



SELPRO

AC Fans Speed control Solutions

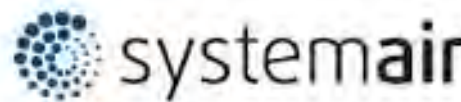


SELPRO, a 35 years old Company, is specialised in the design and manufacturing of equipment and control systems for synchronous (EC) and asynchronous (AC) motors, single & three-phase.

Our AC & EC fans speed controls solutions are approved by producers:

ebm-papst & ziehl-abegg

The company offers a complete range of standardized custom solutions for the control of MOTORS for axial and centrifugal fans, used within the ventilation heat exchangers.



About Fans & Speed Controls Solutions

Fans represent the essential part of Air Handling equipments and systems, and the development of machinery for the variation of speed – and, consequently, of air flow rate – in the different types of systems has emphasized their importance.

The variation of volumetric flow rate in a system may be required according to several needs:

- **NOISE** –operation proportional to appropriate speed values according to environmental conditions
- **CONVENIENCE** – the energy consumption is always in line with the actual ventilation needs
- **FUNCTIONALITY** – elimination of heavy and bulky electromechanical components and easier electrical assembly
- **CONFORMITY** – in full respect for European directives about electrical power drive systems
- **MECHANICAL WEAR** – mechanical stress in structures, due to an ON/OFF operation
- **ELECTRICAL WEAR** – stress of the electromechanical components and of the connected devices.

In order to fulfill such requirements, it is necessary to use regulation equipment able to adjust the rotational speed of fans, so as to make the system more suitable for the variations of contextual operating conditions.

There are several types of equipment that allow to control and regulate fans driven by asynchronous motors. Since a long time the following solutions have been used:

ELECTROMECHANICAL equipment for the **ON-OFF** activation of fans

ELECTROMECHANICAL equipment for the **ON/OFF with STAR-DELTA** activation of fans motors (MIXED mode)

Later, also the following modes have been discovered and used **ELECTRONIC** equipment for **Step (STEP voltage control with AUTO-Transformer) and Steeples** regulation, with **FREQUENCY** variation (inverter or electronic motor) and **AC voltage PHASE CUTTING**

The activation of an **ON-OFF** group of fans allows the modulation of the Air System, but the result is very unstable and it never meets the real requirements of the system.

Only thanks to the electronic equipment it has been possible to obtain a steady balanced Air System.

Electronic solutions also bring many advantages:

- **Reduction of the operating Noise:** the dBs are proportional to the fan speed, with a consequent general noise decrease (dB) in the Air System and the possibility to set a **NIGHT-RPM** operation mode that allows a further reduction of power consumption and meets the requirements of low noise (dB).
- **ENERGY saving:** with the available **PID** regulation, also with Auto-Tuning control, the system can work for the high Efficiency only to maintain the low °C project on the remote condenser (in this case it's reachable the **-27%** of Energy saving on Compressor energy consumption)
- **INNOVATIVE Algorithm** to optimize the fans speed regulation on remote condensers with **DIGITAL scroll** compressors
- **Over current Saving:** thanks to the gradual absorption of power from the mains, it eliminates current peaks due to a frequent ON-OFF of the group of fans.
- **Longer electrical and mechanical life** of the equipment, which is preserved from thermal and electrical stresses typical of an ON-OFF regulation.
- **Elimination of "fluid hammers"**, caused by pressure surge due to the ON-OFF modulation of the heat exchanger.
- **Constant operating parameters** (temperature, pressure, air flow rate, etc...) for the whole Air System, with a sensible increase of mechanical and electrical lifetime of the components of the system.

Furthermore, the proportional regulation allows to:

- Utilize equally the whole surface of the constantly operating heat exchanger;
- Manage the heat exchanger's power in a more rational and balanced way, by operating gradually at low speeds and consequently optimizing the exchange power through a better use of fins;
- Regulate the operating efficiency of the heat exchanger according to the actual cooling needs;
- Reduce the total amount of coolant;
- Reduce dirt and dust accumulation on the heat exchanger fins;
- Make the mechanical structure of the heat exchanger easier, by eliminating the internal partition walls.

Among the different type of equipment that allow to perform the fans system regulation of Synchronous (EC) and Asynchronous (AC) motors, there are the SELPRO Digital FAN SPEED CONTROLS Solutions.

The SELPRO Digital Series, dedicated to applications on Ventilated Heat Exchangers, consist of **Configurable controllers** with :

- Great number of available MASTER or SLAVE modes, only by recalling from a keypad one of the already preset default configurations, always with the possibility to modify the values of default parameters
- Two (2) inputs, for the connection and the management of one or two sensors through mA – Vdc – kohm (NTC probes) signals
- Two complete and independent ranges of settings, one for each SET of regulation parameters (SP1 & SP2), selectable through the “**SP**” on-off input contact

for each SET of regulation parameters (including double setting of: Set-Point – Proportional Band - Cut-Off/Minimum RMP% limit - Maximum RPM% limit - Starter, with acceleration/deceleration time of the regulation control),

Auxiliary Regulation contacts are also available:

S1: contact for **REVERSE** operating mode, active by closing the contact

S2: contact for remote **OFF**, active by closing the contact

SP: contact for **Set-Point 2**, active by closing the contact

S5: contact for **Maximum RPM% Night limit** (one limit for both Set-Point), active by closing the contact

S6: contact for **Maximum RPM% SPRAY limit** (one limit for both Set-Point), active by closing the contact

T.K.: NO/NC contact for the connection of the thermal motor protection

RL1: GENERAL alarm relay, with programmable activation modes (**C6** parameter)

And the following regulation controls too:

COS φ: adjustment of the phase-shift (COS-PHI) due to the motor (**C5** parameter)

NOISE-JUMP: selection of up to 3 RPM% jump-zones, in order to avoid keeping the control values in correspondence with high acoustic disturbance (extra dB) zones, to be defined for both Set-Points (**S1 & S2**) through the Min RPM% limit (**JL 1/2/3**) and Max RPM% limit (**Jh 1/2/3**)

ALARM-M&M: setting of operating POINTS with Minimum-SET (**So**) & Maximum-SET (**Sh**), which allow to set alarm values for both MINIMUM RPM% and MAXIMUM RPM% limitation, so that the fan speed can be driven:

down to **ZERO%** (with control signal exceeding **So** value) and

up to **MAX RPM%** (with control signal exceeding **Sh** value)

(when the values of **MIN & MAX RPM%** limits are selected, the system may not be completely stable); it is also possible to define separately the respective hysteresis values, through: **io** (for So) & **ih** (for Sh)

AC FANs speed control Solution

1

PHASE
STEPLESS CONTROLLER
Dinamic Control Technology



3

PHASE
STEPLESS CONTROLLER
Dinamic Control Technology



3

PHASE
STEP CONTROLLER
HYBRID VAC Control Technology



3

PHASE
STEP CONTROLLER
ON-OFF Control Technology Switch Board



Common technical functions to all digital controllers

WARRANTY
3
YEARS

QUICK
STAR-UP

INTELLIGENT
ENERGY
SAVING
IES

VAC-
-HZ
SMART
Power Supply

LOW
dB
SYSTEM

THD
FREE

FULL
GUARD
SYSTEM

PLUG&
PLAY

MODBUS
INSIDE

PID
AUTO-Tuning
SMART
Energy-Saving

-0-
CROSS
SYSTEM

EMC
CIVIL
LIMIT

CLIMA
SINERGY
CLS
INSIDE

Multipurpose APPLICATIONs for ALL-in-ONE System



Common technical functions to all digital controllers



- 2** Regulation Systems selectable: MASTER & SLAVE
- 2** Integrated Ventilation Systems : Wet & Dry
- 2** Available Regulation Systems : PID (Auto-Tuning) & Proportional
- 2** Regulation MODE selectable: Direct & Reverse
- 2** Inputs Commands for : mA - Vdc - Kohm (NTC) - PWM
- 4** Inputs control signals selectable: mA / Vdc / NTC / PWM
- 5** Auxiliary Contacts switchable by Scheduler mode
- 1** Programmable ALARM relay
- 14** available SOFTWARE with ready working parameters
- 80** Regulations parameters always adjustable
- 2** Benches of selectable Working parameters for Double Set-Points
- 2** Way for Commands transmission : Hardware or Modbus
- 3** Available formats : IP55 (std) – IP20 – IP00 (DIN-Rail)

VAC FANs Speed Control Solution for Asynchronous (AC) Motors

Among the different type of equipment that allow to perform the fans system regulation of asynchronous motors, there are the SELPRO Digital FAN SPEED CONTROLS Solutions.

The SELPRO Digital Series, with dedicated SW for applications on Ventilated Heat Exchangers, consist of **Controllers Always Configurable**

Here the products solutions for the automatic regulation of asynchronous (AC), single and three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

SELPRO offer a broad range of control Systems & Solutions for fans regulation, beginning from only SLAVE and MASTER & SLAVE digital units.

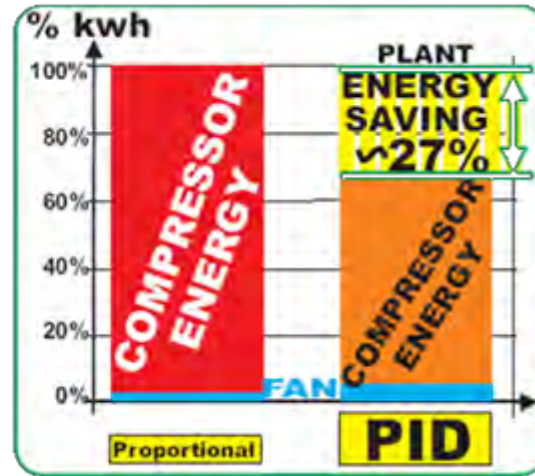
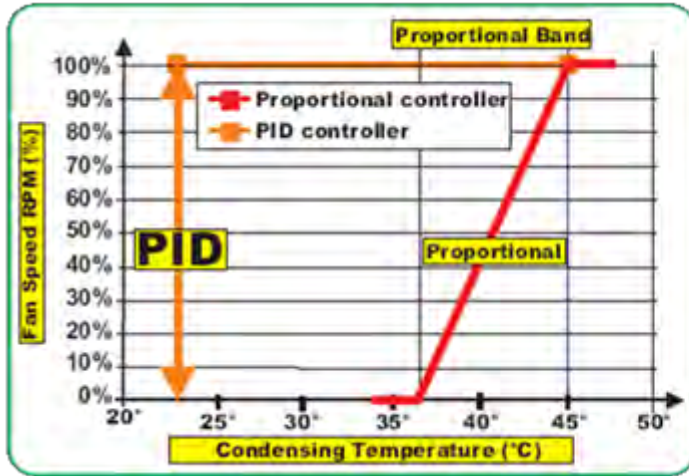
Available Three-Phases AC-FANs Speed

STEP regulation	Auto-Transformer (Hybrid Step Vac)
STEP-less regulation	Phase cutting regulation (SCR)

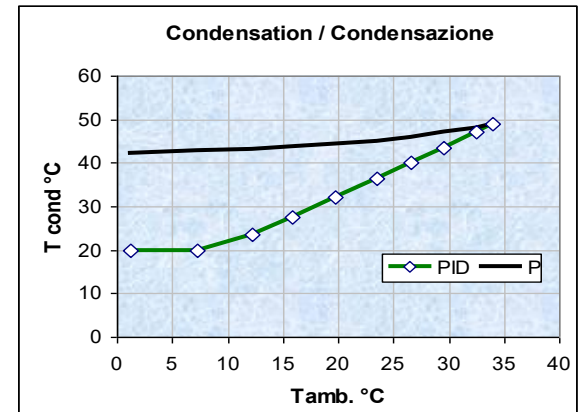
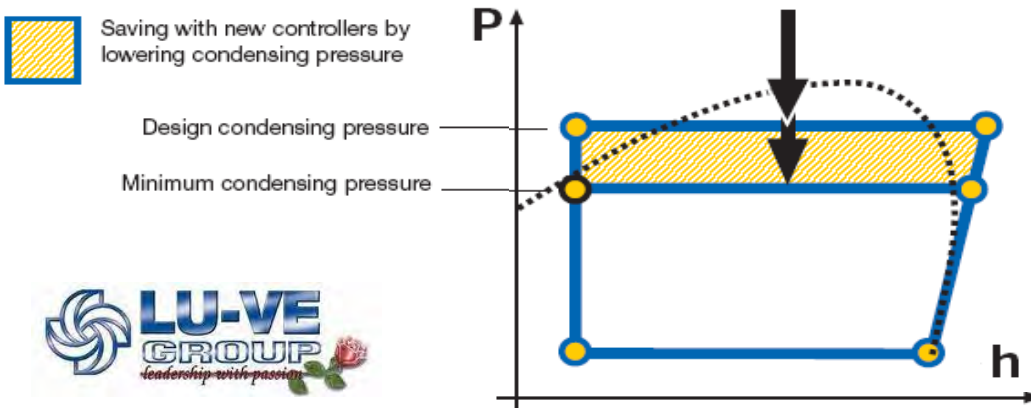
Available Single-Phases AC-FANs Speed

STEP-less regulation	Phase cutting regulation (SCR)
STEP-less regulation	Phase cutting regulation (SCR)

PID & Proportional (also for Emerson DIGITAL-SCROLL compressor)



PID with Active Auto-tuning, for the maintenance of the Design condensing point



Default regulation Software available for all digital controllers

The SELPRO Analog & Digital Series consist of Controllers always ready for all the applications for HVAC&R market.

The products are for the Automatic regulation of single and three-phase AC motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

SELPRO offer a broad range of control Systems & Solutions for fans regulation, all for MASTER & SLAVE applications.

All with the same Solution of Parameterized control SOFTWARE, for PLUG & PLAY applications.

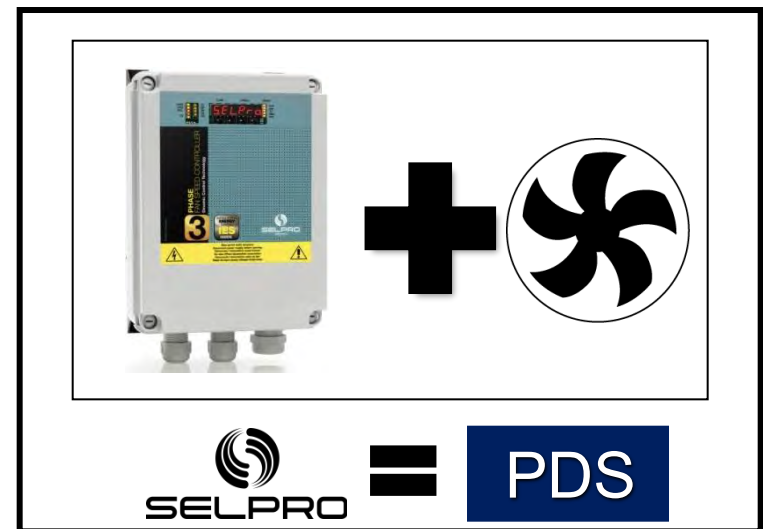
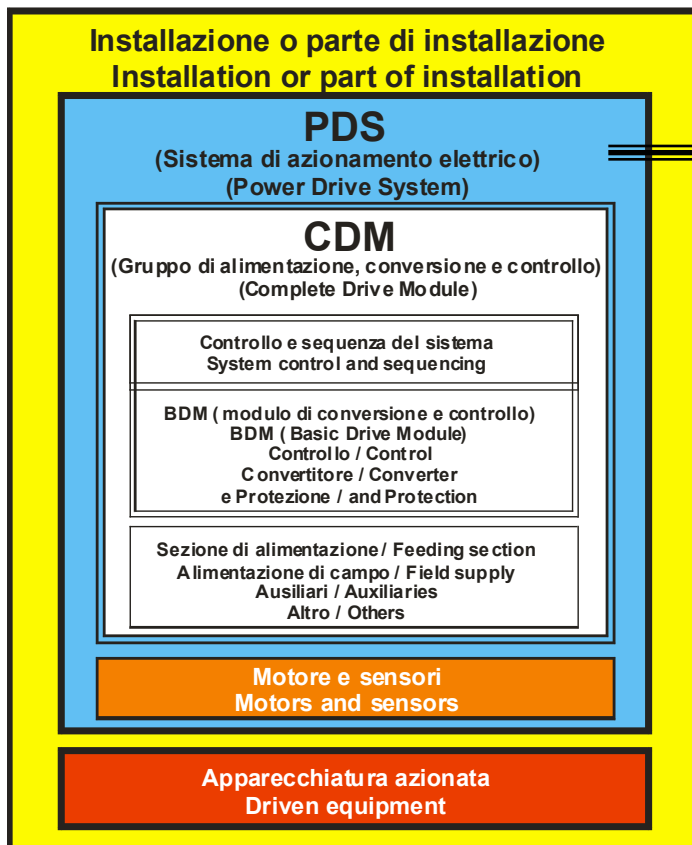
(*) Factory default software

N°	Displayed Codes	Descriptions		
		Mode	Input type	Scale
1	rS-010	SLAVE	Power unit with 2 inputs 0(1)-10 Vdc	0-10 Vdc
2	rS-020	SLAVE	Power unit with 2 inputs 0(4)-20 mA	0-20 mA
3	rS-PWM	SLAVE	Power unit with 1 input PWM% (only RDM & DRM series)	0-100%
4	rtE-01 (*)	MASTER	Controller with 2 input for NTC 10kohm @ 25°C probe	-20 / 90 °C
5	rtE-02	MASTER	Controller with 2 input for NTC 10kohm@25°C probe	10 / 90 °C
6	rPr-420	MASTER	Controller with 2 input for Transducer/s 4-20mA	4-20 mA
7	rPr-015	MASTER	Controller with 2 input for Transducer/s 4-20mA	0-15 bar
8	rPr-025	MASTER	Controller with 2 input for Transducer/s 4-20mA	0-25 bar
9	rPr-030	MASTER	Controller with 2 input for Transducer/s 4-20mA	0-30 bar
10	rPr-045	MASTER	Controller with 2 input for Transducer/s 4-20mA	0-45 bar
11	rUu-05	MASTER	Controller with 2 input for ratio Transducer/s 0-5 Vdc	0-5 Vdc
12	rPu-030	MASTER	Controller with 2 input for ratio Transducer/s 0-5 Vdc	0-30 bar
13	rUu-010	MASTER	Controller with 2 input for Transducer/s 0-10 Vdc	0-10 Vdc

EMC Compliance for Conducted Disturbance

of all SELPRO phase-cutting regulators

Configurazione del PDS nell'ambito di una installazione
 Definition of the PDS installation and its contents



EMC Declaration



DICHIARAZIONE DI CONFORMITÀ
DECLARATION OF CONFORMITY
KONFORMITÄTSEKTLÄRUNG
DECLARATION DE CONFORMITÉ
DECLARACION DE CONFORMIDAD



Costruttore - Manufacturer - Hersteller Fabricant - Fabricante	S.EL.PRO. di Rizzi Stefano - Via Padre Giovanni Piamarta 5/11 25021 BAGNOLO MELLA (Brescia) - ITALY
Tipo di prodotto - Product type Produktart - Type de produit Tipo de producto	Regolatore elettronico di velocità per ventilatori Electronic fans speed controller Régulateur électronique de vitesse pour ventilateurs Elektronischer Drehzahlregler für Ventilatoren Regulador electrónico de la velocidad de los ventiladores
Modelli - Types - Type Modelos - Modelos	RGF100-DRV100-VRM100-RGV100-ESY1-ESK1-PWM100-DUO100 RGF300-RGM300-DRV300-DRM300-RDM300-FCL300-DSV300-RTS300-ECM

Con la presente l'azienda dichiara sotto la propria responsabilità che il prodotto sopra indicato soddisfa per progettazione e costruzione i requisiti della direttiva:
We, the company, declare under on our sole responsibility that the above-mentioned product meets the design and construction requirements of the directive:
Die Firma bestätigt hiermit unter seiner eigenen Verantwortung, daß das o.a. Produkt den Projekts- und Konstruktionsanforderungen der Richtlinie entspricht:
Par la présente, la société déclare sous sa propre responsabilité que le produit susdit satisfait en termes de conception et de construction aux exigences de la directive:
Con esta declaración, la empresa declara bajo su exclusiva responsabilidad que el producto arriba indicado satisface, por su diseño y fabricación, los requisitos de las directivas:

Direttiva Bassa Tensione - Low Voltage Directive
Niederspannungsrichtlinie - Directive basse tension
Directiva baja tensión **2006/95/CE**

La conformità è stata verificata con l'ausilio delle seguenti norme armonizzate
Conformity has been checked using the aid of the following harmonized standards
Die Konformität wurde auf Grund der unten stehenden harmonisierten Normen geprüft
La conformité a été vérifiée selon les normes harmonisées suivantes
La conformidad ha sido comprobada con la ayuda de las siguientes normas armonizadas
EN 60204-1 (2006/09) EN 61800-5-1 (2009/04)

Direttiva Compatibilità Elettromagnetica
Electromagnetic Compatibility Directive
EMV Richtlinie **2004/108/CE**
Directive compatibilité électromagnétique
Directiva compatibilidad electromagnética

La conformità è stata verificata con l'ausilio delle seguenti norme armonizzate
Conformity has been checked using the aid of the following harmonized standards
Die Konformität wurde auf Grund der unten stehenden harmonisierten Normen geprüft
La conformité a été vérifiée selon les normes harmonisées suivantes
La conformidad ha sido comprobada con la ayuda de las siguientes normas armonizadas
EN 61800-3 (2005/04)

01 / 01 / 2012



Data, Date, Datum, Date, Fecha **Firma del responsabile, Signature of person in charge
Umerschrift der zuständigen Person, Signature du responsable, Firma del responsable**

SELPRO® di Rizzi Stefano - Via Padre G. Piamarta, 5/11 - 25021 Bagnolo Mella (BS) Italia
N. iscr. R. ditta 221610 - P. IVA: 0434359095 - Cod. Fisc.: 022 - P.N. 57026 4669
Tel. (+39) 030.6821611 (f.a.) - telefax (+39) 030.622274 - E-mail: info@selpro.it - www.selpro.it

All SELPRO controllers are suitable for the installation in PDS systems (Power Drive System = Controller with connected fan/s), which guarantee the EMC compliance of the System :
"Controller + Fan/s".



