



FURUKAWA
ELECTRIC GROUP

FURUKAWA OPTICAL CABLE & PRODUCTS



FURUKAWA
ELECTRIC

Furukawa Offers FTTx Products for Global Markets

Furukawa Electric has a rich tradition of designing and delivering exceptional, first-to-market optical products and solutions for a wide variety of industries and applications. Today we offer one of the world's leading FTTx product portfolios, including optical fiber, cable, closure, cabinet, connectivity, tools and related solutions.

The diagram illustrates an FTTx solution with various components and their applications:

- Aerial Closure:** J396L3 (P.32) and J397 (P.32).
- Underground Closure:** J363N (P.31) and J380N (P.31).
- Splitter:** PS202 (P.40).
- Drop Cable:** Drop Cable (P.21).
- Single Family Unit Application:** P.5 (indicated by a green box).
- Legend:**
 - Underground cable (Orange line)
 - Aerial cable (Blue line)
 - Underground closure (Blue box)
 - Aerial closure (Blue box)
 - Pole Mount Closure (Green box)

The diagram shows a street scene with buildings, trees, and a road. A blue line represents the aerial cable, which connects to a pole mount closure. An orange line represents the underground cable, which connects to an underground closure. The aerial cable then descends to a single family unit application (indicated by a green box) located on a house roof. The legend identifies the colors and symbols used in the diagram.

FTTx Solution

Single Family Unit Application P.5

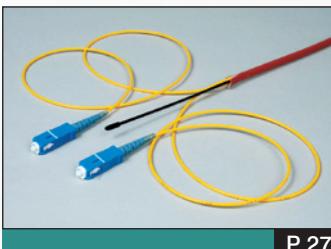
- Underground cable
- Aerial cable
- Underground closure
- Aerial closure
- Pole Mount Closure

Patch Panel



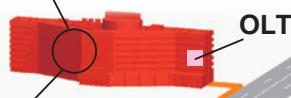
ODF BT48 P.26

Optical Cable



P.27

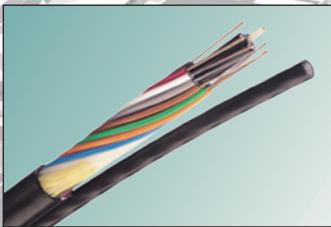
Central Office



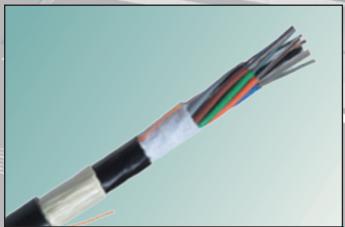
OLT

Multi Dwelling Unit (Office) Application P.3

Aerial Cable



Loose Tube Cable P.16



ADSS Cable P.16



SZ-Slotted Core Cable for Aerial P.18



SZ-Slotted Core Cable P.17

Pole Mount Closure



FK-CTO-16MC P.33



FK-CEO-4T P.33

Contents

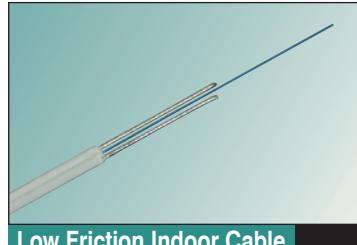
FTTx Network Solution	1
InvisiLight Optical Solutions.....	7
Highlighted Technology	9
Optical Fiber Cable	13
Products for Central office	25
Closure, Cabinet and Splitter	29
•Closure	31
•Cabinet	34
•Splitter	37
Optical Connector and Tools	41
Fusion Splicers and Tools	47
Optical fiber	53

Multi Dwelling Unit (Office) Application Direct Cabling Solution

Direct cabling solution provides flexibility for making network construction upon customer needs in MDU. Splitter can be placed at any point (Termination box in MDU) and fiber splice and connector connection are available at any place.



EZ-Bend Cable P.24



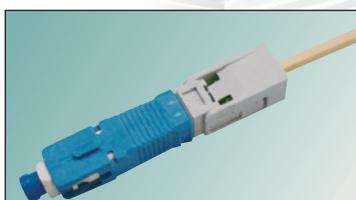
**Low Friction Indoor Cable
(1 or 2-fiber)** P.23



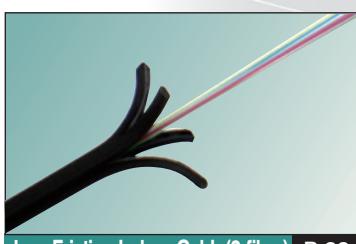
Splitter Module P.37



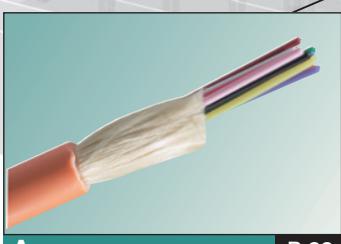
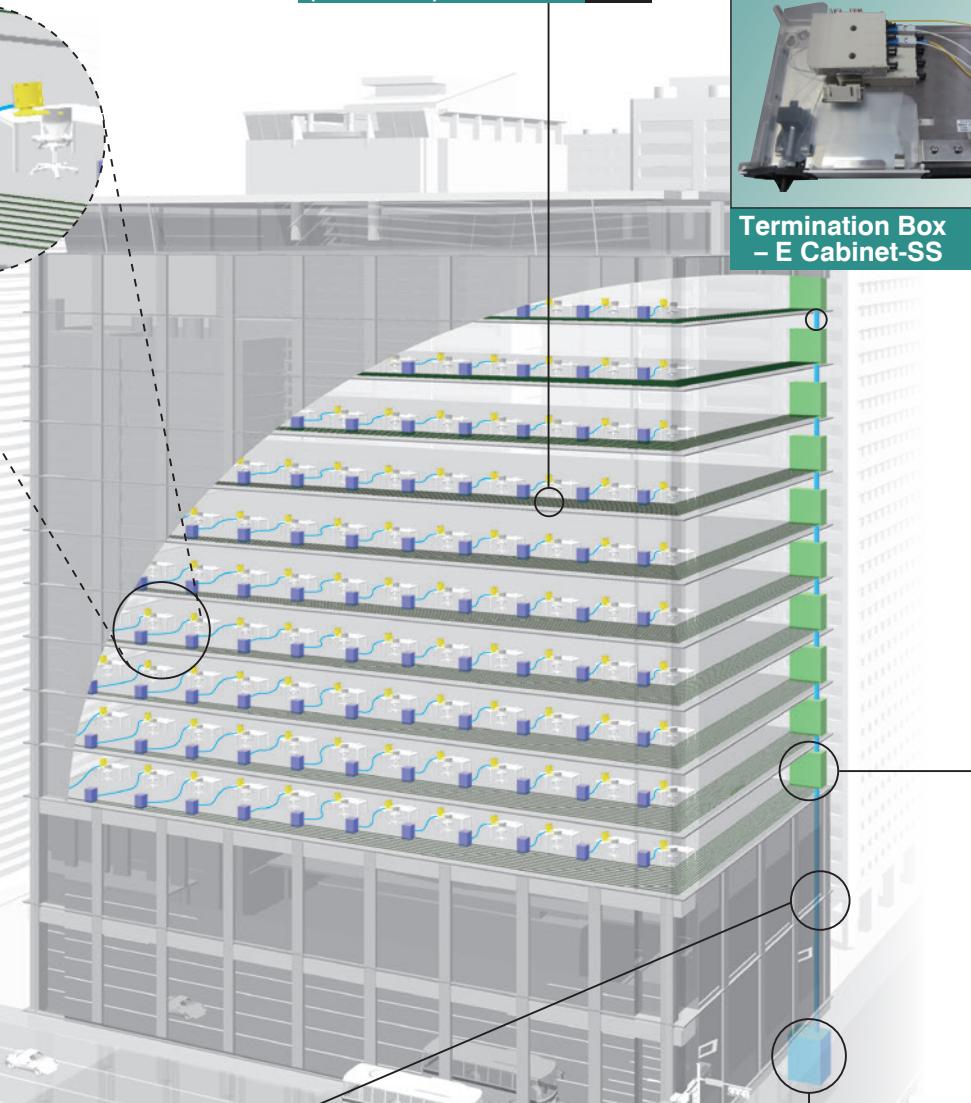
**Optical Connector Rosette
(J428N)** P.39



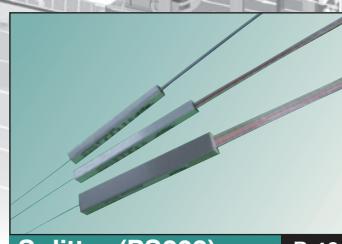
Field Installable Connector P.42



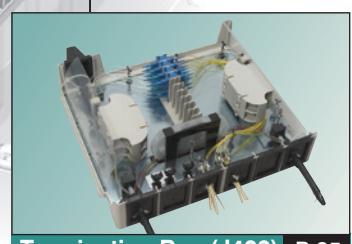
Low Friction Indoor Cable(8-fiber) P.22



Accumax P.22



Splitter (PS202) P.40



Termination Box (J422) P.35

Multi Dwelling Unit (Office) Application Compact MDU Solution

Compact MDU Solution provides only splitter module can be smart network construction.



EZ-Bend Cable P.24



1x8 Splitter P.37



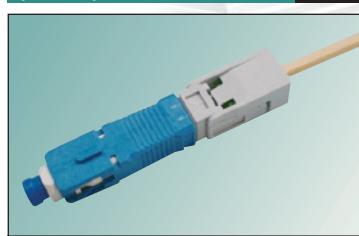
1x4 Splitter P.37



E-Cabinet P.36



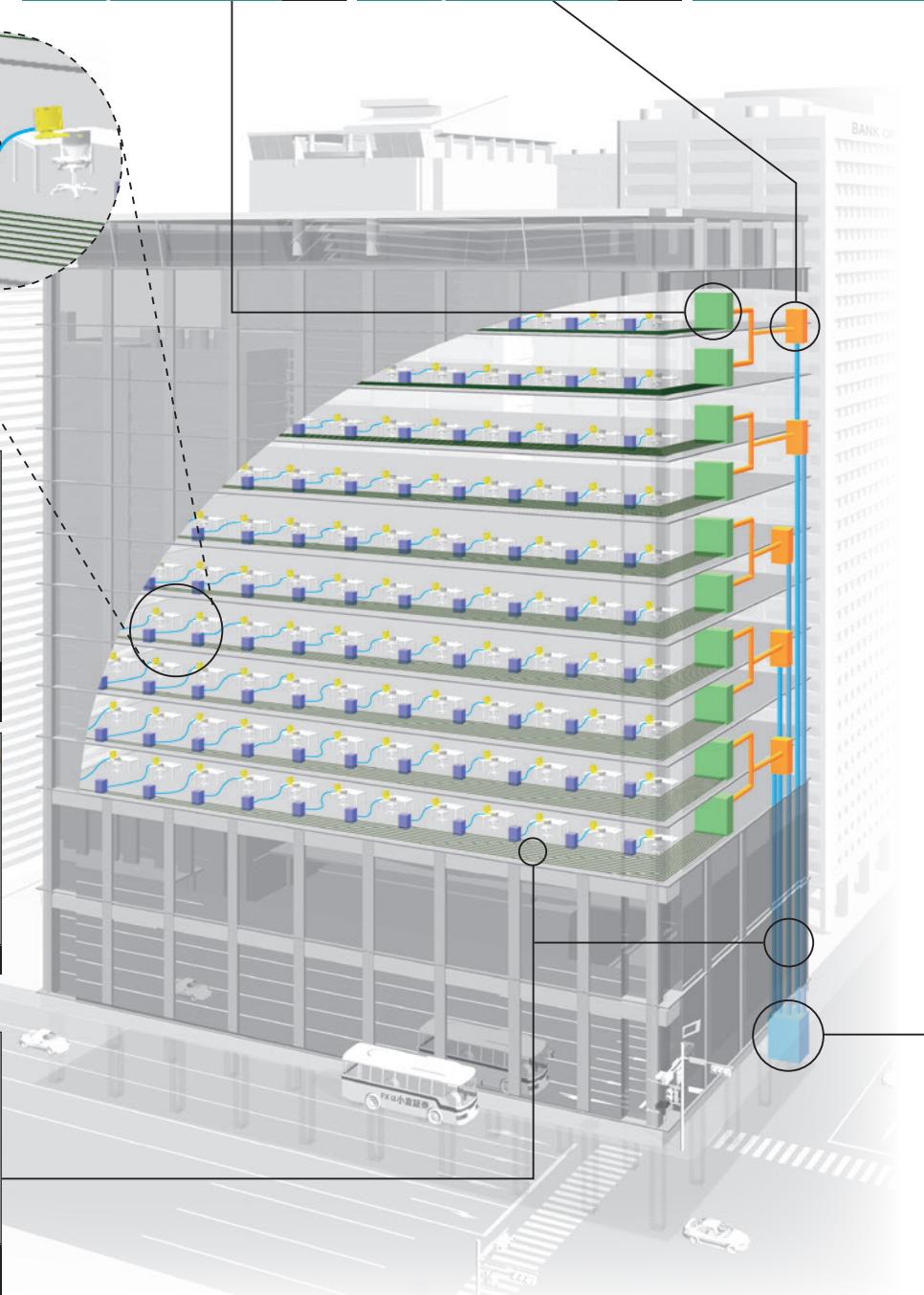
Optical Connector Rosette (J428N) P.39



Field Installable Connector P.42

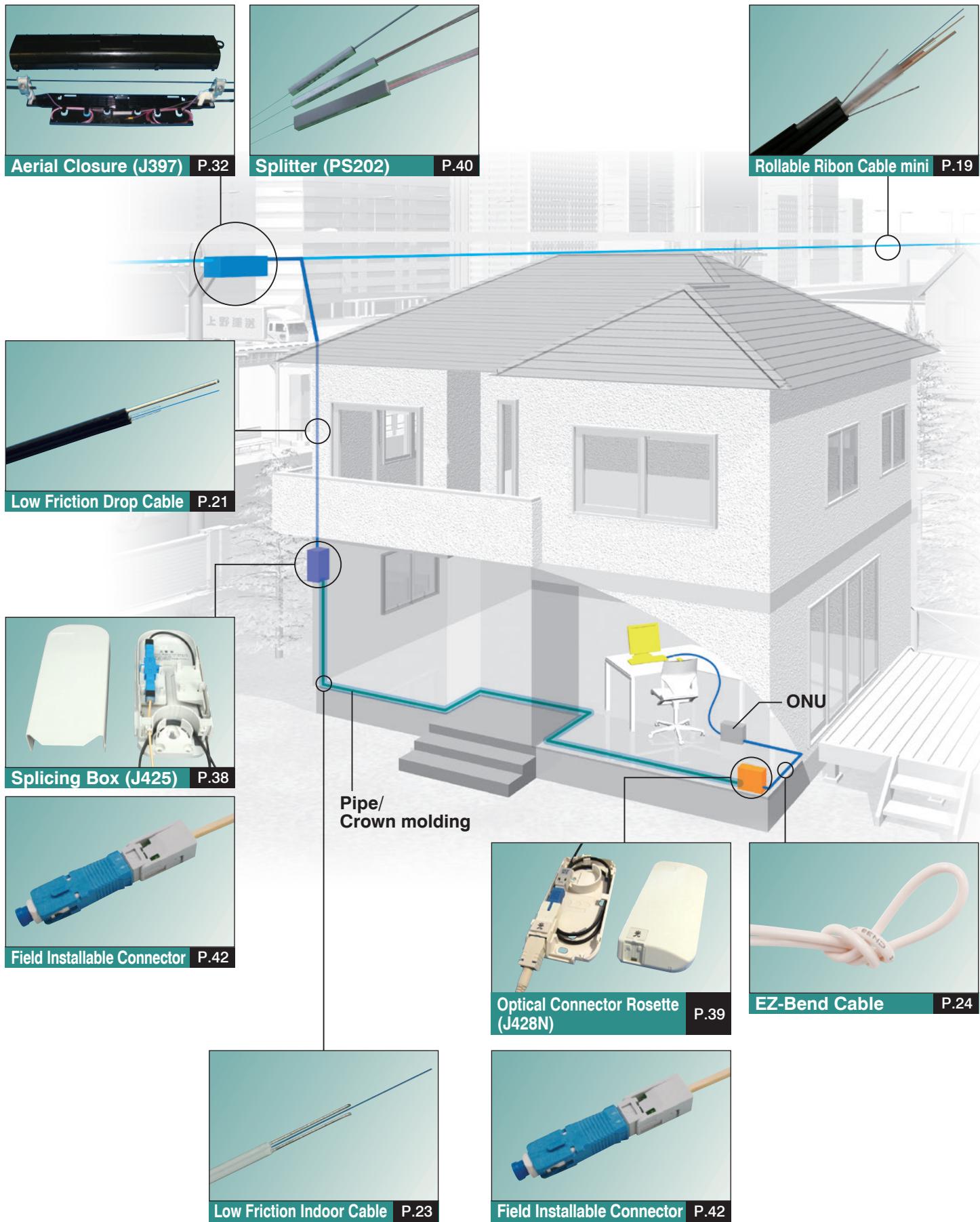


Low Friction Indoor Cable (1 or 2-fiber) P.23



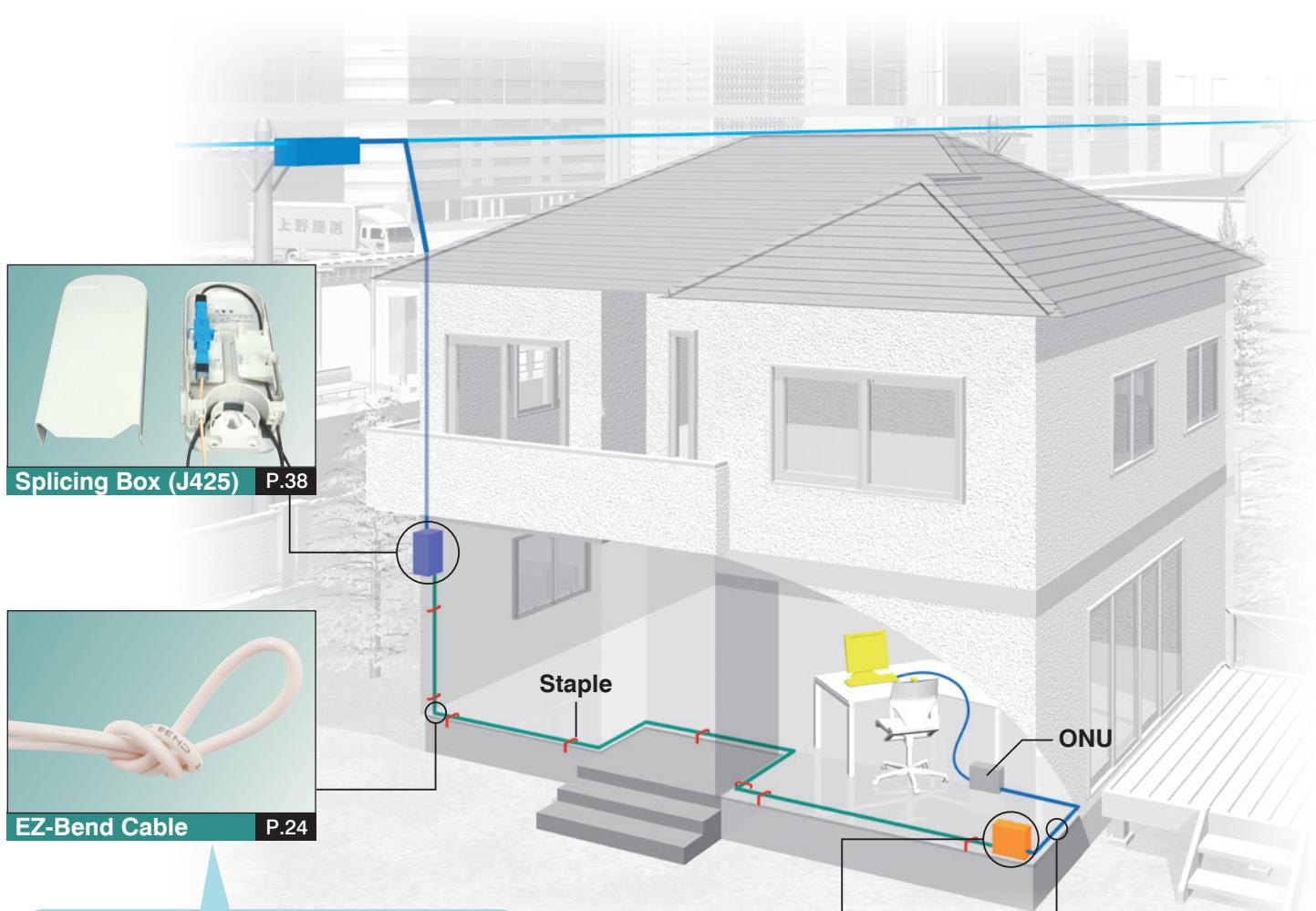
Single Family Unit Application Standard Solution

Low friction cable technology provides ease of installation to congested pipe and crown molding.

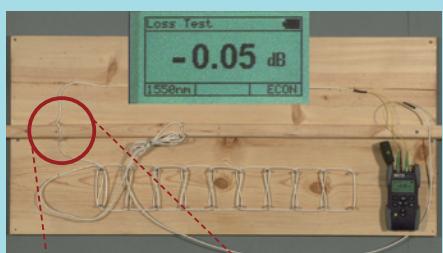


Single Family Unit Application Stapling Solution

EZ-Bend cable technology provides ease of installation by using the stapling method.



