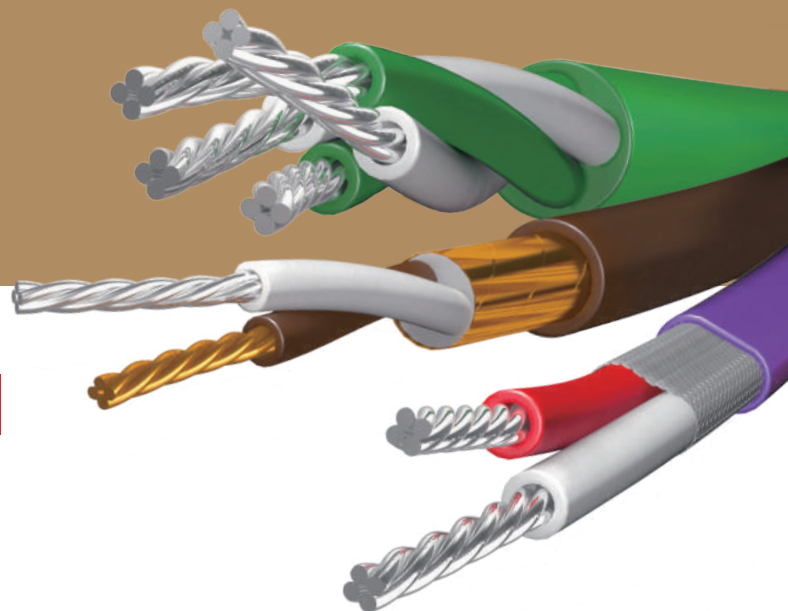


04

Compensating Cable Catalog



OKAZAKI
MANUFACTURING COMPANY

Green Procurement

Okazaki Manufacturing Company has established a policy for the control of hazardous chemical substances as an environmental measure, and promotes green purchasing and procurement activities that take the environment into consideration.

Security Policy

Okazaki Manufacturing Company handles customer information as a critical asset. We thoroughly recognize the importance of ensuring confidentiality and protecting information, and have implemented security measures through company rules and regulations.

To prevent the leakage of information, we take steps such as installing anti-virus software on company computers, implementing measures to prevent data leaks when exchanging data between computers, and prohibiting employees from taking computers out of company facilities and bringing their own private computers into company facilities.

Product Warranty

Okazaki Manufacturing Company conducts appropriate product inspections based on our own company standards.

If a problem occurs with the product, contact your nearest service representative with the specific details of the problem.

Warranty Period

Period of warranty will be limited to one year from the date of the delivery.

Scope of Warranty

If, during the warranty period specified above, a problem occurs due to a fault attributable to Okazaki Manufacturing Company, the product shall be replaced or repaired.

However, this warranty does not apply in the following cases:

- (1) If the product has been handled or used improperly
- (2) If the cause of the problem is attributable to factors external to the purchased product
- (3) If modifications or repairs have been performed by a party other than Okazaki Manufacturing Company
- (4) If the product is used for purposes or applications in which the product is intended as a consumable item
- (5) In other cases such as a natural disaster or accident

Furthermore, the scope of the warranty is limited to the purchased product itself, and it does not cover other damage arising from the problem with the purchased product.

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Head Office

Okazaki Manufacturing Company
UK Limited

Europe
Kamet Trading BV

Middle East
Petroleum Services Co.
Haffar Petroleum Services Co W.L.L
Petro Middle East
Energy Support Trading Est.
Technical Supplies International Co.LLC

● Overseas Bases
● Overseas Representatives

Main Manufacturing Factory



Okazaki Manufacturing Company
supplies highly reliable and
trusted products for use in
a wide range of industries.

Aerospace



Petrochemicals



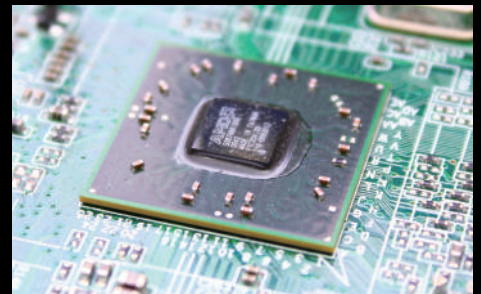
Gas



Fibers



Semiconductors



the world through “heat”

Korea
Newins Co., Ltd.

Okazaki Manufacturing (Taiwan) Company

ARI Industries, Inc., USA

Southeast Asia
Kiuchi Instrumentation Pte.Ltd.

Aerospace Division

Kobe-Iwaoka Factory

Fukuoka Factory

Kyushu Factory

Okazaki Manufacturing
(Taiwan) Company

ARI INDUSTRIES, INC., USA



[Business Sites]

Sales Offices

International Division/Tokyo Branch/Ibaraki Branch/Kita-kanto Branch/Chiba Branch/Yokohama Branch/Nagoya Branch/Kyoto Branch/Osaka Branch/Kobe Sales Office/Takasago Branch/Okayama Branch/Hiroshima Branch/Kita-kyushu Branch/Nagasaki Branch

Factories

Main Manufacturing Factory/Aerospace Division in Main Manufacturing Factory/Kobe-Iwaoka Factory/Fukuoka Factory/Kyushu Factory

Overseas Bases

ARI Industries Inc., USA/Okazaki Manufacturing (Taiwan) Co., Ltd./Okazaki Manufacturing Company UK Limited

Environment



Power Generation



Medical & Food



Automobiles



Ships



Iron & Steel



Sensors and Heaters

Connecting across industries with “heat”