PDS System



PHASE CONTROLLER

Dynamic Control Technology

Available 1~ FANs speed control Solution

Controllers Characteristics at 01.01.2013		Single-Phase 1~ STEPLESS				LEGEND
		DRV100	RGV100	ESY 100	ESK 100	
Nominal Current (RMS) at 50°C ambient temperature	8A	•				(•) : Standard / Default configuration
	10A					
	12A	•			•	
	16A					
	20A		•		•	
Supply Voltage	28A					
	110 Vac (+/-10%)	on request	on request	on request	on request	
Supply Frequency	230 Vac (+/-15%)	•	•	•	•	
	50 Hz	•	•	•	•	
EMC for Conducted Disturbance (Civil limit)	60 Hz	•	•	•	Automatic Selection	
	Directive 2004/108/CE (EN61800-3)	•	•	•	•	
Harmonic Distorsion (THD %)	Norm EN 61000-3-2 & 3-12				on request	
	Analog based	•	•	•		
Control System	Digital Microprocessor based				•	
	Working Principle	Phase-Cut (SCR – Triac)	•	•	•	
Regulation Function Mode	SLAVE	•	•	•	•	
	MASTER					
Regulation System	STARTER			•	•	
	P.I.D.				•	
Inputs	Proportional	•	•	•	•	
	1	•	•			
Av available & Selectable Inputs type	2				•	
	3				on request	
Modbus connection - RS485 (RTU std.)	4				•	
	0(4)-20 mA	•			•	
N° Auxiliary ON-OFF digital inputs available	0.5 Vdc			on request	•	
	0-10 Vdc	•	•		•	
Auxiliary ON-OFF digital inputs type available	NTC (scale -20/90°C)			•	•	
	PWM (3-30 V not Polarized)				•	
Working parameters	SLAVE input from PC Host				on request	
	MASTER output for direct control					
Set-point number	1			•		
	2				•	
Av available working scale types	3				Programmable	
	4					
Set-Point setting mode	5					
	2° Set-Point			•	•	
Protection Box	NIGHT MAX speed limit				•	
	SPRAY MAX speed limit				•	
Working parameters	WINTER mode FANs SPLITTING				•	
	Remote STOP				•	
Set-point number	REVERSE mode (Heat Pump)				•	
	1				•	
Av available working scale types	2				•	
	4-20 mA			on request	•	
Set-Point setting mode	0.5 - 4.5 Vdc				•	
	0-10 Vdc				•	
Protection Box	NTC -20/90 °C			•	•	
	Keyboard				•	
Working parameters	Keyboard on the CONTROLLER Cover				•	
	Visualization Display				Optional LCD	
Protection Box	Dip-Trimmer			•		
	IP 00 for Switchboard	on request	on request	on request	on request	
Protection Box	IP 20 for Switchboard	on request	on request	on request	on request	
	IP 55 for external application	•	•	•	•	

1

PHASE STEPLESS CONTROLLER

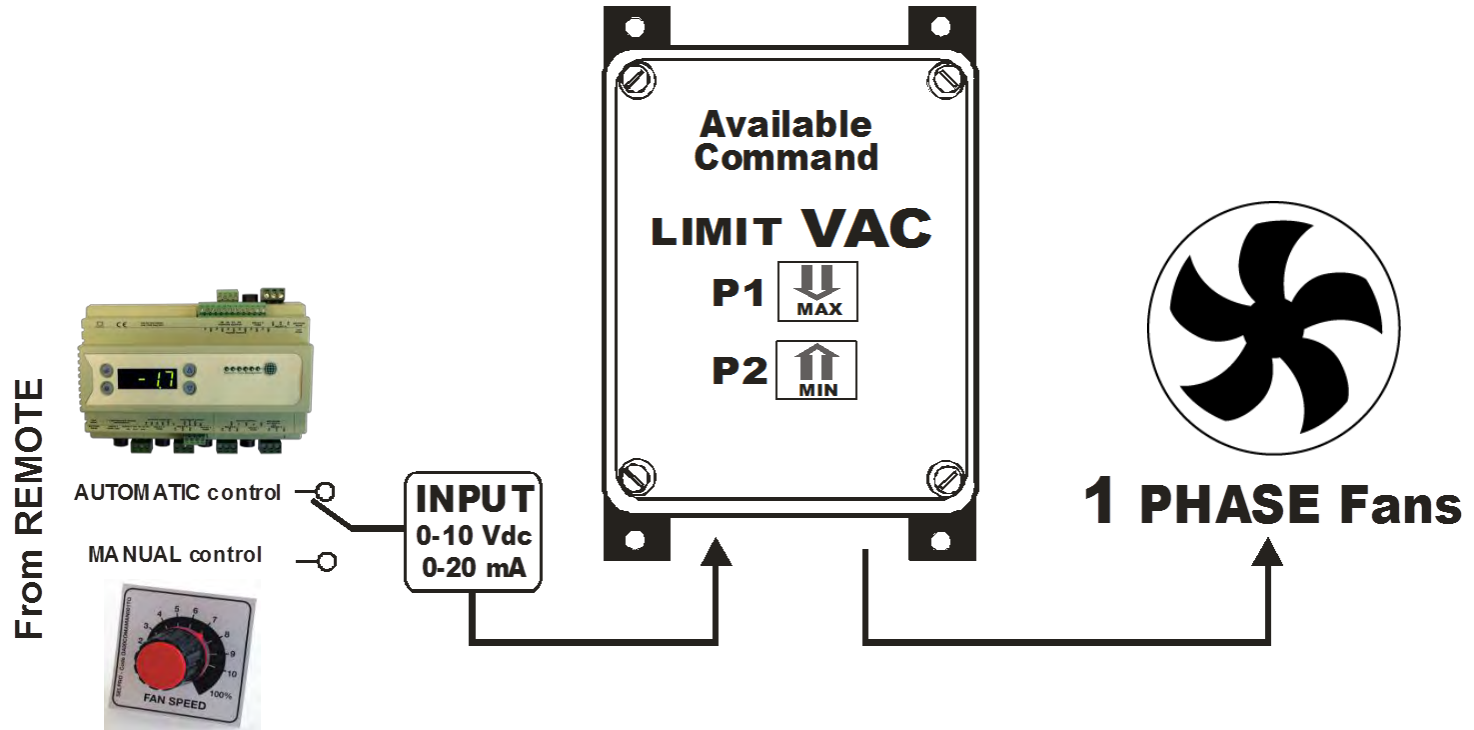
SLAVE CONTROLLER



1

PHASE STEPLESS CONTROLLER

DRV-112

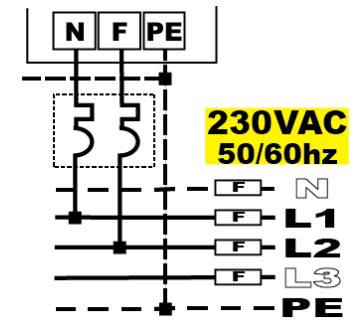
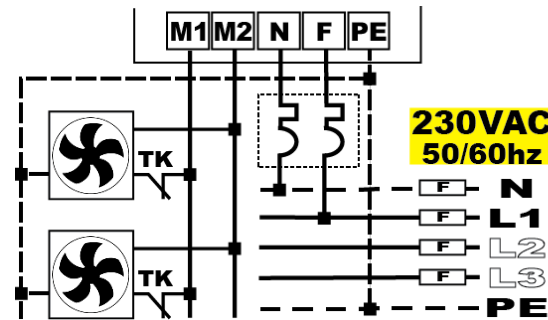
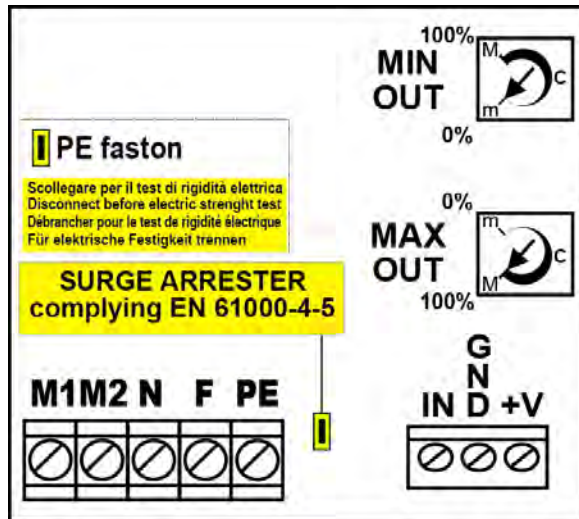
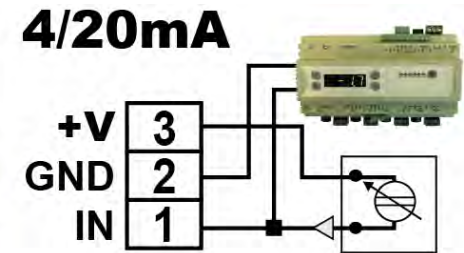
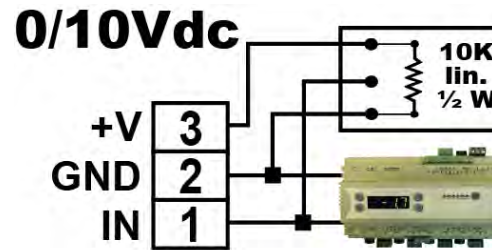
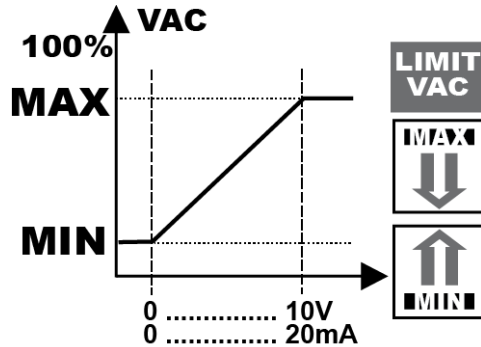


**SLAVE for 0-10Vdc or 0-20mA remote command
(12A/230Vac +/-10% 50/60Hz) – IP55**

1

PHASE STEPLESS CONTROLLER

DRV-112



1

PHASE STEPLESS CONTROLLER

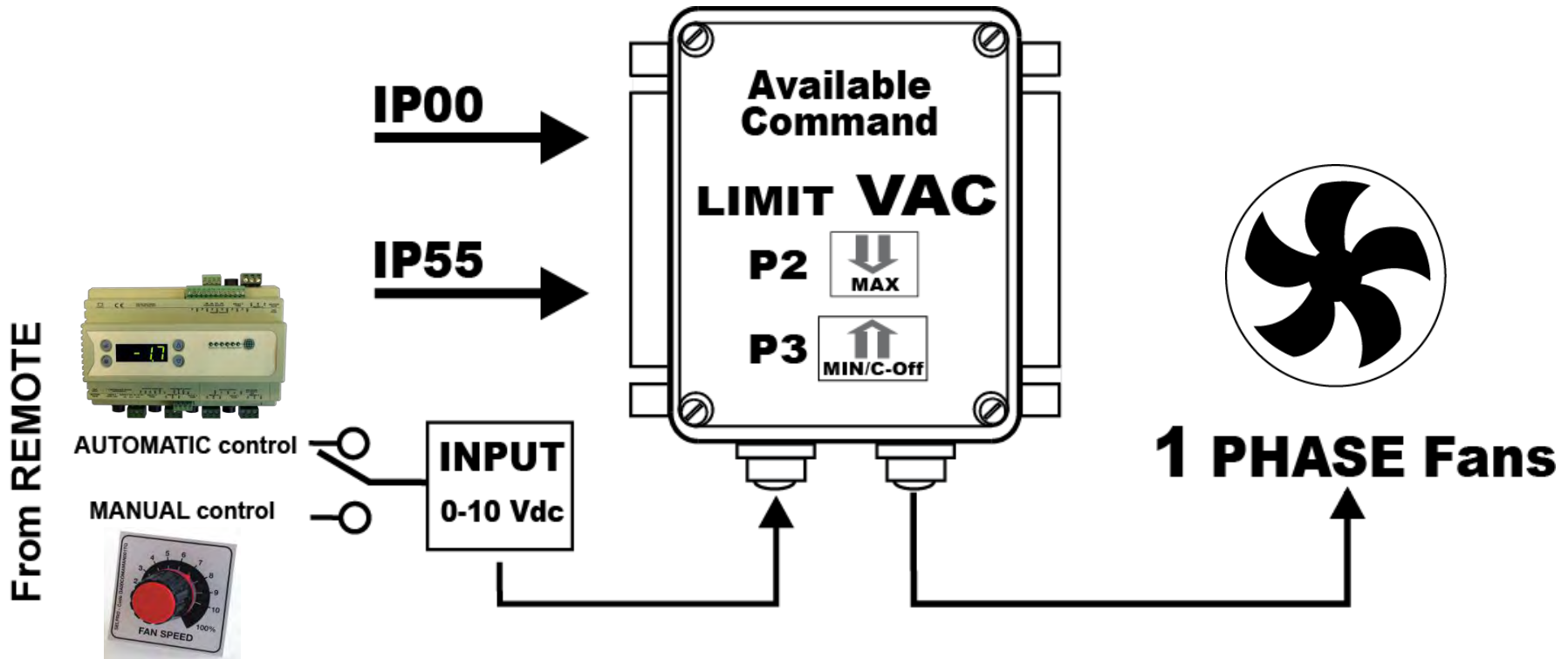
SLAVE CONTROLLER



1

PHASE STEPLESS CONTROLLER

RGV-100

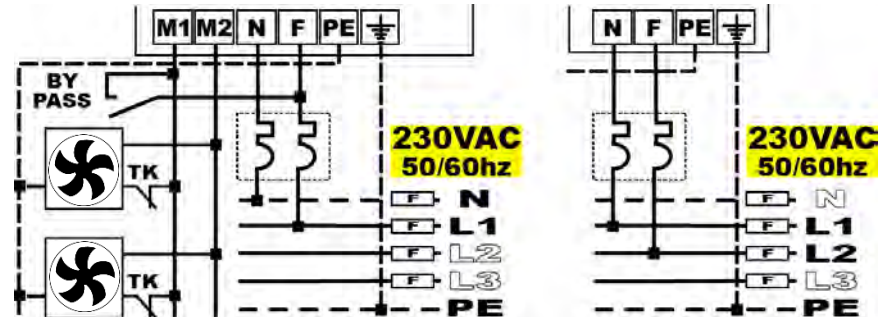
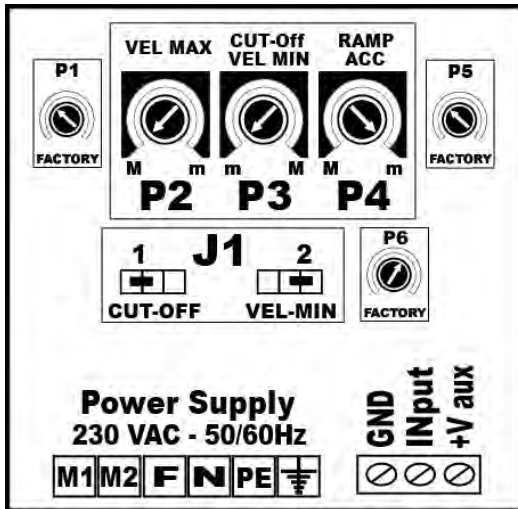
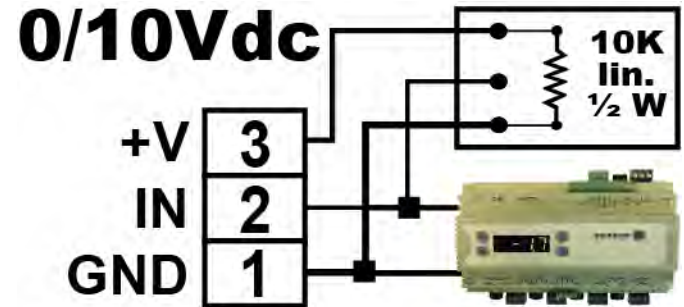
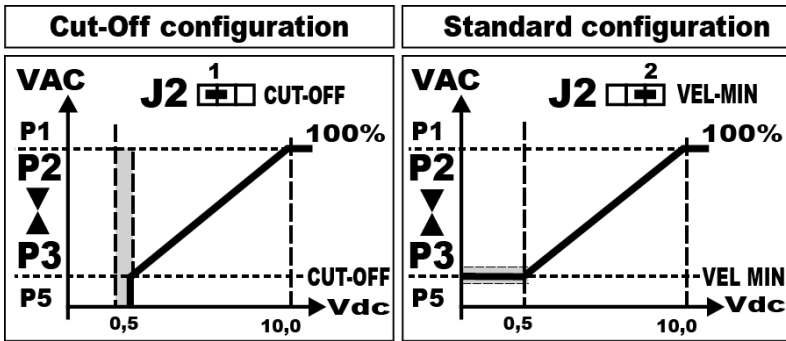


SLAVE for 0-10Vdc remote command
(12 & 20A/230Vac +/-10% 50/60Hz) – IP00 & IP55

1

PHASE STEPLESS CONTROLLER

RGV-100



1

PHASE STEPLESS CONTROLLER



MASTER & SLAVE CONTROLLER



1

PHASE STEPLESS CONTROLLER

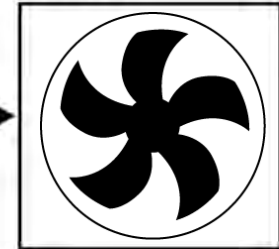
ESY-100

IP55

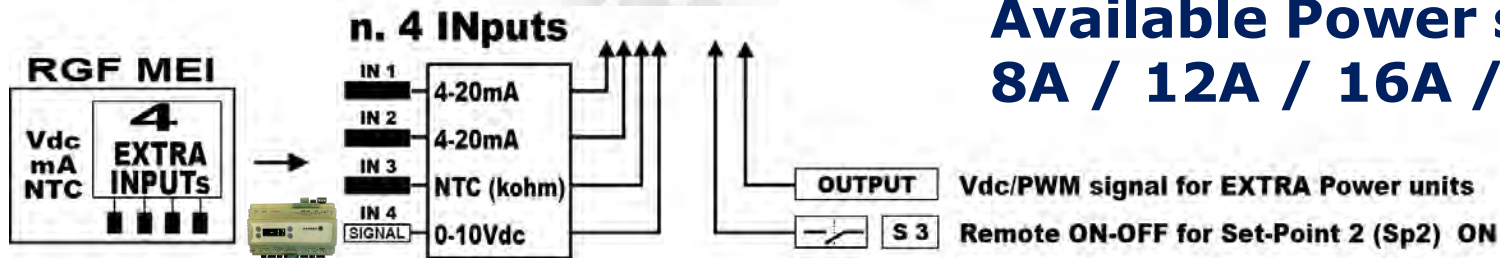


Available regulations for N° 1 or 2 SET-Points
with Proportional regulation

- Single or Double SET-POINTS Proportional Band (factory)
- MAX RPM% limit
- MIN RPM% limit
- CUT-OFF limit
- Direct/Reverse function mode



Available Power sizes
8A / 12A / 16A / 20A



The ESY100 series are for the Manual or Automatic regulation of asynchronous (AC), single-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.
N° 4 inputs, with n. 4 different functions of regulation modes are available; the factory configurations are available by order request.
The controller for work select always the working INPUT with the higher value.



