daly
Middle East

HYDRO SYSTEMS DIVISION

Sea Water Reverse Osmosis

The **SWRO45** offshore watermaker with engineered multi-media prefiltration — reliable potable water from seawater, anywhere on the platform.



CAPABILITY OVERVIEW • Daly Middle East

Engineered water solutions for demanding environments

Daly Middle East's **Hydro Systems Division** specialises in the provision of high-quality products and engineered solutions relating to water treatment — from concept and design through supply, installation, commissioning and ongoing service.

- Design & Engineering
- Supply & Fabrication
- Commissioning
- Service & Support

45 m^3/day

Rated potable water output per SWRO45 skid

42k ppm

Feed salinity handled — full seawater duty

Skid-mounted, factory-assembled and tested — **plug-and-run** installation on deck with minimal site works.

THE CHALLENGE

daly Middle East

Fresh water offshore can't wait on a supply boat

Costly bunkering

Shipping potable water to the platform is expensive, weather-dependent and consumes valuable deck logistics.

Hostile feed

Seawater carries suspended solids, salinity to 42,000 ppm and biofouling that destroy unprotected membranes.

No room for downtime

Crews depend on continuous supply — the system must run unattended and be simple to operate and service.

Our answer: a **two-stage, skid-mounted desalination system** that protects its membranes and delivers potable water on demand — engineered for the deck.

daly Middle East

The reverse osmosis process

Pressure drives seawater through a semi-permeable membrane — pure water passes, dissolved salts are rejected.

Seawater Intake
Raw feed drawn from the sea, up to 42,000 ppm salinity.

→

Prefiltration
Multi-media skid strips suspended solids to protect the membranes.

→

HP Pump
Boosts feed to ±58 bar — above the osmotic pressure of seawater.

→

RO Membranes
Three-stage array separates pure water from salt.

≈40% **Permeate → Potable Storage**
±1.88 m^3/h of fresh product water.

≈60% **Brine → Overboard**
±3 m^3/h concentrated reject, safely discharged.

daly Middle East

Two matched skids, one water train



Prefiltration Skid

Dual multi-media filters (duty + standby) remove suspended solids and turbidity.

SWRO45 Watermaker

HP pump and three-stage membrane array deliver 45 m^3/day potable water.

daly
Middle East

PART ONE

Prefiltration Skid

Media filling · Filter mode · Backwash mode — protecting the membranes before a single drop reaches them.



daly Middle East



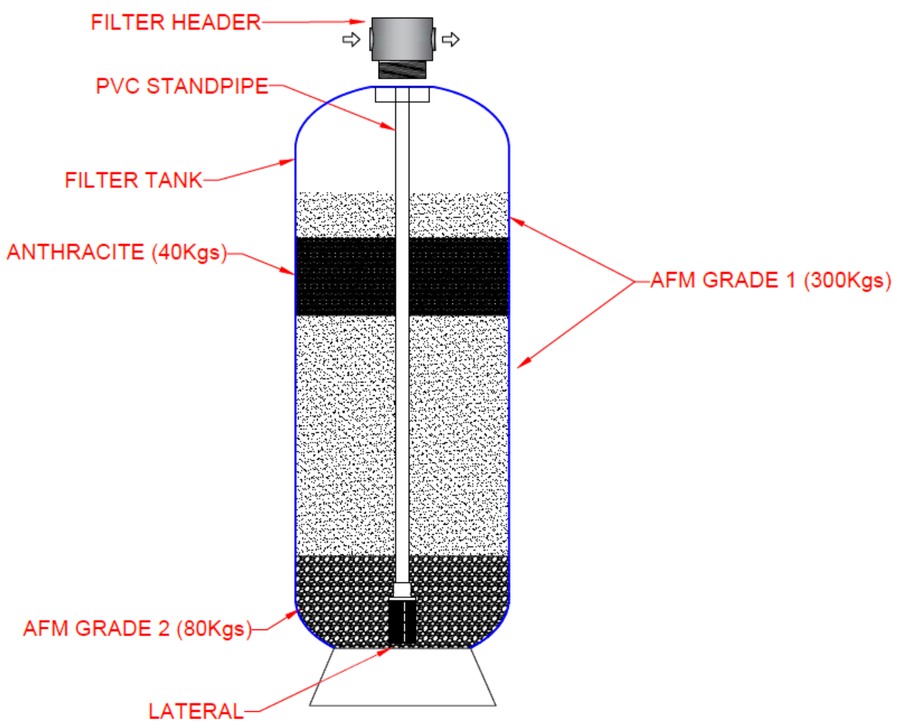
The prefilter skid

Two multi-media pressure vessels run as **duty + standby**, so filtration never stops for cleaning. A shared manifold, dosing tank and instrumentation complete the skid.

