ROBOTICS

Application manual

Mechanical Unit Manager

Trace back information:
Workspace Main version a304
Checked in 2019-05-23
Skribenta version 5.3.012

Application manual

Mechanical Unit Manager

RobotWare 6.09

Document ID: 3HAC050959-001

Revision: C

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Original instructions.

Table of contents

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Overview of this manual

About this manual

This manual contains instructions for daily operation of the software tool Mechanical Unit Manager.

Usage

This manual should be used when using Mechanical Unit Manager to configure an additional axis for the ABB robot controller.

Who should read this manual?

This manual is intended for:

- Commissioning personnel
- Service engineers
- Production engineers
- Robot programmers

Prerequisites

The reader should be familiar with system parameters and be used to editing these.

References

Reference	Document ID
Operating manual - RobotStudio	*3HAC032104-001*
Technical reference manual - System parameters	*3HAC050948-001*
Application manual - Servo Gun Setup	*3HAC065014-001*
Application manual - Additional axes and stand alone controller	*3HAC051016-001*

Revisions

Revision	Description
-	Released with RobotWare 6.0.
A	Released with RobotWare 6.04. • Cfg version removed when exporting a configuration file. • It is now possible to add missing default parameters from a template file. • It is now possible to load and replace parameters in a unit. • It is now possible to import and export configuration from a controller.
B	Released with RobotWare 6.07. • References to the new manual *Application manual - Servo Gun Setup*, that replace the old *Application manual - Servo Gun Tuning*.
C	Released with RobotWare 6.09. • Added information about I/O controlled axis.

Product documentation

Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents can be found via myABB Business Portal, *www.myportal.abb.com*.

Product manuals

Manipulators, controllers, DressPack/SpotPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with corresponding figures (or references to separate spare parts lists).
- References to circuit diagrams.

Technical reference manuals

The technical reference manuals describe reference information for robotics products, for example lubrication, the RAPID language, and system parameters.

Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, software).
- How to install included or required hardware.
- How to use the application.
- Examples of how to use the application.

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Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and troubleshooters.

Safety

Safety of personnel

A robot is heavy and extremely powerful regardless of its speed. A pause or long stop in movement can be followed by a fast hazardous movement. Even if a pattern of movement is predicted, a change in operation can be triggered by an external signal resulting in an unexpected movement.

Therefore, it is important that all safety regulations are followed when entering safeguarded space.

Safety regulations

Before beginning work with the robot, make sure you are familiar with the safety regulations described in the manual *Operating manual - General safety information*.

1 Introduction

1.1 Welcome to Mechanical Unit Manager

What is Mechanical Unit Manager?

Mechanical Unit Manager is a stand alone software tool used for editing system parameters for a servo gun, track motion, I/O controlled axis, or other general additional axis.

The advantage is the focus on the unit, with a structure that gives a good overview of the system parameters.

In a configuration file (cfg file), the instances are arranged according to type, e.g. all instances of *Arm* are listed under the type *ARM*. In Mechanical Unit Manager all instances belonging to a unit are found under that unit in the structure.

Intended use

The intention is to import a system parameter configuration into Mechanical Unit Manager, edit the configuration and then export the configuration and use it in a robot controller.

1.2 User stories

About the user stories

These are examples of how users use Mechanical Unit Manager, intended as inspiration and explanation of when Mechanical Unit Manager is useful.

User story 1

The user, who wants to tune a gun in the lab, uses Mechanical Unit Manager to edit all the system parameters during the tuning. The user starts Mechanical Unit Manager and adds a servo gun to the project by selecting **Add Unit** and selecting the servo gun type. After that the user saves the project and starts to tune the gun. After all the steps in the tuning process are completed and some parameters have been changed, the user imports the data into Mechanical Unit Manager. The configuration can then be loaded again into the robot controller later on.

User story 2

The user has tuned one servo gun. There are other guns in the same gun family as the one that has just been tuned. However, the behaviors of the guns are very similar, and a lot of the tuning parameters can be reused within the same gun family. To create a configuration of a new gun in the same family the user opens the related project, and duplicates the existing gun. The user tunes the new gun and changes some parameter values, and then select **Save** to save the project with all the guns.

User story 3

A company has a configuration file for a servo gun they have delivered with the S4C+ controller. A new delivery is based on the same type of guns they have already delivered, but targeting the IRC5 controller. The user imports a configuration file with S4C+ syntax to Mechanical Unit Manager. The user saves the project and then exports it, which will create a configuration file with IRC5 syntax.

1.3 Installation

Location of the installation file

The installation can be downloaded from the *RobotStudio Online Community*, where it is included in the *Tools and Utilities* package.

> **Note**
>
> To run Mechanical Unit Manager, RobotWare of the same version must be installed on your computer. All necessary templates are taken from RobotWare.

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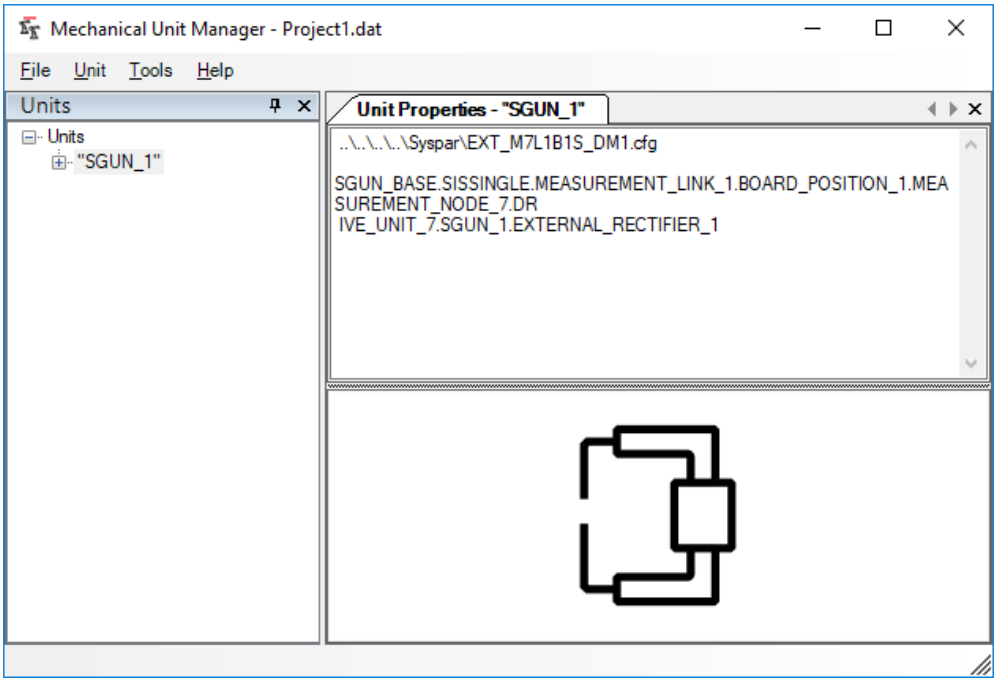
2 Using Mechanical Unit Manager

2.1 User interface

Unit properties view



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Unit view	Tree structure for selecting unit and type.
Unit properties window	Text box where you can write unit properties for the selected unit. Some text is generated automatically (e.g. which template the unit is created from), but any text can be added or edited.
Unit picture	Picture indicating if it is a servo gun, track motion, or I/O controlled axis.
Project tree	A project tree contains one or more units. A project acts as a file that can be saved and opened again. The project can be exported as a whole or selected parts of the project can be exported.
Unit	Represents a servo gun, track motion, or I/O controlled axis and contains unit properties and all the system parameters for that unit.

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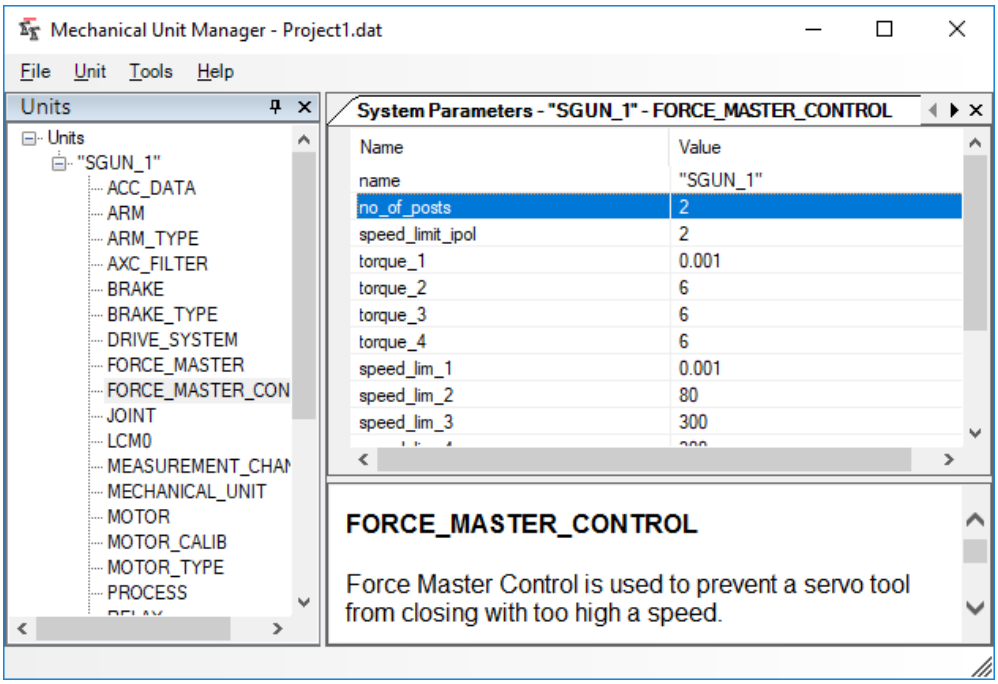
System parameter view



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A project tree contains one or more units. A project acts as a file that can be saved and opened again. The project can be exported as a whole or selected parts of the project can be exported.

2.2 Create, save and open projects

Create new project

If there is no project open, a project must be created before adding a unit.

To create a new project:

1. Click on the **File** menu and select **New Project**.

Save project

To save a project with all its units:

1. Click on the **File** menu and select **Save Project** or **Save Project As**.
2. Type a name for the project and click **Save**.

Open project

If you have saved a project earlier, you can open it by:

1. Click on the **File** menu and select **Open Project**.
2. Browse to the project and click **Open**.

2.3 Import and export cfg files

About cfg files

A cfg file is a text file with configuration data. A cfg file for a servo gun, track motion, or I/O controlled axis can be delivered from the manufacturer of the unit. A cfg file can also be generated from, or installed to, the robot controller using RobotStudio, see *Operating manual - RobotStudio*.

A cfg file can contain configuration data for several units.

Supported cfg formats

Imported cfg files can be of both S4Cplus and IRC5 format.

Exported files are of IRC5 format and can only be used by an IRC5 controller.

How to import a cfg file

When importing a cfg file, Mechanical Unit Manager will use all parameters that have to do with the unit. All other parameters will be ignored.

If no project is open, a new one will be created containing one or several new units according to the cfg file. If a project is already open the program will add the imported units to the existing project.

1. In the **File** menu, select **Import**.
2. Browse and select the cfg file you wish to import or select a controller to import from.
3. If the cfg file contains more than one unit, a dialog will allow you to select which units to import.
4. If any types are missing in the cfg file, a dialog shows which types are missing and asks if you want to add the unit with default values for these types.
5. The missing types must get the default values from a template. Either select the template file by clicking **From template** and select a template, or select

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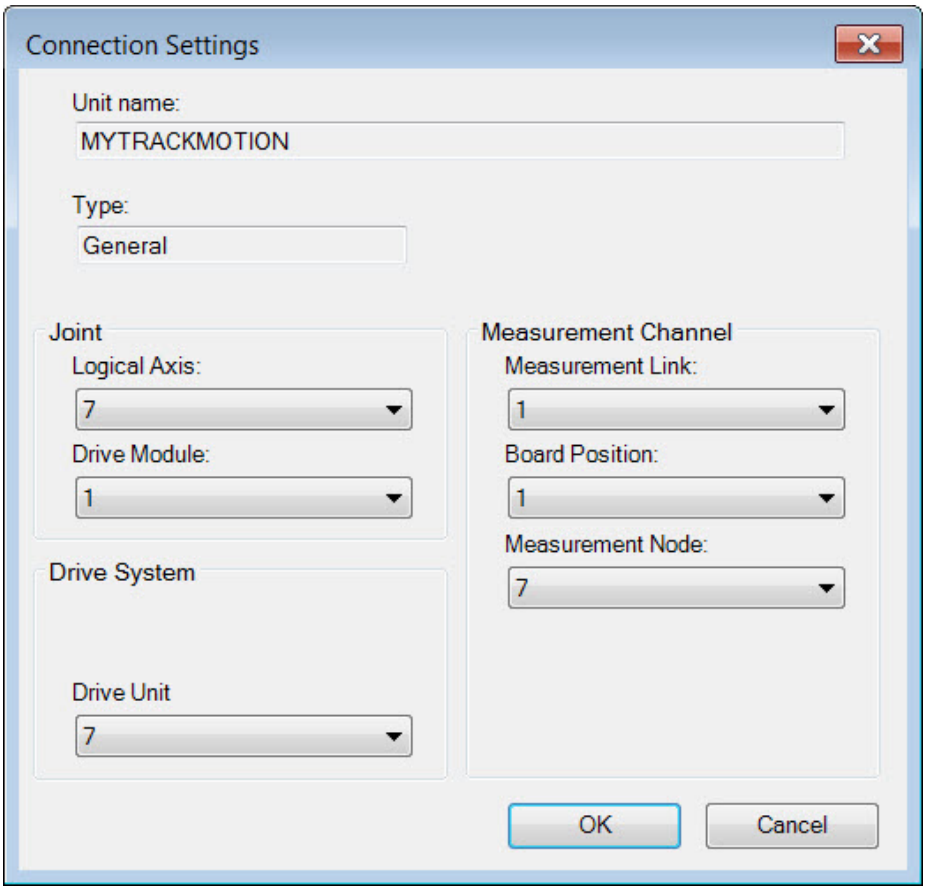
the correct values under **Joint** and **Measurement Channel**. For more information about connection settings, see *Change connection on page 21*.



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How to export a cfg file

1 In the **File** menu, select **Export**.

2 Select which units and which types to export.

Select the box in front of the unit to select the whole unit.

Click on the plus in front of the unit to see the types of that unit. Select the box in front of the types you wish to export.

3 A dialog allows you to change the connection settings for the units in the exported file. This does not affect the open project.

For more information about connection settings, see *Change connection on page 21*.

The connection settings can be changed for all exported units by selecting unit in the field **Unit name**.

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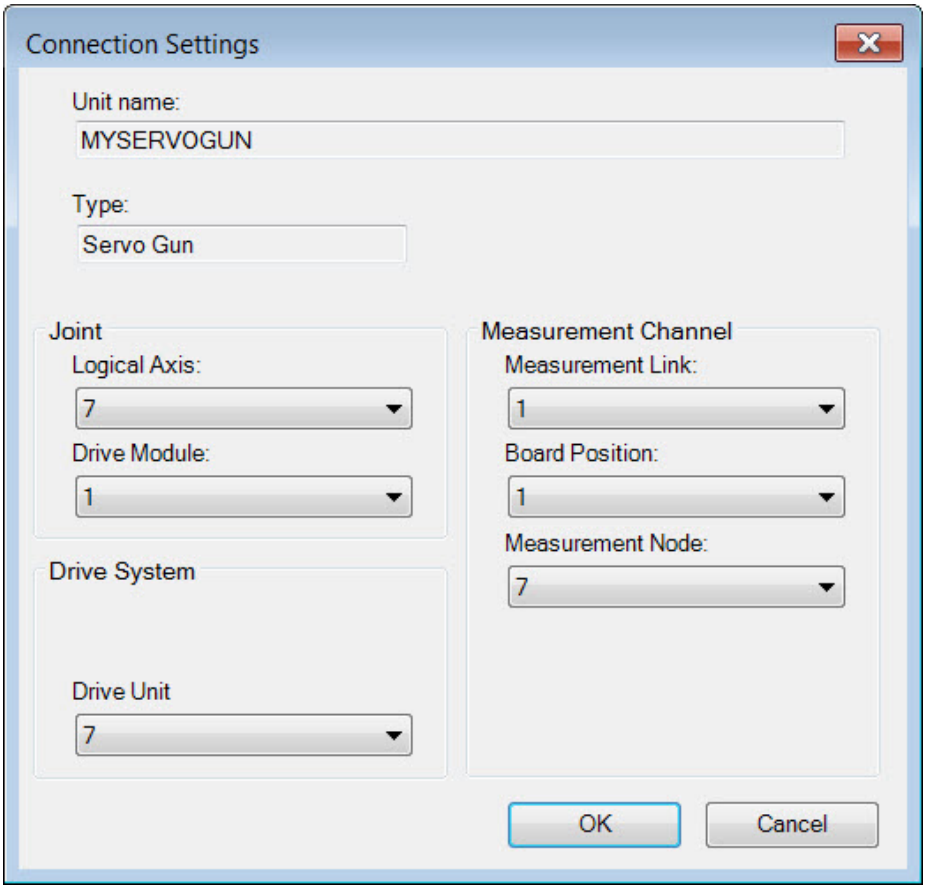
If no changes are made, the connection settings from the project will be exported.



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4 Enter a file name or select a controller to export to.

2.4 Add, remove and modify a unit

Add unit

To add a new unit to the project:

1. Click on the **Unit** menu and select **Add Unit**.
2. Enter a name for the unit, select type of unit, connection settings and click **OK**.

   A standard servo gun or track motion is now added to the project, containing default values for all parameters.

Remove unit

To remove a unit from the project:

1. Select the unit in the unit view.
2. Click on the **Unit** menu and select **Remove Unit**.
3. Confirm by clicking **Yes**.

Duplicate unit

Duplication of a unit may be useful if you have already configured one unit and want to configure a similar one.

To duplicate a unit:

1. Select the unit you want to duplicate in the unit view.
2. Click on the **Unit** menu and select **Duplicate Unit**.
3. Type a new name for the new unit and click **OK**.

   A new unit is now created in the same project with the same parameter values as the original unit.

Rename unit

Renaming a unit does not only change the name of the unit itself, but the instances of all types under that unit will have the parameter *Name* set to the new name.

To rename a unit:

1. Select the unit in the unit view.
2. Click on the **Unit** menu and select **Rename Unit**.
3. Type the new name for the unit and click **OK**.

Change connection

To change connection for a unit:

1. Select the unit in the unit view.
2. Click on the **Unit** menu and select **Change Connection**.

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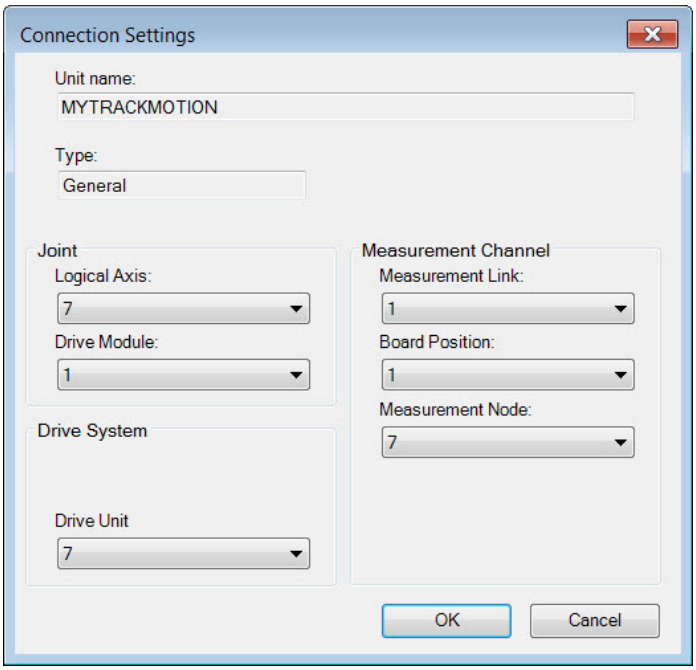
3 Select connection settings and click **OK**.



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Logical Axis	See *Technical reference manual - System parameters*, topic *Motion*, type *Joint*, parameter *Logical Axis*.
Drive Module	The physical drive module that the mechanical unit is connected to.
Drive Unit	The physical drive unit that the mechanical unit is connected to.
Measurement Link	See *Technical reference manual - System parameters*, topic *Motion*, type *Joint*, parameter *Measurement Link*.
Board Position	See *Technical reference manual - System parameters*, topic *Motion*, type *Joint*, parameter *Board Position*.
Measurement Node	See *Technical reference manual - System parameters*, topic *Motion*, type *Joint*, parameter *Measurement Node*.

More information about these settings can also be found in *Application manual - Additional axes and stand alone controller*.

Add default attributes

When a saved *MOC.cfg* from the controller is missing some attributes with default values they can now be added with **Add Default Attributes** for each unit.

Attributes are added from a template file that contains all default attributes that need to be added in the *MOC.cfg*.

Load and replace

Parameters can be replaced from the **Unit menu**.

Motor type parameters can for example be replaced with data from the manufacturer of the motor if they have delivered a *MOC.cfg*.

2.5 Edit system parameters

Descriptions of system parameters

For information about the system parameters, see *Technical reference manual - System parameters*. There you can find descriptions of most system parameters, including allowed values, default values, etc.

Type a new value

1 Select the type in the unit view.
2 Click on the value you wish to change.
3 Type the new value.

Select value from drop down list

Some parameters are used to select which instance of a type to use. These parameters typically starts with "use_". These values are set by selecting one of the instances of the corresponding type present in this project.

2.6 Print

Print the content of a project

To print the content of a project:

1. Click on the **File** menu and select **Print**.
2. Select the units you want to print and click **OK**.

   Unit properties and all system parameters for the selected units will be printed in a list. In the left column are the type names and in the right column are the system parameter names and their values:

```
Project1.dat - 2016-06-23
Servo Gun: "MYSERVOGUN"
..\..\..\..\Syspar\EXT_M7L1B1S_DM1.cfg
SGUN_BASE.SISSINGLE.MEASUREMENT_LINK_1.BOARD_POSITION_1.MEASUREMENT_NODE_
7.DR
IVE_UNIT_7.ROBOT_1.EXTERNAL_RECTIFIER_1
ACC_DATA -> name = "MYSERVOGUN"
ACC_DATA -> wc_acc = 6
ACC_DATA -> wc_dec = 6
ACC_DATA -> wc_dacc_ratio = 1
ACC_DATA -> wc_ddec_ratio = 1
FORCE_MASTER -> name = "MYSERVOGUN"
FORCE_MASTER -> use_force_master_control = "MYSERVOGUN"
FORCE_MASTER -> bandwidth_ramping = 15
FORCE_MASTER -> ramp_start_switch = 1
FORCE_MASTER -> ramp_time_switch =
FORCE_MASTER -> ramp_torque_ref_closing = 80
FORCE_MASTER -> ramp_time = 0.07
FORCE_MASTER -> bandwidth_lp = 5
FORCE_MASTER -> alarm_torque = 1.5
FORCE_MASTER -> col_speed = 0.006
FORCE_MASTER -> distance_to_contact_position = 0
FORCE_MASTER -> max_pos_error_closing = 0.1
FORCE_MASTER -> delay_ramp = 0.03
FORCE_MASTER -> ramp_to_real_contact =
FORCE_MASTER_CONTROL -> name = "MYSERVOGUN"
FORCE_MASTER_CONTROL -> no_of_posts = 2
FORCE_MASTER_CONTROL -> speed_limit_ipol = 2
FORCE_MASTER_CONTROL -> torque_1 = 0.001
...
```

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