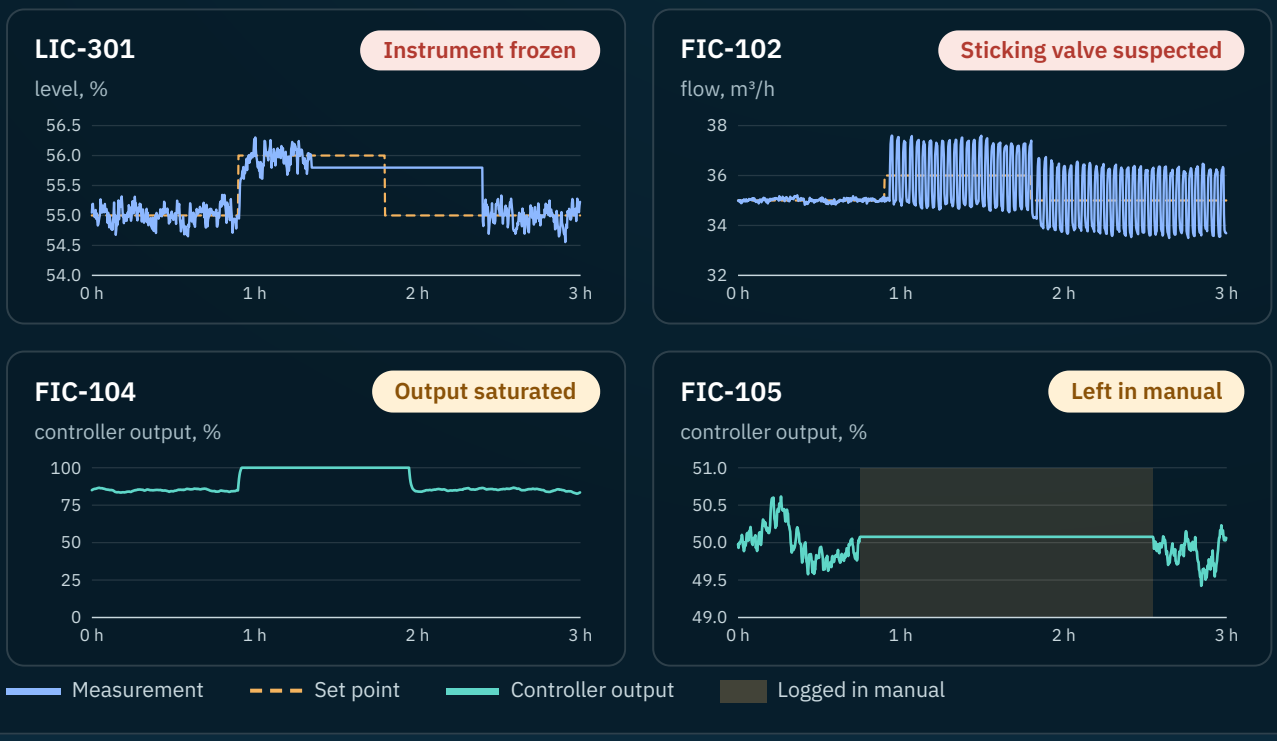
CONTROL LOOP AND VALVE HEALTH FOR PROCESS PLANTS

Know which loops and valves need you first.

CARI-Loops reads the trend history your control system already keeps and gives your team one list, ranked for review: frozen measurements, suspected valve sticking, valve play, outputs at their limits, swinging loops and loops left in manual. Assessed findings come with a likely cause, a next check and how sure, so your team puts its hours on the loops that need them, steadies the process and plans valve repairs into the next shutdown.

Worked example: one unit of our own test plant. Three hours of routine records; four of the loops with findings



One ranked list

the whole unit, ranked for review

Next check

a plain next step on every finding

How sure

high, medium or low for assessed findings

Read-only

nothing changes in your control system

AT A GLANCE

One unit, one report, the right work first.

A plant has hundreds of control loops. CARI-Loops turns the trend records you already keep into a practical review list, with the next check beside each finding. Add your own cost rates for a second view of the recorded error, and use plant criticality to set the work order.

Rank every loop

Every control loop in your export in one table, ranked for review. Give your own cost of a loop's error and a cost ranking sits beside it.

Find the valves to visit

Suspected sticking, valve dead band and outputs at their limits, named loop by loop, with the next check to guide inspection or testing.

Catch the instruments

A frozen measurement, a loop left in manual, an export too poor to judge: each named, with the transmitter to check or the export to make.

