

Assembly manual
Drinking systems

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1 General information

1.1 Symbols

Upon reading this manual you will come across the following symbols, warnings and safety instructions:




	Warning against general dangers
	Warning against dangerous electric tension
	Warning against toxic substances
	Warning against coldness
	Warning against slippery surface

1.2 Special safety instructions

	Warning	This sign indicates risks possibly leading to severe injuries or death.
	Caution	This sign indicates risks or insecure procedures possibly leading to injuries or material damage.
	Note	This sign indicates notes leading to an effective, economic and environmentally-conscious handling of the installation.

1.3 Warnings and safety instructions

On your installations you will find the following pictographs. They indicate **functionally and technically remaining dangers** when handling the system and give information on how to avoid these dangers.

Pictograph ISO 11684	Meaning:
	<p>General danger !</p> <p>Installation startings working automatically. Before starting repair, maintenance or cleaning work, put main switch to "OFF".</p>
	<p>Danger due to rotating machine parts !</p> <p>Close protective devices before taking the system into operation.</p>
	<p>Danger due to operating auger, chain or cable discs !</p> <p>Never reach into or climb into a feed container while the motor is running.</p>

1.4 General safety instructions

The **Big Dutchman®** system may only be used according to its designated use.

Every other use is considered as non-designated use. The manufacturer does not accept liability for damages resulting from other uses, the user alone has to bear the risk.

The designated use also includes the exact following of the operation, maintenance and repair conditions as prescribed by the manufacturer.

All established safety precautions and other generally accepted safety regulations and medical references have to be followed.

Check safety and function control devices to ensure safe and accurate operation:

- before putting into operation
- at adequate time intervals
- after modifications or repairs.

Follow the directions of the electric and water supply company.

1.5 Electrical installations

All kind of work going beyond the maintenance scope of the equipment are to be carried out only by a specialist.

Carry out all kinds of work at the device with disconnected electric power supply cable. Check the electrical wiring and cables for recognisable damage before putting the device into operation.

Replace damaged wiring and cables, before that, do not take the device into operation again.

Let damaged or broken plugs be replaced by an electrician.

Do not pull the plug from a socket at the flexible cable.

Covering electrical motors can cause high temperatures so that fire results and the working means can break down.

1.6 Maintenance



Before working on the electrical installation always disconnect power supply!

Repairs may only be carried out by persons who are competent and can guarantee a proper repair because of special training or their knowledge and practical experiences with the unit.

Repair, maintenance and cleaning operations as well as the removal of functional disorders may generally only be carried out when the drive is turned off and the motor is in a standstill.

Only work with appropriate tools; in case of possible danger to hands, use protective gloves.

After the assembly, the user has to check the proper functioning of the unit or machine. He may only take the device into operation, when all protective systems have been put into place again.

Spare parts have at least to correspond to the technical requirements fixed by the producer of the device. This requirement can be met for example by original spare parts.

1.7 Ordering spare parts



You can find the exact description of the parts for ordering spare parts by means of the pos. no. in the spare parts list.

Indicate the following for ordering spare parts:

- Code No. and description of the spare part or
Pos. No. with description and manual no. in case of parts that are not encoded
- Invoice No. of original invoice
- Current supply, e.g. 220/380V - 3 Ph. - 50 Hz.

1.8 Liability

The manufacturer is not responsible for any damages of the machine resulting from unauthorised changes done by the user.

1.9 Disorders due to power failure

We recommend the installation of warning systems for a better control of your production units. By this, you protect the birds and thus your own economical health.

In case of power failure, an emergency power-generating set should automatically supply the system with power.

Emergency power units with universal transmission for connection to a tractor are also suitable. For further information please contact your property insurance.

1.10 First aid

For the case of an accident, unless specified otherwise, a first-aid kit must always be available at the place of work. Material taken out and used is to be replaced immediately.

If you need help, describe the accident as follows:

- where it happened
- what happened
- the number of persons injured

- what danger of injury
- who is passing the message ! (your data)

1.11 Waste disposal

After finishing the assembly of this installation, dispose of the packing material and remains which do not need to be further used according to the legal provisions for recycling.

After putting out of action of the installation, dispose of the component parts according to the legal provisions for recycling.

1.12 Copyright

This manual is subject to copyright. The information and drawings included in this manual shall not be copied without the manufacturer's consent, nor shall it be used for anything other than the designated use. It shall also not be given to third parties.

The contents of this manual can be altered without prior notice.

If you find mistakes or unclear information in this manual, please do not hesitate to let us know.

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2 Introduction

2.1 System description

Besides an adequate feed supply, the provision of fresh, clean drinking water is extremely important for birds. To achieve this, a reliable water supply must be available. It has to be free from contamination and within easy reach of the animals.

Big Dutchman satisfies all these requirements - offering a wide range of drinking systems with modern nipple drinkers or round drinkers for pullets and layers, broilers and breeders.

The suspended or standing nipple drinkers can easily be winched up to the ceiling. This considerably simplifies housing the birds.

The **Big Dutchman** nipple drinking system consists of:

- pressure control unit or ball tank with or without rinsing system
- nipple tube with Super-, Super-Combi-, screw nipples 50 or 100 ml/min or DOS- nipples
- swivelling aeration with water level indicator
- suspension system
- anti-roost wire

drinker accessories with:

- connecting unit with water meter
- medicator
- medication mixing tank

Besides nipple drinkers, **Big Dutchman** also offers the Jumbo-B (broilers), Jumbo-T (turkeys) and Jumbo-J (junior) round drinkers.

These round drinkers may be installed in either standing or suspended positions, thus making them suitable for both small and large birds.

Due to the small jet of water running alongside the bell, it stays clean and water cannot project over the edge of the pan.

Moreover, chick drinkers (chick founts) and the Mini Master poultry drinker can be used with or without connecting material.

2.2 Special safety instructions

The **Big Dutchman** nipple drinkers and round drinkers are only to be used for the normal operation of water supply to chicks, pullets and layers in poultry management.

Every other use is considered as nondesignated use. The manufacturer does not accept liability for damages resulting from other uses, the user alone has to bear the risk.

During their operation, the **Big Dutchman** drinkers with accessories create a sound level <70 dB (A).

3 Planning aids

3.1 Water consumption of poultry and required rate of flow in relation to feed consumption and increasing ambient temperature

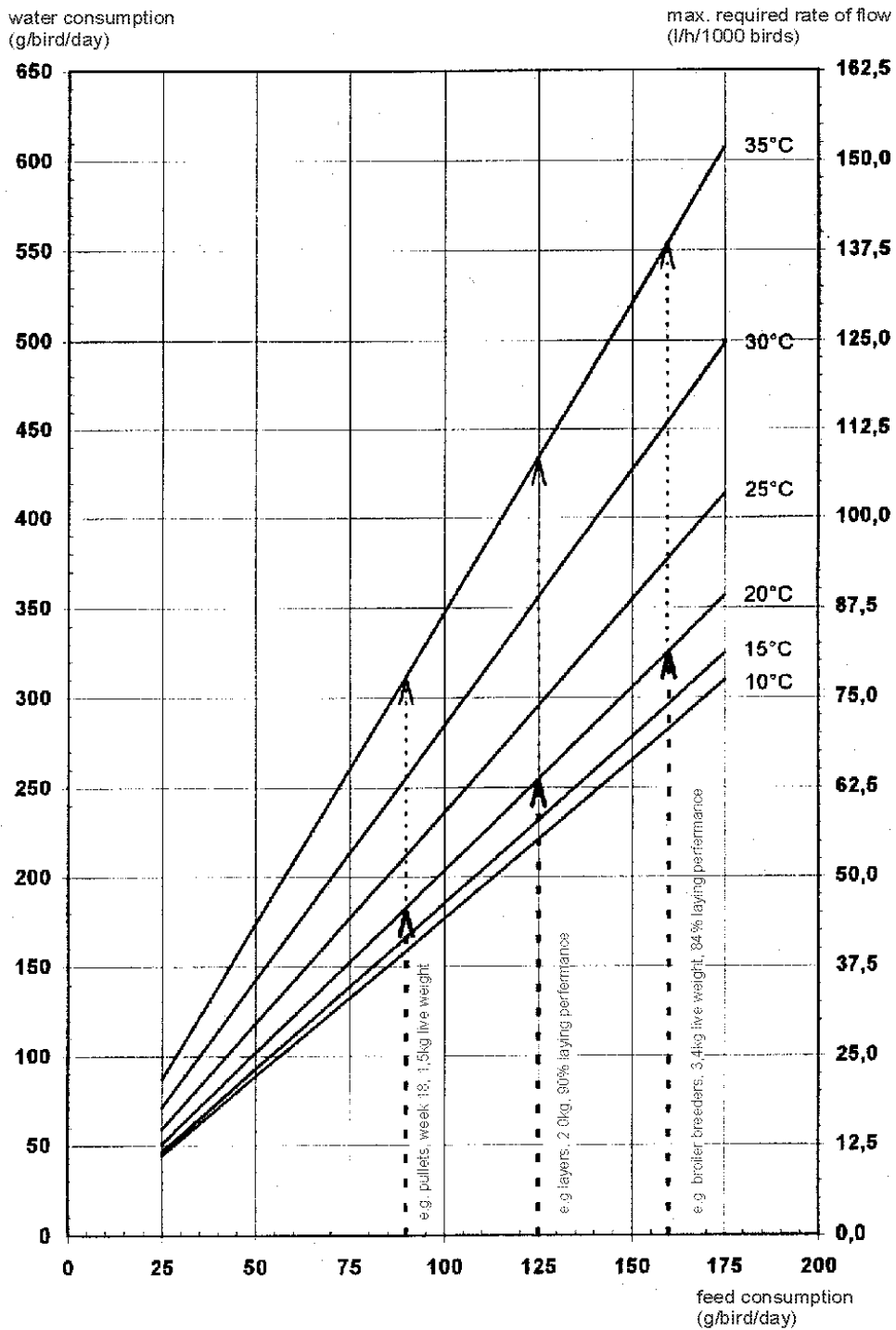


Figure 3-1:Explom706d142

3.2 Water consumption of poultry and required rate of flow in relation to feed consumption and increased house temperature for broilers

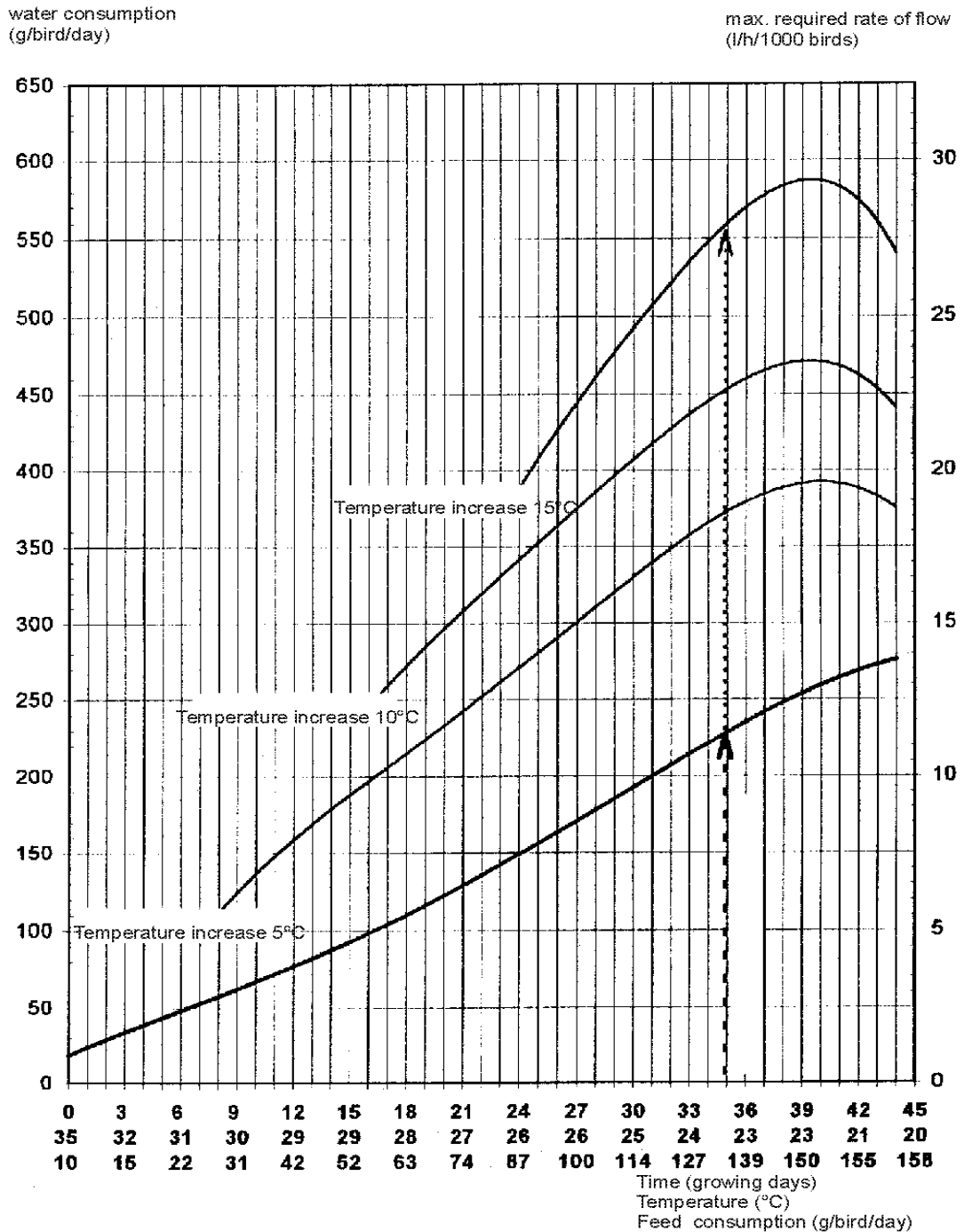

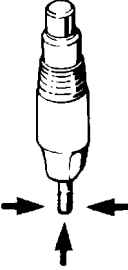





Figure 3-2:Explom706d142a

3.3 Survey drinking nipples for floor management

 <p>1 = 30 00 3411 DOS nipple without gasket 2 = 30 00 3407 Gasket for plug-in and DOS-nipple</p>	 <p>30 00 3412 Super nipple L4002</p>	 <p>30 00 3413 Super-Combi- nipple L4004</p>	 <p>30 00 3107 Screw nipple 50 ml/min L4071</p>	 <p>30 00 1026 Screw nipple 100 ml/min L4001</p>
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3.4 Recommended number of birds per nipple

<p>1 DOS nipple for approx. 12-15 broilers or 12-15 pullets</p>	<p>1 Super nipple for approx. 20-25 broilers or 25-30* rearing ducks up to 3rd week or 8-12 finishing ducks up to 6th-7th week or 12-16 pullets or 10* broiler breeders 0-18 weeks</p>	<p>1 Super- Combi nipple for approx. 20-25 broilers or 12-16 pullets</p>	<p>1 screw nipple 50 ml/min for approx. 8-10 laying hens</p>	<p>1 screw nipple 100 ml/min for approx. 10* broiler breeders (for single phase management week 0-64 or in the mere production phase 18th-64th week)</p>
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* For rearing, starter cups are required for the first 5 days (120-150 birds/starter cup).

For heavy birds, the number of birds per nipple has to be reduced proportionally.


3.5 Number of drinker lines per house

	Generally install one drinker line more than feeding lines.
---	---

For layers and breeders one drinker line per 5 to 7 m house width.

For broilers one drinker line per 2.5 to 3.5 m house width.

3.6 Water supply per line

	From a certain length of drinker line and a certain number of drinking nipples onwards it can be necessary that water is supplied from the centre of the drinker line.
---	--

For broiler / duck growing for more than

- 300 Super nipples or
- 300 Super-Combi nipples or
- 450 DOS-nipples.

For layer management for more than

- 300 screw nipples 50.

For broiler breeder management for more than
breeders or

- 100 Super nipples for rearing broiler breeders or
- 100 screw nipples 100 for broiler

breeders 0-64 weeks

- 100 screw nipples 100 for broiler

breeders week 18 to 64

water has to be supplied from the centre of the drinker line.

e.g.: house length 100 m

nipple tube 3 m with 15 Super nipples, nipple tube with 9 Super nipples

house length 100 m: length of nipple tube 3 m = 33.3 nipple tubes x 15 nipples/nipple tube = approx. 510 nipples: 300 nipples/water supply = 1.7 = 1 central pressure regulator or ball tank with 2 outlets.

house length 100 m: length of nipple tube 3 m = 33.3 nipple tubes x 9 nipples/nipple tube = approx. 300 nipples: 300 nipples/water supply = 1 pressure regulator or ball tank.

3.7 Evaluating the lifting load for suspended nipple drinkers

nipple drinker 3 m incl. aluminium profile and water: 3.6 kg/pc

If load halving is used, only half of the evaluated total weight has to be considered for selecting the cable winch.

3.8 Most important data of round drinkers and their use

Description	Jumbo-T 30 03 3170	Jumbo-B 30 03 3100	Jumbo-J 30 03 3180
Diametre (mm)	480	400	370
Height (mm)	650	640	280
Weight without ballast in kg			
Contents ballast tank in ltr.	1.9	1.75	1.1
Min. working pressure in bar	7	7	5
Max. working pressure in bar	0.2	0.2	0.2
Optimum water level in the channel in mm	0.5	0.5	0.5
	10-20	10-20	10-20
Recommended no. of birds/drinker:			
Turkeys 2 to 25 kg	80-120	-	-
Turkeys 0 to 10 kg	-	80-100	-
Broiler breeders	-	100-150	-
Layers and broilers	-	100-150	100-150
Day-old chicks	-	300*	300

* only with Jumbo-B chick ring Code No. 30 03 3129

For heavy birds and in hot climate zones the number of birds/drinker has to be reduced proportionally.

3.9 Planning aid for evaluating the total lifting load for suspended lines:

- Jumbo-(J)unior round drinker incl. ballast weight: 6.1 kg/pc.
- Jumbo-(B)roiler round drinker incl. ballast weight: 8.8 kg/pc.
- Jumbo-(T)urkey round drinker incl. ballast weight: 8.9 kg/pc.

If load halving is used, only half of the evaluated total weight has to be considered for selecting the cable winch.

4 Tooling

For the assembly of the water supply we recommend using the following tools:

- 1(each) cross head screw driver size 2 and 3
- 1 (each) open-ended / ring / socket spanner 8 mm, 10 mm, 13 mm
- 1 (each) open-ended / ring spanner 17 mm and 19 mm
- 1 pair of combination pliers
- 1 pair of side cutters and pair of bolt cutters
- 1 pair of pincers
- 1 (each) sledge hammer 500 g and 250 g
- 1 electric drilling machine (manually operated)
- 1 electric disk grinder
- 1 (each) twist drill dia 6, 8, and 10 mm
- 1 spirit level
- 1 metal cutting saw
- 1 paint brush
- 1 vise-grip wrench 250 - 350 mm long
- 1 electric screwdriver with fittings for hex. head screws M5, M6, M8
- 1 set of hand radiotelephony devices
- 1 plate (hand cutting) shears for nipple pipes

5 Notes for mounting

Do not put these instructions aside before reading them. Even if you have already installed similar systems, there may always be things and alterations you do not yet know. Being properly informed will help you to avoid unnecessary work, troubles and abnormal expenses.

The instructions, facts and data contained in this manual have been compiled to cover the various existing versions of water supply systems.

We therefore request you to select and apply those paragraphs of this manual that are in relation to your specific installation.

5.1 Explanation on the lay-out of the assembly instructions

In the table of contents you can find and select the subjects to be treated. The instructions are compiled in a chronological order.

The position numbers used in the text refer to the position of the parts in the drawings and exploded views.

In the mounting instructions the parts are marked with position numbers and an abbreviated description. They also appear, together with the code number and the name, in the parts list.

Upon ordering spare parts, please indicate the following:

- Code No. and description of spare part
- Invoice No. of the original delivery
- For electric articles: current supply, e.g. 20/380 V-3 ph.-50 Hz

5.2 Before starting to erect the system

Before starting to erect the system, check whether:

- house dimensions, installation drawing and order are corresponding to one another,
- the ventilation, the watering and the lighting system in the house are completely installed.

6 Installing the main water connection



Install the main water connection at the place predetermined by the planning documentation.

Consider the regulations of the water and electricity supply plants.

Clean all parts to be glued by means of Tangit.

6.1 Main water connection for low pressure (p=0.3 to 1.5 bar)

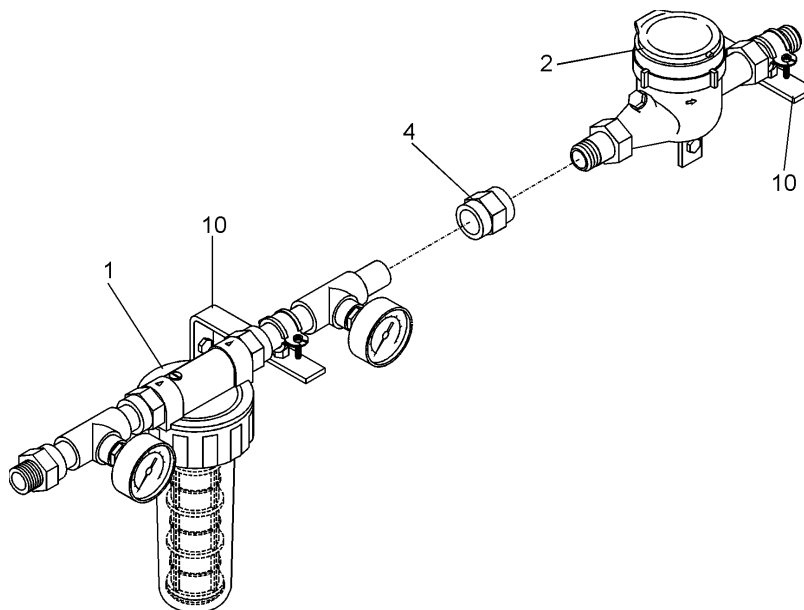


Figure 6-3:Explo M706D100

Pos.	Code-No.	Designation
1	30 62 3601	Water filter 3/4" stand. connect.material PVC+manometer
2	30 00 3450	Water-meter wo/contact 3/4"20-7000L/hMN-RQn2,5
3	30 62 3608	Connection set for connection unit 3/4" required for the connection of water filter, water meter and pressure reducer, consisting of:
4	99 40 3961	Adaptor socket 25 x 3/4"PVC
5	90 40 3965	Pocket 25mm PVC
6	30 00 3846	Sealing strip 12m for thread
7	99 50 3760	Glue Tangit 0,125 kg tube
8	99 40 4009	Socket 3/4" PVC
9	30 62 3611	Cleaner Tangit 125ml
10	30 00 3660	Bracket for connection-unit 3/4" cpl

6.2 Main water connection for high pressure (p=1.5 to 6 bar)

6.2.1 Version with water filter, water meter and pressure reducer

Minimum version without using a medicator

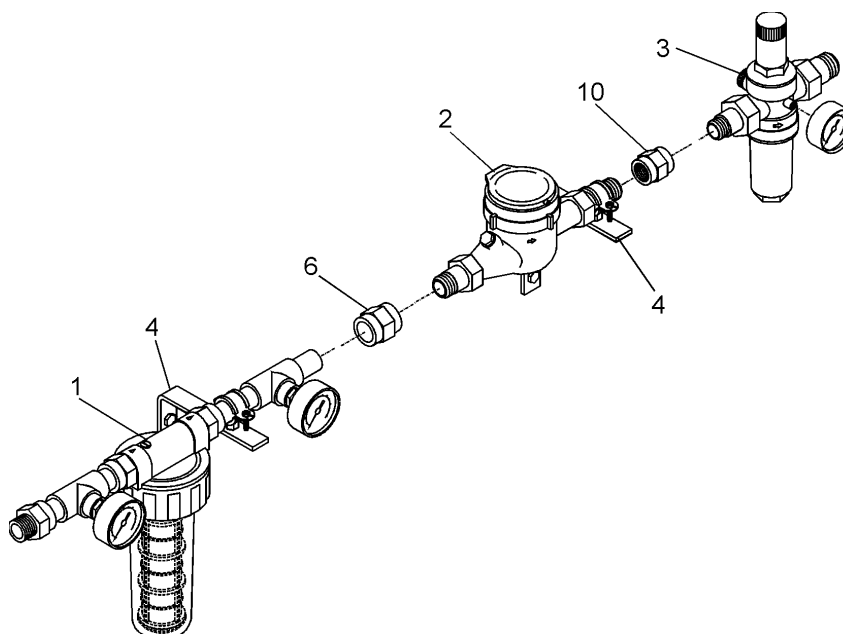


Figure 6-4:Explo M706D101

Pos.	Code-No.	Designation
1	30 62 3601	Water filter 3/4" stand with connect. material PVC + manometer
2	30 00 3450	Water-meter wo/contact 3/4" 20-7000L/h MN-R Qn 2,5
3	30 62 3604	Pressure red. + filter cpl FK06 3/4" AA/1.5-6 bar incl. manometer
4	30 00 3660	Bracket for connection unit 3/4" cpl
5	30 62 3608	Connection set for connection-unit 3/4" required for the connection of water filter, water meter and pressure reducer, consisting of:
6	99 40 3961	Adaptor socket 25 x 3/4"PVC
7	99 40 3965	Socket 25mm PVC
8	30 00 3846	Sealing strip 12m for thread
9	99 50 3760	Glue Tangit 0,125 kg tube
10	99 40 4009	Socket 3/4" PVC
11	30 62 3611	Cleaner Tangit 125ml

6.2.2 Connection unit 3/4" PVC standard mechanic 20-2000 l/h

Maximum version for using a medicator

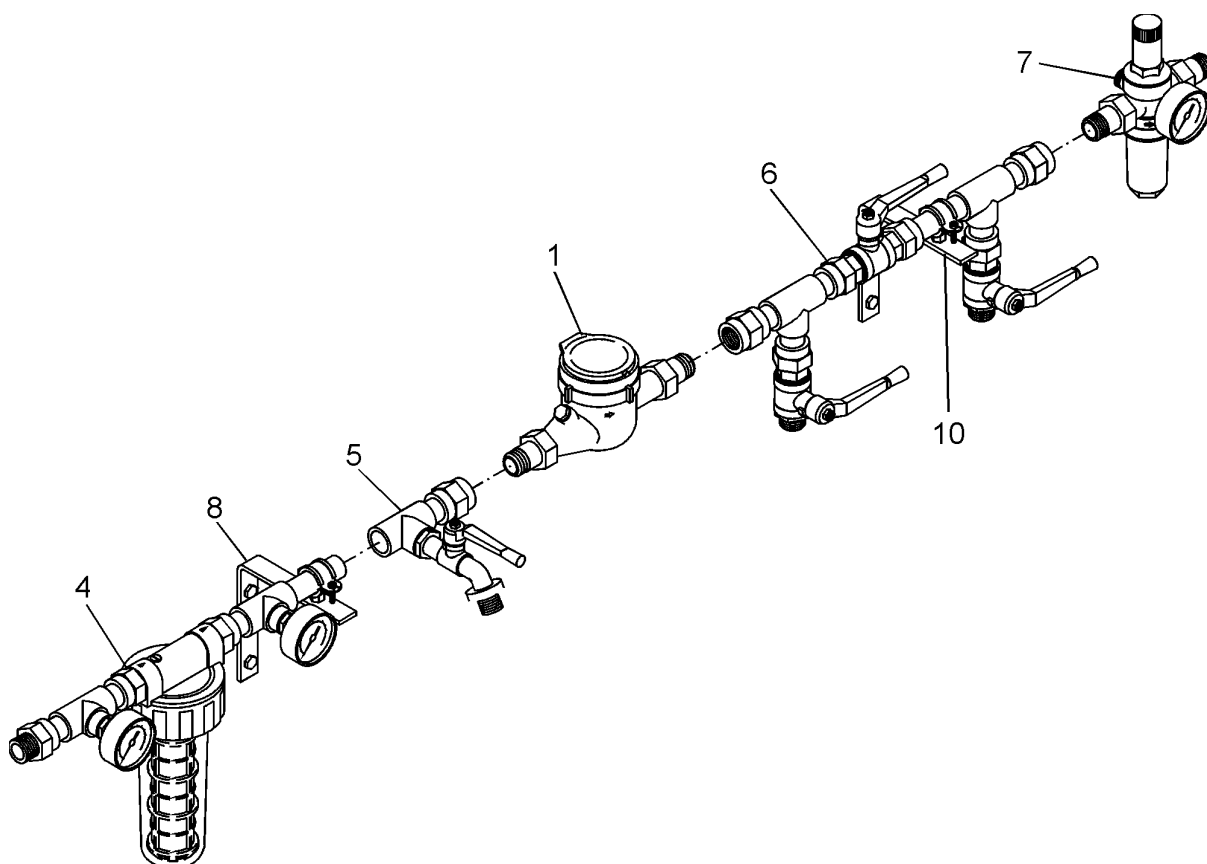


Figure 6-5:Explo M706D103

Pos.	Code-No.	Designation
	30 62 3600	Connection-unit 3/4" PVC standard mechanic 20-2000l/h
1	30 00 3450	Water-meter wo/contact 3/4" 20-7000L/h MN-R Qn 2,5
2	99 50 3760	Glue Tangit 0,125 kg tube
3	30 00 3846	Sealing strip 12m for thread
4	30 62 3601	Water filter 3/4" stand. with connect.material PVC+manometer
5	30 62 3602	Ball valve 3/4" w/connection material PVC
6	30 62 3603	By-pass cpl 3/4" w/connection PVC for medicator
7	30 62 3604	Pressure red.+filter cpl FK06 3/4"AA/1,5-6bar incl.manometer
8	30 00 3660	Bracket for connection-unit 3/4" cpl

6.2.3 Connection unit 3/4" PVC standard electronic 12-2000 l/h

Maximum version for using a medicator

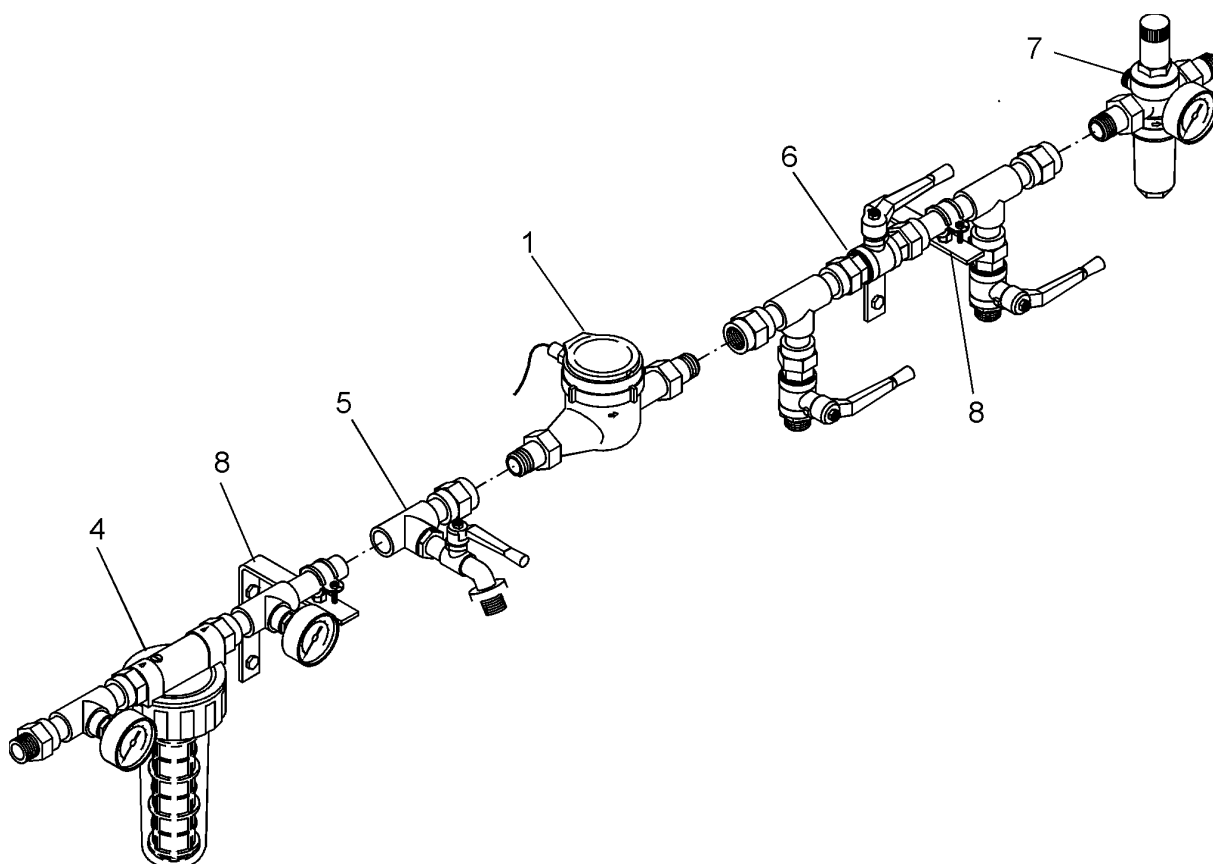


Figure 6-6:Explo M706D102

Pos.	Code-No.	Designation
	30 62 3610	Connection-unit 3/4" PVC standard electronic 12-2000l/h
1	30 00 3482	Water-meter w/contact 3/4" 12-3000L/h KVM Qn 1,5 1L/K
2	99 50 3760	Glue Tangit 0,125 kg tube
3	30 00 3846	Sealing strip 12m for thread
4	30 62 3601	Water filter 3/4" stand. with connect.material PVC+manometer
5	30 62 3602	Ball valve 3/4" w/connection material PVC
6	30 62 3603	By-pass cpl 3/4" w/connection PVC for medicator
7	30 62 3604	Pressure red.+filtre cpl FK06 3/4"AA/1,5-6bar incl.manometer
8	30 00 3660	Bracket for connection-unit 3/4" cpl

6.2.4 Connection unit 3/4" PVC special mechanic 20-2000 l/h

Maximum version for using a medicator

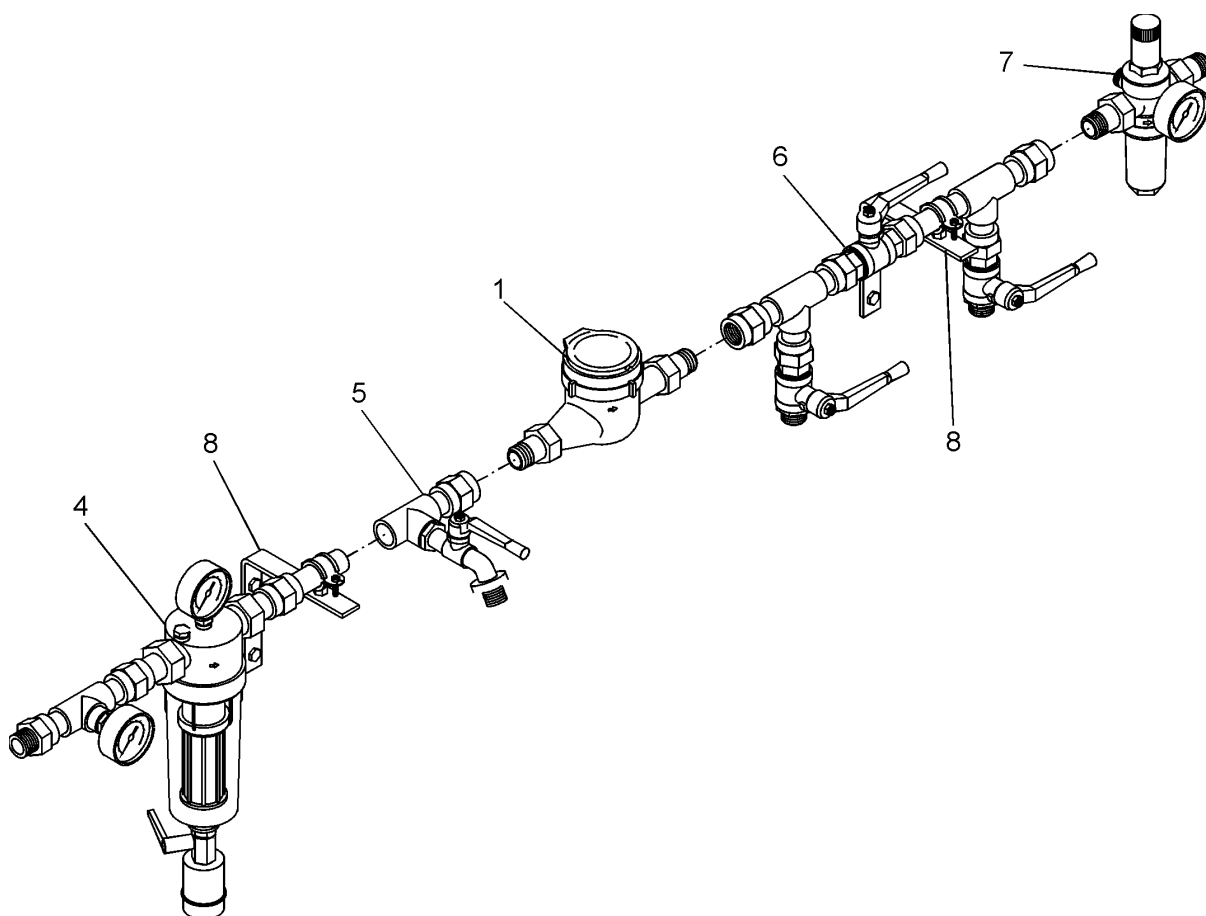


Figure 6-7:Explo M706D104

Pos.	Code-No.	Designation
	30 62 3620	Connection-unit 3/4" PVC special mechanic 20-2000l/h
1	30 00 3450	Water-meter wo/contact 3/4" 20-7000L/h MN-R Qn 2,5
2	99 50 3760	Glue Tangit 0,125 kg tube
3	30 00 3846	Sealing strip 12m for thread
4	30 62 3621	Water filter 3/4" revers.flow+ connect.material PVC+manometer
5	30 62 3602	Ball valve 3/4" w/connection material PVC
6	30 62 3603	By-pass cpl 3/4" w/connection PVC for medicator
7	30 62 3604	Pressure red.+filter cpl FK06 3/4"AA/1,5-6bar incl.manometer
8	30 00 3660	Bracket for connection-unit 3/4" cpl

