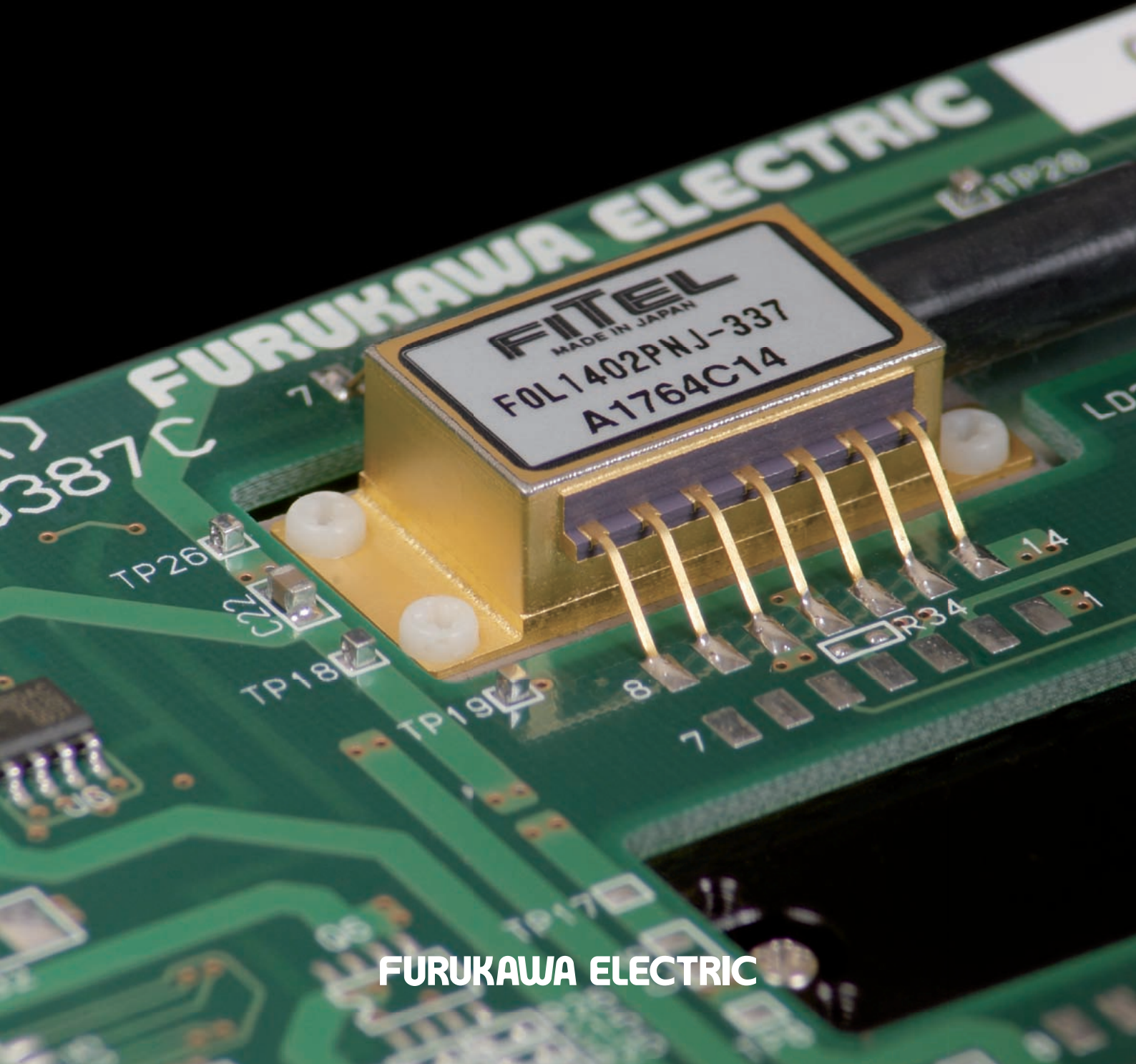