Track it month by month

Run it again next month and the report shows, loop by loop, what changed. Valve dead band is tracked to your own limit.

THE PATH, STEP BY STEP

1 Export	2 Data check	3 Tags	4 Run	5 Report	6 Next month
Trend data from your DCS, PLC or historian.	Each file graded; a poor one with how to export again.	Loops found from your tag names; you confirm.	The whole unit in one run.	Ranked for review, with the next check. Print or PDF.	Run again; see what changed.

Built for the control engineer. Works from CSV or Excel trend exports of your DCS, PLC, SCADA or historian. No DCS connection, no OT network or firewall change, no new sensors, no shutdown: trend review is read-only.

PLANT HEAD

One page for the unit: loops checked, loops with a finding and, at your own cost rates, the errors that cost most.

CONTROL ENGINEER

A list ranked for review: each finding with its likely cause, next check and trends, plus how sure for assessed findings.

INSTRUMENTS AND MAINTENANCE

The transmitters to check and the valves to test, with a planned valve test and a dead-band trend for repair planning.

Worked example in this brochure, one unit of our own test plant: the records on page 7, the ranked answer on page 8, one finding opened up on page 9, the valve tests on page 10.

WHAT GOES IN, WHAT COMES OUT

From a trend export to a work list.

Load what your system already logs. The more signals you include, the more the report can name. No DCS connection, no internet, no new sensors.

YOU LOAD

Trend export of the unit
Time, then measurement and controller output for each loop, with set point where logged, as CSV or Excel from your DCS, PLC, SCADA or historian.

Loop mode, where it is logged
Auto or manual. Loops left in manual are then named directly.

Valve position, where it is logged
From smart positioners. Lost motion and dead band are then sized as a share of travel.

Your cost, and stroke tests (optional)
Cost per unit away from set point per hour, for a cost ranking; stroke tests, to follow a valve to your limit.

→

YOU GET

One ranked list for the unit
Ranked for review: finding, likely cause and next check, with how sure for assessed findings.

A page for each loop with a finding
Its trend drawn, the readings behind the finding and the checks that ran.

Loops needing a better export
Each with the reason and the export setting that fixes it.

A cost ranking at your own rates
Where you give your cost of a loop's error, a cost ranking beside the health ranking.

Findings as CSV, and next month's comparison
Loop by loop, what changed since the last check.

CARI-Loops · result

5. Result

12 loop(s) checked in 28.8 s, over 3.0 hours of records. Saved in this project.