6.2.5 Connection unit 3/4" PVC special electronic 12-2000 l/h

Maximum version for using a medicator

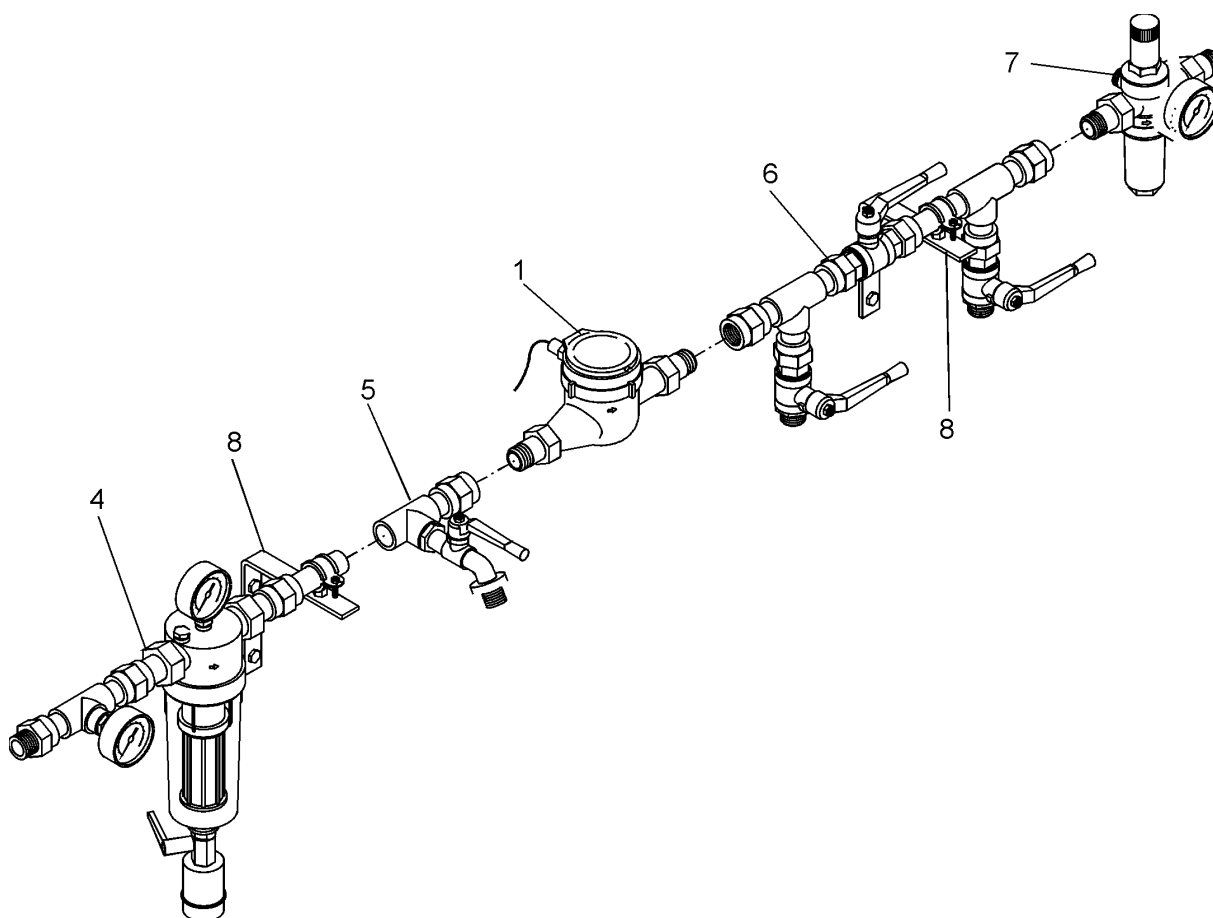
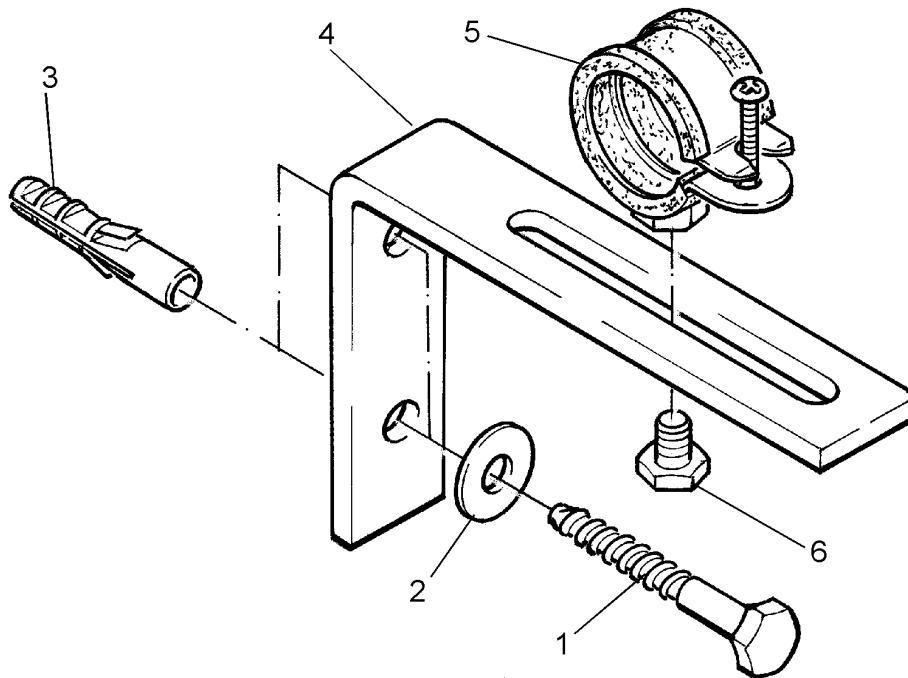


Figure 6-8:Explo M706D105

Pos.	Code-No.	Designation
	30 62 3630	Connection-unit 3/4" PVC special electronic 12-2000l/h
1	30 00 3482	Water-meter w/contact 3/4" 12-3000L/h KVM Qn 1,5 1L/K
2	99 50 3760	Glue Tangit 0,125 kg tube
3	30 00 3846	Sealing strip 12m for thread
4	30 62 3621	Water filter 3/4" revers.flow+ connect.material PVC+manometer
5	30 62 3602	Ball valve 3/4" w/connection material PVC
6	30 62 3603	By-pass cpl 3/4" w/connection PVC for medicator
7	30 62 3604	Pressure red.+filter cpl FK06 3/4"AA/1,5-6bar incl.manometer
8	30 00 3660	Bracket for connection-unit 3/4" cpl

6.2.6 Bracket for connection unit 3/4" cpl.



Pos.	Code-No.	Designation
	30 00 3660	Bracket for connection-unit 3/4" cpl
1	99 10 3733	Hexagon wood screw 8x 60 DIN 571-ST galv
2	37 80 2011	Washer flat A 8,4 DIN 9021 galv
3	99 98 3784	Dowel S 10
4	20 50 3716	Angle bracket galv f/1tube
5	99 50 3035	Pipe clamp 3/4" 25-30mm M8 galv
6	99 10 1143	Hexagon head screw M 8x 10 DIN 558 galv

6.3 Medicator with connection material 3/4"

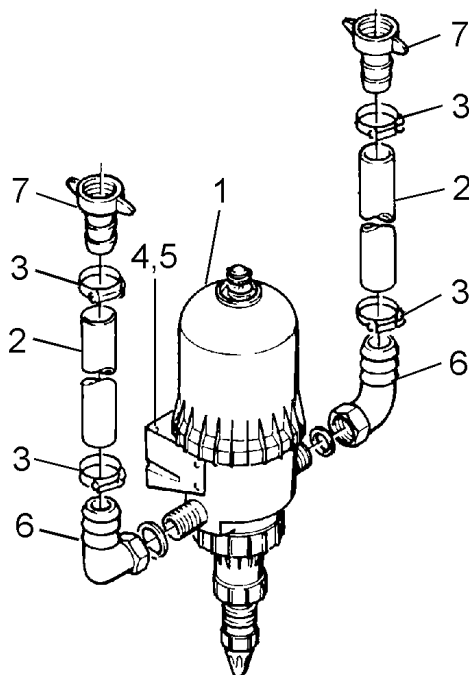


Figure 6-9:Explo706d128

Pos.	Code-No.	Designation
	30 61 3001	Medicator 10-2500L/h 2‰-1,6‰ w/conn. material 3/4"
	30 61 3002	Medicator 10-2500L/h 1‰-5‰ w/connection material 3/4"
1	30 61 3040	Medicator 10-2500L/h 2‰-1,6‰ 0,30-6,00 bar
	30 61 3045	Medicator 10-2500L/h 1‰-5‰ 0,30-6,00 bar
2	30 00 3051	Hose high pressure 3/4"
3	30 00 3709	Hose band clip 3/4" 20- 32
4	99 98 3781	Dowel S 8
5	99 10 3716	Hexagon wood screw 6x 40 DIN 571-ST galv
6	30 00 3077	Bend 3/4"fmx20mm PA
7	30 00 3122	Hose union 3/4"x19 brs flat

6.3.1 Assembling the medicator

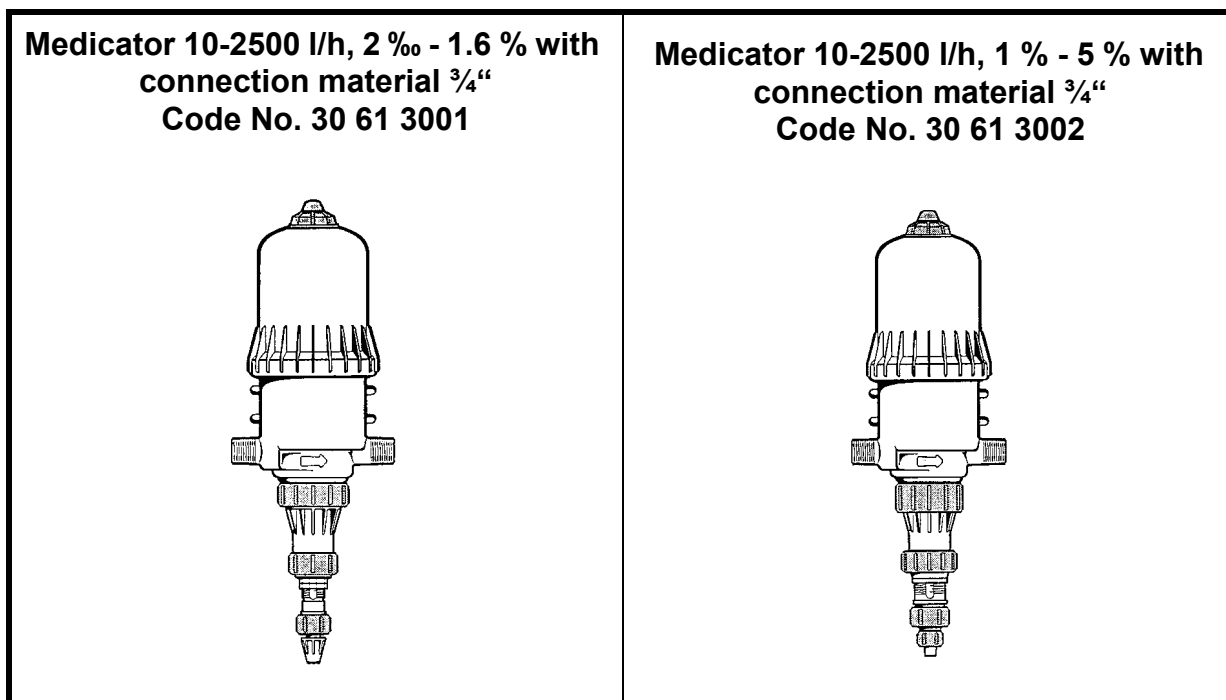


Figure 6-10:Explom706d125a+b

The **Big Dutchman** medicator is installed in the water pipe and meters the desired vitamins or medicine into the birds' drinking water.

The quantity to be metered can be adjusted very accurately and the preparations are adjusted pro-rata to the water consumption.

Please refer to the users' guide enclosed with each medicator.

- Fix the wall bracket at the predetermined place by means of dowels S 8 and hexagon wood screws M 6x40.
99 98 3781 Dowel S 8
99 10 3716 Hexagon wood screw 6x40 DIN 571-ST galv.
- Put the medicator into the wall bracket.
- Connect the medicator to the pressure regulating unit according to the instructions.



See to it that all protective covers are removed from the water connection units and from the medicine supply line.

6.4 Medicine mixer

Medicines can be mixed either manually in an appropriate medicine mixing tank or by means of the **Big Dutchman** mixing tank for medicine 60 l with lye pump.

The mixing tank for medicine 60 l with lye pump is used to avoid separating of the mixed preparations.

The lye pump used ensures thorough mixing in interval operation without destroying the recipes, vaccines and vitamins by heating.

The integrated float valve ensures the complete consumption of the medicines and for automatic rinsing of the medicator after medication has been finished.

The quantity of water is supplied by means of the branch for filling (D). As soon as the target quantity is reached, the supply hose is changed to fit the connection with float valve (C).

The medicine liquid is sucked into the pressure water line pro rata by means of the existing Dosatron medicator. The cover of the mixing tank for medicine has an opening fitting planned for the suction hose from the existing Dosatron medicator.

As soon as the quantity of medicine has been sucked off, fresh water automatically follows via the connection with float valve (C) and cleans the mixing tank for medicines and the Dosatron medicator.

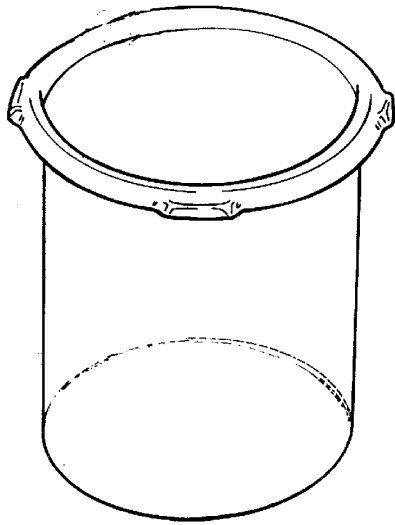


Figure 6-11:explom706d113
Mixing tank for medicines

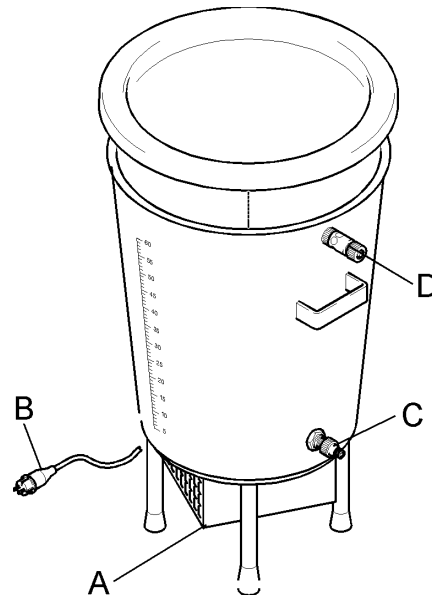


Figure 6-12:explom706d114
**Mixing tank for medicines 60 l
 with lye pump**

Pos.	Code-No.	Designation
	30 61 3105	Mixing tank for medicines 60 l with lye pump
A		Lye pump 220V-50Hz
B		Electric supply with interval switch
C		Supply with float valve
D		Supply for filling

Pos.	Code-No.	Designation
	30 61 3105	Mixing tank for medicines 60 l with lye pump
1		Tank 75 l 042 120 01 01 NPE
2		Cover 040 120 05 01 NPE
3		Stand 042 100 01 00
4		Centrifugal pump NDP 35/3 48 03 001
5		Cable end sleeve 1mm ² 52 01 001
6		Pump cover 042 120 13 01
7	30 00 3775	Backnut 1/2" PVC
8		Outlet 3/4" angular 90° 4209
9		Flat nut 3/4" brs 6320
10		Angle 90° 4343
11		Packing ring 3/4" outside thread 4212
12		Float valve 4204
13		Packing ring 1/2" outside thread 4214
14		Gardena Cock 1/2" 42 50 021
15		Gardena Cock 3/4" 42 50 041
16		Gardena Water stop 42 50 026
17		Hose coupler 100 mm 003 2 009 0
18		Worm drive hose clip 20-32 40 11 407
19		Scale 60 l 63 60 005
20		Connection to earth standard 51 85 001
21		Hex. head screw M 5x8 DIN 933 21 56 046
22		Washer B 5,3 DIN 125 26 02 108
23		Screwed cable gland PG 9 51 70 002
24		Backnut PG 9 DIN 46320 51 71 002
25		Schuko-Plug 51 40 002
26		Sheet metal screw BZ 6,3x19 DIN 7976 21 79 035
27	99 50 1147	Washer B 6,4 DIN 125 26 02 109
28		Hex. head screw M 6x10 DIN 933 21 56 066
29		Crimp type socket 52 02 001
30		Receptacle for tabs 52 03 001
31		Cap for tube 70 50 227

Mixing tank for medicines 60 l with lye pump

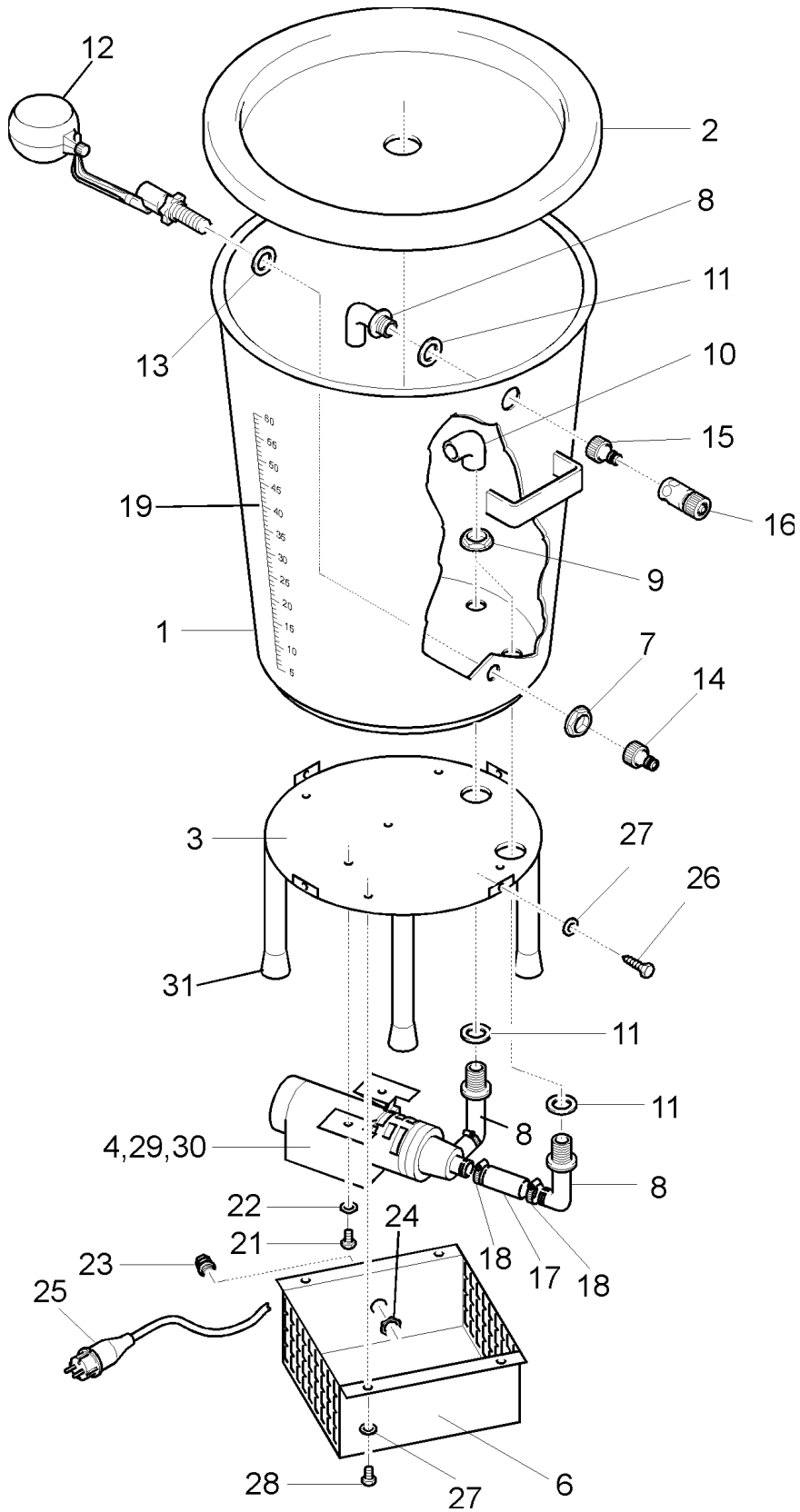
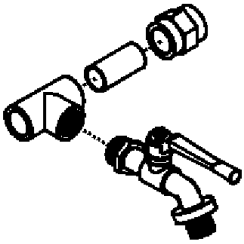
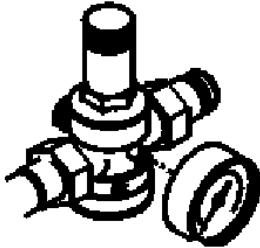
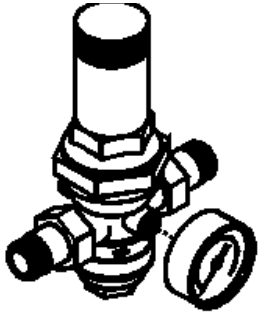


Figure 6-13:explom706d115

6.5 Accessories for water connection unit

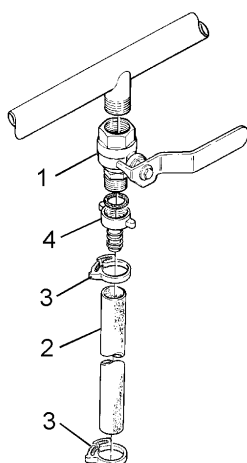
<p>Code No. 30 62 3602</p> <p>Ball valve 3/4" with connection material PVC</p> <p>required in connection with the medicator or, if desired, also additionally as outlet valve</p>	
<p>Code No. 30 62 3605</p> <p>Pressure reducer D06F 3/4" A 1,5-6bar incl. manometer</p> <p>(for regular pressure and as series connected unit for the high pressure area).</p> <p>Alternative to 30 62 3604, if a medicator is not used.</p>	
<p>Code No. 30 62 3606</p> <p>Pressure reducer D06FN 3/4" A 0,5-2 bar incl. manometer</p> <p>(for the low pressure area).</p>	

7 Assembling the hose connecting set 1/2"




The hose connecting set 1/2" is mounted after the assembly of the drinking lines for the connection to the water supply.

- Determine the distance between the pressure regulator resp. the ball tank with one or two supplies and the water supply (distance < 4 m). Cut the hose - high pressure 1/2" (2) to the determined measure.
- Fasten a hose union 1/2" brs 2/3 flat (4) at one end of the hose - high pressure 1/2" (2) by means of a hose band clip nylon 17x20,6 (3).
- Fasten the ball valve 1/2" m/fm brs (1) to the water supply.
- Fasten the hose - high pressure 1/2" (2) to the ball valve 1/2" m/fm brs (1) by means of the hose union 1/2" brs 2/3 flat (4).
- Fasten the other end of the hose - high pressure 1/2" (2) to the pressure regulator resp. the ball tank with a hose band clip nylon 17x20,6 (3).





Pos.	Code-No.	Designation
	30 61 3472	Hose-connecting-set 1/2" for pressure regulator or balltank
1	20 50 3472	Ball valve 1/2" m/fm brs
2	30 00 3059	Hose high pressure 1/2"
3	30 61 3466	Hose band clip nylon 17x20,6
4	30 00 3035	Hose union 1/2"x12 brs flat

8 Mounting of suspended nipple drinker

	If your planning includes several lines, mount the outer lines first. Work in inward direction so that the adjacent areas can be used to store the material whilst you are working.
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- At first determine the number of nipple drinker lines according to project drawing.
- Mark these distances at the gable walls or onto the house floor.

	<p>Before mounting the complete nipple drinker you should pre-mount the individual elements. For this purpose, you will need a suitable working table where you can pre-mount the 3 m elements.</p> <p>The nipple pipes must be treated carefully. Inexpert mounting may cause leaky nipples.</p> <p>It is indispensable to carry out mounting free of dust and dirt.</p>
	Never saw off a nipple pipe, but use the cutting plier Code-No. 99 98 3801 to shorten the pipe.

Before mounting the suspended nipple drinker, firstly mount the suspension system in the house. See manual 'Suspension Systems' M1011GB or M717GB.

- The main wire rope (12) ends up before the third from last pulley (13). See Explom 706d176, detail A.
- Cut the rope Perlon 3 mm (11) to size (house floor to height of main wire rope, 3.5 m max.). Add 3 m resp. 6 m of the rope Perlon PP 3 mm (11) for each of the last two suspensions of a drinking line. See Explom 706d176, details B + C.
Heat (fuse together) the ends of the rope Perlon 3 mm (11), e.g. with a lighter, to prevent them from fanning out.
- Suspend in every suspension hook of the suspension system a plastic pulley 1 7/8" (13). See to it that the suspension hooks are mounted alternately on both sides of the main wire rope 4mm (12). See Explom 706d176.
- Fasten a rope Perlon 3 mm (11) in the direction of pull of the main wire rope 4mm (12) with a cable clamp 5 mm (15).

- Clamp - if existing - the drip cups with 1 arm (1) at the nipple pipes (2). See Explom706d132abc, detail A.
- Connect one nipple pipe 3 m (2) and one alu-profile for drinker 3 m (4) each with 4 clips for nipple pipe (5). The two outer clips for nipple pipe (5) must be mounted with a distance of approx. 30 cm to the end of the nipple pipe 3 m (2). The intermediate distances of the other two clips for nipple pipe (5) are approx. 80 cm. See Explom706d132, 133, 145, 146.
It is possible to displace the clips for nipple pipe (5).
- Screw two coupler-halves for alu-profile (6) at one end of the alu-profile for drinker 3 m (4) using hexagon head screws M 6 x 12 (7) and hexagon nuts M 6 (8). Do **not** drive the screws home.
- At the same end, push a coupler cpl. for nipple pipe - laying (3) onto the nipple pipe 3 m (2).
- Distribute all the pre-mounted elements to the suspension points in the house. At the beginning and the end of a line, no coupler-halves for alu-profile (6) and no couplers cpl. for nipple pipe - laying (3) are required.



The pressure regulator unit with flushing system, the ball tank with flushing system and the breather cpl. are delivered ready to be mounted. Any disassembling or other repair works must only be carried out by skilled persons.

With long drinking lines, the water is supplied from the middle of the drinking line. In this case, start mounting with the pressure regulator unit resp. the ball tank in the middle of the drinking line.

- Screw the pressure regulator (10) with bracket (Z) into the existing bore holes of the alu-profile for drinker 3 m (4) using two hexagon head screws M 6x12 (7), hexagon nuts M6 (8) and washers B 6.4 (9) at the side of the water supply resp. in the middle of the drinking line.
If an alu-profile for drinker 3 m (4) must be shortened, new bore holes \varnothing 7 mm must be made.
- Apply a lubricant (vaseline, acid-free fat, washing-up liquid) to the O-rings (X) of the transition piece (Y) of the pressure regulator (10).

- Put a nipple pipe (2) into the transition piece (Y) of the pressure regulator (10). If the first or last nipple pipe (2) of a line must be shortened, use the cutting plier to shorten them.
- Screw the ball tank with flushing system (10) into the existing bore holes of the alu-profile for drinker 3 m (4) using two hexagon head screws M 6x20 (20), hexagon nuts M6 (8) and washers B 6.4 (9) at the side of the water supply resp. in the middle of the drinking line.

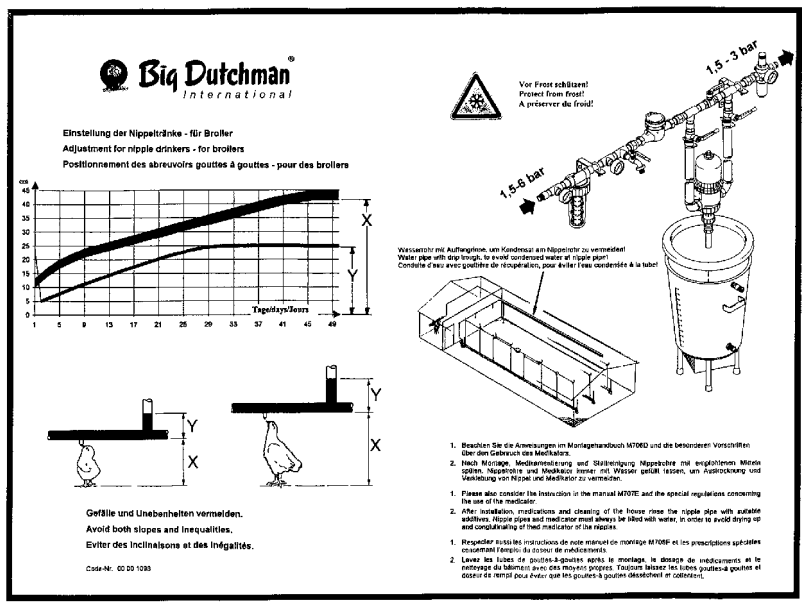
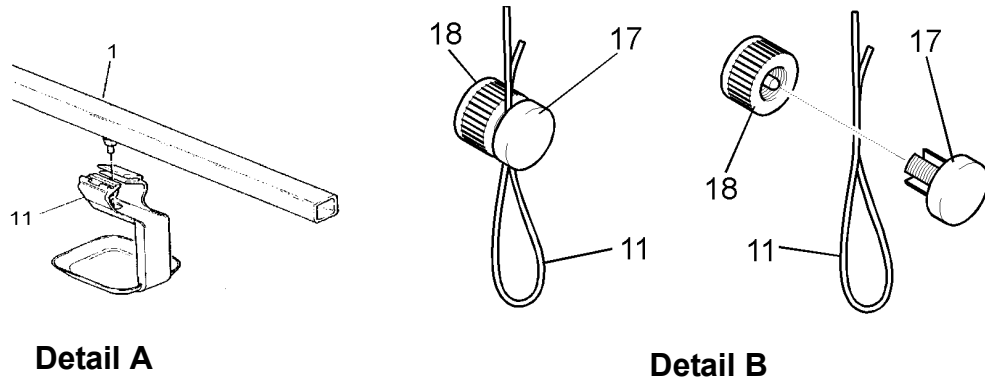
If an alu-profile for drinker 3 m (4) must be shortened, new bore holes \varnothing 7 mm must be made.



Further mounting will be easier if you make use of little posts. Put a pre-mounted element into two of these posts.

- Fasten suspension clips with insulator (16) at the intended suspension points of the alu-profile for drinker 3 m (4).
- Draw a rope Perlon 3 mm (11) through the S-hook (V) of the pressure regulator (10) and fasten it with the plug PE for rope clamp without nut (17) and the knurled nut PE for rope (18).
- Draw a rope Perlon 3 mm (11) through the two S-hooks (V) of the pressure regulator central (10) and fasten it with the plug PE for rope clamp without nut (17) and the knurled nut PE for rope (18).
- Draw a rope Perlon 3 mm (11) through the hole of the suspension clip with insulator (16) and fasten it with the plug PE for rope clamp without nut (17) and the knurled nut PE for rope (18).
- Mount all the pre-mounted elements in this order.
- Clamp the alu-profile for drinker 3 m (4) between the coupler-halves for alu-profile (6) and screw these with hexagon head screws M 6 x 12 (7) and hex nuts M 6 (8).
- Connect also the nipple pipes (2) to the couplers cpl. for nipple pipe - laying (3).
- At the other end of the drinking line, screw a revolving breather cpl. (19) at the alu-profile for drinker 3 m (4) with hexagon head screws M 6x20 (20), hexagon nuts M6 (8) and washers B 6.4 (9).

- If this is required the last plastic pulley 1 7/8" (13) must be displaced.
- Drive home all the hexagon head screws M 6 x 12 (7) and M 6x20 (20) and hexagon nuts M 6 (8) of the coupler-halves for alu-profile (6).
- Pinch the hose clips for coupler of the couplers cpl. (3) with pincers.
- Now align the total drinking line by adjusting the suspension rope (rope Perlon 3 mm) (11) by means of the plug PE for rope without nut (17) and the knurled nut PE for rope (18). See Explom706d132abc, detail B.
- Stick an adhesive label D/E/F-Drinking system, Code-No. 00 00 1098, at the house or gable wall. The fixing material must be provided for by the customer. See Explom706d132abc, detail C.



Detail C

Figure 8-14:Explom706d132abc

Pos.	Code-Nr.	Bezeichnung
11	99 50 1004	Rope Perlon 3mm white
12	99 50 3703	Wire rope 4mm galv
13	00 00 0313	Pulley 1 7/8" 45mm
14		Screw hook to be delivered by customer
15	99 50 0120	Cable clamp 5mm 3/16" galv DIN 741

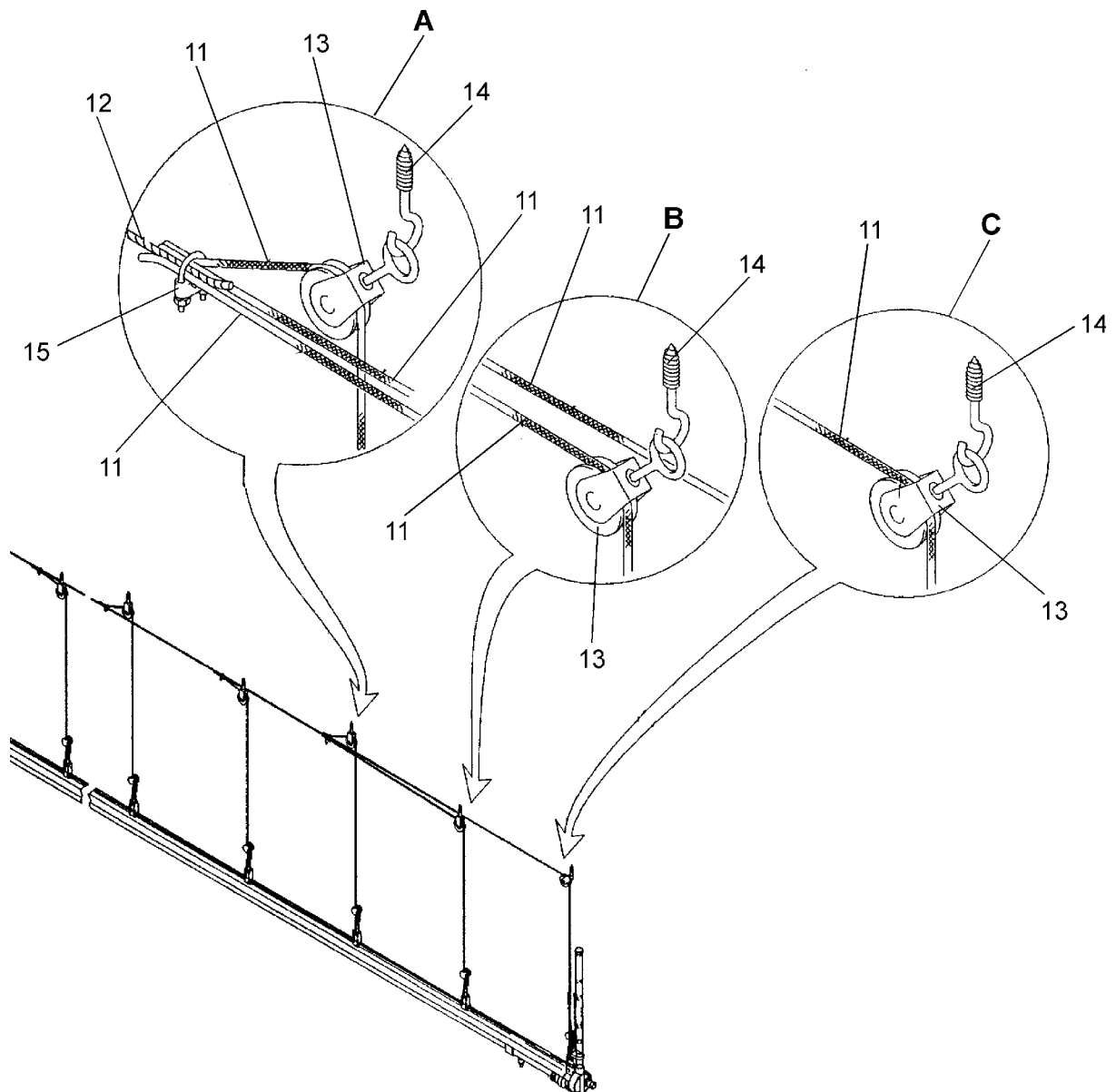


Figure 8-15:Explo M706D176

Pos.	Code-No.	Designation
1	30 61 3497	Drip cup 1-arm L with clamp bracket
2		Nipple pipe 3000 with nipple
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	30 61 3484	Coupler half 80mm for profil-alu
7	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
8	99 10 1045	Hexagon nut M 6 galv DIN 934-8
9	99 50 1147	Washer B 6,4 DIN 125 galv
10	30 63 3421	Pressure regulator L 4281 w. flushing system and accessories
11	99 50 1004	Rope Perlon 3mm white
12	99 50 3703	Wire rope 4mm galv
13	00 00 0313	Pulley 1 7/8" 45mm
14		Srew hook to be delivered by customer
15	99 50 0120	Cable clamp 5mm 3/16" galv DIN 741
16	30 61 3482	Suspension clip with insulator
17	30 61 3485	Plug PE for rope clamp wo/nut
18	30 61 3486	Nut PE f/rope clamp
19	30 61 3430	Breather revolving for end-set cpl L4244
20	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv

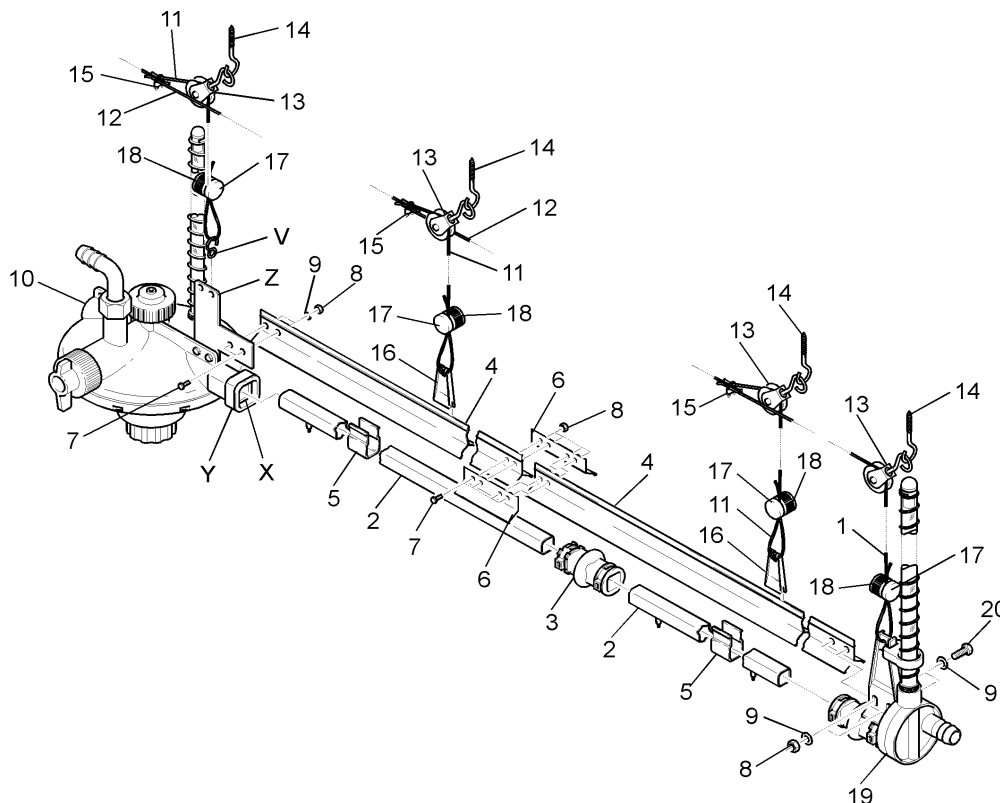


Figure 8-16:Explo M706D132

Pos.	Code-No.	Designation
1	30 61 3497	Drip cup 1-arm L with clamp bracket
2		Nipple pipe 3000 with nipple
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	30 61 3484	Coupler half 80mm for profil-alu
7	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
8	99 10 1045	Hexagon nut M 6 galv DIN 934-8
9	99 50 1147	Washer B 6,4 DIN 125 galv
10	30 63 3423	Pressure regulator L 4282 central w/flushing system+accessor.
11	99 10 1004	Rope Perlon 3mm white
12	99 50 3703	Wire rope 4mm galv
13	00 00 0313	Pulley 1 7/8" 45mm
14		Screw hook to be delivered by customer
15	99 50 0120	Cable clamp 5mm 3/16" galv DIN 741
16	30 61 3482	Suspension clip with insulator
17	30 61 3485	Plug PE for rope clamp wo/nut
18	30 61 3486	Nut PE f/rope clamp
19	30 61 3430	Breather revolving for end-set cpl L4244
20	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv.

