



GUARDIAN

Guardian Electric Manufacturing Co.

Solenoid Data Book



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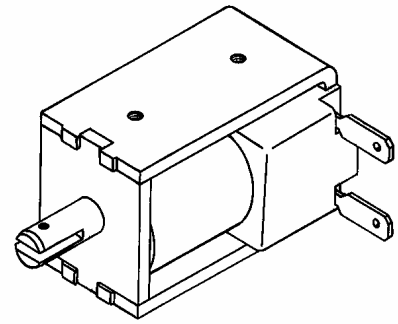
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INDEX— By Guardian Model Number

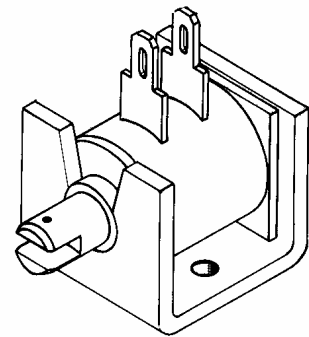
TUBULAR - DC, PULL

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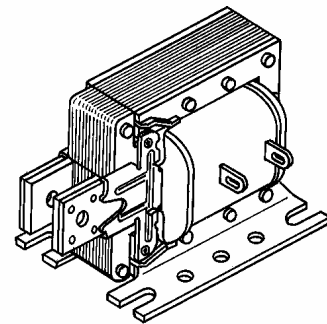
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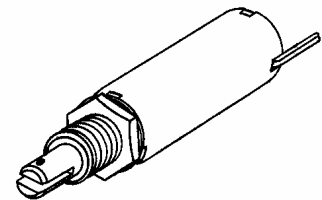
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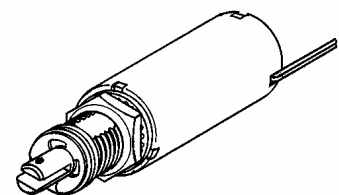
FRAME - DC, LATCHING

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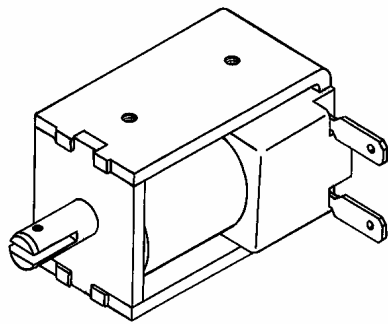


FRAME - DC, PULL

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3HD	68
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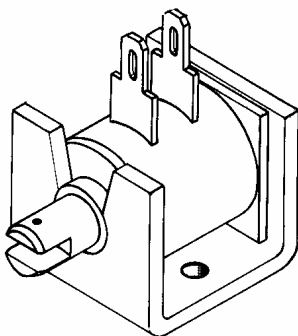


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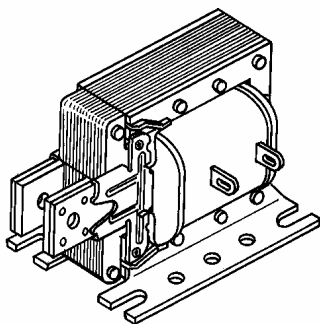
FRAME - DC, PULL cont.

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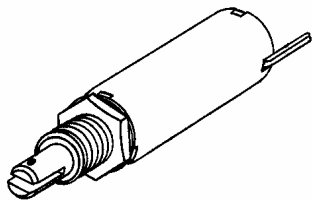
FRAME - DC, PUSH

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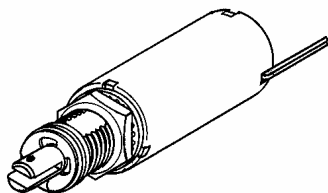
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AC & DC Solenoid Selection Factors

A solenoid is a device which converts electrical energy into mechanical motion. The solenoids presented in this catalog are linear solenoids in that the motion produced is linear.

The following factors must be considered in selecting a solenoid to perform the required work satisfactorily and reliably over an extended period of time.

1. Force
2. Stroke
3. Duty Cycle
4. Temperature

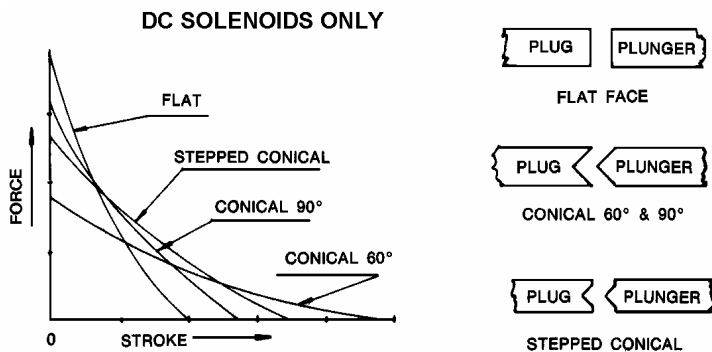
Other considerations are:

1. Size
2. Mounting
3. Electrical Connections
4. Life Expectancy
5. Environment

AC & DC Solenoid Selection Factors

The curves shown here give a general idea of the differences in force stroke relationship among four basic plug and plunger geometries; flat face, 60 degree conical, 90 degree conical and stepped conical. The flat faced configuration is best for short strokes and high holding force, whereas the 60 degree conical is best for longer strokes. The 90 degree conical and stepped conicals are better for medium strokes.

Guardian's standard is the 60 degree conical, but any of the others shown, are available for custom application. Configurations other than the above can be tailored to meet some unusual force/stroke requirements. Consult the factory for specific details.



DC Work Requirements vs. Solenoid Capabilities

The force developed by a DC solenoid at a given stroke is proportional to the product of the number of turns (N) in the coil winding and the current (I) flowing through those turns; commonly referred to as ampere-turns or NI. The NI produced by a DC solenoid is affected by two major variables:

1. Manufacturing Tolerances
2. Coil Temperature

The manufacturing variations are in the total number of turns and coil resistance. Normal manufacturing variations on other parts have no effect on the NI produced. Since coil resistance and therefore coil current and NI are affected by temperature, the force developed is also affected. To determine the force developed, the total coil temperature due to both ambient temperature and self heating, must be taken into consideration.

The NI and wattage values shown in coil charts in this catalog are nominal values. Normal production will yield the majority of units within 5% of the nominal. However, the user must anticipate that some units will be above and below that 5%.

The solenoid selected for a particular application must be one which produces the force required throughout its entire stroke, and operating temperature range. The load must never exceed the force developed at the stroke and NI value as read off the force vs NI curves shown in the catalog.

If the load is too great, the plunger will not pull in or seat. On the other hand, a highly over-rated solenoid which develops substantially more force than required by the load should not be used unless speed of operation is the determining factor. Excessive energy imparted to the solenoid must be dissipated by some other means. If it is not dissipated, the plunger and field piece assembly must absorb the energy of impact causing premature failure. As coil temperature increases, force developed decreases. The variation in force due to temperature cannot be addressed with a pre-determined value, since it is dependent upon the user's ambient temperature, magnitude of input wattage and the relationship of on time to off time, or duty cycle. The heat rise curves shown in this catalog can be used to estimate the effect of self heating and increased ambient. The temperature taken from these curves added to the user's ambient produces the final operating temperature. From this point, it is possible to calculate the temperature effect on the NI produced when "hot".

$$NI \text{ (hot)} = NI \text{ (cold)} \times \frac{1}{1 + (\Delta T \times \frac{1}{234.5 + T_{\text{cold}}})}$$

ΔT = total heat rise, both self heat and increase in ambient above 23 Deg. C.

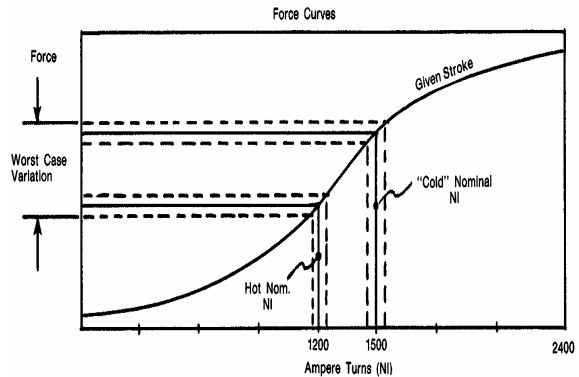
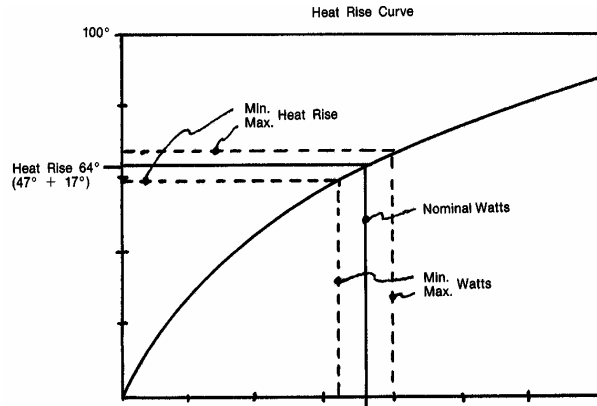
Thus a continuous duty solenoid operating with a 47 degree C. heat rise, in an ambient of 40 degrees C with a stated "cold" NI of 1500 at 23 degrees C. would have a "hot" NI of only 1200.

$$1500 \times \frac{1}{1 + \left(64 \times \frac{1}{234.5 + 23^\circ}\right)} = 1201 \text{ NI.}$$

The "hot" force as well as the "cold" force can then be read on the force vs NI curves at the 1500 NI and at the 1200 NI values. Generally these nominal values are adequate for estimating the power consumption and the effect of heat on the force characteristics of a DC solenoid. If the application is more critical, the "worst Case" estimation can be included by applying the following tolerance factors:

$$\begin{aligned} \text{Wattage} &\approx \pm 5\% \\ \text{NI} &\approx \pm 8\% \end{aligned}$$

Examples showing the use of the force vs NI curves and the watts vs heat rise curves in this catalog are shown below:



DC Duty Cycle

Duty cycle expressed in percent, is the ratio of on time to total time of a cycle operation. When specifying the duty cycle of an operation, either the on time or off time, or both must be specifically stated. Stated alone, a 10% duty cycle could be .1 second on and .9 seconds off, or could be 1 year on and 9 years off. Continuous duty is a 100% duty cycle. One cycle of operation is the time from the beginning of one on time to the beginning of the next on time. If a solenoid is energized for 100 seconds and de-energized for 300 seconds, the duty cycle is as follows:

$$\begin{aligned} \text{Duty Cycle in\%} &= \frac{\text{on time}}{\text{on time} + \text{off time}} \times 100 \\ &= \frac{100}{100 + 300} \times 100 = 25\% \end{aligned}$$

The charts and curves presented in this catalog have been designed to help the user pick the proper solenoid for his particular application.

The DC heat rise curves shown in this catalog are for duty cycles as follows:

Duty	On Time	Off Time
100%	Continuous	—
25%	100 sec.	300 sec.
25%	10 sec.	30 sec.
10%	100 sec.	900 sec.
10%	10 sec.	90 sec.
5%	100 sec.	1900 sec.
5%	10 sec.	190 sec.
1% (Pulse Duty)	1 sec.	99 sec.

Heat rise for duty cycles other than above may be estimated by interpolation.

The coils shown in the coil chart are coils with the optimum number of turns, based on practical manufacturing techniques, of each 1/2 size magnet wire. The wattage shown for each at the four different voltages are the practical range for each voltage at some duty cycle.

The coils shown on the data and specification pages have been designated as typical at the indicated voltages since they exhibit an 85 degree C maximum heat rise at that voltage and duty cycle.

DC How To Use The Curves

For a given stroke and load, find the NI required at the junction of the stroke and load lines on the NI* curve. Since all duty cycles will produce some heat rise, the value picked at this point should always be higher than the absolute minimum required.

Go to the coil chart and find the required NI value in the column for the voltage which will be used. The wattage which produces that NI value can now be read from the coil chart. The heat rise which can be expected for that wattage at some duty cycle can be found on the heat rise curves. The final NI value which the solenoid will produce is the cold NI as taken from the NI curve multiplied by the factor for the heat rise as taken from the heat rise curve.

If the total temperature, heat rise plus ambient temperature, exceeds the maximum temperature rating of the solenoid, and the force requirements and/or duty cycle cannot be compromised, a larger solenoid must be selected.

*NOTE: Force values shown on NI curves in this catalog are with the effect of plunger weight nullified. Operation with plunger down, load under will yield slightly lower forces.

The maximum allowable operating temperature of any solenoid is determined by the temperature rating of the insulating materials. As long as these temperatures are not exceeded, the solenoid will not be degraded. Standard Guardian solenoids use class 105 degree C insulation. The following classes of insulation are available on special orders:

- Class 130 Degree C
- Class 155 Degree C
- Class 180 Degree C
- Class 220 Degree C

Heat rise of a solenoid using copper magnet wire may be calculated by the following formula:

$$\text{Heat Rise Deg. C.} = \left[\left(\frac{R_{HOT} - R_{COLD}}{R_{COLD}} \right) (234.5 + t_1) - (t_2 - t_1) \right]$$

Where: R_{HOT} = resistance at end of test
R_{COLD} = resistance at beginning of test
t₁ = ambient temp at beginning of test
t₂ = ambient temp at end of test

How To Increase DC Solenoid Life Expectancy

LOAD APPLICATION

Proper alignment of plunger and load is important. Side loading, that is, loading which is not centered directly along the line of plunger travel, should be avoided. The results of misalignment are premature wear of plungers and plunger bores and possible impairment of seating. For these reasons it is desirable that solenoids be operated in a vertical position (plunger moving vertically) whenever possible.

POWER INPUT

Selection of a solenoid which most closely matches the mechanical load requirement is most desirable. Energy in excess of that required to do the work required must be dissipated. If the extra force imparted to the plunger is not used either by the load or by some spring cushioning means, the energy will be dissipated at the time of impact of the plunger against the plug. This excessive impacting causes early failure of the unit.

ANTI-BOTTOMING

The single most effect technique to increase the life of a DC solenoid is to prevent the metal to metal contact between plug and plunger. This can be accomplished by using a non-metallic plunger stop, either on the outside of the solenoid or at the interface between plug and plunger on the inside. In some cases, longevity can be increased by a factor of 50 or more by this means. It must be understood that the gap introduced between plug and plunger

must be taken into account insofar as the force delivered by the solenoid is concerned. As an example, if the stroke is to be .250" and the gap between the plug and the plunger is .050", the useable force will read at the .300" stroke curve on the NI chart.

SPEED OF OPERATION

The speed of operation of a DC solenoid is dependent upon the input power (NI), the stroke and the load against which it operates and to some degree upon its orientation, whether vertical, horizontal or other. The operate times shown on the data and specification sheets are typical at the values of NI, stroke, load and orientation indicated. Operate time will increase with an increase of load and stroke and a decrease in NI input. Conversely, any decrease in load and stroke or increase in NI will shorten operate time.

HOLDING FORCE

The value of holding forces shown on three of the NI charts for each solenoid series are typical for the value of NI indicated. Holding force at other values of NI may be estimated by interpolation.

As will be noticed, the LT versions of any series exhibit lower "holding forces" than their counterpart (T) versions. This is because the LT's are "anti-bottoming" units, and the holding forces indicated are the forces the solenoids hold against their anti-bottoming means.

AC Solenoids

The AC solenoids shown in this catalog are dimensionally the same as their DC counterparts, except the laminated #12, #14, #16 and #18 which have no DC counterparts. The AC units differ significantly in performance, however. In AC solenoids, a relatively high inrush current occurs which decreases as the plunger moves toward the seated position.

In general, this high inrush current provides higher forces at longer strokes than the DC versions. The plunger must seat properly for the current to be at its minimum. For this reason, an AC solenoid may never incorporate anti-bottoming features to reduce impact or increase life. If the plunger is not allowed to seat completely, overheating will result.

AC 50-60 HZ Operation

AC solenoids in this catalog are designed for 60 Hz operation, but are also available for 50 Hz.

For best performance, a solenoid with a coil designed for the exact supply frequency should be used. A 50 Hz coil will not develop the rated force on

60 Hz. A 60 Hz coil will tend to overheat when operated at 50 Hz. For some applications, a dual frequency 50-60 HZ coil can be used. Consult factory for details.

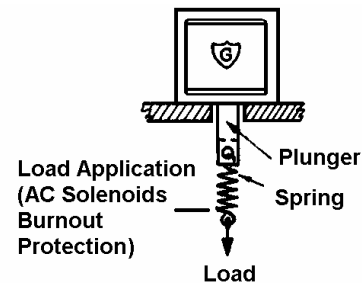
Load Alignment

Alignment of load and solenoid on AC units is even more important than on DC units. The solenoid should be mounted and linked to the load so the plunger is free to move in a straight line.

When the solenoid is energized, the plunger must be free to center itself in the coil and seat firmly. If this is not done, the unit may buzz and is likely to overheat.

Overload Protection

If the possibility exists, in application, that the load on the unit could ever "stall" the plunger, some means of protection against overheating should be employed. This could be a fuse in the circuit, a built-in thermal cut-out, or the application of the load through a spring. The spring will provide the protection only if it will allow the complete seating of the plunger when the load is stalled.



Speed of Operation

As with a DC solenoid, the speed of operation of an AC solenoid is a function of the power input, load and stroke; but in addition, the operate time of the AC unit varies, dependent upon the point in the power cycle

at which the solenoid is energized. If a consistent operate time is required, a DC solenoid should be used.

Hum

An AC solenoid will never be completely silent, but any hum can be held to a minimum by assuring

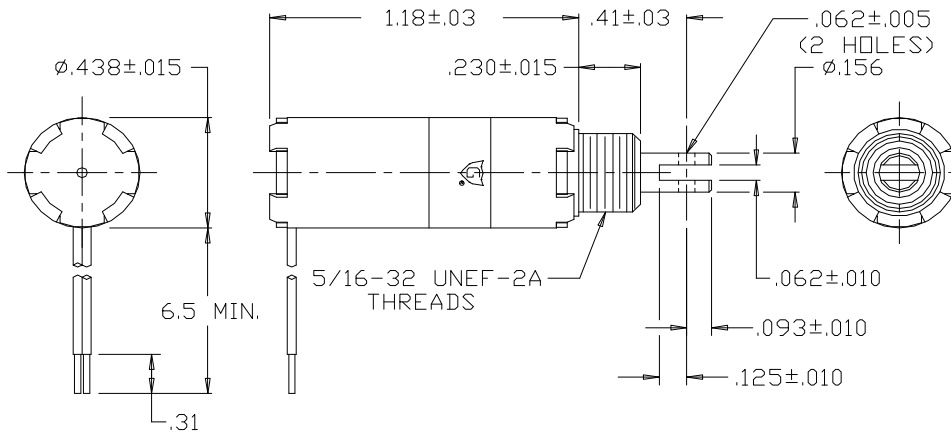
that the plunger seats firmly. Any wear or dirt on the plunger will cause excessive noise as well as overheating.

Model T3.5x9 (DC)

Tubular-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: .61 oz.
 Plunger Weight: .11 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
T3.5x9-I-12	A420-062658-06	Intermittent	12VDC	31.1	4.9	386
T3.5x9-C-12	A420-062658-05	Continuous	12VDC	60.2	2.5	199
T3.5x9-I-24	A420-062658-01	Intermittent	24VDC	122	5	197
T3.5x9-C-24	A420-062658-02	Continuous	24VDC	254	2.4	94

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	3	1	0.5	n/a	n/a	n/a	n/a	n/a	20
Intermittent Duty	5	2	1	n/a	n/a	n/a	n/a	n/a	21

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

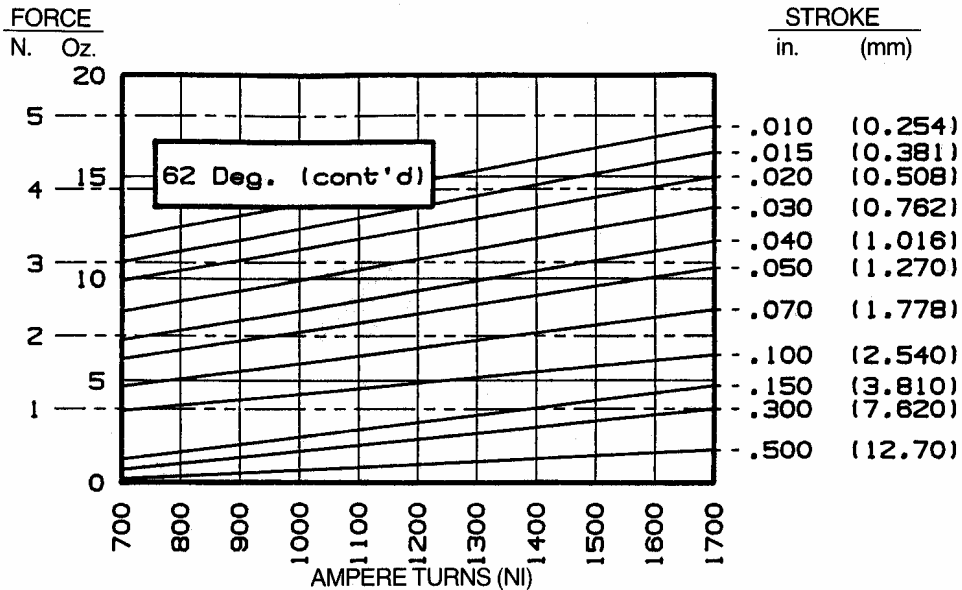
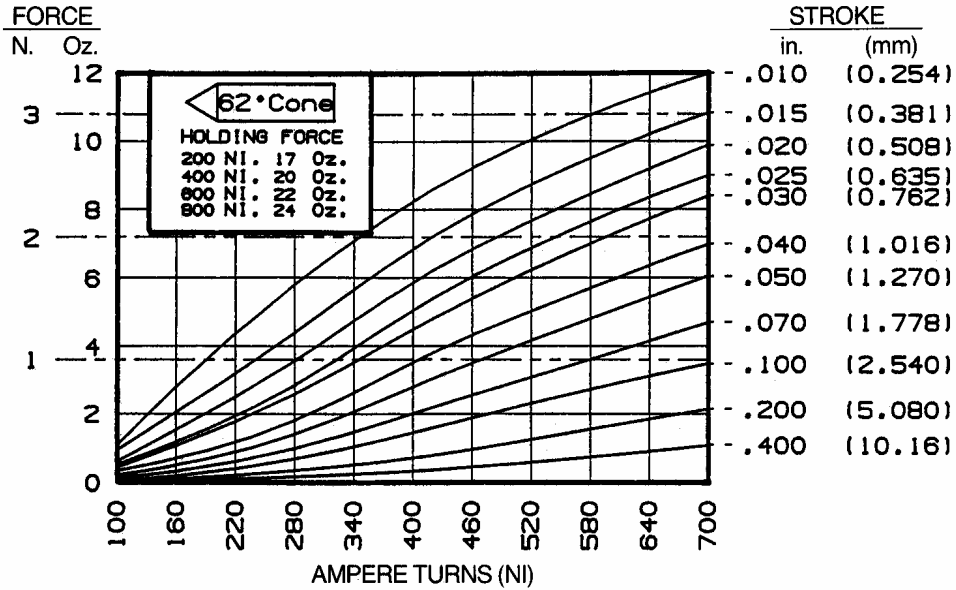
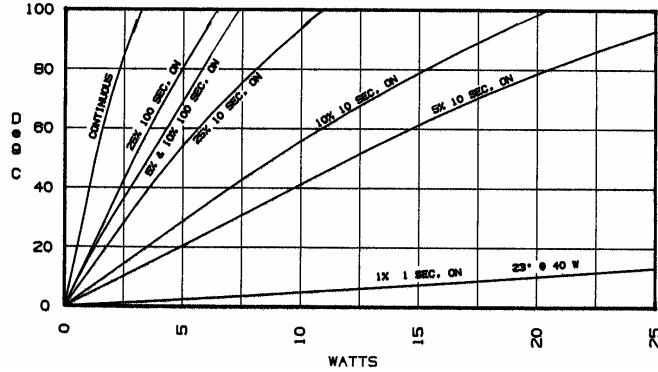
25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model T3.5x9 (DC)

HEAT RISE

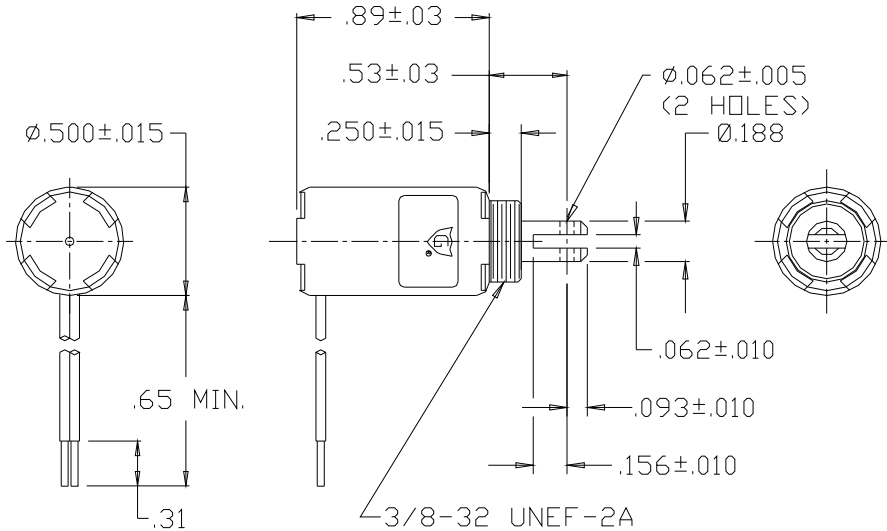


Model T4x7 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: .58 oz.
 Plunger Weight: .14 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
T4x7-I-12	A420-066004-00	Intermittent	12VDC	32.3	4.7	372
T4x7-C-12	A420-066003-00	Continuous	12VDC	62.5	2.4	192
T4x7-I-24	A420-066006-00	Intermittent	24VDC	131	4.6	183
T4x7-C-24	A420-066005-00	Continuous	24VDC	270	2.2	89

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	3	1	0.5	n/a	n/a	n/a	n/a	n/a	20
Intermittent Duty	6	2	1	n/a	n/a	n/a	n/a	n/a	24

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

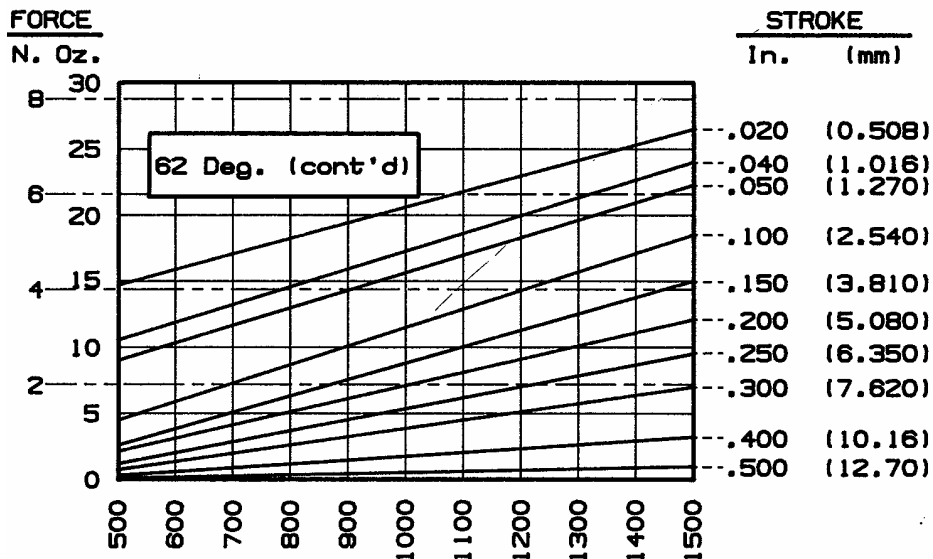
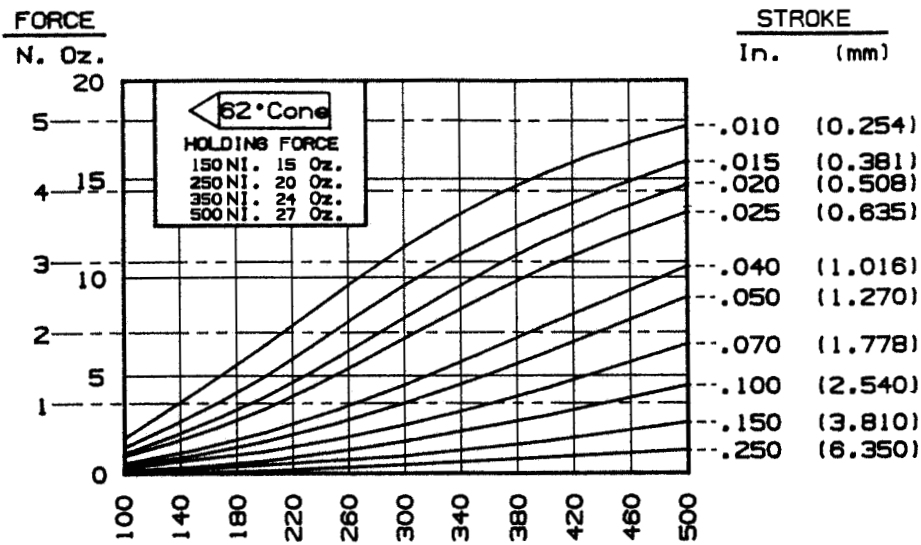
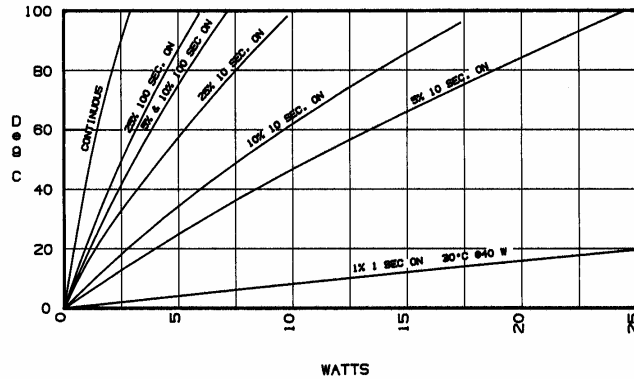
25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model T4x7 (DC)

HEAT RISE

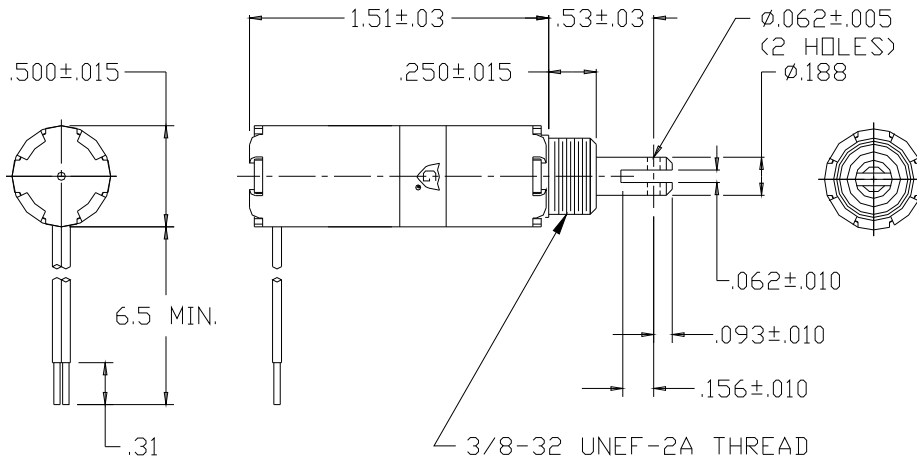


Model T4x12 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 1.00 oz.
 Plunger Weight: .28 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
T4x12-I-12	A420-066012-00	Intermittent	12VDC	24.7	6.1	486
T4x12-C-12	A420-066011-00	Continuous	12VDC	49.8	3.0	241
T4x12-I-24	A420-066014-00	Intermittent	24VDC	96.7	6.3	248
T4x12-C-24	A420-066013-00	Continuous	24VDC	195	3.1	123

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	4	2	1	n/a	n/a	n/a	n/a	n/a	22
Intermittent Duty	7	3	1	n/a	n/a	n/a	n/a	n/a	25

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

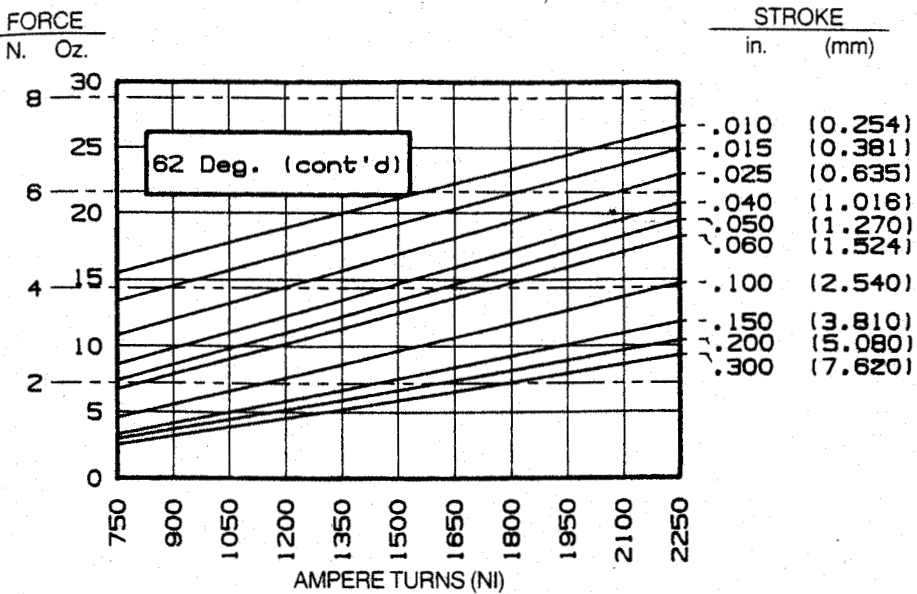
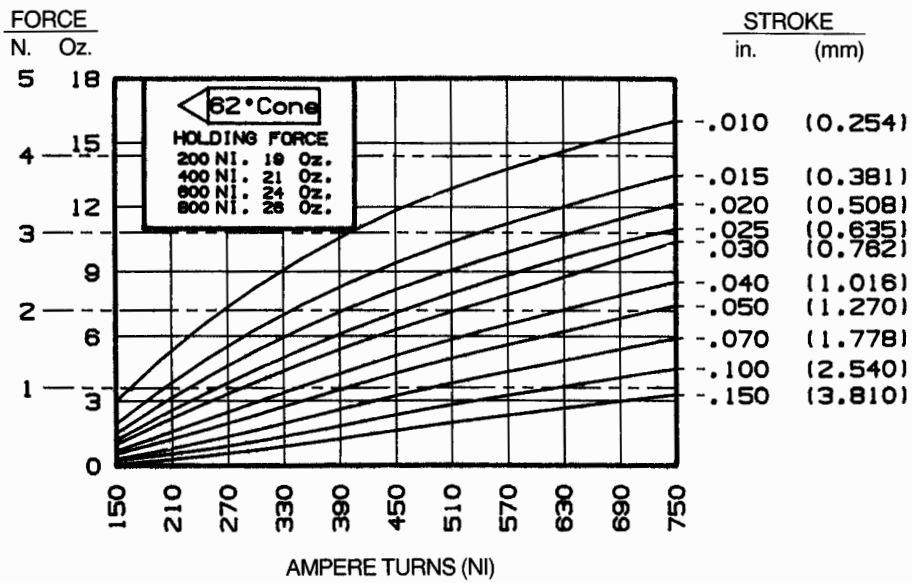
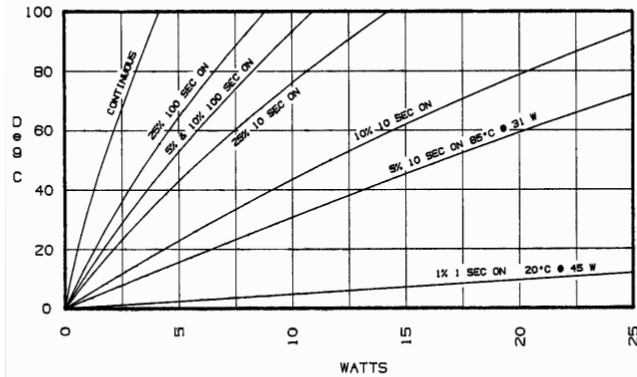
25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model T4x12 (DC)

HEAT RISE

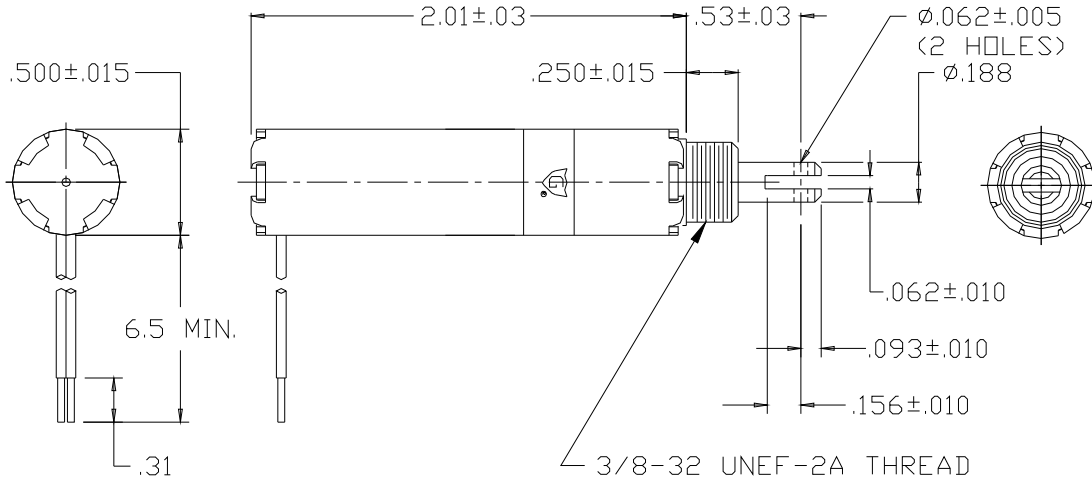


Model T4x16 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 1.35 oz.
 Plunger Weight: .36 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
T4x16-I-12	A420-066020-00	Intermittent	12VDC	17.7	8.5	678
T4x16-C-12	A420-066019-00	Continuous	12VDC	45.1	3.4	266
T4x16-I-24	A420-066022-00	Intermittent	24VDC	72.7	8.3	330
T4x16-C-24	A420-066021-00	Continuous	24VDC	173	3.5	139

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	5	3	1	n/a	n/a	n/a	n/a	n/a	23
Intermittent Duty	8	4	2	n/a	n/a	n/a	n/a	n/a	28

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

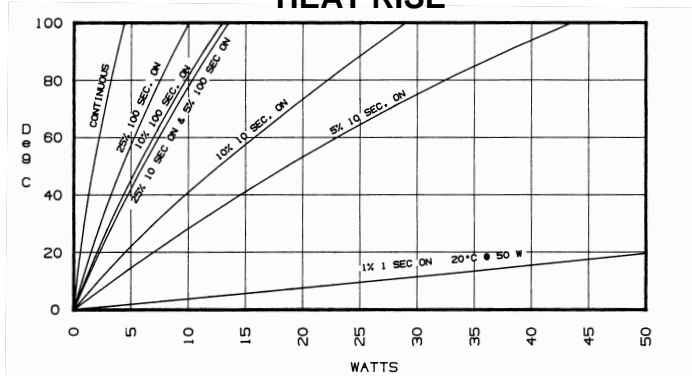
25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

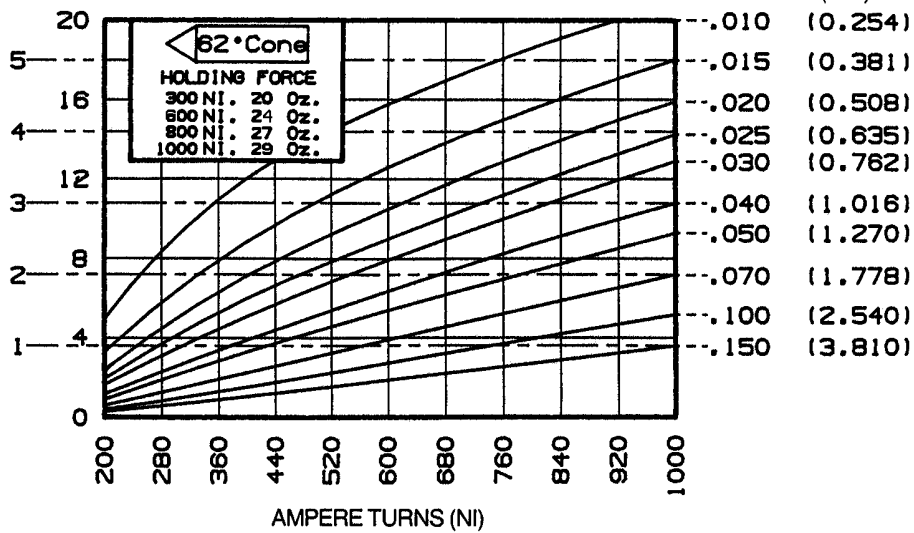
Model T4X16 (DC)

HEAT RISE



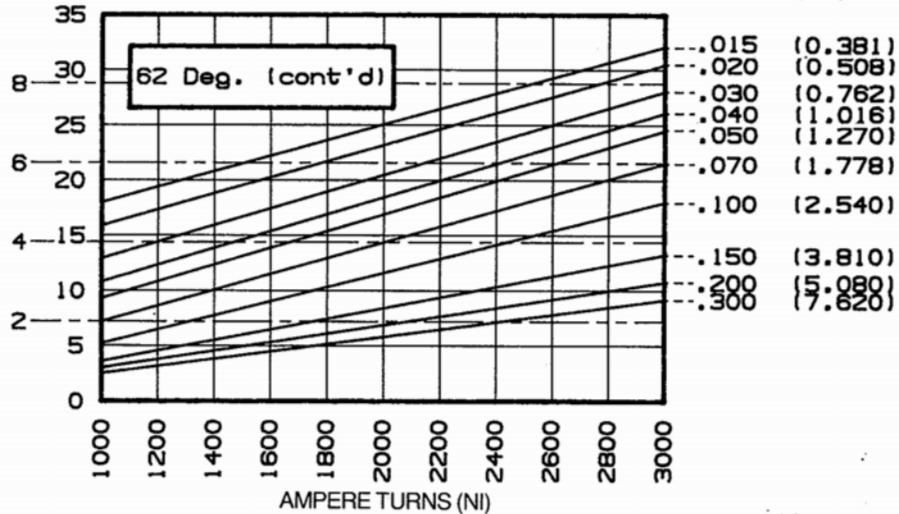
FORCE
N. Oz.

STROKE



FORCE
N. Oz.

