TAKING POINTS AND EDIT THEM USING STAUBLI ROBOTIC SUITE

It is important to familiarize yourself with the CS8 console (which Stäubli calls MCP). Navigation through menus is done with the directional keys, and you have to learn that the right arrow is equivalent to an "enter", and it is usually the key to select or enter the submenus. The left arrow is the equivalent to "ESCAPE", and it is used to close the submenu.

This document reproduces the steps to follow to take different points and create a simple application.


menú   tecles direccionals   enter

The steps to follow are:

1st – Create a new application with the console MCP
2nd – Create a new point with the console MCP
3rd – Move the arm to the desired position using MCP
4th – Overwrite the data corresponding to the position to the new point
5th – Load the application created using MCP (consisting in points only) to the computer to be able to edit this application (mainly adding the code) using VAL3 software
6th – Load again the application to the control unit of the robot (CS8), and execute it.

A continuació es mostra pas a pas les accions a fer, recordant que per passar d'una pantalla a l'altra sol ser prement la fletxa dreta per entrar al submenú seleccionat.

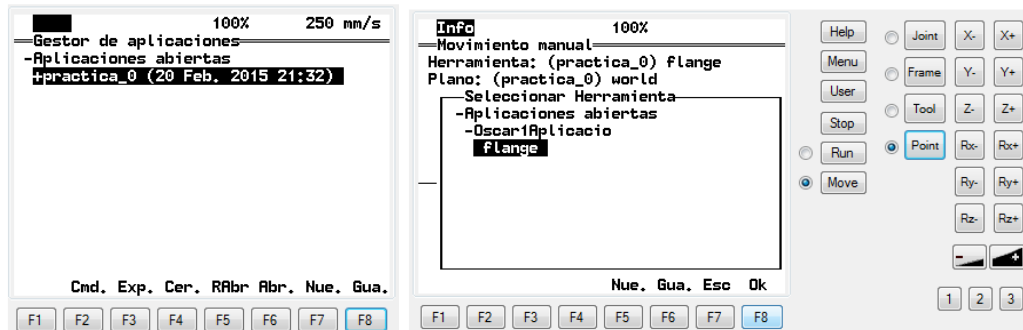Next, in the next pictures we show step-by-step the actions to do.

CREATING A NEW APPLICATION:
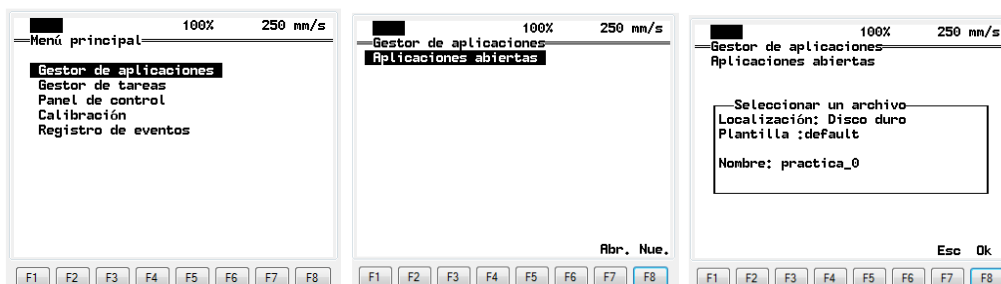
In this specific case the application is called "pràctica_0".

Then F8 (OK), and we have a new application.

CREATING A NEW POINT:

In first screen, we can see that the application is already created. Then, it is necessary to press "point" in the MCP. We have to choose a tool, and we will use "flange" (the tool defined by default). Then, all the points we have in our application must appear on the screen. If our application is empty, no points are going to appear.

Using F5 we will create a new point. A new window will appear asking for the name of this new point (punt_1, in our case). The typology of this new point will be "point" (the typology of a point can be "point" or "joint"). A new window will appear where we can write the values of the point using the keyboard. Normally we will leave these values empty, and we will press F8 (OK).
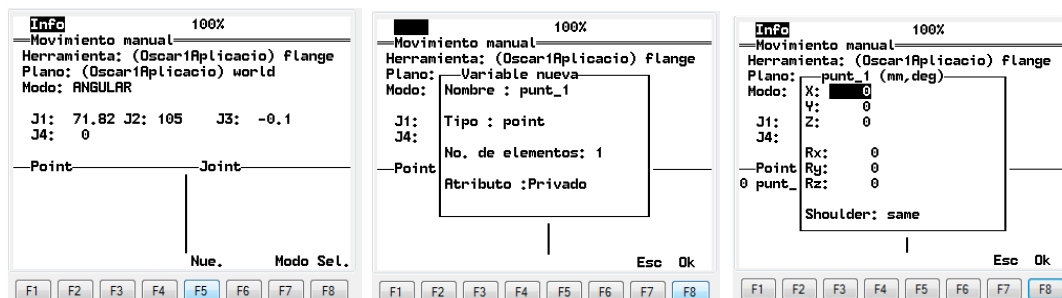
If we need to create more points, we have to reproduce the same procedure. In the screen, we will see the point (or points) already created, but remember that the values for all the parameters of these points are zero till the moment.

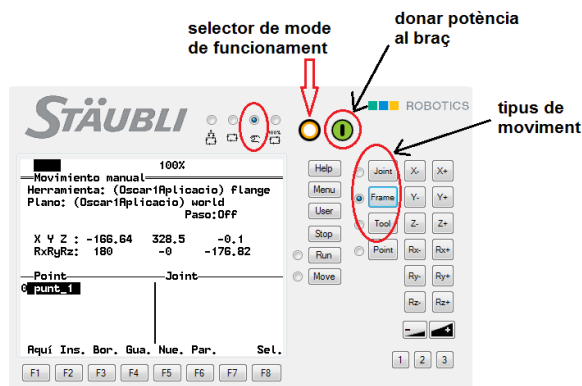**MOVING THE ARM TO THE DESIRED POSITION (POSITIONS)**

Now, we have to assign the already created points to specific interesting positions of the arm. We have to move the arm to the desired position and then save that position in the point.

We have to select the manual mode of work (in MCP). At this moment, we can provide power to the motors of the arm.

Probably an error message could appear, and in that moment, we have to "park" and "unpark" the MCP and then we can press again the power button.

When the power is enabled, we can move the arm selecting one of the 3 modes of movement ("Joint", "Frame" or "Tool").

There is a forth mode of movement ("Point" mode) that is useful to check the points already created in the application (not yet, if you are following this document).

When we move the arm to the desired position then we can re-write this position to one of the points already created.

**REWRITING THE POSITION OF THE ARM TO A POINT (Learning of the points)**

If we press F1 ("aquí" means "here") a new window will appear that allows us to re-write the parameters of a point. If we press F8 (OK). The point is now properly programmed with the desired position of the arm.
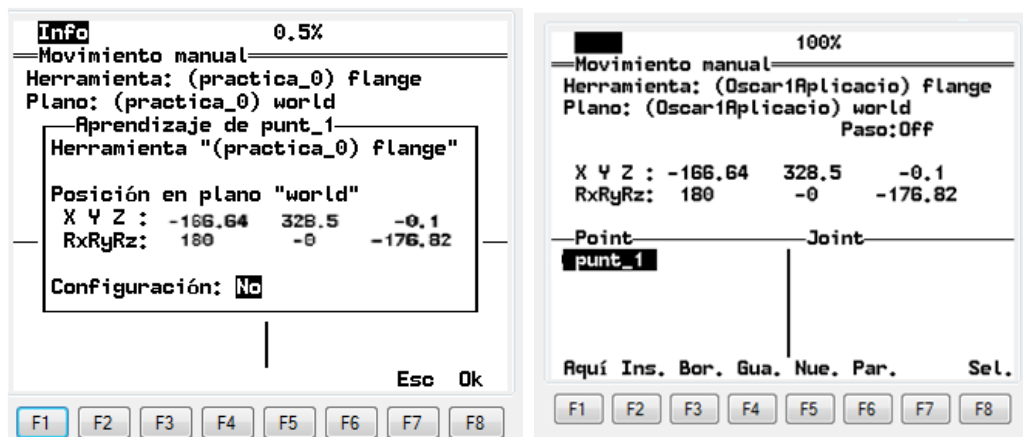
We can repeat this procedure for all the points we have in our application.

Now, we can exit the application on the MCP, because at this point we are going to continue working on the computer with the Staubli Robotics Suite software.

We have to save all the changes we did. Press "menu" on MCP, you have to select your application, and then press "guardar" (means "save") (F8). Then we can close the application pressing "cerrar" (means "close") (F4).
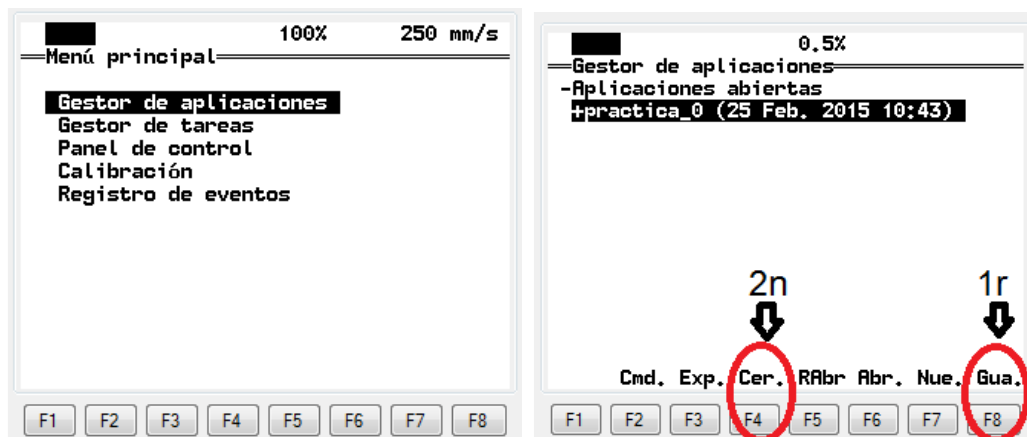
CONFIGURABLE INPUTS & OUTPUTS

It is possible to set and reset different elements belonging to the surroundings of the robotic system using the numerical buttons of the MCP (configurable outputs). In the case of our robot Staubli TX60 (6 degrees of freedom), button 1 opens and closes the pneumatic gripper, and in the case of Staubli Scara TS60 (4 degrees of freedom), button 1 sets and resets the suction of the pneumatic element, and button 2 sets and resets blowing of the pneumatic element to eject the part.

To configure these configurable outputs we have to proceed following these steps:

Menú > Panel de control > E/S (entradas/salidas) > Controlador > Basic IO -1 > Salidas
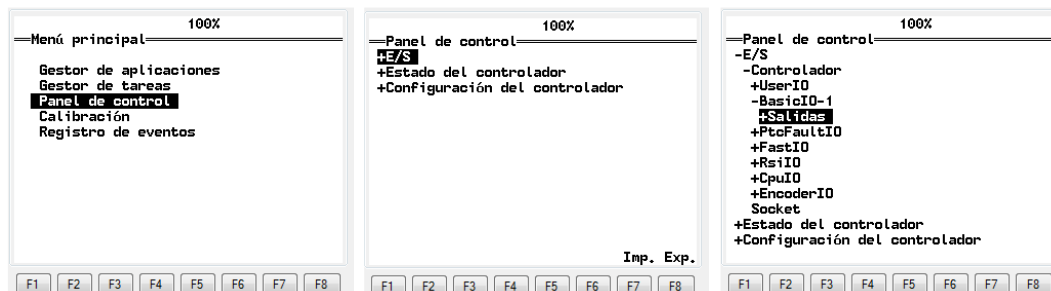
You have to look the desired output in the list. In this case, for button 1, suction is the output bIn0.
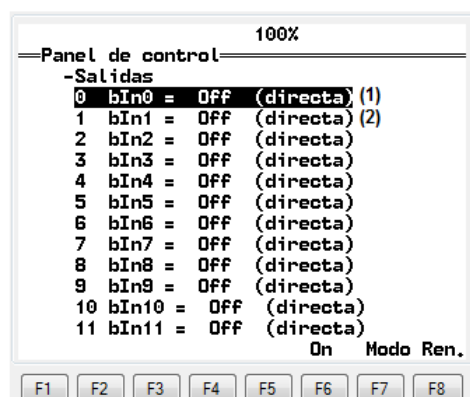
Once selected press the key "capital" and holding that key, press the number you want to associate to this output (1, in this specific case). That number will appear at the right of this output. We can repeat these steps for output bIn1 (blow) and the configurable output number 2, as it is shown in figure.

MONITORING INPUTS & OUTPUTS

Using MCP we can monitor inputs (sensors), set and reset outputs (actuators) in real time. We have to proceed in this way:

Menú > Panel de control > E/S (entradas/salidas) > Controlador > Basic IO -1

Then, we can choose inputs or outputs. If we select salidas (outputs), again we can see that you can set (ON) or reset (OFF) the output using F6. The actuator associated with that output will be set and reset accordingly.

If we select entradas (inputs), we will see the real-time state of the sensors associated to the different inputs (ON or OFF).

EDITING THE APPLICATION USING STAUBLI ROBOTICS SUITE

To create a Cell you have to follow the steps we can see in the following figures: New, New cell wizard.
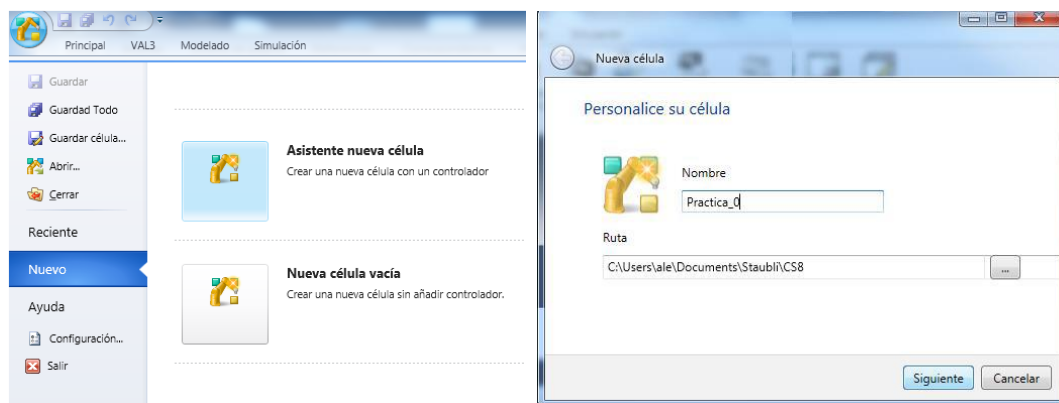
The path is the one that appears by default. You have to write a name for that cell. Then, we have to choose "Añadir un controlador local" (Add a local controller).
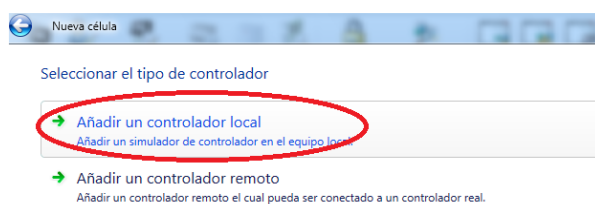
In the figure, we show the different options for the arm Staubli TS-60 (Scara Robotic Arm). For another robotic arm, as for instance Staubli TX-60 (the other one we have in our robotic lab) the version of the controller is 5.3.2, "implantación" (Mount) is "piso" (floor), and the "Conector de Potencia" (Power Connector) is Horizontal. It is not necessary to change the other settings (Not defined).

Nuevo Controlador Local

| Nombre | Practica_0 |
| Versión | s6.9.1 |

Filtros

Tipo de robot	Implantación	Conector de potencia	Largo del eje 3 Scara	Diámetro del eje 3 Scara
ts60	pared	Indiferente	L200	D25

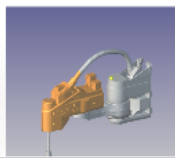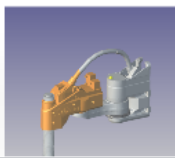| Luz UL	Topes mecánicos externos	Cable del usuario en el eje 3	Fuelle eje Z	
Falso	Indiferente	Indiferente	Indiferente	

8 Robot(s) encontrado(s)

TS60
pared Implantación
Diámetro 25mm

Carrera del eje Z de 200mm
Detección(es) mecánica(s) externa(s)
Cable de usuario con conector recto

TS60
pared Implantación
Diámetro 25mm

Carrera del eje Z de 200mm
Detección(es) mecánica(s) externa(s)
Cable de usuario con conector recto
Fuelle eje Z

TS60
pared Implantación
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Detección(es) mecánica(s) externa(s)

TS60
pared Implantación
Diámetro 25mm

Carrera del eje Z de 200mm
Detección(es) mecánica(s) externa(s)

The other options are:

Opciones del Controlador Local

E/S

- ☑ BIO
- ☐ MIO/BIO2
- ☐ Serial1
- ☐ Serial2

| CAN | No CAN |
| Encoder | Starc 2 - Sin encoder |

Opciones

☐ 4axesAbsoluteRobot	☐ 6axesAbsoluteRobot	☐ alter
☐ cds	☐ compliance	☐ continuousAxis
☐ lli	☐ mcpMode	☐ oemLicence
☐ PaintiXen	☐ pciAccess	☐ plc
☐ remoteMaintenance	☐ remoteMcp	☑ testMode
☐ valKernel	☐ valPlast	☐ valTending
☐ valTrack	☐ valTraj	

Añadir complementos

Press "Siguiente" (Next) and "Finalizar" (Finish). Our cell is no ready.
In the computers of the robotics lab (building P2) the options for remote license are
established yet. A window like this should appear:
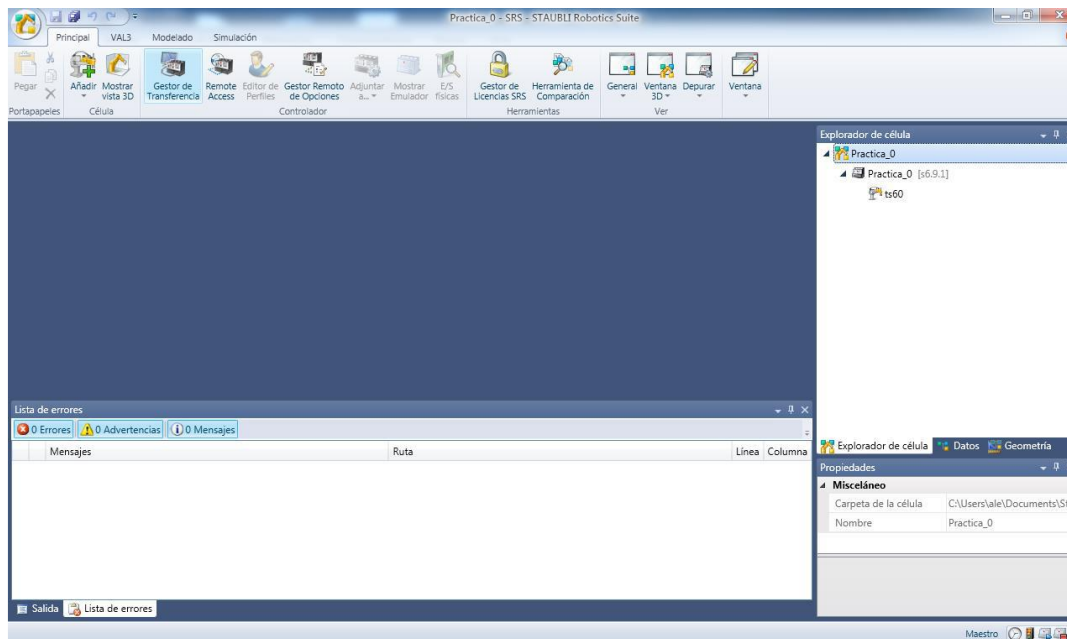
Now, we are going to transfer our application from the Control Unit (CS8) and MCP of the robot to the computer. We will use "Gestor de Transferencia" (Transfer Manager) in folder "Principal" (Home).
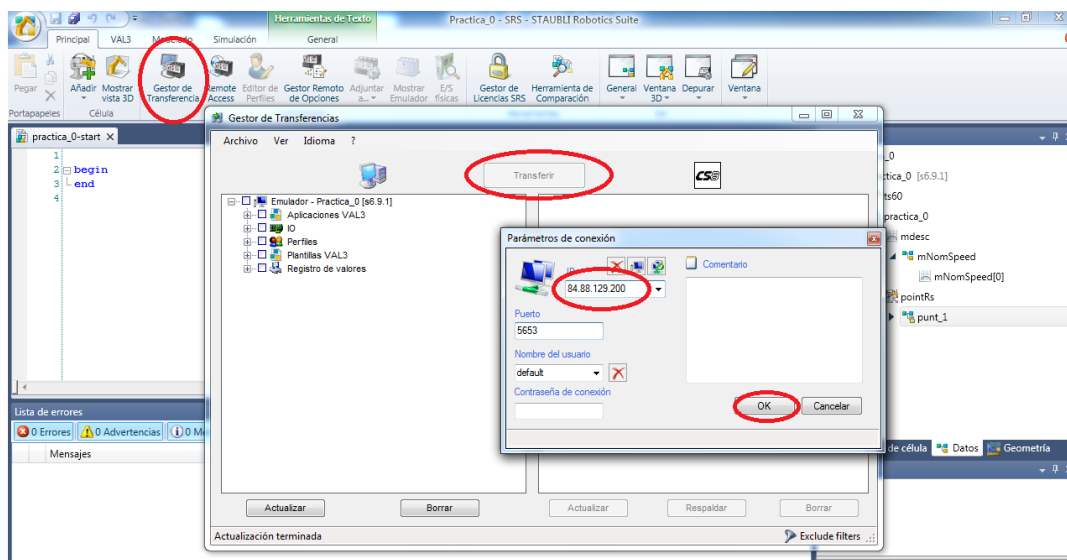

The IP address of robot Staubli TS-60 is 84.88.129.200 (PI address of robot TX-60 is 84.88.129.201). If we click OK, a divided window should appears. At the right there is the Control Unit of the robot (CS8), and at the left there is the computer. We have to select the application in the CS8 side, and then click in "Transferir" (Transfer)

Then, if we select the folder VAL3, and we select the controller on the "Explorador de Célula" (Cell Explorer) window at the right ("practica0" in this specific case), it is possible to open the application "Abrir Aplicacion" (Open Application). We can also do this action using right-click over the name of the controller ("practica0").
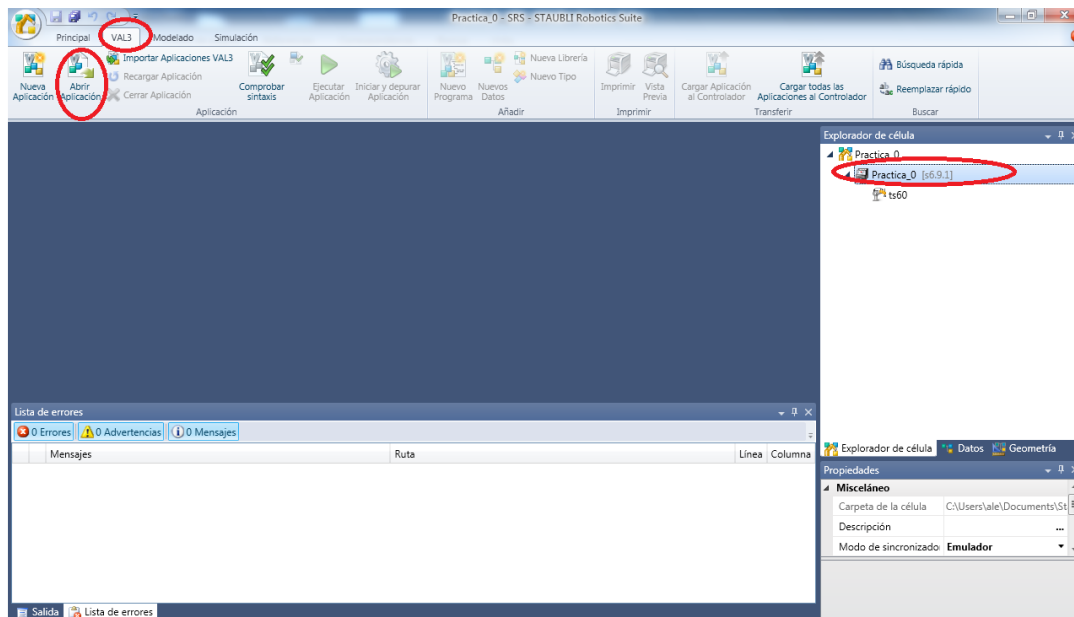
Once opened, the name of the application will appears, as well as the routines by default start() and stop(). If we click over these routines, we will be able to edit them, and to put there the code of our application, considering the points already obtained.
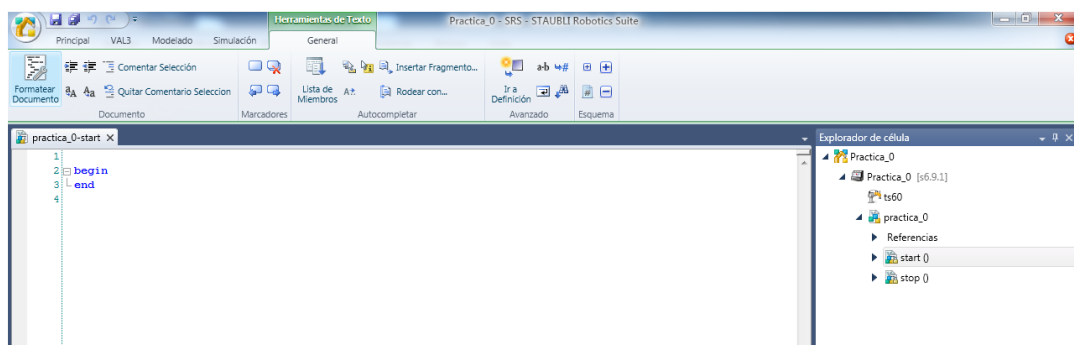
In the Cell Explorer, if we click over the folder "Datos" (Data) we can see the points that we got when we were working previously with the MCP.
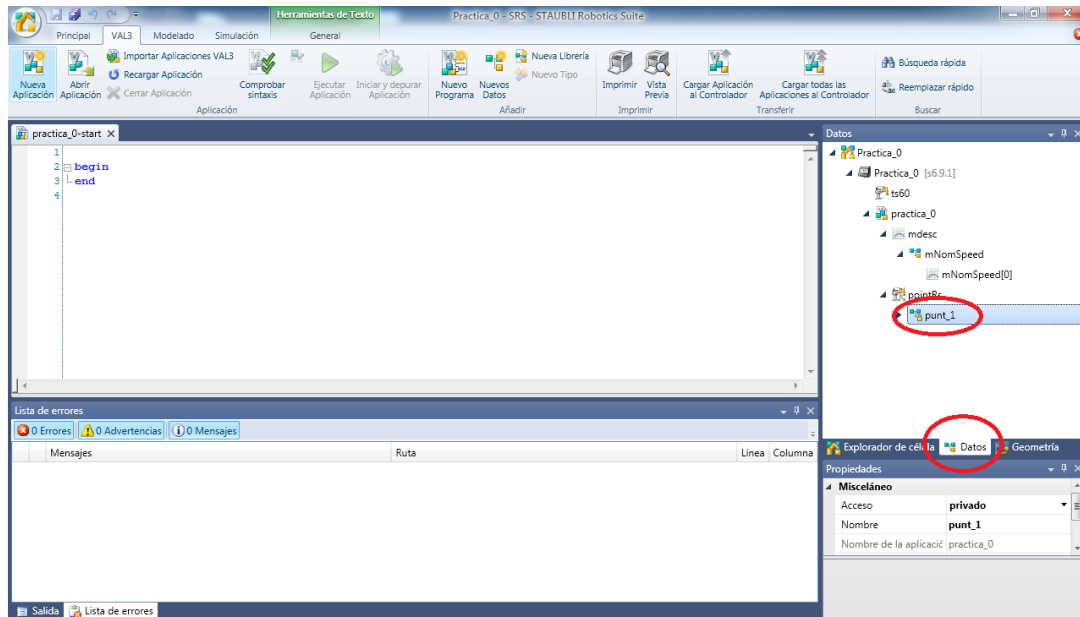
EXECUTING THE APLICATION IN THE ROBOT

After editing start() and stop() routines and programing our application, we can sabe it and transfer it again to the Control Unit of the robot, to be able to execute it. We have to use again the Transfer Manager (now, in the opposite direction, from Computer to CS8), and overwriting the existing previous one.

Now, we will be able to execute the complete application using now the MCP.

Clicking on the key Menu on MCP, the main menu will appears. Then, we have to go to "Gestor de Aplicaciones" (Application Manager), and to look for our application. We will open it and execute it using manual mode of operation (symbol of the hand in the MCP)

Then, we have to bring power to the arm (using the button with the vertical bar, and following the instructions on the screen), and press the key "Run", and then OK to confirm. At this point, the bleu led on the key "Move" will blink. This means that we have to keep this key pressed until the end of the program to see the execution of the application.