

# FlowControl

## FlowControl VUN/BUN 2 & 3 - way control valves



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Silicone free control valve for continuous control of cold water, hot water or air in closed networks. Water quality as per VDI 2035. The valve is used together with actuators AVM115S, AVM321S and AVM322S. Nominal pressure is 16 bar, the valve is made in dimensions ranging from DN15 to DN50 and can be used as a mixing valve or diverting valve depending on your needs. If the spindle is retracted, the valve is closed (A-AB)

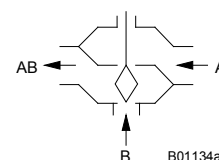
Valve with male thread as per DIN EN ISO 228-1, the valve body and seat are made of DZR (dezincification resistant) cast brass with a stainless steel spindle. Cone made of DZR brass with glass-fibre reinforced PTFE sealing ring and stuffing box made of DZR brass with wiper ring and double O-ring seal in EPDM.

\* AVM 321S/322S is used for DN25-50 and all diverting valves.

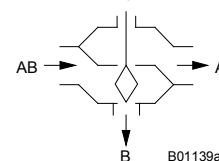
\*\* AVM 115S is used for DN15-20 mixing valve.



Mixing valve



Diverting valve



Art. No.	Description	DN	Connection	Kvs	Weight kg
VUN015 F300	2-way control valve	15	G 1 B	4	0,8
VUN020 F300	2-way control valve	20	G 1 1/4B	6,3	1
VUN025 F300	2-way control valve	25	G 1 1/2B	10	1,3
VUN032 F300	2-way control valve	32	G 2 B	16	1,75
VUN040 F300	2-way control valve	40	G 2 1/4B	22	2,5
VUN050 F200	2-way control valve	50	G 2 3/4B	40	3,5
BUN015 F300	3-way control valve	15	G 1 B	4	0,8
BUN020 F300	3-way control valve	20	G 1 1/4B	6,3	1
BUN025 F300	3-way control valve	25	G 1 1/2B	10	1,3
BUN032 F300	3-way control valve	32	G 2 B	16	1,75
BUN040 F300	3-way control valve	40	G 2 1/4B	22	2,5
BUN050 F300	3-way control valve	50	G 2 3/4B	40	3,5

Art. No.	Description	Supply	Stroke (mm)	Run time Sec	Spring return	Weight kg
AVM 115S	Actuator for VUN/BUN (DN15-20)	24V~ (230V opt.)	8	60/120	-	0,7
AVM 321S	Actuator for VUN/BUN (DN25-50)	24V~ (230V opt.)	8	32/96	-	1,5
AVM 322S	Actuator for VUN/BUN (DN25-50)	24V~ (23V opt.)	20	80/120	-	1,6

Operating temp***	-15...150 °C
Operating pressure	> 120 °C 16 bar > 130 °C 13 bar > 150 °C 10 bar
Characteristic	
mixing	equal percentage
diverting	linear
Ventilens reglerförhållande	>50:1
Stuffing box	2 O-rings in EPDM
Leakage rate for	
diverting	≤ 0,05% of kvs value
mixing	≤ 1% of kvs value

\*\*\* For temperatures below 0 °C you must use a heater for the stuffing box.

## Function of the actuator, AVM 115S

Depending on how it is connected (see wiring diagram), the actuator can be used as a continuous 0...10 V, a 2-point (open/close) or a 3-point (open/stop/close) drive with intermediate position. The running time can be matched to requirements using switches S1 and S2. The characteristic (equal-percentage or linear) can be selected using switch S3.

Manual adjustment is performed by disengaging the transmission (sliding switch next to the power cable) and simultaneously turning, using an Allen key in the insert on the upper part of the drive. 8 mm of stroke is attained with 1½ turns.

N.B.: After manual adjustment, re-set the sliding switch (engage the transmission).

### Connected as a 2-point actuator

Open/close activation can be effected via two wires. Power is applied to the drive via the blue and the brown wires. On connecting power to the black wire, the valve's control passage opens. When power is switched off, the drive goes to the opposite end position and closes the valve. The unused red and grey wires should not be connected, nor should they come into contact with other wires. We recommend that you insulate them.

