SD2DUG24
Dupline generator software manual

rev. 0.4, Jun. ‘20

1 INDEX

1 INDEX 2
2 INTRODUCTION 4
2.1 GENERAL DESCRIPTION 4
2.2 HARDWARE REQUIREMENTS 5
2.2.1 USB driver for Microsoft® Windows 5
2.3 INSTALLATION 5
3 USER INTERFACE 6
3.1 MAIN PAGE 6
3.2 PROCEDURES 8
3.2.1 Create a new configuration 8
3.2.2 Open an existing configuration 8
3.2.3 Save a configuration 8
3.2.4 Program Analink channel 9
3.2.5 Program 8-bit binary protocol 9
3.2.6 Program 8-bit binary protocol with multiplexer 10
3.2.7 Program 3 ½ digit BCD protocol 11
3.2.8 Program 3 ½ digit BCD protocol with multiplexer 12
3.2.8.1 Multiplexer settings for 3 ½ digit BCD and 8-bit binary 13
3.2.9 EM24 alarms 13
3.2.10 EM24: multiplexer (transmission of analogue data) 14
3.2.10.1 Set A5 channel as DMD synchronization or tariff management 15
3.2.11 EM24: multiplexer (transmission of counter values) 16
3.2.11.1 Set B1 channel as reset of the EM24 counter 17
3.2.11.2 Multiplexer settings for EM24 protocol 18
3.2.12 Clear output when bus is faulty 19
3.2.12.1 Set an output channel when Modbus bus is faulty 20
3.2.13 Split I/O 21
3.2.14 Double scan 21
3.2.15 Connect the PC to the SD2DUG24 22
3.2.16 Disconnect the PC from the SD2DUG24 23
3.2.17 Send a configuration to the SD2DUG24 23
3.2.18 Read a configuration from the SD2DUG24 23
3.2.19 Upgrade the SD2DUG24 firmware 24
3.2.20 Set the name of a configuration 24
3.2.21 Set the number of Dupline channels 25

3.2.22 Set the communication parameters 26
3.2.23 Output status 26
3.2.24 Set the password 27
4 FORMULAS 28
4.1 PROCEDURES 28
4.1.1 Link a formula to an analogue value 28
4.1.2 Formula standard 29
4.1.3 Customised formula 30
5 MODBUS MAP 31
5.1 PROCEDURE 32
5.1.1 Access to the Modbus map 32
5.1.2 Search entries in the Modbus map 32
5.1.3 Export the Modbus map 33
5.1.4 Enable Live data 33
5.1.5 Change the output channels status 34
6 XML DRIVER PANEL 35
6.1 THINGS TO KNOW 36
6.2 PROCEDURES 37
6.2.1 Publish EM24 Analog data 37
6.2.2 Publish EM24 counter variables 38
6.2.3 Publish Analog Variables 39
6.2.4 Publish Realtime word inputs / outputs 40
6.2.5 Publish Realtime bit inputs/outputs 41
6.2.6 Generating the XML driver 42
7 G34960005 OR G34900000 QUICK SUBSTITUTION 43
7.1 PROCEDURES 43
7.1.1 Substitute a G34960005 43
7.1.2 Substitute a G34900000 44
8 APENDIX 45
8.1 TIPS AND TRICKS 45
8.1.1 Select multiple channels 45
8.2 BSI-TEMANA CONVERSION TABLE 46
8.3 EM24 ANALOG VARIABLES TABLE 47

2 INTRODUCTION

2.1 General description

Welcome to the SD2DUG Software manual. This guide will cover the essentials of setting up and using the SD2DUG software included with your Dupline® System.

This software tool has been designed for the configuration and updating of the Dupline channel generator SD2DUG24: the communication parameters and the channel programming are set-up locally in the PC, and then transferred to the generator through a USB port. Likewise, data from the generator can be uploaded and modified.

To connect the PC to the SD2DUG any Micro-USB cable can be used (standard cable to connect to Android smart-devices).