FT-1 Primary filter vessel — **duty**

FT-2 Second filter vessel — **standby / rotation**

FEED Inlet pressure **3 – 5 bar** from the SW feed pump



Graded multi-media bed

Media is filled in layers from coarse to fine. Water flows top-down, so each layer captures progressively smaller particles before clean water reaches the lateral underdrain.

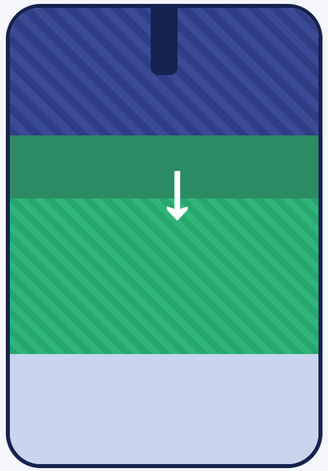
AFM Grade 1 Coarse activated filter media — top layer	**300 kg**
Anthracite Intermediate polishing layer	**40 kg**
AFM Grade 2 Fine media above the lateral underdrain	**80 kg**

daly Middle East

Filter mode

SERVICE · DOWNFLOW

Raw feed flows top-to-bottom through the media bed; suspended solids are captured and clean water is sent on to the RO feed.



1 **Feed in — top**
Seawater enters the vessel head at 3 – 5 bar.

2 **Down through the bed**
Media traps suspended solids and turbidity.

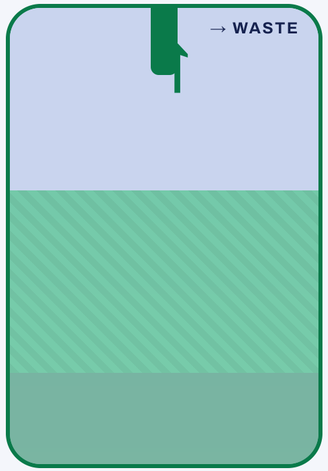
3 **Clean water out — bottom**
Filtered feed leaves via the underdrain to the RO skid.

daly Middle East

Backwash mode

CLEANING · UPFLOW

Triggered when differential pressure across the bed exceeds **≈ 1 bar**. Flow reverses to fluidise the media and flush trapped solids to waste.



1 **Reverse the flow**
Clean water is driven upward from the underdrain.

2 **Fluidise the bed**
Media expands and lifts, releasing trapped solids.

3 **Flush to waste**
Dirty water carries solids out the top; bed is regenerated.

daly
Middle East

PART TWO

SWRO45 Watermaker

The high-pressure heart of the system — membranes, components, controls and start-up.



A complete watermaker on one skid

Every element — pump, membranes, guard filter, dosing and controls — is integrated and tested before shipping, so the unit installs and runs with minimal site works.

45 m³/day
Product water output

±58 bar
Membrane operating pressure

480 VAC 3Ø
Power supply · 60 Hz

≈40 % recovery
Permeate from feed



Three-stage membrane array

Feed flows through three stages of Codeline pressure vessels in series — each stage recovers more permeate while the brine grows more concentrated.



