

## ANEXO MODELO DEL CONTROL DE VELOCIDAD UNIDAD 2 TASAJERA

### Datos Generales

**Tabla 1. Generador**

| Característica                  | Datos           |
|---------------------------------|-----------------|
| Fabricante                      |                 |
| Tipo de Generador               | Sincrónico      |
| Tipo del Rotor                  | Polos Salientes |
| Potencia Nominal                | 109 MVA         |
| Voltaje Nominal                 | 13,8 kV         |
| Factor de Potencia Nominal      |                 |
| Voltaje de Excitación           |                 |
| Corriente de Excitación Nominal |                 |
| Frecuencia Nominal              | 60 Hz           |
| Número de Polos                 |                 |
| Rotación Nominal                | 514,3 rpm       |
| Rotación Máxima                 | 945 rpm         |

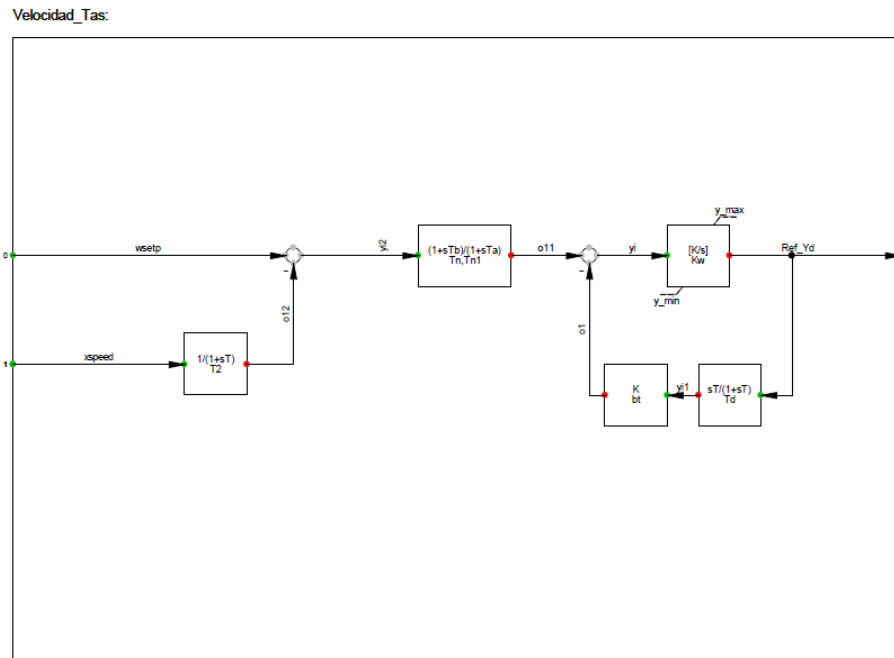
**Tabla 2. Turbina**

| Característica     | Datos                   |
|--------------------|-------------------------|
| Fabricante         |                         |
| Tipo               | Pelton Vertical         |
| Potencia nominal   | 105 MW                  |
| Caída neta nominal | 900 m                   |
| Caudal nominal     | 13,25 m <sup>3</sup> /s |

**Tabla 3. Regulador de Velocidad**

| Característica | Datos     |
|----------------|-----------|
| Fabricante     | REIVAX    |
| Modelo         | RVX POWER |

## CONTROL DE VELOCIDAD



**Figura 1. Diagrama de bloques del control de velocidad**

**Tabla 4. Parámetros del control de velocidad**

| Common Model - Grid\Velocidad_UG02.ElmDsl          |                                                         |  |
|----------------------------------------------------|---------------------------------------------------------|--|
| Name                                               | Velocidad_UG02                                          |  |
| Model Definition                                   | ... odels_Tasajera\Velocidad_Tas                        |  |
| <input checked="" type="checkbox"/> Out of Service | <input type="checkbox"/> A-stable integration algorithm |  |
| Parameter                                          |                                                         |  |
| Kw                                                 | 80.                                                     |  |
| Td                                                 | 9.                                                      |  |
| bt                                                 | 0.45                                                    |  |
| Tn                                                 | 1.8                                                     |  |
| Tn1                                                | 0.18                                                    |  |
| T2                                                 | 0.02                                                    |  |
| y_min                                              | 0.                                                      |  |
| y_max                                              | 0.03                                                    |  |
| Export to Clipboard                                |                                                         |  |

