

5 - Modelagem de Sistemas

Segue o link de acesso ao protótipo base com as funcionalidades descritas nos requisitos do sistema: [IAGRO - Sistema de Gerenciamento Industrial](#)

Documentação do banco de dados:

1) Escopo e objetivo

Este documento descreve tecnicamente o schema PostgreSQL `public` do iAgro Backend: arquitetura de dados, regras de integridade, domínios funcionais, relacionamentos, padrões de modelagem e pontos críticos de operação.

2) Premissas de arquitetura

- **Banco:** PostgreSQL.
 - **Camada de aplicação:** Prisma (enums e contratos de domínio refletidos no `schema.prisma`).
 - **Modelo de segregação:** multi-tenant via `tenant_id`.
 - **Unidade operacional:** `branch_id` (filial/unidade).
 - **Padrão de ciclo de vida:** `created_at`, `updated_at`, `deleted_at` (soft delete), `disabled_at` (desativação lógica). Nem toda tabela possui os 4 campos — tabelas de log/movimentação (ex.: `stock_movements`) e algumas tabelas técnicas (ex.: `branch_capabilities`) não têm `disabled_at`; `audit_logs` não tem nenhum dos 4 (ver seção 3).
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3) Convenções estruturais

- **PK predominante:** `text` (IDs de aplicação), com exceções `serial4` e `uuid`.
- **Status de negócio:** combinação de campos `status` (`text`) e enums PostgreSQL.
- **Integridade referencial:**
 - `ON DELETE RESTRICT` (ou `NO ACTION`, com efeito equivalente) para preservar histórico em entidades mestres. Cadastros geográficos (`states→regions`, `cities→states`, `farms→cities/tenants`, `farm_plots→farms`, `farm_roads→farms`) usam `NO ACTION` explicitamente no schema.
 - `ON DELETE CASCADE` em hierarquias técnicas (ex.: supervisorio, anexos, componentes de Smart Calda, `recipe_modal_action_reports → smart_caldas`).

- `ON DELETE SET NULL` quando o vínculo é opcional e a remoção não deve apagar o registro pai.
 - **Auditoria:** `audit_logs` é desacoplada por design (sem FK para `tenants`) para evitar perda de trilha em cenários de inconsistência referencial.
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4) Enums e contratos de domínio

Enums de maior impacto operacional:

- `InvoiceImportStatus` : ciclo de importação fiscal.
 - `StorageType` / `StockType` : tipo físico/lógico de estoque.
 - `ItemLifecycleStatus` : ativo/esgotado.
 - `WorkOrderStatus` / `WorkOrderParcelStatus` : ciclo da ordem e da parcela.
 - `TruckRouteStatus` : ciclo logístico.
 - `MovementReason` / `MovementSource` : rastreabilidade da movimentação.
`MovementReason` recebeu valores adicionais ao longo do tempo, incluindo `CANCEL_RETURN_TO_ORIGIN` e `PARENT_TO_REMNANT_AFTER_PARCEL`.
 - `MovementType` (`ENTRY` / `EXIT` / `TRANSFER`): definido no schema como enum de domínio; hoje o campo `stock_movements.movement_type` ainda é `text` livre, não usa esse enum.
 - `MaintenanceType` / `SmartCaldaMaintenanceStatus` : manutenção técnica.
 - `InventoryMode` : modo operacional por filial.
 - `PackagingType` : tipologia de embalagem (`IBC` , `BAG` , `FRACIONADO`).
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5) Mapa de domínios e tabelas

5.1 Core organizacional

- `tenants` , `branches` , `users` , `branch_capabilities`
- Papel: identidade organizacional, escopo de acesso e habilitação de funcionalidades por filial.

5.2 Referenciais geográficos

- `regions` , `states` , `cities`
- Papel: base geográfica para cadastro de fazendas e operações.

5.3 Cadastro agrícola e operacional

- `farms` , `farm_plots` , `farm_roads`
- `cost_centers` , `operations` , `responsible_parties`

- `work_orders`, `work_order_fields`, `work_order_inputs`, `work_order_parcel`, `work_order_parcel_inputs`, `work_order_recipe_plc_sync`
- Papel: planejamento e execução de ordens de serviço agrícolas.

5.4 Catálogo de insumos

- `defensive_classes`, `defensive_labels`, `defensives`, `batches`, `measurement_units`
- Papel: taxonomia e identificação de defensivos/lotos/unidades.

5.5 Fiscal e entrada de inventário

- `suppliers`, `invoice_entries`, `invoice_imports`, `invoice_import_errors`, `inventory_items`
- Papel: origem documental/fiscal do estoque.

5.6 Estoque e movimentação

- `locations`, `stock_items`, `stock_movements`
- Papel: posição atual, rastreamento de movimentação e consistência de saldo.

5.7 Smart Calda e supervisório

- `smart_caldas`, `ibcs`, `silos`, `remnants`, `smart_calda_fixed_parameters`
- `supervisories`, `supervisory_views`, `supervisory_components`, `supervisory_component_images`, `supervisory_alarms`
- `recipe_modal_action_reports` : snapshot arquivado de ações (cancelar/completar receita) disparadas a partir do modal de receita no supervisório.
- Papel: integração de automação/PLC, visualização e alarmística.