01

Thermocouples

AEROPAK®

02

Resistance Thermometer Sensors

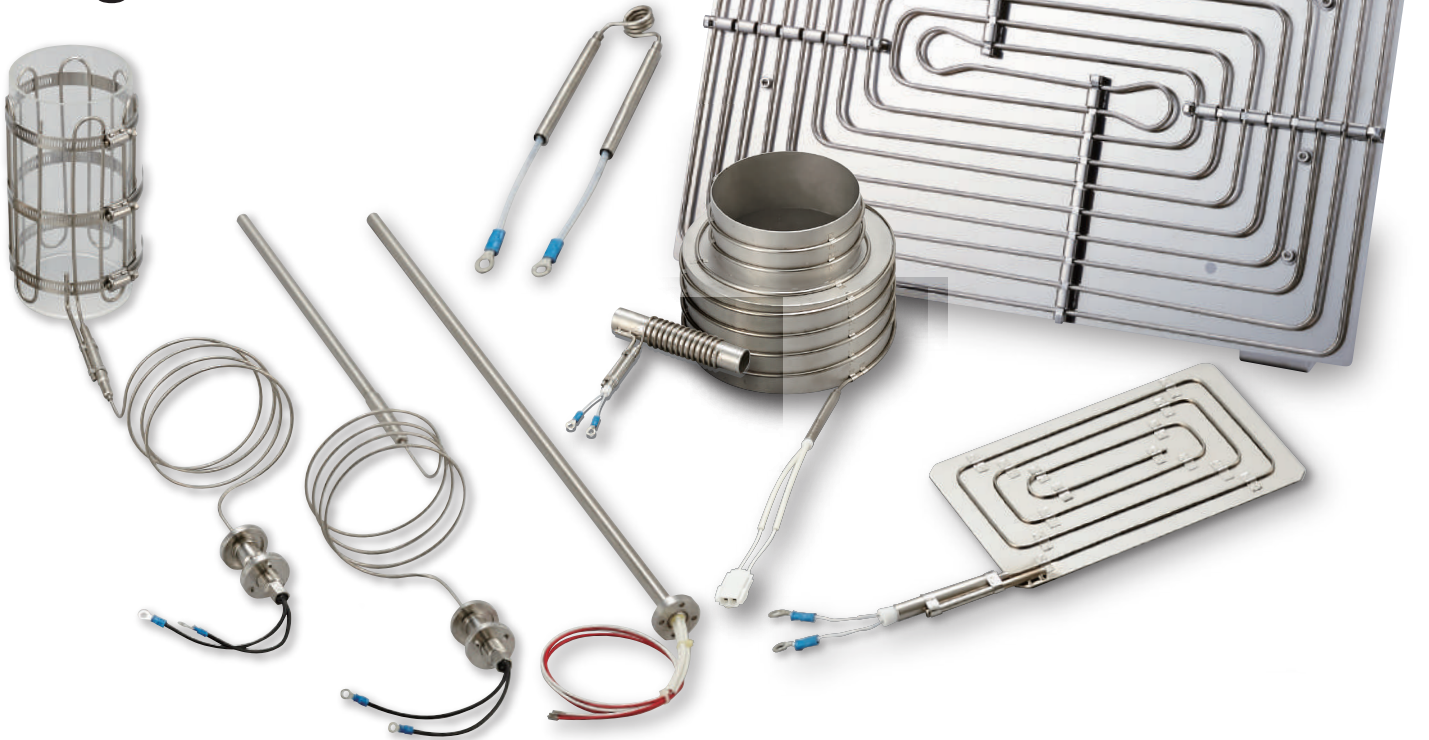
RESIOPAK®



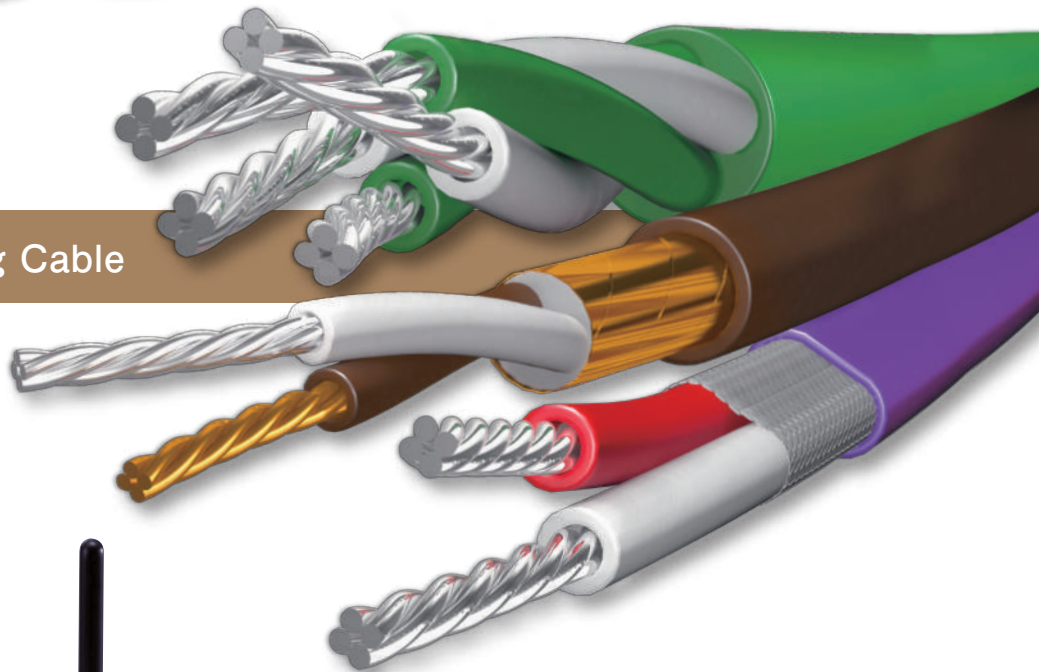
MI Cables

03 Heaters

AEROHEAT®



04 Compensating Cable



05 Thermowells



OKAZAKI Compensating Cables

With the progress of automation in various industries, highly accurate temperature measurement and control have become required. We manufacture a variety of highly reliable compensating cables under our consistent quality control system for all components from the core cable to the coating. Our compensating cables readily support highly accurate temperature measurement and control in the chemical industry, petrochemical industry, petroleum refining, thermal power generation, atomic power generation, and steel industry.

Types of compensating cables

Compensating cables can be categorized as shown in the table below, depending on the type of thermocouple combined therewith.

Types and codes

JIS C1610

Type			2012	1995
Thermocouple types	Conductor materials		Type*	Former type (reference)
	+ leg	- leg		
B	Copper	Copper	BC	BC
R	Copper	Alloy consisting mainly of copper and nickel	RCA	RCA
	Copper	Alloy consisting mainly of copper and nickel	RCB	RCB
S	Copper	Alloy consisting mainly of copper and nickel	SCA	SCA
	Copper	Alloy consisting mainly of copper and nickel	SCB	SCB
N	Alloy consisting mainly of nickel and chromium	Alloy consisting mainly of nickel and silicon	NX	NX
	Alloy consisting mainly of copper and nickel	Alloy consisting mainly of copper and nickel	NC	NC
K	Alloy consisting mainly of nickel and chromium	Alloy consisting mainly of nickel	KX	KX
	Iron	Alloy consisting mainly of copper and nickel	KCA	KCB
	Copper	Alloy consisting mainly of copper and nickel	KCB	KCC
E	Alloy consisting mainly of nickel and chromium	Alloy consisting mainly of copper and nickel	EX	EX
J	Iron	Alloy consisting mainly of copper and nickel	JX	JX
T	Copper	Alloy consisting mainly of copper and nickel	TX	TX

* The type of the compensating cable is determined by the type of thermocouple that is used in combination as well as the conductor material. The suffix for thermocouple extension grades is "X" and "C" for thermocouple compensating grades. In addition, the suffix for thermocouple compensating grades is further categorized into either "CA" or "CB", depending on the conductor materials.

Classification by use

Classification by use	Type	Former type (reference)	Insulation material	Operating temp. range	Notes
General use	G	G	PVC	-20 to +90°C	(1) Not used for RCB and SCB. (2) The operating temperature range for BC, RCA, SCA, NC, KCA, and KCB is 0 to +90°C.
Heat resistance	H	H	Glass	0 to +150°C	Not used for BC, RCA, SCA, KCB, and TX.
High heat resistance	S	-	Fluorinated resin	-25 to +200°C	(1) Not used for compensation type core cables. (2) The operating temperature range for TX is -25 to +100°C.