12	7	1	4
loops checked	with a problem found	could not be judged	no problem found

What to look at first

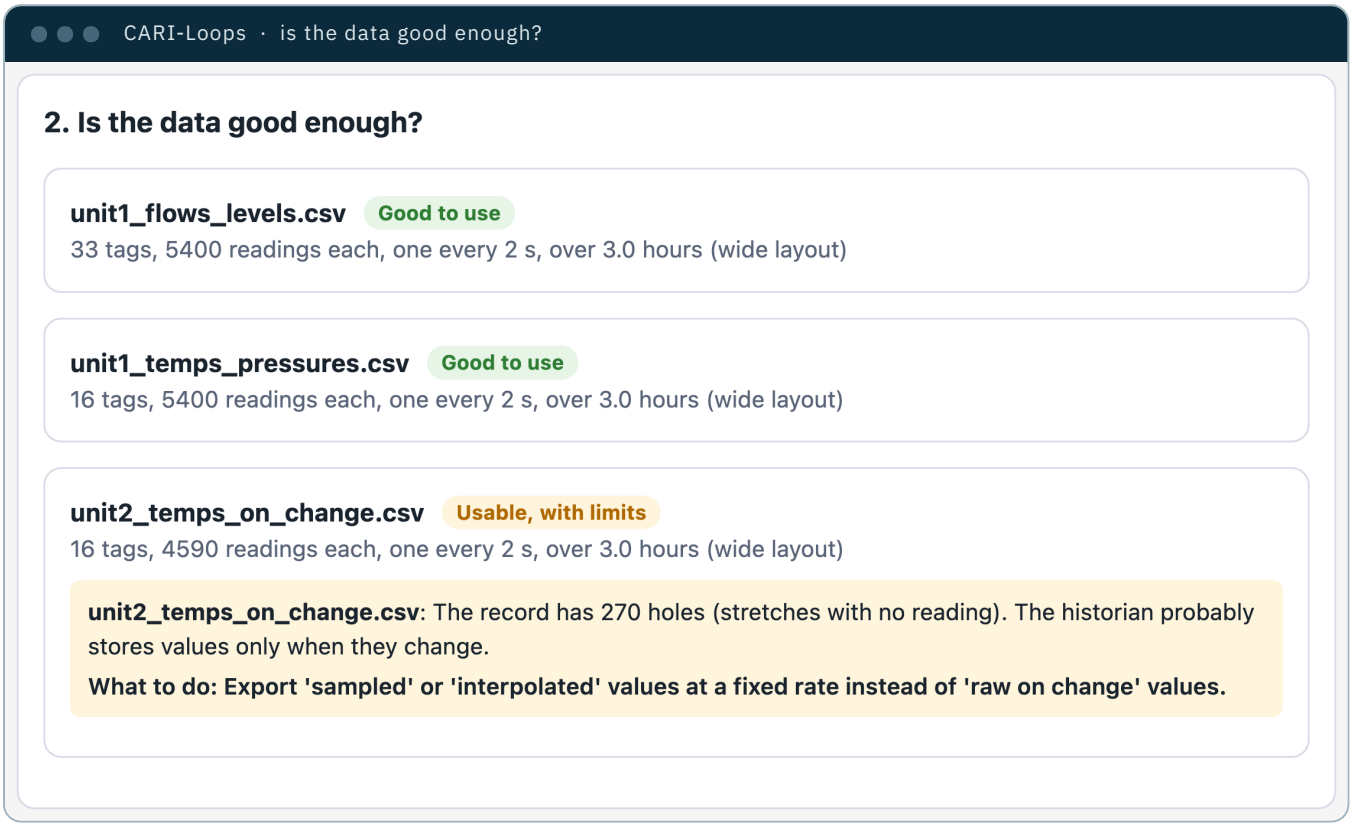
#	Loop	What is wrong	What to do	How sure
1	**LIC-301**	The measurement stopped changing for a long stretch.	Check the transmitter and its wiring. Compare with a local gauge.	high
2	**FIC-102**	The loop swings up and down in the pattern a sticking valve makes.	Put the loop in manual and move the output in small steps (0.5 %, 1 %, 2 %). If the reading does not move until several steps add up, then jumps, the valve sticks. Then service the valve.	medium
3	**FIC-103**	The valve does not follow small changes of its signal; it waits, then moves.	Check the linkage, positioner and actuator for play; re-calibrate the positioner.	high

What you get, on screen, on your own PC.

STEP 2 · THE DATA CHECK

Every file graded before a loop is judged.

Historian exports are often compressed, rounded or full of gaps. CARI-Loops grades each file the moment it is read, says what the record can show, and names the better export where one is needed.



Three exports on screen: two good to use, and one stored only when values change, with the export setting that fixes it.

GOOD TO USE

Tags found, readings per tag, the recording rate and the hours covered, stated for each file.

USABLE, BETTER EXPORT NAMED

Gaps from values stored only on change, a slow recording rate or a short record named, with the export setting that fixes it.

