

HMI – VFD MODBUS Communication



HMI: Delta B Series
(DOP-BO7s411)

10010
↔
11011



Drive: Delta VFD M Series



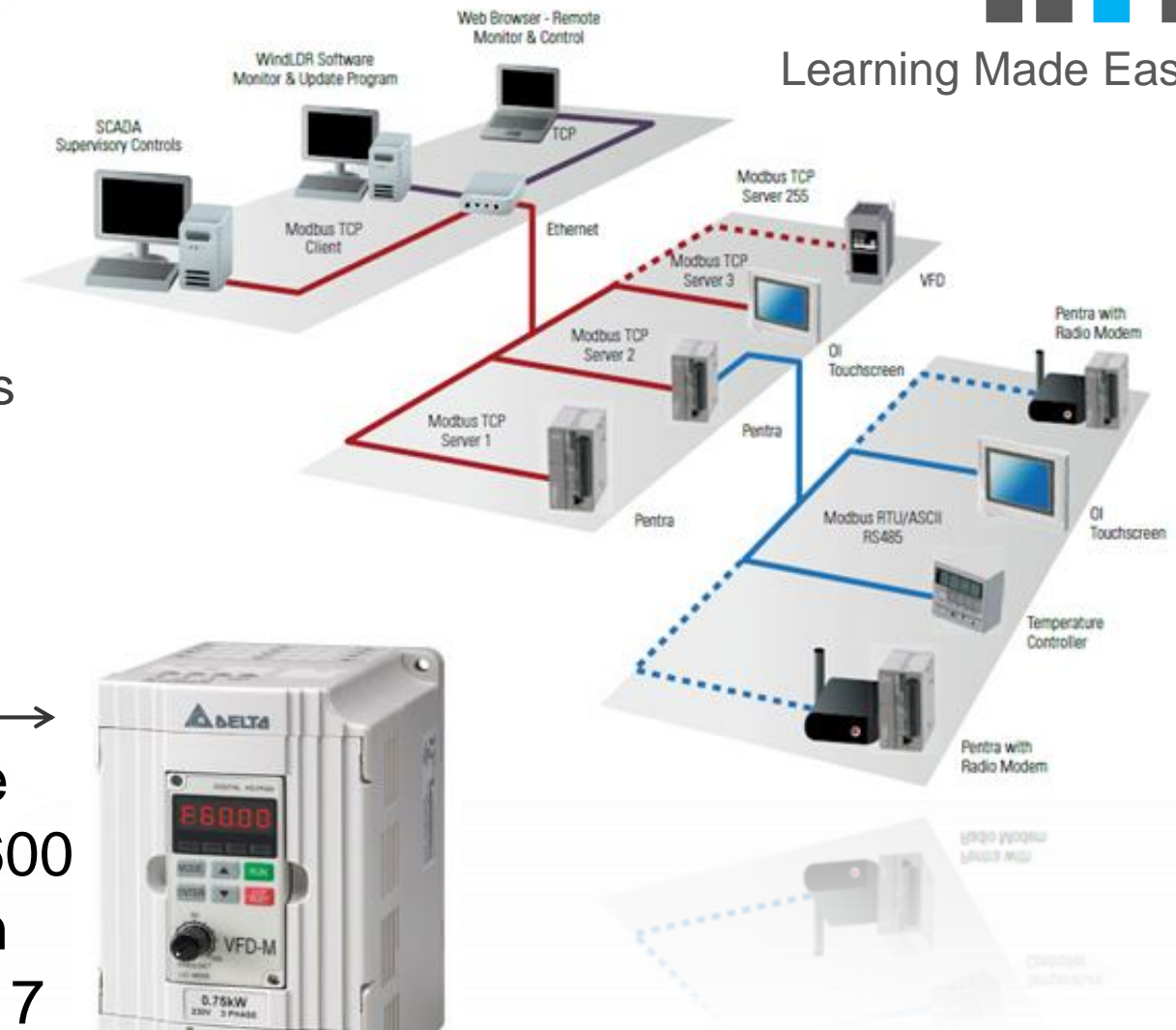
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What is MODBUS

- ? MODBUS is the serial communication between various devices.
- It Read/Write the memory addresses directly



