ModbusEZ V15

This plugin with a RS485 converter is used to control your spindle/motor and set RPM using UCCNC software controls and Gcode, it works with any VFD with modbus capabilities. Using this setup eliminates any need for additional wiring in electrical enclosure or special boards, communication is between the computer with UCCNC installed and directly connected to VFD with 2 wires RS+ and RS-.

With this direct connection gives you a faster response from VFD and more accurate and stable rpm setting. These RS485 converters are inexpensive and in most cases under $10.00 US delivered.

RS485 converters come in several types, USB, Serial, and Ethernet.

USB RS485

Serial RS485

The USB is the most common but I personally use the Serial, I feel it's more immune to noise interference. There are many different suppliers for these USB converters so please do some research, I've read of many getting bad ones and going crazy with setup.

ModbusEZ Features

1. ModbusEZ can be configured to control any spindle/motor.

2. Amp read is used for monitoring current draw from spindle/motor. Even though the label setup in configure is named "Amp Display" it can be used to read and display any holding register available in VFD manual.

Important Setup notes for VFD Communications

There will be several settings in your VFD to configure to serial communications and vary between VFD's so you need to go through manual, there are 3 settings you will have options and need to be set correctly for ModbusEZ plugin are:

1. "Baud Rate" - plugin must match the same set baud rate in VFD settings.

2. "Data Format" - must be set to 8N1-RTU (8 bits, No polarity, 1 stop bit) in VFD settings.

3. "Communication Address" - needs to be set to 1 in VFD settings.

ModbusEZ Setup

These instructions are for ModbusEZ and don't include instructions for setting up your VFD with spindle/motor and Modbus communication, please confirm this is already configured properly.

1. Extract zip file and place ModbusEZ.dll in UCCNC/Plugin folder.

2. Start UCCNC and goto CONFIGURATION / GENERAL SETTINGS / Configure plugins. Locate ModbusEZ and check "**Startup**" and "**Enable**". Restart UCCNC and go back and open ModbusEZ configure window.

ModbusEZ Plugin "Serial Port Setup:"

1. Press "Available Ports" button and choose port from combobox your RS485 is connected to, and baudrate you setup in VFD.

ModbusEZ Plugin" Spindle/Motor Setup:"

1. Set your min, max rpm and max HZ. The max RPM and HZ will be found on spindle/motor nameplate.

2.The default frequency resolution in ModbusEZ V15 is 0.1HZ since this is more commonly used, Check box if frequency resolution is 0.01HZ, this info can be found in VFD manual.

ModbusEZ Plugin" Amp Display Setup:"

1. You will need to create a display field on your UCCNC screen to use this feature, One easy way is to simply copy and paste Sact field in UCCNC screen edit and place where you like. Replace label number with label number used in "Amp Display Setup" in screen edit.

2. You will need to input a Read register before checking box and enabling, this can be obtained in your VFD manual in the monitoring function section or similar. You actually can use any holding register you like and it will display returned values in created textfield box. I suggest not enabling this feature until your set up and controlling spindle.

3. Once setup you can change register and just hit save, you can read many different registers quickly/easily without restarting UCCNC.

ModbusEZ Plugin" Modbus Setup:"

1. All register fields in plugins "Modbus Setup:" needs to be in hex(Hexadecimal). Most VFD manuals gives these value's in hex but a small few show them in decimal and in this case many converters can be found online with a quick Google search. See following page for additional help and examples.

2. You need to check 1 box on how to send commands to VFD, some VFD's can use more than 1 modbus function code and others will not, this info will be in your VFD manual. See following page for additional help and examples. Check to see if your VFD model is in list for complete configuration setups on last page.

3. <u>If any changes are made in the "Modbus setup" UCCNC needs to be restated.</u>

Picture below taken from NOWFOREVER VFD MANUAL E 100 for Example

9. 4. 1 Instruction Data

Instruction data as below list. only can be written by using function code10H.