NEEDS A NEW EXPORT

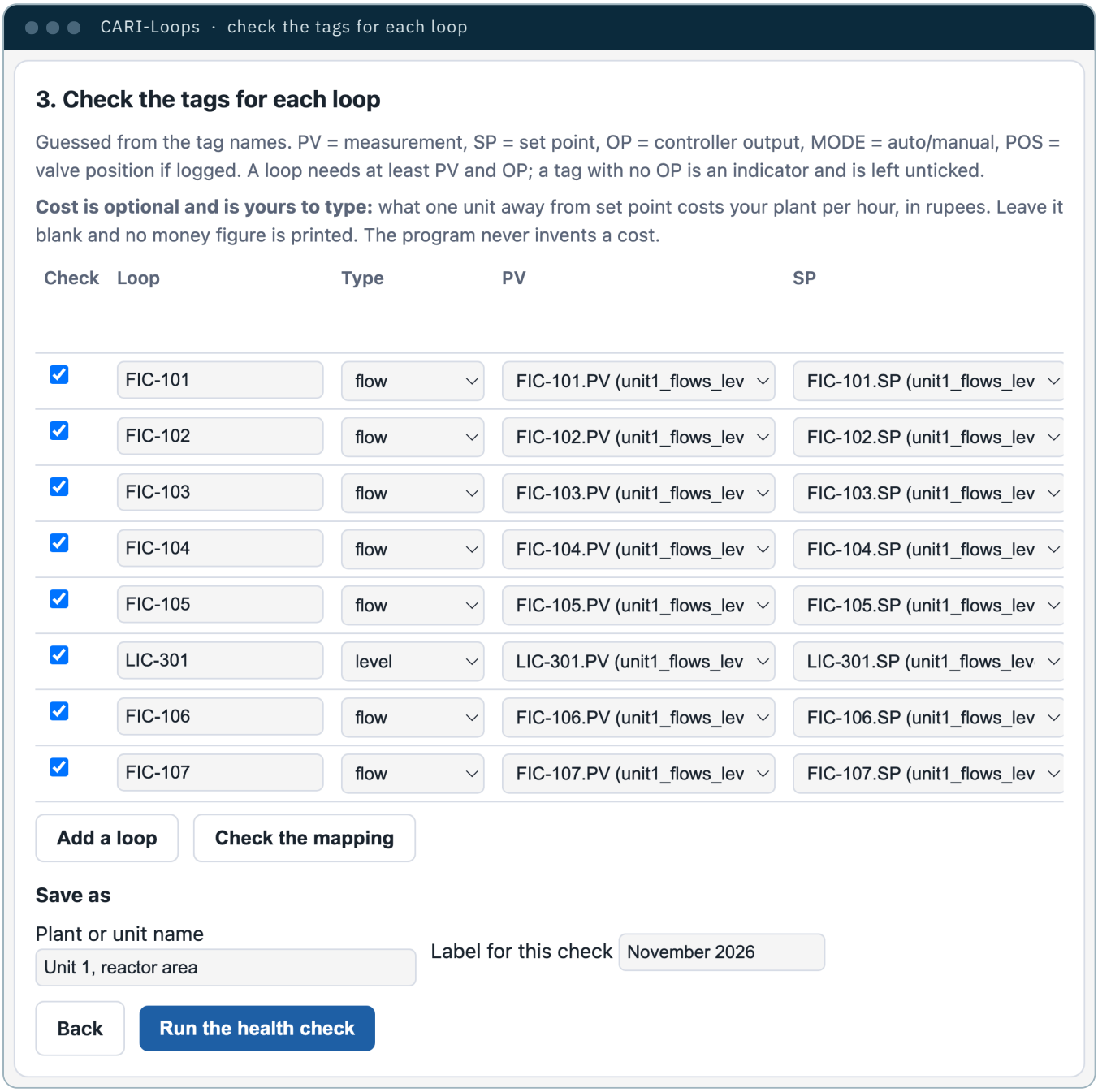
No time column, no numbers or an unreadable file, named, with what to export instead.

Best export. Two weeks of fixed-interval readings from uncompressed history. For flow and pressure loops, aim for every 1 to 5 seconds. Where the stored history has lost detail, record a fresh stretch. A few hours is enough to start.

STEP 3 · THE TAGS

Your own tag names. You confirm the loops.

CARI-Loops finds the loops from your tag names: the measurement, set point, controller output, mode and valve position of each, and the loop type. Your engineer confirms the table, adds a loop or unticks an indicator, and types an optional cost rate.



YOUR TAG NAMES

Vendor-style or plant-style tags in one or several files. Unmatched columns are listed for you to place.

LOOP TYPES

Flow, level, pressure, temperature, analysis, density, speed and weight.

SAVED FOR NEXT MONTH

The confirmed table is saved with the plant name and reused for the next check.

WHAT IT FINDS

Every finding, and its next check.

Finding names are the app's own. A second finding on the same loop is printed under “Also seen”. The checks help your team confirm the cause and choose the work.

FINDING ON THE REPORT	WHAT IT MEANS	WHAT YOUR TEAM CHECKS
Instrument frozen	A measurement that stayed unchanged for a long stretch	The transmitter and its wiring, against a local gauge.
Sticking valve suspected	A swing in the pattern a sticking valve makes	A small-step test agreed with operations, then the valve inspection.
Valve dead band	Valve position that waits before it follows small changes of output (where position is logged)	Linkage, positioner and actuator for friction or play; positioner calibration.
Output saturated	A controller output held at its limit, with no further output movement available in that direction	Operating limits, valve or pump response and duty, before any retune.
Swings with others	Loops that swing at the same rhythm as others	Reviewed as one job: a common cause looked for first.
Loop swinging	A loop that swings up and down in a regular rhythm	The loop in manual, then valve response, before a retune; upstream if the swing continues.
Left in manual	A loop logged in manual for much of the record	Why it was in manual, and whether to return it to automatic.
Export again	A loop whose export cannot show enough	How to export it again: rate, compression, missing signal or a fresh record.
No problem found	The checks this export supports found no problem in the record	No action; keep it in next month's check.