5.8 Manutenção técnica

- `smart_calda_maintenance`, `maintenance_attachments`
- Papel: gestão de manutenção e evidências.

5.9 Frota e rastreamento

- `drivers`, `trucks`, `truck_routes`, `truck_route_positions`
- Papel: execução logística por OS/parcela com telemetria.

5.10 Auditoria

- `audit_logs`
- Papel: trilha de ações de API/usuário/sistema.

6) Relacionamentos críticos (visão técnica)

- `tenants` é raiz de quase todo o domínio.

- `branches` deriva de `tenants` e ancora usuários e capacidades.
 - `work_orders` integra:
 - centro de custo, operação, fazenda, responsável.
 - filhos: campos (`work_order_fields`), insumos (`work_order_inputs`), parcelas (`work_order_parcelas`).
 - `work_order_parcelas` conecta operação com execução técnica (`smart_caldas`) e logística (`trucks`).
 - `work_order_recipe_plc_sync` conecta parcela + Smart Calda + receita JSONB + gatilhos de sincronização; `recipe_modal_action_reports` arquiva o histórico de ações de cancelamento/conclusão feitas sobre essa sincronização.
 - Fluxo de estoque:
 - `invoice_entries/imports` → `inventory_items` → `stock_items` → `stock_movements` .
 - `locations` é pivô físico/lógico entre Smart Calda, estoque e estruturas (`ibcs/silos/remnants`).
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7) Triggers e automações de banco

Tabela com automação explícita:

- `work_order_recipe_plc_sync`
 - `recipe_sync_insert_trigger`
 - `recipe_sync_update_trigger`
 - `sync_parcel_status_trigger`

Finalidade técnica:

- notificar mudanças de sincronização (`notify_recipe_sync_changed()`).
- sincronizar status de parcela a partir do status da sincronização (`sync_parcel_status_from_recipe_sync()`).

Tabelas

`audit_logs`

Campos

- `id` text NOT NULL
- "timestamp" timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- `tenant_id` text NOT NULL

- `user_id` text NULL
- `user_email` text NULL
- `"action"` text NOT NULL
- `resource_type` text NOT NULL
- `resource_id` text NULL
- `endpoint` text NOT NULL
- `request_data` text NULL
- `status_code` int4 NOT NULL
- `success` bool DEFAULT true NOT NULL
- `error_message` text NULL
- `ip_address` text NULL
- `user_agent` text NULL
- `previous_data` text NULL

PK: `audit_logs_pkey` (id)

Índices: `audit_logs_action_timestamp_idx`,
`audit_logs_resource_type_resource_id_idx`,
`audit_logs_tenant_id_user_email_idx`, `audit_logs_timestamp_idx`

Nota: `tenant_id` é um campo escalar, sem `@relation` /FK para `tenants` — desacoplamento intencional. A tabela também não segue o padrão de ciclo de vida `created_at/updated_at/deleted_at/disabled_at` (usa apenas `timestamp`), coerente com seu papel de log imutável.

`measurement_units`

Campos

- `id` text NOT NULL
- `code` text NOT NULL
- `description` text NOT NULL
- `abbreviation` text NOT NULL
- `is_active` bool DEFAULT true NOT NULL
- `created_at` timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- `updated_at` timestamp(3) NOT NULL
- `deleted_at` timestamp(3) NULL

PK: measurement_units_pkey (id)

UK: measurement_units_code_key (code)

regions

Campos

- id serial4 NOT NULL
- "name" varchar(50) NOT NULL

PK: regions_pkey (id)

tenants

Campos

- id text NOT NULL
- "name" text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- disabled_at timestamp(3) NULL
- deleted_at timestamp(3) NULL
- updated_at timestamp(3) NOT NULL

PK: tenants_pkey (id)

batches

Campos

- id text NOT NULL
- batch_code text NOT NULL
- defensive_id text NOT NULL
- expiration_date timestamp(3) NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: batches_pkey (id)

FK: batches_tenant_id_fkey (tenant_id -> tenants.id)

UK: batches_tenant_id_defensive_id_batch_code_key (tenant_id, defensive_id, batch_code)

Índices: batches_tenant_id_deleted_at_idx

branches

Campos

- id uuid NOT NULL
- cnpj text NOT NULL
- "name" text NOT NULL
- city text NOT NULL
- state text NOT NULL
- foundation_year int4 NOT NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- status text DEFAULT 'ATIVO'::text NOT NULL
- latitude numeric(9, 6) NULL
- longitude numeric(9, 6) NULL

PK: branches_pkey (id)

FK: branches_tenant_id_fkey (tenant_id -> tenants.id)

UK: branches_cnpj_key (cnpj)

cost_centers

Campos

- id text NOT NULL
- description text NOT NULL
- status text DEFAULT 'ATIVO'::text NOT NULL
- tenant_id text NOT NULL

- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- external_id text NULL
- branch_id uuid NOT NULL

PK: cost_centers_pkey (id)

FK: cost_centers_tenant_id_fkey (tenant_id -> tenants.id)

UK: cost_centers_tenant_id_branch_id_description_key (tenant_id, branch_id, description)

Índices: cost_centers_tenant_id_deleted_at_idx, cost_centers_tenant_id_status_idx

defensive_classes

Campos

- id text NOT NULL
- class_id text NOT NULL
- sap_id text NULL
- class_name text NOT NULL
- status text DEFAULT 'ATIVO'::text NOT NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: defensive_classes_pkey (id)

