Systems for aqua culture,
sea water aquaria, labs and
water desalination and purification

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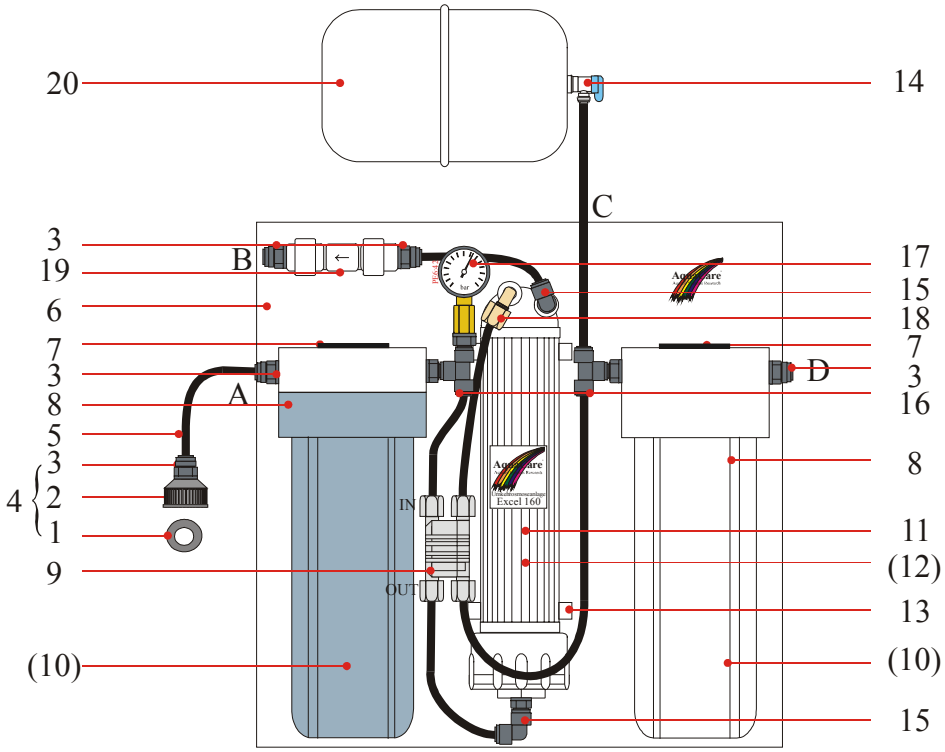
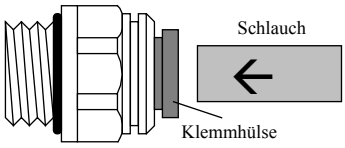
Reverse Osmosis Unit *Excel* DT



Montage



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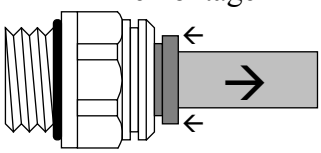