Important note:

Out of the factory, the SD2DUG24 has the following settings:

- It repeats the input channels onto the output ones
- The generated Dupline frame has 128 channels
- The Modbus parameters are:
  - Address = 1
  - Speed = 9600
  - Data bits = 8
  - Parity = None
  - Stop bit = 1

Should these settings fit the ones of the system, no further configurations are needed and the SD2DUG24 can be directly powered and connected without any programming.

2.2 Hardware requirements

- The program operates with Windows 7 or higher, with Microsoft .Net 4.6.2 or higher
- A free USB port
- Micro-USB cable with data transmission and recharging feature

2.2.1 USB driver for Microsoft® Windows

Windows Version	USB driver
10 / 8.1	The USB driver is already included
7	Download the USB driver for Windows 7

2.3 Installation

Download the software file from the link:

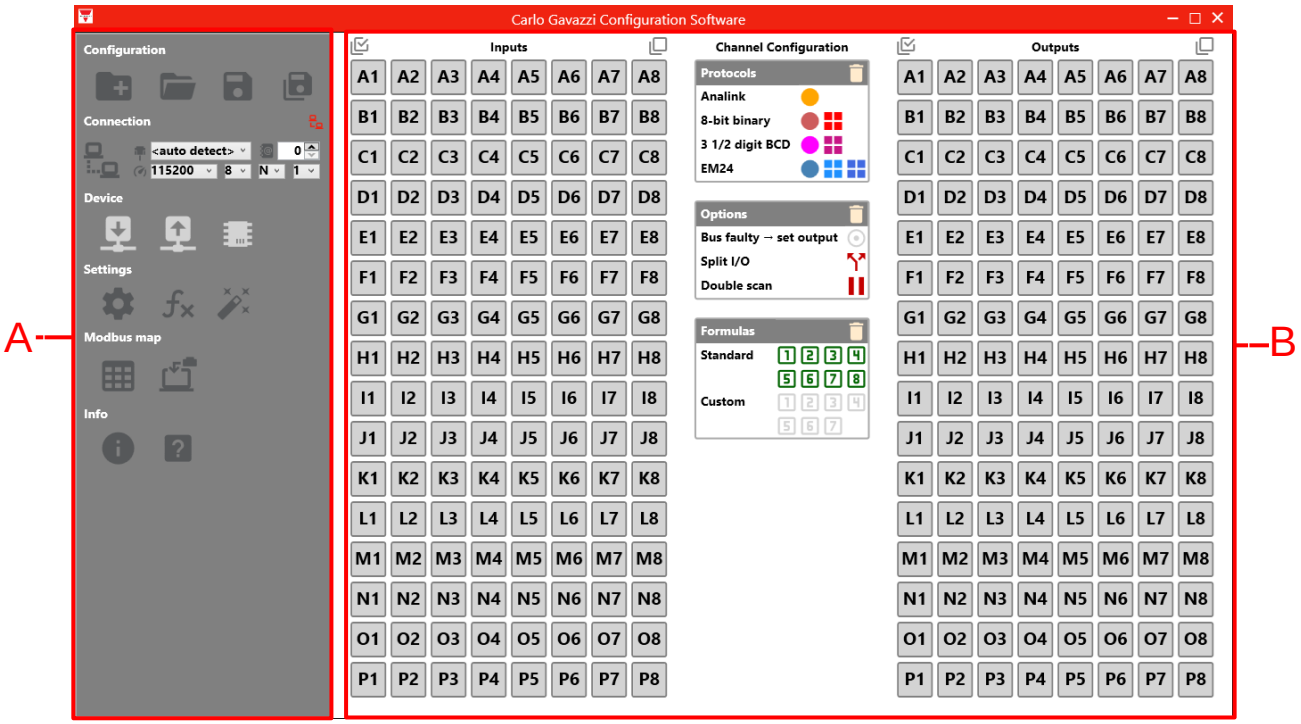
http://www.productselection.net/Download/UK/Setup_DUG_software.zip

