

Sun Edison/FTC Solar AP90 Single Axis Block Tracker

History: The AP90 Single Axis Block Tracker was developed and manufactured by Sun Edison (SE). Manufacturing was continued by FTC Solar as the assets were transferred. Two controller types were deployed with the original AP90. Neither model is networked or remotely managed like the Lauritzen line of Solar Tracker Controllers, which often leave AP90 plant management in a difficult spot to determine root cause of field failures.

Technical Details: The AP90 block tracker is moved by a 300-480VAC/3-phase 1.5HP powered linear actuator.

- Limit switches may or may not be present.
- In most instances, the linear actuator's motor remains in good order. However, the actuator's accordion boot will become brittle from direct solar UV exposure and eventually crack. This will allow water/dirt ingress into the actuator piston which in turn will promote actuator failure.
- The tracker is not balanced, which will require maximum actuator force to move back toward horizontal from the eastern or western extremes.
- The center anchor and horizontal arm to which the actuator is fastened generally appear to robust and have not shown signs of failures. Careful site inspection of these components must regularly be made.

Inspection: A thorough inspection of all tracker components is required. If a present control system is unable to manually drive an actuator, the actuator can be connected directly to a high voltage power source via a temporary contactor to determine if the tracker remains operable.

- Check tracker load bearings for being aligned, free of dirt, and lubricated in accordance with bearing material composition.
- To promote longevity, it is recommended a shroud or cover be placed over the actuator to block direct UV rays and weather.

Control System Upgrade: A review of existing field layout with an eye for how to cost effectively organize domains of master and slave controllers. For block trackers like the AP90, Internet



communication is generally available at inverter locations. This offers a good opportunity to install a CX3 master controller adjacent to an inverter. Note: a master controller can manage up to 25 block trackers. For larger inverter sizes, a master can effectively be used to manage the same domain of trackers as power a given inverter. For smaller inverter sizes, it may be more cost effective to group several inverter tracker domains into a larger one for a single master controller.



If the existing control enclosures are in good condition, and of sufficient size, a simple backplane swap can be made, thereby minimizing conduit rerouting and power cables. If a new enclosure is warranted, a fiberglass model is warranted to facilitate ease of installation.

Operating temperatures can become extremely high inside control enclosures when fully exposed to direct sunlight. For this reason, a shade cover for the control enclosure is recommended.

Intra-field Communication: Master/Slave communication is done via a RS485 wired network, or wireless. A wired network can comfortably span 1km, is known for high reliability, but may also require more installation effort. The wireless interface operates at 916MHz. The sparsity of block trackers can make wireless networks a challenge to operate, even with directional slave antennas.



Local Status Acquisition: For installations requiring local tracker data acquisition, the Modbus TCP protocol can be used to retrieve operational data from master controllers.

Remote Communication: Remote communication and management with the Lauritzen Valhalla server is best done with standard router and firewall conventions in place. Port forwarding is not required. Internet connection bandwidth and data usage is intentionally kept to a minimum such that even satellite connections can be operated cost effectively. Remote management features include:



- Current field status
- Recent and historical operational data sampling
- Event logging
- Fault information history
- Active remote tracker operation and diagnostics
- Actively participate with field staff in fault detection and repair
- Status and operational reports

Conclusion: Upgrading AP90 trackers with Lauritzen control systems will elevate an existing investment in a solar PV plant to a new level of operational reliability, accountability and with improved return on investment.



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