



TANGO
Device
Server

Mechanical 1,2 or 4 motors generic bender. User's Guide

MechanicalGenericBender Class

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Implemented in C++ - CVS repository: tango-ds

Introduction:

This device allows to pilot a mechanical bender with one, two or four motors.

Class Inheritance:

- Tango::Device_4Impl
 - MechanicalGenericBender

Properties:

Device Properties		
Property name	Property type	Description

AttributePositionName	Tango::DEV_STRING	Give the name of the attribute to move the motor according the motors device used.
Bender1MotorName	Tango::DEV_STRING	Name of the first motor bender to create the proxy to this motor.
Bender2MotorName	Tango::DEV_STRING	Name of the second motor bender to create the proxy to this motor.
Bender3MotorName	Tango::DEV_STRING	Name of the third motor bender to create the proxy to this motor.
Bender4MotorName	Tango::DEV_STRING	Name of the fourth motor bender to create the proxy to this motor.
BenderCurvatureConstantA1	Tango::DEV_DOUBLE	The bender curvature constant A value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantA2	Tango::DEV_DOUBLE	The bender curvature constant A value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantA3	Tango::DEV_DOUBLE	The bender curvature constant A value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantA4	Tango::DEV_DOUBLE	The bender curvature constant A value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantB1	Tango::DEV_DOUBLE	The bender curvature constant B value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantB2	Tango::DEV_DOUBLE	The bender curvature constant B value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantB3	Tango::DEV_DOUBLE	The bender curvature constant B value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
BenderCurvatureConstantB4	Tango::DEV_DOUBLE	The bender curvature constant B value used to compute the pseudo bender according the Rbender value. $C=A/R+B$
C1TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the C1 table. It is used when the table file contains more than 2 columns
C1TablePath	Tango::DEV_STRING	The path for the table to compute the C1 value according the Rbender value
C1TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the C1 table. It is used when the table file contains more than 2 columns
C2TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the C2 table. It is used when the table file contains more than 2 columns
C2TablePath	Tango::DEV_STRING	The path for the table to compute the C2 value according the Rbender value

C2TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the C2 table. It is used when the table file contains more than 2 columns
C3TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the C3 table. It is used when the table file contains more than 2 columns
C3TablePath	Tango::DEV_STRING	The path for the table to compute the C3 value according the Rbender value
C3TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the C4 table. It is used when the table file contains more than 2 columns
C4TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the C4 table. It is used when the table file contains more than 2 columns
C4TablePath	Tango::DEV_STRING	The path for the table to compute the C4 value according the Rbender value
C4TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the C4 table. It is used when the table file contains more than 2 columns
CommandStateName	Tango::DEV_STRING	Gives the name of the STATE command according the target device. For SimulatedMotor it is State.
CommandStopName	Tango::DEV_STRING	Name of the command stop for the reached device.
MaximalAsymmetry	Tango::DEV_DOUBLE	The maximal value for asymmetry value.
MaximalBender1	Tango::DEV_DOUBLE	The maximal bender 1 value.
MaximalBender2	Tango::DEV_DOUBLE	The maximal bender 2 value.
MaximalBender3	Tango::DEV_DOUBLE	The maximal bender 3 value.
MaximalBender4	Tango::DEV_DOUBLE	The maximal bender 4 value.
MaximalCurvature	Tango::DEV_DOUBLE	The maximal curvature value.
MaximalPseudoBender	Tango::DEV_DOUBLE	The maximal value for the Pseudo Bender value (C value).
MinimalAsymmetry	Tango::DEV_DOUBLE	The minimal value for asymmetry value.
MinimalBender1	Tango::DEV_DOUBLE	The minimal bender 1 value.
MinimalBender2	Tango::DEV_DOUBLE	The minimal bender 2 value.
MinimalBender3	Tango::DEV_DOUBLE	The minimal bender 3 value.
MinimalBender4	Tango::DEV_DOUBLE	The minimal bender 4 value.
MinimalCurvature	Tango::DEV_DOUBLE	The minimal curvature value.
MinimalPseudoBender	Tango::DEV_DOUBLE	The minimal value for the Pseudo Bender value (C value).
Rbender1TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the Rbender1 table. It is used when the table file contains more than 2 columns
Rbender1TablePath	Tango::DEV_STRING	The path for the table to compute the R1 value according the C1 value