### Connected as a 3-point control unit

By connecting power to the wires (brown or black), the valve can be moved to any position. The coupling rod extends and opens the valve if power is applied to the black wire. It retracts and closes the valve if power is applied to the blue and the brown wires. In the end positions (on hitting a stop in the valve or reaching the maximum stroke) or in the event of an overload, the electronic motor cut-off responds (no end switches). The direction of the stroke can be changed by swapping the power-supply wires over (BN/BK). The unused red and grey wires should not be connected, nor should they come into contact with other wires. We recommend that you insulate them.

### Connections for control voltage 0...10 V

The integrated positioner controls the drive as a function of the controller's positioning signal y. Direction of operation 1 (mains power on brown wire): the coupling rod extends and opens the valve (control passage) as the positioning signal rises. Direction of operation 2 (mains power on black wire): the coupling rod retracts and closes the valve (control passage) as the positioning signal rises. The starting point and the control span are both permanently set. There is a split-range unit available (as an accessory) for setting partial ranges. After manual adjustment or in the event of a power failure for longer than 5 minutes, the drive re-adjusts itself automatically, always with the following running times:

AVM 115 60 s

After power has been applied, the stepping motor moves to the lower stop, connects to the valve spindle and moves to the upper stop in the valve, thereby determining the closed position. Depending on the control voltage, any stroke between 0 and 8 mm can then be obtained. Thanks to the electronics unit, no steps can be lost, and the drive needs no periodical re-adjustment. Parallel operation of more than one drive of the same type is guaranteed.

The feedback signal y0 = 0...10 V corresponds to the effective stroke of 0 to 8 mm.

If the control signal (0...10 V) is interrupted and direction of operation 1 is connected, the valve closes fully (0% position). The valve's characteristic can be selected using the coding switch. The characteristics can be generated only if the drive is used as a continuous drive. Other switches enable the running times to be set. These can be applied irrespective of which function (2-point, 3-point or continuous) has been chosen.

## Function of the actuator, AVM321S/AVM322S

Depending on the type of connection (see connection diagram), the actuator can be used as a continuous (0...10 V or 4...20 mA), 2-point (OPEN/CLOSE) or a 3-point actuator (OPEN/STOP/CLOSE).

The positioning time of the actuator can be set with the S1 switches according to the respective requirements.

Using switch S2, the direction of operation can be changed. In the end positions (valve limit stop or when the maximum stroke is reached) or upon overload, the electronic motor cut-off (no limit switch) responds and turns off the motor.

The external crank handle enables manual positional setting. After the crank handle is folded back, the target position is approached again (without initialisation). If the crank handle is unfolded, the actuator remains in this position.

### Connection as 2-point actuator (24 V)

The OPEN/CLOSE activation is via two wires. The actuator is connected to permanent voltage via the terminal MM and terminal 01. When voltage (24 V) is applied to terminal 02, the coupling rod extends into the end position.

After switching off the voltage at terminal 02, the actuator automatically retracts into the basic position.

Terminal 03 may not be connected or come into contact with other contacts. We recommend that you insulate them.

### Connection as 3-point actuator (24 V)

If voltage is applied to the terminals MM and 01 (or 02), the valve can be moved to any desired position. If voltage is applied to terminal MM and 01, the coupling rod retracts. If the electrical circuit is closed on terminal MM and 02, the coupling rod extends. If there is no voltage on terminals 01 and 02, the actuator remains in the respective position until voltage is applied. Terminal 03 may not be connected or come into contact with other contacts. We recommend that you insulate them.

### Connection to a control voltage (0...10 V or 4...20 mA)

The built-in positioner controls the actuator as a function of the controller positioning signal y. A voltage signal (0...10 V) at terminal 03 serves as the control signal. Coding switch S4 can be switched to a current input (4...20 mA). In case of voltage on the terminals MM/01 and rising positioning signal, the coupling rod extends. The direction of operation can be reversed with coding switch S2. The starting point and control span are fixed. For setting partial ranges (only for voltage input), a Splitrange unit is available as an accessory (see function Splitrange unit). After connection of the power supply and initialisation, the actuator goes to between 0% and 100% with each valve stroke, depending on the control signal. Thanks to the electronics and the absolute distance measurement system, no stroke is lost, and the actuator does not require periodic re-initialisation.

If the control signal 0...10 V is interrupted in the direction of operation 1, the spindle retracts completely.

If the control signal 0...10 V is interrupted in the direction of operation 2, the spindle extends completely.

This is true if the forced operation is switched off. (Coding switch S5 OFF). With coding switch S3, the characteristic of the valve/actuator combination can be adjusted. An equal-percentage characteristic can only be generated when the actuator is used as a continuous actuator.

