CUMSA

VACUUM USER MANUAL

Vacuum Units

VJ
VG
VM
NEW SV
NEW VB

Vacuum Inserts

PT
PA
VV
VT
VD
NEW LV

Sealing components

JV
CV
TV

English
Español
Deutsch
Italiano
Portugues
Česky
中國

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INNOVATIVE SOLUTIONS FOR YOUR MOLDS

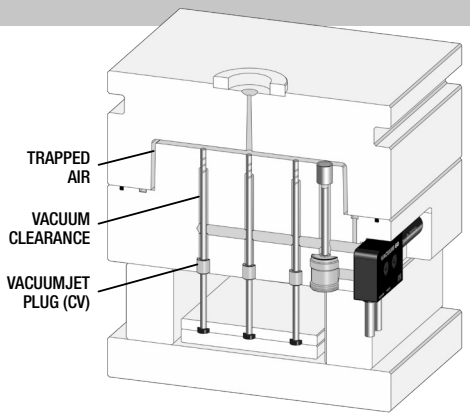
900
CUMSA
SMART VACUUMJET
CUMSA
SM.805253
WARNING
EXHAUST AIR

INDEX

A. VACUUMJET: OPERATIONAL PROCEDURE

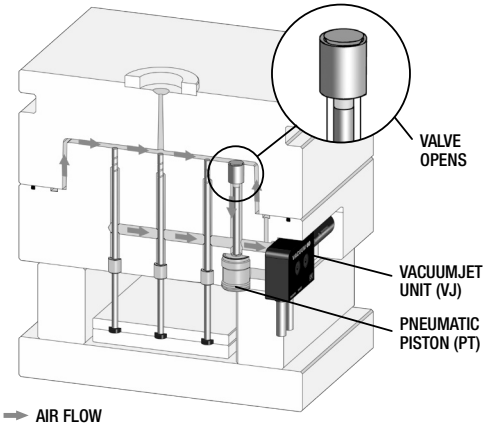
1_ MOLD CLOSED

With the mold closed, air is trapped inside the cavity.
If injection starts, the air will be cornered, heated and compressed by the plastic, producing poor quality plastic parts.
We have to create a Vacuum!



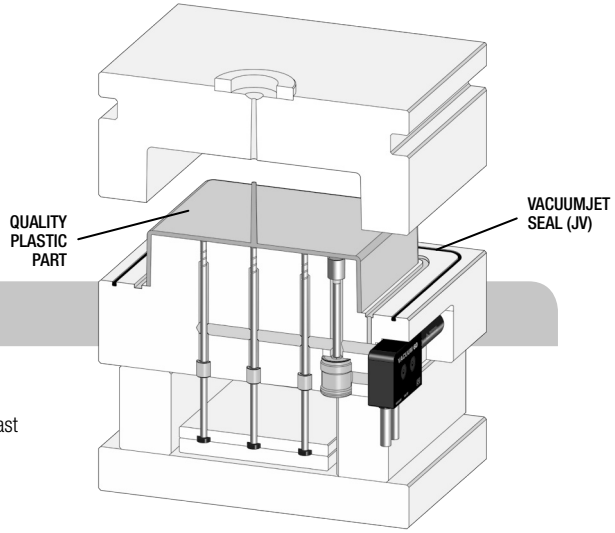
2_ CREATING THE VACUUM IN THE CAVITY

To optimize the injection process we have to take out the air from the cavity.
There are several methods to accomplish this, but in all of them it is the injected plastic that pushes out the air.
With VACUUMJET, when it is activated prior to the injection, a valve is opened and the air is vacuumed, therefore, leaving the cavity in optimal conditions for injection.



3_ INJECTION STARTS

The VACUUMJET continues sucking the air during all the injection process, to guarantee the maximum ease of the plastics fluidity, therefore reducing the pressure needed.



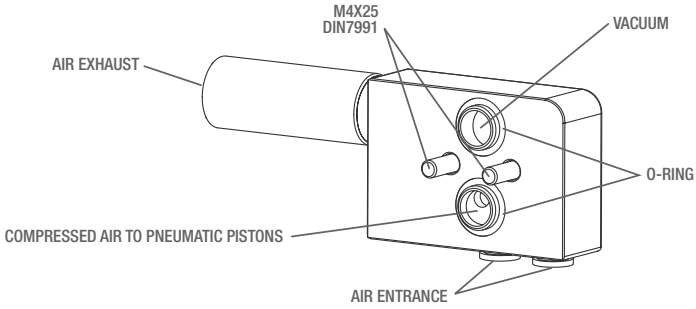
4_ EJECTION PROCESS

When the injection is finished, the VACUUMJET stops, and as with all molds, the plastic is cooled and the part is ejected... but with the VACUUMJET system, we obtain greater quality plastic part, with at least the same injection time, if not faster, and without altering the optimal injection parameters.

B. INSTALLATION

I. VACUUM UNITS

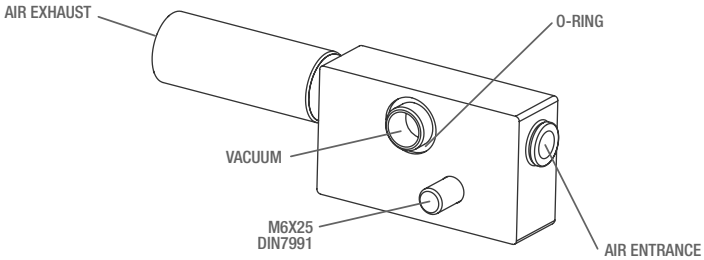
VJ



Important!

Channels must be clean to avoid particles getting into the Venturi System. O-ring completely pressed into position to guarantee a good seal.

VG



Important!

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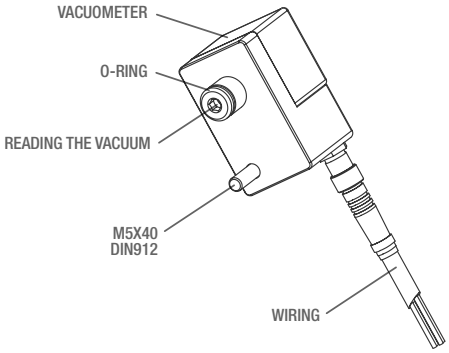
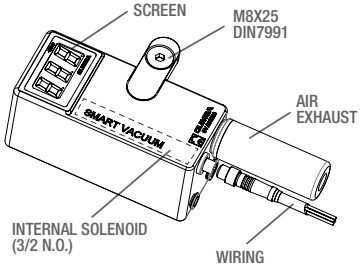
VM

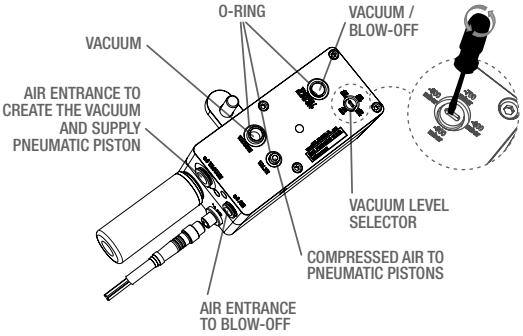


Important!

O-ring completely pressed into position to guarantee a good seal.

SV

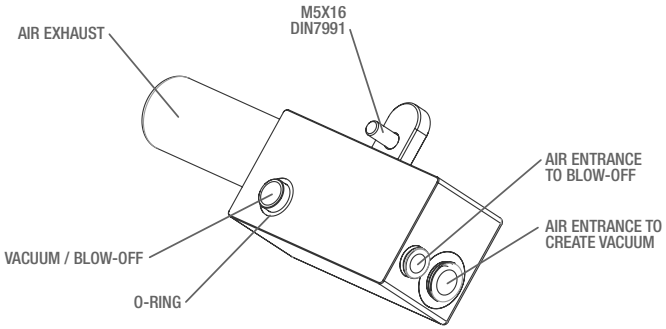




Important!

Channels must be clean to avoid particles getting into the Venturi System. O-ring completely pressed into position to guarantee a good seal.

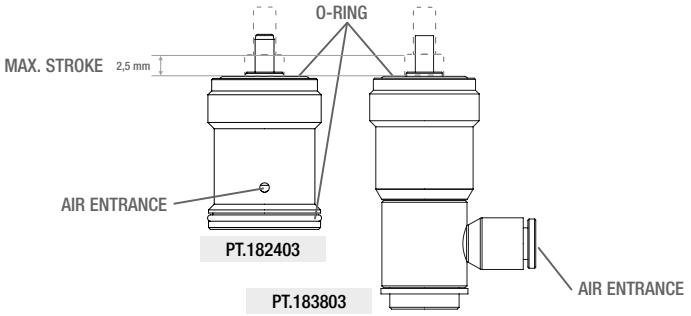
VB



Important!

Channels must be clean to avoid particles getting into the Venturi System. O-ring completely pressed into position to guarantee a good seal.

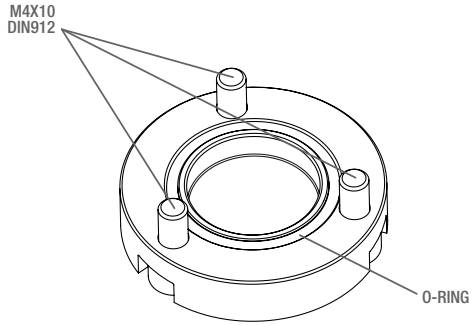
PT



Important!

