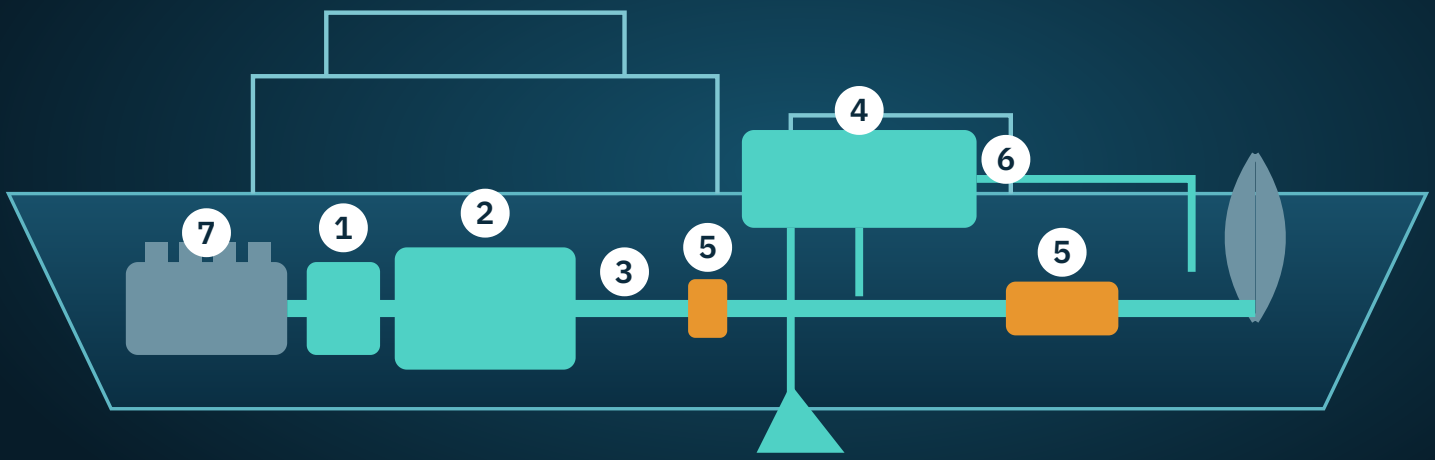
DRAFT 2026-11-18

CARIMO · SHIP PROPULSION-TRAIN HEALTH



1 Clutch
2 Reversing gear
3 Gearbox sensors
4 Hydraulics
5 Shaft life
6 Power unit
7 Engine coolers

CARI-Navi

Your propulsion train's health, at a glance.

Load your vessel's own logs and surveys: clutch, reversing gear, gearbox sensors, hydraulic servo, fin stabiliser, propeller pitch, hydraulic power unit, engine coolers, flexible coupling and stern tube, and the monitoring system's reversing-gear logs. Read one list per vessel in plain words, and print the report. Every finding says what was seen, how large it is and where to look first.

Vessel A, 2026-11-17: 6 faults named.

Clutch

navi_clutch_example.csv **Example log from our own simulated vessel: not this vessel's record.**

Clutch, day 4 Fault named Fix at next stop Plan the repair for the next planned stop.

What was seen: Clutch plates worn or glazed: less torque per unit of pressure.

How large: Grip is 0.75 of this vessel's own normal.

What to look at first: Look first at the clutch plates; check the engagement oil pressure alongside.

Twelve screens · Plain words · Clutch to shaft · Load your own files

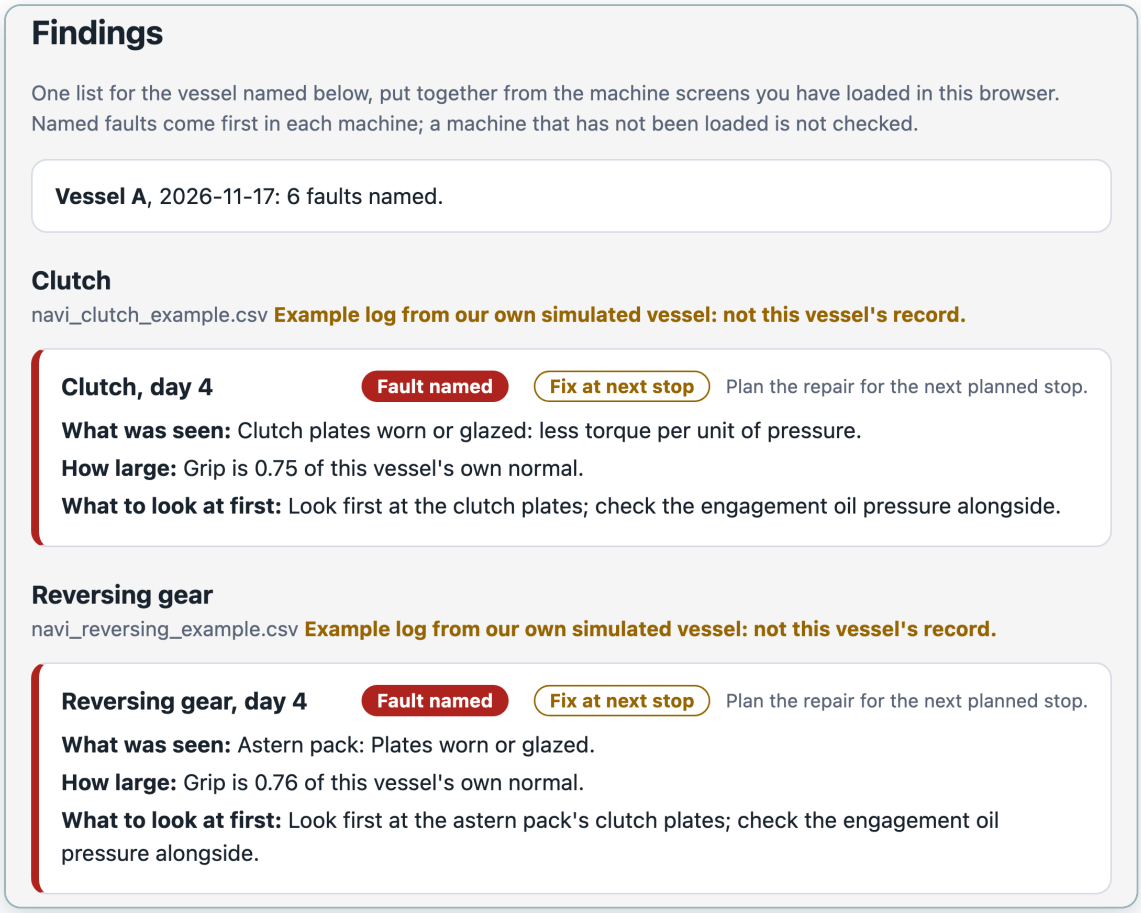
Tested on our own simulated vessels, built to industry practice.

