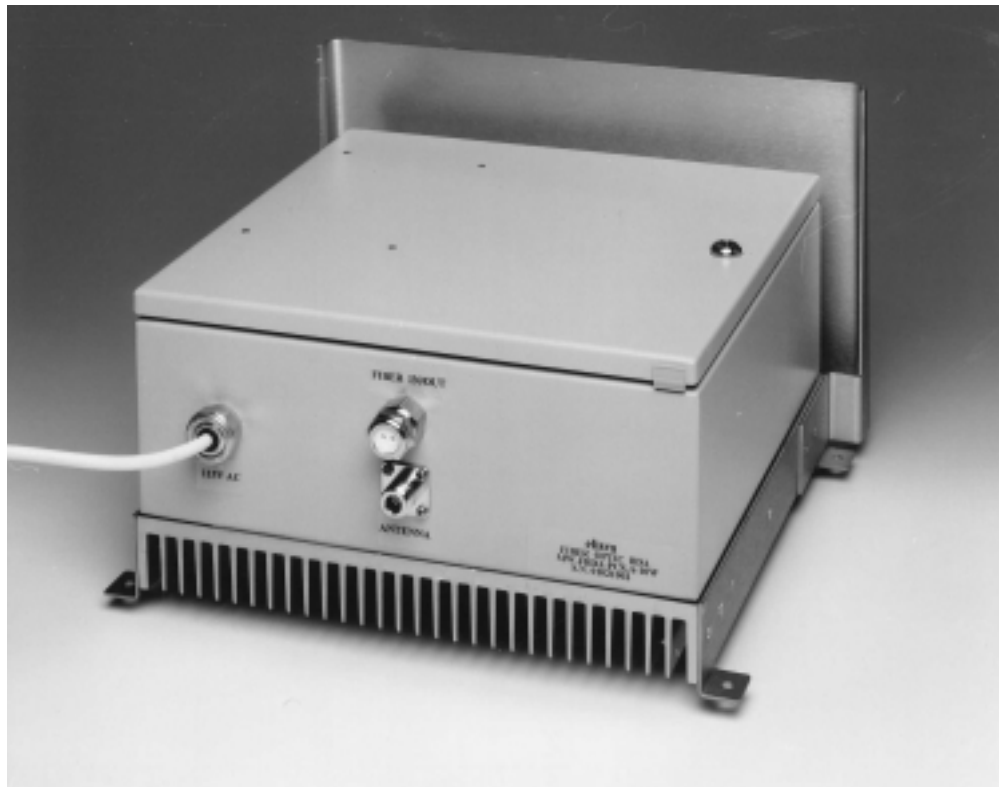


**INSTALLATION AND
OPERATING INSTRUCTIONS
FOR
FiberLink®
BI-DIRECTIONAL AMPLIFIER
Model No. MW-FBDA-PCS-A-10W**



elisra electronic systems ltd. *Wireless Solutions*

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1. OVERVIEW:

The FBDA is an interface unit between optical signals carrying RF information, and a RF antenna covering a defined user area. The system consists of uplink path and downlink path.

The uplink path receives RF signals from the Antenna and amplifies them and converts them to optical signals. These optical signals are sent to the BTS.

The downlink path receives optical signals from the BTS, converts them to RF signals and amplifies these signals using a high power amplifier. The Antenna transmits these RF signals to the users.

A duplexing filter separates the frequencies of uplink path from the downlink path enabling the use of the same antenna for receiving and transmitting. The FBDA provides about 46 dB RF gain in both directions.

Downlink gain can be adjusted over 30 dB range in 2 dB steps using step attenuator to reduce the FBDA downlink RF gain if needed.

Uplink gain can be adjusted by 16 dB continuous trim pot.(usually, this feature is not used as it can cause reduction of noise figure in the uplink path)

The downlink path uses a 10 Watt power amplifier while the uplink uses a 100mWatt AGC amplifier to drive the uplink F/O transmitter. The AGC is set to 0 dBm, which is the max power required by the F/O transmitter.