O-ring completely pressed into position to guarantee a good seal. The pneumatic piston always opens 2,5mm. The Valve is activated by the Pneumatic Piston.

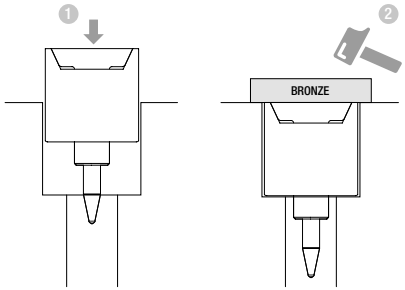
PA



Important!

O-ring completely pressed into position to guarantee a good seal.

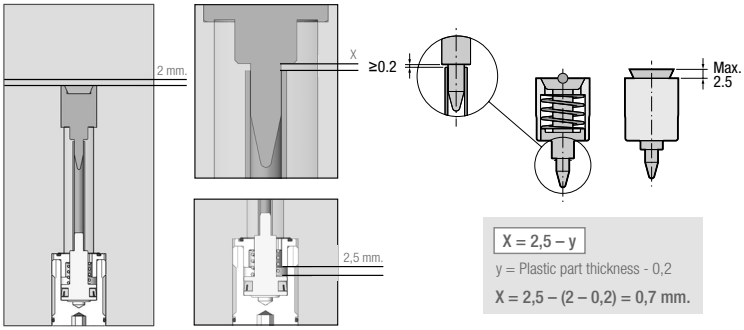
VV



Important!

The Valve is activated by the Pneumatic Piston. The Vacuumjet Valve is pressure fitted. To limit the opening of the Vacuumjet Valve, we must cut the Vacuumjet Valve Tube.

VT



The pneumatic piston always opens 2,5 mm.

X = 2,5 – y

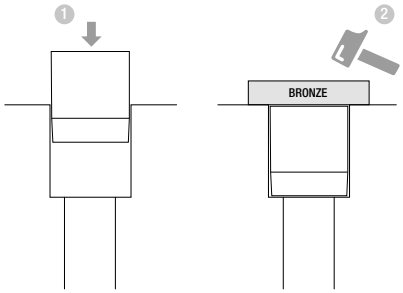
y = Plastic part thickness - 0,2

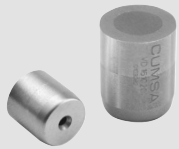
X = 2,5 – (2 – 0,2) = 0,7 mm.

Important!

To limit the opening of the Vacuumjet Valve, we must cut the Vacuumjet Valve Tube. We recommend to cut the Vacuumjet Valve Tube accurately using EDM or turning.

VD

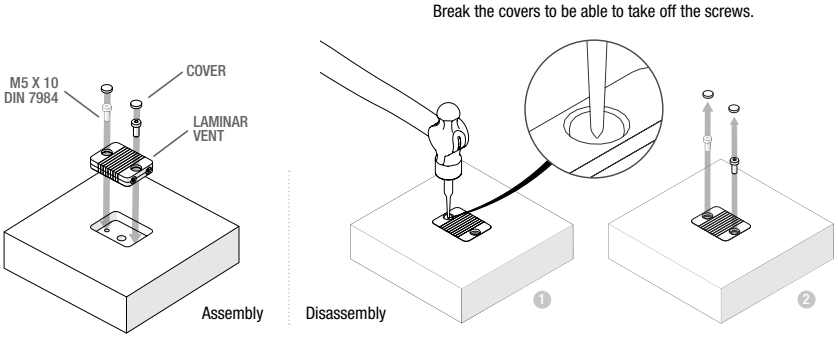




Important!

The VD is press fit. The vent allows air flow through it in both directions.

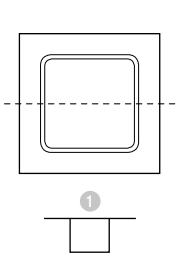
LV



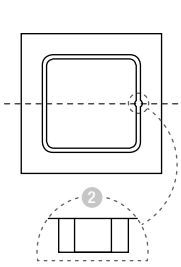
Important!

The LV is applied to the mould and attached with 2 screws. The screws can be hidden with the covers to make the surface flat.

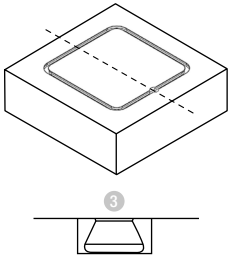
JV



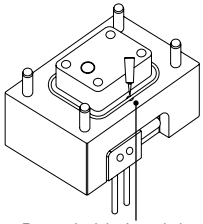
Mill with a cylindrical cutting tool.



Mill an entrance for the trapezoidal cutting tool.

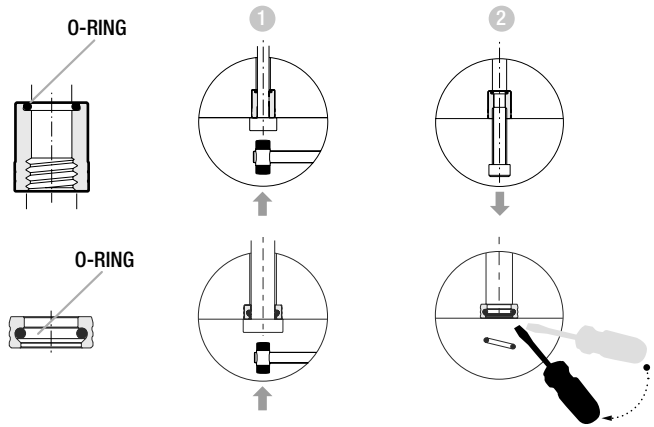


Finally mill with the trapezoidal cutting tool.



Ensure the joint is sealed using silicon.

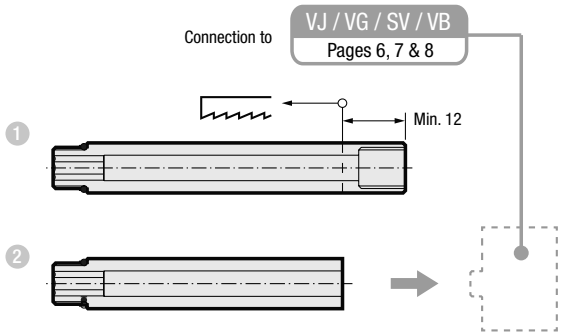
CV



Important!

O-ring completely pressed into position to guarantee a good seal. The Vacuumjet Plug is pressure fitted.

TV



Important!

O-ring completely pressed into position to guarantee a good seal.

C. WORKING

WORKING TEST VACUUMJET SYSTEM

First of all you should know that you are about to work with a **DIFFERENT** concept.
The process and the working is totally **different** to a conventional mold.
Generally a valve is installed in the cavity. Once the tool is closed and the valve opens, the air is taken out.
The injection signal will only be given once the valve is closed, otherwise it may be filled with plastic.
How will we know if the Vacuum has been created in the cavity?
By using a Vacuum sensor.
This sensor will be responsible for sending a signal to OK INJECTION.

CHOOSE YOUR OPTION

DO I NEED TO CONTROL THE VACUUM LEVEL?

✔ / ✕

DO I HAVE SPACE FOR A VALVE?

✔ / ✕ / ✔ / ✕

DO I NEED REVERSE BLOWING?

✔ / ✕ / ✔ / ✕ / ✔ / ✕ / ✔ / ✕

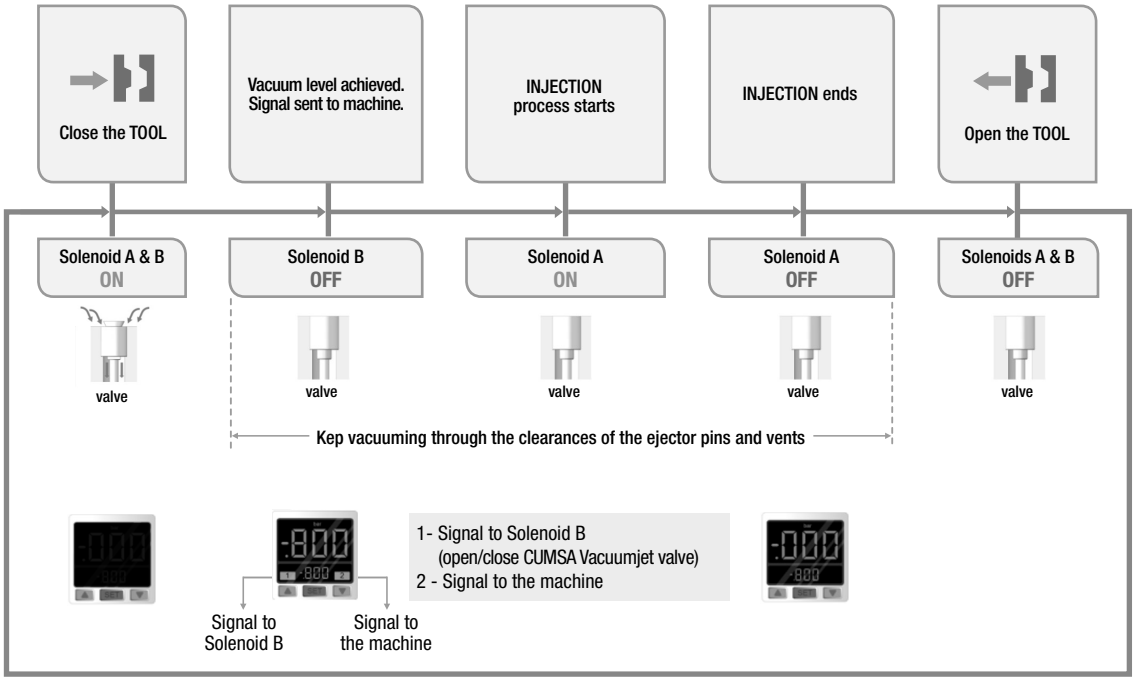
HOW MANY SOLENOIDS DO I HAVE?