CARIMO Technologies, Mumbai

THE ANSWER FIRST

Open it. See what to look at first.

One list for the vessel: its name and date at the top, a block for each machine you loaded, named faults first. Each says what was seen, how large it is against the vessel's own normal, and where to look first.



WHAT GOES IN

The latest result of each machine screen you have loaded: clutch, reversing gear (fast log or monitoring logs), gearbox sensors, hydraulic servo, fin stabiliser, propeller pitch, power unit, engine coolers, flexible coupling, stern tube. You add the vessel's name and the date.

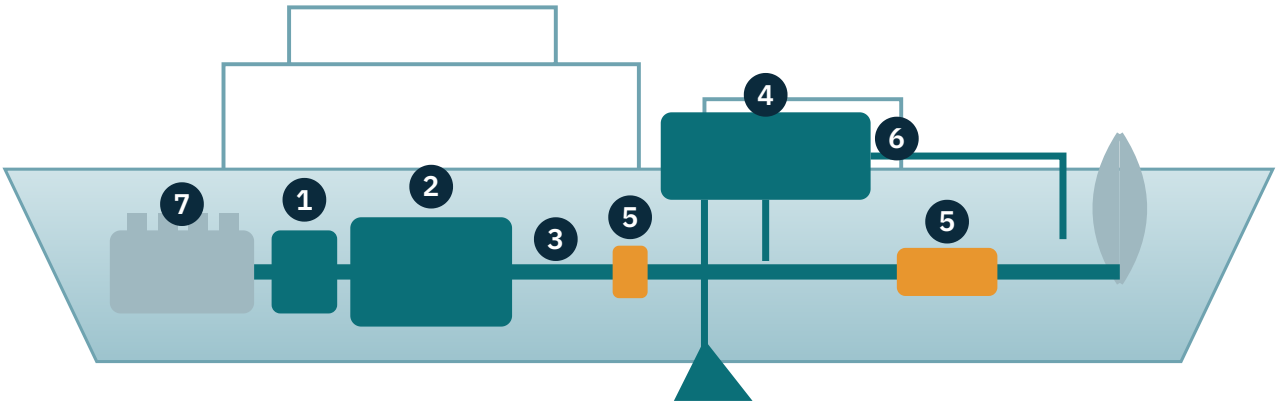
WHAT COMES OUT

One list per vessel and date. A block for each machine, named faults first. Records with no named fault show "Nothing found".

THE PROPULSION TRAIN

Seven areas. Twelve screens. One clear picture.

From the clutch to the stern tube, every area has its own screen and its own plain verdict.



1 Clutch · 2 Reversing gear · 3 Gearbox sensors · 4 Hydraulics · 5 Shaft life · 6 Power unit · 7 Engine coolers

1 Clutch

Load your engagement log. Worn plates, low oil pressure, slow fill, drag, will not release. A heavier propeller is named as what it is, not as a clutch fault.

2 Reversing gear

Load the log of both packs, or the monitoring system's engagement and running logs. The pack and the fault are named together.

3 Gearbox sensors

Load your slow readings. A stuck, flattened or failed reading is named for what it is: a sensor problem.

4 Hydraulics

Servo test moves, fin stabiliser log and propeller pitch test log, each read for its own named faults. The power unit has its own screen.

5 Shaft life

Stern-tube survey readings and flexible coupling survey readings: years left, as a range.

6 Power unit

Load the minute log and the load-cycle log: pump, pressure filter, oil cooler, internal leak, accumulator gas charge.

7 Engine coolers

Load one log per cooler: will each cooler still do the cooling asked of it at the planned stop?

Findings and report

One list per vessel and date, and a printed report: one page per machine.

WHAT GOES IN

Your own files: logger exports of the clutch, both gear packs, the gearbox sensors, the hydraulics and the power unit, the cooler logs, and the coupling and stern-tube surveys.

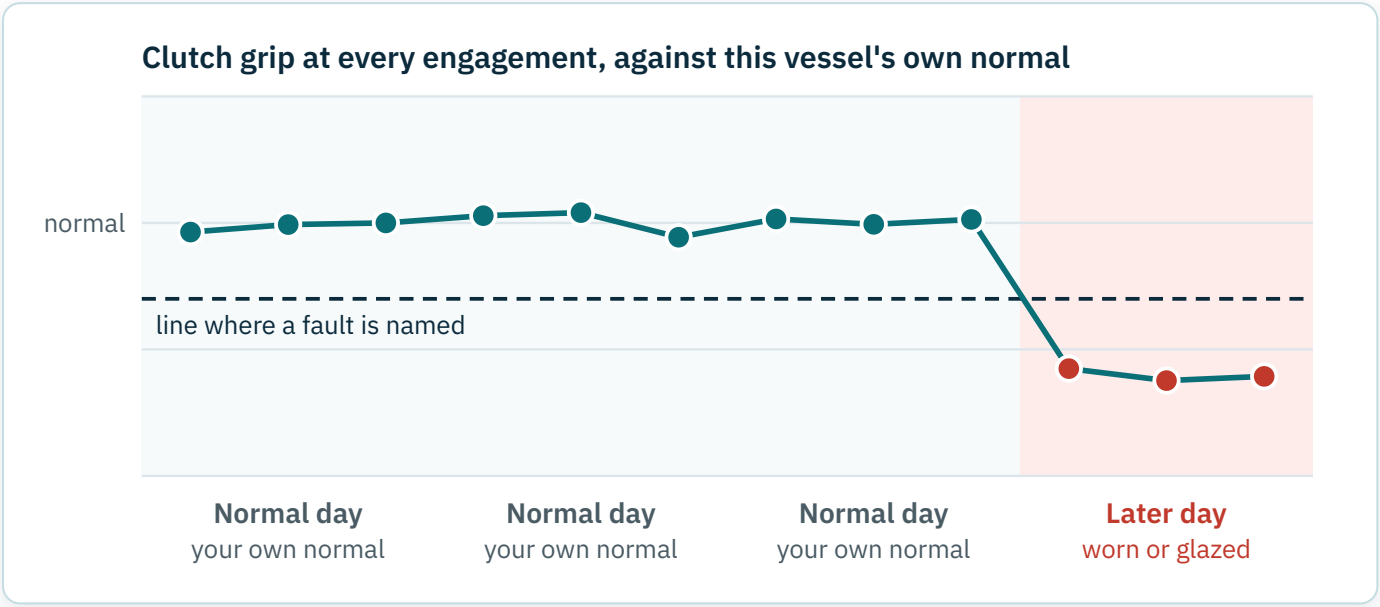
WHAT COMES OUT

A verdict for each area, a list for the vessel with a block per machine, a printed report with one page per machine.

CLUTCH

See clutch grip fall, engagement by engagement.

