



# Poppy project Documentation

*Release 1.1.0*

**INRIA**

October 22, 2015



## CONTENTS

<b>1</b>	<b>Getting Started</b>	<b>1</b>
1.1	Getting Started . . . . .	1
<b>2</b>	<b>Advanced Sections</b>	<b>3</b>
2.1	Assembly Guides . . . . .	3
2.2	Development Guides . . . . .	3
	<b>Python Module Index</b>	<b>59</b>
	<b>Index</b>	<b>61</b>



## GETTING STARTED

### 1.1 Getting Started

#### 1.1.1 Program your robot using Python, Snap!, etc...



## ADVANCED SECTIONS

### 2.1 Assembly Guides

#### 2.1.1 Working with Dynamixel servomotor

#### 2.1.2 Assembly guide for a Poppy Humanoid or Poppy Torso robot

### 2.2 Development Guides

#### 2.2.1 Poppy-humanoid library

#### 2.2.2 Poppy-torso library

#### 2.2.3 Poppy-ergo-jr library

#### 2.2.4 Poppy-creature library

#### 2.2.5 Pypot library

##### Introduction

##### Quickstarts

##### Pypot in details

##### Other useful features

#### 2.2.6 Setup the internal board

#### 2.2.7 APIs

##### poppy\_humanoid package

##### Subpackages

##### poppy\_humanoid.primitives package

## Submodules

`poppy_humanoid.primitives.dance` module

`poppy_humanoid.primitives.idle` module

`poppy_humanoid.primitives.interaction` module

`poppy_humanoid.primitives.posture` module

`poppy_humanoid.primitives.safe` module

## Module contents

### Submodules

`poppy_humanoid.poppy_humanoid` module

### Module contents

`poppy_torso` package

### Subpackages

`poppy_torso.primitives` package

### Submodules

`poppy_torso.primitives.dance` module

`poppy_torso.primitives.idle` module

`poppy_torso.primitives.interaction` module

`poppy_torso.primitives.posture` module

`poppy_torso.primitives.safe` module

### Module contents

`poppy_torso.utils` package



## Submodules

`poppy_torso.utils.min_jerk` module

## Module contents

## Submodules

`poppy_torso.poppy_torso` module

## Module contents

`poppy_ergo_jr` package

## Submodules

`poppy_ergo_jr.dance` module

`poppy_ergo_jr.headfollow` module

`poppy_ergo_jr.jump` module

`poppy_ergo_jr.poppy_ergo_jr` module

`poppy_ergo_jr.postures` module

## Module contents

`poppy-creature` package

## Subpackages

`poppy.creatures` package

## Submodules

`poppy.creatures.abstractcreature` module

`poppy.creatures.poppy_sim` module

`poppy.creatures.services_launcher` module

`poppy.creatures.snap_launcher` module

## Module contents

## Module contents

### pypot package

#### Subpackages

#### pypot.dynamixel package

#### Subpackages

#### pypot.dynamixel.io package

#### Submodules

#### pypot.dynamixel.io.abstract\_io module

```
class pypot.dynamixel.io.abstract_io.AbstractDxlIO(port, baudrate=1000000, timeout=0.05, use_sync_read=False, error_handler_cls=None, convert=True)
```

Bases: `pypot.robot.io.AbstractIO`

Low-level class to handle the serial communication with the robotis motors.

At instantiation, it opens the serial port and sets the communication parameters.

#### Parameters

- **port** (*string*) – the serial port to use (e.g. Unix (/dev/tty...), Windows (COM...)).
- **baudrate** (*int*) – default for new motors: 57600, for PyPot motors: 1000000
- **timeout** (*float*) – read timeout in seconds
- **use\_sync\_read** (*bool*) – whether or not to use the SYNC\_READ instruction
- **error\_handler** (*DxlErrorHandler*) – set a handler that will receive the different errors
- **convert** (*bool*) – whether or not convert values to units expressed in the standard system

**Raises** `DxlError` if the port is already used.

**classmethod** `get_used_ports()`

**open** (*port*, *baudrate*=1000000, *timeout*=0.05)

Opens a new serial communication (closes the previous communication if needed).

**Raises** `DxlError` if the port is already used.

**close** (*\_force\_lock*=False)

Closes the serial communication if opened.

**flush** (*\_force\_lock*=False)

Flushes the serial communication (both input and output).

**port**

Port used by the `DxlIO`. If set, will re-open a new connection.

**baudrate**

Baudrate used by the DxlIO. If set, will re-open a new connection.

**timeout**

Timeout used by the DxlIO. If set, will re-open a new connection.

**closed**

Checks if the connection is closed.

**ping** (*id*)

Pings the motor with the specified id.

---

**Note:** The motor id should always be included in [0, 253]. 254 is used for broadcast.

---

**scan** (*ids=[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253]*)

Pings all ids within the specified list, by default it finds all the motors connected to the bus.

**get\_model** (*ids*)

Gets the model for the specified motors.

**change\_id** (*new\_id\_for\_id*)

Changes the id of the specified motors (each id must be unique on the bus).

**change\_baudrate** (*baudrate\_for\_ids*)

Changes the baudrate of the specified motors.

**get\_status\_return\_level** (*ids, \*\*kwargs*)

Gets the status level for the specified motors.

**set\_status\_return\_level** (*srl\_for\_id, \*\*kwargs*)

Sets status return level to the specified motors.

**switch\_led\_on** (*ids*)

Switches on the LED of the motors with the specified ids.

**switch\_led\_off** (*ids*)

Switches off the LED of the motors with the specified ids.

**enable\_torque** (*ids*)

Enables torque of the motors with the specified ids.

**disable\_torque** (*ids*)

Disables torque of the motors with the specified ids.

**get\_pid\_gain** (*ids, \*\*kwargs*)

Gets the pid gain for the specified motors.

**set\_pid\_gain** (*pid\_for\_id, \*\*kwargs*)

Sets the pid gain to the specified motors.

**get\_control\_table** (*ids*, *\*\*kwargs*)

Gets the full control table for the specified motors.

..note:: This function requires the model for each motor to be known. Querring this additional information might add some extra delay.

**exception** `pypot.dynamixel.io.abstract_io.DxlError`

Bases: `exceptions.Exception`

Base class for all errors encountered using DxlIO.

**exception** `pypot.dynamixel.io.abstract_io.DxlCommunicationError` (*dxl\_io*, *message*, *instruction\_packet*)

Bases: `pypot.dynamixel.io.abstract_io.DxlError`

Base error for communication error encountered when using DxlIO.

**exception** `pypot.dynamixel.io.abstract_io.DxlTimeoutError` (*dxl\_io*, *instruction\_packet*, *ids*)

Bases: `pypot.dynamixel.io.abstract_io.DxlCommunicationError`

Timeout error encountered when using DxlIO.

`pypot.dynamixel.io.abstract_io.with_True` (*\*args*, *\*\*kws*)

#### **pypot.dynamixel.io.io module**

**class** `pypot.dynamixel.io.io.DxlIO` (*port*, *baudrate=1000000*, *timeout=0.05*, *use\_sync\_read=False*, *error\_handler\_cls=None*, *convert=True*)

Bases: `pypot.dynamixel.io.abstract_io.AbstractDxlIO`

At instantiation, it opens the serial port and sets the communication parameters.

#### **Parameters**

- **port** (*string*) – the serial port to use (e.g. Unix (/dev/tty...), Windows (COM...)).
- **baudrate** (*int*) – default for new motors: 57600, for PyPot motors: 1000000
- **timeout** (*float*) – read timeout in seconds
- **use\_sync\_read** (*bool*) – whether or not to use the SYNC\_READ instruction
- **error\_handler** (*DxlErrorHandler*) – set a handler that will receive the different errors
- **convert** (*bool*) – whether or not convert values to units expressed in the standard system

**Raises** `DxlError` if the port is already used.

**factory\_reset** ()

Reset all motors on the bus to their factory default settings.

**get\_control\_mode** (*ids*)

Gets the mode ('joint' or 'wheel') for the specified motors.

**set\_wheel\_mode** (*ids*)

Sets the specified motors to wheel mode.

**set\_joint\_mode** (*ids*)

Sets the specified motors to joint mode.

**set\_control\_mode** (*mode\_for\_id*)

**set\_angle\_limit** (*limit\_for\_id*, *\*\*kwargs*)

Sets the angle limit to the specified motors.

**get\_alarm\_LED** (*ids*, *\*\*kwargs*)  
Gets alarm LED from the specified motors.

**get\_alarm\_shutdown** (*ids*, *\*\*kwargs*)  
Gets alarm shutdown from the specified motors.

**get\_angle\_limit** (*ids*, *\*\*kwargs*)  
Gets angle limit from the specified motors.

**get\_compliance\_margin** (*ids*, *\*\*kwargs*)  
Gets compliance margin from the specified motors.

**get\_compliance\_slope** (*ids*, *\*\*kwargs*)  
Gets compliance slope from the specified motors.

**get\_drive\_mode** (*ids*, *\*\*kwargs*)  
Gets drive mode from the specified motors.

**get\_firmware** (*ids*, *\*\*kwargs*)  
Gets firmware from the specified motors.

**get\_goal\_position** (*ids*, *\*\*kwargs*)  
Gets goal position from the specified motors.

**get\_goal\_position\_speed\_load** (*ids*, *\*\*kwargs*)  
Gets goal position speed load from the specified motors.

**get\_highest\_temperature\_limit** (*ids*, *\*\*kwargs*)  
Gets highest temperature limit from the specified motors.

**get\_max\_torque** (*ids*, *\*\*kwargs*)  
Gets max torque from the specified motors.

**get\_moving\_speed** (*ids*, *\*\*kwargs*)  
Gets moving speed from the specified motors.

**get\_present\_load** (*ids*, *\*\*kwargs*)  
Gets present load from the specified motors.

**get\_present\_position** (*ids*, *\*\*kwargs*)  
Gets present position from the specified motors.

**get\_present\_position\_speed\_load** (*ids*, *\*\*kwargs*)  
Gets present position speed load from the specified motors.

**get\_present\_speed** (*ids*, *\*\*kwargs*)  
Gets present speed from the specified motors.

**get\_present\_temperature** (*ids*, *\*\*kwargs*)  
Gets present temperature from the specified motors.

**get\_present\_voltage** (*ids*, *\*\*kwargs*)  
Gets present voltage from the specified motors.

**get\_return\_delay\_time** (*ids*, *\*\*kwargs*)  
Gets return delay time from the specified motors.

**get\_torque\_limit** (*ids*, *\*\*kwargs*)  
Gets torque limit from the specified motors.

**get\_voltage\_limit** (*ids*, *\*\*kwargs*)  
Gets voltage limit from the specified motors.

**is\_led\_on** (*ids*, *\*\*kwargs*)  
 Gets LED from the specified motors.

**is\_moving** (*ids*, *\*\*kwargs*)  
 Gets moving from the specified motors.

**is\_torque\_enabled** (*ids*, *\*\*kwargs*)  
 Gets torque\_enable from the specified motors.

**set\_alarm\_LED** (*value\_for\_id*, *\*\*kwargs*)  
 Sets alarm LED to the specified motors.

**set\_alarm\_shutdown** (*value\_for\_id*, *\*\*kwargs*)  
 Sets alarm shutdown to the specified motors.

**set\_compliance\_margin** (*value\_for\_id*, *\*\*kwargs*)  
 Sets compliance margin to the specified motors.

**set\_compliance\_slope** (*value\_for\_id*, *\*\*kwargs*)  
 Sets compliance slope to the specified motors.

**set\_drive\_mode** (*value\_for\_id*, *\*\*kwargs*)  
 Sets drive mode to the specified motors.

**set\_goal\_position** (*value\_for\_id*, *\*\*kwargs*)  
 Sets goal position to the specified motors.

**set\_goal\_position\_speed\_load** (*value\_for\_id*, *\*\*kwargs*)  
 Sets goal position speed load to the specified motors.

**set\_highest\_temperature\_limit** (*value\_for\_id*, *\*\*kwargs*)  
 Sets highest temperature limit to the specified motors.

**set\_max\_torque** (*value\_for\_id*, *\*\*kwargs*)  
 Sets max torque to the specified motors.

**set\_moving\_speed** (*value\_for\_id*, *\*\*kwargs*)  
 Sets moving speed to the specified motors.

**set\_return\_delay\_time** (*value\_for\_id*, *\*\*kwargs*)  
 Sets return delay time to the specified motors.

**set\_torque\_limit** (*value\_for\_id*, *\*\*kwargs*)  
 Sets torque limit to the specified motors.

**set\_voltage\_limit** (*value\_for\_id*, *\*\*kwargs*)  
 Sets voltage limit to the specified motors.

#### **pypot.dynamixel.io.io\_320 module**

```
class pypot.dynamixel.io.io_320.Dxl320IO (port,          baudrate=1000000,          timeout=0.05,
                                          use_sync_read=False,      error_handler_cls=None,
                                          convert=True)
```

Bases: `pypot.dynamixel.io.abstract_io.AbstractDxlIO`

At instantiation, it opens the serial port and sets the communication parameters.

#### **Parameters**

- **port** (*string*) – the serial port to use (e.g. Unix (/dev/tty...), Windows (COM...)).
- **baudrate** (*int*) – default for new motors: 57600, for PyPot motors: 1000000
- **timeout** (*float*) – read timeout in seconds

- **use\_sync\_read** (*bool*) – whether or not to use the SYNC\_READ instruction
- **error\_handler** (*DxlErrorHandler*) – set a handler that will receive the different errors
- **convert** (*bool*) – whether or not convert values to units expressed in the standard system

Raises `DxlError` if the port is already used.

**set\_wheel\_mode** (*ids*)

**set\_joint\_mode** (*ids*)

**get\_goal\_position\_speed\_load** (*ids*)

**set\_goal\_position\_speed\_load** (*value\_for\_ids*)

**factory\_reset** (*ids*, *except\_ids=False*, *except\_baudrate\_and\_ids=False*)

Reset all motors on the bus to their factory default settings.

**get\_LED\_color** (*ids*, *\*\*kwargs*)

Gets LED color from the specified motors.

**get\_alarm\_shutdown** (*ids*, *\*\*kwargs*)

Gets alarm shutdown from the specified motors.

**get\_angle\_limit** (*ids*, *\*\*kwargs*)

Gets angle limit from the specified motors.

**get\_control\_mode** (*ids*, *\*\*kwargs*)

Gets control mode from the specified motors.

**get\_firmware** (*ids*, *\*\*kwargs*)

Gets firmware from the specified motors.

**get\_goal\_position** (*ids*, *\*\*kwargs*)

Gets goal position from the specified motors.

**get\_highest\_temperature\_limit** (*ids*, *\*\*kwargs*)

Gets highest temperature limit from the specified motors.

**get\_max\_torque** (*ids*, *\*\*kwargs*)

Gets max torque from the specified motors.

**get\_moving\_speed** (*ids*, *\*\*kwargs*)

Gets moving speed from the specified motors.

**get\_present\_load** (*ids*, *\*\*kwargs*)

Gets present load from the specified motors.

**get\_present\_position** (*ids*, *\*\*kwargs*)

Gets present position from the specified motors.

**get\_present\_position\_speed\_load** (*ids*, *\*\*kwargs*)

Gets present position speed load from the specified motors.

**get\_present\_speed** (*ids*, *\*\*kwargs*)

Gets present speed from the specified motors.

**get\_present\_temperature** (*ids*, *\*\*kwargs*)

Gets present temperature from the specified motors.

**get\_present\_voltage** (*ids*, *\*\*kwargs*)

Gets present voltage from the specified motors.

**get\_return\_delay\_time** (*ids*, *\*\*kwargs*)  
Gets return delay time from the specified motors.

**get\_torque\_limit** (*ids*, *\*\*kwargs*)  
Gets torque limit from the specified motors.

**get\_voltage\_limit** (*ids*, *\*\*kwargs*)  
Gets voltage limit from the specified motors.

**is\_led\_on** (*ids*, *\*\*kwargs*)  
Gets LED from the specified motors.

**is\_moving** (*ids*, *\*\*kwargs*)  
Gets moving from the specified motors.

**is\_torque\_enabled** (*ids*, *\*\*kwargs*)  
Gets torque\_enable from the specified motors.

**set\_LED\_color** (*value\_for\_id*, *\*\*kwargs*)  
Sets LED color to the specified motors.

**set\_alarm\_shutdown** (*value\_for\_id*, *\*\*kwargs*)  
Sets alarm shutdown to the specified motors.

**set\_angle\_limit** (*value\_for\_id*, *\*\*kwargs*)  
Sets angle limit to the specified motors.

**set\_control\_mode** (*value\_for\_id*, *\*\*kwargs*)  
Sets control mode to the specified motors.

**set\_goal\_position** (*value\_for\_id*, *\*\*kwargs*)  
Sets goal position to the specified motors.

**set\_highest\_temperature\_limit** (*value\_for\_id*, *\*\*kwargs*)  
Sets highest temperature limit to the specified motors.

**set\_max\_torque** (*value\_for\_id*, *\*\*kwargs*)  
Sets max torque to the specified motors.

**set\_moving\_speed** (*value\_for\_id*, *\*\*kwargs*)  
Sets moving speed to the specified motors.

**set\_return\_delay\_time** (*value\_for\_id*, *\*\*kwargs*)  
Sets return delay time to the specified motors.

**set\_torque\_limit** (*value\_for\_id*, *\*\*kwargs*)  
Sets torque limit to the specified motors.

**set\_voltage\_limit** (*value\_for\_id*, *\*\*kwargs*)  
Sets voltage limit to the specified motors.

## Module contents

pypot.dynamixel.protocol package

## Submodules



**pypot.dynamixel.protocol.v1 module****class** pypot.dynamixel.protocol.v1.DxlInstruction

Bases: object

**PING = 1****READ\_DATA = 2****WRITE\_DATA = 3****RESET = 6****SYNC\_WRITE = 131****SYNC\_READ = 132****class** pypot.dynamixel.protocol.v1.DxlPacketHeader

Bases: pypot.dynamixel.protocol.v1.DxlPacketHeader

This class represents the header of a Dxl Packet.

**They are constructed as follows [0xFF, 0xFF, ID, LENGTH] where:**

- ID represents the ID of the motor who received (resp. sent) the intruction (resp. status) packet.
- LENGTH represents the length of the rest of the packet

**length = 4****marker = bytearray(b'\xff\xff')****classmethod from\_string (data)****class** pypot.dynamixel.protocol.v1.DxlInstructionPacket

Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket

This class is used to represent a dynamixel instruction packet.

An instruction packet is constructed as follows: [0xFF, 0xFF, ID, LENGTH, INSTRUCTION, PARAM 1, PARAM 2, ..., PARAM N, CHECKSUM]

(for more details see [http://support.robotis.com/en/product/dxl\\_main.htm](http://support.robotis.com/en/product/dxl_main.htm))**to\_array ()****to\_string ()****length****checksum****class** pypot.dynamixel.protocol.v1.DxlPingPacket

Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket

This class is used to represent ping packet.