### Initialisation and feedback signal

The actuator initialises itself automatically when it is connected as a continuous actuator (not in 2-/3-point mode). Once a voltage is applied to the actuator for the first time, the actuator first moves to the first and then to the second valve limit stop or to the internal actuator stop. The two values are recorded and stored by the absolute distance measurement system. The control signal and the feedback are adapted to this effective stroke. After initialisation, the actuator goes to between 0% and 100% with each valve stroke, depending on the control voltage. In case of a power failure or the removal of the power supply, no re-initialisation needs to be carried out. The values remain saved. If the initialisation is interrupted, the initialisation is started again when the voltage is re-applied. You trigger a re-initialisation by switching the coding switch S8 from OFF to ON or vice versa. When the process is triggered, the LED blinks green. During initialisation, the feedback signal is inactive or equal to the value "0". Initialisation is carried out with the shortest positioning time. The re-initialisation is only valid if the whole process is complete. If a change of the stroke is carried out, a re-initialisation must be triggered so that the new stroke can be adapted. If the actuator detects jamming, it will report this by setting the feedback signal to 0 V after about 90 s. During this time, the actuator continues to try to overcome the jamming. If the jamming can be overcome, the normal control function is activated again, and the feedback signal is restored. With 2-point or 3-point control without a feedback signal, no initialisation is performed. Continuous activation can also be implemented with a 230 V power supply with the external accessory 0500570003 "230 V module". You must ensure that the neutral conductor of the controller is connected to the control voltage. The neutral conductor of the power supply may only be used for the 230 V module.

### Forced operation (in continuous mode)

Forced operation is activated with coding switch S5. To use for this function, a 2 point controller must be attached to terminal 6. The 2 point controller is used as a normally-closed contact. If the 2 point controller detects the electrical circuit, then the spindle extends into the end position defined in the coding switch S 6. Forced operation can be used only in continuous mode.

### 2p/3p operation making use of the reset signal

If terminal 6 is continuously connected to the power and the coding switch S5 is set to off, the feedback signal 0...10V can be used. If this function is used, the actuator automatically performs an initialisation during commissioning.

## VUN/BUN in combination with an actuator

Actuator Type: Run time: Control:	500 N pushing force <b>AVM 115S</b> 60 s/120 s 0...10V (2-pt, 3-pt)						1000 N pushing force <b>AVM 321S /AVM322S</b> 0...10V (2-pt, 3-pt)					
	Against the pressure			With the pressure			Against the pressure			With the pressure		
Ventil	$\Delta p$ max	$\Delta ps$	stäng/av tryck	$\Delta p$ max	$\Delta ps$	stäng/av tryck	$\Delta p$ max	$\Delta ps$	stäng/av tryck	$\Delta p$ max	$\Delta ps$	stäng/av tryck
VUN 015	6	-	15	-	-	-	8	-	15	6	-	15
VUN 020	5	-	10	-	-	-	8	-	10	6	-	10
VUN 025	-	-	-	-	-	-	8	-	9	5	-	9
VUN 032	-	-	-	-	-	-	6	-	7	4	-	7
VUN 040	-	-	-	-	-	-	5	-	6	2,5	-	6
VUN 050	-	-	-	-	-	-	3	-	3,5	1,5	-	3,5

Actuator Type: Runtime: Control:	500 N pushing force <b>AVM 115S</b> 60 s/120 s 0...10V (2-pt, 3-pt)						1000 N pushing force <b>AVM321S/AVM322S</b> 0...10V (2-pt, 3-pt)					
	Mixing valve			Diverting valve			Mixing valve			Diverting valve		
Ventil	$\Delta p$ max	$\Delta ps$	shut/off pressure	$\Delta p$ max	$\Delta ps$	shut/off pressure	$\Delta p$ max	$\Delta ps$	shut/off pressure	$\Delta p$ max	$\Delta ps$	shut/off pressure
BUN 015	6	-	15	-	-	-	8	-	15	6	-	15
BUN 020	5	-	9,4	-	-	-	8	-	10	6	-	10
BUN 025	-	-	-	-	-	-	8	-	9	5	-	9
BUN 032	-	-	-	-	-	-	6	-	7	4	-	7
BUN 040	-	-	-	-	-	-	4,4	-	4,4	2,5	-	4,4
BUN 050	-	-	-	-	-	-	3	-	3	1,5	-	3

