KEC

INSTRUMENTATION
cables

RPG CABLES
(A Division of KEC International Limited)

THE MYSORE UNIT OF RPG CABLES MANUFACTURES A RANGE OF INSTRUMENTATION CABLES

The Mysore Unit of RPG Cables is the largest and most diversified cables manufacturing facility in the South of India. The unit manufactures:

- Jelly Filled Telecom Cables
- Optical Fibre Cables
- Low Tension Power & Control Cables
- Instrumentation Cables

Over the years, the cables manufactured at Mysore have been exported to over 25 countries. The plant is accredited to ISO 9001, ISO 14001 and ISO 18001 standards. It has won several quality and other Awards since inception.

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 RPG 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.*

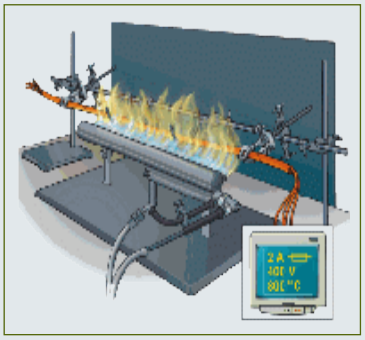
THERMOCOUPLE EXTENSION & COMPENSATING CABLES

The construction of Thermocouple extension & compensating cables is identical to Instrumentation cables. These cables are used to pass the EMF signal from the thermocouple end to the control panel. The thermo-electric properties of the conductors used for these cables are the same as that of the thermocouple used for sensing the temperature.

Thermocouple extension & compensating cables are generally designed & manufactured based on BS EN 50288 (formerly BS 5308), EIL 6-52-45, ANSI MC 96.1, IEC 60584, IS 8784 and generally as per IS 1554-1, IS 7098-1, IEC 60502-1.

SPECIAL APPLICATION CABLES - FIRE SURVIVAL CABLES

Fire Survival Cables are manufactured with Glass Backed Mica Tape applied over conductor and are used where the applications require circuit integrity during a fire mainly in Fire Alarm systems, sprinkler systems in schools, hospitals, shopping malls, cinemas etc. The circuit integrity is maintained for 3 hours at 750°C.



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 (16AWG, 18AWG, 20AWG) 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

Multipair / 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.

INNERSHEATH

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

ARMOUR

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

OUTERSHEATH

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

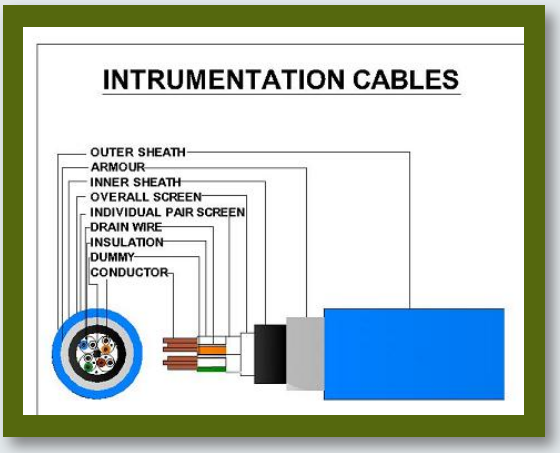
SPECIAL APPLICATION FIRE SURVIVAL CABLE

Heat Barrier Glass Backed Mica Tape applied over conductor to meet the test requirements of 750°C for 3 hours as per IEC 60331.

GENERAL PARAMETRES FOR INSTRUMENTATION CABLES

PARAMETER	UNIT	CONDUCTOR AREA				
		0.5 mm^2	0.75 mm^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^2 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	0.5	0.5	0.5	0.5	0.5
Minimum Insulation Resistance at 27°C (PVC insulated) at 500V	MΩ/km	10	10	10	10	10
Minimum Insulation Resistance at 27°C (XLPE, PE 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 ratio etc.