EZ-Bend cable stapled on board



- 35 quarter turns
- 10 staples



Optical Connector Rosette (J428N) P.39



EZ-Bend Cable P.24

InvisiLight® ILU Solution-Indoor Living Units

Supporting Multiple Dwelling Unit (MDU) and Indoor Living Unit (ILU) Applications

Product Overview

- Plug and Play
- Factory terminated
- Auto-slack storage on spool in module
- EZ-Bend 900 μm buffered fiber compliant with G.657.B3
- Fully splice compatible with outstanding macrobending performance (1 turn at 1550 nm):
 - < 0.1 dB loss at 5 mm bend radius
 - < 0.2 dB loss at 2.5 mm bend radius
- Capable of supporting a maximum of 30 outside and 30 inside corners



Take a Closer Look

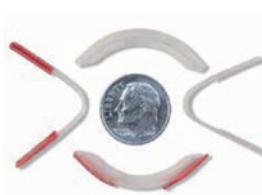
Almost invisible to the human eye



Through-Wall Tool
and Package of Four (4) Wall Covers



Module
or Living Unit Entry Point
to connect the ILU to the
outside optical fiber



Inside and Outside
Corner Protectors
(Package of 10 each)



Adhesive Dispensing Tool
and Adhesive (in tube)

InvisiLight® MDU Solution -Building Hallways

Supporting Multiple Dwelling Unit (MDU) and Indoor Living Unit (ILU) Applications

Product Overview

- Twelve (12) color-coded fibers, within a 2 mm outer diameter (OD) sheath
- EZ-Bend fiber, compliant with G.657.B3.
- Fully splice compatible with outstanding macrobending performance (1 turn at 1550 nm):
 - < 0.1 dB loss at 5 mm bend radius
 - < 0.2 dB loss at 2.5 mm bend radius
- Capable of supporting a maximum of 40 outside corners with no limit on inside corners
- Field termination required at the living unit (field-installable connector or pigtail splice)
- Must be installed in riser-rated conduit in risers, in-between floors, through fire walls or when not adhered to a supporting surface



Point-of-Entry (POE) Module
at the tenant apartment

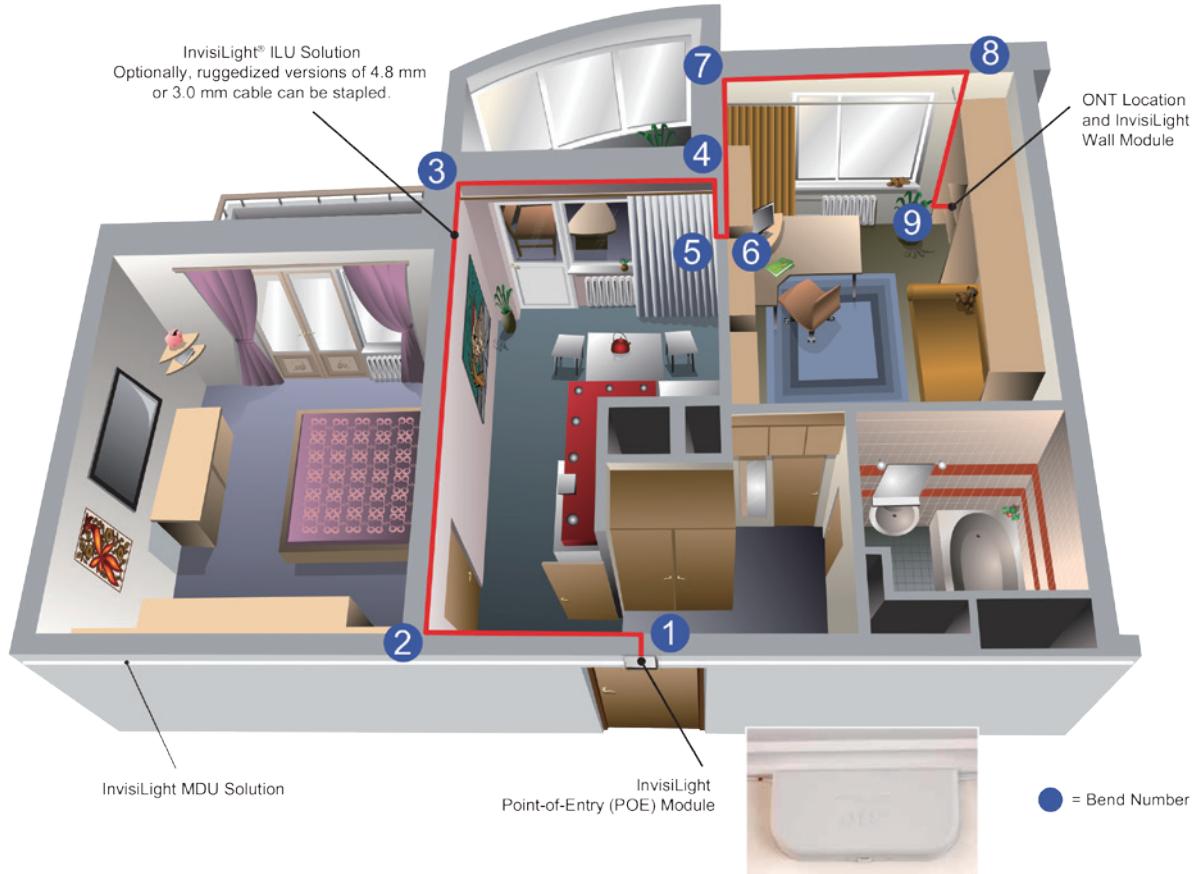


Adhesive Dispensing Tool
and Adhesive (in tube)



• InvisiLight Multi-fiber Unit
shipped on a spool

InvisiLight Optical Solutions TYPICAL INSTALLATION



Product Specifications	InvisiLight ILU Solution	InvisiLight MDU Solution
Size	One 900 μm EZ-Bend Optical Fiber 10X smaller than 2.9 mm cordage 5 to 20X smaller than tape-based cables	Twelve 250 μm EZ-Bend Optical Fibers in a 2 mm unit 15X smaller than tape-based cables
Application	Indoor living unit (home or apartment)	Building or MDU hallways; risers if in OFNR (or equivalent national standard) duct
Install Process	Quick, simple and low-cost installation process to adhere fiber to wall or ceiling surfaces	
Install Tools	Adhesive applicator tool for quick installation; through-wall application tool; and optional extender tool to apply adhesive without a ladder	
Install Materials	adhesive (in tubes) with precision pre-cut tip (fits in applicator tool) Inside and outside corner protectors, wall plugs and caps Indoor unit surface-mounted wall module	Inside and outside corner protectors, wall plugs and caps Mechanical connector or pigtail POE wall module outside tenant unit
Connectors	Plug-and-play, factory-terminated connectors	Factory-terminated connectors for closet - Mechanical connectors or spliced pigtails for point of entry
Surface Mounting	Adheres to most common types of painted and unpainted indoor wall, molding and ceiling surfaces	
Aesthetics	Minimum disruption to owner or tenants Virtually invisible and blends into the décor Can be caulked and painted with latex and oil-based indoor paint Can be repositioned or removed and reinstalled if required without damage Easily installed around corners, obstacles and on textured surfaces Safe and naturally protected in crevices	
Corners	Supports maximum 30 outside corners and 30 inside corners*	Supports maximum 40 outside corners and no limit on inside corners*
Spool Lengths	Available in various spool lengths	
Slack Management	Built-in auto-slack manager	POE module has storage space for slack
Install Conditions	Temperature $>= 50^\circ\text{F}$ ($>= 10^\circ\text{C}$) for adhesive installation - No humidity restriction or preconditioning required	
Operating Conditions	-41°F to 110°F (5°C to 43°C)	
Safety	Does not require entry into single-family home attics	Does not require entry into MDU attics
Standards	UL-1651 compliant fiber and adhesive	UL listed OFN-LS and OFN-FT1 For in-between floors, in risers or through fire walls, it must be placed inside OFNR-rated conduits or ducts.
Environmental	Environmentally friendly, free of heavy metals, RoHS compliant and not hazardous to human touch. Minimal scrap/waste remains after installation process is complete.	

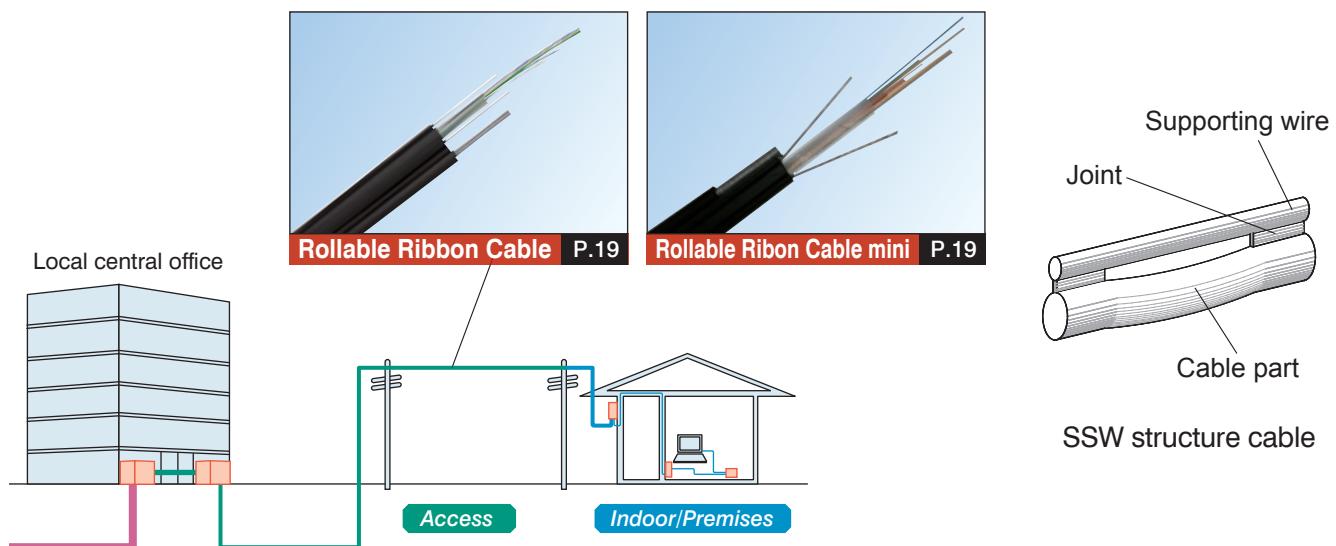
*See InvisiLight Optical Solutions Data Sheet for further guidance.

Highlighted Technology

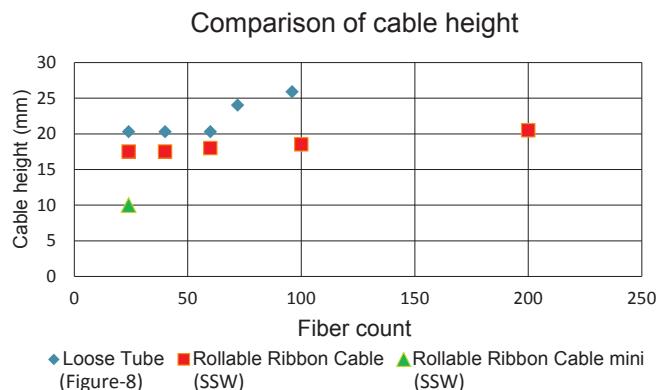
Compact Sized & Light Weight Aerial Cables

Rollable Ribbon Cable, Rollable Ribbon Cable mini (SSW structure cable)

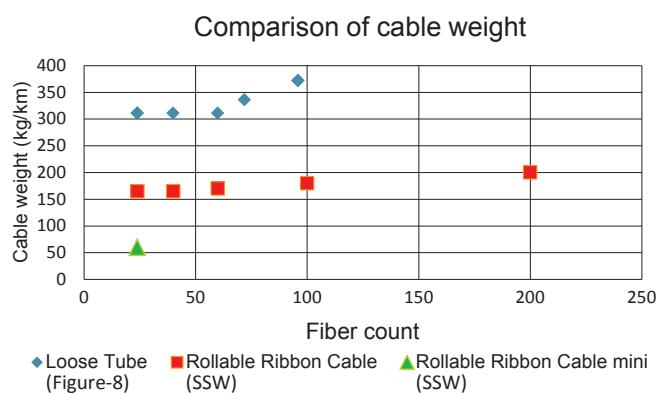
Furukawa Electric newly launched compact sized and light weight aerial cables which compose newly developed Rollable Ribbon fiber. It allows to install high fiber-count aerial cables under situations where wiring conventional type of cables are limited. Rollable Ribbon Cable mini (24-fiber cable) reduced 50% height and 80% weight compared with loose tube cable (figure-8 type , 24-fiber cable).



Cable height has been reduced by 50% compared with loose tube cables (figure-8 type, 24-fiber cable). The new cables will greatly assist easy installation of aerial cables.



Cable weight has been reduced by 80% compared with loose tube cables (figure-8 type, 24-fiber cable). The new cables can be installed under situations where conventional cables can not be installed due to weight limitation.

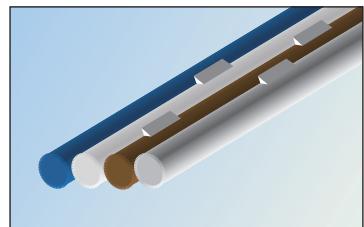


Fiber Ribbon for Easy Separating

Rollable Ribbon

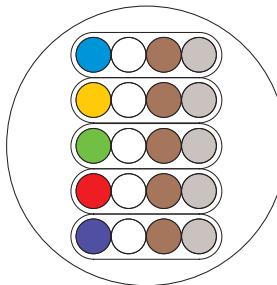
This technology has standardized in
ITU-T Recommendations L.100, L.101, L.102 and L.103.

Optical fiber ribbon which optical fibers are bonded in intervals. The fiber ribbon separation is surprisingly easy since it needs only unsticking the bonded portion. Also, the ribbons can be rolled and the rolled ribbons can be stranded. This new technology has realized extremely compact sized and light weight high fiber-count cables.

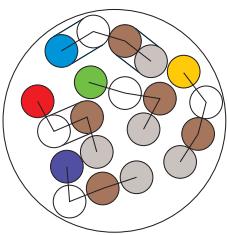


Rollable Ribbon
(schematic view)

P.20



Stacked ribbons
(conventional ribbon)



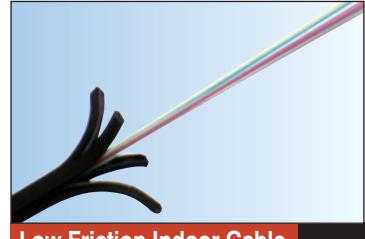
Rolled-up ribbons
(rollable ribbon)

Cables for Pushing Installation

Low Friction Indoor Cable

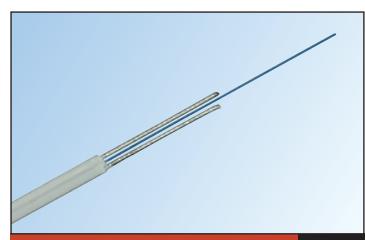
This technology has standardized in
ITU-T Recommendation L.103.

Indoor cables which cable sheath has low friction property based on Furukawa's original cable sheath material technology. Friction coefficient of the cable has been reduced by over 75%^{*1} and over 30 pieces of the cable can be installed into a pipe.^{*2} The new cables will assist to drastically reduce time spent on cable installation in MDU.



Low Friction Indoor Cable
(8-fiber)

P.22



Low Friction Indoor Cable
(1 or 2-fiber)

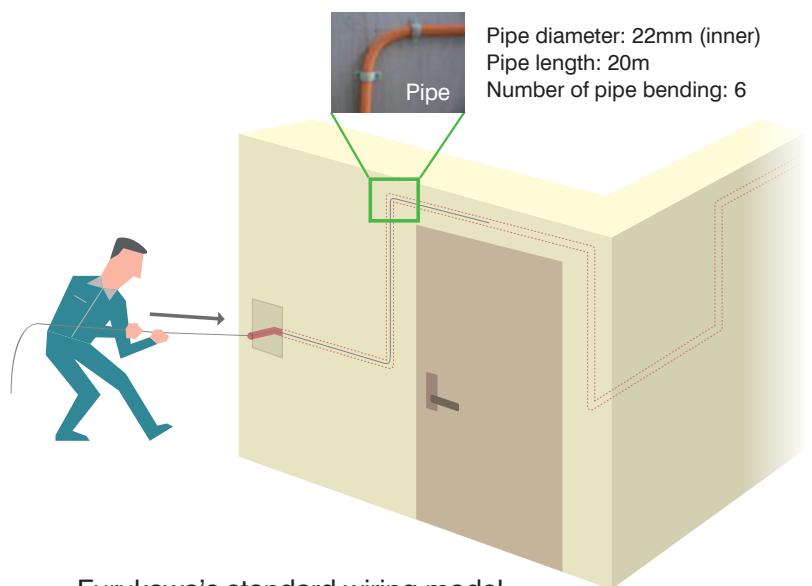
P.23

*1) compared with conventional indoor cables

*2) In case of 1-fiber cable. Based on Furukawa's standard wiring model



Pushing installation



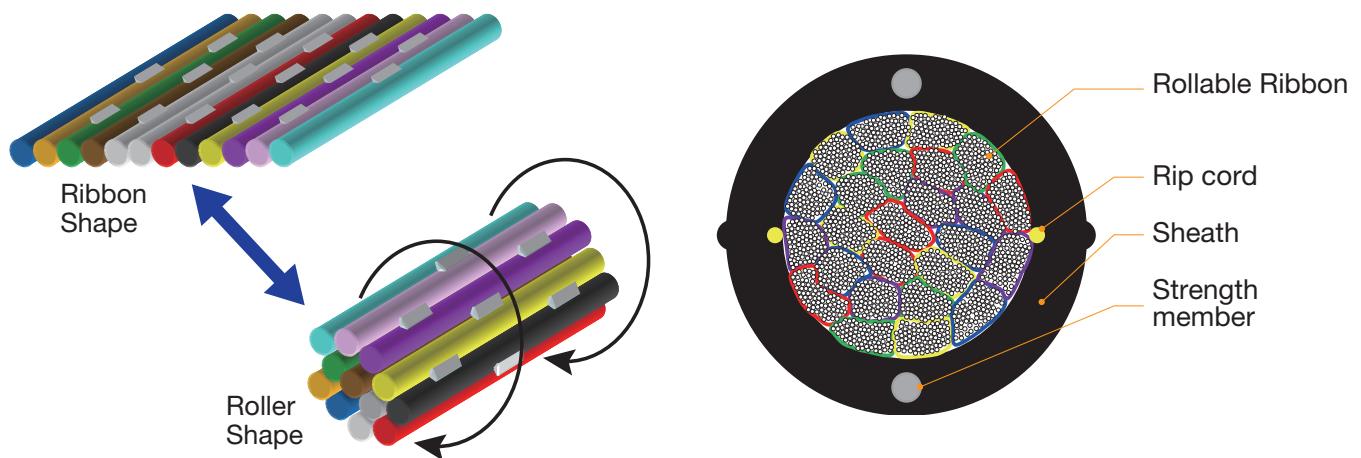
Furukawa's standard wiring model

Pipe diameter: 22mm (inner)
Pipe length: 20m
Number of pipe bending: 6

Highlighted Technology

High Density Optical Fiber Cable

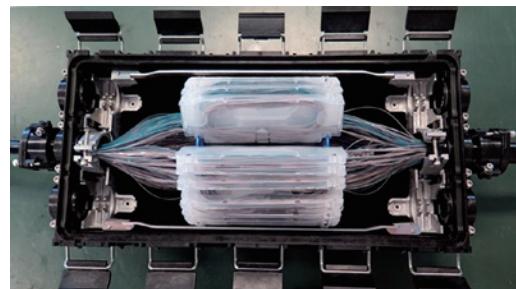
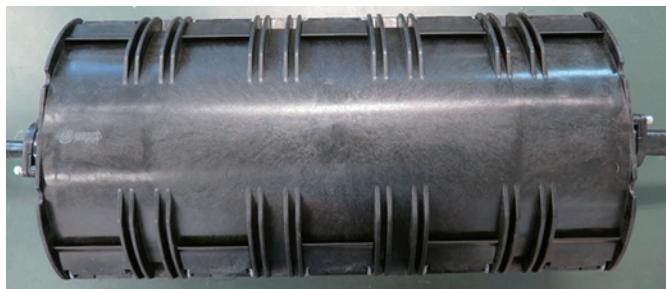
- Highest density optical fiber cable, that all fibers are placed in center of cable, brings highest capacity in limited space.
- Totally dry structure achieves faster cable preparation in field.
- Rollable Ribbon can be spliced same as conventional fiber ribbon.



Item	Specification								
	8-fiber rollable ribbon			12-fiber rollable ribbon					
Fiber ribbon type				288	576	864	1,152	1,728	3,456
Fiber count	400	1,000	2,000	14.9	17.5	18.5	19.7	22.0	28.0
Outer diameter (mm)	16.2	20.4	23.9	180	230	270	300	380	540
Weight (kg/km)	200	310	440	2,700					
Maximum pulling tension (N)									
Minimum bending radius (mm)	Static	162	204	239	149	175	185	197	220
	Dynamic	324	408	478	298	350	370	394	560

High Density Optical Fiber Closure for over 1000 fibers cable

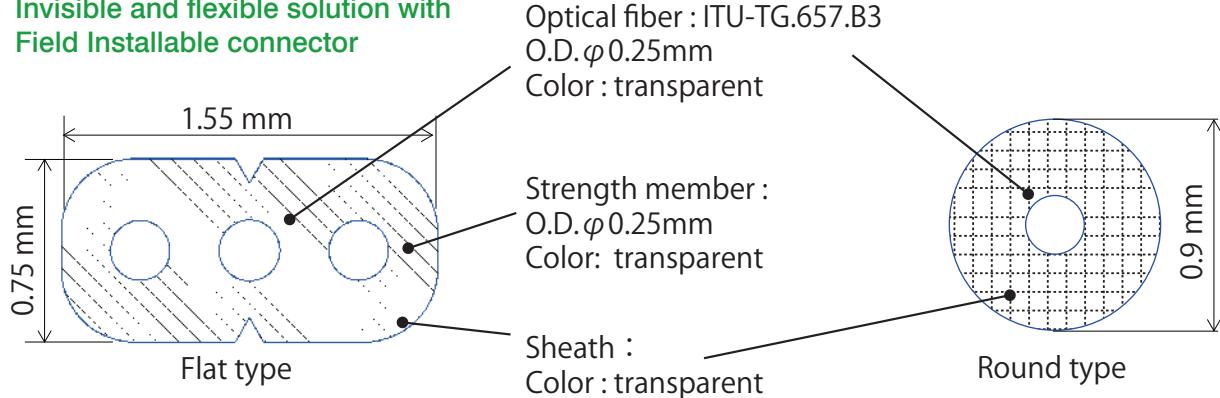
- Large capacity for 3456 fibers cable and more
- Quick access to each splice tray
- Support for both of Butt (entry from one end) and In-Line (entry from both end)



