Transmission Register
Component Linking Manual

January 1, 2024

Table of Contents

1. Introduction

The Transmission Register (TR) is a secure Web-enabled database environment for CAISO internal users and specific Participating Transmission Owners (PTO) to access TR data.

The TR discloses for each transmission line and associated facility the:

- Identity of the PTO responsible for operation and maintenance, and its owners.
- Dates which the CAISO assumed or relinquished Operational Control.
- Date of any change in the identity of the PTO responsible for its operation and maintenance, or in the identity of its owner.
- Transmission equipment's applicable ratings and history.

The TR also provides ISO, PTO Administrators, and/or linking designees the ability to link group able components.

Note: *Refer to the* <u>*Transmission Register CAISO & PTO General User Manual*</u> *for the basic steps to navigate within TR, the* <u>*Transmission Register Autoloader User Manual*</u> *to perform bulk Change Requests, and the* <u>*Transmission Register PTO Admin User Manual*</u> *for PTO Admin to perform maintenance and management of Component information for their individual Organizations.*

1.1. Purpose

The TR maintains the official listing of transmission lines, associated facilities, and Entitlements that are subject to the CAISO's Operational Control, as required by the Transmission Control Agreement, Section 4.2.

This manual describes the method for linking components to accurately represent transmission facilities under CAISO Operational Control.

1.2. Scope

A Component Link is a relationship between two Components of which one is considered a Parent Component and the other a Child Component. The user of this manual must be a TR Admin authorized representative set with Linking permissions.

1.3. Definitions

The following table gives the definitions of the different components used in linking, and differentiates between parent and child, and group able components:

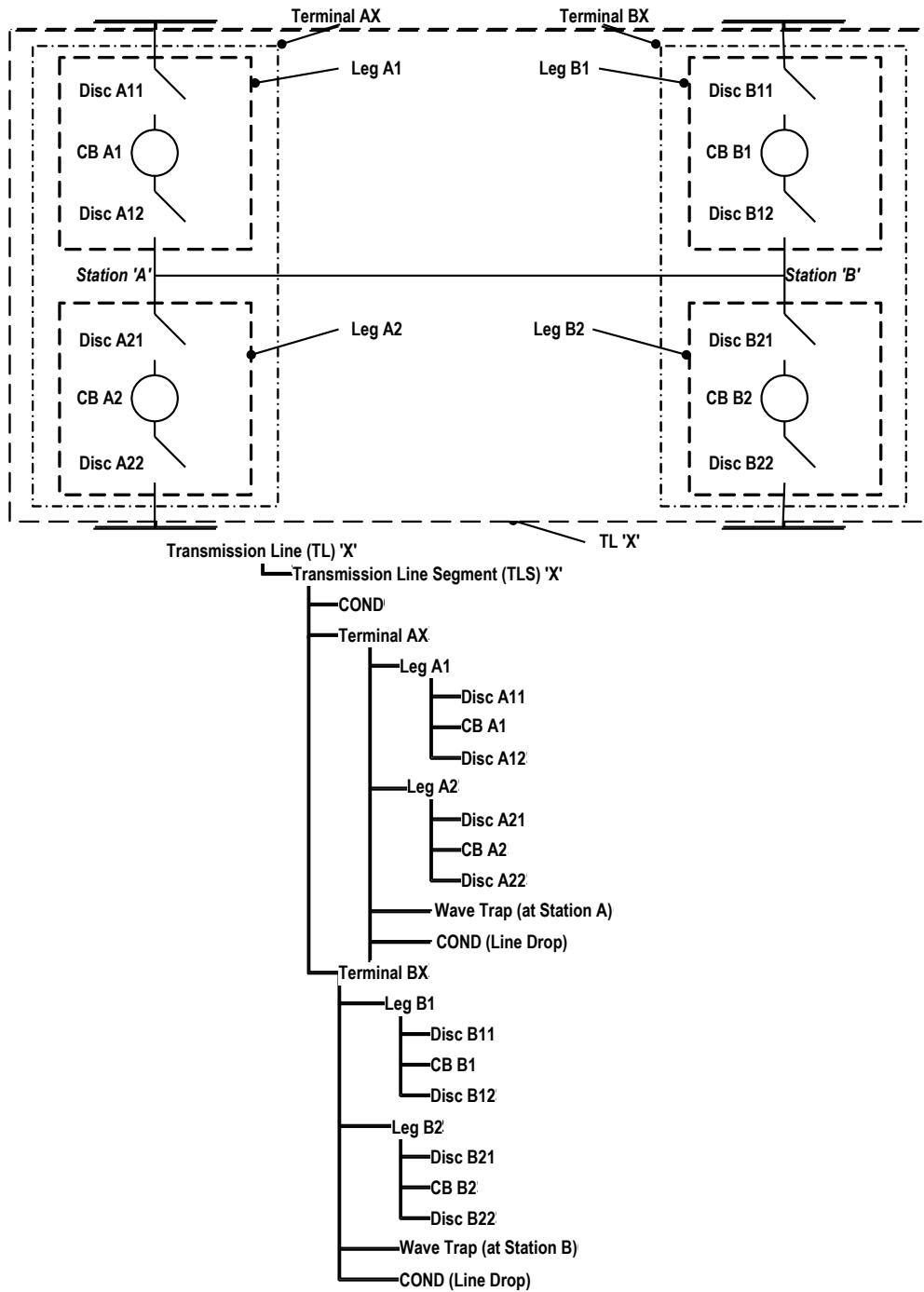| Object	Definition	Parent or Child designation
BUS	Bus	Both
BSCB	Bus Sectionalizing Circuit Breaker	Both
CABLE	Cable	Both
CAP	Shunt Capacitor	Both
CB	Circuit Breaker	Both
COND	Overhead Conductor	Both
CSW	Circuit Switch	Both
CT	Current Transformer	Both
DISC	Disconnect Switch	Both
FUSE	Fuse	Both
LEG	Typically consists of a CB, DISCs, and COND at a CB position inside a Station.	Both & can represent group of components
MOD	Motor Operated Disconnect Switch	Both
RCT	Shunt Reactor	Both
REG	Regulator	Both
RLY	Relay	Both
SCAP	Series Capacitor	Both
SCND	Synchronous Condenser	Both
SRCT	Series Reactor	Both
SVC	Static VAR Compensator	Both
TERM	Represents one terminus of a transmission line typically consisting of a LEG(s) and line drop CONDs.	Both and can represent group of components
TL	Transmission Line	Parent, and can represent group of components
TLS	Transmission Line Section	Both
TR	Transmission Register	Both
TRCT	Tertiary Reactor	Both
WTRP	Wave Trap	Both
XFMR	Transformer	Both
XFMR BANK	Transformer Bank	Both and can represent group of components
XFMR BAY	Transformer Bay	Parent and can represent group of components

2. Linking Examples

A variety of components can be entered into the TR. Some components are individual pieces of equipment, such as circuit breakers or disconnect switches. Other components such as legs, transmission lines, and transformer banks are considered a grouping of individual pieces of equipment or sub-groups of equipment. For instance, legs generally consist of a group of station equipment (circuit breakers, disconnect switches, jumpers, etc.) that reside between a line drop and a station bus, or another line drop. Another example is a transmission line, which consists of line segments, conductor types, legs, and additional pieces or sub-groups of equipment that in a group make up a transmission line.

