# REM.S.RA... TYPE ELECTRONIC REGULATORS

## SINGLE SOLENOID PROPORTIONAL CONTROL VALVES

| | | | | |
|---|---|---|---|---|
| Supply voltage (stabilized) | | | | 12 VDC ÷ 28 VDC |
| Supply voltage (Maximum) | | | | 30 VDC |
| Max. power | | | | 40W |
| Maximum output current | | | | 2.8 A |
| External pontetiometer supply (output) | | | | +5V / $I_{max}$ 10 mA |
| Reference (input) | 0V ÷ +2V | 0V ÷ +5V | 0V ÷ +10V | 0 ÷ 20 mA |
| Polarization current adjustment (I. min) | | | | 0 ÷ 50% $I_{max}$ |
| Ramp time adjustment | | | | 0 ÷ 10 sec |
| Output signal test point (Valve Current) | | | | 1 Volt = 1 Ampere ±5% |
| Ambient operating temperature | | | | 0 ÷ +70°C |
| Weight | | | | 0,15 Kg |

| REM.S.RA... | |
|---|---|
| CALIBRATION PROCEDURE | CH. IX PAGE 3 |
| OVERALL DIMENSIONS | CH. IX PAGE 6 |
| MOUNTING BASES | CH. IX PAGE 6 |

The electronic control card type REM.S.RA has been designed to drive the "XD.*.A, XDP.3.A, XP.3, XQ.3, XQP.*. and CXQ.3" series ARON single solenoid proportional valves without integral position transducer. The control card is enclosed in an "OCTAL" type housing, a typical relay mounting standard. The output stage operates on the pulse width modulation principle (P.W.M.) and is provided with current feedback in order to obtain a solenoid output current proportional to the reference input signal. Output short circuit and supply polarity inversion protection is provided.
Gain, minimum current and rise and fall ramp time adjustments are possible through the corresponding front panel trimming potentiometers, while the output current to the solenoid can be measured via the Valve Current test points, and the ramp operation can be excluded.

**Pay attention please: electronic regulators must be used in dampness and water protected places.**

### ORDERING CODE

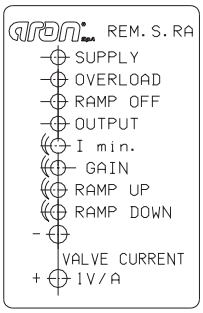
| | |
|---|---|
| **REM** | Miniaturized electronic regulator in Octal type container |
| **S** | Single solenoid |
| **RA** | Asymmetrical ramp |
| * | Maximum output current $I_{MAX.}$ (A)<br>**X** = 0.88 A<br>**Y** = 1.76 A<br>**Z** = 2.8 A |
| * | Input reference (V)<br>**2** = 0÷ + 2 V<br>**5** = 0÷ + 5 V<br>**0** = 0÷ + 10 V<br>**A** = 0 ÷ 20 mA |
| * | Frequency Dither<br>**1** = 100 Hz (standard)<br>**2** = 330 Hz (for XP.3) |
| * | Minimum initial current<br>**G** = step (normally for XD.*. and XDP.3 valves)<br>**C** = continuous (normally for XP.3, XQ.3, XQP.*. and CXQ.3 valves) |
| **00** | No variant |
| **3** | Serial No. |

CE registered mark for industrial environment

with reference to the electromagnetic compatibility.

European norms:

- EN50082-2 general safety norm - industrial environment
- EN 50081-1 emission general norm - residential environment




### ADJUSTMENT PANEL

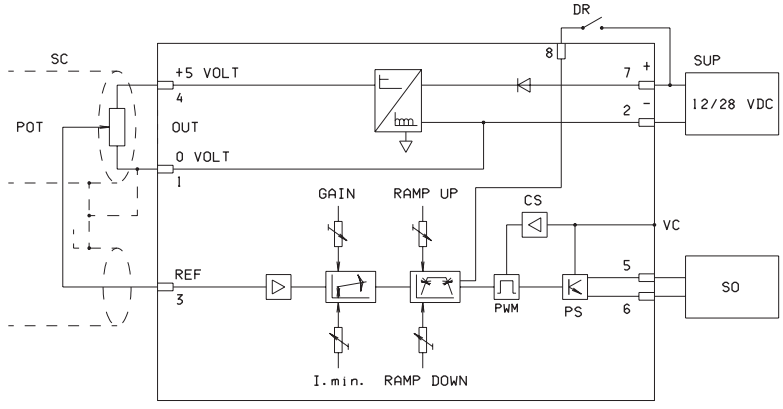
| | |
|---|---|
| **Supply** | 12VDC ÷ 28VDC (green led) |
| **Overload** | Protection against overload (red led) |
| **Ramp off** | Ramp off (red led) |
| **Output** | Output (current at solenoid, yellow led) |
| **I. min.** | Minimum current adjustment |
| **Gain** | Ramp down adjustment |
| **Ramp up** | Rump up adjustment time |
| **Ramp down** | Rump down adjustment time |
| **Valve Current** | Current test point at solenoid (1V =1A) |

**If any field is missing from the ordering code the standard setting is as follows:**

- Dither 100Hz
- $I_{min.}$ = continuous
- Input ref. = 0÷5V
- $I_{max.}$ = 0.8A

### ELECTRICAL CIRCUIT AND CONNECTIONS

| | |
|---|---|
| **Sup (2-7)** | Power supply |
| **Out (1-4)** | Output for external potentiometer |
| **Ref(3)** | Reference |
| **SO (5-6)** | Output at solenoid |
| **DR (8)** | Ramp off (contact closed = exclusion) |
| **Pot** | External reference potentiometer |
| **CS** | Feedback current |
| **PS** | Final stage |
| **SC** | Cable screen |
| **VC** | Current measure test point at solenoid |
| **PWM** | Pulse width modulate wave |




9

**Calibration procedure**

Connect the card in the proper way following the previous page diagram but without powering it. Turn completely anticlockwise the 4 trimming potentiometers and position the reference potentiometer on zero. Before powering the card, ensure that any unforseen hydraulic system movement cannot cause material damage or injury to people. Power now the card; the green LED should light up.

**Minimum current or polarization current adjustment**

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. For the REM model with minimum initial threshold current, turn the reference potentiometer up to a Vref. of 50 mV.

**Maximum current GAIN adjustment**

Turn first the ramp time trimming potentiometers clockwise by at least 10 turns, if the system could be damaged by a too fast solenoid operation (evaluate the application carefully). The maximum actuator speed can now be adjusted. Turn the (reference signal) potentiometer to its maximum setting and rotate slowly the GAIN trimming potentiometer (GAIN) until the maximum required speed is obtained. The speed can now be varied by moving the potentiometer. The GAIN setting could change the $I_{min}$ current setting. For this reason it's better to recheck the $I_{min}$ after GAIN setting

**Ramp time adjustment**

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 0s up to a maximum of 10s (to reach the maximum current value setted). Turning clockwise the trimming potentiometer, the ramp time increases.

**Notes:**

- The ramp fall time affects the actuator stop position. Moving the reference potentiometer to zero Volt, the actuator goes on moving till the setted ramp time is elapsed. Therefore it's necessary to adjust it properly.
- When the overload red LED lights up, it will be necessary to switch off the power to the card, switching it on again after having eliminated the cause of overload.

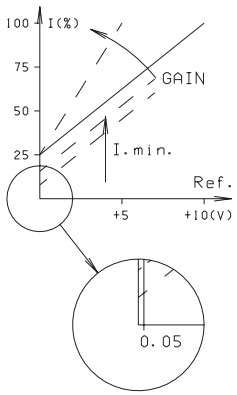
**DIP switch table**

Six miniature switches are mounted internally on one of the REM sides. The REM configuration to suit any particular application can be implemented by setting these switches, which can be reached through the unit ventilating slots.
PWM frequency (100 to 330 Hz), minimum (continuous or step) current, reference voltage range and maximum current ($I_{max}$) can thus be adjusted.

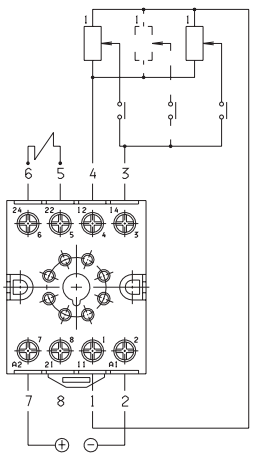
For our proportional valves are recommended the following settings:

| | | | |
|---|---|---|---|
| **C** | XD.3.A | DITHER =100Hz | $I_{max.}$ = 2.35A with 9V coil |
| **C** | XQ.3 | DITHER =100Hz | $I_{max.}$ = 2.35A with 9V coil |
| **C** | XQP.3 | DITHER =100Hz | $I_{max.}$ = 2.33A with 9V coil |
| **C** | CXQ.3 | DITHER =100Hz | $I_{max.}$ = 2.35A with 9V coil |
| **G** | XD.3.A | DITHER =100Hz | $I_{max.}$ = 1.76A with 12V coil |
| **G** | XD.5.A | DITHER =100Hz | $I_{max.}$ = 2.5A with 12V coil |
| **G** | XDP.3.A | DITHER =100Hz | $I_{max.}$ = 1.76A with 12V coil |
| **C** | XQ.3 | DITHER =100Hz | $I_{max.}$ = 1.76A with 12V coil |
| **C** | XQP.3 | DITHER =100Hz | $I_{max.}$ = 1.76A with 12V coil |
| **C** | XQP.5 | DITHER =100Hz | $I_{max.}$ = 2.5A with 12V coil |
| **C** | XP.3 | DITHER =330Hz | $I_{max.}$ = 1.25A with 12V coil |
| **C** | CXQ.3 | DITHER =100Hz | $I_{max.}$ = 1.76A with 12V coil |
| **G** | XD.3.A | DITHER =100Hz | $I_{max.}$ = 0.88A with 24V coil |
| **G** | XD.5.A | DITHER =100Hz | $I_{max.}$ = 1.25A with 24V coil |
| **G** | XDP.3.A | DITHER =100Hz | $I_{max.}$ = 0.88A with 24V coil |
| **C** | XQ.3 | DITHER =100Hz | $I_{max.}$ = 0.88A with 24V coil |
| **C** | XQP.3 | DITHER =100Hz | $I_{max.}$ = 0.88A with 24V coil |
| **C** | XQP.5 | DITHER =100Hz | $I_{max.}$ = 1.25A with 24V coil |
| **C** | XP.3 | DITHER =330Hz | $I_{max.}$ = 0.68A with 24V coil |
| **C** | CXQ.3 | DITHER =100Hz | $I_{max.}$ = 0.88A with 24V coil |

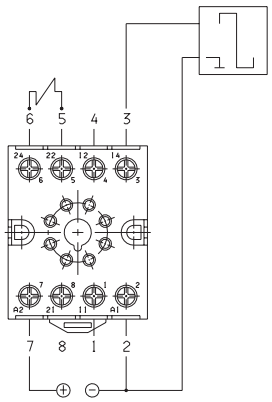
| FUNCTION / DIP sw | DITHER (Hz) | | I min. | | Input ref. (Volt) | | | I max. (Amp) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 100 | 330 | C | G | 0÷10 | 0÷5 | 0÷2 | 2.8 | 1,6 | 0,8 |
| 1 | off | on | | | | | | | | |
| 2 | | | off | on | | | | | | |
| 3 | | | | | off | on | off | | | |
| 4 | | | | | off | off | on | | | |
| 5 | | | | | | | | off | on | off |
| 6 | | | | | | | | off | off | on |




**TYPICAL CONNECTIONS**




With external reference potentiometer bank




With external reference value generator, e.g. by a PLC or in case of courrent input reference

- The connection between REM and the solenoid must be direct
- The common one of return to proportional solenoid mustn't be shared between other valve connections or electrical equipment worker.

9