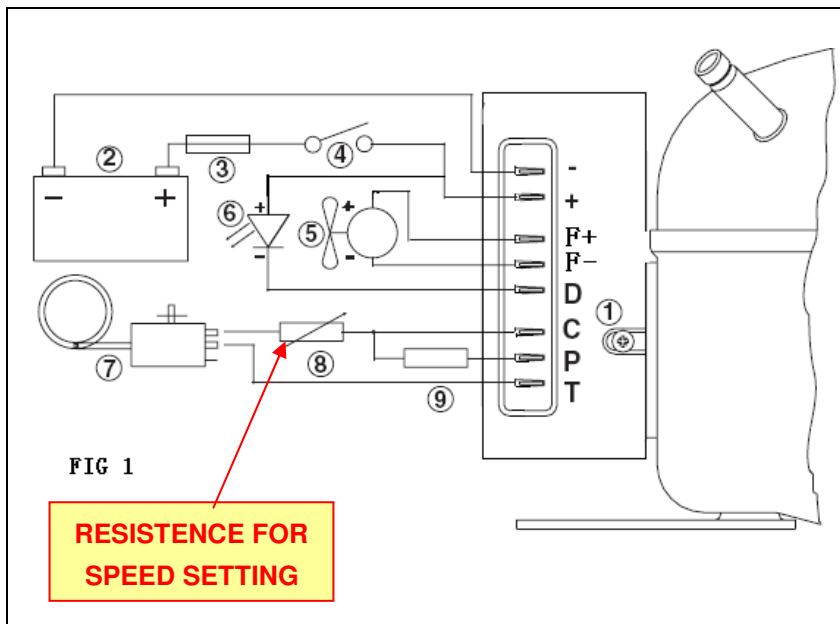


## Instructions

### Electronic Unit for PRO30VS ~ PRO35VS 12/24V DC Compressors



Optional battery protection settings (Table 1)						
Resistor (9) KΩ	12Vcut-out V	12Vcut-in V	12Vmax Voltage	24Vcut-out V	24Vcut-in V	24Vmax Voltage
0	9.6	10.9	17.0	21.3	22.7	35
1.6	9.7	11.0	17.0	21.5	22.9	35
2.4	9.9	11.1	17.0	21.8	23.2	35
3.6	10.0	11.3	17.0	22.0	23.4	35
4.7	10.1	11.4	17.0	22.3	23.7	35
6.2	10.2	11.5	17.0	22.5	23.9	35
8.2	10.4	11.7	17.0	22.8	24.2	35
11	10.5	11.8	17.0	23.0	24.5	35
14	10.6	11.9	17.0	23.3	24.7	35
18	10.8	12.0	17.0	23.6	25.0	35
24	10.9	12.2	17.0	23.8	25.2	35
33	11.0	12.3	17.0	24.1	25.5	35
47	11.1	12.4	17.0	24.3	25.7	35
82	11.3	12.5	17.0	24.6	26.0	35
220	9.6	10.9	17.0	21.3	22.7	35

Wire dimensions (Table 2)					
AWG Gauge	Cross section (mm <sup>2</sup> )	Max length* 12V DC		Max length* 24V DC	
		ft.	m	ft.	m
13	2.5	8	2.5	16	5
12	4	13	4	26	8
10	6	20	6	39	12
8	10	33	10	66	20

\*length between battery and electronic unit

Standard battery protection settings (Table 3)			
12Vcut-out V	12V cut-in V	24Vcut-out V	24V cut-in V
10.4	11.7	22.8	24.2

Compressor speed settings (Table 4)			
Motor speed (RPM)	Resistor (8) Ω	C/T current mA	
2000	0	5	
2100	51	4.8	
2200	100	4.6	
2300	150	4.4	
<b>2500</b>	<b>277</b>	<b>4</b>	<b>white</b>
2600	330	3.8	
2700	400	3.6	
2800	490	3.4	
2900	586	3.2	
<b>3000</b>	<b>692</b>	<b>3</b>	<b>black</b>
3100	816	2.8	
3200	963	2.6	
3300	1137	2.4	
3400	1331	2.2	
<b>3500</b>	<b>1523</b>	<b>2</b>	<b>red</b>
<b>stop</b>	>3000		

#### Controller specification

The electronic unit is a dual voltage device. This means that the same unit can be used in both 12V and 24V power supply systems. Maximum voltage is 17V for a 12V system and 36V for a 24V power supply system. Max. ambient temperature is 55°C. The electronic unit has a built-in thermal protection which is actuated and stops compressor operation if the electronic unit temperature gets too high.