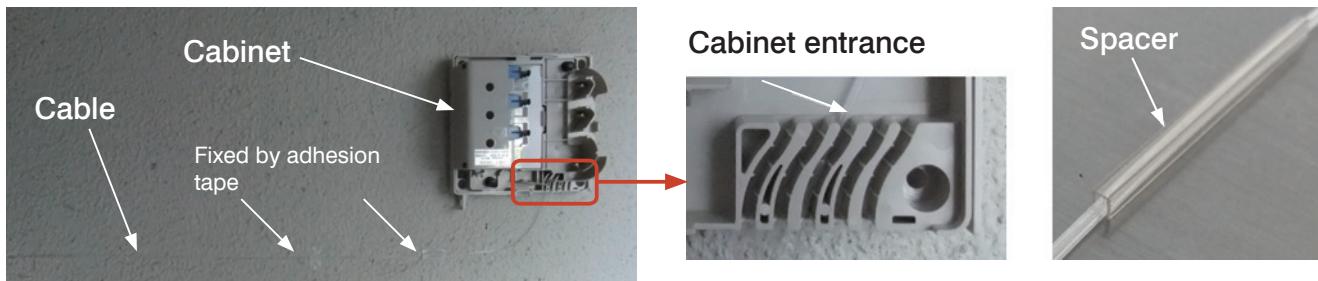
Invisible Indoor Cable

● Invisible indoor cable

Invisible and flexible solution with
Field Installable connector

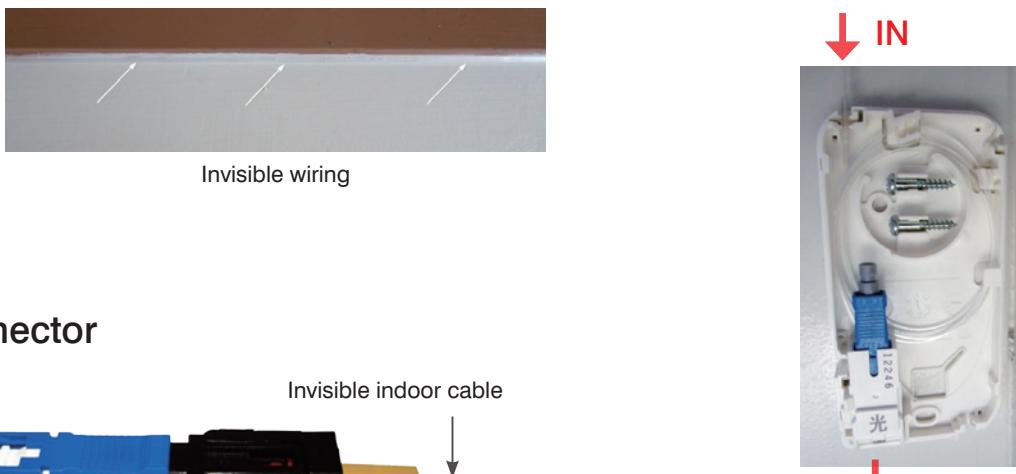


● Example of Installation (Cabinet to outside wiring)

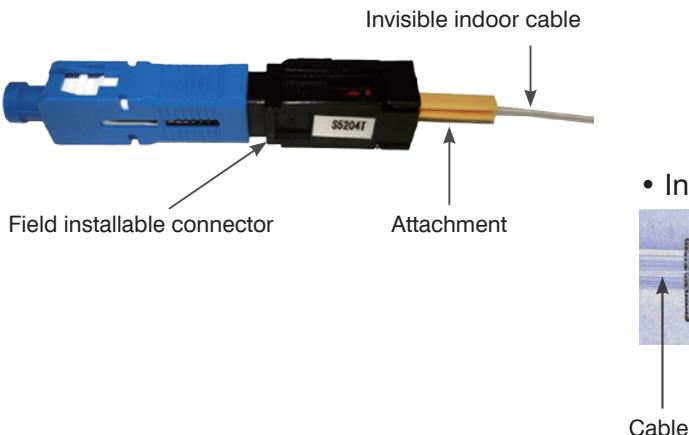


● Home wiring to optical outlet

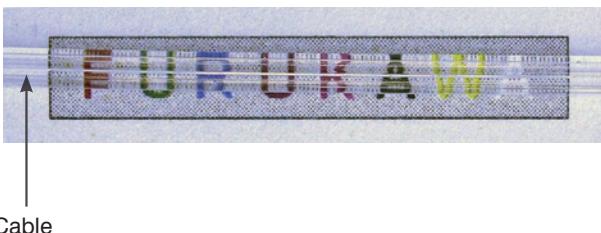
- SC connector



● Connector



- Invisible design

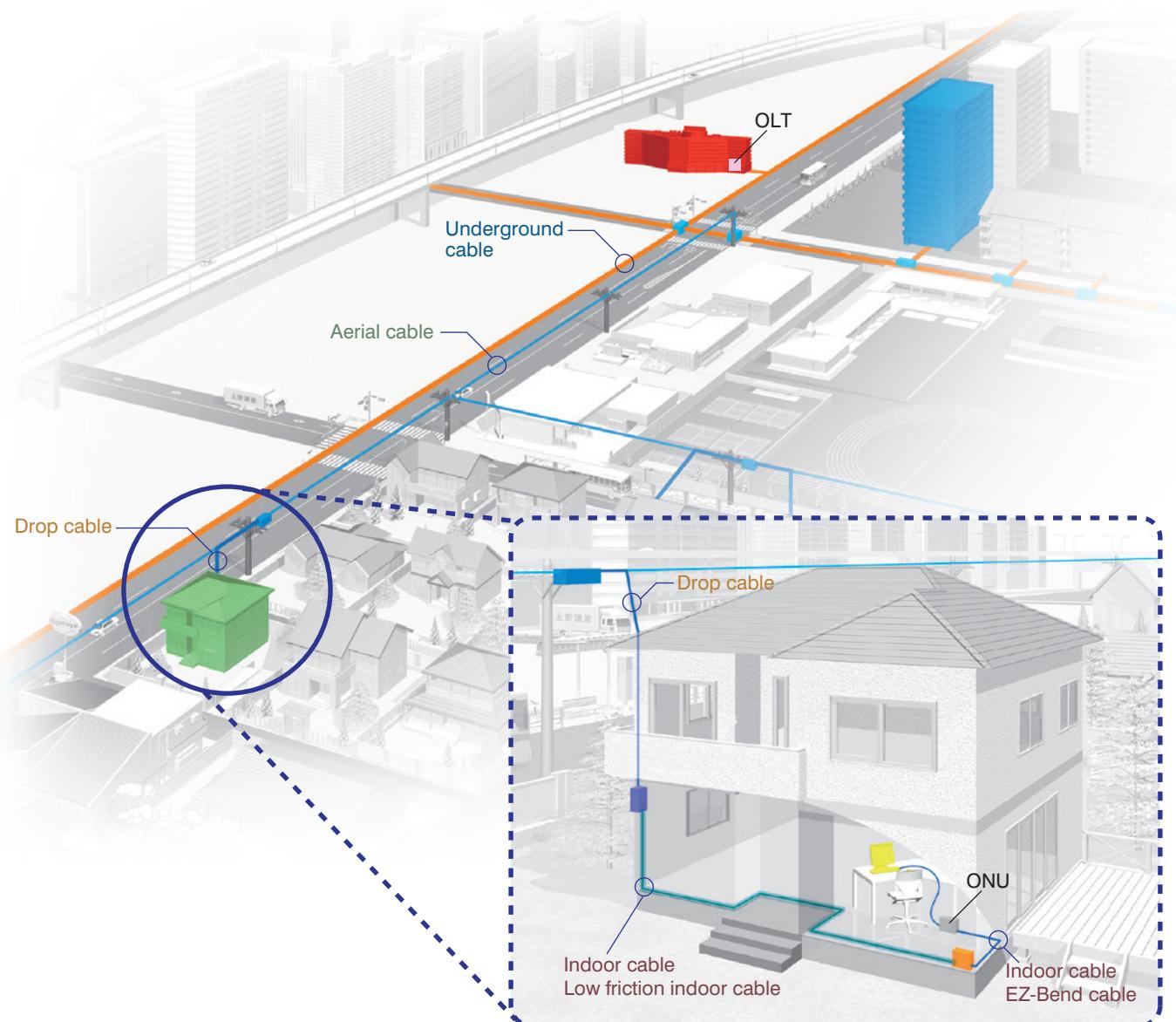


Optical Fiber Cable

FTTx Network deployment offers a significant challenge to the network provider.

The time proven technologies as well as innovative optical fiber cables offered by Furukawa Electric is the result of exceptional optical fibers protected by ground-breaking packaging that ensures superior performance and durability.

We offer comprehensive solution for passive products including the variety of optical fiber cables from central office to each FTTx subscriber realizing the FTTx network construction.



Application	Product name	Appearance	Feature	Intl. standard of applicable fiber	Page
Underground	Loose Tube Cable for Direct Buried for Duct		· Adopted worldwide	G.652. D G.657. A1	15
	SZ-Slotted Core Cable for Duct		· Easy mid-span access · High density fiber count · Available mass fusion splice · QS Ribbon	G.652. D G.657. A1	17
	S-Slotted Core Cable for Duct		· Helical slotted core cable · High density fiber count · Mass fusion splice	G.652. D G.657. A1	17
Aerial	Figure 8 Cable (Loose Tube Cable for Aerial)		· Suitable for aerial installation	G.652. D G.657. A1	16
	ADSS Cable (Loose Tube Cable for Aerial)		· Suitable for aerial installation · Consists of all dielectric elements	G.652. D G.657. A1	16
	SZ-Slotted Core Cable (SSW structure)		· Suitable for aerial installation · Easy mid-span access · QS Ribbon	G.652. D G.657. A1	18
	Rollable Ribbon Cable (SSW structure)		· Suitable for aerial installation · Easy mid-span access · Small diameter and light weight · Rollable Ribbon	G.657. A1	19
	Rollable Ribbon Cable mini (SSW structure)		· Suitable for rural area · Easy mid-span access · Small diameter and light weight · Rollable Ribbon	G.657. A1	19
Drop	Drop Cable		· Easy jacket removal · Self support structure	G.657. A1 G.657. A2	21
	Round Drop Cable		· Compact totally dielectric tight-buffered round drop cable	G.657. A1 G.657. A2	21
Riser for MDU	ACCUMAX Distribution Cable		· Easy handling · Faster, easier cable preparation	G.652. D G.657. A1	22
	Low Friction Indoor Cable (8-fiber)		· Low friction cable · 8 individual fiber · Easy jacket removal	G.657. A1 G.657. A2	22
Indoor	Low Friction Indoor Cable (1 or 2-fiber)		· Low friction cable · Easy jacket removal · Pushing Installation available	G.657. A1 G.657. A2	23
	Indoor Cable		· Easy jacket removal	G.657. A1 G.657. A2	23
	EZ-Bend Cable		· Allows small bending radius · Allows copper-like installation	G.657. B3	24
	Invisible Indoor Cable		· Invisible and flexible solution with Field Installable connector	G.657. B3	24

Loose Tube Cable

Innovative loose tube cable designs from Furukawa Electric fulfill the need for every situation, and provide excellent performance. Our complete portfolio offers cables with increased fiber density and easy deployment for a wide range of installations, including duct, aerial (Lashed and self-supporting), and direct buried.

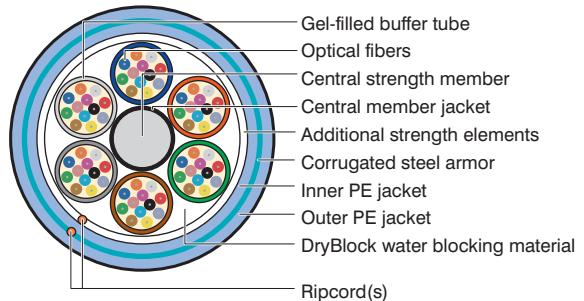
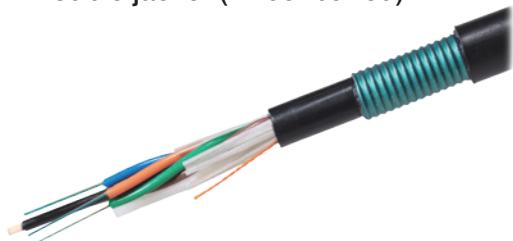
Features and Benefits

- Time proven technologies with a proven history
- Available with full range of fiber types
- Fulfilling the needs for every situation (Duct, aerial, direct buried, and indoor application)
- Dry core technology for a more craft-friendly, jelly-free cable core, resulting easy of handling
- Available for metallic or non-metallic central strength member
- Proven loose tube design provides outstanding optical fiber protection
- Armored structure provides outstanding mechanical strength and enhanced rodent protection
- Ripcord allows easy jacket removal

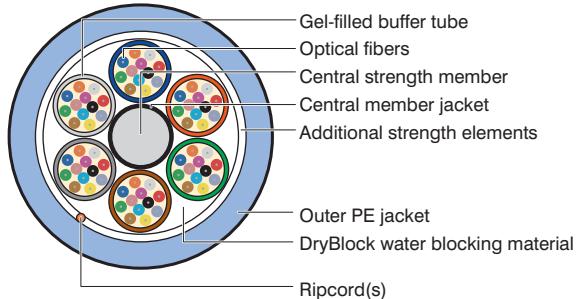
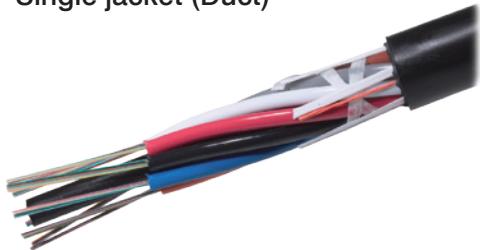
Construction

Underground cable

• Double jacket (Direct buried)

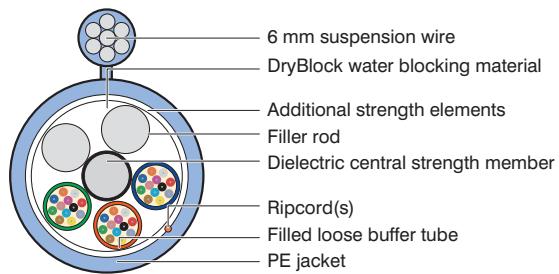


• Single jacket (Duct)

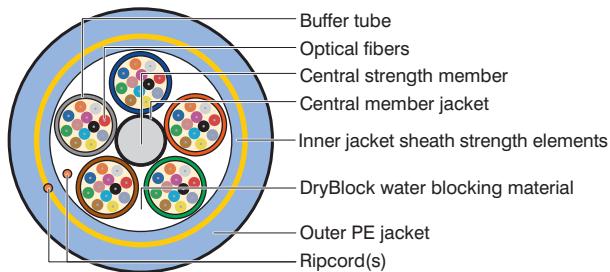
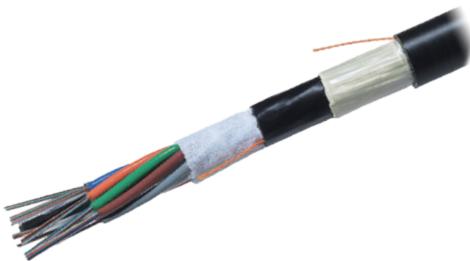


Aerial cable

•Figure 8



•ADSS



Specification

Item		Specification for underground cable								
Fiber count		2-60		61-72	73-96	97-120	121-144	145-216	217-240	241-288
Outer diameter (mm)	Double jacket	12.9		13.6	15.3	17.0	18.6	18.3	19.1	20.9
	Single jacket	10.1		10.7	12.5	14.1	15.7	15.4	16.2	18.0
Weight (kg/km)	Double jacket	162		182	223	280	318	306	351	388
	Single jacket	77		88	116	149	186	173	195	234
Maximum pulling tension (N)		2700								
Minimum bending radius (mm)	Double jacket	129		136	153	170	186	183	191	209
	Single jacket	101		107	125	141	157	154	162	180

Item		Specification for aerial cable		
Fiber count	Figure 8	2-60	62-72	74-96
	ADSS	2-30	31-288	
Outer diameter (mm)	Figure 8	11×20.3	12.2×24	14×25.9
	ADSS	Based on maximum pulling tension		
Weight (kg/km)	Figure 8	311	336	372
	ADSS	Based on maximum pulling tension		
Maximum pulling tension (N)	Figure 8	2700		
	ADSS	Based on customer's requirement		
Minimum bending radius (mm)	Figure 8	203	240	259
	ADSS	10×cable diameter		

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Underground

G.652. D

G.657. A1

SZ-Slotted Core Cable

Features and Benefits

- Easy mid-span access
- High density fiber count - Up to 800-fiber counts are available
- Mass fusion splice - Reduces the splicing time
- Totally dry core structure enhances the installation workability



Specification

Item	Specification							
	4-fiber ribbon					8-fiber ribbon		
Fiber ribbon type								
Fiber count	4-24	28-60	64-100	104-200	204-300	304-400	408-640	648-800
Outer diameter (mm)	9	10	12	15.5	20.5	20.5	23	28.5
Weight (kg/km)	65	85	115	180	305	260	360	510
Maximum pulling tension (N)	950	1240	1930	2560	3270	3270	5540	5540
Minimum bending radius (mm)	90	100	120	155	205	205	230	285

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

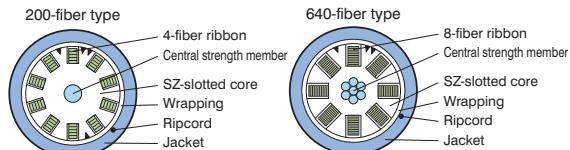
Fundamental Construction

Cable core structure



The ribbon is easily taken off from the slotted core at the any point of the network (mid-span access).

Example of cross sectional view

**Underground**

G.652. D

G.657. A1

S-Slotted Core Cable

Features and Benefits

- High density fiber count - Up to 1000-fiber counts are available
- Mass fusion splice - Reduces the splicing time
- Totally dry core structure enhances the installation workability
- Proven slotted core design provides outstanding optical fiber protection
- Available with full range of fiber types
- Cable structure is customizable upon the request



Specification

Item	Specification							
	4-fiber ribbon				8-fiber ribbon			
Fiber ribbon type								
Fiber count	4 - 40	44 - 100	104 - 200	204 - 300	304 - 400	408 - 600	608 - 1000	
Outer diameter (mm)	9.5	11.5	15.5	19	19.5	22.5	28	
Weight (kg/km)	80	110	180	275	290	400	580	
Maximum pulling tension (N)	1570	1570	1930	2560	3270	4070	4070	
Minimum bending radius (mm)	95	115	155	190	195	225	280	

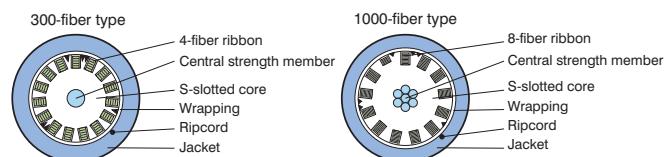
* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Fundamental Construction

Structure of Core



Example of cross sectional view



SZ-Slotted Core Cable for Aerial(ssw structure)

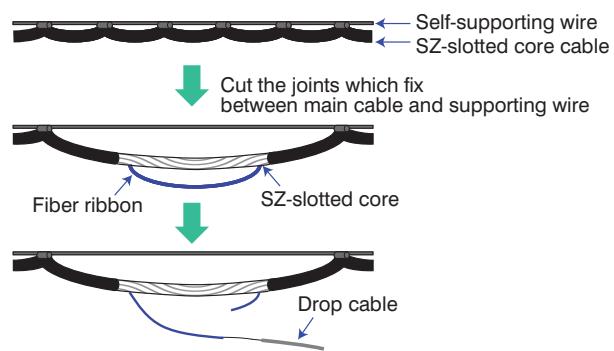
Features and Benefits

- Designed especially for aerial application.
- Easy mid-span access
- Slack between the cable and self supporting wire
- Totally dry core structure enhances the installation workability
- Proven slotted core design provides outstanding optical fiber protection
- Available with full range of fiber types
- Up to 400-fiber counts are available



SSW Structure for Mid-Span Access

Mid-span access is easily conducted by instruction shown in right figure. Self-supporting wire will still maintain the cable properties after the mid-span access.

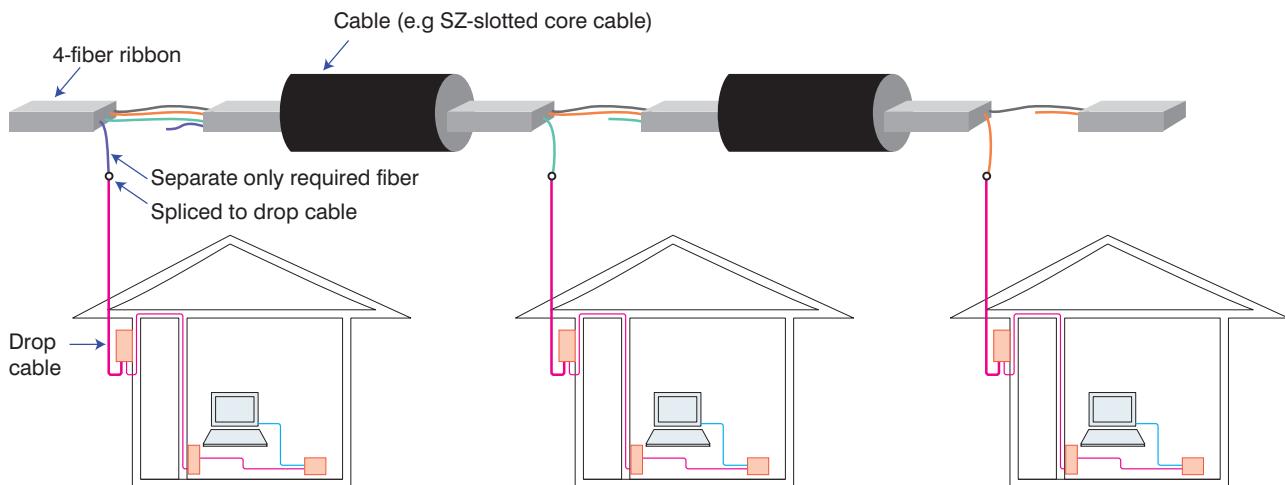


Specification

Item		Specification					
Fiber ribbon type		4-fiber ribbon					8-fiber ribbon
Fiber count		4-24	28-60	64-100	104-200	204-300	304-400
Supporting wire	Count	7	7	7	7	7	7
	Wire diameter (mm)	1.8	2	2	2	2	2
Diameter of cable part (mm)		9	10	13	16.5	20.5	21
Height of overall cable (mm)		20	22	25	29	33	33
Weight (kg/km)		230	280	320	400	500	460
Maximum pulling tension (N)	Cable part	630	820	1290	1710	2180	2180
	Supporting wire	6100	7540	7540	7540	7540	7540
Minimum bending radius (mm)		Dinamic: 400 Static: 200	Dinamic: 440 Static: 220	Dinamic: 500 Static: 250	Dinamic: 580 Static: 290	Dinamic: 660 Static: 330	Dinamic: 660 Static: 330

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Example of the Construction



Only required fiber will be cut from 4-fiber ribbon, other remaining fibers could be used at next point.

