

Généralités

Les vannes de régulation C 7700 sont des vannes électriques en matériau synthétique à moteur réversible spécialement étudiées pour travailler avec du chlore gazeux en dépression. Elles ne sont donc pas conçues pour travailler en pression. L'ouverture de ces vannes est linéaire lorsqu'elles sont utilisées avec les appareils du groupe de dosage C 2002. Elles se composent d'un moteur ATE réversible avec fins de course. La commande peut être manuelle ou automatique par un régulateur à sortie 3 points.

Description de fonctionnement

"Sperrklinke für dauernde max. Öffnungsstellung im Fall einer separaten manuellen Mengeneinstellung" : Levier de commande pour l'ouverture maximum dans le cas d'un dosage manuel.

"Ventilspindel hochziehen und arretieren" : Tirer vers le haut la boule du levier de commande et la bloquer.

"Exzenter vom ATE-Motor gedreht" : Excentrique du moteur ATE pivotant.

"(A) Regelkegel vom 5 kg/h bis 200 kg/h" : (A) bille de réglage de 5 à 200 kg/h.

"(B) Regel-Profilschlitz bis 2500 g/h" : Entaille profilée pour réglage jusque 2500 g/h.

La vanne de régulation possède une pièce réglable suivant le modèle A ou B.

L'orifice d'ouverture de la vanne se modifie de 10 mm de façon linéaire en fonction de la position de l'excentrique. Le réglage d'ouverture maximum de la bille de réglage (A) est fait en usine en fonction du rotamètre fourni avec l'installation.

Pour une chloration manuelle, il faut ouvrir la vanne ATE à 100%, la bloquer à cette position et régler le débit souhaité avec la vanne à pointeau du doseur de chlore gazeux au dessus du rotamètre.

Modèles d'installation

La vanne ATE est utilisée pour une régulation de dosage de chlore gazeux commandée par un analyseur de chlore dans le cas d'une régulation en circuit fermé ou par un asservissement proportionnel au débit d'eau en circuit ouvert.

Dans ce dernier cas, il faut veiller à la linéarité de la pression en amont et en aval de la vanne ATE. C'est pourquoi on installe cette vanne entre la sortie du rotamètre et le régulateur de pression (voir schéma A et C). Un adaptateur est utilisé pour la connection avec un doseur de type C 2002 (voir schéma A).

Schéma A

Bloc de dosage type C 2010 MAH avec vanne de régulation C 7700

"3-Punkt-Schritt Signal entweder vom Wasserdurchfluss oder vom Chlorbedarf" : Signal 3 points venant d'un débitmètre ou d'un appareil de mesure de chlore.

"ATE Ventil" : Vanne ATE.

"Zum Injektor" : Sortie vers hydro-éjecteur.

"Chlor unter Vakuum vom Vakuumregler C 2002 (ggf. über Umschalter C 2005)" : Entrée chlore en dépression venant du détendeur C 2002 (ou d'un échangeur automatique C 2005).

FICHE DE TRADUCTION en langue Française

Annexée au document : MB 2 07 10/2 Vanne de régulation C7700



Egalement pour d'autres unités de dosage de chlore gazeux type C 2500, C 2515 (25) ou C 2700 (voir schémas B et C).

Schma B

Unité de dosage C 2500 avec vanne de régulation C 7700

"3-Punkt-Schritt-Signal abhängig vom Chlorbedarf" : Entrée signal 3 points d'un régulateur de chlore.

"ATE-Ventil" : Vanne ATE.

"Zum Injektor" : Vers hydro-éjecteur.

"Chlor unter Druck vom der Chlorflasche" : Chlore sous pression venant de la bonbonne.

Schéma C

Unité de dosage C 2500 WL, C 2515 (25) WL, C 2700 WL avec vanne de régulation C 7700

"3-Punkt-Schritt-Signal entweder vom Wasserdurchfluss oder vom Chlorbedarf" : Entrée signal 3 points venant d'un débitmètre ou d'un régulateur de chlore.

"ATE-Ventil" : Vanne ATE.

"Zum Injektor" : Vers hydro-éjecteur.

"Chlor unter Druck von der Chlorflasche" : Arrivée du chlore sous pression de la bonbonne.

Données techniques

Moteur

Type : moteur réversible pour commande par signal 3 points.
Courant du signal : 220/240 v, 50/60 Hz.
Consommation : 11 watt.
Temps de rotation : 110 secondes pour 100% de déplacement avec un signal ininterrompu.
Couple de rotation : 15 Nm.
Potentiomètre : 130 Ohm.

VANne de réglage

Matériau : PVC, PE, Viton, PTFE.
Commande : linéaire.
Course de la vanne : 10 mm.
Pression de service : uniquement en dépression.
Attention, pour une bonne linéarité et un dosage correct, les pressions amont et aval doivent être réglées au travers de l'unité de dosage.
Taille : Les parties interchangeables tels que sièges et billes sont déterminées en fonction du tableau ci-dessous.
Poids : 3.2 kg.

Tableau de sélection

Voir original.

Dimensions

Voir original.

1. General

The chlorine gas flow is rarely controlled by hand in state-of-the-art chlorination installations according to DIN 19606. In the majority of cases, the concentration of free chlorine in the water is monitored by an electronic controller which sets the required chlorine gas quantity by means of an electrically operated valve.

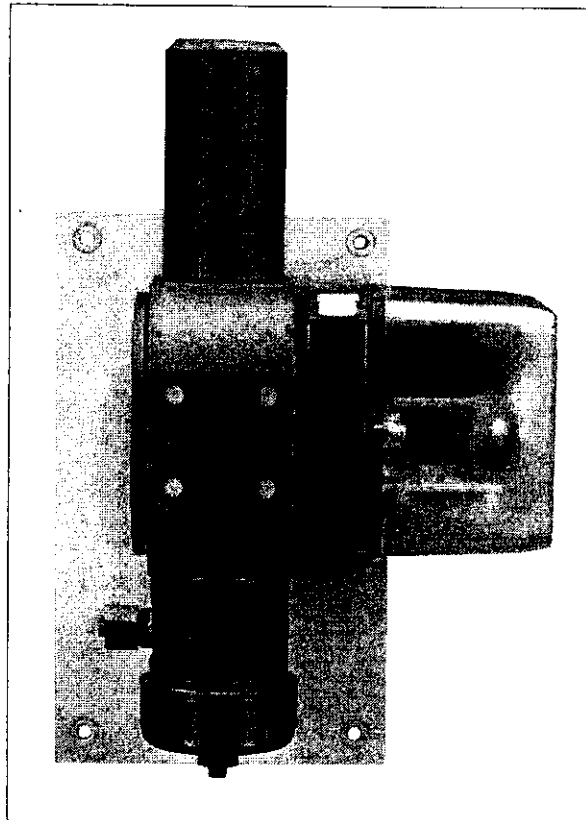
The control valve C7700 has been developed for this purpose. It is a plastic valve for chlorination installations based on the vacuum principle and therefore must not be used with excess pressure.

2. Functional description

A servomotor with 90° bevel actuates the adjusting eccentric (1). It converts the rotary motion into the stroke movement of the valve spindle (2). Contact between the valve spindle and eccentric is ensured by a spring (3).

The actual control element is located at the lower end of the valve spindle. Up to 2500 g Cl₂/h, the control element is designed as an air jet in the form of a helically slotted cylindrical shaft (4); for larger quantities, it takes the form of a control cone (5).

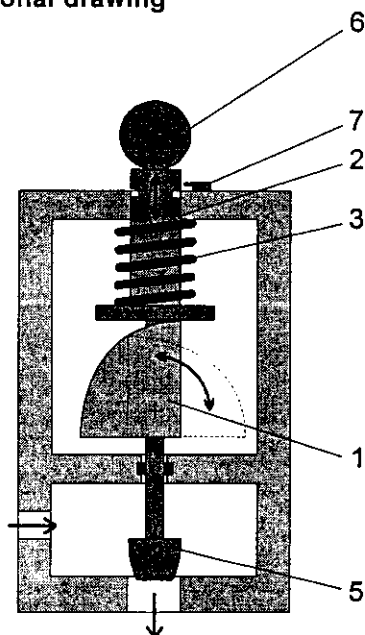
Both control elements are shaped so that the cross-sectional flow area changes in proportion to the position of the servomotor. The valve has a linear characteristic.