2	2	2	1	3	2	2	1
							
SV	VM + VJ	VM + VB	VM + VG	VJ + VB	VJ	VB	VG

The Vacuumjet + (VG model) can be added to any combination to increase vacuuming power and speed up the vacuum process. For each VG model, a separate compressed air circuit is needed to assure that we always have at least 6 BARS of air pressure.

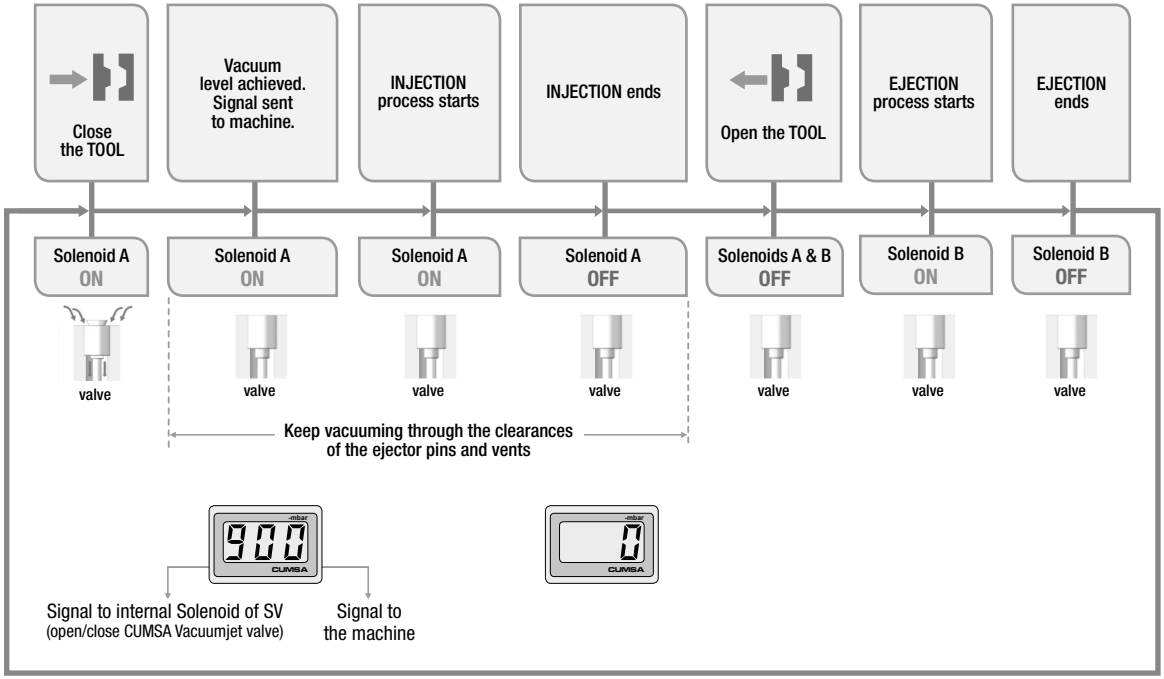
The use of Spiral Ejector or Spiral Sleeve (VP & VS) is mandatory when not using a valve. However, it is also recommended when using a valve to maintain the vacuum achieved throughout the rest of the process.

VACUUMJET SYSTEM VJ + VM



2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi (Vacuum ON / Vacuum OFF)*
- *Solenoid B – Valve* — ***OPEN/CLOSE*** *air circuit to supply the pneumatic pistons*

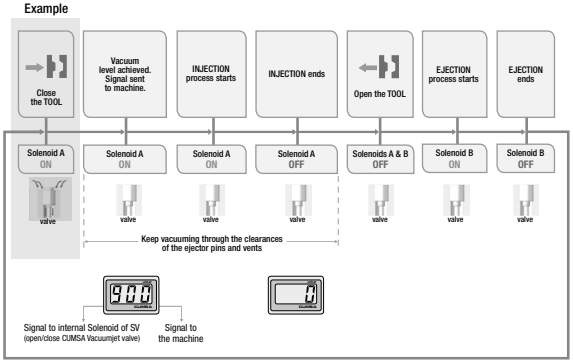
VACUUMJET SYSTEM **SV**



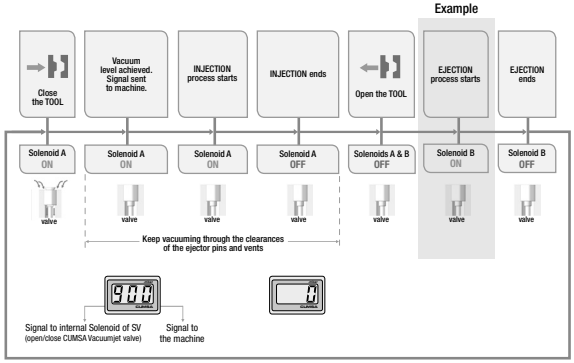
2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi and supply the pneumatic pistons*
- *Solenoid B – Blow-off* — ***OPEN/CLOSE*** *air circuit to blow-off through the gas vent insert/vents*