STROKE
in. (mm)

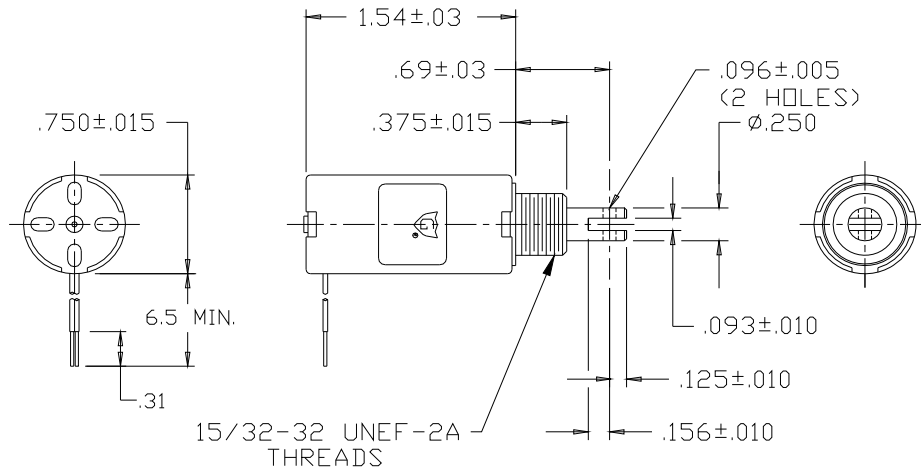


Model T6x12 (DC)

Tubular-Pull



ISO 9001 / AS9100 Certified Company
 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 2.34 oz.
 Plunger Weight: .42 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
T6x12-I-12	A420-066028-00	Intermittent	12VDC	12.1	12.5	992
T6x12-C-12	A420-066027-00	Continuous	12VDC	31.7	4.8	379
T6x12-I-24	A420-066030-00	Intermittent	24VDC	60.6	10	396
T6x12-C-24	A420-066029-00	Continuous	24VDC	121	5	198

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	17	9	5	2	n/a	n/a	n/a	n/a	48
Intermittent Duty	24	13	9	6	n/a	n/a	n/a	n/a	53

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

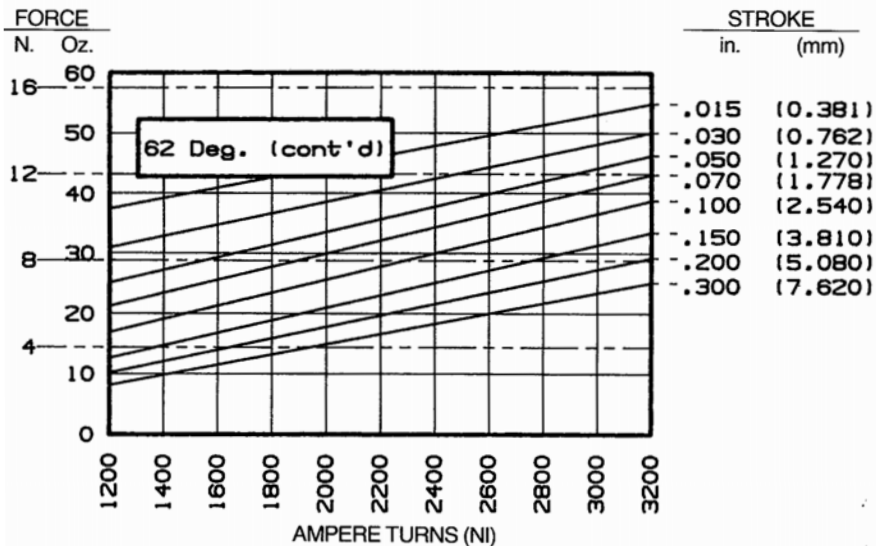
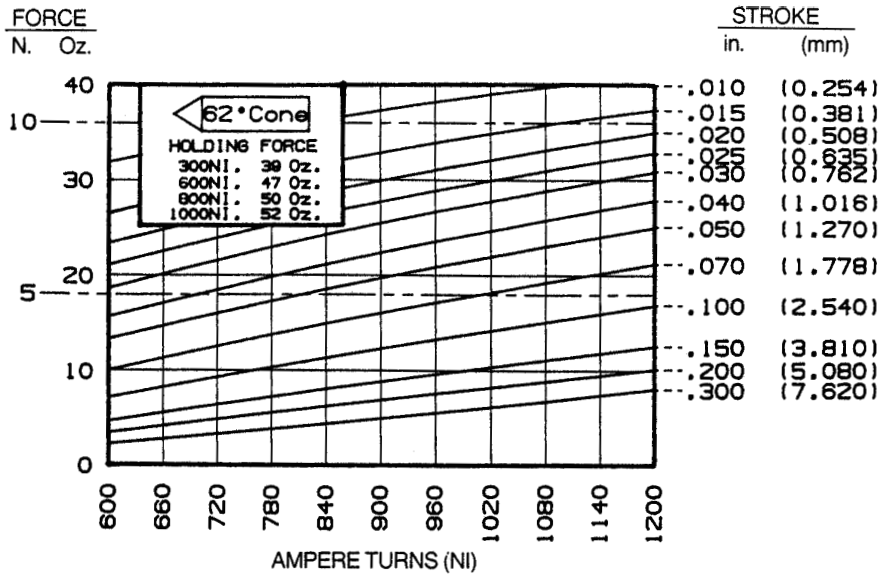
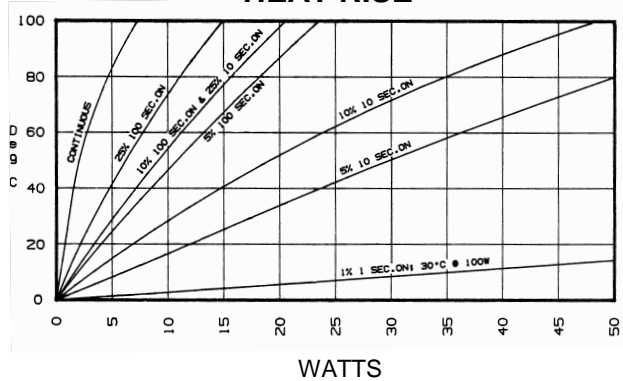
25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model T6x12 (DC)

HEAT RISE

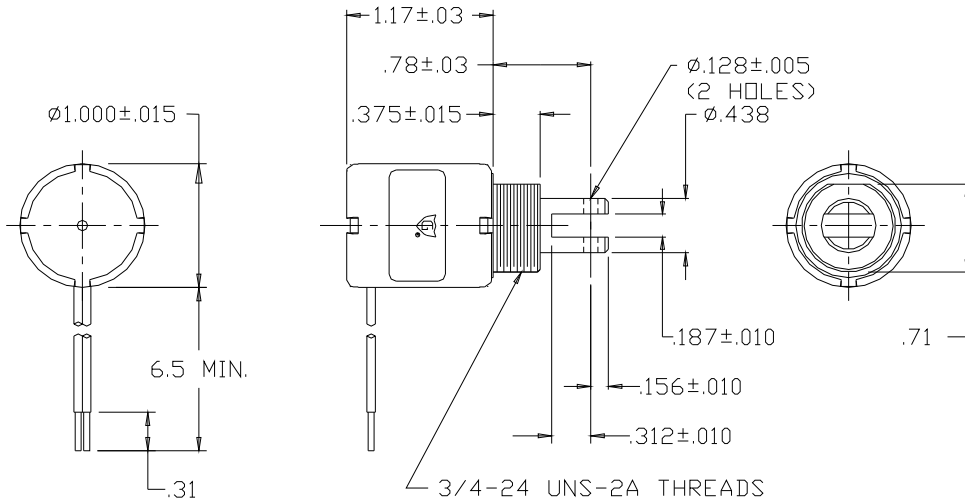


Model T8x9 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 3.46 oz.
 Plunger Weight: 1.03 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
T8x9-I-12	A420-066653-00	Intermittent	12VDC	10.9	13.9	1.1 A
T8x9-C-12	A420-066652-00	Continuous	12VDC	35.5	4.3	228 mA
T8x9-I-24	A420-066655-00	Intermittent	24VDC	44	13.7	545 mA
T8x9-C-24	A420-066654-00	Continuous	24VDC	135	4.5	178 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	20	10	4	1	0.5	n/a	n/a	n/a	96
Intermittent Duty	42	30	15	6	2	n/a	n/a	n/a	128

UL Recognition

Recognized under the  Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

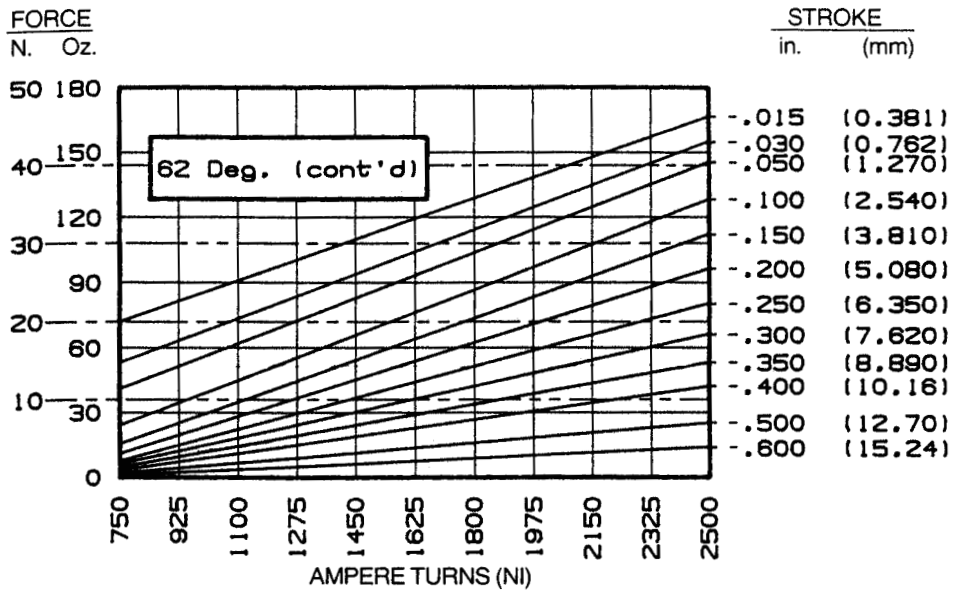
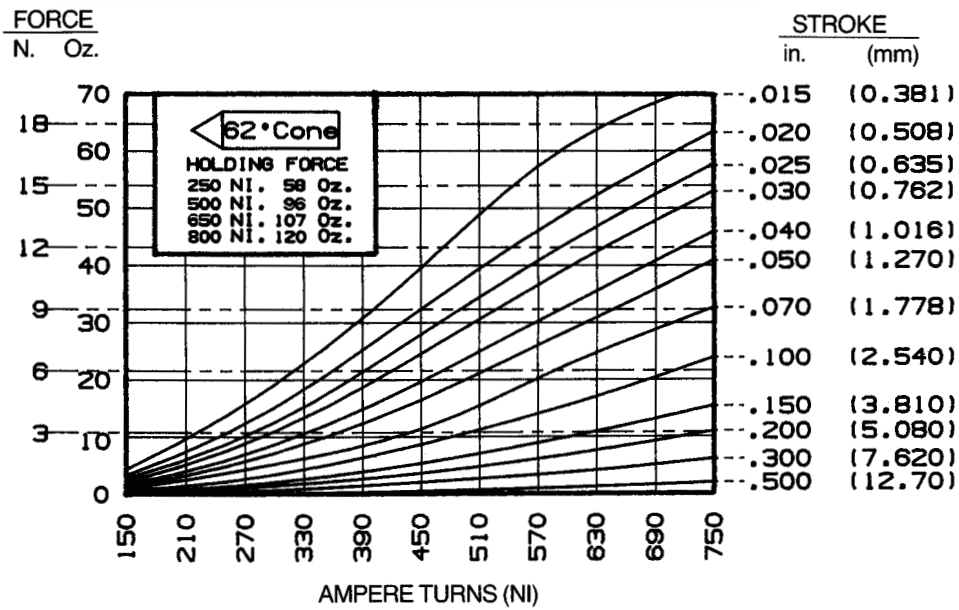
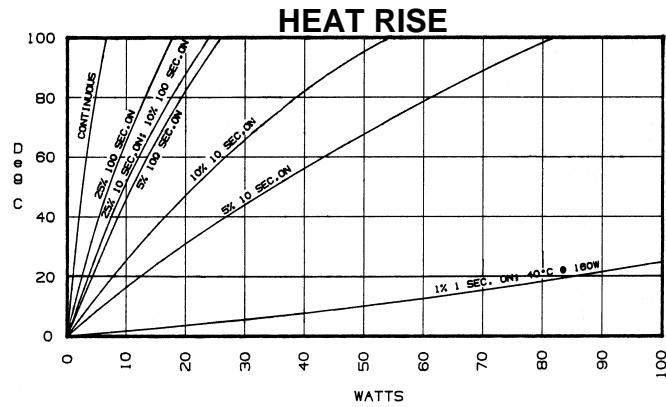
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model T8x9 (DC)

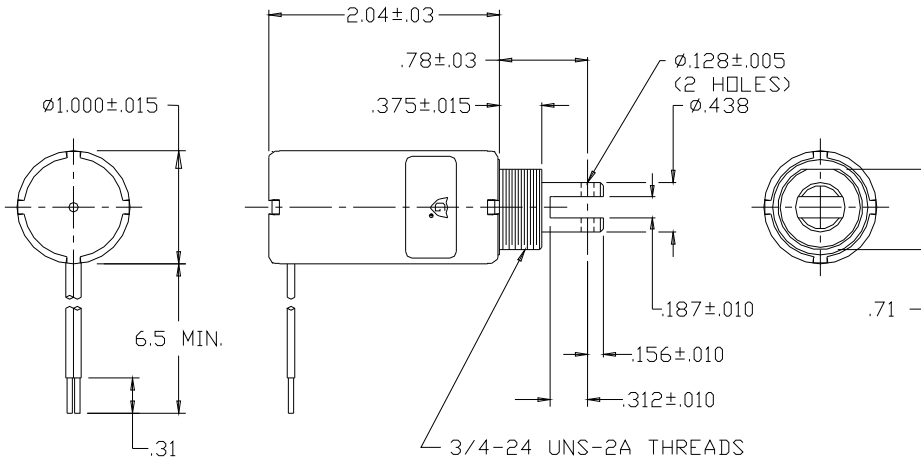


Model T8x16 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 5.80 oz.
 Plunger Weight: 1.57 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
T8x16-I-12	A420-066643-00	Intermittent	12VDC	9.3	16.3	1.29 A
T8x16-C-12	A420-066642-00	Continuous	12VDC	28.3	5.3	424 mA
T8x16-I-24	A420-066645-00	Intermittent	24VDC	36.1	16.8	665 mA
T8x16-C-24	A420-066644-00	Continuous	24VDC	110	5.5	218 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	30	18	11	5	4	3	2	n/a	103
Intermittent Duty	60	40	25	19	15	10	8	n/a	125

UL Recognition

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Continuous Duty

100% 'On' Time

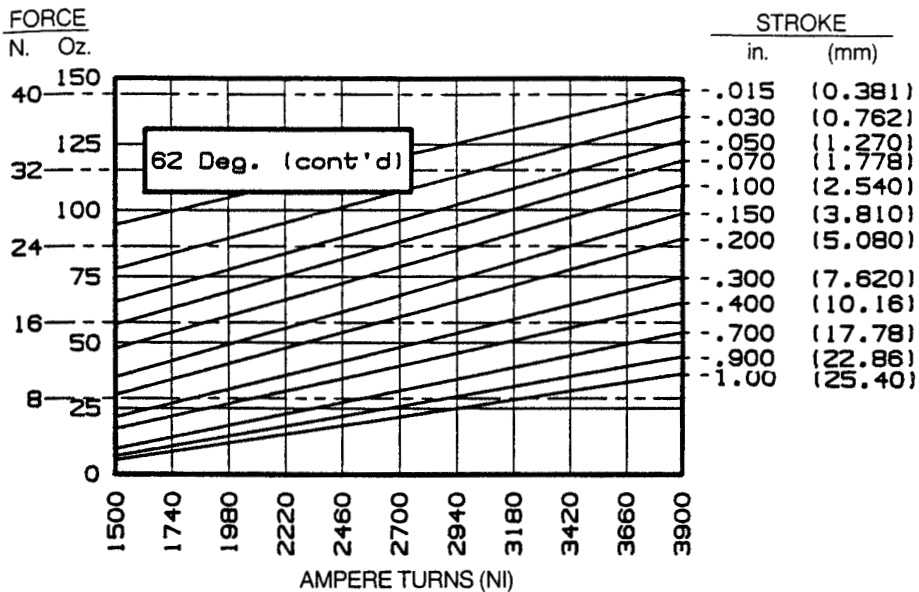
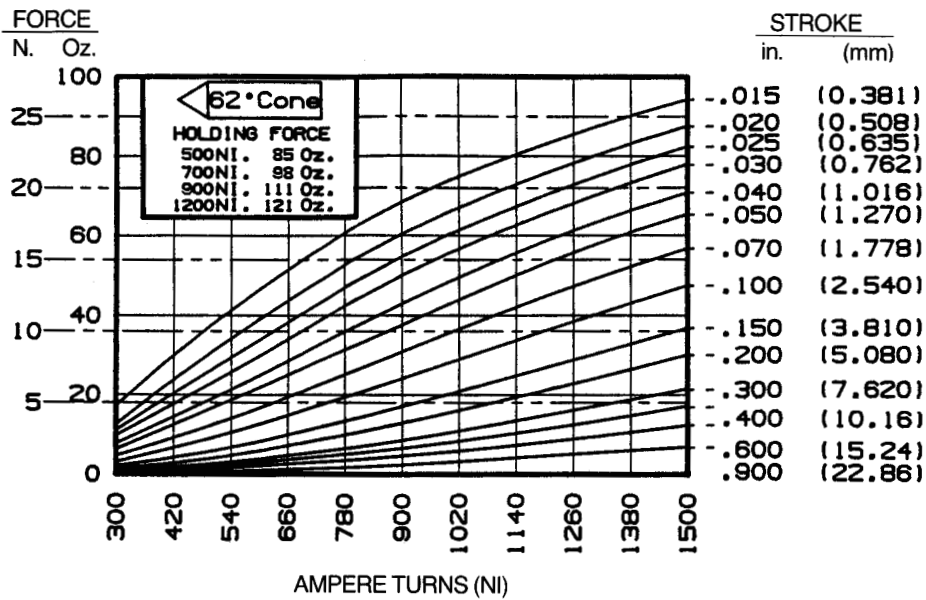
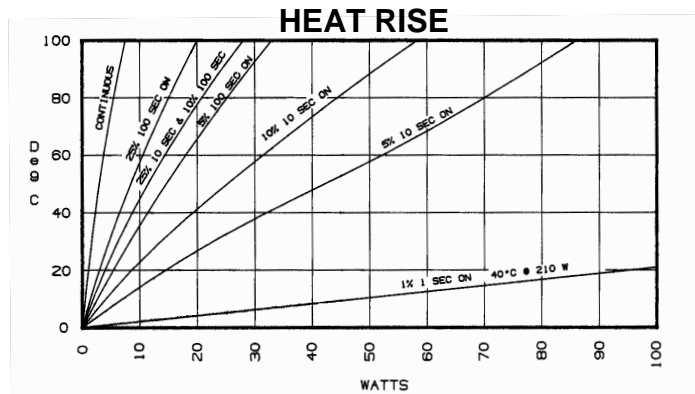
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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Model T8x16 (DC)

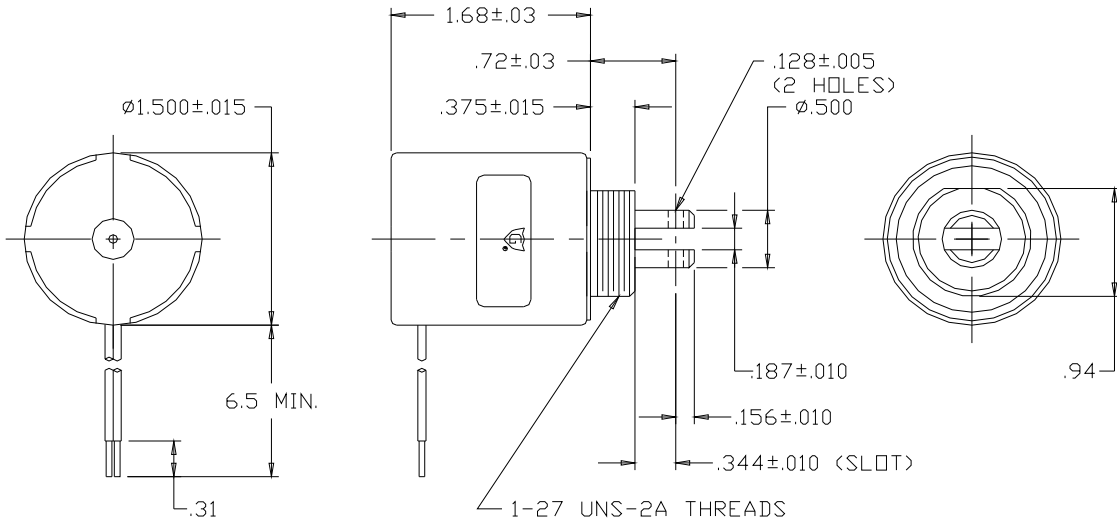


Model T12x13 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 10.2 oz.
 Plunger Weight: 1.6 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
T12x13-I-12	A420-066052-00	Intermittent	12VDC	7.3	20.7	1.64 A
T12x13-C-12	A420-066051-00	Continuous	12VDC	22.8	6.6	526 mA
T12x13-I-24	A420-066054-00	Intermittent	24VDC	28.4	21.3	845 mA
T12x13-C-24	A420-066053-00	Continuous	24VDC	90.4	6.7	265 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	80	40	18	10	5	2	1	n/a	188
Intermittent Duty	140	104	55	30	20	15	7	n/a	215

UL Recognition

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Continuous Duty

100% 'On' Time

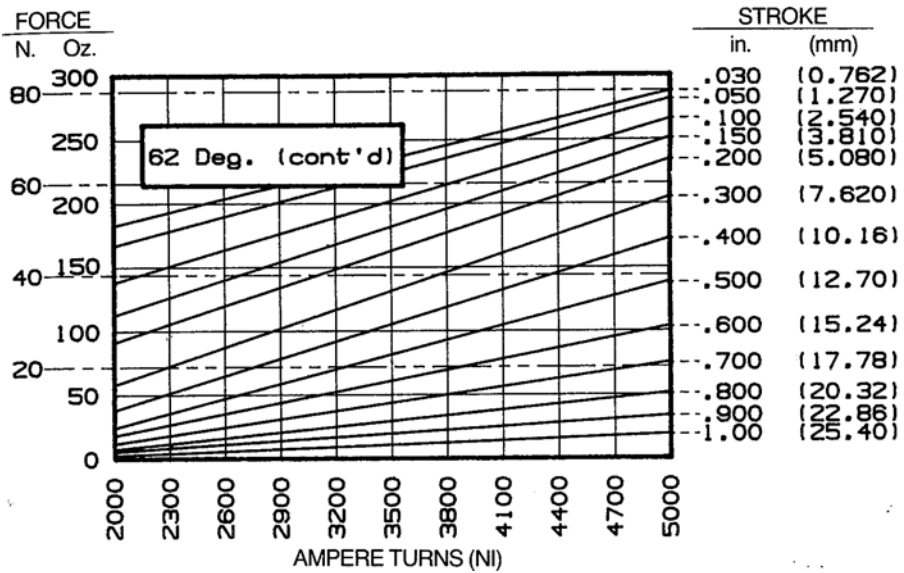
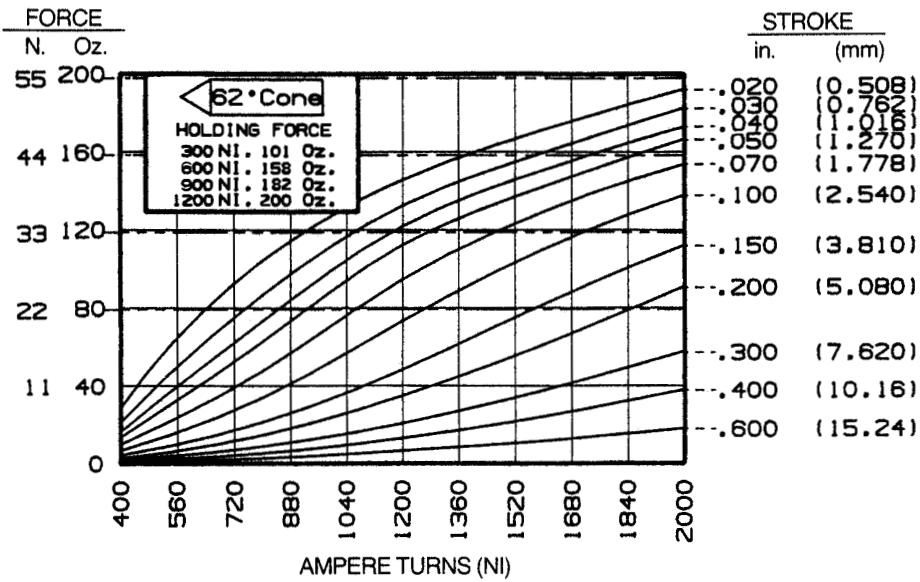
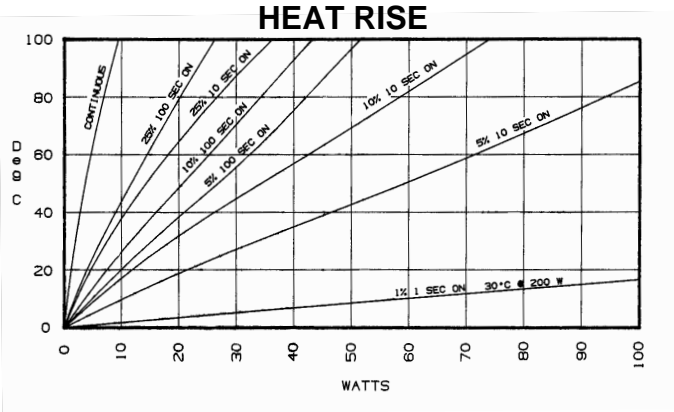
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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Model T12x13 (DC)

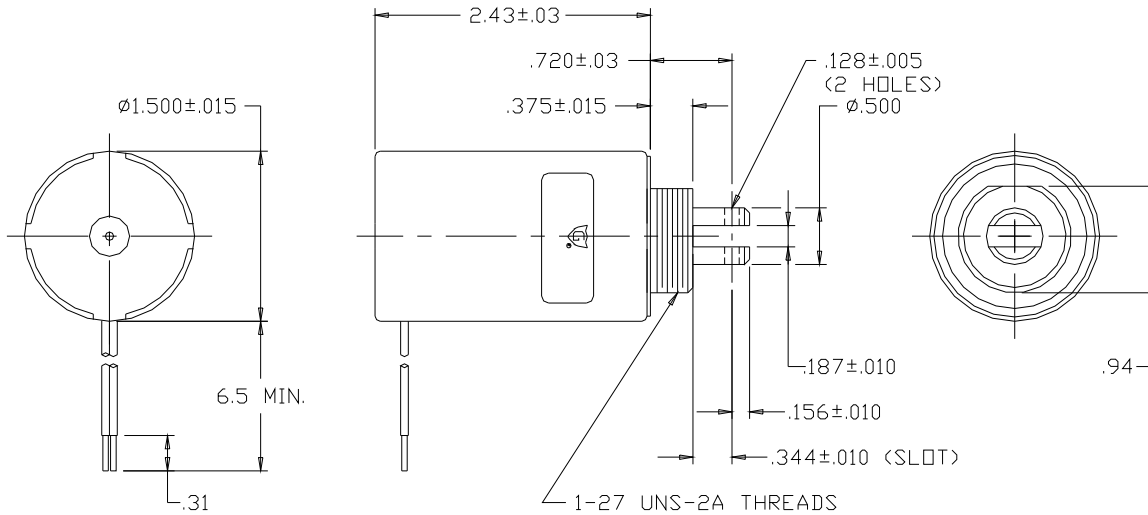


Model T12x19 (DC)

Tubular-Pull



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 10.2 oz.
 Plunger Weight: 1.6 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
T12x19-I-12	A420-066843-00	Intermittent	12VDC	5.6	27	2.14 A
T12x19-C-12	A420-066842-00	Continuous	12VDC	17.5	8.6	686 mA
T12x19-I-24	A420-066845-00	Intermittent	24VDC	22.1	27.4	1.09 A
T12x19-C-24	A420-066844-00	Continuous	24VDC	68	8.9	353 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	100	60	30	20	18	15	10	8	179
Intermittent Duty	145	110	70	50	40	35	27	20	205

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

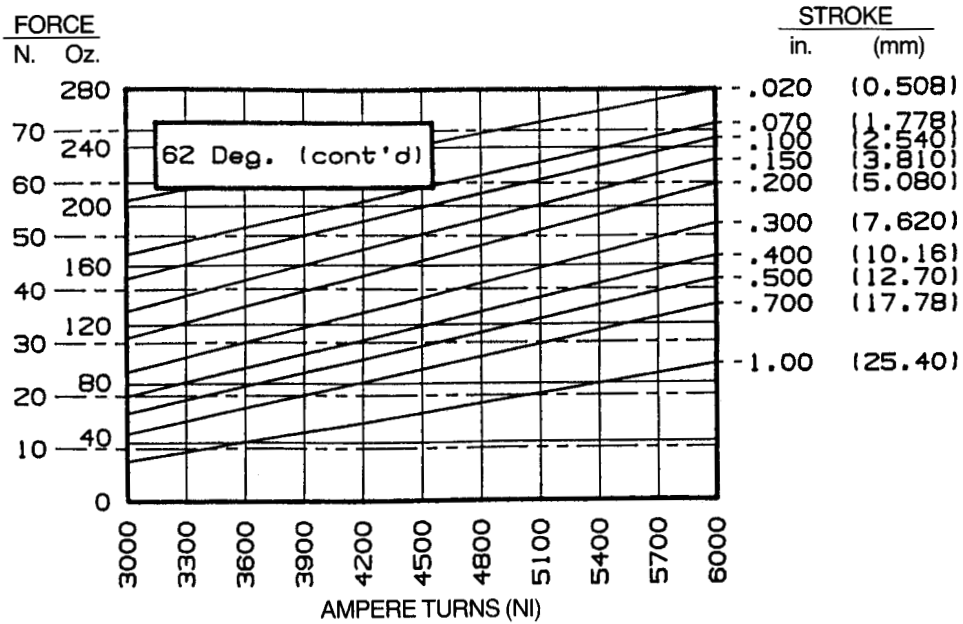
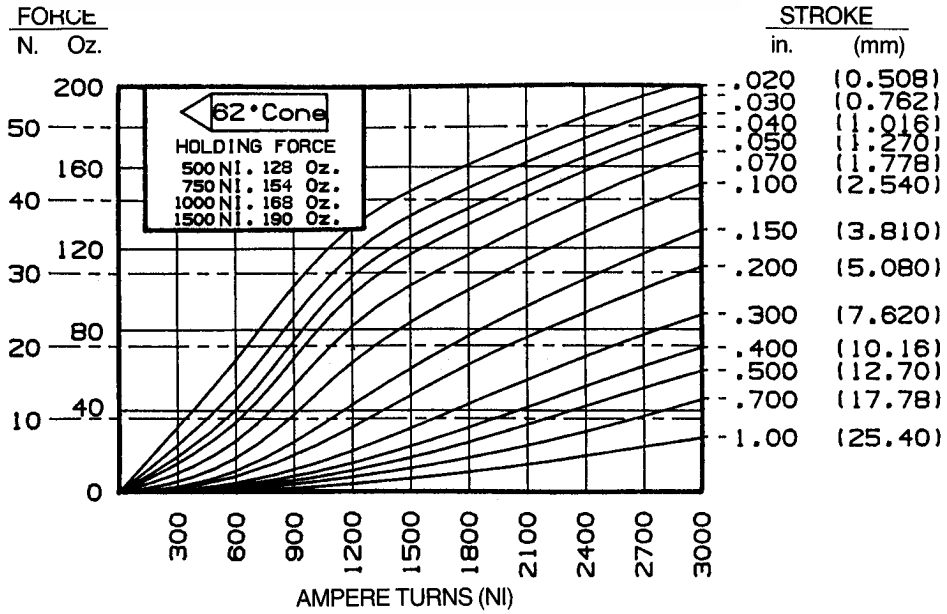
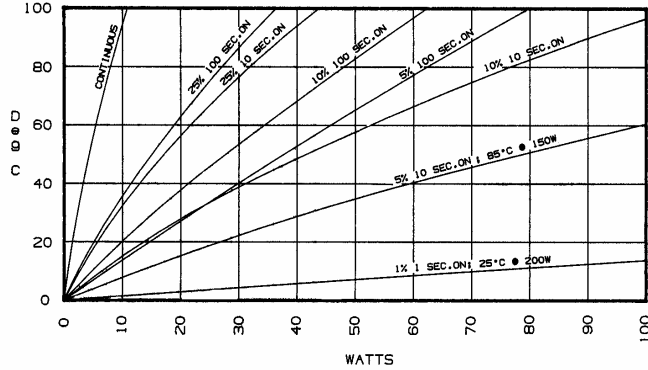
25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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Model T12x19 (DC)

HEAT RISE

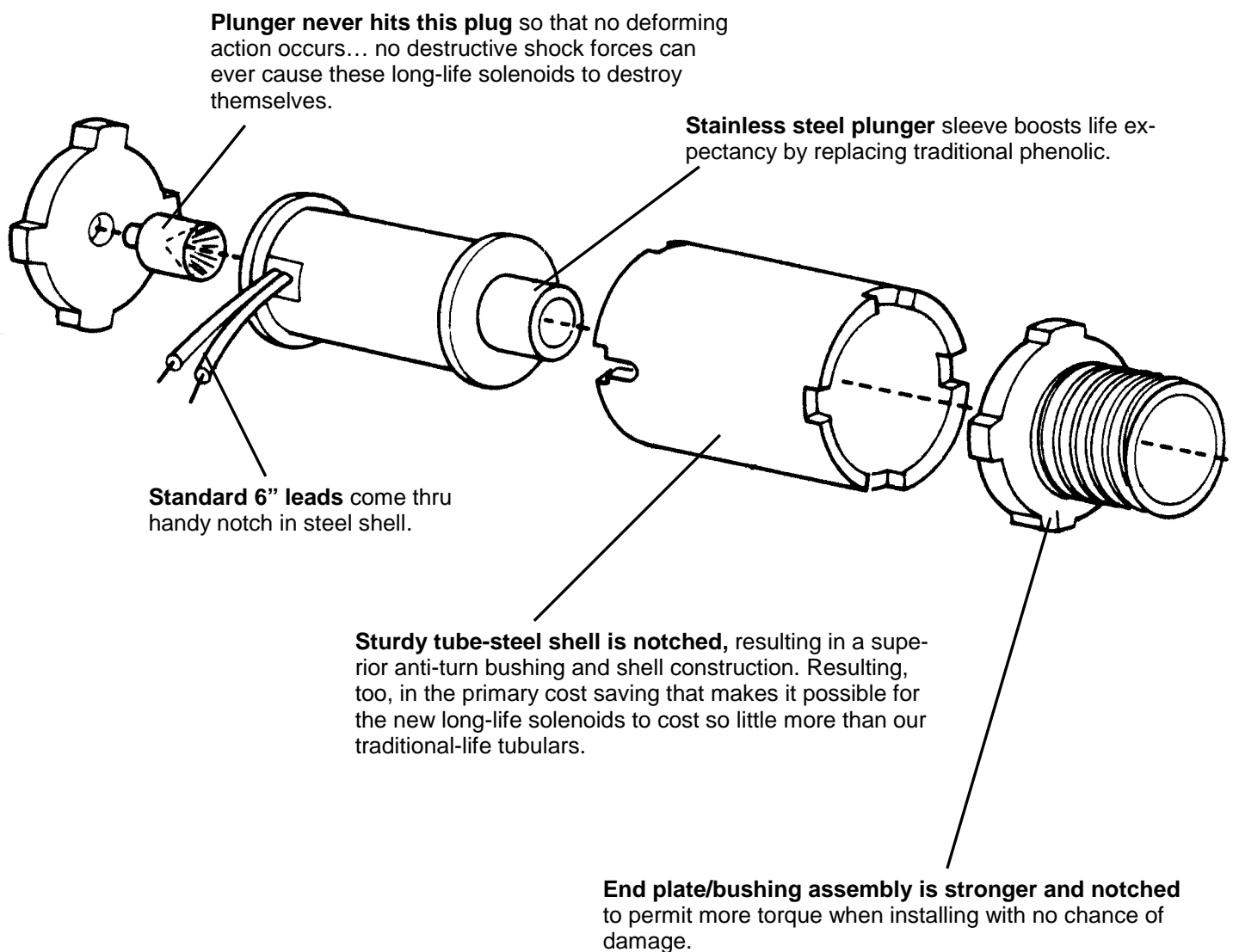


Long-Life “LT” Tubular Solenoids

This unique design increases mechanical life. The same design holds the cost line to a minimal premium over our traditional-life “T” tubular solenoids. Available in eight models to fit every application.

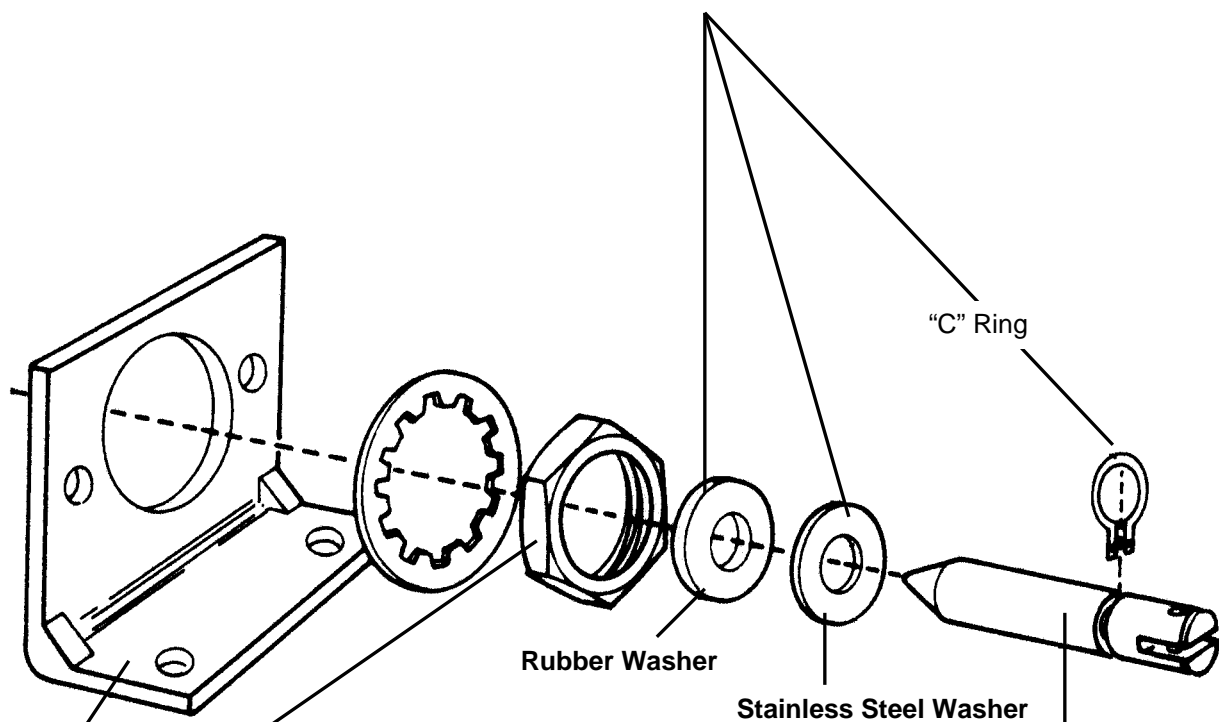
Ideal for use in business machines, computers, testing equipment, medical electronic equipment, *any place* where a longer life expectancy is required. Ideal, too, for high reliability applications where accessibility for repair is difficult or costly in downtime.

Where your profits can depend on long, reliable service, you can depend on Guardian’s long-life “LT” solenoids.



Lasts a lot longer... at just a little more cost

Plunger stop is moved to the front of the plunger where it seats on the sturdy end plate/bushing assembly. Where a unique design uses a rubber washer to absorb and cushion deforming forces... plus a stainless steel washer for strength... plus a "C" ring retainer to hold it all together.



These solenoids practically install themselves! Clean design allows side-by-side mounting. Just insert threaded bushing thru installation hole and tighten furnished nut on lock washer.

Teflon plunger coating is standard.

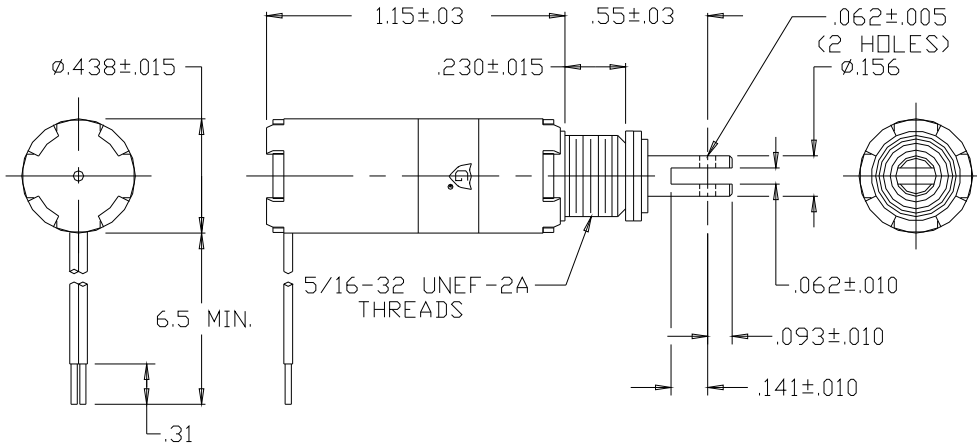
Or, mount with special bracket furnished with each solenoid.

Model LT3.5x9 (DC)

Tubular-Pull, Long-Life



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: .6 oz.
 Plunger Weight: .1 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
LT3.5x9-I-12	A420-064803-00	Intermittent	12VDC	27	5.6	444
LT3.5x9-C-12	A420-064802-00	Continuous	12VDC	52.4	2.9	229
LT3.5x9-I-24	A420-064805-00	Intermittent	24VDC	105	5.8	229
LT3.5x9-C-24	A420-064804-00	Continuous	24VDC	221	2.7	109

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	3	1.5	1	n/a	n/a	n/a	n/a	n/a	1.5
Intermittent Duty	6	2	1.5	n/a	n/a	n/a	n/a	n/a	1.8

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

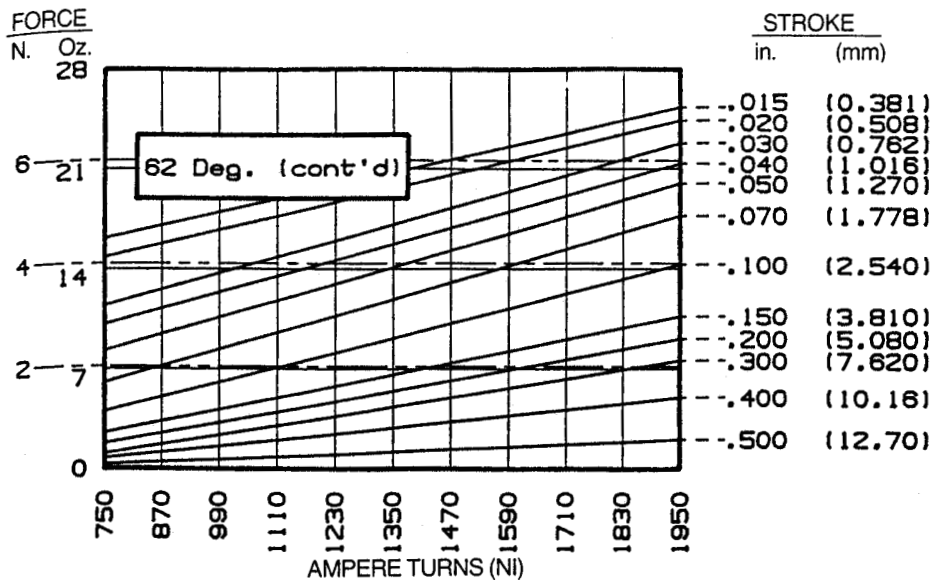
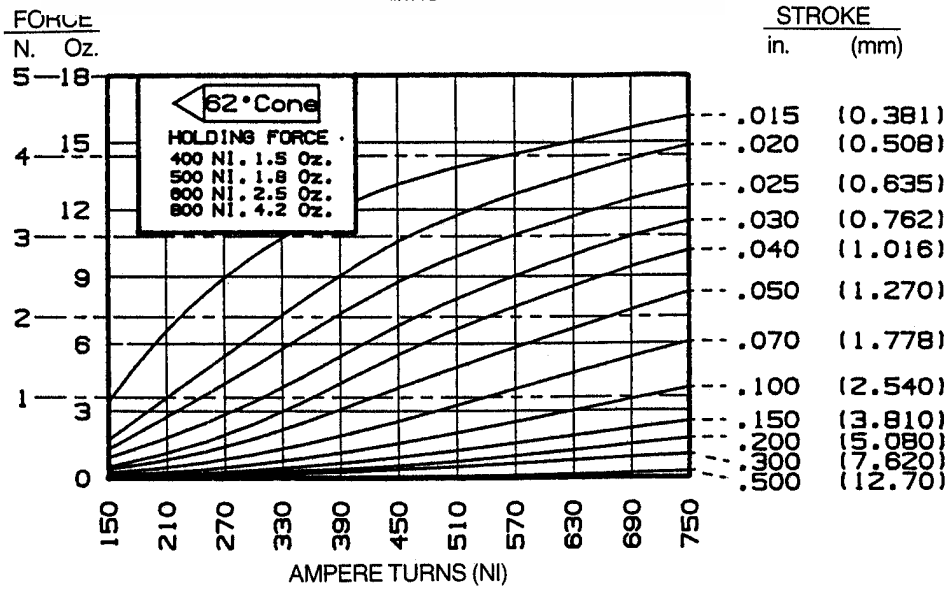
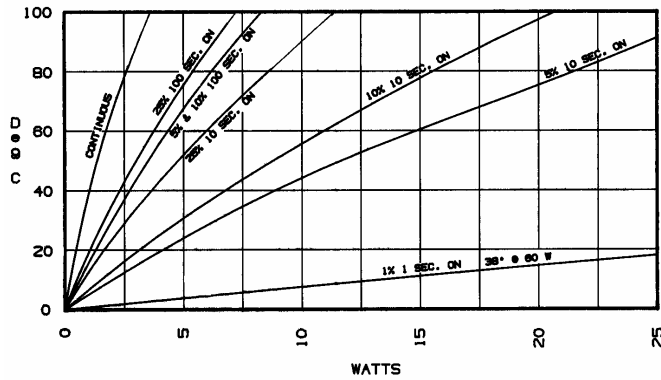
RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model LT3.5x9 (DC)

Tubular-Pull, Long-Life

HEAT RISE

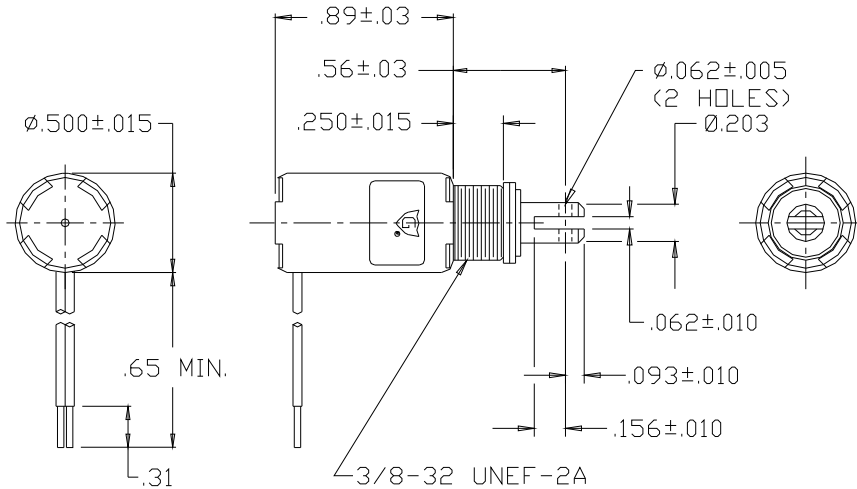


Model LT4x7 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: .71 oz.
 Plunger Weight: .15 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
LT4x7-I-12	A420-064811-00	Intermittent	12VDC	32.5	4.7	369
LT4x7-C-12	A420-064810-00	Continuous	12VDC	63.3	2.4	190
LT4x7-I-24	A420-064813-00	Intermittent	24VDC	121	5	198
LT4x7-C-24	A420-064812-00	Continuous	24VDC	264	2.3	91

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	3.5	2	0.5	n/a	n/a	n/a	n/a	n/a	3
Intermittent Duty	6	3	1	n/a	n/a	n/a	n/a	n/a	9

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

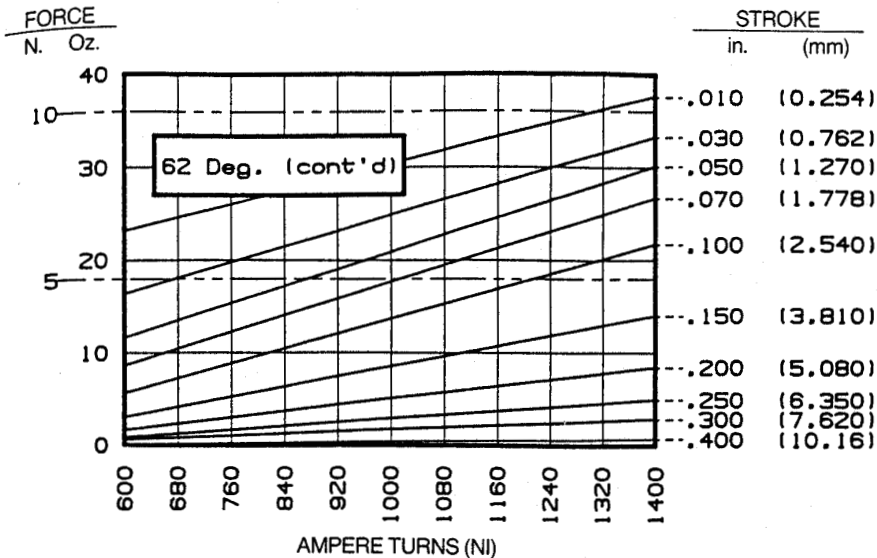
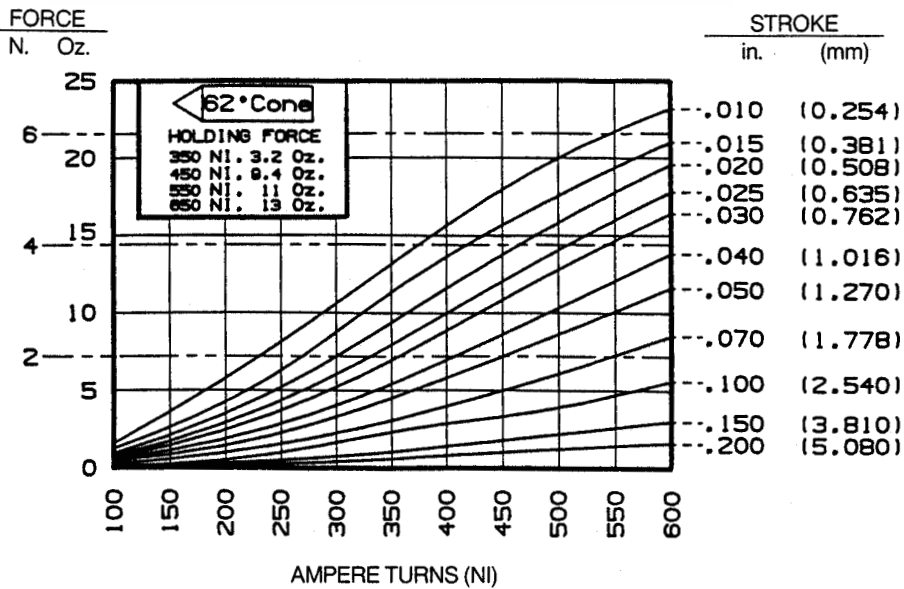
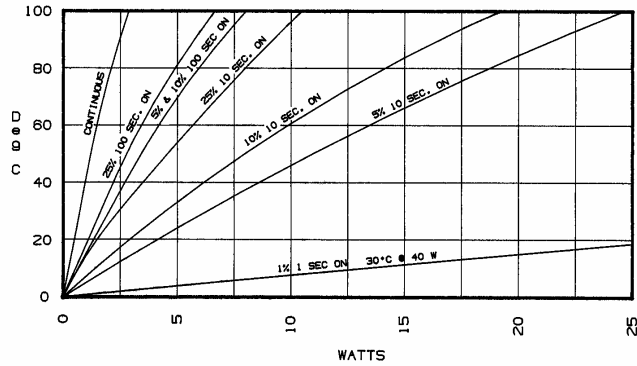
RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model LT4x7 (DC)

Tubular-Pull, Long-Life

HEAT RISE

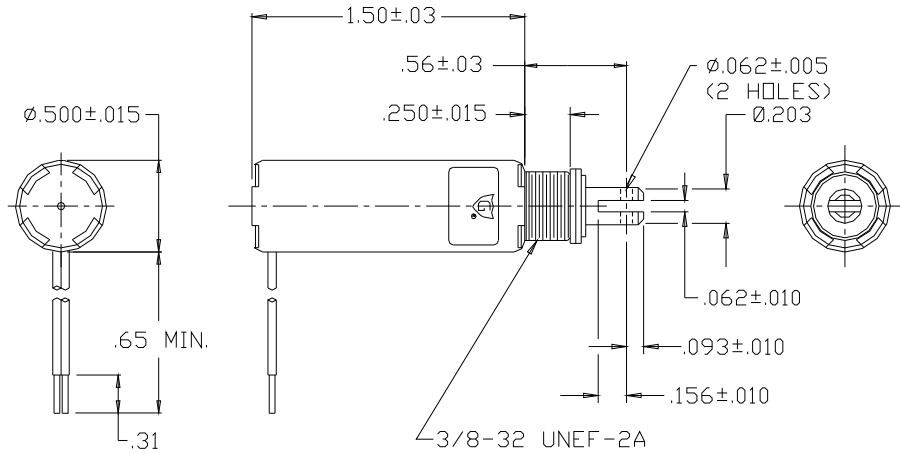


Model LT4x12 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).

