

# Phoenix Contact nanoLC

## Information Sheet for Crimson v2.0

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### Compatible Devices

- Devices supporting Modbus, as slaves, via Serial and TCP

### Verified Device

- Phoenix Contact nLC-50

### Device Configuration

Opening the Device provides a list of permitted selections for the Serial connection and for the TCP/IP connection.

### Accessible Data

Prefix	Description	Data Type	Notes
R	Holding Registers	Long	1
Q	Digital Outputs	Bit	2
I	Digital Inputs	Bit	3
F	Flags	Bit	4
TCA	Timer/Counter Accumulated	Long	5
TCP	Timer/Counter Preset	Long	6
OTA	Output Time Accumulated	Long	7
OTP	Output Time Preset	Long	8
HSA	High Speed Accumulated	Long	9
HSP	High Speed Preset	Long	10
A	Analog Input	Word	11
O	Analog Output	Word	12
M	Direct Modbus Addressing	Word	13

Caution: A nanoLC does not support the full range of address provided. The programmer is responsible for knowing the addressing range permitted in the device to be attached. The driver is capable of accessing any Modbus slave device which might use addresses beyond the range of the nanoLC.

#### Accessing other Modbus Slaves:

This driver is zero-based, standard Modbus is one-based. Use only the address portion, not the table specifier, and subtract one from the address. For example, to access Holding Register 40043 as a Word, select M42. For a Long data type see "General Information (A)". As an example, to access 40043/40044 as a long, use R21. To handle 32 bits of data at 40044/40045 (first register is an even number), the programmer would use M43 and M44, shifting one value up by 16 bits and adding the other.

#### General Information:

A) The driver modifies the address of Long Data Types. The driver multiplies the number (n) selected in the dialog box by 2, then adds the Modbus Base address if one is specified in the note below. Two consecutive 16 bit registers are used to form the 32 bit data returned. The low 16 bits of the read or write data are in register  $n*2$ . The high 16 bits are in register  $(2*n)+1$ .

B) All selections are Read/Write except for I (Digital Inputs). See Note 3.

C) A Long uses function codes 3 for read, 16 for write.

D) A Word uses function codes 3 for read, 6 to write 1 word, 16 to write n words. Exception: Analog Input A uses function code 4 for read.

F) A Bit uses function codes 5 to write 1 bit, 15 to write n bits. The read function code is specified with the note, below.

#### Reading/Writing TCA and TCP

The nanoLC TC Accumulated/TC Preset data format is:

rHours = (Value >> 16)  
rMinutes = ((Value >> 8) & 0xFF).  
rSeconds = (Value & 0xFF)

To display the time using a Time Display item, give it the value:

$(rHours * 3600) + (rMinutes * 60) + rSeconds$

To create Hours:Minutes:Seconds from time 'T' equal to a number of seconds:

wHours = (T/3600)  
wMinutes = ((T/60) % 60)  
wSeconds = (T % 60)

To write an Hours:Minutes:Seconds format, send the value:

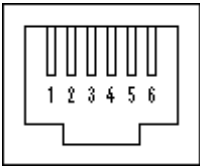
$(wHours << 16) + (wMinutes << 8) + wSeconds$ .

Notes:

1. R – Reads/writes two holding registers for each selection,  $2*n$  (Low 16 Bits) and  $(2*n)+1$  (High 16 Bits).
2. Q – Reads/writes digital bits.  
Modbus Function Codes: 1 for read, 5 to write 1, 15 to write n.
3. I – Read Only. Reads digital bits using Modbus Function Code 2.
4. F – Reads/writes internal digital bits. Modbus Function Code to read is 1.  
Modbus Base address = 0x1000 (4096).
5. TCA – Reads/writes the Timer/Counter Accumulated value.  
Modbus Base address = 0x5000 (20480). Adds 2x the address provided.  
Refer to General Information (A) and Reading/Writing TCA and TCP.
6. TCP – Reads/writes the Timer/Counter Preset value.  
Modbus Base address = 0x2000 (8192). Adds 2x the address provided.  
Refer to General Information (A) and Reading/Writing TCA and TCP.
7. OTA – Reads/writes the Output Time Accumulated value.  
Modbus Base address = 0x6000 (24576). Adds 2x the address provided.
8. OTP – Reads/writes the Output Time Preset value.  
Modbus Base address = 0x3000 (12288). Adds 2x the address provided.
9. HSA – Reads/writes the High Speed Accumulated value.  
Modbus Base address = 0x7000 (28672). Adds 2x the address provided.
10. HSP – Reads/writes the High Speed Preset value.  
Modbus Base address = 0x4000 (16384). Adds 2x the address provided.
11. A – Reads/(writes) the Analog Input value. Note: The write function permits writing 16 bit values to the designated address. Normally, one would not write to an Analog Input register.
12. O – Reads/writes the Analog Output value.  
Modbus Base address = 0x1000 (4096).
13. M – Reads/writes a single 16 bit register value. M accesses 16 bits from the selected number. For a device that is not a nanoLC, refer to "Other Modbus Devices" above. Example: Another device accesses Modbus Holding Register 40013. Program M00012 to select that register. M00012 is also the low 16 bits of R6.

## RS-232 Connections

RJ-11



G3	Signal	nanoLC
2	Rx < -- > Tx	2
5	Tx < -- > Rx	3
3/4	0V	4