FK: defensive_classes_tenant_id_fkey (tenant_id -> tenants.id)

UK: defensive_classes_tenant_id_class_id_key, defensive_classes_tenant_id_class_name_key

Índices: defensive_classes_class_id_idx, defensive_classes_class_name_idx, defensive_classes_tenant_id_idx

defensive_labels

Campos

- id text NOT NULL
- cod_group text NOT NULL
- short_description text NOT NULL
- description text NOT NULL
- status text DEFAULT 'ATIVO'::text NOT NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT now() NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- class_id text NULL
- branch_id uuid NOT NULL

PK: defensive_labels_pkey (id)

FKs: defensive_labels_class_id_fkey (class_id -> defensive_classes.id, ON DELETE SET NULL)

defensive_labels_tenant_id_fkey (tenant_id -> tenants.id)

UK: defensive_labels_tenant_id_branch_id_cod_group_key

Índice: defensive_labels_tenant_id_class_id_idx

defensives

Campos

- id text NOT NULL
- trade_name text NOT NULL
- active_ingredient text NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- tenant_id text NOT NULL
- status text DEFAULT 'ATIVO'::text NOT NULL

- `cod_item` text NOT NULL
- `cod_fab` text NOT NULL
- `manufacturer` text NOT NULL
- `label_id` text NOT NULL
- `branch_id` uuid NOT NULL
- `packaging_type` public."PackagingType" NULL

PK: `defensives_pkey` (id)

FKs: `defensives_label_id_fkey`, `defensives_tenant_id_fkey`

UK: `defensives_tenant_id_branch_id_cod_item_key`

drivers

Campos

- `id` text NOT NULL
- `registration_number` text NOT NULL
- `"name"` text NOT NULL
- `contact` text NOT NULL
- `cnh` text NULL
- `cnh_expiration_date` timestamp(3) NULL
- `status` text DEFAULT 'ATIVO'::text NOT NULL
- `tenant_id` text NOT NULL
- `created_at` timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- `updated_at` timestamp(3) NOT NULL
- `deleted_at` timestamp(3) NULL
- `disabled_at` timestamp(3) NULL
- `branch_id` uuid NOT NULL

PK: `drivers_pkey` (id)

FK: `drivers_tenant_id_fkey`

UK: `drivers_tenant_id_registration_number_key`

Índices: `drivers_tenant_id_deleted_at_idx`, `drivers_tenant_id_status_idx`

invoice_imports

Campos

- `id text NOT NULL`
- `file_name text NOT NULL`
- `imported_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL`
- `imported_by text NOT NULL`
- `imported_by_email text NULL`
- `status public."InvoiceImportStatus" DEFAULT 'PENDING'::"InvoiceImportStatus" NOT NULL`
- `total_read int4 DEFAULT 0 NOT NULL`
- `total_valid int4 DEFAULT 0 NOT NULL`
- `total_invalid int4 DEFAULT 0 NOT NULL`
- `total_inserted int4 DEFAULT 0 NOT NULL`
- `total_updated int4 DEFAULT 0 NOT NULL`
- `total_rejected int4 DEFAULT 0 NOT NULL`
- `total_duplicate_file int4 DEFAULT 0 NOT NULL`
- `total_duplicate_db int4 DEFAULT 0 NOT NULL`
- `allow_update_balance bool DEFAULT false NOT NULL`
- `tenant_id text NOT NULL`
- `created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL`
- `updated_at timestamp(3) NOT NULL`
- `branch_id uuid NOT NULL`

PK: `invoice_imports_pkey (id)`

FK: `invoice_imports_tenant_id_fkey`

Índices: `invoice_imports_tenant_id_imported_at_idx`,
`invoice_imports_tenant_id_status_idx`

operations

Campos

- `code text NOT NULL`
- `description text NOT NULL`
- `created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL`
- `updated_at timestamp(3) NOT NULL`
- `deleted_at timestamp(3) NULL`
- `disabled_at timestamp(3) NULL`

- tenant_id text NOT NULL
- external_id text NULL
- branch_id uuid NOT NULL

PK: operations_pkey (code)

FK: operations_tenant_id_fkey

responsible_parties

Campos

- id text NOT NULL
- "name" text NOT NULL
- deleted_at timestamp(3) NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- disabled_at timestamp(3) NULL
- tenant_id text NOT NULL
- external_id text NULL
- branch_id uuid NOT NULL

PK: responsible_parties_pkey (id)

FK: responsible_parties_tenant_id_fkey

smart_caldas

Campos

- id text NOT NULL
- "name" text NOT NULL
- latitude text NOT NULL
- longitude text NOT NULL
- url text NOT NULL
- "token" text NOT NULL
- status text DEFAULT 'OFFLINE'::text NOT NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL

- `deleted_at timestamp(3) NULL`
- `disabled_at timestamp(3) NULL`
- `active_alerts bool DEFAULT true NOT NULL`
- `automatic_backup bool DEFAULT true NOT NULL`
- `equipment_identification text NOT NULL`
- `firmware_version text NULL`
- `installation_date timestamp(3) NOT NULL`
- `last_connection timestamp(3) NULL`
- `linked_plant text NOT NULL`
- `"location" text NOT NULL`
- `observations text NULL`
- `reading_interval int4 NOT NULL`
- `serial_number text NOT NULL`
- `branch_id uuid NOT NULL`
- `configuration_json jsonb NULL`
- `supervisor_device_key text NULL`