## Coding switch AVM 115S


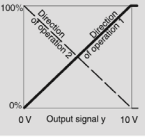
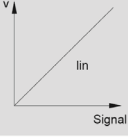




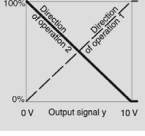


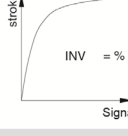





Equal percentage				
Quadratic				
Linear				
Equal percentage				
Linear				

= factory setting

## Running time AVM 115S

Run time per mm	Switch coding	Run time for 8 mm stroke
7,5 s		60 s ± 2
15 s		120 s ± 4
= factory setting		

## Coding switch AVM321S / AVM322S

de Schalterstellung fr Position du commutateur en Switch position it Posizione dell'interruttore es Posición del interruptor sv Brytarläge nl Schakelaarstand	de Stellzeit fr Temps de positionnement en positioning time it tempo di manovra es tiempo de ajuste sv ställtid nl steltijd	de Wirkssinn fr Sens d'action en Direction of operation it Direzione dell'azione es Sentido de mando sv Driftriktning nl Werkingsrichting	de Kennlinie Antrieb* fr Courb caractéristique du servomoteur en Actuator characteristic it Curva caratteristica attuatore es Curva característica del motor sv Kurva, drivning nl Karakteristiek aandrijving	de Stellsignal* fr Signal de positionnement en Positioning signal it Segnale di regolazione es Señal de mando sv Styrsignal nl Stuursignaal	de Zwangssteuerung* fr Commande forcée en Forced operation it Comando forzato es Mando desmodrómico sv Tvångsstyrd ventil nl Dwangbesturing	de Schliesspunkt Zwangssteuerung* fr Point de fermeture de la commande forcée en Closing point for forced operation it Comando forzato punto di bloccaggio es Punto de cierre del mando desmodrómico sv Stängningspunkt, tvångsstyrd ventil nl Sluipunt dwangbesturing
	AVM321: 12 s/mm AVM322: 6 s/mm			DC 0...10 V		
	AVM321: 4 s/mm AVM322: 4 s/mm					
						
						*Gilt nur für stellig Modus de fr *S'applique uniquement au mode de régulation en *Applies for continuous mode only it *Vaie solo per modo "continuo" es *Se aplica solo para modo continuo sv *Gäller endast för kontinuerlig reglering nl *Geldt uitsluitend voor continu modus
				4...20 mA		
						
						

### LED description

Flashes green (T1s)

Flashes green (T3s)