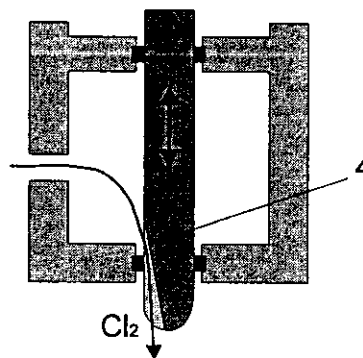
For manual chlorination, the valve spindle can be lifted completely upwards by pulling the hand knob (6) and locked in position by means of the slide (7). The chlorine gas flow is then adjusted at the needle valve of the flow meter.

The housing of the control valve consists of two chambers, the valve chamber and the eccentric chamber. The chambers are separated from one another by a seal to prevent contact between the mechanical drive and the chlorine gas.

Functional drawing



Air jet

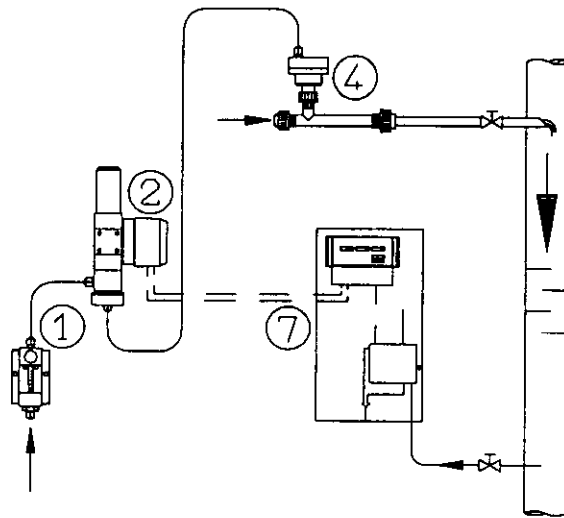


Installation types

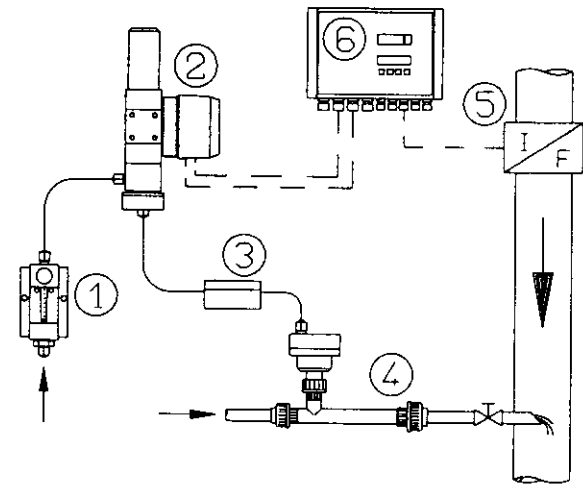
The control valve operates on the basis of changes in the free cross-sectional flow area. The volumetric chlorine gas flow, however, also depends on a pressure gradient. This ensures that fluctuations in the intake pressure of the injector have little effect on the metered quantity.

The influence is insignificant in a closed control loop with measurement of the free chlorine, since the control valve is adjusted by the process controller. Such fluctuations in intake pressure must be excluded, however, in systems with flow-proportional metering. A back pressure regulator in accordance with DIN 19606 is required in such cases.

Closed control loop



Proportional metering



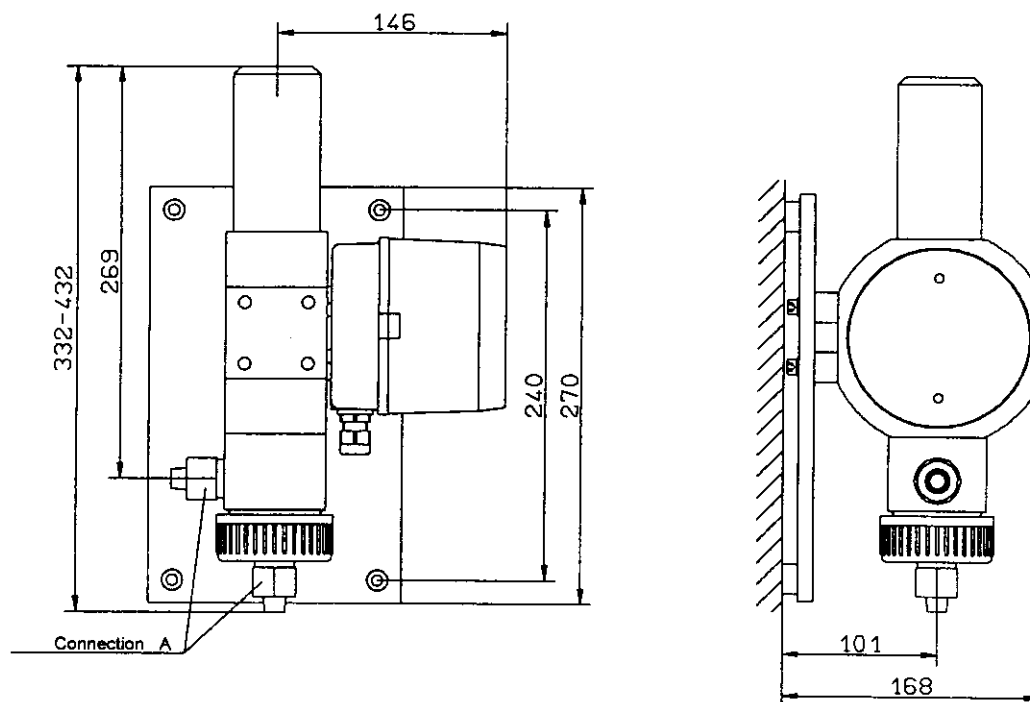
1. Quantity meter with manual adjusting valve
2. Chlorine control valve C 7700
3. Back pressure regulator
4. Injector with non-return valve
5. Flow meter
6. Ratio controller
7. Measurement and control station for free chlorine

Technical data

Power supply (depending on version)	230 V 50/60 Hz	24 V 50/60 Hz
Power consumption	Approx. 10 W	
Type of protection	IP 55	
Control signal	3-point step	(0)4...20mA or (0)2...10 V
Position feedback	Potentiometer 0...1000 ohm	0...10 V or 0...620mV
Regulating time for 90° C	120 seconds	
Torque	15 Nm	
Ambient temperature	0...50° C	
Spindle stroke	10 mm	
Weight	Approx. 4 kg	

Dimensional drawing

C 7700 without measurement glass



Chlorine Control Valve C 7700

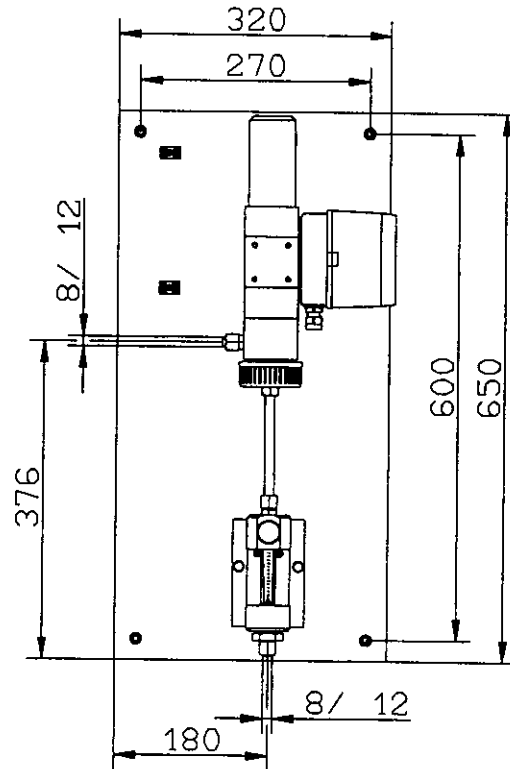
Selection table

Throughput	Part No.		Connection A Connection for PE tubing d 8/12
	230 V, 3-point step	24 V, 4...20 mA	
up to 80 g/h	20729281	20700013	Connection A Connection for PE tubing d 8/12
up to 200 g/h	20729305	20700014	
up to 500 g/h	20729306	20700015	
up to 1000 g/h	20729307	20700016	
up to 2000 g/h	20729308	20700017	
up to 2500 g/h	20729309	20700018	
up to 4000 g/h	20732296	20700058	
up to 80 g/h	20700050		G 1/4 i
up to 200 g/h	20700051		
up to 500 g/h	20700052		
up to 1000 g/h	20700053		
up to 2000 g/h	20700054		
up to 2500 g/h	20700055		
up to 4000 g/h	20700056		
up to 5 kg/h	20729318	20732319	Connection for PE tubing d 12/16
up to 10 kg/h	20729319	20700035	
up to 15 kg/h	20729320	20700034	
up to 25 kg/h	20729313		PVC gland
up to 40 kg/h	20729314		
up to 60 kg/h	20729315		
up to 100 kg/h	20729316		
up to 200 kg/h	20729317		