## CONTROL DE POTENCIA

## ACTUADOR

Actuador\_Tas:

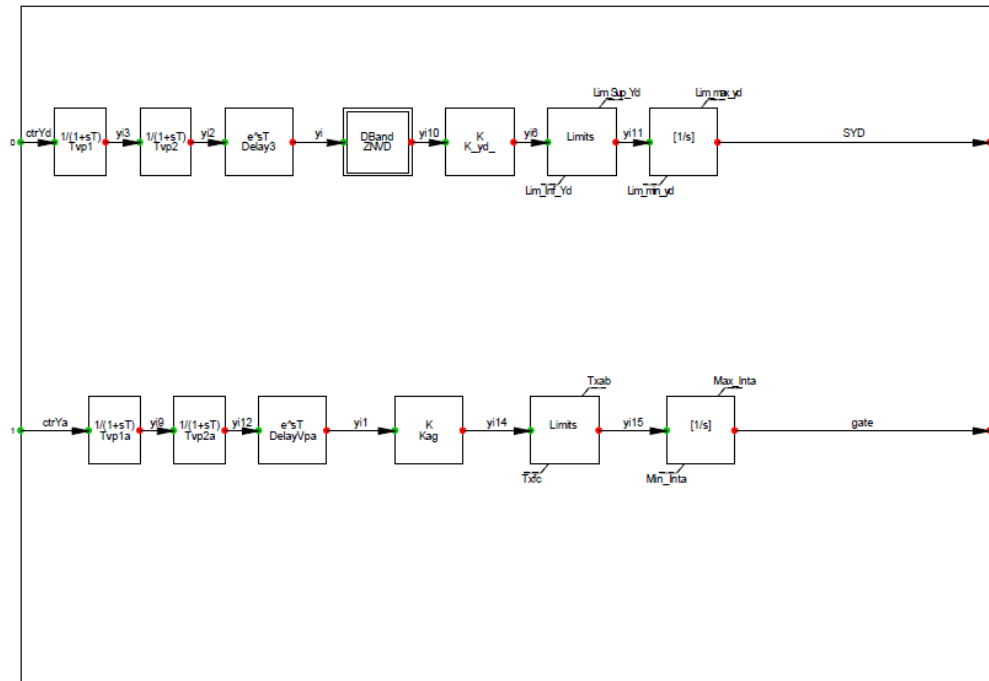


Figura 3. Diagrama de bloques del actuador

Tabla 6. Parámetros del actuador

| Common Model - Grid\Actuador_UG02.ElmDsl |                                                         |  |
|------------------------------------------|---------------------------------------------------------|--|
| Name                                     | Actuador_UG02                                           |  |
| Model Definition                         | ...s\Models_Tasajera\Actuador_Tas                       |  |
| <input type="checkbox"/> Out of Service  | <input type="checkbox"/> A-stable integration algorithm |  |
| Parameter                                |                                                         |  |
| Tvp1                                     | 0.002                                                   |  |
| Tvp2                                     | 0.002                                                   |  |
| ZNVD                                     | 0.                                                      |  |
| K_yd_                                    | 0.632911                                                |  |
| Delay3                                   | 0.025                                                   |  |
| Tvp1a                                    | 0.01                                                    |  |
| Tvp2a                                    | 0.01                                                    |  |
| DelayVpa                                 | 0.                                                      |  |
| Kag                                      | 0.05009                                                 |  |
| Lim_min_yd                               | 0.                                                      |  |
| Lim_inf_Yd                               | -0.535657                                               |  |
| Txfc                                     | -0.05009                                                |  |
| Min_inta                                 | 0.                                                      |  |
| Lim_max_yd                               | 1.                                                      |  |
| Lim_Sup_Yd                               | 0.632911                                                |  |
| Txab                                     | 0.036906                                                |  |
| Max_inta                                 | 1.                                                      |  |
| Export to Clipboard                      |                                                         |  |

