

IPG YLR / YLPP SERIES FIELDBUS INTERFACE

This document provides information on the IPG YLR/YLPP Series Fieldbus Interface. This interface currently provides support for cyclical messaging between a Fieldbus Master and the LFBI device for the YLR/YLPP lasers. The document is divided into three sections covering the laser model classes to which this specification is applicable. These model classes include YLR (and YLR- U Ultra-Compact), YLR-QCW and YLPP/YLPF variants. The first section defines the core Fieldbus parameters that are common to all three supported model types. The second section defines Fieldbus parameters that are specific to YLR-QCW models. The third section defines Fieldbus parameters that are specific to YLPP/YLPF models.

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1. YLR CORE PROCESS DESCRIPTION

The YLR Core Process is the common cyclical data exchanged between the Fieldbus Master and the LFBI device for the YLR/YLPP lasers. The YLR Core data are comprised of **16 input bytes** and **16 output bytes** as shown in the table below. Unless otherwise indicated, the YLR Core Process definitions are applicable to YLR, YLR-U, YLR-QCW and YLPP/YLPF model types. Bytes, Control Bits and Status Bits tagged with “N/A” in the YLR Core Process may have additional functionality in the YLR-QCW and YLPP Process Descriptions.

Byte	Tag	Variable	Type	Description	Detail
INPUT (FB Master --> LFBI)					
0	Control	GENERAL	Bit field	Laser Control Input signals	Table 1-2
1	RESERVED	RESERVED	--	Reserved for future use	
2-3	Set Power	SET_POWER	Unsigned 16	Laser Power requested	Table 1-3
4-5	Modulation	MOD_FREQ	Unsigned 16	Modulation Frequency requested (Hz)	Table 1-4
6		DUTY_CYCLE	Unsigned 8	Modulation Duty Cycle requested (%)	
7	RESERVED	RESERVED	--	Reserved for future use	
8-11	N/A	Not Available	--	Reserved for QCW and YLPP models.	
12-15	RESERVED	RESERVED	--	Reserved for future use	
OUTPUT (FB Master <-- LFBI)					
0-2	Status	GENERAL	Bit field	Laser Status Output signals	Table 1-5
3	RESERVED	RESERVED	--	Reserved for future use	
4-5	Sensor	OUTPUT_POWER	Unsigned 16	Laser Output Power monitor	Table 1-6
6-7		BACK_REFLECTION	Unsigned 16	Laser Back Reflection monitor	
8-9		CASE_TEMP	Unsigned 16	Laser Case Temperature (°C)	
10-13	N/A	Not Available	--	Reserved for QCW and YLPP models.	
14-15	RESERVED	RESERVED	--	Reserved for future use	

TABLE 1-1 YLR CORE PROCESS MAPPING

CONTROL BITS

The mapping of the YLR Core Laser control signals is provided in the following table. For the CONTROL bits, a value of “1” asserts the respective control, and a value of “0” removes it. Note that some controls are edge-triggered only.

	Bit	Signal	Description
Byte 0 - GENERAL	0	EMISSION_ON	Turn laser emission on (Positive edge triggered)
	1	MODULATION_ON	Turn laser modulation on
	2	GUIDE_BEAM_ON	Turn guide laser beam on (Positive edge triggered)†
	3	RESET_ERRORS	Clear all resettable laser errors
	4	N/A	Reserved for QCW models (Bit is ignored otherwise)
	5	Reserved	Reserved for future use
	6	Reserved	Reserved for future use
	7	Reserved	Reserved for future use

TABLE 1-2 YLR CORE INPUT PROCESS CONTROL BYTES

† This control bit is not available on YLPP Series lasers and is ignored for YLPP case.