Each engagement's grip is drawn against the vessel's own normal days. When grip falls below the fault line, the screen names the fault.



Clutch engagements

Each bar shows a reading against healthy running. The black line is where a fault is named; the label on each bar says whether a low or a high reading is the fault. Red means past the line.

Example vessel 3 — Fault named

Clutch plates worn or glazed: less torque per unit of pressure.

Grip (low is a fault)	0.70 of healthy
Oil pressure (low is a fault)	1.00 of healthy
Fill time (high is a fault)	0.93 times healthy
Creep in neutral (high is a fault)	0.02 rad/s
Slip after release (low is a fault)	9.0 rad/s
Propeller load (for information)	1.02 of healthy

WHAT GOES IN

Engine and shaft speed, clutch oil pressure, the engage command and the shaft torque meter, from every engagement.

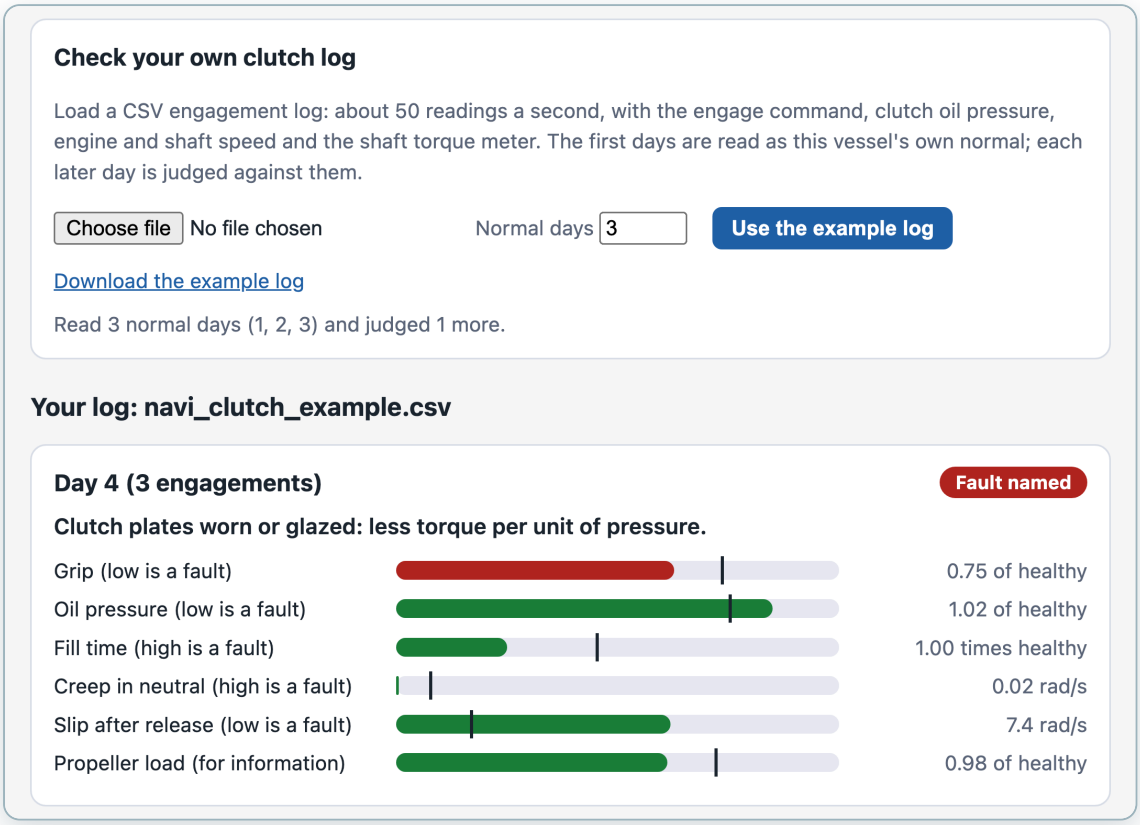
WHAT COMES OUT

A verdict in words: worn plates, low pressure, slow fill, drag, will not release. Or: not a clutch fault, the propeller is heavier.

YOUR OWN CLUTCH LOG

Load your clutch log. Read the verdict on the same screen.

Pick a CSV file, say how many days were normal, and the Clutch screen judges every later day against them. An example log comes with it.



1 Pick the log file → 2 Say the normal days → 3 Read the verdict

Day by day

Each later day gets its own card: grip, oil pressure, fill time, creep, slip, propeller load.

About 50 a second

One reading every 0.02 s for each engagement, with a neutral lead-in and a release at the end.

Your own normal

Every later day is judged against the days you name as normal for this vessel.

WHAT GOES IN

A CSV file, about 50 readings a second. Columns: day, eng, t_s, cmd, pressure_bar, engine_rad_s, shaft_rad_s, shaft_torque_n_m. At least three days: two normal and one to judge.

WHAT COMES OUT

A card for each judged day: the fault named in words, six labelled bars, and where to look first.

REVERSING GEAR

Ahead or astern, it names the pack.

Load the log of both packs. Each is read on its own against its own normal. The fault and the pack come out together.

Example	Ahead pack	Astern pack
Everything normal	Nothing found	Nothing found
Astern plates worn	Nothing found	Worn or glazed
Ahead pack will not transmit	Does not transmit	Nothing found
Ahead pack will not release	Does not release	Nothing found
Astern oil pressure low	Nothing found	Oil pressure low
Fouled propeller	Nothing found	Nothing found

A fouled propeller is named as what it is, not as a pack fault

Check your own reversing-gear log

Load a CSV engagement log of both packs: about 50 readings a second, with the pack (ahead or astern), engage command, clutch oil pressure in bar, engine speed and output shaft speed in rad/s (ahead positive, astern negative). Enter the two gear ratios. The first days are read as this vessel's own normal; each later day is judged against them.

Choose file | No file chosen | Ahead ratio 3 | Astern ratio 3.2

Normal days 3 | Use the example log | Download the example log

Read 3 normal days (1, 2, 3) and judged 1 more.

Your log: navi_reversing_example.csv

Day 4 (4 engagements) — Fault named

Astern pack: Plates worn or glazed.

Ahead pack Nothing found

Astern pack Fault named Plates worn or glazed.

WHAT GOES IN

A CSV of both packs, about 50 readings a second. Columns: day, eng, pack (ahead or astern), t_s, cmd, pressure_bar, engine_rad_s, output_rad_s. You enter the two gear ratios.

