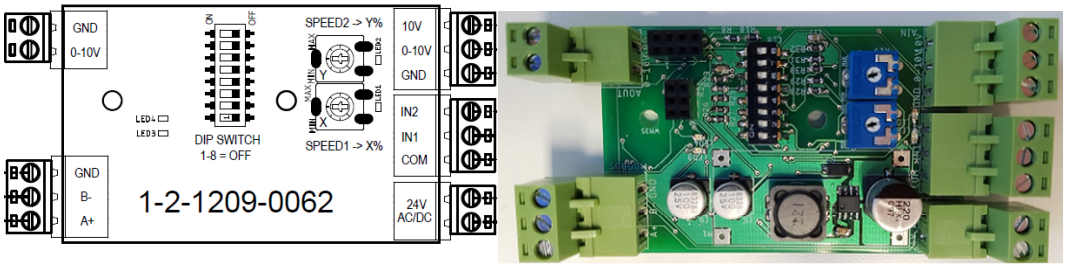
Control EC_board for Air Handling Units index 1-2-1209-0062 ver1.0



Introduction

EC_board has two functions:

1) Converts digital inputs to analog input 0-10V – it is used to control EC motor by analog signal or modbus signal.
In this configuration Modbus communication is in Master function. EC_board can send command by bus to control speed motor drive. One EC_board is sending commands for 10 motors on address 1-10, every motors have the same speed.

2) Expansion I/O board for PLC controller. In this configuration EC_board is in Slave function. External PLC controller send to EC_board commands to control I/O.

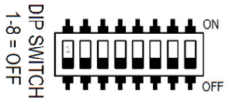
Operation parameters

- Power Supply +24VDC or 24AC - only config. I
- Digital Input 24VDC or 10-30V AC (optoisolation) 2 input
- Analog Input 0-10V DC 1
- For configuration I (EC_Board = Modbus Master DIP 8 = OFF)
  - Reference 10V DC 1
  - Analog Output 0-10V DC 1
- For configuration II (EC_Board = Modbus Slave DIP 8 = ON)
  - Analog Output 2
- Modbus communication RS-485 1

Change configuration

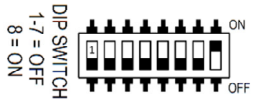
To change configuration you must set DIP switch to:

1) DIP 1-8=OFF



Configuration I - EC_board is Modbus Master, can without outside plc help control EC motor speed. Change speed by change digital output. Set speed by 0-10V analog output or modbus communication.

2) DIP 1-7=OFF, DIP8=ON



Configuration II - EC_board is Modbus Slave, can not work without outside plc. Change outputs and read inputs by commands from external PLC controller Warning! Applies to PCB-EC boards, which after switching the position 8 switch do not change the logic of the program for cooperation with switchboards – please switch the DIP switch 7 to "On" position. Dip-switch 7 is redundant, in this case its switching increases the accuracy of microcontroller reading.

Functions in configurations

Configuration I DIP8=OFF

The potentiometers set the voltage value for speed 1 and 2. Activation of IN1 and IN2 inputs - the green LEDs 1 and 2 for speed 1 and 2 will light up respectively. The value on the output matches the set ranges on the potentiometers.

It is possibly to work with 3 speeds. Speed 3 through the 0-10V input. Signal above 5V = speed 3 activation. Speed 3 gives a maximum signal 10V - no adjustment possible. After activating gear 3, the green LED3 blinks.

The signal for run speed 1 is also a work permit. No signal - there is no voltage on the 0-10V output = 0V, despite activating gears 2 and 3.

Setting the value with a smaller potentiometer for speed 2 than for speed 1 causes an alarm (the red LED 4 blinks) and the 0-10V output is set to 0V.

The 0-10V output1 is permanently set to 10V DC and marked as 10V on pcb.

The modbus communication connector - used to control the speed of EC VTS engines, can be used instead of a 0-10V signal. He is the Modbus Master on the RS-485 line. It should not be connected to another RS-485 bus. The system simultaneously issues a 0-10V signal and a value after modbus. The motor must be activated by modbus (instead of 0-10V) - standard for VSS005s engines. Controls motors with addresses from 1-10.

Configuration II DIP8=ON

The system is used to extend the I / O of the connected PLC. Orders and data are sent on the modbus bus.

Potentiometers can be used to set analog outputs in a specific state in the event of communication loss between PLC and Ec_board. The settings are controlled by the DIP switch 7, according to the values shown in the diagram.

