

KATALOŠKI MATERIJAL ZA HLORNU STANICU

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REGIONALNI SISTEM VODOSNABDIJEVANJA PLAVA VODA			
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KATALOŠKI MATERIJAL ZA HLORNU STANICU	 INSTITUT ZA HIDROTEHNIKU GRADEVINSKOG FAKULTETA U SARAJEVU Stjepana Tomića 1, Sarajevo, Bosna i Hercegovina Tel./Fax: 21 24 66/67; 20 44 95; FB: 405; E-mail: hts@hts.com.ba ID broj: 4200689/1003, PDV broj: 25000971003, Broj upisa u sudski registar: 16/111063		3.19
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Boce za tečni hlor

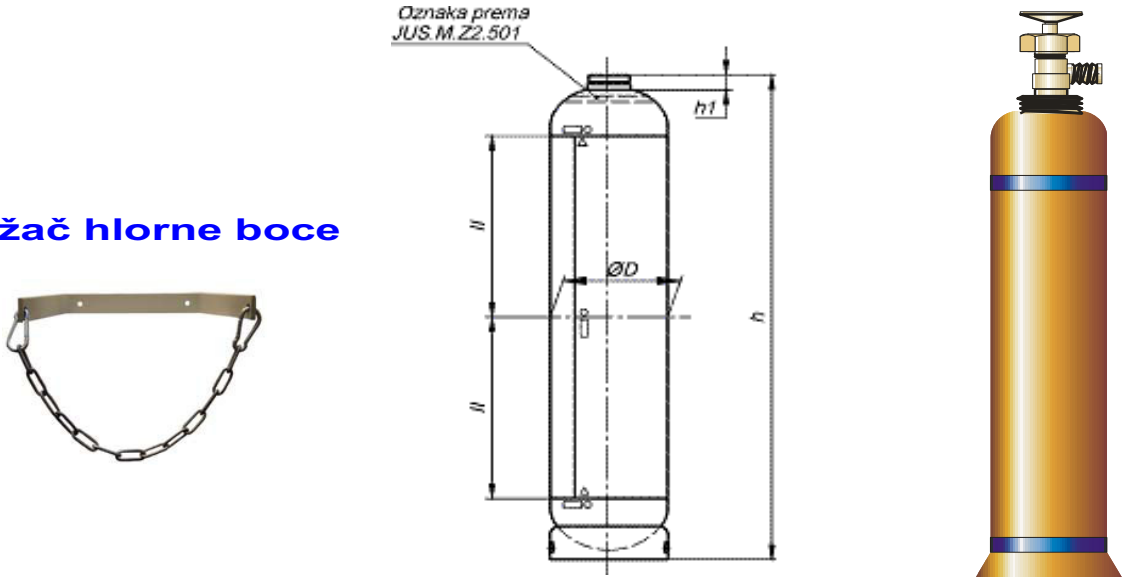
Namena: Boce za tečni hlor služe za transport i skladištenje tečnog hlora. Hlor se koristi za hlorisanje i prečišćavanje pitke i sanitarne vode u bazenima i gradskim vodovodima.

Tehničke karakteristike: Boce za tečni hlor izrađujemo od čeličnog lima S355J2G3 (C0563), zavarivanjem. Oblik, glavne dimenzije i kvalitet boca usaglašen je sa standardom JUS M.Z2.501. Boce se isporučuju sa ventilom za hlor i zaštitnom kapom, spremne za punjenje hlorom. Boce su sa spoljne strane antikoroziono zaštićene odgovarajućom bojom RAL 6010. Boce izrađujemo u više veličina (od 30 do 150 litara, pregled po veličinama dat je u tabeli). Uz boce isporučujemo atestno tehničku dokumentaciju, overenu od republičke Inspekcije za opremu pod pritiskom.

Tip	33	45	50	115	120	150
zapremina (litara)	33	45	50	115	120	150
D mm	229	229	229	368	368	368
h1 mm	35	35	35	35	35	35
h mm	1014	1290	1450	1270	1350	1640

Hlorne boce

Držač hlorne boce



Bačva (kontejner) za tečni hlor

Namena: Bačve za tečni hlor služe za transport i skladištenje do jedne tone tečnog hlora. Hlor se koristi za hlorisanje i prečišćavanje pitke i sanitarne vode u bazenima i gradskim vodovodima.

Tehničke karakteristike: Bačve za tečni hlor izrađujemo od čeličnog lima S355K2G3 (C0563), zavarivanjem. Oblik, glavne dimenzije su prikazani na donjoj skici i tabeli. Bačve su opremljene obručima za kotrljanje. Isporučuju se sa ventilima za hlor koji su pod zaštitnom kapom, spremne za punjenje hlorom. Bačve su sa spoljne strane antikoroziono zaštićene odgovarajućom bojom RAL 6010. Uz bačve isporučujemo atestno tehničku dokumentaciju, overenu od republičke Inspekcije za opremu pod pritiskom.

Tip	400	800
zapremina (litara)	400	800
Punjenje (kg)	500	1000
D mm	600	800
L mm	1850	2050



Zaštitni kontejner za evakuaciju bačvi i boca

Namena: Zaštitna posuda služi za evakuaciju bačvi ili boca za tečni hlor u slučaju havarije (curenja hlora). Služe da se u njih stavi havarisana posuda i bezbedno isprazni od hlora. U posudu mogu da stanu tri boce za hlor ili jedna bačva. Ove posude je moguće raditi i kao pokretne, kako bi se mogao izvršiti prevoz sa mesta koje nema takve sisteme do mesta gde ce se posuda degazirati.

Tehničke karakteristike: Zaštitne posude se izrađuju, kao i bačve za hlor, od čeličnog lima S355J2G3 (C0563), zavarivanjem. Oblik, lavne dimenzije su prikazani na donjoj skici i tabeli.

Ove posude su opremljene brzozatvarajućim poklopcem sa bajonet zatvaračem, kako bi se što brže i sigurnije izvršilo zatvaranje posude nakon unošenja posude koja se evakuiše. Posude su sa spoljne strane antikoroziono zaštićene odgovarajućom bojom RAL 6010. Uz zaštitne posude isporučujemo atestno tehničku dokumentaciju, overenu od republičke Inspekcije za opremu pod pritiskom.

Tip	1	2
D mm	500	1200
l mm	1850	2500
namena	za 1 bocu	za 1 bačvu ili 3 boce



Regulaciona i Dozirna Tehnika

za tekućine, gasove i sipkaste materijale

Vakumski regulator C2213



VAKUMSKI REGULATOR C 2213

Namjena vakumskih regulatora

Hlorni gas je veoma važan za dezinfekciju pitke i bazenske vode, ali također predstavlja izvor opasnosti što se tiče rukovanja, transportovanja i skladištenja. Zbog toga, već desetljećima se koristi princip vakuma u hlordinacijskim instalacijama. Prema ovom principu, pritisak hlornog gasa se reducira do vakuma i samo tada, ako ima vakuma u dovoljnim količinama, hlorni gas će proticati do tačke mjerenja.

Glavni aspekt sigurnosti je taj da istjecanje(ispuštanje) hlornog gasa je zaista izbjegnuto. Čak i u slučaju pucanja i kidanja vodova, hlorni gas ne može “pobjeći”, niti iscuriti.

Vakumski regulator C 2213

Vakumski regulator korišten kao ventil za redukciju pritiska je od glavne važnosti za sigurnost u vakumskim instalacijama. Zbog ovog razloga, C 2213 verzija je dizajnirana prema posljednjim tehničkim saznanjima. Uređaj sačinjavaju nekoliko funkcija u kućištu: (svi brojevi u zagradama odgovaraju šematskom crtežu na sljedećoj stranici).

a) Vakum regulacija

U početnom položaju, kugla(1) je naslonjena na ventilsko sjedište(2). Ova kugla je pritisnuta na sjedište pomoću zavojne opruge(3) i tako hlorni cilindar pritišće i zatvara sistem. Nakon uključivanja injektora vodeni mlaz pumpe stvara vakum. Vakum stvara silu na radnoj dijafragmi(7) vakumskog regulatora, koja je usmjerena na desnu stranu. Ova sila se dalje prenosi na kuglu(1) preko šipke(8) tako da hlorni gas ulazi u vakum sistem. Ako vakuma nestane, kugla se odmah vraća nazad na sjedište ventila i zaustavlja dovod hlornog gasa.

b) Istovremeno uzimanje hlora iz boce

Konstantna zapremina hlornog gasa uzeta iz jedne boce sa hlorom , ne smije preći 1% na sat cjelokupnog sadržaja te boce. Prema tome, maksimalna mjera za npr. 65 kg boce sa hlorom je 650 g Cl₂/sat.

U većini slučajeva, uzimanje hlora iz jedne boce sa hlorom nije dovoljno, jer je potrebno više hlora od 650 g Cl₂/sat. U ovakvim slučajevima, hlor se uzima iz istovremeno iz nekoliko boca sa hlorom u tzv. baterijskom djelovanju.

Da bi bili sigurni da su se boce sa hlorom ispraznile jednako, svi vakumski regulatori na tim bocama moraju početi raditi na istom vakumu. Za ovu svrhu, JESCO-ovi vakum hlorni regulatori C2213 su opremljeni sa uređajem za podešavanje otvarajućeg pritiska. Šaraf za podešavanje(10) tog pritiska se koristi da se podesi učinak sile između zavojnih opruga(9) i (3). Kao rezultat toga, osigurano je da je otvarajući pritisak isti za sve vakumske regulatore i da se hlorni gas uzima gotovo istivremeno iz svih spojenih boca sa hlorom.

Istovremeno uzimanje hlora radi sa mjerom od oko 200 g/sat i više. Da bi mogli održati mjeru iznad ove vrijednosti, moramo biti sigurni da broj spojenih boca sa hlorom nije veći od potrebnog.

c) Ograničivač pritiska

Ako se neka od spojenih boca(u batrerijskom djelovanju) za hlor već ispraznila, a nama je potreban puni kapacitet doziranja, mjera uzimanja iz djelimično ispunjene boce postaje nedopustivo velika, te zbog toga prouzrokuje “smrzavanje”(ledenje) boca za hlor. Da bi se ovaj efekat izbjegao, ograničivač pritiska (11) je integrisan u spoju vakuma, koji dozvoljava maksimalnu mjeru uzimanja hlora od približno 1000 g/sat.

Ako se vakumski regulator montira na hlornu burad(tankove) ili u slučaju dostatnog uzimanja hlora iz drugih izvora, uređaj omogućuje mjere do 10 kg/sat. Za ovu svrhu, ograničivač pritiska može se lako ukloniti.

(Kao standard, ograničivač pritiska je integrisan u uređaju kao dio koji se isporučuje).

d) Održavanje rezidualnog pritiska

Dok se boca sa hlorom prazni, pritisak u boci se smanjuje sve dok ne bude suviše nizak da pomjeri kuglu(4) koja se oslanja na zavojnu oprugu(6) sa ležišta ventila(5). Rezidualni pritisak od oko 0.1 bar ostaje u bocama.

Odatle vlaga nemože da uđe u boce za hlorom tokom zamjene istih. Vlaga ulazećeg zraka bi prouzrokovala da boce stalno korodiraju tako da bi hlorni gas bio kontaminiran. Zbog toga, održavanje rezidualnog pritiska pomaže produžavanju radnog vijeka boce sa hlorom.

e) Manometar

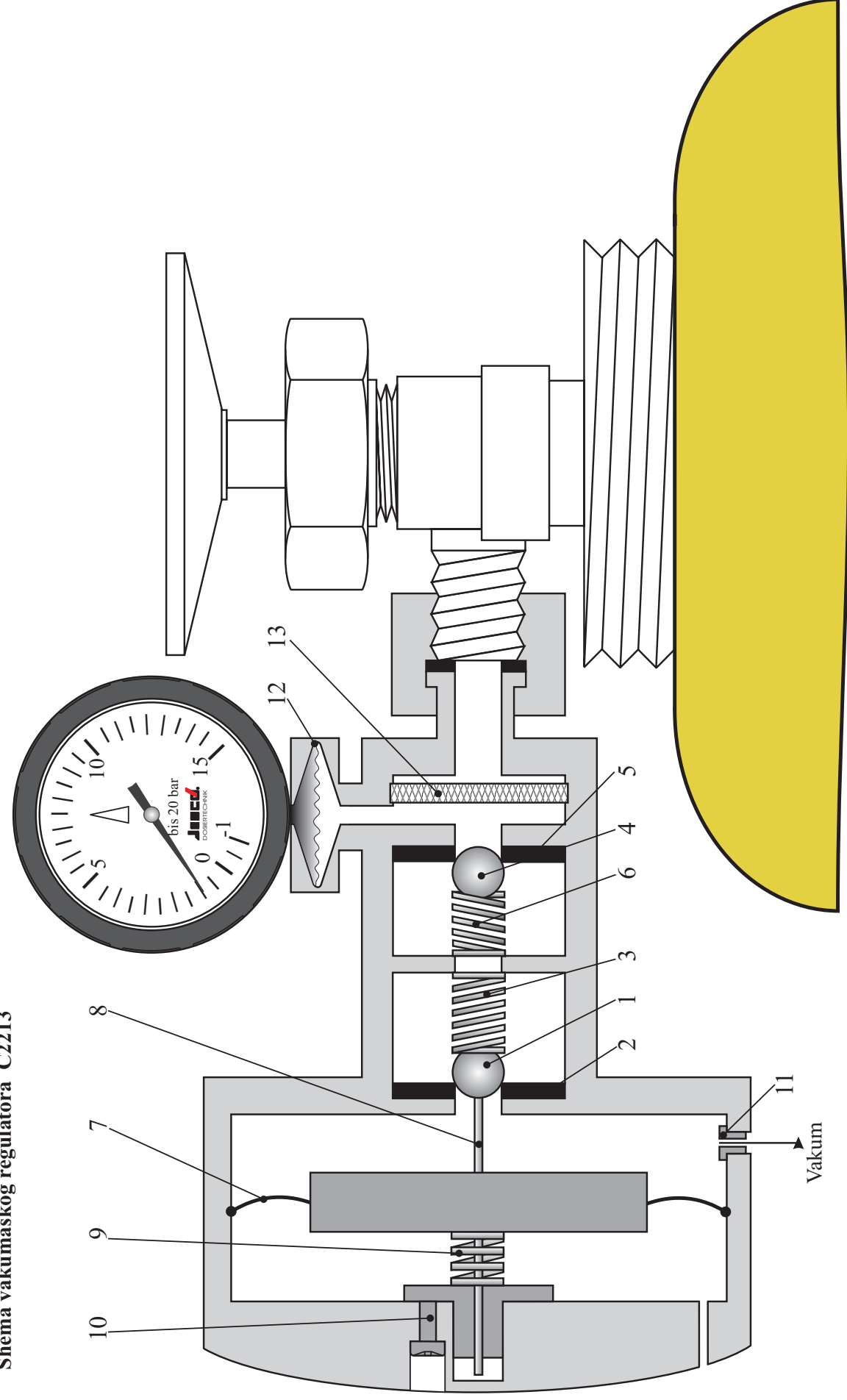
Vakumski regulator je opremljen sa manometrom za pokazivanje pritiska u boci sa hlorom. Manometar je zaštićen sa razdjeljivačem koju čini glicerinska dijafragma koja “bezbrižno” prenosi pritisak. Kućište manometra je od plastike u kojoj se nalazi vodonepropusni mjerni element koji je hidraulički spojen. Odvajajuća dijafragma(12) je prekrivena sa srebrenim filmom kao zaštita od hlornog gasa. Da se kojim slučajem ona ne bi oštetila sa prljavim česticama, hlorni gas se propušta kroz ugrađeni filter(13) prije nego li dođe do manometra.

Mjerni opseg manometra je -1...0...15 bar tako da se i fukcija održavanja rezidualnog hlora mogla regulisati.

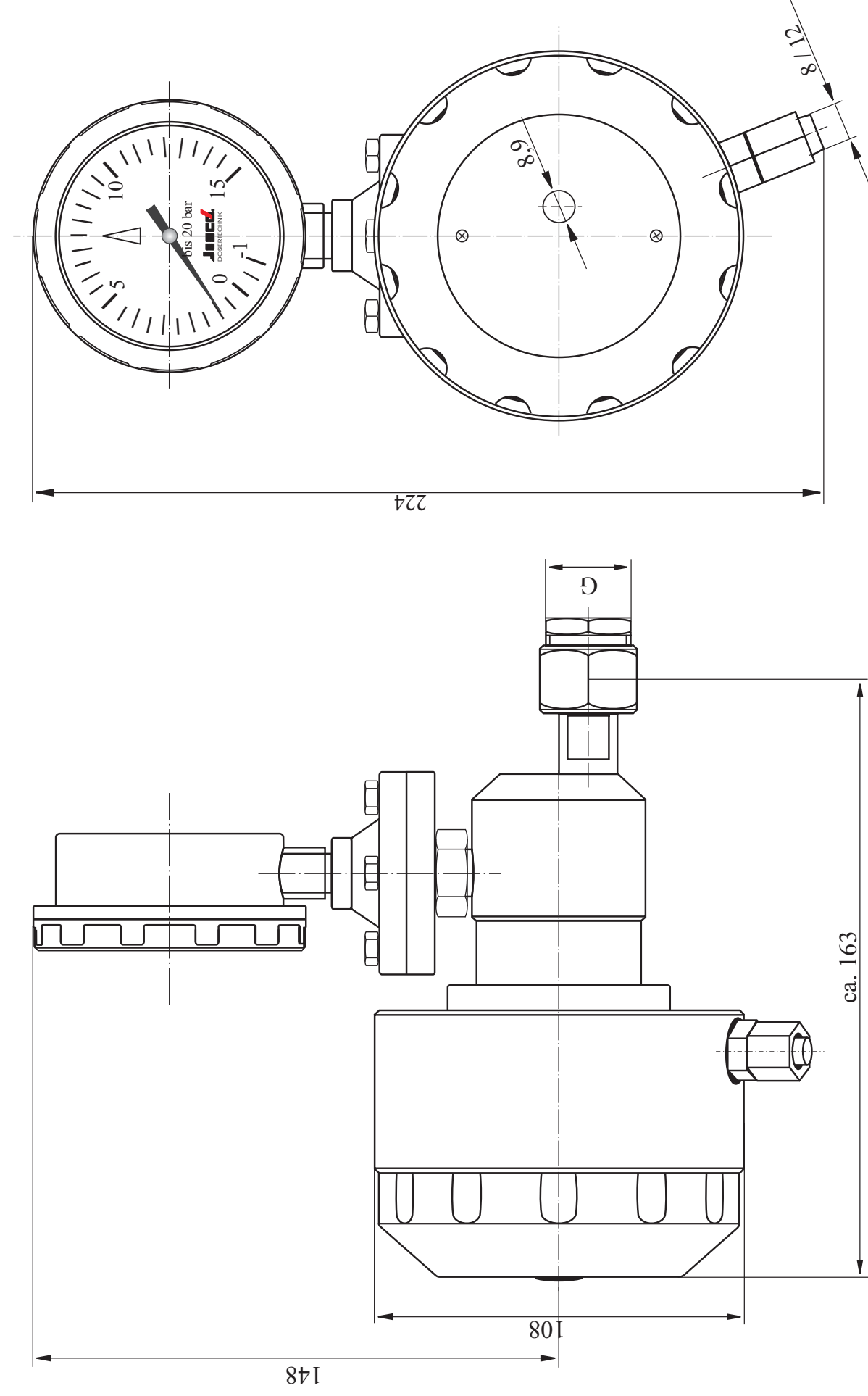
Tehnički podaci vakumskog regulatora C 2213

Matrerijali	otporni na hlor, kao što su niklovana bronza Hasteloy, PVC, Viton
Maksimalni kapacitet sa ograničivačem pritiska	približno 1 kg/sat
bez ograničivača pritiska	10 kg/sat
Radni vakum	80 mbar (za 200 g/sat)
Težina	2200 g
Nazivni pritisak	PN 16
Priključak za pritisak	spojna matica W1”, G 5/8, G 3/4
Priključak za doziranje	PE cijev d 8/12

Shema vakumskog regulatora C2213



Dimenzije vakumskog regulatora C 22113



Vakumski regulator C 2213

Spojna matica W 1”

Spojna matica G 5/8

Spojna matica G 3/4

Br. djela 20401100

Br. djela 20401101

Br. djela 20401102

Cijevni matrijali / Cijevni priključci

PE d 8/12

PVC d 8/12

PE d 8/12

Bočica sa amonijakom (30ml)

Priključna oprema (5m cijevi,

obujmnica ili šelna, amonijak)

Viljuškasti ključ za odvijanje SW32

Br. djela 97124

Br. djela 97561

Br. djela 97176

Br. djela 13513

Br. djela 22412

Br. djela 15901

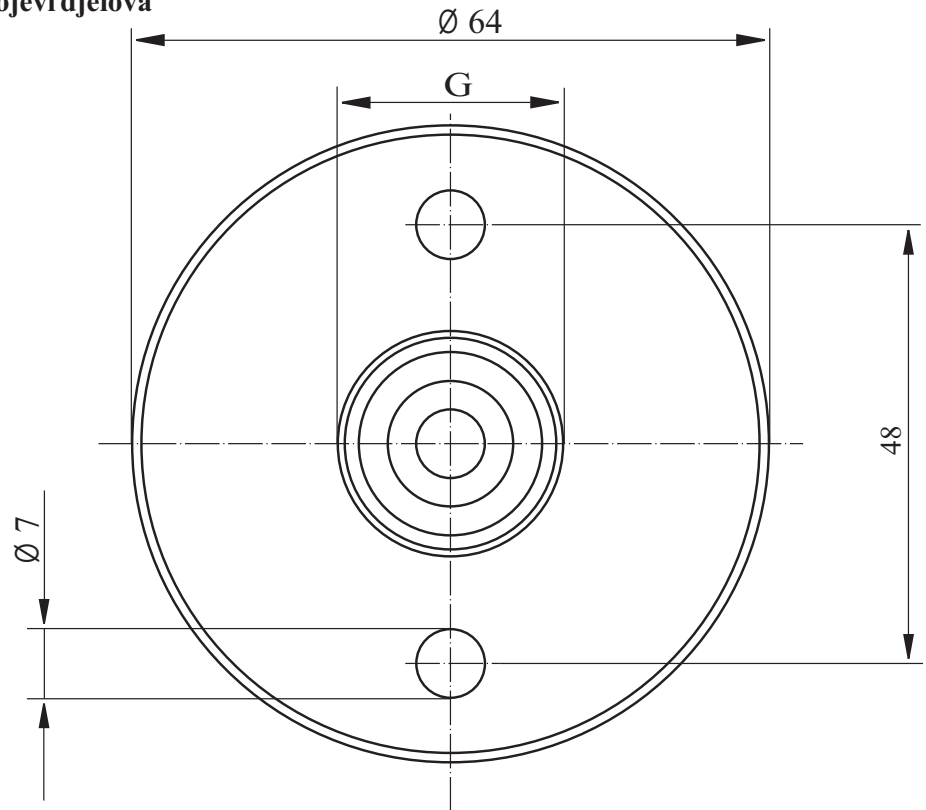
ZIDNI DRŽAČ

Na raspolaganju su dvije vrste zidnih držača:

• Zidni držač od PVC materijala se koristi za držanje vakumskog regulatora dok se mijenja boca sa hlorom, a ujedno zatvara spoj pritiska. Zbog toga je ulazak vlažnog zraka izbjegnuta tokom zamjene boca sa hlorom.

• Zidni držač od nerđajućeg čelika se koristi kao fiksni spojni uređaj. Vakumski regulator se montira na zidni držač i opskrbljuje istovremeno nekoliko hlornih boca preko razdjeljivača. Zbog toga je moguće dozirati velike količine hlornog gasa sa samo jednim vakuskim regulatorom.

Dimenzije i brojevi dijelova



PVC zidni držač za vakumski regulator C 2213

Priključni navoj W 1”

Priključni navoj G 5/8

Priključni navoj G 3/4

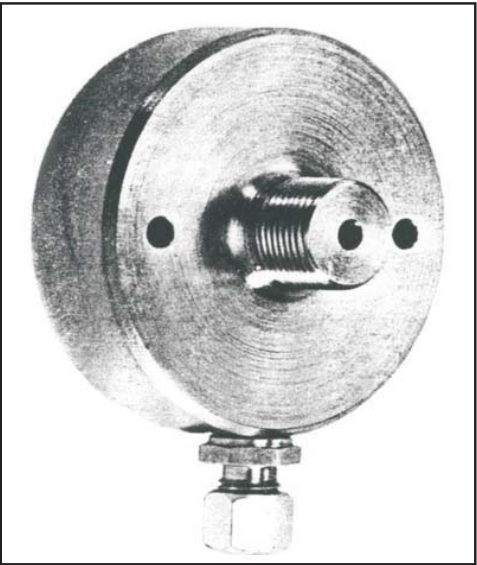
(Montažni materijal je uključen kod dostavljanja)

Br. djela 28380

Br. djela 29752

Br. djela 28360

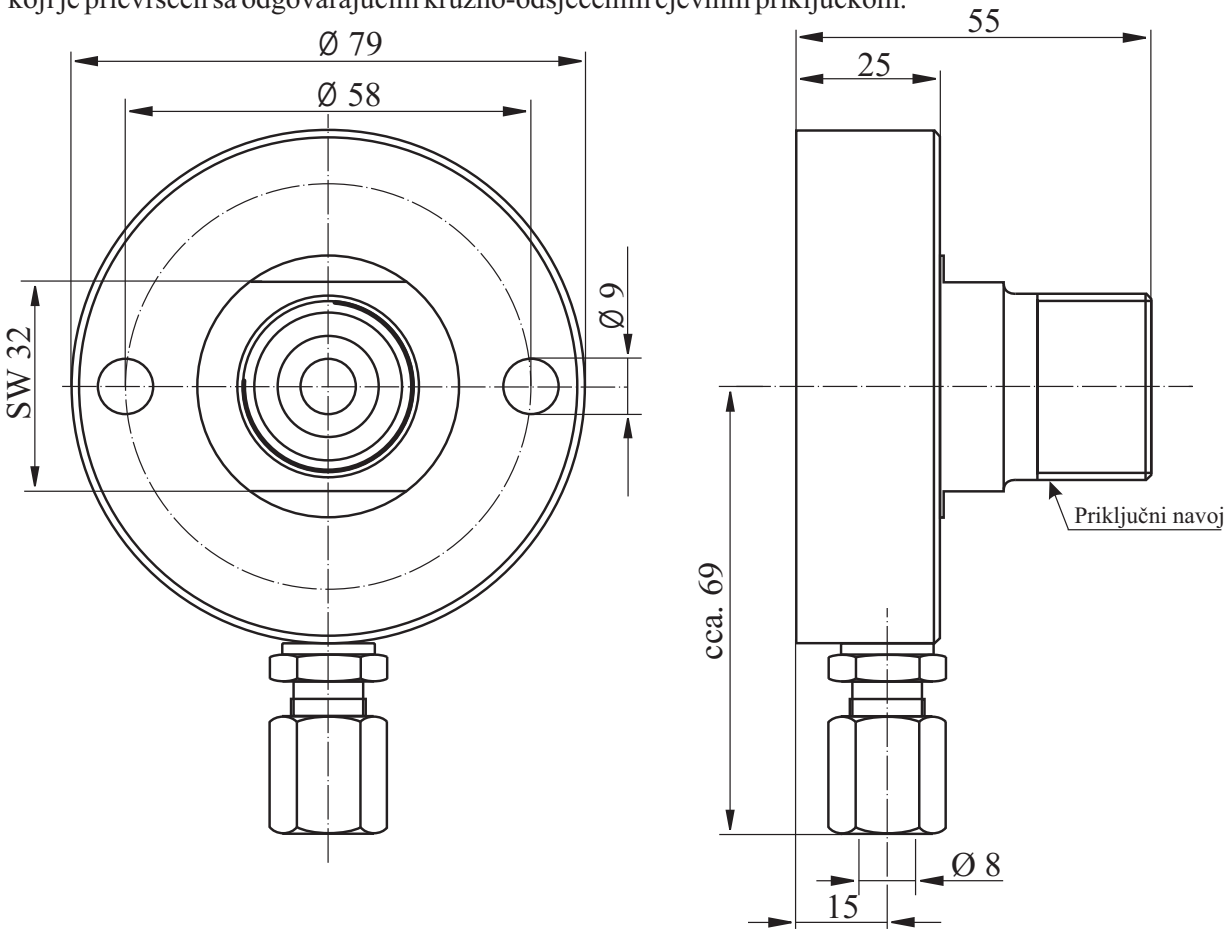
Priključni navoj	Broj djela
1”	29280
G 3/4	29278
G 3/4	29753



Seriya vakumskih regulatora C 2213 / C 2214 je dizajnirana tako da se mogu spojiti direktno na ventil hlorne boce. Prednost je ta da se hlorni gas pod pritiskom u hlornoj boci, prenosi u sigurni vakum bez posredovanja fleksibilnih metalnih vodova(cijevi) koji bi se mogli slomiti ili popucati.

Ako zbog sigurnosnih razloga ili zbog zamjene za već postojeći zidno-montirajući vakumski ragulator, uređaj C 2213 / C 2214 se mora montirati na zid, to se može lako postići pričvršćavanjem spajajućeg zidnog bloka.

Spajajući blok je pričvršćen na zid i ima projektovane priključne navoje koje odgovaraju spajanju standardne hlorna boce. Vakumski regulator tada se može direktno spojiti na ove priključne navoje. Fleksibilni bakar je vođen direktno od hlorne boce ili od razdjeljivača sa nekoliko boca do spojnog bloka, koji je pričvršćen sa odgovarajućim kružno-odsječenim cjevnim priključkom.



SIGURNOSNI VENTIL

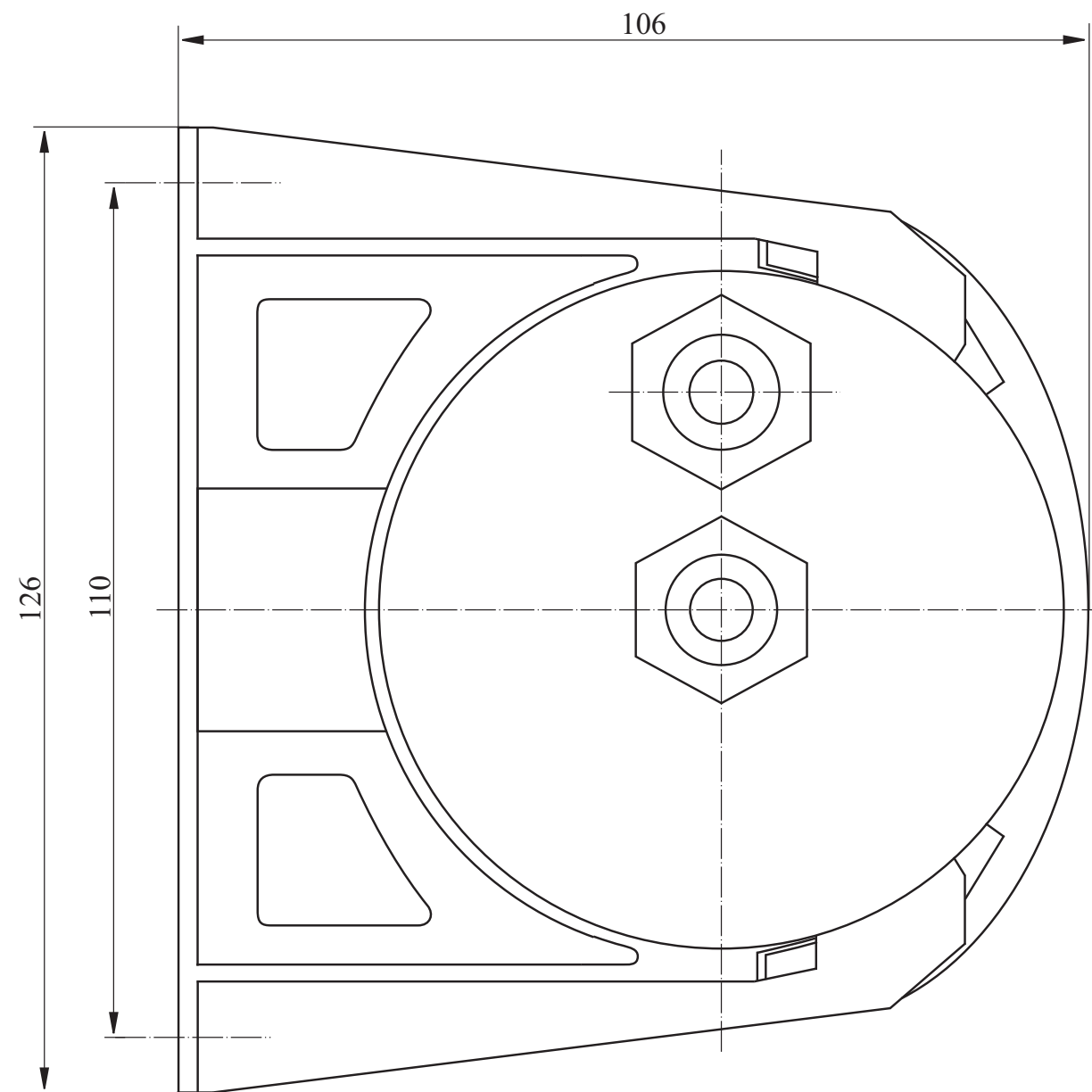
Ako se ulazni ventil vakumskog regulatora ne zatvori potpuno zbog mogućih nečistoća, onda je moguće da se prekomjeran pritisak razvije u vakumskom cijevnom sistemu koji prouzrokuje nepoželjnu hlorinaciju.

Da bi ovo izbjeglo, koristi se sigurnosni ventil. On se otvara na najmanjem mogućem prekomjernom pritisku i ispražnjava cjevovodni sistem. Kraj izduvne cijevi se pruža blizu do senzora hlornog gasa. Te usljed toga, osigurava trenutni alarmni signal.

Tehnički podaci

Materijali:	PVC, Viton, Hasteloid
Otvarajući pritisak:	20 mbar
Priključak:	PE tubing d 8 / 12
Težina:	350g

Dimenzije i brojevi dijelova



Sigurnosni ventil Br. djela 32843
(Montažni materijal je uključen kod dostavljanja)

ULOŽAK OD AKTIVNOG UGLJA

U gotovo svakoj instalaciji uključujući vakuum sisteme, može se pojaviti trenutni šok pritiska, koji prouzrokuje da ekstremno osjetljivi sigurnosni ventil reaguje u kratkom roku, tako da uključi uređaj za dojavu hloru.

Da bi mogli biti sigurni da se samo “stvarne” opasne situacije mogu indicirati preko uređaja za dojavu hloru, ugrađen je uložak od aktivnog uglja u izduvnoj cijevi, sa kojim su izbjegnute alarmne greške. Samo ako velike količine hloru budu iscurile, imat ćemo dojavu alarma.

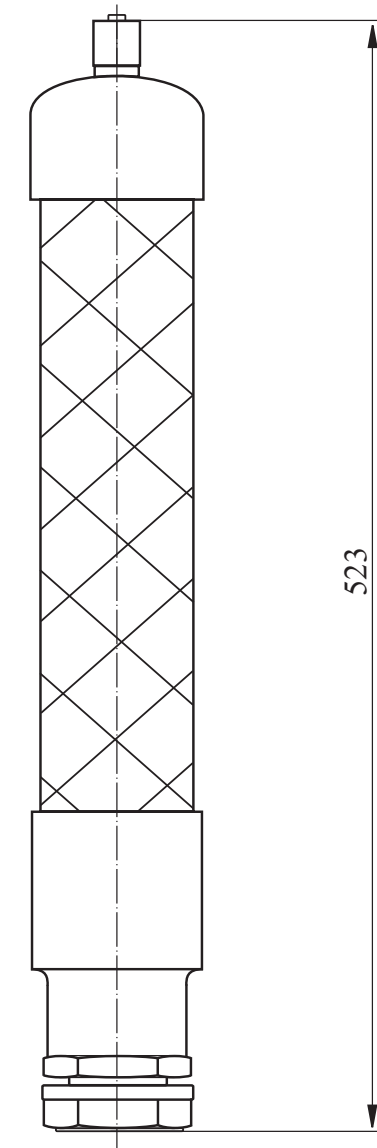
Tehnički podaci

Materijal:	PVC
Sadržajna količina:	1.2 l
Priključak:	PE tubing d 8 / 12
Težina:	1200g

Napomena:

Veoma je razborito koristiti prozirno PVC crijevo kao spojni vod do uložka sa aktivnim ugljem, umjesto standardnog PE crijeva. Čim PVC crijevo dođe u dodir sa hlorom ono promjeni boju iz prozirne u mlječno zelenu. U slučaju da dođe do curenja hloru, vrlo lako je pronaći tačku ili mjesto gdje je hlor iscurio.