01 **Stage 1**
LG SW 400 SR — first-pass bulk recovery

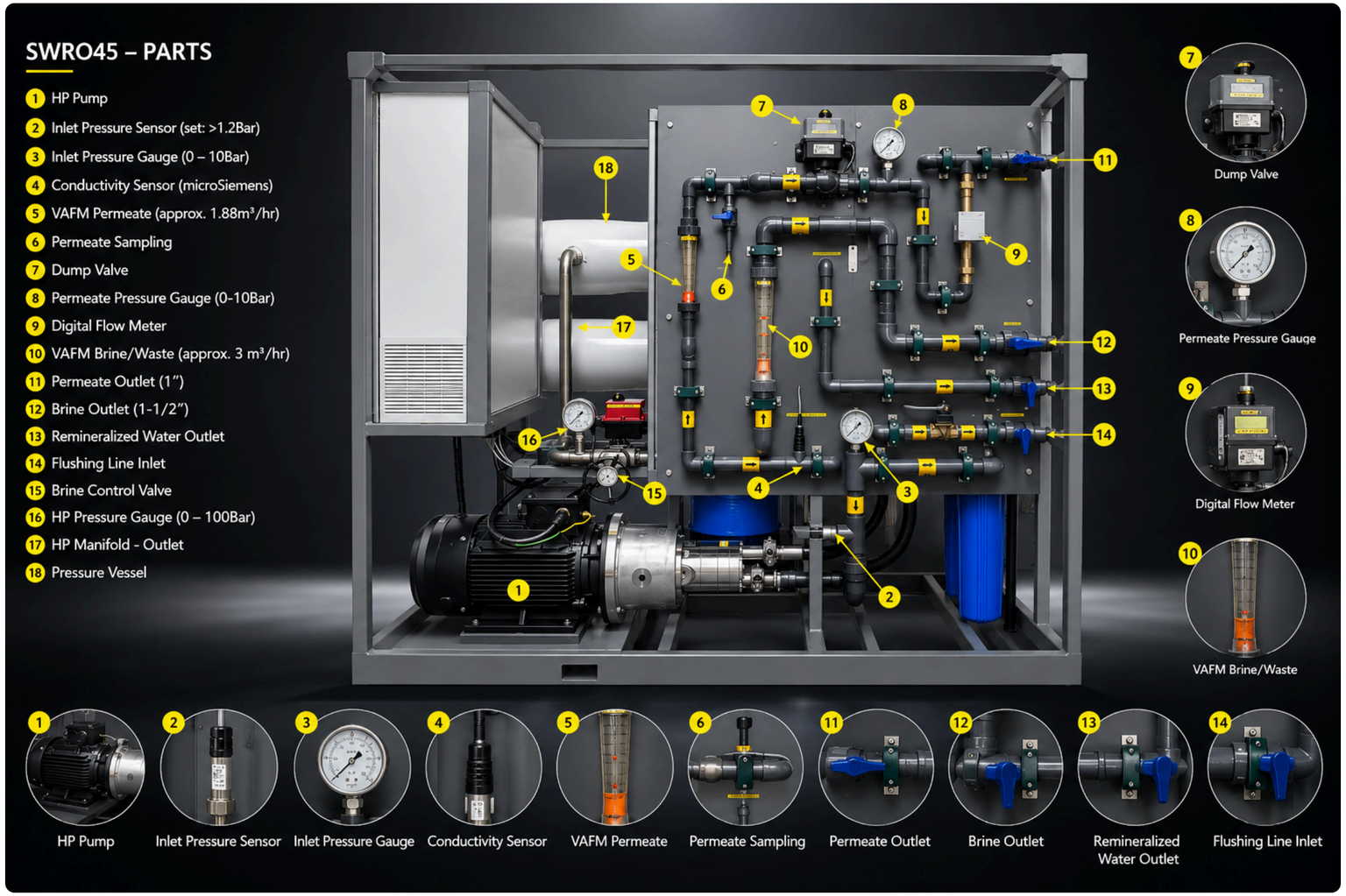
02 **Stage 2**
LG SW 400 R — intermediate recovery

03 **Stage 3**
LG SW 400 ES — final polish, brine to reject

Membrane stage arrangement & flow sequence



Full parts diagram — dosing & membrane stages



daly Middle East

Full parts diagram — high-pressure section

SWRO45 – PARTS

- 19 MOV INLET
- 20 Pressure Gauge – Inlet (0–10Bar)
- 21 Cartridge Filter – 10 Microns
- 22 Safety Relief Valve – Permeate (3 Bars)
- 23 Dosing Pump for Chlorine Neutralizer (SMBS)
- 24 Dosing Pump for Anti-Scalant
- 24 Flush Line Inlet
- 26 Safety Relief Valve – 63Bar
- 27 Stage 1 Pressure Vessel with LG SW 400 SR Membrane
- 28 Stage 2 Pressure Vessel with LG SW 400 R Membrane
- 29 Stage 3 Pressure Vessel with LG SW 400 ES Membrane
- 30 Permeate Outlet Manifold
- 31 REMIN Tank





Safety Relief Valve – Permeate (3 Bars)



Dosing Pump for Chlorine Neutralizer (SMBS)



