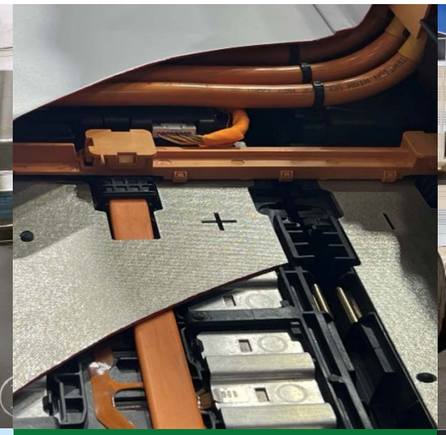
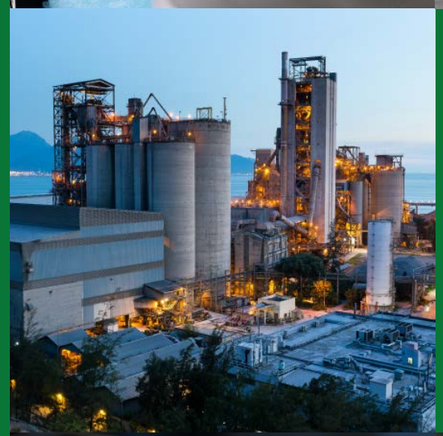
YUCHANG E&C CO.,LTD.

#22, Barangongdan-ro 4-gil, Hyangnam-eup, Hwaseong-si, Gyeonggi-do, South Korea
Tel. +82-31-354-2800 / +82-31-354-4852~4 Fax. +82-31-354-4851 Email. ycec@ycec.kr

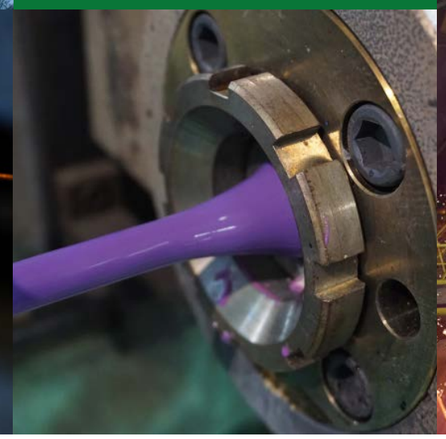
YUCHANG E&C

STANDARD PRODUCT GUIDE






With customer value
The best product
The better future

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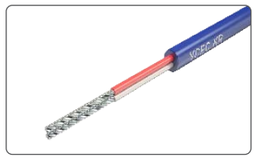
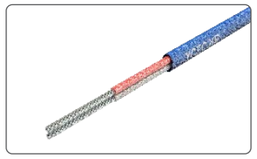
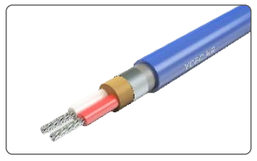
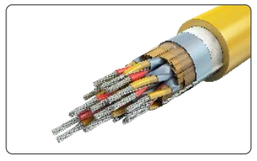




CONTENTS

GREETINGS

Over the 35 years, Yuchang E&C. has been providing the highest quality T/C extension and compensating cables to customers of various fields.

From plant industries (iron manufacture, chemical fibers, petroleum)to shipping and automobiles industries, Yuchang E&C. has made every effort to ensure the best flow of the heat and automatic controls. As robotics and auto-controls marked major milestones in industrial growth, the importance of accurate temperature control has never been so emphasized. Thus, Yuchang E&C. promises to continue providing the best quality products as well as the best follow-up services to each customer

YUCHANG E&C CO.,LTD.