Dimenzije i brojevi dijelova



Uložak od aktivnog uglja Br. djela 12032301
(Montažni materijal je uključen kod dostavljanja)

Držač rotametra(mjerač protoka hlora)

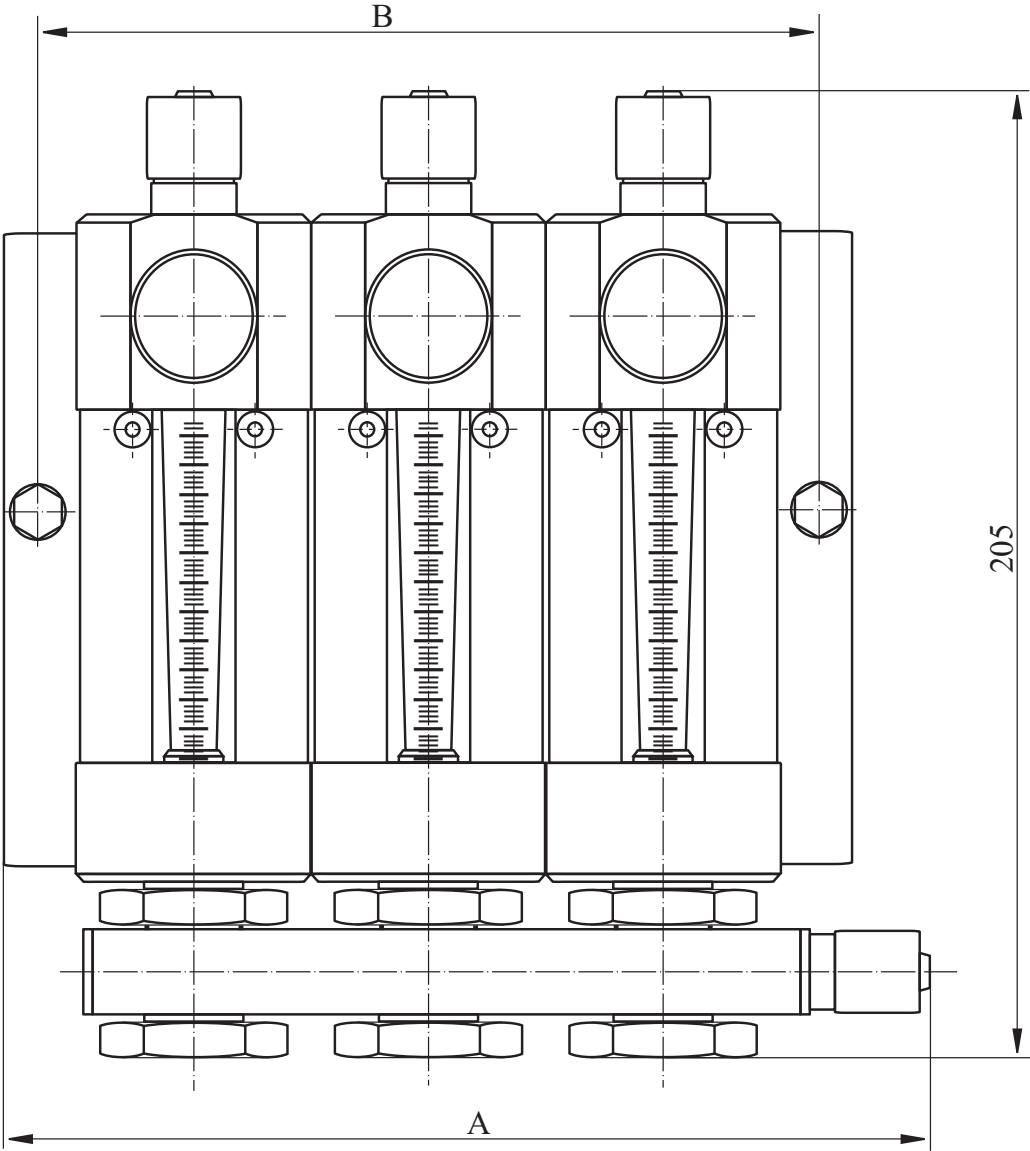
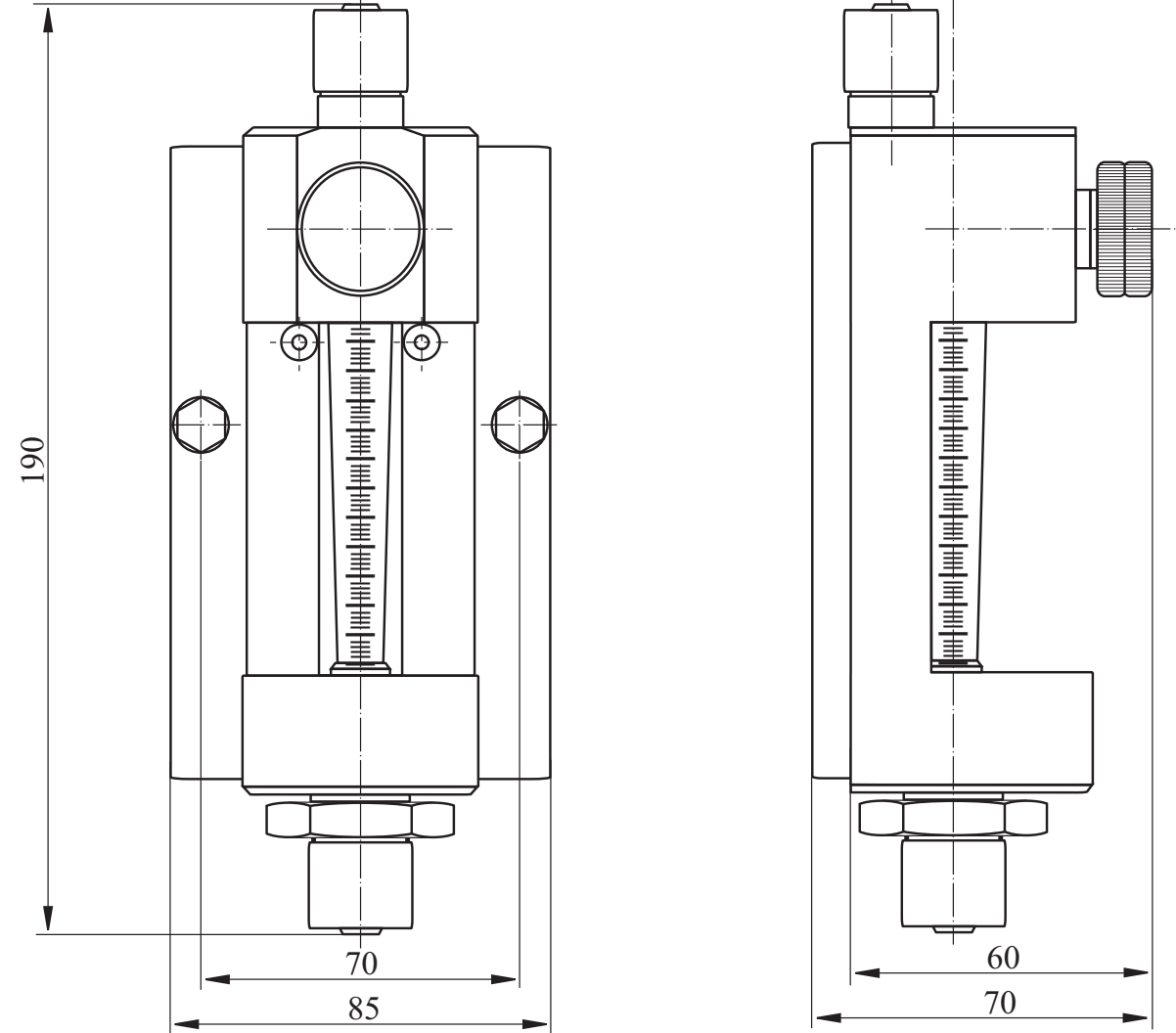
Držač rotametra ima dvije funkcije:
On nadzire i prilagođava protok hlornog gasa. Dostupni su mjerači protoka hlora sa maksimalnim mjernim opsegom od 25...4,000 g Cl₂/h. Protok hlornog gasa se podešava koristeći igličasti vetil na držaču rotametra.
Držač mjerača protoka hlora se montira bilo gdje u liniji između vakumskog regulatora i injektorskog nepovratnog ventila. Također su dostupni rotametri sa dva ili tri držača koji omogućavaju distribuciju hlornog gasa do nekoliko dozirnih tačaka.
Napomena:
Ako hlorna instalacija odgovara njemačkom standardu DIN 19606, mora se koristiti nepovratni ventil za hlor, kojim se izbjegava fluktacija(nestalnost) pritiska u sistemu. Ovaj nepovratni regulator za hlor je integrisan u injektorskom nepovratnom ventilu.

Tehnički podaci

Materijali: PVC, Viton, Keramika, PMMA
Mjerni opseg: od 1...25g Cl₂/sat, pa sve do 200...4000g Cl₂/sat
Omjer podešavanja: 1 : 20
Tačnost: +/- 6% od zadnjeg očitavanja sa skale
Priključci: PE cijevi d 8/12
Težina: 400g

Napomena:
Ako se protok hlornog gasa podešava telemetrijski u automatizovanom regulacionom sistemu, onda se integrira regulacioni vetil sa servomotorom u liniji između rotametra i nepovratnog ventila za hlor.

Dimenzije i brojevi djelova



Zbog velikog broja mogućih kombinacija držač sa dva ili tri rotametra se kombinira od individualnog rotametra i od montažnog seta. Molimo vas, da kod narudžbe specificirate odgovarajući mjerni opseg.

Mjerni opseg g Cl ₂ / h			Individualna mjerna ćelija	Mjerna ćelija u distributivnom bloku
1	...	25	33367	33359
4	...	80	33368	33360
10	...	200	33369	33361
25	...	500	33370	33362
50	...	1000	33371	33363
100	...	2000	33372	33364
125	...	2500	33373	33365
200	...	4000	33374	33366

Montažni set	Dimenzija A	Dimenzija B	Broj djela
2 rotametra	152	120	33375
2 rotametra	152	120	33376

(Montažni materijal je uključen kod dostavljanja)
Rotametri za veće kapacitete doziranja su također dostupni.

Nepovratni ventil za hlor

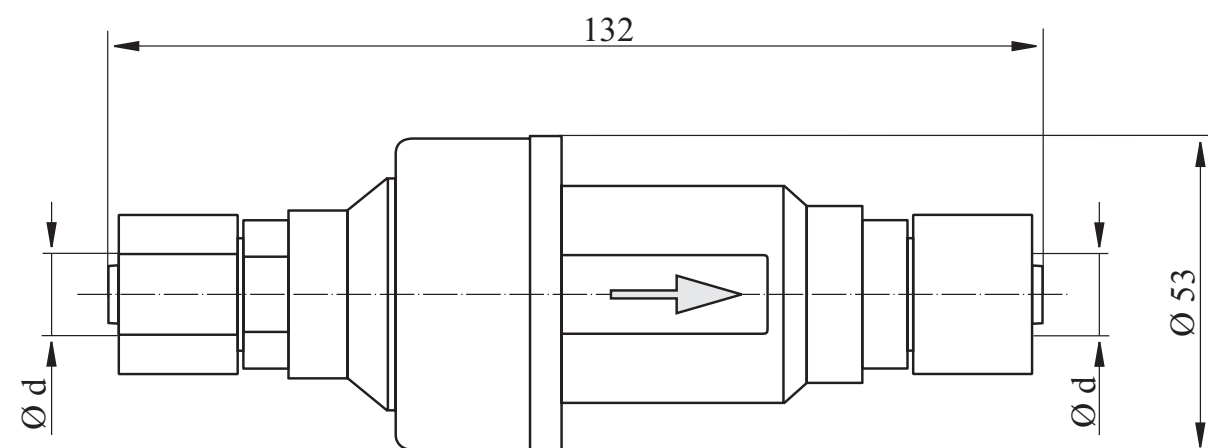
U praksi se pokazalo da čak i najbolji injektorski nepovratni ventil može nekad postati nepropusan zbog nečistoća, prljavština, sitnih čestica i sl. Zbog toga je u nekim zemljama nepovratni ventil za hlor propisan zakonom u samim instalacijama. Njegova funkcija je da spriječi ulazak vode u hlorinator čak i u slučaju “pada sistema” tako da se hlorinator ne ošteti.

Nepovratni ventil za hlor ima i sekundarnu sigurnosnu funkciju. On zahtjeva malu razliku pritiska za otvaranje. Vrijednost ovog diferencijalnog pritiska se određuje tako da on neznatno pređe minimum reagirajućeg pritiska sigurnosnog ventila. Čak i uslučaju neznatnog laganog ispuštanja hlora na vakuskom regulatoru, sigurnosni ventil reaguje tako da izbjegava razvijanje prekomjernog pritiska u vakuskom sistemu.

Tehnički podaci

Materijali:	PVC, Viton, staklo, Hastelolj
Pritisak reagovanja:	40 mbar
Protok:	do 10 kg Cl ₂ /sat
Priključci:	PE cijevi d 8/12 ili PE cijevi d 12/16
Težina:	150 g

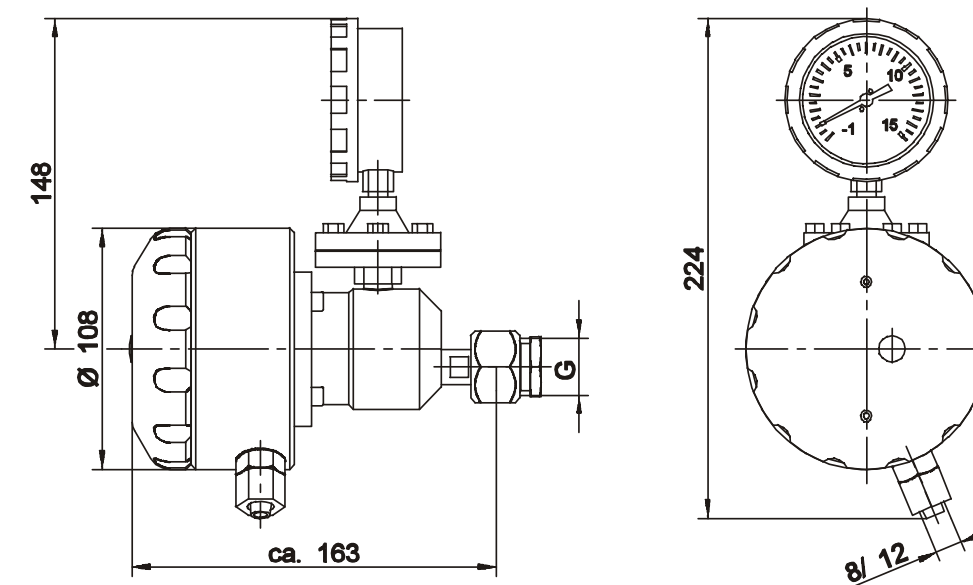
Dimenzije i broj djela



Priključci nepovratnog ventila za hlor na:

Cijevi d 8/12	Br. djela	20400060
Cijevi d 12/16	Br. djela	20400061
PVC d 16i	Br. djela	20435118

Dimensions C 2211



Full-vacuum chlorinator C 2211

Union nut W 1"	Part No. 20401100
Union nut G 5/8	Part No. 20401101
Union nut G 3/4	Part No. 20401102

Tubing / Accessories

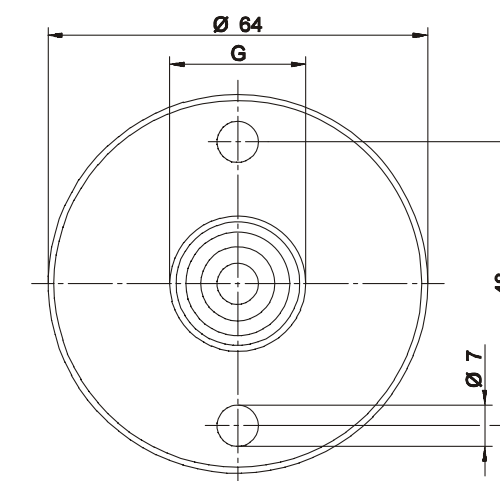
PE d 8/12	Part No. 97124
PVC d 8/12	Part No. 97561
PE d 12/16	Part No. 97176
Ammonia bottle (30ml)	Part No. 13513
Accessories kit (5m PE tubing, mounting brackets, ammonia)	Part No. 22412
Fork wrench SW32	Part No. 15901

Wall holder

Two different wall holders are available:
A PVC wall holder is used to receive the chlorinator while cylinder is exchanged and closes the pressure connection at the same time. Thus the entry of humid air is avoided effectively also during replacement of the cylinder.

A steel wall holder (see MB 2 23 03) is used as a permanent connection unit. The chlorinator is mounted onto the wall holder and supplied simultaneously from several chlorine cylinders via a manifold. Thus it is possible to meter large quantities with just one chlorinator.

Dimensions and Part Nos.

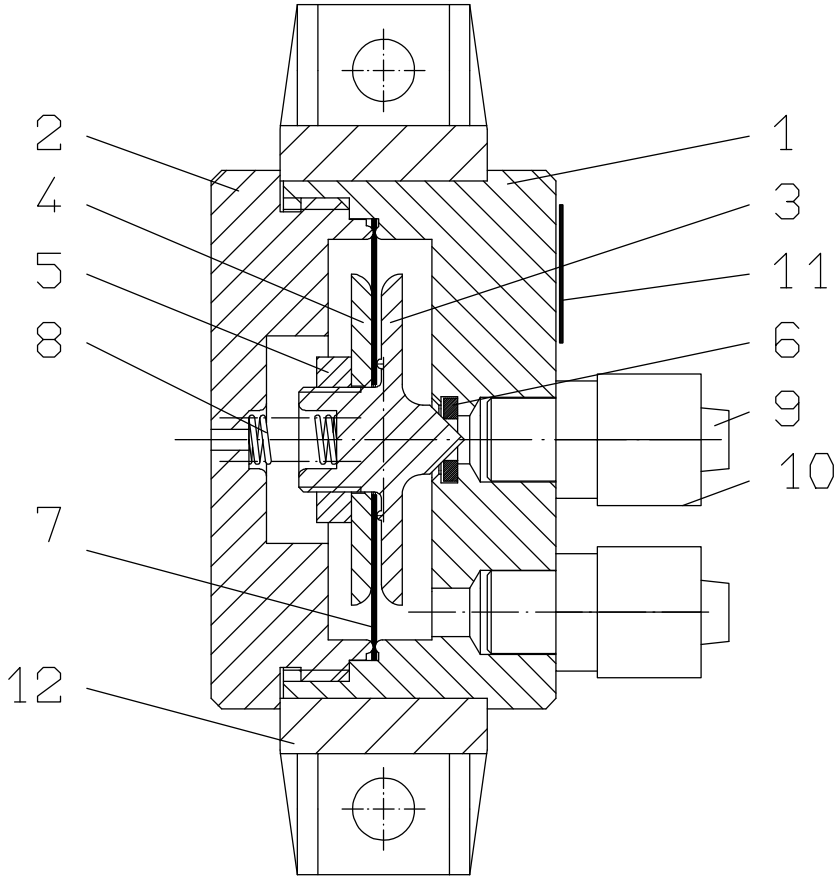


PVC wall holders for C 2211

Threaded pin W 1"	Part No. 28380
Threaded pin G 5/8	Part No. 29752
Threaded pin G 3/4	Part No. 28360
(Delivery incl. mounting material)	

Full-Vacuum Chlorinator C 2211

Safety valve



Item	Quantity	Description	Material	Part No.
1	1	Lower part	PVC	32841
2	1	Upper part	PVC	32840
3	1	Diaphragm holder	PVC	32839
4	1	Diaphragm disc	PVC	32842
5	1	Lock nut	PVC	33182
6*	1	Valve seat	Viton	10032
7*	1	Diaphragm	Viton	81682
8	1	Pressure spring (14mm)	Hastelloy	28967
9	2	Clamping connection	PVC	22325
10	2	Union nut	PVC	10365
11	1	"IN-OUT" label	Polyscript	87548
12	1	Pipe clamp	PE	32619
Safety valve assembly for chlorine gas manifold				32843

* contained in spare parts kit.

General

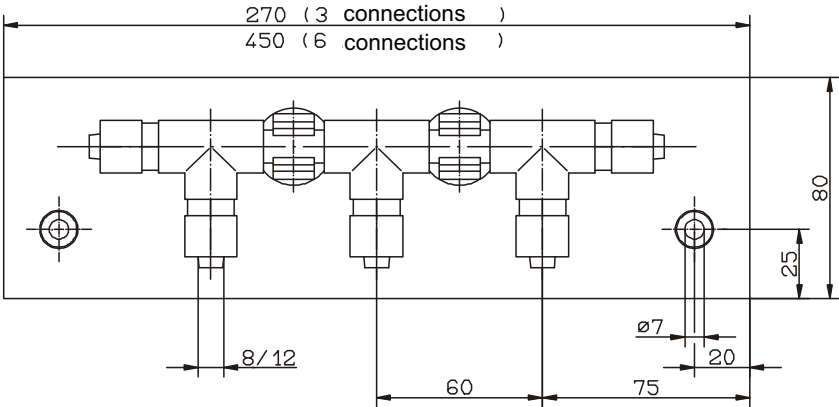
Chlorine may only be continuously withdrawn from tanks at a rate of approx. 1% since the pressure would drop considerably as a result of the reduction in temperature associated with the loss of energy if chlorine is withdrawn at a higher rate. This can result in icing on the outside.

For this reason, large quantities of chlorine are withdrawn from several tanks in parallel and collected in a chlorine manifold.

The chlorine manifold is available for connection to three or six chlorine cylinders. Unused connections can be sealed with blank caps. The symmetrical design ensures appropriate installation as shown in the example.

Important: No excess pressure
The chlorine manifold must not be used for pressurized chlorine gas, but only in a vacuum. Refer to data sheet MB 2 31 01 for manifold excess pressure.

Dimensions



Example for ordering

1500 g/h chlorine are required for continuous chlorination. This means that three 50 kg chlorine cylinders must be connected simultaneously on account of the permissible 1% withdrawal rate. A second battery of chlorine cylinders must be kept on hand with automatic changeover to ensure continuity.

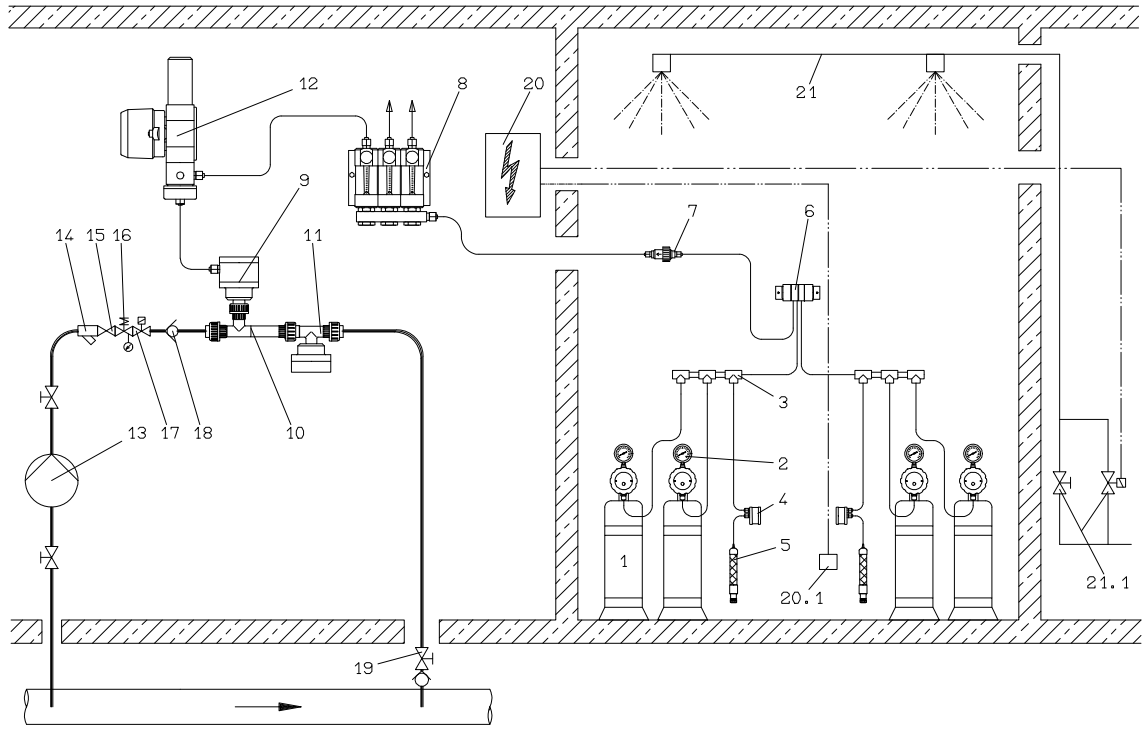
The order must be worded as follows:
2 ea. PVC manifold for 3 chlorine cylinders. Type S-3, Part No. 22329185
Single blank caps with seal: Part No. 29184

Part Numbers

Cylinder connections	Types	Blank caps	Part No.
3	S-3	2	22329185
6	S-6	3	22329186

The Part No. includes the manifold, blank caps, screws and dowels.

Installation example

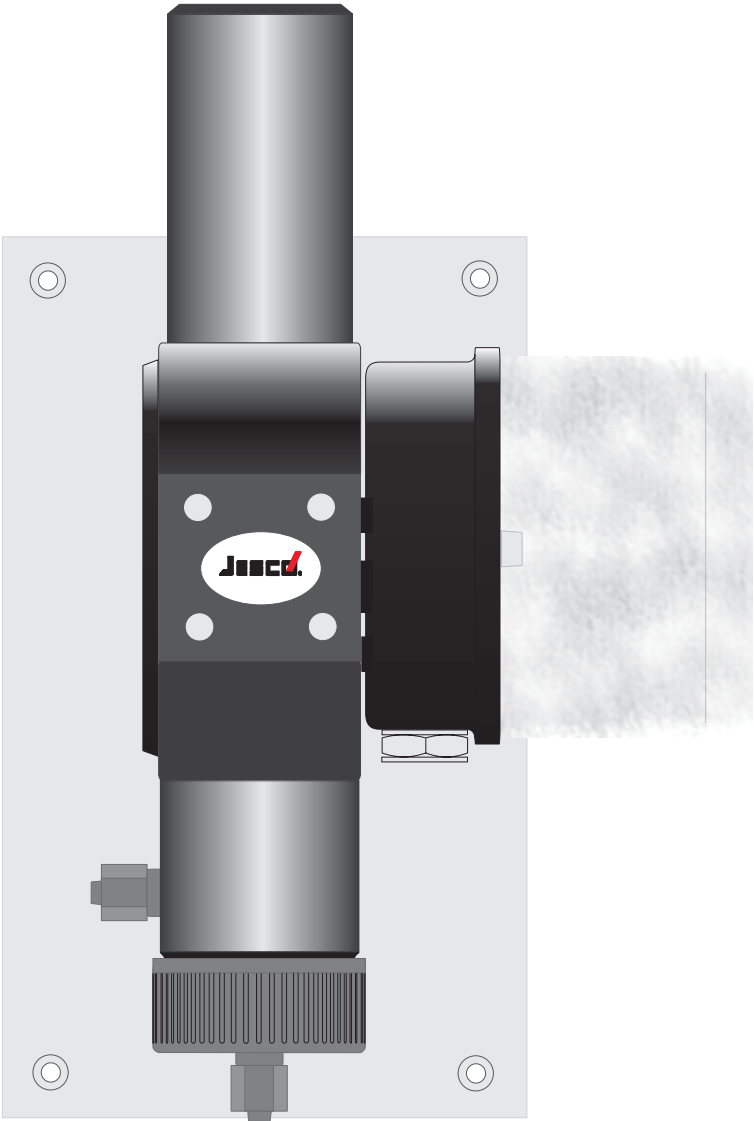


Legend

1 Chlorine cylinder		11 Vacuum breaker	MB 2 33 02
2 Vacuum chlorinator C 2211	MB 2 04 11	12 Control valve C 7700	MB 2 07 10
3 Vacuum manifold	MB 2 23 02	13 Booster pump	MB 2 29 01
4 Safety valve	MB 2 04 11	14 Dirt trap	MB 2 29 04
5 Activated carbon cartridge	MB 2 04 11	15 Shutoff valve	MB 2 29 04
6 Chlorine changeover valve C 2005	MB 2 04 05	16 Pressure reducing valve with pressure gauge	MB 2 29 04
7 Non-return valve or Safety shutoff valve	MB 2 04 11	17 Solenoid valve	MB 2 29 04
8 Measuring glasses and distributor block	MB 2 04 06	18 Ball-type non-return valve	
9 Ejector non-return valve	MB 2 04 11	19 Chlorine solution inlet	MB 2 34 01
10 Ejector	MB 2 32 01	20 Chlorine gas warning device	MB 2 36 04
	MB 2 31 01	20.1 Sensor for gas warning device	MB 2 36 04
		21 Sprinkler system	MB 2 41 00
		21.1 Fittings for sprinkler system	

PVC Chlorine Manifold

Regulaciona i Dozirna
Tehnologija
za Tekućine, Gasove i Sipkaste materijale



Regulacioni ventil hlora
C 7700

1. TEHNIČKI OPIS

1.1 Općenito

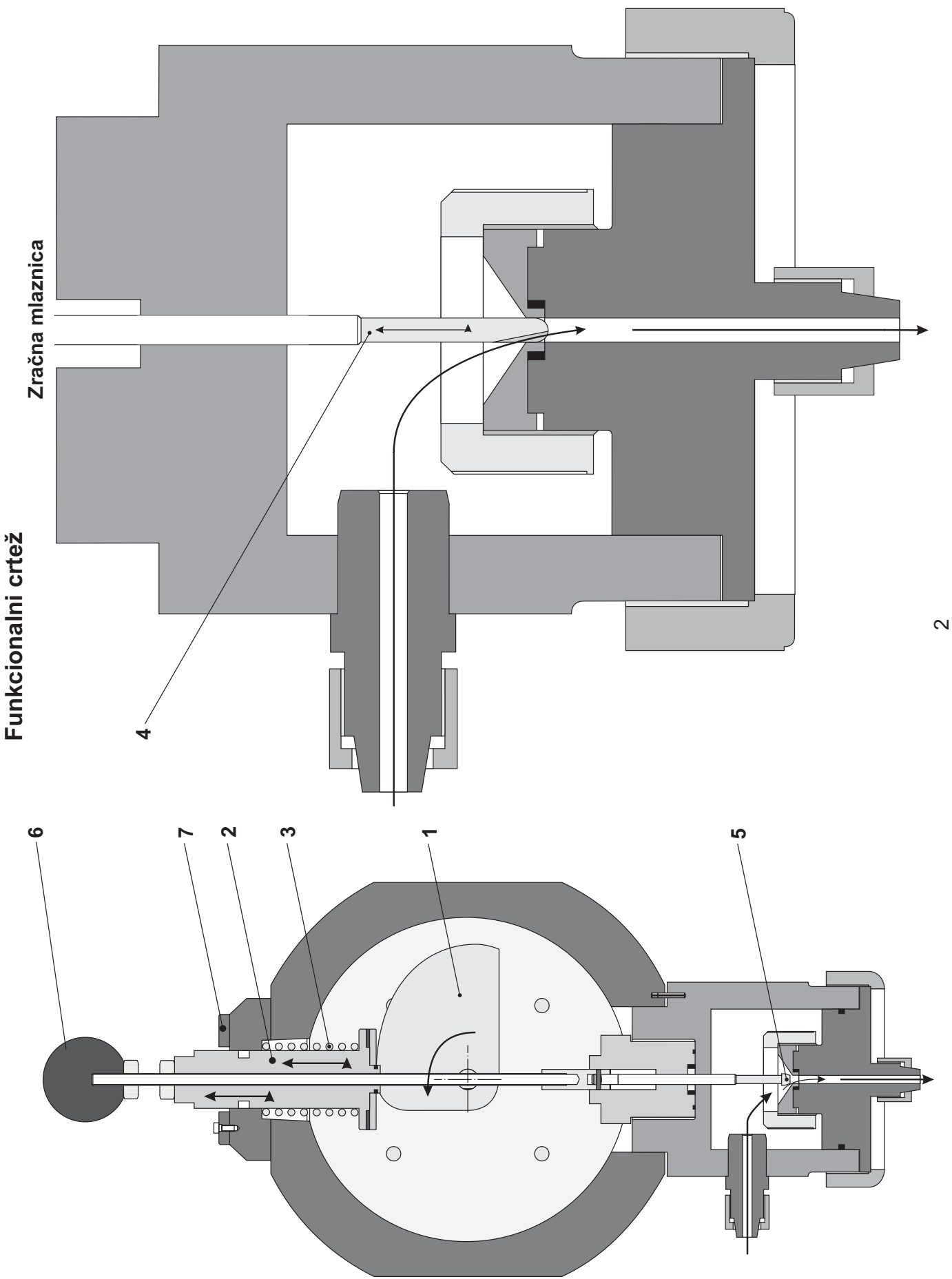
Protok gasnog hlora, rijetko se reguliše ručno u današnjim savremenim hlornim instalacijama prema DIN 19606. U većini slučajeva, koncentracija slobodnog hlora u vodi se nadzire sa elektroničkim regulatorom, koji podešava potrebnu količinu gasnog hlora u svojstvu električnog upravljačkog ventila. Regulacioni ventil C 7700 je stoga razvijen u ovu svrhu. To je plastični ventil za hlorne instalacije, temeljen na principu vakuma i zbog toga se nesmiije koristiti sa prekomjernim pritiscima.

1.2. Opis funkcionalnosti

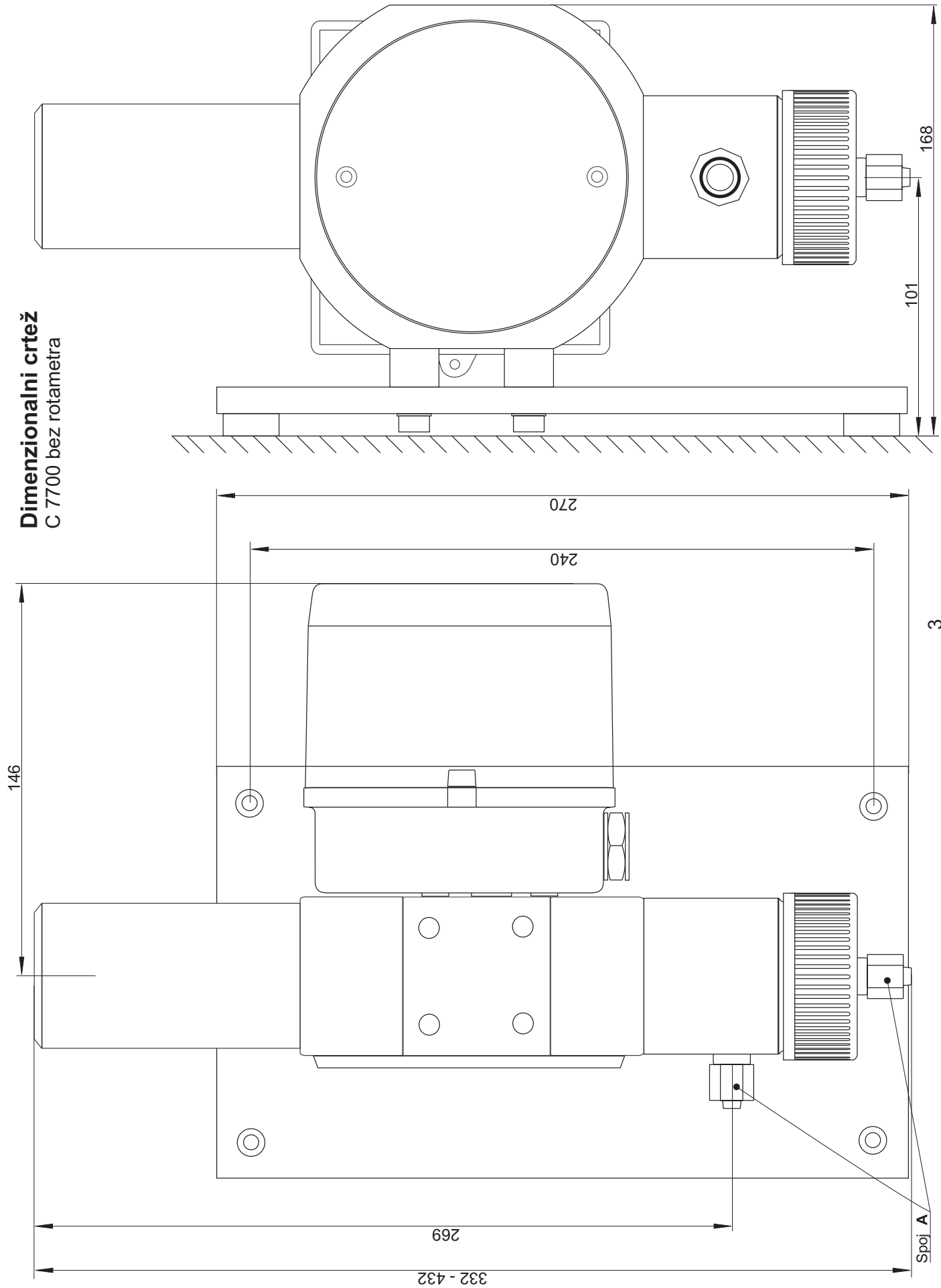
Servomotor sa 90°-skim konusnim zupčanicom pokreće podesni ekscentrik (1). On pretvara rotaciono kretanje u potpuni hod osovine ventila (2). Kontaktat između osovine ventila i ekscentrika osigurava se preko opruge (3). Ovaj regulacioni element je lociran na gornjem kraju osovine ventila. Do 2500 g Cl₂/h, regulacioni element je dizajniran kao zračna mlaznica u obliku heliptički urezane cilindrične osovine (4); za veće količine , ima oblik regulacionog konusa (5). Oba regulaciona elementa su oblikovana tako da je poprečni presjek protčnog područja mijenja srazmjerno položaju servomotora. Ovaj ventil ima linearnu karakteristiku. Za ručnu hlorinaciju, osovina ventila može se kompletno podići prema gore, povlačeći okruglu ručku (6) i zaglaviti u poziciju preko klizača-vođice (7). Protok hlornog gasa tada se podešava na igličnom ventilu rotametra. Kućište regulacionog ventila sastoji se od dvije komore, komore ventila i komore ekscentrika. Komore su odvojene jedna od druge sa dihtungom, da bi izbjegli kontakt između mašinskog pogona i hlornog gasa.