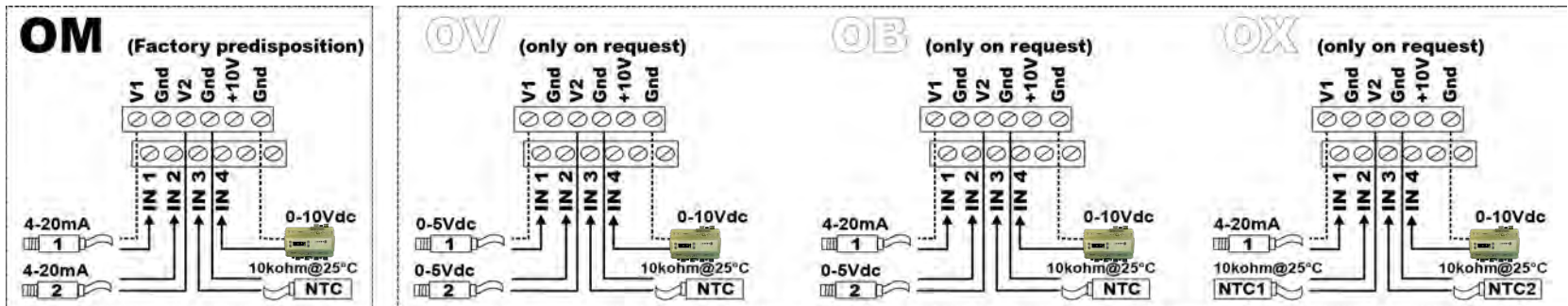
PHASE STEPLESS CONTROLLER

ESY-100

N. 4 function MODE available

for

N. 4 Inputs always available



The working INPUT greater in value DRIVE the FANS

1

PHASE STEPLESS CONTROLLER

ESY-100

Trimmer Setting Parameters

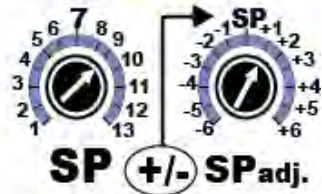
VAC LIMIT Continuous-Setting

DL1 (Power OK)



SET-POINT STEP-Setting

SP - SP +



VAC limits

Set-Point

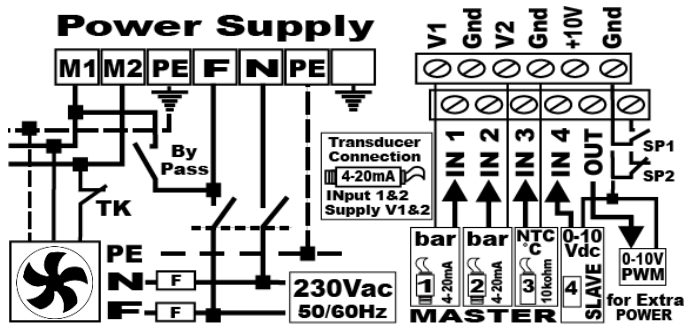
Cut-Off/Min

MAX



Double Set-Point
(plug option)

Terminal Blocks



Power Supply

Control Signals

1

PHASE STEPLESS CONTROLLER Dynamic Control Technology



**Available power sizes
12A / 20A / 28A**



PHASE STEPLESS CONTROLLER

Dynamic Control Technology

ESK-100

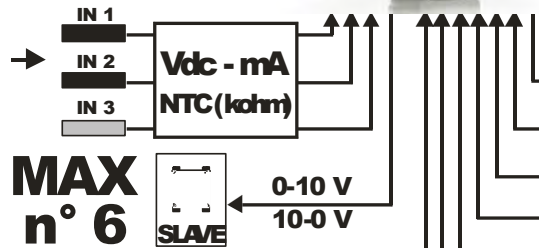
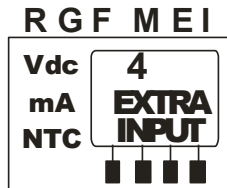
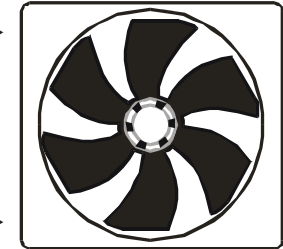
**RS-485
ModBus
(RTU)**

IP55



**Available regulations for N° 1 or 2 SET of parameters
With PID or Proportional regulation**

- SET-POINT 1 & 2
- Proportional Band 1 & 2
- NIGHT MAX RPM% limit
- MAX RPM% limit
- MIN RPM% limit
- CUT-OFF limit
- Bypass of MAX & MIN limit
- Heat Pump regulation
- Fans Winter function
- TK fans Alarm function



AUXILIARY Programmable contacts

- RL 1** General Alarm relay
- TK** Fan/s Thermal contact
- S n** N° 3 Remote ON-OFF for TK fans cut
- S 2** Remote ON-OFF for regulation STOP
- S 5** Remote ON-OFF for Night RPM% dB-Limit ON
- S P** Remote ON-OFF for Set-Point 2 ON
- S 1** Remote ON-OFF for Reverse mode ON

The ESK100 series are for the Manual or Automatic regulation of asynchronous (AC), single-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

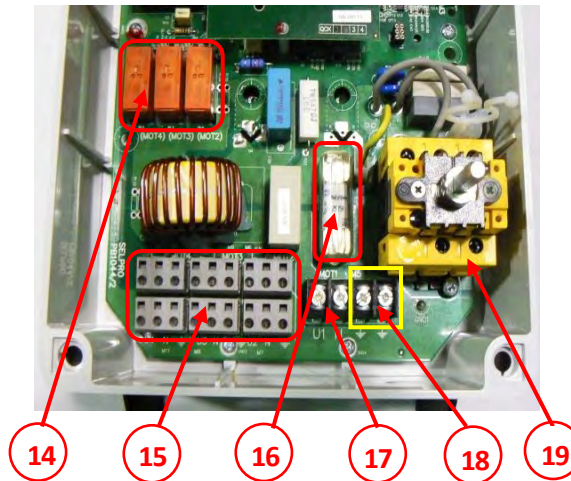
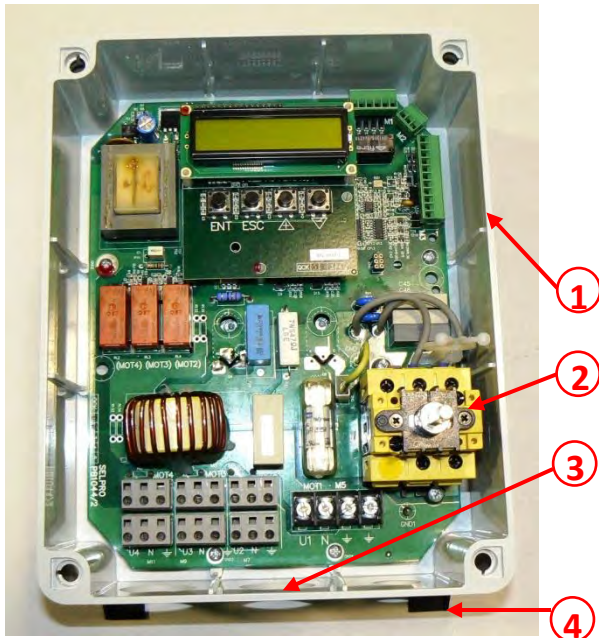
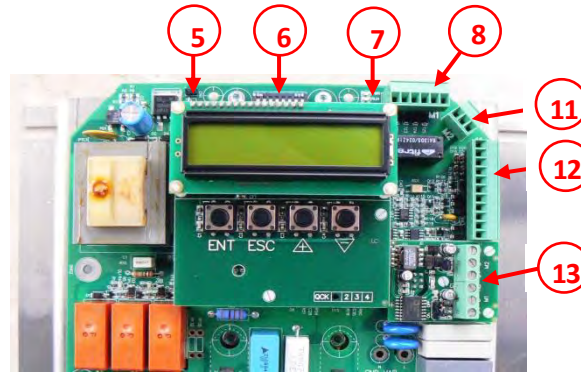
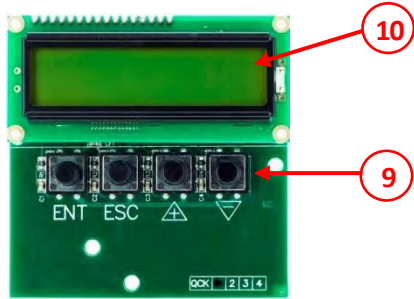
N° 2 inputs, with n. 14 different software of regulation modes are available.

The controller for work, select always the working INPUT with the higher value.

1

PHASE STEPLESS CONTROLLER Dinamic Control Technology

ESK-100



- 1) *GW Plast™* protection boc
- 2) Power supply switch
- 3) Holes for Cable glands
- 4) Tab with holes for wall mounting the device
- 5) RESET push button
- 6) Dip-Switch
- 7) Led indicators
- 8) Aux Inputs contacts terminal block
- 9) Keyboard plug
- 10) Display LCD
- 11) Alarm relay RL1 terminal block
- 12) Control Inputs connection terminal block
- 13) Plug for MODBUS (RTU) - option
- 14) Relays for load cut with fans TK alarm
- 15) Fans direct connection terminal block
- 16) Protection fuse
- 17) Terminal block for all fans direct connection
- 18) Groud terminal block
- 19) Power supply direct connection (F/F or F/N)



PHASE CONTROLLER **Dynamic Control Technology**

3

PHASE STEPLESS CONTROLLER Dinamic Control Technology



3

PHASE STEPLESS CONTROLLER

Dinamic Control Technology

VTS300
SLAVE

VTM300
Master



8A/12A/20A

VTS300

only for SLAVE mode

3

PHASE

STEPLESS CONTROLLER
Dynamic Control Technology

IP 00
IP 20
IP 55



Speed Limit regulations

MAX VAC limit
MIN VAC limit
CUT-OFF limit

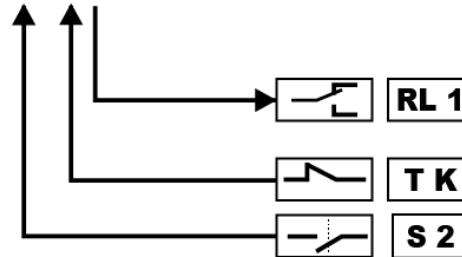


8A/12A/20A

IN 1

0-5Vdc
0-10Vdc
0-20mA
4-20mA
PWM

Available INPUT
DIP-Switch selection



RL 1 General Alarms relay

T K Fan/s Thermal contact

S 2 Remote ON-OFF for regulation STOP

The VTS300 series are for the Manual or Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

N° 1 inputs, with n. 5 different remote control signals regulation modes are available.

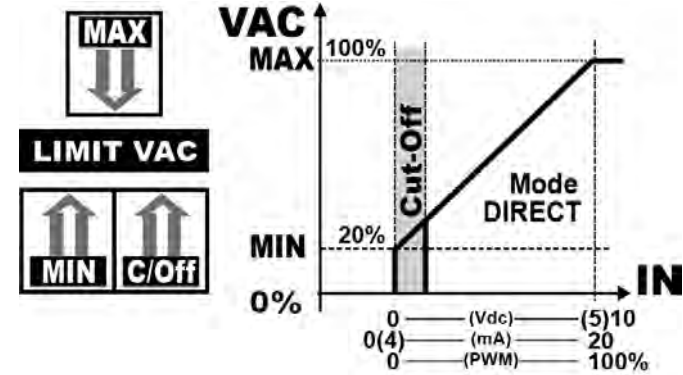
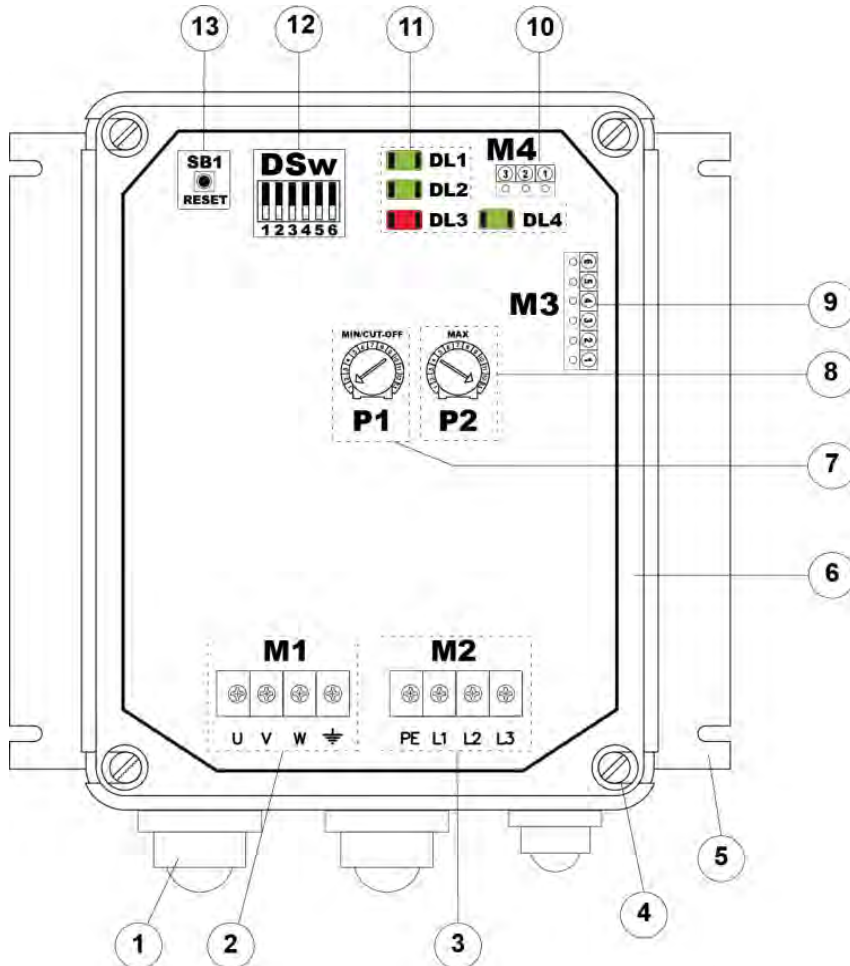
VTS300

only for SLAVE mode

3 PHASE

STEPLESS CONTROLLER

Dynamic Control Technology



Legenda VTS300	
1	Cable glands
2	Terminals for 3-phase load connection (U-V-W + GND) – (M1)
3	3-phase power supply connections (L1-L2-L3 + PE) – (M2)
4	TPN clamping screw (CEI 23-58)
5	Tab with holes for wall mounting the device
6	GW PLAST 75 container
7	P1 trimmer for VAC output MIN or Cut Off limit
8	P2 trimmer for VAC output MAX limit
9	Control Inputs connection terminal block (M3)
10	Alarm relay terminal block (M4)
11	Led indicators
12	Dip-Switch
13	Reset push button

VTS300

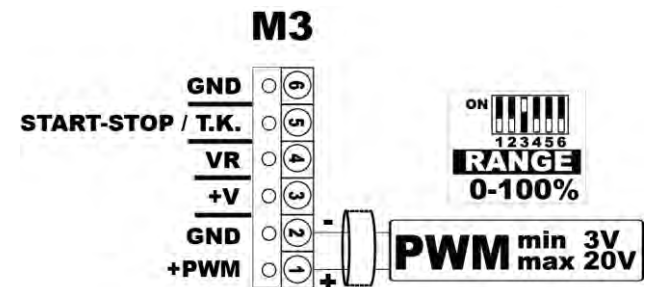
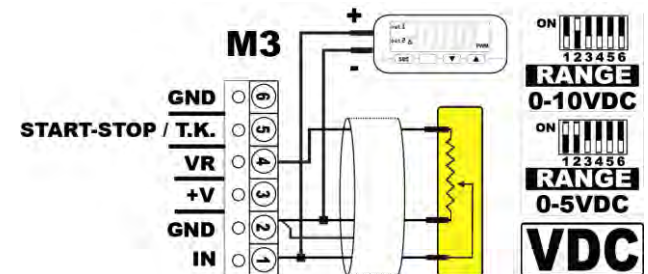
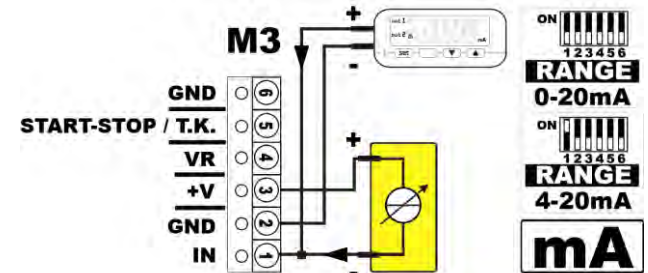
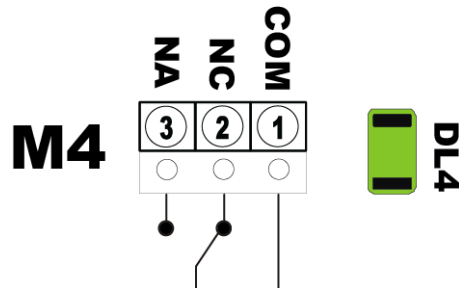
only for SLAVE mode



Control signal terminal block

M3	Terminal	Label	Description
6	6	GND	Ground reference
5	5	S/S – TK	Start/Stop command (CLOSED = Stop) TK FAN thermal contact (OPEN = Stop)
4	4	VR	Stabilized supply +5,0V / +10,0V for 20 mA (automatic commutation)
3	3	V+	Auxiliary supply +20V (+/-20%) for 20 mA
2	2	GND	Ground reference
1	1	IN	Input for available command : 0-5V / 0-10V / 0-20mA / 4-20mA / PWM

Alarm relay terminal block

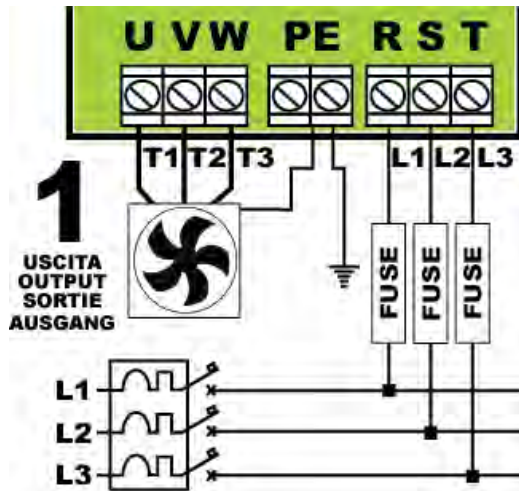


VTS300

only for SLAVE mode



Standard Power Connections



8A / 12A / 20A

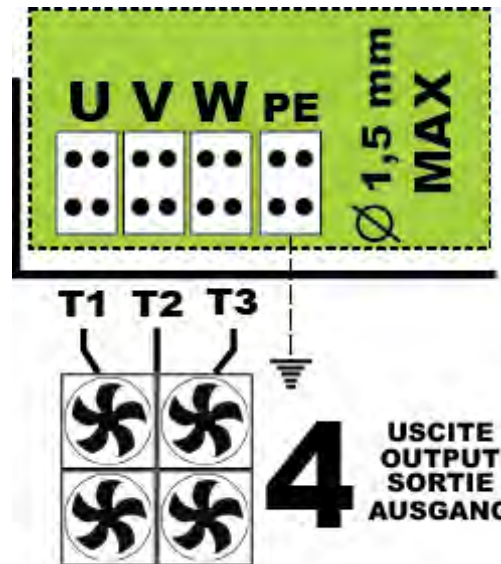
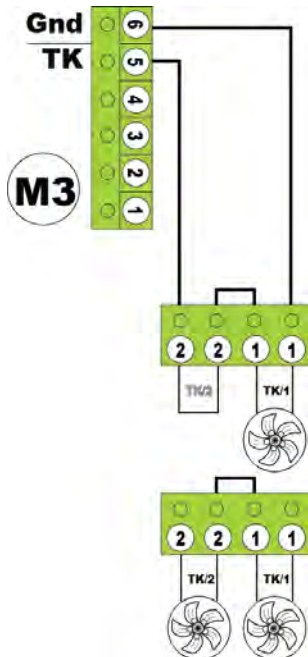
VTS300

only for SLAVE mode



Optional Power Connections

Plug for double
TK connection



Available sizes

8A / 12A / 20A

VTM300

only for MASTER mode

3

PHASE STEPLESS CONTROLLER

Dynamic Control Technology

IP 20

IP 55

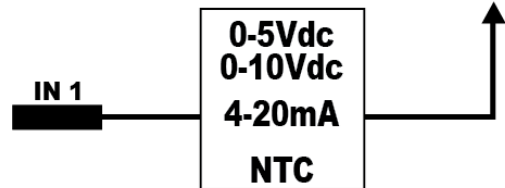


Available Regulations

- MAX VAC limit
- MIN/Cut-Off VAC limit
- Proportional Band
- Set-Point
- Set-Point adjust

