DATASHEET

Amplified Spontaneous Emission (ASE) Source

Integrated Spectral Bench (ISB4)

ASE Light Source, PM Fiber, High Degree of Polarization, Spectral Coverage: 1520nm-1580nm, FWHM >60nm, CW: 1550nm, Light Output Power >60mW.

DAYY Part Number: ASM003522

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A. PRODUCT DESCRIPTION

The amplified spontaneous emission (ASE) Integrated Spectral Bench (ISB4) product is a compact light source solution that employs Luxmux's high-performance Optical Spectral Engine (OSE4) module. The ISB4 is a broadband light source that operates in the near infrared range. It is a turn-key product that can easily be integrated into existing devices that require light power.

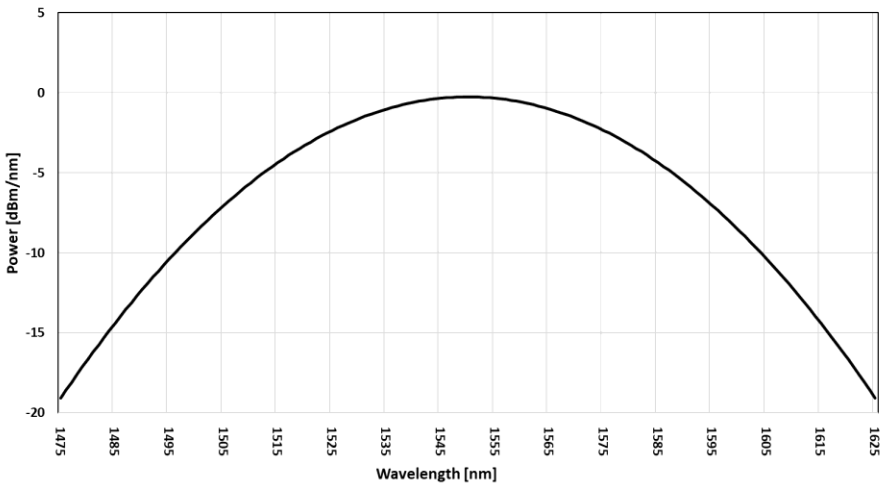
The ASE ISB4 includes an integrated isolator and a proprietary driver and controller, each of which enable the light power to easily be adjusted. A Graphical User Interface (GUI) with a USB or RS232 connection allows for external monitoring and adjustment capabilities. The ASE ISB4's light output is powered by a standard FC/APC connector (FC/PC or SMA available upon request).

B. KEY FEATURES

- User-friendly
- Centre wavelength (CW): 1550nm
- ASE can be run from 0% to 100% of maximum rating
- Output power: >60mW
- Bandwidth FWHM: >60nm
- Internally optimized for maximum coupling efficiency with PM1550-XP Fiber
- Monolithic integration of a broadband dual stage PMF isolator (35dB)
- Includes a monitor photodiode
- Light output connector: FC/APC (optional: FC/PC or SMA)
- Multiple communication interfaces: USB, RS-232 and TTL Status pins
- User-friendly GUI and custom API available for test automation

C. APPLICATIONS

- Optical Component Testing
- Telecom Test Equipment
- Medical Optical Coherence Tomography
- Industrial Optical Coherence Tomography
- Fiber Optic Gyroscopes
- Metrology
- Biomedical Imaging Systems
- Optical Sensing
- White Light Interferometry
- Research and Development



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D. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Minimum	Maximum	Unit
DRIVER POWER SUPPLY SPECIFICATIONS					
Input Power Supply Voltage	V_S	CW	10	14	V
Input Power Supply Current	I_S	CW	5	-	A
TEMPERATURE SPECIFICATIONS					
Case Temperature (see note 2)	T_{Case}		0	60	°C
Storage Temperature (see note 4)	T_{stg}	No condensation, Unbiased	-40	85	°C
Storage Humidity (see note 4)	RH_{stg}		5	85	%RH
Ambient Operating Temperature (See note 3)	T_{OP}		0	50	°C