1 Instruments — A frozen reading misleads everything after it, so it is named first.

2 Valves — A valve that sticks or has play gets valve work, checked first by a short manual test.

3 Outputs at limit — An output at its limit: operating limits, equipment response and duty before any tuning.

4 Swings, then modes — Swinging loops, then manual. Where settings are the cause, CARI-Tune gives new ones to try.

How sure, finding by finding. High, medium or low shows the strength of the evidence for assessed findings. Your engineer uses the trend and on-site checks to establish the cause. Loops needing more data are listed for re-export, with the reason.

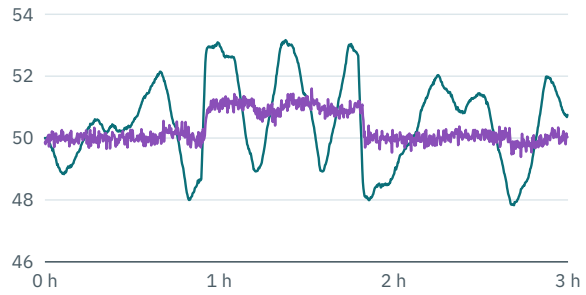
WORKED EXAMPLE, PART 1 · THE RECORDS

One unit, three hours, twelve loops.

The example that comes with the app: one unit of our own test plant, exported as two ordinary trend files with vendor-style tags, one row every 2 seconds. The cover shows four of its loops; here are four more, as recorded.

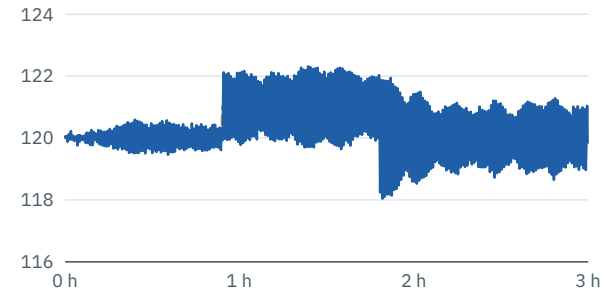
FIC-103 — Valve dead band

controller output and valve position, %



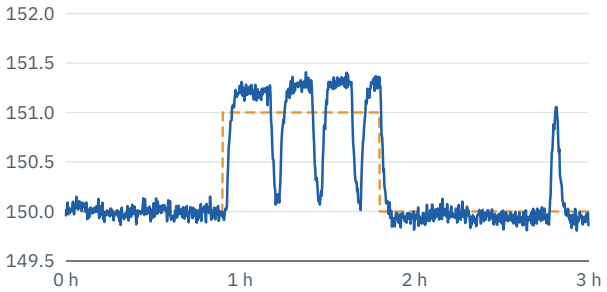
TIC-201 — Loop swinging

temperature, °C



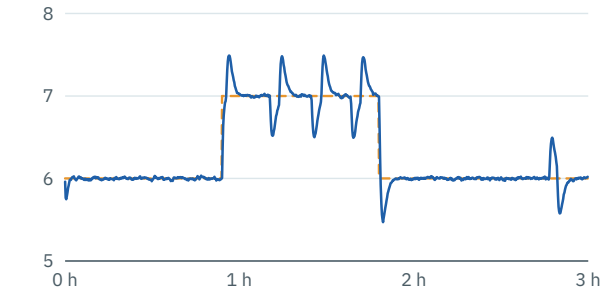
TIC-203 — Loop swinging

temperature, °C



PIC-401 — Export again

pressure, bar



Measurement · Set point · Controller output · Valve position

FIC-103

The valve position waits at each change of direction before it follows the output.

TIC-201

The temperature swings up and down in a steady rhythm around its set point.

TIC-203

A slower, regular swing on a second temperature loop.

PIC-401

The pressure was stored too compressed to judge: the report asks for a better export.

2 files	every 2 s	3 hours	31 s
ordinary trend exports, vendor-style tags	recording rate of the example	of routine records	to check the whole unit on one PC

From records to a ranked list. The two files went through the data check and the tag table, then all twelve loops were checked in one run. The answer is on the next page.