VACUUMJET SYSTEM **SV**

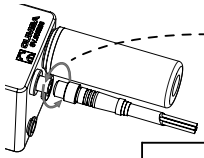
Example



VACUUMJET SYSTEM **SV**



VACUUMJET SYSTEM SV



Power supply 24V - ON

Display verification test

if NOT OK

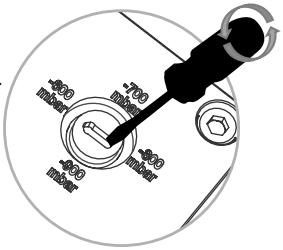
Power supply less than 18V

Internal valve not granted to work properly

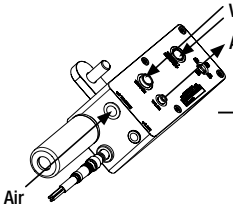
Stop production

if OK

SET Vacuum level shown



SET Vacuum level



Vacuum level > 0,1 mbar

Process starts

Real time Vacuum level

SET Vacuum level NOT achieved

After 5 seconds

Vacuum level < -200 mbar

Stop production

SET level > Vacuum level > -200 mbar

Vacuum level achieved shown in RED

Close CUMSA Vacuumjet valve

SET Vacuum level achieved

Vacuum level ≥ SET level

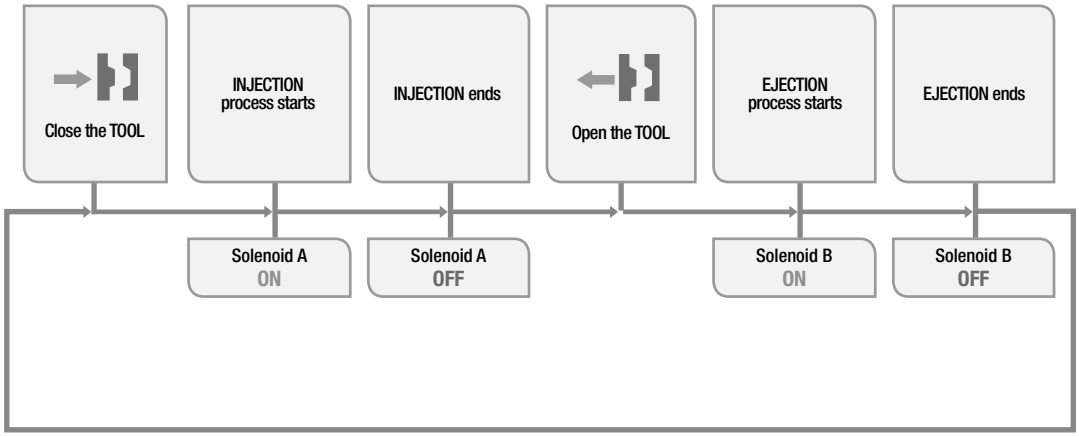
Vacuum level achieved shown in GREEN

Close CUMSA Vacuumjet valve

1 second safety delay

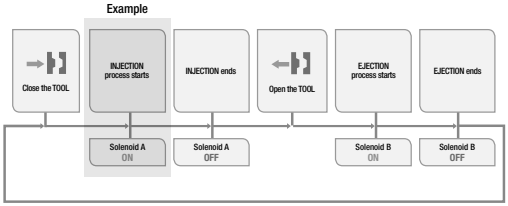
Injection signal

VACUUMJET SYSTEM **VB**



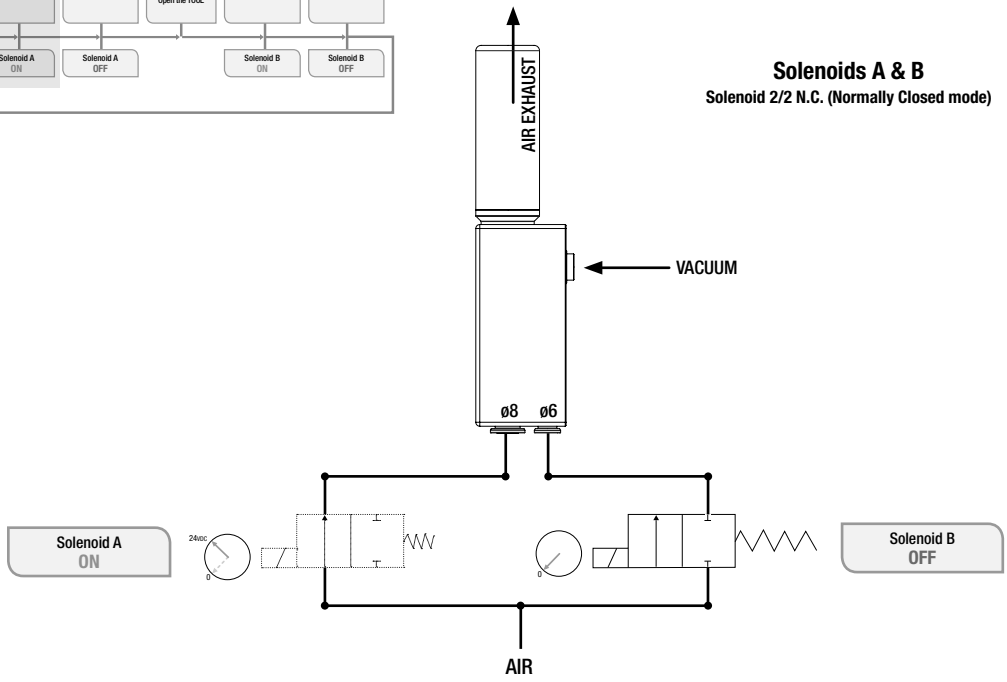
2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi (Vacuum ON / Vacuum OFF)*
- *Solenoid B – Blow-off* — ***OPEN/CLOSE*** *air circuit to blow-off through the gas vent insert/vents*

VACUUMJET SYSTEM VB



Solenoids A & B

Solenoid 2/2 N.C. (Normally Closed mode)



2 external solenoids are needed:

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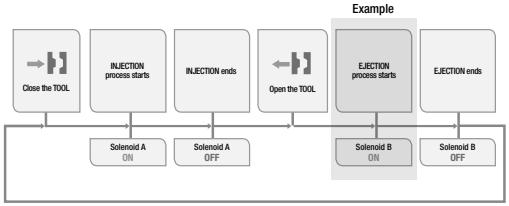
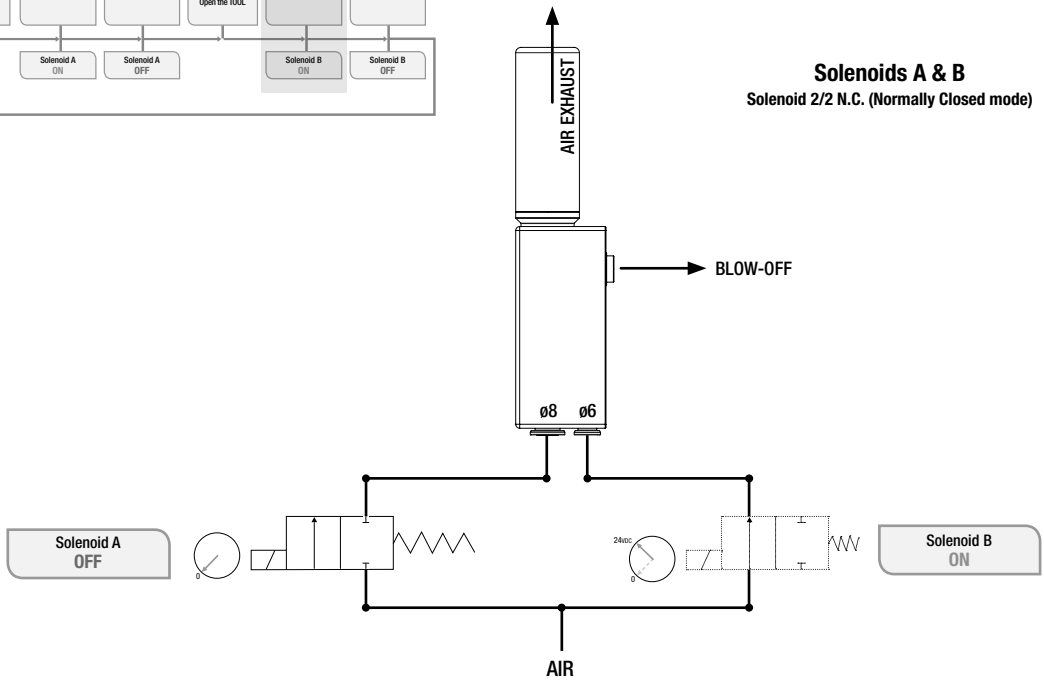
- *Solenoid B – Blow-off* — ***OPEN/CLOSE*** *air circuit to blow-off through the gas vent insert/vents*

VACUUMJET SYSTEM **VB**



Solenoids A & B

Solenoid 2/2 N.C. (Normally Closed mode)



2 external solenoids are needed:

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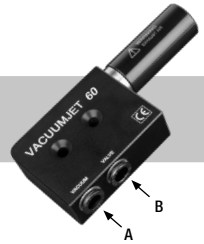
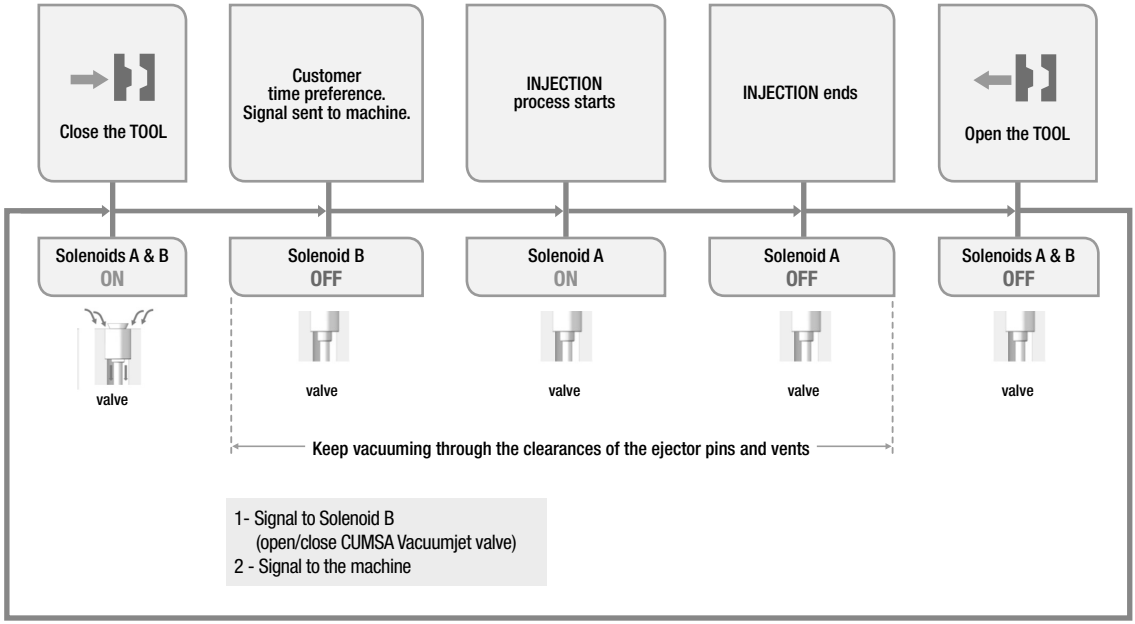
- *Solenoid B – Blow-off* — ***OPEN/CLOSE*** *air circuit to blow-off through the gas vent insert/vents*