10H(16 dec) is Modbus function code for multiply registers

MODBUS register address	Countents	
900H	Bit 0 1	Run instruction: 1 run; 0 stop
	Bit 1 1	Direction instruction: 1 reverse;0 forward
	Bit 2 0	JOG instruction: 1 JOG; 0 stop
	Bit 3 0	Reset instruction: 1 fault reset; 0 no
	Bit 4~F	reserved
901H	Frequency instruction	
902H	PID setting value	
903H~908H	reserved	
909H	Save instruction: 1 parameter data save to EEPROM	
Remarks: Bit 0 for the lowest bit		

CCW

Convert Bits to hex for CCW

ON/OFF

CCW/CW

900 on/off address already in hex

Frequency address 901 hex

Note: Bits are written from right to left. Example below is for CCW using online converter.

Binary to Hexadecimal Converter

In order to use this **binary to hex converter** tool, type a binary value like 1110 into the left field below, and hit the Convert button. This way, you can convert up to 63 binary characters to hex.

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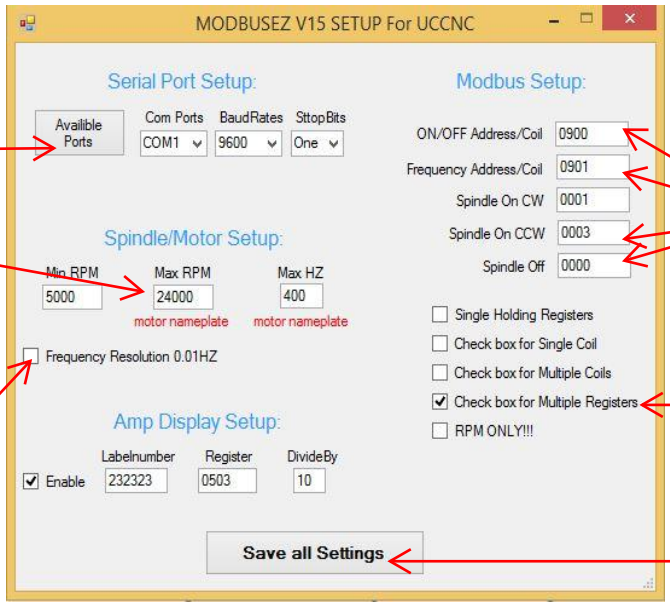
Binary value: 0011

Hexadecimal value: 3

Convert



Pressing this button will show you your systems availible com ports.

