D03 — Dataset Template Schema & Mapping Guide (Dev Pack)

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Purpose: one readable guide that tells the developer how to model ALL dataset templates consistently (no fragmented schemas).

1) Core rule (non-negotiable)

• **E&M; (S11)** is the *master data source of truth* for equipment instances and their available meters/states.

• Dataset templates define *field definitions* (meters/states/events) that attach to equipment **types** and/or **instances**.

• **Daily Log (S06)** stores time-series readings by **equipment_id + field_id + timestamp** (and context = DAILY_LOG / RUNNING_LOG / WORK_ORDER / etc.).

• Workflows (Defects/WOs/Projects/Inventory) link back to equipment_id and can add events/measurements using the same field model.

2) Unified data model (minimum schema)

2.1 Master tables

• equipment_type (global library templates; builder/model packs)

• equipment_instance (per yacht; equipment_id stable forever)

• equipment_system (optional grouping)

• location (vessel zones/spaces)

2.2 Field definition tables (template engine)

• field_definition (field_id, name, canonical_unit, input_type, options, expected_range, default_log_enabled, severity)

• equipment_type_field_map (type_id ↔ field_id, default_log_enabled, default_group/widget)

• equipment_instance_field_override (instance_id ↔ field_id overrides: log_enabled, label override, expected range override)

2.3 Readings + events

• meter_readings (equipment_id, field_id, value, unit, recorded_at, source, context_id)

• equipment_events (equipment_id, event_type, severity, occurred_at, notes, attachments, source, context_id)

2.4 Close-out measurements

• work_order_measurements (optional table) OR use meter_readings with source=WORK_ORDER and context_id=work_order_id (preferred for simplicity).

3) Widget generation for Daily Log

• Daily Log widgets are generated deterministically from E&M; fields where **log_enabled = true**.

• Widgets group by `default_group/widget` (e.g., HVAC/Chillers, Electrical, Bilge, Fuel, Safety).

• Exception-first rendering: show tagged-out items, open defects/WOs, due/overdue PM/Compliance at top of each widget group.

4) How to use the templates you uploaded

Treat each template as:

• a set of **recommended equipment types**

• a set of **default daily meters (fields)**

• a set of **events**

• optional close-out measurement requirements for WOT reporting.

5) Template index (Batch 1)

Template index (summary)

Batteries / Chargers / Inverters / UPS — Types: BATTERY_BANK, BATTERY_CHARGER, INVERTER, UPS_SYSTEM

MVP meters: BANK_VOLTAGE, BANK_SOC, CHARGER_STATUS, UPS_STATUS, UPS_LOAD_PERCENT

Key events: LOW_VOLTAGE_ALARM, CHARGER_FAULT, UPS_ON_BATTERY_EVENT

Bilge & Dewatering — Types: BILGE_SYSTEM, BILGE_PUMP

MVP meters: BILGE_LEVEL_STATE, BILGE_ALARM_ACTIVE, BILGE_PUMP_HOURS, BILGE_PUMP_STATUS

Key events: VERY_HIGH_BILGE_ALARM, PUMP_FAIL_TO_START, OIL_SHEEN_OBSERVED

Chiller & HVAC Plant — Types: CHILLER_PLANT, CHILLER_UNIT

MVP meters: CHW_SUPPLY_TEMP, CHW_RETURN_TEMP, CH_RUN_HOURS, CH_STATUS

Key events: TRIP_LOCKOUT_OCCURRED, HIGH_HEAD_PRESSURE, LOW_SUCTION_PRESSURE

Compressed Air — Types: COMPRESSED_AIR_SYSTEM, AIR_COMPRESSOR, AIR_RECEIVER, AIR_DRYER(optional)

MVP meters: RECEIVER_PRESSURE, COMPRESSOR_STATUS, COMPRESSOR_HOURS

Key events: HIGH_TEMP, FREQUENT_CYCLING, DRYER_ALARM

Electrical Power & Distribution — Types: ELECTRICAL_SYSTEM, MAIN_SWITCHBOARD, EMERGENCY_SWITCHBOARD(optional), SHORE_POWER_INLET

MVP meters: BUS_VOLTAGE, BUS_FREQUENCY, BUS_LOAD_KW/BUS_LOAD_PERCENT, SHORE_CONNECTED, SHORE_AMPS

Key events: BREAKER_TRIP, EARTH_FAULT_ALARM, BLACKOUT_EVENT

Exhaust / Wet Exhaust — Types: EXHAUST_SYSTEM

MVP meters: EXHAUST_BACKPRESSURE(optional), EXHAUST_OUTLET_TEMP(optional), WATER_INJECTION_STATUS, EXHAUST_LEAK_STATE

Key events: WATER_INJECTION_LOST, HIGH_BACKPRESSURE, OVERTEMP

Fire & Safety Systems — Types: FIRE_DETECTION_SYSTEM, FIRE_PUMP, FIXED_FIRE_SUPPRESSION_SYSTEM

MVP meters: FDS_STATUS, FIRE_PUMP_STATUS, FIRE_PUMP_HOURS, FIXED_SYS_STATUS, BOTTLE_PRESSURE_OK/READING

Key events: FIRE_PUMP_FAIL_TO_START, FIXED_SUPPRESSION_ISOLATED, FDS_FAULT_ACTIVE

Fresh Water Pressure / Hydrophore — Types: FRESH_WATER_SYSTEM, FW_PRESSURE_PUMP, PRESSURE_VESSEL

MVP meters: FW_PRESSURE, FW_PUMP_STATUS, FW_PUMP_HOURS, UV_STATUS(optional)