OKAZAKI Compensating Cables and Extension Cables

Types and tolerances of compensating cables

JIS C 1610 (IEC60584-3)							ASTM E230			
Type		Conductor materials		Temperature range of validity (°C)	Tolerance (μV)		Type	Temperature range of validity (°C)	Tolerance (°C)	
JIS-2012	JIS-95	+	-		Class 1	Class 2			Special	Standard
BC	BC	Cu	Cu	0 to +100	-		BX	0 to +200	-	±4.2
RCA	RCA		Cu-Ni	0 to +100	-	±30	RX	0 to +200	-	±5
RCB	RCB			0 to +200	-	±60				
SCA	SCA			0 to +100	-	±30	SX	0 to +200	-	±5
SCB	SCB			0 to +200	-	±60				
NX	NX	Ni-Cr	Ni-Si	-25 to +200	±60	±100	NX	0 to +200	±1.1	±2.2
NC	NC	Cu-Ni	Cu-Ni	0 to +150	-	±100	-	-	-	-
KX	KX	Ni-Cr	Ni	-25 to +200	±60	±100	KX	0 to +200	±1.1	±2.2
-	KCA			0 to +150	-	±100	-	-	-	-
KCA	KCB	Fe	Cu-Ni	0 to +150	-	±100	-	-	-	-
KCB	KCC	Cu		0 to +100	-	±100	-	-	-	-
EX	EX	Ni-Cr		-25 to +200	±120	±200	EX	0 to +200	±1.0	±1.7
JX	JX	Fe		-25 to +200	±85	±140	JX	0 to +200	±1.1	±2.2
TX	TX	Cu		-25 to +100	±30	±60	TX	-60 to +100	±0.5	±1.0

Note 1 : The current KCA type is equivalent to KCB in the 1995 revision, and WX in the 1981 revision.

Note 2 : The current KCB type is equivalent to KCC in the 1995 revision, and VX in the 1981 revision.

Color codes of compensating cables

Type		* JIS C 1610 (IEC60584-3)						ASTM E230					
		JIS-2012			JIS-1995 (Category 2)			Compensating cable			Thermocouple wire		
JIS-2012	JIS-95	+	-	Sheath	+	-	Sheath	+	-	Sheath	+	-	Sheath
BC	BC	Gray	White	Gray	Red	White	Gray	Gray	Red	Gray	-	-	-
RCA	RCA	Orange	White	Orange	Red	White	Black	Black	Red	Green	-	-	-
RCB	RCB												
SCA	SCA	Orange	White	Orange	Red	White	Black	Black	Red	Green	-	-	-
SCB	SCB												
NX	NX	Pink	White	Pink	-	-	-	Orange	Red	Orange	Orange	Red	Brown
NC	NC							-	-	-	-	-	-
KX	KX	Green	White	Green	Red	White	Blue	Yellow	Red	Yellow	Yellow	Red	Brown
-	KCA							-	-	-	-	-	-
KCA	KCB							-	-	-	-	-	-
KCB	KCC							-	-	-	-	-	-
EX	EX	Bluish purple	White	Bluish purple	Red	White	Purple	Purple	Red	Purple	Purple	Red	Brown
JX	JX	Black	White	Black	Red	White	Yellow	White	Red	Black	White	Red	Brown
TX	TX	Brown	White	Brown	Red	White	Brown	Blue	Red	Blue	Blue	Red	Brown

The latest version is applied for the standard year.

* JIS C1610 was revised and integrated into the IEC standard (Category 1) in 2012. However, we will also continue to use the former standard (Category 2) for a while.

Types of compensating cable insulation materials

The insulation material and sheath material of compensating cables must be selected depending on the conditions of use. The materials that are generally used for various applications are shown in the table below.

Types of compensating cable insulation materials

Insulation material	Classification by use	Operating temp. in °C	Water resistance	Oil resistance	Acid resistance	Flame resistance	Cold resistance	Weather resistance
60°C heat resistant PVC	General use	-20 to 60	○	○	○	△	×	○
90°C heat resistant PVC		-20 to 90	○	○	○	○	×	○
105°C heat resistant PVC		-20 to 105	○	○	○	○	×	○
90°C flame/heat resistant PVC		-20 to 90	○	○	○	◎	×	○
Polyethylene		-60 to 75	◎	○	○	×	○	×
Cross-linked polyethylene		-60 to 80	◎	◎	○	×	○	×
Glass yarn	Heat resistance	-20 to 200*	×	△	△	◎	×	×
Silicone rubber		-60 to 180	○	△	○	○	○	○
PFA	High heat resistance	-195 to 260	◎	◎	◎	◎	○	○
4-6 fluorocarbon polymer (FEP)		-253 to 200	◎	◎	◎	◎	○	○

* The glass fiber binder emits a small amount of smoke at temperatures exceeding 150°C. ◎: Optimum ○: No problem in actual use △: Suitable in some conditions ×: Not suitable

* Care should be taken when using fiberglass insulated cables at high temperatures since the sizing agent might generate some gases.

Screening of compensating cables

Electrostatic or electromagnetic screening is required when compensating cables are placed in a location where they may be subject to induction. Electrostatic screening is used to eliminate the effects of electrostatic induction generated by the voltage of objects such as electric power lines, and electromagnetic screening is used to eliminate the effects of electromagnetic induction generated by the current in objects such as electric power lines.

The types of screening that are generally used for various applications are shown in the table below.

Types of screening

		Application
Electrostatic screening	Mild copper tape	○ Most commonly used ○ Collective screening for multi-pair type
	Laminated aluminum tape	○ More flexible and inexpensive than mild copper tape ○ Eliminates concern about the drain wire breaking the screening layer, and easy to ground ○ Can be used for individual screening of multi-pair type
	Tin-plated braided mild copper	○ Good flexibility ○ Easy to ground ○ Often used for individual screening of multi-pair type
Electromagnetic screening	Mild copper tape + mild iron tape	○ Most commonly used ○ Collective screening for multi-pair type
	Braided mild copper + braided mild iron	○ Good flexibility ○ Can be used for individual screening of multi-pair type

Insulation resistance value

Unit: MΩ·km

Classification by use	Type	Insulation material	Insulation resistance value	
			JIS C 1610-1995	JIS C 1610-2012
General use	G	PVC	50	500
Heat resistance	H	Glass	0.05	5
High heat resistance	S	Fluorinated resin	1000	500

The minimum values are shown in the table. The actual insulation resistance values can be adjusted to meet the requirements of the system in which the cables will be installed.



Armour and anti-corrosion layer of compensating cables

The armour is a protective metal coating that is used when mechanical strength is required, and the anti-corrosion layer is an external coating used to prevent chemical corrosion and electrical corrosion of the armour. Note that the anti-corrosion layer is not necessary when the armour is braided stainless steel.

The table below shows the types and characteristics of the armours that are generally used.

Type	Characteristics
Braided stainless steel	○ Readily available and flexible, with no need for anti-corrosion layer
Iron wire	○ High tensile strength ○ Can be buried
Steel strip	○ Good flexibility ○ Can be buried


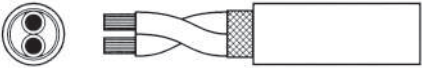
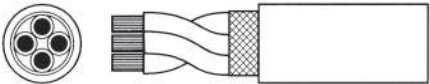
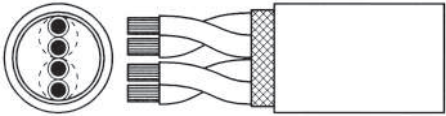
Loop electrical resistance values of compensating cables

The loop electrical resistance values of compensating cables are shown in the table below.

