HIEX

Data Q

User guide Modbus DataQ-DI/DO addressing

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1 - Introduction

Once connected to the network and with an IP address obtained, the DataQ becomes a Modbus TCP Server (slave) and makes certain addresses available for reading and writing on port 502, for various purposes. The purpose of this document is to list these addresses and explain the use of each one.

2 - Address

There are Coils addresses (1 bit) and Holding Registers addresses (16 bits). The Coils will be listed first.

The first Coil address is 1 (0x0001), it has a length of 16 bits, that is, readings from 1 (0x0001) to 16 (0x0010) are valid. This address stores, in binary and sequential form, the value of the eight DataQ pins, either DI or DO, followed by the Wire-Break value of each of the pins. Therefore, if pin 2 has a logic level of 0 and the Wire-Break value is active, we will have:
Address: 2 (0x0002), Value: 0 e Address: 10 (0x000A), Value 1
If the value you want to read is from pin 8, for example, and it is at high level and Wirebreak is inactive, we will have:
Address: 8 (0x0008), Value: 1 e Address: 16 (0x00010), Value 0
The second set of Coil addresses covers the range from 256 (0x0100) to 259 (0x0103). This set of Coils reports DataQ errors, with each address indicating a different error.

- 256 (0x0100): Wire-Break error detected. Whenever any port detects Wire-Break, this variable will have a high logic level (DI Module).
- 257 (0x0101): Communication error detected. This error occurs when there is an error in communication with the chip responsible for reading or externalizing the ports.
- 258 (0x0102): Voltage Error. This register will have a high logic level when there is a voltage problem with the chip responsible for reading or externalizing the ports. Be it under-voltage, overvoltage or short circuit.
- 259 (0x0103): Temperature Error: This register will have a high logic level when there is a temperature-related problem, either a shutdown or a high temperature.

The next addresses listed are the Holding Register, 16-bit registers.
The first eight addresses correspond to the pin values, starting with address 1 (0x0001) and extending to 8 (0x0008). For both DataQ-DI and DO, these addresses refer to the pins. To set or read the logical value of a pin, it is necessary to perform write or read operations within this address range. We will illustrate an example for a DI device and the same example for a DO device.

If a read is performed at address 0x0001, reading a total of 8 registers, we will have, in a hypothetical scenario, the following output:
[0x0001, 0x0001, 0x0001, 0x0001, 0x0000, 0x0000, 0x0000, 0x0000]
A read with these values on a DI device represents that pins 1 to 4 are at high logic level, while the next 4 are at high logic level. Similarly, a write with these values could be made to address 0x0001 on a DO device. This would cause pins 1 to 4 to rise in logic level and pins 5 to 8 to fall in logic level.
The next set of addresses is the one that signals the Wire-Break actuation on each of the pins. This set starts at address 9 (0x0009) and extends to 16 (0x0010). These registers are only updated if DataQ is a DI.
These two register ranges represent information about the current situation of the 8 pins, the next set of register ranges is used to make some settings on these pins.
The first range of configuration registers defines whether the pin in question is DI or DO. For a DI device, the value in each of the registers in this register group must be 1 (0x0001), while for a DO device, this value must be 2 (0x0002). The starting address of this group of registers is 257 (0x0101) and extends to 264 (0x0108), with the first corresponding to pin 1, the second to pin 2 and so on.
The second range of configuration registers is for pin activation. This range starts at address 265 (0x0109) and goes up to 272 (0x0110), the first of which refers to pin 1 and the last to pin 8. Thus, when defining, for example, the set of values:
[0x0001, 0x0001, 0x0001, 0x0001, 0x0000, 0x0000, 0x0000, 0x0000]
Pins 1 to 4 will be available for reading or writing (DI or DO), while pins 5 to 8 will not read or write, even if addresses 5 (0x0005) to 8 (0x0008) are written (DO). By default, all pins are initially enabled.
The last two sets of configuration addresses are only effective in DataQ-DI devices, but they also exist in DO devices.
The next eight addresses represent the activation of the Wire-Break sensor (DataQ-DI), the first address in this set is 273 (0x0111) and goes up to 281 (0x0119). When the value 1 (0x0001) is written, the Wire-Break of the pin in question is active. By default, all pins have the Wire-Break sensor active.
Finally, the last range is from address 282 (0x011A) to 291 (0x0123). This address defines the value of the DeBounce filter for each of the pins. There are 9 possible values, which are:

- 0 (0x0000) NO_DEBOUNCE: When this value is written, the DeBounce filter is disabled.
- 1 (0x0001) 50US_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 50 microseconds.

- 2 (0x0002) 100US_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 100 microseconds.
- 3 (0x0003) 400US_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 400 microseconds.
- 4 (0x0004) 800US_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 800 microseconds.
- 5 (0x0005) 1600US_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 1600 microseconds.
- 6 (0x0006) 3200US_DEBOUNCE: With this value in the register the pin will have a
- DeBounce filter of 3200 microseconds.
- 7 (0x0007) 12800US_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 12800 microseconds.
- 8 (0x0008) 20MS_DEBOUNCE: With this value in the register the pin will have a DeBounce filter of 20 milliseconds.

By default, all pins have the DeBounce filter disabled.

As a result, all Modbus addresses have been traversed and described. These addresses provide the DataQ DI/DO with the ability to configure, query and write the pins in a completely remote manner and can be integrated into high-speed systems.