



**ELECTRONIC CARD  
FOR PROPORTIONAL  
ELECTRO-HYDRAULIC VALVES**

**REMS – 4  
REMD – 4**

**USER AND  
INSTALLATION MANUAL**



**EN**

READ THIS INSTRUCTION MANUAL BEFORE USING THE  
PRODUCT





## Safety regulations



Reliable operation cannot be guaranteed if samples or prototypes are used in series production machines.

Correct functioning of the circuit board is guaranteed by protecting the power supply using rapid external fuse.

The circuit board must be disconnected during machine maintenance operations carried out with electrical welding.

The connection between the circuit board and coil must be direct. The common return connection from the proportional coil must not be shared with other connections to other valves or appliances.

The PWM and on/odd (high side) outputs may not be externally connected to battery positive supply or battery negative supply.

The PWM output mustn't be linked or bridged.

Without written authorization of the manufacturer it is prohibited to use this circuit board for different reasons than those indicated. The manufacturer is exempt from any liability regarding damage deriving from incorrect use of the component.

The proposed circuit do not imply any technical liability for the system on the part of Brevini Fluid Power.

Incorrect connections could cause unexpected signals at the outputs of the REM card.

Incorrect parameter settings on the electronic card may create potential hazards while the machine is in operation. It is the responsibility of the machine manufacturer to identify hazards of this type in a hazard analysis and to bring them to the attention of the end user. Brevini Fluid Power assumes no liability for dangers of type.

The system must be designed in such a way that actuating the safety switch ensure safe braking.

System developments, installations and commissioning of electronic systems for controlling hydraulic drives must only be carried out by trained and experienced specialists who are sufficiently familiar with both the components used and the complete system.

Do not install the REM unit close to parts that generate considerable heat (engine motor, exhaust)

Do not install the REM unit close to radio systems.



Do not install the REM unit under rain, under water, or in wet ambient.

The REM unit may only be wired when it is de-energized.

Wires must not be kinked or twisted, must not rub against edges and must not be routed through sharp-edged ducts without protection.

The electronics may only be tested with the proportional solenoids connected.

Other inductive loads that are in the system but not connected to the REM must be connected to spark-suppression diodes.

**Use in explosive areas is not permissible.**

**The customer is responsible for performing risk analysis on the mobile working equipment and for defining possible safety related functions.**

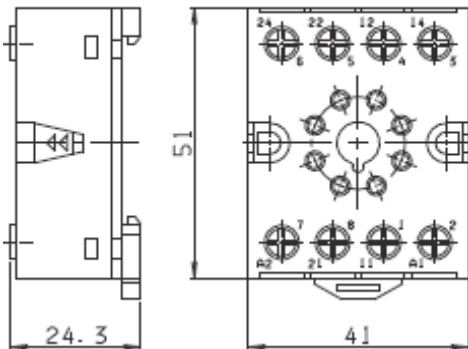


## General rules of installation.

Before to start it is necessary to have the required material for a correct installation. Otherwise a wrong choice of cables or other parts could lead to failures/ misbehaviour/ bad performances of REMS and REMD electronic cards.

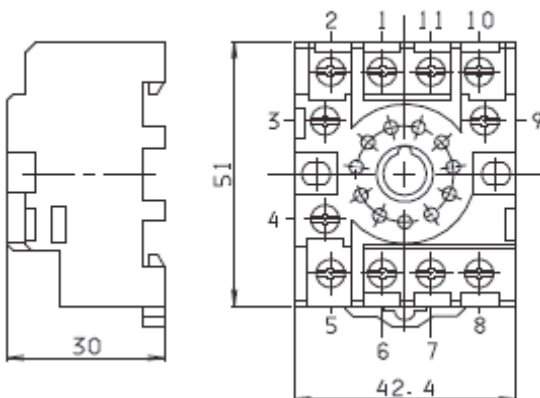
Use a OCTAL connector plug for the wiring connections of REMS.

### Octal standard base



Use a UNDECAL connector plug for the wiring connections of REMD

### Undecal standard base



## Fuse

The supply circuit of the REM must be protected with external rapid fuse 2A.

## Cables and connections.

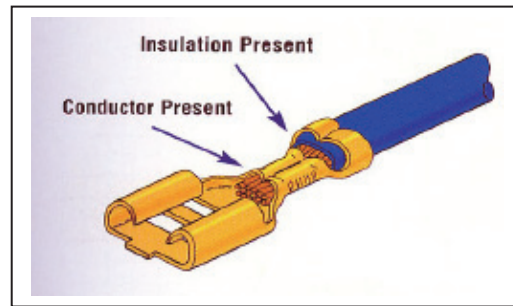
For the signal circuits, use cables of 0.5 mm<sup>2</sup> section.

- REM cards and valves with 24V coils and maximum absorption 1.25Ampere  
For the coils, use cables of 1.0 mm<sup>2</sup> section or upper.  
For the general supply of the REM, use cables of 1.0 mm<sup>2</sup> section or upper.

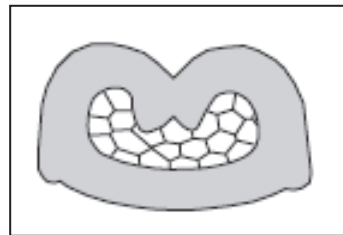
- REM cards and valves with 12V coils and maximum absorption 2.50Ampere  
For the coils, use cables of 1.5 mm<sup>2</sup> section or upper.  
For the general supply of the REM, use cables of 2.0 mm<sup>2</sup> section or upper.

**Cables with crimp spade terminal: make sure the correct procedures of crimping.**

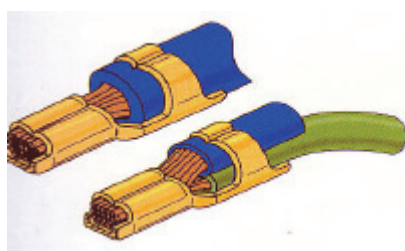
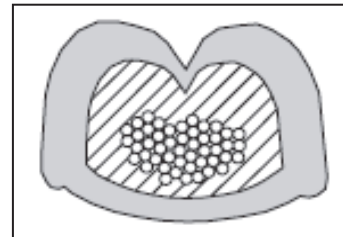
Clamp the cable in contact in the correct Manner using pincers.



Correct clamping of the lead wire



Correct clamping of the lead wire sheath



**Cables with terminals cylindrical collar isolated: verify the correct procedures of crimping.**



Strip the wire.

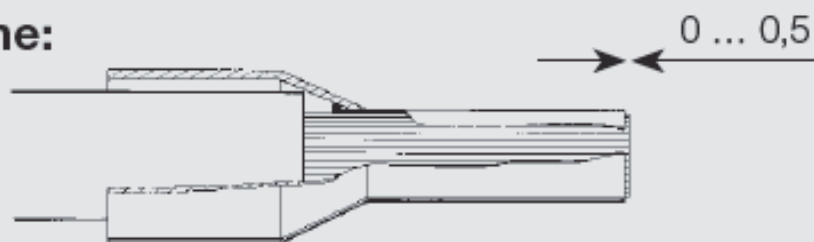
Uses the terminal diameter right, respect to the section of the cable conductor.

Plug the thread inside the cylindrical terminal.

The insulation of the conductor must be inserted in the collar.

The tube must be filled by thread.

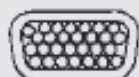
**Vista in sezione:**



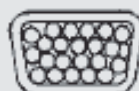
**Vista anteriore:**



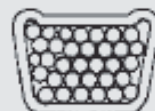
0,5 mm<sup>2</sup>



0,75 mm<sup>2</sup>



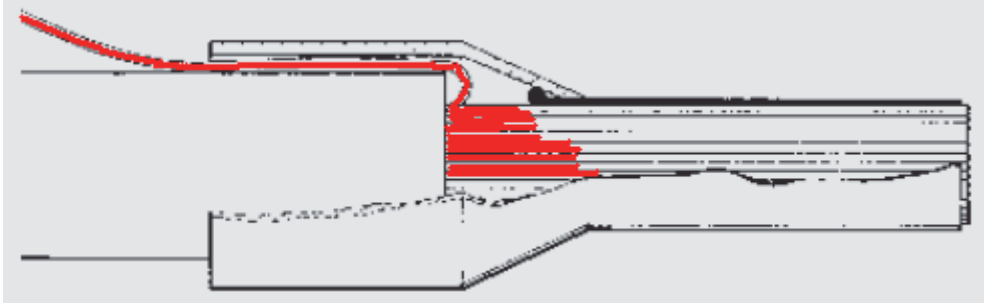
1,0 mm<sup>2</sup>



1,5 mm<sup>2</sup>



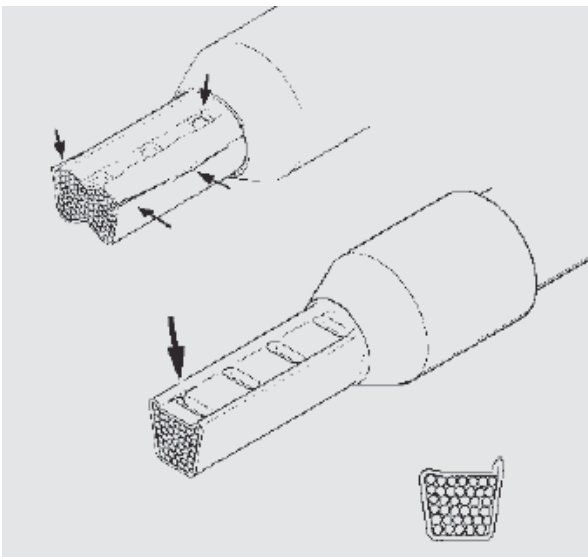
Caution: ensure that individual strands of the cable conductor must not escape from the collar.



check the proper crimping of the cylindrical terminal.

**Possible errors during crimping:**

- breaking along the lateral edge and at the points of compression
- breakage of the terminal
- asymmetric form of crimping
- relevant smudges of the sides
- the tube is not filled by the conductor
- the individual strands emerge from the isolated collar
- the individual strands are crushed
- the isolated collar is damaged
- the insulation of the conductor does not enter to the plastic collar
- the terminal after crimping is folded along the length



Cuts on the sides  
Explosion on the side edges

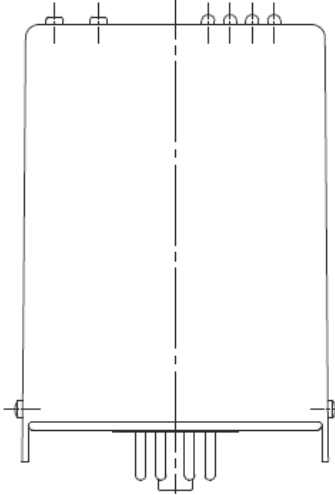
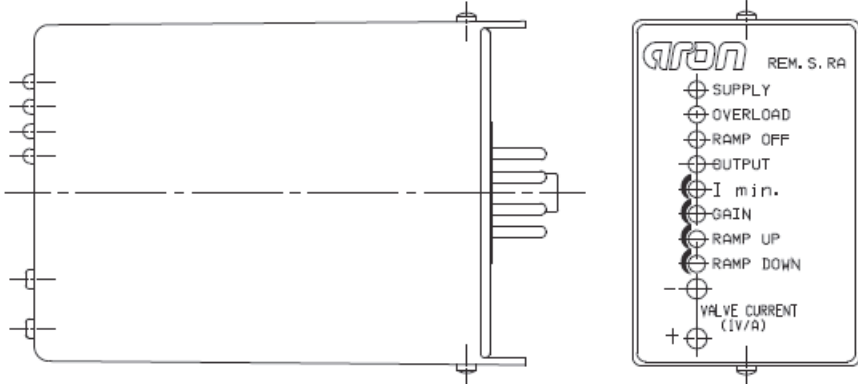
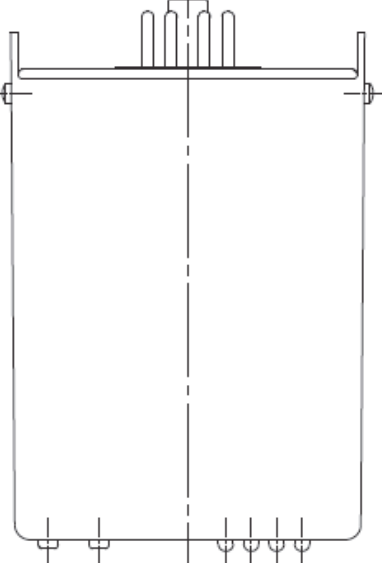
Cuts on the points of  
compression

Asymmetrical crimping  
deburring unilateral

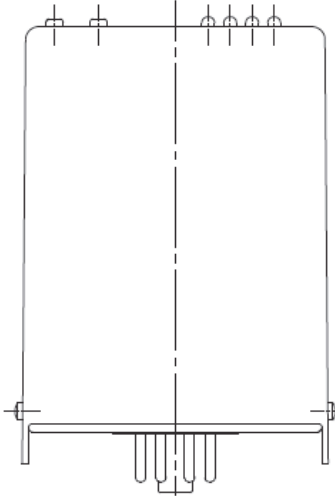
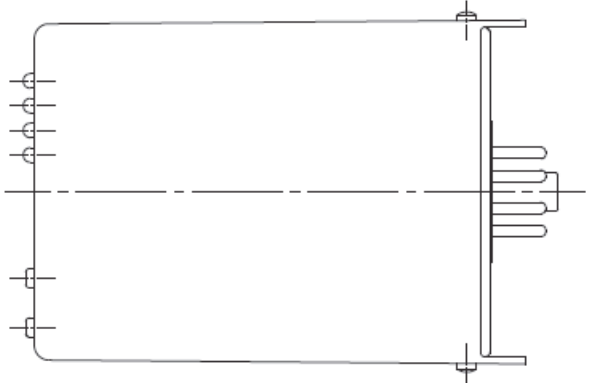
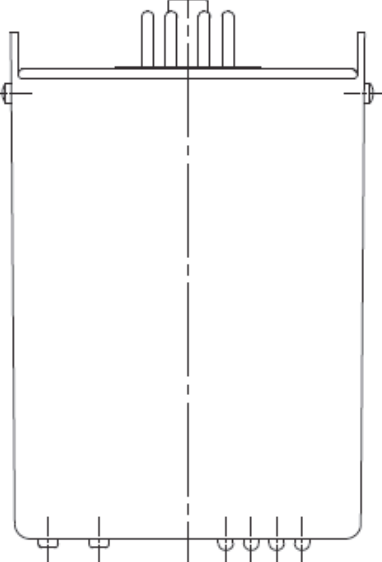


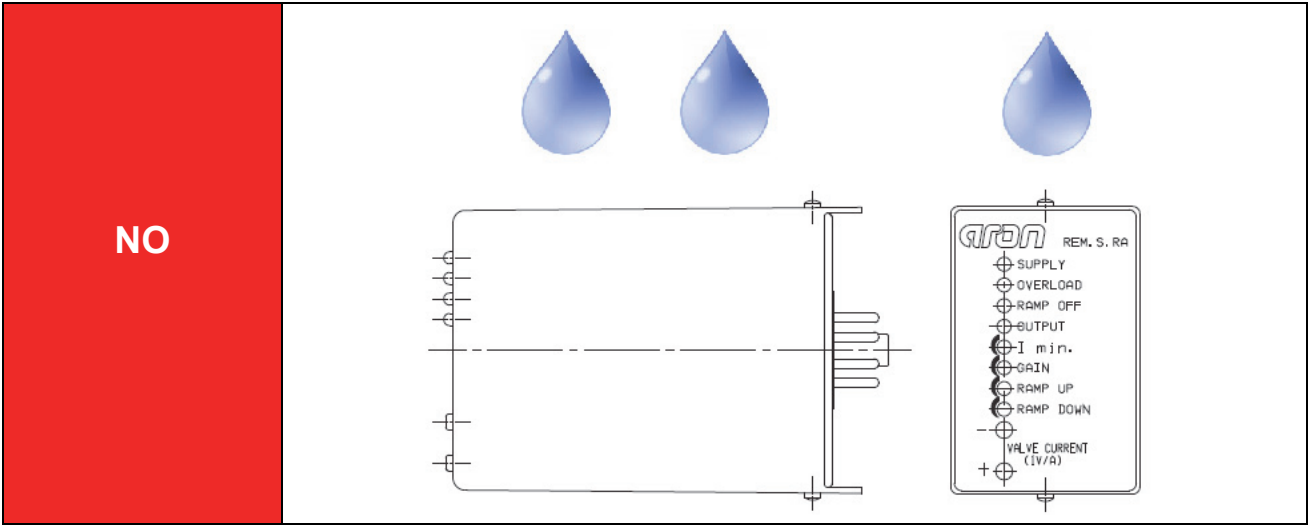
# Orientation of installation

Electrical substations or switchboards, without mechanical vibration

<p>OK</p>	
<p>OK</p>	 <p>REM. S. RA</p> <ul style="list-style-type: none"><li>⊕ SUPPLY</li><li>⊕ OVERLOAD</li><li>⊕ RAMP OFF</li><li>⊕ OUTPUT</li><li>⊕ I min.</li><li>⊕ GAIN</li><li>⊕ RAMP UP</li><li>⊕ RAMP DOWN</li><li>- ⊕ VALVE CURRENT (I/V/A)</li><li>+ ⊕</li></ul>
<p>NO</p>	

Electrical substations or switchboards of self-propelled machinery, with low mechanical vibrations.