Total Weight: 1.1 oz.
 Plunger Weight: .21 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
LT4x12-I-12	A420-064819-00	Intermittent	12VDC	19.2	7.9	625
LT4x12-C-12	A420-064818-00	Continuous	12VDC	49.3	3.1	243
LT4x12-I-24	A420-064821-00	Intermittent	24VDC	76.3	7.9	315
LT4x12-C-24	A420-064820-00	Continuous	24VDC	192	3.2	125

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	9	3	1.5	0.5	n/a	n/a	n/a	n/a	10
Intermittent Duty	16	8	3	1.5	n/a	n/a	n/a	n/a	18

UL Recognition

Recognized under the Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

Intermittent Duty

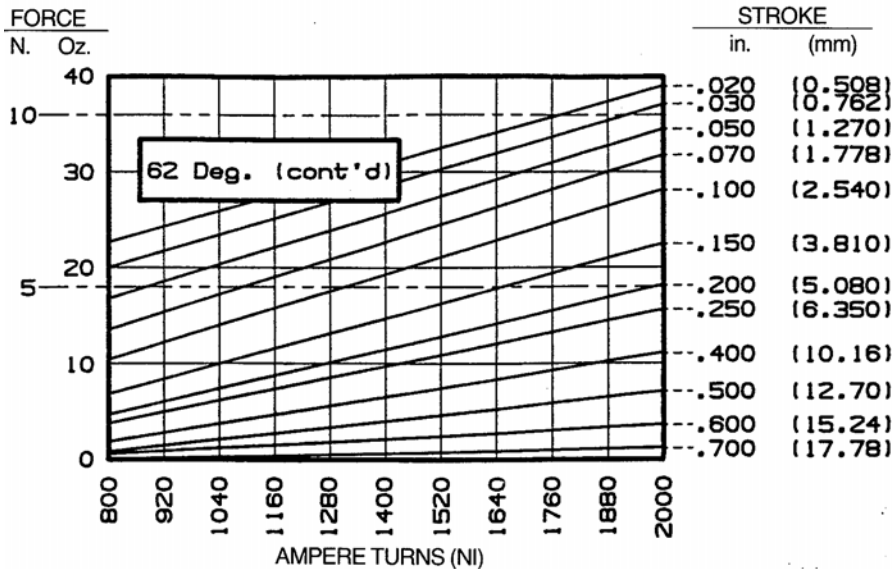
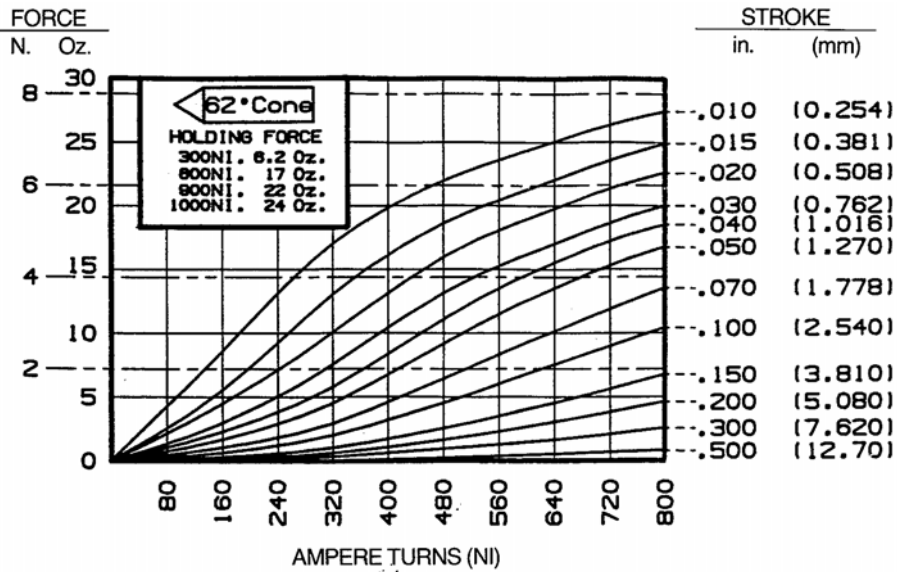
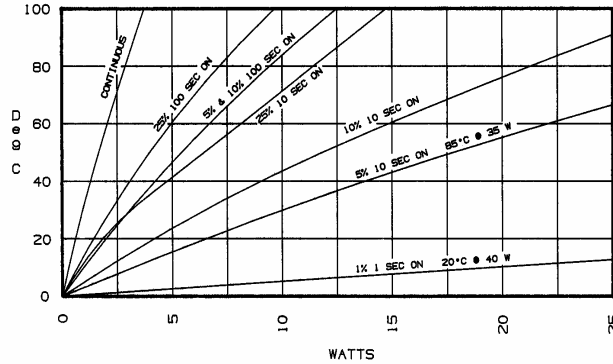
25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model LT4x12 (DC)

HEAT RISE

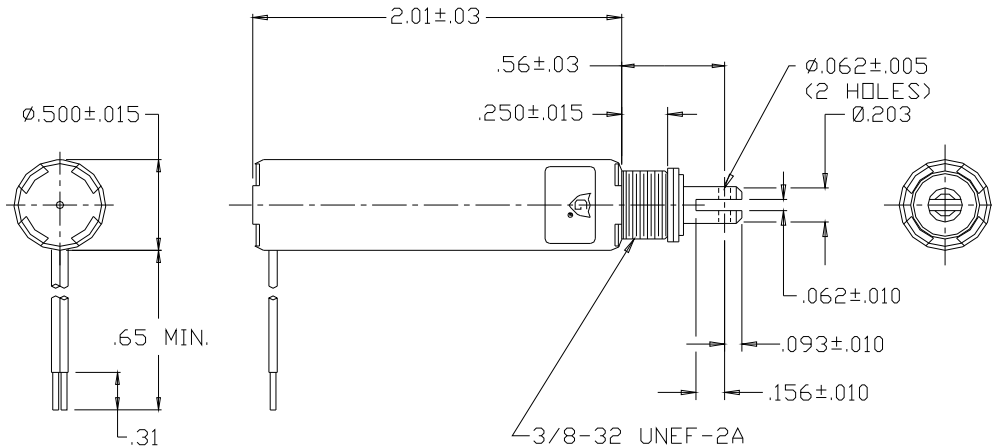


Model LT4x16 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 1.43 oz.
 Plunger Weight: .28 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
LT4x16-I-12	A420-064827-00	Intermittent	12VDC	14	10.8	857
LT4x16-C-12	A420-064826-00	Continuous	12VDC	42.5	3.6	282
LT4x16-I-24	A420-064829-00	Intermittent	24VDC	69.1	8.8	347
LT4x16-C-24	A420-064828-00	Continuous	24VDC	168	3.6	143

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	8	3	1	0.5	n/a	n/a	n/a	n/a	13
Intermittent Duty	14	7	3	1.5	n/a	n/a	n/a	n/a	17

UL Recognition

Recognized under the  Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

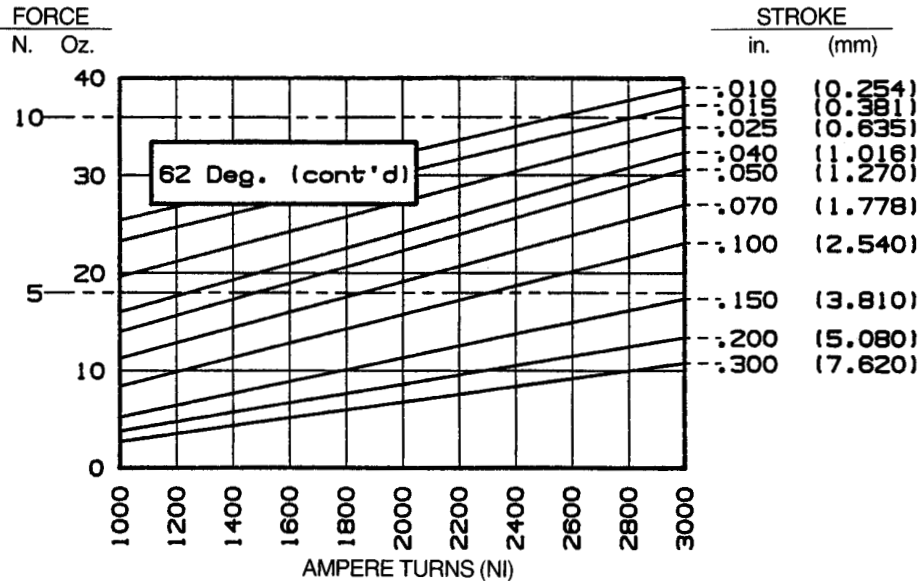
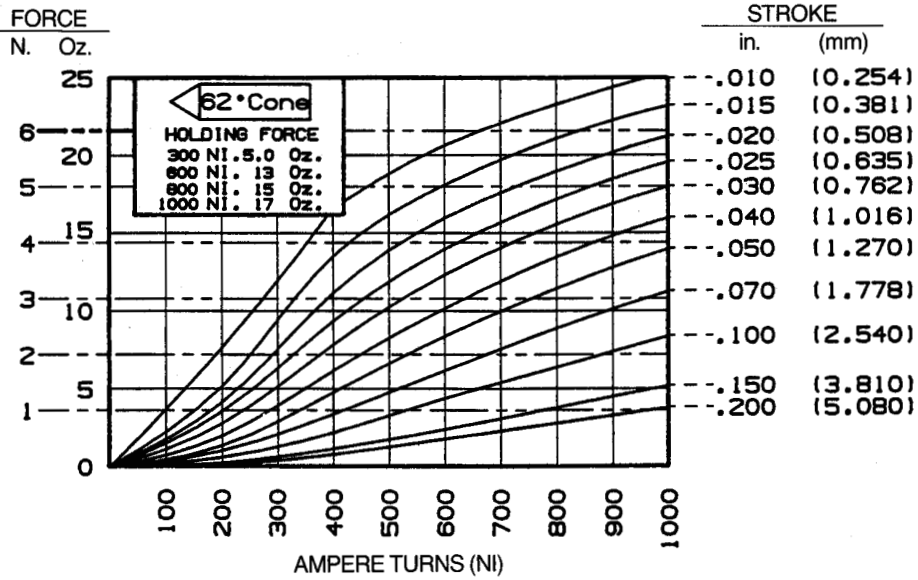
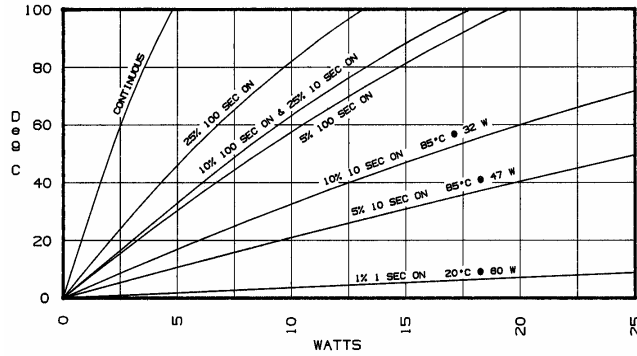
RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model LT4x16 (DC)

Tubular-Pull, Long-Life

HEAT RISE

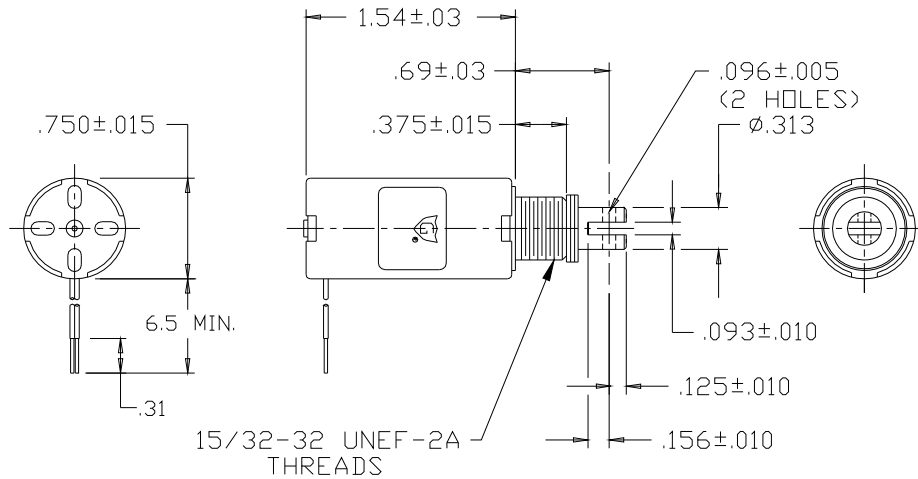


Model LT6x12 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 2.53 oz.
 Plunger Weight: .57 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
LT6x12-I-12	A420-064835-00	Intermittent	12VDC	13.8	11	870
LT6x12-C-12	A420-064834-00	Continuous	12VDC	35	4.3	343
LT6x12-I-24	A420-064837-00	Intermittent	24VDC	53.8	11.2	446
LT6x12-C-24	A420-064836-00	Continuous	24VDC	138	4.4	174

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	28	10	5	1	0.5	n/a	n/a	n/a	21
Intermittent Duty	45	22	10	5	1	n/a	n/a	n/a	39

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

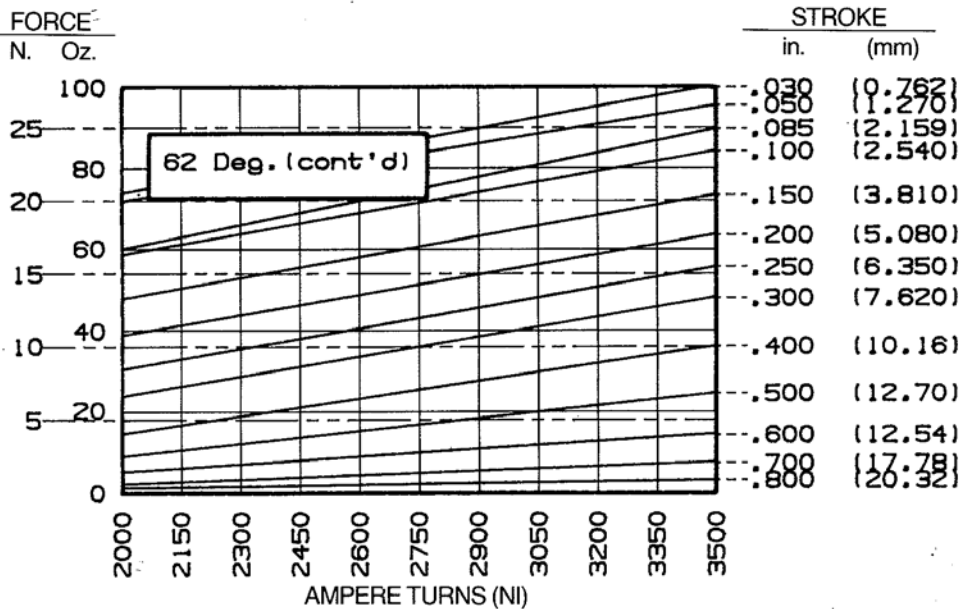
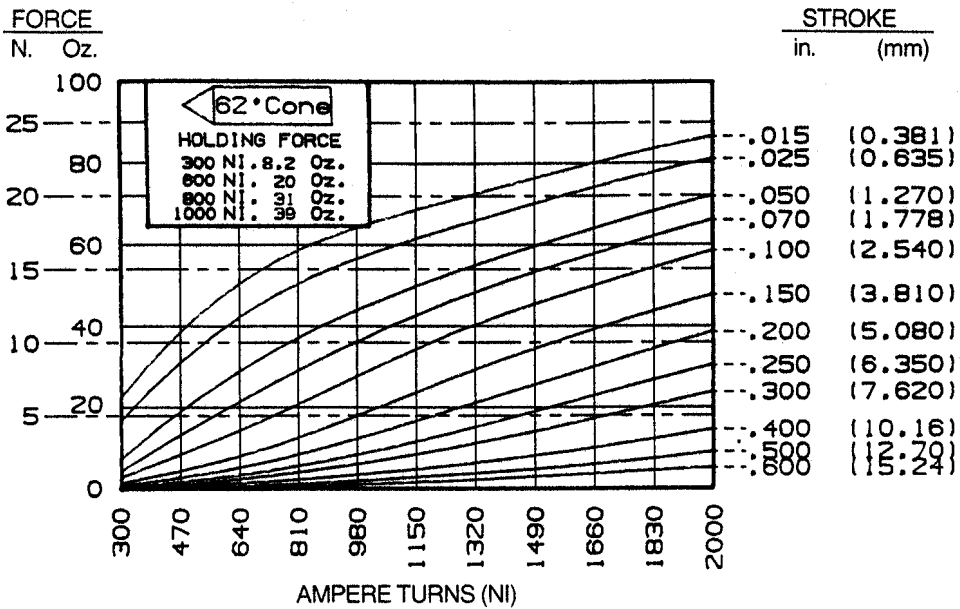
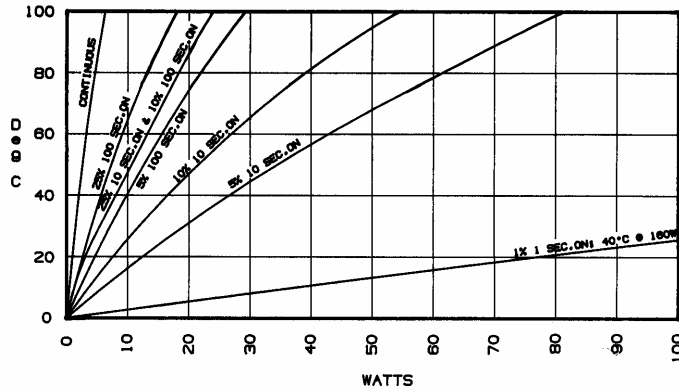
25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model LT6x12 (DC)

HFAT RISE

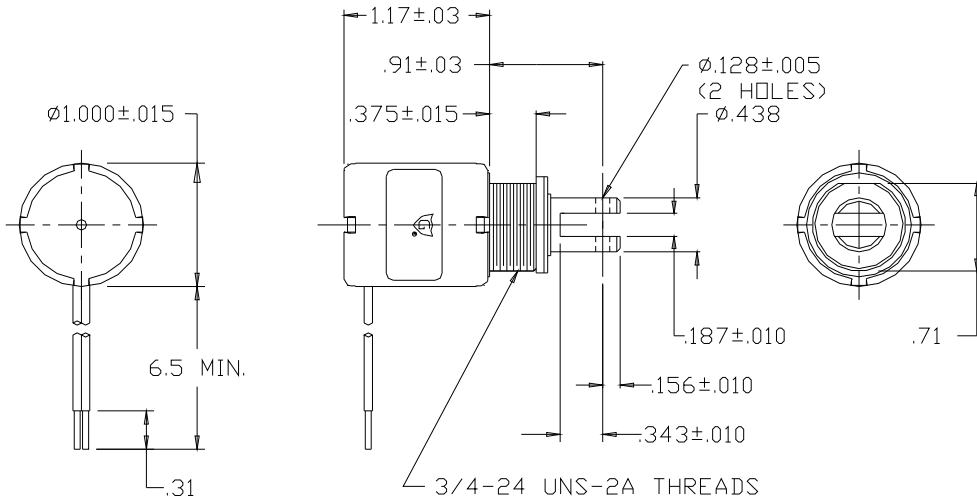


Model LT8x9 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 3.7 oz.
 Plunger Weight: 1.1 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
LT8x9-I-12	A420-064843-00	Intermittent	12VDC	11.1	13.6	1.08 A
LT8x9-C-12	A420-064842-00	Continuous	12VDC	27.6	5.5	435 mA
LT8x9-I-24	A420-064845-00	Intermittent	24VDC	44.6	13.6	538 mA
LT8x9-C-24	A420-064844-00	Continuous	24VDC	109	5.5	220 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	25	10	5	2	0.5	n/a	n/a	n/a	24
Intermittent Duty	50	27	10	6	2	n/a	n/a	n/a	60

UL Recognition

Recognized under the  Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

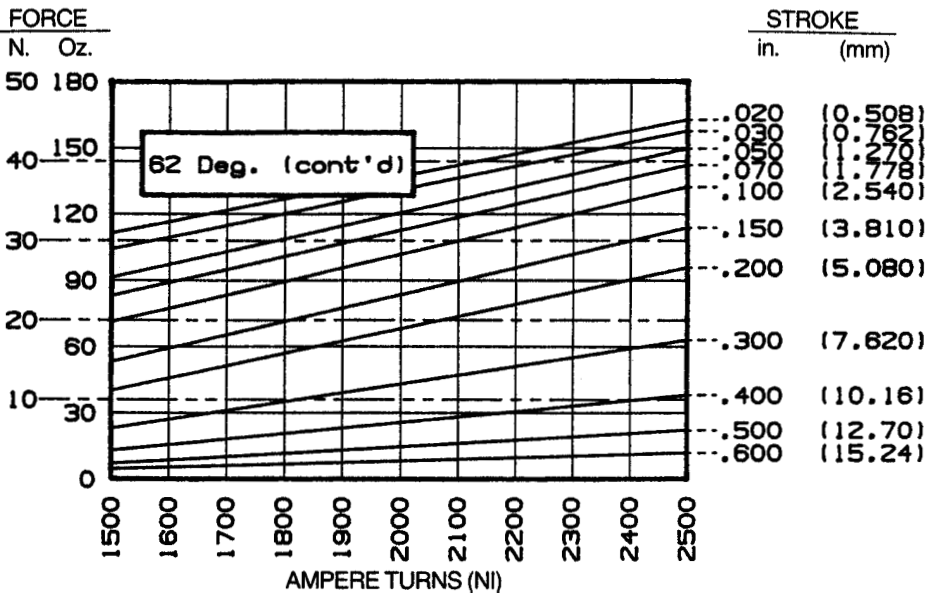
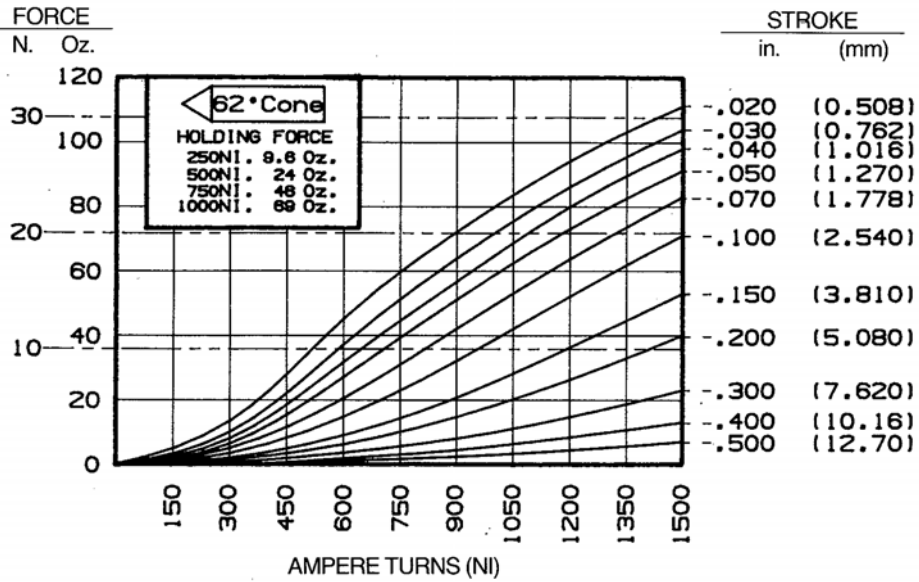
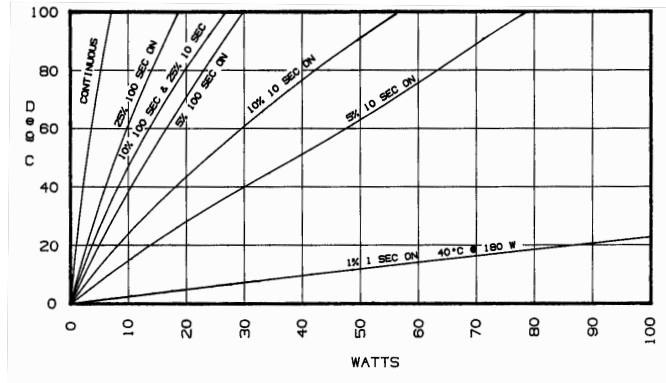
RoHS

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Model LT8x9 (DC)

Tubular-Pull, Long-Life

HEAT RISE

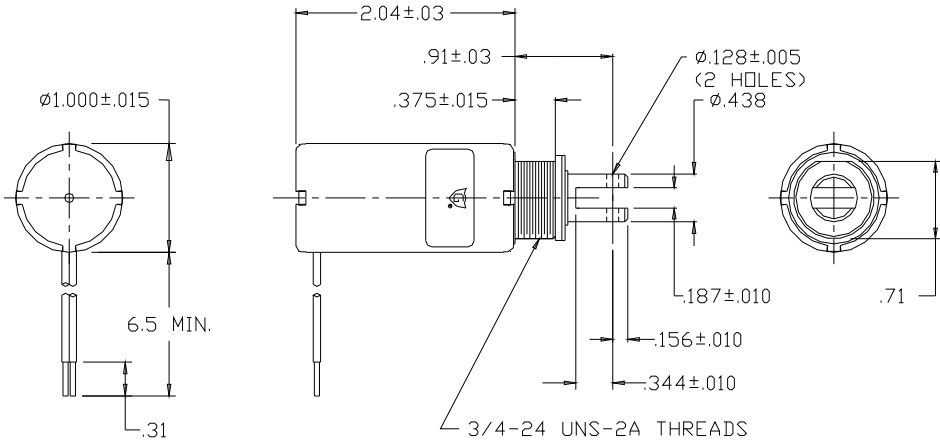


Model LT8x16 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 6.4 oz.
 Plunger Weight: 1.4 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
LT8x16-I-12	A420-064851-00	Intermittent	12VDC	6.2	24.4	1.94 A
LT8x16-C-12	A420-064850-00	Continuous	12VDC	19.3	7.8	622 mA
LT8x16-I-24	A420-064853-00	Intermittent	24VDC	29.7	20.4	808 mA
LT8x16-C-24	A420-064852-00	Continuous	24VDC	77.2	7.8	311 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	45	28	12	9	5	3	1	n/a	43
Intermittent Duty	80	55	35	25	15	10	3	n/a	66

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

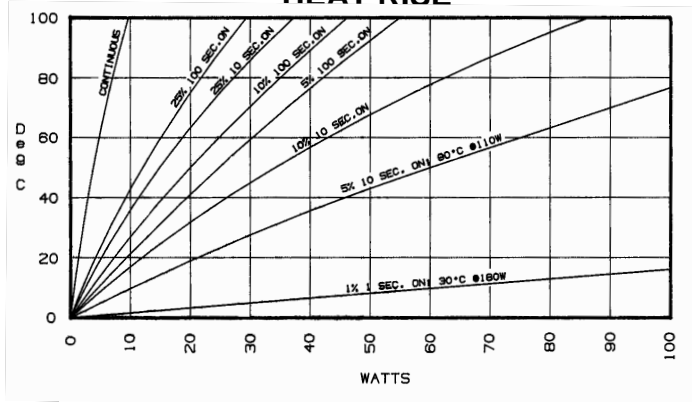
RoHS

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Model LT8x16 (DC)

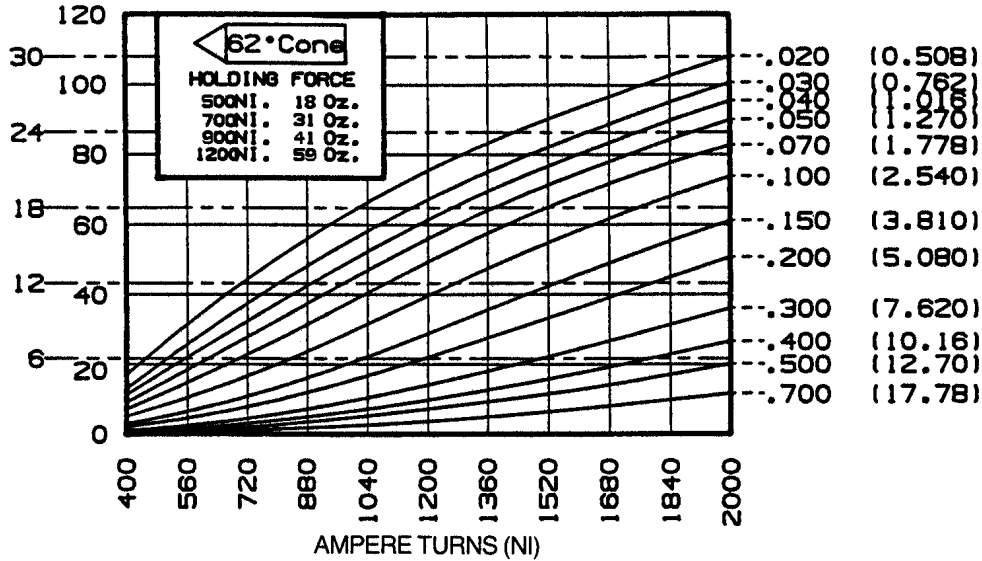
Tubular-Pull, Long-Life

HEAT RISE



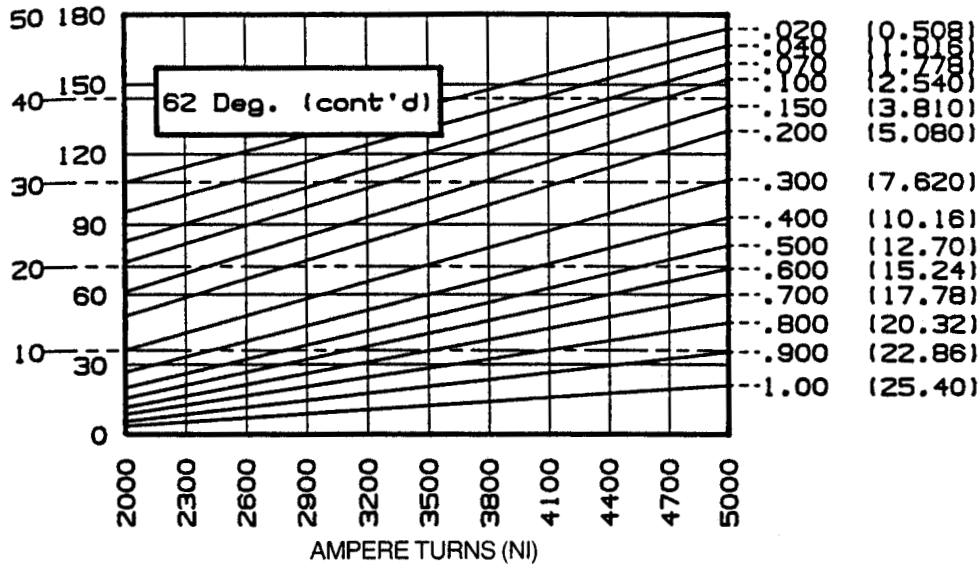
FORCE
N. Oz.

STROKE
in. (mm)



FORCE
N. Oz.

STROKE
in. (mm)

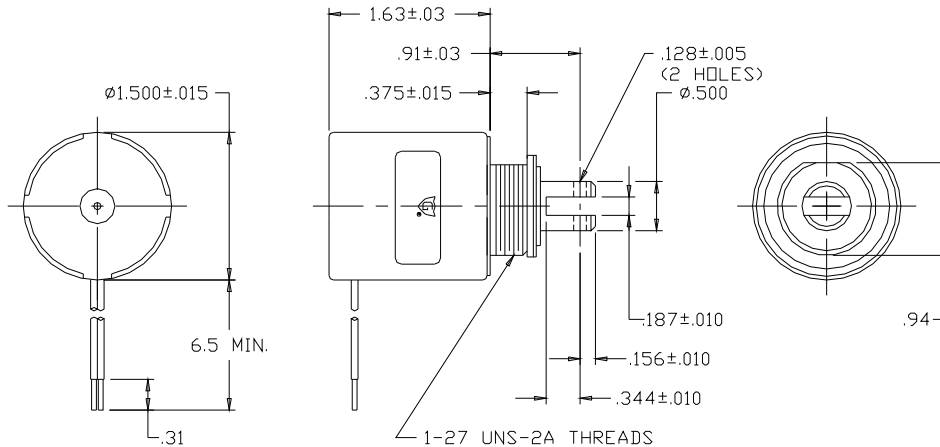


Model LT12x13 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 10.6 oz.
 Plunger Weight: 1.8 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
LT12x13-I-12	A420-064859-00	Intermittent	12VDC	5.9	25.6	2.03 A
LT12x13-C-12	A420-064858-00	Continuous	12VDC	18.3	8.3	656 mA
LT12x13-I-24	A420-064861-00	Intermittent	24VDC	22	27.5	1.09 A
LT12x13-C-24	A420-064860-00	Continuous	24VDC	71.2	8.5	337 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	90	45	20	15	5	3	1.5	n/a	100
Intermittent Duty	160	118	67	40	20	10	7	n/a	144

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

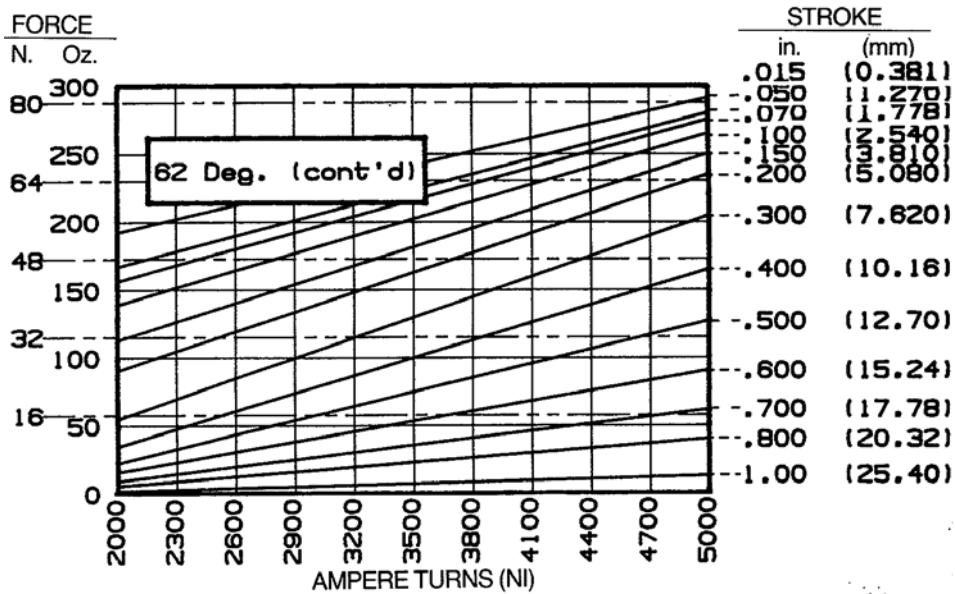
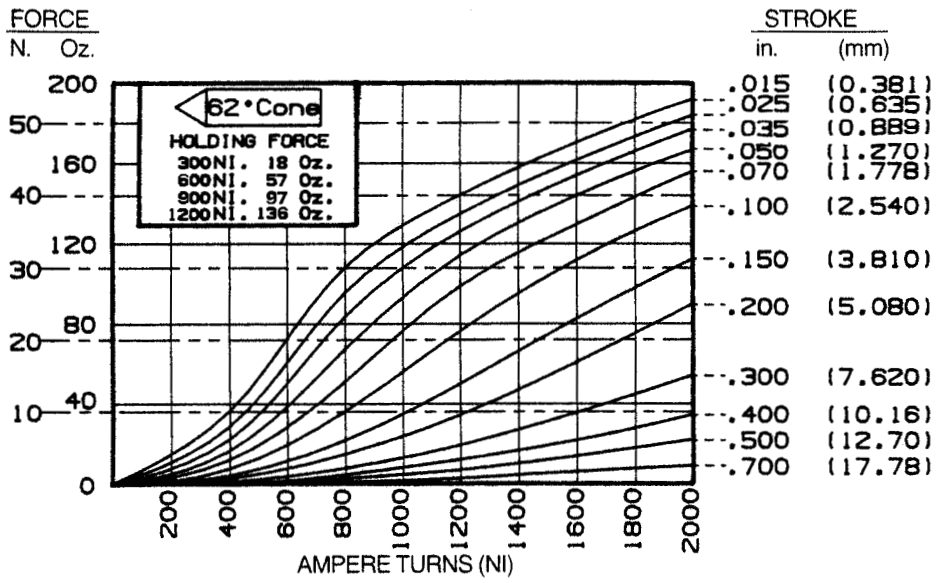
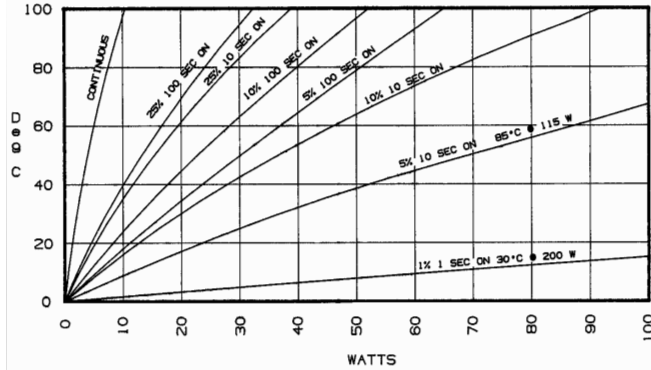
RoHS

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Model LT12x13 (DC)

Tubular-Pull, Long-Life

HEAT RISE

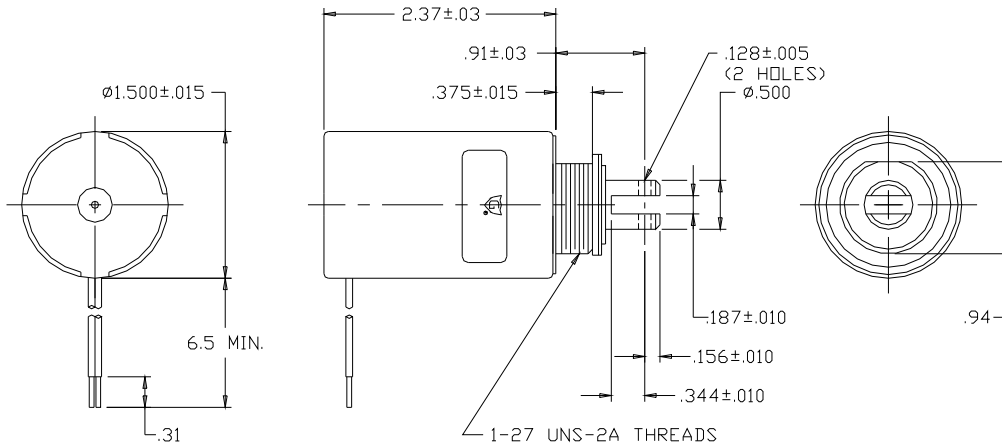


Model LT12x19 (DC)

Tubular-Pull, Long-Life



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 14.6 oz.
 Plunger Weight: 2.2 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
LT12x19-I-12	A420-064867-00	Intermittent	12VDC	4.6	32.4	2.58 A
LT12x19-C-12	A420-064866-00	Continuous	12VDC	14.8	10.2	811 mA
LT12x19-I-24	A420-064869-00	Intermittent	24VDC	18.6	32.5	1.29 A
LT12x19-C-24	A420-064868-00	Continuous	24VDC	71.8	8.4	334 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	110	70	32	20	15	8	5	3	139
Intermittent Duty	170	140	97	75	45	35	20	10	160

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

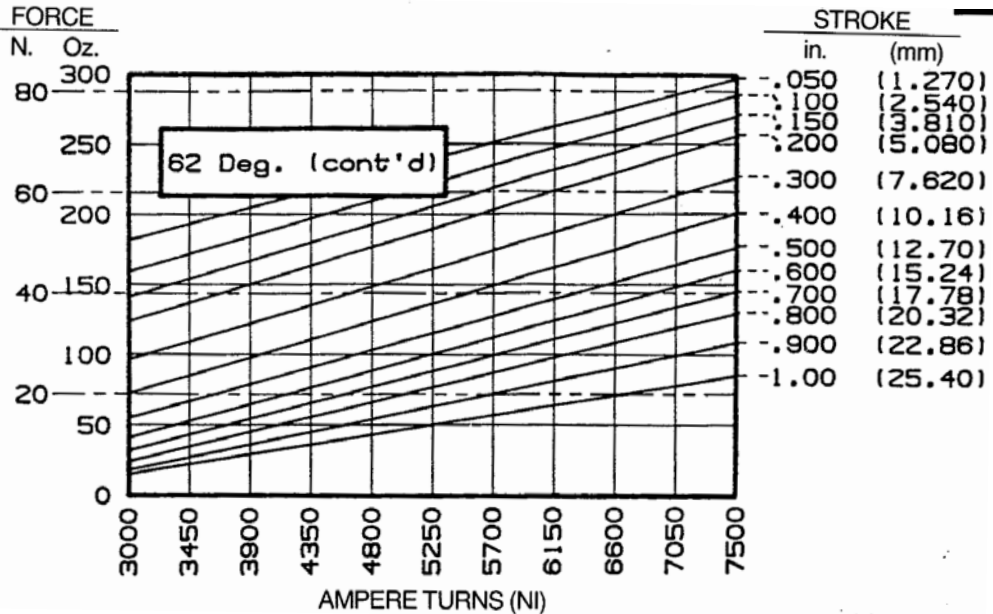
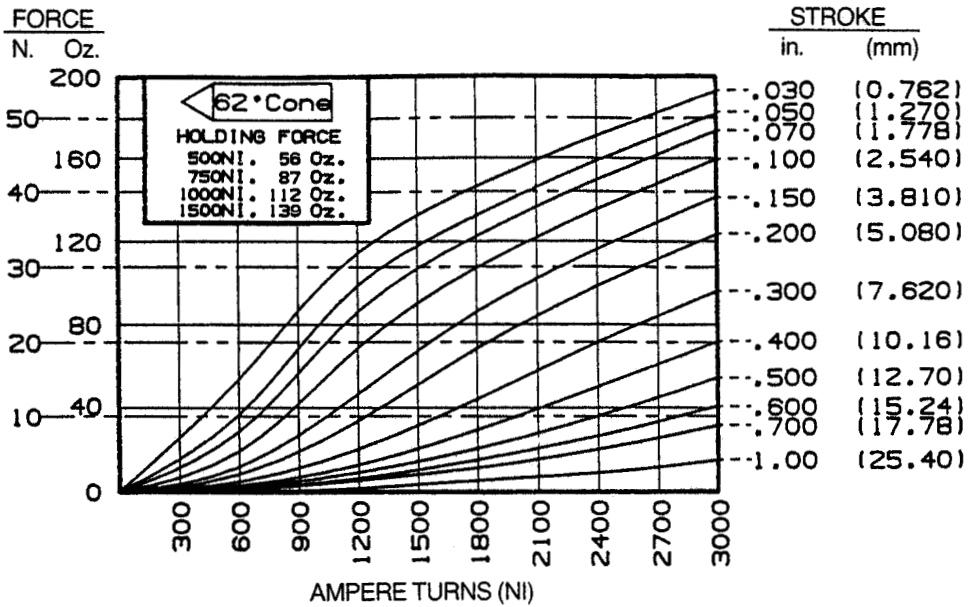
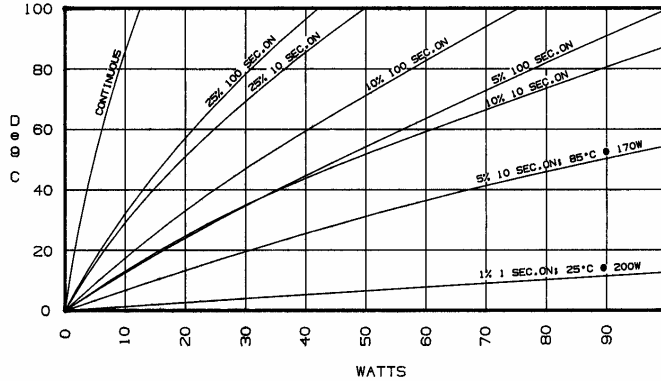
RoHS

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Model LT12x19 (DC)

Tubular-Pull, Long-Life

HEAT RISE

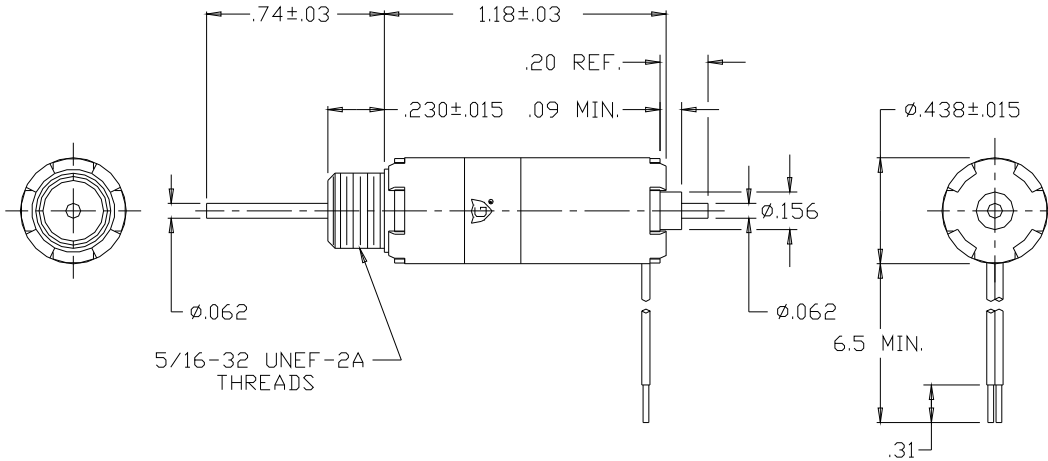


Model TP3.5x9 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: .61 oz.
 Plunger Weight: .1 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
TP3.5x9-I-12	A420-063496-02	Intermittent	12VDC	31.1	4.9	386
TP3.5x9-C-12	A420-063496-05	Continuous	12VDC	60.2	2.5	199
TP3.5x9-I-24	A420-063496-04	Intermittent	24VDC	122	5	197
TP3.5x9-C-24	A420-063496-06	Continuous	24VDC	254	2.4	94

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	3	1	0.5	n/a	n/a	n/a	n/a	n/a	15
Intermittent Duty	5	2	1	n/a	n/a	n/a	n/a	n/a	17

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

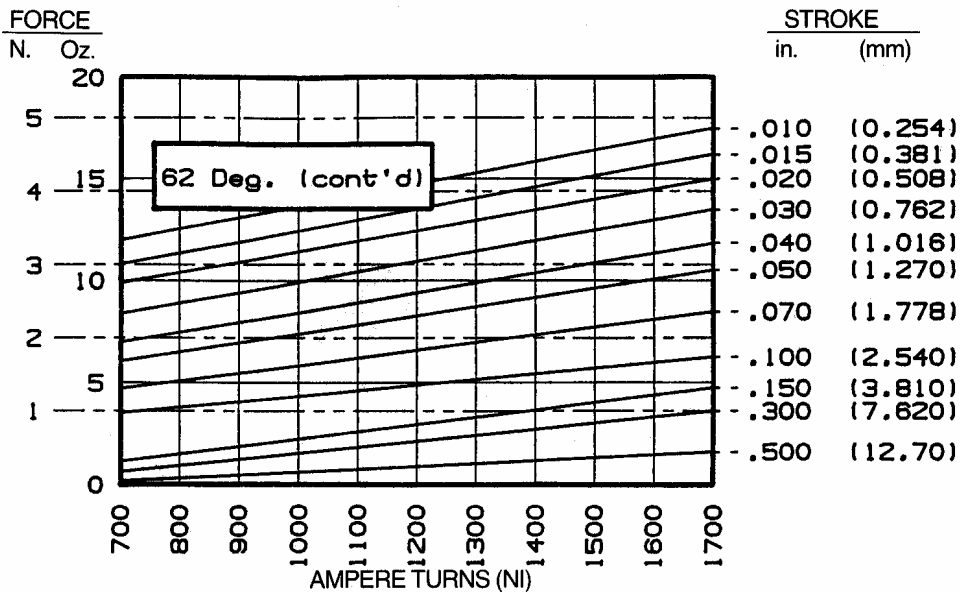
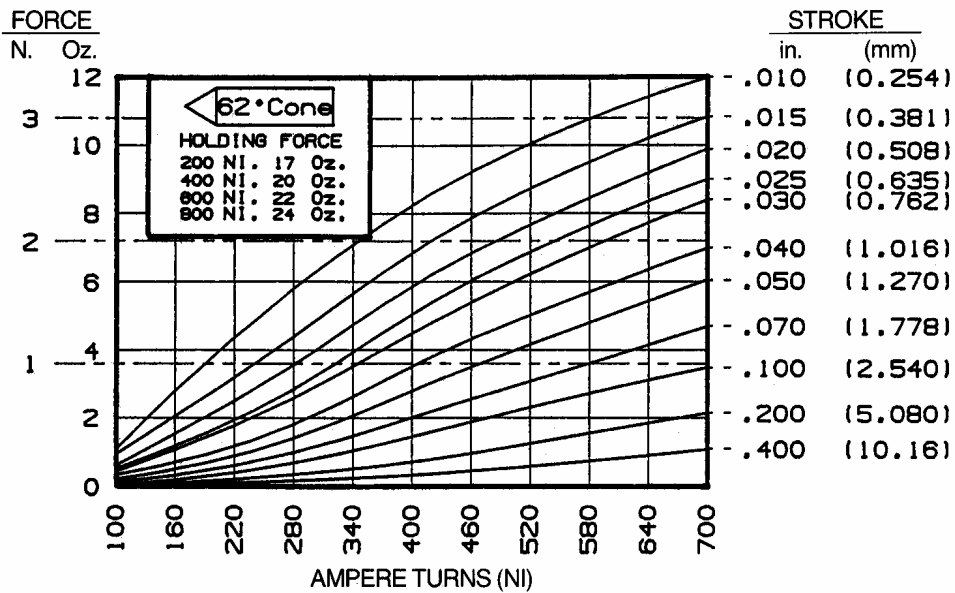
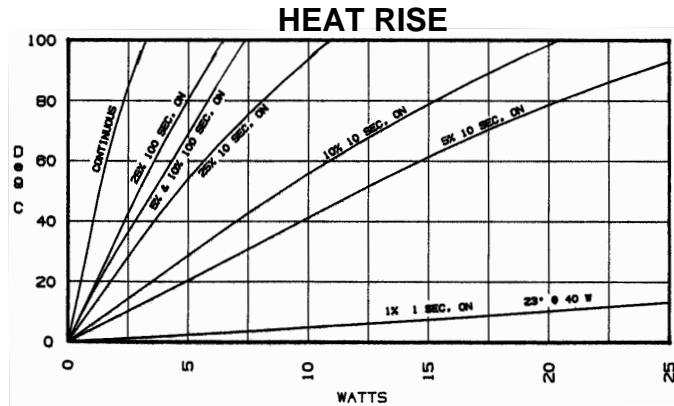
25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model TP3.5x9 (DC)

Tubular-Push

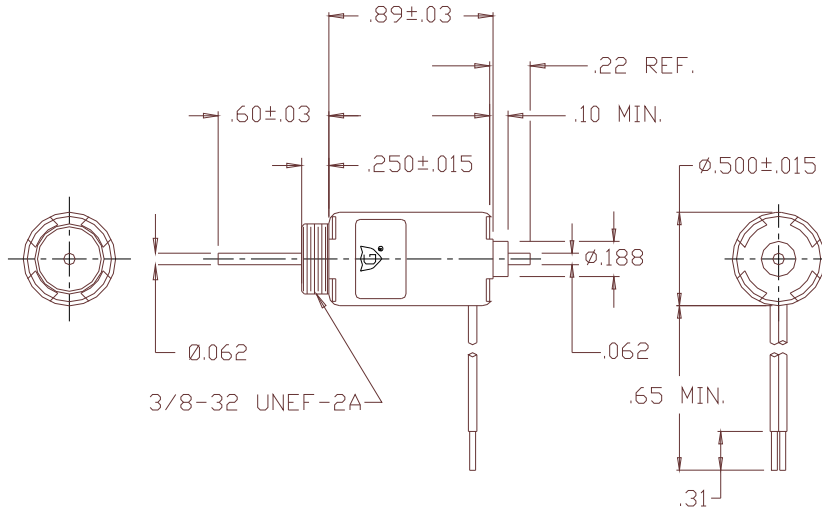


Model TP4x7 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: .61 oz.
 Plunger Weight: .1 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
TP4x7-I-12	A420-066065-00	Intermittent	12VDC	32.3	4.5	372
TP4x7-C-12	A420-066067-00	Continuous	12VDC	62.5	2.4	192
TP4x7-I-24	A420-066070-00	Intermittent	24VDC	131	4.6	183
TP4x7-C-24	A420-066069-00	Continuous	24VDC	270	2.2	89

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	3	1	0.5	n/a	n/a	n/a	n/a	n/a	16
Intermittent Duty	6	2	1	n/a	n/a	n/a	n/a	n/a	20

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

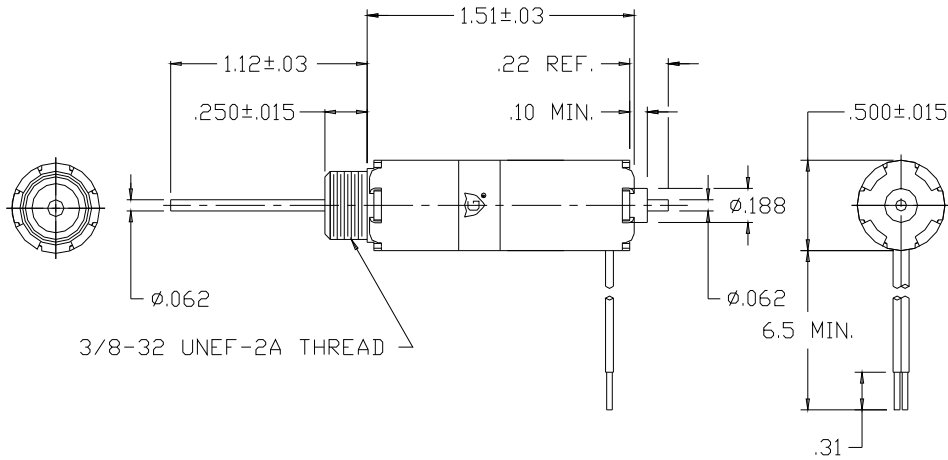
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Model TP4x12 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 1.00 oz.
 Plunger Weight: .28 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
TP4x12-I-12	A420-066076-00	Intermittent	12VDC	24.7	5.8	486
TP4x12-C-12	A420-066075-00	Continuous	12VDC	49.8	2.9	241
TP4x12-I-24	A420-066078-00	Intermittent	24VDC	96.7	6.0	248
TP4x12-C-24	A420-066077-00	Continuous	24VDC	195	3.0	123

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	4	2	1	n/a	n/a	n/a	n/a	n/a	18
Intermittent Duty	7	3	1	n/a	n/a	n/a	n/a	n/a	20

UL Recognition

Recognized under the  Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

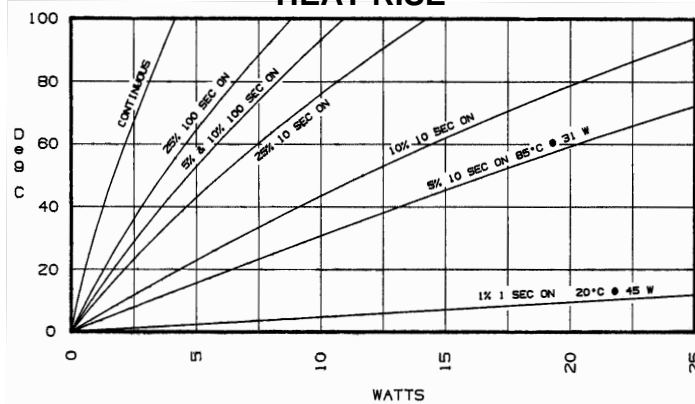
RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model TP4x12 (DC)

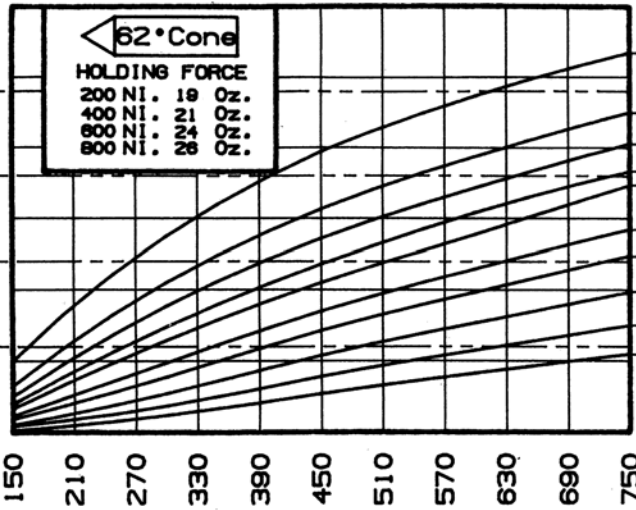
Tubular-Push

HEAT RISE



FORCE
N. Oz.