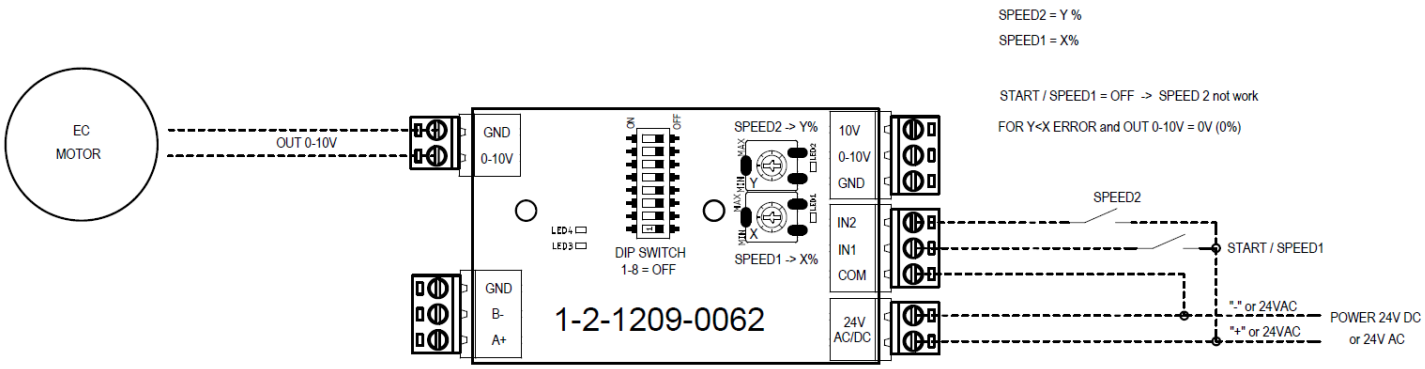
Configuration I and II (both)

Turning on the power - the green LED3 is on.

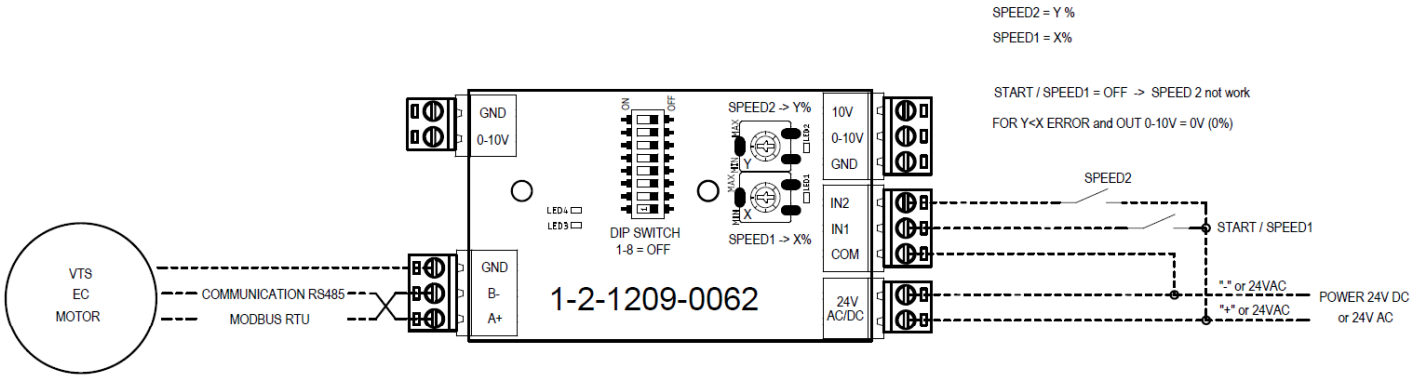
Parameters of communication DIP 1 = OFF speed 9600 8/N/1. DIP1 = ON speed 19200 8/N/1. The speed can be switched during the module operation.

Diagrams

Configuration I - Converts digital inputs to analog input - 2 speed



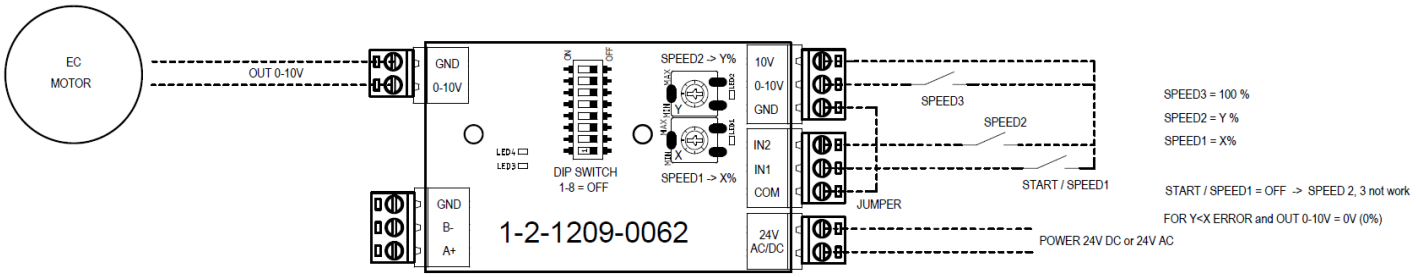
Connection to motor with 0-10V control signal