Other chlorine connections on request, e.g. PVC glands

Chlorine Control Valve C 7700

Dimensional drawing
C 7700 with measuring glass

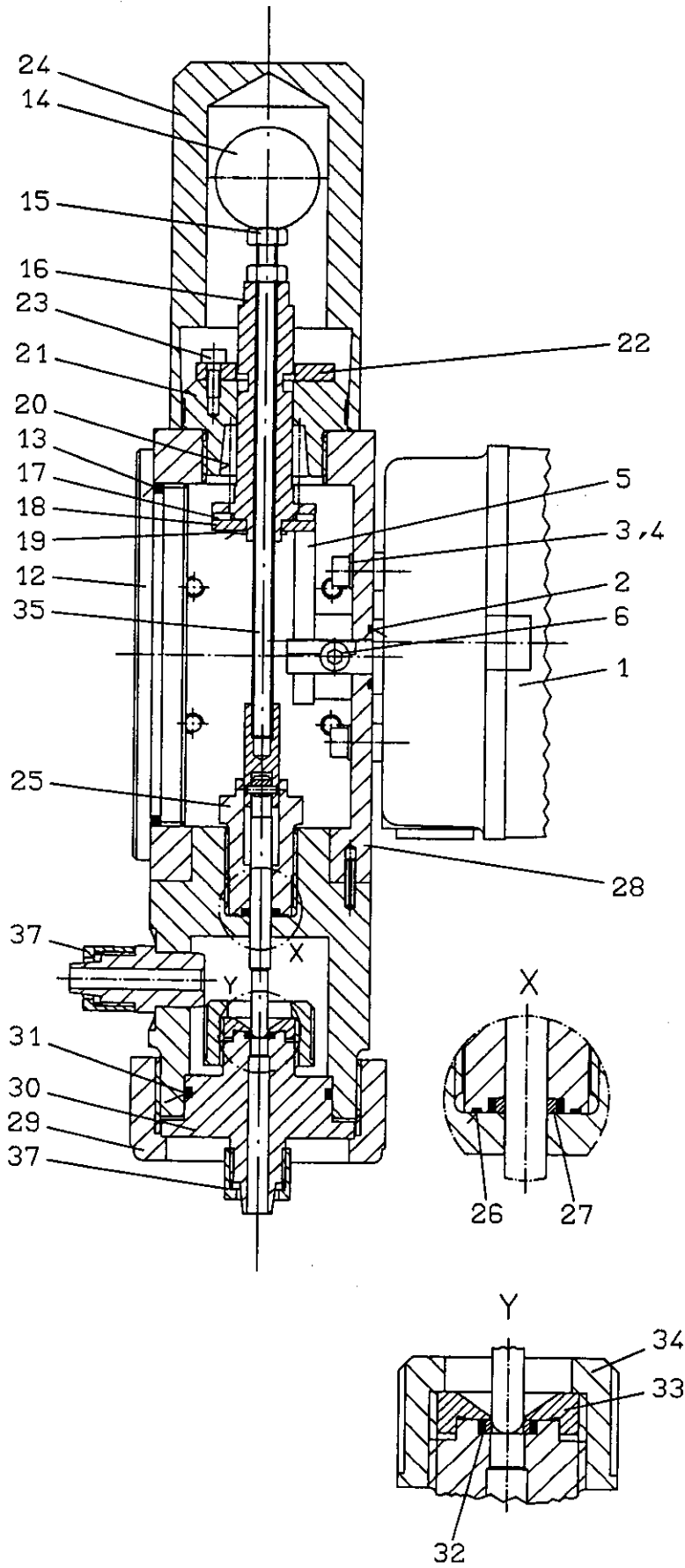


Selection table

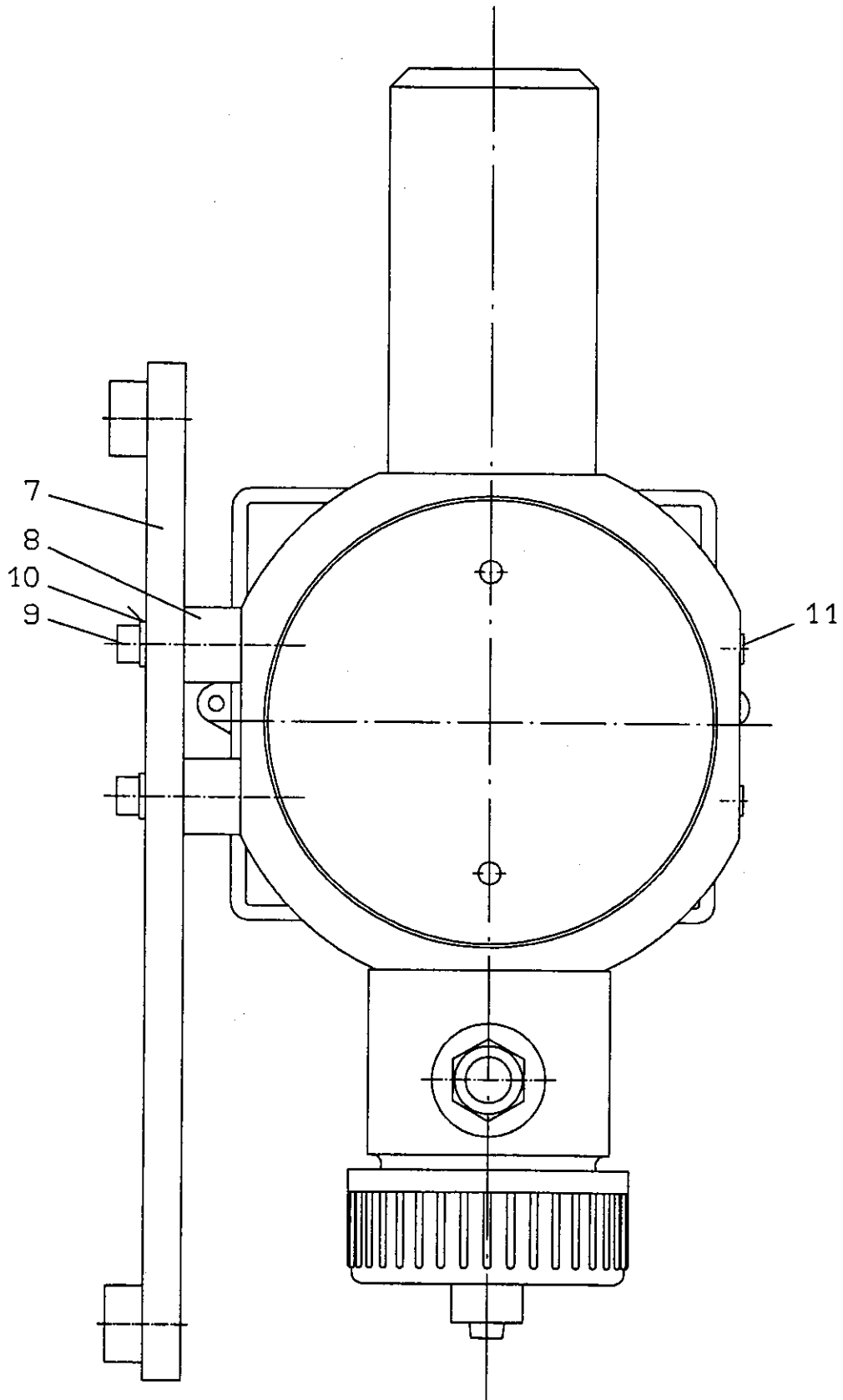
Throughput	Connection for PE tubing d8/12	
	230 V, 3-point step	24 V, 4...20mA
up to 80 g/h	20700001	20700021
up to 200 g/h	20700002	20700022
up to 500 g/h	20700003	20700023
up to 1000 g/h	20700004	20700024
up to 2000 g/h	20700005	20700025
up to 2500 g/h	20700006	20700026
up to 4000 g/h	20700007	20700027

Other chlorine connections on request, e.g. screw connections or PVC glands.

