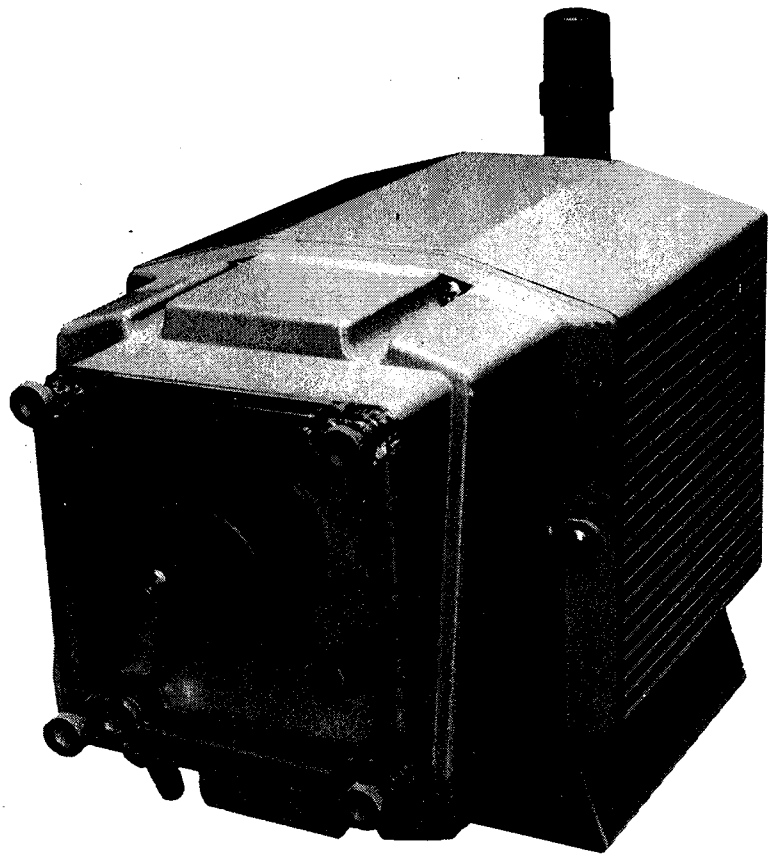
# ProMinent® Dosierpumpe Typenreihe C/Series C/ Types C

**Bedienungsanleitung**
**Operating instructions**
**Consignes de fonctionnement**

ProMinent®

d/e/f



cfg ProMinent

3/87 **ProMinent Dosiertechnik GmbH · D-6900 Heidelberg 1 · West Germany** PM-BA-072

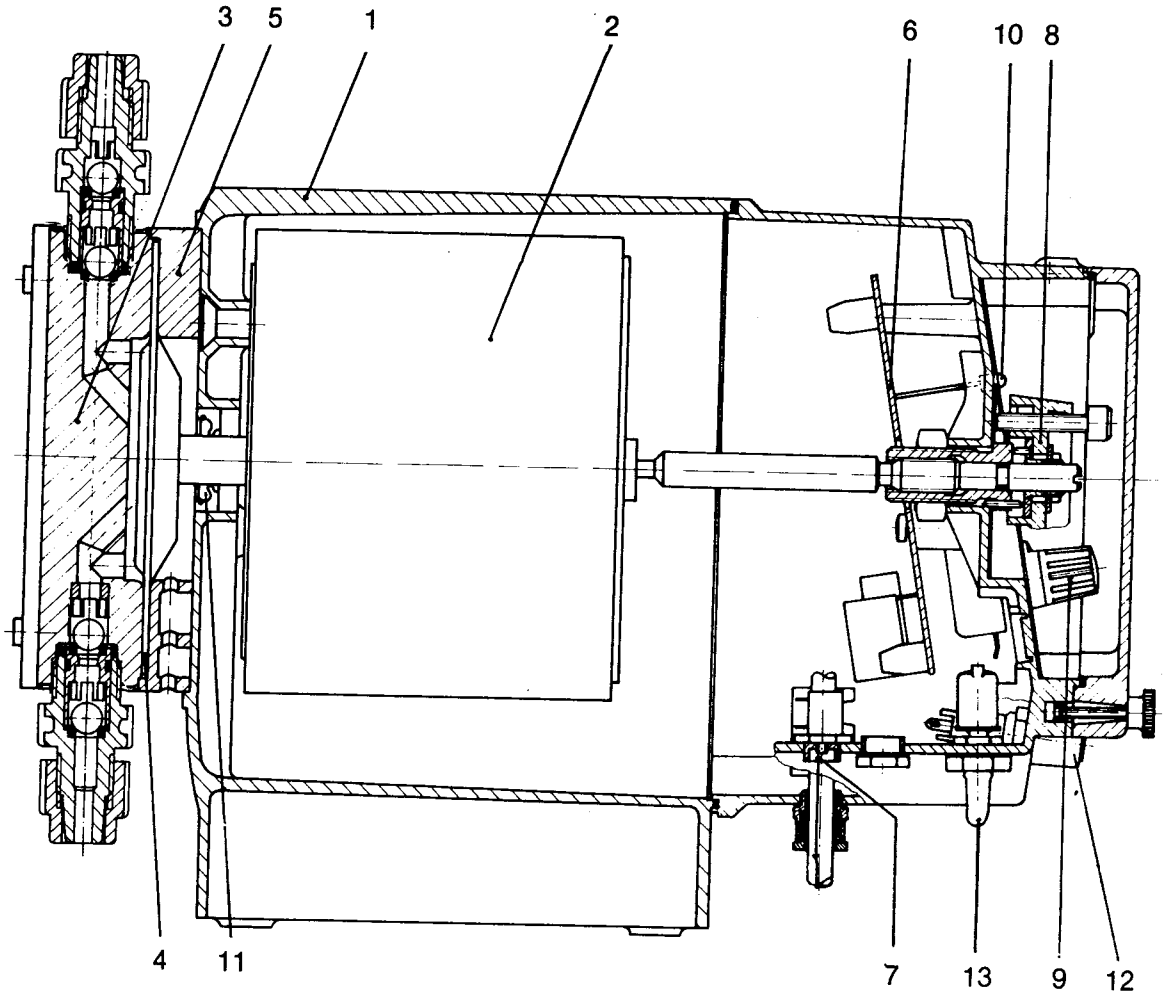
**Inhaltsverzeichnis / table of contents / table des matières:**



**Symbolerklärung für Frontplatte Bedienungsteil/ legend for symbols on front plate/ Descriptif des symboles sur face avant**

| | | | |
|---|---|---|---|
|  | Hublängeneinstellung | displacement | Course |
|  | Hubfrequenz | frequency | Fréquence |
|  | Betriebs-/Impulsanzeige | operation/pulse control | Contrôle fréquence |
|  | Leeranzeige | tank level zero | Contrôle niveau |
|  | Sicherung | fuse | fusible |
| I | Ein | on | marche |
| 0 | Aus | off | arrêt |

