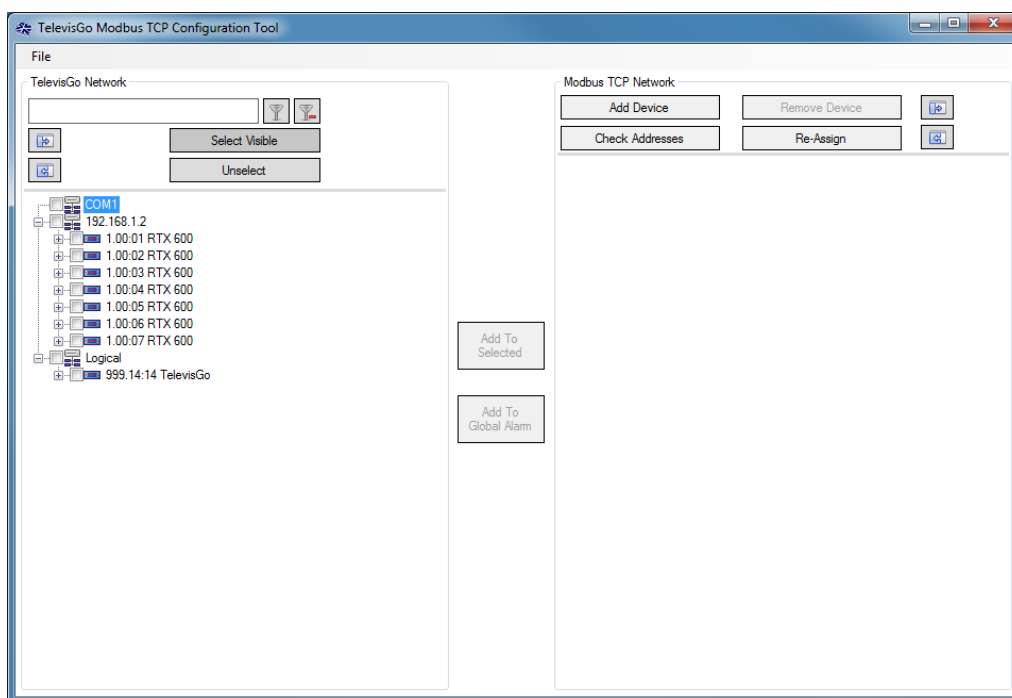# TelevisGo Modbus/TCP BMS Configuration Tool

USER GUIDE

www.eliwell.com

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Eliwell nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Eliwell software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it.

The following special messages may appear throughout this documentation or on the equipment to inform of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result** in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result** in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Eliwell for any consequences arising out of the use of this material.
A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Before starting

Do not use this product on machines without effective protection on the working point.
The lack of effective protection on the working point of a machine can cause serious accidents for the machine operator.

⚠ WARNING

EQUIPMENT WITHOUT PROTECTION

- Do not use this software or the relative automation equipment on a device lacking protection on the working point.
- Never insert hands inside the machine during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and the relative software are used to control various industrial processes. The type or model of the automation equipment suitable for each application varies based on factors such as the requested control function, the necessary degree of protection, the production methods, any unusual conditions, government regulations, etc. In some applications more than one processor may be necessary, such as when reserve redundancy is necessary.

Only the user, the machine manufacturer or the system integrator can be updated about all the conditions and factors present when preparing, starting-up and servicing the machine and therefore only they are able to determine which automation equipment and relative safety devices and interlocks can be used in a correct manner. When the automation and control equipment and the relative software are selected for a particular application, also the applicable local and national standards and regulations must be taken into consideration. Furthermore, the manual for accident prevention of the National Safety Council (recognised nationally in the United States of America) provides very useful information.

In some applications, such as with packaging machines, additional protections must be provided for the operator, such as protection of the working point, for example. This is necessary if hands or other parts of the operator's body can reach crushing points or other dangerous areas and serious accidents can occur. Software products alone cannot protect an operator against accidents. For this reason, the software cannot replace or represent an alternative to protection of the working point.

