RING by Ringwood

Installation Guide

FOR THE PERSON INSTALLING RING ON SITE — NO PROGRAMMING REQUIRED

Step-by-step: what to bring, putting Ring on the plant PC, the first-start setup wizard, checking your work, and what to do (and not touch) when something goes wrong.

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Contents

Ring Installation Guide

Who this is for

You are going to a plant to put **Ring** — the touchscreen application that runs a corrugator's glue kitchen — onto a laptop, and get it ready for training. You are comfortable with ordinary Windows work: copying folders in File Explorer, plugging in an Ethernet cable, checking Device Manager, maybe pasting a command someone gave you into a black window. You have never opened Visual Studio, you have never "built" anything, and you never need to. Nothing in this guide asks you to write or read code.

This book is written for exactly that visit: unpack the release package, put the application in place, run its first-time setup screens, confirm it looks right, and know what to do — and who to call — if something doesn't.

What you need before you go

A one-page checklist is 01-before-you-go.md. Read it before you leave the office — it covers the exact files you need in hand, the information the plant needs to have ready for you, and who to have on the phone.

How this book relates to the install runbook

The technical authority for installing Ring is `docs/production-readiness/12_INSTALL_RUNBOOK.md`. It is written for an engineer and assumes comfort with things like editing `.json` files and reading source-code line numbers. This book covers the same ground in plainer language, in the order you'll actually do it, and tells you exactly what to type and where. Every chapter names, at the top, which official document it is restating — if this book and that document ever seem to disagree, or if you're ever unsure, the document named at the top of the chapter (and the application itself) is the final word, not this book. Where the underlying scripts or the app's own behavior disagreed with the runbook's wording, this book says so and follows what the app actually does.

What you are — and are not — responsible for

You install Ring, set it up, and prove it works. You are **not** the person who decides the plant is ready to let Ring actually drive the equipment, and you are **never** the person who flips that switch. Ring ships with a safety setting called **read-only mode** switched **on** — in this mode Ring can watch everything the controller is doing but cannot send it a single command. That is correct and expected on every install you do. Turning it off is a separate, later, formally-approved event called **the cutover**, run by Ringwood's own engineers against a signed-off checklist — never by the person installing the software. You'll see this rule repeated at the exact moment it matters, in 03-first-start.md.

Chapters

1. Before you go — the site-visit checklist: what to bring, what the plant must have ready, checking your release package is intact, who to have on the phone.
2. Installing Ring — unpacking the release package, putting it in place, the per-plant settings file, and (when the plant is ready) making Ring start on its own.
3. First start — the first launch, the startup warning dialogs, and the first-time setup wizard, screen by screen.
4. Checking your work — the verification pass, where the database file lives, and what to tell the operators before you leave.
5. When something goes wrong — a symptom-first troubleshooting table, what evidence to collect, and — just as important — what you must never do yourself.
6. Install record and pre-drive checklist — one printable page: a single tick-box checklist for the whole visit, plus a fill-in record of what you did. Print it before you leave the office.

1. Before you go

Authority for this chapter: `docs/production-readiness/12_INSTALL_RUNBOOK.md` (sections 2 and 3) and `docs/production-readiness/RELEASE_PACKAGE_CONTRACT.md`. This chapter restates their pre-visit checklist in plain language; where the runbook uses a term this chapter doesn't explain, that is the one to open.

Who does what

Three groups of people share this job, and it helps to know which one you are before you start:

Who	Does what
Ringwood's engineering team	Builds the release package you'll install, fills in the plant's specific settings template, supplies the plant's logo images, and hands you everything below.
The plant's own IT department	Gets the laptop itself ready — the right version of Windows, one small piece of Microsoft software installed, the laptop's network address on the controller's network, and gives you an administrator login for the visit.
You, the installer	Everything from this book: unpack, place, configure, start, verify, hand off.

If any of these three hasn't done their part, **stop and reschedule** rather than improvise. A visit where the laptop isn't ready, or the settings template is missing, wastes everyone's time and usually causes a second visit anyway.

What to have in hand before you leave the office

- ☐ **The release package** — a single `.zip` file, plus a small text file next to it with a name ending in `.sha256.txt`. That second file is a fingerprint of the `.zip` — see Checking the package is intact below for what it's for and how to use it. **Do not build this `.zip` yourself and do not accept a folder someone copied by hand instead of the official package** — the engineering team generates it with a specific tool that also writes the fingerprint file; a hand-copied folder skips that proof entirely.
- ☐ **Know that the package now runs its own pre-flight check for you.** A script called `Preflight-Check.ps1` ships inside the package (you don't need to bring it separately). It is the very first thing you run once you're on site — see the "Step 0" callout at the top of 02-installing-ring.md — and it looks at the laptop and the network before you copy a single file, instead of finding out one problem at a time as later steps fail. It also writes a report file you can attach if you end up calling for help — see 05-when-something-goes-wrong.md.

- ☐ **The filled-in settings template** for this specific laptop. This is a short list of values — the plant's controller address, a name for this station, and so on — that the engineering team prepares per plant. You'll type these into a small settings file once you're on site (covered in 02-installing-ring.md). If any field on the template is blank, get it filled in before you travel; do not guess a controller address.
- ☐ **The plant's logo image file**, if the plant wants its own branding — one image file, typically supplied by the plant or by Ringwood's marketing team. If it isn't ready yet, Ring still works perfectly without it — see the note on Check 3 in chapter 4 for exactly what this file does and doesn't change in this build.
- ☐ **The manuals PDF library, if the plant wants the in-app Help → Manuals Library populated** — a folder of PDFs (roughly 100 MB) from engineering, on a USB drive. It is not bundled with the release package because of its size, so if you don't bring it, that screen shows "PDF library not installed on this PC" until a later visit copies it in — see chapter 4 for the copy step.
- ☐ **The small piece of Microsoft software the laptop needs** — called the "Visual C++ Redistributable" (x64). This is required for Ring to talk to the controller at all. Download it in advance in case the plant's internet is slow or filtered: search for "Visual C++ 2015-2022 Redistributable x64" from Microsoft, or ask engineering for a copy on a USB drive.
- ☐ **A phone number for the rollback contact** — an engineer who can get into the plant's *previous* control software if your install has to be undone. You are extremely unlikely to need this call, but confirm the number works before you're standing in the plant needing it. See 05-when-something-goes-wrong.md for when this call is (and is not) the right move.

What the plant needs to have ready

- **A laptop running Windows 10 (version 1803 or newer) or Windows 11.** Older Windows versions are not supported without extra software the runbook does not cover — if you find one, stop and call engineering.
- **A network connection to the controller.** The laptop needs a fixed (static) network address on the same network segment as the plant's controller — plant IT sets this up, typically before you arrive. Confirm it with `ipconfig` in a command window: you should see one address on that network, not several.
- **An administrator login for the laptop**, valid for your visit. You need it to install the Microsoft software above and to place files in the right folder. It does not need to stay in place after you're done — the application itself never needs administrator rights just to run.
- **A printer, if the plant wants to print reports.** Ring's own reports print through whatever printer Windows already knows about on that laptop — there is nothing Ring-specific to install for this, so it is not a blocking item for your visit.
- **A screen of at least 1280×720 pixels.** Ring's screens are laid out for a touchscreen at that size or larger; the pre-flight check in chapter 2 confirms this for you automatically, but it's worth knowing in advance — Ring's layout shrinks to fit a smaller window but never grows, so a small or heavily-scaled display makes labels harder to read from a metre away, which is exactly how an operator will be standing. If the laptop's Windows display scaling is set well above 100%, check with plant IT that this is still workable before you travel.

Checking the package is intact

Before you copy a single file onto the plant laptop, prove that the package you're holding is the real one and that nothing in it was corrupted or swapped in transit. There are two separate checks — do both.

Check 1 — the ZIP file itself

The `.sha256.txt` file that shipped beside the `.zip` holds a single long string of letters and numbers: a fingerprint of the exact `.zip` file. If even one byte of the `.zip` changed — a bad download, a corrupted USB copy — the fingerprint will not match. In a PowerShell window (search "PowerShell" in the Windows Start menu), run:

```
Get-FileHash -Algorithm SHA256 -Path "C:\path\to\the\package.zip"
```

Compare the `Hash` value it prints against the text inside the `.sha256.txt` file. They must match, character for character. If they do not, **do not use this package** — re-download or re-copy it and check again; if it still doesn't match, call engineering rather than guessing.

Check 2 — every file inside the package

The fingerprint above only proves the `.zip` itself arrived intact. The package also carries a second, deeper check: extract the `.zip` to a **scratch folder** first — not straight into `C:\Ring\App\` — for example `C:\Staging\Ring-Release`. You'll copy the application out of this folder in chapter 2; this folder itself is not the install location, it's just where you check the package before you trust it. Once it's extracted there, a small checking program shipped inside that same folder compares every single file against a manifest listing exactly what should be there, with each file's exact size and fingerprint — catching a missing file, an extra file that shouldn't be there, or a single file that was quietly modified. Run it from that same PowerShell window, pointed at the folder you extracted to:

```
powershell -NoProfile -ExecutionPolicy Bypass -File C:\Staging\Ring-Release\Test-ReleasePackage.ps1 -PackageRoot C:\Staging\Ring-Release -RequireAuthenticode -ExpectedPublisher <the-approved-publisher-name-engineering-gave-you>
```

> **Note:** Replace `C:\Staging\Ring-Release` with wherever you actually extracted the `.zip`, and `<the-approved-publisher-name-engineering-gave-you>` with the exact publisher name engineering told you to expect — it should be provided to you along with the package, not guessed. `Ring.exe` inside the package is the one file that carries an Authenticode signature; the manifest itself is just a hash list, not a signed document.

The check prints its result in the window. It fails loudly — with a clear error, not a quiet warning — if anything is missing, added, or changed, or if the application file inside isn't properly signed by the expected publisher.

> **Warning:** Do not install a package that fails either check. Get a fresh copy from engineering and check again. Do not proceed "just this once" — this check exists specifically to catch a corrupted or tampered package before it reaches a live plant laptop.

Words you will hear on site

This book keeps jargon to a minimum, but a few terms come up constantly once you're at the plant and are worth knowing before someone uses them on the phone:

- **PLC / controller** — the industrial computer that actually runs the glue-kitchen equipment. Ring watches it and (after a formal cutover) can command it; the PLC keeps running the plant either way.
- **Heartbeat tag** — one value Ring reads from the controller purely to prove the connection is alive. Reading it never changes anything on the controller.
- **Path (port, slot)** — where the controller's CPU sits inside its own rack, on the controller's internal network. Almost always `1,0` — the settings template will say otherwise if this plant is different.
- **Tank roster** — the mapping between the tank cards you see on screen and the actual tank positions in the controller's memory.
- **Read-only mode** — Ring's default safety state: it can watch the controller but cannot send it a single command. See What you are — and are not — responsible for.
- **Cutover** — the later, formally-approved event where Ringwood's own engineers turn read-only mode off. Never something you do on an install visit.
- **LCP** — Line Control PC: the plant's own name for the laptop or workstation you're installing Ring onto.
- **RS-360** — the older Borland application Ring replaces. If a plant still runs it, that's the "legacy system" this book refers to.

Anything else you hear and don't recognize, the Operator Manual's glossary defines in plain language.

You are done with this chapter when…

- You have the `.zip` package and its `.sha256.txt` fingerprint file, and Check 1 above passed.
- You have the filled-in settings template for this specific laptop, with no blank fields.
- You have confirmed the plant's laptop, network, and administrator access will be ready when you arrive.
- You have a working phone number for the rollback contact.

Next: 2. Installing Ring.

2. Installing Ring

Authority for this chapter: `docs/production-readiness/12_INSTALL_RUNBOOK.md` (Step 0, and sections 4 through 8, including 5A/5B for the "make it start on its own" part) and `scripts/New-ReleasePackage.ps1` for exactly what ships inside the release package — see the note in Making Ring start on its own for which watchdog script this chapter recommends and why.

Step 0 — run the pre-flight check first

Before you do anything else below, run the check-up script that ships at the root of the release package: **`Preflight-Check.ps1`**. It is read-only — it never installs anything, never changes a setting, and never writes to the PLC. It only looks at the laptop and the network and tells you, in plain `[PASS]` / `[WARN]` / `[FAIL]` lines, whether this machine is ready, instead of you finding out one problem at a time as each later section fails.

From the folder where you extracted the package (see Unpack and place the application below — you can run this from the staging folder before you copy anything into `C:\Ring\App\`):

```
powershell -NoProfile -ExecutionPolicy Bypass -File .\Preflight-Check.ps1
```

It checks: the Windows version, free disk space, screen resolution, the laptop's network adapters, and — most usefully — it broadcasts on the network to find any EtherNet/IP controller that answers, so you can see the plant's PLC (and confirm its address) before you ever open the settings file in this chapter. If you already know the address you were given, add `-PlcIp <address>` to have it specifically ping and test that one PLC.

If Windows has "blocked" the extracted files (a common side effect of downloading or copying a `.zip`), add `-Unblock` once:

```
powershell -NoProfile -ExecutionPolicy Bypass -File .\Preflight-Check.ps1 -Unblock
```

The script always writes a `PreflightReport.txt` file next to itself — a plain-text copy of everything it printed. Keep it; if you end up calling engineering (see chapter 5), attaching that file says more, faster, than describing what you saw on screen.

A **READY** result at the bottom means carry on with the rest of this chapter. A **NOT READY** result lists exactly what to fix first — fix it, re-run the check, and don't proceed to unpacking Ring until it says READY (`[WARN]` lines are fine to proceed on; `[FAIL]` lines are not).

Before you touch the laptop: two things to confirm

1. **Windows version.** Type `winver` into the Start menu and press Enter. You need Windows 10 version 1803 or newer, or Windows 11. If it's older, stop and call engineering — do not attempt the install on an older Windows version.

2. **The Microsoft Visual C++ software.** Open **Control Panel** → **Programs** → **Programs and Features** and look for **"Microsoft Visual C++ 2015-2022 Redistributable (x64)"**. If it isn't listed, install it now from the copy you brought (or downloaded from Microsoft) — Ring's connection to the controller will not work without it.

Unpack and place the application

Ring always installs to the exact same folder path: **`C:\Ring\App\`**. Using this exact path matters — other tools and scripts assume it.

The package is not just the application — the `.zip` root also carries `release-manifest.json`, the runbook documents, `Test-ReleasePackage.ps1`, `Preflight-Check.ps1`, and a `START-HERE.txt` index, all sitting *beside* an `App\` folder that holds the application itself. That layout is deliberate, not an accident of how someone zipped it — so you extract the whole package to a scratch folder first, then copy just the **contents of** its `App\` folder into `C:\Ring\App\`. Trying to extract the `.zip` straight into `C:\Ring\App\` leaves the manifest and runbooks sitting next to `Ring.exe`, and a nested `C:\Ring\App\App\Ring.exe` if you then "move everything up" a level — don't do that.

1. Find the `.zip` package you checked in chapter 1. **Right-click it** → **Properties.** If you see a checkbox labelled **"Unblock"** near the bottom, tick it, then click **OK**.

   > **Warning:** Do not skip this. Windows marks a downloaded or copied-from-the-internet file as untrusted, and if that mark is still on the files after extracting, Ring will silently fail to load some of its components. Unblocking the `.zip` before extracting clears the mark from everything inside it in one step.

2. Right-click the `.zip` → **Extract All...** and extract it to a **scratch folder**, for example `C:\Staging\Ring-Release` (this is the same folder you ran Check 2 and Step 0's pre-flight check against). Do **not** extract it directly to `C:\Ring\App\`.
3. Open that scratch folder in File Explorer. You should see, side by side: an `App\` folder, `release-manifest.json`, a handful of runbook `.md` files, `Test-ReleasePackage.ps1`, `Preflight-Check.ps1`, and `START-HERE.txt`. **Open the `App\` folder** and confirm `Ring.exe` is directly inside it.
4. Copy everything **inside** that `App\` folder (not the `App\` folder itself) into `C:\Ring\App\` (create `C:\Ring` and `C:\Ring\App` first if they don't exist). When you're done, `C:\Ring\App\Ring.exe` should exist directly — the manifest, runbooks and the other scratch-folder files stay behind in the scratch folder; they are not part of the installed application and do not belong in `C:\Ring\App\`.
5. Confirm `C:\Ring\App\x64\SQLite.Interop.dll` is present — without it Ring's database engine will not start. An `x86\` folder normally ships too; it is unused on this (x64-only) build, so its absence on its own is not a fault — only `x64\` matters.

Folders to create yourself

Create these two folders now, even if you don't have the logo file yet:

- `C:\Ring\Pictures\`

- `C:\Ring\Icons\`

If you have the plant's logo image file (see chapter 1), copy it into `C:\Ring\Pictures\` now, using the exact filename `LogoRingwood.png`. If you don't have it yet, leave the folder empty — Ring starts fine either way. See the note on Check 3 in chapter 4 for exactly what this file does (and doesn't) change.

If you brought the manuals PDF library (see chapter 1), copy it into place now too:

```
powershell -NoProfile -ExecutionPolicy Bypass -File scripts\Deploy-Manuals.ps1 -Source <folder-of-pdfs-you-brought> -Dest C:\Ring\Manuals
```

This creates `C:\Ring\Manuals\` and copies the PDFs into it so **Help → Manuals Library** inside Ring can open them — see chapter 4, Check 11. If you don't have the library yet, skip this — Ring works fine without it; that screen just says the library isn't installed until a later visit runs this same command.

