



OCC Corporation

Cables for Ocean-observation  
& Resource exploration

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OCC Corporation  
Sales & Marketing Department Cable System Business Unit

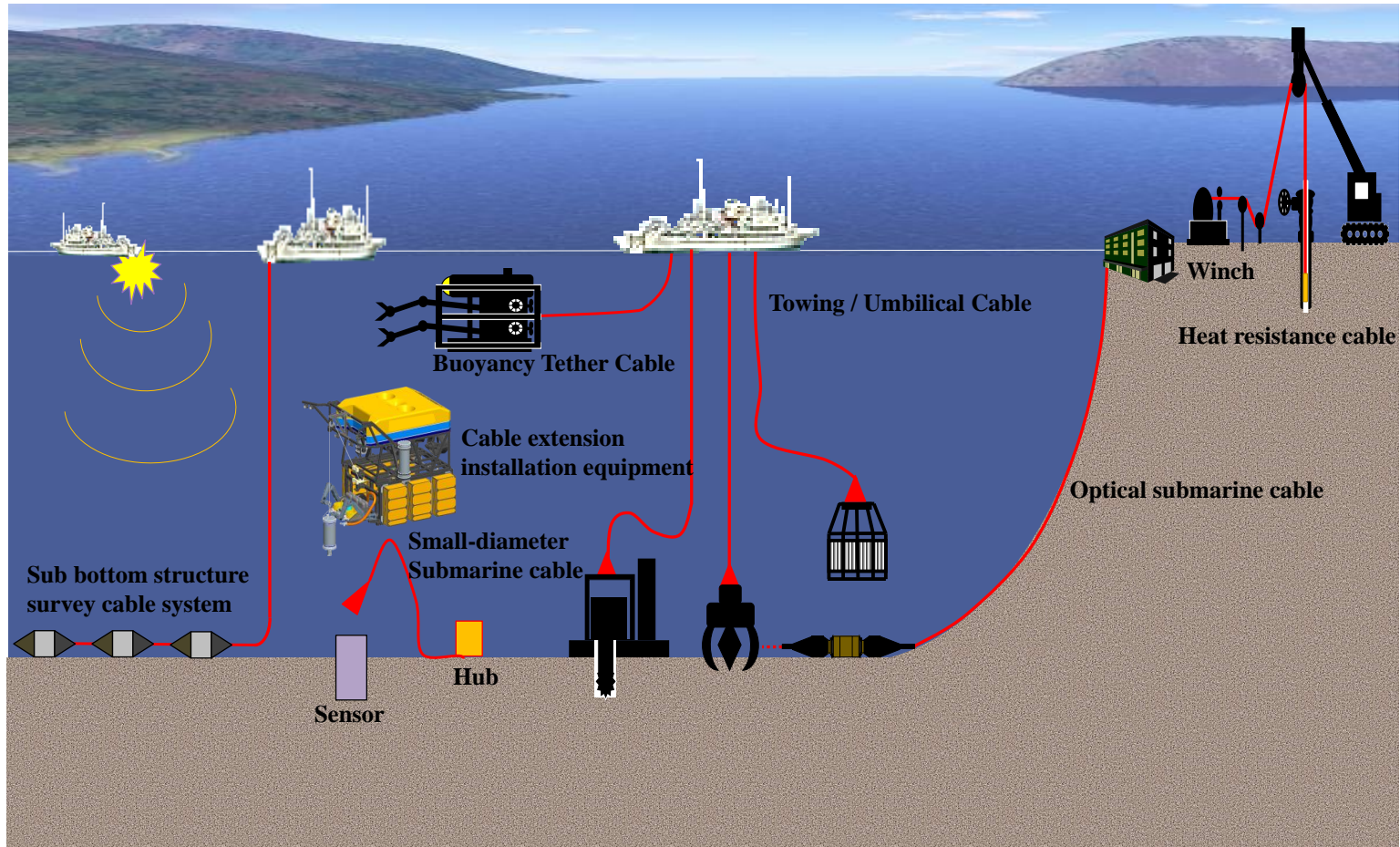
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## 1. Seabed Cable

- 1.1 Optical submarine cable
- 1.2 Small-diameter submarine cable

## 2. Towing / Umbilical Cable

- 2.1 Triple armored umbilical
- 2.2 Double armored umbilical
- 2.3 Umbilical for CTD
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- 5.2 Under Water TV camera system
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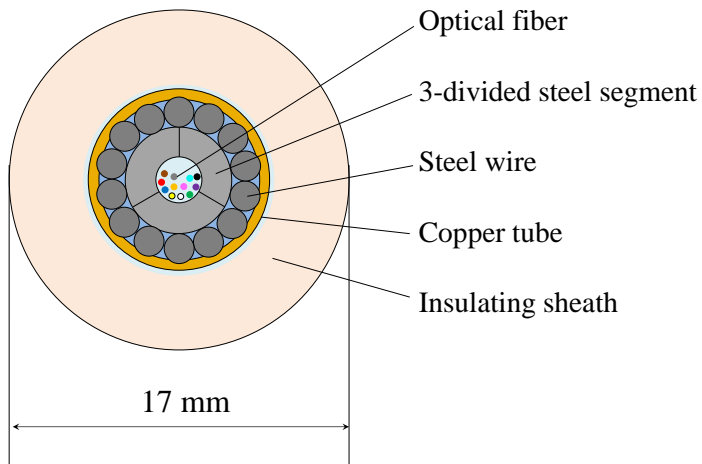
- 6.1 Cable joint box
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# 1. Seabed Cable

## 1.1 Optical submarine cable (LW Cable)

**Features:** This cable is designed to protect fibers from seabed environments at a depth of 8,000 m and maintain stable optical electrical properties over a long period of 25 years.

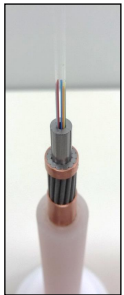
**Applications:** Transcontinental optical communication, Core cable for submarine sensing systems, etc.



