

CSSP Manual

ABB CRB 15000
Version: 1.00.00



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1 INTRODUCTION

1 Introduction

1.1 About this manual

This manual contains the description of the Camozzi Add-in for ABB CRB 15000 of the pneumatic collaborative gripper CSSP, designed by Camozzi Automation S.p.A.

⚠ Failure to observe the information contained in this manual can result in injury or equipment damage. Please contact Camozzi Automation S.p.A. for technical assistance.

PRODUCT SPECIFICATIONS AND DATA ARE SUBJECTED TO CHANGE WITHOUT NOTICE.

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1.2 Unit overview

The pneumatic collaborative gripper CSSP is composed of a standard gripper, in the NC or NO version, and two integrated valves. CSD-integrated sensors allow to recognize the presence or absence of the gripped piece.

The design and the performance of the gripper make the system suitable for collaborative applications.

1.3 Product specifications

The product specification manual can be download from Camozzi Website.

1.4 Brief Add-in description

The Camozzi CSSP Add-in software provides several functions and commands:

- Add-in application with configuration settings
- Commands for the Wizard program editor
- Function libraries for RAPID programs

The Add-in application allows to set different configurations of the CSSP gripper and select the desired one depending on the robot application.

Commands for the Wizard program editor permit to control and receive data from the CSSP gripper in a simple way.

Function libraries for RAPID programs allow to control and receive data from the CSSP gripper in the traditional programming way.

2 HARDWARE CONNECTION

2 Hardware connection

. The gripper is provided of a 8-pin M8 female connector that can be connected directly to the robot wrist through the Y-cable available in the catalogue. The M12 8 poles cable, which is also available in the catalogue, allows to connect the X2 port to the I/O board of the control box.

In the following table it is reported the default configuration (see section 4) cable connection assignment of the M12 8 poles to the I/O board of the control box.

Function	I/O board	Cable color
Not connected	-	Pink
Not connected	-	Gray
Close end stroke sensor	DI 2	Yellow
Open end stroke sensor	DI 1	Green
Power supply +24 V DC \pm 10%	-	Blue
Closing command	DO 1	Brown
Opening command	DO 2	White
Power supply reference 0 V DC	-	Red

Please refer to the CSSP Manual for further details about the electrical interface of the gripper.

3 ADD-IN INSTALLATION

3 Add-in installation

Download the latest version of the Camozzi CSSP Add-in from Camozzi Website.

The Add-in can be installed in two different ways:

1. Add-In Installer (available from RobotWare 7.7)
2. RobotStudio Add-In

3.1 Add-In Installer

The Add-In installer allows to install the Add-in through the FlexPendant using a USB stick according to the following steps:

1. Insert the USB stick on the FlexPendant USB port
2. Open the "Software Controller" app
3. Click on "Add-In installer"
4. Click on "Add Add-In"
5. Select the "Camozzi_CSSP" Add-In (compressed file) from the USB stick and install it

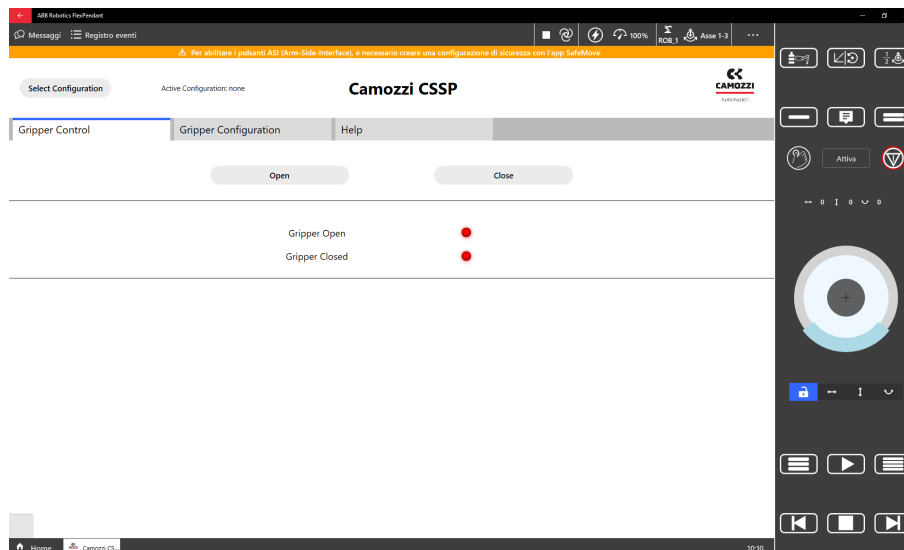
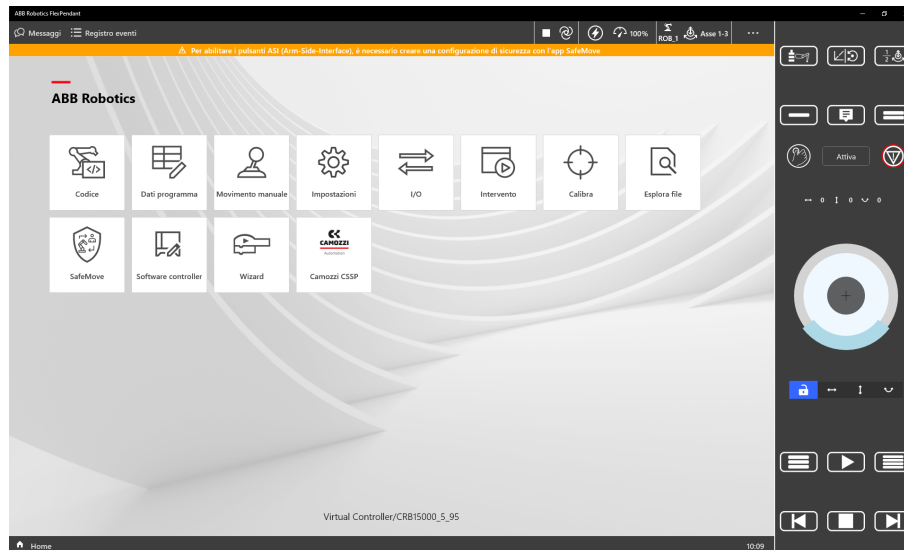
Please refer to official ABB Website for further information about how to install an Add-In.

4 ADD-IN APPLICATION

4 Add-in application

4.1 Application

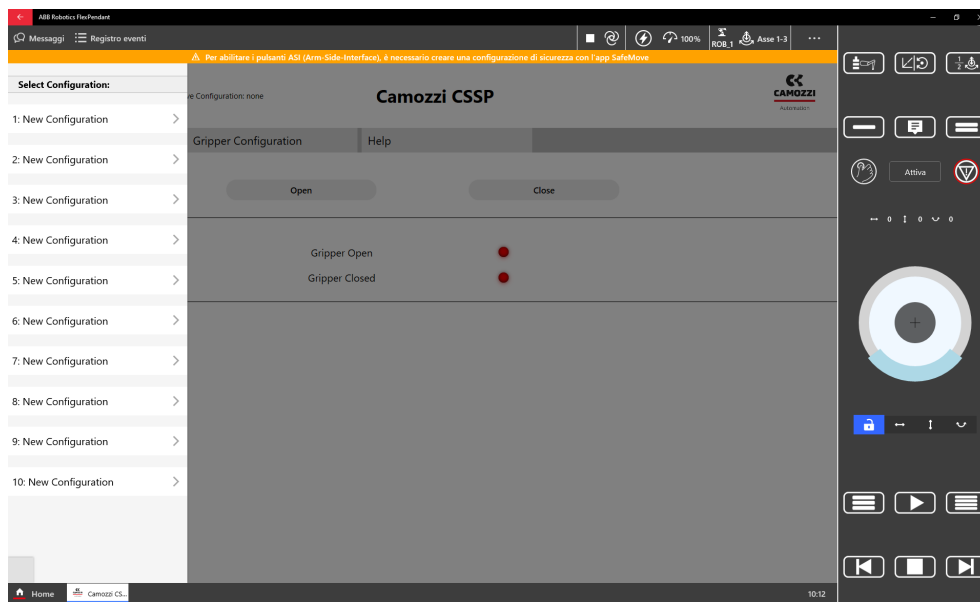
After the installation of the Add-in, it is possible to run the Add-in application "CAMOZZI CSSP".



First of all, it is necessary to select the configuration to be modified. A maximum of 10 different configurations can be selected.

After installation, each configuration is not active and results as "New Configuration".

4 ADD-IN APPLICATION



⚠ The configuration data are persistently stored in the controller memory. They are defined in the module system program "CCC_USER". Do not modify directly these data.

Once a configuration is selected, it becomes the current active configuration.

⚠ If the selected active configuration is a "New Configuration", the reboot of the controller is necessary in order to create the I/O System Signals:

- "CCC_CSSP_Close_Cmd_" + (configuration number)
- "CCC_CSSP_Close_Status_" + (configuration number)
- "CCC_CSSP_Open_Cmd_" + (configuration number)
- "CCC_CSSP_Open_Status_" + (configuration number)

From the "Gripper Configuration" tab it is possible to modify the configuration data of the active one:

- Configuration Name: the name of the configuration
- Finger Length: the length of the fingers
- Finger Weight: the weight of the fingers
- Gripper Weight: the weight of the gripper
- Center Of Mass: the center of mass of the gripper
- Tool Center Point: the tool center point of the gripper

4 ADD-IN APPLICATION

All data are configured by default according to the CSSP gripper equipped with robot flange and standard fingertips. Please refer to technical documentation of the gripper for further details.

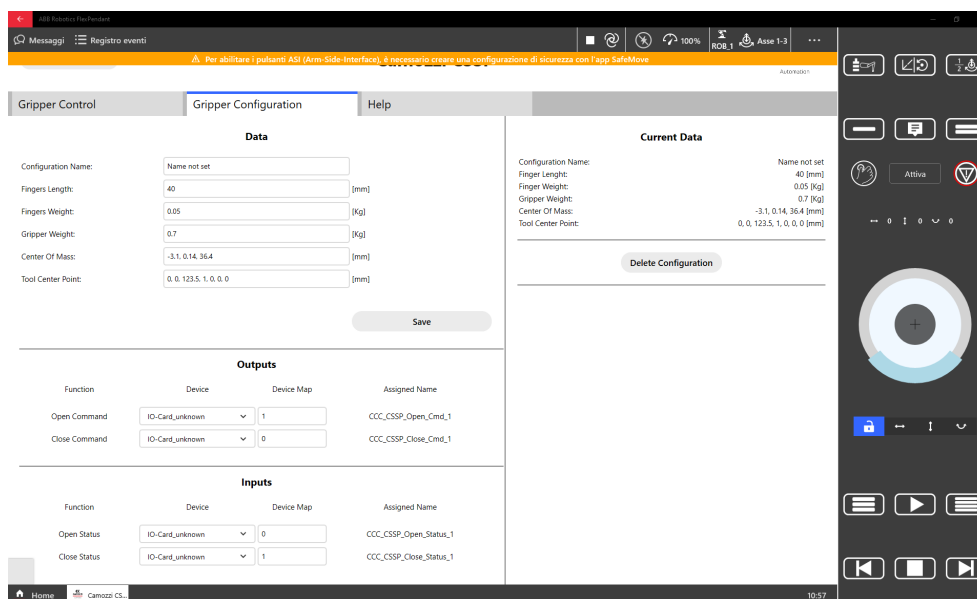
It is also possible to configure Inputs and Outputs Devices and Devices Maps (I/O System Signals) in order to properly control the gripper according to the controller connections:

- Open Command: I/O System Signal that controls the gripper opening
- Close Command: I/O System Signal that controls the gripper closing
- Open Status: I/O System Signal that monitors the gripper open signal
- Close Status: I/O System Signal that monitors the gripper closed signal

I/O System Signals are configured by default according to the physical cable connections instructions provided in section 2.

The "Save" button saves the modified parameters of the current active configuration and activates it (only the first time).

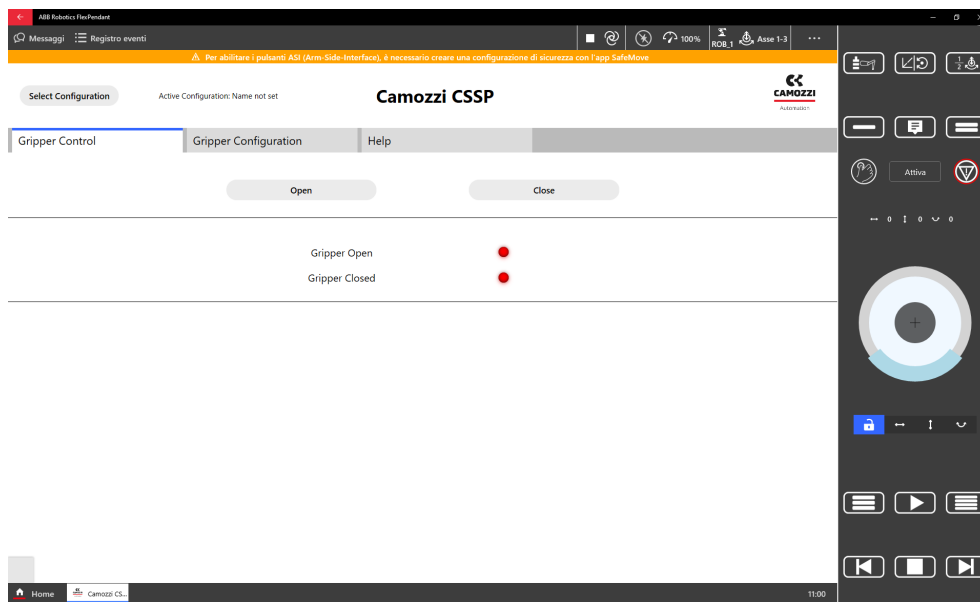
The "Delete Configuration" button resets the current active configuration data and deactivate it removing also the I/O System Signal.



Once the desired current active configuration is selected, from the "Gripper Control" tab it is possible to:

- Open gripper
- Close gripper
- Verify if the gripper is totally open (green) or totally closed (red) through the two available led icons

4 ADD-IN APPLICATION



4.2 Payloads and Tool Frame

Once the Add-in is installed, the "CAMOZZI_CSSP_TOOL" tooldata is defined.

⚠ The tool frame data are updated when the user selects the configuration (current active configuration) in the Add-in application. As it will be presented in the following section, the tool data can be also set through the Wizard program editor and/or from the RAPID programs.

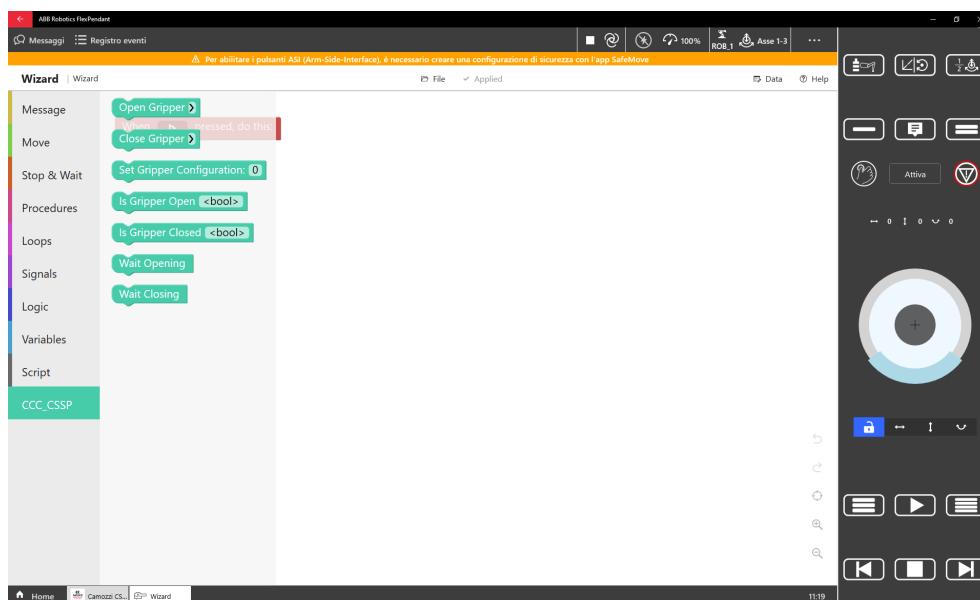
5 PROGRAMMING

5 Programming

5.1 Wizard editor

The Add-in provides 7 program blocks:

1. Open Gripper
2. Close Gripper
3. Set Gripper Configuration
4. Is Gripper Open
5. Is Gripper Closed
6. Wait Opening
7. Wait Closing



Open Gripper:

The Open Gripper block allows to open the gripper and optionally set a wait time in seconds (default 0.5s) after the command execution.

Close Gripper:

The Close Gripper block allows to close the gripper and optionally set a wait time in seconds (default 0.5s) after the command execution.

5 PROGRAMMING

Set Gripper Configuration:

The Set Gripper Configuration block allows to set the desired configuration of the gripper in terms of payload and tool frame. If the conf parameter represents a not active configuration the program is aborted.

Is Gripper Open:

The Is Gripper Open block allows to check if the gripper is totally open. It returns a boolean value that is stored in the input variable.

Is Gripper Closed:

The Is Gripper Closed block allows to check if the gripper is totally closed. It returns a boolean value that is stored in the input variable.

Wait Opening:

The Wait Opening block allows to wait until the gripper is totally open.

Wait Closing:

The Wait Closing block allows to wait until the gripper is totally closed.

5 PROGRAMMING

5.2 RAPID

The Add-in provides the following procedures that can be used within a RAPID program:

1. PROC CCC_CSSP_SetConf(num conf)
2. PROC CCC_CSSP_OpenGripper(\num wait)
3. PROC CCC_CSSP_CloseGripper(\num wait)
4. PROC CCC_CSSP_UpdateStatus()
5. PROC CCC_CSSP_Is_Open(bool res)
6. PROC CCC_CSSP_Is_Closed(bool res)
7. PROC CCC_CSSP_Wait_Opening()
8. PROC CCC_CSSP_Wait_Closing()

PROC CCC_CSSP_SetConf(num conf):

This procedure allows to set the desired configuration of the gripper in terms of payload and tool frame. If the conf parameter represents a not active configuration the program is aborted.