<p><b>OK</b></p>	<div style="text-align: center;">  </div> <p style="text-align: center;">The REM has to be secured with straps / belts / elastic bands</p>
<p><b>NO</b></p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>REM. S. RA</b></p> <ul style="list-style-type: none"> <li>⊕ SUPPLY</li> <li>⊕ OVERLOAD</li> <li>⊕ RAMP OFF</li> <li>⊕ OUTPUT</li> <li>⊕ I min.</li> <li>⊕ GAIN</li> <li>⊕ RAMP UP</li> <li>⊕ RAMP DOWN</li> <li>- ⊕ VALVE CURRENT (I<sub>V/A</sub>)</li> <li>+ ⊕</li> </ul> </div> </div>
<p><b>NO</b></p>	<div style="text-align: center;">  </div>



IP40

## REMS technical data

### REMS

Nominal supply voltage	12V – 24V
Minimum supply voltage	10V
Maximum supply voltage	36V
Max power consumption	40W
Maximum current output	0 – 0.88 Amp with X setup code 0 – 1.76 Amp with Y setup code 0 – 2.80 Amp with Z setup code
Command input signals	0 – 2V with setup code 2 0 – 5V with setup code 5 0 – 10V with setup code 0 0 – 20mA with setup code A
Frequency of PWM output	4000 Hz
Frequency Dither	100Hz with setup code 1 330Hz with setup code 2
Output PWM with current feedback	1
PWM output overload protection	YES
Command input of Disable ramp current (REM contact n°8)	12V or 24V With high signal (12V or 24V) the ramps are disabled
Fixed voltage output +5V	To supply the external command potentiometer. Max. load 10mA.
Fixed voltage output +5V protected against overload or short circuitis	NO
Working ambient temperature	-20 ÷ +70°C

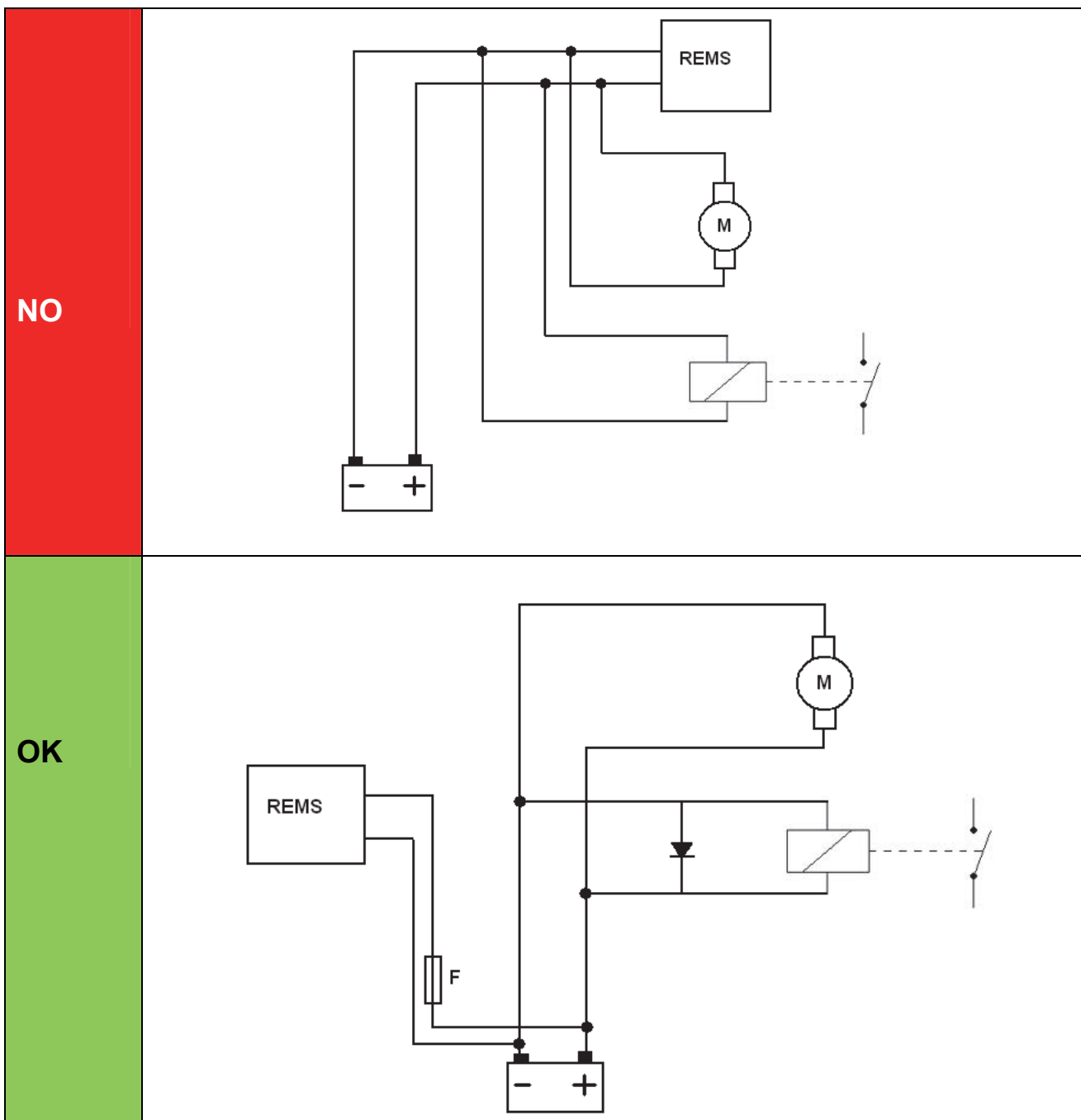
REM S	
<b>Pin 4</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply
<b>Pin 3</b>	Never connect to the positive of the power supply
<b>Pin 5</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply
<b>Pin 6</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply

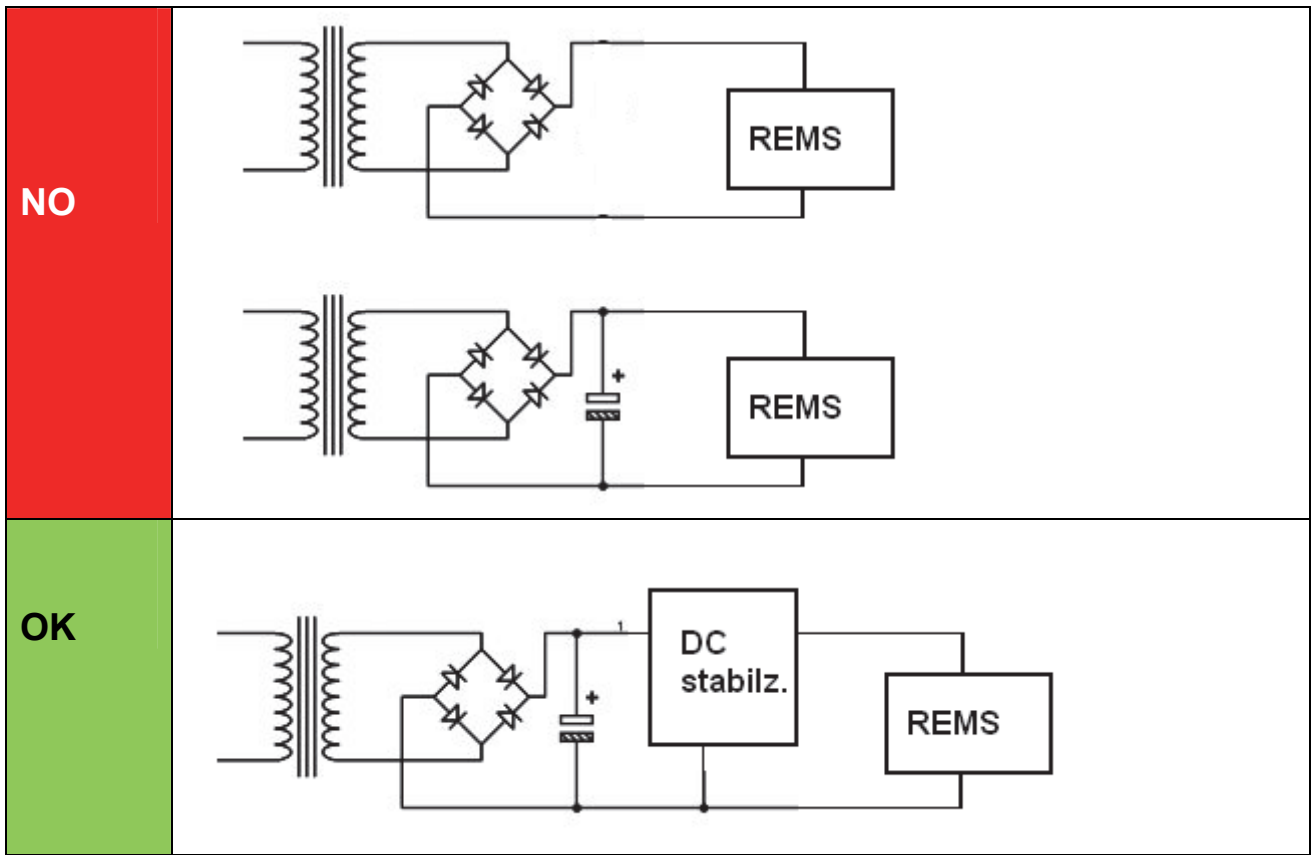
The positive supply (pin 7) of the REMS and the negative supply of the REMS (pin 2) has to be connected directly to the battery supply or supply power voltage and protects with 2Amp fuse.

The supply line of the REMS has not be shared with other electrical equipments like electrical motors, rely, coils.

**The reversal or forward currents end reversal peaks voltage generated from the other electrical equipments on the same supply line of the REM, could makes improperly malfunctions of the REM product.**

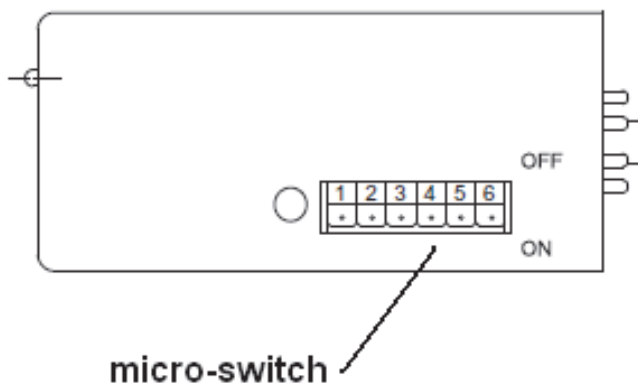
**The supply line of the REMS has to be stabilized.**





**Setup of input for analog commands and PWM output.**

On the edge of REM card there are 6 micro-switch, the combination of these micro-switch allow to set the maximum current range of the PWM output and allow to set the analog input for the right type of command signal.

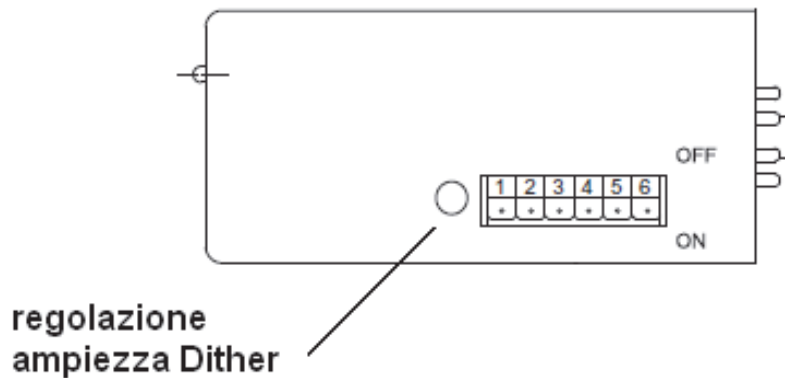


Setup		microswitches position					
		1	2	3	4	5	6
Dither	100 Hz	Off					
	330 Hz	On					
Type of offset/polarization current	C		Off				
	G		On				
Input signal range	0 – 2V			Off	On		
	0 – 5V			On	Off		
	0 – 10V			Off	Off		
	0 – 20mA Note1			*On	*Off		
Output current range	0 – 0.88A					Off	On
	0 – 1.76A					On	Off
	0 – 2.80A					Off	Off