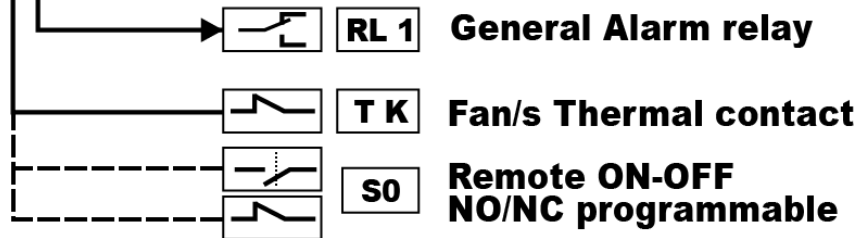
8A/12A/20A

Selectab



Available Input mode
By DIP-Switch selection

Auxiliary Contacts



The VTM300 series are for the Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

N° 1 inputs, with n. 5 different remote control signals regulation modes are available and selectable (Vdc – mA – NTC)

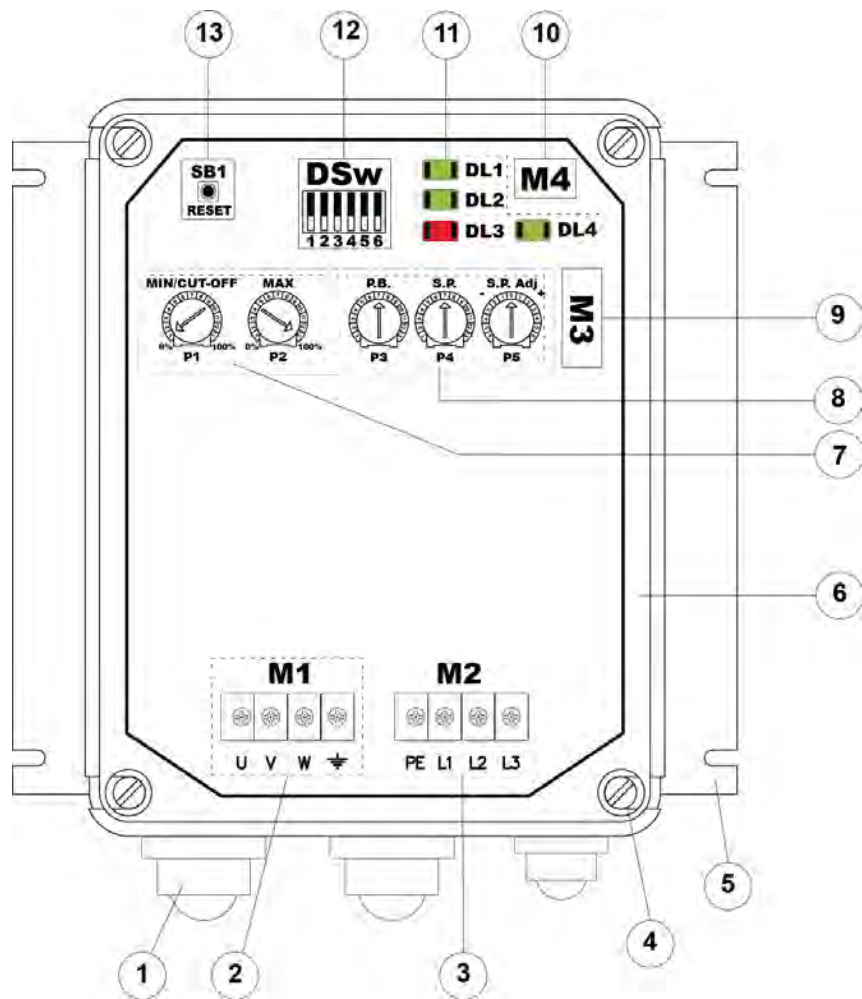
VTM300

only for MASTER mode

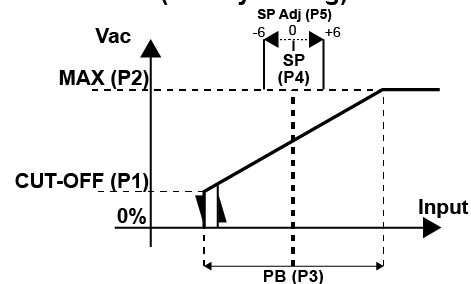
3 PHASE

STEPLESS CONTROLLER

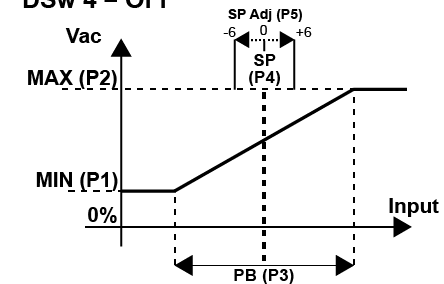
Dynamic Control Technology



DSw 4 = ON (factory setting)



DSw 4 = OFF



Legenda VTM300		
1	-	Pressacavi - cavi di collegamento
2	M1	Morsettiera uscita trifase (U-V-W) + GND carico
3	M2	Morsettiera alimentazione trifase (L1-L2-L3) + PE
4	-	Vite di chiusura TPN con coppia di serraggio max 2,5 N m
5	-	Aletta forata per fissaggio a parete
6	-	Contenitore in GW PLAST
7	P1	Impostazione della tensione minima (MIN / CUT-OFF)
	P2	Impostazione della tensione massima (MAX)
	P3	Impostazione banda proporzionale (P.B.)
8	P4	Impostazione set-point (S.P.)
	P5	Impostazione di aggiustamento fine set-point (S.P. Adj.)
9	M3	Morsettiera ingressi di comando
10	M4	Morsettiera relè di allarme
11	DL..	Led di segnalazione
12	DSw	Dip switch di programmazione
13	SB1	Pulsante di reset

VTM300

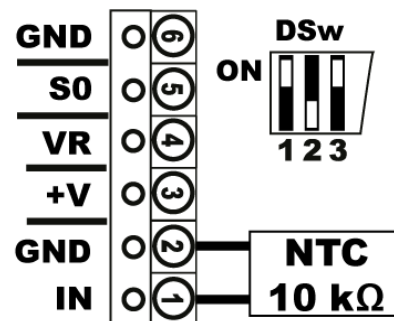
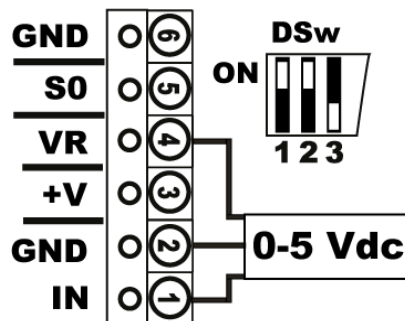
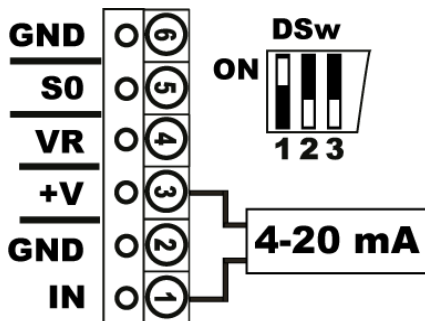
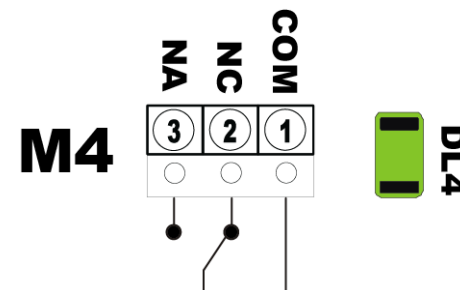
only for MASTER mode



Control signal terminal block

M3	Mors.	Etichetta	Descrizione
○	6	GND	Massa di riferimento
○	5	S0	Ingresso ON-OFF (vedi punto 3.3.3)
○	4	VR	Uscita tensione di riferimento +5,0 Vdc ($\pm 1,0\%$)
○	3	V+	Uscita tensione di alimentazione +20 Vdc ($\pm 20\%$)
○	2	GND	Massa di riferimento
○	1	IN	Ingresso segnale trasduttore

Alarm relay terminal block

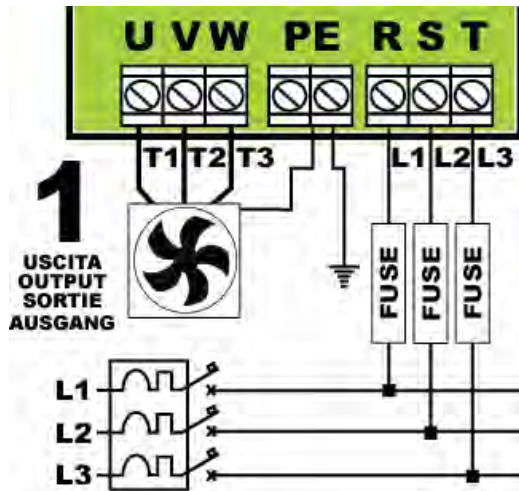


VTM300

only for MASTER mode



Standard Power Connections



8A / 12A / 20A

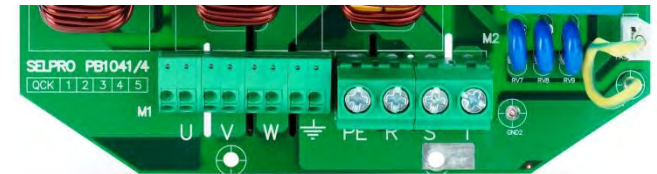
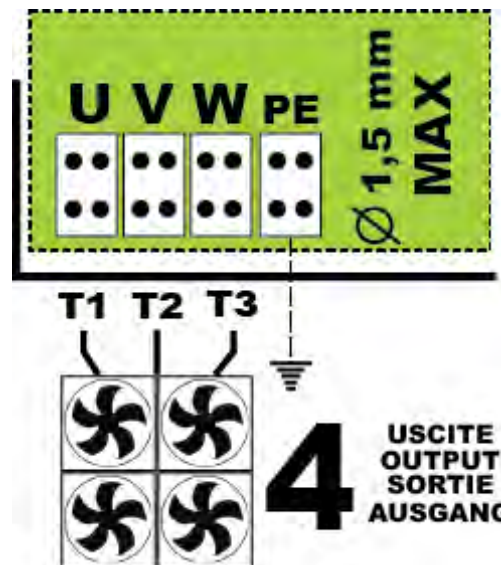
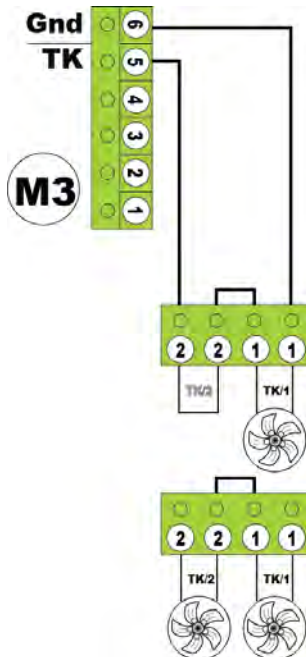
VTM300

only for MASTER mode



Optional Power Connections

Plug for double TK connection



Available sizes
8A / 12A / 20A



3 PHASE STEPLESS CONTROLLER Dinamic Control Technology





3 PHASE STEPLESS CONTROLLER Dynamic Control Technology

DRM300
SLAVE

RDM300
Master & Slave

RGM300
Master & Slave



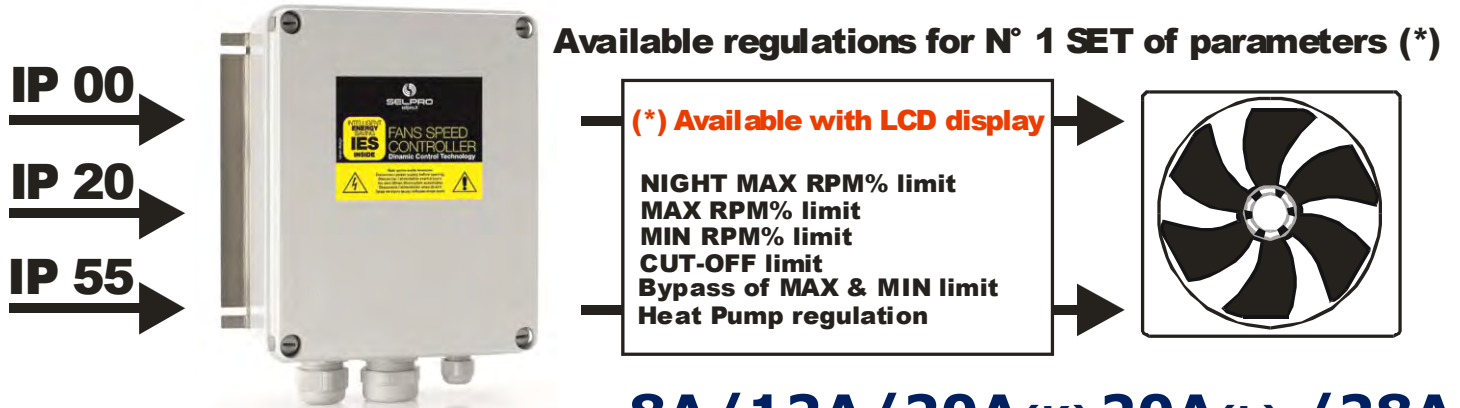
8A/12A/20A(K)
20A(L) /28A

12A/20A/28A
40A/60A/90A

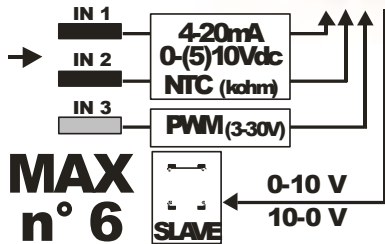
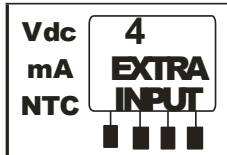
3

PHASE STEPLESS CONTROLLER Dynamic Control Technology

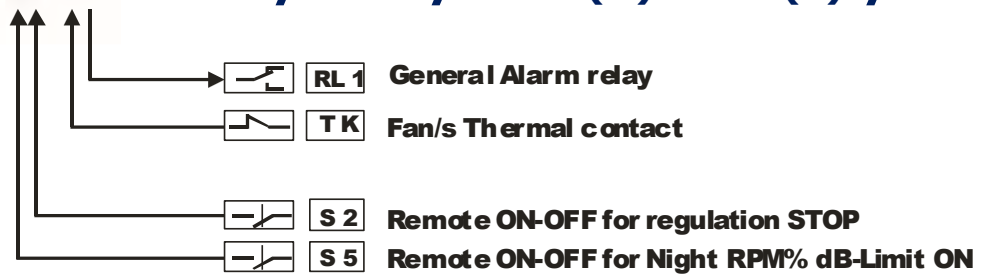
DRM-300



R G F M E I



8A / 12A / 20A(K) 20A(L) / 28A



The DRM300 series are for the Manual or Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

N° 2 + 1 inputs, with n. 3 different remote control signals regulation modes are available.

The controller for work, select always the working INPUT with the higher value.

DRM300

only for SLAVE mode

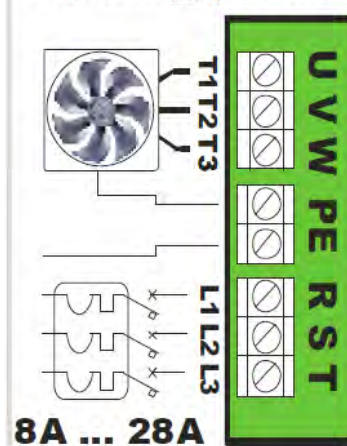


ELECTRICAL DATA

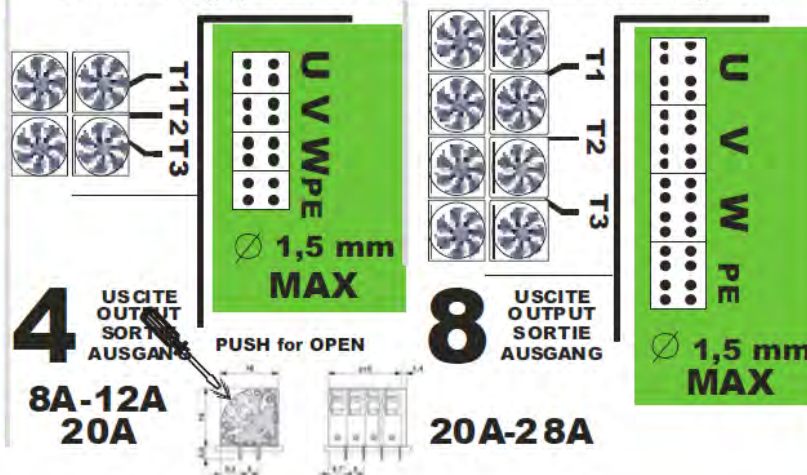
Power Supply	400Vac (+/-20%) 50/60Hz Aut. Sel. - 230Vac/480Vac or others VAC on request									
Rated current (RMS @ 50°C)	8A		12A			20A			28A	
Protection Case available	IP00	IP55	IP00	IP20	IP55	IP00	IP20	IP55	IP00	IP55
EMC Compliance (EN 61800-3)	Applications for PDS Systems – Civil limit (Regulator with connected fans – Residential, Commercial & Light Industrial Filter)									
Limit Harmonic Current (LHC) Compliance (EN61000-3-2 & 3-12)	The regulator does NOT have any internal filter for the suppression of harmonic distortions caused by electronic regulation – for THD% compliance see user manual									
Control Circuit Power	3 VA					Environmental Pollution			High pollution	
Thermally Dissipated Power	4 W/Amp					Insulation Characteristics			4000 Vac	
°C/UR% Work Environment	-20T50°C			85% not condensing		Ageing Characteristics			60.000 h	

ELECTRICAL CONNECTION

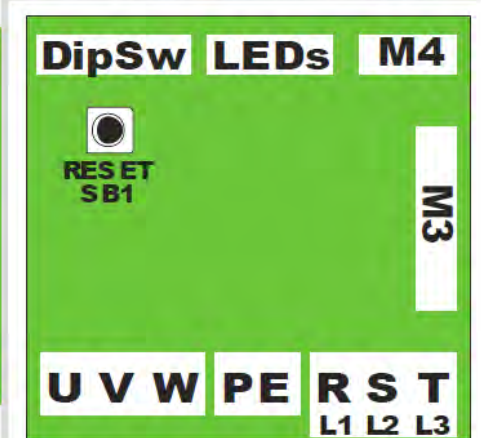
Power Supply & Load



Power Supply & Load with Multi-Connection Option



Components Placement

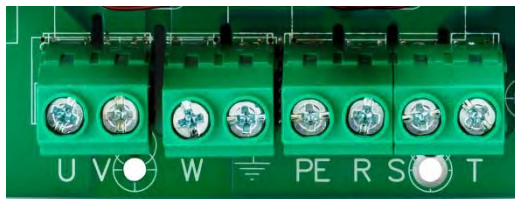
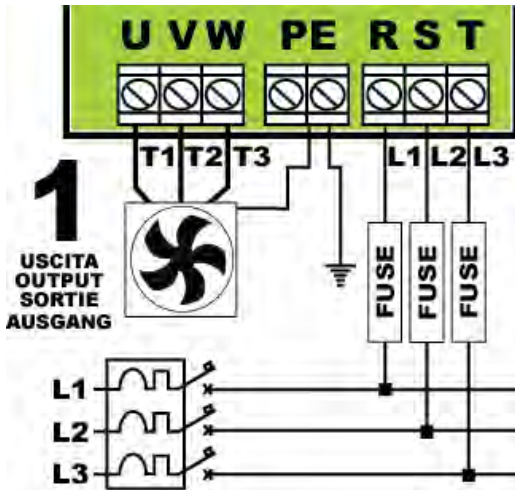


DRM300

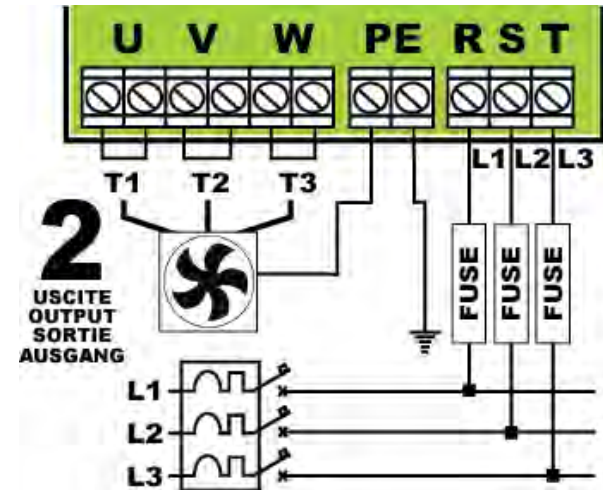
only for SLAVE mode



Standard Power Connections



8A/12A
20A (Kompact)



