

A business of BARNES GROUP INC

KIT-TM-J

USER MANUAL

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1. INTRODUCTION

The KIT-TM-J is a plug & play gripping solution for Techman Robot cobots (TM5, TM12 and TM14 series) and it is completely compatible with Gimatic KIT-TM-EQC20 kit. It can be used in combination with any collaborative robot that provides a limited power supply capability at the wrist.

The KIT-TM-J is based on the MPRJ2553NP gripper. This electric gripper can be used for either external or internal gripping applications. The part will be gripped in any position within the jaws stroke. After the part is gripped, the spring force will hold the part (motor OFF and zero consumption), even in case of power black-out: the gripper mechanism is irreversible.

The “Gripper Gimatic KITJ” software package has three components: Set, Grip and Release.

These components allow the user to configure and operate the robot with a list of work items (8 at most) and to easily perform two tasks: GRIP (for taking a specific work item) and RELEASE (for releasing a specific work item).

This operating manual describes how to import, setup and use these components.



2. IMPORTING THE COMPONENTS

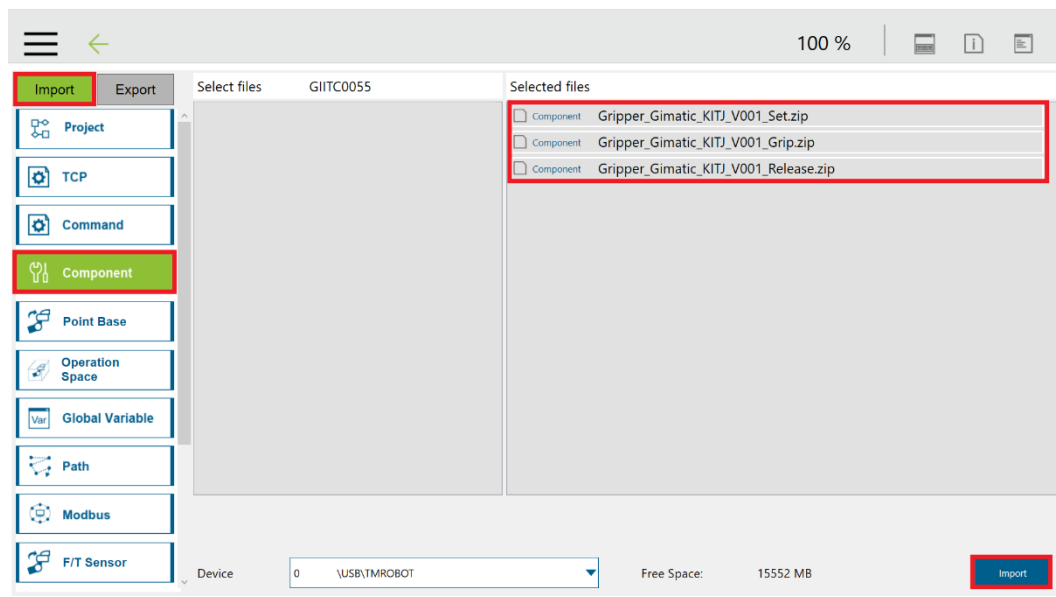
The component can be downloaded from: shop.gimatic.com/en/tm

Copy the folder "TM_Export" to an USB pen and set the name of the pen drive to match the following name: "TMROBOT". Insert it in the appropriate port on the robot controller.

In the TMflow menu, navigate to System, Import/Export to import the components on TM controller and to make them available in the TMflow.