Notes:

1. *Please note that exceeding the Absolute Maximum Ratings above may cause device failure. DAYY does not bear responsibility for laser power damage that is attributed to electrostatic discharge, excessive current levels, and current spikes (transients).*
   Any attempts to increase the ASE drive current above the pre-set limits or recommended specification limits, can damage the device, and nullify the warranty period. It should be emphasized that the current limit set points cannot be exceeded.
2. *For optimum performance of the Integrated Spectral Bench (ISB4), the ISB4 must be operated within the specified temperature ranges. The ASE Source has an internal thermoelectric cooler (TEC) to remove heat from the light source and dissipate it through the ISB4 case. It is required to provide free air circulation around the ISB4 device. It is always recommended to cool down the unit with a fan, and/or to mount the ISB4 on an appropriate heatsink, capable of dissipating up to 10W. The thermal resistance between ISB4 metal case and heatsink can be minimized by applying thermal grease, thermal glue or thermal pad between the contact surfaces.* ***When the ASE source is used without a heatsink, maximum ambient operating temperature is 40˚C.*** *The specification lists the operating temperature for the electrical/optical characteristics, which is the temperature of the ISB4 during the time that the specifications were measured. Variation in temperature beyond what is specified can have a significant effect on the optical characteristics, like changes in wavelength or drop in output power.*
3. *Storage temperature and relative humidity should be chosen so the dew point of the humid air around the package is below the storage temperature of the package, to avoid condensation inside the ISB4 enclosure.*

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E. OPTICAL AND ELECTRICAL SPECIFICATIONS (see note 5)

Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
DRIVER POWER SUPPLY SPECIFICATIONS						
Input Power Supply Voltage	V_S	CW	10	12	14	V
Input Power Supply Current	I_S	CW	5	-	-	A
Input Power Supply Voltage Ripple and Noise	γ	CW	-	-	200	mVpp
OPTICAL SPECIFICATIONS						
Center Wavelength (see note 6)	CWL	CW T_{OP} = 25˚C T_{TEC} = 21˚C	1520	1550	1580	nm
PM Fiber Coupled Power (see note 7)	P	CW T_{OP} = 25˚C T_{TEC} = 21˚C I_{OP}	60	-	-	mW
Bandwidth FWHM	B_{FWHM}	CW T_{OP} = 25˚C T_{TEC} = 21˚C I_{OP}	60	-	-	nm
Spectrum Ripple (see note 8)	R	CW T_{OP} = 25˚C T_{TEC} = 21˚C	-	0.1	0.2	dB
Spectral Coverage (FWHM)	SC	CW T_{OSE2} = 25˚C T_{TEC} = 21˚C I_{OP}	-	1520-1580	-	nm
Polarization Extinction Ratio (see note 9)	PER	CW T_{OP} = 25˚C T_{TEC} = 21˚C I_{OP}	10	-	-	dB
RIN	RIN		-	< -130	-	dB/Hz
Power Stability (After 1h warm up)	P_{STAB}	@25˚C ± 1˚C	-	< 0.1	-	dB
Warmup Time	W		15	30	60	Min.
CONSTANT CURRENT MODE						
Operating Current	I_{OP}	CW T_{OP} = 25˚C T_{TEC} = 21˚C	-	900	950	mA
Current Setting Resolution	R_{IOP_SET}		-	-	0.1	mA
ISB4 Current Reading Resolution	R_{IOP_READ}		-	0.1	-	mA