SET POWER

Laser Input	Input Type	Units	SCALE	Description
SET_POWER	Unsigned 16	%	10	Laser Set Power Input

TABLE 1-3 INPUT PROCESS SET_POWER CONTROL BYTES

The SET_POWER parameter is used to set the laser power as a percentage ranging from 0 to 100% of its maximum power. This parameter is translated into a control voltage where full power (100%) corresponds to value of 1000 (0x3E8 in hex) at a resolution of 0.1% per bit. The scaling applied to SET_POWER is shown in the example below.

Data Type: 16-bit unsigned integer

Example: Set Power = 78.9% --> 789 (0x315) at 0.1%/bit for analog control voltage at 78.9% of its maximum.

MODULATION

Laser Input	Input Type	Units	SCALE	Description
MOD_FREQ	Unsigned 16	Hz	1	Modulation Frequency (0 – 50 kHz)
DUTY_CYCLE	Unsigned 8	%	1	Modulation Duty Cycle (0 – 100%)

TABLE 1-4 INPUT PROCESS MODULATION CONTROL BYTES

The MOD_FREQ parameter is used to set the modulation frequency. This parameter specifies the modulation frequency in Hertz and supports a range of 0 to 50.0 kHz. The MOD_FREQ parameter is scaled as shown in the example below.

Data Type: 16-bit unsigned integer

Example: Mod Frequency = 25.8 kHz = 25800 Hz → 25800 (0x64C8) → drive modulation signal at 25.8 kHz.

The DUTY_CYCLE parameter is used to define the ON/OFF ratio of the modulation applied to the laser. This parameter ranges from 0% (modulation fully OFF) to 100% (modulation fully ON). The DUTY_CYCLE parameter is scaled as shown in the example below.

Data Type: 8-bit unsigned integer

Example: Duty Cycle = 30% → 30 (0x1E) → apply duty cycle of 30% ON / 70% OFF to modulation signal.

STATUS BITS

The mapping of the YLR Core status signals is provided in the following table. Error status bits are latched once the error condition has occurred. A RESET_ERRORS command must be asserted in order to reset the error bit state(s). Bits that are not errors will set or clear continuously based on their required condition. A value of “1” indicates that the required condition has been satisfied. A value of “0” indicates the condition has not been met.

	Bit	Signal	Description
Byte 0 - GENERAL	0	EMISSION_ON	Laser Emission is ON
	1	LASER_READY	Laser is Ready (normal operation)
	2	LASER_ERROR	Laser Error(s) detected
	3	MAIN_PWR_ON	Main Power Supply is ON
	4	PWR_KEY_ON	Power Key Switch is ON
	5	INTLK1_OPEN	Interlock Ch. 1 contact is OPEN
	6	INTLK2_OPEN	Interlock Ch. 2 contact is OPEN
	7	RS232_LINK_UP	RS-232 link connected

	Bit	Signal	Description
Byte 1 - GENERAL	0	MONITOR_ONLY	Only allow monitoring of laser parameters*
	1	MODULATION_ON	Laser Modulation is ON
	2	GUIDE_BEAM_ON	Laser Guide Beam is ON†
	3	BACK_REFL_HIGH	Back Reflection level is HIGH
	4	CASE_TEMP_HIGH	Case temperature too high
	5	CASE_TEMP_LOW	Case temperature too low
	6	FIBER_INTLK_OPEN	Fiber interlock is OPEN
	7	CRITICAL_ERROR	Critical error detected

	Bit	Signal	Description
Byte 2 - GENERAL	0	N/A	Reserved for QCW models (Set to “0” otherwise).
	1-3	MODEL_CLASS	Laser Model Class (See MODEL CLASS CODES).
	4	N/A	Reserved for YLPP models (Set to “0” otherwise).
	5	Reserved	Reserved for future use
	6	Reserved	Reserved for future use
	7	Reserved	Reserved for future use

TABLE 1-5 YLR CORE OUTPUT PROCESS STATUS BYTES

Model Class	Code	Description
Unknown	0	Model Class unknown or not yet read
YLR-CW	1	YLR CW Series (Standard chassis)
YLR-CW-U	2	YLR CW Series (Ultra-compact chassis)
YLR-QCW	3	YLR QCW Series (Pulse Mode support)
YLPP/YLPPF	4	YLPP Picosecond or YLPPF Femtosecond Pulse Laser Series
Reserved	5-7	Reserved for future use

MODEL CLASS CODES

† This status bit is not available on YLPP Series lasers and is set to “0” for YLPP case.