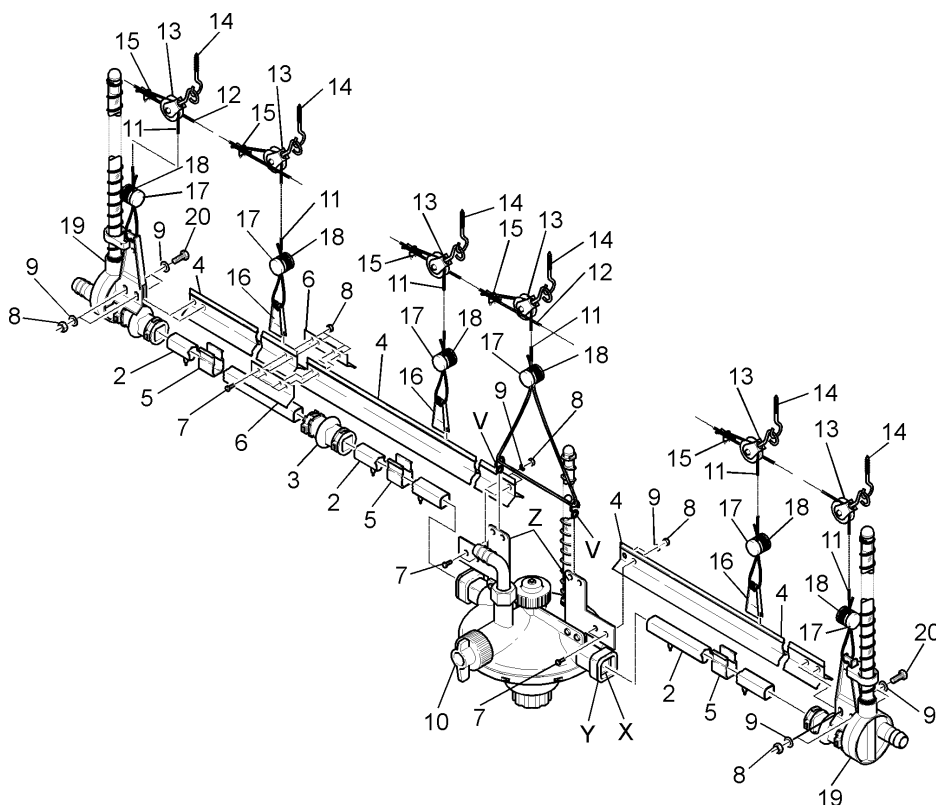


Figure 8-17:Explo M706D133

Pos.	Code-No.	Designation
1	30 61 3497	Drip cup 1-arm L with clamp bracket
2		Nipple pipe 3000 with nipple
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	30 61 3484	Coupler half 80mm for profil-alu
7	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
8	99 10 1045	Hexagon nut M 6 galv DIN 934-8
9	99 50 1147	Washer B 6,4 DIN 125 galv
10	30 61 3401	Ball tank w. flushing system 1 outlet f. floor management
11	99 50 1004	Rope Perlon 3mm white
12	99 50 3703	Wire rope 4mm galv
13	00 00 0313	Pulley 1 7/8" 45mm
14		Screw hook to be delivered by customer
15	99 50 0120	Cable clamp 5mm 3/16" galv DIN 741
16	30 61 3482	Suspension clip with insulator
17	30 61 3485	Plug PE for rope clamp wo/nut
18	30 61 3486	Nut PE f/rope clamp
19	30 61 3430	Breather revolving for end-set cpl L4244
20	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv

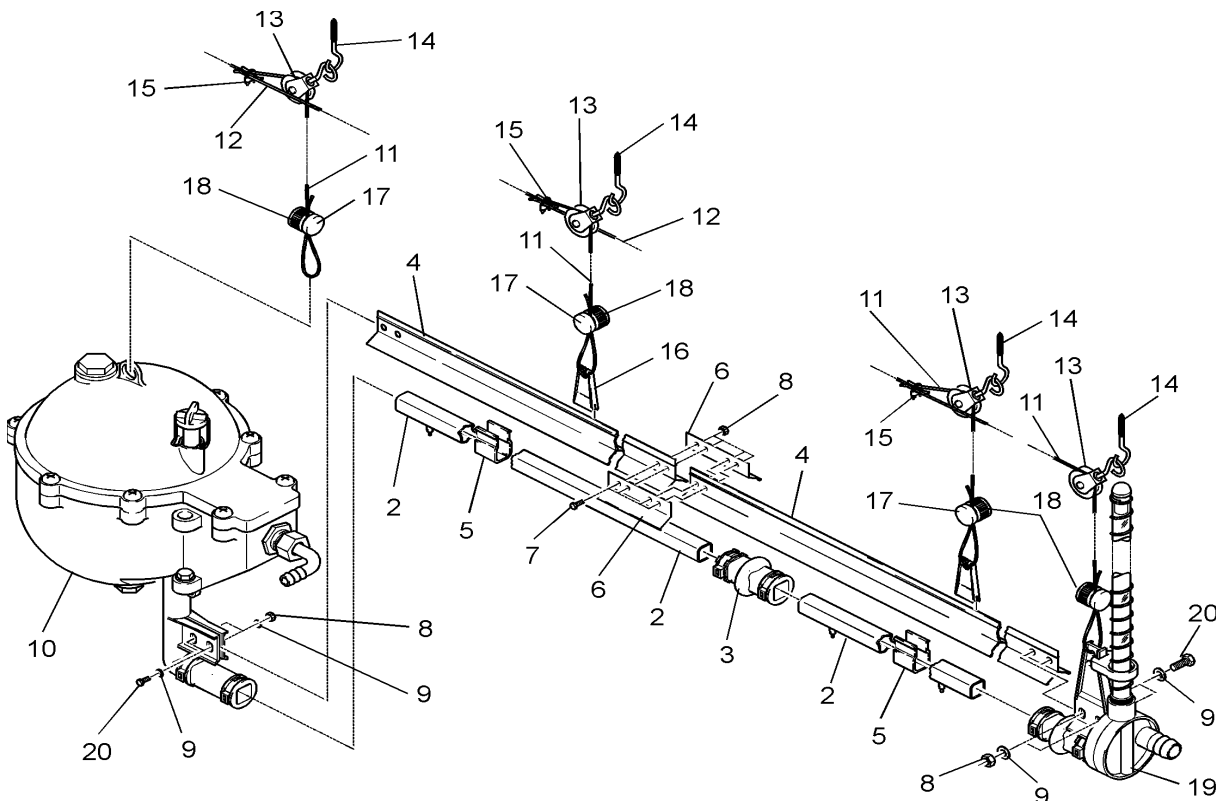


Figure 8-18:Exp glo M706D145

Pos.	Code-No.	Designation
1	30 61 3497	Drip cup 1-arm L with clamp bracket
2		Nipple pipe 3000 with nipple
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	30 61 3484	Coupler half 80mm for profil-alu
7	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
8	99 10 1045	Hexagon nut M 6 galv DIN 934-8
9	99 50 1147	Washer B 6,4 DIN 125 galv
10	30 63 3401	Ball tank w. flushing system 2 outlets f. floor management
11	99 10 1004	Rope Perlon 3mm white
12	99 50 3703	Wire rope 4mm galv
13	00 00 0313	Pulley 1 7/8" 45mm
14		Screw hook to be delivered by customer
15	99 50 0120	Cable clamp 5mm 3/16" galv DIN 741
16	30 61 3482	Suspension clip with insulator
17	30 61 3485	Plug PE for rope clamp wo/nut
18	30 61 3486	Nut PE f/rope clamp
19	30 61 3430	Breather revolving for end-set cpl L4244
20	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv

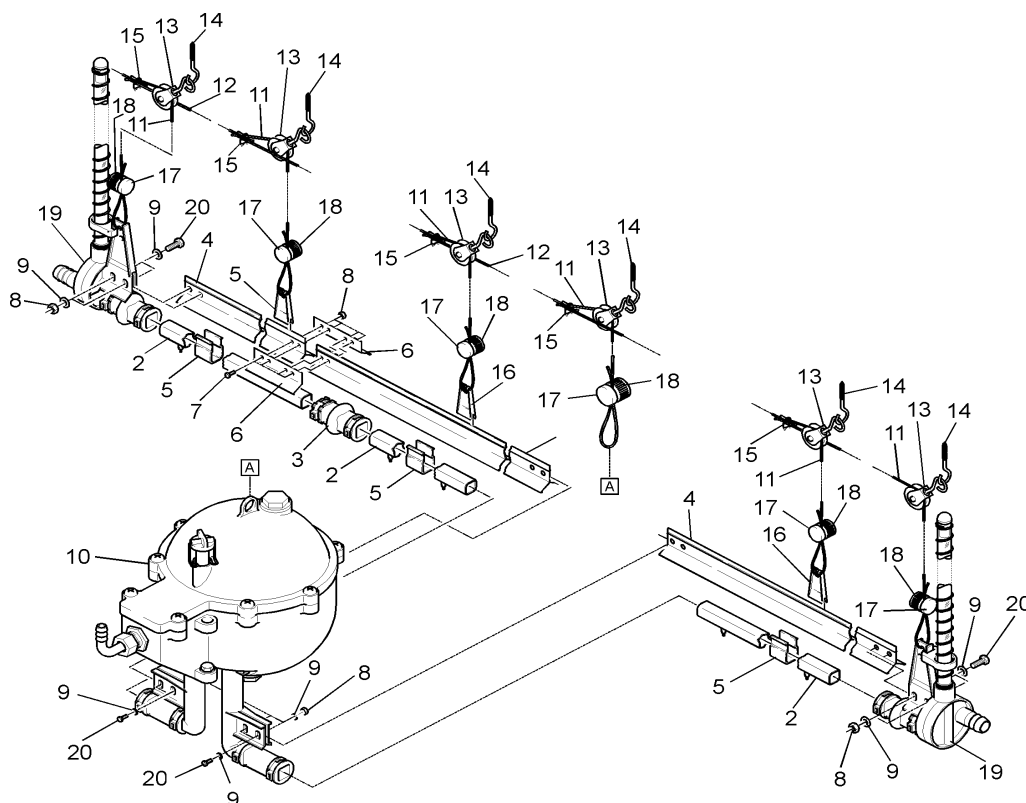


Figure 8-19:Explo M706D146

9 Mounting of the standing nipple drinker



If your planning includes several lines, mount the outer lines first. Work in inward direction so that the adjacent areas can be used to store the material whilst you are working.

- At first determine the number of nipple drinker lines according to project drawing.
- Mark these distances at the gable walls or onto the house floor.



Before mounting the complete nipple drinker you should pre-mount the individual elements. For this purpose, you will need a suitable working table where you can pre-mount the 3 m elements.

The nipple pipes must be treated carefully. Inexpert mounting may cause leaky nipples.

It is indispensable to carry out mounting free of dust and dirt.



Never saw off a nipple pipe, but use the cutting plier Code-No. 99 98 3801 to shorten the pipe.

- Clamp - if existing - the drip cups with 1 arm (11) at the nipple pipes (1). See Explom706d132-1, detail A.
- Open by boring with a drill bit \varnothing 8,5 mm the third bore hole at one end of each alu-profile for drinker 3 m (4) to fasten at the post 670mm galv. standing drinker (12). Open by boring to \varnothing 8,5 mm the first alu-profile for drinker 3 m (4) of a drinking line at both ends.
- Connect one nipple pipe 3 m (1) and one alu-profile for drinker 3 m (4) each with 4 clips for nipple pipe (5). The two outer clips for nipple pipe (5) must be mounted with a distance of approx. 30 cm to the end of the nipple pipe 3 m (1). The intermediate distances of the other two clips for nipple pipe (5) are approx. 80 cm. See Explom706d155, 156, 157, 160, 161. It is possible to displace clips for nipple pipe (5).
- Screw two coupler-halves for alu-profile (10) at one end of the alu-profile for drinker 3 m (4) using hexagon head screws M 6x12 (6) and hexagon nuts M 6 (9).

Do **not** drive the screws home.

- At the same end, push a coupler cpl. for nipple pipe - laying (3) onto the nipple pipe 3 m (1).
- Distribute all the pre-mounted elements to the intended places in the house. At the beginning and the end of a line, no coupler-halves for alu-profile (10) and no couplers cpl. for nipple pipe - laying (3) are required.
- Distribute one support 670mm galv. (12) per drinker element.
Two supports 670mm galv. (12) are required at the first drinker element.
- Screw the first drinker element in the opened bore holes onto the support 670mm galv. (12) using a hexagon head screw M 8x40 (15), three washers PP-black 19x8.5-6 (13) and a threaded plate M 8x38 (14).
The washers PP-black 19x8.5-6 (13) must be screwed between the alu-profile for drinker 3 m (4) and the support 670mm galv. (12).
The threaded plate M 8x38 plastic (14) must be screwed with the smooth side from above onto the slotted profile of the support 670mm galv. (12).
- Screw all the other drinker elements in the opened bore holes onto the support 670mm galv. (12) using a hexagon head screw M 8x40 (15), three washers PP-black 19x8.5-6 (13) and a threaded plate M 8x38 (14) each.
- Clamp the alu-profile for drinker 3 m (4) of every drinker element between the coupler-halves for alu-profile (10) of the previous drinker element and screw these with hexagon head screws M 6x12 (6) and hexagon nuts M 6 (9).
- Connect also the nipple pipes (1) with the couplers cpl. for nipple pipe - laying (3).



The BD pressure regulator unit with flushing system, the ball tank with flushing system and the breather cpl. are delivered ready to be mounted. Any disassembling or other repair works must only be carried out by skilled persons.

With long drinking lines, the water is supplied from the middle of the drinking line. In this case, start mounting with the pressure regulator unit resp. the ball tank in the middle of the drinking line.

- Screw the pressure regulator (24, 25) into the existing bore holes of the alu-profile for drinker 3 m (4) using two hexagon head screws M 6x12 (6), hexagon nuts M6 (9) and washers B 6.4 (8) at the side of the water supply resp. in the middle of the drinking line.
If an alu-profile for drinker 3 m (4) must be shortened, new bore holes \varnothing 7 mm must be made.
- Apply a lubricant (vaseline, acid-free fat, washing-up liquid) to the O-rings of the pressure regulator (24, 25). See also chapter 9.
- Put a nipple pipe (1) into the transition piece of the pressure regulator (24, 25).
If the first or last nipple pipe (1) of a line must be shortened, use the cutting plier to shorten them.
- Screw the ball tank with flushing system (26, 27) into the existing bore holes of the alu-profile for drinker 3 m (4) using two hexagon head screws M 6x12 (7), hexagon nuts M6 (8) and washers B 6.4 (9) at the side of the water supply resp. in the middle of the drinking line.
If an alu-profile for drinker 3 m (4) must be shortened, new bore holes \varnothing 7 mm must be made.
- At the other end of the drinking line, screw a revolving breather cpl. (23) at the alu-profile for drinker 3 m (4) with hexagon head screws M 6x20 (7), hexagon nuts M6 (9) and washers B 6.4 (8).
- Now align the total drinking line in longitudinal direction and in height. Drive home all the hexagon head screws M 6x12 (6), M 6x20 (7) and hexagon nuts M 6 (9) of the coupler-halves for alu-profile (10).
- Pinch the hose clips for coupler of the couplers cpl. for nipple pipe - laying (3) with pincers. See to it that the hose clips for coupler are not pinched over the corners but on the vertical side of the nipple pipe (1).
- Distribute the pipes 1"x6000 galv. (20) along the drinking lines.
- Screw the pipes 1"x6000 galv. (20) loosely at the posts 670mm galv. (12) with U-bolts galv. 8x35/W38/H69 (16) and hexagon nuts M 8 galv. (17).
The pipes 1"x6000 galv. (20) should have an excess length of approx. 5 cm at the

ends of the drinking lines.

- Connect the pipes 1"x6000 galv. (20) with couplers slotted PA6 f. perch 1" (21).
- Put a plastic cap for tube 1" GPN 250/33.7 (22) onto the exceeding ends of the pipes 1"x6000 galv. (20) of a drinking line.
- Drive home the hexagon nuts M 8 galv. (17) with the U-bolts galv. 8x35/W38/H69 (16) at the posts 670mm galv. (12).
- If the drinking lines are erected on the house floor the posts 670mm galv. (12) are to be fixed with hexagon wood screws 6x 40 (18) and dowels S 8 (19).
- If the drinking lines are erected on slatted floor the posts 670mm galv. (12) are to be fixed with straps 290mm plt3s-cs (28).
- Stick an adhesive label D/E/F-Drinking system, Code-No. 00 00 1098, at the house or gable wall. The fixing material must be provided for by the customer. See Explom706d132-1, detail C.

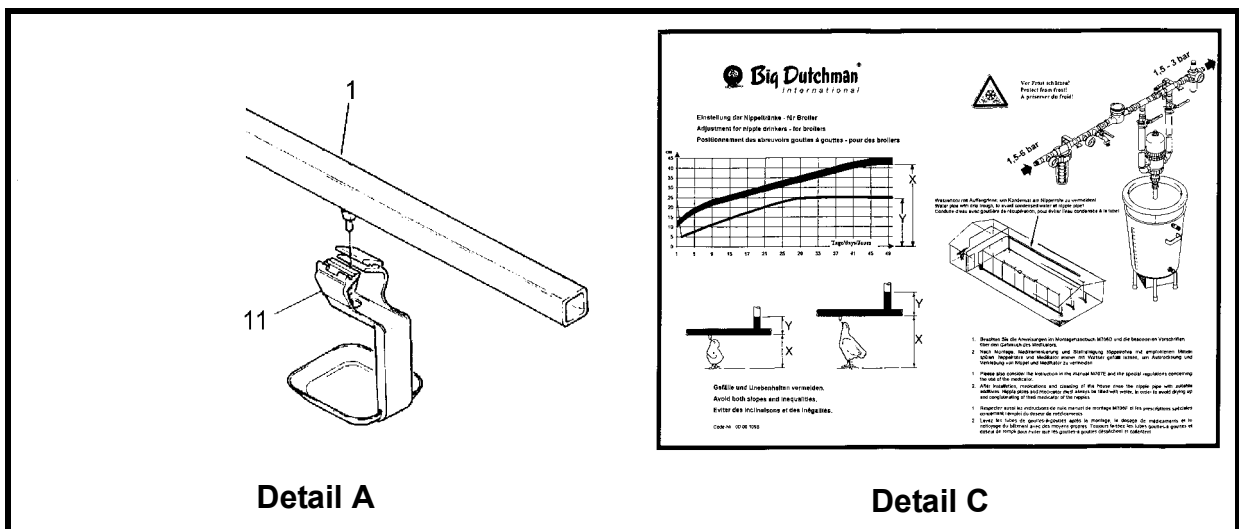


Figure 9-20: Explom706d132-1

Pos.	Code-No.	Designation
1	30 61 3019	Nipple pipe 3000-09-super nipple
	30 61 3022	Nipple pipe 3000-12-super nipple
	30 61 3025	Nipple pipe 3000-15-super nipple
	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
2	30 00 3412	Super-nipple L4002
	30 00 3107	Screw-nipple 50ml/min 4071
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
7	99 10 1088	Hexagon head screw M 6x 20 DIN 558 gav
8	99 50 1147	Washer B 6,4 DIN 125 galv
9	99 10 1045	Hexagon nut M 6 galv DIN 934-8
10	30 61 3484	Coupler half 80mm for profil-alu
11	30 61 3497	Drip cup 1-arm L with clamp bracket
12	30 61 3091	Support 670mm galv
13	15 00 3711	Washer PP-black 19x8,5-6
14	65 00 1070	Threaded plate M 8x38 plastic
15	99 10 1085	Hexagon head screw M 8x 40 DIN 558 galv
16	99 50 1248	U-bolt galv 8x35/W38/H69
17	99 10 1040	Hexagon nut M 8 galv DIN 934-8
18	99 10 3716	Hexagon wood screw 6x 40 DIN 571-ST galv
19	99 98 3781	Dowel S 8
20	99 40 3813	Pipe 1"x6000 galv DIN 2440
21	15 22 5028	Coupler slotted PA6 f/perch 1"
22	65 97 3703	Cap plastic for tube 1" GPN 250/33.7
28	99 50 3775	Strap 290mm

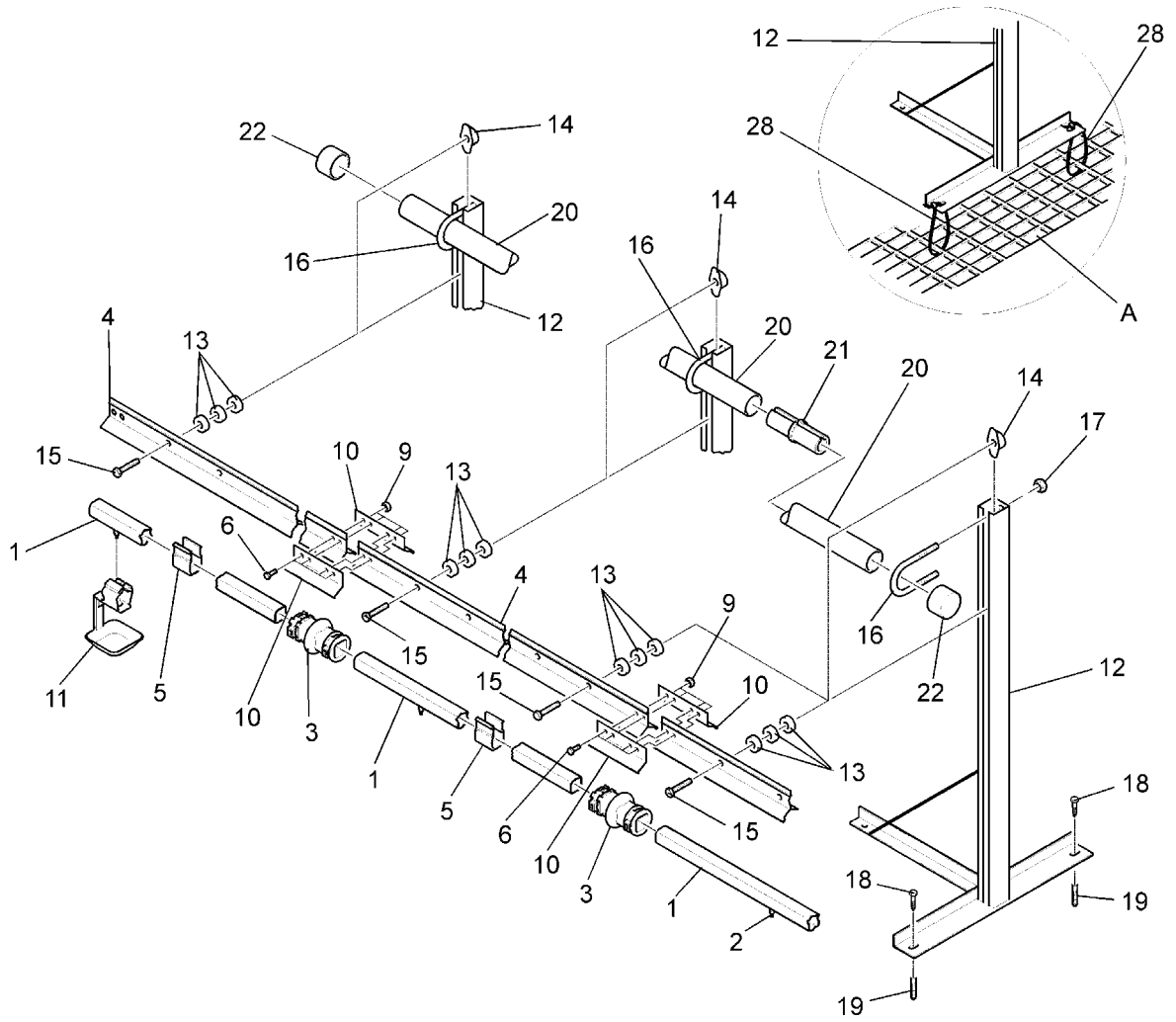


Figure 9-21:Explom706d155

Pos.	Code-No.	Designation
1	30 61 3019	Nipple pipe 3000-09-super nipple
	30 61 3022	Nipple pipe 3000-12-super nipple
	30 61 3025	Nipple pipe 3000-15-super nipple
	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
2	30 00 3412	Super-nipple L4002
	30 00 3107	Screw-nipple 50ml/min 4071
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
7	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
8	99 50 1147	Washer B 6,4 DIN 125 galv
9	99 10 1045	Hexagon nut M 6 galv DIN 934-8
10	30 61 3484	Coupler half 80mm for profil-alu
11	30 61 3497	Drip cup 1-arm L with clamp bracket
12	30 61 3091	Support 670mm galv
13	15 00 3711	Washer PP-black 19x8,5-6
14	65 00 1070	Threaded plate M 8x38 plastic
15	99 10 1085	Hexagon head screw M 8x 40 DIN 558 galv
16	99 50 1248	U-bolt galv 8x35/W38/H69
17	99 10 1040	Hexagon nut M 8 galv DIN 934-8
18	99 10 3716	Hexagon wood screw 6x 40 DIN 571-ST galv
19	99 98 3781	Dowel S 8
20	99 40 3813	Pipe 1"x6000 galv DIN 2440
21	15 22 5028	Coupler slotted PA6 f/perch 1"
22	65 97 3703	Cap plastic for tube 1"GPN 250/33.7
23	30 61 3430	Breather revolving for end-set cpl L4244
24	30 63 3421	Pressure regulator L 4281 w. flushing system and accessories
25	30 63 3423	Pressure regulator L 4282 central w. flushing system and accessories
28	99 50 3775	Strap 290mm

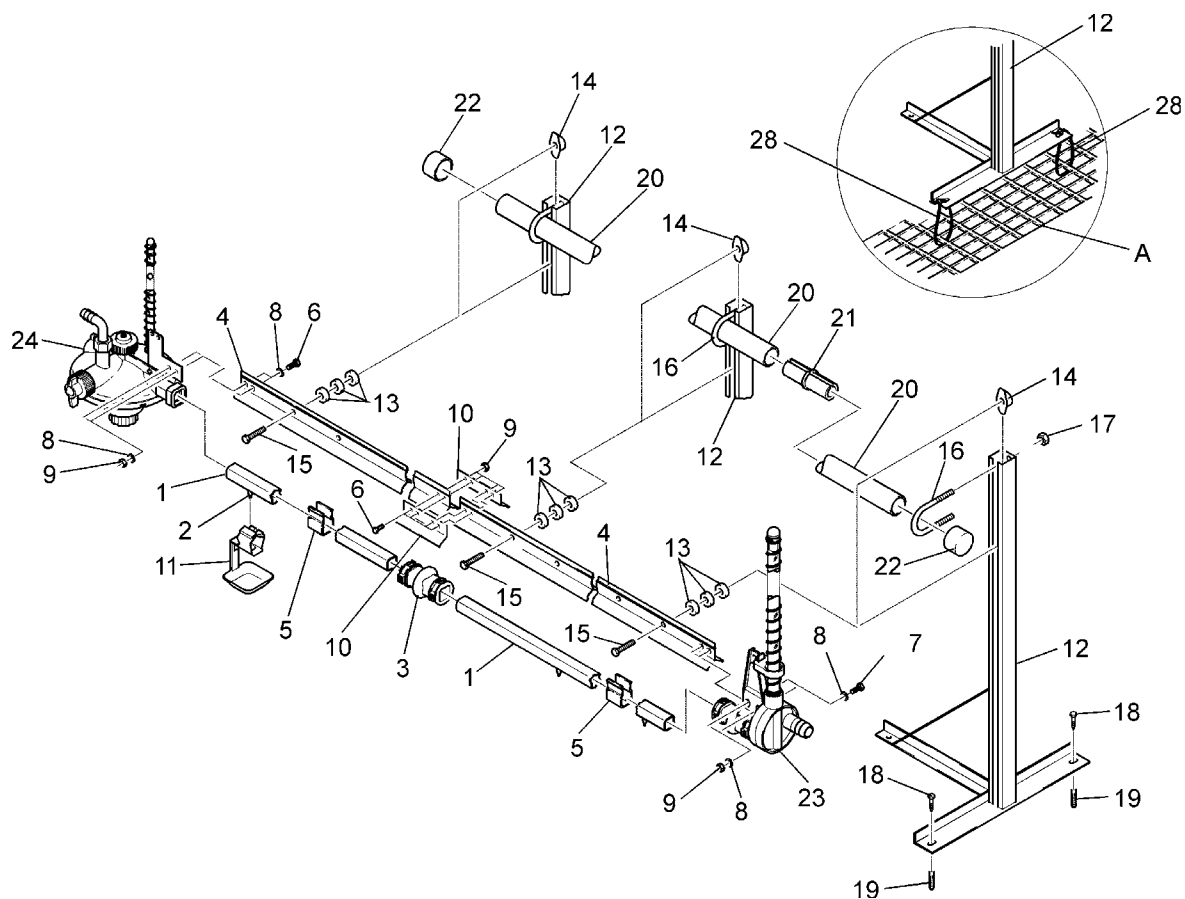


Figure 9-22:Explom706d156

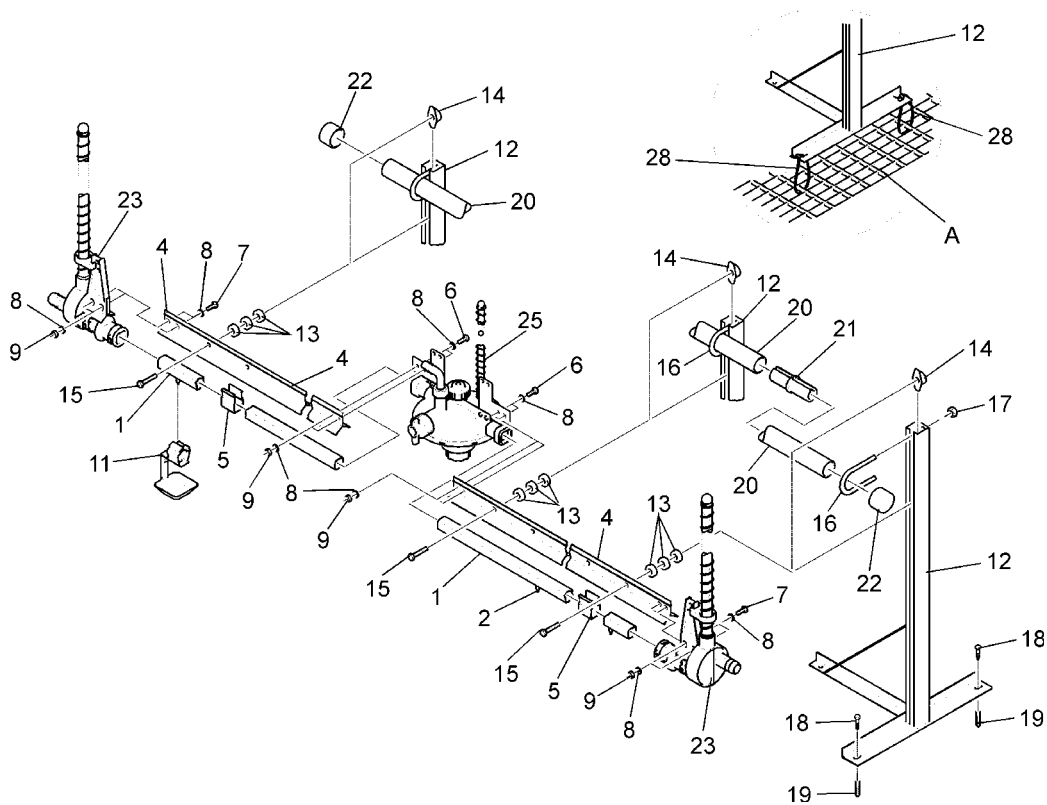


Figure 9-23:Explom706d157

Pos.	Code-No.	Designation
1	30 61 3019	Nipple pipe 3000-09-super nipple
	30 61 3022	Nipple pipe 3000-12-super nipple
	30 61 3025	Nipple pipe 3000-15-super nipple
	30-61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
2	30 00 3412	Super-nipple L4002
	30 00 3107	Screw-nipple 50ml/min 4071
3	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
4	30 61 3480	Profil alu for waterer 3m
5	30 61 3483	Clip POM for nipple pipe
6	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
7	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
8	99 50 1147	Washer B 6,4 DIN 125 galv
9	99 10 1045	Hexagon nut M 6 galv DIN 934-8
10	30 61 3484	Coupler half 80mm for profil-alu
11	30 61 3497	Drip cup 1-arm L with clamp bracket
12	30 61 3091	Support 670mm galv
13	15 00 3711	Washer PP-black 19x8,5-6
14	65 00 1070	Threaded plate M 8x38 plastic
15	99 10 1085	Hexagon head screw M 8x 40 DIN 558 galv
16	99 50 1248	U-bolt galv 8x35/W38/H69
17	99 10 1040	Hexagon nut M 8 galv DIN 934-8
18	99 10 3716	Hexagon wood screw 6x 40 DIN 571-ST galv
19	99 98 3781	Dowel S 8
20	99 40 3813	Pipe 1"x6000 galv DIN 2440
21	15 22 5028	Coupler slotted PA6 f/perch 1"
22	65 97 3703	Cap plastic for tube 1" GPN 250/33.7
23	30 61 3430	Breather revolving for end-set cpl L4244
26	30 61 3401	Ball tank with flushing system 1 outlet for floor management
27	30 61 3402	Ball tank with flushing system 2 outlets for floor management
28	99 50 3775	Strap 290mm

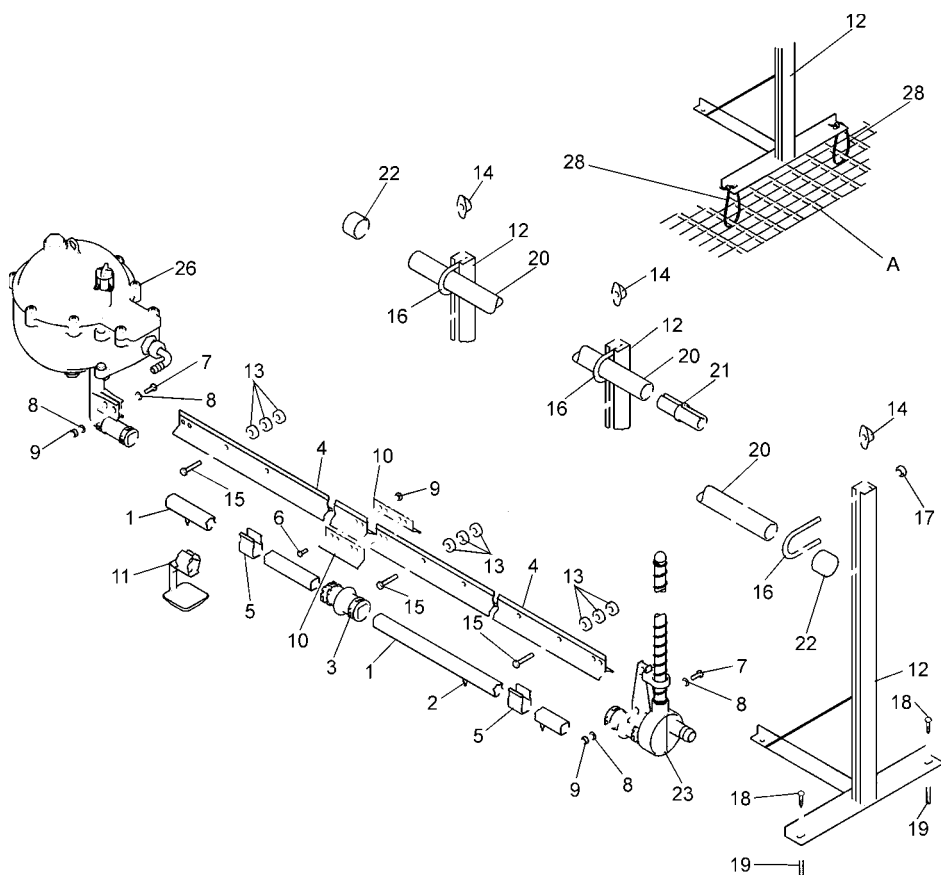


Figure 9-24:Explom706d160

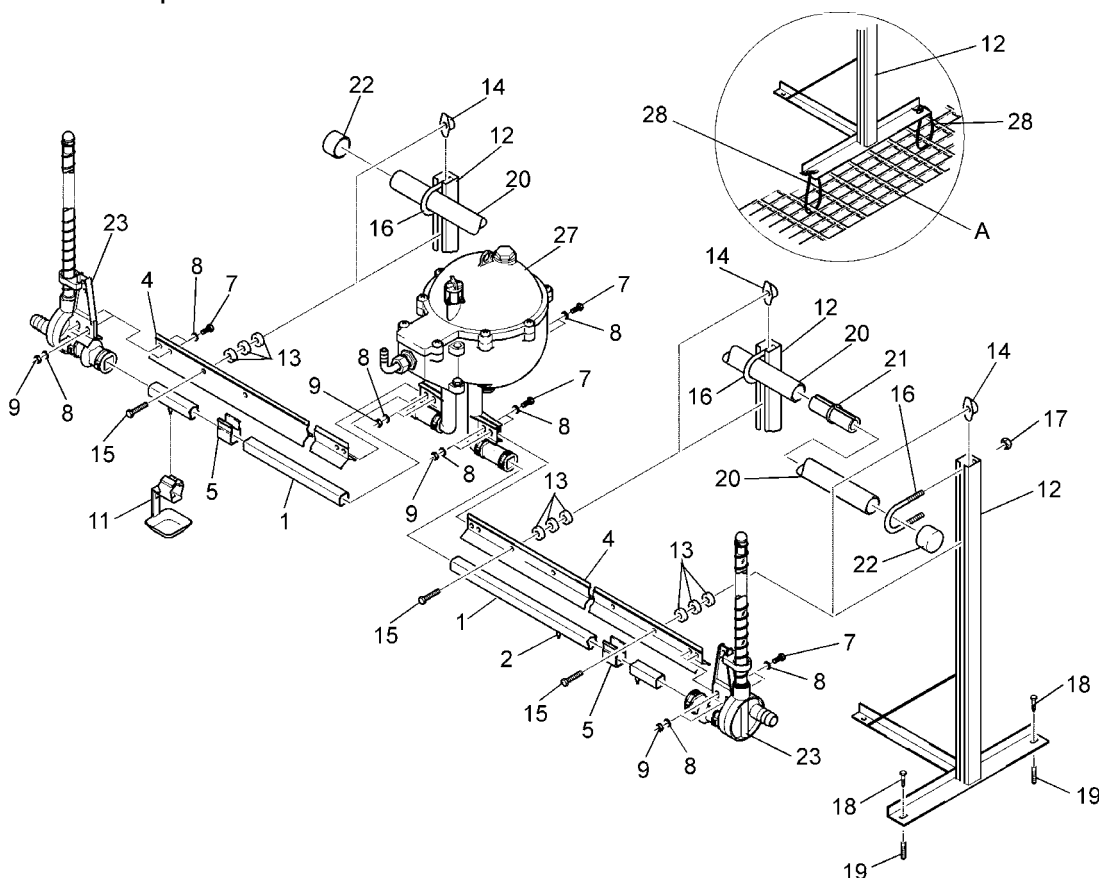





Figure 9-25:Explom706d161

Space for notes:

10 Mounting of the Nipple Drinkers for A-racks

	If your planning includes several lines, mount the outer lines first. Work in inward direction so that the adjacent areas can be used to store the material whilst you are working.
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- At first determine the number of nipple drinking lines according to the project drawing.
- Mark these distances at the gable walls or onto the house floor.