Compact Sized & Light Weight Aerial Cables

Rollable Ribbon Cable(ssw structure)

Features and Benefits

- Smaller diameter and lighter weight due to using Rollable Ribbon and not using slot spacer
- Non slotted rod structure, like center core cable, and Rollable Ribbon make the cable size smaller and save space comparing to the conventional ribbon slotted core cable
- Rollable Ribbon is especially adopted to mass fusion splice as standard ribbon
- It has slack between the cable and the supporting wire to reduce wind pressure



Specification

Item		Specification				
Fiber ribbon type		4-fiber ribbon				
Fiber count		4-24	28-40	44-60	64-100	104-200
Cable core construction		4-fiber ribbon × 6	4-fiber ribbon × 10	20-fiber unit × 3	20-fiber unit × 5	20-fiber unit × 10
Supporting wire	Count	7	7	7	7	7
	Wire diameter (mm)	1.4	1.4	1.4	1.4	1.4
Diameter of cable part (mm)		8	8	8.5	9.5	10.5
Height of overall cable (mm)		16.5	16.5	17	18	19
Weight (kg/km)		155	155	160	170	190
Maximum pulling tension (N)	Cable part	392	392	392	392	392
	Supporting wire	1960	1960	1960	1960	1960
Minimum bending radius (mm)		Dynamic: 250 Static: 300				

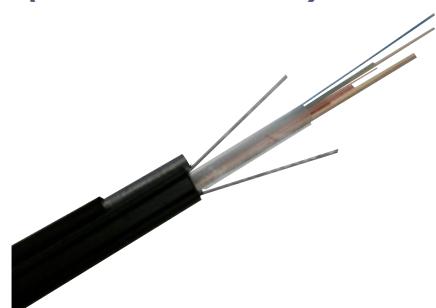
* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Compact Sized & Light Weight Aerial Cables

Rollable Ribbon Cable mini(ssw structure)

Features and Benefits

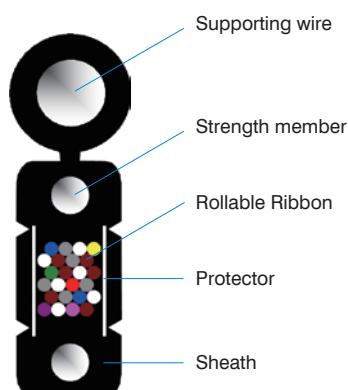
- Rollable Ribbon Cable mini is small diameter and light weight
- 24 fibers aerial cable
- Rollable Ribbon is especially adopted to mass fusion splice as standard ribbon
- Rollable Ribbon Cable mini has slack between the cable and the supporting wire to reduce wind pressure
- Using customized sheath removing tool, the sheath can be easily removed and we can access the ribbon fibers at mid-span



Specification

Item	Specification
Fiber ribbon type	24
Fiber count	4-fiber Rollable Ribbon x 6
Supporting wire (mm)	Steel wire: 2.6
Strength member (mm)	Steel wire: 0.5 × 2
Cable dimension (WxH mm)	3.3 × 10.5
Weight (kg/km)	66.5
Maximum pulling tension (N)	700 (392 for cable part)

This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.



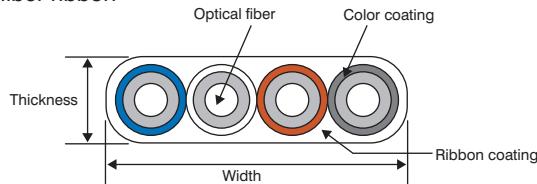
Sheath Removing Tool

Optical Fiber Ribbon

(for S-Slotted Core Cable and SZ-Slotted Core Cable)

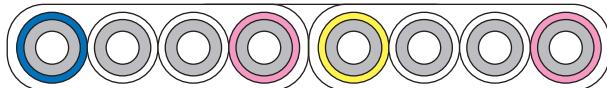
Cross Sectional View of Fiber Ribbon

■ 4-fiber ribbon



Item	4-fiber ribbon	8-fiber ribbon
Optical fiber count	4	8
Ribbon coating (μm)	Material UV curable acrylate	Width 1100 ± 100
Thickness		2100 ± 100
Identification		Thickness 320 ± 50
		Color coating

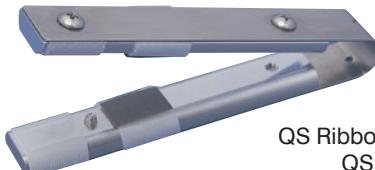
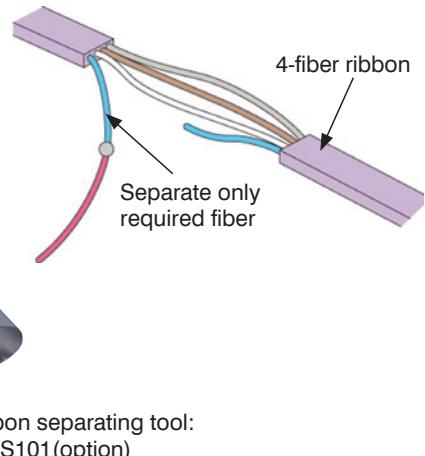
■ 8-fiber ribbon



QS Ribbon (for SZ-Slotted Core Cable)

Features and Benefits

- Able to separate into individual fiber with using associated tools
- Able to splice with standard 4-fiber ribbon
- Designed for mid-span branch joint
- QS Ribbon is offered with SZ-slotted core cable design

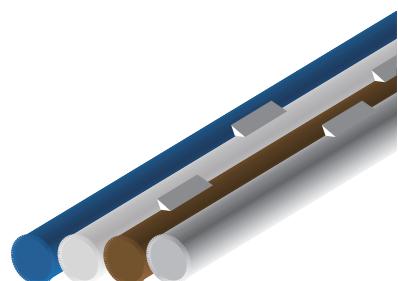


Rollable Ribbon

This technology has standardized in four cable ITU-T recommendations L.100, L.101, L.102 and L.103.

Features and Benefits

- Rollable Ribbon can be separated to individual fibers at the end of the cables much more easily by hand than conventional ribbon fibers.
- Rollable Ribbon can be spliced to conventional ribbon fibers (standard encapsulated ribbon or QS Ribbon) by ribbon to ribbon splice using conventional ribbon splicer
- Rollable Ribbon is flexible in width direction and can be even rolled. This realizes high fiber density cable



Schematic illustration

Drop

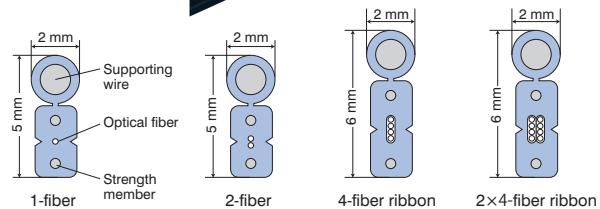
G.657. A1

G.657. A2

Low Friction Drop Cable

Features and Benefits

- Time proven technologies with long supplied record
- Easy jacket removal without special tools
- Self support structure
- Compact cable size
- Available with flame retardant jacket
- Available from 1 to 8-fiber counts



Specification

Item		Specification			
Cable type		Drop cable			
Fiber count		1	2	4	8
Cable dimension (WxH mm)		2x5		2x6	
Supporting wire (mm)				Φ 1.2	
Strength member (mm)	Metallic			Steel wire: Φ 0.4	
	Non-metallic			FRP: Φ 0.5	
Weight (kg/km)		20		25	
Maximum pulling tension (N)			690		
Minimum bending radius (mm)	With supporting wire		240		
	Without supporting wire	metallic	Dynamic: 30 Static: 15		
		non-metallic	Dynamic: 50 Static: 15		Dynamic: 50 Static: 50
Standard length (m)			500		

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

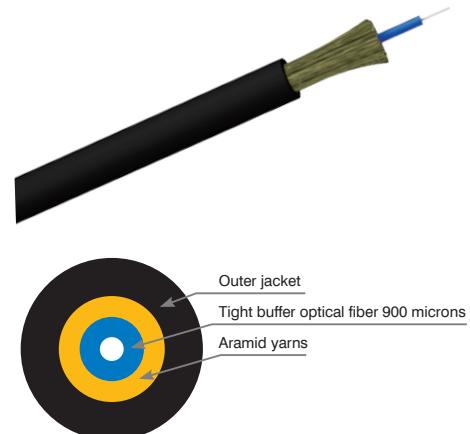
Drop

G.657. B3

Round Drop Cable

Specification

Item		Specification	
Optical fiber		BLI G.657.B3	
Fiber coating		Acrylate	
Tensile Strength Yarns		Aramid yarns	
Rip cord		A Rip Cord must be inserted	
Cable flammability rating		Optical Cable with LSZH jacket	
Dimension	Number of optical fiber	1	
	Nominal diameter (mm)	3.0 ± 0.2	
	Nominal mass (kg/km)	8	
Operation Temperature (°C)		-30 to 70	
Maximum installation load (N)		500	



Riser for MDU

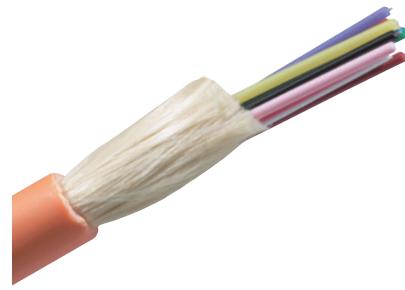
G.652. D

G.657. A1

ACCUMAX Distribution Cable

Features and Benefits

- Easy handling
- Faster, easier cable preparation
- Cable fiber counts are 2 to 144
- Various fiber types are available
- Flame testing proved that ACCUMAX LS0H cables meet the IEC60332-3C and UL 1666 standards
- Smoke tests prove that ACCUMAX LS0H cables meet the IEC601034-2 standard



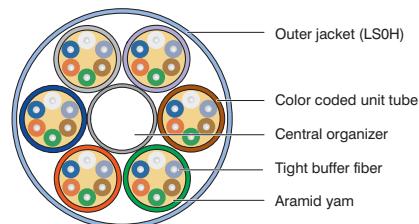
Specification

Item	Specification													
	Single tube						Multi tube							
Fiber count	2	4	6	8	12	18	24	18	24	36	48	72	96	144
Outer diameter (mm)	4.0	4.4	5.0	5.4	6.0	14.8	14.8	14.8	14.8	14.1	20.4	20.4	22.4	23.9
Unit fiber count			—				6			12				
Weight (kg/km)	14.3	17.1	22.5	28.5	30.8	48	82	171	166	163	313	332	528	458
Maximum pulling tension (N)	1223				1334				2224				2700	
Minimum bending radius (mm)	40	44	50	54	60	79	86	147	141	204	223	238		

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

*We can adapt the cable specification to LS0H, Riser, Plenum upon customer request.

Cross Sectional View



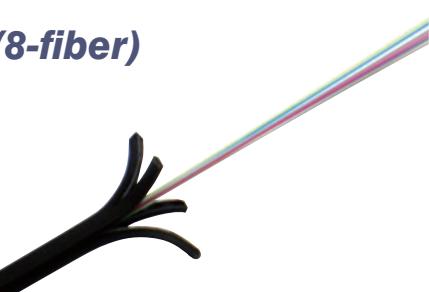
Riser for MDU

G.657. A1

G.657. A2

Cables for Pushing Installation

Low Friction Indoor Cable (8-fiber)



Features and Benefits

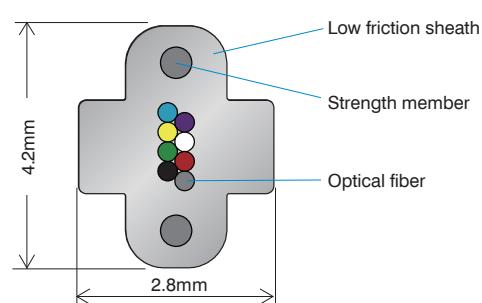
- Reduce friction coefficient over 75% *1
- Allows pushing installation
- High flame retardant cable for MDU network
- LS0H (Low-Smoke Zero Halogen) cable

*1 Compared to conventional indoor cable

Specification

Construction

Item	Specification
Cable type	Indoor cable
Fiber type	G.657.A1
Fiber diameter (μm)	250
Fiber count	8
Cable dimension (WxH mm)	2.8 x 4.2
Strength member	Steel wire
Weight (kg/km)	15
Maximum pulling tension (N)	200
Minimum bending radius (mm)	Dynamic: 165, Static: 50
Standard length (m)	400



* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Indoor

G.657. A1

G.657. A2

Cables for Pushing Installation**Low Friction Indoor Cable (1 or 2-fiber)**

Structure, features and guidance for selection is specified in indoor cable ITU-T recommendation (L.103)

Features and Benefits

- Downsized to 50% (1 fiber cable) *1
- Reduce friction coefficient over 75% *1
- Allows pushing installation into ducts
- High flame retardant solution for MDU network
- LS0H (Low Smoke Zero Halogen) cable
- Easy jacket removal with nippers

*1 Compared to conventional indoor cable

**Construction**

Twisted and tangled free packing

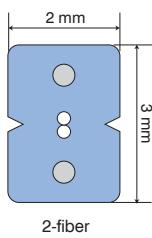
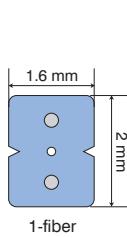
Pushing installation available



Multi-cable installation in a pipe

Specification

Item	Specification	
Cable type	Indoor cable	
Fiber count	1	2
Cable dimension (WxH mm)	1.6 x 2	2 x 3
Strength member (mm)	Steel wire : $\phi 0.5 \times 2$	
Weight (kg/km)	7	11
Maximum pulling tension (N)	200	
Minimum bending radius (mm)	Dynamic : 30, Static : 15	
Standard length (m)	1000	500



G.657. A1

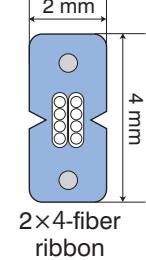
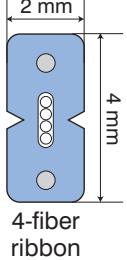
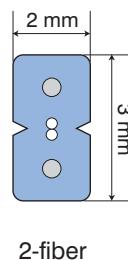
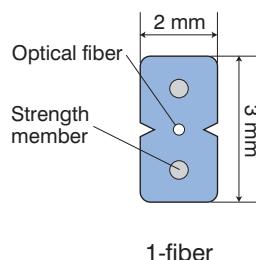
G.657. A2

Indoor**Indoor Cable****Features and Benefits**

- Time proven technologies with long supplied record
- Easy jacket removal without special tools
- Compact cable size
- Available with flame retardant jacket
- Available from 1 to 8-fiber counts

**Specification**

Item	Specification					
Cable type	Indoor cable					
Fiber count	1	2	4	8		
Cable dimension (WxH mm)	2x3		2x4			
Strength member (mm)	Metallic	Steel wire: $\phi 0.4$				
	Non-metallic	FRP: $\phi 0.5$				
Weight (kg/km)	10	11				
Maximum pulling tension (N)	Metallic	147				
	Non-metallic	60				
Minimum bending radius (mm)	Dynamic: 30 Static: 15		Dynamic: 50 Static: 50			
Standard length (m)	500					

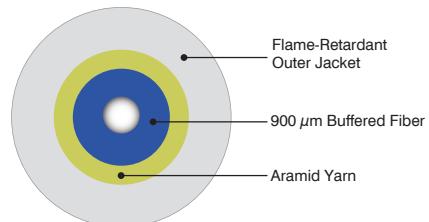


* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

EZ-Bend Cable

Features and Benefits

- 3.0 and 4.8 diameter ruggedized cordage
- Less than 0.1 dB macrobending attenuation at 1550 nm for 1 turn at 5 mm fiber bend radius
- Less than 0.3 dB macrobending attenuation at 1550 nm when subjected to MDU Simulation Test called out by Verizon TPR.9424 FOC Document
- Solid construction fiber with macrobending performance far better than ITU G.657B requirements
- Backward compatible with installed G.652D fibers
- Conform to UL® Riser and Plenum fire ratings
- Compliant with Telcordia 409 & ICEA S-83-596 requirements
- Dry water-blocked core to protect against water ingress
- Reinforced solid jacket construction naturally limits cable bending to control macrobending attenuation and protect fiber reliability
- “Copper-like” installation process: Can be routed around corners using familiar copper wire practices, and stapled
- Faster, easier installation: no extra steps to install bend limiters, conduits, or raceways
- Compact installation and storage: Conforms to building; slack fits in small spaces



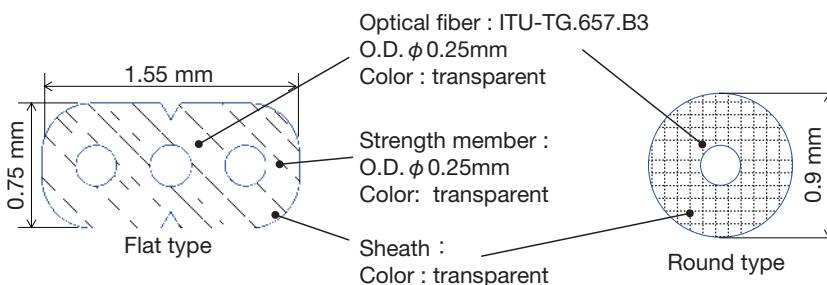
EZ-Bend Ruggedized Optical Cable Cross-Section

- Fast, easy, low loss splicing to G.652D fiber with existing core and clad aligned splice equipment
- Familiar, standard connector termination: Solid fiber construction can be terminated using standard optical connectors and polishing techniques
- Familiar connector endface cleaning using same process as with existing G.652 solid construction fiber
- Greener Solution: Free of heavy metals and RoHS-compliant; solution uses fewer total materials and energy than copper solutions

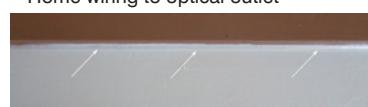
Specification

Item	Specification		
Flame performance	Riser	UL 1666 compliant	
	Plenum	NFPA 262 (UL 910) compliant	
	Dual rated	IEC-3C and UL 1666	
	Non-Halogen	IEC 60332-3c and IEC 61034-2 compliant	
Mechanical and environment performance		Telcordia GR-409, ICEA S-83-596 compliant	
Temperature range	Installation (°C)	0 to 40	
	Operation (°C)	-40 to 70	
	Storage (°C)	-40 to 70	
Maximum tensile rating (N)		440	
Maximum attenuation	@1310nm (dB/km)	0.4	
	@1550nm (dB/km)	0.3	
Typical attenuation	@1310nm (dB/km)	0.35	
	@1550nm (dB/km)	0.25	

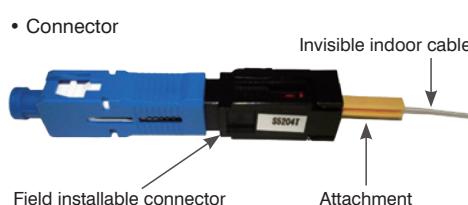
Invisible Indoor Cable



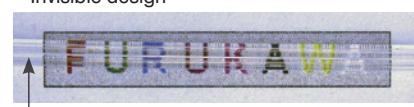
- Home wiring to optical outlet



Invisible wiring

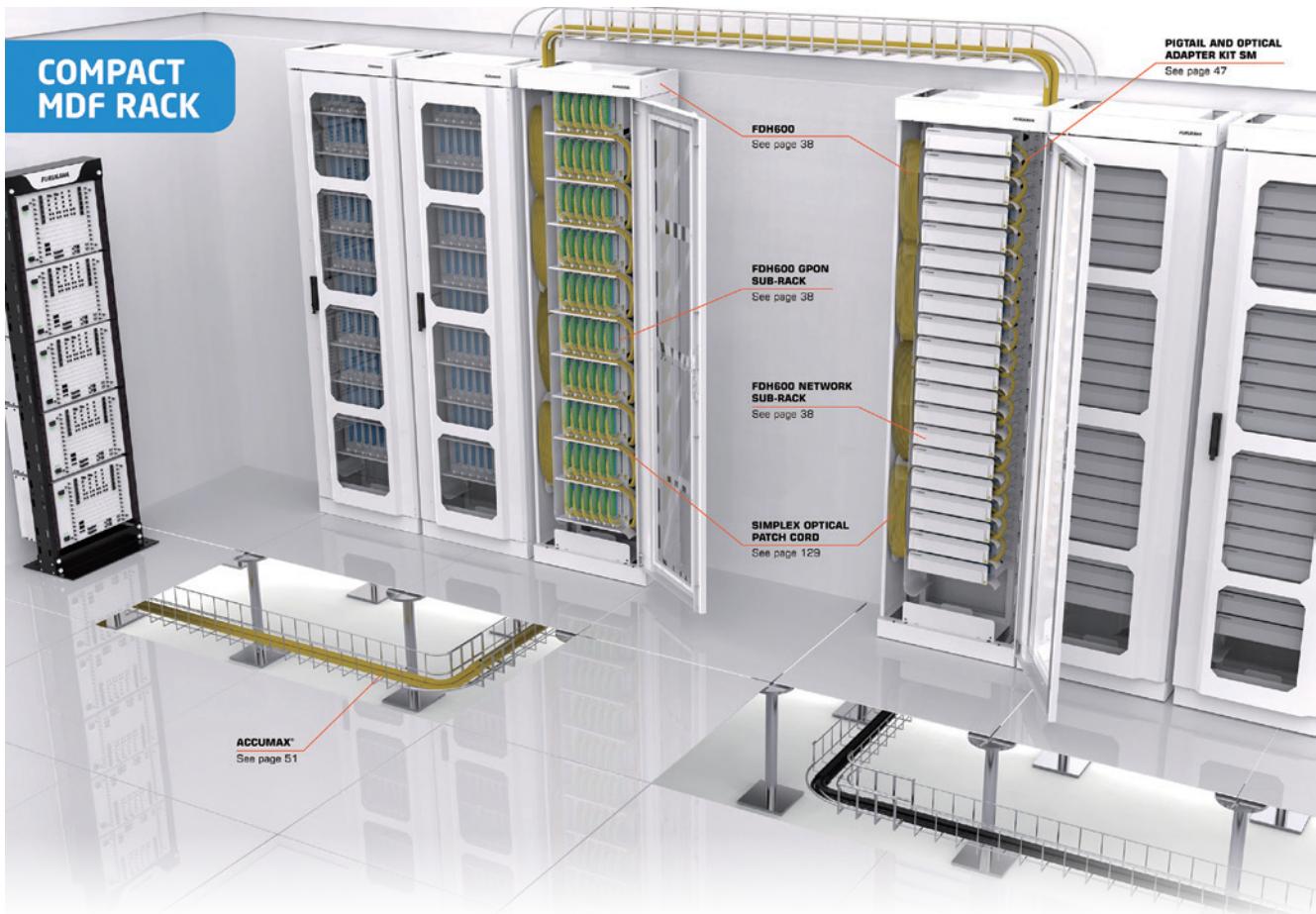


- Invisible design



Products for Central Office

Central Office



Central Office

Patch Panel (SD Series)

Specification

Item		Specification			
Number of positions	24	48	100	100	
Dimension (H×W×D mm)	44 (1U)×480×415	88 (2U)×480×450	177 (4U)×480×500	113.5 2.5U)×480×380	
Model	Fixed type or Slide type	Fixed type or Slide type	Fixed type	Fixed type	
Connector type	SC	SC	SC	SC and RJ45	
Cable entry	Φ ≤ 18mm	2	2	4	Cord entry
Splicing type	Single fiber pigtail cord 4-fiber FO pigtail cord 4-fiber FO module (pre-installed)				No splicing (cord wiring directly)



Ordering Description

SD19P-XXX-NNN-Y-ZZ
 XXX=Splicing type (S=Single fiber pigtail cord, FO=4-fiber FO pigtail cord, FoM=4-fiber FO module (pre-installed) or CO=cord wiring directly)
 NNN=Number of positions (24, 48, 100 or 100(SC/RJ45))
 Y=Model (S=Slide type or H=Fixed type)
 ZZ=Fiber type (SM or GI)

Patch Panel (Fiber Distribution Frame)

ODF BT48

Specification

Item	Specification
Dimension (H×W×D mm)	44.45(1U)×484×290
Color	Light grey (RAL 7035)
Number of positions	Up to 48 fibers
Product body material	Steel SAE1020
Connector type	SC
Polishing type	APC or PC (UPC or SPC)
Cable type	Loose tube optical cable

Ordering Description

ODF BT48 12F SM SC-APC - TELCORDIA
ODF BT48 24F SM SC-APC - TELCORDIA
ODF BT48 36F SM SC-APC - TELCORDIA
ODF BT48 48F SM SC-APC - TELCORDIA
ODF BT48 12F SM SC-UPC - TELCORDIA
ODF BT48 24F SM SC-UPC - TELCORDIA
ODF BT48 36F SM SC-UPC - TELCORDIA
ODF BT48 48F SM SC-UPC - TELCORDIA



ODF BT72

Specification

Item	Specification
Dimension (H×W×D mm)	88.9 mm (2U)×484×255
Color	Light grey (RAL 7035)
Number of positions	Up to 72 fibers
Product body material	Steel SAE1020
Connector type	SC
Polishing type	APC or PC (UPC or SPC)
Cable type	Loose tube optical cable

Ordering Description

ODF BT72 - Basic module
ODF BT72 72F SM SC-APC TELCORDIA - Full
ODF BT72 72F SM SC-UPC TELCORDIA - Full



Other configurations upon request.