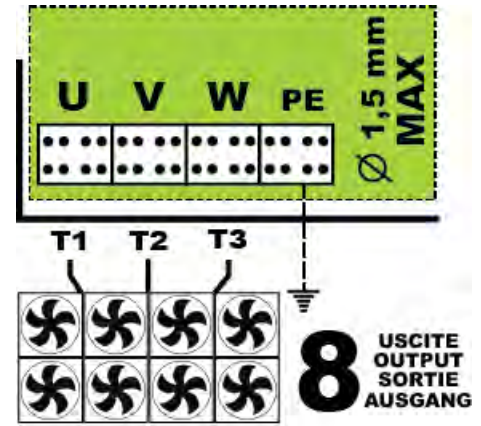
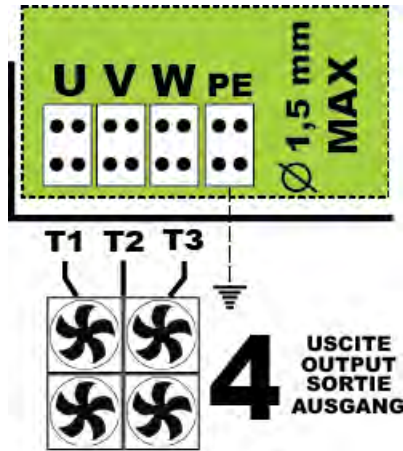
20A (Large)
28A

DRM300

only for SLAVE mode

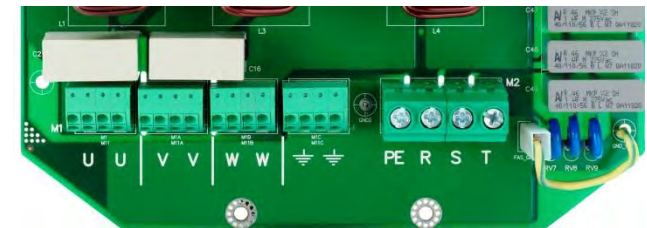


Optionals Power Connections



8A/12A

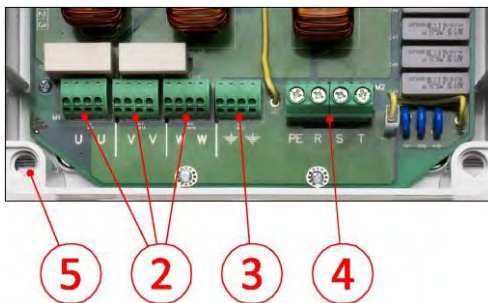
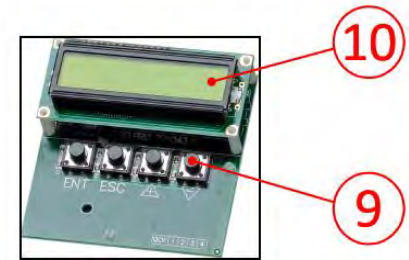
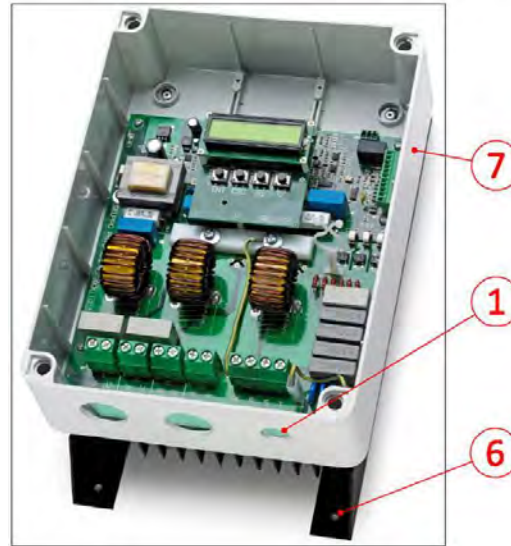
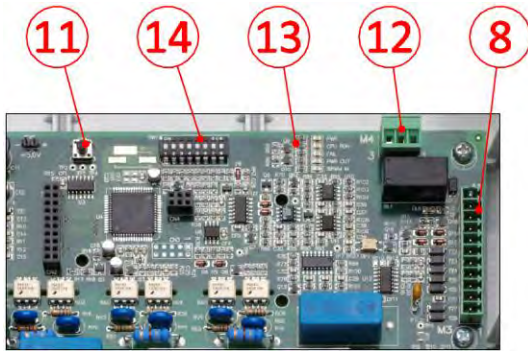
20A (Kompact)



20A (Large)

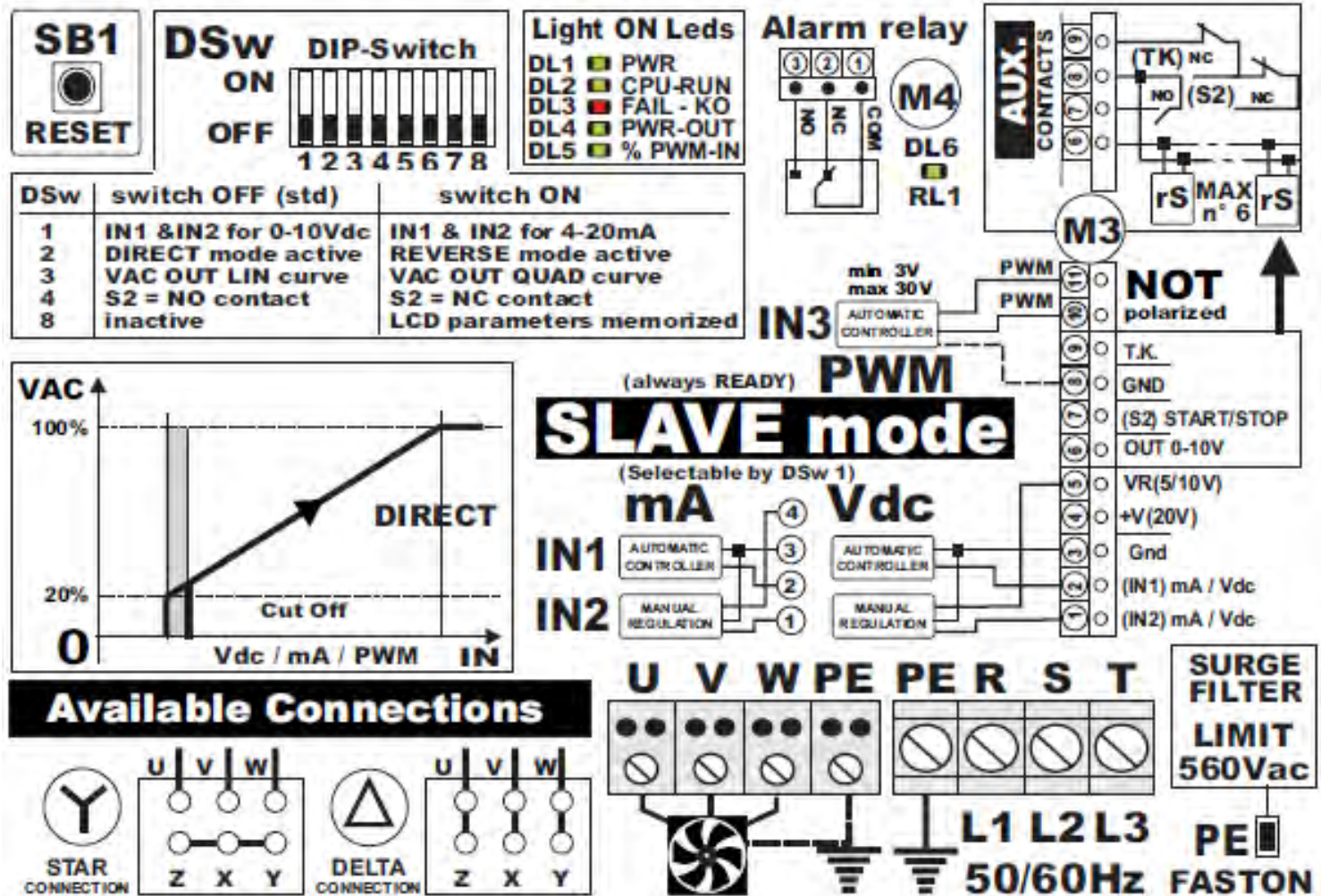
28A

Components description



1. Cable glands;
2. Terminals for three-phase load connection (U-V-W)
3. Terminals for earth connection
4. Three-phase power supply connection L1-L2-L3 (R-S-T) + EARTH (PE);
5. NPT clamping screw (CEI 23-58);
6. Tab with holes for wall mounting the device;
7. GW Plast™ container;
8. Control inputs connection terminal block
9. Keyboard (option on request)
10. Display (option on request)
11. RESET pushbutton
12. Alarm relay terminal block
13. Indicator light LED
14. Dip-Switch

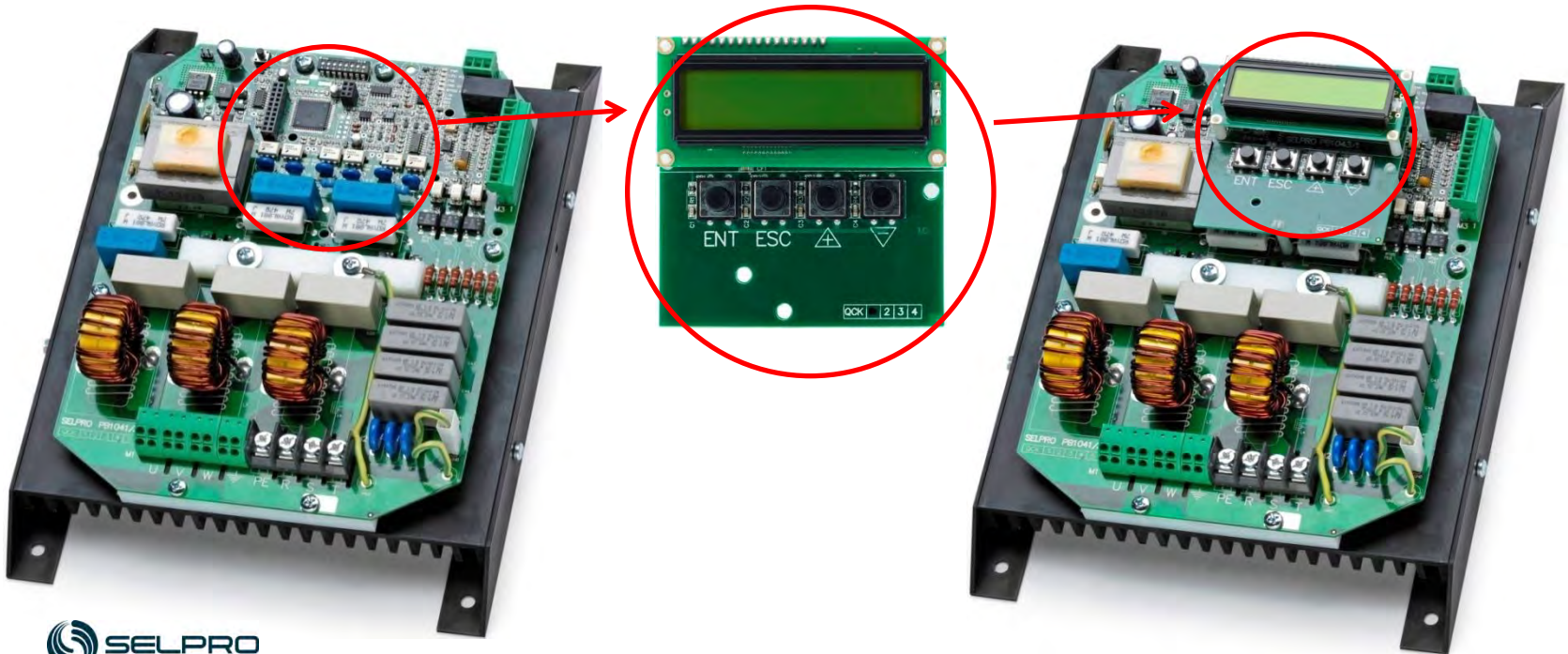
DRM300 internal COVER label



DRM \geq to \leq RDM

from SLAVE to Master & Slave

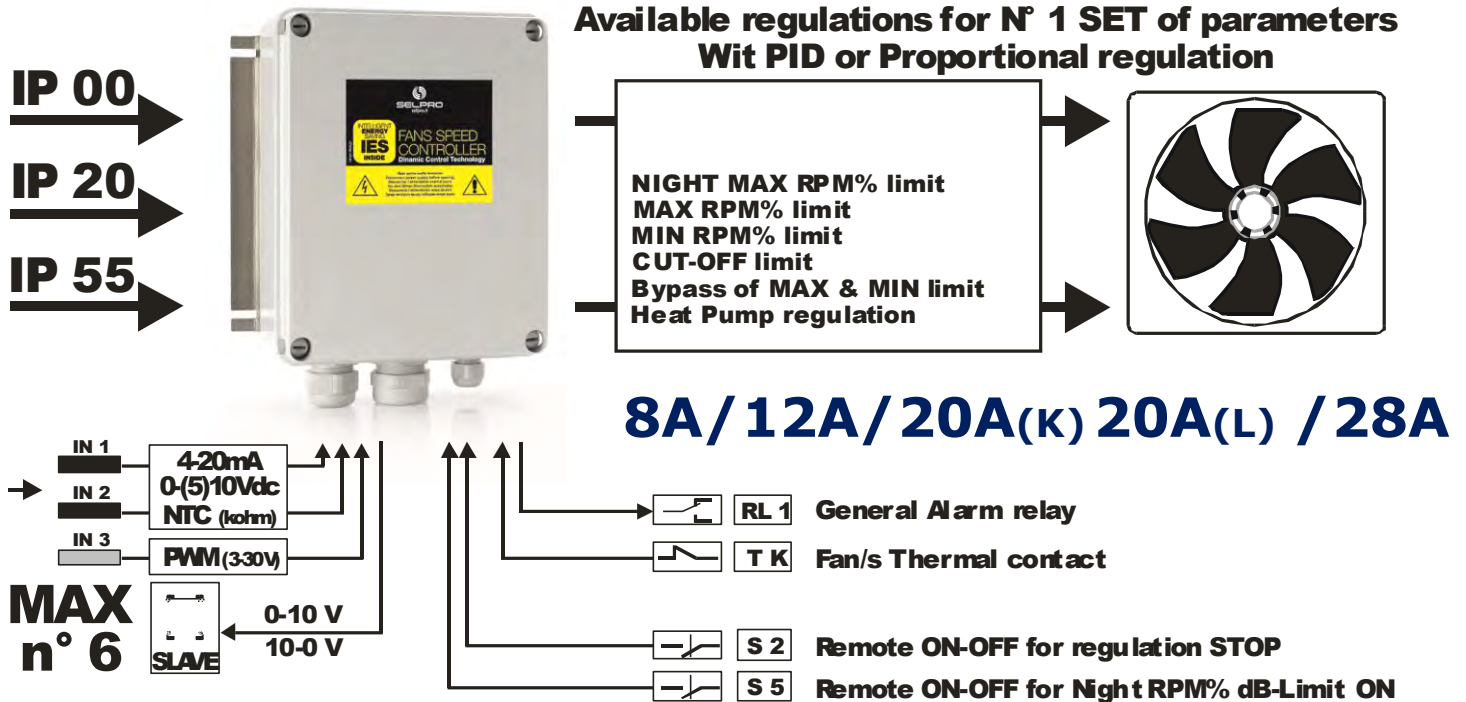
$$\boxed{\text{DRM300 (IP00)}} + \boxed{\text{DISPLAY}} = \boxed{\text{RDM300 (IP00)}}$$





3 PHASE STEPLESS CONTROLLER Dynamic Control Technology

RDM-300



The RDM300 series are for the Manual or Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.
 N° 2 + 1 inputs, with n. 14 different software of regulation modes are available.
 The controller for work, select always the working INPUT with the higher value.

RDM300

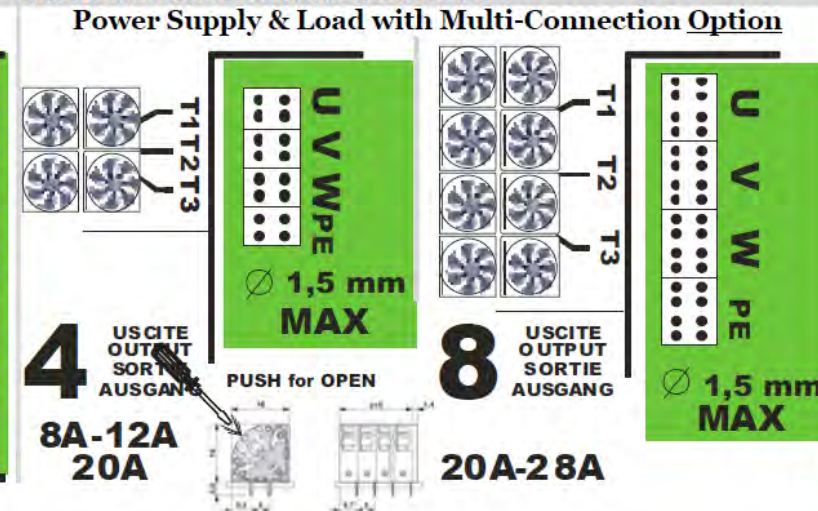
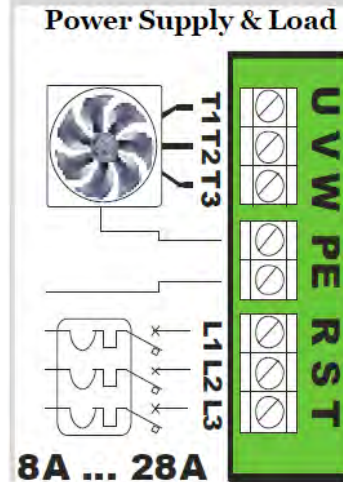
Master & SLAVE



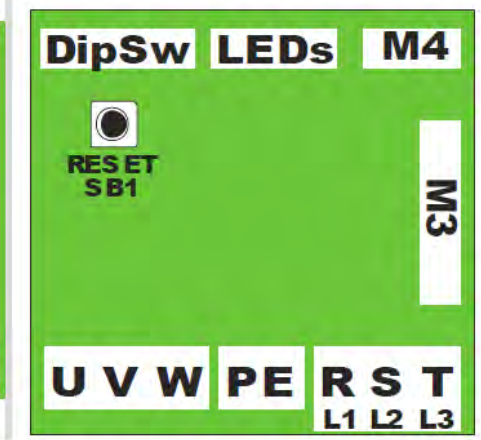
ELECTRICAL DATA

Power Supply	400Vac (+/-20%) 50/60Hz Aut. Sel. - 230Vac/480Vac or others VAC on request							
Rated current (RMS @ 50°C)	8A		12A		20A		28A	
Protection Case available	IP00	IP55	IP00	IP20	IP55	IP00	IP20	IP55
EMC Compliance (EN 61800-3)	Applications for PDS Systems – Civil limit (Regulator with connected fans – Residential, Commercial & Light Industrial Filter)							
Limit Harmonic Current (LHC) Compliance (EN61000-3-2 & 3-12)	The regulator does NOT have any internal filter for the suppression of harmonic distortions caused by electronic regulation – for THD% compliance see user manual							
Control Circuit Power	3 VA				Environmental Pollution		High pollution	
Thermally Dissipated Power	4 W/Amp				Insulation Characteristics		4000 Vac	
°C/UR% Work Environment	-20T50°C		85% not condensing		Ageing Characteristics		60.000 h	

ELECTRICAL CONNECTION



Components Placement

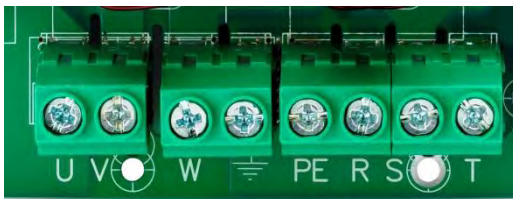
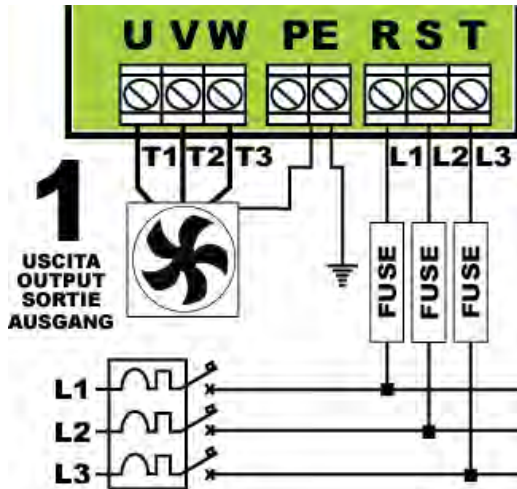


