Smart Lift Duplex

User Manual

Application version 2.4.2

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Control Narrative

Your **Smart Lift** station controls **two pumps** that empty a **wet well**. It is a *drain* controller — the opposite of a water-tower station: the pumps run when the level is **high** and stop once the well has been pumped **down**.

The two pumps share the work as **lead and lag**:

- The **lead** pump starts when the well rises to **Start Level**.
- If the well keeps rising to **Lag Start Lvl**, the **lag** pump joins it.
- When the well is drawn down to **Stop Level**, both pumps stop. That start-to-stop sequence is called a **cycle**.
- With **Cycle Mode** set to `Rotate`, the pumps trade the lead role at the end of every cycle so they wear evenly. With `Single`, Pump 1 always leads when it is available.

The well level can come from three independent sources, so one failed sensor does not stop the station:

- a **radar** above the well (the normal choice),
- an analog **rod** (float-rod) sensor, and
- four **floats** — F1 low alarm, F2 high alarm, F3 pump start, F4 pump stop.

Primary Level chooses which one is in charge. If that sensor reads out of range for three minutes straight, the controller marks it in error and automatically falls back to the next available source; floats are always the last resort. When the sensor recovers, control returns to it on its own.

The radar reports the **distance down to the water**, not the level, so the controller works out the level from **Well Height** — how far the radar sits above the bottom of the well. Setting Well Height correctly is what makes the level percentage right.

An optional **second radar over a flume** can be fitted to measure flow depth. It is **monitoring only** — it never affects pumping. Leave **Flume Height** at 0 if your station has no flume radar.

The station protects itself automatically. While in Auto, pumping is suspended whenever any of these is present, and resumes on its own once the condition clears — no reset needed:

- **Low level (dry-run)** — the well is below **Low Level Cutout**, protecting the pumps from running dry. Pumping resumes once the level recovers past the cutout by a margin.
- **No usable level** — every level source has failed. The controller stops rather than pump blind, and raises **Level lockout**.
- **Power loss** — the station is running on its battery backup.
- **High motor current** — a pump drawing more than **Hi Amp Cutout** for 30 seconds is taken out of service and the other pump carries the load. It is returned to service only after the cycle ends and a 10-minute cool-down.
- **Pump fault** — a pump reporting a fault is stopped and taken out of rotation; the healthy pump is promoted and started in its place.

- **Fail to start** — a pump commanded to run that never reports running within 15 seconds is taken out of service and the other pump takes over. It returns automatically once it is actually seen running, or after a 5-minute retry.

Modes

Setting	Options	What it does
Primary Level	`Floats` / `Radar` / `Rod`	Which level source is in charge. On a sensor failure the controller falls back automatically down the list; floats are always last.
Cycle Mode	`Single` / `Rotate`	`Rotate` alternates which pump leads after each completed cycle, balancing run-hours. Both pumps must be in Auto to rotate.
Pump 1 / Pump 2 AHO	`Off` / `Hand` / `Auto`	Per-pump mode. `Off` = pump stays stopped. `Hand` = pump runs **continuously, ignoring every protection** — use only for testing or emergency manual operation, and attend the pump while in Hand. `Auto` = the pump follows the automatic control described above.
Radar enable	`Disabled` / `Enabled`	Whether the radar may be used as a level source. Disable it to take a failed or removed radar out of the failover list.
Rod enable	`Disabled` / `Enabled`	Same, for the analog rod sensor.
Float enable	`Disabled` / `Enabled`	Same, for the floats. With all three disabled the station has no level source and stops on **Level lockout**.
Pump 1 / 2 RunFB Pol	`NO` / `NC`	Matches the controller to how each pump's **run-feedback contact** is wired (normally open or normally closed). Set at installation — do not change unless the panel wiring changes.
Pump 1 / 2 Fault Pol	`NO` / `NC`	Same, for each pump's **fault contact**. `NC` fails safe: a broken wire reads as a fault. Set at installation.

Setpoints

Levels are a **percentage of the well depth**. Because this station drains, keep **Stop Level below Start Level below Lag Start Lvl** — the reverse of a tower-fill station.

Setpoint	Default	Units	What it does
Start Level	70	%	The lead pump starts when the well rises to this.
Lag Start Lvl	85	%	The lag pump joins when the well keeps rising to this. Keep it **above** Start Level.
Stop Level	30	%	Both pumps stop once the well is drawn down to this. Keep it **below** Start Level.

Setpoint	Default	Units	What it does
Low Level Cutout	10	%	Pumping is suspended below this level to stop the pumps running dry.
Hi Amp Cutout	40	A	A pump drawing more than this for 30 seconds is taken out of service until the cycle ends plus 10 minutes.
Well Height	180	in	How far the radar is mounted above the bottom of the well. The controller computes the level from this and the radar's measured distance, so an incorrect value makes every radar level reading wrong.
Flume Height	0	in	How far the optional flume radar is mounted above the flume floor. **Leave 0 if no flume radar is fitted** — Flume Level then stays at 0.
Pump 1 / 2 Speed SP	100	%	The VFD speed each pump runs at (100 % = full speed). Leave at 100 % for across-the-line (contactor) pumps.
Pump 1 / 2 Runtime	—	Hrs	Accumulated run-hours. Write 0 to reset after a pump replacement.

Readings, Alarms and Status

Channel	Meaning	What to do
Well Level	The level the controller is actually using, from whichever source is in charge.	Normal operating value.
Radar Level / **Radar Distance**	The radar's computed level and the raw distance down to the water.	If the level looks wrong but the distance looks right, check **Well Height**.
Rod Level	The analog rod sensor's reading.	Should broadly agree with the radar.
Flume Level	Depth at the flume, if a second radar is fitted. Monitoring only.	Stays 0 when **Flume Height** is 0.
Radar error / **Rod error**	`Error` = that sensor has read out of range for three minutes and has been dropped from service.	The station keeps running on another source. Investigate the sensor; it returns automatically when it reads sensibly again.
Level lockout	`Lockout` = **no** usable level source remains, and pumping has stopped.	Act promptly — the well will keep filling. Check the sensors and their enable settings.
All Pump Error	`Error` = the well is high and **no pump is able to run** (both faulted, locked out, or switched Off).	Urgent — the well is filling with nothing pumping it down.
Pump 1 / 2 Running	Whether each pump is actually running, as reported by its run feedback.	—

Channel	Meaning	What to do
Pump 1 / 2 Faulted	`Fault` = that pump is reporting a fault and has been taken out of rotation.	Clear the fault at the pump/starter; the controller returns it to service by itself.
Pump 1 / 2 Seal Fail	`SEAL FAIL` = that pump's seal-leak detector has tripped.	Schedule service — the pump keeps running.
Pump 1 / 2 Amps	Motor current for each pump.	Feeds the high-current protection.
Power Loss	`POWER LOSS` = the station is on battery backup.	Pumping is suspended until power returns.
Bad Battery	`REPLACE` = the backup battery needs replacing.	Schedule replacement.
P1 / P2 RT Last Cycle	How long that pump ran on its most recent completed cycle, in hours.	A cycle far longer than usual can indicate a worn pump or a high inflow.
P1 / P2 RT Yesterday	Total hours each pump ran during the previous day.	Useful for comparing duty between the two pumps.

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