**Note1 :**

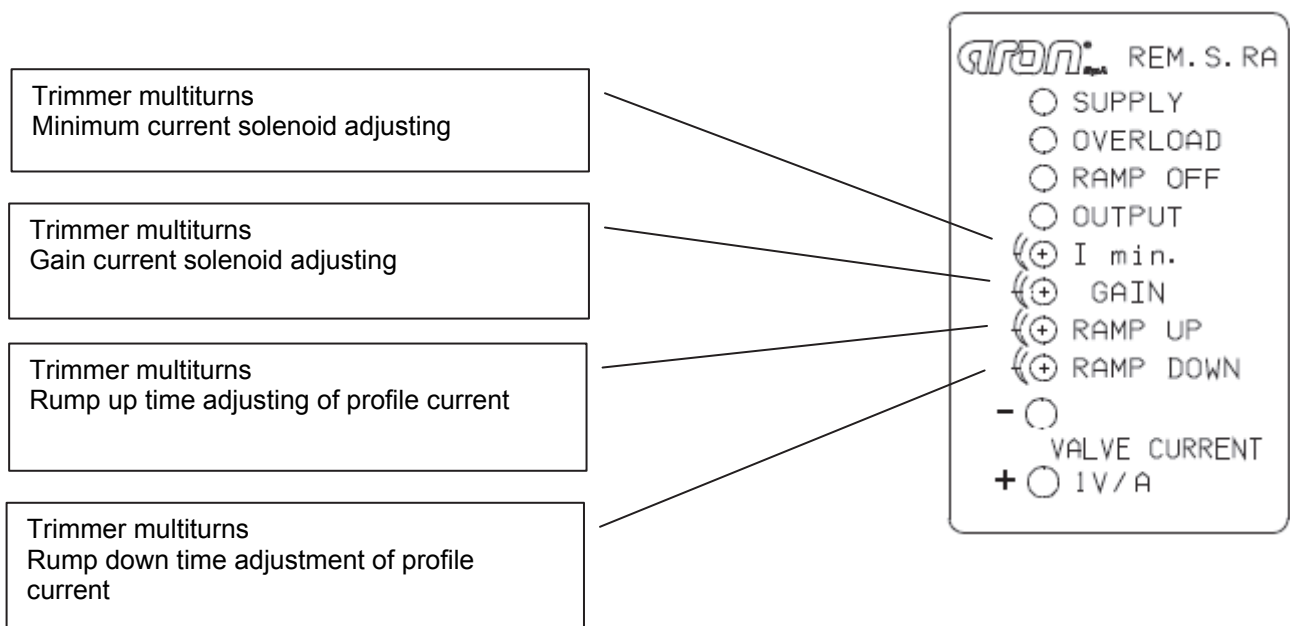
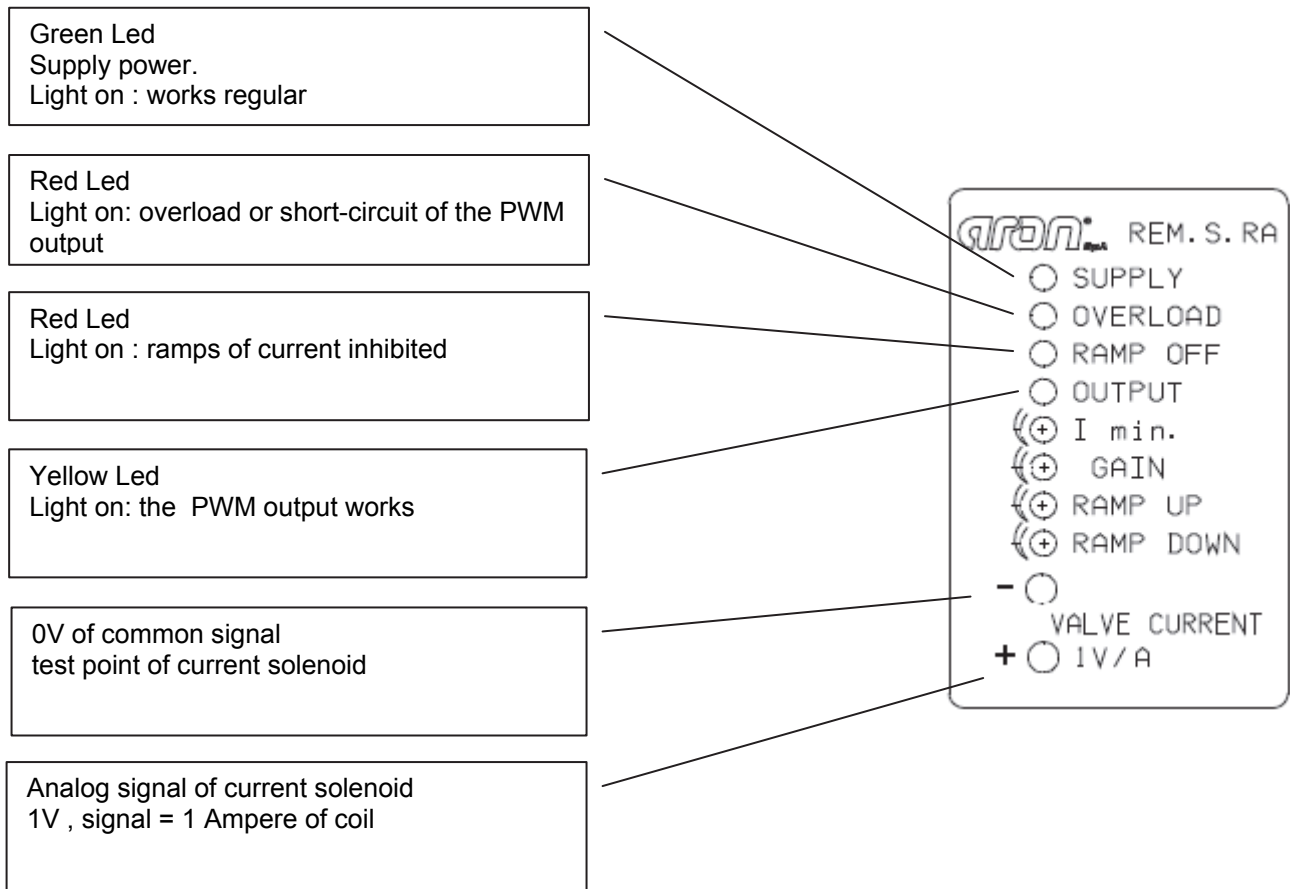
the setting 0..20mA of the analog input of the REM, has to be presetted from the factory.

The amplitude of the Dither signal is set from the factory.



**Dither trimmer position : 50% of the stroke.**

## Front panel





## **REMS – settings and signals.**

### **SUPPLY**

The green LED lights up, when the REM card is correctly powered.

### **OVERLOAD**

The red LED lights up, when the PWM output of the REM card is in short-circuit, or in overload.

Switch-off the REM and checks the wires connection between the Coil and REM and checks the integrity of the coil.

### **RAMP OFF**

The red LED lights up, when the ramps current profile is disabled.

To disabled the ramps function it's necessary to supply (+12V or +24V) the contact n°8 of the REM card.

Caution : the contact n°8 is not protected against overvoltage peaks generated from coils and inductive loads.

### **OUTPUT**

The yellow LED lights up when the PWM output works.

### **MINIMUM CURRENT ADJUSTMENT (I<sub>min</sub> or offset current)**

The trimmer enables the offset current regulation of the valve solenoid.

It is used to eliminate the mechanical overlapping of the valve and increases the sensitivity of the flow regulation.

Turns clockwise the trimmer to increase the Offset current.

The range of the span is from 0 to 50% of the maximum current value set by the microswitches.

### **GAIN CURRENT ADJUSTMENT (Gain)**

The trimmer enables the adjustment of the ratio between the set reference signal and the value of the current valve.

Turns clockwise the trimmer to increase the Gain current.

The range of the span is from 50 to 100% of the maximum current value set by the microswitches

## RAMP CURRENT ADJUSTMENT

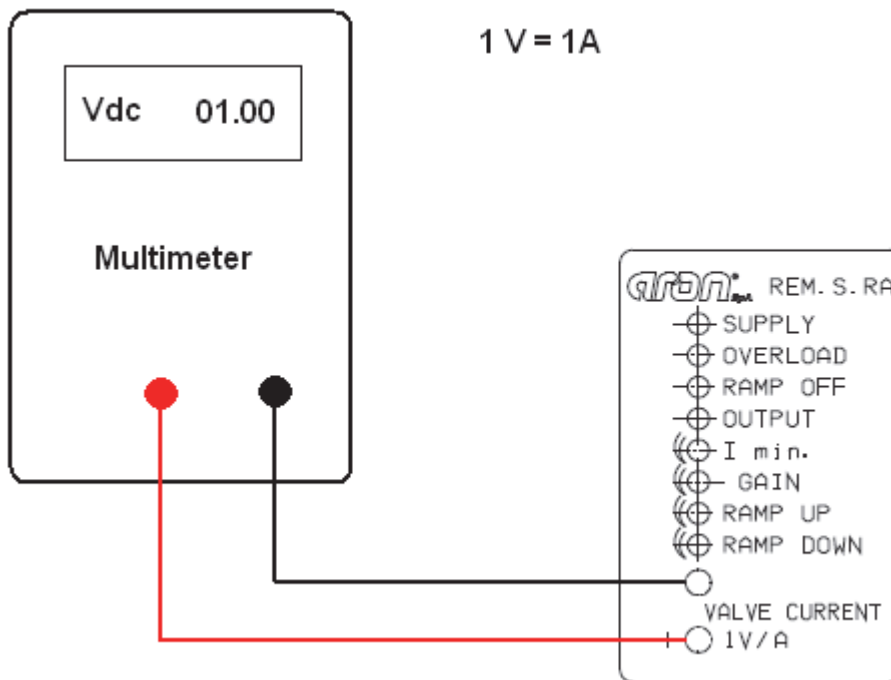
The trimmers enable to adjust in a range from 0.2s to 20s the time taken to achieve the current for a step change of the reference signal up or down. Turns clockwise the trimmers to increase the time.

## CURRENT MEASUREMENT POINTS "Valve Current".

On a front side of the REM card there are two test points to reading the current supplied to the valve.

The signal output from the test points is in voltage.

1V = 1A



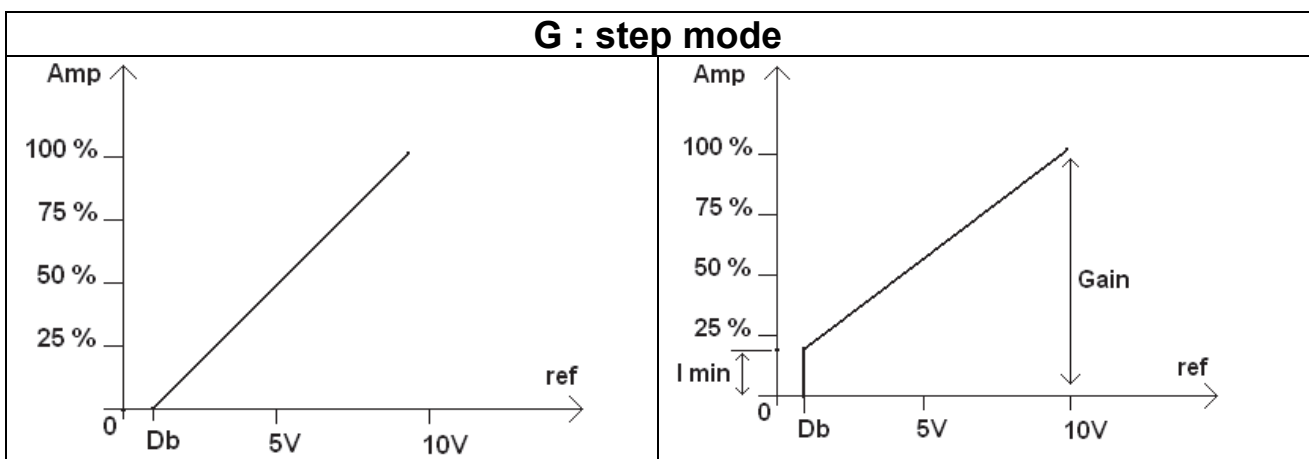
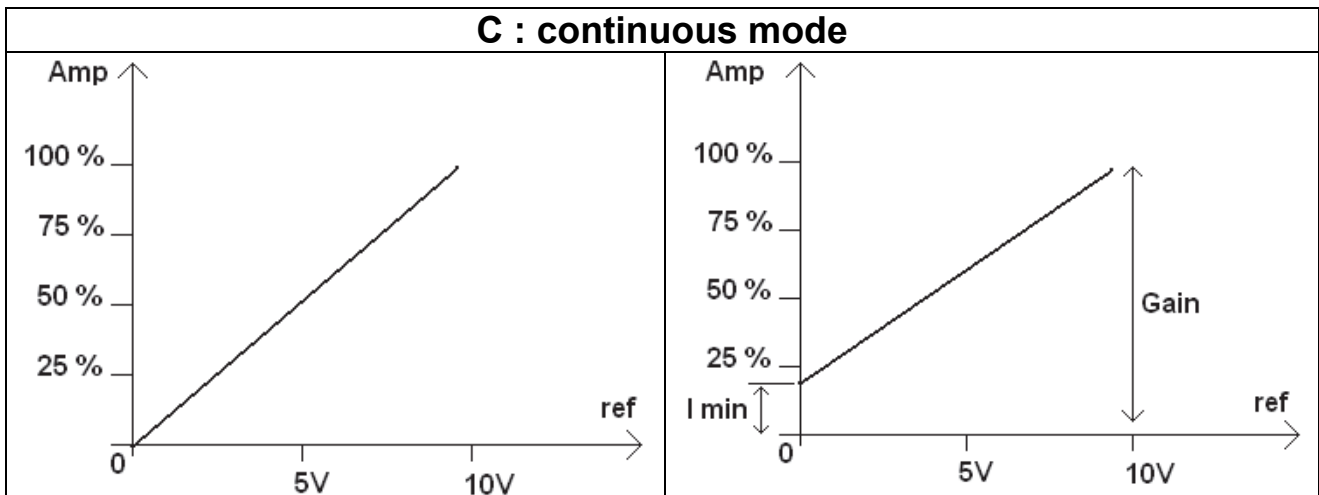
## TYPE of POLARIZATION CURRENT

C : continuous mode.

The current solenoid of the valve, supplied from the REM card can be higher than 0 Ampere even if the signal reference is 0V.

G : step mode.

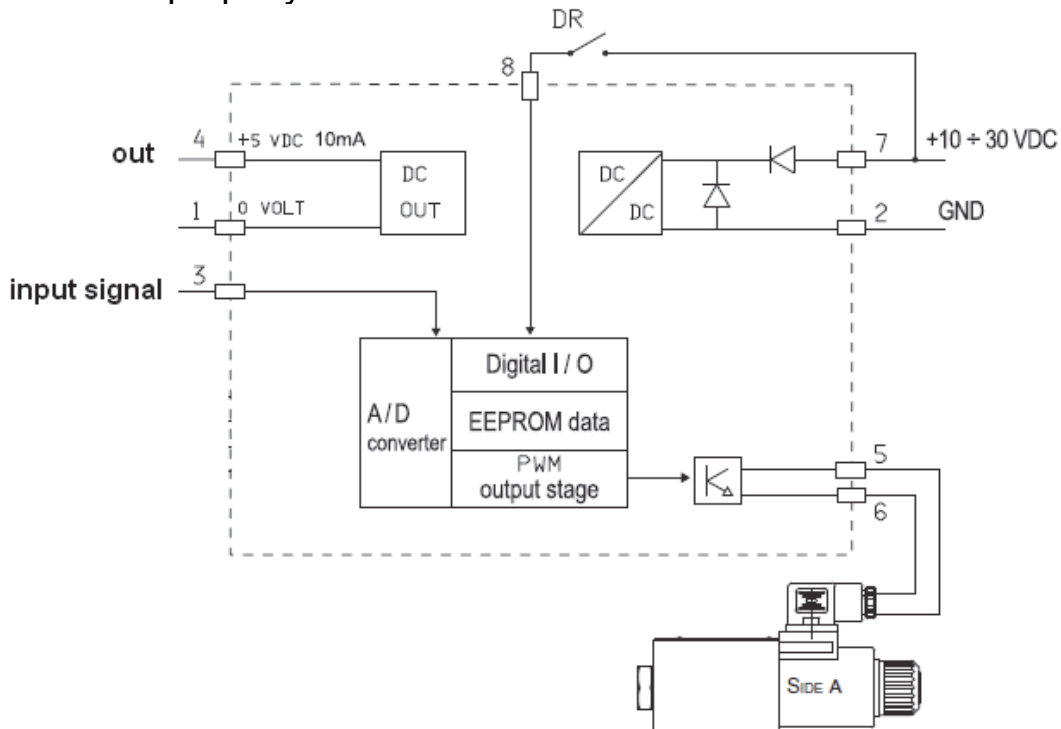
The solenoid's current of the valve, supplied from the REM card is 0.0 Ampere when the signal reference is 0V. The REM supplies the current to the solenoid only when the signal reference is over the Dead zone (Db) near the 0V.