RDM300

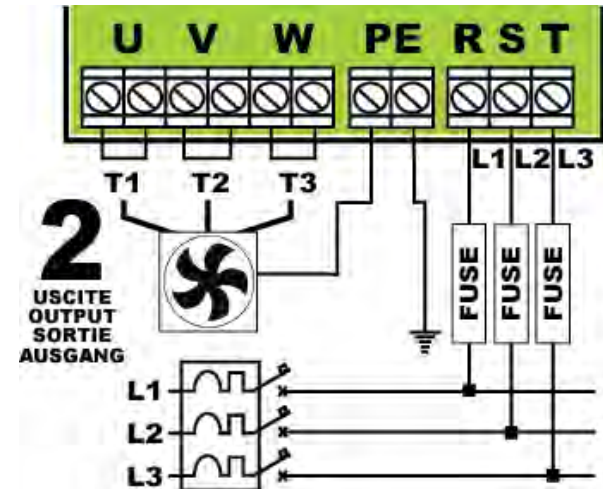
Master & SLAVE



Standard Power Connections



8A/12A
20A (Kompact)



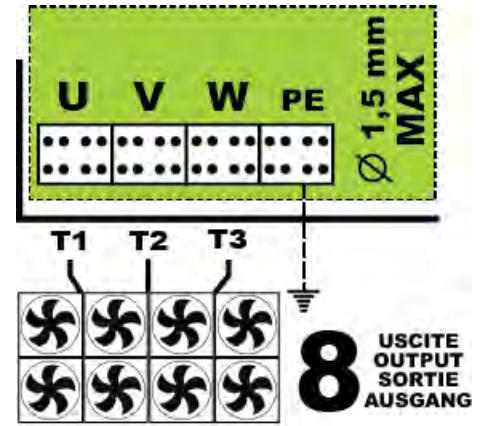
20A (Large)
28A

RDM300

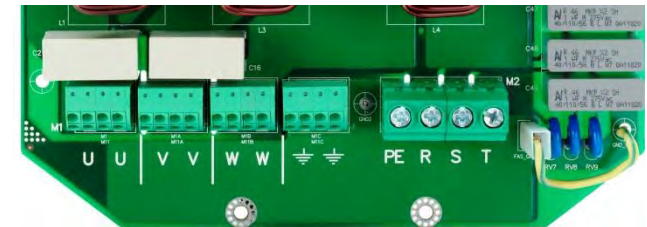
Master & SLAVE



Optionals Power Connections

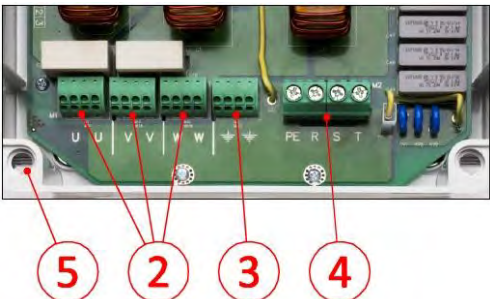
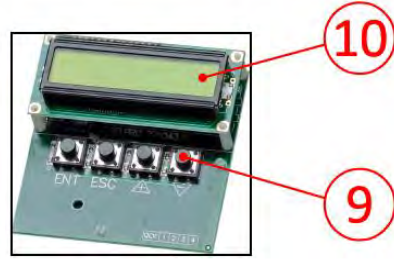
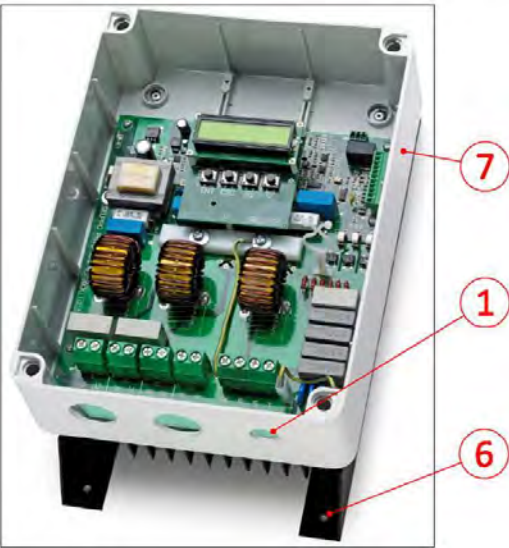
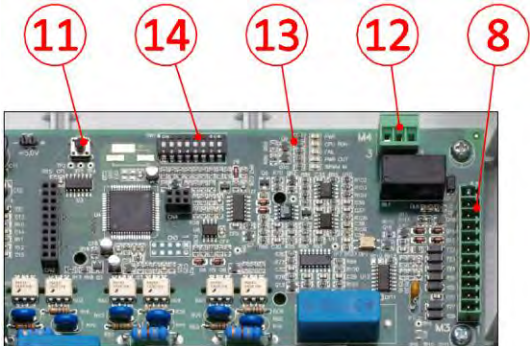


8A/12A
20A (Kompact)



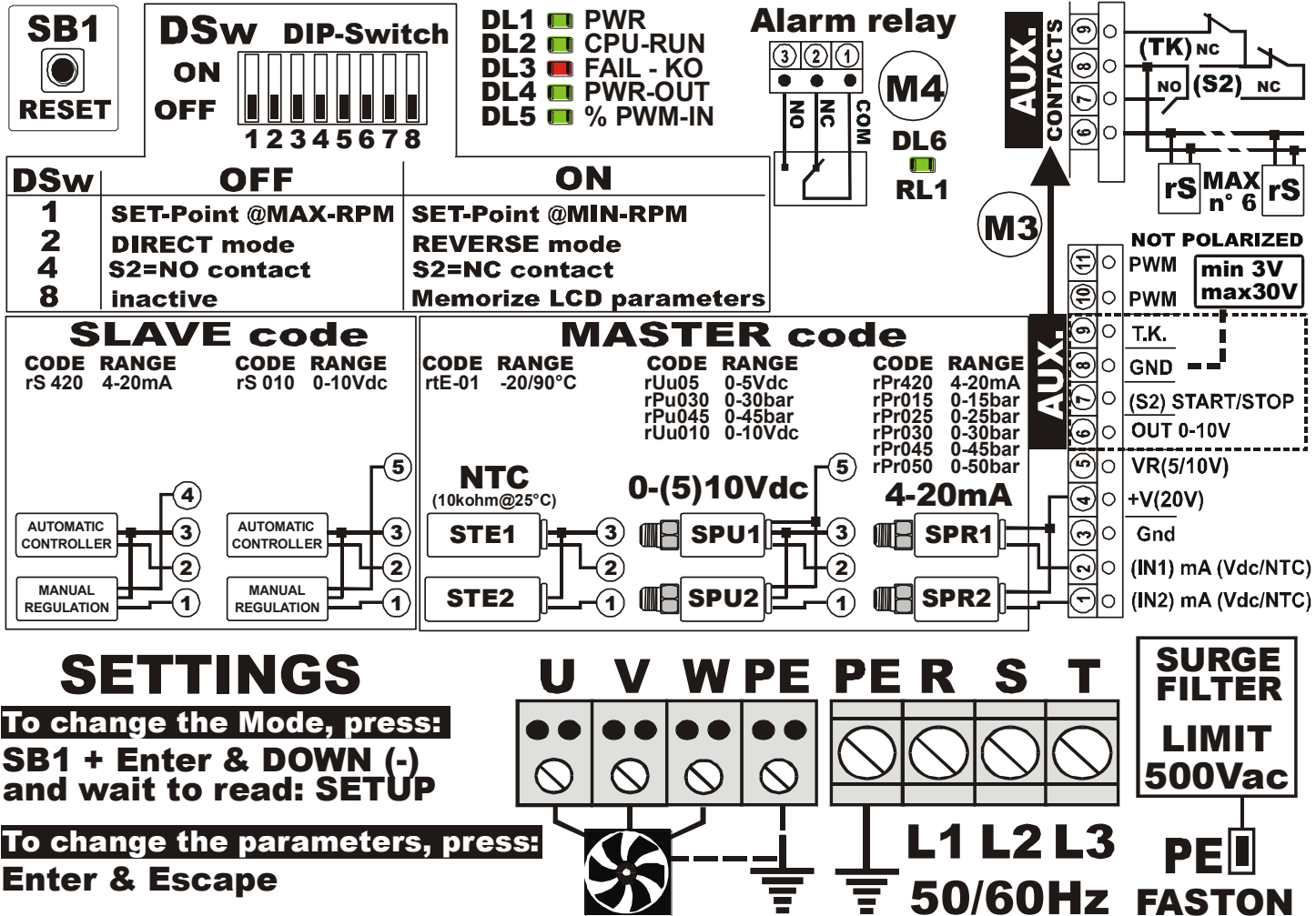
20A (Large)
28A

Components description

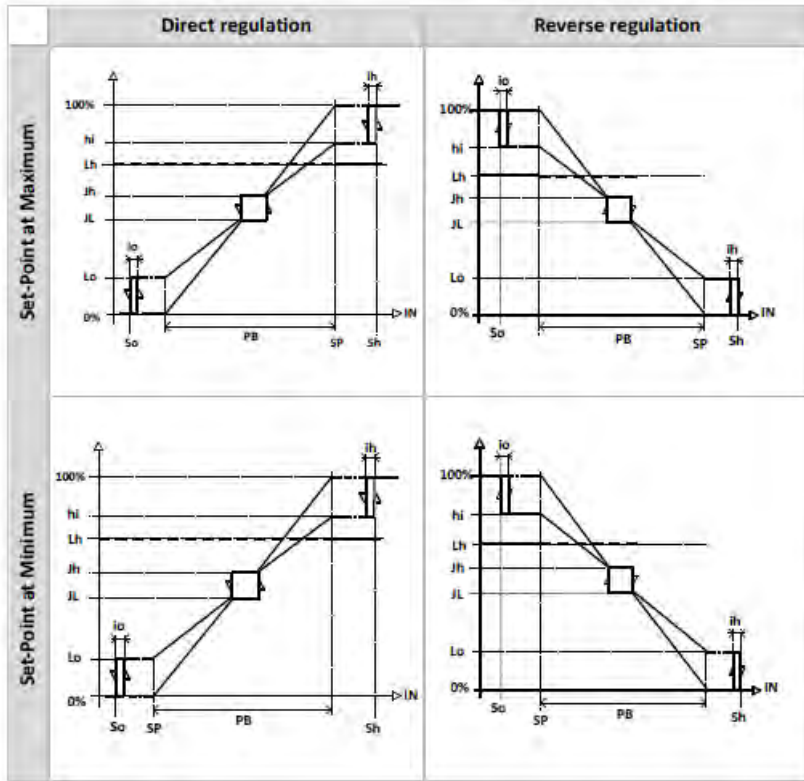


1. Cable glands;
2. Terminals for three-phase load connection (U-V-W)
3. Terminals for earth connection
4. Three-phase power supply connection L1-L2-L3 (R-S-T) + EARTH (PE);
5. NPT clamping screw (CEI 23-58);
6. Tab with holes for wall mounting the device;
7. GW Plast™ container;
8. Control inputs connection terminal block
9. Keyboard (option on request)
10. Display
11. RESET pushbutton
12. Alarm relay terminal block
13. Indicator light LED
14. Dip-Switch

RDM300 COVER LABEL







Settings available for Proportional regulation



RDM300

Code	Description	Unit of measure
SP	Set-Point : desired value of the magnitude to be controlled	mA / Vdc / °C / bar
Pb	Proportional regulation band width	mA / Vdc / °C / bar
Lh	RPM night limit	% (of supply voltage)
hi	Maximum output voltage limit	% (of supply voltage)
Lo	Minimum output voltage limit	% (of supply voltage)
dE	Soft-Start : acceleration/deceleration time	seconds
Jh	Upper limit of the skip area (for extra dB)	% (of supply voltage)
JL	Lower limit of the skip area (for extra dB)	% (of supply voltage)
Sh	Value of input signal that forces the output at maximum (Overspeed)	mA / Vdc / °C / bar
ih	Hysteresis at Sh value	mA / Vdc / °C / bar
So	Cut-Off : value of input signal that forces the output to 0	mA / Vdc / °C / bar
io	Hysteresis at the So value	mA / Vdc / °C / bar
HP	Heat Pump: operation in heat pump mode	% (of output voltage)

Setting	Dsw1	Dsw2	Function
ON OFF  1 2 3 4 5 6 7 8	Off	Off	Direct regulation with Set-Point at maximum
ON OFF  1 2 3 4 5 6 7 8	Off	On	Inverse regulation with Set-Point at maximum
ON OFF  1 2 3 4 5 6 7 8	On	Off	Direct regulation with Set-Point at minimum
ON OFF  1 2 3 4 5 6 7 8	On	On	Inverse regulation with Set-Point at minimum



3 PHASE STEPLESS CONTROLLER Dynamic Control Technology

RGM-300

**RS-485
ModBus
(RTU)**

IP55

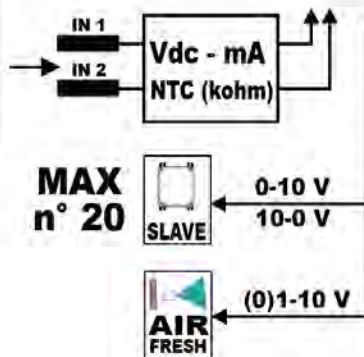
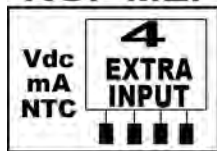


**Available regulations for N° 1 or 2 SET of parameters
With PID or Proportional regulation**

- SET-POINT
- Proportional Band
- NIGHT MAX RPM% limit
- MAX RPM% limit
- MIN RPM% limit
- CUT-OFF limit
- SPRAY MAX RPM% limit
- Over-speed / MAX limit bypass
- SET-POINT aux. controller
- Prop. Band aux. controller



RGF MEI



12A/20A/26A/40A/60A/90A



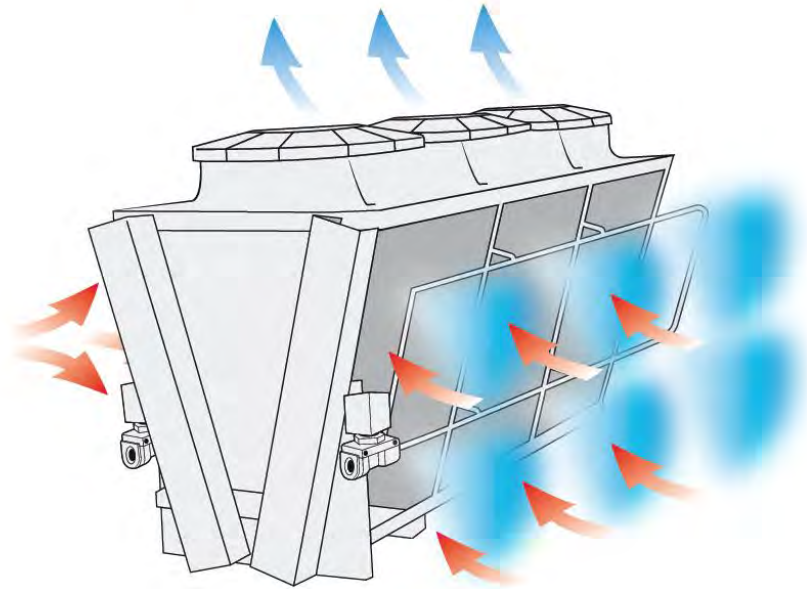
The RGM300 series are for the Manual or Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

N° 2 inputs, with n. 12 different software of regulation modes are available.

The controller for work, select always the working INPUT with the higher value.

RGM300

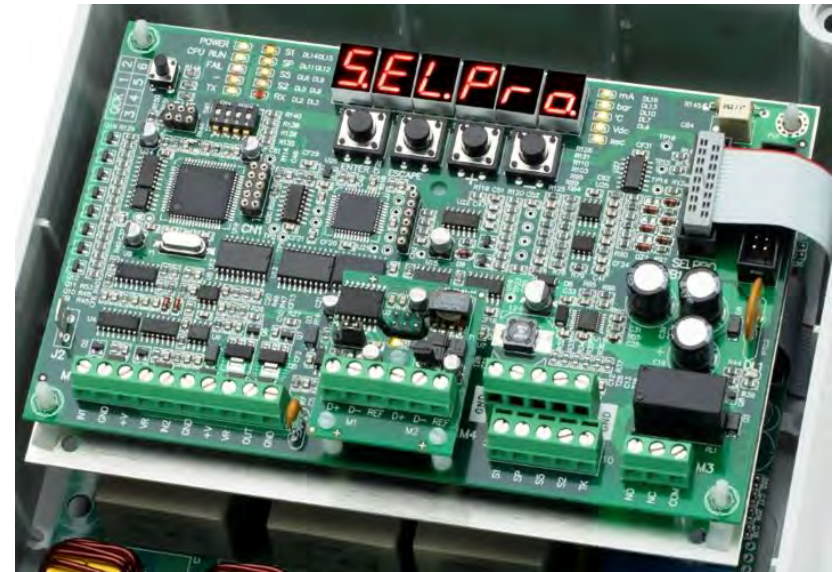
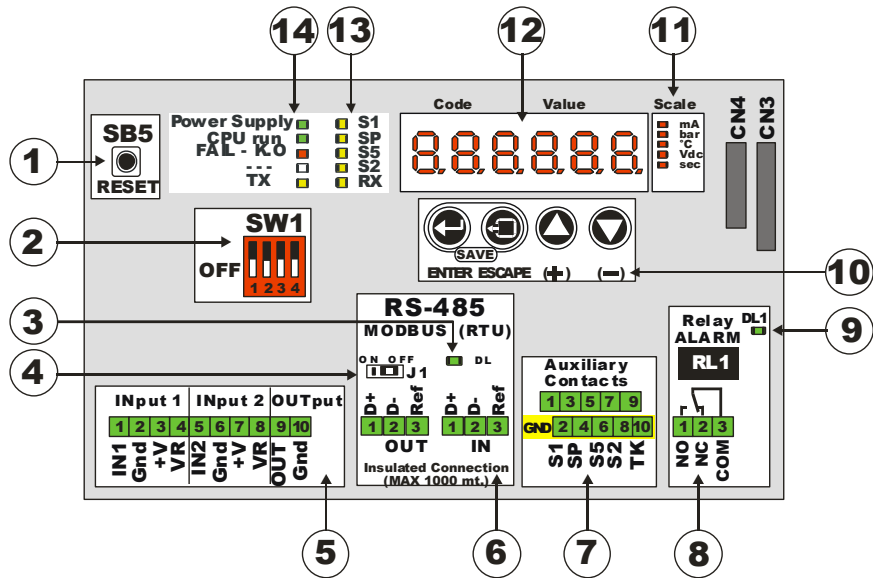
WS SPRAY CONTROLLER ADIABATIC BOOSTER



