnetic noise is achieved by twisting the insulated conductors. Twisting causes the noise to be cancelled in adjacent sections of the wire.

Instrumentation cables are generally designed & manufactured based on BS EN 50288 (formerly BS 5308), EIL 6-52-46 and generally as per IS 1554-1, IS 7098-1, IEC 60502-1.



CONSTRUCTION

CONDUCTOR

Instrumentation cables are manufactured with Electrolytic Copper (Plain or Tinned) conductor in form of Solid (class 1), Stranded Circular (class 2) or flexible (class 5) as per IS 8130, IEC 60228 & BS EN 60228. Thermocouple Extension cables are manufactured with Solid (16 AWG, 18 AWG, 20 AWG) conductors depending on type of thermocouple i.e. K, E, T, J types as per ANSI MC 96.1, IEC 584 & IS 8784.

INSULATION

Based on rated conductor temperature & electrical characteristics insulation materials such as PVC 70°C, HR PVC 85°C, XLPE 90°C or Polyethylene (70°C) are offered.

INDIVIDUAL SCREEN

Twisted Pair or Triad are Individually shielded with Aluminium-Mylar tape alongwith ATC Drain wire in continuous contact with Aluminium side of the tape. Shielding of Copper tape can also be provided to meet specific requirements.

PAIR/TRIAD IDENTIFICATION

Pair or Triad Identification can be done by numbered polyester tape applied over each pair / triad or by number printing on core of each pair / triad or by different colour coding.



OVERALL SCREEN

Multi pair / Multitriad are laid up together and are shielded with Aluminium-Mylar tape alongwith ATC Drain wire in continuous contact with Aluminium side of the tape. Shielding of Copper tape can also be provided to meet specific requirements.

INNER SHEATH

Extruded PVC / LSZH inner sheath is applied as a protection over the laid up pairs / triads.

ARMOUR

Galvanized steel wire or strip are applied spirally over inner sheath as a mechanical protection for cable.

OUTER SHEATH

Extruded sheath is provided depending on the application requirements such as temperature, flame retardant (FR), reduced smoke & acid gas emission (FRLS), Halogen free (LSZH / ZHFR).

GENERAL PARAMETERS FOR INSTRUMENTATION CABLES

PARAMETER	UNIT	CONDUCTOR AREA				
		0.5 mm ²	0.75mm ²	1.0 mm ²	1.5 mm ²	2.5 mm ²
Maximum D.C. Resistance of plain copper conductor at 20°C	Ω/km	39.7	26.5	18.5	12.3	7.56
Maximum D.C. Resistance of Tinned copper conductor at 20°C	Ω/km	40.5	27.0	18.9	12.5	7.7
Maximum D.C. Resistance of 0.5mm ATC Drain wire at 20°C	Ω/km	30	30	30	30	30
Maximum mutual capacitance core to core (PVC insulated)	nF/km	250	250	250	250	250
Maximum mutual capacitance core to core (PE, XLPE insulated)	nF/km	115	115	115	115	115
L/R ratio maximum	μH/ohm	25	25	30	40	70
Electrostatic Noise Rejection Ratio as per IEEE Vol3 (minimum)	dB	76	76	76	76	76
Minimum Insulation Thickness	mm	0.44	0.44	0.44	0.44	0.53
Minimum Insulation Resistance at 27°C (PVC insulated) at 500V	MΩ/km	10	10	10	10	10
Minimum Insulation Resistance at 27°C (PE, XLPE insulated) at 500V	MΩ/km	100	100	100	100	100
High Voltage test	kV	1kV for 1 minute				

Instrumentation cables can be specially designed to meet specific requirements of Capacitance, L/R ration etc.