Chlorine Control Valve C 7700



Chlorine Control Valve C 7700

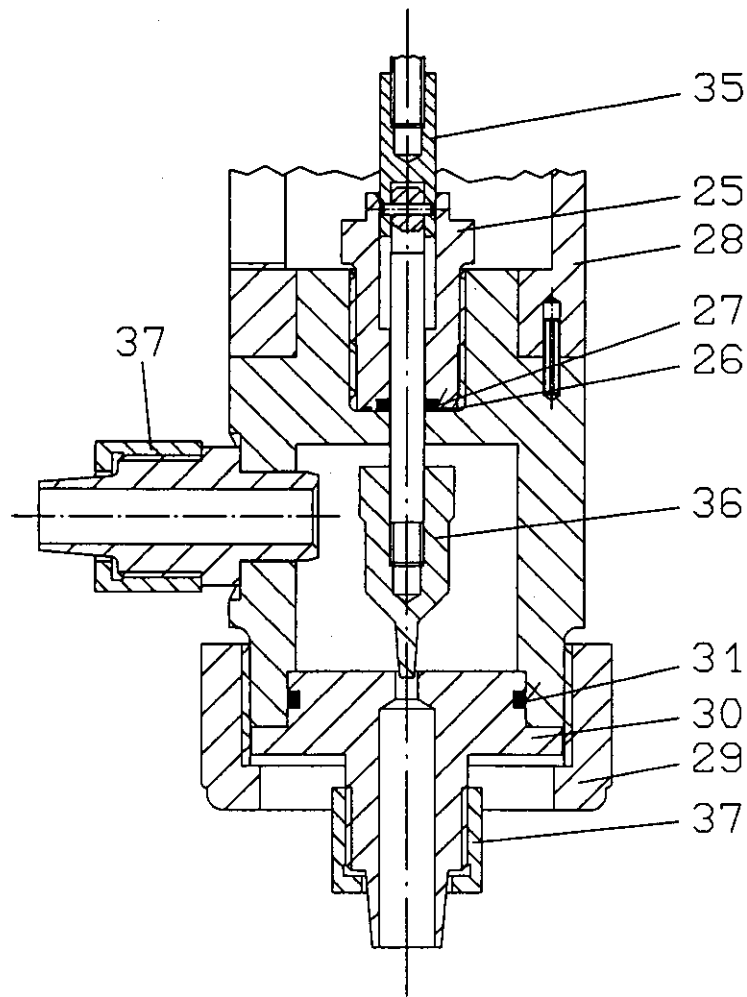


Chlorine control valve C7700 ...80 g/h to ...2500 g/h

Item	Description	Material	Part No.	Qty.	
1	Servomotor 230 VAC, 3-point step	-	78745	1	
	Servomotor 24 VAC, 0(4)...20 mA	-	78993		
2	O-ring d14x1.78	Viton	80003	1	
3	Cheese head screw M5x16	A2	83608	4	
4	Washer d5.3	A2	84164	4	
5	Adjusting eccentric	Brass	15524	1	
6	Cheese head screw M5x12	A2	83606	1	
7	Mounting plate with bushings	PP	29304	1	
8	Spacer	PP	34213	4	
9	Cheese head screw M6x40	A2	83821	4	
10	Washer d6.4	A2	84160	4	
11	Tapered plug for M6	PE	32213	4	
12	Screw cap for eccentric chamber	PVC	29291	1	
13	O-ring d99x2	NBR	80615	1	
14	Hand-operated knob M6	Plastic	29287	1	
15	Hex nut M6	A2	83395	2	
16	Guide pin for valve spindle	Brass	29282	1	
17	Axial needle rim	Steel	86107	1	
18	Stop plate for eccentric	Brass	29284	1	
19	Circlip	Steel	84084	1	
20	Compression spring	Steel	82624	1	
21	Guide nut for guide pin	PVC	29283	1	
22	Locking plate	PVC	29285	1	
23	Cheese head screw M4x12	A2	83622	1	
24	Cap to protect against splashing water	PVC	32141	1	
25	Housing grommet G 1/2	PVC	32140	1	
26	O-ring d13x1	Viton	80647	1	
27	Set of seals d6	PTFE/Viton	80648	1	
28	Housing for C 7700	Tubing d8/12	PVC	29302	1
		G 1/4 inside	PVC	34471	
29	Union nut G2	PVC	22259	1	
30	Valve seat up to 2500 g/h	Tubing d8/12	PVC	29288	1
		G 1/4 inside	PVC	34848	
		d16 inside	PVC	34470	
31	O-ring d38x2.5	Viton	80049	1	
32	Set of seals d4.6	PTFE/Viton	80621	1	
33	Seat holder	PVC	29289	1	
34	Union nut G5/8	PVC	82087	1	
35	Valve spindle assembly	... 80 g/h, No. 1	PVDF/Brass	32396	1
		... 200 g/h, No. 2		32397	
		... 500 g/h, No. 3		32398	
		... 1000 g/h, No. 4		32399	
		... 2000 g/h, No. 5		32400	
		... 2500 g/h, No. 6		32401	
37	Union nut for tubing d8/12	PVC	10365	2	

Chlorine Control Valve C 7700

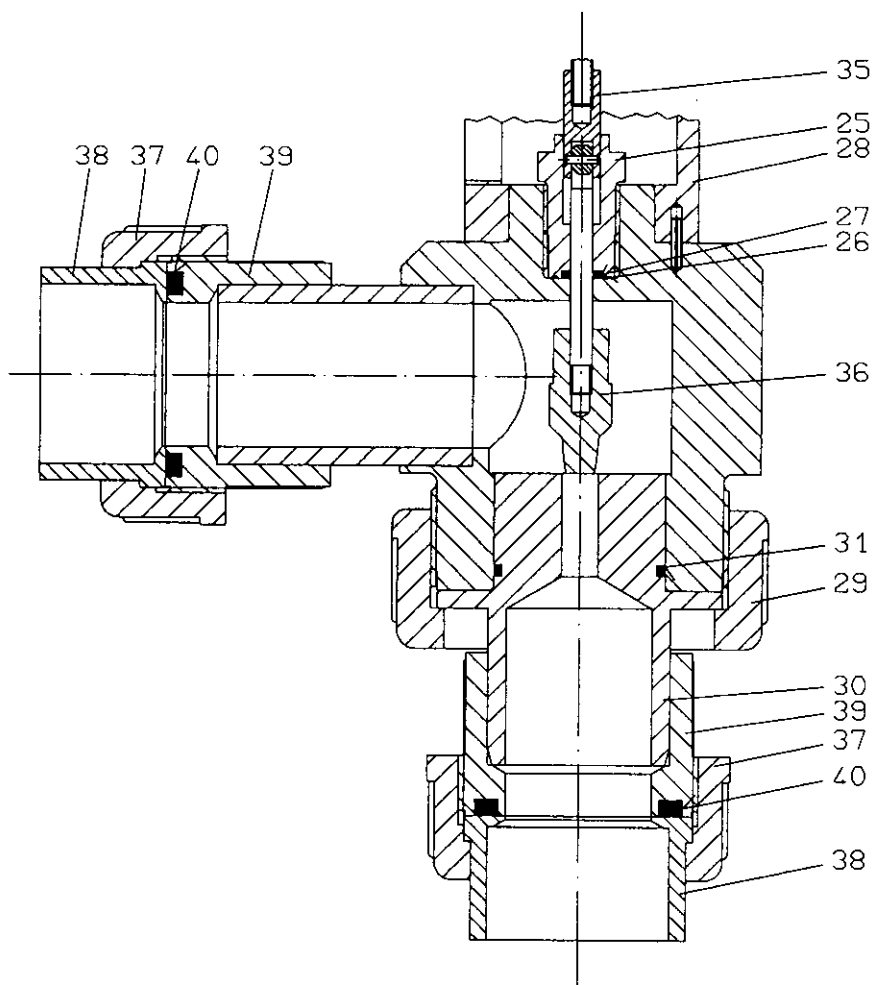
Chlorine control valve C7700 ...4 kg/h to ...15 kg/h