Key events: LOW_PRESSURE, EXCESSIVE_CYCLING, UV_ALARM

Fuel System & Filtration — Types: FUEL_SYSTEM, FUEL_TRANSFER_PUMP/BOOSTER_PUMP, FUEL_FILTER/FUEL_WATER_SEPARATOR, FUEL_POLISHER(optional)

MVP meters: FUEL_FILTER_DP, FUEL_FILTER_STATUS, FUEL_TRANSFER_ACTIVITY

Key events: DP_HIGH_RISING, WATER_CONTENT_HIGH, MISSING_BDN_SAMPLE

Gearbox / Shafting / Propulsion Train — Types: PROPULSION_TRAIN_SYSTEM, GEARBOX, SHAFT_LINE(optional)

MVP meters: GB_OIL_TEMP, GB_OIL_PRESSURE(optional), GB_OIL_LEVEL_STATE, SHAFT_SEAL_LEAK_RATE

Key events: LOW_OIL_PRESSURE, HIGH_TEMP, LEAK_INCREASED

Diesel Generator — Types: DIESEL_GENERATOR

MVP meters: DG_HOURS, DG_KW_LOAD, DG_LOAD_PCT, DG_VOLTAGE, DG_FREQUENCY_HZ, DG_LO_PRESS, DG_COOLANT_TEMP

Key events: TRIP_SHUTDOWN_OCCURRED, ALARM_OCCURRED, SMOKE_OBSERVED

Hydraulic General Services — Types: HYD_GENERAL_SYSTEM, HYD_POWER_PACK, HYD_CONSUMER

MVP meters: PACK_STATUS, PACK_HOURS, HYD_OIL_LEVEL

Key events: LOW_OIL, OVERTEMP, FILTER_DP_HIGH

Lube Oil Management & Purification — Types: LUBE_OIL_SYSTEM, LO_TRANSFER_PUMP, LO_PURIFIER(optional)

MVP meters: PURIFIER_STATUS, PURIFIER_HOURS

Key events: OIL_SAMPLE_TAKEN, HIGH_WATER_CONTENT, PURIFIER_FAULT

Main Engine — Types: MAIN_ENGINE

MVP meters: ME_HOURS, ME_RPM, ME_LO_PRESS, ME_JW_TEMP, ME_EXH_TEMP_AVG

Key events: TRIP_SHUTDOWN_OCCURRED, ALARM_OCCURRED, SMOKE_OBSERVED

Refrigeration Plant (Cold Rooms/Galley) — Types: REFRIGERATION_UNIT, COLD_ROOM

MVP meters: SPACE_TEMP, UNIT_STATUS, UNIT_RUN_HOURS(optional)

Key events: HIGH_TEMP, DEFROST_FAIL, COMPRESSOR_TRIP

Sea Water Cooling — Types: SEA_WATER_SYSTEM, SEA_WATER_PUMP, STRAINER, HEAT_EXCHANGER

MVP meters: SW_PUMP_STATUS, SW_PUMP_HOURS, STRAINER_DP/STRAINER_CLEAN_STATE, SW_TEMPS(optional)

Key events: LOW_FLOW, STRAINER_BLOCKED, PUMP_FAIL_TO_START

Small Craft (Tenders/PWCs) — Types: SMALL_CRAFT, SMALL_CRAFT_ENGINE(optional)

MVP meters: TRIP_USE_RECORD (hours start/end, fuel start/end), CHECKLIST (pass/fail items)

Key events: CHECKLIST_FAIL→DEFECT, SERVICE_OVERDUE_ALERT

Stabilizers — Types: STABILIZATION_SYSTEM, STABILIZER_UNIT, STABILIZER_HPU(optional)

MVP meters: STAB_MODE, STAB_STATUS, STAB_RUN_HOURS, HPU_STATUS(optional), HPU_HOURS(optional)

Key events: HPU_FAULT, LOCKOUT, OVER_TEMP

Steering & Hydraulics — Types: STEERING_GEAR_SYSTEM, HYDRAULIC_POWER_UNIT

MVP meters: STEERING_STATUS, HPU_STATUS, HPU_RUN_HOURS, HYD_OIL_TEMP(optional), SYSTEM_PRESSURE(optional)

Key events: LOW_OIL_LEVEL, HPU_FAIL_TO_START, HIGH_OIL_TEMP

STP & Waste System — Types: STP_SYSTEM, STP_UNIT(optional)

MVP meters: STP_RUN_HOURS, STP_STATUS, STP_EFFLUENT_CLARITY/CLARITY_RATING, STP_CHLORINE_RESIDUAL(optional), STP_UV_STATUS(optional)

Key events: TRIP_LOCKOUT_OCCURRED, DISCHARGE_RESTRICTED, POOR_CLARITY_ALERT

6) Implementation checklist for the dev

1) Implement the unified schema above (equipment + fields + readings + events).

2) Implement template import: create equipment_type_field_map records per template.

3) Implement onboarding: instantiate equipment instances from equipment library + attach default fields.

4) Implement Daily Log widget builder: read log_enabled fields and render grouped widgets.

5) Ensure WOT reports can write measurements using the same field model (source=WORK_ORDER).

6) Ensure Archive stores evidence/docs; E&M; stores links.

7) Notes

• Several templates explicitly call out the storage rule: readings in meter_readings with source/context (e.g., DAILY_LOG/RUNNING_LOG/WORK_ORDER).

• Safety systems and bilge events may trigger auto-defects (policy already in S01/S06/S07).