SCHNITTZEICHNUNG/ SECTIONAL DRAWING/ COUPE **ProMinent® C**




| | | | |
|---|---|---|---|
| 1 | Gehäuse | casing | Boitier |
| 2 | Kurzhubmagnet | short-stroke magnet | Electro-aimant |
| 3 | Dosierkopf mit Saug- u. Druckanschlüssen | dosing head with suction and pressure sockets | Tête doseuse avec raccords d'aspiration et de refoulement |
| 4 | Dosiermembrane mit Stahlkern und PTFE-Auflage | dosing diaphragm with steel core and PTFE coating | Membrane doseuse avec noyau acier et couche de protection en PTFE |
| 5 | Kopfscheibe mit Sicherheitsbohrung | head disc with safety bore holes | Disque avec écoulement de sécurité |
| 6 | Elektron. Steuerung | electronic control | Commande électronique |
| 7 | Steckbuchse für Niveauschalter | female socket for level switch | Fiche pour contrôle de niveau |
| 8 | Hublängenregelknopf | stroke-length regulating knob | Réglage de la course de la membrane |
| 9 | Hubfrequenz-regelknopf | stroke-frequency regulating knob | Potentiomètre de la fréquence |
| 10 | Anzeigenlampen für Impuls- und Leer-anzeige | signal lamps for impulse- and empty-tank indication | Lampes témoins des impulsions et niveau bas |
| 11 | Sicherungsmembrane | safety diaphragm | Bourrage de sécurité |
| 12 | Sicherung | fuse | fusible |
| 13 | Netzschalter | main switch | Interrupteur principale |

## FUNCTIONAL CHARACTERISTICS

The ProMinent® electronic is an electronically controlled, short-stroke electromagnet, piston-diaphragm dosing pump for pulsating operation. Every electronic impulse attracts the magnet and causes a stroke of max. 1,25 mm. The steel-core stabilised diaphragm displaces the media in the dosing head, the ball-checks on the suction side are pressed into the seat, the ball-ckecks on the pressure side open and release the media for dosing. After completion of the stroke the magnet is switched off and forced into its initial position by a spring. The pressure side valve is closed thereby, the suction side one opened to draw the media into the dosing head.
The infinitely variable height-of-stroke setting is adjusted with knob 8 and arrested while the pump is in operation. The impulse frequency can be set infinitely with knob 9. Through pole changing of a bridge at the electronic inside the casing the dosing pump can be adapted to control via external control (e.g. contact water meter or Dulcometer® as potential-free or semi contacts). The contact cable must be fitted in addition (see wiring diagram inside the casing). When operating the pump via external contacts the impulse sequence must not exceed the given max. frequency for the pump as self-controlled unit.
Admissible environmental temperature: -10 to +30°C. With higher temperatures the stroke frequency must be reduced by the same percentage as the temperature exceeds above readings. For short periods of less than 1 hour of operation the environmental temperature is of no concern as long as it does not exceed 50°C.

## COMMISSIONING

1. fit pump to container or console, connect grid plug, insert level switch if used,
2. fit suction hose to respective socket, immerse valve to all but container bottom contact, shorten it if necessary,
3. immerse suction hose with foot valve, level switch,
4. the dosing pump is ready for operation. Switch pump to "ein" (on) position, put frequency knob to 100 and head to 100 while the pump is in action, allow pump to run till dosing head is filled.
   If an externally controlled pump is not provided with an impulse key, impulses may be caused by joining and separating the contact lead by hand. The necessary miniture voltage provided by a separation transformer in the pump is absolutely harmless.
5. connect dosing hose,
6. set dosing output as per nomogram.

## 1. Dosing output

The max. head of ProMinent dosing pumps lies between 1 and 6 m WC with the dosing head filled - see technical data. With an empty dosing head it is dependent on the stroke volume (lower volumes = lower head). Priming should, therefore be allowed at a 100 height-of-stroke setting. If a pump has to be drained at a lower setting and without changing the head, and if such a pump is to operate again after self priming, the head should be a lower one. The pump cannot prime against pressure.

If the pump is to dose into a pressure system and has drawn air this is compressed in the dosing head only. In such cases the dosing hose must be detached and deaerated till suction hose and dosing head are filled free of bubbles.

With a level switch being used the pump is switched off at min. level to prevent air being drawn.

## 2. Dosing precision

The setting precision as per nomogram is one of approx. $\pm$ 5% of the end reading. The reproduceable dosing precision is one of $\leq \pm$ 2%, like conditions and a min. head of 30% being given as explained below:

a) all statements are based on dosing performances with water at 20°C,
b) a precise dosing is only possible at constant counter pressures of, if possible, no more than 1 bar,
c) for dosing with a free outlet, a pressure retainer valve should be fitted onto the dosing head to produce a counter pressure of approx. 1,5 bar. The pressure retainer valve can easily be depressurized by pulling the ventilation knob. If a dosing pump with a free outlet is dual-point controlled (e.g. by conductivity) no pressure retainer valve is needed.
d) suction and dosing hoses/pipes should be fitted at a constant rise.

## 3. Electric connection

The pump is laid out for 220 V 50 Hz grid supply (other voltages are possible upon request). It is switched on and off via the main switch.

If the pump is to be switch-operated parallel with an induction consumer unit such as a magnet valve, a motor or such like, it must separated from such other units electrically at being switched off. The control must therefore be arranged via an auxiliary contactor or relay. Where this is impossible suitable steps must be taken, e.g. parallel switching of an RC-member of approx. 0,22 µF 1,5 k $\Omega$ or a varistor with 250 V contact voltage on the induction consumer to reduce its induction voltage.

## TROUBLE SHOOTING HINTS

1. pumps does not prime despite full-stroke setting and deaeration:
   cristaline deposits on the ball seat through drying out of valves - lift suction hose temporarily, rinse pump thoroughly. If unsuccessfull detach and clean valves,
2. pump stops performance after a longer run:
   deaerate dosing hose/pipe, check media level in container. If unsuccessful proceed as per 1,
3. pump does not operate, impulse signal lamp does not light up:
   check fuse, exchange it if necessary.
   **Attention:** use only prescribed sizes. If unsuccessful have electronic or entire pump works checked,
4. red signal lamp lights up:
   refill/top up media container,
5. level switch does not function at low level:
   float is blocked by cristaline deposits - remove these making certain the three distance cones are topmost on the float,
6. liquid seeps from the head disc:
   a) leaking diaphragm, tighten internal hexagon screw on dosing head,
   b) if of no avail diaphragm may be torn. Loosen internal hexagon screw without taking it off. With pump in operation set head to zero, switch pump off, loosen dosing head with diaphragm and head disc from magnet axis in anti clock fashion.