Company History

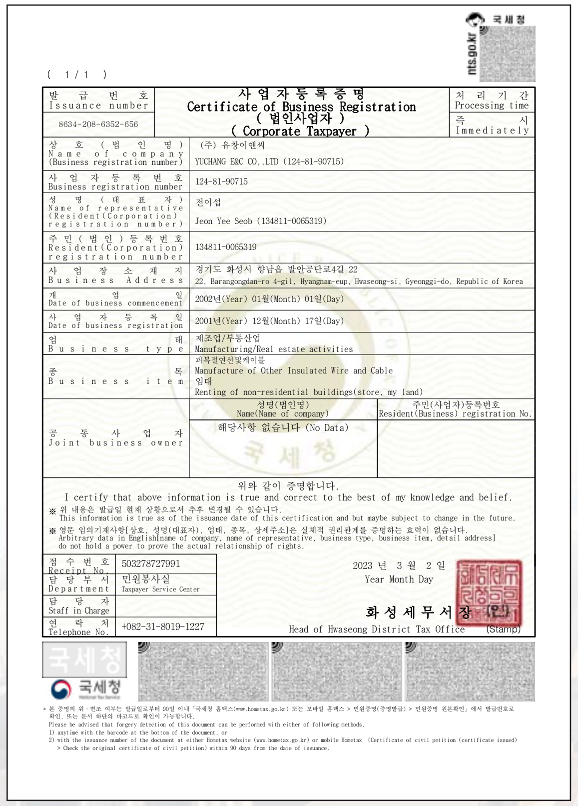
- 1988 Established 'Yuchang Electrics'
- 1995 Factory located at Bong- dam eup, Hwaseong si, Kyung-gi do
- 1996 Renamed as 'Yuchang Instruments and Electrics'
- 2001 Certified ISO 9001
- 2002 Converted to 'Yuchang E&C Co., LTD.'
- 2002 Factory located at Hyangnam-eup, Hwaseong si, Kyung-gi do
- 2006 Certified ISO 14001

- 2008 Certified Korea Standard (KS C1609)
- 2008 Acquired Electrical Appliances Safety Certificate on FR-CVV
- 2010 New factory built at Bal-An Industrial Complex
- 2011 New R&D division (approved by Koita) built
- 2011 Certified 'Innovation-driven enterprise' by Mainbiz
- 2012 Certified UL 1330, 1331, 1332, etc (Fluoropolymer wire)
- 2014 Selected as 'Outstanding company' (by Ministry of Employment & Labor)

- 2015 Enterprise Specializing in Materials & Parts (by Ministry of Trade, Industry and Energy)
- 2017 Certified UL 13(PLTC)
- 2018 Certified UL 1726, 1727
- 2021 Certified UL 4648, 4649
- 2021 Wire Harness Business Started
- 2023 YAGEO Nexensos distributor
- 2024 Awarded the 3 Million Dollar Export Tower

Certificate

Business Registration



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발급번호 Issuance number	사업자등록증명 Certificate of Business Registration (법인사업자) (Corporate Taxpayer)	처리기간 Processing time
8634-208-6352-656		즉시 Immediately

상호(법인명) Name of company (Business registration number)	(주) 유창이앤씨 YUCHANG E&C CO,.LTD (124-81-90715)
사업자등록번호 Business registration number	124-81-90715
성명(대표자) Name of representative (Resident(Corporation) registration number)	전이섭 Jeon Yee Seob (134811-0065319)
주민(법인)등록번호 Resident(Corporation) registration number	134811-0065319
사업장소재지 Business Address	경기도 화성시 향남읍 발안공단로4길 22 22, Barangongdan-ro 4-gil, Hyangnam-eup, Hwaseong-si, Gyeonggi-do, Republic of Korea
개업일 Date of business commencement	2002년(Year) 01월(Month) 01일(Day)
사업자등록일 Date of business registration	2001년(Year) 12월(Month) 17일(Day)
업태 Business type	제조업/부동산업 Manufacturing/Real estate activities
종목 Business item	피복절연선및케이블 Manufacture of Other Insulated Wire and Cable 임대 Renting of non-residential buildings(store, my land)

공동사업자 Joint business owner	성명(법인명) Name(Name of company)	주민(사업자)등록번호 Resident(Business) registration No.
	해당사항 없습니다 (No Data)	

위와 같이 증명합니다.
I certify that above information is true and correct to the best of my knowledge and belief.

※ 위 내용은 발급일 현재 상황으로서 추후 변경될 수 있습니다.
This information is true as of the issuance date of this certification and but maybe subject to change in the future.