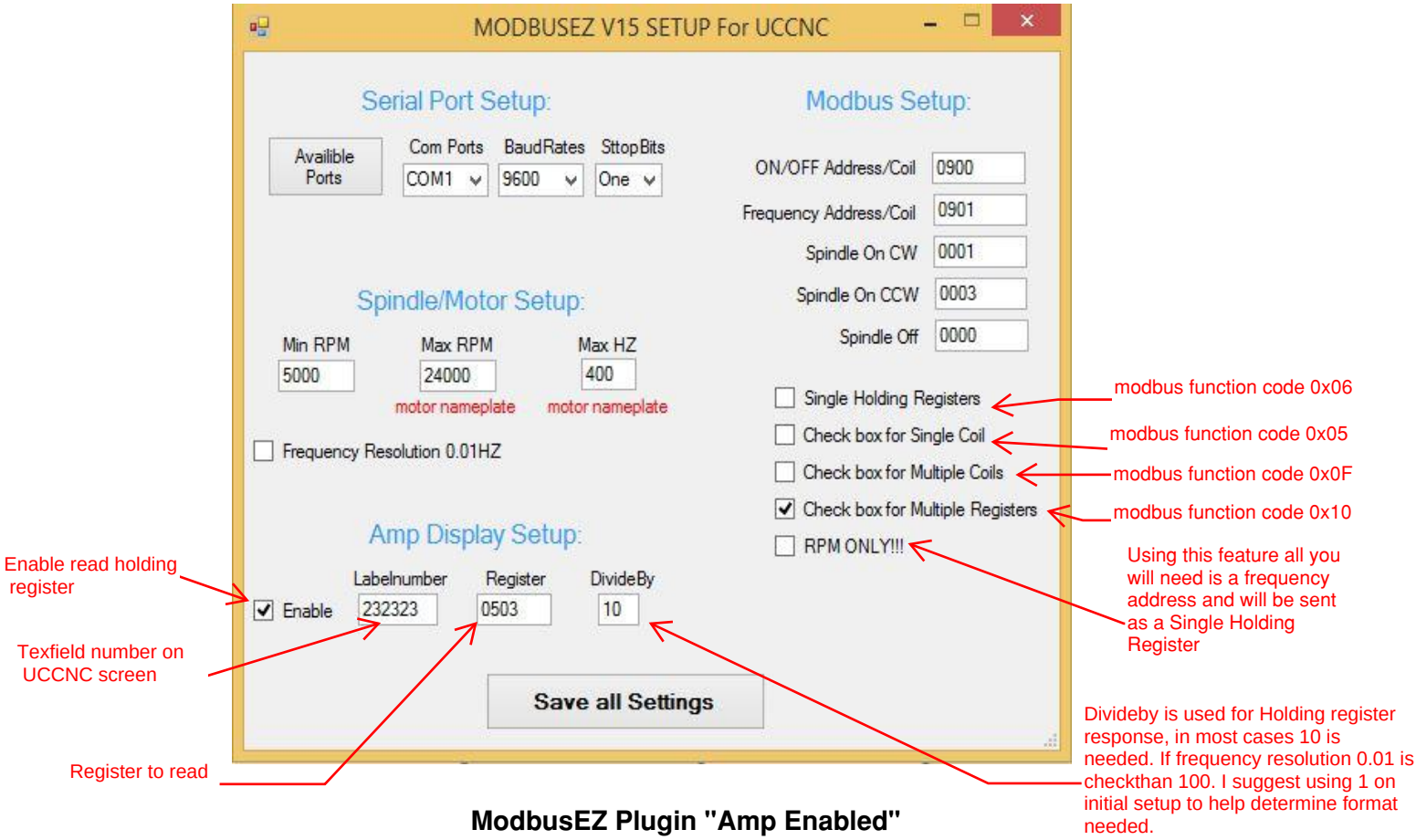
Typical China Spindle 24000 rpm / 400HZ

Check this box for 0.01 frequency resolution

see manual pic above

Save settings and restart UCCNC

After restart and when return to ModbusEZ configure window you will see data was converted to HI and Low bytes.



ModbusEZ Plugin "Amp Enabled"

Below is an example locating your amp output address(Output current) in VFD manual.

Taken from NOWFOREVER VFD MANUAL E 100 for Example

d2-001	Setting frequency	0.00～600.00Hz	0.01Hz	501H
d2-002	Output frequency	0.00～600.00Hz	0.01Hz	502H
d2-003	Output current	0.1～2000.0A	0.1A	503H
d2-004	Output voltage	0.1～2000.0V	0.1V	504H
d2-005	DC bus voltage	100～1000V	1V	505H