PK: `smart_caldas_pkey (id)`

FKs: `smart_caldas_branch_id_fkey, smart_caldas_tenant_id_fkey`

UK: `smart_caldas_supervisor_device_key_key`

`states`

Campos

- `id serial4 NOT NULL`
- `uf_code int4 NOT NULL`
- `"name" varchar(50) NOT NULL`
- `uf bpchar(2) NOT NULL`
- `region_id int4 NOT NULL`

PK: `states_pkey (id)`

FK: `states_regions_fk (region_id -> regions.id)`

`supervisories`

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- smart_calda_id text NOT NULL
- "name" text NOT NULL
- description text NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: supervisories_pkey (id)

FKs: supervisories_smart_calda_id_fkey, supervisories_tenant_id_fkey

Índice: supervisories_tenant_id_smart_calda_id_idx

supervisory_alarms

Campos

- id text NOT NULL
- smart_calda_id text NOT NULL
- tipo text NOT NULL
- mensagem text NOT NULL
- "timestamp" timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- acknowledged bool DEFAULT false NOT NULL
- acknowledged_at timestamp(3) NULL
- acknowledged_by text NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- variable_id int4 NOT NULL
- trigger_on_transition bool DEFAULT false NOT NULL
- last_variable_value bool NULL
- trigger_on_true_to_false bool DEFAULT false NOT NULL
- trigger_on_false_to_true bool DEFAULT false NOT NULL
- branch_id uuid NOT NULL

PK: supervisory_alarms_pkey (id)

FKs: supervisory_alarms_smart_calda_id_fkey,
supervisory_alarms_tenant_id_fkey

Índices: supervisory_alarms_acknowledged_idx,
supervisory_alarms_smart_calda_id_idx,
supervisory_alarms_smart_calda_id_variable_id_idx,
supervisory_alarms_tenant_id_idx,
supervisory_alarms_tenant_id_smart_calda_id_idx,
supervisory_alarms_timestamp_idx, supervisory_alarms_tipo_idx,
supervisory_alarms_variable_id_idx

supervisory_component_images

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- filename text NOT NULL
- original_name text NOT NULL
- mime_type text NOT NULL
- "size" int4 NOT NULL
- description text NULL
- created_at timestamp(3) DEFAULT now() NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: supervisory_component_images_pkey (id)

FK: supervisory_component_images_tenant_id_fkey

Índice: supervisory_component_images_tenant_id_filename_idx

supervisory_views

Campos

- id text NOT NULL
- supervisory_id text NOT NULL
- "name" text NOT NULL

- description text NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- is_fixed bool DEFAULT false NOT NULL

PK: supervisory_views_pkey (id)

FK: supervisory_views_supervisory_id_fkey

Índice: supervisory_views_supervisory_id_idx

suppliers

Campos

- id text NOT NULL
- razao_social text NOT NULL
- nome_fantasia text NULL
- cnpj_cpf text NOT NULL
- inscricao_estadual text NULL
- endereco text NOT NULL
- telefone text NOT NULL
- email text NULL
- status text DEFAULT 'ATIVO'::text NOT NULL
- ultima_compra timestamp(3) NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: suppliers_pkey (id)

FK: suppliers_tenant_id_fkey

trucks

Campos

- id text NOT NULL
- license_plate text NOT NULL
- patrimony text NULL
- volume_liters float8 NOT NULL
- model text NOT NULL
- brand text NOT NULL
- "year" int4 NOT NULL
- observations text NULL
- status text DEFAULT 'ATIVO'::text NOT NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: trucks_pkey (id)

FK: trucks_tenant_id_fkey

UK: trucks_tenant_id_license_plate_key, trucks_tenant_id_patrimony_key

Índices: trucks_tenant_id_deleted_at_idx, trucks_tenant_id_status_idx

users

Campos

- id text NOT NULL
- email text NOT NULL
- first_name text NOT NULL
- last_name text NOT NULL
- profile text NULL
- branch_id uuid NOT NULL
- created_at timestamp(3) DEFAULT now() NOT NULL
- updated_at timestamp(3) NOT NULL

PK: users_pkey (id)

FK: users_branch_id_fkey

UK: `users_email_key`

Nota: `users` não tem `tenant_id` direto (herda `tenant` via `branch_id`) e não possui `deleted_at` / `disabled_at` — foge do padrão de ciclo de vida geral por design.

`branch_capabilities`

Campos

- `id` uuid NOT NULL
- `branch_id` uuid NOT NULL
- `tenant_id` text NOT NULL
- `inventory_mode` public."InventoryMode" DEFAULT 'INTERNAL'::"InventoryMode" NOT NULL
- `stock_internal_enabled` bool DEFAULT true NOT NULL
- `work_orders_enabled` bool DEFAULT true NOT NULL
- `plc_sync_enabled` bool DEFAULT true NOT NULL
- `created_at` timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- `updated_at` timestamp(3) NOT NULL
- `deleted_at` timestamp(3) NULL

PK: `branch_capabilities_pkey` (`id`)

FKs: `branch_capabilities_branch_id_fkey`,
`branch_capabilities_tenant_id_fkey`

UK: `branch_capabilities_branch_id_key`

Índice: `branch_capabilities_tenant_id_idx`

Nota: não possui `disabled_at` — foge do padrão de ciclo de vida completo de 4 campos.