Nominal cross-sectional area in mm ²	BC	RCA RCB SCA SCB	NX	NC	KX	KCA (WX)	KCB (VX)	EX	JX	TX
0.2	0.18	0.4	6.6	1.3	5.0	3.3	2.8	6.3	3.3	2.8
0.3	0.12	0.28	5.0	0.8	3.6	2.5	2.1	4.5	2.5	2.1
0.5	0.08	0.17	3.0	0.66	2.2	1.4	1.2	2.7	1.4	1.2
0.75	0.05	0.11	2.0	0.44	1.5	0.95	0.75	1.8	0.95	0.75
1.25	0.04	0.08	1.3	0.26	1.0	0.65	0.55	1.3	0.65	0.55
1.3	0.03	0.07	1.1	0.25	0.9	0.55	0.45	1.1	0.55	0.45
1.5	0.03	0.06	1.0	0.22	0.78	0.5	0.42	0.96	0.5	0.42
2.0	0.02	0.045	0.75	0.17	0.55	0.4	0.3	0.7	0.4	0.3
2.3	0.02	0.04	0.65	0.14	0.5	0.3	0.25	0.6	0.3	0.25

Unit: Ω/m

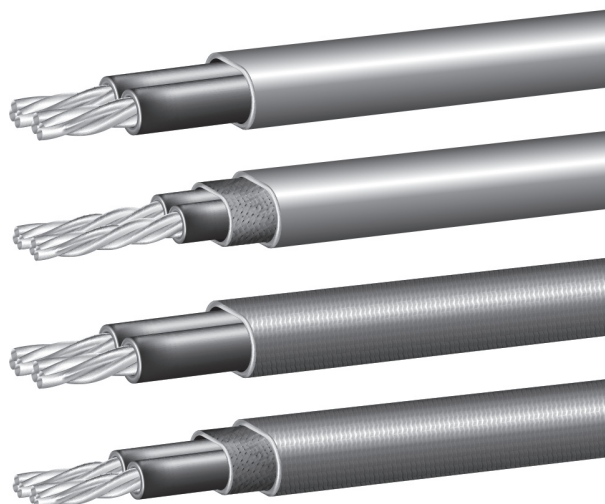


<div>F</div> <div>>> C-6</div> <div>F/Flat Type Compensating Cable</div> <div></div>	
<div>R</div> <div>>> C-8</div> <div>R/Round Type Compensating Cable</div> <div></div>	
<div>CT</div> <div>>> C-10</div> <div>CT/Compensating Cable with Collectively Twisted Multiple Conductors</div> <div></div>	
<div>PT</div> <div>>> C-14</div> <div>PT/Compensating Cable with Individually and Collectively Twisted Multiple Paired Conductors</div> <div></div>	

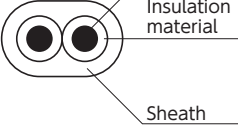
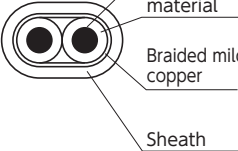
F/Flat Type Compensating Cable

Overview

The F type compensating cable features one pair of stranded conductors, each conductor is insulated, the pair is laid flat and then insulated. Screening is also available upon request.



Standard specifications of compensating cables

Cross-section diagram	Conductor		Insulation material		Screening	Sheath		Overall diameter (approx. mm)
	Cross-section area (approx. mm ²)	Conductor size (strands / mm)	Material	Thickness (approx. mm)		Material	Thickness (approx. mm)	
 <div>Conductor</div> <div>Insulation material</div> <div>Sheath</div>	1.3	4/0.65	PVC	0.6	-	PVC	1.0	4.8×7.6
	2.3	7/0.65						5.2×8.3
	1.3	4/0.65	Heat resistant PVC			Heat resistant PVC		4.8×7.6
	2.3	7/0.65						5.2×8.3
	1.3	4/0.65	Polyethylene			Polyethylene		4.8×7.6
	2.3	7/0.65						5.2×8.3
	1.3	4/0.65	Glass yarn			Glass yarn	0.4	3.1×5.4
	2.3	7/0.65						3.5×6.2
	1.3	4/0.65	4-6 fluorocarbon polymer (FEP)			4-6 fluorocarbon polymer (FEP)	0.4	3.0×5.1
	2.3	7/0.65						3.4×5.9
 <div>Conductor</div> <div>Insulation material</div> <div>Braided mild copper</div> <div>Sheath</div>	1.3	4/0.65	PVC	0.6	Braided mild copper	PVC	1.0	5.4×8.2
	2.3	7/0.65						5.8×8.9
	1.3	4/0.65	Heat resistant PVC			Heat resistant PVC		5.4×8.2
	2.3	7/0.65						5.8×8.9
	1.3	4/0.65	Polyethylene			Polyethylene		5.4×8.2
	2.3	7/0.65						5.8×8.9
	1.3	4/0.65	Glass yarn			Glass yarn	0.4	3.7×6.0
	2.3	7/0.65						4.1×6.8
	1.3	4/0.65	4-6 fluorocarbon polymer (FEP)			4-6 fluorocarbon polymer (FEP)	0.4	3.6×5.7
	2.3	7/0.65						4.0×6.5

* The coating thickness and overall diameter are representative values.



Model code

F ① ② ③ ④ / ⑤ ⑥ ⑦ / ⑧

①	Conductor size		
②	Type		
③	Classification by use and tolerance		
④	Color		
⑤	Insulation material		
⑥	Collective screening		
⑦	Sheath		
⑧	Overall sheath		

