

Torsion-resistant robot cables

**Highly  
resistant to  
torsion**

# ORP-TW Cable Series

UL758 Style2517

Torsion-resistant robot cables specially designed for use in rotating driven sections of industrial machinery and medical devices, etc.

## Features

Resistant to twisting over  
50,000,000 times\*

This series achieves unprecedented  
torsion resistance for robot cables.

※With a torsion pitch of 500 mm

### ORP-TW Cable Series

The lineup of 50 types in total

Conductor sizes: 0.05~0.5 mm<sup>2</sup>  
Number of pairs: 3~8 pairs

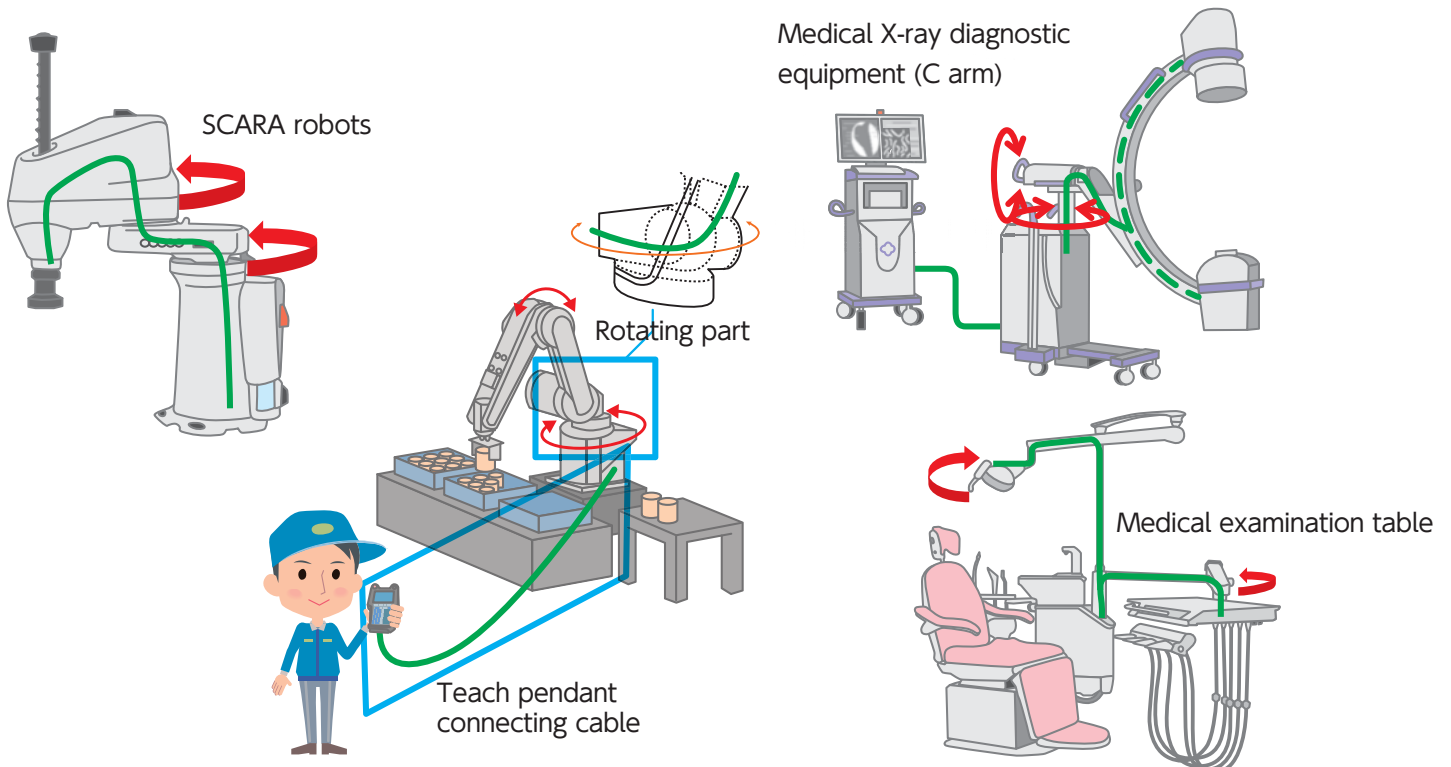
Durable against local torsion

Even with a torsion pitch of only  
100 mm, the cables can endure  
twisting over 10 million times.

Special robust shielding

The cables use special conductors  
with excellent flexibility and high-  
tensility, and shielded with outstanding  
durability.

## Applications



# Specifications

## Materials & structure

Conductor	Tin-plated soft copper stranded wire
Insulator	Special elastomer
Insulator identification	Depends on the core wire identification (pairings) and configuration of core wires (pairs).
Shielding	Special braiding
Jacket material (color)	Oil-proof PVC (black matte)

## Usage environment

Application	Indoor, between and within devices
Operating temperature range	-10 to 105°C

## Core wire identification (combination)

Pair No.		1	2	3	4	5	6	7	8
Insulator color configuration	Core wire ①	Blue	Yellow	Green	Red	Purple	Blue	Yellow	Green
	Core wire ②	White	Brown	Black	Gray	Orange	Brown	Black	Gray

## Applicable standard

UL758 Style 2517(rated at 105°C, 300 V)

## Jacket marking



□part: Conductor cross-section area (mm<sup>2</sup>) 0.05/0.1/0.2/0.3/0.5 △△part: Shield code(unshielded: blank;shielded: -SB)  
####part: Lot No.