**Fitting of diaphragm**

Put diaphragm into head disc, fit dosing head in such manner that the suction socket is above the drainage bore hole of the head disc. Insert screws and fasten diaphragm tightly clockwise. Switch pump on, set head to 100% and continue turning the parts clockwise while the pump is operating till the suction socket points downward vertically. Switch pump off, tighten internal hexagon screws.

## EINSTELLEN DER FÖRDERLEISTUNG

1. Korrekturfaktor nach Diagramm "Förderleistung in Abhängigkeit vom Gegendruck" ermitteln.
2. Gewünschte Förderleistung durch Korrekturfaktor dividieren.
3. Erhaltenen Wert auf mittlerer Skala suchen, mit Lineal Verbindung zu den anderen Skalen herstellen.
   **Hinweis:** Normalerweise legt man das Lineal möglichst waagerecht, jedoch so, daß man wenigstens an einer Skala auf einen ganzen Wert kommt.
   Für sehr viskose Medien wählt man große Hubhöhe und niedrige Frequenz. Für eine gute Vermischung wählt man niedrige Hubhöhe und hohe Frequenz. Für Dosiergenauigkeit 2%, Hubhöhe möglichst nicht kleiner als 30%.
4. An der linken Skala "Hublängenregelung" Wert für Hublänge entnehmen, an der rechten Skala "Frequenzregelung" Wert für Hubfrequenz ablesen.
5. Abgelesene Werte an Dosierpumpe einstellen (Hublänge nur bei Betrieb). Erhaltene Frequenz abstoppen und ggf. auf Wert "Hubfrequenz" korrigieren.
6. Für genaue Dosierung erzielte Förderleistung kontrollieren, ggf. korrigieren.

## ADJUSTMENT OF RATING

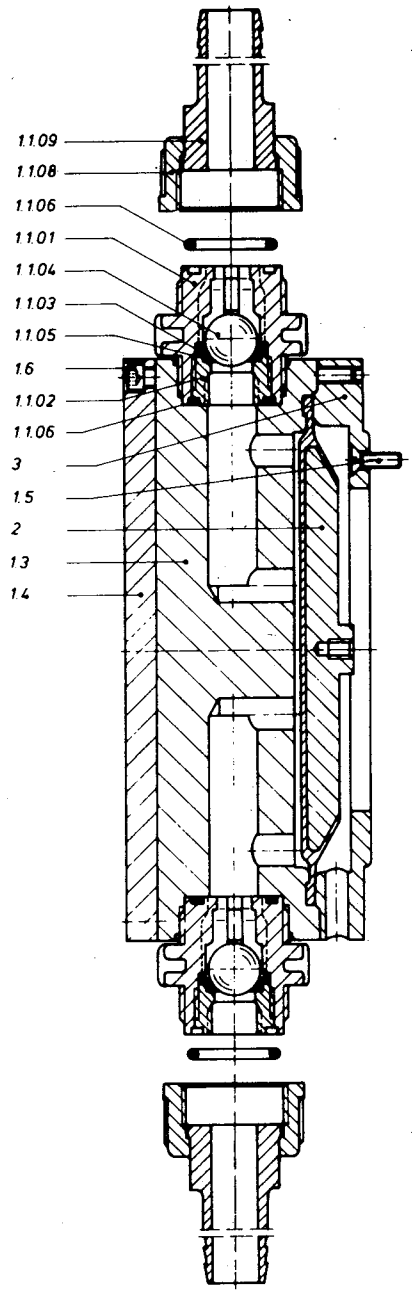
1. define correction factor as per diagram "output in relation to counter pressure",
2. divide desired rating by correction factor,
3. find reading given on centre diagram, connect reference point found with outer diagrams, using a ruler;
   **Observations:** normally, the ruler is placed as horizontally as possible whereby, however, a full reading mark should be chosen on at least one diagram, for highly viscous dosing medias, high stroke- and low frequency settings are chosen, while low stroke- and high frequency adjustments are used to achieve a thorough intermixing, for dosing precision below 2%, the stroke setting should not be below 30%.
4. the left-hand "stroke-length" diagram gives the stroke length readings, the right-hand "frequency adjustment" diagram indicates the stroke frequency,
5. set pump as per readings given (stroke length adjustments only while the pump is operating),
6. check dosing outputs for precision, if necessary correct settings of the pump finally

## REGLAGE DU DEBIT

1. Déterminer le coéfficient de rectification en fonction du diagramme (1).
2. Diviser le débit désiré par le coéfficient de rectification (2).
3. Chercher l'indice ainsi obtenu sur l'échelle (3) et établir la relation à l'aide d'une règle avec les échelles (4) et (5).
   **Remarque:** en principe, on pose la règle de façon horizontale mais il faut atteindre, au moins sur une échelle, une valeur entière. S'il s'agit de milieux très visqueux, il faut choisir une longueur de course importante et un fréquence basse. Par contre, pour obtenir un bon mélange, on choisit une longueur de course faible et une fréquence élevée. Pour l'exactitude des rajouts en dessous de 5% ou 2%, la longueur de course ne devra pas être inférieure à 30%.
4. L'échelle de gauche (5) donne la longueur de course; l'échelle de droite (4) indique la fréquence des impulsions.
5. Régler ces deux indices sur la pompe doseuse (pompe en marche pour la longueur de course). Bloquer le réglage course et rectifier éventuellement la valeur "Fréquence des impulsions".
6. Pour obtenir un dosage plus exact, contrôler le débit et le rectifier le cas échéant.