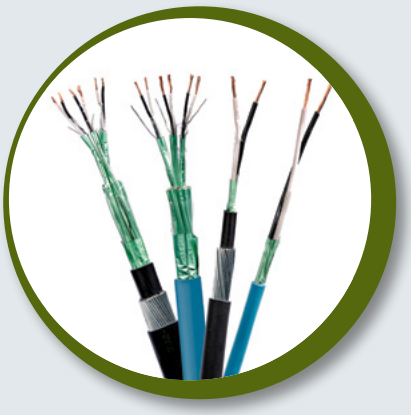


GENERAL DETAILS FOR THERMOCOUPLE EXTENSION & COMPENSATING CABLES

TYPE	CONDUCTOR COMBINATIONS		ANSI MC 96.1			IS 8784			IEC 60584-3		
			COLOUR CODE		EMF TOLERANCE ± °C	COLOUR CODE		EMF TOLERANCE ± °C	COLOUR CODE		EMF TOLERANCE ± °C
	+VE	-VE	+VE	-VE		+VE	-VE		+VE	-VE	
Kx	Nickel-Chromium (Chromel)	Nickel-Aluminium (Alumel)	Yellow	Red	2.2	Red	Green	2.2	Green	White	2.5
Ex	Nickel-Chromium (Chromel)	Copper-Nickel (Constantan)	Purple	Red	1.7	Red	Violet	1.7	Violet	White	2.5
Tx	Copper	Copper-Nickel (Constantan)	Blue	Red	1.0	Red	Black	1.0	Brown	White	1.0
Jx	Iron	Copper-Nickel (Constantan)	White	Red	2.2	Red	Blue	2.2	Black	White	2.5
Vx (KxA)	Copper	Copper-Nickel (Constantan)	-	-	-	-	-	-	Brown	White	2.5
Rxa / Sxa	Copper	Copper-Nickel (Constantan)	Black	Red	1.5	Red	White	1.5	Orange	White	2.5

MAXIMUM D.C LOOP RESISTANCE FOR THERMOCOUPLE CONDUCTORS AT 20^{0}C Ω/KM

CONDUCTOR SIZE	Kx	Ex	Tx	Jx	Vx (KxA)	Rx / Sx
16 AWG (1.29mm)	746	905	385	475	385	110
18 AWG (1.02mm)	1210	1470	623	770	623	175
20 AWG (0.81mm)	1910	2311	980	1212	980	280



QUALITY, ENVIRONMENTAL & SAFETY SYSTEMS

CERTIFICATE

This is to certify that

KEC International Limited
(RPG Cables Division)
#349/350, Hebbal Industrial Area
Belavadi, Hootagalli Post
Mysore - 570 018
Karnataka
INDIA

has implemented and maintains a **Quality Management System**.

Scope:
The Design & Development and Manufacture of Polythene Insulated Jelly Filled Cables and Optical Fibre Cables for Telecommunication & Industrial Applications.
The Manufacture of Railway Signaling Cables for use in AC and DC Systems, and LT Aluminum and Copper cables for power transmission and control cables.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2008

Certificate registration no.	20002506 QM08
Date of original certification	2005-11-13
Date of revision	2011-09-28
Date of certification	2011-11-13
Valid until	2014-11-12

UL DQS Inc.

Ganesh Rao
President

Accredited Body: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA

CERTIFICATE

This is to certify that

KEC International limited
(RPG Cables Division)
349/350, Hebbal Industrial Area
Hootagalli, Belavadi post
Mysore - 570 018
Karnataka
INDIA

has implemented and maintains an **Environmental Management System**.

Scope:
The Environmental Management System of KEC International Limited associated with the design and development and manufacture of Polythene insulated jelly filled cables for telecommunication applications and optical fiber cables for telecommunication and industrial applications, manufacture of railway signaling cables for use in AC and DC systems, manufacture of LT Aluminum and Copper cables for power transmission and control cables located at Mysore, Karnataka India.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 14001 : 2004

Certificate registration no.	20002506 UM
Date of certification	2012-03-30
Valid until	2015-03-29

UL DQS Inc.