Run the Setup DUG xxxx.exe file

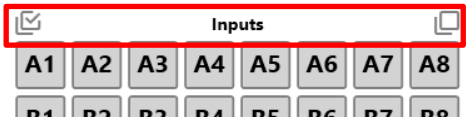
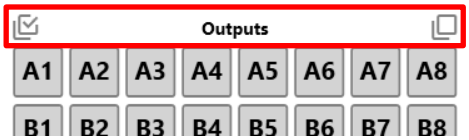
3 USER INTERFACE

3.1 Main page

When the DUG software is started, the following window will open:



The different areas are as follows:

<table>
<tr><th>Area</th><th>Description</th></tr>
<tr><td>A</td><td>The left panel contains:
<table>
<tr><th>Tab</th><th>Description</th></tr>
<tr><td>Configuration</td><td>To open new or already saved configuration or to save a configuration</td></tr>
<tr><td>Connection</td><td>To connect the PC to an SD2DUG24 module</td></tr>
<tr><td>Device</td><td>To read a configuration from an SD2DUG24, to write a configuration into an SD2DUG24, to update the firmware of an SD2DUG24</td></tr>
<tr><td>Settings</td><td>To set different parameters, to set customised formulas, to copy the setting of a G34900000 or a G34960005</td></tr>
<tr><td>Modbus map</td><td>To export the Modbus map, to see Live data on the Dupline bus, to export XML driver files for UWP 3.0 Tool</td></tr>
<tr><td>Info</td><td>To see info relevant to the software and firmware version, to open the online manual</td></tr>
</table></td></tr>
<tr><td>B</td><td>The right panel contains:
<table>
<tr><th>Tab</th><th>Description</th></tr>
<tr><td>Inputs</td><td>Matrix of the Dupline input channels
Click on to select all the Dupline Input channels
Click on to deselect all the Dupline Input channels
 
</td></tr>
<tr><td>Channel configuration</td><td>To select the Dupline protocols, set the different options and apply formulas</td></tr>
<tr><td>Outputs</td><td>Matrix of the Dupline output channels
Click on to select all the Dupline Output channels
Click on to deselect all the Dupline Output channels
 
</td></tr>
</table></td></tr>
</table>

3.2 Procedures

3.2.1 Create a new configuration

To create a new configuration, follow this procedure:

Step	Action
1	Click on
2	If a configuration is already open, a pop-up will appear in which is possible to choose an operation from: a) Save b) Do not save c) Cancel action “New configuration”

3.2.2 Open an existing configuration

To open a configuration, follow this procedure:

Step	Action
1	Click on
2	Select the configuration to open

3.2.3 Save a configuration

To save a configuration, follow this procedure:

Step	Action
1	Click on (Save) or (Save as)
2	Select the folder where the configuration has to be saved

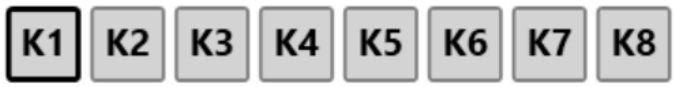
3.2.4 Program Analink channel

To program one or more channels as Analink, follow this procedure:

Step	Action
1	Click on the **channel** to be programmed (from A1 to P8): if one or more channels are selected, the underline is marked with a thicker line Not selected channel Selected channel To select more channels, see the detailed procedure
2	Click on the orange circle on the right side of **Analink**: the channels will be marked in **orange**

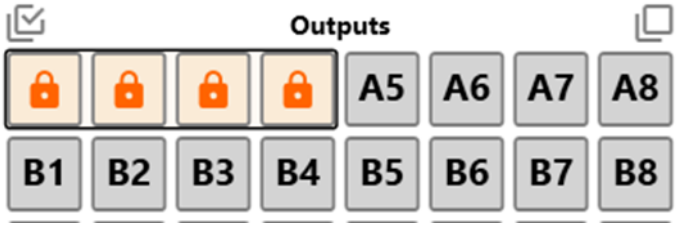
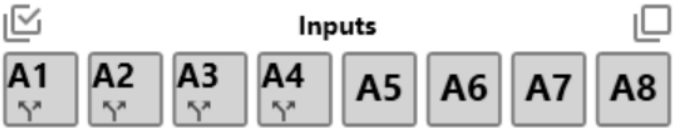
3.2.5 Program 8-bit binary protocol