**class** pypot.dynamixel.protocol.v1.DxlResetPacket

Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket

This class is used to represent reset packet.

**class** pypot.dynamixel.protocol.v1.DxlReadDataPacket

Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket

This class is used to represent read data packet (to read value).

**class** pypot.dynamixel.protocol.v1.DxlSyncReadPacket

Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket

This class is used to represent sync read packet (to synchronously read values).

```
class pypot.dynamixel.protocol.v1.DxlWriteDataPacket
    Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket
```

This class is used to represent write data packet (to write value).

```
class pypot.dynamixel.protocol.v1.DxlSyncWritePacket
    Bases: pypot.dynamixel.protocol.v1.DxlInstructionPacket
```

This class is used to represent sync write packet (to synchronously write values).

```
class pypot.dynamixel.protocol.v1.DxlStatusPacket
    Bases: pypot.dynamixel.protocol.v1.DxlStatusPacket
```

This class is used to represent a dynamixel status packet.

A status packet is constructed as follows: [0xFF, 0xFF, ID, LENGTH, ERROR, PARAM 1, PARAM 2, ..., PARAM N, CHECKSUM]

(for more details see [http://support.robotis.com/en/product/dxl\\_main.htm](http://support.robotis.com/en/product/dxl_main.htm))

```
classmethod from_string (data)
```

#### pypot.dynamixel.protocol.v2 module

```
class pypot.dynamixel.protocol.v2.DxlInstruction
    Bases: object
```

```
PING = 1
```

```
READ_DATA = 2
```

```
WRITE_DATA = 3
```

```
RESET = 6
```

```
SYNC_READ = 130
```

```
SYNC_WRITE = 131
```

```
class pypot.dynamixel.protocol.v2.DxlPacketHeader
    Bases: pypot.dynamixel.protocol.v2.DxlPacketHeader
```

This class represents the header of a Dxl Packet.

They are constructed as follows [0xFF, 0xFF, 0xFD, 0x00, ID, LEN\_L, LEN\_H] where:

- ID represents the ID of the motor who received (resp. sent) the instruction (resp. status) packet.
- LEN\_L, LEN\_H represents the length of the rest of the packet

```
length = 7
```

```
marker = bytearray(b'\xff\xff\xfd\x00')
```

```
classmethod from_string (data)
```

```
class pypot.dynamixel.protocol.v2.DxlInstructionPacket
    Bases: pypot.dynamixel.protocol.v2.DxlInstructionPacket
```

This class is used to represent a dynamixel instruction packet.

An instruction packet is constructed as follows: [0xFF, 0xFF, 0xFD, 0x00, ID, LEN\_L, LEN\_H, INST, PARAM 1, PARAM 2, ..., PARAM N, CRC\_L, CRC\_H]

(for more details see [http://support.robotis.com/en/product/dxl\\_main.htm](http://support.robotis.com/en/product/dxl_main.htm))

```
to_array ()
```

**to\_string()**

**length**

**checksum**

**class** `pypot.dynamixel.protocol.v2.DxlPingPacket`

Bases: `pypot.dynamixel.protocol.v2.DxlInstructionPacket`

This class is used to represent ping packet.

**class** `pypot.dynamixel.protocol.v2.DxlResetPacket`

Bases: `pypot.dynamixel.protocol.v2.DxlInstructionPacket`

This class is used to represent factory reset packet.

**class** `pypot.dynamixel.protocol.v2.DxlReadDataPacket`

Bases: `pypot.dynamixel.protocol.v2.DxlInstructionPacket`

This class is used to represent read data packet (to read value).

**class** `pypot.dynamixel.protocol.v2.DxlSyncReadPacket`

Bases: `pypot.dynamixel.protocol.v2.DxlInstructionPacket`

This class is used to represent sync read packet (to synchronously read values).

**class** `pypot.dynamixel.protocol.v2.DxlWriteDataPacket`

Bases: `pypot.dynamixel.protocol.v2.DxlInstructionPacket`

This class is used to represent write data packet (to write value).

**class** `pypot.dynamixel.protocol.v2.DxlSyncWritePacket`

Bases: `pypot.dynamixel.protocol.v2.DxlInstructionPacket`

This class is used to represent sync write packet (to synchronously write values).

**class** `pypot.dynamixel.protocol.v2.DxlStatusPacket`

Bases: `pypot.dynamixel.protocol.v2.DxlStatusPacket`

This class is used to represent a dynamixel status packet.

A status packet is constructed as follows: [0xFF, 0xFF, 0xFD, 0x00, ID, LEN\_L, LEN\_H, 0x55, ERROR, PARAM 1, PARAM 2, ..., PARAM N, CRC\_L, CRC\_H]

(for more details see [http://support.robotis.com/en/product/dxl\\_main.htm](http://support.robotis.com/en/product/dxl_main.htm))

**classmethod** `from_string(data)`

`pypot.dynamixel.protocol.v2.crc16(data_blk, data_blk_size, crc_accum=0)`

## Module contents

### Submodules

#### **pypot.dynamixel.controller module**

**class** `pypot.dynamixel.controller.DxlController` (*io, motors, sync\_freq, synchronous, mode, regname, varname=None*)

Bases: `pypot.robot.controller.MotorsController`

**working\_motors**

**synced\_motors**

**setup()**

```

    update ()
    get_register (motors)
        Gets the value from the specified register and sets it to the DxlMotor.
    set_register (motors)
        Gets the value from DxlMotor and sets it to the specified register.
class pypot.dynamixel.controller.AngleLimitRegisterController (io, motors, sync_freq,
                                                             synchronous)
    Bases: pypot.dynamixel.controller.DxlController
    synced_motors
    get_register (motors)

class pypot.dynamixel.controller.PosSpeedLoadDxlController (io, motors, sync_freq)
    Bases: pypot.dynamixel.controller.DxlController
    setup ()
    update ()
    get_present_position_speed_load (motors)
    set_goal_position_speed_load (motors)

```

**pypot.dynamixel.conversion module** This module describes all the conversion method used to transform value from the representation used by the dynamixel motor to a more standard form (e.g. degrees, volt...).

**For compatibility issue all comparison method should be written in the following form (even if the model is not actually used):**

- def my\_conversion\_from\_dxl\_to\_si(value, model): ...
- def my\_conversion\_from\_si\_to\_dxl(value, model): ...

---

**Note:** If the control is readonly you only need to write the dxl\_to\_si conversion.

---

```

pypot.dynamixel.conversion.dxl_to_degree (value, model)
pypot.dynamixel.conversion.degree_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_speed (value, model)
pypot.dynamixel.conversion.speed_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_torque (value, model)
pypot.dynamixel.conversion.torque_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_load (value, model)
pypot.dynamixel.conversion.dxl_to_pid (value, model)
pypot.dynamixel.conversion.pid_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_model (value, dummy=None)
pypot.dynamixel.conversion.check_bit (value, offset)
pypot.dynamixel.conversion.dxl_to_drive_mode (value, model)
pypot.dynamixel.conversion.drive_mode_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_baudrate (value, model)

```

```

pypot.dynamixel.conversion.baudrate_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_rdt (value, model)
pypot.dynamixel.conversion.rdt_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_temperature (value, model)
pypot.dynamixel.conversion.temperature_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_voltage (value, model)
pypot.dynamixel.conversion.voltage_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_status (value, model)
pypot.dynamixel.conversion.status_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_alarm (value, model)
pypot.dynamixel.conversion.decode_error (error_code)
pypot.dynamixel.conversion.alarm_to_dxl (value, model)
pypot.dynamixel.conversion.XL320LEDColors
    alias of Colors
pypot.dynamixel.conversion.dxl_to_led_color (value, model)
pypot.dynamixel.conversion.led_color_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_to_control_mode (value, _)
pypot.dynamixel.conversion.control_mode_to_dxl (mode, _)
pypot.dynamixel.conversion.dxl_to_bool (value, model)
pypot.dynamixel.conversion.bool_to_dxl (value, model)
pypot.dynamixel.conversion.dxl_decode (data)
pypot.dynamixel.conversion.dxl_decode_all (data, nb_elem)
pypot.dynamixel.conversion.dxl_code (value, length)
pypot.dynamixel.conversion.dxl_code_all (value, length, nb_elem)

```

### pypot.dynamixel.error module

**class** pypot.dynamixel.error.DxlErrorHandler

Bases: `object`

This class is used to represent all the error that you can/should handle.

The errors can be of two types:

- communication error (timeout, communication)
- motor error (voltage, limit, overload...)

This class was designed as an abstract class and so you should write your own handler by subclassing this class and defining the appropriate behavior for your program.

**Warning:** The motor error should be overload carefully as they can indicate important mechanical issue.

**handle\_timeout** (timeout\_error)

**handle\_communication\_error** (communication\_error)

```

    handle_input_voltage_error(instruction_packet)
    handle_angle_limit_error(instruction_packet)
    handle_overheating_error(instruction_packet)
    handle_range_error(instruction_packet)
    handle_checksum_error(instruction_packet)
    handle_overload_error(instruction_packet)
    handle_instruction_error(instruction_packet)
    handle_none_error(instruction_packet)
class pypot.dynamixel.error.BaseErrorHandler
    Bases: pypot.dynamixel.error.DxlErrorHandler

    This class is a basic handler that just skip the communication errors.

    handle_timeout(timeout_error)

    handle_communication_error(com_error)

    handle_none_error(instruction_packet)

```

#### pypot.dynamixel.motor module

```

class pypot.dynamixel.motor.DxlRegister(rw=False)
    Bases: object
class pypot.dynamixel.motor.DxlOrientedRegister(rw=False)
    Bases: pypot.dynamixel.motor.DxlRegister
class pypot.dynamixel.motor.DxlPositionRegister(rw=False)
    Bases: pypot.dynamixel.motor.DxlOrientedRegister
class pypot.dynamixel.motor.RegisterOwner
    Bases: type
class pypot.dynamixel.motor.DxlMotor(id, name=None, model='', direct=True, offset=0.0, broken=False)
    Bases: pypot.robot.motor.Motor

```

High-level class used to represent and control a generic dynamixel motor.

This class provides all level access to (see [registers](#) for an exhaustive list):

- motor id
- motor name
- motor model
- present position/speed/load
- goal position/speed/load
- compliant
- motor orientation and offset
- angle limit
- temperature
- voltage

This class represents a generic robotis motor and you define your own subclass for specific motors (see [DxlMXMotor](#) or [DxlAXRXMotor](#)).

Those properties are synchronized with the real motors values thanks to a [DxlController](#).

**registers** = ['registers', 'goal\_speed', 'compliant', 'safe\_compliant', 'angle\_limit', 'present\_load', 'id', 'present\_tempe

**goal\_speed**

Goal speed (in degrees per second) of the motor.

This property can be used to control your motor in speed. Setting a goal speed will automatically change the moving speed and sets the goal position as the angle limit.

---

**Note:** The motor will turn until reaching the angle limit. But this is not a wheel mode, so the motor will stop at its limits.

---

**compliant\_behavior**

**compliant**

**angle\_limit**

**goto\_behavior**

**goto\_position** (*position, duration, control=None, wait=False*)

Automatically sets the goal position and the moving speed to reach the desired position within the duration.

**class** `pypot.dynamixel.motor.DxlAXRXMotor` (*id, name=None, model='', direct=True, offset=0.0, broken=False*)

Bases: [pypot.dynamixel.motor.DxlMotor](#)

This class represents the AX robotis motor.

**This class adds access to:**

- compliance margin/slope (see the robotis website for details)

**registers** = ['registers', 'goal\_speed', 'compliant', 'safe\_compliant', 'angle\_limit', 'present\_load', 'id', 'present\_tempe

**class** `pypot.dynamixel.motor.DxlMXMotor` (*id, name=None, model='', direct=True, offset=0.0, broken=False*)

Bases: [pypot.dynamixel.motor.DxlMotor](#)

This class represents the RX and MX robotis motor.

**This class adds access to:**

- PID gains (see the robotis website for details)

This class represents the RX and MX robotis motor.

**This class adds access to:**

- PID gains (see the robotis website for details)

**registers** = ['registers', 'goal\_speed', 'compliant', 'safe\_compliant', 'angle\_limit', 'present\_load', 'id', 'present\_tempe

**class** `pypot.dynamixel.motor.DxlXL320Motor` (*id, name=None, model='XL-320', direct=True, offset=0.0, broken=False*)

Bases: [pypot.dynamixel.motor.DxlMXMotor](#)

**registers** = ['registers', 'goal\_speed', 'compliant', 'safe\_compliant', 'angle\_limit', 'present\_load', 'id', 'present\_tempe

**class** `pypot.dynamixel.motor.SafeCompliance` (*motor, frequency=50*)

Bases: `pypot.utils.stoppablethread.StoppableLoopThread`

This class creates a controller to active compliance only if the current motor position is included in the angle limit, else the compliance is turned off.

**update()**

**teardown()**

### **pypot.dynamixel.syncloop module**

**class** pypot.dynamixel.syncloop.**MetaDxlController**(*io, motors, controllers*)

Bases: pypot.robot.controller.MotorsController

Synchronizes the reading/writing of *DxlMotor* with the real motors.

This class handles synchronization loops that automatically read/write values from the “software” *DxlMotor* with their “hardware” equivalent. Those loops shared a same DxlIO connection to avoid collision in the bus. Each loop run within its own thread as its own frequency.

**Warning:** As all the loop attached to a controller shared the same bus, you should make sure that they can run without slowing down the other ones.

**setup()**

Starts all the synchronization loops.

**update()**

**teardown()**

Stops the synchronization loops.

**class** pypot.dynamixel.syncloop.**BaseDxlController**(*io, motors*)

Bases: *pypot.dynamixel.syncloop.MetaDxlController*

Implements a basic controller that synchronized the most frequently used values.

**More precisely, this controller:**

- reads the present position, speed, load at 50Hz
- writes the goal position, moving speed and torque limit at 50Hz
- writes the pid gains (or compliance margin and slope) at 10Hz
- reads the present voltage and temperature at 1Hz

**class** pypot.dynamixel.syncloop.**LightDxlController**(*io, motors*)

Bases: *pypot.dynamixel.syncloop.MetaDxlController*

### **Module contents**

pypot.dynamixel.**get\_available\_ports**(*only\_free=False*)

pypot.dynamixel.**get\_port\_vendor\_info**(*port=None*)

Return vendor informations of a usb2serial device. It may depends on the Operating System. :param string port: port of the usb2serial device

#### **Example**

Result with a USB2Dynamixel on Linux: In [1]: import pypot.dynamixel In [2]: pypot.dynamixel.get\_port\_vendor\_info('/dev/ttyUSB0') Out[2]: 'USB VID:PID=0403:6001 SNR=A7005LKE'

pypot.dynamixel.**find\_port**(*ids, strict=True*)

Find the port with the specified attached motor ids.

#### **Parameters**



- **ids** (*list*) – list of motor ids to find
- **strict** (*bool*) – specify if all ids should be find (when set to False, only half motor must be found)

**Warning:** If two (or more) ports are attached to the same list of motor ids the first match will be returned.

`pypot.dynamixel.autodetect_robot()`

Creates a Robot by detecting dynamixel motors on all available ports.

## pypot.primitive package

### Submodules

#### pypot.primitive.manager module

**class** `pypot.primitive.manager.PrimitiveManager` (*motors*, *freq=50*, *filter=<functools.partial object>*)

Bases: `pypot.utils.stoppablethread.StoppableLoopThread`

Combines all `Primitive` orders and affect them to the real motors.

At a predefined frequency, the manager gathers all the orders sent by the primitive to the “fake” motors, combined them thanks to the filter function and affect them to the “real” motors.

---

**Note:** The primitives are automatically added (resp. removed) to the manager when they are started (resp. stopped).

---

#### Parameters

- **motors** (list of *DxlMotor*) – list of real motors used by the attached primitives
- **freq** (*int*) – update frequency
- **filter** (*func*) – function used to combine the different request (default mean)

**add** (*p*)

Add a primitive to the manager. The primitive automatically attached itself when started.

**remove** (*p*)

Remove a primitive from the manager. The primitive automatically remove itself when stopped.

**primitives**

List of all attached `Primitive`.

**update** ()

Combined at a predefined frequency the request orders and affect them to the real motors.

**stop** ()

Stop the primitive manager.

#### pypot.primitive.move module

**class** `pypot.primitive.move.Move` (*freq*)

Bases: `object`

Simple class used to represent a movement.

This class simply wraps a sequence of positions of specified motors. The sequence must be recorded at a predefined frequency. This move can be recorded through the `MoveRecorder` class and played thanks to a `MovePlayer`.

**framerate**

**add\_position** (*pos, time*)

Add a new position to the movement sequence.

Each position is typically stored as a dict of (time, (motor\_name,motor\_position)).

**iterpositions** ()

Returns an iterator on the stored positions.

**positions** ()

Returns a copy of the stored positions.

**save** (*file*)

Saves the `Move` to a json file.

---

**Note:** The format used to store the `Move` is extremely verbose and should be obviously optimized for long moves.

---

**classmethod load** (*file*)

Loads a `Move` from a json file.

**class** `pypot.primitive.move.MoveRecorder` (*robot, freq, tracked\_motors*)

Bases: `pypot.primitive.primitive.LoopPrimitive`

Primitive used to record a `Move`.

The recording can be start () and stop () by using the `LoopPrimitive` methods.

---

**Note:** Re-starting the recording will create a new `Move` losing all the previously stored data.

---

**setup** ()

**update** ()

**move**

Returns the currently recorded `Move`.

**add\_tracked\_motors** (*tracked\_motors*)

Add new motors to the recording

**class** `pypot.primitive.move.MovePlayer` (*robot, move=None, play\_speed=1.0, move\_filename=None, start\_max\_speed=50, \*\*kwargs*)

Bases: `pypot.primitive.primitive.LoopPrimitive`

Primitive used to play a `Move`.

The playing can be start () and stop () by using the `LoopPrimitive` methods.

**Warning:** the primitive is run automatically the same framerate than the move record. The `play_speed` attribute change only time lockup/interpolation

**setup** ()

**update** ()

**duration** ()

**pypot.primitive.primitive module****class** pypot.primitive.primitive.**Primitive**(robot)

Bases: pypot.utils.stoppablethread.StoppableThread

A Primitive is an elementary behavior that can easily be combined to create more complex behaviors.

A primitive is basically a thread with access to a “fake” robot to ensure a sort of sandboxing. More precisely, it means that the primitives will be able to:

- request values from the real robot (motor values, sensors or attached primitives)
- request modification of motor values (those calls will automatically be combined among all primitives by the `PrimitiveManager`).