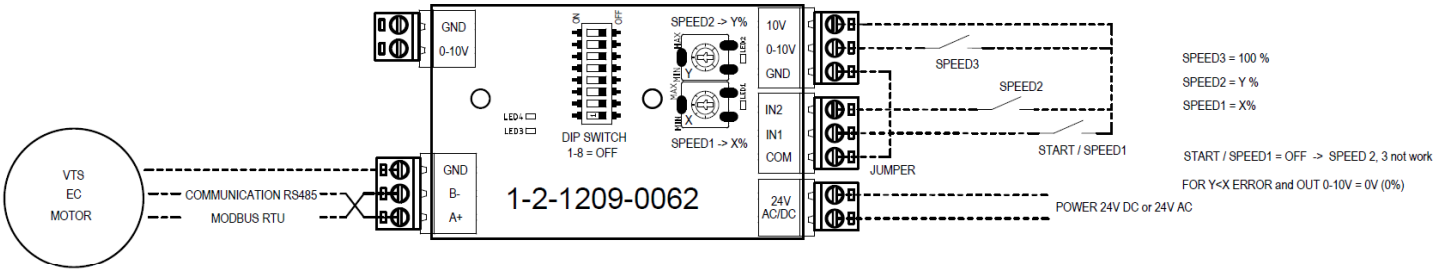
Connection to motor with MODBUS control signal for VVS005s EC072/25E3G01-B190

For MOTOR EC072/25E3G01-B190
Cable1 (power): Brown - L, Blue - N, Green/Yellow - PE
Cable2 (communication): Yellow- A+, White- B+, Blue - GND

Configuration I - Converts digital inputs to analog input - 3 speed



Connection to motor with 0-10V control signal



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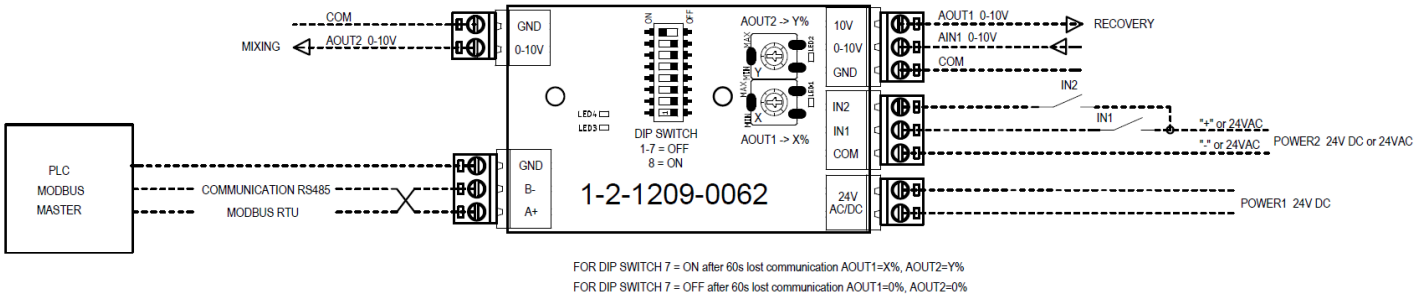
Configuration II - Configuration with external I/O (Modbus slave)



Connection to PLC Modbus Master to controls boards I/O

2 analog outputs
1 analog input
2 digital input

Table I/O

EC_board / with PLC *		EC_board / with PLC *	
Supply – AOUT		**Analog IN/OUT – AIN**	
G	+24V DC	GND	Reference Ground (0V)
G0	-24V DC	0-10V	Input 0-10V
Digital Inputs		10V	Reference 10V / Output1 0-10V (Recovery*)
IN1	Digital Input 1 - (Speed 1) / (Supply Filer*)	**Analog Output - AOUT**	
IN2	Digital Input 2 - (Speed 2) / (Return Filer*)	GND	Reference Ground (0V)
DI3	Common (Reference Ground)	0-10V	Output2 0-10V (Mixing*)
Modbus communication			
A+	Txd/Rxd (positive)		
B-	Txd/Rxd (negative)		
GND	Common (Reference Ground)		

*Symbol for function input/output EC_board when is used with PLC

Table LEDs

Modbus communication		
LED3 (green)	ON	Power is on, system is working
LED1 (green)	ON	IN1 Speed1 active signal
LED2 (green)	ON	IN2 Speed2 active signal
LED3 (green)	Blink	AIN 0-10V Speed3 active signal
LED4 (red)	Blink	Error set for speed 2 is smaller then for speed 1 (config. I)
LED4 (red)	ON	Communication timeout (60sec.) (config. II)