* When set to “1”, indicates CONTROL of the laser through this interface is disabled.

SENSOR READINGS

The sensor reading values are provided in the output process as 16-bit unsigned integers. To accommodate floating-point precision, the LFBI device scales the sensor readings to integers before sending them to the Fieldbus Master. The Master can then divide the output data by the scale factor to calculate the equivalent float.

Sensor	Output Type	Units	SCALE	Description
OUTPUT POWER	Unsigned 16	%	10	Laser Output Power reading
BACK REFLECTION	Unsigned 16	%	10	Laser Back Reflection reading*
CASE TEMP	Unsigned 16	°C	10	Laser Case Temperature

TABLE 1-6 OUTPUT PROCESS SENSOR READING BYTES

The OUTPUT POWER sensor parameter returns the laser's actual power currently in effect as a percentage ranging from 0 to 100% of its maximum nominal power. This parameter is a translation of the laser power output monitor's analog voltage signal where full nominal power (100%) corresponds to a value of 1000 (0x3E8 in hex). The scaling applied to OUTPUT POWER is shown in the example below.

Data Type: 16-bit unsigned integer

Example: Output Power = 789 (0x315) --> 78.9% at 0.1%/bit

The BACK REFLECTION sensor parameter returns the laser's back reflection power currently in effect as a percentage ranging from 0 to 100% of its maximum permissible level. This parameter is represented as an unsigned 16 value where maximum permissible back reflection (100%) corresponds to a value of 1000 (0x3E8 in hex). The scaling applied to BACK REFLECTION is shown in the example below.

Data Type: 16-bit unsigned integer

Example: Back Reflection = 31 (0x1F) --> 3.1% at 0.1%/bit.

The CASE TEMP sensor parameter returns the laser's current operating temperature in a range from 0 to 100 °C. This parameter is represented as an unsigned 16 value where a maximum temperature of 100 °C corresponds to a value of 1000 (0x3E8 in hex). The scaling applied to CASE TEMP is shown in the example below.

Data Type: 16-bit unsigned integer

Example: Case Temperature = 245 (0xF5) --> 24.5 °C at 0.1°C/bit

* Back Reflection sensor reading available only on YLR-U CW and YLPP Pico-laser Series lasers.

2. YLR-QCW PROCESS DESCRIPTION

The YLR-QCW Process is the cyclical data exchanged between the Fieldbus Master and the LFBI device for the YLR-QCW lasers. The YLR-QCW data are comprised of **16 input bytes** and **16 output bytes** as shown in the table below. The YLR-QCW Process adds **Pulse Mode** control parameters and status to the YLR Core Process, and is applicable only to YLR-QCW model types. Refer to the YLR Core Process section for descriptions of variables not shown in this section.