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Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
MODULATION MODE						
Waveform			-	Square	-	
Modulation Frequency Range	f_{mod}		0.016	-	1000	Hz
Duty Cycle	D		10	50	90	%
LIGHT OUTPUT CONNECTOR						
Type of Fiber Connector			-	FC/PC, FC/APC, SMA	-	
ISB4 TEC SPECIFICATIONS						
ISB4 TEC Temperature Setpoint	T_{isb4_SET}		0	-	40	°C
ISB4 TEC Temperature Setpoint Resolution	R_{Tisb4_SET}		-	0.1	-	°C
ISB4 TEC Temperature Reading	T_{isb4_READ}		-40	-	100	°C
ISB4 TEC Temperature Reading Resolution	R_{Tisb4_READ}		-	0.1	-	°C
TEMPERATURE SPECIFICATIONS						
Heatsink Temperature Reading Range	T_{HS}		-40	-	100	°C
Heatsink Temperature Reading Resolution	R_{THS}		-	0.1	-	°C

Notes:

5. *There may be differences in typical values of output power, power stability, wavelength and bandwidth, due to coupling efficiency. These values are references and there is no guarantee that each particular ISB4 module will have EXACTLY the typical values shown on the previous chart.*
6. *Center Wavelength is defined as the center point of the 3dB bandwidth of the ASE Source.*
7. *The ISB4 uses a Dual Stage Isolator for back reflection protection. Isolators are used to protect a source from back reflections or signals that may occur after the isolator. Back reflections can damage a laser source or cause it to amplitude modulate, or frequency shift. In high-power applications, back reflections can cause instabilities and power spikes. DAYY does not bear responsibility for laser power damage that is attributed to hot spots in the beam.*
8. *Resolution of 0.1nm.*
9. *Polarization Extinction Ratio is defined as the ratio of optical powers of perpendicular polarizations, expressed in decibels (dB).*

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F. PLOTS - Test performed at T_{OP}=25°C and T_{TEC}=21°C

FIG. 1. ISB4 SPECTRUM

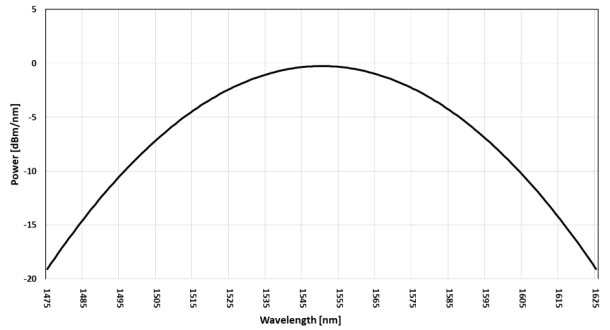


FIG. 2: ISB4 OUTPUT POWER VS CURRENT

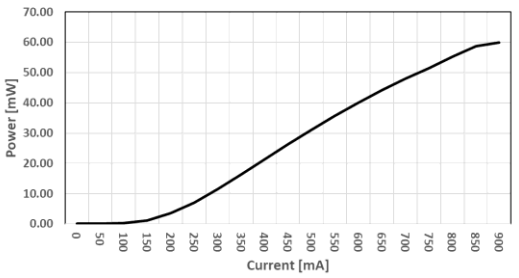


FIG. 3: ISB4 TYPICAL POWER STABILITY

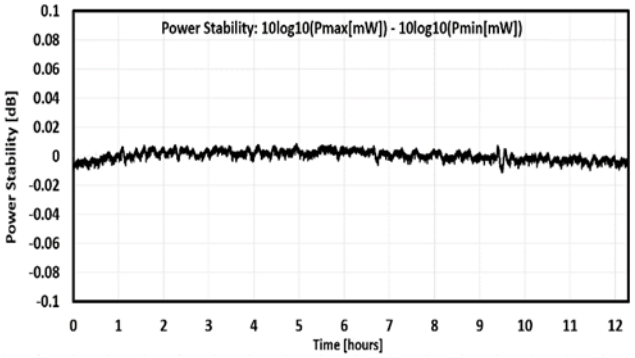
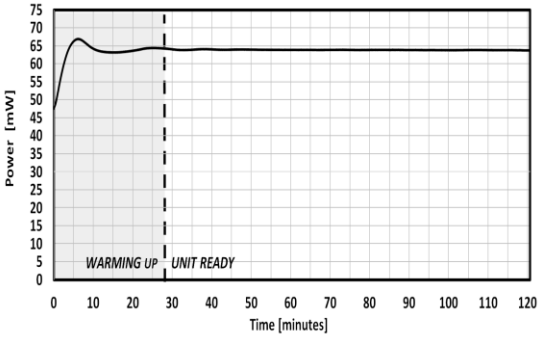