`cities`

Campos

- `id` serial4 NOT NULL
- `code` int4 NOT NULL
- `"name"` varchar(255) NOT NULL
- `state_id` int4 NOT NULL

PK: `cities_pkey` (`id`)

FK: `cities_states_fk`

farms

Campos

- id text NOT NULL
- "name" varchar(50) NOT NULL
- description varchar(255) NULL
- city_id int4 NOT NULL
- latitude numeric(9, 6) NOT NULL
- longitude numeric(9, 6) NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- disabled_at timestamp(3) NULL
- deleted_at timestamp(3) NULL
- tenant_id text NOT NULL
- total_area_ha float8 NOT NULL
- external_code int4 NULL
- branch_id uuid NOT NULL

PK: farms_pkey (id)

FKs: farms_cities_fk, farms_tenants_fk

ibcs

Campos

- id text NOT NULL
- "name" text NOT NULL
- capacity float8 NOT NULL
- smart_calda_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- "position" int4 NOT NULL

PK: ibcs_pkey (id)

FK: ibcs_smart_calda_id_fkey

UK parcial: ibcs_smart_calda_position_unique (smart_calda_id, position)
WHERE deleted_at IS NULL

invoice_entries

Campos

- id text NOT NULL
- invoice_number text NOT NULL
- invoice_series text NULL
- supplier_id text NOT NULL
- entry_date timestamp(3) NOT NULL
- observations text NULL
- created_by text NOT NULL
- created_by_email text NULL
- updated_by text NULL
- updated_by_email text NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: invoice_entries_pkey (id)

FKs: invoice_entries_supplier_id_fkey, invoice_entries_tenant_id_fkey

UK: invoice_entries_tenant_id_invoice_number_supplier_id_entry__key

Índices: invoice_entries_tenant_id_deleted_at_idx,
invoice_entries_tenant_id_entry_date_idx,
invoice_entries_tenant_id_invoice_number_idx

invoice_import_errors

Campos

- id text NOT NULL
- import_id text NOT NULL
- line_number int4 NOT NULL

- error_type text NOT NULL
- error_message text NOT NULL
- field_name text NULL
- field_value text NULL
- raw_data jsonb NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL

PK: invoice_import_errors_pkey (id)

FK: invoice_import_errors_import_id_fkey

Índice: invoice_import_errors_import_id_idx

remnants

Campos

- id text NOT NULL
- "name" text NOT NULL
- capacity float8 NOT NULL
- smart_calda_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL

PK: remnants_pkey (id)

FK: remnants_smart_calda_id_fkey

silos

Campos

- id text NOT NULL
- "name" text NOT NULL
- capacity float8 NOT NULL
- smart_calda_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- "position" int4 NOT NULL

PK: silos_pkey (id)

FK: silos_smart_calda_id_fkey

UK parcial: silos_smart_calda_position_unique (smart_calda_id, position)

WHERE deleted_at IS NULL

smart_calda_fixed_parameters

Campos

- id text NOT NULL
- smart_calda_id text NOT NULL
- start_variable_id int4 NULL
- stop_variable_id int4 NULL
- emergency_variable_id int4 NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- status_variable_id int4 NULL
- software_revision_variable_id int4 NULL
- recipe_cancel_variable_id int4 NULL

PK: smart_calda_fixed_parameters_pkey (id)

FK: smart_calda_fixed_parameters_smart_calda_id_fkey

UK: smart_calda_fixed_parameters_smart_calda_id_key

smart_calda_maintenance

Campos

- id text NOT NULL
- smart_calda_id text NOT NULL
- maintenance_type public."MaintenanceType" NOT NULL
- summary text NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL

- status public."SmartCaldaMaintenanceStatus" DEFAULT 'PENDING'::"SmartCaldaMaintenanceStatus" NOT NULL
- maintenance_date timestamp(3) NOT NULL
- responsible_email text NULL
- branch_id uuid NOT NULL

PK: smart_calda_maintenance_pkey (id)

FKs: smart_calda_maintenance_smart_calda_id_fkey,
smart_calda_maintenance_tenant_id_fkey

supervisory_components

Campos

- id text NOT NULL
- view_id text NOT NULL
- "type" text NOT NULL
- position_x float8 NOT NULL
- position_y float8 NOT NULL
- variable_id int4 NULL
- "label" text NULL
- width float8 NULL
- height float8 NULL
- config jsonb NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- data_block_id int4 NULL

PK: supervisory_components_pkey (id)

FK: supervisory_components_view_id_fkey

Índice: supervisory_components_view_id_idx

work_orders

Campos

- id text NOT NULL

- tenant_id text NOT NULL
- "number" text NOT NULL
- generation_date timestamp(3) NOT NULL
- cost_center_id text NOT NULL
- operation_id text NOT NULL
- calda_per_ha_liters numeric(65, 30) NOT NULL
- farm_id text NOT NULL
- responsible_id text NULL
- production_area_ha numeric(65, 30) NOT NULL
- status public."WorkOrderStatus" DEFAULT 'PENDENTE'::"WorkOrderStatus" NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- branch_id uuid NOT NULL
- observations text NULL