Fig. I

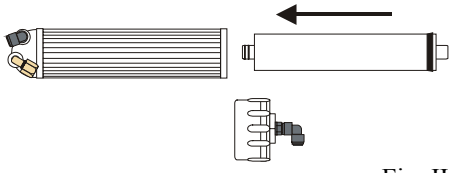
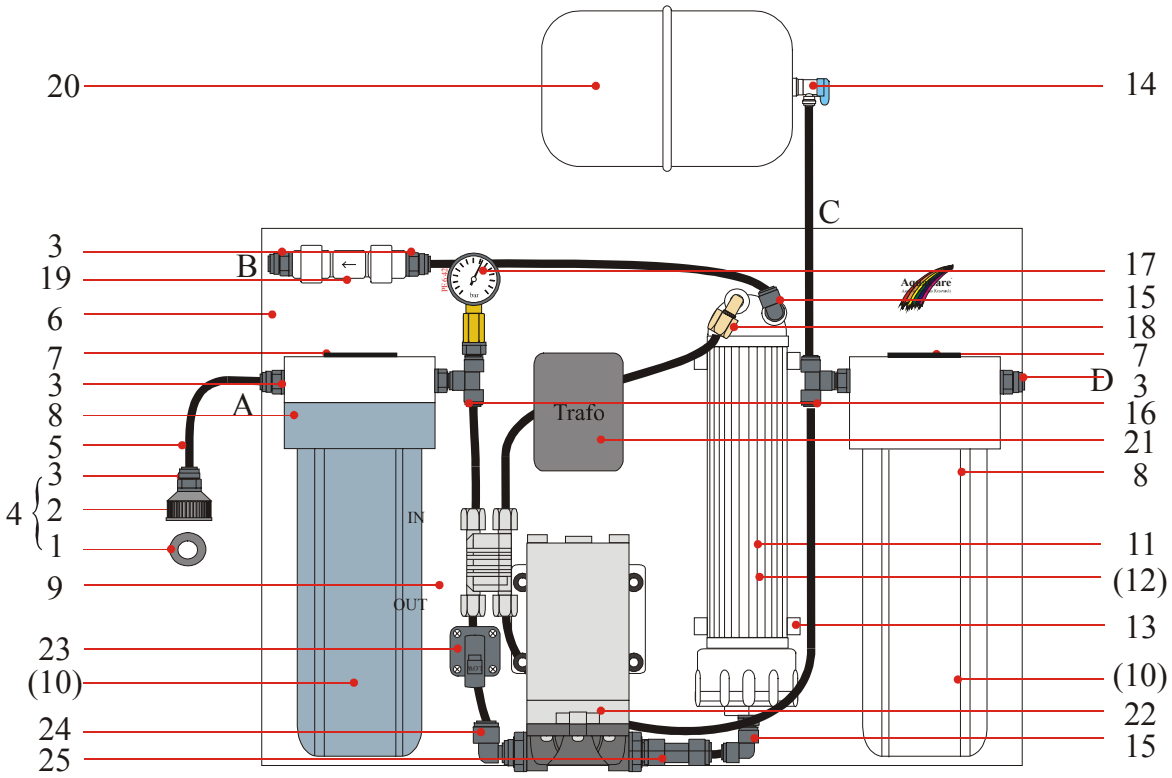
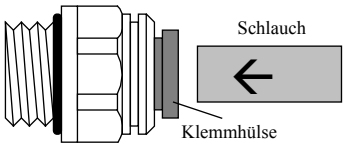
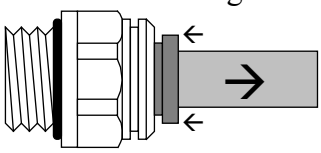
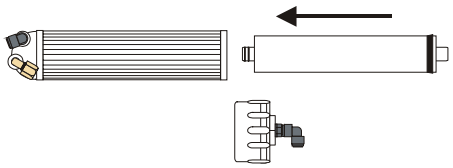


Fig. II

		GB	order number
		Instruction manual	
A		Feed water	-
B		Waste water	-
C		Tank connection	-
D		To using unit	
1		Flat sealing	778-033
2		Muffle ¾"f- ¼"m	011-001
3		Fitting ¼"m-6f	PM090612E
4		Tap connector	897-001
5		6 mm PE tube	890-006
6		Mounting plate	032-001
7		Bracket	209-004
8		Filter housing	201-111
9		Hydraulic valve	897-007
10		10" combi filter cartridge	221-105
11		Membran housing	191-001
12		Membran 50 GPD	190-012
13		Clip	191-102
14		Valve ¼"f-6f, 90°	PPSV500822W
15		Fitting 1/8"km-6f, 90°	PM090601E
16		Fitting T6f-¼"m-1/8"m	-
17		Pressure gauge	700-010
18		Fitting 1/8"km-6f	PM010601E
19		Flow reducer	896-011
20		Pressure tank 8 l	192-002

Reverse Osmosis Unit *Excel* DTP



			GB **Instruction manual**	**order number**
Montage  Demontage  Fig. I	A		Feed water	-
	B		Waste water	-
	C		Tank connection	-
	D		To using unit	
	1		Flat sealing	778-033
	2		Muffle ¾”f- ¼“m	011-001
	3		Fitting ¼“m-6f	PM090612E
	4		Tap connector	897-001
	5		6 mm PE tube	890-006
	6		Mounting plate	032-001
	7		Bracket	209-004
	8		Filter housing	201-111
 Fig. II	9		Hydraulic valve	897-007
	10		10” combi filter cartridge	221-105
	11		Membran housing	191-001
	12		Membran 50 GPD	190-012
	13		Clip	191-102
	14		Valve ¼”f-6f, 90°	PPSV500822W
	15		Fitting 1/8”km-6f, 90°	PM090601E
	16		Fitting T6f-¼“m-1/8“m	-
	17		Pressure gauge	700-010
	18		Fitting 1/8“km-6f	PM010601E
	19		Flow reducer	896-011
	20		Pressure tank 8 l	192-002
	21		Transformer	119-106
	22		Booster pump	119-120
	23		Pressure switch With fitting T6f-1/4”m6f	690-008 PM100612E
	24		Fitting 3/8”m-6f, 90°	PM051013E + PM211006E
	25		Fitting 3/8”m-6f	PM051013E + PM201006E

Instruction manual of
Umkehrosmoseanlage *Excel DT(P)*

Attention! Water that contains bacteria, iron or manganese or has an electrical conductivity of more than 2000 µS/cm (about 1000 ppm) should not be supplied to this unit. For limits of those substances see chapter "guarantee".

