Hya®-Rain

Rain Water Utilisation Systems

Class A airgap to DIN 1988

DVGW-approved DW-0402AS2173

Fields of Application

- Rain water utilisation
- Service water utilisation
- Irrigation systems
- Sprinkling systems

Medium Handled

Clean to turbid water not containing aggressive, abrasive or solid substances.

Operating Data

Capacities Q	up to 4 m^3/h, 1.1 l/s
Heads H	up to 43 m
Suction lift H_S	up to 7 m
Temperature of medium handled t	up to 35 °C
Start-up pressure, pump	2.5 bar
System discharge pressure p_d	up to 6 bar
Inlet pressure p_{vor}	up to 1 bar
Public water supply system pressure	up to 4 bar

Drive

Single-phase a.c. motor 230 V with integrated overload protection, IP 44, thermal class F.

Function

Function of the system control

- **Automatic operation:**
  Rain water is withdrawn from the rain water storage tank. If the rain water storage tank is empty, mains water supply is automatically activated.
- **Manual operation on "rain water" mode:**
  System uses exclusively rain water from the rain water storage tank. In this mode, the rain water storage tank may be drained (e.g. for servicing).
- **Manual operation on "mains water" mode:**
  Even with the rain water storage tank filled, exclusively mains water supply is activated (e.g. if work on the rain water tank is under way).
  The flow rate possible under continuous operation conditions depends on how much mains water is supplied.

Function of the pump control (Cervomatic ME)

- When the consumer installation is opened, the pump is automatically started up and pumps water.
- As soon as the consumer installations are closed, the pump is switched off automatically.
- In the case of lack of water the integrated dry-running protection automatically switches the pump off.
- These functions are available and effective for all modes of operation.

For "Design", please refer to page 3

Materials

Pump

Pump casing	Stainless steel
Discharge casing	Cast iron (anti-corrosive coating)
Stage casing	Noryl
Pump shroud	Stainless steel
Diffuser	Polypropylene
Impeller	Noryl
Shaft	Stainless steel
Motor housing	Aluminium

System

Mains water storage tank	PE-HD
Valve with electric actuator	Brass
Piping	Plastic/brass
Float valve	Plastic, **KTW-approved**

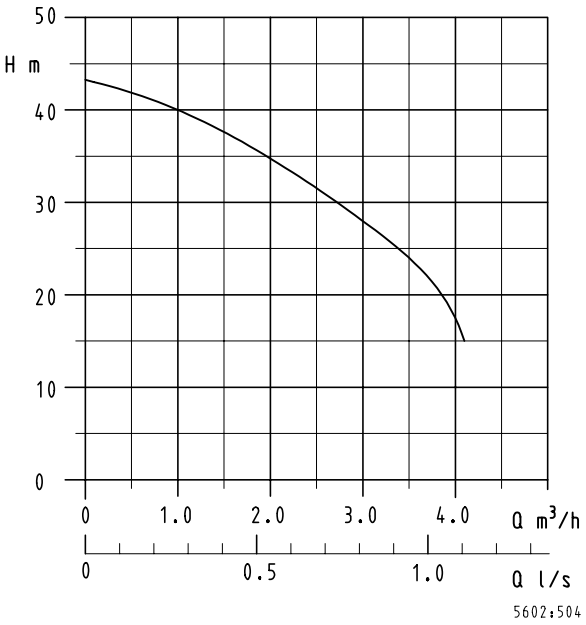
PN 10 **expansion joints**, DVGW-approved, TÜV-certified, 10-year warranty

Shaft Seal (Pump)
Mechanical seal; carbon-ceramics

Drive (Pump)
Motor IP 44, thermal class F
230 V/50 Hz with thermal motor protection

Bearings (Pump)
Deep-groove ball bearings sealed for life

Characteristic Curve



The pump discharge pressure (gauge) is the discharge head **minus** geodetic suction lift and pressure loss in the suction line.
The flow rate depends on the relevant discharge head and, if on mains water mode, on the mains water quantity supplied.
Max. permissible system pressure p_d: 6 bar.

Mains water quantity supplied: The mains water quantity supplied depends on the hydraulic pressure and the cross section of the mains water supply pipe.

Example: Pipe cross section $^3/_4$", hydraulic pressure ≥2 bar
Mains water quantity ≈ 2.7 m³/h ≈ 0.75 l/s.

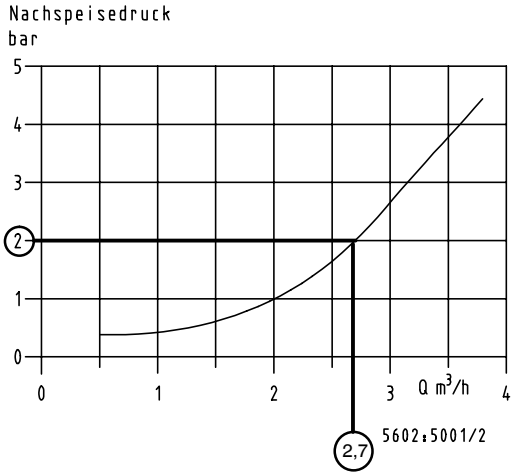
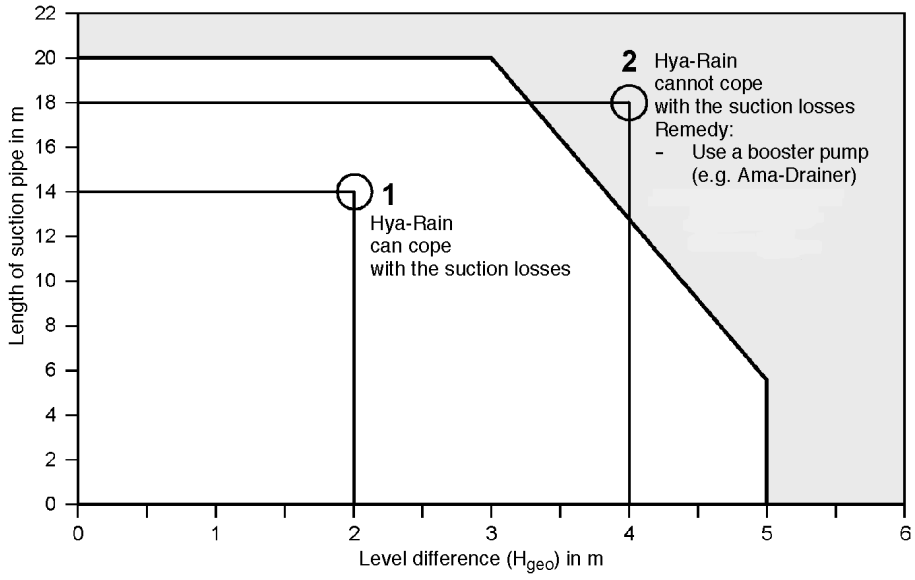


Diagram for Checking Hya-Rain's Suction Capacity

(Boundary conditions: $H_{s\,max}$ = 7 m of water, 1-inch suction hose with foot valve, Q_{max} = 4 m³/h)

Example 1:
Length of suction pipe: 14 m
Level difference (H_{geo}): 2 m
→ Hya-Rain can cope with the suction losses

Example 2:
Length of suction pipe: 18 m
Level difference (H_{geo}): 4 m
→ A booster pump must be used



Technical Data

Mains water quantity supplied: The mains water quantity supplied depends on the hydraulic pressure and the cross section of the mains water supply pipe.

Noise level: Depending on the system operating data, the noise level will be similar to that of a modern dishwasher (48 to 50 dB(A)).

	50 Hz, 2800 1/min 1~230 V		Mains water storage tank volume	Suction lift Suction losses	Cable with plug		Float switch with 20 m cable	Liquid level indication via sensors	Booster pump connection		
	P_1 W	I_N ≈A	l	≈m	m	mm^2					≈kg
Hya-Rain	800	3.7	13	7	1.5	3 x 1.0	X		X	29 130 437 29 130 436 ***)**	28
Hya-Rain N	800	3.7	13	7	1.5	3 x 1.0		X	X	29 130 438 29 130 435 ***)**	27

***) for UK only**

Design

● **Hya-Rain**

Ready-to-connect package rain water utilisation system consisting of:

- Self-priming multistage centrifugal pump
- Cervomatic ME control and monitoring unit
- System control
- Tank with integrated mains water back-up system equipped with a mechanical float valve and class A airgap to DIN 1988
- Three-way valve with electric actuator automatically switching between rain water storage tank and mains water storage tank
- Terminals for connecting a booster pump (e.g. Ama-Drainer)
- Set of mounting elements for wall mounting consisting of bolts, pegs and mounting angle steel
- Expansion joints for discharge side and mains water connection (length approx. 30/50 cm)
- Float switch with 20 m cable
- Illustrated instructions for quick installation including mounting pattern

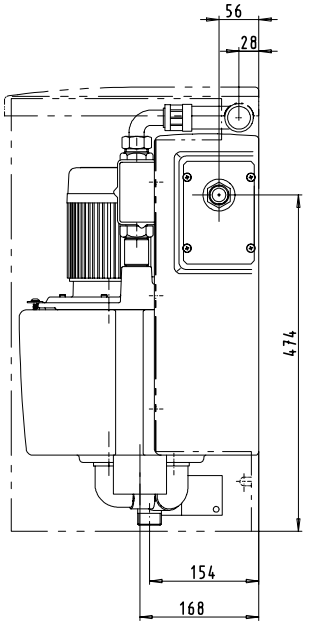
● **Hya-Rain N**

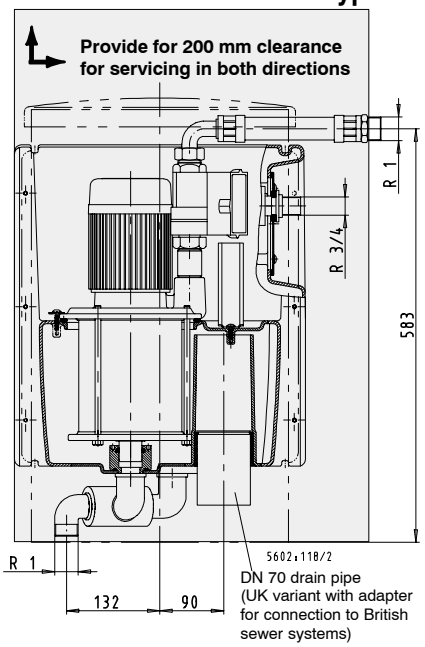
Ready-to-connect package rain water utilisation system consisting of:

- Self-priming multistage centrifugal pump
- Cervomatic ME control and monitoring unit
- System control with liquid level indicated (in %) in the display
- Tank with integrated mains water back-up system equipped with a mechanical float valve and class A airgap to DIN 1988
- Programmable water replacement function in case of permanent rain water mode
- Three-way valve with electric actuator automatically switching between rain water storage tank and mains water storage tank
- Terminals for connecting a booster pump (e.g. Ama-Drainer)
- Set of mounting elements for wall mounting consisting of bolts, pegs and mounting angle steel
- Expansion joints for discharge side and mains water connection (length approx. 30/50 cm)
- Sensor with 3 m cable and connection box
- Illustrated instructions for quick installation including mounting pattern

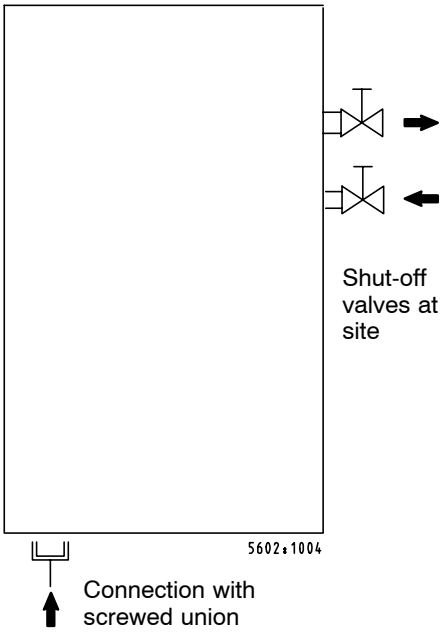
For the collection of rain water, Hya-Rain can be combined with subterranean or basement-installed storage systems.

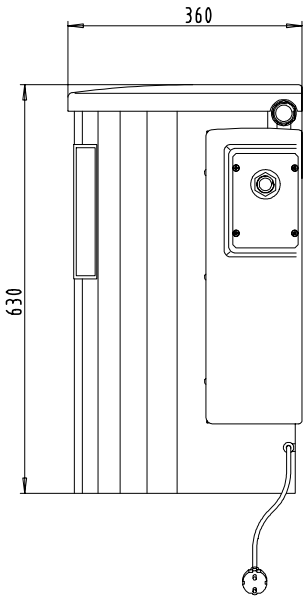
Dimensions

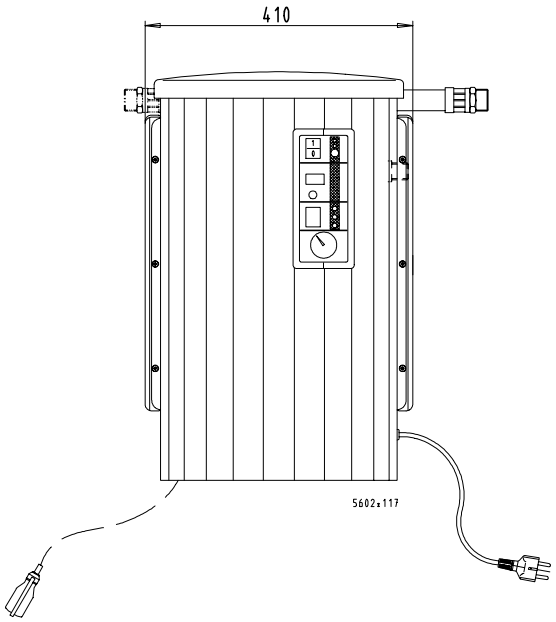




Typical installation

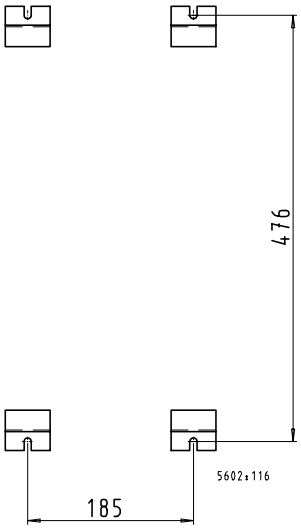




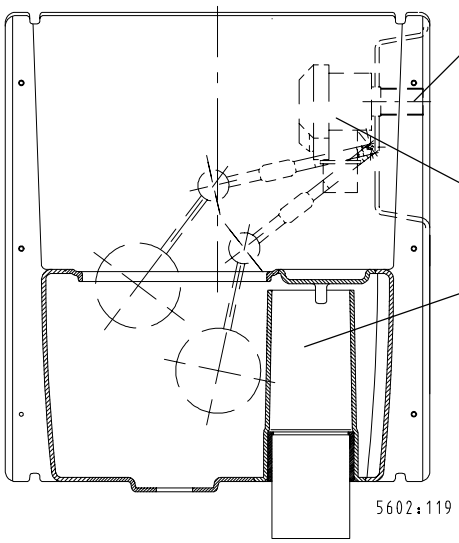


UK variant with British standard plug

Bolt hole pattern for wall mounting



Mains water back-up system and overflow

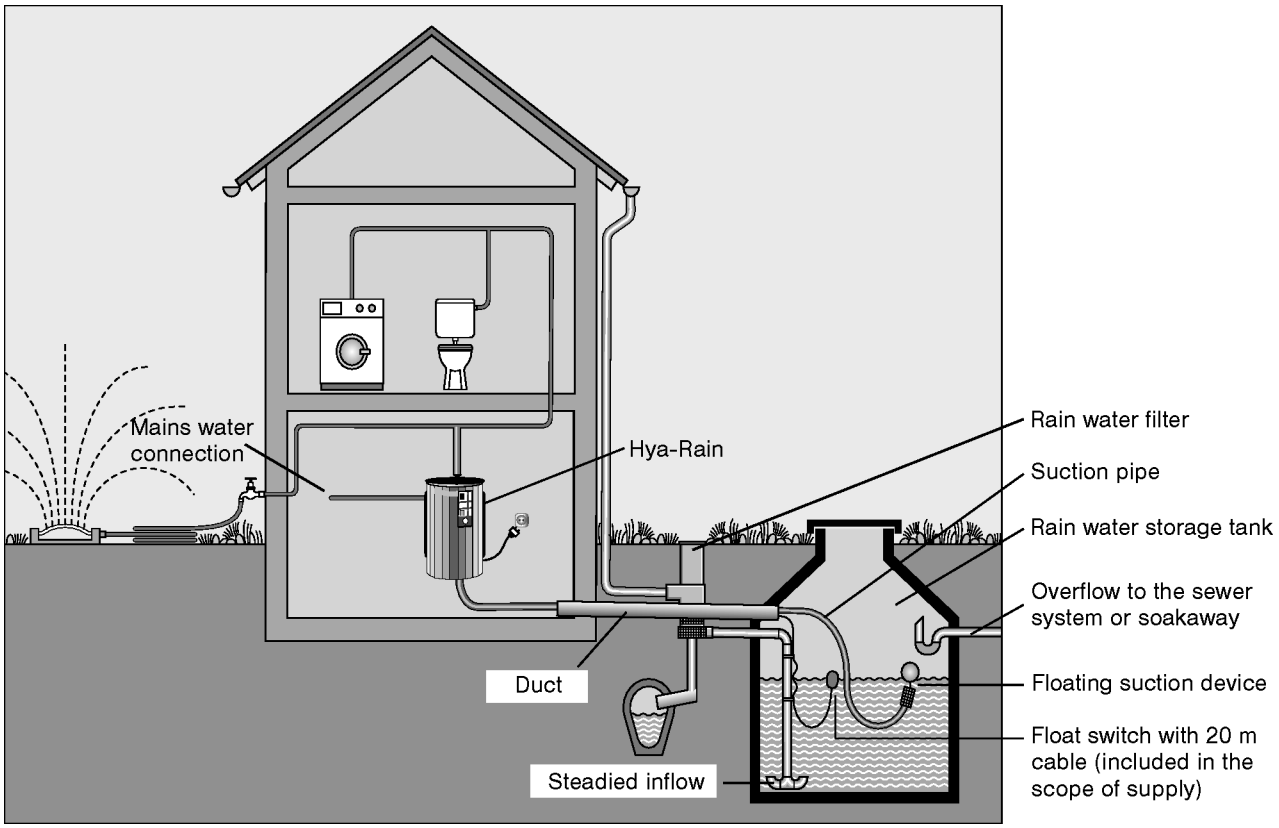


Mains water connection with class A airgap to DIN 1988

Mechanical float valve

Overflow for connecting drain pipes to DIN 1986. The overflow must be a class A airgap to DIN 1988, Part 4; if not, the DVGW (German Association of the Gas and Water Sector) approval will become void.

Typical Hya-Rain installation with subterranean rain water storage tank outside of the building



DIN 1986 stipulates that the overflow must be connected to a floor drain or directly to the public sewer system.
It is not allowed to close the overflow with a plug.

The suction lift line is laid with a rising slope from the rain water storage tank to Hya-Rain to ensure perfect priming of the pump.

Recommendation: To avoid intake of dirt particles the float switch must be fixed so as to ensure a water level of at least 30 cm under the floating suction device.

Tip:

- If on-site conditions do not allow to lay the suction line with a rising slope, it is recommended to install a booster pump in the rain water storage tank. The booster pump can be operated with a standard Hya-Rain or Hya-Rain N.
- In the case of low-lying rain water storage tanks, the overflowing water can be led into the rain water storage tank via the duct accommodating the suction line and the float switch cable.

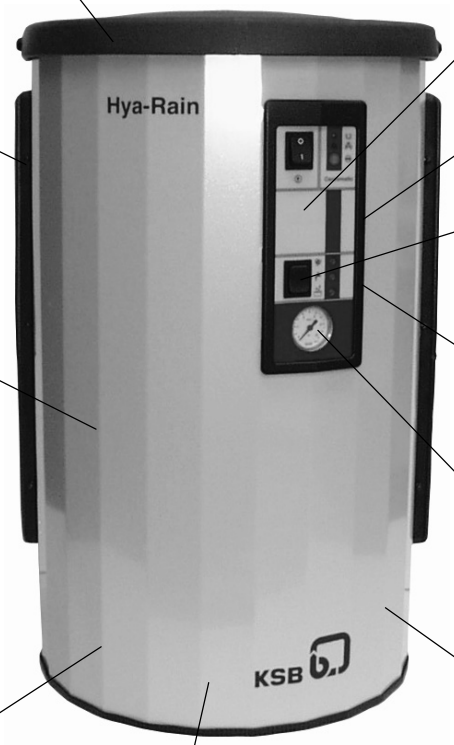
Attention: Rain water is **no drinking water**.
Easily accessible tapping points must be marked **"No drinking water"**. It is recommended to fit them in addition with a childproof device (e.g. removable turning handle).

Ready to connect and automatically vented, the unit ensures easy and fast installation and commissioning.

High operating reliability even below the backwash level thanks to safety shut-off of the rain water storage tank line.

The optically attractive hood covers a low-noise (≤50 dB(A)), self-priming, multistage centrifugal pump with professional efficiency.

Indication of the rain water storage tank liquid level on option.



Simple and well-proven control to ensure operating reliability.

Easy-to-operate control panel for all manual and automatic functions and indication of the operating modes by LEDs.

The integrated dry-running protection prevents lack-of-water damage and ensures reliable operation.

Automatic switching to the mains water storage tank if the rain water storage tank is empty and supply of mains water as required.

The operating pressure is indicated in the display.

Thanks to its dimensions
H = 630 mm
W = 410 mm
D = 360 mm
Hya-Rain will fit into every corner.

Float switch or optional liquid level indicator connecting easily from outside.

Complete range of accessories for mounting, for connection to the public water supply system and to the consumer lines.

How to plan your rain water utilisation system

I Rain water quantity

Receiving surface x coefficient of discharge x filter efficiency x height of precipitation = rain water quantity/year.

- The *receiving surface* is the roof's plan area (length x width) in m^2. Example: 10 m x 17 m = 170 m^2.
- The *coefficient of discharge* takes into account the difference between the amount of precipitation and the amount of water actually discharged. For ridge roofs, a factor of 0.75 proved to be the best value.
- The *filter efficiency* considers the filter losses upstream of the rain water storage tank.
- As to the *height of precipitation*, an average amount of 700 mm per year can be assumed.

Example:	**Your values**
170 m^2 x 0.75 x 0.9 x 700 mm	_____ m^2 x 0.75 x 0.9 x 700 mm
= 80 325 l of rain water per year	= _____ **l of rain water per year**

II Rain water requirement

Example:		**Your values**			
A household of 4, with a garden area of 200 m^2					
Toilet/number of household members/days:					
24 l x 4 people x 365 days =	35 040 l	24 l x __	people x 365 days	=	_____ l
Washing machine/number of household members/days:					
10 l x 4 people x 365 days =	14 600 l	10 l x __	people x 365 days	=	_____ l
Garden irrigation/m^2/year:					
60 l x 200 m^2 garden area =	12 000 l	60 l x ____	m^2 garden area	=	_____ l
Rain water requirement per year:	61 640 l	**Rain water requirement per year:**			_____ **l**

III Storage volume

The rain water requirement must be compared with the rain water quantity and the lower value of the two must be used for calculating the storage volume.
6 % of this lower value are considered to be the adequate storage volume.

Example:	**Your values:**
61 640 l x 0.06 = 3698 l	_____ l x 0.06 = _____ l

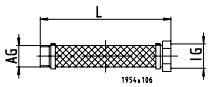
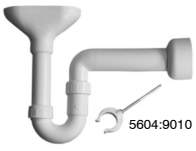
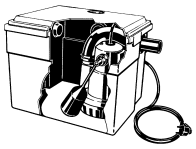
It is recommended to select the next larger commercially available tank size.

As a rule, overflowing of the rain water storage tank at regular intervals is desired since this way dirt particles floating on the water surface are eliminated.

IV Saving mains water

The annual amount of mains water saved by using collected rain water roughly corresponds to the calculated rain water requirement per year.
In our example, the annual amount of mains water saved is approximately 61 000 l.

Pump Accessories

			≈kg
	Nipple joint made of brass R 1 $^1/_4$ external thread (Required in case of direct connection between pump and non-return valve)	00 240 354	0.3
 5604:9104	**Suction hose kit,** with union parts, without foot valve 7 m, G 1 $^1/_4$ - G 1	18 040 868	5.5
 5604:9037	**Suction strainer with foot valve** and spring-loaded non-return valve, opening pressure approx. 2 m of water, G 1 $^1/_4$ (internal thread), stainless steel. **For cisterns situated at a high level.**	01 068 052	0.3
 5604:9105	**Foot valve with fine filter** for suction hose kit 18 040 868	01 076 873	0.25
 5604:9106	**Screwed union G 1 $^1/_4$,** for suction hose kit 18 040 868	11 037 848	0.15
	**Float,** ∅ 150 mm, for suction hose kit or for the combination of suction hose kit with fine filter and non-return valve for fine filter	19 071 460	0.3
	**Expansion joint PN 10,** R 1, L = 300 mm	11 037 177	
 5604:9011	**Floating-suction strainer,** length: 2 m, R 1	18 040 795	1.5
	Floating-suction strainer, length: 2 m, R 1 $^1/_4$	18 040 796	1.8
 5604:9010	**Overflow syphon Ø50** for Class A air gap Note: On Hya-Rain, the overflow must be reduced to Ø50.	01 068 180	0.5
	**Lifting units** for rooms without connection to the sewer system **Ama-Drainer-Box 021** Automatic waste water lifting unit with Ama-Drainer 301.1 pump	29 127 257	7.5
 5602:9086	**Tank** (membrane-type accumulator), 8 l, reduces the unit's frequency of starts when the system leaks	00 116 025	

