Temperature range:

Type-number	Temperature range
BV, BR, BL, BA	-20°C to +50°C
BG, BH	-10°C to +60°C
HV, HVR, P	-10°C to +60°C
MH, MNH DC-version	-10°C to +60°C
MH, MNH AC-version	-10°C to +50°C
MD, MK	-10°C to +50°C
TT	-50°C to +50°C

Several customer-specific items have been catered for an enlarged temperature range.

Leakage rate at 6 bar pressure:
All (100 % of) the Hafner-valves leaving the factory are individually tested on function and leakage.
The following leakage rate is allowed and a valve is still rated as good with the following:
- Internal leakage: 4 cm^3 / min
- External leakage: 2 cm^3 / min

For TT-valves only:
At temperatures below - 40°C the internal leakage can increase to 10 cm^3 / min

General Warranty:
The general warranty is 12 month from delivery. Warranty expires when valves have been opened.

Recommended signal length:
The recommended signal length to reach full flow is 50 msek.

Operation and required air-quality:
The valves are designed for being used with cleaned and lubricated or cleaned and unlubricated compressed air.
Required Air-quality-level in accordance to ISO 8573-1:2010: 7 – 4 – 4 for particles – water – oil

Lubrication:
Valves do not require any lubrication but lubrication in general increases the life-time of the products. Please avoid to lubricate the valves during a certain period of time and let them run dry later. For low-temperature-items: Do not lubricate as most kinds of oil and grease do not properly operate below - 25°C.

Voltage tolerance:
The general voltage tolerance of all solenoid systems is +/- 10%.

Standard materials used for Hafner-valves:

Bodies	standard	anodised aluminum
	VES / KES chapter 6.	1.4404
Spool		stainless steel 1.4104, operator tube 1.4305
Sealing-system	standard	brass & NBR
	low temperature chapter 5.	brass & PUR
	1/4" VES / KES chapter 6.	stainless steel, operator tube 1.4305 & PUR
	1/2" VES chapter 6.	stainless steel, operator tube 1.4305 & FKM
Other inner parts	standard	brass, POM, NBR
	low temperature chapter 5.	brass, POM, NBR
	VES / KES chapter 6.	stainless steel, operator tube 1.4305 POM, FKM
Actuation elements	BA-valves	PA 6.6 30 % glass filled
	HV	Duroplast PF31 P/PA
	BH	Duroplast PF31 P/PA
	BHP	ABS-plastic
Upper part solenoids	series 500 and 700	PA 6.6 30 % glass filled, brass
	other series	anodised aluminum, brass
	VES	1.4404
	KES	PA 6.6 30 % glass filled, stainless steel, operator tube 1.4305