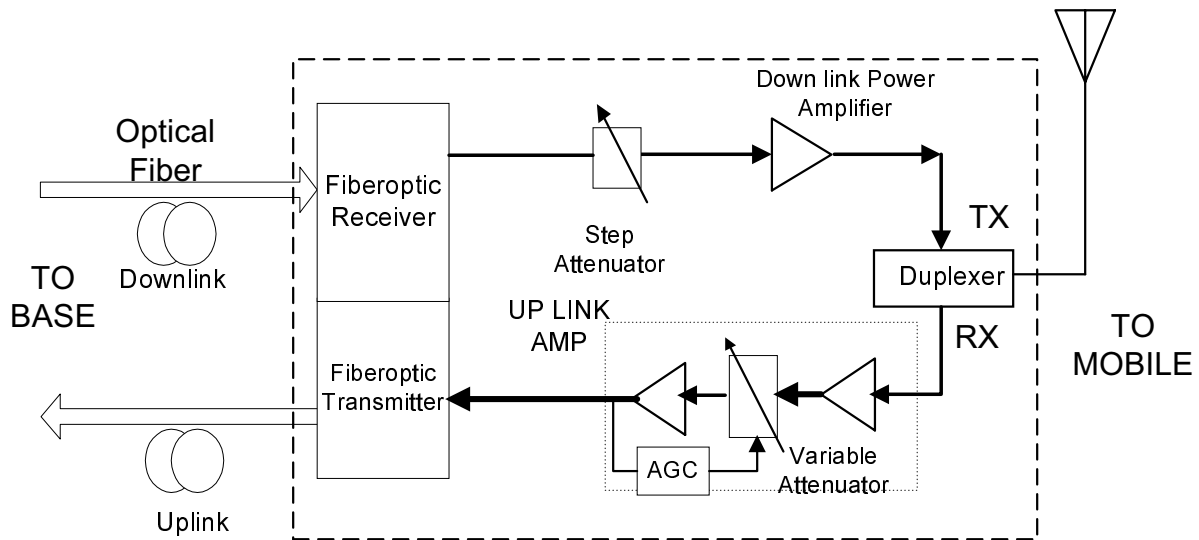


Fig. 1 : FBDA RF BLOCK DIAGRAM

2. COMPONENTS DESCRIPTION:

2.1 DUPLEXER

The duplexer serves to frequency separate uplink signals from downlink signals. The duplexer has sharp out of band attenuation for better isolation between the receiving and transmitting paths and reduction of interfering signals on air.

2.2 UPLINK AMPLIFIER

This uplink amplifier contains AGC control circuitry. The amplifier has a directional coupler at its output and a detector to monitor the uplink power. When a high power signal is received the automatic level control detects the amplitude and sends a feedback signal to a voltage variable attenuator at its input, which attenuates the signal level so that the output power of the amplifier is constant. The AGC function

limits the signal at the Fiberoptic transmitter input when high power signals are received while keeping high gain when low power signals are received.

The **LED** on the amplifier illuminates when the power output of the amplifier is within the set limit (when the AGC is either On or OFF).

The **Switch** on the RF amplifier enables the AGC function. If the AGC is disabled then the amplifier gives maximum gain for any input.

2.3 10 WATT DOWNLINK POWER AMPLIFIER

This is 45 dB gain, high linearity power amplifier.

2.4 RFiber+™ optical transceiver

The RFiber+™ product is a transceiver that includes a transmitter and receiver unit.

The transmitter converts the RF signals into light wave signals, which are then sent over fiberoptic cables. The receiver converts light wave signals back to RF. Using fiberoptic cable allows long distance transmission, up to 20 Km.

The model in use is 8325 that is an ultra-wide band product in the 0.08-2.2 GHz frequency range

The RFiber+™ series main features are:

1. Protocol transparency; i.e. any standard can be faithfully transmitted.
2. An optional serial port (RS232) is installed into each unit. This port allows data communication over the same fiberoptic cable.
3. Manual Gain Control is standard in receiver.