ODF B144

Specification

Item	Specification
Dimension (H×W×D mm)	177.8 mm (4U)×496×465
Painting type	Powder epoxy painting with high resistance to scratch
Color	Black
Number of positions	144 positions (36 positions per U)
Number of fibers	Up to 144 fibers

Ordering Description

ODF B144 - Basic module
ODF B144 144F SM SC-APC D0.9 - Complete



MODULAR SUB-RACK ODF 144F

Specification

Item	Specification	
Dimension (H×W×D mm)	4U×19"×365	
Capacity	Cards	12
	Fibers	144 (12 F per card)

Ordering Description

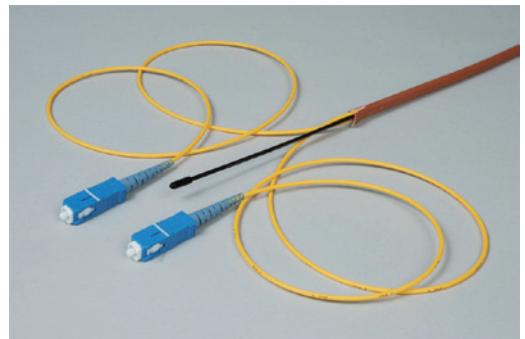
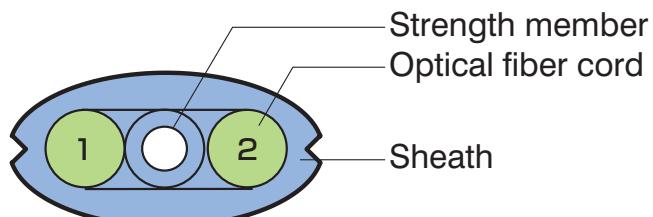
Modular Sub-rack ODF 144F
12F Card for 144 Modular Distribution Frame
Sub-rack SC-APC Complete

Other configurations upon request.



12F CARD FOR 144 MODULAR DISTRIBUTION FRAME

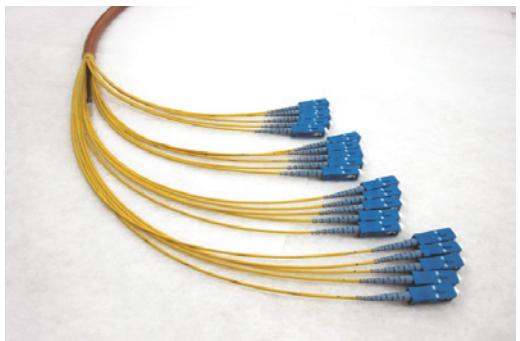
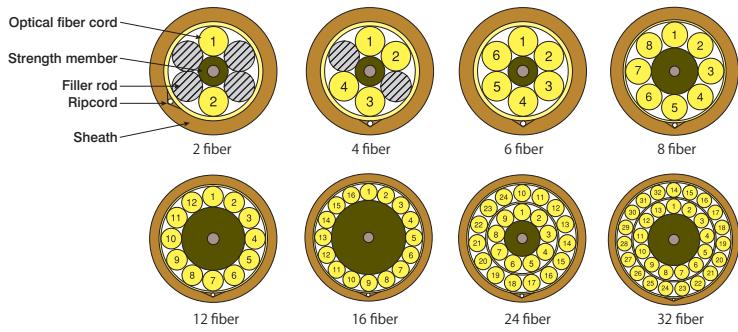
Optical Fiber Cord Cable with Connectors



Specification

Item	Specification	
	Fiber Count	
Dimension (W×H mm)	26 6.5×3.5	4 10.7×5.1
Cord diameter (mm)		1.7
Weight (kg/km)	30	70
Maximum pulling tension (N)		150
Minimum bending radius (mm)	40	60

Premise Cable with Connectors



Specification

Item	Specification							
	Fiber Count							
	2	4	6	8	12	16	24	32
Cord diameter (mm)				1.7				
Outer diameter (mm)	7.2		8.3		10.5	12.8	12.5	15.0
Weight (kg/km)	45		60		95	135	120	170
Maximum pulling tension (N)		150				300		440
Minimum bending radius (mm)	75		85		110		130	150

Central Office

Closure, Cabinet and Splitter

Optical connection management presents many challenges depending on the location and conditions of the network. Wide variety connectivity products from Furukawa Electric fulfill the needs, designed to serve business, SFU, and MDU and many more applications. Our connectivity offer also includes closure and cabinet with various types of splitters inside.

■Closure

Application	Product name	Max. connection/Method		Splitter*	Appearance	Page
		Fusion splice (Individual fiber)	Connector (Single)			
Underground	J363N	150	—	1x4 1x8		31
	J380N <T12>	48	—	—		31
	J380N <T9>	64	—	—		31
Aerial	J396L3 <PO4>	72	—	1x4 1x8		32
	J396L3 <PO6>	120	—	1x16		32
	J397	10	—	1x4 1x8		32
Pole Mount	SlimBox™ Drop Terminal - FC-CTO-16MC	64 Fusion splice and 0 Connector with 4 splice trays 32 Fusion splice and 8 or 16 Connector with 2 splice trays and 1 connector tray		—		33
	Aerial Optical Splice Closure FK-CEO-4T-144F	144	—	—		33

*Allowable type of splitter inside the closure.

■Cabinet

Application	Product name	Max. connection/Method		Splitter*	Appearance	Page	
		Fusion splice (Individual fiber)	Connector (Single)				
MDU	Indoor	Slimbox™ 12-Fiber Internal Adapter Module	12	12(SC)	1x4 1x8		34
		Slimbox™ 12-Fiber Internal Adapter Module	12	12(SC)	—		34
		J420 SS/S/M	8/40/120	—	1x4 (SS/S/M) 1x8 (S/M) 1x16 (S/M) 1x32 (S/M)		35
	Termination	J421 SS/S/M/L	—	8/40/120/200 (SC)	1x4 (SS/S/M/L) 1x8 (S/M/L) 1x16 (S/M/L) 1x32 (S/M/L)		35
		J422 SS/S/M	—	8/40/120 (SC)	1x4 (SS/S/M) 1x8 (S/M) 1x16 (S/M) 1x32 (S/M)		35
		Cabinet E-SS	4 (4-fiber ribbon)	16 (SC)	1x4 1x8		36
	Outdoor	J423 S-SS	8	—	1x4 1x8		36
		J423 H-SS	8	—	1x4 1x8		36

*Allowable type of splitter inside the closure.

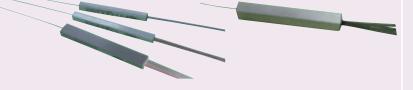
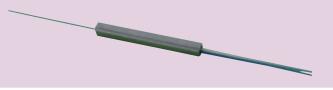
■Splitter module

	Application	Product name	Max. connection count	Splitter*	Appearance	Page
MDU	Indoor	Splitter Module	4/8 (SC)	1×4 / 1×8		37
	Indoor Outdoor	Splitter Module- WM	4/8 (SC)	1×4 / 1×8		37

	Application	Product name	Max. connection count	Splitter*	Appearance	Page	
			Fusion splice (Individual fiber)	Connector (Single)			
MDU/SFU	Indoor	J417	4	2 (SC)	—		38
		J425	—	2 (SC)	—		38
		J426	2	—	—		38
	Outdoor Demarcation point	J428N	—	1(SC)	—		39
		J418	4	—	—		39
		optical Roselite	2	2 (SC and LC-Duplex)	—		39

*Allowable type of splitter inside the cabinet.

■Splitter

Product name	Split	Dimension (mm) (Bare fiber type)	Appearance	Page
PS202	1×4, 1×8 1×16 1×32 2×4, 2×8 2×16 2×32	W4×D4×L50 W5×D4×L50 W7×D4×L50 W4×D4×L50 W5×D4×L60 W7×D4×L60		40
PS202	2×1×8	W6 x D4 x L40		40

Other passive products are also available. Please contact us for more details.

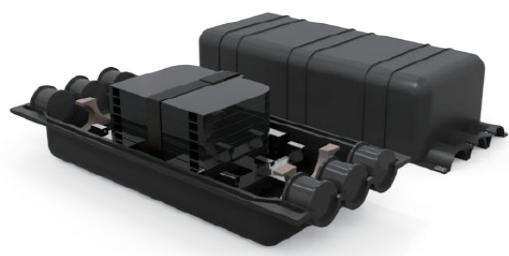
Underground

Aerial

Optical Splice Closure J363N

Features and Benefits

- Underground application
- Allows installation in hand hole (Small size)
- High fiber counts connection
- Enable to accommodate water immersion sensor (Optional)

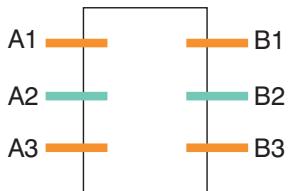


Specification

Item		Specification	Remark
Product No.		J363N <T9>	—
Dimension (H×W×L mm)		200×200×550	—
Weight (kg)		11	—
Water proof		IPX7	—
Environmental condition		Temperature: -20 to +60°C Humidity: 0 to 100%RH	—
Max. cable entry	Cable size	Φ 7-30 mm	2 cables/side
		Φ 8-35 mm	1 cables/side
Max. fiber splices	Strength member outer diameter (mm)		Information for cable outer diameter is required
	≤ 6		—
Max. fiber splices	Single fiber	150	10 splices/tray
	2-fiber ribbon	300	10 splices/tray
Max. fiber splices	4-fiber ribbon	600	10 splices/tray
	8-fiber ribbon	1200	10 splices/tray
Applicable splitter		1×4, 1×8	—

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Installation



Position	Applicable cable size	Position	Applicable cable size
A1 (mm)	Φ 7-30	B1 (mm)	Φ 7-30
A2 (mm)	Φ 8-35	B2 (mm)	Φ 8-35
A3 (mm)	Φ 7-30	B3 (mm)	Φ 7-30

Underground

Aerial

Optical Splice Closure J380N

Features and Benefits

- Underground application
- Up to 64 for singlefiber splicing. 40 for 4-fiber ribbon splicing
- Allows installation in hand hole (Small size)

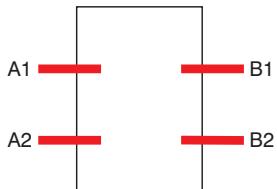


Specification

Item		Specification	
Product No.		J380N<T12>	J380N<T6>
Dimension (H×W×L mm)		130×155×350	
Water proof		IPX7	
Environmental condition		Temperature: -20 to 60°C Humidity: 0 to 100%RH	—
Max. cable entry	Φ 8-24 mm	2 cables/side	
Max. fiber splices	Single fiber	48(12 splices/tray)	64(8 splices/tray)
	2-fiber ribbon	96(12 splices/tray)	128(8 splices/tray)
Max. fiber splices	4-fiber ribbon	160(10 splices/tray)	160(5 splices/tray)

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Installation



Position	Applicable cable size	Position	Applicable cable size
A1 (mm)	Φ 8-24	B1 (mm)	Φ 8-24
A2 (mm)	Φ 8-24	B2 (mm)	Φ 8-24

Aerial

Aerial Closure J396L3

Features and Benefits

- Small size and light weight
- Up to 240 fiber splicing (Max. 400 fiber splicing)
- Suitable for FTTx construction
- Ease of installation
- Able to place closure over the installed cable
- Wide wiring space allows ease of operation
- 1×8 splitter module installable as well as bare splitter

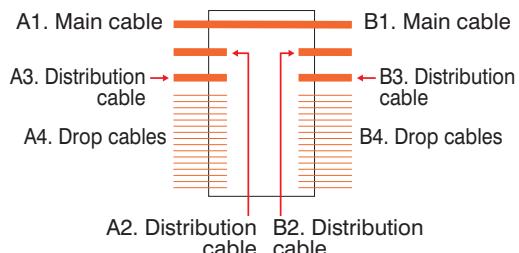


Specification

Item		Specification		Remark
Product No.		J396L3<P04><SP0> J396L3<P06><SP0>		—
Dimension (H×W×L mm)		110×110×860		—
Weight (kg)		2		—
Water proof		IPX4		—
Environmental condition		Temperature: -20 to +60°C Humidity: 0 to 100%RH		—
Max. fiber splice capacity	Main cable	Φ 8-24 mm	1 cable/side	—
	Distribution cable	Φ 8-18 mm	2 cables/side	—
	Drop cable		16 cables/side	—
	Single fiber	72	120	24 splices/tray
	2-fiber ribbon	120	200	20 splices/tray
Applicable splitter type(Bare splitter)	4-fiber ribbon	240	400	20 splices/tray
	8-fiber ribbon	240	400	10 splices/tray
Applicable splitter type(Bare splitter)		1×4, 1×8, 1×16		Installed in fiber tray
Max. count of 1×8 splitter module		2 sets	—	SC connector interface

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Installation



Position	Applicable cable type	Position	Applicable cable type
A1	Main cable	B1	Main cable
A2	Distribution cable	B2	Distribution cable
A3	Distribution cable	B3	Distribution cable

Aerial

Aerial Closure J397

Features and Benefits

- Ultra Small size and light weight
- Up to 10 fiber splicing
- Suitable for FTTx construction
- Ease of installation
- Able to place closure over the installed cable
- Sealing is just to cover with sleeve

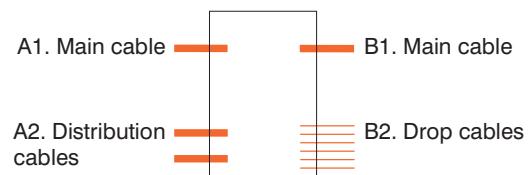


Specification

Item		Specification		Remark
Product No.		J397<FULL><SP0>		—
Dimension (H×W×L mm)		70×110×550		—
Weight (kg)		2		—
Water proof		IPX4		—
Environmental condition		Temperature: -20 to +60°C Humidity: 0 to 100%RH		—
Max. fiber splice capacity	Main cable	Φ 8-16.5 mm	1 cable/side	—
		Φ 3.3×7 mm	1 cable/side	Rural area cable
	Distribution cable	Φ 8-11.5 mm	2 cables/side	—
	Drop cable		6 cables/side	—
	Single fiber	10	10 splices	
Applicable splitter	2-fiber ribbon	20	10 splices	
	4-fiber ribbon	40	10 splices	
	Applicable splitter	1×4, 1×8	Installed in fiber tray	

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Installation



Position	Applicable cable type	Position	Applicable cable type
A1	Main cable	B1	Main cable
A2	Distribution cable or Drop cable	B2	Distribution cable or Drop cable

Pole Mount

SlimBox™ Drop Terminal - FK-CTO-16MC

Specification

Item	Specification
Dimension (H×W×D mm)	300×220×100
Body material	Reinforced thermoplastic
Color	Black
Input cable diameter	5~15 mm
Output cable diameter	Circular : 16 cables 4.5~5.3 mm Flat : 16 cables 2~3 mm

Ordering Description

SlimBox™ Drop Terminal (FK-CTO-16MC - Basic Module)
SlimBox™ Drop Terminal (FK-CTO-16MC - with 1 Splice Tray, 1 Tray with 8 Adapters SC-APC and 1 Splitter 1X8 NC/SC-APC)
SlimBox™ Drop Terminal (FK-CTO-16MC - with 1 Splice Tray, 1 Tray with 16 Adapters SC-APC and 1 Splitter 1X16 NC/SC-APC)
Splice Tray for Optical Termination Box FK-CTO-16-MC
Connectors Tray with 16 SC-APC Adapters Without Shutter (FK-CTO-16MC)
Connectors Tray with 8 SC-APC Adapters Without Shutter (FK-CTO-16MC)
Drop Cable Grommets and Supports Kit for Network Access Point FK-CTO-16MC
Round Cable Grommet Kit (FK-CTO-16MC)
Strand Installation Kit (FK-CTO-16MC)



Connector Tray



Grommets Kit

Pole Mount

Optical Splice Closure FK-CEO-4T-144F

Specification

Item	Specification
Dimension (H×D mm)	450×230
Color	Black
Input cable diameter	10 to 17 mm
Derivation cable diameter	8 to 17.5 mm
Number of oval ports	1
Number of derivation ports 04	4
Installation	Aerial
Sealing type	Heat-shrink

Ordering Description

Aerial Optical Splice Closure FK-CEO-4T-144F
Splice Tray 24F for FK-CEO
FK-CEO Mounting Kit for Pole and Wall
FK-CEO Mounting Kit for Wire Rope



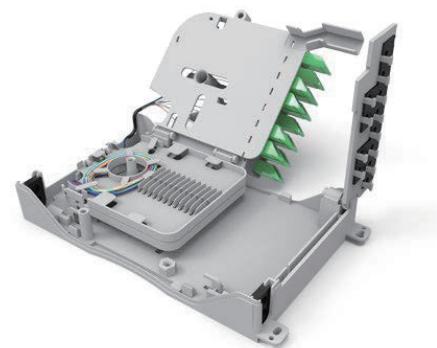
Slimbox™ 12-Fiber Internal Adapter Module

Specification

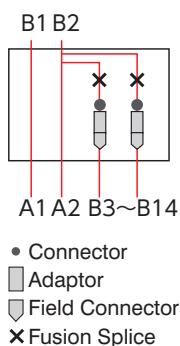
Item	Specification		
Dimension (H×W×D mm)	220×130×70		
Output cable diameter	SC-APC Adapters	12	
	Fusion Splices	12	
	PLC Splitters	1x8 1x4	1 2

Ordering Description

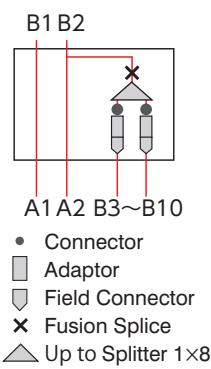
- SlimBox™ 12-Fiber Internal Adapter Module (CEIP 12 - Basic Module)
- SlimBox™ 12-Fiber Internal Adapter Module (CEIP 12 - with 12 Pigtails)
- SlimBox™ 12-Fiber Internal Adapter Module (CEIP 12 - with 1 Splitter 1x8)



Wiring Diagram



If installed on building base
 A1 and A2 : Drop Outdoor
 B1 and B2 : Riser
 B3~B14 : Drop indoor (up to 12 Outputs)



If installed on building base
 A1 and A2 : Drop Outdoor
 B1 and B2 : Riser
 B3~B10 : Drop indoor

If installed on building floor
 A1 and A2 : Riser
 B1 and B2 : Riser
 B3~B10 : Drop indoor

Slimbox™ 12-Fiber External Adapter Module

Specification

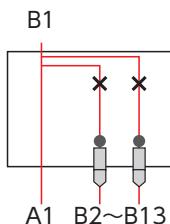
Item	Specification
Dimension (H×W×D mm)	220×130×70
Color	Light grey
Connector type	SC
Cable type	Tight buffer, loose tube and micro-module
Fiber type	Single-mode G-652B, G-652D or G-657A
Number of positions	12 positions
Product body material	Highly resistant plastic

Ordering Description

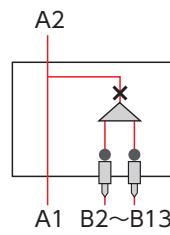
- SlimBox™ 12-Fiber External Adapter Module (BW 12 - Basic Module)



Wiring Diagram



A1 : Riser
 B1 : Riser
 B2~B13 : Drop indoor (up to 12 outputs)

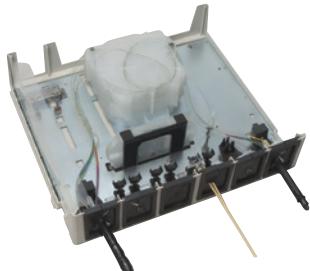


A1 : Riser
 B1 : Riser
 B1~B13 : Horizontal Cable
 • Connector
 □ Adaptor
 ▽ Field Connector
 ✕ Fusion Splice
 ▲ Up to Splitter 1x8

Termination Box – J420, J421, J422

Features and Benefits

- Wide product range for various type of MDU
- J420 series: Suitable for MDU application with fusion splice
- J421 series: Suitable for installing slotted core cable (4-fiber ribbon)
- J422 series: Suitable for MDU application with SC connector
- Easy to re-wire by adopting SC connector