PK: work_orders_pkey (id)

FKs: work_orders_cost_center_id_fkey, work_orders_farm_id_fkey, work_orders_operation_id_fkey, work_orders_responsible_id_fkey, work_orders_tenant_id_fkey

UK: work_orders_tenant_id_number_key

Índices: work_orders_tenant_id_created_at_idx, work_orders_tenant_id_status_idx

farm_plots

Campos

- id text NOT NULL
- "name" varchar(50) NOT NULL
- description varchar(255) NULL
- farm_id text NOT NULL
- area_ha float8 NOT NULL
- latitude numeric(9, 6) NOT NULL

- longitude numeric(9, 6) NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- disabled_at timestamp(3) NULL
- deleted_at timestamp(3) NULL

PK: farm_plots_pkey (id)

FK: farm_plots_farms_fk

farm_roads

Campos

- id text NOT NULL
- "name" varchar(50) NOT NULL
- description varchar(255) NULL
- farm_id text NOT NULL
- area_ha float8 NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- disabled_at timestamp(3) NULL
- deleted_at timestamp(3) NULL

PK: farm_roads_pkey (id)

FK: farm_roads_farms_fk

maintenance_attachments

Campos

- id text NOT NULL
- file_name text NOT NULL
- original_name text NOT NULL
- file_path text NOT NULL
- mime_type text NOT NULL
- "size" int4 NOT NULL
- smart_calda_maintenance_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL

- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL

PK: maintenance_attachments_pkey (id)

FK: maintenance_attachments_smart_calda_maintenance_id_fkey

work_order_fields

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- work_order_id text NOT NULL
- field_id text NOT NULL
- field_area_ha numeric(65, 30) NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: work_order_fields_pkey (id)

FKs: work_order_fields_field_id_fkey, work_order_fields_tenant_id_fkey, work_order_fields_work_order_id_fkey

Índices: work_order_fields_tenant_id_idx, work_order_fields_work_order_id_idx

work_order_inputs

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- work_order_id text NOT NULL
- dose_per_ha numeric(65, 30) NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- label_id text NOT NULL

- branch_id uuid NOT NULL

PK: work_order_inputs_pkey (id)

FKs: work_order_inputs_label_id_fkey, work_order_inputs_tenant_id_fkey, work_order_inputs_work_order_id_fkey

Índice: work_order_inputs_tenant_id_work_order_id_idx

work_order_parcelas

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- work_order_id text NOT NULL
- "sequence" int4 NOT NULL
- area_ha numeric(65, 30) NULL
- volume_liters numeric(65, 30) NULL
- status public."WorkOrderParcelStatus" DEFAULT 'NA_MAQUINA'::"WorkOrderParcelStatus" NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- smart_calda_id text NULL
- truck_id text NULL
- truck_capacity_liters numeric(65, 30) NULL
- percentage_of_total numeric(65, 30) NULL
- branch_id uuid NOT NULL
- process_sequence int4 DEFAULT 0 NOT NULL

PK: work_order_parcelas_pkey (id)

FKs: work_order_parcelas_smart_calda_id_fkey, work_order_parcelas_tenant_id_fkey, work_order_parcelas_truck_id_fkey, work_order_parcelas_work_order_id_fkey

UK: work_order_parcelas_work_order_id_sequence_key

Índice: work_order_parcelas_tenant_id_idx

work_order_recipe_plc_sync

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- work_order_id text NOT NULL
- parcel_id text NOT NULL
- smart_calda_id text NOT NULL
- recipe_data jsonb NOT NULL
- status public."WorkOrderParcelStatus" DEFAULT 'BLOQUEADO'::"WorkOrderParcelStatus" NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- branch_id uuid NOT NULL

PK: work_order_recipe_plc_sync_pkey (id)

FKs: work_order_recipe_plc_sync_parcel_id_fkey ,
work_order_recipe_plc_sync_smart_calda_id_fkey ,
work_order_recipe_plc_sync_tenant_id_fkey ,
work_order_recipe_plc_sync_work_order_id_fkey

UK: work_order_recipe_plc_sync_work_order_id_parcel_id_smart_ca_key

Índices: work_order_recipe_plc_sync_tenant_id_parcel_id_idx ,
work_order_recipe_plc_sync_tenant_id_smart_calda_id_idx ,
work_order_recipe_plc_sync_tenant_id_status_idx ,
work_order_recipe_plc_sync_tenant_id_work_order_id_idx

Triggers: recipe_sync_insert_trigger , recipe_sync_update_trigger ,
sync_parcel_status_trigger

recipe_modal_action_reports

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- branch_id uuid NOT NULL

- smart_calda_id text NOT NULL
- plc_sync_id text NOT NULL
- action text NOT NULL
- requested_by text NULL
- command_id int4 NULL
- report_payload jsonb NOT NULL
- created_at timestamp(3) DEFAULT now() NOT NULL

PK: recipe_modal_action_reports_pkey (id)