The following drawings show sample front and rear panels of the RFiber+™ unit.

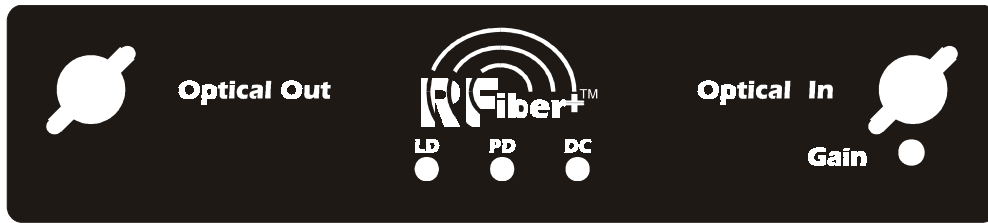


Fig. 2 : - RFiber+™ Front Panel

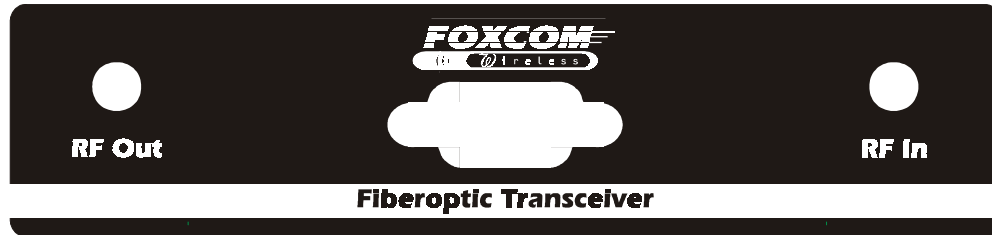


Fig. 3 : - RFiber+™ Rear Panel

. For more detail please refer to Rfiber+ Installation and User's Guide manual.

2.5 MONITOR UNIT

The FBDA monitor performs the following functions:

- a) Monitors the DC supply voltage of the FBDA. The fault LED illuminates when the voltage is beyond the specified limits.
- b) Monitors the current to each active element and the internal fan. If the current is below or above the specified limits then a LED illuminates.
- c) Monitor the optical receive signal using alarm output of the optical transceiver.
- d) Provides automatic alarm function. Whenever any fault occurs or when the power is removed from the FBDA, the unit sends summarized alarm signal to the base station via the Fiberoptic transmitter data port.
- e) Provides self test for the alarm functions. The pushbutton switch on the Monitor unit turns on all the alarm LEDs and initiates the summarized alarm.