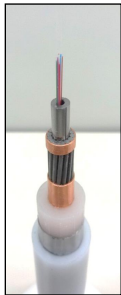
Specification	
Diameter	17.0 mm
Weight in air	Approx. 612 kg/km
Weight in water	Approx. 388 kg/km
Breaking load	$\geq 77$ kN
Conductor resistance (20°C)	$\leq 1.2 \Omega/\text{km}$
Insulation resistance (DC 500V)	$\geq 2 \times 10^5 \text{ M}\Omega \cdot \text{km}$
Optical loss (SM 1,550nm)	$\leq 0.18 \text{ dB/km}$
Hydrostatic Pressure Resistance	$\geq 80 \text{ MPa}$

\*The above is a general spec. Custom design available on request.

LW Cable



LWS Cable



SA Cable



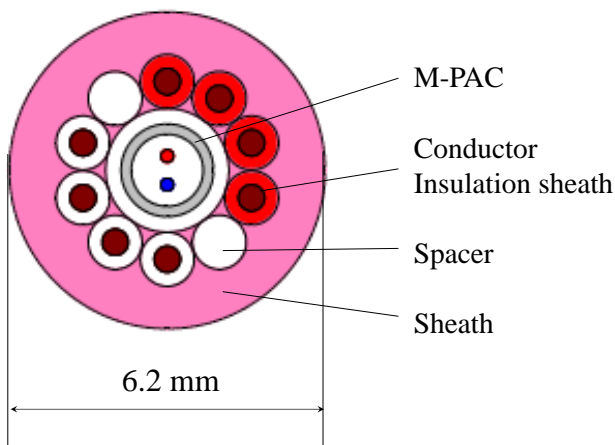
DA Cable



## 1.2 Small-diameter submarine cable

**Features:** Small diameter and light weight submarine which consist of metal pipe armored fiber (M-PAC) and electric wire.

**Applications:** connecting underwater equipment installed at the bottom of the sea



Specification	
Diameter	6.2 mm
Weight in air	Approx. 55 kg/km
Weight in water	Approx. 23 kg/km
Breaking load	$\geq 0.98$ kN
Conductor resistance (20°C)	$\leq 22.0 \Omega/\text{km}$
Insulation resistance (DC500V)	$\geq 1,000 \text{ M}\Omega \cdot \text{km}$
Optical loss (SM 1,550nm)	$\leq 0.3 \text{ dB/km}$
Hydrostatic Pressure Resistance	$\geq 30 \text{ MPa}$

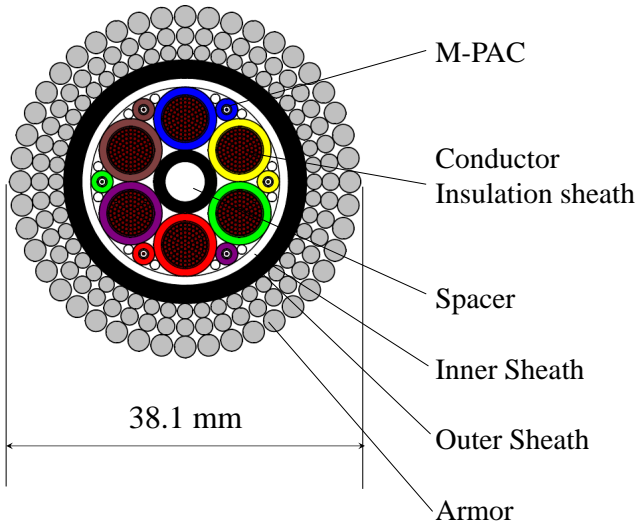
\*The above is a general spec. Custom design available on request.

## 2. Towing / Umbilical Cable

### 2.1 Triple armored umbilical

Features: High-strength, torque-balanced, high-depth, optical and electrical composite cable with metal pipe armored fibers (M-PAC).

Applications: Umbilical for ROVs, boring machine, etc.



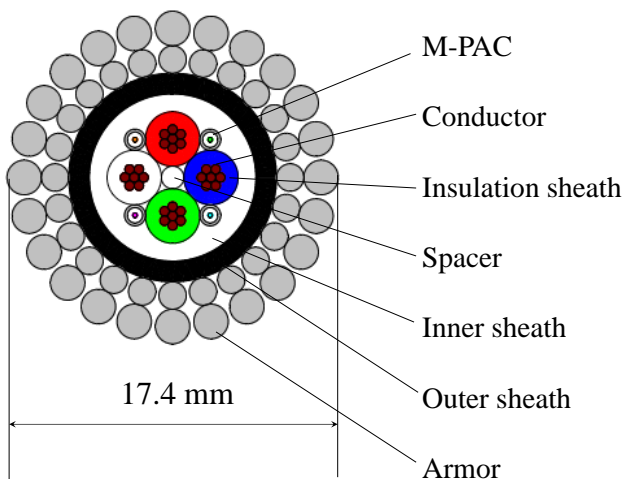
Specification	
Diameter	38.1mm
Weight in air	Approx. 5,250 kg/km
Weight in water	Approx. 4,100 kg/km
Breaking load	$\geq 740$ kN
Conductor resistance (20°C)	$\leq 2.0 \Omega/\text{km}$
Insulation resistance (DC500V)	$\geq 1,000 \text{ M}\Omega \cdot \text{km}$
Optical loss (SM 1,310nm)	$\leq 0.7 \text{ dB/km}$
Hydrostatic Pressure Resistance	$\geq 30 \text{ MPa}$

\*The above is a general spec. Custom design available on request.

### 2.2 Double armored umbilical

Features: High-strength, kink-resistant, high-depth, optical-electric composite cable with metal pipe armored fibers (M-PAC).

Applications: Umbilical for underwater towing machine, etc.



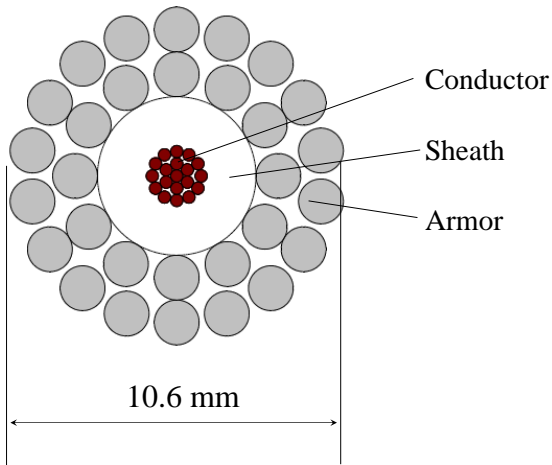
Specification	
Diameter	17.4 mm
Weight in air	Approx. 1,060 kg/km
Weight in water	Approx. 820 kg/km
Breaking load	$\geq 147$ kN
Conductor resistance (20°C)	$\leq 18.0 \Omega/\text{km}$
Insulation resistance (DC500V)	$\geq 1,000 \text{ M}\Omega \cdot \text{km}$
Optical loss (SM 1,310nm)	$\leq 0.7 \text{ dB/km}$
Hydrostatic Pressure Resistance	$\geq 70 \text{ MPa}$

\*The above is a general spec. Custom design available on request.