1.3. Tehnički podaci

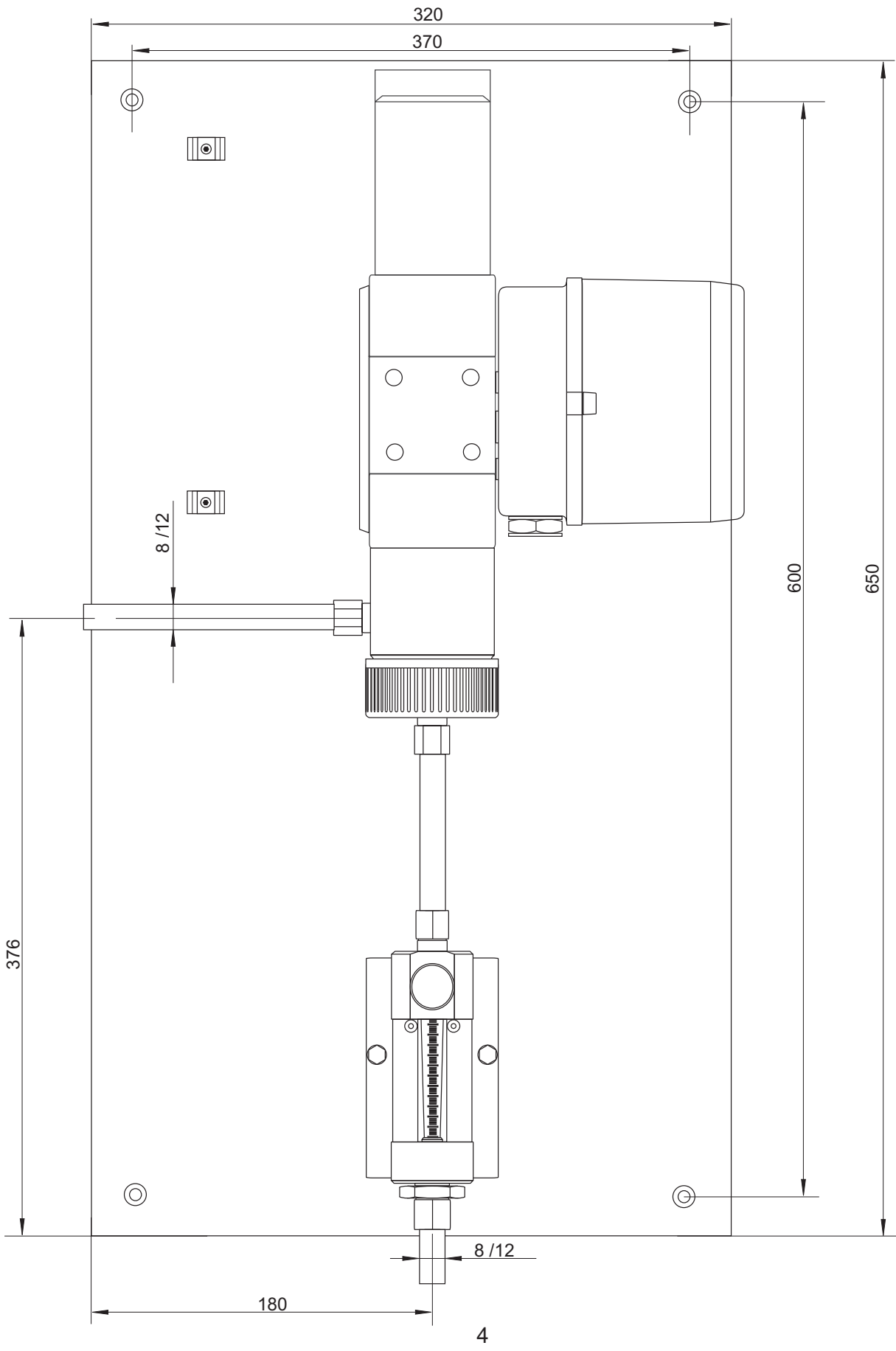
Napajanje (zavisno od verzije)	230 V 50 / 60 Hz	24 V 50 / 60 Hz
Potrošnja snage	Otprilike 10 W	
Vrsta zaštite	IP 55	
Signal regulacije	3 - tačkasto koračni	(0) 4 ... 20 mA ili (0) 4 ... 10 V
Položaj povratne sprege	Potenciometar 0...1000 Ohm	0 ... 10 V ili 0 ... 620 mV
Vrijeme regulacije za 90°	120 sekundi	
Obrtni momenat	15 Nm	
Temperatura ambijenta	0... 15° C	
Hod osovine	10 mm	
Težina	Otprilike 4 kg	



Dimenzionalni crtež
C 7700 bez rotametra



Dimenzionalni crtež
C 7700 sa rotametrom



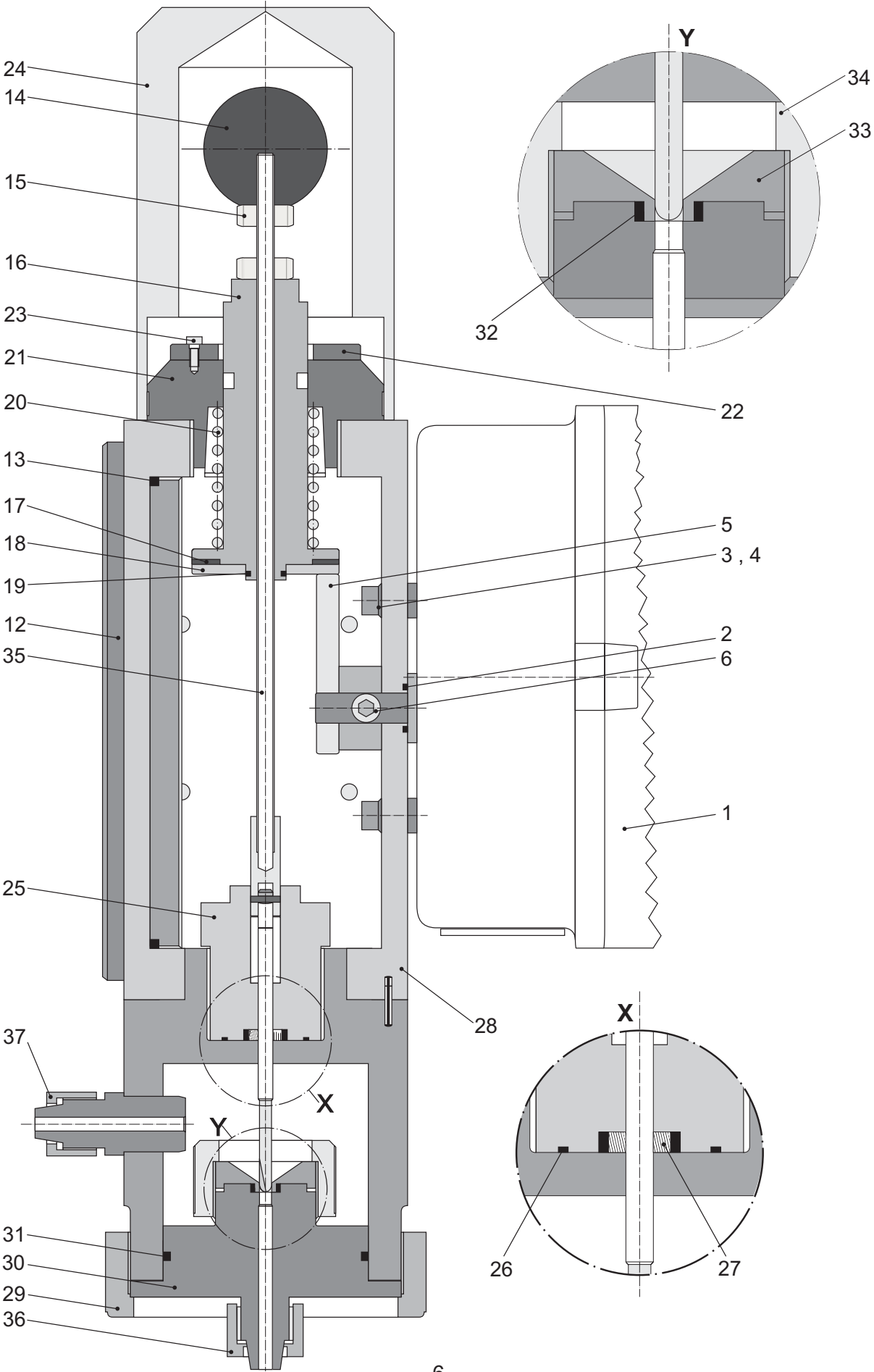
Odabirna tabela za regulacioni ventil C 7700 bez rotametra

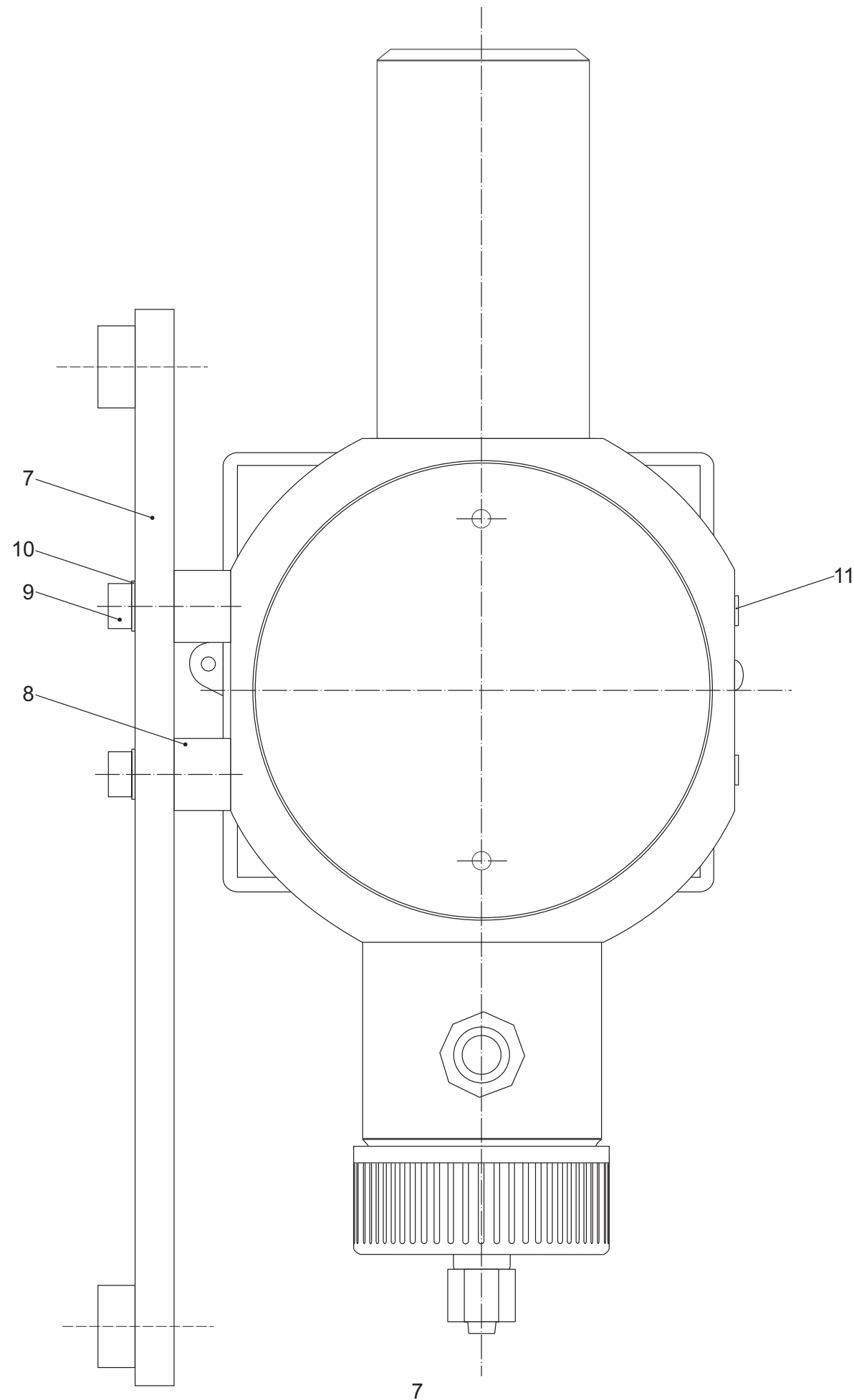
	Broj djela		
	230 V,3-tačkasto koračni	24 V, 4 ... 20 mA	
do 80 g / h	20729281	20700013	Spoj A Spajanje za PE crijevo d 8 / 12
do 200 g / h	20729305	20700014	
do 500 g / h	20729306	20700015	
do 1000 g / h	20729307	20700016	
do 2000 g / h	20729308	20700017	
do 2500 g / h	20729309	20700018	
do 4000 g / h	20729296	20700058	
do 80 g / h	20700050		G 1 / 4 i
do 200 g / h	20700051		
do 500 g / h	20700052		
do 1000 g / h	20700053		
do 2000 g / h	20700054		
do 2500 g / h	20700055		
do 4000 g / h	20700056		
do 5 kg / h	20729318	20732319	Spajanje za PE crijevo d 12 / 16
do 10 kg / h	20729319	20700035	
do 15 kg / h	20729320	20700034	
do 25 kg / h	20729313		PVC priрубnica DN 40 / d 50
do 40 kg / h	20729314		
do 60 kg / h	20729315		
do 100 kg / h	20729316		
do 200 kg / h	20729317		

Odabirna tabela za regulacioni ventil C 7700 sa rotametrom

	Spojevi za PE crijevo d 8 / 12	
	230 V,3-tačkasto koračni	24 V, 4 ... 20 mA
do 80 g / h	20700001	20700021
do 200 g / h	20700002	20700022
do 500 g / h	20700003	20700023
do 1000 g / h	20700004	20700024
do 2000 g / h	20700005	20700025
do 2500 g / h	20700006	20700026
do 4000 g / h	20700007	20700027

2. REZERVNI DJELOVI





Poz.	Opis	Materijal	Broj dijela	Količ.
1	Servomotor 230 VAC, 3 - tačkasto-koračni	-	78745	1
	Servomotor 24 VAC, 0(4) ... 20 mA	-	78993	
2	O - ring d 14 x 1.78	Viton	80003	1
3	Imbus vijak M5 x 16	A2	83608	4
4	Podloška d 5.3	A2	84164	4
5	Regulacioni ekscentar	Mesing	15524	1
6	Vijak M5 x 16	A2	83606	1
7	Montažna ploča sa umetcima	PP	29304	1
8	Razmaknica	PP	34213	4
9	Imbus vijak M5 x 16	A2	83821	4
10	Podloška d 5.3	A2	84160	4
11	Plastični čep za M6	PE	32213	4
12	Pokolpac sa navojem za komoru sa ekscentrom	PVC	29291	1
13	O - prsten d 99 x 2	NBR	80615	1
14	Ručna poluga za upravljanje	Plastika	29287	1
15	Matica M6	A2	83395	2
16	Vodilica za osovinu ventila	Mesing	29282	1
17	Među-prsten	Čelik	86107	1
18	Podupirač vodilice	Mesing	29284	1
19	Sigurnosni prsten	Čelik	84084	1
20	Opruga	Čelik	82624	1
21	Matica za vodilicu osovine	PVC	29283	1
22	Pločica za zaustavljanje podignute osovine ventila	PVC	29285	1
23	Imbus vijak M5 x 16	A2	83622	1
24	Zaštitna kapa	PVC	32141	1
25	Kućište vodilice G 1/2	PVC	32140	1
26	O - prsten d 13 x 1	Viton	80647	1
27	Komplet zaptivača	PTFE / Viton	80648	1
28	Kućište ventila za crijevo d 8 / 12 G 1 / 4 unutrašnji	PVC	29302	1
		PVC	34471	
29	Donji poklopac sa navojem G2	PVC	22259	1
30	Sjedište ventila do 2500 g / h za crijevo d 8 / 12 G 1 / 4 unutrašnji d 16 unutrašnji	PVC	29288	1
		PVC	34848	
		PVC	34470	
31	O - prsten d 38 x 2.5	Viton	80049	1
32	Komplet zaptivača d 4.6	PTFE / Viton	80621	1
33	Sjedište držača	PVC	29289	1
34	PVC navrtka	PVC	82087	1
35	Osovina ventila (komplet) ... 80 g / h, Br. 1 ... 200 g / h, Br. 1 ... 500 g / h, Br. 1 ... 1000 g / h, Br. 1 ... 2000 g / h, Br. 1 ... 2500 g / h, Br. 1	PVDF / Mesing	32396	1
			32397	
			32398	
			32399	
			32240	
			32421	
36	Priključak za crijevo d 8 /12	PVC	10365	2

3. ODRŽAVANJE

3.1. Dostavljena paleta

Budite oprezni kod otpakivanja hlorne opreme i dodataka vezanih uz isporuku, da ne bi u kojem slučaju izostavili male dijelove. U većini slučajeva to su montažni šrafovi za zidnu montažu. Odmah provjerite dostavljenu paletu sa dostavljenom narudžbom, da bih provjerili ima li ikakvih neslaganja.

3.2. Sigurnosne instrukcije

- ⇒ Hlorni gas je opasan za zdravlje i život. Zbog toga budite veoma oprezni kad god budete rukovali sa hlornim instalacijama. Svi radovi na instalacijama zahtijevaju posebno znanje i sigurnosne mjere i mogu ih izvoditi samo tehnički osposobljeno osoblje.
- ⇒ Obratite pažnju na lokalna sigurnosna pravila kod radova na hlornim instalacijama. U Njemačkoj, sigurnosno pravilo "*hlorinacija vode*" (VGB 65) se primjenjuje kao najnovija dostupna verzija u gradskim udruženjima za osiguranje od nezgoda.
- ⇒ Prije rada na hlornim instalacijama, zatvorite ventile na hlornim bocama. Ispraznite sve noseće hlorne linije (crijeva) koristeći injektor (koji će pomoću vakuma stvorenog od nadpritisaka, isprazniti zaostali hlor u crijevima).
- ⇒ C 7700 regulacioni ventili pogodni su za vakumske hlorne instalacije. Oni se ne smiju koristiti za gas pod prekomjernim pritiskom.
- ⇒ Hlorni gas je ekstremno higroskopan (svojstvo gasova da se vežu sa vlagom). Prema tome, vlaga će ući u sistem u slučaju otvaranja ili napuknuća linija (crijeva) između uređaja. Kao rezultat toga, formirat će se hidrohlorna kiselina, koja će prouzročiti oštećenja opreme. Stoga, svi spojevi (uključujući i one na vakumskim uređajima i vodovima) moraju biti zatvoreni tokom "padova" sistema.
- ⇒ Ako se hlorinatori trebaju koristiti za druge gasove umjesto hlornog gasa, provjerite hemijsku otpornost uređaja na taj gas u dogovoru sa proizvođačem.
- ⇒ Prije rada sa regulacionim ventilom, iskopčajte glavne vodove i osigurajte da se nemogu ponovo prikopčati.
- ⇒ Nakon prilagodbe električnih spojeva na ventilu ili podešavanju servomotora, kablovski spojevi na zavrtnje moraju biti stegnuti, a zaštitni poklopac se mora montirati. U protivnom, ne može se garantovati klasa zaštite (IPxx).

3.3. Hidraulična instalacija

Regulacioni ventil za hlor C 7700 instalira se u vakumskoj liniji u bilo kojoj tački između rotametra i injektorskog nepovratnog ventila.

Pažljivo stegnite PVC matice. Čak i ručno zavrtnute PVC matice daju čvrsto zategnut spoj.

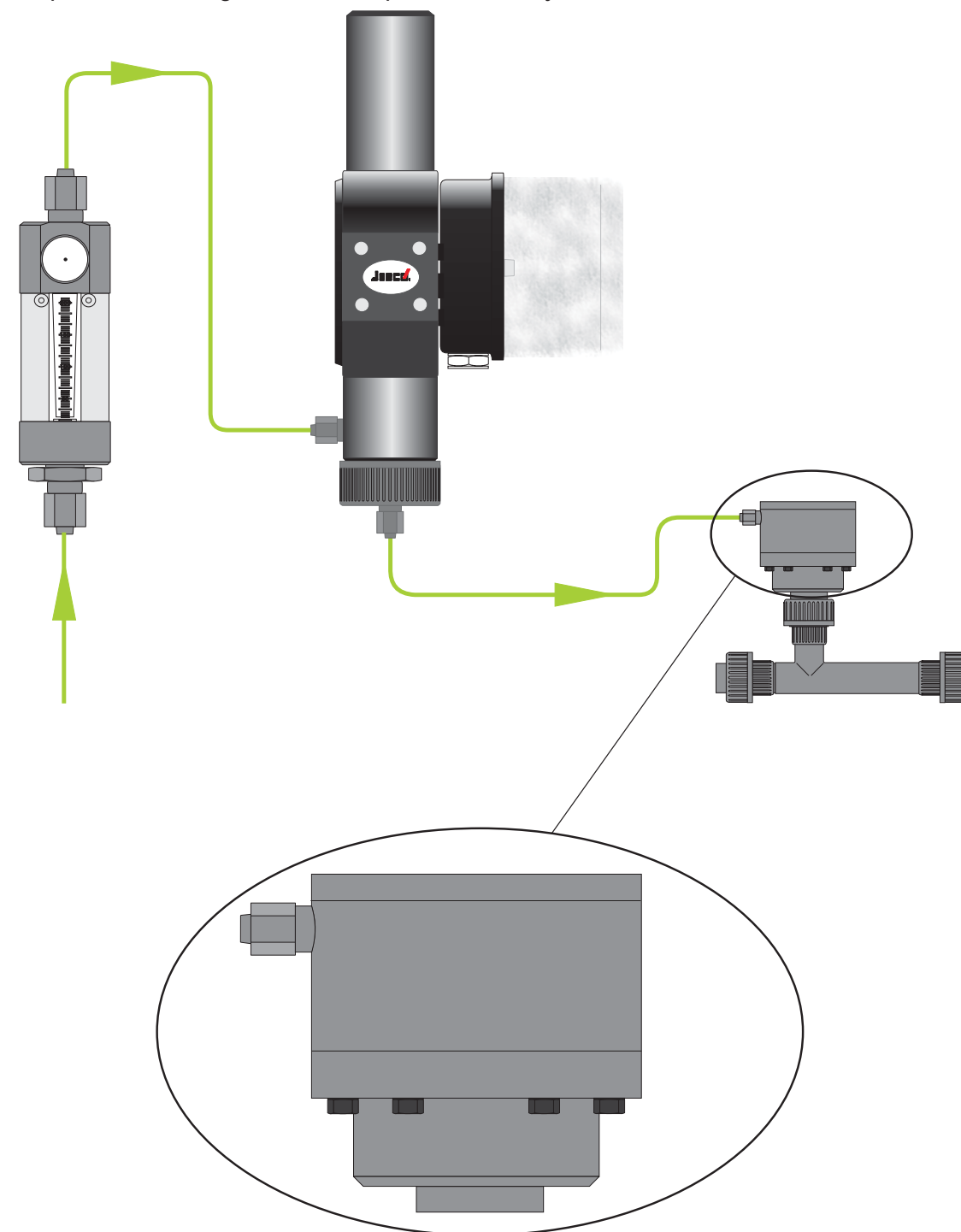
Svi spojevi regulacionog ventila za hlor moraju biti apsolutno čvrsto spojeni. U protivnom, vlaga će ući u sistem tokom operacije sa vakumom, stvarajući naslage zajedno sa hlorom, što može uticati na funkciju ventila. Ovo se posebno odnosi na regulacioni otvor manjih regulacionih ventila.

3.4. Regulator pozadinskog pritiska

Protok na regulacionom ventilu za hlor, određuje se sa:

- a) Položajem regulacionog elementa i
- b) intenzitetom vakuma injektora.

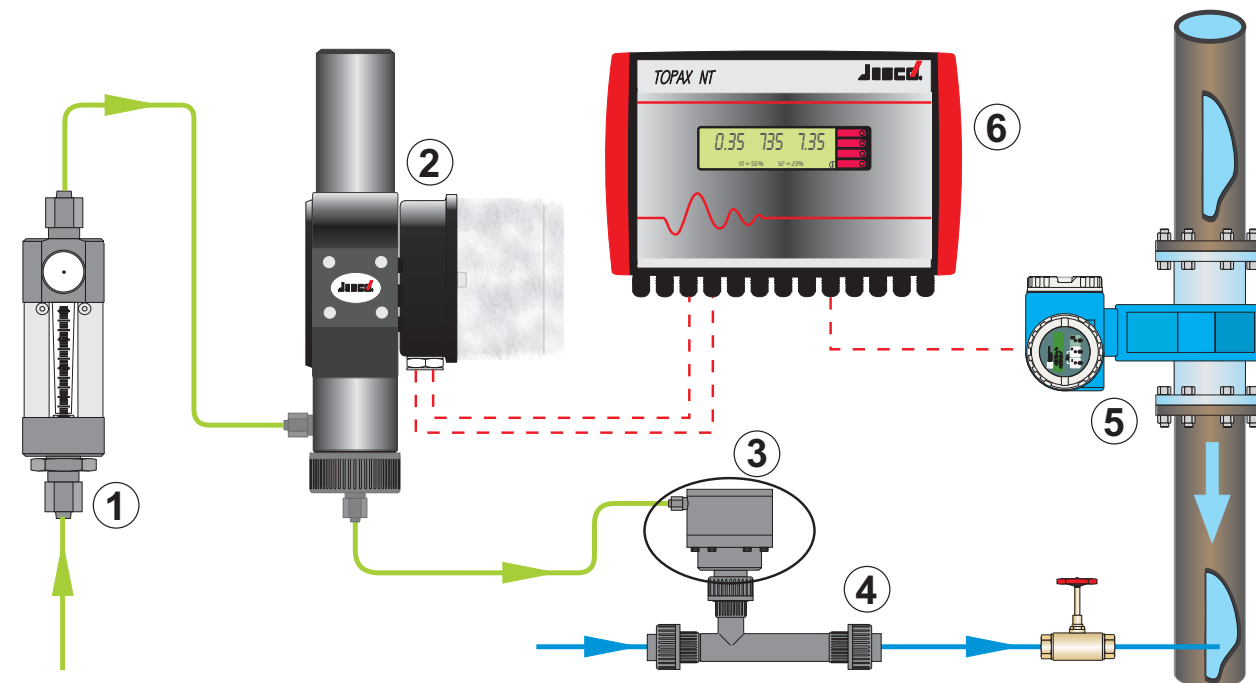
Vakum iz injektora ne smije da varira zbog toga da bi mogli osigurati da kapacitet doziranja ovisi samo od položaja regulacionog elementa. Stoga, njemački standard DIN 19606 zahtjeva tzv. regulator pozadinskog pritiska, koji osigurava uslove stalnog pritiska na regulacionom ventilu za hlor i prema tome osigurava tačni kapacitet doziranja i linearnu karakteristiku.



3.5. Tipovi instalacije

Regulacioni ventil hlora radi na principu promjena u području slobodnog poprečno-presječnog protoka. Volumetrijski protok gasnog hlora, međutim, također zavisi od gradijenta pritiska. Ovo osigurava da fluktuacije na usisnom pritisku injektora imaju mali efekat na količinu doziranja.

3.5.1. Proporcionalno doziranje



1. Rotametar sa ručnim ventilom za podešavanje
3. Regulator pozadinskog pritiska
5. Mjerač protoka

2. Regulacioni ventil hlora C7700
4. Injektor sa nepovratnim ventilom
6. Proporcionalni regulator

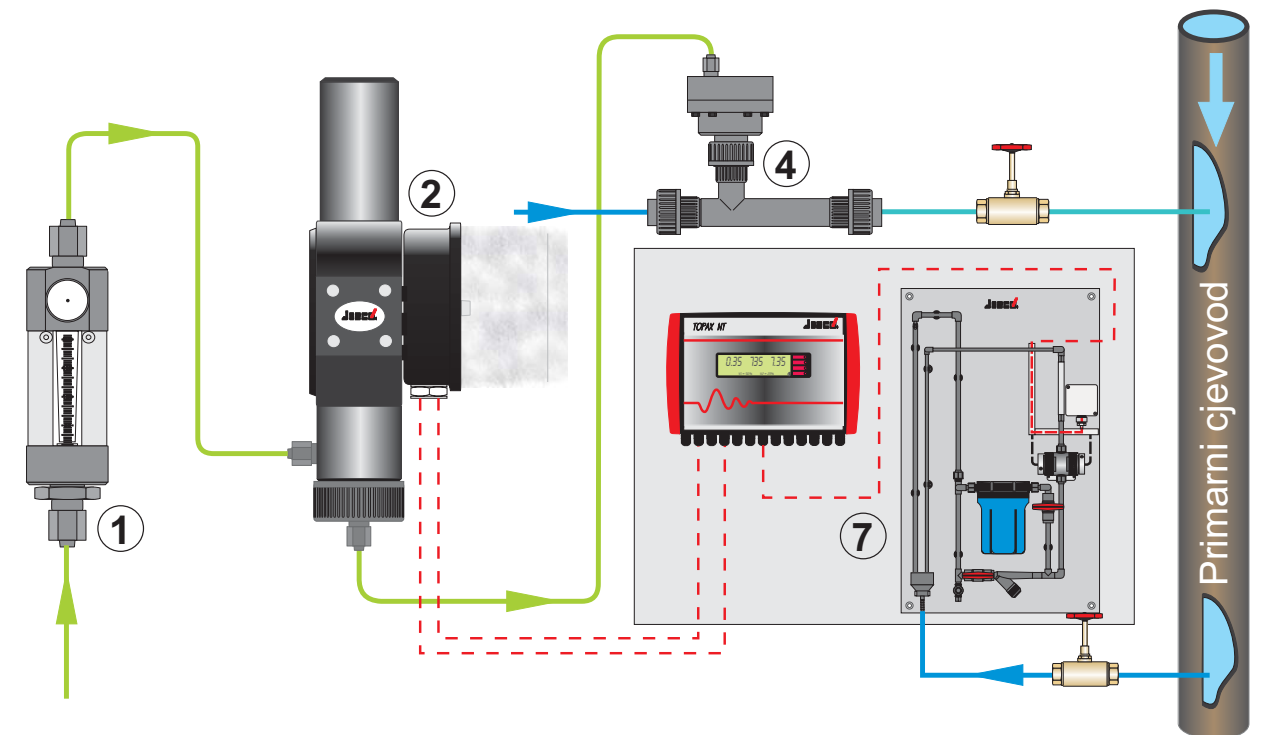
Proporcionalni regulator (TOPAX NT) (6), reguliše servomotor regulacionog ventila za hlor (2), proporcionalno signalu induktivnog mjerača protoka (5). U nekim slučajevima, dodatno se ugrađuje senzor, koji bi mjerio koncentraciju slobodnog hlora u vodi. Tada proporcionalni regulator reguliše ventil u zavisnosti od protoka i koncentracije hlora.

3 - tačkasto koračni signal se koristi većinom iz finansijskih razloga. Ponavljajući potencijometar obavještava proporcionalni regulator o trenutnom položaju regulacionog ventila hlora.

Ako se proporcionalni regulator spoji direktno na induktivni mjerača protoka bez uključivanja regulatora, potreban je servomotor sa regulacijom od 4...20 mA.

Za ovaj tip instalacije, regulator pozadinskog pritiska (3) osigurava uslove stalnog pritiska na regulacionom ventilu. Stoga, doziranje je stvarno proporcionalno protoku vode.

3.5.2. Zatvoreni regulacijski krug



1. Rotametar sa ručnim ventilom za podešavanje
2. Regulacioni ventil hlora C7700
4. Injektor sa nepovratnim ventilom
7. Stanica za mjerenje i regulaciju slobodnog hlora

U ovom slučaju regulacioni ventil hlora je reguliran sa regulatorom za slobodni hlor (kombinacija TOPAX-a NT i stanice za uzimanje uzorka SR 404) (7). Već hlorisana voda se mjeri. Pogrešno doziranje zbog variranja usisnog kapaciteta sa injektora se ispravlja preko proporcionalnog regulatora. Prema tome, nikakav regulator pozadinskog pritiska nije potreban za ovu vrstu instalacije.

Uticaj je beznačajan u zatvorenom regulacijskom krugu sa mjerenjem slobodnog hlora, budući da je regulacioni ventil hlora podešen sa procesnim regulatorom. Takve fluktuacije na usisnom pritisku moraju biti isključene u sistemima sa proporcionalnim pritiskom doziranja. U takvim slučajevima potreban je membranski ventil za regulaciju pozadinskog pritiska u skladu sa DIN 19606.

3.6. Električni spojevi

Lokalni zakoni (DIN, VDE, ...) moraju biti ispoštovani za električne instalacije. Molimo vas, da osigurate da radove na električnim instalacijama uvijek vrši tehničko osposobljeno osoblje.

Nezaboravite da spojite klemu uzemljenja metalnog kućišta!
Kod električnog spajanja, morate uvijek osigurati klasu zaštite servomotora (koristite odgovarajuće kablovske spojnice i kablove).

Šeme ožičenja servomotora biti će prikazano u daljnjem tekstu.

3.7. Pokretanje

3.7.1. Podešavanje potenciometra

Za servomotor sa 3 - tačkasto koračnom regulacijom, ponavljajući potenciometar i regulator moraju se prilagoditi jedan drugom nakon električnog spajanja.

Procedura zavisi od vrste regulatora. U opštem slučaju, sljedeći koraci moraju se poduzeti:

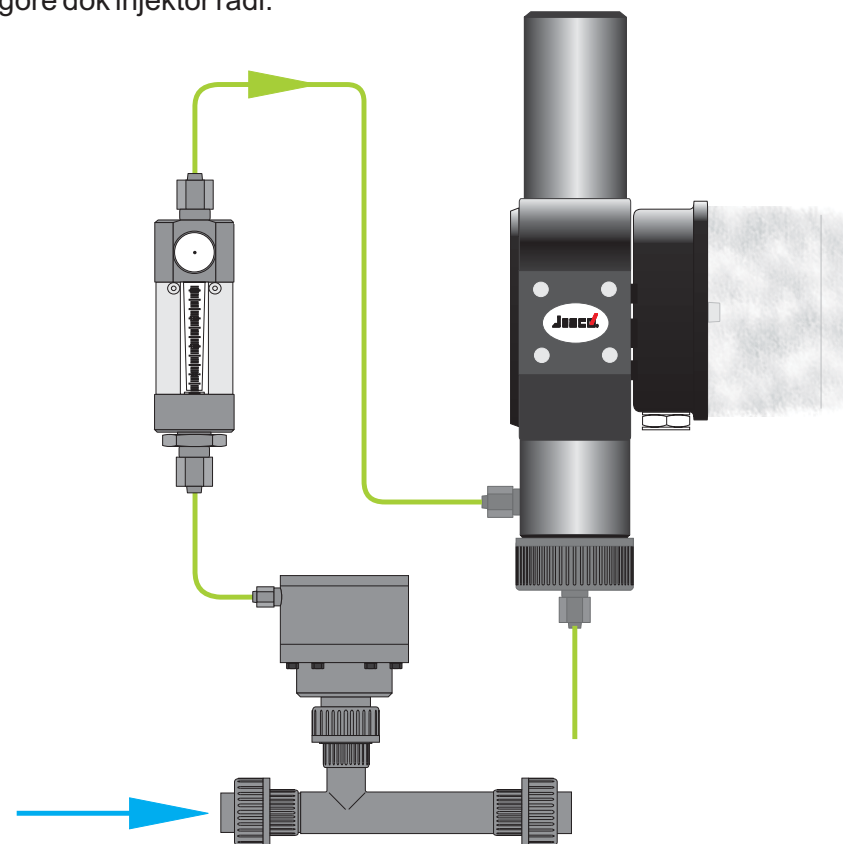
- Dok je regulator u modu podešavanja, servomotor je doveden u završni, odnosno u krajnji položaj.
- Pomoću odvijača ili šarafcigera, potenciometar se pomjera preko kliznog kvačila u isti smjer sve do njegovog zaustavljanja.
- Vrijednost otpora potvrđuje se na regulatoru.
- Servomotor je doveden u drugi krajnji položaj. Granični prekidač također i u ovom slučaju isključuje motor.
- Ova vrijednost se također potvrđuje na regulatoru.

Prilagođavanje potenciometra i regulatora je završena.

3.7.2. Test ispuštanja (curenja)

Za test isticanja hidrauličnih spojeva, potreban je dodatni rotametar. On se instalira između regulacionog ventila za hlor i injektorskog nepovratnog ventila za vrijeme trajanje testa.

Zatvorite dodvod hlora. Nakon blagog pomjeranja na početku, kuglica rotametra se ne bi smijela kretati prema gore dok injektor radi.



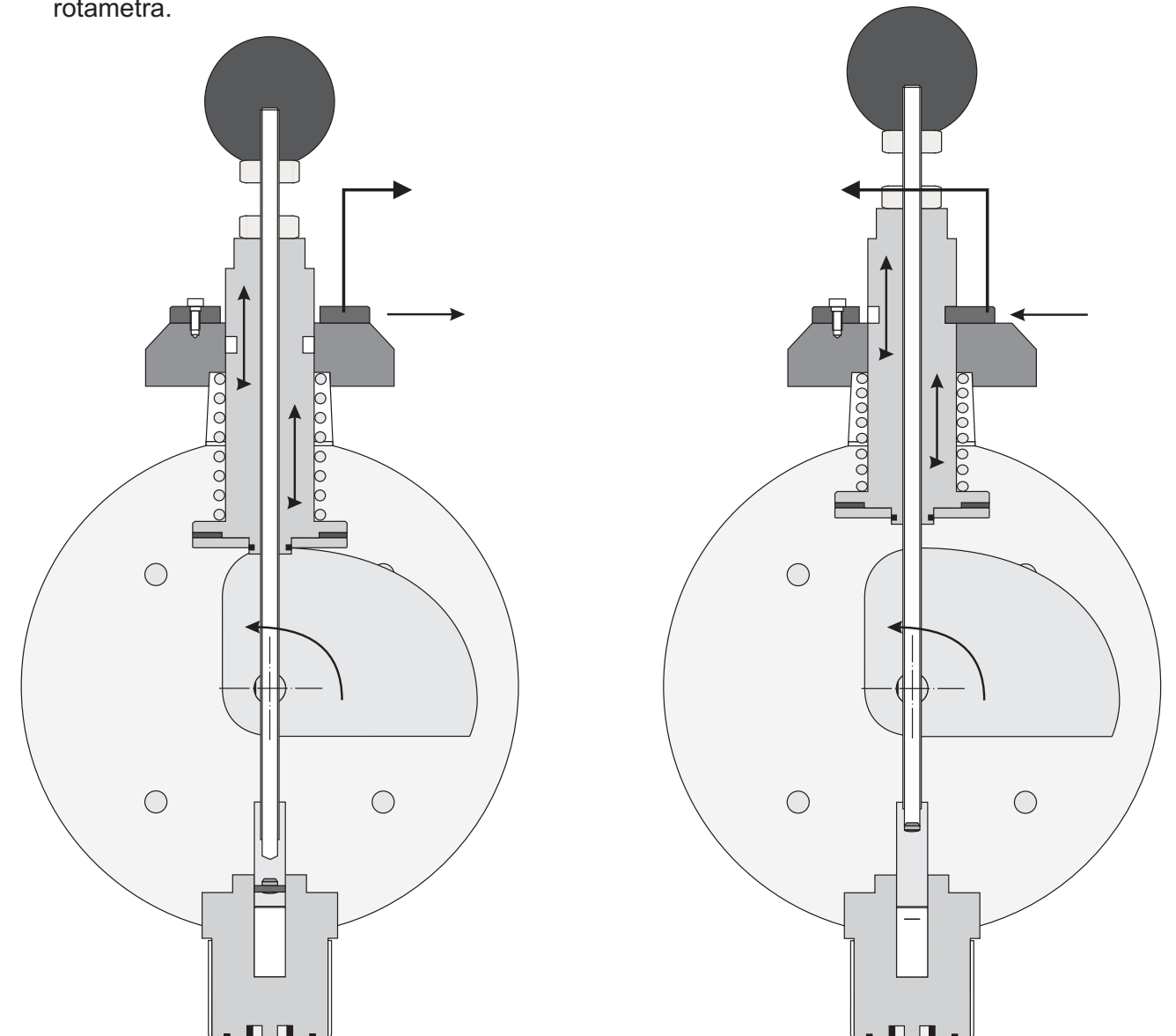
3.8. Upravljanje

3.8.1. Automatsko doziranje

Normalno, regulacionom ventilu za hlor nije potrebno nikakvo opsluživanje tokom automatskog doziranja. Ali preporučuje se vizuelna rutinska provjera.

3.8.1. Ručno doziranje

Često je potrebno ručno zaustaviti doziranje na privremeno vrijeme (npr. za vrijeme “šok” hlorinacije). Za ovu svrhu, osovina ventila može se kompletno povući prema gore i “zaključati”. Tada je doziranje nezavisno od položaja ekscentra, te se ono podešava na ručnom ventilu rotametra.



Da bi ste se vratili na automatsko upravljanje, kugla sa osovnom ventila se povlači prema gore i zapon za zaustavljanje se sklanja.

U tom slučaju, ručni ventil na rotametu mora biti potpuno otvoren.

3.9. Isključenje iz sistema

Za kraće prekide u radu, nikakve specijalne mjere treba poduzimati. Bilo bi razumno da ispraznite vakumsku liniju koristeći injektor, ako su hlorne boce (cilindri) zatvorene. U slučaju dužih isključenja sistema, hlorna instalacija trebala bi se isprati sa suhim zrakom ili nitrogenom na nekoliko minuta. Nakon toga, svi spojevi vakumskog sistema moraju se pažljivo zatvoriti zbog mogućnosti ulaska vlage u sistem.

Održavanje uređaja trebalo bi se izvoditi tokom pada sistema, tako da sve naslage nastale tokom rada ne stvrdnu.

3.10. Održavanje

Redovitim održavanjem i servisom izbjegavaju se nezgode!

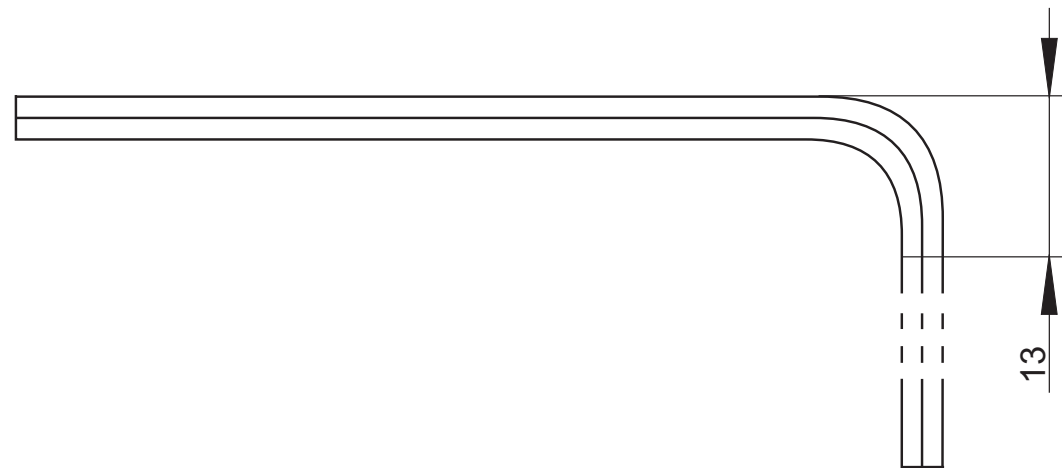
Mi vam preporučujemo ugovor o održavanju.

Prije rada sa hlornim instalacijama, hlorne boce/tankovi moraju uvijek biti zatvoreni.

Ispraznite sistem koristeći injektor, dok rotametar ne pokaže nulu.

Za održavanje, regulacioni ventil hlora se pažljivo rastavlja, svi dijelovi se vizuelno pregledaju i habasti dijelovi se mijenjaju.

Topla voda ili izopropilni alkohol je pogodan za čišćenje komponenti. Prije demontaže, oni moraju biti potpuno suhi. PVC navrtke i navoji se malo podmažu sa silikonkom masti. Da bi se sa njima lako rukovalo i da se odspoje bez ikakvih problema. Za demontažu ekscentra, potreban je imbus SW 4mm sa skraćenom stranicom.