## Dosierkopf kpl. C 04.060, C 02.067, C 02.120

Ausführung N, P, PP

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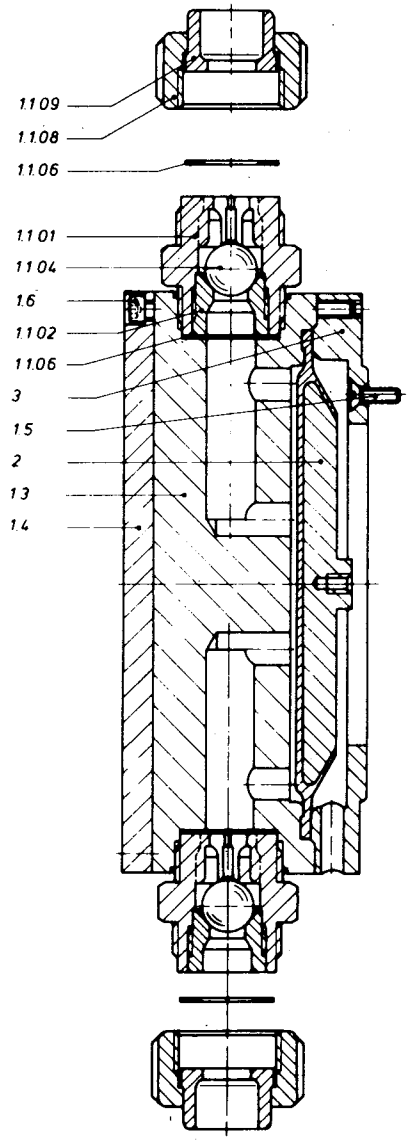
Ausführung T

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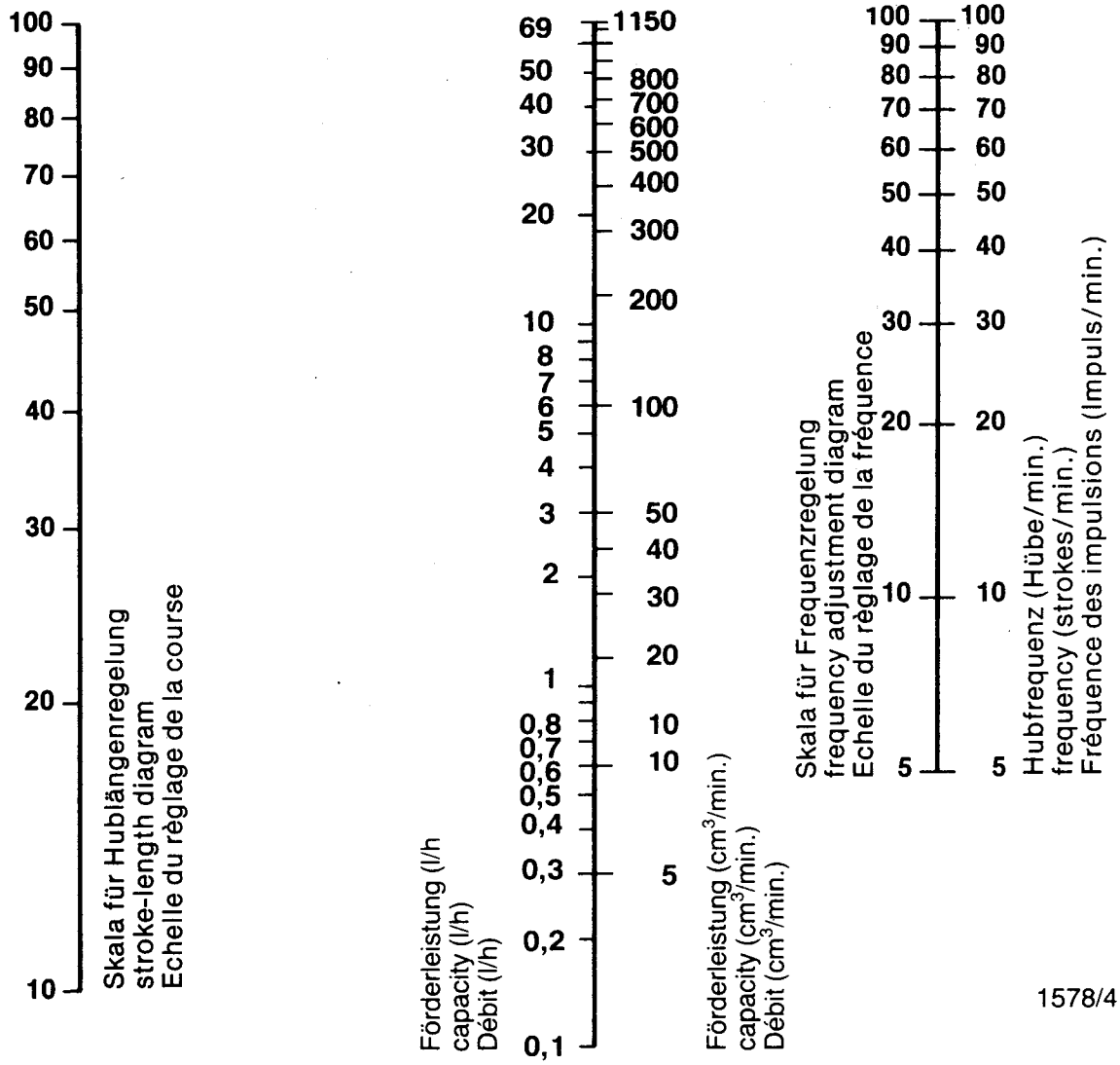
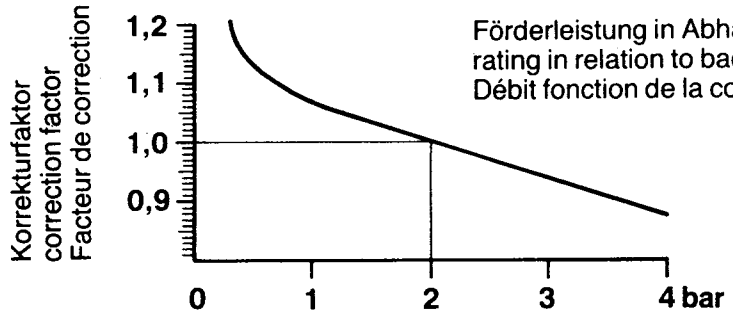
NOMOGRAMM zur Bestimmung der Förderleistung für Dosierpumpe Typ **C 04.060**
NOMOGRAM to determinate the capacity of Pump model **C 04.050**
ABAQUE pour la détermination du débit de la Pompe Doseuse type **C 04.050**




Maximale Förderleistung bei 2 bar: 69 l/h ≙ 11,5 cm³/Hub
Maximale Förderleistung bei 4 bar: 60 l/h ≙ 10 cm³/Hub
max. rating at 2 bar: 69 l/h ≙ 11.5 cm³/stroke
max. rating 4 bar: 60 l/h ≙ 10 cm³/stroke
Débit maximum à 2 bar: 69 l/h ≙ 11,5 cm³/Impuls.
Débit maximum à 4 bar: 60 l/h ≙ 10 cm³/Impuls.