To program as 8-bit binary protocol, follow this procedure:

Step	Action
1	Click on **one** of the channels belonging to the group to be programmed: 
2	Click on the brown circle on the right side of **8-bit**: all the 8 channels belonging to the group will be marked in brown with a thin black box around:

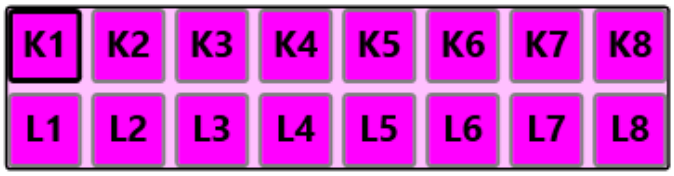
3.2.6 Program 8-bit binary protocol with multiplexer

To program as 8-bit binary protocol with multiplexer, follow this procedure:

Step	Action
1	Click on **one** of the channels belonging to the group to be programmed:
2	Click on the red square on the right of **8-bit binary:** the whole group will be marked in red inside a thin black frame: The output channel from A1 to A4 will be reserved for the multiplexer:  *Note: The Input channels from A1 to A4 are automatically set as split I/O.* 

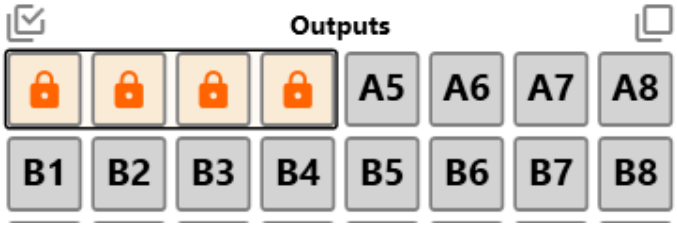
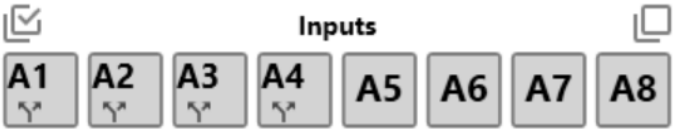
3.2.7 Program 3 ½ digit BCD protocol

To program as 3 ½ digit BCD protocol, follow this procedure:

Step	Action
1	Click on **one** of the channels belonging to the first group to be programmed:
2	Click on the pink circle on the right side of **3 ½ digit BCD**: all the 16 channels belonging to the selected and following group will be marked in pink inside a thin black frame: 

3.2.8 Program 3 ½ digit BCD protocol with multiplexer

To program as 3 ½ digit BCD protocol with multiplexer, follow this procedure:

Step	Action
1	Click on **one** of the channels belonging to the first group to be programmed:
2	Click on the violet square on the right side of **3 ½ digit BCD**: all the 16 channels belonging to the selected and following group will be marked in violet inside a thin black frame: The output channels from A1 to A4 will be reserved for the multiplexer:  The Input channels from A1 to A4 are automatically set as split I/O. 

3.2.8.1 Multiplexer settings for 3 ½ digit BCD and 8-bit binary

To set the multiplexer parameters, follow this procedure:

Step	Action
1	Click on
2	To set how long the value of the multiplexer has to be maintained for, fill in field **Keep multiplexer value for ...** the value in seconds
3	The multiplexer values have to be defined in the **Multiplexer values** field: To add a new value, click on To switch between single value or more values, click on To delete an existing value, click on