J420-SS/J420-S/J420-M



J421-SS/S/M/L



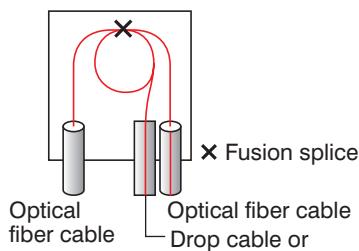
J422-SS/J422-S/J422-M

Specification

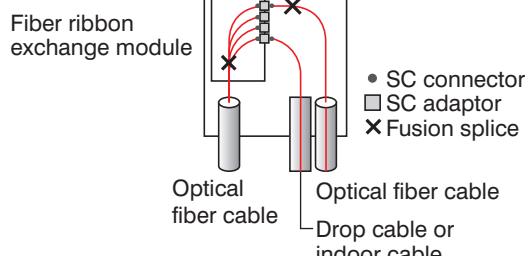
Item		Specification									
Product No.		J420-SS	J420-S	J420-M	J421-SS	J421-S	J421-M	J421-L	J422-SS	J422-S	J422-M
Dimension (W×H×D mm)		326×218×63	440×390×100	440×850×100	326×218×63	440×390×100	440×850×100	470×1500×140	326×218×63	440×390×100	440×850×100
Weight (kg)		2	5	11	2	5	11	35	2	5	8.5
Flame retardance		UL94, V-0			UL94, V-0			UL94, V-0			
Mount condition		Indoor wall mount type			Indoor wall mount type			Indoor wall mount type			
Cable entry position		Bottom			Bottom			Top and Bottom	Bottom	Top and Bottom	
Cable entry		3	6	6	2	6	6	Top: 6 Bottom: 6	3	Top: 1 Bottom: 6	Top: 1 Bottom: 6
Max. cable count	Optical cable (~Φ 23mm)	1 per cable entry			1 per cable entry			1 per cable entry			
	Drop cable or Indoor cable	6 per cable entry			6 per cable entry			6 per cable entry			
Max. 4-fiber ribbon joint count (Cable in)		—	—	—	2	10	30	50	2	10	30
Max. single fiber joint count		8	40	120	—	—	—	—	8	40	120
Max. SC connector joint		—	—	—	8	40	120	200	8	40	120
Applicable splitter		1×4	1×4, 1×8, 1×16, 1×32	1×4	1×4, 1×8, 1,16, 1×32			1×4	1×4	1×4, 1×8, 1,16, 1×32	

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

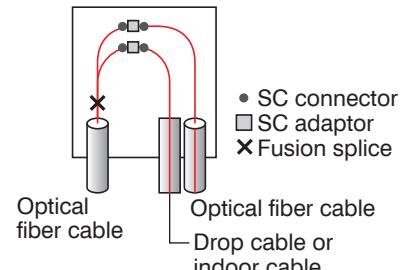
Wiring Diagram



J420



J421

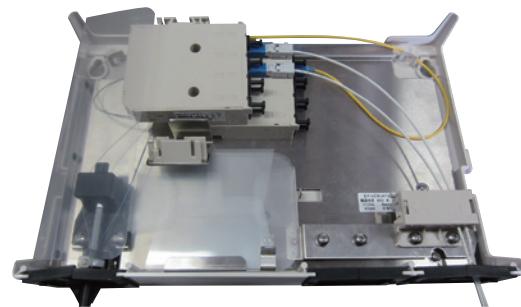


J422

Termination Box - E Cabinet-SS

Features and Benefits

- Able to install various modules into the cabinet depending on usage
- Easy to re-wire by adopting SC connector
- Max. connector counts: 16 SC connector joints

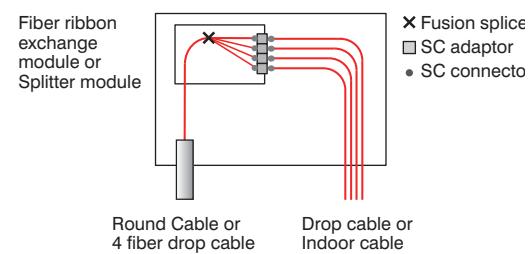


Specification

Item	Specification	
Product No.	E Cabinet-SS	
Dimension (W x H x D mm)	326×218×63	
Weight (kg)	2	
Flame retardance	UL94, V-0	
Mount condition	Indoor wall mount	
Cable entry	Bottom	
Max. cable count	Cable in	Optical cable (~Φ 13.5mm): 1 or 4-fiber drop cable: 1
	Cable out	Drop cable or indoor cable: 16
Max. 4-fiber ribbon fusion splice count	Cable in	4
Max. SC connector joint count	Cable out	16
Applicable splitter module	1x4, 1x8	

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Wiring Diagram



- (a) 8 SC Module×2PC : 4-fiber×4 splice
- (b) 4 SP Module×2PC : singlefiber×2 splice
- (C) 8 SP Module×2PC : singlefiber×2 splice

Termination Box - J423H-SS

Features and Benefits

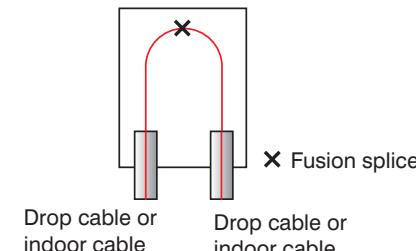
- For small MDU
- Wall mount type
- Light weight
- Max. fusion splice: 8-fibers



Specification

Item	Specification	
Product No.	J423H-SS	
Dimension (W×H×D mm)	156×151×69	
Weight (kg)	0.3	
Flame retardance	UL94, V-0	
Mount condition	Indoor/outdoor wall mount type	
Water proof	IPX3	
Cable entry position	Top, Bottom, Right	
Cable entry	Main cable: 2 (cable width: 2mm) Drop cable/indoor cable: 8	
Max. cable count	Main cable	1 per cable entry
	Drop cable or Indoor cable	1 per cable entry
Max. single fiber fusion splice count	8	
Applicable splitter	1x4, 1x8	

Wiring Diagram



*1 Except for plastic cover

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Splitter Module

Features and Benefits

Splitter Module (indoor type)

- Indoor wall mount type
- Ultra small and light weight
- Easy access with SC connectors
- Mounting direction is changeable depending on situations
- Easy fixing on a steel cabinet with magnets



Specification

Item	Specification	
Product No.	Splitter Module-4	Splitter Module-8
Dimension (W×H×D mm)	94×29×57	102×29×77
Weight (kg)	0.2	
Flame retardance	UL94, V-0	
Mount condition	Indoor wall mount type	
Water proof	—	
Insertion loss (dB)*1	≤ 8.9	≤ 12.4
Connector type	SC	

*1 Including insertion loss of connectors

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

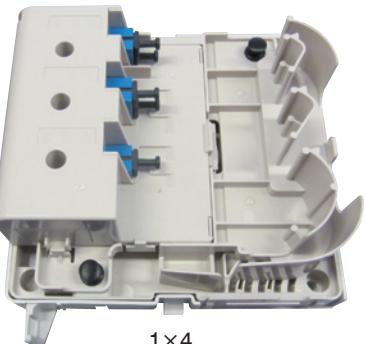


Splitter Module (indoor type)

Features and Benefits

Splitter Module WM (indoor/outdoor type)

- Suitable for small size apartment
- Attachable on external wall of apartment
- Small and light weight
- Easy access with SC connectors
- Water proof of IPX3



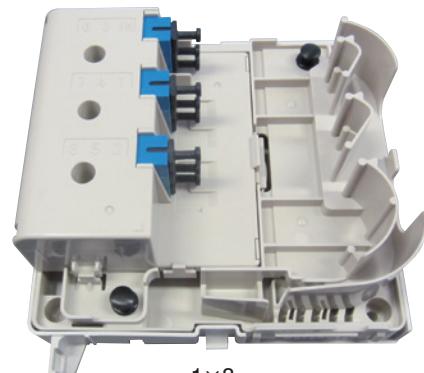
1x4

Specification

Item	Specification	
Product No.	Splitter Module WM-4	Splitter Module WM-8
Dimension (W×H×D mm)	156×151×69	
Weight (kg)	0.5	
Flame retardance	UL94, V-0	
Mount condition	Indoor/outdoor wall mount type	
Water proof	IPX3	
Insertion loss (dB)*1	≤ 8.9	≤ 12.4
Connector type	SC	

*1 Including insertion loss of connectors

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.



1x8

Splitter Module (indoor/out door type)

Splicing Box – J417, J425, J426

Features and Benefits

J417

- Outdoor application: IPX3 (IEC60529)
- Wall mount type
- Compact size: W115×H200×D30 mm
- Light weight by plastic body and cover
- SC connector termination is available (optional)
- Max. fusion splice: 4-fibers



Features and Benefits

J425

- Outdoor application: IPX3 (IEC60529)
- Wall mount type
- Compact size: W77×H183×D37 mm
- Light weight by plastic body and cover
- SC connectorized drop or indoor cable termination (Max. 2 connectors) or KANTAN SC
- For bend insensitive (R15) fiber
- Can be used indoor (Flame retardant material)
- Both outdoor/indoor use



Features and Benefits

J426

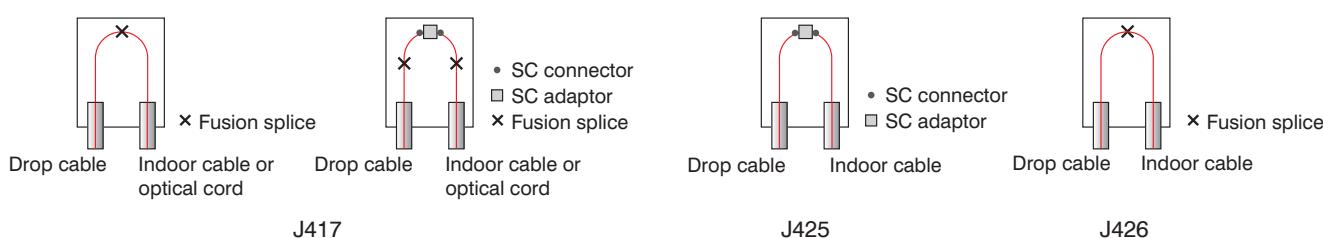
- Outdoor application: IPX3 (IEC60529)
- Wall mount type
- Compact size: W65×H155×D26 mm
- Light weight by plastic body and cover
- SC connector termination (Max. 1 connector)
- Fusion splice: Max. 2-fibers
- For bend insensitive (R15) fiber
- Box color: Ivory, Brown, Grey



Item		Specification		
Product No.		J417	J425	J426
Dimension (W×H×D mm)		115×200×30	77×183×37	65×155×26
Weight (kg)		0.2	0.2	0.1
Flame retardance		Cover: UL94, V-2 Main body: UL94, HB Cable clamp: UL94, V-0	UL94, V-0	UL94, HB
Mount condition		Indoor/outdoor wall mount type	Indoor/outdoor wall mount type	
Water proof		IPX3	IPX3	
Cable entry position		Bottom: 2	Bottom: 2	
Max. cable count	Drop cable or Indoor cable	4 per cable entry	2 per cable entry	
	Optical cord (Φ 2 mm)	2 per cable entry		
Max. single fiber fusion splice count		4	—	2
Max. SC connector count		2	2	—

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Wiring Diagram



MDU/SFU

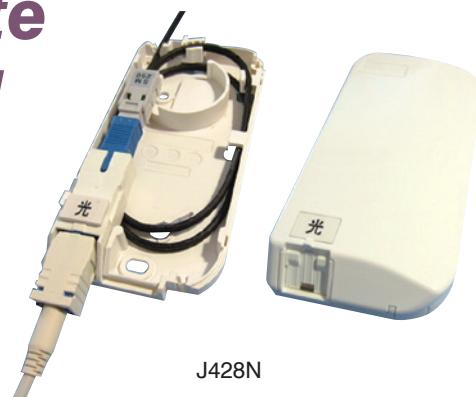
Indoor

Rosette

Optical Connector Rosette for FTTx Network – J428N

Features and Benefits

- Wall mounted indoor type
- Small size : W50 x H100 x D17 mm
- Allow drop / indoor cable entry from 4 directions
- For bend insensitive (R15) fiber
- Kantan SC connector termination (Max. 1 connector)
- SC adaptor with shutter



MDU/SFU

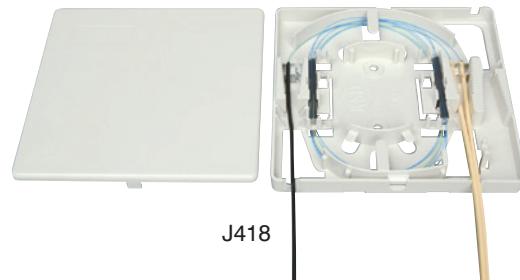
Indoor

Rosette

Splicing Box- J418

Features and Benefits

- Max. fusion splice: 4-fibers



MDU/SFU

Indoor

Rosette

Optical Rosette

Features and Benefits

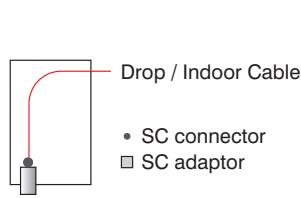
- Compatible to 4×2" boxes
- Can be installed in any vertical plane surface
- Easy to handle - articulated parts; removable piece to fix the cable; internal fiber guides
 - articulated parts
 - removable piece to fix the cable
 - internal fiber guides



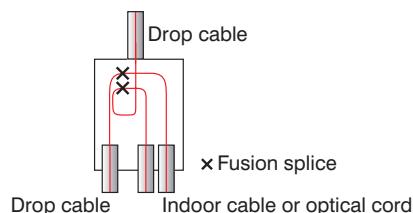
Features and Benefits

Item		Specification		
Product No.		J428N	J418	OPTICAL ROSETTE
Dimension (W×H×D mm)		50×100×17	120×115×16	114.9×79.8×22.5
Weight (kg)		0.1	0.1	0.1
Flame retardance		UL94, V-0	Cover: UL94, HB Main body: UL94, HB Cable clamp: I+94, V-0	UL94, V-0
Mount condition				
Cable entry position		Bottom: 1, Top: 1, Right:1, Left:1	Bottom: 2, Top: 1	Bottom: 2, Top: 2, Right:1, Left:1, Rear:1
Max. cable count	Drop cable or Indoor cable	1 per cable entry	4 per cable entry	1 per cable entry
	Optical cord (Φ2mm)	—	2 per cable entry	2 per cable entry
	Optical cord (Φ8mm)	—	—	1 per cable entry
Max. single fiber joint count		—	4	2
Connector type		SC	—	SC and LC-Dplex
Max. connector joint count		1	—	2

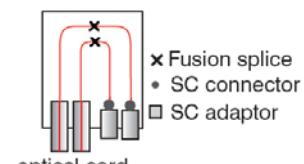
Wiring Diagram



J428N



J418



Optical Rosette

Compact PLC Splitter PS202-1xN and 2xN

PS202 is the compact 1xN and 2xN optical splitter using PLC (Planar Light-wave Circuit) and suitable for installation in optical equipments. PS202 is the best choice for constructing passive optical networks.

- Video signals distribution in optical CATV
- Usable for PON (Passive Optical Network)
- Signal-distribution using optical AMP

Features and Benefits

- Low insertion loss
- Compact packaging size. Suitable for installation in a splicing closure
- High reliability (Telcordia GR-1209, GR-1221 qualified)

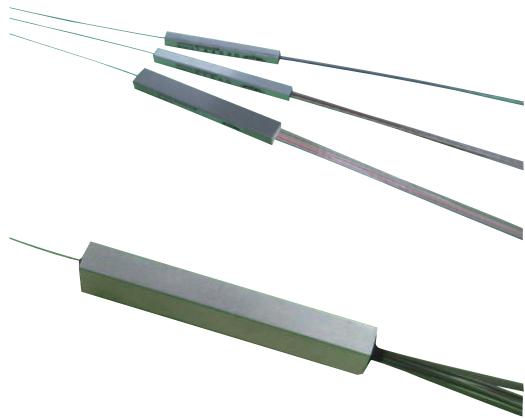
Specification

Item	Specification							
Operating wavelength (nm)	1260 to 1360/1480 to 1580							
Configuration	1×4	1×8	1×16	1×32	2×4	2×8	2×16	2×32
Insertion loss (dB)	≤ 7.8	≤ 11.0	≤ 14.5	≤ 17.8	≤ 7.8	≤ 11.2	≤ 14.5	≤ 17.8
Uniformity (dB)	≤ 1.0	≤ 1.0	≤ 1.5	≤ 2.0	≤ 1.2	≤ 1.5	≤ 2.0	≤ 2.0
Dimension (WxDxL mm)	4×4×40	4×4×40	5×4×50	7×4×50	4×4×50	4×4×50	7×4×60	7×4×60
PDL (dB p-p)	≤ 0.3							
Directivity (dB)	≥ 50							
Return loss (dB)	≥ 50							
Operating temperature (°C)	-40 to +75							
Fiber length (m)	≥ 2							

* Not including connectors in all specifications

* Available connector upon customer request

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.



Ordering Information

PS202-□

Configuration
1×4
1×8
1×16
1×32
2×4
2×8
2×16
2×32

Compact PLC Splitter PS202-2×1×N

PS202-2×1×N is the compact size optical splitter, which is capable to distribute a pair of video and data signals.

This product is preferable for the construction of PON (Passive Optical Network), and it realizes easier installation and higher-density packaging in a closure.

Features and Benefits

- Efficient for installation in a splicing closure
- Compact size (Same as 1×8 splitter in dimensions of package except 2×1×16)
- High reliability (Telcordia GR-1209,GR-1221 qualified)

Specification

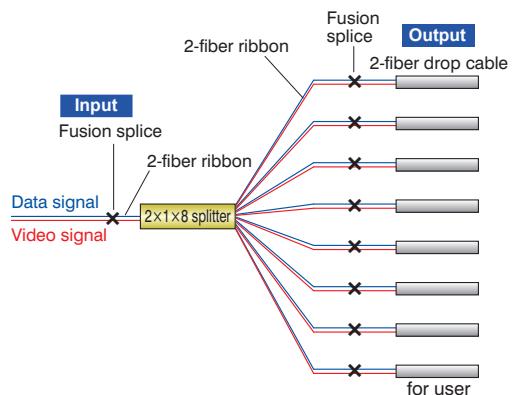
Item	Specification		
Configuration	2×1×4	2×1×8	2×1×16
Operating wavelength (nm)	1260 to 1360/1480 to 1580		
Insertion loss (dB)	≤ 8.0	≤ 11.0	≤ 14.5
Uniformity (dB)	≤ 1.0	≤ 1.0	≤ 1.5
Dimensions (WxDxL mm)	4×4×40	4×4×40	7×4×60
PDL (dB)	≤ 0.3		
Directivity (dB)	≥ 50		
Return loss (dB)	≥ 50		
Operating temperature (°C)	-40 to +75		
Fiber length (m)	Over 2m (standard)		

* Not including connectors in all specifications

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.



Example of System structure



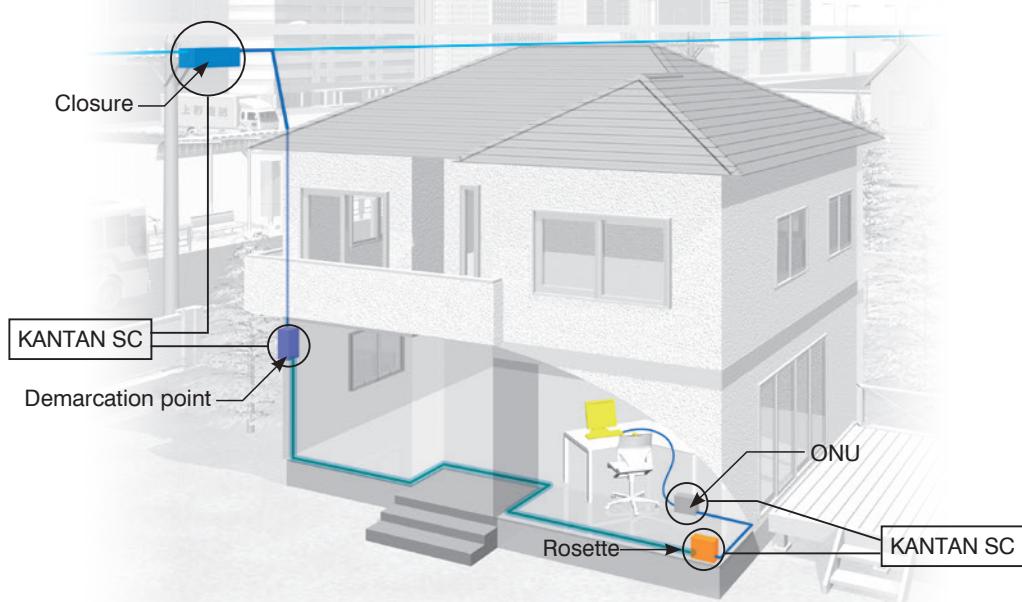
Ordering Information

PS202-□

Configuration
2×1×4
2×1×8
2×1×16

Optical Connector and Tools

High reliable optical connector offered by Furukawa Electric allows using inside the closure, optical termination box, demarcation point, and rosette. One of the Furukawa's innovative optical connector called "KANTAN SC" (field installable connector) with associated tools enables quick assembly with drop cable, indoor cable, and low friction cable at various places.