WORKED EXAMPLE, PART 2 · THE ANSWER

The unit, ranked for review.

The example puts the frozen measurement first, followed by the suspected sticking valve, valve dead band, the output at its limit, swinging loops and the loop in manual. The loop needing a better export is named; loops with no problem found are grouped at the bottom.

#	LOOP	FINDING	LIKELY CAUSE	NEXT CHECK	HOW SURE
1	**LIC-301** level	Instrument frozen	Most likely a stuck or failed transmitter, or a broken signal wire. The controller was acting on a frozen number.	Check the transmitter and its wiring. Compare with a local gauge.	High
2	**FIC-102** flow	Sticking valve suspected	Valve friction or linkage play may explain the pattern. A small-step test checks the valve response.	Agree a small-step test with operations. Check valve position, or the flow or pressure response, for delayed movement and jumps; use the result to plan the valve inspection.	Medium
3	**FIC-103** flow	Valve dead band	The position record shows delayed valve response. Friction, mechanical play or positioner behaviour may explain it.	Check the linkage, positioner and actuator for friction or play; check positioner calibration and correct it as needed.	High
4	**FIC-104** flow	Output saturated	Demand, operating limits, or a valve or pump not delivering the required response, may be holding the output at its limit.	Check operating limits, valve or pump response and duty before deciding whether to retune.	High
5	**TIC-201** temperature	Loop swinging	Controller settings, valve sticking or an upstream disturbance; a manual observation and a valve check help separate them.	With operations, observe the loop in manual. If the swing stops, check valve response before retuning (CARI-Tune gives the settings); if it continues, investigate upstream.	Low
6	**TIC-203** temperature	Loop swinging	Controller settings, valve sticking or an upstream disturbance; a manual observation and a valve check help separate them.	With operations, observe the loop in manual. If the swing stops, check valve response before retuning (CARI-Tune gives the settings); if it continues, investigate upstream.	Low
7	**FIC-105** flow	Left in manual	The loop ran in manual for much of the record. Ask the operators whether this was intended and what prompted it.	Confirm why it was in manual. Resolve any fault, then agree with operations whether to return it to automatic.	High
8	**PIC-401** pressure	Export again	The historian stored too few or too coarse values (compression, rounding, gaps), or a needed signal is missing.	Follow the named export correction: use a suitable recording rate and uncompressed history, add a missing signal, or record a fresh stretch where detail has been lost.	—
9–12	**Four loops**	No problem found	**FIC-106, TIC-202, FIC-107, FIC-101:** the checks this export supports found no problem.	No action. Keep it in next month's check.	Medium

Why low on a swinging loop: the record shows the swing; its cause is settled by the on-site checks. Your team sets the work order with plant criticality in mind.

THE REPORT

Every finding shows its own record.

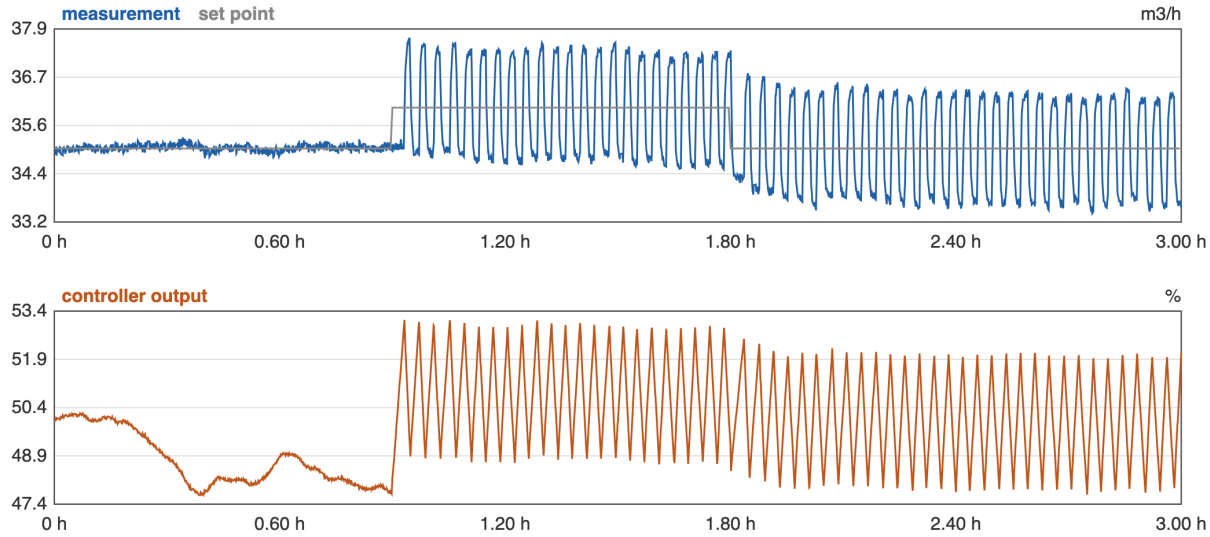
Each loop with a finding gets its own section in the report: likely cause, what to do, and its trends over the record, so your engineer sees what the check saw.