## 2. Towing / Umbilical Cable

### 2.3 Umbilical for CTD

Features: This is suitable for CTD (Conductivity Temperature Depth) profiling and can be deployed to a maximum depth of 7,000 meters.

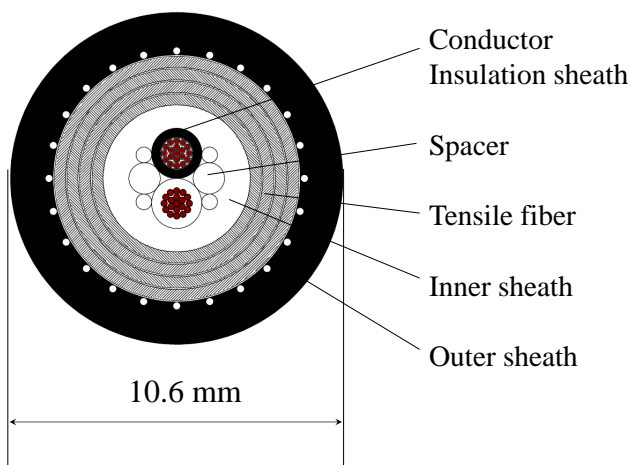


Specification	
Diameter	10.6 mm
Weight in air	Approx. 380 kg/km
Weight in water	Approx. 320 kg/km
Breaking load	$\geq 70$ kN
Conductor resistance(20°C)	$\leq 10.0 \Omega/\text{km}$
Insulation resistance(DC500V)	$\geq 1,000 \text{ M}\Omega \cdot \text{km}$
Optical loss	—
Hydrostatic Pressure Resistance	$\geq 68 \text{ MPa}$

\*The above is a general spec. Custom design available on request.

### 2.4 Tensile fiber umbilical

Features: this is high-strength, lightweight cable using Tensile fibers and can be utilized to deploy CTDs at a maximum depth of 10,000 m or more.



Specification	
Diameter	10.6 mm
Weight in air	Approx. 120 kg/km
Weight in water	Approx. 25 kg/km
Breaking load	$\geq 29$ kN
Conductor resistance(20°C)	$\leq 36.0 \Omega/\text{km}$
Insulation resistance(DC500V)	$\geq 1,000 \text{ M}\Omega \cdot \text{km}$
Optical loss	—
Hydrostatic Pressure Resistance	$\geq 100 \text{ MPa}$

\*The above is a general spec. Custom design available on request.

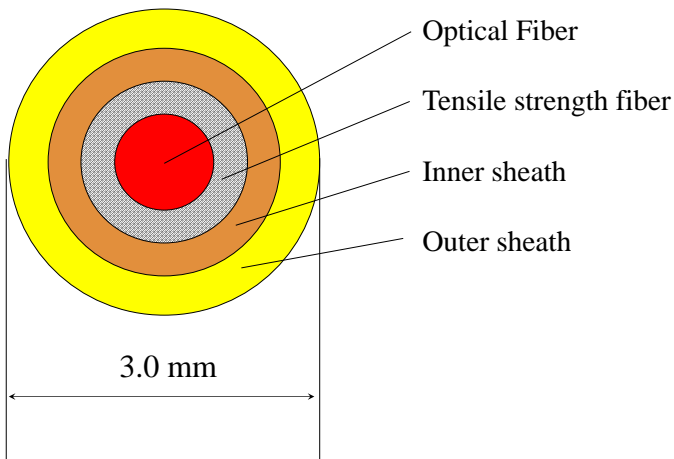
## 3. Buoyancy Tether Cable

### 3.1 Buoyancy optical cable

Features: Small diameter, high-strength and buoyancy tether cable for ROV or Under Water Drone.

Not disturbing movement of vehicle in the water and enabling stable operation.

Applications: Tether cable for ROVs, under water camera, etc.



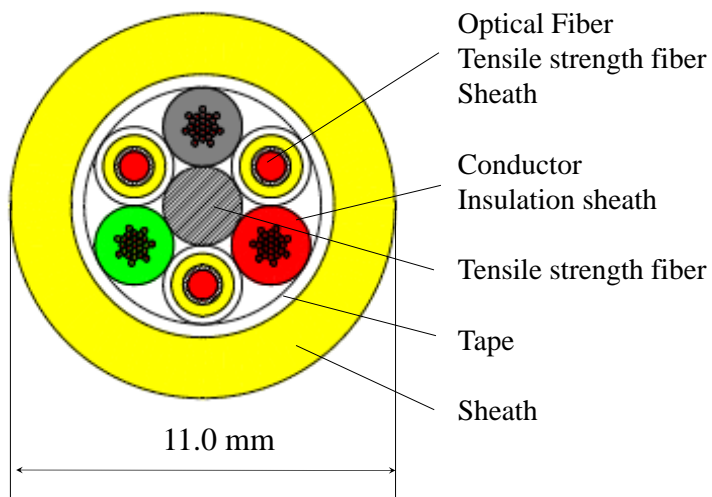
Specification	
Diameter	3.0 mm
Weight in air	Approx. 7.0 kg/km
Weight in water	Approx. -0.3 kg/km
Breaking load	$\geq 1.8$ kN
Conductor resistance (20°C)	—
Insulation resistance (DC500V)	—
Optical loss (SM 1,310nm)	$\leq 0.4$ dB/km
Hydrostatic Pressure Resistance	$\geq 3.0$ MPa

\*The above is a general spec. Custom design available on request.

### 3.2 Buoyancy O/E composite cable

Features: Buoyancy tether cable that can supply power and communication with minimal impact of the cable's own weight in water

Applications: Tether cable for ROVs, under water camera, etc.