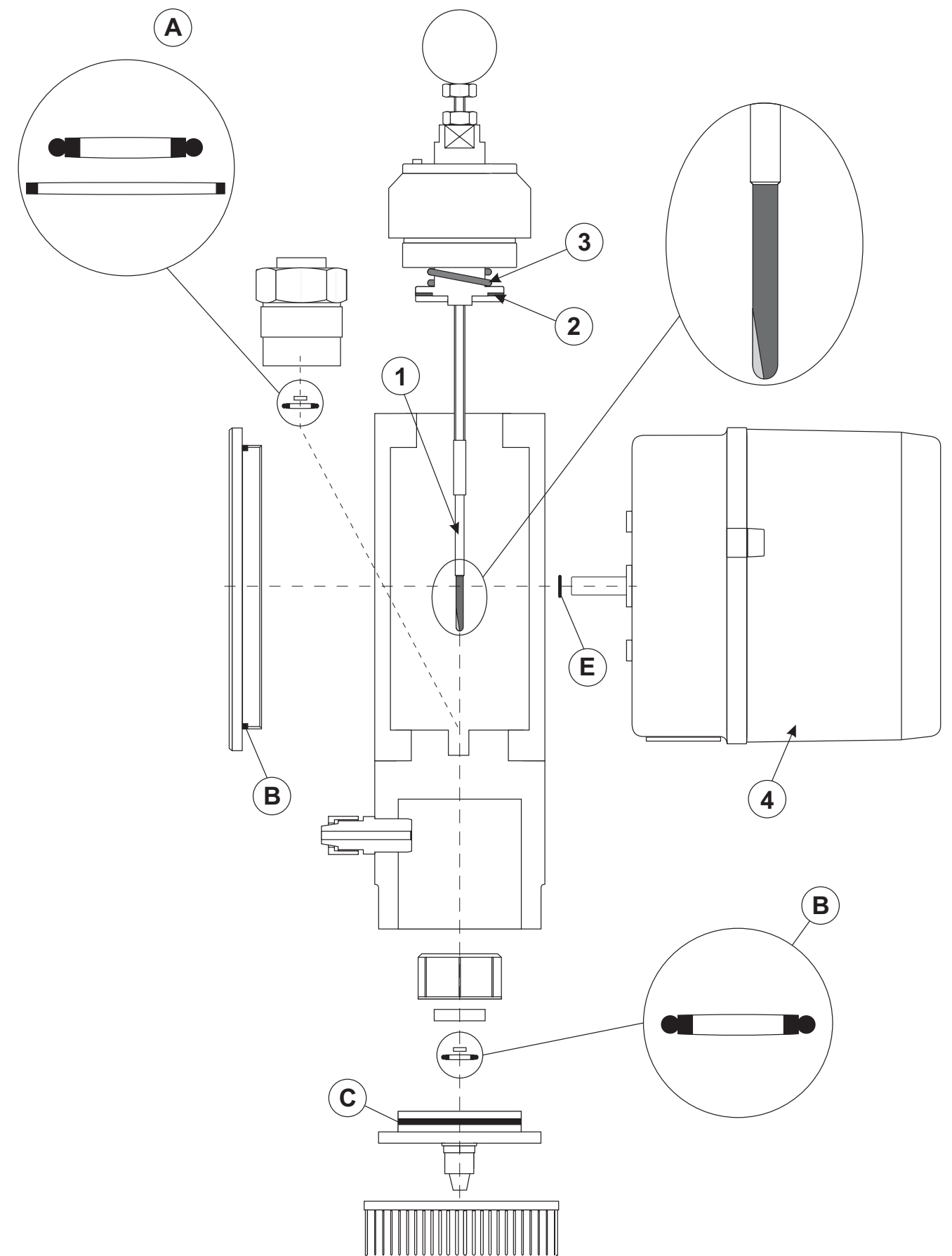
3.10.1. Zamjena zaptivača

Oni zaptivači koji bi se trebali zamijeniti tokom godišnjeg održavanja, dostupni su kao održavajući setovi.

Ovi setovi uključuju zaptivače za osovinu ventila i zračnu mlaznicu. Oni su predmet konstantnog habanja zbog čestih kretanja gore - dolje.

Komora se ekscentrom postaje dostupna ako se poklopac koji se nalazi nasuprot servomotoru odvrne. Zamijenite zaptivače onako kao što je prikazano na slici (sljedeća strana).

Mjesta zamjene zaptivača, O - prstena i podmazivanja



A: Šipka prolazi kroz PTFE prsten koji je zadihtovan sa vanjskim O - prstenom. Zaptivač se koristi podmazan sa malo silikonske masti. Jače stezanje ne povećava pritegnutost. Nepokretnost zaptivača osigurava dodatni O - prsten. Za montažu, O- prsten se “priljepi” na holender koristeći silikonsku mast.

B: (samo do 2,500 g/h) Za zračnu mlaznicu, koristi se ista vrsta zaptivača kao kod **A**. Ovi zaptivači se montiraju u suvim uslovima da bi se izbeglo blokiranje mlaznice.

C, D, E: Ovi O- prsteni se podmazuju sa silikonskom masti tako da lagano nalegnu na PVC površinu kod montaže.

3.10.2. Podmazivanje

Obično je dovoljno izmjeniti fluid za podmazivanje regulacionog ventila jednom godišnje ako dio rutinskog održavanja.

Za podmazivanje uvijek koristite silikonsku mast, ali nikad vazelin. Hlorni gas izvlači vodu (vlagu) iz vazelina tako da se on stvrdne. Rezulata toga bi bilo povećano habanje i otkazivanje sistema.

Brojevi koji odgovaraju prethodnom crtežu:

1: Osovina podešavajuće šipke se malo pomaže u cilindru smještenom između komore ekscentra i komore ventila.

2: Sjedište igličastog završetka ventilske osovine između ekscentra i potisnog zaptivača se podmazuje.

3: Tlačna opruga se lagano podmazuje da bi se osigurala zaštita protiv korozije.

4: Servomotoru je dovoljno podmazivanje sa uljem za pogonske zupčanike. Veoma je razumno provjeravati pogon jednom godišnje, radi dovoljne količine podmazivanja i ako je potrebno izmjeniti pogonsko ulje zupčanika. U slučajevima u kojima su pogoni izloženi povećanim temperaturama, intervali između provjera podmazivanja moraju se skratiti.

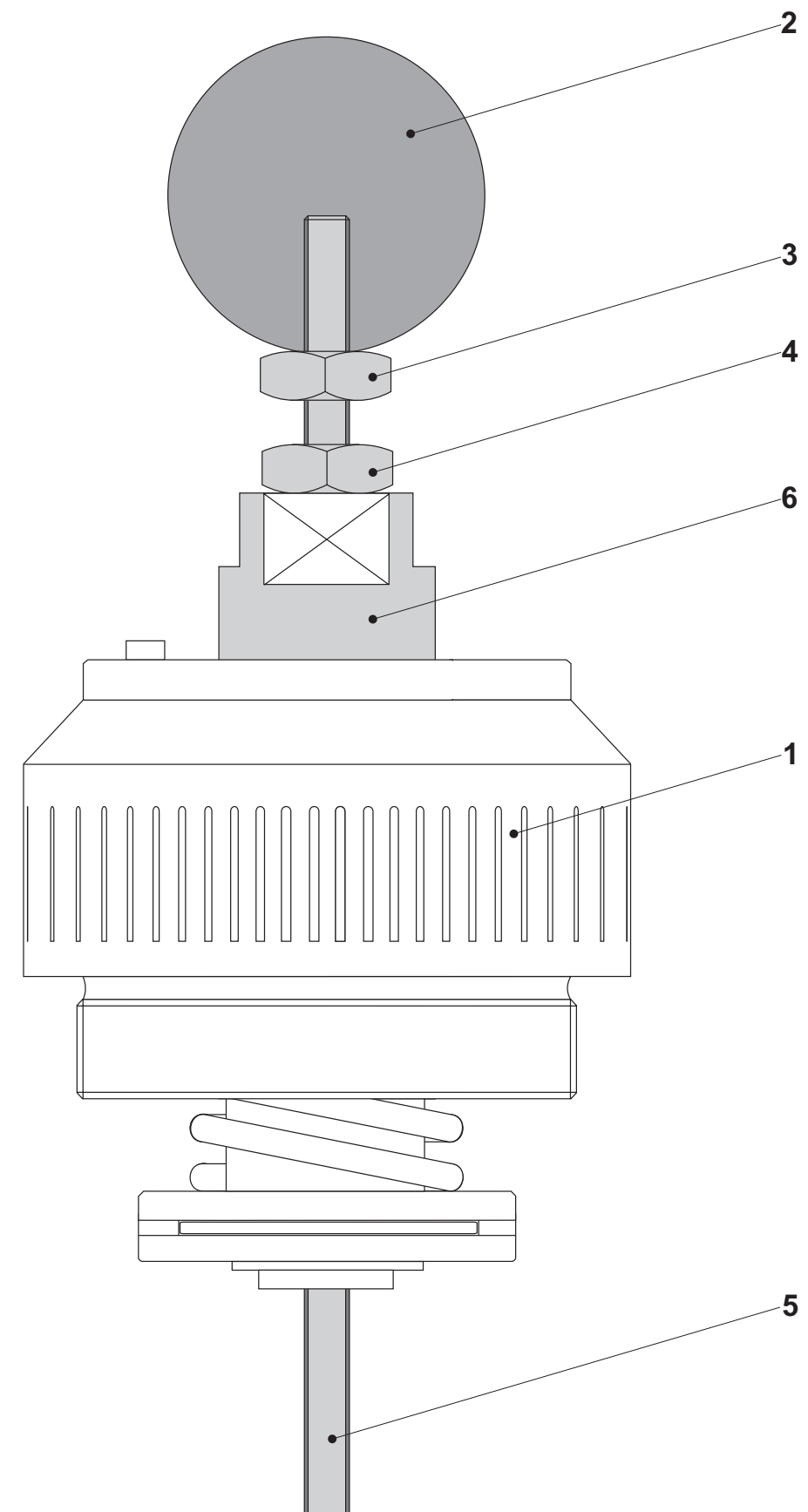
3.10.3 Zamjena šipke ventila

Ako je kapacitet regulacionog ventila suviše mali ili suviše velik za određenu aplikaciju, stvarni regulacioni element može biti zamjenjen sa odgovarajućom veličinom. Procedura zavisi od tipa regulacionog elementa.

Zamjena zračne mlaznice

Pošto je različite zračne mlaznice teško razlikovati, one su označene sa brojem na navojnoj osovini, koja je vidljiva nakon skidanja poklopca komore ekscentra. Za određivanje broja, pogledati naslov “2. REZERVNI DJELOVI”.

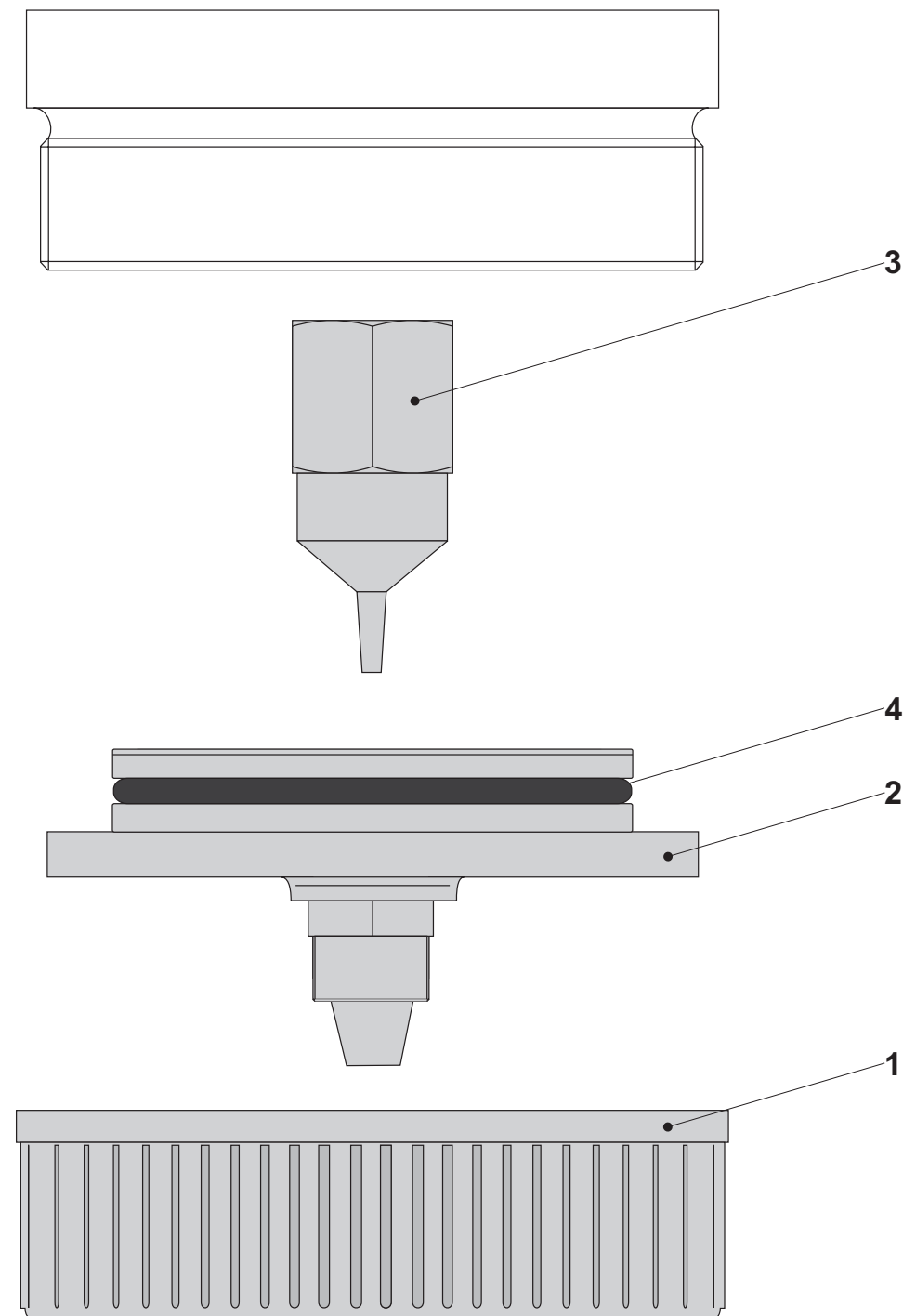
- Skinite zaštitni poklopac sa ručne poluge za upravljanje.
- Odvrnite maticu za vodilicu osovine (**1**) i izvucite šipku ventila.
- Skinite ručnu polugu za upravljanje(**2**) i kočionu maticu (**3**) sa šipke ventila.
- Skinite drugu kočionu maticu (**4**) i odvrnite šipku ventila (**5**) sa vodilice osovine ventila (**6**).
- Montirajte novu šipku u obrnutim gore navedenim redoslijedom.
- Podešavanje nulte tačke.



Zamjena regulacionog konusa

Zavisno od veličine regulacionog konusa koji će se zamjeniti, u većini slučajeva sjedišta ventila se moraju izmijeniti. Za određivanje broja, pogledati naslov "2. REZERVNI DJELOVI".

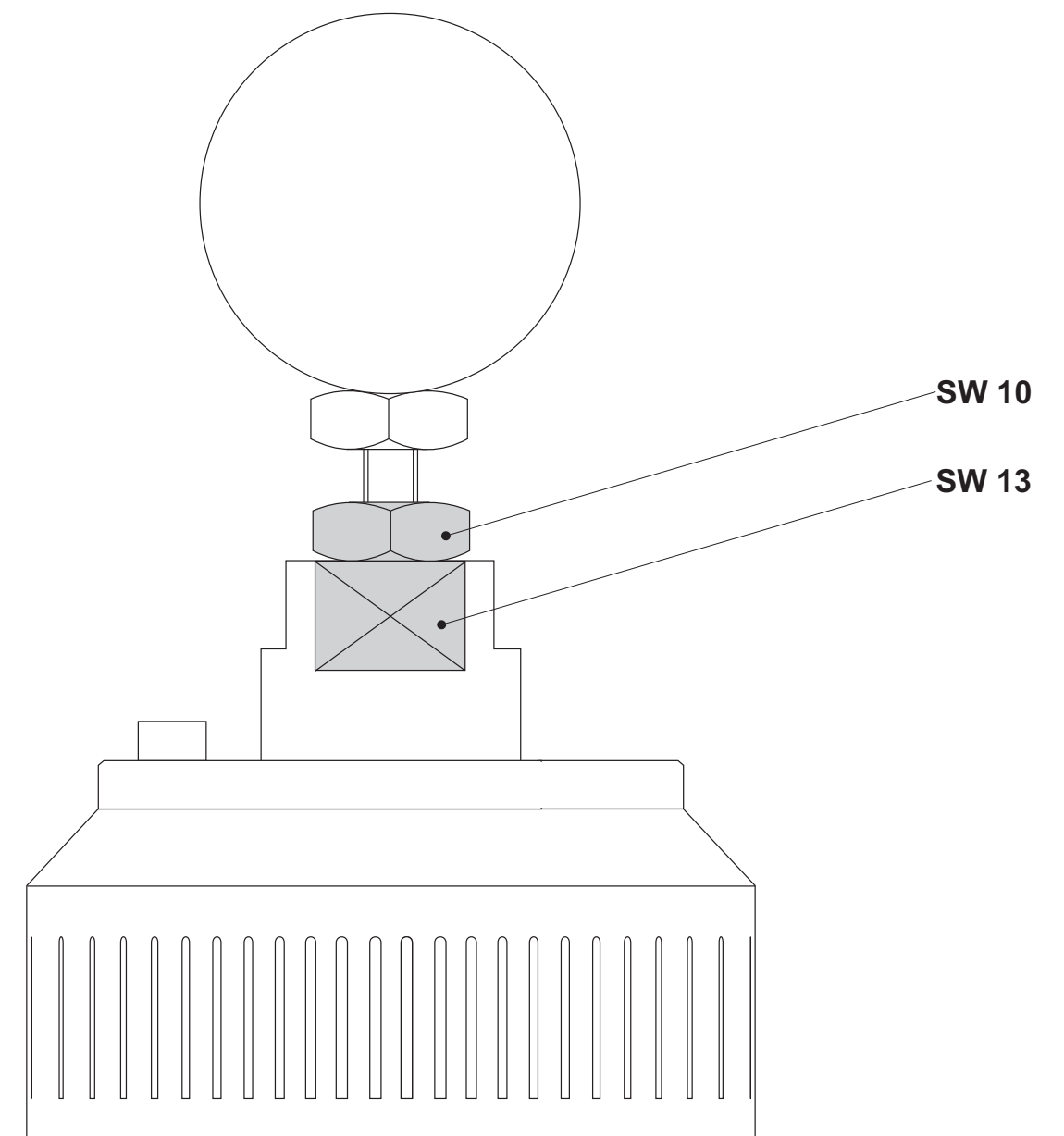
- Odšarafite PVC navojnu maticu (1) u najdonjem dijelu regulacionog ventila.
- Izvadite sjedište ventila (2).
- Odšarafite regulacioni konus (3) iz šipke ventila.
- Sastavite obrnutim gore navedenim redoslijedom. O - prsten (4) iz sjedišta ventila mora se promijeniti nakon svake de montaže.
- Podešavanje nulte tačke.



3.10.4. Podešavanje nulte tačke

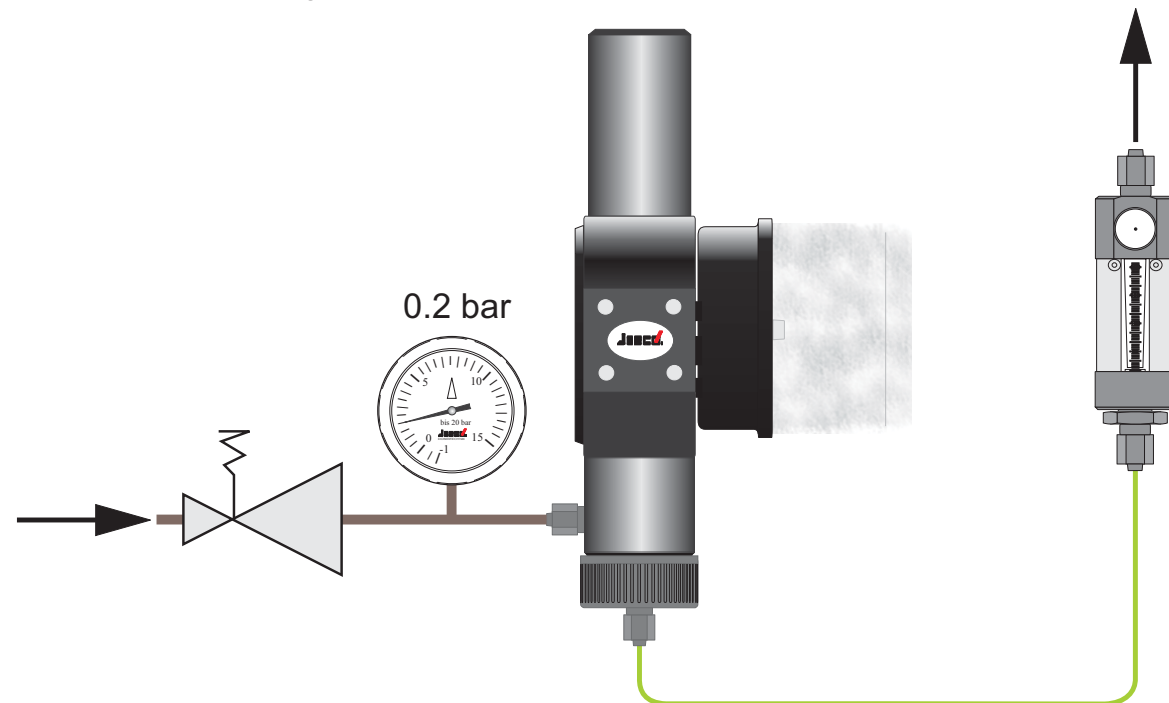
Pred isporuku, pozicija šipke ventila je optimalno podešena. Podešavanje nulte tačke potrebno je samo nakon održavanja ili zamjene šipke ventila.

- Dovedi servomotor u "zatvoreni" položaj.
- Uključiti injektor.
- Otvoriti dozirni ventil na rotametu.
- Otpustiti maticu (SW10) i vodilicu protu-držača zavrtnja (SW13).
- Okrenuti šipku ventila preko kuglaste ručke, dok rotametar ne pokaže nulu. Zatim nastavite okretanje šipke ventila za 1/4 punog obrtaja.
- Zategnite maticu (SW10) i vodilicu protu-držača zavrtnja (SW13).

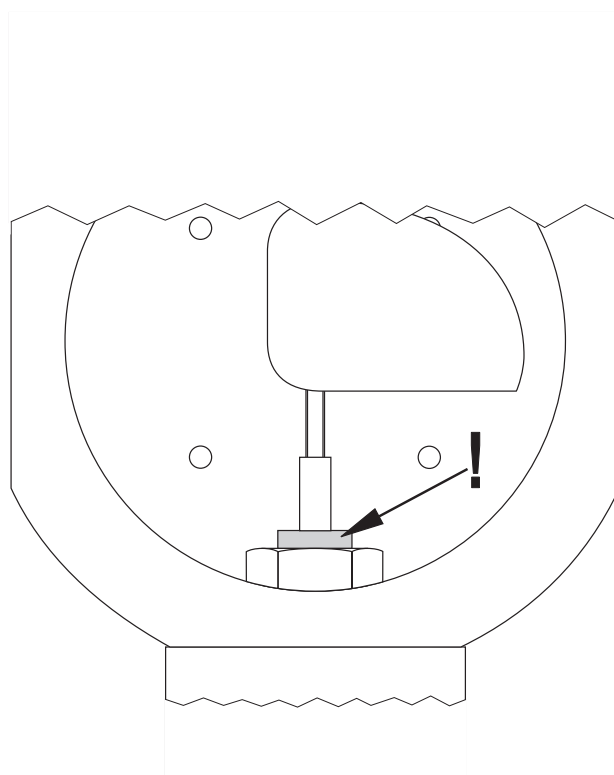


3.10.5. Provjera

Kod slučaja održavanja u radionici (servisu), regulacioni ventil hlora se može testirati sa zrakom. Da bi provjerili kapacitet doziranja regulacionog ventila, koristi se komprimirani vazduh sa prekomjernim pritiskom od 0.2 bara. Prema tome, stakleni pokazivač na rotametu za hlorni gas je isti kao i u stvarnom pogonu.



Također, mora se provjeriti da li je klipna zaptivka između komore ekscentra i ventilske komore čvrsto zaptivena. Ovaj test se izvodi također na prekomjernom pritisku 0.2 bara. Detektorski sprej za curenje omogućuje curenje da postane vidljivo. Nakon testa, uređaj odnosno regulacioni ventil prebrišite.

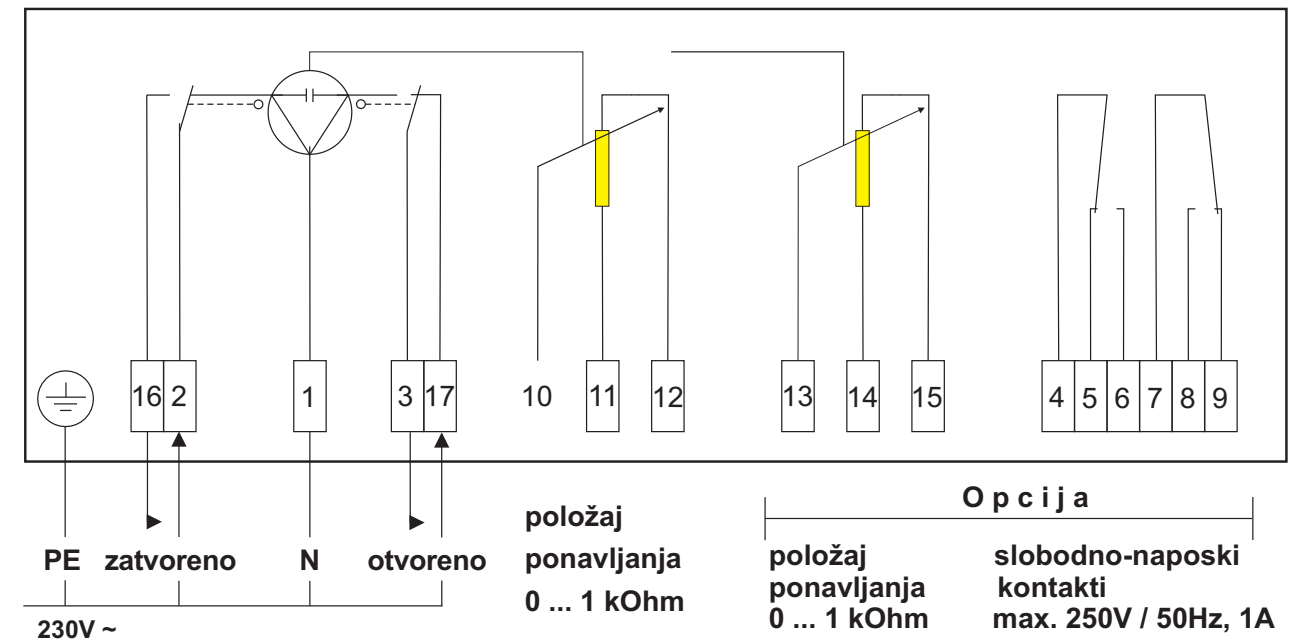


3.11. Servomotori

Servomotori koriste se sa 3 - tačkasto-koračnom regulacijom ili sa 4...20 mA signalom.

a) 3 - tačkasto-koračna regulacija (standardna verzija) AR30W

Servomotor se reguliše spajanjem faze na mrežu napajanja u smjeru kretanja kazaljke na satu ili obrnuto na odgovarajuće namotavanje motora. Često se koristi neutralni provodnik.

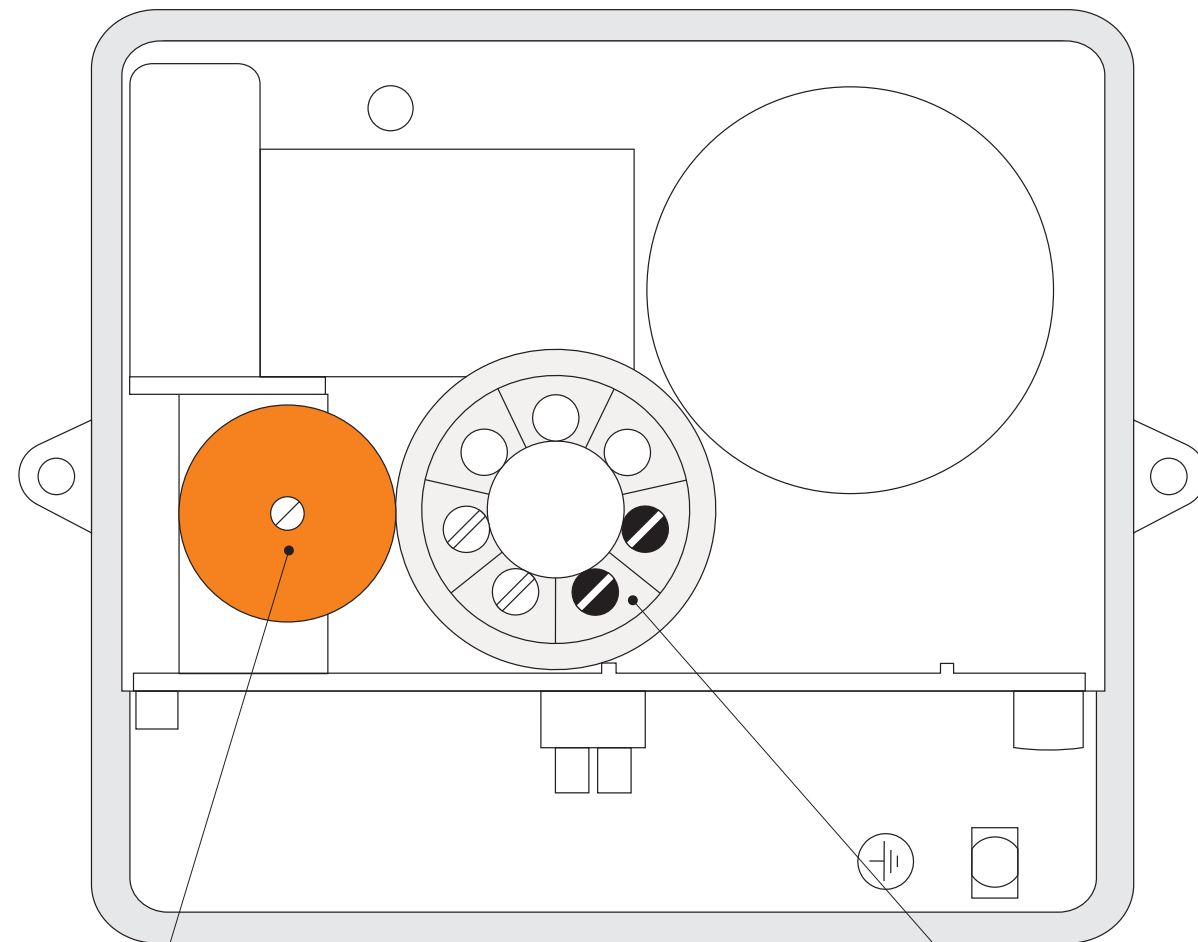


Potenciometar služi kao uređaj ponavljajućeg položaja, tako da regulator može dovesti regulacioni ventil tačno u pravi položaj. Pridržavati se precizno uputstava za upravljanje regulatora, kada spajate klizač. U protivnom regulator može biti u kvaru.

Kao opcija servo motor može biti opremljen sa dodatnim graničnim prekidačima (S3 i S4). Dodatni signal je potreban, npr. ako se snabdijevanje pobudnom vodom na injektoru prekine zbog isključenja regulacionog ventila na duže vrijeme. Prema tome, taloženje karbonata na regulatoru treba izbjegavati, jer u protivnom može prouzročiti dugoročne kvarove na injektoru.

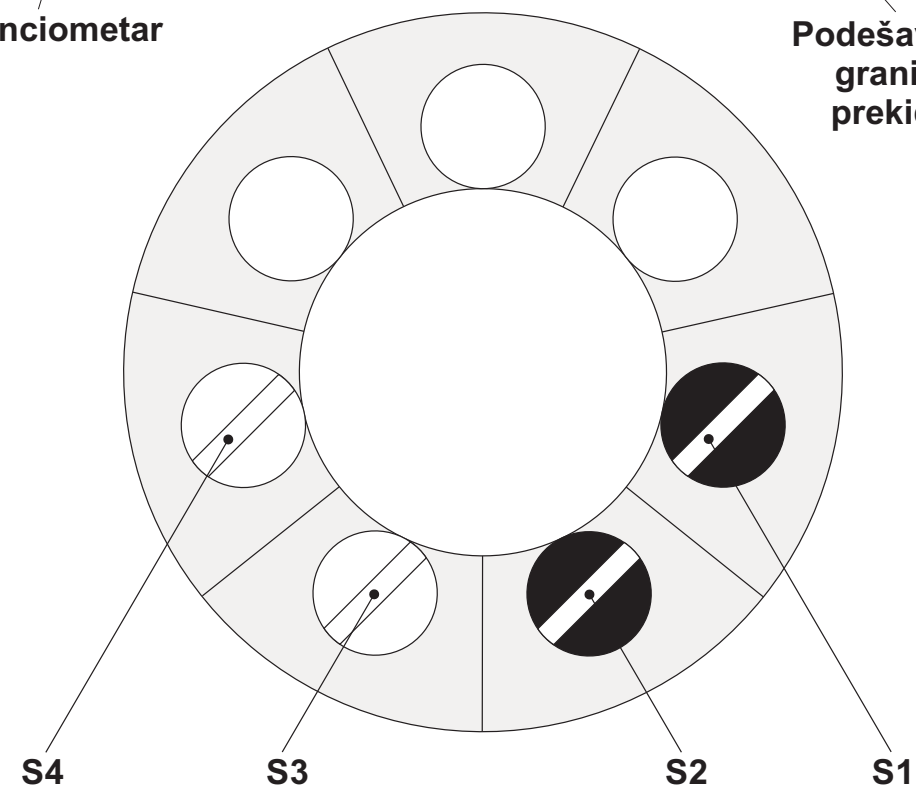
Granični prekidači mogu se podešavati preko šarafa smještenih na vratilu servomotora. Svakom od ovih šarafa dodjeljen je granični prekidač (**S1...S4**). Okretanjem šarafa u smjeru kazaljke na satu znači:

- S1** (ventil potpuno otvoren) - reduciranje kapaciteta doziranja
- S2** (ventil zatvoren) - šipka ventila je spuštena
- S3, S4** (dodjeljivanje prema slobodnom odabiru) - prekidač za male kapacitete doziranja.



Potenciometar

Podešavajući
granični
prekidač



S4

S3

S2

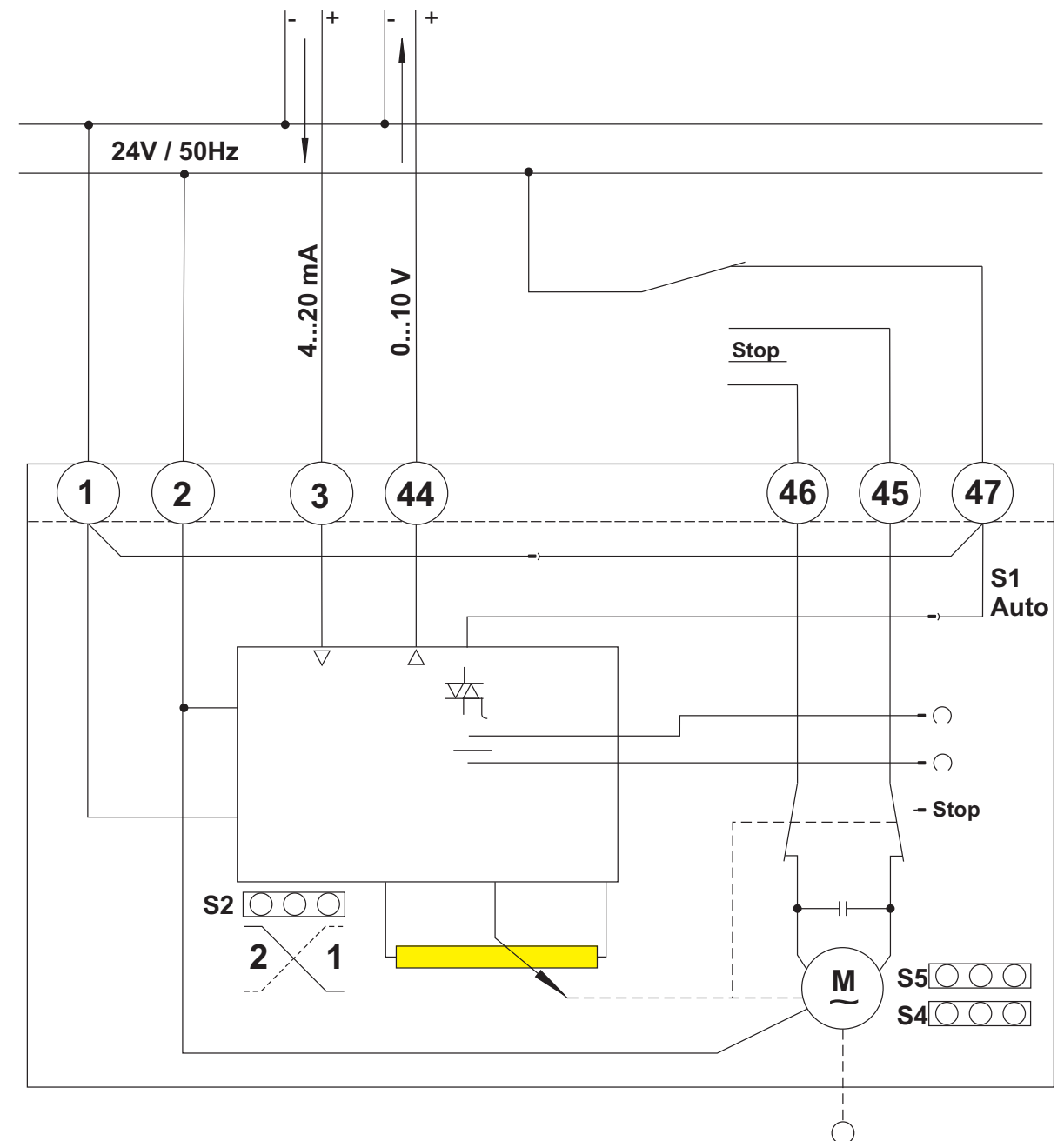
S1

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

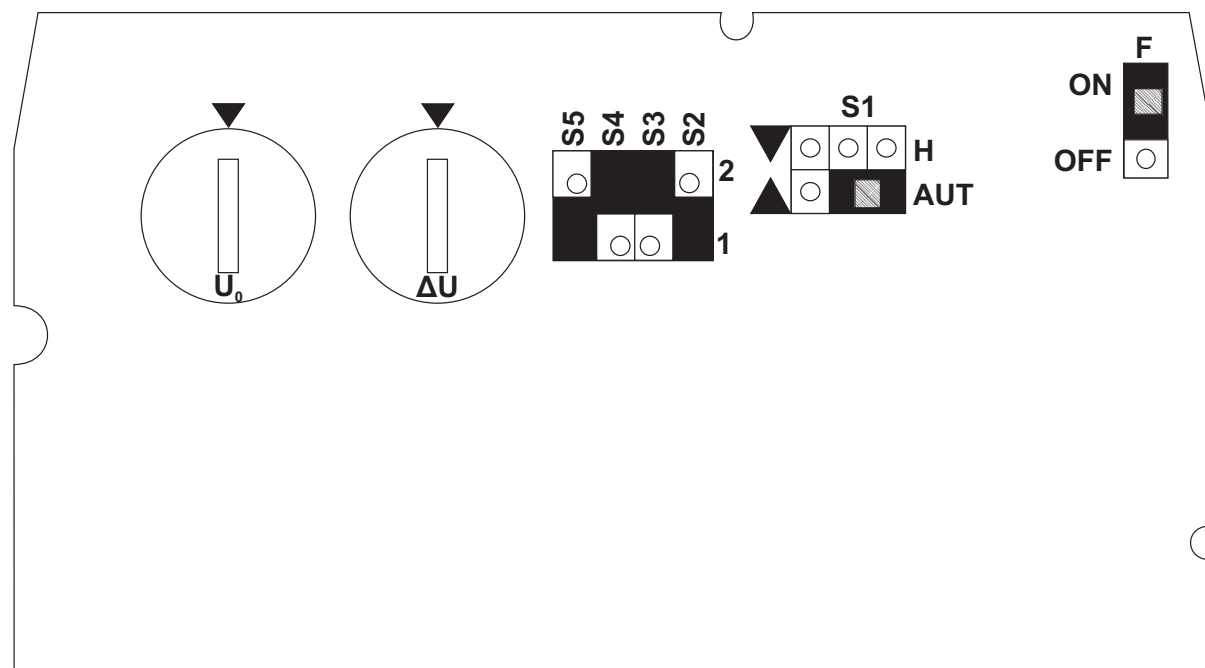
Servomotor se snabdijeva neprekidno sa naponom od 24VAC i mijenja položaj zavisno od ulaznog signala.