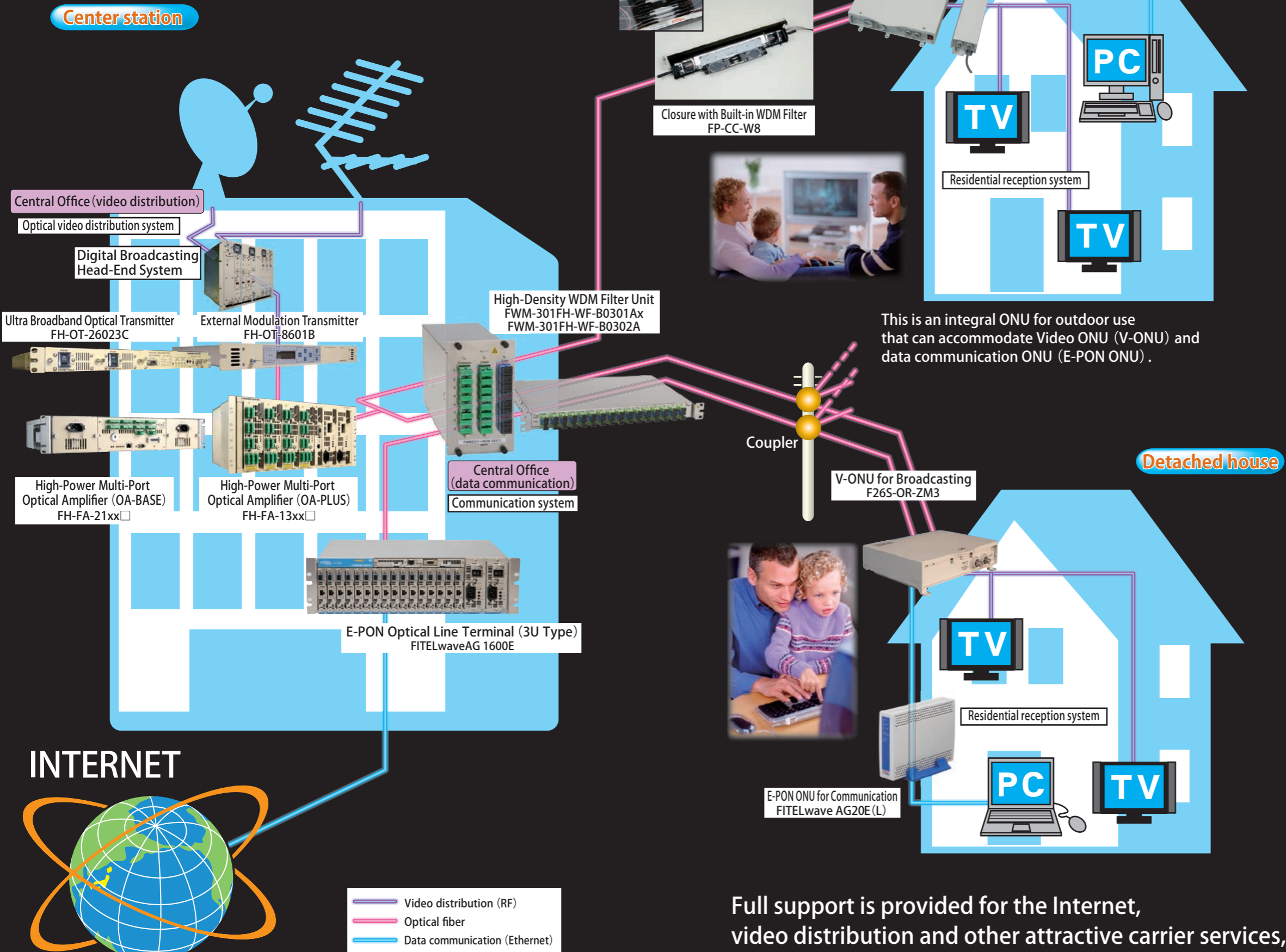