ASCII Mode
Baud Rate: 9600
Parity: Even
Data Length: 7
Stop Bit: 1

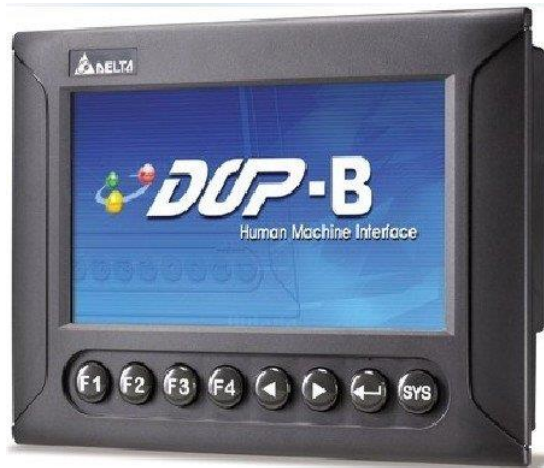


A dark grey arrow points right from the left edge. Several thin, curved lines in dark blue and light grey sweep from the bottom left towards the center of the page.

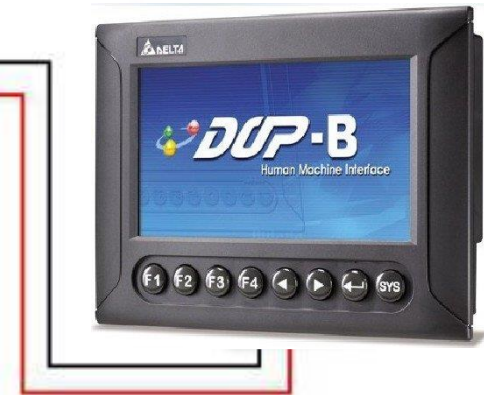
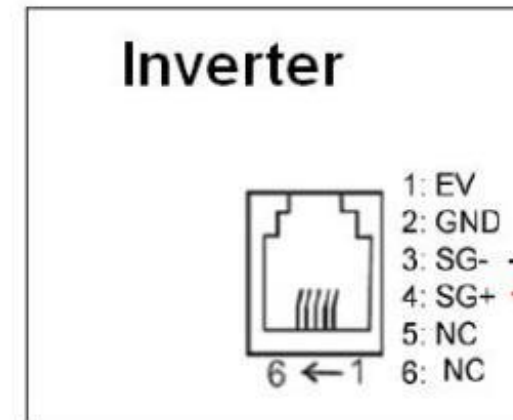
STEPS TO LINK VFD AND HMI VIA MODBUS

Step 1: Wire the VFD and HMI

- MODBUS is the serial communication between various devices.
- It Read/Write the memory addresses directly



↔
ASCII Mode
Baud Rate: 9600
Parity: Even
Data Length: 7
Stop Bit: 1



PIN WIRING

Inverter	HMI PIN
4 (+)	1
3 (-)	6

Step 2

Configuring VFD with Communication Parameters



ASCII Mode
Parity: Even
Data Length: 7
Stop Bit: 1

(Parameter 92 – 01)

Baud Rate: 9600 (Parameter 89 – 01)

Source of Frequency Command : RS 485 (Pr. 00 - 3)

