

## Basic Network Control of the MCH Drive using ModBus™ Communications

Follow these Quick Start instructions to use ModBus Communications for basic network control of an MCH drive. For more information refer to the MCH ModBus Reference Guide (RG-MHMOD) 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 the Modbus Master to 9600 bps with 8 data bits, no parity and 2 stop bits. The MCH series drive does NOT support any other baud rates or data formats.
2. Set Parameter 58 (Serial Address) 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 that you do not set the slave address to 1.

3. The MCH series drive has the provision for a watchdog timer to monitor network communications to the drive. The timer is fixed at a value of 10 seconds. If the drive is under network control (with Parameter 30 (Control) set to SERIAL AUTO or S AUTO/NO HND) and the master does not communicate with the MCH drive for longer than the 10 second timeout period, the drive will trip to FLWR/SERIAL fault. The timer can either be enabled or disabled as outlined in the next step.
4. Set Parameter 57 (Serial Communication) to either W/TIMER or W/O TIMR as desired in order for serial communication to function.

### Drive Control:

1. Start/Stop Control: Please be advised that while the drive is under network control the local STOP circuit is always enabled. Input TB1 needs to be asserted in order for the drive to start. If you will not be starting/stopping the drive via the terminal strip, simply jumper the TB1 input to TB2 for a basic MCH drive or jumper B3 to B4 for an MCH drive with bypass.
  - a. To Start and control the MCH drive from the network AND be able to start the drive locally in HAND mode, set Parameter 30 (Control) to SERIAL AUTO
  - b. To start and control the MCH drive exclusively from the network, set Parameter 30 (Control) to S AUTO/NO HND.
2. Use either Modbus function code 16 with a length of 1 or Modbus function code 06 to perform any writes to the drive.

### Unlocking the Drive:

1. The first write necessary to the drive to perform any function (start, change speed, change a parameter, etc) needs to be an unlock. To only control the drive over the network you can write a value of 0 to the drive's Modbus register 40049 (AC Tech register 48). To both control the drive and alter any programming parameters then write the drive's programming password to Modbus register 40049. The default password for the MCH drive is 0019.
2. 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 any other function.

## Basic Drive Commands:

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

1. To STOP the drive using the stop method programmed in Parameter 26 (STOP), write a value of 0004hex to Modbus register 40002 (AC Tech register 1).
2. To Start the drive write a value of 0008hex to Modbus register 40002.
3. Drive direction cannot be controlled via Modbus on the MCH series drive.
4. If you want the network to control the speed of the drive, set Parameter 24 (Auto Source) to KEYPAD and write the speed to the Keypad Speed Command Register, Modbus register 40041 (AC Tech register 40). Speed is written in 0.01Hz (so 4120 would be 41.20 Hz). In this mode the drive's initial speed reference on power up will be the last speed written to the drive.

## Basic Drive Status:

AC Tech register 24 is a 6 word entity containing the drive's status information. To retrieve the entire status block (Modbus registers 24-29) send a read command to Modbus register 40025 using Modbus function code 03 with a register count of 6. The low byte of the third word in this block of data contains the operational status.

The value of that low byte of data corresponds to the following operational states:

Operational Status (byte D3L or Register #26 DL)

VALUE*	OPERATIONAL STATE
0	FAULT LOCKOUT
1	FAULT
2	START PENDING
3	STOP
4	DC BRAKE
5	RUN AT 0Hz
6	RUN
7	ACCEL
8	DECEL
9	CURRENT LIMIT
10	DECEL OVERRIDE
16	SLEEP MODE

\* This is the decimal equivalent value of the binary number of the bits in that byte.

## Basic Drive Network Programming:

The programming parameters of the MCH drive may be altered by a Modbus master. To do so simply write the desired value to the appropriate Modbus register. The translation is as follows:

$$\text{Modbus register number} = \text{MCH parameter number} + 52$$

As an example if you wanted to change the acceleration time (Parameter 8) of the MCH drive, write the time desired into Modbus register 40060. Note that time is written in 0.1 seconds (so 200 would be 20.0 sec).

For a complete listing of parameters, refer to the *MCH Series Drives Modbus Communications Reference Guide*, document RG-MHMOD.