Example

F

—

7/0.65

KX

H1

C2

—

G

SB

G

Model

①

②

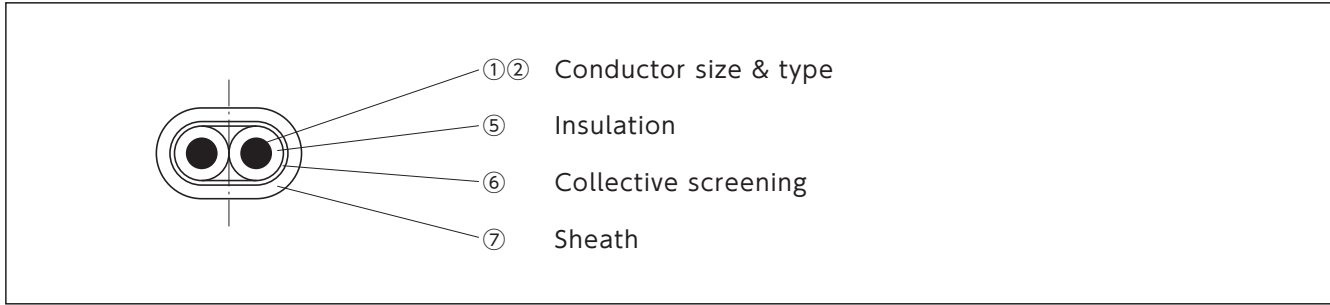
③

④

⑤

⑥

⑦

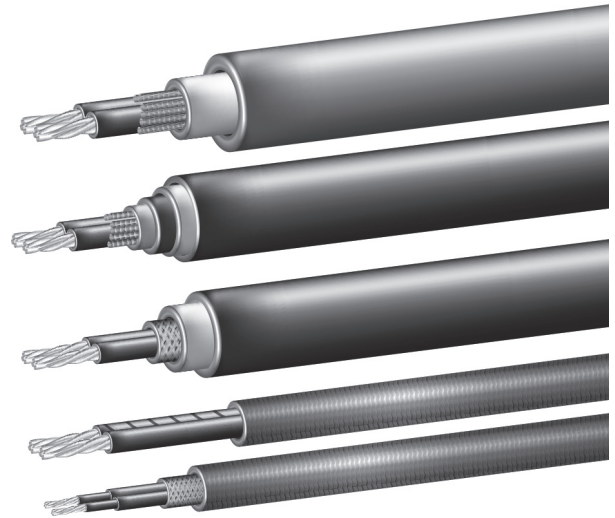


* For details on items ① to ⑧, refer to the model code table (page C-13).
* Enter only the items that are necessary.

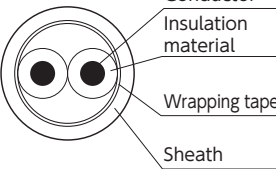
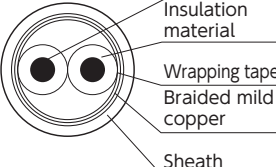
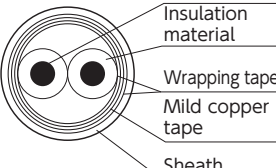
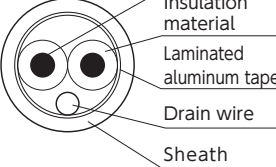
R/Round Type Compensating Cable

Overview

The R type compensating cable features one pair of stranded conductors, each conductor is insulated, the pair is twisted together and then screened with either a tape or braided material whichever is more suitable for the type & degree of the induction, and sheathed with PVC etc to form a round shape.



Standard specifications of compensating cables

Cross-section diagram	Conductor		Insulation material		Screening	Sheath		Overall diameter (approx. mm)	
	Cross-section area (approx. mm ²)	Conductor size (strands / mm)	Material	Thick-ness (approx. mm)		Material	Thick-ness (approx. mm)		
	1.3	4/0.65	PVC	0.6	-	PVC	1.0	7.7	
	2.3	7/0.65							8.4
	1.3	4/0.65	Heat resistant PVC					Heat resistant PVC	7.7
	2.3	7/0.65						8.4	
	1.3	4/0.65	Polyethylene			Polyethylene	7.7		
	2.3	7/0.65					8.4		
	1.3	4/0.65	4-6 fluorocarbon polymer (FEP)	0.3		4-6 fluorocarbon polymer (FEP)	0.4	5.2	
	2.3	7/0.65							5.9
	1.3	4/0.65	Glass yarn	0.4		Glass yarn			5.8
	2.3	7/0.65							6.5
	1.3	4/0.65	PVC	0.6	Braided mild copper	PVC	1.0	8.3	
	2.3	7/0.65							9.0
	1.3	4/0.65	Heat resistant PVC					Heat resistant PVC	8.3
	2.3	7/0.65						9.0	
	1.3	4/0.65	Polyethylene			Polyethylene	8.3		
	2.3	7/0.65					9.0		
	1.3	4/0.65	4-6 fluorocarbon polymer (FEP)	0.3		4-6 fluorocarbon polymer (FEP)	0.4	5.8	
	2.3	7/0.65							6.6
	1.3	4/0.65	Glass yarn	0.4		Glass yarn			6.1
	2.3	7/0.65							6.8
	1.3	4/0.65	PVC	0.6	Mild copper tape	PVC	1.0	8.3	
	2.3	7/0.65							9.0
	1.3	4/0.65	Heat resistant PVC			Heat resistant PVC		8.3	
	2.3	7/0.65							9.0
	1.3	4/0.65	Polyethylene			Polyethylene		8.3	
	2.3	7/0.65							9.0
	1.3	4/0.65	PVC	0.6	Laminated aluminum tape	PVC	1.0	7.7	
	2.3	7/0.65						8.4	
	1.3	4/0.65	Heat resistant PVC			Heat resistant PVC		7.7	
	2.3	7/0.65							8.4
	1.3	4/0.65	Polyethylene			Polyethylene		7.7	
	2.3	7/0.65							8.4

* The coating thickness and overall diameter are representative values.



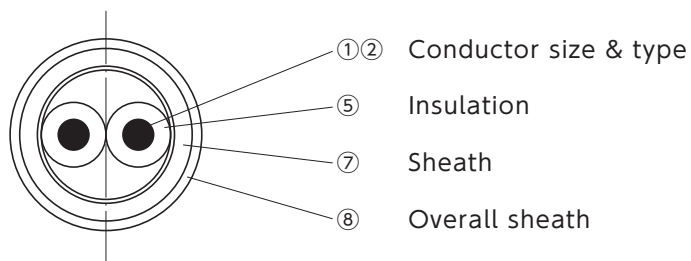
Model code

R ① ② ③ ④ / ⑤ ⑥ ⑦ / ⑧ ⑨

①	Conductor size		
②	Type		
③	Classification by use and tolerance		
④	Color		
⑤	Insulation material		
⑥	Collective screening		
⑦	Sheath		
⑧	Overall sheath		
⑨	Anti-corrosion layer		

Example

R — $\frac{7/0.65}{\text{①}}$ **KX** **H1** **C2** — **G** **G** — **AB**
 Model ① ② ③ ④ ⑤ ⑦ ⑧



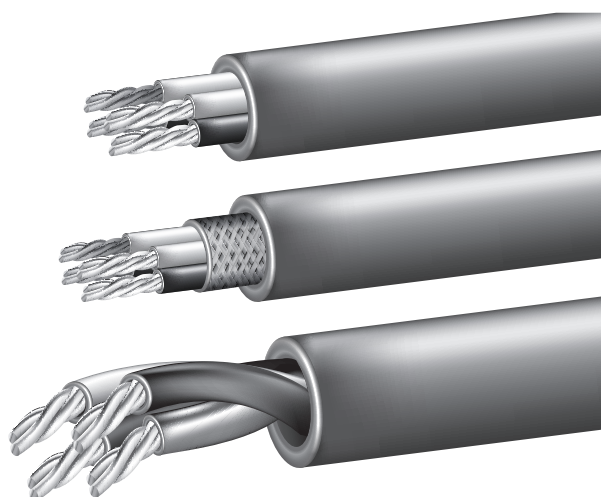
* For details on items ① to ⑨, refer to the model code table (page C-13).
* Enter only the items that are necessary.