■Connector

Application	Product name	Picture	Page
Indoor Outdoor Closure Box (Demarcation point, Rosette, ONU)	KANTAN SC for Cable		42
	KANTAN SC for Fiber		42
	EZ! Connector for Round Cable		43
Indoor Box (Rosette, ONU)	Single-mode Fiber Connector Patch Cord		43
	Multi-Fiber Connector Patch Cord		44

■Tools

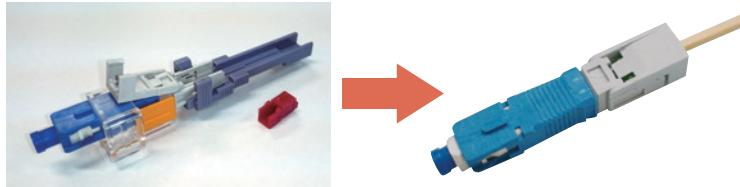
Application	Product name	Type	Picture	Page
KANTAN SC for Cable	FA-504	Fiber coating stripper		45
KANTAN SC for Fiber	S211B	Single fiber stripper		45
KANTAN SC	S326A	Fiber cleaver		46
KANTAN SC	S218R	Fiber coating thermal stripper		46

Indoor**Outdoor**

Field Installable Connector KANTAN SC Connector (for Drop/Indoor Cable)

Features and Benefits

- Quick and easy assembly time
- No polishing or no epoxy required
- Fully compatible with standard SC connector
- Low insertion loss



Specification

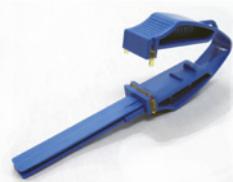
Item	Specification
Applicable cable diameter (mm)	3.1 x 2.0 (Drop/Indoor cable) 2.0 x 1.6 (Low friction indoor cable)
Polishing type	SPC polish, APC polish
Insertion loss (dB)	≤ 0.5 (SPC polish), ≤ 0.6 (APC polish)
Return loss (dB)	≥ 40 (SPC polish), ≥ 50 (APC polish)
Operating temperature (°C)	- 40 ~ + 75

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

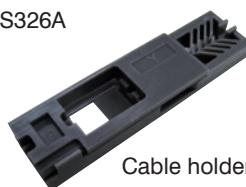
Tools for Assembly (Optional)



Fiber cleaver S326A



Fiber coating stripper FA-504



Cable holder FA-501B

Ordering Information

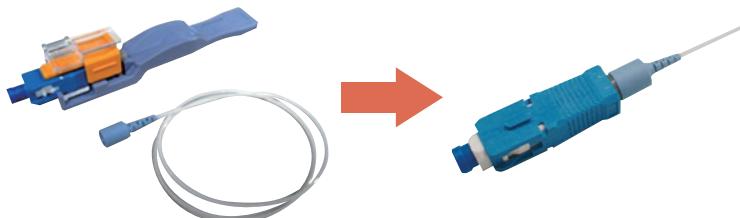
Type	Product Code
SPC polish, Drop/Indoor Cable	KSC/SPC-F-SM-250-IKY
APC polish, Drop/Indoor Cable	KSC/APC-F-SM-250-IKY

Indoor**Outdoor**

Field Installable Connector KANTAN SC Connector (for 0.25mm fiber)

Features and Benefits

- Quick and easy assembly time
- No polishing or no epoxy required
- Fully compatible with standard SC connector
- Low insertion loss



Specification

Item	Specification
Applicable fiber	Single Optical fiber (ITU-T G.652.B, G.652.D, G.657.A)
Applicable fiber diameter (μm)	250 ± 15
Polishing type	SPC polish, APC polish
Insertion loss (dB)	≤ 0.5 (SPC polish), ≤ 0.6 (APC polish)
Return loss (dB)	≥ 40 (SPC polish), ≥ 50 (APC polish)
Operating temperature (°C)	- 40 ~ + 75

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Tools for Assembly (Optional)



Fiber cleaver S326A



Fiber coating stripper S211B

Ordering Information

Item	Product Code	Remark
SPC polish, 250μm fiber	KSC / SPC-F-SM-250	with boot
SPC polish, 250μm fiber	KSC / SPC-F-SM-250-OB	without boot
APC polish, 250μm fiber	KSC / APC-F-SM-250	with boot
APC polish, 250μm fiber	KSC / APC-F-SM-250-OB	without boot

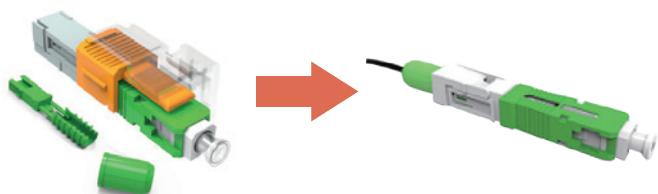
Indoor

Outdoor

Field Installable Connector EZ! Connector for Round Cable (3mm)

Features and Benefits

- Quick and easy assembly time
- No polishing or no epoxy required
- Fully compatible with standard SC connector
- Low insertion loss



Specification

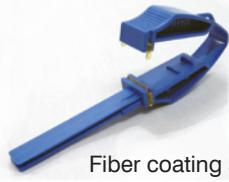
Item	Specification
Applicable cable diameter (mm)	round cable tight 3mm type
Polishing type	APC polish
Insertion loss (dB)	≤ 0.6 (APC polish)
Return loss (dB)	≥ 50 (APC polish)
Operating temperature (°C)	- 40 ~ +80

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Tools for Assembly (Optional)



Fiber cleaver S326A



Fiber coating stripper FA-504



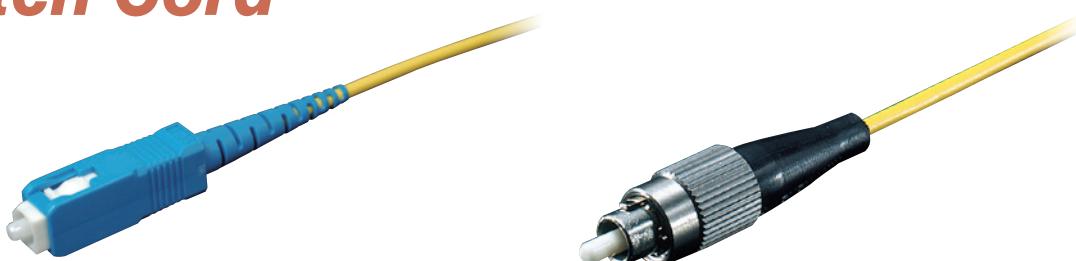
Cable holder FA-501B



Single Fiber Stripper S211B

Single-mode Fiber Connector Patch Cord

G.652. D
G.657. A1
G.657. A2



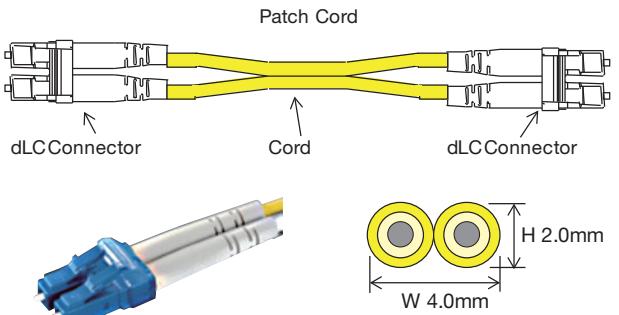
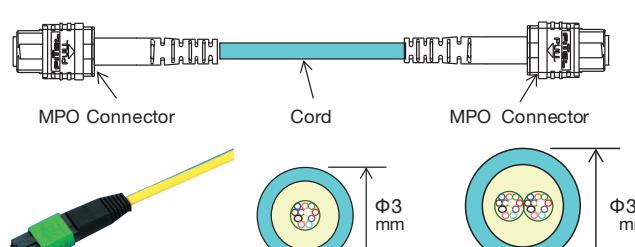
Specification

Connector	Polish	Applicable cord type			Connector insertion loss (dB)	Connector return loss (dB)
		Φ 1.5	Φ 1.7	Φ 2.0		
SC	PC	○	○	○	≤ 0.5	≥ 25
	SPC	○	○	○		≥ 40
	APC	○	○	○		≥ 60
FC	PC	○	○	○	≤ 0.5	≥ 25
	SPC	○	○	○		≥ 40
	APC	○	○	○		≥ 60

*Measured at 1310, 1550 nm wavelength

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Multi-Fiber Connector Patch Cord

Optical transmission	Standard	Distance	Fiber type	Connector	Patch Cord		
100G (4x25G) 2f WDM	ER4	40km	SM	dLC			
40G (4x10G) 2f WDM	ER4						
100G (4x25G) 2f WDM	LR4						
40G (4x10G) 2f WDM	LR4		10km				
100G (4x25G) 2f WDM	CWDM4						
40G (1x40G) 2f	FR		2km				
100G (4x25G)	PSM4	500m					
100G (10x10G)	SR10	OM3: 100m OM4: 150m	MM	24MPO			
100G (4x25G)	SR4	OM3: 70m OM4: 100m					
40G (4x10G)	SR4	OM3: 100m OM4: 150m		12MPO			

Specification

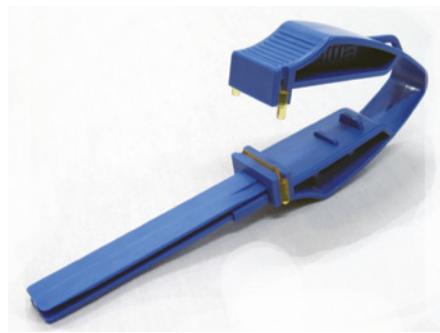
Fiber type	Polish	Connector	Connector insertion loss [dB]	Connector return loss [dB]
SM	SPC	dLC	≤ 0.5	≤ 40
SM	APC	12MPO	≤ 0.75	≤ 50
SM-LL			≤ 0.35	
MM	PC	24MPO	≤ 0.5	–
MM		12MPO		–

MM: Multi-Mode SM: Single-Mode SM-LL: Single Mode Low-Loss

Optical Fiber Stripper with Plastic Blades FA-504

Features and Benefits

- Plastic blades adopted
- Rust free and easy maintenance
- Easy to exchange blades
- Available for field installable connector as well as fusion splicing and mechanical splicing



Specification

Item	Specification
Applicable fiber	Single fiber with UV curable acrylate coating
Cladding diameter (μm)	Nominal 125 ^{**1}
Coating diameter (μm)	Nominal 250
Durability	Over 1600 times of stripping per a pair of blades (typical) ^{**2}
Dimensions / Weight	23 W x 142 D x 52 H mm / 19 g

^{**1} For other diameter, please contact us.

^{**2} In case of stripping Furukawa's standard fiber

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

Product Code

Product Code	Description
FA-504	Main body : 1 pc, Plastic blade : 2 pcs (1 pairs)
FA-503-blade	Plastic blade : 12 pcs (6 pairs)

Single Fiber Stripper S211B



Specification

Item	Specification
Applicable fiber	Single glass-based optical fiber
Cladding diameter (μm)	125
Coating diameter (μm)	250 and 900

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.

High Precision Cleaver S326A

Features and Benefits

- Cleave anywhere
- Simple operation
- Operation on hand
- Easy fiber loading
- Durable and reliable design
- Wide lid opening
- Light weight (About 30% reduced from previous model)

Specification

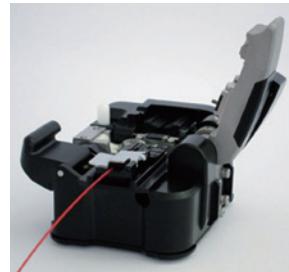
Item	Specification
Fiber types	All fiber types
Fiber count	Single to 12 ribbon fiber
Cladding diameter (μm)	125
Coating diameter (μm)	Single: 250 to 900 Ribbon fiber: 280 to 400 (thickness)
Cleave length (mm)	Single fiber: Fixed length 10 & 16, Variable length 5 to 20 Ribbon Fiber: Fixed length 10
Blade life ^{**}	48000 fibers (2000 fibers \times 24positions)
Dimensions (W \times D \times H mm)	96 \times 79 \times 56
Weight (g)	250

*1 The blade life depends on the operation environment and condition. The number can vary and is not guaranteed.

*This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.



Operation on hand



Wide lid opening

Thermal Stripper S218R

Features and Benefits

- Exceptional stripping for single and ribbon fiber
- Simple operation via built-in battery or AC power
- Durable design
- Easy maintenance on-Site

Specification

Item	Specification
Fiber types	All fiber types, single to 12 ribbon fiber
Cladding diameter (μm)	125
Coating diameter (μm)	Single: 250 to 400 Ribbon fiber: 300 to 400 (thickness)
Power source (V)	DC 11 to 14 / AC 100 to 240
Battery running time (hrs.)	Approximately 10
Charge time (hrs.)	Approximately 2.5
Operating environment	Temperature: 0 to 40°C Humidity: Below 95%
Dimensions / Weight	125 W \times 48 D \times 41 H mm / 260g

* This is typical specification. Furukawa Electric reserves the right to improve, enhance and modify the specification of these products without prior notification.



Fusion Splicers and Tools

FITEL fusion splicers produce highly accurate, reliable splices with minimal loss.

FITEL fusion splicers are designed using state-of-the-art technology from Furukawa Electric, decades of manufacturing experience, and feedback from countless customer installations. You'll find that FITEL splicers are simple yet precise and reliable tools that can support your full range of fiber manufacturing, R&D, installation, and maintenance applications.

Application	Product name	Picture	Page
Hand-Held, Core Alignment Fusion Splicer	FITEL S178A ver.2 Fusion Splicer		48
Hand-Held Single Fiber Fusion Splicer	FITEL NJ001 Fusion Splicer (FITELNINJA)		49
Hand-Held Ribbon Fiber Fusion Splicer	FITEL NJ001M4 Fusion Splicer		49
Hand-Held Ribbon Fiber Fusion Splicer	FITEL S123M ver.2 Fusion Splicer		50
Optical Identifier	ID-L, ID-H/R v3		51

FITEL S178A ver.2 Fusion Splicer

Hand-Held, Core Alignment Fusion Splicer

Features and Benefits

- The S178A Hand-Held Core-Alignment Fusion Splicer has been enhanced and updated to version 2. The battery is automatically charged internally when connected to AC mains power even during operation. The new illumination lamp lights up a wide area around the V-grooves and helps operation in low light environment. The redesigned and strengthened heater simplifies the protection sleeve loading process.
- The S178A is fast and durable, it continues the FITEL tradition of quality and excellence by delivering precise and accurate splices even under rigorous field conditions.
- The S178A is equipped with a core alignment system that can complete a splice in 7 seconds (semi-auto mode) and an integrated heater which can shrink a protection sleeve in 25 seconds (pre-heat mode). The USB 2.0 mini interface speeds up PC communication and image / video transfer, whilst enhancing reliability.
- Although the S178A is significantly smaller and lighter in weight than previous models, its canopy design, durable metal body frame and rubber protection corners provide robust protection. This enables use in demanding environments without compromising splicing performance. Along with its rugged durability, the splicer also offers convenience. An internal battery system allows up to 200 splicing cycles (splicing/heating) and an innovative, mirror-free alignment system reduces maintenance work.
- The S178A is a versatile choice for a wide range of applications including FTTx, LAN, backbone, enterprise, long-haul installations, data-center and OEM. It is an excellent option for use in the conventional telecommunications industry, along with other industries (including oil and gas and outside broadcast).



Key Features

- Internal battery charging
- Illumination lamp lights up a wide area around V-grooves
- User friendly LCD display offers 4 different X / Y image layouts
- Simplified splice result indicator red / green icon
- Simplified program fusion and heater programming
- Improved GUI enhancing ease-of-use



Under Tough Environments

S178A passed criteria as below ^{*1}

- Drop Resistance - 76 cm Drops from 5 different angles
- Water Resistance - IPX2 rating drip proof ^{*2}
- Dust Resistance - IP5X rating dust proof ^{*3}

^{*1} Above tests were performed at Furukawa Electric Co., Labs, and do not guarantee that the machine will be undamaged under these conditions.

^{*2} IPX2 rating drip proof means that the machine can be exposed to 3 mm/min drip from 4 different angles with 15° tilt for 2.5 min each and still functions.

^{*3} IP5X rating dust proof means that the machine can be exposed to dust particles with a diameter of 0.1 to 25 µm for 8 hours and still functions.



Drop Resistance



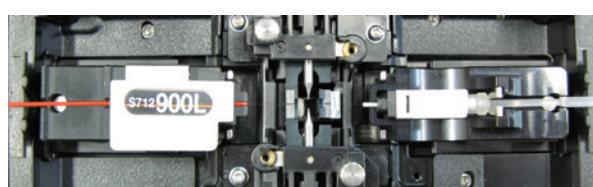
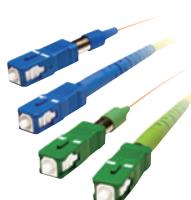
Water Resistance



Dust Resistance

FITEL Splicer SOC partners

SEIKOH GIKEN



^{*4} "DIAMOND" is a registered trademark of DIAMOND SA.

FITEL NJ001 Fusion Splicer (FITELNINJA)

Hand-Held Single Fiber Fusion Splicer

Features and Benefits

- Wide splicing chamber allowing easy fiber loading
- 3 LED lamps Brightly illuminating a wide area of the splicing chamber in a dark environment.
- High propulsion motor A powerful motor with a propulsion of 8N guarantees stable splicing even for highly rigid cables including drop and indoor cables.
- Ruggedized design The ruggedized body is designed to endure shocks, impact, water and dust.
- Internal battery charging
- Compatibility with Splice-on-Connector (SOC) The detachable heater clamp allows work with SOC.
- 100 cycles (Splicing and Heating)^{*1)} on a fully charged S946 Battery
- Available for ALL METRO/LAN/FTTx fibers including ultra bend-insensitive fibers
- Easy maintenance The industry's first detachable V-groove allows ease of cleaning and maintenance. The NJ001 also features tool-less electrode replacement and mirror free alignment system.
- PC interface software Easy software upgrades, splice management, program editing and exportation of splice results.
- Auto-start function Heating and splicing processes.

*1) In semi-auto splicing mode and regular heating mode.



Under Tough Environment



Drop Resistance

76 cm drops from 5 different angles^{*2)}



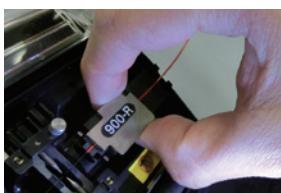
Water Resistance

Equivalent to IPX2 rating drip proof^{*2)}



Dust Resistance

Equivalent to IP5X rating dust proof^{*2)}



Spacious splicing chamber

The NJ001 is one of the most user-friendly splicers in the field thanks to its wide splicing chamber in relation to its size. Compared to its predecessor (S123C) there is 4 times more space around the fiber holders for easy fiber loading.



3 LED lamps

With an light intensity of > 300 Lux, 3 LED lights illuminating the entire splicing chamber make it easier to perform work in a dark environment. The light on the V-groove is 6 times brighter than that of its predecessor (S123C).



The industry's first detachable V-groove

The NJ001's V-groove is detachable for easy cleaning and optimal maintenance.

FITEL NJ001M4 Fusion Splicer

Hand-Held Ribbon Fiber Fusion Splicer

Product Line Up

Model	Application
NJ001	Singlefiber
NJ001M4	Single to 4 ribbon fiber



*2) Standard operations could be properly carried out after having conducted the above tests. These tests were performed at the Furukawa Electric Lab with no significant damage. This does not guarantee that the machine will always be undamaged under these conditions.

FITEL S123M ver.2 Fusion Splicer

Hand-Held Ribbon Fiber Fusion Splicer

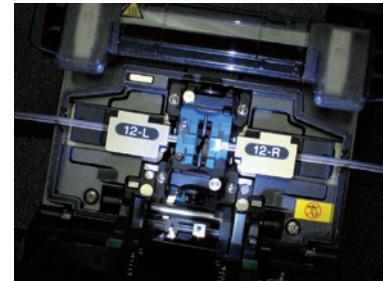


Features and Benefits

- Internal battery charging
- Illumination lamp lights up a wide area around V-grooves
- IP-52 - Rugged and compact hand held design for demanding environmental conditions
- Fast splice (15 sec) at low loss and Fast heating (36 sec) for ribbon fiber ^{*1)}
- Simple operation with Fixed V-groove
- Splicer is compatible with the Seikoh Giken Splice-on-connector (9mm bare fiber SOC)
- 70 cycles (Splicing & heating) for S123M4 and 160 cycles for S123M8 and S123M12 with two batteries^{*2)}
- Available for All METRO/LAN/FTTx fibers including ultra bend-insensitive fibers (e.g. EZ-Bend)
- Easy maintenance - Toolless electrode replacement/mirror free alignment system
- Up-and-down fiber clamp system allows automatic fiber re-positioning
- Easy software upgrade via the Internet
- PC interface software to allow user manage splicing programs and results
- Auto-start shrink sleeve oven feature
- Improved GUI to further enhance ease-of-use
- RoHS compliant

^{*1)} By using semi-auto mode for splicing and pre-heating mode for heating

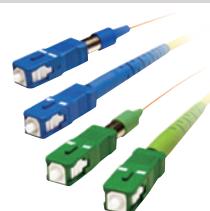
^{*2)} By using semi-auto mode for splicing and regular mode for heating



Product Line Up

Model	Application
S123M4-A	Single to 4 ribbon fiber (with Soft Case)
S123M4-B	Single to 4 ribbon fiber (with Hard Case)
S123M8	Single to 8 ribbon fiber
S123M12	Single to 12 ribbon fiber

FITEL Splicer SOC partners



Under Tough Environment

S123M series passed criteria as below ^{*3)}



Drop Resistance
76 cm drops from 5 different angles ^{*3)}



Water Resistance
IPX2 rating drip proof ^{*4)}



Dust Resistance
IP5X rating dust proof ^{*5)}

^{*3)} Above tests were performed at Furukawa Electric Labs, and do not guarantee that the machine will be undamaged under these conditions.

^{*4)} IPX2 rating drip proof means that the machine can be exposed to 3 mm/min drip from 4 different angles with 15° tilt for 2.5 min each and still functions.

^{*5)} IP5X rating dust proof means that the machine can be exposed to dust particles with a diameter of 0.1 to 25 µm for 8 hours and still functions.

ID-L, ID-H/R v3

Optical Identifier

Features and Benefits

ID-L

- 4 wavelength lineup
- Lightweight design for easy handling
- Operate more than 60 hours on battery

ID-H/R v3

- Wide dynamic range
- Detects the signal without disrupting traffic
- Detects the tone signal and traffic signal
- Light weight design for easy handling



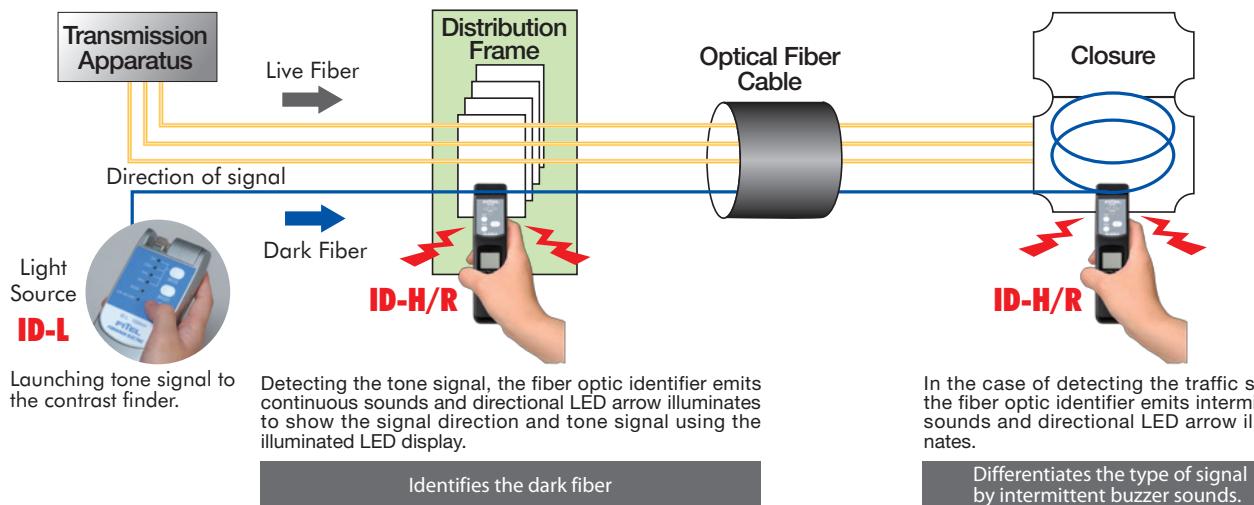
ID-L



ID-H/R v3

Instruction

ID-H/R (Optical fiber identifier) detects tone signal from ID-L (Hand held light source) to identify a target fiber.



※Make sure to launch tone signal to the dark fiber and confirm the detection before disconnecting it.

Optical Fiber

Furukawa Electric Group designs and manufactures high performance optical fibers offering superior performance and reliability.