The types of components that are individual pieces of equipment that can either be a parent or child, or can represent a group of components. The types of components ordinarily used to represent a group or sub-group of individual equipment components, or sub-groups of components, are reiterated as follows:
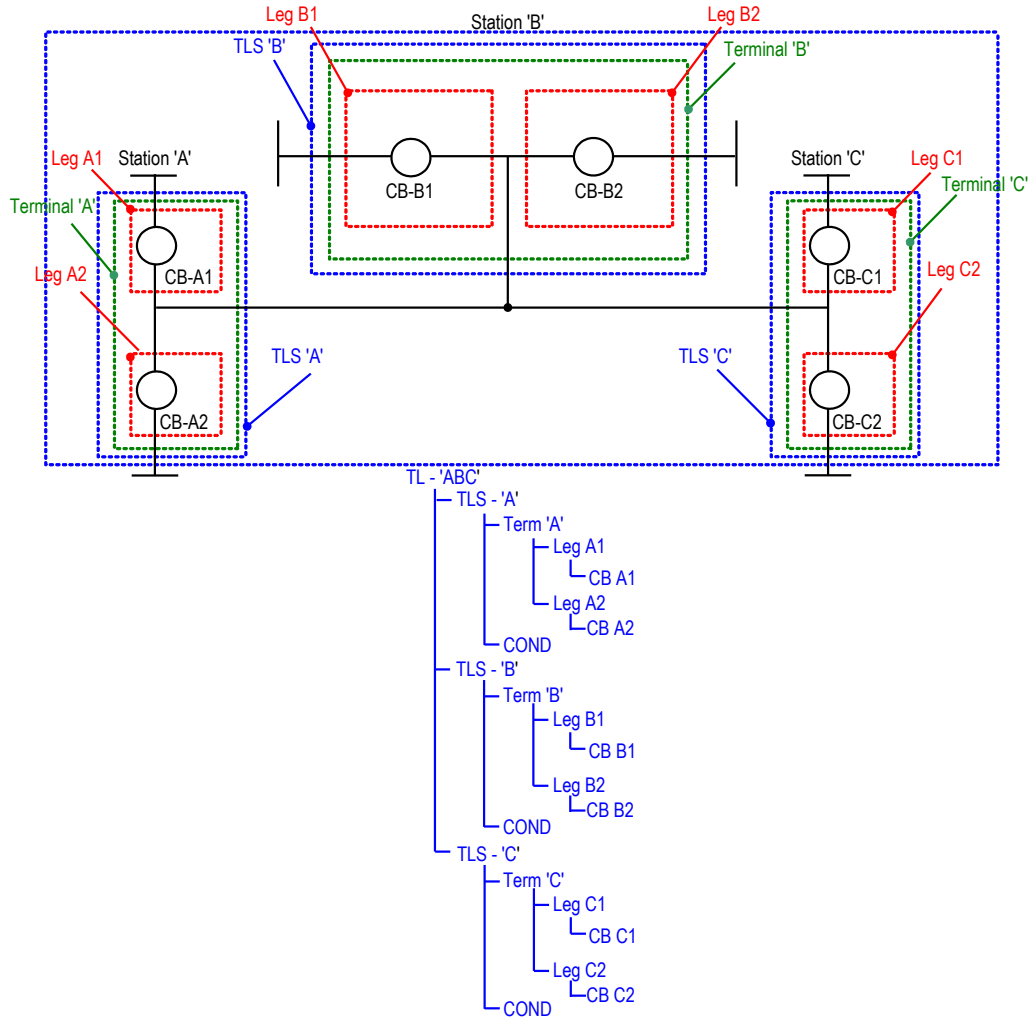
Group able Component Type	Description
LEG	Leg
TERM	Terminal
TL	Transmission Line
TLS	Transmission Line Segment
XFMR BANK	Transformer Bank
XFMR BAY	Transformer Bay

