

# SERIES PR



## AC & DC Solenoids

Open frame linear solenoids designed for AC & DC applications. Both the frame and the plunger are made of solid steel construction. They can be operated in any position, turning an electric pulse into an axial pull or push-pull action. Coil winding insulation being in Class F. Performance, as shown in the following diagrams, is always referred to a temperature rise of 80°C in open air, with 35°C ambient temperature and coil fed at 105% of rated voltage (VDE 0580). Since the mechanical energy generated by all solenoids is a constant, any amount of that force

eventually not utilised by relevant application will be expended under form of impact force. Consequently, any application should correctly use the smallest available solenoid performing the required action, whilst not exceeding the max admitted operational temperature. To select the right solenoid, also the exact determination of the duty cycle is equally essential: in fact, whenever the maximum cycle is exceeding 300 seconds, a continuously rated solenoid (ED=100) must be used. Otherwise the relative duty factor would result as follows:

$$ED\% = \frac{\text{ON time}}{(\text{ON} + \text{OFF time})} \times 100$$

(Cycle = ON + OFF time)

ON and OFF times corresponding to relative duty factors lower than ED=100 result, for standard ED values, from the following diagram:

Current values given in our diagrams are at nominal voltage. Forces shown are referred to solenoids fed @ 90% of rated voltage, with 'hot' coil at 20°C ambient temperature.

### RELATIVE DUTY FACTOR (ED%)

Operation per hour	Total cycle (seconds)	ED 40		ED 25		ED 15		ED 5	
		ON	OFF	ON	OFF	ON	OFF	ON	OFF
12	300	120	180	75	225	45	255	15	285
120	30	12	18	7.5	22.5	4.5	25.5	1.5	28.5
300	12	4.8	7.2	3.0	9.0	1.8	10.2	0.6	11.4
600	6	2.4	3.6	1.5	4.5	0.9	5.1	0.3	5.7
1200	3	1.2	1.8	0.75	2.25	0.45	2.55	0.15	2.85
1800	2	0.8	1.2	0.5	1.5	0.3	1.7	0.1	1.9
3000	1.2	0.48	0.72	0.3	0.9	0.18	1.02	0.06	1.14

Any AC solenoid, due to its high power consumption (VA), will rapidly overheat and fail to operate, whenever its plunger is prevented from seating properly. To avoid this, a proper spring can be interposed between plunger and application. DC solenoids are not affected by this problem, as current consumed is constant all along the plunger run. When adopting a solenoid please also bear in mind what follows:

1) Any load should be always applied strictly along the plunger main axis (to avoid excessive wear due to friction, and noise magnifying due to the vibration

generated by the AC power supply).

2) Any mechanical stroke-limiting device eventually provided, should be made of non magnetic material.

3) The expected life of a solenoid would be remarkably increased as much as its impact force could be absorbed by the solenoid mounting frame.

When a continuously rated (ED=100) solenoid is required but space is not enough, a ballast resistor and/or a limiting impedance could be used to feed a smaller intermittently rated solenoid (ED<100).

Prior to select the right solenoid you must always know the force required, as well as stroke, maximum feeding time, minimum OFF time, ambient temperature and supply voltage. If in doubt to select the best type for your application, please do not hesitate contacting us to help you making the right choice, supplying us with all above information. Even if you can't find the solenoid you require in our range, please let us know, as we do have both the experience and the ability to solve any problem in this field.

## ORDERING INFORMATION

**PR3-TS-24AC-F100-60**

1 2 3 4 5 6 7

1 - Solenoid series: PR

2 - Type (size): 1-2-3-4

3 - Action: T = Pull (standard)

TS = Push-pull

4 - Coil supply voltage: AC or DC

5 - Coil terminals:

F = Faston 0.25 (6.3x0,8mm)

(not available for PR1)

C = 150 mm leads (PR1 = 100 mm)

6 - Relative duty service ED%:

Permanently (100) or intermittently rated coils (standard values: 40-25-15-5)

7 - Coil supply frequency (if differing from 50 Hz).

*NB: When ordering standard types you can omit the last group of code (7).*

**Available types**

**PR1**

Coil supply voltages :  
 Insulating resistance :  
 Dielectric strength :  
 Coil terminals :  
 Total / Plunger weight :

Axial Force (grams) Vs. Stroke and Duty Factor (ED)							
ED	1	3	5	8	11	15	mm
100	230	100	50	-	-	-	DC
	250	100	70	50	-	-	AC
40	380	250	70	50	-	-	DC
	400	200	150	100	50	-	AC
25	500	350	250	80	-	-	DC
	550	300	200	130	80	-	AC
15	750	600	400	150	60	-	DC
	-	450	300	200	120	50	AC
5	1150	950	850	350	130	-	DC
	-	700	550	360	250	110	AC