## CONTROL DEL ACTUADOR

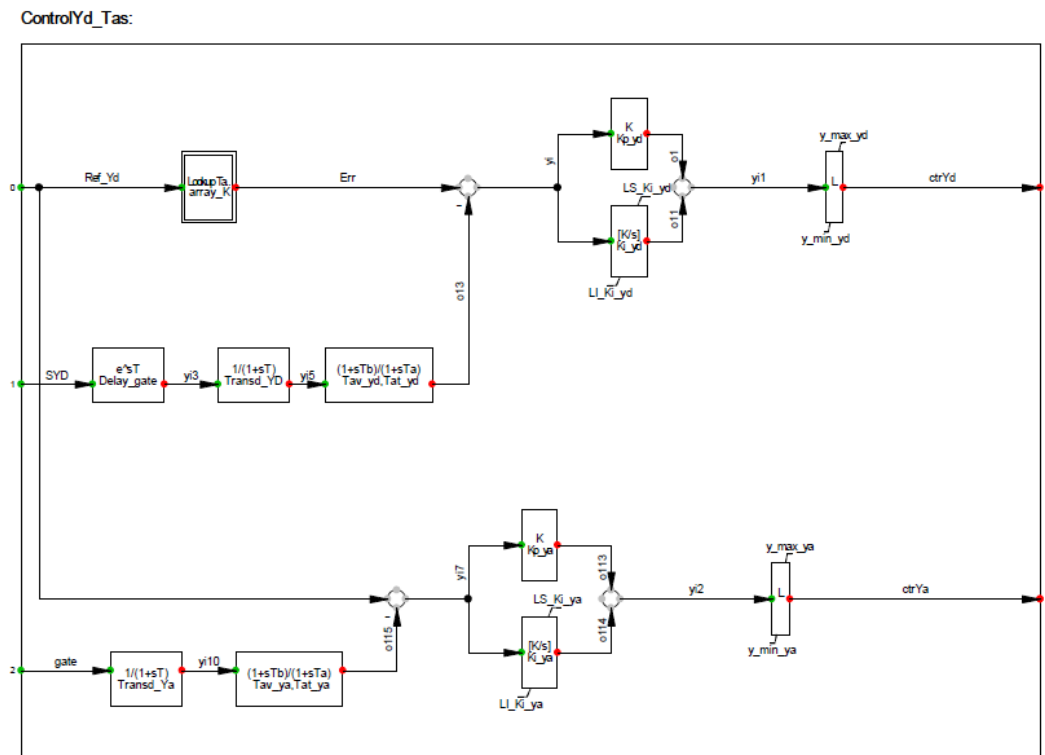


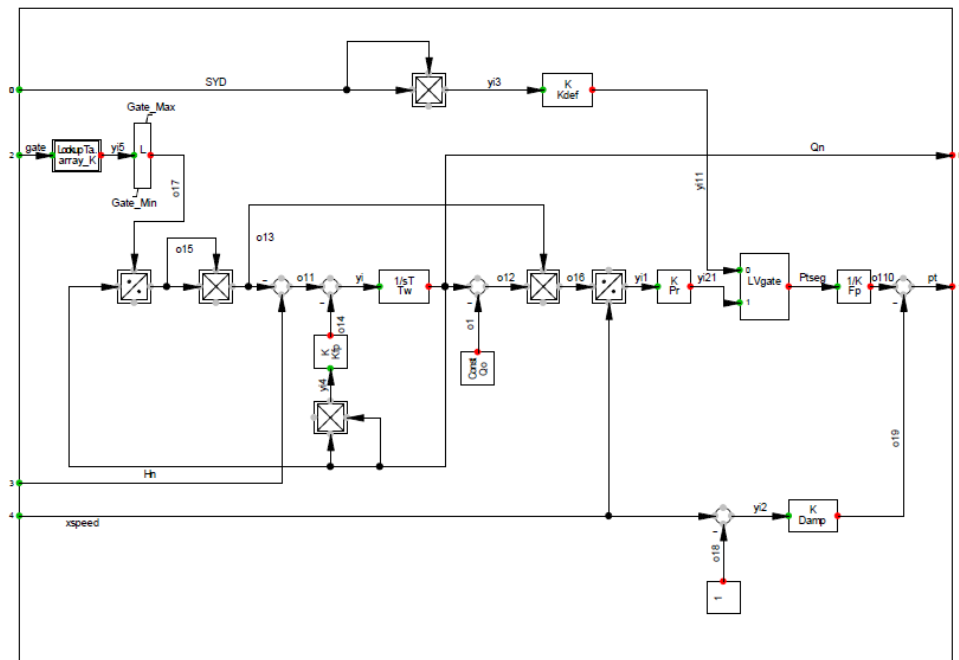
Figura 4. Diagrama de bloques del control del actuador