Before putting the equipment into service, make sure that all the safety devices and appropriate mechanical/electrical interlocks relative to the protection of the working point have been installed. All the interlocks and safety devices relative to the protection of the working point must be coordinated with the corresponding software programming and automation instruments.

NOTE: *The coordination of the safety devices and mechanical/electrical interlocks for the protection of the working point lies outside the scope of the function block library, the system user guide or other implementations to which reference is made in this documentation.*

Start-up and testing

Before using the electric control and automation equipment for normal operation after installation, the system should be subjected to a start-up test by qualified personnel to make sure the equipment is functioning correctly.

It is important to carry out the preparations for this check and that sufficient time is provided in order to completely and satisfactorily perform the test.

⚠ CAUTION

DANGER WHEN STARTING-UP THE EQUIPMENT

- Check that all installation and preparation procedures have been completed.
- Before performing the operating tests, remove all the locks or other temporary retaining devices used when shipping the component devices.
- Remove any tools, measuring instruments and debris from the equipment.

Failure to follow these instructions can result in injury or equipment damage.

Perform all the start-up tests recommended in the equipment documentation.
Conserve the documentation for all the equipment for future consultation.

The software must be tested in a simulated environment as well as in the real environment.

Check that the completed system is free of short circuits and that the temporary earthing system is not installed in compliance with local standards (for example the National Electrical Code in the US).
If it is necessary to perform high potential voltage tests, comply with the recommendations provided in the equipment documentation in order to prevent damaging the device.

Before powering the equipment:

- Remove any tools, measuring instruments and debris from the equipment.
- Close the door in the equipment casing.
- Remove all the temporary earthing systems from the incoming power supply lines.
- Perform all the start-up tests recommended by the manufacturer.

Operation and adjustments

The following precautionary measures were taken from the NEMA Standards Publication ICS 7.1-1995 (the English version prevails):

- Regardless of the care exercised in the design and manufacture of the device or in the selection and rating of the components, there are hazards which can be encountered if such equipment is improperly operated.

- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. The manufacturer's instructions should always be used as a guide for functional adjustments. Personnel who are to have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machine used with the electrical equipment.

- Only those operational adjustments which are actually needed by the operator should be accessible to him. Access to other controls should be restricted to prevent unauthorised changes in operating characteristics.

Product related information

⚠ WARNING
LOSS OF CONTROL
• The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.   • Separate or redundant control paths must be provided for critical control functions.   • System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.   • Observe all accident prevention regulations and local safety guidelines.[1]   • Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION
• Only use software approved by Eliwell for use with this equipment.   • Update your application program every time you change the physical hardware configuration.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

ABOUT THE BOOK

Document Scope

This document provides the instructions needed for configuring the Modbus map that TelevisGo displays to third party applications via the Modbus/TCP interface.

Validity Note

This document is valid for "TelevisGo Modbus/TCP BMS Configuration Tool" version 01.

Our policy of continuous improvement involves document revisions to improve clarity and accuracy. Refer to the website **www.eliwell.com** to make sure you have the most updated version

Related Documents

| Document title	Reference Document Code
User Guide - TelevisGo Modbus/TCP BMS Configuration Tool	9MA00270 (IT)
User Guide - TelevisGo	9MA00061 (IT)
User Guide - TelevisGo	9MA10061 (EN)
User Guide - TelevisGo	9MA20061 (FR)
User Guide - TelevisGo	9MA30061 (ES)
User Guide - TelevisGo	9MA50061 (DE)
User Guide - TelevisGo	9MAA0061 (RU)

INTRODUCTION

Description

TelevisGo Modbus/TCP BMS Configuration Tool prepares a map that displays Televis**Go** resources or commands as Modbus/TCP registers organised in virtual devices.

