What Field Service knows, and you should know too.

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As a field service team, we encounter that there are 2 main reasons we receive emergency calls:

- Lack of knowledge of the system, its components and how they interact.
- Deficiency of Maintenance.

MAINTENANCE

TROUBLESHOOT

FRANKEN SYSTEMS

Today, I want to share with you some of the subjects we recognize as important to consider on your CEMS system from the field service perspective.

Know your system

- Components & how they work
- Audit Testing
- What to do / what not to do
- Drawings
- Log important information - critical values/readings
    - Rxcell
    - CO measure

MAINTENANCE

Schedule

Spare parts List

When you acquire one of our systems, we provide you with two main lists necessary to maintain your system in good working condition.

Maintenance Schedule

SCHEDULED MAINTENANCE

MAINTENANCE DESCRIPTION	MONTH:	1	2	3	4	5	6	7	8	9	10	11	12
EXERCISE SYSTEM ALARMS		X	X	X	X	X	X	X	X	X	X	X	X
REPLACE FINE SAMPLE FILTERS	PMP #1	---	---	X	---	---	X	---	---	X	---	---	X
DRAIN PUMP TUBING REPLACE AS REQUIRED	PMP #11	---	---	X	---	---	X	---	---	X	---	---	X
EXERCISE PRESSURE REGULATORS / FLOW METERS	PMP #2	---	---	X	---	---	X	---	---	X	---	---	X
EXERCISE PRESSURE REGULATORS / FLOW METERS	PMP #3	---	---	X	---	---	X	---	---	X	---	---	X
REPLACE SECONDARY AIR FILTERS (INST. AIR)	PMP #6	---	---	X	---	---	X	---	---	X	---	---	X
REPLACE PRIMARY AIR FILTERS (INST. AIR)	PMP #6	---	---	X	---	---	X	---	---	X	---	---	X
REPLACE AIR CONDITIONER FILTERS	PMP #8	---	---	X	---	---	X	---	---	X	---	---	X
INSPECT NOx ANALYZER CAPILLARIES / REPLACE AS NEEDED	See Mfg's Manual in Appendix D	---	---	X	---	---	X	---	---	X	---	---	X
REPLACE FINE SAMPLE FILTER SEALS	PMP #12	---	---	---	---	---	X	---	---	---	---	---	X
PERFORM VACUUM LEAK TEST	PMP #21	---	---	---	---	---	X	---	---	---	---	---	X
REPLACE SAMPLE NH3 SCRUBBER	PMP #22	---	---	---	---	---	X	---	---	---	---	---	X
PURGE AIR DRYER REPLACE TOWERS AS REQUIRED	PMP #10	---	---	---	---	---	---	---	---	---	---	---	X
REBUILD SAMPLE VACUUM PUMP	PMP #13	---	---	---	---	---	---	---	---	---	---	---	X
REPLACE (STANDARD) SAMPLE PROBE SEALS / FILTER	PMP #4	---	---	---	---	---	---	---	---	---	---	---	X
CLEAN HEATED SAMPLE LINES	PMP #7	---	---	---	---	---	---	---	---	---	---	---	X
MEMBRANE DRYER REPLACE ELEMENT AS REQUIRED	PMP #9	---	---	---	---	---	---	---	---	---	---	---	X
REBUILD NOx VACUUM PUMP	See Mfg's Manual in Appendix D	---	---	---	---	---	---	---	---	---	---	---	X