Items 1...27 are identical with those of the version ...2500g/h

Item	Description	Material	Part No.	Qty.	
28	Housing for C 7700 Tubing d8/12	PVC	29302	1	
			Tubing d12/16		29310
			G 1/4 inside		34471
29	Union nut G2	PVC	22259	1	
30	Valve seat ...4 kg/h and 5 kg/h, Tubing d8/12	PVC	33715	1	
			...4 kg/h and 5 kg/h, Tubing d12/16		29325
			...10 kg/h, Tubing d12/16		29326
			...15 kg/h, Tubing d12/16		29327
31	O-ring d38x2.5	Viton	80049	1	
35	Valve cone holder, complete	Brass/Silver	32395	1	
36	Valve cone ...4 kg/h	PVC	33716	1	
			...5 kg/h		29322
			...10 kg/h		29323
			...15 kg/h		29324
37	Union nut for	PVC	Tubing d8/12	10365	2
			Tubing d12/16	15534	

Chlorine control valve C7700 ...25 kg/h to ...200 kg/h



Chlorine Control Valve C 7700

Items 1...27 are identical with those of the version ...2500g/h

Item	Description	Material	Part No.	Qty.
28	Housing for C 7700 d50 outside	PVC	29321	1
29	Union nut G2 3/4	PVC	22461	1
30	Valve seat ...25 kg/h, d50 outside	PVC	29334	1
	...40 kg/h, d50 outside		29335	
	...60 kg/h, d50 outside		29336	
	...100 kg/h and ...200 kg/h, d50 outside		29337	
31	O-ring d42x2.5	Viton	80030	1
35	Valve cone holder	Brass/Silver	32395	1
36	Valve cone ...25 kg/h	PVC	29329	1
	...40 kg/h		29330	
	...60 kg/h		29331	
	...100 kg/h		29332	
	...200 kg/h		29333	
37	Union nut G2 1/4	PVC	13717	2
38	Insert d50 inside	PVC	13718	2
39	Screw-in part d50 inside	PVC	88197	2
40	O-ring d47x5.3	Viton	80079	2

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1. General

In state-of-the-art vacuum chlorination installations according to DIN 19606, the chlorine gas flow is hardly controlled by hand. Mostly the concentration of free chlorine in the water is monitored by an electronic controller which sets the required chlorine gas quantity by means of an electrically operated valve.

For this purpose the control valve C7700 has been developed. It is a plastic valve for chlorination installations working according to the vacuum method and must therefore not be used with excess pressure.

2. Functional description

A servomotor with a 90° bevel actuates the adjusting eccentric (1). It converts the rotary motion into the stroke movement of the valve rod (2). A spring (3) makes sure that there is a contact between the valve rod and the eccentric.

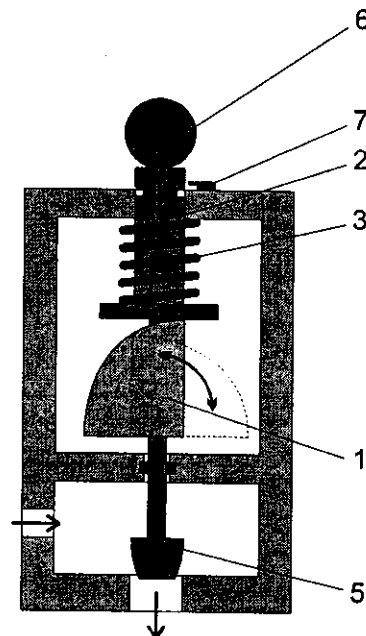
The actual control element is located at the lower end of the valve rod. Up to 2,500 g Cl₂/h, the control element is designed as an air jet in the form of a helically slotted cylindrical shaft (4), for higher quantities as a control cone (5).

Both control elements are shaped so that the cross-sectional area of flow changes in proportion to the position of the servomotor. The valve has a linear characteristic.

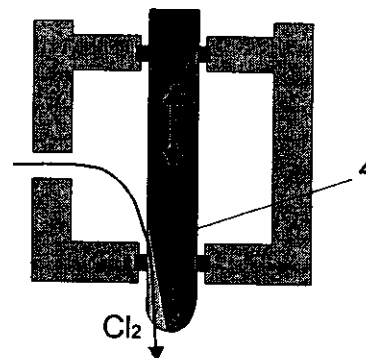
For manual chlorination, the valve rod can be lifted completely upwards by pulling the hand knob (6) and locked by means of the slide (7). The chlorine gas flow is then adjusted at the needle valve of the flow meter.

The housing of the control valve consists of two chambers, the valve chamber and the eccentric chamber. The chambers are separated from each other by a sealing so that the mechanical drive does not get in contact with the chlorine gas.

Functional diagram



Air jet



3. Scope of delivery

Be careful when unpacking the chlorine equipment and order-related accessories in order not to miss small parts. In many cases these are mounting screws for wall mounting. Compare the scope of delivery immediately to the delivery note to find out the reason if there are any discrepancies.

4. Safety instructions

- ⇒ JESCO chlorinators have to be maintained and tested by specialist staff at least once a year (cf. also local rules or specifications, e.g. GUV 8.15).
- ⇒ Chlorine gas is dangerous for health and life. Therefore be very careful whenever handling chlorination installations. All works on the installation require special knowledge and safety measures and may only be carried out by technical personnel.
- ⇒ Observe the local safety rules when working on chlorination installations. In Germany, the *safety rule "chlorination of water"* (VBG 65) applies, the latest version of which is available at the municipal accident insurance association.
- ⇒ Before working on the chlorination installation, close the chlorine cylinder valves. Empty all chlorine-bearing lines using the ejector.
- ⇒ C 7700 control valves are suitable for vacuum chlorination installations. They must not be used for gas under excess pressure.
- ⇒ Chlorine gas is extremely hygroscopic. Thus humidity will enter the system in the case of open device connections and lines. As a result hydrochloric acid will be formed which causes damage to the equipment. Consequently, all connections (including those of vacuum devices and vacuum lines) must be closed during down times of the system.
- ⇒ If chlorinators are to be used for other gases than chlorine gas, check the chemical resistance of the devices with the manufacturer.
- ⇒ Before working on the control valve, disconnect the mains line and make sure that it cannot be switched on again.
- ⇒ After modifying the electrical connections of the valve or settings of the servomotor, the screwed cable connections must be tightened and the protective cover of the servomotor must be mounted. Otherwise the protection class cannot be guaranteed.

5. Installation

Use the enclosed mounting material for wall mounting. It corresponds to the individual application as far as dimensions and material are concerned. The mounting position of the valve is vertical, the servomotor being installed laterally. The screwed cable connections of the servomotor show downwards (see installation examples).

5.1 Hydraulic installation

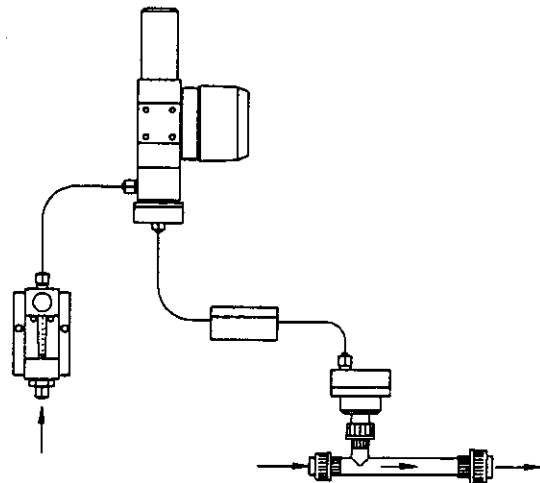
The C 7700 control valve is installed into the vacuum line at any point between the measuring glass and the ejector non-return valve. Tighten the PVC union nuts carefully. Even manually screwed down union nuts establish a tight connection. All connections of the control valve must be absolutely tight. Otherwise humidity enters the system during vacuum operation forming deposits together with the chlorine, which may affect the valve functions. This concerns especially the control slot of the smaller control valves.