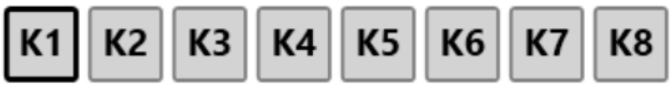
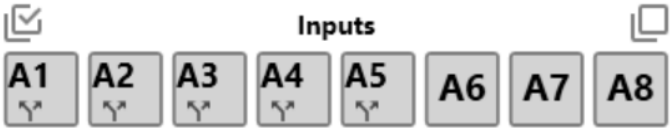
3.2.9 EM24 alarms

To dedicate one input channel to the alarm output of the EM24, follow this procedure:

Step	Action
1	Click on the channel to be programmed as retransmission of setpoint alarms: *Note: A maximum of two input channels can be programmed as alarm signals from each EM24.*
2	Click on the blue circle on the right side of **EM24**: the channel will be marked in blue

3.2.10 EM24: multiplexer (transmission of analogue data)

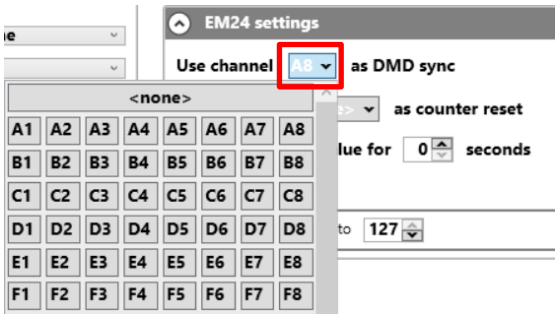
To program the channels to detect the analogue values sent by one or more EM24s, follow this procedure:

Step	Action
1	Click on **one** of the channels belonging to the first group to be programmed from G to P: 
2	Click on the light-blue square on the right side of **EM24**: all the 16 channels belonging to the selected and following group will be marked in light-blue inside a thin black frame: The Output channels from **A1 to A4** will be reserved for the multiplexer and the **A5** channel is automatically reserved as the synchronization channel: The Input channel from **A1 to A5** are automatically set as split I/O 

3.2.10.1 Set A5 channel as DMD synchronization or tariff management

The A5 output value can be set in two ways:

a) Copying the status of any input channel (see the procedure below):

Step	Action
1	Copying the status of any input channel a) Click on b) Select the input channel from the list, as shown below:  The status of this input will be reproduced on the sync channel A5.

b) Via Modbus (see the procedure below):

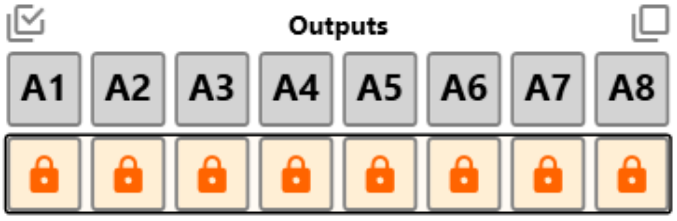
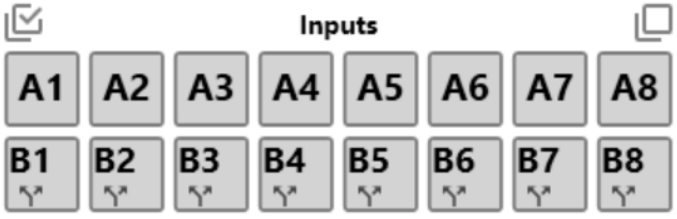
The A5 channel can be set via Modbus by sending write command to one of the following addresses:

Entry type	Function Code (Write)	Address (Dec)	Address (Hex)	Note
Coil	01, 05, 15	**4**	**H0004**	
Holding Register	06,16	**1520**	**H05F0**	High Byte = A5 Low Byte = B1

Note: The DMD synchronization or tariff management will be executed on the next Dupline frame after sending the Modbus command.