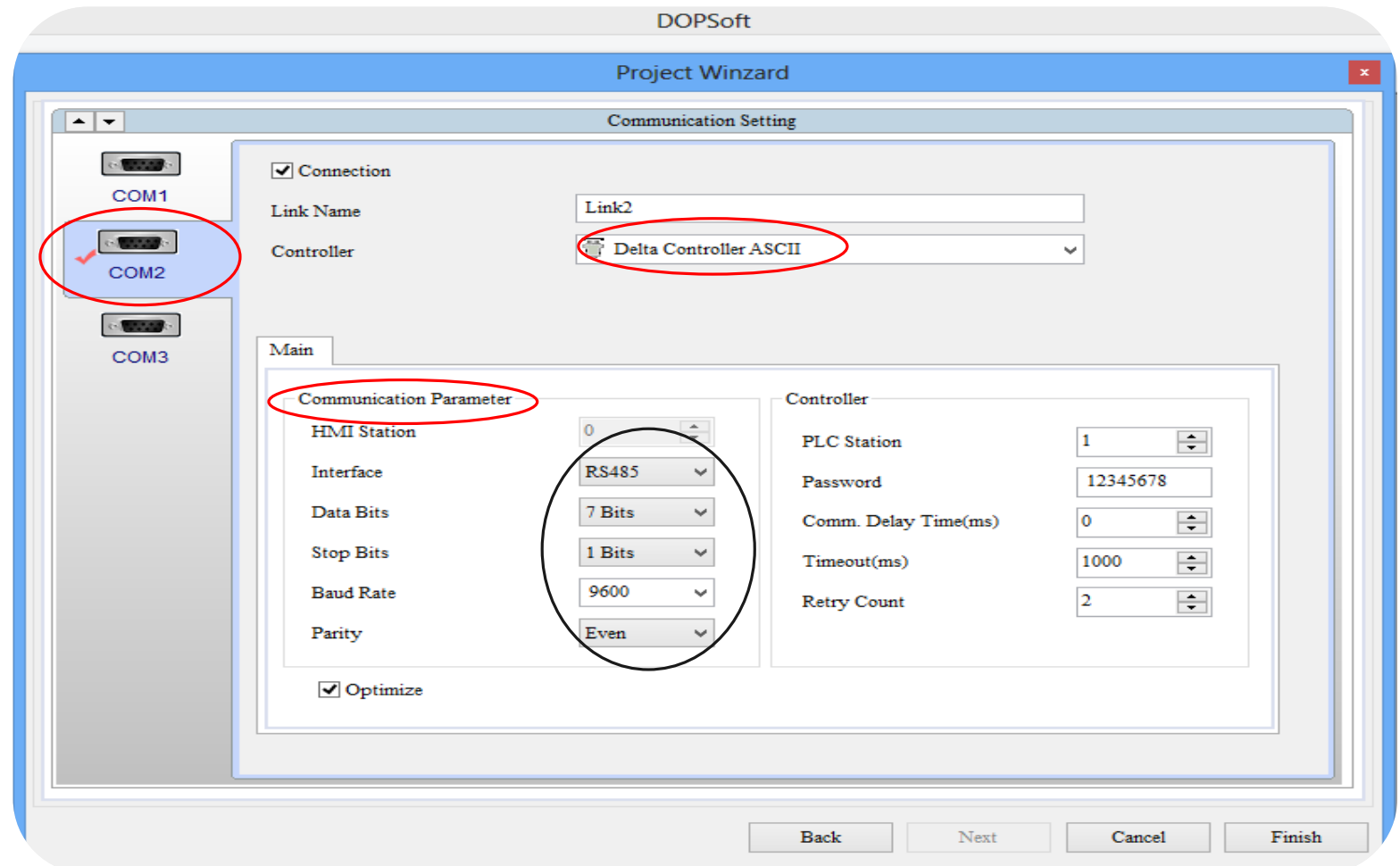
Source of Operation Command : RS 485 (Pr. 01 - 3)

Step 3

Configuring HMI with Communication Parameters

Steps to follow:

1. Start a **new project** in **DOP Soft**
2. Select your **HMI Model** and click **NEXT**
3. Enter the **parameters** as shown in the figure
4. Click **Finish**