Rbender1TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the Rbender1 table. It is used when the table file contains more than 2 columns
Rbender2TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the Rbender2 table. It is used when the table file contains more than 2 columns
Rbender2TablePath	Tango::DEV_STRING	The path for the table to compute the R2 value according the C2 value
Rbender2TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the Rbender2 table. It is used when the table file contains more than 2 columns
Rbender3TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the Rbender3 table. It is used when the table file contains more than 2 columns
Rbender3TablePath	Tango::DEV_STRING	The path for the table to compute the R3 value according the C3 value
Rbender3TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the Rbender3 table. It is used when the table file contains more than 2 columns
Rbender4TableFirstIndex	Tango::DEV_ULONG	The index of the first column of the Rbender4 table. It is used when the table file contains more than 2 columns
Rbender4TablePath	Tango::DEV_STRING	The path for the table to compute the R4 value according the C4 value
Rbender4TableSecondIndex	Tango::DEV_ULONG	The index of the second column of the Rbender4 table. It is used when the table file contains more than 2 columns
RbenderTableFirstIndex	Tango::DEV_ULONG	The index of the first column of the Rbender table. It is used when the table file contains more than 2 columns
RbenderTablePath	Tango::DEV_STRING	The path for the table to compute the R value according the C value
RbenderTableSecondIndex	Tango::DEV_ULONG	The index of the second column of the Rbender table. It is used when the table file contains more than 2 columns
UseEquation	Tango::DEV_BOOLEAN	if true, equation are used if false table must be given
NumberOfMotors	Tango::DEV_SHORT	The number of motors of the bender.
TablesPath	Tango::DEV_STRING	The path to the tables
AutoSendAfterWrite	Tango::DEV_BOOLEAN	Set the AutoSend flag to false after each SendValue execution
AutoSendAtInit	Tango::DEV_BOOLEAN	Value of the AutoSend Flag at Init. (default: false)

Device Properties Default Values:

Property Name	Default Values
AttributePositionName	position

Bender1MotorName	No default value
Bender2MotorName	No default value
Bender3MotorName	No default value
Bender4MotorName	No default value
BenderCurvatureConstantA1	No default value
BenderCurvatureConstantA2	No default value
BenderCurvatureConstantA3	No default value
BenderCurvatureConstantA4	No default value
BenderCurvatureConstantB1	No default value
BenderCurvatureConstantB2	No default value
BenderCurvatureConstantB3	No default value
BenderCurvatureConstantB4	No default value
C1TableFirstIndex	No default value
C1TablePath	No default value
C1TableSecondIndex	No default value
C2TableFirstIndex	No default value
C2TablePath	No default value
C2TableSecondIndex	No default value
C3TableFirstIndex	No default value
C3TablePath	No default value
C3TableSecondIndex	No default value
C4TableFirstIndex	No default value
C4TablePath	No default value
C4TableSecondIndex	No default value
CommandStateName	state
CommandStopName	stop
MaximalAsymmetry	No default value
MaximalBender1	No default value
MaximalBender2	No default value
MaximalBender3	No default value
MaximalBender4	No default value
MaximalCurvature	No default value
MaximalPseudoBender	No default value
MinimalAsymmetry	No default value

MinimalBender1	No default value
MinimalBender2	No default value
MinimalBender3	No default value
MinimalBender4	No default value
MinimalCurvature	No default value
MinimalPseudoBender	No default value
Rbender1TableFirstIndex	No default value
Rbender1TablePath	No default value
Rbender1TableSecondIndex	No default value
Rbender2TableFirstIndex	No default value
Rbender2TablePath	No default value
Rbender2TableSecondIndex	No default value
Rbender3TableFirstIndex	No default value
Rbender3TablePath	No default value
Rbender3TableSecondIndex	No default value
Rbender4TableFirstIndex	No default value
Rbender4TablePath	No default value
Rbender4TableSecondIndex	No default value
RbenderTableFirstIndex	No default value
RbenderTablePath	No default value
RbenderTableSecondIndex	No default value
UseEquation	No default value
NumberOfMotors	No default value
TablesPath	No default value
AutoSendAfterWrite	false
AutoSendAtInit	false

There is no Class properties.

States:

States	
Names	Descriptions
MOVING	Bender is MOVING (at least one motor is Moving)
STANDBY	Bender is STANDBY (all motors are Standby)
ALARM	Bender is ALARM (at least one motor is Alarm)
FAULT	Bender is FAULT not possible to reach a device, getting a value or a state. (In this case it is only allowed to redone a init after correcting the problem with the other devices)
INIT	The device is in this state after the Init command succeeded. After it needs a InitializeBender call to be fully use.