Tabla 7. Parámetros del control del actuador

| Common Model - Grid\Control_Yd_UG02.ElmDsl                                                      |       |  | Common Model - Grid\Control_Yd_UG02.ElmDsl |                |                |
|-------------------------------------------------------------------------------------------------|-------|--|--------------------------------------------|----------------|----------------|
| Name: Control_Yd_UG02                                                                           |       |  | Characteristics:                           |                |                |
| Model Definition: ...odels_Tasajera\ControlYd_Tas                                               |       |  |                                            |                |                |
| <input type="checkbox"/> Out of Service <input type="checkbox"/> A-stable integration algorithm |       |  |                                            |                |                |
| Parameter                                                                                       |       |  | Size                                       | K <sub>x</sub> | K <sub>y</sub> |
| K <sub>p_yd</sub>                                                                               | 5     |  | 1                                          | 0              | 0              |
| K <sub>i_yd</sub>                                                                               | 3     |  | 2                                          | 0.01           | 0.325          |
| Delay_gate                                                                                      | 0     |  | 3                                          | 0.1            | 0.41           |
| Tav_yd                                                                                          | 0.15  |  | 4                                          | 0.2            | 0.55           |
| Tat_yd                                                                                          | 0.015 |  | 5                                          | 0.3            | 0.65           |
| Transd_YD                                                                                       | 0.02  |  | 6                                          | 0.5            | 0.79           |
| K <sub>p_ya</sub>                                                                               | 28    |  | 7                                          | 0.7            | 0.91           |
| K <sub>i_ya</sub>                                                                               | 1     |  | 8                                          | 0.8            | 0.95           |
| Transd_Ya                                                                                       | 0.02  |  | 9                                          | 0.9            | 0.98           |
| Tav_ya                                                                                          | 0.01  |  | 10                                         | 1              | 1              |
| Tat_ya                                                                                          | 0.01  |  |                                            |                |                |
| LI_Ki_yd                                                                                        | -0.1  |  |                                            |                |                |
| y_min_yd                                                                                        | -1    |  |                                            |                |                |
| LI_Ki_ya                                                                                        | -0.2  |  |                                            |                |                |
| y_min_ya                                                                                        | -1    |  |                                            |                |                |
| LS_Ki_yd                                                                                        | 0.1   |  |                                            |                |                |
| y_max_yd                                                                                        | 1     |  |                                            |                |                |

## CONDUCTO Y TURBINA

Conducto\_Turbina\_Tas2:



**Figura 5. Diagrama de Bloques del conducto y turbina**

**Tabla 8. Parámetros del conducto y turbina**

| Common Model - Grid\Conducto_Turbina_UG02.Elmdsl |                                                         |  |
|--------------------------------------------------|---------------------------------------------------------|--|
| Name                                             | Conducto_Turbina_UG02                                   |  |
| Model Definition                                 | ... Tasajera\Conducto_Turbina_Tas2                      |  |
| <input type="checkbox"/> Out of Service          | <input type="checkbox"/> A-stable integration algorithm |  |
|                                                  | Parameter                                               |  |
| ► Pr                                             | 0.963303                                                |  |
| Tw                                               | 0.25                                                    |  |
| Qo                                               | 0.003469                                                |  |
| Fp                                               | 0.95                                                    |  |
| Damp                                             | 0.1                                                     |  |
| Kdef                                             | 1.4                                                     |  |
| Kfp                                              | 0.                                                      |  |
| Ho                                               | 1.                                                      |  |
| Gate_Min                                         | 0.0001                                                  |  |
| Gate_Max                                         | 1.1                                                     |  |
| Export to Clipboard                              |                                                         |  |

Common Model - Grid\Conducto\_Turbina\_UG02.ElmDsl

Characteristics:

| Size | K <sub>x</sub> | K <sub>y</sub> | K1 <sub>x</sub> | K1 |
|------|----------------|----------------|-----------------|----|
| 1    | 0.             | 12.            | 10.             | 0. |
| 2    | 0.01369        | 0.00347        | 0.01            |    |
| 3    | 0.067          | 0.1025         | 0.1             |    |
| 4    | 0.11828        | 0.201          | 0.2             |    |
| 5    | 0.19713        | 0.3005         | 0.3             |    |
| 6    | 0.2681         | 0.4            | 0.5             |    |
| 7    | 0.35           | 0.5            | 0.7             |    |
| 8    | 0.46523        | 0.595          | 0.8             |    |
| 9    | 0.55914        | 0.696          | 0.9             |    |
| 10   | 0.70574        | 0.794          | 1.              |    |
| 11   | 0.89104        | 0.893          | 0.              |    |
| 12   | 1.             | 1.02           | 0.              |    |

OK  
Cancel

Common Model - Grid\Conducto\_Turbina\_UG02.ElmDsl

Characteristics:

| Size | K1 <sub>y</sub> |
|------|-----------------|
| 1    | 0.              |
| 2    | 0.325           |
| 3    | 0.41            |
| 4    | 0.55            |
| 5    | 0.65            |
| 6    | 0.79            |
| 7    | 0.91            |
| 8    | 0.95            |
| 9    | 0.98            |
| 10   | 1.              |
| 11   | 0.              |
| 12   | 0.              |

OK  
Cancel

## TÚNEL

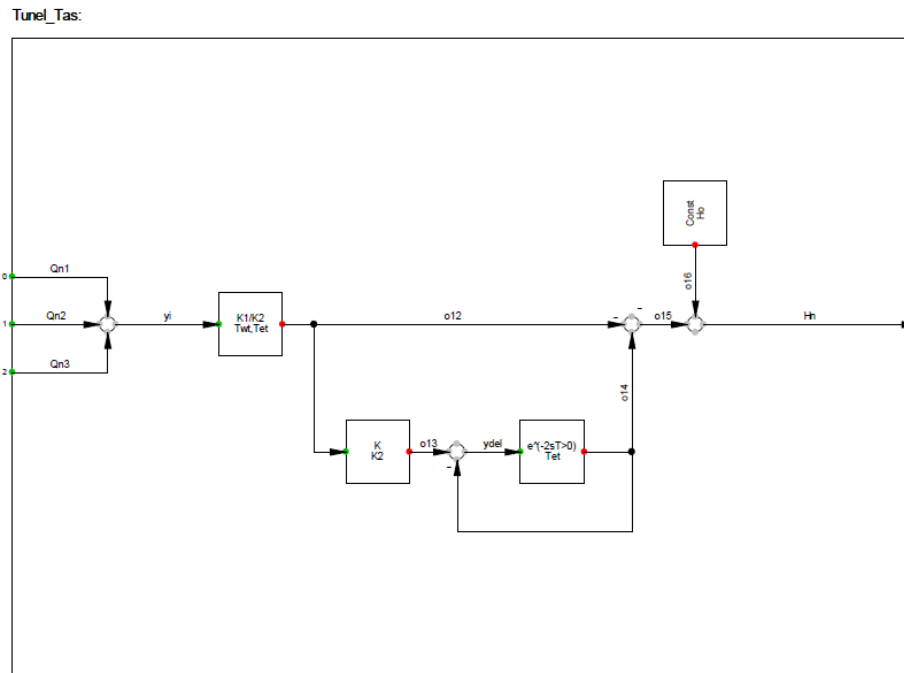


Figura 6. Diagrama de Bloques del túnel

Tabla 9. Parámetros del túnel

Common Model - Grid\Tunel.ElmDsl

Name:

Model Definition:

☐ Out of Service ☐ A-stable integration algorithm

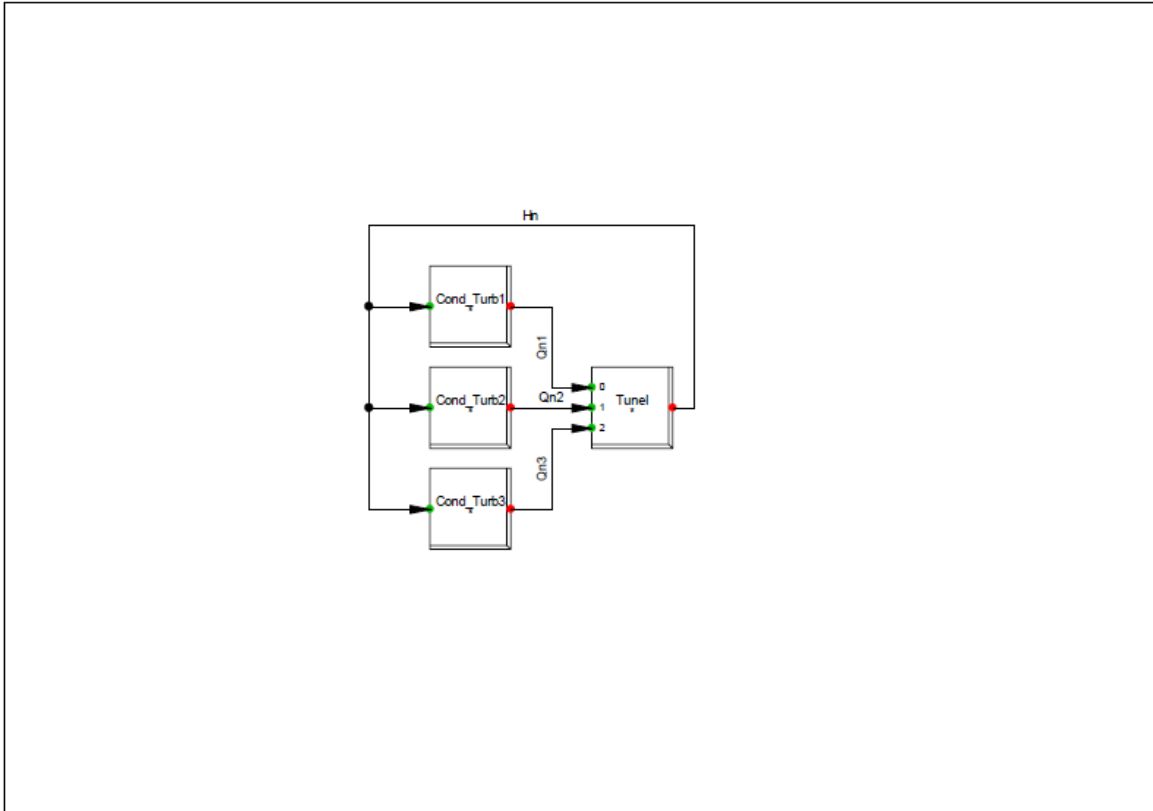
| Parameter | Value |
|-----------|-------|
| Twt       | 0,25  |
| Tet       | 0,84  |
| K2        | 2,    |
| Ho        | 1,    |

Export to Clipboard

OK Cancel Events

## FRAME DEL TÚNEL

Frame\_Tunel\_Tas:



**Figura 7. Diagrama de Bloques del frame del túnel**