Lights up green

Flashes orange

Flashes red

Lights up red

Valve adapting, initialisation

Position reached

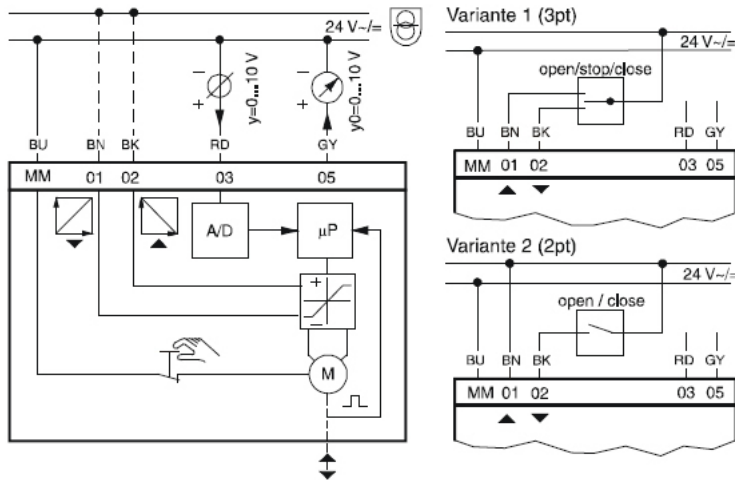
Spindle retracts/extends

Manual adjustment activated

Actuator blocked, actuator at end stop

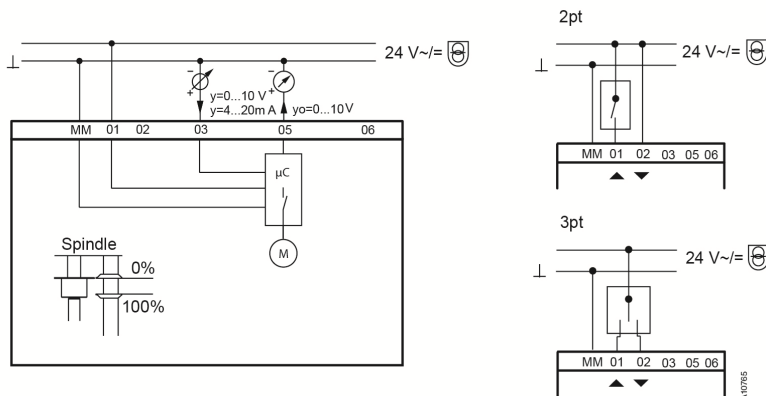
Incorrect configuration of forced operation, undervoltage, insufficiently.

## Electrical wiring AVM 115S



MM = Neutral  
 01 = 0...10 V control, 24V supply  
 02 = 10...0 V control, 24V supply  
 03 = 0...10 V signal  
 04 = 4...20 mA signal  
 05 = Feedback

## Electrical wiring AVM 321S / AVM322S



MM = Neutral  
 01 = 0...10 V control, 24V supply  
 02 = 10...0 V control, 24V supply  
 03 = 0...10 V signal  
 05 = Feedback

### Installation notes

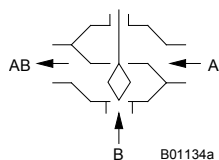
- Condensation, water etc. along the spindle that can come into the actuator must be avoided.
- Do not install the valve with the actuator below the horizontal line.
- Do not use in environments with higher humidity than 95% rf.



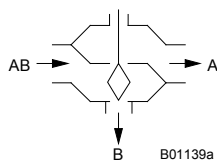
## Function of the valve

The valve can be controlled to any intermediate position using an electric drive. The valve is closed with the valve stem extended. Use as a mixing valve is possible with valve drive AVM 115(S), 321S or 322S.

### Used as mixing valve



### Used as diverting valve



## Description

These control valves are characterised by being extremely reliable and accurate, and make a considerable contribution to providing environmentally friendly control. They comply with the most demanding requirements such as having a rapid closing function, handling differential pressures, controlling media temperatures and providing a shut-off facility – all with a low-noise design.

The valve stem is automatically and firmly connected to the drive shaft. The brass plug ensures that there is an equal-percentage flow in the control passage (exception BUN 050 F200: linear flow). In order to correct the complementary characteristic curve of the consumer and provide a consistent quantity of medium regardless of the valve position, the mixing passage operates with a linear characteristic curve. This combination also eliminates plug fluttering in the final position and prevents cavitation and erosion from occurring at an early stage. Since there is no spring power to counteract the closing of the valve, the full power of the drive is available for the permissible pressure difference. The tightness of the control passage is ensured by the seat in the body and the fibre glass-reinforced PTFE seal on the plug.

The stuffing box is maintenance-free. This consists of a brass body, 2 O-rings, a scraper ring and a supply of grease. This is silicon-free, i.e. silicon oil must not be used for the stems.

## Engineering and fitting notes

The valves are combined with the valve drives with or without a spring return. The drive is directly attached to the valve and secured using nut or bolts. The drive is connected to the valve stem automatically. During initial commissioning of the system the drive moves out and the lock closes automatically when it reaches the lower valve seat. The stroke of the valve is also detected by the drive, meaning that no other settings are required. The force on the seat is therefore always consistent and ensures that the leakage rate is minimal. The characteristic curve of the SUT drives can be set to linear or quadratic.

In order to prevent impurities from being retained in the water (e.g. welding beads, rust particles etc.) and damaging the stem seal, collective filters must be installed on each floor or in each feed pipe. For water requirements see VDI 2035.

All valves must only be used in closed circuits. Excessive oxygen content in open circuits can destroy the valve. In order to prevent this, an oxygen binding material must be used; the manufacturer of the solution must be consulted with regard to compatibility in order to prevent corrosion. The material list can be used for this purpose.

The valves are usually insulated in the systems. Care must be taken not to insulate the collar that holds the drive when doing this. A stuffing box heater must also never be insulated.

In order to prevent interfering flow noise in quiet rooms, the pressure difference across the valve must not exceed 50% of the specified values.

The manual operation facility (accessory) is fitted to the valve like a drive. The connection to the valve stem takes place automatically when the valve is opened with the knob.