CT/Compensating Cable with Collectively Twisted Multiple Conductors

Overview

The CT type compensating cable is a multi-conductor type in which all of the insulated conductors are twisted collectively, and not as separate pairs. However, the number of twisted conductors of each layer is a multiple of 2. For identification, numbers are printed (*) consecutively on the surface of the insulation material of the positive and negative legs. CT type compensating cables are the smallest of the multi-conductor types, and they are lightweight and economical.

*Printing may not be possible under certain conditions.



Standard specifications of compensating cables

Cross-section diagram	Insulation material	Screening	Sheath material
	PVC	—	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene
	4-6 fluorocarbon polymer (FEP)		Glass yarn
	Silicone rubber		Glass yarn
	4-6 fluorocarbon polymer (FEP)	Braided mild copper	Glass yarn
	Silicone rubber		Glass yarn
	PVC	Mild copper tape	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene



Standard specifications of compensating cables for general use

Number of pairs	Conductor		Insulation thickness (approx. mm)	Sheath thickness (approx. mm)	Code for insulation combination / Overall diameter (approx. mm)	
	Cross-section area (approx. mm ²)	Conductor size (strands / mm)			-EE- -HVHV-	-ES+E- -HVS+HV-
2	1.3	4/0.65	0.6	1.0	9.5	10.0
	2.3	7/0.65			10.0	11.0
3	1.3	4/0.65			11.0	11.5
	2.3	7/0.65			12.5	13.0
4	1.3	4/0.65		1.2	14.0	14.5
	2.3	7/0.65			16.0	16.5
5	1.3	4/0.65			14.0	14.5
	2.3	7/0.65			16.0	16.5
7	1.3	4/0.65			15.5	16.5
	2.3	7/0.65			17.5	19.5
10	1.3	4/0.65		1.4	20.0	21.0
	2.3	7/0.65			23.0	24.0
15	1.3	4/0.65		1.6	22.0	23.0
	2.3	7/0.65			25.0	25.5

* The coating thickness and overall diameter are representative values.

Standard specifications of compensating cables for heat resistance

Number of pairs	Conductor		Insulation thickness (approx. mm)	Sheath thickness (approx. mm)	Code for insulation combination / Overall diameter (approx. mm)			
	Cross-section area (approx. mm ²)	Conductor size (strands / mm)			-FG-	-KG-	-FS _B G-	-KS _B G-
2	1.3	4/0.65	0.3	0.5	6.5	-	7.0	-
	2.3	7/0.65			7.5		8.0	
	1.3	4/0.65	0.8		-	9.0	-	9.5
	2.3	7/0.65			-	10.0	-	10.5
3	1.3	4/0.65	0.3		8.0	-	8.5	-
	2.3	7/0.65			9.0		9.5	
	1.3	4/0.65	0.8		-	11.0	-	11.5
	2.3	7/0.65			-	12.0	-	12.5
4	1.3	4/0.65	0.3	0.6	10.0	-	10.5	-
	2.3	7/0.65			11.5		12.5	
	1.3	4/0.65	0.8		-	14.0	-	15.0
	2.3	7/0.65			-	15.5	-	16.5
5	1.3	4/0.65	0.3		10.0	-	10.5	-
	2.3	7/0.65			11.5		12.5	
	1.3	4/0.65	0.8		-	14.0	-	15.0
	2.3	7/0.65			-	15.5	-	16.5
7	1.3	4/0.65	0.3		11.0	-	11.5	-
	2.3	7/0.65			12.5		13.5	
	1.3	4/0.65	0.8		-	15.5	-	16.0
	2.3	7/0.65			-	17.0	-	18.0

* The coating thickness and overall diameter are representative values.



Model code

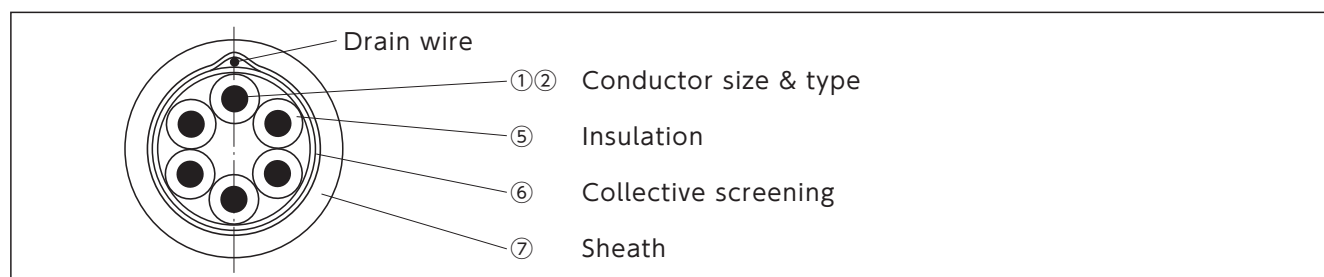
CT ① ② ③ ④ / ⑤ ⑥ ⑦ / ⑧ ⑨ / ⑩

①	Conductor size		
②	Type		
③	Classification by use and tolerance		
④	Color		
⑤	Insulation material		
⑥	Collective screening		
⑦	Sheath		
⑧	Overall sheath		
⑨	Anti-corrosion layer		
⑩	Number of pairs		

Example 1

CT — 4/0.65 EX G1 C1 — HV SA HV — 3P

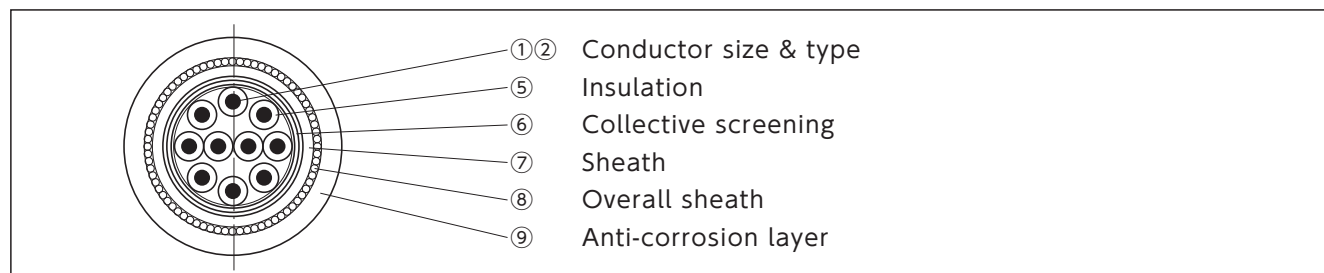
Model ① ② ③ ④ ⑤ ⑥ ⑦ ⑩



Example 2

CT — 7/0.65 EX G1 C1 — V ST V — WA ZV — 5P

Model ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩



* For details on items ① to ⑩, refer to the model code table (page C-13).

* Enter only the items that are necessary.

* The drain wire is available only when laminated aluminum tape is used for the collective screening.



