

INPUT REGISTERS					
		Data type	Description	Data	Values
1	Analogue input level	unsigned int.	Analogue input value depending on the selected analogue input type.	0–100	0 = 0 VDC 100 = 10,0 VDC or 0 = 0 mA 100 = 20,0 mA
2	Current output voltage	unsigned int.	Actual output voltage	0 30–100	0 = 0 % Us 30 = 30 % Us 100 = 100 % Us
3	Analogue input type	unsigned int.	Type of the selected analogue input	0–1	0 = 0–20 mA 1 = 0–10 VDC
4	Ascending / descending input mode	unsigned int.	Ascending or descending analogue input mode depending on the selected analogue input type.	0–1	0 = 10–0 VDC 1 = 0–10 VDC or 0 = 20–0 mA 1 = 0–20 mA
5	Maximum output voltage	unsigned int.	Maximum output voltage	75–100	75 = 75 % Us 100 = 100 % Us
6	Minimum output voltage	unsigned int.	Minimum output voltage	30–70	30 = 30 % Us 70 = 70 % Us
7	Enable off level	unsigned int.	Enables off level	0–1	0 = Disabled 1 = Enabled
8	Off level value	unsigned int.	Off level value depending on the selected analogue input type and ascending / descending analogue input mode.	0– 40 60–100	Ascending mode: Voltage 0 = 0 VDC 400 = 4,0 VDC Current 0 = 0 mA 200 = 8,0 mA Descending mode: Voltage 100 = 10,0 VDC 60 = 6,0 VDC Current 100 = 20,0 mA 60 = 12,0 mA
9	Kick start / soft start	unsigned int.	Selects kick start or soft start	0–1	0 = soft start 1 = kick start
10	Remote control input	unsigned int.	Remote control input	0–1	0 = Disabled 1 = Enabled
12	L1 control	unsigned int.	L1 control	0–1	0 = Off 1 = On
14	ON/Stand-by LED	unsigned int.	ON/Stand-by LED	0–2	0 = Off 1 = On 2 = Stand-by
15-20			Reserved, returns 0		

HOLDING REGISTERS						
		Data type	Description	Data	Default	Values
1	Device slave address	unsigned int.	Modbus device address	1–247	1	
2	Modbus baud rate	unsigned int.	Modbus communication baud rate	1–4	2	1 = 9,600 2 = 19,200 3 = 38,400 4 = 57,600
3	Modbus parity	unsigned int.	Parity check mode	0–2	1	0 = 8N1 1 = 8E1 2 = 8O1
4	Device type	unsigned int.	Device type (<i>Read only</i>)	EVSX-DM = 3005		
5	HW version	unsigned int.	Hardware version of the device (<i>Read only</i>)	XXXX		0x0300 = HW version 3.00
6	FW version	unsigned int.	Firmware version of the device (<i>Read only</i>)	XXXX		0x0150 = FW version 1.50
7	Operating mode	unsigned int.	Enables Modbus control and disables the DIP switch and trimmers	0–1	0	0 = Standalone mode 1 = Modbus mode
8	Output override	unsigned int.	Enables the direct control over the output. <i>Always settable. Active only if holding register 7 is set to 1.</i>	0–1	0	0 = Disabled 1 = Enabled
9-10			Reserved, returns 0			
11	Analogue input type	unsigned int.	Selects the analogue input type of the device. <i>Always settable. Active only if holding register 7 is set to 1.</i>	0–1	1	0 = 0–20 mA 1 = 0–10 VDC
12	Ascending / descending analogue input mode	unsigned int.	Ascending / descending analogue input mode. <i>Depends on the selected analogue input type. Always settable. Active only if holding register 7 is set to 1.</i>	0–1	1	0 = 10–0 VDC 1 = 0–10 VDC or 0 = 20–0 mA 1 = 0–20 mA
13	Maximum output voltage	unsigned int.	Maximum settable output voltage. <i>Always settable. Active only if holding register 7 is set to 1.</i>	75–100	100	75 = 75 % Us 100 = 100 % Us
14	Minimum output voltage	unsigned int.	Minimum settable output voltage. <i>Always settable. Active only if holding register 7 is set to 1.</i>	30–70	30	30 = 30 % Us 160 = 00 % Us
15	Enable off level	unsigned int.	Enables off level. <i>Always settable. Active only if holding register 7 is set to 1.</i>	0–1	0	0 = Disabled 1 = Enabled
16	Off level value	unsigned int.	Off level value. <i>Depends on the selected analogue input type and ascending / descending analogue input mode. Always settable. Active only if holding register 7 is set to 1.</i>	0–40 60–100	0	Ascending mode: Voltage 0 = 0 VDC 40 = 4,0 VDC Current 0 = 0 mA 40 = 8,0 mA Descending mode: Voltage 100 = 10,0 VDC 60 = 6,0 VDC Current 100 = 20,0 mA 60 = 12 mA
17	Kick start / soft start	unsigned int.	Selects kick start or soft start. <i>Always settable. Active only if holding register 7 is set to 1.</i>	0–1	1	0 = Soft start 1 = Kick start
18	Kick start / soft start duration	unsigned int.	Sets the duration time. <i>Always settable. Active only if holding register 7 is set to 1.</i>	0–60	10	0 = 0 s 60 = 60 s
19	Remote control functionality	unsigned int.	Sets the remote control input mode. <i>Depends on the selected kick start or soft start mode. Always settable. Active only if holding register 7 is set to 1.</i>	0–1	0	0 = Normal mode 1 = Timer mode
20	Analogue input functionality	unsigned int.	Sets the analogue input functionality. <i>Depends on the selected kick start or soft start mode. Always settable. Active only if holding register 7 is set to 1.</i>	0–1	0	0 = Normal mode 1 = Logic mode
21	Operation timer	unsigned int.	Sets the operation time of the device when Timer mode by remote control input or Logic mode by the analogue input is selected. The operation time is additional to the kick start / soft start duration times. <i>Always settable. Active only if holding registers 7 and 19 or / and 20 are set to 1.</i>	0–200	60	0 = 0 s 200 = 200 s
22-30			Reserved, returns 0			
31	Output override value	unsigned int.	Override value for the analogue output. <i>Always settable. Active only if holding register 8 is set to 1.</i>	0 30–100	0	0 = 0 % Us 30 = 30 % Us 100 = 100 % Us
32-40			Reserved, returns 0			