Specification	
Diameter	11.0 mm
Weight in air	Approx. 100 kg/km
Weight in water	Approx. -2 kg/km
Breaking load	$\geq 1.8$ kN
Conductor resistance (20°C)	$\leq 30.1$ $\Omega$ /km
Insulation resistance (DC500V)	$\geq 1,000$ M $\Omega$ ·km
Optical loss (SM 1,310nm)	$\leq 0.4$ dB/km
Hydrostatic Pressure Resistance	$\geq 2.0$ MPa

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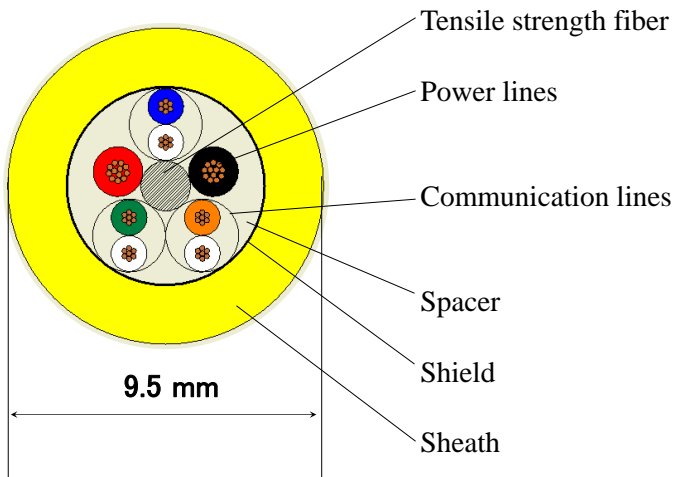
## 3. Buoyancy Tether Cable

### 3. 中性浮力ケーブル

#### 3.3 Buoyancy Power and Communication cable

Features: Buoyancy tether cable that can supply power and communication

Applications: Tether cable for ROVs, under water camera, etc.



仕様	
Diameter	9.5 mm
Weight in air	Approx. 70.0 kg/km
Weight in water	$\leq 0$ kg/km
Breaking load	$\geq 2.25$ kN
Conductor resistance (20°C)	Power lines : $\leq 66.1\Omega/\text{km}$ Communication lines : $\leq 144.8\Omega/\text{km}$
Insulation resistance (DC500V)	$\geq 1000\text{M}\Omega\cdot\text{km}$
Optical loss (SM 1,310nm)	—
Hydrostatic Pressure Resistance	1.0 MPa

\*The above is a general spec. Custom design available on request.

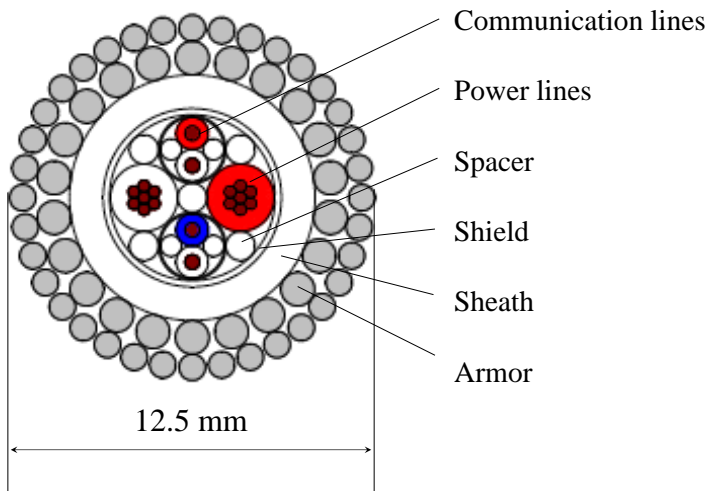


## 4. Heat resistance cable

### 4.1 Heat resistant cable (100 °C /212 °F)

Features: This cable has a heat resistance of 100 °C (212 °F), and can be used in high temperature environments.

Applications: Seismometers, in-hole sensors, etc.



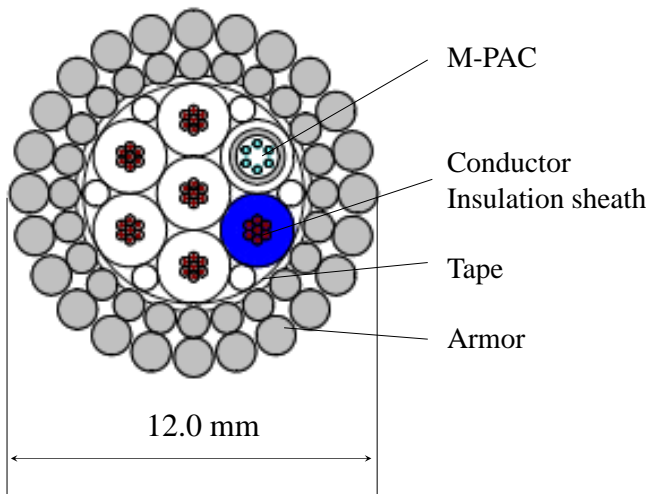
Specification	
Diameter	12.5 mm
Weight in air	Approx. 530 kg/km
Weight in water	Approx. 430 kg/km
Breaking load	≥ 54.2 kN
Conductor resistance(20°C)	Communication lines ≤ 97.6 Ω/km Power lines ≤ 22.6 Ω/km
Insulation resistance(DC500V)	≥ 1,000 MΩ·km
Optical loss	—
Hydrostatic Pressure Resistance	≥ 19.6 MPa
Operation Temperature	-15 ~ +100 °C

\*The above is a general spec. Custom design available on request.

### 4.2 Heat resistant O/E composite cable(150 °C /302 °F)

Features: This cable has a heat resistance of 150 °C(302 °F), and it can be used in high temperature environments.

Applications: Seismometers, in-hole sensors, etc.