FTTH Systems



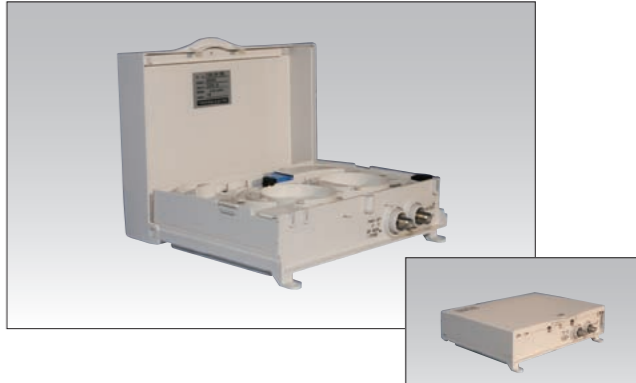
Furukawa Electric can configure high-quality, stable, flexible and efficient optical transmission systems through its comprehensive offerings, from optical components to products and from products to systems. Our broad product lineup offers optical video distribution and communication services that ensure higher customer satisfaction.



This is an integral ONU for outdoor use that can accommodate Video ONU (V-ONU) and data communication ONU (E-PON ONU).

Full support is provided for the Internet, video distribution and other attractive carrier services, encompassing the Center facilities to optical terminals.

1 V-ONU for Broadcasting
F26S-OR-ZM3



This is a compact and lightweight V-ONU for FTTH terminals.

Item	Specifications
Receiving optical element	pin-PD
Transmission wavelength	1.3μm band or 1.55μm band
Optical connector	SC-SPC (standard)
Receiving optical power	-8~-2dBm
Frequency band	70~2,602MHz
High-frequency signal output power	mode1 Analog: 95dBμV; Digital: 85dBμV mode2 Analog: 89dBμV; Digital: 79dBμV
Number of output connectors	1
Power supply	AC100V±10%
Power consumption	7W
Dimensions	104 (W) × 29.5 (D) × 60 (H) mm (excluding projections)
Mass	0.3kg or less

2 Integral ONU for Broadcasting and Communication
FITELwave AX20



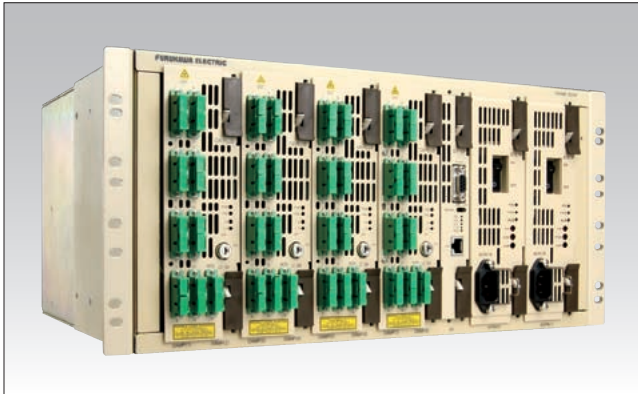
V-ONU for broadcasting and E-PON ONU for communication have been integrated.

Item	Specifications
Transmission medium	1.3μm zero-dispersion optical fiber
Optical connector	SC/SPC
Optical wavelength	1,550nm
Optical input power range	-2~-8dBm
Transmission frequency band	70~770MHz
Max. transmission capacity	Analog 11ch + Digital 80ch
RF output power	95dBμ
Number of output terminals	1
Transmission medium	1.3μm zero-dispersion optical fiber
Optical wavelength	Downstream: 1,480~1,500nm; Upstream: 1,260~1,360nm
Allowable transmission loss	29dBm or more (including power penalty of 1dB or less)
Optical connector	SC/SPC
LAN port 1	10M/100M/1000M, Auto-Negotiation/Fixed
LAN port 2	10M/100M, Auto-Negotiation/Fixed
PoE-compatible terminal	1 (LAN2)
PoE receiving input voltage	DC+48V
Temperature range	-20~40°C
Humidity range	30~80% (no dew condensation)
Radio wave regulation	VCC classB-compliant
Extraneous radiation	34dBμ/m or less
Dimensions	Main body: 205 (W) × 59.5 (D) × 207 (H) mm / Power supply: 80 (W) × 59.5 (D) × 207 (H) mm
Mass	Main body: 1.5kg / Power supply: 0.5kg