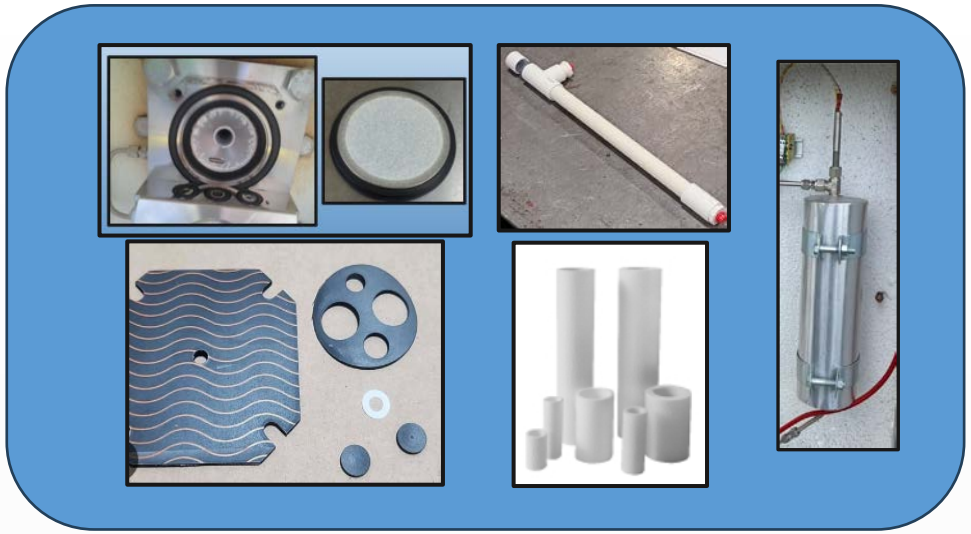
Quarterly

Semiannual

Annual

Generic example

Spare parts



The list is divided by levels, generally recommended to have level 1 and 2 as essential.

1. Consumables
2. General Maintenance
3. Critical Emergency Repairs
4. Non-Critical Component Replacement

Flow switch ,pressure switch

TROUBLESHOOTING A FAILED CAL

- Review what value failed. (zero? Span?)
- Check that there is enough gas in the failed gas cylinder and if there have been any cylinder change make sure the concentration was updated on the system.
- Check the calibration flow meter, remember that the calibration flow must be greater than the bypass and sample flow together.
- Perform a leak check.

Leak Check

If it's not a leak, then check the analyzer.

- When was the last service to it done?
- If the drift is not too big, perform a manual adjust to the values, and then perform a manual calibration.

Leak Check

If you suspect a leak

- Put the system out of service and place it on “probe mode”
- Energize the O2 zero gas solenoid.
- After the O2 analyzer stabilizes adjust the zero.
- Manually place the system into cabinet mode (Continue flowing O2 zero gas)

If the O2 reads zero in cabinet mode but it reads more than 0.2% on the probe mode it means, there is a leak on the system.

Common leak places after maintenance

- Probe
- Sample filter
- Analyzer filter
- Solenoids
- Sample pumps
- Tubing

Leak Check

Was any maintenance done recently? This would be the place to start.