3.2.11 EM24: multiplexer (transmission of counter values)

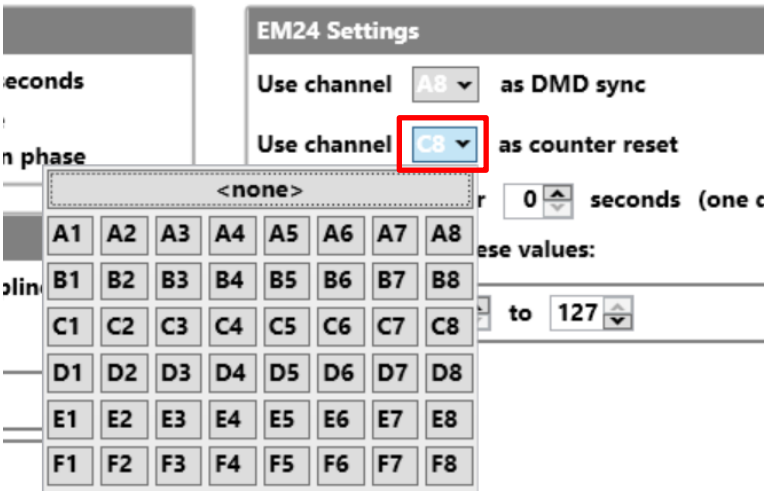
To program the channels to detect the counter values sent by one or more EM24s, follow this procedure:

Step	Action
1	Click on **one** of the channels belonging the first group to be programmed from C to F:
2	Click on the blue square on the right side of **EM24**: all the 32 channels belonging to the C, D, E and F groups will be marked in blue The output channels from B2 to B8 will be reserved for the multiplexer and B1 channel is automatically reserved as the reset channel  The Input channels from B1 to B8 are automatically set as split I/O. 

3.2.11.1 Set B1 channel as reset of the EM24 counter

The B1 output value can be set in two ways:

a) Copying with the status of any input channel (see procedure below):

Step	Action
1	Copying with the status of any input channel: a) Click on b) Select the input channel from the list, as shown below  The status of this input channel will be reproduced on the reset channel B1.

b) Via Modbus (see procedure below):

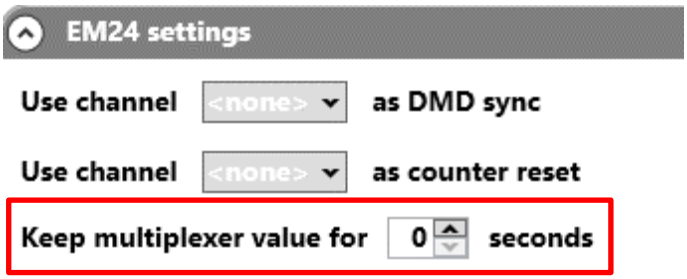
To reset the EM24 counters via Modbus, one of the following addresses can be used:

Entry type	Function Code (Write)	Address (Dec)	Address (Hex)	Note
Coil	01, 05, 15	**8**	**H0008**	
Holding Register	06,16	**1520**	**H05F0**	High Byte = A5 Low Byte = B1

Note: The software automatically detects how many counters are configured and the reset command will be executed for all the active(*) counters.
(*) Reset command has to be applied only for transmitted counters: if a multiplexer address in not enabled, the related counter value is not transmitted, and it will not be reset.

3.2.11.2 Multiplexer settings for EM24 protocol

To set the multiplexer parameters, follow this procedure:

Step	Action
1	Click on
2	To set how long the value of the multiplexer has to be maintained for, fill in the field **Keep multiplexer value for ...** in seconds 
3	The multiplexer values have to be defined in the **Multiplexer values** field: To add a new value, click on To switch between single value or more values, click on To delete an existing value, click on

3.2.12 Clear output when bus is faulty

If the Modbus bus is faulty, the relevant Dupline output channels can be kept OFF until the Modbus bus will be on again.