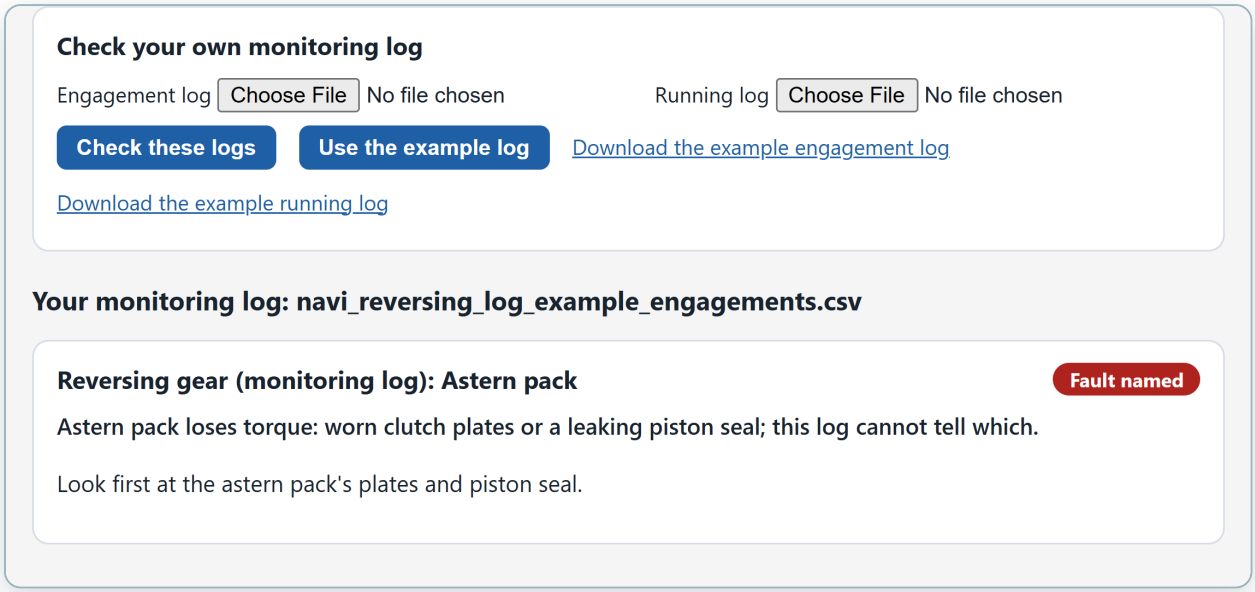
WHAT COMES OUT

The pack and the fault, in words, for each judged day. A fouled propeller is named as what it is, not as a pack fault.

REVERSING GEAR, MONITORING LOG

No torque meter? Use the monitoring log.

Load the engagement log and the running log from the alarm and monitoring system. The first days are read as this gear's normal; the last days are judged against them.



Engagement log

One row per engagement: day, hour, pack, engage time, slip energy, control-oil pressure.

Running log

Day, pack, engine load, slip, control-oil pressure, gear oil temperature.

The pack and the fault

Control-oil pump worn, a pack engaging late, a pack losing torque or failing to engage, each with where to look first.

WHAT GOES IN

An engagement log and a running log from the alarm and monitoring system. No torque meter is needed.

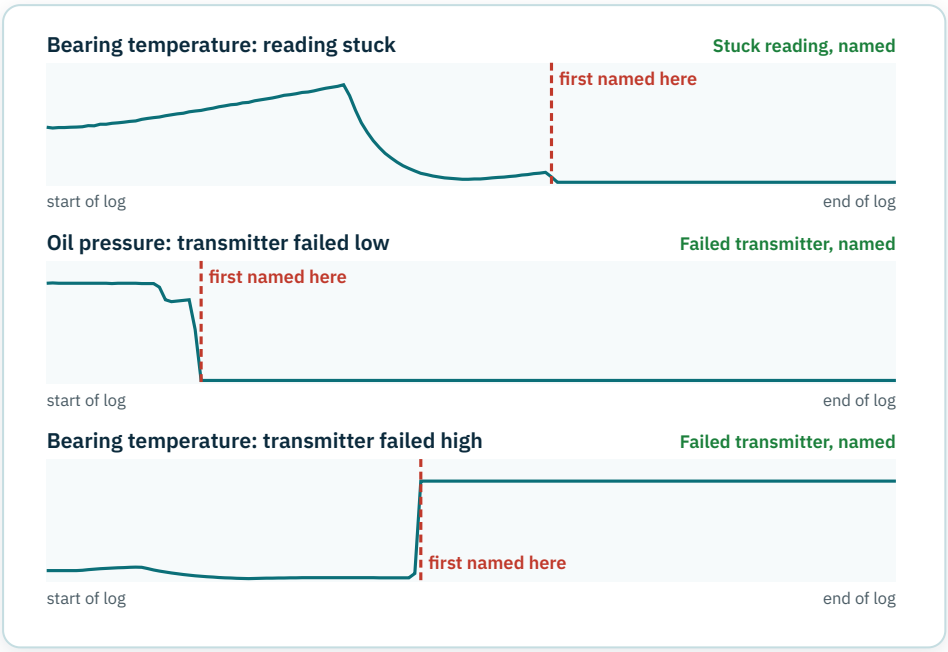
WHAT COMES OUT

The pack and the fault in words, and where to look first. A cold morning, a gauge reading low or a heavier propeller is named as what it is, not called a gear fault.

GEARBOX SENSORS

A failed sensor is named for what it is.

Load your slow readings. Each channel is checked on its own, and the time the problem was first seen is given.



Check your own gearbox sensor log

Load a CSV of slow readings, about 1 a second: a time column t_s (seconds) and any of oil_temp_c, oil_pressure_bar, bearing_in_c, bearing_out_c (degrees C and bar). Enter each transmitter's range (the readings that mean 4 mA and 20 mA). The first hours are read as this gearbox's healthy running; the rest is checked. This finds sensor faults only, not gear faults.

Choose file | No file chosen | Oil temp range 0,120 | Oil pressure range 0,10

Bearing in range 0,120 | Bearing out range 0,120 | Healthy hours 2

Use the example log | Download the example log

Read 2 healthy hours and checked 4 more. Sensor faults only: this screen does not judge the gearbox itself.

Your log: navi_gearbox_example.csv

Oil temperature — Nothing found

Nothing found: the reading moves normally.

Oil pressure — Fault named

Reading is flattened at a ceiling: the transmitter range may be set too low. First seen about 3.7 hours into the log.

WHAT GOES IN

A CSV of slow readings, about one a second. A time column t_s and any of oil_temp_c, oil_pressure_bar, bearing_in_c, bearing_out_c. You enter each transmitter's range; the first healthy hours set the normal.