FIG. 4: WARM-UP TIME



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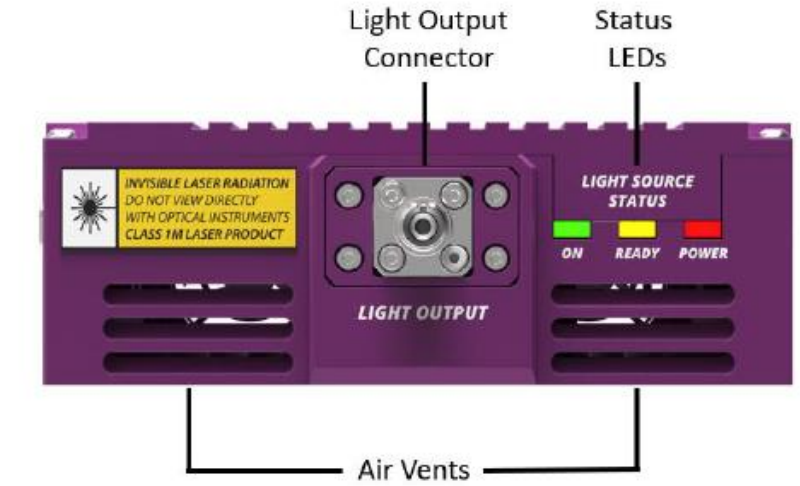
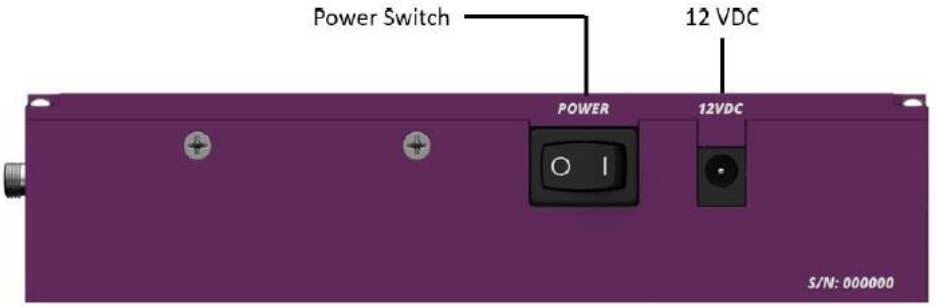
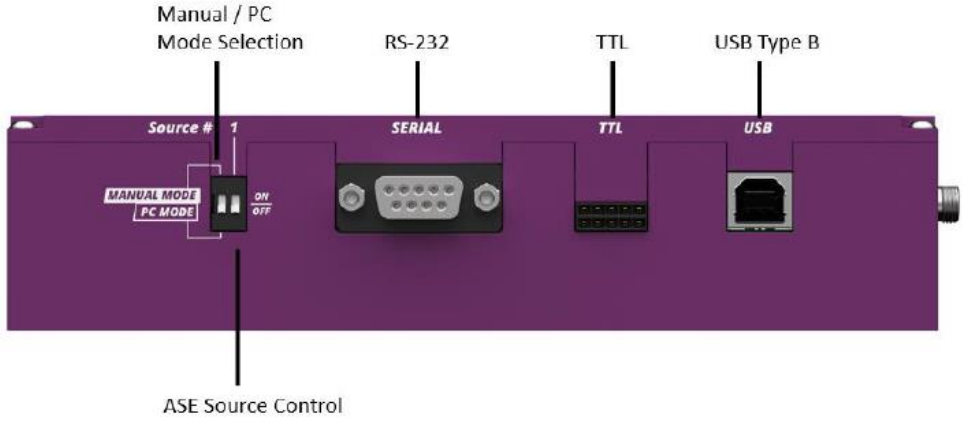
G. ISB4 Interface







