# Controllable Unit

A controllable unit is defined as “a single power-generating module and/or demand unit” in [public consultation on the draft network code on demand response](https://www.acer.europa.eu/documents/public-consultations/pc2024e07-public-consultation-draft-network-code-demand-response).

The controllable unit is connected to a single accounting point. This restriction is there to provide a unambiguous connection between the controllable unit and the balance responsible party of the energy supplier. This enables us to do imbalance adjustment.

The accounting point is also used to determine the locational information of the controllable unit.

## Business Identifiers

Controllable units are identified by a UUID. UUID are simple and easy to generate and requires no coordination with external bodies (like GS1 or ENTSO-E). It is a un-complicated way to ensure uniqueness.

The UUIDs are generated by the system when a CU is created.

## Status transitions for grid validation

The following diagram shows the transitions for the grid validation status of controllable units. It normally starts as pending, then the system operator takes over to conclude on their validation or signal that information is missing. On any change to a technical information on a controllable unit or one of its technical resources, the grid validation status is reset if not already pending or in\_progress.

[Full Size](../diagrams/controllable_unit_grid_validation_status.png) | [Plantuml description](../diagrams/controllable_unit_grid_validation_status.plantuml) | [How to read the diagram](./index.md#status-and-transitions)

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| --- |
| Controllable Unit Registration Status |

Controllable Unit Registration Status

## Status transitions for controllable unit

The following diagram shows the status and its transitions for controllable unit. The Service Provider is responsible for creating a new controllable unit. Initially, the status is set to “new.” Once the CU registration is complete, the Service Provider updates the status to “active.” After termination, the status can only be edited by a FIS operator.

[Full Size](../diagrams/controllable_unit_status.png) | [Plantuml description](../diagrams/controllable_unit_status.plantuml) | [How to read the diagram](./index.md#status-and-transitions)

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| Controllable Unit Registration Status |

Controllable Unit Registration Status

## Relevant links

* [API Documentation](https://flex-test.elhub.no/api/v0/#/operations/list_controllable_unit)
* [Download docx](../download/controllable_unit.docx)

## Fields

| Name | Description | Format | Reference |
| --- | --- | --- | --- |
| id | Unique surrogate key. | bigintRead only |  |
| business\_id | Unique business identifier for the controllable unit. | textPattern: ^[0-9a-f]{8}-[0-9a-f]{4}-4[0-9a-f]{3}-[89ab][0-9a-f]{3}-[0-9a-f]{12}$Read only |  |
| name | Free text name of the controllable unit. | textRequiredMax length: 512 |  |
| start\_date | The usage date when the controllable unit is first active. | date |  |
| status | The status of the controllable unit. | textOne of: new, active, suspended, terminatedDefault: newAlways new when created. Can then be updated to the other values. Once terminated, only editable by a FIS operator. |  |
| regulation\_direction | The regulation direction of the controllable unit. up means it can be used to increase production or decrease consumption, while down means to decrease production or increase consumption. | textOne of: up, down, bothRequiredup |  |
| maximum\_available\_capacity | Maximum continuous active power that the controllable unit can produce or consume, i.e. deliver for balancing and congestion services, in kilowatts. | decimalRequiredMin: 0Max: 999999.999Multiple of: 0.001 |  |
| is\_small | Whether the controllable unit is small or not, following NCDR. | booleanRead only |  |
| minimum\_duration | The minimum activation duration in seconds. | bigintMin: 0 |  |
| maximum\_duration | The maximum activation duration in seconds. | bigintMin: 0 |  |
| recovery\_duration | The minimum recovery duration between activations in seconds. | bigintMin: 0 |  |
| ramp\_rate | The rate of power per unit of time to reach empty or full power for the controllable unit, in kilowatts per minute. | decimalMin: 0.001Multiple of: 0.001 |  |
| accounting\_point\_id | Reference to the accounting point that the controllable unit is connected to. | bigintRequiredNon-updatable | [accounting\_point.id](accounting_point.md#field-id) |
| grid\_node\_id | Reference to the node that the controllable unit is connected to. | textPattern: ^[0-9a-f]{8}-[0-9a-f]{4}-4[0-9a-f]{3}-[89ab][0-9a-f]{3}-[0-9a-f]{12}$ |  |
| grid\_validation\_status | The grid validation status of the controllable unit. | textOne of: pending, in\_progress, incomplete\_information, validated, validation\_failedDefault: pending |  |
| grid\_validation\_notes | Free text notes on the current grid validation status. | textMax length: 512 |  |
| last\_validated | When the controllable unit was last validated. | timestamp with time zone |  |
| recorded\_at | When the resource was recorded (created or updated) in the system. | timestamp with time zoneRead only |  |
| recorded\_by | The identity that recorded the resource. | bigintRead only |  |