## C 04.060

| | | | |
|---|---|---|---|
| max. Förderleistung | bei 4 bar | 60 l/h | 10 $cm^3$/Hub |
| max. Gegendruck | | 4 bar | |
| max. Hubfrequenz | | 6000 Hübe/h | 100 Hübe/min. |
| min. Hubfrequenz (nur b. Eigensteuerung) | | 240 Hübe/h | 4 Hübe/min. |
| regelbare Hublänge | | 10 - 100% | |
| elektr. Anschluß | | 220 V, 50 Hz | 5,6 A ED 25 |
| mittlere Leistungsaufnahme | | 229 W | |
| Steuerspannung | | 24 V | |
| Schutzart | | IP 64 | |
| Ventil kpl. | Typ N, P, PP | Druckschl.tülle DN 15-A ∅ 20 Anschl.gew. 1" | |
| | T | Einlegteil DN 15-I ∅ 20 Anschlußgewinde 1" | |
| | S | Einlegteil DN 15-I Gew. 1/2" Anschlußgew. 1" | |
| notw. Kontaktdauer bei fremdgest. Pumpen | | 20 mS | |
| Belastung des Kontaktes | | 20 mA | |
| Maße | | L 335 mm, B 190 mm, H 305 mm | |
| Gewicht netto/mit Verpackung/Ausführung S | | 20 kg/21 kg/5 kg mehr | |
| max. Saughöhe | | ca. 2,5 mWS | |

| | | | |
|---|---|---|---|
| max. rating | at 4 bar | 60 l/h | 10 $cm^3$/strokes |
| max. back pressure | | 4 bar | |
| max. stroke rate | | 6000 strokes/h | 100 strokes/min. |
| min. stroke frequency (manual control only) | | 240 strokes/h | 4 strokes/min. |
| adjustable stroke-length setting | | 10 - 100% | |
| supply voltage | | 220/115 V, 50/60 Hz | 5,6 A ED 25 |
| nominal power | | 229 W | |
| control voltage | | 24 V | |
| protection | | IP 64 | |
| valve, complete | types N, P, PP | disch. hose conn. DN 15-o.d. 20 conn. thread 1" | |
| | T | threaded nipple DN 15-i.d. 20 conn. thread 1" | |
| | S | threaded nipple DN 15-i.d. thread 1/2" connecting thread 1" | |
| contact duration required f. ext. controlled pumps | | 20 mS | |
| contact load | | 20 mA | |
| dimensions (length, width, height) | | 335 × 190 × 305 mm | |
| net weight/ship. weight/type S | | 20/21 kg/plus 5 kg | |
| max. suction lift | | approx. 2.5 mWC | |

| | | | |
|---|---|---|---|
| Débit maxi | pour 4 bar | 60 l/h | 10 $cm^3$/Impuls. |
| Contre-pression maxi | | 4 bar | |
| Fréquence maxi des impulsions | | 6000 Impuls./h | 100 Impuls./min. |
| Fréquence mini des impulsions (uniquement pour commande interne) | | 240 Impuls./h | 4 Impuls./min. |
| Course règlable | | 10 - 100% | |
| Raccordement électrique | | 220 V, 50 Hz | 5,6 A ED 25 |
| Puissance moyenne absorbée | | 229 W | |
| Tension d'alimentation | | 24 V | |
| Type de protection | | IP 64 | |
| Vanne complète | type N, P, PP | Embout de tuyau de refoul. DN 15-A diam. 20, taraudage de raccordement 1" | |
| | T | Plèce intercalaire DN 15-I diam.20, taraudage de raccordement 1" | |
| | S | Plèce intercalaire DN 15-filetage 1/2", taraudage de raccordement 1" | |
| Durée de contact nécessaire pour pompes à commande externe | | 20 mS | |
| Charge de contact | | 20 mA | |
| Dimensions | | L 335 mm, l 190 mm, H 305 mm | |
| Poids net/avec emballage/Modèle S | | 20 kg/21 kg/5 kg en plus | |
| Hauteur max. d'aspiration | | env. 2,5 mCE | |

**Ersatzteilliste Typenreihe C**
**Spare Parts List Types C**

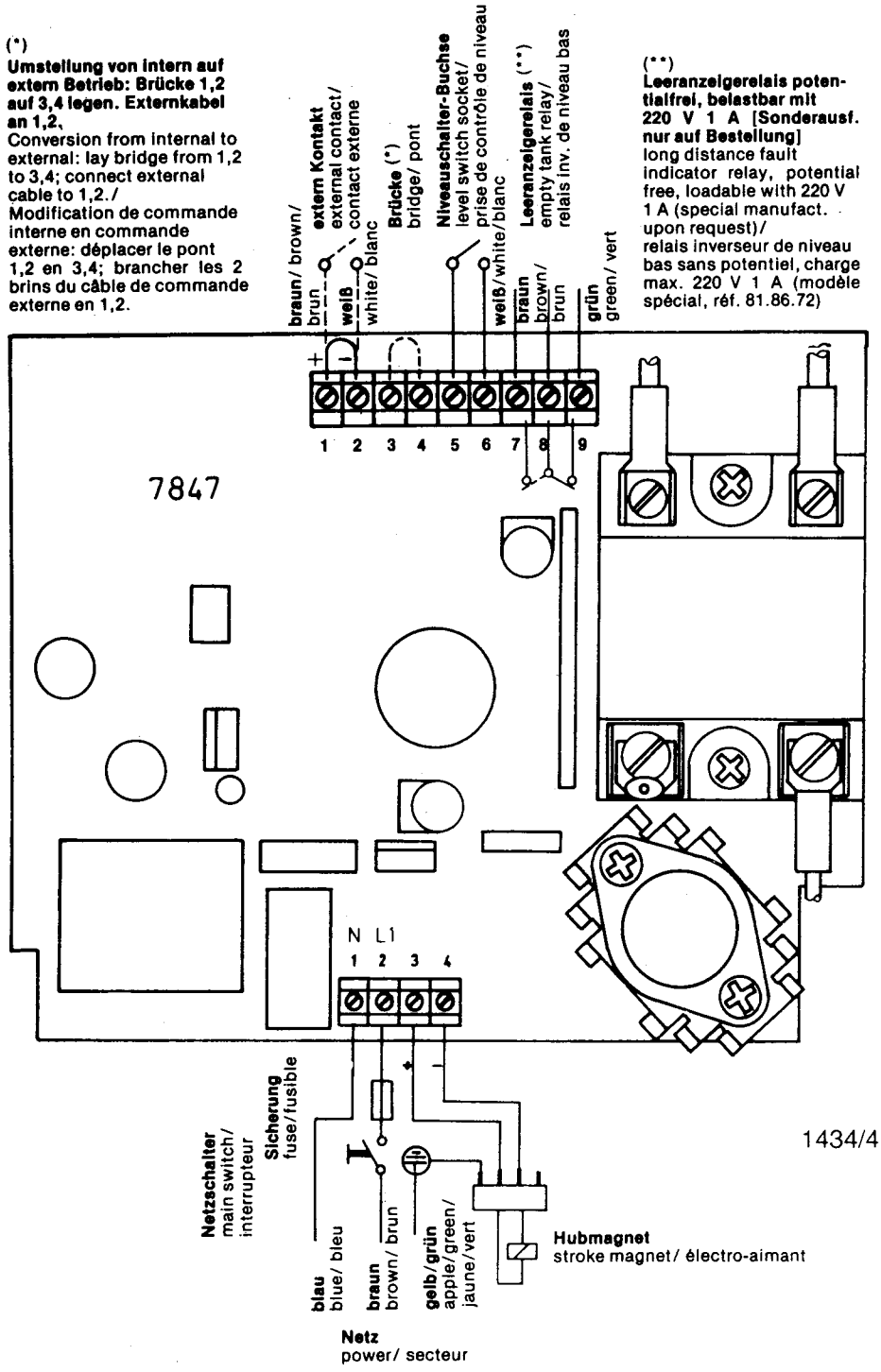
| Pos.<br>Pos. | Anz.<br>No.of | Artikel | Description | Werkstoff<br>Material |
|---|---|---|---|---|
| 1.0.00 | 1 | Dosierkopf komplett | Dosing Head Assembly | Plexiglas |
| 1.1.00 | 2 | Ventil kpl. DN 15 | Valve compl. DN 15 | PVC |
| 1.1.01 | 1 | Ventilkörper | Valve body | PVC |
| 1.1.02 | 1 | Kugelsitzbüchse | Ball seat | PVC |
| 1.1.03 | 1 | Scheibe | Disk | PVC |
| 1.1.04 | 1 | Kugel d 16 | Ball d 16 | Duran 50 |
| 1.1.05 | 1 | O-Ring 13 × 2,5 | O-Ring 13 × 2.5 | 83 FKM 575 |
| 1.1.06 | 2 | O-Ring 22,2 × 3 | O-Ring 22,2 × 3 | 83 FKM 575 |
| 1.1.08 | 2 | Überwurfmutter R 1" DN 15 | Clamping Nut 1 in. DN 15 | PVC |
| 1.1.09 | 2 | Druckschlauchtülle DN 15 | Discharge hose connector DN 15 | PVC |
| 1.3 | 1 | Dosierkopf | Dosing Head | Plexiglas |
| 1.4 | 1 | Panzerscheibe | Reinforcement Plate | Al besch. |
| 1.5 | 6 | Senkschraube M5 × 12 | C'sk. hd. screw M5 × 12 | verz. |
| 1.6 | 6 | I-S Schraube M5 × 70 | Screw M5 × 70 (Skt.hd.) | A 2 |
| 1.6 | 8 | I-S Schraube M5 × 65 | Screw M5 × 65 (Skt.hd.) | A 2 |
| 2 | 1 | Dosiermembran | Diaphragm | EPDM |
| 3 | 1 | Kopfscheibe | Back Plate | Noryl |