The desktop shortcut

1. In `C:\Ring\App\`, right-click `Ring.exe` → **Send to** → **Desktop (create shortcut)**.
2. Rename the new desktop shortcut to **Ringwood HMI**.
3. Copy that same shortcut into `C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Ringwood\` (create the `Ringwood` folder if it doesn't exist) so it shows up in the Start menu for anyone who logs into this laptop, not just you.

   Note: Leave the shortcut's "Run as administrator" option **unticked** unless the plant specifically requires it. Ring does not need administrator rights to run.

The per-plant settings file

Ring ships with generic, safe defaults — in particular, it does not know this plant's controller address until you tell it. That information goes into a small settings file that lives alongside the application and is specific to this one laptop.

1. In File Explorer, go to `C:\Ring\App\Config\`. You'll see a file called `appsettings.json` already there — **do not edit this one**; it's the generic base file that ships with every install.

2. Create a **new** text file in that same folder named exactly `appsettings.local.json` (make sure Windows doesn't silently add `.txt` to the end — in File Explorer, turn on **View → File name extensions** first so you can see and control the real name).

3. Open it in Notepad and paste in the following, then fill in the plant's real values from the settings template engineering gave you before saving:

```
{
  "PlcSettings": {
    "DefaultIpAddress": "192.168.202.15",
    "DefaultPath": "1,0"
  },
  "System": {
    "CompanyName": "Ringwood",
```

```
    "SystemNumber": 1
  },
  "AlarmEscalation": {
    "LcpName": "LCP-1"
  },
  "Authentication": {
    "SupervisorPassword": "REPLACE_WITH_UNIQUE_SITE_SUPERVISOR_PASSWORD",
    "AdminPassword": "REPLACE_WITH_UNIQUE_SITE_ADMIN_PASSWORD"
  },
  "Database": {
    "ConnectionString": "Data Source=D:\\Ring\\Data\\RingwoodDatabase.db;Version=3;"
  },
  "DatabaseMaintenance": {
    "BackupDirectory": "D:\\Ring\\Backups\\"
  },
  "DemoMode": {
    "Enabled": false
  },
  "ImageSettings": {
    "CompanyLogoFile": "LogoRingwood.png"
  }
}
```

Field	What it is
`DefaultIpAddress`	The controller's network address for this plant — from the settings template. If you leave this out, Ring's first-time setup screen (chapter 3) will show **`127.0.0.1` already sitting in the box** — that is a stand-in value the screen fills in for you, not a real answer, and clicking Next past it is **not blocked**. Always replace it with the real plant address before continuing; see chapter 3 for what happens if you don't.
`DefaultPath`	Almost always `1,0` unless the settings template says otherwise.
`CompanyName`	The name shown in report headers.
`SystemNumber`	A small number identifying this station, from the settings template.
`AlarmEscalation.LcpName`	A short name for this specific station, used in alarm emails if the plant uses them.

Field	What it is
`SupervisorPassword` / `AdminPassword`	Two passwords that unlock protected screens inside Ring (see chapter 3). If either is left out of the overlay entirely, Ring falls back to a single shared default password — **"ringwood"** (see your commissioning sheet) — for *both* tiers, and, unlike earlier releases, that means the Administrator tier is enabled out of the box rather than silently disabled the way a blank `AdminPassword` used to leave it. **Replace both placeholder values in the template above before Ring is handed over regardless** — the shared default is a safe fallback for an unfinished install, not a per-site password. Ring's configuration validator keeps warning (non-blocking, at every boot) for as long as a password is blank, is left as the exact placeholder text shown above (Ring specifically watches for text starting with `REPLACE_`), is still that shared default, or — for the supervisor password only — is the old legacy default `9999`. But that is not a safety net: if you type in *some other* placeholder-style value instead of a real one, Ring will not warn you, and a plant laptop can ship with a guessable password and no red flag at handoff. Treat replacing both as a hard rule, not something the warning will catch for you. If a site genuinely wants the Administrator tier disabled outright — not merely password-protected — set `AdminPassword` explicitly to an empty string (`""`) in `appsettings.local.json`; leaving the key out now means the shared default applies, not "disabled."
`Database.ConnectionString`	Where the database file lives. Leave this out and it defaults to `C:\Ring\App\RingwoodDatabase.db` — right next to the program files, on the same drive a future re-install or rollback might delete (see chapter 5). Point it at an absolute path **outside** `C:\Ring\App\`, ideally on a drive the plant backs up.
`DatabaseMaintenance.BackupDirectory`	Where Ring's automatic startup backups land. Leave this out and it defaults to `%ProgramData%\Ring\backups\` on the laptop's own system drive. Point it at an absolute path outside `C:\Ring\App\`, same reasoning as above.
`DemoMode.Enabled`	Must be `false` for a real plant install. `true` makes Ring show synthetic demo data instead of live controller values — never correct for a plant laptop, only for training/trade-show stations engineering sets up on purpose.
`ImageSettings.CompanyLogoFile`	The plant's logo filename, if supplied (see chapter 1) — copy the file itself into `C:\Ring\Pictures\` as described below. This setting only silences a startup warning in this build; see the note on Check 3 in chapter 4 for exactly what it does and doesn't change on screen.

> **Note:** The full list of settings engineering may ask you to add to this file is longer than the template above — this is the minimum a normal install needs. If the settings template you were given lists additional fields, add them in the same style (matching brackets and commas) rather than guessing their format.

4. Save the file and close Notepad.
5. **Check you typed it correctly.** A single missing comma or bracket makes Ring ignore the whole file and fall back to its generic defaults with no warning dialog explaining why. In the same PowerShell window from chapter 1, run:

   ```
   Get-Content "C:\Ring\App\Config\appsettings.local.json" | ConvertFrom-Json | Out-Null
   ```

   If this prints nothing and returns you to the prompt, the file is valid. If it prints a red error, the file has a typo — compare it carefully against the template above and try again.

   Warning: Never edit `C:\Ring\App\Config\appsettings.json` (the file *without* `.local` in the name) by hand. That file is the generic base that ships with the application; your plant-specific values belong only in the `.local.json` overlay file you just created.

Which file wins: appsettings.json vs. appsettings.local.json

The two files play different roles, and it matters which one a later change lands in. `Config\appsettings.json` is the generic base file every install starts from; `Config\appsettings.local.json` — the file you just created — is a per-laptop **overlay** that Ring reads afterwards and lets override anything the base file says. If both files set the same key, the `.local.json` value wins, always.

This matters because of what you'll do in chapter 3: the first-time setup wizard writes its answers into the **base** `appsettings.json` file, not the overlay. Since this chapter has you put `PlcSettings.DefaultIpAddress` and `DefaultPath` into the overlay already, the overlay will keep winning over whatever the wizard's PLC page saves — which is exactly why the wizard's PLC page shows a yellow banner warning you about it (see chapter 3, page 4). That banner is expected on an install that followed this chapter, not a sign something is broken. If you ever need to change the PLC address again after today, change it in `appsettings.local.json` (the file that wins), not by re-running the wizard alone — and restart Ring afterwards.

What a correct install folder looks like when you're done

Before moving on, glance through `C:\Ring\App\` in File Explorer and compare it against this (some file names are abbreviated; `…` means "more files like this, nothing to check individually"):

```
C:\Ring\App\
├── Ring.exe                        ← must be here, directly in this folder
├── Ring.exe.config
├── *.dll, *.xml                    ← managed dependencies, ships as-is
├── x64\SQLite.Interop.dll          ← must be here (database engine)
```

```
├── x86\SQLite.Interop.dll          ← may be here — unused on this build
├── Config\
│   ├── appsettings.json            ← must be here, unedited
│   └── appsettings.local.json      ← must be here — the file you create below
├── Assets\
│   └── Manuals\…                   ← must be here (built-in help documents)
└── plctag.dll                      ← must NOT be here yet — see below
```

`plctag.dll` is *not* here yet, and that is correct. This one file is created automatically the very first time Ring successfully talks to a controller — you'll check for it in chapter 4. If it is still missing after your first successful start, and the PLC connection indicator (covered in the next chapter) never turns green, that points at the Visual C++ software from the beginning of this chapter, or at the install folder not being writable — not at a broken package.

Everything else from the scratch folder in the previous section (`release-manifest.json`, the runbook `.md` files, `Test-ReleasePackage.ps1`, `Preflight-Check.ps1`, `START-HERE.txt`) stays in the scratch folder — none of it belongs inside `C:\Ring\App\`. Keep the scratch folder around somewhere on the laptop (or a USB drive) until after chapter 4; the runbooks and `Preflight-Check.ps1` are useful again if something goes wrong (see chapter 5).

> **About `AssetsManuals`:** in the app these files surface under **Help → Manuals Library**, and the three customer PDFs (Operator Manual, Installation Guide, Engineering Reference) under **Help → Documentation**. Those three PDFs are optional — if a release was packaged without them, the Documentation chooser offers the `ring-rs3000.pages.dev/docs` website instead. That is expected behavior, not a broken package.

Data Ring keeps outside `C:\Ring\App\`

Not everything Ring writes lives inside the install folder you just built. A few things deliberately live under the laptop's shared Windows data folder instead, specifically so that copying a new release over `C:\Ring\App\` later (see "Putting a new version on a laptop that already has Ring" below) can never delete them:

What	Where
Application log	`%ProgramData%\Ring\logs\application.log`
Automatic startup backups	`%ProgramData%\Ring\backups\`, or wherever `DatabaseMaintenance.BackupDirectory` points
Scheduled report PDFs (if the plant uses emailed report subscriptions)	`%ProgramData%\Ring\ScheduledReports\`

Chapter 4, "Where everything lives" covers the database, backups and crash-log folders in more depth — this is only the subset worth knowing before your first install.

Making Ring start on its own (do this once the plant is ready)

Everything above gets Ring ready to launch by double-clicking the desktop shortcut. **Leave it that way during the initial install and during operator training** — the training window is the one time you want a human to be the one starting the application, not Windows doing it silently in the background.

Once the plant is genuinely ready to run this laptop unattended — the training is done, and the laptop is going to sit on the floor 24 hours a day — three separate things need to be true, because they cover three different ways an unattended laptop can go dark:

What	Covers
A. The laptop logs itself in after a restart	So a reboot (Windows Update, a power blip) doesn't just sit at a login screen with nobody there to type a password.
B. Something notices if Ring isn't running, and restarts it — and a native crash leaves evidence behind	So a crash doesn't leave the screen dark until an operator happens to notice, and the rare crash Ring's own logging can't see still leaves something for engineering to look at. One command below covers both.
C. Windows doesn't restart the laptop in the middle of a production shift	Set by the plant's IT department, not you — a scheduling policy, not a Ring setting.

A. Auto-login for a dedicated account

Use a plant-dedicated Windows account made just for running Ring — never someone's personal login, and never an administrator account. Ask plant IT to create one (a normal, non-administrator account) if it doesn't already exist. Setting up auto-login for that account is a short registry change; ask engineering for the exact commands for this plant, since the account name and password are plant-specific and the password is stored in a recoverable form as part of how auto-login works — which is exactly why the account must have no special privileges.

B. The one-command kiosk setup (watchdog + crash dumps + shortcuts)

The release package carries a single script that sets up everything in this section in one run — **`Install\Install-RingKiosk.ps1`** (it only ships if engineering built the package with kiosk support included; if your package has no `Install\` folder, ask engineering for one that does). From an **elevated** ("Run as administrator") PowerShell window, from the folder you extracted the package to:

```
powershell -NoProfile -ExecutionPolicy Bypass -File .\Install\Install-RingKiosk.ps1 -ExePath
"C:\Ring\App\Ring.exe" -RunAsUser "<the dedicated kiosk account from step A>"
```

Always pass `-RunAsUser` with the dedicated account name from step A. Left out, it defaults to whichever account you happen to be logged in as to run this command — which registers the watchdog against the wrong account, and it silently never fires once you log out and the plant's own kiosk account takes over.

One command does all of this:

1. **The watchdog** — registers a background Windows task named **"Ringwood HMI AutoRestart"** that launches Ring at logon and again every minute if it isn't already running. Ring's single-instance design makes the once-a-minute check harmless while Ring is healthy — it just finds Ring already running and does nothing.
2. **Native crash dumps** — turns on Windows Error Reporting for `Ring.exe`, so a rare native crash (one Ring's own logging can't see at all) still leaves a diagnosable file in `C:\Ring\logs\dumps\` instead of just a dark screen.
3. **Desktop shortcuts and first-run branding folders** — re-creates the shortcuts from the previous section and pre-creates `C:\Ring\Pictures\` / `C:\Ring\Icons\` if you haven't already.

Useful extra flags: `-DryRun` shows what the command would do without changing anything; `-Verify` runs the same "End Task, wait, does it come back" proof test described below for you; `-Uninstall` reverses all of it (use this **before** deleting `C:\Ring\App\` if you ever roll back — see chapter 5).

> **Note:** A different, more cautious watchdog script (`Install-RingWatchdog.ps1`) also exists in Ringwood's toolbox. Instead of blindly relaunching every minute, it checks whether Ring's process is actually gone first — which avoids popping a "Ring is already running" notice over a merely slow-to-start HMI. It is **not** part of the standard release package above; if engineering has supplied it to you separately for this visit, prefer it, but say so at handoff, because it registers a differently-named task ("Ringwood HMI Watchdog") and refuses to run alongside "Ringwood HMI AutoRestart" unless you pass `-ReplaceAutoRestartTask` to remove the one Step B just installed.

Prove it works, once, deliberately:

1. Open Task Manager, find `Ring.exe`, and click **End Task**.
2. Wait about a minute.
3. Ring's splash screen should reappear on its own.

If it doesn't come back within a few minutes, this is a job for chapter 5 — do not simply try again repeatedly.

C. Windows Update timing

This one belongs to the plant's IT department: they should set Windows' **Active Hours**, or manage the laptop's updates through their own update-management tooling, so a reboot never lands in the middle of a production shift. Confirm with them that this has been set — there is nothing for you to configure inside Ring for this part.

Putting a new version on a laptop that already has Ring

Everything above assumes an empty `C:\Ring\App\`. A later visit to update an already-working station is a different job — the same laptop, a working database full of real batch history, and operators who already know this screen. Do it in this order so nothing is lost:

1. **Close Ring** on the laptop (see chapter 4, Check 1 for how).
2. **Back up first, twice, before you touch anything:**
   - Inside Ring (if it will still open), use **Setup** → **Database Backup / Restore** to take a manual backup, and **Setup** → **Plant Profile** to export the current configuration (see chapter 4, Check 12) — both need the supervisor password (chapter 3).
   - Copy `C:\Ring\App\Config\appsettings.local.json` somewhere safe (a USB drive, or a folder outside `C:\Ring\`). This file is **not** part of the new release package and is never touched by the steps below — but a mistake later in this list could still overwrite it, so get a copy off the laptop first.
3. **Verify the new package** exactly as in chapter 1 and run Step 0 again — a Windows or hardware change since the last visit is exactly what a second visit is for.
4. **Replace only the program files.** Copy the contents of the new package's `App\` folder into `C:\Ring\App\`, overwriting the old program files — but do **not** delete `C:\Ring\App\` first, and do **not** touch `RingwoodDatabase.db`, `Config\appsettings.local.json`, `C:\Ring\Pictures\`, or `C:\Ring\Icons\`. The database and your settings overlay live in the same folder as the program files but are not part of the package; replacing files by copying over them, not by deleting the folder first, is what keeps them intact. This isn't just a copying convention — the packaging script that built the release ZIP (`scripts/New-ReleasePackage.ps1`) deliberately **excludes** every `*.db`/`*.db-wal`/`*.db-shm` file and `Config\appsettings.local.json` from the ZIP in the first place, so even copying the new `App\` folder's *entire* contents over the old one cannot overwrite your database or settings overlay — there is nothing in the package to overwrite them with.

   > **This is an upgrade, not a rollback — the two are opposites.** An upgrade (this step) *adds* new program files on top of a working install and is safe by construction, as above. Chapter 5's rollback procedure is the opposite: it *deletes* `C:\Ring\App\` outright with `Remove-Item -Recurse`, and is scoped to **abandoning an unfinished install visit**, never to a station that has already gone live. Do not reach for chapter 5's rollback steps as a way to "start the upgrade over" — that is exactly the case it is not meant for.

5. **Restart Ring.** If the new version's setup wizard changed enough to need re-asking a question or two, it reopens automatically with your previous answers already filled in (see chapter 3) — answer only what it asks and get back to the main screen; it does not mean you're starting the install over.
6. **Confirm before you leave**: the read-only banner is exactly as it was before (chapter 4, Check 5), the tank cards show the right tanks and a report opens correctly (chapter 4, Checks 6-7), and the version number on the splash screen matches the new release (write it on your install record — see chapter 6).

If anything in steps 3-5 fails or looks wrong, stop and treat it as a fresh install problem — chapter 5's rollback section is scoped to *your own unfinished visit*, not to a laptop that was already live; if in doubt, call engineering before removing anything from an already-working station.

You are done when…

- `C:\Ring\App\Ring.exe` exists, with `x64\SQLite.Interop.dll` present.
- `Config\appsettings.local.json` exists, has this plant's real values — including a real PLC address (not `127.0.0.1`) and two unique passwords that are neither blank nor the placeholders this chapter shipped with — and passed the `ConvertFrom-Json` check with no error.
- The **Ringwood HMI** shortcut exists on the desktop and in the Start menu.
- If — and only if — the plant is ready to run unattended: the watchdog restart test above actually brought Ring back after you ended its task.

Next: 3. First start.