FKs: recipe_modal_action_reports_plc_sync_id_fkey (plc_sync_id -> work_order_recipe_plc_sync.id, ON DELETE RESTRICT),
 recipe_modal_action_reports_smart_calda_id_fkey (smart_calda_id -> smart_caldas.id, ON DELETE CASCADE),
 recipe_modal_action_reports_tenant_id_fkey (tenant_id -> tenants.id)

Índices:

recipe_modal_action_reports_tenant_id_smart_calda_id_created_at_idx,
 recipe_modal_action_reports_plc_sync_id_idx

Papel: snapshot arquivado da ação (cancelar/completar) disparada a partir do modal de receita no supervisorio. Tabela apenas com created_at (append-only, sem os demais campos de ciclo de vida).

truck_routes

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- branch_id uuid NOT NULL
- license_plate text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- driver_id text NULL
- status public."TruckRouteStatus" DEFAULT 'CREATED'::"TruckRouteStatus" NOT NULL

- truck_id text NULL
- work_order_id text NULL
- work_order_parcel_id text NULL

PK: truck_routes_pkey (id)

FKs: truck_routes_driver_id_fkey, truck_routes_tenant_id_fkey, truck_routes_truck_id_fkey, truck_routes_work_order_id_fkey, truck_routes_work_order_parcel_id_fkey

UKs: truck_routes_tenant_id_work_order_parcel_id_key, truck_routes_work_order_parcel_id_key

Índices: truck_routes_tenant_id_branch_id_license_plate_idx, truck_routes_tenant_id_status_idx, truck_routes_tenant_id_work_order_id_idx, truck_routes_tenant_id_work_order_parcel_id_idx

public.truck_route_positions

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- branch_id uuid NOT NULL
- truck_route_id text NOT NULL
- license_plate text NOT NULL
- latitude float8 NOT NULL
- longitude float8 NOT NULL
- tracked_at timestamp(3) NOT NULL
- speed float8 NULL
- direction text NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL

PK: truck_route_positions_pkey (id)

FK: truck_route_positions_truck_route_id_fkey

Índices: truck_route_positions_tenant_id_branch_id_license_plate_idx, truck_route_positions_tenant_id_truck_route_id_tracked_at_idx

inventory_items

Campos

- id text NOT NULL
- invoice_number text NOT NULL
- supplier_id text NOT NULL
- entry_date timestamp(3) NOT NULL
- defensive_id text NOT NULL
- batch_id text NOT NULL
- quantity numeric(65, 30) NOT NULL
- packaging_quantity numeric(65, 30) NULL
- packaging_capacity numeric(65, 30) NULL
- current_balance numeric(65, 30) NOT NULL
- unit_id text NOT NULL
- location_id text NOT NULL
- storage_type public."StorageType" DEFAULT 'PRIMARY'::"StorageType" NOT NULL
- import_id text NULL
- expiration_date timestamp(3) NULL
- tenant_id text NOT NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- invoice_entry_id text NULL
- packaging_type public."PackagingType" NULL
- branch_id uuid NOT NULL

PK: inventory_items_pkey (id)

FKs (ALTER TABLE):

- inventory_items_batch_id_fkey
- inventory_items_defensive_id_fkey
- inventory_items_import_id_fkey (SET NULL)
- inventory_items_invoice_entry_id_fkey (SET NULL)
- inventory_items_location_id_fkey

- inventory_items_supplier_id_fkey
- inventory_items_tenant_id_fkey
- inventory_items_unit_id_fkey

UK: inventory_items_tenant_id_invoice_number_defensive_id_batch_key

Indices: inventory_items_batch_id_idx,
 inventory_items_invoice_entry_id_idx,
 inventory_items_tenant_id_deleted_at_idx,
 inventory_items_tenant_id_invoice_number_idx,
 inventory_items_tenant_id_storage_type_idx

locations

Campos

- id text NOT NULL
- code text NOT NULL
- description text NULL
- storage_type public."StorageType" NOT NULL
- capacity text NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- disabled_at timestamp(3) NULL
- tenant_id text NOT NULL
- remnant_id text NULL
- ibc_id text NULL
- silo_id text NULL
- smart_calda_id text NULL
- availability bool DEFAULT true NOT NULL
- current_stock_item_id text NULL
- branch_id uuid NOT NULL
- current_defensive_id text NULL

PK: locations_pkey (id)

FKs (ALTER TABLE):

- `locations_current_defensive_id_fkey` (SET NULL)
- `locations_current_stock_item_id_fkey` (SET NULL)
- `locations_ibc_id_fkey` (CASCADE)
- `locations_remnant_id_fkey` (CASCADE)
- `locations_silo_id_fkey` (CASCADE)
- `locations_smart_calda_id_fkey` (CASCADE)
- `locations_tenant_id_fkey`

UKs: `locations_ibc_id_key`, `locations_remnant_id_key`,
`locations_silo_id_key`, `locations_tenant_id_code_key`

Índices: `locations_current_defensive_id_idx`,
`locations_current_stock_item_id_idx`, `locations_ibc_id_idx`,
`locations_remnant_id_idx`, `locations_silo_id_idx`,
`locations_smart_calda_id_idx`, `locations_tenant_id_deleted_at_idx`

