

EASY-1 USER FRIENDLY Step-less Electronic Voltage Controller for single-phase asynchronous motors

TECNICAL CHARACTERISTICS EASY-1

Power Supply	Voltage	230V _{AC} +/- 10% / 15% single-phase (110V _{AC} 400V _{AC} ON REQUEST)			
	Frequency	50 Hz Standard (60 Hz on request)			
Operating Principle	Over Voltage protection	For installation category II (4 KV)			
	Single-phase electronic voltage regulators which utilize the phase-cutting principle in order to regulate the output active voltage as a function of the control signal being applied to the inputs.				
Current	Rated	ESY108	08 A up to 50°C environment, over decrease by 0,4 A/°C		
		ESY112	12 A up to 50°C environment, over decrease by 0,6 A/°C		
		ESY116	16 A up to 50°C environment, over decrease by 0,8 A/°C		
	In-Rush	ESY120	20 A up to 50°C environment, over decrease by 1,0 A/°C		
		ESY108	16A		
Overload	ESY112	24A			
	ESY116	32A			
ESY120	40A				
Power	Control Circuits	3VA			
	Thermally dissipated	1,4 W/A			
Operating Characteristic	Master (Regulator) (Input IN1,IN2,IN3)	The output voltage change in order to keep the measured value by the transducer at Set-point otherwise inside the proportional band (Pb)			
	Slave (Power Unit) (Input IN4)	The output voltage is controlled by a 0-10 V driving input applied in IN4, in according to the device presetting			
Input Signals	Driving signal	Config. 0M	Master (Regulator)	IN 1 4-20 mA on 100 ohm (R)	
			Slave (Power Unit)	IN 4 0-10V on 10 kohm	
		Config. 0X	Master (Regulator)	IN 1 4-20 mA on 100 ohm (R)	
			Slave (Power Unit)	IN 4 0-10V on 10 kohm	
		Config. 0V	Master (Regulator)	IN 1 0-5 Vdc	
			Slave (Power Unit)	IN 4 0-10V on 10 kohm	
		Config. 0B	Master (Regulator)	IN 1 4-20 mA on 100 ohm (R)	
			Slave (Power Unit)	IN 4 0-10 V on 10 kohm	
		Functional logical		SP2 : selection Set Point 1 or Set Point 2 (Double Set Point option)	
		Set-Point Regulation		Double detens (13 positions)	
		Input type		4-20 mA NTC 10K @ 25°C 0-5 Vdc	
		Main Set Point (rough)		8 - 18 mA 10 - 60 °C 0,5 - 4,5 V	
		Set Point adjustment (fine)		+/- 0,5 mA +/- 2,5 °C +/- 0,40	
		Proportional band (default)		2,5 mA 7°C 0,65 V	
		Min limit / Cut-Off		This adjusts the output voltage from 0 to 60%	
		Maximum output limit		This adjusts the output voltage from 100% to 0%	
Acceleration ramp (fixed)		5"			
Modality operation		Direct (The output increases when driving input increases) or Reverse (The output decreases when driving input decreases)			
Set Point output voltage regulation		Max or Min (Max fan speed or Min fan speed)			
Lower output voltage		Min selected otherwise Cut-Off			
Signal for Power unit (SLAVE)		Analog 0-10V otherwise PWM logic 0-cross modulation			
Working Parameters	Config. 0M	V1	Aux.power supply	22V (+10/-20%) max. 25mA	
		V2	Aux.power supply	22V (+10/-20%) max. 25mA	
		+10V	Aux.power supply	10,0V (+/-1%)	
		OUT	Output signal for Power unit : 0-10V o PWM (Max 5 modules)		
	Config. 0X	V1	Aux.power supply	22V (+10/-20%) max. 25mA	
		V2	Aux.power supply	22V (+10/-20%) max. 25mA	
	Config. 0V	V1	Aux.power supply	5,0V (+/-1%)	
		V2	Aux.power supply	5,0V (+/-1%)	
		+10V	Aux.power supply	10,0V (+/-1%)	
		OUT	Output signal for Power unit : 0-10V o PWM (Max 5 modules)		
	Config. 0B	V1	Aux.power supply	22V (+10/-20%) max. 25mA	
		V2	Aux.power supply	5,0V (+/-1%)	
Config. 0B	+10V	Aux.power supply	10,0V (+/-1%)		
	OUT	Output signal for Power unit : 0-10V o PWM (Max 5 modules)			
Protections	EMC integrated mains filter	According to EN 55011 (CEI 110-6) Category B : appliances directly connected to low voltage power mains.			
	SURGE arrester protection	According to EN 61000-4-5 :Overvoltage category II (4 KV)			
Casement	Materials	GW-Plast 120°C (max. 120°C) and aluminium			
	Protection Degree	IP 55 (on request IP 00)			
	Heatsink temperature	60°C			
	Environmental pollution	Low pollution			
	Fire Resistance	Category D			
Dimensions and weight	ESY108	195 x 162 x 97	1,4 Kg		
	ESY112	195 x 162 x 97	1,5 Kg		
	ESY116	240 x 152 x 115	1,7 Kg		
	ESY120	240 x 152 x 115	1,8Kg		
Insulation	Electric stress of the of the insulating parts	Long Time Class I (use of the protection cable connected to the ground)			
	Control circuit	2000 Vac between protection grounding and energized parts of the device 2500Vac between the driving input and energized parts of the device 4000V between the driving input and the parts having the supply voltage			
Environmental conditions	Working temperature	-20 T 50 (to -20°C from + 50°C)			
	Storing temperature	-30 T 85 (to -30°C from + 85°C)			
	Vibrations	Lower of 1G (9.8 ms/s)			
	Ageing characteristics	60.000 ore			
Installation	Wall mounted-only in vertical position with N° 4 holes Ø 5 mm,free space above and below the regulator about 100 mm				
	Signal cables	Trailing cable with rated cross section min. 1,5 mmq			
Electrical Connections	Power cables	ESY108	Trailing cable with rated cross section min. 1,5 mmq		
		ESY112	Trailing cable with rated cross section min. 2,5 mmq		
		ESY116	Trailing cable with rated cross section min. 4,0 mmq		
		ESY120	Trailing cable with rated cross section min. 4,0 mmq		

