

SILENT CORE INDUSTRIES | MARINE HVAC REPORT

High-Pressure Trip Investigation

Majesty 100 ft | MAR-IX three-chiller system

REPORT REFERENCE	SCI-MHVAC-CASE-002	SYSTEM	Marine HVAC / chilled water
REPORT TYPE	Fault finding and corrective work	PHOTO RECORD	Technical close-ups included

CURRENT STATUS

Stabilized under test; corrective work remains open

Executive assessment

The shutdowns were consistent with inadequate condenser heat rejection under severe summer conditions. High seawater temperature, condenser-circuit restriction, loss of pump redundancy and refrigerant-charge condition acted together. A separate chilled-water outlet sensor fault was corrected, but the failed seawater pump remained an outstanding reliability risk.

Situation

A three-chiller marine HVAC installation experienced repeated high-pressure trips. A separate temperature-sensor fault affected another circuit. The system was evaluated over more than one service visit so that water-side, refrigerant-side and controls evidence could be compared.

Diagnostic scope

- Fault-history review for high-pressure and chilled-water sensor alarms.
- Chilled-water loop pressure, air removal and circulation checks.
- Seawater pump operation, condenser flow path, strainer condition and seawater temperatures.
- Suction/discharge pressure and compressor-current monitoring before and after correction.
- Control sensor replacement and loaded operational test.

Key technical outcome

The equipment operated without another recorded high-pressure trip during an approximately five-hour monitored test. This was a successful stabilization result, not final close-out, because one seawater pump and two air-side blower issues remained unresolved.

Equipment details

Key equipment information recorded during the inspection.

Item	Specification	Field note
Yacht	Majesty 100 ft motor yacht	Three-chiller chilled-water installation.
Chiller make and type	MAR-IX chilled-water chiller system	Reported consistently across two service records.
Chiller quantity	3 chiller units	The diagnostic sequence addressed all three circuits.
Reported capacity	100,000+ BTU per chiller	Recorded in the follow-up service report; manufacturer rating not independently verified.
Distribution inventory	Total FCU/AHU count not stated	Two cabin blower/AHU defects were specifically documented; total inventory should be confirmed at commissioning.
Controls history	High-pressure trips on two chillers; chilled-water outlet sensor fault on one	Separates the heat-rejection fault from the independent controls fault.
Water-side baseline	Chilled-water loop recorded at approximately 0.2 bar; reported target 2-3 bar	Demonstrates why refill and air removal were a necessary first corrective step.

Note: Figures shown combine the two recorded service visits.

Diagnostic sequence

Stage	Evidence	Response
Initial water-side check	Chilled-water pressure approximately 0.2 bar against a reported 2 to 3 bar operating target; trapped air present.	Refilled the loop and air-bled the circuit.
Heat-rejection check	Marine growth and scale in the seawater circuit; later seawater readings of 35 deg C in and 39 deg C out.	Descaled and air-bled the seawater circuit; verified operation.
Controls check	Separate chilled-water outlet temperature sensor fault.	Installed replacement sensor and confirmed alarm clearance and normal response.
Capacity check	One seawater circulation pump inoperative; system dependent on the remaining pump.	Continued controlled testing with replacement listed as mandatory follow-up.
Refrigerant check	Elevated operating pressures under load.	Charge condition adjusted against observed operating conditions; pressures monitored before and after.

Recorded before-and-after readings

Parameter	Before	After	Observed change
High-side pressure	460 psi	410 psi	Reduced by 50 psi (10.9%)
Low-side pressure	150 psi	110 psi	Reduced by 40 psi (26.7%)
Compressor current	-	12 A	Recorded during stabilized operation
Seawater temperature	35 deg C inlet	39 deg C outlet	4 deg C rise across circuit

Interpretation note

Pressure reduction and stable operation during the monitored test demonstrated improvement. The readings alone do not establish full seasonal reliability or confirm manufacturer commissioning limits, particularly while the system remains dependent on one seawater pump.