**Db : Dead zone or Dead band**

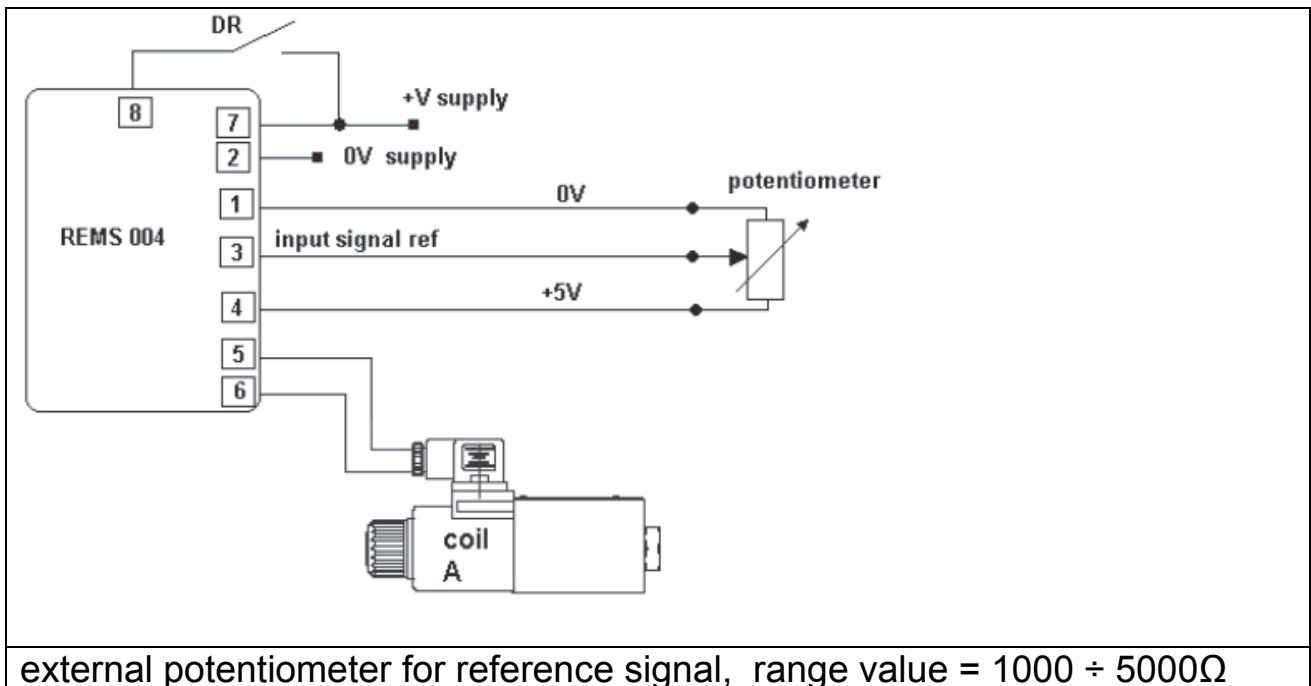
## REMS, setting procedures.

Connects properly the REM card .

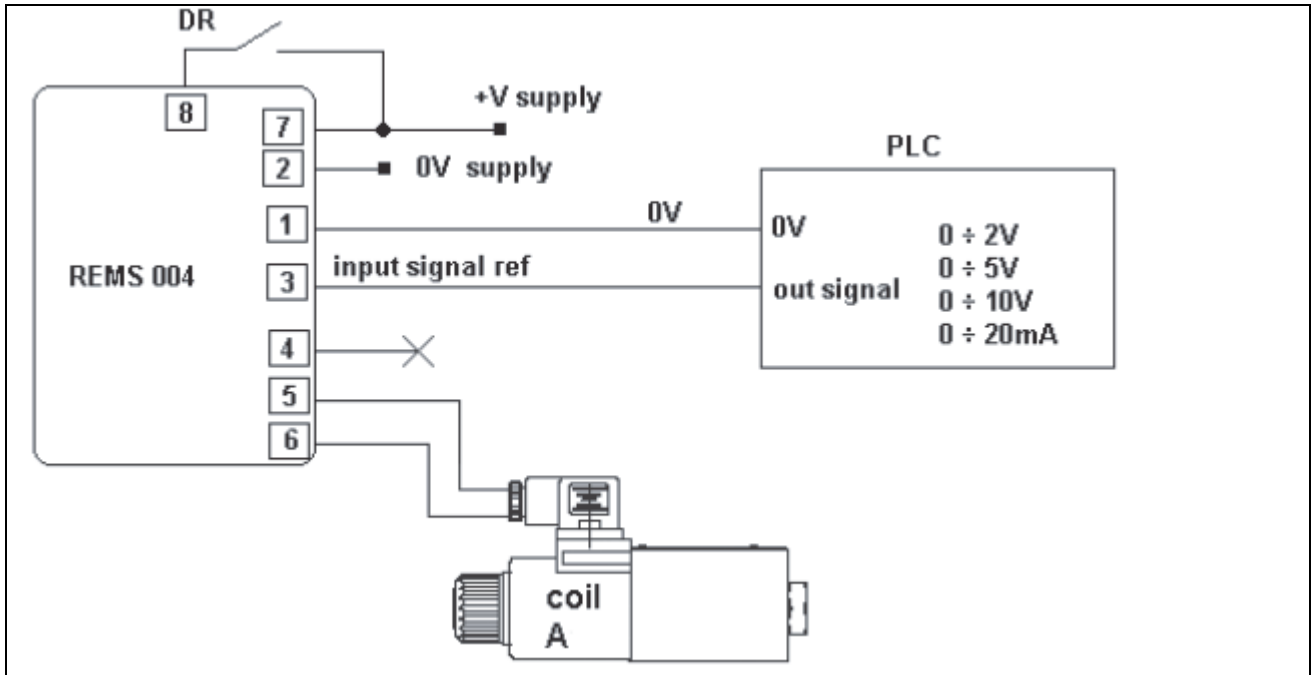


DR = inhibit of ramp functions

Supply the contact n° 8 of the REMS to the 12V or 24V, to inhibit the ramp current functions.



external potentiometer for reference signal, range value = 1000 ÷ 5000Ω



Before powering the REMS card, ensure that any unforeseen movements of the hydraulic system, cannot cause material damage or injury to people.

The REMS card must be connected to the valve for a right setting.

Checks the right voltage supply of the REMS card.

Type of the valve	Type of coil	Coil resistance	REMS voltage supply
XD3, XDP3, XQ3, XQP3,CX3, CXQ3, CXDH3	0.88 Ampere G	16.0 $\Omega$	24Vdc
	1.76 Ampere F	4.0 $\Omega$	12Vdc
	2.35 Ampere	2.25 $\Omega$	12Vdc
XP3	0.68Ampere-24V	24.6 $\Omega$	24Vdc
	1.25Ampere-12V	7.2 $\Omega$	12Vdc
XDP5, XQP5	1.25 Ampere G	11.4 $\Omega$	24Vdc
	2.50 Ampere F	2.85 $\Omega$	12Vdc

## SETTING of MIMINUM CURRENT (Imin)

Power on the REMS.

Turn anticlockwise 10 turns the trimmer "Imin".

The minimum current enable to eliminate the mechanical overlapping of the valve and increases the sensitivity of the flow regulation.

Set the reference command signal at min. value of PWM output activation :

REMS, input signal setting	min. value of PWM output activation
0 – 2V	0.1V
0 – 5V	0.1V
0 – 10V	0.2V
0 – 20mA	0.5mA

With the signal command reference, set at the min value as a table:

Turn slowly the minimum current trimming potentiometer clockwise (Imin)

until an actuator movement can be visually detected. Turn slowly

anticlockwise the potentiometer: the minimum current setting will be adjusted correctly when the actuator movement stops.

## SETTING of GAIN CURRENT (Gain)

Set the reference command signal to its maximum setting and rotate slowly the GAIN trimming potentiometer (GAIN) until the maximum required speed is obtained.

## SETTING of RAMP TIME "RampUp" "RampDown"

The ramp time is the time taken to pass from the minimum to the maximum current value, and vice versa. It's adjustable from a minimum of 0.2s up to a maximum of 20s (to reach the maximum current value setted).

### **Caution :**

The ramp fall time "Ramp Down", affects the stop of the actuator movements. even if the signal reference fall down to zero Volt, the actuator goes on moving until the set ramp time is elapsed. Therefore it's necessary to adjust it properly.

## REMD - technical data

### REMD

Nominal supply voltage	12V – 24V
Minimum supply voltage	10V
Maximum supply voltage	36V
Max power consumption	40W
Maximum current output	0 – 0.88 Amp with X setup code 0 – 1.76 Amp with Y setup code 0 – 2.80 Amp with Z setup code
Command input signals (differential)	-2 – 2V with setup code 2 -5 – 5V with setup code 5 -10 – 10V with setup code 0 -20 – 20mA with setup code A
Command input signals (only positive)	0 – 5V 0 -20mA with setup code A
Frequency of PWM output	4000 Hz
Frequency Dither	100Hz with setup code 1 330Hz with setup code 2
Output PWM with current feedback	1
PWM output overload protection	YES
Command input of Disable ramp current (REM contact n°8)	12V or 24V With high signal (12V or 24V) the ramps are disabled
Fixed voltage output +5V	To supply the external command potentiometer. Max. load 10mA.
Fixed voltage output +5V protected against overload or short circuitis	NO
Working ambient temperature	-20 ÷ +70°C

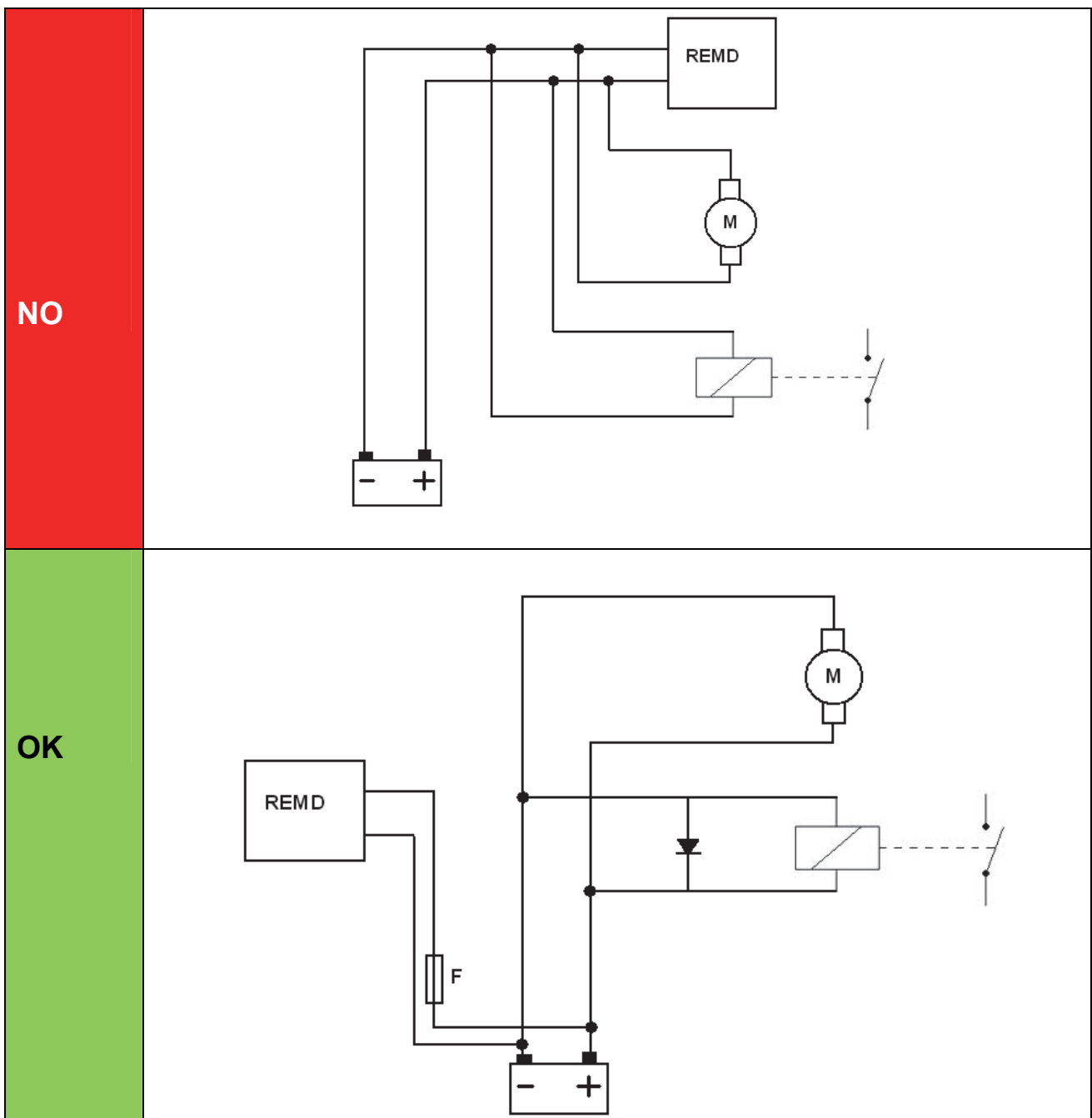
<b>REM D</b>	
<b>Pin 10</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply
<b>Pin 9</b>	Never connect to the positive of the power supply
<b>Pin 5</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply
<b>Pin 6</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply
<b>Pin 7</b>	Never connect to the positive of the power supply Never connect to the negative of the power supply

The positive supply (pin 11) of the REMD and the negative supply of the REMD (pin 1) has to be connected directly to the battery supply or supply power voltage and protects with 2Amp fuse.