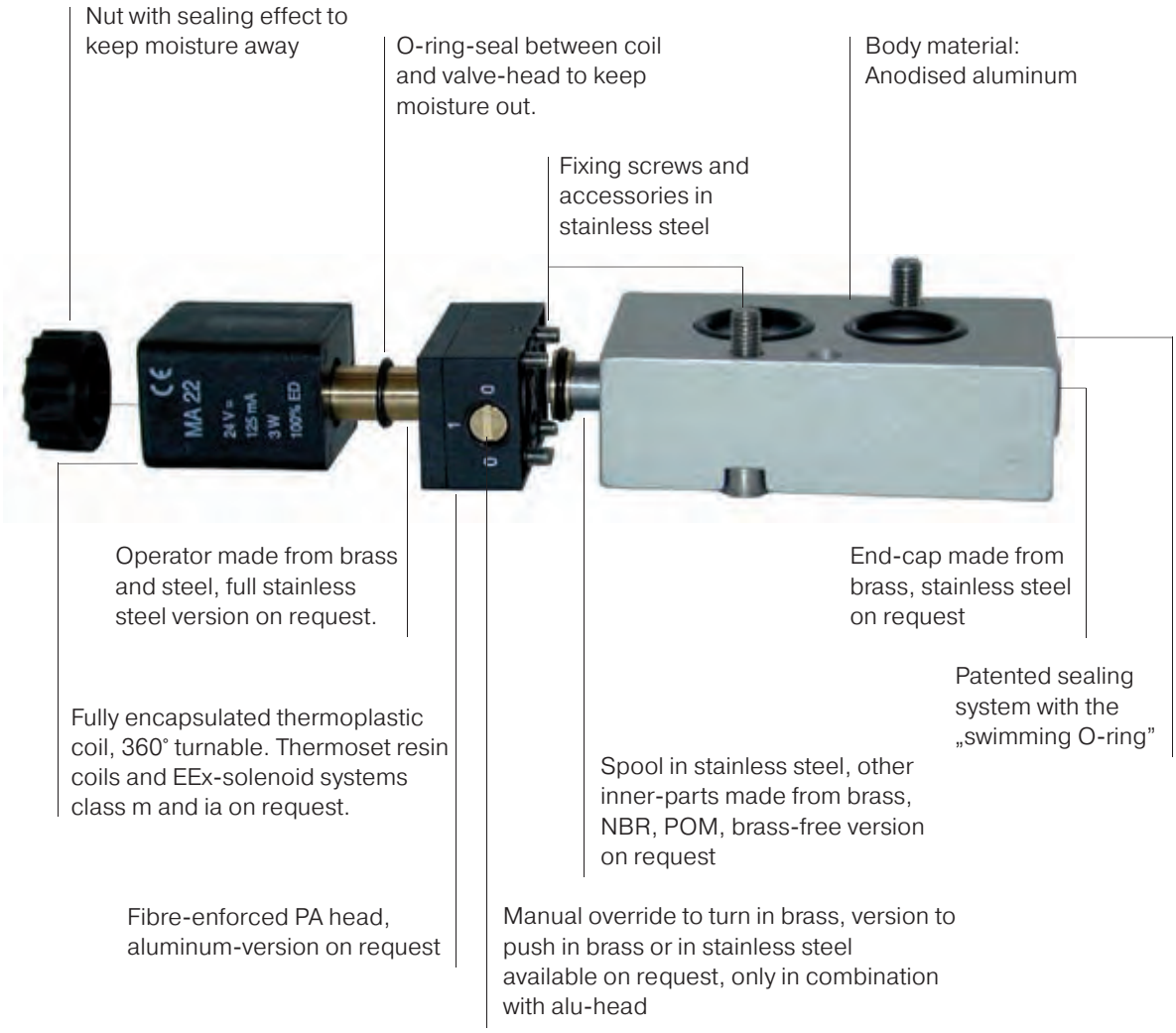
PA	*Polyamide*
1.4404	*high graded stainless steel*
POM	*Polyoxymethlene*
FKM	*Fluoroelastomer*

In accordance to CETOP position paper „PP07 Machine Directive 2006/42/EC": Single valves placed on the market are not ... within the meaning of Annex V, point 4 of Machine Directive 2006/42/EC.

The Hafner company policy is one of a continuous improvement process. We therefore reserve the right to amend, enhance and change specifications of the products presented in this document without notice.

HAFNER

Besides maximum flow of 1.250 Nl/min at compact design there are 11 more competitive advantages of the Hafner NAMUR-valves series 701.



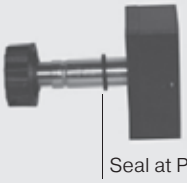
The special Hafner coil with covered yoke and additional seals between the coil and valve offers excellent protection in wet and humidity environment. Most Hafner solenoid valves offer IP65 as a standard and IP67 as an option.

The yoke of the MA 22 standard coil is completely covered in Polyamide. This prevents the yoke from rusting and as a result not to burn out.

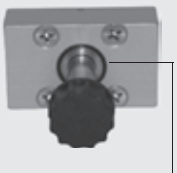
Protected yoke of Hafner's MA 22-coils

Open yoke at coils of competitors

Additionally an O-Ring between the operator tube and the coil protects the electrical part from moisture.



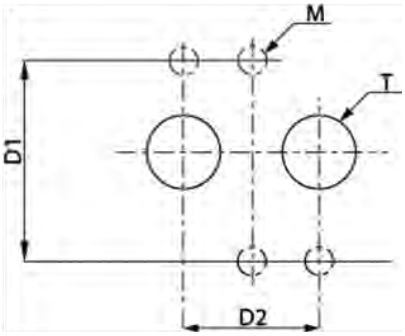
Seal at PA-head



Seal at Aluminum-head

Using our Epoxy coil, a special connector with moulded cable and a second O-Ring, the system reaches protection class IP67 in accordance to IEC 60 529.