The device is suitable for the installation in units of class I, II & III

COMMUNITARIANS DIRECTIVES & TECHNICAL NORMS

Like all our products, the EASY100 series bears CE marking as required by directive 89/336/ECC and its subsequent modification EEC/92/31 on electromagnetic compatibility. The essential requirements of the directive are satisfied by conformity to "generic standards" for heavy industry:

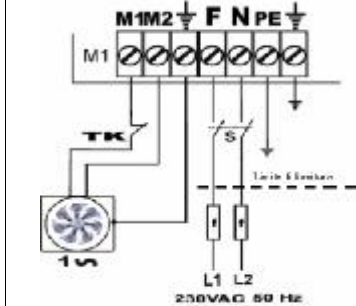
CEI-EN 60204-1 : "Safety of machinery"
EN 50081-1 emission standard civil environment
EN 50082-2 immunity standard industrial environment
EN 55011 class B, for radiated disturbances
EN 55011 class B, for conducted disturbances
ENV 50140 (IEC 801-3) for susceptibility (on the power supply)
ENV 50141 for conducted susceptibility on power lines
IEC 801-4 for fast transistors (bursts / high frequency disturbances)
IEC 801-2 for electrostatic discharge (ESD)

Directive 89/392/CEE
Directive 73/23/CEE (93/68)
Directive 89/336/CEE

POWER SUPPLY CONNECTION TERMINAL BOARD M1

WARNING !
HIGH LEAKAGE CURRENT: first connect to earth !
DO NOT touch the electrical parts of the circuit when the power supply is connected under any circumstances.
Before supplying power to the unit, check carefully that the power and earth are correctly connected.
The regulator must be suitably and effectively earthed by the installer according to the standards in force; earthing is essential for the EMC filter to operate correctly.
The user must be protected from the electric supply and the motor must be protected from possible overloads in compliance with the standards in force.

The regulator must be connected as shown in figure, being careful:



Prerange a "switch and two fuses upstream of the regulator so as to interrupt of the power supply for inspection;
Control the power connections and check the efficiency of earthing, before energizing the regulator;
Utilize, for the power connections and the earth cable, a cable with a right section;
Regulator fixing to the electrical panel: it's important the vertical fixing and that the internal temperature does not exceeds 50°C and the air circulation is adequate.

Switching:
After verifying the wiring, supply the card and connect a PWM input signal.
The output voltage ranges from 0 to 230 Vac according to the change in the driving signal.

*Switch and Fuses characteristics are defined by the Rated Current of the regulator and by the Load used.