Fig 4.: MONITOR OUTLINE

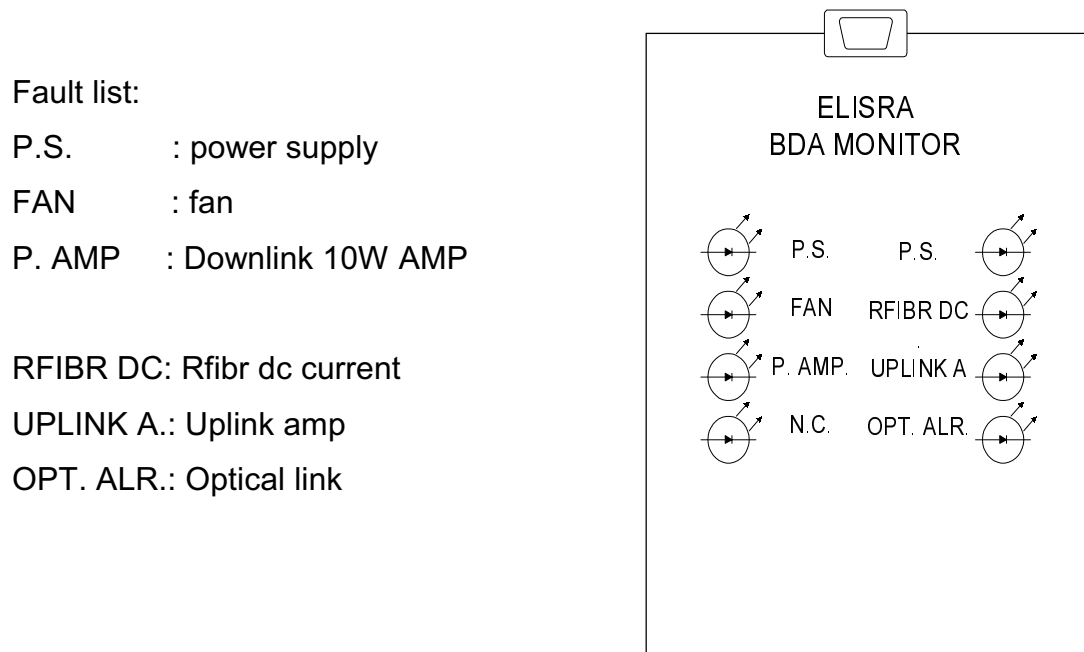
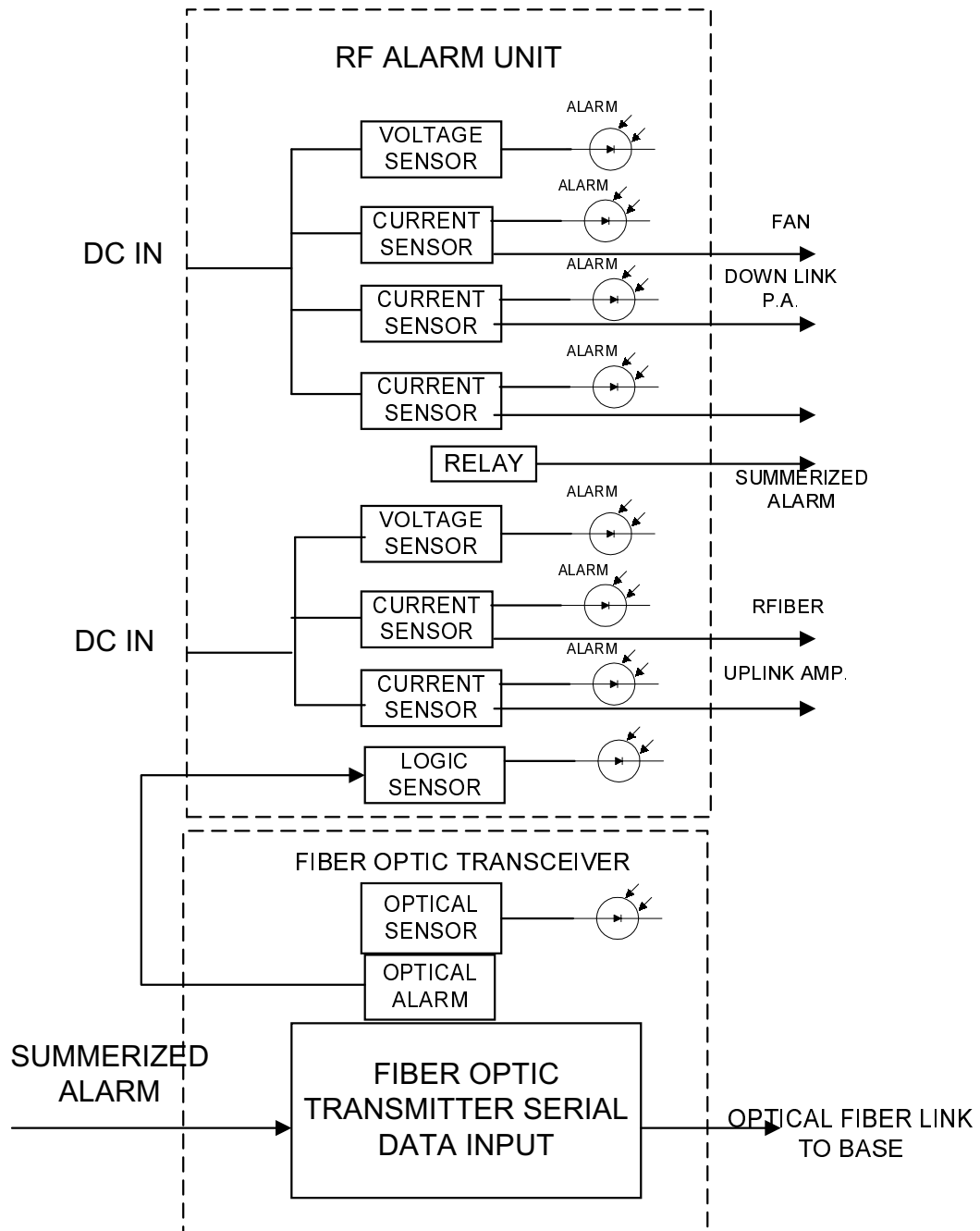