The Hafner NAMUR-valves are available with the ¼” standard in accordance to VDI / VDE 3845 also called NAMUR 1 – as well as with the ½” standard – also called NAMUR 2.



NAMUR-standard: Drawing of the actuator flange

Notice: Difference between 1/4” – 1/8” and 1/2 “ – 3/8“ is port-size and position as well as the size, position and depth of the fixing screws in the actuator. On actuators NAMUR 1 (G 1/8” and **G 1/4”**) the same NAMUR-valves can be used. The same is true on NAMUR 2 (G 3/8” and **G 1/2”**) where also the same NAMUR-valves fit.

Type	D1 (mm)	D2 (mm)	M (mm)
1/4” (1/8”)	32	24	M5
1/2” (3/8”)	45	40	M6

Hafner’s target to offer valves with maximum flow leads to offer 3 sizes of NAMUR-valves.

Series 701 / 711 Orifice size 7 — 1.250 l/min
NAMUR-interface — 1/4”
Port size — G 1/4” or 1/4” NPT

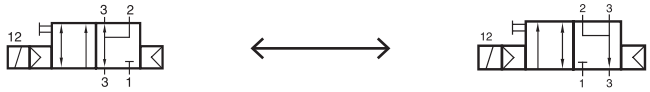
Series 101 Orifice size 10 — 2.250 l/min
NAMUR-interface — 1/4”
Port size — G 3/8”

Series 121 Orifice size 12 — 3.000 l/min
NAMUR-interface — 1/2”
Port size — G 1/2” or 1/2” NPT

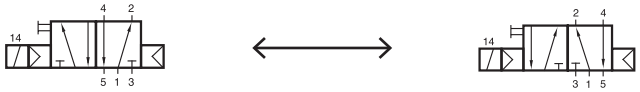
For single solenoid valves we offer two different port-schemes. Use depends on actuator interface.

2 port-schemes for 1/4" NAMUR-valves

standard port-scheme **alternative port-scheme**



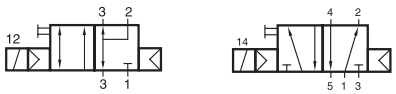
MNH 310 701 MNH 310 711



MNH 510 701 MNH 510 711

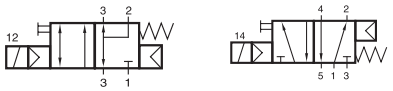
Single solenoid and single pilot valves are available with air spring or combined (air and mechanical spring) return.

Valves with air spring return

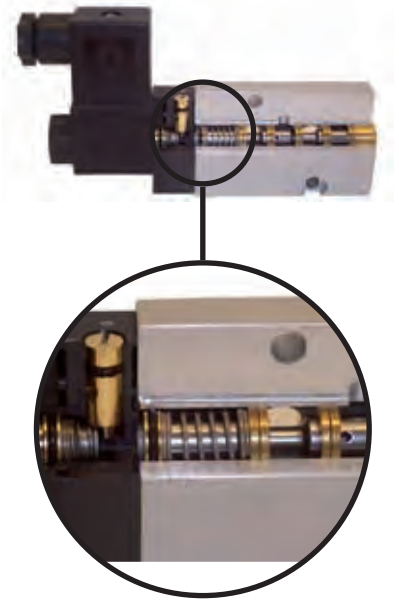


MNH 310 701 MNH 510 701

Valves with combined spring return



MNH 311 701 MNH 511 701



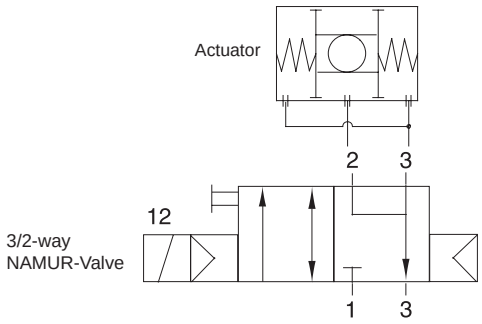
Combined spring assures a **fail-safe function** in case of loss of air pressure. Also available in **1/2"-valves**.

Air-recirculation into the spring-chamber or “purge” is a central demand in process-automation. On standard Rack and Pinion actuators as well as on smaller Scotch Yoke actuators with spring return the spring chamber has an air-port. Therefore the pilot valve should support the desire of the user to supply the spring chamber with process air and not just suck ambient atmosphere into it.