3. First start

Authority for this chapter: `Ring/Views/App.xaml.cs` (the actual startup sequence and every warning dialog it can show) and `Ring/Views/Wizard/StartupWizardSteps.cs` and the individual step files under `Ring/Views/Wizard/Steps/` (the exact first-time setup wizard — 15 pages as of the control-and-visibility wave), plus `Ring/Services/PLC/EipDiscoveryService.cs`, `EipDeviceInfo.cs`, and `PlcConnectionProbe.cs` (the network scan and staged connection test the PLC connection page uses), `Ring/Services/Readiness/ReadinessChecks.cs` and `Ring/Services/DataMirrorService.cs` / `Ring/Services/Export/SqlDumpService.cs` (what the new Readiness and Data Mirror pages actually check and do), and `Ring/Views/Wizard/WizardRestorePointService.cs`, `CommissioningSheetBuilder.cs`, and `Ring/Services/Documentation/InstallationGuideLauncher.cs` (the Finish page's automatic restore point and install record, and the Guide link). Where this chapter quotes a screen's wording, it was copied from the application's own text resources, not paraphrased.

Starting Ring for the first time

Double-click the **Ringwood HMI** shortcut you created in chapter 2. A splash screen appears with a progress bar and a line of text that changes as Ring starts up — you'll see it step through, in order:

1. Initializing Application...
2. Loading Configuration...
3. Connecting to Database...
4. Initializing PLC Services...
5. Loading User Interface...
6. Starting Control Systems...
7. Ready!

This normally takes a few seconds. Nothing to do here but wait — the next thing you should see is either a warning dialog (see below) or the first-time setup wizard.

If a warning dialog appears first

Ring checks its own configuration and database *before* it lets you touch anything, and it will stop and tell you in plain language if something is wrong rather than starting up silently broken. You may see one of these. None of them means you did the install wrong by default — read the message box itself; it names the actual problem.

Dialog title	What it means	What you do
Startup Configuration Error	The JSON itself is broken, or one of a short list of genuinely required values is missing or empty — the whole `Database`, `PlcSettings`, or `System` section, `Database.ConnectionString`, or `System.CompanyName`. (A blank or `127.0.0.1` PLC address is **not** on this list — that's a Warning, below, specifically so this dialog never blocks you from reaching the wizard that fixes it.) Ring refuses to start at all — this dialog has only an OK button, and clicking it closes Ring.	Reopen `appsettings.local.json` from chapter 2 and check it against the template, especially matching brackets and commas. Re-run the `ConvertFrom-Json` check from that chapter.
Startup Configuration Warning	A setting exists but looks suspicious — Ring can still start, so this dialog offers **Continue** (the default) or **Quit**, plus a countdown that auto-continues after 60 seconds even if nobody is at the laptop.	Read what it flagged. If you recognize it as expected for this plant, click Continue (or just wait). If not, click Quit, fix it, and restart — or note it and mention it during handoff.
Database Integrity Warning	Ring's own SQLite database file reported a problem, but Ring will still start — this is very unlikely on a brand-new install (it usually means an old, damaged database file was carried over).	This should not happen on a fresh install. If it does, stop and call engineering rather than continuing past it.
Database Schema Warning	The database file exists but is missing something Ring expects to be able to save batch history to. Also very unlikely on a brand-new install.	Same as above — stop and call engineering on a fresh install; this points at a database file that isn't actually new.
Database problem — PLC writes disabled	The database could not be opened or created at all. Ring will still start so you can see the screen, but nothing will be recorded, and (since Ring ships read-only anyway, see below) this mostly matters for history and reporting, not safety.	Confirm `C:\Ring\App\` is a folder Windows will actually let Ring write to (not a read-only network share), then restart Ring. If it recurs, call engineering.
Tank roster could not be read	Ring's saved list of which tank is which could not be read, so it's using a generic 4-tank default layout, which may not match this plant.	Continue past the dialog, then, once you're in Ring, go to **Setup → Password** (supervisor), then **Setup → Tanks → Configure tank roster (advanced)** and set it up for real before treating any tank screen as trustworthy. (Ring's own on-screen banner for this says "Check Setup > Tank Roster" — that's the same screen; there's no menu item with that exact name.)

Dialog title	What it means	What you do
Startup Error / **Error during application startup**	Something unexpected went wrong before Ring could even get to its main window. Ring closes itself.	The dialog itself tells you where a written report was saved — a folder named `logs\crashes` next to `Ring.exe` (that is, `C:\Ring\App\logs\crashes\`). Zip that folder and send it to engineering along with the exact text of the dialog. Do not attempt repeated retries on your own; see chapter 5.
"Ring Already Running" / "Ring Is Starting" / "Ring Not Responding"	You (or a script) tried to open a second copy of Ring while one was already running. Ring only ever allows one copy at a time.	Usually nothing to do — a healthy already-running Ring is simply brought to the front and the second launch closes itself with no dialog at all. If you **do** see one of these three, it counts itself down and closes on its own after 60 seconds; if the existing Ring seems stuck, see the first row of chapter 5's symptom table before doing anything else.

> **Note:** Every one of these dialogs prints the specific problem it found, not just a generic error — read the actual text in the box. It usually tells you exactly which setting or file is at fault.

If none of these appear, you went straight from the splash screen to the setup wizard below — that is the normal, expected path on a first install.

The first-time setup wizard

The first time Ring starts on this laptop (and only the first time, unless someone runs it again on purpose — see the end of this chapter), it opens a step-by-step setup window instead of the normal screen. It walks through 15 pages, in a fixed order, with the same four buttons at the bottom of every page:

Button	What it does
Finish later	Asks for confirmation, then closes **only the wizard** — Ring itself opens normally to its main screen. Nothing is marked complete, so the whole wizard starts over from page 1 the next time Ring runs. **If you haven't yet entered a PLC address when you click this, Ring quietly writes `127.0.0.1` into its settings on the way out** — never use Finish later after reaching page 4 without typing in the real plant address first.
Back	Returns to the previous page.
Skip	Only appears on pages that don't require an answer right now (see below) — moves on without saving anything for this page.
Next	Saves this page's answers and moves to the next page. On the last page this button is literally labeled **Finish** instead of Next.

Some pages have a **Skip** button and some don't — that is Ring's own built-in distinction between "must answer before continuing" and "fine to come back to later." Do not treat the absence of Skip as a bug; it means this page genuinely needs an answer before Ring can be used safely or sensibly.

Every page also carries a **Guide** link in the top-right corner of the header band, above the page content, on every single page — click it to open the shipped Installation Guide PDF on this laptop; if that file wasn't deployed with this build, Ring tells you plainly and gives you the public web address instead, rather than failing silently.

Here are all 15 pages at a glance; the detail for each follows below.

#	Page title	Can you Skip it?
1	Welcome to Ring setup	No
2	Language	No
3	Units	No
4	Connect to the PLC	No
5	Read-only safety mode	**No — read this one carefully**
6	Passwords	Yes
7	Email alerts (SMTP)	Yes
8	Alert recipients	Yes
9	Sensible defaults	Yes
10	Name your plant	No
11	Plant names	Yes
12	Work shifts	Yes
13	Data mirror	Yes
14	Readiness check	Yes
15	You're all set	No (last page)

Page 1 — Welcome to Ring setup

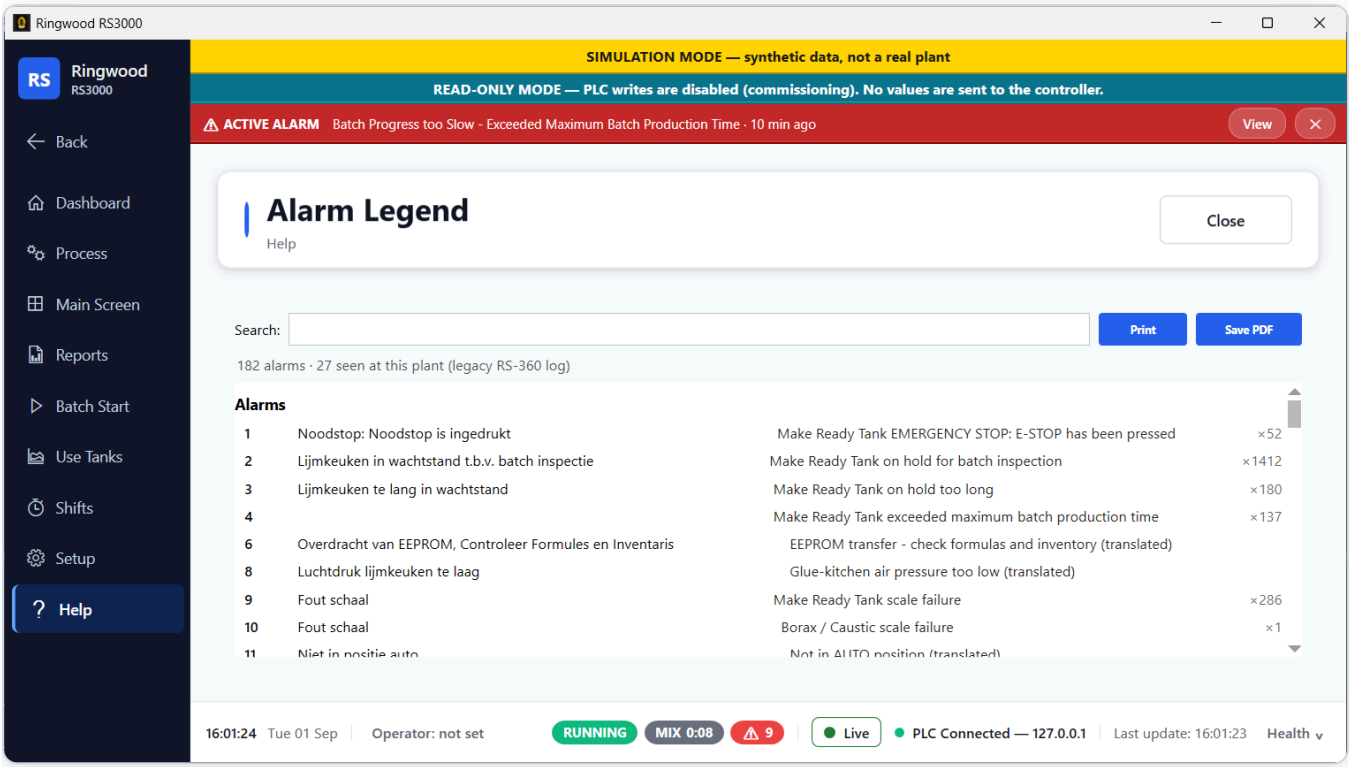
Required — no Skip button. Just an introduction: "*A few quick steps to get this station configured.*" Nothing to enter; click **Next**.

Page 2 — Language

Required — no Skip button. Which language Ring's screens should use.

Answer comes from: the settings template — do not guess. If the template doesn't say, ask the plant which language its operators expect before answering; this is exactly the kind of thing that otherwise only surfaces during operator training, and changing it later means re-running this page. Alarm text is available in both

languages regardless of this choice, through **Help → Alarm legend** — worth showing operators at handoff either way.



Help → Alarm legend — alarm text is always shown in both languages, whichever one this page picks for the rest of the screens.

Page 3 — Units

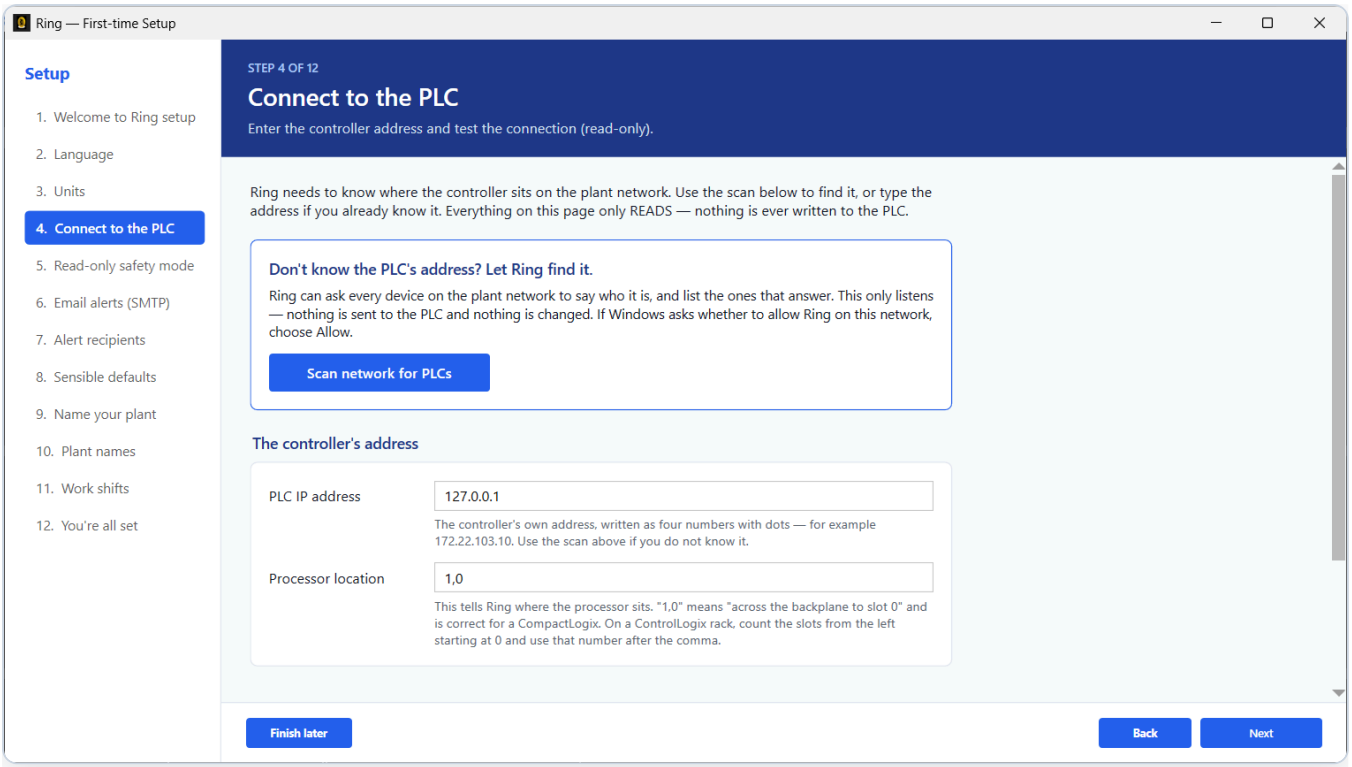
Required — no Skip button. Three separate pickers, not one: **volume**, **weight**, and **temperature**, each set independently to US or metric.

Answer comes from: the settings template's chosen unit system, decided ahead of time — not something to guess on site. The page states its own scope plainly, and it's worth repeating to the plant in exactly these words: "*This is display-only — plant data is always stored in native units.*" Changing this choice later is safe (it never touches recorded data) and can be revisited any time under **Setup → Display Units**.

Page 4 — Connect to the PLC

Required — no Skip button. The controller's network address and its processor location — found by scanning the plant network, typed in by hand, or both. The page says exactly: "*Ring needs to know where the controller sits on the plant network. Use the scan below to find it, or type the address if you already know it. Everything on this page only READS — nothing is ever written to the PLC.*" The page is three cards, top to bottom, plus a fourth panel that only appears after a successful test (see below).

Answer comes from: the settings template's controller address — the same value chapter 2 has you put in `appsettings.local.json` — or the scan in Card 1, if you don't already have it.



Page 4 — Connect to the PLC. This capture predates the "Live from the controller" panel described below, which only appears after a successful Test connection.

Card 1 — "Don't know the PLC's address? Let Ring find it." The **Scan network for PLCs** button asks every device on the plant network to say who it is and lists the ones that answer; it only listens, and takes about 3 seconds. While it runs you'll see an indeterminate progress bar and *"Asking every device on the network to identify itself… this takes a few seconds."* This is the same kind of broadcast discovery chapter 2's `Preflight-Check.ps1` already did before Ring was even installed (see chapter 2) — if you ran that script and already have the address, you can skip straight to Card 2 below.

> **If Windows asks whether to allow Ring on this network, choose Allow.** This prompt appears the first time the scan runs on a new network. Dismissing or blocking it makes the scan silently find nothing — which looks exactly like "no PLCs on this network" but isn't.

One of four things happens when the scan finishes:

- **One device answers:** *"Found 1 device. Click it to use its address."*
- **Several devices answer:** *"Found N devices. Click the one that is your controller — likely controllers are marked and listed first."* Each row shows the catalog name in bold (e.g. `1769-L36ERM-QBFC1B`), a grey detail line with the address, vendor, firmware, and serial number, and — for a Logix processor only — a green **CONTROLLER** badge on the right. A device that gave no name of its own shows as *"Unnamed EtherNet/IP device."*
- **Devices answer, but none look like a processor:** an amber panel reads *"None of these look like a PLC processor."* — these are drives, adapters, or panels; the PLC may be on a different network, or behind a router the scan can't pass through. Ask the plant's controls engineer for the address.

- **Nothing answers:** an amber panel reads "*No PLCs answered the scan.*" with a checklist, worked in this order: 1) check the network cable to the PLC panel — the link light must be on at both ends; 2) this PC must be on the same network as the PLC (if you know its address, this PC's own address should start with the same first three numbers); 3) if Windows asked about the firewall, choose Allow and scan again; 4) ask the plant's controls engineer for the address and type it in below.

Clicking a row fills in the address field in Card 2 and confirms "*Using `<name>` at `<ip>`. Now press "Test connection" below.*" For a **CompactLogix only**, it also fills in the processor location and adds "*The processor location was set to 1,0 (built-in processor, slot 0).*" For a **ControlLogix**, it deliberately leaves the processor location blank — the rack slot is a site fact the scan has no way to know, and Ring won't guess it.