Dosing Pump for Anti-Scalant



19 MOV INLET



20 Pressure Gauge – Inlet (0–10Bar)



21 Cartridge Filter – 10 Microns



25 Flush Line Inlet



25 Safety Relief Valve – 63Bar



27 Stage 1 Pressure Vessel with LG SW 400 SR Membrane



28 Stage 2 Pressure Vessel with LG SW 400 R Membrane



29 Stage 3 Pressure Vessel with LG SW 400 ES Membrane



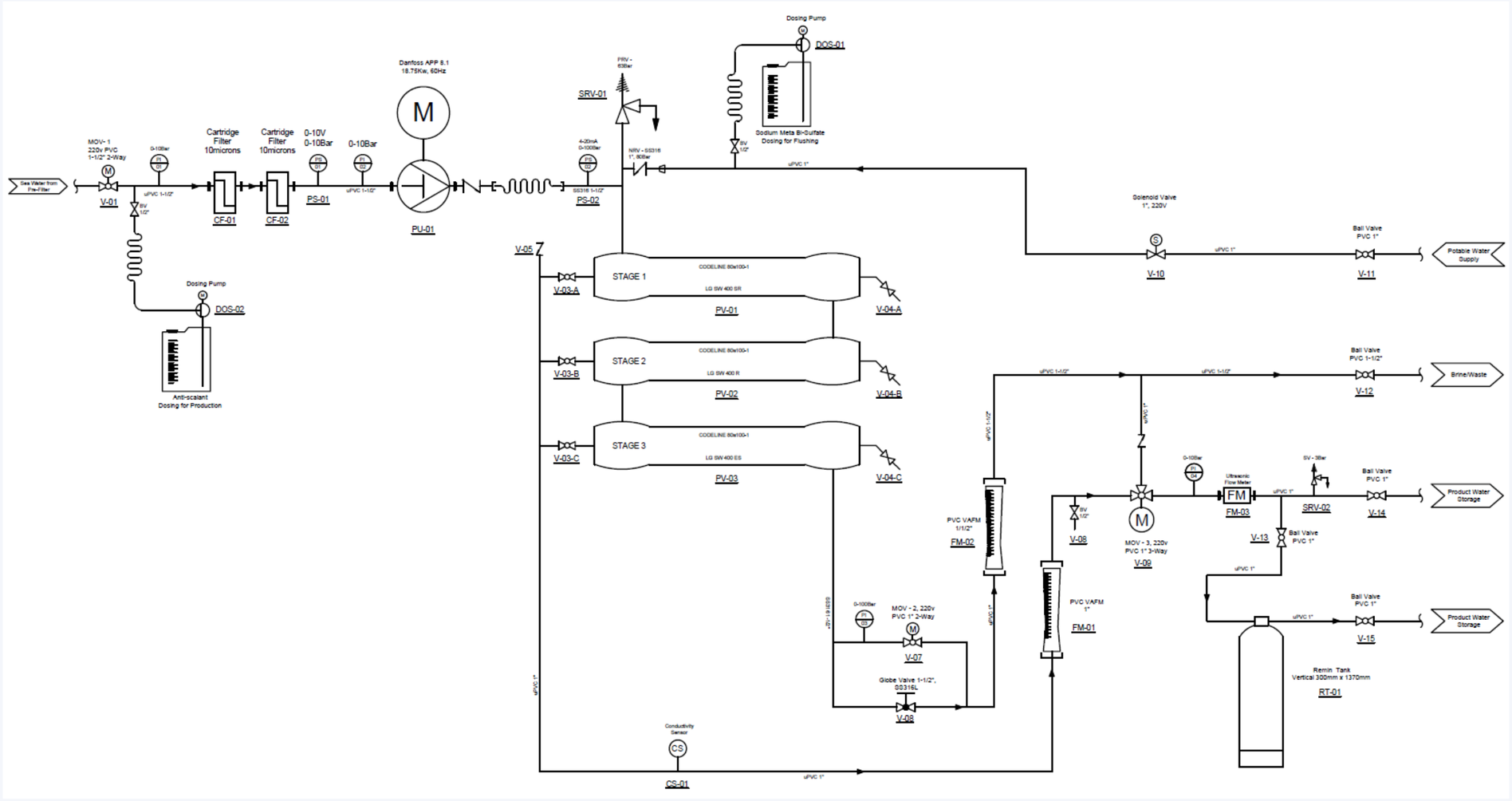
30 Permeate Outlet Manifold



31 REMIN Tank

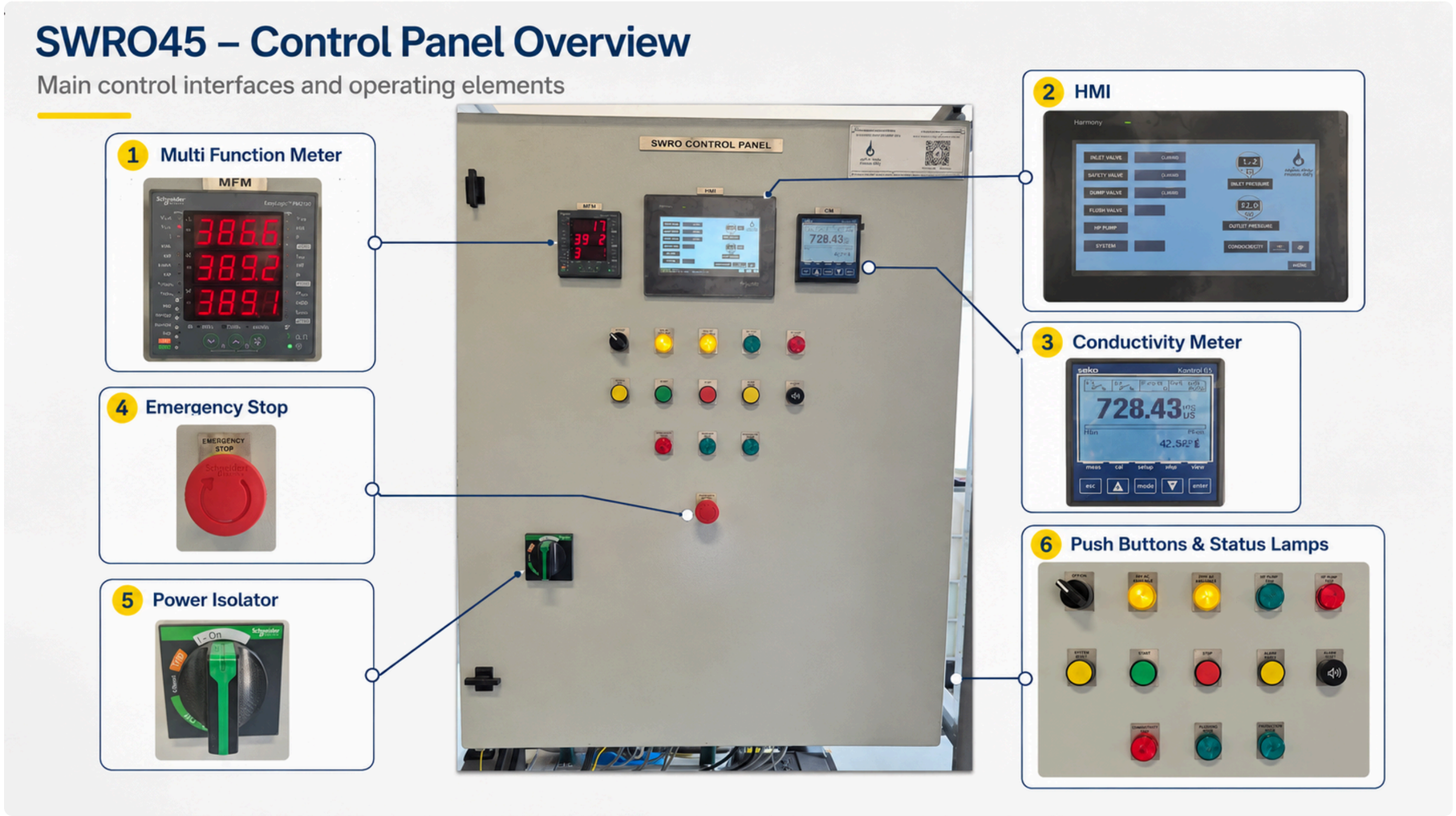
daly Middle East

Process & instrumentation



daly Middle East

Control panel overview



Start-up sequence

01
Energise
Switch on at the main isolator; confirm panel healthy, no active alarms.

02
Confirm feed
Verify inlet pressure > 1.2 bar and dosing systems primed and running.

03
Low-pressure flush
Open the dump valve (V-09) to flush the membranes at low pressure.

04
Start HP pump
Start the high-pressure pump and ramp slowly to ±58 bar operating pressure.

05
Divert to product
Once conductivity is within limits, divert permeate from drain to storage.

Shutdown reverses the sequence — always finish with a fresh-water flush to preserve the membranes.