5 18
4 15
3 12
2 9
1 6
0 3



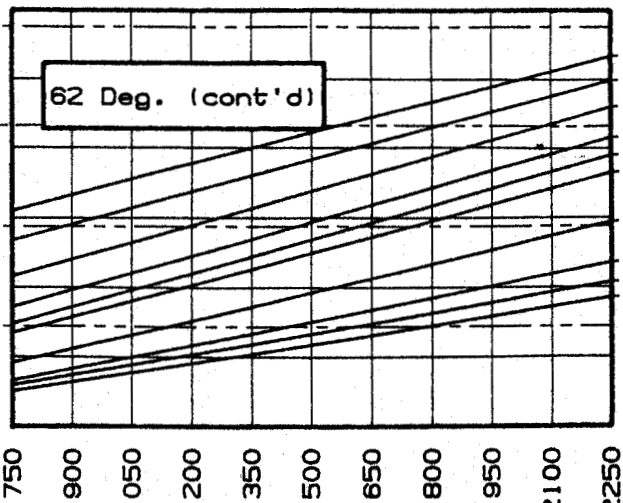
AMPERE TURNS (NI)

STROKE

in. (mm)
-.010 (0.254)
-.015 (0.381)
-.020 (0.508)
-.025 (0.635)
-.030 (0.762)
-.040 (1.016)
-.050 (1.270)
-.070 (1.778)
-.100 (2.540)
-.150 (3.810)

FORCE
N. Oz.

8 30
6 25
4 20
2 15
0 10
0 5



AMPERE TURNS (NI)

STROKE

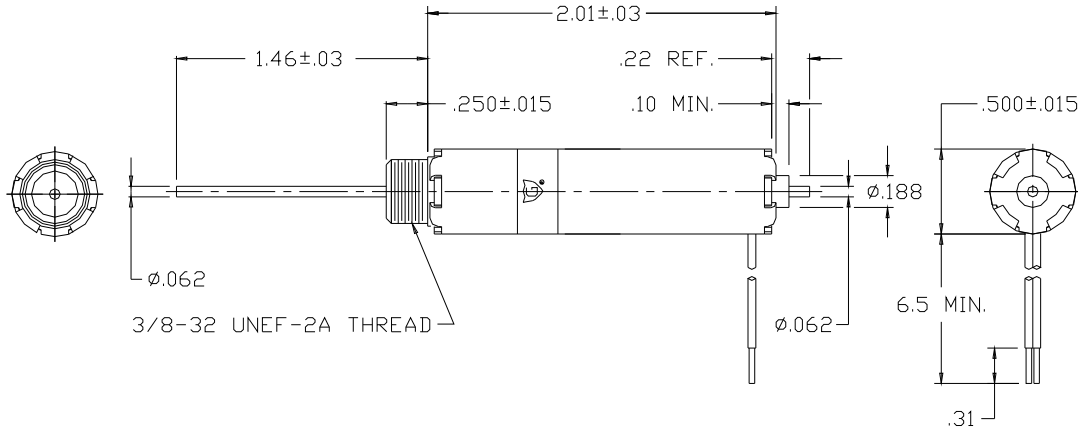
in. (mm)
-.010 (0.254)
-.015 (0.381)
-.025 (0.635)
-.040 (1.016)
-.050 (1.270)
-.060 (1.524)
-.100 (2.540)
-.150 (3.810)
-.200 (5.080)
-.300 (7.620)

Model TP4x16 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).

Total Weight: 1.35 oz.
 Plunger Weight: .36 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
TP4x16-I-12	A420-066084-00	Intermittent	12VDC	17.7	8.5	678
TP4x16-C-12	A420-066083-00	Continuous	12VDC	45.1	3.4	266
TP4x16-I-24	A420-066086-00	Intermittent	24VDC	72.7	8.3	330
TP4x16-C-24	A420-066085-00	Continuous	24VDC	173	3.5	139

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	4	2.5	1	n/a	n/a	n/a	n/a	n/a	18
Intermittent Duty	6.5	3	2	n/a	n/a	n/a	n/a	n/a	22

UL Recognition

Recognized under the Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

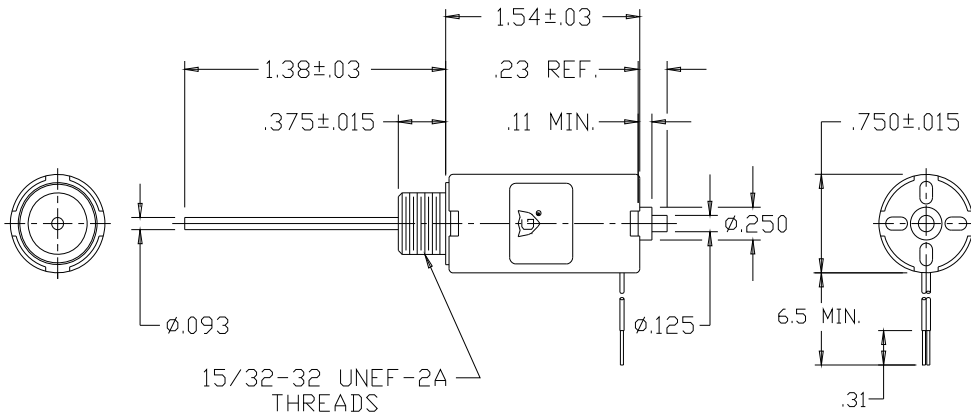
Pull Curves Not Available

Model TP6x12 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 2.34 oz.
 Plunger Weight: .42 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
TP6x12-I-12	A420-066092-00	Intermittent	12VDC	12.1	12.5	992
TP6x12-C-12	A420-066091-00	Continuous	12VDC	31.7	4.8	379
TP6x12-I-24	A420-066094-00	Intermittent	24VDC	60.6	10.1	399
TP6x12-C-24	A420-066093-00	Continuous	24VDC	121	5	198

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	13	7	4	2	n/a	n/a	n/a	n/a	38
Intermittent Duty	19	10	7	5	n/a	n/a	n/a	n/a	43

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

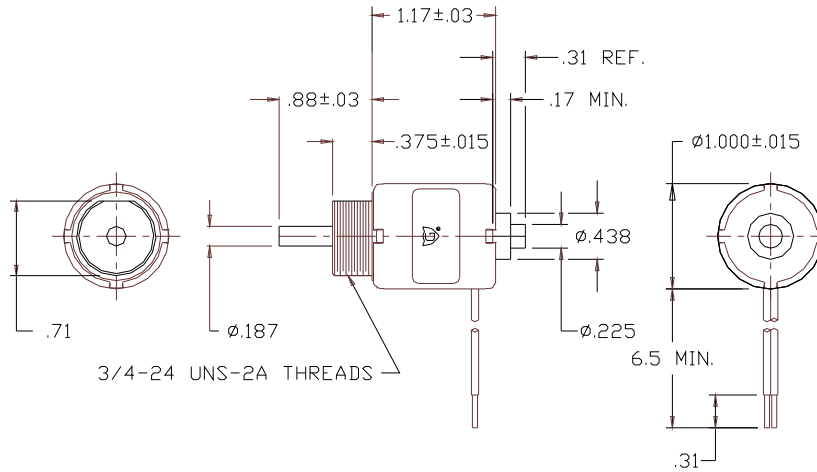
Pull Curves Not Available

Model TP8x9 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 3.46 oz.
 Plunger Weight: 2.20 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
TP8x9-I-12	A420-066673-00	Intermittent	12VDC	10.9	13.9	1.1 A
TP8x9-C-12	A420-066672-00	Continuous	12VDC	35.5	4.3	338 mA
TP8x9-I-24	A420-066675-00	Intermittent	24VDC	44	13.7	545 mA
TP8x9-C-24	A420-066674-00	Continuous	24VDC	135	4.5	178 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	16	8	3	1	n/a	n/a	n/a	n/a	76
Intermittent Duty	34	24	15	5	1	n/a	n/a	n/a	123

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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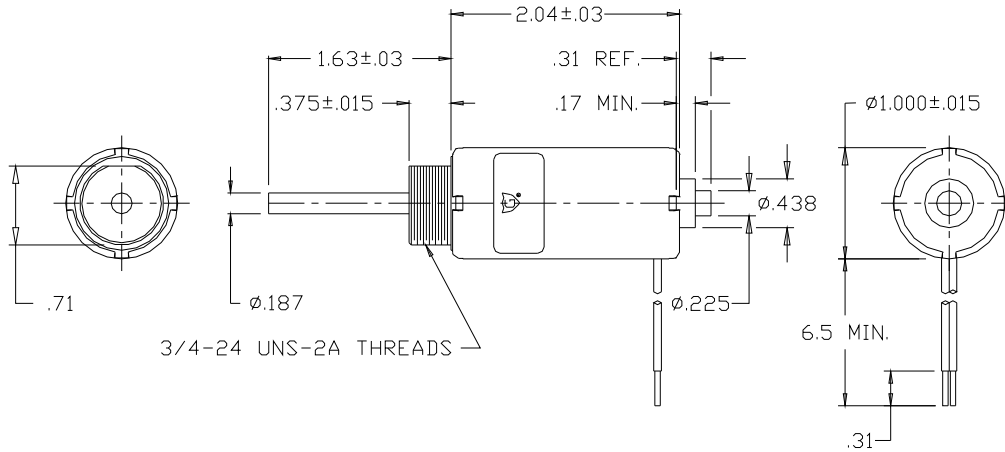
Pull Curves Not Available

Model TP8x16 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 5.80 oz.
 Plunger Weight: 1.57 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
TP8x16-I-12	A420-066663-00	Intermittent	12VDC	9.3	16.3	1.29 A
TP8x16-C-12	A420-066662-00	Continuous	12VDC	28.3	5.3	424 mA
TP8x16-I-24	A420-066665-00	Intermittent	24VDC	36.1	16.8	665 mA
TP8x16-C-24	A420-066664-00	Continuous	24VDC	110	5.5	218 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	24	14	9	4	3	2	1	n/a	83
Intermittent Duty	48	32	20	14	12	8	6	n/a	100

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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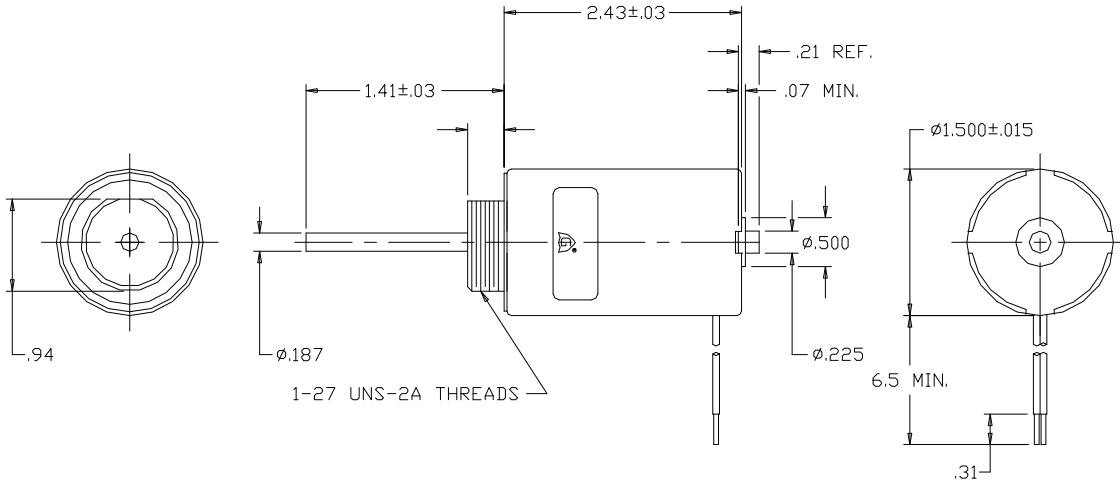
Pull Curves Not Available

Model TP12x13 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).

Total Weight: 10.2 oz.
 Plunger Weight: 1.65 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
TP12x13-I-12	A422-064103-03	Intermittent	12VDC	7.3	20.7	1.64 A
TP12x13-C-12	A422-064103-04	Continuous	12VDC	22.8	6.6	526 mA
TP12x13-I-24	A422-064103-01	Intermittent	24VDC	28.4	21.3	845 mA
TP12x13-C-24	A422-064103-02	Continuous	24VDC	90.4	6.7	265 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	64	32	20	15	4	2	1	n/a	146
Intermittent Duty	112	84	44	28	16	12	5	n/a	168

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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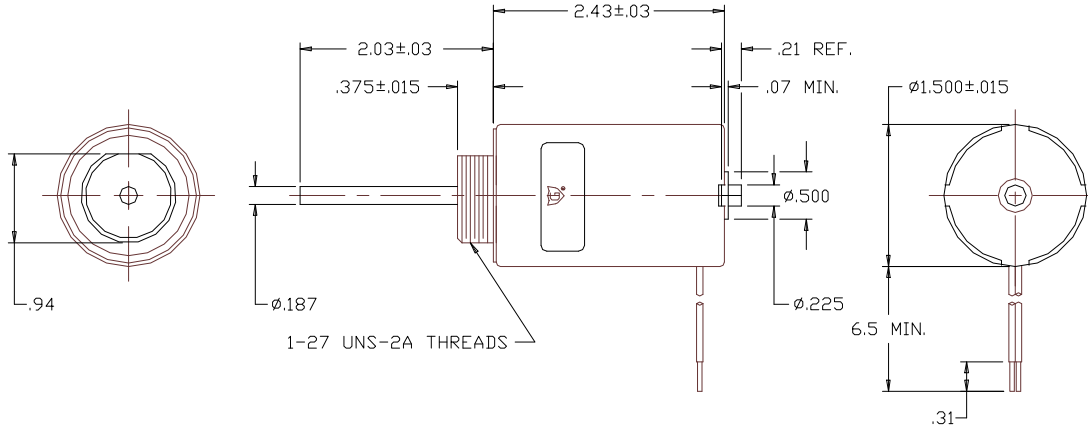
Pull Curves Not Available

Model TP12x19 (DC)

Tubular-Push



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Solenoid shown energized and fully seated.
 Supplied with mounting bracket, hex nut and lockwasher (not shown).
 Spring kits are available (consult factory).


Total Weight: 14.2 oz.
 Plunger Weight: 2.20 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
TP12x19-I-12	A422-064104-03	Intermittent	12VDC	5.6	27	2.15 A
TP12x19-C-12	A422-064104-04	Continuous	12VDC	17.5	8.6	685 mA
TP12x19-I-24	A422-064104-01	Intermittent	24VDC	22.1	27.4	1.09 A
TP12x19-C-24	A422-064104-02	Continuous	24VDC	68	8.9	353 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	80	48	24	16	14	12	8	6	143
Intermittent Duty	116	88	56	40	32	28	22	16	163

UL Recognition

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Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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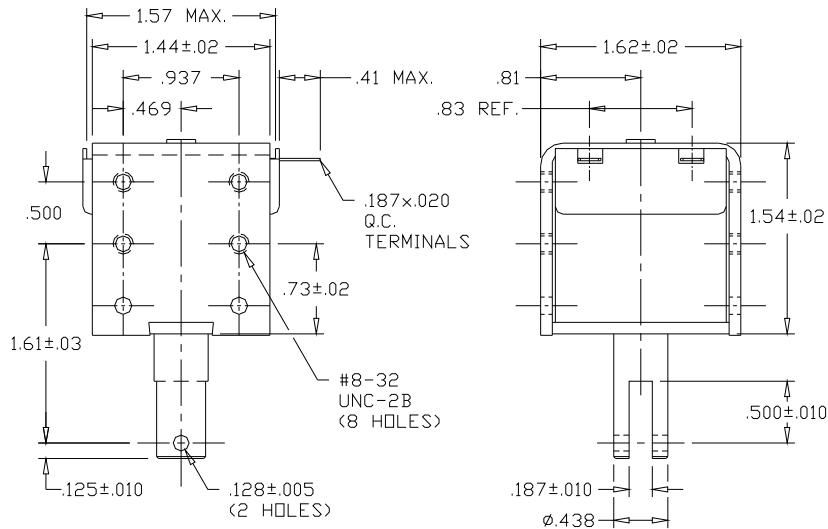
Pull Curves Not Available

Model 2 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 9.5 oz.
 Plunger Weight: 1.1 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
2-I-12D	A420-065513-00	Intermittent	12VDC	5.8	26.1	2.07 A
2-C-12D	A420-065512-00	Continuous	12VDC	18.1	8.4	663 mA
2-I-24D	A420-065515-00	Intermittent	24VDC	22.6	26.8	1.06 A
2-C-24D	A420-065514-00	Continuous	24VDC	71	8.5	338 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	95	48	15	8	4	2	1	n/a	145
Intermittent Duty	125	93	70	32	20	15	12	10	181

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

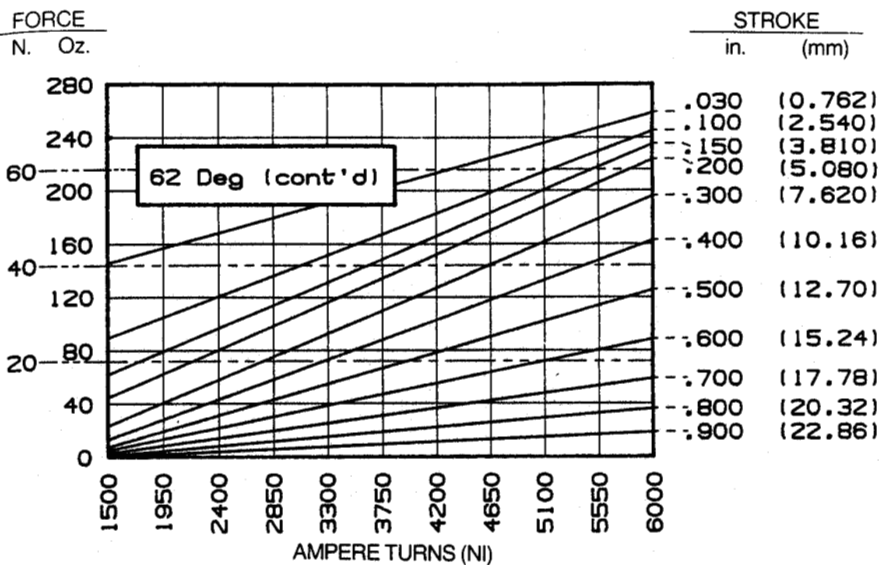
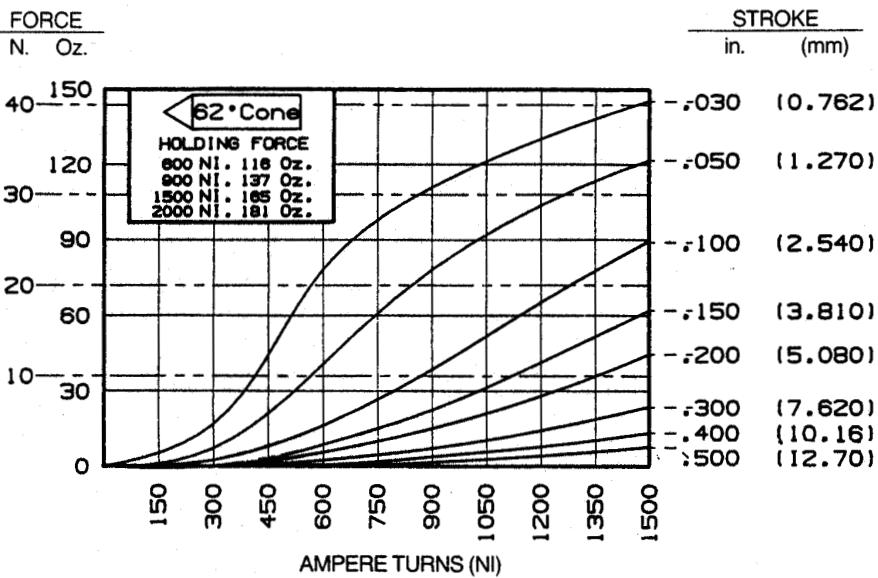
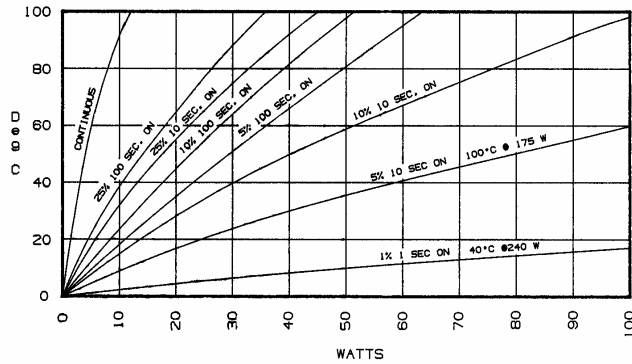
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HFAT RISE

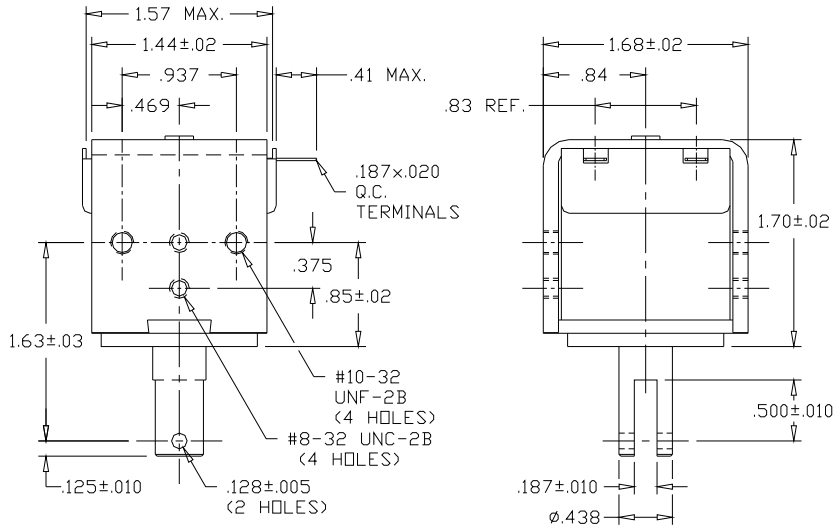


Model 2HD (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 11.7 oz.
 Plunger Weight: 1.2 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
2HD-I-12D	A420-065493-00	Intermittent	12VDC	5.8	26.1	2.07 A
2HD-C-12D	A420-065492-00	Continuous	12VDC	18.1	8.4	663 mA
2HD-I-24D	A420-065495-00	Intermittent	24VDC	22.6	26.8	1.06 A
2HD-C-24D	A420-065494-00	Continuous	24VDC	71	8.5	338 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	100	48	15	8	4	2	1	n/a	155
Intermittent Duty	135	93	70	32	20	15	12	10	191

UL Recognition

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Continuous Duty

100% 'On' Time

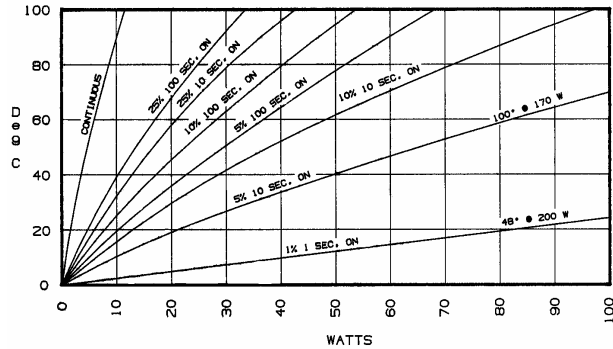
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

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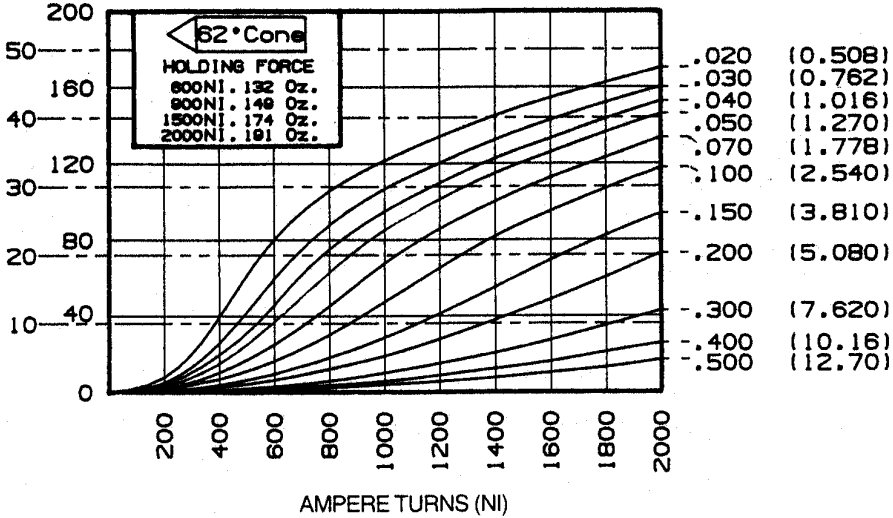
HEAT RISE



FORCE
N. Oz.

STROKE

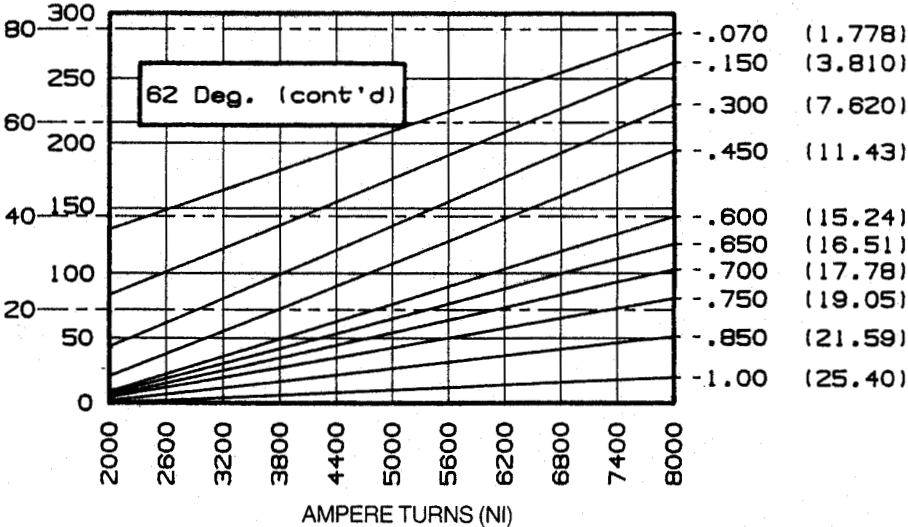
in. (mm)



FORCE
N. Oz.

STROKE

in. (mm)

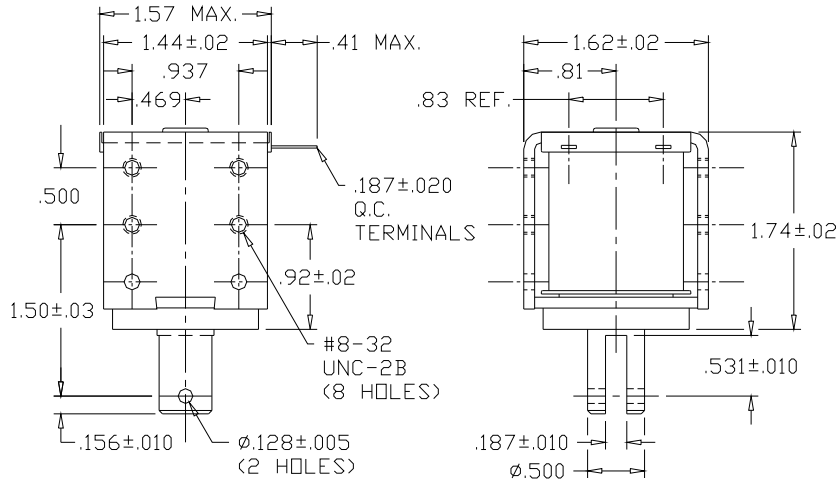


Model 3HD (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 10.70 oz.
 Plunger Weight: 1.53 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
3HD-I-12D	A420-065923-00	Intermittent	12VDC	5.45	27.7	2.2 A
3HD-C-12D	A420-065922-00	Continuous	12VDC	16.7	9.1	719 mA
3HD-I-24D	A420-065925-00	Intermittent	24VDC	22.1	27.4	1.09 A
3HD-C-24D	A420-065924-00	Continuous	24VDC	65.8	9.2	365 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	115	55	20	10	8	4	2	1	145
Intermittent Duty	165	107	60	40	30	15	12	5	181

UL Recognition

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Continuous Duty

100% 'On' Time

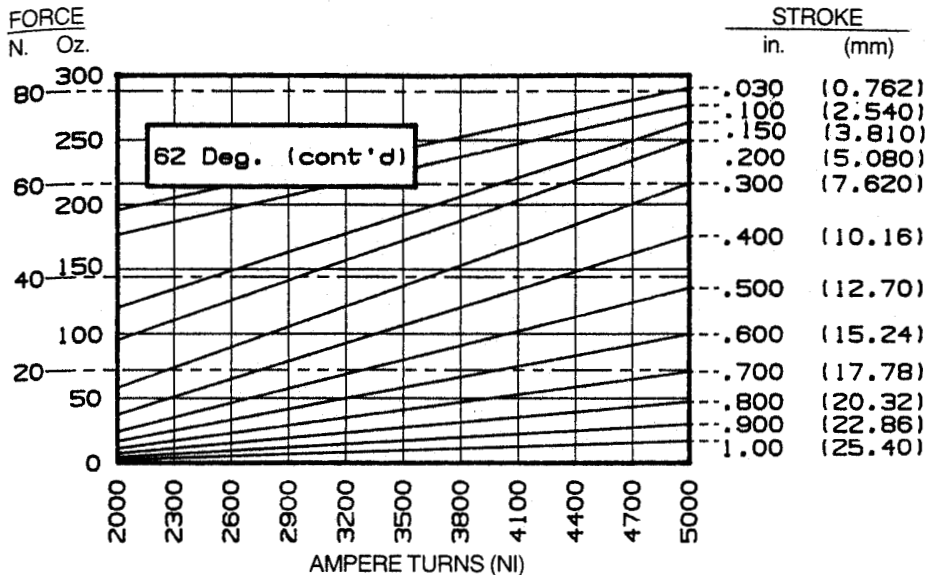
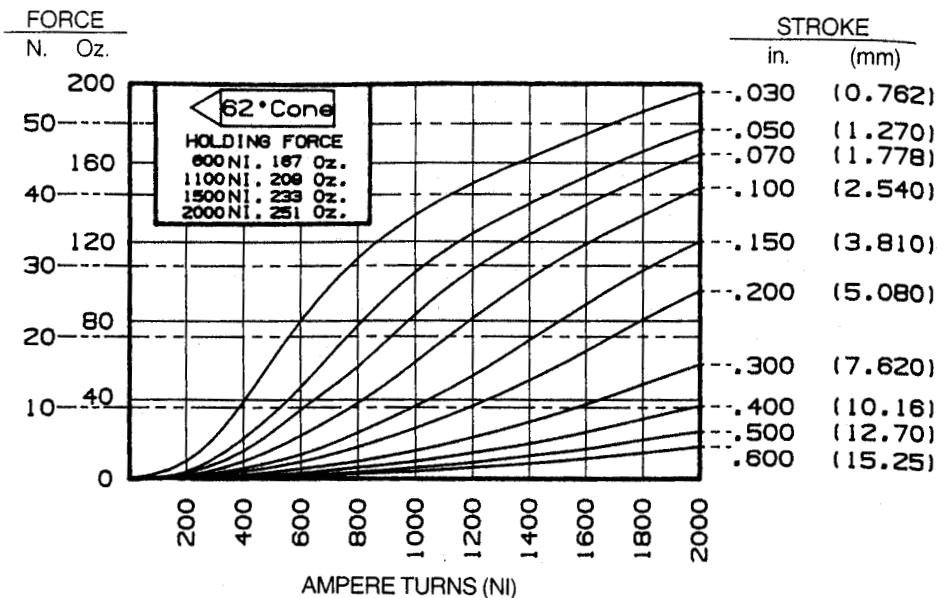
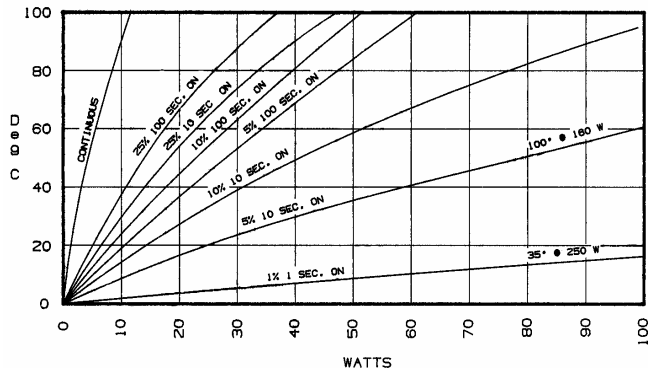
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE

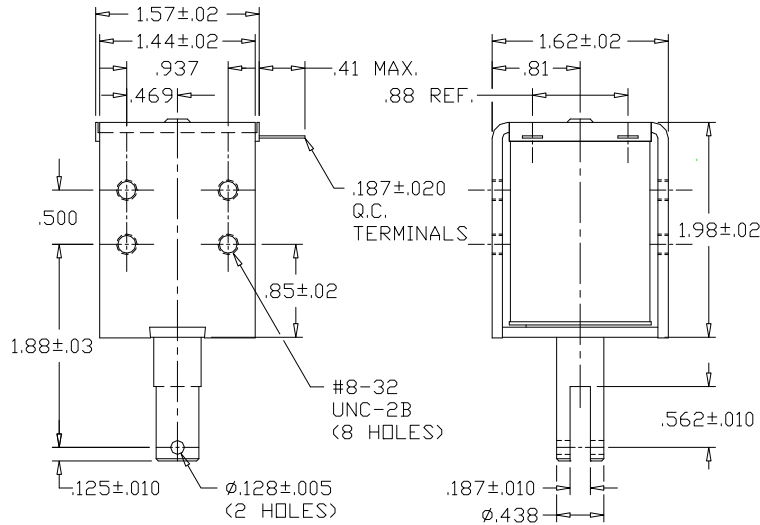


Model 4 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 12.6 oz.
 Plunger Weight: 1.6 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
4-I-12D	A420-065943-00	Intermittent	12VDC	3.96	38.2	3.03 A
4-C-12D	A420-065942-00	Continuous	12VDC	15.8	9.6	759 mA
4-I-24D	A420-065945-00	Intermittent	24VDC	15.8	38.3	1.52 A
4-C-24D	A420-065944-00	Continuous	24VDC	61.3	9.9	392 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	100	60	20	14	9	5	3	1	155
Intermittent Duty	140	112	97	60	40	27	22	20	181

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

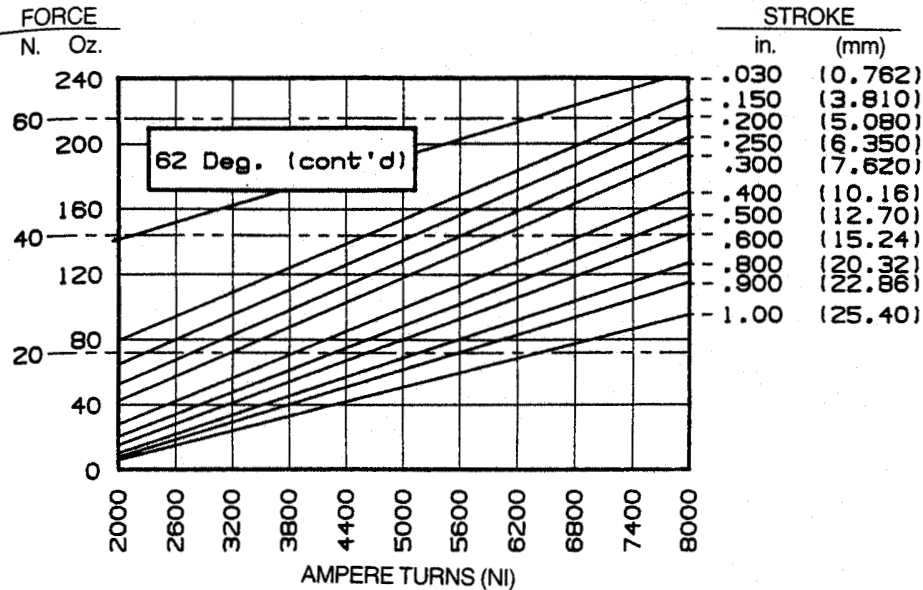
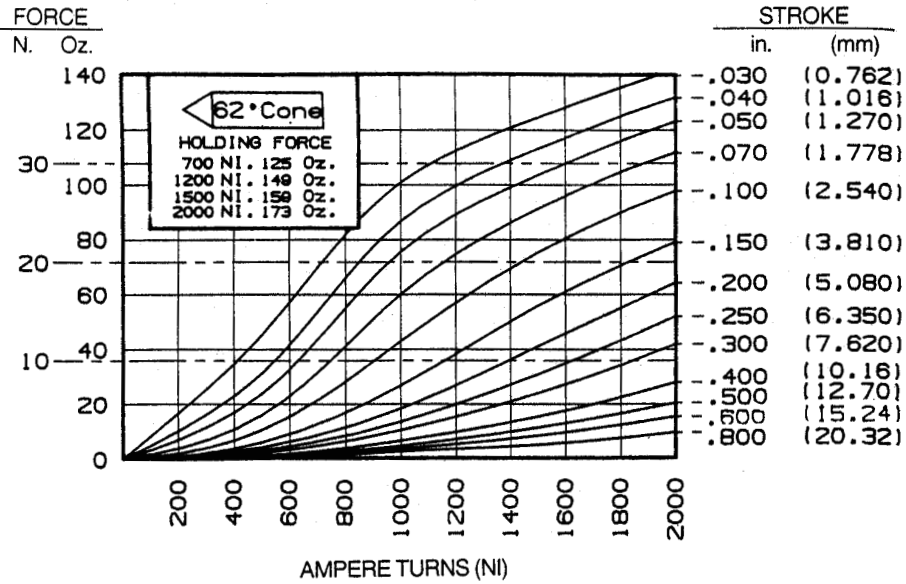
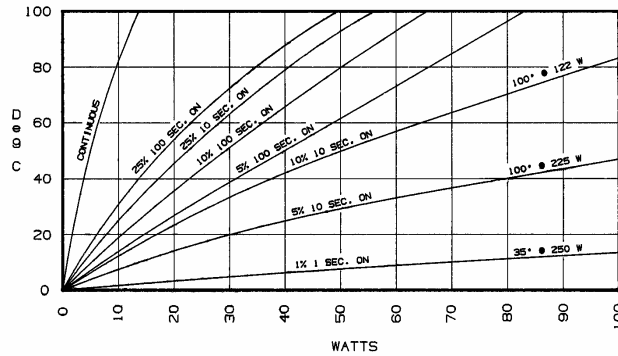
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE

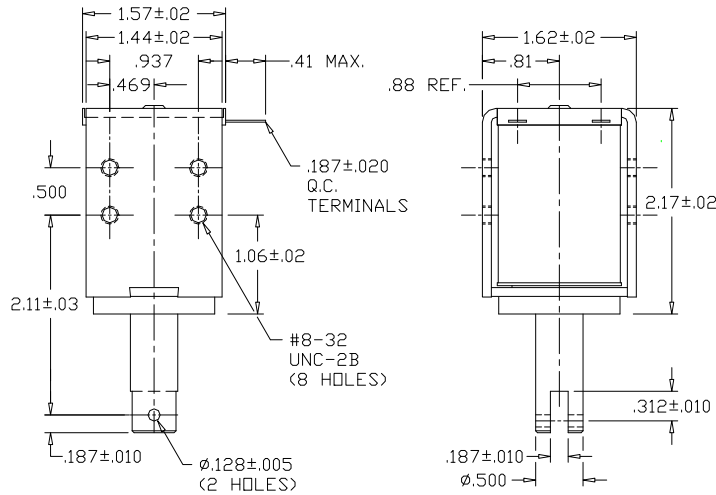


Model 4HD (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 14.1 oz.
 Plunger Weight: 2.4 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
4HD-I-12D	A420-065433-00	Intermittent	12VDC	4.68	32.3	2.6 A
4HD-C-12D	A420-065432-00	Continuous	12VDC	14.8	10.2	811 mA
4HD-I-24D	A420-065435-00	Intermittent	24VDC	18.9	32	1.27 A
4HD-C-24D	A420-065434-00	Continuous	24VDC	57.5	10.5	417 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	118	74	32	17	11	8	5	2	176
Intermittent Duty	165	130	85	60	40	30	22	20	235

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

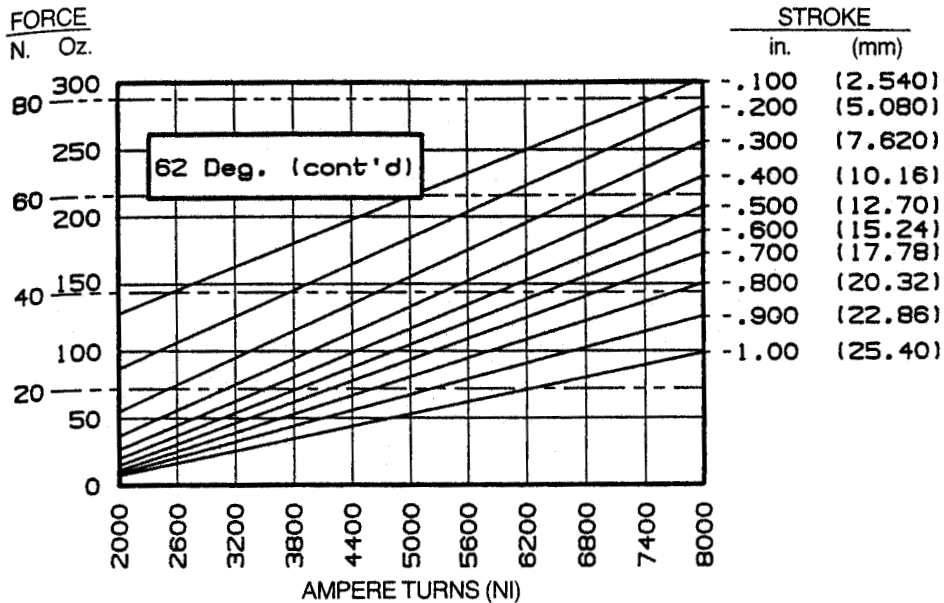
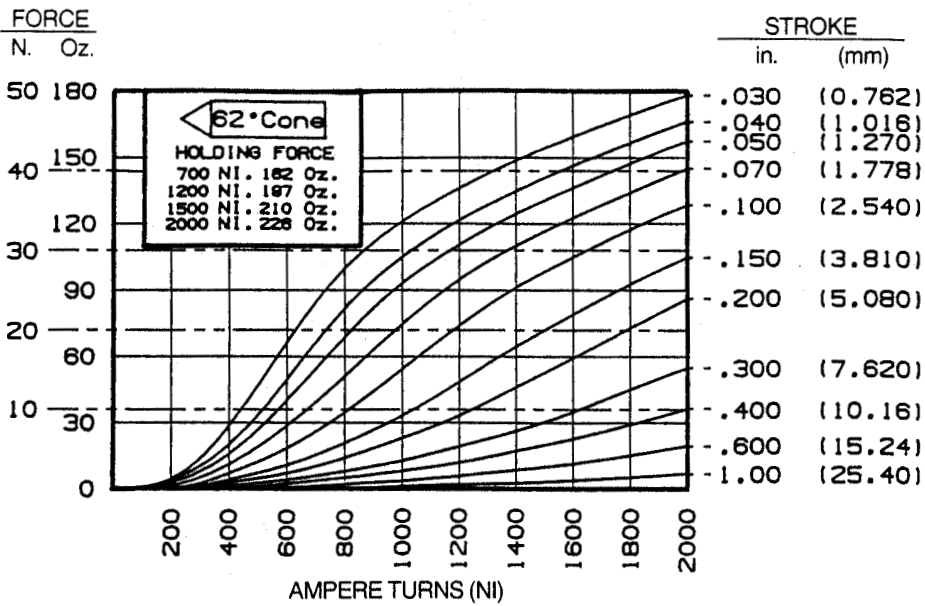
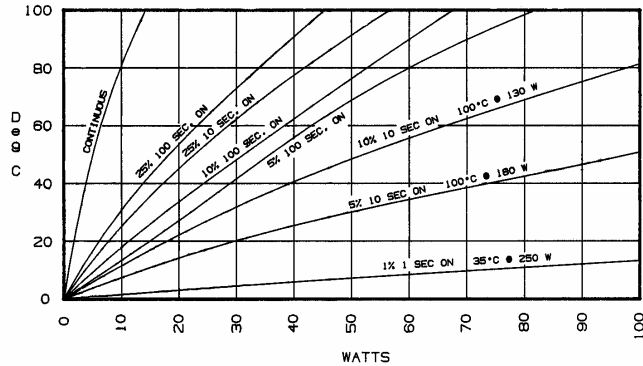
25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model 4 HD (DC)

HEAT RISE

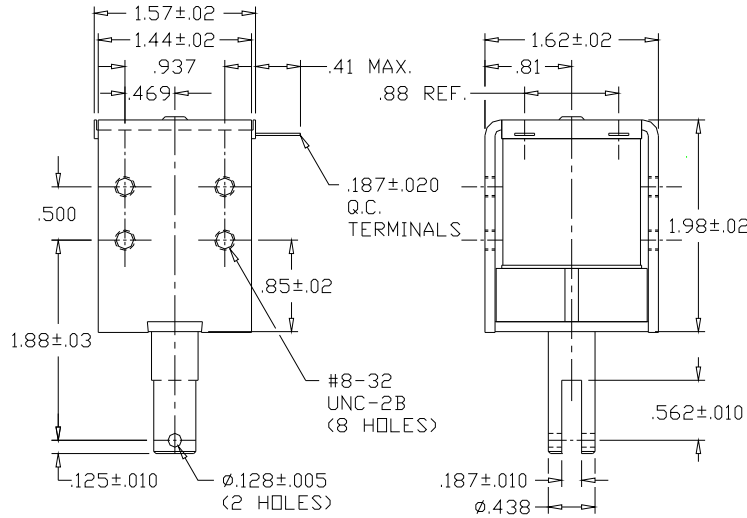


Model 4L (DC)

Frame-Pull, Latching



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 12.50 oz.
 Plunger Weight: 1.57 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
4L-C-12D	A420-067897-00	Continuous	12VDC	25.5	5.9	471
4L-C-24D	A420-067899-00	Continuous	24VDC	102	5.9	235

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.
 *At 0 VDC (provided by permanent magnet latch).