| | C 04.060 N<br>Best. Nr.<br>Code No. | C 02.067 N<br>Best. Nr.<br>Code No. | C 02.120 N<br>Best. Nr.<br>Code No. |
|---|---|---|---|
| | 81.97.22.0 | · | 81.97.23.8 |
| | 80.94.01.3 | · | · |
| | 14.05.78.6 | · | · |
| | 14.05.79.4 | · | · |
| | 14.05.80.2 | · | · |
| | 40.42.15.6 | · | · |
| | 48.10.14.9 | · | · |
| | 48.10.25.5 | · | · |
| | 35.65.63.7 | · | · |
| | 81.14.07.6 | · | · |
| | 81.07.35.1 | · | 81.07.46.8 |
| | 81.01.04.0 | · | 81.01.05.7 |
| | – | – | 46.13.13.9 |
| | 46.80.79.9 | · | – |
| | – | – | 46.80.78.1 |
| | 81.14.61.3 | · | 81.14.62.1 |
| | 81.15.01.6 | · | 81.02.20.4 |

## Verdrahtungsplan ProMinent® C
## Wiring plan ProMinent® C/ Schéma de branchement ProMinent® C

(*)
**Umstellung von intern auf extern Betrieb: Brücke 1,2 auf 3,4 legen. Externkabel an 1,2.**
Conversion from internal to external: lay bridge from 1,2 to 3,4; connect external cable to 1,2./
Modification de commande interne en commande externe: déplacer le pont 1,2 en 3,4; brancher les 2 brins du câble de commande externe en 1,2.

(**)
**Leeranzeigerelais potentialfrei, belastbar mit 220 V 1 A [Sonderausf. nur auf Bestellung]**
long distance fault indicator relay, potential free, loadable with 220 V 1 A (special manufact. upon request)/
relais inverseur de niveau bas sans potentiel, charge max. 220 V 1 A (modèle spécial, réf. 81.86.72)

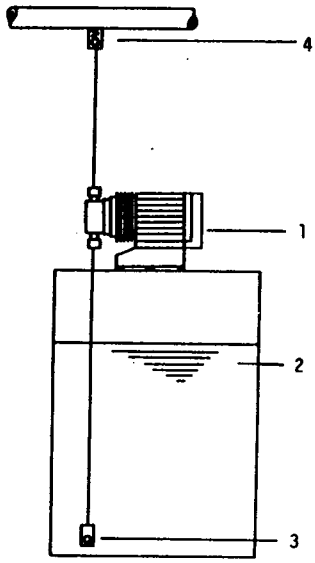



**Typen/types C 25.007; C 10.024; C 04.050; C 02.100**
**220 V Elektronik 79 U 118/482 Best.Nr. 81.88.87.2 SI 1,25 A TT Best.Nr. 71.20.65.2**
110 V Electronic 79 U 118/482 Code No. 81.88.85.6 fuse 3,15 A TT Code No. 71.20.69.4
220 V Electronique 79 U 118/482 Réf. 81.88.87.2 fusible 1,25 A TT Réf. 71.20.65.2

**Typen/types C 04.031; C 02.056**
**220 V Elektronik 79 U 118/427 Best.Nr. 81.88.86.4 SI 0,8 A TT Best.Nr. 71.20.63.7**
110 V Electronic 79 U 118/427 Code No. 81.88.84.9 fuse 1,6 A TT Code No. 71.20.66.0
220 V Electronique 79 U 118/427 Réf. 81.88.86.4 fusible 0,8 A TT Réf. 71.20.63.7

## Installationsbeispiele Dosierpumpen/Installation Examples of Dosing Pumps/ Exemples d'installation des Pompes Doseuses