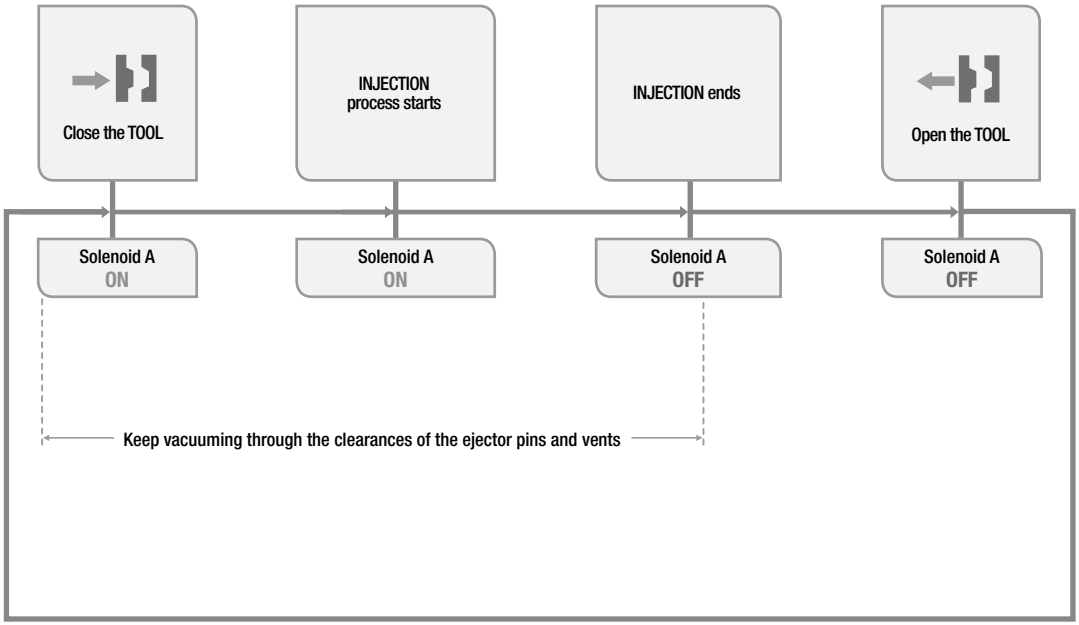
VACUUMJET SYSTEM VJ





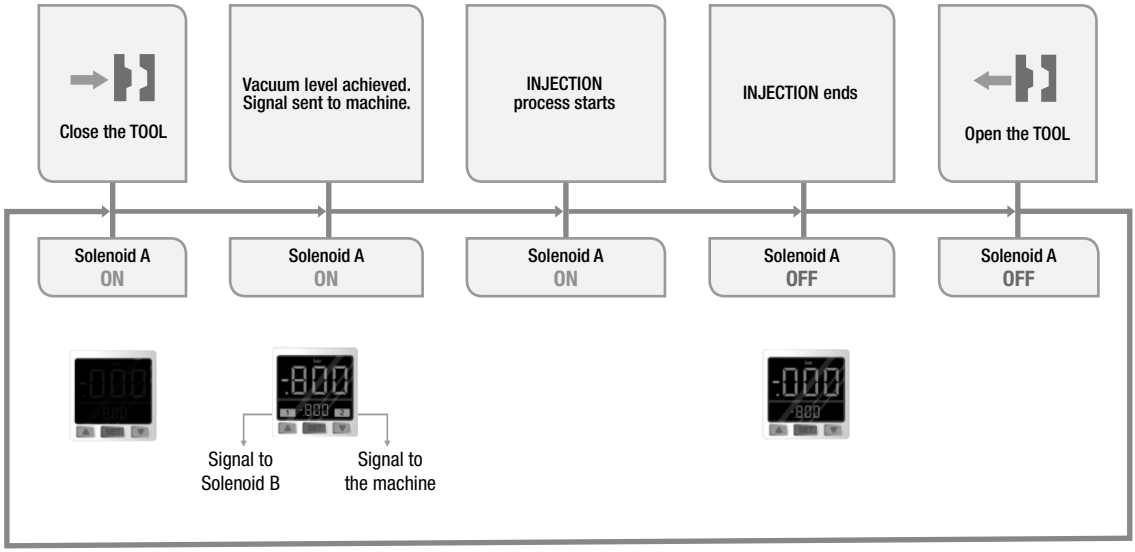
2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi (Vacuum ON / Vacuum OFF)*
- *Solenoid B – Valve* — ***OPEN/CLOSE*** *air circuit to blow-off through the gas vent insert/vents*

VACUUMJET SYSTEM **VG**



1 external solenoid is needed: *Solenoid A – Vacuum -* ***OPEN/CLOSE*** *air circuit to activate Venturi*

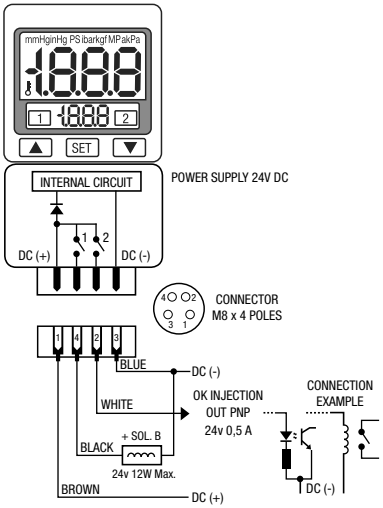
VACUUMJET SYSTEM VG + VM

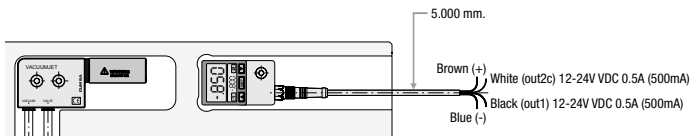


*1 external solenoid is needed: Solenoid A – Vacuum - **OPEN/CLOSE** air circuit to activate Venturi (Vacuum ON / Vacuum OFF)*

WIRING VJ + VM

Model: VM.503032





Model: VM.503032

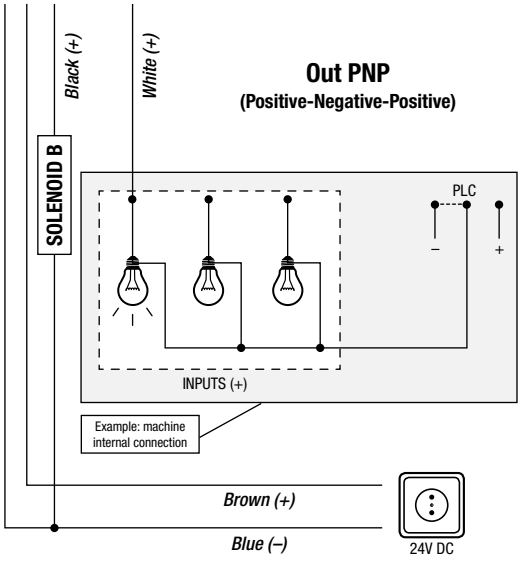
Switch output:
Output PNP open collector
Max. load: 500mA
Max. supply voltage: 24VDC ±10%

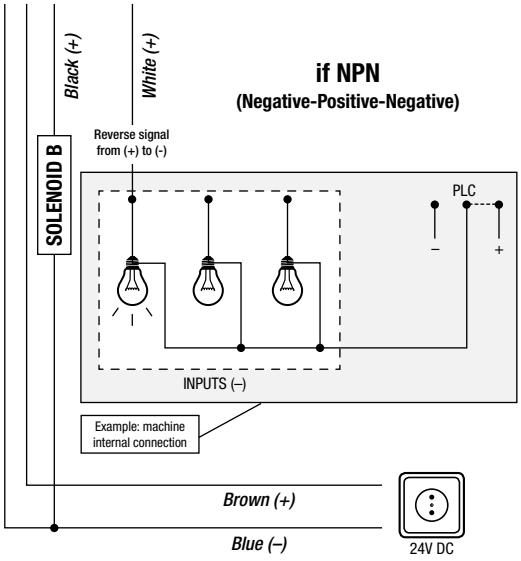
Wires to supply power 24V to connect the VM.503032:
Blue (-): Power negative signal.
Brown (+): Power positive signal.

Signal wires, to start OK injection:
White (+): Output PNP open collector.

Signal wires, to command external solenoid B:
Black (+): To be connect to positive born of solenoid B ("SOL. B") 24VDC, 12W Max.
Then connect negative born of solenoid B with the ***blue wire (-)***.

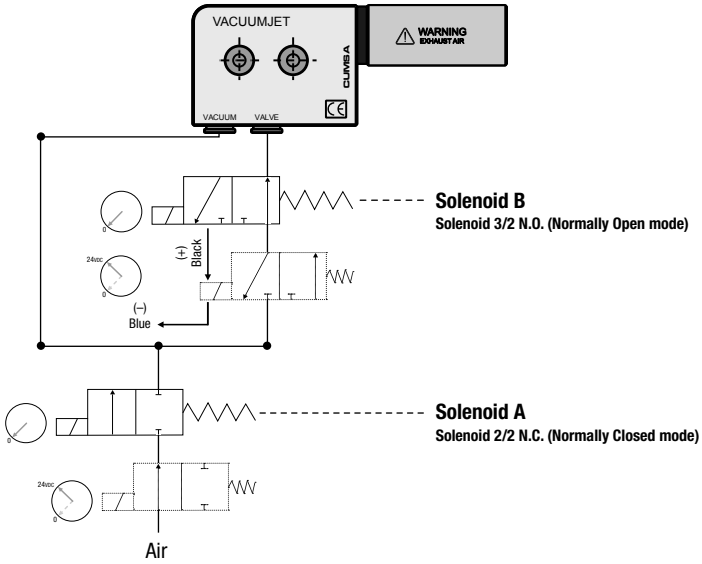
ELECTRICAL WIRING SIMULATION VJ + VM





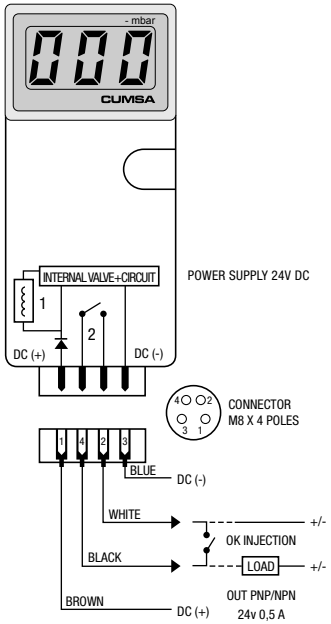
SOLENOIDS VJ + VM

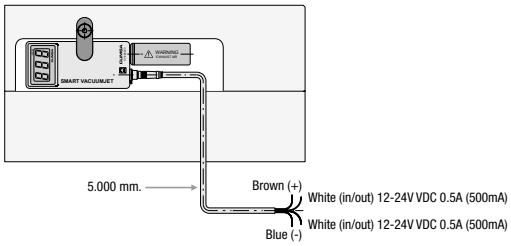
Please pay attention that VM.503032 does not incorporate any solenoid.