	<p>Before mounting the complete nipple drinker you should pre-mount the individual elements. For this purpose, you will need a suitable working table where you can pre-mount the 3 m elements.</p> <p>The nipple pipes must be treated carefully. Inexpert mounting may cause leaky nipples.</p> <p>It is indispensable to carry out mounting free of dust and dirt.</p>
	Never saw off a nipple pipe, but use the cutting plier Code-No. 99 98 3801 to shorten the pipe.

- Clamp - if existing - the drip cups with 1 arm (5) at the nipple pipes (1). See Explom706d132-2, detail A.
- Connect one nipple pipe 3 m (1) and one covering plate for nipple pipe 3000 (7) each with 4 clips POM for nipple pipe (2). See Explom706d149, 151, 152, 153, 154.
- Screw at one end of the covering plate for nipple pipe 3000 (7) a coupler for covering plate 3000 (8) with 2 mushroom head screws M 6x16 galv. slotted (9) and hexagon nuts M 6 (11).
Screw mushroom head screws M 6x16 galv. slotted (9) and hexagon nuts M 6 (11) diagonally staggered through the outer bore holes of the coupler for covering plate 3000 (8).
- At the same end, put a coupler cpl. for nipple pipe - laying (6) onto the nipple pipe 3 m (1).

- At the first covering plate for nipple pipe 3000 (7) of a drinking line, couplers for covering plate 3000 (8) are required at both ends of a drinking line, but only one coupler cpl. for nipple pipe - laying (6) is required.
- Distribute all pre-mounted elements to the cross braces of the A-rack.
- Screw all elements with 2 mushroom head screws M6x16 galv. slotted (9) and hexagon nuts M 6 (11).
Screw mushroom head screws M 6x16 slotted (9) and hexagon nuts M 6 (11) diagonally staggered through the outer bore holes of the coupler for covering plate 3000 (8).
- Connect also the nipple pipes (1) with the couplers for nipple pipe - laying (6).
- Pinch the hose clips for coupler of the couplers cpl. for nipple pipe - laying (6) with pincers. See to it that the hose clips for coupler are not pinched over the corners but on the vertical side of the nipple pipe (1).
- Then put the nipple pipes (1) with the covering plates for nipple pipe 3000 (7) on the A-rack so that the couplers cpl. for nipple pipe - laying (6) lie between the cross braces of the A-rack.
- Align the total drinking line.
- Screw the couplers for covering plate 3000 (8) and the covering plates for nipple pipe 3000 (7) through the outer bore holes which are still open onto the cross braces of the A-rack using chipboard screws 5.0x40 ABC-Spax countersunk head (12).



The pressure regulator unit with flushing system, the ball tank with flushing system and the breather cpl. are delivered ready to be mounted. Any disassembling or other repair works must only be carried out by skilled persons.

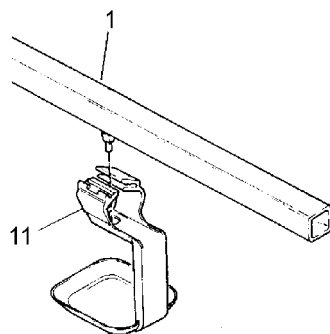
With long drinking lines, the water is supplied from the middle of the drinking line. In this case, start mounting with the pressure regulator unit resp. the ball tank in the middle of the drinking line.

- Screw at both sides of the covering plate for nipple pipe 3000 (7) a bracket left for aeration at covering plate (15) and a bracket right for aeration at covering plate

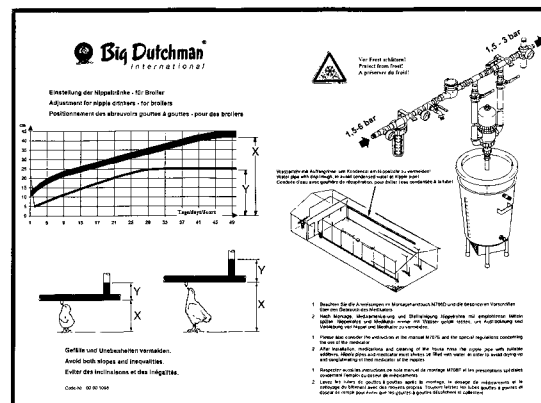
- (16) with mushroom head screws M 6x16 galv. slotted (9) and hex nuts M 6 (11).
- Screw a pressure regulator L4281 with flushing system (18) at the bracket left for aeration at covering plate (15) and at the bracket right for aeration at covering plate (16) using hexagon head screws M 6x12 (13), washers B 6.4 (10) and hexagon nuts M 6 (11).
 - Screw a ball tank with flushing system 1 outlet for floor management 4221 (20) at the bracket left for aeration at covering plate (15) and at the bracket right for aeration at covering plate (16) using hexagon head screws M 6x20 (14)), washers B 6.4 (10) and hexagon nuts M 6 (11).
 - Screw a revolving breather cpl. L4244 (17) at the bracket left for aeration at covering plate (15) and at the bracket right for aeration at covering plate (16) using hexagon head screws M 6x20 (14)), washers B 6.4 (10) and hexagon nuts M 6 (11).
 - Connect also the nipple pipe (1) to the revolving breather cpl. L4244 (17).
 - If the water is supplied from the middle of the drinking line the nipple pipe (1) and the covering plate for nipple pipe 3000 (7) must be cut through so that the pressure regulator unit central (19) or the ball tank with two outlets (21) can be inserted.
 - Screw a bracket left for aeration at covering plate (15) and a bracket right for aeration at covering plate (16) at each side of the pressure regulator L4282 central with flushing system (19) using hexagon head screws M 6x12 (13), washers B 6.4 (10) and hexagon nuts M 6 (11).
 - Screw a bracket left for aeration at covering plate (15) and a bracket right for aeration at covering plate (16) at each side of the ball tank with flushing system 2 outlets for floor management (21) using hexagon head screws M 6x12 (13), washers B 6.4 (10) and hexagon nuts M 6 (11).
 - Put this assembled unit at the intended position onto the nipple pipe (1) with the covering plate for nipple pipe 3000 (7). Mark out in which area the nipple pipe (1) with the covering plate for nipple pipe 3000 (7) must be cut out and where new bore holes must be made. When cutting the nipple pipe (1) to size, see to it that they reach until the limit stop into the couplers of the pressure regulator unit (19)

or of the ball tank (21).

- Screw the pressure regulator L4282 central with flushing system (19) resp. the ball tank with flushing system 2 outlets for floor management (21) with the bracket left for aeration at covering plate (15) and the bracket right for aeration at covering plate (16) at each side of the covering plate for nipple pipe 3000 (7) with mushroom head screws M 6x16 galv. slotted (9) and hexagon nuts M 6 (11).
- Apply a lubricant (vaseline, acid-free fat, washing-up liquid) to the O-rings of the pressure regulator (18, 19). See also chapter 9.
- Put a nipple pipe (1) into the transition piece of the pressure regulator (18, 19). If the first or last nipple pipe (1) of a line must be shortened, use the cutting plier to shorten them.
- Stick an adhesive label D/E/F-Drinking system, Code-No. 00 00 1098, at the house or gable wall. The fixing material must be provided for by the customer. See Explom706d132-1, detail C.



Detail A



Detail C

Figure 10-26: Explom706d132-2,

Pos.	Code-No.	Designation
1	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
2	30 61 3483	Clip POM for nipple pipe
4	30 00 3107	Screw-nipple 50ml/min 4071
5	30 61 3497	Drip cup 1-arm L with clamp bracket
6	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
7	36 00 3411	Covering plate for nipple pipe 3000
8	36 00 3412	Coupler f/covering plate 3000
9	99 10 3872	Mushroom head screw M 6x 16 galv slotted
11	99 10 1045	Hexagon nut M 6 galv DIN 934-8
12	99 10 3900	Chipboard screw 5.0x40 ABC-Spax countersunk head SST

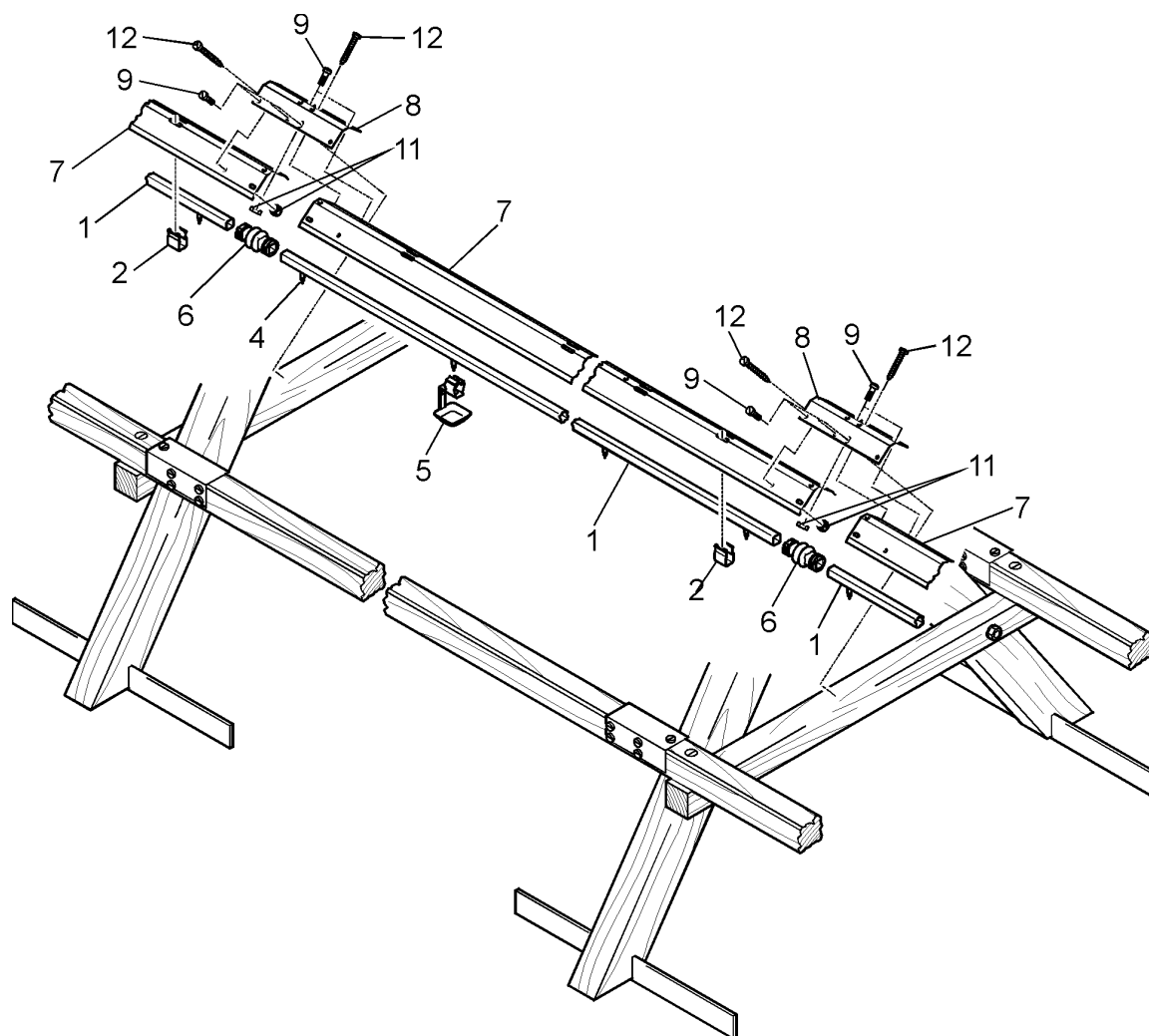


Figure 10-27:Explo706d149

Pos.	Code-No.	Designation
1	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
7	36 00 3411	Covering plate for nipple pipe 3000
8	36 00 3412	Coupler f/covering plate 3000
9	99 10 3872	Mushroom head screw M 6x 16 galv slotted
10	99 50 1147	Washer B 6.4 DIN 125 galv
11	99 10 1045	Hexagon nut M 6 galv DIN 934-8
12	99 10 3900	Chipboard screw 5.0x40 ABC-Spax countersunk head SST
13	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
14	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
15	36 00 3413	Bracket left for aeration at covering plate
16	36 00 3414	Bracket right for aeration at covering plate
17	30 61 3430	Breather revolving for end-set cpl L4244
18	30 63 3421	Pressure regulator L4281 with flushing system and accessories

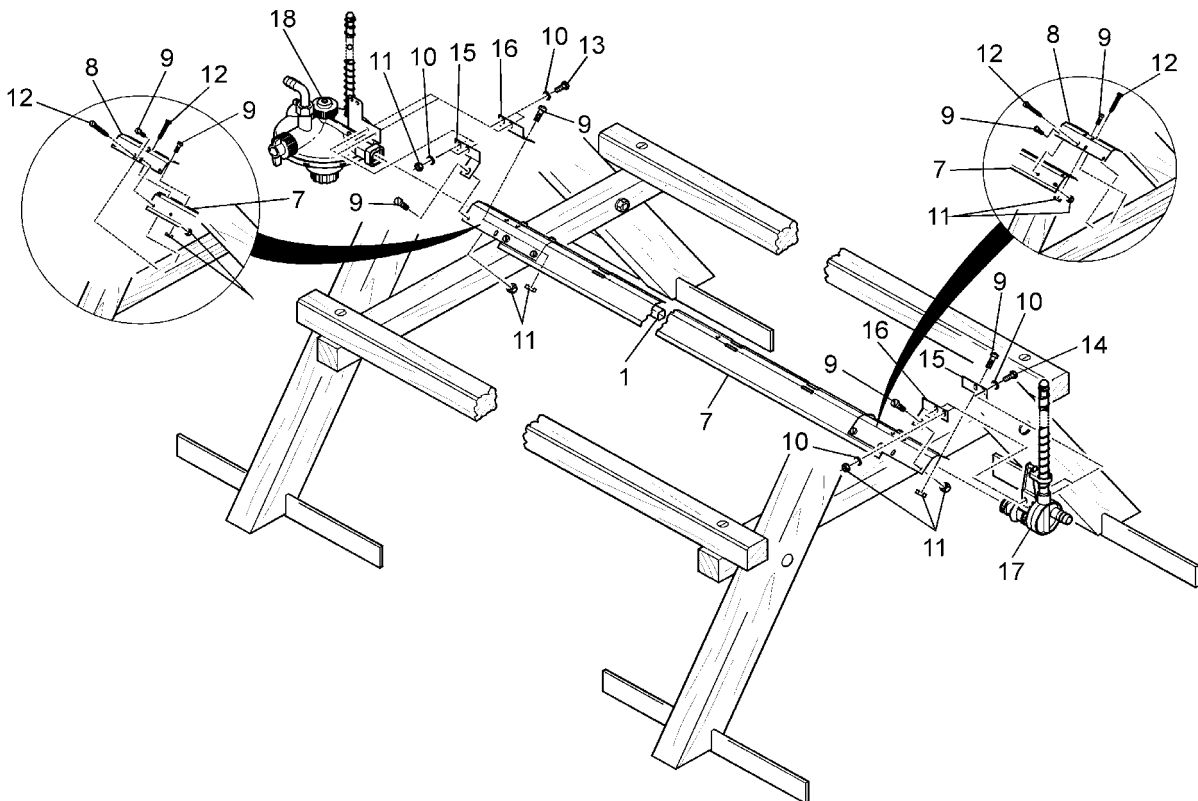


Figure 10-28:Explom706d151

Pos.	Code-No.	Designation
1	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
7	36 00 3411	Covering plate for nipple pipe 3000
8	36 00 3412	Coupler f/covering plate 3000
9	99 10 3872	Mushroom head screw M 6x 16 galv slotted
10	99 50 1147	Washer B 6.4 DIN 125 galv
11	99 10 1045	Hexagon nut M 6 galv DIN 934-8
12	99 10 3900	Chipboard screw 5.0x40 ABC-Spax countersunk head SST
13	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
14	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
15	36 00 3413	Bracket left for aeration at covering plate
16	36 00 3414	Bracket right for aeration at covering plate
17	30 61 3430	Breather revolving for end-set cpl L4244
19	30 63 3423	Pressure regulator L4282 central w. flushing system and accessories

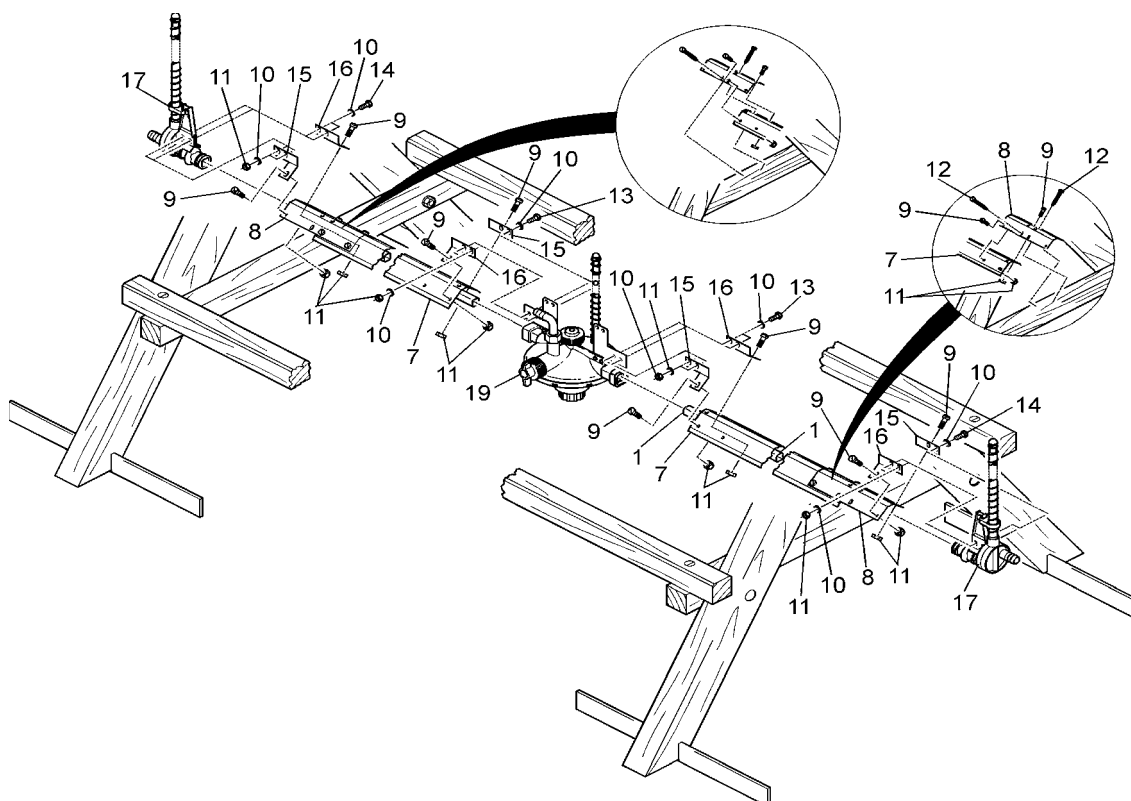


Figure 10-29:Explo706d152

Pos.	Code-No.	Designation
1	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
7	36 00 3411	Covering plate for nipple pipe 3000
8	36 00 3412	Coupler f/covering plate 3000
9	99 10 3872	Mushroom head screw M 6x 16 galv slotted
10	99 50 1147	Washer B 6.4 DIN 125 galv
11	99 10 1045	Hexagon nut M 6 galv DIN 934-8
12	99 10 3900	Chipboard screw 5.0x40 ABC-Spax countersunk head SST
14	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
15	36 00 3413	Bracket left for aeration at covering plate
16	36 00 3414	Bracket right for aeration at covering plate
17	30 61 3430	Breather revolving for end-set cpl L4244
20	30 61 3401	Ball tank with flushing system 1 outlet for floor management

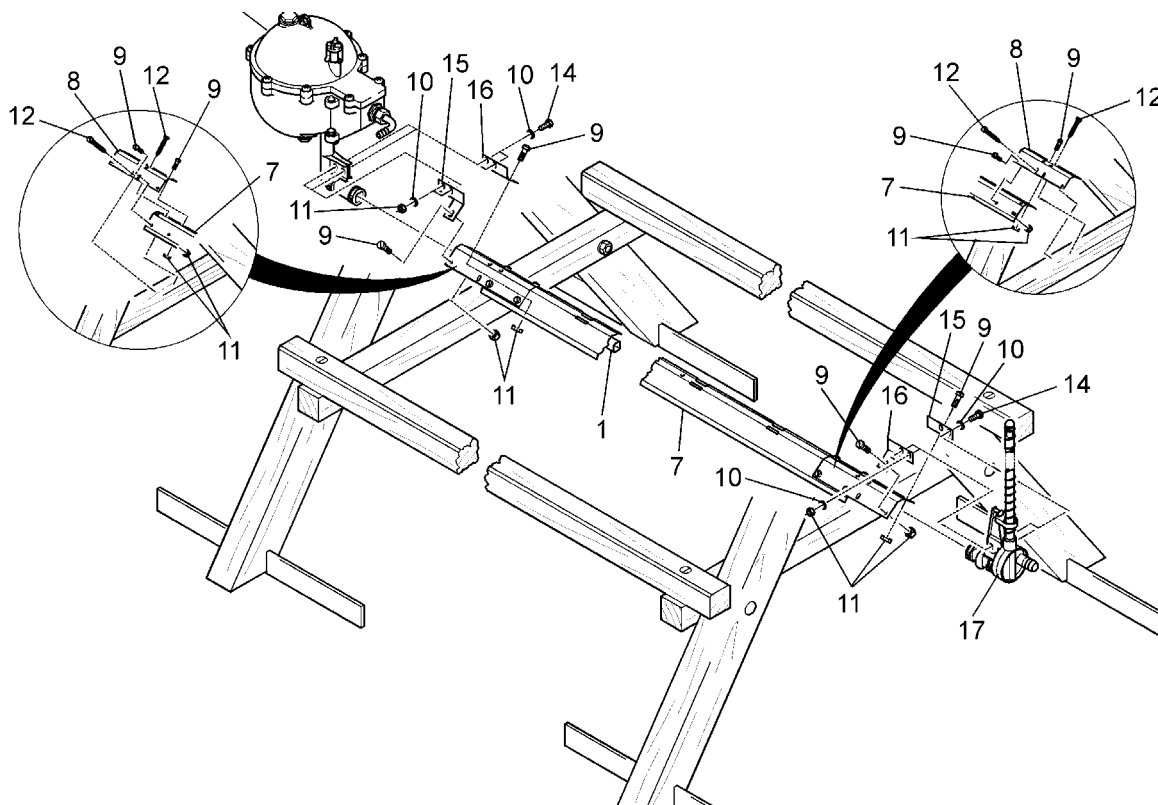


Figure 10-30:Explom706d153

Pos.	Code-No.	Designation
1	30 61 3819	Nipple pipe 3000-09-screw 50ml
	30 61 3822	Nipple pipe 3000-12-screw 50ml
	30 61 3825	Nipple pipe 3000-15-screw 50ml
7	36 00 3411	Covering plate for nipple pipe 3000
8	36 00 3412	Coupler f/covering plate 3000
9	99 10 3872	Mushroom head screw M 6x 16 galv slotted
10	99 50 1147	Washer B 6.4 DIN 125 galv
11	99 10 1045	Hexagon nut M 6 galv DIN 934-8
12	99 10 3900	Chipboard screw 5.0x40 ABC-Spax countersunk head SST
14	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
15	36 00 3413	Bracket left for aeration at covering plate
16	36 00 3414	Bracket right for aeration at covering plate
17	30 61 3430	Breather revolving for end-set cpl L4244
21	30 61 3402	Ball tank with flushing system 2 outlets for floor management

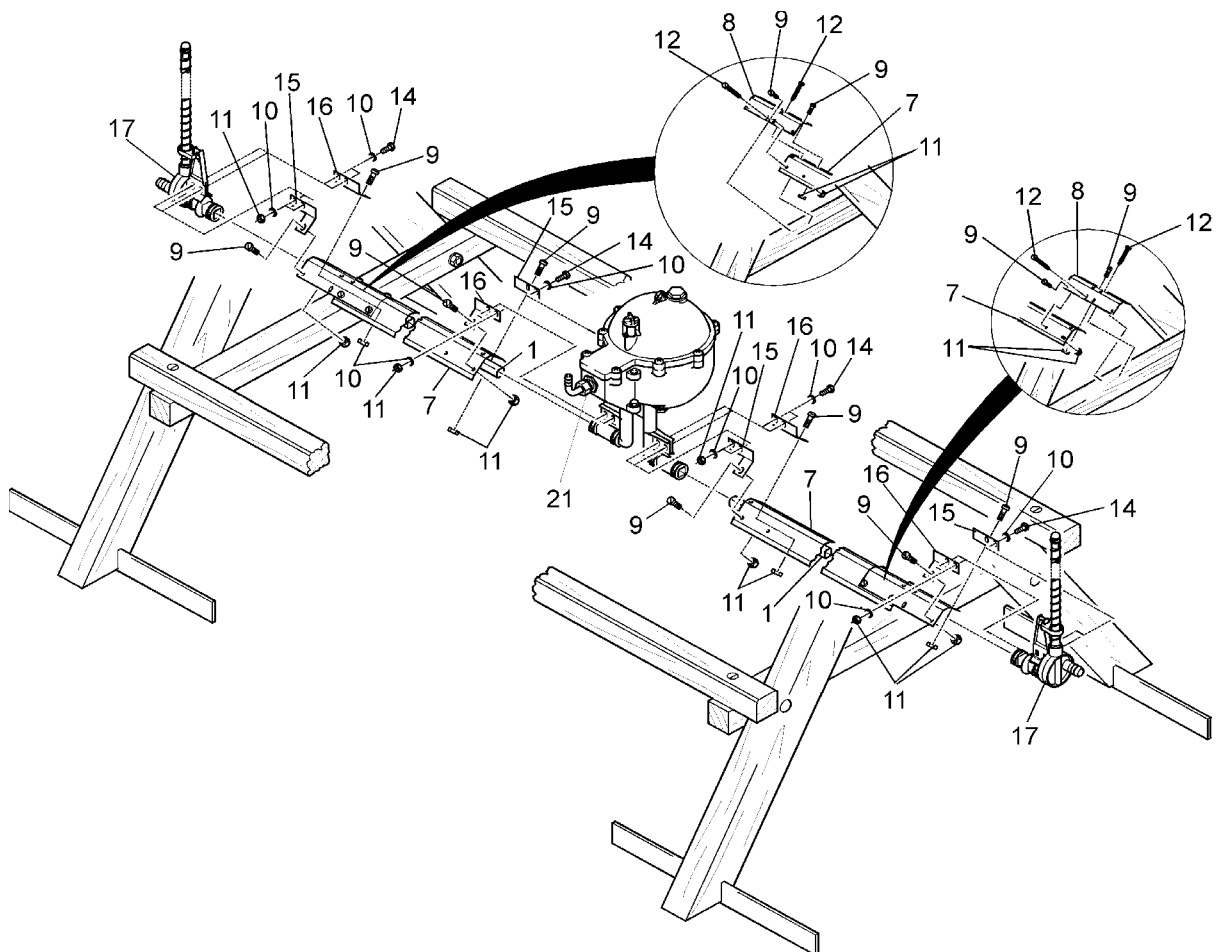


Figure 10-31:Explom706d154

Space for notes:

11 Accessories and Parts Lists Water Supply

11.1 Breather revolving cpl. L4244 orange

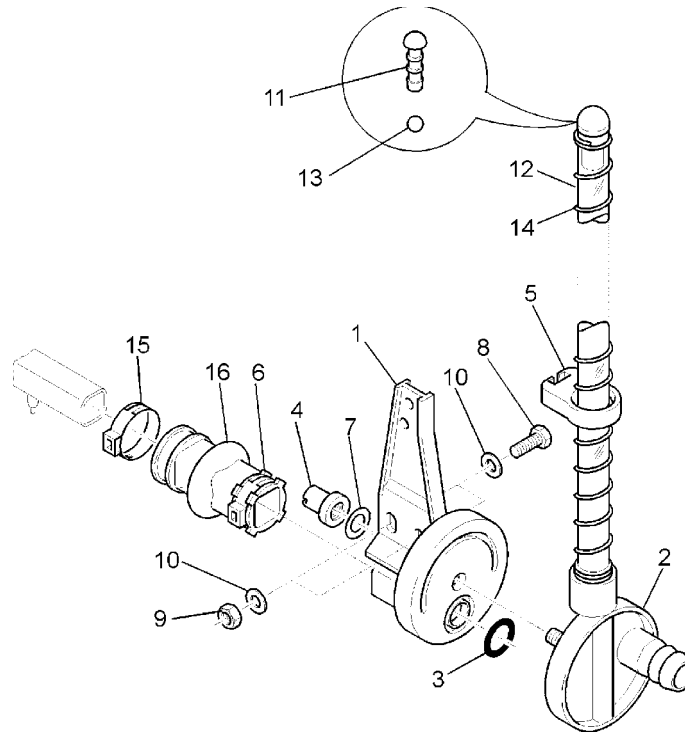
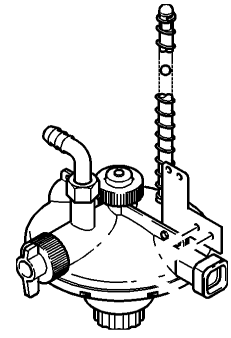
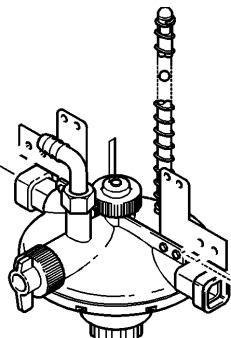
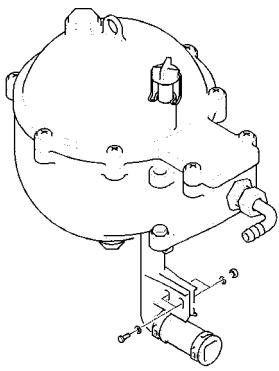
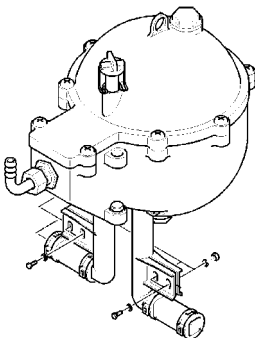


Figure 11-32:Explom706d126

Pos.	Code-No.	Designation
	30 61 3430	Breather revolving for end-set cpl. L4244
1		Sealing segment with suspender 001 390 18 00
2		Revolving segment with hose nozzle 001 390 19 00
3		O-ring 16x3 30 02 250
4		Threaded piece 001 390 21 00
5		Retaining piece 001 390 20 00
6		Expansion coupler w. clamp f. pipe 22x22 4363
7		Disk 001 390 24 00
8	99 10 1088	Hexagon head screw M 6x 20 DIN 558 galv
9	99 10 1045	Hexagon nut M 6 galv DIN 934-8
10	99 50 1147	Washer B 6.4 DIN 125 galv
11		Ventilation plug 001 370 20 00
12		Breather tube 450 mm lg 001 320 07 01
13		Ball Ø 10 001 370 19 00
14		Flat spiral spring Ø 20x450lg
15		Expansion coupler for square pipe 22x22 4361
16		Clamp 4392 for No. 4361+4365

11.2 Survey of Pressure Regulator Units and Ball Tanks with Flushing System, Outlet for Floor Management

<p>Code-No. 30 63 3421</p> <p>Pressure regulator L4281 with flushing system and accessories</p>	
<p>Code-No. 30 63 3423</p> <p>Pressure regulator L4282 central with flushing system and accessories</p>	
<p>Code-No. 30 61 3401</p> <p>Ball tank with flushing system 1 outlet for floor management</p>	
<p>Code-No. 30 61 3402</p> <p>Ball tank with flushing system 2 outlets for floor management</p>	

11.2.1 Pressure regulator L4281 with flushing system and accessories, Code-No. 30 63 3421

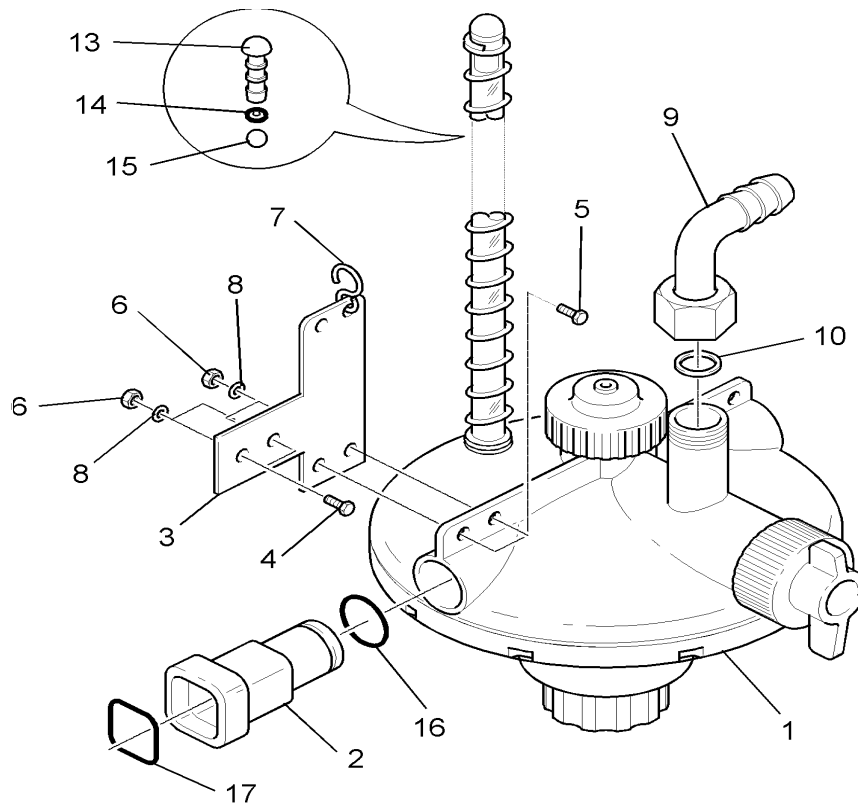


Figure 11-33:Explom796d129

Pos.	Code-No.	Designation
1	30 63 3421	Pressure regulator L4281 with flushing system and accessories
2	30 63 3460	Transition piece cpl from square pipe to pressure regulator
3	30 63 3429	Bracket for pressure regulator L at alu-profile
4	99 10-1100	Hexagon head screw M 6x 12 DIN 558 galv
5	99 10 1067	Hexagon head screw M 6x 16 DIN 558 galv
6	99 10 1045	Hexagon nut M 6 galv DIN 934-8
7	99 50 0011	S-hook 1" no 40/4x35
8	99 50 1147	Washer B 6.4 DIN 125 galv
9	81 01 0241	Angular hose nozzle with swivel nut 1/2" 4313
10	30 00 3583	Gasket - rubber 11x20-1.7 Extension pipe-clamp 1/2"
11	30 63 3462	Breather tube
12	30 63 3463	Compression spring
13	30 63 3464	Ventilation socket
14	30 63 3465	Flat packing
15	30 61 3094	Ball for breather tube
16	39 00 4204	O-ring 16x3.0 NBR50 for pipe clamp PVC
17	30 63 3466	O-ring 23.4x3.5

11.2.2 Pressure regulator L4282 central with flushing system and accessories Code-No. 30 63 3421

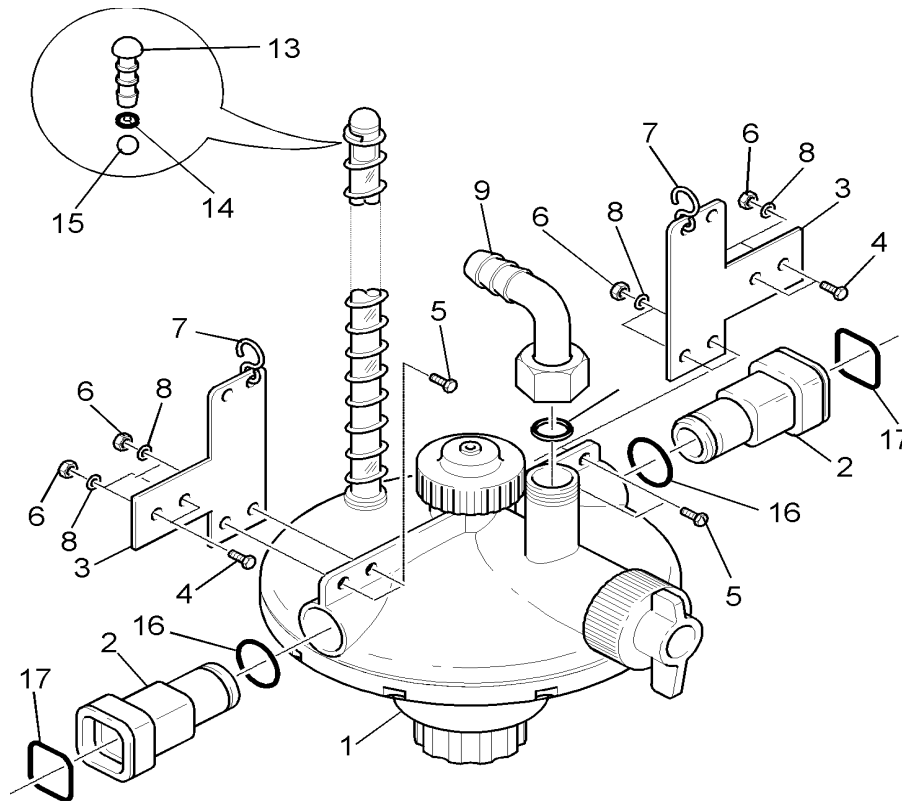


Figure 11-34:Explom796d138

Pos.	Code-No.	Designation
1	30 63 3423	Pressure regulator L4282 central w/flushing system+accessor.
2	30 63 3460	Transition piece cpl from square pipe to pressure regulator
3	30 63 3429	Bracket for pressure regulator L at alu-profile
4	99 10 1100	Hexagon head screw M 6x 12 DIN 558 galv
5	99 10 1067	Hexagon head screw M 6x 16 DIN 558 galv
6	99 10 1045	Hexagon nut M 6 galv DIN 934-8
7	99 50 0011	S-hook 1" no 40/4x35
8	99 50 1147	Washer B 6.4 DIN 125 galv
9	81 01 0241	Angular hose nozzle with swivel nut 1/2" 4313
10	30 00 3583	Gasket - rubber 11x20-1.7 Extension pipe-clamp 1/2"
11	30 63 3462	Breather tube
12	30 63 3463	Compression spring
13	30 63 3464	Ventilation socket
14	30 63 3465	Flat packing
15	30 61 3094	Ball for breather tube
16	39 00 4204	O-ring 16x3.0 NBR50 for pipe clamp PVC
17	30 63 3466	O-ring 23.4x3.5