Specification	
Diameter	12.0 mm
Weight in air	Approx. 535 kg/km
Weight in water	Approx. 440 kg/km
Breaking load	≥ 78.4 kN
Conductor resistance(20°C)	≤ 35.9 Ω/km
Insulation resistance(DC500V)	≥ 1,000 MΩ·km
Optical loss(SM 1,310nm)	≤ 0.7 dB/km
(GI 1,300nm)	≤ 2.0 dB/km
(GI 850nm)	≤ 4.0 dB/km
Hydrostatic Pressure Resistance	≥ 19.6 MPa
Operation Temperature	-15 ~ +150 °C

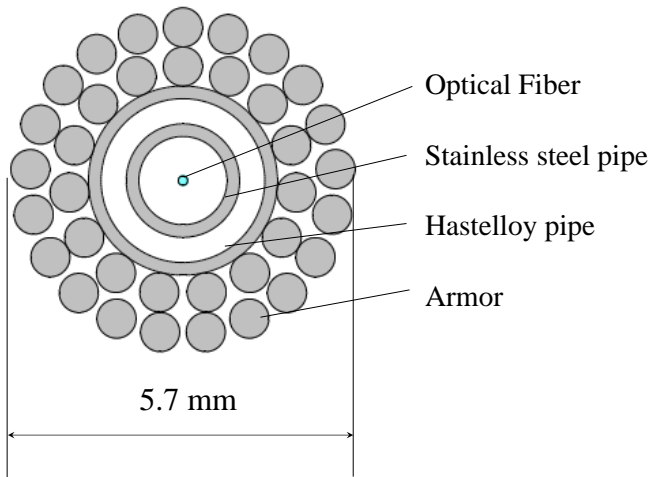
\*The above is a general spec. Custom design available on request.

## 4. Heat resistance cable

### 4.3 Heat resistant optical cable (300 °C /572 °F)

**Features:** This cable is highly heat-resistant and corrosion-resistant, with optical fiber protected with stainless steel and Hastelloy.

**Applications:** In-hole fiber sensing cable



Specification	
Diameter	5.7 mm
Weight in air	Approx. 140 kg/km
Weight in water	Approx. 110 kg/km
Breaking load	$\geq 14$ kN
Conductor resistance	—
Insulation resistance	—
Optical loss(SM 1,310nm)	$\leq 0.7$ dB/km
Hydrostatic Pressure Resistance	$\geq 30$ MPa
Operation Temperature	-30 ~ +300 °C

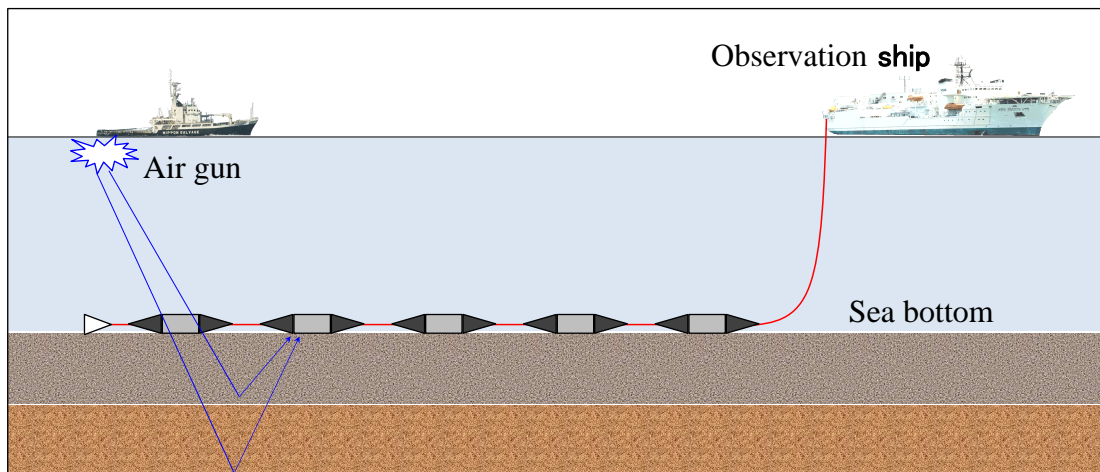
\*The above is a general spec. Custom design available on request.

## 5. Cable System/Equipment

### 5.1 Sub bottom structure survey cable system

**Features:** This system collects reflection and refraction waves with high S/N. The receivers can be buried directly under seabed.

**Applications:** Refraction seismic sub bottom structure survey, Reflection seismic sub bottom structure survey.

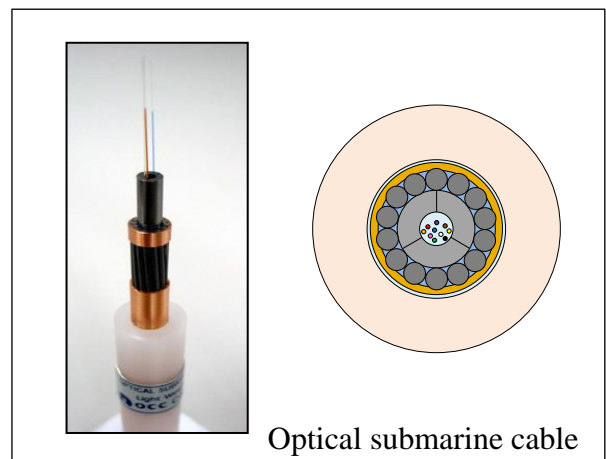


Specification	
Sensor	3 axis Accelerometers, Hydrophone
Hydrostatic Pressure Resistance	$\geq 20$ MPa
Receiver interval	25 m ~
Cable	Optical submarine cable
Sampling rate	1 kHz
A/D	24 bit
Receiver size	1,600 mm $\times$ $\Phi$ 136 mm

\*The above is a general spec. Custom design available on request.



