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# FBUS vs Modbus[®]
# (Modbus TCP Distributed I/O)

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## Abstract

FBUS differs from Modbus[®] * in setup and functionality. Which one should you use for Modbus TCP distributed I/O?

*—Modbus is a trademark of Schneider Automation Inc.

## Detailed Solution

When you are programming for distributed I/O that talks Modbus TCP, you have two choices in GAP™. There are FBUS blocks, or you can use the MODBUS_M and some other assorted blocks. How do you decide which one to use?

FBUS blocks may initially appear to be the best choice because they were developed for use with distributed I/O. They look like our regular I/O channels. However, let's take a look at how the FBUS_M actually works.

For those of us familiar with Modbus and the MODBUS_M, it seems to be very similar. The FBUS_M is assigned to a rate group, and has a scan rate and a timeout. With the MODBUS_M, you may assign the block to rate group 160 because you assume that the data is not critical, since distributed I/O is non-deterministic. You may set the scan rate to 160 ms or slower. And you will set the timeout to 1.5 to 2 times your scan rate, assuming that the slave can normally answer within one scan time. Of course, these values can't be know for sure without testing. Using FBUS_M, you may be inclined to use the same criteria, setting the rate group at 160, the scan rate at 160 ms, and the timeout at 240 ms. (You may even consult the block help, which seems to imply that there are differences, but is unclear.)

The MODBUS_M will request all of the channels' data from the slave every scan rate, and deliver the data to the rest of the GAP at the rate group rate. As long as the slave can respond within the timeout, there is no link error.

The FBUS_M will request one channel's data from the slave every rate group, and deliver that data to the GAP at the rate group rate. As long as the slave can respond within the timeout, there is no link error. So what is the scan rate? It is how often you want to scan the whole set of channels connected to that slave, but only if it can go that fast. For example, with 66 channels, and the FBUS_M in rate group 160, it takes a total of 10.56 seconds to scan all the channels. If you set your scan rate less than this, your actual rate will still be 10.56 seconds. However, if you set your scan rate to 20 seconds, then when one scan is complete, there will be a delay of 9.44 seconds before the next scan. This is the S_IDLE time. There is even an output that gives the actual scan rate, A_SCAN.

The difference is in the message size, and function code. The MODBUS_M generates a message asking for all the channels at once using multiple coils/registers function codes. The FBUS_M generates a message asking for one channel using single coils/registers function codes.

This is why the help states that for best performance, the highest (fastest) rate group should be selected. With 66 channels and the FBUS_M in rate group 5, the actual scan rate is 330 ms.

The result is that, depending on how many channels you have on one slave, MODBUS_M may be faster. Unfortunately, to use it, you have to convert the analogs yourself using calculate blocks and just use name blocks for the discretes. And you can't determine the actual data rate without some extra logic.

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