※ 영문 임의기재사항[상호, 성명(대표자), 업태, 종목, 상세주소]은 실체적 권리관계를 증명하는 효력이 없습니다.
Arbitrary data in English[name of company, name of representative, business type, business item, detail address] do not hold a power to prove the actual relationship of rights.

접수번호 Receipt No.	503278727991
담당부서 Department	민원봉사실 Taxpayer Service Center
담당자 Staff in Charge	
연락처 Telephone No.	+082-31-8019-1227

2023 년 3 월 2 일
Year Month Day

화성세무서장 (인)
Head of Hwaseong District Tax Office (Stamp)

국세청

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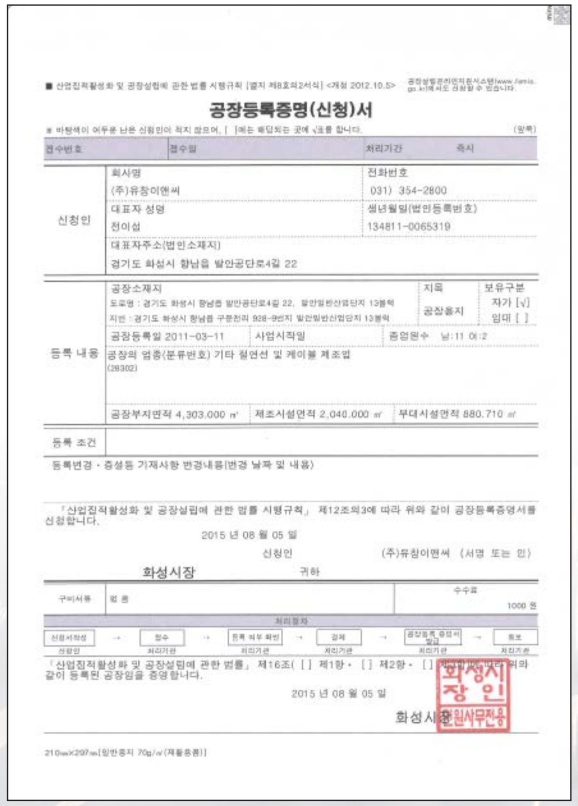
Business Registration Number



■ 산업집적활성화 및 공장설립에 관한 법률 시행규칙 [별지 제8호의2서식] <개정 2012.10.5>

공장등록증명(신청)서

접수번호	접수일	처리기간 즉시

신청인	회사명 (주)유창이엔씨	전화번호 031) 354-2800
	대표자 성명 전이섭	생년월일(법인등록번호) 134811-0065319
	대표자주소(법인소재지) 경기도 화성시 향남읍 발안공단로4길 22	
등록 내용	공장소재지	지목 공장용지 / 보유구분 자가 [√] 임대 [ ]
	공장등록일 2011-03-11 / 사업시작일	종업원수 남:11 여:2
	공장의 업종(분류번호) 기타 절연선 및 케이블 제조업 (28302)	
	공장부지면적 4,303.000 ㎡ / 제조시설면적 2,040.000 ㎡	부대시설면적 880.710 ㎡
등록 조건		

등록변경 · 증설등 기재사항 변경내용(변경 날짜 및 내용)

「산업집적활성화 및 공장설립에 관한 법률 시행규칙」 제12조의3에 따라 위와 같이 공장등록증명서를 신청합니다.

2015 년 08 월 05 일

신청인 (주)유창이엔씨 (서명 또는 인)

화성시장 귀하

구비서류	없음	수수료 1000 원

「산업집적활성화 및 공장설립에 관한 법률」 제16조([ ] 제1항 · [ ] 제2항 · [ ] ...)에 따라 위와 같이 등록된 공장임을 증명합니다.

2015 년 08 월 05 일

화성시장

Factory Certificate

Certificate

ISO 9001 & 14001

CERTIFICATE OF APPROVAL

YUCHANG E&C Co., Ltd.