In this way, third party applications can read/write these values via a simple TCP connection and using a standard Modbus/TCP protocol.
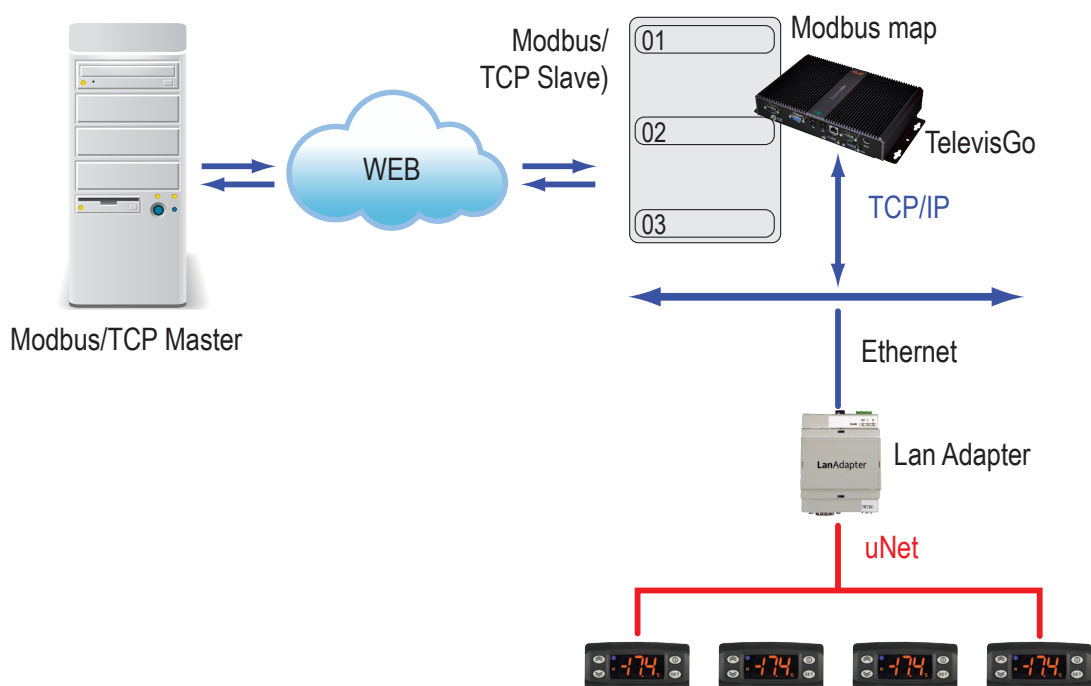
Supported Modbus commands

The supported Modbus commands are **0x03** (read) and **0x10** (write).

Operation

The TelevisGo Modbus/TCP BMS Configuration Tool software reads a descriptor file supplied by Televis**Go** and shows all the devices in the network and their resources.

The resources (parameters, analogue and digital inputs, alarms) and the commands to be shown in the map in order to organise them in virtual devices are selected from this list.

A visual address that can be changed is assigned automatically to each device and to each resource.

For the analogue resources, it is possible to set the type of representation selected, signed or floating point, IEEE754.

The project configuration can be saved in a local xml file. The map must be exported in a file read by Televis**Go**.

NOTE: *if changes are made to the network of devices in TelevisGo, recreate the descriptor file, acquire it with the TelevisGo Modbus/TCP BMS Configuration Tool and eliminate the resources originating from the devices that were removed from the network.*

Parameter inclusion/exclusion

To make scanning the network faster by TelevisGo and by the TelevisGo Modbus/TCP BMS Configuration Tool, the parameters are not extracted in the descriptor file.

If you want to include them and have them be displayed in the network, a parameter must be changed in the settings file GenericSettings.xml.

NOTICE: *adding parameters can significantly increase the size of the descriptor file and therefore slowdown the operation of Televis**Go** and the TelevisGo Modbus/TCP BMS Configuration Tool.*

To extract the parameters from Televis**Go**:

1. In the folder C:\Eliwell\Televis\bin di TelevisGo for Televis**Go**, use a text editor to open the file:
   GenericSettings.xml
2. Set the value NamingSnapshotExportParameters = TRUE
3. Restart scanning: all the parameters are saved in the descriptor file AutomaticBackupNamingSnapshot.xml and then displayed in the network of the TelevisGo Modbus/TCP BMS Configuration Tool next to **Resources** and **Commands**.

INSTALLATION

Minimum requisites

Operating system	**Windows 7 and above**
Microsoft .NET Framework	**3.5**

> ❗ **NOTICE**: *check the version currently installed in your PC. Install version 3.5 if not installed*.

Televis**Go** version	**7.1.0 and above**

Change the utilised port

The TelevisGo Modbus/TCP BMS Configuration Tool can be executed on the same computer as Televis**Go** and uses port 502 to read the current network configuration. The port can be changed if necessary.

> ❗ **NOTICE**: *if the installed version of TelevisGo is prior to 7.2.2 do not perform the procedure and contact support.*

To set the port:
1. In the folder C:\Eliwell\Televis\bin for Televis**Go**, use a text editor to open the file:
   GenericSettings.xml
2. Set the ModbusSlaveServiceTCPport value as required.

Starting the application

The TelevisGo Modbus/TCP BMS Configuration Tool must not be installed. To start it:
1. Download the zip **TgoModbusConfig.zip**.
2. Extract the content to C:\Eliwell\Tools or another selected folder.
3. Double click on the file Invensys.Tools.ModbusTCPConfigurator.exe: the start screen will appear.

NOTE: *TelevisGo Modbus/TCP BMS Configuration Tool can also be executed from a USB memory stick, but .NET Framework 3.5 must always be installed on the computer.*

Initial activities

Proceed as follows to create a map:
1. Load the descriptor file of the network from Televis**Go**
   (see "Load the description of the network from TelevisGo" below)
2. Configure the map of the resources to display (see "Map operations")
3. Save the configuration locally (see "Saving the map configuration locally" below)
4. Export the map to a file read by TelevisGo (see "Exporting the map for TelevisGo" below)

Load the description of the network from TelevisGo

The description of the device network must be loaded from a descriptor file generated in Televis**Go** after scanning the network. If Televis**Go** is on another computer, transfer the file to the computer in use.

1. If the TelevisGo Modbus/TCP BMS Configuration Tool is installed on the same computer as TelevisGo, all the devices currently in the network will be displayed upon start. If it is installed on another computer, in the **File** menu, double click **Load** and select the file AutomaticBackupNamingSnapshot.xml in the folder C:\Eliwell\Televis\bin for Televis**Go**: a list will appear with the network devices and all their resources.

Saving the map configuration locally

1. The current configuration of the map can be saved locally in order to use it later.
2. In the **File** menu, click **Save** or **Save as**: the name of an .xml file will be requested or the last file saved will be updated.

Exporting the map for TelevisGo

To make the changes operative, export the map for Televis**Go**. If Televis**Go** is on another computer, transfer the saved file.

1. In the **File** menu, select **Export** and save the map in the file ModbusTCPMap.xml already in the folder C:\Eliwell\Televis\bin for Televis**Go**. If Televis**Go** is on another computer, transfer the file to the folder C:\Eliwell\Televis\bin.
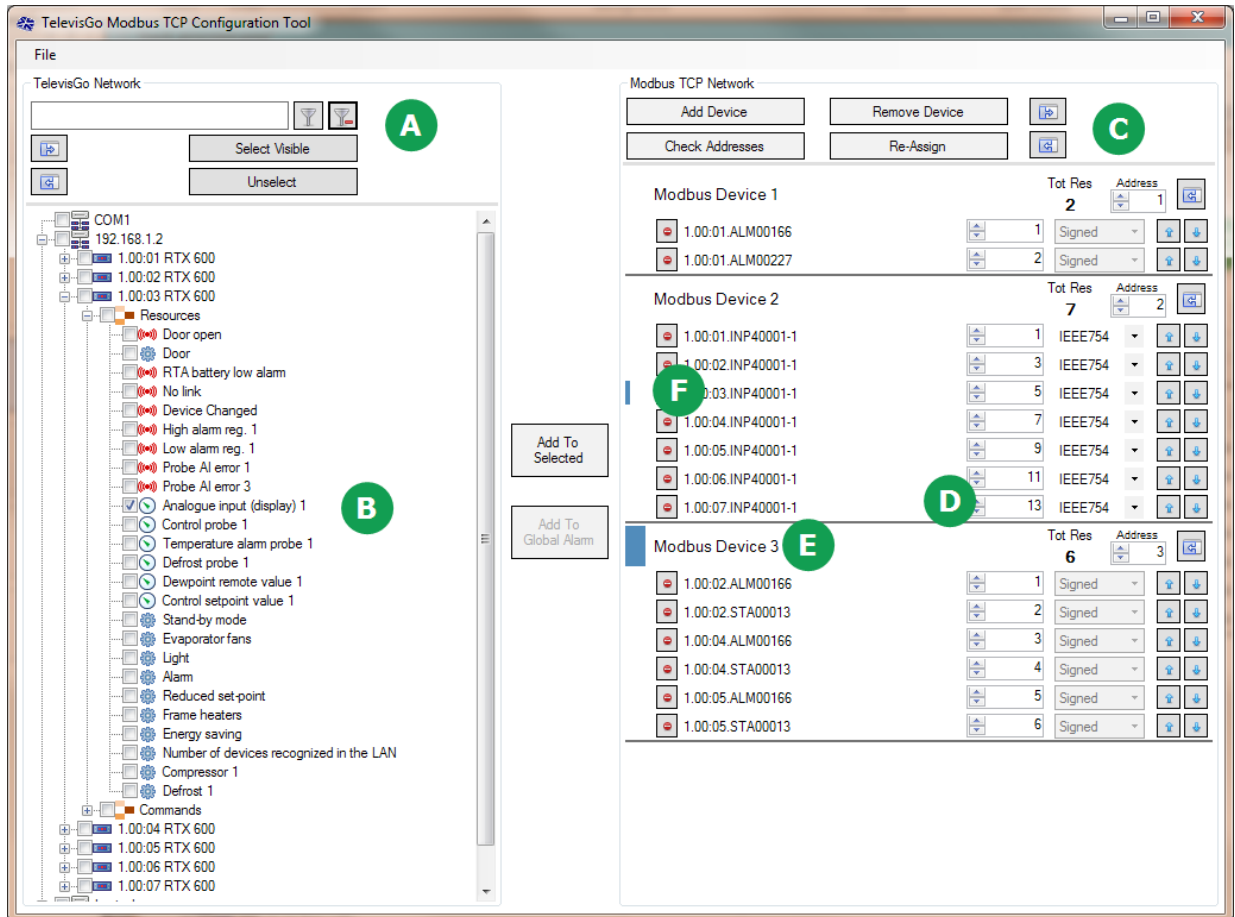
NOTICE: *do not change the file name!*

Recovering a configuration

A configuration can be accessed to change it.

1. In the **File** menu, click **Open** and select the previously saved configuration.

GRAPHIC INTERFACE

It appears as follows

Area	Function
A	Area for filtering resources, selecting them, unselecting them, expanding and compressing the network.
B	Televis**Go** network with all the connected instruments, their resources and their commands.
C	Area for adding or removing a virtual device, controlling addresses and reassigning them.
D	Map of the Modbus resources divided in virtual devices.
E	Device selected.
F	Resource selected.

Resource key

The resources can be displayed to the Modbus/TCP interface are:

Icon	Resource
	analogue inputs
	digital inputs
	alarms (individual or result of an OR from multiple alarms)
	states
	commands
	parameters

Useful buttons

Button	Function
	They expand or compress the list of the network instruments and resources or the list of the virtual devices and resources that were selected.
	It filters the resources based on the data entered (e.g.: "keyb" displays all resources that contain the string "keyb").
	They move the resources up or down in order to reassign the addresses with the **Re-assign** button.
	It removes the selected resource from the list.

MAP OPERATIONS

Configuring the map

To configure the map, select the resources from the Televis**Go** network.
1. Expand the instrument network and select the resources to be displayed.
2. Add a virtual device (**Add Device** button).
3. Change the device address if necessary (**Address** box).
4. Add the selected resources to the selected device (**Add to selected** button): the resources appear in the virtual device with an automatically increased Modbus address. The total of the resources is updated.
5. To add other resources to the virtual device, unselect the resources that were already added (**Unselect** button) and repeat point 4.

Filtering resources to be added to the map

It is possible to filter by resource description and select the resulting resources.
1. Enter part of the description of the resources to search for and click the button ⧩ : only the resources that comply with the criteria appear.
2. Select the visible resources (**Select Visible** button).
3. Select the virtual device.
4. Add the resources to the map (**Add to selected** button).

Adding global alarms

A global alarm can be created by grouping multiple alarms.
The function performs the OR of the alarms and is active when at least one alarm is present.
1. Select a virtual device.
2. Select two or more alarms from the resources list.
3. Add the alarms to the selected device (**Add to Global Alarm** button).
4. Change the address if the global alarm if necessary.

Automatically readdressing the resources

It is possible to move the resources to a virtual device and request automatic addressing.
1. Click the ⬆ and ⬇ buttons to move the resource to the suitable position.
2. Click the **Re-assign** button to readdress the resources.

Manually changing addresses and representation

1. Manually change the address of the resources and the address of the virtual devices (**Address** box).
2. For analogue resources with a sign, if necessary change the representation - signed/standard IEEE754 (number with a floating point).
3. Check double addresses (**Check Address** button): devices or resources are signalled with identical addresses.

Identifying the resource origin

The resource can be traced in the Televis**Go** network using the map.
1. Select the resource in the map (including global alarms): the list shows the original resource that was selected.

Solutions to the problems

Symptom	Cause	Solution
Message "You selected resources already included in other Modbus devices. Those resources will not be added to a new Modbus device"	You tried to add resources already present in the virtual devices	Click the **Unselect** button before adding new resources
You select a resource in the map and the device network compresses without showing the corresponding physical resource	The resource or the entire device was removed from the network	Adjust the Modbus map accordingly
If you select a resource in the map the resource origin does not appear	A filter is active	Remove the filter by clicking button

Modbus errors

Modbus request	Modbus error code	Modbus exception code	Cause
0x03	0x83	2	The combination of starting address and transfer length is invalid
		3	Incorrect register quantity
		4	Reading failed due to: • interrupted data acquisition • Televis**Go** controller not in network • resource offline • resource coordinates do not exist (incorrect configuration)
0x10	0x90	2	Incorrect byte or register quantity based on the data being written (signed or IEEE754)
		3	The combination of starting address and transfer length is invalid
		4	Writing failed due to: • value exceeding the range • register read only enabled • Televis**Go** controller not in network • controller offline • resource coordinates do not exist (incorrect configuration)
(other commands)	(error code)	1	Command not supported

APPENDIX

Data types and memory occupation

The memory occupied by the various resources and the conversion rule applied by Televis**Go** are shown below:

Resource TelevisGo	Representation	Registers occupied [*]	Conversion rule towards Modbus Master
analogue	IEEE754	2	Value converted to IEEE754 format.
	Signed	1	Value rounded to signed INT value. Possible overflows are signalled with a Modbus error.
status	Signed	1	Value rounded to signed INT value. Possible overflows are signalled with a Modbus error.
digital	Signed	1	Value rounded to signed INT value. Possible overflows are signalled with a Modbus error.
alarm	Signed	1	Value rounded to signed INT value. Possible overflows are signalled with a Modbus error.
parameter	Signed	1	Value rounded to signed INT value. Possible overflows are signalled with a Modbus error.
command	Signed	1	Not converted. Used only to activate the command.

NOTE *(*): one register = two bytes, two registers = four bytes*

Supported Modbus commands

The supported Modbus commands are **0x03** (read) and **0x10**(write).

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