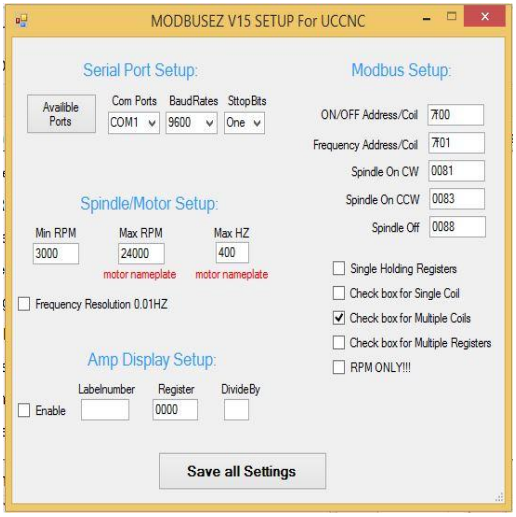
Confirm Output current

503 address already in hex

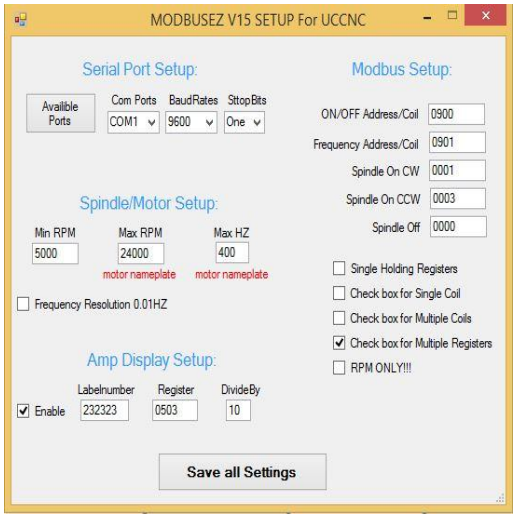
The follow page provides a list of complete modbus setup with make and model names for modbusEZ . In most cases the make of the VFD will have same settings for all of there models. I only found this NOT to be true with Hitachi and Huanyang GT.

Below is a list of popular Make and model VFD's with correct settings for ModbusEZ. If your make is listed most likely settings will work regardless of model, so far I only seen this not true with Hitachi. Settings shown in "Spindle/Motor Setup:" is for a common China spindle 24000 rpm and 400HZ.

