

PLC/Modbus API

A number of Variables from [Global Variable Array](#) are mapped to Modbus interface. It's possible to setup Modbus device ID, communication parameters and speed, and access to device Modbus Registers by writing to this variables.

Mapped variables to access the Modbus devices are listed below:

Variable Address	Description	Function code
60010	Device ID. Change Device ID	server command
60011	ASCII/RTU Switch. Change Modbus mode. "0" - Modbus/RTU "1" - Modbus/ASCII	server command
60012	Modbus bitrate. Writing to this register will change RS485/Modbus speed. Available speeds are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
60013	Communication parameters. Change UART connection parameters: number of bits (8 or 7), parity (none, odd, even), number of stop bits (1, 2). Data comes in 3 low nibbles. The lowest is stop bits, then parity, then number of bits. Example: 0x801=8,N,1 0x712=7,0,2 0x822=8,E,2	
60019	Register Value. Writing to register will latch the value in shadow register. Value from shadow register will be used	
60020	Read Register Address. Writing to register will latch Address to read in shadow register	
60030	Write Register. Writing to register will send value from shadow register to Modbus device to address given in written value on write operation	16
60031	Read Register. Read from this register will send read inquiry to Modbus device (PLC controller will be in Sleep till Register value received from Modbus device). Writing to this register will send ready inquiry to Modbus device. The value written is used as Register address to read	3
60035	Write multiple coils. Write multiple coils command indicates the 16-bit address of first coil to write, the number of coils to write, number of bytes of coil values to follow, and the coil values. The response will be the address of the first coil and the number of coils.	15
60037	Write single register. Write single register indicates address of the holding register and the new value of the register. The response, similarly, is the address of the register and the new value.	6
60038	Write single coil. Requests the 16-bit address of the coil, and the value to write (0 for OFF, FF00 for ON)	5
60039	Read multiple coils. This will request the address of the first coil to read and the number of coils to read. The Modbus device will respond with the number of bytes to follow and the coil input values	1
60060	Input register 0	
60091	Input register 32	

PLC code examples

```
main()
{
    gvarset (60010,40);    //Set Device ID (40)
    gvarset (60011,1);    //Set Modbus ASCII
    gvarset (60012,9600);  //Set bitrate 9600bps
    gvarset (60013,0x801); //Set communication parameters 8,N,1
    gvarset (60019,12345); //Set Value to write (12345)
    gvarset (60030,0x1001); //Write the Value (12345) to Register #0x1001
    gvarset (60035, 0x081001); //Write the value (12345) to register #0x1001
    gvarset (60037,0x64);  //Send value to address

    exit(99);
};
```

Switching the Modbus Device ID:

```
#include pins.h

main()
{

    gvarset(60010,0); //addressed to all devices (0)
    gvarset(60019,34); //the device ID will be set to 34 in this case
    gvarset(60037,0x64); //sends the new device ID to the Modbus device

    exit(99);
};
```

Below is a more realistic PLC example which involves a WP8028ADAM Modbus device (capable of reading/writing):

```
#include pins.h

main()
{
    gvarset (60010,34);    //Set Device ID (40)
    gvarset (60011,0);    //Set Modbus RTU
    gvarset (60012,9600);  //Set bitrate 9600bps
    gvarset (60013,0x801); //Set communication parameters 8,N,1

    do{
        timer++;

        if ((timer&0x7f)==0) //how often the commands will be sent to the Modbus
            device
        {
            read_address=0;
        }
    }
```

```
gvarset(60020,read_address); //read register address

in=gvarget(60039); //read multiple coils

gvarset (60019,in); //latches the values in the shadow register
a=(8<<24)+0; //0 is the shift value here - can easily shift the input by
writing a different number
gvarset (60035, a); //Write the value
};

}while(1);

exit(99); //normal exit

};
```

Note that the commands to read multiple coils (the *in* variable) will not work for a Modbus device that can only write (outputs only). Similarly, the write commands will not work on a Modbus device with inputs only, such as the WP8026ADAM. Below is a list of available Modbus devices and their capabilities:

Device	Description
WP8028ADAM	8 digital inputs, 8 digital outputs
WP8027ADAM	16 digital outputs, 0 inputs (write-only)
WP8026ADAM	16 digital inputs, 0 outputs (read-only)
WP8025ADAM	8 relay outputs (normally open)
WP9038ADAM	6 analog inputs, 4 digital inputs, 4 digital outputs. The digital inputs/outputs work similarly to the WP8028

Modbus Scheduler in myCNC has 4 messages queue. Up to 4 registers can be written immediately from PLC procedure. Modbus manager will send it one-by-one and will be waiting a reply from Modbus device after each message.

Modbus manager will repeat the message to device up to 4 times in case no reply in 250ms.

Important!
If Modbus device is controlled directly from the PLC procedure,
"RS485/Modbus communication"
checkbox should be UNCHECKED in Settings > Config > Technology > Mill/Lathe
> Spindle
configuration dialog

SYS

PLC

Log

Config

Info

Support

Camera

Config

SAVE

CFG

CNC Settings

Axes/Motors

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Network

Motion

PLC

G-codes settings

DXF import settings

Macro List

Macro Wizard

Probing Wizard

Preferences

Screen

Work Offsets

Parking Coordinates

Technology

Plasma Cutting

Gas/Oxyfuel

Cutcharts

THC

Mill/Lathe

Spindle

Tools

ATC Pots

Lathe

Multi Head

Laser control

Tangential Knife

Special Purpose

Camera

5 axes RTCP

Panel/Pendant

Hardware

Advanced

Spindle Speed, [rpm] (Min, Max, Step)

100

24000

100

Spindle Overspeed, [%] (Min, Max, Step)

1

100

1

Encoder channel

Not used

Encoder pulses per revolution

1

Voltage offset, units

Voltage ratio, units

1

RS485/Modbus communication

☒

Speed ratio (modbus)

RS485 speed

9600

Connection

8

N

1

Inverter Address

☒ 7

☒ -1

☒ -1

☒ -1

Inverter Modbus address should be 16 or more. Addresses 0...15 reserved for Non-Modbus devices.

Messages: ☒ Exceptions: ☒

Write registers

WR/Operate

☒ 8192

Send

WR/Frequency

☒ 8193

Send

Read registers

RD/Drive Status

☒ 8448

RD/Fault Content

☒ 8449

RD/Frequency reference

☒ 8450

RD/Output frequency

☒ 8451

RD/Output current

☒ 8452

9

7

5

3

1

5000

10000

15000

20000

25000

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