Step 1 · Power isolator

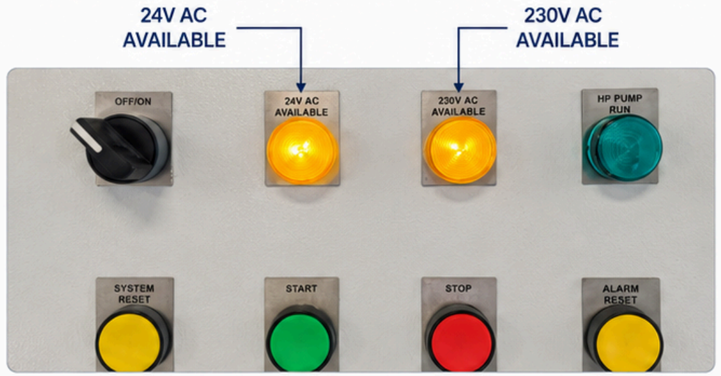
SWRO45 – Start-Up | Step 1 – Power Isolator

Enable main power supply

Start-up Sequence

1. Power Isolator
2. Initialization
3. Flushing Mode
4. Production Mode
5. Pressurizing the System





ACTION

Switch **ON** the power isolator.

NOTE

Ensure the incoming power supply is 480V across each phase.

Step 2 · Initialization

SWRO45 – Start-Up | Step 2 – Initialization

Switch selector to ON and allow the start-up delay

Start-up Sequence

1. Power Isolator
2. **Initialization**
3. Flushing Mode
4. Production Mode
5. Pressurizing the System





Instructions

- Turn selector switch to ON.
- Wait **20 seconds** for initialization.

Important

Position selector switch to ON and wait for the system to finish initialization.

daly Middle East

Step 3 · Flushing mode

SWRO45 – Start-Up | Step 3 – Flushing Mode

Start the automatic flushing cycle

Start-up Sequence

1. Power Isolator
2. Initialization
3. **Flushing Mode**
4. Production Mode
5. Pressurizing the System



NOTE

Flushing operates for 5 minutes.

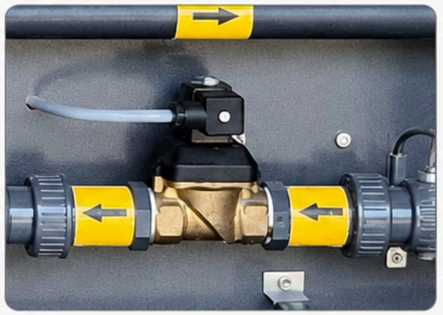
SUMMARY

Press **START** in flushing mode to begin the cycle.

1 Safety Valve Opens



2 Flush Solenoid Valve Open



3 SMBS Dosing Starts



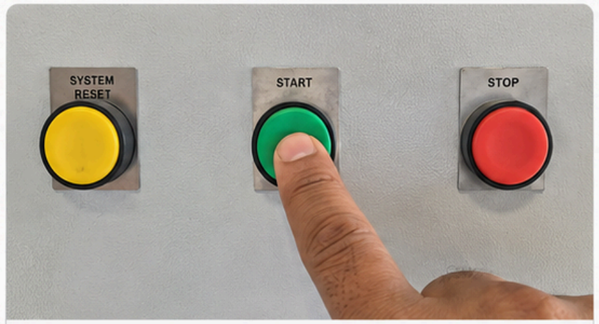
Step 4 · Production mode

SWRO45 – Start-Up | Step 4 – Production Mode

Transition the system into production

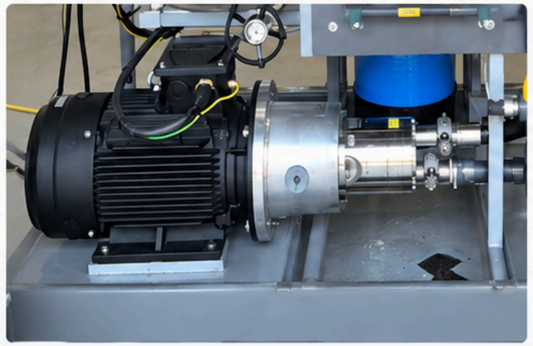
Start-up Sequence

1. Power Isolator
2. Initialization
3. Flushing Mode
4. **Production Mode**
5. Pressurizing the System

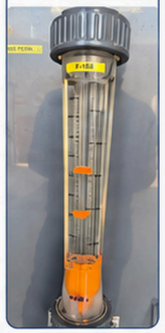


Press START to enter production mode.