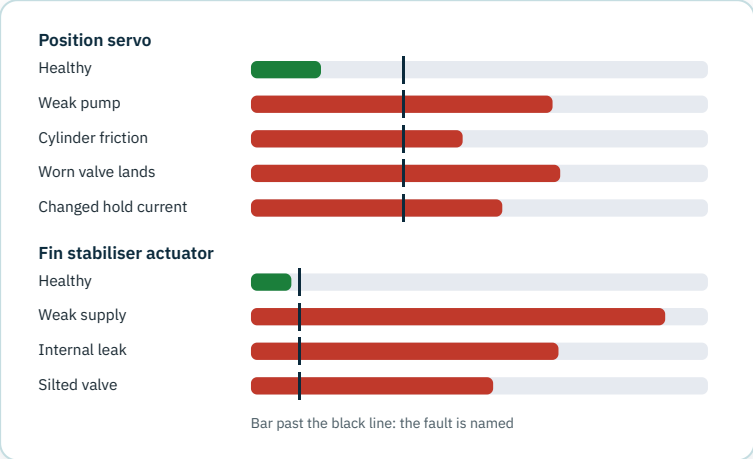
WHAT COMES OUT

Stuck, flattened and failed readings called out as sensor problems, with the time. A reading simply held at a limit by the process is left alone.

HYDRAULICS

The servo, the fin and the pitch system read their own logs.

Load the repeated test-move log of a position servo, the log of a fin stabiliser actuator, or a propeller pitch test log. A reading across the black line is named. The bar shows how far.



Check your own fin actuator log

Fin stabiliser actuator. Load one CSV holding two records of the same actuator from the fin roll test: a healthy baseline, then a later record. Each record is 60 s with a reading every 0.05 s. Columns: record (baseline or later), t_s, position_signal_v, controller_output_v, coil_current_ma, supply_pressure_bar, pressure_a_bar, pressure_b_bar, pump_hydraulic_power_kw, pump_shaft_power_kw, motor_electrical_power_kw, oil_temperature_c, reservoir_level_mm, pressure_b_peak_bar, gyro_roll_deg (bar, kW and degrees C). The later record is read as a change against the baseline.

Choose file | No file chosen | Use the example log | Download the example log

Your log: navi_fin_example.csv

Fin actuator — Change found

Internal leak: oil is leaking past a seat or seal inside the fin actuator.

WHAT GOES IN

Servo: a CSV of repeated test moves, a reading every 10 ms for the 2.6 s move; the first healthy moves set the normal. Fin stabiliser: one CSV with a healthy baseline record and a later record, 60 s each, a reading every 0.05 s. Propeller pitch: one 12 s pitch test log, a reading every 0.01 s.

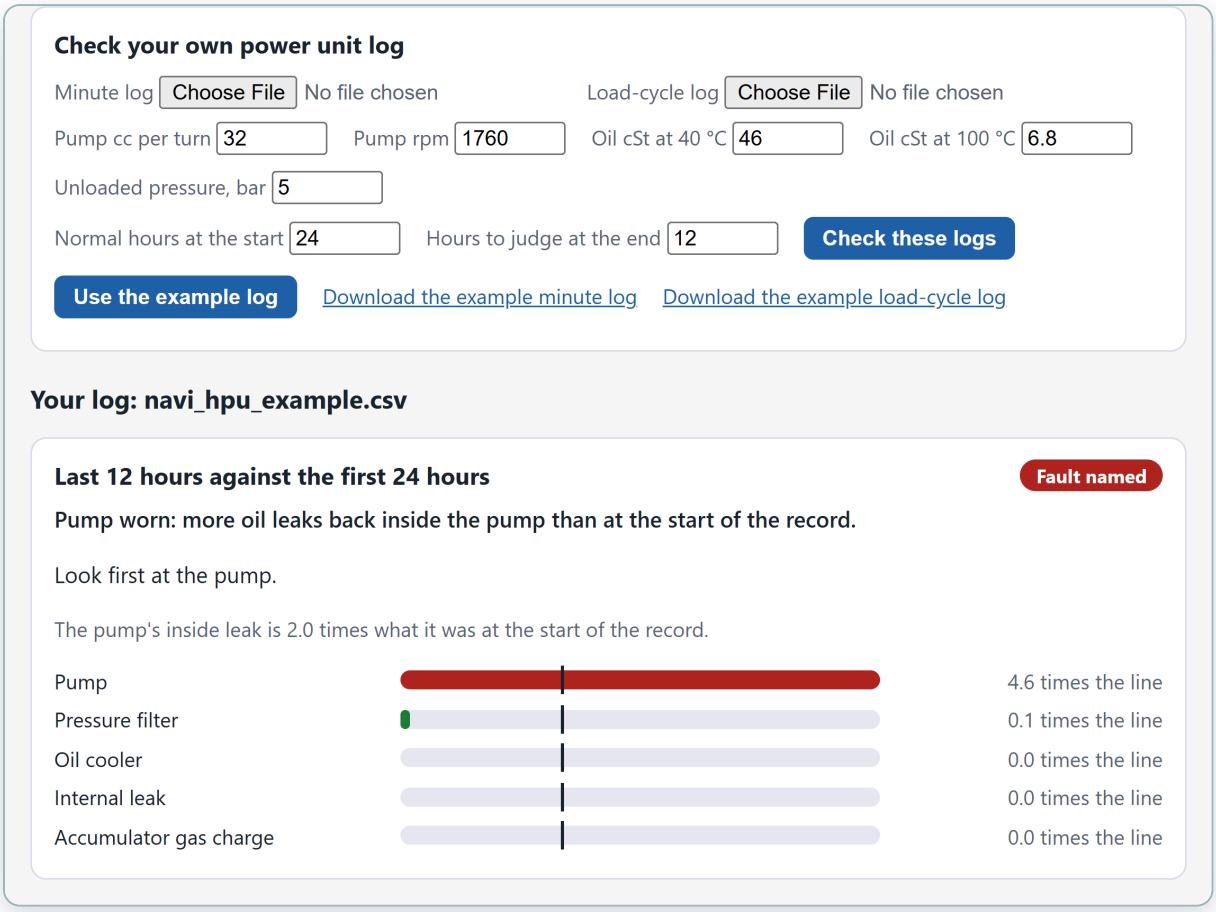
WHAT COMES OUT

Servo: a weak pump, cylinder friction, worn valve lands or a changed hold current. Fin stabiliser: an internal leak, a silted valve, a weak supply or hot oil. Propeller pitch: worn oil-box side lands, a worn centre land or a weak pump. Each named in words.

HYDRAULIC POWER UNIT

Five parts of the power unit, read from its own logs.

Load the minute log and the load-cycle log. The first hours are read as this unit's normal; the last hours are judged against them. Oil temperature is allowed for.



Pump

Pump worn: more oil leaks back inside the pump. Look first at the pump.

Filter and cooler

A clogging pressure filter, and an oil cooler that takes less heat out of the oil.

Leaks and gas charge

Internal leaks while the fins stand still, and a low accumulator gas charge.

