

## Basic Network Control of the SMVector Drive via the ESVZAR0 Modbus™ Module

Follow these Quick Start instructions to use Modbus Communications for basic network control of an SMVector drive, equipped with an ESVZAR0 RS-485/Modbus module. The ESVZAR0 Modbus Communication module is available as an option for the SMVector drive models 10HP and smaller and supports Modbus RTU. For more information refer to the SMVector Modbus Communications Guide (CMVMB401) and "Getting Started with ModBus RTU" (AN0025). To download this product manual or application note visit the AC Tech Technical Library at <http://www.lenze-actech.com>.

### For Further Reference

Modbus-IDA: <http://www.modbus-IDA.org>

AC Tech Library: <http://www.lenze-actech.com>

### Quick Start Instructions:

1. Set P400 to a value of 2. This enables modbus communications.
2. Set P410 to the desired network address that the modbus master will poll. Valid modbus addresses are 1-247.  
**TIP** - Avoid using address 1. Most modbus devices ship with a default address of 1. As duplicate addressing on a modbus network is not allowed, this can lead to conflicts when replacing and commissioning nodes. To avoid this, it is recommended not to set the slave address to 1.
3. Set the drive to the same baud rate as the master. Use P411 to set the communications baud rate for the drive. P411=0 (2400bps), 1 (4800 bps), 2 (9600 bps), 3 (19200 bps), 4 (38400bps), 5 (57600 bps), 6 (115200 bps).
4. Set the drive's network data formatting the same as the modbus master.
  - a. If the modbus master is set to use 8 data bits, no parity and two stop bits, set P412 to 0.
  - b. If the modbus master is set to use 8 data bits, no parity and one stop bit, set P412 to 1.
  - c. If the modbus master is set to use 8 data bits, even parity and 1 stop bit, set P412 to 2.
  - d. If the modbus master is set to use 8 data bits, odd parity and 1 stop bit, set P412 to 3**NOTE:** No other modbus data formats can be supported by the SMVector drive.
5. Define the timeout state for the drive. This determines what the SMVector drive will do if communications are lost for the time period programmed. That time period is set in P425 and is in seconds.
  - a. If you want the timeout to be ignored, set P426 to 0.
  - b. If you want the drive to stop on timeout using the stop method programmed in P111, set P426 to 1.
  - c. If you want the drive to ramp to stop on a timeout, set P426 to 2.
  - d. If you want the drive to coast to stop on a timeout, set P426 to 3.
  - e. If you want the drive to trip to a fault on a timeout (F.nF1), set P426 to 4.
6. Finally, set either P121(TB13A), P122(TB13B) or P123(TB13C) equal to 9 and jumper the corresponding TB13x input to TB4. This enables the drive to accept modbus writes

Drive Control and Basic Drive Commands are detailed on the next page.

**Drive Control:**

1. **Start/Stop Control:** If you want the drive to accept start and stop controls ONLY from the network you will need to set P100 to 3. When you do this, the stop circuit is still enabled. Input 1 needs to be asserted in order for the drive to start. If you will not be using start/stop field wiring controls, then simply jumper TB1 input to TB4.
2. **Speed Control:** If you want the network to control speed of the drive, set P101 to 6 (Network) and write the speed to modbus register 40045 (network speed register) (AC Tech Reg 44). Speed is written in 0.1Hz (so 412 would be 41.2 Hz). In this mode the drive's initial speed reference on power up will be 0.0Hz.
3. **Unlocking the Drive:** The first write necessary to the drive to perform any function (start/stop/change speed, etc) needs to be an unlock. If the drive is going to be started and stopped via network control write the drive's password (default is 225) to modbus register 40049 (AC Tech Reg 48).

If you will be starting and stopping the drive from terminal wiring and will only be using the network to change a speed set point, then write the drive's password (default is 225) to modbus register 40050 (AC Tech Reg 49).

You should only need to send the unlock command once after power up. As long as the communications do not timeout you should not need to write another unlock to the drive before writing start or network speed commands.

**Basic Drive Commands:**

The following commands are the basic drive commands. ONLY ONE OF THESE COMMANDS CAN BE EXECUTED AT A TIME.

1. To perform a Quick stop (Ramp to stop), write a value of 0001hex to modbus register 40002 (AC Tech Reg 1).
2. To STOP the drive using the stop method programmed in P111, write a value of 0004hex to modbus register 40002 (AC Tech Reg 1).
3. To Start the drive, write a value of 0008hex to modbus register 40002 (AC Tech Reg 1).
4. To Inhibit the drive (coast to stop), write a value of 0010hex to modbus register 40002 (AC Tech Reg 1).
5. To Set Reverse direction, write a value of 0040hex to modbus register 40002 (AC Tech Reg 1). P112 must be set to 1 in order for this command to be accepted.
6. To Set Forward direction (the drive powers up with forward direction already selected), write a value of 0080hex to modbus register 40002 (AC Tech Reg 1).