Receiver



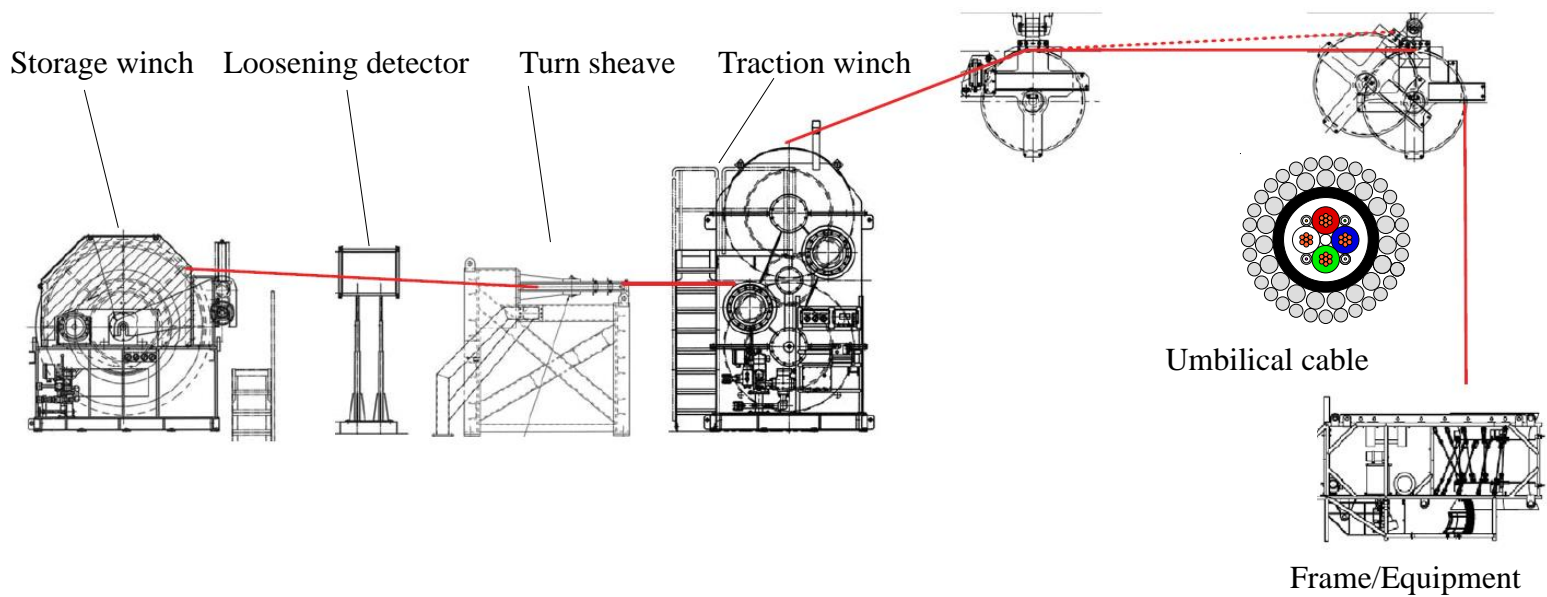
Optical submarine cable

## 5. Cable System/Equipment

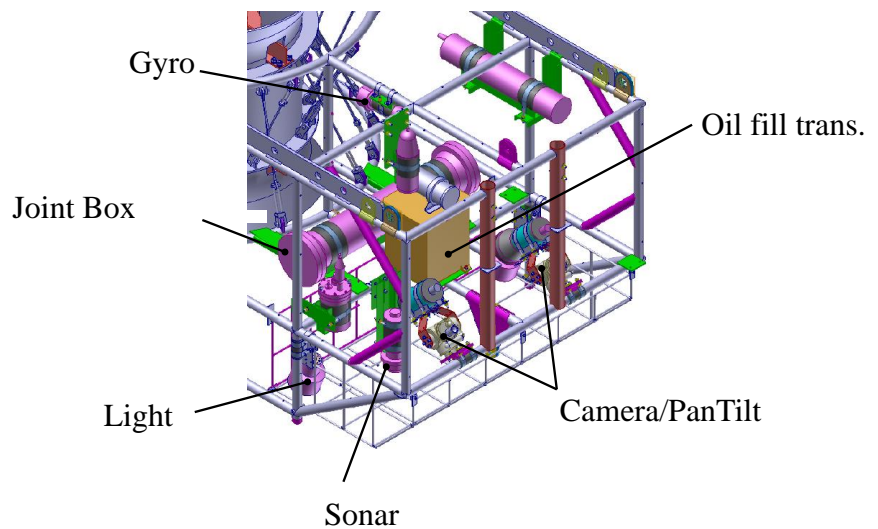
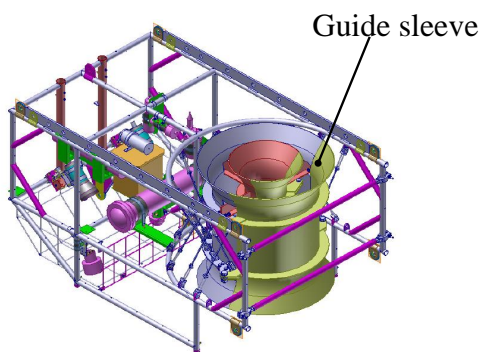
### 5.2 Under Water TV camera system

Features: This system dives down to 7,000m water depths, with TV camera, light, other equipment and sends to support ship clear video images and data in real time.

Applications: For surveillance of sea bottom drilling operations.



Frame/Equipment



#### Specification

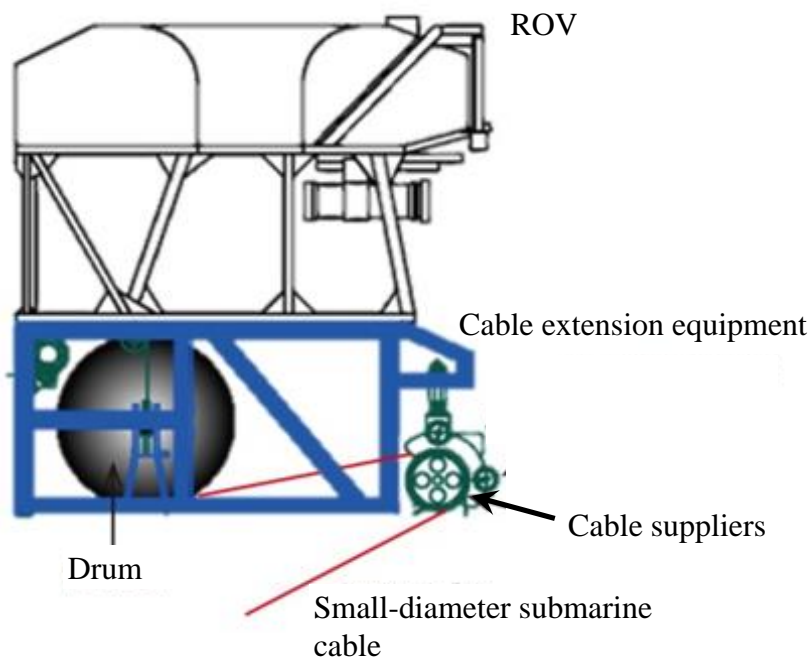
Specification	
Weight in air	Approx. 1200kg
Weight in water	Approx. 1000kg
Depth	max 7000m
Equipment	Camera, Light, Sonar, Gyro, etc.