Attributes:

Scalar Attributes			
Attribute name	Data Type	R/W Type	Expert
bender: This value represent the pseudo motor bender. The equation used is $C=a'/R+b'$ with a' and b' the mean of the different a and b values of each motor equation. And we can deduce $1/R$ thanks the previous equation and use this value like entry point for the curvature attribute.	DEV_DOUBLE	READ_WRITE	No
bender1: Value of the first bender.	DEV_DOUBLE	READ_WRITE	Yes
bender2: Value of the second bender.	DEV_DOUBLE	READ_WRITE	Yes
bender3: Value of the third bender.	DEV_DOUBLE	READ_WRITE	Yes
bender4: Value of the fourth bender.	DEV_DOUBLE	READ_WRITE	Yes
asymmetry: Represents the assymetry value between the two bender motors.	DEV_DOUBLE	READ	No
curvature: This value represents the curvature value (inverse of the curvature radius)	DEV_DOUBLE	READ_WRITE	No
curvatureRadius: This attribute represents the curvature radius of the bender. It's the real value of curvature.	DEV_DOUBLE	READ_WRITE	No
meanCurvature: This the mean curvature (inverse of the mean curvature radius)	DEV_DOUBLE	READ	No
meanCurvatureRadius: The bender mean curvature radius. It is computed thanks the values of the motors	DEV_DOUBLE	READ	No
numberOfMotors: The number of piloted motors	DEV_SHORT	READ	No
autoSendValues: This attribute indicate if the values computed are automatically send to the motors. If not, the user must use the SendValue command to send the computed values.	DEV_BOOLEAN	READ_WRITE	No

Commands:

More Details on commands....

Device Commands for Operator Level		
Command name	Argument In	Argument Out
Init	DEV_VOID	DEV_VOID
State	DEV_VOID	DEV_STATE
Status	DEV_VOID	CONST_DEV_STRING
Stop	DEV_VOID	DEV_VOID
InitializeBender	DEV_VOID	DEV_VOID
SendValues	DEV_VOID	DEV_VOID

1 - Init

- **Description:** This commands re-initialise a device keeping the same network connection.
After an Init command executed on a device, it is not necessary for client to re-connect to the device.
This command first calls the device *delete_device()* method and then execute its *init_device()* method.
For C++ device server, all the memory allocated in the *nit_device()* method must be freed in the *delete_device()* method.
The language device desctructor automatically calls the *delete_device()* method.
- **Argin:**
DEV_VOID : none.
- **Argout:**
DEV_VOID : none.
- **Command allowed for:**
 - Tango::MOVING
 - Tango::STANDBY
 - Tango::ALARM
 - Tango::FAULT
 - Tango::INIT

2 - State

- **Description:** This command gets the device state (stored in its *device_state* data member) and returns it to the caller.
- **Argin:**
DEV_VOID : none.
- **Argout:**
DEV_STATE : State Code
- **Command allowed for:**
 - Tango::MOVING
 - Tango::STANDBY
 - Tango::ALARM
 - Tango::FAULT
 - Tango::INIT

3 - Status

- **Description:** This command gets the device status (stored in its *device_status* data member) and returns it to the caller.
- **Argin:**
DEV_VOID : none.
- **Argout:**
CONST_DEV_STRING : Status description
- **Command allowed for:**
 - Tango::MOVING
 - Tango::STANDBY
 - Tango::ALARM
 - Tango::FAULT
 - Tango::INIT

4 - Stop

- **Description:** Stop all the bender motors.
- **Argin:**
DEV_VOID :
- **Argout:**
DEV_VOID :

- **Command allowed for:**

- Tango::MOVING
- Tango::STANDBY
- Tango::ALARM

5 - InitializeBender

- **Description:** This method allows to make the initialization of the four motor bender.

- **Argin:**

DEV_VOID :

- **Argout:**

DEV_VOID :

- **Command allowed for:**

- Tango::STANDBY
- Tango::ALARM
- Tango::INIT

6 - SendValues

- **Description:** When "Auto Send Value" attribute is set to false, this command is necessary to send the computed value.

- **Argin:**

DEV_VOID :

- **Argout:**

DEV_VOID :

- **Command allowed for:**

- Tango::STANDBY
- Tango::ALARM

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