Delivered parts

Examine the completeness of the supplied reverse osmosis plant, please. It consists of the R.O. mounted on plate, a pressure tank, and mounting material: ¾" connector, PE pressure tube, filter wrenches.

Field of application

The reverse osmosis water can be used for many purposes.
The load of the **drinking water** with hardness substances, fertilizer remainders (e.g. nitrate), dismantling products of the pharma industry (e.g. Oestrogene), the chemical industry (e.g. phenol) and agrar industry (e.g. Atrazin) is at the edge or over the legal limit value in some areas. It must be noted that this limit value is always referred to an adult person with good constitution. All other humans - babies, children, old persons and patient - are substantially more sensitive and should protect itself against these materials. Likewise results are hardly present over long-term effects about the substances specified above or their cooperating reactions. The reverse osmosis technology removes reliably these harmful and potentially harmful materials from the drinking water.
In the **hobby aquaristics** the problem of too bad drinking water is very well-known. Most fish originated from areas with extremely soft water, so that they can feel in European tap water hardly well. Some substances contained in water lead to sterility and can mix up water chemistry in such a manner that a magnificent underwater landscape cannot be developed.
The **breeders of orchids and *Tillandsia*** are dependent on extremely soft and nutrient-poor water. The reverse osmosis is the best technique to produce clear water free of salts and hardness. If only very hard water is available, also the house plants should be poured with reverse osmosis water - pay attention however to the supply of plant fertilizer.
All **household technique** that should be operated with soft water can be supplied with reverse osmosis water: e.g. steam flat irons.
Also the **car battery** should be filled up with reverse osmosis water.
Room air humidifiers should be likewise operated with pure, bacterium-free water. Only like that a long life span of these devices is ensured.

Operational principle

With the help of the tap water pressure and the build-in pressure pump (only type Excel DTP) the tap water is driven through a semi permeable diaphragm (membrane). The membrane is in such a way conceived that salts even solved (common salt, hardness, nitrate, silicic acid) and organic compounds (solvents, pesticides and medicine arrears) are rejected (pure water = permeate). To prevent blocking the membrane the part of the water before the diaphragm, enriched with pollutants, must be drained (waste water = concentrate).
The pure water quality and water flow of a reverse osmosis plant are affected by several factors. The better the quality of the feed water (usually tap water), the purer the permeate becomes - however the tap water quality is usually not to be affected. The higher the water pressure, the more pure water can be produced; at the same time the quality of the pure water becomes better. Below 3 bar the acquisition of a reverse osmosis plant is not worthwhile itself. Therefore a pressure pump is build-in (only type Excel DTP). The water temperature affects the pure quantity of water, too: the warmer the water, the higher the water flow of the reverse osmosis plant. However the water temperature should not be higher than 30°C, otherwise the membrane suffers. Thus the plant produces in the winter less water than in the summer. If the water pressure should drop under 1 bar, the plant switches off automatically, to prevent damages at the booster pump.
AquaCare plants are delivered with combi filter to ensure a long life time of the membrane and crystal clear and safe water.
If the pressure tank is empty or not completely filled, the hydraulic valve opens to start the system. If the pressure tank is filled up the pressure switch interrupts the water production, and the pump stops. The pure water can be taken from the tank by e.g. a drinking water faucet or another valve.

Mounting the unit

In any case the plant should be installed in the near of a tap connection and a sewer. It pay attention that the tubes from the tap to the plant and from the sewer to the plant are kept as short as possible to avoid pressure losses. Likewise an electrical connection (plug socket) is needed.
If the unit is mounted more than 5 meter apart from the tap water connection, a tube with a larger diameter should be installed (take suitable adapters). This applies to long concentrate tube also.
If the permeate must flow more than 5 meter to the height remember that the effective membrane pressure drops for 0.1 bar every meter.
Fix the mounting plate (6) of the unit with screws at rigid wall. Pay attention to the filter housings (8) – they should be opened without taking the mounting plate from the wall.
It is not necessary to install the unit at a wall but it is very practicable.
The position of the pressure tank does not matter.

