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

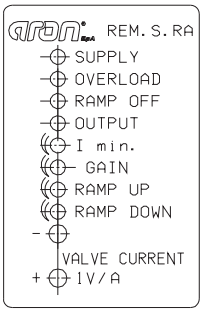
The electronic control card type REM.S.RA has been designed to drive the "XD.*.A, XDP.3.A, XP.3, XQ.3, XQP.*. and CXQ.3" series ARON single solenoid proportional valves without integral position transducer. The control card is enclosed in an "OCTAL" type housing, a typical relay mounting standard. The 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) **X** = 0.88 A **Y** = 1.76 A **Z** = 2.8 A
*	Input reference (V) **2** = 0÷ + 2 V **5** = 0÷ + 5 V **0** = 0÷ + 10 V **A** = 0 ÷ 20 mA
*	Frequency Dither **1** = 100 Hz (standard) **2** = 330 Hz (for XP.3)
*	Minimum initial current **G** = step (normally for XD.*. and XDP.3 valves) **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



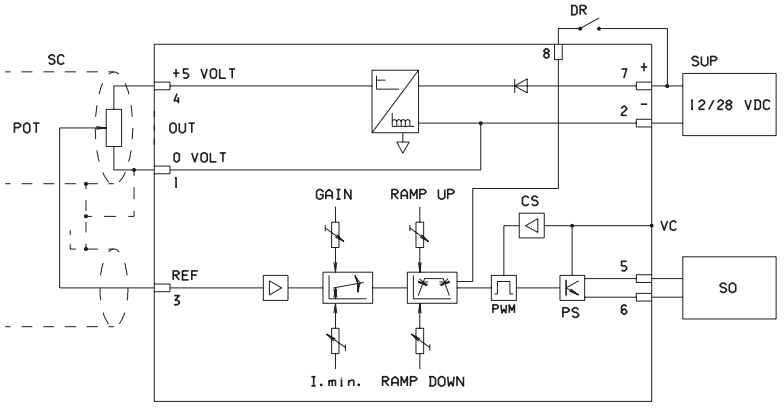
ADJUSTMENT PANEL

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



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

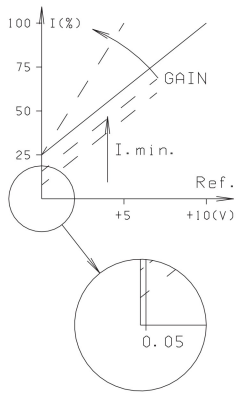
Ramp time adjustment
The ramp time is the time taken to pass from the minimum to the maximum current value, and vice versa. It's adjustable from a minimum of 0s up to a maximum of 10s (to reach the maximum current value setted). Turning clockwise the trimming potentiometer, the ramp time increases.

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.

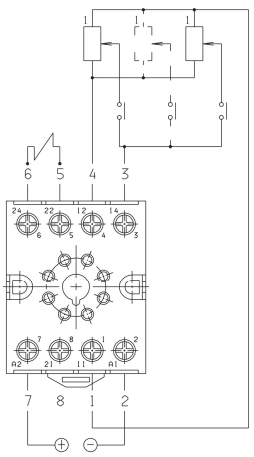
DIP switch table
Six miniature switches are mounted internally on one of the REM sides. The REM configuration to suit any particular application can be implemented by setting these switches, which can be reached through the unit ventilating slots.
PWM frequency (100 to 330 Hz), minimum (continuous or 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

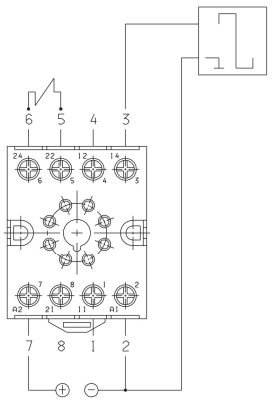
FUNCTION / DIP sw	DITHER (Hz)		I min.		Input ref. (Volt)			I max. (Amp)		
	100	330	C	G	0÷10	0÷5	0÷2	2.8	1,6	0,8
1	off	on								
2			off	on						
3					off	on	off			
4					off	off	on			
5								off	on	off
6								off	off	on



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.