CASE STUDY · INDUSTRIAL BMS · 2025

How GHCL's Production Floor Got a Smart HVAC Brain — and the BMS Operator Got a Control Room

GHCL's Madurai production floor ran entirely on manual humidity management — one operator, three compressors, no automation, no fallback. EnSmart replaced the entire manual routine with a purpose-built FBD control sequence, a live HMI, and full SOP documentation. Completed in under two weeks.

Client: GHCL Limited · Location: Madurai, Tamil Nadu, India · Platform: EnSmart BMS + FBD Logic · Commenced: February 2025

At a Glance

3 Compressors Automated	**1** AHU Controlled	**2** Water Heaters Integrated
1 Strip Heaters Integrated	**Zero** Manual Operator Dependency	**<2 Wks** Project Completion

Before EnSmart: A BMS Operator, Three Compressors, and No Automated Humidity Control

Think of a kitchen with one chef — no timers, no thermometer, no recipe — just one person tasting and adjusting every dish by instinct, alone. If that chef steps away, the kitchen burns. That was the exact situation at GHCL's Madurai production floor before EnSmart arrived.

The on-site BMS Operator had one core responsibility every shift: keep the production floor humidity within safe limits. But with zero automation in place, that meant physically walking to each compressor and the AHU, switching them on and off manually, and guessing when to act based on feel and experience. The AHU had no RH feedback, no control sequence, no setpoint — it ran entirely on human judgment.

In textile production, humidity is not a comfort setting — it is a quality control variable. Too high and fabric absorbs excess moisture. Too low and static builds. One bad shift of uncontrolled humidity can mean an entire batch of

rejected fabric. And the only thing standing between that outcome and the production floor was one person with a switch panel.

- **No automation, no feedback loop, no fallback**
  The BMS Operator's entire job during production hours was manual humidity management — if they stepped away, the floor ran uncontrolled.
- **AHU with no closed-loop control**
  The AHU ran without any RH-based sequence or setpoint — purely switched on and off by hand, based on operator experience alone.
- **No HMI — no live view of anything**
  The operator had no live view of temperature, RH, or equipment status at any point — every check required physically walking to the equipment.
- **Incorrect compressor switching risked production**
  Wrong compressor switching order could trigger internal protection timers and cause humidity spikes mid-production — with no way to detect this until damage was done.
- **No SOP — knowledge lived in one person's head**
  No written procedure existed. If the regular operator was absent, nobody else knew how to run the system and the production floor was left entirely to chance.

> *"The BMS Operator went from manually chasing humidity across the production floor to monitoring everything from one HMI screen. Live temperature, RH readings, and equipment status — visible at a glance, from one place."*

More Than Wiring — This Was a Full System Built from Scratch

- **Full project ownership.**
  Every stage was executed independently — site survey, I/O count, FBD logic, HMI design, commissioning, and handover. No supervision, no team.
- **Human-to-machine handover.**
  This project did not add automation on top of an existing system. It replaced an entire manual human routine with a purpose-built control sequence. That is not installation — that is transformation.
- **Custom FBD sequence logic.**
  Temperature and RH-based control sequences were written from scratch using Function Block Diagram programming. No off-the-shelf template. Every compressor stage, every heater cut-in point, every setpoint — built for GHCL's specific production floor.
- **Completed in under two weeks.**
  The full project lifecycle — first site visit to final client sign-off — was closed within two weeks, on time and to full client satisfaction.

From First Site Visit to Final Handover — Under Two Weeks

Day	Activity
Week 1 · Day 1	Site inspection, I/O point count, BMS panel and controller selection.
Week 1 · Day 2	Panel fabrication, controller wiring, I/O module termination and labelling.
Week 1 · Day 3	FBD control logic development — temperature and RH sequence programming from scratch.
Week 1 · Day 4	HMI screen design — equipment overview pages, alarm screens, setpoint entry.
Week 1 · Day 5	Point-to-point field verification across all devices — MODScan communication validation.
Week 2 · Day 1	Live commissioning, BMS operator training, setpoint tuning with client observation.
Week 2 · Day 2	Final handover — SOP documentation delivered, client signed off.