Fig 5.: FIBER LINK ALARMS BLOCK DIAGRAM



2.6 POWER SUPPLY

This is a high efficiency switching power supply providing +12 VDC, up to 8 Amp.

2.7 RF EXPOSURE WARNING

In order to satisfy the FCC RF exposure requirements, you must ensure that the installation complies with the following:

The antenna is connected via cable that has typical 1~10 dB attenuation (depends on the length of the cable) to the FBDA MOBILE port. This antenna is installed outdoor and has very sharp beam (Yagi type or similar) pointed to the donor (BTS). This type of antenna has about 10 dBi gain. Typical specifications: gain: 8 dBd (=10.1 dBi), VSWR: better than 1.5:1 , Impedance: 50 ohm. The outdoor antenna must be installed to provide a minimum separation distance of 0.8 m (80 cm) from persons within the area.

3 . SPECIFICATIONS:

3.1 RF SPECIFICATIONS

Frequency Range	Uplink (RX)	Downlink (TX)
	1850-1865 MHz	1930-1945 MHz
Noise Figure @+25 C (optical loss less than 3 dB)	: 10.0 dB max	N.A.
Manual Attenuation Range	0 to 16 db continuous	: 0 to 30dB in 2 dB steps
Passband Gain @ min attenuation	: 45 dB Nom.	42 dB Nom.
Passband Ripple	: \pm 1.0 dB typical	
Up-Link 3 rd Order Intermodulation Products @two tones -3 dBm each at Amplifier Output	: 60 dBc typical	N.A.
Down-Link 3 rd Order Intermodulation Products @two tones 27 dBm each at Output	N.A.	: 50 dBc typical
Impedance Level	: 50 Ohms	
VSWR In	: 1.5 : 1 typ	
VSWR Out	: 2.0 : 1 typ	

3.2 FBDA ALARM SPECIFICATIONS

Remote Fault Indication (Summarized alarm)	Alarm is sent on the serial data link of the FO transmitter
Fault List :	Power Supply Over-voltage or Under-voltage
	Uplink Amplifier Over Current or Under Current
	Downlink Power Amplifier Over Current or Under Current
	FO Transceiver Over Current or Under Current
	FO Receiver Power fall (Bad Optical Connection)
	Fan Over Current or Under Current
Electrical Fault Indication LED	Illuminated LED on Monitor Box for each Electrical Fault
Fiber Optic Connection Fault Indication LED	Illuminated LED on FO Transceiver when Optical Connection is performing Correctly. LED is OFF when FO Receiver Power falls.