> **How proven this is:** the network scan is new. It has been tested against synthetic device replies in the app's own test suite, not yet against a real plant network. If you run it on site and it finds nothing, that does not by itself mean the PLC is unreachable — fall back to typing the address into Card 2 below, which works exactly the way it always has.

Card 2 — the controller's address. Two fields: **PLC IP address** (help text: "*The controller's own address, written as four numbers with dots — for example 172.22.103.10. Use the scan above if you do not know it.*") and **Processor location** — this label replaces the older "Path (port,slot)" wording — with its own help text: "*This tells Ring where the processor sits. '1,0' means 'across the backplane to slot 0' and is correct for a CompactLogix. On a ControlLogix rack, count the slots from the left starting at 0 and use that number after the comma.*" Validation is immediate and friendly: type something that isn't a valid address and you get "'`<what you typed>`' *is not a valid address.*" plus that same help text again, right there, instead of being accepted and reported as a network fault later. The same check runs when you click Next, so a bad value can't be saved by accident.

Card 3 — "Test connection." A progress bar runs while it works. This is a staged, read-only probe — it opens a connection and reads one tag, never writes — and it reports exactly which stage it stopped at, because each stage points at a different physical thing to go check:

1. **Connected** (green) — "*Connected to the controller at `<ip>`.*" / "*Read PC_Read_Integer[0] = `<value>`. Nothing was written. Click Next to save this address.*"
2. **"Nothing answered at `<ip>`."** — this PC can't reach that address at all. Check the cable to the PLC panel, then check this PC is on the same network. For a dotted-quad address it adds: "*For this address, this PC's own address should start with 172.22.103.*"
3. **"`<ip>` answered, but it is not a PLC."** — something is switched on there (a PC, a printer, a panel) but it refused the connection. Almost certainly the wrong address — run the scan above and pick the row marked CONTROLLER.
4. **"`<ip>` is reachable, but it never answered Ring."** — a firewall is dropping the traffic, either on this PC or between it and the panel. Allow Ring through the Windows firewall on this network, or ask IT to open TCP port 44818 to the PLC.
5. **"The controller at `<ip>` refused to open a connection."** — it IS a PLC and Ring reached it, but it has no free session. Close RSLinx and any other software talking to this PLC, wait about 30 seconds, and test again. (A controller only allows a handful of sessions at once — a laptop left connected in the panel is the usual cause.)

6. **"Reached the device at `<ip>`, but no controller answered at 1,0."** — the address is right; the processor location is probably wrong. CompactLogix → "1,0"; ControlLogix → count the slots from the left starting at 0. If the location is definitely right, this controller may not be running the plant's batching program.

A hostname that DNS can't resolve gets its own message, telling you to type the numeric address instead or use the scan above.

"Live from the controller" — the proof panel. As soon as Test connection goes green, a fourth panel appears below the result, headed **Live from the controller**, and starts reading three more tags once a second for as long as this page stays open: the **heartbeat counter** (the same tag the test itself just read once), the **status word**, and **Tank 1 level** — visibly changing in front of you, not just a one-time "Connected" message. This is read-only, exactly like everything else on this page, and it stops the instant you leave the page, click Test connection again, or pick a different row from the scan results.

> **This field is never blank when you arrive at it — that's the trap.** If no address has been set yet, Ring pre-fills this box with `127.0.0.1`, and clicking Next past it is not blocked. `127.0.0.1` means "this laptop," not the plant controller — it is a placeholder, not a real answer, and Ring will not stop you from accepting it. **Always overwrite it with the real plant address from the settings template, click Test connection, and don't click Next until the result is green.** If you already put the real address into `appsettings.local.json` in chapter 2, this page shows a **yellow banner** warning that the override file "wins" over anything you type here — that banner is expected in that case (see chapter 2, "Which file wins"), not a fault.
>
> **If the plant's network isn't patched through to the controller yet** — a routine reality on a first visit — run the scan or type the controller address anyway, let **Test connection** fail, and continue. Everything else in this install works without the controller reachable. Note it on your install record (chapter 6), tell the plant exactly what remains, and say so plainly at handoff: an install with the PLC unreachable is a legitimate stopping point, not a failed visit.

Page 5 — Read-only safety mode

Required — read this one carefully. See the next section — this is the most important page in the whole wizard.

Page 6 — Passwords

Optional — Skip is available. Set the Supervisor and Administrator passwords for this station.

The page shows two matching cards, one per tier — **Supervisor password** and **Administrator password** — each with a **Current state** line, a **New password** field, and a **Confirm password** field with a plain **Show**/**Hide** toggle so you can check what you typed before saving.

Answer comes from: the site's own chosen passwords, if the plant is ready to set them now. This page is entirely optional: leave every New/ Confirm field blank and click **Next** (or **Skip**) to keep whatever is already configured — including the shipped default — and set real passwords later from **Setup** → **Edit Passwords**

(administrator tier; see Getting into the Setup menu below). Chapter 2 already covers exactly what the shipped default is and why it must be replaced before handoff — see chapter 2's password guidance — this page doesn't repeat that here.

Each tier's **Current state** line reads one of:

- *"a site-specific password is set."*
- *"still the shipped default ("9999")."* — Supervisor only, when the value is blank, `9999`, or a `REPLACE_` placeholder.
- *"still the shipped default — blank, which disables administrator sign-in."* — Administrator only, when the value is blank.
- *"still a placeholder value — set a real password before commissioning."* — Administrator only, when the value is a `REPLACE_` placeholder.

If you type a new password that matches one of those shipped/placeholder values, a non-blocking amber note appears under that tier: *"That is the shipped default value — anyone with the manual can guess it. Consider choosing a different password."* Ring will still let you save it — this is advice, not a gate. If this station's `appsettings.local.json` overlay already defines the password you're changing, Ring updates both files together, so the one that actually wins at runtime (see chapter 2, "Which file wins") matches what you just typed.

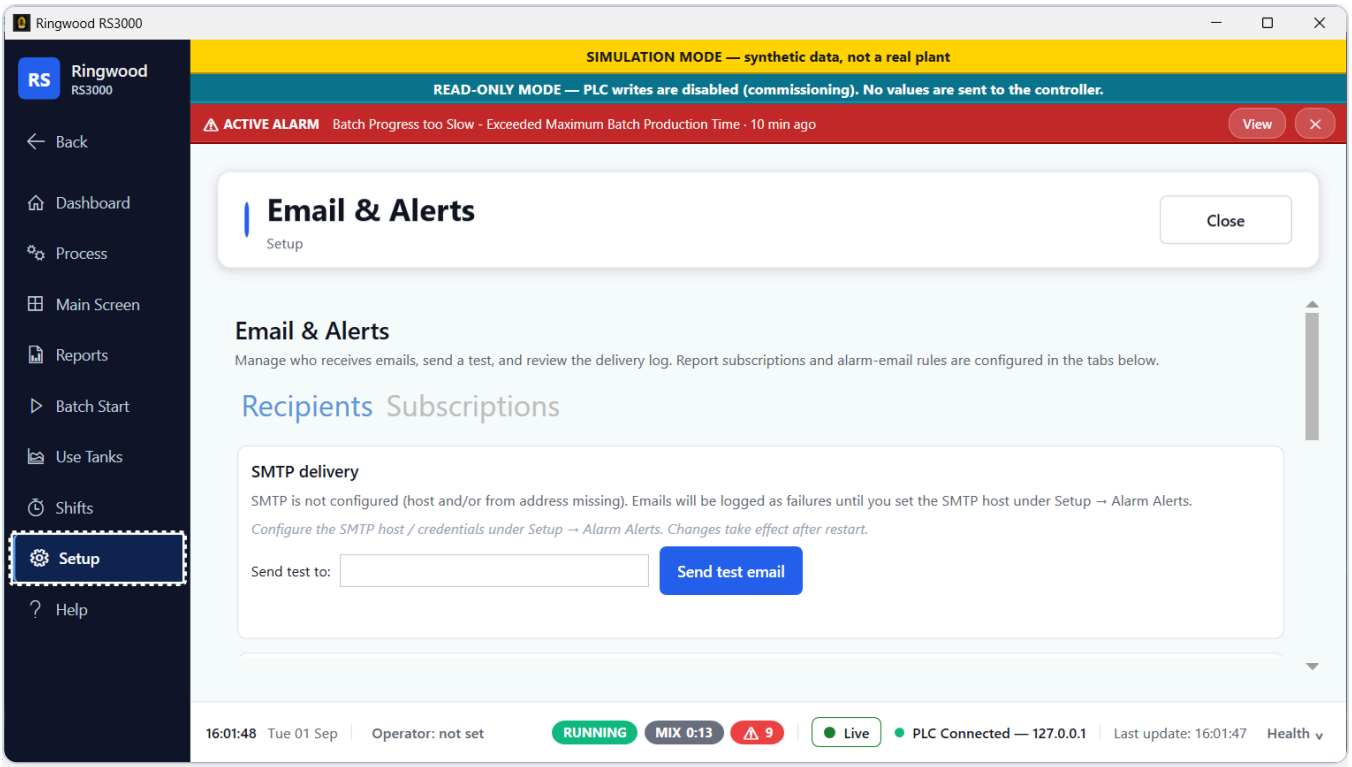
> **Note:** the Current state line, the while-typing warning, and the Readiness page's Passwords check all recognize every shipped default — blank, the legacy `"9999"`, a `REPLACE_` placeholder, and the compiled shared default described in chapter 2 — using the same rule the boot-time configuration validator applies, so this page and the startup warning can never disagree.

Whatever you leave blank on this page is committed as "no change" — Ring never writes an empty password back into the settings file just because you visited here.

Page 7 — Email alerts (SMTP)

Optional — Skip is available. The plant's outgoing mail server, so Ring can send alarm and report emails.

Answer comes from: the settings template, if the plant wants email alerts. If not ready yet, skip it — the mail server itself can be finished later under **Setup** → **Alarm Alerts** (supervisor password; see Getting into the Setup menu below). That's a different screen from the one recipients live on, next.



Setup → Email & Alerts — this is where you finish recipients later if you skip pages 7-8 now. This capture shows a station with no mail server configured yet; the in-app text itself points you at Setup → Alarm Alerts to set the SMTP host.

Page 8 — Alert recipients

Optional — Skip is available. Who should receive alarm and report emails.

Answer comes from: the plant's list of names/addresses, if known. Skip if not decided yet — finish it later under **Setup** → **Email & Alerts** (supervisor password).

Page 9 — Sensible defaults

Optional — Skip is available. Offers to create one starter alarm rule and one starter report email, so the plant isn't starting from a totally empty setup.

Answer comes from: your judgement, or skip and let the plant configure its own from scratch later.

Page 10 — Name your plant

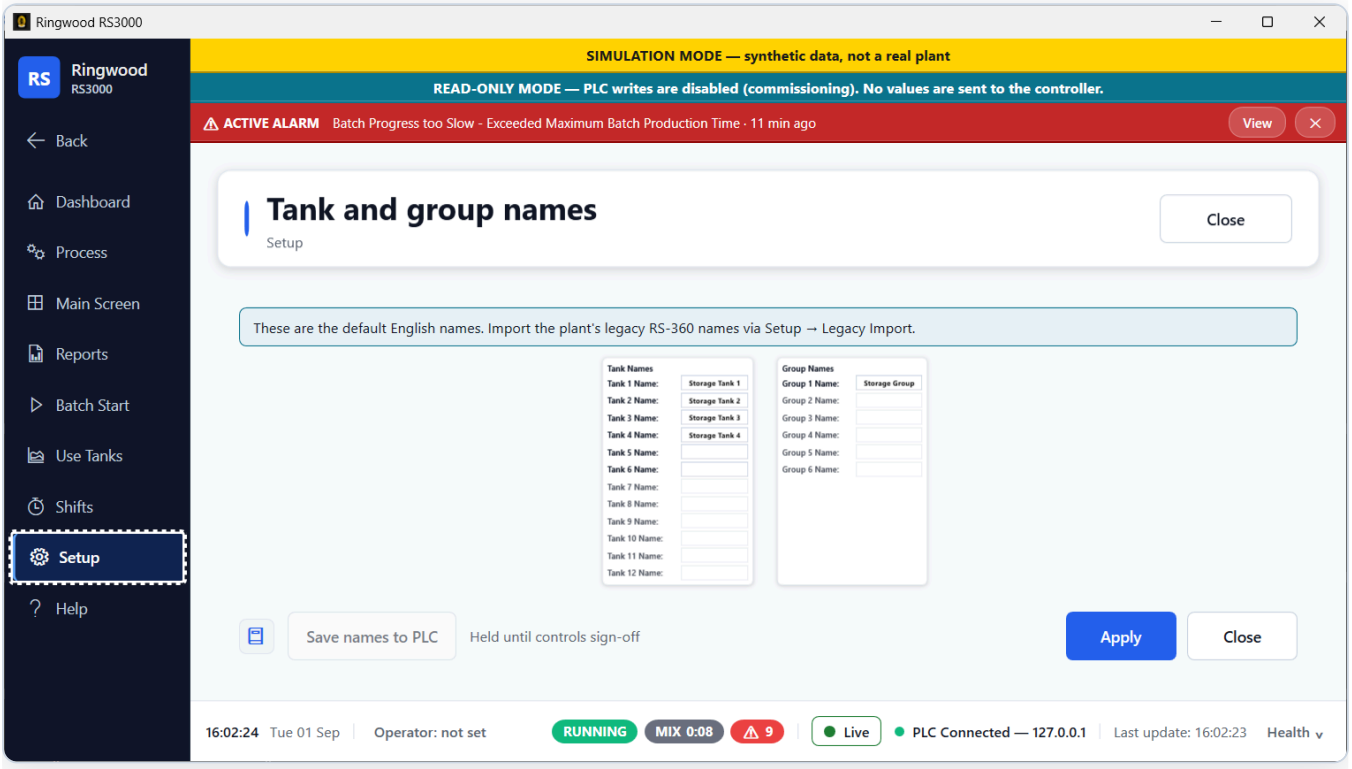
Required — no Skip button. The company name and logo shown in report headers and on screen.

Answer comes from: the settings template's company name, and the logo image file from chapter 1 if you have it (it should already be sitting in `C:\Ring\Pictures\` per chapter 2 — this page has its own **Browse** button too, if you'd rather point it at the file directly). If you don't have the logo yet, leave it blank — you can add it later. Be aware that in this build, the logo you set here does **not** appear anywhere on screen or in a report header yet — see the note on Check 3 in chapter 4 for exactly what it does control.

Page 11 — Plant names

Optional — Skip is available. Offers to import this plant's real tank/equipment names, or use generic English defaults.

Answer comes from: the plant's own naming list, if engineering supplied one; otherwise skip and use the defaults, or set real names later under **Setup → Tank and Group Names Edit** (supervisor password) — not the tank *roster* (that maps tank slots to PLC positions; this page and its follow-up screen are just the display names).



Setup → Tank and Group Names Edit — where you finish this later if you skip page 11 now.

Page 12 — Work shifts

Optional — Skip is available. The plant's shift schedule (names and time spans).

Answer comes from: the plant's actual shift pattern, if known; otherwise skip and set it later under **Setup → Shift Names and Spans** (supervisor password).

Page 13 — Data mirror

Optional — Skip is available. An optional second copy of the database, kept somewhere a dead disk on this laptop can't take out with it — your plant's data, automatically copied somewhere safe.

What to do: tick **"Keep a second copy of the data in another location,"** then point **Mirror folder** at a folder on another drive or a network share — type the path directly, or use **Browse…**. Click **Check folder** before saving: Ring creates the folder if it doesn't already exist, writes and then deletes a tiny marker file to prove it can actually write there (a folder can exist and still be read-only — a locked-down share, a drive

mounted read-only — so this checks more than just "does the folder exist"), and reports the free space on that drive — for example "'*PLANTSHARE\ring-backup' is writable.*" followed by "*812.4 GB free.*" A folder Ring can't write to is reported just as plainly: "*Ring cannot write to '\PLANTSHARE\ring-backup'.*" with the underlying Windows error shown beneath it.

What Ring actually does with this, once it's turned on: a full database export — a plain `.sql` text file, not a locked binary copy — is written to that folder once when Ring starts, again every 60 minutes for as long as Ring keeps running, and once more shortly after every batch completes. Each copy is written to a temporary file first and only swapped into place once it's completely finished, so a copy caught mid-write by a power cut or a dropped network share never leaves a half-written file sitting where a real one should be. Only the newest 14 copies are kept; older ones are deleted automatically as new ones land. If the folder later vanishes — the share goes offline, a drive gets unplugged — Ring does not crash and does not stop running: it logs the problem and shows a non-blocking warning toast, then simply tries again on the next scheduled copy.

> **Changing this later:** there is no separate Data Mirror screen in the Setup menu — to turn the mirror on, off, or point it somewhere else after today, re-run **Setup → Setup Wizard** and revisit this page (the in-app note under the folder field says the same).

Answer comes from: whatever second location the plant actually has available — another local drive, a NAS share, a server folder. Skip this page entirely if there is nowhere else to put a copy yet; nothing else in the wizard depends on this being answered.

Page 14 — Readiness check

Optional — Skip is available. A live PASS / WARN / FAIL look at whether this station is actually ready, run automatically the moment you reach this page and re-runnable on demand. Purely informational — nothing here blocks **Next**, and nothing here writes anything to the PLC or the database; it's a checklist for you, not a gate.