1.) Standardinstallation/Standard installations/Installation standard



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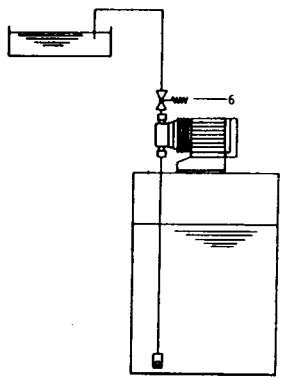
1 = Dosierpumpe/Dosing Pump/Pompe doseuse
2 = Dosierbehälter/Chemical Tank/Réservoir
3 = Fußventil mit Sieb u. Kugelrückschlag/Foot Valve with Strainer and Non-return Valve/Clapet de pied avec tamis et clapet de non-retour à bille
4 = Dosierventil federbelastet/Dosing Valve, Spring-loaded/ Canne d'injection à ressort
5 = Dosierventil mit verstärkter Feder/ Dosing Valve with reinforced spring/Canne d'injection à ressort renforcé
6 = Druckhalteventil DK-(Dosierkopf)/Loading Valve, Pump-mounted/Soupape de contre-pression DK-(tête doseuse)
7 = Druckhalteventil DL-(Dosierleitung)/Loading Valve, Line-mounted/Soupape de contre-pression DL-(conduite)
8 = Druckhalteventil einstellbar/Loading Valve, Adjustable/ Soupape de contre-pression réglable
9 = Windkessel/Air chamber/Réservoir à air
10 = Magnetventil/Solenoid-operated Valve/Electro-vanne

2.) Dosierung bei freiem Auslauf
- und kleiner Förderhöhe/
Dosing with free outlet - and low head/
Dosage libre et faible hauteur de refoulement



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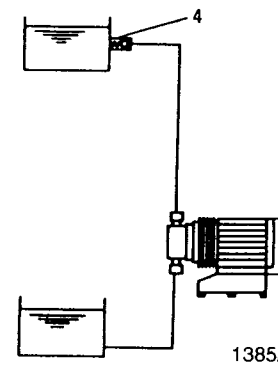
- und großer Förderhöhe ohne D-H-V/
- and great head without loading valve/
- et grande hauteur de refoulement sans soupape de contre-pression



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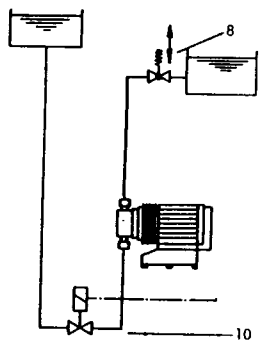
3.) bei Vordruck auf Saugseite
- und großer Förderhöhe/
with positive suction head
- and great delivery head/
pression côté aspiration
- et grande hauteur de refoulement



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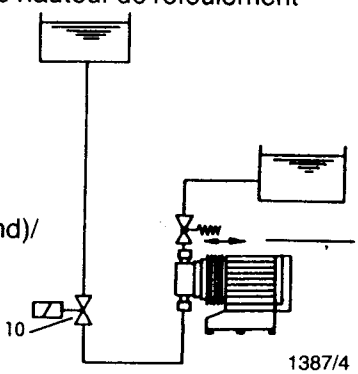
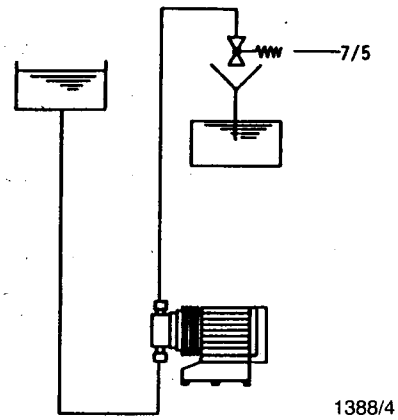
- und kleiner Förderhöhe/
- and low delivery head/
- et faible hauteur de refoulement



1387/4

10 = Magnetventil (geschl. bei Pumpenstillstand)/ Solenoid valve (closed when pump is idle)/ Electro-vanne (fermée si la pompe es en arrêt)

4.) Installation zur Absoluten Verhinderung v. Durch-Hebern bei gefährlichen Medien/
Installation to prevent syphoning of hazardous media/
Installation empêchant la circulation automatique dans le cas liquides dangereux



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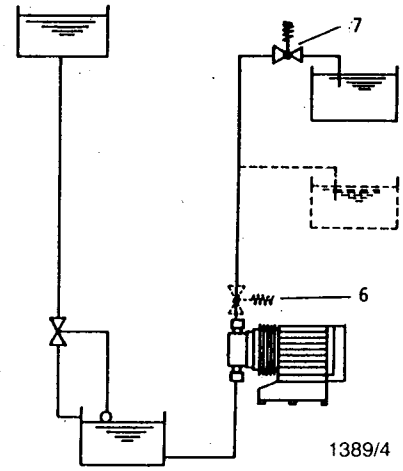
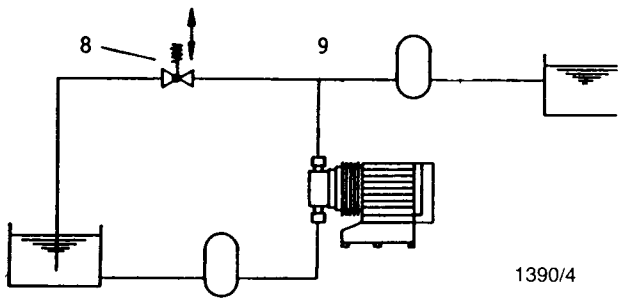


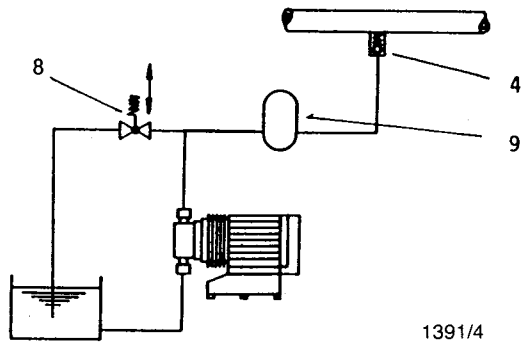
1389/4

5.) bei langen Leitungen/
with long pipe lines/
lorsque les conduites sont longues



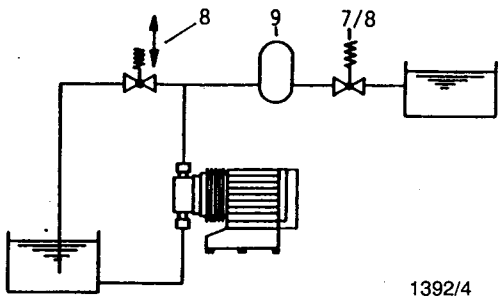
1390/4

6.) zur pulsationsfreien Dosierung
- in Druckleitung/
for nonpusating dosing
- into discharge pipe/
pour un dosage sans pulsations
- dans la conduite de refoulement