3

High-Power Multi-Port Optical Amplifier (OA-PLUS)

FH-FA-13xx



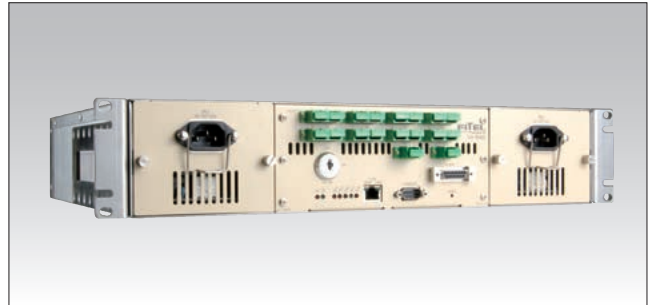
High-power and multiple-port have been realized.
The product lineup includes +16/18/20dBm output.

Item	Specifications
Wavelength	1,550~1,560nm
Optical input power	+10dBm (standard)
Optical output power	Type A : +16dBm/port
	Type B : +18dBm/port
	Type C : +20dBm/port
Noise figure	6.0dB or less; when in combination with OA-BASE (OA-BASE input: 0dBm)
IN/FAIL	Turned off when normal; red LED turns on when abnormal
Monitoring and control interface	SNMP/WEB/TELNET
Power supply/power consumption	AC100V or DC-48V/AC100V or less, DC550W or less (full implementation)
Dimensions	483 (W) × 399 (D) × 221.5 (H) mm (excluding projections)
Mass	33kg or less (full implementation)

4

High-Power Multi-Port Optical Amplifier (OA-BASE)

FH-FA-21xx



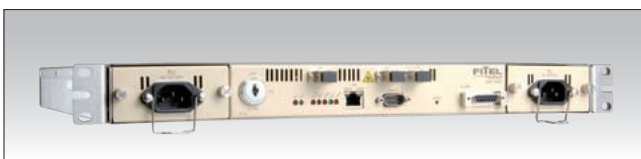
SNMP manageable multiple port optical amplifiers for FTTH video distribution. Selectable are the port number (4, 8, 16 or 32) and the optical output power (11.5, 13, 16 or 20dBm/port).

Item	Specifications
Optical input power	0~10dBm (1,550~1,560nm)
Number of output ports	4/8/16/32
Optical output power	+11.5dBm/port. (Port number=4/8/16/32)
	+13dBm/port. (Port number=4/8/16/32)
	+16dBm/port. (Port number=4/8/16/32)
	+20dBm/port. (Port number=4/8/16)
Optical connector	SC-APC (Angled PC)
Noise figure	5.5dB or less @Pin=0dBm, λ=1,550nm
Monitoring/control interface	SNMP/WEB/TELNET/Dry contact
Power supply/power consumption	AC100V/95W-185VA or less (depending on models)
Dimensions	1U: 481 (W) × 44 (H) × 400 (D) mm (4 port products upto 13dBm/port.)
	2U: 481 (W) × 88 (H) × 400 (D) mm (4, 8 and 16 port products.)
	3U: 481 (W) × 132 (H) × 400 (D) mm (32 port products.)
	* Depth (D) excludes protrusions.
Mass	1U: 9kg or less/ 2U: 13kg or less/ 3U: 14.5kg or less

5

Optical Amplifier (pizza box type)

FH-FA-20xx



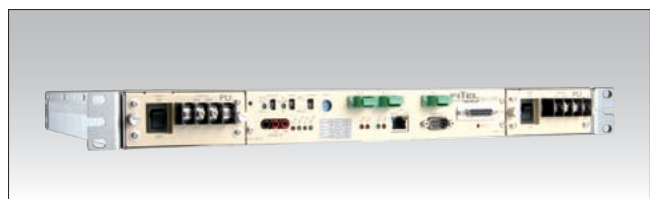
SNMP manageable single port optical amplifiers for video transmission, with 1U height compact chassis (19" rack mountable).