## Validation Rules

| Validation rule key | Validation rule | Status |
| --- | --- | --- |
| CU-VAL001 | If both minimum\_duration and maximum\_duration are specified, then the minimum duration must be lower than the maximum duration. | DONE |

## Notifications

| Action | Recipient | Comment |
| --- | --- | --- |
| create | Connecting SO |  |
| create | End user of the accounting point |  |
| update | Active SP |  |
| update | Connecting SO | When status is not new |

## Authorization

### Resource Level Authorization

Below is the [RLA](../technical/auth.md#resource-level-authorization-rla) for the resource. The default policy is **deny**.

#### Anonymous

No policies.

#### Common

No policies.

#### Balance Responsible Party

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-BRP001 | Read CU data that are connected to AP where they are BRP. Only for the contract period. | DONE |
| CU-BRP002 | Read CU history that are connected to AP where they are BRP. Only for the contract period. | DONE |

#### End User

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-EU001 | Read CU data that are connected to AP where they are EU. Only for when they are EU on the AP. | DONE |
| CU-EU002 | Read CU history that are connected to AP where they are EU. Only for when they are EU on the AP. | DONE |

#### Energy Supplier

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-ES001 | Read CU data that are connected to AP where they are ES. Only for the contract period. | DONE |
| CU-ES002 | Read CU history that are connected to AP where they are ES. Only for the contract period. | DONE |

#### Flexibility Information System Operator

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-FISO001 | Read, create and update all CU. | DONE |
| CU-FISO002 | Read all CU history. | DONE |

#### Market Operator

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-MO001 | Read CU that are connected to their market. Only for the period CU is active in the market. | TODO |
| CU-MO002 | Read history on CU that are connected to their market. Only history on the period the CU is active in the market. | TODO |

#### System Operator

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-SO001 | Read and update CU that are connected to AP belonging to SO. | DONE |
| CU-SO002 | Read CU belonging to SPG that the SO can see. | DONE |
| CU-SO003 | Read history on CU that they can read. | DONE |

#### Service Provider

| Policy key | Policy | Status |
| --- | --- | --- |
| CU-SP001 | Read CU data for the period they are SP. | DONE |
| CU-SP002 | Create new CU. | DONE |
| CU-SP003 | Update CU where they are current SP. | DONE |
| CU-SP004 | Read CU history for the period they are SP. | DONE |
| CU-SP005 | Read CU they created. | DONE |

#### Third Party

No policies.

### Field Level Authorization

For party type abbreviations, check [the auth docs](../technical/auth.md#party)

| FIELD | ANON | BRP | ES | EU | FISO | MO | SO | SP | TP |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| id |  | R | R | R | R | R | R | R | R |
| business\_id |  | R | R | R | R | R | R | R | R |
| name |  | R | R | R | RCU | R | R | RCU | R |
| regulation\_direction |  | R | R | R | RCU | R | R | RCU | R |
| maximum\_available\_capacity |  | R | R | R | RCU | R | R | RCU | R |
| is\_small |  | R | R | R | R | R | R | R | R |
| start\_date |  | R | R | R | RCU | R | R | RCU | R |
| status |  | R | R | R | RU | R | R | RU | R |
| minimum\_duration |  | R | R | R | RCU | R | R | RCU | R |
| maximum\_duration |  | R | R | R | RCU | R | R | RCU | R |
| recovery\_duration |  | R | R | R | RCU | R | R | RCU | R |
| ramp\_rate |  | R | R | R | RCU | R | R | RCU | R |
| accounting\_point\_id |  | R | R | R | RC | R | R | RC | R |
| grid\_node\_id |  | R | R | R | RCU | R | RU | R | R |
| grid\_validation\_status |  | R | R | R | RCU | R | RU | R | R |
| grid\_validation\_notes |  | R | R | R | RCU | R | RU | R | R |
| last\_validated |  | R | R | R | RCU | R | RU | R | R |
| recorded\_at |  | R | R | R | R | R | R | R | R |
| recorded\_by |  | R | R | R | R | R | R | R | R |