1 HP Pump Operational



Flowmeter (Detail)



2 Inlet MOV Open



3 Safety Valve Opens Then Closes



4 Antiscalant Dosing Starts



5 Dump MOV Open (Production)



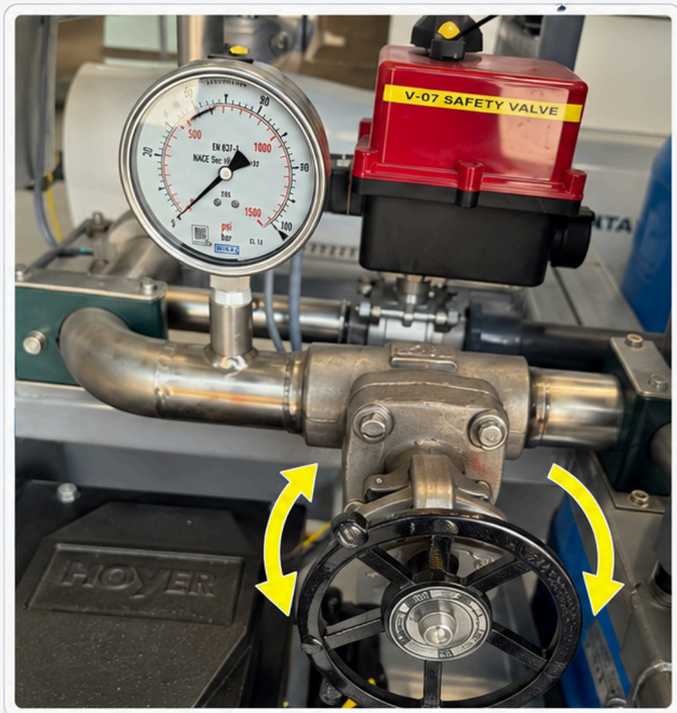
Step 5 · Pressurizing the system

SWRO45 – Start-Up | Step 5 – Pressurizing the System

Adjust the brine control valve and confirm operating conditions

Start-up Sequence

1. Power Isolator
2. Initialization
3. Flushing Mode
4. Production Mode
5. **Pressurizing the System**



⚠ Throttle the brine control valve slowly to avoid water hammering and damage to the system.

HP Pump Operational



Pressure 57.9 Bar



Dump MOV Open (Production)