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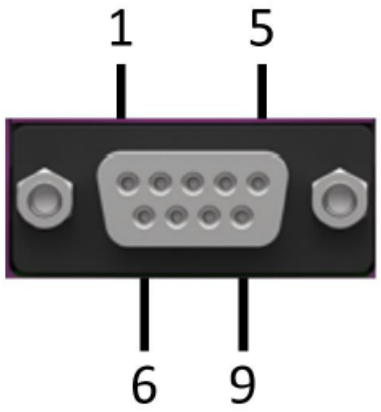
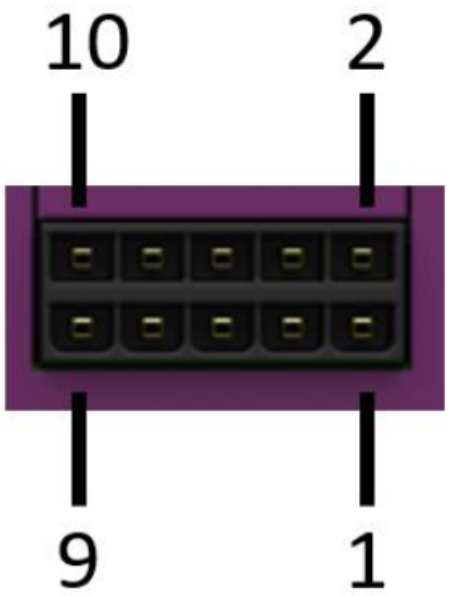
D-SUB CONNECTOR PIN OUT



Pin 2: RXD Recevied Data
Pin 3: TXD Transmit Data
Pin 5: Ground

Baud Rate 115200, 1 stop bit, no parity

TTL CONNECTOR PIN OUT



Pin 1: TTL Control Enable (input)
Pin 2: ASE Ready (output)
Pin 3: TTL Alarm (output)
Pin 4: TTL ASE On/Off_Not (input)
Pin 5: TTL GP1 (input)
Pin 6: TTL GP2 (input)
Pin 7: TTL GP3 (output)
Pin 8: TTL GP4 (output)
Pin 9, 10: Ground

