

XbpmMachine Tango Cpp Class

Contents :

- o [Description](#)
- o [Properties](#)
- o [Commands](#)
 - [State](#)
 - [Status](#)
 - [Start](#)
 - [Stop](#)
- o [Attributes](#)
 - [current1](#)
 - [current2](#)
 - [current3](#)
 - [current4](#)
 - [verticalPosition1](#)
 - [verticalPosition2](#)
 - [gain](#)
 - [enableAutomaticGain](#)
 - [xPos](#)
 - [zPos](#)
- o [States](#)

XbpmMachine Class Identification :

Contact : at synchrotron-soleil.fr - xavier.elattaoui
 Class Family : Calculation
 Platform : All Platforms
 Bus : Not Applicable
 Manufacturer : none
 Manufacturer ref. :

XbpmMachine Class Inheritance :

- o [Tango::DeviceImpl](#)
 - XbpmMachine

XbpmMachine Class Description :

it calculates the vertical positions of the beam. calculation:

$Z1 = f(la, ld, G, \text{offsets}, \text{factors}...)$

$Z1 = f(lb, lc, \text{offsets}, \text{factors}...)$

where:

la = generated current on blade A

lb = generated current on blade B

lc = generated current on blade C

ld = generated current on blade D

G = locum4 amplifier gain

and offset & factors ...

XbpmMachine Properties :

There is no class properties

Device Properties			
Name	Description	Type	Default Value
Kz1_Factor	Coefficient used with the dipole measurement mode (AD) exterior blades	double	1
Kz2_Factor	Coefficient used with the dipole measurement mode (BC) exterior blades	double	1
Delta_Z	Coefficient used with the dipole measurement mode	double	0
Ca	current offset on electrode A. this is the current measured when the beam is cut	double	0
Cb	current offset on electrode B. this is the current measured when the beam is cut	double	0
Cc	current offset on electrode C. this is the current measured when the beam is cut	double	0
Cd	current offset on electrode D. this is the current measured when the beam is cut	double	0
Ka	GAIN correction of the electrode A	double	1
Kb	GAIN correction of the electrode B	double	1
Kc	GAIN correction of the electrode C	double	1
Kd	GAIN correction of the electrode AGAIN correction of the electrode D	double	1
MisalignementOffset		double	none
ElectronicOffset		double	none
OperatorOffset	operator offset	double	none
Locum4ProxyName		String	none
LowVoltageThreshold	if the input voltages of the ADC decrease this threshold, the corresponding average current attributes become ALARM (ex : if Vmes < low_threshold)	double	0.1
HighVoltageThreshold	if the input voltages of the ADC exceed this threshold, the corresponding average current attributes become ALARM (ex : if Vmes > threshold)	double	9.9
SaiControllerProxyName	name of the SaiController device proxy	String	none
OffsetZ1	offset on vertical position 1	double	0
OffsetZ2	offset on vertical position 2	double	0
Z1CorrectionTable	offset list for Z1 position. one offset is associated to one gain. Offset are ordered according increase gain order.	double[]	none
Z2CorrectionTable	offset list for Z2 position. one offset is associated to one gain. Offset are ordered according increase gain order.	double[]	none
	XBPM version. Value must be in range [1,2].		

XBPMVersion	This property has no default value and must be defined.	short	none
Kx_Factor	This property is only supported by the XBPM version 2 Defaults to 1.0	double	1.0
Kz_Factor	This property is only supported by the XBPM version 2 Defaults to 1.0	double	1.0
MisalignementOffsetX	This property is only supported by the XBPM version 2 Defaults to 0.0	double	0.0
MisalignementOffsetZ	This property is only supported by the XBPM version 2 Defaults to 0.0	double	0.0
OffsetX	This property is only supported by the XBPM version 2 Defaults to 0.0	double	0.0
OffsetZ	This property is only supported by the XBPM version 2 Defaults to 0.0	double	0.0
OperatorOffsetX	This property is only supported by the XBPM version 2 Defaults to 0.0	double	0.0
OperatorOffsetZ	This property is only supported by the XBPM version 2 Defaults to 0.0	double	0.0
XCorrectionTable	X gain correction table	double[]	0, 0, 0, 0, 0, 0, 0, 0
ZCorrectionTable	Z gain correction table	double[]	0, 0, 0, 0, 0, 0, 0, 0
Formula	0 : use old formula to compute beam position. 1 : use the new one.	short	0

XbpmMachine Class Commands				
Name	Input type	Output type	Level	Description
State	DEV_VOID	DEV_STATE	OPERATOR	This command gets the device state (stored in its <i>device_state</i> data member) and returns it to the caller.
Status	DEV_VOID	CONST_DEV_STRING	OPERATOR	This command gets the device status (stored in its <i>device_status</i> data member) and returns it to the caller.
Start	DEV_VOID	DEV_VOID	OPERATOR	start acquisition
Stop	DEV_VOID	DEV_VOID	OPERATOR	stop acquisition

Command State :

This command gets the device state (stored in its *device_state* data member) and returns it to the caller.