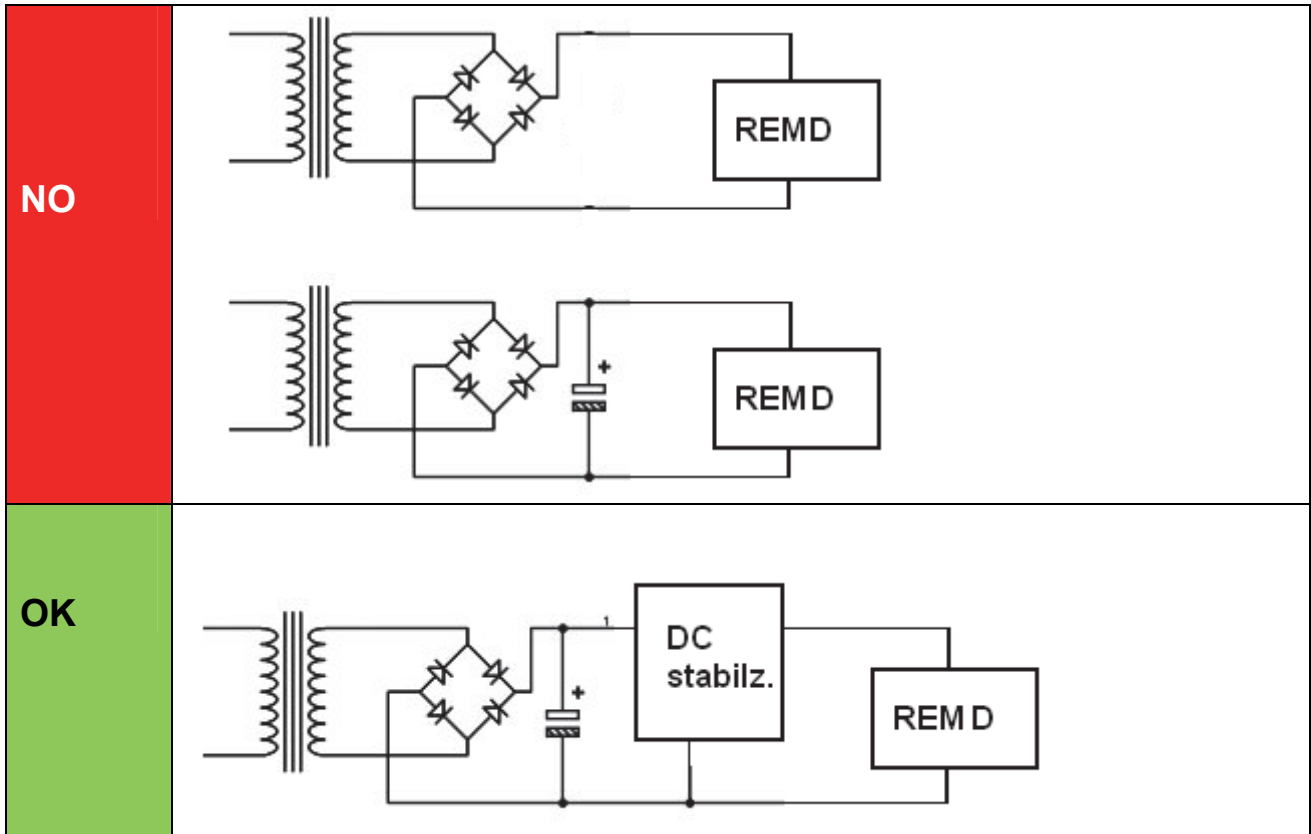
The supply line of the REMD has not be shared with other electrical equipments like electrical motors, rely, coils.

**The reversal or forward currents end reversal peaks voltage generated from the other electrical equipments on the same supply line of the REM, could makes improperly malfunctions of the REM product.**

**The supply line of the REMD has to be stabilized.**

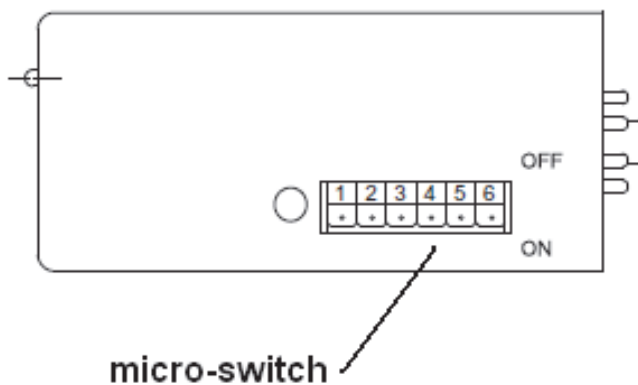






**Setup of input for analog commands and PWM output.**

On the edge of REM card there are 6 micro-switch, the combination of these micro-switch allow to set the maximum current range of the PWM output and allow to set the analog input for the right type of command signal.



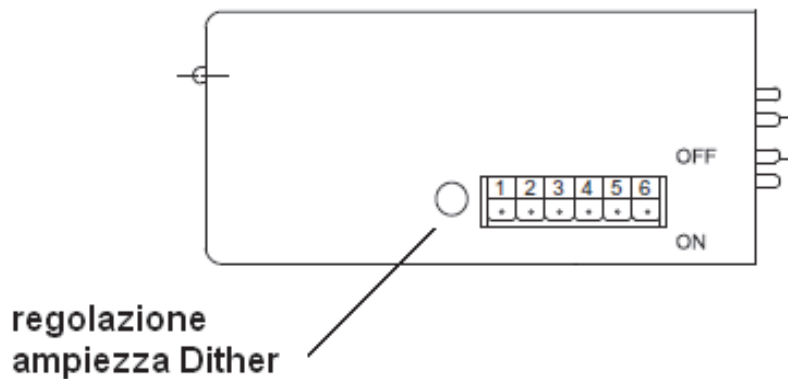
Setup		microswitches position					
		1	2	3	4	5	6
Dither	100 Hz	Off					
	330 Hz	On					
Type of offset/polarization current	C		Off				
	G		On				
Input signal range (differential)	-2 – 2V			Off	On		
	-5 – 5V			On	Off		
	-10 – 10V			Off	Off		
	-20 – 20mA Nota1			*On	*Off		
Input signal range (only positive)	0 – 5V			**On	**Off		
	0 – 20mA Note 2			**On	**Off		
Output current range	0 – 0.88A					Off	On
	0 – 1.76A					On	Off
	0 – 2.80A					Off	Off

**Note1 :**

**note2 :**

the setting 0..20mA and -20..20mA of the analog input of the REM, has to be presetted from the factory.

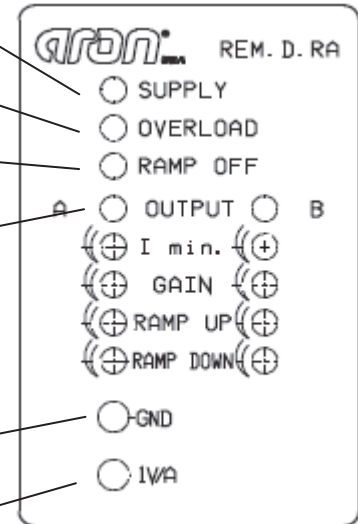
The amplitude of the Dither signal is set from the factory.



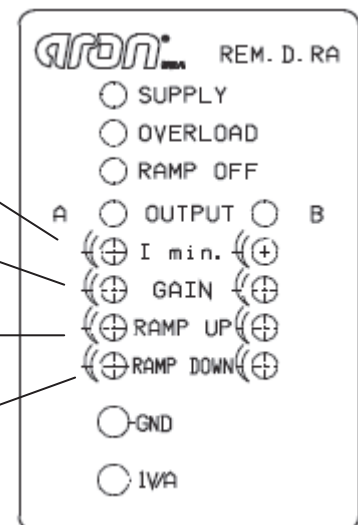
**Dither trimmer position : 50% of the stroke.**

## Front panel

- Green LED  
Supply power.  
Light on : works regular
- Red LED  
Light on: overload or short-circuit of the PWM output
- Red LED  
Light on : ramps of current inhibited
- Yellow LED solenoid A  
Yellow LED solenoid B  
Light on: the correspondent PWM output works
- 0V of common signal  
test point of current solenoid
- Analog signal of current solenoid  
1V , signal = 1 Ampere of coil



- Multiturns Trimmer solenoid A  
Multiturns Trimmer solenoid B  
Minimum current solenoid adjusting
- Multiturns Trimmer solenoid A  
Multiturns Trimmer solenoid B  
Gain current solenoid adjusting
- Multiturns Trimmer solenoid A  
Multiturns Trimmer solenoid B  
Rump up time adjusting of profile current
- Multiturns Trimmer solenoid A  
Multiturns Trimmer solenoid B  
Rump down time adjusting of profile current



## **REMD – settings and signals.**

### **SUPPLY**

The green LED lights up, when the REM card is correctly powered.

### **OVERLOAD**

The red LED lights up, when the PWM output of the REM card is in short-circuit, or in overload.

Switch-off the REM and checks the wires connection between the Coil and REM and checks the integrity of the coil.

### **RAMP OFF**

The red LED lights up, when the ramps current profile is disabled.

To disabled the ramps function it's necessary to supply (+12V or +24V) the contact n°3 of the REM card.

Caution : the contact n°3 is not protected against overvoltage peaks generated from coils and inductive loads.

### **OUTPUT**

The yellow LED lights up when the PWM output of solenoid A or solenoid B works.

### **MINIMUM CURRENT ADJUSTMENT (I<sub>min</sub> or offset current)**

The trimmers enables the offset current regulation of the valve solenoid.

It is used to eliminate the mechanical overlapping of the valve and increases the sensitivity of the flow regulation.

Turns clockwise the trimmer to increase the Offset current.

The range of the span is from 0 to 50% of the maximum current value set by the microswitches.

### **GAIN CURRENT ADJUSTMENT (Gain)**

The trimmers enables the adjustment of the ratio between the set reference signal and the value of the current valve.

Turns clockwise the trimmer to increase the Gain current.

The range of the span is from 50 to 100% of the maximum current value set by the microswitches

## RAMP CURRENT ADJUSTMENT

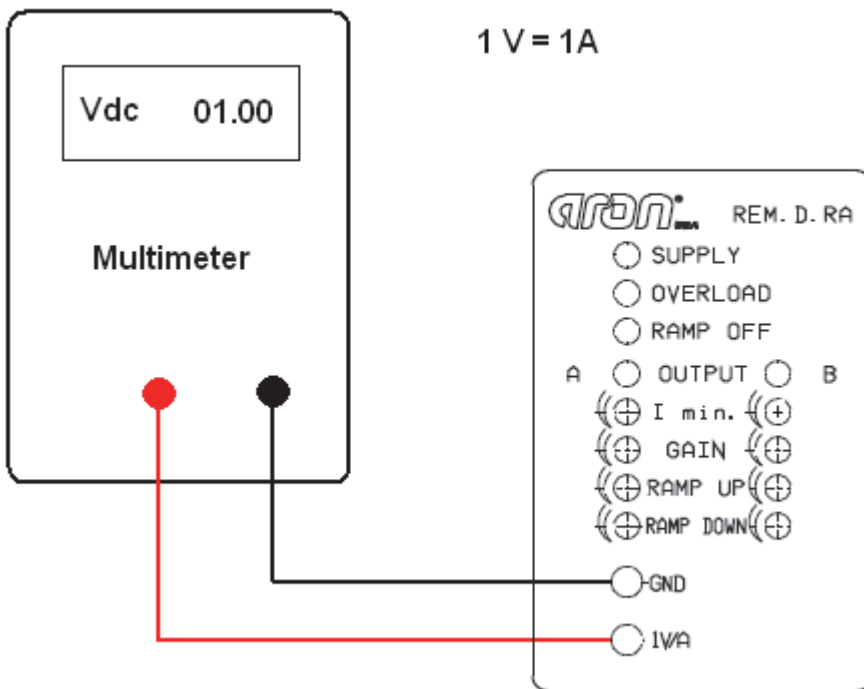
The trimmers enable to adjust in a range from 0.2s to 20s the time taken to achieve the current for a step change of the reference signal up or down. Turns clockwise the trimmers to increase the time.

## CURRENT MEASUREMENT POINTS "Valve Current".

On a front side of the REM card there are two test points to reading the current supplied to the valve.

The signal output from the test points is in voltage.