# Characteristics

## Electrical performance

Conductor cross-section area	mm <sup>2</sup> (AWG size)	0.05 (30)	0.1 (28)	0.2 (25)	0.3 (23)	0.5 (21)
Conductor resistance	Ω /km (20°C)	≤ 340	≤ 205	≤ 102	≤ 68	≤ 45
Insulator resistance	M Ω -km (20°C)	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
Withstanding Voltage	V/min	AC2000	AC2000	AC2000	AC2000	AC2000

## Movement performance<sup>※1</sup>

Mode	Performance	[Reference for comparison] ORP Slim Cable	Test conditions
Slide-bending	<b>Over 30,000,000 times</b>	Over 100,000,000 times	<ul style="list-style-type: none"> <li>Bend radius R: 6 times cable outer diameter</li> <li>Sliding speed: 70 times/min</li> <li>Moving distance: 350 mm</li> <li>Count: 1 retuning(back-and-forth) motion=1 time</li> </ul>
Swing-bending	<b>Over 3,000,000 times</b>	Over 20,000,000 times	<ul style="list-style-type: none"> <li>Bend radius R: 8 times cable outer diameter</li> <li>Bending angle: ±90°</li> <li>Bending speed: 40 times/min</li> <li>Load: 4.9N</li> <li>Count: 1 retuning(back-and-forth) motion = 1 time</li> </ul>
Twisting	<b>Over 50,000,000 times (pitch:500 mm)</b> <b>Over 10,000,000 times (pitch:100 mm)</b>	Over 20,000,000 times (pitch:500 mm) Over 500,000 times (pitch:100 mm)	<ul style="list-style-type: none"> <li>Twisting angle: ±180°</li> <li>Twisting speed: 90 times/min</li> <li>Pitch: 500 mm/100 mm</li> <li>Count: ±180° returning(back-and-forth motion)=1 time</li> </ul>

※1 Test conditions and process are based on our company's own methods. These data are reference values only, and are not guaranteed values.

### Unshielded

●Product code indication

ORP-TW ① SQ×② P(2517)

①: Conductor mm<sup>2</sup> ②: Number of pairs(See table below.)

### ●Structure

Conductor			Insulator Outer diameter <sup>※2</sup> mm	② Number of pairs	Outer diameter <sup>※2</sup> mm	Approximate weight kg/km	Allowable current <sup>※3</sup> A(30°C)
① mm <sup>2</sup>	AWG size	Configura- tion					
0.05	30	30/0.05	0.66	3	4.8	22	1.2
				4	5.1	26	1.1
				5	5.4	29	1.0
				6	5.8	33	1.0
				8	6.6	41	0.8
0.1	28	49/0.05	0.74	3	5.1	25	1.6
				4	5.4	32	1.4
				5	5.8	34	1.3
				6	6.2	39	1.2
				8	7.1	51	1.1
0.2	25	102/0.05	0.93	3	5.9	37	2.6
				4	6.2	48	2.3
				5	6.7	51	2.1
				6	7.2	59	2.0
				8	8.3	84	1.8
0.3	23	108/0.06	1.09	3	6.3	47	3.5
				4	6.9	60	3.2
				5	7.7	67	2.9
				6	8.0	81	2.7
				8	9.4	105	2.4
0.5	21	177/0.06	1.36	3	7.4	67	4.9
				4	8.0	83	4.7
				5	8.7	99	4.2
				6	9.4	115	3.8
				8	11.1	150	3.3

※2 The insulator outer diameters and the outer diameters are standard values.

※3 The allowable current values are calculated with a straight installation of the cable in the air.They are not guaranteed values.

### Shielded

●Product code indication

ORP-TW ① SQ×② P(SB)(2517)

①: Conductor mm<sup>2</sup> ②: Number of pairs(See table below.)