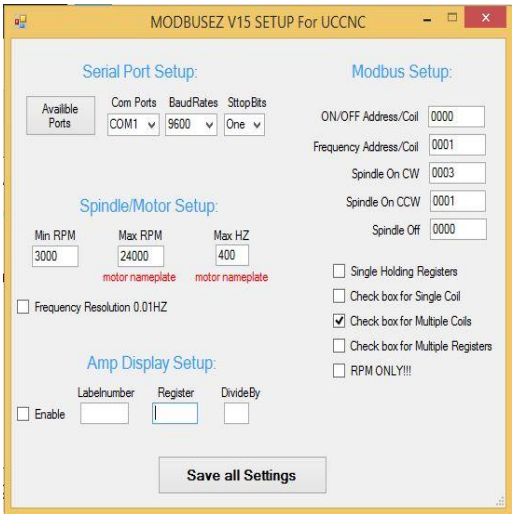
Bosh Rexroth EFC 5610



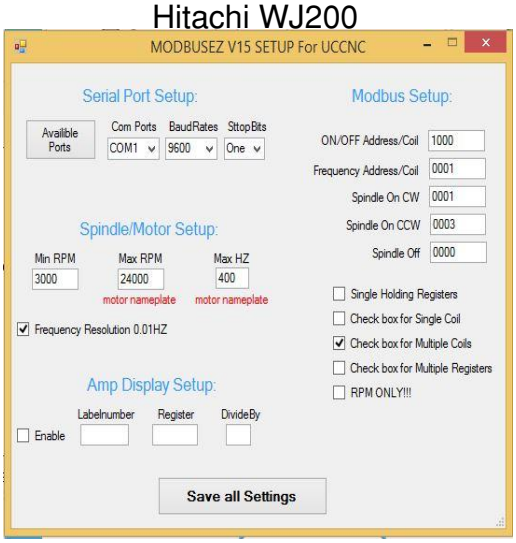
NowForever E 100



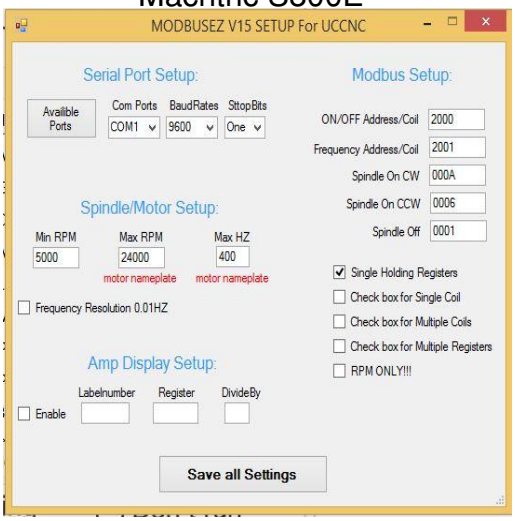
Hitachi X200



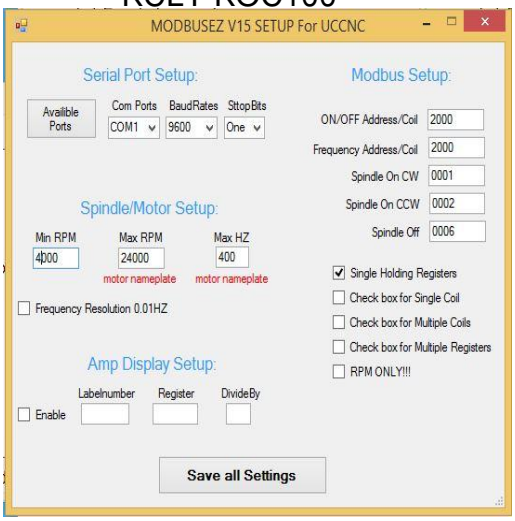
Hitachi WJ200



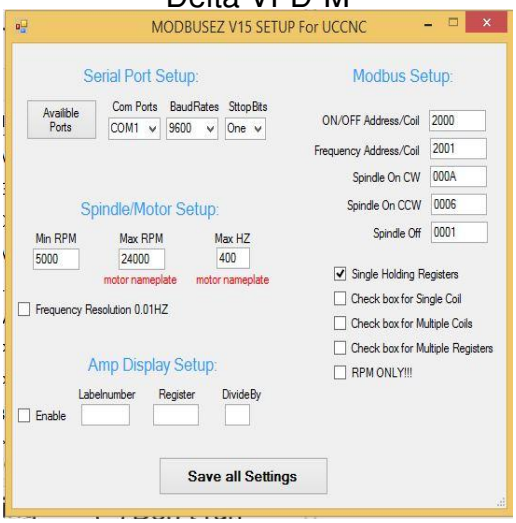
Machtric S800E



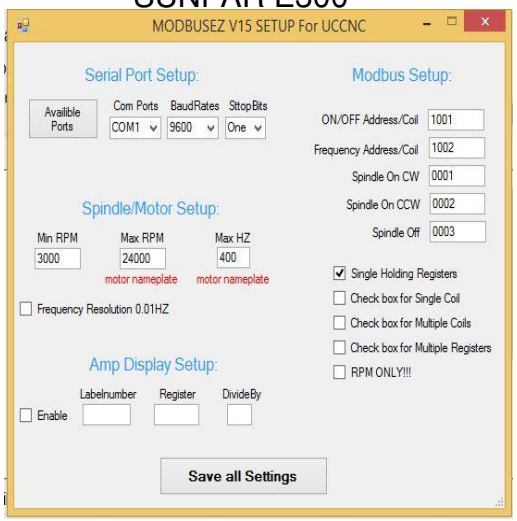