**Modulating V_{dc} or ON-OFF Command
for Spray System
(Adiabatic-BOOSTER)**

RGM300

THE COMPLETE MULTIPURPOSE SYSTEM



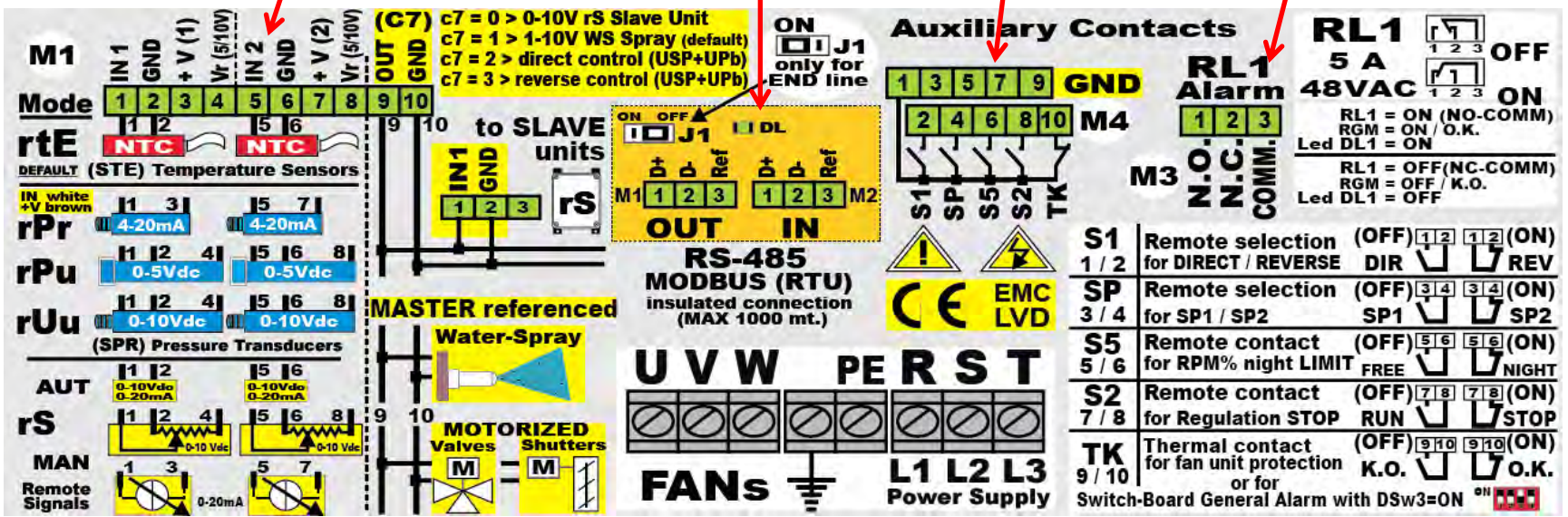
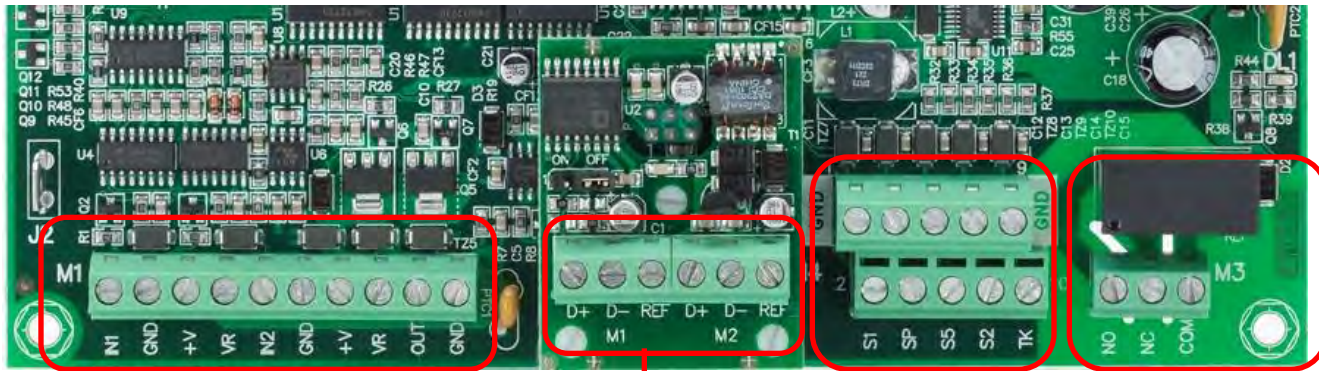
1	SB5 RESET Button
2	SW1 Switch to enable modification of operating param.
3(*)	Led for RS-485 line state
4(*)	Jumper J1 for RS-485 END line
5	Connection of control sensors and signals
6	Plug for RS-485 / Modbus (RTU) net connection
7	Connection of auxiliary contacts

8	RL1 connection for Alarm or ON/OFF command
9	Led RL1 state
10	Keypad for programming the operating parameters
11	Led for displayed measurement units
12	Display for the operating parameters
13	Led signals for Auxiliary Contacts ON
14	Led for the regulation state

(*) Optional plug for RS-485 connection

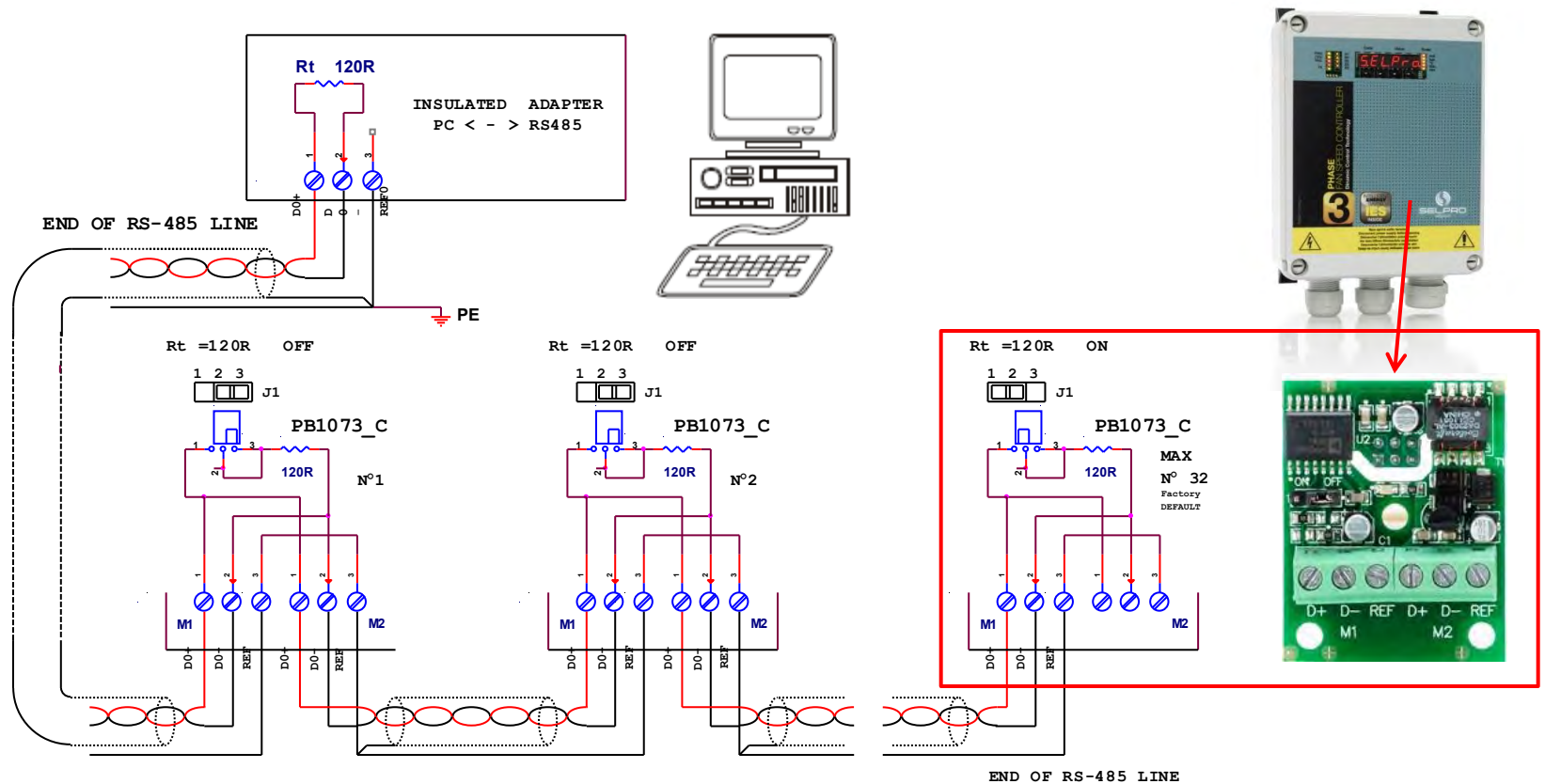
RGM300

AVAILABLE INPUTS CONNECTION



RGM300

MODBUS (RTU) Network Connections



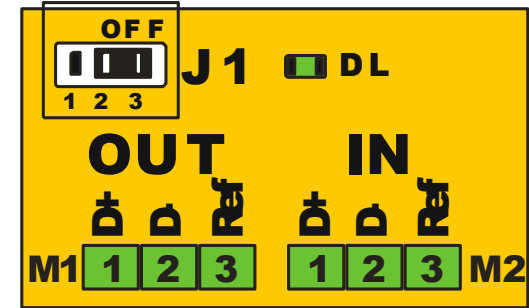
RGM300

Supervising SW : CLIMA-Sinergy

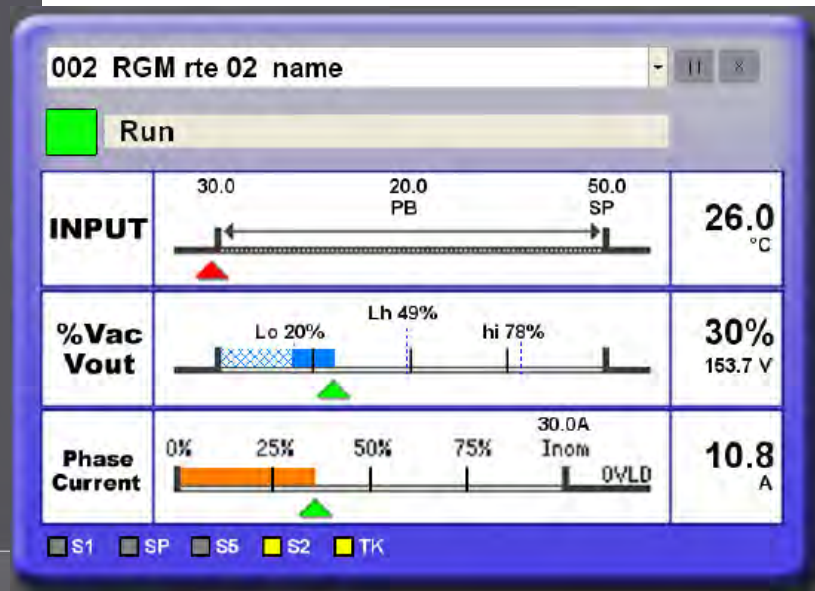
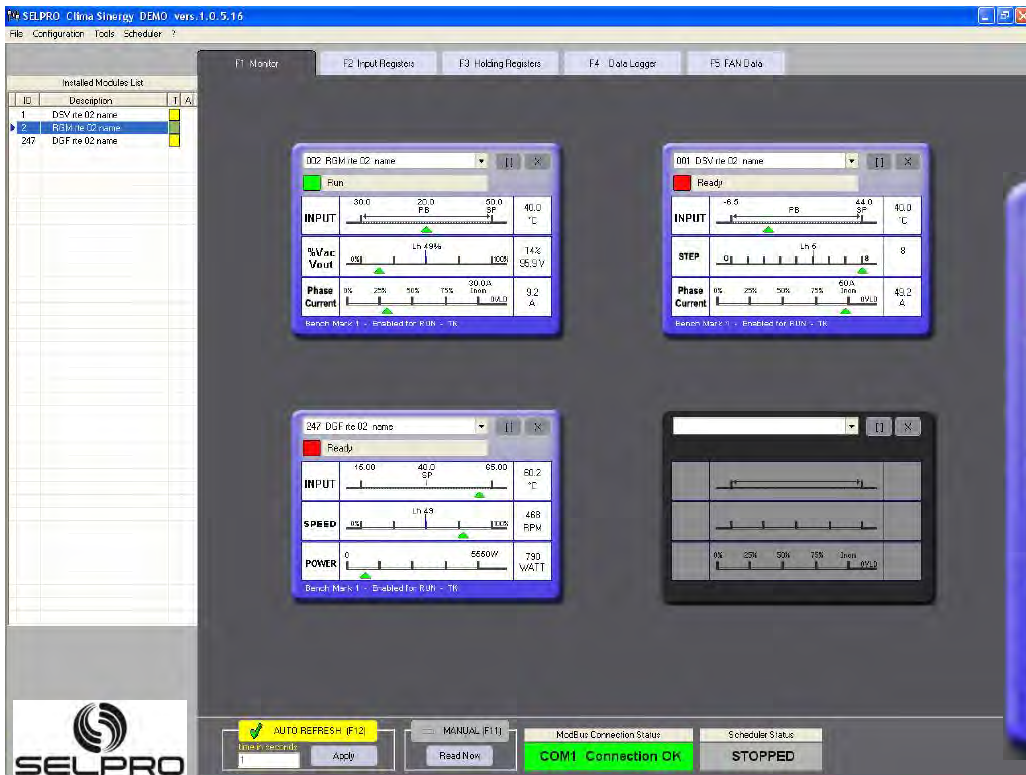
For the PC remote control, it's available the CLIMA-Sinergy Supervising & Monitoring software, through MODBUS Communication System (RS-485).

It allows remote administration (reading, monitoring and modification) of the working parameters of the controlled Ventilation System, and permits to monitor and acquire working data from connected units, also with GPRS-GSM option.

Are also available bridge systems for different working protocol, like: BACnet, LonWork, ...



RS-485
MODBUS (RTU std)





PHASE STEP CONTROLLER

HYBRID VAC Control Technology



PHASE STEP CONTROLLER HYBRID STEP VAC Control Technology

DSV300 System Master & Slave



8A/16A

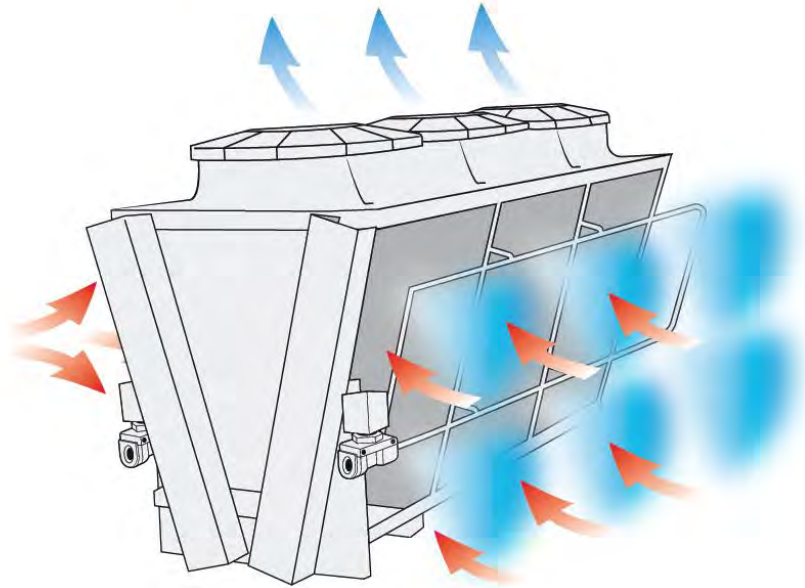
DSV300 bi-System Master & Slave



10A/20A/32A/40A/46A

DSV300

WS SPRAY CONTROLLER ADIABATIC BOOSTER

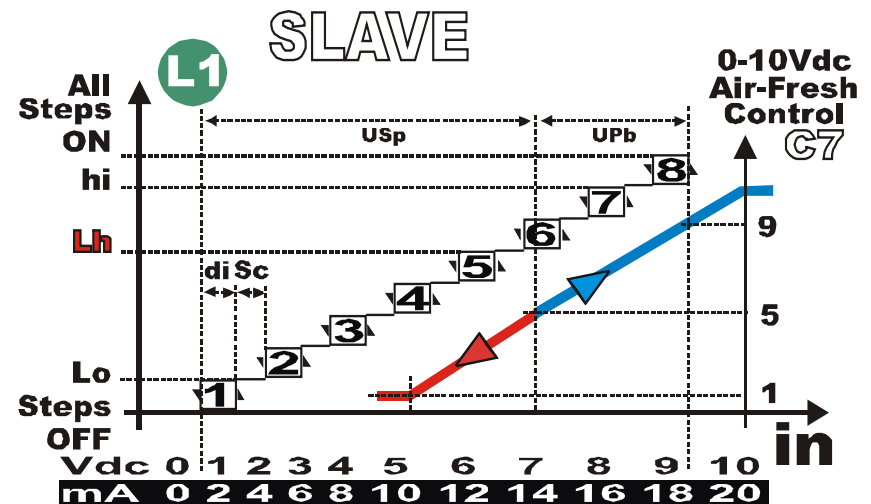
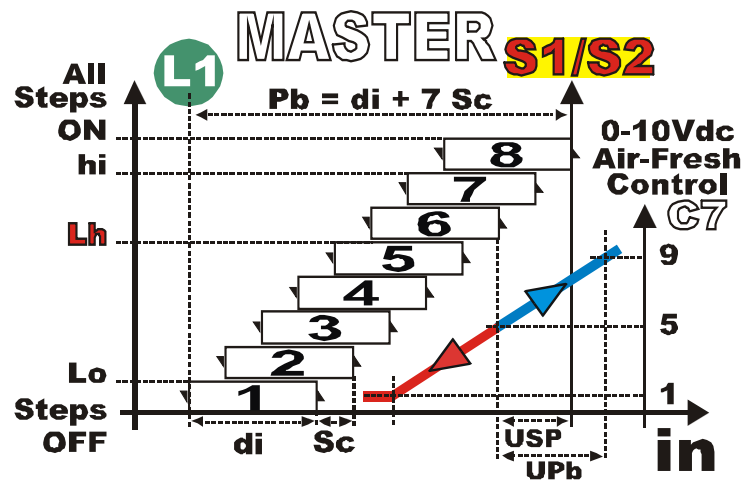


**Modulating V_{dc} Command
for Spray System
(Adiabatic-BOOSTER)**

Total & Certifiable Compliance	EMC	EMC Immunity to radiated and conducted emissions
	LHC (THD%)	Harmonic Current Emissions EN 61000-3-2 & EN61000-3-12
	Low-Noise	NO-Noise Emissions - NO extra dB - NO electric spike

Functions Diagrams

S1 Set-Point 1	in Signal Input value	di Step differential	hi MAX fans limit
S2 Set-Point 2	USP Humidity Set-Point	Sc Step shifting	Lo MIN fans limit
Lh Night limit	UPb Humidity Prop. Band	Pb Proportional Band	
Setting			
without Service-Key			

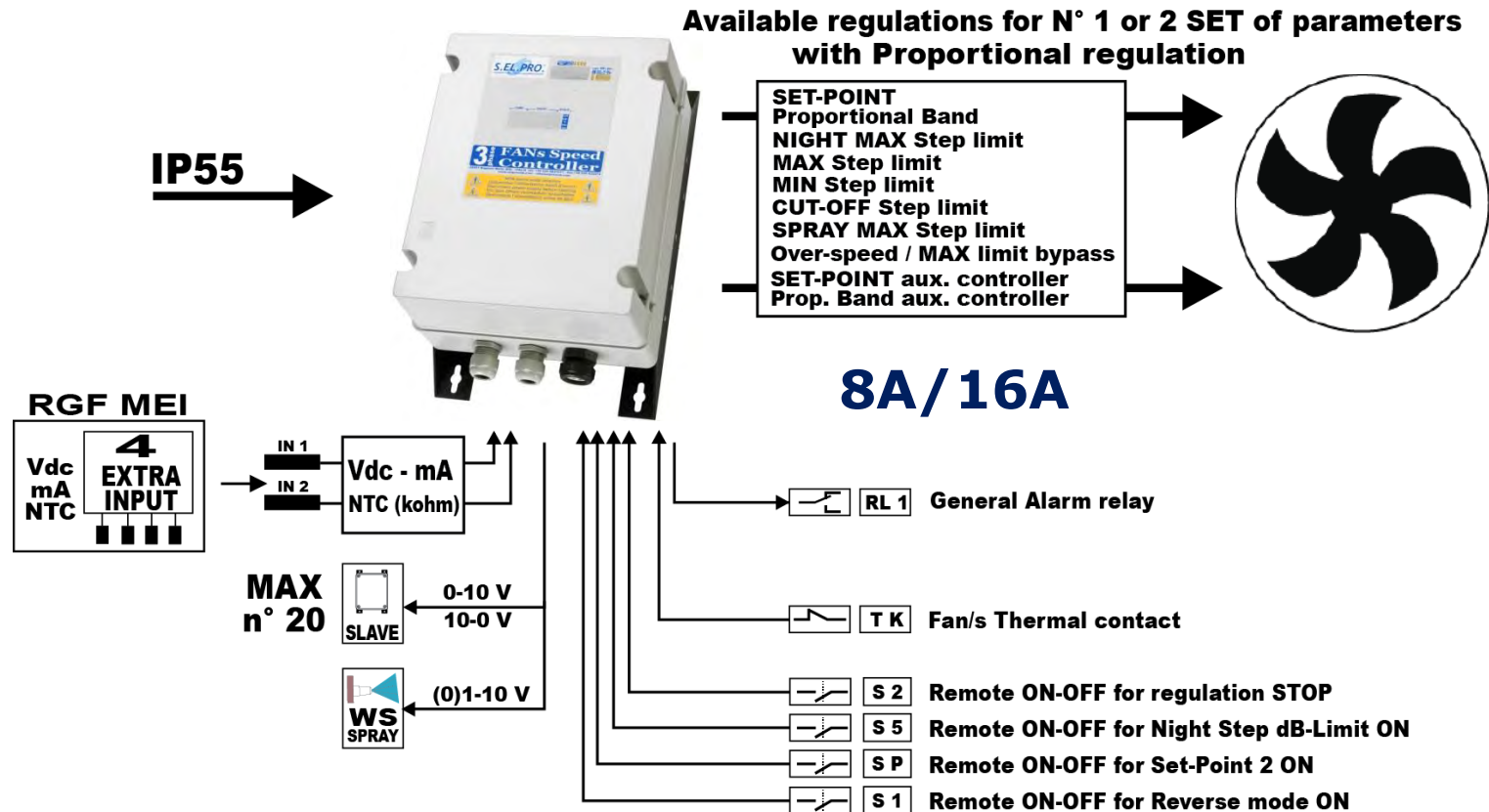


VAC STEP Master & Slave Controller



3 PHASE STEP CONTROLLER HYBRID STEP VAC Control Technology

DSV300 System



The DSV300 series are for the Manual or Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

N° 2 inputs, with n. 12 different software of regulation modes are available.