CARI-Loops · report, one loop

FIC-102 — The loop swings up and down in the pattern a sticking valve makes.

flow · m3/h · how sure: **Medium**

Likely cause. Most likely valve friction (tight packing, a sticking stem). The same pattern can also come from a loose linkage or an uneven process.
What to do. Put the loop in manual and move the output in small steps (0.5 %, 1 %, 2 %). If the reading does not move until several steps add up, then jumps, the valve sticks. Then service the valve.



NEXT MONTH, LOOP BY LOOP

LOOP	EARLIER CHECK	LATER CHECK	CHANGE, AS THE APP SHOWS IT
FIC-102	Sticking valve suspected	Sticking valve suspected	still there
PIC-401	Export again	Loop swinging	judged now: problem found
FIC-101	No problem found	No problem found	still fine

THE SAME UNIT, RANKED BY ERROR AT YOUR COST RATES

#	LOOP	FINDING	ERROR OVER THE RECORD, AT THE EXAMPLE RATES
1	**TIC-201**	Loop swinging	**Rs 2,706**
2	**TIC-203**	Loop swinging	**Rs 714**
3	**FIC-102**	Sticking valve suspected	**Rs 468**

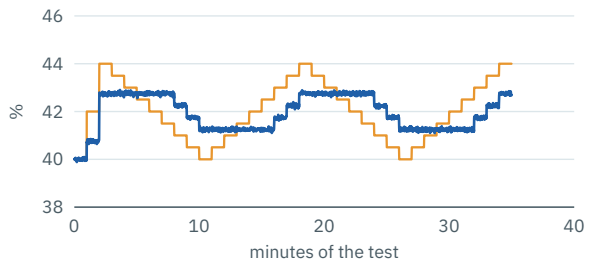
Values assigned to the error over the three-hour record, using example rates per loop: Rs 200 per m³/h away from set point per hour for flow, and Rs 1,500 per °C away from set point per hour for temperature.

VALVE HEALTH · MANUAL TEST AND STROKE-TEST TREND

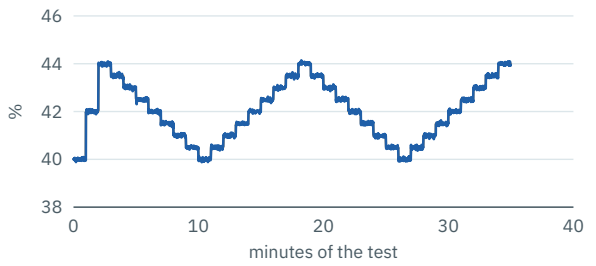
Check the valve. Then plan its repair.

The app plans a small-step test for your engineer to check a suspect valve. Agree the operating conditions and permitted output moves with operations, then hold the loop in manual and step the output up and down. Export the output with the valve's position, or with the flow or pressure it moves. The example takes about half an hour; the app reads the response and sizes dead band as a share of the output signal.

Sticking valve — dead band 2.5 % of output



Sound valve — followed small moves



Controller output, stepped by hand — Valve position

TEST RESULT, STICKING VALVE

The valve does not answer small moves: the test indicates dead band. Check the linkage, positioner and actuator for friction or play, and check positioner calibration.