2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi (Vacuum ON / Vacuum OFF)*
- *Solenoid B – Valve* — ***OPEN/CLOSE*** *air circuit to supply the pneumatic pistons (Valve opened/Valve closed)*

WIRING SV



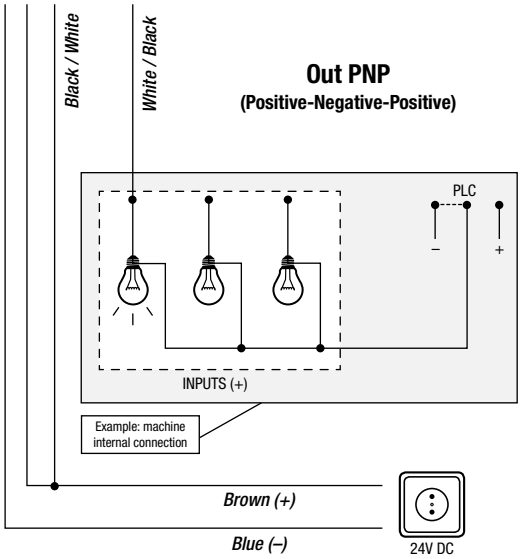


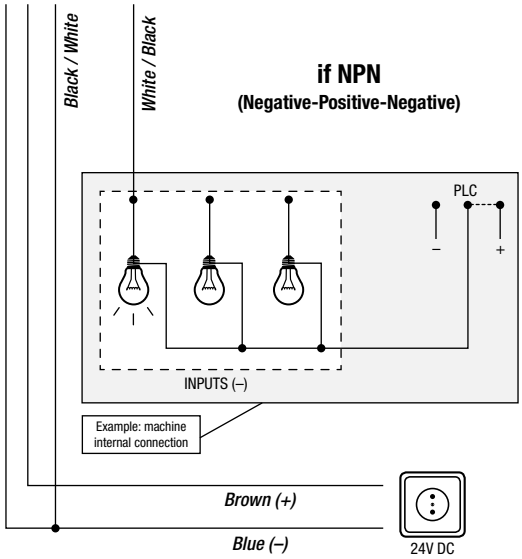
Wires to supply power 24V to connect the SV.605253:
Blue (-): Power negative signal.
Brown (+): Power positive signal

Signal wires, to start OK injection:
White (+/–)
Black (+/–)

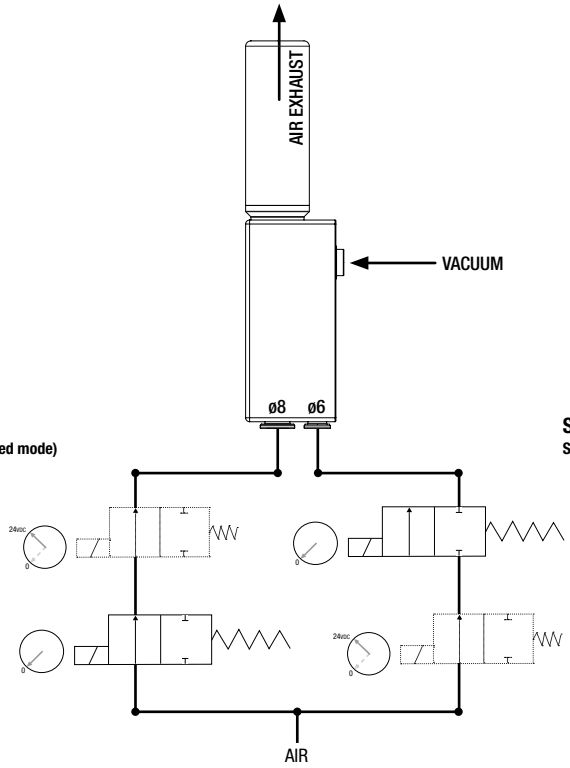
These wires are points of information, both PNP (Positive-Negative-Positive) or NPN (Negative-Positive-Negative) will give the OK injection to injection machine.
These wires must be connected to injection machine PLC, this will command injection.
Each injection machine have different points where connected.

ELECTRICAL WIRING SIMULATION SV





SOLENOIDS VB

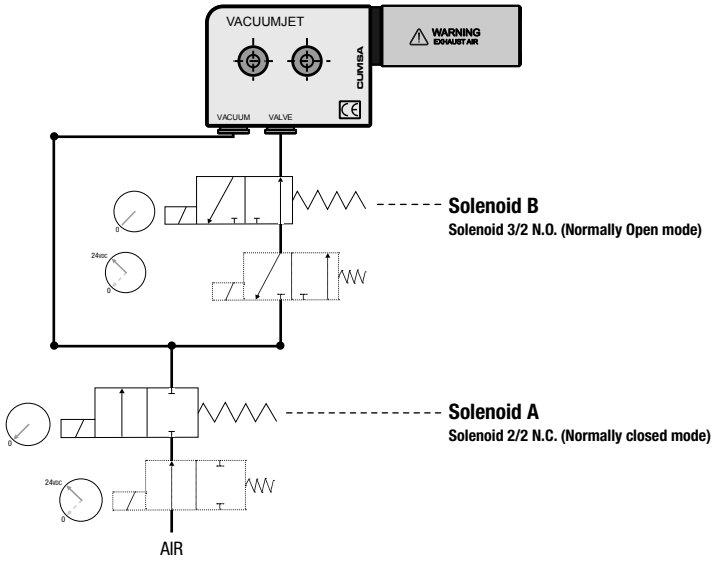


Solenoid A
Solenoid 2/2 N.C. (Normally closed mode)

Solenoid B
Solenoid 2/2 N.C. (Normally closed mode)

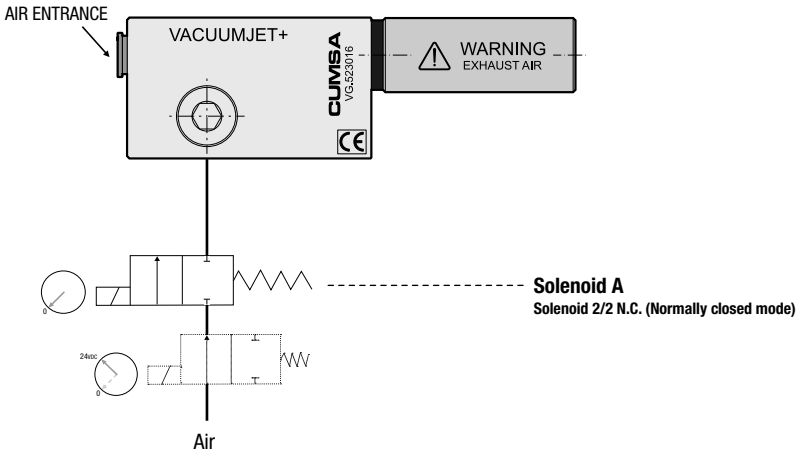
2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi*
- *Solenoid B – Blow-off* — ***OPEN/CLOSE*** *air circuit to blow-off through the gas vent insert/vents*

SOLENOIDS **VJ**



2 external solenoids are needed:
- *Solenoid A – Vacuum* — ***OPEN/CLOSE*** *air circuit to activate Venturi*
- *Solenoid B – Valve* — ***OPEN/CLOSE*** *air circuit to activate the pneumatic piston (valve open/valve closed)*

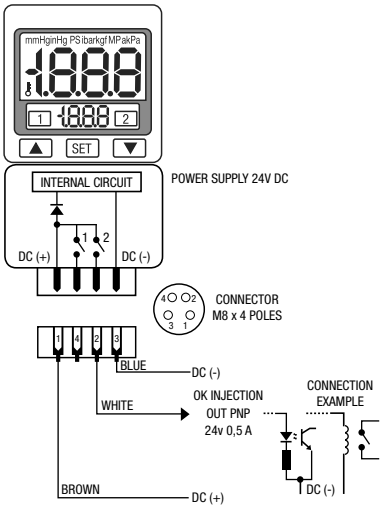
SOLENOIDS VG

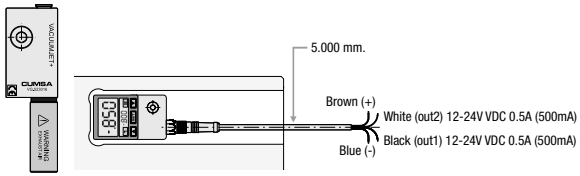


1 external solenoid is needed: *Solenoid A -* ***OPEN/CLOSE*** *air circuit to activate Venturi (Vacuum ON / Vacuum OFF)*

WIRING VG + VM

Model: VM.503032





Model: VM.503032

Switch output:

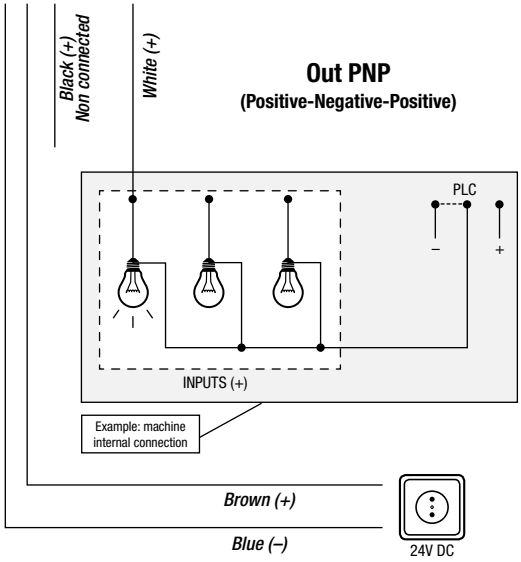
Output PNP open collector
Max. load: 500mA
Max. supply voltage: 24VDC ±10%

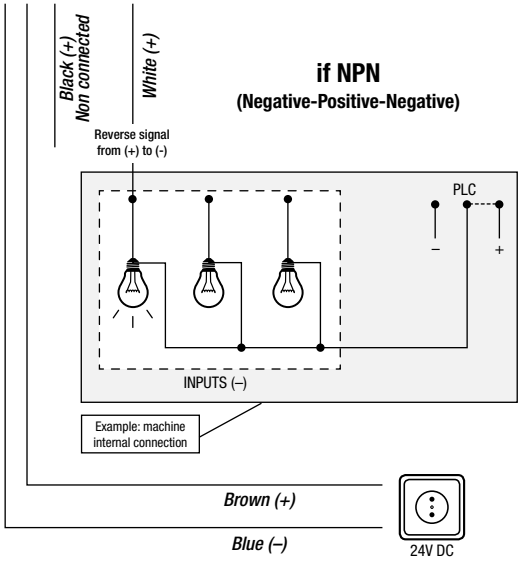
Wires to supply power 24V to connect the VM.503032:
Blue (-): Power negative signal.
Brown (+): Power positive signal.