WHAT GOES IN

The minute log (pressures, oil and cooling-water temperatures, filter pressure drop, pump case drain, pump loaded, stabiliser on), the load-cycle log, and the pump and oil figures from the nameplate.

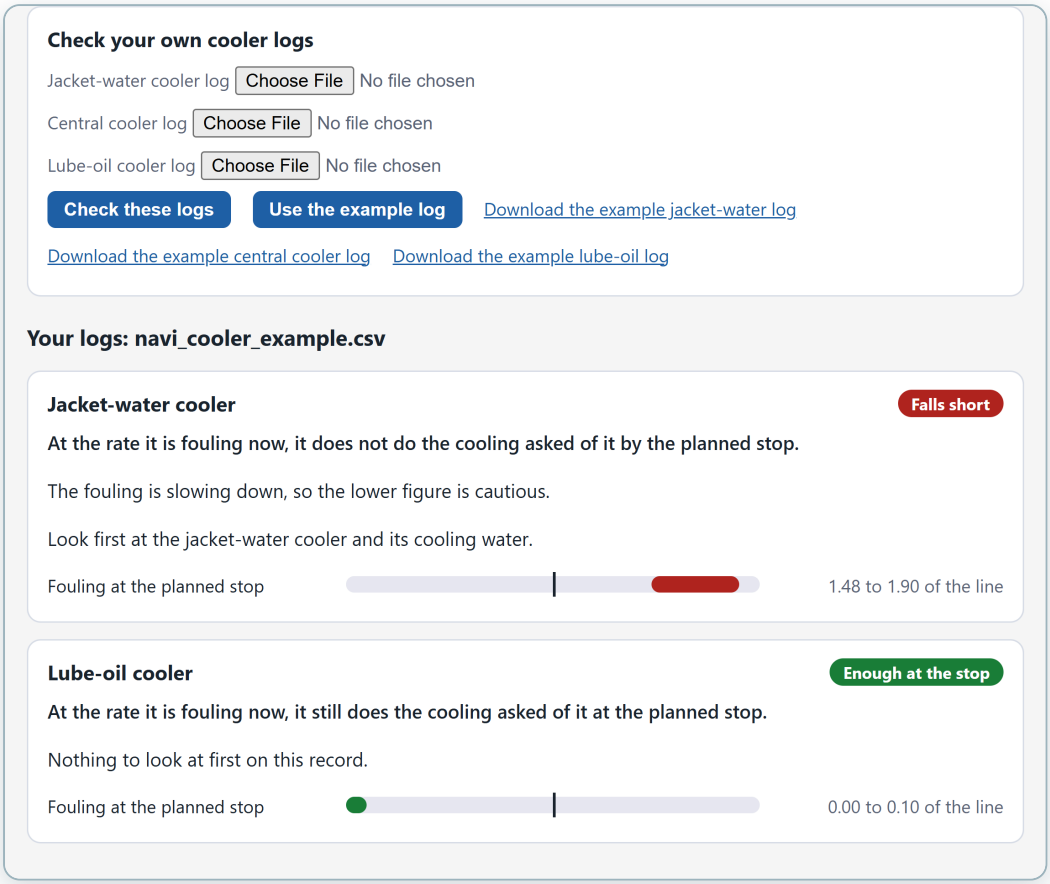
WHAT COMES OUT

A bar for each of the five parts against the line where a fault is named, the fault in words, and where to look first.

ENGINE COOLERS

Will each cooler still cool at the planned stop?

Load one log per cooler: jacket-water, central (seawater) and lube-oil. The first days of each log are read as that cooler's normal, and the fouling is carried forward to your planned stop.



Enough at the stop

The cooler still does the cooling asked of it at the planned stop.

May fall short

Look again at this cooler's log before the planned stop.

Falls short

Look first at the cooler and its cooling water.

WHAT GOES IN

One log per cooler (one row an hour or one a watch: hours, engine load, temperatures in and out on both sides), the cooler's type and nameplate figures from its datasheet, and the days to the planned stop. Mark cleanings and water-treatment dose changes in the log.

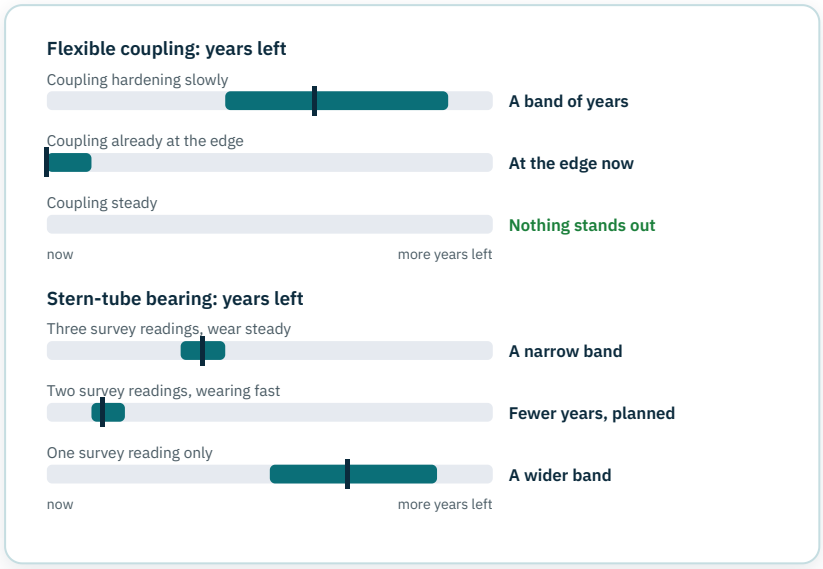
WHAT COMES OUT

For each cooler: how much it will have fouled by the planned stop, against the most it can carry and still do its duty, in plain words.

SHAFT LIFE

Years of life, as a band you can plan around.

Fill in the stern-tube survey form, or load the coupling surveys, and read the years left as a range. More survey readings narrow the band.



Stern-tube bearing: enter your survey readings

For a water-lubricated bearing (not rubber). Enter the date the bearing was new, its clearance then, the shaft diameter, and the wear-down reading (mm) from each survey. The limit shown is an example; enter your class rule's limit to replace it.

Bearing new on 01/01/2016 As-new clearance (mm) 1.2

Shaft diameter (mm) 400 Machinery amidships Limit (mm, optional)

Survey date 02/07/2018 Wear-down (mm) 1.25 Remove

Survey date 01/01/2021 Wear-down (mm) 2.5 Remove

Survey date 02/07/2023 Wear-down (mm) 3.75 Remove

Add a survey | Work out the years left | Use the example

About 8.5 to 10.2 years left from the last survey, best guess 9.2. That is between 2031-12-31 and 2033-09-29. Limit 9.53 mm: an example limit; enter your class rule's limit to replace it. Based on 3 survey readings.

Stern-tube bearing

Years left to the class-rule clearance, from your survey wear-down.