22 BARANGONGDAN-RO 4-GIL, HYANGNAM-EUP, HWASEONG-SI, GYEONGGI-DO, KOREA

Korean Standards Association hereby certifies that the Quality Management System of the above organization has been assessed and found to meet the requirements of the standard and scope of certification detailed below:

CERTIFICATION No. QMS-3962

STANDARD KS Q ISO 9001:2015/ISO 9001:2015

SCOPE OF CERTIFICATION
DESIGN, DEVELOPMENT, PRODUCTION OF EXTENSION COMPENSATING WIRES, THERMOCOUPLE WIRES, TEFLON CABLES AND POWER CABLE WITH EXTRUDED INSULATION FOR RATED VOLTAGES FROM 1KV TO 30KV

VALID FROM 29 November, 2024
VALID TO 28 November, 2027

Original Certification Date : 19 June, 2008

Date of Issue : 01 October, 2024

PRESIDENT OF KSA

KOREAN STANDARDS ASSOCIATION
5, Teheran-ro 69-gil, Gangnam-Gu, Seoul, Korea

(KAB-QC-30)
KSA has been accredited by Korea Accreditation Board(KAB) as an ISO 9001 Certification body.(Accreditation Number : KAB-QC-30)

Quality Management System Certificate

CERTIFICATE OF APPROVAL

YUCHANG E&C Co., Ltd.

22 BARANGONGDAN-RO 4-GIL, HYANGNAM-EUP, HWASEONG-SI, GYEONGGI-DO, KOREA

Korean Standards Association hereby certifies that the Environmental Management System of the above organization has been assessed and found to meet the requirements of the standard and scope of certification detailed below:

CERTIFICATION No. EMS-1207

STANDARD KS I ISO 14001:2015/ISO 14001:2015

SCOPE OF CERTIFICATION
DESIGN, DEVELOPMENT, PRODUCTION OF EXTENSION COMPENSATING WIRES, THERMOCOUPLE WIRES, TEFLON CABLES AND POWER CABLE WITH EXTRUDED INSULATION FOR RATED VOLTAGES FROM 1KV TO 30KV

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PRESIDENT OF KSA

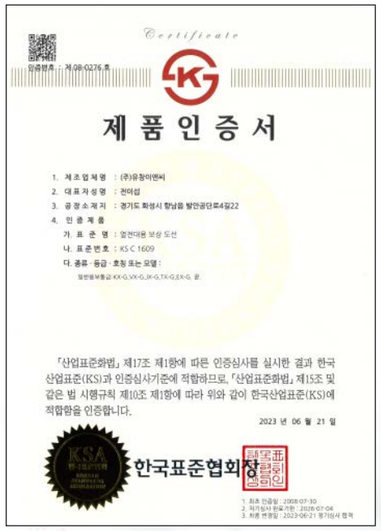
KOREAN STANDARDS ASSOCIATION
5, Teheran-ro 69gil, Gangnam-Gu, Seoul, Korea

(KAB-EC-11)
KSA has been accredited by Korea Accreditation Board(KAB) as an ISO 14001 Certification body.(Accreditation Number : KAB-EC-11)

Environmental Management System Certificate

Certificate

Product Domestic(KS, KC)



Korean Industrial Standard

Electrical Equipment Safety Certificate(FR)

Electrical Equipment Safety Certificate(TFR)

Certificate

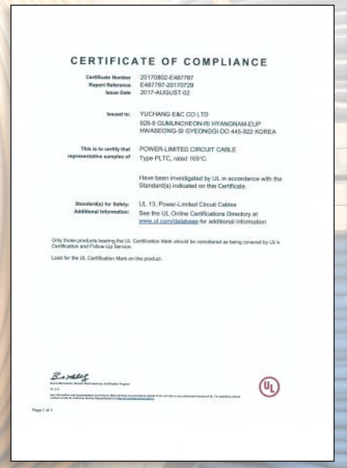
Product International(UL)

UL AWM 2464(2919,21974,20276)

UL 1330, 1331

UL 1726,1727

AWM 4648, 4649



UL PLTC PVC 105°C

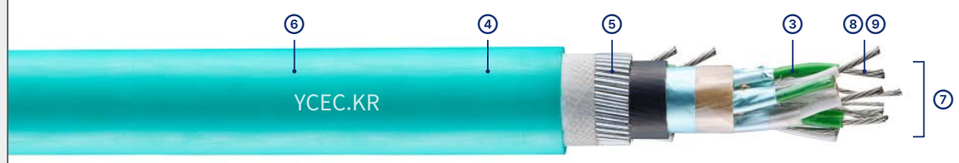
UL PLTC FEP 200°C

What is T/C Extension and Compensating wire?