The syntax of those requests directly match the equivalent code that you could write from the `Robot`. For instance you can write:

```
class MyPrimitive(Primitive):
    def run(self):
        while True:
            for m in self.robot.motors:
                m.goal_position = m.present_position + 10

            time.sleep(1)
```

**Warning:** In the example above, while it seems that you are setting a new `goal_position`, you are only requesting it. In particular, another primitive could request another `goal_position` and the result will be the combination of both request. For example, if you have two primitives: one setting the `goal_position` to 10 and the other setting the `goal_position` to -20, the real `goal_position` will be set to -5 (by default the mean of all request is used, see the `PrimitiveManager` class for details).

Primitives were developed to allow for the creation of complex behaviors such as walking. You could imagine - and this is what is actually done on the Poppy robot - having one primitive for the walking gait, another for the balance and another for handling falls.

**Note:** This class should always be extended to define your particular behavior in the `run()` method.

At instantiation, it automatically transforms the `Robot` into a `MockupRobot`.

**Warning:** You should not directly pass motors as argument to the primitive. If you need to, use the method `get_mockup_motor()` to transform them into “fake” motors. See the `write_own_prim` section for details.

**methods** = ['start', 'stop', 'pause', 'resume']

**properties** = []

**setup()**

Setup methods called before the run loop.

You can override this method to setup the environment needed by your primitive before the run loop. This method will be called every time the primitive is started/restarted.

**run()**

Run method of the primitive thread. You should always overwrite this method.

**Warning:** You are responsible of handling the `should_stop()`, `should_pause()` and `wait_to_resume()` methods correctly so the code inside your `run` function matches the desired behavior. You can refer to the code of the `run()` method of the `LoopPrimitive` as an example.

After termination of the `run` function, the primitive will automatically be removed from the list of active primitives of the `PrimitiveManager`.

#### **teardown()**

Tear down methods called after the run loop.

You can override this method to clean up the environment needed by your primitive. This method will be called every time the primitive is stopped.

#### **elapsed\_time**

Elapsed time (in seconds) since the primitive runs.

#### **start()**

Start or restart (the `stop()` method will automatically be called) the primitive.

#### **stop(wait=True)**

Requests the primitive to stop.

#### **is\_alive()**

Determines whether the primitive is running or not.

The value will be true only when the `run()` function is executed.

#### **get\_mockup\_motor(motor)**

Gets the equivalent `MockupMotor`.

**class** `pypot.primitive.primitive.LoopPrimitive(robot, freq)`

Bases: `pypot.primitive.primitive.Primitive`

Simple primitive that call an update method at a predefined frequency.

You should write your own subclass where you only defined the `update()` method.

#### **recent\_update\_frequencies**

Returns the 10 most recent update frequencies.

The given frequencies are computed as short-term frequencies! The 0th element of the list corresponds to the most recent frequency.

#### **run()**

Calls the `update()` method at a predefined frequency (runs until stopped).

#### **update()**

Update methods that will be called at a predefined frequency.

**class** `pypot.primitive.primitive.MockupRobot(robot)`

Bases: `object`

Fake Robot used by the `Primitive` to ensure sandboxing.

**goto\_position(position\_for\_motors, duration, control=None, wait=False)**

#### **motors**

List of all attached `MockupMotor`.

#### **power\_max()**

**class** `pypot.primitive.primitive.MockupMotor(motor)`

Bases: `object`

Fake Motor used by the primitive to ensure sandboxing:

- the read instructions are directly delegate to the real motor
- the write instructions are stored as request waiting to be combined by the primitive manager.

**goto\_position** (*position, duration, control=None, wait=False*)

Automatically sets the goal position and the moving speed to reach the desired position within the duration.

**goal\_speed**

Goal speed (in degrees per second) of the motor.

This property can be used to control your motor in speed. Setting a goal speed will automatically change the moving speed and sets the goal position as the angle limit.

---

**Note:** The motor will turn until reaching the angle limit. But this is not a wheel mode, so the motor will stop at its limits.

---

### pypot.primitive.utils module

**class** pypot.primitive.utils.**Sinus** (*robot, refresh\_freq, motor\_list, amp=1, freq=0.5, offset=0, phase=0*)

Bases: pypot.primitive.primitive.LoopPrimitive

Apply a sinus on the motor specified as argument. Parameters (amp, offset and phase) should be specified in degree.

**properties** = ['frequency', 'amplitude', 'offset', 'phase']

**update** ()

Compute the sin(t) where t is the elapsed time since the primitive has been started.

**frequency**

**amplitude**

**offset**

**phase**

**class** pypot.primitive.utils.**Cosinus** (*robot, refresh\_freq, motor\_list, amp=1, freq=0.5, offset=0, phase=0*)

Bases: pypot.primitive.utils.Sinus

Apply a cosinus on the motor specified as argument. Parameters (amp, offset and phase) should be specified in degree.

**class** pypot.primitive.utils.**Square** (*robot, refresh\_freq, motor\_list, amp=1, freq=1.0, offset=0, phase=0, duty=0.5*)

Bases: pypot.primitive.utils.Sinus

Apply a square signal. Param (amp, freq, offset, phase, duty cycle).

**update** ()

**duty**

**class** pypot.primitive.utils.**PositionWatcher** (*robot, refresh\_freq, watched\_motors*)

Bases: pypot.primitive.primitive.LoopPrimitive

**record\_positions**

**setup** ()

**update** ()

**plot** (*ax*)

```
class pypot.primitive.utils.SimplePosture(robot, duration)
    Bases: pypot.primitive.primitive.Primitive

    setup()

    run()

    teardown()
```

## Module contents

### pypot.robot package

#### Submodules

**pypot.robot.config module** The config module allows the definition of the structure of your robot.

Configuration are written as Python dictionary so you can define/modify them programmatically. You can also import them from file such as JSON formatted file. In the configuration you have to define:

- **controllers**: For each defined controller, you can specify the port name, the attached motors and the synchronization mode.
- **motors**: You specify all motors belonging to your robot. You have to define their id, type, orientation, offset and `angle_limit`.
- **motorgroups**: It allows to define alias of group of motors. They can be nested.

`pypot.robot.config.from_config(config, strict=True, sync=True, use_dummy_io=False)`  
Returns a Robot instance created from a configuration dictionary.

#### Parameters

- **config** (*dict*) – robot configuration dictionary
- **strict** (*bool*) – make sure that all ports, motors are available.
- **sync** (*bool*) – choose if automatically starts the synchronization loops

For details on how to write such a configuration dictionary, you should refer to the section `config_file`.

`pypot.robot.config.motor_from_confignode(config, motor_name)`

`pypot.robot.config.sensor_from_confignode(config, s_name, robot)`

`pypot.robot.config.dxl_io_from_confignode(config, c_params, ids, strict)`

`pypot.robot.config.check_motor_limits(config, dxl_io, motor_names)`

`pypot.robot.config.instantiate_motors(config)`

`pypot.robot.config.make_alias(config, robot)`

`pypot.robot.config.from_json(json_file, sync=True, strict=True, use_dummy_io=False)`  
Returns a Robot instance created from a JSON configuration file.

For details on how to write such a configuration file, you should refer to the section `config_file`.

`pypot.robot.config.use_dummy_robot(json_file)`

**pypot.robot.controller module**

**class** `pypot.robot.controller.AbstractController` (*io*, *sync\_freq*)  
 Bases: `pypot.utils.stoppablethread.StoppableLoopThread`

Abstract class for motor/sensor controller.

The controller role is to synchronize the reading/writing of a set of instances with their “hardware” equivalent through an `AbstractIO` object. It is defined as a `StoppableLoopThread` where each loop update synchronizes values from the “software” objects with their “hardware” equivalent.

To define your Controller, you need to define the `update()` method. This method will be called at the predefined frequency. An example of how to do it can be found in `BaseDxlController`.

**Parameters**

- **io** (`AbstractIO`) – IO used to communicate with the hardware motors
- **sync\_freq** (*float*) – synchronization frequency

**start()**

**close()**

Cleans and closes the controller.

**class** `pypot.robot.controller.MotorsController` (*io*, *motors*, *sync\_freq=50*)  
 Bases: `pypot.robot.controller.AbstractController`

Abstract class for motors controller.

The controller synchronizes the reading/writing of a set of motor instances with their “hardware”. Each update loop synchronizes values from the “software” `DxlMotor` with their “hardware” equivalent.

**Parameters**

- **io** (`AbstractIO`) – IO used to communicate with the hardware motors
- **motors** (*list*) – list of motors attached to the controller
- **sync\_freq** (*float*) – synchronization frequency

**class** `pypot.robot.controller.DummyController` (*motors*)  
 Bases: `pypot.robot.controller.MotorsController`

**update()**

**class** `pypot.robot.controller.SensorsController` (*io*, *sensors*, *sync\_freq=50.0*)  
 Bases: `pypot.robot.controller.AbstractController`

Abstract class for sensors controller.

The controller frequently pulls new data from a “real” sensor and updates its corresponding software instance.

**Parameters**

- **io** (`AbstractIO`) – IO used to communicate with the hardware motors
- **sensors** (*list*) – list of sensors attached to the controller
- **sync\_freq** (*float*) – synchronization frequency

**pypot.robot.io module**

**class** `pypot.robot.io.AbstractIO`  
 Bases: `object`

`AbstractIO` class which handles communication with “hardware” motors.

**close()**

Clean and close the IO connection.

#### **pypot.robot.motor module**

**class** `pypot.robot.motor.Motor` (*name*)

Bases: `object`

Purely abstract class representing any motor object.

**registers** = []

**name**

#### **pypot.robot.remote module**

**class** `pypot.robot.remote.RemoteRobotClient` (*host, port*)

Bases: `object`

Remote Access to a Robot through the REST API.

This RemoteRobot gives you access to motors and alias. For each motor you can read/write all of their registers.

You also have access to primitives. More specifically you can start/stop them.

`pypot.robot.remote.from_remote` (*host, port*)

Remote access to a Robot through the REST API.

#### **pypot.robot.robot module**

**class** `pypot.robot.robot.Robot` (*motor\_controllers=[], sensor\_controllers=[], sync=True*)

Bases: `object`

This class is used to regroup all motors and sensors of your robots.

Most of the time, you do not want to directly instantiate this class, but you rather want to use a factory which creates a robot instance - e.g. from a python dictionary (see `config_file`).

This class encapsulates the different controllers (such as dynamixel ones) that automatically synchronize the virtual sensors/actuators instances held by the robot class with the real devices. By doing so, each sensor/effector can be synchronized at a different frequency.

This class also provides a generic motors accessor in order to (more or less) easily extends this class to other types of motor.

##### **Parameters**

- **motor\_controllers** (*list*) – motors controllers to attach to the robot
- **sensor\_controllers** (*list*) – sensors controllers to attach to the robot
- **sync** (*bool*) – choose if automatically starts the synchronization loops

**close()**

Cleans the robot by stopping synchronization and all controllers.

**start\_sync()**

Starts all the synchronization loop (sensor/effector controllers).

**stop\_sync()**

Stops all the synchronization loop (sensor/effector controllers).

**attach\_primitive** (*primitive, name*)



**motors**

Returns all the motors attached to the robot.

**sensors**

Returns all the sensors attached to the robot.

**active\_primitives**

Returns all the primitives currently running on the robot.

**primitives**

Returns all the primitives name attached to the robot.

**compliant**

Returns a list of all the compliant motors.

**goto\_position** (*position\_for\_motors*, *duration*, *control=None*, *wait=False*)

Moves a subset of the motors to a position within a specific duration.

**Parameters**

- **position\_for\_motors** (*dict*) – which motors you want to move {motor\_name: pos, motor\_name: pos,...}
- **duration** (*float*) – duration of the move
- **control** (*str*) – control type ('dummy', 'minjerk')
- **wait** (*bool*) – whether or not to wait for the end of the move

**power\_up** ()

Changes all settings to guarantee the motors will be used at their maximum power.

**to\_config** ()

Generates the config for the current robot.

---

**Note:** The generated config should be used as a basis and must probably be modified.

---

**pypot.robot.sensor module**

**class** pypot.robot.sensor.**Sensor** (*name*)

Bases: *object*

Purely abstract class representing any sensor object.

**registers** = []

**name**

**class** pypot.robot.sensor.**ObjectTracker** (*name*)

Bases: pypot.robot.sensor.Sensor

**registers** = ['position', 'orientation']

**position**

**orientation**

**Module contents**
**pypot.sensor package**
**Subpackages**

## pypot.sensor.camera package

### Submodules

#### pypot.sensor.camera.abstractcam module

```
class pypot.sensor.camera.abstractcam.AbstractCamera(name, resolution, fps)
    Bases: pypot.robot.sensor.Sensor

    registers = ['frame', 'resolution', 'fps']

    frame
    post_processing(image)
    grab()
    resolution
    fps
```

#### pypot.sensor.camera.opencvcam module

#### pypot.sensor.camera.rpicam module

#### Module contents

```
class pypot.sensor.camera.CameraController(camera)
    Bases: pypot.robot.controller.SensorsController
```

## pypot.sensor.imagefeature package

### Submodules

#### pypot.sensor.imagefeature.blob module

#### pypot.sensor.imagefeature.face module

#### pypot.sensor.imagefeature.marker module

#### Module contents

## pypot.sensor.kinect package

### Submodules

**pypot.sensor.kinect.sensor module** This code has been developed by Baptiste Busch: <https://github.com/buschbapti>

This module allows you to retrieve Skeleton information from a Kinect device. It is only the client side of a zmq client/server application.

The server part can be found at: <https://bitbucket.org/buschbapti/kinectserver/src> It used the Microsoft Kinect SDK and thus only work on Windows.

Of course, the client side can be used on any platform.

```
class pypot.sensor.kinect.sensor.Skeleton
    Bases: pypot.sensor.kinect.sensor.Skeleton

    joints = ('hip_center', 'spine', 'shoulder_center', 'head', 'shoulder_left', 'elbow_left', 'wrist_left', 'hand_left', 'shoulder_right', 'elbow_right', 'wrist_right', 'hand_right')

class pypot.sensor.kinect.sensor.Joint (position, orientation, pixel_coordinate)
    Bases: tuple

    orientation
        Alias for field number 1

    pixel_coordinate
        Alias for field number 2

    position
        Alias for field number 0

class pypot.sensor.kinect.sensor.KinectSensor (addr, port)
    Bases: object

    remove_user (user_index)

    remove_all_users ()

    tracked_skeleton

    get_skeleton ()

    run ()
```

## Module contents

### Submodules

#### pypot.sensor.optibridge module

```
class pypot.sensor.optibridge.OptiBridgeServer (bridge_host, bridge_port, opti_addr,
                                                opti_port, obj_name)
    Bases: threading.Thread

    run ()

class pypot.sensor.optibridge.OptiTrackClient (bridge_host, bridge_port, obj_name)
    Bases: threading.Thread

    run ()

    tracked_objects

    recent_tracked_objects
```

#### pypot.sensor.optitrack module

**class** pypot.sensor.optitrack.TrackedObject (*position, quaternion, orientation, timestamp*)

Bases: tuple

##### orientation

Alias for field number 2

##### position

Alias for field number 0

##### quaternion

Alias for field number 1

##### timestamp

Alias for field number 3

pypot.sensor.optitrack.quat2euler(*q*)

#### Module contents

#### pypot.server package

#### Submodules

#### pypot.server.httpserver module

**class** pypot.server.httpserver.MyJSONEncoder (*skipkeys=False, ensure\_ascii=True, check\_circular=True, allow\_nan=True, sort\_keys=False, indent=None, separators=None, encoding='utf-8', default=None*)

Bases: json.encoder.JSONEncoder

JSONEncoder which tries to call a json property before using the encoding default function.

Constructor for JSONEncoder, with sensible defaults.

If *skipkeys* is false, then it is a TypeError to attempt encoding of keys that are not str, int, long, float or None. If *skipkeys* is True, such items are simply skipped.

If *ensure\_ascii* is true (the default), all non-ASCII characters in the output are escaped with uXXXX sequences, and the results are str instances consisting of ASCII characters only. If *ensure\_ascii* is False, a result may be a unicode instance. This usually happens if the input contains unicode strings or the *encoding* parameter is used.

If *check\_circular* is true, then lists, dicts, and custom encoded objects will be checked for circular references during encoding to prevent an infinite recursion (which would cause an OverflowError). Otherwise, no such check takes place.

If *allow\_nan* is true, then NaN, Infinity, and -Infinity will be encoded as such. This behavior is not JSON specification compliant, but is consistent with most JavaScript based encoders and decoders. Otherwise, it will be a ValueError to encode such floats.

If *sort\_keys* is true, then the output of dictionaries will be sorted by key; this is useful for regression tests to ensure that JSON serializations can be compared on a day-to-day basis.

If *indent* is a non-negative integer, then JSON array elements and object members will be pretty-printed with that indent level. An indent level of 0 will only insert newlines. None is the most compact representation. Since the default item separator is `,`, the output might include trailing whitespace when *indent* is specified. You can use *separators=(',', ':')* to avoid this.

If specified, separators should be a (item\_separator, key\_separator) tuple. The default is (' ', ': '). To get the most compact JSON representation you should specify ('', ':') to eliminate whitespace.

If specified, default is a function that gets called for objects that can't otherwise be serialized. It should return a JSON encodable version of the object or raise a `TypeError`.

If encoding is not None, then all input strings will be transformed into unicode using that encoding prior to JSON-encoding. The default is UTF-8.

**default** (*obj*)

**class** `pypot.server.httpserver.EnableCors` (*origin='\*'*)

Bases: `object`

Enable CORS (Cross-Origin Resource Sharing) headers

**name** = 'enable\_cors'

**api** = 2

**apply** (*fn, context*)

**class** `pypot.server.httpserver.HTTPRobotServer` (*robot, host, port, cross\_domain\_origin='\*', quiet=True*)

Bases: `pypot.server.server.AbstractServer`

Bottle based HTTPServer used to remote access a robot.

Please refer to the REST API for an exhaustive list of the possible routes.

**run** (*quiet=None, server='tornado'*)

Start the bottle server, run forever.

#### **pypot.server.rest module**

**class** `pypot.server.rest.RESTRobot` (*robot*)

Bases: `object`

REST API for a Robot.