M1	Fans electrical connections	Single phase motor 230 Vac 50 Hz
F	Power supply phase 1 (L1)	Single phase power supply 230 Vac 50 Hz (on request 60 Hz)
N	Power supply phase 2 (L2)	
PE	Safety ground	Ground connection (PE obligatory)
	Auxiliary ground	
S	Switch	External device
f	Protection Fuses	Outside device protection
TK	Fan motor thermic protection	

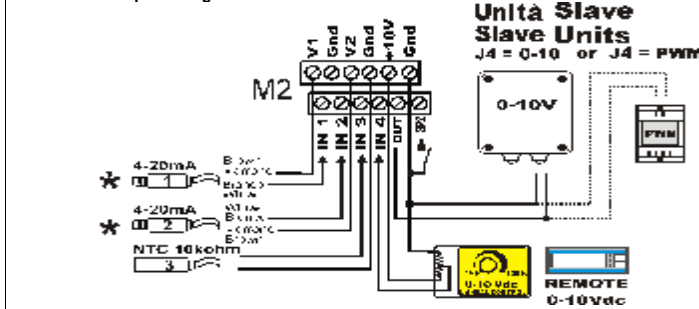
INPUT/OUTPUT CONNECTIONS TERMINAL STRIP M2 :

For the control connections in undisturbed environments, to utilise a common bipolar cable, whereas, in electromagnetically disturbed environments, to utilise a cable shielded with the braiding connected to the earth, keeping it as much far as possible from any other power cable.
The working modality can be:

- MASTER with Set-Point (inputs 4-20mA, 0-5Vdc or NTC probe)
- SLAVE (input 0-10Vdc)

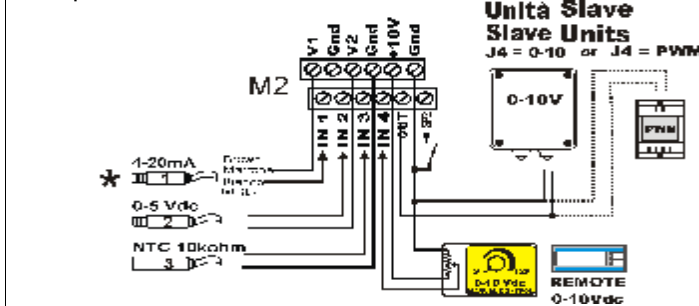
The selection of the input signal and the working modality is automatic :
The device function with the sensor/input signal at the moment operative and the customer will not have to operate on the device selection or programming (Jumper only to modify the default working modality).

OM Default input configuration :



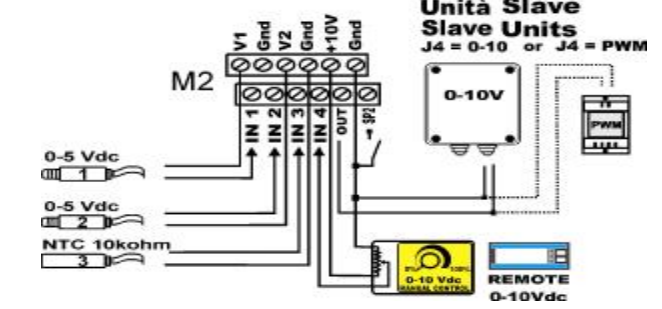
N°	Name	Function	CONF. OM
1	V1	Output power supply	+24V
2	IN1	Input trasducer N° 1	4-20 mA
3	GND	Ground	GND
4	IN2	Input trasducer N° 2	4-20 mA
5	V2	Output power supply	+ 24V
6	IN3	Input trasducer N° 3	NTC 10kohm @25°C
7	GND	Ground	GND
8	IN4	Input N° 4 (Input SLAVE)	0-10Vdc
9	+10V	Output power supply	10,0V +/-1%
10	OUT	Output signal SLAVE	0-10Vdc / PWM
11	GND	Ground	GND
12	SP2	Input SetPoint 1-2 selection	OPEN = SP1 - CLOSED = SP2

OB input configuration :