A thermocouple is a self-powered device that are used to measure wide range of temperature.
It consists of two different conductors that contact each other at one or more spots where temperature difference is experienced. Then, two conductors create voltage that are converted to temperature readings in the control box. Thermocouple utilizes 'extension wires' to measure temperature from its body to the control box, where the measurements are calculated. Since extension cables are made of the same exact material as thermocouples, they yield accurate reading results. However, extension wires are fairly expensive and new cables were invented to 'compensate' the cost; they are called 'compensating wires'. Compensating wires are made of materials that easily and quickly transfer temperatures. Copper, iron and constantan are main materials used to make compensating wire. Though there are some limitations on accuracy, the range of errors is definitely not that significant. Places (such as plants) that require very accurate temperature readings tend to use extension cable; while others look for compensating cables for cost efficiencies.

Symbols for T/C Extension & Compensating Wire

Example: IEC 60584-3 applied



Example) KX(①) - G(②) - VV(③④) SWA(⑤) R(⑥) 16P(⑦) X 1.5SQ(⑧) (7/0.53)(⑨)

① Type of T/C Extension & Compensating cable

Extension : KX, EX, JX, TX, NX
Compensation : BX, RX, SX, WX, VX

② Classification

G : General Standard
GS : General High accuracy
H : Heat resistant Standard
HS : Heat resistant High accuracy

③④ The material of Insulation & Jacket

V : PVC
HV : Heat-resistant PVC
E(C) : Polyethylene (XLPE)
F : Fluoropolymer (FEP,ETFE,PFA)
K : Silicone Rubber
G : Glass Fiber

⑤ Shield / Armor

N : None
S : Copper Tape
SB : Tinned Copper Braid
AMS : Aluminum Mylar Tape Shield
SWA : Steel Wire Armor

⑥ Shape

F : Flat Type
R : Round Type

⑦ Inner Configuration

P : Pair

⑧ Conductor Size

SQ : mm²

⑨ Conductor Construction

Number of strands / dia.(mm)
(Solid or stranded)

Limits of Error : Conforms to ASTM E230, IEC 60584 and ANSI MC 96.1
Color Code : Conforms to ASTM E230 and ANSI MC96.1 (International Color Codes Available)

Type and Color Code for Extension & Compensating Wire

① Type of Extension & Compensating cable

Type	Symbol	Conductor Composition		KS C 1609	ISA(ANSI)-MC96.1 (ASTM E230)	IEC60584-3
		Positive (+)	Negative (-)			
K	KX	Chromel	Alumel	Red + − White, Blue	Yellow + − Red, Yellow	Green + − White, Green
	WX (KCA)	Iron	Constantan	Red + − White, Blue		Green + − White, Green
	VX (KCB)	Copper	Constantan	Red + − White, Blue		Green + − White, Green
E	EX	Chromel	Constantan	Red + − White, Puple	Puple + − Red, Puple	Puple + − White, Puple
J	JX	Iron	Constantan	Red + − White, Yellow	White + − Red, Black	Black + − White, Black
T	TX	Copper	Constantan	Red + − White, Brown	Blue + − Red, Blue	Brown + − White, Brown
R	RX (RCB)	Copper	Copper Nickel Alloy	Red + − White, Black	Black + − Red, Green	Orange + − White, Orange
S	SX (SCB)	Copper	Copper Nickel Alloy	Red + − White, Black	Black + − Red, Green	Orange + − White, Orange
B	BX (BC)	Copper	Copper	Red + − White, Gray	Gray + − Red, Gray	Gray + − White, Gray
N	NX	Nickel Chromium Silicon (Ni-Cr-Si Alloy)	Nickel Silicon (Ni-Si Alloy)		Orange + − Red, Orange	Pink + − White, Pink
C	CX (CC)	CPC	CNC		Green + − Red, Red	

• JIS C 1610 was replaced by IEC 60584-3 starting from 2014.

