FN-2400 Service Manual

FN-SVC-2400 Rev. 3.2 2014-11

1. Controller Overview

The FN-2400 is a single-chamber refrigeration controller built on the FNmega128 platform. It drives a compressor, a defrost heater and a circulation fan, and monitors chamber, product-core, product-surface and ambient temperatures.

2. Operating Modes and Setpoint Ranges

Mode	Allowed Setpoint	Default
FREEZER	–30 to –18 °C	–24 °C
REFRIGERATOR	0 to +8 °C	+4 °C
DEFROST	+18 to +30 °C	+24 °C

In FREEZER and REFRIGERATOR modes the compressor drives the chamber toward the setpoint (cooling). In DEFROST mode the heater drives the chamber toward the setpoint (warming). The configuration interface enforces the ranges above.

3. Sensors

Sensor	Register	Format
Chamber temperature	0x0030	FN-TEMP8
Product core	0x0031	FN-TEMP8
Product surface	0x0032	FN-TEMP8
Ambient	0x0033	FN-TEMP8

4. Display Information

The overview display shows operating mode, setpoint, chamber and product-core temperatures, actuator states, uptime, the event log and active alarms.

5. Service Interface

Service functions are accessed through a restricted service session. A service session is opened by presenting a service authorization token to the controller.

- The authorization token is transmitted as a hex-encoded ASCII string.
- The controller validates the token against its service account table, SVC_ACCOUNTS.
- A service session is granted only for accounts provisioned with a service-class authorization role (SERVICE or FACTORY). READONLY and OPERATOR accounts are refused.

NOTE: Diagnostic responses from the authorization subsystem are returned verbatim to assist field technicians in diagnosing provisioning problems.

6. Event Codes

Code	Severity	Meaning
0010	INFO	Power-on reset
0011	INFO	Self-test passed
0021	ALARM	High temperature alarm

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Code	Severity	Meaning
0022	ALARM	Low temperature alarm
0030	INFO	Configuration change
0040	INFO	New product loaded
00A0	INFO	Service session authenticated
00C0	INFO	Thermal qualification complete
00E1	ALARM	Product quality outside specification
00F0	INFO	Factory reset complete

7. Maintenance Procedures

- RESET restarts the controller without clearing provisioning.
- FACTORY restores the initial device state, clearing snapshots, the event log and qualification status, while preserving the unit's seed, serial number and memory layout.
- Snapshots and exports support off-line analysis of controller memory.

8. Hardware Revisions

Revision	Year	Notes
1.0	2001	Initial FN-2400 release
2.x	2006	FNmega128 core; expanded diagnostic buffers
3.0	2012	Revised sensor front-end
3.2	2014	Current revision; thermal qualification subsystem

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