	Basic model	F: Flat PT: Individually and collectively twisted multi paired conductors	R: Round	CT: Collectively twisted multi conductors
①	Conductor size	Number of strands / Wire diameter in mm		
②	Conductor types	JIS-2012	JIS-'95	ASTM-'17
		BC	BC	BX
		RCA-RCB	RCA-RCB	RX
		SCA-SCB	SCA-SCB	SX
		NX	NX	NX
		NC	NC	-
		KX	KX	KX
		KCA	KCB	-
		KCB	KCC	-
		EX	EX	EX
		JX	JX	JX
		TX	TX	TX
③	Classification by use and tolerance	JIS-2012		ASTM-'17
		G1	For general use, Class 1	GAS For general use, Precision class
		G2	For general use, Class 2	GA For general use, Standard class
		H1	For heat resistance, Class 1	HAS For heat resistance, Precision class
		H2	For heat resistance, Class 2	HA For heat resistance, Standard class
		S1	For high heat resistance, Class 1	SAS For high heat resistance, Precision class
		S2	For high heat resistance, Class 2	SA For high heat resistance, Standard class
④	Color	C1	JIS-2012/JIS-1995 Category 1	
		C2	JIS-1995 Category 2 & JIS-1981	
		CA	ASTME230-'17	
⑤ ⑦	Insulation & sheath	V	60°C PVC	NFV Flame resistant 90°C PVC/ OI ₂ 35 (sheath material)
		HV	90°C PVC	E Polyethylene
		SHV	105°C PVC	PF PFA (perfluoroalkoxy alkane)
		C	Cross-linked polyethylene	K Silicone rubber
		NFC	Flame resistant cross-linked polyethylene	G Glass yarn
		F	4-6 fluorocarbon polymer (FEP)	
⑥	Collective screening	SB	Braided copper	ST2 Two layers of copper/iron tape
		SA	Laminated aluminum tape	SB2 Double-braided copper/iron
		ST	Copper tape	
⑧	Overall sheath (in the case mechanical strength is required)	AB	Braided SUS304	
		WA	Iron wire	
		TA	Steel strip	
⑨	Anti-corrosion layer (in the case mechanical strength is required)	ZV	60°C PVC	
		ZE	Polyethylene	
⑩	Number of pairs	nP	n: 2 to 25	

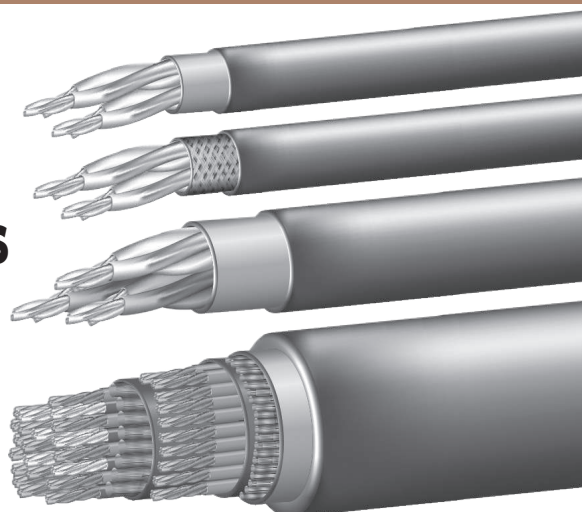


PT/Compensating Cable with Individually and Collectively Twisted Multiple Paired Conductors

Overview

The PT type compensating cable is a multi-paired type in which the insulated conductors are twisted in pairs, and the twisted pairs can then be further grouped and twisted as required. Since each pair of conductors is twisted together, internal noise is prevented. For identification, numbers are printed (*) consecutively on the surface of the insulation material of the negative legs.

*Printing may not be possible under certain conditions.



Standard specifications of compensating cables

Cross-section diagram	Insulation material	Screening	Sheath material
	PVC	-	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene
	4-6 fluorocarbon polymer (FEP)		Glass yarn
	Silicone rubber		Glass yarn
	4-6 fluorocarbon polymer (FEP)	Collective braided mild copper	Glass yarn
	Silicone rubber		Glass yarn
	PVC	Collective mild copper tape	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene
	PVC	Collective mild copper tape + Collective mild iron tape	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene
	PVC	Braided mild copper for each pair	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene
	4-6 fluorocarbon polymer (FEP)		Glass yarn
	Silicone rubber		Glass yarn
	PVC	Laminated aluminum tape for each pair	PVC
	Heat resistant PVC		Heat resistant PVC
	Polyethylene		Polyethylene



Standard specifications of compensating cables for general use

Number of pairs	Conductor		Insulation thickness (approx. mm)	Sheath thickness (approx. mm)	Code for insulation combination / Overall diameter (approx. mm)				
	Cross-section area (approx. mm ²)	Conductor size (strands / mm)			PT-EE HVHV	PT-ES ₁ E HVS ₁ HV	PT-EST ₂ E HVST ₂ HV	PT-EE HVHV-S _B	PT-EE HVHV-S _A
2	1.3	4/0.65	0.6	1.2	13.0	14.5	15.0	14.0	13.0
	2.3	7/0.65			14.5	15.5	16.0	15.5	14.5
3	1.3	4/0.65			14.0	15.0	15.5	15.0	14.0
	2.3	7/0.65			16.0	17.0	17.5	16.5	15.5
4	1.3	4/0.65			15.5	16.5	17.0	16.5	15.0
	2.3	7/0.65			17.5	18.5	19.0	18.5	17.5
5	1.3	4/0.65		1.4	17.0	18.0	18.5	18.5	17.0
	2.3	7/0.65			19.0	20.0	20.5	20.0	19.0
7	1.3	4/0.65			18.5	19.5	20.5	20.0	18.5
	2.3	7/0.65			21.5	22.5	23.0	22.5	20.5
10	1.3	4/0.65		1.6	24.0	25.0	25.5	26.0	24.0
	2.3	7/0.65			26.5	27.5	28.0	29.0	27.0
15	1.3	4/0.65			26.5	27.5	28.0	29.5	27.5
	2.3	7/0.65			30.0	31.0	31.5	32.5	30.5

* The coating thickness and outer diameter of the completed product are representative values.

Standard specifications of compensating cables for heat resistance

Number of pairs	Conductor		Insulation thickness (approx. mm)	Sheath thickness (approx. mm)	Code for insulation combination / Overall diameter (approx. mm)					
	Cross-section area (approx. mm²)	Conductor size (strands / mm)			PT-FG	PT-KG	PT-FS _B G	PT-KS _B G	PT-FG-S _B	PT-KG-S _B
2	1.3	4/0.65	0.3	0.5	9.0	-	9.5	-	10.0	-
	2.3	7/0.65			10.5		11.0		11.5	
	1.3	4/0.65	0.8		-	12.5	-	13.5	-	14.0
	2.3	7/0.65				14.0		14.5		15.0
3	1.3	4/0.65	0.3		9.5	-	10.5	-	11.0	-
	2.3	7/0.65			11.0		12.0		12.5	
	1.3	4/0.65	0.8		-	13.5	-	14.0	-	14.5
	2.3	7/0.65				15.0		15.5		16.0
4	1.3	4/0.65	0.3	0.6	11.0	-	11.5	-	12.0	-
	2.3	7/0.65			12.5		13.0		14.0	
	1.3	4/0.65	0.8		-	15.5	-	16.0	-	16.5
	2.3	7/0.65				17.0		17.5		18.0
5	1.3	4/0.65	0.3		12.0	-	12.5	-	13.5	-
	2.3	7/0.65			14.0		14.5		15.5	
	1.3	4/0.65	0.8		-	17.0	-	17.5	-	18.5
	2.3	7/0.65				19.0		19.5		20.0
7	1.3	4/0.65	0.3		13.0	-	14.0	-	15.0	-
	2.3	7/0.65			15.5		16.0		17.0	
	1.3	4/0.65	0.8		-	18.5	-	19.0	-	20.0
	2.3	7/0.65				20.5		21.5		22.5

* The coating thickness and outer diameter of the completed product are representative values.