Item	Specifications	
Input section	Wavelength	1,550~1,560nm
	Optical input power	0~10dBm
	Input optical connector	SC-APC (Angled PC)
Output section	Optical fiber	1.31μm zero-dispersion, SMF 10/125μm
	Optical connector	SC-APC (Angled PC)
	Number of optical output	1
	Optical output power	FH-FA-2014A 13.0dBm, FH-FA-2015A 16.5dBm, FH-FA-2016A 19.0dBm, FH-FA-2017A 22.0dBm
Noise figure	5.0dB or less (@Pin=0dBm)	
Monitoring/control	Monitoring/control interface	SNMP/WEB/TELNET/Dry contact
	Alarm	Loss of input, Output deterioration, LD current, LD temperature, PU, FAN, etc.
	Status monitor	Optical input power, optical output power, LD current, LD temp., etc.
	Control	Enable/disable pump LDs, etc.
	LED	IN, PU0, PU1, FAN, FAIL: Red LED turns on in case of alarm. LD : Green LED turns on in case that the pump LDs are enabled. ACT: Green LED turns on in case that power is supplied properly.
	Total alarm contact output	CRITICAL/MAJOR/MINOR (Alarm contact outputs are made by assigning each alarm to CRITICAL, MAJOR or MINOR. The assignment configuration can be changed.)
Power supply/power consumption	AC100V 28W/36VA or less (13dBm), 30W/60VA or less (16.5dBm), 35W/70VA or less (19dBm), 50W/100VA or less (22dBm)	
Dimensions/Mass	483 (W) × 400 (D) × 43.7 (H) mm (excluding projections) / 9kg or less	

6

Optical Switch

FH-SW-210xL



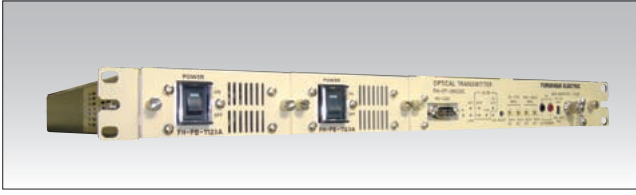
The optical switch is optimum for redundant configuration of optical transmission channel. It is also compatible with SNMP, and automatic switching and forced switching would also be possible at remote sub-central office.

Item	Specifications			
model	FH-SW-2101L	FH-SW-2102L		
Input section	Wavelength	1,530~1,570nm	1,280~1,340nm	
	Number of terminals	2 inputs (lines A and B)/1 output		
	Optical connector	SC-APC (Angled PC), SC-SPC	#Can be designated at the time of ordering	
	Max. input level	+23dBm	+16dBm	
	Insertion loss	2dB or less	2.3dB or less	
	Isolation	50dB or more		
	Automatic switching threshold level	Setting is possible between -10dBm and +17dBm	Setting is possible between -10dBm and +5dBm	
	Switching time	50ms or less		
	Control mode selection	Operation line switching mode selection (Auto/A-Fix/B-Fix)	Auto: switches optical channel automatically or by remote control; A-Fix/B-Fix: fixes optical channel for operation	
		Main line selection (Remote/A/B)	Remote: designates main line by remote control; A: operates line A as main line; B: operates line B as main line	
Return mode selection (Auto/Manual)		Auto: returns automatically when the main line has recovered; Manual: does not return automatically even when the main line has recovered		
Power supply/power consumption	AC100V or DC-48V/AC35VA or less	DC15W or less		
Dimensions	480 (W) × 397 (D) × 43.7 (H) mm (excluding projections)			
Mass	Approx. 9kg			

7

Ultra Broadband Optical Transmitter (2.6GHz-compatible)

FH-OT-26023C



The transmitter sends CATV transmission signals between 70 and 770MHz, and BS and CS-IF signals between 950 and 2,602 MHz by converting them into optical intensity modulated signals.