Back-pressure regulator

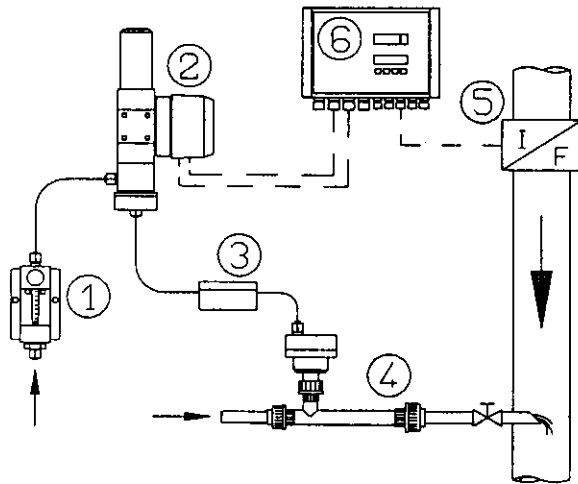
The flow rate at the control valve is determined by:

- a) the position of the control element and
- b) the intensity of the ejector vacuum.

The ejector vacuum must not vary in order to make sure that the metering capacity depends only on the position of the control element. Therefore German standard DIN 19606 requires a so-called back-pressure regulator which provides for constant pressure conditions at the control valve and thus for an exact metering capacity and linear characteristic.



Proportional metering



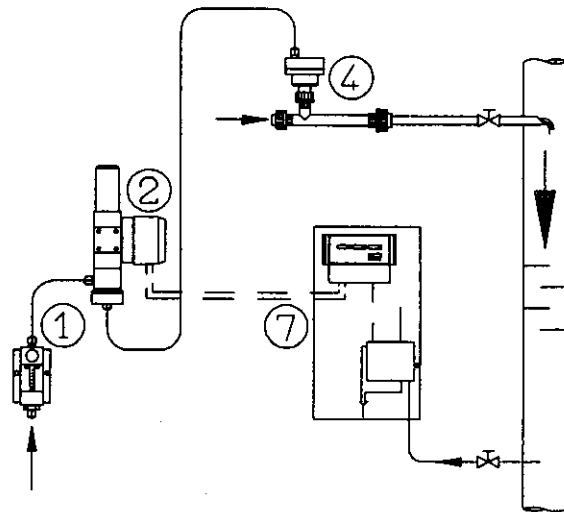
A ratio controller (6) controls the servomotor of the control valve proportionally to the signal of the flow meter (5). In some cases, a sensor is installed additionally to measure the concentration of free chlorine in the water. Then the controller controls the valve in dependence of the flow and the chlorine concentration.

A 3-point step signal is used mostly for financial reasons. A repeating potentiometer informs the controller about the actual position of the control valve.

If the controller is to be connected directly to the flow meter without including a controller, a servomotor with 4...20 mA control is required.

For this type of installation, the back-pressure regulator (3) ensures constant pressure conditions at the control valve. Thus metering is really proportional to the water flow.

Closed loop



In this case the control valve is controlled by the controller for free chlorine (7). The already chlorinated water is measured. Faulty metering due to varying suction capacity of the ejector is corrected by the controller. Therefore no back-pressure regulator is required for this type of installation.

5.2 Electrical connection

The local rules (DIN, VDE, ...) must be observed for the electrical installation. Please make sure that electrical work is always carried out by technical personnel.

Don't forget to connect the grounding terminal of the metal housing!

When carrying out the electrical connection, it must always be ensured that the protection class of the servomotor is maintained (use appropriate screwed cable connections and cables).

For wiring diagrams of the servomotors, see chapter 10.

6. Startup

6.1 Potentiometer adjustment

For the servomotor with 3-point-step control, the repeating potentiometer and the controller must be adjusted to each other after electrical connection. The procedure depends on the type of controller. In general, the following steps must be carried out:

- While the controller is in the adjusting mode, the servomotor is brought into a final position.
- By means of a screwdriver, the potentiometer is turned on the slipping clutch into the same direction until stop (see chapter 10, servomotors).
- The resistance value is confirmed at the controller.
- The servomotor is brought into the other final position. A limit switch turns off the motor also in this case.
- This value is also confirmed at the controller.

The adjustment of potentiometer and controller is completed.

6.2 Definition of the control range

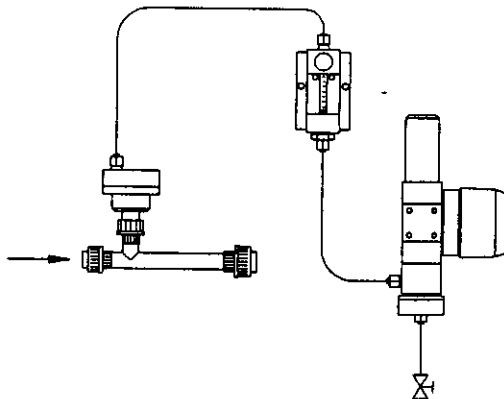
If the control range of the control valve is oversized for the particular application, it can be reduced by up to 50 %. Further reduction would affect the metering accuracy.

The bevel of the servomotor is limited so that the valve rod can only be lifted to a lower max. position. The procedure depends on the servomotor used (see chapter 10, servomotors).

In the case of 3-point step control, the potentiometer must be adjusted afterwards.

6.3 Leakage test

For the leakage test of the hydraulic connections, an additional measuring glass is required. It is installed between the control valve and the ejector non-return valve for the duration of the test.



Close chlorine supply. After moving slightly in the beginning, the ball must not go up anymore when the ejector is running.

7. Operation

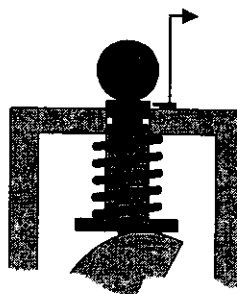
Automatic metering

Normally the control valve does not require any service during operation. A routine visual check is, however, recommended.

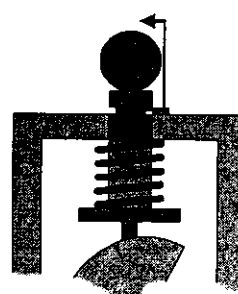
Manual metering

It is often necessary to stop metering temporarily by hand (e.g. for shock chlorination). For this purpose, the valve rod can be pulled up completely and locked. Metering is then independent of the position of the eccentric. It is adjusted at the manual valve of the flow meter instead.

Automatic operation



Manual operation



To return to automatic operation, the knob of the valve rod is pulled up and the stop pawl is removed. The **manual valve at the flow meter must then fully be opened.**

8. Disconnection of the system

For short interruptions, no special measures must be taken. It is sensible to empty the vacuum line using the ejector, if the chlorine cylinders are closed. In the case of longer shutdowns, the chlorination installation should be rinsed with dry air or nitrogen for some minutes. Afterwards all connections of the vacuum system must be closed carefully so that humidity cannot enter.

Maintenance of the devices should be carried out during down times so that deposits resulting from operation do not harden.

9. Maintenance

Regular maintenance avoids trouble!

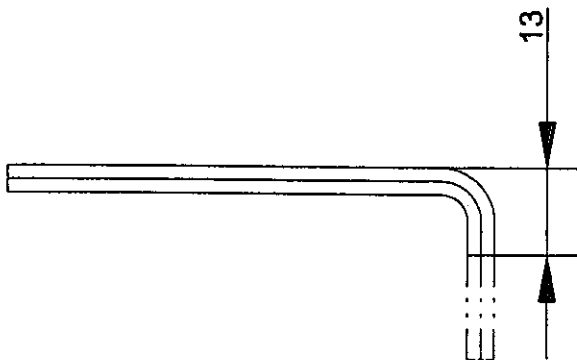
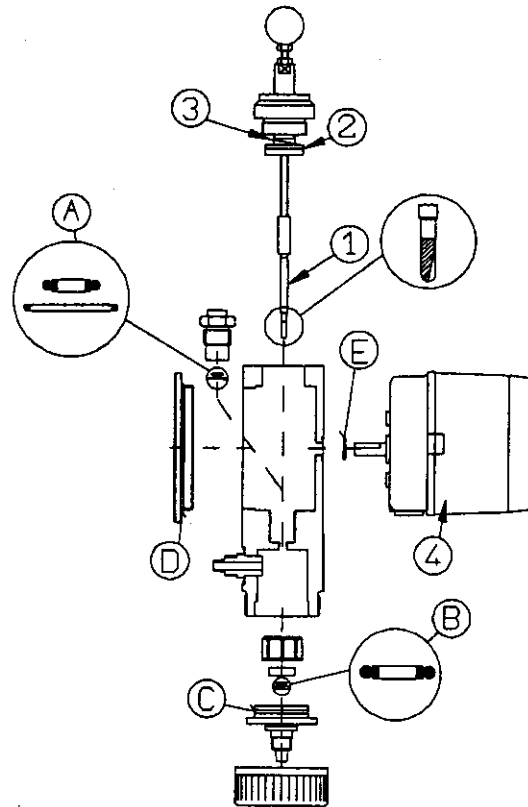
We recommend a maintenance contract.