3.3 MECHANICAL SPECIFICATIONS:

Size	: 300 x 300 x 160 mm approx.
Weight	: 15 kg. Approx.
Type	: Weatherproof Enclosure* for Wall Mounted Installation
Power Supply	: 110 VAC / 1A

3.4 ENVIRONMENTAL CONDITIONS:

Operating temperature	: - 30 C to + 50 C
Storage temperature	: - 30 C to + 70 C
Weatherproof conditions	: Protected to IP66

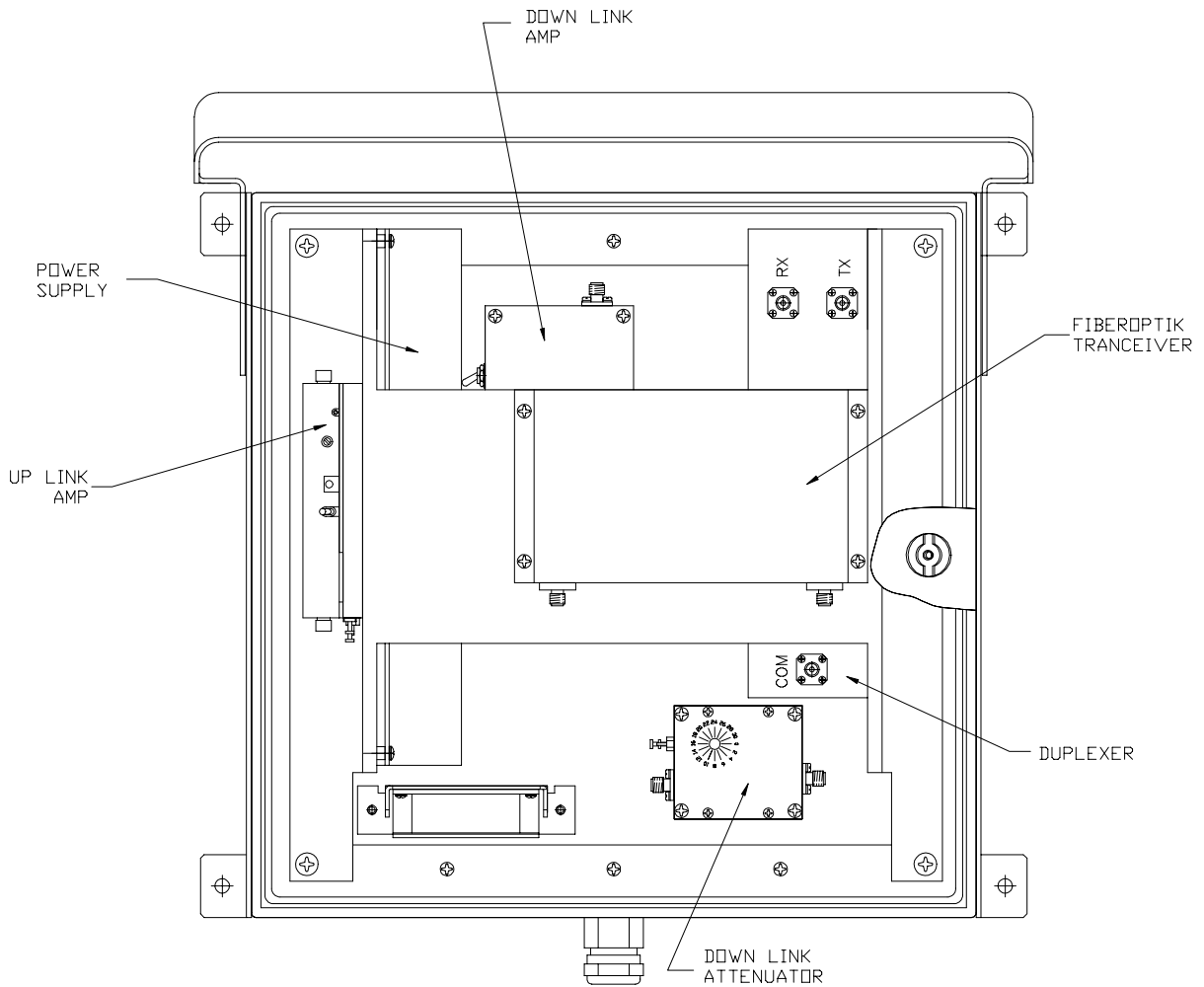


Fig. 6:MECHANICAL LAYOUT

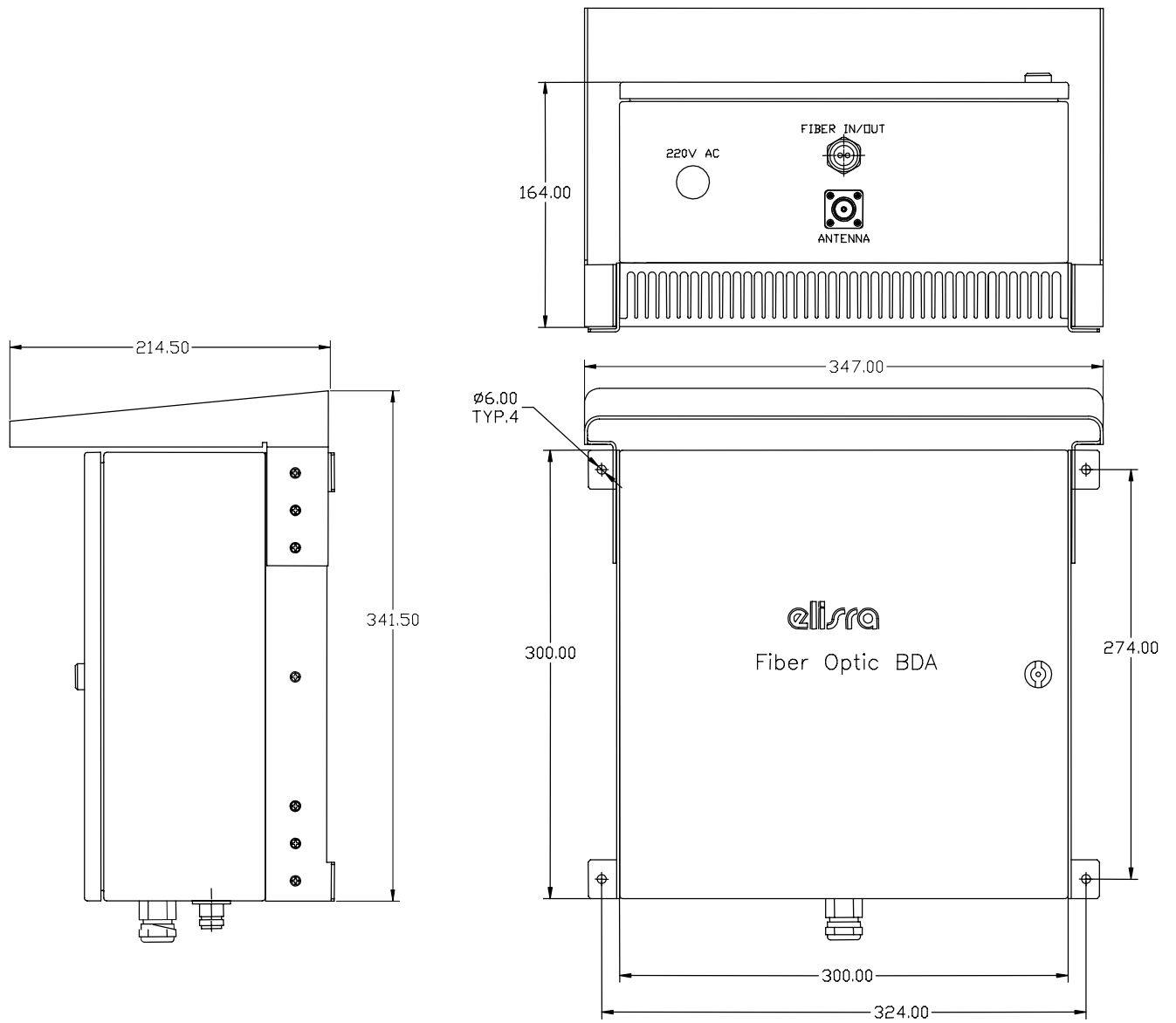


Fig. 7: MECHANICAL OUTLINE