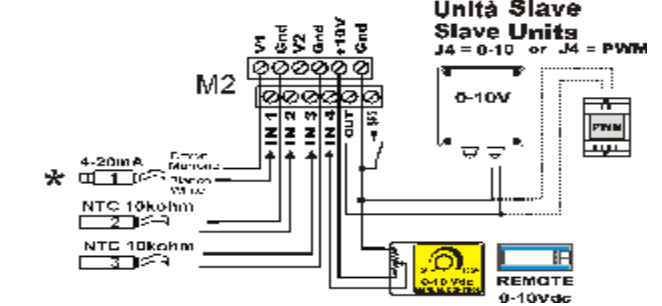
N°	Name	Function	CONF. OB
1	V1	Output power supply	+ 24V
2	IN1	Input trasducer N° 1	4-20 mA
3	GND	Ground	GND
4	IN2	Input trasducer N° 2	0-5 Vdc
5	V2	Output power supply	+ 5,0V +/-1%
6	IN3	Input trasducer N° 3	NTC 10kohm @25°C
7	GND	Ground	GND
8	IN4	Input N° 4 (Input SLAVE)	0-10V
9	+10V	Output power supply	+10,0V +/-1%
10	OUT	Output signal SLAVE	0-10Vdc / PWM
11	GND	Ground	GND
12	SP2	Input SetPoint 1-2 selection	OPEN = SP1 - CLOSED = SP2

OV input configuration :



N°	Name	Function	CONF. OV
1	V1	Output power supply	+ 5,0V +/-1%
2	IN1	Input trasducer N° 1	0-5 Vdc
3	GND	Ground	GND
4	IN2	Input trasducer N° 2	0-5 Vdc
5	V2	Output power supply	+ 5,0V +/-1%
6	IN3	Input trasducer N° 3	NTC 10kohm @25°C
7	GND	Ground	GND
8	IN4	Input N° 4 (Input SLAVE)	0-10Vdc
9	+10V	Output power supply	+10,0V +/-1%
10	OUT	Output signal SLAVE	0-10Vdc / PWM
11	GND	Ground	GND
12	SP2	Input SetPoint 1-2 selection	OPEN = SP1 - CLOSED = SP2

OX input configuration :

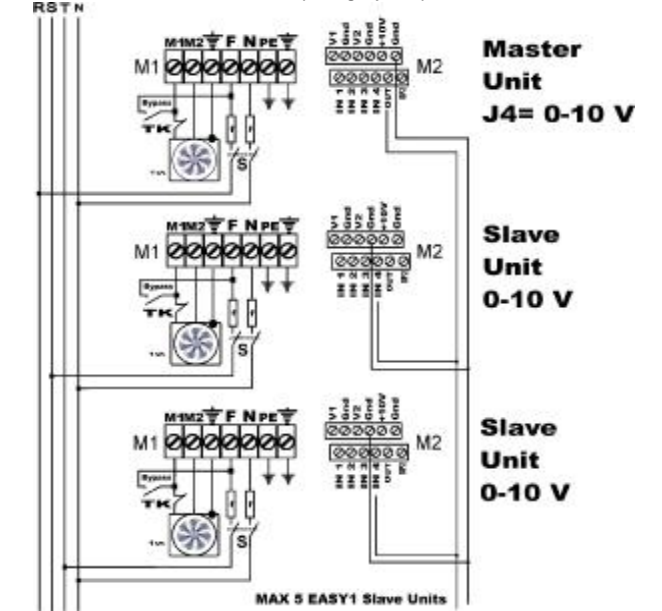


N°	Name	Function	CONF. OX
1	V1	Output power supply	+ 24V
2	IN1	Input trasducer N° 1	4-20 mA
3	GND	Ground	GND
4	IN2	Input trasducer N° 2	NTC 10kohm @25°C
5	V2	Output power supply	+ 24V
6	IN3	Input trasducer N° 3	NTC 10kohm @25°C
7	GND	Ground	GND
8	IN4	Input N° 4 (Input SLAVE)	0-10Vdc
9	+10V	Output power supply	+10,0V +/-1%
10	OUT	Output signal SLAVE	0-10Vdc / PWM
11	GND	Ground	GND
12	SP2	Input SetPoint 1-2 selection	OPEN = SP1 - CLOSED = SP2

* 4-20mA Brown Marrone
White Bianco
*TRANSUCER (2 wires) output : 4-20 mA Working temperature : -25 / +80°C IP : 65 White : IN1, IN2 Brown : V1, V2

SLAVE UNITS ELECTRICAL CONNECTIONS

CONNECTION OTHER EASY1 UNITS (3 single-phase):



PWM UNITS CONNECTION WITH THE SAME MASTER UNIT REFERENCE SUPPLY:

