RAINMASTER Favorit-SC

- **RM-F45-SC-A**
- **RM-F55-SC**
- **RM-F70-SC**
- **Duplex-Application**

Installation and user manual

WATER IS OUR ELEMENT

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Table of Contents

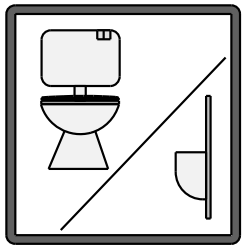
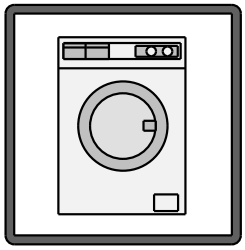
1. Introduction and scope of application

Congratulations on purchasing your RAINMASTER **Favorit-SC** (hereinafter referred to as ***RM-FXX-SC***).

The RM-FXX-SC is a pump and replenishment unit specially designed for the supply of service water (e.g. with rainwater, grey water or cooling water) and is used in large single-family homes, multi-family homes, as well as in commercial and industrial areas.

The range of application can be extended by connecting two *RM-FXX-SC units of the same type* in parallel. The system control of the units used then communicates via a data cable connection (for further information, see appendix).

The following consumers can be supplied with the *RM XX-SC*:

Toilet / urinal: Several toilets and urinals can be connected.	
Washing machine: Multiple washing machines can be connected.	
Garden / Cleaning: All types of garden appliances and cleaning equipment can be connected, depending on the maximum pump flow rate. <u>Note:</u> Drip irrigation systems require a separate design in combination with a buffer expansion tank.	

<u>Note</u>

The system is dimensioned in accordance with DIN 1988-3 in Germany with regard to the required peak flow rate.

1.1 Functionality

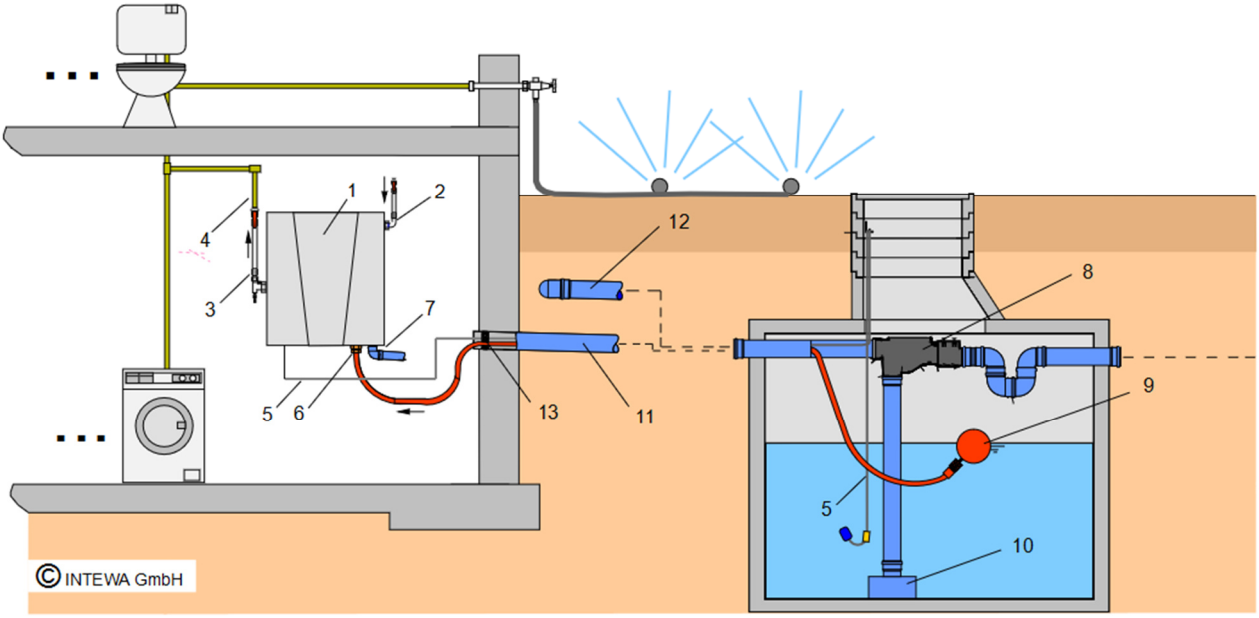
Automatic mode: Rainwater/mains water

In automatic mode (switch position I), the self-priming centrifugal pump delivers rainwater from the cistern to the consumers that are open. If the cistern is empty, the float switch in the cistern detects this and switches the electric 3/2-way ball valve to mains water mode. The suction line is then shut off and the required service water is taken from the integrated make-up tank. The make-up tank is supplied with mains water by a float valve. When the rainwater cistern fills up again with rainwater, the float switch detects this and switches the electric 3/2-way ball valve back to the rainwater position.

Maintenance mode: Mains water

In maintenance mode (switch position II), the electric 3/2-way ball valve switches to permanent mains water mode, in which the consumers are always supplied from the make-up tank.

In both modes, the centrifugal pump is switched on and off via the integrated electronic pressure switch, which also monitors the flow. This ensures 100% protection against dry running.



Example overview of a rainwater harvesting system

1. RAINMASTER Favorit rainwater control unit
2. Mains water connection with flexible hose and shut-off valve
3. Pressure connection set with vent and shut-off valve
4. Pressure pipe to the consumers
5. Float switch cable
6. Suction line connection
7. Emergency overflow
8. PURAIN rainwater filter
9. Floating suction filter SAUGSAGF
10. Inlet calming device
11. Protective tube for suction pipe and float switch cable
12. Rainwater inlet into the tank
13. Wall feed-through MD100

Speed control

In both operating modes (automatic/maintenance), the centrifugal pump is speed-controlled via the integrated pump control according to the set pressure level. Pressure monitoring is carried out by an integrated pressure sensor, which is monitored by the pump control. Flow monitoring (dry-running protection) is also carried out by the pump control. All operating parameters such as run-on time, no-load and load current range, and response time for dry running are specified by the pump control.

Overview of functions:

Variable frequency, constant pressure	The motor speed follows the water consumption and attempts to maintain the set working pressure.
Overvoltage protection	The pump switches off in the event of overvoltage.
Blockage protection	If the pump becomes blocked, it switches off to protect the motor.
Motor temperature protection	If the motor temperature exceeds 103°C, the pump switches off.
Temperature shutdown if the water temperature is too high	If the water temperature in the pump pot reaches 73°C, the pump automatically switches to standby. When the temperature drops, the pump switches back on automatically.
Leak detection	In the event of minor leaks or dripping consumers, the leakage indicator lights up to inform the user. This has no effect on operation.
Dry-running protection	The pump detects when there is no more water flowing and switches off after a certain period of time.

2. Safety Instructions

Current-carrying components must only be installed by a qualified electrician. In the event of malfunctions of electrical devices, the product may only be put back into operation after it has been repaired by a qualified electrician. There is a risk of electric shock!

The socket circuit used for the device must be protected by a circuit breaker (16 A in many countries). A residual current device with a maximum response current of 30 mA must also be installed upstream if not already present.

Before installing the product, read these installation and operating instructions carefully. Follow the instructions exactly. Modifications to the product are not permitted, as this will void any warranty claims.

The following points must also be observed during installation and operation:

- Inspect the product for any visible defects before installation. If defects are found, the product must not be installed. Damaged products can be dangerous.
- Installations on the mains water supply network may only be carried out by an authorized installation company.
- A floor drain must be provided near the installation site to collect any accidental water leaks (e.g., in the event of a pump failure, pipe break, etc.) and prevent water damage to the building.
- The masonry behind a water-carrying system must be protected from water (e.g., with a waterproof coating).
- Ensure that existing emergency overflows are connected and sufficiently dimensioned.
- Disconnect the power plug if you are away for more than 24 hours.
- Shut off the mains water supply to the device if you are away for more than 24 hours.
- All products must be checked regularly to ensure they are in proper working order. The minimum inspection intervals are specified in the maintenance instructions.
- Electrical appliances can be dangerous for children. Therefore, keep children away from the product at all times. Do not allow children to play with the product.
- Never install water-carrying products in locations where the temperature may fall below 0°C.
- Do not install electrical products in rooms that are at risk of flooding.
- The operator is responsible for compliance with safety and installation regulations.

3. Scope of Delivery

Pump and Replenishment Unit
- RM-FXX-SC

Wall mounting material,
- Installation material and operating instructions

Accessories A:
- Mains water connection set

Accessory B:
- Pressure connection set

Accessory C:
- Float switch set

4. Technical Data

	RM-F45-SC-A	RM F55-SC	RM-F70-SC
Dimensions (H x W x D):	595 x 550 x 265 mm	595 x 550 x 265 mm	595 x 550 x 265 mm
Weight	24 kg	29	29.5 kg
Mains voltage/frequency:	230 V / 50-60 Hz	230 V / 50-60 Hz	230 V / 50-60 Hz
Power:	max. 0.37 kW	max. 0.55 kW	max. 0.75 kW
Current:	max. 2.5 A	max. 3.5 A	max. 6.2 A
Insulation class:	B	B	B
Working pressure:	1.0 –3.2 bar (adjustable)	2.0 - 4.5 bar (adjustable)	2.0 - 4.8 bar (adjustable)
Max. volume flow:	4.5 m³/h (75 l/min)	5.5 m³/h (90 l/min)	7.0 m³/h (116 l/min)
Sound pressure level	< 52 dB(A)	< 54 dBA	< 58 dBA
Suction height:	0 - 4m (s. diagram)	0 - 6m (s diagram)	0 - 6 m (s diagram)
Protection class:	IP 54	IP 54	IP 54
Mains water inlet pressure:	2.5 - 6 bar	2.5 - 6 bar	2.5 - 6 bar
Max. height of highest consumer:	15 m	20 m	20 m
Ambient temperature	< 40°C	< 40°C	< 40°C
Water temperature:	< 60°C	< 60°C	< 60°C
Float switch:			
Cable length x cross-section:	15 m x Ø9 mm (3 x 1.0 mm²)	15 m x Ø9 mm, (3 x 1.0 mm²)	15 m x Ø9 mm, (3 x 1.0 mm²)
S Protection class:	IP68	IP68	IP68

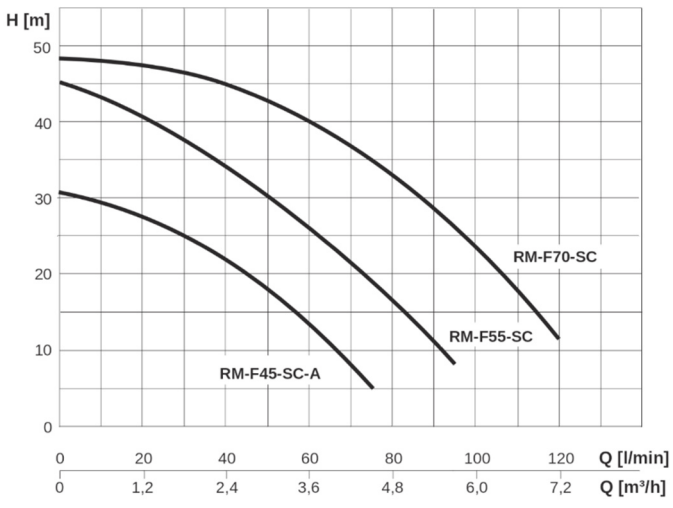


Fig.: Pump characteristic curve

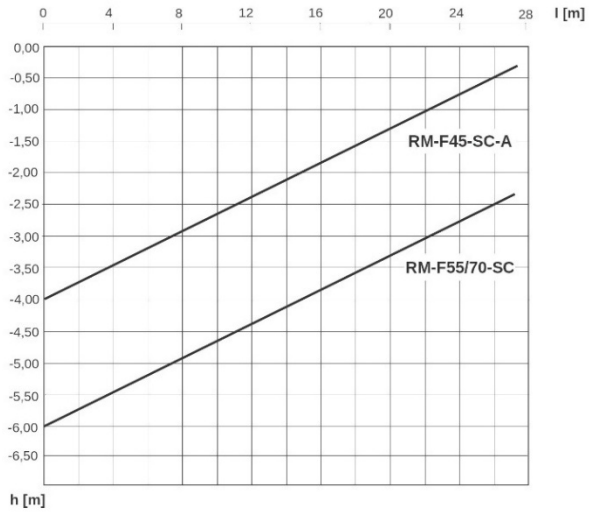
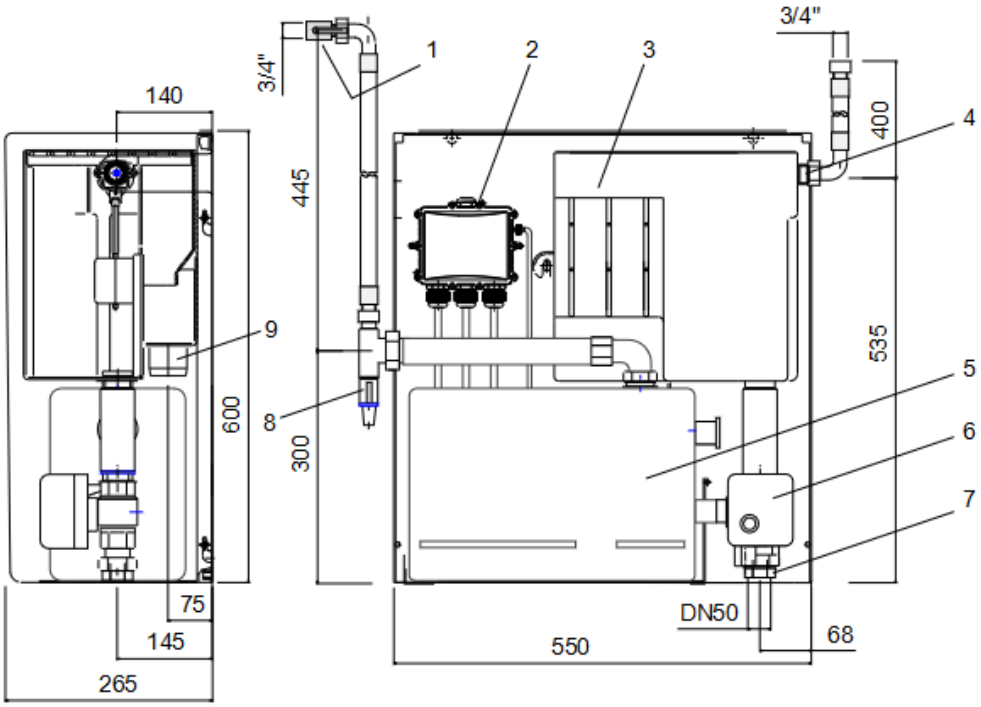


Fig.: Intake characteristic curve

4.1 Device overview and Dimensions



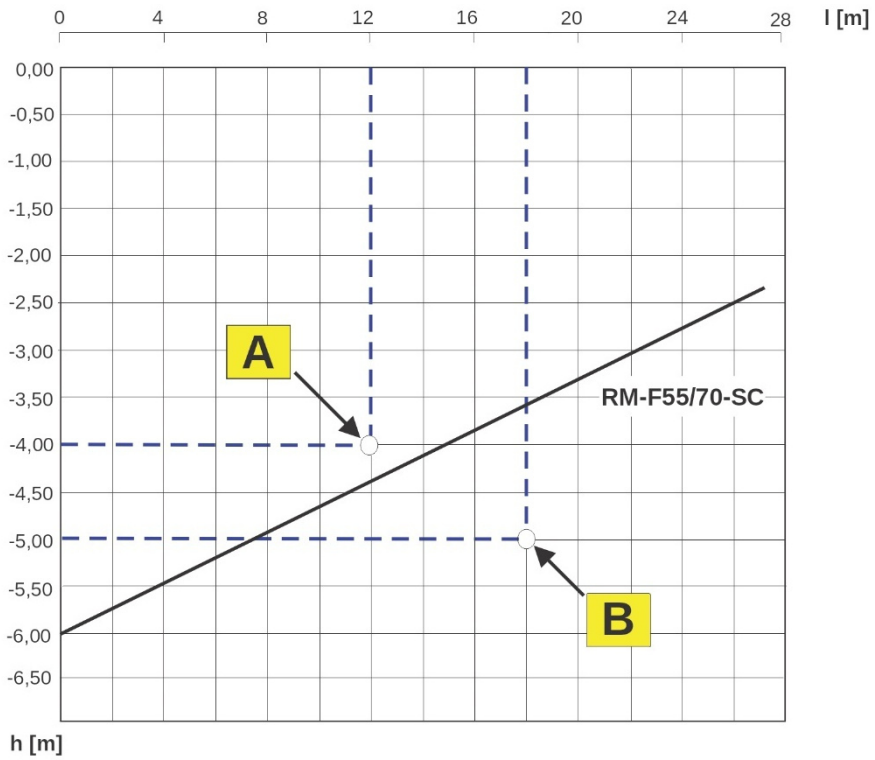
1. Pressure shut-off valve (1" female thread)
2. Terminal box
3. Make-up tank
4. Drinking water make-up valve
5. Centrifugal pump NUVOS 45S /55S / 70S
6. 3/2-way ball valve with display
7. Suction line connection (1" female thread)
8. Vent valve
9. Emergency overflow connection (DN50)

Fig.: Device dimensions and assembly overview

4.2. Dimensioning of the Suction

In practice, a centrifugal pump is only self-priming within a certain range due to vacuum losses (pipe friction, suction height). In this operating range, the pump is able to vent the suction line independently (e.g. during initial commissioning). The suction characteristic curve shows the dependence of the suction length on the suction height. The determined value must be above the suction characteristic curve shown in the diagram. If the suction point is below the suction characteristic curve, a hybrid storage tank with a charging pump must be used (see Appendix 1.1).

Dimensioning examples:



Example A:
Suction pipe length = 12 m
Intake height = 4.0 m (height difference between lowest intake position and pump)

- ➔ OK because the intersection point is above the characteristic curve

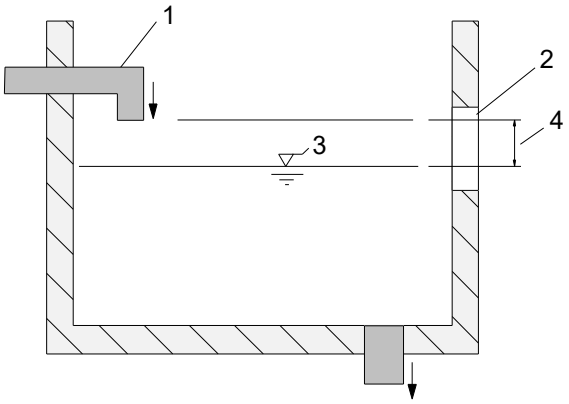
Example B:
Suction line length = 18 m
Suction height = 5 m (height difference between lowest suction position and pump)

- ➔ Not OK, as the intersection point is below the characteristic curve
- ➔ Suction via a hybrid storage tank with a charging pump in the central storage tank (see example in Appendix 1.1)

4.3 Standards, Guidelines, Tests

4.3.1 DVGW connection safety device, separator according to water category 5

The *RM-Fxx-SC* complies with the standard for rainwater utilization systems DIN 1989-4 "Components for control and replenishment." The DVGW test mark confirms the necessary "free inlet" in accordance with DIN EN1717 for safe separation of service water from the mains water connection, which is integrated in *the RM-Fxx–SC*.



1. Drinking water inlet Make-up tank
2. Overflow opening of the make-up tank
3. Maximum possible water level (in case of malfunction)
4. Air gap between inlet and max. possible water level = safe separation of drinking water and service water

Fig.: Mains water replenishment device, type AB in accordance with DIN EN 1717

Certification of separation device according to EN 1717, safety category 5 for: ○ Germany ○ Belgium ○ Netherlands ○ Switzerland	DVGW CERT Anschlusssicher W 540 · BELGAQUA · SVGW SSIGE · kiwa certified BRL-K14011
Certification mains water top-up valve for: ○ United Kingdom	WRAS Water Regulations Advisory Scheme

4.3.2 EU Declaration of Conformity

1 **EU Konformitätserklärung**
EU- Declaration of Conformity

de/en

2 **Diese EU-Konformitätserklärung wurde in alleiniger Verantwortung von INTEWA GMBH ausgestellt.**
This declaration of conformity is issued under the sole responsibility of INTEWA GmbH.

3 **Dokument-Nr.:** **06/30/2025**
Document-No.:

4 **Hersteller:** INTEWA GmbH
Manufacturer:

5 Anschrift: Auf der Hüls 182
Address: D – 52068 Aachen

6 **Produktbezeichnung:**
Product designation:

7 Pumpenstation
pump station

8 Typenbezeichnung: RM-Fxx-SC, SMT-Fxx-SC
Type:

9 **Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:**
The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

10 **2006/42/EU:** **Maschinenrichtlinie**
2006/42/EU: *Directive Machinery*
2014/30/EU: **EMV Richtlinie**
2014/30/EU: *Directive relating to electromagnetic compatibility*

11 **2011/65/EU:** **RoHS-Richtlinie II**
2011/65/EU: *RoHs Directive II*

12 **2015/863/EU** **RoHS-Richtlinie III**
2015/863/EU *RoHS-Richtlinie III*

13 **Angewandte harmonisierte Europäische Norm:**
Applied harmonised European Standard:

EN60335-1:2012/A11:2014:2014/A13:2010/A15:2011, ENISO 12100:2010

EN 61000-6-3:2007/A1:2011, EN 61000-6-1: 2007, EN 61000-6-4: 2007/A1:2011
EN 61000-6-2: 2005, EN55014-1:2006/A2:2011

EN50581:2012

Weitere normative Dokumente
Other normative documents

EN 60335-2-41:2003/A2:2010

14 **Ort, Datum:** **Aachen, 30.06.2025**
Place, Date:

15 **Rechtsverbindliche Unterschrift:**
Legal signature:

16 Geschäftsführer Oliver Ringelstein
Manager

30/06/2025

5. Assembly Overview

The *RM-FXX-SC* has a modular design. Each assembly part can be replaced individually.

5.1 Centrifugal Pump Assembly of RMF-F45-SC-A

① Suction connection
② Pressure connection
③ Check valve / Filling nozzle
④ Display and keypad

Fig.: Pump Connections and Display

5.1.1 Display and Button Functions

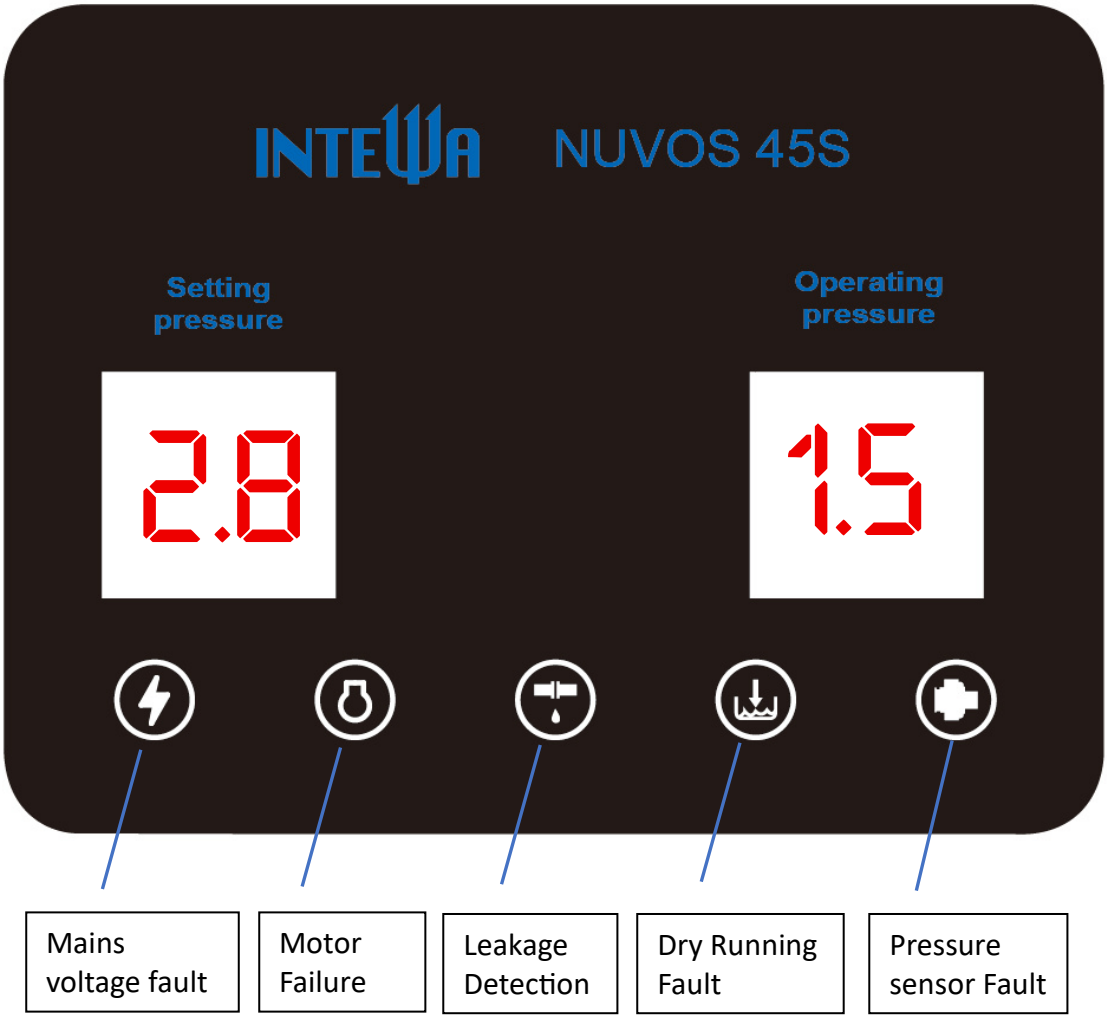


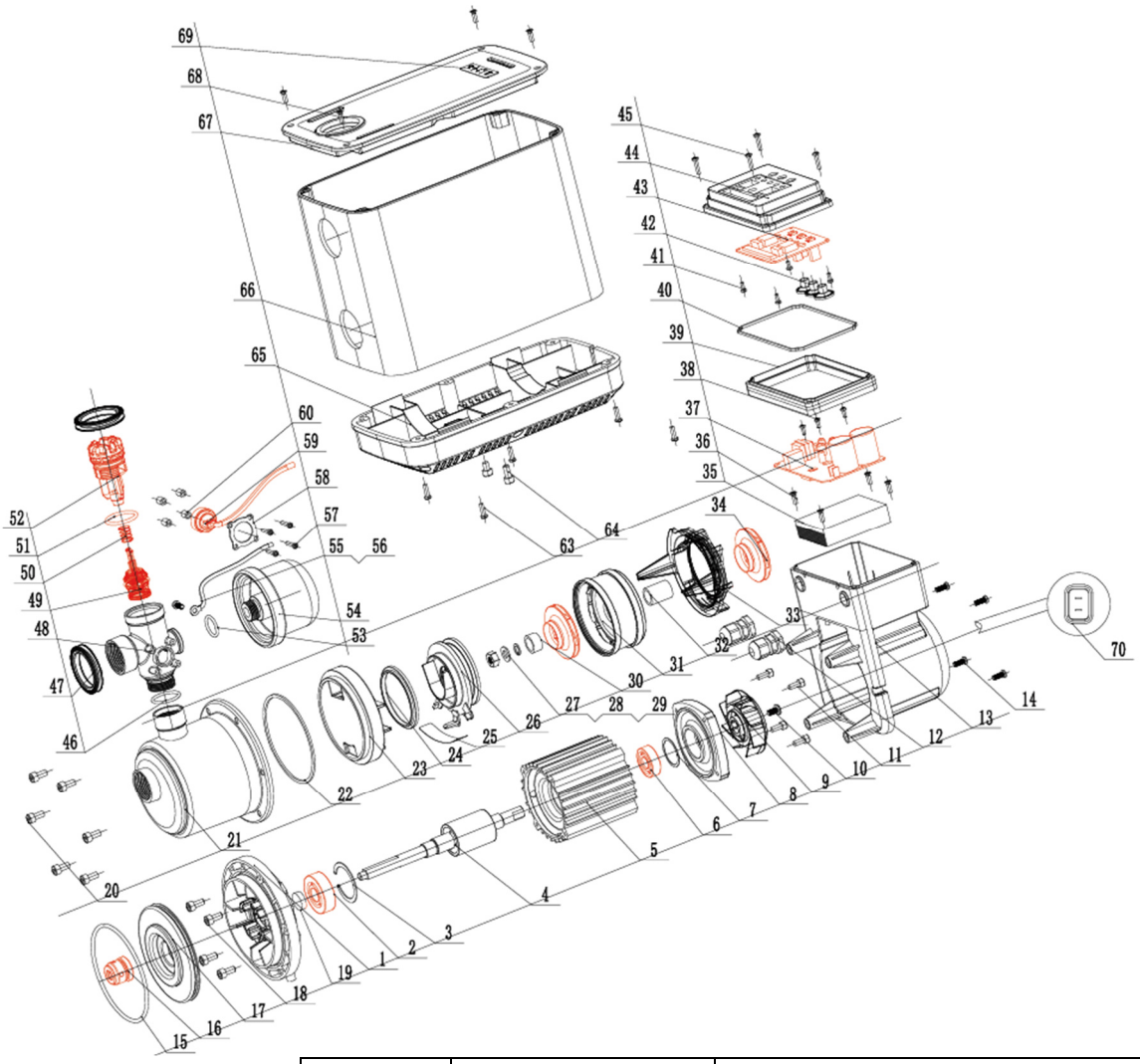
Fig.: Display field RM-F45-SC-A

KEY	FUNKTION
⏻	Start / Stop The pump switches between standby and stop when ⏻ actuated. The pump starts automatically in standby (pump mode) when the pressure drops below the set inrush pressure.
+ or −	Displaying and Adjusting Working Pressure Press the Adjustment button once + or −, to display the set working pressure value. When + or − further pressed the working pressure value increases or decreases. The setting is automatically saved.

5.1.2 Parameter Settings

Note: This pump does not have the same parameter setting as the RM-F55/70.

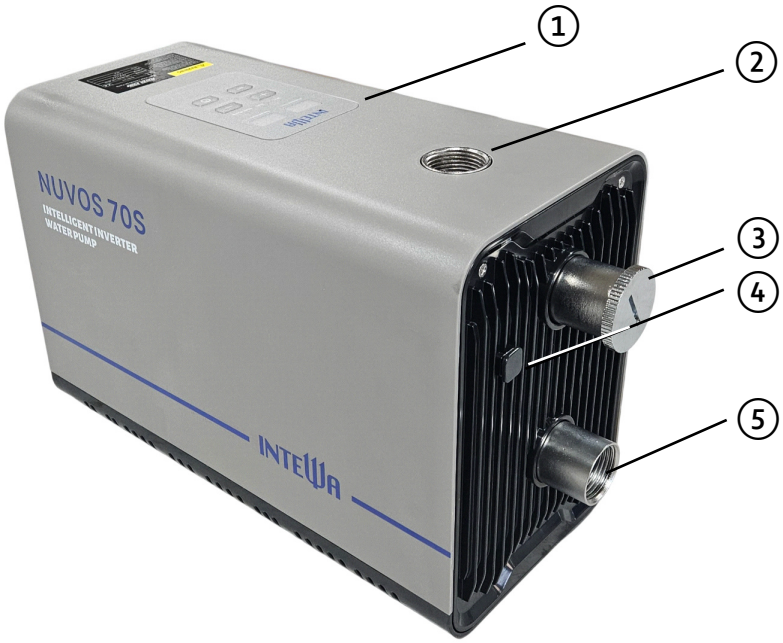
5.1.2 Exploded-view Diagram



Pos	Description	Description
2	NV-45 BR 6302	C & U bearing 6302
6	NV-45 BR 6201	C&U bearing 6201
16	NV-45 GLD	Mechanical seal
23	NV-45 LA	REFLEX-device (self-priming part)
26	NV-45 LR1	Diffusor, Guide vane 1
31	NV-45 LR2	Diffusor, Guide vane 2
34	NV-45 IMP	Impeller
37	NV-45 PC	Variable Frequency controller
43	NV-45 PD	Control panel
49-52	NV-45 RSV	Check valve
59	NV-45 DS	Pressure sensor assembly

Fig./Tab.: Exploded view and spare parts list for RM-F45-SC-A

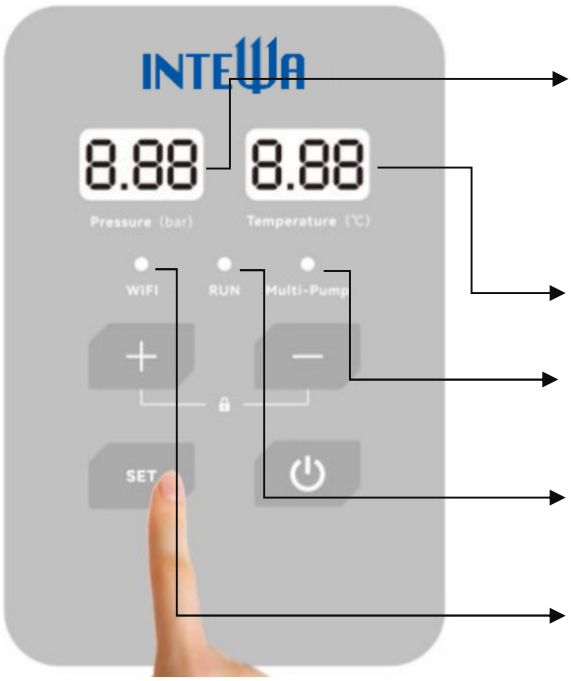
5.2 Centrifugal Pump Assembly of RM-F55/70-SC



① Display and keypad
② Pressure connection
③ Pressure connection alternative (is closed with a fitting)
④ Socket for signal cable for DUPLEX application
⑤ Suction connection with internal check valve

Fig.: Pump connections and display

5.2.1 Display and Button Functions



- Operating pressure
- Start pressure
- Operating mode (frequency)
- Parameters (B01+B17)
- Alarm
- Setting value

Temperature

LED ON: DUPLEX function is active
LED OFF: DUPLEX function not active

LED ON: Pump running
LED OFF: Pump is OFF

LED ON: WIFI connected (currently not available)
LED OFF: WIFI inactive

KEY	FUNCTION
+ or −	**Display and set working pressure** Press the setting button + or − once to display the set working pressure value. Pressing the + or − button again increases or decreases the working pressure value by 0.1 bar. The pressure value flashes. Press the "SET" button to save the setting. This also happens automatically after 20 seconds without any input.
+ + −	**Key lock** Press and hold the buttons "+" and "−" to lock/unlock the buttons "+", "−" and "SET". The default setting is "unlocked."
⏻	**Standby / Stop** The pump switches between standby (ON) and OFF when ⏻ is pressed. The pump starts automatically in standby (pump mode) when the pressure falls below the set switch-on pressure.
⏻ (3 sec.)	**Display mode ON/OFF** To enter display mode, press and hold the "⏻" button for 3 seconds. The pump switches to display mode, in which the operating frequency is shown as Lxx (xx stands for the operating frequency) in the left-hand numeric display. Pressing the "⏻" button for 3 seconds exits the display mode and the working pressure is displayed. **Frequency setting** The frequency is set using the "+" or "−" buttons to increase or decrease the frequency by 1 Hz with each press (accompanied by a short beep). Press the "SET" button to save the setting or exit immediately. Automatic, but after 20 seconds without input.
SET	**Parameter menu** Press the SET button to open the parameter menu.

5.2.2 Parameters and Settings

Note: The standard factory settings [FS] of the pumps are optimal values that are suitable for most application conditions. It is generally not necessary to change the settings. If this is necessary, it should be done under the guidance of qualified personnel, as otherwise any damage that occurs will not be covered by the warranty.

Setting the parameters:

Parameters are set using the " + " or " − " buttons.

Select the parameter to be set and save the setting value with the "SET"button (.).

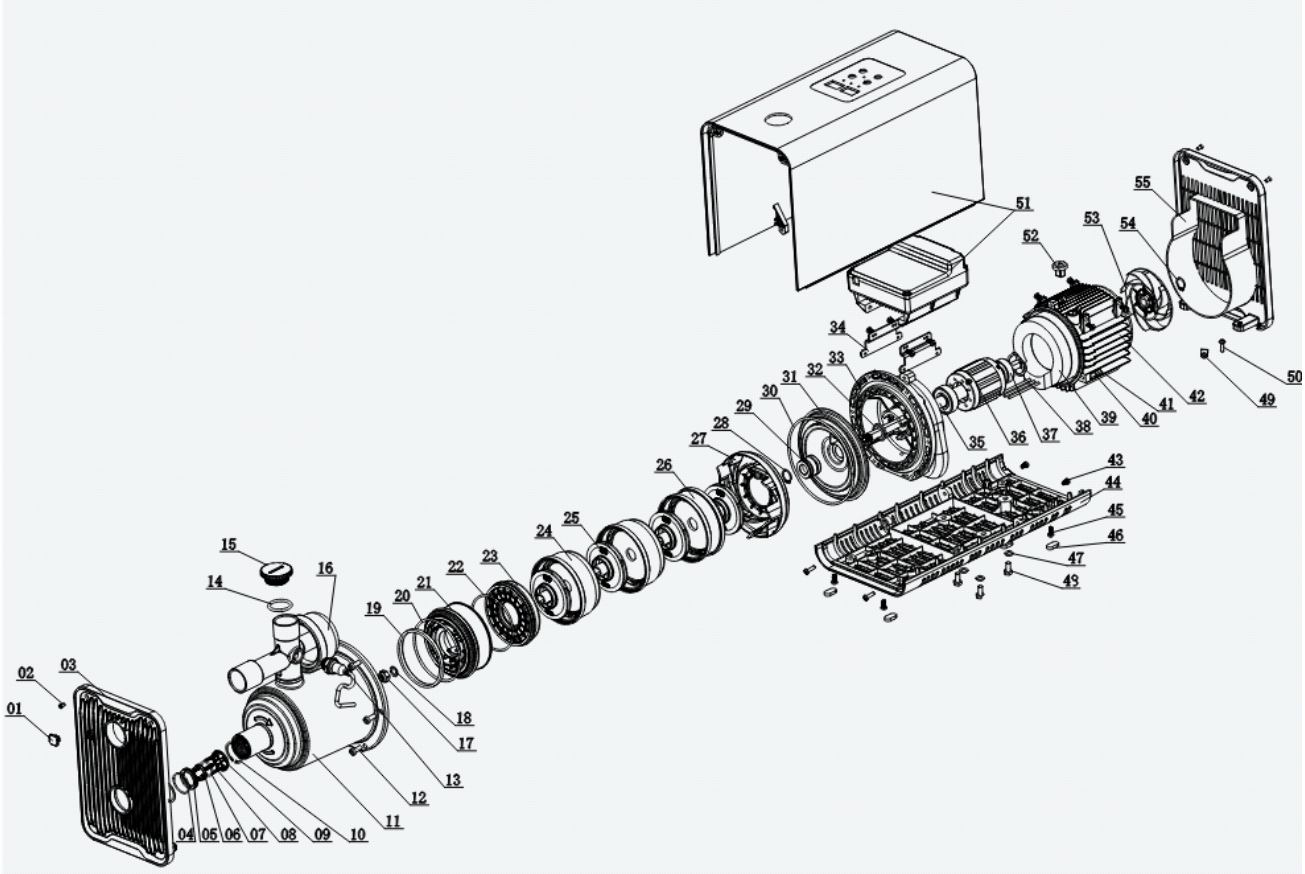
Note Factory setting [FS]: The value flashes on the screen during setup.

	Setting parameters B01 to B17: Navigation: SET Press and display "B01" > Set with " + " or " − " to change parameters Press " SET " to select the parameter and make the setting > Change the value with " + " or " − ". Press SET to save.
b01 [FS: 80]	[Range: 10-90%] Start-up pressure parameter: The pump starts automatically when the pressure drops to the set percentage of the working pressure. Navigation: Press " SET " > "B01" > " SET " > "adjust value [10~90 %]" > " SET " to save.
b02 [FS: 00]	[00: clockwise; 01: counterclockwise] Parameter rotation direction: The correct rotation direction is clockwise when viewed from the side of the fan cover. The motor **must** be stopped for adjustment. Navigation: Press " SET " > "B02" > " SET " > set digit [00 or 01] > " SET " to save.
b03 [FS: 0.5]	[Range: 0 – switch-on pressure] Dry run protection parameter (pipe leak protection): If the working pressure falls below the preset value, the pump switches off. Navigation: Press " SET > + " or " − " > [B03] > " SET " > "Adjust value [0-SP]" > " SET " to save.

b04 FS: 180]	[Range: 10-180 seconds], Parameter Run-on time: Time required for the pump to stop when running dry. Navigation: Press " SET > + " or " − " > [B04] > " SET " > "Digital setting [10-180]" > " SET " to save.
b05 [FS: 00]	[00: Activate 01: Deactivate] Activate or deactivate the automatic protection function when the pump is running The pressure is subject to irregular fluctuations. Navigation: Press " SET > + " or " − " > [B05] > " SET " > "Adjust value [00-01]" > " SET " to save.
b06 [FS: 00]	[00: Display of working pressure (bar) 01: Real-time frequency (Hz) 02: Real-time power (kW)] Parameter display type: Set the parameters for real-time display. Navigation: Press " SET > + " or " − " > [B06] > [SET] > [Adjust value (Digital setting)] [00-02] > [SET] to save.
b07 [FS: 30]	[Range: 10-50] Flow detection parameter: Reduce the value if the pump does not run or runs for a long time when the tap is closed. Increase the value if the pump stops during water consumption. Navigation: Press SET > + or − > [B07] > SET > Digital setting [10-30] > [SET to save.
b08 [FS: 0]	[Range: 0-2] Double pump application parameter: Set to 0 for single pump operation. Settings 1 and 2 for double pump operation (setting 0 is not permitted in parallel operation!) Navigation: Press " SET > + " or " − " > [B08] > [SET] > [Adjust value [0-2]] > [SET] to save.
B09-B13	Not active
b14 [FS: 01]	[00: Enable 01: Disable Enable or disable the freeze protection feature. This feature prevents damage to the pump in low-temperature or freezing environments. Navigation: Press " SET > + " or " − " > [B14] > " SET " > "Adjust value" ["00" or "01"] > " SET " to save.

b15 [FS: 5°C]	[Range: -10°C ~ +10°C] To set the start temperature for the freeze protection. The pump switches on automatically when the water temperature in the pump housing drops to this value to prevent the water from freezing and damaging the pump housing. Only works if B14 is activated ("00"). Navigation: Press " SET > + " or " − " > [B15] > [SET] > [Adjust value [-10°C ~ +10°C]] > [SET] to save.
b16 [FS: +30°C]	[Range: +20°C ~ +40°C] Parameter Switch-off temperature for frost protection: If the pump is started due to the activation of the frost protection, it is automatically stopped when the water temperature reaches the set value. Only works if B14 is activated ("00"). Navigation: Press " SET > + " or " − " > [B16] > [< SET] > [Adjust value (Digital setting)] [20℃ ~40℃] > [SET] to save.
b17 [FS: 75°C]	[Range: 40℃ ~ 130°C] Parameter max. water temperature (overheating protection): If the water temperature rises above this value, the pump switches off to prevent damage. The pump starts automatically when the temperature drops by 2°C. Navigation: Press " SET > + " or " − " > [B17] > [SET] > "Adjust value" [50°C ~ 110°C] > " SET " to save.

5.2.3 Exploded-view Diagram

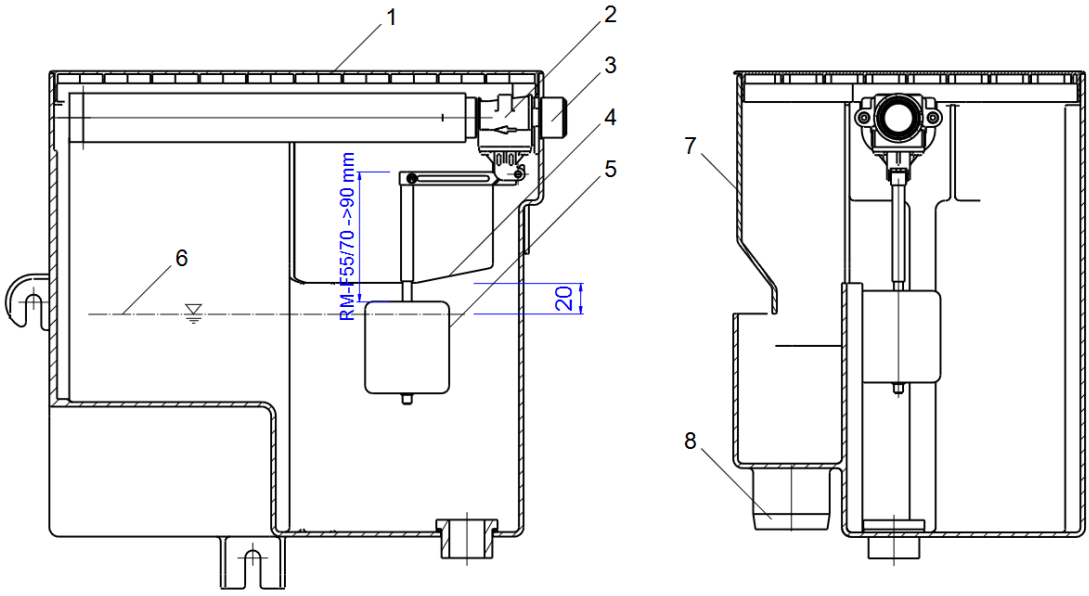


Pos	Code	Description
04-09	NV55/70-NRV	Check valve incl. seals
13	NV55/70-PS	Pressure sensor
16	NV55/70-ADG	Pressure tank
19-21	NV55/70-LA	Air separator with seal
22-23	NV55/70-LEIT-A	Guide vane cover with O-ring
24	NV55/70-LEIT	Guide vane
25	NV55/70-LAUF	Running wheel
26	NV55/70-S-LEAD	Start guide vane
27	NV55/70-A-LEIT	Exit guide vane
29-30	NV55/70-GLD	Sliding bearing seal
37	NV55/70-KL	Ball bearing
51	NV55/70-CON01	Pump controller

Fig./Tab.: Exploded view and spare parts list for RM-F55/70-SC

5.3 Components of supplemental supply

The float valve keeps the water level in the make-up tank constant. When the float valve closes, the maximum water level must be approx. 2-3 cm below the emergency overflow edge (4) (rear of the tank). The correct distance between the float (5) and the top edge of the lever is set at the factory to 90 mm for the RM-F55/70 valve.
Note: If overflow occurs due to constant dripping of the valve, the valve must be descaled (see Maintenance). A protective screen (3) is located downstream of the float valve, which can be pulled out for cleaning. There is also a screen in the inlet pipe.

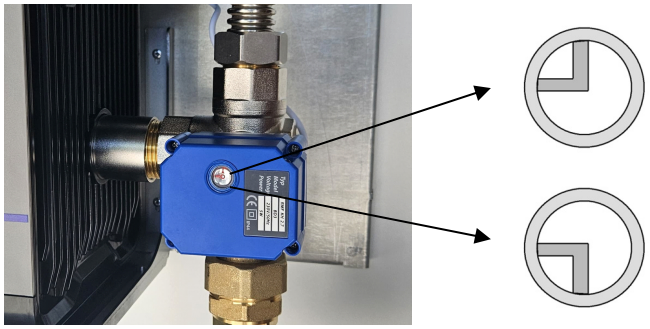


1. Feed tank with cover
2. Float valve with inlet pipe
3. Protective screen in valve inlet
4. Emergency overflow edge
5. Buoyancy body
6. Maximum water level
7. Splash guard
8. Emergency overflow DN50

Fig.: Refill device exploded view and spare parts list

5.4 Electrical 3/2-Ball Valve Assembly

The electric ball valve switches between rainwater and mains water operation. The respective position can be identified via a small display.

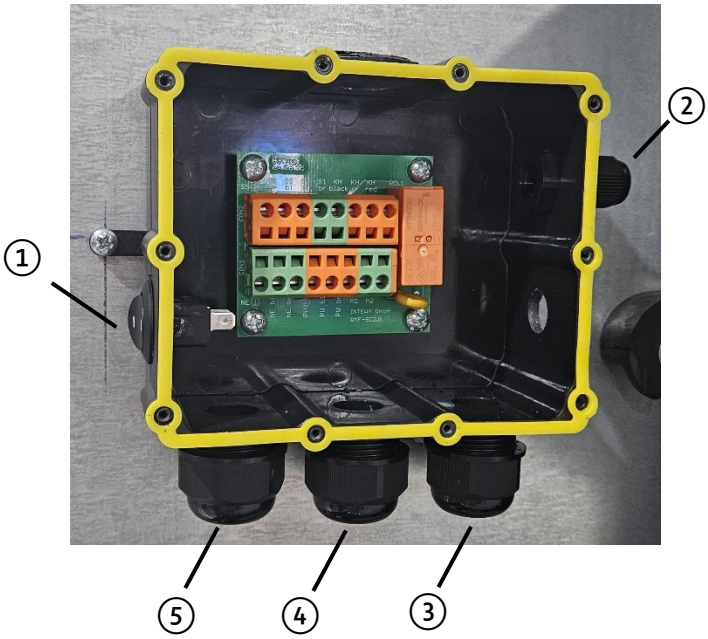


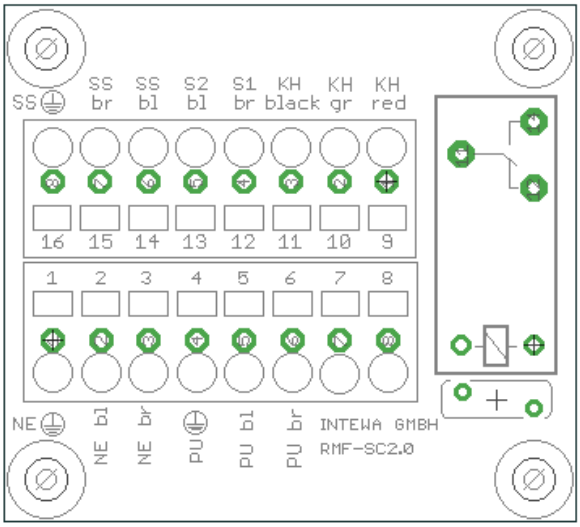
Drinking water mode
(pump draws from the make-up tank)

Rainwater mode
(Pump draws from the rainwater cistern)

5.5 Electronic Box Assembly

The connection electronics box is attached to the top left of the rear panel. All electrical components are connected to the circuit board. The I/II operating selector switch [1] for setting the automatic or maintenance mode is located on top of the box (see Chapter 7.3 for a description of the functions).





① Operating selector switch I / II
② Ball valve feed-through
③ 230VAC/50-60 Hz power cable feed-through
④ Pump power cable feed-through
⑤ Feed-through for float switch

Pos	Board inscription	Connection description
1	NE PE	Mains power cable protective conductor PE
2	NE bl	Mains power cable blue
3	NE br	Mains power cable brown
4	PU PE	Pump protective conductor PE
5	PU bl	Pump blue
6	PU br	Pump brown
7	A1	--
8	A2	--

Item	Board inscription	Connection description
16	SS PE	Float switch protective conductor PE
15	SS br	Float switch brown
14	SS bl	Float switch blue
13	S2 bl	Switch contact blue
12	S1 br	Switch contact brown
11	KH bl	Ball valve black
10	KH gr	Ball valve green
9	KH red	Ball valve red

Tab.: Cable connection diagram

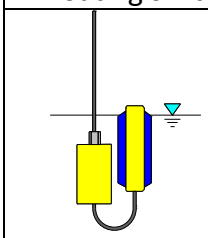
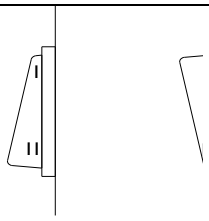
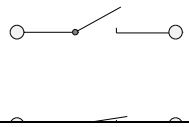
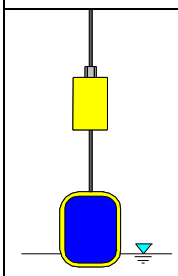
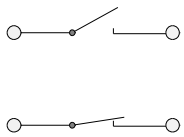
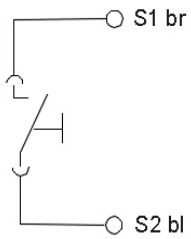
Floating switch position	Selector switch	Electrical contact
		
		

Table: Electrical switching states of float switches and selector switches

The operating selector switch is connected using a flat plug.

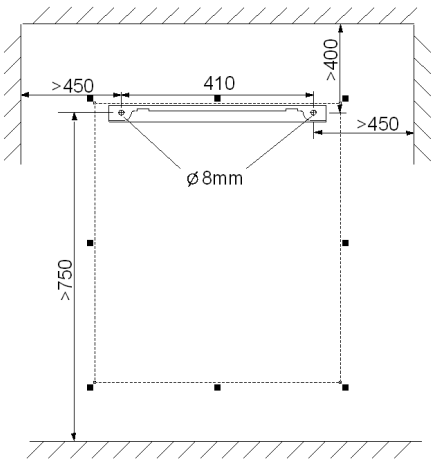


Note: The float switch contact is not potential-free!

6. Installation Instructions

6.1 Wall Mounting

The *RM-FXX-SC* is mounted on a wall using the wall bracket provided. The minimum distance from the ceiling and the minimum side distances must be observed for installation and maintenance purposes.



The RM-FXX-SC is hooked into the wall bracket so that the protruding ends of the mounting bracket engage in the corresponding grooves on the rear panel of the housing.

The rubber buffers supplied are screwed into the lower corners of the rear metal panel.
The rubber buffers ensure that the device rests against the wall. Unevenness in the wall can be compensated for by varying the insertion depth.

The transport lock must be removed.

6.2 Connection to the mains water supply

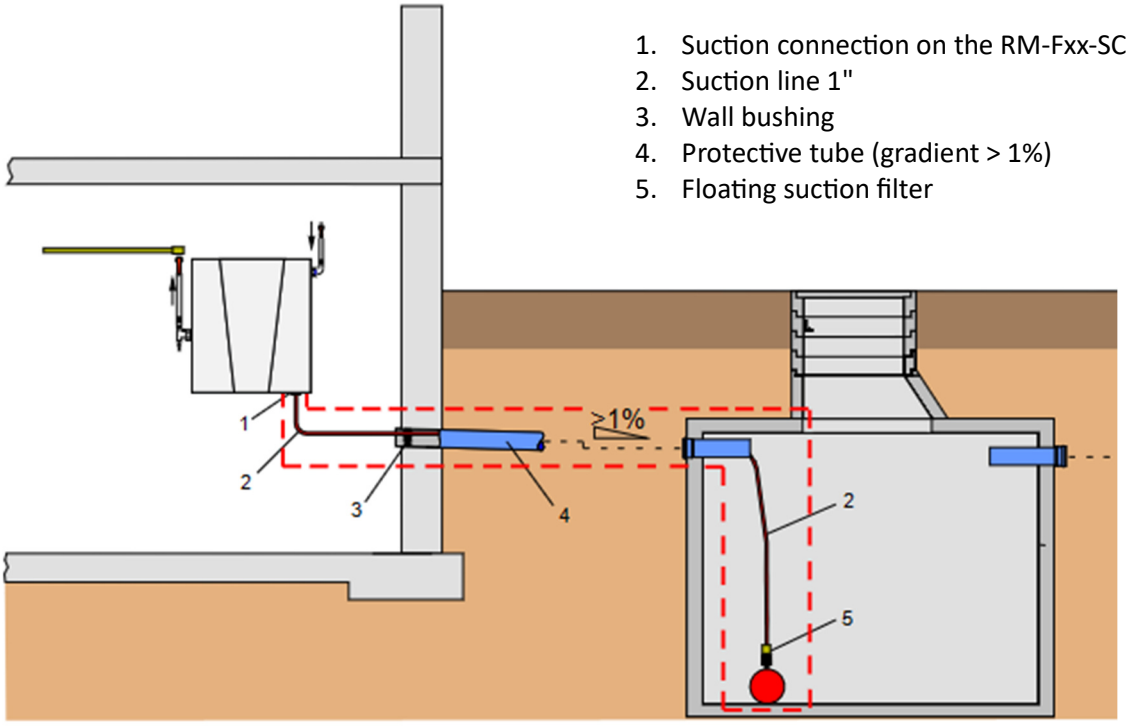
The connection to the mains water supply is made using the flexible hose with shut-off valve supplied.

The union nut is connected to the tank connection.

Note:
The flexible hose must not be installed under tension.
All enclosed flexible hoses have union nuts with flat seals. The rubber seals must be used. Do not use additional sealing material on the union nut!

6.3 Installations on the suction side

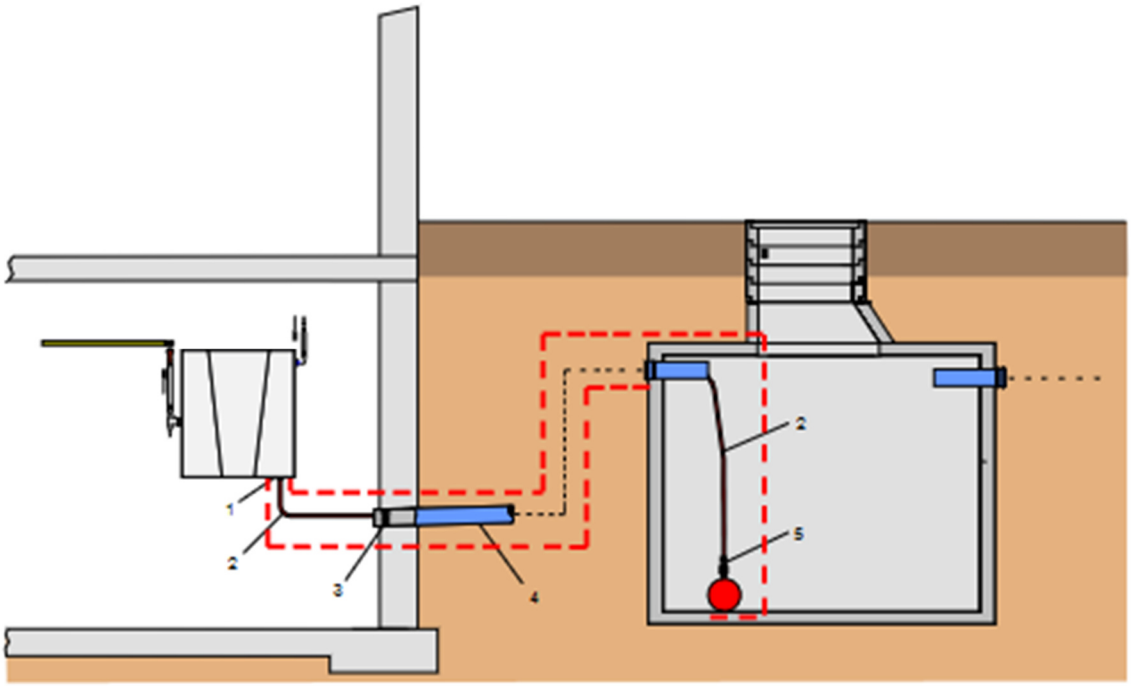
The installation of the intake requires special attention, as only proper assembly and tightness will ensure trouble-free operation of the system. Proper function also requires observance of the boundary conditions such as intake height and intake length (see section 4.2.).
To avoid installation and functional problems, the suction line should ideally be laid with a gradient of 1%.



1. Suction connection on the RM-Fxx-SC
2. Suction line 1"
3. Wall bushing
4. Protective tube (gradient > 1%)
5. Floating suction filter

Example: Ideal laying of the suction line with a gradient to the tank

If this cannot be achieved, the suction line can also be installed without a gradient or with a counter-gradient. Ventilation is also possible thanks to the self-priming action of the pumps. However, it is important that ventilation is carried out at maximum volume flow, as this is the only way to remove the air accumulation in the upper area.
The RAINMASTER can also be installed in the basement, e.g., below the water level of a water storage tank.



Example: Laying the suction line with a counter-slope and/or RAINMASTER below the water level

6.3.1 Installation of the protective tube

The suction pipe must be laid in a DN100 protective tube to ensure permanent accessibility. To prevent water from standing in the protective tube, the protective tube must be laid with a gradient of >1% towards the tank.

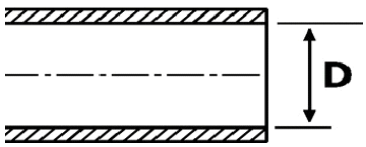
In general, all pipes routed through the protective pipe should be sealed to the house using a wall feed-through, e.g. INTEWA MD100 (item no.: 610050). This prevents water from entering the basement in the event of backwater. The wall feed-through must be installed according to the instructions so that the suction pipe is not squashed (cross-sectional narrowing!).

6.3.2 Design of the suction pipe

A vacuum-resistant hose that does not contract under vacuum but is still flexible must be used as the suction pipe. This allows a floating suction to be achieved in the storage tank. The INTEWA SDS 1" suction hose meets this requirement.
To prevent potential leaks at connection points, we recommend laying the suction hose in one piece from the floating suction device to the *RM-FXX-SC*.

Warning notices:

The inner diameter of the suction hose must be at least D=26 mm to achieve the full volume flow.

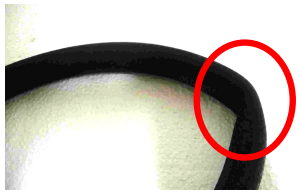


No water filter may be used in the suction line, as its seals are not designed for negative pressure. The negative pressure required for suction cannot then be built up and air enters the suction line.

PVC corrugated hoses are not suitable as rainwater suction lines. Experience has shown that these become brittle and permeable to gas after a short time.

Flexible hoses must not be used in the suction area, as the soft inner rubber hose contracts under negative pressure.

The suction hose line must not kink. We therefore recommend the INTEWA SDS 1" with steel spiral.



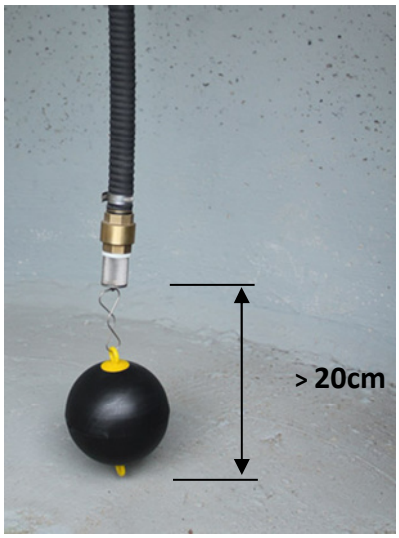
6.3.3 Suction connection

Once the suction pipe has been fed into the house, it is connected to the RM-FXX-SC without tension.

The union nut must be screwed tightly to the suction connection. The suction line must not exert any tension on the device. Therefore, the suction line must be secured to the wall using separate pipe clamps.

6.3.4 Installation of the floating suction

We recommend installing the intake in the cistern as a floating intake.



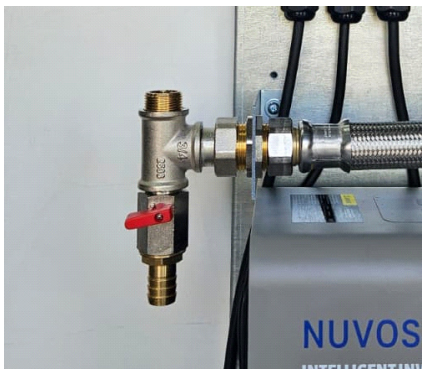
The accessory product SAUGSAGF 1" (item no. 21 01 30) meets this requirement. This draws in the rainwater just below the water surface. This is where the rainwater is cleanest. The integrated non-return valve ensures that the water is kept in the suction pipe. The suction strainer provides additional protection for the pump.

The suction hose with filter is installed so that when the cistern is empty, there is a minimum distance of 20 cm between the cistern floor and the suction filter. This reliably prevents sediment from being sucked in.

6.4 Installation of the pressure connection set

The pressure connection set (see scope of delivery) connects the pump to the pressure pipe system.

The enclosed pressure connection unit is connected using the flat-sealing union nut.



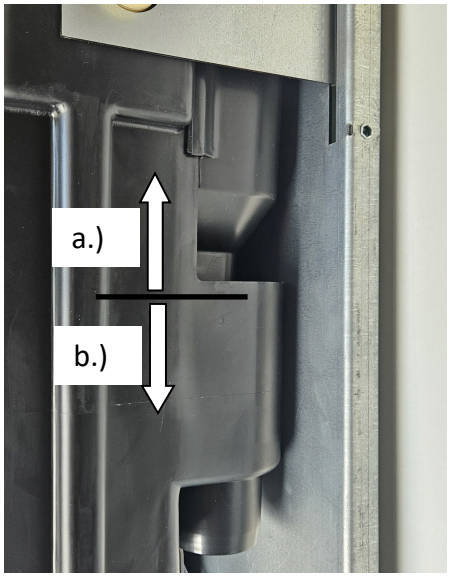
The pressure shut-off valve and the flexible hose are connected to the pressure system.

6.5 Connecting the emergency overflow

The *RM-FXX-SC* is connected to the building's drainage system via a DN 50 emergency overflow connection. The drainage system must be designed for a maximum flow rate of 90 l/min.

Note:

When connecting to the drainage system, the position of the backwater level must be observed to prevent backwater from the sewer entering the open funnel connection (design in accordance with DIN EN 1717) on *the RM-FXX-SC*.



The location of the backflow level determines the type of drainage device.

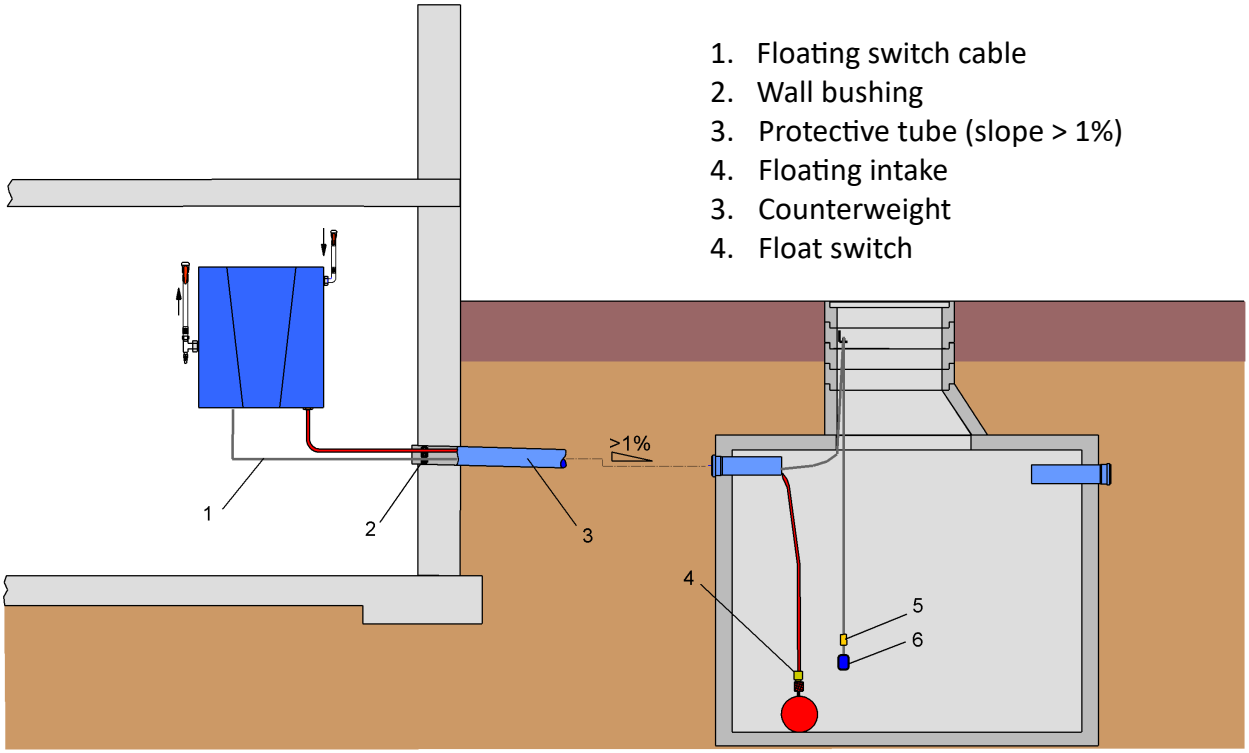
a) Backflow level above the emergency overflow funnel of the make-up tank:

   The emergency overflow must be connected to a lifting system.

b) Backflow level below the emergency overflow funnel of the make-up tank:

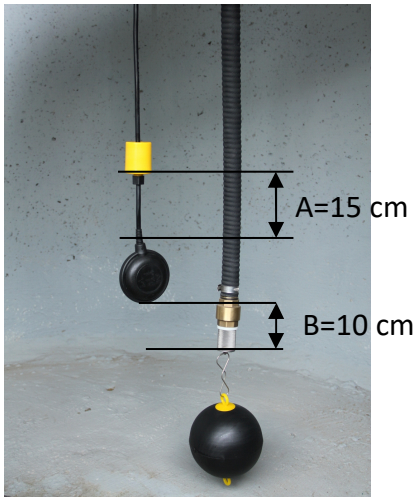
   The emergency overflow must be connected to a vented sewer connection pipe with a siphon.

6.6 Installation and adjustment of the float switch



In underground storage tanks, the float switch cable is routed through the protective tube to *the RM-FXX-SC*. To do this, it must be disconnected from the base control. Then the cable gland is pushed onto the cable.

The cable gland is used to fix the required length of the float switch cable in the storage tank. The cable gland is then hooked into the mounting bracket. This allows removal (e.g., for inspection and maintenance purposes) at any time without changing the length setting.
(The mounting bracket is attached in the accessible area of the cistern opening.)
The counterweight of the float switch is fixed at a distance of A = 15 cm above the float switch so that the float switch can move freely around the counterweight.
The safety distance between the suction filter and the lower edge of the float switch must be set to at least B = 10 cm.
The float switch is connected electrically to the base control (see chapter 5.1).



Note
The distance to cistern fittings must be selected so that the float switch can float up and down freely without getting caught.

7. Start-up and Operation

7.1 Start-up in mains water mode

1. Select maintenance/mains water mode = **switch position II**
2. Open the shut-off valve to the mains water pipe so that the make-up tank fills with water.

3.a. Procedure for RM-F45-SC-A

When the drinking water operation is starting, the pump automatically fills with water via the replenishment tank. Manual filling of the pump is not necessary!

Caution:

Pump must not run dry!

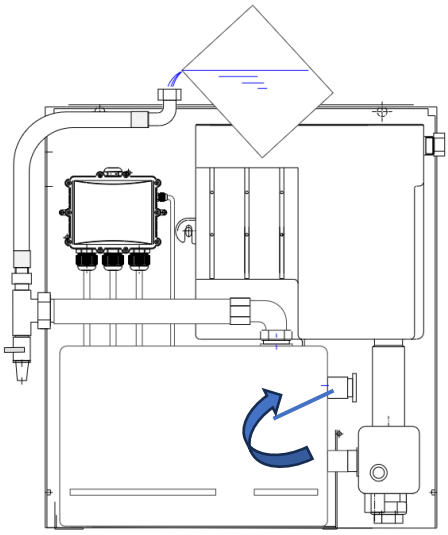
3b. Procedure for RM-F55/70-SC

Fill the pump manually with 1 litre of water via the flexible hose on the pressure side. In order for air to escape, it is essential to loosen the plug of the alternative pressure connection two turns. During the process, a little water will leak out here. Please put a cloth underneath.

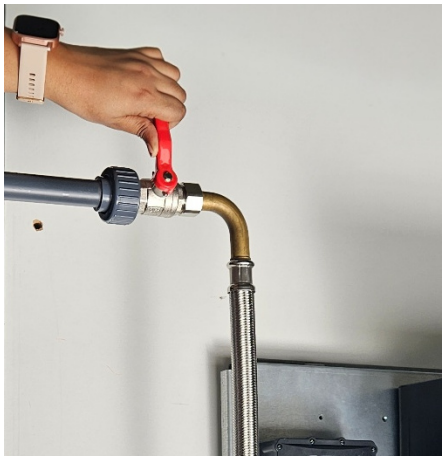
Hint: The filling process as under 3.a is not possible with this version!

Caution:

Pump must not run dry!



4. Close the pressure shut-off valve.



5. Open the vent valve.

   Hold a bucket of water under the vent valve and start the pump by plugging in the power cord. (The 3/2-way ball valve moves to the mains water position if it was still in the rainwater position).

   Allow water to run through the vent valve into a water bucket until the pump delivers water without bubbles.

6. Close the vent valve.

7. Open the pressure shut-off valve and vent the pipe to the consumers (e.g., flush the toilet several times and open the garden tap).

8. Close the consumers.

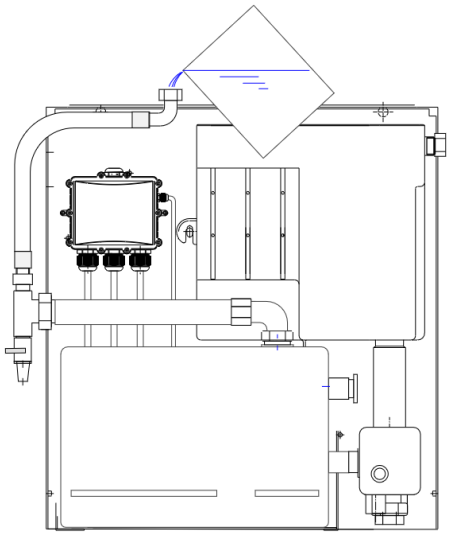
   The pump is automatically switched off by the pump control when the maximum system pressure is reached.

7.2 Start-up rainwater mode

Note:

If the mains water mode could not be started as the first step (e.g. if the mains water connection is not yet available), the pump must be filled manually with approx. one litre of water before starting it for the first time (see Chapter 7.1)

Only then can the rainwater operation be put into operation!



1. Select automatic mode = switch position I

Note

Rainwater mode can only be started if there is sufficient water in the rainwater cistern. This can be recognized by the fact that the 3/2-way ball valve in switch position **I** moves to the rainwater mode position (see chapter 5.4).

2. Close the pressure shut-off valve.

3. Open the vent valve.

   Hold a bucket of water under the vent valve and start the pump by plugging in the mains plug. (The 3/2-way ball valve moves to the rainwater position).

   Leave the vent valve open until bubble-free water is delivered from the rainwater tank and all air has been removed from the suction line.

4. Close the vent valve.

5. Open the pressure shut-off valve and vent the pipe to the consumers (e.g., flush the toilet several times and open the garden tap).

6. Close the consumers.

   The pump is automatically switched off via the pump control when the maximum system pressure is reached.

7.3 Operating Modes

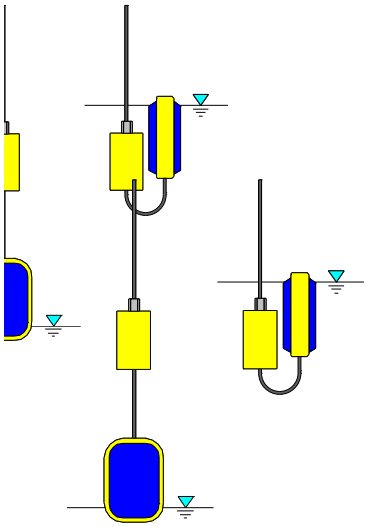
The automatic mode or maintenance mode (mains water) is set on the operating mode selector switch.

7.3.1 Automatic Mode (switch position I)

The normal operating mode is automatic mode, which is selected by **setting the switch to I**. In this mode, the system automatically switches from rainwater to mains water when the float switch detects that the cistern is empty.

Depending on the two switching states of the float switch, two operating states can be selected, which can be read on the viewing window of the 3/2-way ball valve (see section 5.3).

➔ Rainwater mode:
Rainwater cistern filled
(float switch is vertical)



➔ Mains water mode:
Rainwater cistern empty
(float switch hangs vertically downwards)

7.3.2 Maintenance Mode (switch position II)

Maintenance mode is selected by pressing **switch position II.** This mode is only activated when maintenance work is being carried out on the cistern, for example. The *RM-FXX-SC* then runs in continuous mains water mode regardless of the float switch signal.

8. Troubleshooting

8.1 Troubleshooting of RM-F45-SC-A

8.1.1 Errors without error code on the display of RM-F45-SC-A

Nr.	Symptom/Problem	Cause	Remedy
1	The pump does not start	The line pressure is higher than the switch-on pressure of the pump.	Increase the working pressure or reduce the line pressure by opening a consumer.
		The pipe or faucet is clogged	Check the pipes and taps.
2	The pump does not stop	Pressure sensor defective	Replace the pressure sensor.
		Leak in the line or leaky dripping consumer	Check the pipes and fittings
		Working pressure value is too high.	Reduce the value of working pressure.
3	The pump is running but not delivering water	Line blocked or the check valve cannot open.	Check the pipe and that the check valve is unobstructed.
		Air in the suction line	Restart the pump. Vent the suction line. Repair any leaks in the suction line.
4	Water shortage Warning	The diameter of the outlet is too large	Change the outlet diameter or add a throttle valve.
		Water scarcity	Wait for the water supply.

8.1.2 Errors with error indicator/code on the display of RM-F45-SC-A

Nr.	Symptom/Problem	Cause	Remedy
1		Mains voltage fault	Check the mains voltage.
2		Motor Failure	Send the pump in for repair.
3		Leakage Detection	Check the pipe and consumer for leaks.
4		Dry Running Fault	Find and fix the cause of dry running.
5		Pressure sensor Fault	Replace the pressure sensor

Error code	Cause	Remedy
E1	Phase Loss	Make sure that all motor cable connections are firmly and properly connected.
E2	Controller Overcurrent	1.Check if the motor is short-circuited or if it turns on with a fault. 2. Replace the controller board if necessary
E3	Motor malfunction	1.Turn off the pump, wait for the LED to turn off, and turn it back on. 2. If the error indicator is still on, the motor or controller is damaged.
E4	Communication error between display board and controller	Replace the display and controller
E6	Pressure sensor defective	Check if the pressure sensor interface has a bad contact, check the interface and plug it back in. If the fault persists, the pressure sensor must be replaced.
E7-E10	Nonexistent	
E11	Mains voltage outside the operating range	Please check the mains voltage
E12	Blocked rotor	Please try to rotate the fan blades to see if the pump is mechanically blocking. Send the pump in for service.
E13	Leakage	Check if there is a leak in the pipeline or check valve.
E14	Water shortage / dry running	Check if it is a real water shortage.
E15	Overheating fault in the drive circuit board.	Wait for the temperature of the pump to drop and the operation to resume automatically and place the pump in a well-ventilated place.
E16	IPM Temperature Sensor defective	Check if the sensor cable is loose.
E18	Overheating protection at water temperature	The pump stops, check if the water temperature is too high.
E19	Antifreeze protection-Water temperature	The pump runs at low speed, check if the water temperature is too low. If necessary, change the installation location
E20	Water temperature sensor malfunction	Check that the water temperature sensor is plugged in correctly.

8.2 Troubleshooting of RM-F55/70-SC

8.2.1 Errors without error code on the display of RM-F55/70-SC

Symptom/problem	Cause	Remedy
The pump does not start	The line pressure is higher than the switch-on pressure of the pump.	Increase the working pressure or reduce the line pressure by opening a consumer.
	B01 parameter value too low	Increase the B01 parameter value
The pump does not stop	Pressure sensor defective	Replace the pressure sensor.
	Leak in the line or leaky dripping consumer	Check the pipes and fittings
	Working pressure value is too high	Reduce the working pressure value
	Motor rotation direction is reversed	Adjust the direction of rotation of the motor using B02.
	Dry run protection not activated	Set parameters B3 / B5 to activate the dry-running protection
	Water withdrawal by the consumer too low/dripping (<1 l/min)	Check the consumer
	Suction line is leaking or cartridge fine filter is installed in the suction line	Check suction line or remove the cartridge fine filter
The pump is running but not delivering water	Motor rotation direction is reversed	Adjust the direction of rotation of the motor using B02.
	Line blocked or the check valve cannot open	Check the pipe and that the check valve is unobstructed.
	Air in the suction line	Wait for the pump to expel the air

Symptom/problem	Cause	Remedy
Water shortage Warning (P01)	Severe fluctuations in water pressure cause the controller to misjudge the water shortage	Change the value of B05 to 01
	Excessive flow causes the pressure in the pump housing to be too low	Reduce the parameter of B03 or add a throttle valve.
	The diameter of the outlet is too large (insufficient back pressure)	Change the outlet diameter or add a throttle valve
	Water shortage	Wait for the pump to expel the air
Pump pressure only reaches half the maximum pump pressure	Air separator or guide vanes defective	Replace air separator or guide vanes
In rainwater mode: Volume flow too low or pump not delivering any water	a.) Suction filter clogged b.) Suction hose kinked c.) Leak in the suction line or connections d.) No switchover to mains water because the float switch is incorrectly positioned or defective	a) Clean the intake filter b.) Check the suction line c.) Check intake pipe and connections d.) Check float switch function and position (see section 6.3.4 or replace float switch, then restart
In mains water mode: Volume flow too low or pump not delivering any water	a.) Too little or no water in the mains water tank b.) 3/2-way ball valve does not switch to mains water operation	a.) Check the mains water inlet pressure, clean the filter screen at the inlet to the make-up valve (see section 5.3) b.) Replace 3/2-way ball valve
System does not switch automatically from rainwater to mains water and vice versa.	a.) Float switch not positioned correctly b.) Float switch defective c.) 3/2-way ball valve does not switch despite float switch signal	a.) Check the float switch function and position (see section 6.6), then restart. b.) Replace float switch c.) Replace 3/2-way ball valve

8.2.2 Error with alarm code on the display

Error code	Cause	Remedy
E01	[Undervoltage] Input voltage lower than 130V (± 10%)	1. As soon as the voltage rises to 180V, the pump will automatically restart. 2. Install a voltage stabilizer.
E02	[Overvoltage] Input voltage higher than 280V	1. As soon as the voltage drops to 260V, the pump will automatically restart. 2. Install a voltage stabilizer.
E03	[Pressure sensor error]	1. Switch off the device and check the signal cable to the pressure sensor for a good connection. 2. Check the connection terminal in the controller and ensure that good connectivity. 3. Install a new signal cable if necessary. 4. Replace the pressure sensor if necessary.
E04	[IPM controller temperature too high]	1. When the IPM controller temperature drops below 80°C, the pump will return to normal operation. 2. Install the pump in a cool, ventilated location.
E05	[Pump overload protection]	Check the operating status of the pump.
E06	[IPM controller error on temperature sensor]	1. Move the controller to a well-cooled location 2. Check the sensor
E07	[IP conflict of the pump unit]	Check parameter B08 and replace the repeat value.
E08	[Missing phase/overcurrent] a. Rotor or impeller blocked due to defect, rust, or contamination in the pump housing. b. Poor connection between motor and control c. Water in the motor / motor defective.	1. Replace the impeller or clean the hydraulics 2. Check or replace the cable between the motor and the controller 3. Replace the motor
E09	[IPM current monitoring] Current too high	1. Check and fix the cause of the motor overload. 2. External environmental interference
E10	[Startup error]	Repeat startup process
E11	Error connecting the pump unit	1. Check the connection to rectify the error. 2. Replace the connection cable.
E13	Communication error	1. Replace the pressure sensor 2. Change the controller.

ERR	[Pressure transducer malfunction]	1. Check and replace the wiring. 2. Replace the transmitter.
P01	[Water shortage warning] 1. The operating pressure of the pump fluctuates irregularly. 2. Pressure lower than setting b03. 3. The outlet is too large to maintain the pressure. 4. Water shortage.	1. Set the parameter of b05 to 01. 2. Reduce the setting value for b03 or limit the outlet flow. 3. Replace small-diameter pipes or add throttle valves. 4. Wait for the water supply to be restored.

9. Maintenance

A visual and functional inspection must be carried out every 3 months.
The intake filter in the rainwater storage tank must be cleaned every six months to ensure proper suction at all times.
If the make-up valve drips, it must be descaled. To do this, remove the entire valve from the tank and place it in a commercially available descaling solution (citric acid) so that the inlet and outlet are covered with solution. Move the float arm several times in between so that the descaling solution also reaches the membrane chamber of the valve (leave to work for 24 hours). If this does not stop the dripping, the valve must be replaced.

Note:
The internal pressure vessel does not require maintenance, even if it loses its air preload over time. (When repairing the pump, if the housing is opened, it can be preloaded with 2 bar. Very rigid and short lines can cause control fluctuations and the pump to run continuously. In this case, we recommend an external expansion vessel (e.g., INTEWA ADG-05).

10. Spare Parts

Item description	Item no. (see chapter 4.1)	Art. No.	Code
Multi-stage centrifugal pump for RM-F45-SC-A	[1]	200010	NUVOS 45S
Multi-stage centrifugal pump for RM-F50-SC	[1]	200012	NUVOS 55S
Multi-stage centrifugal pump for RM-F70-SC	[1]	200013	NUVOS 70S
Make-up tank	[7]	600420	RMF-B
Float valve for mains water top up	[9]	600161	RMF-NSP V1.8B
Ball valve assembly for RM-F45-SC-A, RM-F55-SC, RM-F70-SC	[10]	600202	RMF45A-55-70-KH-M
Float switch, 15 m	not shown	600295	RM-SCHW-15m
Basic PCB RAINMASTER Favorit 41-A/55/75-SC	[2]	600396	RMF-SC-BPL2.0
Spare parts for centrifugal pump			see chapter 5.1.4

11. Accessories

RAINMASTER D-24, Article No. 220092

The RAINMASTER D 24 is a level indicator for water tanks up to 3 m water depth. It can be installed anywhere in the house and is a good addition to the RM-FXX-SC rainwater systems.

Wall bushing DN100, Art.-No. 610050

The INTEWA MD-100 wall bushes is specially developed for rainwater harvesting. Inserted into walls, they prevent cold, damp and backwater from permeating the ductwork into the control unit installation room by sealing the pipework and electrical cabling. They feature different size holes to take both intake pressure hoses and electrical cables through walls to the control unit. Unused holes in the bushes are sealed with blind plugs. Bushes are made of stainless steel and a high-quality rubber compound and are easily installed and tightened in place even if retrofitted. We offer two sizes of wall bushes for installation into standard DN100 or DN150 ductwork.

Floating suction with coarse filter 1 inch, Art.-No. 210130

The floating suction filter ensures that the cleanest water, from just below the surface, is always drawn from the tank. Its built-in filter protects the pump as well as toilet and washing machine inlet valves, against potential contaminants in the tank water. The filter mesh width is selected to ensure maintenance intervals are minimized. The brass backflow valve prevents the intake line from running dry

Floating suction with coarse filter 1 ½ inch, Art.-No. 210131

The floating suction filter ensures that the cleanest water, from just below the surface, is always drawn from the tank. Its built-in filter protects the pump as well as toilet and washing machine inlet valves, against potential contaminants in the tank water. The filter mesh width is selected to ensure maintenance intervals are minimized. The brass backflow valve prevents the intake line from running dry

SDS 1“suction hose, Art.-No. 610025

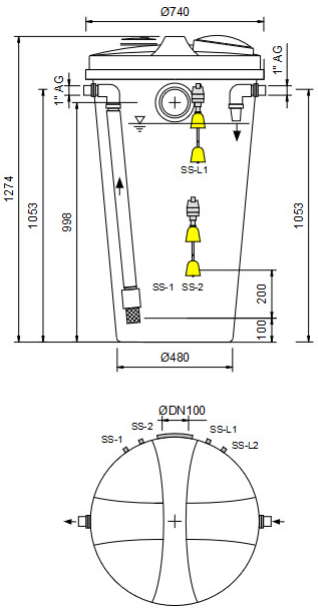
The INTEWA 1“SDS intake hose is specifically designed for use with the RAINMASTER Favorit. The intake line can be safely installed directly from the intake filter in the tank to the RAINMASTER Favorit. This means no additional joins or pipe sealing is necessary, which in turn limits the chance of intake pressure problems at the control unit side. It is produced from high quality EPDM rubber offering a pressure range from -0.85 to 1.5 bar. It is particularly robust with an integrated steel spiral reinforcing as well as a synthetic cord insert. Other characteristics of the SDS intake line include: a narrow bending radius, UV resistance, weather-proof, and resistance to bacterial contamination. It is suitable for use with INTEWA MD-100 and MD-150 wall bushes.

SDS 1 ½“suction hose, Art.-No. 610028

The INTEWA 1 ½“SDS intake hose is specifically designed for use with the RAINMASTER Favorit DUPLEX. The intake line can be safely installed directly from the intake filter in the tank to the RAINMASTER Favorit. This means no additional joins or pipe sealing is necessary, which in turn limits the chance of intake pressure problems at the control unit side. It is produced from high quality EPDM rubber offering a pressure range from -0.85 to 1.5 bar. It is particularly robust with an integrated steel spiral reinforcing as well as a synthetic cord insert. Other characteristics of the SDS intake line include: a narrow bending radius, UV resistance, weather-proof, and resistance to bacterial contamination. It is suitable for use with INTEWA MD-100 and MD-150 wall bushes.

Hybrid tank 350 L for RAINMASTER F55/70-SC, Art.-No. 220083

The hybrid tank is used when the intake length or height is so large that the RAINMASTER Favorit-SC can no longer draw directly from the tank. A separate charging pump (submersible motor pump with dry run protection) then pumps the process water from the cistern in the so-called hybrid tank. The RAINMASTER Favorit-SC then takes the process water from this via a central intake connection. The charging pump is controlled via a floating switch (incl. connection plug) integrated in the hybrid tank. The floating switch of RMF-SC is installed in the hybrid storage for changing over to mains water. In the hybrid reservoir, the charging pump connection, the intake and the floating switch for the charging pump are pre-mounted. In addition, an emergency overflow DN100 and the vertical floating switch (switching to mains water) are integrated.



12. Warranty

INTEWA GmbH provides a 24-month warranty for this device, calculated from the date of purchase. Please keep the proof of purchase to verify this date.

Within the warranty period, INTEWA GmbH will, at its own discretion, provide warranty service in the form of factory repairs or replacement delivery.

Damage resulting from improper use, wear and tear or interference by third parties is excluded from the warranty. The warranty does not cover defects that only insignificantly impair the value or usability of the device.

13. Contact / Serial Number

For customers in Germany:
If you have any questions, need to order spare parts, or require service, please contact INTEWA GmbH directly, quoting the device number and purchase invoice.

INTEWA GmbH
Auf der Hüls 182
52068 Aachen

Tel.: 0049-241-96605-0
Fax
Email: info@intewa.de
Website: www.intewa.de

For customers in other countries:
If you have any questions, need to order spare parts, or require service, please contact your dealer or the responsible general importer, who will handle all service in the respective country, and provide them with the device number and purchase invoice.

The device number with the serial number (SN) is located in the *RM-FXX-SC* at the top right of the device.

Appendix 1.0 Area of application for the duplex version of RM-F55/70-SC

For large buildings where the highest possible security of supply and comfort are important, the speed-controlled RM-F55-SC and RM-F70-SC can be used in a redundant duplex design. Two RM-FXX-SCs of the same type will then run in parallel.

Fully automatic parallel control is via the data cable. The automatic, alternating start-up of the pumps, the peak load switching, and the operating pressure setting are coordinated and transmitted via this cable.
If one system fails, the slave and master functions are automatically transferred to the remaining system.

Attention:
The pumps must be adjusted with regard to parameter B08 via the parameter settings.

b08 [FS: 0]	[Range: 0-2] Parameter for dual pump application: Set to 0 for single pump operation. Settings 1 and 2 are for dual pump operation (setting 0 is not allowed in parallel operation!). Navigation: Press " SET > + " or " − " > [B08] > " SET " > "Adjust value [0-2]" > " SET " to save.

Appendix 1.1 Design of suction pipe of RM-F55/70-SC Duplex

With the duplex version it is possible to use a central 1 ½" suction connection (INTEWA SAGF 1 ½") to draw water from the cistern or to equip each device with a suction connection (INTEWA SAGF 1").

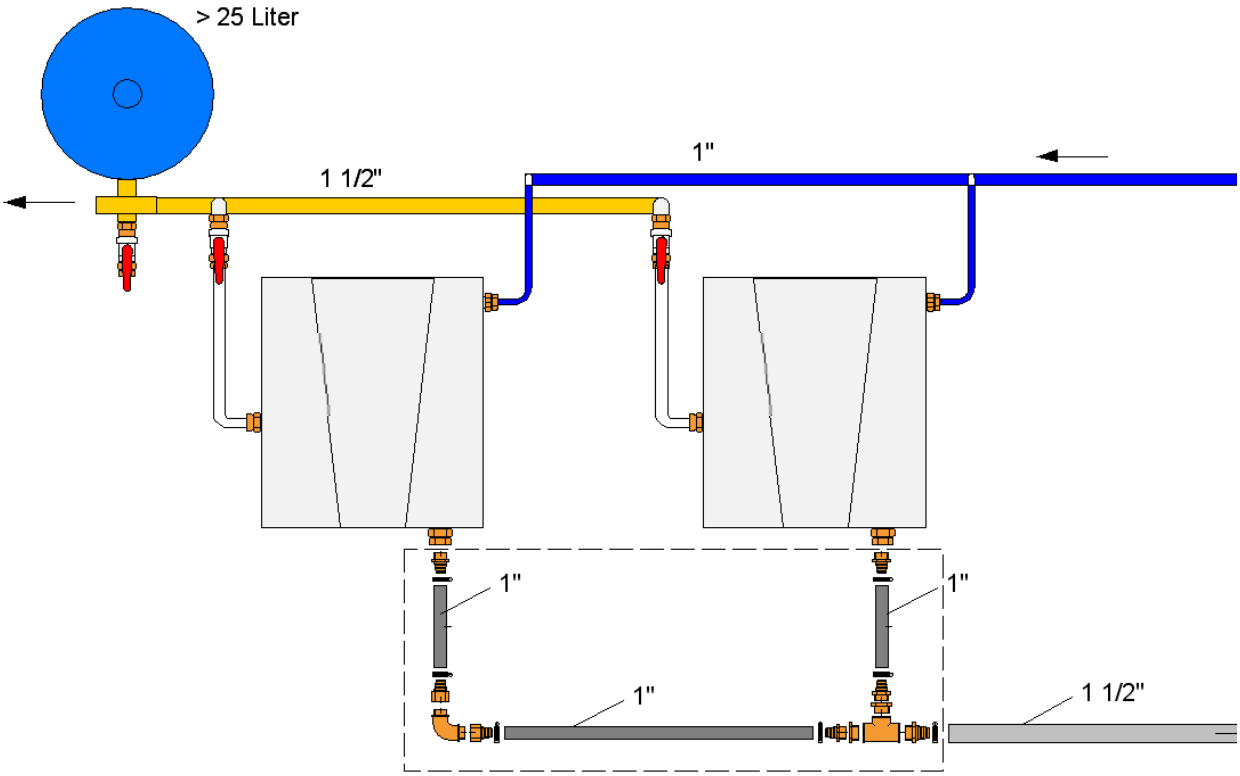


Fig.: Design of suction pipe

If the suction line is too long and/or the suction height is too high, a hybrid tank must be used from which the pump system can draw water. The hybrid tank is supplied from the main storage tank by a charge pump.

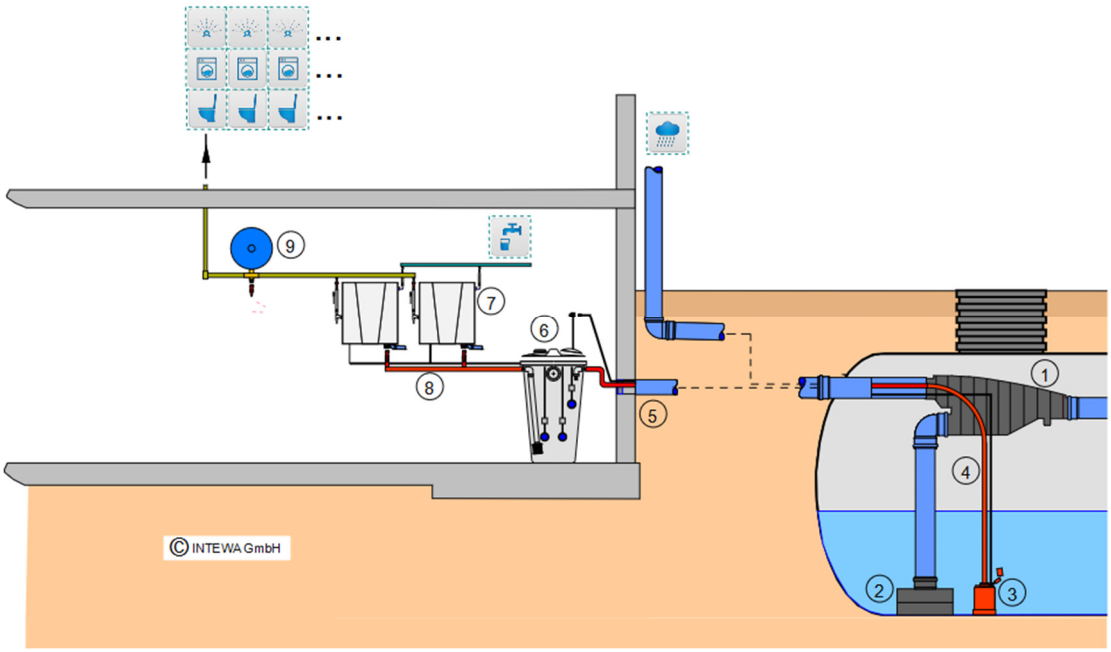


Fig.: Example overview with RM-FXX-SC duplex design with central suction, hybrid tank, and charge pump

Legend:

1: PURAIN rainwater filter
2: Inlet stabilization
3: Charging pump incl. dry-run protection
4: Pressure line to hybrid storage tank
5: Protective tube for suction line and sensor cable
6: Hybrid tank
7: RAINMASTER Favorit XX-SC
8: Central suction line with SAGF 1 1/2"
9: Expansion vessel

Attention:

The float switches for switching the systems to mains water are installed in the main storage tank (or in the hybrid storage tank). The float switches must not be connected in parallel. Each device must be operated via its own float switch!

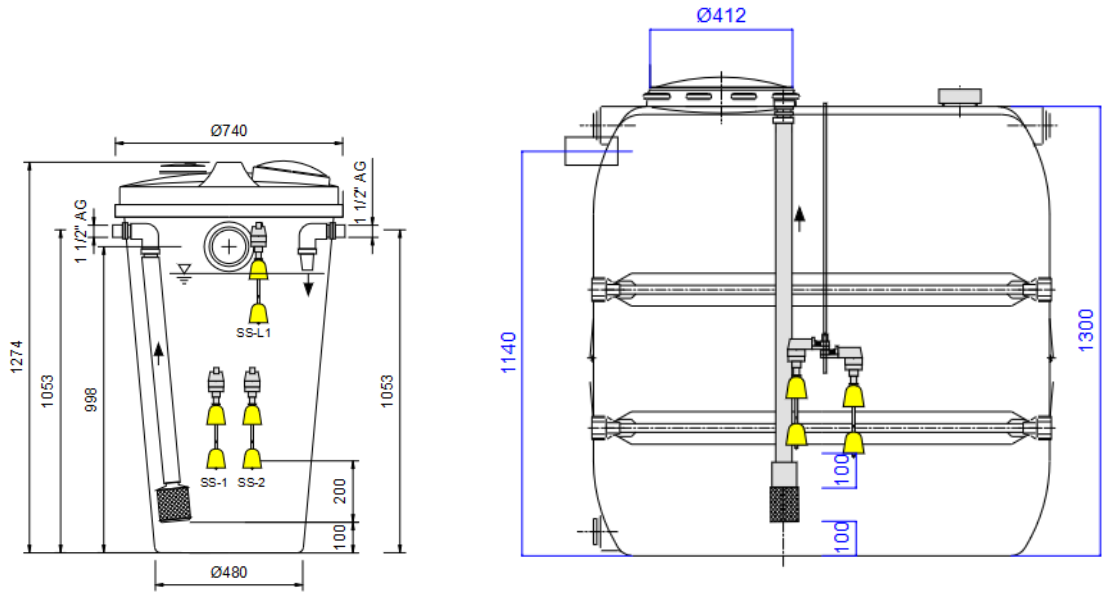


Fig.: Hybrid storage versions in 350L (left) and 1100 L (right)

Appendix 1.2 Suction curve for RM-F55/70-SC Duplex application

The pressure pipe system must be dimensioned according to the max. volume flow.

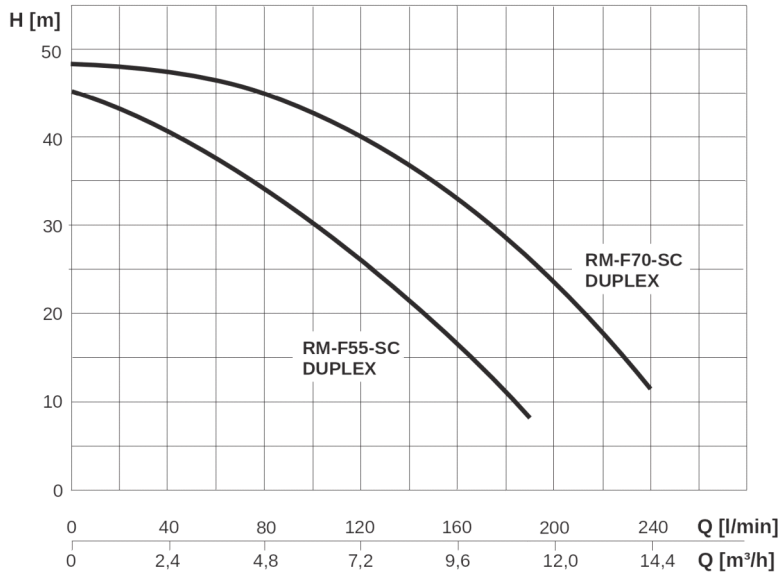


Diagram: Pressure characteristic curve for RM-FXX-SC Duplex

We recommend the following pipe cross-sections for the central piping:

	Pressure pipe	Mains water line	Suction line
RM-F55/70-SC	1 ½	1	1 ½

Appendix 1.3 Scope of delivery for RM-FXX-SC Duplex

Pump and Replenishment Unit
2 x RM-F55-SC or 2 x RMF70-SC

Signal Cable
1 x SIG-Cable