Signal wires, to start OK injection:
White (+): Output PNP open collector. If the PLC injection Machine is NPN, we must reverse this signal from (+) to (-)

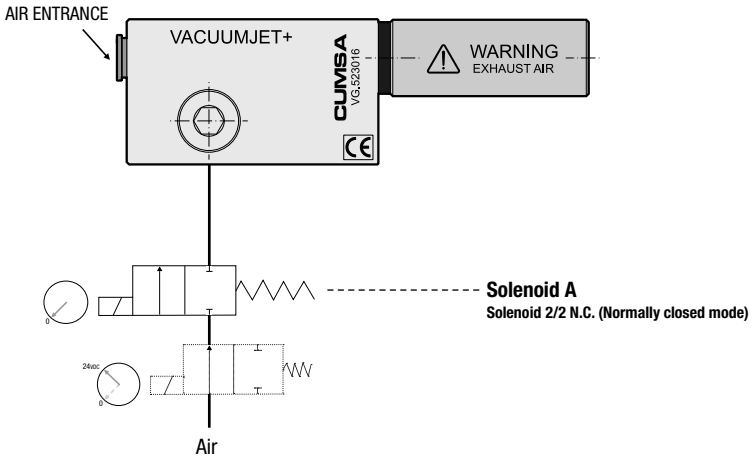
Signal wires, to command external solenoid B:
Black (+): Non connected.

ELECTRICAL WIRING SIMULATION VG + VM





SOLENOIDS VG + VM

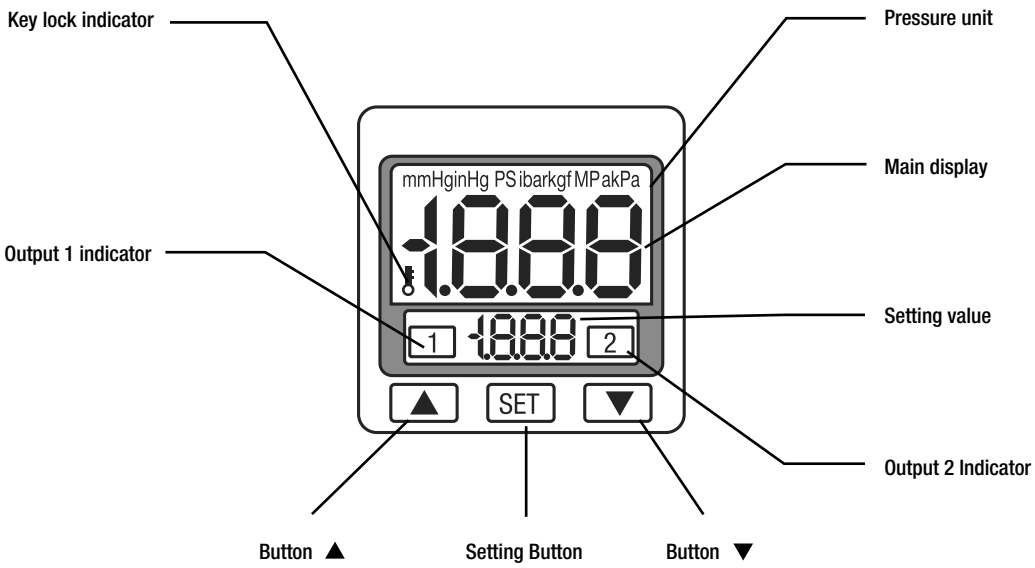


*1 external solenoid is needed: Solenoid A - **OPEN/CLOSE** air circuit to activate Venturi*

SETTING OF THE SENSOR

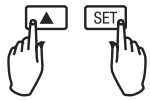
VACUOMETER INDICATORS

The main parts of the controller are:

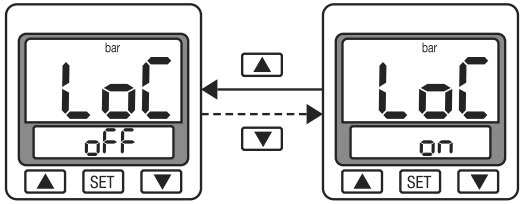


A. KEY LOCK - UNLOCK MODE

The unit is always supplied locked to prevent unauthorized or accidental tampering with the switch setting.
In case you need to modify the zero point setting, you need to unlock it.
We strongly reccomend to lock it again, as the system will only work for the Vacuumjet with the factory settings showed in the section INITIAL SETTING MODE



Press both buttons simultaneously for more than 2 seconds.

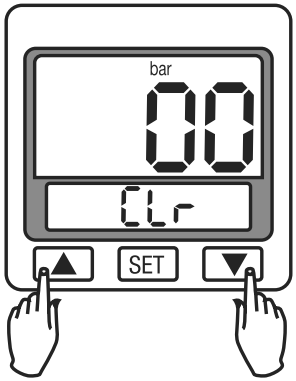


Unlock mode Lock mode

Press SET button to set Lock or Unlock mode. When lock mode is selected, the panell will display "⚷".

B. ZERO POINT SETTING

When connecting the system of the power, if the display does not show 000, the system must be reset to the appropiate value.
To do this, press the arrow buttons at the same time until the "000" is shown. Release the buttons to end zero setting.



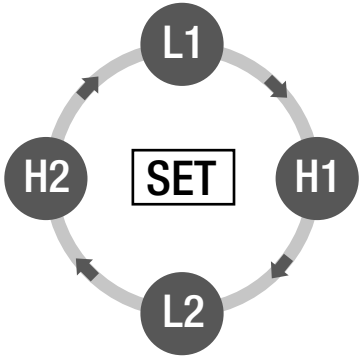
C. SETTING THE VACUUM LEVELS

The vaccum is factory defined as an 80%, which is the recommended level. In case the user wants to modify this value. First, refer to the Lock/Unlock mode section to be able to modify this.

Press [SET] button to start configuration, ant to switch between L-1, H-1, L2 and H-2 options.

Press [▲] and [▼] to increase or decrease values, and press [SET] again to define values.

** The L-1, H-1, L2 and H-2 options and the Values, are shown in the secondary display.*



IMPORTANT!

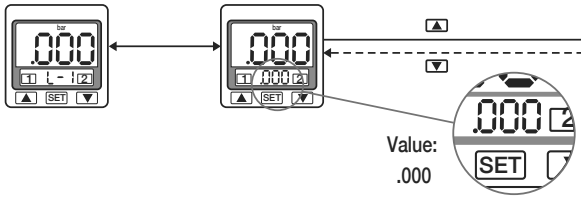
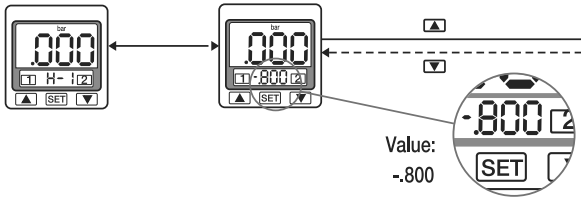
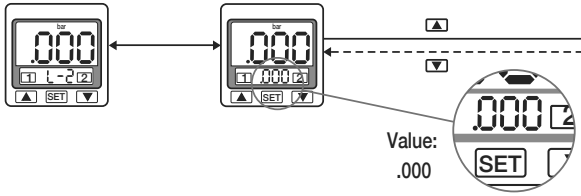
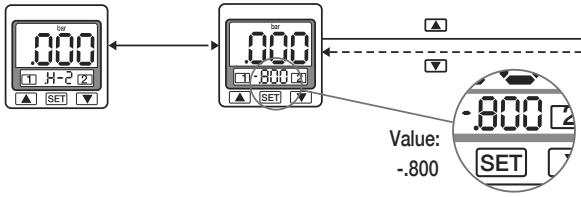
We recommend to follow the factory settings.

IMPORTANT!