What Changed After EnSmart Took Over from Manual Operation

- **Zero manual switching.**
  All three compressors and the AHU now operate automatically on RH and temperature-based sequences. The BMS Operator no longer makes a single manual switching decision during production hours.
- **Production humidity now controlled.**
  Relative humidity is actively managed around the clock with no human intervention required. The BMS Operator's core responsibility is now handled entirely by the system.
- **RH stabilised through heater integration.**
  When relative humidity rises above threshold, the water heaters and strip heaters activate automatically to compensate. Moisture-related fabric damage during production is now prevented by the control loop — not by a person walking the floor.
- **BMS Operator empowered, not replaced.**
  The operator went from manually chasing humidity to monitoring everything from one HMI screen. Live temperature, RH readings, and equipment status — visible at a glance, from one place.
- **Complete SOP handed over.**
  Full operating documentation was delivered at handover. Any new operator assigned to the system can read the SOP and run the floor confidently from day one — no dependency on one person's memory.

Results and Value Delivered

Area	Before EnSmart	After EnSmart
HVAC Control	Manual switching by one operator every shift	Fully automated FBD sequence — RH and temp based
Humidity Stability	Operator judgment — inconsistent shift to shift	Closed-loop RH control running 24/7
Heater Control	No integration — heaters operated separately	Water heaters and strip heaters in the control loop

Area	Before EnSmart	After EnSmart
Visibility	No HMI — operator walked to each device to check	Live temp, RH, and equipment status on one screen
Knowledge Risk	Everything in one person's head — no documentation	Full SOP delivered — any operator can run the floor
Deployment	No BMS — manual operations throughout	Fully live in under two weeks from first site visit

Frequently Asked Questions

Q: Why were heaters added to an HVAC cooling system?

A: Think of a car's climate control on a cold rainy day — it blows warm air not to heat the cabin, but to remove moisture from the windscreen. The goal was never just temperature. It was always humidity. When the compressors cool the production floor, cooler air holds less moisture — which raises relative humidity. The water heaters and strip heaters counteract that RH rise. They are not fighting the compressors. They are working with them to hold RH steady. Remove the heaters and you lose humidity control — and with it, fabric quality.

Q: Why does the BMS use three compressors instead of one large unit?

A: Think of driving on a motorway — you don't floor the accelerator from zero to top speed in one go. Three staged compressors let the BMS step cooling capacity up or down in response to actual floor conditions. Compressor 1 handles base load. Compressor 2 cuts in when conditions demand more. Compressor 3 activates only when the floor is under genuine thermal stress. This staged approach protects the compressors from short-cycling, reduces wear, and gives the control sequence precision a single large unit cannot offer.

Q: The BMS Operator was already managing this manually. Why did the facility need automation?

A: Because a person is not a system. The BMS Operator knew the equipment well — but that knowledge lived in one person's head, with no documentation, no backup, and no visibility for anyone else. The BMS does not replace the operator's expertise. It captures it, codifies it into a sequence, and makes it run reliably every shift — regardless of who is on duty.

Q: What does the HMI give the BMS Operator that they didn't have before?

A: Before the HMI, the operator's only feedback was walking to each device and observing it directly. Think of the difference between a pilot flying blind and a pilot with a full instrument panel. The HMI gives the operator live temperature, live RH, equipment run status, and alarm visibility from a single screen. Problems are seen before they become production issues. The operator is no longer chasing the environment — they are commanding it.

Q: What happens if the BMS loses power or a sensor fails mid-production?

A: This is exactly what the SOP is designed to answer. Think of an SOP like the emergency checklist a pilot runs before takeoff — it does not assume everything will go right. The SOP delivered at GHCL's handover covers manual override procedures, sensor fault responses, and escalation steps — so any operator on any shift can respond to an abnormal condition without guessing.

> *If your facility still has one person holding the entire HVAC together — no documentation, no backup, no visibility for anyone else — EnSmart can change that. We capture the expertise, codify it into a control sequence, and make it run reliably every shift, regardless of who is on duty.*

Ready to Stop Running Your Production Floor by Hand?

EnSmart designs and deploys custom BMS control sequences for industrial HVAC — compressors, AHUs, heaters, and full HMI. From first site visit to SOP handover.

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