If there are no rules/specifications (e.g. GUV 8.15) or special annotations prescribing shorter maintenance intervals, all JESCO chlorinators have to be maintained and tested by an authorized specialist firm at least once a year. Preferably this should happen at the beginning of a high-rate period, prior to a downtime or a restart.

Before working on the chlorination installation, the chlorine tanks/cylinders must always be closed. Empty the system using the ejector, until the measuring glass shows zero.

For maintenance, the control valve is disassembled, all parts are visually checked, and the wear parts are replaced.

Warm water or isopropyl alcohol is suitable for cleaning the components. Before remounting, they must be absolutely dry. PVC threads are lubricated with little silicon grease. Thus they are easy to handle and can be detached without any problem. For disassembly of the eccentric, a SW4mm wrench with shortened leg is required.



A: The rod is passed through a PTFE ring which is prestressed by an external O-ring. The seal is used with little silicon grease. Stronger tightening does not increase tightness. Static sealing is ensured by the additional O-ring. For mounting, the O-ring is "sticked" to the clamping screw using silicon grease.
 B: (only up to 2,500 g/h) For the air jet, the same type of sealing is used as for A. This seal is mounted in dry condition in order to avoid blocking of the jet.
 C, D, E: These O-rings are lubricated with silicon grease so that they slide easily on the PVC surface when mounted.

9.1 Replacement of seals

Those seals which should be replaced during yearly maintenance are available as maintenance kits. These include seals for the valve rod and the air jet. They are subject to constant wear due to the up and down movement.

The eccentric chamber becomes accessible if the cover located opposite to the servomotor is unscrewed. Replace the seals in accordance with the following drawing.

9.2 Lubrication

Normally it is sufficient to renew lubrication of the control valve once a year as part of the routine maintenance.

For lubrication always use silicon grease but never vaseline. The chlorine gas extracts water from the vaseline so that it hardens. Increased wear and failures would be the result.

The numbers refer to the above drawing:

1: The shaft of the adjusting rod is slightly lubricated in the piston packing between eccentric chamber and valve chamber.

2: The needle bearing between eccentric and thrust washer is greased.

3: The pressure spring is slightly lubricated to ensure protection against corrosion.

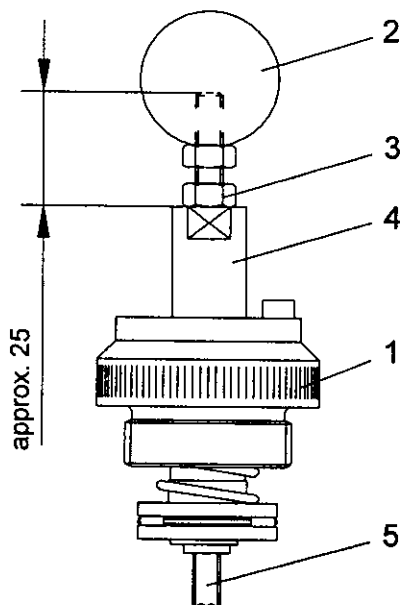
4: The servomotor is greased sufficiently with transmission lubricant. It is, however, sensible to check the drive once a year for sufficient lubrication and to relubricate the gear wheels, if necessary. In the case of drives which are subject to increased temperatures, the intervals between the checks must be reduced.

9.3 Replacement of valve rod

If the capacity of the control valve is too low or too high for the particular application, the actual control element can be replaced by the right size. The procedure depends on the type of control element.

Replacement of the air jet (up to 2,500 g/h)

As the different air jets are difficult to distinguish, they are marked with a number on the threaded shaft, which is visible after removing the cover of the eccentric chamber. For the assignment of the number, refer to the Spare Parts sheet.

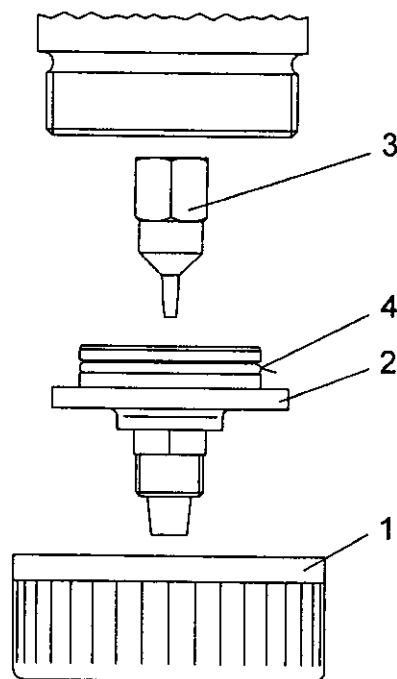


- Remove protective cover over hand knob.
- Unscrew guide nut (1) from valve and pull out rod.
- Remove hand knob (2) and lock nut from rod.
- Remove lock nut (3) and unscrew rod (5) from guide bolt (4).

- Mount new rod in opposite order.
- Zero-point adjustment.

Replacement of control cone (≥ 4 kg/h)

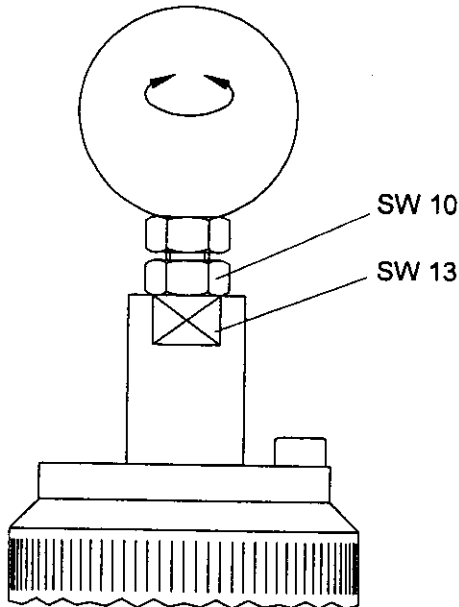
Depending on the size of the control cone to be replaced, the valve seat must be exchanged as well in most cases. For assignment, see Spare Parts sheet.



- Unscrew lock nut (1) at lower section of control valve.
- Remove valve seat (2).
- Unscrew control cone (3) from valve rod.
- Assembly in opposite order. The O-ring (4) of the valve seat must be exchanged after dismantling.
- Zero-point adjustment.

9.4 Zero-point adjustment

Upon delivery the position of the rod is optimally set. A zero-point adjustment is only required after maintenance or replacement of the rod.

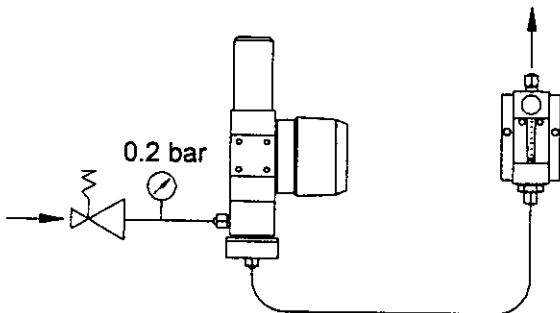


- Bring servomotor into "closed" position.
- Switch on ejector.
- Open metering valve at flow meter.
- Untighten nut (SW10) and counterhold guide bolt (SW13).
- Turn rod at hand knob until the flow meter indicates zero. Then carry on turning it by another 1/4 revolution.
- Tighten nut (SW10) and counterhold guide bolt (SW13).

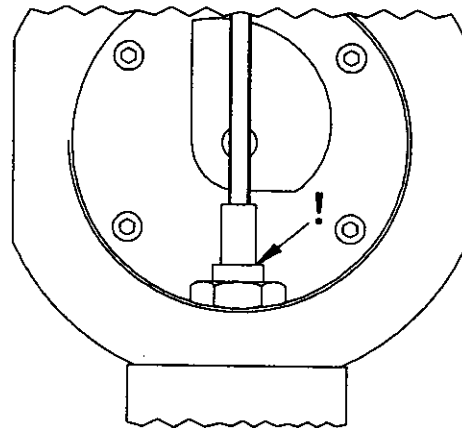
9.5 Check

In the case of maintenance work in the workshop, the control valve can be tested with air.