**Through the REST API you can currently access:**

- the motors list (and the aliases)
- the registers list for a specific motor
- read/write a value from/to a register of a specific motor
- the sensors list
- the registers list for a specific motor
- read/write a value from/to a register of a specific motor
- the primitives list (and the active)
- start/stop primitives

**get\_motors\_list** (*alias='motors'*)

**get\_motor\_registers\_list** (*motor*)

**get\_registers\_list** (*motor*)

**get\_motor\_register\_value** (*motor, register*)

**get\_register\_value** (*motor, register*)

**set\_motor\_register\_value** (*motor, register, value*)

```

set_register_value (motor, register, value)
get_motors_alias ()
set_goto_position_for_motor (motor, position, duration)
get_sensors_list ()
get_sensors_registers_list (sensor)
get_sensor_register_value (sensor, register)
set_sensor_register_value (sensor, register, value)
get_primitives_list ()
get_running_primitives_list ()
start_primitive (primitive)
stop_primitive (primitive)
pause_primitive (primitive)
resume_primitive (primitive)
get_primitive_properties_list (primitive)
get_primitive_property (primitive, property)
set_primitive_property (primitive, property, value)
get_primitive_methods_list (primitive)
call_primitive_method (primitive, method, kwargs)
start_move_recorder (move_name, motors_name=None)
attach_move_recorder (move_name, motors_name)
get_move_recorder_motors (move_name)
stop_move_recorder (move_name)
    Allow more easily than stop_primitive() to save in a filename the recorded move
start_move_player (move_name, speed=1.0, backwards=False)
    Move player need to have a move file <move_name.record> in the working directory to play it
get_available_record_list ()
    Get list of json recorded movement files
remove_move_record (move_name)
    Remove the json recorded movement file

```

#### pypot.server.server module

```

class pypot.server.server.AbstractServer (robot, host, port)
    Bases: object

    run ()

class pypot.server.server.RemoteRobotServer (robot, host, port)
    Bases: pypot.server.server.AbstractServer

    run ()

```

**pypot.server.snap module**

```
pypot.server.snap.get_snap_user_projects_directory()
pypot.server.snap.find_local_ip()

pypot.server.snap.set_snap_server_variables(host, port, snap_extension='.xml',
                                             path=None)
    Allow to change dynamically port and host variable in xml Snap! project file

class pypot.server.snap.SnapRobotServer(robot, host, port, quiet=True)
    Bases: pypot.server.server.AbstractServer

    run()
```

**pypot.server.zmqserver module**

```
class pypot.server.zmqserver.ZMQRobotServer(robot, host, port)
    Bases: pypot.server.server.AbstractServer

    A ZMQServer allowing remote access of a robot instance.

    The server used the REQ/REP zmq pattern. You should always first send a request and then read the answer.

    run()
        Run an infinite REQ/REP loop.

    handle_request(request)
```

**Module contents****pypot.tools package****Subpackages****pypot.tools.herborist package****Submodules****pypot.tools.herborist.herborist module**

```
pypot.tools.herborist.herborist.get_dxl_connection(port, baudrate, protocol='MX')
pypot.tools.herborist.herborist.release_dxl_connection()

class pypot.tools.herborist.herborist.HerboristApp(argv)
    Bases: PyQt4.QtGui.QApplication

    class UpdatePortThread
        Bases: PyQt4.QtCore.QThread

        port_updated

        run()

    HerboristApp.update_port(new_ports)
    HerboristApp.update_motor_tree(baud_for_ids)
    HerboristApp.start_scanning()
    HerboristApp.abort_scanning()
```

```
HerboristApp.done_scanning()

class HerboristApp.ScanThread(port, baudrates, protocol, id_range, motor_tree, scan_progress)
    Bases: PyQt4.QtCore.QThread

    done
    part_done
    run()
    abort()

HerboristApp.update_motor_view()

HerboristApp.update_motor_position(pos)

HerboristApp.motor_position_updated(pos)

HerboristApp.switch_torque(torque_enable)

HerboristApp.enable_motor_view(enabled)

HerboristApp.update_eeprom()

class HerboristApp.UpdateMotorThread(port, baudrate, protocol, mid)
    Bases: PyQt4.QtCore.QThread

    position_updated
    stop()
    run()

HerboristApp.port

HerboristApp.protocol

HerboristApp.usb_device

HerboristApp.baudrate

HerboristApp.id

HerboristApp.selected_motors

HerboristApp.ids

pypot.tools.herborist.herborist.main()
```

## Module contents

### Submodules

**pypot.tools.dxl\_reset module** Reset a dynamixel motor to “poppy” configuration.

This utility should only be used with a single motor connected to the bus. For the moment it’s only working with robotis protocol v1 (AX, RX, MX motors).

To run it: `$ poppy-reset-motor 42`

The motor will now have the id 42, use a 1000000 baud rates, a 0µs return delay time. The angle limit are also set (by default to (-180, 180)). Its position is also set to its base position (default: 0).

For more complex use cases, see: `$ poppy-reset-motor -help`



```
pypot.tools.dxl_reset.leave(msg)
pypot.tools.dxl_reset.almost_equal(a, b)
pypot.tools.dxl_reset.main()
```

## Module contents

### pypot.utils package

#### Submodules

**pypot.utils.appdirs module** Utilities for determining application-specific dirs.

See <http://github.com/ActiveState/appdirs> for details and usage.

```
pypot.utils.appdirs.user_data_dir(appname=None, appauthor=None, version=None, roaming=False)
```

Return full path to the user-specific data dir for this application.

**“appname” is the name of application.** If None, just the system directory is returned.

**“appauthor” (only used on Windows) is the name of the** appauthor or distributing body for this application. Typically it is the owning company name. This falls back to appname. You may pass False to disable it.

**“version” is an optional version path element to append to the** path. You might want to use this if you want multiple versions of your app to be able to run independently. If used, this would typically be “<major>.<minor>”. Only applied when appname is present.

**“roaming” (boolean, default False) can be set True to use the Windows** roaming appdata directory. That means that for users on a Windows network setup for roaming profiles, this user data will be sync’d on login. See [http://technet.microsoft.com/en-us/library/cc766489\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc766489(WS.10).aspx) for a discussion of issues.

**Typical user data directories are:** Mac OS X: ~/Library/Application Support/<AppName> Unix: ~/.local/share/<AppName> # or in \$XDG\_DATA\_HOME, if defined Win XP (not roaming): C:\Documents and Settings<username>\Application Data<AppAuthor>\<AppName> Win XP (roaming): C:\Documents and Settings<username>\Local Settings\Application Data<AppAuthor>\<AppName> Win 7 (not roaming): C:\Users<username>\AppData\Local<AppAuthor>\<AppName> Win 7 (roaming): C:\Users<username>\AppData\Roaming<AppAuthor>\<AppName>

For Unix, we follow the XDG spec and support \$XDG\_DATA\_HOME. That means, by default “~/.local/share/<AppName>”.

```
pypot.utils.appdirs.site_data_dir(appname=None, appauthor=None, version=None, multi-path=False)
```

Return full path to the user-shared data dir for this application.

**“appname” is the name of application.** If None, just the system directory is returned.

**“appauthor” (only used on Windows) is the name of the** appauthor or distributing body for this application. Typically it is the owning company name. This falls back to appname. You may pass False to disable it.

**“version” is an optional version path element to append to the** path. You might want to use this if you want multiple versions of your app to be able to run independently. If used, this would typically be “<major>.<minor>”. Only applied when appname is present.

**“multipath” is an optional parameter only applicable to \*nix** which indicates that the entire list of data dirs should be returned. By default, the first item from `XDG_DATA_DIRS` is returned, or `‘/usr/local/share/<AppName>’`, if `XDG_DATA_DIRS` is not set

**Typical user data directories are:** Mac OS X: `/Library/Application Support/<AppName>` Unix: `/usr/local/share/<AppName>` or `/usr/share/<AppName>` Win XP: `C:Documents and SettingsAll UsersApplication Data<AppAuthor><AppName>` Vista: (Fail! “C:ProgramData” is a hidden *system* directory on Vista.) Win 7: `C:ProgramData<AppAuthor><AppName>` # Hidden, but writeable on Win 7.

For Unix, this is using the `$XDG_DATA_DIRS[0]` default.

WARNING: Do not use this on Windows. See the Vista-Fail note above for why.

```
pypot.utils.appdirs.user_config_dir(appname=None, appauthor=None, version=None,
                                     roaming=False)
```

Return full path to the user-specific config dir for this application.

**“appname” is the name of application.** If None, just the system directory is returned.

**“appauthor” (only used on Windows) is the name of the** appauthor or distributing body for this application. Typically it is the owning company name. This falls back to appname. You may pass False to disable it.

**“version” is an optional version path element to append to the** path. You might want to use this if you want multiple versions of your app to be able to run independently. If used, this would typically be “<major>.<minor>”. Only applied when appname is present.

**“roaming” (boolean, default False) can be set True to use the Windows** roaming appdata directory. That means that for users on a Windows network setup for roaming profiles, this user data will be sync’d on login. See [http://technet.microsoft.com/en-us/library/cc766489\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc766489(WS.10).aspx) for a discussion of issues.

**Typical user data directories are:** Mac OS X: same as `user_data_dir` Unix: `~/config/<AppName>` # or in `$XDG_CONFIG_HOME`, if defined Win \*: same as `user_data_dir`

For Unix, we follow the XDG spec and support `$XDG_CONFIG_HOME`. That means, by default “~/config/<AppName>”.

```
pypot.utils.appdirs.site_config_dir(appname=None, appauthor=None, version=None, multipath=False)
```

Return full path to the user-shared data dir for this application.

**“appname” is the name of application.** If None, just the system directory is returned.

**“appauthor” (only used on Windows) is the name of the** appauthor or distributing body for this application. Typically it is the owning company name. This falls back to appname. You may pass False to disable it.

**“version” is an optional version path element to append to the** path. You might want to use this if you want multiple versions of your app to be able to run independently. If used, this would typically be “<major>.<minor>”. Only applied when appname is present.

**“multipath” is an optional parameter only applicable to \*nix** which indicates that the entire list of config dirs should be returned. By default, the first item from `XDG_CONFIG_DIRS` is returned, or `‘/etc/xdg/<AppName>’`, if `XDG_CONFIG_DIRS` is not set

**Typical user data directories are:** Mac OS X: same as `site_data_dir` Unix: `/etc/xdg/<AppName>` or `$XDG_CONFIG_DIRS[i]/<AppName>` for each value in

`$XDG_CONFIG_DIRS`

Win : *same as site\_data\_dir* Vista: (Fail! “C:ProgramData” is a hidden \*system directory on Vista.)

For Unix, this is using the \$XDG\_CONFIG\_DIRS[0] default, if multipath=False

WARNING: Do not use this on Windows. See the Vista-Fail note above for why.

```
pypot.utils.appdirs.user_cache_dir(appname=None, appauthor=None, version=None, opinion=True)
```

Return full path to the user-specific cache dir for this application.

“**appname**” is the name of application. If None, just the system directory is returned.

“**appauthor**” (only used on Windows) is the name of the appauthor or distributing body for this application. Typically it is the owning company name. This falls back to appname. You may pass False to disable it.

“**version**” is an optional version path element to append to the path. You might want to use this if you want multiple versions of your app to be able to run independently. If used, this would typically be “<major>.<minor>”. Only applied when appname is present.

“**opinion**” (boolean) can be False to disable the appending of “Cache” to the base app data dir for Windows. See discussion below.

**Typical user cache directories are:**

Mac	OS X:	~/Library/Caches/<AppName>
Unix:	~/cache/<AppName>	(XDG default)
Win XP:	C:Documents and Settings<username>Local SettingsApplication Data<AppAuthor><AppName>Cache	
Vista:	C:Users<username>AppDataLocal<AppAuthor><AppName>Cache	

On Windows the only suggestion in the MSDN docs is that local settings go in the *CSIDL\_LOCAL\_APPDATA* directory. This is identical to the non-roaming app data dir (the default returned by *user\_data\_dir* above). Apps typically put cache data somewhere *under* the given dir here. Some examples:

...MozillaFirefoxProfiles<ProfileName>Cache ...AcmeSuperAppCache1.0

OPINION: This function appends “Cache” to the *CSIDL\_LOCAL\_APPDATA* value. This can be disabled with the *opinion=False* option.

```
pypot.utils.appdirs.user_log_dir(appname=None, appauthor=None, version=None, opinion=True)
```

Return full path to the user-specific log dir for this application.

“**appname**” is the name of application. If None, just the system directory is returned.

“**appauthor**” (only used on Windows) is the name of the appauthor or distributing body for this application. Typically it is the owning company name. This falls back to appname. You may pass False to disable it.

“**version**” is an optional version path element to append to the path. You might want to use this if you want multiple versions of your app to be able to run independently. If used, this would typically be “<major>.<minor>”. Only applied when appname is present.

“**opinion**” (boolean) can be False to disable the appending of “Logs” to the base app data dir for Windows, and “log” to the base cache dir for Unix. See discussion below.

**Typical user cache directories are:**

Mac	OS X:	~/Library/Logs/<AppName>	Unix:
~/cache/<AppName>/log	# or under \$XDG_CACHE_HOME if defined	Win XP:	C:Documents and Settings<username>Local SettingsApplication Data<AppAuthor><AppName>Logs
Vista:	C:Users<username>AppDataLocal<AppAuthor><AppName>Logs		

On Windows the only suggestion in the MSDN docs is that local settings go in the *CSIDL\_LOCAL\_APPDATA* directory. (Note: I’m interested in examples of what some windows apps use for a logs dir.)

OPINION: This function appends “Logs” to the `CSIDL_LOCAL_APPDATA` value for Windows and appends “log” to the user cache dir for Unix. This can be disabled with the `opinion=False` option.

**class** `pypot.utils.appdirs.AppDirs` (*appname*, *appauthor=None*, *version=None*, *roaming=False*, *multipath=False*)

Bases: `object`

Convenience wrapper for getting application dirs.

`user_data_dir`

`site_data_dir`

`user_config_dir`

`site_config_dir`

`user_cache_dir`

`user_log_dir`

#### **pypot.utils.interpolation module**

**class** `pypot.utils.interpolation.KDTreeDict` (*gen\_tree\_on\_add=False*, *distance\_upper\_bound=0.2*, *k\_neighbors=2*)

Bases: `dict`

`update` (*\*args*, *\*\*kwargs*)

`generate_tree` ()

`nearest_keys` (*key*)

Find the nearest\_keys (l2 distance) thanks to a cKDTree query

`interpolate_motor_positions` (*input\_key*, *nearest\_keys*)

Process linear interpolation to estimate actual speed and position of motors Method specific to the :meth:`~pypot.primitive.move.Move.position()` structure it is a `KDTreeDict[timestamp] = {dict[motor]=(position,speed)}`

#### **pypot.utils.pypot\_time module**

`pypot.utils.pypot_time.time` ()

`pypot.utils.pypot_time.sleep` (*t*)

#### **pypot.utils.stoppablethread module**

**class** `pypot.utils.stoppablethread.StoppableThread` (*setup=None*, *target=None*, *tear-down=None*)

Bases: `object`

Stoppable version of python Thread.

**This class provides the following mechanism on top of “classical” python Thread:**

- you can stop the thread (if you defined your run method accordingly).
- you can restart a thread (stop it and re-run it)
- you can pause/resume a thread

**Warning:** It is up to the subclass to correctly respond to the stop, pause/resume signals (see `run()` for details).

#### **Parameters**

- **setup** (*func*) – specific setup function to use (otherwise self.setup)
- **target** (*func*) – specific target function to use (otherwise self.run)
- **teardown** (*func*) – specific teardown function to use (otherwise self.teardown)

**start** ()

Start the run method as a new thread.

It will first stop the thread if it is already running.

**stop** (*wait=True*)

Stop the thread.

More precisely, sends the stopping signal to the thread. It is then up to the run method to correctly respond.

**join** ()

Wait for the thread termination.

**running**

Whether the thread is running.

**started**

Whether the thread has been started.

**wait\_to\_start** ()

Wait for the thread to actually start.

**should\_stop** ()

Signals if the thread should be stopped or not.

**wait\_to\_stop** ()

Wait for the thread to terminate.

**setup** ()

Setup method call just before the run.

**run** ()

Run method of the thread.

---

**Note:** In order to be stoppable (resp. pausable), this method has to check the running property - as often as possible to improve responsiveness - and terminate when `should_stop()` (resp. `should_pause()`) becomes True. For instance:

```
while self.should_stop():
    do_atom_work()
    ...
```

---

**teardown** ()

Teardown method call just after the run.

**should\_pause** ()

Signals if the thread should be paused or not.

**paused**

**pause** ()

Requests the thread to pause.

**resume** ()

Requests the thread to resume.

**wait\_to\_resume()**

Waits until the thread is resumed.

**pypot.utils.stoppablethread.make\_update\_loop(thread, update\_func)**

Makes a run loop which calls an update function at a predefined frequency.

**class pypot.utils.stoppablethread.StoppableLoopThread(frequency, update=None)**

Bases: `pypot.utils.stoppablethread.StoppableThread`

LoopThread calling an update method at a pre-defined frequency.

---

**Note:** This class does not mean to be accurate. The given frequency will be approximately followed - depending for instance on CPU load - and only reached if the update method takes less time than the chosen loop period.

---

**Params float frequency** called frequency of the `update()` method

**run()**

Called the update method at the pre-defined frequency.

**update()**

Update method called at the pre-defined frequency.