Permeate ±1.88 m³/h



Brine/Waste ±3 m³/h

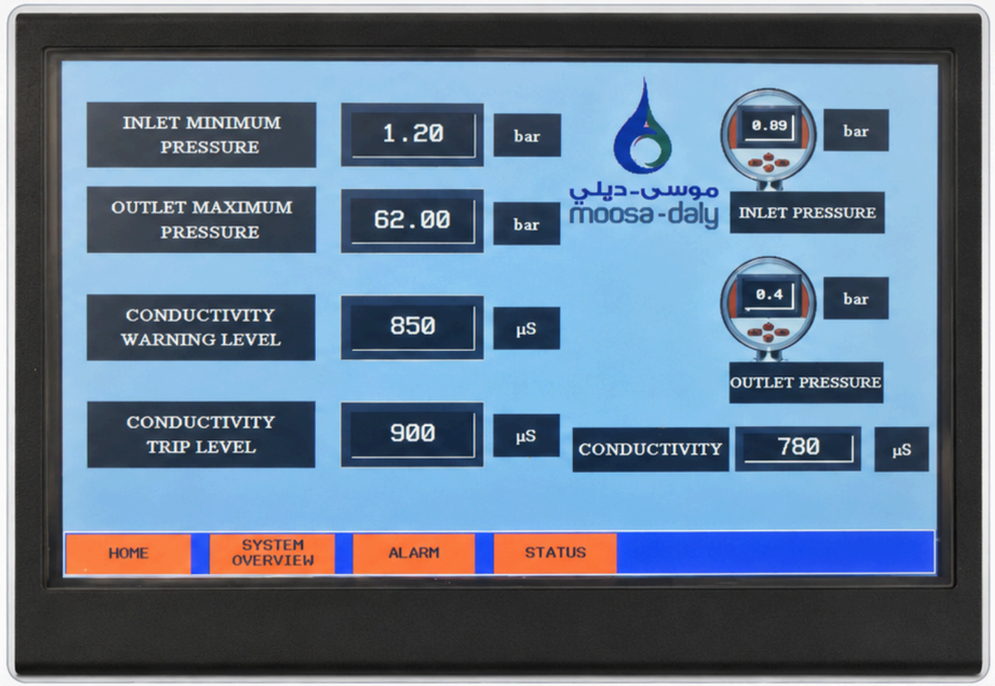


HMI settings — on the display

SWRO45 – HMI Settings

Recommended operating set points

Description	Setting
INLET MINIMUM PRESSURE	1.20 Bar
OUTLET MAXIMUM PRESSURE	62.00 Bar
CONDUCTIVITY WARNING LEVEL	850 µS
CONDUCTIVITY TRIP	900 µS



HMI Display

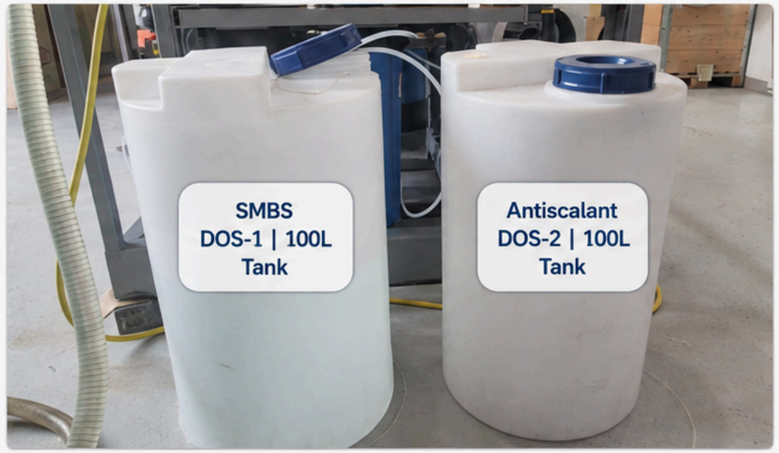
daly Middle East

Chemicals & remineralization media — on the skid

SWRO45 – Chemicals & Media

Chemical dosing and remineralization media

Dosing Tanks



SMBS –
5 g chemical /
100 L permeate



Antiscalant ratio 1:9 –
10 L chemical /
90 L permeate



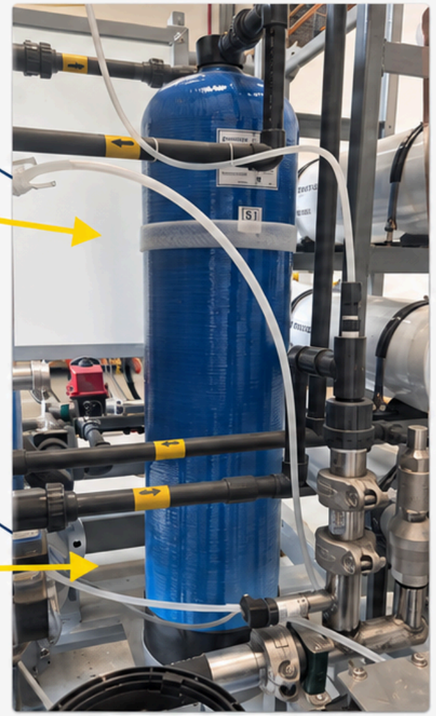
Remin Tank Media



Calcite –
2 Bags



Gravel –
2 Bags



Remin Tank

PERFORMANCE

daly Middle East

Specifications at a glance

45
m^3 / day
Potable output (≈283 bbl)

42k
ppm feed
Full seawater salinity

±58
bar
Membrane operating pressure

≈40%
recovery
Permeate from feed

±1.88
m^3/h permeate

±3.0
m^3/h brine reject

480 V
3Ø · 60 Hz supply

3-stage
Codeline membrane array

Supported through its whole life

Beyond supply, our Hydro Systems Division delivers commissioning, operator training, spares and scheduled service — keeping the unit producing water year after year.

- **Design & fabrication** — engineered to the platform's duty
- **Commissioning & training** — handover to confident operators
- **Spares & service** — regional support and fast response



daly
Middle East

HYDRO SYSTEMS DIVISION

Let's engineer your water supply

From feasibility to first flow — talk to us about the SWRO45 for your platform.

EMAIL
sales@daly-me.com

PHONE
+971 4 887 2049

WEB
daly-me.com