Step 4

Create Constant elements in HMI Software for ON/OFF

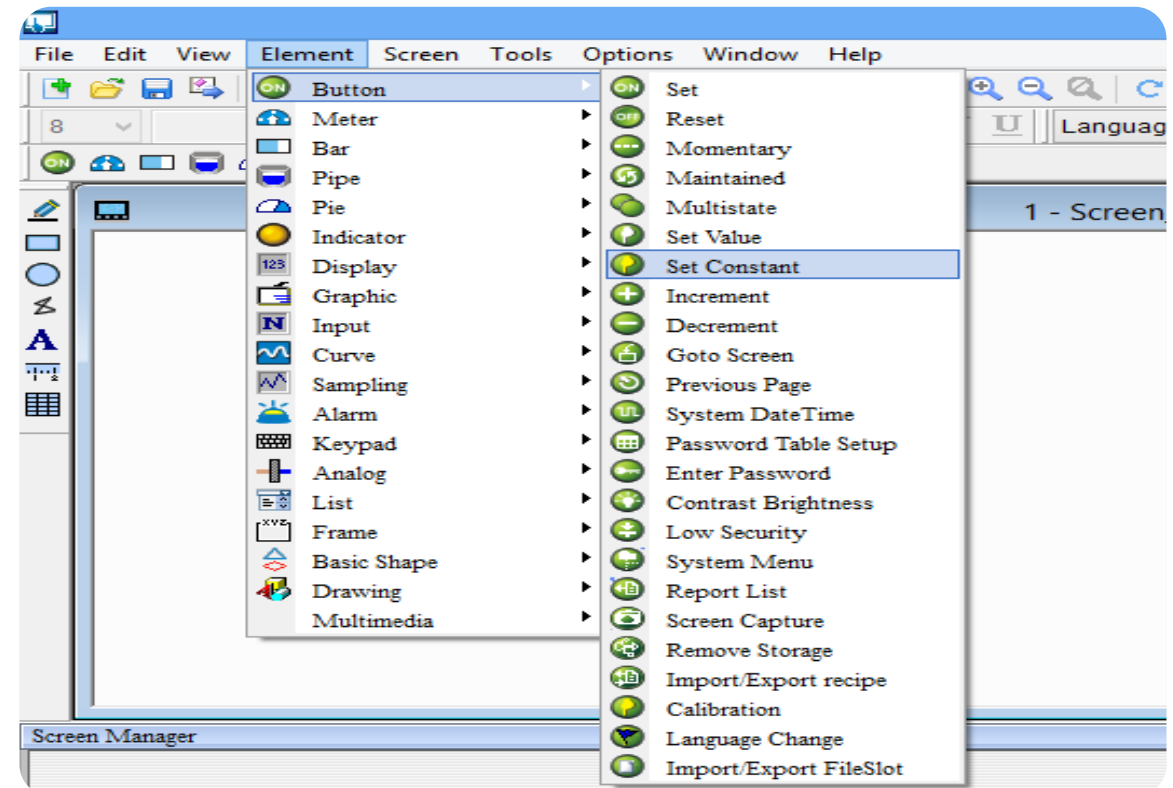
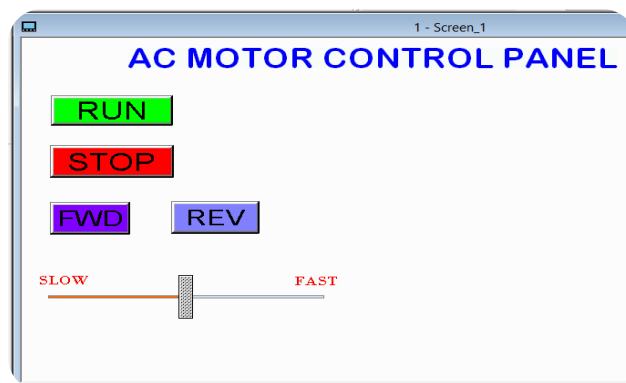
Now we have to create some **constant elements & Slider** in HMI to **Read/Write** the values directly in **VFD Memory registers**.

How to create Constant?

Navigate to

Elements – Button – Set Constant

Sample Screen



Understanding Memory addresses of the VFD

Following image shows general memory addresses of VFD for MODBUS operation via the constant we created in HMI.

MODBUS ADDRESSES

Find more addresses in VFD manual

Content	Address	Functions	
AC drive Parameters	00nnH	00 means parameter group, nn means parameter number, for example, the address of Pr.100 is 0064H. Referencing to chapter 5 for the function of each parameter. When reading parameter by command code 03H, only one parameter can be read at one time.	
Command Read/Write	2000H	Bit 0-1	00: No function 01: Stop 10: Run 11: Jog + Run
		Bit 2-3	Reserved
		Bit 4-5	00: No function 01: FWD 10: REV 11: Change direction
		Bit 6-15	Reserved
	2001H	Freq. command	
	2002H	Bit 0	1: EF (external fault) on
		Bit 1	1: Reset
		Bit 2-15	Reserved

**READ/WRITE
VALUES**

	3005H	Bit 5-12	Reserved
		Bit 1	1: Reset

Example:

VFD Operation 2000H - Calibrated Values:

Following are the calibrated values you can use in the constant elements you created in HMI

b5	b4	b3	b2	b1	b0	D	Function
0	0	0	0	0	1	K1	Stop
0	0	0	0	1	0	k2	RUN
0	0	0	0	1	1	k3	JOG
0	1	0	0	0	0	k16	FWD
1	0	0	0	0	0	K3 2	REV
1	1	0	0	0	0	k48	Toggle Direction
0	1	0	0	1	0	k18	FWD RUN
1	0	0	0	1	0	K3 4	REV RUN