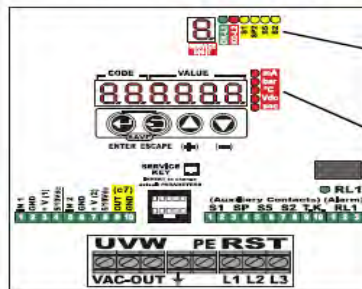
The controller for work, select always the working INPUT with the higher value.

DSV300 System

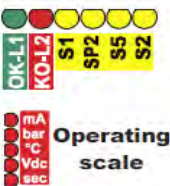
ELECTRICAL DATA

Power Supply	400Vac +/- 10% - 50/60Hz - 230Vac (on request)								
Rated Current (RMS @ 50°C)	8 A	16 A							
Step Output N° 09 fixed VAC	00	65	75	85	120	160	210	280	400
Protection Case	IP 55 in GW-plast 120°C for outdoor installation (standard)								
EMC Compliance	Applications for PDS Systems (Regulator with connected fans – Residential, Commercial & Light Industrial Facility)								
LHC Compliance (EN61000-3-2 & 3-12)	The regulator does NOT generate any harmonic distortions while controlling the fan speed								
Control Circuit Power	10 VA			Environmental Pollution			High pollution		
Thermally Dissipated Power	5 W/Amp			Insulation Characteristics			4000 Vac		
°C/UR% Work Environment	-20 / 50°C		85% non condensing		Ageing Characteristics			60.000 h	

Components Placement



LED signals



Operating scale

Control Signals & Auxiliary Contacts Connection

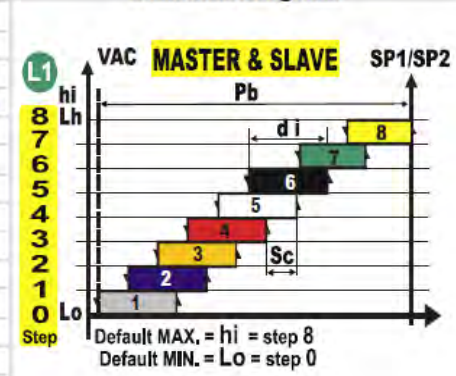


Selectable regulation modes

Control MODE	Probe	Range	Code
Factory selection	NTC (10k)	-20/90°C	rtE-01
MASTER	4-20mA	4-20mA	rPr420
		0-15bar	rPr015
		0-25bar	rPr025
		0-30bar	rPr030
	0-45bar		rPr045
		0-5 Vdc	rUu 05
SLAVE	4-20mA	4-20mA	rS 420
		0-10Vdc	rS 010
	0-10Vdc	0-10Vdc	

N°	Double-SET Regulation Parameters	Code
2	Fans Set-Point (SP1 & SP2)	SP
2	Fans Proportional Band	Pb
2	Set-Point for Auxiliary Output	USP
2	Proportional Band for Aux. Output	UPb
2	Cut-Off Limit	So
2	Minimum Step Limit	Lo
2	Maximum Step Daily Limit	hi
2	Maximum Step Night Limit	Lh
2	Control Steps Insertion Differential	di
2	Control Steps Insertion Deviation	Sc
2	By-pass Minimum Step Limit	So
2	By-pass Maximum Step Limit	Sh
2	Acceleration / Deceleration Starter	dE
1	Programmable Vdc Output	C7

Function Diagram

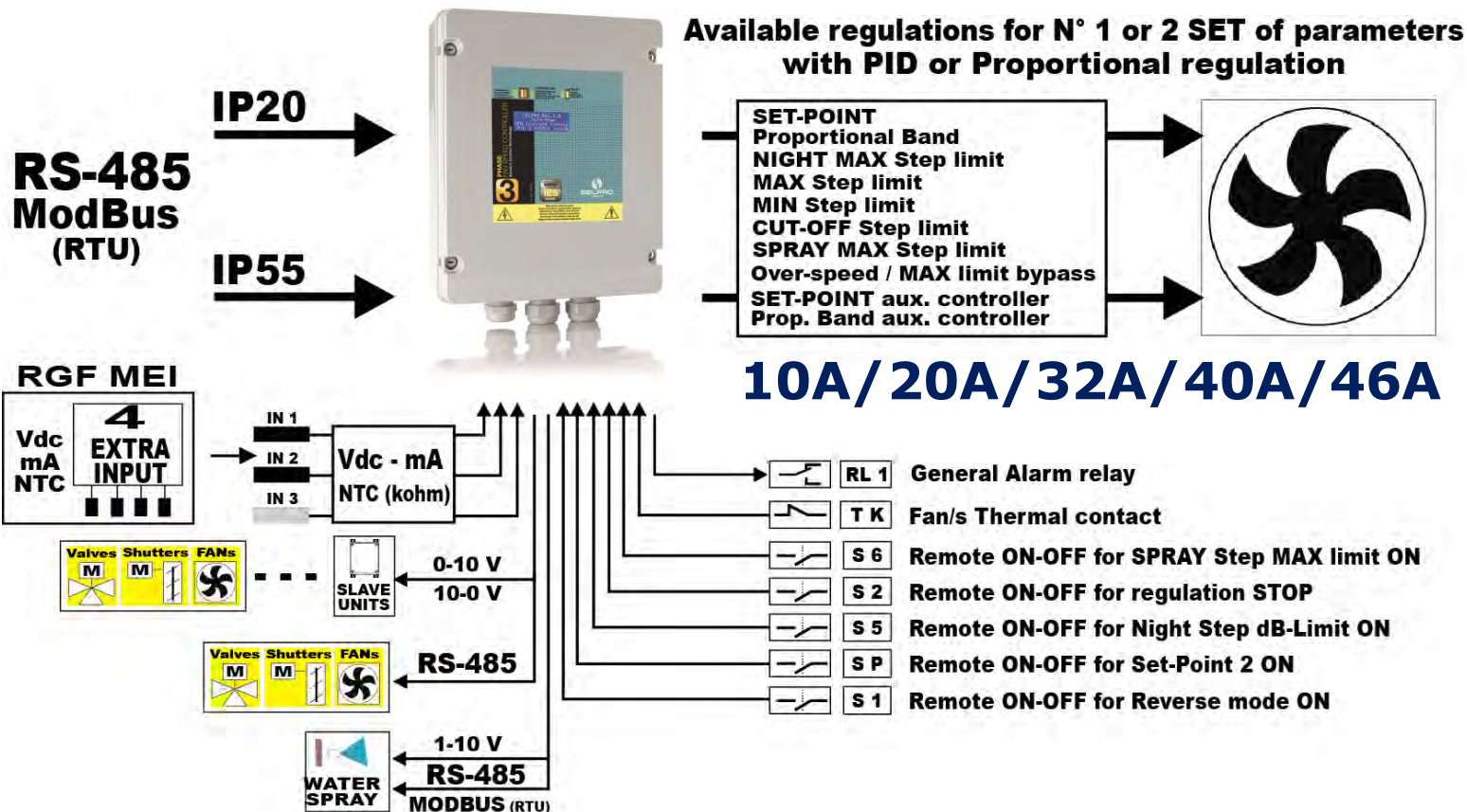




3 PHASE STEP CONTROLLER

HYBRID STEP VAC Control Technology

DSV300 bi-System



The DSV300 series are for the Manual or Automatic regulation of asynchronous (AC), three-phase motors, applied on axial and centrifugal fans, with devices and control systems specialized for applications on ventilated heat-exchangers.

N° 2 inputs, with n. 12 different software of regulation modes are available.

The controller for work, select always the working INPUT with the higher value.

DSV300 bi-System

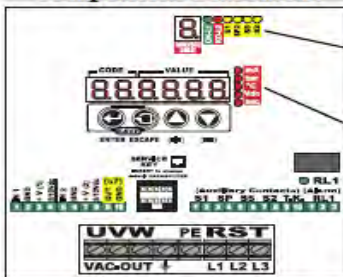
ELECTRICAL DATA								
Power Supply	400Vac +/- 10% - 50/60Hz - 230Vac (on request)							
Rated Current (RMS @ 50°C)	10 A	20 A	32 A	40 A	46 A			
Step output	N° 7 VAC steps N° 2 ON-OFF steps	00	65	95	140	190	265	400
Case for electronic unit	Control contacts for extra ON-OFF programmable steps							
Case for Autotransformers	IP 55 in GW-plast 120°C for outdoor installation (standard)							
EMC Compliance	Die-cast Aluminium IP68 – Complying with UL Class 2							
	Applications for PDS Systems (Regulator with connected fans – Residential, Commercial & Light Industrial Filter)							
LHC Compliance (EN61000-3-2 & 3-12)	The regulator does NOT generate any harmonic distortions while controlling the fan speed							

Control Circuit Power
Thermally Dissipated Power
Max °C/UR% Work Environment

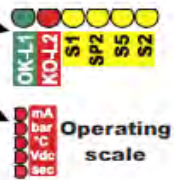
10 VA	
5 W/Amp	
-20/50°C	85% non condensing

Environmental Pollution High pollution
Insulation Characteristics 4000 Vac
Ageing Characteristics 60.000 h

Components Placement



LED signals



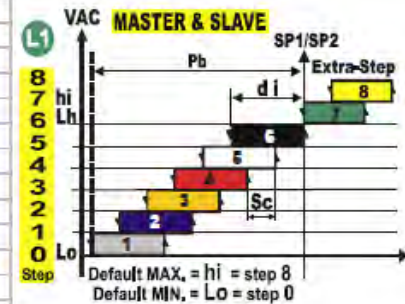
Control Signals & Auxiliary Contacts Connection



Selectable regulation modes			
Control MODE	Probe	Range	Code
Selections Standard	NTC1 10K	0/20/90°C	rTE-01
MASTER	4-20mA	4-20mA	rPr420
		0-15bar	rPr015
		0-25bar	rPr025
		0-30bar	rPr030
		0-45bar	rPr045
		0-5 Vdc	rUu 05
SLAVE	4-20mA	0-5 Vdc	rPu030
		0-30bar	rPu030
		0-45bar	rPu045
		0-10Vdc	rUu010
		0-10Vdc	rS 610
		0-10Vdc	rS 710
			rS 810
			rS 620
			rS 720
			rS 820

N°	Double-SET Regulation Parameters	Code
2	Fans Set-Point (SP1 & SP2)	SP
2	Fans Proportional Band	Pb
2	Set-Point for Auxiliary Output	USP
2	Proportional Band for Auxiliary Output	UPb
2	Cut-Off Limit	So
2	Minimum Step Limit	Lo
2	Maximum Step Daily Limit	hi
2	Maximum Step Night Limit	Lh
2	Control Steps Insertion Differential	di
2	Control Steps Insertion Deviation	Sc
2	Differential & Deviation Step 7	do/So
2	Differential & Deviation Step 8	do/So=
2	By-pass Minimum Step Limit	So
2	By-pass Maximum Step Limit	Sh
2	Acceleration / Deceleration Starter	dE
1	Programmable Vdc Control Output	C7

Function Diagram



DSV300 bi-System

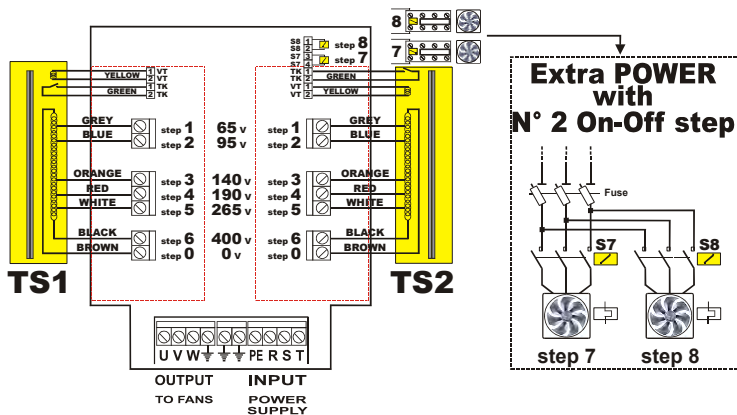
The DSV300 regulators are multifunction three-phase power units driven by a latest-generation extended range (-40/85 °C) microprocessor, for the variation of AC voltage through step-voltage regulation operated by toroidals autotransformers.

The given AC voltage variation allows controlling the speed of three-phase asynchronous motors, of fans. With the DSV300 regulator, the active voltage applied to the fans motors varies within fixed AC voltage values, which are given by the preset steps on the autotransformer.

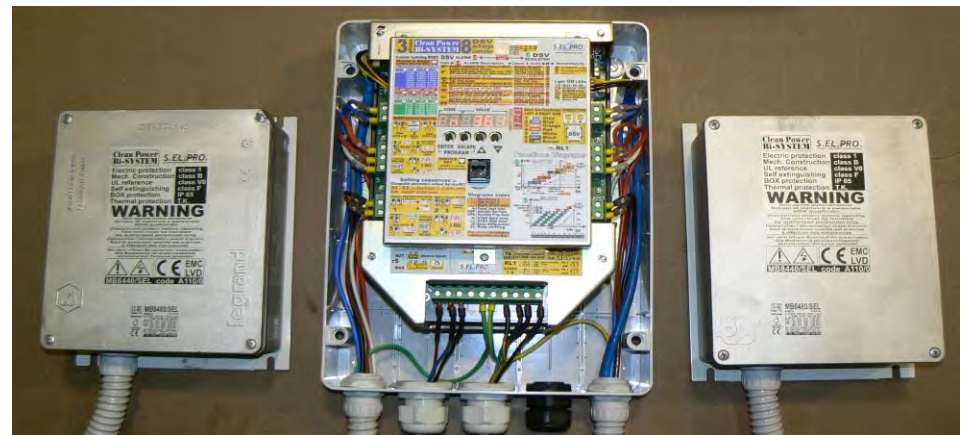
The asynchronous motor, in this case, can also be a STANDARD one, directly or indirectly coupled with the fan rotor.

This kind of regulation produces perfect sine waves, and can be applied to STANDARD motors without: special wiring (shielded cables), dedicated motors, filters on the mains supply (EMC filter and Harmonic filters, complying with IEC 61000-3-12) and on the connected load (such as filters for inverter-generated microwaves, which can damage the electrical isolation of motor windings).

DSV with TS-6 step



DSV300 controller does NOT generate any kind of noises during the fan speed regulation.

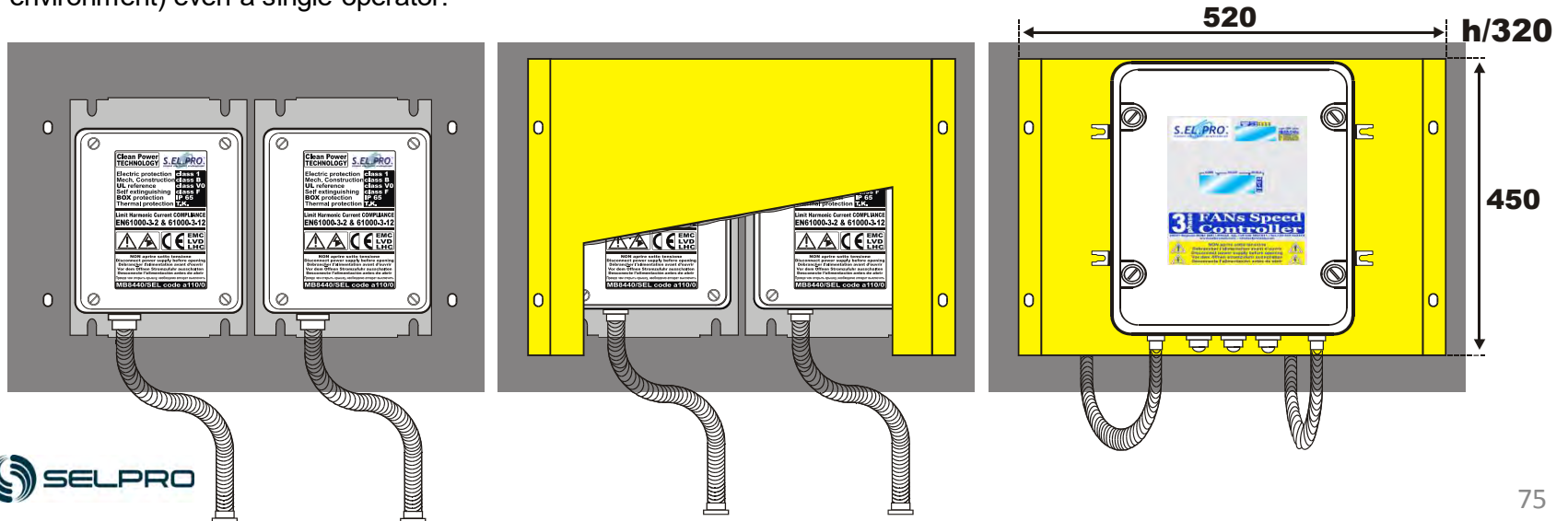


TOROIDAL HIGH POWER EFFICIENCY transformer

MECHANICAL CONSTRUCTION	CLASS B
BOX PROTECTION	IP68
SELF EXTINGUISHING	Class F
ELECTRIC PROTECTION	Class 1
“UL” REFERENCE	Class V0
THERMAL PROTECTION	T.K. contact



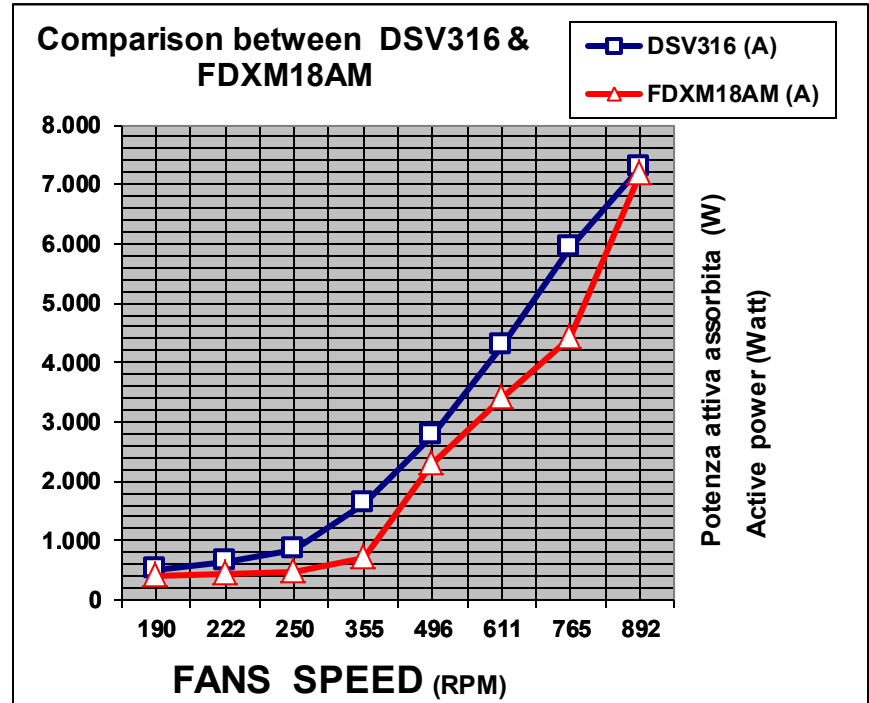
The toroidal Auto-transformers are housed in an aluminum die-cast, filled with a special epoxy resin for outdoor environment, which guarantees the insulation class-1, with output cables sheathed in PVC 105°C, headed for free Quick-Plug. In the figure the three components of the regulator: the control & switching UNIT and the two Toroidal auto-transformers. The simplicity of the fastening structure, with minimum overall dimensions, allows the mounting of a unit 40A (RMS @ 50°C environment) even a single operator.



Regulation SYSTEMS comparison (Watt) : DSV300 & Inverter FXDM with N° 04 FE 080-6-6P

DSV300 (VAC step values)

Step	RPM	VAC	Watt
1	190	65	509
2	222	75	649
3	250	85	833
4	355	120	1.633
5	496	160	2.753
6	611	210	4.282
7	765	280	5.930
8	892	400	7.280



The consumption (Watt) of the DSV300 Hybrid Steps-System, allows for a saving relationship between RPM and fans-Watt, comparable to the consumption with Inverter regulation.

- first step : with the **20%** of the speed of the fans (RPM%), the consuming reach the **7%** of the motors total power;
- fifth step : with the **55%** of the speed of the fans (RPM%), the consuming reach the **38%** of the motors total power.

This adjustment system, in addition to maintain on perfect balance the parameter, allows to fully exploit the power of the heat exchanger at low speeds, with very low electric consumption, thanks to the perfectly sinusoidal regulation of the electronic system, in conjunction with the toroidal transformer for VAC steps.



SELPRO

AC Fans Speed control Solutions