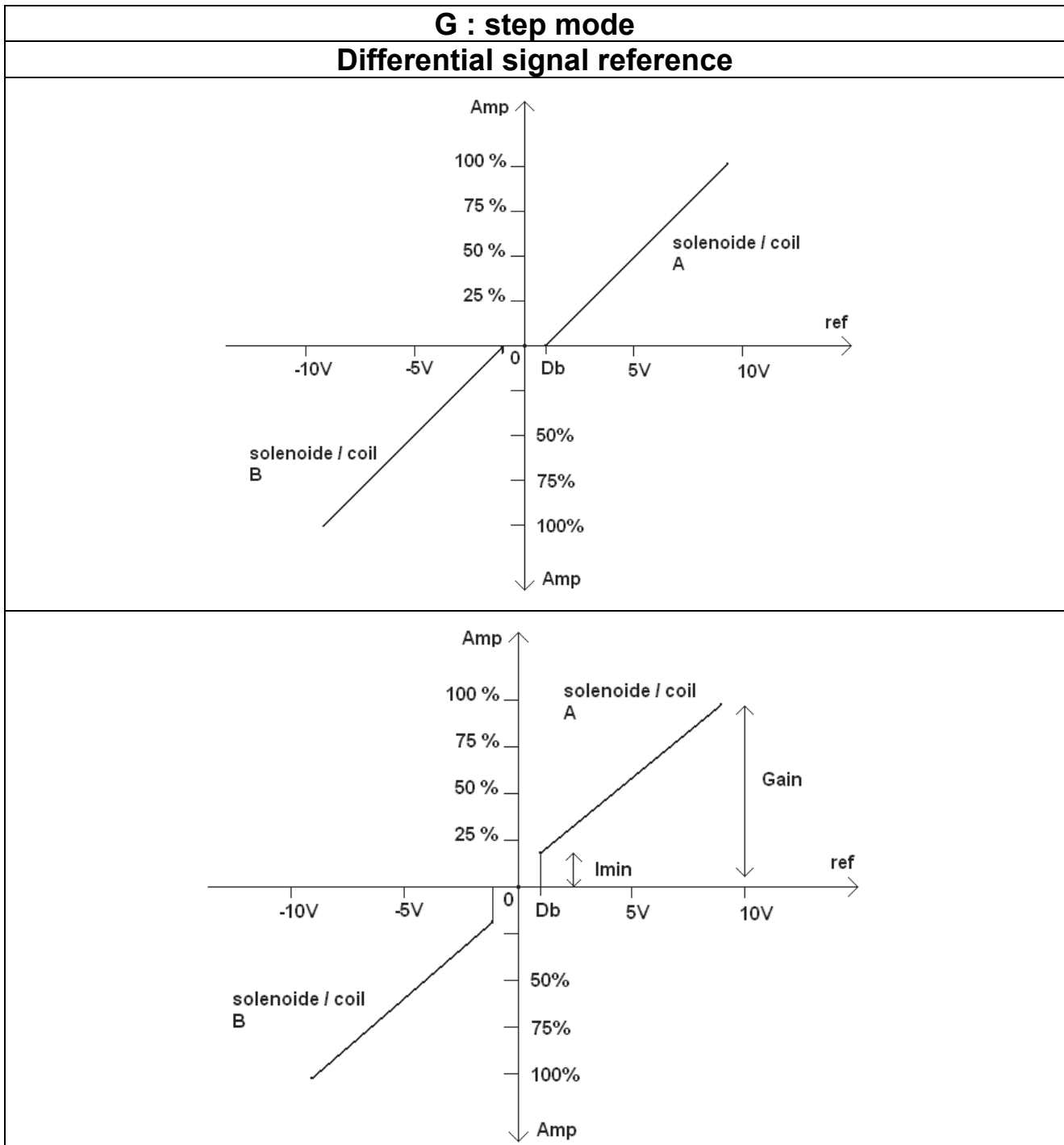
1V = 1A



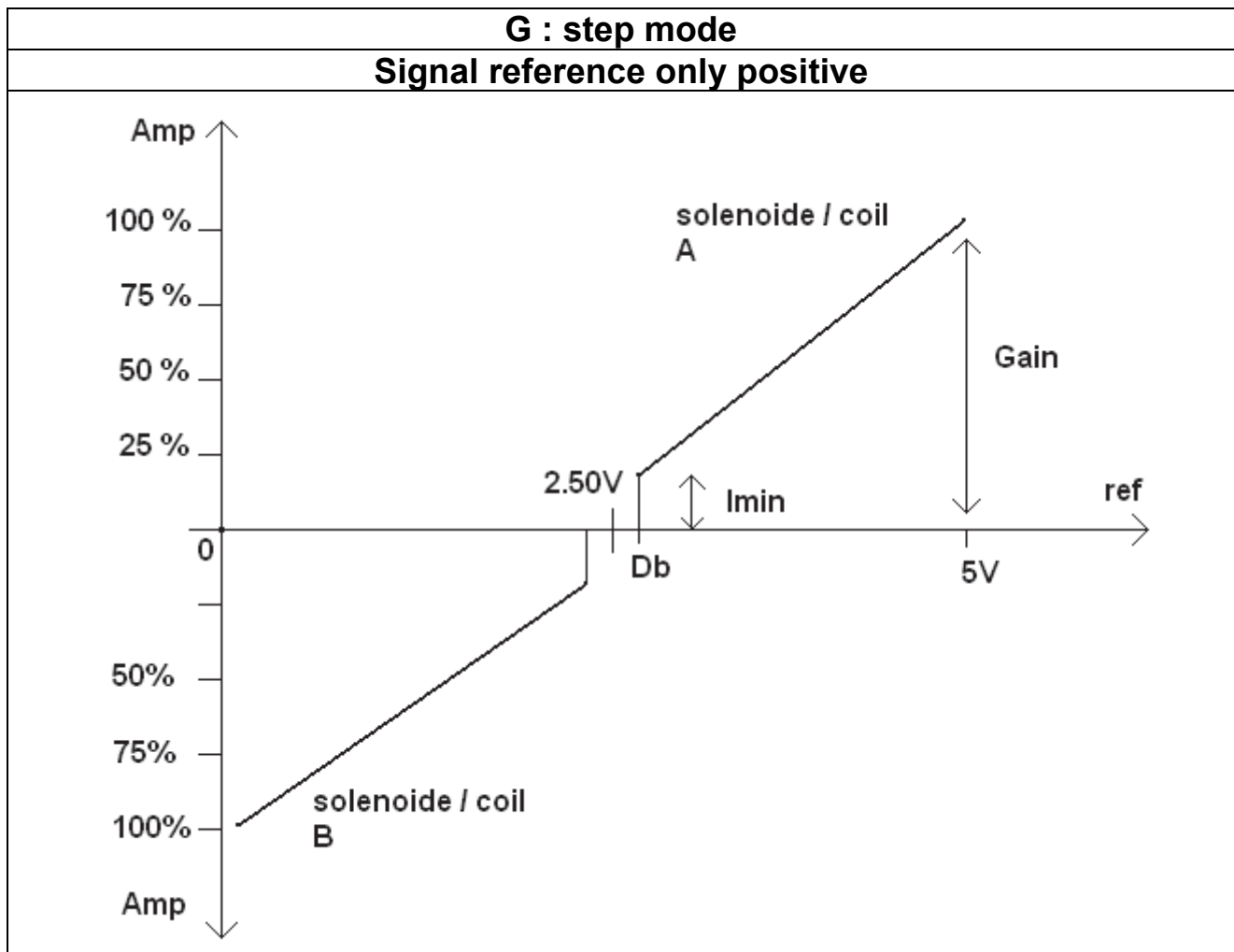
## TYPE of POLARIZATION CURRENT

G : step mode.

The solenoid's current of the valve, supplied from the REM card is 0.0 Ampere when the signal reference is 0V (when the REMD is sets for a differential signal reference) or 2.50V (when the REMD is sets for a only positive signal reference). The REM supplies the current to the solenoid only when the signal reference is over the Dead zone (Db) near the 0V.



**Db : dead zone of signal**



### **Db : dead zone of signal**

The REMD card, can works with differential analog signal reference e.g  $\pm 5V$  and also with the signal reference only positive, 0..5V or 0..20mA.

The position of the microswitches 3 and 4 are the same for each type of signal,  $\pm 5V$ ,  $\pm 20mA$  and 0..5V, 0..20mA.

microswitches 3 in ON position.

microswitches 4 in OFF position.

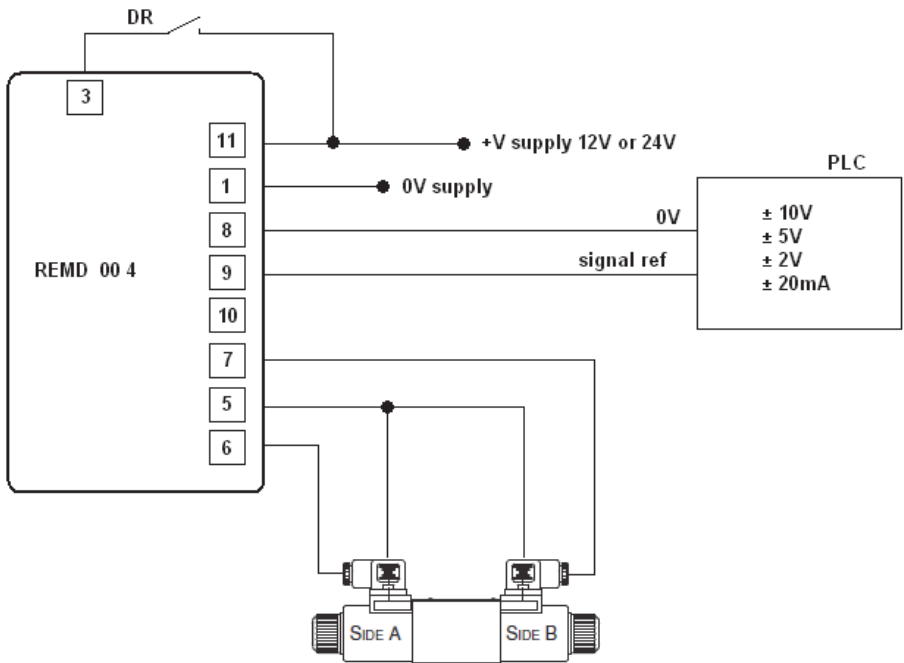
To enable the microprocessor of the REMD card to accept a differential signal reference or a signal reference only positive it's necessary to connects on the right mode the pin n°10 of the REMD.

The pin n°10 it's an +5V fixed output voltage to supply the external reference potentiometer.

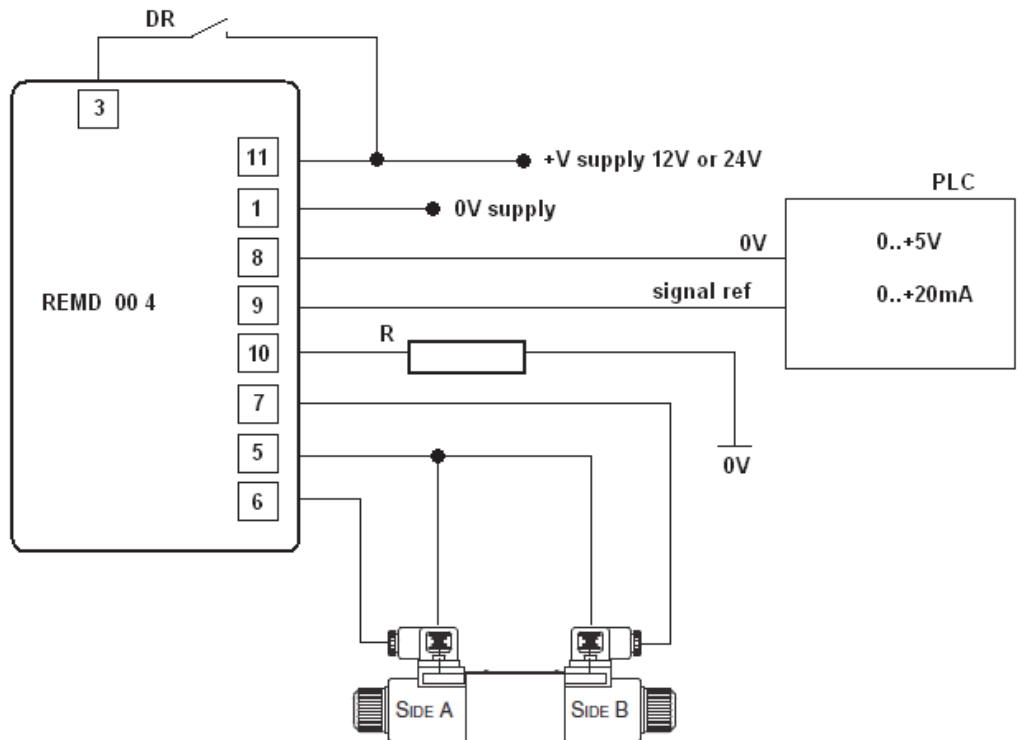
When the pin n°10 is connected to the resistive load, resistor or potentiometer, the microprocessor inside the REMD detects the current absorption through the pin 10 and sets the analog input circuits for a positive signal reference.

Instead the pin 10 is free (not connected), the microprocessor sets the analog input circuits for differential signal reference.

**Typical connection of REMD for differential signal reference :  $\pm 2V$  or  $\pm 5V$ , or  $\pm 10V$**



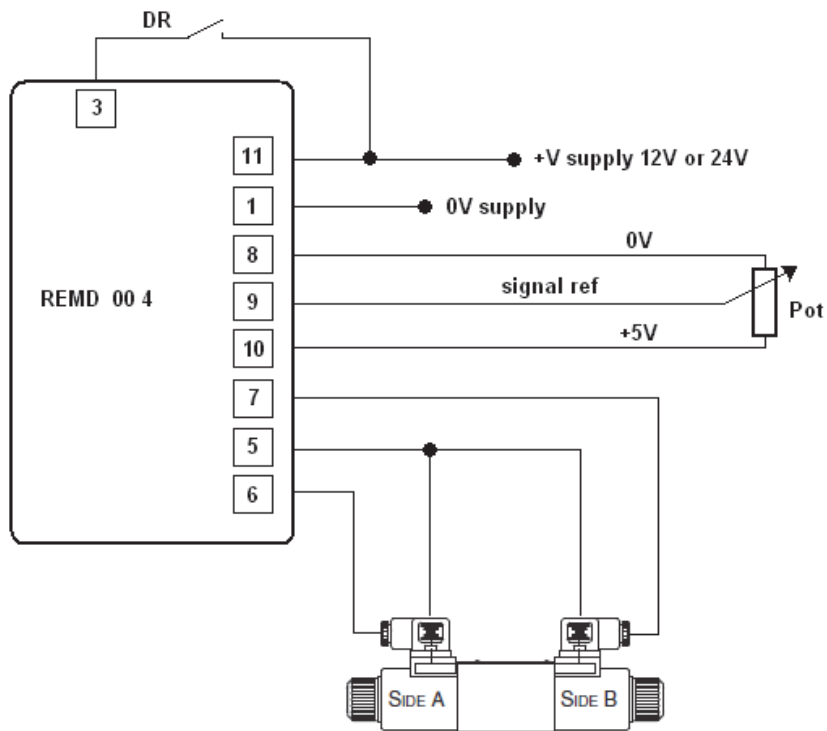
**Typical connection of REMD for positive signal 0..+5V , 0..+20mA**



Value of resistor, R = from 1000Ω to 5000Ω.



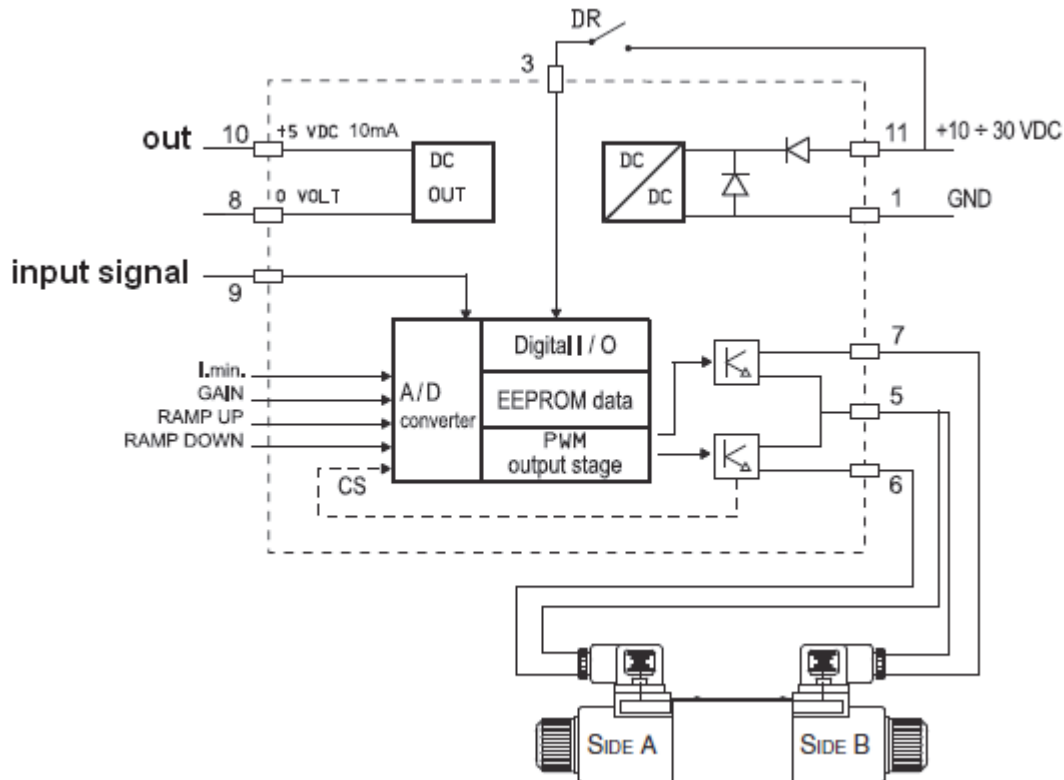
## Connection of REMD for potentiometer signal 0..+5V



Value of potentiometer, Pot = from 1000Ω to 5000Ω.

## REMD, setting procedures.

Connects properly the REM card .



DR = inhibit of ramp functions

Supply the contact n° 3 of the REMD to the 12V or 24V, to inhibit the ramp current functions.

Before powering the REMD card, ensure that any unforeseen movements of the hydraulic system, cannot cause material damage or injury to people.

The REMD card must be connected to the valve for a right setting.

Checks the right voltage supply of the REMD card.

