PRECAUTIONS TAKING INTO ACCOUNT IN THE SOLENOID MANIPULATION AND INSTALLATION

VARIATIONS IN THE VOLTAGE:
Admitted variations on the standard voltage are +5% and -10%. The value of the standard voltage appears in the data label of the solenoid.

Higher voltage than +5%:
It can produce an increase of the push force, that could cause a greater impact between the plungers. This can affect the life expectancy of the solenoid, also produce an increase in the temperature of solenoid and also damaging the coil and the supply leads. Depending on the value of the overvoltage, the coil may be damaged.

Lower voltage than -10%:
The push force decreases and the response time is delayed.

Measures to be taken:
Select the solenoid taking into account the variations in the supply voltage. If you want to work with higher voltage margin, the coil must be adapted from the design phase by NAFSA.

VOLTAGE PEAKS GENERATED IN THE DISCONNECTING OF THE COIL:
Damages in the control elements by voltage peaks when the voltage’s shutdown:
The power to the solenoid control elements of high sensivity can be damaged due to these peaks that can be between 5 and 10 times higher than the value of standard voltage.

Measures to be taken:
Protection devices must be added such as free wheel diodes, varistor...
Read coil protection page 121.

DIFFERENCES BETWEEN THE VALUE OF THE FORCE AND THE LOAD TO BE DISPLACED:

Solenoid force far superior to the work load:
The plunger impacts strongly, so this can affects on the life expectancy.

Electromagnet force slightly greater than the work load:
The magnetic force and the reponse time will decrease.

Measures to be taken:
Select the solenoid depending on the load, with a security margin between 2 and 3. Example: If the load to be displaced is 10N, should be selected a solenoid with a force of 20-30N. Read data sheet for each product.

LIMITATION OF POWER:
Insufficient power supply:
If the power supply designed to feed the solenoid has less power than the demanded by the same, the force will be less than what is specified in the technical data sheet.

Measures to be taken:
Ensure that the power supply has higher power available than the one demanded by the electromagnet.

INFLUENCE OF WIRING IN THE OPERATION OF SOLENOID:
In a low resistance solenoid (eg. low voltage, low duty cycle) if the supply lead is very long and has high resistance, this resistance can be added to the coil of the solenoid, this decreases the force values shown in the datasheets.

Measures to be taken:
The power supply must be installed as near as possible of the solenoid.

ASSEMBLY:
The solenoid assembly respect load and additional pieces:
It is recommended to assemble the solenoid on the same axis of the load, avoiding lateral forces on the plunger, that might shorten the life of the sliding guides.

Measures to be taken:
Ensure the load does not produce lateral efforts or interfering in the displacement.

Selecting and assembly of the fixing elements:
Ensure the fixing elements do not interfere in the displacement of the solenoid. Avoid the use of very long screws that may reach contact the coil.
For the appropriate thread depth, read each product’s data sheet.

Adjust the assembly position and use of accessories on the same axis of sliding:
Make sure that during installation of auxiliary parts on the shaft and plunger of the solenoid, this one does not become damaged or does not lose manufactured concentricity between the shaft and the plunger.
PRECAUTIONS TAKING INTO ACCOUNT IN THE SOLENOID MANIPULATION AND INSTALLATION

POLARIZED COIL CONNECTION:
In solenoids with magnets system is needed to polarize properly the coil such as ERB, ERDI, ECI VM and VM / ND series.
Example: Working principle of ERB serie depending on polarization.

FREQUENCY OF USE IN NUMBER OF CYCLES (only for the solenoids, the holding magnet are exempt) :
The number of cycles of life depends on the materials used to manufacture the slide guides, the conditions of use, installation, loads ...

Measures to be taken: If the number of operations is high (> 200 cycles per day), we recomend using solenoids with friction bearing with teflon layer.
Example: ERC, CU, ECH, ECR series.
If any doubt consult the technical department of NAFSA.

NOT RESPECTING OF DUTY-CYCLES:
In case of not respecting the duty-cycles indicated for each solenoid, two things can happen:
1) The solenoid is longer time under voltage than the one indicated on duty cycle:
This can burn the coil and melt the plastic materials, therefore, the guides may not slide properly and the solenoid is disabled.
2) The solenoid is less time under voltage than indicated in the duty-cycle:
The coil generates less heat and it is beneficial for the solenoid.

ENVIROMENTAL WORKING CONDITIONS:
Adhesion of oil, dust and other strange material in the slide guides of the solenoid:
If materials such as oils, dust or other material ingress the sliding guides this can influence in the pushing or pulling force as well as in the response time, with the possibility that the solenoid doesn’t work properly by seizure.
The solenoid should be away from water, dust and hard environments in general, unless they are specifically designed for this type of application. Some materials are less resistant to acids or other chemical agents.

Measures to be taken:
Complementary protective measures must be taken and we must adapt the design for each case.

Room temperature higher than 35ºC:
The higher the room tempertaure is (V13), the higher the final temperature of the solenoid will be (V23), this means less force. Read page 1.3, paragraph "Temperature and Insulation".

Measures to be taken in case of problems:
Select a solenoid with a higher duty- cycle, read page 1.2, paragraph "How to obtain the duty-cycle".

PHYSICAL PHENOMENONS THAT MAY AFFECT THE WORKING OF SOLENOID:

Magnetism:
Pay attention on the mounting position and direction of the solenoid, and if it is surrounded by sources of magnetic fields generation, which can influence in the magnetic circuit of the soleenoid.

Measures to be taken:
The solenoid should be away enough from the source of magnetic fields generation.

Temperature influence on the associated electronics:
Due to the heat generated by the solenoid, components with less resistance to heat, such as semiconductors, can be damaged.
If the solenoid is assembled in a sealed box the heat should be controled.

Measures to be taken:
Select a solenoid with a higher duty cycle, so less heat will be generated for the same time of use.

FUSION OF PROTECTION ELEMENTS (thermal switch, varistors, diodes...):
The overvoltages or the use of voltages higher than the normal ones, can destroy the protection elements of the solenoid.

Measures to be taken:
Add preventive measures in the supply circuit to prevent abnormal power flows from reaching the coil or using resettable thermal fuses.
Verify that the supply voltage corresponds with the standard of the product.

DAMAGED COIL BY EXCESSIVE LENGTH OF THE FIXATION SCREWS:
If the length of the screws is too long, they can get into the coil, breaking the cooper wire.
This can create short-circuit in the coil.

BROKEN LEADS:
Avoid pulling from supply leads, terminals...