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	108	65	35	20	13	5	3	1	*160

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

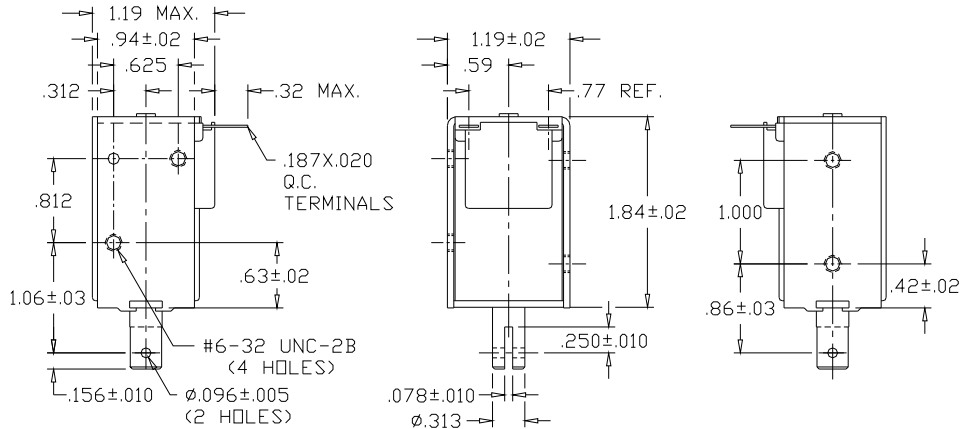
Pull Curves Not Available

Model 11 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 5.3 oz.
 Plunger Weight: .6 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
11-I-12D	A420-065573-00	Intermittent	12VDC	7.5	20.2	1.6 A
11-C-12D	A420-065572-00	Continuous	12VDC	18.4	8.2	652 mA
11-I-24D	A420-065575-00	Intermittent	24VDC	29.1	20.8	825 mA
11-C-24D	A420-065574-00	Continuous	24VDC	93.1	6.5	258 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	35	21	10	6	4	2	1	n/a	82
Intermittent Duty	58	46	27	18	10	8	6	5	93

UL Recognition

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Continuous Duty

100% 'On' Time

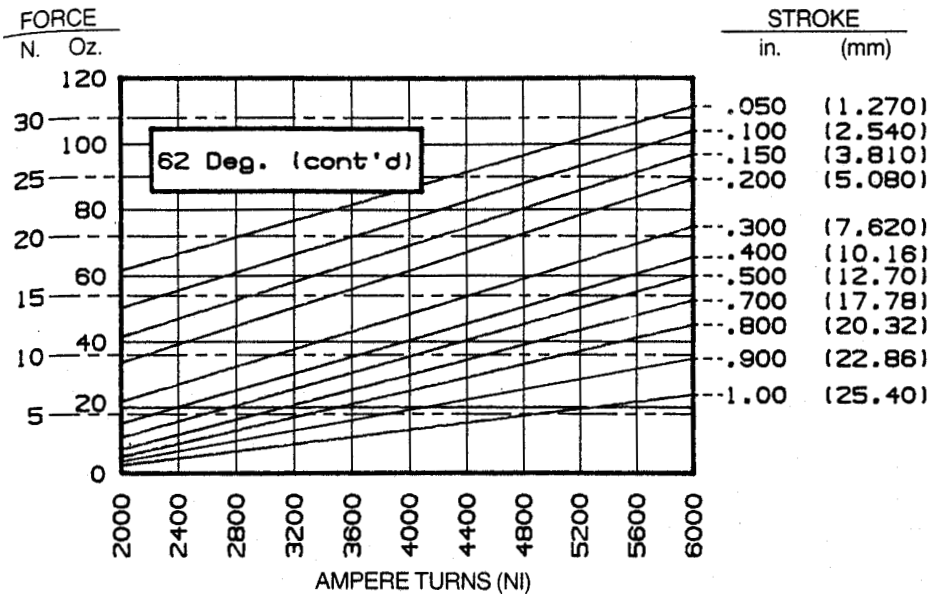
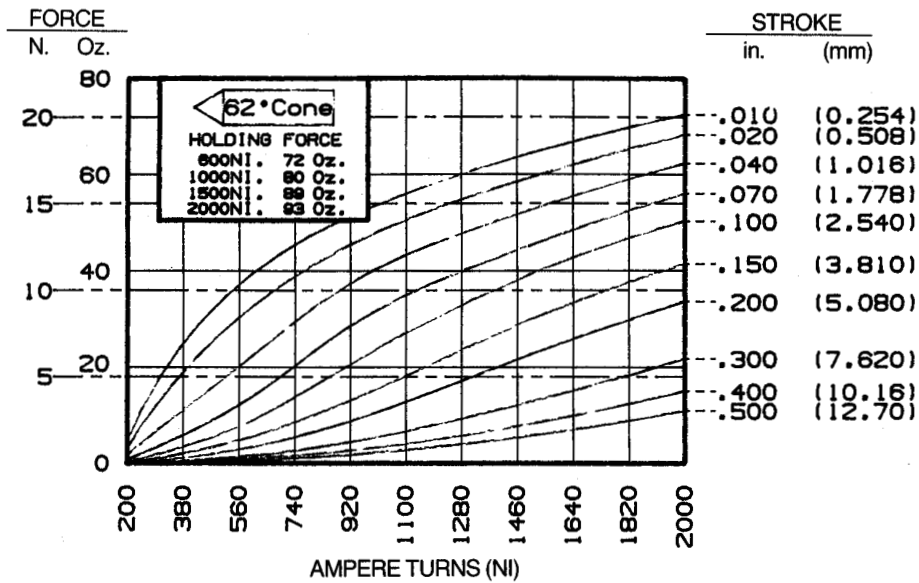
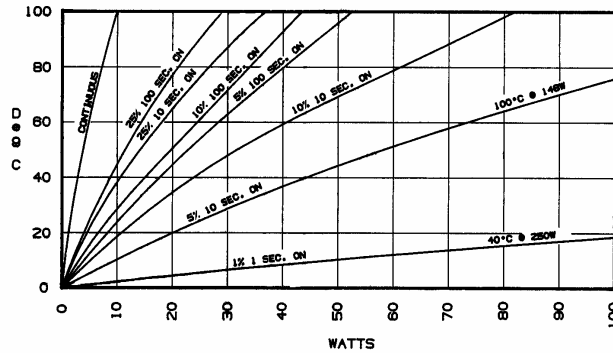
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE

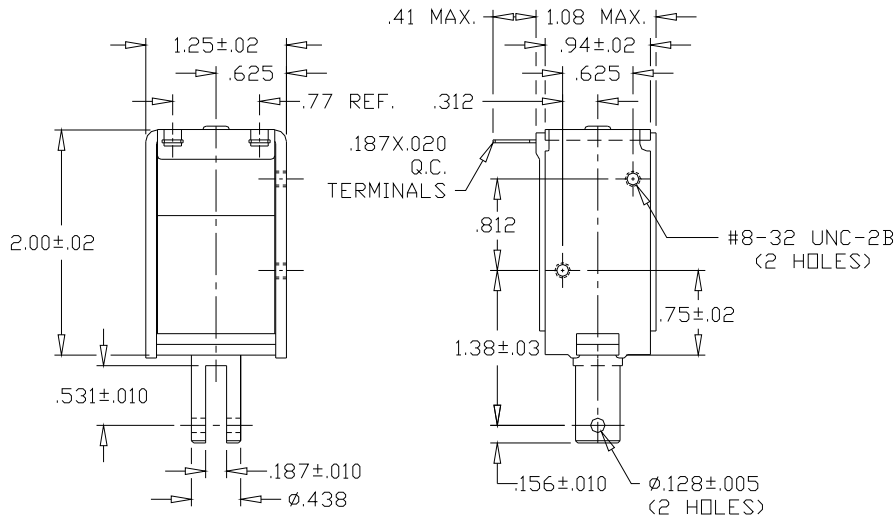


Model 11HD (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 6.6 oz.
 Plunger Weight: 1.3 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
11HD-I-12D	A420-065763-00	Intermittent	12VDC	7.78	19.4	1.5 A
11HD-C-12D	A420-065762-00	Continuous	12VDC	19	8	632 mA
11HD-I-24D	A420-065765-00	Intermittent	24VDC	29.3	20.6	819 mA
11HD-C-24D	A420-065764-00	Continuous	24VDC	76.3	7.9	315 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	70	35	14	8	5	3	2	1	150
Intermittent Duty	100	73	35	22	18	10	7	5	168

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

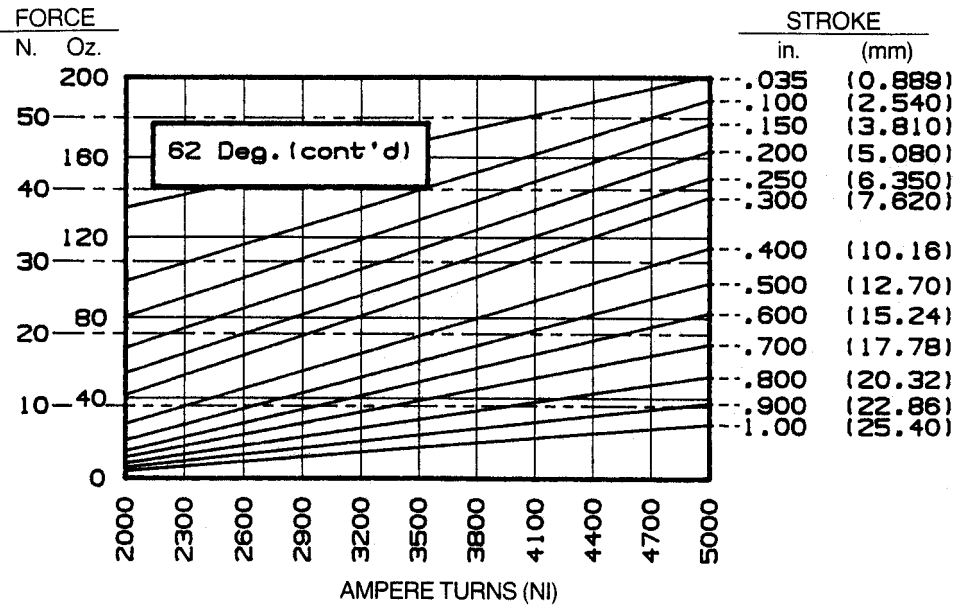
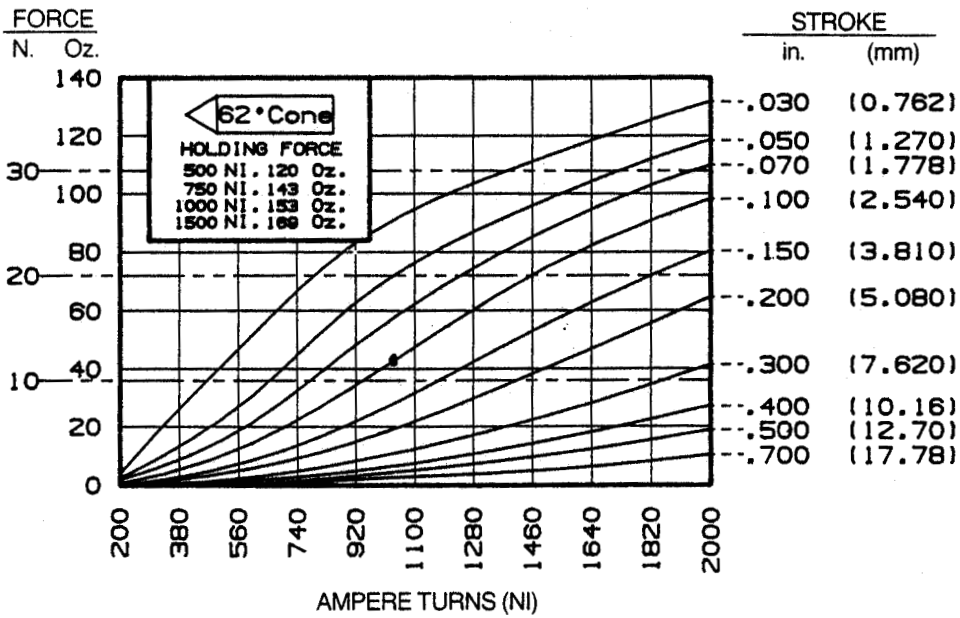
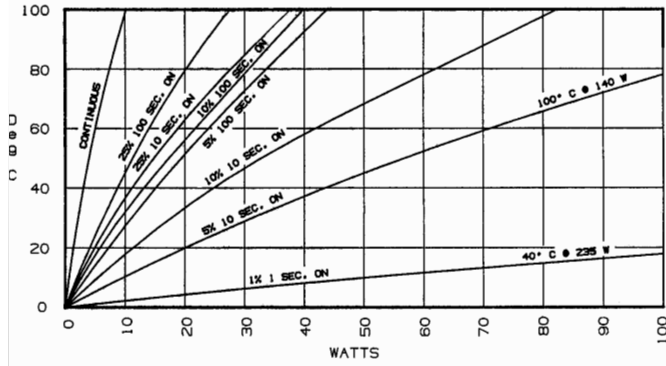
25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model 11HD (DC)

HEAT RISE

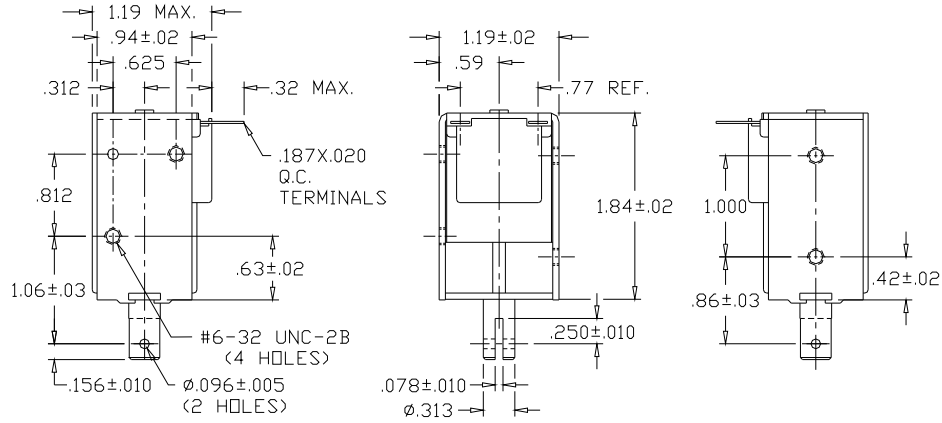


Model 11L (DC)

Frame-Pull, Latching



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Solenoid shown energized and fully seated.


Total Weight: 5.2 oz.
 Plunger Weight: .6 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
11L-C-12D	A420-067860-00	Continuous	12VDC	35	4.3	343
11L-C-24D	A420-067862-00	Continuous	24VDC	146	4.1	164

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.
 * At 0 VDC (provided by permanent magnet latch).

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	35	20	14	6	4	2	1	n/a	*96

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

RoHS

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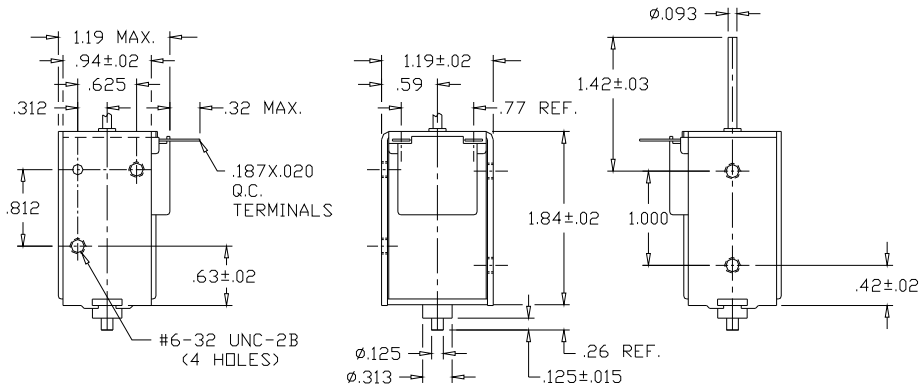
Pull Curves Not Available

Model 11P (DC)

Frame-Push



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 9.5 oz.
 Plunger Weight: 1.1 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
11P-I-12D	A420-065713-00	Intermittent	12VDC	7.5	20.2	1.6 A
11P-C-12D	A420-065712-00	Continuous	12VDC	18.4	8.2	652 mA
11P-I-24D	A420-065715-00	Intermittent	24VDC	29.1	20.8	825 mA
11P-C-24D	A420-065714-00	Continuous	24VDC	93.1	6.5	258 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	35	21	10	6	4	2	1	n/a	82
Intermittent Duty	62	46	27	18	10	8	6	5	93

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

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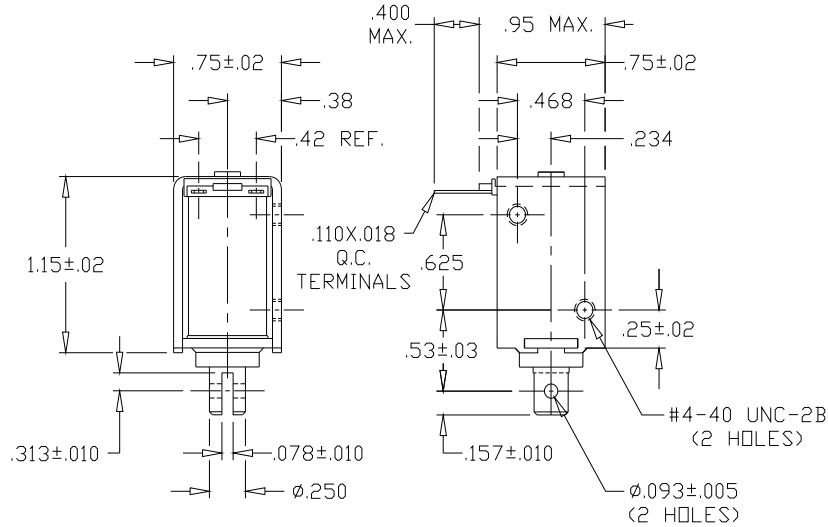
Pull Curves Not Available

Model 22 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 1.6 oz.
 Plunger Weight: .2 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
22-I-12D	A420-065803-00	Intermittent	12VDC	22.6	6.7	531
22-C-12D	A420-065802-00	Continuous	12VDC	45.7	3.3	263
22-I-24D	A420-065805-00	Intermittent	24VDC	93.2	6.5	258
22-C-24D	A420-065804-00	Continuous	24VDC	182	3.3	132

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	11	3	2	1	n/a	n/a	n/a	n/a	39
Intermittent Duty	20	8	3	2	1	n/a	n/a	n/a	45

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

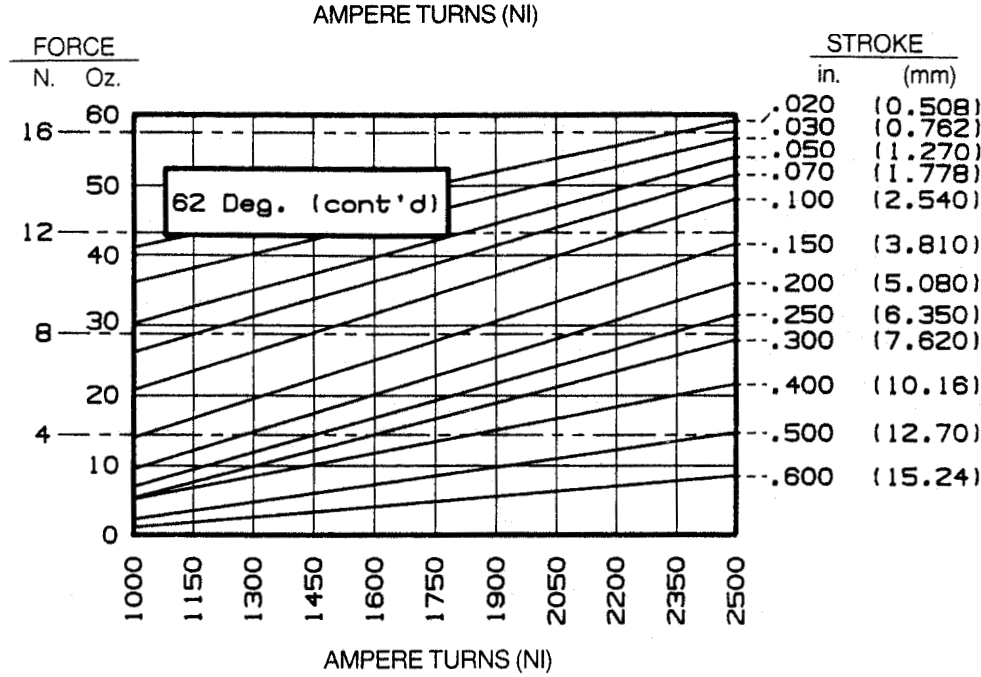
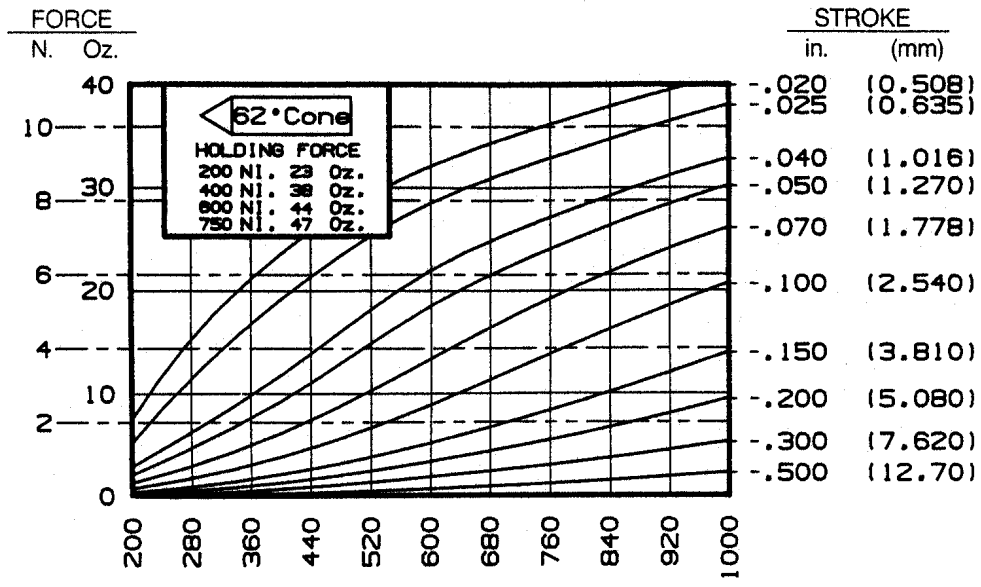
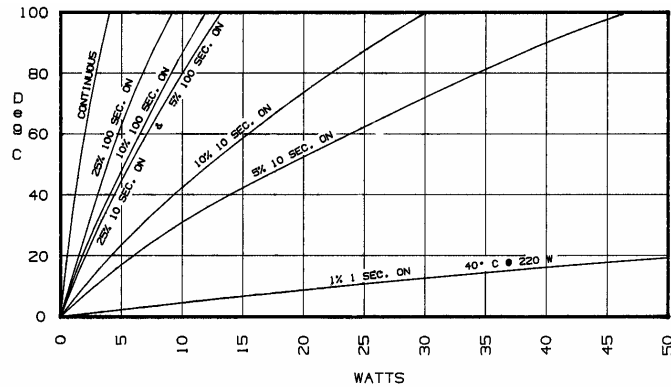
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE

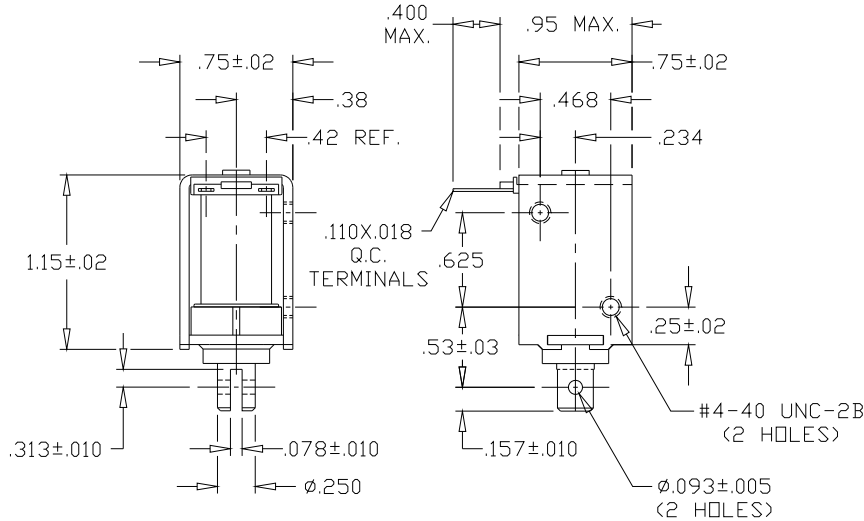


Model 22L (DC)

Frame-Pull, Latching



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Solenoid shown energized and fully seated.


Total Weight: 1.66 oz.
 Plunger Weight: .26 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
22L-C-12D	A420-067879-00	Continuous	12VDC	30	5	400
22L-C-24D	A420-067881-00	Continuous	24VDC	120	5	200

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.
 * At 0 VDC (provided by permanent magnet latch).

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	13	7	2	1	n/a	n/a	n/a	n/a	*48

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

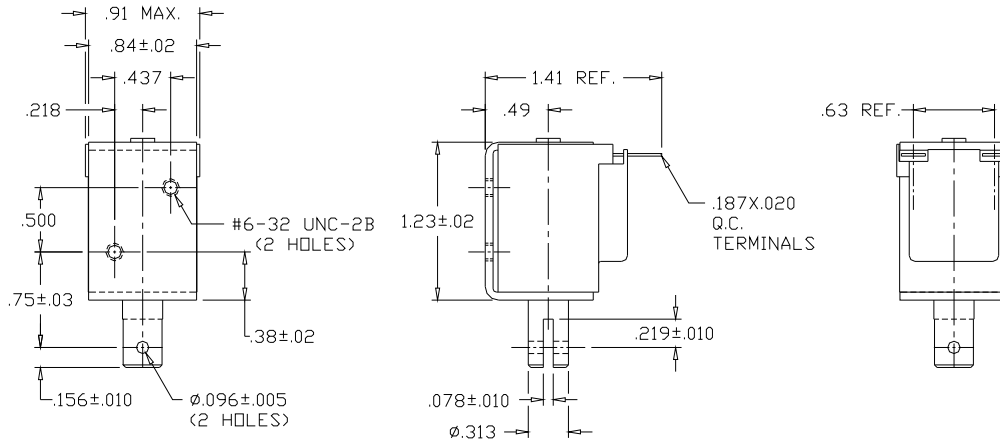
Pull Curves Not Available

Model 24 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 2.40 oz.
 Plunger Weight: .45 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
24-I-12D	A420-065823-00	Intermittent	12VDC	13.8	11	870
24-C-12D	A420-065822-00	Continuous	12VDC	35.5	4.3	338
24-I-24D	A420-065825-00	Intermittent	24VDC	53.9	11.2	445
24-C-24D	A420-065824-00	Continuous	24VDC	137	4.4	175

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	15	6	4	2	1	n/a	n/a	n/a	48
Intermittent Duty	33	18	9	4	2	n/a	n/a	n/a	65

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

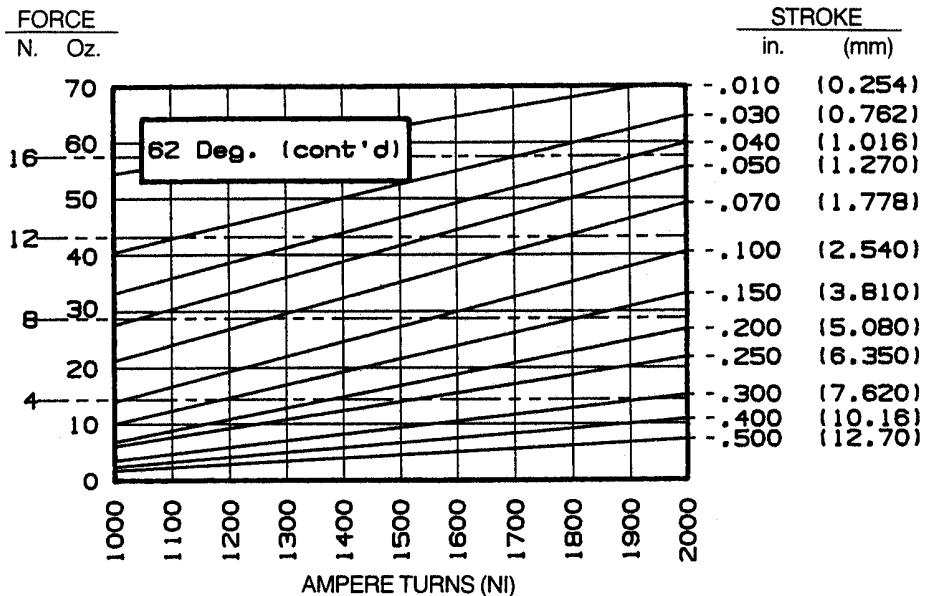
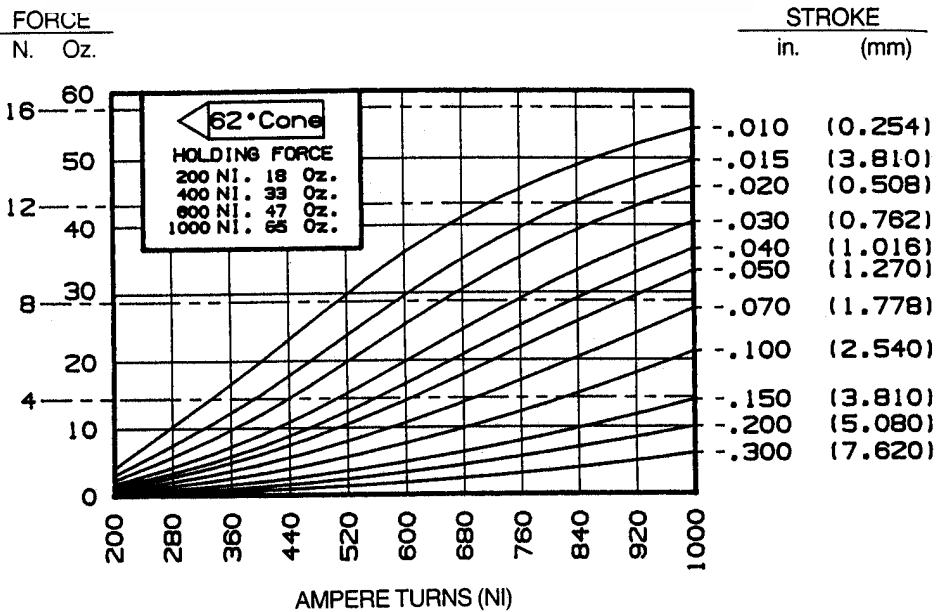
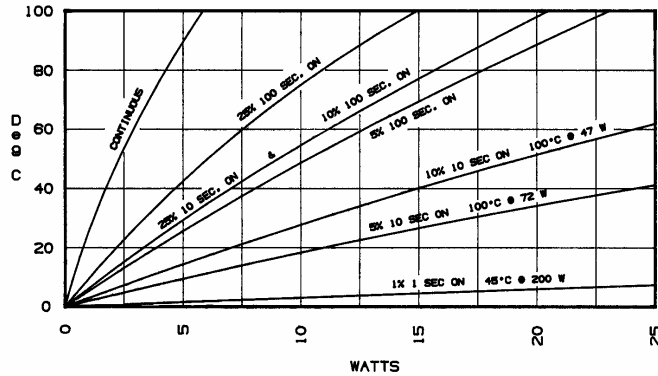
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE

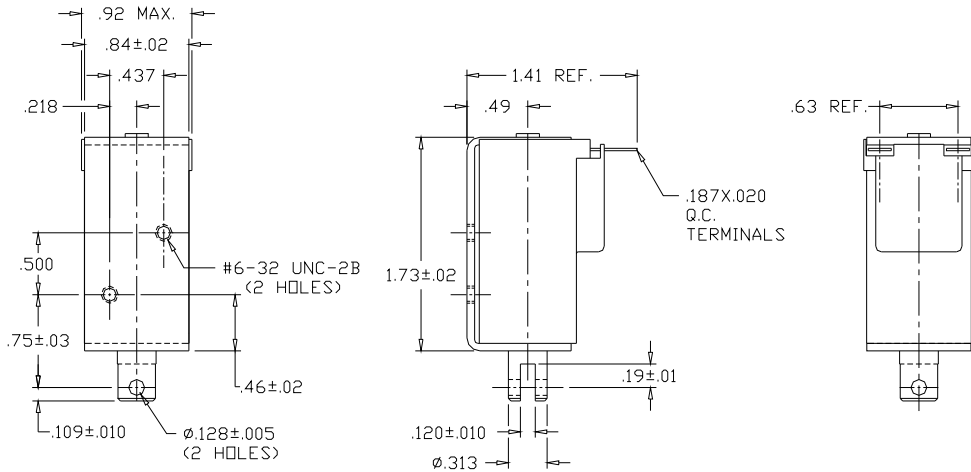


Model 26 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.


Total Weight: 3.2 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
26-I-12D	A420-065543-00	Intermittent	12VDC	10.7	14.1	1.1 A
26-C-12D	A420-065542-00	Continuous	12VDC	26.7	5.7	449 mA
26-I-24D	A420-065545-00	Intermittent	24VDC	41.5	14.6	578 mA
26-C-24D	A420-065544-00	Continuous	24VDC	104	5.8	231 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	25	12	5	3	2	1	n/a	n/a	58
Intermittent Duty	30	24	16	13	12	6	3	2	75

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

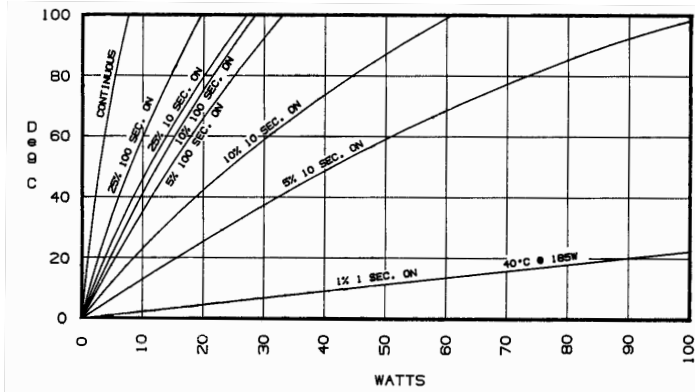
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

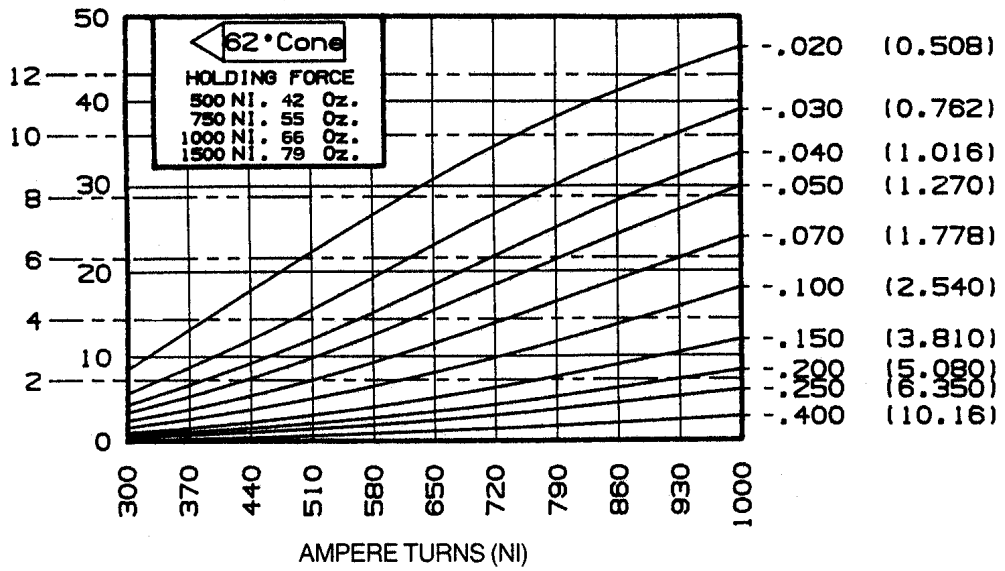
These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE



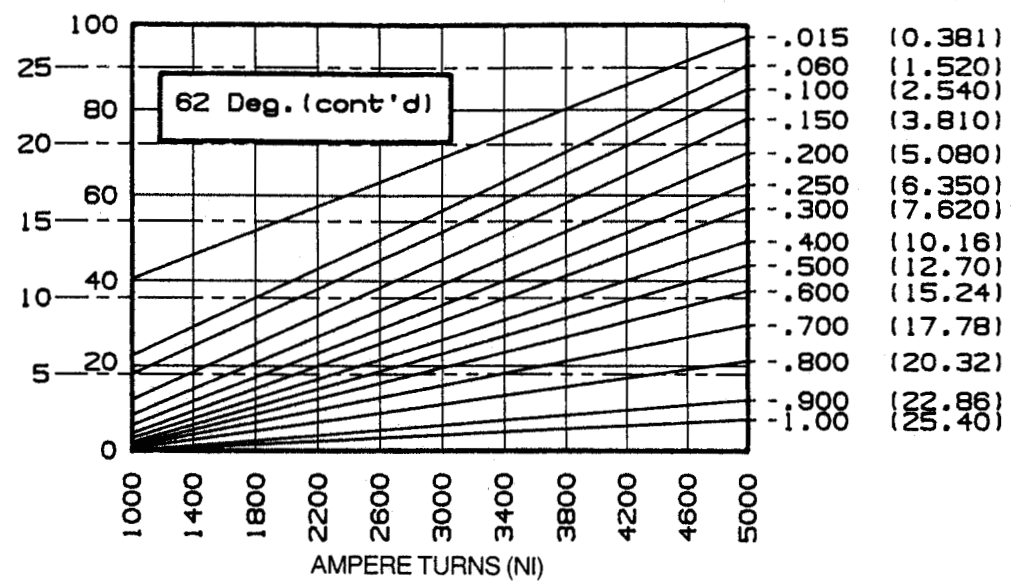
FORCE
N. Oz.

STROKE
in. (mm)



FORCE
N. Oz.

STROKE
in. (mm)

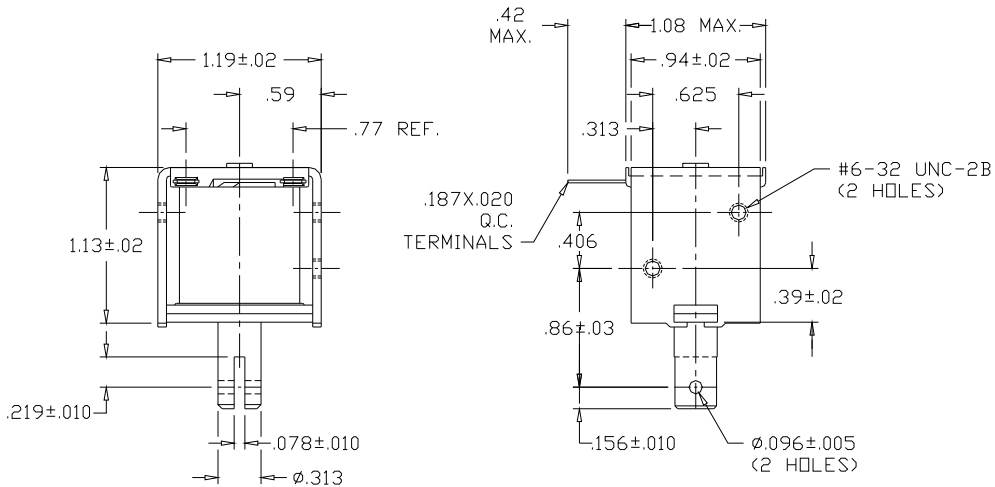


Model 28 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 3.5 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
28-I-12D	A420-065453-00	Intermittent	12VDC	11.9	12.7	1.01 A
28-C-12D	A420-065452-00	Continuous	12VDC	29.8	5.1	403 mA
28-I-24D	A420-065455-00	Intermittent	24VDC	47.4	12.8	506 mA
28-C-24D	A420-065454-00	Continuous	24VDC	116	5.2	207 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	25	10	4	2	1	n/a	n/a	n/a	76
Intermittent Duty	40	12	7	4	2	n/a	n/a	n/a	92

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

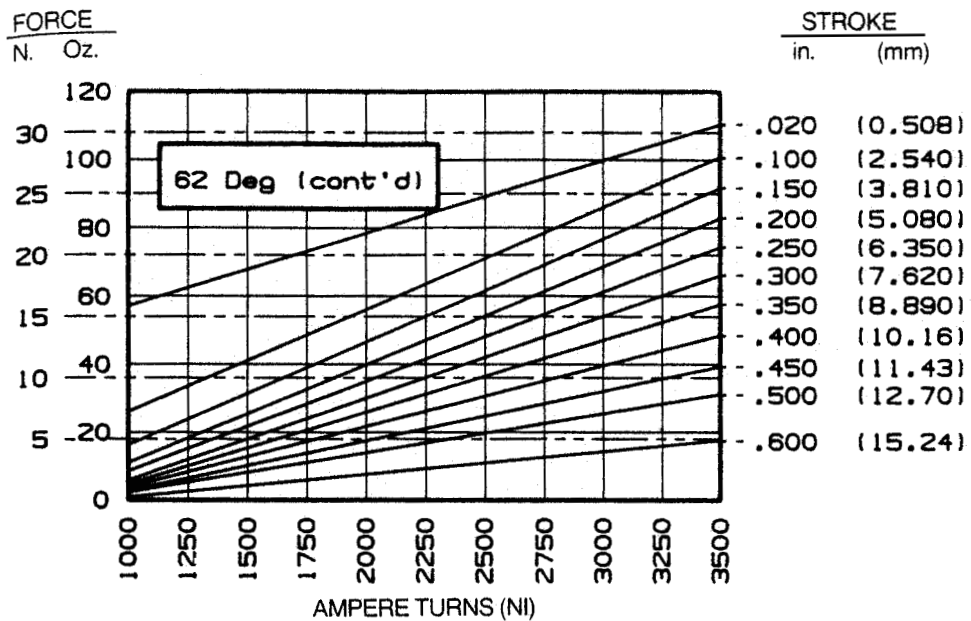
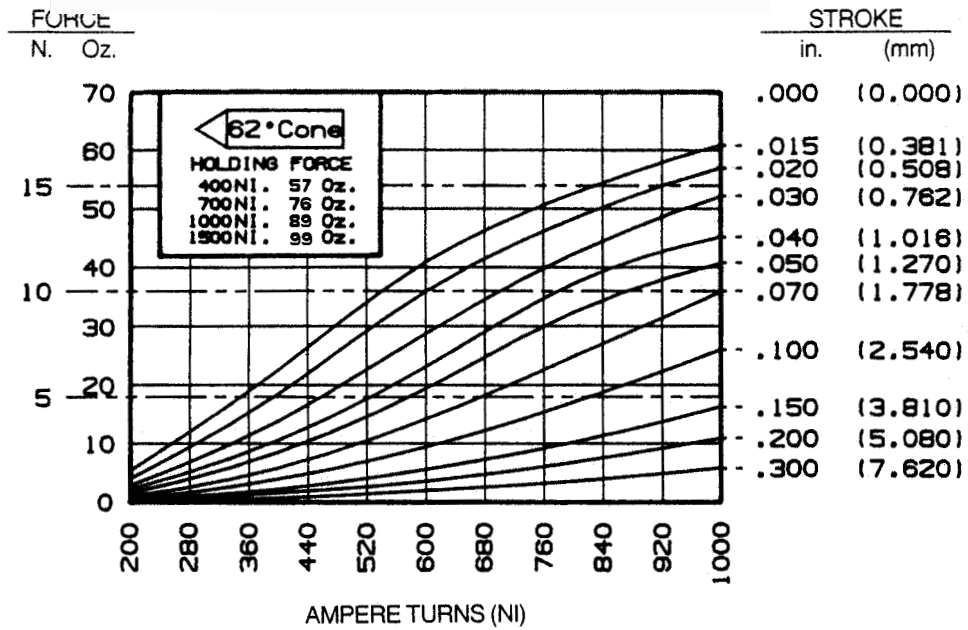
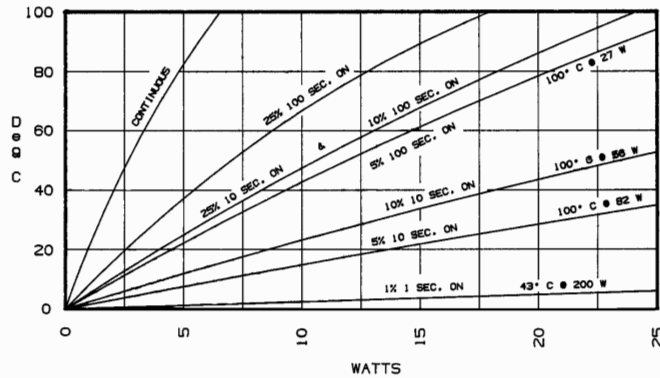
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE

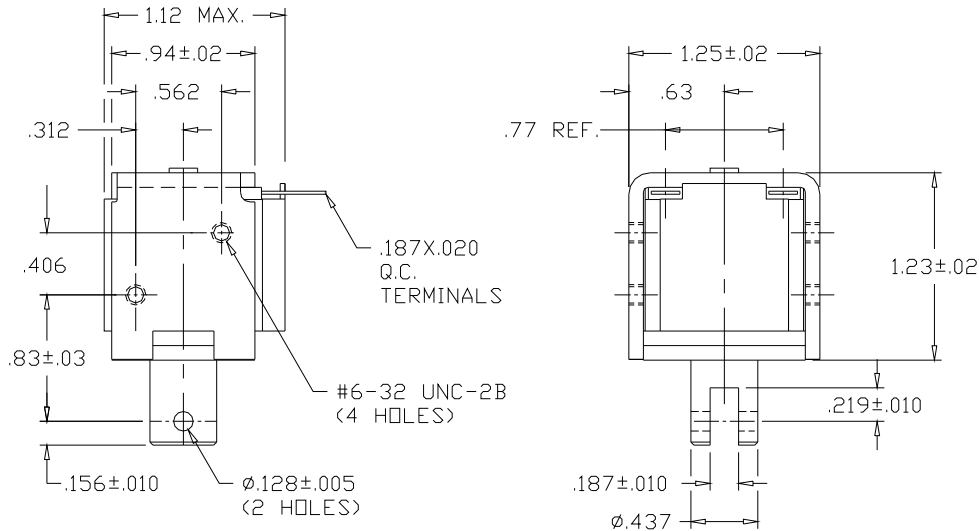


Model 28HD (DC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 4.7 oz.
 Plunger Weight: .9 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
28HD-I-12D	A420-065963-00	Intermittent	12VDC	12.2	12.4	984
28HD-C-12D	A420-065962-00	Continuous	12VDC	30.1	5	399
28HD-I-24D	A420-065965-00	Intermittent	24VDC	49	12.3	490
28HD-C-24D	A420-065964-00	Continuous	24VDC	119	5.1	202

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	-
Continuous Duty	30	12	6	4	1	n/a	n/a	n/a	130
Intermittent Duty	65	30	12	8	5	n/a	n/a	n/a	159

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

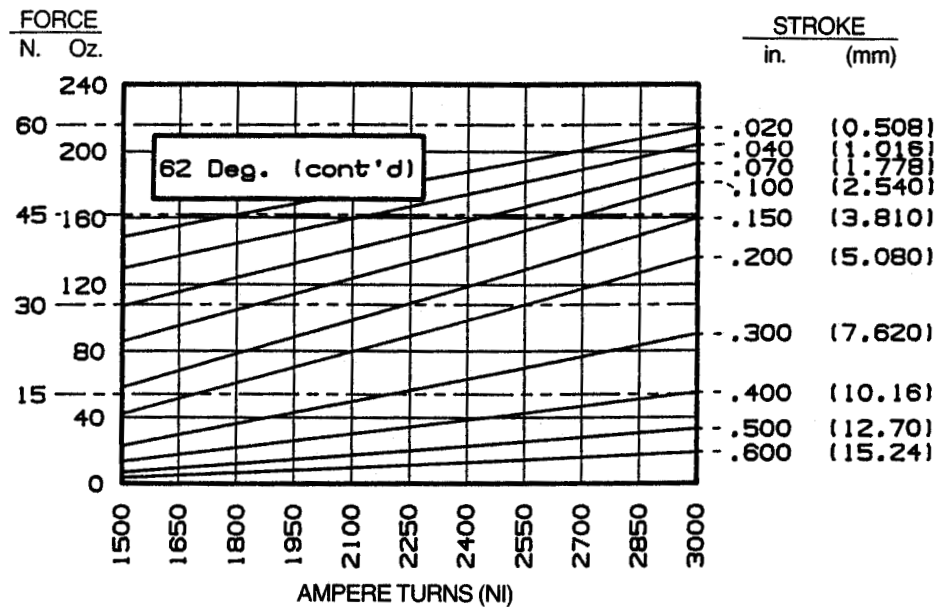
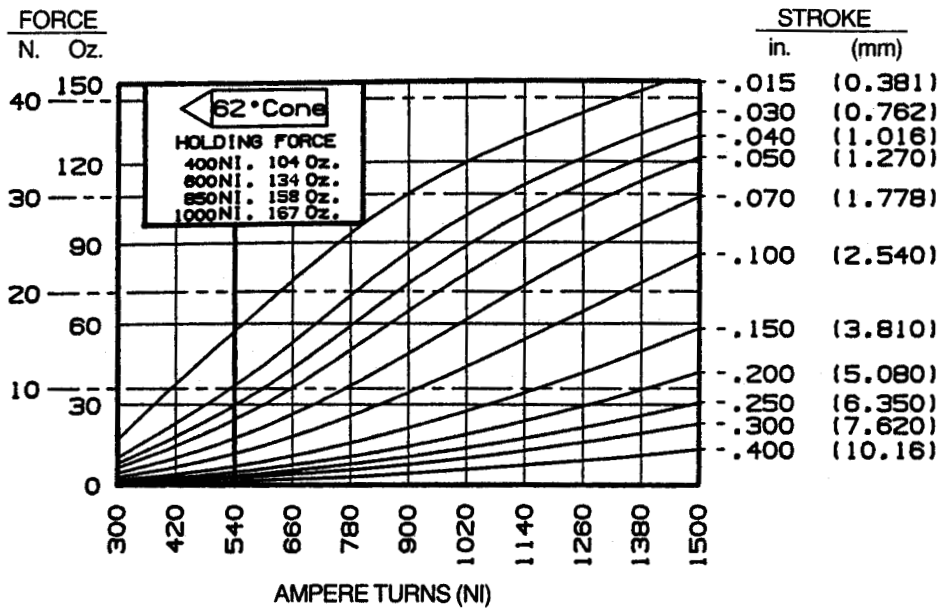
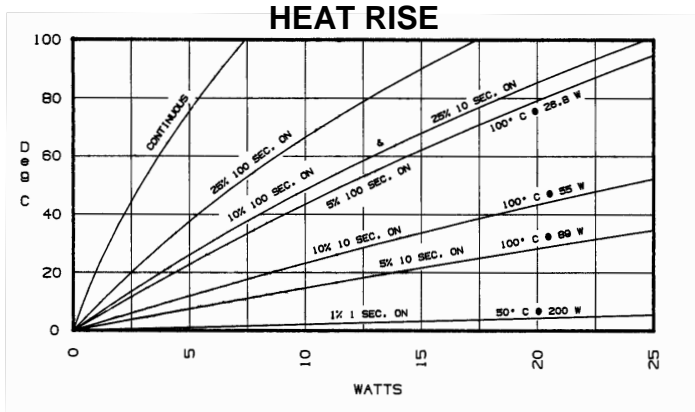
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model 28HD (DC)

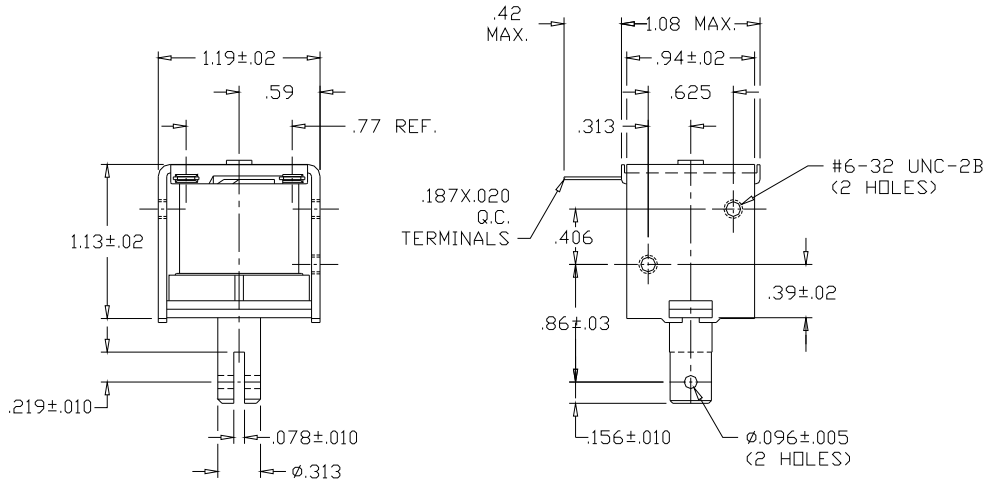


Model 28L (DC)

Frame-Pull, Latching



ISO 9001 / AS9100 Certified Company
 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 1.7 oz.
 Plunger Weight: .3 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
28L-C-12D	A420-067916-00	Continuous	12VDC	24	6.3	500
28L-C-24D	A420-067918-00	Continuous	24VDC	96	6.3	250

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.
 * At 0 VDC (provided by permanent magnet latch).