TTL Voltage range: 0-3.3V

Mates with #IPS1-105-01-L-D-RA or equivalent

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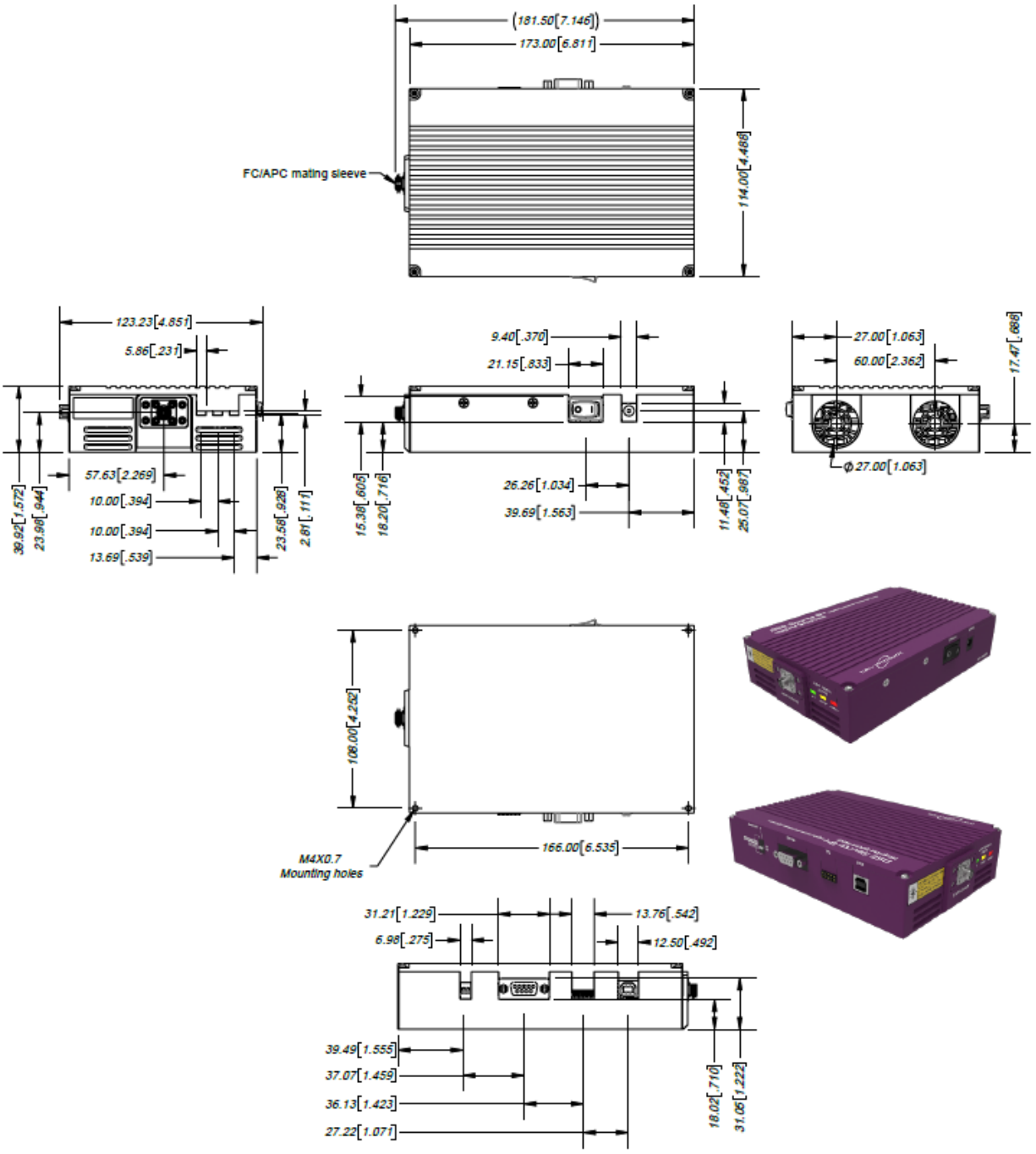
H. MECHANICAL DIAGRAM – STANDARD ISB4



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I. SAFETY

All statements regarding safety of operation and technical data will only apply when the unit is operated correctly.

The driver must not be operated in environments susceptible to explosion hazards. Do not obstruct the air ventilation slots. If any parts of the driver, or electronics are broken or exposed, contact DAYY's technical support and do not attempt to operate the unit.

The ISB4 a Class 1M laser product. It is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes. It produces a beam that is divergent. If light is re-focused use protective eye wear.

J. APPLICATION PROTOCOL INTERFACE (API)

DAYY driver utilizes the MODBUS Protocol for communications. Users can find numerous detailed specifications for the protocol on the internet. MODBUS is used widely in industrial applications. The driver is designed to use this protocol over all of its communication interfaces, MODBUS – RTU is a master/slave protocol and is employed by the USB or RS232.

The MODBUS specification has outlined how a user can adapt the overall packet structure to suit each interface requirement. The primary section of a MODBUS packet is known as the Protocol Data Unit (PDU) and it is independent of the underlying communication interface. The PDU includes additional byte fields for the MODBUS transaction per the Application Data Unit (ADU).

A high-level overview of MODBUS Protocol can be found on the ISB4 User Manual. If users want to develop their own API, the ISB4 Register Map is available upon request. Please contact technical support: techsupport@dayyphotonics.com.

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