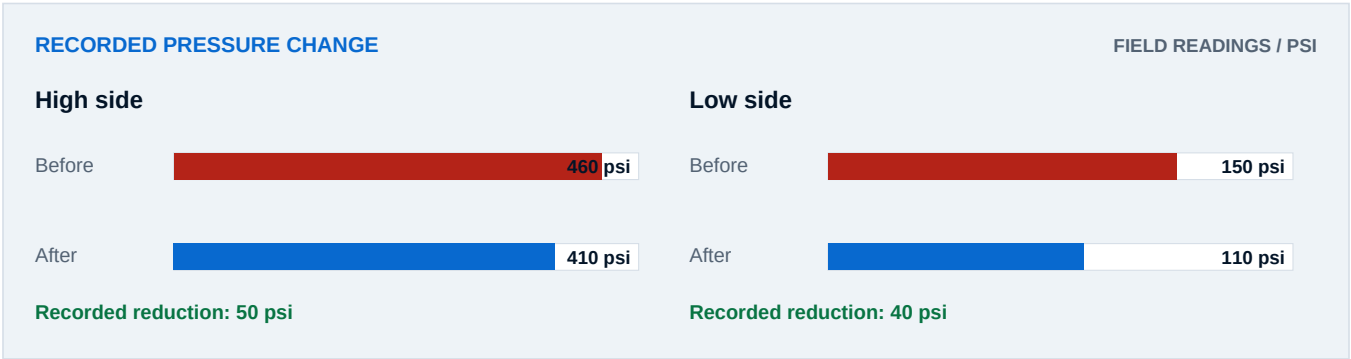
Residual risk

Priority	Observed risk	Required control
HIGH	No seawater-pump redundancy during operation.	Replace the failed pump and prove duty/standby operation under load.
HIGH	High condenser load during 35 deg C seawater conditions.	Maintain clean strainers and condenser surfaces; trend inlet/outlet temperature and pressure.
MEDIUM	Charge correction based on field operating conditions.	Verify final charge using the installed equipment's specified method under stable load.
MEDIUM	Two air-side blowers with failure or bearing noise.	Repair or replace, then record airflow and supply-air temperature.

Measured improvement and field evidence

The visual record links before-and-after pressure data to condenser-water conditions and a separate blower repair.

Technical close-ups recorded during the inspection.



SEAWATER INLET

Field measurement recorded approximately 35 deg C at the condenser-water inlet.



SEAWATER OUTLET

Outlet measurement recorded approximately 39 deg C, a 4 deg C rise across the circuit.



BLOWER BEARING RENEWAL

Removed and replacement bearings documented the separate air-side repair.

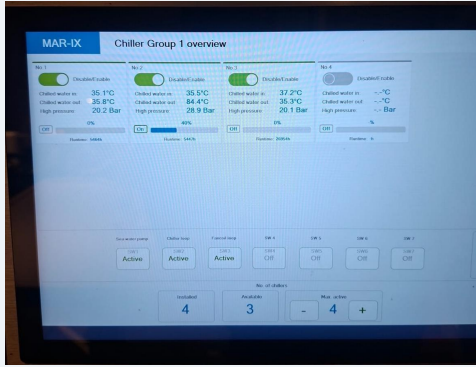
Field notes

- The pressure chart distinguishes the measured stabilization result from the remaining pump risk.
- Inlet and outlet temperature evidence supports the heat-rejection diagnosis under high seawater temperature.
- The bearing comparison shows that related air-side defects were documented and corrected separately.

Supplementary diagnostic evidence

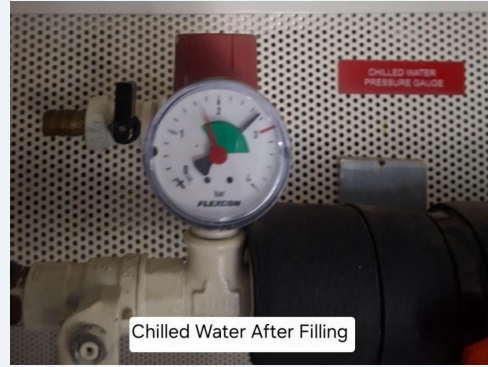
The supporting record shows both the MAR-IX control interface and restored chilled-water pressure after corrective work.

Technical close-ups recorded during the inspection.



CHILLER GROUP INTERFACE

The MAR-IX controller documented the multi-chiller configuration used in the investigation.



CHILLED-WATER PRESSURE RECOVERY

Gauge evidence documented the water-side condition after filling and air removal.

Field notes

- The controller view supports a three-chiller system context rather than a single-unit fault narrative.
- Water-side restoration was documented independently from refrigerant-side pressure stabilization.

Assessment

The recurring high-pressure trips were most consistent with insufficient heat rejection under unusually hot seawater and ambient conditions. Scale, reduced seawater-pump availability and refrigerant-side operating condition compounded the load. The sensor alarm was a separate controls defect and was not treated as the cause of the high-pressure events.

Key observations

- A 35 deg C seawater inlet materially reduced available condensing margin.
- A 4 deg C seawater rise confirmed heat transfer while also indicating a heavily loaded circuit.
- One failed circulation pump removed redundancy and increased dependence on the remaining pump's actual flow.
- Pressure reduction and an extended stable test supported improvement but did not remove the unresolved pump risk.

Recommended work

1. Replace the failed seawater circulation pump and verify both pumps independently and in the intended rotation strategy.
2. Clean strainers and maintain a documented condenser/descaling interval appropriate to local seawater conditions.
3. Verify final refrigerant charge by the equipment manufacturer's specified method after water-side flow is confirmed.
4. Confirm replacement-sensor calibration and review alarm history after sustained operation.
5. Repair or replace the affected air-side blowers and verify airflow after installation.
6. Repeat the loaded test at representative summer conditions and document pressures, temperatures, current and trip history.

After repair

- Prove stable operation with each seawater pump and confirm automatic/manual changeover as applicable.
- Trend seawater inlet/outlet temperature, condenser approach and compressor current at fixed intervals.
- Close only after there are no repeat high-pressure alarms during a representative observation period.

Report notes

The combined case history consolidates two reports concerning the same anonymous asset. Readings were collected during separate service stages and should not be treated as a single laboratory-controlled dataset.