State Definition		
Input Argument	Tango::DEV_VOID	none.
Output Argument	Tango::DEV_STATE	State Code

DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Status :

This command gets the device status (stored in its *device_status* data member) and returns it to the caller.

Status Definition		
Input Argument	Tango::DEV_VOID	none.
Output Argument	Tango::CONST_DEV_STRING	Status description
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Start :

start acquisition

Start Definition		
Input Argument	Tango::DEV_VOID	nothing
Output Argument	Tango::DEV_VOID	nothing
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Stop :

stop acquisition

Stop Definition		
Input Argument	Tango::DEV_VOID	nothing
Output Argument	Tango::DEV_VOID	nothing
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

XbpmMachine Class Attributes							
Name	Inherited	Abstract	Attr. type	R/W type	Data type	Level	Description
current1	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	average current on channel 1 Average over n samples :\nwhere n = (integretion_time * sampling_frequency)/4
current2	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	average current on channel 2 Average over n samples :\nwhere n = (integretion_time * sampling_frequency)/4
current3	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	average current on channel 3 Average over n samples :\nwhere n = (integretion_time * sampling_frequency)/4
current4	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	average current on channel 4 Average over n samples :\nwhere n = (integretion_time * sampling_frequency)/4
							Z1 = Kz1_factor x log10(X1) + offsets

verticalPosition1	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	... \nwhere:\nG = range / 10 \nX1 = Ia/Ic \nIa = Va*G + ca \nId = Vd*G
verticalPosition2	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	$Z_2 = Kz_2_factor \times \log_{10}(X_2) + offsets$... \nwhere:\nG = range / 10 \nX2 = Ib/Ic \nIb = Vb*G + cb \nIc = Vc*G + cc
gain	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	according to the Locum4 input range the gain change: \n\nInput Range gain (micro_A) (A/V) 1000 100 100 10 1 0.1 0.1 0.01 0.01 0.001 0.001 0.0001 0.0001 0.00001
enableAutomaticGain	false	false	Scalar	WRITE	Tango::DEV_BOOLEAN	OPERATOR	enable auto range
xPos	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	
zPos	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	

There is no dynamic attribute defined.

Attribute current1 :

average current on channel 1
Average over n samples \nwhere n = (integretion_time * sampling_frequency)/4

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed	

Attribute Properties	
label	I1
unit	microA
standard unit	microA
display unit	microA
format	%4.3e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not

for	All states
-----	------------

min_warning	
delta_time	
delta_val	

	set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current2 :

average current on channel 2
Average over n samples : n where $n = (\text{integration_time} * \text{sampling_frequency})/4$

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	I2
unit	microA
standard unit	microA
display unit	microA
format	%4.3e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current3 :

average current on channel 3
Average over n samples : n where $n = (\text{integration_time} * \text{sampling_frequency})/4$

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	I3
unit	microA
standard unit	microA
display unit	microA
format	%4.3e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current4 :

average current on channel 4
Average over n samples : $\bar{I} = \frac{1}{n} \int_{t_0}^{t_0 + \Delta t} I(t) dt$ where $n = (\text{integration_time} * \text{sampling_frequency})/4$

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed	

Attribute Properties	
label	I4
unit	microA
standard unit	microA
display unit	microA
format	%4.3e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set

for	All states
-----	------------

min_warning	
delta_time	
delta_val	

Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute verticalPosition1 :

$$Z1 = Kz1_factor \times \log_{10}(X1) + \text{offsets} \dots \text{where: } nG = \text{range} / 10 \quad nX1 = la/ld \quad nla = Va * G + ca \quad nld = Vd * G + cd$$

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	Z1
unit	mm
standard unit	mm
display unit	mm
format	%6.2f
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute verticalPosition2 :

$$Z2 = Kz2_factor \times \log_{10}(X2) + \text{offsets} \dots \text{where: } nG = \text{range} / 10 \quad nX2 = lb/lc \quad nlb = Vb * G + cb \quad nlc = Vc * G + cc$$

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	Z2
unit	mm
standard unit	mm
display unit	mm
format	%6.2f
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute gain :

according to the Locum4 input range the gain change:\n\nInput Range gain\n(n(micro_A) (A/V)\n1000 100 \n100 10\n10 1\n1 0.1\n0.1 0.01\n0.01 0.001 \n0.001 0.0001\n0.0001 0.00001

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	gain
unit	A/V
standard unit	A/V
display unit	A/V
format	%4.3e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set

min_warning	
delta_time	
delta_val	

Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute enableAutomaticGain :

enable auto range

Attribute Definition	
Attribute Type	Scalar
R/W Type	WRITE
Data Type	Tango::DEV_BOOLEAN
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	true
Write hardware at init.	Not set
Write allowed for	All states

Attribute Properties	
label	enable auto range
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute xPos :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	<ul style="list-style-type: none"> • FAULT

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute zPos :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	<ul style="list-style-type: none"> • FAULT

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false

Push DataReady event by user code	Not set
-----------------------------------	---------

XbpmMachine Class States	
Name	Description
FAULT	causes may be: - DAQ hardware driver failure - a fatal error occurred
RUNNING	DAQ is running
STANDBY	device is up and ready to acquire data