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	25	10	4	2	1	n/a	n/a	n/a	*48

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

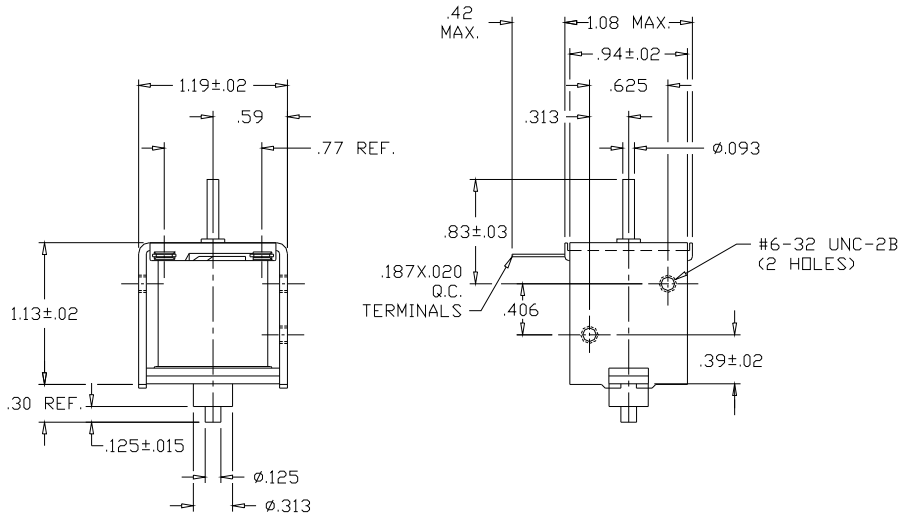
Pull Curves Not Available

Model 28P (DC)

Frame-Push



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 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 3.5 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
28P-I-12D	A420-065593-00	Intermittent	12VDC	11.9	12.7	1.01 A
28P-C-12D	A420-065592-00	Continuous	12VDC	29.8	5.1	403 mA
28P-I-24D	A420-065595-00	Intermittent	24VDC	47.4	12.8	506 mA
28P-C-24D	A420-065594-00	Continuous	24VDC	116	5.2	207 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	25	10	4	2	1	n/a	n/a	n/a	76
Intermittent Duty	32	12	7	4	2	n/a	n/a	n/a	92

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

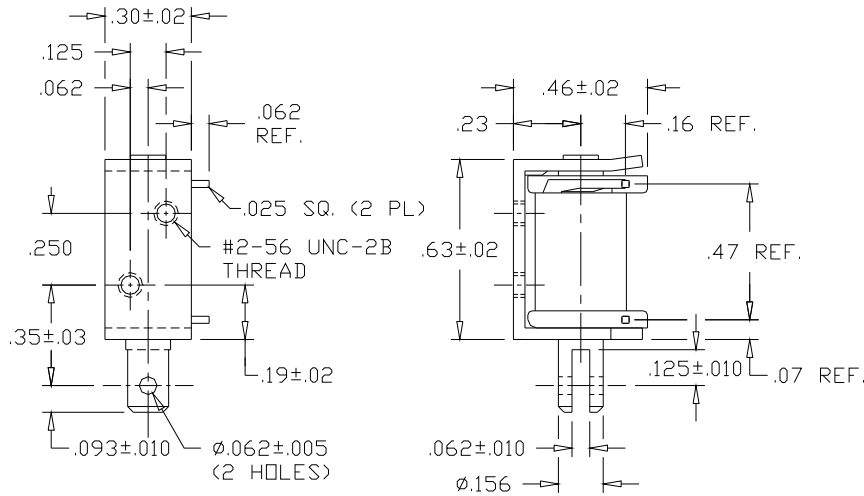
Pull Curves Not Available

Model 42 (DC)

Frame-Pull



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Solenoid shown energized and fully seated.

Total Weight: .25 oz.
 Plunger Weight: .02 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current (mA)
42-I-12D	A420-066613-00	Intermittent	12VDC	83.7	1.8	143
42-C-12D	A420-066612-00	Continuous	12VDC	106	1.4	113
42-I-24D	A420-066615-00	Intermittent	24VDC	297	2	81
42-C-24D	A420-066614-00	Continuous	24VDC	412	1.5	58

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	0.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4
Intermittent Duty	0.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.5

UL Recognition

Recognized under the Component Recognition Program of **Underwriters Laboratories, Inc.**

Continuous Duty

100% 'On' Time

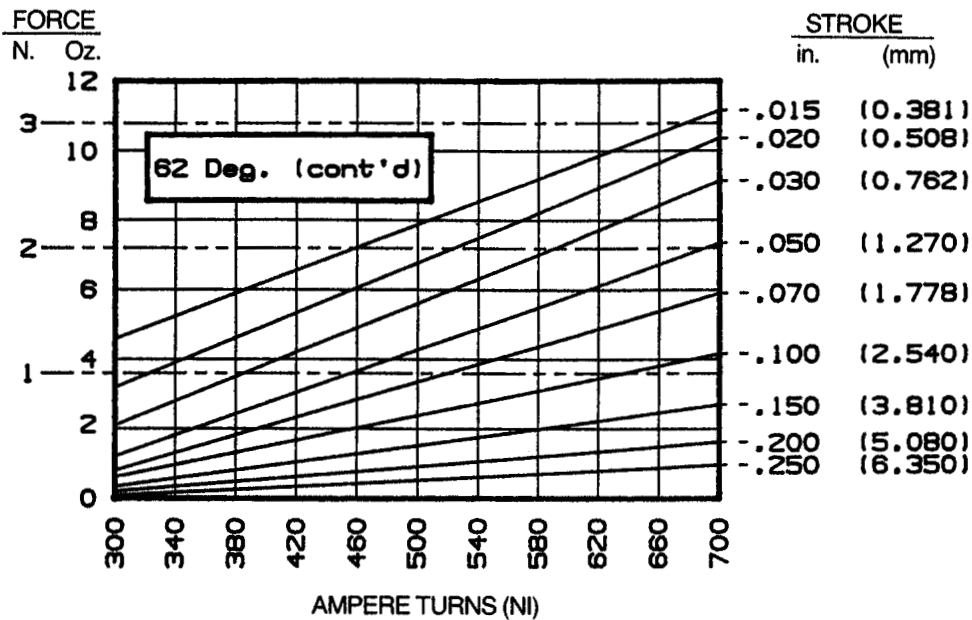
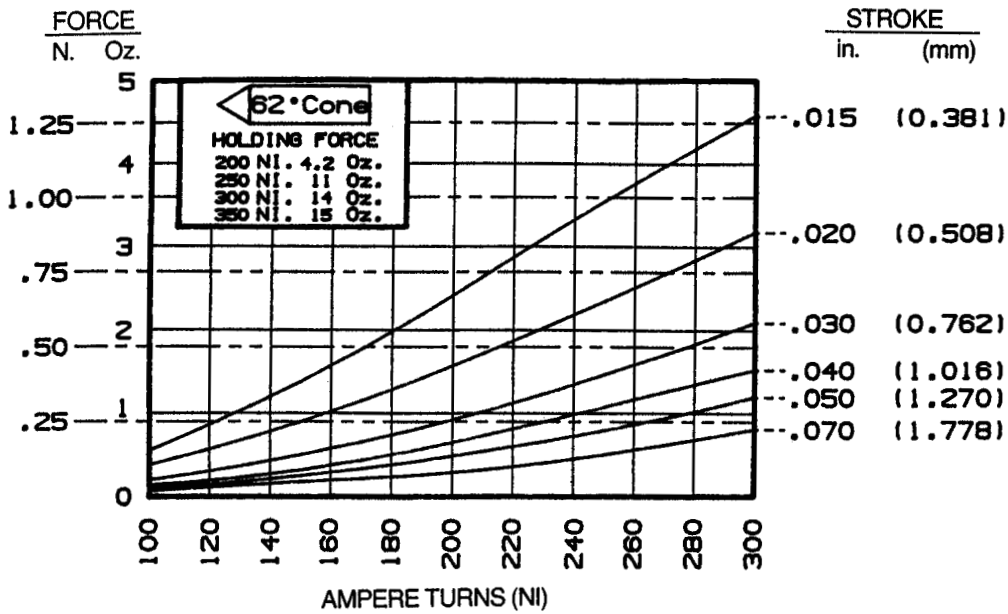
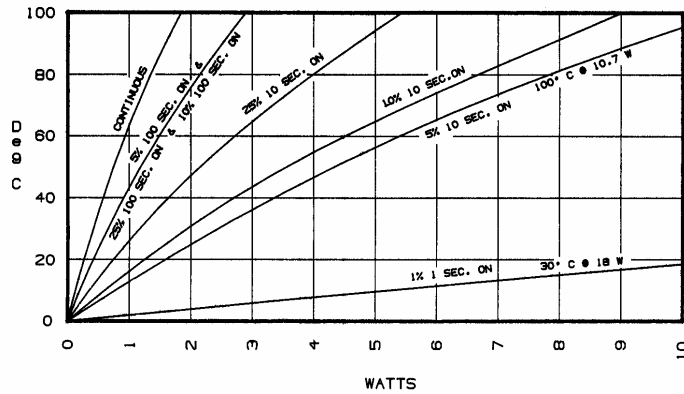
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max.
 Followed By 300 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC

HFAT RISE

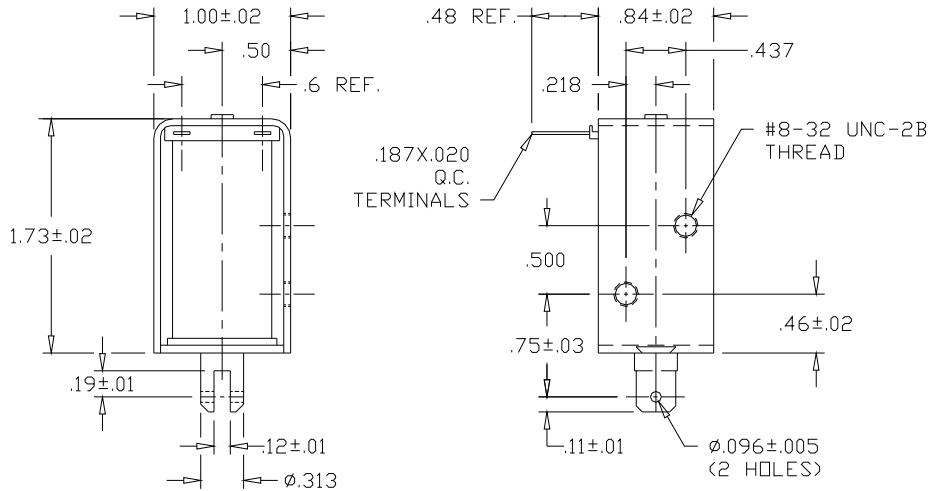


Model 64 (DC)

Frame-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 3.6 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Voltage	Resistance (Ω)	Power (W)	Current
64-I-12D	TBA	Intermittent	12VDC	8.8	17.2	1.4 A
64-C-12D	TBA	Continuous	12VDC	21.3	7.1	563 mA
64-I-24D	TBA	Intermittent	24VDC	34.8	17.4	690 mA
64-C-24D	TBA	Continuous	24VDC	83.6	7.2	287 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)								Holding Force (oz.)
	0.050	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	17	9	5	2	n/a	n/a	n/a	n/a	85
Intermittent Duty	50	32	18	12	8	4	3	2	95

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

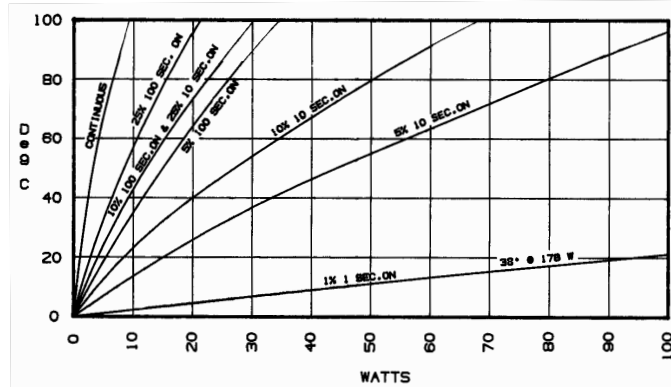
Intermittent Duty

25% 'On' Time, (100 Seconds 'On' Max. Followed By 300 Seconds 'Off' Min.)

RoHS

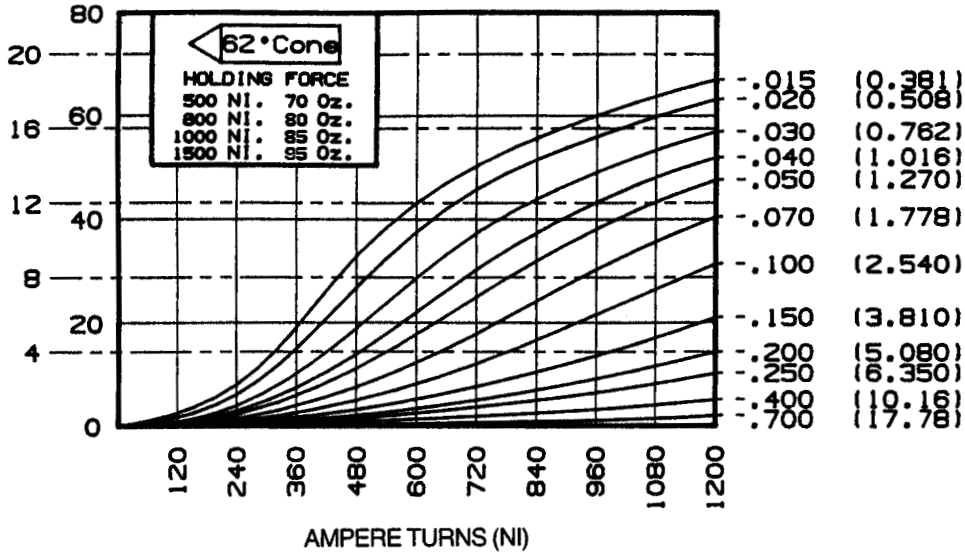
These parts comply with **RoHS** Directive 2002/95/EC

HEAT RISE



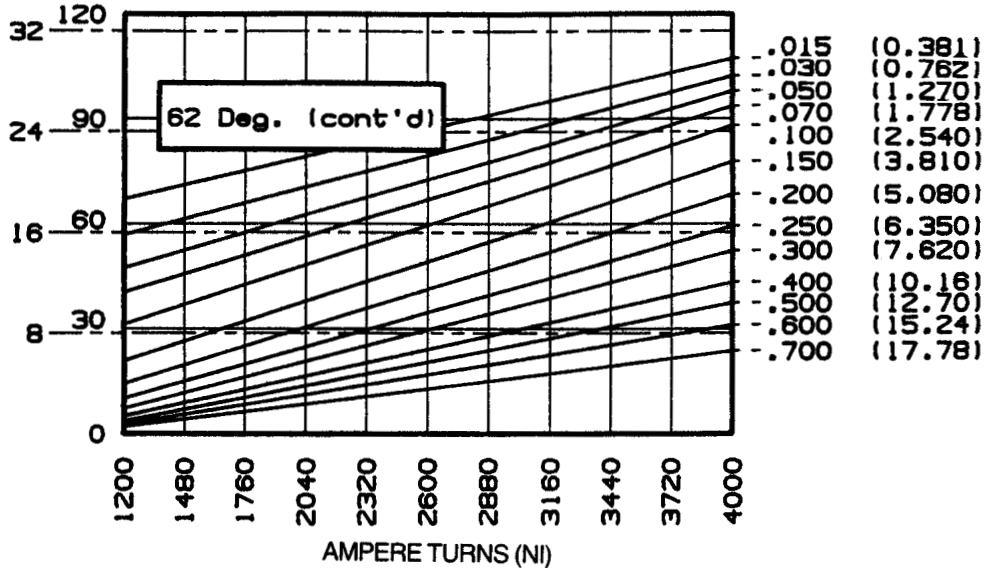
FORCE
N. Oz.

STROKE
in. (mm)



FORCE
N. Oz.

STROKE
in. (mm)

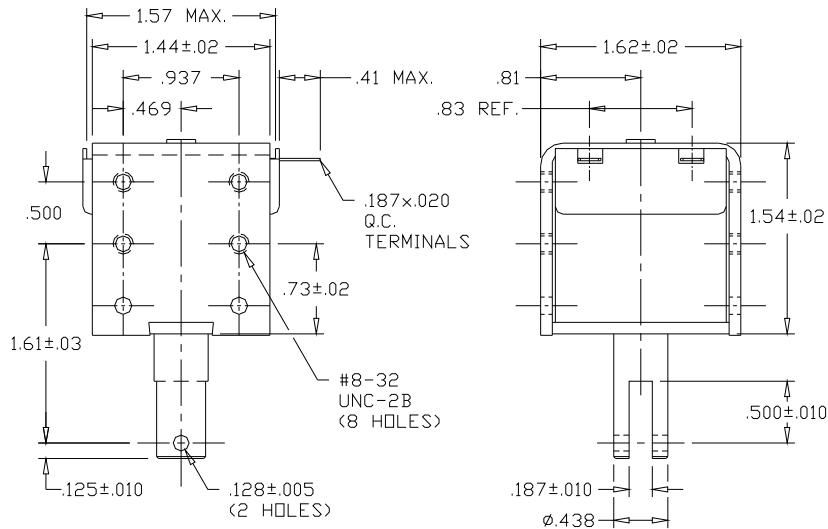


Model 2 (AC)

Frame-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 10 oz.
 Plunger Weight: 1 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
2-I-120A	A420-065507-00	*Intermittent	120	45	44	367
2-C-120A	A420-065506-00	Continuous	120	140	13	108
2-I-240A	A420-065509-00	*Intermittent	240	245	44	183
2-C-240A	A420-065508-00	Continuous	240	650	13	54

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	-
Continuous Duty	20	17	16	14	10	6	n/a	50
*Intermittent Duty	54	45	42	36	26	15	n/a	80

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

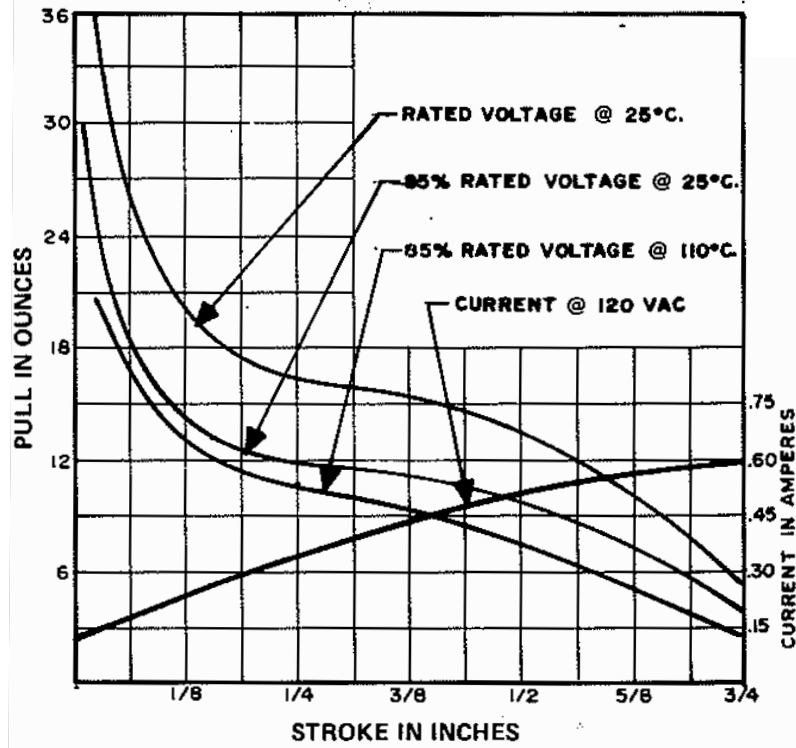
100% 'On' Time

*Intermittent Duty

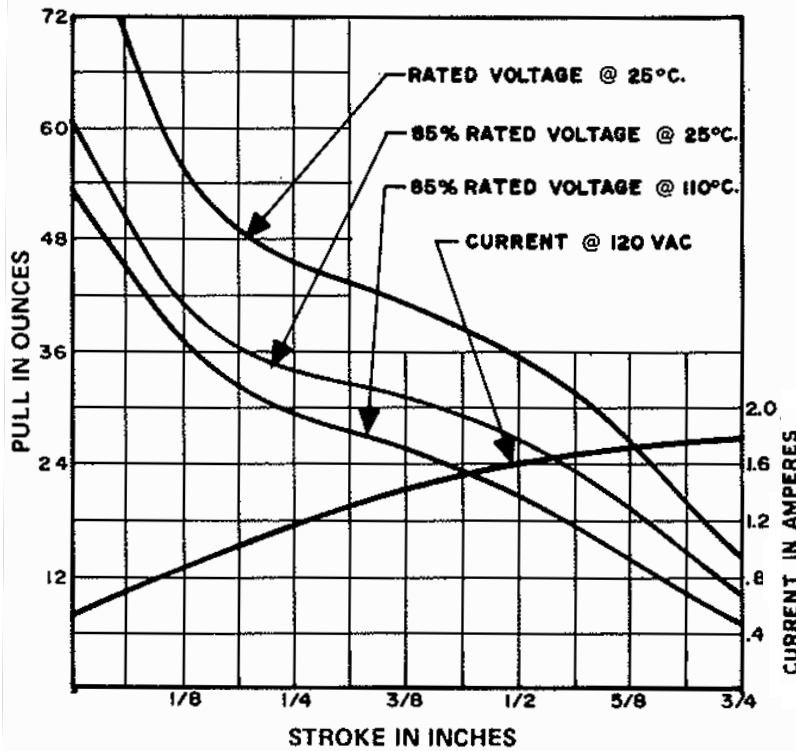
25% 'On' Time, (300 Seconds 'On' Max. Followed By 900 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

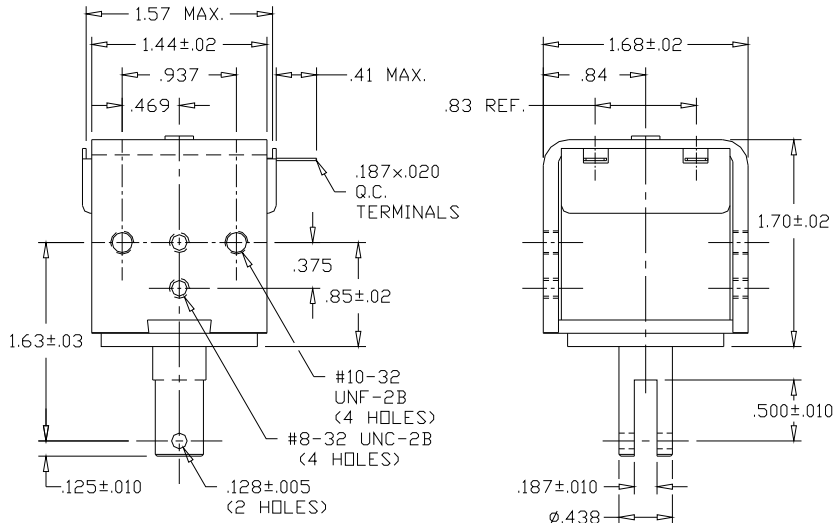


Model 2HD (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 13.0 oz.
 Plunger Weight: 1.5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
2HD-I-120A	A420-065487-00	*Intermittent	120	42	66	550
2HD-C-120A	A420-065486-00	Continuous	120	101	16.5	138
2HD-I-240A	A420-065489-00	*Intermittent	240	140	66	275
2HD-C-240A	A420-065488-00	Continuous	240	404	16.5	69

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	26	22	20	18	14	9	n/a	55
*Intermittent Duty	64	52	48	40	32	20	n/a	70

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

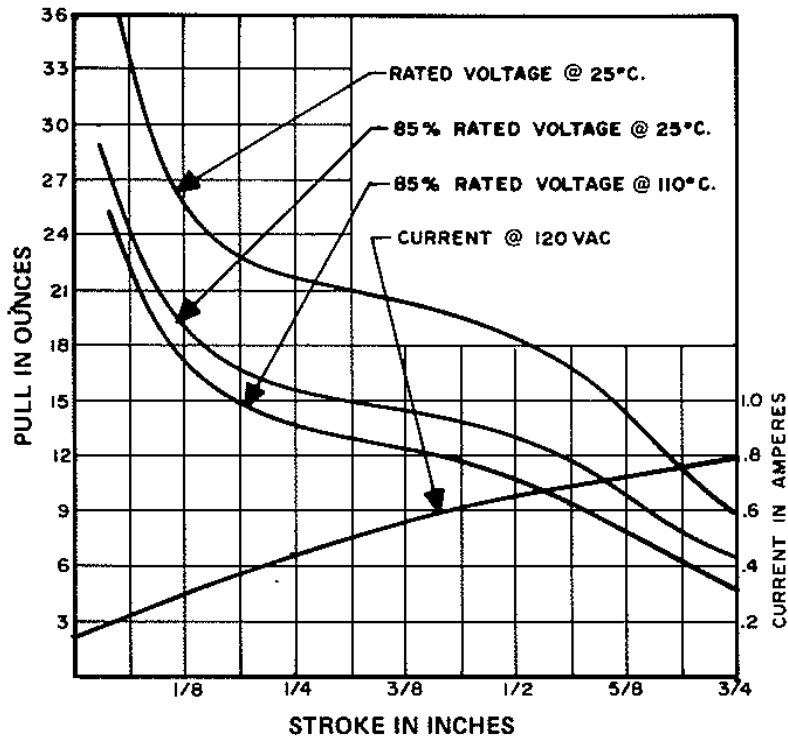
100% 'On' Time

*Intermittent Duty

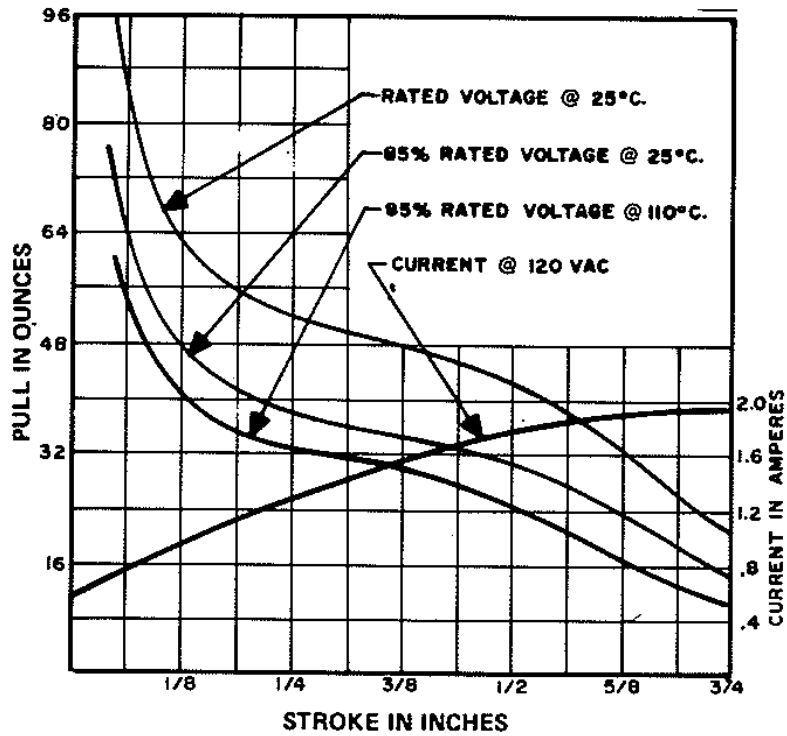
25% 'On' Time, (300 Seconds 'On' Max. Followed By 900 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

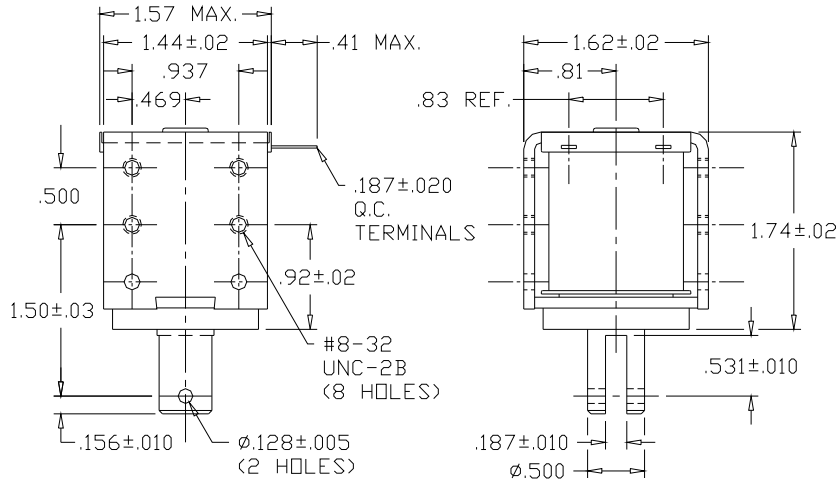


Model 3HD (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 12.0 oz.
 Plunger Weight: 1.4 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
3HD-I-120A	A420-065917-00	*Intermittent	120	23	103	858
3HD-C-120A	A420-065916-00	Continuous	120	100	20	167
3HD-I-240A	A420-065919-00	*Intermittent	240	100	103	429
3HD-C-240A	A420-065918-00	Continuous	240	400	20	83

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	26	23	22	21	18	14	7	43
*Intermittent Duty	88	75	70	66	54	40	8	88

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

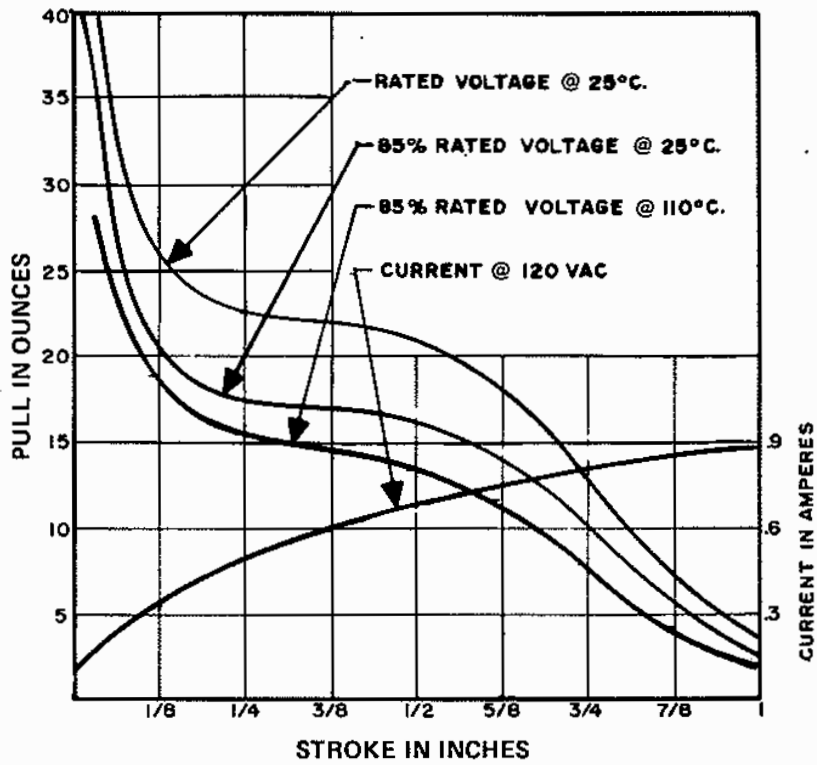
100% 'On' Time

*Intermittent Duty

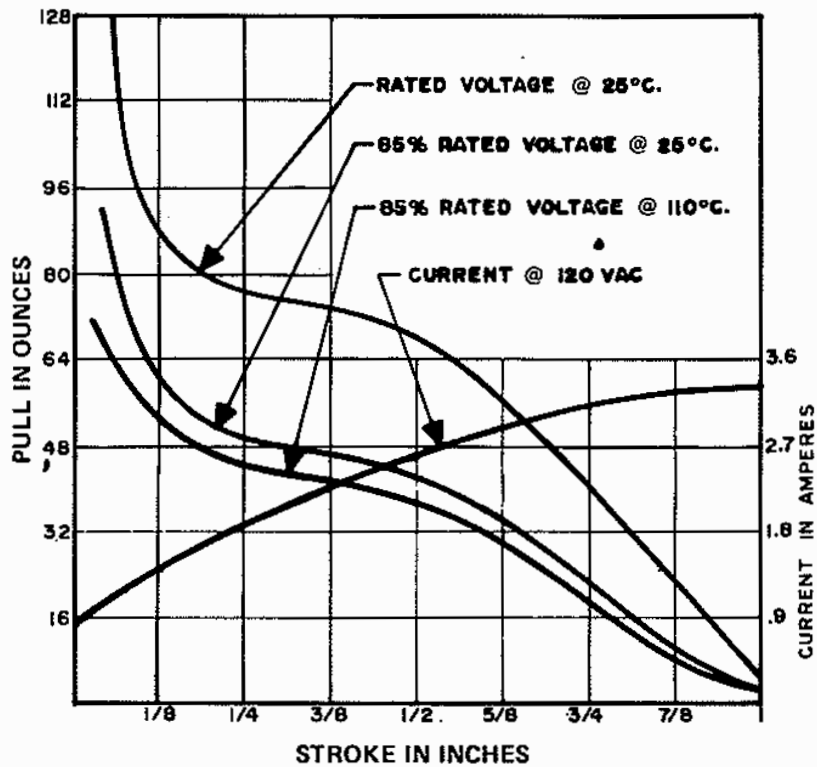
25% 'On' Time, (240 Seconds 'On' Max.
 Followed By 720 Seconds 'Off' Min.)

RoHS

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TYPICAL PULL CURVES

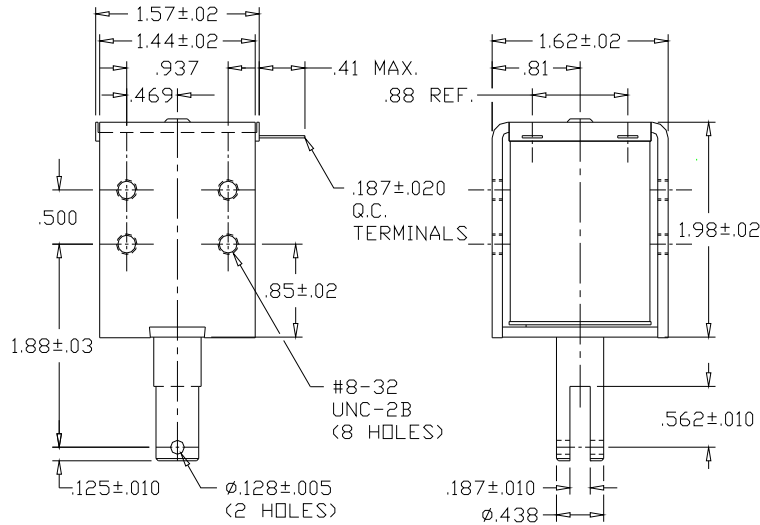


Model 4 (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 9.5 oz.
 Plunger Weight: 1.2 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
4-I-120A	A420-065937-00	*Intermittent	120	37	60	500
4-C-120A	A420-065936-00	Continuous	120	133	10	83
4-I-240A	A420-065939-00	*Intermittent	240	148	60	250
4-C-240A	A420-065938-00	Continuous	240	561	10	42

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	10	9	9	10	12	13	12	43
*Intermittent Duty	38	32	35	38	44	46	46	92

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

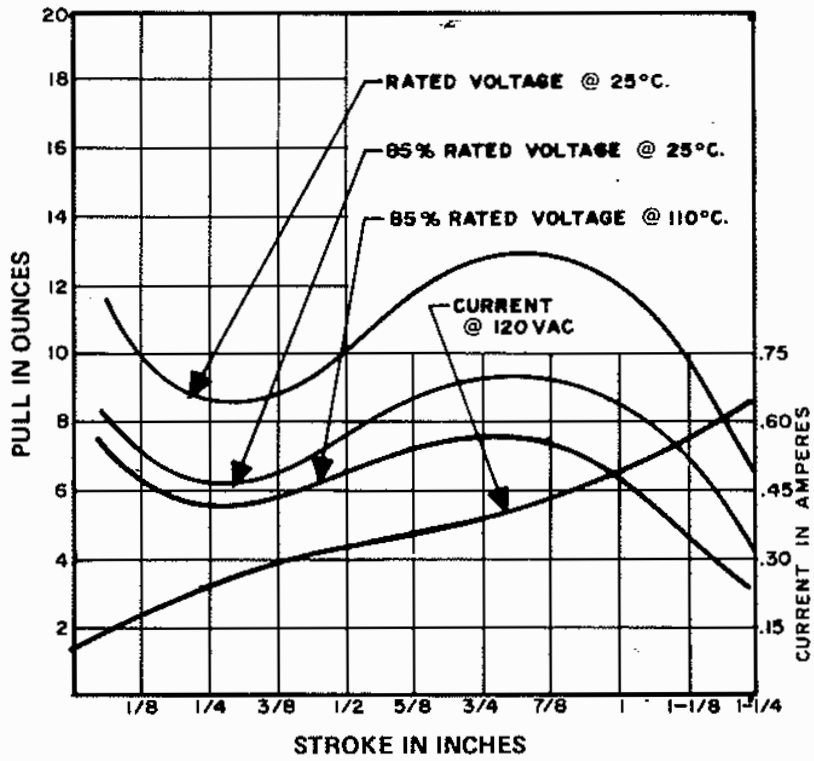
100% 'On' Time

*Intermittent Duty

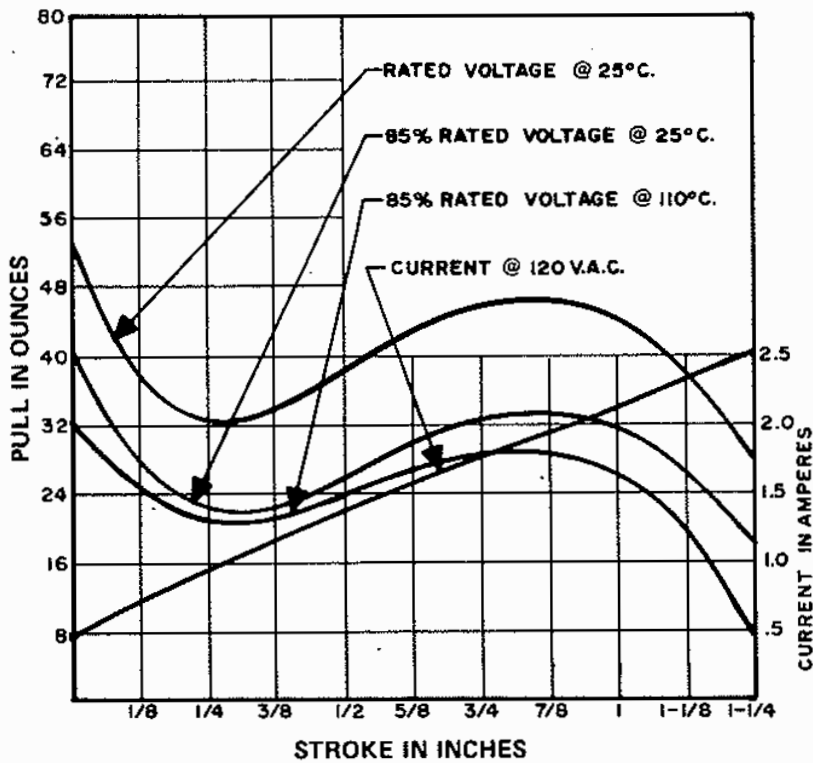
25% 'On' Time, (300 Seconds 'On' Max. Followed By 900 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

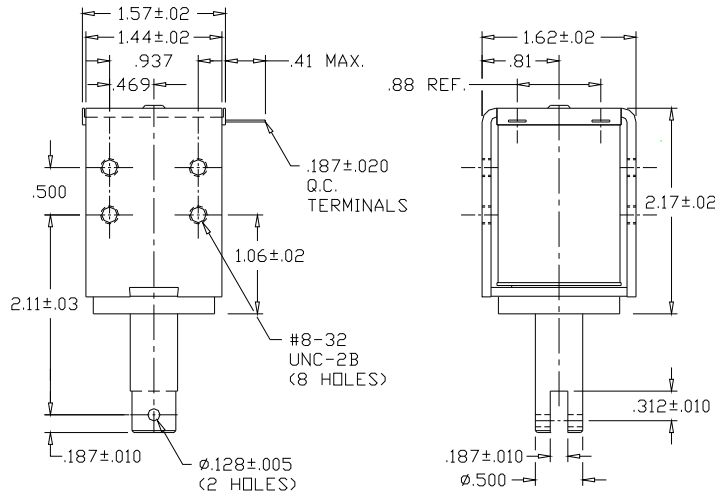


Model 4HD (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 16 oz.
 Plunger Weight: 2 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated
4HD-I-120A	A420-065427-00	*Intermittent	120	19.3	171	1.4 A
4HD-C-120A	A420-065426-00	Continuous	120	73	31	258 mA
4HD-I-240A	A420-065429-00	*Intermittent	240	77	171	713 mA
4HD-C-240A	A420-065428-00	Continuous	240	292	31	129 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	20	18	18	20	22	24	24	80
*Intermittent Duty	70	60	60	66	75	75	66	135