Ponavljajući položaj preko potenciometra nije neophodan za ovu verziju, zato što položaj regulatora integriranog u servomotoru osigurava tačan položaj motora. Za ostale aplikacije, kao npr. u procesnom regulacionom sistemu, uređaj sa ponavljajućim položajem je dostupan.

Dijagram ožičenja



Terminali (klemme) 45, 46, 47, koristi se samo ako će se upravljački mod motora promjeniti vanjskim putem. U ovom slučaju đamper F mora biti isključen (OFF). Servomotor nudi raznolike mogućnosti upravljačkih modova koji se mogu definisati preko đampera.



Različiti đampéri imaju sljedeće funkcije (tvornička podešavanja su boldirana slova):

“S1” upravljački mod

AUT : automatsko upravljanje prema ulaznom signalu

H : ručno upravljanje, servomotor je isključen

▼ : regulacioni ventil se otvara

▲ : regulacioni ventil se zatvara

“F” predodabir upravljačkog moda

ON : bez vanjskog prekidača upravljačkog moda

OFF : sa vanjskim prekidačem upravljačkog moda

“S2” osjećaj mehanizma položaja regulatora

1 : proporcionalno otvaranje prema signalu

2 : otvaranje inverzno proporcionalno prema signalu

“S3” ugao rotacije servomotora

1 : 30° ugao

2 : 90° ugao

“S4” izlazni signal

1 : 0..6.20 mV

2 : 0...10 V

“S5” ulazni signal

1 : 0(4)...20 mA

2 : 0(2)...10 V

Nulta tačka i pokrivanje (širenje) ulaznog signala se podešavaju na potencimetrima.

U₀ - nulta tačka sigala (npr. položaj $2 \approx 4$ mA).

ΔU - pokrivanje (širenje) signala (npr. položaj $8 \approx 16$ mA).

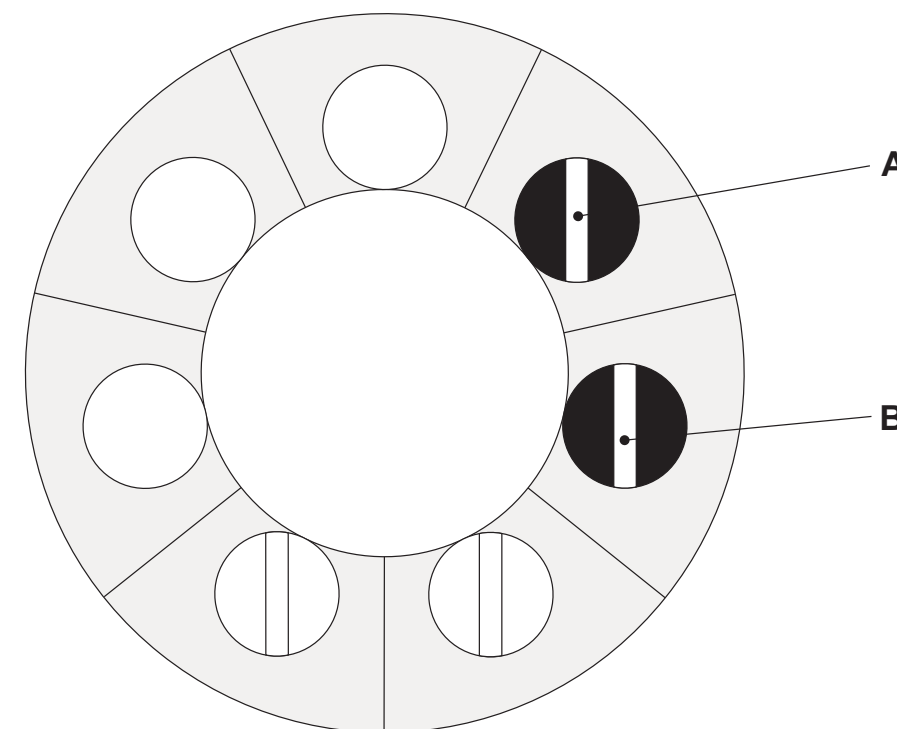
Rotaciono kretanje servomotora se dodatno ograničava preko prekidača-spone. Prekidači-spone mogu se podešavati šarafima na osovini servomotora. Svakom od tih šarafa dodjeljuje se granični kontakt (A, B).

Okretanjem šarafa u smjeru kazaljke na satu zanči:

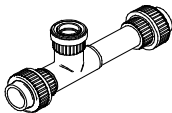
A (ventil potpuno otvoren) - reduciranje kapaciteta doziranja

B (ventil zatvoren) - spuštena šipka ventila.

Sa ovim servomotorom, ne mogu se instalirati nikakvi dodatni granični prekidači .



Tip	AR 30W...	AR 30W...S
Dizajn	reverzibilan motor na naizmjeničnu struju sa samo-zaustavnim reduktorom.	
Korištenje	za regulatore sa izlaznim prekidačem (3-tačkasto koračnim)	za regulatore sa neprekidnim izlazom (2...10 V ili 4...20 mA)
Pomoćno napajnje	230 V~ ± 15% 50...60 Hz	24 V~ ± 20% 50...60 Hz
Regulacija		2...10 V ili 4...20 mA
Potrošnja snage	2 W	7 W
Vrijeme regulacije / kosina	120 s / 90° = 0...100%	
Ponavljajući položaj za daljinski displej	potencijometar 0.5 W 0...1000 Ω = 0...100%	0...620 mV = 0...100%
Granični prekidač	unutrašnji granični prekidač za ograničavanje ugla rotacije. Signaliziranje krajnjeg položaja preko terminala 16 i 17.	unutrašnji granični prekidač za ograničavanje ugla rotacije.
Klasa zaštite	IP 55 (EN 60529)	
Temperatura ambijenta	-20 ... 60°C	
Opcija		
Drugi potencijometar	0...1000 W 0.5 W	
Granični prekidači	maksimalno 250V 2A	
Broj dijela	78743	



Ausführung: Standardinjektoren für einen Gegendruck bis 8 bar
Hochdruckinjektoren für einen Gegendruck bis 10 bar
Hinweis: Hochdruckinjektoren sind auf geringeren Treibdruck und höheren Treibwasserstrom als die Standardinjektoren ausgelegt.
Werkstoff: PVC, PN 16
Auslegung: Die Saugleistung von Injektoren wird vom Wasserdruck vor und hinter dem Injektor bestimmt. Die angegebenen Werte sind Maximal-Saugleistungen und gelten bei 20° C.
Bei höheren Temperaturen nimmt die Saugleistung stark ab!
Saugleistungskurven siehe MB 2 31 01

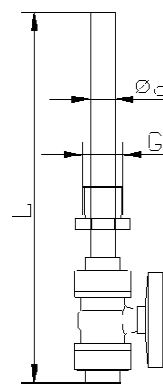
Injektor- Typ	Wasser- anschlüsse PVC- Verschraubung	Gas- Anschluss	max. Saug- Leistung kg/h Cl2	max. Gegendruck bar	Artikel-Nr.	Preis EUR
A	d20/DN15	G 1	1,6	8	23122170	259,10
AH	d20/DN15	G 1	2	10	23132646	425,30
B	d20/DN15	G 1	3,2	8	23123768	259,10
BH	d25/DN20	G 1	4	10	23132647	437,80
E	d20/DN15	G 1	6,4	6	23128948	259,10
C	d40/DN32	G 2	20	8	23122256	731,90
CH	d40/DN33	G 2	8	10	23132648	943,90
F	d40/DN32	G 2	24	10	23132451	731,90
D	d63/DN50	G 2	25	8	23100088	863,20
D	d63/DN50	Flansch DN65	60	8	23122258	1011,30
DH	d63/DN50	Flansch DN65	16	10	23132649	1049,50

Ausführung:
Werkstoff:
Leistung:
(Technische Daten siehe MB 2 31 02)

Injektor- Typ	Wasser- anschluss	Gasanschluss Flansch	Werkstoff	Artikel-Nr.	Preis EUR
6a	DN65 / PN10	DN65 / PN10	PVC	auf Anfrage	2154,40
7a	DN80 / PN10	DN65 / PN10	PVC		2797,60
8a	DN100 / PN10	DN65 / PN10	PVC		3732,80
9a	DN125 / PN10	DN65 / PN10	PVC		5895,50
10a	DN150 / PN10	DN65 / PN10	PVC		8054,60

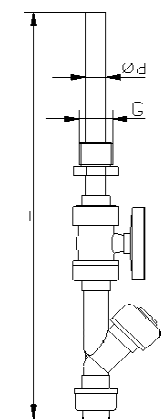
Injektor-R... 10... 10... 10... 10... 10... 10... 10... 10... 10... 10...





Ausführung: Impfstelle und Absperrventil (Typ IR)
Werkstoff: PVC/FPM
Impfrohlänge: 300 mm

Benennung	DN	Q	G	d	Länge [mm]	Artikel-Nr.	Preis [EUR]
IA	15	3	G 1	20	436	23428717	149,40
	25	4.5	G 1 1/2	32	459	23428720	213,60
	32	7.5	G 2	40	474	23428722	273,00
	40	12	G 2	50	482	23428723	315,40
	50	18	G 2 1/2	63	509	23428724	364,60



Ausführung: Impfstelle mit Rückschlagventil und Absperrventil (Typ IRA)
Werkstoff: PVC/FPM/Hastelloy
Impfrohlänge: 300 mm

Benennung	DN	Q	G	d	Länge [mm]	Artikel-Nr.	Preis [EUR]
IRA	15	3	G 1	20	573	23428761	300,90
	25	4.5	G 1 1/2	32	626	23428764	448,90
	32	7.5	G 2	40	663	23428766	552,30
	40	12	G 2	50	693	23428767	777,70
	50	18	G 2 1/2	63	754	23428768	961,40



Diffusor für Chlörlösung zur Bodenmontage im offenen Becken, inkl. Befestigungsmaterial

Größe	Anschluss	Artikel-Nr.	Preis [EUR]
bis zu 5 m ³ /h Chlörlösung	für Schlauch d25 mm innen	23400002	212,30
bis zu 50 m ³ /h Chlörlösung	Einklebeanschluss d110 mm	23400003	598,30

Back stop / back-pressure valve

It is an experience that even the best ejector non-return valve may become untight sometime because of impurities. Therefore the installation of an additional back stop is prescribed by law in some countries. Its function is to prevent water from entering the chlorinators even in the case of a failure so that these devices are not damaged.

The backstop has a second safety function. It requires a small differential pressure to open. The value of this differential pressure has been chosen so that it slightly exceeds the minimum response pressure of the safety valve. Even in the case of creeping chlorine leakage at the full-vacuum chlorinator, the safety valve responds exactly thus avoiding the development of excessive pressure in the vacuum system.

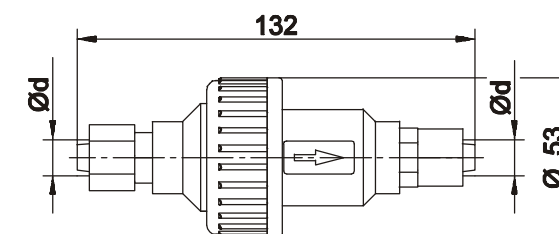
Technical data

Materials: PVC, Viton, glass, Hastelloy
Response pressure: 40 mbar
Flow rate: up to 10 kg Cl₂/h
Connections: PE tubing d 8/12 or
PE tubing d12/16
Weight: 150 g

Safety Shutoff Valve

Often the use of a valve is required which opens only if the ejector is under vacuum and which is completely closed during system standstill. The safety shutoff valve ensures this function. It is installed instead of the back stop. (Description see MB 2 04 06).

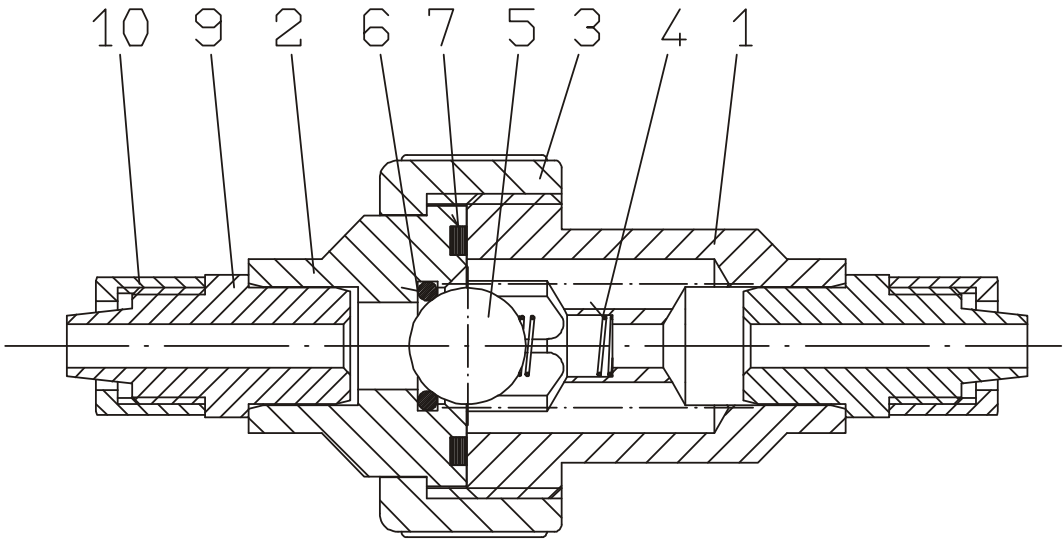
Dimensions and Part Nos.



Back stop with connections for:

Tubing d 8/12	Part No. 20435060
Tubing d 12/16	Part No. 20435061
PVC d 16i	Part No. 20435118

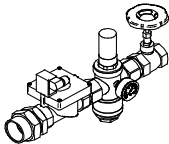
Back stop



Item	Description	Material	Qty	Part No.
1	Ball guide for back stop	PVC	1	35059
2	Seat holder for back stop	PVC	1	35058
3	Union nut G1 1/4	PVC	1	82213
4	Pressure spring d 8.1x27mm	Hastelloy	1	25082
5*	Ball d 16	Glass	1	82457
6*	O-ring d 12.4x2.62mm	Viton	1	80004
7*	O-ring d 25x3mm	Viton	1	80138
8	Arrow label	Adhesive film	1	87359
9	Tubing connection	PVC	2	8/12 33350
				12/16 15533
10	Union nut	PVC	2	8/12 10365
				12/16 15534
	Back stop assembly			8/12 20435060
				12/16 20435061
				d 16i 20435118

* contained in spare parts kit.

Full-Vacuum Chlorinator C 2211



Einsatz: zur Einstellung des optimalen Vordruckes für den Injektor bei schwankendem Vordruck in der Injektorleitung bei Einsatz des Elektromagnetventils zum EIN/AUS-Schalten des Injektors

Werkstoff: Messing, PVC

Minderdruck: 1,5...6 bar (höhere Druckstufen auf Anfrage)
max. Vordruck: 16 bar

Treibwassersatz bestehend aus:	Anschluss für Wasser-versorgung	[m³/h]	PVC-Anschluss für Injektor	Artikel-Nr.	Preis [EUR]
Absperrventil, Druckminderer mit Schmutzfänger und Manometer 0...10bar	G 3/4i	3	d 20i / DN15	22913611	266,90
	G 1 1/4i	6	d 40i / DN32	22913614	469,80
	G 2i	24	d 63i / DN50	22928685	876,30
Absperrventil, Druckminderer mit Schmutzfänger und Manometer 0...10bar, Magnetventil 230V, 50-60 Hz	G 3/4i	3	d 20i / DN15	22913619	614,70
	G 1 1/4i	6	d 40i / DN32	22913622	1135,10
	G 2i	24	d 63i / DN50	22928687	1776,60
Absperrventil, Druckminderer mit Schmutzfänger und Manometer 0...10bar, Magnetventil 230V, 50-60 Hz Schrägsitzrückschlagventil	G 3/4i	3	d 20i / DN15	22900015	724,00

Zubehör

Manometer für Wasserdruck 6 bar G 1/4 a (hinten)	87384	38,60
Manometer für Wasserdruck 10 bar G 1/4 a (hinten)	87149	18,20
Manometer für Wasserdruck 16 bar G 1/4 a (hinten)	87372	23,90
Schlüssel für Schmutzfänger für G 3/4	31367	33,70
für G 1 1/4	31368	33,70
für G 2	31369	44,40
Filtereinsatz für Druckminderer für G 3/4	88280	19,10
für G 1 1/4	88282	21,70
für G 2	88284	25,10
Siebtaße für Druckminderer für G 3/4	88281	23,90
für G 1 1/4	88283	29,70
für G 2	88285	36,30

Treibwasser-Satz

General

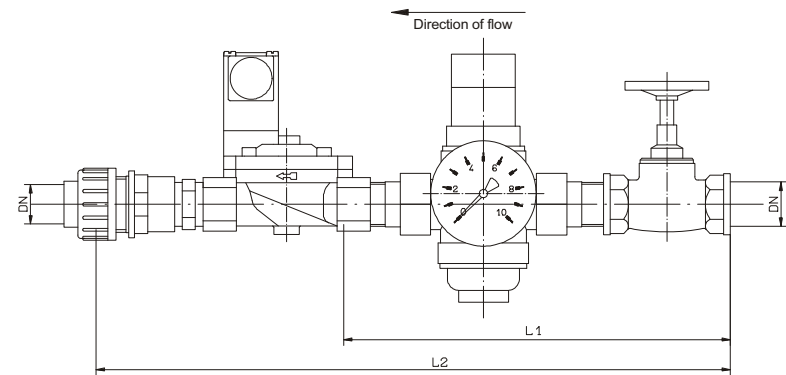
Motive water units are preassembled fittings in various configuration levels and used in combination with booster pumps according to data sheet MB 2 29 01 to guarantee a constant supply pressure for chlorine gas ejectors.

The pressure reducing valve is the most important part of the motive water unit. It compensates all pressure fluctuations in the booster pump due to changing inlet pressure or variations in withdrawal by several connected metering systems.

The pressure reducer has a built-in dirt trap and is available with pressure gauge to indicate the reduced pressure.

In addition to the standard shutoff valve, a version with solenoid valve is also available. The latter may be required if the supply to the ejector has to be shut off without stopping the booster pump so that it can continue to supply other metering systems.

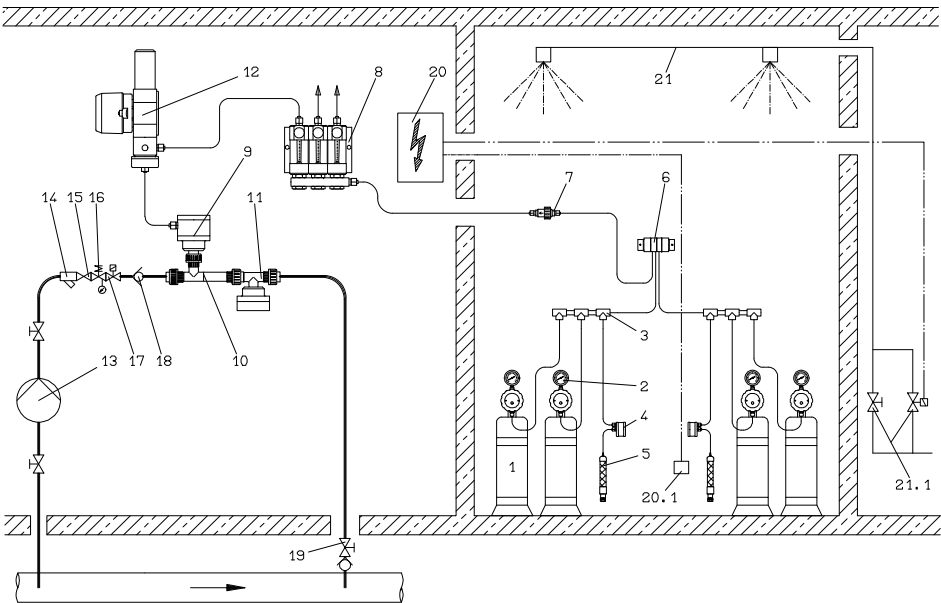
Dimensions



Technical data

Nominal width	Capacity	Motive water unit comprising:	
		Shutoff valve Pressure reducing valve with dirt trap	Shutoff valve Pressure reducing valve with dirt trap and solenoid valve
DN	m³/h	L1	L2
G 3/4-DN15	3	232	380
G 1 1/4-DN32	6	320	460
G 2-DN50	24	420	620

Installation example



Legend

1	Chlorine cylinder		12	Control valve C 7700	MB 2 07 10
2	Vacuum chlorinator C 2211	MB 2 04 11	13	Booster pump	MB 2 29 01
3	Vacuum manifold	MB 2 23 02	14	Dirt trap	MB 2 29 04
4	Safety valve	MB 2 04 11	15	Shutoff valve	MB 2 29 04
5	Activated carbon cartridge	MB 2 04 11	16	Pressure reducing valve with pressure gauge	MB 2 29 04
6	Chlorine changeover valve C 2005	MB 2 04 05	17	Solenoid valve	MB 2 29 04
7	Non-return valve	MB 2 04 11	18	Ball-type non-return valve	
	or		19	Chlorine solution inlet	MB 2 34 01
8	Viewglasses and distributor block	MB 2 04 11	20	Chlorine gas warning device	MB 2 36 04
9	Ejector non-return valve	MB 2 32 01	20.1	Sensor for gas warning device	MB 2 36 04
10	Ejector	MB 2 31 01	21	Sprinkler system	MB 2 41 00
11	Vacuum breaker	MB 2 33 02	21.1	Fittings for sprinkler system	

Part numbers

Nominal width DN	Motive water unit comprising:	
	Shutoff valve, pressure reducing valve with dirt trap and pressure gauge	Shutoff valve, pressure reducing valve with dirt trap, pressure gauge and solenoid valve
G 3/4	22913611	22913619
G 1 1/4	22913614	22913622
G 2	22928685	22928687

Order example

An ejector requiring 5.2 m³/h motive water has been selected for a C 2525 chlorination system. Since only one chlorination system is to be operated by the booster pump, the system can be actuated by switching the booster pump on and off. A solenoid valve is not required. A pressure gauge indicating the reduced pressure is advisable, since the motive

pressure can be reduced to the minimum required for ejector operation in order to save energy and avoid unnecessary noise in the ejector. A pressure reducer with pressure gauge and shutoff valve is therefore selected in size G 1 1/4 for up to max. 6 m³/h throughput.

Product Information Booster Pump MVI

Negative pressure for Safety

Chlorine gas dosing systems in accordance with DIN 19606 are characterised by the fact that the chlorine gas to be dosed enters the piping, at a pressure below that of the atmospheric pressure. Possible leaks or loose seals allow the air to enter the system and do not cause the escape of chlorine gas. Booster pumps are used to produce the vacuum.

Guaranteed constant vacuum

The MVI booster pumps have been designed especially for use in chlorination installation according to DIN 19606. This standard specifies that chlorine gas must be dissolved in water under vacuum.

To produce the vacuum ejectors are used. The booster pumps ensure that a sufficient amount of motive water is supplied to the ejectors at the required pressure.

The booster pump is a multi-level vertical high pressure centrifugal pump with an “inline” design, i.e. suction and discharge connections are in a line.

In short

- Suitable for use in accordance with DIN 19606
- Flow rate up to 25 m³/h
- Pump housing pressure max. 16 bar
- Oval flange with internal thread
- All parts in contact with the media are corrosion resistant



Technical data

Flow rate	max. 25 m³/h
Pressure	max. 16 bar
Nominal power	max. 4 kW
Power consumption	max. 7.9 A
Delivery head	max. 82 m
Medium temperature	-15...+120 °C
Max. ambient temperature	40 °C
Voltage supply	3~ 400 V AC, 50 Hz*
Protection class	IP 55
Isolation class	F
Material	Cast iron, rust free steel, EPDM
Weight	max. 51.7 kg

* Design for 60 Hz upon request.

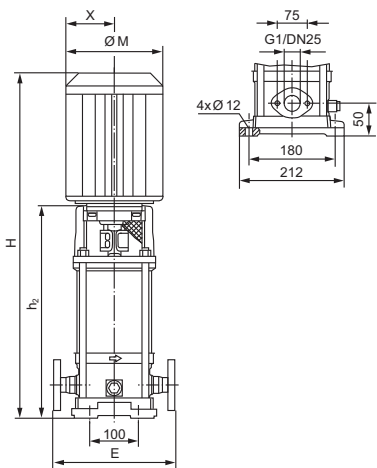
Model variants

Type	Ejector	Ejector-backpressure	Nominal power	Flow rate	Delivery head	Flange thread	Order no.
MVI 104	Typ A (max. 1 kg/h Cl ₂)	0.5 bar	0.55 kW	0.5 m³/h	37 m	G 1"	22900400
MVI 106		1.0 bar	0.75 kW	0.6 m³/h	56 m	G 1"	22900401
MVI 107		2.0 bar	0.75 kW	0.6 m³/h	65 m	G 1"	22900402
MVI 106	Typ B (max. 2.5 kg/h Cl ₂)	0.5 bar	0.75 kW	1.0 m³/h	52 m	G 1"	22900401
MVI 108		1.0 bar	0.75 kW	1.2 m³/h	68 m	G 1"	22900403
MVI 110		2.0 bar	1.1 kW	1.3 m³/h	82 m	G 1"	22900404
MVI 106	Typ E (max. 4 kg/h Cl ₂)	0.5 bar	0.75 kW	1.4 m³/h	50 m	G 1"	22900401
MVI 107		1.0 bar	0.75 kW	1.5 m³/h	57 m	G 1"	22900402
MVI 112		2.0 bar	1.1 kW	2.0 m³/h	80 m	G 1"	22900405
MVI 203	Typ C (max. 5 kg/h Cl ₂)	1.0 bar	0.55 kW	3.8 m³/h	16 m	G 1"	22900406
MVI 404		2.0 bar	1.1 kW	5.0 m³/h	32 m	G 1 1/4"	22900407
MVI 404	Typ C (max. 10 kg/h Cl ₂)	1.0 bar	1.1 kW	5.0 m³/h	32 m	G 1 1/4"	22900407
MVI 404		2.0 bar	1.1 kW	5.0 m³/h	32 m	G 1 1/4"	22900407
MVI 410	Typ C (max. 15 kg/h Cl ₂)	1.0 bar	2.2 kW	6.0 m³/h	65 m	G 1 1/4"	22900408
MVI 410		2.0 bar	2.2 kW	6.0 m³/h	65 m	G 1 1/4"	22900408
MVI 805	Typ D (max. 25 kg/h Cl ₂)	1.0 bar	1.85 kW	12.9 m³/h	26 m	G 1 1/2"	22900409
MVI 1603-6		2.0 bar	2.2 kW	14.9 m³/h	26 m	G 2"	22900410
MVI 1606-6	Typ D (max. 40 kg/h Cl ₂)	1.0 bar	4.0 kW	16.0 m³/h	53 m	G 2"	22900411
MVI 1606-6		2.0 bar	4.0 kW	16.0 m³/h	53 m	G 2"	22900411

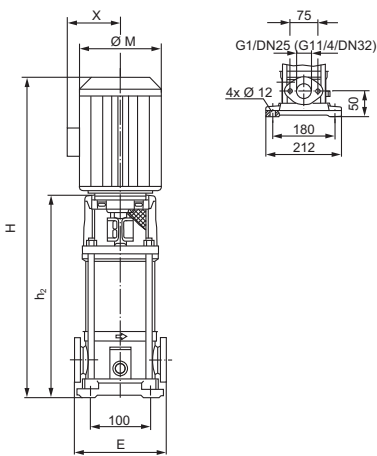
Accessories

Mounting kit for booster pumps		Order no.
G 1, DN 25	Shutoff valves (2x), non-return valve, pressure gauge 0...16 bar and PVC cemented sleeve	22913859
	like 22913859, but in brass	22900013
	Shutoff valves (2x) with reducers	22900012
G 1 1/4, DN 32	Shutoff valves (2x), non-return valve, pressure gauge 0...16 bar and PVC cemented sleeve	22928832
	Shutoff valves (2x) with reducers	22900033
G 1 1/2, DN 40	Shutoff valves (2x), non-return valve, pressure gauge 0...16 bar and PVC cemented sleeve	22900031
	Shutoff valves (2x) with reducers	22900034
G 2, DN 50	Shutoff valves (2x), non-return valve, pressure gauge 0...16 bar and PVC cemented sleeve	22900032
	Shutoff valves (2x) with reducers	22900035
	Wall bracket made from stainless steel for G 1 and G 1 1/4	22900017
	Wall bracket made from stainless steel for G 1 1/2 and G 2	22900036

Dimensions

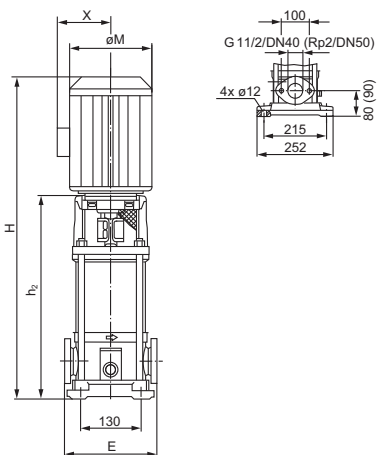


Type	E	H	h ₂	Ø M	X
MVI 104	204	528	305	140	118
MVI 106	204	598	355	170	127
MVI 107	204	618	375	170	127
MVI 108	204	658	415	170	127
MVI 110	204	678	435	170	127
MVI 112	204	718	475	170	127



Type	E	H	h ₂	Ø M	X
MVI 203	204	519	296.5	140	118
MVI 404	204	574	330.5	170	127
MVI 410	204	751	484.5	193	151

Bracket measurements are valid for the booster pumps MVI 404 and MVI 410

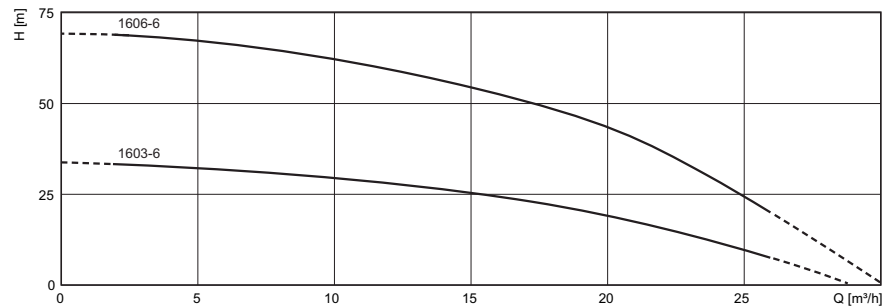
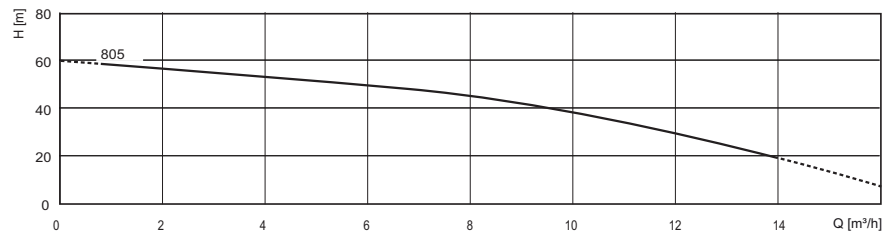
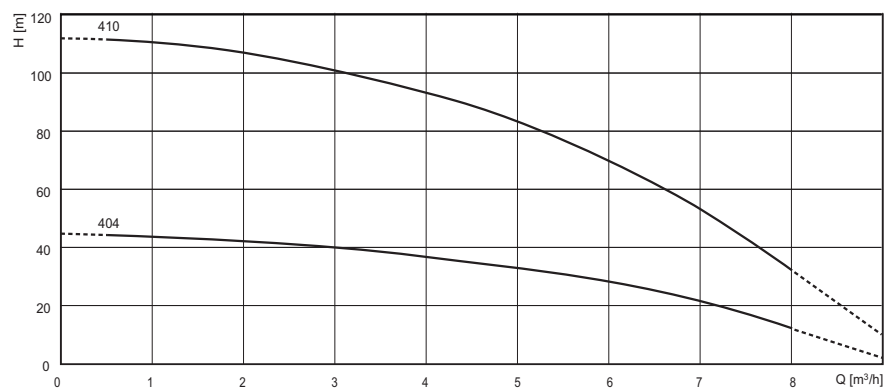
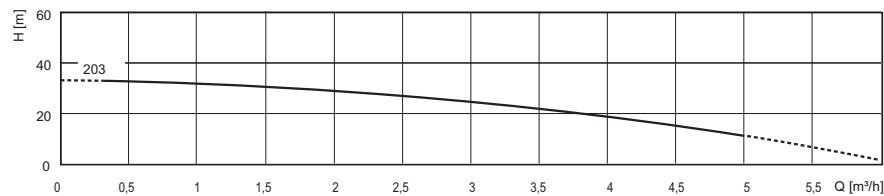
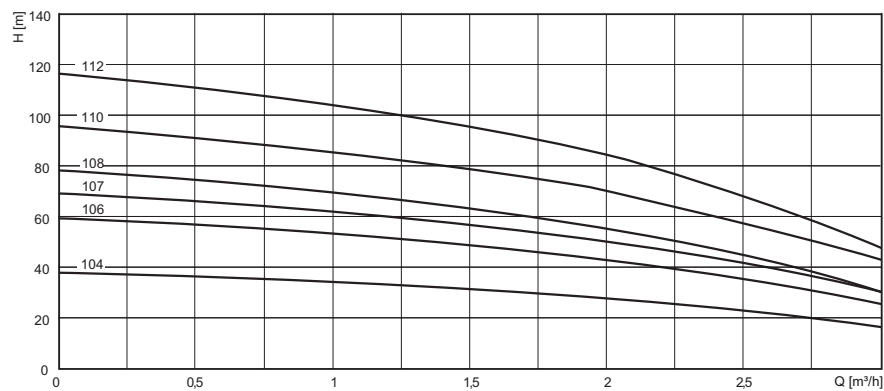


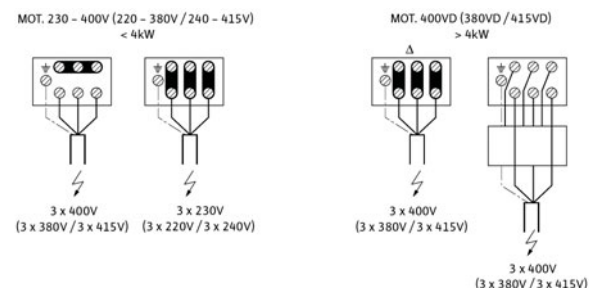
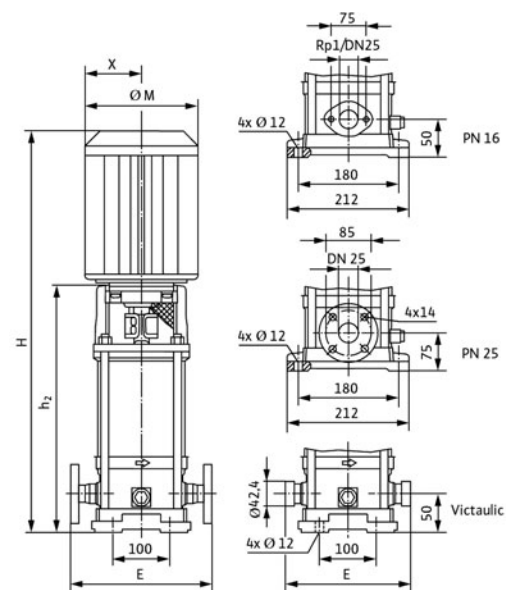
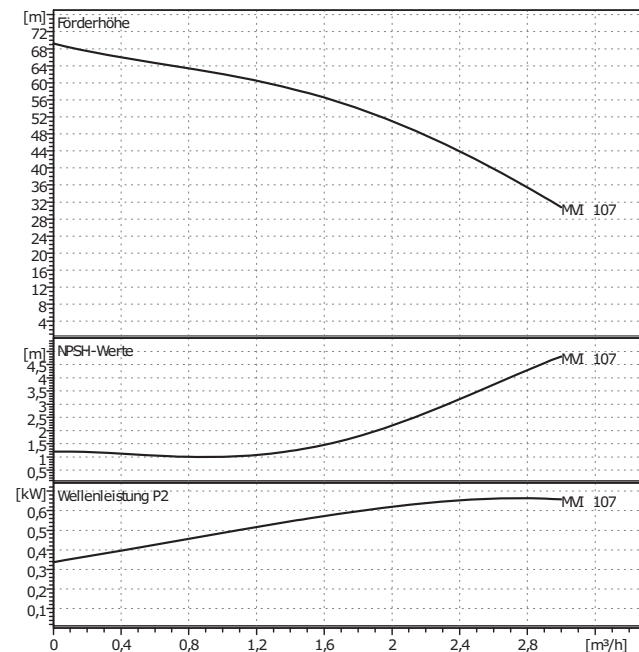
Type	E	H	h ₂	Ø M	X
MVI 805	250	714	434	193	151
MVI 1603-6	250	712	445.5	193	151
MVI 1606-6	250	827	531.5	217	160

Bracket measurements are valid for the booster pumps MVI 1603-6 and MVI 1606-6

All measurements are given in mm

Performance curves





Betriebsdatenvorgabe

Förderstrom	0	m ³ /h
Förderhöhe	0	m
Fördergut	Wasser	
Fluidtemperatur	20	°C
Dichte	0,9983	kg/dm ³
Kinematische Viskosität	1,005	mm ² /s
Dampfdruck	0,02337	bar

Pumpendaten

Fabrikat	WILO
Typ	MVI 107/ PN16 3~
Anlagenart	Einzelpumpe
Nenndruckstufe	PN 16
Min. Fluidtemperatur	-15 °C
Max. Fluidtemperatur	120 °C

Hydraulische Daten (Betriebspunkt)

Förderstrom		m ³ /h
Förderhöhe		m
Drehzahl	2900	1/min
Wellenleistung P2		kW
NPSH		m

Werkstoffe / Dichtung

Laufkörper	1.4301
Stufenkammern	1.4301
Druckmantel	1.4301
Welle	1.4301
Dichtung	EP 851
Gehäusedeckel	1.4301
Gleitringdichtung	Wolframkarbid/Kohle

Abmessungen pro Pumpe

E	204						
H	618						
h ²	375						
M	170						
X	127						

Saugseite	Rp 1	/ PN 16	
Druckseite	Rp 1	/ PN 16	
Gewicht	24,6		kg

Motordaten pro Motor/Pumpe

Nennleistung P2	0,75	kW
Nenn Drehzahl	2950	1/min
Nennspannung	3~400 V, 50	Hz
Max. Stromaufnahme	1,7	A
Schutzart	IP 55	
Zulässige Spannungstoleranz +/-	10%	

Artikelnr. der Standardversion 4070473



Product Information Multi-channel Controller TOPAX® DX / DX Net

Important values securely under control

As a multi-channel controller the TOPAX DX monitors the current water values during the preparation of the water and it controls in real-time the connected metering system for treating the water. In this way it ensures constant water values in the most varied of applications – taking into account the given norms and guidelines – it is universally applicable.