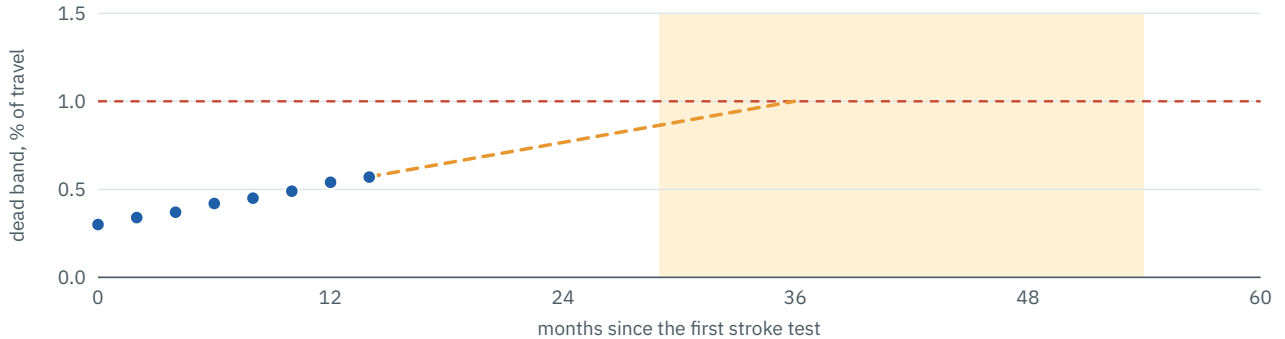
TEST RESULT, SOUND VALVE

The valve answered the small moves.

YOUR TEAM RUNS THE TEST

Trend review is read-only. The valve test is run by your own team, under your plant procedures.

Another valve, followed to your limit — stroke tests every two months, % of travel



About 22 months to the limit, with a range of 15 to 40 months, from the example stroke-test history: a basis for planning the repair into a shutdown, updated as each new test arrives.

WORKING WITH YOUR TEAM

On your own PC. With your own team.

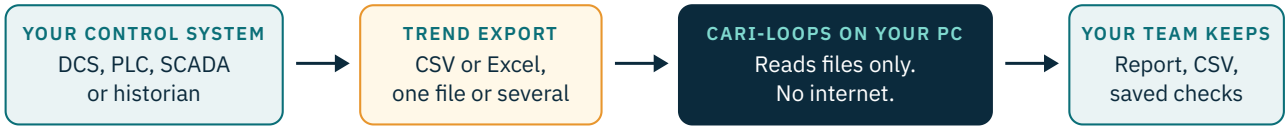
WHERE IT RUNS

On your own PC, opened in a web browser. It listens on that PC alone and needs no internet. The app sends no data elsewhere; you choose whether to share an export with CARIMO for the guided first unit.

CARI-Loops only reads exported files: nothing changes in your control system.

SET UP WITH YOU

CARIMO sets up the app with your team, maps the first unit's tags, goes through the first report with your engineers and agrees the monthly routine.



One-way review: exported files in, reports out. CARI-Loops writes nothing to the control system and sends no data elsewhere.

Fits your system and your data

Which control systems?	CARI-Loops works from CSV or Excel exports of your DCS, PLC, SCADA or historian, one file or several, so it needs no direct connection.
Our own tag names?	Yes. The app lists the loops it sees from your tag names, and you confirm.
No valve position logged?	It still works. Loop and sticking-valve checks use measurement, set point and controller output; valve play and dead band use valve position where you have it.
Compressed or gappy exports?	The data check says what each file can show and names the better export.
Will it change our DCS?	No. It reads exported files only.
Who acts on it?	Your own engineers and maintenance team, with the report in hand. We go through the first one with them.

READINGS SHOWN

Each finding is drawn from its own record.

HOW SURE

High, medium or low for assessed findings; a reason where more data is needed.

CLEAR ANSWERS

A loop needing a finer export is listed with the setting to change.

READ-ONLY

Trend review changes nothing in your control system.

PART OF THE FAMILY

CARI-Loops finds the trouble. CARI-Tune is CARI-Loops plus tuning. For a loop whose own settings are the cause, CARI-Tune gives new settings to try.

START WITH A GUIDED FIRST UNIT

Send one export. Get one ranked list.

Start with a guided first unit: a trend export of a few hours to two weeks, the ranked report of its loops and valves, and a review with your engineers. Then CARI-Loops runs on your own PC, and every check after that stays with your team.

1
You share

A trend export, on a call on your own PC or sent to us, as you prefer: measurement and controller output, with set point, mode and valve position where logged.

2
We check it together

Every file graded, the tags confirmed, every loop judged or listed with the reason, ranked for review.

3
You receive

The ranked report, a page per finding, the CSV, and a review call with your engineers.

WRITE TO US

contact@carimo.tech

WEB

carimotech.com

PART OF THE FAMILY

CARI-Loops finds the trouble. CARI-Tune is CARI-Loops plus tuning.