## Use with water

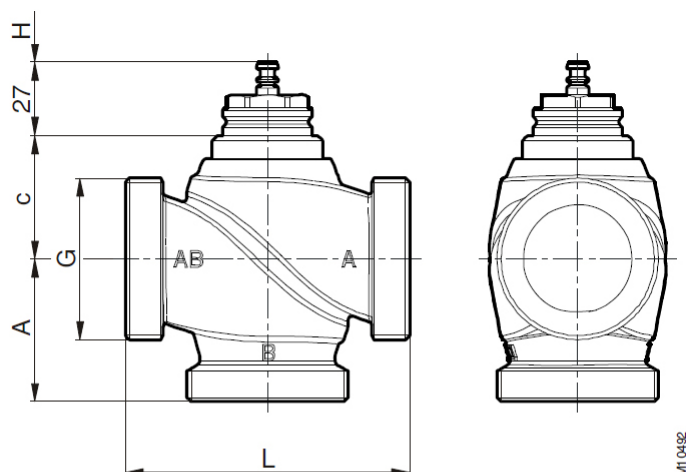
When water that has been mixed with glycol or inhibitor is being used, compatibility with the materials and seals in the valve should be clarified with the manufacturer for safety reasons. The table of materials shown below can be used for this purpose. We recommend using a concentration of between 20% and 55% when glycol is being used.

The valves are not suitable for use in potentially explosive areas. The materials that have been selected are approved for use with drinking water. The entire valve as a unit is not certified for use with drinking water.

## Installation position

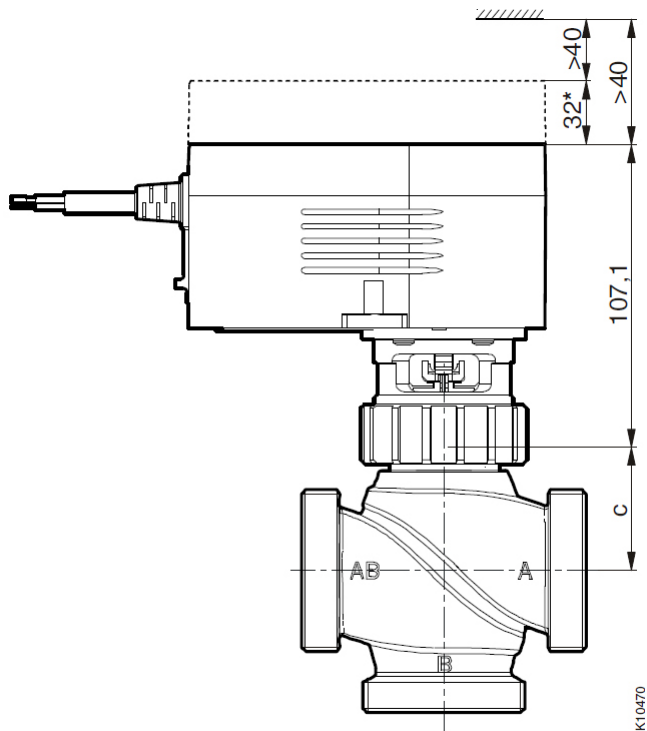
The final control element can be installed in any position, but a suspended installation position is not recommended. Condensation and dripping water must be prevented from penetrating the drive.

Dimension drawing DN 15...50



DN	A	c	L	H	G
15	50.0	45.5	100	8	G 1"
20	50.0	38.5	100	8	G 1 1/4"
25	52.5	42.5	105	8	G 1 1/2"
32	52.5	45.5	105	8	G 2"
40	65.0	59.0	130	8	G 2 1/4"
50	75.0	67.5	150	8	G 2 3/4"

Dimension drawing DN 15...50, AVM115S



\* with accessory 372145, 372286

## DIN material number

	DIN material number	DIN code
Valve body	CC752S-GM	CU Zn 35 Pb 2 Al-C
Valve seat	CC752S-GM	CU Zn 35 Pb 2 Al-C
Spindle	1.4305	X 8 Cr Ni S 18-9
Plug	CW 602 N	Cu Zn 36 Pb 2 As
Plug seal	PTFE	
Stuffing box	CW 602 N	Cu Zn 36 Pb 2 As

## CE conformity

EMC direktiv2004/108/EC Maskin direktiv 98/37/EEC/I/B  
 EN 61000-6-1 EN 1050  
 EN 61000-6-2  
 EN 61000-6-3  
 EN 61000-6-4