One of its main applications is to ensure the quality of the water in public baths by evaluating the measurements of, amongst other things, the free chlorine, pH, redox, total chlorine and the conductivity and to control the chlorine gas meter – and/ or salt-flow rate electro-analysis unit.

Convincing features

The TOPAX DX is based on the longstanding experience of many generations of TOPAX controllers from Lutz-Jesco. Its modular design makes it an adaptable and a highly compatible partner in measuring and control technology. With the option of connecting it directly to a variety of sensors to measure the water parameters the TOPAX DX fulfils all the needs for optimal water preparation. Mounted on a water sampling station, e.g. PM 01 or DCM 01, all elements required for a professional measurement are united.

When developing the multi-channel controller emphasis was put at the beginning on making it simple and easy to use. The large colour display, presenting all information in plain text and the concise, multilingual menu guidance are proof of this. They make the TOPAX DX easy to understand and operable. The integrated online help adds to its user friendliness.

The access possibilities to the actual measuring and control values are extensive: All current measurement data and controller values are displayed in the main view. They can also be displayed in the screen writer for 24 h at various zoom levels. The data logger and the logbook use the memory card to archive the values. The memory card (Software TopReader) or the TOPAX DX can be read out or controlled per PC via RS 485 (Software TopView). The communication with a PLC controller is possible via RS 485 or Ethernet.

The maintenance and upkeep of the measuring unit with the sensors and the regulator is greatly facilitated with the menu-guided calibration with the subsequent validity check. Faulty sensors or errors in the calibration process are automatically recognized and displayed by the TOPAX DX.

How it Works

The TOPAX DX has multiple digital as well as analogue inputs and different regulator-outputs. All measured water parameters can be regulated.

Very accurate and quick control is attained thanks to its microprocessor controlled measurement amplifier and controller. The connection of Lutz-Jesco sensors is carried out very simply via terminal blocks to the modules in the TOPAX DX.

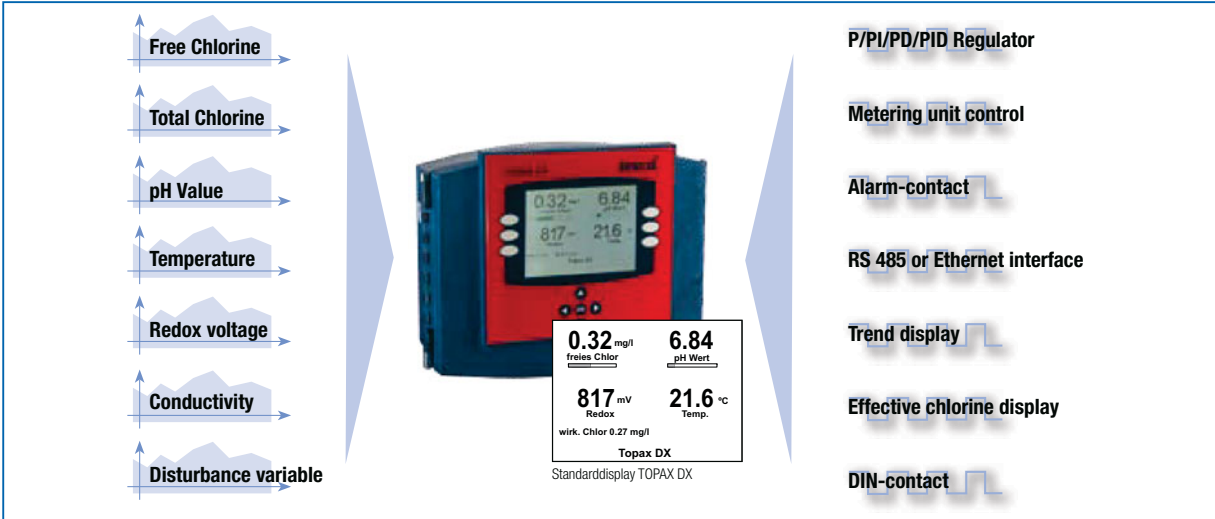
The start up is supported by the pre-selection of sensors displayed in plain text, which can be assigned in the most varied of outlet signals and thereby freely configured. Following the configuration the complete wiring diagram is displayed.



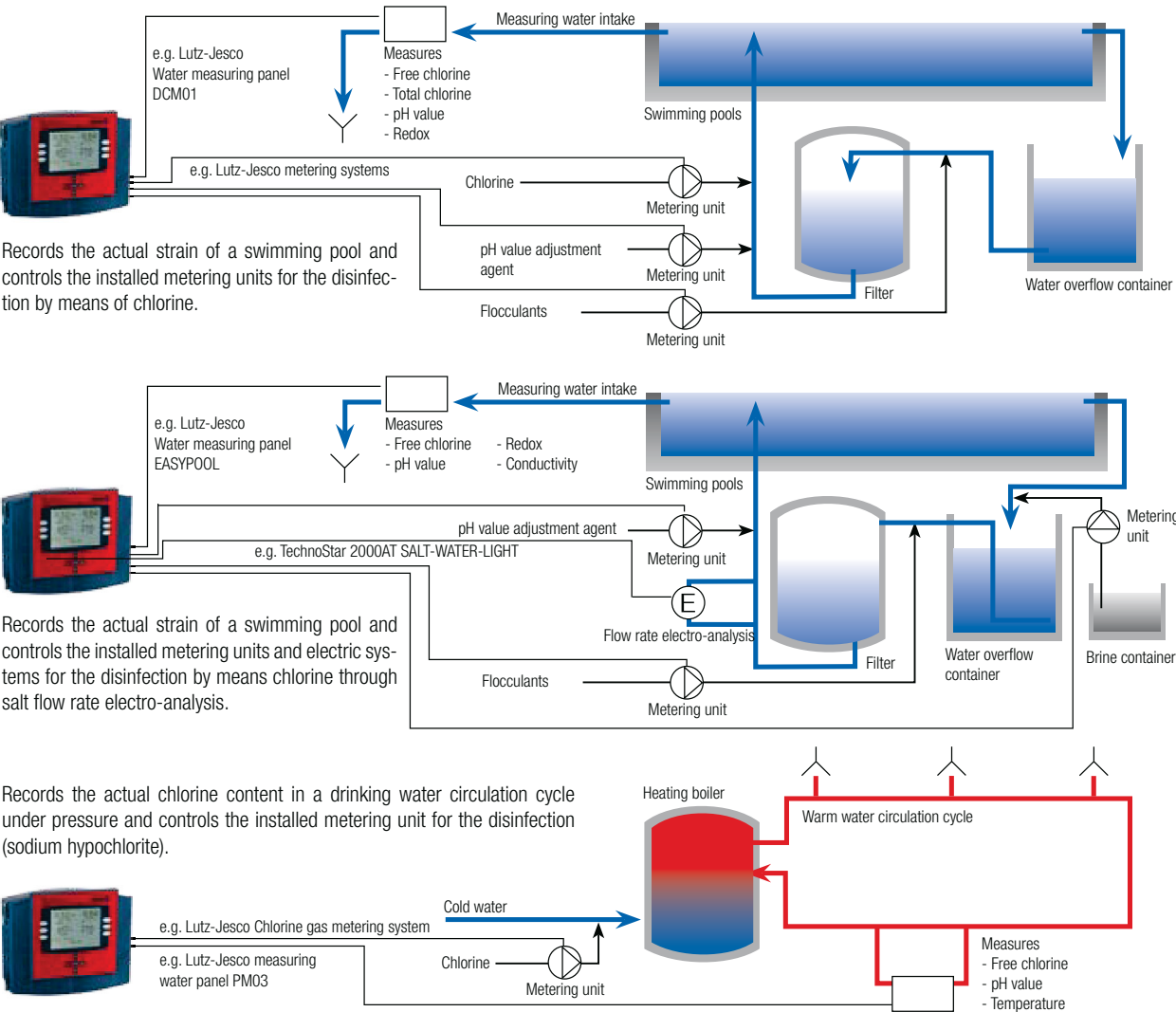
In short

- Measuring free chlorine with potentiostatic, open amperometric or diaphragm covered measuring cell
- Measuring total chlorine, pH, temperature, redox and conductivity
- Display of the effective chlorine according to dissociation curve
- 6 analogue measured value inputs and 8 digital inputs, galvanically isolated
- 8 analogue outputs 0/4 ... 20 mA for measurement or control values, galvanically isolated
- 2 ... 4 controllers for free chlorine, pH value, bound chlorine and conductivity (brine dosing)
- Balancing the pH value of the chlorine value
- Balancing the temperature of the pH value
- Control of the flocculants metering
- Real-time with timers for autom. control of the ECO-mode, thereby saving energy
- DIN contact function
- Modbus protocol via RS 485 or Ethernet
- Memory card for data logger and logbook
- Very easy to operate, guided start up
- Large display with operator guidance in plain language, a flat, multilingual menu structure and context oriented online help
- Glass surface with touch-sensitive keypad
- Integrated 24 h screen writer
- Display of the quality of the measuring cells during calibration
- Validity check during calibration
- Sensor monitoring
- Extensive alarm function

Measurement inputs and main functions of the TOPAX DX



Application of the TOPAX DX



Technical data (depending on model)

Display and operating elements	Colour display with graphical capabilities 5.7 inch, 320 x 240 pixels with background lighting 6 sensor keys to navigate the menu 5 sensor keys to control the cursor
Measuring input of free chlorine Measuring cell-options	Open amperometric measuring cells, measuring range adjustable from 0 ... 10 mg/l Potentiostatic measuring cells, measuring range adjustable from 0 ... 2 mg/l Diaphragm covered measuring cells, type 4 ... 20 mA, measuring range according to the measuring cell installed
Further measurement inputs	- pH value, measuring range: pH 0 ... 14 - Redox potential, measuring range: 0 ... 1000 mV - Temperature, measuring range: -10 ... +100 °C - Total chlorine, 4 ... 20 mA input, diaphragm covered measuring cell, 24 VDC supply of the measuring cell - Conductivity, 4 ... 20 mA input, with separate measurement amplifier
Digital inputs	Inputs for: - Pre-alarm and main alarm of the metering container metering pump 1 and metering pump 2 - Filter cleaning-cut off of the regulating function without alarm - Measuring water deficiency of the regulating function with alarm (external cut off) - Night reduction
Connection of the in- and outputs	By means of terminal blocks, max. 1 mm ²
Regulating characteristic for 4 inputs (free chlorine, bonded chlorine, conductivity and pH value)	P, PI, PD or PID performances Fixed value regulation, standard channel selectable, disturbance variable feed forward, 2-sided control
Disturbance variable input	0/4 ... 20 mA programmable, intervention of the disturbance variable 0.1 ... 10 times amplified
Standard outputs (each as per the configuration)	3 digital outputs, optocoupler, 48 V DC; 250 mA, pulse frequency 10 ... 200 pulses/min 5 relay outputs programmable as: - IN/OUT - Pulse frequency 10 ... 100 pulse/min - Pulse length 10 ... 120 seconds 3-point steps outputs with setting feedback signal, value of the potentiometer 1 ... 10 kOhm 4 analogue outputs, 0/4 ... 20 mA, max. working resistance 500 Ohm Ethernet network, Modbus TCP/IP, 0 ... 100 %, for products of the manufacturer
Control output to control the flocculants pump	Relay output, optocoupler output or continuous output 0/4 ... 20 mA (burden 500 Ohm)
Alarm outputs	Relay output as collective alarm for the measuring size of free and bonded chlorine, pH value, redox potential, temperature and conductivity as potential free changer Measuring value alarm Min. and max. alarm freely adjustable. Time delay adjustable: max. 200 minutes Safety shut off To prevent over metering (Y-alarm), time delay adjustable: max. 200 minutes
Current outputs for remote transfer of the measured value to the inputs	6 current outputs, 0/4 ... 20 mA, geometric spreading possible, max. burden 500 Ohm, potential-free Significant geometric spreading: >50% during measurement input of free chlorine and 0/4 ... 20 mA >10% during measurement input of pH value and redox potential
Interface	Modbus protocol via RS 485 or Ethernet
Load capacity of the relay	230 V / 50 Hz, 3 A
Degree of protection	IP 65 with locked filter cap
Surrounding temperature	-5 °C ... +45 °C
Supply voltage	90 ... 264 VAC, short circuit and overload-proof
Capacity intake	24 VA
Housing dimensions	302 x 231 x 107 mm (W x H x D) wall mounted unit
Weight	2 ... 2.5 kg



Product Information Multi-channel Controller TOPAX® DX / DX Net

Model variants

The TOPAX DX is available in several different variations and configuration. The following 5 variants are standard:

Order no.		TOPAX DX	40100001	40100002	40100003	40100004	40100005
		TOPAX DX Net (Ethernet)	40100110	40100111	40100112	on request	on request
Inputs							
Unit 78403 (5-way input circuit board)			X	X	X	X	X
Unit 78403 (3-way input circuit board)				X	X	X	X
Free chlorine	Measuring cell (optional):						
	Amperometric		X	X		X	
	Potentiostatic			X	X	X	X
	Diaphragm covered		X	X		X	
pH value			X	X	X	X	X
Redox potential			X	X	X	X	X
Temperature			X	X	X	X	X
Setting feedback with 3-point-steps controller			1	2	2	2	2
Measurement of total chlorine with a diaphragm covered measuring cell					X		X
Measurement of conductivity with a measurement amplifier						X	X
Outputs							
Unit 78399 (output circuit board)			X	X	X	X	X
Controller with 3-point-step output / relay output (pulse length / pulse frequency / ON/OFF) or analogue output 0/4 ... 20 mA			1	2	2	2	2
Controller with relay output (pulse length / pulse frequency / ON/OFF) or analogue output 0/4 ... 20 mA			1		1	1	2

Options

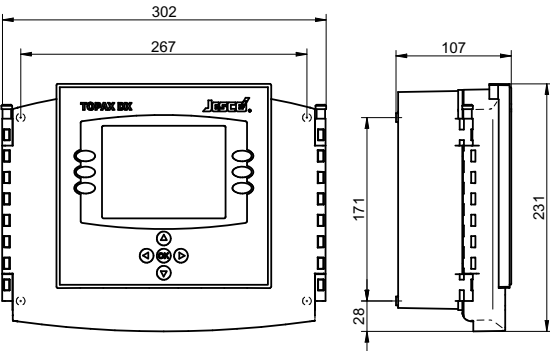
Description	Order no.
Interface RS 485	78406
Expansion module for measuring the total chlorine content and controlling bonded chlorine (without measuring cell)	78438
Expansion module for measuring and controlling the conductivity (without measurement amplifier or measuring cell)	78439

Scope of Delivery

- TOPAX DX
- Tool (M4 screw) to open the housing
- Memory card
- Mounting material
- Operating manual
- Measurement protocol
- Terminal plan for the sensors
- pH and Redox single-rod measuring cell (optional)
- Cable connection for the electrode (optional)

The product is delivered as a free-standing unit or mounted on a water measurement panel.

Dimensional figure



All measurements are given in mm

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Subject to technical changes

TOPAX® is a registered trademark of Lutz-Jesco GmbH, Wedemark.



A measured step forward
Gas warning device GW 601



Operation & Maintenance Instructions

Read these operation & maintenance instructions before start up!
To be held for future reference.



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1. Safety

1.1 General

This Operation & Maintenance Manual contains basic information to be noted during installation, operation and maintenance. It is therefore essential that the Manual be read by the fitter before installing and commissioning the unit, as well as by the relevant operating personnel /owner of the unit. It must remain accessible at the dosing pump/system for reference at all times.

In addition to the general safety instructions set out under this main heading Safety, the special safety precautions set out under the other main headings must also be observed.

1.2 Warnings used in this Operation & Maintenance Manual

This Operation & Maintenance Manual contains warnings which may endanger persons and units if they are disregarded. These warnings are identified by the following symbols:

WARNING!
refers to a potentially hazardous situation. Non-compliance can lead to death or extremely serious injury.

CAUTION!
refers to a potentially hazardous situation. Non-compliance can lead to minor injury or property damage.



NOTICE!
appears in conjunction with safety instructions which may endanger the unit and its operation if disregarded.



IMPORTANT!
Draws attention to supplementary information to make the work easier and ensure troublefree operation.



Markings which are affixed directly to the pump, such as

- Cable markings

must be observed without fail and must remain fully legible at all times.

1.3 Qualification and training of personnel

The personnel employed for operation, maintenance, inspection and installation must be suitably qualified for this work. The areas of responsibility, competence and supervision of the personnel must be precisely defined by the owner. Personnel who do not have the requisite know-how must be duly trained and instructed. If necessary, this can also be undertaken by the

manufacturer/supplier on behalf of the owner. In addition, the owner must also ensure that the relevant personnel are fully familiar with and have understood the contents of these Operation & Maintenance Manual.

1.4 Hazards due to non-compliance with the safety instructions

Failure to comply with the safety instructions may endanger not only persons, but also the environment and unit. Non-compliance with the safety instructions can lead to the loss of all entitlement to damages.

The following hazards in particular may arise:

- Failure of major unit und system functions.
- Danger to persons due to electrical, mechanical and chemical effects.

1.5 Safe operation

The safety instructions contained in this Operation & Maintenance Manual must be observed. The owner is responsible for ensuring compliance with local safety regulations. Disturbances which may affect safety must be eliminated immediately!

1.6 Safety instructions for the owner/operator

A safe and ecologically beneficial disposal of process materials as well as replacement parts must be ensured. (Statutory regulations must be observed.)

Danger due to electric current must be excluded (for further details, refer to the VDE¹⁾ regulations and the regulations of the local public utilities).

1.7 Safety instructions for inspection, maintenance and installation work

The owner must ensure that all maintenance, inspection and installation work is undertaken by authorized and duly qualified skilled personnel who have also studied the Operation & Maintenance Manual in depth.

Before carrying out installation and maintenance works, always make sure that the unit is disconnected from power supply. It must be secured against reconnection during the works! Only then may additional modules be mounted or removed and connections be made. Non-compliance can lead to the failure and warranty loss of the unit. All safety mechanisms and guards must be refitted and reactivated as soon as the work is complete.

1.8 Unauthorized modification and production of spare parts

The unit may only be modified or converted in consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer ensure greater safety. Liability for damage or loss may be extinguished if other parts are used.

1) VDE: German Association for Electrical, Electronic & Information Technologies

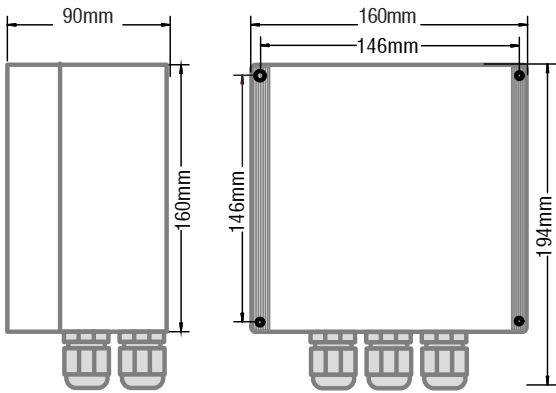
2. Introduction

Gas warning devices are stationary control units that are in continuous operation, which are connected to sensors for measuring toxic gases. Such devices are characterised by a high reliability and negligible installation and maintenance costs.

2.1 Overview of the gas warning device:

- 1 input channel for the sensor (4 - 20 mA).
- Adjustments on the central control unit are possible without the sensor.
- 2 freely selectable alarm thresholds per channel, self-locking configurable.
- Integrated acoustic signalling device.
- 1 Error reporting facility.
- 4 relay-switchable outputs, voltage-free, for generating Alarm 1, Alarm 2, a horn and equipment malfunction report.
- RS 232 and RS 485 interfaces for communications with a PC or PLT system.
- Illuminated 4-line graphic display (4 x 20 characters) for the display of measured values, reports and alarms.
- Integrated menu control for complete configuration on the equipment itself.
- LED indicators for alarms, operations, equipment malfunction and service mode.
- 1 analog output, voltage-free (4 - 20 mA).

3. Dimensions and illustration



3.1 Display and reporting facilities

4 LEDs are provided on the front panel of the gas warning device, for displaying the corresponding operating condition and the various function reports. 4 function keys are provided for inputting settings and programming. An illuminated 4-line display shows the measured values, reports and alarms, as well as gas concentrations in the form of a bar display. Four relays are provided for controlling external equipment, or for transmitting information. The relays are fitted with voltage-free change-over contacts with a maximum load of 230 V/5 A (ohmic load). The relays for Alarm 1 and Alarm 2 can, for instance, control the magnetic valves of a sprinkler system. If Alarm 2 is generated, the relay for the electric horn is also activated. The electric horn relay is provided for controlling and external horn or siren. This relay can be acknowledged when gas concentrations are detected. The malfunction relay indicates a malfunction of the sensor. The relays in the gas warning device equipment can function in accordance with two different principles and are freely adjustable.

On delivery, the relays are adjusted as follows:

1. Working current operations:

The relays for Alarm 1, Alarm 2 and the horn relay are activated when the corresponding condition is detected, namely the relay coil picks up when the set values for Alarm 1 or Alarm 2 are exceeded (these functions can be reprogrammed).

2. Neutral circuit operation:

The relay for reporting a fault condition is attracted in a trouble-free condition and is released when a fault condition is detected. This makes it possible to transmit a malfunction signal through the fault-condition relay, even if the power supply of the gas warning device has dropped off (this function can be reprogrammed).

The presentation in the display, and the assignment of the selection keys F1 to F4, is different for each operating mode. The current assignment of the selection key is shown in the bottom line of the graphic display.

The selection keys are provided with a repeat function, whereby one can browse through the selection list more quickly by holding down the key.

In normal operating mode, the display shows the following information:

1st line:

The measured gas or measured variable, the currently measured value and the unit of measurement.

2nd line:

Bar chart presentation of the currently measured value. Displayed values cover 0 to 100% of the measured range.

3rd line:

Setting of the threshold for Alarm 1 and Alarm 2.

4th line:

Assignment of the function keys F1 to F4.

4. Configuration

That F1 key (NEXT) activates the menus for configuring the parameters. The function key F2 is used for acknowledging alarms. In normal operating mode, the function keys F3 and F4 are not assigned.

The processing of measured values continues unchanged during configuration. The configuration menu is a continuous loop. The function key F1 must be activated repeatedly, until the desired menu is displayed.

All settings can be viewed, but they cannot be changed. The setting values can only be changed after the entry of a password. If a correct password has been entered, then the function keys F2 and F3 can be used to change the parameter settings.

In case of a key assignment for F2 (!) and F3 (!), the numerical values can be increased or decreased step-by-step and one can scroll in the displayed list. If only the function key F2 (!) is assigned, then the setting changes between the two alternatives.

Any changes made in these settings are saved by activating the F4 (SAVE) key. Such changes are only activated after one leaves the menu. If one closes the menu with out pushing the F4 (SAVE) key, then the last saved values remain valid and the changes that have been input lost.



IMPORTANT!



CAUTION!



CAUTION!

If no entries are made in the device for more than 10 minutes, then the display dramatically changes back to the display for normal operations mode (except when the service mode has been activated).

The configuration of the GW 601 device contains all the parameter settings with which the functions of the device can be adapted to the requirements of the application.

Descriptions of the configuration options are provided in the following table.

The following will be indicated for each menu:

Menu text:

Entries in the menu on the display

Selection:

Setting options for the parameter

Function:

Description of the effect on the behaviour of the gas detection system.

IMPORTANT!

To be able to make changes, the system must be enabled by entering a valid password.

Menu text	Selection	Function
Password	— (Entry blocked), OK (Entries enabled)	The system is enabled for entries through the simultaneous activation of the function keys F3 and F4 for approximately 5 seconds. Renewed activation of this key combination for approximately five seconds disables the input of entries. The entry functionality is automatically reset (disabled) when no key is activated for more than 10 minutes. CAUTION! In service mode (Service = On) input to the system is permanently enabled.
Password	GB, D	In the menu that becomes available, when settings are enabled, one can switch between the language German (D) and English (GB). Push the F2 key in the display until the entry switches. GB -> D: English activated D -> GB: German activated
Service	Off, On	In service mode, alarm and malfunction reports are blocked, and relay outputs are also blocked. The service operating mode is indicated by blinking operating LEDs.
Gas	List of gases and measured variables	Display of the empirical chemical formula that is assigned to the measured gas or the other measured variables and their description. The selected description will be shown in the display during normal operating mode.
Dimension	ppm, Vol.-%, % UEG, pH, degrees	Unit for the measuring range. The selected description will be shown in the display during normal operating mode.
Decimal point	0, 0.0	Defines whether values after the decimal point are to be displayed. CAUTION! A change of this parameter also influences the settings for the measuring range and the alarm thresholds.
Range	0.0 to 3000. 0,0 to 30000	Defines the maximum value of the measuring range.
Alarm 1, Alarm 2	0 to end of measuring range	Defines the two alarm thresholds and the direction of the exceedance that triggers the alarm. The values of the alarm thresholds are listed in ascending order. The alarms are triggered when the threshold value is exceeded.
Quit A1, Quit A2	On, Off	Indicates whether the alarm and the corresponding relay are self-locking (ON) or non-locking (OFF). A non-locking alarm turns off when the alarm condition no longer applies. (make sure to observe alarm hysteresis in this case). A non-locking alarm must always be manually acknowledged, by using the F2 (QUIT) function key to reset.

Menu text	Selection	Function
Horn	A1,A2	Indicates whether the horn relay (and the integrated signal generator that is linked to it) has been assigned to Alarm 1 or Alarm 2. Both alarms are deactivated, in case of an „—“ setting.The horn relay can be acknowledged with the F3 (HORN) function key, even when the alarm condition is still present. CAUTION! The horn relay should only be used for external acoustic signal generators. NOTICE! The horn is triggered once more, if the alarm threshold is again exceeded after an interim interruption (new event alarm). This also applies when a self-locking alarm has been acknowledged in the meantime.
Relay mode A1, Relay mode A2, Relay mode F, Relay mode H	Closed, Opened	This indicates whether the alarm, the malfunction or the horn relay drops off or picks up when the trigger condition is met. Opened: The relay is attracted during measuring operations, and it drops off when the alarm value is exceeded (working current operation). Closed: The relay has dropped off during measuring operations, and it picks up when the alarm value is exceeded (neutral circuit operation). NOTICE! With the setting „Opened“, an interruption in the power supply of the warning equipment has the same effect as the triggering of an alarm or a report.
Hyst.	0 % to 10 %	Defines the alarm hysteresis in percent of the value of the corresponding alarm threshold. A non-locking alarm is only turned off, when its value is less than of the alarm threshold by at least the value of the hysteresis or to present time of the maximum value of the measured range, in which case the larger value applies. This prevents repetitions of alarm triggering situations, which are caused by small fluctuations of the measured value around the alarm threshold.
NPC	0 to 5 %	A near point of convergence can be set.The value range ± NPC over the maximum measured value is displayed as zero. In the adjacent area of up to ± 2 NPC over the maximum measured value, a floating approximation of a linear steady state characteristic is made. Default setting: 0 % (deactivated). Actual input: The unconverted and current output current of the sensor is displayed, which is provided at the input of the gas warning device system.

The last two menu items are used for adjusting the gas warning device system without a sensor.

CAUTION!

These adjustments may only be performed by trained personnel and include two steps:
1. When no gas is present, then the zero point is changed until the ACTUAL VALUE shown in the display is 0. Please note that negative values are represented as „< 0“. In case of a correct adjustment, the preceding „<„ disappears and precisely „0“ is displayed.
2. Subsequently, when a test gas is provided, the GAIN is adjusted until the current value shown in the display corresponds to the set point value.

Menu text	Selection	Function
Zero	2,000 to 6,000	Position of the zero point. No correction is made at a value of 4,000mA. ACTUAL VALUE: The measured value that has been corrected to around ZERO and possibly by GAIN is displayed.
Gain	0.500 to 2,000	Correction for amplification. Explained in the text above. No correction is made at a value of 1,000. ACTUAL VALUE: The measured value that has been corrected to around ZERO and possibly by GAIN is displayed.



CAUTION!



NOTICE!



NOTICE!



CAUTION!



IMPORTANT!



CAUTION!



CAUTION!

The GW 601 is normally operated with sensors that have a 4 to 20 mA output with a linear steady state characteristic, namely an input current of 4mA is interpreted as a zero point, and an input current of 20mA as the maximum measured value. Between these values the conversion is calculated according to the following formula:

Measured value :
$$\frac{\text{Measured current} - 4\text{mA}}{\text{mA } 16} \times \text{maximum measuring value}$$

IMPORTANT!

Corrections of the settings are normally undertaken at the sensor itself and not on the gas warning device system.
If this is not possible, then adjustments can be performed on the GW 601. For this purpose and after the detection of the signal, the detected current value is first recalculated with an offset and with an amplification factor. An evaluation only follows after the measured value has been converted. The necessary adjustments can be performed in the ZERO and GAIN Menus.

CAUTION!

The setting range of correction values is limited, so that adjustments can be limited to a tolerance range that is acceptable for measuring technology. More extensive corrections require a direct intervention in the corresponding sensor.

5. Operating conditions

The gas warning device works as a control centre for a gas detection system. It detects signals from the sensors and evaluates these.
A variety of operating conditions, which can occur with gas warning devices, are described in what follows.

5.1 Start-up

The connected sensors can show undefined values, immediately after the start-up of the system. This situation can lead to false alarms. All alarm messages are therefore blocked for 120 seconds, after the system is switched on, or after the power supply has been interrupted.
The LEDs begin to blink as soon as power is switched on, and the time remaining until normal operations are resumed is indicated by a decremending counter. All memory components (RAM / ROM / EEPROM) are given a complete test. This test will subsequently be repeated at regular intervals during measuring operations.
After the start-up pause of 120 seconds, the green „Operating“ LED burns continuously and the gas warning device is in Detection mode.

5.2 Data logging

The automatic sensing and recording of data is indicated by the continuously lit green „Operation/Power“ LED. The signals from the sensor are recorded by the gas warning device.

Status LEDs

Alarm 1, 2, (red): off
Operation: lighted
Malfunction: off

Display

Measured value: Current measured value, in the range between 0 and the maximum value.
Bar-type display: Current measured value, in the range between 0 and the maximum value.

The threshold value settings for A1 and A2 are displayed permanently.

Relays

Alarm 1 and 2 (K1, K2): not activated
Malfunction (K3) : not activated
Horn (K4): not activated
Integrated signal generator: Mute

5.3 Service mode

In the service mode, alarm and malfunction signals are blocked. The service operating mode is indicated by a blinking operating LED. The service mode can be activated in the configuration menu.
In service mode input to the system is permanently enabled.

5.4 Analog output terminals 4 to 20mA

Current is output at the analog terminal,

5.5 Alarm

By default the alarm thresholds are set to 2.00 ppm (Alarm 1) and to 4.00 ppm (Alarm 2). The red LEDs indicate when the alarm threshold values have been exceeded. 2 alarm thresholds can be set. At 2.00 ppm of the measured range the red LED „Alarm 1“ lights up and the Alarm 1 relay is activated. Alarm 1 is automatically cancelled when the value falls below the threshold. At 4.00 ppm of the measured range the red LED „Alarm 2“ lights up and the „Alarm 2“ relay is activated. Alarm 2 is self-locking and can only be acknowledged after the gas concentration falls below the threshold by pressing the „F2“ function key. Furthermore, upon the attainment of alarm threshold 2 the horn relay for external signalling devices is activated. The horn relay is self-locking and must be acknowledged by pressing „F3“.

6. Measures in case of Alarm or Malfunction

6.1 Alarm 1

After the occurrence of Alarm 1 a minimal concentration of gas is present. Appropriate measures are to be initiated immediately. Repair work may only be started when the concentration has dropped below alarm threshold 1.

CAUTION!

Repair work may only be started when the concentration has dropped below alarm threshold 1 (2.00 ppm).
1 ppm chlorine in the breathable air still irritates the breathing organs and will be recognized easily by the smell. However, in this case there is no longer any danger.

6.2 Alarm 2

The endangered region and all surrounding rooms must be cleared and the measures specified in the safety regulations and in the chlorine alarm plans must be taken.

CAUTION!

Repair work may only be started when the concentration has dropped below alarm threshold 1 (2.00 ppm).
1 ppm chlorine in the breathable air still irritates the breathing organs and will be recognized easily by the smell. However, in this case there is no longer any danger.

6.3 Equipment malfunction

In case of malfunctions of the gas detection system which the operator is not able to eliminate immediately, appropriate measures are to be initiated and the maintenance service is to be notified. Until the malfunction has been eliminated warning signs are to be posted and the workforce is to be informed of the special situation.

6.4 Troubleshooting Measures

Display	Possible reason	Troubleshooting Measures
„Operation“ LED is off	Interruption of power supply	Check the power supply
„Malfunction“ LED is burning	Interruption of the sensor circuit	Check the sensor circuit

7. Maintenance

Maintenance of the system should be performed in accordance with the T 023 code of practice of BG Chemie.
The maintenance comprises the following items:

- Checking and if necessary adjusting the sensors;
- Operational check of the switching stages for the triggering of the alarms. In this connection the sensors are to be loaded with test gas with a concentration above alarm threshold 2;
- Operational check of the relay contacts;
- Operational check of the optical and acoustical warning devices.

8. Calibration

The Gas detection system is calibrated in the plant prior to delivery. Should a calibration become necessary, it may only be performed by authorized skilled personnel.
The calibration of the gas detection system takes place with test gas directly on the sensor.
Type and Composition of the Test Gases
Only certified test gases may be used within their shelf life. The actual concentration must be known up to 2 % relative from the bottle value. Pure ambient air (without combustible substances) can be used as a reference gas. If there is no guarantee of this, synthetic air must be taken. The gas concentration of the test gases must lie above Alarm 2 and below the measured range rating.



9. Technical Data

Description	Gas warning device system for the measurement of combustible and/or toxic gases as well as oxygen. Graphic display. 2 alarm thresholds. 2 alarm, horn and malfunction relays. Analog output 4-20 mA
Sensor	1
Alarm/Malfunction/Display	• Illuminated 4-line display for indication of readings, messages and alarms, bar chart of the concentration • Green LED as operational status indicator • 2 red LEDs for alarm display (Alarm thresholds 1 and 2) • Yellow LED for display of equipment and sensor malfunctions
Alarm thresholds	2 freely selectable alarm thresholds,self-locking configurable
Relay	4 change-over contacts 250 V / 5A for alarms 1 and 2, malfunction, horn
Additional functions	• Completely configurable on device by means of 4 non-locking keys. • RS 232/RS 485 interface for communication with external peripherals (PC or PLT system). • Alarm locking in maintenance mode. • Horn alarm separately acknowledgeable. • Analog output 4-20 mA.
Operating temperature	-10 °C to +40 °C
Dimensions	194 mm x 160 mm x 90 mm (height x width x depth)
Assembly	Wall assembly
Material	Case ABS
Degree of protection	IP 54
Storage temperature	-25 °C to +60 °C

Electric data

Power supply	230 V AC
Current/Power consumption	Max. 0.08 A / 18 W
Cable inlet	• 1 piece M20 x 1.5 (Cable diameter 7-13 mm) • 5 piece M16 x 1.5 (Cable diameter 5-10 mm)

Conformity

EC directives	X II (3)G 94/9/EG (ATEX), 89/336/EWG (EMV), 73/23/EWG (LVD)
Measuring function	Design according to • DIN EN 61779-1 with DIN EN 61779-4 • DIN EN 45544-1 to DIN EN 45544-3 • DIN EN 50104

Security system (Option)

Transfer of Power supply	max. 10 hours (without alarm)
Battery type	one 12 V Block 7,0 Ah
Dimensions	500 x 500 x 300 mm (W x H x D)
Degree of protection	IP 65

10. Connection and Assembly

10.1 Installation requirements

In the electrical installation for the gas warning devices a separating device (e.g. an automatic circuit breaker) must be present in order to guarantee a secure separation from the power supply.

10.2 Power connection

The gas warning devices are provided for stationary installation on a power supply of 230 V /50 Hz. The device corresponds to safety class I under EN 60335 and must be connected to a ground wire (PE). The maximum power consumption is 20 VA.

10.3 Relay connection

External devices can be addressed or information can be forwarded with 4 relays. The relays have potential-free changeover contacts for 230 V/5 A (ohmic load).

10.4 Sensor connection

1 sensor can be connected to the gas warning device. The connection of the sensor takes place via shielded lines. Note that during the installation the shielding is placed on the sensor. Only in this state is the interference immunity for the gas detection system guaranteed. The connection follows the drawing.

10.5 Assembly

The devices are provided for wall assembly. Make certain that an access is free. The power supply can only be switched on after assembly has been completed.

CAUTION!

When working on the device make sure it is current less!

10.6 Security system

The security system is an uninterruptible power supply which supplies the auxiliary voltage for the gas warning device in a power failure. This power supply implements the operability of the gas warning device for approx. 10 hours.

11. Tests

EMV-Directive 89/336/EWG:

The gas warning devices are EMC certified in accordance with generic standards EN 50081-1 and 50082-2 and can be used in industry and at home with regard to jamming and interference immunity.

Low voltage guideline 3/23/EWG:

According to the standard EN 61010 Part 1, Safety rules for electric measuring, control and laboratory instruments.



CAUTION!



CAUTION!

13. Sensor

The sensors for the gas warning devices are electronic measuring cells which work according to the electro-chemical principle.

Testing, calibration and settings are possible directly on the sensor. The electro-chemical measuring sensor and an evaluation circuit board are built into the sensor case. On the evaluation circuit board the signal is converted by the test probe into the uniform current signal 4 – 20 mA. This signal is supplied to the gas warning device. Power is supplied to the sensor circuit board via the measuring line (two wire connection).

CAUTION!

The sensors are calibrated at the factory. Any unqualified change in the setting will interrupt the function.

13.1 Features

- Sturdy, corrosion-resistant design for industrial use.
- 4-20 mA output signal corresponding to the measured range.
- Maximum distance to evaluation main frame 1000m.
- Power supply 18 to 30 V DC.
- Simple replacement of the sensor block.
- Measuring function designed according to DIN EN 60079, DIN EN 45544 or DIN EN 50104 standards.

13.2 Operating modes of the sensor

Measuring operation

During measuring operations, the measured concentration is output via the 4-20 mA interface. 4 mA corresponds to zero point, 20 mA corresponds to the measured range rating of the sensor. The characteristic is linearised.

Turn-on phase

When turning on the power supply during start-up or after a power failure the sensor must first stabilize itself. During this burn-in period invalid measuring signals could trigger false alarms. To prevent this, a constant current of 0.8 mA is output in the turn-on phase. The red LED located on the electronics board in the case of the sensor flashes during this time period. The duration of the turn-on phase is about 60 s.

Self-monitoring

The sensors have hardware self-monitoring functions. If an error is detected during the automatic controls 1.1 mA is output as output current. The LED for failure burns at the main frame.