## 5. Cable System/Equipment

### 5.3 Cable extension equipment

**Features:** This system installs equipment on the seabed precisely location and connect the extension cable up to 10km use with ROV.

**Application:** Subsea earthquake and Tsunami observation system installation.



Courtesy of Japan Agency for Marine-Earth Science and Technology

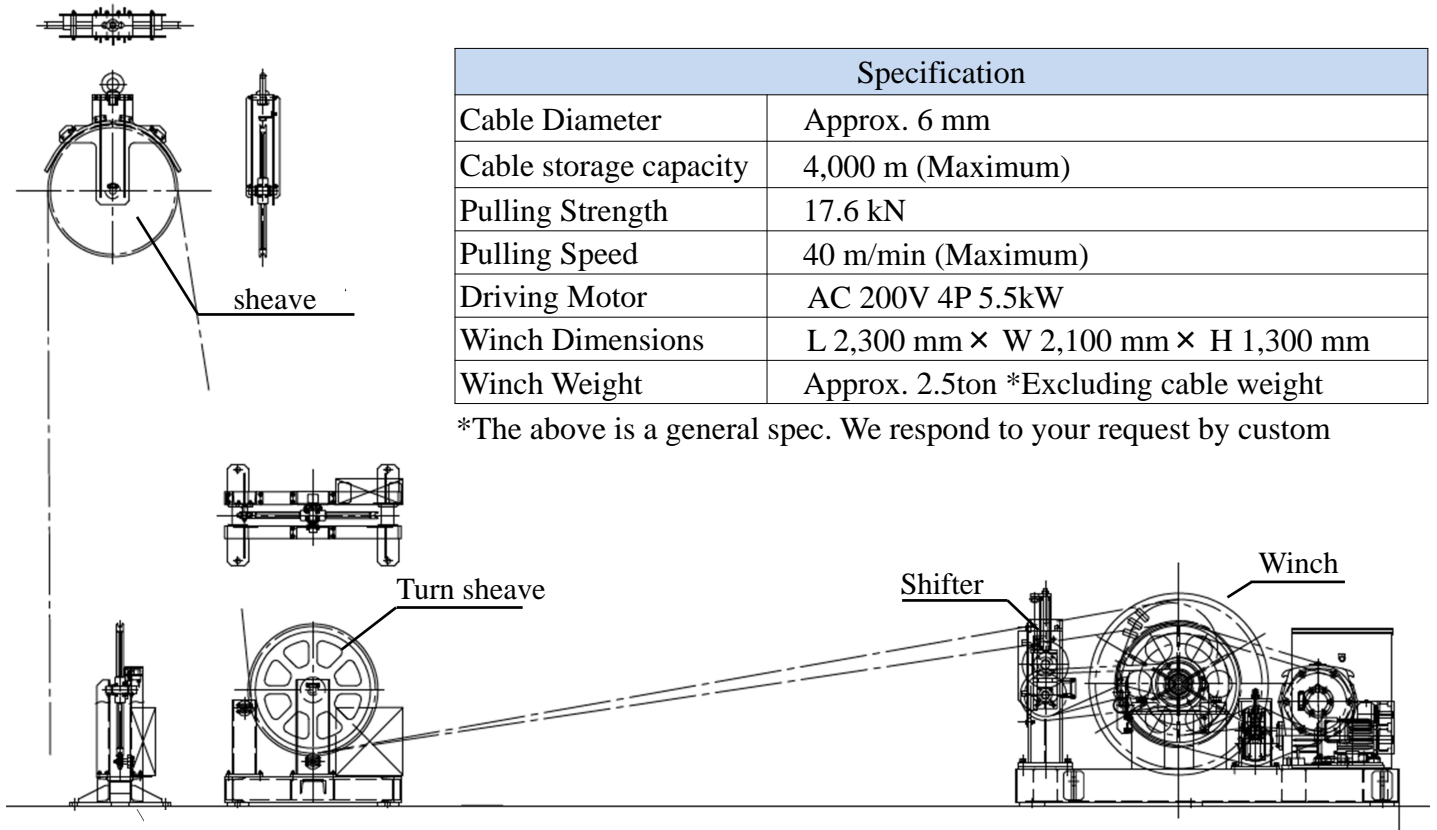
Specification	
Size	W1,120 × L1,700 × H1,120 mm
Weight in air	Approx. 150 kg
Weight in water	Approx. 55 kg
Extension range	11,000 m
Depth	6,000 m
Extension speed	2 knot
Cable	Small-diameter Submarine cable

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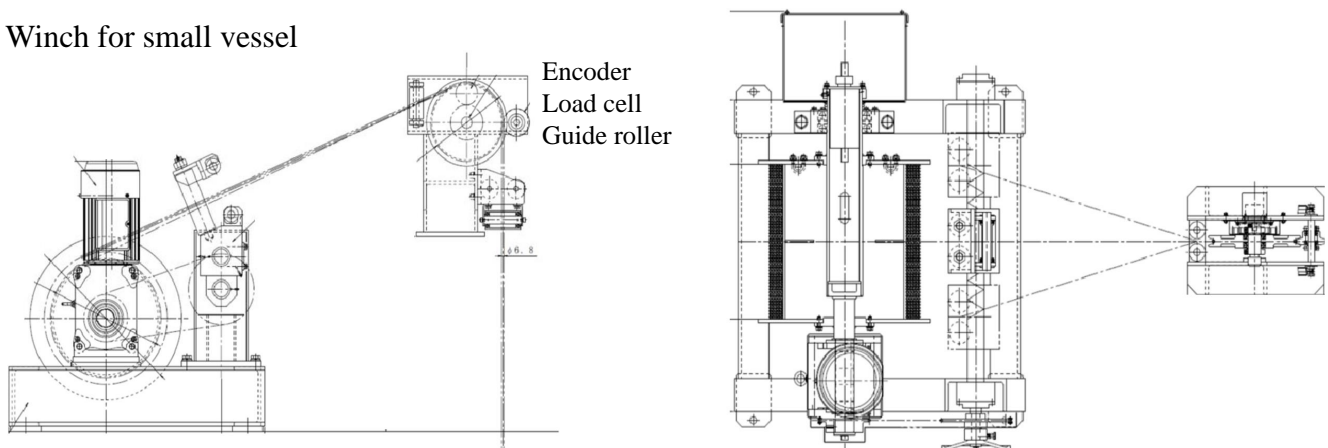