Two buttons sit above the list: **Re-run checks** (runs everything again — useful right after you've fixed something) and **Copy report** (copies the same PASS/WARN/FAIL text to the clipboard, ready to paste into an email or a ticket).

Ring checks these, in this order, each shown as its own colored row:

Check	What it looks at
PLC connection	Re-runs the exact same staged, read-only probe as page 4's Test connection button. PASS shows the address and the heartbeat value it read; FAIL names which stage it stopped at.
Database	Confirms Ring's SQLite file can actually be written to, and reports its journal mode. PASS if writable with journal mode `WAL`; WARN if writable but in some other journal mode; FAIL if it can't be opened or written to at all.
Screen resolution	PASS/FAIL only, against the same 1280×720 minimum as chapter 1's pre-flight check.

Check	What it looks at
Passwords	PASS once both Supervisor and Administrator have been changed from the shipped default; otherwise WARN, naming which tier is still default. This shares the exact same check as page 6's Current state line — including the same known gap around a password of literally `ringwood` called out there.
Demo mode	PASS if off; WARN if this station is still showing synthetic demo data instead of the live plant.
Data mirror folder	Only appears at all if you turned the mirror on on page 13. PASS if that folder is still writable; FAIL if it is not.
Disk free space	PASS/WARN/FAIL against the same low-disk thresholds Ring's own running low-disk alarm uses, measured on the drive holding the database.

Answer comes from: nothing you type — read it, fix anything WARN or FAIL if you reasonably can before leaving site, and move on. Whatever this page shows the last time it ran is also what gets folded into the Finish page's install record, on page 15, next.

Page 15 — You're all set

Required — no Skip button (this is the last page). Several cards, top to bottom:

1. **Your setup** — a summary of what you entered (language, PLC endpoint, company, email, alert recipients, plant names), with the read-only safety state shown last, in color: green when read-only is still on, bold red if it has been turned off.
2. **Good to know** — three reminder tips, Ring's own words, not this book's: *"You can re-run this wizard any time from Setup → Setup Wizard,"* *"PLC writes stay suppressed while Ring is in read-only mode,"* and *"Email and alert settings live under Setup → Email & Alerts."*
3. **Optional: back up now** — the same *"Back up the database now…"* button as before, described as *"Capture a snapshot of the configured database before opening Ring — a clean post-commissioning restore point."* Below that button is a line reporting on a restore point Ring already took **automatically, on its own**, at the very first Next you clicked this wizard run — as early as page 1, before anything had actually changed on disk yet: either *"A restore point was saved at `<folder>`"* — a timestamped folder under Ring's backup area holding a copy of the config files and the database as they were at that moment — or, on a brand-new install with nothing to back up yet, *"No restore point was needed — this station had no existing config or database to back up yet."* This automatic restore point is separate from, and in addition to, whatever you save manually with the backup button.
4. **Installation record** — a **Save install record** button. It writes a plain-text commissioning sheet — every wizard choice, plus the Readiness page's last results if you ran page 14 — to your **Documents** folder, and, if you turned on the data mirror on page 13, to that folder as well. Password rows never record an actual value, only whether each tier was left as **"shipped default"** or has been **"set."**

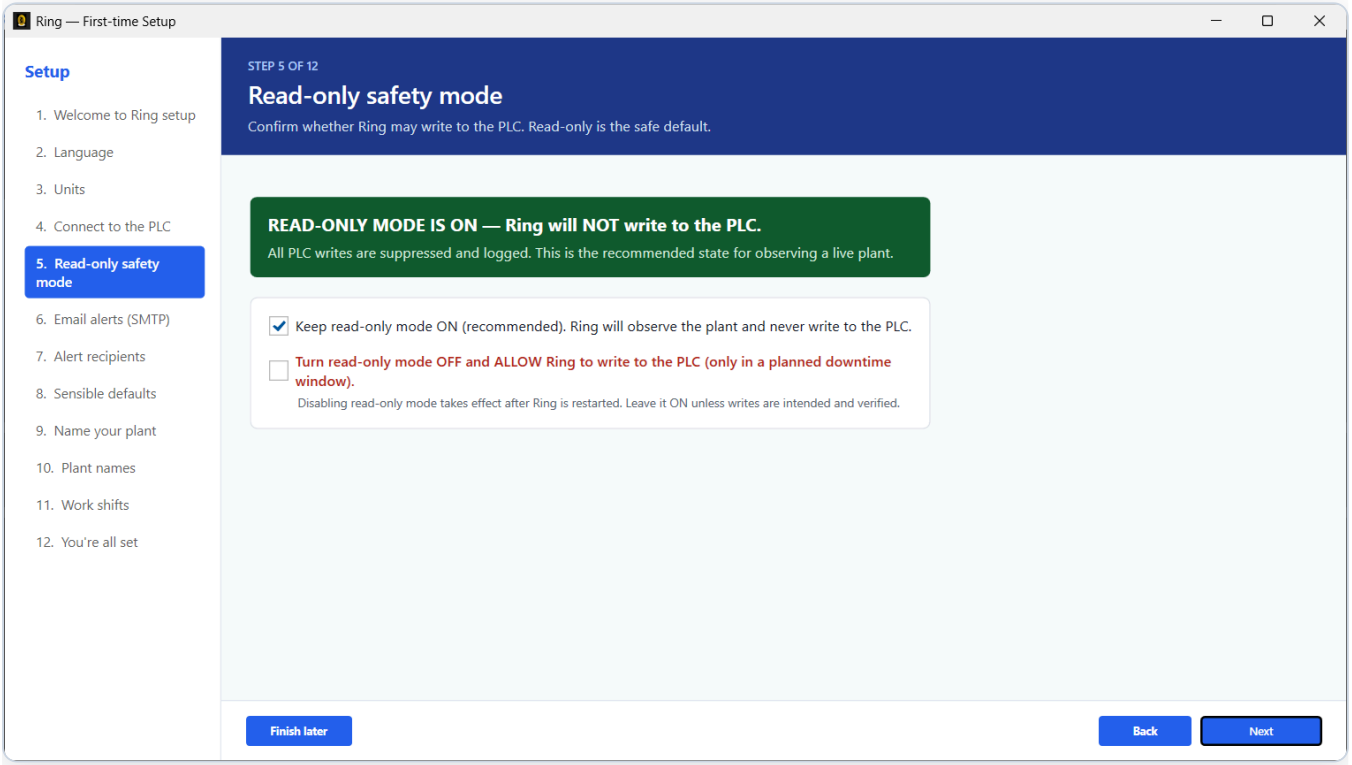
What to do: review what's shown; click the backup button if you want a manual backup on top of the automatic restore point (recommended); click **Save install record** to keep tonight's choices for your own paperwork or the plant's; note the three tips above for the handoff conversation in chapter 4. Then click

Finish — this page's Next button is literally labeled **Finish**, not Next — to open Ring for real.

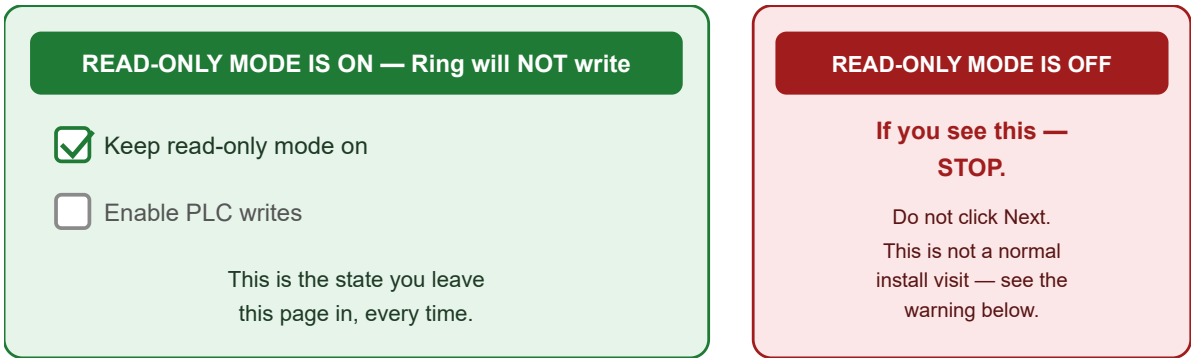
Page 5, in detail: Read-only safety mode — the one page you must get right

This page exists specifically so that nobody — installer or engineer — accidentally lets Ring start sending commands to a live controller before the plant has actually signed off on that. Read it slowly. The page shows a large colored banner that changes depending on the current state:

- **Green banner**, when read-only is on: *"READ-ONLY MODE IS ON — Ring will NOT write to the PLC." / "All PLC writes are suppressed and logged. This is the recommended state for observing a live plant."*
- **Red banner**, if read-only were ever turned off: *"WARNING: READ-ONLY MODE IS OFF — Ring CAN write to the PLC." / "Ring may send commands to the live controller. Only run in this state during a planned, verified downtime window."*



Page 5 as it actually renders — the safe, expected state: green banner, "Keep read-only mode on" ticked.



The state to recognize either way: green banner, "Keep read-only mode on" ticked, "Enable PLC writes" left unticked. If you ever see the red state on the right instead, stop and read the

warning below before doing anything else.

Below the banner are two checkboxes, and they are deliberately set up so you cannot tick both:

- **Keep read-only mode on** (confirms the safe, current state)
- **Enable PLC writes** (turns the safe state off)

> **Warning: leave read-only mode ON.** Tick the "keep read-only mode on" checkbox and click Next. Turning writes on is **not your decision to make** — it is a separate, later, formally-approved event (the plant's "cutover"), run by Ringwood's own engineers against a signed-off checklist. Never tick "Enable PLC writes" during a normal installation visit, no matter who asks you to over the phone, unless you have been explicitly told this exact visit *is* the scheduled, signed-off cutover. If you are ever unsure which visit this is, stop and ask — do not guess.

If you leave the default alone and simply confirm it, nothing is written to any file at all — Ring only writes to its settings file when you *change* something on this page. That is by design: confirming a safe state should never touch anything.

Re-running the wizard later

The wizard automatically appears again on a later restart only if Ring's internal record shows it was never finished, or if a future Ring update changes the wizard enough to need re-asking a few questions. For a routine follow-up visit — filling in the email settings you skipped on day one, for example — you don't need to trigger any of that: once Ring is open, **Setup** → **Password** (supervisor), then **Setup** → **Setup Wizard**, and it opens the exact same set of pages again, with your previous answers already filled in.

> **A note on this specific wave of pages.** The three new pages — Passwords, Data mirror, Readiness — and the PLC/Finish page updates described above shipped without bumping the wizard's internal version number. That is deliberate: a station that had already finished the wizard under the previous build will **not** be forced back through it — nothing about those stations changes on its own. Only a brand-new install, or someone deliberately choosing **Setup** → **Setup Wizard** to re-run it, will ever see the new pages. If you want an already-commissioned station to get the Passwords/Data mirror/Readiness pages (or the PLC page's live tag panel and the Finish page's install record button), the only way is the manual re-run above — there is no automatic prompt coming for it.

Getting into the Setup menu (you will need this)

Every "**Setup** → **something**" instruction in this book — including the one just above — assumes you can actually get into the Setup menu. You can't, not right away: **Setup is locked until you type a password**, and this book will send you there ten more times across this chapter and the next two, including as the very first step of chapter 5's own evidence-collection procedure. Read this once now so none of those later instructions stall you.

1. Tap **Setup** in the navigation rail. A password box appears — this is normal, not an error.

2. The two passwords are the `SupervisorPassword` and `AdminPassword` values you typed into `appsettings.local.json` back in chapter 2 — or whatever you set on page 6 of the wizard above, if you changed them there instead. Keep them with you for the whole visit; you'll need them repeatedly.

3. There are **two tiers**, and they unlock different things:

Password	Unlocks
Supervisor	Setup Wizard, Email & Alerts, Alarm Alerts, Tanks (including the tank roster), Tank and Group Names Edit, Shift Names and Spans, Database Backup / Restore, Plant Profile, Tag Inspector, Communication Monitor
Administrator	Everything supervisor unlocks, **plus** Diagnostic Console, Edit Passwords, Viscometer, Groups, Data Entry, Factory Reset

   The single most common surprise: **Diagnostic Console is administrator-tier**, not supervisor. If you only have the supervisor password and open Setup expecting to find Diagnostic Console for chapter 5's evidence-collection procedure, it simply won't be in the list — that's the password tier, not a missing feature.

   > **Locked out? There is a service override.** Ring includes a fixed service override password that installation and service engineers can use at either the Supervisor or Admin prompt, at any site, even after the site has changed both passwords. Use it only when a site's password has been lost or forgotten. The value is never printed in this guide — it is on your commissioning sheet and on the gated engineer download page. Every use is written to Ring's tamper-evident audit journal, naming the screen and tier unlocked, so the site can always see that service access occurred.

4. **Setup re-locks itself automatically after about ten minutes of no activity.** If you step away mid-task during a long troubleshooting session, expect to re-enter the password when you come back. Opening the Setup menu again resets that ten-minute clock, so actively working in it keeps it unlocked.

This book never prints an actual password value, and neither should you — don't write one down anywhere it could end up in a ticket, a screenshot, or this book's own install record (chapter 6).

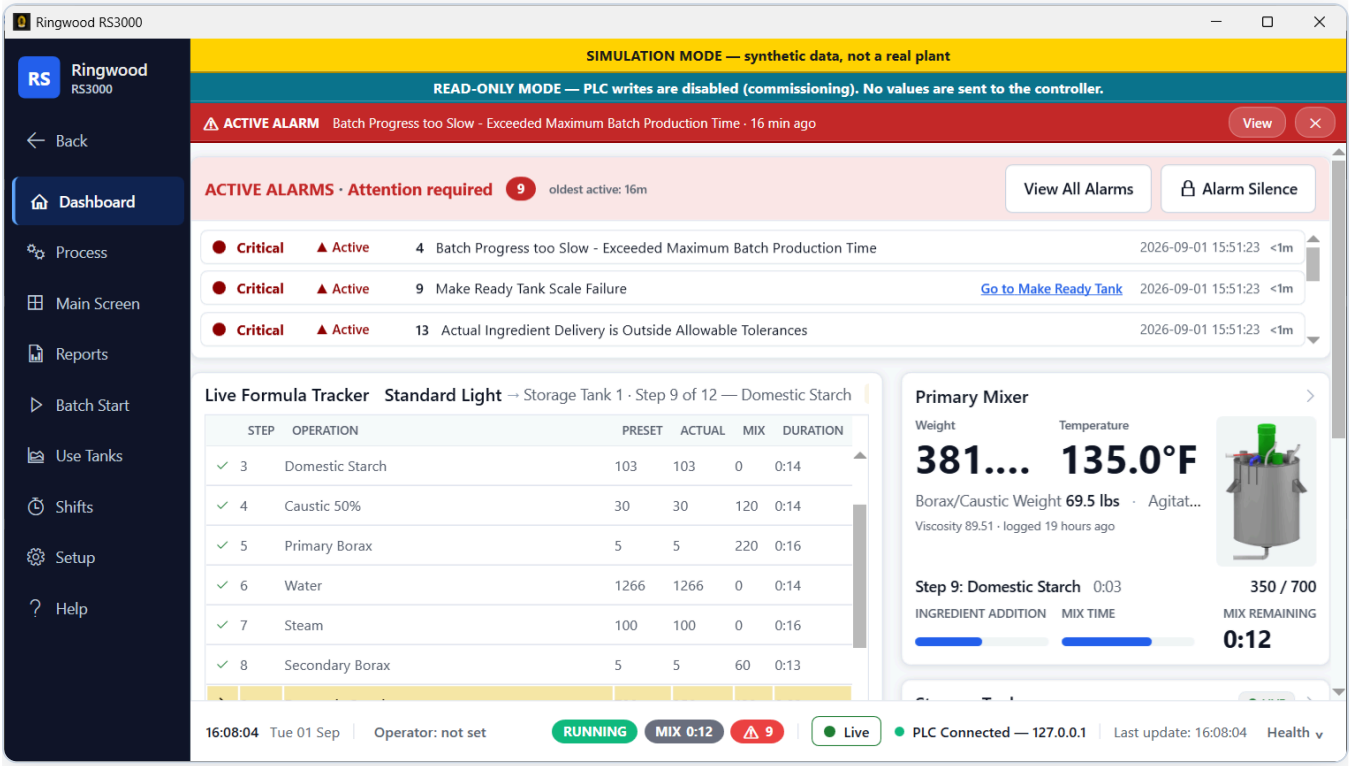
You are done when…

- The wizard's final page has been completed and Ring has opened its normal main screen (not the wizard, not a warning dialog).
- You are certain the read-only safety page was left on **"keep read-only mode on."**
- The PLC address on page 4 is the real plant controller address, not the `127.0.0.1` placeholder, and the "Live from the controller" panel showed real, changing values.

- The Supervisor and Administrator passwords have been changed from the shipped default — or, if not, you know that and have told the plant (page 6's Current state line and page 14's Readiness check both point at this, subject to the known gap noted on page 6).
- You know which optional pages (Passwords, email, recipients, defaults, plant names, shifts, data mirror, readiness) you skipped, so you can tell the plant what still needs finishing.
- You saved an install record from the Finish page before leaving site.

Next: 4. Checking your work.

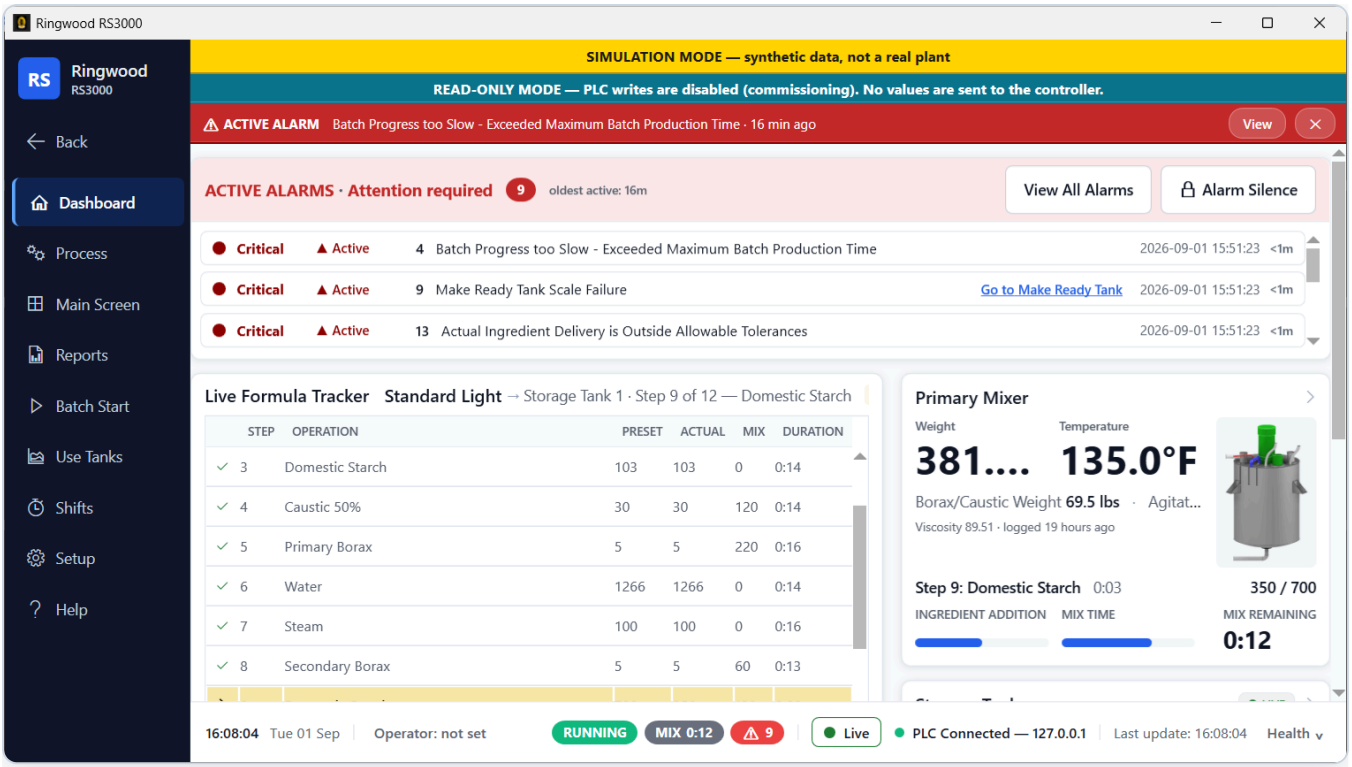
4. Checking your work



What a healthy first start looks like: the Dashboard.

Authority for this chapter: `docs/production-readiness/12_INSTALL_RUNBOOK.md` section 9 (the official 7-step smoke test) restates the same checks in this chapter, in plain language, and follows the application's own actual screens where they differ from the runbook's wording — see the note under Check 4 and Check 2. `docs/production-readiness/09_DB_BACKUP_RESTORE.md` is the authority for where backups live.

Before you leave the site, walk through every check below with Ring open on the plant laptop. Do them in order — some later checks assume an earlier one already passed.



The Dashboard after a good first start — this particular capture is from a demo station, so it carries the yellow SIMULATION MODE banner on top of the teal read-only one. On your live plant install, you should see only the teal READ-ONLY banner (Check 5) and no yellow banner at all.

Check 1 — Ring opens to its normal screen, not a warning

Close Ring completely — there is no File menu; use the window's own close button (top right). A **"Close Ring?"** confirmation appears, explaining that batch history, alarm and trend recording stop until Ring is restarted (the plant itself keeps running on the PLC regardless) — confirm it. Then start Ring again from the **Ringwood HMI** shortcut. This time it should go: splash screen → straight to the normal main screen. No warning dialog, no setup wizard (you already finished that in chapter 3).

> **Note:** If you still see the setup wizard on this second launch, it did not save — go back to chapter 3 and make sure you reached the final **"You're all set"** page and clicked its Next/Finish button, not **Finish later**.

Check 2 — the title bar

Look at the top of the Ring window. It should read **"Ringwood RS3000."** This is a fixed label built into the application — it does not change per plant or per station, so do not expect to see this laptop's own name or station number in it.

> **Note on this book vs. the install runbook:** the install runbook describes this step as checking for a title bar reading "Ringwood — LCP-*N*". That is not what the application actually shows — the title bar text is fixed. This book follows what the application does; if you want to confirm which station this is, that is exactly what your `appsettings.local.json` values in chapter 2 are for, and you can see them again on the wizard's final summary page.

Check 3 — the plant's logo (if you had one to install)

In this build, the logo file does not appear anywhere on screen or in any report — do not expect it to, and don't record its absence as a fault. `ImageSettings.CompanyLogoFile` / `PictureDirectory` are read in exactly two places: the startup checker (which only confirms the file exists, to avoid nagging you with a warning) and the wizard's branding page (which writes the setting when you Browse to a file). Nothing that draws the screen or a report reads it back — the title bar is a fixed "Ringwood RS3000" (Check 2), and every report header renders Ringwood's own compiled logo, not a per-plant one.

So: confirm the file is sitting in `C:\Ring\Pictures\LogoRingwood.png` if the plant supplied one (this silences a startup warning, which is genuinely useful), but don't go hunting for it on screen — there is nowhere for it to show up yet. If the plant specifically asked about their branding appearing in Ring, tell them plainly that customer logos in the app and in report headers are not implemented in this build, rather than promising a follow-up visit will surface it.

Check 4 — the PLC connection indicator

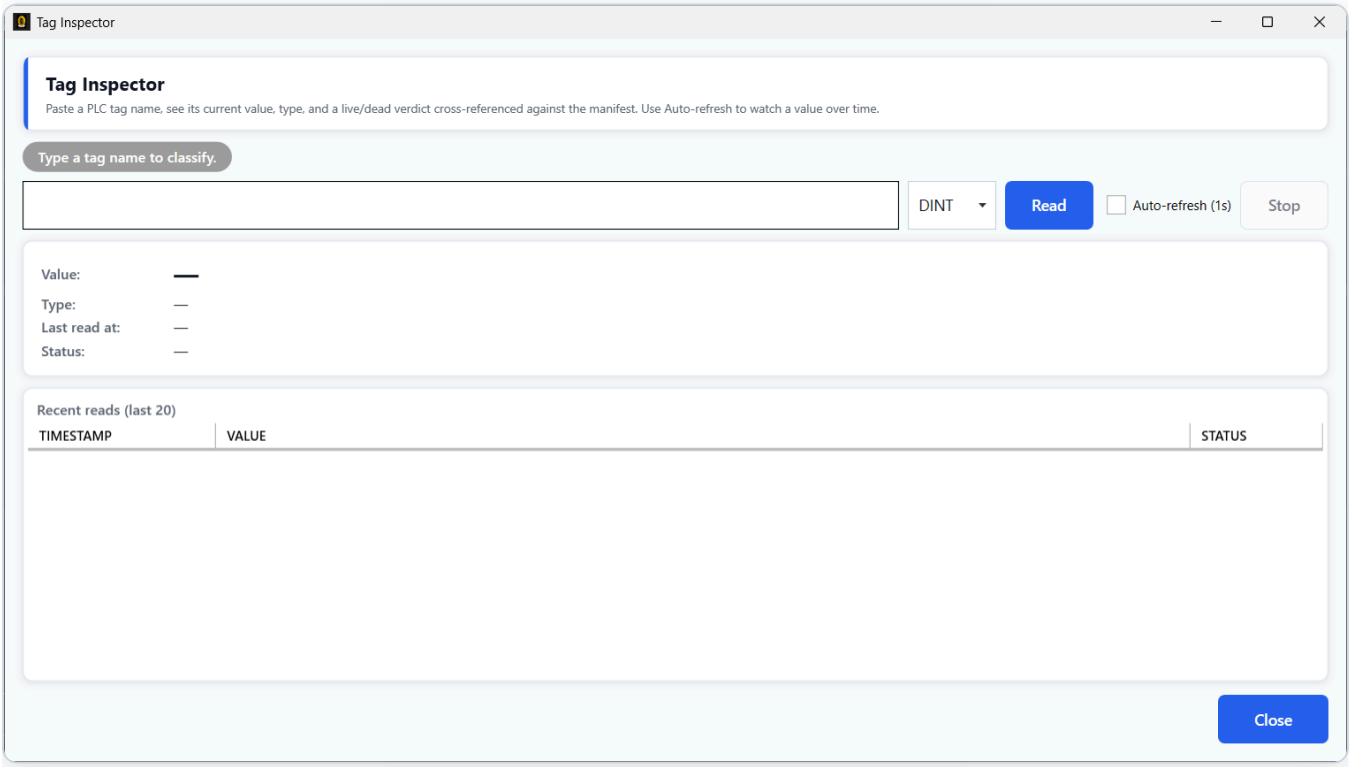
Somewhere in Ring's status strip along the top or bottom of the main window (not on a separate settings screen) there is a small colored indicator showing the state of the connection to the controller. It has three parts: a plain-language badge, a coloured dot with technical status text **and the address Ring is polling**, and a "Last update" clock. Read the badge and the address, then compare against this table:

Badge	Color / text	What it means	Is this expected on your visit?
Live	Green — "PLC Connected — *(address)*"	Ring is actively talking to the controller and getting fresh data.	Yes, if the plant's network and controller were ready when you set the address in chapter 3. This is the goal.
Lagging	Amber/yellow — "PLC heartbeat stale — *(address)*"	Ring was connected but hasn't heard from the controller in a little while.	Only expected as a brief, passing state — if it sits here, treat it as a problem.
Reachable — control logic idle	Amber/yellow — "PLC reachable but heartbeat stopped — *(address)*"	Ring can reach the controller over the network, but the controller's own logic program is not running.	This is normal on a **bench/test rig** where the controller program is deliberately not running yet. It should **not** appear at a live plant — if it does, that is a controls-engineer problem, not something for you to fix.

Badge	Color / text	What it means	Is this expected on your visit?
Connecting…	Amber/yellow — "PLC connecting…"	Ring is still trying to establish the connection.	Expected for the first few seconds after Ring starts; should clear on its own.
Offline	Red — "PLC Disconnected — *(address)*"	Ring cannot reach the controller at all.	Not expected once the controller address is correct and the network is up. See chapter 5 if it stays red.

Read the address, not just the color. Every status string is followed by the address Ring is actually polling. **If it reads `127.0.0.1`, Ring is talking to this laptop, not the plant** — go back to chapter 3, page 4 and fix the address; a green pill against `127.0.0.1` is not success.

If this laptop has `DemoMode` turned on (see Check 5 below), this pill is pinned green ("Live") no matter what the real link is doing — it means nothing on a demo station. That setting should never be on for a live plant install.



Setup → Tag Inspector — if the indicator above isn't green, this is where to look next: read the heartbeat tag directly and see either a live value or the exact error, without needing Studio 5000.

If the indicator is anything other than green: open **Setup → Password** (supervisor), then **Setup → Tag Inspector** and read the heartbeat tag — it either comes back with a live value or it names the error directly. **Setup → Communication Monitor** shows the raw traffic if engineering asks for it. Neither screen writes anything to the controller. Check these before working through chapter 5's ping-and-IP troubleshooting — they are often faster.

> **Note on this book vs. the install runbook:** the install runbook describes reaching this indicator through a "Settings → System → Connection Status" screen. No such screen exists in the application — this indicator is part of the status strip you see on the ordinary main screen at all times, not a separate page you navigate to. This book follows what the application actually shows.

Check 5 — the read-only safety banner is present and correct

You should see a solid teal-colored banner reading: "*READ-ONLY MODE — PLC writes are disabled (commissioning). No values are sent to the controller.*"

> **This banner being visible is correct and expected on every install you do**, unless this specific visit is the formally scheduled cutover (see chapter 3). If you do **not** see this banner, stop: it means read-only mode is off. Do not attempt to fix this by editing files yourself — reopen chapter 3's wizard page via **Setup** → **Password** (supervisor), then **Setup** → **Setup Wizard**, tick "keep read-only mode on," and if it still doesn't reappear, call engineering before leaving the laptop unattended.

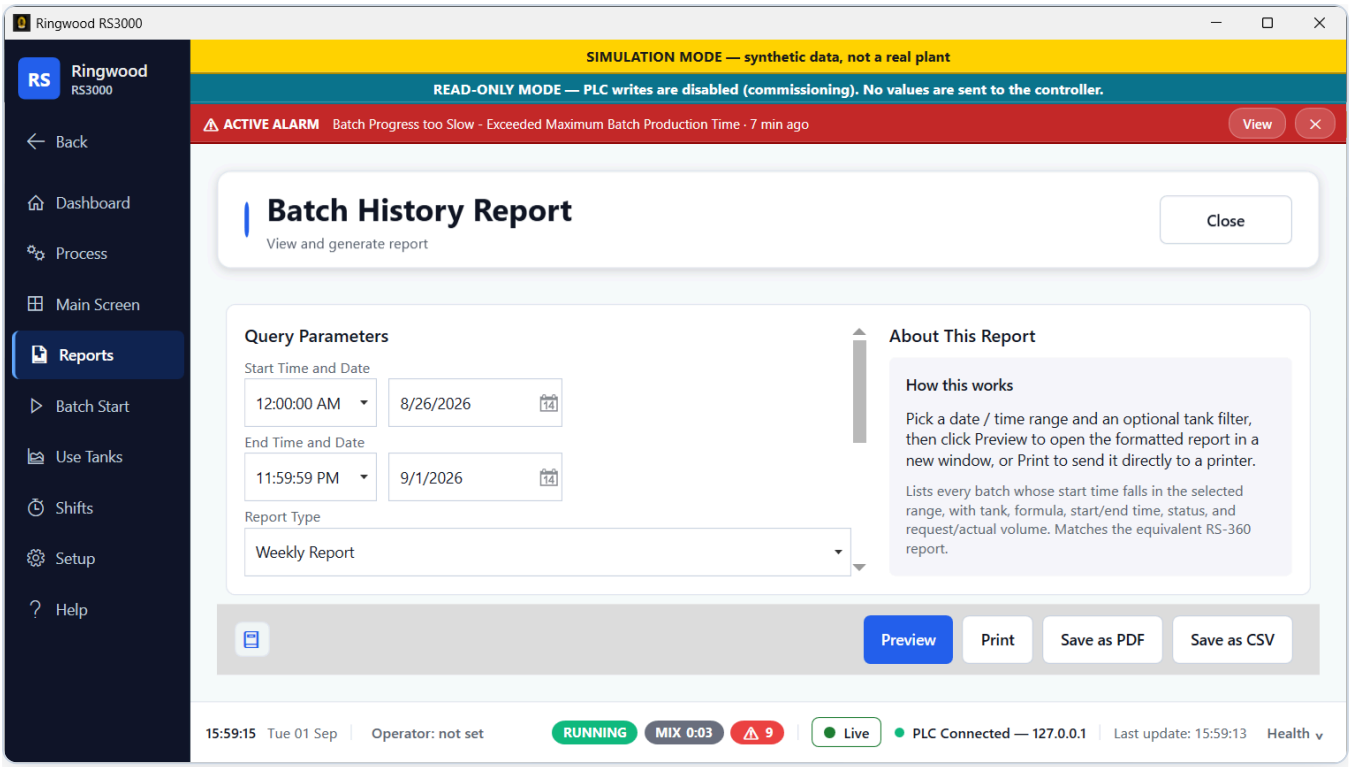
Separately, if this laptop happens to have `DemoMode` turned on (a setting only engineering would have asked for, for a training or trade-show station, never for a live plant), you'd also see a distinct **yellow** demo banner. The two banners are independent and mean different things — do not confuse a yellow demo banner with the teal read-only banner, and do not expect a live plant install to show a yellow banner at all.

There must also be no red banner below the teal one. A separate, danger-colored banner appears if the database failed to start, or the saved tank roster couldn't be read — either one forces read-only for the whole session regardless of your settings file, and the tank cards may be showing the wrong tanks. If you see it, stop and call engineering; do not hand over a laptop showing a red banner. Because a database failure can force the teal banner on even when your settings file says otherwise, also open `appsettings.local.json` and confirm `PlcSettings.ReadOnlyMode` is still `true` there, as a second, independent confirmation.