Byte	Tag	Variable	Type	Description	Detail
INPUT (FB Master --> LFBI)					
0	Control	GENERAL	Bit field	Laser Control Input signals	Table 2-2
1	RESERVED	RESERVED	--	Reserved for future use	
2-3	Set Power	SET_POWER	Unsigned 16	Laser Power requested (%)	Table 1-3
4-5	Modulation	MOD_FREQ	Unsigned 16	Modulation Frequency requested (Hz)	Table 1-4
6		DUTY_CYCLE	Unsigned 8	Modulation Duty Cycle requested (%)	
7	RESERVED	RESERVED	--	Reserved for future use	
8-9	Pulse Mode	PULSE_REP_RATE	Unsigned 16	Pulse Repetition Rate (Hz)	Table 2-3
10-11		PULSE_WIDTH	Unsigned 16	Pulse Width (µs)	
12-15	RESERVED	RESERVED	--	Reserved for future use	
OUTPUT (FB Master <-- LFBI)					
0-2	Status	GENERAL	Bit field	Laser Status Output signals	Table 2-4
3	RESERVED	RESERVED	--	Reserved for future use	
4-5	Sensor	OUTPUT_POWER	Unsigned 16	Laser Output Power monitor (%)	Table 1-6
6-7		Not available	--	Reserved for YLR-U and YLPP models	
8-9		CASE_TEMP	Unsigned 16	Laser Case Temperature (°C)	
10-11	Pulse Mode	PULSE_REP_RATE	Unsigned 16	Pulse Repetition Rate (Hz)	Table 2-5
12-13		PULSE_WIDTH	Unsigned 16	Pulse Width (µs)	
14-15	RESERVED	RESERVED	--	Reserved for future use	

TABLE 2-1 YLR-QCW PROCESS MAPPING

CONTROL BITS

The mapping of the YLR-QCW Laser control signals is provided in the following table. For the CONTROL bits, a value of “1” asserts the respective control, and a value of “0” removes it. Note that some controls are edge-triggered only.

	Bit	Signal	Description
Byte 0 - GENERAL	0	EMISSION_ON	Turn laser emission on (Positive edge triggered)
	1	MODULATION_ON	Turn laser modulation on
	2	GUIDE_BEAM_ON	Turn guide laser beam on (Positive edge triggered)
	3	RESET_ERRORS	Clear all resettable laser errors
	4	PULSE_MODE_ON	Turn laser pulse mode on
	5	Reserved	Reserved for future use
	6	Reserved	Reserved for future use
	7	Reserved	Reserved for future use

TABLE 2-2 INPUT PROCESS CONTROL BYTES

PULSE MODE INPUT PARAMETERS

The pulse mode input parameters are used to control the pulse repetition rate and pulse width for YLR-QCW laser models. In the YLR-QCW Fieldbus Interface, all pulse mode parameters are specified as unsigned 16-bit types. These are internally scaled and converted to floats based on their respective units before being sent to the laser over its serial interface.

Pulse Mode	Input Type	Units	SCALE	Description
PULSE REP RATE	Unsigned 16	Hz	1	Pulse Repetition Rate
PULSE WIDTH	Unsigned 16	μs	1	Pulse Width

TABLE 2-3 INPUT PROCESS PULSE MODE PARAMETERS

The PULSE REP RATE parameter specifies the laser’s pulse repetition rate as a value in Hertz ranging from 1 to 50,000. The scaling applied to PULSE REP RATE is shown in the example below.

Data Type: 16-bit unsigned integer
Example: Pulse Rep Rate = 40.0 kHz = 40,000 Hz → 40,000 (0x9C40) at 1 Hz/bit.

The PULSE WIDTH parameter specifies the laser’s pulse width as a value in microseconds ranging from 1 to 50,000. The scaling applied to PULSE WIDTH is shown in the example below.

Data Type: 16-bit unsigned integer
Example: Pulse Width = 15.0 ms = 15,000 μs → 15,000 (0x3A98) at 1 μs/bit.

STATUS BITS

The mapping of the YLR-QCW status signals is provided in the following table. Error status bits are latched once the error condition has occurred. A RESET_ERRORS command must be asserted in order to reset the error bit state(s). Bits that are not errors will set or clear continuously based on their required condition. A value of “1” indicates that the required condition has been satisfied. A value of “0” indicates the condition has not been met.