The diagrams in the ensuing subsections represent the method to group components to analyze grid configurations using current TR terminology:
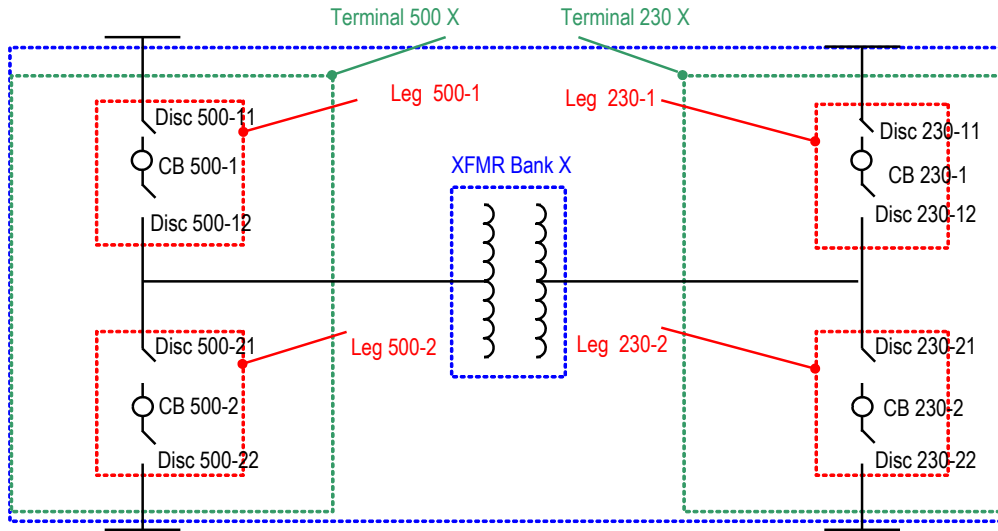
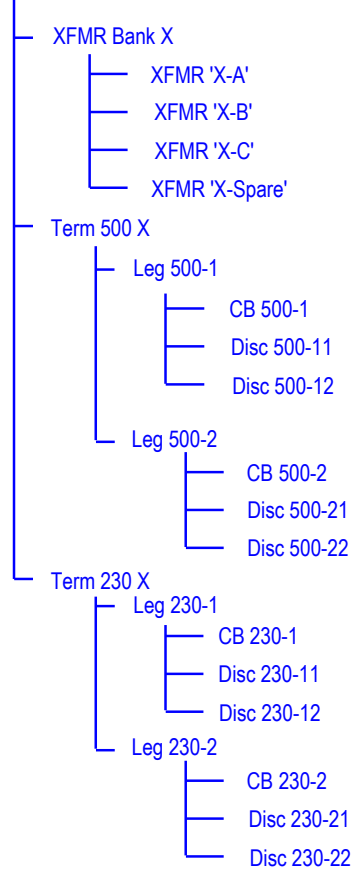## 2.1. Example 1 – Two Terminal Transmission Line

2.2. Example 2 – Three Terminal Transmission Line

2.3. Example 3 – Transformer Bay

Terminal 500 X   Terminal 230 X

Leg 500-1   Leg 230-1

Disc 500-11   Disc 230-11

CB 500-1   XFMR Bank X   CB 230-1

Disc 500-12   Disc 230-12

Leg 500-2   Leg 230-2   Disc 500-21   Disc 230-21

CB 500-2   CB 230-2

Disc 500-22   Disc 230-22

```
XFMR Bay - X
    └─ XFMR Bank X
        ├─ XFMR 'X-A'
        ├─ XFMR 'X-B'
        ├─ XFMR 'X-C'
        └─ XFMR 'X-Spare'
    ├─ Term 500 X
        ├─ Leg 500-1
        │   ├─ CB 500-1
        │   ├─ Disc 500-11
        │   └─ Disc 500-12
        └─ Leg 500-2
            ├─ CB 500-2
            ├─ Disc 500-21
            └─ Disc 500-22
    └─ Term 230 X
        ├─ Leg 230-1
        │   ├─ CB 230-1
        │   ├─ Disc 230-11
        │   └─ Disc 230-12
        └─ Leg 230-2
            ├─ CB 230-2
            ├─ Disc 230-21
            └─ Disc 230-22
```

CAISO/Grid Assets

3. Linking Steps

The linking function is viewable on the TR Main Page for those individuals with linking permission. Once the linking criterion is understood, performing the steps is fairly simple.

Take the following actions to link components:

1) Go to the TR **Components** Homepage (see Figure 1) and click on the Components tab drop down. Select the **Link components** view (Figure 2).
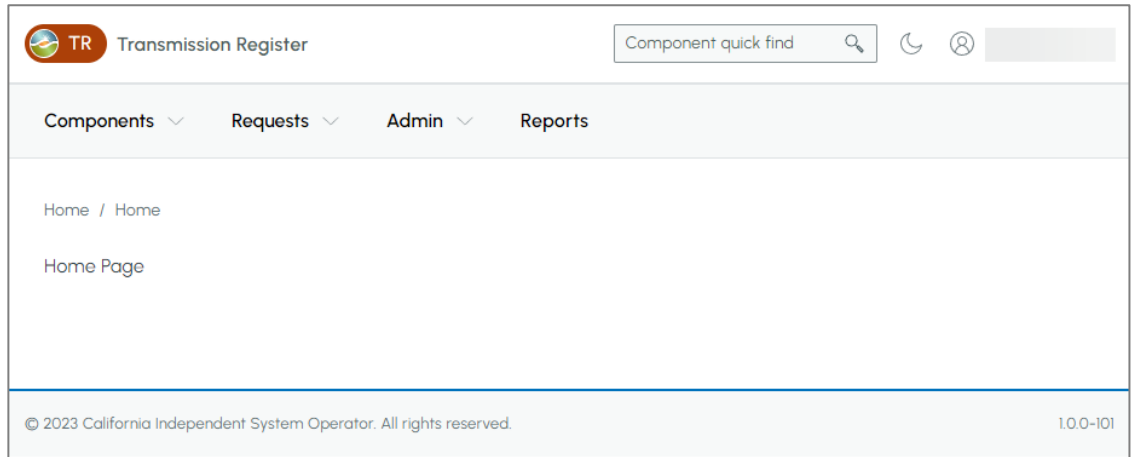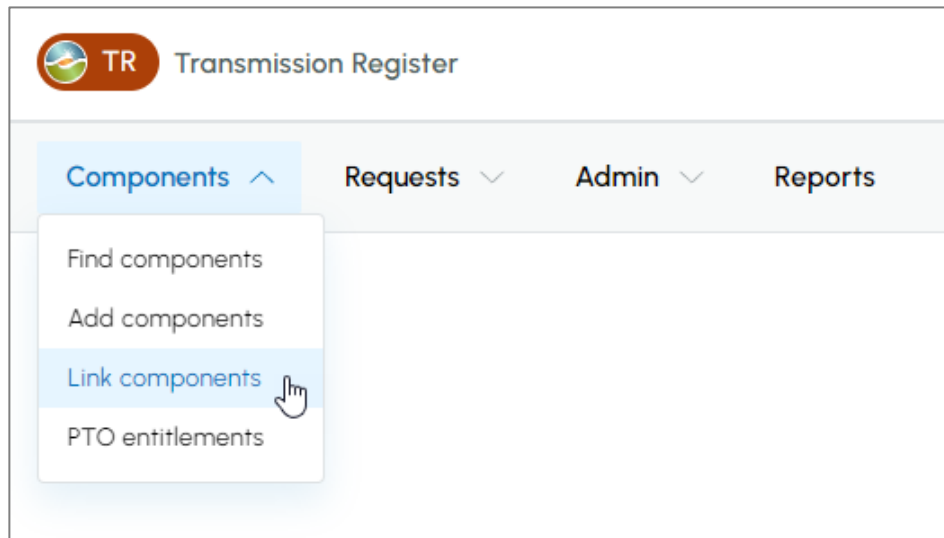

Figure 1. Components Home Page

Figure 2. Link components option

CAISO/Grid Assets

3) Select the options under the **Maintenance organization, Station,** and **Voltage (kV)** drop down. If needed, select the **Equipment** Type. Next, click on the Search components button to populate the data results (Figure 3).
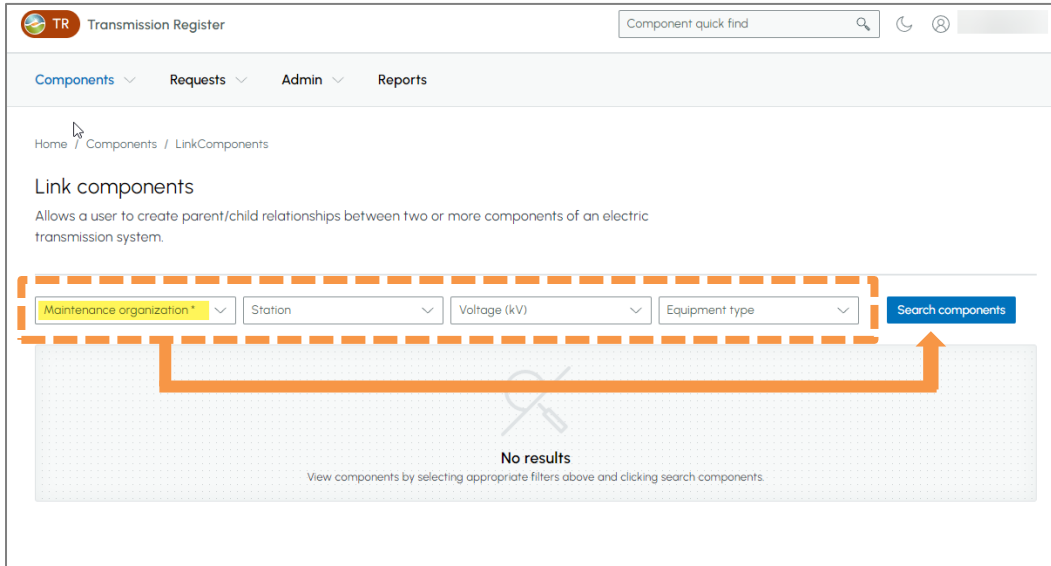