The water connections

To install the water connection (A, B, C, D) you must cut straight the delivered tube with a sharp knife. Use the AquaCare pressure tube only. For mounting the tube (5) push it strongly into the fitting (see fig. I). Control the connection by pulling the tube. To release the tube push the collet into the fitting and pull out the tube.
Water inlet: the tap water connector (4) has to be mounted with the seal (1) to a ¾" tap water connector. Do not use tools for it – otherwise the plastic fitting may broke. Connect the tap connector with the tube to the water inlet fitting (A). – Connect the waste water / concentrate connector (B) with to a waste water pipe. – Connect the pressure tank connector (C) to the pressure tank (20). Screw in the tank valve (14) before. Use teflone tape of other sealing for the thread – take care to the plastic valve. – Connect the consumer (e.g. drinking water valve, humidifier, etc.) to the connector (D).

Attention:
Use only cold water. At temperatures above 30°C the membrane will be destroyed.
The tubes should never be squeezed – the water must flow without resistant e.g. valve, solenoids, etc.

Build in the membrane

The last step is the mounting of the reverse osmosis membrane (12). Release the tube at the bottom of the membrane housing (11) and open the cap of the housing with a wrench. Wrap off the transparent plastic cover from the membrane. Push the membrane with the two small o-ring at first into the housing (see fig. II). If you use a little silicone fat for the o-rings and the main seal of the membrane the work will be easier. – Close the housing and connect the tube to the fitting again.

Electrical connection

The type Excel DTP needs an electrical connection additional. Plug in the plug of the transformer (21) into the main. Check the voltage before.

Putting into operation

Open the feed water valve – water will through the unit. The pressure gauge (17) should show minimum 4 bar (Excel DT) or 1 bar (Excel DTP). The pump is running (only Excel DTP). Please check all water connectors if they are tight. After 0.5…2 hours the pressure tank is full and the unit is on stand by: water is not flowing / type Excel DTP pump is off. Do not use the first water: drain the complete first filling of the tank – is may contain disinfecting substances.

Maintenance

To ensure a proper operation of the unit and the best water quality it is important to maintain the R.O. unit regularly.

Every 6 to 12 months - changing the filters

Check the pre-filter regularly. Otherwise the water quality get bad and the life time of the membrane decreases.
If the first filter look clean (fresh filters have a white layer) its life time is not reached. If the filter looks dirty (grey or brown layers, lot of sediment) both filters (10) have to be changed; at least after 12 months.
For changing the filters close the feed water valve, close the valve of the pressure tank and open the valve to the consumer / drinking water valve or activate the consumer unit. Now unscrew counter-clockwise the filter cup (8) with the delivered wrench. Take off the old filter cartridge (10), clean the filter cup and put in a new filter cartridge. Do not forget the o-ring. If the filter cartridge has a transparent foil unwrap it before.
Check the permeate quality. Measure the conductivity or TDS of the permeate regularly (TDS meters are available at AquaCare). Measure the feed water quality, too.
With the formula:

Retention in % = (1 – EC of permeate / EC of feed) * 100
EC = electrical conductivity or TDS

If you do not want to calculate you may have a look into the following table.

conductivity feed in µS/cm	conductivity permeate in µS/cm with a good membrane
100	10 to 3
200	20 to 6
500	50 to 15
750	75 to 23
1000	100 to 30
1250	125 to 38
1500	150 to 45
hardness feed in °dH	hardness permeate with a good membrane
2	0.2 to 0.06
5	0.5 to 0.15
7	0.7 to 0.21
10	1.0 to 0.3
15	1.5 to 0.45
20	2.0 to 0.6
25	2.5 to 0.75

Example: you have tested the feed water with 150 µS/cm (it is between 100 and 200). If the membrane is o.k. the conductivity of the permeate should not be over 5 µS/cm (it is between 3 and 6).
If the water quality gets not better after changing the filters, you have to change the membrane. Follow reverse the manual as described in "build in the membrane" for getting out the old membrane. Build in the new membrane as described in the same chapter.