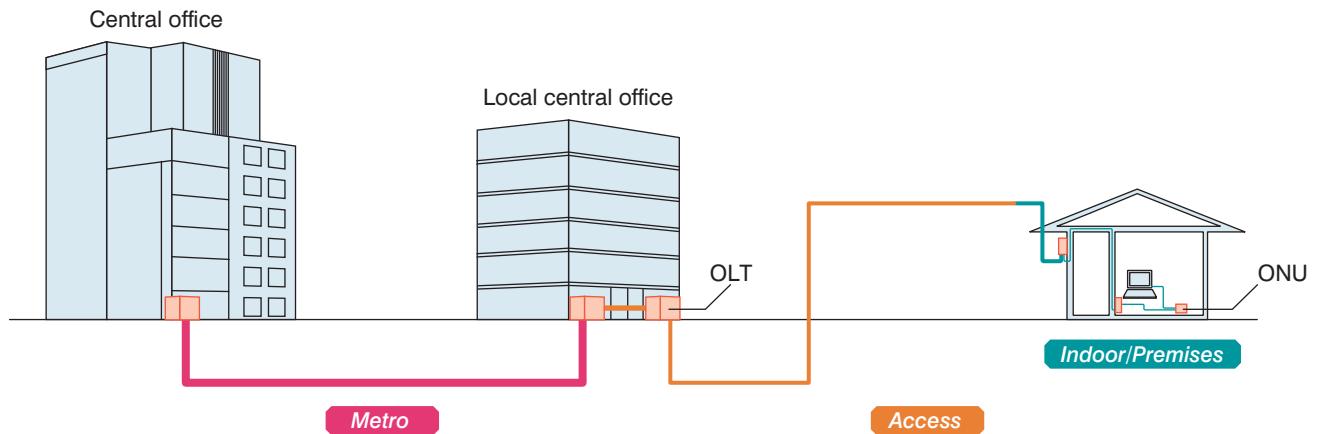
AllWave Zero Water Peak (ZWP) Family offers increased transmission capacity by full spectral bandwidth, and the lowest loss in metro/access applications.

AllWave FLEX ZWP Fiber can transmit full spectrum with low bending loss, and have good reliability for long-term in premise and indoor applications as well as access applications.

AllWave FLEX + ZWP Fiber maintains even lower bending loss at a bending radius of 7.5 mm keeping its full spectrum feature, and is suitable for premises and indoor applications.

AllWave FLEX Max Fiber offers outstanding bend performance to a 5 mm radius for demanding in-building and connectivity applications.

Application



Product name	AllWave ZWP Fiber	AllWave+ ZWP Fiber	AllWave One ZWP Fiber	AllWave FLEX ZWP Fiber	AllWave FLEX+ ZWP Fiber	AllWave FLEX Max Fiber
Intl. standard	G.652. D	G.652. D G.657. A1	G.652. D G.657. A1	G.657. A1	G.657. A2	G.652. D G.657. B3
Bend loss vs. AllWave+ Fiber 10 mm radius mandrel	NA	0.75 dB/turn at 1550 nm	33% lower bend loss	73% lower bend loss	87% lower bend loss	96% lower bend loss
PMD LDV vs. AllWave	0.06	33% better (0.04)	33% better (0.04)	0.06	0.06	0.06
ZWP	Full Spectrum ZWP	Full Spectrum ZWP	Full Spectrum ZWP	Full Spectrum ZWP	Full Spectrum ZWP	Full Spectrum
MFD for seamless splicing and testing	9.2	9.2	9.2	8.9	8.8	8.7
Uncabled Loss vs. G.652.D at 1550 nm	40% lower loss	43% lower loss	48% lower loss	43% lower loss	43% lower loss	43% lower loss

Product specifications	G.652. D	G.652. D	G.652. D	G.657. A1	G.657. A2	G.657. B3
	AllWave ZWP Fiber	AllWave + ZWP Fiber	AllWave One ZWP Fiber	AllWave FLEX ZWP Fiber	AllWave FLEX + ZWP Fiber	AllWave FLEX Max Fiber

• Physical characteristics

Cladding diameter (mm)	125.0 ± 0.7	125.0 ± 0.7	125.0 ± 0.7	125.0 ± 0.7	125.0 ± 0.7	125.0 ± 0.7
Cladding non-circularity (%)	≤ 0.7	≤ 0.7	≤ 0.7	≤ 0.7	≤ 0.7 %	≤ 0.7 %
Core / cladding concentricity error (offset)(mm)	≤ 0.5 (Typical: < 0.2)					
Coating diameter (uncolored) (mm)	235-250	235-250	235-250	235-250	235-250	237 - 247
Coating / cladding concentricity error (offset)(mm)	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12
Tensile proof test strain (kpsi)	100 (0.69 GPa)					
Coating strip force (N)	1.3 - 8.9	1.3 - 8.9	1.3 - 8.9	1.3 - 8.9	1.3 - 8.9	1.3 - 8.9
Standard reel length (km)	up to 50.4					

• Optical characteristics

Attenuation (dB/km)						
at 1310 nm [Maximum / Typical]	[≤ 0.34 / ≤ 0.32]	[≤ 0.34 / ≤ 0.33]	[≤ 0.33 / -]	[≤ 0.35 / ≤ 0.34]	[≤ 0.35 / ≤ 0.34]	≤ 0.35
at 1383 nm [Maximum / Typical]	[≤ 0.31 / ≤ 0.28]	[≤ 0.31 / ≤ 0.28]	[≤ 0.31 / -]	[≤ 0.31 / ≤ 0.28]	[≤ 0.31 / ≤ 0.28]	≤ 0.35
at 1490 nm [Maximum / Typical]	[≤ 0.24 / ≤ 0.21]	[≤ 0.24 / ≤ 0.21]	[≤ 0.21 / -]	[≤ 0.24 / ≤ 0.21]	[≤ 0.24 / ≤ 0.21]	≤ 0.24
at 1550 nm [Maximum / Typical]	[≤ 0.21 / ≤ 0.19]	[≤ 0.20 / ≤ 0.19]	[≤ 0.18 / -]	[≤ 0.21 / ≤ 0.19]	[≤ 0.21 / ≤ 0.19]	≤ 0.21
at 1625 nm [Maximum / Typical]	[≤ 0.24 / ≤ 0.20]	[≤ 0.24 / ≤ 0.20]	[≤ 0.20 / -]	[≤ 0.24 / ≤ 0.20]	[≤ 0.24 / ≤ 0.20]	≤ 0.23

• Optical characteristics

Macrobending attenuation (dB)						
The maximum attenuation with bending does not exceed the specified values under the following deployment conditions:						
30 mm radius, 100 turns at 1550 nm	≤ 0.05	≤ 0.03	≤ 0.03	–	–	–
at 1625 nm	≤ 0.05	≤ 0.03	≤ 0.01	–	–	–
25 mm radius, 100 turns at 1310 nm	≤ 0.05	-	-	–	–	–
at 1550 nm	≤ 0.05	-	≤ 0.03	≤ 0.01	–	–
at 1625 nm	–	-	≤ 0.01	≤ 0.05	–	–
16 mm radius, 1 turn	at 1550 nm	≤ 0.05	-	-	–	–
15 mm radius, 10 turns	at 1550 nm	–	≤ 0.25	≤ 0.05	≤ 0.2	≤ 0.03
at 1625 nm	–	≤ 1.0	≤ 0.30	≤ 0.5	≤ 0.1	–
10 mm radius, 1 turn	at 1550 nm	–	≤ 0.75	≤ 0.50	≤ 0.2	≤ 0.1
at 1625 nm	–	≤ 1.5	≤ 1.0	≤ 0.5	≤ 0.2	≤ 0.10
7.5 mm radius, 1 turn	at 1550 nm	–	-	-	–	≤ 0.5
at 1625 nm	–	-	-	–	≤ 1.0	≤ 0.15
5 mm radius, 1 turn	at 1550 nm	–	-	-	–	≤ 0.10
at 1625 nm	–	-	-	–	–	≤ 0.25

• Optical characteristics

Chromatic dispersion						
Zero dispersion wavelength λ_0 (nm)	1302 – 1322	1302 – 1322	1302 – 1322	1302 – 1322	1302 – 1322	1302 – 1322
Dispersion slope at λ_0 (ps / (nm ² •km))	≤ 0.090 (Typical: 0.087)	≤ 0.090 (Typical: 0.087)	≤ 0.090 (Typical: 0.087)	≤ 0.092 (Typical: 0.088)	≤ 0.092 (Typical: 0.088)	≤ 0.092

• Optical characteristics

Mode field diameter (mm)						
at 1310 nm	9.2 ± 0.4	9.2 ± 0.4	9.2 ± 0.4	8.5 – 9.3	8.4 – 9.2	8.3 – 9.1
at 1550 nm	10.4 ± 0.5	10.4 ± 0.5 (Typical)	10.4 ± 0.5 (Typical)	9.4 – 10.4 (Typical)	9.4 – 10.4 (Typical)	9.2 – 10.4
Cutoff wavelength λ_{cc} (nm)	≤ 1260	≤ 1260	≤ 1260	≤ 1260	≤ 1260	≤ 1260

• Optical characteristics

Polarization mode dispersion (PMD) (ps/ $\sqrt{\text{km}}$) ^{**}	≤ 0.06 (Typical: < 0.02)	≤ 0.04 (Typical: < 0.02)	≤ 0.04 (Typical: < 0.02)	≤ 0.06 (Typical: < 0.02)	≤ 0.06 (Typical: < 0.02)	≤ 0.06 (Typical: < 0.02)
Individual fiber PMD	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1

• Optical characteristics

Group refractive index						
at 1310 nm	1.467	1.467	1.467	1.467	1.467	1.467
at 1550 nm	1.468	1.468	1.468	1.468	1.468	1.468

• Environmental characteristics

Attenuation increase during / after aging at 1310 nm, 1550 nm, and 1625 nm (dB / km)						
Temperature cycling (-60°C to +85°C)	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05
High temperature aging (+85°C ± 2°C)	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05
Temperature & humidity cycling (-10°C to +85°C, 95% RH)	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05
Water immersion (+23°C ± 2°C)	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05	≤ 0.05

*1 As measured with low mode coupling (LMC) technique in fiber form, value may change when cabled. Check with your cable manufacturer for specific PMD limits in cable form.

*2 The PMD link design value complies with IEC 60794-3, September 2001 (N = 20, Q = 0.01%). Details are described in IEC 61282-3 TR Ed.2, October 2006.

* Those are typical characteristics of uncabled optical fiber. Some characteristics may change after cabling. The characteristics of cabled fiber shall be confirmed for each cable.

Furukawa Electric reserves the right to improve, enhance and modify the features and specification of this product without prior notification.

AllWave , AllWave +, AllWave One Fiber

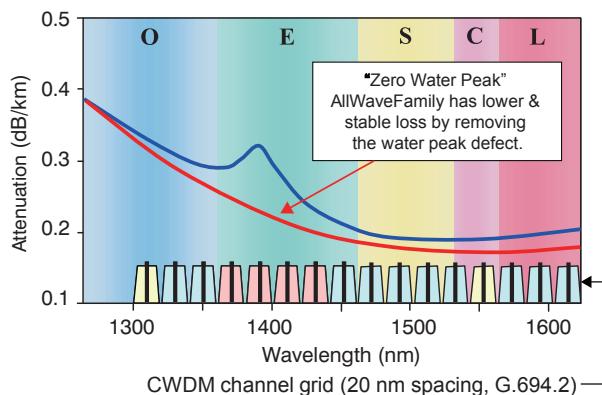
Features and Benefits

AllWave Zero Water Peak family (AllWave, AllWave +, and AllWave One) is ideally designed for use in metro and access networks due to superior performance.

- Low and stable attenuation loss around 1400 nm band by removing the water peak defect
- Macrobend performance superior to the G.652.D and G.657.A1 standards
- 1 turn on a 10 mm radius mandrel (@1550 nm): ≤ 0.75 dB (AllWave +)
 ≤ 0.50 dB (AllWave One)
- The industry's tightest geometric control for lowest splice loss

Characteristic comparison

	Attenuation (dB/km)		International standards
	@1310 nm	@1550 nm	
AllWave	≤ 0.34	≤ 0.21	G.652.D
AllWave +	≤ 0.34	≤ 0.20	G.652.D G.657.A1
AllWave One	≤ 0.33	≤ 0.18	G.652.D G.657.A1



AllWave FLEX, AllWave FLEX +, AllWave FLEX Max Fiber

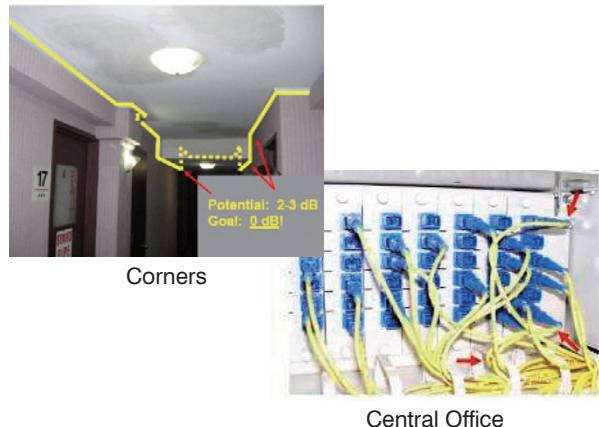
Features and Benefits

AllWave FLEX family (AllWave FLEX, AllWave FLEX +, and AllWave FLEX Max) includes G.657 fibers to offer optimized bend performance for Fiber-to-the-x (FTTx), enterprise networks, or any other applications.

- Easier to install, handle, and store in space-constrained applications such as FTTx and premises networks
- Tight geometric control for very low splice loss and improved connectorization performance with G.652.D embedded base
- Fully compatible with conventional single-mode fiber international standard G.652.D

Characteristic comparison

	Macrobending loss (@1550 nm)	Attenuation(dB/km)		International standards
		@1310 nm	@1550 nm	
AllWave FLEX	≤ 0.2 dB (1 turn on a 10 mm radius mandrel)	≤ 0.35	≤ 0.21	G.652.D G.657.A1
AllWave FLEX +	≤ 0.5 dB (1 turn on a 7.5 mm radius mandrel)	≤ 0.35	≤ 0.21	G.652.D G.657.A2
AllWave FLEX Max	≤ 0.10 dB (1 turn on a 5 mm radius mandrel)	≤ 0.35	≤ 0.21	G.652.D G.657.B3

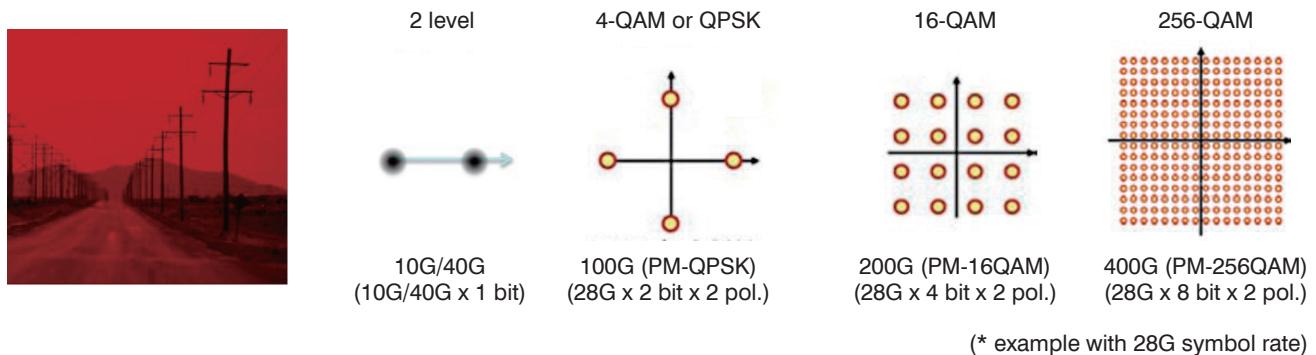


TeraWave Fiber

Features and Benefits

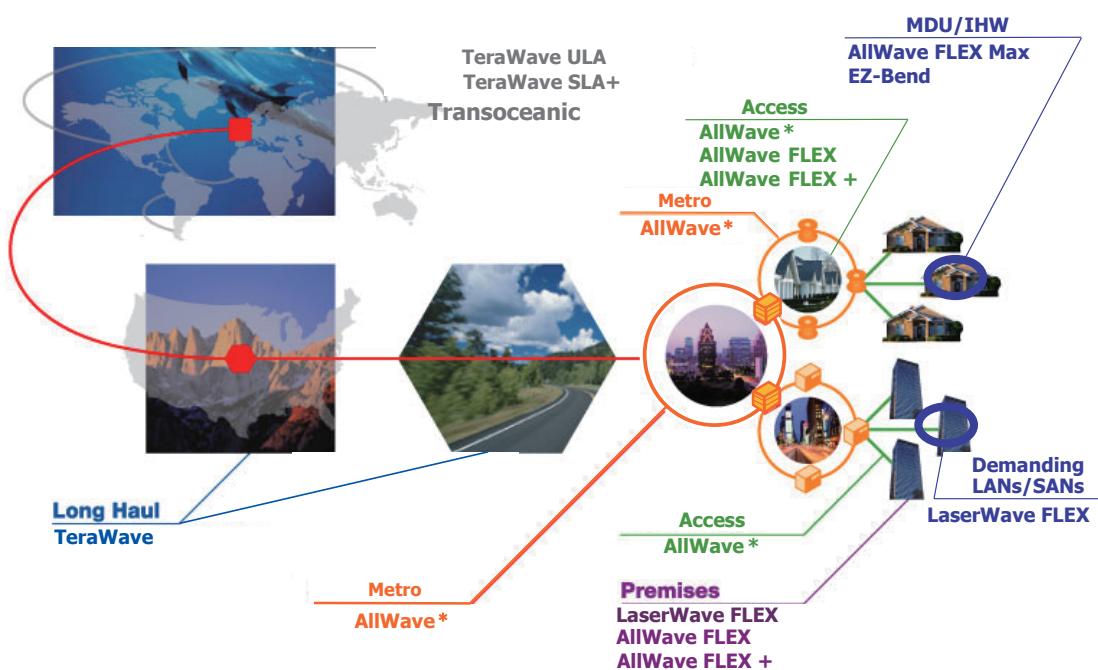
TeraWave single-mode optical fiber provides outstanding cable performance and design freedom for long-haul systems.

- Large effective area ($125 \mu\text{m}^2$ @1550 nm) and low loss (0.186 dB/km@1550 nm)
- ~ 40 % longer unrepeated reach than standard SMF at 400 Gb/s and 1 Tb/s
- DLUX Ultra coating system for excellent microbending performance in cable
- Meets all macrobending loss requirements in G.654.E
- Fabricated by the method similar to AllWave fiber featuring Zero Water Peak, Long-term reliability, and Low PMD



Application-Specific Optical Fibers

Covering all application areas



* AllWave series include AllWave One, AllWave +, AllWave LL, and standard AllWave.

FURUKAWA ELECTRIC CO., LTD.

<http://www.furukawa.co.jp/telecom/en/>

HEAD OFFICE

Marunouchi Nakadori Bldg., 2-3, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8322, Japan

Tel: +81-3-3286-3245 Fax: +81-3-3286-3978

Contact Form: <http://www.furukawa.co.jp/jyotsutop/english/inquiry/fttx.htm>

<http://www.furukawa.co.jp/telecom/en/>

OFS FITEL, LLC (OFS)

2000 Northeast Expressway Norcross, Georgia 30071, U.S.A.

Tel: 1-770-798-5555

E-mail: sales@ofsoptics.com

<http://www.ofsoptics.com/>

FURUKAWA ELECTRIC EUROPE LTD. (FEEL)

Furukawa House 77-85 Fulham Palace Road, London W6 8JD, United Kingdom

Tel: +44-20-7313-5300 Fax: +44-20-7313-5310

Contact Form: <http://www.furukawa.co.uk/contactus.php>

<http://www.furukawa.co.uk/>

Furukawa Electric Singapore Pte. Ltd. (FES)

60 Albert Street, #13-10 OG Albert Complex, Singapore 189969

Tel: +65-6224-4686 Fax: +65-6336-2635

Contact Form: <http://www.furukawa.co.jp/srm/form/index.php?id=enfes>

<http://www.furukawa.co.jp/en/>

Furukawa Shanghai, Ltd. (FSL)

Room1006, Hongyi Plaza, 288 Jiujiang Road, Shanghai 200001, P.R.China

Tel: +86-21-3366-5301 Fax: +86-21-3366-5315

E-mail: inquiry@furukawa-sh.com.cn

Contact Form: <http://www.furukawa.co.jp/srm/form/index.php?id=enfsl>

<http://www.furukawaelectric.com/fsl/en/>

Furukawa Electric Hong Kong Ltd. (FEHK)

Suite 1810, 18/F, Tower 2, 33 Canton Road, China Hong Kong City, Tsim Sha Tsui, Kowloon, Hong Kong

Tel: +852-2512-8938 Fax: +852-2512-9717

Contact Form: <http://www.furukawa.co.jp/srm/form/index.php?id=enfehk>

<http://www.furukawaelectric.com/fehk/en/>

Furukawa Electric Trading SZ Ltd.(FESZ)

Room 2501, Block A, United Plaza, No.5022 Bin He Road, Futian District Shenzhen 518033 P.R.China

Tel: +86-755-8373-4878 Fax: +86-755-8373-4829

Contact Form: <http://www.furukawa.co.jp/srm/form/index.php?id=enfehk>

<http://www.furukawaelectric.com/fehk/en/>

FTC

Furukawa (Thailand) Co., Ltd. (FTC)

No.191 Silom Complex Building 16th Floor, Units 4,C Silom Road, Kwaeng Silom, Khet Bangrak, Bangkok 10500

Tel: +66-(0)2-632-1079

Contact Form: <http://www.furukawa.co.jp/srm/form/index.php?id=enftc>

<http://www.furukawaelectric.com/ftc/>

FEI

P.T. Furukawa Electric Indonesia (FEI)

Sucaco Building, 6th Floor Jl. Kebon Sirih No.71, Jakarta 10340 Indonesia

Tel: +62-(0)21-3190-6212

Contact Form: <http://www.furukawa.co.jp/srm/form/index.php?id=enfei>

<http://www.furukawaelectric.com/fei/>

* The products and their appearances, as described in this brochure, are subject to change for improvement without prior notice.

* Company and product names appearing in this brochure are registered trademarks or trademarks of respective companies.

Export Control Regulations

The products and/or technical information presented in this publication may be subject to the application of the Foreign Exchange and Foreign Trade Act and other related laws and regulations in Japan.

In addition, the Export Administration Regulations (EAR) of the United States may be applicable.

In cases where exporting or reexporting the products and/or technical information presented in this publication, customers are requested to follow the necessary procedures at their own responsibility and cost.

Please contact the Ministry of Economy, Trade and Industry of Japan or the Department of Commerce of the United States for details about procedures.