Item	Specifications
Input section	
Transmission frequency band	70~770MHz, 950~2,602MHz
Max. transmission channel	(70~770MHz) 11ch (analog), 80ch (digital) (950~2602MHz) 36ch (BS-CS-IF)
RF signal input level	(70~770MHz) 76dBμV (analog), 66dBμV (digital) (950~2602MHz) 76dBμV (BS-CS-IF)
Output section	
Light-emitting element	Laser diode
Optical output wavelength	1,550nm band
Optical connector	SC-APC (Angled PC)
Optical output power/optical output port	+9dBmW±1dB
Performance	
CNR (Note 1)	46dB or more (70~770MHz), 26dB or more (950~2,602MHz)
CSO (Note 2)	-56dB or less (77~770MHz)
CTB (Note 2)	-56dB or less (77~770MHz)
IM3 (Note 2)	-59dB or less (950~2,602MHz)
IM2 (Note 2)	-36dB or less (950~2,602MHz)
Power consumption	50VA or less
Dimensions	480(W)×401(D)×43.7(H)mm(excluding projections)
Mass	3.4kg or less

Note 1: Performance when paired with the company's optical receiver (fiber length: 20km, optical reception level: -8dBmW)
Note 2: Performance when paired with the company's optical receiver (fiber length: 20km, optical reception level: -2dBmW)

8

DWDM External Modulation Optical Transmitter

FH-OT-8601B



This is an optical transmitter for long-distance transmission of RF broadcast signals. Multiple-channel, long-distance transmission of video signals is possible in combination with optical amplifiers. It is externally modulated, compatible with DWDM wavelength of ITU-G, and can be multiplexed in various ways. The transmitter can also be made compatible with the L-band.

Item	Specifications
Input section	
Transmission frequency band	70~770MHz
RF input power	80dBμV
RF monitor level/connector	-20dB over input power/F type
Optical output wavelength	1,550~1,560nm, 1,570nm (ITU-grid)
Optical output wavelength adjustable range	±100GHz (in steps of 50GHz)
Optical output power/optical output port	+8.5dBm (standard) /2 ports
Performance	
SBS suppression	Can be set between +13.0 to +19.0dBm (in steps of 0.5dB)
RF return loss	15dB or more
Relative intensity noise (RIN)	-158dB/Hz or less (-160dB/Hz as standard)
CNR (Note)	50.0dB or more
CSO (Note)	65.0dB or more
CTB (Note)	65.0dB or more
Others	
External control terminal	Monitoring and control are possible with Ethernet 10/100 interface, Web browser software and SNMP
Power supply/power consumption	AC100V/80VA or less
Dimensions	480(W)×464(D)×49(H)mm (JIS), 483(W)×464(D)×44.5(H)mm (EIA) (excluding projections)
Mass	12kg or less

Note: Performance when paired with the company's optical receiver (at optical input of 0dBm)

9

E-PON Optical Line Terminal(3U Type)

FITELwave AG1600E



This is a slimmer version of AG1600. The accommodation efficiency improves by 60% .

Item	Specifications
Transmission medium	1.3μm zero-dispersion optical fiber
Optical wavelength	Downstream: 1,480~1,500nm; Upstream: 1,260~1,360nm
Allowable optical transmission loss	29dB as a standard (including power penalty of 1dB)
Number of optical branches	Up to 64 branches per PIF card
Configuration	Power supply: 2 units
	Fan: 2 units
	SV: 1 unit
	PIF: 16 units
PON interface (PIF)	100BASE-TX/1000BASE-T
	Auto-Negotiation/Fixed (full duplex/half duplex)
Power supply	AC100V~240V
Dimensions	480(W)×380(D)×130(H)mm(excluding projections)
Mass	20kg or less (full implementation)

10

E-PON ONU for Communication

FITELwave AG20E (L)



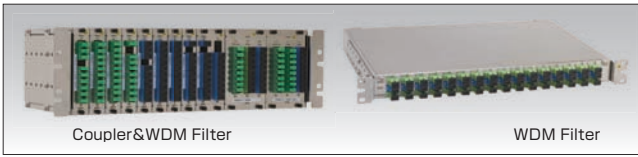
FITELwave AG20E (L) is E-PON ONU that can offer up to a 1Gpbs service to subscribers, when connected with the E-PON optical line terminal.