Storing a R.O. unit / changing a membrane

It is possible to shut down an AquaCare R.O. unit for a longer time. The membrane will not get damaged. To prevent bacteria growth and died water it is useful to take out all the water from the R.O. system if you do not take water the next 4 or more weeks:
Therefore shut down the unit by closing the feed water valve, open both filter housings (8) and take out the water, take off the tube from fitting (15), open the membrane housing and take out the water. After it close all housings (filter and membrane). Empty the pressure tank, too.
To **disinfect the membrane** shut down the R.O. unit and let out the water as described before. Pull the membrane housing (11) out of its brackets. Hold the open side upside and fill in 50-100 ml disinfecting substances: use only AquaCare disinfecting fluid. Oxidising agents will destroy the membrane. Close the housing (11), click it back to its brackets and connect the tube to fitting (15) again. – If you reactivate the system drain the first tank filling.
Do not store the unit or membrane below 4°C or above 35°C.

Fehlerbeseitigung

If you are not able to eliminate the malfunction please ask your dealer or AquaCare.

Unit is leaking

If water is coming out between a fitting and a housing, screw out the fitting and seal it with sealing tape again. Take care with the plastic fittings and threads.
If water is coming out between a fitting and a tube, check the tube connection: the tube must be push in totally. If it is still leaking take out the tube (push the collet, pull the tube), shorten it about 10 mm and push it back into the fit-

ting. If it is still leaking change the fitting.
If water is coming out between tap water connector or between filter top and filter cup check the o-ring or displace it. A little bit silicone grease will help, too.

Too less permeate but enough concentrate

Check the water pressure at the pressure gauge (17). Type Excel DT: minimum 4 bar, type Excel DTP: minimum 1 bar. Rise the inlet pressure; otherwise the R.O. unit will not work properly.

Too less or no concentrate, but enough permeate

Check the concentrate tube.
Replace the flow reducer (19).

Too much permeate with a bad quality

Check the small o-rings at membrane. Displace them if damaged.
Look into the membrane housing if membrane is take out. If the locator of the membrane central tube is broken, replace the housing.
Too bad water quality / low rejection
Check the water quality if the units is in operation for minimum 1 hour.
Replace the filter cartridges.
Replace the membrane.

Guarantee

To all AquaCare products you have the prescribed guarantee by law (2 years), excluding parts like pre-filter cartridges, one-way filters, filter fillings, seals, etc.. With damage, which was caused by force, the requirement expires. For damages caused by water AquaCare cannot be made liable. To get the guarantee AquaCare needs a copy of the dated purchase receipt. The feed water quality must correspond to the drinking water law and must have the following values: TDS (salt content) < 2000 mg/l; iron concentration < 0.1 mg/l; manganese concentration < 0.05 mg/l; strontium and barium not detectable; concentration of oxidizing agents (if any activated charcoal filter or combi filter is used) < 0.1 mg/l, maximum bacteria load according to drinking water standard.

Technische Daten / Technical Data

Bestellnummer	Order number	**Excel DT 120 120-010**	**Excel DTP 120 120-011**	**Excel DTP 240 120-012**
Abmessungen Anlage (Breite × Höhe × Tiefe) in cm	Dimensions unit (Wide × Height × Depths) in cm	41 × 41 × 14	58 × 41 × 14	
Abmessung Tank (Durchmesser × Höhe) in cm	Dimensions tank (diameter × height) in cm	20 × 33		
Gewicht (trocken) in kg	Weight (dry) in kg	5,5	8,4	
Anschlüsse in mm	Connections in mm	6		
Wasserhahnanschluss	Tap water connector	¾“		
Betriebsdruck in bar	Operation pressure in bar	4...8	1...4	
Betriebstemperatur in °C	Operation temperature in °C	4...35		
Gesamthärte im Rohwasser in °dGH	Hardness of feed water in °dGH	0...30		
Membrantyp	Type of Membrane	Wickelmodul / spiral wound module		
Membranmaterial	Material of membrane	Polyamid TFC		
Reinwasserleistung in l/d bei 0 bar Gegendruck	Pure water flow in l/d at 0 bar counter pressure	120	200	400
Verhältnis Abwasser / Reinwasser	Ratio waste water to pure water	3:1		
Salzrückhalterate bei *	Rejection at *	95...97%		
Vorfiltertyp / Nachfiltertyp	Type of pre filter / type of post filter	Blockfilter 5µm / Carbon block 5µm		
Lebensdauer Filter in Monaten	Life time of filters in months	6…12		
Elektrischer Anschluss	Electrical connection	-	230V, 50/60Hz, 22VA	

*500 mg/l Salzgehalt, 4 bar und 15°C, ohne Gegendruck; Änderungen vorbehalten
*500 mg/l TDS, 4 bar, 15°C, without counter pressure; modifications possible