Type of the valve	Type of coil	Coil resistance	REMS voltage supply
XD3, XDP3, CX3, CXDH3	0.88 Ampere G	16.0 $\Omega$	24Vdc
	1.76 Ampere F	4.0 $\Omega$	12Vdc
	2.35 Ampere	2.25 $\Omega$	12Vdc
XDP5	1.25 Ampere G	11.4 $\Omega$	24Vdc
	2.50 Ampere F	2.85 $\Omega$	12Vdc

#### SETTING of MIMINUM CURRENT ( $I_{min}$ )

Power on the REMD.

Turn anticlockwise 10 turns the trimmer “ $I_{min}$ ”, A channel and B channel. The minimum current enable to eliminate the mechanical overlapping of the valve and increases the sensitivity of the flow regulation.

Set the reference command signal at min. value of PWM output activation :

REMD, input signal setting	min. value of PWM output activation
$\pm 2V$	+0.1V to energized solenoid A -0.1V to energized solenoid B
$\pm 5V$	+0.1V to energized solenoid A -0.1V to energized solenoid B
$\pm 10V$	+0.2V to energized solenoid A -0.2V to energized solenoid B
$\pm 20mA$	+0.5mA to energized solenoid A -0.5mA to energized solenoid B
0 – 5V	2.55V to energized solenoid A 2.45V to energized solenoid B
0 – 20mA	10.5mA to energized solenoid A 9.5mA to energized solenoid B

With the signal command reference, set at the min value as a table:  
Turn slowly the minimum current trimming potentiometer clockwise ( $I_{min}$ ) until an actuator movement can be visually detected. Turn slowly anticlockwise the potentiometer: the minimum current setting will be adjusted correctly when the actuator movement stops.

#### SETTING of GAIN CURRENT (Gain)

Set the reference command signal to its maximum setting and rotate slowly the GAIN trimming potentiometer (GAIN) until the maximum required speed is obtained.

Repeat it for both channels.

#### SETTING of RAMP TIME “RampUp” “RampDown”

The ramp time is the time taken to pass from the minimum to the maximum current value, and vice versa. It's adjustable from a minimum of 0.2s up to a maximum of 20s (to reach the maximum current value set).

#### **Caution :**

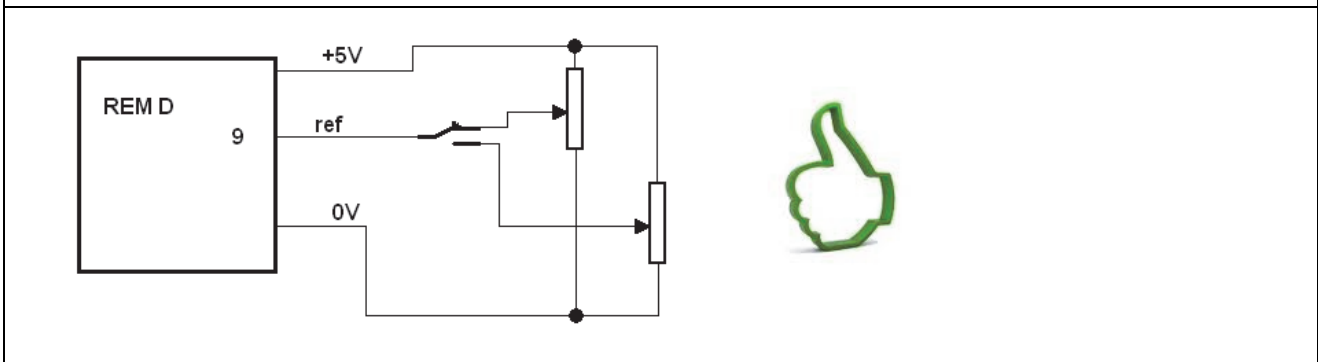
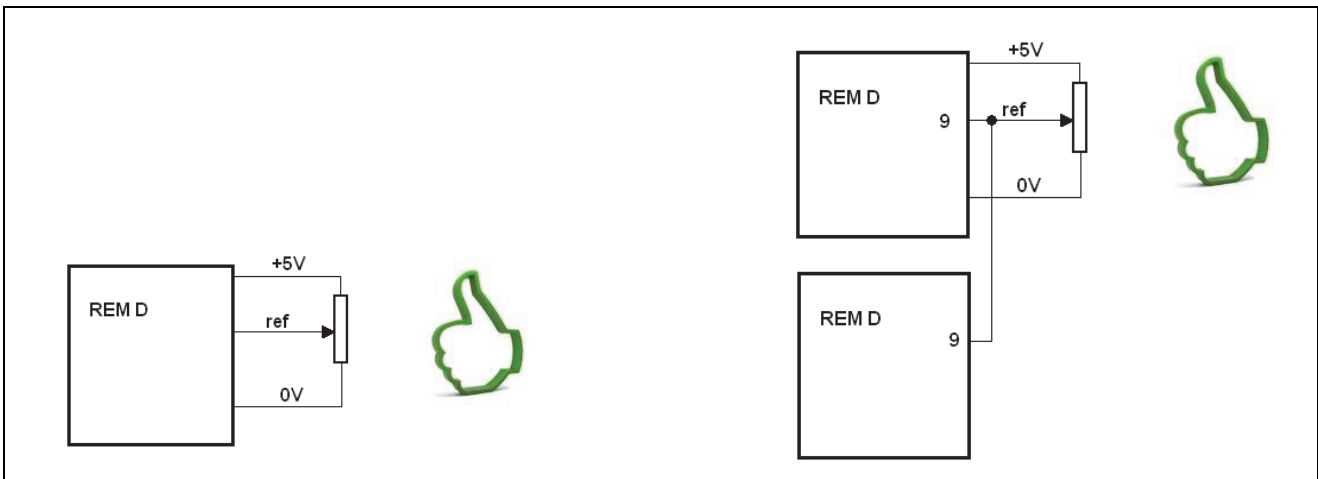
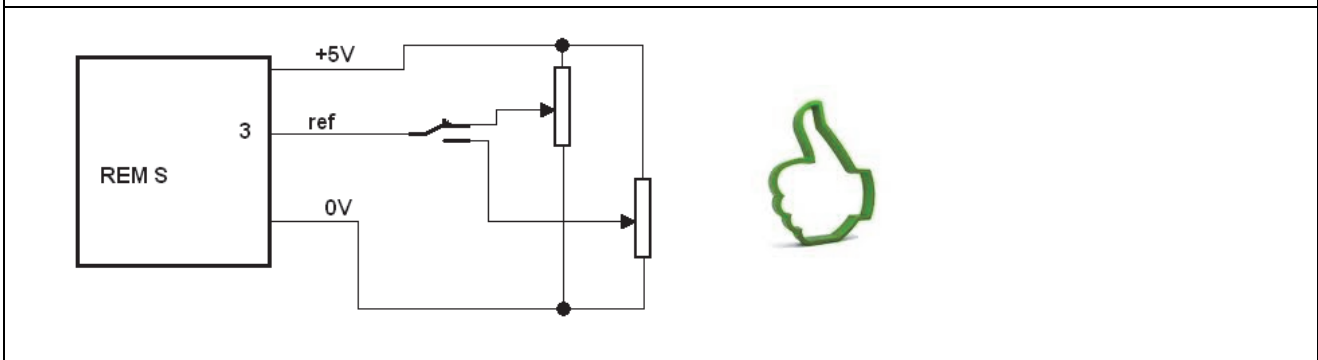
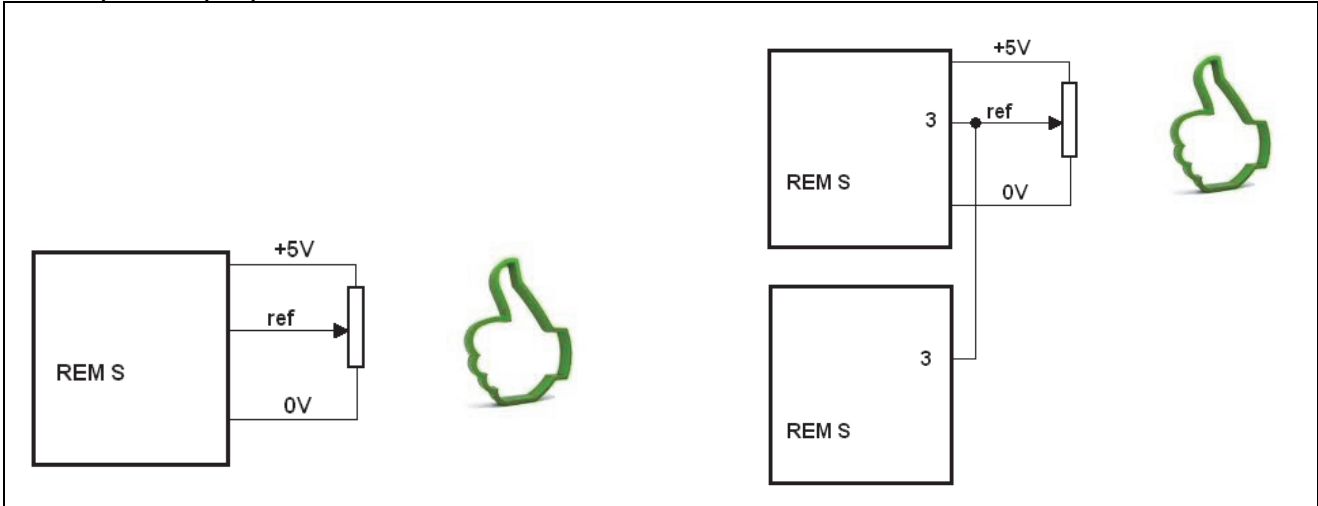
The ramp fall time “Ramp Down”, affects the stop of the actuator movements. even if the signal reference fall down to zero Volt, the actuator goes on moving until the set ramp time is elapsed. Therefore it's necessary to adjust it properly.

## Troubleshooting, REMS and REMD

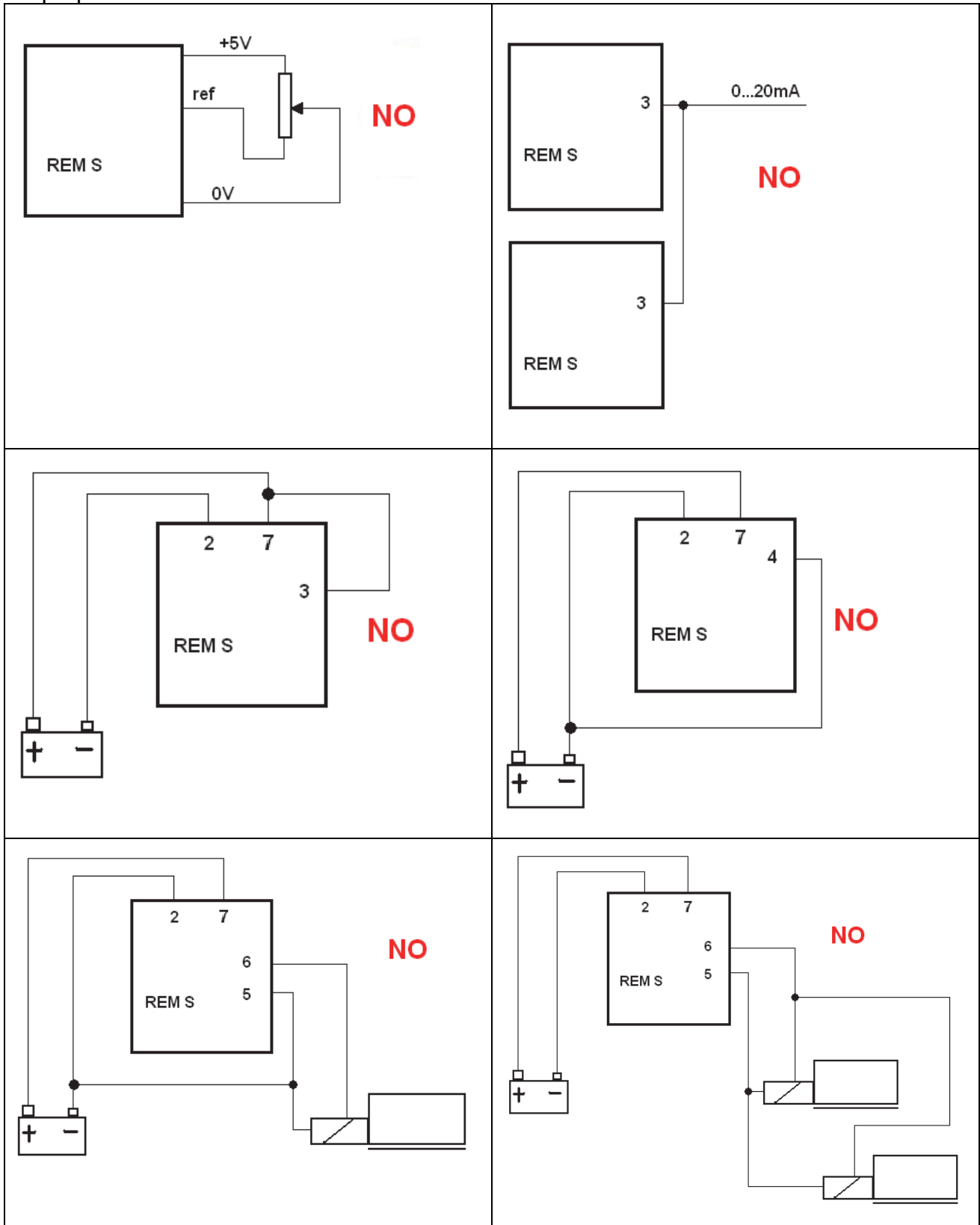
Trouble	Cause	Action
The REM card doesn't switch ON (green led OFF)	Reversing polarity in board power	Connects properly the positive terminal and negative terminal of power
	The supply voltage is below 10V	Supply the board with power supply 12V or 24V
	The supply voltage is above 36V	Supply the board with power supply 12V or 24V
The REM card, doesn't supply the current to the coils (yellow led ON)	The wires aren't properly connected to the terminals of the card, or coils	Connect the coils as a shown in the diagrams in the catalog
	On the connector valve, there are recirculation diodes, or other electrical circuit, such as filters	Use the coils connectors without electronic devices, or filter or recirculation diodes.
	The coil is burned, and the wire coil is broken	Eliminate the cause of the fault and replace the coil
The REM card, doesn't supply the current to the coils (yellow led OFF)	The control signal doesn't reach the circuit board	Check the signal wire, which could be interrupted or the control potentiometer is not powered
The REM card, supplies current to the coils, but the valve is not working properly (Valve does not open or partially open)	The spool is locked	The hydraulic line or the vale are dirty, or the valve screws are tightened too high
	The current is not enough to open the valve	Check the setting of microswitches positioned on the side of the card REM, and set the current values appropriate to the magnet. If the control signal is given by a potentiometer, supplied by REM card, the card must be set to receive a signal command 0 to 5V
		Check the current gain setting, is probably set to the minimum value
	On the terminals of PWM outputs are connected to other electrical loads in parallel	the PWM outputs of current, and the terminal of the common return of the card must be connected in a direct way to the coils of the valve and must not be shared with other equipment or electrical loads