Characteristics Table

② Classification

Code and Material of Thermocouple wire	Kinds and classes of thermocouple extension wire		Temperature range of validity					
			KS C 1609		ISA(ANSI)-MC96.1 (ASTM E230)		IEC60584-3	
	Symbols	Classification	Temp. Range(°C)	Limits of error(°C)	Temp. Range(°C)	Limits of error(°C)	Temp. Range(°C)	Limits of error(°C)
K Chromel Alumel	KX-G	General Standard	-20 ~ 150	±2.5	0 ~ 200	±2.2	-25~200	±2.5
	KX-GS	General High accuracy		±1.5		-		±1.5
	KX-H	Heat resistant Standard		±2.5		±2.2		±2.5
	KX-HS	Heat resistant High accuracy		±1.5		-		±1.5
	WX-G	General Standard		±3.0		-	0~150	±2.5
	WX-H	Heat resistant Standard						
	VX-G	General Standard	-20~100	±2.5			0~100	±2.5
E Chromel Constantan	EX-G	General Standard	-20~ 150	±2.5	0 ~ 200	±1.7	-25~200	±2.5
	EX-H	Heat resistant Standard						
J Iron Constantan	JX-G	General Standard		±2.5		±2.2		±2.5
	JX-H	Heat resistant Standard						
T Copper Constantan	TX-G	General Standard		±2.0		±1.0	-25~100	±1.0
	TX-GS	General High accuracy		±1.0		±0.5		±0.5
	TX-H	Heat resistant Standard		±2.0		±1.0		±1.0
	TX-HS	Heat resistant High accuracy		±1.0		±0.5		±0.5
R Platinum-13% Rhodium Platinum	RX-G	General Standard	0~150	+3 -7	0 ~ 200	±0.057mv (±5°C)	0~200	±5.0
	RX-H	Heat resistant Standard						
S Platinum-10% Rhodium Platinum	SX-G	General Standard					0~200	±5.0
	SX-H	Heat resistant Standard						
B Platinum-30% Rhodium Platinum-6% Rhodium	BX-G	General Standard	0~100	-	0~100	±0.000mv (0°C) ±0.033mv (-3.7°C)	0~100	±3.5
N Nickel-14% Chromium-1.5% Silicon Nickel-4.5% Silicon-0.1% Magnesium	NX-G	General Standard	-	-	0~200	±2.2	0~150	±2.5
	NX-H	Heat resistant Standard						
C Tungsten-5% Rhenium Tungsten-26% Rhenium	CX-G	General Standard	-	-	0~200	±4.4	-	-
	CX-H	Heat resistant Standard						

IEC60584-3 : Tolerance Class 1 : ±1.5°C
Class 2 : ±2.5°C

Material of Insulation and Jacket

③④ The material of Insulation & Jacket

Insulation Materials for Various Compensating Wires

PVC	Widely used in general environments due to its cost-effectiveness and ease of installation, making it a suitable alternative to rubber materials.
PE / XLPE	Provides excellent electrical insulation, weather, chemical resistance; XLPE maintains stable performance even at high temperatures up to 90°C through cross-linking.
Glass Fiber	Known for excellent heat and chemical resistance, commonly used in high-temperature heating applications.
Silicone Rubber	Provides excellent flexibility, heat and chemical resistance, making it ideal for environments with temperature fluctuations, oils, or air exposure.
Fluoropolymer	Provides excellent heat, chemical, and electrical insulation performance, ensuring reliable use in high-voltage and high-temperature conditions.
PEEK	Maintains stable properties at temperatures up to around 260°C and offers excellent resistance to abrasion, chemicals, and radiation as a high-performance halogen-free material.
Polyimide (PI)	Withstands extreme temperatures above 300°C while offering excellent electrical insulation and chemical resistance, making it suitable for high-reliability applications.