	Bit	Signal	Description
Byte 0 - GENERAL	0	EMISSION_ON	Laser Emission is ON
	1	LASER_READY	Laser is Ready (normal operation)
	2	LASER_ERROR	Laser Error(s) detected
	3	MAIN_PWR_ON	Main Power Supply is ON
	4	PWR_KEY_ON	Power Key Switch is ON
	5	INTLK1_OPEN	Interlock Ch. 1 contact is OPEN
	6	INTLK2_OPEN	Interlock Ch. 2 contact is OPEN
	7	RS232_LINK_UP	RS-232 link connected

	Bit	Signal	Description
Byte 1 - GENERAL	0	MONITOR_ONLY	Only allow monitoring of laser parameters*
	1	MODULATION_ON	Laser Modulation is ON
	2	GUIDE_BEAM_ON	Laser Guide Beam is ON
	3	BACK_REFL_HIGH	Back Reflection level is HIGH
	4	CASE_TEMP_HIGH	Case temperature too high
	5	CASE_TEMP_LOW	Case temperature too low
	6	FIBER_INTLK_OPEN	Fiber interlock is OPEN
	7	CRITICAL_ERROR	Critical error detected

	Bit	Signal	Description
Byte 2 - GENERAL	0	PULSE_MODE_ON	Laser Pulse Mode is ON
	1-3	MODEL_CLASS	Laser Model Class (See MODEL CLASS CODES).
	4	N/A	Reserved for YLPP models (Set to “0” otherwise).
	5	Reserved	Reserved for future use
	6	Reserved	Reserved for future use
	7	Reserved	Reserved for future use

TABLE 2-4 OUTPUT PROCESS STATUS BYTES

* When set to “1”, indicates CONTROL of the laser through this interface is disabled.

PULSE MODE OUTPUT PARAMETERS

The YLR-QCW Pulse Mode output parameters are cyclically read from the laser by the LFBI device and returned to the Fieldbus Master as 16-bit unsigned integers. These values may be used by the Master to confirm that requested Pulse Mode input parameters have been processed correctly and are within their respective allowed ranges.

Pulse Mode	Output Type	Units	SCALE	Description
PULSE REP RATE	Unsigned 16	Hz	1	Pulse Repetition Rate
PULSE WIDTH	Unsigned 16	μs	1	Pulse Width

TABLE 2-5 OUTPUT PROCESS PULSE MODE PARAMETERS

The PULSE REP RATE parameter returns the laser’s pulse repetition rate currently in effect as a value in Hertz ranging from 1 to 50,000. The scaling applied to PULSE REP RATE is shown in the examples below.

Data Type: 16-bit unsigned integer
Example: Pulse Rep Rate = 40,000 (0x9C40) --> 40000 Hz = 40.0 kHz at 1 Hz/bit.

The PULSE WIDTH parameter returns the laser’s pulse width currently in effect as a value in microseconds ranging from 1 to 50000. The scaling applied to PULSE WIDTH is shown in the example below.

Data Type: 16-bit unsigned integer
Example: Pulse Width = 15,000 (0x3A98) --> 15000 μs = 15.0 ms at 1 μs/bit

3. YLPP PROCESS DESCRIPTION

The YLPP Process is the cyclical data exchanged between the Fieldbus Master and the LFBI device for the YLPP/YLPP lasers. The YLPP data are comprised of **16 input bytes** and **16 output bytes** as shown in the table below. The YLPP Process adds **Pulse Setup** control parameters and **Pulse Info** monitoring to the YLR Core Process, and is applicable only to YLPP/YLPP model types. Refer to the YLR Core Process section for descriptions of variables not shown in this section.

Byte	Tag	Variable	Type	Description	Detail
INPUT (FB Master --> LFBI)					
0	Control	GENERAL	Bit field	Laser Control Input signals	Table 3-2
1	RESERVED	RESERVED	--	Reserved for future use	
2-3	Set Power	SET_POWER	Unsigned 16	Laser Power requested (%)	Table 1-3
4-5	Modulation	MOD_FREQ	Unsigned 16	Modulation Frequency requested (Hz)	Table 1-4
6		DUTY_CYCLE	Unsigned 8	Modulation Duty Cycle requested (%)	
7	RESERVED	RESERVED	--	Reserved for future use	
8-9	Pulse Setup	PULSE_REP_RATE	Unsigned 16	Pulse Repetition Rate (kHz)	Table 3-3
10		PULSE_BURST_CT	Unsigned 8	Pulse Burst Count	
11-15	RESERVED	RESERVED	--	Reserved for future use	
OUTPUT (FB Master <-- LFBI)					
0-2	Status	GENERAL	Bit field	Laser Status Output signals	Table 3-4
3	RESERVED	RESERVED	--	Reserved for future use	
4-5	Sensor	OUTPUT_POWER	Unsigned 16	Laser Output Power monitor (%)	Table 1-6
6-7		BACK_REFLECTION	Unsigned 16	Laser Back Reflection monitor (%)	
8-9		CASE_TEMP	Unsigned 16	Laser Case Temperature (°C)	
10-11	Pulse Info	PULSE_ENERGY	Unsigned 16	Pulse Energy (μJ)	Table 3-5
12-13		PULSE_REP_RATE	Unsigned 16	Pulse Repetition Rate (kHz)	
14		PULSE_BURST_CT	Unsigned 8	Pulse Burst Count	
15	RESERVED	RESERVED	--	Reserved for future use	

TABLE 3-1 YLPP PROCESS MAPPING

CONTROL BITS

The mapping of the YLPP Laser control signals is provided in the following table. For the CONTROL bits, a value of “1” asserts the respective control, and a value of “0” removes it. Note that some controls are edge-triggered only.

	Bit	Signal	Description
Byte 0 - GENERAL	0	EMISSION_ON	Turn laser emission on (Positive edge triggered)
	1	MODULATION_ON	Turn laser modulation on
	2	N/A	Reserved for YLR models (Bit is ignored otherwise)
	3	RESET_ERRORS	Clear all resettable laser errors
	4	N/A	Reserved for YLR-QCW models (Bit is ignored otherwise)
	5	Reserved	Reserved for future use
	6	Reserved	Reserved for future use
	7	Reserved	Reserved for future use

TABLE 3-2 INPUT PROCESS CONTROL BYTES

PULSE SETUP INPUT PARAMETERS

The pulse setup input parameter is used to control the pulse repetition rate for YLPP/YLPF laser models. In the YLPP Fieldbus Interface, the pulse repetition rate is specified as an unsigned 16-bit type. This is internally scaled and converted to a float value in kHz before being sent to the laser over its serial interface.

Pulse Setup	Input Type	Units	SCALE	Description
PULSE REP RATE	Unsigned 16	kHz	10	Pulse Repetition Rate*
PULSE BURST CT	Unsigned 8	count	1	Pulse Burst Count*

TABLE 3-3 INPUT PROCESS PULSE SETUP PARAMETERS

The PULSE REP RATE parameter specifies the laser’s requested pulse repetition rate as a value in (kHz * 10), allowing a range from 0.1 kHz to 5.5 MHz. The scaling applied to PULSE REP RATE is shown in the example below.

Data Type: 16-bit unsigned integer
Example: Pulse Rep Rate = 500 kHz → 500 x 10 = 5,000 (0x1388) at 0.100 kHz/bit.

The PULSE BURST CT parameter sets the number of pulses to generate at a given repetition rate for YLPP/YLPF laser models. In the YLPP Fieldbus Interface, the pulse burst count is specified as an unsigned 8-bit type.

Data Type: 8-bit signed integer
Example: Pulse Burst Count = 16 (0x10) at 1 pulse/bit.

* Note that these parameters are values that the Fieldbus Master is requesting the laser to be set to. A parameter’s requested setting and actual setting in the laser may be different due to the laser’s operational constraints.