`stock_items`

Campos

- `id` text NOT NULL
- `inventory_item_id` text NOT NULL
- `stock_type` public."StockType" NOT NULL
- `current_balance` numeric(65, 30) NOT NULL
- `location_id` text NOT NULL
- `status` text DEFAULT 'ATIVO'::text NOT NULL
- `tenant_id` text NOT NULL
- `created_at` timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- `updated_at` timestamp(3) NOT NULL
- `deleted_at` timestamp(3) NULL
- `disabled_at` timestamp(3) NULL
- `reserved_quantity` numeric(65, 30) DEFAULT 0 NOT NULL
- `lifecycle_status` public."ItemLifecycleStatus" DEFAULT 'ACTIVE'::"ItemLifecycleStatus" NOT NULL
- `smart_location_code` text NULL
- `packaging_type` public."PackagingType" NULL
- `has_passed_technical` bool DEFAULT false NOT NULL

- `technical_entry_at timestamp(3) NULL`
- `technical_exit_at timestamp(3) NULL`
- `branch_id uuid NOT NULL`

PK: `stock_items_pkey (id)`

FKs (ALTER TABLE): `stock_items_inventory_item_id_fkey`,
`stock_items_location_id_fkey`, `stock_items_tenant_id_fkey`

Índices: `stock_items_tenant_id_deleted_at_idx`,
`stock_items_tenant_id_lifecycle_status_idx`,
`stock_items_tenant_id_status_idx`, `stock_items_tenant_id_stock_type_idx`

Nota: a tabela mantém dois mecanismos de status em paralelo — `status` (texto legado, ex. "ATIVO") e `lifecycle_status` (enum `ItemLifecycleStatus`, ACTIVE/DEPLETED).

Ambos coexistem no momento.

`stock_movements`

Campos

- `id text NOT NULL`
- `stock_item_id text NOT NULL`
- `quantity numeric(65, 30) NOT NULL`
- `reason text NULL`
- `performed_by text NOT NULL`
- `performed_by_email text NULL`
- `observations text NULL`
- `tenant_id text NOT NULL`
- `created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL`
- `updated_at timestamp(3) NOT NULL`
- `deleted_at timestamp(3) NULL`
- `performed_by_name text NULL`
- `movement_type text NOT NULL`
- `source_location_id text NOT NULL`
- `destination_location_id text NOT NULL`
- `is_automatic bool DEFAULT false NOT NULL`
- `movement_reason public."MovementReason" NULL`

- movement_source public."MovementSource" DEFAULT 'USER_ACTION'::"MovementSource" NOT NULL
- work_order_id text NULL
- work_order_number text NULL
- parcel_id text NULL
- parcel_sequence int4 NULL
- plc_batch_id text NULL
- correlation_id text NULL
- smart_location_code text NULL
- storage_location_code text NULL
- packaging_type public."PackagingType" NULL
- is_momentary_passage bool DEFAULT false NOT NULL
- idempotency_key text NULL
- quantity_before numeric(65, 30) NULL
- quantity_consumed numeric(65, 30) DEFAULT 0 NULL
- quantity_remaining numeric(65, 30) NULL
- branch_id uuid NOT NULL

PK: stock_movements_pkey (id)

FKs (ALTER TABLE): stock_movements_destination_location_id_fkey,
stock_movements_source_location_id_fkey,
stock_movements_stock_item_id_fkey, stock_movements_tenant_id_fkey

UK: stock_movements_idempotency_key_key

Índices: stock_movements_correlation_id_idx,
stock_movements_destination_location_id_idx,
stock_movements_movement_reason_idx,
stock_movements_source_location_id_idx,
stock_movements_stock_item_id_idx,
stock_movements_tenant_id_created_at_idx,
stock_movements_tenant_id_deleted_at_idx,
stock_movements_tenant_id_movement_type_idx,
stock_movements_work_order_id_idx

Nota: não possui disabled_at (log de movimentação append-only); movement_type é text livre e ainda não usa o enum MovementType .

work_order_parcel_inputs

Campos

- id text NOT NULL
- tenant_id text NOT NULL
- parcel_id text NOT NULL
- defensive_id text NOT NULL
- defensive_code text NOT NULL
- defensive_name text NOT NULL
- source_stock_type public."StockType" NOT NULL
- destination_stock_type public."StockType" NOT NULL
- quantity numeric(65, 30) NOT NULL
- total_required numeric(65, 30) NOT NULL
- stock_movement_id text NULL
- created_at timestamp(3) DEFAULT CURRENT_TIMESTAMP NOT NULL
- updated_at timestamp(3) NOT NULL
- deleted_at timestamp(3) NULL
- stock_item_id text NULL
- density numeric(65, 30) NULL
- branch_id uuid NOT NULL
- packaging_type public."PackagingType" NULL
- location_id text NULL

PK: work_order_parcel_inputs_pkey (id)

FKs (ALTER TABLE):

- work_order_parcel_inputs_defensive_id_fkey
- work_order_parcel_inputs_location_id_fkey (SET NULL)
- work_order_parcel_inputs_parcel_id_fkey
- work_order_parcel_inputs_stock_item_id_fkey (SET NULL)
- work_order_parcel_inputs_stock_movement_id_fkey (SET NULL)
- work_order_parcel_inputs_tenant_id_fkey

Índices: work_order_parcel_inputs_location_id_idx,
work_order_parcel_inputs_parcel_id_idx,
work_order_parcel_inputs_stock_item_id_idx,
work_order_parcel_inputs_tenant_id_idx