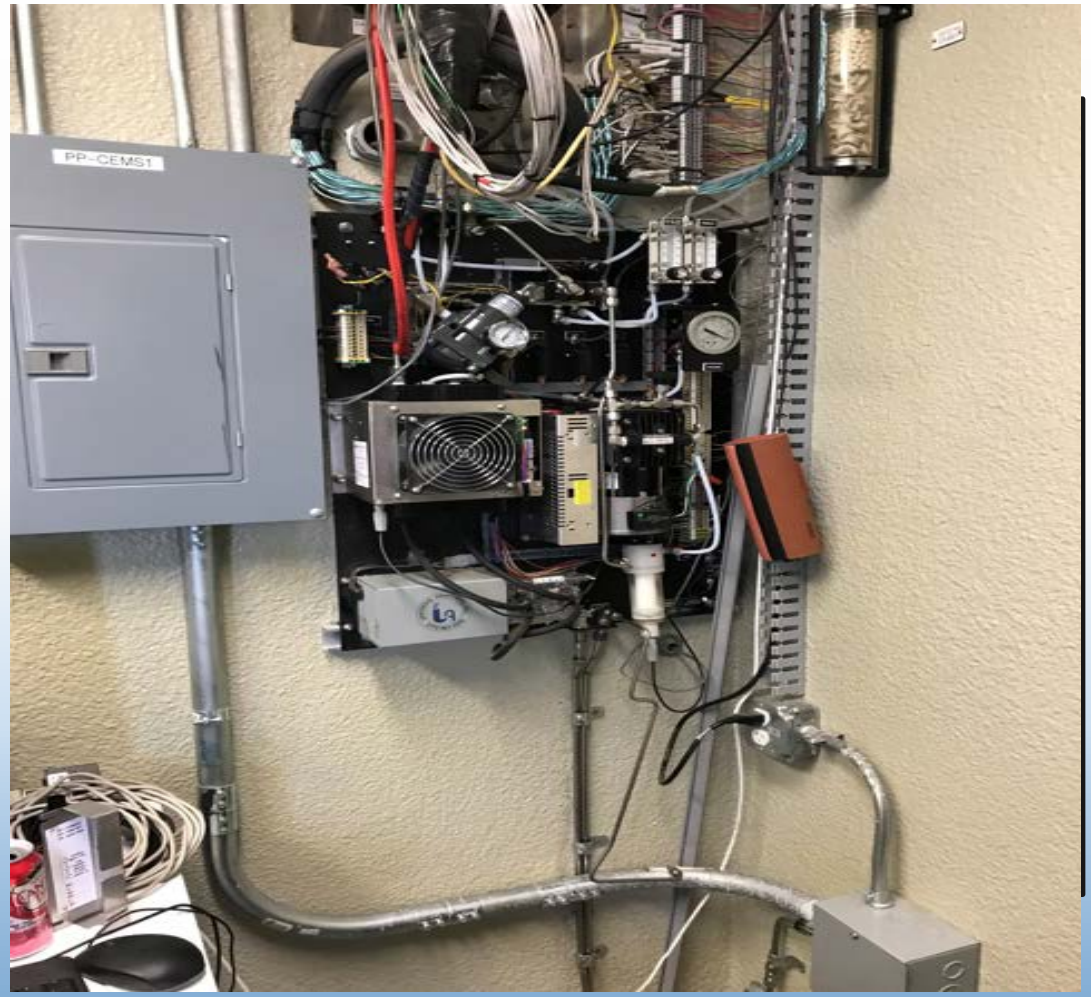
- Check properly tight fittings, filters, regulators, tubing, gaskets, o-rings.
- Check your sample pump working properly
- Start a deeper search by the middle point of the system, the cooler

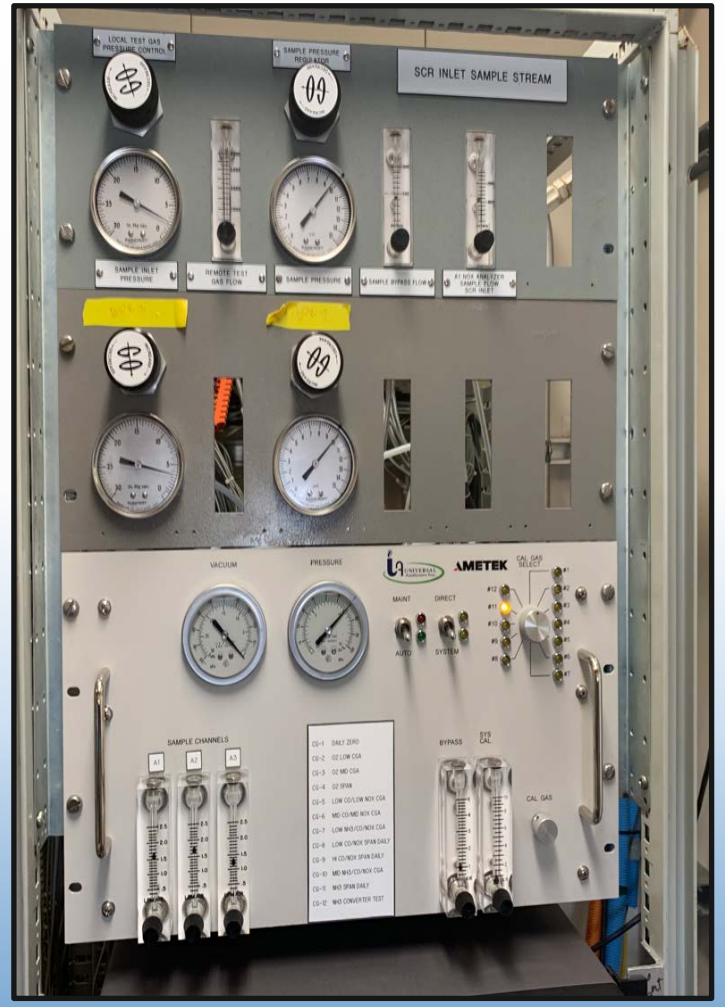
The process to look for a leak can become extensive.