STATUS BITS

The mapping of the YLPP status signals is provided in the following table. Error status bits are latched once the error condition has occurred. A RESET_ERRORS command must be asserted in order to reset the error bit state(s). Bits that are not errors will set or clear continuously based on their required condition. A value of “1” indicates that the required condition has been satisfied. A value of “0” indicates the condition has not been met.

	Bit	Signal	Description
Byte 0 - GENERAL	0	EMISSION_ON	Laser Emission is ON
	1	LASER_READY	Laser is Ready (normal operation)
	2	LASER_ERROR	Laser Error(s) detected
	3	MAIN_PWR_ON	Main Power Supply is ON
	4	PWR_KEY_ON	Power Key Switch is ON
	5	INTLK1_OPEN	Interlock Ch. 1 contact is OPEN
	6	INTLK2_OPEN	Interlock Ch. 2 contact is OPEN
	7	RS232_LINK_UP	RS-232 link connected

	Bit	Signal	Description
Byte 1 - GENERAL	0	MONITOR_ONLY	Only allow monitoring of laser parameters*
	1	MODULATION_ON	Laser Modulation is ON
	2	N/A	Reserved for YLR models (returned as 0)
	3	BACK_REFL_HIGH	Back Reflection level is HIGH
	4	CASE_TEMP_HIGH	Case temperature too high
	5	CASE_TEMP_LOW	Case temperature too low
	6	FIBER_INTLK_OPEN	Fiber interlock is OPEN
	7	CRITICAL_ERROR	Critical error detected

	Bit	Signal	Description
Byte 2 - GENERAL	0	N/A	Reserved for YLR-QCW models (returned as 0)
	1-3	MODEL_CLASS	Laser Model Class (See MODEL CLASS CODES).
	4	SEED_READY	Seed is Ready
	5	Reserved	Reserved for future use
	6	Reserved	Reserved for future use
	7	Reserved	Reserved for future use

TABLE 3-4 OUTPUT PROCESS STATUS BYTES

* When set to “1”, indicates CONTROL of the laser through this interface is disabled.

PULSE INFO OUTPUT PARAMETERS

The YLPP Pulse Info output parameters are cyclically read from the laser by the LFBI device and returned to the Fieldbus Master as unsigned integers. These values may be used by the Master to confirm that a requested pulse setup parameter has been processed correctly and is within its respective allowed range.

Pulse Info	Output Type	Units	SCALE	Description
PULSE ENERGY	Unsigned 16	μJ	100	Pulse Energy
PULSE REP RATE	Unsigned 16	kHz	10	Pulse Repetition Rate*
PULSE BURST CT	Unsigned 8	count	1	Pulse Burst Count*

TABLE 3-5 OUTPUT PROCESS PULSE INFO PARAMETERS

The PULSE ENERGY parameter returns the laser's pulse energy currently in effect as a value in microJoules * 100 corresponding to a range from 0 to 655.35 μJ. The scaling applied to PULSE ENERGY is shown in the example below.

Data Type: 16-bit unsigned integer

Example: Pulse Energy = 2500 (0x9C4) --> $2500 / 100 = 25.0 \mu\text{J}$ at 0.01 μJ/bit.

The PULSE REP RATE parameter returns the laser's pulse repetition rate currently in effect as a value in (kHz * 10) ranging from 0.1 kHz to 5.5 MHz. The scaling applied to PULSE REP RATE is shown in the example below.

Data Type: 16-bit unsigned integer

Example: Pulse Rep Rate = 5,000 (0x1388) --> $5000 / 10 = 500 \text{ kHz}$ at 0.100 kHz/bit.

The PULSE BURST CT parameter returns the laser's pulse burst count currently in effect as a value ranging from 1 to 255 pulses. The scaling applied to PULSE BURST CT is shown in the example below.

Data Type: 8-bit unsigned integer

Example: Pulse Burst Count = 16 (0x10) at 1 pulse/bit.

* Note that in some cases these parameters may be different from the Fieldbus Master's requested settings due to the laser's operational constraints.