Ganesh Rao
Managing Director

Accredited Body: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA

CERTIFICATE

This is to certify that

KEC International limited
(RPG Cables Division)
349/350, Hebbal Industrial Area
Hootagalli, Belavadi Post
Mysore - 570 018
Karnataka
INDIA

has implemented and maintains an
Occupational Health and Safety Management System.

Scope:
The Occupational Health and Safety activities and supporting processes, associated with the Design and Development and Manufacture of Polythene insulated jelly filled cables for telecommunication applications and optical fiber cables for telecommunication and industrial applications, manufacture of railway signaling cables for use in AC and DC systems, manufacture of LT Aluminum and Copper cables for power transmission and control cables of their products and services.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

BS OHSAS 18001 : 2007

Certificate registration no.	20002506 BSOH
Original Certification date	2012-03-30
Date of revision	2013-02-27
Date of certification	2012-03-30
Valid until	2015-03-29

UL DQS Inc.

Ganesh Rao
Managing Director

Accredited Body: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA

RPG CABLES
(A Division of KEC International Limited)

HEAD OFFICE:

MUMBAI	6th floor, RPG House, 463, Dr.Annie Besant Road, Worli, Mumbai-400030	+91 22 66670300	powercables@kecrpg.com

MANUFACTURING UNITS:

VADODARA	Plot No. 803, Samlaya Savli Road, Village Godampura, Taluka- Savli, Vadodara, Gujarat-391520	+91 267 6398529
SILVASSA	273/4, Demni Road, Silvassa - 396 193 (D&NH).	+91 260 6618500/ 2668518
MYSORE	349, Hebbal Industrial Area, Hootagalli, Belavadi Post, Mysore - 570 018.	+91 821 6559938/ 6553375

SALES OFFICES:

NEW DELHI	N-83, 1st Floor, above PNB, Pratap, Pratap Building, Cannaught Place, New Delhi - 110001	+91 11 660 98598/ 66098599	newdelhicables@kecrpg.com
KOLKATA	12, Park Street, Queens Mansion, 1st Floor, Flat No. 22E, Gate No.3, Kolkata - 700 071.	+91 33 64590654	kolkatacables@kecrpg.com
CHENNAI	No.27, Sudharshan Building, 6th Floor, Whites Road, Chennai - 600 014.	+91 44 28520384	chennaicables@kecrpg.com
BENGALURU	1st Floor, Auto Towers, No-9, J.C.Road, Bangalore - 560 002.	+91 80 22124444	bengalurucables@kecrpg.com
VADODARA	A-304, Sidhivinayak Complex, Farmji Compound, Behind Railway Station, Alkapuri, Vadodara - 390 007	+91 265 2311011	vadodaracables@kecrpg.com
PUNE	Flat No.9, " KSHITIJ ", 1st Floor, 769/6, Lane No.7, Prabhat Road, Deccan Gymkhana, Pune - 411 004.	+91 20 64706061/ 64706065	punecables@kecrpg.com
HYDERABAD	406 & 407, Maheshwari Chambers, Erramanzil, Somajiguda, Hyderabad - 560 082.	+91 40 30901642/ 23311642	hyderabadcables@kecrpg.com
MUMBAI	B-501, 247 Park, L.B.S.Marg, Vikhroli (W), Mumbai - 400 083	+91 22 66406350	mumbaicables@kecrpg.com

RESIDENT REPRESENTATIVES:

DEHRADUN	dehraduncables@kecrpg.com
RAJASTHAN	rajasthancables@kecrpg.com
RANCHI	ranchicables@kecrpg.com
BHOPAL	bhopalcables@kecrpg.com
BHUBANESWAR	bhubaneswarcables@kecrpg.com
AHMEDABAD	ahmedabadcables@kecrpg.com
NAGPUR	nagpurcables@kecrpg.com
VISAKHAPATNAM	visakhapatnamcables@kecrpg.com
COIMBATORE	coimbatorecables@kecrpg.com
COCHIN	cochincables@kecrpg.com

RPG CABLES
(A Division of KEC International Limited)