Model code

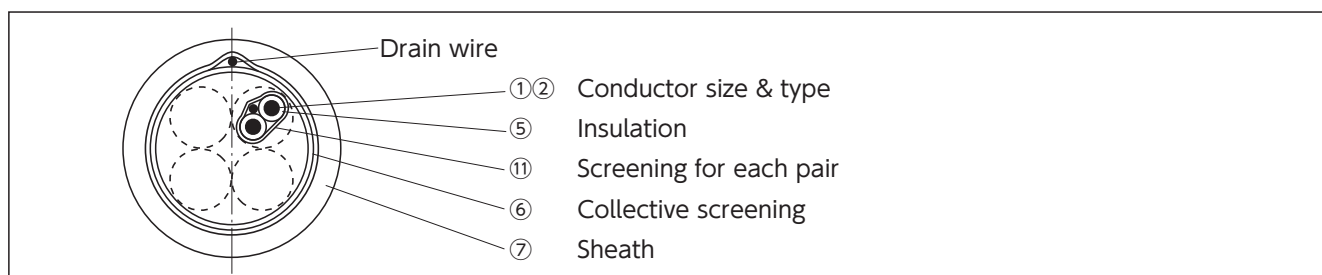
PT ① ② ③ ④ / ⑤ ⑥ ⑦ / ⑧ ⑨ / ⑩ / ⑪

①	Conductor size		
②	Type		
③	Classification by use and tolerance		
④	Color		
⑤	Insulation material		
⑥	Collective screening		
⑦	Sheath		
⑧	Overall sheath		
⑨	Anti-corrosion layer		
⑩	Number of pairs		
⑪	Screening for each pair		

Example 1

PT — 4/0.65 EX G1 C1 — HV SA HV — 4P — SA

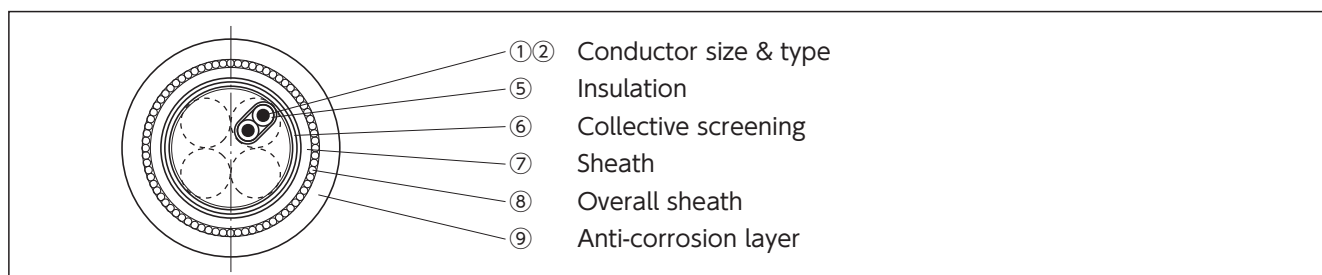
Model ① ② ③ ④ ⑤ ⑥ ⑦ ⑩ ⑪



Example 2

PT — 7/0.65 EX G1 C1 — V ST V — WA ZV — 4P

Model ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩



* For details on items ① to ⑪, refer to the model code table (page C-17).




* Enter only the items that are necessary.

* The drain wire is available only when laminated aluminum tape is used for the collective screening.



	Basic model	F: Flat PT: Individually and collectively twisted multi paired conductors	R: Round	CT: Collectively twisted multi conductors
①	Conductor size	Number of strands / Wire diameter in mm		
②	Conductor types	JIS-2012	JIS-95	ASTM-17
		BC	BC	BX
		RCA-RCB	RCA-RCB	RX
		SCA-SCB	SCA-SCB	SX
		NX	NX	NX
		NC	NC	-
		KX	KX	KX
		KCA	KCB	-
		KCB	KCC	-
		EX	EX	EX
		JX	JX	JX
		TX	TX	TX
③	Classification by use and tolerance	JIS-2012		ASTM-17
		G1	For general use, Class 1	GAS For general use, Precision class
		G2	For general use, Class 2	GA For general use, Standard class
		H1	For heat resistance, Class 1	HAS For heat resistance, Precision class
		H2	For heat resistance, Class 2	HA For heat resistance, Standard class
		S1	For high heat resistance, Class 1	SAS For high heat resistance, Precision class
		S2	For high heat resistance, Class 2	SA For high heat resistance, Standard class
④	Color	C1	JIS-2012/JIS-1995 Category 1	
		C2	JIS-1995 Category 2 & JIS-1981	
		CA	ASTME230-17	
⑤ ⑦	Insulation & sheath	V	60°C PVC	NFV Flame resistant 90°C PVC/ OI≥35 (sheath material)
		HV	90°C PVC	E Polyethylene
		SHV	105°C PVC	PF PFA (perfluoroalkoxy alkane)
		C	Cross-linked polyethylene	K Silicone rubber
		NFC	Flame resistant cross-linked polyethylene	G Glass yarn
		F	4-6 fluorocarbon polymer (FEP)	
⑥	Collective screening	SB	Braided copper	ST2 Two layers of copper/iron tape
		SA	Laminated aluminum tape	SB2 Double-braided copper/iron
		ST	Copper tape	
⑧	Overall sheath (in the case mechanical strength is required)	AB	Braided SUS304	
		WA	Iron wire	
		TA	Steel strip	
⑨	Anti-corrosion layer (in the case mechanical strength is required)	ZV	60°C PVC	
		ZE	Polyethylene	
⑩	Number of pairs	nP	n: 2 to 25	
⑪	Screening for each pair	SB	Braided copper	
		SA	Laminated aluminum	
		ST	Copper tape	

Identification of Compensating Cables for Each National Standard

Standard Type	BC	RCA (RCB) SCA (SCB)	NX/NC	KX/KCA/ KCB	EX	JX	TX
 JIS C 1610 :2012 IEC 584-3 :2007	+	+	+	+	+	+	+
 JIS C 1610 :1995 Category 2	+	+		+	+	+	+
 ASTM E230	+	+	+	+	+	+	+

The JIS C 1610 standard for thermocouple compensating cables was revised in June 2012. We are continuing to apply the former JIS C 1610:1995 standard (color codes; Category 2) on a temporary basis. Please contact us if you wish to purchase products that conform to the new standard. However, note that we currently do not have all types of products in stock, so it may take some time to ship items after purchase. In addition, Category 2 has been eliminated in the 2012 version of the standard.

Identification of Thermocouple Wires for ASTM Standard

Standard Type	N	K	E	J	T
ASTM E230	+	+	+	+	+



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