Figure 3

4) In the *Results* section, identify which component to link and then click on the Add Child button (Figure 4).
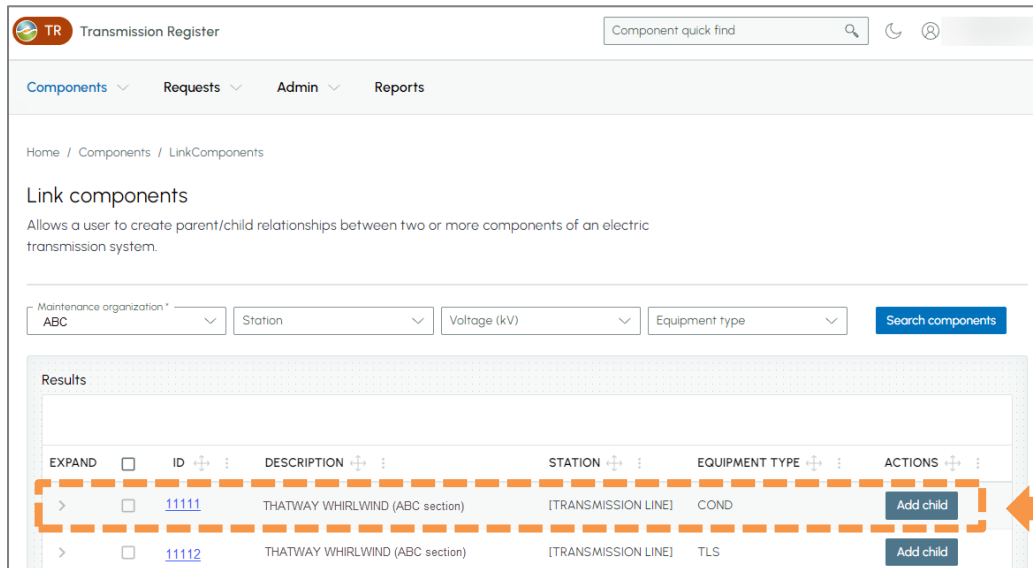