#### Installation (Fig. 1)

Connect the terminal plug from the electronic unit to the compressor terminal. Mount the electronic unit on the compressor by snapping the cover over the screw head (1).



### Power supply (Fig. 1)

The electronic unit must always be connected directly to the battery poles (2). Connect the plus to + and the minus to -, otherwise the electronic unit will not work. The electronic unit is protected against reverse battery connection.

For protection of the installation, a fuse (3) must be mounted in the + cable as close to the battery as possible. 15A fuse for 12V and 7.5A fuse for 24V circuits are recommended. If a main switch (4) is used, it should be rated to a current of min. 20A.

The wire dimensions in **Table 2** must be observed. Avoid extra junctions in the power supply system to prevent voltage drop from affecting the battery protection setting.

### Battery protection (Fig. 1)

The compressor is stopped and re-started again according to the decided voltage limits measured on the + and - terminals of the electronic unit.

The standard settings for 12V and 24V power supply systems appear from **Table 3**.

Other settings (**Table 1**) are optional if a connection which includes a resistor (9) is established between terminals **C** and **P**.

### Thermostat (Fig. 1)

The thermostat (7) is connected between the terminals **C** and **T**. Without any resistor in the control circuit, the compressor with electronic unit will run with a fixed speed of **2,000 rpm** when the thermostat is switched on. Other fixed compressor speeds in the range between 2,000 and 3,500 rpm can be obtained when a resistor (8) is installed to adjust the voltage (v) of the control circuit. Resistor values for various motor speeds appear from **Table 4**.

### Fan (optional, Fig. 1)

A fan (5) can be connected between the terminals **F+** and **F-**. Connect the plus to **F+** and the minus to **F-**.

Since the output voltage between the terminals **F +** and **F-** is always regulated to 12V, a **12V fan must be used for both 12V and 24V power supply systems**.

The fan output can supply a continuous current of **0.5A<sub>avg</sub>**. A higher current draw is allowed for 2 seconds during start.

### LED (optional, Fig. 1)

A 10mA light emitting diode (LED) (6) can be connected between the terminals **+** and **D**. In case the electronic unit records an operational error, the diode will flash a number of times. The number of flashes depends on what kind of operational error was recorded.

Each flash will last 1/5 second. After the actual number of flashes there will be a delay with no flashes, so that the sequence for each error recording is repeated every 1 minutes.

Table 5

Number of flashes	Error type
1	<b>Battery protection cut-out</b> (The voltage is outside the cut-out setting).
2	<b>Fan over-current cut-out</b> (The fan loads the electronic unit with more than 1A <sub>peak</sub> ).
3	<b>Motor start error</b> (The rotor is blocked or the differential pressure in the refrigeration system is too high (>6bar))
4	<b>Minimum motor speed error</b> (If the refrigeration system is too heavily loaded, the motor cannot maintain minimum speed 1850 rpm or controller cannot find the rotor position).
5	<b>Thermal cut-out of electronic unit</b> (If the refrigeration system has too heavily loaded, or if the Ambient temperature is high, the electronic unit will run too hot (case temperature>75°C) .
6	<b>Controller hardware failure</b> (Controller detects abnormal parameters).

### Technical superiority:

1. Step-up regulator controller using speed compressor, electric compressor to reduce the loss of copper; inverter level will not be adopted after the chopper way to reduce the wear and tear of the controller, at the same time improve the efficiency of the DC motor; use of low-power controller Energy-saving devices and software technology, so that the controller of the static power consumption <math><3\text{mA} \sim 5\text{mA}</math> (DC12V ~ DC36V input).
2. Current controller with multi-level control functions, the largest output of 150W, according to the changes in the load-conditioning compressor to achieve the speed limit power output.

### 3. Notes:

- Powercontroller, please read the manual; and check the connection is correct, incorrect connection may damage controller;
- Controller can not be greater than the value of the input voltage DC36V.