◎ Excellent ○ Good △ Normal X Weak

Material of Insulation & Sheath	Symbols	Temperature Range(°C)	Insulation resistance (MΩ/Km)	Abrasion resistance	Heat resistance	Water proof	Chemical resistance	Oil proof
PVC	V	-10~70	500	○	X	◎	△	△
HR-PVC	HV	-10~105	500	○	△	◎	△	△
PE	PE	-60~75	1,000	○	△	◎	○	△
XLPE	C	-50~90	1,000	○	○	◎	○	△
Glass Fiber	G	0~200	10	△	◎	X	○	△
Silicone Rubber	K	-55~180	100	○	○	○	○	X
FEP	F	-80~200	1,500	◎	○	◎	◎	◎
ETFE	ETFE	-80~150	1,500	◎	○	◎	◎	◎
PFA	PFA	-80~260	1,500	◎	○	◎	◎	◎
PTFE	PTFE	-80~260	1,600	◎	○	◎	◎	◎
PEEK	PEEK	-60~260	1,600	◎	○	◎	◎	◎
Polyimide	PI	-40~300	1,700	◎	○	◎	◎	◎
HG	HG	-30~400	5	△	◎	X	○	△
SHG	SHG	-30~700	5	△	◎	X	○	△
Silica	S	-30~1000	1,600	△	◎	X	○	△

Material of Insulation & Jacket

③④ The material of Insulation & Jacket

Temperature Range & Characteristic table

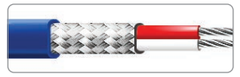
◎ Excellent ○ Good △ Normal X Weak

Material of Insulation	Water proof	Oil proof	Chemical resistance	Insulation resistance	Cold resistance	Heat resistance
Cold Resistant PVC	○	△	△	○	-20	50
Polyethylene	○	△	○	◎	-60	75
General PVC	○	△	△	○	-10	70
Heat resistant PVC	○	△	△	○	-10	105
Natural Rubber	○	○	○	○	-40	60
Urethane Rubber	○	○	○	○	-20	70
Cross-linked Polyethylene	○	△	○	◎	-50	90
Silicone	○	△	○	○	-55	180
Nylon	◎	◎	◎	○	-40	120
FEP	◎	◎	◎	◎	-80	200
ETFE	◎	◎	◎	◎	-80	150
PFA	◎	◎	◎	◎	-80	260
PEEK	◎	◎	◎	◎	-60	260
Polyimide	◎	◎	◎	◎	-40	300
Glass Fiber	X	△	○	-		200
Silica	X	△	○	-	-30	1000

Other Options

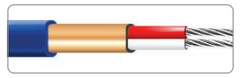
⑤ Shield / Armor

SB: Tinned Copper Braid



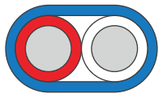
AMS: Aluminum Mylar Tape Shield

S: Copper Tape

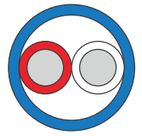


SWA: Steel Wire Armor

⑥ Shape



Flat(F)

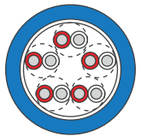


Round(R)

⑦ Inner Configuration

Thermocouple Extension & Compensating wire consists of a pair(s) which is composed of a Positive and a Negative.

Pair	1Pair	2Pair	8Pair	10Pair	30Pair
Symbol	1P	2P	8P	10P	30P



Multi - Pair

⑧⑨ Conductor Size & Construction

Compensating wires send tiny mV-level currents to measuring devices, so conductor size has little effect on the measurement. The below tables show typical conductor sizes for thermocouple Extension & Compensating wire.