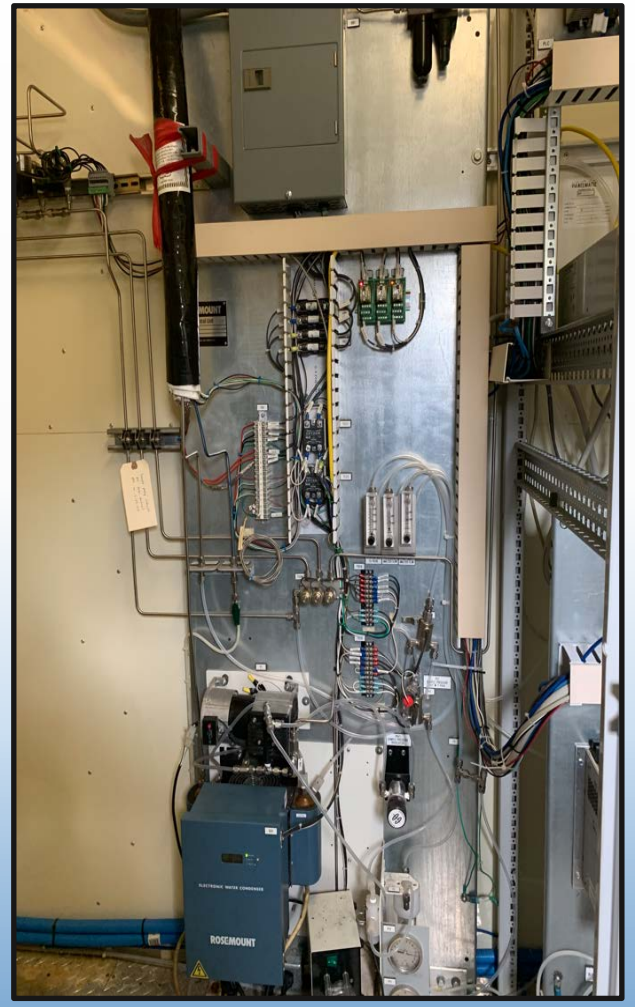
If nothing is resolved, we are here to help you. It's already good that you have identified the problem as a leak.