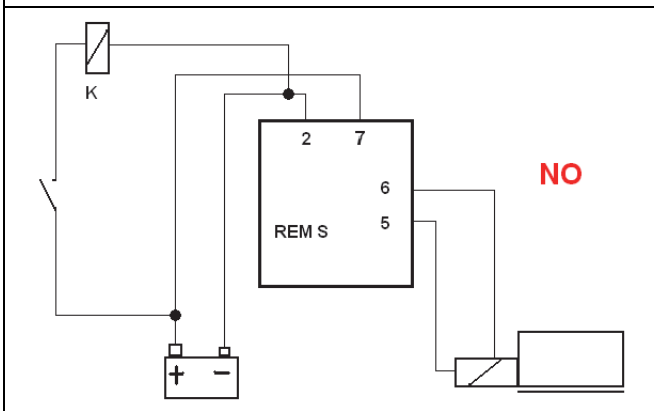
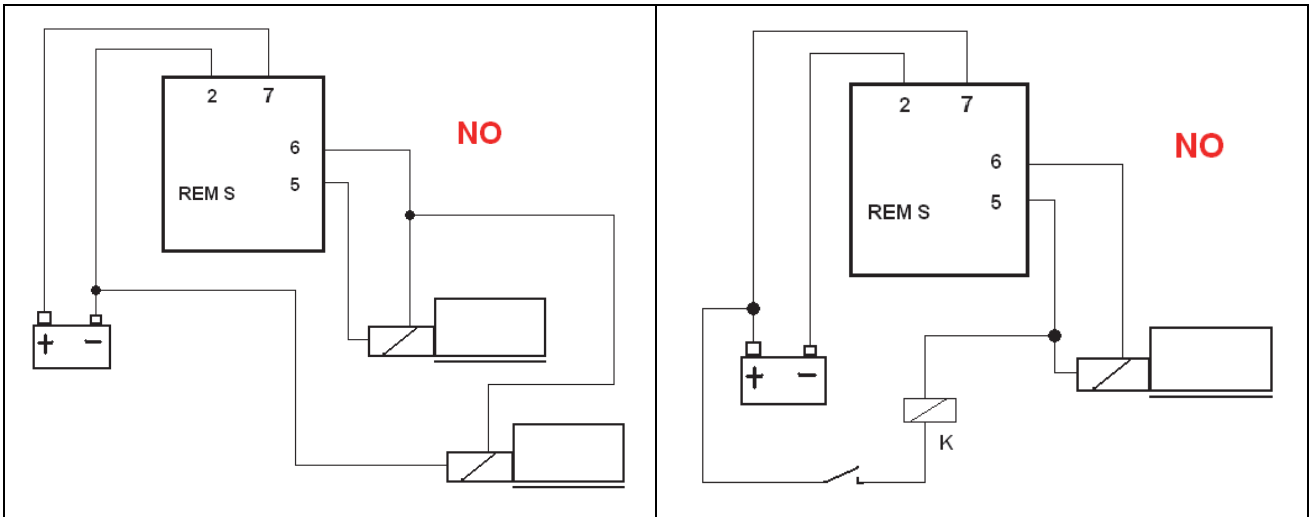
Trouble	Cause	Action
The OVERLOAD indicator lights	On the connector valve, there are recirculation diodes, or other electrical circuit, such as filters	Use the coils connectors without electronic devices, or filter or recirculation diodes.
	When you enable other uses (lamps, coils, relays), the return stream from users, it disperses through the negative card REM, instead of going to the battery negative	Connect the negative REM directly to battery negative. Avoid connecting the negative points of the REM mass distributed on the frame of the system.
	The coil is shorted	Replace the solenoid
	The water inlet to the coil	Replace the connector
	The water inlet to the REM card	Replace the REM card, and check that there are no infiltrations of water in the electric panel
The REM card stops supplies current	The ambient temperature is too high, over 70°C	Use a forced ventilation in the electric panel
	The card is subject to strong vibration or shock	Fasten the cabinet with shock absorbers
The REMS card continues to supply current to the valve, even if the control signal is at 0V or 0mA	The card is set in mode C (the microswitch 2 is in the OFF position) and the minimum current is adjusted to a value greater than 0 Amperes	If this operating mode is not accepted by the user, place the microswitch 2 in the ON position, work mode G, when the control signal is 0V the PWM output remains forcibly turned off.
The REMD card continues to supply current to the valve even if the control signal is 0V or 0mA	The card is not properly connected. When you want to control the card REMD with a control signal to dual ± 5V ± 10V ± 20mA Terminal 10 must be disconnected	Disconnects the terminal 10 of the card
The tab REMD continues to supply current to the valve even if the control signal is 2.50V or 10mA	The card is not properly connected when you want to control the card REMD with a control signal positive 0 ... 5V 0 ... 20mA The terminal 10 must be connected to a resistive load such as a potentiometer to generate the signal 0 ... 5V	Check the connection. If you want to control the REMD with a 0 ... 20mA must be connected to terminal 10 a resistive load 1000Ω.

Examples of proper electrical connection – REMS - REMD

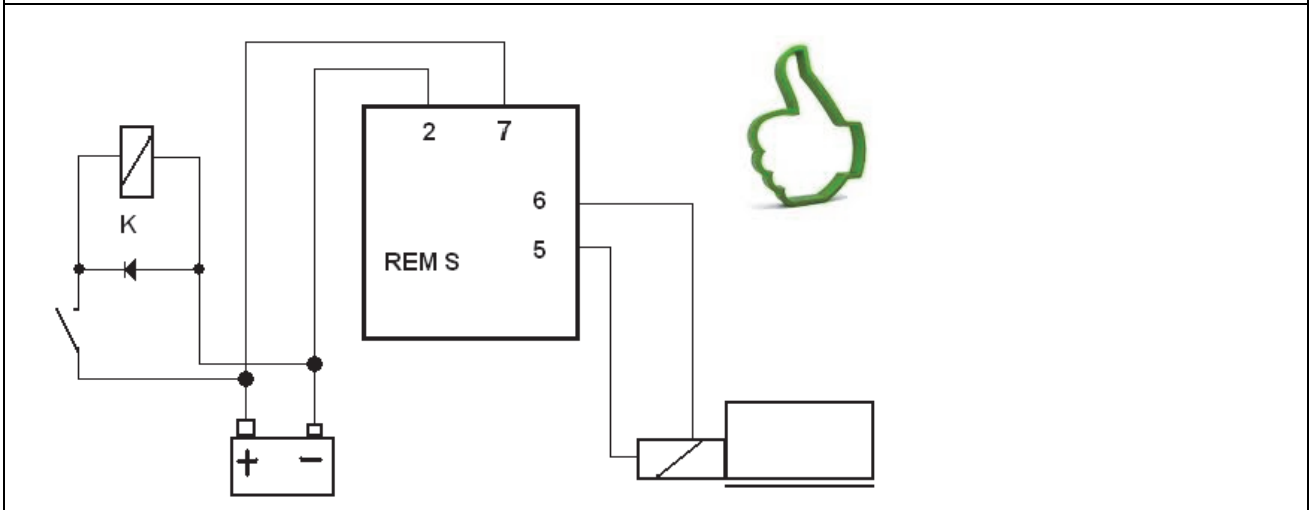


Improper electrical connection - REMS



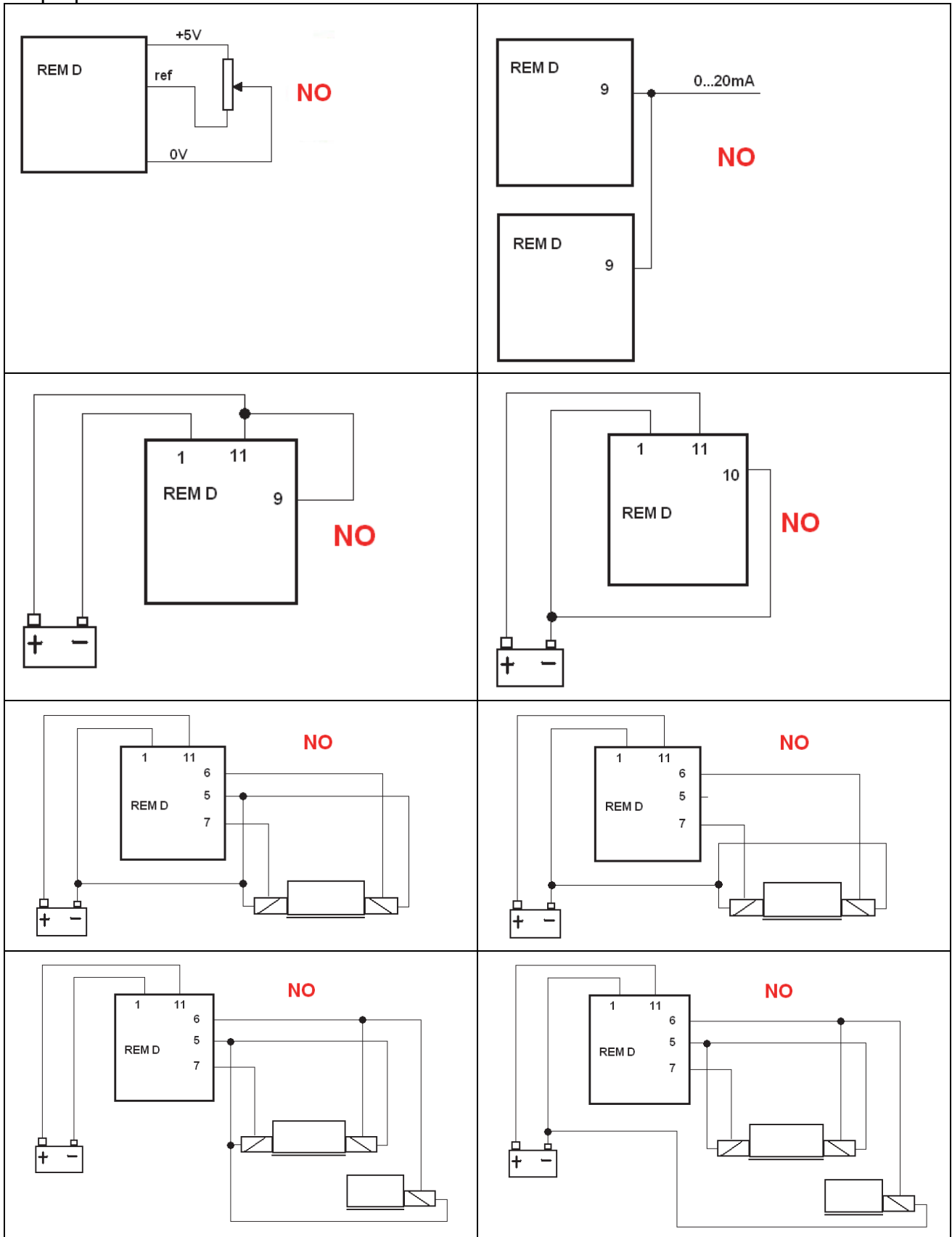


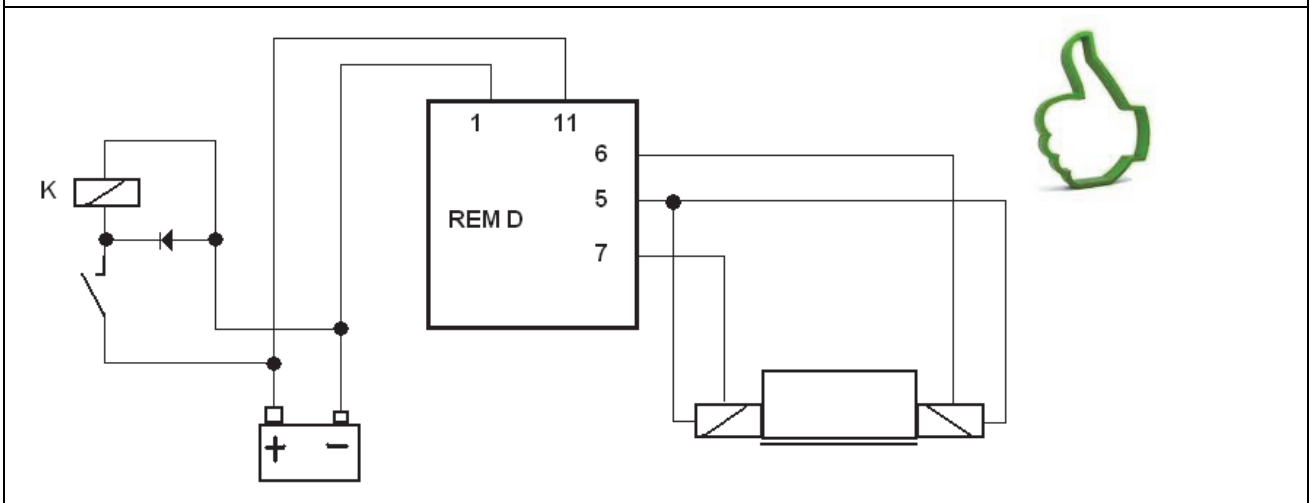
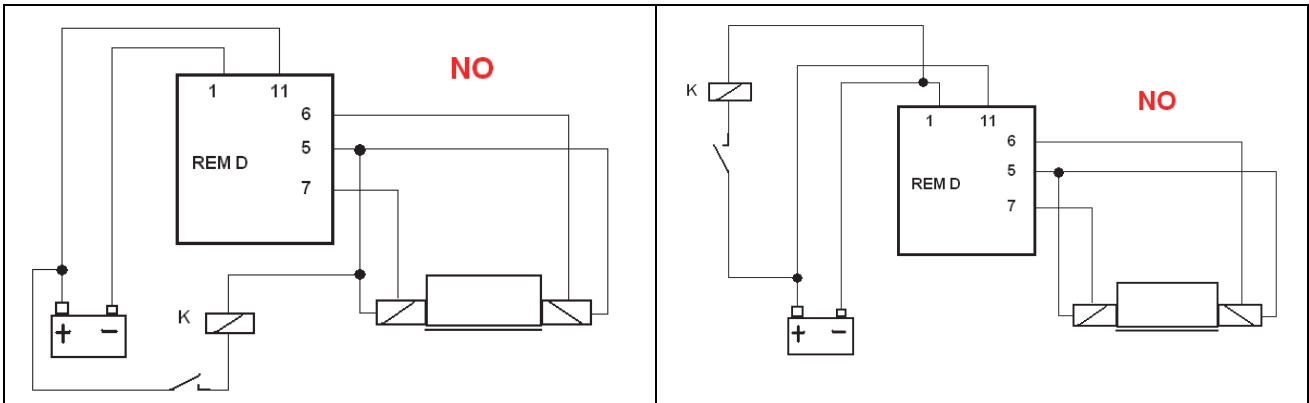
proper electrical connection





Improper electrical connection - REMD





REM S	
Pin 4	Never connect to the positive of the power supply Never connect to the negative of the power supply
Pin 3	Never connect to the positive of the power supply
Pin 5	Never connect to the positive of the power supply Never connect to the negative of the power supply
Pin 6	Never connect to the positive of the power supply Never connect to the negative of the power supply

REM D	
Pin 10	Never connect to the positive of the power supply Never connect to the negative of the power supply
Pin 9	Never connect to the positive of the power supply
Pin 5	Never connect to the positive of the power supply Never connect to the negative of the power supply
Pin 6	Never connect to the positive of the power supply Never connect to the negative of the power supply
Pin 7	Never connect to the positive of the power supply Never connect to the negative of the power supply





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