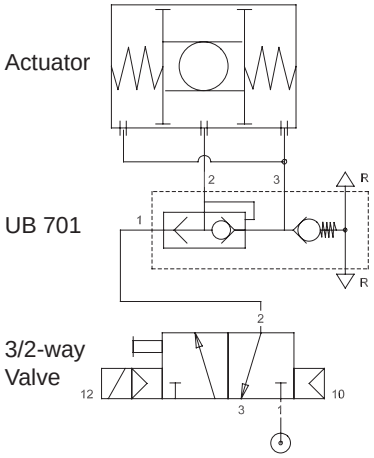
This function is called **exhaust air-recirculation or “purge”**.

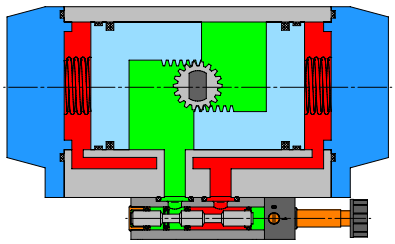
How it works: When the actuator “closes” (pressurized chamber exhausts), a part of the instrument air is directed from the actuation side into the spring chamber. The rest exhausts out of port 3.

Function if actuator is piloted by a NAMUR-valve:

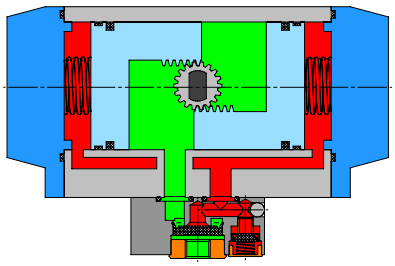


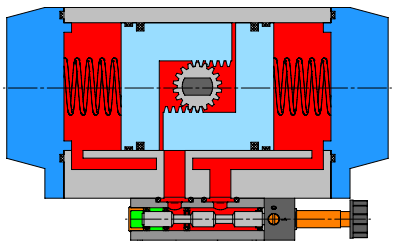
Function if actuator is remote piloted:



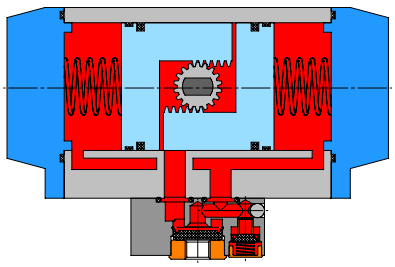


Step 1 - Opening:
1. Pilot valve opens
2. Air flows into actuation chamber
3. Actuator opens





Step 2 - Closing:
1. Air supply cuts-off
2. Actuator closes through the force of the springs
3. Air is directed from the actuation chamber into the spring chamber



All 3-way Hafner NAMUR-valves ensure the exhaust air-recirculation! That applies also to our Hafner NAMUR-Flex valve (page 2.1.3).

If single-acting actuators are remote controlled, we strongly recommend to use our air-recirculation block type UB 701 which you can find on page 3.3. Only by using the UB 701 you can avoid that ambient atmosphere can suck into the actuator.

Optimal accessibility of the manual override and available options

The head (pilot part) of our NAMUR solenoid valves can be turned by 180° to ensure optimal accessibility to the manual override.

Standard MNH 510 701 mounted on a double acting actuator. The override is on the same side as the fittings.

MNH 510 701 **H180** mounted on a double acting actuator. The pilot part is turned by 180°. The override is on the other side from the fittings.
Advantage: Better accessibility

Different customers have demand for different manual overrides. Hafner offers a standard but on demand variations are an option.

Series MH
Manual override to turn by screw-driver:
- Direct acting valves
- 22+ mm wide valves (by default)

Series MD
Manual override to push, momentary:
- Direct acting valves
- 16 mm wide valves (by default)
- 22+ mm wide valves

Series MF
Manual override to turn by hand:
- Direct acting valves
- 22+ mm wide valves

Series MHF
Manual override to turn by hand and recess for screw-driver use:
- Direct acting valves
- 22+ mm wide valves

16 mm

22+ mm

Series MHD
Manual override to push plus detent position by turning:
- Direct acting valves
- 16 mm wide valves
- 22+ mm wide valves

M-Version
Without manual override.
- An option for all 22 mm + wide valves