If you want to find out more about Modbus over serial line, please visit: http://www.modbus.org/docs/Modbus_over_serial_line_V1_02.pdf

INPUT REGISTERS

The input registers are read-only. Table 1 shows how the data is organized in the input register sector. The measured data starts from address 1 (30001) and ends at address 14 (30014). The other input registers are not used. When they are addressed, they return '0'.

All the data can be read by "Read Inputs Registers" command. Table 1 shows what the type of the returned data for each register is and the way it should be interpreted. For example reading '300' in input register 1 means that the measured analogue input signal is 3,0Vdc (or 6,0mA), reading '50' in input register 2 means that the output voltage is 50% U_s (115Vac)

Input register 1 (30001) shows the current value of measured analogue input signal. This value depends on the selected analogue input type. When voltage input is selected, the values vary in the range of 0 -1.000 (0-10,0Vdc). When current input is selected, the values vary in the range of 0-1.000 (0-20,0 mA).

Input register 2 (30002) shows the current value of the output voltage. This input register is overridden by holding register 31 if output override control (holding register 8) is enabled. When output override control is disabled, this input register shows the value of the output voltage according to the selected operating mode.

The output voltage values vary in the range of 30—100 % U_s (69-230Vac).

Reading '0' (0Vac) indicates that the controller is off.

Input register 3 (30003) shows the type of the analogue input signal. This input register is defined by holding register 11 or by the hardware setting of position 4 of the DIP switch. The values are '0' (for 0-20mA) or '1' (for 0-10Vdc)

Input register 4 (30004) shows the selected mode of the analogue input. This input register is defined by holding register 12 or the hardware setting of position 1 of the DIP switch, according to the selected operating mode. The values are '0' (for descending mode) or '1' (for ascending mode).

Input register 5 (30005) shows the value of the maximum output voltage. This input register is defined by holding register 13 or the hardware setting of the Max. trimmer, according to the selected operating mode. The register values are in range of 75-100 (75-100 % U_s Vac).

Input register 6 (30006) shows the value of the minimum output voltage. This input register is defined by holding register 14 or the hardware setting of Min. trimmer, according to the selected operating mode. The register values are in range 30-70 % U_s .

Input Register 7 (30007) gives information about the OFF level state. In Standalone mode it contains the value set by position 2 of the DIP switch. In Modbus mode it contains the value of holding register 15. It could be '0' (disabled) or '1' (enabled).

Input Register 8 (30008) gives information about the OFF level value. In Standalone mode it contains the value set by the OFF level trimmer. In Modbus mode it contains the value set by holding register 16. This value depends on the selected analogue input type and mode. The register values can vary from 0 to 40 (0-4,0 Vdc/0-8,0mA) and from 60 to 100 (6,0-10,0 Vdc/ 12,0-20,0mA).

The values depend on the selected analogue input type and mode.

Input Register 9 (30009) gives information about the kick start or soft start selection. In Standalone mode the value corresponds to the start type set by position 3 of the DIP switch. In Modbus mode it contains the value set by holding register 17. The register values are '0' (for soft start) or '1' (for kick start).

Input Register 10 (30010) shows the state of the remote control input. When it is disabled, the unit works in normal operating mode. When the remote control input is enabled, the controller is in stand-by mode. The register values are '0' (for disabled) or '1' (for enabled).

Input Register 12 (30012) shows the status of the unregulated output L1. When the analogue input signal is below the value of the OFF level (if enabled) or when the remote control input is disabled, the output voltage of the unregulated output L1 is '0' = OFF (0Vac). Otherwise it is '1' = On (23Vac)

Input Register 14 (30014) shows the operating status of the unit. When the register value is '0' (Off), the controller is switched off. The ON/Stand-by LED on the front panel is off.