11.2.3 Spare parts list for pressure regulator 4235 and 4236

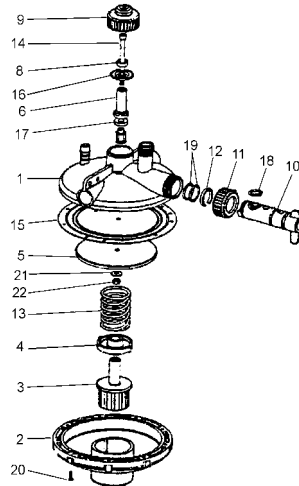


Figure 11-35:Explo796d138

	30 63 3425	Pressure regulator with one connection 4235
	30 63 3426	Pressure regulator with two connections (central) 4236
1	30 63 3467	Upper part (with one connection)
	30 63 3468	Upper part (with two connections central)
2	30 63 3469	Lower part
3	30 63 3470	Adjusting wheel
4	30 63 3471	Adjusting nut
5	30 63 3472	Diaphragm disk
6	30 63 3473	Rubber retainer
7	30 63 3474	Rubber bracket
8	30 63 3475	Retainer for diaphragm
9	30 63 3476	Valve cap
10	30 63 3477	Flush valve
11	30 63 3478	Valve nut
12	30 63 3479	Valve retaining ring
13	30 63 3480	Compression spring
14	30 63 3481	Hexagon socket head cap screw M 6x75 DIN 7984 ST vz
15	30 63 3482	Diaphragm large for pressure regulator L4281/4284
16	30 63 3483	Diaphragm small for pressure regulator L4281/4284
17	30 63 3484	Packing ring for pressure regulator
18	30 63 3485	O-ring 15x2.5 NBR 70
19	30 63 3486	O-ring 21x2.5 NBR 70
20	30 63 3487	Pan-head tapping screw BZ 4.2x13 DIN 7981 St vz
21	99 20 1170	Washer flat A 6.4x18x1.5 DIN 9021
22	99 10 1045	Hexagon nut M 6 galv DIN 934-8

11.2.4 Ball tank with flushing system 1 outlet (4221)

Pos.	Code-No.	Designation
	30 61 3401	Ball tank w/flushing system 1 outlet f/floor management (4221)
1		Tank 001 380 03 01
2		Cover 001 380 04 00
3		Float valve cpl 4254
4		Outlet with bracket 001 380 13 00
5		Seal 001 380 11 00
6		Guide piece 001 380 12 00
7		Flat nut 001 380 16 01
8		Plug drain 3/4" 001 370 29 01
9		Packing ring 3/4" 001 370 18 00
10		Packing ring 3/4" 4212
11		Form O-ring 001 380 20 00
12		O-ring 12x3 30 02 480
13		Hose coupler 4367
14		Straight pin \varnothing 3m6x16 DIN 7
15		Oval head screw M 5x30 DIN 7985
16		Hexagon head screw M 6x20 DIN 933
17	99 10 1045	Hexagon nut M 6 galv DIN 934-8
18	99 20 1170	Washer flat A 6.4 DIN 9021 galv
19	99 10 1023	Hexagon nut M 5 galv DIN 934-8
20		Circlip 001 390 23 00
21		Angular bush with swivel nut 1/2" 4313
22		Float 001 390 09 02
23		Lever 001 390 01 00
24		Retainer 001 390 02 00
25		Piston 001 390 04 01
26		Nozzle 001 390 22 00
27		Tightening nut 001 390 15 00
28		Nozzle retainer 001 300 07 00
29		Flat nut 001 390 12 01
30		Piston gasket 001 390 10 00
31		Valve seal 001 390 11 00
32		Pin 001 390 03 00
33		Packing ring 001 370 10 00

Ball tank with flushing system 1 outlet

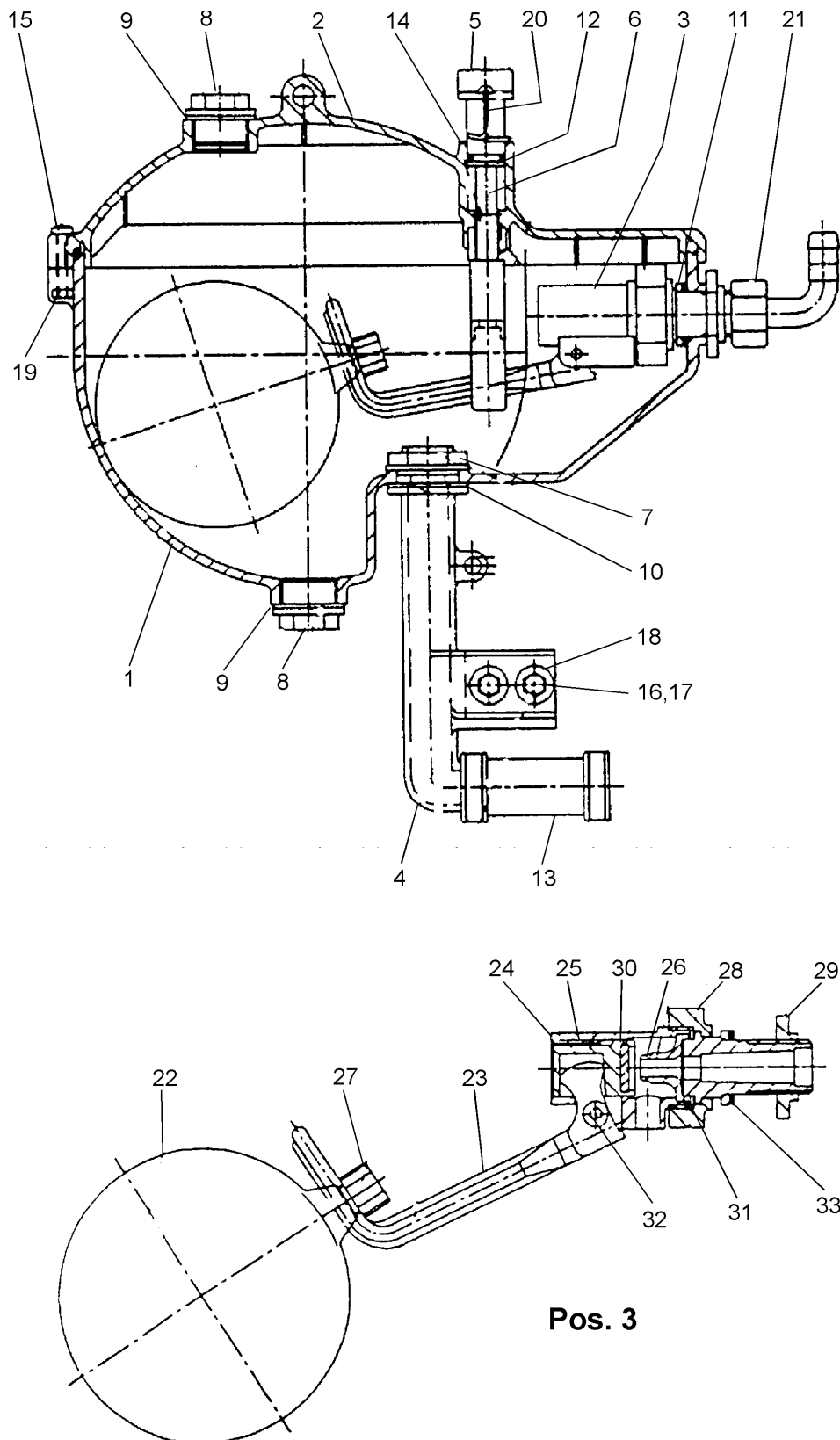


Figure 11-36:Explo706d141

11.2.5 Ball tank with flushing system 2 outlets (4223)

Pos.	Code-No.	Designation
	30 61 3402	Ball tank w/flushing system 2 outlets f/floor management (4223)
1		Tank 001 380 03 01
2		Cover 001 380 04 00
3		Float valve cpl 4254
4		Outlet with bracket 001 380 13 00
5		Seal 001 380 11 00
6		Guide piece 001 380 12 00
7		Flat nut 001 380 16 01
8		Plug drain 3/4" 001 370 29 01
9		Packing ring 3/4" 001 370 18 00
10		Packing ring 3/4" 4212
11		Form O-ring 001 380 20 00
12		O-ring 12x3 30 02 480
13		Hose coupler 4367
14		Straight pin \varnothing 3m6x16 DIN 7
15		Oval head screw M 5x30 DIN 7985
16		Hexagon head screw M 6x20 DIN 933
17	99 10 1045	Hexagon nut M 6 galv DIN 934-8
18	99 20 1170	Washer flat A 6.4 DIN 9021 galv
19	99 10 1023	Hexagon nut M 5 galv DIN 934-8
20		Circlip 001 390 23 00
21		Angular bush with swivel nut 1/2" 4313
22		Float 001 390 09 02
23		Lever 001 390 01 00
24		Retainer 001 390 02 00
25		Piston 001 390 04 01
26		Nozzle 001 390 22 00
27		Tightening nut 001 390 15 00
28		Nozzle retainer 001 300 07 00
29		Flat nut 001 390 12 01
30		Piston gasket 001 390 10 00
31		Valve seal 001 390 11 00
32		Pin 001 390 03 00
33		Packing ring 001 370 10 00

Ball tank with flushing system 2 outlets (4223)

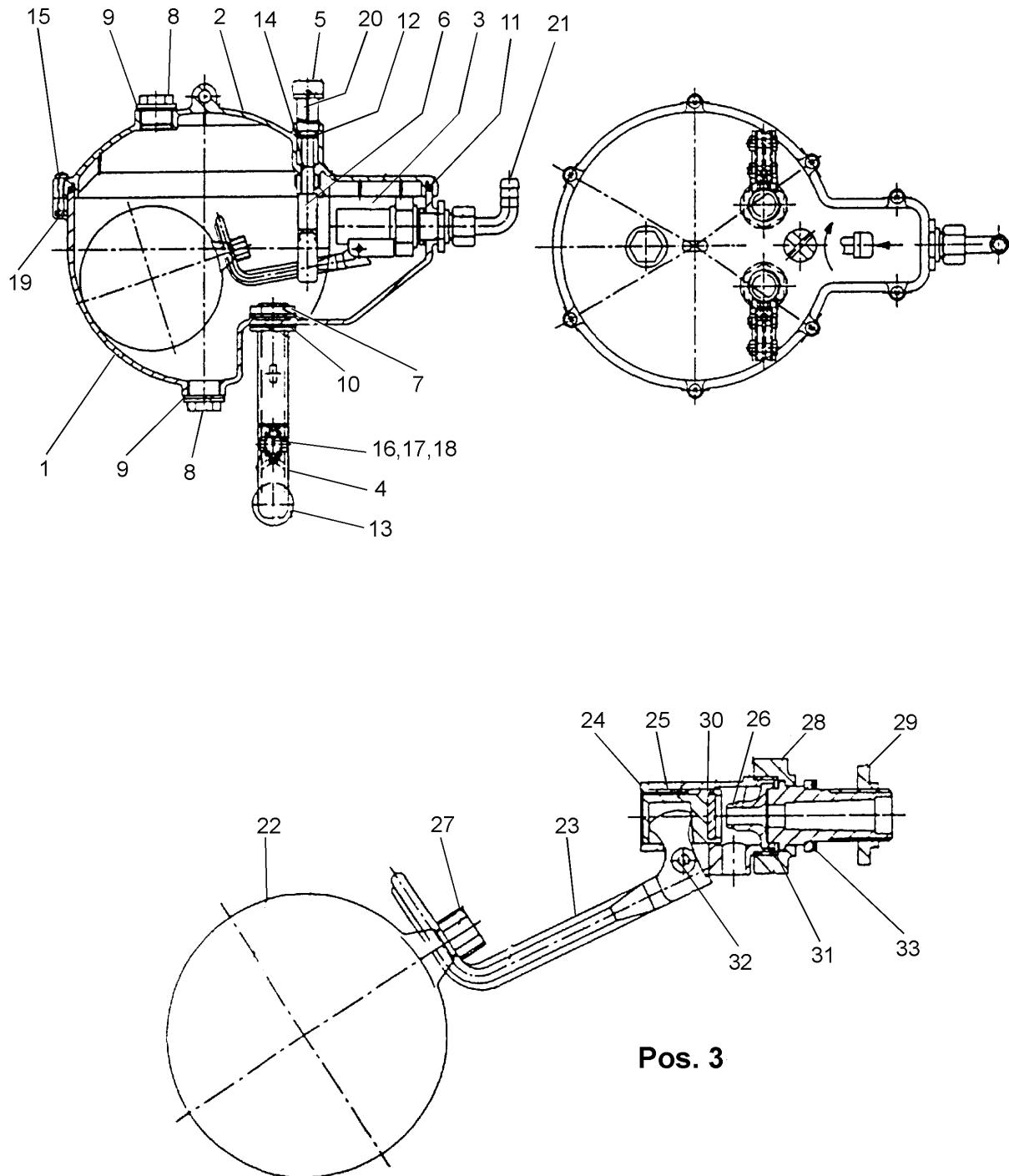


Figure 11-37:Explom706d140

11.2.6 Starter-cup for super-nipple L4060 with hose and adapter

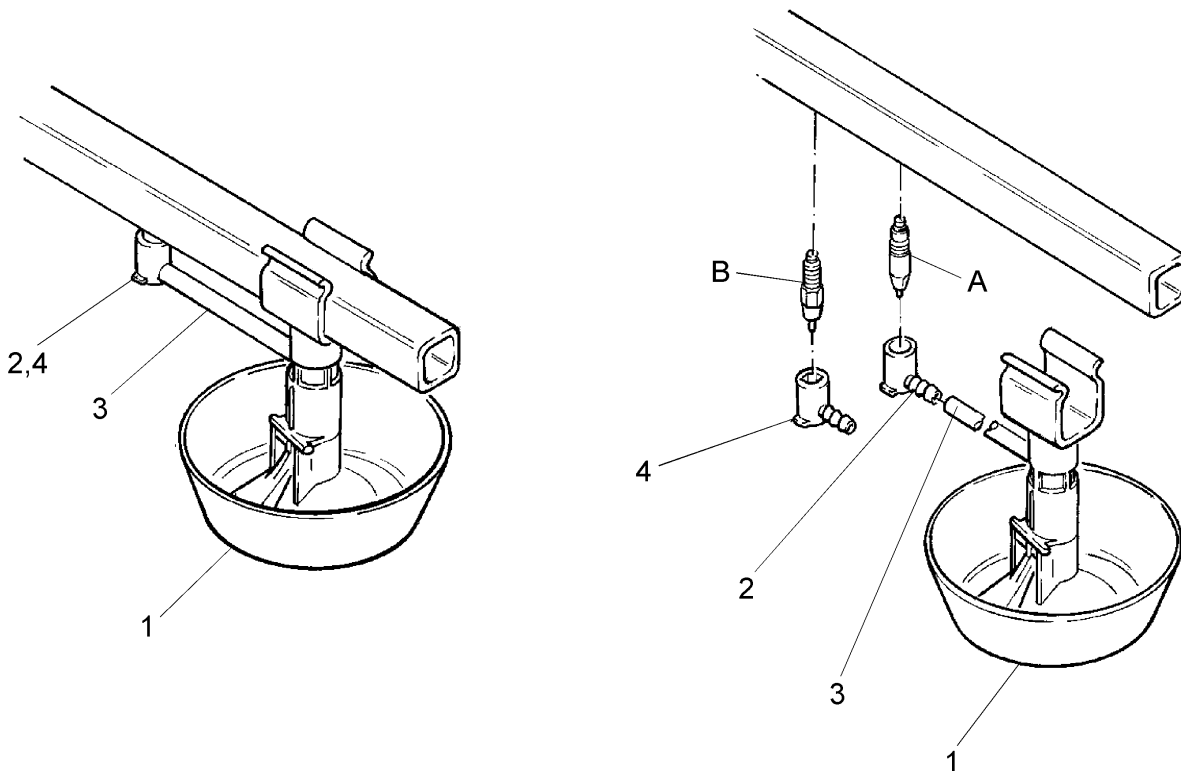


Figure 11-38:Explom706d120

Pos.	Code-No.	Designation
	30 61 3475	Starter cup cpl for the first week for super-nipple
1	30 61 3467	Starter cup for the first week L4059
2	30 00 3648	Adapter for SST nipple
3	30 03 3023	Hose - runn mtr - 6x9
	30 61 3465	Starter cup cpl for the first week for super-combi-nipple
1	30 61 3467	Starter cup for the first week L4059
4	30 00 3629	Adapter for combi nipple
3	30 03 3023	Hose - runn mtr - 6x9

11.2.7 Round cup for DOS-nipple NE

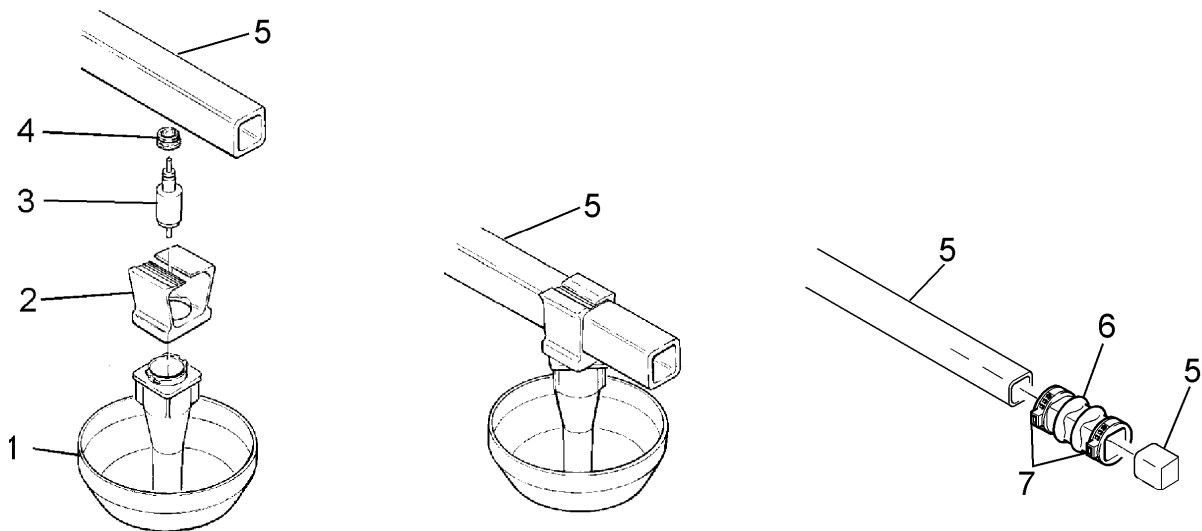



Figure 11-39:Explom706d121

Pos.	Code-No.	Designation
1	30 00 3436	Cup round wo/clamp f/DOS-nipple NE
2	30 00 3438	Clamp bracket closed NE for 30-00-3436 + 30-00-3437
3	30 00 3411	DOS-nipple without gasket
4	30 00 3407	Gasket for plug-in and DOS-nipple
5		Nipple pipe
6	30 00 3155	Coupler cpl W-PVC/galv for nipple pipe laying
7	30 00 3111	Clip hose 031.6-708 galv for coupler f/nipple pipe laying (standard)
	30 00 3112	Clip hose 031.6-706 R SST for coupler f/nipple pipe laying (optional)

Space for notes:


12 Mounting of the Anti-Roost Wire

	<p>The anti-roost wire is used in the management of laying hens and pullets.</p> <p>The anti-roost wire is not included in the standard version. It is optional. See Explo m706d162-165.</p> <p>Carefully unroll the anti-roost wire (wire rope -2 mm) (12).</p> <p>Avoid kinks and knots when unrolling the wire rope -2 mm (12)!</p>
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- Clamp two additional suspension clips with insulator (10) on every alu-profile for drinker 3 m (9). See to a regular distribution of the suspension clips with insulator (10). See Explo m706d166x and Explo m706d172.
- Draw the anti-roost wire (wire rope -2 mm) (12) from one end of the drinking line through the eyes of the suspension ropes to the other end and cut it off. See Explo m706d172.
- If you have drinking lines with a pressure regulator with two connections (2) or a ball tank with flushing system 2 outlets for floor management (5) the wire rope -2 mm must be cut through in the middle of the row. See Explo m706d178b and Explo m706d 177b.
- Hook the wire rope -2 mm (12) into the rope guide of the suspension clip with insulator (10). See Explo m706d172.
- Hang an insulator (13) with an S-hook 4 x 80 for insulator (14) into the bore hole of the revolving breather cpl (11). See Explo m706d179a and Explo m706d179b.
- Fasten one end of the wire rope -2 mm (12) with a cable clamp 3 mm 1/8" (15) at the insulator (13). See Explo m706d179a and Explo m706d 179b.
- Cut the wire rope -2mm (12) through after every 10th to 12th element of drinking line (30 - 36 m) (A).
- Fasten one tension spring (16) each between the cut ends of the wire rope -2 mm (12) using one cable clamp 3 mm 1/8" (15) per rope end. See Explo m706d166F.
- If you have a pressure regulator unit (1, 2) hang an insulator (13) with an S-hook 4 x 80 for insulator (14) into the corresponding bore hole at the bracket for pressure

regulator L at alu-profile (3). See Explo m706d177 and m706d 178b.

- In case the water is supplied with a ball tank with flushing system (4, 5) hang an insulator (13) with an S-hook 4 x 80 for insulator (14) into the eye of the ball tank with flushing system (4,5). See Explo m706d177a and Explo m706d 177b.
- Tension the anti-roost wire -2 mm (12) until the tension springs (16) are extended by about 60 mm. Fasten the end of the wire rope -2 mm (12) at the insulator (13) with a cable clamp 3 mm 1/8" (15). Cut off the exceeding end of the wire rope -2 mm (12).
- If you have drinking lines with a pressure regulator with two connections (2) or a ball tank with flushing system 2 outlets for floor management (5) put a Dolue connector (20) on each end of the wire rope -2mm (12) in the middle of the line. See- Explo m706d178b and Explo m706d 177b.
- In the middle of the line, connect the wire ropes -2mm (12) to a cable - NYL 3.75 kV yellow 1.5 (19) by means of Dolue connectors (20) with the drinking lines with a pressure regulator with two connections (2) or a ball tank with flushing system 2 outlets for floor management (5). See Explo m706d178b and Explo m706d 177b.
- After having mounted all the anti-roost wires -2 mm (12), install the cross ropes (X, Y) wire rope -2 mm (12) an. See Explo m706d173 and Explo m706d 174.

	<p>Mount the cross ropes (X, Y) twice per house:</p> <ul style="list-style-type: none"> • for the electric power supply of the anti-roost wire (X) • for the earthing of the drinking lines (Y).
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- Fasten an insulator St-D (18) at both side walls of the house with dowels S 8 (17) See Explo m706d173, details A + B.
- Fasten a wire rope -2mm (12) at one side wall at the insulator St-D (18) with a cable clamp 3mm 1/8" (15). See Explo m706d173, detail B.
- Hang a tension spring 2 x 14 x 134 A (16) into the eye of the insulator St-D (18) at the opposite side wall of the house. See Explo m706d173, detail A.
- Push one Dolue connector (20) on every cross cable (X, Y) for the connection of

the electric fencer ES-20/60 with cable (22) and one for every drinking line for the connection of the wire rope -2mm (12) to the cross cable (X, Y). See Explo m706 d174, detail D.

- Fasten every cross cable (X, Y) at the tension spring 2 x 14 x 134 A (16) with a cable clamp 3 mm 1/8" (15). See Explo m706d173, detail A.



With a house width of over 8m, the cross rope (X, Y) must in addition be suspended in the house centre.

- Fasten an insulator St-D (18) in the house centre at the roof beam. See Explo m706d173, detail C.
- Cut off a piece of wire rope -2mm (12) with the length of the insulator St-D (18) at the roof beam to the cross cable (X, Y) and fasten this piece with one cable clamp 3 mm 1/8" (15) each at the insulator St-D (18), at the roof beam and at the cross cable. See Explo m706d173 and detail C.
- Cut off one cable - NYL 3.75 kV yellow 1.5 (insulation cable) (19) per drinking line with the length of the cross cable (X) to the connecting point of the anti-roost wire 2 mm (12). See Explo m706d174, details D + E.
- Connect one end of the cable - NYL 3.75 kV yellow 1.5 (19) to the cross cable (X) with a Dolue connector (20). See Explo m706d174, detail D.
- Connect the other end of the cable - NYL 3.75 kV yellow 1.5 (19) to an adjustable collar AK 2 S black (21) and the anti-roost wire -2 mm (12). See Explo m706d174, detail E.
- Fasten the electric fencer ES-20/60 with cable (22) close to the cross cables (X, Y). See Explo m706d174.
- Connect the connection cable AKO WZ 2 b (23) to the plus pole of the electric fencer ES-20/60 with cable (22) and to the cross cable (X) with a Dolue connector (20). See Explo m706d174, detail D.
- Cut off one wire rope -2 mm (12) per drinking line with the length of the cross rope (Y) to the connecting point of the pressure regulator resp. the ball tank. See Explo m706d174, detail D, G, L.

- Connect one end of the wire rope -2 mm (12) to the cross cable (Y) with a Dolue connector (20). See Explo m706d174 and detail D.
- If you have a pressure regulator unit (1, 2), connect the other end of the wire rope -2mm (12) to the bracket for pressure regulator L to alu-profile (3) and the alu-profile for drinker 3 m (9). See Explo m706d174, detail G and Explo m706d180, detail S.
- If the water is supplied with a ball tank (4, 5) put the other end of the wire rope -2mm (12) between the ball tank (4, 5) and the alu-profile for drinker 3 m (9). See Explo m706d174, detail L and Explo m706d180, detail U.
- If you have a revolving breather cpl (11) connect the other end of the wire rope -2mm (12) to the alu-profile for drinker 3 m (9). See Explo m706d180, detail N.
- Connect the electric fencer ES-20/60 with cable (22) to the connection cable AKO WZ 2 b (23) at the minus pole and the cross cable (Y) with the connection cable AKO WZ 2 b (23) with a Dolue connector (20). See Explo m706d174, detail D.
- The earthing and the connection of the electric fencer ES-20/60 with cable (22) must be carried out at site by an authorised expert.



Please consider the "General instructions for the installation and connection of an electric fencer."

Pos	Code-No.	Designation
1	30 63 3421	Pressure regulator L4281 with flushing system and accessories
2	30 63 3423	Pressure regulator L4282 central w. flushing system and accessories
3	30 63 3429	Bracket for pressure regulator L at alu profile
4	30 61 3401	Ball tank with flushing system 1 outlet for floor management
5	30 61 3402	Ball tank with flushing system 2 outlets for floor management
6	99 10 1088	Hexagon head screw M 6x20 DIN 558 galv
7	99 10 1100	Hexagon head screw M 6x12 DIN 558 galv
8	99 10 1045	Hexagon nut M 6 galv DIN 934-8
9	30 61 3480	Profile alu for waterer 3m
10	30 61 3482	Suspension clip with insulator
11	30 61 3430	Breather revolving for end-set cpl L4244
12	99 50 1260	Wire rope 2mm galv
13	11 00 9071	Insulator
14	11 00 9073	S-hook 4x80 f/insulator
15	99 50 0014	Cable clamp 3mm 1/8" galv DIN 741
16	39 00 3096	Tension spring 2x14x134 C DIN 17223 galv
17	99 98 3781	Dowel S 8
18	11 00 9072	Insulator St-D with thread for woodwork
19	99 30 3401	Cable - NYL 3.75kV yell 1.5
20	99 98 5050	Dolue connector 12pcs/6qmm
21	99 30 3104	Adjustable collar black AK2
22	91 00 1263	Electric fencer ES-20/60 with cable
23	91 00 1265	Connection cable AKO WZ2b
24	99 50 1147	Washer B 6.4 DIN 125 galv

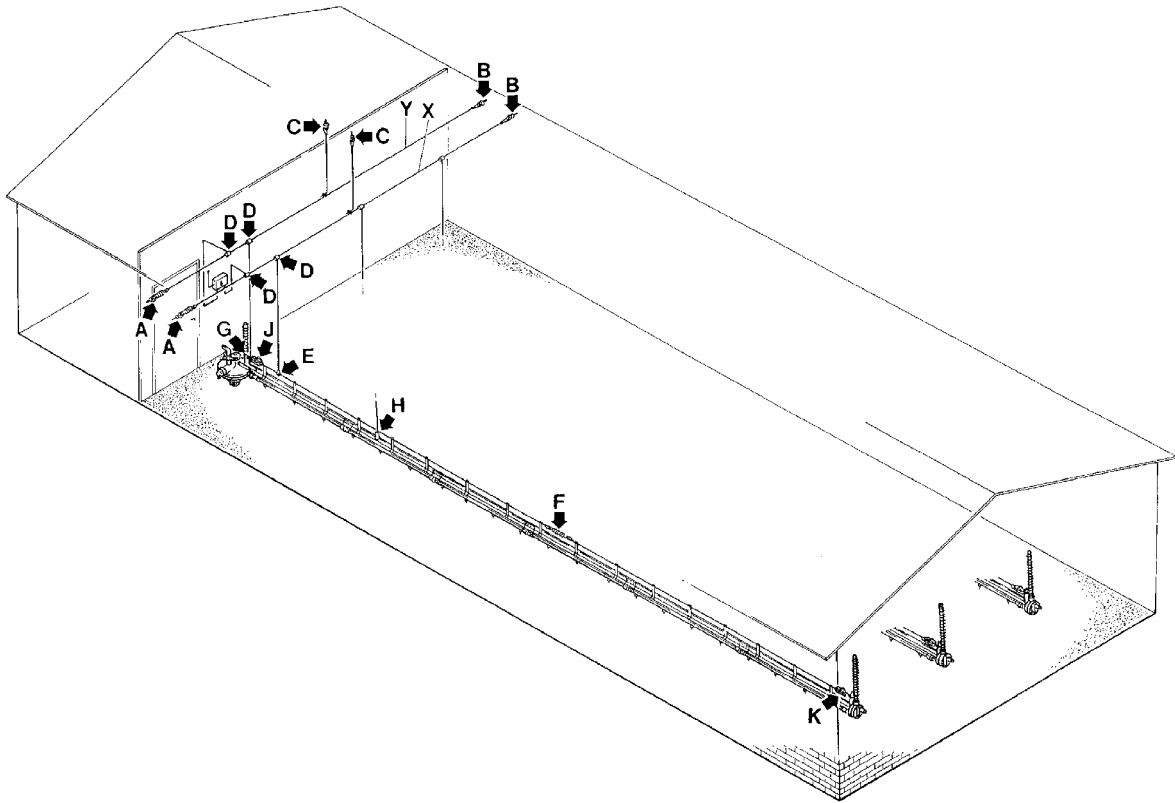


Figure 12-40:Explom706d162

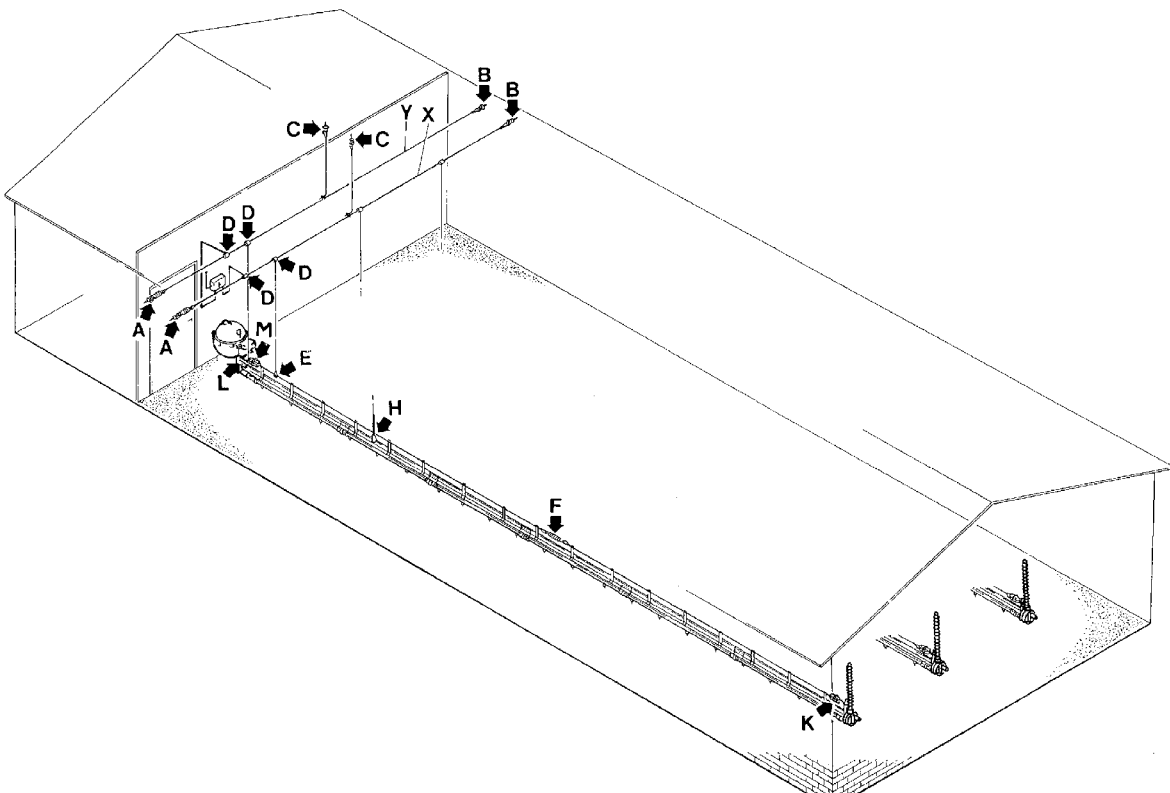


Figure 12-41:Explom706d163

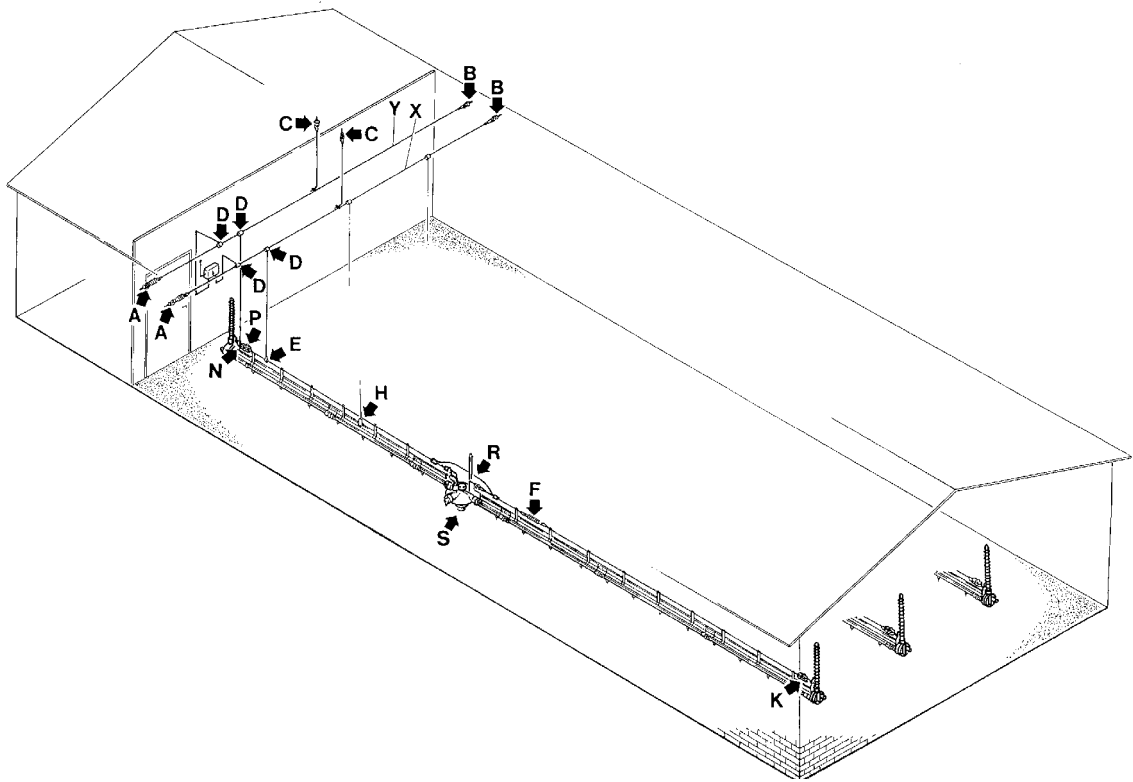


Figure 12-42:Explom706d164

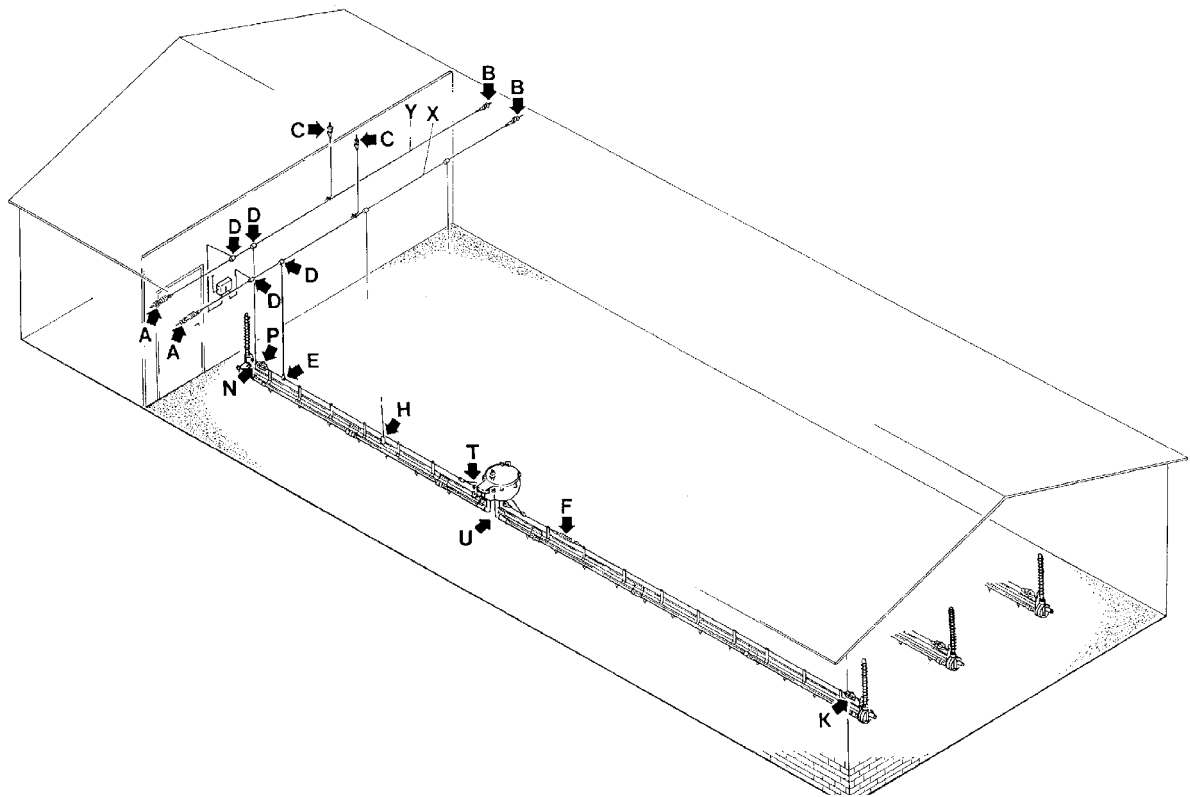
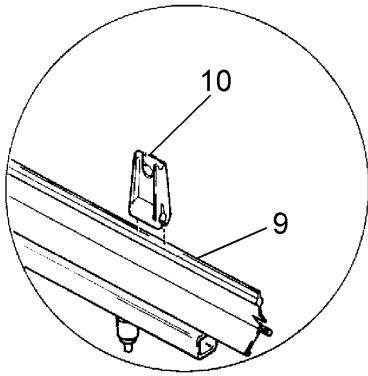
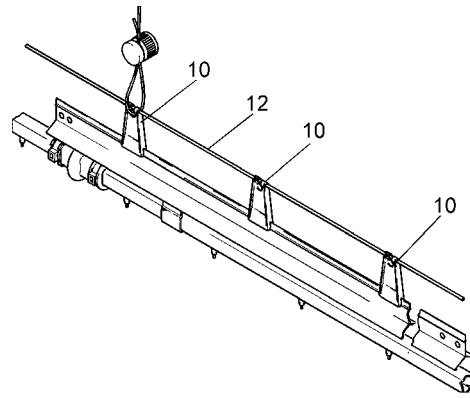