Item	Specifications
Transmission medium	1.3μm zero-dispersion optical fiber
Optical wavelength	Downstream: 1,480~1,500nm; Upstream: 1,260~1,360nm
Allowable optical transmission loss	29dB as a standard (including power penalty of 1dB)
Structure	Optical fiber surplus length storage section, AC adapter
LAN port 1	10BASE-T/100BASE-TX/1000BASE-T
	Auto-Negotiation/Fixed (full duplex/half duplex)
LAN port 2	Auto MDI/MDIX
	10BASE-T/100BASE-TX
LAN port 2	Auto-Negotiation/Fixed (full duplex/half duplex)
	Auto MDI/MDIX
Power supply	AC100V, 10W or less
Dimensions	35(W)×158(D)×114(H)mm(excluding projections) (tentative)
Mass	Main body: 0.5kg or less, AC adaptor: 0.4kg or less

11

Optical Distribution/WDM coupler

FWM Series



Coupler

Item	Specifications			
Model	2-port	4-port	8-port	16-port
Applicable fiber	FWM20T-120μ	FWM20T-140μ	FWM20T-160μ	FWM20T-180μ
Terminal connector(Note)	SM fiber			
Applicable adapter	SC with shutter/APC adapter (green)			
Type	1×2 (3 units)	1×4 (3 units)	1×8 (3 units)	1×16 (1 unit)
Insertion loss	4.5dB or less	7.5dB or less	11.5dB or less	18.0dB or less
Use together with when sub-mounting	1			
Number of components used (fiber-optic)	For 16 units (with 3-, 4- or 8-port coupler)			
Dimensions (EIA30-30)	480(W)×271.5(D)×132(H)mm (excluding projections)			
Mass	●●●kg			

WDM Filter

Item	Specifications	
Model	FWM-30-FH-RF-800(nm)	FWM-30-FH-RF-800(nm)
Transmission wavelength	1,310/1,490/1,550nm	
Division output	1 output	2 output
Insertion loss	2.0dB or less	3.0dB or less
	2.0dB or less	3.0dB or less
	2.0dB or less	3.0dB or less
Isolation	7.5dB or more	C→V(1,310nm)
	11.5dB or more	C→V(1,490nm)
	11.5dB or more	C→V(1,550nm)
Optical connector	SC-APC (V, C port) SC-SPC (D port)	
Dimensions	480(W)×242(D)×140(H)mm (excluding projections)	
Mass	●●●kg	

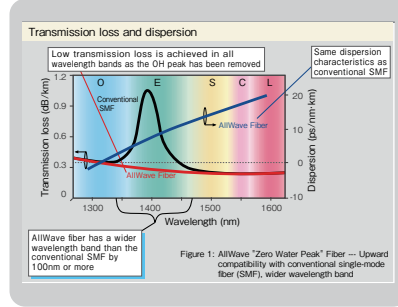
Note: Compatibility with SPC connector is also available

V port: video port; D port: communication port; C port: common (transmission channel) port

12

Wide Wavelength Band Fiber

AllWave/AWL



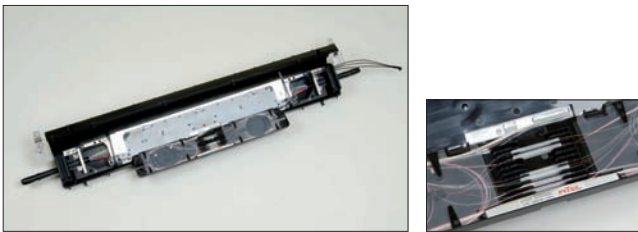
- Applications
- For subscriber networks
- Regional adoption of IT

The fiber minimizes loss in the E-band wavelength region, and can be used in all wavelength bands from 1,280 to 1,625nm. It is compatible with the ITU-T G.652 standard of single-mode optical fiber. The performance exceeds the ITU-T G.652.D standard of low OH peak fibers.