**PR2**

Coil supply voltages :  
 Insulating resistance :  
 Dielectric strength :  
 Coil terminals :  
 Total / Plunger weight :

Axial Force (grams) Vs. Stroke and Duty Factor (ED)							
ED	3	5	7	10	14	18	mm
100	150	150	80	-	-	-	DC
	150	100	60	50	-	-	AC
40	350	350	230	100	-	-	DC
	300	250	220	180	140	50	AC
25	500	500	400	180	80	-	DC
	450	400	350	300	200	100	AC
15	750	700	550	300	150	-	DC
	750	500	400	350	300	150	AC
5	1250	1050	950	700	350	-	DC
	1250	1000	900	800	650	300	AC

**PR3**

Coil supply voltages :  
 Insulating resistance :  
 Dielectric strength :  
 Coil terminals :  
 Total / Plunger weight :

Axial Force (grams) Vs. Stroke and Duty Factor (ED)							
ED	3	5	7	10	15	20	mm
100	200	200	150	120	30	-	D
	250	170	140	120	100	50	C
40	450	450	380	300	100	15	D
	500	450	350	330	300	0	C
25	600	600	500	400	150	-	D
	850	700	600	450	400	20	C
15	115	105	750	600	280	50	D
	0	0	850	650	600	35	C
5	170	150	140	115	750	30	D
	0	0	0	0	110	0	C
0	230	185	165	125	0	70	D
	0	0	0	0	0	0	C

**PR4**

Coil supply voltages :  
 Insulating resistance :  
 Dielectric strength :  
 Coil terminals :  
 Total / Plunger weight :

Axial Force (grams) Vs. Stroke and Duty Factor (ED)							
ED	5	10	15	20	25	30	mm
100	100	100	450	220	80	50	D
	0	0	240	220	200	200	C

	300	260					A
							C
40	160	120	950	500	300	230	D
	0	0	480	450	430	400	C
25	240	205	130	750	500	350	D
	0	0	0	700	650	600	C
15	280	250	195	105	650	550	D
	0	0	0	800	750	700	C
5	340	340	250	150	850	750	D
	0	0	0	0	200	190	C
0	330	260	230	210	0	0	A
	0	0	0	0	0	0	C

12-24-110-220-230 AC / 12-24-110 DC  
 > 100 MΩ @ 500V DC  
 1.5 KV  
 'flying' leads (100 mm long)  
 60 / 10 grams

Coil Rated Current Vs. Stroke and Duty Factor (ED)								
ED	DC W	AC	Stroke (mm)					
			0	2	5	10	15	20
100	4,5	VA	6	8	10	11	11	
40	9	VA	13	20	23	25	27	
25	16	VA	22	32	37	40	43	
15	28	VA	38	51	57	63	67	
5	70	VA	105	130	142	158	175	

12-24-110-220-230 AC / 12-24-110 DC  
 > 100 MΩ @ 500V DC  
 1.5 KV  
 Faston 6.3x0.8 mm or leads (150 mm)  
 100 / 15 grams

Coil Rated Current Vs. Stroke and Duty Factor (ED)								
ED	DC W	AC	Stroke (mm)					
			0	2	5	10	15	20
100	6	VA	8	12	14	16	18	19
40	13	VA	17	25	33	37	41	44
25	22	VA	27	40	49	60	65	69
15	36	VA	50	70	82	94	104	110
5	75	VA	150	212	230	258	280	295

12-24-110-220-230 AC / 12-24-110 DC  
 > 100 MΩ @ 500V DC  
 1.5 KV  
 Faston 6.3x0.8 mm or leads (150 mm)  
 170 / 20 grams

Coil Rated Current Vs. Stroke and Duty Factor (ED)								
ED	DC W	AC	Stroke (mm)					
			0	2	5	10	15	20
100	9	VA	10	15	19	25	30	33
40	20	VA	22	31	43	58	67	73
25	30	VA	33	49	65	85	101	112
15	50	VA	60	85	114	148	175	192
5	13	VA	16	22	27	39	46	50

0	0	0	5	0	0	5
---	---	---	---	---	---	---

12-24-110-220-230 AC / 12-24-110 DC  
 > 100 MΩ @ 500V DC  
 1.5 KV  
 Faston 6.3x0.8 mm or leads (150 mm)  
 500 / 70 grams

Coil Rated Current Vs. Stroke and Duty Factor (ED)								
ED	DC W	AC	Stroke (mm)					
			0	10	15	20	25	30
100	11	VA	14	40	55	65	75	80
40	26	VA	40	110	130	160	190	210
25	42	VA	60	150	190	230	270	290
15	70	VA	110	210	260	300	350	400
5	190	VA	310	450	510	570	630	480