Figure 12-43:Explom706d165



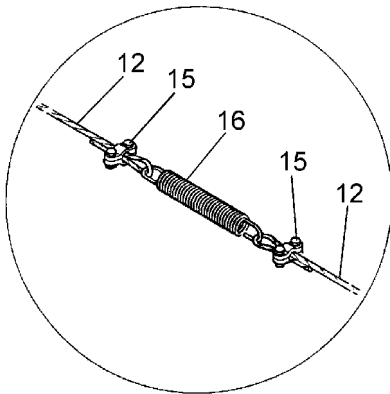
Detail V

Figure 12-44:Explom706d166x



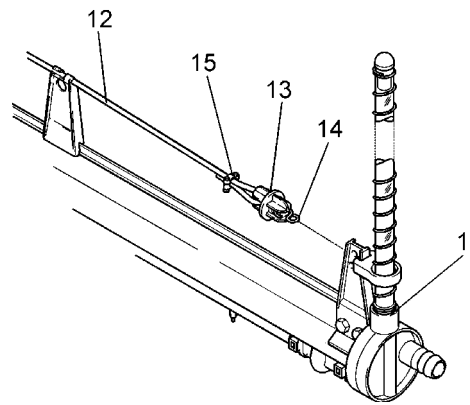
Detail H

Figure 12-45:Explom706d172



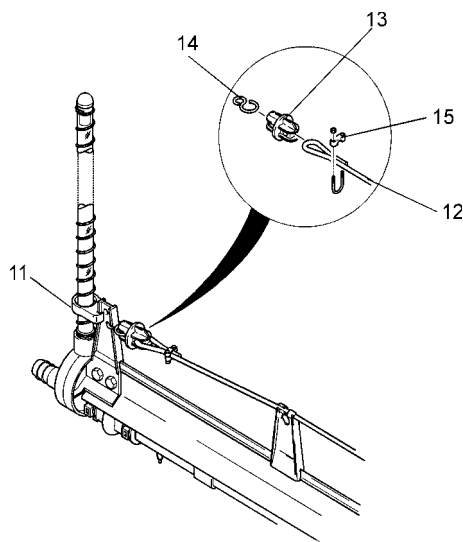
Detail F

Figure 12-46:Explom706d166F



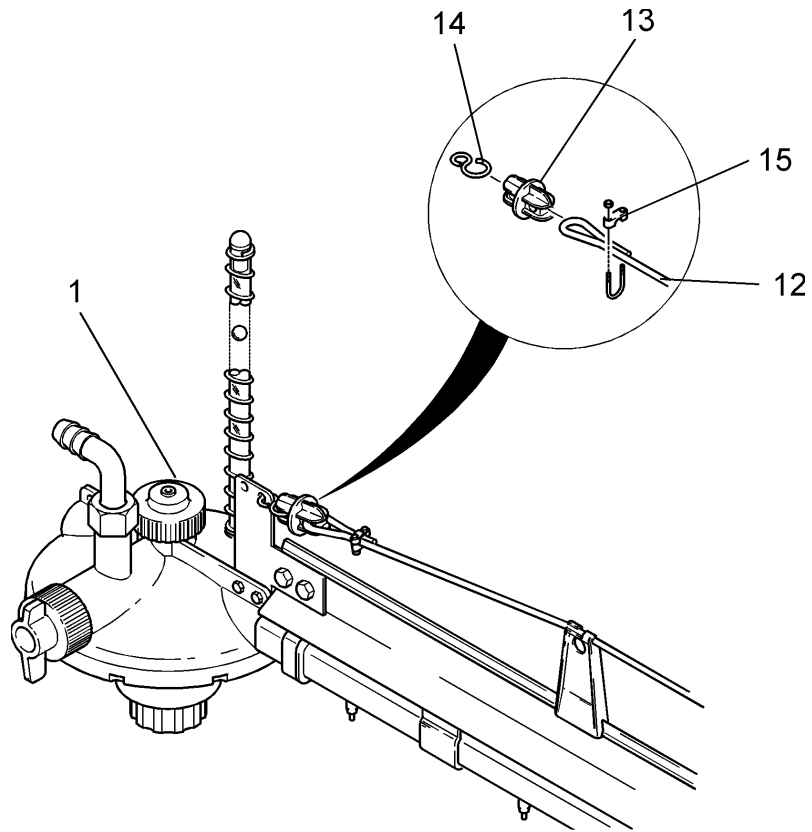
Detail K

Figure 12-47:Explom706d179b



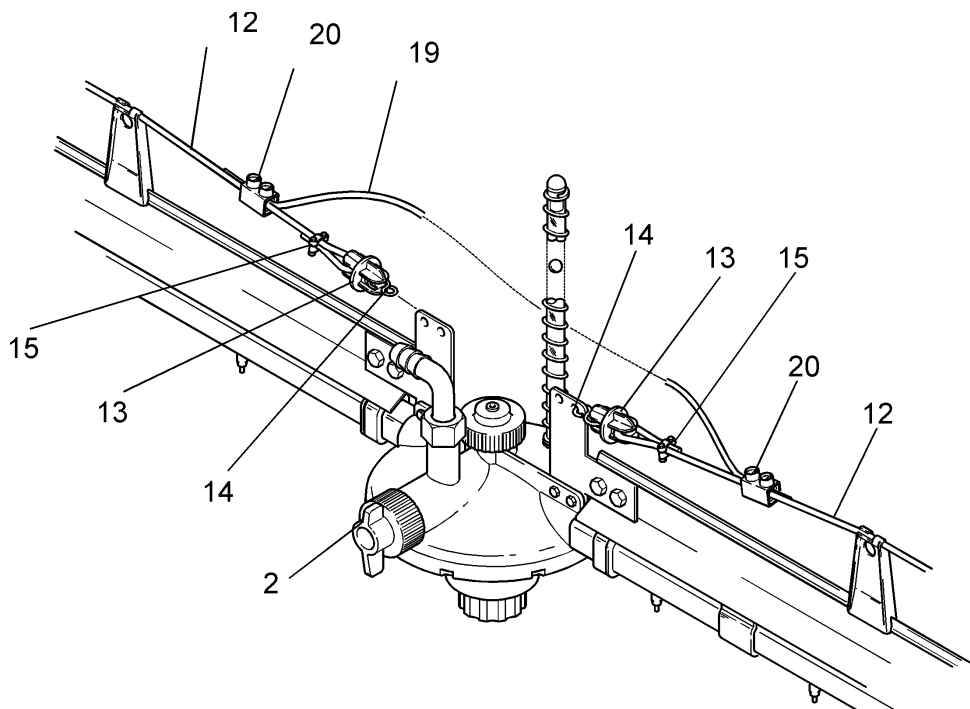
Detail P

Figure 12-48:Explom706d179a



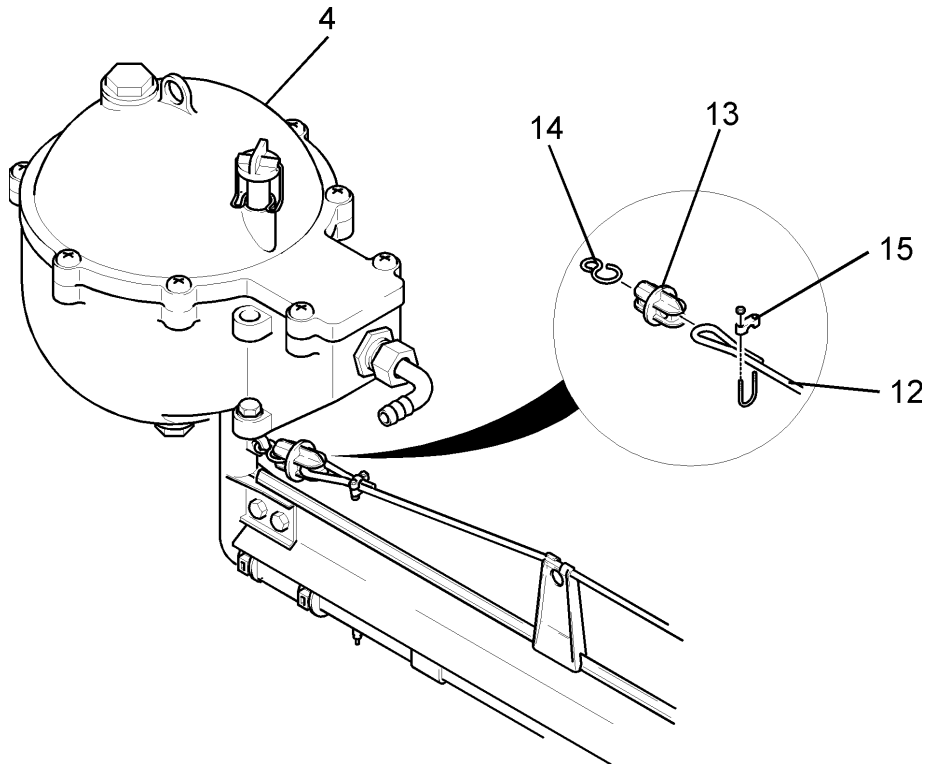
Detail J

Figure 12-49:Explom706d177



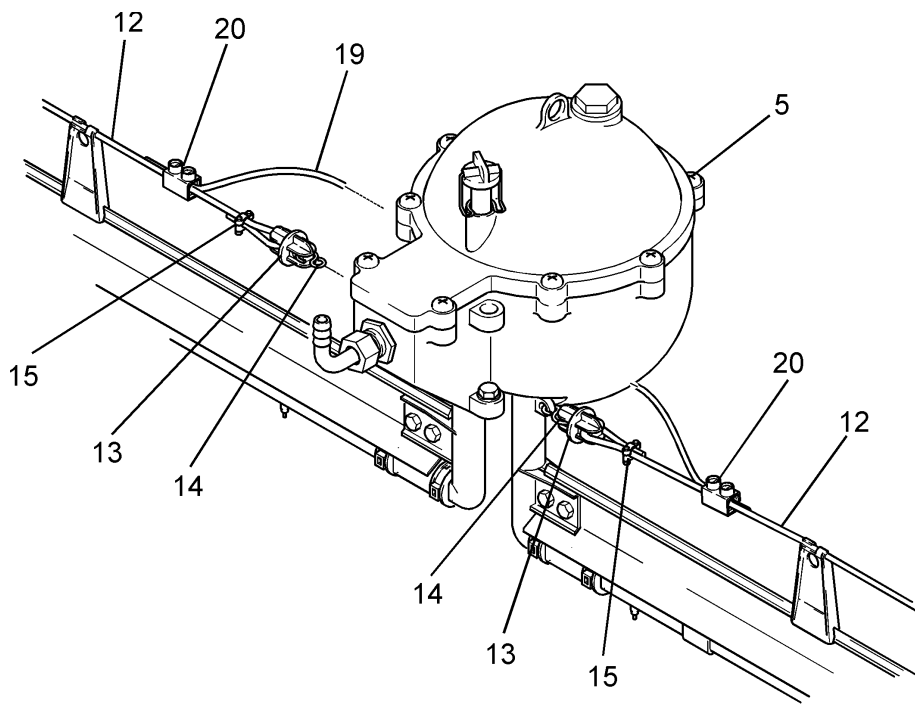
Detail R

Figure 12-50:Explom706d178b



Detail M

Figure 12-51:Explom706d177a



Detail T

Figure 12-52:Explom706d177b

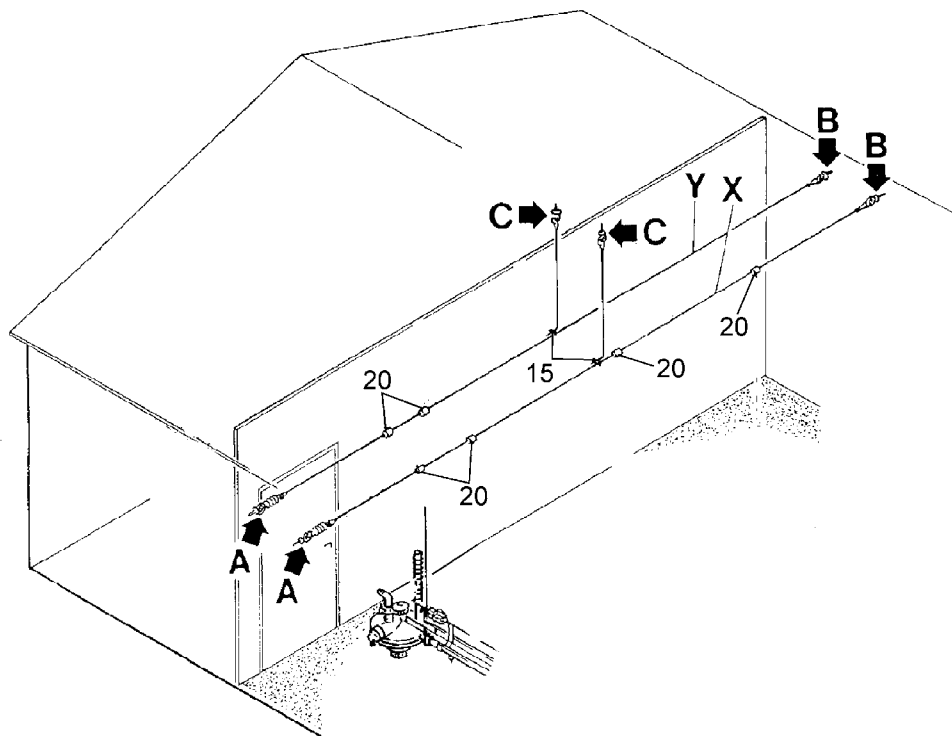
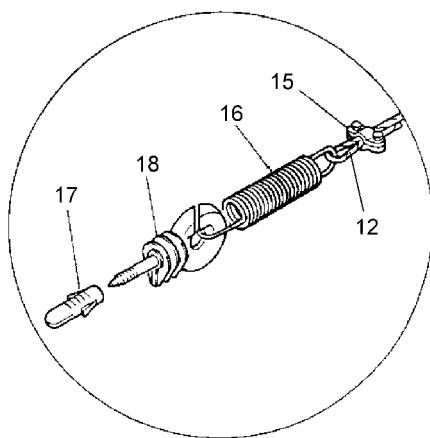
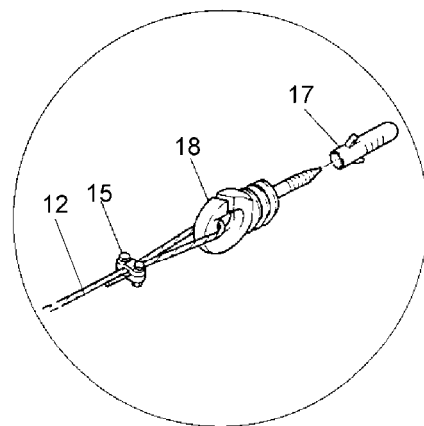


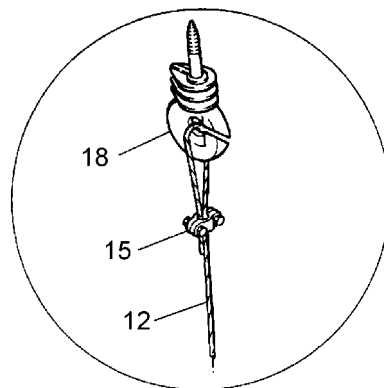
Figure 12-53:Explom706d173



Detail A



Detail B



Detail C

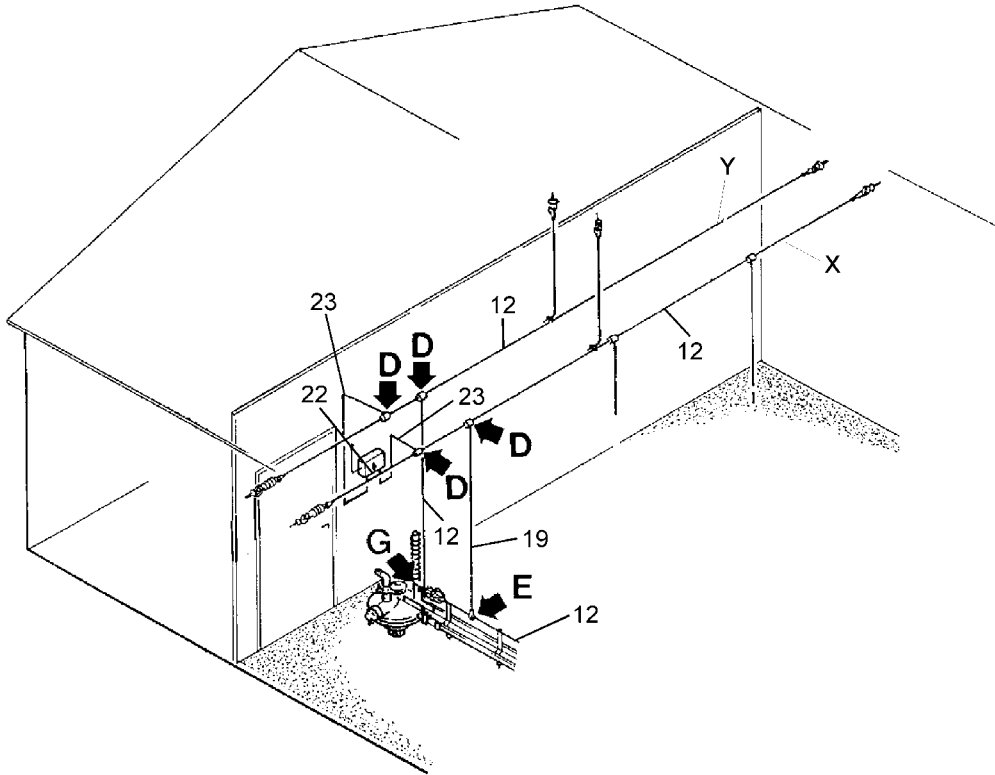
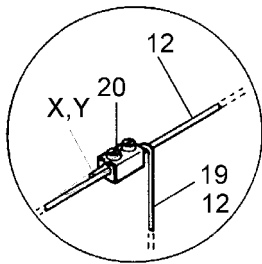
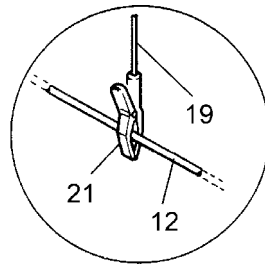


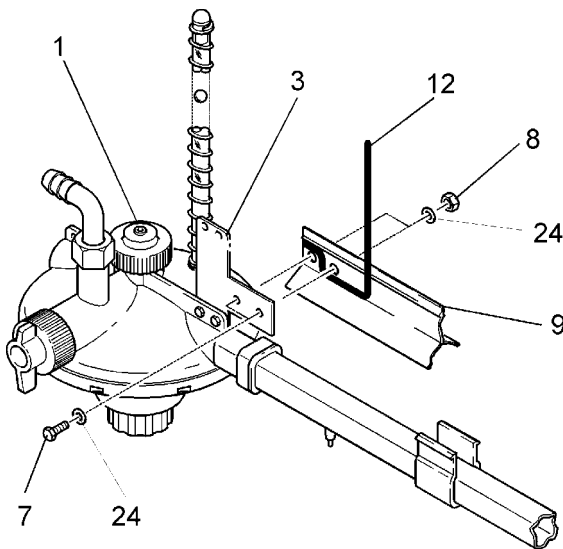
Figure 12-54: Explom706d174



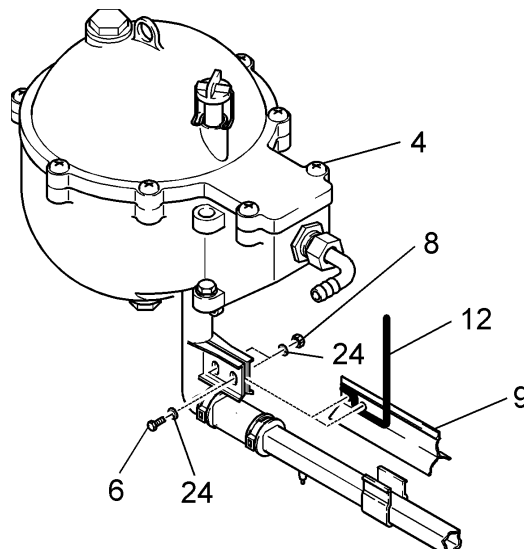
Detail D



Detail E



Detail G



Detail L

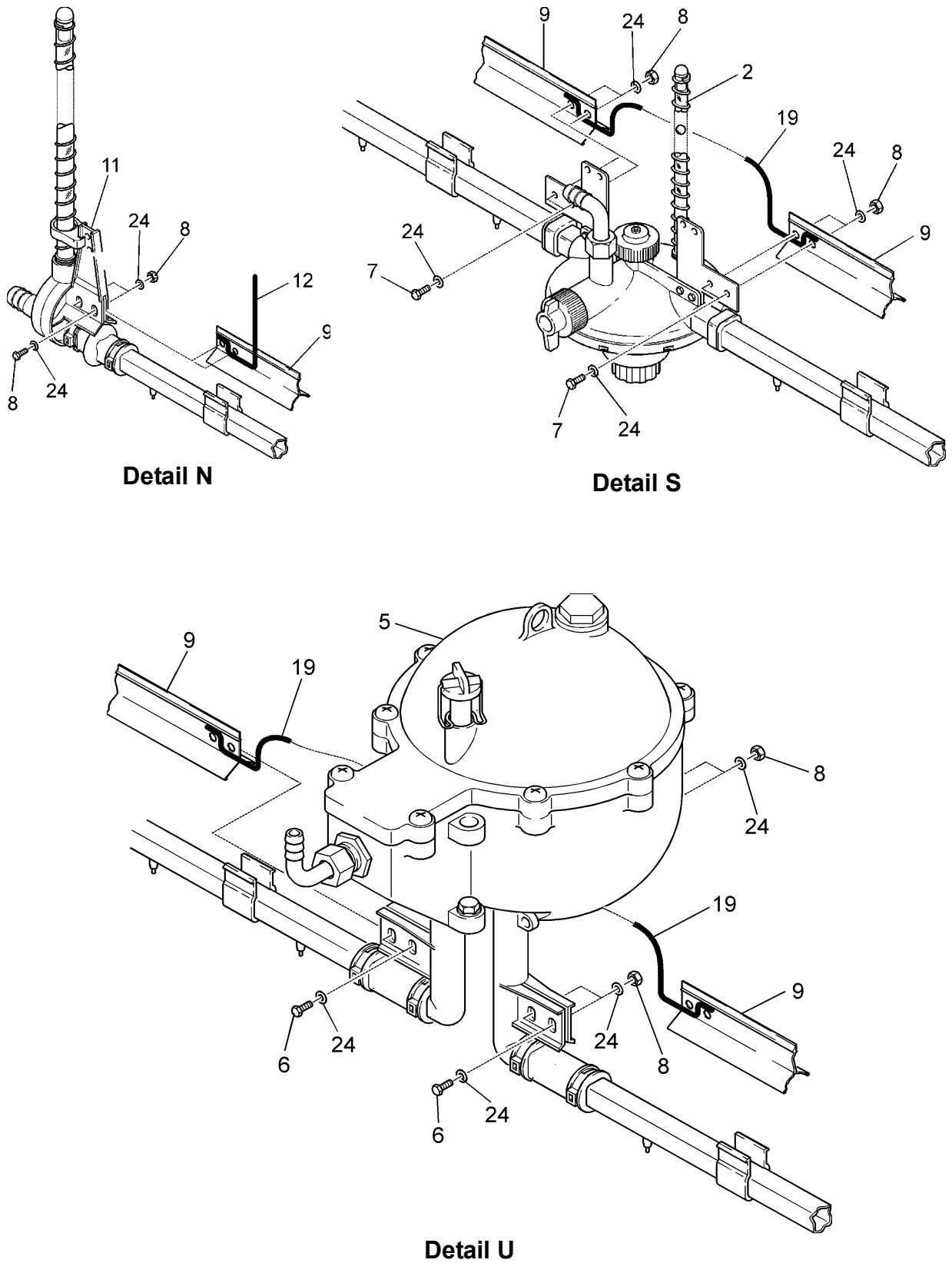


Figure 12-55:Explom706d180

Space for notes:

13 Round Drinkers

13.1 Description of the Round Drinkers:

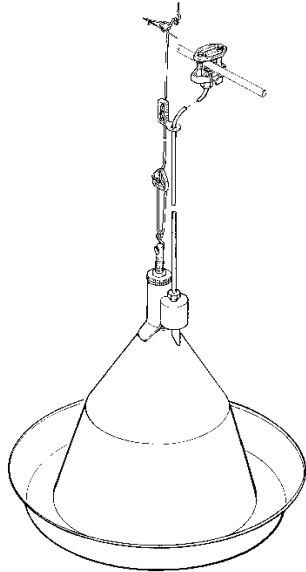
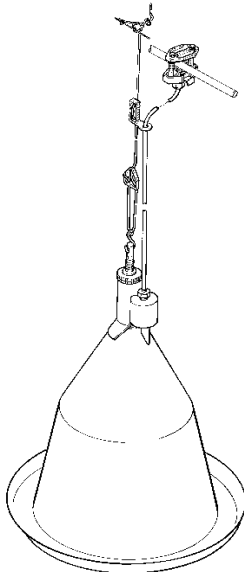
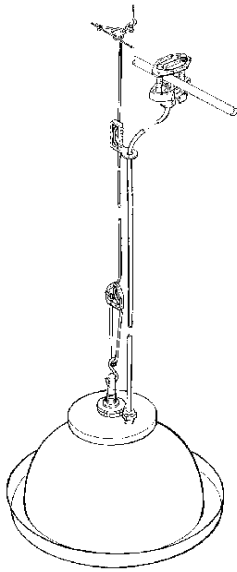
30 03 3170 Jumbo-T	30 03 3100 Jumbo-B	30 03 3180 Jumbo-J
Jumbo-(T) urkey	Jumbo-(B) roiler	Jumbo-(J) unior
		

Figure 13-56:Explom706d106,106a,106b

Round drinkers can be used in suspended or standing position.

Owing to the small water jet along the bell, the bell will get only little dirty. The water will not splash over the border. In case of the Jumbo-J, the water supply is situated directly above the drinking trough.

The only differences between the Jumbo-B and Jumbo-T drinkers are the bell and the big spring. Therefore both versions can very easily be modified by exchanging these two parts (see spare parts list).

For the mounting of the round drinkers please see the following explas.

13.2 Parts List Round Drinkers

13.2.1 Poultry drinker Jumbo-T Code-No. 30 03 3170

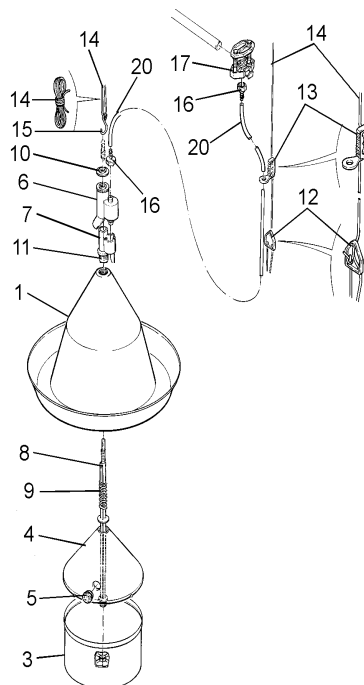


Figure 13-57:Explom706d134

Pos.	Code-No.	Designation
1	30 03 3171	Bell f/drinker Jumbo-T
2	30 03 3102	Ballast tank cpl for Jumbo-B/T (Pos. 3-5)
3	30 03 3103	Base f/drinker Jumbo-B/T
4	30 03 3104	Cover for drinker Jumbo-B/T
5	30 03 3105	Plug Jumbo-B/T/J
6	30 03 3106	Valve housing outer Jumbo-B/T
7	30 03 3107	Valve housing inner Jumbo-B/T
8	30 03 3108	Stem Jumbo-B/T
9	30 03 3179	Big spring Jumbo-T
10	30 03 3110	Backnut Jumbo-B/T/J
11	30 03 3111	Valve insert cpl Jumbo-B/T/J
12	30 03 3112	Tightener for suspension cord Jumbo-B/T/J
13	30 03 3113	Hose guide Jumbo-B/T/J
14	30 03 3114	Suspension cord Jumbo-B/T/J
15	30 03 3115	S-hook for suspension Jumbo-B/T/J
16	30 03 3116	Socket Jumbo-B/T/J
17	30 03 3125	Shut-off saddle cpl Jumbo-B/T/J
20	30 03 3128	Hose - runn mtr - 5x9

13.2.2 Poultry drinker Jumbo-B Code-No. 30 03 3100

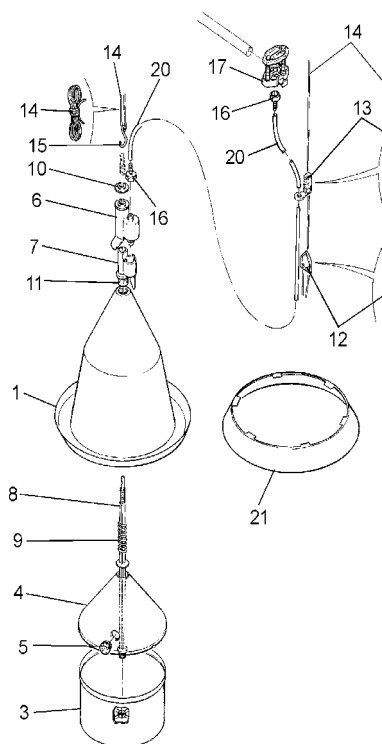


Figure 13-58:Explom706d131

Pos.	Code-No.	Designation
1	30 03 3101	Bell f/drinker Jumbo-B
2	30 03 3102	Ballast tank cpl for Jumbo-B/T (Pos. 3-5)
3	30 03 3103	Base f/drinker Jumbo-B/T
4	30 03 3104	Cover for drinker Jumbo-B/T
5	30 03 3105	Plug Jumbo-B/T/J
6	30 03 3106	Valve housing outer Jumbo-B/T
7	30 03 3107	Valve housing inner Jumbo-B/T
8	30 03 3108	Stem Jumbo-B/
9	30 03 3109	Big spring Jumbo-B
10	30 03 3110	Backnut Jumbo-B/T/J
11	30 03-3111	Valve insert cpl Jumbo-B/T/J
12	30 03 3112	Tightener for suspension cord Jumbo-B/T/J
13	30 03-3113	Hose guide Jumbo-B/T/J
14	30 03 3114	Suspension cord Jumbo-B/T/J
15	30 03 3115	S-hook for suspension Jumbo-B/T/J
16	30 03 3116	Socket Jumbo-B/T/J
17	30 03 3125	Shut-off saddle cpl Jumbo-B/T/J
20	30 03 3128	Hose - runn mtr - 5x9
21	30 03 3129	Chick ring Jumbo-B

13.2.3 Poultry drinker Jumbo-J Code-No. 30 03 3180

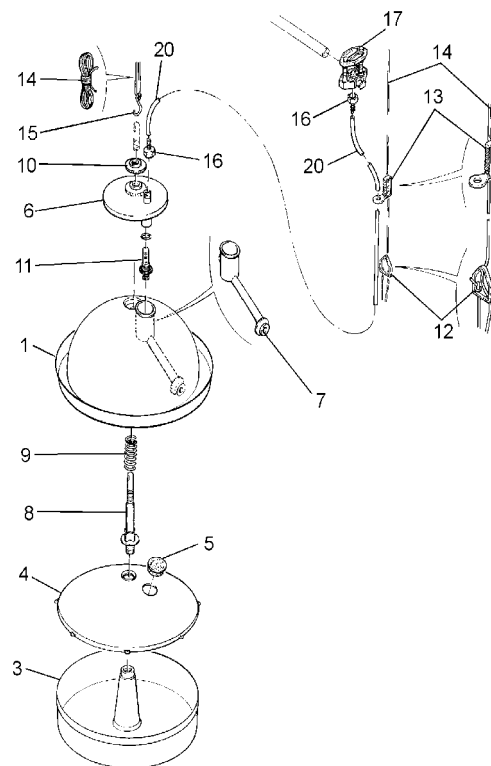
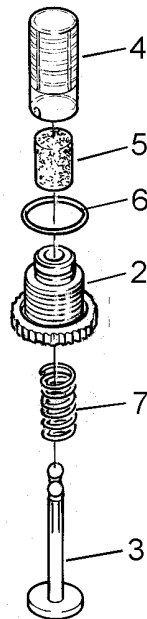


Figure 13-59:Explom706d130

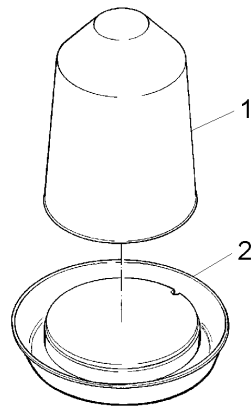
Pos.	Code-No.	Designation
1	30 03 3181	Bell for Jumbo-J
2	30 03 3182	Ballast tank cpl for Jumbo-J (Pos. 3-5)
3	30 03 3183	Base for drinker Jumbo-B/J
4	30 03 3184	Cover for drinker Jumbo-B/J
5	30 03 3105	Plug Jumbo-B/T/J
6	30 03 3186	Valve body Jumbo-J
7		Water pipe 0209106 Jumbo-J
8	30 03 3188	Stem Jumbo-J
9	30 03 3189	Big spring Jumbo-J
10	30 03 3110	Backnut Jumbo-B/T/J
11	30 03 3111	Valve insert cpl Jumbo-B/T/J
12	30 03 3112	Tightener for suspension cord Jumbo-B/T/J
13	30 03 3113	Hose guide Jumbo-B/T/J
14	30 03 3114	Suspension cord Jumbo-B/T/J
15	30 03 3115	S-hook for suspension Jumbo-B/T/J
16	30 03 3116	Socket Jumbo-B/T/J
17	30 03 3125	Shut-off saddle cpl Jumbo-B/T/J
20	30 03 3128	Hose - runn mtr - 5x9

13.2.4 Valve insert cpl. Jumbo-B/T/J



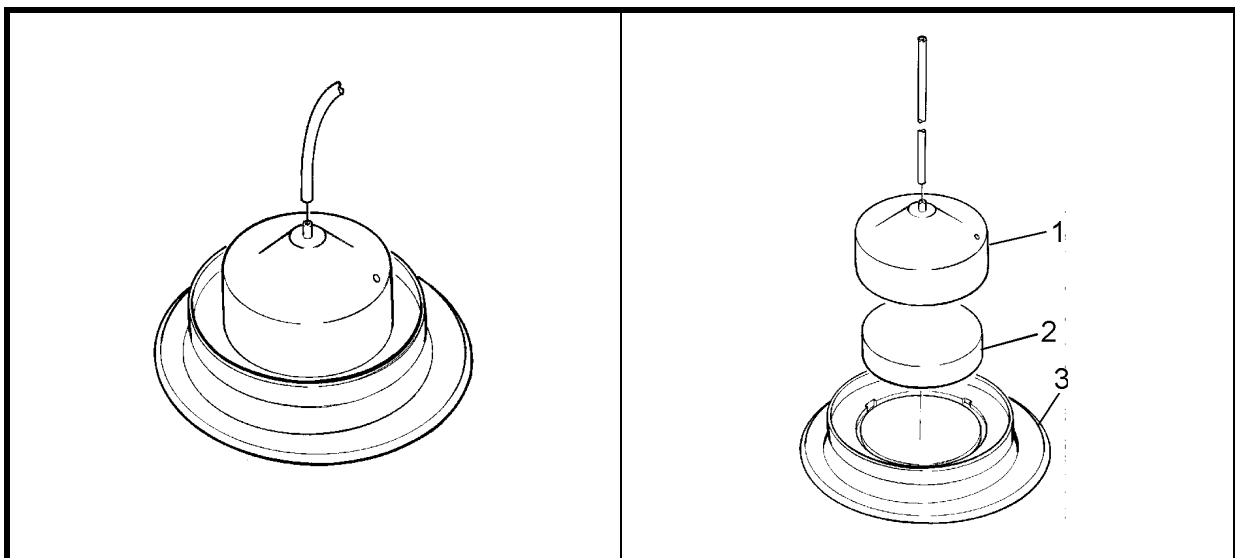
Pos.	Code-No.	Designation
1	30 03 3111	Valve insert cpl Jumbo-B/T/J
2	30 03 3117	Valve body Jumbo-B/T/J
3	30 03 3118	Rod for valve Jumbo-B/T/J
4	30 03 3119	Filter for valve Jumbo-B/T/J
5	30 03 3120	Rubber bullet Jumbo-B/T/J
6	30 03 3121	O-ring f/valve Jumbo-B/T/J
7	30 03 3122	Spring f/valve Jumbo-B/T/J

13.2.5 Chick drinker - plastic



Pos.	Code-No.	Designation
	30 68 1500	Chick-fount plastic 2.5l
1	30 68 1501	Lower part f/plastic chick-fount 2.5 ltr
2	30 68 1502	Jar plastic f/chick-fount 2.5ltr
	30 68 1510	Chick-fount plastic 5.0l
1	30 68 1512	Lower part f/plastic chick-fount 5.0 ltr
2	30 68 1513	Jar plastic f/chick-fount 5.0ltr

13.2.6 Poultry drinker Minimaster 2 without connection material



Pos.	Code-No.	Designation
	30 05 1050	Drinker round Minimaster 2 without connection material
1	30 05 1051	Top incl. Valve 412430 Minimaster
2	30 05 1053	Float 412466 Minimaster
3	30 05 1052	Dish Minimaster 2 413420

Pos.	Code-No.	Designation
1	30 05 1060	Drinker round Minimaster 2 with connection material
2	30 05 1055	Hose green 6x1.5
3	30 05 1004	T-piece 412425 (0092) Watermaster
4	30 03 3126	Side outlet to compress. Jumbo-B/T/J
5	30 00 3629	Adapter for combi nipple
6	30 00 3628	Adapter for plug-in nipple

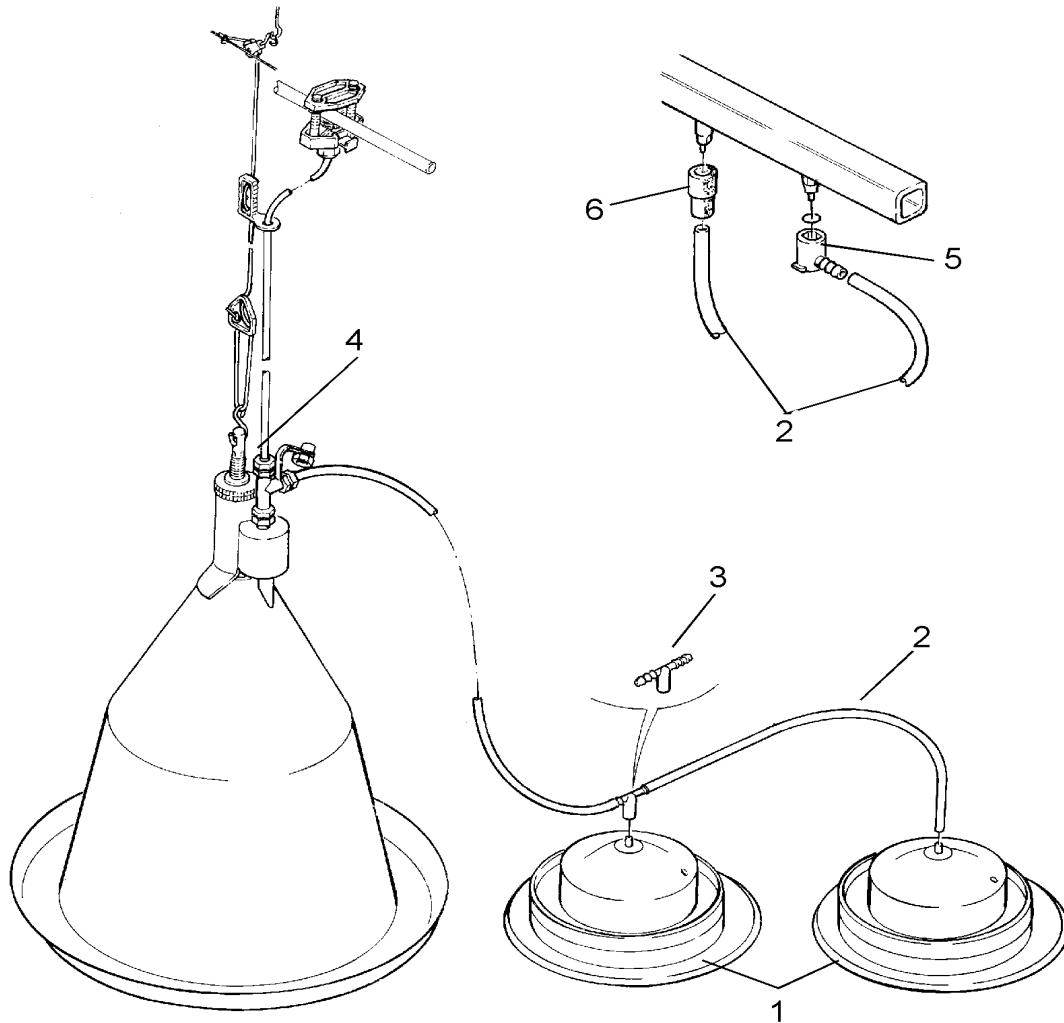


Figure 13-60:Explom706d150

14 Water Supply for Round Drinkers



For the placing of the water supply unit please go by the project drawing or any existing planning guidelines.