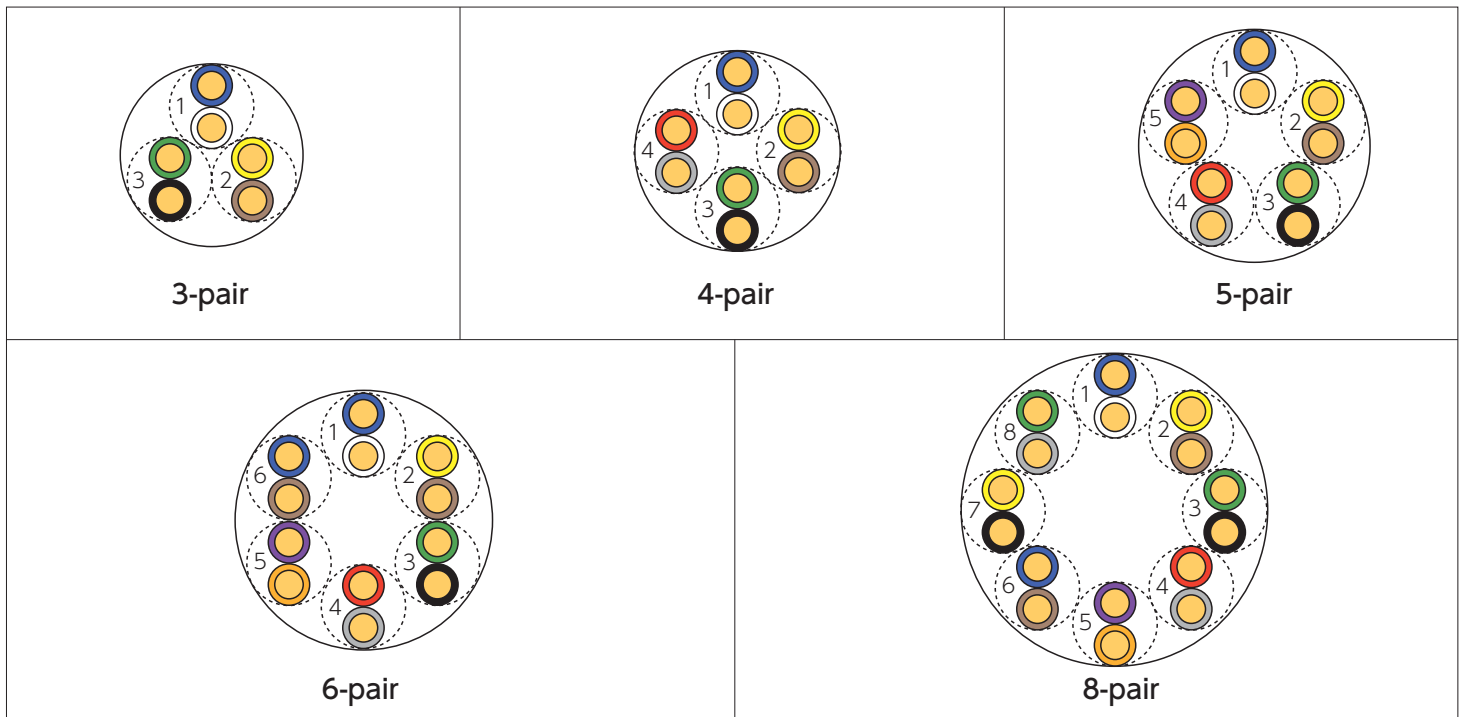
### ●Structure

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① mm <sup>2</sup>	AWG size	Configura- tion					
0.05	30	30/0.05	0.66	3	5.5	31	1.2
				4	5.8	35	1.1
				5	6.1	39	1.0
				6	6.4	43	1.0
				8	7.3	51	0.8
0.1	28	49/0.05	0.74	3	5.8	32	1.6
				4	6.1	42	1.4
				5	6.5	44	1.3
				6	6.9	49	1.2
				8	7.8	63	1.1
0.2	25	102/0.05	0.93	3	6.6	47	2.6
				4	6.9	58	2.3
				5	7.4	62	2.1
				6	7.9	71	2.0
				8	9.0	92	1.8
0.3	23	108/0.06	1.09	3	7.0	58	3.5
				4	7.6	72	3.2
				5	8.3	80	2.9
				6	8.7	95	2.7
				8	10	120	2.4
0.5	21	177/0.06	1.36	3	8.1	78	4.9
				4	8.7	96	4.7
				5	9.4	115	4.2
				6	10.1	135	3.8
				8	11.8	165	3.3

※2 The insulator outer diameters and the outer diameters are standard values.

※3 The allowable current values are calculated with a straight installation of the cable in the air.They are not guaranteed values.

### ●Configuration of core wires(pairs)<sup>※4</sup>



※4 The circles with broken lines indicate pairings (twisted pairs) and the numbers indicate pair No..

## Positioning in relation to other ORP series

Series	Application	Series summary	Movement durability			Thickness	Rating
			Swing-bending	Sliding	Twisting		
<b>ORP-TW Cables</b>	For controllers (torsion-resistant type)	Robot cables designed specifically for durability against twisting motion.	★	★★	★★★★	★★	105°C 300V
<b>ORP Cables</b>	For controllers (standard type)	Basic robot cables designed to accommodate all robot movements (sliding, swinging, twisting).	★★	★★★★	★★	★★	80°C 300V
<b>ORP Slim Cables</b>	For controllers (small-diameter type)	Top-class small-diameter robot cables based on the ORP cable series, with diameter and weight reduced by approximately 20%.	★★	★★★★	★★	★★★★	80°C 300V
<b>ORP-D Cables</b>	For power supply	Power-supply robot cables with a voltage rating of 600 V, but a diameter as thin as that of 300V-rated cables.	★★	★★★★	★★	★★	105°C 600V
<b>ORP-I Series</b>	For internal wiring in devices	Insulated core cables for wiring in moving parts within devices.	★★	★★	★★	★★★★	105°C 600V