## 5. Cable System/Equipment

### 5.4 Winch for borehole logging cable



### 5.5 Winch for small vessel



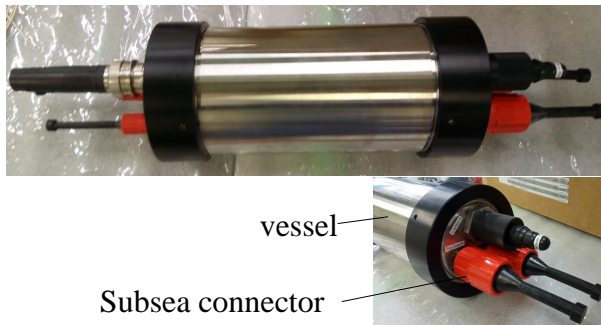
Specification	
Cable Diameter	Approx. 7 mm
Cable storage capacity	250 m (Maximum)
Pulling Strength	2.0 kN
Pulling Speed	10 m/min (Maximum)
Driving Motor	AC200V 4P 0.75kW
Winch Dimensions	L 800 mm × W 800 mm × H 800 mm
Winch Weight	Approx. 300 kg *Excluding cable weight

\*The above is a general spec. Custom design available on request.

## 6. Other products

### 6.1 Cable joint box

We provide cable joint box for under water use. Please let us know your preference about material, size, pressure and connectors etc.



Specification	
Material	Stainless steel, Aluminum, Titanium, etc.
Shape	Customized upon request
Hydrostatic pressure resistance	
Connector	

### 6.2 Water pressure proof mold

We provide water pressure proof mold for cable termination.



Specification	
Material	Rubber, urethane, PE, fluoro resin, etc.
Shape	Customized upon request

### 6.3 Water pressure proof feed through

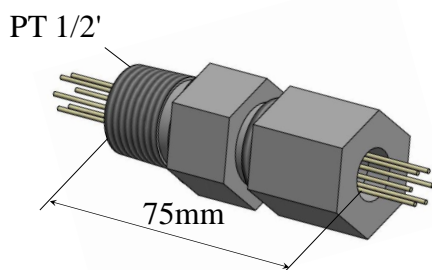
We provide special designed feed through. ex. multiple optical fibers feed through, heat resistant feed through.

Optical Fiber feed through



Specification	
Material	Stainless steel, Khobar
Size	Approx. $\Phi 30 \times L30$
Hydrostatic Pressure Resistance	$\geq 30 \text{ MPa}$
Number of fiber	1 ~ 45
Loss(SM 1,310nm)	$\leq 0.3 \text{ dB}$
Operation Temperature	-10 ~ +40 °C

Heat resistant feed through



Specification	
Material	Stainless steel
Size	PT1/2' $\times$ L75
Hydrostatic Pressure Resistance	$\geq 20 \text{ MPa}$
Number of electric wire	1 ~ 6
Operation Temperature	-15 ~ +100 °C

\*The above is a general spec. Custom design available on request.



Cables used in the fields of Ocean-observation and Resource exploration must withstand extremely harsh environments such as high water pressure, high temperature corrosion and high tensile strength and must provide the electrical power and communication links required for operation.

Utilizing our technological expertise supported by many years of manufacturing submarine cables and land Cables, we provide optimal products to our customers.

## ●Optical Fiber

Standard SMF/MMF, Harsh environment (High temperature, High radiation), Sensing (FBG), Metal Pipe Armored, etc.

## ●Insulation sheath

PVC, Polyethylene, Polypropylene, Fluoro resin, Urethane, etc.

## ●Shielding

Aluminum or Copper tape, Soft copper wire Braided shield, etc.

## ●Armoring

Steel, Stainless steel, FRP, Strength Fiber etc.

## ●Jacketing

PVC, Polyethylene, Polyurethane, Rubber

## ●Special Process

Watertight processing, Terminations, molding, Winch/Drum Custom Spooling, Pre-tensioning, etc.

## ●Testing

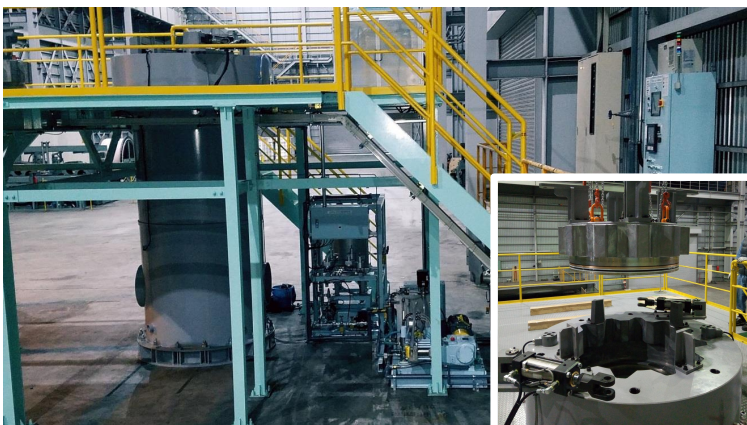
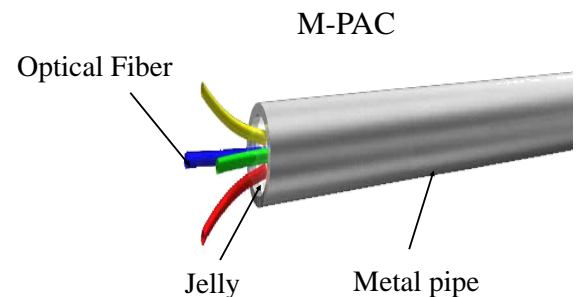
Electrical, Optical, Mechanical, Hydrostatic (max 10000m), High Tensile Breaks, Cyclical Fatigue, ITU-T G.976 Compliant and others.

Main test equipment

- 1000kN × 100m Tensile test rig
- 600kN × 30m × Φ3.5m(max) Sheave test

Water Pressure

- 100MPa Φ1,000mm × 1.2m
- 80MPa Φ 30mm × 100m
- 80MPa Φ 230mm × 5m



100MPa Water Pressure testing machine



600kN Sheave test machine