#### pypot.utils.trajectory module

**class pypot.utils.trajectory.MinimumJerkTrajectory(initial, final, duration, init\_vel=0.0, init\_acc=0.0, final\_vel=0.0, final\_acc=0.0)**

Bases: `object`

**compute()**

**get\_value(t)**

**domain(x)**

**test\_domain(x)**

**fix\_input(x)**

**get\_generator()**

**class pypot.utils.trajectory.GotoMinJerk(motor, position, duration, frequency=50)**

Bases: `pypot.utils.stoppablethread.StoppableLoopThread`

**setup()**

**update()**

**elapsed\_time**

#### Module contents

**class pypot.utils.Point2D(x, y)**

Bases: `tuple`

**x**

Alias for field number 0

**y**

Alias for field number 1

**class pypot.utils.Point3D(x, y, z)**

Bases: `tuple`

**x**  
Alias for field number 0

**y**  
Alias for field number 1

**z**  
Alias for field number 2

`pypot.utils.Point`  
alias of `Point3D`

**class** `pypot.utils.Vector3D` (*x, y, z*)  
Bases: `tuple`

**x**  
Alias for field number 0

**y**  
Alias for field number 1

**z**  
Alias for field number 2

`pypot.utils.Vector`  
alias of `Vector3D`

**class** `pypot.utils.Quaternion` (*x, y, z, w*)  
Bases: `tuple`

**w**  
Alias for field number 3

**x**  
Alias for field number 0

**y**  
Alias for field number 1

**z**  
Alias for field number 2

`pypot.utils.attrsetter` (*item*)

**class** `pypot.utils.SyncEvent` (*period=0.1*)  
Bases: `object`

**request** ()

**done** ()

**is\_recent**

**needed**

**pypot.vrep package**

**Subpackages**

**pypot.vrep.remoteApiBindings package**

## Submodules

### **pypot.vrep.remoteApiBindings.vrep module**

`pypot.vrep.remoteApiBindings.vrep.tbs` (*str*)

`pypot.vrep.remoteApiBindings.vrep.py3compatible` (*f*)

`pypot.vrep.remoteApiBindings.vrep.simxGetJointPosition` (*clientID, jointHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetJointPosition` (*clientID, jointHandle, position, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetJointMatrix` (*clientID, jointHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetSphericalJointMatrix` (*clientID, jointHandle, matrix, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetJointTargetVelocity` (*clientID, jointHandle, targetVelocity, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetJointTargetPosition` (*clientID, jointHandle, targetPosition, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxJointGetForce` (*clientID, jointHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetJointForce` (*clientID, jointHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetJointForce` (*clientID, jointHandle, force, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxReadForceSensor` (*clientID, forceSensorHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxBreakForceSensor` (*clientID, forceSensorHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxReadVisionSensor` (*clientID, sensorHandle, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetObjectHandle` (*clientID, objectName, operationMode*)

Please have a look at the function description/documentation in the V-REP user manual



```
pypot.vrep.remoteApiBindings.vrep.simxGetVisionSensorImage(clientID, sensorHandle, options, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetVisionSensorImage(clientID, sensorHandle, image, options, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetVisionSensorDepthBuffer(clientID, sensorHandle, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetObjectChild(clientID, parentObjectHandle, childIndex, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetObjectParent(clientID, childObjectHandle, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxReadProximitySensor(clientID, sensorHandle, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxLoadModel(clientID, modelPathAndName, options, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxLoadUI(clientID, uiPathAndName, options, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxLoadScene(clientID, scenePathAndName, options, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxStartSimulation(clientID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxPauseSimulation(clientID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxStopSimulation(clientID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetUIHandle(clientID, uiName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetUISlider(clientID, uiHandle, uiButtonID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetUISlider(clientID, uiHandle, uiButtonID, position, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetUIEventButton(clientID, uiHandle, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetUIButtonProperty (clientID, uiHandle,  
                                                             uiButtonID, operation-  
                                                             Mode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetUIButtonProperty (clientID, uiHandle,  
                                                             uiButtonID, prop,  
                                                             operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxAddStatusBarMessage (clientID, message, op-  
                                                             erationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxAuxiliaryConsoleOpen (clientID, title, max-  
                                                             Lines, mode, position,  
                                                             size, textColor, back-  
                                                             groundColor, opera-  
                                                             tionMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxAuxiliaryConsoleClose (clientID, console-  
                                                             Handle, operation-  
                                                             Mode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxAuxiliaryConsolePrint (clientID, con-  
                                                             soleHandle, txt,  
                                                             operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxAuxiliaryConsoleShow (clientID, consoleHan-  
                                                             dle, showState, opera-  
                                                             tionMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetObjectOrientation (clientID, objec-  
                                                             tHandle, relative-  
                                                             ToObjectHandle,  
                                                             operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetObjectPosition (clientID, objectHandle,  
                                                             relativeToObjectHandle,  
                                                             operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetObjectOrientation (clientID, objec-  
                                                             tHandle, relative-  
                                                             ToObjectHandle,  
                                                             eulerAngles, opera-  
                                                             tionMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetObjectPosition (clientID, objectHandle,  
                                                             relativeToObjectHandle,  
                                                             position, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetObjectParent (clientID, objectHandle, par-  
                                                             entObject, keepInPlace, opera-  
                                                             tionMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetUIButtonLabel(clientID, uiHandle, uiButtonID, upStateLabel, downStateLabel, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetLastErrors(clientID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetArrayParameter(clientID, paramIdentifier, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetArrayParameter(clientID, paramIdentifier, paramValues, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetBooleanParameter(clientID, paramIdentifier, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetBooleanParameter(clientID, paramIdentifier, paramValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetIntegerParameter(clientID, paramIdentifier, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetIntegerParameter(clientID, paramIdentifier, paramValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetFloatingParameter(clientID, paramIdentifier, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetFloatingParameter(clientID, paramIdentifier, paramValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetStringParameter(clientID, paramIdentifier, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetCollisionHandle(clientID, collisionObjectName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetDistanceHandle(clientID, distanceObjectName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxReadCollision(clientID, collisionObjectHandle, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxReadDistance` (*clientID*, *distanceObjectHandle*,  
*operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxRemoveObject` (*clientID*, *objectHandle*, *operation-*  
*Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxRemoveModel` (*clientID*, *objectHandle*, *operation-*  
*Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxRemoveUI` (*clientID*, *uiHandle*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxCloseScene` (*clientID*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetObjects` (*clientID*, *objectType*, *operation-*  
*Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxDisplayDialog` (*clientID*, *titleText*, *mainText*, *di-*  
*alogType*, *initialText*, *titleColors*,  
*dialogColors*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxEndDialog` (*clientID*, *dialogHandle*, *operation-*  
*Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetDialogInput` (*clientID*, *dialogHandle*, *opera-*  
*tionMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetDialogResult` (*clientID*, *dialogHandle*, *opera-*  
*tionMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxCopyPasteObjects` (*clientID*, *objectHandles*, *op-*  
*erationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetObjectSelection` (*clientID*, *operation-*  
*Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetObjectSelection` (*clientID*, *objectHandles*,  
*operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxClearFloatSignal` (*clientID*, *signalName*, *oper-*  
*ationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxClearIntegerSignal` (*clientID*, *signalName*,  
*operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxClearStringSignal` (*clientID*, *signalName*, *op-*  
*erationMode*)

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetFloatSignal(clientID, signalName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetIntegerSignal(clientID, signalName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetStringSignal(clientID, signalName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetAndClearStringSignal(clientID, signalName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxReadStringStream(clientID, signalName, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetFloatSignal(clientID, signalName, signalValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetIntegerSignal(clientID, signalName, signalValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetStringSignal(clientID, signalName, signalValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxAppendStringSignal(clientID, signalName, signalValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxWriteStringStream(clientID, signalName, signalValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetObjectFloatParameter(clientID, objectHandle, parameterID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxSetObjectFloatParameter(clientID, objectHandle, parameterID, parameterValue, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

```
pypot.vrep.remoteApiBindings.vrep.simxGetObjectIntParameter(clientID, objectHandle, parameterID, operationMode)
```

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetObjectIntParameter` (*clientID*, *objectHandle*, *parameterID*, *parameterValue*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetModelProperty` (*clientID*, *objectHandle*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSetModelProperty` (*clientID*, *objectHandle*, *prop*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxStart` (*connectionAddress*, *connectionPort*, *waitUntilConnected*, *doNotReconnectOnceDisconnected*, *timeOutInMs*, *commThreadCycleInMs*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxFinish` (*clientID*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetPingTime` (*clientID*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetLastCmdTime` (*clientID*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSynchronousTrigger` (*clientID*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxSynchronous` (*clientID*, *enable*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxPauseCommunication` (*clientID*, *enable*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetInMessageInfo` (*clientID*, *infoType*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetOutMessageInfo` (*clientID*, *infoType*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetConnectionId` (*clientID*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxCreateBuffer` (*bufferSize*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxReleaseBuffer` (*buffer*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxTransferFile` (*clientID*, *filePathAndName*, *fileName\_serverSide*, *timeOut*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxEraseFile` (*clientID*, *fileName\_serverSide*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxCreateDummy` (*clientID*, *size*, *color*, *operation-Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxQuery` (*clientID*, *signalName*, *signalValue*, *retSignal-Name*, *timeOutInMs*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetObjectGroupData` (*clientID*, *objectType*, *dataType*, *operation-Mode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxGetObjectVelocity` (*clientID*, *objectHandle*, *operationMode*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxPackInts` (*intList*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxUnpackInts` (*intsPackedInString*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxPackFloats` (*floatList*)

Please have a look at the function description/documentation in the V-REP user manual

`pypot.vrep.remoteApiBindings.vrep.simxUnpackFloats` (*floatsPackedInString*)

Please have a look at the function description/documentation in the V-REP user manual

## **pypot.vrep.remoteApiBindings.vrepConst module**

### **Module contents**

### **Submodules**

#### **pypot.vrep.controller module**

**class** `pypot.vrep.controller.VrepController` (*vrep\_io*, *scene*, *motors*, *sync\_freq=50.0*)

Bases: `pypot.robot.controller.MotorsController`

V-REP motors controller.

#### **Parameters**

- **vrep\_io** (`VrepIO`) – vrep io instance
- **scene** (*str*) – path to the V-REP scene file to start
- **motors** (*list*) – list of motors attached to the controller
- **sync\_freq** (*float*) – synchronization frequency

#### **setup()**

Setups the controller by reading/setting position for all motors.

#### **update()**

Synchronization update loop.

At each update all motor position are read from vrep and set to the motors. The motors target position are also send to v-rep.

```
class pypot.vrep.controller.VrepObjectTracker(io, sensors, sync_freq=50.0)
    Bases: pypot.robot.controller.SensorsController
```

Tracks the 3D position and orientation of a V-REP object.

**Parameters**

- **io** (*AbstractIO*) – IO used to communicate with the hardware motors
- **sensors** (*list*) – list of sensors attached to the controller
- **sync\_freq** (*float*) – synchronization frequency

**setup()**

Forces a first update to trigger V-REP streaming.

**update()**

Updates the position and orientation of the tracked objects.

```
class pypot.vrep.controller.VrepCollisionDetector(name)
    Bases: pypot.robot.sensor.Sensor
```

**colliding**

```
class pypot.vrep.controller.VrepCollisionTracker(io, sensors, sync_freq=50.0)
    Bases: pypot.robot.controller.SensorsController
```

Tracks collision state.

**Parameters**

- **io** (*AbstractIO*) – IO used to communicate with the hardware motors
- **sensors** (*list*) – list of sensors attached to the controller
- **sync\_freq** (*float*) – synchronization frequency

**setup()**

Forces a first update to trigger V-REP streaming.

**update()**

Update the state of the collision detectors.

**pypot.vrep.io module**

```
class pypot.vrep.io.VrepIO(vrep_host='127.0.0.1', vrep_port=19997, scene=None, start=False)
    Bases: pypot.robot.io.AbstractIO
```

This class is used to get/set values from/to a V-REP scene.

It is based on V-REP remote API (<http://www.coppeliarobotics.com/helpFiles/en/remoteApiOverview.htm>).

Starts the connection with the V-REP remote API server.

**Parameters**

- **vrep\_host** (*str*) – V-REP remote API server host
- **vrep\_port** (*int*) – V-REP remote API server port
- **scene** (*str*) – path to a V-REP scene file
- **start** (*bool*) – whether to start the scene after loading it



**Warning:** Only one connection can be established with the V-REP remote server API. So before trying to connect make sure that all previously started connections have been closed (see `close_all_connections()`)

**MAX\_ITER = 5**

**TIMEOUT = 0.4**

**open\_io()**

**close()**

Closes the current connection.

**load\_scene(scene\_path, start=False)**

Loads a scene on the V-REP server.

#### Parameters

- **scene\_path** (*str*) – path to a V-REP scene file
- **start** (*bool*) – whether to directly start the simulation after loading the scene

---

**Note:** It is assumed that the scene file is always available on the server side.

---

**start\_simulation()**

Starts the simulation.

---

**Note:** Do nothing if the simulation is already started.

---

**Warning:** if you start the simulation just after stopping it, the simulation will likely not be started. Use `restart_simulation()` instead.

**restart\_simulation()**

Re-starts the simulation.

**stop\_simulation()**

Stops the simulation.

**pause\_simulation()**

Pauses the simulation.

**resume\_simulation()**

Resumes the simulation.

**get\_motor\_position(motor\_name)**

Gets the motor current position.

**set\_motor\_position(motor\_name, position)**

Sets the motor target position.

**get\_motor\_force(motor\_name)**

**set\_motor\_force(motor\_name, force)**

**get\_object\_position(object\_name, relative\_to\_object=None)**

Gets the object position.

**set\_object\_position(object\_name, position=[0, 0, 0])**

Sets the object position.

**get\_object\_orientation** (*object\_name*, *relative\_to\_object=None*)

Gets the object orientation.

**get\_object\_handle** (*obj*)

Gets the vrep object handle.

**get\_collision\_state** (*collision\_name*)

Gets the collision state.

**get\_collision\_handle** (*collision*)

Gets a vrep collisions handle.

**get\_simulation\_current\_time** (*timer='CurrentTime'*)

Gets the simulation current time.

**add\_cube** (*name*, *position*, *sizes*, *mass*)

Add Cube

**add\_sphere** (*name*, *position*, *sizes*, *mass*, *precision=[10, 10]*)

Add Sphere

**add\_cylinder** (*name*, *position*, *sizes*, *mass*, *precision=[10, 10]*)

Add Cylinder

**add\_cone** (*name*, *position*, *sizes*, *mass*, *precision=[10, 10]*)

Add Cone

**change\_object\_name** (*old\_name*, *new\_name*)

Change object name

**call\_remote\_api** (*func\_name*, *\*args*, *\*\*kwargs*)

Calls any remote API func in a thread\_safe way.

#### Parameters

- **func\_name** (*str*) – name of the remote API func to call
- **args** – args to pass to the remote API call
- **kwargs** – args to pass to the remote API call

---

**Note:** You can add an extra keyword to specify if you want to use the streaming or sending mode. The oneshot\_wait mode is used by default (see [here](#) for details about possible modes).

---

**Warning:** You should not pass the `clientId` and the `operationMode` as arguments. They will be automatically added.

As an example you can retrieve all joints name using the following call:

```
vrep_io.remote_api_call('simxGetObjectGroupData',
                        vrep_io.remote_api.sim_object_joint_type,
                        0,
                        streaming=True)
```

**pypot.vrep.io.close\_all\_connections** ()

Closes all opened connection to V-REP remote API server.

**exception** `pypot.vrep.io.VrepIOError` (*error\_code*, *message*)

Bases: `exceptions.Exception`

Base class for V-REP IO Errors.

**exception** `pypot.vrep.io.VrepIOErrors`

Bases: `exceptions.Exception`

**exception** `pypot.vrep.io.VrepConnectionError`

Bases: `exceptions.Exception`

Base class for V-REP connection Errors.

## Module contents

**class** `pypot.vrep.vrep_time(vrep_io)`

**get\_time()**

**sleep(t)**

`pypot.vrep.from_vrep(config, vrep_host='127.0.0.1', vrep_port=19997, scene=None, tracked_objects=[], tracked_collisions=[])`

Create a robot from a V-REP instance.

### Parameters

- **config** (*str or dict*) – robot configuration (either the path to the json or directly the dictionary)
- **vrep\_host** (*str*) – host of the V-REP server
- **vrep\_port** (*int*) – port of the V-REP server
- **scene** (*str*) – path to the V-REP scene to load and start
- **tracked\_objects** (*list*) – list of V-REP dummy object to track
- **tracked\_collisions** (*list*) – list of V-REP collision to track

This function tries to connect to a V-REP instance and expects to find motors with names corresponding as the ones found in the config.

---

**Note:** The Robot returned will also provide a convenience `reset_simulation` method which resets the simulation and the robot position to its initial stance.

---



---

**Note:** Using the same configuration, you should be able to switch from a real to a simulated robot just by switching from `from_config()` to `from_vrep()`. For instance:

---

```
import json

with open('my_config.json') as f:
    config = json.load(f)

