

Smart Pump Duplex

User Manual

Application version 3.6.0



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Control Narrative

Your **Smart Pump Duplex** station controls **two pumps** that either **fill a water tower** or **hold a discharge pressure** — you choose which with the **Station Mode** setting. It is a *fill* controller: pumps run when the tower level (or pressure) is **low** and stop when it recovers.

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

- The **lead** pump starts first, when the tower falls below **Start Level**.
- If the tower keeps falling below **Lag Start Lvl**, the **lag** pump joins it.
- When the tower recovers 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.

In Pressure mode the station starts the lead pump when discharge pressure falls below **Press Start SP** and stops at **Press Stop SP** (only one pump runs in this mode).

In **OD-PP** mode ("on-demand ping-pong", for stations whose VFDs start, speed-regulate, and stop **themselves** on pressure demand) the controller does not start or stop the pumps at all — it only decides **which pump is allowed to run**, by moving a single enable between them. When the enabled pump finishes a run, the enable moves to the other pump, so they alternate cycle-for-cycle. A faulted pump hands the enable over immediately and is retried on its next turn once its fault clears; a pump switched to `Off` is skipped. In this mode the level/pressure setpoints do not apply, and `Hand` behaves like `Auto` (the controller can only enable a pump, never force it to run).

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

- **Low suction** — suction pressure below **Low Suct Cutout** (protects against dry-running).
- **High discharge** — discharge pressure above **Hi Disch Cutout** (over-pressure protection).
- **Power loss** — the station is on its battery backup.
- **Pump fault** — a pump reporting a fault is stopped and taken out of rotation; if the lead pump faults, the healthy pump is automatically promoted to lead and started in its place.
- **Lost tower signal** — the tower level arrives over the cellular network; if it goes silent for more than 10 minutes the station stops pumping rather than fill blind. If **Failover En** is turned on, the station instead keeps running by temporarily switching to pressure control until the tower signal returns.

Each pump also has a variable-speed (VFD) output, driven to that pump's **Speed SP** whenever the pump runs. The controller totals each pump's **run hours** and the station's **flow**; totals are kept through power outages and can be reset (for example, after a pump change). Runtime and flow totals update on the display when a run ends, not continuously while pumping.

Modes

Mode	Choices	What it does
Station Mode	Tower / Pressure / OD-PP	Selects what the station controls on: tower level (with lead/lag), discharge pressure (single pump), or OD-PP (self-controlled VFDs; the controller alternates a single pump-enable).
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.
Failover En	False / True	What happens if the tower signal is lost: False = stop pumping (safe default); True = keep running on pressure control until the signal returns.
P1 / P2 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.
P1 / P2 Fault Pol	NO / NC	Same, for each pump's fault contact . NC fails safe: a broken wire reads as a fault. Set at installation.

The read-only **Pump 1/2 Running** (Stopped/Running) and **Pump 1/2 Faulted** (OK/Fault) displays show each pump's true state after the polarity settings are applied — these are what the cloud fault alerts watch. The **Pump 1/2 Run In** and **Pump 1/2 Fault** displays show the raw wire state, which reads inverted on NC-wired contacts.

Setpoints

All setpoints can be changed at the controller (they are marked with * on the display) or from the cloud dashboard. Changes take effect immediately and are retained through power loss.

Setpoint	Default	Units	How it affects operation
Start Level	20	ft	Tower mode: the lead pump starts when the tower falls below this.
Lag Start Lvl	15	ft	Tower mode: the lag pump joins below this. Keep it below Start Level.
Stop Level	30	ft	Tower mode: both pumps stop when the tower reaches this. Keep it above Start Level.
Press Start SP	40	psi	Pressure mode: the lead pump starts below this pressure.

Setpoint	Default	Units	How it affects operation
Press Stop SP	60	psi	Pressure mode: pumping stops at this pressure. Keep it above Press Start SP.
Low Suct Cutout	5	psi	Pumping is suspended while suction pressure is below this.
Low Suct Hyst	3	psi	After a low-suction trip, pumping resumes once suction recovers to Cutout + this margin (prevents rapid on/off cycling).
Hi Disch Cutout	180	psi	Pumping is suspended while discharge pressure is above this. Keep it above Press Stop SP.
Hi Disch Hyst	10	psi	After a high-discharge trip, pumping resumes once pressure falls to Cutout – this margin.
Pump 1 / 2 Speed SP	100	%	The VFD speed each pump runs at (100 % = full speed).
Pump 1 / 2 Runtime	—	Hrs	Accumulated run-hours (read-only in normal use). Write 0 to reset after a pump replacement.
Flow Total	—	gal	Accumulated flow. Write 0 to reset.
TowerHeight	100	ft	Display scaling: the tower level gauge's full-scale height for your site.
MaxFlowRate	1000	gpm	Display scaling: the flow meter's full-scale rate for your site.

Support: if the station is not behaving as described here, note what the display shows on both lines and contact D6 Labs support before changing protection setpoints.

Readings

Channel	Meaning
Clearwell	The level of the clearwell the station draws from, in feet, computed from the suction transducer (1 psi of water column = 2.31 ft). Monitoring only — the dry-run protection still acts on Low Suct Cutout in psi.
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 an unusually high demand.
P1 / P2 RT Yesterday	Total hours each pump ran during the previous day — useful for comparing duty between the pumps.

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