13

Closure with Built-in WDM Filter

FP-CC-W8



Item	Specifications	Remarks
Transmission wavelength	1,310/1,490/1,550nm	
Insertion loss	12.4dB or less	P2→P3(1,310nm)
	12.4dB or less	P3→P2(1,490nm)
	12.4dB or less	P3→P1(1,550nm)
Isolation	25dB or more	P3→P1(1,310nm)
	33dB or more	P3→P1(1,490nm)
	9.5dB or more	P3→P2(1,550nm)
Dimensions	105(W)×70(D)×865(H)mm	
Mass	●●●kg	

P1 port: video port; P2 port: communication port; P3 port: common (transmission channel) port

14

Exclusive Aerial Closure

J398



Model	Fiber type	Connections per tray	Connected cores per tray	Max. tray mounted	Max. cores connected
J398S	Single core	12	12	10	120
	2-core ribbon	16	32	10	320
	4-core ribbon	10	40	10	400
	8-core ribbon	5	40	10	400
J398T	Single core	6	6	10	60
	2-core ribbon	8	16	10	160
	4-core ribbon	5	20	10	200 (300 for through)
J398A	Single core	50	50	1	50
	2-core ribbon	50	100	1	100
	4-core ribbon	50	200	1	200

* Max. number of cables fed in (one side) : 3 lines, or 2 lines + 8 lines of drop cable, or 1 line + 16 lines of drop cable
 * Dimensions: 772(L) × 150(W) × 193(H)mm
 * Mass: 5kg
 * Applicable outer diameter of cables fed in: 8 to 24mm for trunk cables, 2.0mm width for drop cable
 * Waterproofing properties: Waterproofing of grade 4, JIS C 0920

15

Exclusive Aerial Closure

J396



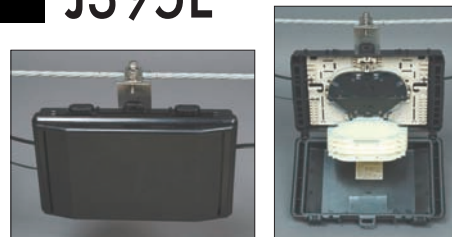
Model	Fiber type	Connections per tray	Connected cores per tray	Max. tray mounted	Max. cores connected
J398S	Single core	12	12	2	24
	2-core ribbon	12	24	2	48
	4-core ribbon	12	48	2	96
J396B J396S	Single core	12	12	2	44
	2-core ribbon	20	20	Coupler case-1	64
		8	16	2	
	4-core ribbon	16	32	Coupler case-1	104
		8	32	2	
		10	40	Coupler case-1	

* Max. number of cables fed in (one side) : 2 lines + 6 lines of drop cable, or 1 line + 12 lines of drop cable
 * Dimensions: 867(L) × 68(W) × 117(H)mm
 * Mass: 3kg
 * Applicable outer diameter of cables fed in: 9 to 22 mm for trunk cables, 9 to 17 mm for branch cables, 2.0mm width for drop cable
 * Waterproofing properties: Waterproofing of grade 4, JIS C 0920

16

Exclusive Closure for Drop Cable

J395L



		Max. trays mounted	Drop cable type	Connections per tray	Connected cores per tray	Max. cores connected
Basic kit (straight connection)	1 base tray		Single core	4	4	4
			2-core drop cable	4	8	8
			4-core drop cable	4	16	16
			Tray module M...S... (Note) (Optional) (Trunk cable/branch cable connection)	Tray S	12 sheets when only Tray S is used	Single core
Tray M	6 sheets when only Tray M is used	Single core	2		2	12
		2-core drop cable	2		4	
		4-core drop cable	1		4	24

Note: Indicates combination of trays S and M; "M2S8" indicates two M trays and 8 S trays; two S trays and one M tray are interchangeable.
 * Max. number of cables fed in (one side) : 2 lines of trunk cable, 8 lines of branch cables
 * Dimensions: 242(L) × 53(W) × 140(H)mm
 * Mass: 1kg
 * Applicable outer diameter of cables fed in: 3.3mm width for trunk cables, 2mm width for branch cables
 * Waterproofing properties: Waterproofing of grade 4, JIS C 0920

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