from pypot.robot import from_config
from pypot.vrep import from_vrep

real_robot = from_config(config)
simulated_robot = from_vrep(config, '127.0.0.1', 19997, 'poppy.ttt')
```

---

## Submodules

### pypot.kinematics module

**class** pypot.kinematics.**Link**

Bases: *pypot.kinematics.Link*

Link object as defined by the standard DH representation.

This representation is based on the following information: :param float theta: angle about previous z from old x to new x :param float d: offset along previous z to the common normal :param float a: offset along previous to the common normal :param float alpha: angle about common normal, from old z axis to new z axis

---

**Note:** We are only considering revolute joint.

---

Please refer to [http://en.wikipedia.org/wiki/Denavit-Hartenberg\\_parameters](http://en.wikipedia.org/wiki/Denavit-Hartenberg_parameters) for more details.

**get\_transformation\_matrix** (*theta*)

Computes the homogeneous transformation matrix for this link.

**class** pypot.kinematics.**Chain**

Bases: *pypot.kinematics.Chain*

Chain of Link that can be used to perform forward and inverse kinematics.

#### Parameters

- **links** (*list*) – list of Link that compose the chain
- **base** – the base homogeneous transformation matrix
- **tool** – the end tool homogeneous transformation matrix

**forward\_kinematics** (*q*)

Computes the homogeneous transformation matrix of the end effector of the chain.

**Parameters** **q** (*vector*) – vector of the joint angles (theta 1, theta 2, ..., theta n)

**inverse\_kinematics** (*end\_effector\_transformation*, *q=None*, *max\_iter=1000*, *tolerance=0.05*, *mask=array([ 1., 1., 1., 1., 1., 1.])*, *use\_pinv=False*)

Computes the joint angles corresponding to the end effector transformation.

#### Parameters

- **end\_effector\_transformation** – the end effector homogeneous transformation matrix
- **q** (*vector*) – initial estimate of the joint angles
- **max\_iter** (*int*) – maximum number of iteration
- **tolerance** (*float*) – tolerance before convergence
- **mask** – specify the cartesian DOF that will be ignore (in the case of a chain with less than 6 joints).

**Return type** vector of the joint angles (theta 1, theta 2, ..., theta n)

pypot.kinematics.**transform\_difference** (*t1*, *t2*)

pypot.kinematics.**rotation\_from\_transf** (*tm*)

pypot.kinematics.**translation\_from\_transf** (*tm*)

pypot.kinematics.**components\_from\_transf** (*tm*)

`pypot.kinematics.transf_from_components` ( $R, T$ )

`pypot.kinematics.transl` ( $x, y, z$ )

`pypot.kinematics.trotx` ( $theta$ )

`pypot.kinematics.troty` ( $theta$ )

`pypot.kinematics.trotz` ( $theta$ )

## Module contents



**p**

- [pypot](#), 57
- [pypot.dynamixel](#), 20
  - [pypot.dynamixel.controller](#), 15
  - [pypot.dynamixel.conversion](#), 16
  - [pypot.dynamixel.error](#), 17
  - [pypot.dynamixel.io.abstract\\_io](#), 6
  - [pypot.dynamixel.motor](#), 18
  - [pypot.dynamixel.protocol](#), 15
  - [pypot.dynamixel.syncloop](#), 20
- [pypot.kinematics](#), 56
- [pypot.primitive](#), 26
- [pypot.sensor.camera](#), 30
  - [pypot.sensor.camera.abstractcam](#), 30
- [pypot.sensor.imagefeature](#), 30
- [pypot.sensor.kinect](#), 31
- [pypot.sensor.optibridge](#), 31
- [pypot.server.server](#), 34
- [pypot.tools](#), 37
  - [pypot.tools.herborist](#), 36
    - [pypot.tools.herborist.herborist](#), 35
- [pypot.utils.appdirs](#), 37
- [pypot.utils.interpolation](#), 40
- [pypot.utils.pypot\\_time](#), 40
- [pypot.vrep.remoteApiBindings](#), 51
  - [pypot.vrep.remoteApiBindings.vrep](#), 44
  - [pypot.vrep.remoteApiBindings.vrepConst](#), 51





## A

[abort\(\)](#) (pypot.tools.herborist.herborist.HerboristApp.ScanThread method), 36  
[abort\\_scanning\(\)](#) (pypot.tools.herborist.herborist.HerboristApp method), 35  
[AbstractCamera](#) (class in pypot.sensor.camera.abstractcam), 30  
[AbstractController](#) (class in pypot.robot.controller), 27  
[AbstractDxIIIO](#) (class in pypot.dynamixel.io.abstract\_io), 6  
[AbstractIO](#) (class in pypot.robot.io), 27  
[AbstractServer](#) (class in pypot.server.server), 34  
[active\\_primitives](#) (pypot.robot.robot.Robot attribute), 29  
[add\(\)](#) (pypot.primitive.manager.PrimitiveManager method), 21  
[add\\_cone\(\)](#) (pypot.vrep.io.VrepIO method), 54  
[add\\_cube\(\)](#) (pypot.vrep.io.VrepIO method), 54  
[add\\_cylinder\(\)](#) (pypot.vrep.io.VrepIO method), 54  
[add\\_position\(\)](#) (pypot.primitive.move.Move method), 22  
[add\\_sphere\(\)](#) (pypot.vrep.io.VrepIO method), 54  
[add\\_tracked\\_motors\(\)](#) (pypot.primitive.move.MoveRecorder method), 22  
[alarm\\_to\\_dxl\(\)](#) (in module pypot.dynamixel.conversion), 17  
[almost\\_equal\(\)](#) (in module pypot.tools.dxl\_reset), 37  
[amplitude](#) (pypot.primitive.utils.Sinus attribute), 25  
[angle\\_limit](#) (pypot.dynamixel.motor.DxlMotor attribute), 19  
[AngleLimitRegisterController](#) (class in pypot.dynamixel.controller), 16  
[api](#) (pypot.server.httpserver.EnableCors attribute), 33  
[AppDirs](#) (class in pypot.utils.appdirs), 40  
[apply\(\)](#) (pypot.server.httpserver.EnableCors method), 33  
[attach\\_move\\_recorder\(\)](#) (pypot.server.rest.RESTRobot method), 34  
[attach\\_primitive\(\)](#) (pypot.robot.robot.Robot method), 28  
[attrsetter\(\)](#) (in module pypot.utils), 43  
[autodetect\\_robot\(\)](#) (in module pypot.dynamixel), 21

## B

[BaseDxlController](#) (class in pypot.dynamixel.syncloop),

## 20

[BaseErrorHandler](#) (class in pypot.dynamixel.error), 18  
[baudrate](#) (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO attribute), 6  
[baudrate](#) (pypot.tools.herborist.herborist.HerboristApp attribute), 36  
[baudrate\\_to\\_dxl\(\)](#) (in module pypot.dynamixel.conversion), 16  
[bool\\_to\\_dxl\(\)](#) (in module pypot.dynamixel.conversion), 17

## C

[call\\_primitive\\_method\(\)](#) (pypot.server.rest.RESTRobot method), 34  
[call\\_remote\\_api\(\)](#) (pypot.vrep.io.VrepIO method), 54  
[CameraController](#) (class in pypot.sensor.camera), 30  
[Chain](#) (class in pypot.kinematics), 56  
[change\\_baudrate\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO method), 7  
[change\\_id\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO method), 7  
[change\\_object\\_name\(\)](#) (pypot.vrep.io.VrepIO method), 54  
[check\\_bit\(\)](#) (in module pypot.dynamixel.conversion), 16  
[check\\_motor\\_limits\(\)](#) (in module pypot.robot.config), 26  
[checksum](#) (pypot.dynamixel.protocol.v1.DxlInstructionPacket attribute), 13  
[checksum](#) (pypot.dynamixel.protocol.v2.DxlInstructionPacket attribute), 15  
[close\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO method), 6  
[close\(\)](#) (pypot.robot.controller.AbstractController method), 27  
[close\(\)](#) (pypot.robot.io.AbstractIO method), 27  
[close\(\)](#) (pypot.robot.robot.Robot method), 28  
[close\(\)](#) (pypot.vrep.io.VrepIO method), 53  
[close\\_all\\_connections\(\)](#) (in module pypot.vrep.io), 54  
[closed](#) (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO attribute), 7  
[colliding](#) (pypot.vrep.controller.VrepCollisionDetector attribute), 52

- ul style="list-style-type: none; padding-left: 0;">
- compliant (pypot.dynamixel.motor.DxlMotor attribute), 19
- compliant (pypot.robot.robot.Robot attribute), 29
- compliant\_behavior (pypot.dynamixel.motor.DxlMotor attribute), 19
- components\_from\_transf() (in module pypot.kinematics), 56
- compute() (pypot.utils.trajectory.MinimumJerkTrajectory method), 42
- control\_mode\_to\_dxl() (in module pypot.dynamixel.conversion), 17
- Cosinus (class in pypot.primitive.utils), 25
- crc16() (in module pypot.dynamixel.protocol.v2), 15
- D**
- decode\_error() (in module pypot.dynamixel.conversion), 17
- default() (pypot.server.httpserver.MyJSONEncoder method), 33
- degree\_to\_dxl() (in module pypot.dynamixel.conversion), 16
- disable\_torque() (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7
- domain() (pypot.utils.trajectory.MinimumJerkTrajectory method), 42
- done (pypot.tools.herborist.herborist.HerboristApp.ScanThread attribute), 36
- done() (pypot.utils.SyncEvent method), 43
- done\_scanning() (pypot.tools.herborist.herborist.HerboristApp method), 35
- drive\_mode\_to\_dxl() (in module pypot.dynamixel.conversion), 16
- DummyController (class in pypot.robot.controller), 27
- duration() (pypot.primitive.move.MovePlayer method), 22
- duty (pypot.primitive.utils.Square attribute), 25
- Dxl320IO (class in pypot.dynamixel.io.io\_320), 10
- dxl\_code() (in module pypot.dynamixel.conversion), 17
- dxl\_code\_all() (in module pypot.dynamixel.conversion), 17
- dxl\_decode() (in module pypot.dynamixel.conversion), 17
- dxl\_decode\_all() (in module pypot.dynamixel.conversion), 17
- dxl\_io\_from\_confignode() (in module pypot.robot.config), 26
- dxl\_to\_alarm() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_baudrate() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_bool() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_control\_mode() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_degree() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_drive\_mode() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_led\_color() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_load() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_model() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_pid() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_rdt() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_speed() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_status() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_temperature() (in module pypot.dynamixel.conversion), 17
- dxl\_to\_torque() (in module pypot.dynamixel.conversion), 16
- dxl\_to\_voltage() (in module pypot.dynamixel.conversion), 17
- DxlAXRXMotor (class in pypot.dynamixel.motor), 19
- DxlCommunicationError, 8
- DxlController (class in pypot.dynamixel.controller), 15
- DxlError, 8
- DxlErrorHandler (class in pypot.dynamixel.error), 17
- DxlInstruction (class in pypot.dynamixel.protocol.v1), 13
- DxlInstruction (class in pypot.dynamixel.protocol.v2), 14
- DxlInstructionPacket (class in pypot.dynamixel.protocol.v1), 13
- DxlInstructionPacket (class in pypot.dynamixel.protocol.v2), 14
- DxlIO (class in pypot.dynamixel.io.io), 8
- DxlMotor (class in pypot.dynamixel.motor), 18
- DxlMXMotor (class in pypot.dynamixel.motor), 19
- DxlOrientedRegister (class in pypot.dynamixel.motor), 18
- DxlPacketHeader (class in pypot.dynamixel.protocol.v1), 13
- DxlPacketHeader (class in pypot.dynamixel.protocol.v2), 14
- DxlPingPacket (class in pypot.dynamixel.protocol.v1), 13
- DxlPingPacket (class in pypot.dynamixel.protocol.v2), 15
- DxlPositionRegister (class in pypot.dynamixel.motor), 18
- DxlReadDataPacket (class in pypot.dynamixel.protocol.v1), 13
- DxlReadDataPacket (class in pypot.dynamixel.protocol.v2), 15
- DxlRegister (class in pypot.dynamixel.motor), 18
- DxlResetPacket (class in pypot.dynamixel.protocol.v1), 13
- DxlResetPacket (class in pypot.dynamixel.protocol.v2), 15

DxlStatusPacket (class in pypot.dynamixel.protocol.v1), 14

DxlStatusPacket (class in pypot.dynamixel.protocol.v2), 15

DxlSyncReadPacket (class in pypot.dynamixel.protocol.v1), 13

DxlSyncReadPacket (class in pypot.dynamixel.protocol.v2), 15

DxlSyncWritePacket (class in pypot.dynamixel.protocol.v1), 14

DxlSyncWritePacket (class in pypot.dynamixel.protocol.v2), 15

DxlTimeoutError, 8

DxlWriteDataPacket (class in pypot.dynamixel.protocol.v1), 14

DxlWriteDataPacket (class in pypot.dynamixel.protocol.v2), 15

DxlXL320Motor (class in pypot.dynamixel.motor), 19

## E

elapsed\_time (pypot.primitive.primitive.Primitive attribute), 24

elapsed\_time (pypot.utils.trajectory.GotoMinJerk attribute), 42

enable\_motor\_view() (pypot.tools.herborist.herborist.HerboristApp method), 36

enable\_torque() (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO method), 7

EnableCors (class in pypot.server.httpserver), 33

## F

factory\_reset() (pypot.dynamixel.io.io.DxIIIO method), 8

factory\_reset() (pypot.dynamixel.io.io\_320.Dxl320IO method), 11

find\_local\_ip() (in module pypot.server.snap), 35

find\_port() (in module pypot.dynamixel), 20

fix\_input() (pypot.utils.trajectory.MinimumJerkTrajectory method), 42

flush() (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO method), 6

forward\_kinematics() (pypot.kinematics.Chain method), 56

fps (pypot.sensor.camera.abstractcam.AbstractCamera attribute), 30

frame (pypot.sensor.camera.abstractcam.AbstractCamera attribute), 30

framerate (pypot.primitive.move.Move attribute), 22

frequency (pypot.primitive.utils.Sinus attribute), 25

from\_config() (in module pypot.robot.config), 26

from\_json() (in module pypot.robot.config), 26

from\_remote() (in module pypot.robot.remote), 28

from\_string() (pypot.dynamixel.protocol.v1.DxlPacketHeader class method), 13

from\_string() (pypot.dynamixel.protocol.v1.DxlStatusPacket class method), 14

from\_string() (pypot.dynamixel.protocol.v2.DxlPacketHeader class method), 14

from\_string() (pypot.dynamixel.protocol.v2.DxlStatusPacket class method), 15

from\_vrep() (in module pypot.vrep), 55

## G

generate\_tree() (pypot.utils.interpolation.KDTreeDict method), 40

get\_alarm\_LED() (pypot.dynamixel.io.io.DxIIIO method), 8

get\_alarm\_shutdown() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_alarm\_shutdown() (pypot.dynamixel.io.io\_320.Dxl320IO method), 11

get\_angle\_limit() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_angle\_limit() (pypot.dynamixel.io.io\_320.Dxl320IO method), 11

get\_available\_ports() (in module pypot.dynamixel), 20

get\_available\_record\_list() (pypot.server.rest.RESTRobot method), 34

get\_collision\_handle() (pypot.vrep.io.VrepIO method), 54

get\_collision\_state() (pypot.vrep.io.VrepIO method), 54

get\_compliance\_margin() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_compliance\_slope() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_control\_mode() (pypot.dynamixel.io.io.DxIIIO method), 8

get\_control\_mode() (pypot.dynamixel.io.io\_320.Dxl320IO method), 11

get\_control\_table() (pypot.dynamixel.io.abstract\_io.AbstractDxIIIO method), 7

get\_drive\_mode() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_dxl\_connection() (in module pypot.tools.herborist.herborist), 35

get\_firmware() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_firmware() (pypot.dynamixel.io.io\_320.Dxl320IO method), 11

get\_generator() (pypot.utils.trajectory.MinimumJerkTrajectory method), 42

get\_goal\_position() (pypot.dynamixel.io.io.DxIIIO method), 9

get\_goal\_position() (pypot.dynamixel.io.io\_320.Dxl320IO method), 11

<code>get_goal_position_speed_load()</code> (py-pot.dynamixel.io.io.DxlIO method), 9	<code>get_present_position_speed_load()</code> (py-pot.dynamixel.controller.PosSpeedLoadDxlController method), 16
<code>get_goal_position_speed_load()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11	<code>get_present_position_speed_load()</code> (py-pot.dynamixel.io.io.DxlIO method), 9
<code>get_highest_temperature_limit()</code> (py-pot.dynamixel.io.io.DxlIO method), 9	<code>get_present_position_speed_load()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11
<code>get_highest_temperature_limit()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11	<code>get_present_speed()</code> (pypot.dynamixel.io.io.DxlIO method), 9
<code>get_LED_color()</code> (pypot.dynamixel.io.io_320.Dxl320IO method), 11	<code>get_present_speed()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11
<code>get_max_torque()</code> (pypot.dynamixel.io.io.DxlIO method), 9	<code>get_present_temperature()</code> (pypot.dynamixel.io.io.DxlIO method), 9
<code>get_max_torque()</code> (pypot.dynamixel.io.io_320.Dxl320IO method), 11	<code>get_present_temperature()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11
<code>get_mockup_motor()</code> (pypot.primitive.primitive.Primitive method), 24	<code>get_present_voltage()</code> (pypot.dynamixel.io.io.DxlIO method), 9
<code>get_model()</code> (pypot.dynamixel.io.abstract_io.AbstractDxlIO method), 7	<code>get_present_voltage()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11
<code>get_motor_force()</code> (pypot.vrep.io.VrepIO method), 53	<code>get_primitive_methods_list()</code> (py-pot.server.rest.RESTRobot method), 34
<code>get_motor_position()</code> (pypot.vrep.io.VrepIO method), 53	<code>get_primitive_properties_list()</code> (py-pot.server.rest.RESTRobot method), 34
<code>get_motor_register_value()</code> (py-pot.server.rest.RESTRobot method), 33	<code>get_primitive_property()</code> (pypot.server.rest.RESTRobot method), 34
<code>get_motor_registers_list()</code> (pypot.server.rest.RESTRobot method), 33	<code>get_primitives_list()</code> (pypot.server.rest.RESTRobot method), 34
<code>get_motors_alias()</code> (pypot.server.rest.RESTRobot method), 34	<code>get_register()</code> (pypot.dynamixel.controller.AngleLimitRegisterController method), 16
<code>get_motors_list()</code> (pypot.server.rest.RESTRobot method), 33	<code>get_register()</code> (pypot.dynamixel.controller.DxlController method), 16
<code>get_move_recorder_motors()</code> (py-pot.server.rest.RESTRobot method), 34	<code>get_register_value()</code> (pypot.server.rest.RESTRobot method), 33
<code>get_moving_speed()</code> (pypot.dynamixel.io.io.DxlIO method), 9	<code>get_registers_list()</code> (pypot.server.rest.RESTRobot method), 33
<code>get_moving_speed()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11	<code>get_return_delay_time()</code> (pypot.dynamixel.io.io.DxlIO method), 9
<code>get_object_handle()</code> (pypot.vrep.io.VrepIO method), 54	<code>get_return_delay_time()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11
<code>get_object_orientation()</code> (pypot.vrep.io.VrepIO method), 53	<code>get_running_primitives_list()</code> (py-pot.server.rest.RESTRobot method), 34
<code>get_object_position()</code> (pypot.vrep.io.VrepIO method), 53	<code>get_sensor_register_value()</code> (py-pot.server.rest.RESTRobot method), 34
<code>get_pid_gain()</code> (pypot.dynamixel.io.abstract_io.AbstractDxlIO method), 7	<code>get_sensors_list()</code> (pypot.server.rest.RESTRobot method), 34
<code>get_port_vendor_info()</code> (in module pypot.dynamixel), 20	<code>get_sensors_registers_list()</code> (py-pot.server.rest.RESTRobot method), 34
<code>get_present_load()</code> (pypot.dynamixel.io.io.DxlIO method), 9	<code>get_simulation_current_time()</code> (pypot.vrep.io.VrepIO method), 54
<code>get_present_load()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11	
<code>get_present_position()</code> (pypot.dynamixel.io.io.DxlIO method), 9	
<code>get_present_position()</code> (py-pot.dynamixel.io.io_320.Dxl320IO method), 11	

[get\\_skeleton\(\)](#) (pypot.sensor.kinect.sensor.KinectSensor method), 31  
[get\\_snap\\_user\\_projects\\_directory\(\)](#) (in module pypot.server.snap), 35  
[get\\_status\\_return\\_level\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7  
[get\\_time\(\)](#) (pypot.vrep.vrep\_time method), 55  
[get\\_torque\\_limit\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 9  
[get\\_torque\\_limit\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[get\\_transformation\\_matrix\(\)](#) (pypot.kinematics.Link method), 56  
[get\\_used\\_ports\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxlIO class method), 6  
[get\\_value\(\)](#) (pypot.utils.trajectory.MinimumJerkTrajectory method), 42  
[get\\_voltage\\_limit\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 9  
[get\\_voltage\\_limit\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[goal\\_speed](#) (pypot.dynamixel.motor.DxlMotor attribute), 19  
[goal\\_speed](#) (pypot.primitive.primitive.MockupMotor attribute), 25  
[goto\\_behavior](#) (pypot.dynamixel.motor.DxlMotor attribute), 19  
[goto\\_position\(\)](#) (pypot.dynamixel.motor.DxlMotor method), 19  
[goto\\_position\(\)](#) (pypot.primitive.primitive.MockupMotor method), 25  
[goto\\_position\(\)](#) (pypot.primitive.primitive.MockupRobot method), 24  
[goto\\_position\(\)](#) (pypot.robot.robot.Robot method), 29  
[GotoMinJerk](#) (class in pypot.utils.trajectory), 42  
[grab\(\)](#) (pypot.sensor.camera.abstractcam.AbstractCamera method), 30

## H

[handle\\_angle\\_limit\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_checksum\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_communication\\_error\(\)](#) (pypot.dynamixel.error.BaseErrorHandler method), 18  
[handle\\_communication\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 17  
[handle\\_input\\_voltage\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 17  
[handle\\_instruction\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_none\\_error\(\)](#) (pypot.dynamixel.error.BaseErrorHandler method), 18  
[handle\\_none\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_overheating\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_overload\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_range\\_error\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 18  
[handle\\_request\(\)](#) (pypot.server.zmqserver.ZMQRobotServer method), 35  
[handle\\_timeout\(\)](#) (pypot.dynamixel.error.BaseErrorHandler method), 18  
[handle\\_timeout\(\)](#) (pypot.dynamixel.error.DxlErrorHandler method), 17  
[HerboristApp](#) (class in pypot.tools.herborist.herborist), 35  
[HerboristApp.ScanThread](#) (class in pypot.tools.herborist.herborist), 36  
[HerboristApp.UpdateMotorThread](#) (class in pypot.tools.herborist.herborist), 36  
[HerboristApp.UpdatePortThread](#) (class in pypot.tools.herborist.herborist), 35  
[HTTPRobotServer](#) (class in pypot.server.httpserver), 33

## I

[id](#) (pypot.tools.herborist.herborist.HerboristApp attribute), 36  
[ids](#) (pypot.tools.herborist.herborist.HerboristApp attribute), 36  
[instantiate\\_motors\(\)](#) (in module pypot.robot.config), 26  
[interpolate\\_motor\\_positions\(\)](#) (pypot.utils.interpolation.KDTreeDict method), 40  
[inverse\\_kinematics\(\)](#) (pypot.kinematics.Chain method), 56  
[is\\_alive\(\)](#) (pypot.primitive.primitive.Primitive method), 24  
[is\\_led\\_on\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 9  
[is\\_led\\_on\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[is\\_moving\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10



is\_moving() (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
 is\_recent (pypot.utils.SyncEvent attribute), 43  
 is\_torque\_enabled() (pypot.dynamixel.io.io.DxlIO method), 10  
 is\_torque\_enabled() (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
 iterpositions() (pypot.primitive.move.Move method), 22

## J

join() (pypot.utils.stoppablethread.StoppableThread method), 41  
 Joint (class in pypot.sensor.kinect.sensor), 31  
 joints (pypot.sensor.kinect.sensor.Skeleton attribute), 31

## K

KDTreeDict (class in pypot.utils.interpolation), 40  
 KinectSensor (class in pypot.sensor.kinect.sensor), 31

## L

leave() (in module pypot.tools.dxl\_reset), 36  
 led\_color\_to\_dxl() (in module pypot.dynamixel.conversion), 17  
 length (pypot.dynamixel.protocol.v1.DxlInstructionPacket attribute), 13  
 length (pypot.dynamixel.protocol.v1.DxlPacketHeader attribute), 13  
 length (pypot.dynamixel.protocol.v2.DxlInstructionPacket attribute), 15  
 length (pypot.dynamixel.protocol.v2.DxlPacketHeader attribute), 14  
 LightDxlController (class in pypot.dynamixel.syncloop), 20  
 Link (class in pypot.kinematics), 56  
 load() (pypot.primitive.move.Move class method), 22  
 load\_scene() (pypot.vrep.io.VrepIO method), 53  
 LoopPrimitive (class in pypot.primitive.primitive), 24

## M

main() (in module pypot.tools.dxl\_reset), 37  
 main() (in module pypot.tools.herborist.herborist), 36  
 make\_alias() (in module pypot.robot.config), 26  
 make\_update\_loop() (in module pypot.utils.stoppablethread), 42  
 marker (pypot.dynamixel.protocol.v1.DxlPacketHeader attribute), 13  
 marker (pypot.dynamixel.protocol.v2.DxlPacketHeader attribute), 14  
 MAX\_ITER (pypot.vrep.io.VrepIO attribute), 53  
 MetaDxlController (class in pypot.dynamixel.syncloop), 20  
 methods (pypot.primitive.primitive.Primitive attribute), 23

MinimumJerkTrajectory (class in pypot.utils.trajectory), 42

MockupMotor (class in pypot.primitive.primitive), 24  
 MockupRobot (class in pypot.primitive.primitive), 24  
 Motor (class in pypot.robot.motor), 28  
 motor\_from\_confignode() (in module pypot.robot.config), 26  
 motor\_position\_updated() (pypot.tools.herborist.herborist.HerboristApp method), 36  
 motors (pypot.primitive.primitive.MockupRobot attribute), 24  
 motors (pypot.robot.robot.Robot attribute), 28  
 MotorsController (class in pypot.robot.controller), 27  
 Move (class in pypot.primitive.move), 21  
 move (pypot.primitive.move.MoveRecorder attribute), 22  
 MovePlayer (class in pypot.primitive.move), 22  
 MoveRecorder (class in pypot.primitive.move), 22  
 MyJSONEncoder (class in pypot.server.httpserver), 32

## N

name (pypot.robot.motor.Motor attribute), 28  
 name (pypot.robot.sensor.Sensor attribute), 29  
 name (pypot.server.httpserver.EnableCors attribute), 33  
 nearest\_keys() (pypot.utils.interpolation.KDTreeDict method), 40  
 needed (pypot.utils.SyncEvent attribute), 43

## O

ObjectTracker (class in pypot.robot.sensor), 29  
 offset (pypot.primitive.utils.Sinus attribute), 25  
 open() (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 6  
 open\_io() (pypot.vrep.io.VrepIO method), 53  
 OptiBridgeServer (class in pypot.sensor.optibridge), 31  
 OptiTrackClient (class in pypot.sensor.optibridge), 31  
 orientation (pypot.robot.sensor.ObjectTracker attribute), 29  
 orientation (pypot.sensor.kinect.sensor.Joint attribute), 31  
 orientation (pypot.sensor.optitrack.TrackedObject attribute), 32

## P

part\_done (pypot.tools.herborist.herborist.HerboristApp.ScanThread attribute), 36  
 pause() (pypot.utils.stoppablethread.StoppableThread method), 41  
 pause\_primitive() (pypot.server.rest.RESTRobot method), 34  
 pause\_simulation() (pypot.vrep.io.VrepIO method), 53  
 paused (pypot.utils.stoppablethread.StoppableThread attribute), 41  
 phase (pypot.primitive.utils.Sinus attribute), 25  
 pid\_to\_dxl() (in module pypot.dynamixel.conversion), 16

[PING \(pypot.dynamixel.protocol.v1.DxlInstruction attribute\), 13](#)  
[PING \(pypot.dynamixel.protocol.v2.DxlInstruction attribute\), 14](#)  
[ping\(\) \(pypot.dynamixel.io.abstract\\_io.AbstractDxlIO method\), 7](#)  
[pixel\\_coordinate \(pypot.sensor.kinect.sensor.Joint attribute\), 31](#)  
[plot\(\) \(pypot.primitive.utils.PositionWatcher method\), 25](#)  
[Point \(in module pypot.utils\), 43](#)  
[Point2D \(class in pypot.utils\), 42](#)  
[Point3D \(class in pypot.utils\), 42](#)  
[port \(pypot.dynamixel.io.abstract\\_io.AbstractDxlIO attribute\), 6](#)  
[port \(pypot.tools.herborist.herborist.HerboristApp attribute\), 36](#)  
[port\\_updated \(pypot.tools.herborist.herborist.HerboristApp attribute\), 35](#)  
[position \(pypot.robot.sensor.ObjectTracker attribute\), 29](#)  
[position \(pypot.sensor.kinect.sensor.Joint attribute\), 31](#)  
[position \(pypot.sensor.optitrack.TrackedObject attribute\), 32](#)  
[position\\_updated \(pypot.tools.herborist.herborist.HerboristApp attribute\), 36](#)  
[positions\(\) \(pypot.primitive.move.Move method\), 22](#)  
[PositionWatcher \(class in pypot.primitive.utils\), 25](#)  
[PosSpeedLoadDxlController \(class in pypot.dynamixel.controller\), 16](#)  
[post\\_processing\(\) \(pypot.sensor.camera.abstractcam.AbstractCamera method\), 30](#)  
[power\\_max\(\) \(pypot.primitive.primitive.MockupRobot method\), 24](#)  
[power\\_up\(\) \(pypot.robot.robot.Robot method\), 29](#)  
[Primitive \(class in pypot.primitive.primitive\), 23](#)  
[PrimitiveManager \(class in pypot.primitive.manager\), 21](#)  
[primitives \(pypot.primitive.manager.PrimitiveManager attribute\), 21](#)  
[primitives \(pypot.robot.robot.Robot attribute\), 29](#)  
[properties \(pypot.primitive.primitive.Primitive attribute\), 23](#)  
[properties \(pypot.primitive.utils.Sinus attribute\), 25](#)  
[protocol \(pypot.tools.herborist.herborist.HerboristApp attribute\), 36](#)  
[py3compatible\(\) \(in module pypot.vrep.remoteApiBindings.vrep\), 44](#)  
[pypot \(module\), 57](#)  
[pypot.dynamixel \(module\), 20](#)  
[pypot.dynamixel.controller \(module\), 15](#)  
[pypot.dynamixel.conversion \(module\), 16](#)  
[pypot.dynamixel.error \(module\), 17](#)  
[pypot.dynamixel.io \(module\), 12](#)  
[pypot.dynamixel.io.abstract\\_io \(module\), 6](#)  
[pypot.dynamixel.io.io \(module\), 8](#)  
[pypot.dynamixel.io.io\\_320 \(module\), 10](#)  
[pypot.dynamixel.motor \(module\), 18](#)  
[pypot.dynamixel.protocol \(module\), 15](#)  
[pypot.dynamixel.protocol.v1 \(module\), 13](#)  
[pypot.dynamixel.protocol.v2 \(module\), 14](#)  
[pypot.dynamixel.syncloop \(module\), 20](#)  
[pypot.kinematics \(module\), 56](#)  
[pypot.primitive \(module\), 26](#)  
[pypot.primitive.manager \(module\), 21](#)  
[pypot.primitive.move \(module\), 21](#)  
[pypot.primitive.primitive \(module\), 23](#)  
[pypot.primitive.utils \(module\), 25](#)  
[pypot.robot \(module\), 29](#)  
[pypot.robot.config \(module\), 26](#)  
[pypot.robot.controller \(module\), 27](#)  
[pypot.robot.io \(module\), 27](#)  
[pypot.robot.motor \(module\), 28](#)  
[pypot.robot.port \(module\), 28](#)  
[pypot.robot.robot \(module\), 28](#)  
[pypot.robot.sensor \(module\), 29](#)  
[pypot.sensor \(module\), 32](#)  
[pypot.sensor.camera \(module\), 30](#)  
[pypot.sensor.camera.abstractcam \(module\), 30](#)  
[pypot.sensor.camera.motor \(module\), 30](#)  
[pypot.sensor.kinect \(module\), 31](#)  
[pypot.sensor.kinect.sensor \(module\), 31](#)  
[pypot.sensor.optibridge \(module\), 31](#)  
[pypot.sensor.optitrack \(module\), 32](#)  
[pypot.server \(module\), 35](#)  
[pypot.server.httpserver \(module\), 32](#)  
[pypot.server.rest \(module\), 33](#)  
[pypot.server.server \(module\), 34](#)  
[pypot.server.snap \(module\), 35](#)  
[pypot.server.zmqserver \(module\), 35](#)  
[pypot.tools \(module\), 37](#)  
[pypot.tools.dxl\\_reset \(module\), 36](#)  
[pypot.tools.herborist \(module\), 36](#)  
[pypot.tools.herborist.herborist \(module\), 35](#)  
[pypot.utils \(module\), 42](#)  
[pypot.utils.appdirs \(module\), 37](#)  
[pypot.utils.interpolation \(module\), 40](#)  
[pypot.utils.pypot\\_time \(module\), 40](#)  
[pypot.utils.stoppablethread \(module\), 40](#)  
[pypot.utils.trajjectory \(module\), 42](#)  
[pypot.vrep \(module\), 55](#)  
[pypot.vrep.controller \(module\), 51](#)  
[pypot.vrep.io \(module\), 52](#)  
[pypot.vrep.remoteApiBindings \(module\), 51](#)  
[pypot.vrep.remoteApiBindings.vrep \(module\), 44](#)  
[pypot.vrep.remoteApiBindings.vrepConst \(module\), 51](#)

**Q**  
[quat2euler\(\) \(in module pypot.sensor.optitrack\), 32](#)  
[Quaternion \(class in pypot.utils\), 43](#)

quaternion (pypot.sensor.optitrack.TrackedObject attribute), 32

## R

rdt\_to\_dxl() (in module pypot.dynamixel.conversion), 17

READ\_DATA (pypot.dynamixel.protocol.v1.DxlInstruction attribute), 13

READ\_DATA (pypot.dynamixel.protocol.v2.DxlInstruction attribute), 14

recent\_tracked\_objects (pypot.sensor.optibridge.OptiTrackClient attribute), 31

recent\_update\_frequencies (pypot.primitive.primitive.LoopPrimitive attribute), 24

record\_positions (pypot.primitive.utils.PositionWatcher attribute), 25

RegisterOwner (class in pypot.dynamixel.motor), 18

registers (pypot.dynamixel.motor.DxlAXRXMotor attribute), 19

registers (pypot.dynamixel.motor.DxlMotor attribute), 19

registers (pypot.dynamixel.motor.DxlMXMotor attribute), 19

registers (pypot.dynamixel.motor.DxlXL320Motor attribute), 19

registers (pypot.robot.motor.Motor attribute), 28

registers (pypot.robot.sensor.ObjectTracker attribute), 29

registers (pypot.robot.sensor.Sensor attribute), 29

registers (pypot.sensor.camera.abstractcam.AbstractCamera attribute), 30

release\_dxl\_connection() (in module pypot.tools.herborist.herborist), 35

RemoteRobotClient (class in pypot.robot.remote), 28

RemoteRobotServer (class in pypot.server.server), 34

remove() (pypot.primitive.manager.PrimitiveManager method), 21

remove\_all\_users() (pypot.sensor.kinect.sensor.KinectSensor method), 31

remove\_move\_record() (pypot.server.rest.RESTRobot method), 34

remove\_user() (pypot.sensor.kinect.sensor.KinectSensor method), 31

request() (pypot.utils.SyncEvent method), 43

RESET (pypot.dynamixel.protocol.v1.DxlInstruction attribute), 13

RESET (pypot.dynamixel.protocol.v2.DxlInstruction attribute), 14

resolution (pypot.sensor.camera.abstractcam.AbstractCamera attribute), 30

restart\_simulation() (pypot.vrep.io.VrepIO method), 53

RESTRobot (class in pypot.server.rest), 33

resume() (pypot.utils.stoppablethread.StoppableThread method), 41

resume\_primitive() (pypot.server.rest.RESTRobot method), 34

resume\_simulation() (pypot.vrep.io.VrepIO method), 53  
Robot (class in pypot.robot.robot), 28

rotation\_from\_transf() (in module pypot.kinematics), 56

run() (pypot.primitive.primitive.LoopPrimitive method), 24

run() (pypot.primitive.primitive.Primitive method), 23

run() (pypot.primitive.utils.SimplePosture method), 26

run() (pypot.sensor.kinect.sensor.KinectSensor method), 31

run() (pypot.sensor.optibridge.OptiBridgeServer method), 31

run() (pypot.sensor.optibridge.OptiTrackClient method), 31

run() (pypot.server.httpserver.HTTPRobotServer method), 33

run() (pypot.server.server.AbstractServer method), 34

run() (pypot.server.server.RemoteRobotServer method), 34

run() (pypot.server.snap.SnapRobotServer method), 35

run() (pypot.server.zmqserver.ZMQRobotServer method), 35

run() (pypot.tools.herborist.herborist.HerboristApp.ScanThread method), 36

run() (pypot.tools.herborist.herborist.HerboristApp.UpdateMotorThread method), 36

run() (pypot.tools.herborist.herborist.HerboristApp.UpdatePortThread method), 35

run() (pypot.utils.stoppablethread.StoppableLoopThread method), 42

run() (pypot.utils.stoppablethread.StoppableThread method), 41

running (pypot.utils.stoppablethread.StoppableThread attribute), 41

## S

SafeCompliance (class in pypot.dynamixel.motor), 19

save() (pypot.primitive.move.Move method), 22

scan() (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7

selected\_motors (pypot.tools.herborist.herborist.HerboristApp attribute), 36

Sensor (class in pypot.robot.sensor), 29

sensor\_from\_confignode() (in module pypot.robot.config), 26

sensors (pypot.robot.robot.Robot attribute), 29

SensorsController (class in pypot.robot.controller), 27

set\_alarm\_LED() (pypot.dynamixel.io.io.DxlIO method), 10

set\_alarm\_shutdown() (pypot.dynamixel.io.io.DxlIO method), 10

set\_alarm\_shutdown() (pypot.dynamixel.io.io\_320.Dxl320IO method), 10



- 12  
[set\\_angle\\_limit\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 8  
[set\\_angle\\_limit\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_compliance\\_margin\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_compliance\\_slope\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_control\\_mode\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 8  
[set\\_control\\_mode\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_drive\\_mode\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_goal\\_position\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_goal\\_position\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_goal\\_position\\_speed\\_load\(\)](#) (pypot.dynamixel.controller.PosSpeedLoadDxlController method), 16  
[set\\_goal\\_position\\_speed\\_load\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_goal\\_position\\_speed\\_load\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 11  
[set\\_goto\\_position\\_for\\_motor\(\)](#) (pypot.server.rest.RESTRobot method), 34  
[set\\_highest\\_temperature\\_limit\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_highest\\_temperature\\_limit\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_joint\\_mode\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 8  
[set\\_joint\\_mode\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 11  
[set\\_LED\\_color\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_max\\_torque\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_max\\_torque\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_motor\\_force\(\)](#) (pypot.vrep.io.VrepIO method), 53  
[set\\_motor\\_position\(\)](#) (pypot.vrep.io.VrepIO method), 53  
[set\\_motor\\_register\\_value\(\)](#) (pypot.server.rest.RESTRobot method), 33  
[set\\_moving\\_speed\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_moving\\_speed\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_object\\_position\(\)](#) (pypot.vrep.io.VrepIO method), 53  
[set\\_pid\\_gain\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7  
[set\\_primitive\\_property\(\)](#) (pypot.server.rest.RESTRobot method), 34  