When the value is '1' (On), the controller operates according to the control algorithm, and the analogue input signal is above the selected OFF level value (if enabled). The ON/Stand-by LED gives out continuous light.

The ON / Stand-by LED blinks and the register value is 2 (Stand-by) when OFF level is enabled and the analogue input signal is below the OFF level value.

HOLDING REGISTERS

These registers are read / write registers and they can be managed with “Read Holding Registers” command, “Write single register” and “Write Multiple Registers” commands. They are organised in parts containing different kind of information.

The registers that are not used are read only. Writing on these registers does not return Modbus error exception; however, it does not change anything either!

Part 1:

This part contains information about the unit and Modbus communication settings.

Holding register 1 (40001) contains the address at which the controller replies to the Modbus master unit. The default address is ‘1’. You can change it in two ways:

1. Send command “Write Single Register” with address ‘1’ and write the new address value.
2. Connect only your unit to a master controller or PC application and send the command “Write Single Register” to address ‘0’ (Modbus broadcast address) and write a new address value.

The next two registers (2 and 3) contain Modbus settings. Changing these registers you change the communication settings. The default Modbus settings are 19200-E-1 as it is stated in the Modbus Protocol Specification.

The next three registers (4, 5 and 6) are read only. They contain information about the hardware and firmware versions.

Holding register 7 (40007) sets the operation mode of the controller. There are two options: Standalone mode and Modbus mode. In Standalone mode the controller is fully controlled by the analogue input signal and the selected hardware settings.

In Modbus mode the settings can be controlled by the Modbus master controller.

Holding register 8 (40008) is used for output override control. The setting is used to override the output voltage by a preselected value. This value has greater priority over the calculated output voltage of the integrated control algorithm.

Only kick start / soft start can change the output voltage value.

Holding registers 9 (40009) and 10 (40010) are not used. They are read only.

Part 2:

Holding register 11 (40011) sets the analogue input signal type. The default value is ‘1’ (0-10Vdc). ‘0’ is for 0-20mA.

Holding register 12 (40012) defines the ascending / descending analogue input mode. The default value is ‘1’ is for 0-10Vdc (ascending voltage signal). The register values are ‘0’ for 10-0Vdc and ‘1’ for 0-10Vdc when voltage signal is selected, and ‘0’ for 20-0mA and ‘1’ for 0-20mA when current signal is selected

Holding register 13 (40013) contains the maximum output voltage. The default value is ‘100’ (100 % Us or 230Vac). The register values vary in the range of 75-100 (75-100 % Us).

Holding register 14 (40014) contains the minimum output voltage. The default value is ‘30’ (30 % Us). The register values vary in the range of 30-70 (30-70 % Us).

Holding register 15 (40015) sets the OFF level state. The default value is ‘0’ (disabled). ‘1’ is for enabled.

Holding register 16 (40016) defines the OFF level. The default value is ‘0’ (0Vdc).

This value depends on the selected analogue input type and mode. The register values vary in the ranges of 0-40 (0-4,0Vdc) for ascending voltage signal and 60-100 (6,0-10,0Vdc) for descending voltage signal. When current signal is selected, the register values are in ranges of 0-40 (0-8,0 mA) for ascending signal and 60-100 (12,0-20,0mA) for descending signal.

Holding register 17 (40017) sets kick start or soft start. The default value is ‘1’ (kick start). ‘0’ value is for soft start

Holding register 18 (40018) contains kick start or soft start duration time.

The default value is ‘10’ (10 seconds). The register values vary from ‘0’ to ‘60’ (0-60 seconds). This setting is accessible only in Modbus mode.

Holding register 19 (40019) selects the remote control input functionality. The default value is '0' for normal mode. Value '1' is for timer mode. This setting is accessible only in Modbus mode. OFF level mode is not used in timer mode.

Holding register 20 (40020) selects the analogue input functionality. The default value is '0' for normal mode; '1' is for logic mode. This setting is accessible only in Modbus mode.

Holding register 21 (40021) sets the value of the operation timer. This holding register is accessible only in timer mode and / or logic mode. The default value is '60' (60 seconds). The register values can vary from 0 to 200 (0-200 seconds). This setting is accessible only in Modbus mode. The working time is equal to the sum of the kick start / soft start duration time and the time value of the operation timer. When a working time expires, only a remote control input or analogue input can restart the unit.

The next holding registers 22 (40022)-30 (40030) are not used. They are read only.

Holding register 31 (40031) overrides the output voltage value in Modbus mode when output override is enabled. The override value setting does not depend on the other settings except on the kick start or soft start selection. The default value is '0' (Vac). The register value can vary in the range of 30-100 (30-100 % Us). It can be also '0' (0 % Us).

The next holding registers 32 (40032)-40 (40040) are not used. They are read only