Check 6 — a report actually opens

From the main screen, open any report (for example, one of the Batch reports — see the operator manual's report chapter for the full list of what's available once training has covered them). Confirm:

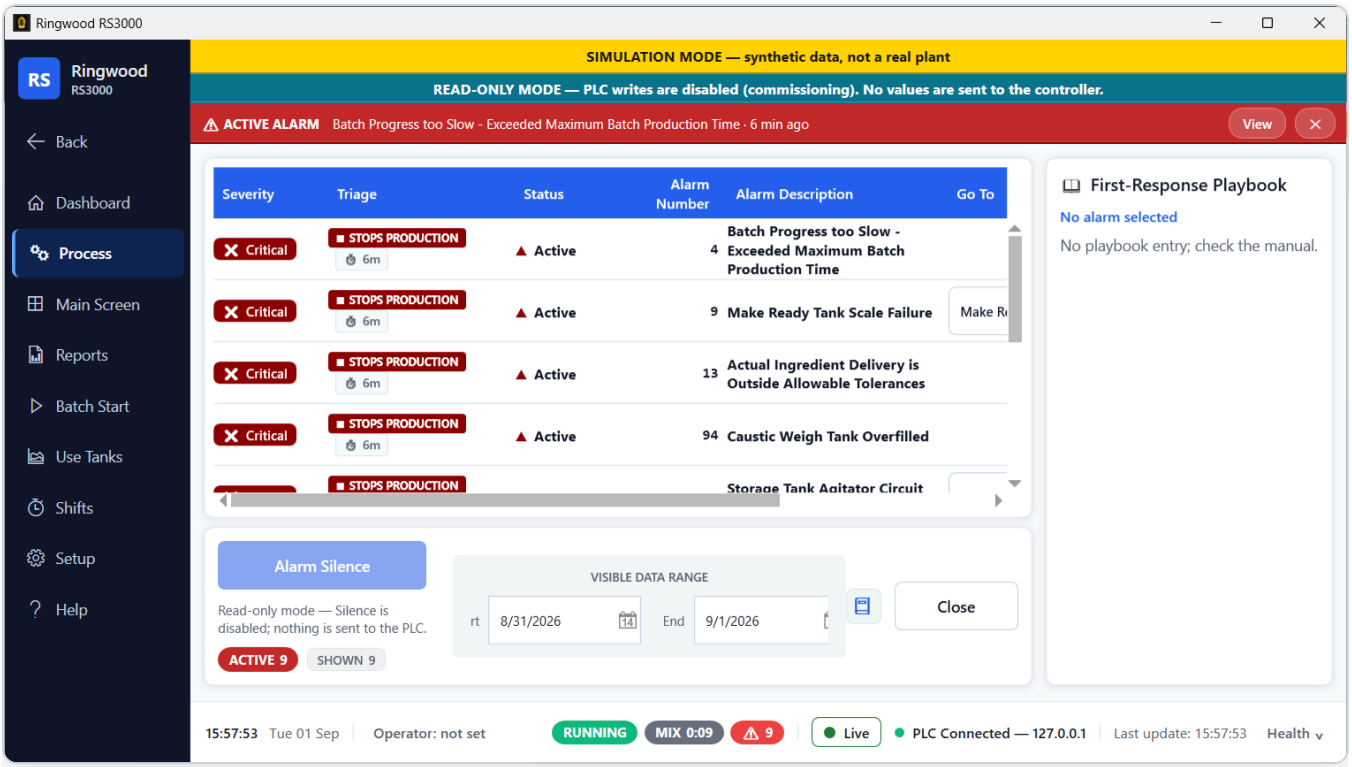
- The report window opens without an error.
- The report shows data (or a clear "no data yet" state) rather than an error message. On a brand-new install with no batch history yet, an empty report is the **correct** result, not a fault — an error message is the thing to worry about.



The Batch History Report screen — pick a date range and click Preview. On a fresh install with no batches yet, the opened report will be empty; that's expected, not a fault.

Check 7 — the Alarms screen opens

Open **Process** → **Alarms** (or the **View All Alarms** button from the Dashboard) — Alarms is not a top-level item in the navigation rail by itself. It should render an alarm list without crashing — on a bench/test rig with the controller logic not running, this list may be empty or show a fixed set of "not running" alarms; on a live plant with the controller running, it should reflect whatever the controller is actually reporting.



Process → Alarms. On a bench rig this list may be empty or fixed; against a live controller it mirrors whatever the controller is reporting.

Check 8 — where the database file lives now

If you added `Database.ConnectionString` to `appsettings.local.json` per chapter 2, Ring's database file lives wherever you pointed it — confirm that path instead of the one below. If you left it out, Ring creates it right next to the application itself, on the same drive as the program files:

```
C:\Ring\App\RingwoodDatabase.db
```

You don't need to open or inspect this file — just confirm (in File Explorer) that it exists and its size is bigger than zero bytes. This is the file that holds every batch record, formula, and setting from this point forward. Leaving it in the default location works, but means a future re-install that removes `C:\Ring\App\` (see chapter 5) would delete it too — that's exactly why chapter 2 recommends pointing it somewhere else.

Check 9 — automatic backups are happening

Ring automatically makes a backup copy of its database every time it starts (this is separate from the manual **Setup → Database Backup / Restore** screen operators can use any time). If you added `DatabaseMaintenance.BackupDirectory` in chapter 2, confirm backups are landing there instead. Otherwise, confirm the default location:

1. In File Explorer, go to `%ProgramData%\Ring\backups\` (type that path directly into the File Explorer address bar).
2. You should see at least one file named like `RingwoodDatabase-auto-20260901-091500.db` — the numbers are the date and time of that backup.

3. Ring keeps the most recent 7 of these automatically and deletes older ones on its own — you don't need to clean this folder up yourself.

   Note: If this folder doesn't exist yet, restart Ring once more (the backup runs at startup) and check again.

Check 10 — the startup log is clean

Open `%ProgramData%\Ring\logs\application.log` in Notepad and look at the entries from your most recent start. Search for the word "**validation**". You should find **no** `Configuration validation warning` or `Configuration validation error` lines from this boot. This matters more than it sounds: an unresolved warning shows a dialog that waits for a click, and if this laptop is ever restarted unattended (chapter 2's watchdog), nobody will be there to click it.

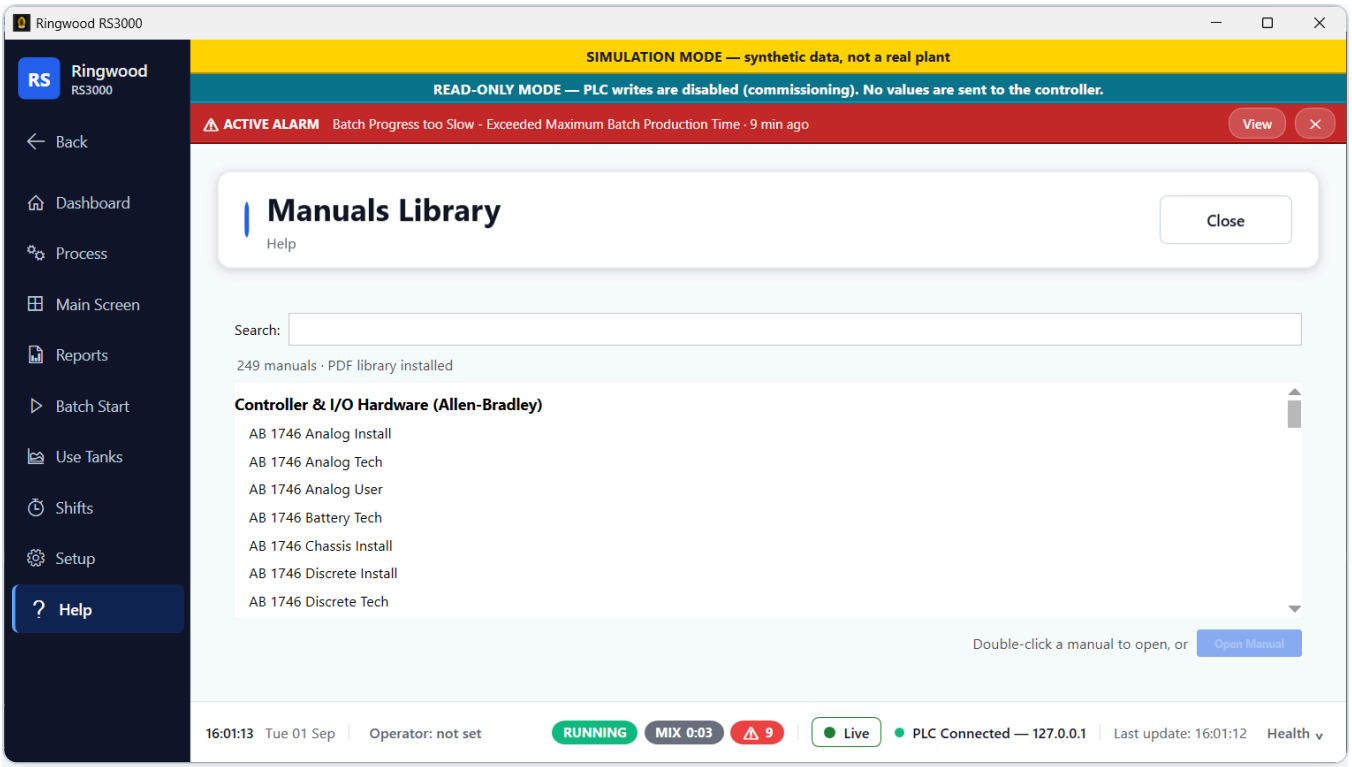
A couple of warnings are expected and harmless on a no-logo install — don't mistake them for a real problem:

- `ImageSettings.CompanyLogoFile "..." not found in PictureDirectory` — expected if you don't have a logo file yet (see Check 3).
- `ImageSettings.ReportBannerFile "..." not found in PictureDirectory` — same; this file isn't used by anything yet regardless (see Check 3).

Any other warning or error line is worth reading carefully and, if you're not sure it's safe to ignore, worth a call to engineering before you leave the laptop unattended.

Check 11 — the Manuals Library

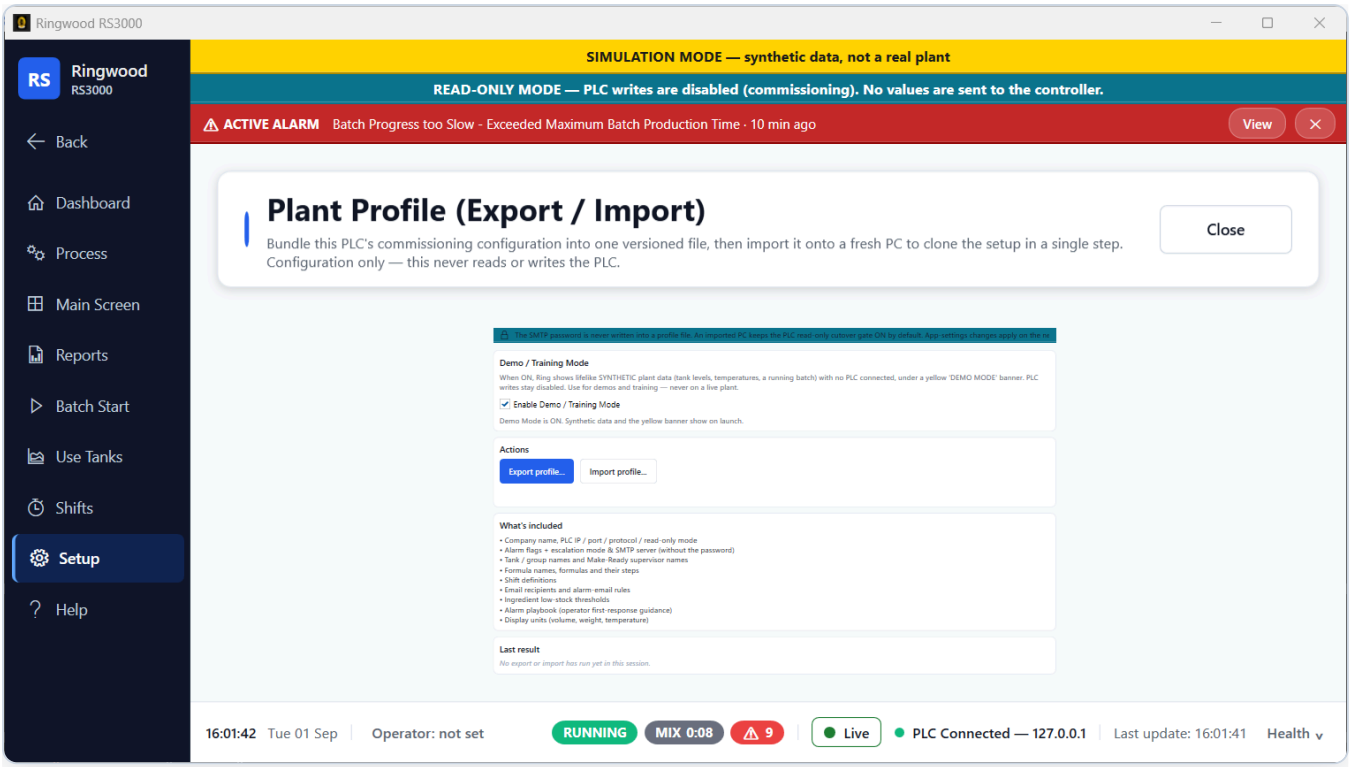
Open **Help** → **Manuals Library**. If you copied the PDF library into place in chapter 2, the status line should read "*N* manuals · PDF library installed", and double-clicking any manual in the list should open it. If you didn't bring the library on this visit, it instead reads "*N* manuals indexed — PDF library not installed on this PC" — that's expected, not a fault; tell the plant it can be added on a later visit.



Help → Manuals Library — confirms the PDF library copied into C:\Ring\Manuals\ is actually readable from inside Ring.

Check 12 — export the plant profile

Before you leave, capture a snapshot of exactly how you configured this station. Open **Setup → Password** (supervisor), then **Setup → Plant Profile**, click **Export**, and accept the default filename (something like `plant-profile-20260901-0915.ringprofile.json`). Save it to the USB drive you brought, and plan to send it to engineering along with your handoff notes.



Setup → Plant Profile — export before you leave. It's safe to email: the mail server password is deliberately left out of the file.

This is one of the most useful things you can do at the end of a visit: the exported file records the tank/group names, formulas, shifts, alarm rules, and hardware options exactly as you left them, and carries the read-only setting so a PC rebuilt from it stays inside the safety gate by default. A future laptop swap or second-station install can start from this file instead of repeating chapters 2 and 3 from scratch. It is deliberately safe to email or leave on a shared drive — the mail server password is never written into the export.

Where everything lives

Ring's files end up in more than one place. Engineering will ask you for some of these by name — this table is worth photographing before you leave.

What	Where	Do you touch it?
Application folder	`C:\Ring\App\`	Yes — this is what you installed in chapter 2.
Your settings file	`C:\Ring\App\Config\appsettings.local.json`	Yes — you created and edited this in chapter 2.
Database file	`C:\Ring\App\RingwoodDatabase.db`, or wherever `Database.ConnectionString` points	Not directly — Ring reads and writes it; you confirm it exists (Check 8).
Automatic backups	`%ProgramData%\Ring\backups\`, or wherever `DatabaseMaintenance.BackupDirectory` points	No — Ring manages retention on its own (Check 9).

What	Where	Do you touch it?
Application log	`%ProgramData%\Ring\logs\application.log`	Read-only — you check this (Check 10) and send it if asked.
Crash reports (managed)	`C:\Ring\App\logs\crashes\`	Read-only — collected only if something crashes (chapter 5).
Crash reports (native, if configured)	`C:\Ring\logs\dumps\`	Read-only — same, only present if the kiosk install script set up crash dumps (chapter 2).
Logo image	`C:\Ring\Pictures\LogoRingwood.png`	Yes — you copy this in chapter 2, if supplied.
Icons	`C:\Ring\Icons\`	No — created for future use; nothing to put here today.
Manuals PDF library	`C:\Ring\Manuals\`	Yes — you copy this in chapter 2, if supplied (Check 11).

Why there are two "logs" folders: Ring's day-to-day application log lives in the shared Windows data folder (`%ProgramData%\Ring\`) because that location stays writable no matter who is logged in. A crash report — written only when Ring fails hard — lands next to the program itself instead. Engineering usually wants both when something goes wrong, which is exactly why the Diagnostic Console's export bundle (chapter 5) tries to collect what it can in one step — though as chapter 5 explains, it doesn't currently include either log folder, so collect them by hand as well.

Leave-behind notes for the operators

Your job ends at a verified, working install — training the operators on how to actually *run* the plant with Ring is a separate job. Point the people running that training at what the plant can actually open once you've driven away:

- **The Operator Manual** — published online and as a downloadable PDF, written for the people running the plant day to day, not for you. Leave its glossary page open on the laptop before you go — it defines every term you've been using all day (heartbeat, LCP, read-only mode, TVC, RS3000 vs. RS360, and more): ../operator/08-glossary.md. The manual's front page is ../operator/README.md.
- **`OPERATOR_TRAINING_RUNBOOK.md`** is the internal, step-by-step script Ringwood's own trainer works from during a formal training session. It also ships *inside the application* at `C:\Ring\App\Assets\Manuals\` and is reachable from **Help** → **Manuals Library** (Check 11) — no repository access needed to open it on the laptop itself. If you only have a repository link to it, that link won't open from the plant floor; ask engineering for the copy that shipped in the package instead.
- The install, rollback and cutover runbooks (`12_INSTALL_RUNBOOK.md`, `13_RS3000_ROLLBACK.md`, `CUTOVER_RUNBOOK.md`, `STARCH_SYSTEM_CUTOVER_RUNBOOK.md`) are the four `.md` files that shipped at the root of your extracted package (chapter 2) — leave that scratch folder on the laptop or the plant's file share rather than relying on anyone finding them online later.