14.1 Mounting of the Water Connection Unit Inside the House



In most cases, the water connection unit is placed in a separate service room.

The water connection unit can be put together according to the requirements.

There is also a connecting possibility to add vitamins or medicines. See Ex-
plo m706d158, B, C, D, E.

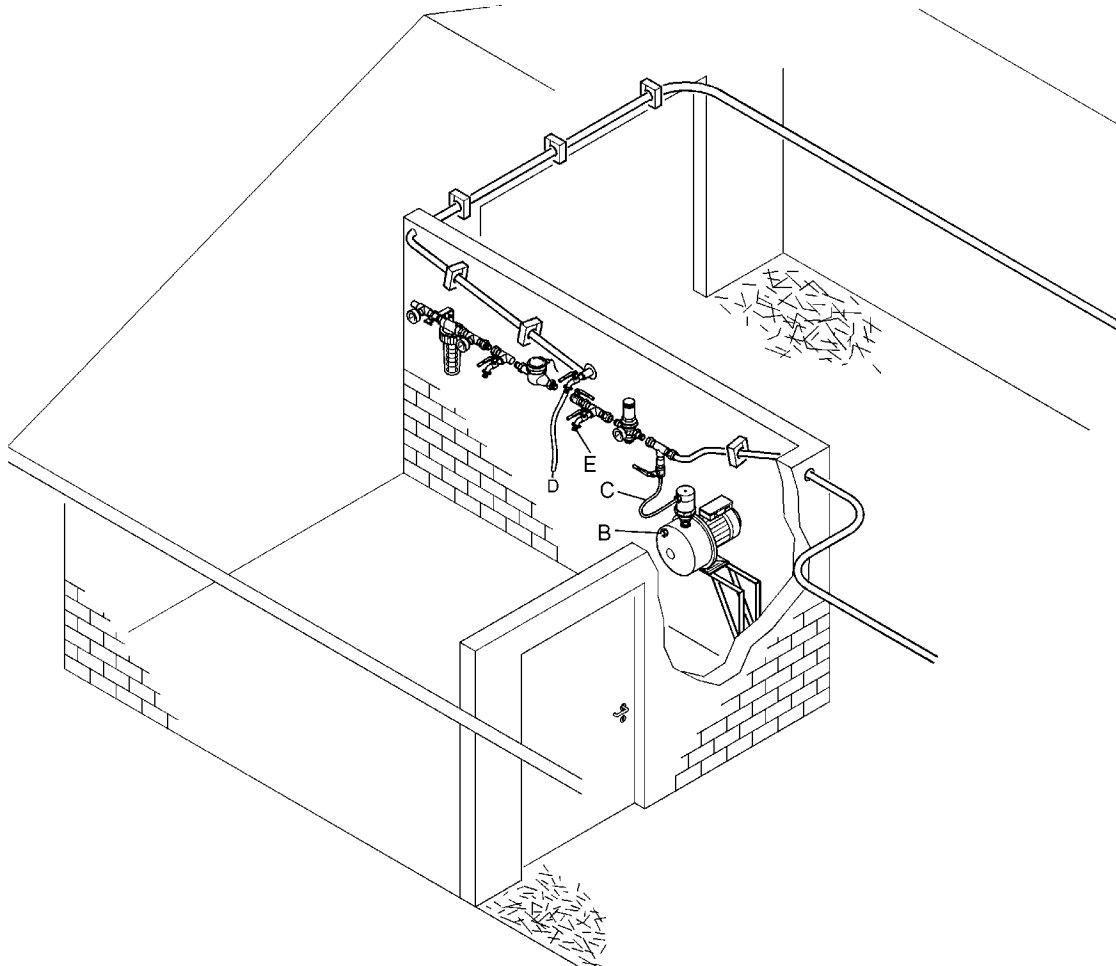


Figure 14-61:Explom706d158

14.2 Mounting of the Preparation Tank



Place the preparation tank (water tank) with the drain valve 1½" cpl., the siphon trap 1½"x50 PVC without main connection cpl. and the bead chain 1500mm for plug at the intended position.

Pos.	Code-No.	Designation
1	30 61 3671	Water tank GRP 2200L with water level indicator
	30 61 3701	Water tank GRP 1500L with water level indicator
2	30 61 3674	Cover for water reservoir 2200L
	30 61 3704	Cover for water reservoir 1500L
3	30 61 3675	Siphon trap 1 1/2"x50 PVC
4	30 61 3673	Bead chain 1500mm for plug
5	30 61 3672	Drain valve 1 1/2"

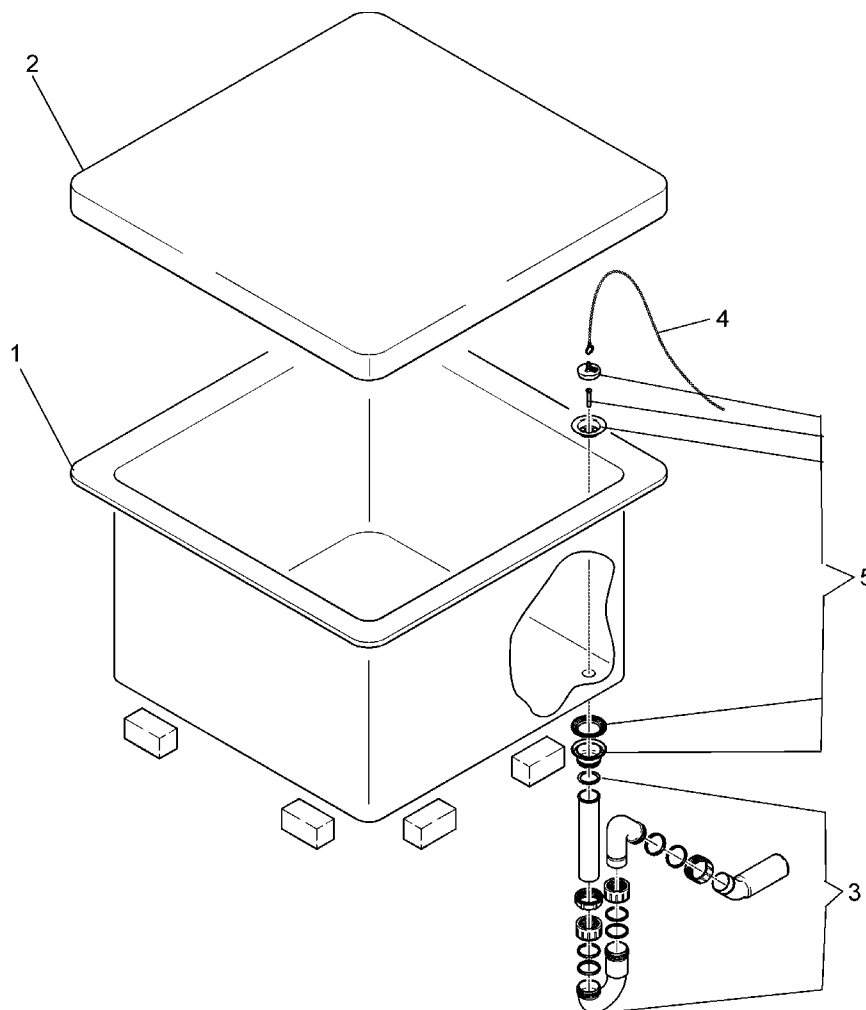


Figure 14-62:Explo706d167



Connect the connections A, B, C, D of the preparation tank to the corresponding connections of the water connection unit.

Pos.	Code-No.	Designation
A	30 61 3692	Accessory-set for filling of water tank cpl w/2 float valves (Pos. 1 - 13)
1	20 50 3473	Ball valve 3/4" m/fm brs
2	30 00 1237	Hose nozzle 3/4"x3/4" brs
3	30 00 3051	Hose high pressure 3/4"
4	30 00 3709	Hose band clip 3/4" 20- 32
5	30 00 1238	Backnut 3/4"x49 brs
6	30 00 1239	Rubber washer 26x42-2 for connection socket f/tube
7	99 44 4053	T-piece 3/4x3/x3/4 PVC
8	99 40 4052	Elbow 90deg fm/fm PVC 3/4"
9	99 40 4051	Socket 3/4" No 270 brs
10	30 00 3125	Threaded nipple brs 3/4"x65
11	30 00 3120	Float valve 3/4" wo/ball
12	30 00 3121	Float valve 3/4" wo/ball
13	30 00 3086	Ball dia 130 for float valve
B	30 61 3665	Flex. suction tube 1"x2000 cpl
14	30 61 3666	Flexible suction tube 1"
15	99 50 1460	Hose band clip 26- 38
16	30 00 3119	Hose nozzle 1"m brs
17	30 61 3667	Spray head 1"fm brs
18	30 00 3124	Hose union 1"x25 brs flat
C	30 61 3664	Pressure hose 3/4"x1500 cpl for water pump JP5
18	30 00 3051	Hose high pressure 3/4"
19	30 00 3709	Hose band clip 3/4" 20- 32
20	30 00 3076	Hose union 3/4"x12 brs flat
D	30 61 3662	Hose 3/4"x2000 with weight for runback
21	30 00 3051	Hose high pressure 3/4"
22	30 00 3709	Hose band clip 3/4" 20- 32
23	30 61 3663	Mould weight for hose
24	30 00 3076	Hose union 3/4"x12 brs flat
E		belongs to water tank 30 61 3670 + 30 61 3700
25	30 00 3051	Hose high pressure 3/4"
26	30 00 3709	Hose band clip 3/4" 20- 32

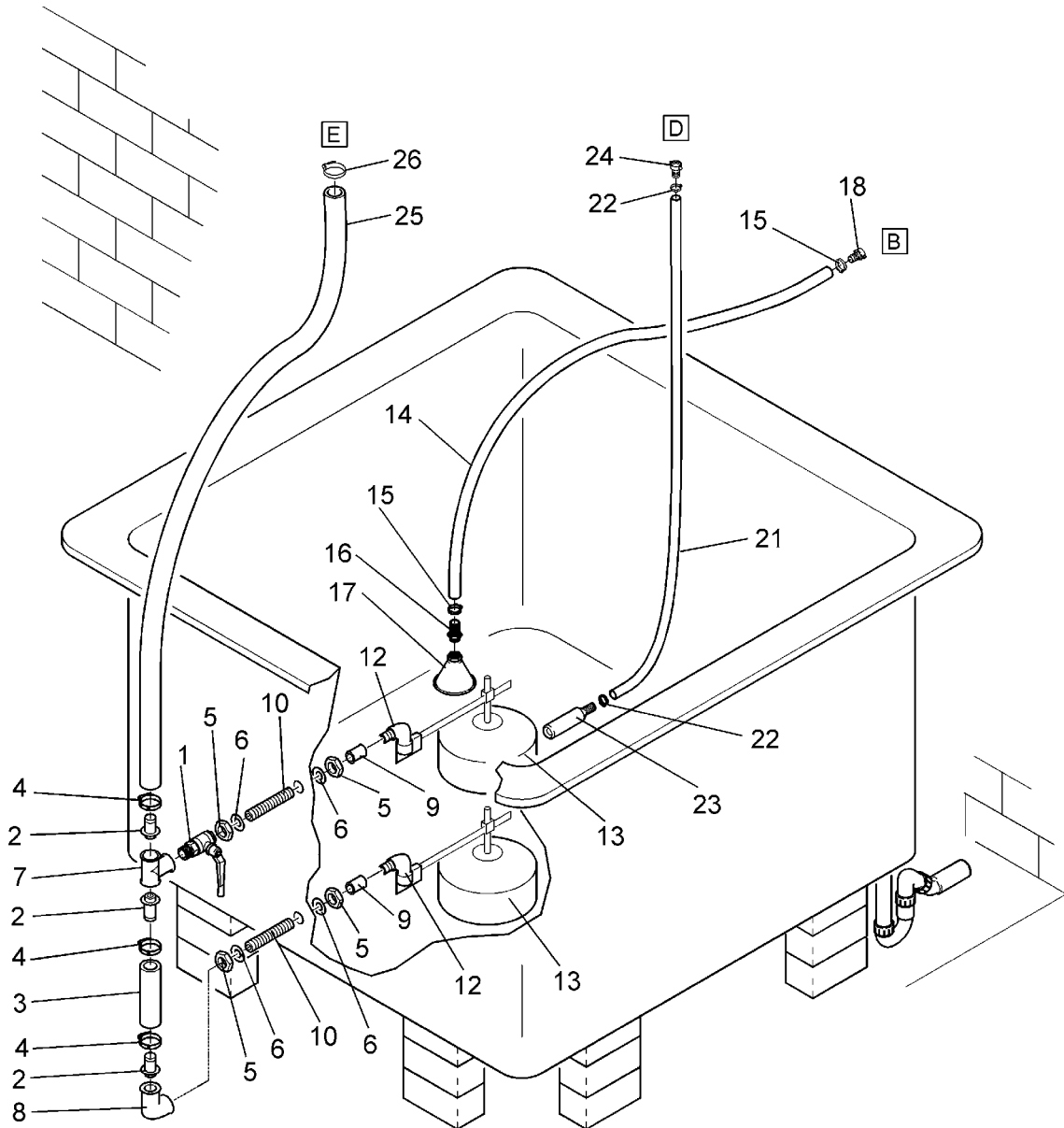



Figure 14-63:Explom706d159

14.3 Mounting of the Pump

	<p>The pump must be mounted at the intended position in the house.</p> <p>The water pump JP5 230 V, 0.75 KW is used for the preparation of the water with pulverized medicaments.</p> <p>The water pump JP5 230 V, 0.75 KW with a hydrostat for pump JP5 is used for the preparation of the water with liquid medicaments.</p>
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Please consider the enclosed operation instructions of the water pump JP5 230 V, 0.75 KW and of the hydrostat for water pump JP5.

Pos.	Code-No.	Designation
1	30 61 3661	Water pump JP5 230V 0.75KW
2	30 61 3668	Hydrostat for pump JP5
3	20 50 3717	Angle bracket galv f/2-3 tubes
4	99 10 3733	Hexagon wood screw 8x 60 DIN 571-ST galv
5	99 98 3784	Dowel S 10
6	99 10 1040	Hexagon nut M 8 galv DIN 934-8
7	37 80 2011	Washer flat A 8.4 DIN 9021 galv
8	99 10 3827	Mushroom head square neck bolt M 8x 40 DIN 603 galv
C	30 61 3664	Pressure hose 3/4"x1500 cpl for water pump JP5
18	30 00 3051	Hose high pressure 3/4"
19	30 00 3709	Hose band clip 3/4" 20- 32
20	30 00 3076	Hose union 3/4"x12 brs flat

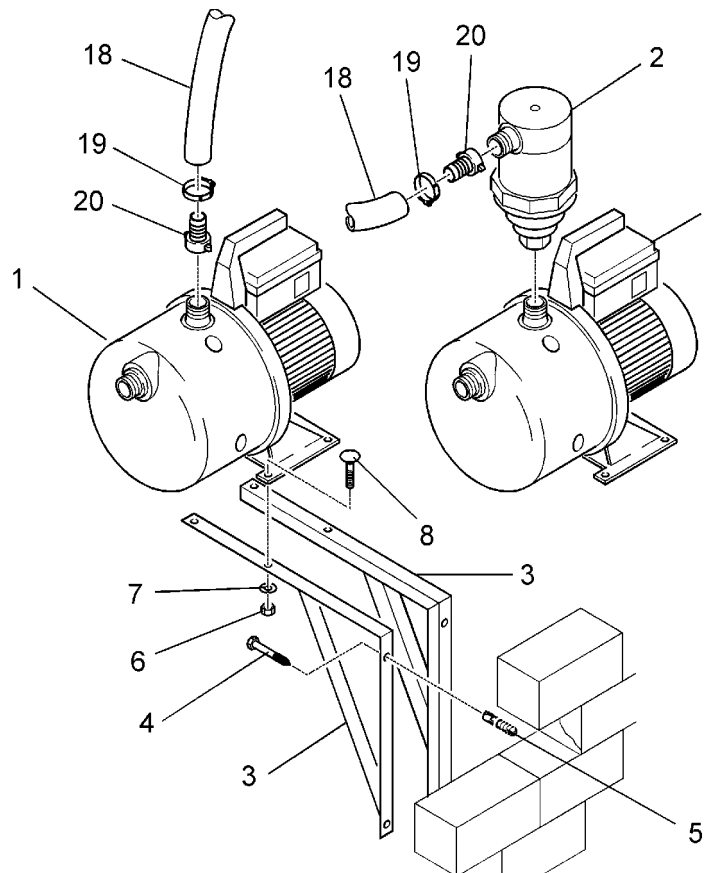


Figure 14-64:Explom706d168

14.4 Mouting of the Suspension Ropes to Fasten the Water Pipes

Pos.	Code-No.	Designation
1	99 10 3710	Rod threaded M10x1000 DIN 975 galv
2	99 20 1029	Hexagon nut M 10 galv DIN 555
3	20 90 3759	Washer flat 13x50-2 galv
4	11 31 3026	Fork head M 10 galv
5	99 10 1058	Hexagon head screw M 8x 30 DIN 558 galv
6	99 20 1064	Self-locking counter nut M 8 DIN 985-6 galv
7	99 50 1077	Thimble 6mm for cable 5mm DIN 6899
8	99 50 0120	Cable clamp 5mm 3/16" galv DIN 741
9	99 50 3703	Wire rope 4mm galv
10	38 90 3809	Strap 185mm plt2s-c
11	99 50 3814	Hooked bolt galv 140x6.5
12	99 50 1059	Pipe 3/4" black PE 25x2.3

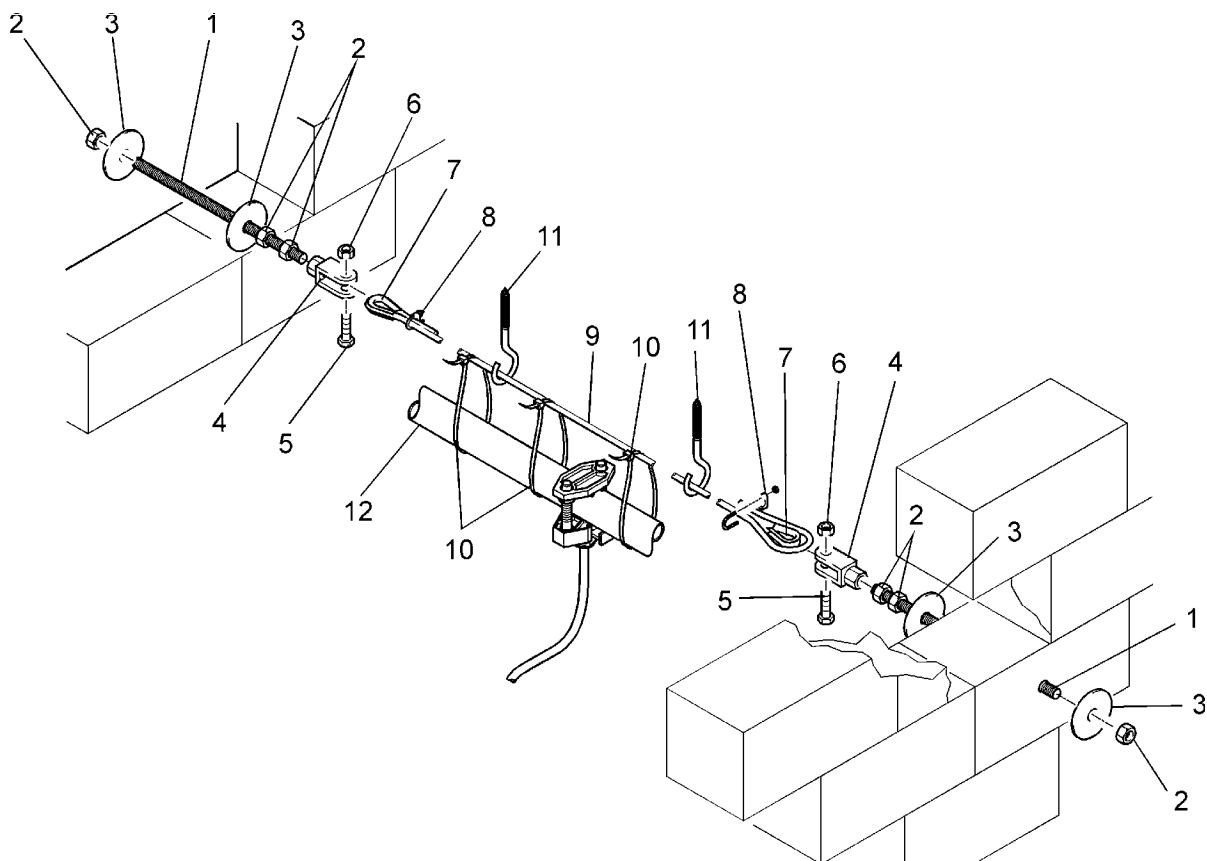



Figure 14-65:Explom706d171

14.5 Mounting of the Water Pipes in the House

	<p>The water lines in the house must be arranged according to the existing planning guidelines.</p> <p>For the suspension of the water pipes, suspension ropes must be fixed in the longitudinal direction of the house. The suspension ropes are to be hooked into the hooked bolts which are at the ceiling with an intermediate distance of approx. 2.5m.</p> <p>Fasten the water pipes with an intermediate distance of approx. 25 cm at the suspension ropes using straps - 185 mm long.</p> <p>At the gable ends and in the front location of the house the water pipes are to be fixed with hose band clips. Fasten the hose band clips at the walls with an intermediate distance of approx. 40 cm with dowels S8 and chipboard screws 5x50. In case of ceilings with an insulation, the hose band clips are to be fastened with chipboard screws 6x70.</p>
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Pos.	Code-No.	Designation
	30 61 3651	Accessories f/water conduit PE for round drinkers
1	99 40 3892	Screw union 3/4"m x 3/4"Brs-PE
2	30 00 3709	Hose band clip 3/4" 20- 32
3	99 40 3897	Coupler f/pipe 3/4" Brs-PE
4	30 61 3027	Ball valve w/hose nozzle 3/4"
5	99 10 3876	Chipboard screw 5.0x50 SBC-Spax counter sunk hd galv
6	99 10 3907	Chipboard screw 6.0x70 SBC-Spax counter sunk hd galv
8	99 98 3781	Dowel S 8
9	99 50 1114	Clip OBO- 24-34mm
10	99 50 1059	Pipe 3/4" PE/black 25x2.3
11	99 40 3172	Bracket elbow 3/4" No 471 galv

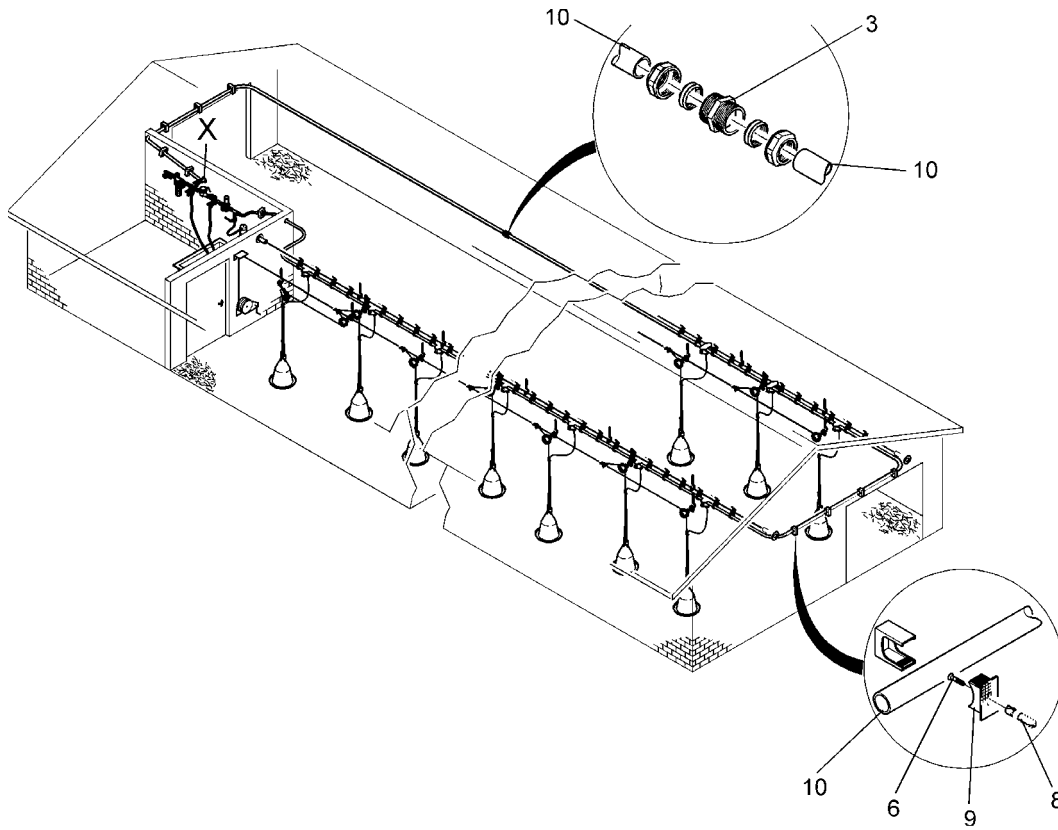
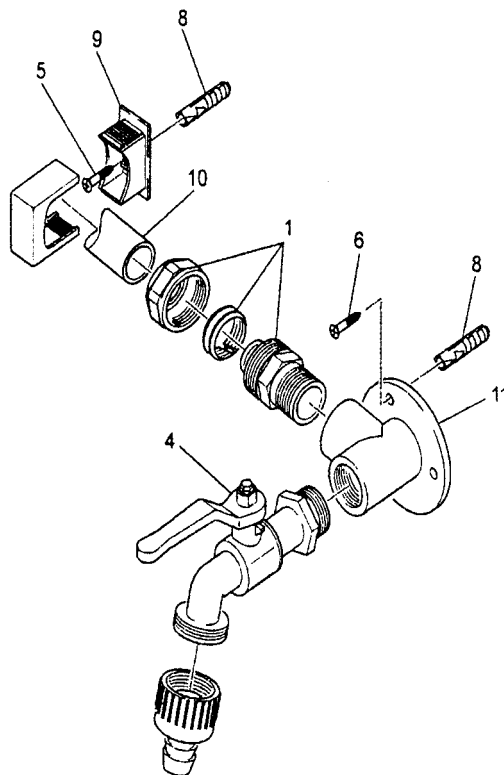


Figure 14-66:Explom706d169



Detail X. von Explom706d169

Figure 14-67:Explom706d170

Space for notes:

15 Operation and Maintenance Instructions

15.1 Water Supply

15.1.1 Notes and requirements for water quality

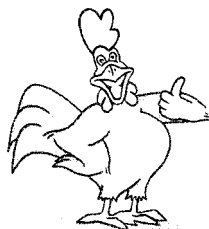
- Requirements for water quality
- Recommendations for water quality for poultry

Parameter	Unit	Recommended limit value	Remarks
Total germs	quantity/ ml	100	-
Coliforms	quantity/ ml	0	-
Nitrate	mg/l	25	Values between 3 and 20 mg/l are already able to impede development.
Nitrite	mg/l	4	-
Chloride	mg/l	250	Values of about 14 mg/l can already be a damage if the sodium value is higher than 50 mg/l.
Copper	mg/l	0,6	Higher values cause a bitter taste.
Lead	mg/l	0,02	Higher values are toxic.
Sodium	mg/l	50	Values above 50 mg/l cause a bad development in case of high chloride or sulphate values.
Sulphate	mg/l	250	Higher values cause diarrhoea. In case of high chloride or magnesium values, development is impeded with more than 50 mg sulphate/l.
Zinc	mg/l	1,5	Higher values are toxic.

15.1.2 Limit values for the connection unit and drinker system

Parameter	Unit	Recommended limit value	Remarks
Particle size for insoluble particles and suspended matters	µm	<60	Above this a filter is required.
pH-value		6,5-8,5	
Total hardness	mg/l	<20	
Calcium	mg/l	<100	
Magnesium	mg/l	<50	
Iron	mg/l	<0,2	
Manganese	mg/l	<0,05	

15.1.3 Drinking water temperatures



Water temperature

10°C - 15°C

> 30°C

> 44°C

Bird reaction

optimum water consumption

reduced water consumption

refusal to consume water

15.1.4 Preparations

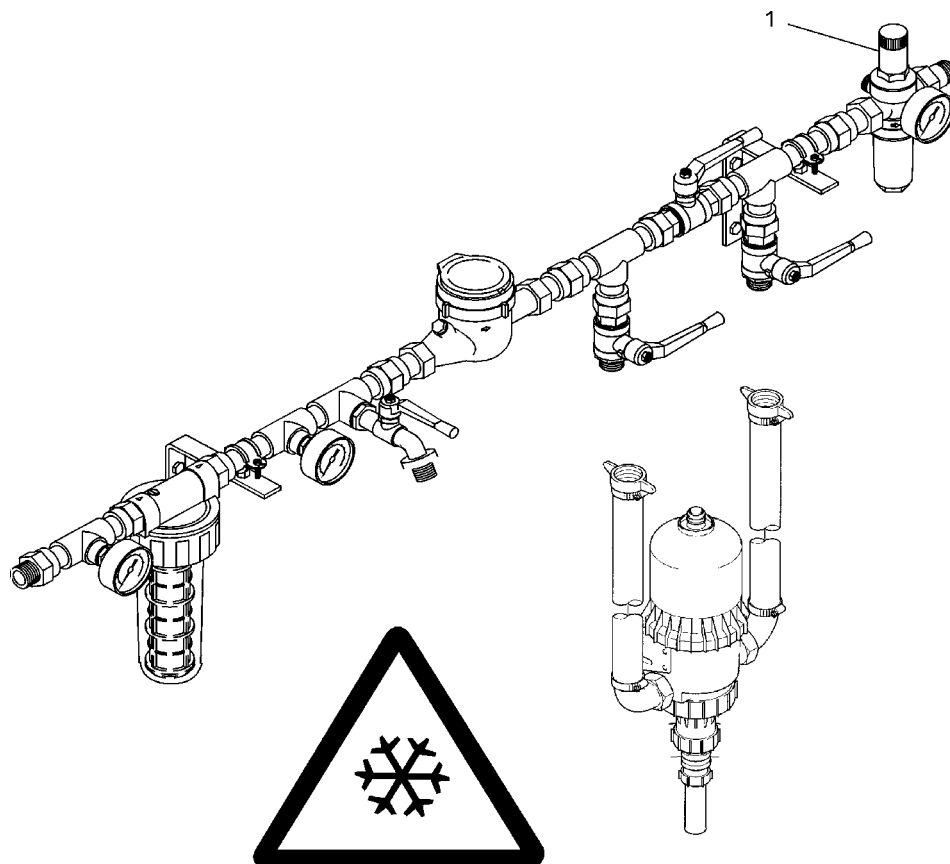
- The input pressure (normal pressure) on site has to be between 1.5 and 6 bar.
- The basic equipment of a connection unit should consist of a water filter, water meter, pressure reducer and bracket.
- The water filter has to be connected in front of all other constructional groups, in order to prevent this unit from getting dirty.
- The water for preparing the medicine solution has to be filtered before. The possibility to take out water (drain cock) therefore has to be positioned behind the water filter.

- If badly soluble medicine is to be used, we recommend to use an additional filter **behind** the medicator for protection purposes. For this, a combination of pressure reducer and filter can be installed. For retooling, a filter can also be installed in between bypass and pressure reducer.
- The pressure reducer has to be the last constructional group of the water connection unit in front of the pressure reducers of the drinker lines, in order to create a constant pre-pressure independent of the flow rate.
- In case of float tanks and ball tanks working completely independent of the pre-pressure it is the task of the pressure reducer to limit the water pressure to a maximum of 3 bar.



Overflowing water mixed up with dust and feed residues may lead to a slippery surface. Remove any leakages.

15.2 Operation and Maintenance of the Nipple Drinkers and the Connection Unit



Protect against frost

1. Adjust the pressure reducer (1) at the manometer to 1.5 - 3 bar.
2. Adjust the pressure regulator to the desired water column (see table).
3. Lift the nipple pipe to the correct height over the total length of the house and check every nipple. Remove leakages.
4. In any case, avoid uneven distribution of the litter at the nipple pipes.
5. Avoid any slope of the nipple pipe, otherwise the pressure will rise.
6. Continually readjust the pressure regulator and the height of the nipple pipes during the rearing period.
7. Flush the nipple pipes with suitable cleaning material after mounting, medication and house cleaning. The nipple pipes must always be filled with water in order to prevent drying-out and „gumming-up“ of the nipples.
8. Completely remove the water only if there is the danger of frost.
9. Please consider also the instructions for the use of the medicator in manual M-787-INT/GB.

15.3 Cleaning of the Water Filters



Clean water does not only have a decisive influence on the productive results which can be achieved with the birds but also on good functioning of the drinking system. The water filter is an important component for this.

15.3.1 Water filter 3/4" 3,5 cbm/h mE for manual cleaning

With a difference in pressure of **more than 1 bar**, the filter insert must be cleaned manually. **Only use clean water.**

Technical data and fitting dimensions:

Connection thread:	3/4"
Max. water temperature:	45°C
Working pressure:	from 1.5 to 7 bar
Nominal flow ($\Delta p=0.2$ bar):	2500 l/h

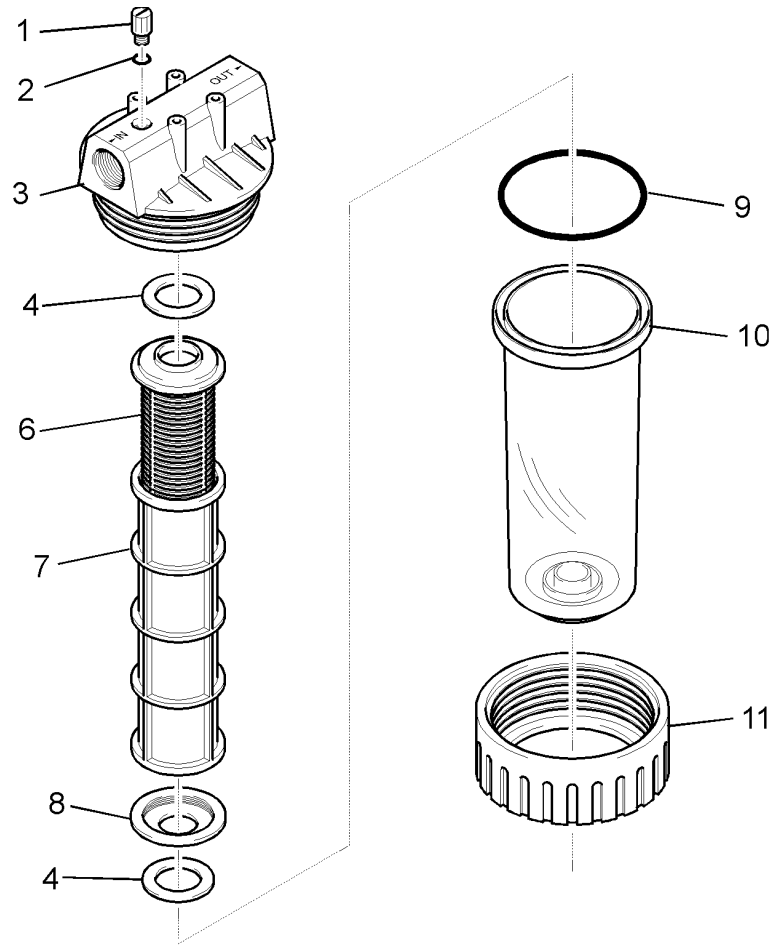




Figure 15-68:Explom760d110

Pos.	Code-No.	Designation
	30 00-3871	Water filter 3/4" 3,5 cu.m/h consisting of:
1		Vent screw for cover
2		Gasket for vent screw
3	30 00 3873	Cover for water filter 3/4" 30-00-3871
4	30 00 3872	Flat packing white for filter insert
5	30 00 3684	Filter insert CFS cpl 3/4" for 30-00-3671/3871 consisting of pos. 6-8
6	30 00 3876	Outer part for filter insert 30-00-3684
7	30 00 3685	Filter part for filter insert 3/4" 30-00-3684
8		Screw union for filter insert 30-00-3684
9	30 00 3686	O-ring f/water filter 30-00-3871
10	30 00 3874	Inspection glass f/water filt. 30-00-3871
11	30-00-3875	Swivel nut f/inspection glass 30-00-3874

15.3.2 Reversible flow filter F76 ¾"-AC for automatic cleaning

	<p>Any fault with the reversible flow filter F76 that may impair the safety must be removed immediately.</p> <p>The reversible flow filter F76 is exclusively designed for the uses described in this manual. Any other or exceeding use is not due.</p> <p>Cleaning products containing solvents must not be used to clean the plastic parts.</p> <p>In areas with UV-radiation or solvent vapours, this type of reversible flow filter F76 cannot be used.</p>
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- The filter is cleaned **automatically** when the drain cock is opened. Backwashing must be done at a supply pressure of at least 1.5 bar.
- The interval of backwashing depends on the contamination level of the water. Backwashing must however be carried out every two months at the latest according to DIN 1988, part 8.