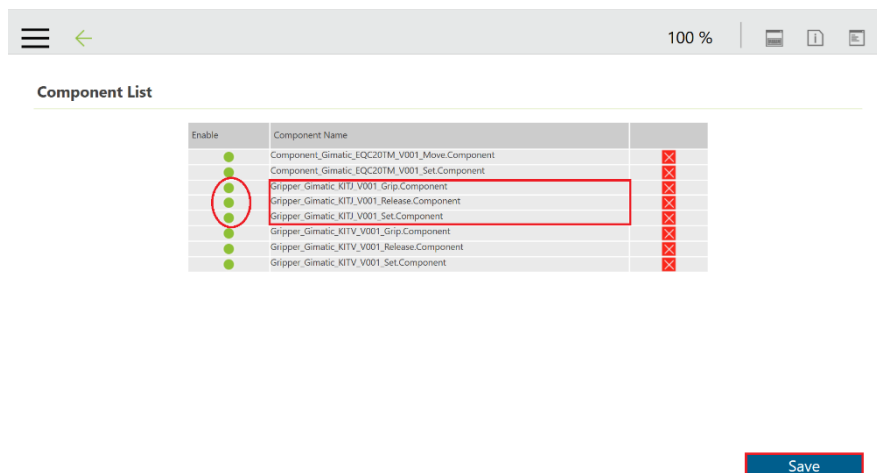
Click the "Import" button and select "TMComponent" on Robot List.

Select "Component" on the leftside menu and choose the components to import, in this case "Gripper_Gimatic_KITJ_V002_Set.zip", "Gripper_Gimatic_KITJ_V002_Grip.zip" and "Gripper_Gimatic_KITJ_V001_Release.zip".



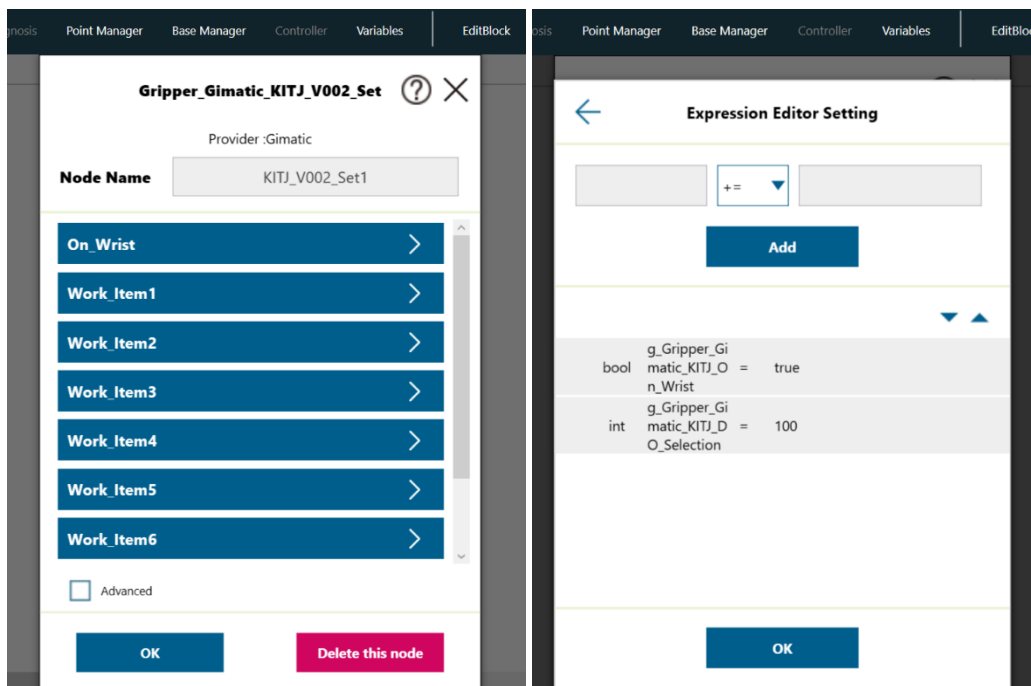
If the import operation is successfully completed, a success message box will appear, press the "OK" button to continue.

Choose "Component" on Robot Setting page and enable the components just imported on component list, select "Save" button and leave.



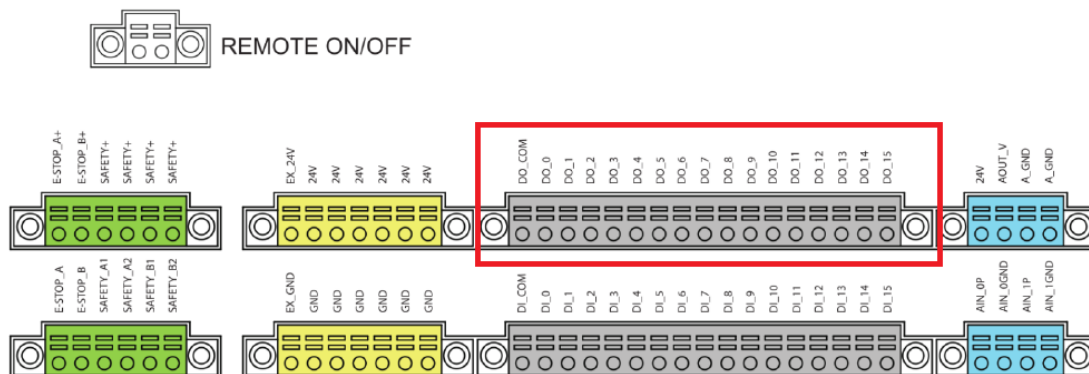
3. GIMATIC KITJ SET

When starting a new project, please import the component denominated "Gripper_Gimatic_KITJ_V002_Set" necessary to indicate where the KIT is phisically connected and set the main informations for each work item used in the application (a maximum of 8 work items can be configured).



Through the "On-Wrist" section it is possible to change the connection of the KIT from the wrist of the robot (default setting) to one of the digital outputs of the control box.

Control Box I/O configuration



For every work item it is possible to setting the name and the gripping direction.

The name is a string variable usefull to later identify the work item which one want to use, gripping direction is an integer variable equals to 1 if one wants internal gripping or equals to -1 if one want external gripping.

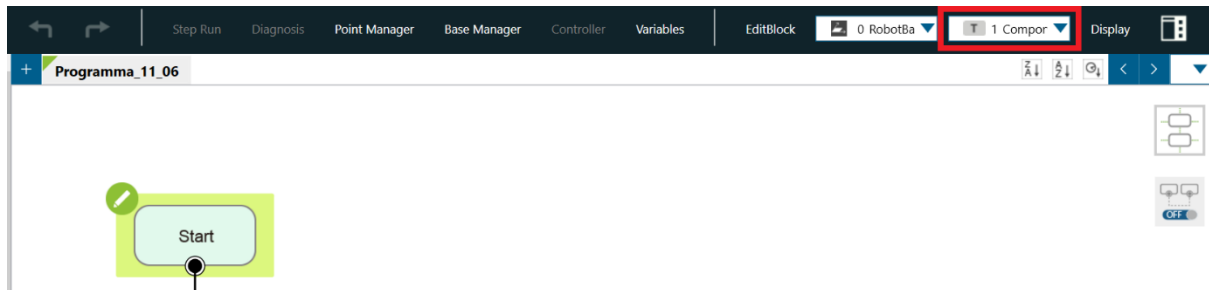
The screenshot shows a mobile application interface titled "Expression Editor Setting". At the top, there is a back arrow and the title. Below the title, there are two input fields: a text box and a dropdown menu. Below these fields is a blue "Add" button. A list of variables is displayed, including "g_Gripper_Gimatic_KITJ_WI1_Name" (string) and "g_Gripper_Gimatic_KITJ_Grip_Direction1" (int). At the bottom, there is a blue "OK" button.

The following table summaris the parameters that can be set through this node.

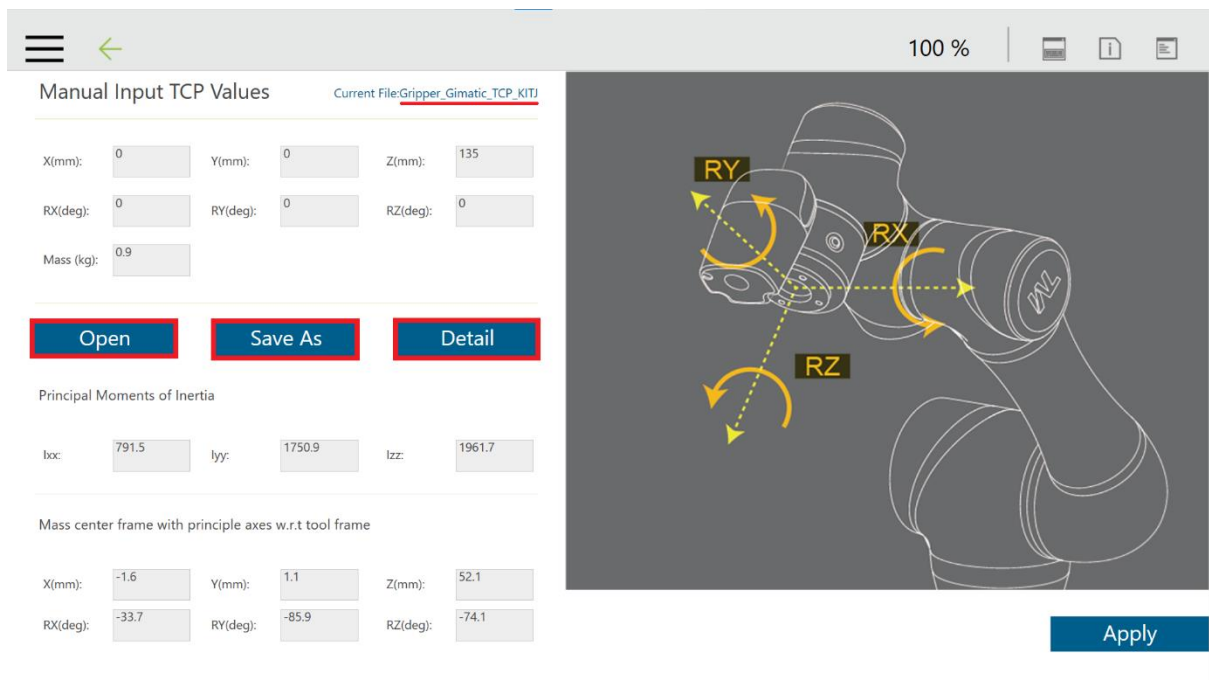
Item	Variable	Type	Description
On_Wrist	g_Gripper_Gimatic_KITJ_On_Wrist	Bool	True if the KIT is connected to the wrist of the robot, false if connected to the control box. (Default value = true).
On_Wrist	g_Gripper_Gimatic_KITJ_DO_Selection	Int (0 ÷ 15)	Indicates the Digital Output of the control box to which the KIT is connected (used only in case of On_Wrist = false).
Work_Item1	g_Gripper_Gimatic_KITJ_WI1_Name	String	The name of the WI1 ("WI1" means the system include the MPRJ gripper plus the specific work item 1).
Work_Item1	g_Gripper_Gimatic_KITJ_Grip_Direction1	Int	1 = internal grip -1 = external grip
... and so on with the respective variables of the remaining work items (WI2, WI3, ..., WI8).			

Modify the values corresponding to the MPRJ and the work items used in the application and leave the remaining TCPs unchanged (remember that "WI1" means that the system includes the KIT-J plus the specific work item 1 and so on for the remaining work items).

Once this node has been imported, 9 new TCP entries are automatically added in the top-right angle of the screen, corresponding at 8 work items plus the MPRJ TCP.

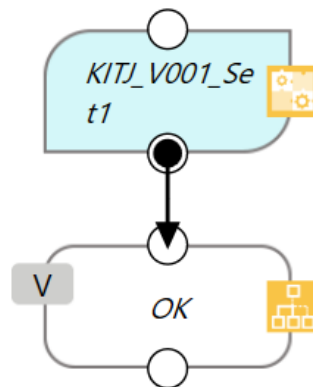


For each TCP the mass, geometric coordinates ("Value"), moment of inertia ("MOI") and mass center frame ("MCF") must be set through the appropriate section of the TM menu (*Setting* → *TCP Setting* → *Manual input parameters of TCP*):



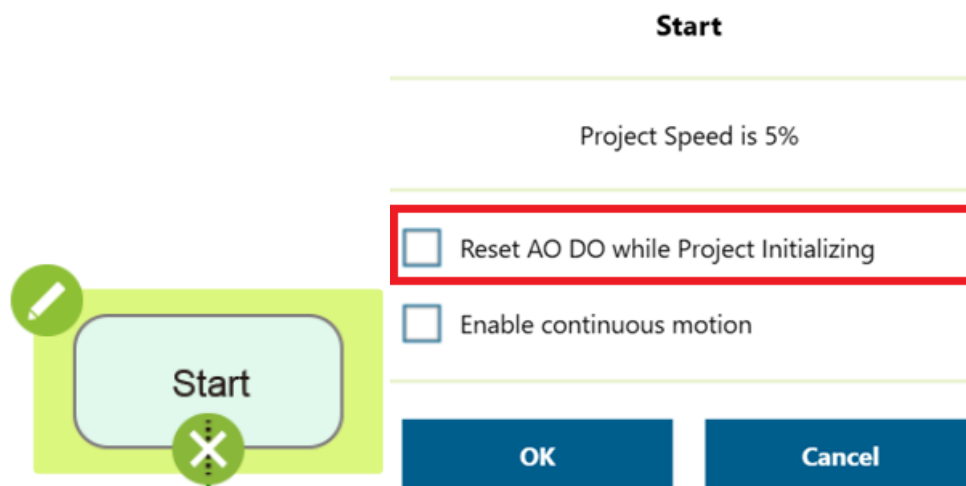
Please pay attention that for "work item TCP" is intended the system including the MPRJ gripper and the user's specific work item. The default mass and geometric coordinates of the TCPs of the 8 work items are the same as those of the MPRJ and so they must be modified in consequence of the various combinations of gripper and work item. The TCP of the MPRJ gripper must also be modified according to the jaws that are mounted.

The “GIMATIC KITJ SET” component does not include any command but only set-up operations and so it can generate only one result.



Please pay attention that the setting (open from Start node pencil mark) of “Reset AO DO while Project Initializing” is checked as default. In this case, the gripper will close once the project run.

If one want maintain unaltered the I/O this setting must be unchecked.

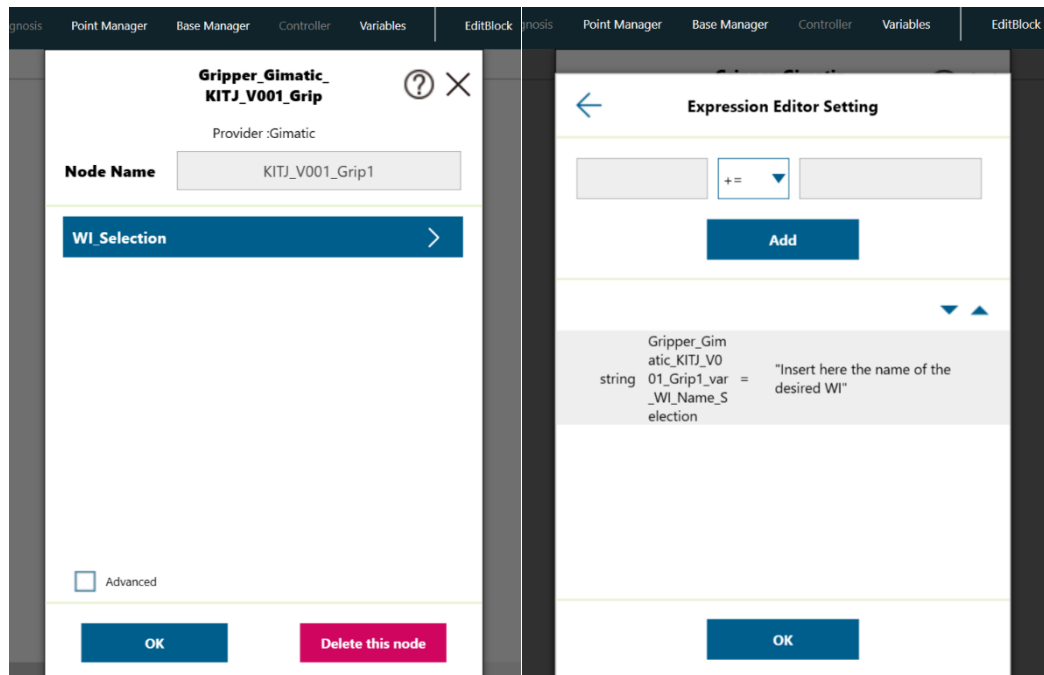


4. GIMATIC KITJ GRIP

Please insert the component denominated “Gripper_Gimatic_KITJ_V002_Grip” into the project to perform a grip command.

It is possible to setup the node by entering the name of the work item to grip.

Please pay attention to insert exactly the same characters insert previously in the Set node.

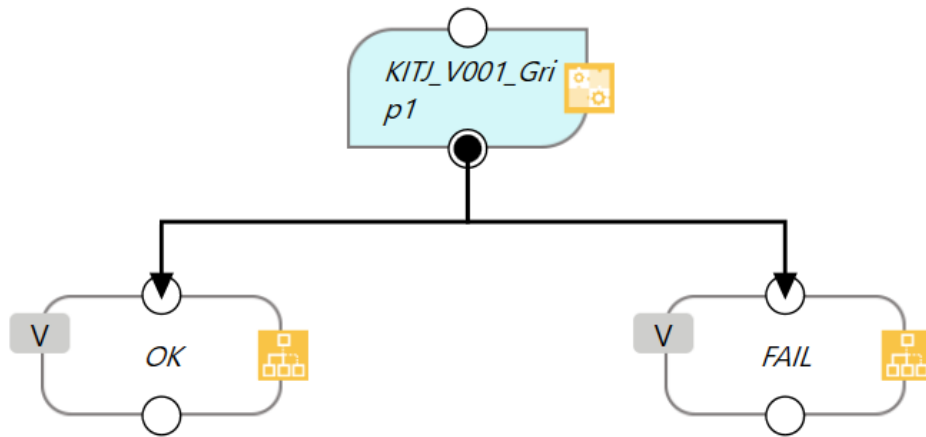


When the program executes this node a grip operation of the selected piece will be commanded. The movement direction of the jaws will depend on the relative parameter previously set in the Set node.

Item	Variable	Type	Description
WI_Selection	var_WI_Selection	string	The name of the desired WI to be gripped.

The output results of this component could be:

- OK: if all parameters have been correctly set and the program correctly controls the selected digital output
- FAIL: in any other case, for example if one have not correctly selected the WI to grip.

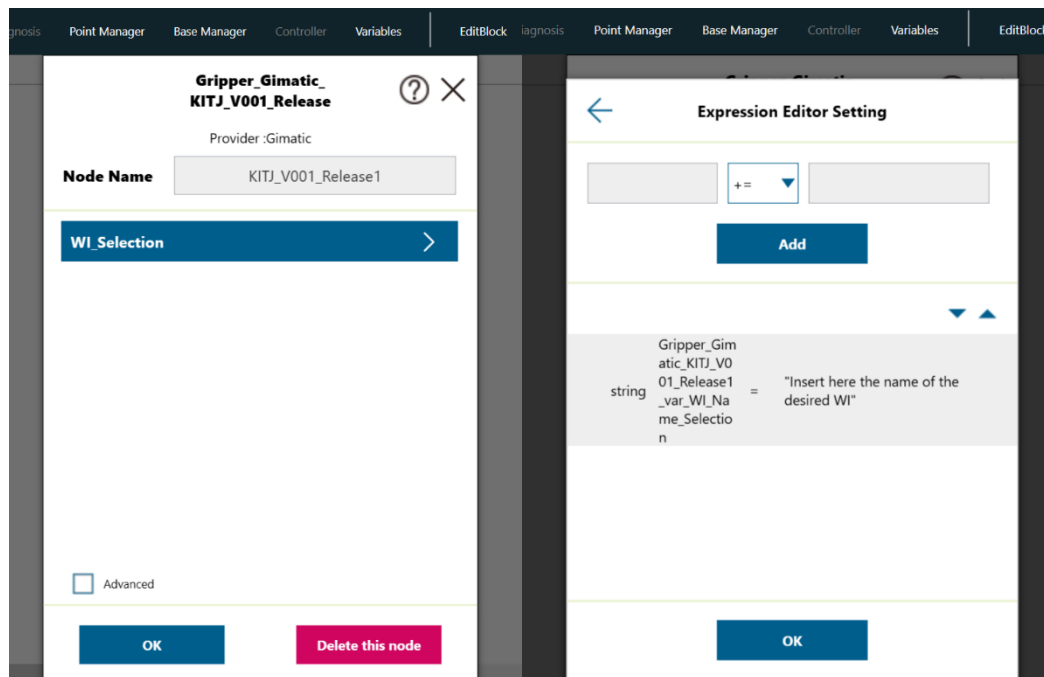


It's possible to import as many Grip nodes as needed according to the specific robotic application.

Please select “Inherit old component” when importing any additional Grip node to ensure that all the nodes share the same setup previously setted.

5. GIMATIC KITJ RELEASE

This node ("Gripper_Gimatic_KITJ_V001_Release") must be imported when one wants release a work item. This node has the same characteristics of the previous one.

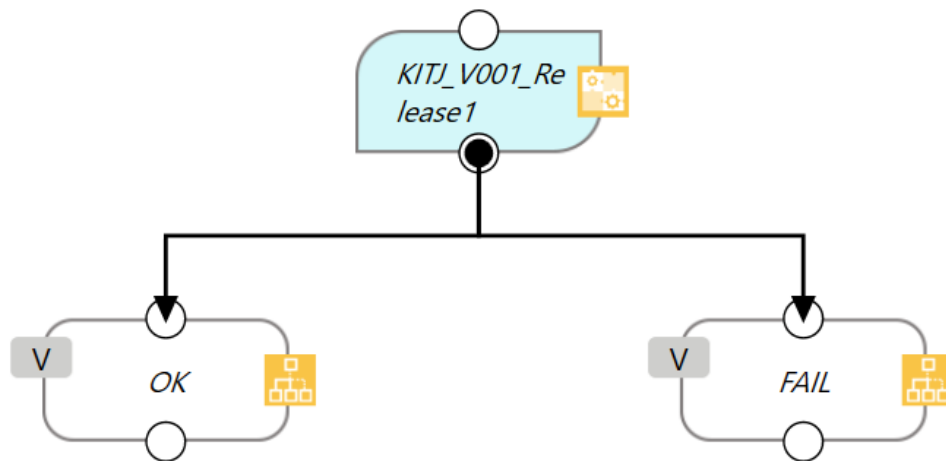


For setup this node just need to insert the name of the desired work item to be released.

When the program passes from this node a release operation of the selected piece will be commanded. The movement direction of the jaws will depend on the relative parameter previously set in the set node.

Item	Variable	Type	Description
WI_Selection	var_WI_Selection	string	The name of the desired WI to be released.

The possible outputs of this component follow the logic of the previous one.



It's possible to import as many Release nodes as needed according to the specific robotic application.

Please select “Inherit old component” when importing any additional Release node to ensure that all the nodes share the same setup previously setted.

6. PROGRAMMING WITHOUT TMFLOW CONTROL

TMflow provides a simpler process programming method for the gripper-type software packages.

On the robot setting page, click the **Gripper Button** to set the job triggered by the Gripper Button at the End Module.

The concept is when pressing the Gripper Button, a set of Component is added in the flow and executed once, and two Components are used in sequence (Grip and Release nodes).

For doing so, please click on “Using Customized Component” and select the “Gripper_Gimatic_KITJ_V002_Grip” component as “Grip” and the “Gripper_Gimatic_KITJ_V001_Release” component as “Release”.

As for our KIT-TM-J, this function is usefull to command a simply and quickly gripping (or a releasing) operation of a work item.

In practical applications, the robot uses the **FREE Button**, working with the buttons of End Module, to complete flow programming without TMflow control.

For further informations and instructions please refer to TMflow software manual.