CiSCO : 303-790-1000

FRANKEN SYSTEMS







- Integration issues may arise during upgrades

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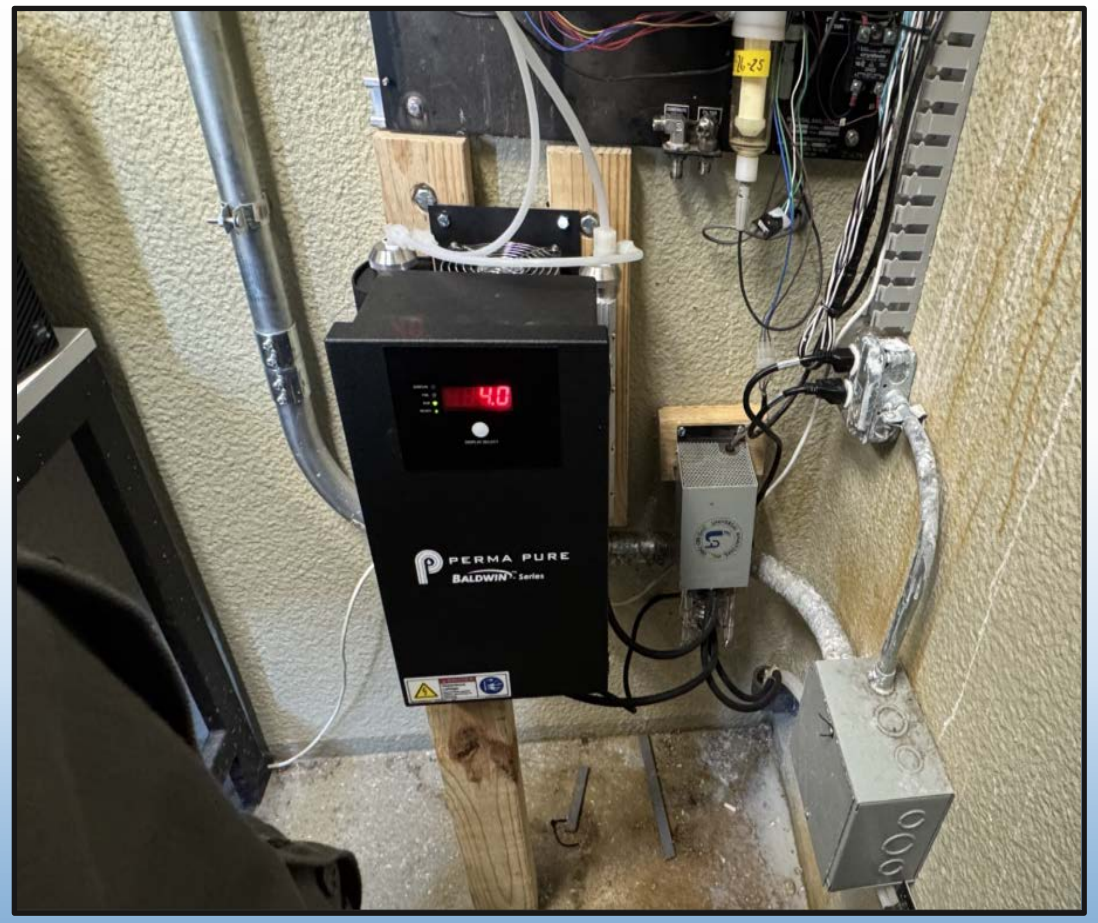

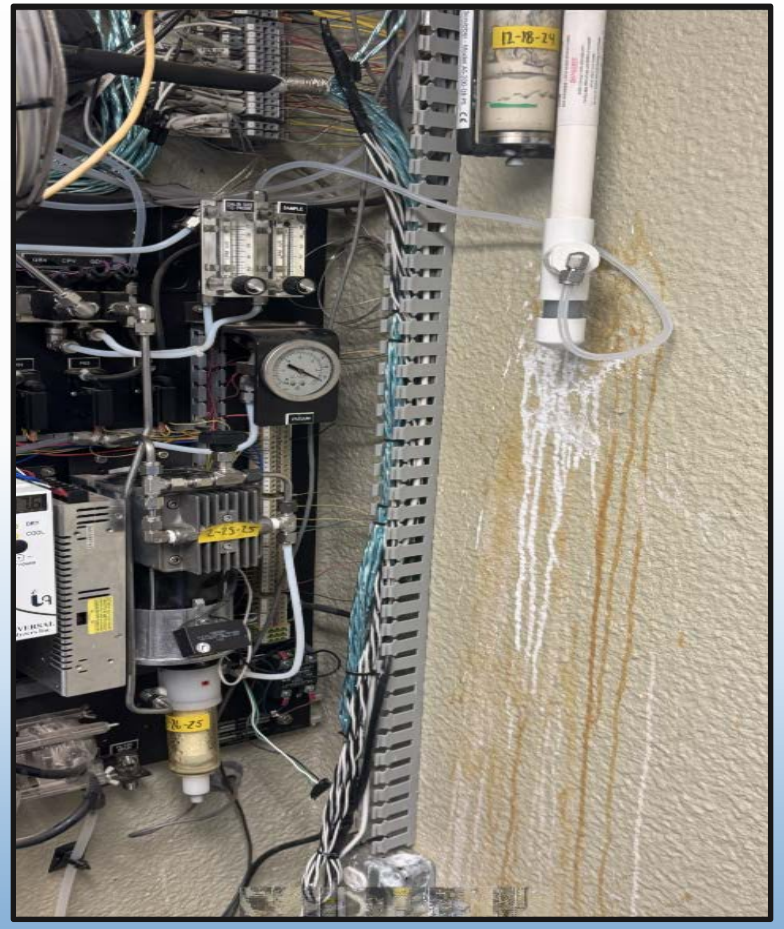

- Long term repair costs can be greater than an upgrade.

QUESTIONS
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