Your limit

Enter your class society's figure and it replaces the default, named as yours.

Flexible coupling

Load your twisting-vibration surveys: years left against the maker's stiffness band, as a range.

WHAT GOES IN

Stern tube: the date the bearing was new, its clearance then, the shaft diameter, and one wear-down reading in mm for each survey date. Coupling: your shaft line, the coupling's catalogue stiffness and its place in the list, and the survey CSV.

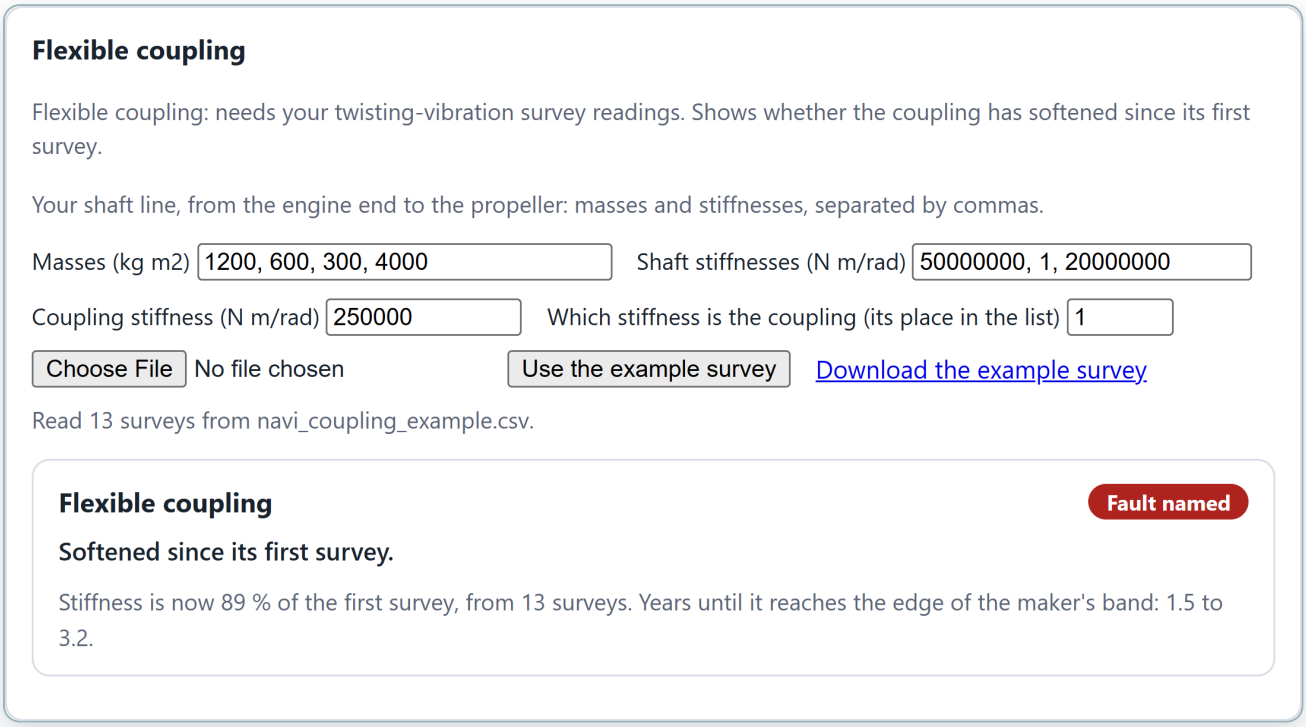
WHAT COMES OUT

Stern tube: a range of years and a best guess, and the limit they rest on. Coupling: softened or stiffer, and years left as a range.

FLEXIBLE COUPLING

Load the coupling survey. See if it has softened.

Enter your shaft line once and load the twisting-vibration survey readings. The screen shows whether the coupling has softened since its first survey, and the years until it reaches the edge of the maker's band, as a range.



Your shaft line

Masses and stiffnesses from the engine end to the propeller, entered once.

Your surveys

A CSV of survey readings: survey_date, mode, frequency_hz. An example survey comes with it.

Years as a range

Softened or stiffer, and the years until the edge of the maker's band, as a band you can plan around.

WHAT GOES IN

Your shaft line from the engine end to the propeller (masses and stiffnesses), the coupling's catalogue stiffness and its place in the stiffness list, and a CSV of survey readings: survey_date, mode, frequency_hz.

WHAT COMES OUT

Softened or stiffer since its first survey, how far, and the years until it reaches the edge of the maker's band, as a range.

SET-UP AND BASELINE

Describe your ship. Pick the normal days.

Choose the gear, the propeller and the power unit and the line diagram redraws. The baseline screen shows, on example days, how a vessel's own normal is built from the days it ran well.

Vessel set-up

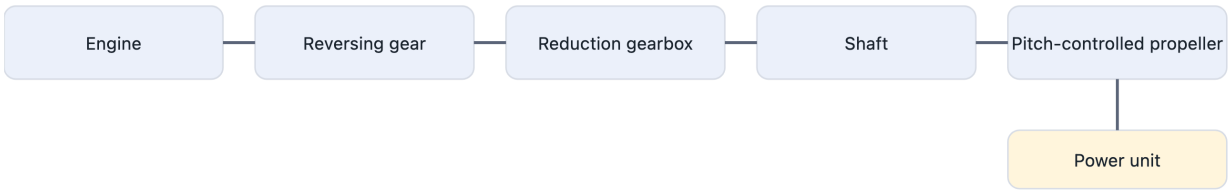
Pick the parts of a drive line. The line diagram follows. Twin-shaft ships are described one shaft line at a time.

Choose the drive line

Gear between engine and gearbox: Reversing gear (ahead and astern) ⌄ Propeller: Pitch-controlled ⌄

☑ Power unit (hydraulic)

Your drive line



Every size in this example carries a tag: here SIMULATED. Sizes from a vessel's own documents would carry their own tag.

Baseline

Choose example days when a vessel ran healthy, to see how a baseline is set up.

Choose the healthy days

☑ Day 1 ☑ Day 2 ☐ Day 3 oil hot ☑ Day 4 ☑ Day 5 ☐ Day 6 ☐ Day 7

Example result: a normal band for Clutch grip, Clutch oil pressure, Clutch fill time, Gearbox sensors, built from the days chosen.

WHAT GOES IN

Drive-line choices and the days the vessel ran well.

WHAT COMES OUT

A normal band for clutch grip, oil pressure, fill time and gearbox sensors. A day with hot oil is kept out.

DATA IN

Know which readings each screen needs.

A plain table of readings: which screen uses each, and what it lets that screen say. Tick or untick to see what could run.

Data in

Which readings a logger export would carry for each screen. Tick or untick to see what each screen could then say.