	<p>Even during the backwashing process filtered water can be taken out.</p>
---	---

Technical data and fitting dimensions:

Connection thread: ¾"

Max. water temperature: 40°C

Working pressure: from 1.5-13 bar

Nominal flow (□ Δ p=0.2 bar): 2500 l/h

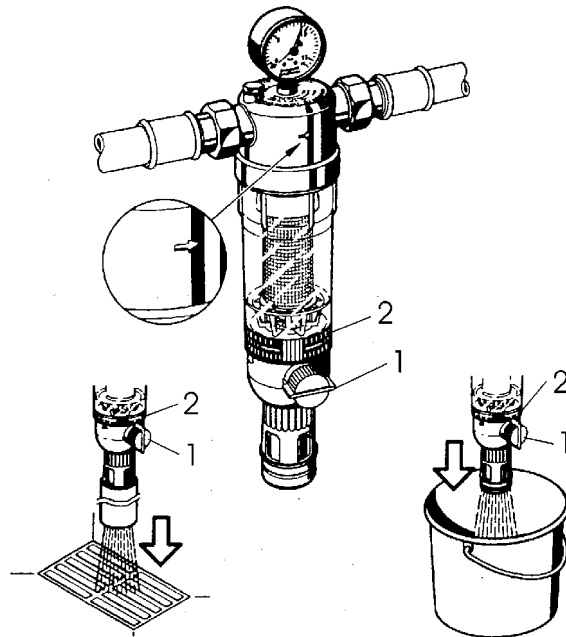


Figure 15-69:Explom760d111

- Draining of backwashing water
The backwashing water must be drained so that a back draught cannot occur.
- Manual backwashing
Open the ball valve by turning the reversible flow button (1). The marker bar must be in vertical position. In this way, the reversible flow system is set into operation. Shut the ball valve again after approx. 15 seconds. A longer backwashing duration may be required if the filter is badly soiled.
By means of the memory ring (2) the next date for manual backwashing can be noted down.

Pos.	Code-No.	Designation
1	30 61 3603	Reversible flow filter F76 ¾"-AC
2		Manometer connection shank at the bottom G ¼" M 76 K-A 16
3		Filter insert cpl. AF 11 S-1A 105/135 µm for ½"-1¼"
4		Double ring spanner ZR 10 K-¾ for ½"+¾"
5		Transparent filter cup cpl. with O-ring, ball valve, discharge connection and memory ring KF 11 S-1 A for ½"-1¼"
6		Ball valve with O-ring KH 11 S-1 A for ½"-2"
7		Discharge connection with O-ring AA 76-½ A for ½"-2"

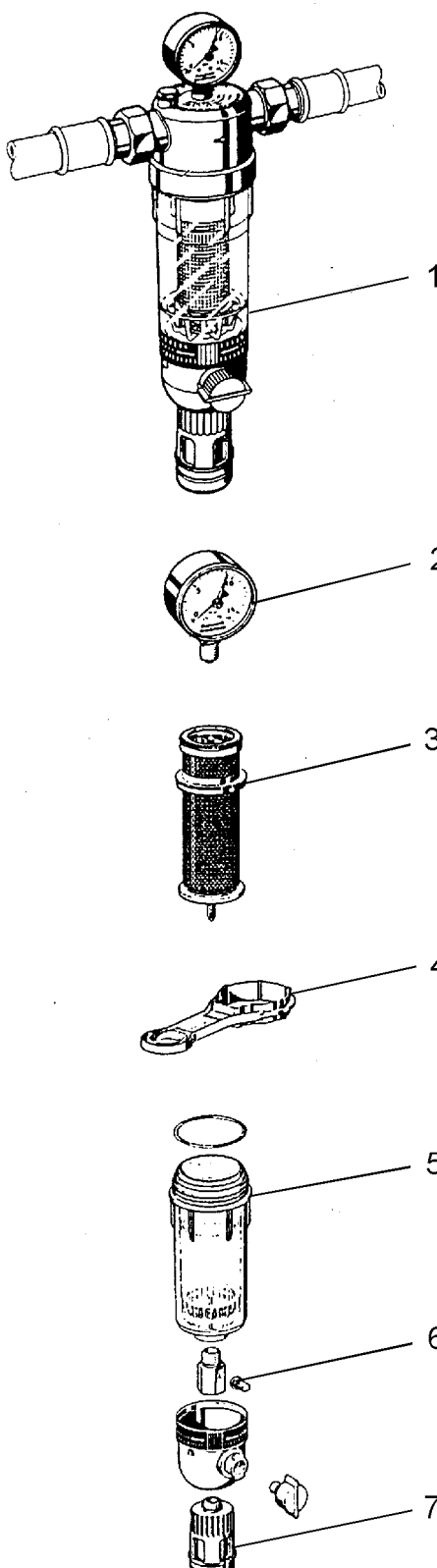


Figure 15-70:Explom760d112

15.4 Automatic for Reversible Flow Z11A for Fully Automatic Filter Cleaning

On request, the cleaning of the filter can also be done fully automatically by means of the automatic for reversible flow Z11A at which 16 periods can be adjusted between 4 minutes and 3 months. It is adjusted by the factory to 45 days, 230 V or 24 V, 50/60 Hz, 10W.



The water installation has to be carried out according to the regulations of the local water supply concern.

Pos.	Code-No.	Designation
	30 00 3836	Automatic for reversible flow Z11A of filter F76 and HS10

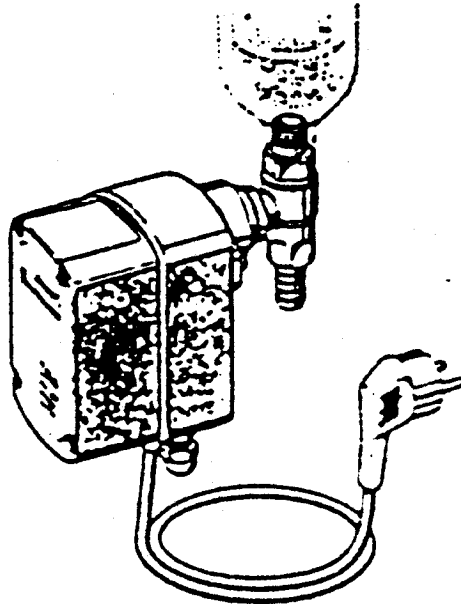


Figure 15-71:Explom760d107

15.5 Height Adjustment of the Nipple Drinker

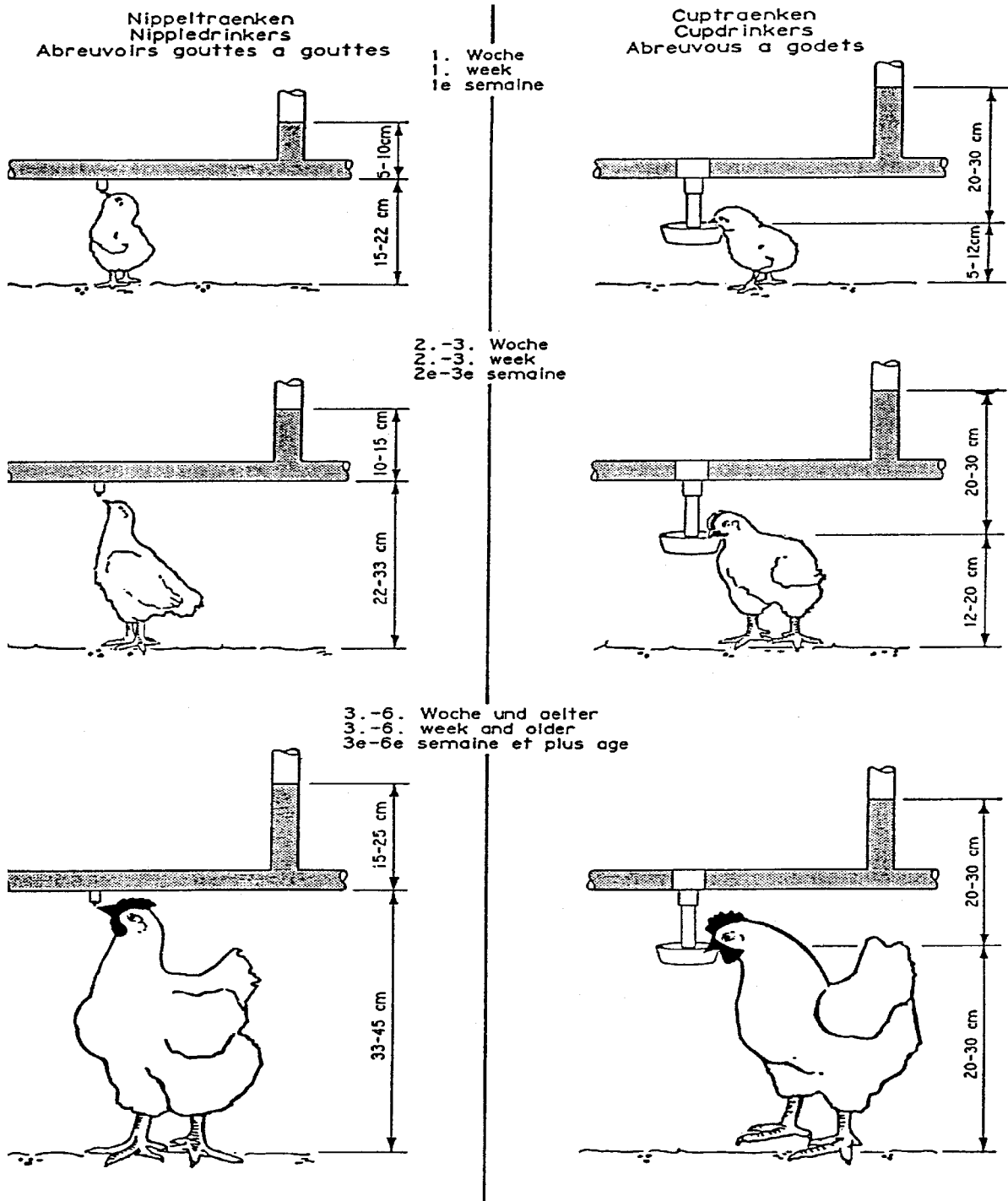


Figure 15-72:Explom706d123

Adjustment of the Nipple Drinker for Broiler

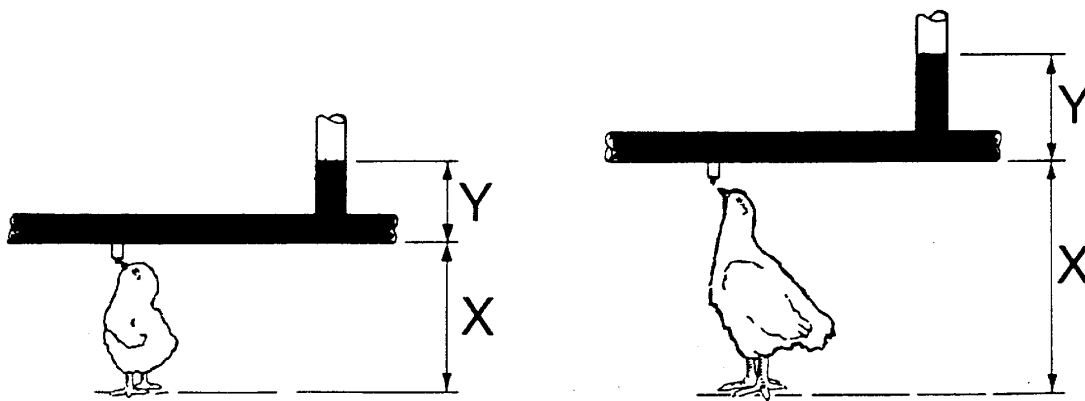
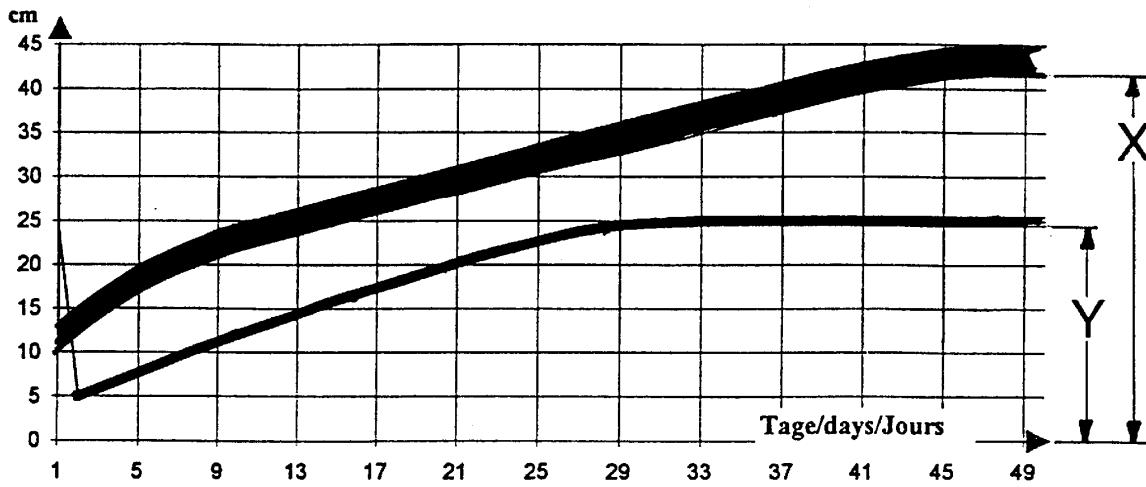


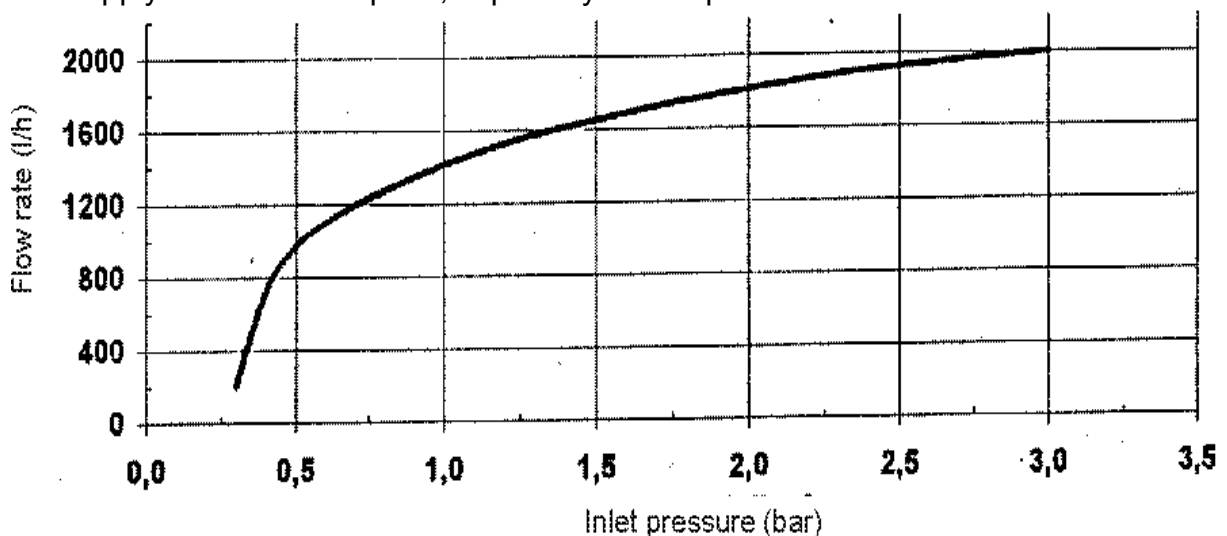
Figure 15-73:Explom706d124

Avoid slope and unevenness!

15.6 Operation Instructions of the Pressure Regulator Unit

15.6.1 Description of the pressure regulator unit

- Flexible inlet pressure **of at least** 0.3 bar to a **maximum** of 3 bar.
- There is a wide range of adjustable outlet pressures to adapt the water pressure at the drinking nipple depending on the age and weight of the birds. Continuously adjustable from 0 to 100 cm of water column.
- The set outlet pressure of the pressure regulator **does not depend** on the inlet pressure. This means that if the pre-pressure of the water rises or falls, for example due to fluctuating consumed quantities during the alternation of day and night, this fluctuation does not influence the water column (pressure) of the nipple drinker line.
- Flow rates from 200 to 2000 l/h depending on the inlet pressure ensure a water supply without interruption, especially after a phase of restriction.



- Easy to operate. Exact adjustment of the outlet pressure is possible by means of an adjusting wheel. At the same time, the water pressure can be controlled by means of a float in the flexible breather tube.
- A flushing system is included. After having turned the flushing valve by half, the total inlet pressure is used to flush the nipple pipe. A high flow rate ensures that all the residues can be flushed out of the nipple pipe.
- Easy and quick mounting.

15.6.2 Technical Data

Inlet pressure: 0.3 to a **maximum** of 3 bar

Adjustable water column: 0 to 100 cm

Flow rate: 200 to 2.000 l/h

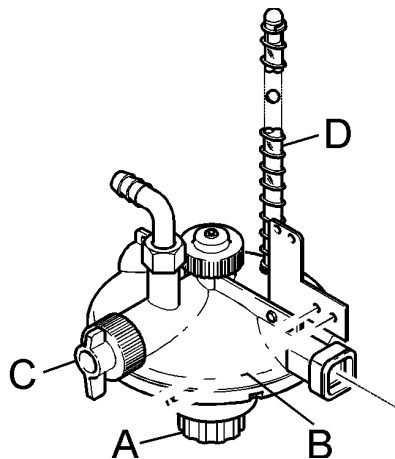


The maximum inlet pressure at the pressure regulator must **not** be exceeded. A higher inlet pressure will result in a damage to the pressure regulator, especially after a water restriction when the now empty pipes are suddenly refilled.

The following points must be followed for a troublefree functioning of the pressure regulator:

- Continuous control of the water quality especially of the contents of iron and lime.
- Use water filters with sufficient mesh size and flow rate.
- Inlet pressure between 0.3 and 3 bar. In case of a deep tank this corresponds to a minimum height of 3m above the pressure regulator.
- Do not use aggressive cleaning material (e.g. acid, etc.).

15.6.3 Adjustment of the water column



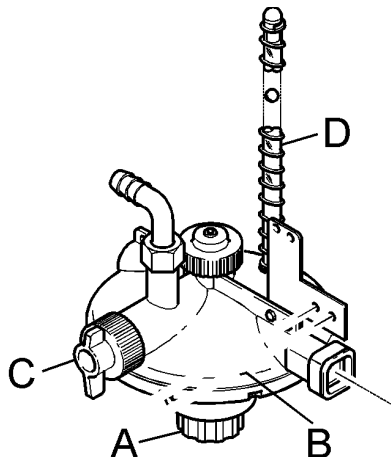
- Adjust the desired water column at the red adjusting wheel (A) at the bottom of the pressure regulator.
- The direction of rotation for increasing or reducing the water column is indicated on the body of the pressure regulator with + and - (B).

15.6.4 Flushing procedure




Before activating the flushing procedure, the breathers at the end of the drinking line must be set to „**flushing**“!

Too high a water pressure may damage the connection elements of the drinking line.



- The flushing procedure is activated by means of the red turning lever (C) at the side of the pressure regulator.
- Turn the red turning lever (C) by 180°.
- The ball in the breather tube (D) seals the air vent during the flushing procedure.
- To stop the flushing procedure, reset the turning lever (C) into the original position.
- Reset the breathers at the end of the drinking line to normal functioning.

15.7 Operation Instructions for the Ball Tank

	Attention	<p>The ball tank must only be operated with a maximum inlet pressure of 3 bar.</p> <p>Too high a pressure leads to damage on the couplers and nipple pipes.</p>
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- Check water supply and cleanliness of the water. If necessary, clean the central water filter.
- Check water pressure of the supply line. The maximum admissible inlet pressure for the ball tank is **3 bar**.
- Always start the flushing procedure by setting the breather unit to „flushing“ before.
- Make sure that the admissible inlet pressure of **3 bar** is not exceeded.

15.7.1 Flushing procedure

The ball tank can be set to flushing with only a few movements without cutting off the water supply.

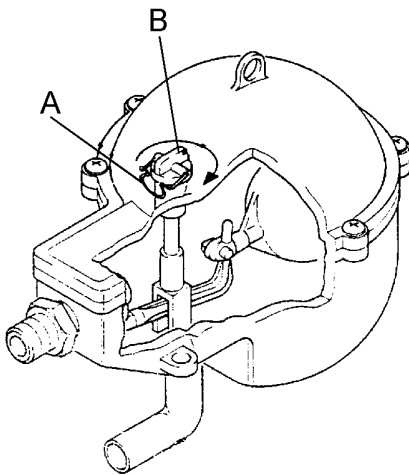


Figure X

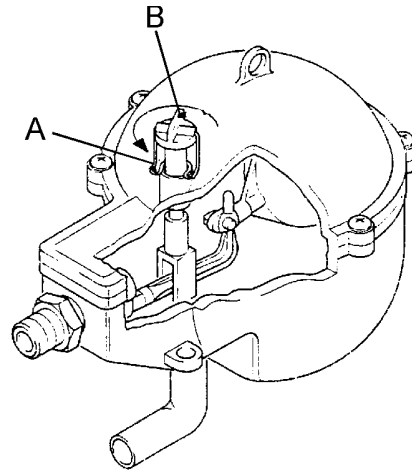


Figure Y

Figure 15-74:Explom706d147

To activate the flushing procedure:

- Release the safety bow (A) at the ball tank. See figure X.
- Press down the red sealing piece (B) and turn it by 90° in clockwise direction until the limit stop. See figure X.



The flushing procedure is now in operation.

To finish the flushing procedure:

- Turn the red sealing piece (B) by 90° in counterclockwise direction until the limit stop and pull it upwards. See figure Y.
- The flushing procedure is finished. The sealing piece is in „parking position“ now. In this „parking position“ the pressure in the ball tank constantly decreases. Time: approx. 30 sec.
- After that, turn the sealing piece by 30° in clockwise direction until the limit stop and pull it upwards.
- Bolt the safety bow (A). See figure Y.

The ball tank is now in normal operation.

15.7.2 Cleaning of the nipple pipes with the pressure regulator unit or with the ball tank

	<p>When cage installations with nipple drinkers stay empty for a certain time and in that period the temperature is likely to drop below 0°C, the water must be drained from the nipple pipes. Otherwise there is the danger of nipple pipes to burst due to frost.</p>
	<p>Depending on the contamination level of the drinking water, nipple pipes are to be cleaned every fortnight or once a month.</p>

- Push clamp **A** of the revolving breather cpl. L 4227 **B** upwards out of the holding device and turn the piece with the breather tube **C** by 90° to the right.
- In doing that the cleaning water can flow through the pipes.
- Fasten a water hose 3/4" **D** (is not included in the delivery volume) to connection **E**.
- Open the water supply of the pressure regulator resp. of the ball tank to clean the nipple pipes.

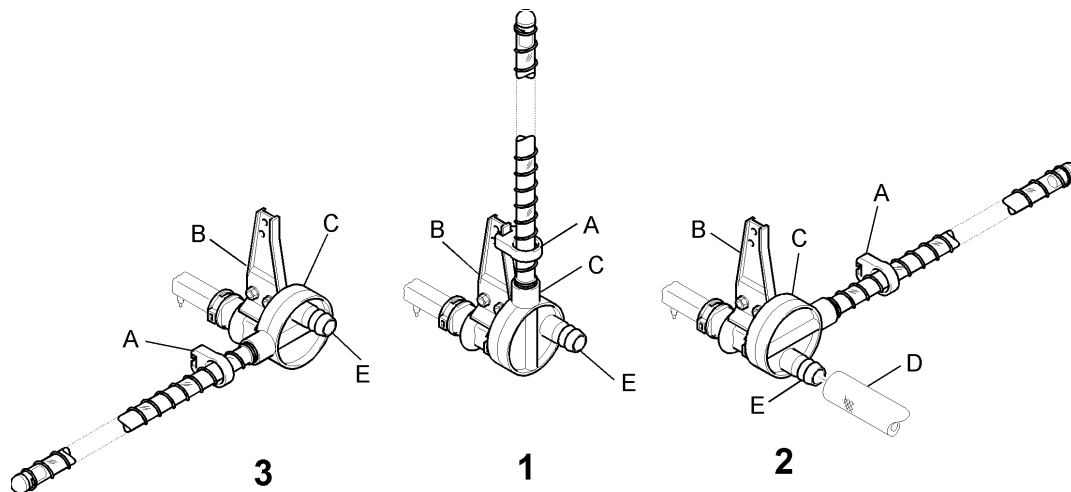


Figure 15-75:Explom760d108

- 1 = normal position
 2 = flushing position
 3 = closed

15.8 Medicine metering through water in the nipple pipes

Medicine with fat and adhesive content must not be added to the water aimed for water supply by nipple drinkers.

Every medicine to be used here must be completely water-soluble.

The metering and preparation of the medicines must proceed in a tank outside of the installation and mixed thoroughly.

Make sure that the medicines are completely dissolved in the water. After having prepared and metered this drinking water according to the prescriptions, it can be added to the float tank.

The automatic metering of medicine can be done by using a **Big Dutchman** DOSA-TRON-medicator.

Medicine with high fat content has to be fed out with the feed. In general, metering and distribution of the medicine over the feed is better. This metering is more exact and ensures a more reliable distribution to all the birds.

16 Broiler Management Procedures

16.1 General Guidelines

- The height of the birds, the temperature and many other things may have an influence on how high the drinking line is to be adjusted and which water pressure must be set.
- Wet litter may have the following causes: The nipples or round drinkers are suspended too low or high (pull higher or lower), or the water pressure is too high. Use a lower water pressure in winter.

Before moving chicks in, water supply with nipple drinkers



The correct distance from the floor to the tappet of the nipple is based on the natural upright drinking posture of the birds.

- See to it that the water lines are correctly installed with a distance of 60 - 90 cm to the feeding lines.
- Make sure that the density of the nipples is correct. See planning guidelines.
- Check the filter insert and replace or rinse it if required.
- The water lines must be adjusted to the house floor.
- Flatten splinters below the water lines, remove high / deep spots.
- Adjust the height of the water line to day 1.
- If you have different birds in your flock, the smaller birds must be able to reach the drinker.
- Make sure that water runs out of every drinker and thus air flows out of the drinking system.
- Some minutes before moving the birds in, activate the nipples manually (e.g. by brushing with a broom) so that drops are formed at the nipple tappets.
- Use maximum illumination.

Moving chicks in

- Place the chicks under the water lines and not under the heating devices.
- Make sure that the nipple tappets are at eye level of the birds.
- Check twice - to be sure - that there is water everywhere in the drinking system.
- After 48 hours, pull up the water lines so that the birds can actuate the nipple tappets at head level.

Fattening period


- Check filter system and if required replace filter insert.
- Adjust the pressure of the water line and the height of the drinkers appropriate to the age and the height of the birds.
- The water pressure should be as high as possible without the litter getting wet.
- During the winter months, adjust a lower pressure in order to keep the floor dry.
- Increase the height of the drinkers at least twice a week so that the birds can drink from the lower edge of the tappet (nipple pin).
- Only add medicines and chlorine admixtures with the peak water consumption of the broiler house.

After the fattening period:

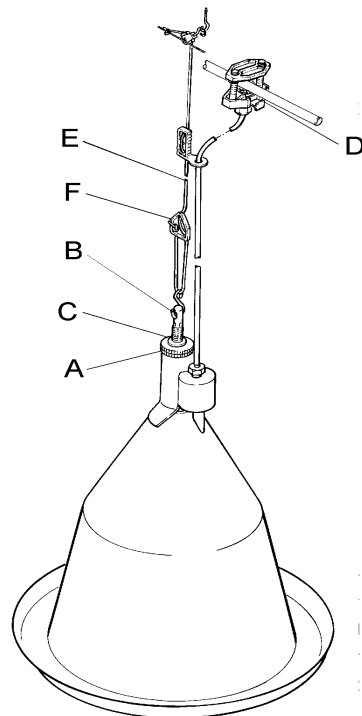
- Flush the water lines with high pressure in order to remove possible residues.
- In case frost is likely drain the water lines.

Before moving chicks in, water supply with round drinkers

See also: Moving chicks in, water supply with nipple drinkers

	<p>In order to achieve optimum water consumption it is necessary to keep the water level at the level of the back of the birds.</p> <p>At the beginning of the fattening period, it is required to readjust the height of the drinkers because the suspension rope of the Jumbo-B/T/J drinker extends a little in length. The suspension rope Jumbo-B/T/J also gets longer when the house is heated.</p>
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- Before fattening starts, check the water level of the ballast tank. If required, refill with water up to the plug in the ballast tank.
- Adjust the water level with the adjusting wheel of the valve housing outer Jumbo-B/T (A) at the suspension rod Jumbo-B/T (B) and readjust the backnut Jumbo-B/T/J (C). See to it that the stop valve cpl. for connection Jumbo-B/T/J (D) is open.
- The height of the round drinkers is adjusted at the suspension cord Jumbo-B/T/J (E) with the tightener for suspension Jumbo-B/T/J (F).
- During the rearing period, you may put - if required - and additional chick ring Jumbo-B into the round drinkers Jumbo-B.



Exploded view 16-76: Explo760d182

17 Cleaning and Disinfecting

Directions for cleaning drinking systems

	Switch off electricity during cleaning of live parts.
	Spilled water mixed with dust and feed remains can lead to a slippery surface.
	Keep in mind and follow the directions of the manufacturer of disinfectants and solvents.

- Drinkers
Clean water tanks, to this end remove discharging screw.
- Wet cleaning
Switch off electricity during wet cleaning of live elements.
- Soaking the entire installation by means of a high pressure cleaner at a pressure of approx. 100 bar.
After at least 10 hours of soaking time, rinse the installations with a high pressure cleaner at a pressure of approx. 140 to 160 bar.
- Clean the floor of the house with a rubber broom.
Remove the rinsing water from the sloppy water sump.
- After completion of cleaning, switch on ventilation and let the house dry up.
For disinfecting, disinfect first then proceed to fumigation. Example:
Disinfect the floor and walls with some disinfectant killing coccidiosis and worm eggs (e. g. Lomasept).
Disinfect the entire house, all the equipment and the silo installation (also inside) with a 1.5% Lorasol V-solution or a 2% Formalin solution.
After the use of Formalin, heat the closed house, if possible, at a temperature of at least 25 °C for a period of 24 hours.
- Fill water supply system and drinker installations in an empty house with a Des L 14 solution in order to kill algae, bacteria and fungi.

- Spray house and equipment (e.g. with pharmacy available CBM or Gesektin K) if required for killing mites, maliophagae, lice and flees and other ectoparasites.
- Let the disinfecting means be effective for at least one day, then ventilate the house.
- Before moving the birds in, rinse the tanks for drinkers and drinkers themselves, in order to remove the remains of disinfectants. Avoid any kind of dirt in the drinkers.

17.1 Periodical Maintenance Plan

- Daily check if all the revolving breathers cpl. L 4227 of the nipple drinkers are filled with water at the end of the nipple lines.
- Weekly check the pressure regulator unit and the ball tank for stable position and correct setting.
- Clean the nipple pipes or round drinkers if required every fortnight or once a month.
- Daily check the water consumption of the birds and record the consumption.

18 Troubles and their Remedies

18.1 Water Supply

Water supply volume is not large enough

- Water pressure is too low.
Increase water pressure.
- Float valve is blocked.
Remove foreign matter.
- Failure of water supply.
Pump etc. defective.
- Cross section of main pipe is too small.
Increase cross section.
- Contraction of cross section of main pipe as a result of sedimentation.
Replace pipes and install filter.

Nipple pipes are blocked



- Medicines with fat contents or water sediments reduce the cross section.
Rinse nipple pipes thoroughly. Disassemble nipples and clean them.
- Foreign matter such as glue remains, feed, dirt in the nipple pipe.
Rinse nipple pipes thoroughly.
- Pipe coupling has slipped off.
Replace coupling.
- Air bubbles in water supply.
Install plastic hoses avoiding built-up of air bubbles.
- Air bubbles in nipple pipe.
Rinse nipple pipes thoroughly. Put nipples into operation while venting them.

Valves of round drinkers are blocked

- Medicines with fat contents or water sediments reduce the cross section.
Rinse water pipes and hoses thoroughly.
- Foreign matter such as glue remains, feed, dirt in the water pipes and hoses.
Rinse pipes and hoses thoroughly.
- Air bubbles in water supply.
Install plastic hoses avoiding built-up of air bubbles.

19 Important Notices

19.1 Resistance to chemicals of drinker components

	<p>Do not use chemicals of categories 1 and 2 in or on the drinker line!</p> <p>For chemical resistance there are 4 categories of chemicals: 1 = little resistant, 2 = less resistant, 3 = often resistant, 4 = resistant</p>
	<p>Due to the large number of chemicals this list cannot be complete. Please also check the lists of resistance of the chemicals used.</p>

Material	ABS	POM	PVC
as at 01.98	ventilation pressure reducer water tank	nipple housing plug + nut suspension clip	nipple pipe expansion coupler ventilation
alcohol	2	3	4
aldehyde	2	3	3
amine / alipatic	1	3	2
amine / aromatic	1	2	1
bases	3	3	4
boiling water	2	3	2
engine oil	3	4	4
ester	1	3	1
glycol	3	3	4
hydrocarbon / alipatic	3	3	4
hydrocarbon / aromatic	1	3	1
hydrocarbon / chlorinated	1	2	1
ketone	1	3	1
mineral acids / concentrated	1	2	4
mineral acids / dilute	3	3	4
organic acids / concentrated	1	2	4
organic acids / dilute	3	3	4
oxydating mineral acids / concentrated	3	1	3
petrol	2	4	2
solvent	2	3	3

19.2 ABS is not resistant against the following chemicals



Due to the large number of chemicals this list cannot be complete. Please also check the lists of resistance of the chemicals used.

Plastic parts made of ABS: ball tank, revolving breather unit, pressure regulator cpl., elbow end piece, end cap, elbow, T-piece, connector

1.4-dioxan	dibutyl sebacate	nitric acid conc.
acetic acid (glacial acetic acid)	dichlorobenzole	nitrobenzene
aceto phenone	dichloroethane	phenol 10%
acetone	diethyl ether	phenol conc..
allyl alcohol	diethyl ketone	phenylethyl alcohol
amyl acetate	diethyl phthalate	phthalamic acid
amyl acetate	diphenyl ether	propylene chloride
amyl mercaptan	diphenylamine	propylene oxide
aniline	ether	pyridine
benzaldehyde	ethyl benzole	sulphuric acid conc.
benzole	ethyl chloride	tetrachloroethylene
benzyl alcohol	ethylene dichloride	thymol
brake fluid ATE	frigen / freon 21	tin tetrachloride
butyl acetate	frigen / freon 22	titanium tetrachloride
butyl acetate	furfural	toluene
carbolic acid	furfuryl alcohol	trichlorobenzole
carbon disulphide	isopropyl acetate	trichloroethane
carbon tetrachloride	kerosene	trichloroethylene
Cetamoll 13	methyl chloride	trichlorophenol
chlorine, liquid	methyl ethyl ketone	tricresyl phosphate
chloroacetic acid	methyl isobutyl ketone	triglycolacetate
chlorobenzene	methyl propyl ketone	verbana oil
chlorobenzene	methyl salicylate	xylol
chlorosulphuric acid	methylene chloride	
diacetone alcohol	methylene chlorobromide	

19.3 POM is not resistant against the following chemicals



Due to the large number of chemicals this list cannot be complete. Please also check the lists of resistance of the chemicals used.

Plastic parts made of POM: clamping screw, holder, ball tank, valve body

acetic acid	hydrogen fluoride
acetyl chloride	hydrogen peroxide
antimony trichloride	iodine alkaline solution
benzoic acid	maleic acid
bleaching liquuor 12.5% Cl	naphthalene sulphane acid
boron trifluoride	nitric acid
brake fluid DIN 53521	nitrogen oxides
butan 2-ol	oxalic acid
calcium hypochlorite	ozone
chloroacetic acid	peracetic acid
chlorosulphuric acid	phenol
citric acid	phenol alkaline solution
cleaning agent pH<3	phosphoric acid
dichloroethylene	salicylic acid
disinfectant (alt. chlorine)	sodium bisulphite
fluorine	sodium hypochlorite
formic acid	soldering fluid
fuming sulphuric acid	sulphic acid, aqueous
glycerin	sulphur dioxide
glycolic acid	sulphuric acid
hydrochloric acid	trichloroacetic acid
hydrofluoric acid	trichloroethylene
hydrogen chloride	WC-cleaning agent pH<3
hydrogen iodide	

19.4 PVC is not resistant against the following chemicals



Due to the large number of chemicals this list cannot be complete. Please also check the lists of resistance of the chemicals used.

Plastic parts made of PVC: nipple pipe, expansion connector.

acetaldehyde	dibutyl ether
acetic acid (glacial acetic acid)	dibutyl oxalate
acetic anhydride	dibutyl phthalate
acetone, aqueous	diethyl amine
acetophenone	dioctyl phthalate DOP
acetylacetone	ethyl acetate
allyl chloride	ethyl chloride
amyl acetate	formamide
amyl chloride	formic acid 100%
aniline, aqueous	furfural
benzal chloride	hexachloroethane
benzole	hydrazine
benzophenone	methyl bromide
benzotrichloride	methyl chloride
butyl acetate	naphthalene
butyl chloride	nitric acid, aqueous 95%
capric acid 30%	nitric oxide, moist, dry
chlorine, liquid	nitrobenzene
chloroacetaldehyde	phenylacetate
chlorobenzaldehyde	phenylhydrazine
chlorocresol	phosgene, liquid
chloroform	phosphortrichloride
chlorophenol	pyridine
chlorotoluene	tetrachloromethane
chlorotrifluoroethylene	toluene
cyanogen acetic acid	trichloroethylene
cyclohexanol	xylol
dibromomethylene	

Space for notes: