EUCHNER

Application

Connecting MGB-L1B-EI... to Allen Bradley ControlLogix

EN

from V1.5

Contents

1. About this document

1.1. Version

Version	Date	Change/addition	Chapter
01-08/21	8/11/2021	Prepared	All

1.2. Scope

The purpose of this document is the integration and configuration of the MGB Ethernet/IP from V1.5 in Rockwell Studio 5000® V32.

1.3. Target group

Design engineers and installation planners for safety systems on machines, as well as setup and servicing staff possessing special expertise in handling safety components as well as expertise in the installation, setup, programming and diagnostics of programmable logic controllers (PLCs) and bus systems.

1.4. Supplementary documents

The overall documentation for this application consists of the following documents:

Document title (document number)	Contents	
Operating instructions (2126330)	Safety Systems MGB-L..B-EI-... (Ethernet/IP) with Data Structure Type A	
Safety information (2126331)	Safety Information and Maintenance (part of the operating instructions for safety system MGB-L.B-EI.-... (Ethernet/IP))	
Possibly enclosed data sheets	Item-specific information about deviations or additions	

1.5. Notice

This application is based on the MGB Ethernet/IP operating instructions. Please refer to the operating instructions for technical details and other information.

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2. Components/modules used

2.1. EUCHNER

Description	Order number / item
MGB with Ethernet/IP™ interface	All MGBs with Ethernet/IP™ interface

TIP!

More information and downloads about the aforementioned EUCHNER products can be found at www.euchner.com.

2.2. Others

Description	Order number / item
1756-L81ES GuardLogix® 5580 Safety Controller	1756-L81ES
1756-L8SP GuardLogix® 5580 Safety Partner	1756-L8SP

2.3. Software

Description	Version
BootP DHCP Ethernet/IP Commissioning Tool	3.05.00
RSLinx Classic	Rev. 4.12.00 CPR 9 SR 11.0
Studio 5000 Logix Designer	Version 32.03.00 - Professional Edition

3. Functional description

The MGB-L1B-EIA-.. is a guard locking device in accordance with EN ISO 14119 according to the closed-circuit current principle; the MGB-L2B-EIA-.. is a guard locking device in accordance with EN ISO 14119 according to the open-circuit current principle. In this example, all safety functions are processed via the CIP Safety protocol. The MGB Ethernet/IP is connected via the bus module to a GuardLogix® 5580 Safety Controller from Allen Bradley.

4. IP address assignment with BOOTP/DHCP

4.1. General BOOTP/DHCP settings

Select the *Network Settings* option from the *Tools* menu.

Depending on the network, enter the *subnet mask*, the *gateway address*, the *primary and/or secondary DNS address* and the *domain name*.

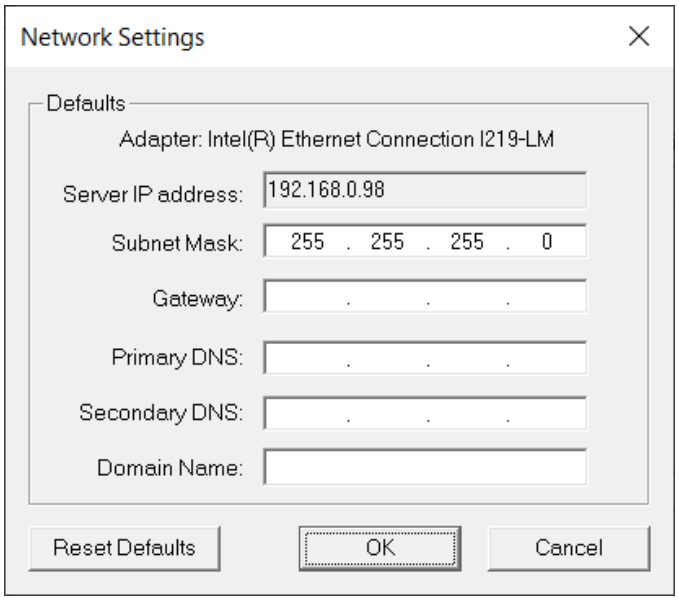

Fig. 1: BOOTP/DHCP network settings

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4.2. New (out of the box) MGB

1. Open BOOTP/DHCP and select the corresponding network adapter.
2. Make the network settings.
3. Connect the network cable (X3 or X4) to the appropriate RJ45 port on the PC.
4. Connect the MGB to the power supply (X1 or X2).
5. The connected MGB is displayed in the *Discovery History*.

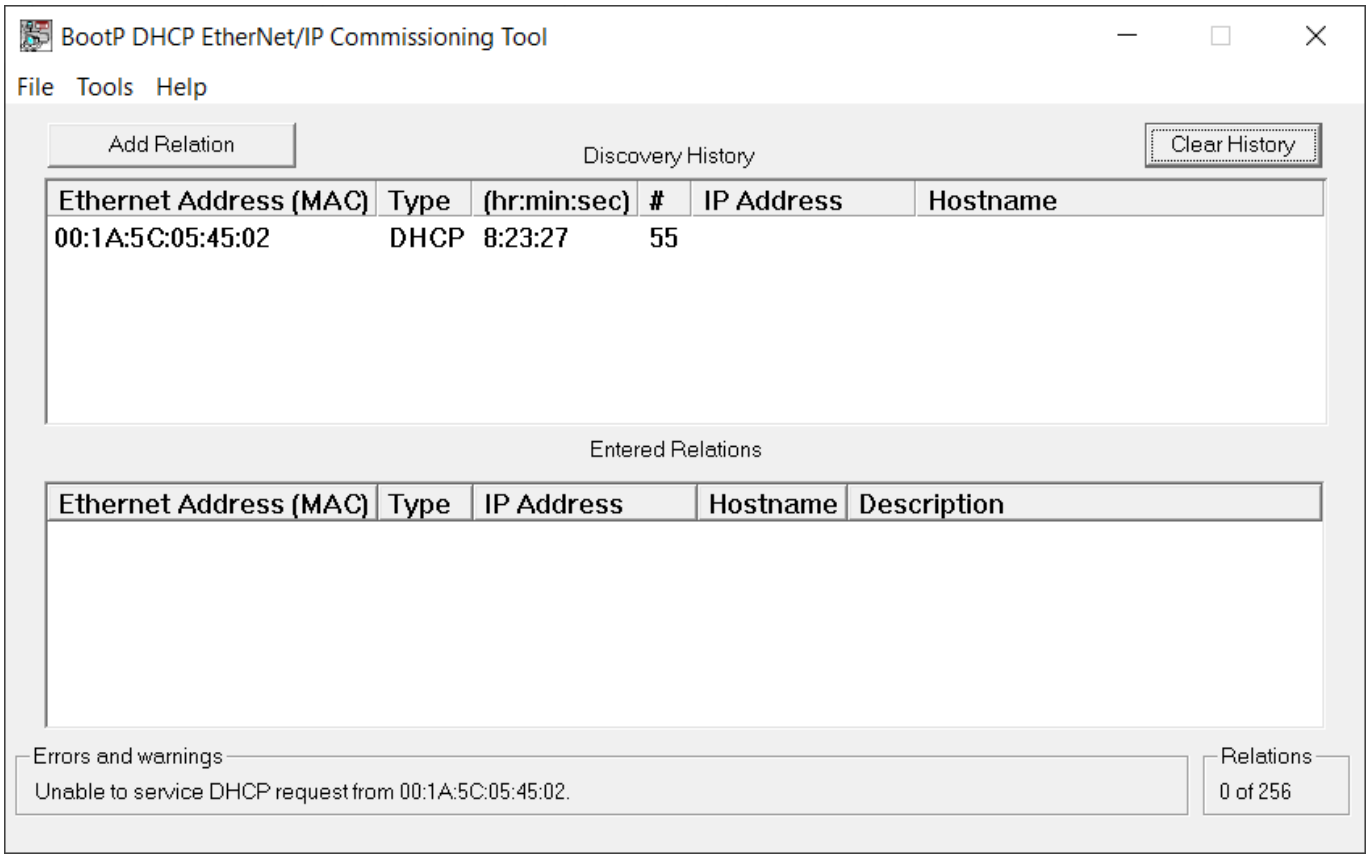

Fig. 2: Automatic search for MAC addresses

6. Compare the MAC address from BOOTP/DHCP with the MAC address on the type label.

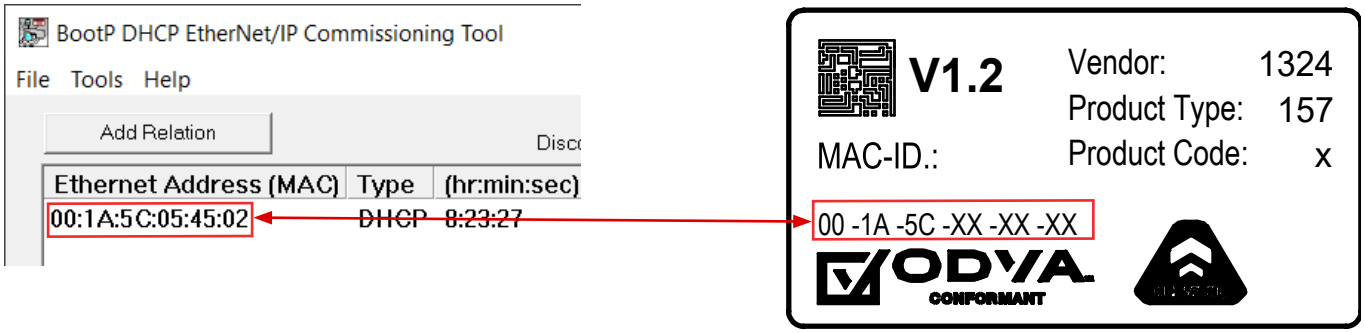

Fig. 3: MAC address comparison

7. Select the MGB and add a new relation with *Add Relation*.

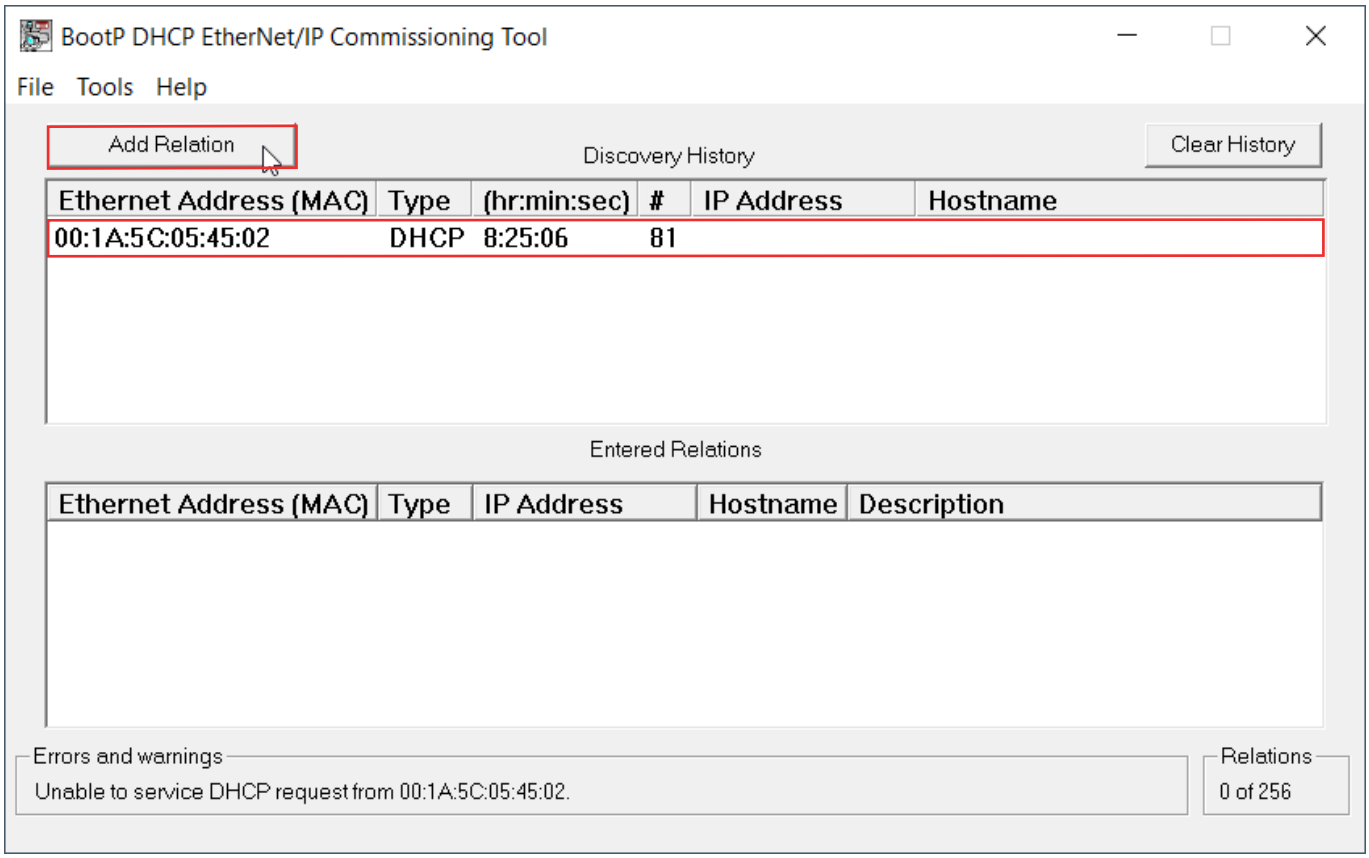

Fig. 4: Adding relation

8. Assign the IP address of the MGB and confirm with *OK*.

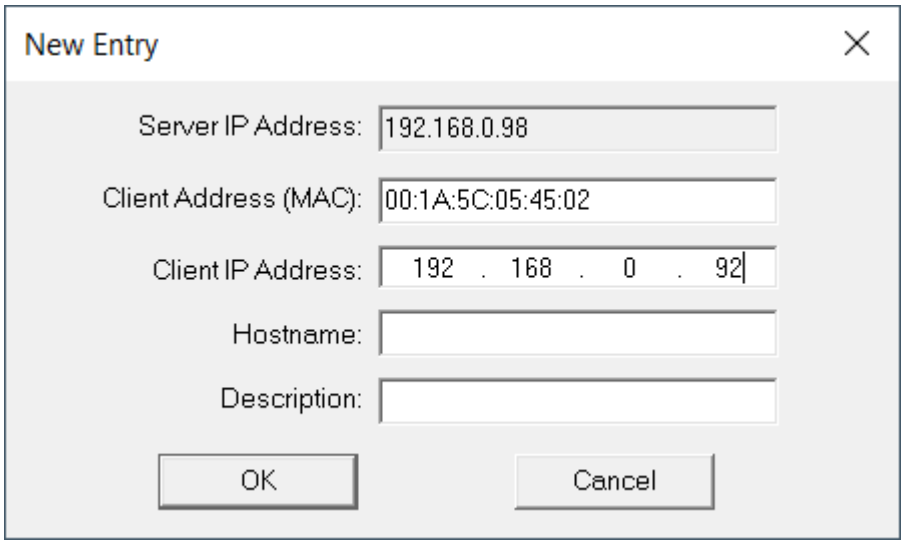

Fig. 5: MGB IP address assignment

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9. After successful IP address assignment, the MGB and its IP address are displayed under *Entered Relations*.

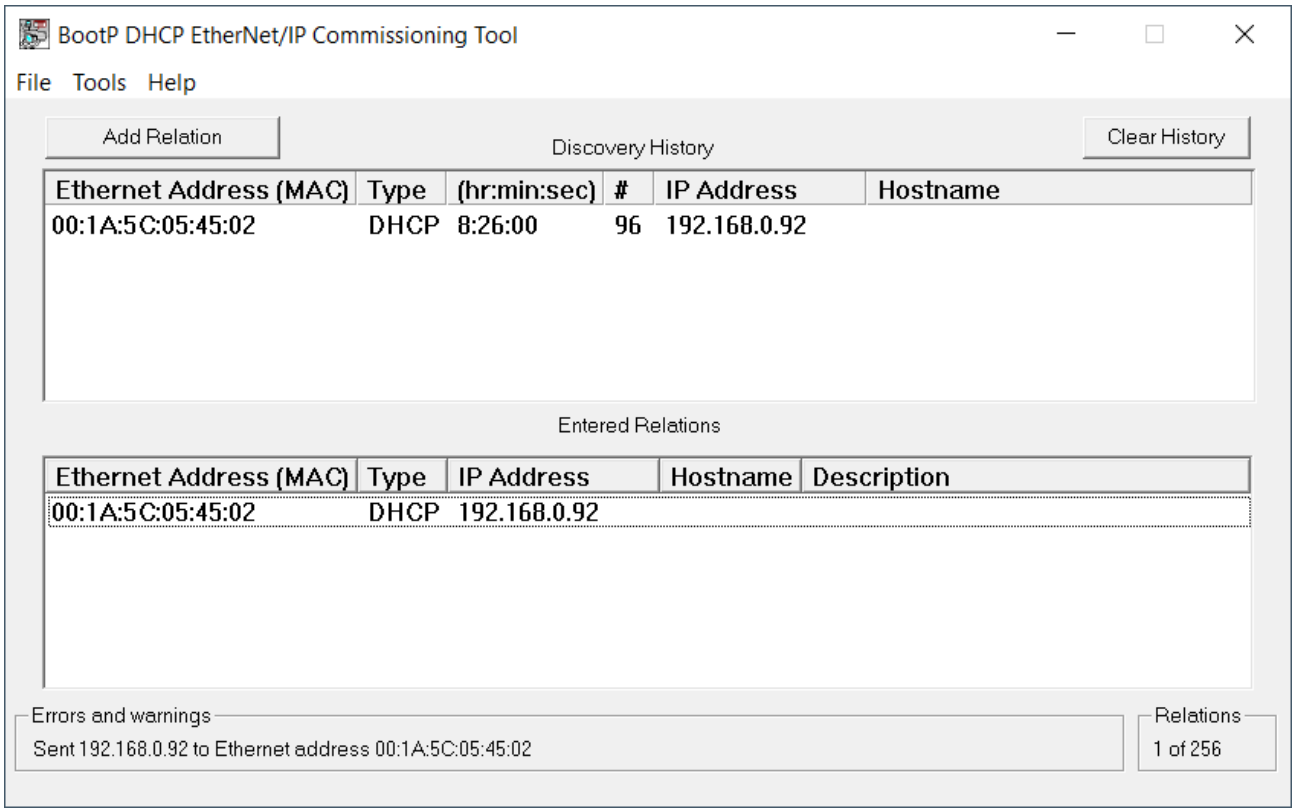

Fig. 6: Entered Relations list

10. Deactivate DHCP in the MGB using *Disable BOOTP/DHCP*.

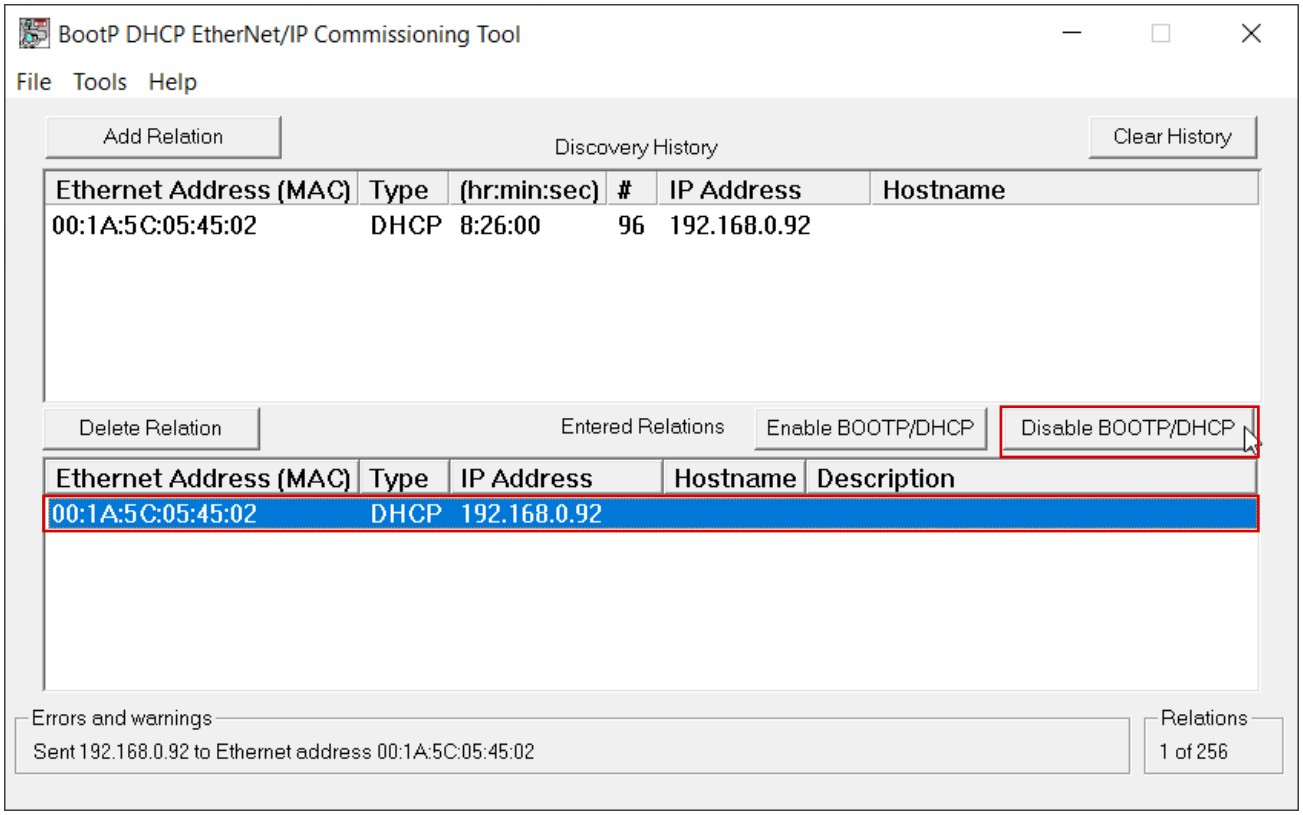

Fig. 7: Deactivating DHCP mode

11. Successful acknowledgment and completion of IP address assignment.

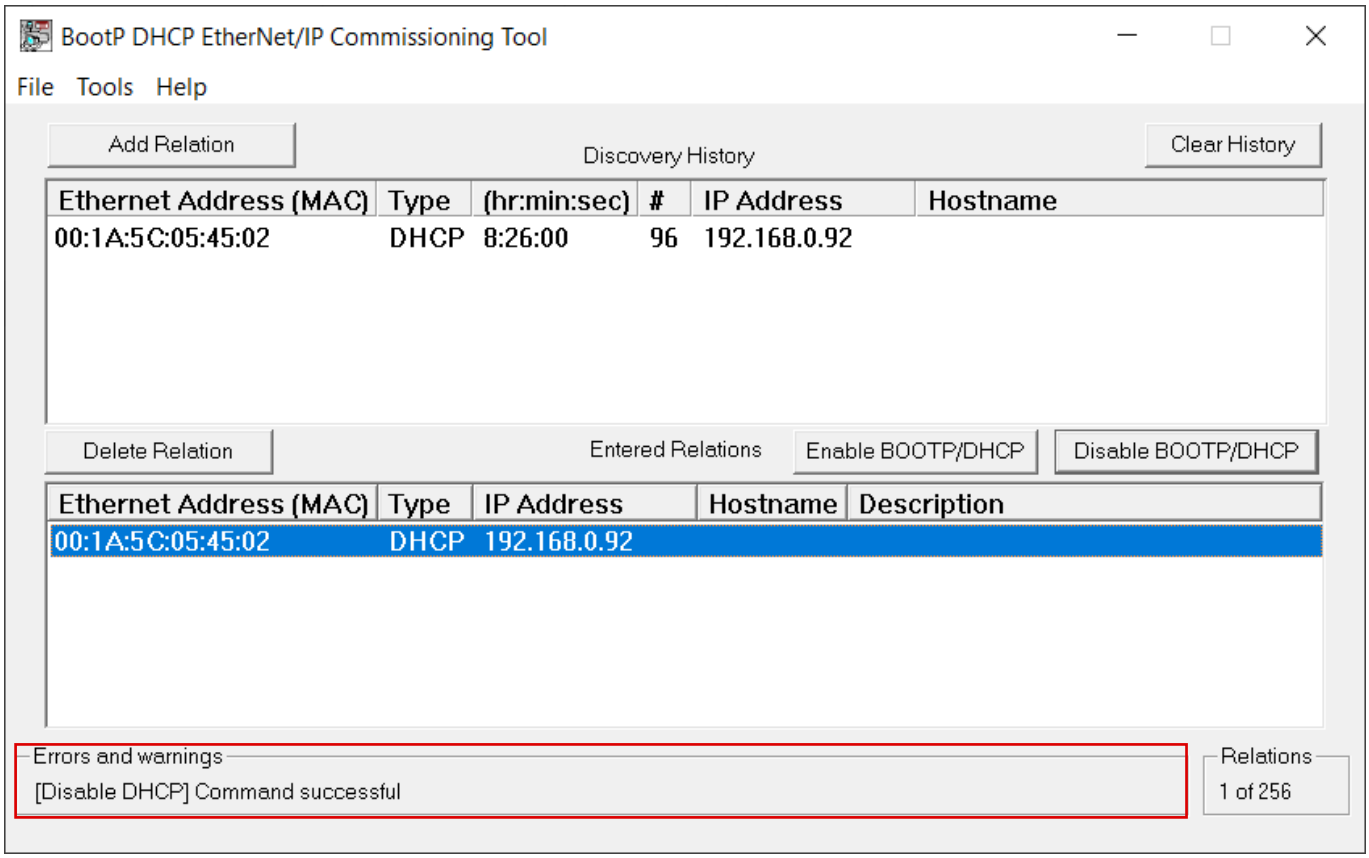

Fig. 8: Acknowledgment

4.3. Assigning a new IP address to an MGB already in use

1. Set the *DHCP* DIP switch to *ON*.

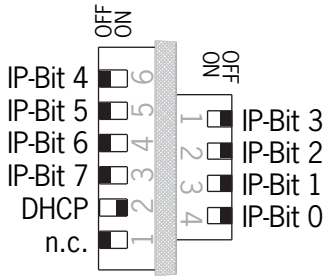

Fig. 9: MGB DIP switch

2. Open BOOTP/DHCP and select the corresponding network adapter.
3. Make the network settings.
4. Connect the network cable (X3 or X4) to the appropriate RJ45 port on the PC.
5. Connect the MGB to the power supply (X1 or X2).

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6. The connected MGB is displayed in the *Discovery History*.

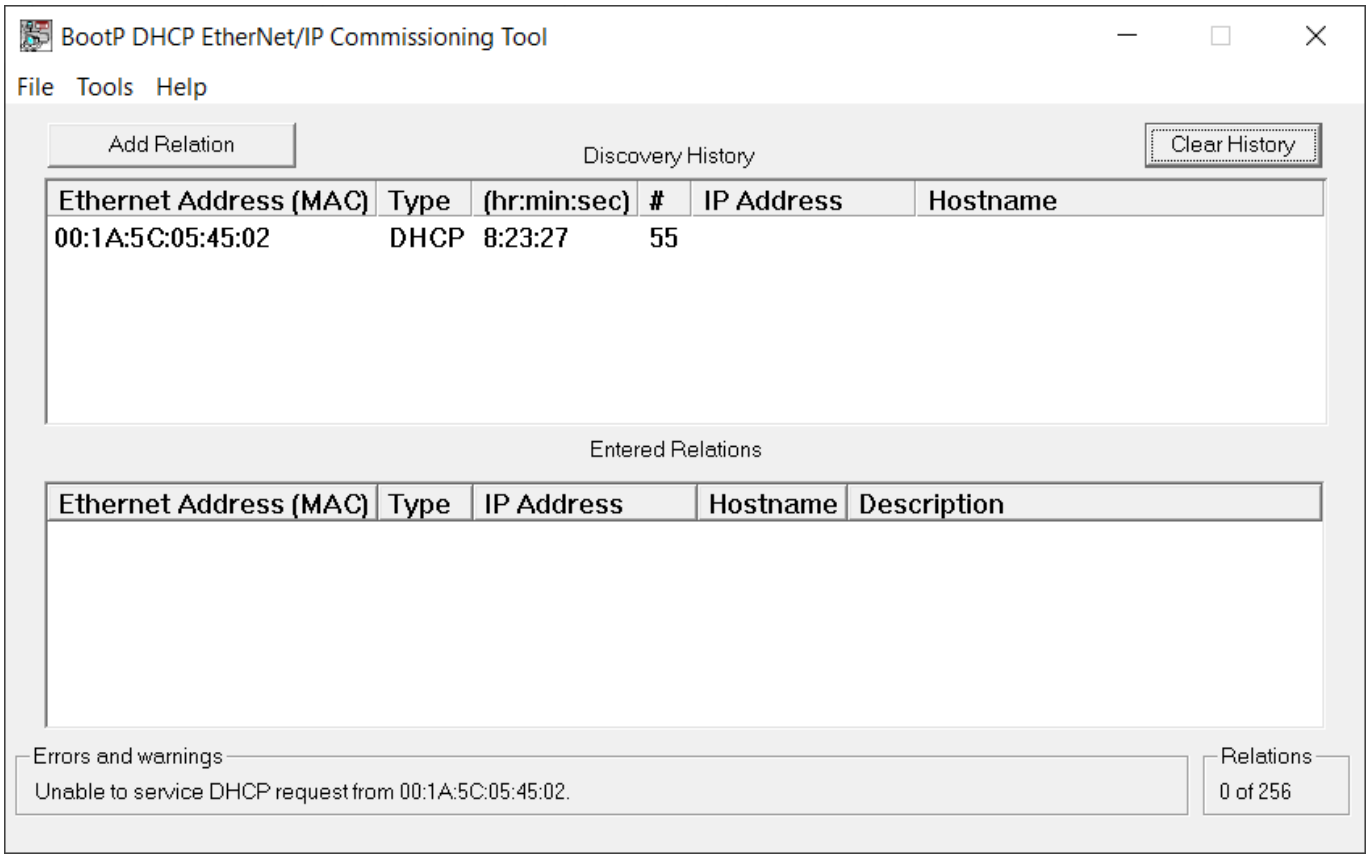

Fig. 10: Automatic search for MAC addresses

7. Compare the MAC address from BOOTP/DHCP with the MAC address on the type label.

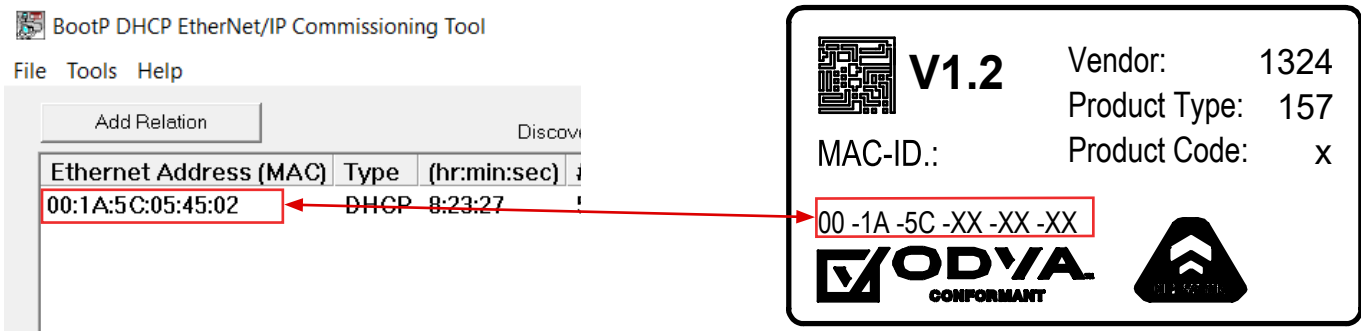

Fig. 11: MAC address comparison

8. Select the MGB and add a new relation with *Add Relation*.

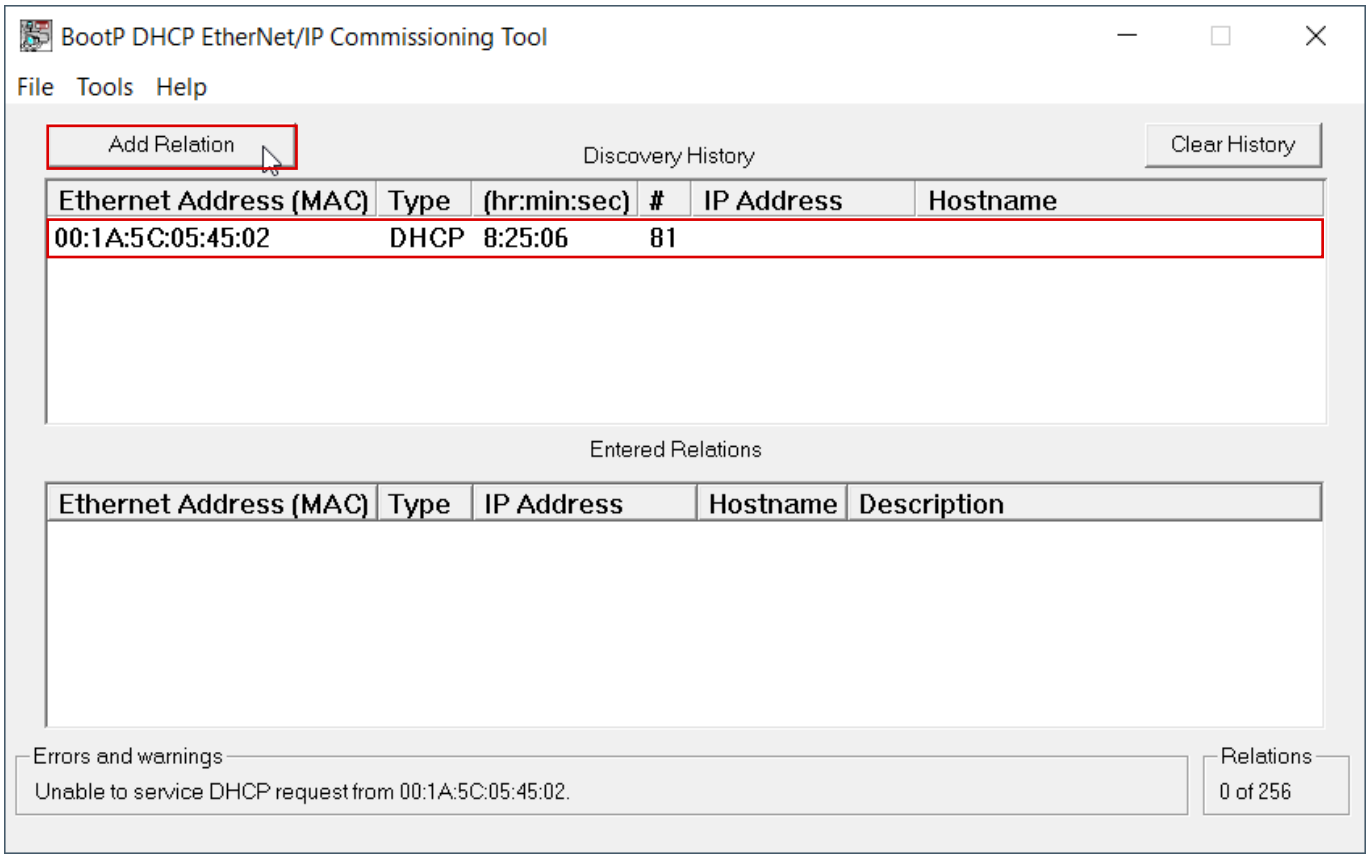

Fig. 12: Adding relation

9. Assign the IP address of the MGB and confirm with *OK*.

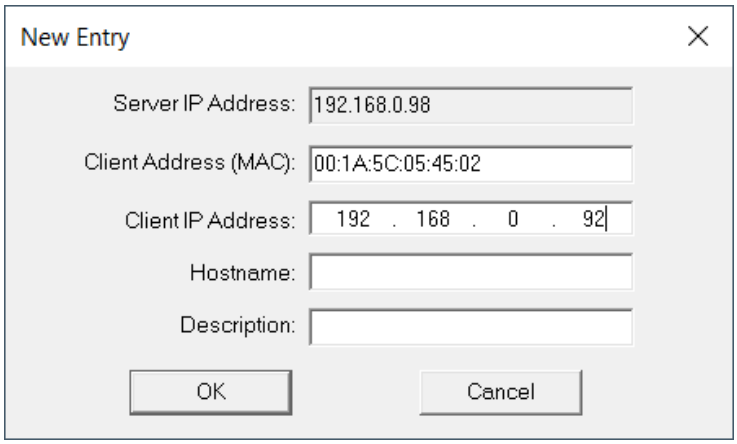

Fig. 13: MGB IP address assignment

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10. After successful IP address assignment, the MGB and its IP address are displayed under *Entered Relations*.

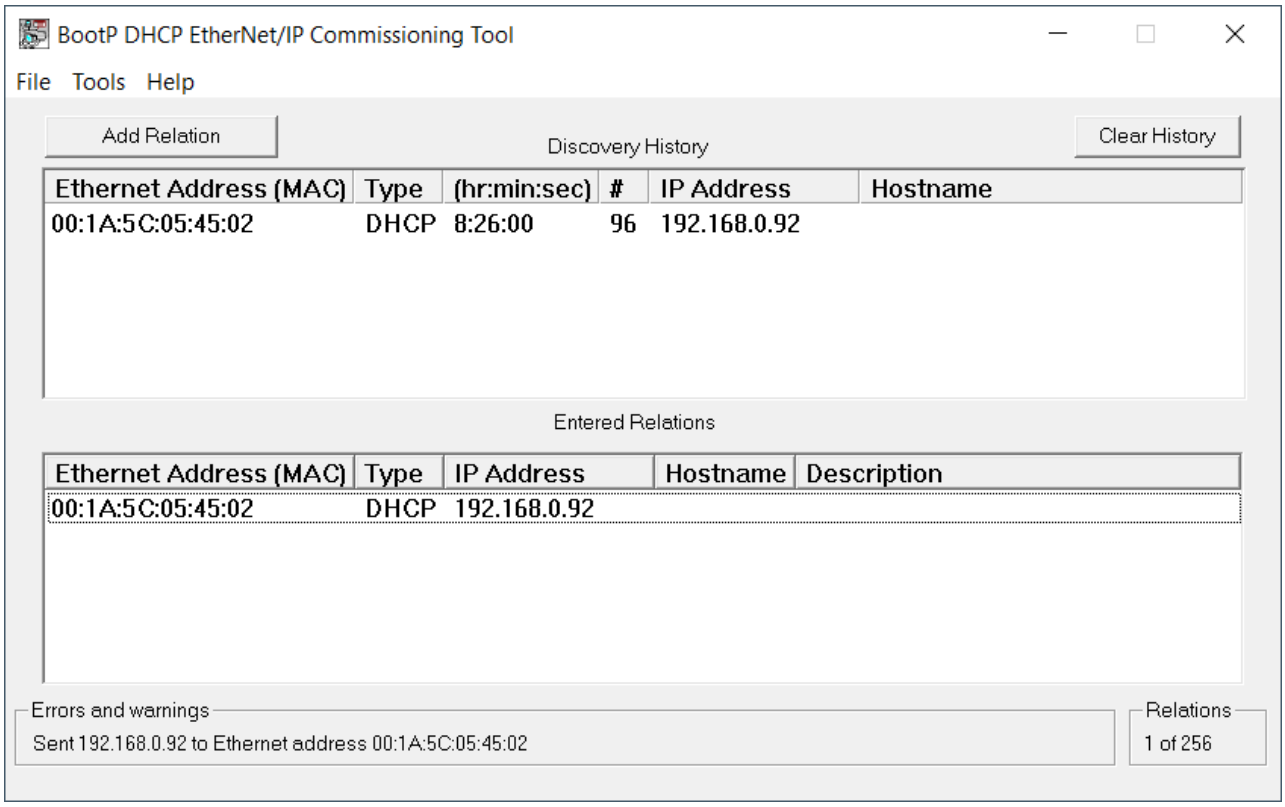

Fig. 14: Entered Relations list

11. Deactivate DHCP in the MGB using *Disable BOOTP/DHCP*.

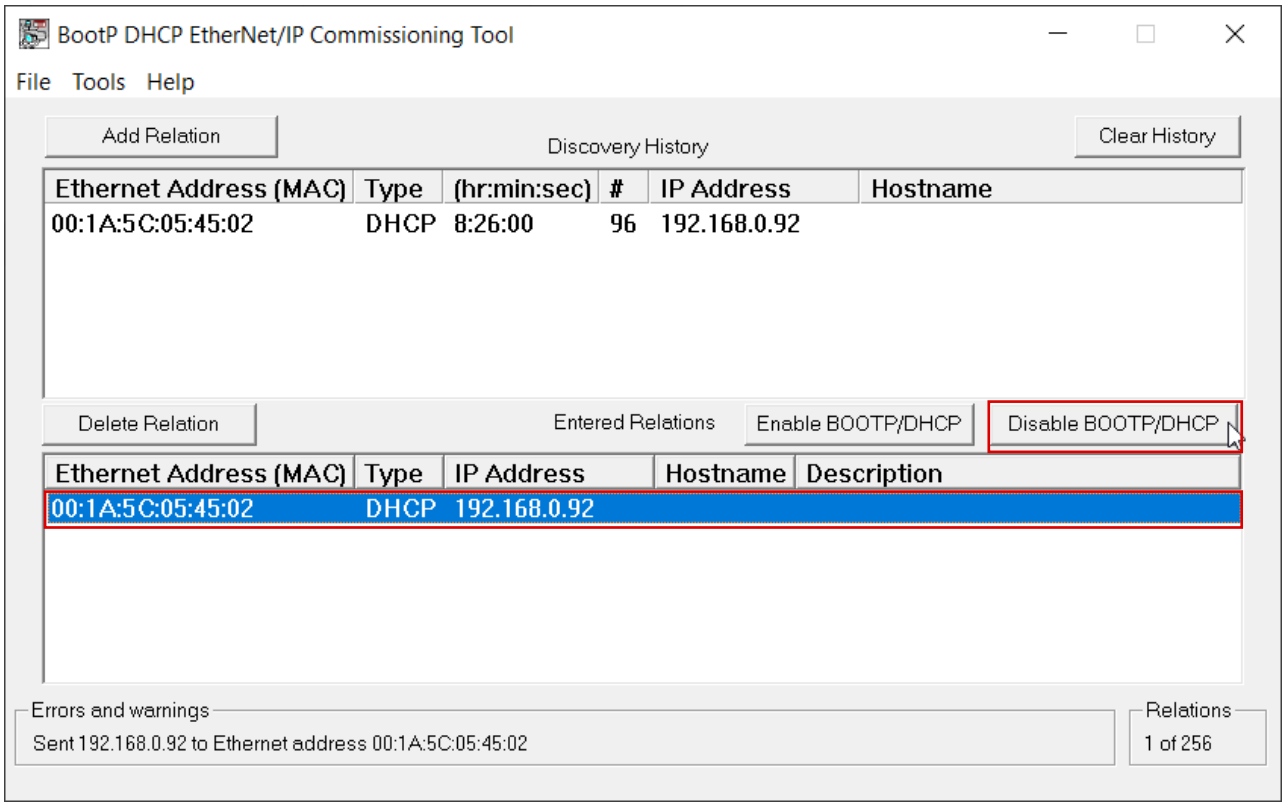

Fig. 15: Deactivating DHCP mode

12. Successful acknowledgment and completion of IP address assignment.

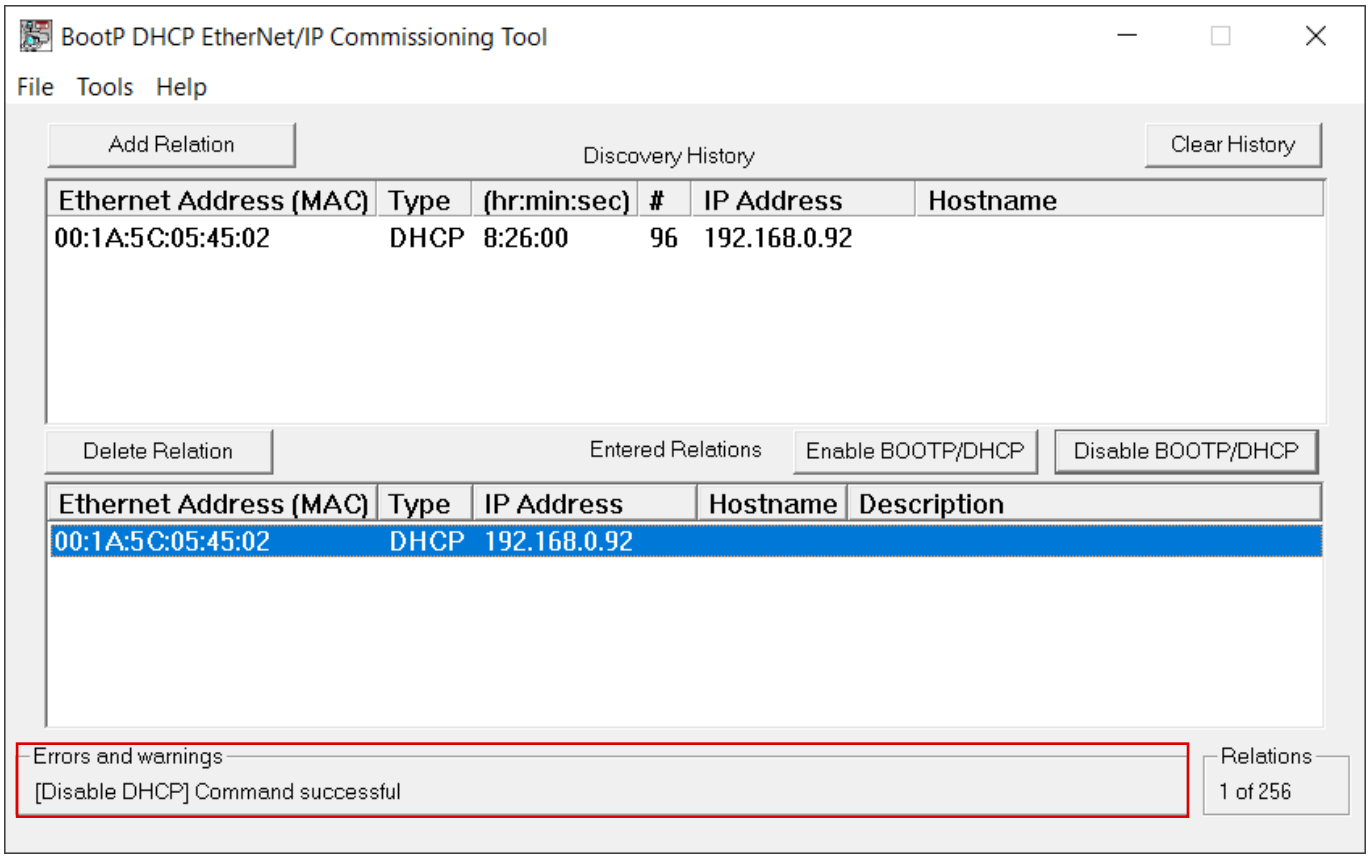

Fig. 16: Acknowledgment

13. Set the *DHCP* DIP switch of the MGB to *OFF*. If the DIP switch is not set to *OFF*, the IP address setting will be deleted again the next time the MGB is restarted.

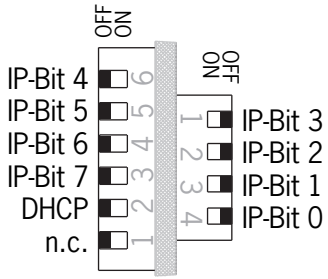

Fig. 17: MGB DIP switch

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5. Integrating the MGB in Studio 5000®

5.1. Installing the EDS file using RSLinx Classic

1. Open RSLinx Classic and scan the network. Then right-click the device you found. Now select *Upload EDS file from device*.

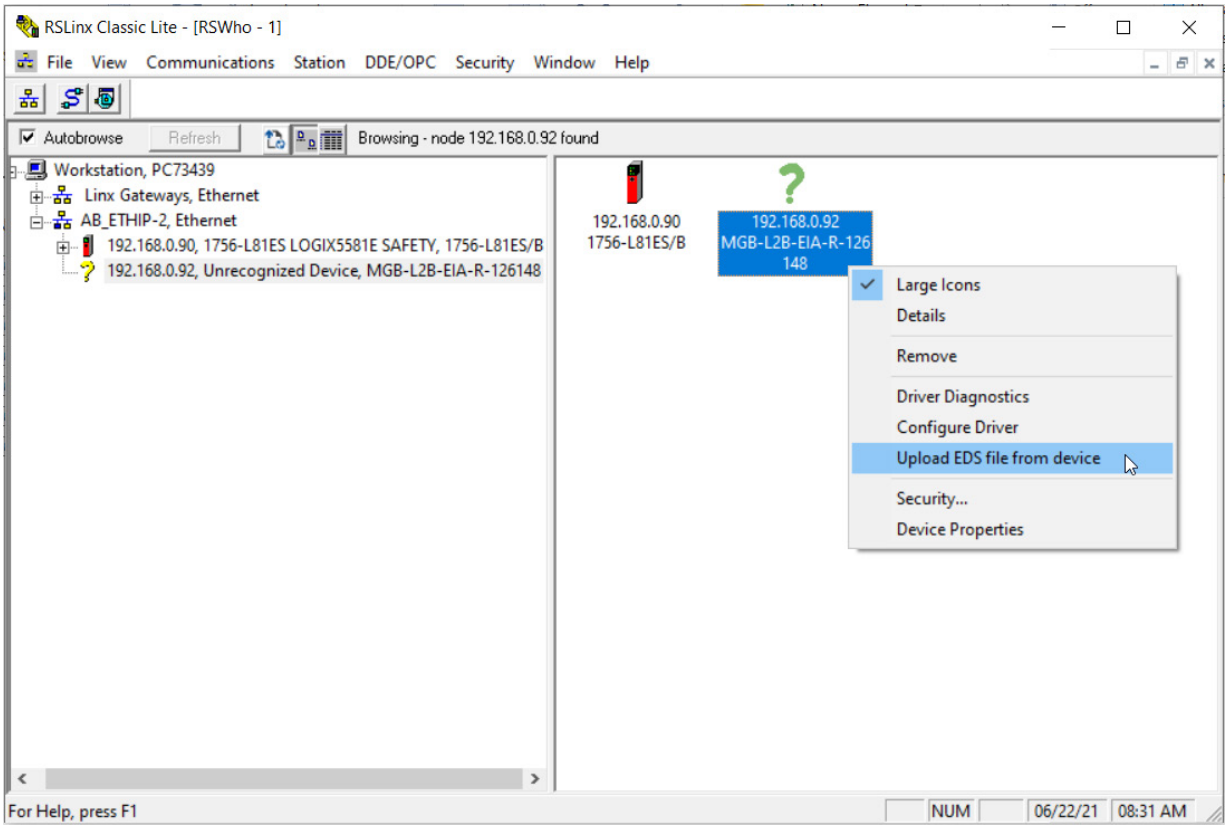

Fig. 18: RSLinx Classic device overview

2. The *Rockwell Automation's EDS Wizard* opens. Follow the Wizard's instructions by clicking *Next* until the EDS file has been successfully installed. Then click *Finish*.

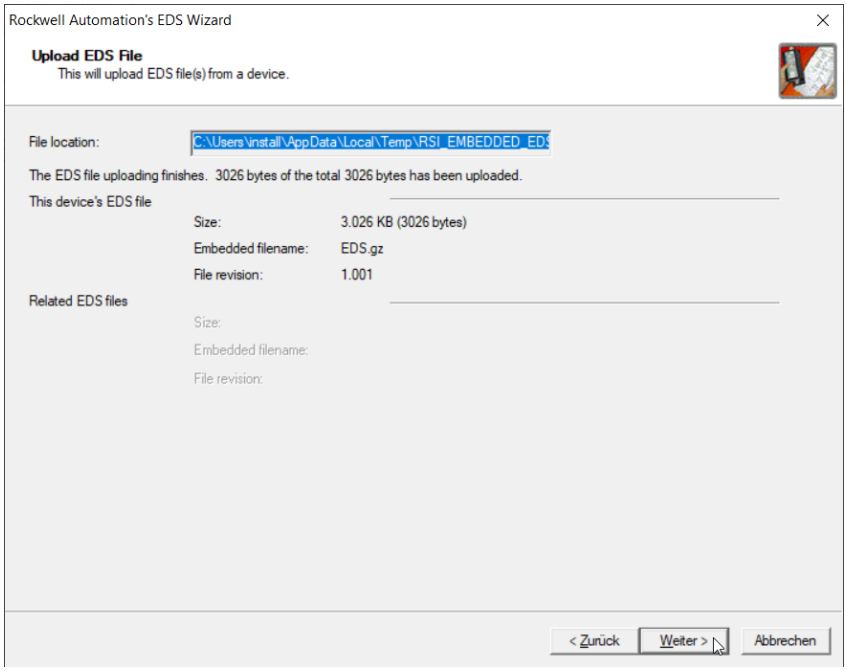

Fig. 19: Rockwell Automation's EDS Wizard

3. RSLinx Classic will display the device with designation and item number.

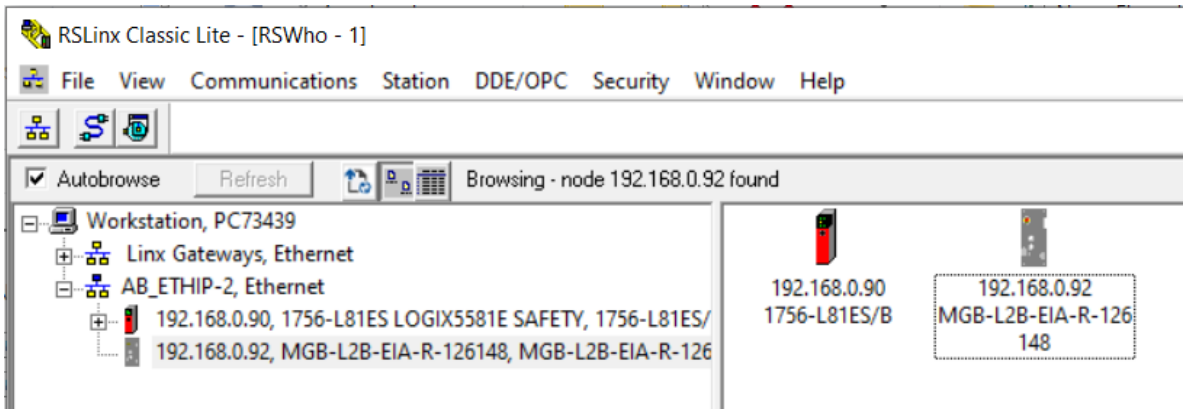

Fig. 20: RSLinx Classic device overview

5.2. Configuring and parameterizing the MGB in Studio 5000®

1. In your project in Studio 5000®, right-click *Ethernet* and select *New Module...*.

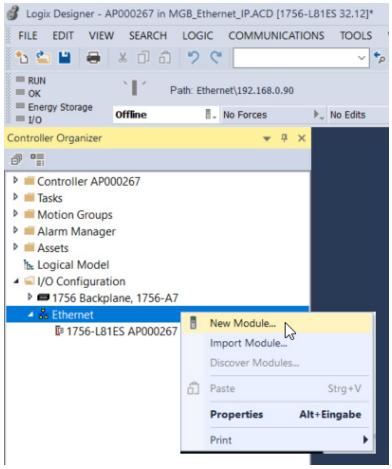

Fig. 21: Adding new module

2. Enter the item number (here: 126148) in the search box on the *Catalog* tab. Then click *Create*.

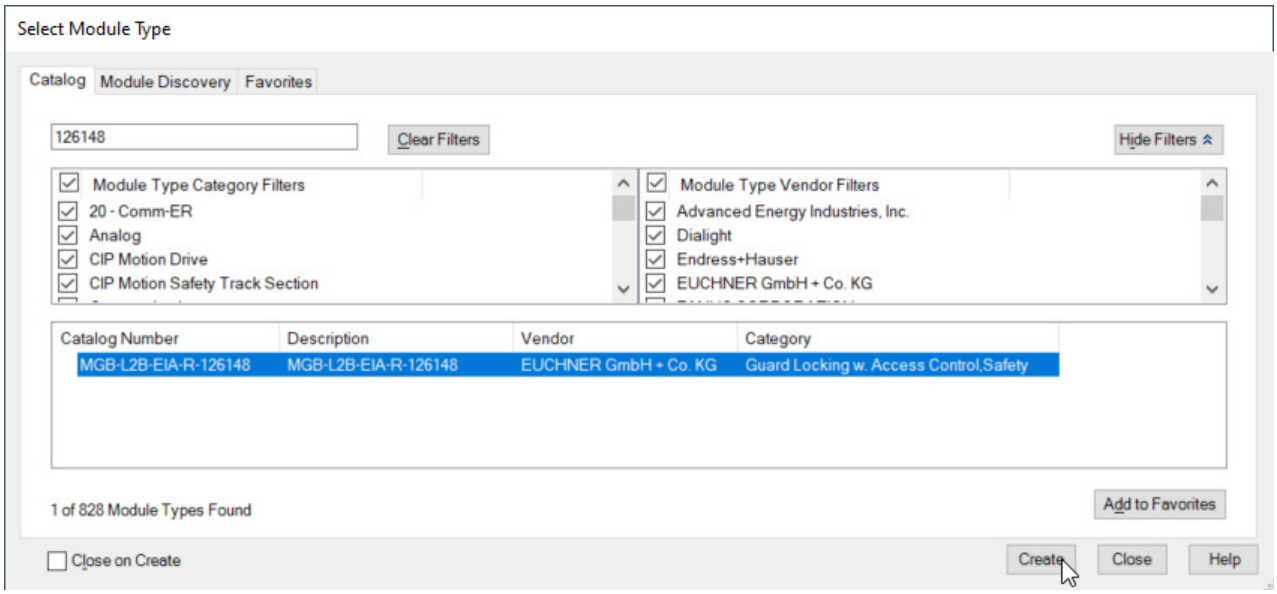

Fig. 22: Device catalog

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3. The device must now be parametrized. To do this, complete the following fields on the *General* tab:
‣ Name: MGB_EI_AP000267 (as example here)
‣ IP Address: 192.168.0.92 (as example here)

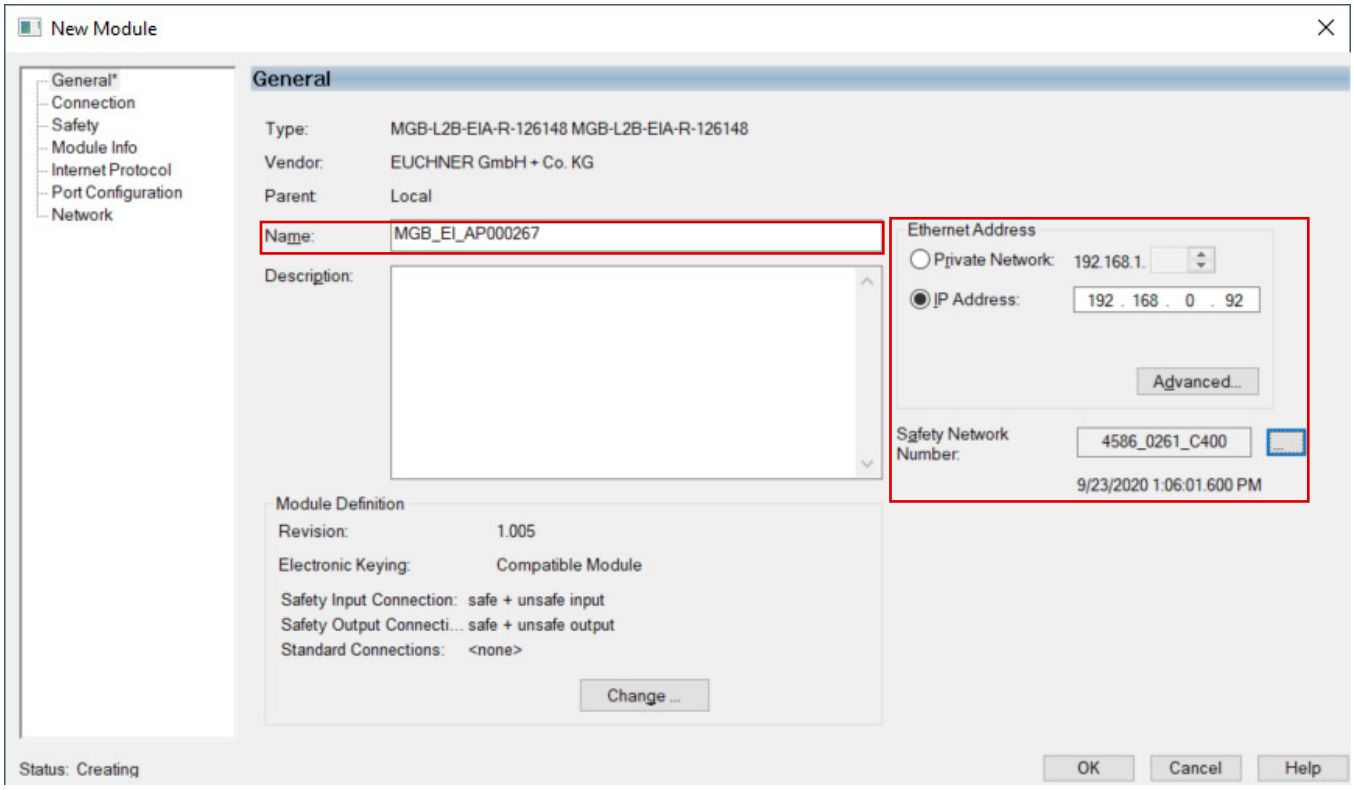

Fig. 23: Module parametrization

4. Open the *Safety* tab. Enter 20 in the editable part of the table. The other table values will adapt automatically. Deselect the configuration signature (the MGB does not include any configuration data).

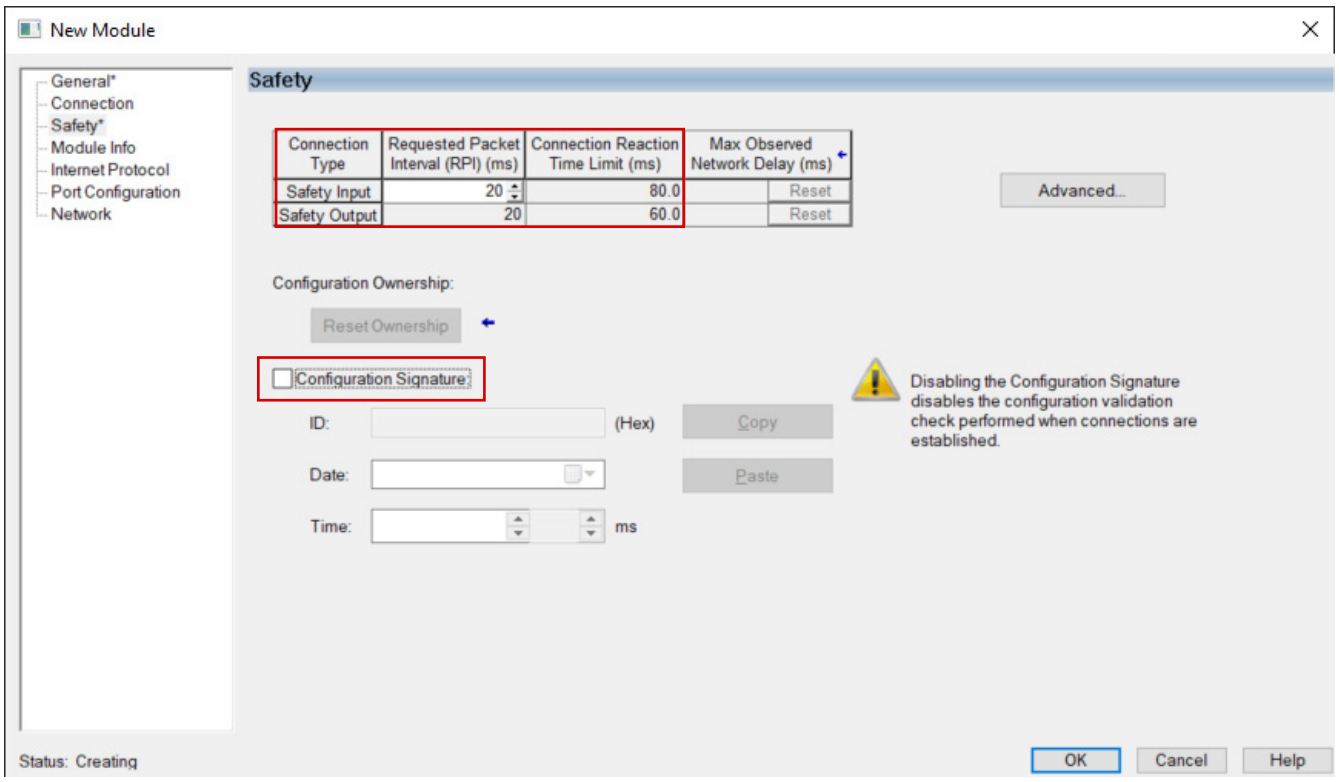

Fig. 24: Safety parametrization

5. The program must now be transferred. Go online after loading to the control system.
6. The *Safety Network Number* must be set as the next step. To do this, open the MGB properties and click ...

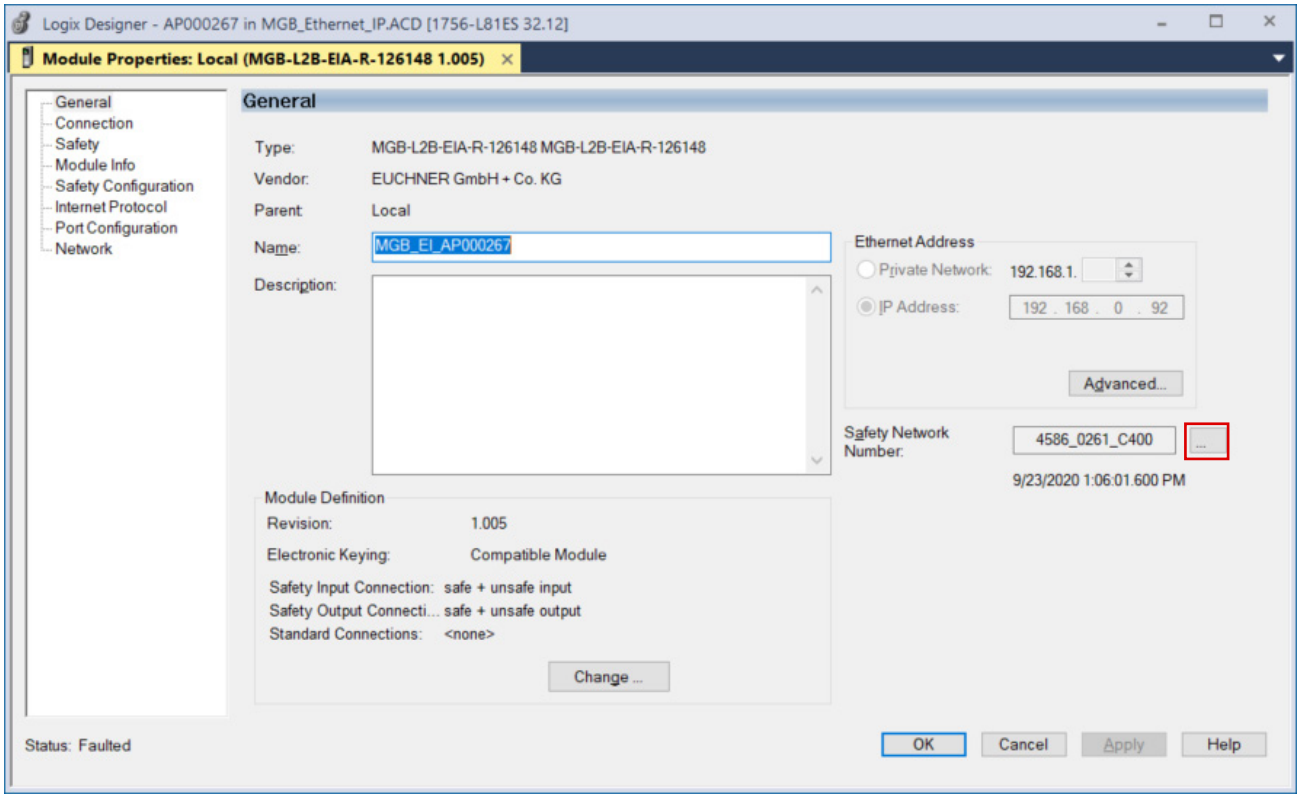

Fig. 25: Opening Safety Network Number

7. The following window opens. Click *Set*.

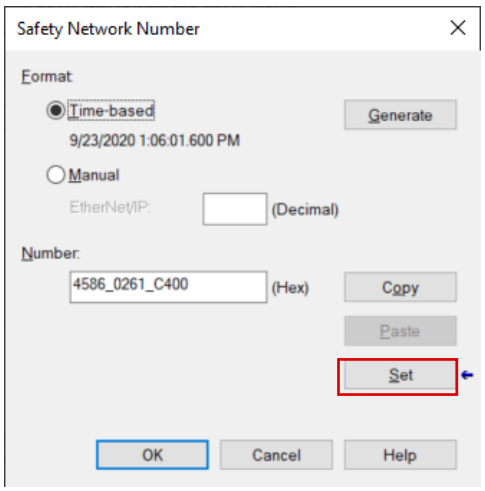

Fig. 26: Setting Safety Network Number

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8. Acknowledge the warning. This will transfer the ownership for the MGB to the CPU in this project.

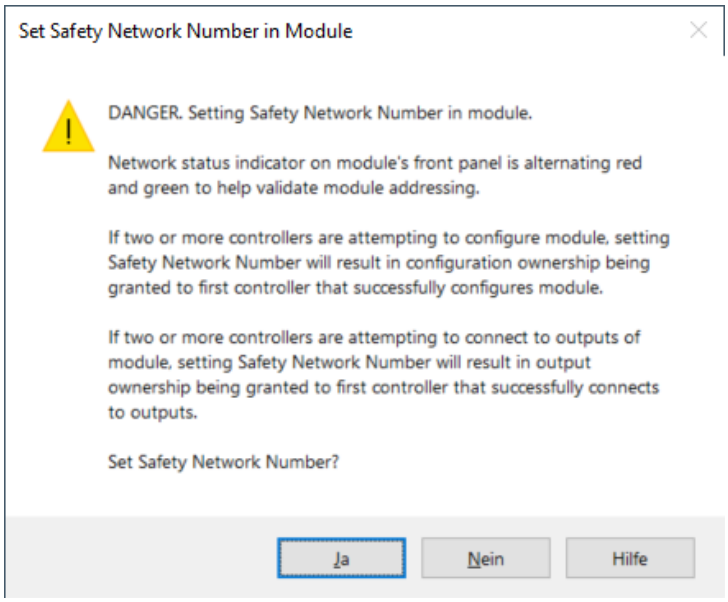

Fig. 27: Safety Network Number warning

6. Using the AOI

An Add-On-Instruction (AOI) is available for download from the Euchner homepage, www.euchner.com. When the AOI is used, the safe information is separated from the standard information and the designations for the individual bits are assigned to the respective MGB. If several MGBs are used, the same number of AOI instances must be created. Each instance must have a unique name.

6.1. Importing the AOI

1. In the *Controller Organizer*, right-click *Add-On Instructions* under *Assets*. Then select *Import Add-On Instruction...*.

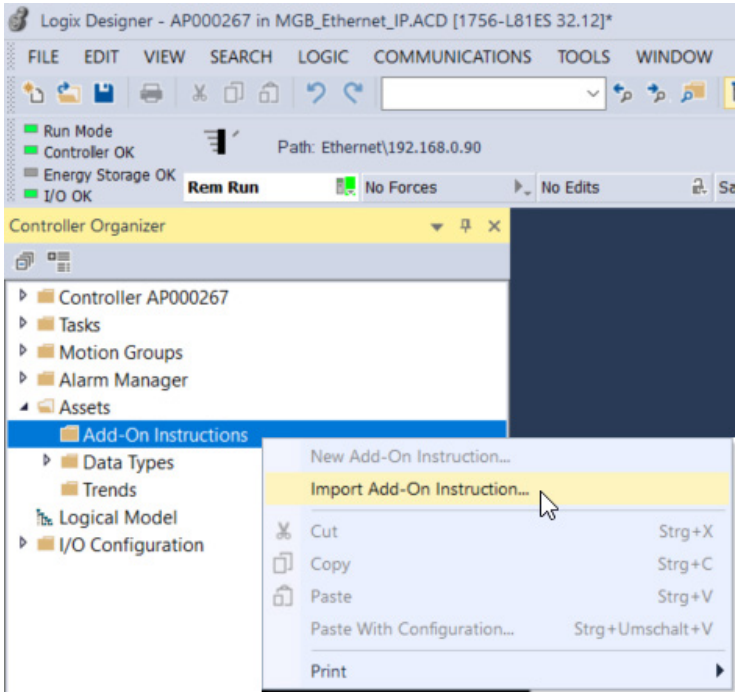

Fig. 28: Importing AOI

2. Select the unzipped AOI in L5X file format and then click *Open*.

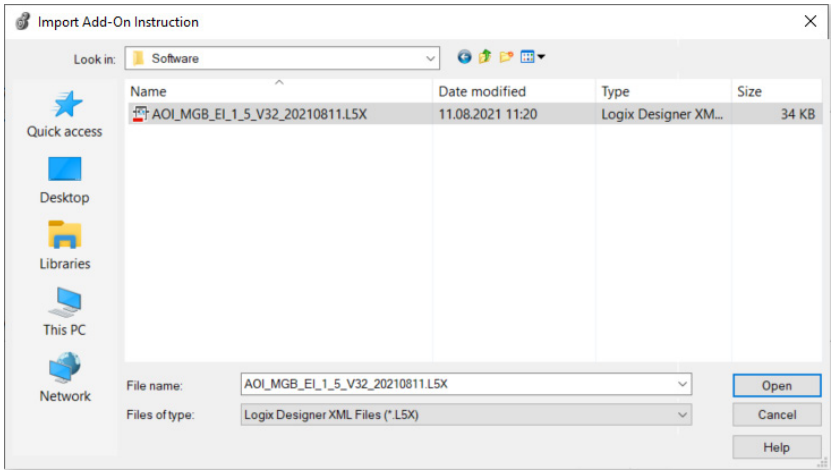

Fig. 29: Selecting AOI

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3. Name the AOI and confirm with OK. All required information will now be imported.

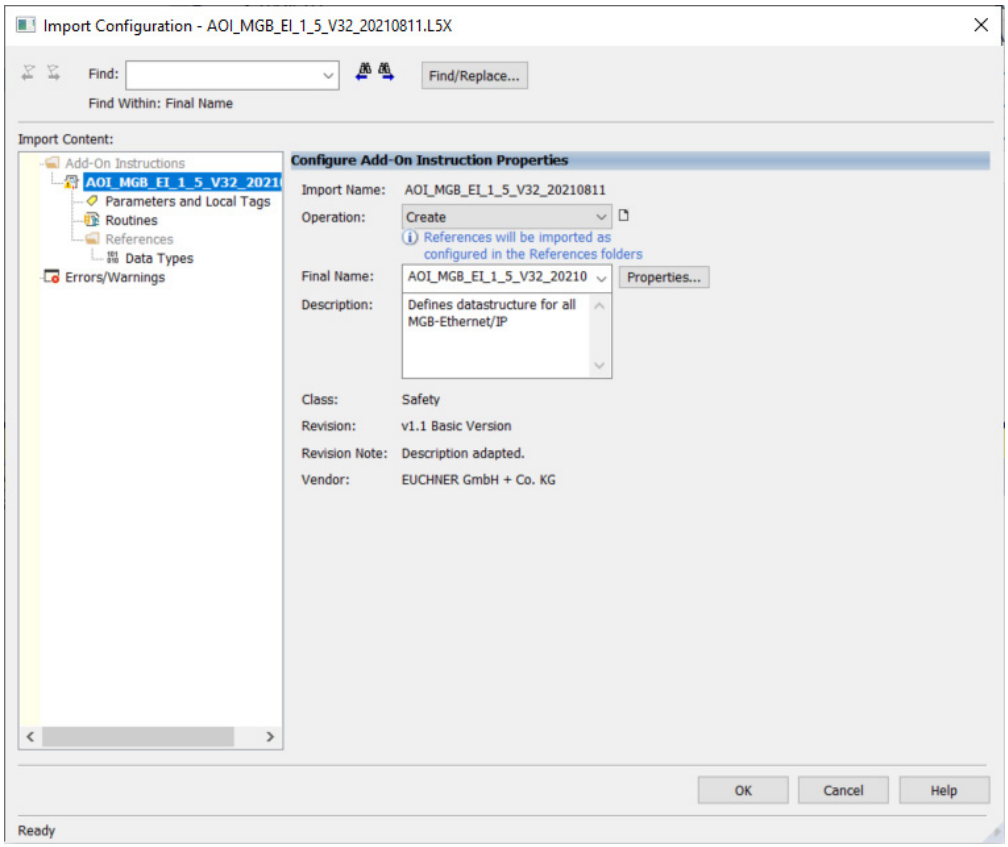

Fig. 30: Import configuration

4. After the import, you will see the new data types for the MGB in the *Add-On Instructions* folder and the new data types for the MGB in the *Data-Types* folder, *User-Defined* subfolder.

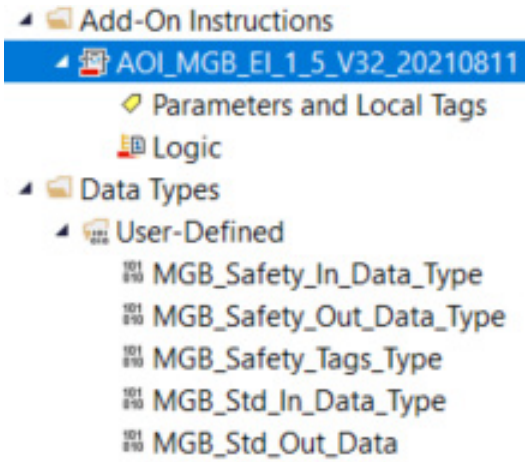

Fig. 31: AOI content

6.2. Integrating the AOI

1. Drag and drop the AOI_MGB to add it to your safety program.

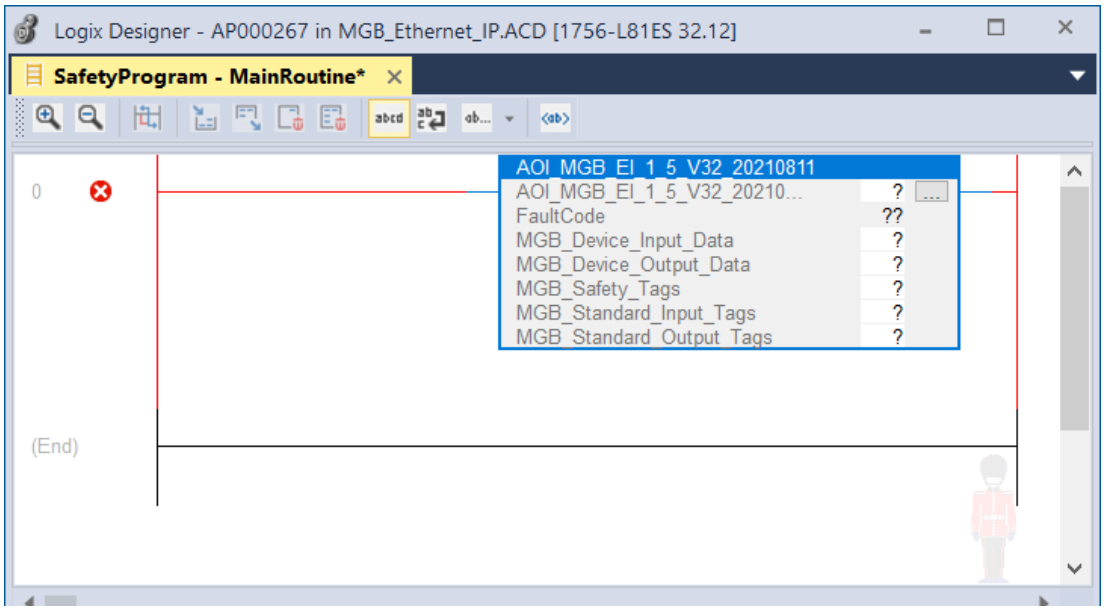

Fig. 32: Adding AOI to safety program

2. Open the context-sensitive menu by right-clicking *AOI_MGB_EI...*. Select *New Tag...* .

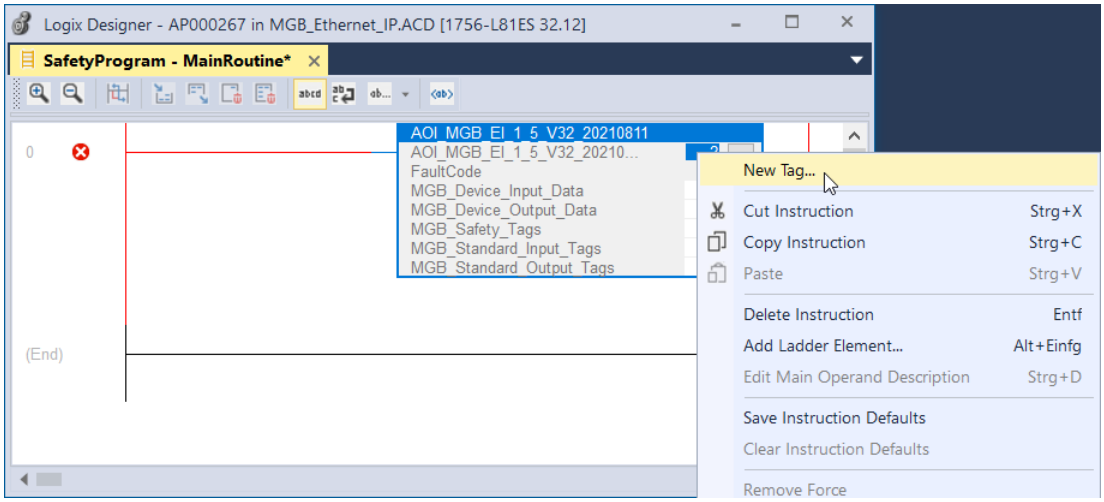

Fig. 33: Creating new tag

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3. Give the instance a unique name (here: *AOI_MGB_Tag*). Select *SafetyProgram* from the *Scope:* drop-down list.

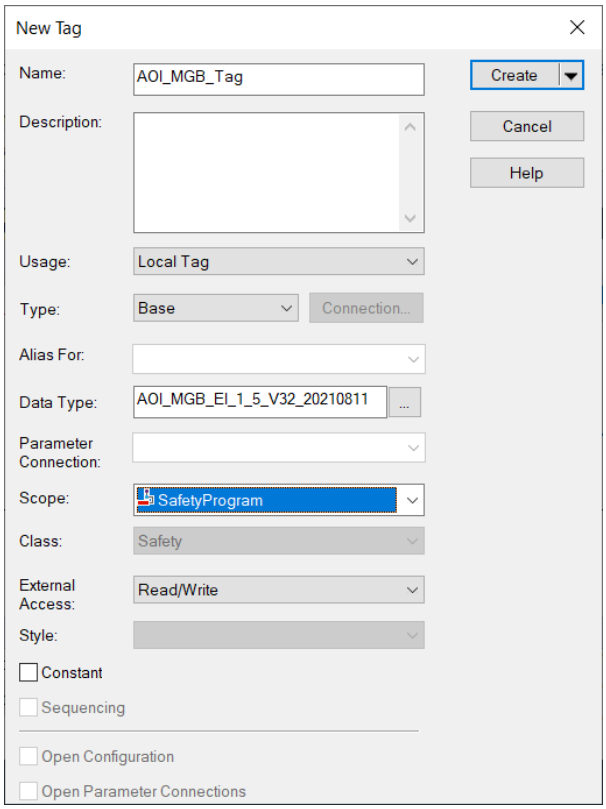

Fig. 34: Configuring new tag

4. Once the tag has been created, the inputs and outputs must be linked to the MGB used in the MGB_Device_Input_Data and MGB_Device_Output_Data fields. For this purpose, select the designation of the MGB to which the command is to be linked (here: the designation of application AP000267).

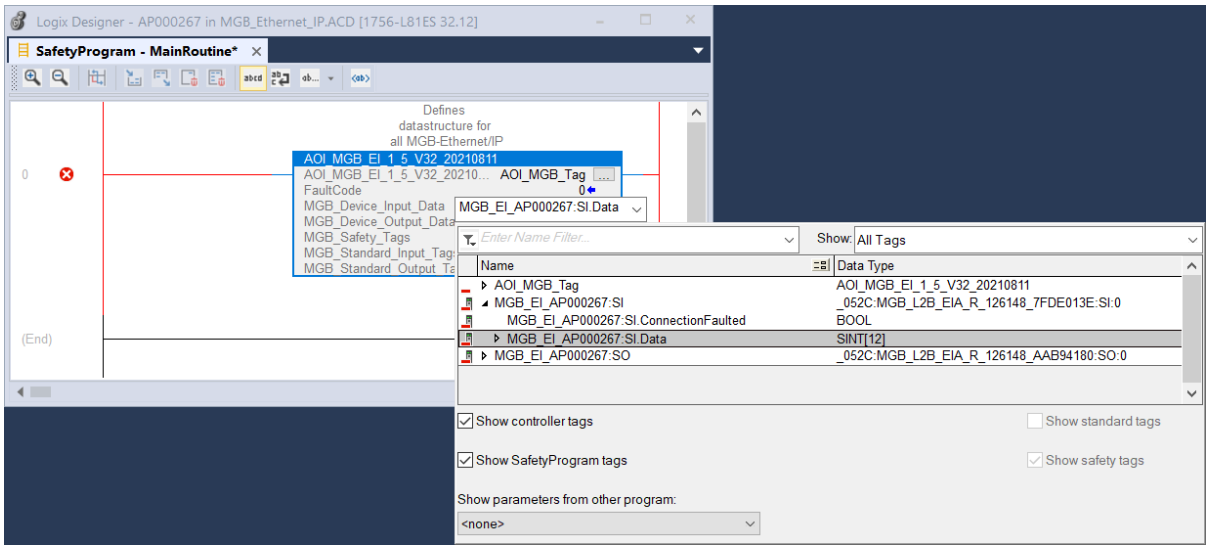

Fig. 35: Linking the MGB inputs

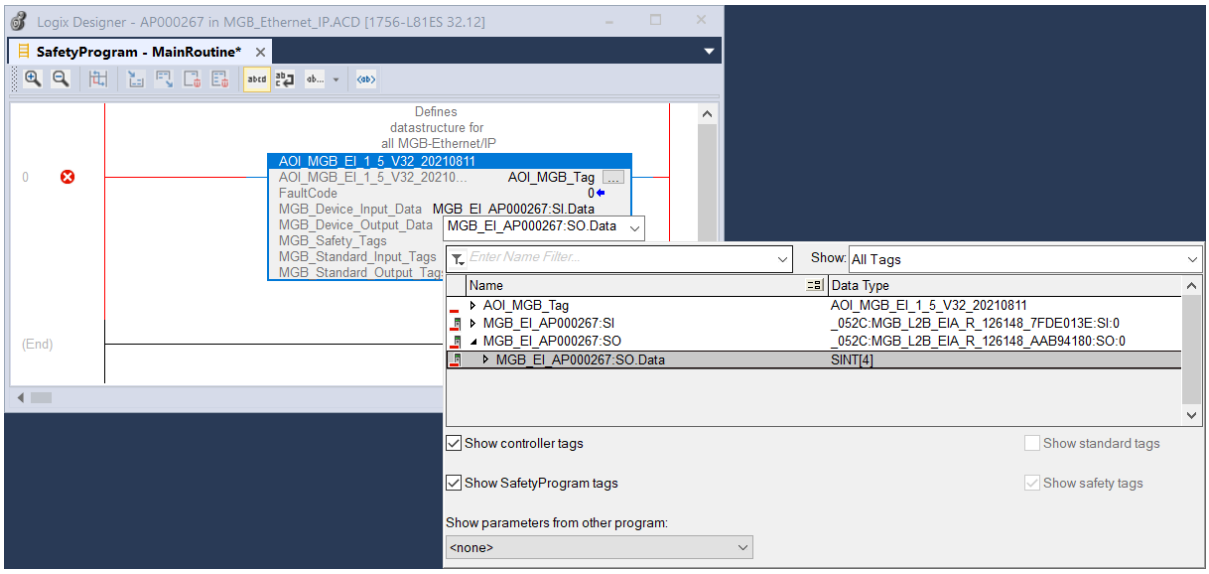

Fig. 36: Linking the MGB outputs

5. Now create the standard tags and the safety tag. Under *Scope*, select where the tags are to be created. In this example, the safety tag is created in the *SafetyProgram* and the standard tags under the *Controller Tags*.

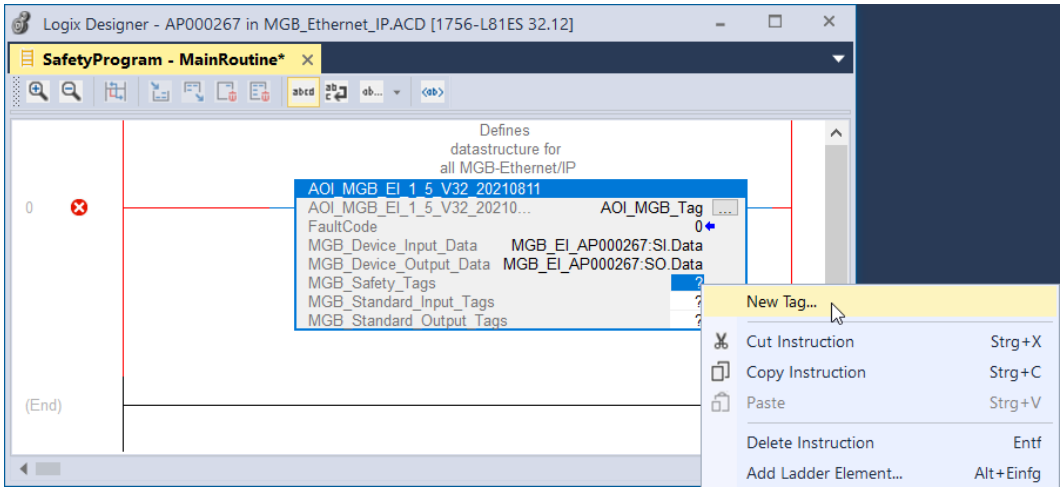

Fig. 37: Creating new tag

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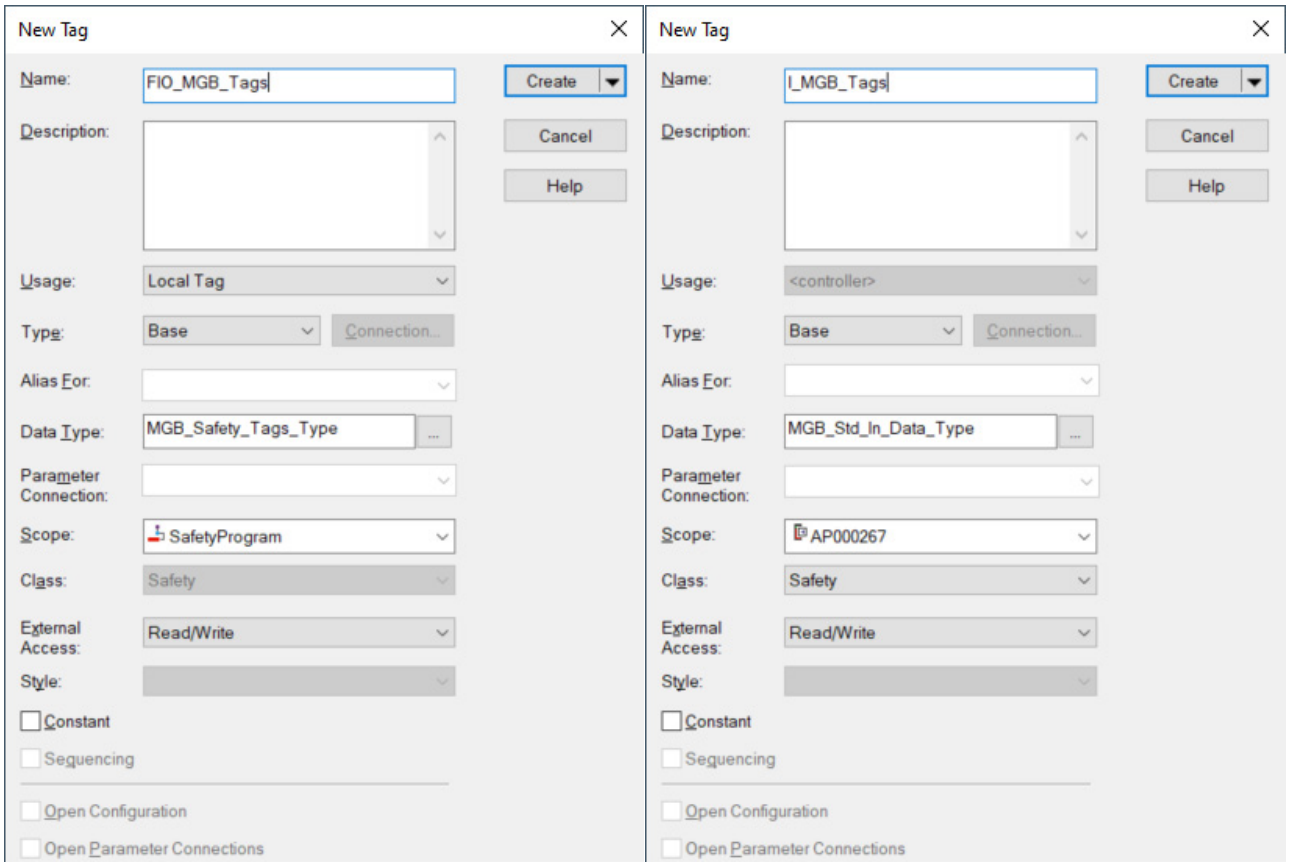

Fig. 38: Configuring new tags

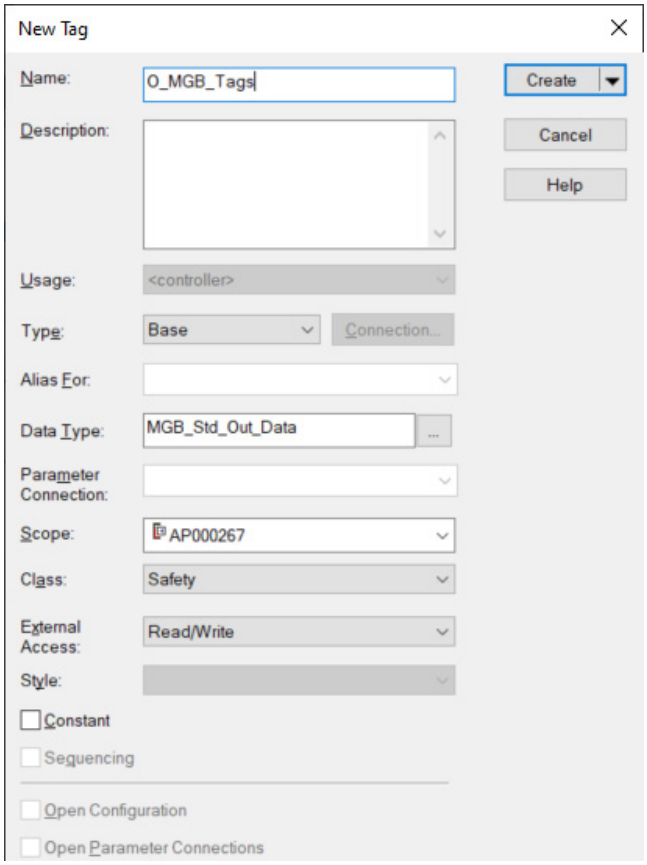

Fig. 39: Configuring new tag

6. Open the global *Controller Tags*, create a new tag with the data type *MGB_Std_Out_Data* and select the *Class Standard* (here: Tag Name: O_MGB_Std_Tags).

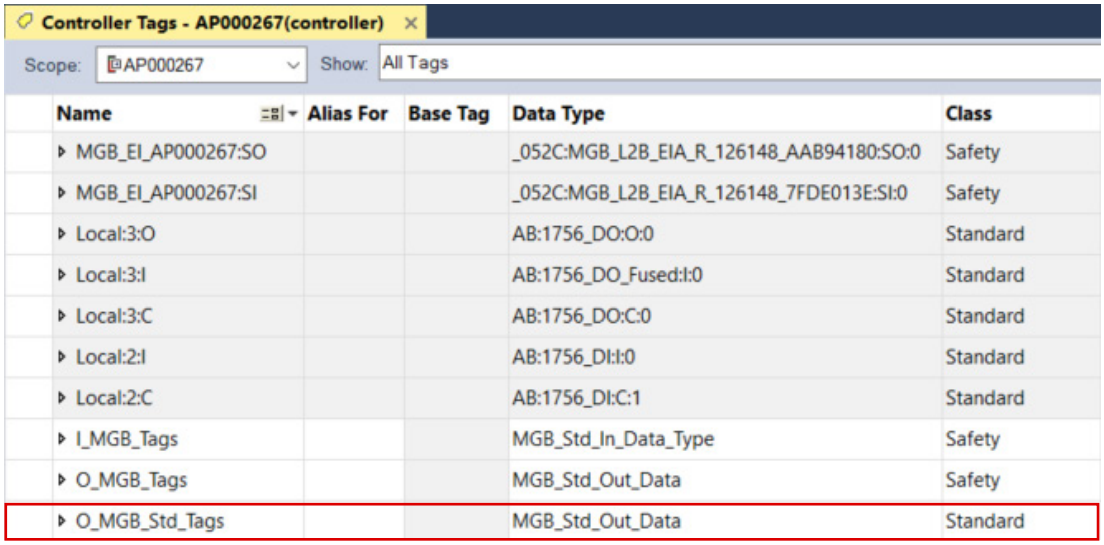

Fig. 40: Creating new tag in Controller Tags

7. During processing in the safety task, the AOI copies the necessary bits from the MGB input area to the variables created earlier. The outputs from the standard task are copied to the MGB structure. To separate safe bits and standard bits, the standard bits still need to be made available for the outputs on the standard tasks. For this purpose the corresponding part of the safe bits is mapped to the new variable just created. The safe inputs can be read directly from the safe data in the standard task.

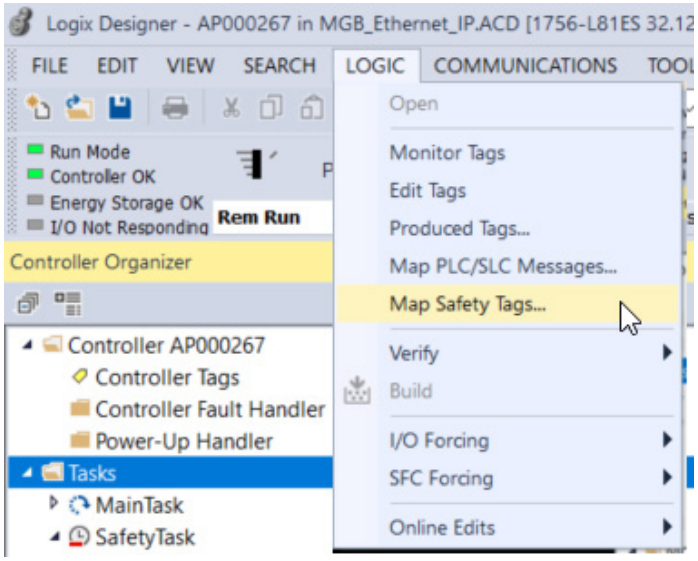

Fig. 41: Opening safety tag mapping

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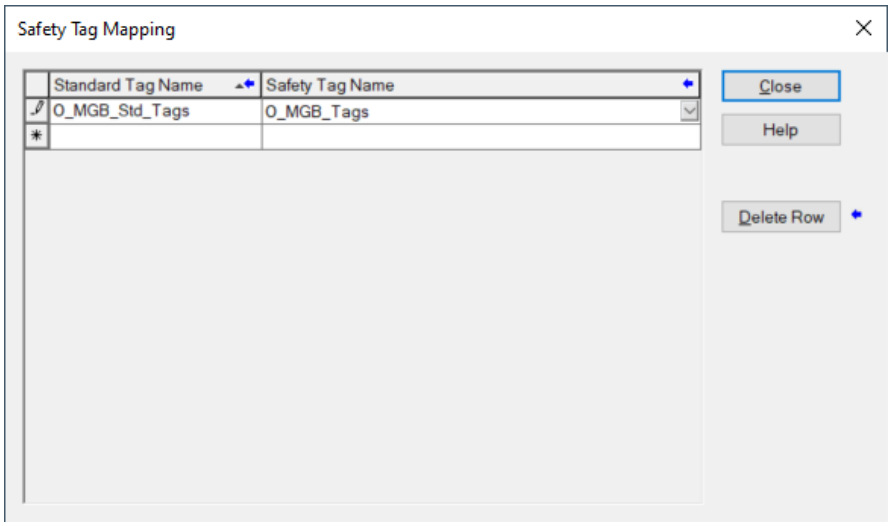

Fig. 42: Linking standard tag with safety tag

NOTICE

All tags of the *Safety* class from the AOI are available for reading. The tags of the class (here: O_MGB_Std_Tags) are available for writing.

7. Important note – please observe carefully!

This document is intended for a design engineer who possesses the requisite knowledge in safety engineering and knows the applicable standards, e.g. through training for qualification as a safety engineer. Only with the appropriate qualification is it possible to integrate the example provided into a complete safety chain.

The example represents only part of a complete safety chain and does not fulfill any safety function on its own. In order to fulfill a safety function, the energy switch-off function for the danger zone and the software must also be considered in the safety evaluation, for example.

The applications provided are only examples for solving certain safety tasks for protecting safety doors. The examples cannot be comprehensive due to the application-dependent and individual protection goals within a machine/installation.

If questions concerning this example remain open, please contact us directly.

According to the Machinery Directive 2006/42/EC, the design engineer of a machine or installation has the obligation to perform a risk assessment and take measures to reduce the risk. While doing this, the engineer must comply with the applicable national and international safety standards. Standards generally represent the current state-of-the-art. Therefore, the design engineer should continuously inform himself about changes in the standards and adapt his considerations to them. Relevant standards for functional safety include EN ISO 13849 and EN 62061. This application must be regarded only as assistance for the considerations about safety measures.

The design engineer of a machine/installation has the obligation to assess the safety technology himself. The examples must not be used for an assessment, because only a small excerpt of a complete safety function was considered in terms of safety engineering here.

In order to be able to use the safety switch applications correctly on safety doors, it is indispensable to observe the standards EN ISO 13849-1, EN ISO 14119 and all relevant C-standards for the respective machine type. Under no circumstances does this document replace the engineer's own risk assessment, and it cannot serve as the basis for a fault assessment.

In particular in relation to a fault exclusion, it must be noted that a fault can be excluded only by the machine's or installation's design engineer and this action requires justification. A general fault exclusion is not possible. More information about fault exclusion can be found in EN ISO 13849-2.

Changes to products or within assemblies from third-party suppliers used in this example can lead to the function no longer being ensured or the safety assessment having to be adapted. In any event, the information in the operating instructions on the part of EUCHNER, as well as on the part of third-party suppliers, must be used as the basis before this application is integrated into an overall safety function. If contradictions should arise between the operating instructions and this document, please contact us directly.

Use of brand names and company names

All brand names and company names stated are the property of the related manufacturer. They are used only for the clear identification of compatible peripheral devices and operating environments in relation to our products.

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