

# Precise Log Data Loggers Modbus Registers

Modbus TCP protocol was added to all PRECISE-LOG series of data loggers with firmware version 2.06. A Modbus master/client can read one or more Input Registers and Holding Registers available in a PRECISE-LOG data logger through Modbus TCP communications.

The below specifications list all supported commands and available registers PL-TW data logger supports:

## Input Registers:

An Input Register stores a 16-bit integer for a channel's real-time reading. To read one or more 16-bit Input register data, use function code 4.

Register	Description	Type	Range
0	CH0 Value	Unsigned Integer	0 - 65535
1	CH1 Value	Unsigned Integer	0 - 65535
2	CH2 Value	Unsigned Integer	0 - 65535
3	CH3 Value	Unsigned Integer	0 - 65535
4	CH4 Value	Unsigned Integer	0 - 65535
5	CH5 Value	Unsigned Integer	0 - 65535
6	CH6 Value	Unsigned Integer	0 - 65535
7	CH7 Value	Unsigned Integer	0 - 65535
8	CH8 Value	Unsigned Integer	0 - 65535

### Example:

To read CH2, CH3 and CH4's real-time values, a Modbus master device sends in the following command:

Data(HEX)	Description	Note
0001	Transaction identifier	Fixed 2-byte value
0000	Protocol identifier	Fixed 2-byte value
0006	Length(6 bytes are followed)	2-byte value
01	The device address	1-byte value, don't care
04	Function Code (read Input Register)	1-byte value
0002	First register's address	2-byte value
0003	The number of required registers (read 3 registers 0002 to 0004)	2-byte value

### Holding Registers:

A Holding Register stores a 16-bit integer indicating a setting for the data logger. To read one or more 16-bit Holding Register data, use function code 3.

Register	Description	Type	Range/Equation
0	Sample Interval	0: below 1 second >=1: sample interval in second	0 - 65535 seconds
1	Device Operating Mode	0: logging stopped 1: logger is logging data	
10	CH0 Type	0:thermistor	
11	CH0 Enabled	0:disabled 1:enabled	If a channel is disabled, the reading is unknown
12	CH0 Equation	0: thermistor	Range: -40 to + 70 °C / -40 to 158 °F Equation for Metrics: $O = 110 * I / 65535 - 40$ Equation for Imperial: $O = 198 * I / 65535 - 40$
X0	CHX-1 Type	0: Wide Range	-8 to + 74 mV
		1: Narrow Range	-2 to + 18 mV
X1	CHX-1 Enabled	0: Disabled 1: Enabled	If a channel is disabled the reading is unknown

X2	CHX-1 Equation	0: Wide-Range Voltage	Voltage Equation (mV) O = 81 * I / 65535 - 8
		1: Wide-Range TC E	-171 to + 955 °C / -275.8 to + 1751 °F Temperature Equation (Metrics): O = 1126 * I / 65535 - 171 Temperature Equation (Imperial): O = 2026.8 * I / 65535 - 275.8
		2: Wide-Range TC J	-205 to + 1200 °C / -337 to + 2192 °F Temperature Equation (Metrics): O = 1405 * I / 65535 - 205 Temperature Equation (Imperial): O = 2529 * I / 65535 - 337
		3: Wide-Range TC K	-270 to + 1372 °C / -454 to + 2501.6 °F Temperature Equation (Metrics): O = 1642 * I / 65535 - 270 Temperature Equation (Imperial): O = 2955.6 * I / 65535 - 454
		4: Wide-Range TC N	-270 to 1300 °C / -454 to 2372 °F Temperature Equation (Metrics): O = 1570 * I / 65535 - 270 Temperature Equation (Imperial): O = 2826 * I / 65535 - 454
		5: Wide-Range TC T	-270 to + 400 °C / -454 to +752 °F Temperature Equation (Metrics): O = 670 * I / 65535 - 270 Temperature Equation (Imperial): O = 1206 * I / 65535 - 454
		6: Narrow-Range Voltage	Voltage Equation (mV): O = 20 * I / 65535 - 2
		7: Narrow-Range TC E	-35 to + 260 °C / -31 to +500 °F Temperature Equation (Metrics): O = 295 * I / 65535 - 35 Temperature Equation (Imperial): O = 531 * I / 65535 - 31
		8: Narrow-Range TC J	-40 to +330 °C / -40 to +626 °F Temperature Equation (Metrics): O = 370 * I / 65535 - 40 Temperature Equation (Imperial): O = 666 * I / 65535 - 40
		9: Narrow-Range TC K	-53 to +437 °C / -63.4 to +818.6 °F Temperature Equation (Metrics): O = 490 * I / 65535 - 53  Temperature Equation (Imperial): O = 882 * I / 65535 - 63.4
10: Narrow-Range TC N	-81 to +532 °C / -113.8 to +989.6 °F Temperature Equation (Metrics): O = 613 * I / 65535 - 81  Temperature Equation (Imperial): O = 1103.4 * I / 65535 - 113.8		

		11: Narrow-Range TC T	-55 to +353 °C / -67 to +667.4 °F Temperature Equation (Metrics): O = 408 * I / 65535 - 55 Temperature Equation (Imperial): O = 734.4 * I / 65535 - 67
		12: Narrow-Range TC B	0 to 1820 °C / 32 to +3308 °F Temperature Equation (Metrics): O = 1820 * I / 65535 Temperature Equation (Imperial): O = 3276 * I / 65535 + 32
		13: Narrow-Range TC R	-50 to +1539 °C / -58 to 2802.2 °F Temperature Equation (Metrics): O = 1589 * I / 65535 - 50 Temperature Equation (Imperial): O = 2860.2 * I / 65535 - 58
		14: Narrow-Range TC S	-50 to +1704 °C / -58 to 3099.2 °F Temperature Equation (Metrics): O = 1754 * I / 65535 - 50 Temperature Equation (Imperial): O = 3157.2 * I / 65535 - 58
		15: Linear	O = (LRH - LRL) * I / 65535 + LRL Where: LRH is Linear Range high value LRL is Linear Range low value You can get those values from SiteView

Where X = 2,3,4,5,6,7,8,9

O = Output, I = Input Register Value

**Example:**

To read CH3's equation, a Modbus master device sends in the following command:

Data(HEX)	Description	Note
0001	Transaction identifier	Fixed 2-byte value
0000	Protocol identifier	Fixed 2-byte value
0006	Length(6 bytes are followed)	2-byte value
01	The device address	1-byte value, don't care
03	Function Code (read Holding Register)	1-byte value

002A	First register's address (42 is 2A in HEX)	2-byte value
0001	The number of required registers (read 1 registers 002A)	2-byte value

**Note:**

1. Modbus feature was added to firmware version 2.06 or above.

To upgrade a data logger's firmware please refer to this link: [How can I upgrade logger firmware?](#)

2. The age of an Input Register data is based on the Modbus request rate.

A request of Input Register data will initiate the sampling process and the new data will be available upon the next request.