To check the metering capacity of the valve, compressed air with 0.2 bar excess pressure is used. Thus the display at the vacuum flow meter for chlorine gas is the same as in real operation.



It also has to be checked if the piston packing between eccentric chamber and valve chamber is tight. This test is carried out at 0.2 bar excess pressure as well. Leak detector spray makes possible leaks visible. Wipe it off after the test.

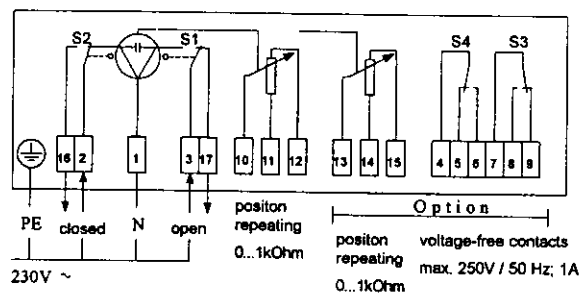


10. Servomotors

Servomotors are used with 3-point step control or with 4..20 mA signal.

a) 3-point step (standard version) AR30W..

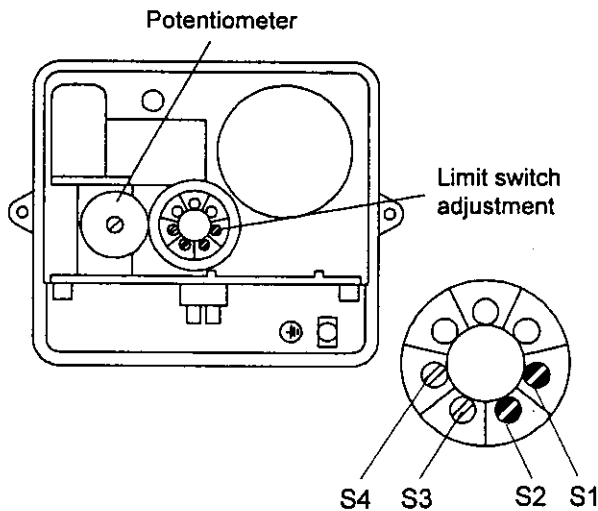
The servomotor is controlled by connecting the phase of the supply network for clockwise or counterclockwise rotation to the corresponding winding of the motor. The neutral conductor is commonly used.



AR 30 W 23

The potentiometer serves as a position repeating device so that the controller can bring the control valve exactly into the right position. Observe the operating instructions of the controller precisely when connecting the slider. Otherwise the controller might be damaged.

As an option the servomotor can be equipped with additional limit switches (S3 and S4). This additional signal is required, for example, if the motive water supply of the ejector is to be disconnected because the control valve is closed for a longer period. Thus carbonate precipitation is avoided at the controller which otherwise would cause a long-term failure of the ejector.



The limit switches can be adjusted by means of the screws located on the shaft of the servomotor. Each of the screws is assigned to a limit switch (S1..S4). Turning the screws clockwise means:

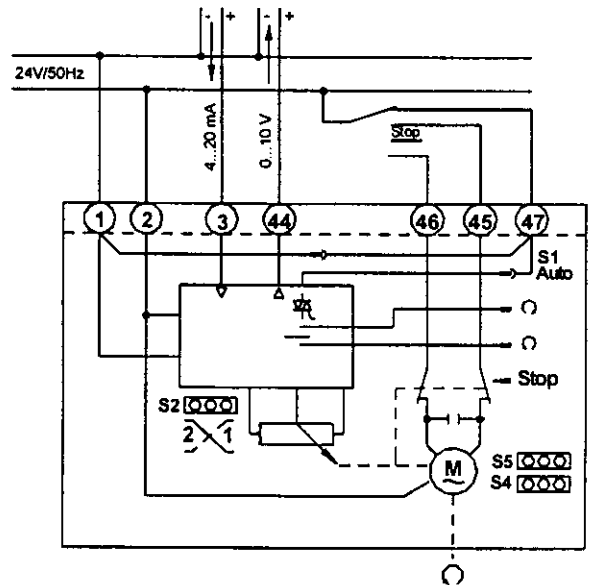
- S1 (valve fully opened) – reduce metering capacity
- S2 (valve closed) – lower rod
- S3, S4 (allocation freely selectable) – switch point for small metering capacities

b) (0)4..20 mA (option) AR30W..S

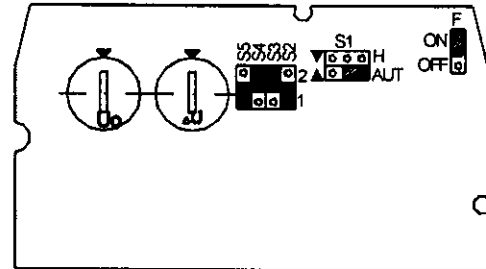
This servomotor is provided continuously with 24VAC voltage and changes its position depending on the input signal.

Position repeating via potentiometer is not necessary for this version because the position controller integrated in the servomotor ensures the correct position of the motor. For other applications, as for example in process control systems, a position repeating device is available.

Wiring diagram



Terminals 45, 46, 47 are only used if the operating mode of the motor is to be changed externally. Jumper F must be connected to OFF in this case. The servomotor offers a variety of possible operating modes which can be defined via jumpers.



The different jumpers have the following functions (factory setting in bold letters):

- "S1" operating mode
 - AUT** : automatic operation according to input signal
 - H** : manual operation, servomotor is switched off
 - ▼ : control valve opens
 - ▲ : control valve closes
- "F" preselection of operating mode
 - ON** : without external operating mode switch
 - OFF** : with external operating mode switch
- "S2" sense of action of position controller
 - 1** : opening proportional to signal
 - 2** : opening inversely proportional to signal

"S3" angle of rotation of servomotor

- 1 : 30° bevel
- 2 : 90° bevel

"S4" output signal

- 1 : 0..620 mV
- 2 : 0..10 V

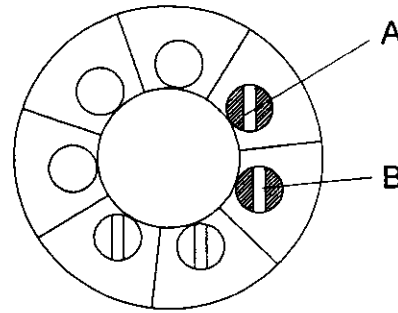
"S5" input signal

- 1 : 0(4)..20 mA
- 2 : 0(2)..10 V

Zero point and spreading of the input signal are adjusted at potentiometers.

U_0 zero point of signal (e.g. position 2 \approx 4 mA)

ΔU spreading of signal (e.g. position 8 \approx 16 mA)



The rotary motion of the servomotor is limited additionally by snap switches. The can be adjusted at the screws on the shaft of the servomotor. Each of the screws is assigned to a limit switch (A, E). Turning the screw clockwise means:

A (valve fully opened) – reduce metering capacity
 B (valve closed) –lower rod

With this servomotor, no additional limit switches can be installed.

Technical data

Type	AR 30W..	AR 30W..S
Design	reversible A.C. motor with self-locking reduction gear.	
Use	for controllers with switching output (3-point step)	for controllers with continuous output (2...10V or 4...20mA)
Auxiliary voltage	230V ~ \pm 15% 50...60 Hz	24V ~ \pm 20% 50...60 Hz
Control		2...10V or 4...20mA
Power consumption	2 W	7 W
Control time/bevel	120s / 90° = 0...100%	
Position repeating for remote display	potentiometer 0.5 W 0...1000 Ω = 0...100%	0...620mV = 0...100%
Limit switch	internal limit switch for limiting angle of rotation. Signaling of final position via terminals 16 and 17	internal limit switch for limiting angle of rotation.
Protection class	IP 55 (EN 60529)	
Ambient temperature	-20 ... 60°C	
Option		
2nd potentiometer	0...1000 W 0.5 W	
Limit switches (2 off)	max. 250V 2A	
Part No.	78743	