Sectional Area (mm^2)	Conductor Construction (No./mm)
0.5	7/0.30
0.75	7/0.37
1.0	7/0.43
	1/1.13
1.25	7/0.45
1.5	7/0.53
	1/1.38
2.0	7/0.60
2.5	7/0.67

AWG	Conductor Construction (No./mm)
#24	7/0.203
#22	7/0.254
	1/0.65
#20	7/0.32
	1/0.81
#18	7/0.386
	1/1.02
#16	7/0.488
	1/1.29

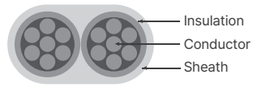
INTRODUCTION-THERMOCOUPLE WIRE

PVC, Flat Type | -VVF

Materials & Construction

Conductor	: Depends on Thermocouple Types
Insulation	: PVC
Sheath	: PVC
Applicable Standard	KS C 1609/ ASTM E230/ IEC 60584-3
Operating Temperature	-10~70°C

Cross-sectional View



Features

- PVC insulation and sheath for general-purpose applications
- Excellent resistance to water, abrasion, chemicals, and oils
- High durability and flexibility for easy installation and wiring
- Cost-effective and widely trusted for its reliability
- Suitable for use at temperatures up to 90°C with HR-PVC

Applications

- Automation, control, and heat management in industrial equipment (plants, power stations, steelworks, petrochemical facilities)
- HVAC systems, temperature controllers, and internal sensors in home appliances
- Temperature measurement and monitoring in environments below 70°C

Specification Table

※ UL-certified cable : contact us

Product	Conductor			Thickness of Insulation (mm)	Thickness of Sheath (mm)	Overall Diameter (mm)	Withstand Voltage (V/min)	Insulation resistance (MΩ/km)	Weight (kg/300M)
	Sectional Area (mm^2)	Construction (No./mm)	Diameter (mm)						
(Type)X1-G	2.0	7/0.6	1.8	0.6	0.9	4.8 X 7.8	AC 500	Min. 50	21.5
(Type)X2-G	1.25	7/0.45	1.35	0.6	0.9	4.35 X 6.9	AC 500	Min. 50	16
(Type)X3-G	0.5	7/0.3	0.9	0.35	0.7	3.0 X 4.6	AC 500	Min. 50	7

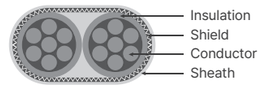
INTRODUCTION-THERMOCOUPLE WIRE

PVC, Flat Type | -VVSBF

Materials & Construction

Conductor	: Depends on Thermocouple Types
Insulation	: PVC
Shield	: Tinned Copper Braid
Sheath	: PVC
Applicable Standard	KS C 1609/ ASTM E230/ IEC 60584-3
Operating Temperature	-10~70°C

Cross-sectional View



Features

- PVC insulation and sheath with an internal metallic shielding layer
- Shielding reduces EMI, RFI, and electrostatic interference, ensuring stable temperature signals
- Excellent resistance to water, abrasion, chemicals, and oils
- High mechanical strength and durability for reliable signal transmission, even in outdoor environments
- Cost-effective and highly reliable
- Suitable for use at temperatures up to 90°C when HR-PVC is applied

Applications

- Automation, control, and heat management in industrial equipment (plants, power stations, steelworks, petrochemical facilities)
- Signal transmission in environments with strong electromagnetic interference (large motors, electric furnaces, generators, high-power equipment)
- HVAC systems, temperature controllers, and internal sensors in home appliances
- Temperature measurement and monitoring in environments below 70°C

Specification Table

※ UL-certified cable : contact us

Product	Conductor			Thickness of Insulation (mm)	Thickness of Shield (mm)	Thickness of Sheath (mm)	Overall Diameter (mm)	Withstand Voltage (V/min)	Insulation resistance (MΩ/km)	Weight (kg/300M)
	Sectional Area (mm^2)	Construction (No./mm)	Diameter (mm)							
(Type)X1-SG	2.0	7/0.6	1.8	0.6	0.3	0.9	5.4 X 8.4	AC 500	Min. 50	28
(Type)X2-SG	1.25	7/0.45	1.35	0.6	0.3	0.9	4.95 X 7.5	AC 500	Min. 50	20
(Type)X3-SG	0.5	7/0.3	0.9	0.35	0.3	0.7	3.6 X 5.2	AC 500	Min. 50	10