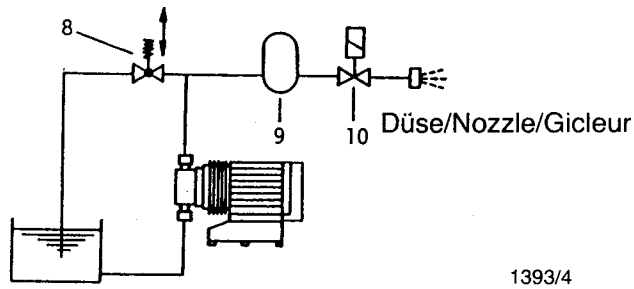
1391/4

- bei freiem Auslauf/
with free outlet/
lorsque l'écoulement est libre



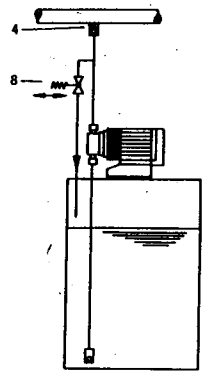
1392/4

7.) zur pulsationsfreien Dosierung
- ohne Nachlauf/
for nonpulsating dosing
- without backflow from the system/
pour un dosage sans pulsations
- sans egouttement



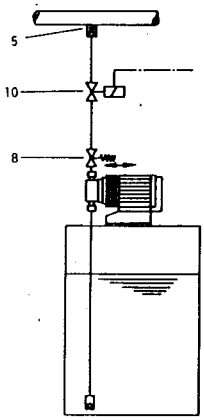
1393/4

8.) zum Schutz vor Überdruck/
for protection from overpressure/
protection contre surpression



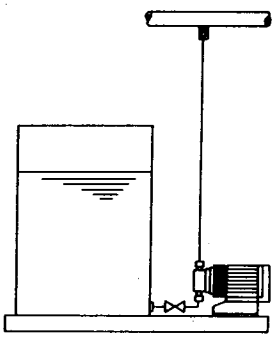

1394/4

9.) Dosierung in Vakuum/
Dosing in vacuum/
Dosage sous vide



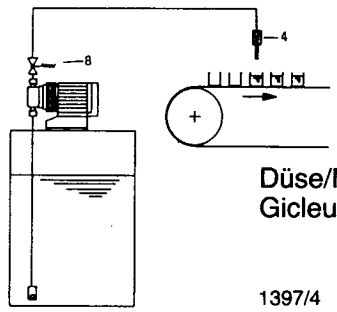

1395/4

10.) bei ausgasenden Dosiermedien/
with gassing media/
avec des liquides gazeux



1396/4

11.) pulsartige Einzeldosierung/
Multiple-pulse batch dosing/
Dosage individuel à impulsions

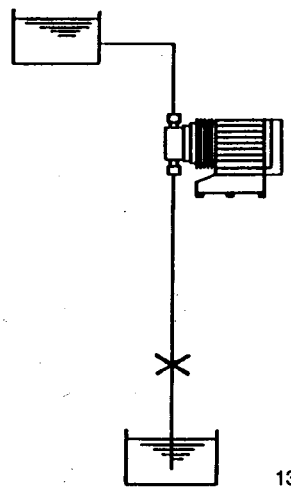



Düse/Nozzle/
Gicleur

1397/4

Wie nicht installiert werden sollte/Installations which are not recommended/
Installations déconseillées:

12.) Saugleitung zu hoch/
Suction lift too high/
Conduite d'aspiration trop haute



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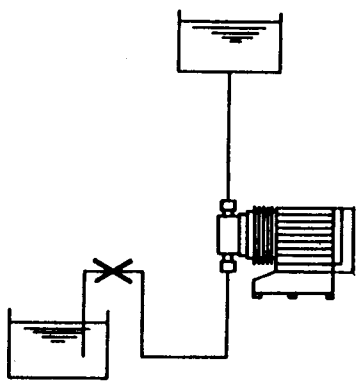
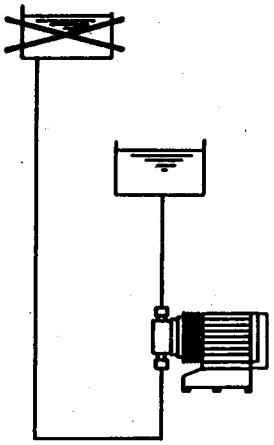
13.) Saugleitung nicht entlüftbar/
Suction pipe cannot be vented/
Conduite d'aspiration non purgeable



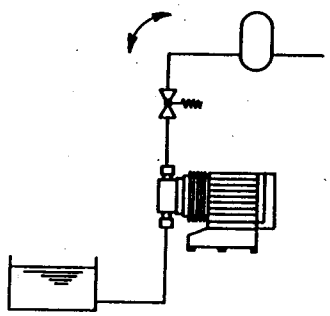
1399/4

14.) freier Durchlauf/
free outlet/Circulation libre



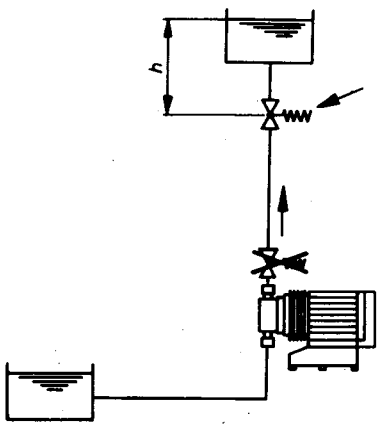
1400/4

15). Windkessel nicht wirksam/
Air chamber ineffective/
Réservoir à air inefficace



1401/4

16.) hier D-H-Ventil richtig (oder Dosierventil mit verstärkter Feder)
Correct locating of loading valve (or spring-loaded dosing valve with reinforced spring)/
ici: soupape de contre-pression bien installée (ou canne d'injection à ressort renforcé)




1402/4

Formel zur Berechnung der max. Flüssigkeitshöhe über einem installierten Druckhalteventil.
Formula for the calculation of max. medium level above the loading valve.
Règle à calcul du niveau du liquide max. de la clapet de contre-pression installée.

$$h_{max.} \leq \frac{P}{\varrho} \cdot 1{,}4 \text{ (m)}$$

P: Vorspanndruck am Druckhalteventil (bar)
(Öffnungsdruck von der Dosierpumpenseite)
initial pressure setted on loading valve (bar)
(opening pressure from dosing pump side)
Pression initiale à la clapet de contre-pression (bar)
(Pression d'ouverture de la côté de la pompe doseuse)

$\varrho$: Dichte des Mediums (kg/dm$^3$)
Density of medium
Densité du milieu