KCLY KOC100



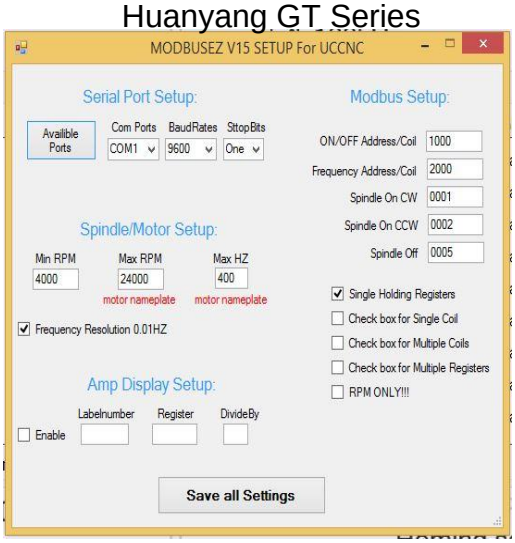
Delta VFD-M



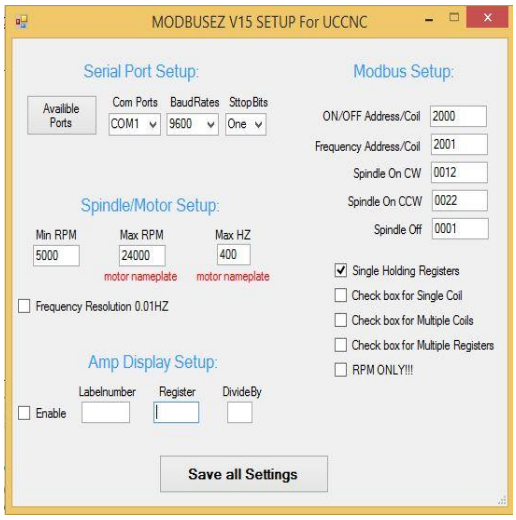
SUNFAR E300



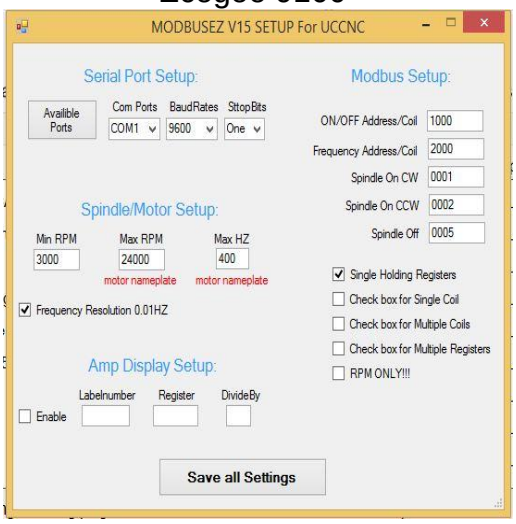
Huanyang GT Series



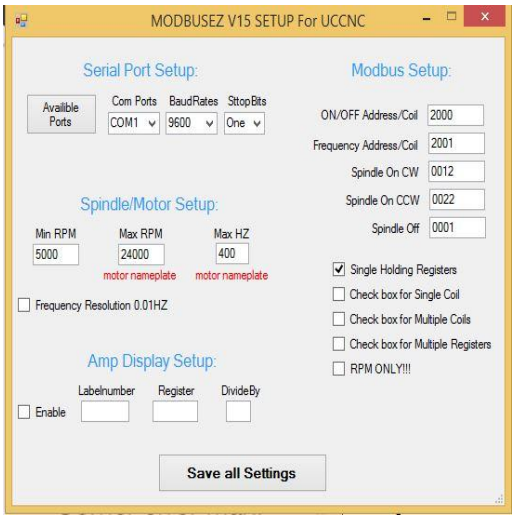
SAVCH S900



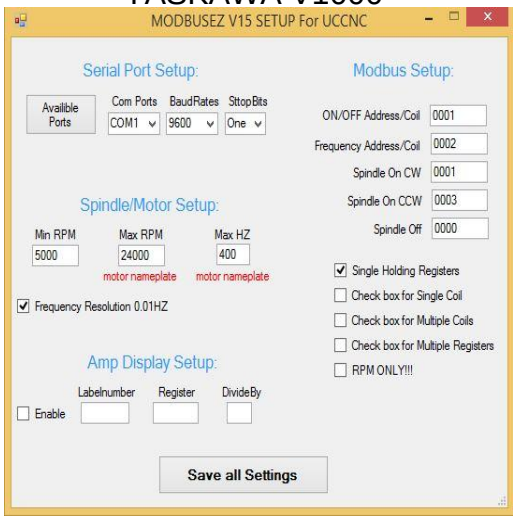
Ecogoo 9100



AB Power Flex 4



YASKAWA V1000



Powtran PI9000