Cable disruption and short-circuit

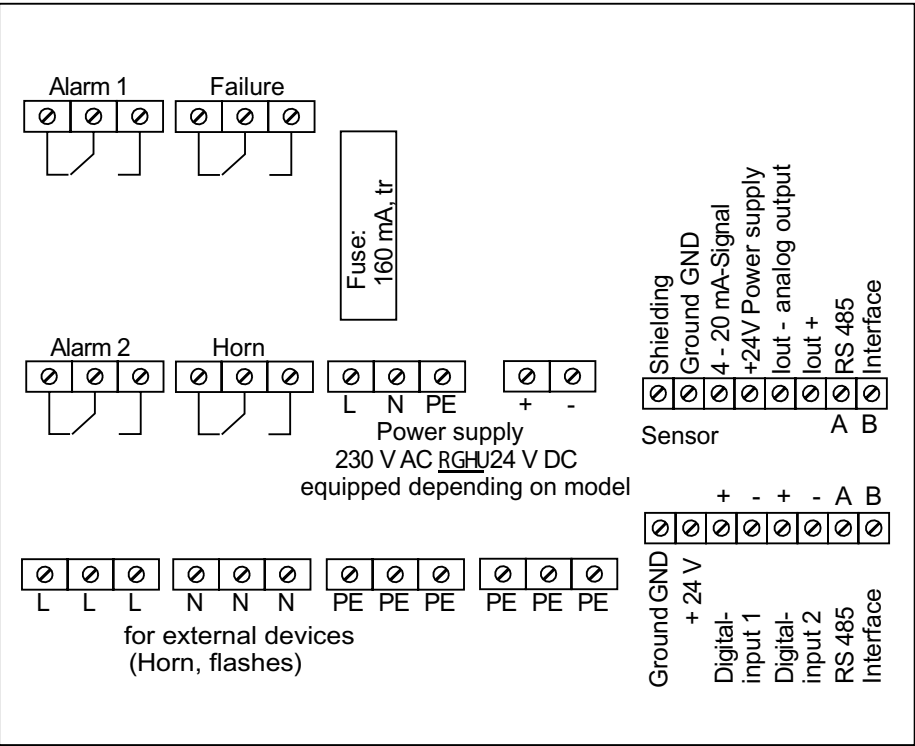
Interruptions or short-circuits in the wires of the main cable as well as a failure of the sensor power supply cause the current value to be at 0 mA or above 22 mA.

Diagnosis and Measures

The 4-20 mA current output is available for diagnosis. To be able to observe the current output, a current measuring instrument must loop in to the 4-20 mA line.

The following table summarizes the states and describes the measures for restoring measuring readiness.

12. Gas warning device system circuit diagram



Current output (I _{out} ±0,1 mA)	State	LEDs		Measures
		green	red	
0 mA	Cable interruption	on	off	• Check electric connection • Repair cable
	Power failure	off	off	• Check power supply • Repair cable
0.8 mA	Turn-on phase	on	blinking	State is automatically cancelled after expiration of the turn-on phase.
1.1 mA	Hardware error	on	off	Check hardware and repair if necessary.
to 22 mA	Measuring operation	on	off	-
> 22 mA	Cable short-circuit	on	off	• Check electric connection • Repair cable

Changing the sensor block

After specifying the serial number, pre-calibrated replacement sensor blocks can be made available.

The maintenance-friendly concept of the sensors allows an easy replacement of the sensor block. To replace the sensor block, first separate the sensor from the power supply (U+) and the ground (GND). The potential compensation can stay connected. After opening the cover of the case, remove a flat ribbon plug which connects the sensor block to the electronics.

After that the three screw connections can be loosened, which connect the sensor cap, the basic case and the sensor block. The sensor block is replaced and the sensor is put back together again.

After closing the case the power supply connected again.

The replaced sensor block can be sent back to Lutz Jesco for disposal.

Installation and Start-up

The wall assembly takes place with two screws (max. $\varnothing$ 4 mm) and can only be done with the cover opened.

During assembly make sure that the sensor is accessible for maintenance work. For this reason a space of at least 10 cm must be kept between the gas inlet of the sensor and other components.

CAUTION!

Electrical connections can only be performed by a skilled electrician observing the relevant installation requirements.

The sensor is connected by means of a 3-pole double-shielded wire. The wire cross-section and the wire resistance associated therewith determine the maximum distance between the sensor and the evaluation main frame. The outer diameter of the cable must be range between 5 and 9 mm for the supplied cable inlet.

NOTICE!

The cable is to be installed in such a way that it is protected from mechanical damages. Strain relief is to be maintained near the cable inlet.

Cable inlet and Shielding

The cable passes through the supplied cable inlet into the interior of the case. The cable inlet consists of the flange which screws into the basic housing and is cemented in there, the clamp/seal assembly and the threaded bush.

Insert the cable through the threaded bush, clamp/seal assembly and the flange. Make certain the clamp/seal assembly is correctly installed. Ensure that the cable end in the sensor is long enough for subsequent assignment of the terminals. Place the cable shield on the flange and fasten it. The cable is fastened by screwing into the threaded bush. Do not insert the cable shield into the case.

Potential compensation

A potential compensation is not absolutely necessary, i.e. the ground terminals in the case do not have to be assigned. If an external potential compensation is desired, perform the grounding during the assembly at one of the fastening screws.

Connection

The terminals are designed as plug-in terminals. Remove the plugs before laying the cable in order to avoid mechanical damages and do not plug them back in until you have completed the assembly.

13.3 Maintenance

The sensors are subject to aging and wear and tear whose extent depends very greatly on the environmental conditions prevailing on-site. For this reason the sensors of the sensor are excluded from the warranty.

Each sensor is adjusted in the plant prior to delivery. The state during the test is documented in the test protocol.

Maintenance by a competent person represents an indispensable measure for testing and maintaining the operability of gas measuring systems. Maintenance involves inspection, calibration and adjustment as well as a function test of the entire gas measuring system.

CAUTION!

A regular inspection and function test is to be performed for all supplied measuring systems in intervals no greater than 6 months. Prior to the function test ensure that steps have been taken to prevent an unintentional triggering and forwarding of alarms.

In addition nationally binding provisions for determining the maintenance intervals can also exist.

The performance of an appropriate maintenance is subject to your responsibility as the operator of the system. The results of the maintenances should be documented if this is not already required by the prevailing regulations.

Inspections take the form of a visual inspection.

IMPORTANT!

Watch out for dust and dirt. In particular the gas inlet of the sensor block must be free of dust and dirt.

Performing adjustments

The potentiometers that are used for making adjustments are located on the electronics board in the base housing. The housing can be opened by removing the cover.

The potentiometer for setting the zero point is labelled „Zero“, while the one for setting the sensitivity is labelled „Sens“. The other potentiometers are set and sealed in the plant. They must not be altered.

The adjustment of the zero point is always performed first, before the sensitivity is set while feeding test gas. In the case of the reverse approach the sensitivity of the sensor will be erroneously changed.

We recommend checking the zero point one more time after completing the adjustment. This also ensures that the sensor is not accidentally in an alarm mode at the end of the calibration and adjustment operation.

Function test

The function test additionally contains the test of the alarm signal triggering and the signalling device for malfunctions. The additional tests essentially concern all components still belonging to the gas measuring system.



CAUTION!



CAUTION!



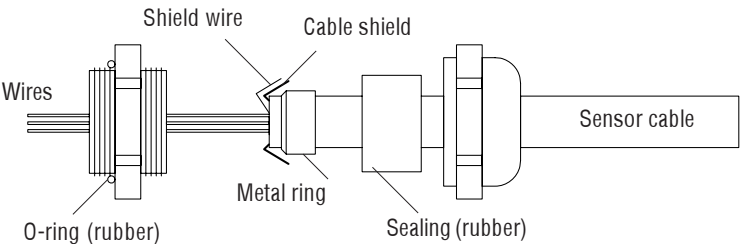
IMPORTANT!



NOTICE!

13.3 Connection of the sensors

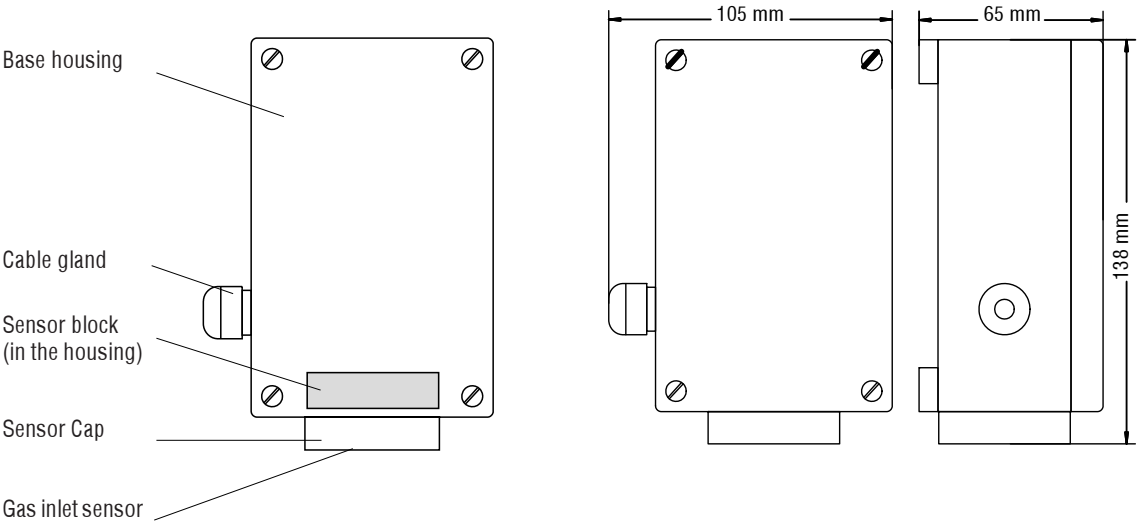
PG thread (metal)



13.4 Technical Data Sensor

RF radiation proof metal case with protective cap

Dimension



Function features

Test gas :	Chlorine (Cl ₂)
Measured range :	0 to 10 ppm
Measuring principle :	Electro-chemical cell
Operating temperature :	-10 °C to +45 °C
Moisture :	15 r.F to 90 r.F (avoid condensation)
Pressure :	900 hPa to 1100 hPa
Operate time t ₉₀ :	ca. 30 s

Mechanical data

Dimensions :	138 mm x 105 mm x 65 mm (length x width x height)
Weight :	approx. 0.5 kg
Material :	Cast aluminium (painted) / PTFE
Degree of protection :	IP 54 (except gas inlet)
Installation :	Wall assembly
Storage temperature :	-20 °C to +45 °C

Electric data

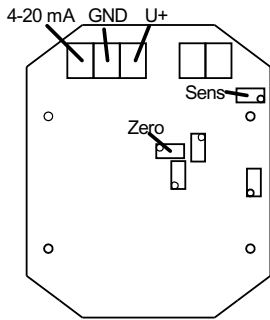
Power supply :	24 ± 6 V DC
Current/Power consumption :	40 mA / 1 W
Interface :	4-20 mA (linear)
Max. burden :	500 Ω
Cable inlet :	M 16 x 1.5 (Cable diameter 5-9 mm)

Conformity

EC directives :	X II 3G (suitable for Zone 2) 94/9/EG (ATEX), 89/336/EWG (EMV)
Degree of ignition protection :	EEx nA IIC T6 X
Measuring function :	Designed according to DIN EN 45544-1 to DIN EN 45544-3

Installation

Mounting place :	Near to ground (in ca. 30 cm height).
Mounting position :	Sensor opening preferably facing bottom
Fastening :	Drill jig can be downloaded at „www.jesco.de“
Terminal assignment and Potentiometer :	



U+	Power supply 24 V
GND	Ground (Power supply and current output)
4-20mA	Current output 4-20 mA
Length of line :	Maximum 1000 m (cable 3 x 0.8 mm)(corresponds to a wire resistance of 18 Ω)
Stabilization time :	approx. 60 min (90%), ca. 24 h (99%)

Use

Description measuring principle :	The sensor consists of two or more electrodes arranged in an electrolyte. One of the electrodes is accessible for the test gas. A redox reaction takes place at the electrode. In the process an electrical current is generated which is proportional to the concentration in the test gas.
Transverse sensitivities :	1 ppm Br ₂ -> Display ca. 1 ppm Cl ₂ 1 ppm F ₂ -> Display ca. 0.4 ppm Cl ₂ 10 ppm ClO ₂ -> Display ca. 3 ppm Cl ₂ 10 ppm SO ₂ -> Display ca. 2 ppm Cl ₂ 10 ppm NO ₂ -> Display ca. 2 ppm Cl ₂
Special influences :	- Avoid long continuous operation in very dry atmosphere - Continuous exposure to H₂S damages sensor - Alarm thresholds from 0.5 ppm - Measured range lower limit 0.5 ppm (as per DIN EN 45544)
Sensor service life :	Normally 2 years, depending on the conditions of use

Maintenance

Intervals :	At least every six months. We recommend observing DIN EN 45544-4 and BG Chemie-Information BGI 836 (Code of practice T021)
Test gas (zero point) :	Ambient air (free from test gas), synthetic air
Test gas (sensitivity) :	Chlorine,Concentration in the middle of the measured range or slightly above highest alarm threshold
Test gas task :	0.5 to 1 l/min via calibration adapter for at least 2 min

Sensor block, replacement:	Item No. 78392
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Further information	DIN EN 45544-4, BG Chemie-Information BGI 836 (Code of practice T021)
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The service life of the sensors is approx. 2 years. After this time the sensors should be replaced as a precaution. Corresponding replacement sensors can be obtained through the Lutz-Jesco company upon return of the existing sensors.

14. Ordering information

Part No.	Description
23600201	GAS WARNING DEVICE GW 601 Consisting of: Gas warning device system Sensor with sensor and 5 m main cable
78390	Gas warning device system for gas warning device GW 601
78391	Chlorine gas sensor CM 601 for gas warning device GW 601
78392	Chlorine gas sensor block for CM 601(replacement sensor)
78017	Connection cable sensor for gas warning device system

List of Contents

1. General
2. Scope of Delivery
3. Installation
4. Startup
5. Switching off the System
6. Maintenance
7. Troubleshooting

1. General

The water sampling station SR 400 and SR 500 includes additional to the chlorine measuring cell a connector with flow adjustment valve, a dirt trap, a hydrostatic flow controller for the chlorine measuring cell and a flow monitor with Reed contact. It is built in an activated-carbon filter for adjusting the OFF-SET of the chlorine measuring cell.

Water sampling station SR 500 includes additional a transparent housing for measurement of pH-value and redox-value. A groundig pin is built in, too.

The two electrodes of the chlorine measuring cell which is suitable for all types of pure water are normally made from platinum/copper. Because of the better chemical resistance, we recommend using platinum/silver electrodes for salt and sea water.

Note!

In order to avoid malfunctions due to contamination of the measuring cells or flow controllers, it is recommended to install an 80µm filter into the sampling tube.

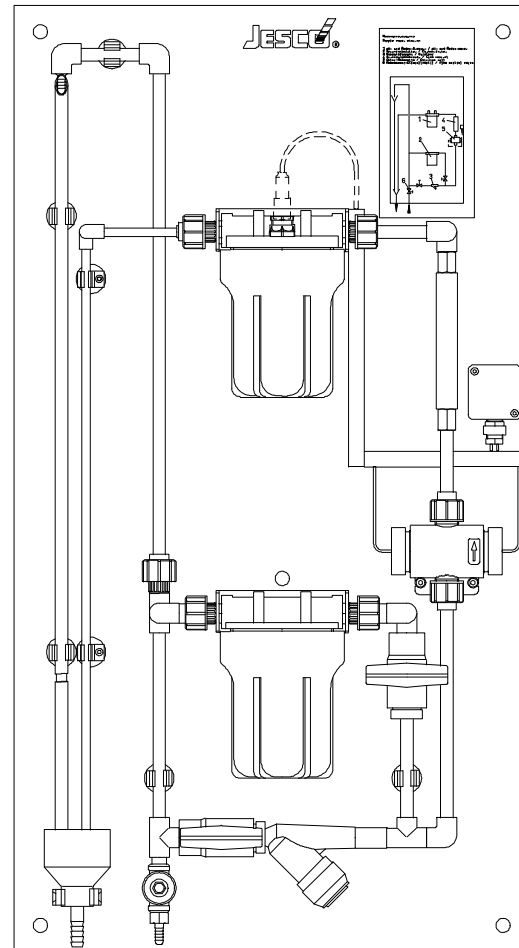
The filter element must be changed or cleaned regularly so that chlorine consumption in the sample water due to separated dirt particles does not occur.

2. Scope of Delivery

When unpacking the water sampling station and accessories, make sure that small parts are not overlooked. Compare the scope of delivery with the packing list.

3. Installation

The water sampling station must be mounted vertically at eye level. Please use the delivered mounting set.



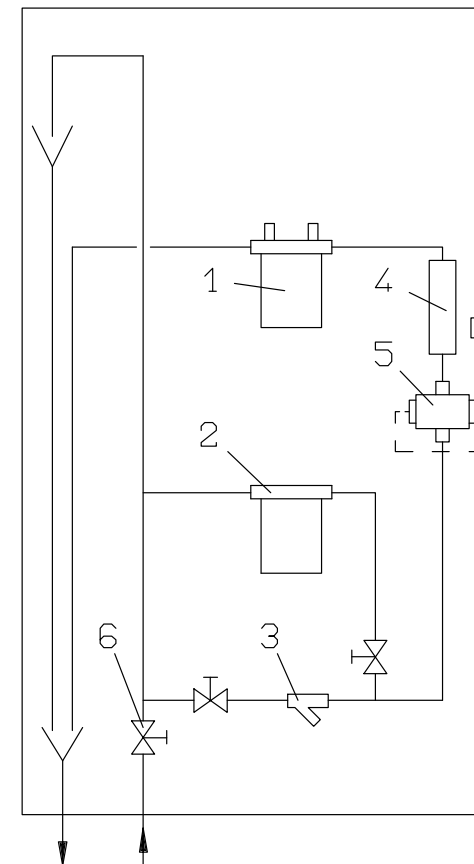
3.1 Electrical Connection

For the general electric installation, observe the local standard regulations. Always let an expert do the electrical connection. Controller and amplifier should be located as close as possible to the water sampling station, either in the switch cabinet or at the wall. Connecting lines between the pH and redox sensors and the amplifier in particular must not be longer than 15 m unless special measures have been taken. If longer distances must be overcome, the electrode must be fitted with an impedance transformer. Measuring cables must never be layed directly in parallel to mains and control lines or their installation channels. Crossings must be rectangular.

A grounding pin is required if imported voltages might cause wrong measurements (especially pH measurement).

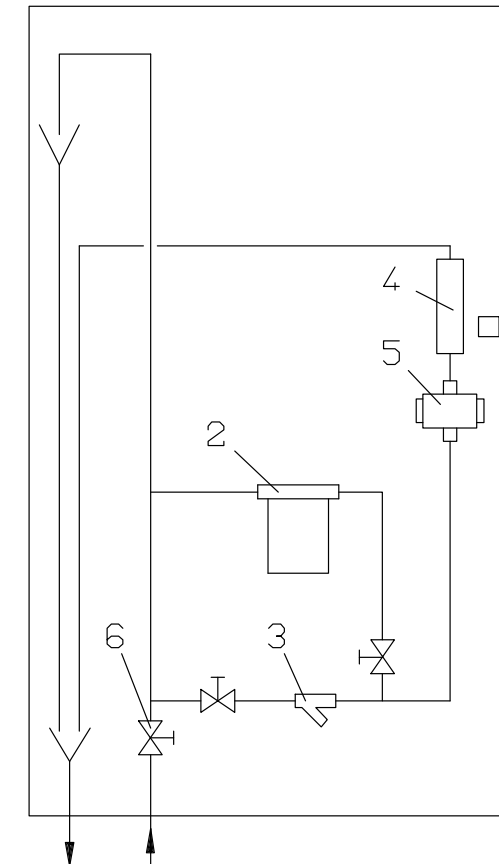
Water Sampling Station SR 400 / SR 500

Water Sampling Station SR 500



- 1 pH- and redox-meter (not at SR 400)
- 2 activated carbon filter
- 3 dirt trap

SR 400



- 4 flow monitor
- 5 Chlorine measuring cell
- 6 flow control valve

The task of the Reed contact of the flow monitor (4) is to block the controller output and to deactivate a servomotor (if available) if the sample water quantity required is too small for a reliable measurement.

3.2 Sample Water Connection

The sample water is to be routed without delay from the sampling point to the measuring cell. Consequently, large line cross-sections must be avoided. We recommend using PE or PVC tubes or pipes with 6...10 mm internal diameters. A 50 m long DN 6 tube causes a dead time of about 2 minutes and a pressure loss of 0.25 bar.

The inlet of the water sampling station is fitted with a tubing connection for 6/12 PVC tubes.

The supply pressure for the sample water must be at least 0.15 bar.

Note!

Never use metal pipes as they alter the measurements due to chlorine consumption!

The sample water must be directed into open collecting basins or the sewerage.

The flow adjusting valve must be adjusted, that just a few drops come out at the overflow-pipe.

Water Sampling Station SR 400 / SR 500

4. Startup

After installation, the sample water must flow through the connected devices for at least four hours in order to put the electrodes into a balanced condition before initial adjustment. Otherwise, the adjustment would have to be repeated several times. The hydrostatic flow controller ensures a constant sample water flow of approximately 40 l/h, if some drops come out of the overflow. Before adjusting the chlorine measuring cell, the pH value must be stable. The pH adjustment must be carried out first.

4.1 pH Value

The connected measuring and control devices are adjusted following the same steps irrespective of the model. In order to set the measuring points, two buffer liquids are required, the pH values of which are slightly higher / lower than the operating level to be measured finally (e.g. pH 6.8 and pH 9.27). For a detailed description of the adjustment procedure, refer to the operating instructions of the amplifier.

For buffering, loosen the clamping screw of the pH electrode, remove the electrode carefully and put it into the buffer liquid.

After buffering the clamping screw must be fixed carefully to ensure that no air is sucked in at the connection. Otherwise the flow of water will be too low for the chlorine measurement cell and the flow monitor will go down.

Note!

The pH electrode must be resistant to a weak vacuum, because at the electrode is a vacuum of nearly 0.1 bar.

4.2 Redox Value

For the adjustment of the redox value, only one buffer liquid is required (e.g. 468 mV). For a detailed adjustment description, refer to the operating instructions of the amplifier.

For buffering, loosen the clamping screw of the redox electrode, remove the electrode carefully and put it into the buffer liquid.

After buffering the clamping screw must be fixed carefully to ensure that no air is sucked in at the connection. Otherwise the flow of water will be too low for the chlorine measurement cell and the flow monitor will go down.

Note!

The redox electrode must be resistant to a weak vacuum, because at the electrode is a vacuum of nearly 0.1 bar.

4.3 Chlorine Measuring Cell

The chlorine measuring cell can be adjusted as follows after several hours of running.

Check that the balls move freely in the chlorine measuring cell and also reach the upper cell section. If necessary, collect and measure the sample water (approximately 0.66 l/min correspond to approximately 40 l/h).

OFFSET Adjustment

Prepare controller/amplifier for OFFSET adjustment. The OFFSET can be adjusted with or without the activated-carbon filter. We recommend using an activated-carbon filter because the adjustment procedure can be carried out more quickly and does not influence the cell flow.

OFFSET Adjustment with Activated-Carbon Filter

Lead the sample water through the activated-carbon filter by closing the bottom ball valve and open the top ball valve. The dechlorinated sample water produces a residual current in the chlorine measuring cell, which must be compensated by the OFFSET corrector of the connected device. Indicator and digital device must show „zero“.

OFFSET Adjustment without Activated-Carbon Filter

This procedure is helpful if the activated carbon is consumed and no spare filter is available. Close both ball valves on the water sampling station and wait for about 10 minutes. The cell current droppage due to polarization gradually reaches a constant residual value. This value is adjusted as "OFFSET" display as described before.

Range Setting

After the OFFSET adjustment, the measuring range (slope of curve) is set using chlorinated water. For this purpose, the sample water must bypass the activated-carbon filter with the help of the both ball valves. The balls in the chlorine measuring cell (5) must rotate correctly.

After a few minutes, the measurement amplifier / controller displays a value. This display must be adapted immediately to the results of an independent comparison measurement. For the comparison measurement, a sufficiently accurate device working according to the DPD method is appropriate. The water sample used for the comparison measurement may only be taken from the overflow of the sampling station and not from a more distant system section. Observe the operating instructions for the comparison measuring device carefully in order to avoid faulty displays (receptacles contaminated by water, finger prints, residues, etc. often cause errors).

The deviating display on the amplifier or controller is then corrected in accordance with this result of this comparison measurement. The whole device is now adjusted.

Note!

If the device is operated for the first time, a correction of the adjustment becomes necessary after one or two days, because at least one OFFSET drift can be expected. The reason for this drift is that the electrode surfaces adapt slowly to the chemical and mechanical operating conditions.

5. Switching off the System

For short interruptions of operation, the sample water flow should not be switched off in order to keep the chlorine measuring cell prepared for operation and to avoid unnecessary OFFSET drifts. If the sample water rests in the chlorine measuring cell for several days, chemical changes at the copper electrode in particular are likely. These can be removed either by dismantling the copper electrode and using sandpaper (400 grit) or the balls themselves by running sample water through the measuring cell for several hours.

Note!

When dismantling the electrode, the 200 glass balls might get lost. To avoid this, remove the chlorine measuring cell and open it with electrode pointing upwards before dismantling it. We recommend draining and drying the measuring cell completely before standstills of several days. By no means should the sample water be drained from the measuring cell (e.g. by siphoning) during normal maintenance operations, or during off-shift shutdowns. Otherwise, exact measurements cannot be guaranteed after recommissioning.

6. Maintenance

The correctness of the measurement must be verified by separate comparison measurements (manual measurement). The intervals for these measurements depend on the procedure used and on the rules (e.g. for waterworks, swimming pools, etc.).

Maintenance consists of checking the filters, activated-carbon filter and dirt trap, every six months and of visually inspecting the electrodes from outside (is the platinum spiral still in the center or has it moved?). If the water sampling station is not contaminated, there is no reason to dismantle it. The service life of the individual components, such as the pH and redox electrodes or the chlorine measuring cell, depends on the water properties (aggressiveness, abrasiveness, lubricants). To increase the operating reliability, it is recommended to have spare electrodes, balls and activated-carbon filters ready at the system.

Please consider the limited operational life of the pH and redox electrodes. It is normally about 12...15 months, including storage time which must be calculated with at least 50 %. The electrodes must be stored vertically so that the electrolyte reservoir wets the lower ends of the measuring surfaces and leaking of the electrolyte is avoided.

7. Troubleshooting

NATURE OF PROBLEM	POSSIBLE CAUSE	RECOMMENDED ACTION
Balls do not move at all or insufficiently.	Water supply pressure too low.	Check pressure conditions (Dp > 0.15 bar), use booster pump, if necessary.
	flow adjustment valve is blocked by dirt.	Open the valve for one short moment totally and readjust the flow.
	80 µ filter blocked.	Clean or replace filter element.
	Air is sucked in at pH- or redox electrode.	Fix the clamping screw carefully.
Flow monitor does not switch although the balls rotate correctly.	Contamination stops float element.	Dismount and clean float.
	Position of Reed contact is not aligned with reference to float element in upper position.	After loosening the setscrew, adjust Reed contact.
Despite correct sample water flow (flow monitor and ball rotation okay) insufficient current input into the connected measuring devices.	The pH value might be too high and thus the amount of measurable free chlorine too low (with the DPD method, a large amount of chlorine seems to be available because the tablet releases the chlorine contained in the water by acidification.	Reduce the pH value of the whole system, if possible, or acidify the sample water before entering cell.
	80 µ filter is dirty and consuming chlorine.	Replace filter element.
The display of the connected devices fluctuates at random and does not correspond to the pH and redox values determined by other means.	Faulty measurements are possible several devices connected are not physically separated or have different ground potentials.	Connect one grounding pin end of the fittings block to earth (e.g. to ground of amplifier). Use voltage separator at 0(4)...20 mA outputs.
OFFSET can not be adjusted.	The base current due to certain water components is too high.	Install a 500 or 1000 ohm shunt resistor in the measuring cell feedback line.

Water Sampling Station SR 400 / SR 500

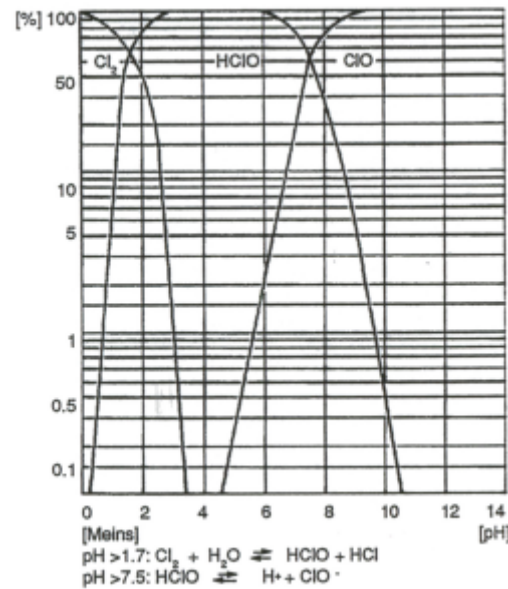
General

For the disinfection of any type of wasted water, preference is given to chlorine gas or chlorine compounds. In order to monitor the disinfection process, a measuring cell has been developed which is working according to the principle of depolarization of a galvanic element.

The measuring cell contains a platinum and a copper electrode. With the sample water acting as the electrolyte, galvanic potential develops between the two electrodes, depending on the electrode material. If the sample water was not moving, the electrodes would polarize and the current flow would gradually be interrupted due to insulation caused by hydrogen ions (gas). Glass balls inside the cell rotate as they are actuated by the continuous sample water flow, and thus remove the hydrogen gas layer from the electrodes. Starting from this constant basic condition, the cell current increases in proportion to the free chlorine surplus. The current is analyzed by connected amplifiers.

The disinfecting efficiency of chlorine strongly depends on the pH value. This is shown in the following dissociation diagram. Consequently, a constant pH value is required for the sample water. Otherwise, the same chlorine content would give different readings.

Diagram



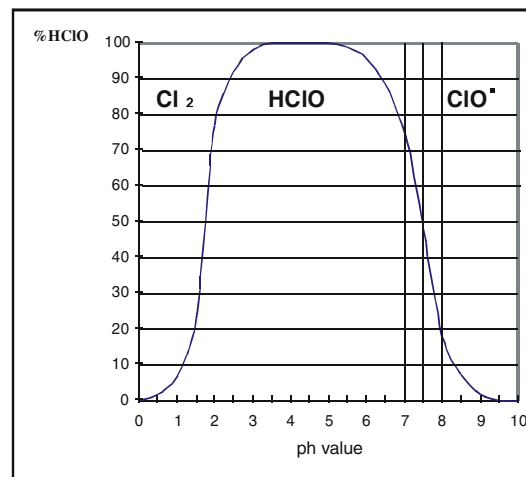
Note:
Apart from chlorine, the other halogens, such as bromine, fluorine and iodine can be analyzed. The measurement can also be carried out in sea-water or salt water. The sample should, however, be free of grease, if possible, or cleaned through a 50 mm filter. Protect the measuring cell against intense light, especially direct sunlight.

Principle	Depolarization measuring cell w/rotating glass balls
Electrodes:	Platinum/Copper combination
Measuring range:	0...0.5 mg/l Cl2 to 0...20 mg/l Cl2 (adjustment of the measuring range only via amplifier input)
pH value:	Must be constant within the range pH3...6 to measure total chlorine content. For pH values > 6, a portion of chlorine is measured which forms HClO according to the dissociation curve.
Sample water volume:	approx. 50 l/h at 100 mbar pressure drop through the cell
Operating pressure:	max. 10 bar
Pressure dependence:	0.1 % / bar
Temp. dependence:	1 % / °C
Current output with chlorine-free water:	approx. 15 µA
Cell constant:	approx. 35 µA / 1 mg/l Cl2
Housing material:	Acrylic glas (PMMA)
Weight:	approx. 0.2 kg
Rec.amplifier input resistance:	500W..5KW (adjustable)

1. General

For the disinfection of any type of water, preference is given to chlorine gas or chlorine compounds. The germicidal effect is due to the formation of hypochlorous acid (HClO) if chlorine is dissolved in water. The formation of hypochlorous acid, however, depends strongly on the pH value which is shown in the dissociation diagram below.

Consequently, a constant pH value of the water to be analyzed is desired (preferably pH 7.00 or less). Otherwise the same chlorine concentration would cause different indications.



Calibration of sensors

As electrochemical sensors are used for measuring the free chlorine contents, it is necessary to calibrate the sensors with the relevant amplifiers. This requires a measurement according to another measuring method (e.g. photometric measuring method).

A water sample is taken directly at the sensor. The contents of free chlorine is determined by the DPD method. Most often a photometer is used for this measurement. The amplifier is calibrated using the manually measured value.

In the case of a first startup the calibration must be repeated after one to two days. During that period of time the electrodes's surfaces will adapt to the chemical and mechanical operating conditions.

The operating instructions of the used photometer must be followed carefully. Ensure cleanliness, since dirty cells or fingerprints at the cell may cause considerable measuring errors.

2. Sensors

2.1 Chlorine sensor CS 120 (open amperometric sensor)

1.1 Measuring method

The free chlorine sensor works according to the principle of depolarization of a galvanic element.

The sensor contains a platinum and a copper electrode. With the sample water acting as the electrolyte, galvanic potential develops between the two electrodes, depending on the electrode material. With non-flowing water the electrodes would polarize and interrupt the current flow (hydrogen gas at the platinum electrode, oxide layer at the copper electrode). The constant flow causes small glass balls inside the sensor to circulate and remove any passivation layer from the electrodes. With these stable conditions, the sensor current increases proportionally to the free chlorine surplus.

Note

Apart from chlorine, all other halogens (bromine, fluorine and iodine) can be analyzed. The measurement can also be carried out in sea water or salt water. In this case, however, a sensor with a platinum/silver electrode combination has to be used. The sample water should be grease-free, if possible, or cleaned through a 50µ filter. The sensor must not be exposed to intense light, especially direct sunlight. As the free chlorine contents cannot be measured selectively with the open sensor, a two-point calibration has to be conducted at the controller. For zero-point calibration chlorine-free sample water must be routed through the sensor. Depending on the water quality some µA may flow in the case of chlorine-free sample water (normally 5...15 µA). For further details see operating and maintenance instructions BW 4 12 01).

Chlorine Sensors

2.2 Potentiostatic sensor PM 01 (open potentiostatic sensor)

Measuring method

The potentiostatic sensor consists of three electrodes and the potentiostat developed for the measurement of the free chlorine contents. These parts form a control circuit the stability of which is ensured by its construction. Depending on the free chlorine surplus, current flows which is analyzed by a special measuring amplifier.

The sensors are accommodated in a transparent multifunction instrument block. The amplifier and the potentiostat electronics are integrated in the electrical measurement and control system TOPAX.

For more details see operating and maintenance instructions BW 2 37 20.

2.3 Chlorine sensor CI 5.0

(diaphragm-covered potentiostatic sensor)

Measuring method

The diaphragm-covered sensor (Clark type) consists of an 2-electrode system with integrated electronics. The actual working electrode is a gold electrode, the joint counter and reference electrode is a silver electrode with a silver halogen cover. Between these two electrodes a polarization potential is set up. The electrodes are kept in an electrolyte filled chamber. They are in contact with the sample water via a semipermeable diaphragm.

The provided sensor electronics simply require 12VDC. The electronics realize a galvanic separation of the power supply so that the measuring signal is ungrounded. The electronics also incorporate temperature compensation of the measuring signal. The sensor is connected to the amplifier/controller via a special cable (Part No. 77455). This special four-wire cable is equipped with a plug suited to be linked with the sensor.

Note

For sensors according to the potentiostatic measuring method and diaphragm-covered sensors zero calibration is not required. Such a calibration is only necessary if the zero-point of the amplifier changed or if the amplifier requires a zero-point calibration by all means.

Also for these sensors the chlorine measuring amplifier must be recalibrated after one to two days in the case of a first startup. During that period of time the electrodes's surfaces will adapt to the chemical and mechanical operating conditions.