PROC CCC_CSSP_OpenGripper(\num wait):

This procedure allows to open the gripper and wait the desired optional delay time in milliseconds (default 500ms).

PROC CCC_CSSP_CloseGripper(\num wait):

This procedure allows to close the gripper and wait the desired optional delay time in milliseconds (default 500ms).

PROC CCC_CSSP_UpdateStatus():

This procedure allows to update two PERS BOOLEAN variables stored in the "CCC_BASE_CSSP" system program. The two variables are:

- CAMOZZI_CSSP_STATUS_OPEN is true if the gripper is totally open, false otherwise.
- CAMOZZI_CSSP_STATUS_CLOSE is true if the gripper is totally closed, false otherwise.

PROC CCC_CSSP_Is_Open(bool res):

This procedure returns TRUE if the gripper is totally open, otherwise returns FALSE.

PROC CCC_CSSP_Is_Closed(bool res):

5 PROGRAMMING

This procedure returns TRUE if the gripper is totally closed, otherwise returns FALSE.

PROC CCC_CSSP_Wait_Opening():

This procedure allows to wait until the gripper is totally open.

PROC CCC_CSSP_Wait_Closing():

This procedure allows to wait until the gripper is totally closed.

6 ERRORS

6 Errors

6.1 Application errors

Error	Description	Type
"Insert a valid finger length value (≥ 0)"	The inserted value of the finger length is lower than zero. Only values equals or greater than zero are admissible.	Fault
"Insert a valid finger weight value (≥ 0)"	The inserted value of the finger weight is lower than zero. Only values equals or greater than zero are admissible.	Fault
"Insert a valid gripper weight value (≥ 0)"	The inserted value of the gripper weight is lower than zero. Only values equals or greater than zero are admissible.	Fault
"Insert a valid number of COM values (3)"	The number of the inserted value of the gripper COM is not equal to three. Three values are required.	Fault
"Insert a valid number of TCP values (7)"	The number of the inserted value of the gripper TCP is not equal to seven. Seven values are required.	Fault

6.2 Rapid errors

Error	Description	Type
"Configuration x not previously set! Insert a valid configuration."	The inserted x configuration is not set. Insert a valid one.	Fault

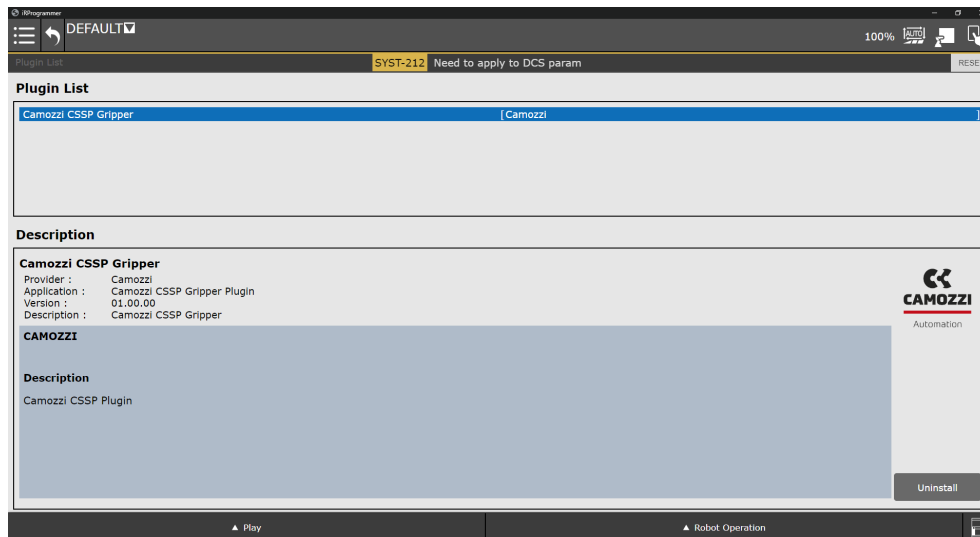
7 UNINSTALL THE ADD-IN

7 Uninstall the Add-in

The Add-in can be removed from the robot in two different ways:

1. Add-In Installer (available from RobotWare 7.7)
2. RobotStudio Add-In

Please refer to official ABB Website for further information about how to uninstall an Add-In.





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