[set\\_register\(\)](#) (pypot.dynamixel.controller.DxlController method), 16  
[set\\_register\\_value\(\)](#) (pypot.server.rest.RESTRobot method), 33  
[set\\_return\\_delay\\_time\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_return\\_delay\\_time\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_sensor\\_register\\_value\(\)](#) (pypot.server.rest.RESTRobot method), 34  
[set\\_snap\\_server\\_variables\(\)](#) (in module pypot.server.snap), 35  
[set\\_status\\_return\\_level\(\)](#) (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7  
[set\\_torque\\_limit\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_torque\\_limit\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_voltage\\_limit\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 10  
[set\\_voltage\\_limit\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 12  
[set\\_wheel\\_mode\(\)](#) (pypot.dynamixel.io.io.DxlIO method), 8  
[set\\_wheel\\_mode\(\)](#) (pypot.dynamixel.io.io\_320.Dxl320IO method), 11  
[setup\(\)](#) (pypot.dynamixel.controller.DxlController method), 15  
[setup\(\)](#) (pypot.dynamixel.controller.PosSpeedLoadDxlController method), 16  
[setup\(\)](#) (pypot.dynamixel.syncloop.MetaDxlController method), 20  
[setup\(\)](#) (pypot.primitive.move.MovePlayer method), 22  
[setup\(\)](#) (pypot.primitive.move.MoveRecorder method), 22  
[setup\(\)](#) (pypot.primitive.primitive.Primitive method), 23  
[setup\(\)](#) (pypot.primitive.utils.PositionWatcher method), 25  
[setup\(\)](#) (pypot.primitive.utils.SimplePosture method), 26  
[setup\(\)](#) (pypot.utils.stoppablethread.StoppableThread method), 41  
[setup\(\)](#) (pypot.utils.trajectory.GotoMinJerk method), 42  
[setup\(\)](#) (pypot.vrep.controller.VrepCollisionTracker method), 52  
[setup\(\)](#) (pypot.vrep.controller.VrepController method), 52

51			
setup()	(pypot.vrep.controller.VrepObjectTracker method), 52	simxGetDialogInput()	(in module pot.vrep.remoteApiBindings.vrep), 48 py-
should_pause()	(pypot.utils.stoppablethread.StoppableThread method), 41	simxGetDialogResult()	(in module pot.vrep.remoteApiBindings.vrep), 48 py-
should_stop()	(pypot.utils.stoppablethread.StoppableThread method), 41	simxGetDistanceHandle()	(in module pot.vrep.remoteApiBindings.vrep), 47 py-
SimplePosture	(class in pypot.primitive.utils), 25	simxGetFloatingParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47 py-
simxAddStatusbarMessage()	(in module pot.vrep.remoteApiBindings.vrep), 46	py- simxGetFloatSignal()	(in module pot.vrep.remoteApiBindings.vrep), 48 py-
simxAppendStringSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49	py- simxGetInMessageInfo()	(in module pot.vrep.remoteApiBindings.vrep), 50 py-
simxAuxiliaryConsoleClose()	(in module pot.vrep.remoteApiBindings.vrep), 46	py- simxGetIntegerParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47 py-
simxAuxiliaryConsoleOpen()	(in module pot.vrep.remoteApiBindings.vrep), 46	py- simxGetIntegerSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49 py-
simxAuxiliaryConsolePrint()	(in module pot.vrep.remoteApiBindings.vrep), 46	py- simxGetJointForce()	(in module pot.vrep.remoteApiBindings.vrep), 44 py-
simxAuxiliaryConsoleShow()	(in module pot.vrep.remoteApiBindings.vrep), 46	py- simxGetJointMatrix()	(in module pot.vrep.remoteApiBindings.vrep), 44 py-
simxBreakForceSensor()	(in module pot.vrep.remoteApiBindings.vrep), 44	py- simxGetJointPosition()	(in module pot.vrep.remoteApiBindings.vrep), 44 py-
simxClearFloatSignal()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetLastCmdTime()	(in module pot.vrep.remoteApiBindings.vrep), 50 py-
simxClearIntegerSignal()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetLastErrors()	(in module pot.vrep.remoteApiBindings.vrep), 47 py-
simxClearStringSignal()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetModelProperty()	(in module pot.vrep.remoteApiBindings.vrep), 50 py-
simxCloseScene()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetObjectChild()	(in module pot.vrep.remoteApiBindings.vrep), 45 py-
simxCopyPasteObjects()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetObjectFloatParameter()	(in module pot.vrep.remoteApiBindings.vrep), 49 py-
simxCreateBuffer()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxGetObjectGroupData()	(in module pot.vrep.remoteApiBindings.vrep), 51 py-
simxCreateDummy()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxGetObjectHandle()	(in module pot.vrep.remoteApiBindings.vrep), 44 py-
simxDisplayDialog()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetObjectIntParameter()	(in module pot.vrep.remoteApiBindings.vrep), 49 py-
simxEndDialog()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxGetObjectOrientation()	(in module pot.vrep.remoteApiBindings.vrep), 46 py-
simxEraseFile()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxGetObjectParent()	(in module pot.vrep.remoteApiBindings.vrep), 45 py-
simxFinish()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxGetObjectPosition()	(in module pot.vrep.remoteApiBindings.vrep), 46 py-
simxGetAndClearStringSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49	py- simxGetObjects()	(in module pot.vrep.remoteApiBindings.vrep), 48 py-
simxGetArrayParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py- simxGetObjectSelection()	(in module pot.vrep.remoteApiBindings.vrep), 48 py-
simxGetBooleanParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py- simxGetObjectVelocity()	(in module pot.vrep.remoteApiBindings.vrep), 51 py-
simxGetCollisionHandle()	(in module pot.vrep.remoteApiBindings.vrep), 47	py- simxGetOutMessageInfo()	(in module pot.vrep.remoteApiBindings.vrep), 50 py-
simxGetConnectionId()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxGetPingTime()	(in module pot.vrep.remoteApiBindings.vrep), 50 py-

simxGetStringParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py- simxSetArrayParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py-
simxGetStringSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49	py- simxSetBooleanParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py-
simxGetUIButtonProperty()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetFloatingParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py-
simxGetUIEventButton()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetFloatSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49	py-
simxGetUIHandle()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetIntegerParameter()	(in module pot.vrep.remoteApiBindings.vrep), 47	py-
simxGetUISlider()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetIntegerSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49	py-
simxGetVisionSensorDepthBuffer()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetJointForce()	(in module pot.vrep.remoteApiBindings.vrep), 44	py-
simxGetVisionSensorImage()	(in module pot.vrep.remoteApiBindings.vrep), 44	py- simxSetJointPosition()	(in module pot.vrep.remoteApiBindings.vrep), 44	py-
simxJointGetForce()	(in module pot.vrep.remoteApiBindings.vrep), 44	py- simxSetJointTargetPosition()	(in module pot.vrep.remoteApiBindings.vrep), 44	py-
simxLoadModel()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetJointTargetVelocity()	(in module pot.vrep.remoteApiBindings.vrep), 44	py-
simxLoadScene()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetModelProperty()	(in module pot.vrep.remoteApiBindings.vrep), 50	py-
simxLoadUI()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetObjectFloatParameter()	(in module pot.vrep.remoteApiBindings.vrep), 49	py-
simxPackFloats()	(in module pot.vrep.remoteApiBindings.vrep), 51	py- simxSetObjectIntParameter()	(in module pot.vrep.remoteApiBindings.vrep), 49	py-
simxPackInts()	(in module pot.vrep.remoteApiBindings.vrep), 51	py- simxSetObjectOrientation()	(in module pot.vrep.remoteApiBindings.vrep), 46	py-
simxPauseCommunication()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxSetObjectParent()	(in module pot.vrep.remoteApiBindings.vrep), 46	py-
simxPauseSimulation()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetObjectPosition()	(in module pot.vrep.remoteApiBindings.vrep), 46	py-
simxQuery()	(in module pot.vrep.remoteApiBindings.vrep), 51	py- simxSetObjectSelection()	(in module pot.vrep.remoteApiBindings.vrep), 48	py-
simxReadCollision()	(in module pot.vrep.remoteApiBindings.vrep), 47	py- simxSetSphericalJointMatrix()	(in module pot.vrep.remoteApiBindings.vrep), 44	py-
simxReadDistance()	(in module pot.vrep.remoteApiBindings.vrep), 47	py- simxSetStringSignal()	(in module pot.vrep.remoteApiBindings.vrep), 49	py-
simxReadForceSensor()	(in module pot.vrep.remoteApiBindings.vrep), 44	py- simxSetUIButtonLabel()	(in module pot.vrep.remoteApiBindings.vrep), 47	py-
simxReadProximitySensor()	(in module pot.vrep.remoteApiBindings.vrep), 45	py- simxSetUIButtonProperty()	(in module pot.vrep.remoteApiBindings.vrep), 46	py-
simxReadStringStream()	(in module pot.vrep.remoteApiBindings.vrep), 49	py- simxSetUISlider()	(in module pot.vrep.remoteApiBindings.vrep), 45	py-
simxReadVisionSensor()	(in module pot.vrep.remoteApiBindings.vrep), 44	py- simxSetVisionSensorImage()	(in module pot.vrep.remoteApiBindings.vrep), 45	py-
simxReleaseBuffer()	(in module pot.vrep.remoteApiBindings.vrep), 50	py- simxStart()	(in module pot.vrep.remoteApiBindings.vrep), 50	py-
simxRemoveModel()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxStartSimulation()	(in module pot.vrep.remoteApiBindings.vrep), 45	py-
simxRemoveObject()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxStopSimulation()	(in module pot.vrep.remoteApiBindings.vrep), 45	py-
simxRemoveUI()	(in module pot.vrep.remoteApiBindings.vrep), 48	py- simxSynchronous()	(in module pot.vrep.remoteApiBindings.vrep), 50	py-

- simxSynchronousTrigger() (in module pot.vrep.remoteApiBindings.vrep), 50
- simxTransferFile() (in module pot.vrep.remoteApiBindings.vrep), 50
- simxUnpackFloats() (in module pot.vrep.remoteApiBindings.vrep), 51
- simxUnpackInts() (in module pot.vrep.remoteApiBindings.vrep), 51
- simxWriteStringStream() (in module pot.vrep.remoteApiBindings.vrep), 49
- Sinus (class in pypot.primitive.utils), 25
- site\_config\_dir (pypot.utils.appdirs.AppDirs attribute), 40
- site\_config\_dir() (in module pypot.utils.appdirs), 38
- site\_data\_dir (pypot.utils.appdirs.AppDirs attribute), 40
- site\_data\_dir() (in module pypot.utils.appdirs), 37
- Skeleton (class in pypot.sensor.kinect.sensor), 31
- sleep() (in module pypot.utils.pypot\_time), 40
- sleep() (pypot.vrep.vrep\_time method), 55
- SnapRobotServer (class in pypot.server.snap), 35
- speed\_to\_dxl() (in module pypot.dynamixel.conversion), 16
- Square (class in pypot.primitive.utils), 25
- start() (pypot.primitive.primitive.Primitive method), 24
- start() (pypot.robot.controller.AbstractController method), 27
- start() (pypot.utils.stoppablethread.StoppableThread method), 41
- start\_move\_player() (pypot.server.rest.RESTRobot method), 34
- start\_move\_recorder() (pypot.server.rest.RESTRobot method), 34
- start\_primitive() (pypot.server.rest.RESTRobot method), 34
- start\_scanning() (pypot.tools.herborist.herborist.HerboristApp method), 35
- start\_simulation() (pypot.vrep.io.VrepIO method), 53
- start\_sync() (pypot.robot.robot.Robot method), 28
- started (pypot.utils.stoppablethread.StoppableThread attribute), 41
- status\_to\_dxl() (in module pypot.dynamixel.conversion), 17
- stop() (pypot.primitive.manager.PrimitiveManager method), 21
- stop() (pypot.primitive.primitive.Primitive method), 24
- stop() (pypot.tools.herborist.herborist.HerboristApp.UpdateMotorThread method), 36
- stop() (pypot.utils.stoppablethread.StoppableThread method), 41
- stop\_move\_recorder() (pypot.server.rest.RESTRobot method), 34
- stop\_primitive() (pypot.server.rest.RESTRobot method), 34
- stop\_simulation() (pypot.vrep.io.VrepIO method), 53
- stop\_sync() (pypot.robot.robot.Robot method), 28
- py- StoppableLoopThread (class in pypot.utils.stoppablethread), 42
- py- StoppableThread (class in pypot.utils.stoppablethread), 40
- py- switch\_led\_off() (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7
- py- switch\_led\_on() (pypot.dynamixel.io.abstract\_io.AbstractDxlIO method), 7
- py- switch\_torque() (pypot.tools.herborist.herborist.HerboristApp method), 36
- SYNC\_READ (pypot.dynamixel.protocol.v1.DxlInstruction attribute), 13
- SYNC\_READ (pypot.dynamixel.protocol.v2.DxlInstruction attribute), 14
- SYNC\_WRITE (pypot.dynamixel.protocol.v1.DxlInstruction attribute), 13
- SYNC\_WRITE (pypot.dynamixel.protocol.v2.DxlInstruction attribute), 14
- synced\_motors (pypot.dynamixel.controller.AngleLimitRegisterController attribute), 16
- synced\_motors (pypot.dynamixel.controller.DxlController attribute), 15
- SyncEvent (class in pypot.utils), 43
- T**
- tbs() (in module pypot.vrep.remoteApiBindings.vrep), 44
- teardown() (pypot.dynamixel.motor.SafeCompliance method), 20
- teardown() (pypot.dynamixel.syncloop.MetaDxlController method), 20
- teardown() (pypot.primitive.primitive.Primitive method), 24
- teardown() (pypot.primitive.utils.SimplePosture method), 26
- teardown() (pypot.utils.stoppablethread.StoppableThread method), 41
- temperature\_to\_dxl() (in module pypot.dynamixel.conversion), 17
- test\_domain() (pypot.utils.trajectory.MinimumJerkTrajectory method), 42
- time() (in module pypot.utils.pypot\_time), 40
- timeout (pypot.dynamixel.io.abstract\_io.AbstractDxlIO attribute), 7
- TIMEOUT (pypot.vrep.io.VrepIO attribute), 53
- Timestamp (pypot.sensor.optitrack.TrackedObject attribute), 32
- to\_array() (pypot.dynamixel.protocol.v1.DxlInstructionPacket method), 13
- to\_array() (pypot.dynamixel.protocol.v2.DxlInstructionPacket method), 14
- to\_config() (pypot.robot.robot.Robot method), 29
- to\_string() (pypot.dynamixel.protocol.v1.DxlInstructionPacket method), 13

- to\_string() (pypot.dynamixel.protocol.v2.DxlInstructionPacket method), 14
  - torque\_to\_dxl() (in module pypot.dynamixel.conversion), 16
  - tracked\_objects (pypot.sensor.optibridge.OptiTrackClient attribute), 31
  - tracked\_skeleton (pypot.sensor.kinect.sensor.KinectSensor attribute), 31
  - TrackedObject (class in pypot.sensor.optitrack), 32
  - transf\_from\_components() (in module pypot.kinematics), 56
  - transform\_difference() (in module pypot.kinematics), 56
  - transl() (in module pypot.kinematics), 57
  - translation\_from\_transf() (in module pypot.kinematics), 56
  - trotx() (in module pypot.kinematics), 57
  - troty() (in module pypot.kinematics), 57
  - trotz() (in module pypot.kinematics), 57
- ## U
- update() (pypot.dynamixel.controller.DxlController method), 16
  - update() (pypot.dynamixel.controller.PosSpeedLoadDxlController method), 16
  - update() (pypot.dynamixel.motor.SafeCompliance method), 20
  - update() (pypot.dynamixel.syncloop.MetaDxlController method), 20
  - update() (pypot.primitive.manager.PrimitiveManager method), 21
  - update() (pypot.primitive.move.MovePlayer method), 22
  - update() (pypot.primitive.move.MoveRecorder method), 22
  - update() (pypot.primitive.primitive.LoopPrimitive method), 24
  - update() (pypot.primitive.utils.PositionWatcher method), 25
  - update() (pypot.primitive.utils.Sinus method), 25
  - update() (pypot.primitive.utils.Square method), 25
  - update() (pypot.robot.controller.DummyController method), 27
  - update() (pypot.utils.interpolation.KDTreeDict method), 40
  - update() (pypot.utils.stoppablethread.StoppableLoopThread method), 42
  - update() (pypot.utils.trajectory.GotoMinJerk method), 42
  - update() (pypot.vrep.controller.VrepCollisionTracker method), 52
  - update() (pypot.vrep.controller.VrepController method), 51
  - update() (pypot.vrep.controller.VrepObjectTracker method), 52
  - update\_eeprom() (pypot.tools.herborist.herborist.HerboristApp method), 36
  - update\_motor\_position() (pypot.tools.herborist.herborist.HerboristApp method), 36
  - update\_motor\_tree() (pypot.tools.herborist.herborist.HerboristApp method), 35
  - update\_motor\_view() (pypot.tools.herborist.herborist.HerboristApp method), 36
  - update\_port() (pypot.tools.herborist.herborist.HerboristApp method), 35
  - usb\_device (pypot.tools.herborist.herborist.HerboristApp attribute), 36
  - use\_dummy\_robot() (in module pypot.robot.config), 26
  - user\_cache\_dir (pypot.utils.appdirs.AppDirs attribute), 40
  - user\_cache\_dir() (in module pypot.utils.appdirs), 39
  - user\_config\_dir (pypot.utils.appdirs.AppDirs attribute), 40
  - user\_config\_dir() (in module pypot.utils.appdirs), 38
  - user\_data\_dir (pypot.utils.appdirs.AppDirs attribute), 40
  - user\_data\_dir() (in module pypot.utils.appdirs), 37
  - user\_log\_dir (pypot.utils.appdirs.AppDirs attribute), 40
  - user\_log\_dir() (in module pypot.utils.appdirs), 39
- ## V
- Vector (in module pypot.utils), 43
  - Vector3D (class in pypot.utils), 43
  - voltage\_to\_dxl() (in module pypot.dynamixel.conversion), 17
  - vrep\_time (class in pypot.vrep), 55
  - VrepCollisionDetector (class in pypot.vrep.controller), 52
  - VrepCollisionTracker (class in pypot.vrep.controller), 52
  - VrepConnectionError, 55
  - VrepController (class in pypot.vrep.controller), 51
  - VrepIO (class in pypot.vrep.io), 52
  - VrepIOError, 54
  - VrepIOErrors, 54
  - VrepObjectTracker (class in pypot.vrep.controller), 52
- ## W
- w (pypot.utils.Quaternion attribute), 43
  - wait\_to\_resume() (pypot.utils.stoppablethread.StoppableThread method), 41
  - wait\_to\_start() (pypot.utils.stoppablethread.StoppableThread method), 41
  - wait\_to\_stop() (pypot.utils.stoppablethread.StoppableThread method), 41
  - with\_True() (in module pypot.dynamixel.io.abstract\_io), 8
  - working\_motors (pypot.dynamixel.controller.DxlController attribute), 15
  - WRITE\_DATA (pypot.dynamixel.protocol.v1.DxlInstruction attribute), 13

WRITE\_DATA (pypot.dynamixel.protocol.v2.DxlInstruction attribute), [14](#)

## X

x (pypot.utils.Point2D attribute), [42](#)

x (pypot.utils.Point3D attribute), [42](#)

x (pypot.utils.Quaternion attribute), [43](#)

x (pypot.utils.Vector3D attribute), [43](#)

XL320LEDColors (in module pypot.dynamixel.conversion), [17](#)

## Y

y (pypot.utils.Point2D attribute), [42](#)

y (pypot.utils.Point3D attribute), [43](#)

y (pypot.utils.Quaternion attribute), [43](#)

y (pypot.utils.Vector3D attribute), [43](#)

## Z

z (pypot.utils.Point3D attribute), [43](#)

z (pypot.utils.Quaternion attribute), [43](#)

z (pypot.utils.Vector3D attribute), [43](#)

ZMQRobotServer (class in pypot.server.zmqserver), [35](#)