UL Recognition

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Continuous Duty

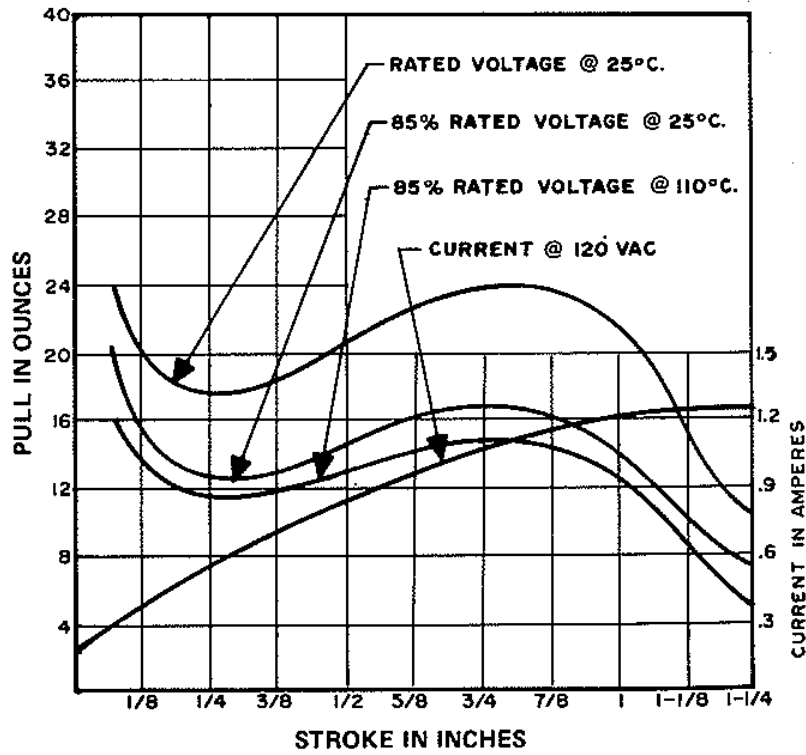
100% 'On' Time

*Intermittent Duty

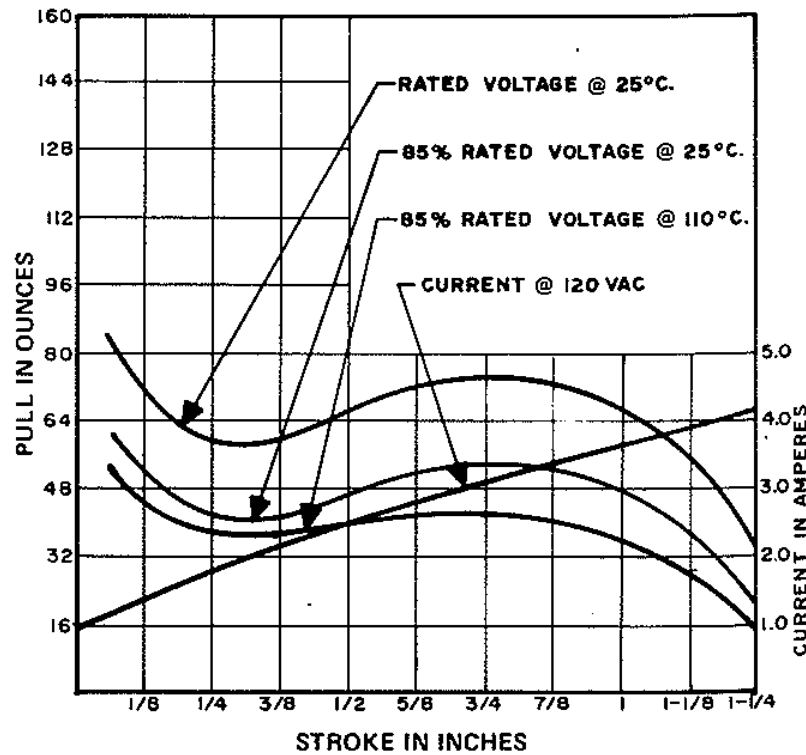
25% 'On' Time, (300 Seconds 'On' Max.
 Followed By 900 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

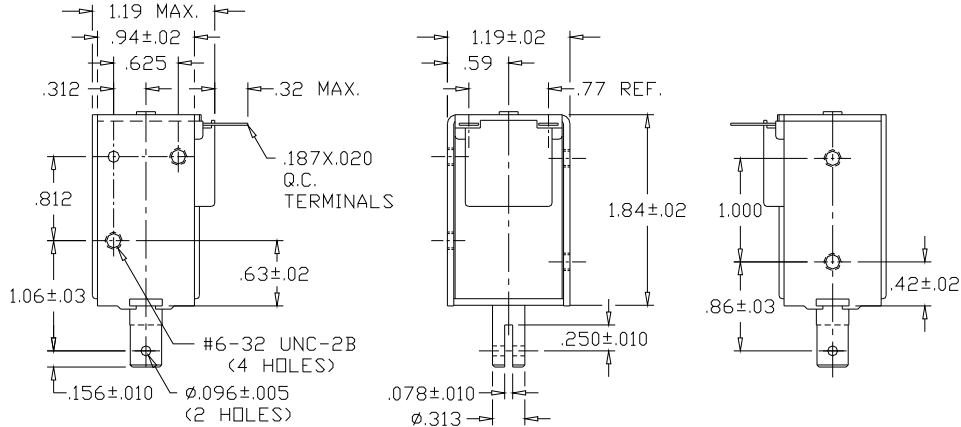


Model 11 (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 5.0 oz.
 Plunger Weight: .6 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
11-I-120A	A420-065567-00	*Intermittent	120	85	40	333
11-C-120A	A420-065566-00	Continuous	120	225	12	100
11-I-240A	A420-065569-00	*Intermittent	240	345	40	167
11-C-240A	A420-065568-00	Continuous	240	920	12	50

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	13	11	10	9	8	7	4	12
*Intermittent Duty	24	20	19	18	17	16	8	20

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

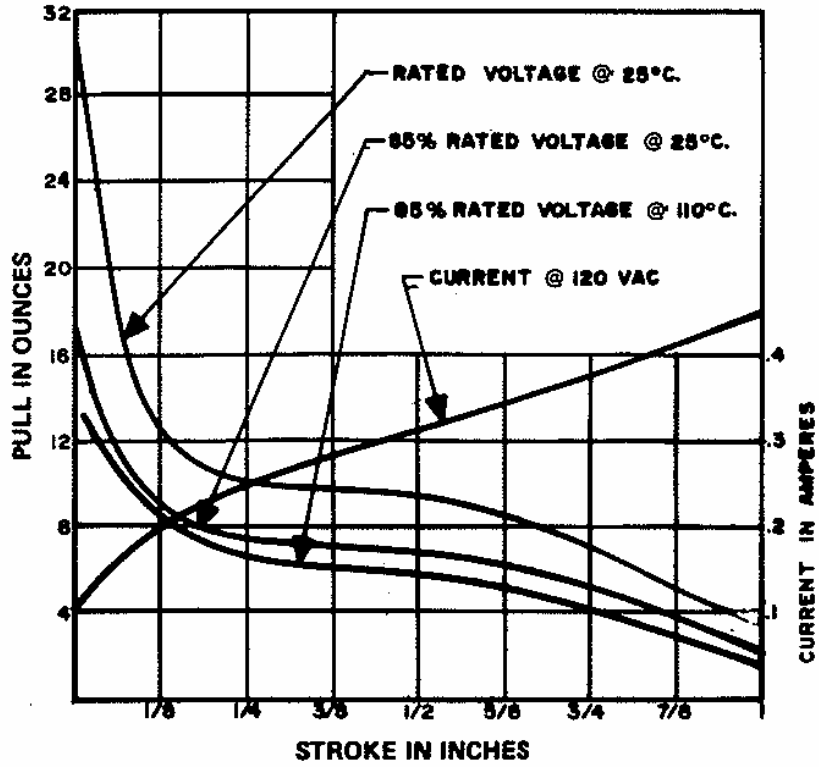
100% 'On' Time

*Intermittent Duty

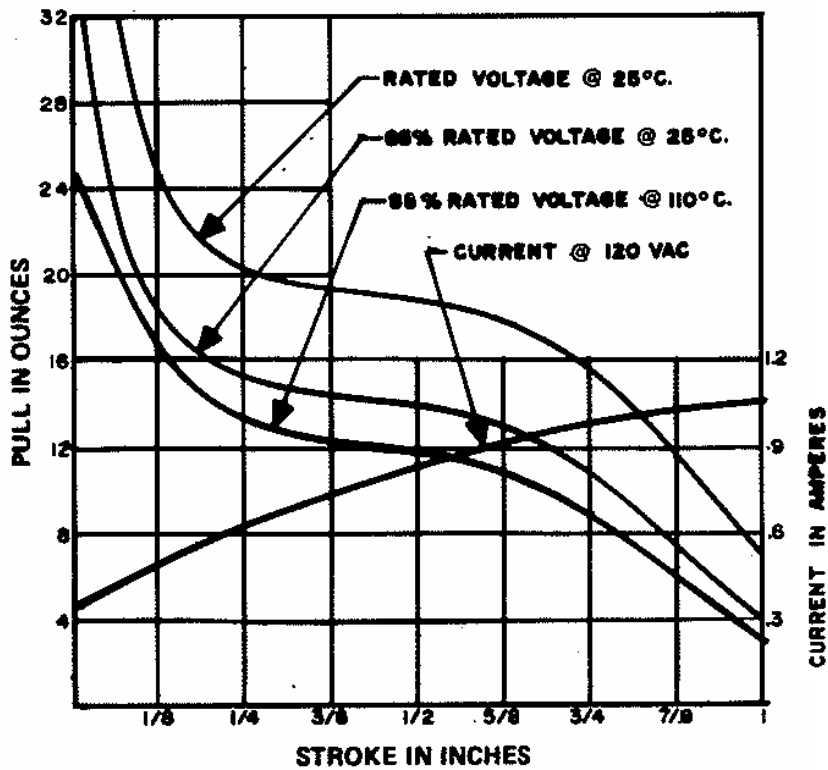
15% 'On' Time, (240 Seconds 'On' Max.
 Followed By 1360 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

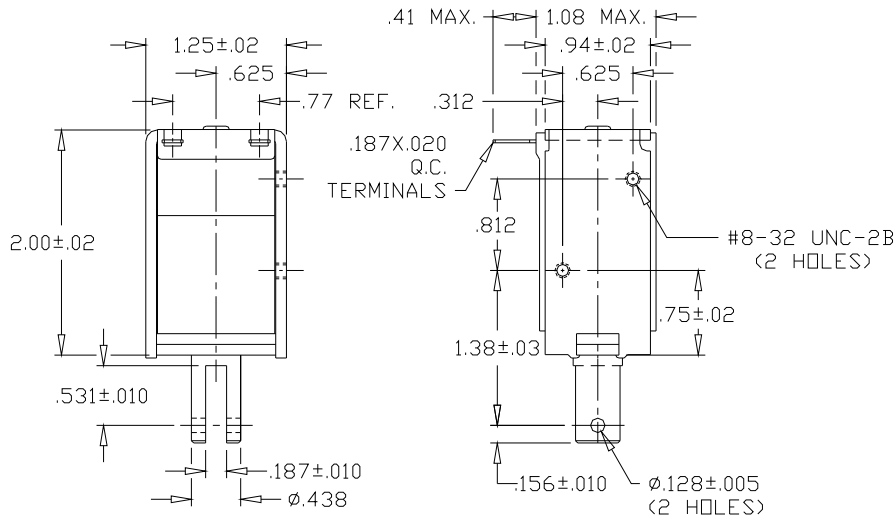


Model 11HD (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 8.0 oz.
 Plunger Weight: 1.0 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
11HD-I-120A	A420-065757-00	*Intermittent	120	75	40	333
11HD-C-120A	A420-065756-00	Continuous	120	165	16	133
11HD-I-240A	A420-065759-00	*Intermittent	240	300	40	167
11HD-C-240A	A420-065758-00	Continuous	240	660	16	67

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	12	10	10	9	8	7	3	50
*Intermittent Duty	24	20	19	18	17	16	7	85

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

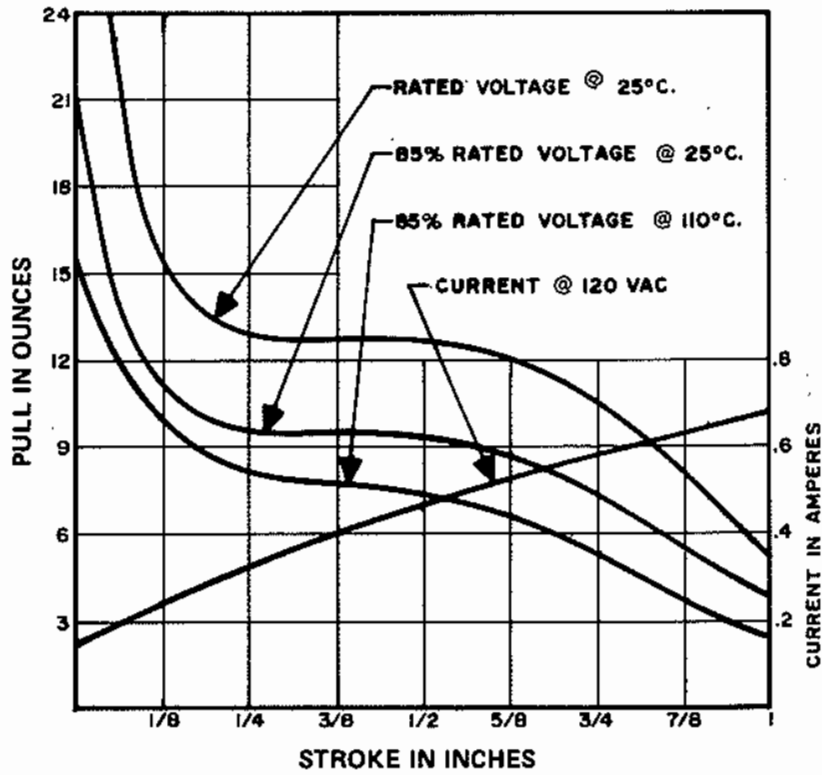
100% 'On' Time

*Intermittent Duty

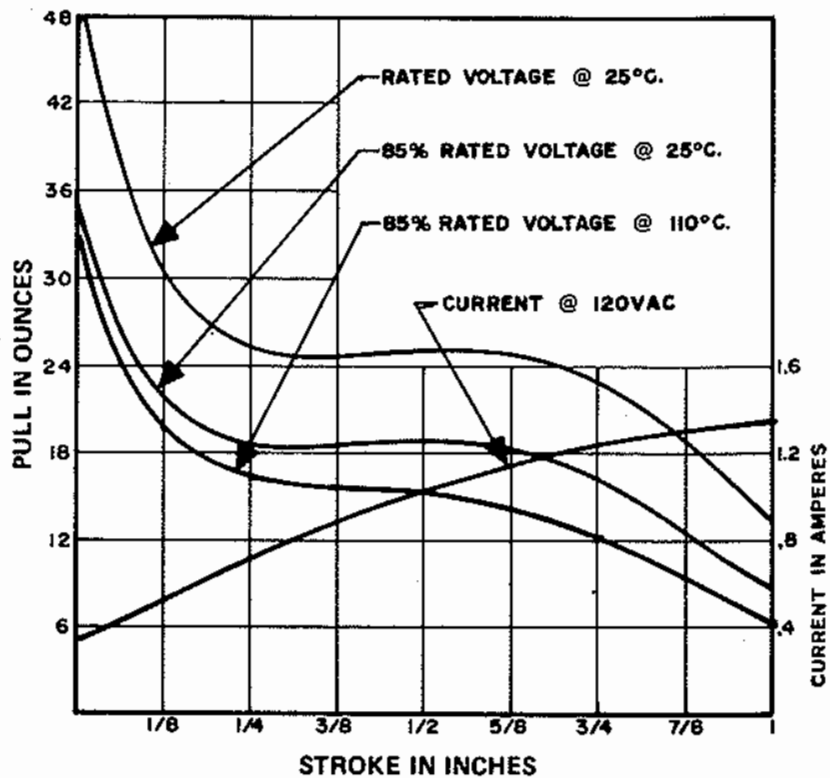
20% 'On' Time, (240 Seconds 'On' Max. Followed By 960 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

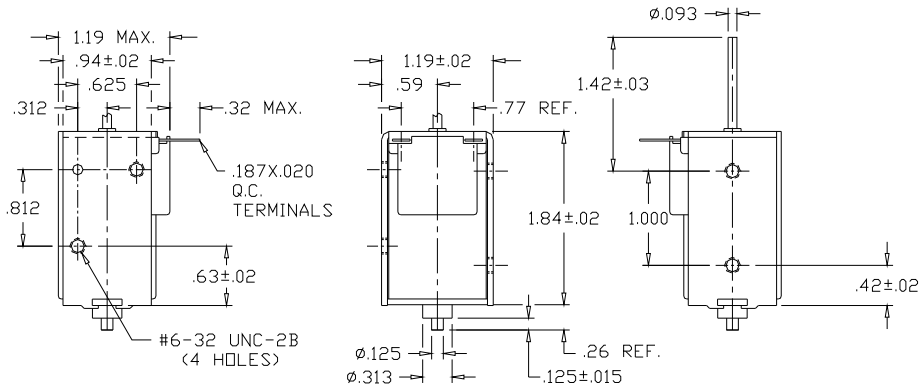


Model 11P (AC)

Frame-Push



ISO 9001 / AS9100 Certified Company
 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 5.0 oz.
 Plunger Weight: .6 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
11P-I-120A	A420-065707-00	*Intermittent	120	85	40	333
11P-C-120A	A420-065706-00	Continuous	120	225	12	100
11P-I-240A	A420-065709-00	*Intermittent	240	345	40	167
11P-C-240A	A420-065708-00	Continuous	240	920	12	50

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	13	11	10	9	8	7	4	12
*Intermittent Duty	24	20	19	18	17	16	8	20

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

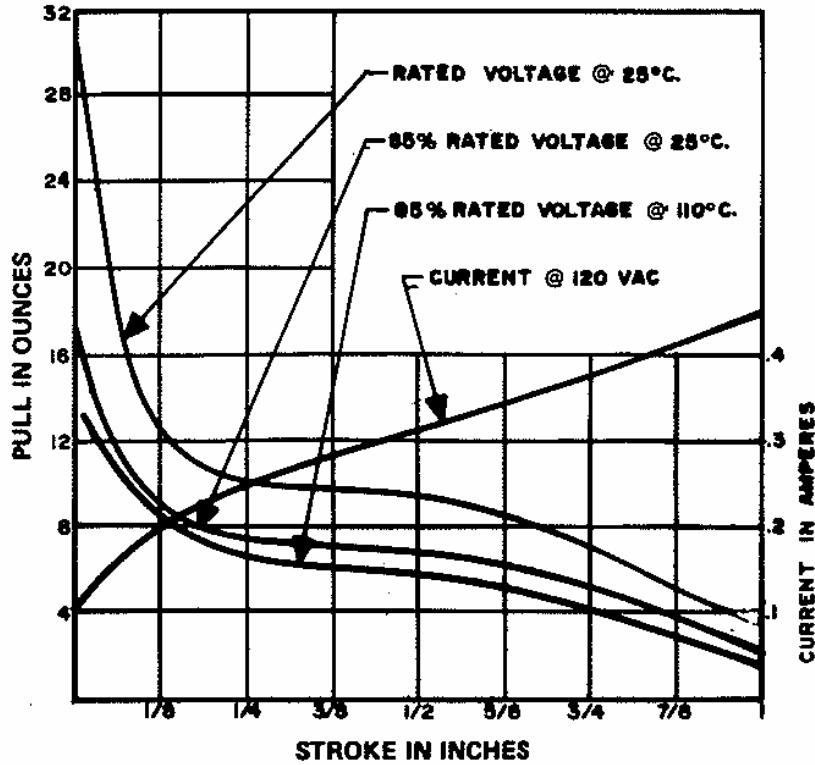
100% 'On' Time

*Intermittent Duty

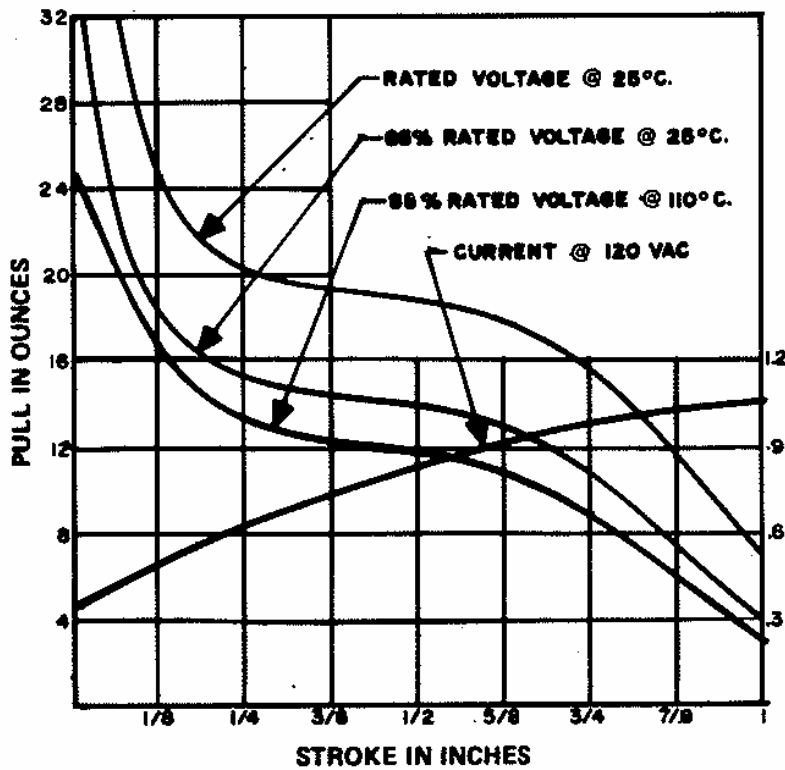
15% 'On' Time, (240 Seconds 'On' Max.
 Followed By 1360 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

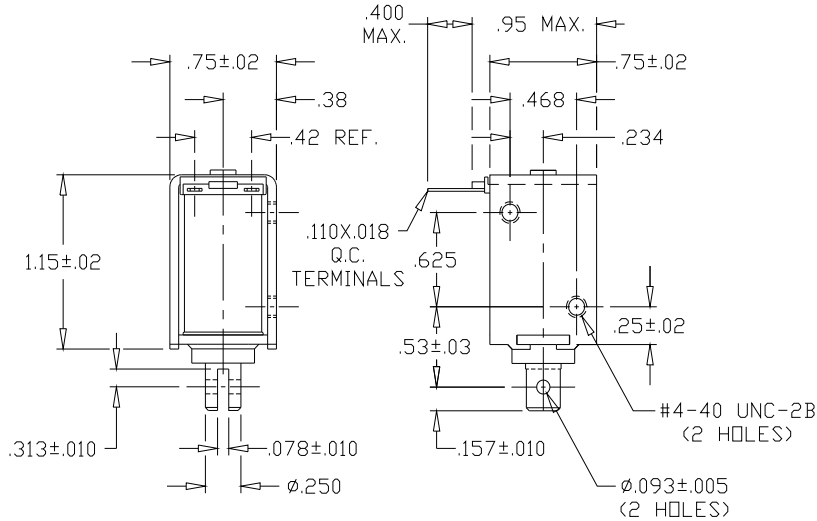


Model 22 (AC)

Frame-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 3.0 oz.
 Plunger Weight: 1.75 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
22-I-120A	A420-065797-00	*Intermittent	120	576	9	75
22-C-120A	A420-065796-00	Continuous	120	970	5.5	46
22-I-240A	A420-065799-00	*Intermittent	240	2360	9	38
22-C-240A	A420-065798-00	Continuous	240	3920	5.5	23

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	7	3	2	1	n/a	n/a	n/a	6
*Intermittent Duty	8	5	3	2	n/a	n/a	n/a	7

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

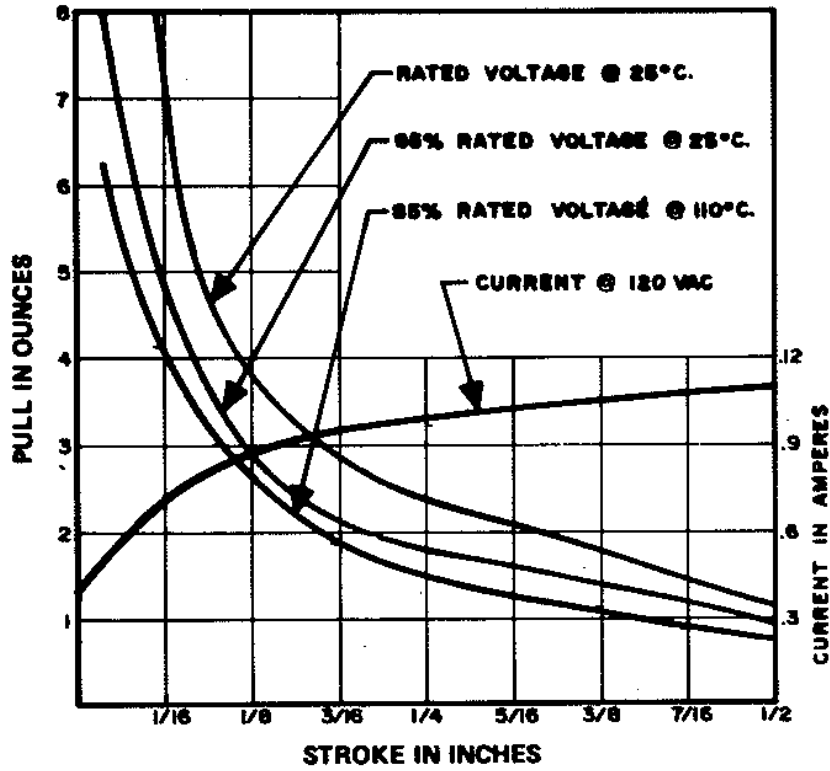
100% 'On' Time

*Intermittent Duty

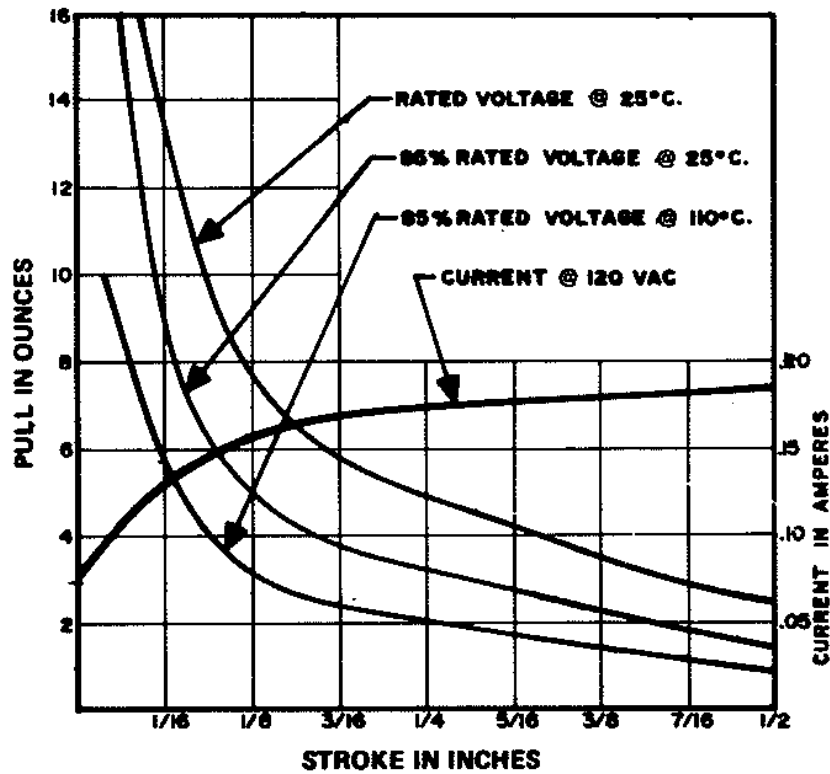
20% 'On' Time, (240 Seconds 'On' Max.
 Followed By 960 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

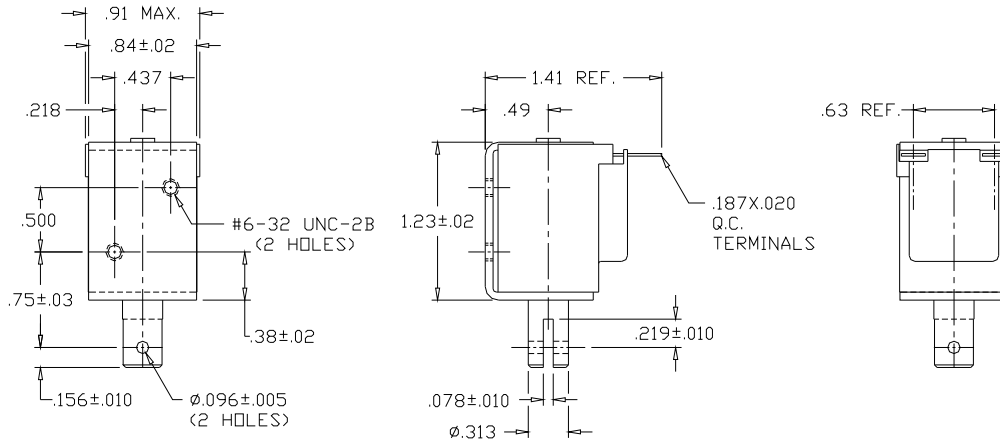


Model 24 (AC)

Frame-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 5.0 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
24-I-120A	A420-065817-00	*Intermittent	120	310	14	117
24-C-120A	A420-065816-00	Continuous	120	500	7.5	63
24-I-240A	A420-065819-00	*Intermittent	240	1240	14	58
24-C-240A	A420-065818-00	Continuous	240	2000	7.5	31

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	8	6	5	4	2	1	n/a	20
*Intermittent Duty	14	10	8	6	4	2	n/a	23

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

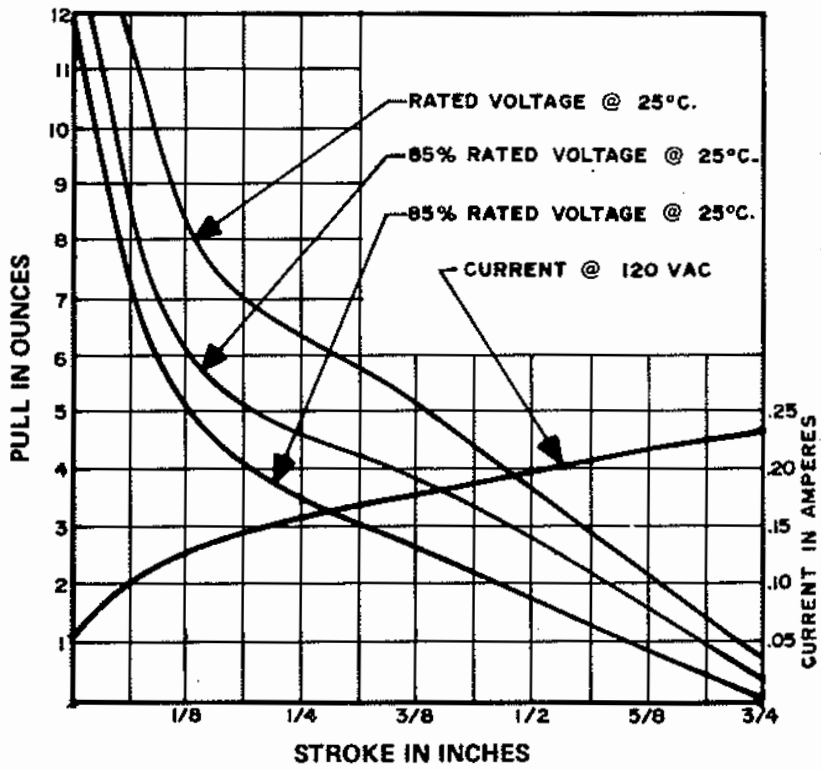
100% 'On' Time

*Intermittent Duty

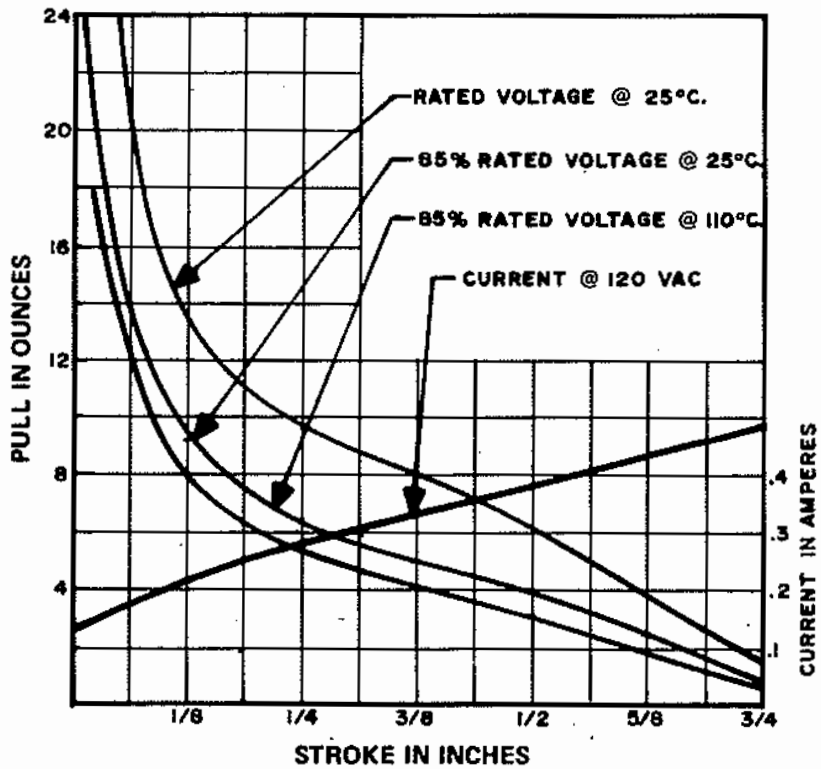
20% 'On' Time, (240 Seconds 'On' Max. Followed By 960 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

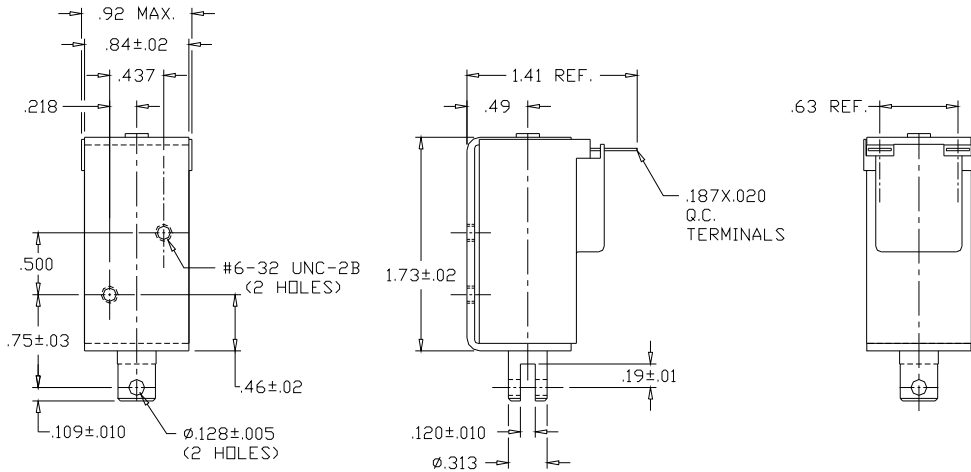


Model 26 (AC)

Frame-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 6.0 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
26-I-120A	A420-065537-00	*Intermittent	120	140	24	200
26-C-120A	A420-065536-00	Continuous	120	412	12	100
26-I-240A	A420-065539-00	*Intermittent	240	560	24	100
26-C-240A	A420-065538-00	Continuous	240	1000	12	50

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	10	8	7	7	6	1	n/a	15
*Intermittent Duty	20	15	14	12	10	8	2	27

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

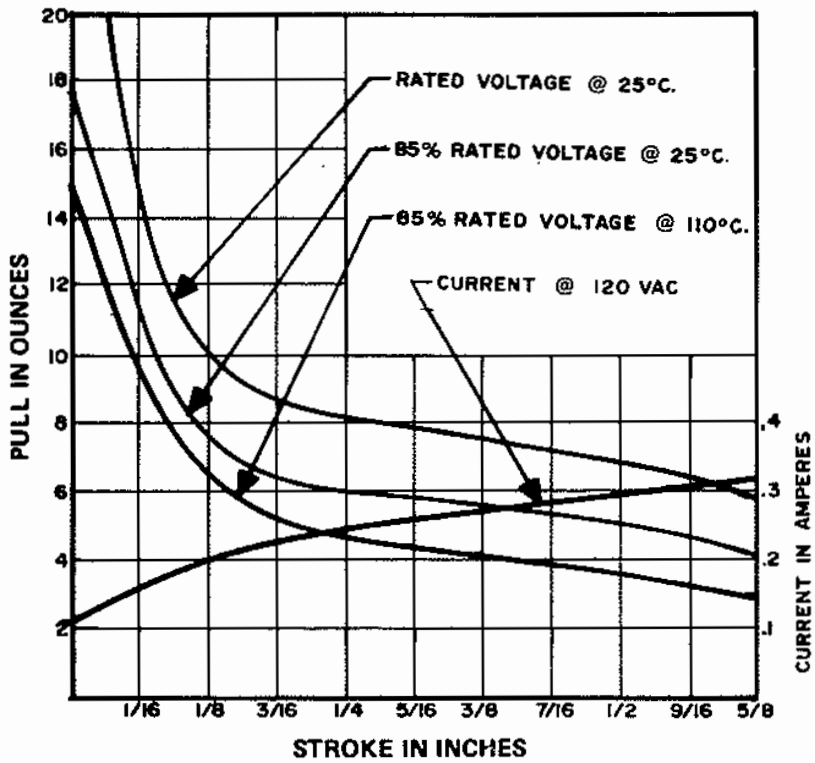
100% 'On' Time

*Intermittent Duty

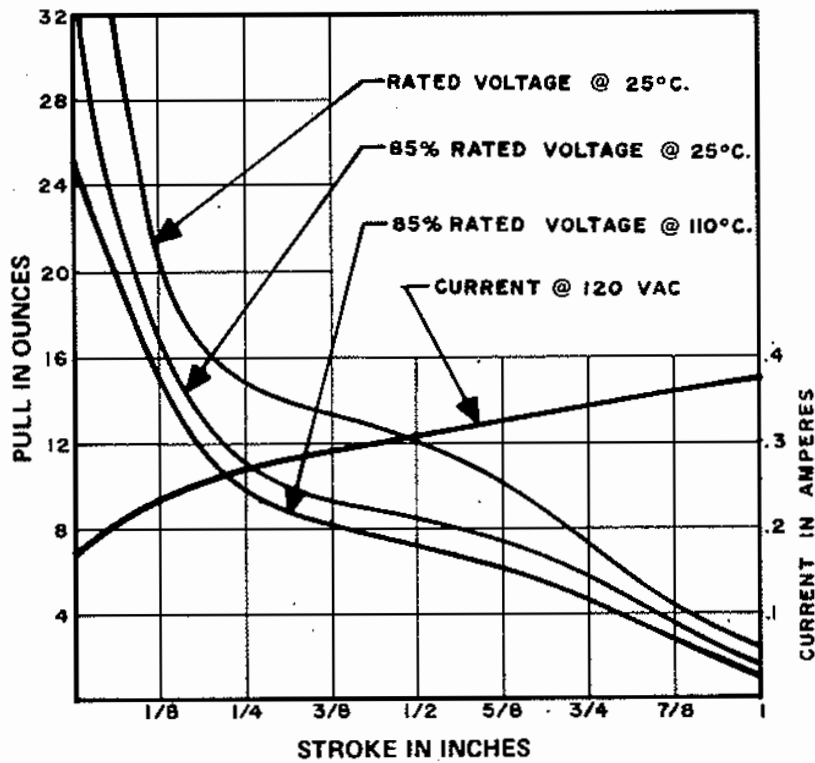
20% 'On' Time, (240 Seconds 'On' Max. Followed By 960 Seconds 'Off' Min.)

RoHS

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TYPICAL PULL CURVES

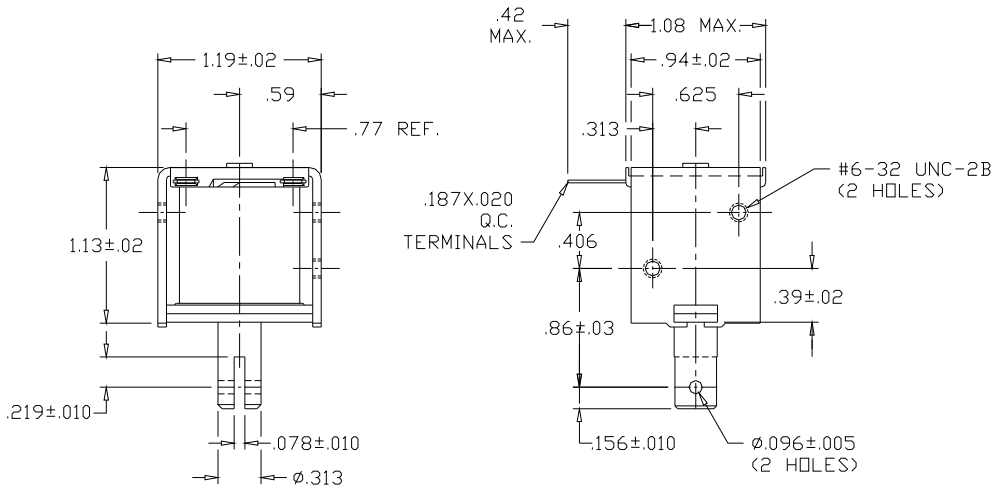


Model 28 (AC)

Frame-Pull



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Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 3.5 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
28-I-120A	A420-065447-00	*Intermittent	120	220	22	183
28-C-120A	A420-065446-00	Continuous	120	400	8	67
28-I-240A	A420-065449-00	*Intermittent	240	900	22	92
28-C-240A	A420-065448-00	Continuous	240	1600	8	33

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	11	8	6	4	n/a	n/a	n/a	13
*Intermittent Duty	18	14	9	5	n/a	n/a	n/a	15

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

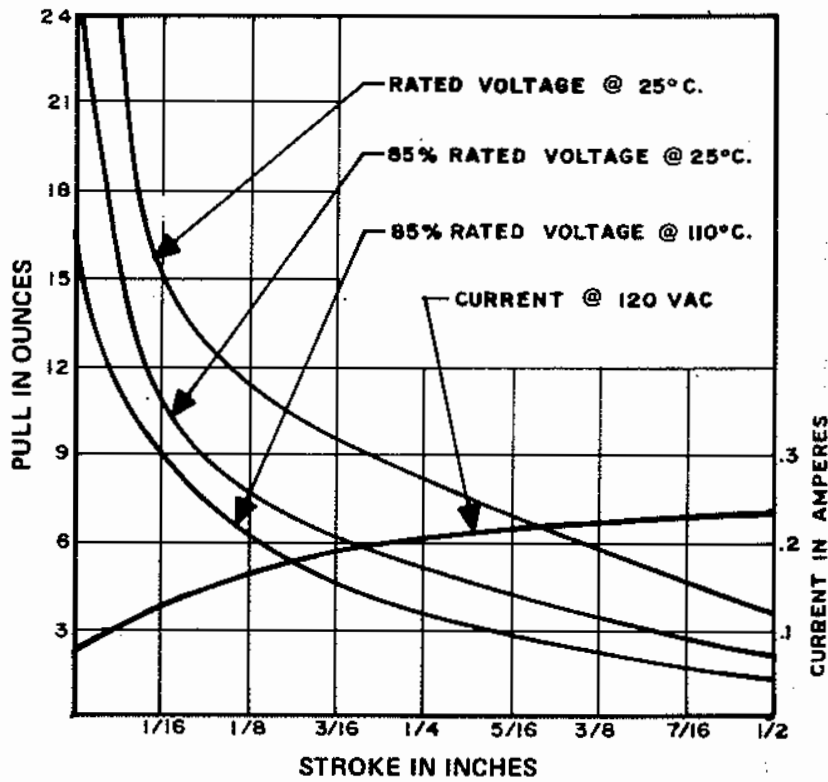
100% 'On' Time

*Intermittent Duty

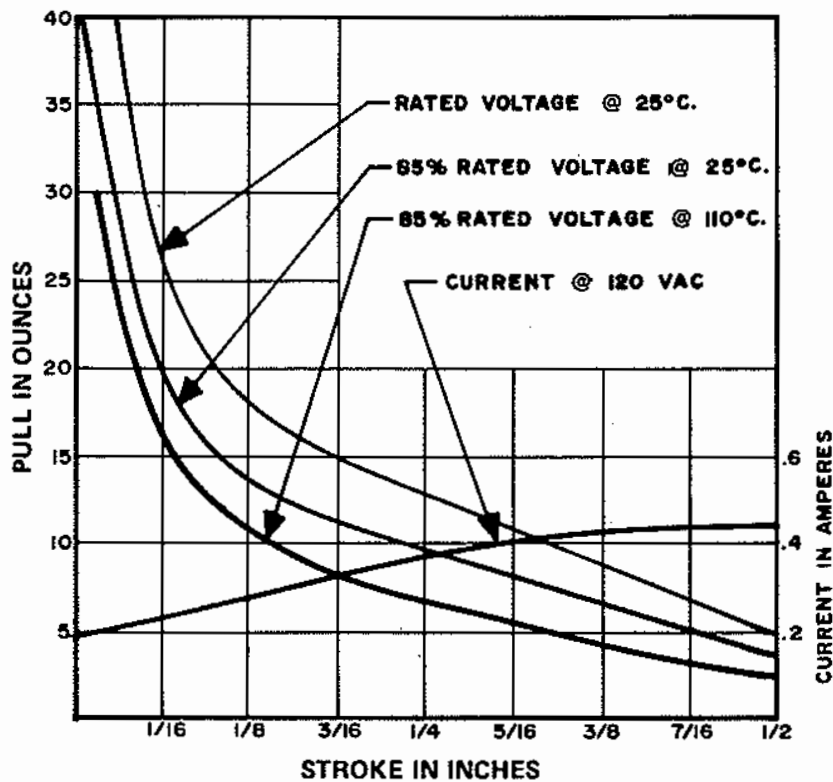
25% 'On' Time, (240 Seconds 'On' Max.
 Followed By 720 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

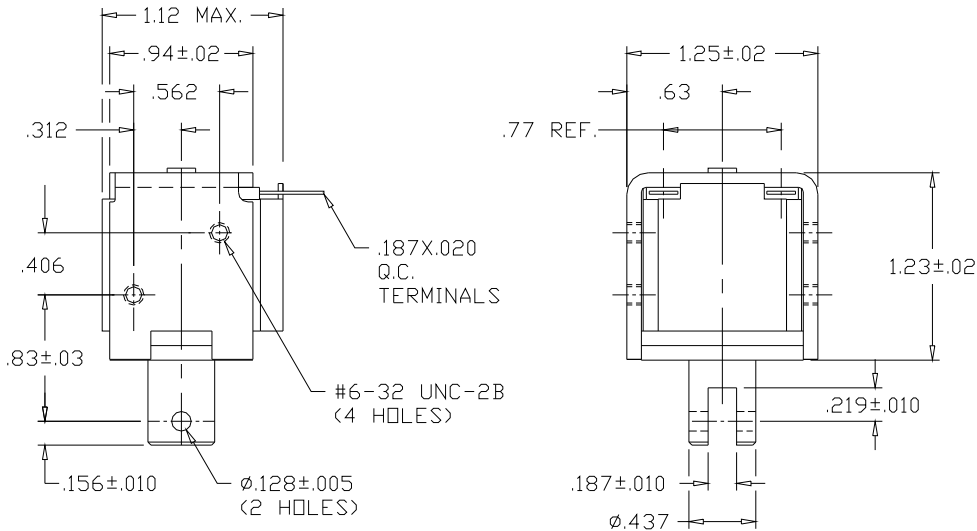


Model 28HD (AC)

Frame-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.
 Spring kits are available (consult factory).


Total Weight: 6 oz.
 Plunger Weight: 1 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
28HD-I-120A	A420-065957-00	*Intermittent	120	173	28	233
28HD-C-120A	A420-065956-00	Continuous	120	375	9	75
28HD-I-240A	A420-065959-00	*Intermittent	240	800	28	117
28HD-C-240A	A420-065958-00	Continuous	240	1480	9	38

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	12	9	6	4	n/a	n/a	n/a	35
*Intermittent Duty	24	18	13	8	n/a	n/a	n/a	61

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

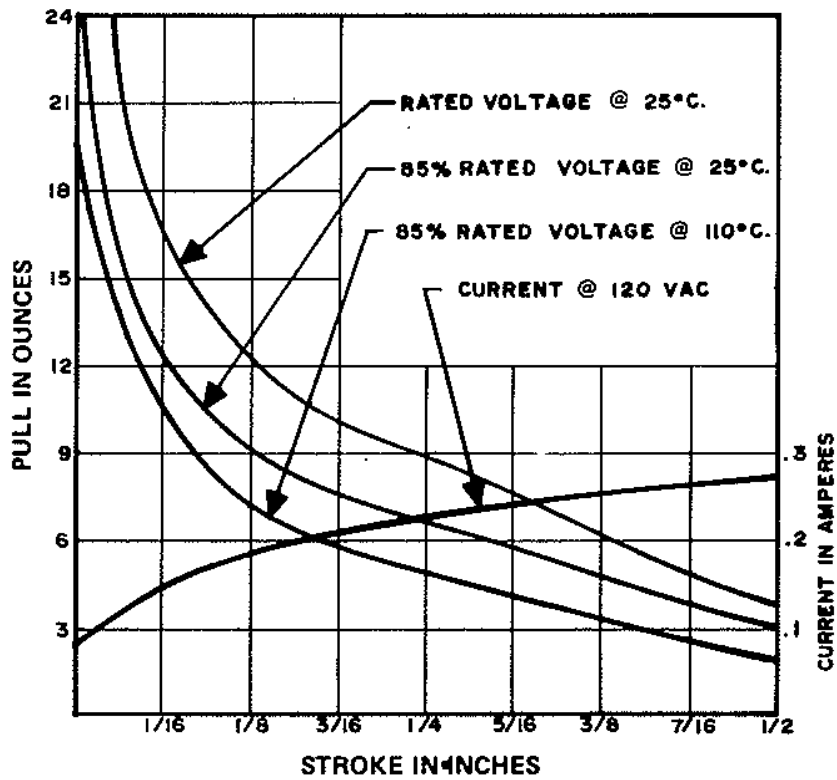
*Intermittent Duty

20% 'On' Time, (240 Seconds 'On' Max. Followed By 960 Seconds 'Off' Min.)