Step 5

Write address in constants elements

Constant Element

AC MOTOR

Preview

State: 0

Language: Language1

Write Address: **{Link2}1@INVERTER-2000**

Write Offset Addr.: None

Data Type: Word

Memory Format: Unsigned Decimal

Detail..: 2

Style: Standard

Foreground Color: Green

HMI Link

VFD ADDRESS for Operation

{Link2}1 @INVERTER-2000

Step 6

Memory addresses for VFD Frequency

Following image shows general memory addresses of Frequency Command of VFD



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MODBUS

ADDRESSES

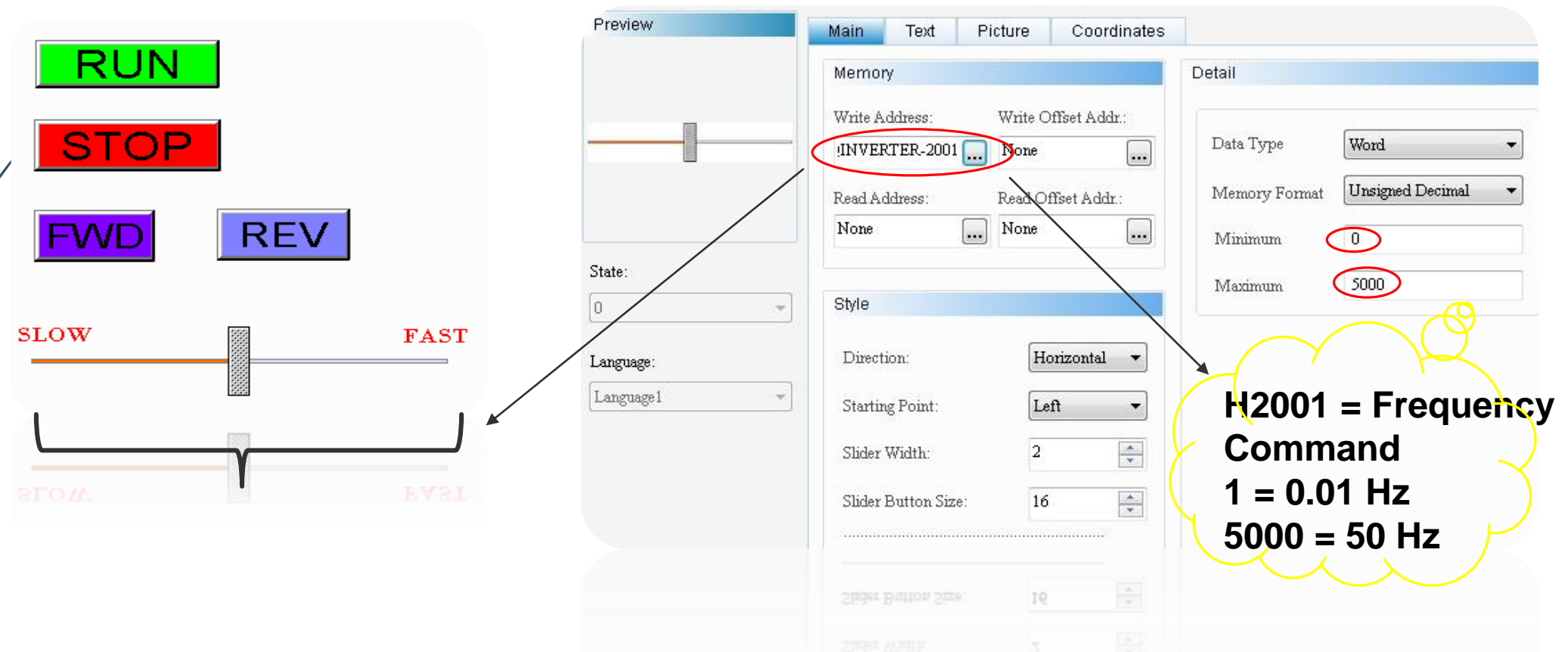
Content	Address	Functions	
AC drive Parameters	00nnH	00 means parameter group, nn means parameter number, for example, the address of Pr.100 is 0064H. Referencing to chapter 5 for the function of each parameter. When reading parameter by command code 03H, only one parameter can be read at one time.	
Command Read/Write	2000H	Bit 0-1	00: No function 01: Stop 10: Run 11: Jog + Run
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	2001H	Freq. command	
	2002H	Bit 0	1: EF (external fault) on
		Bit 1	1: Reset
		Bit 2-15	Reserved