Before you leave, also make sure whoever will run the training session has:

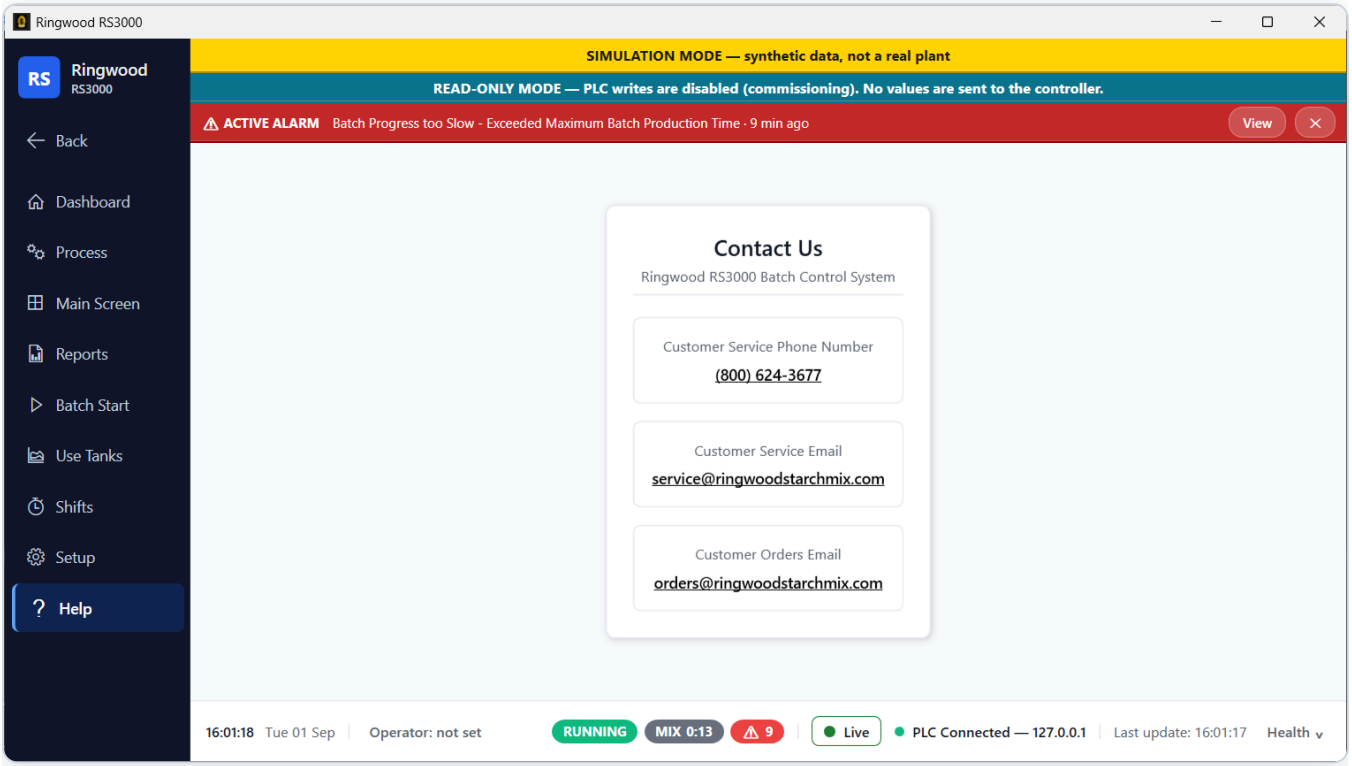
- The desktop shortcut confirmed working (Check 1 above).
- Told which optional wizard pages you skipped (email alerts, recipients, plant names, shifts — see chapter 3), so training can flag what still needs finishing.
- Confirmed that read-only mode is on, and understands that it stays that way until the formally scheduled cutover — this is worth repeating to them in your own words, since it is the one thing every operator should hear before their first session.

You are done when…

- Checks 1 through 12 above all passed (or, for Check 4, the network is confirmed not available yet and you've recorded that per chapter 3).
- You know, and have written down, anything that didn't pass and what you did about it (or who you called).
- The person taking over for operator training has what they need from the "Leave-behind notes" section above.

Next: 5. When something goes wrong.

5. When something goes wrong



Help → Contact Us.

Authority for this chapter: `docs/production-readiness/12_INSTALL_RUNBOOK.md` section 10 (rollback for **your own, still-in-progress install**) and `docs/production-readiness/13_RS3000_ROLLBACK.md` (reverting a **plant that was already live**, which is not your job — see The line you never cross below).

First: which kind of problem is this?

Before you do anything, work out which of these two situations you're in — the right response is completely different for each.

Situation	What it looks like	What you do
A. Your own install visit hasn't finished yet, and something is broken.	You're still on chapter 2, 3, or 4 of this book, this laptop has never been handed to operators, and a step failed.	This is **your job**. Use the quick table and the rollback steps below.
B. Ring has already been live on this laptop, operators have been using it, and something goes wrong later.	Anyone reports a problem with a laptop that already passed its install and has been running for a while, especially after the plant's PLC write "cutover" event.	This is **not your job**. It goes to `docs/production-readiness/13_RS3000_ROLLBACK.md`, run by Ringwood's own engineers under a time-boxed procedure. Call the rollback contact from chapter 1 and stop.

Everything else in this chapter is about situation A — something broken partway through **this** visit. If instead you're visiting a laptop that already has a **working** Ring on it and you're simply putting a newer version on top (nothing is broken; this is a planned update), that's a different job with its own steps: see chapter 2, "Putting a new version on a laptop that already has Ring".

Quick symptom table

Symptom	Likely cause	First thing to try	Where to read more
Nothing happens when you double-click the shortcut	**Ring is probably already running.** It only ever allows one copy — a second launch against a healthy instance silently brings the existing window to the front and closes itself with no message at all. Only after ruling that out: files were never unblocked before extracting, or the VC++ software is missing.	Alt-Tab and check every display/monitor for an already-open Ring window. Open Task Manager and look for `Ring.exe` under Details — if it's there, End Task, wait ten seconds, and launch again. Only then re-check unblocking and VC++ in chapter 2	Ch. 2, this chapter
"Startup Configuration Error" dialog, app closes	`appsettings.local.json` has a typo or a missing required value	Re-run the `ConvertFrom-Json` check from chapter 2	Ch. 2, Ch. 3
Splash screen shows, then nothing (no wizard, no main screen, no dialog)	Something failed silently before it could show you a dialog	Check `%ProgramData%\Ring\logs\application.log` for the most recent entries; collect a diagnostic bundle (below) and call engineering	This chapter
PLC indicator is red ("PLC Disconnected") and stays that way	Wrong controller address, cable/network not actually up yet, or the controller genuinely isn't reachable from this laptop	First, open **Setup** → **Password** (supervisor), then **Setup** → **Tag Inspector** and try reading the heartbeat tag directly (see chapter 4, Check 4) — it often names the problem faster than the steps below. Then: confirm the address in your settings file matches the plant's template exactly; confirm with `ping <the address>` from the same PowerShell window; confirm with plant IT that this laptop is really on the controller's network segment	Ch. 4

Symptom	Likely cause	First thing to try	Where to read more
PLC indicator says "PLC reachable but heartbeat stopped — controller logic not running" **at a live plant** (not a bench rig)	The controller's own program isn't running	This is a controls-engineer problem, not an installer one — call engineering, do not attempt to start or change anything in the controller yourself	Ch. 4
Wrong language on screen	The Language page of the wizard was answered wrong, or needs changing after the fact	**Setup** → **Password** (supervisor), then **Setup** → **Setup Wizard**, go to the Language page, fix it, click through to Finish	Ch. 3
Read-only teal banner is missing	Read-only mode has been turned off somehow	Stop. Do not try to fix this by editing a file. Reopen (**Setup** → **Password**, supervisor, then) **Setup** → **Setup Wizard**'s read-only page, confirm "keep read-only mode on," and if it still doesn't reappear, call engineering before leaving the laptop	Ch. 3, Ch. 4
Touchscreen doesn't register taps, or registers them in the wrong place	This is a Windows/hardware touch-calibration issue, not a Ring setting — Ring does not configure touch input	Use Windows' own **Settings** → **Devices** → **Touch** (or `tabletpc.cpl` Tablet PC Settings → Calibrate) to recalibrate; if the touch driver itself isn't installed, that's a Device Manager / plant-IT problem	Windows documentation
Everything on screen looks tiny, or there are grey bars around the edges	The screen is smaller than 1280×720, or Windows display scaling is set high	`Preflight-Check.ps1` (chapter 2) flags this before you even install — re-run it; otherwise check **Settings** → **System** → **Display**	Ch. 1, Ch. 2
App was working, then crashed	Managed crash (Ring wrote a log) or a native crash (Ring vanished with no log)	Check `C:\Ring\App\logs\crashes\` first; if nothing is there, check `C:\Ring\logs\dumps\` (only exists if `Install-RingWerDumps.ps1` — or the one-command kiosk installer that includes it — was run)	Below

Symptom	Likely cause	First thing to try	Where to read more
Watchdog didn't restart Ring after End Task	The kiosk installer wasn't run, or `-RunAsUser` wasn't set to the actual auto-logon account	Re-run the kiosk install command from chapter 2, making sure `-RunAsUser` names the dedicated kiosk account, not whichever account you're installing from	Ch. 2

Collecting evidence to send to engineering

Start on the Health tab, before you collect anything. Inside Ring, go to **Setup** → **Password** (administrator tier — see chapter 3), then **Setup** → **Diagnostic Console...**. Its **Health** tab shows 16 live rows in one glance — PLC endpoint and connection state, heartbeat age and poll interval, data freshness, the database's path/size/journal mode and how long since it last wrote, the config validator's status, the app version and uptime, and the single-instance check — which answers most "is it actually broken, or does it just look broken" questions faster than collecting a bundle first. **Copy diagnostics text** copies that Health panel, as plain text, to the clipboard — quick to paste straight into a phone call or a chat with engineering without leaving the screen.

If the Health tab doesn't answer it, collect **both** of these before you call — the built-in bundle is fast but not exhaustive, and engineering will sometimes ask for the other half too:

1. **The built-in support bundle.** Click **Refresh** once so the console captures a fresh snapshot, then click **Collect support bundle**. There is no Save dialog to answer — it always writes straight to the current user's Desktop as `RingSupportBundle-<computername>-<timestamp>.zip`, and the resulting message box names the exact path so you know where to find it. The bundle auto-includes the rolling application log, recent managed crash logs, native WER crash dumps (if `Install-RingWerDumps.ps1` was run), a **sanitized** copy of the effective configuration (passwords and similar secrets replaced with `***`), a fresh startup-configuration- validator report, `PreflightReport.txt` if one is present next to the install, a database schema/row-count census (**counts only, never row data**), and the last 24 hours of the PLC communication log — everything a first triage pass needs, in one file, with no folder-hunting required.
2. **Fall back to collecting folders by hand only if Ring won't even launch far enough to reach the Diagnostic Console** — the support bundle above already covers what step 2 used to ask you to zip manually. In that launch-failure case, gather instead:
   - `%ProgramData%\Ring\logs\` (the rolling application log)
   - `C:\Ring\App\logs\crashes\` (managed crash reports, if Ring's own code caught the failure)
   - `C:\Ring\logs\dumps\` (native crash minidumps — only present if `Install-RingWerDumps.ps1`, or the one-command kiosk installer that includes it, was run; if this folder doesn't exist, that's expected and not itself a problem)
   - Your `C:\Ring\App\Config\appsettings.local.json`
3. **The exact text of any error dialog**, typed or photographed — don't paraphrase it, the exact wording is often the fastest clue.

Rolling back your own unfinished install

This is a rollback, not an upgrade — the two are opposites and are not interchangeable. A later version's install visit (chapter 2, "Putting a new version on a laptop that already has Ring") only ever *copies new files on top of* a working install, and is safe by construction — the release package itself is built to exclude the database and your settings overlay, so there is nothing in it that could overwrite them. What follows here instead **deletes** `C:\Ring\App\` outright. Use it only for situation A above — an install visit that has not yet been handed to operators. Follow it in order:

1. **Stop Ring** if it's still running (Task Manager → find `Ring.exe` → **End Task**).
2. **Save a copy of the evidence first**, so nothing is lost when you remove files in the next step — zip up `%ProgramData%\Ring\logs\`, `C:\Ring\App\logs\crashes\`, `C:\Ring\App\Config\`, and (if you didn't redirect it in chapter 2) `C:\Ring\App\RingwoodDatabase.db`, into one file somewhere outside `C:\Ring\` (for example, your Desktop or a USB drive).
3. **Remove the install**: delete the `C:\Ring\App\` folder, the **Ringwood HMI** desktop shortcut, and the Start-menu copy you created in chapter 2. Leave `C:\Ring\Pictures\` and `C:\Ring\Icons\` in place — they don't cause harm and save you re-copying logo files on a retry.

   > **Warning:** If you left `Database.ConnectionString` at its default (chapter 2) instead of pointing it outside `C:\Ring\App\`, the database file lives inside the folder you're about to delete — step 2 above is the only copy of it you'll have. Confirm step 2 actually captured it before you delete anything.

4. **If this laptop had a working legacy system before you started** and you disabled or removed it as part of your visit, put it back per that system's own procedure — do not attempt this from memory; ask engineering if you're not certain how.
5. **Send the evidence zip from step 2** to engineering, along with which numbered step in this book you were on and the exact wording of whatever failed.
6. **Do not try the same install again the same day.** Re-attempting with the same package on the same problem usually just repeats it and makes the eventual diagnosis harder, not easier.

The line you never cross

Whatever the symptom, and whoever is asking on the phone, do not do any of the following yourself:

- **Never turn read-only mode off.** That is the formally-scheduled cutover, run by Ringwood's own engineers against a signed-off checklist — never a troubleshooting step, never something to try "just to see."
- **Never touch the PLC or controller directly** — no forcing values, no changing its program, nothing. Ring's own job is to never do this either outside a supervised, signed-off cutover; yours is the same.
- **Never hand-edit any file** beyond exactly what this book told you to create or fill in (`appsettings.local.json`, and nothing else). A file you don't recognize is not yours to open and change.

- **Never run the plant-wide legacy-system rollback procedure yourself.** That is `13_RS3000_ROLLBACK.md`, and it exists specifically because it needs an engineer's judgment about a live, already-operating plant — a different situation from the one this book covers.
- **Never keep retrying the same failed step over and over.** If the quick table and one attempt at its fix don't resolve it, that's the signal to collect evidence and call, not to try five more times.

You are done when…

- You have correctly identified whether you're in situation A or situation B above.
- For situation A: either the problem is fixed and Checks 1-12 in chapter 4 all pass, or you've rolled back cleanly and sent engineering the evidence they need.
- For situation B: you've made the phone call and stopped — this was never yours to fix.

Next: 6. Install record and pre-drive checklist.

6. Install record and pre-drive checklist

Authority for this chapter: it does not introduce anything new — every line below is copied from the "You are done when…" section at the end of chapters 1 through 5. This chapter exists to put the whole visit on one printable page: a single tick-box checklist, and a fill-in record of what you actually did. Print it (or save it as a PDF) before you leave the office, and bring it back filled in.

The whole visit, as one checklist

Chapter 1 — Before you go

- ☐ You have the `.zip` package and its `.sha256.txt` fingerprint file, and Check 1 passed.
- ☐ You have the filled-in settings template for this specific laptop, with no blank fields.
- ☐ You have confirmed the plant's laptop, network, and administrator access will be ready when you arrive.
- ☐ You have a working phone number for the rollback contact.

Chapter 2 — Installing Ring

- ☐ `C:\Ring\App\Ring.exe` exists, with `x64\SQLite.Interop.dll` present.
- ☐ `Config\appsettings.local.json` exists, has this plant's real values — including a real PLC address (not `127.0.0.1`) and two unique passwords that are neither blank nor placeholders — and passed the `ConvertFrom-Json` check with no error.
- ☐ The **Ringwood HMI** shortcut exists on the desktop and in the Start menu.
- ☐ If — and only if — the plant is ready to run unattended: the watchdog restart test actually brought Ring back after you ended its task.

Chapter 3 — First start

- ☐ The wizard's final page has been completed and Ring has opened its normal main screen (not the wizard, not a warning dialog).
- ☐ You are certain the read-only safety page was left on "keep read-only mode on."
- ☐ The PLC address on page 4 is the real plant controller address, not the `127.0.0.1` placeholder.
- ☐ You know which optional pages (email, recipients, defaults, plant names, shifts) you skipped, so you can tell the plant what still needs finishing.

Chapter 4 — Checking your work

- ☐ Checks 1 through 12 all passed (or Check 4's network reachability is explicitly recorded as deferred below).
- ☐ You know, and have written down, anything that didn't pass and what you did about it (or who you called).

- ☐ The person taking over for operator training has what they need from chapter 4's "Leave-behind notes."

Chapter 5 — When something goes wrong (only if something did)

- ☐ You correctly identified whether you were in situation A (your own unfinished visit) or situation B (an already-live plant) before doing anything.
- ☐ Either the problem is fixed and Checks 1-12 in chapter 4 all pass, or you've rolled back cleanly and sent engineering the evidence they need.

Install record

Fill in the right-hand column as you go. Take a photo of the completed page before you leave, in addition to leaving the paper copy with your handoff notes.

Field	Value
Plant / customer name	
Station / LCP name	
Date of visit	
Installer name	
Ring version (from the splash screen — watch for it as Ring starts)	
Controller IP address used	
Controller path (port, slot) used	
Read-only mode confirmed ON at handoff? (Y/N)	
Wizard pages skipped (list page numbers)	
Network / PLC reachable at handoff? (Y / deferred — see chapter 3)	
Plant profile exported to (filename)	
Manuals library installed? (Y/N)	
Watchdog / unattended-restart configured? (Y/N/not yet)	
Operators trained by / date	
Handover accepted by (plant contact, name)	
Anything left unfinished, and who owns finishing it	

Next: back to the chapter list, or — if you're not done — whichever chapter you left off on.