Chlorine Sensors

Overall view of chlorine sensors

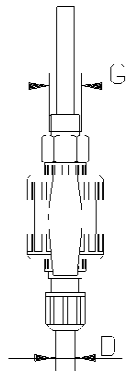
Type	CS120	PM 01	CI 5.0
Principle	open amperometric sensor 2-electrode system depolarization sensor with circulating glass balls	open potentiostatic sensor 3-electrode system	diaphragm-covered potentiostatic sensor (Clark type)
Calibration	2-point calibration - zero-point drift possible - activated-carbon consumption	1-point calibration - stable zero-point	1-point calibration - stable zero-point
Electrodes	platinum/copper electrode or platinum/silver electrode	gold electrode, stainless steel electrode, ref. electrode (KCl)	measuring electrode, counter/reference electrode
Measuring range	0.00 ... 0.50 mg/l Cl ₂ to 0.00 ... 10.00 mg/l Cl ₂ The measuring is adjusted via the amplifier input.		
pH value	must be constant. At a constant pH-value in the range of pH3...6 the total chlorine contents is measured. At pH-values >6 the chlorine which forms HClO acc. to the dissoziation curve is measured proportionally.		pH-value must be constant.
Sample water quantity	approx. 50 l/h at 100 mbar pressure drop through the sensor	approx. 50 l/h	25 ... 40 l/h
Operating pressure	max. 10 bar	pressureless	max. 1 bar
Current ouput at chlorine-free water	approx. 5-15 µA	0 µA	0 µA
Sensor constant	approx. 35 µA per 1 mg/l Cl ₂	approx. 50 µA per 1 mg/l Cl ₂	approx. 50 µA per 1 mg/l Cl ₂
Dependence of measuring signal on flow fluctuations	major dependence - hydrostatic flow control at sampling station SR 500 - flow adjustment using rotameter at sampling station SR600 slight fluctuations possible	minor dependence - hydrostatic flow control at sampling station PM01	minor dependence Flow adjustment using rotameter
Housing material	LURAN	fitted in transparent multifunction instrument block (PMMA)	-PVC and poly-carbonatr Ø 25mm, 175mm long
Selectivity of measurement	no selectivity, there is a combined signal of all oxidizing substances in the water (e.g. Cl, ClO ₂ , O ₃ , H ₂ O ₂ , ClO ₂ -)	partial selectivity, cross sensitivity to chlorine dioxide, other substances are ignored	partial selectivity, minor cross sensitivity to chlorine dioxide, other substances are ignored
Sensitivity to dirt	minor due to self-cleaning	minor due to self-cleaning	- danger of clogging in the case of mananiferous, ferric and calcareous water - sensitive to tensides diaphragm rupture
Use in salt water	special sensor (silver-platinum) slightly higher wear	standard sensor suitable	different sensors for different salt water concentrations other electronics other electrolyte
Dependence on temperature	increase of measured value by approx. 1% per 1°C	increase of measured value by approx. 1% per 1°C	temperature-compensated by integrated electronics
Weight:	approx. 0.2 kg		
Recommended input resistance in amplifier	500 ... 5 kOhm (ajustable)		

Order data

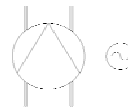
Type	Electrodes	Part No.
open sensor CS120	copper / platinum	23722968
open sensor CS120	silver / platinum	23732271
potentiostatic sensor (without reference electrode)	gold electrode and stainless steel electrode in multifunction block multifunction block includes - dirt trap - needle valve DN 2.5 - feed pipe with overflow - flow monitor - potential compensating rod multifunction block provides installation holes for - reference electrode for potentiostatic sensor - pH combination electrode - REDOX combination electrode - Pt 100	34186
- reference electrode for potentiostatic sensor		41100060
- Potentiostat electronics for installation in TOPAX/TOPAX 6		78140
- Diaphragm-covered sensor CI 5.0		23700600
- Connecting cable for diaphragm-covered sensor		77455

Chlorine Sensors

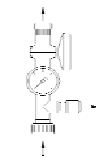
Chlorine Sensors



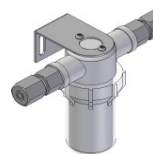
Messwasser-Entnahme				
Anwendung: Zur Entnahme des Messwassers aus dem Becken oder der Hauptleitung				
Ausführung: Tauchrohr mit Einschraubstutzen (Gewinde siehe Tabelle)				
Typ A: mit PVC-Kugelhahn				
Typ AS: zusätzlich mit PVC Schrägsitz- Schmutzfänger				
Typ ASM: zusätzlich mit Manometer 6 bar				
Typ AS-DM: zusätzlich Druckminderer und Manometer 6 bar				
Typ	Einschraubgewinde	Anschluss	Artikel-Nr.	Preis EUR
A	G 1/2 a	Schlauch d 6/12	23733813	101,60
A	G 3/4 a	PVC-Verschraubung DN 15/d20	23734501	140,60
AS	G 1/2 a	Schlauch d 6/12	23733814	175,00
AS	G 3/4 a	PVC-Verschraubung DN 15 / d20	23734502	266,30
ASM	G 1/2 a	Schlauch d 6/12	23733815	212,40
AS-DM	G 3/4 a	Schlauch d 6/12	23734988	451,90



Messwasser - Pumpe 230 V / 50Hz / 775 W Qmax = 3,4 m³ / h, H max = 43 Anschlüsse G 1a - G 1a Als Umwälzpumpe für die Bypass-Leitung	23700018	415,90
Wandkonsole für Messwasserpumpe, PP	23799025	108,20



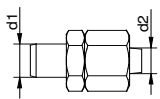
T-Stück für Messwasser aus der Bypass-Ringleitung zur direkten Montage auf der Meßwasser-Pumpe mit Manometer 0-6 bar, Drosselkugelhahn Anschluss für Messwasser: Schlauch d6/12. Systemanschlüsse: G1a	33819	98,10
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Messwasser-Filter DN 6, 300µm mit Edelstahl-Einsatz und Wandhalter		
mit Anschlüssen für Schlauch 6/8	38744	112,40
mit Anschlüssen für Schlauch 6/12	38745	96,80
Ersatzteilsatz für DN6 / 300µm	38702	16,10



Benennung	Artikel-Nr.	Preis [EUR]
Chlorgas-Schutzmaske inkl. Tragetasche und Filtereinsatz Typ B	29810389	342,30
Ersatzfilter Typ B für Schutzmaske	29810392	58,80
Chemikalien-Schutzanzug (einteilig) mit Handschuhen und Sicherheitsstiefeln Atenschutzmaske integriert	29800002	2283,60
Vollkörperdusche für Wandmontage Augendusche für Wandmontage mit Kunststoffbecken	29800008 29800009	524,80 687,20
Chemikalien-Schutzausstattung zum Umgang mit flüssigen Chemikalien - 1 Vollsicht-Schutzmaske - 1 Paar Gummihandschuhe - 1 Paar Gummistiefel Größe 45 - 1 Gummischürze mit Gewebeeinlage - 1 Warnschild: Vorsicht Chemikalien	19800001	179,80
Pressluft-Atemgerät körpergerecht geformte Flaschen-Tragschale aus Kunststoff mit gepolsterten Schulter- und Beckenriemen beweglich gelagerter Druckminderer Druckmesser mit akustischer Warneinrichtung Lungenautomat Panorama-Atenschutzmaske Druckluftflasche 6 liter/300 bar (ungefüllt)	29800003	2829,60
Reserveflasche ungefüllt	29800004	697,20
Chlorflaschen-Notfallausrüstung (Schutzhülle mit Flaschenventil und Werkzeug)	29831285	488,10
Chlorfass-Notfallausrüstung (Schutzhülle mit Fassventil und Werkzeug)	29800005	488,10



PVC - Schlauchklemmanschlüsse für PE-Schlauch (siehe d2)
inklusive Überwurfmutter

d 1	d 2	Artikel-Nr.	Preis EUR
d 12	8/12	28881	15,40
d 16	8/12	34483	15,30
G 1/4	8/12	34484	15,30
G 3/8	8/12	22344	15,30
G 3/8 mit Durchflußblende 1000 g/h	8/12	35018	26,20
d 16	12/16	29883	24,00
G 3/8	12/16	34485	24,00



Ersatz-Überwurfmutter

8/12
12/16

10365 4,10
15534 7,10



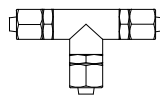
Blindkappe mit Flachdichtung für Anschluss 8/12
Ersatz-Flachdichtung für Blindkappe

34486 5,80
81613 0,90



PVC - Schlauchkupplung für PE-Schlauch
8/12 - 8/12
8/12 - 12/16
12/16 - 12/16

29826 31,00
29828 28,90
29827 33,80



PVC - T-Stück für PE-Schlauch
8/12
12/16
12/16 - 8/12 - 12/16

33661 47,10
32300 51,00
35672 48,90



PE-Schlauch

Durchmesser für maximale Dosierleistung bei Leitungslänge:

innen/außen	10 m	20 m	50 m	100 m	Farbe:	Artikel-Nr.	Preis [EUR]
8/12	7 kg/h	5 kg/h	3 kg/h	2 kg/h	transparent	97124	2,10
8/12	7 kg/h	5 kg/h	3 kg/h	2 kg/h	schwarz*	97695	2,10
12/16	20 kg/h	15 kg/h	9 kg/h	6 kg/h	transparent	97176	3,50
12/16	20 kg/h	15 kg/h	9 kg/h	6 kg/h	schwarz*	97696	3,50

* schwarzer Schlauch für Außen-Installation mit UV-Strahlung

PVC-Schlauch (transparent) d 8/12
nur als **Abblaseschlauch** vom Sicherheitsventil

97561 3,10

Uputstvo za upravljanje

HI 93701 Slobodni Hlor ISM



GARANCIJA

HI 9371 ima garanciju na dvije godine na kvarove u radu sa korisnicima i materijalima koji se koriste za intenzivnu upotrebu i održavanje prema uputstvima.

Ova garancija je ograničena besplatne popravke ili zamjenu uređaja.

Šteta načinjena nesrećom, pogrešnim korištenjem ili nedostatkom već opisanog održavanja nespada pod garancijom.

Ako vam je potreban servis, obratite se vašem dobavljaču od kojeg ste nabavili uređaj. Ako je uređaj pod garancijom, prijavite: broj modela, datum nabavke uređaja, serijski broj i vrsta kvara.

PRETHODNA ISPITIVANJA

Izvadite instrument iz upakovanog materijala i pažljivo ispitajte da li je nanijeta šteta tokom transporta. Ako postoji ikakva šteta na uređaju, obavijestite vašeg dobavljača što prije.

Svaki "Ion Specific Meter" je opremljen sa sljedećim kompletom:

- 9 V Baterija
- Dvije kivete za uzorak i poklopac
- Jedan transportni poklopac

OPŠTI OPIS INSTRUMENTA

HI 93701 potrabelni mikroprocesorski mjerni uređaj mjeri sadržaj slobodnog hlora (Cl_2) u vodama i otpadnim vodama sa opsegom od 0.00 do 2.50 mg/L (ppm).

Mjerač koristi ekskluzivni sistem pozicioniranja da bi se osiguralo da kiveta bude uvijek na istom mjestu kod stavljanja u mjernu ćeliju.

Reagenti su ili u tečnom li u praškastom stanju i dostavljaju se ili u bočicama ili kesicama. Količina reagenta je precizno dozirana da bi se osigurala maksimalno reagiranje.

Prikazne šifre pomažu korisniku u rutinskim operacijama.

Uređaji imaju funkciju automatskog gašenja koja isključuje instrument nakon 10 minuta nekorištenja istog.

SPECIFIKACIJA



SPECIFIKACIJA

Opseg:	do 0.00 do 2.50 mg / L
Rezolucija:	0.01 mg / L
Tačnost:	± 0.03 mg / L ±3% od očitavanja
Tipčna EMC devijacija:	± 0.01 mg / L
Izvor svjetlosti:	Svjetlosno-emitirajuća dioda @ 555 nm
Metoda:	Adaptacija EPApreporučena DPD metoda 330.5. Reakcija između slobodnog hlora i DPD reagenta prouzrokuje ljubičastu tintu u uzorku
Svjetlosni detektor:	Slilkonska fotočelija
Okruženje / ambijent:	0 do 50°C (32 do 122°F); maksimalno 95% nekondezirajuće vlage u zraku
Baterija	
Tip / Trajanje:	1 x 9 volta / 40 sati
Auto-isključivanje:	Nakon 10 min. nekorštenja uređaja
Dimenzije:	180 x 83 x 46 mm (7.1 x 3.3 x 1.8")
Težina:	290 g (10 oz.)

POTREBNI REAGENTI

PRAŠAK:

Šifra	Opis	Kvantitet
HI 93701-0	DPD	1 paket

TEKUĆINA:

Šifra	Opis	Kvantitet
HI 93701A-F	DPD1 Indikator	3 kapi
HI 93701B-F	DPD1 Pufer	3 kapi

VODIČ ZA PRIKAZNE ŠIFRE NA DISPLEJU



Ovo pokazuje da je mjerač u početnom radnom stanju i spreman je za namještanje nule.



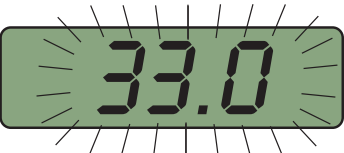
Uzorkovanje je u procesu (**S**ampling **I**n **P**rogress). Ovaj natpis se pojavljuje svaki put kad uređaj vrši mjerenj-uzorkovanje.



Ovo pokazuje da je uređaj-mjerač nuliran i mjerenje može započeti.



Ispod mjrenog opsega. Treptajući prikaz "0.00" pokazuje da uzorak propušta(apsorbuje) manje svjetlosti nego nulirana referenca. Provjerite i ponovite proceduru te osigurajte korištenje potpuno iste kivete za referencu(nulu) i mjerenje.



Iznad mjernog opsega. Svjetleća(treptajuća) vrijednost veća je nego maksimum vrijednosti očitavajuće koncentracije i pokazuje da uzorak propušta previše svjetlosti.



Osvjetljenje je iznad opsega. Kiveta nije pravilno ubačena i vanjska svjetlost ambijenta zahvata detektor. Ako je poklopac pravilno postavljen, a ova poruka se i dalje javlja, onda obavjestite vašeg dobavljača.



Osvjetljenje je ispod omjera. Nulirani uzorak je previše taman(mračan) za pravilno nuliranje. Ako se u ovom slučaju to neispostavi, onda obavjestite vašeg dobavljača.



Oznaka "V" u gornjem ljevom uglu označava da je napon baterije sve slabiji i da bi se baterija trebala zamijeniti.

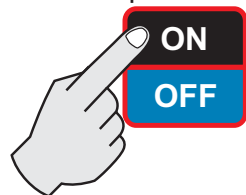


Ovo pokazuje da je baterija "mrtva" (ispražnjena) i da se mora zamijeniti

VODIČ ZA UPRAVLJANJE

PROCEDURA MJERENJA

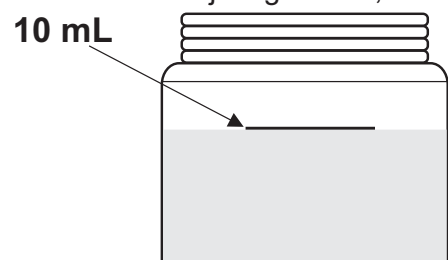
- Uključite mjerač-uređaj pritiskom na tipku **ON / OFF** (UKLJUČI/ISKLJUČI).



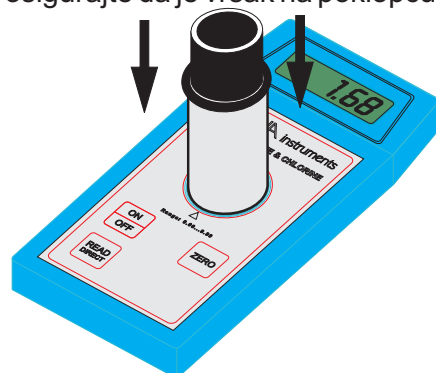
- Kada se na LCD displeju prikaže “- - -”, uređaj je spreman odnosno u funkciji.



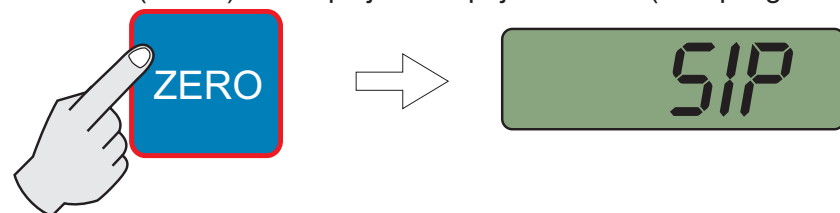
- Napunite kivetu sa 10 mL nereagujućeg uzorka, do visine sa oznakom, te zamijenite poklopac.



- Ubacite kivetu u držač i osigurajte da je vršak na poklopcu “ulegao” u udubinu u držaču uređaja.



- Pritisnite “ZERO” (NULA) i na displeju će se pojaviti “SIP” (Sampling In Progress).



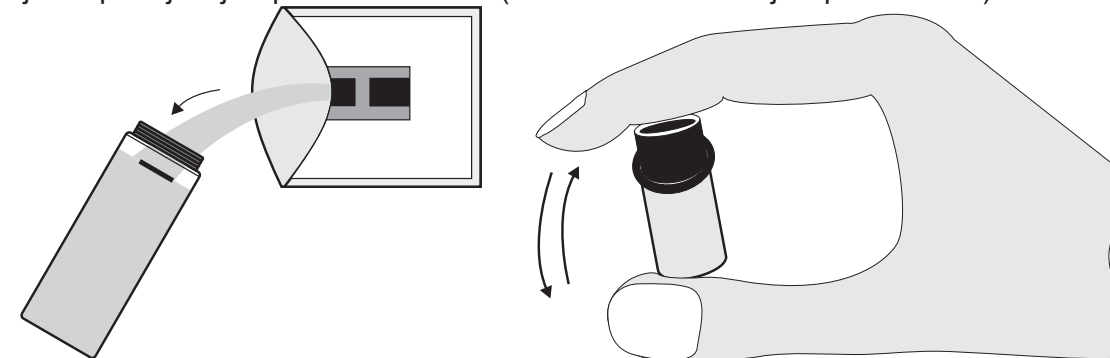
- Pričekajte par sekundi i na displeju će se prikazati “- 0.0 -”. Sada je mjerač podešen na nulu i spreman za mjerenje. Izvadite kivetu.



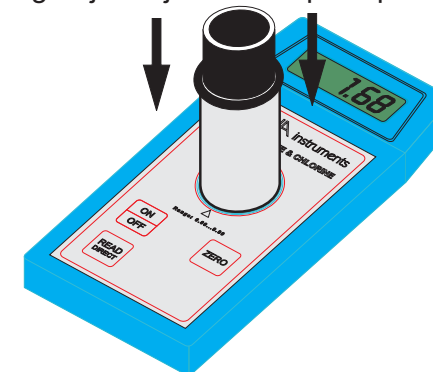
VODIČ ZA UPRAVLJANJE

PROCEDURA SA PRAŠKASTIM REAGENTOM

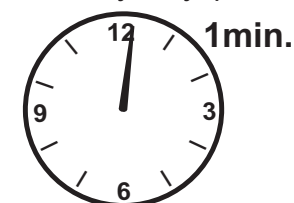
- U kivetu dodajte sadržaj jedne kesice (vrećice) HI 93701 DPD reagenta. Zamijenite poklopac i nježno promješajte otprilike 20 sekundi (ili 2 minuta kod slučaja otpadnih voda).



- Ubacite kivetu u držač i osigurajte da je vršak na poklopcu “ulegao” u udubinu u držaču uređaja.



- Pričekajte 1 minutu i pritisnite **READ DIRECT** (DIREKTNO OČITAVANJE). Na displeju će se tokom mjerenja prikazati “SIP”.

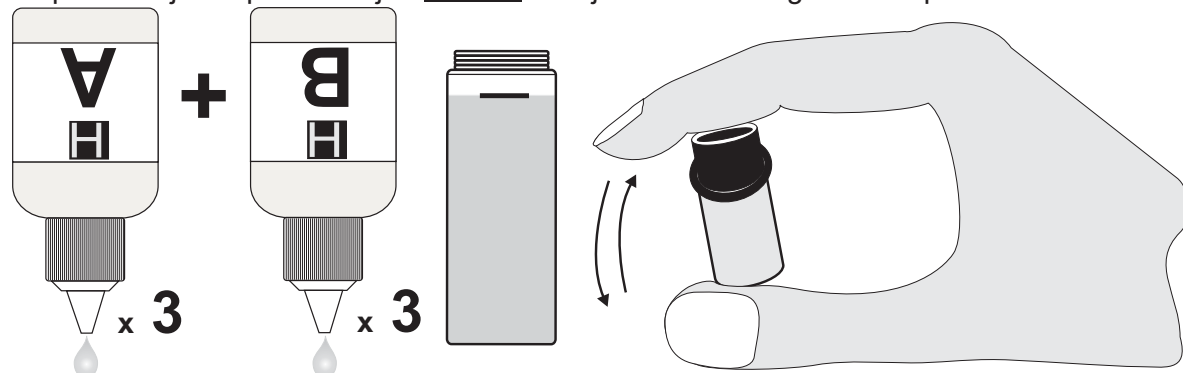


- Instrument direktno prikazuje koncentraciju slobodnog hlora u mg / L na LCD displeju.

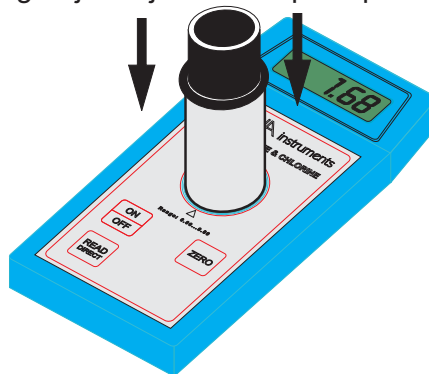
VODIČ ZA UPRAVLJANJE

PROCEDURA SA TEČNIM REAGENTOM

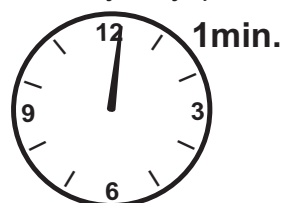
- U praznu kivetu dodajte sadržaj tri kapi HI 93701A-F DPD1 indikatora i tri kapi HI 93701B-F DPD1 pufera. Nježno promućkajte i **odmah** dodajte 10 mL nereagentne otopine za uzorak.



- Ubacite kivetu u držač i osigurajte da je vršak na poklopcu "ulegao" u udubinu u držaču uređaja.



- Pričekajte 1 minutu i pritisnite **READ DIRECT** (DIREKTNO OČITAVANJE). Na displeju će se tokom mjerenja prikazati "SIP".



- Instrument direktno prikazuje koncentraciju slobodnog hlora u mg / L na LCD displeju.

SMETNJE

Smetnje mogu prouzročiti:

Brom
Flour
Jod
Ozon
Oksidni mangan i Krom

Alkalnost iznad 250 mg/L ili kiselost iznad 150 mg/L, neće pouzdano razviti cijelu količinu boje ili može rapidno izbljedjeti. Da bi smo ovo riješili, neutralizirajte uzorak sa razblaženim HCl-om ili NaOH.

U slučaju sa vodom koja ima tvrdoću veću od 500 mg/L CaCO₂, promješajte uzorak otprilike 1 minut nakon dodavanja praškastog reagenta.

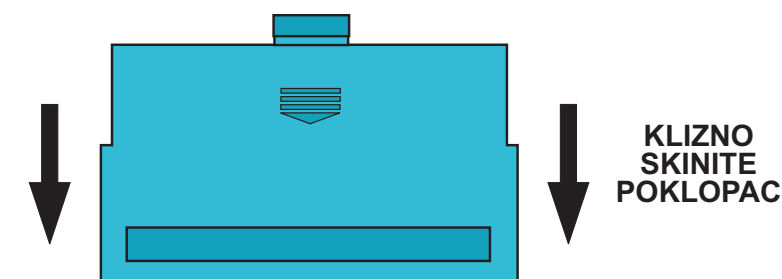
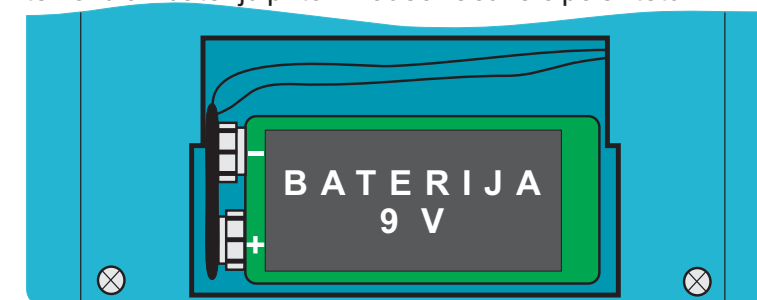
SAVJETI ZA TAČNA MJERENJA

Da bi se osiguralo najbolja tačnost mjerenja, trebali bi ste se pridržavati dole navedenih instrukcija.

- Ne dirajte stijenke kivete sa rukama.
- Da bi ste održali potpuno iste uslove tokom nuliranja i paza mjerenja, potrebno je zatvoriti kivetu da bi ste spriječili kontaminaciju.
- Ne dozvolite da se uzorak predugo zadržava nakon što se reagent ubaci jer će se tačnost izgubiti.
- Kadgod se kiveta stavlja u mjernu ćeliju, mora potpuno biti čista od otisaka prstiju, ulja ili prašine. Kivetu dobro obrisati sa HI 731318 ili sa nepamučnom takaninom prije ubacivanja.
- Vrlo je važno da uzorak ne sadrži ikakve ostatke. Ovo bi ugrozilo očitavanje.
- Moguće je raditi višestruko očitavanje u jednom redu, ali se preporučuje da se nuliranje uradi za svaki uzorak i da se pri tom koristi ista kiveta i za nuliranje i za mjerenje.
- Potrebno je izbaciti uzorak odmah nakon očitavanja, jer bi se staklo kivete moglo trajno uprljati.
- Mješanje(mućkanje) kivete može prouzročiti stvaranje mjehurića(balončića) u uzorku, koji bi se odrazili visokim očitavanjem. Da bi ste zadržali tačnost kod mjerenja, odstranite mjehuriće kružnom vrtnjom kivete ili sa nježnim lupanjem po stijenkama staklene kivete.
- Sva reakciona vremena koja su navedena u ovim uputstvima odgovaraju sobnoj temperaturi od 20° (68°F). Kao glavno pravilo odobravanja, ova vremena bi se na 10°C (50°F) trebala udvostručiti, a na 30°C (86°) prepoloviti.

ZAMJENA BATERIJA

Zamjena baterija bi se trebala provoditi u ne opasnim ambijentima koristeći 9V alkalnu bateriju. Jednostavno klizno skinite poklopac za bateriju na poleđini uređaja. Odvojite bateriju od priključaka i natakните novu 9V bateriju pritom vodeći računa o polaritetu.



Computer interface RS 485

The RS 485 computer interface has been designed for installation in TOPAX Industry units. When this interface has been installed in a corresponding unit, the user can transmit data over distances of up to 1000 metres for communication with a PC or printer. This data interface can also be used to set up a data network.

Up to 15 TOPAX Industry units can be connected to a printer or the data transferred to a PC with our PC software, Part. No. 78142 or 78143. Measured data can be displayed and recorded by means of these software packages.

When setting up a network, care must be taken to ensure that the jumpers are plugged into the circuit board of the RS 485 in accordance with the point at which the TOPAX Industry is installed in the network. This can be seen from the installation drawing for the bus system.

A shielded, two-wire twisted cable must be used to connect the TOPAX Industry to the printer or PC. The supplementary “real-time clock” circuit board RTC, Part. No. 78137, must be installed in **each TOPAX Industry unit** if a printer is to be connected.

The TOPAX Industry units must be numbered and the numbers set in the maintenance code of the TOPAX Industry. It must be ensured that the TOPAX Industry unit which is directly connected to the printer or PC is given the number One. All other units must be numbered consecutively.

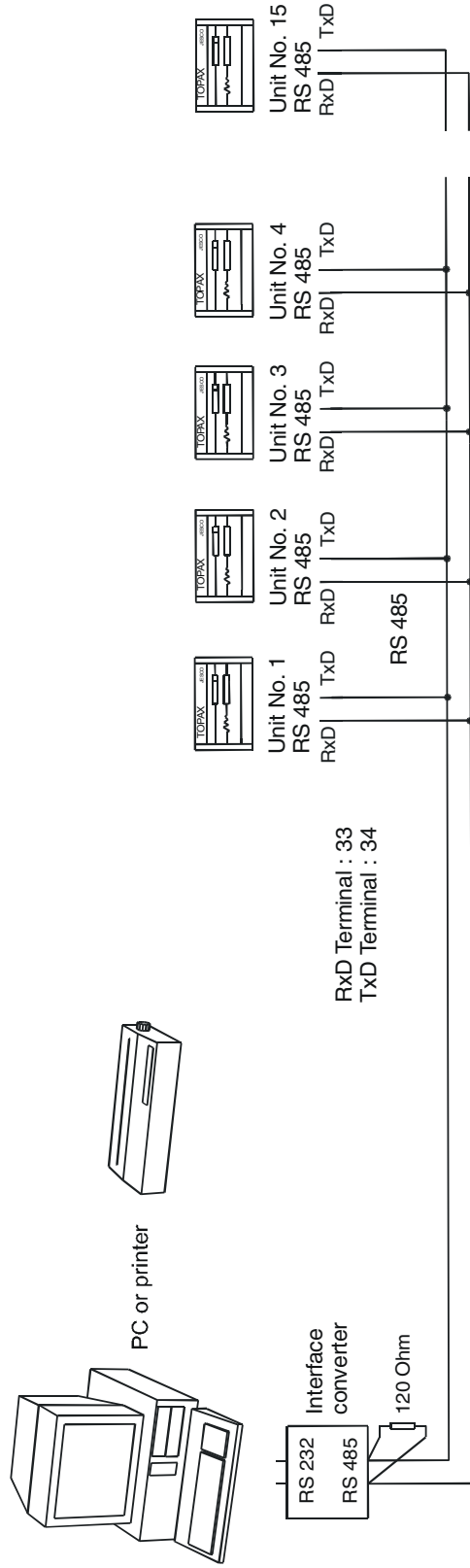
Data transmission must be set as follows on the printer and PC:

- 9600 Baud
- No Parity
- 8 Bit
- 1 Stop bit

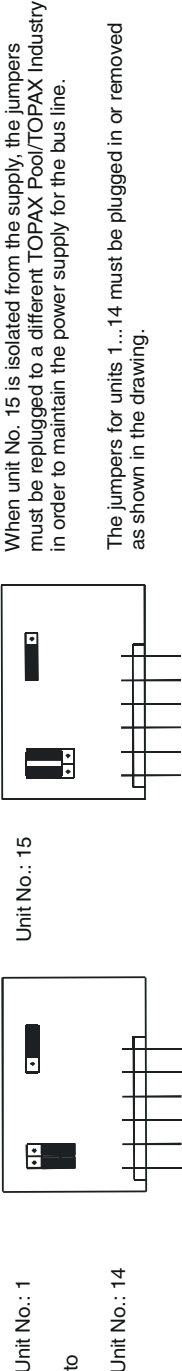
Computer Interface RS 485

Connection of the computer interface RS 485 in networks (bus system)

The computer interface **RS 485** must be installed in the units when networking several JESCO units. The computer interface contains **jumper**s which must be connected differently. The bus system must be terminated with a **120 ohm** terminating resistor at each end. This is done by connecting the jumpers on the RS 485 circuit board according. A 120 ohm resistor can be connected before the interface converter. This resistor is already integrated in the interface converters supplied by JESCO.



Setting of jumpers on the RS 485 circuit board



Computer Interface RS 485



RS 232 <> RS 485

Schnittstellenkonverter / Interface Converter



DE⁰¹

Beiblatt

Für künftige Verwendung aufbewahren.

EN⁰²

Supplement

To be held for future reference.

Dosieren
Fördern
Regeln

Flüssigkeiten
Gase
Systeme

Allgemein

Schnittstellenkonverter

Anbindung eines PCs an ein RS 485 Netzwerk. (A/N 44300101)

Verbindungen

Zum PC: RS 232 serielle Schnittstelle mit 9 poliger Sub-D Buchse. Anbindung an die COM Schnittstelle des PCs.

Zum Netzwerk: 2 Anschlussklemmen. Anbindung an das zwei-adrige (A / B) RS 485 Netzwerk.

Spannungsversorgung: 5 V DC. Am USB Port des PCs oder mit dem beigefügten Netzteil (100 ... 240 V AC, 50/60 Hz).

120 Ohm Abschlusswiderstand des RS 485 Netzwerkes ist an beiden Enden vorzunehmen. Schalten des Abschlusswiderstandes am Schnittstellenkonverter ist möglich.

Installation

Verbinden Sie die A und B Leitungen des RS 485 Netzwerkes mit dem Schnittstellenkonverter.

Verbinden Sie den Schnittstellenkonverter mit der COM Schnittstelle des PCs.

Setzen Sie den 120 Ohm Abschlusswiderstand auf dem Schnittstellenkonverter.

Schließen Sie die Stromversorgung am Schnittstellenkomverter an (via USB oder Netzteil)

LED Anzeige

LED rot	LED grün	Status
blinkt		PC empfängt Daten
	blinkt	PC sendet Daten
AUS		kein RS 485 Gerät aktiv
AN		RS 485 Gerät aktiv, RS 485 Netzwerk falsch angeschlossen

Tab.: LED Funktionen

General

Interface Converter

Connector between a PCs and a RS 485 network. (A/N 44300101)

Connectors

To PC: RS 232 serial interface with 9 pin female sub-D connector. Connect with the COM PC interface.

To network: 2 connection terminals. Connect with two-core (A / B) RS 485 network.

Power supply: 5 V DC. From USB PC port or with enclosed external power supply (100 ... 240 V AC, 50/60 Hz).

A 120 Ohm terminator has to be set on both ends of the RS 485 network. It's possible to set the terminator on the interface converter.

Installation

Connect the A and B wire of the RS 485 network with the interface connector. Connect A with A and B with B.

Connect the interface converter with the COM interface of the PC.

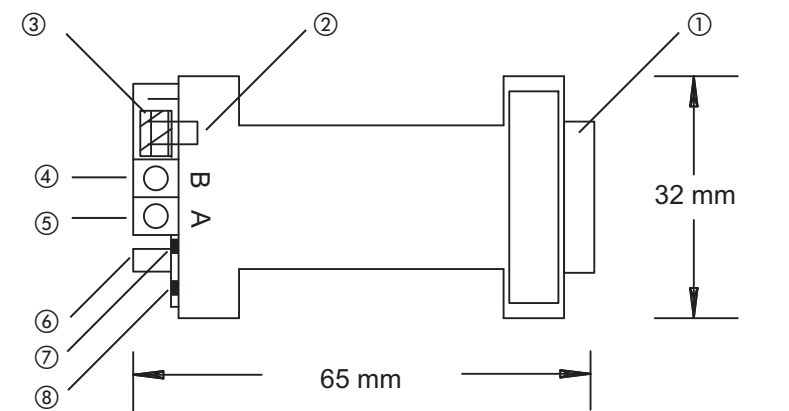
Set 120 Ohm terminator on the interface.

Plug in the power to the interface converter (via USB or power supply).

LED displays

LED red	LED green	Status
flash		PC receives data
	flash	PC sends data
OFF		no RS 485 unit activ
ON		RS 485 unit activ, RS 485 network wrong connected

Tab.: LED functions



- | | |
|-------------------------------|---------------------------|
| 1 Sub-D Buchse, RS 232 | 1 Sub-D connector, RS 232 |
| 2 120 Ohm Abschlusswiderstand | 2 120 Ohm terminator |
| 3 Steckbrücke | 3 Jumper |
| 4 RS 485 Netzwerk, B | 4 RS 485 network, B |
| 5 RS 485 Netzwerk, A | 5 RS 485 network, A |
| 6 Stromversorgung, 5 V DC | 6 Power, 5 V DC |
| 7 LED grün, Daten senden | 7 LED green, data sending |
| 8 LED rot, Daten empfangen | 8 LED red, data receiving |

- | | |
|--------------------------------------|--------------------------|
| 9 Abschlusswiderstand gesetzt | 9 Terminator is set |
| 10 Abschlusswiderstand nicht gesetzt | 10 Terminator is not set |

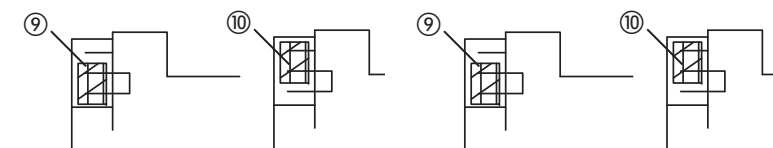


Abb. 1.: Steckbrücken Position für Abschlusswiderstand

Fig. 1.: Jumper settings of terminator

Zubehör

TopView Visualisierungssoftware von RS 485 Geräten (A/N 78349). Siehe Demo-Version auf der Webseite des Herstellers.

Accessories

ToView Visualisation Software (A/N 78349). See demo version on the homepage of the manufacturer.

Unbedenklichkeitserklärung

Bitte bei Reparatursendungen kopieren und für jedes Gerät ausgefüllt einsenden!

Unbedenklichkeitserklärung - Formular

(für jedes Gerät bitte separat ausfüllen und sichtbar am Gerät anbringen)

Wir übergeben Ihnen das nachfolgendes Gerät zur Reparatur:

Gerät und Gerätetyp:

Artikel-Nr.:

Auftrags-Nr.:

Lieferdatum:

Grund der Reparatur:

Fördermedium

Bezeichnung:

Eigenschaften:

Reizend: Ja/Nein*) Ätzend: Ja/Nein*)

*) Nichtzutreffendes bitte streichen!

Hiermit versichern wir, dass das Gerät vor dem Versand gründlich von innen und außen gereinigt wurde, und frei von gesundheitsgefährdenden chemischen, biologischen und radioaktiven Stoffen ist, sowie Öl abgelassen wurde. *)

Sollten weitere Reinigungsmaßnahmen seitens des Herstellers erforderlich sein, werden uns die Kosten dafür in Rechnung gestellt.

Wir versichern, dass die vorstehenden Angaben korrekt und vollständig sind, und der Versand gemäß den gesetzlichen Bestimmungen erfolgt.

Firma:

Anschrift:

.....

.....

Telefon:

Telefax:

E-Mail:

Kunden-Nummer:

Ansprechpartner:

.....

Datum, Unterschrift, Stempel:

Gewährleistungsantrag

Bitte kopieren und mit dem Gerät einsenden!
Bei Ausfall des Gerätes innerhalb der Gewährleistungszeit bitten wir Sie um Rücksendung im gereinigten Zustand mit vollständig ausgefülltem Formular.

Absender

Firma: Tel.-Nr.: Datum:

Anschrift:.....

Ansprechpartner:

Hersteller Auftrags-Nr.: Auslieferungs-Datum:

Geräte Typ: Serien-Nr.:

Nenn-Förderleistung:/Nenndruck:.....

Fehlerbeschreibung:.....

.....

.....

Fehlerart:

1. mechanischer Fehler

vorzeitiger Verschleiß

Verschleißteile

Bruch/sonstige Schäden

Korrosion

Beschädigung beim Transport

2. elektrischer Fehler

Anschlüsse wie Stecker oder Kabel lose

Bedienungselemente (z.B. Schalter/Taster)

Elektronik

3. Undichtigkeit

Anschlüsse

Dosierkopf

4. keine bzw. unzureichende Funktion

Membrane defekt

Sonstige

Einsatzbedingungen des Gerätes

Einsatzort/Anlagenbezeichnung:.....

Eventuell verwendetes Zubehör:.....

.....

.....

Inbetriebnahme (Datum):

Laufzeit (ca. Betriebsstunden):

Bitte benennen Sie die Eigenarten der Installation und fügen Sie ggf. eine einfache Skizze mit Material-, Durchmesser-, Längen- und Höhenangaben bei.

Declaration of harmlessness

Please copy and send in with your device!
Please display anon the outer packaging!

Declaration of harmlessness

(please fill out a separate form for each appliance)

We forward the following device for repairs:

Type of device:

Part-no.:

Order-no.:

Delivery date:

Reason for repair:

.....

Medium used:

Properties:

irritant: yes/no

corrosive: yes/no

We hereby certify that the machine has been thoroughly cleaned inside and out before its dispatch and that it is free from health risk chemical, biological and radioactive materials as well as having been drained of oil. *)

If the manufacturer find it necessary to carry out further cleaning work, we accept the charge will be made to us.

We certify that the aforementioned information is correct and complete and that the unit is dispatched in compliance with legal requirements.

Company / address:

Phone:

Fax:

E-Mail:

Customer-number:

Contact person:

.....

Date

.....

Signature / stamp

*) If not applicable please cross out!

Warranty

Please copy and send with the device.
If the device breaks down within the period of warranty,
please return it in a cleaned condition with the complete warranty application, filled out.

Sender

Company:..... Phone:..... Date:

Address:.....

Contact person:

Manufacturer order-no.: Delivery date:

Device type:..... Serial no.:

Nominal capacitynominal pressure:

Description of fault:

.....

.....

Type of fault:

1. Mechanical fault

2. Electrical fault

o premature wear

o loose connections such as plug connector or cable

o wear parts

o operating elements (e.g.. switches/buttons)

o breakage/other damage

o electronics - corrosion

o damage in transit

3. Leaks

4. No or inadequate function

o connections

o defective diaphragm

o dosing head

o other

Service conditions of the device

Point of use / system designation:.....

Accessories used (Suction line, etc.):.....

.....

.....

Commissioning (date):.....

Duty peroid (approx. operating hours):

Please describe the specifics of the installation and provide a simple diagram with details of the material, diameter, length and levels.



Lutz-Jesco GmbH

Am Bostelberge 19
30900 Wedemark
Germany

Phone: +49 5130 5802-0
Fax: +49 5130 5802-68
E-Mail: info@lutz-jesco.de
Internet: www.lutz-jesco.de

24h-Hotline: +49 5130 580 280

Austria

Lutz-Jesco GmbH

Aredstraße 7/2
2544 Leobersdorf
Austria

Phone: +43 2256 62180
Fax: +43 2256 6218062
E-Mail: info@lutz-jesco.at
Internet: www.lutz-jesco.at

Great Britain

Lutz-Jesco (GB) Ltd.

Gateway Estate
West Midlands Freeport
Birmingham B26 3QD
Great Britain

Phone: +44 121 782 2662
Fax: +44 121 782 2680
E-Mail: info-gb@lutz-jesco.de
Internet: www.lutz-jesco.de

Netherlands

Lutz-Jesco Nederland B.V.

Nijverheidstraat 14 C
2984 AH Ridderkerk
Netherlands

Phone: +31 180 499460
Fax: +31 180 497516
E-Mail: info@lutz-jesco.nl
Internet: www.lutz-jesco.nl

Hungary

Lutz-Jesco Üzletág

Vasvári P. u. 9.
9024 Győr
Hungary

Phone: +36 96 523046
Fax: +36 96 523047
E-Mail: info@lutz-jesco.hu
Internet: www.lutz-jesco.hu

USA

Lutz-JESCO America Corp.

55 Bermar Park
Rochester, NY 14624
USA

Phone: +1 585 426-0990
Fax: +1 585 426-4025
E-Mail: mail@jescoamerica.com
Internet: www.jescoamerica.com

East Asia

Lutz-Jesco
East Asia Sdn Bhd

Taman Perindustrian Jaya
47200 Petaling Jaya
Malaysia

Phone: +603 78454812
Fax: +603 78458413
E-Mail: info@lutz-jescoasia.com
Internet: www.lutz-jescoasia.com

Middle East

Lutz-Jesco Middle East FZE

P.O. Box 9614
SAIF-Free Zone Center
Sharjah
UAE

Phone: +971 6 5572205
Fax: +971 6 5572230
E-Mail: info@jescome.com
Internet: www.jescome.com



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