} **READ/WRITE
VALUES**

Step 7

Linking Freq. Command address to Slider Element

Following images show the general memory addresses of Frequency Command (0 ~ 50Hz) of VFD



The diagram illustrates the configuration of a VFD (Variable Frequency Drive) for frequency control. On the left, a control panel shows buttons for RUN (green), STOP (red), FWD (purple), and REV (blue). Below these are two frequency sliders: the top one is labeled SLOW and FAST, and the bottom one is labeled SLOW and FAST. Arrows indicate the mapping of these controls to the software configuration.

The software configuration window shows the following settings:

- Memory:**
 - Write Address: **INVERTER-2001** (circled in red)
 - Write Offset Addr.: None
 - Read Address: None
 - Read Offset Addr.: None
- Style:**
 - Direction: Horizontal
 - Starting Point: Left
 - Slider Width: 2
 - Slider Button Size: 16
- Detail:**
 - Data Type: Word
 - Memory Format: Unsigned Decimal
 - Minimum: **0** (circled in red)
 - Maximum: **5000** (circled in red)

A yellow cloud contains the following text:

- H2001 = Frequency Command**
- 1 = 0.01 Hz**
- 5000 = 50 Hz**

Step 8

Reading the output current from VFD

Following images show the memory addresses of Output Current of VFD

Preview

Main Text Picture Coordinates

Memory

Read Address: INVERTER-2104 Read Offset Addr.: None

Style

Scale Region Number: 6

SubScale Number: 0

Stitch Color: [Black]

Grid Color: [Black]

Rule Color: [Red]

Border Color: [Grey]

Low Region Color: [Green]

High Region Color: [Red]

Numeric Display: Yes

Style: Sunken

Foreground Color: [Blue]

Background Color: [White]

Detail

Data Type: Word

Memory Format: Unsigned Decimal

Minimum: 0

Maximum: 5

Target: 0

Ranges

Low range limits: 0

High range limits: 100

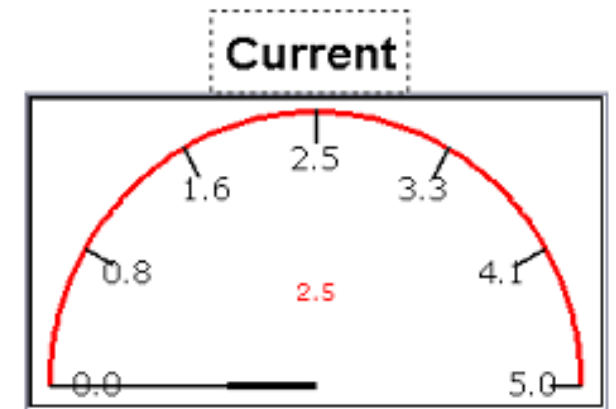
Variable target/range limits: [Unchecked]

Integer Digits: 3 Min 0.0

Fractional: 1 Max 999.9

	Bit 14-15	Reserved
2102H	Frequency command F (XXX.XX)	
2103H	Output Frequency H (XXX.XX)	
2104H	Output Current A (XXX.X)	
2105H	DC-BUS Voltage U (XXX.X)	