Electrical Accessories / Supplementary Equipment *)

		E-No.	Ident. No.	≈kg
	**Hya-Rain-Control,** with volt-free contacts for operation and fault indications. **Explanation:** Hya-Rain-Control is an additional switchgear providing Hya-Rain with volt-free contacts for operation and fault indications. The reset function is to be found on Hya-Rain-Control.	E 094	29 130 422	1.3
	Connection cable H05RR-F2x1 between terminal box of sensor and Hya-Rain N or Niveau-Rain K 10 m 20 m		 19 071 802 19 071 803	 0.5 1.0
 5602:9083	**Niveau-Rain K** with water level indication in % and switching between rain water and mains water mode *For description see product literature*		18 040 846	1.1

*) Accessories (Ident. No.) are included in the scope of supply but not fitted.
Supplementary equipment / options (E No.) come fitted to the unit.

Description of Accessories
Hya-Rain-Control

Application:
If required, Hya-Rain may be supplied or retrofitted with the Hya-Rain-Control switchgear to indicate operation and fault signals of the Cervomatic pump control unit via volt-free contacts.

Media handled:
Any medium

Operating Data:

Supply voltage (analysing device)	230 V AC
Type of enclosure (analysing device)	IP 52
Power input	1 watt
Max. current (volt-free contact)	2 A, 230 V
Contact	change-over contact

Designation:
Hya-Rain-Control

Design:
The switchgear converts visually indicated operation and fault signals into one volt-free contact each.

Installation:
The switchgear should preferably be installed next to Hya-Rain in a dry and frost-proof room and supplied with 230 V / 50 Hz voltage. Connection to Hya-Rain is to be effected on site as described in the operating instructions, using the connection cable included in the scope of supply.

Function:
The switchgear performs the reset function and displays the operation and fault messages of the Cervomatic pump control unit. In addition, operation and fault signals are provided via volt-free contacts.

Customer benefits:
- Connection of Hya-Rain to the control station.

Niveau-Rain K

Application:
Hya-Rain with float switch can be retrofittd with the Niveau-Rain K switchgear to allow measurement and indication of the filling level. It is also suitable for measuring and indicating the water level of all tanks having a max. depth of water of 3 m.

Media handled:
Rain water, service water, fire-fighting water, cooling water.

Operating data:

Supply voltage (analysing device)	230 V AC
Type of enclosure (analysing device)	IP 52
Type of enclosure (sensor with box)	IP 65
Measuring voltage (sensor)	12 V
Measuring principle	capacitive
Sensor cable length	3 m
Power input	1 watt
Max.current (volt-free contact)	10 A, 230 V
Contact	change-over contact
Switching levels	5 % and 7 %
Connection cable (to be provided by the operator)	2x 1 mm^2, max. 50 m long

Designation:
Niveau-Rain K

Design:
Switchgear for measuring the filling level of a tank; fitted with a pre-set switch as volt-free change-over contact.

Function:
In the calibration process, the relevant sensor cable length immersed in the medium will be considered 100 %. Variations in the filling level are shown on the display in percentage increments. The value displayed may exceed 100 % if the point calibrated was at a lower level. By pressing the calibration button (10 s) the unit may be recalibrated any time. Once the water level in the tank has dropped to 5 %, Hya-Rain will switch to the mains water mode. If rainfalls make the water level rise to 7 % again, Hya-Rain returns to the rain water mode.
This function makes it possible to control also other rain water systems (e.g. equipped with single Multi Eco pumps) and direct water supply to the cistern.
Customer benefits:
- Permanent indication of the filling level
- Optimum use of the available rain water
- As little as a 2 % rise in the rain water level will return the system to the rain water mode.
  This corresponds to 4 cm for a water level of 2 m. If a float switch is used, 20 – 30 cm are needed at this water level to return the system to the rain water mode.

Special designs:

Longer sensor cables	on request
Other switching levels	on request

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