REM.D.RA... TYPE ELECTRONIC REGULATORS

DOUBLE SOLENOID PROPORTIONAL CONTROL VALVES

Supply voltage (stabilized)				12 VDC ÷ 28 VDC
Supply voltage (maximum)				30 VDC
Max. power				40W
Maximum output				2.8 A
External potentiometer supply (output)				-5V, +5V / I_{max} 10 mA
Reference (input)	-2V÷+2V	-5V÷+5V	-10V÷+10V	-20mA ÷ +20mA
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
Ambient operating temperature				0 ÷ +70°C
Weight				0,2 Kg

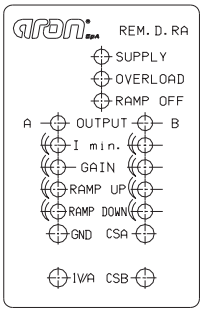
REM.D.RA...

The electronic control card type REM.D.RA has been designed to drive the ARON double solenoid proportional valves series "XD.*.C...and XDP.3.C" without integral position transducer. The control card is enclosed in an "UNDECAL" 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 ramps can be excluded.
Pay attention please: electronic regulators must be used in dampness and water protected places.

ORDERING CODE

REM	Miniaturized electronic regulator in Undecal type container
D	Double 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** = -2 ÷ +2 V **5** = -5 ÷ +5 V **0** = -10 ÷ +10 V **A** = -20mA ÷ +20mA
*	Frequency Dither **1** = 100 Hz (standard) **2** = 330 Hz
G	Minimum initial current can only be adjusted in steps
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

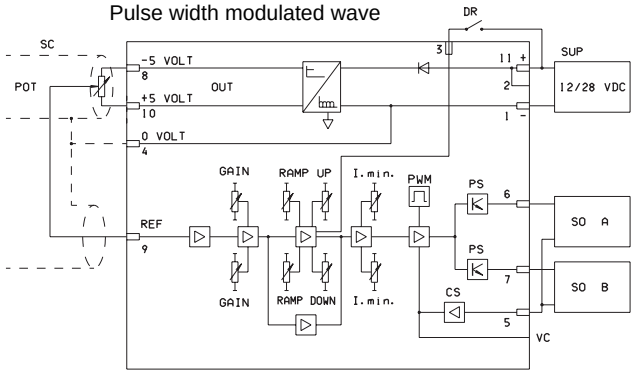


Supply	12Vdc ÷ 28Vdc (green led)
Overload	Protection against over (red led)
Ramp off	Ramp off (red led)
Output	Output (current at solenoid A/B, yellow led)
I. min.	Minimum current adjustment A/B
Gain	A/B gain adjustment
Ramp up	A/B rump up adjustment time
Ramp down	A/B rump down adjustment time
GND	Ground
1V/A	Current test point at solenoid
CSA	Command signal Ch A
CSB	Command signal Ch B

If any field is missing from the ordering code the standard setting is as follows:
- Dither = 100Hz
- Input ref. = -5 ÷ +5V
- $I_{max.}$ = 0.8A

ELECTRICAL CIRCUIT AND CONNECTIONS

Sup (1-11)	Power supply
Out (8-10)	Output external potentiometer
Ref (9)	Reference
0V (4)	Common
SO A (5-6)	Output at solenoid A
SO B (5-7)	Output at solenoid B
DR (3)	Ramp off (contact = exclusion)
Pot	External reference potentiometer
CS	Feedback current
PS	Final stage
VC	Current measure test point at solenoid
SC	Cable screen
PWM	Pulse width modulated wave



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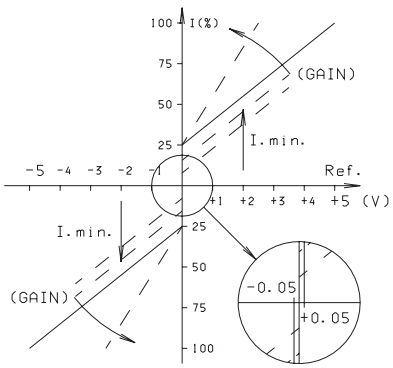
Calibration procedure
Connect the card in the proper way following the previous page diagram but without powering it. Turn completely anticlockwise the 8 trimming potentiometers and position the reference potentiometer on zero. Before powering the card, ensure that any unforseen hydraulic system movement cannot cause material damage or injury to people. Power now the card; the green LED should light up.

Two channel minimum current adjustment (dead band)
Turn the reference potentiometer slowly until, in correspondence of approx. 0.05 V, the A channel (Output) LED lights up, depending on the polarity of the applied voltage. When the yellow LED lights up (indicating that current is flowing through the solenoid), turn slowly the I_{min} trimming potentiometer clockwise until an actuator movement can be visually detected. Turn the trimming potentiometer anticlockwise until the movement stops. Place again the reference potentiometer in its central position and repeat the I_{min} calibration for the other channel, turning the potentiometer in the other direction.

Gain adjustment
Turn first the ramp time trimming potentiometers (RAMP UP and RAMP DOWN) 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 potentiometer to its maximum setting (+5 V) 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 lever. Repeat the above operations for the other channel after positioning the potentiometer on -5 V. 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) separately for channel A and B. 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.

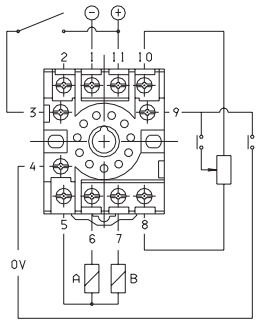
DIP switch table
Six miniature switches are mounted internally on one of the REM sides. The REM configuration to suit any particular application can be implemented by setting these switches, which can be reached through the unit ventilating slots. PWM frequency (100 to 330 Hz), reference voltage range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

For our proportional valves are recommended the following settings:

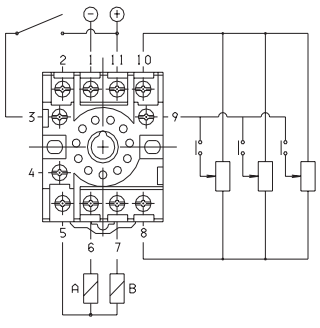
G XD.3.C DITHER =100Hz $I_{max.}$ = 1.76A with 12V coils
G XD.5.C DITHER =100Hz $I_{max.}$ = 2.5A with 12V coils
G XDP.3.C DITHER =100Hz $I_{max.}$ = 1.76A with 12V coils
G XD.3.C DITHER =100Hz $I_{max.}$ = 0.88A with 24V coils
G XD.5.C DITHER =100Hz $I_{max.}$ = 1.25A with 24V coils
G XDP.3.C DITHER =100Hz $I_{max.}$ = 0.88A with 24V coils

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

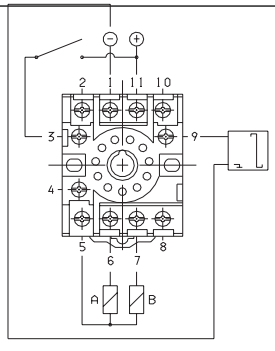
TYPICAL CONNECTIONS



With external reference potentiometer bank



With external reference 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.

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