Channels a logger export would carry

Channel	Used by	What it lets the screen say	In this export
Engine speed	Clutch and reversing gear	Whether the shaft follows the engine	☑ Present
Shaft speed	Clutch and reversing gear	Whether the clutch grips, lets go or drags	☑ Present
Clutch oil pressure	Clutch and reversing gear	Low pressure and slow filling	☑ Present
Engage command	Clutch and reversing gear	When each engagement starts and ends	☑ Present
Torque meter	Clutch and reversing gear	The grip bar: how much torque the clutch passes for its oil pressure; without it the grip bar is not given	☑ Present
Gearbox oil temperature	Gearbox sensors	Stuck, flattened or failed readings	☑ Present
Gearbox oil pressure	Gearbox sensors	Stuck, flattened or failed readings	☑ Present
Bearing temperature	Gearbox sensors	Stuck or failed readings	☑ Present
Pitch command and feedback	Hydraulics	Pitch-system example	☐ Optional, missing

Clutch and reversing gear: can run.
Gearbox sensors: can run.
Hydraulics: can run (some optional readings missing; the checks that need them are not given).

WHAT GOES IN

The channels of a logger export, ticked present or missing.

WHAT COMES OUT

Which screens could run. A missing reading is named.

THE REPORT

One page per machine. Print it.

Headed with the vessel's name and the date: what was found, how large it is, and what to look at first, on one clear page per machine.

Tested on our own simulated vessels, built to industry practice.

Report: Vessel A, 2026-11-17

Clutch

navi_clutch_example.csv **Example log from our own simulated vessel: not this vessel's record.**

Clutch, day 4 Fault named | Fix at next stop | Plan the repair for the next planned stop.

What was seen: Clutch plates worn or glazed: less torque per unit of pressure.

How large: Grip is 0.75 of this vessel's own normal.

What to look at first: Look first at the clutch plates; check the engagement oil pressure alongside.

Tested on our own simulated vessels, built to industry practice.

Report: Vessel A, 2026-11-17

Reversing gear

navi_reversing_example.csv **Example log from our own simulated vessel: not this vessel's record.**

Reversing gear, day 4 Fault named | Fix at next stop

Plan the repair for the next planned stop.

What was seen: Astern pack: Plates worn or glazed.

How large: Grip is 0.76 of this vessel's own normal.

What to look at first: Look first at the astern pack's clutch plates; check the engagement oil pressure alongside.

Clear
Plain words, no jargon.

Actionable
Every finding ends with what to look at first.

Complete
A page for each machine you loaded, in one printed report.

WHAT GOES IN
The same results as the Findings screen, for the vessel and date you name.

WHAT COMES OUT
A printable report: one page per machine. Print from the browser, or save as PDF.

A VESSEL'S FIRST WEEK

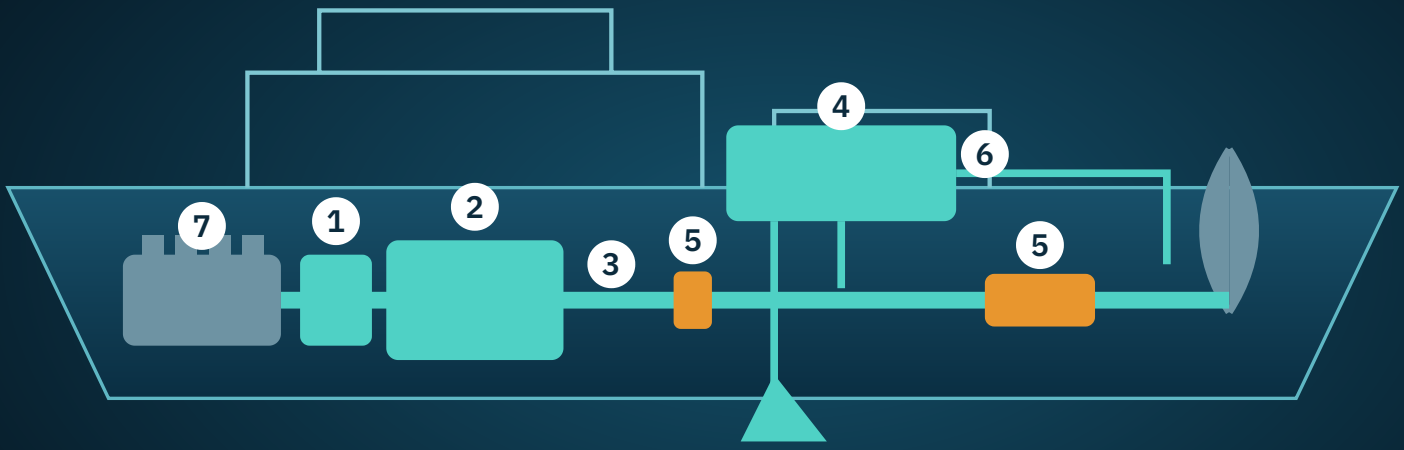
From set-up to a printed finding, step by step.

One of our simulated vessels with a clutch drive line, from the first file to the printed report.

DAY 1	The drive line is picked: clutch, power unit. The Data screen shows which readings each screen uses.
DAY 2	The clutch log is loaded and the normal days are named. The vessel's own normal is set.
DAY 3	The first card arrives. Clutch plates grip less than on the normal days. It says: look first at the clutch plates, and check the engagement oil pressure alongside.
DAY 4	The gearbox readings are loaded. An oil pressure reading goes flat. CARI-Navi says: sensor problem, check the transmitter range. The gearbox stays out of it.
DAY 5	The servo test moves, the fin stabiliser log, the power unit and cooler logs, and the shaft surveys go in. The power unit shows a worn pump; the jacket-water cooler will fall short by the planned stop; the coupling and the stern tube show bands of years left.
DAY 6	The vessel's name and date go on the Findings screen: one list, named faults first.
DAY 7	The report is printed: one page per machine, each finding ending with what to look at first.

> Tested on our own simulated vessels, built to industry practice.

DRAFT 2026-11-18



1 Clutch
2 Reversing gear
3 Gearbox sensors
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START HERE

Start with your vessel's own records.

Choose a machine and load its log or survey. You get the verdict, in plain words, with where to look first.

1 Load your files → 2 Each is read by its own screen → 3 Read the findings, print the report

What goes in

Clutch and gear logs, the monitoring system's gear logs, gearbox readings, the servo, fin, pitch and power unit logs, cooler logs, and the coupling and stern-tube surveys.

What comes out

A result for each machine you load, one list per vessel, and a printed report with a page for each machine.

Engine room too

The hydraulic power unit and the engine coolers each have their own screen, read from their routine logs.

CARIMO Technologies, Mumbai

carimotech.com · contact@carimo.tech

CARI-NAVI

Tested on our own simulated vessels, built to industry practice.