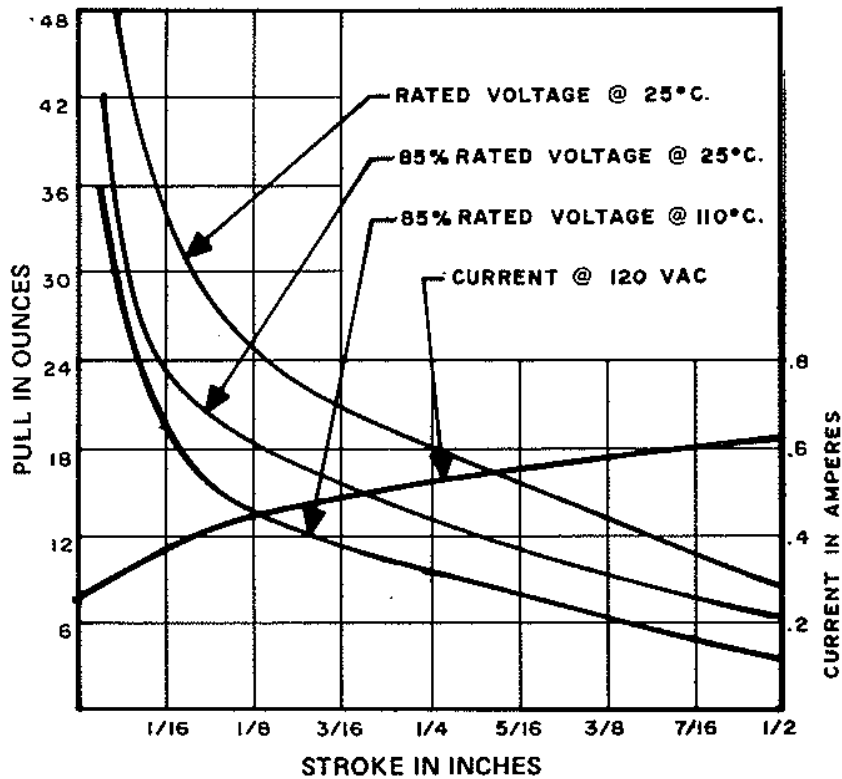
RoHS

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Model 28HD (AC)



TYPICAL PULL CURVES

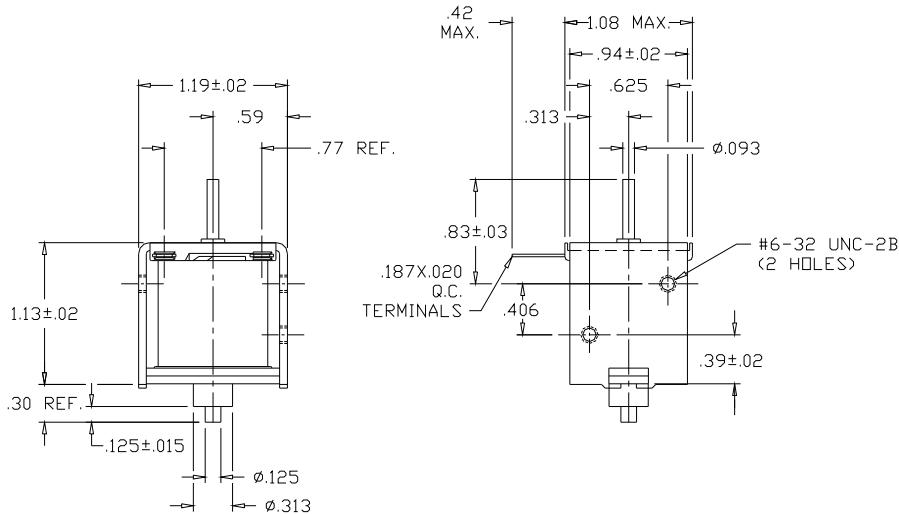


Model 28P (AC)

Frame-Push



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 3.5 oz.
 Plunger Weight: .5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
28P-I-120A	A420-065587-00	*Intermittent	120	220	22	183
28P-C-120A	A420-065586-00	Continuous	120	400	8	67
28P-I-240A	A420-065589-00	*Intermittent	240	900	22	92
28P-C-240A	A420-065588-00	Continuous	240	1600	8	33

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	11	8	6	4	n/a	n/a	n/a	13
*Intermittent Duty	18	14	9	5	n/a	n/a	n/a	15

UL Recognition

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Continuous Duty

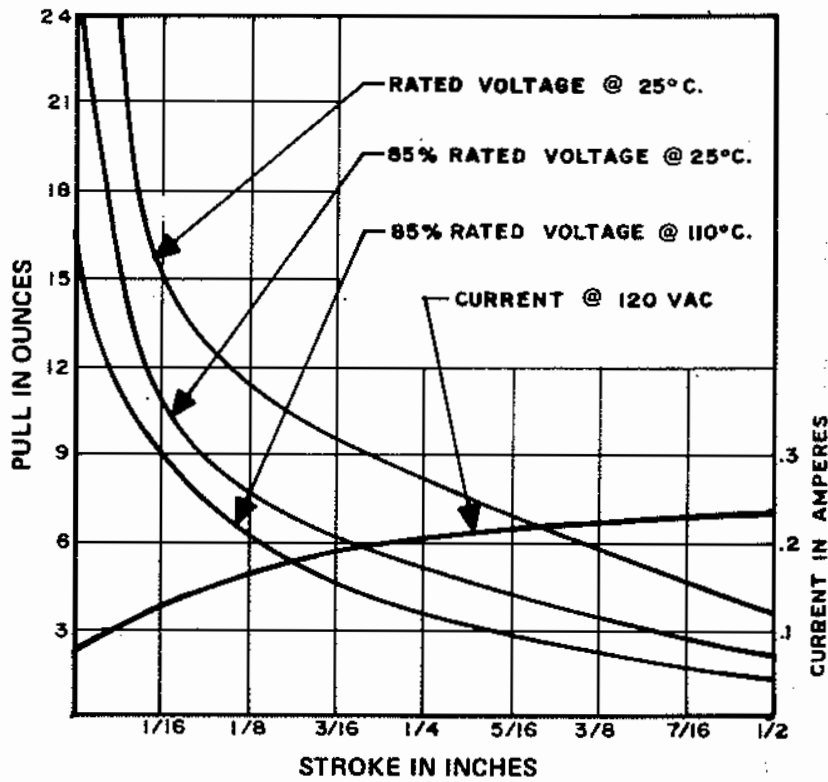
100% 'On' Time

*Intermittent Duty

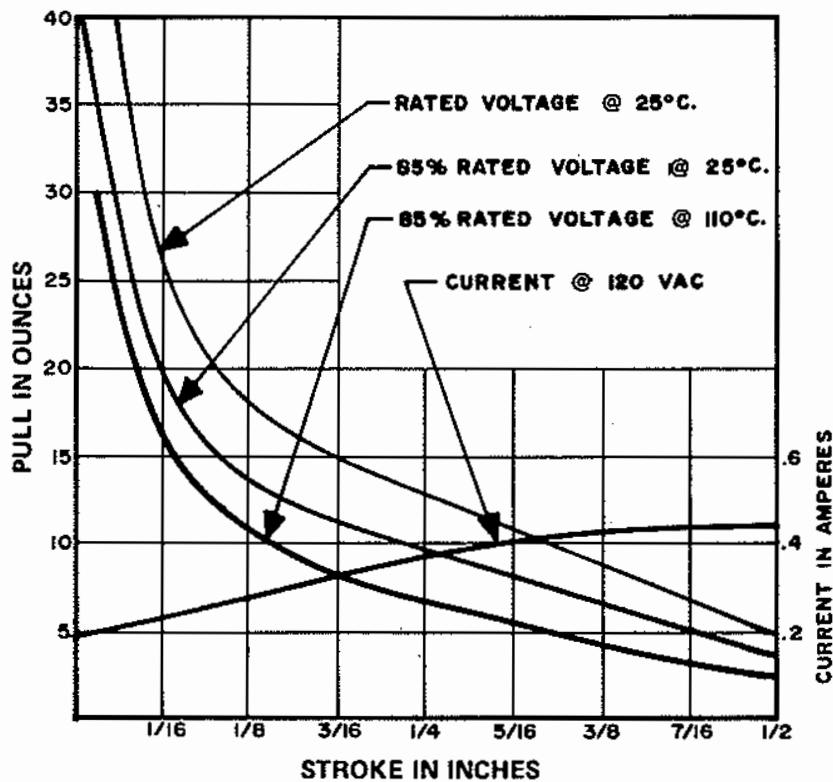
25% 'On' Time, (240 Seconds 'On' Max. Followed By 720 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

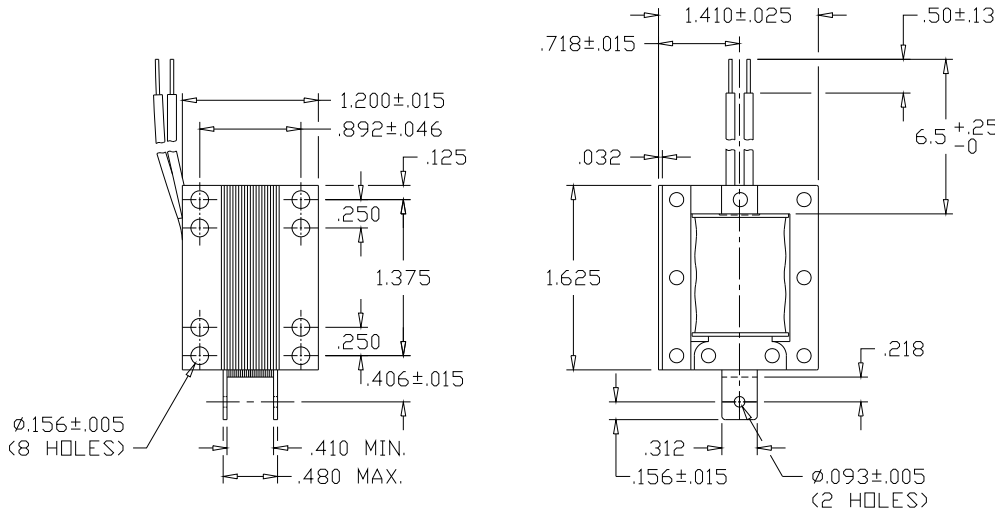


Model 12 (AC)

Laminated-Pull



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 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 5.5 oz.
 Plunger Weight: 1.0 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
12-I-120A	A421-062507-11	*Intermittent	120	100	33	275
12-C-120A	A421-062507-12	Continuous	120	150	22	183
12-I-240A	A421-062507-13	*Intermittent	240	400	33	138
12-C-240A	A421-062507-14	Continuous	240	600	22	92

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	30	21	17	16	15	12	5	25
*Intermittent Duty	48	32	28	24	20	17	8	35

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

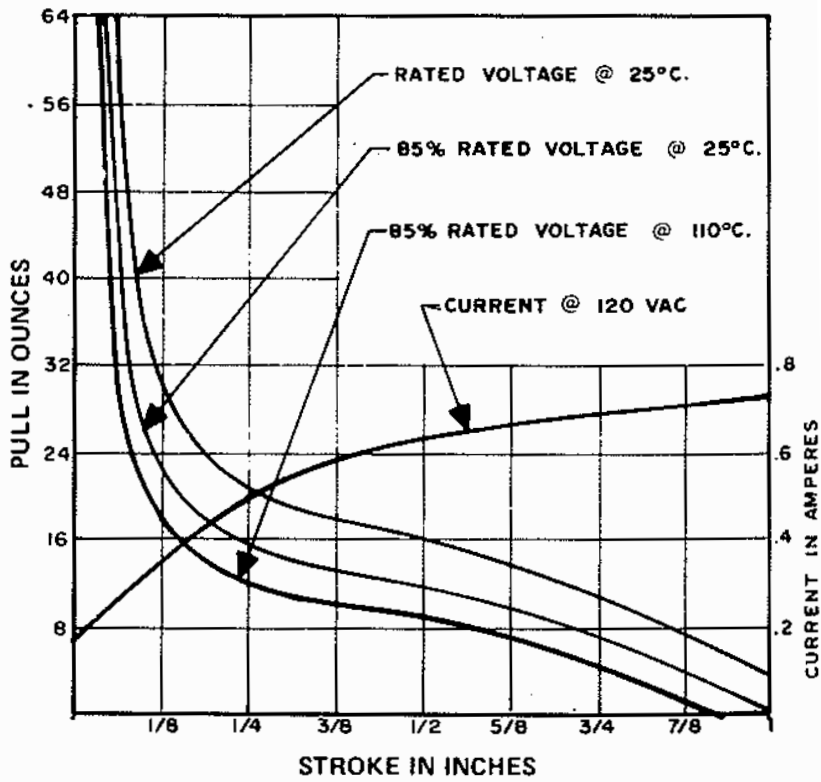
100% 'On' Time

*Intermittent Duty

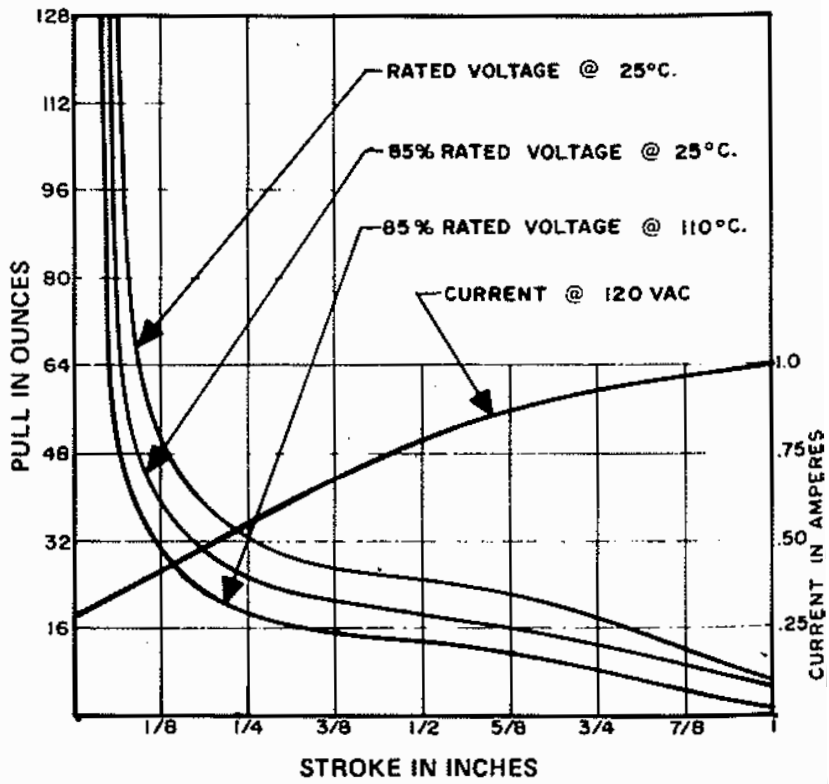
20% 'On' Time, (180 Seconds 'On' Max. Followed By 720 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

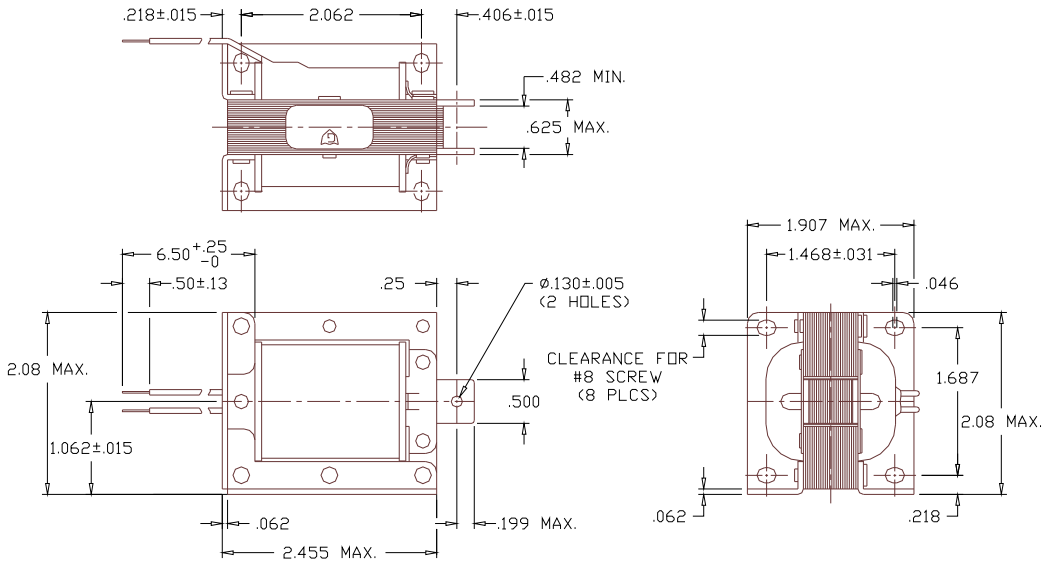


Model 14 (AC)

Laminated-Pull



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 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
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Solenoid shown energized and fully seated.


Total Weight: 18 oz.
 Plunger Weight: 2.6 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated
14-I-120A	A421-062508-08	*Intermittent	120	11	180	1.5 A
14-C-120A	A421-062508-09	Continuous	120	18	63	525 mA
14-I-240A	A421-062508-10	*Intermittent	240	45	180	750 mA
14-C-240A	A421-062508-11	Continuous	240	93	63	263 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	96	75	75	96	108	115	115	160
*Intermittent Duty	130	108	108	110	115	120	120	220

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

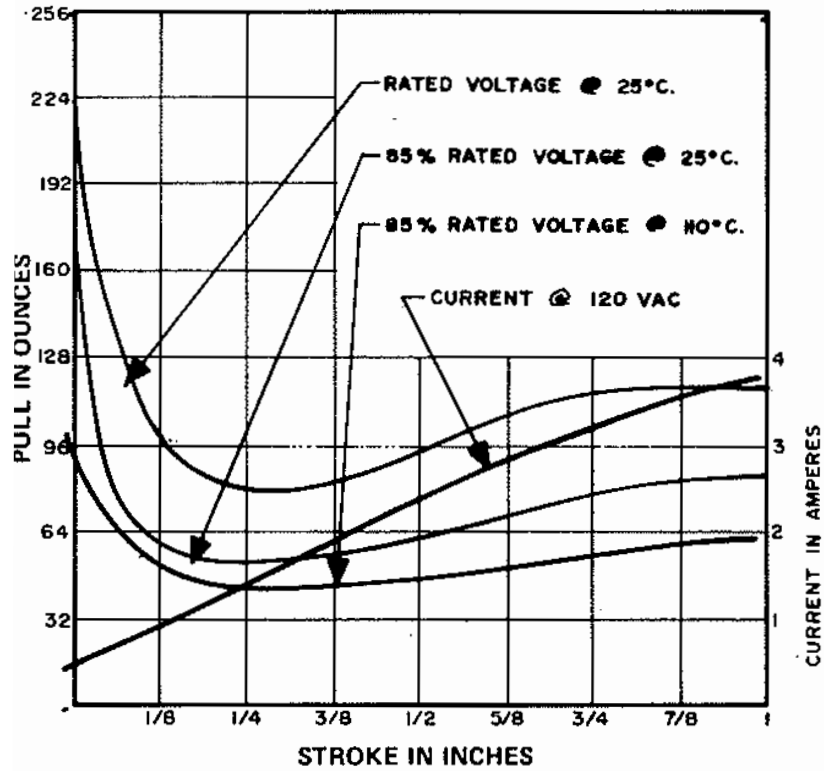
100% 'On' Time

*Intermittent Duty

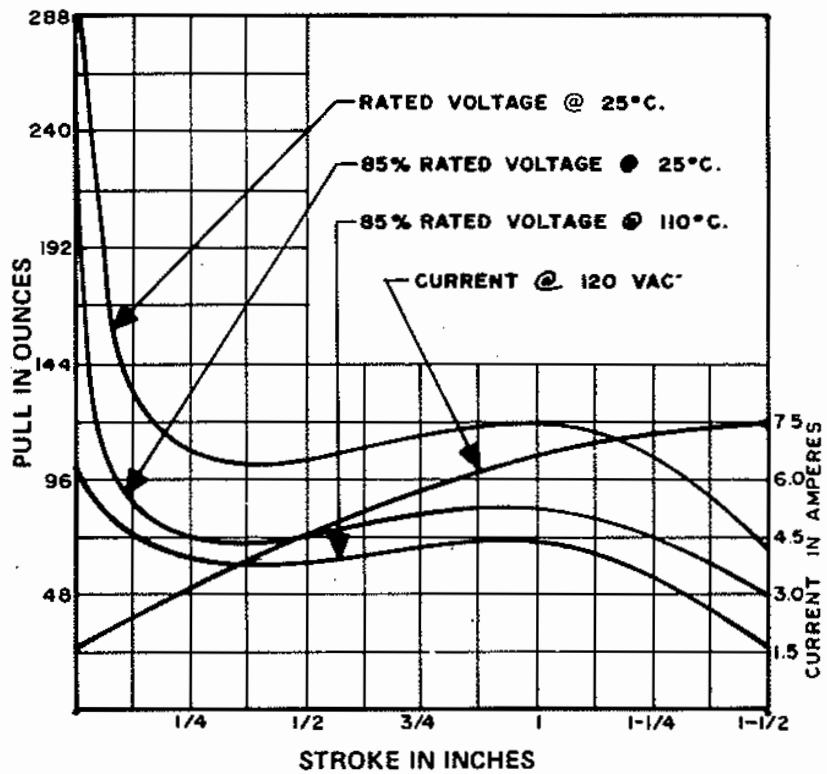
20% 'On' Time, (240 Seconds 'On' Max. Followed By 960 Seconds 'Off' Min.)

RoHS

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TYPICAL PULL CURVES

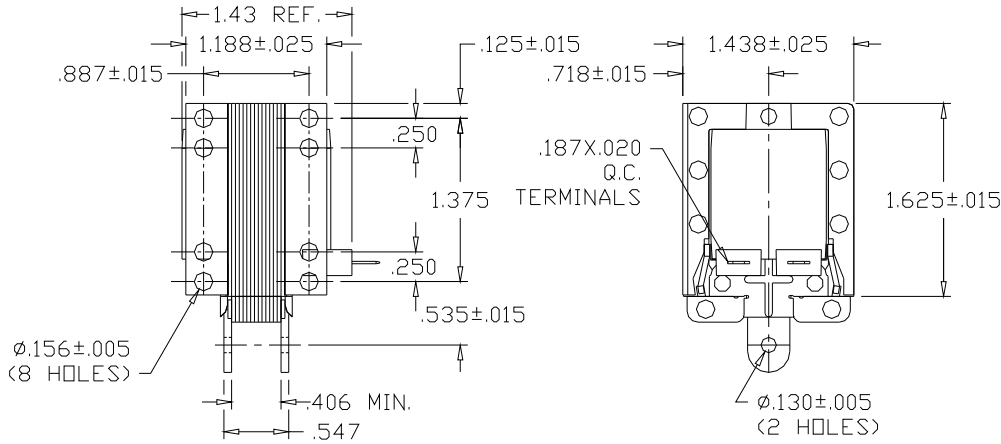


Model 16 (AC)

Laminated-Pull



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 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
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Solenoid shown energized and fully seated.


Total Weight: 9 oz.
 Plunger Weight: 2 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
16-I-120A	A421-064142-02	*Intermittent	120	41	70	583
16-C-120A	A421-064142-01	Continuous	120	85	20	167
16-I-240A	A421-064142-04	*Intermittent	240	200	70	292
16-C-240A	A421-064142-03	Continuous	240	350	20	83

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	68	43	35	30	23	18	8	70
*Intermittent Duty	112	80	67	60	50	35	8	130

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

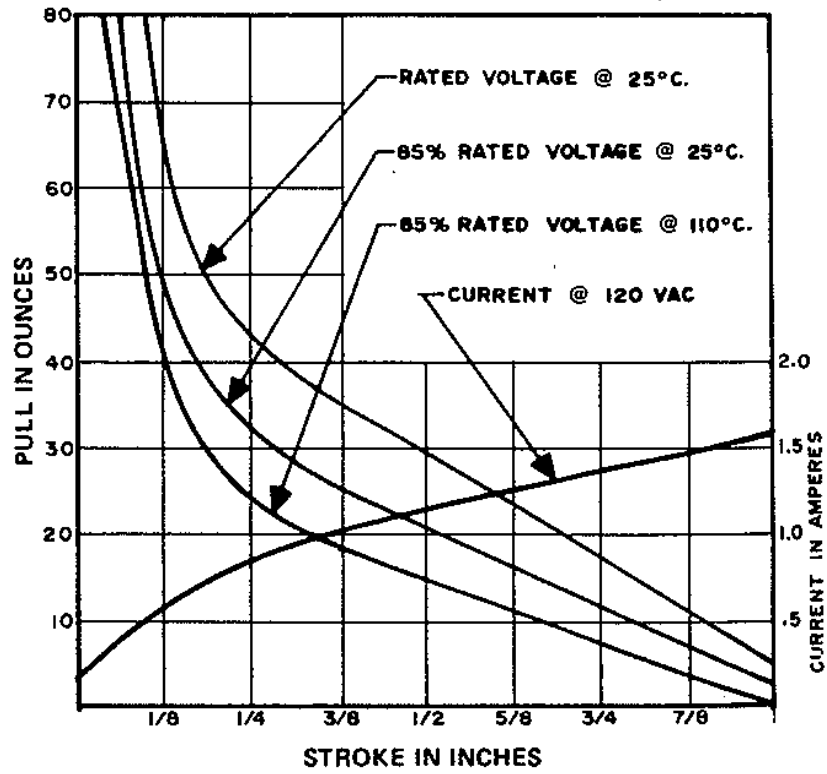
100% 'On' Time

*Intermittent Duty

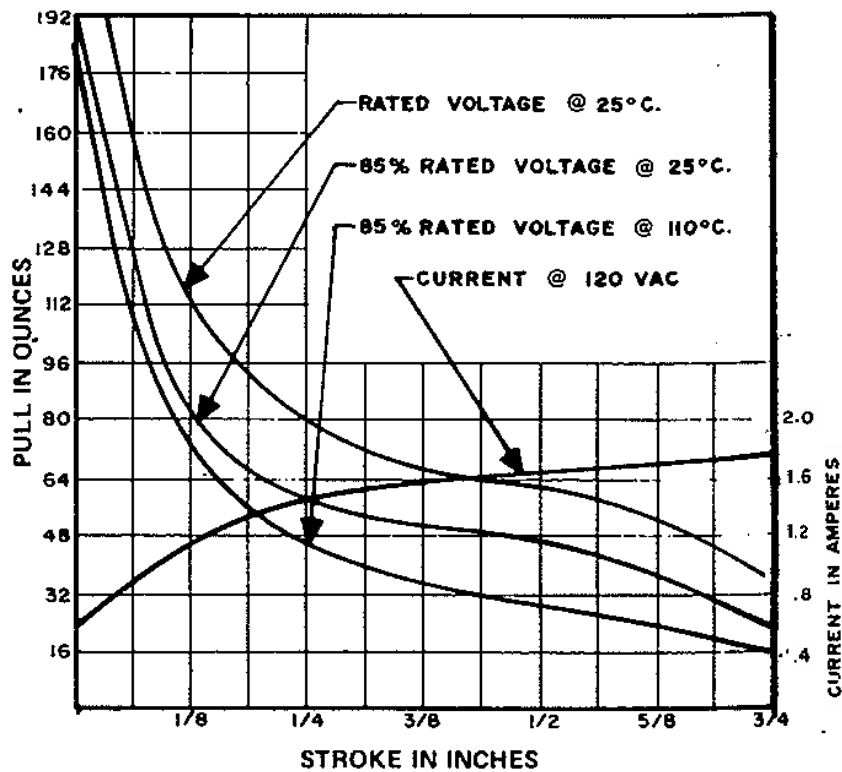
10% 'On' Time, (150 Seconds 'On' Max. Followed By 1350 Seconds 'Off' Min.)

RoHS

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TYPICAL PULL CURVES

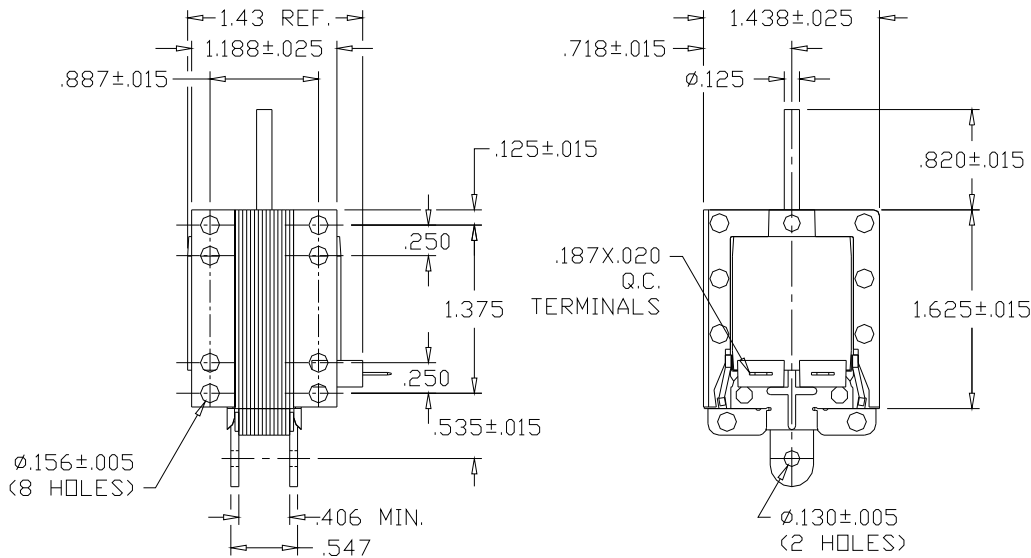


Model 16P (AC)

Laminated-Push



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Solenoid shown energized and fully seated.


Total Weight: 9.5 oz.
 Plunger Weight: 2.5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated (mA)
16P-I-120A	A420-065147-00	*Intermittent	120	41	70	583
16P-C-120A	A420-065146-00	Continuous	120	85	20	167
16P-I-240A	A420-065149-00	*Intermittent	240	200	70	292
16P-C-240A	A420-065148-00	Continuous	240	350	20	83

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	68	43	35	30	23	18	8	70
*Intermittent Duty	112	80	67	60	50	35	8	130

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

100% 'On' Time

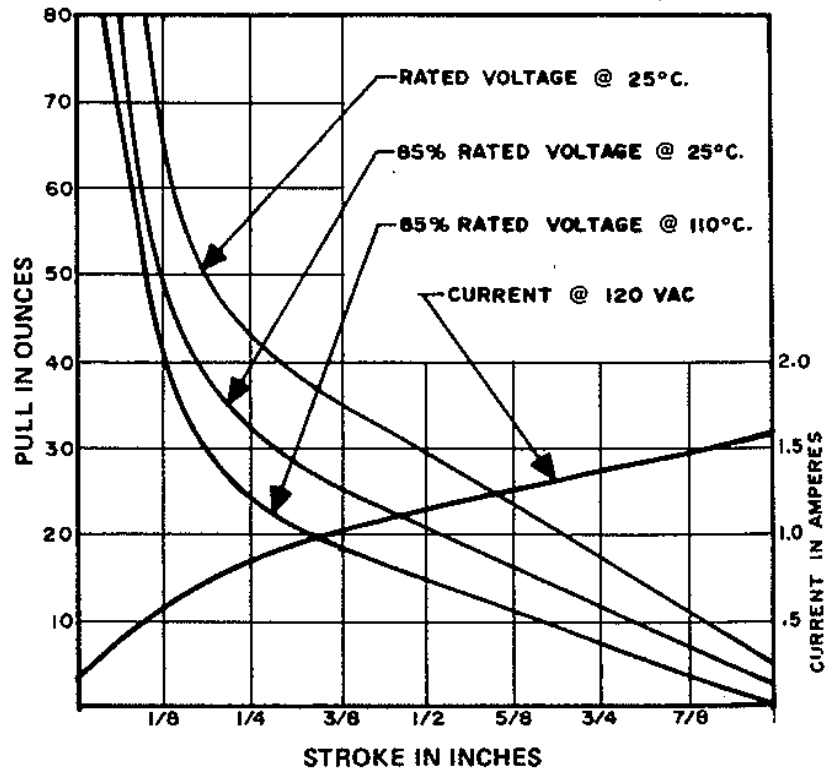
*Intermittent Duty

10% 'On' Time, (150 Seconds 'On' Max. Followed By 1350 Seconds 'Off' Min.)

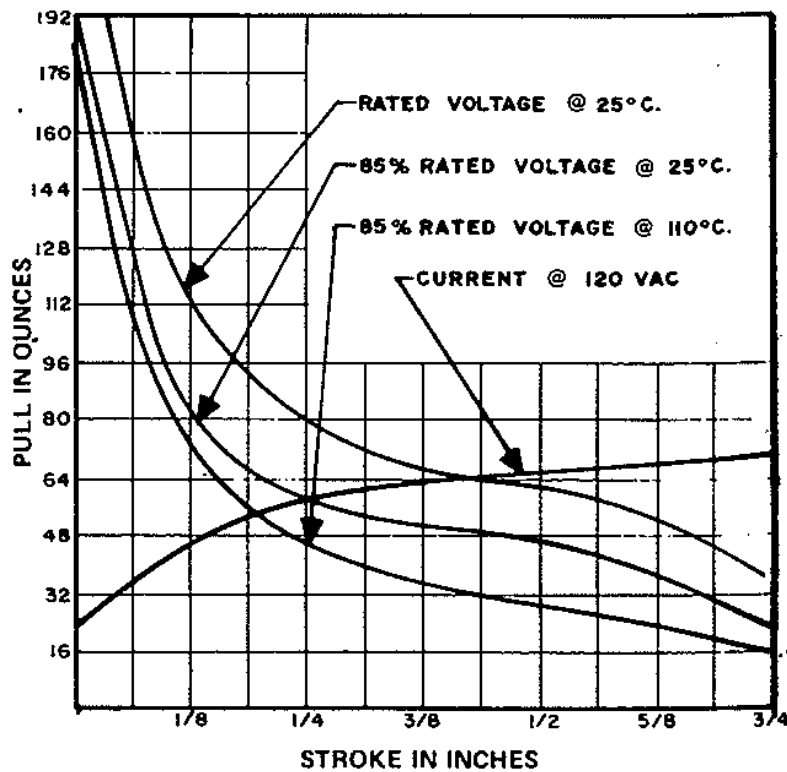
RoHS

These parts comply with **RoHS** Directive 2002/95/EC

Model 16P (AC)



TYPICAL PULL CURVES

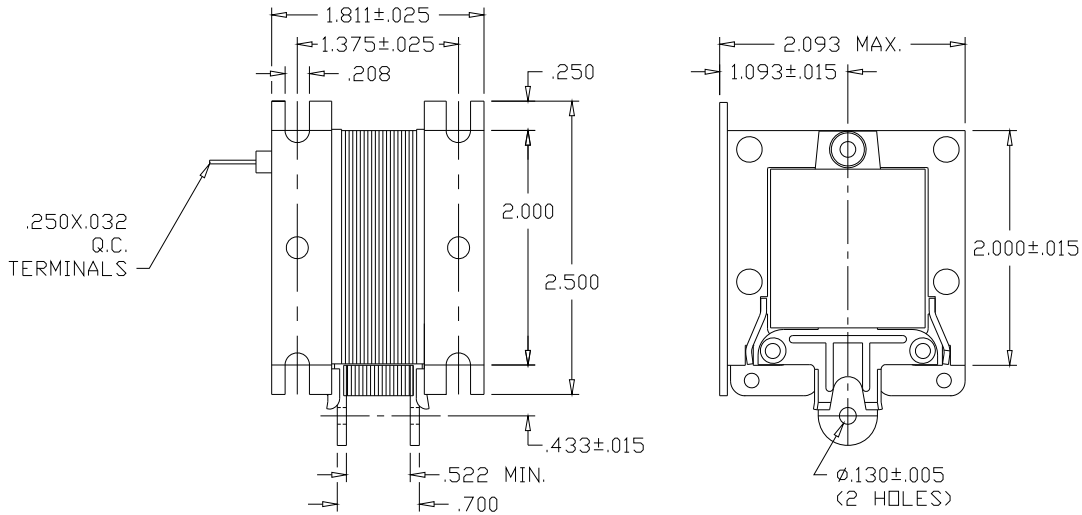


Model 18 (AC)

Laminated-Pull



ISO 9001 / AS9100 Certified Company
 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 17 oz.
 Plunger Weight: 4.5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated
18-I-120A	A421-062510-07	*Intermittent	120	8	228	1.9 A
18-C-120A	A421-062510-08	Continuous	120	20.3	49	408
18-I-240A	A421-062510-09	*Intermittent	240	46.9	228	950
18-C-240A	A421-062510-10	Continuous	240	80.7	49	204

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Pull Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	155	115	105	105	105	100	60	100
*Intermittent Duty	336	240	200	195	200	195	144	240

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

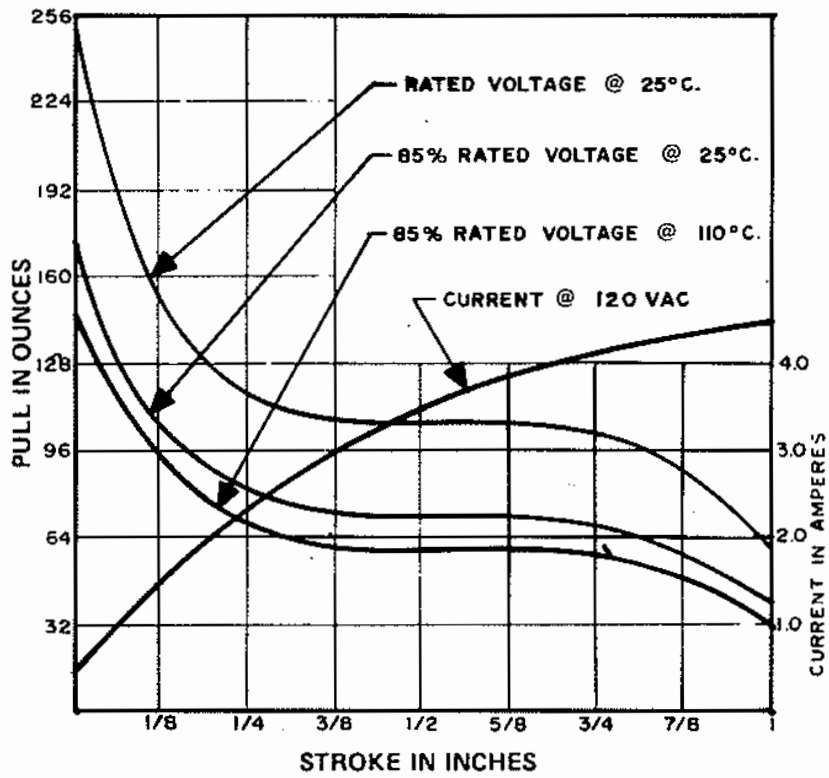
100% 'On' Time

*Intermittent Duty

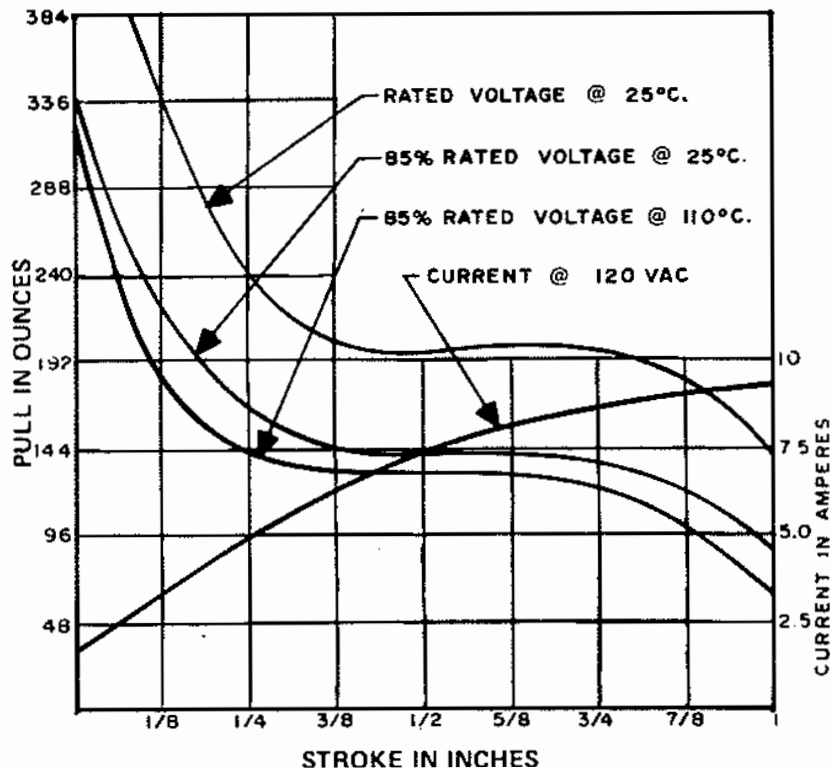
10% 'On' Time, (180 Seconds 'On' Max.
 Followed By 1620 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES

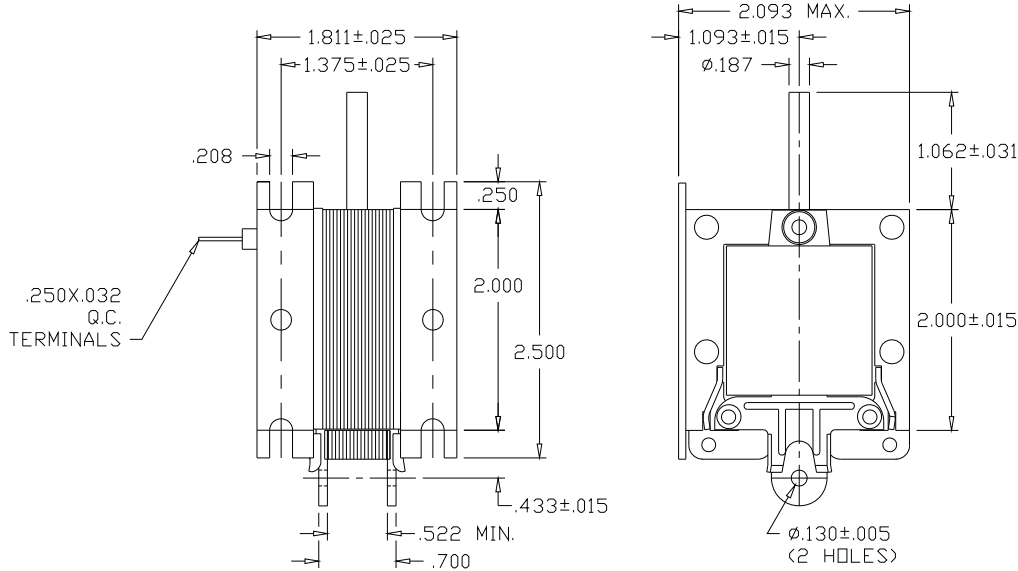


Model 18P (AC)

Laminated-Push



ISO 9001 / AS9100 Certified Company
 Woodstock, IL 60098 Ph. (815)334-3600 Fax (815)337-0377
 Or visit us at our website www.guardian-electric.com



Solenoid shown energized and fully seated.


Total Weight: 18 oz.
 Plunger Weight: 5 oz.

Model No.	Part No.	Duty Cycle	Volts	Res. (Ω)	Power (VA)	Current, Seated
18P-I-120A	A420-063493-07	*Intermittent	120	8.8	228	2.0 A
18P-C-120A	A420-063493-08	Continuous	120	19.7	49	430 mA
18P-I-240A	TBA	*Intermittent	240	45	228	1.1 A
18P-C-240A	TBA	Continuous	240	78	49	220 mA

When ordering, please refer to Part No., as listed above.
 Consult factory for custom configurations.

Stroke (in.)	Push Force (oz.)							Holding Force (oz.)
	0.125	0.250	0.375	0.500	0.625	0.750	1.000	
Continuous Duty	155	115	105	105	105	100	60	100
*Intermittent Duty	336	240	200	195	200	195	144	240

UL Recognition

Recognized under the  Component Recognition Program of Underwriters Laboratories, Inc.

Continuous Duty

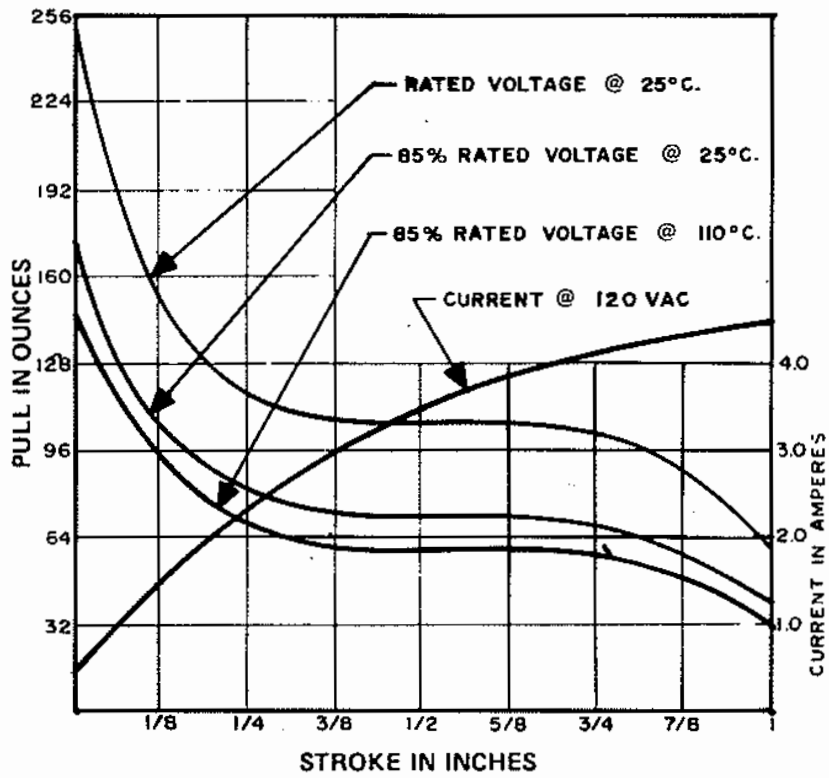
100% 'On' Time

*Intermittent Duty

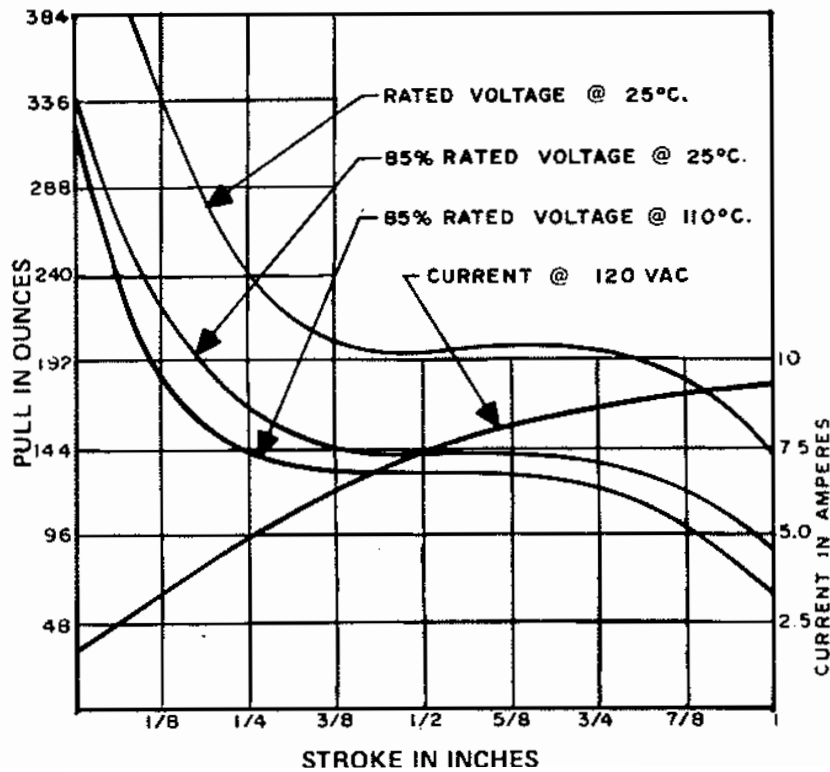
10% 'On' Time, (180 Seconds 'On' Max.
 Followed By 1620 Seconds 'Off' Min.)

RoHS

These parts comply with **RoHS** Directive 2002/95/EC



TYPICAL PULL CURVES



Solenoid Design Data Sheet

This sheet is to be filled out when requesting a sample or quote

Company _____

Street Address _____ City _____ State _____ Zip Code _____

Send to the Attention of: _____ Phone _____

Sample and Quote Quote Only

1.0 DC Frame

1.1 Power Supply: Battery _____ Other _____ Specify _____
 Full wave filtered _____ Half wave _____
 Full wave unfiltered _____ Average _____

1.2 Maximum current _____ Maximum watts _____

1.3 Voltage, nominal _____ Maximum _____ Minimum _____

2.0 AC Frame

60 HZ _____ 50/60 HZ _____ Other _____

2.1 Voltage, nominal _____ Maximum _____ Minimum _____

2.2 Maximum current _____

3.0 Pull Requirements

3.1 Pull _____ oz. at stroke _____

3.2 Push _____ oz. at stroke _____

3.3 Pull Conditions

3A Pull _____ oz. or Push _____ oz. at maximum temperature, minimum voltage

3B Pull _____ oz. or Push _____ oz. at ambient temperature
 and _____ voltage

3C Holding force _____ under voltage condition _____

3D Pull in time _____ load _____ oz.

3E Pre load conditions _____

3F Mounting attitude horizontal _____ vertical _____

4.0 Duty Cycle

4.1 Continuous _____ Intermittent _____

4.2 Specify on time _____ Off time _____

4.3 Maximum heat rise above ambient _____ °C.

4.4 Ambient temperature _____ °C.

4.5 Cooling conditions _____

5.0 Are Underwriters' Labs, requirements a consideration? Yes _____ No _____

6.0 Are applicable specifications attached? Yes _____ No _____

7.0 Estimate approximate life _____