Figure 4 Add Child

5) This will open a new window for you to **add child to component**. Select the applicable options from the **Station**, **Voltage (kV)**, or **Equipment type** drown downs. Next, click on the <mark>Search</mark> button to populate the data results (See Figure 5).
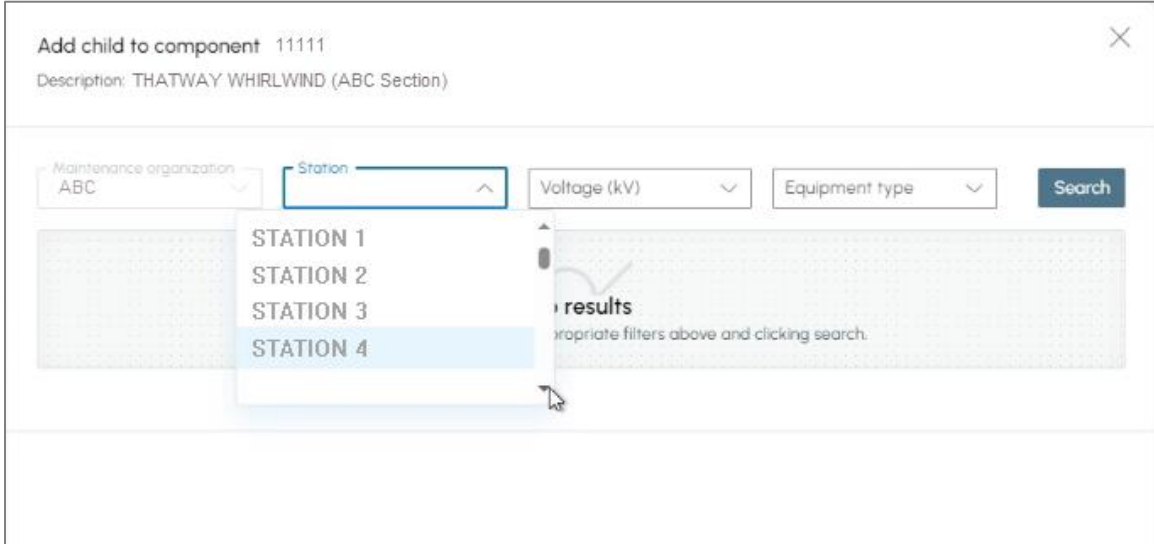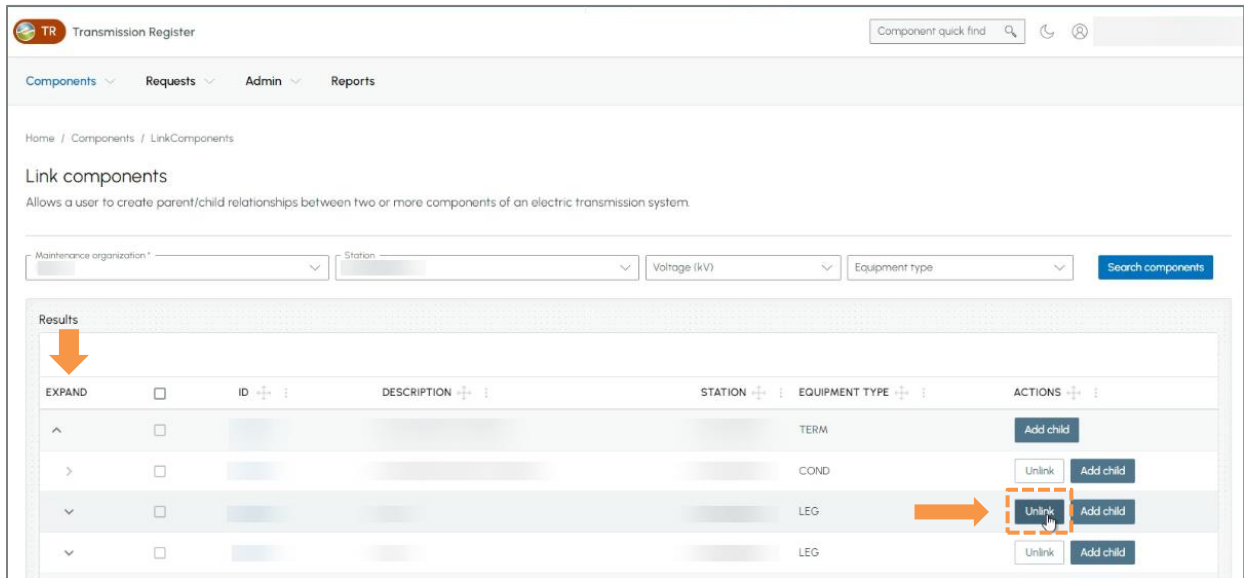

Figure 5 Add child component

6) Click on the <mark>Add</mark> button to link the component (See Figure 6).

Figure 6 Link component

7) To unlink the parent and children components, expand the component row for the data and clicking on the **Unlink** button (Figure 7).

Figure 7 Unlink components

4. Revision History

Version	Activity	By	Date
1.0	Draft	Steve Rutty	7/1/2002
2.0	TR rebuild initiated manual rewrite.	Marilyn Lien	5/17/2007
3.0	Corrected Components in Examples 1 & 3, Updated ISO Logo	Duke Luu	5/12/2014
4.0	Updated ISO Logo and format	Chris Hillman	8/13/2021
5.0	Reviewed and updated formatting – UI images	N. Strouse	11/14/2023

CAISO/Grid Assets