Meter Element
{Link21@INVERTER-2104

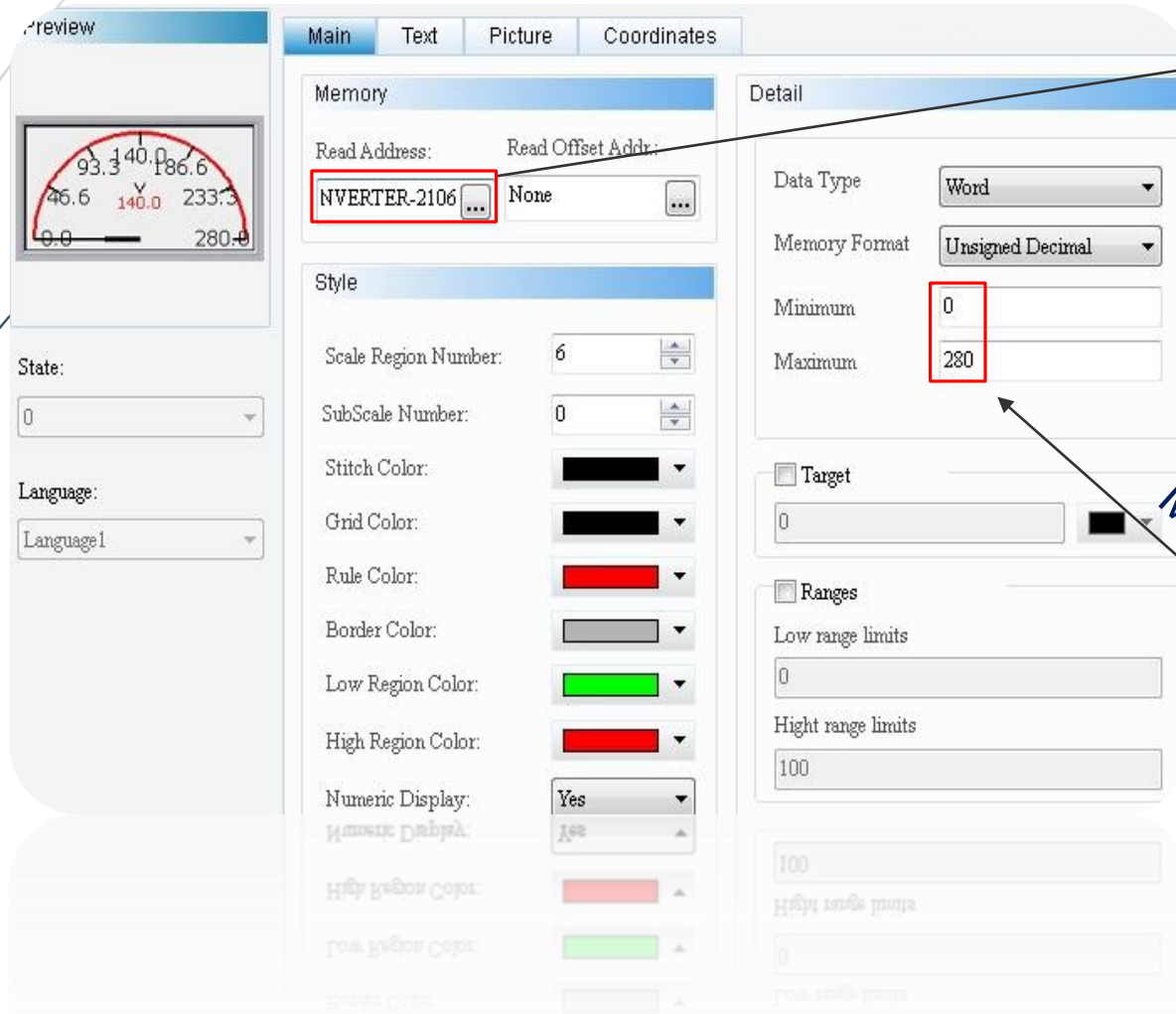


Double Click on the element to access properties

Step 9

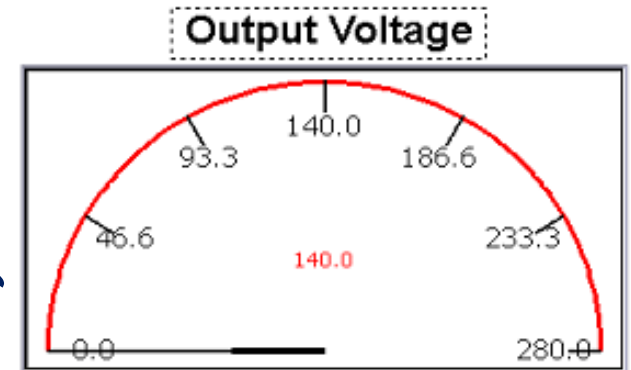
Reading the output voltage from VFD

Following images show the memory addresses of Output Voltage of VFD



er 4 Parameters VFD-M		
Content	Address	Functions
	2106H	Output Voltage E (XXX.X)
	2107H	Step number of Multi-Step Speed Operation (step)
	2108H	Time of PLC Operation (sec)
	2109H	Value of External Trigger (count)
	210AH	Value of External Trigger (count)
	210BH	Value of External Trigger (count)

Meter
{Link2} INVERTER-2106
Element



Double Click on the element to access properties



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Thank You