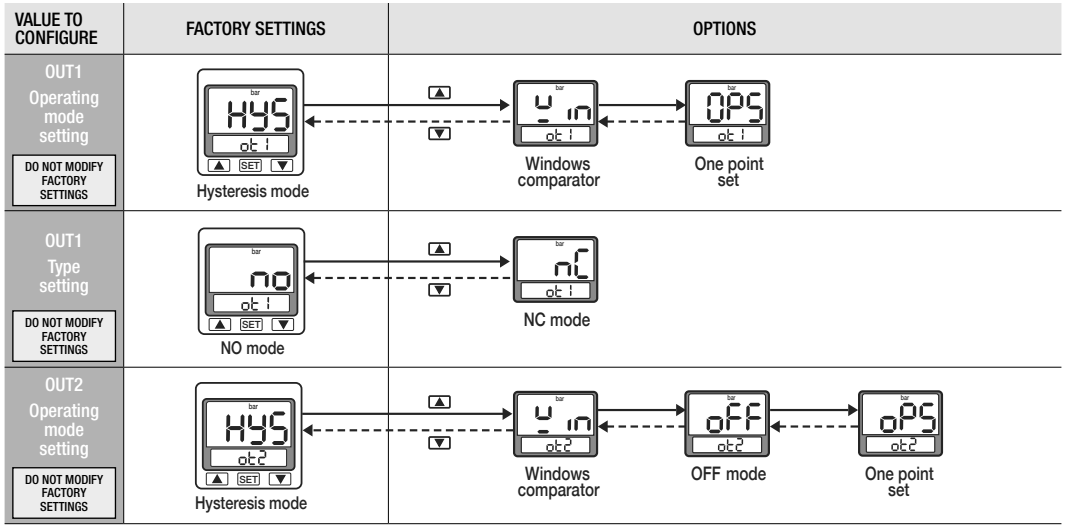
L1=L2=0
H1=H2=-0.800

L1= Low level for the signal 1
H1= High level for the signal 1
L2= Low level for the signal 2
H2= High level for the signal 2

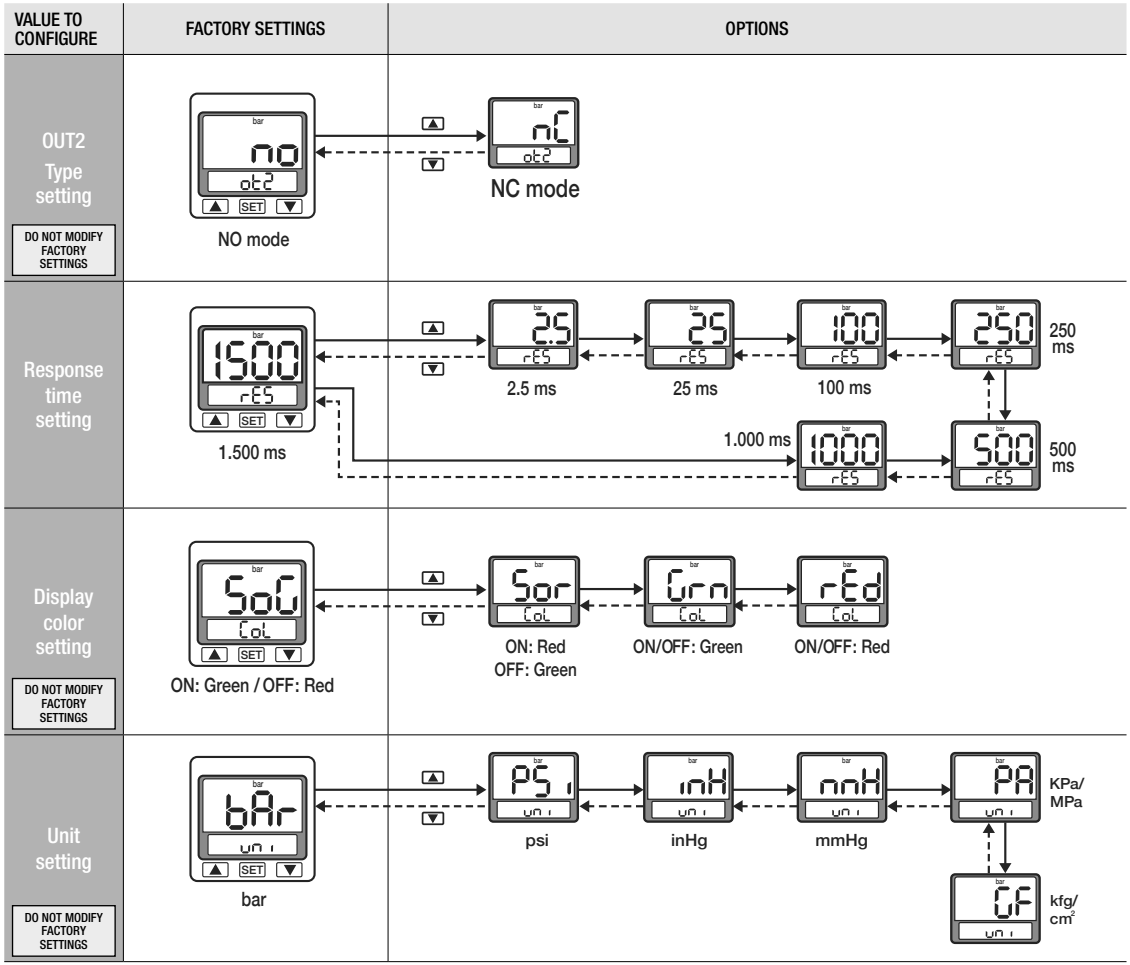
C. SETTING THE VACUUM LEVELS

VALUE TO CONFIGURE	FACTORY SETTINGS	OPTIONS
L-1		
H-1		
L-2		
H-2		

Press [SET] button between 3 to 5 seconds to start configuration.
Press [▲] and [▼] to switch between options and press [SET] again to set the desired option.



D. INITIAL SETTING MODE



TYPE	CODE	CONDITION	TROUBLESHOOTING
RESIDUAL PRESSURE ERROR	ER3	During zero reset, ambient pressure is over ±3% F.S.	Change input pressure to ambient pressure and perform zero reset again.
APPLIED PRESSURE ERROR	HHH	Supplied pressure exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
APPLIED PRESSURE ERROR	LLL	Supplied pressure exceeds the lower limit of pressure setting.	Adjust the pressure within operating pressure range.
SYSTEM ERROR	ER4	Internal system error.	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
	ER5		
	ER6	Internal data error.	
	ER7		

C. WORKING

START TEST

a) Check list.

b) Turn on the air and check which is the maximum level of Vacuum that the tool can achieve.
Keep in mind that we cannot allow the machine to inject.

c) Once the Vacuum level is stable, take note of it.
This will be the maximum level of Vacuum that the tool can achieve.

Now we are ready to inject plastic parts.

The most important point is to assure that the sensor is what commands the injection process.

CHECK LIST

- ☐ Tool in the press
- ☐ Diagram correctly followed
- ☐ Wirings correctly done
- ☐ Zero point setting
- ☐ L1=L2=0
- ☐ H1=H2=-0.980*
- ☐ Sensor locked
- ☐ Nozzle in position

**In order to test the vacuum level we recommend to set H1/H2 at -0.980. This guarantees that we will never reach it, as the maximum venturi level is -0.940. By following this procedure we can avoid sending the signal to the injection machine.*

MAINTENANCE

- Assure that the compressed air is DRY and filtered.
- Assure that the air pressure is between 5 and 8 bar.
- Assure that the Vacuum channels are completely clean.
- Assure that all the plugs, bushings and O-rings remain hermetic.
- Assure that the spirals of the ejectors are free of debries.
- Assure that the muffler of the Vacuum unit remains clean.
- Assure that there are no debries in the Venturi.
- Assure that the unit remains locked during the production.

E. TECHNICAL ESPECIFICATIONS

VACUUMJET

TYPE		SPECIFICATIONS	
Rated pressure range		0.0 ~ / -101.3kPa	
Withstand pressure		300kPa	
Fluid		Air, non/corrosive gases, incombustible gases	
Set pressure resolution	kPa	0.1	
	Mpa	–	
	kgf/cm²	0.001	
	bar	0.001	
	psi	0.01	
	InHg	0.1	
	mmHg	1	
Power supply voltage		12 to 24 VDC ±10%, Ripple (P-P) 10% or less	
Current consumption		≤40mA (With no load)	
Switch output		Model: SV.605253	Model: VM.503032
		Output PNP/NPN (DC/AC) Max. load: 500mA Max. supply voltage: 24VDC ±10%	Output PNP open collector Max. load: 500mA Max. supply voltage: 24VDC ±10%

TYPE		SPECIFICATIONS
Repeatability (Switch output)		≤±0.2% F.S. ±1 digit
Response time		≤2.5ms (chattering-proof function 25ms to 1500ms selections)
Output short circuit protection		Yes
7 segment LCD display		Three color (Red/Green/Orange) (Sampling rate> 5 times/sec.)
Indicator accuracy		≤±2% F.S. ±1 digit (ambient temperature: 25 ±3ºC)
Switch ON indicator		Orange 1 & 2 Indicator
Environment	Enclosure	IP 40
	Ambient temp. range	Operation: 0~50ºC, Storage: -10~60ºC (no condensation or freezing)
	Ambient humidity range	Operation/Storage: 35~85% RH (no condensation)
	Withstand voltage	1000VAC in 1-min (between case and lead wire)
	Insulation resistance	50Mohm min. (at 500VDC, between case and lead wire)
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-150Hz-10Hz scan for 1 minute, two hours each direction of X, Y and Z
	Shock	100m/s (10G), 3 times each direction of X, Y and Z
Temperature characteristic		≤±2% F.S. of detected pressure (25ºC) at temp. range of 0~50ºC

CUMSA

ANNOTATIONS

CUMSA

INNOVATIVE SOLUTIONS
FOR YOUR MOLDS