To keep the Dupline output channels OFF when the bus is faulty, follow this procedure:

Step	Action
1	To enable this function, click on the icon
2	Check the ☑ **Clear output when bus is faulty for ... seconds**
3	Define the time period (expressed in seconds) after which the Dupline output channel has to be set OFF in the numeric field
4	Click on ☑ (Save)**:** The action will automatically be applied to all the Dupline output channels. If specific output channels must be set ON, see the next procedure

3.2.12.1 Set an output channel when Modbus bus is faulty

To program an output channel so that it is set ON when the Modbus bus is faulty, follow this procedure:

Step	Action
1	To enable this function, click on the icon Check **Clear output....** Set after how many seconds the output has to be reset Click on **Save**
2	Click on the **Dupline output channel** to be programmed (from A1 to P8): if one or more channels are selected, the underline is marked with a thicker line: Not selected channel Selected channel To select more channels, see the detailed procedure
3	Click on the red circle on the right side of **Bus faulty –> set output**: the channels will be marked with a small circle next to the channel name: The status of the selected channel will be (set ON) activated each time the bus is faulty.

3.2.13 Split I/O

To program an input channel as split I/O, follow this procedure:

Step	Action
1	Click on the **input channel** to be programmed (from A1 to P8): if one or more channels are selected, the underline is marked with a thicker line Not selected channel Selected channel To select more channels, see the detailed procedure
2	Click on the red arrows on the right side of **Split I/O**: The channels will be marked with the same symbol below the channel name

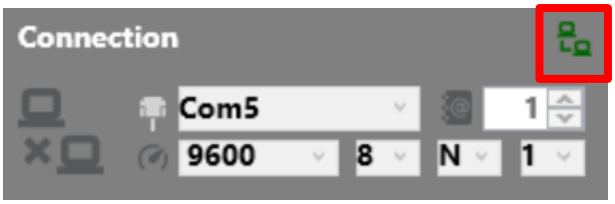
3.2.14 Double scan

To enable the double scan on one or more input channels, follow this procedure:

Step	Action
1	Click on the **input channel** to be programmed (from A1 to P8): if one or more channels are selected, the underline is marked with a thicker line: Not selected channel Selected channel To select more channels, see the detailed procedure
2	Click on the red double bar on the right side of **Double scan**: the channels will be marked with the same symbol next to the channel name.

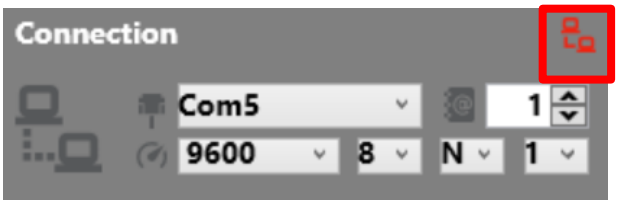
3.2.15 Connect the PC to the SD2DUG24

To connect the PC to the SD2DUG24 generator, follow this procedure:

Step	Action
1	Connect the SD2DUG24 to your PC, using one of the following ports: a) The Micro-USB port in the front part of the module – using a standard USB cable. b) The RS485 port on the bottom of the module – using an RS485 to USB converter.
2	Select **<auto detect>** in the **Connection** menu, alternatively a **Com** port can be selected together with the connection parameters. ***Things to know*** • The software shows all the detected Com ports • <**auto detect**> mode is available only when the Micro-USB port is used and the connection parameters are 115200, 8, N, 1 and they cannot be changed • If the Micro-USB port is used, Modbus address 0 can be used as the default address • If the RS485 port is used, the Modbus address of the SD2DUG24 has to be used together with the proper connection parameters (the default address out of the factory is 1, while the default parameters are 9600, 8, N,1) *Note: If the RS485 port is used, the Modbus address 0 cannot be selected*
3	Click on
4	The Dupline generator will connect to the PC and a green icon will be shown: 

3.2.16 Disconnect the PC from the SD2DUG24

To disconnect the PC from the SD2DUG24, follow this procedure:

Step	Action
1	Click on
2	The Dupline generator will disconnect from the PC and a red icon will be shown: 

3.2.17 Send a configuration to the SD2DUG24

To send a configuration to the SD2DUG24 generator, follow this procedure:

Step	Action
1	Connect the SD2DUG24 to your PC
2	Click on

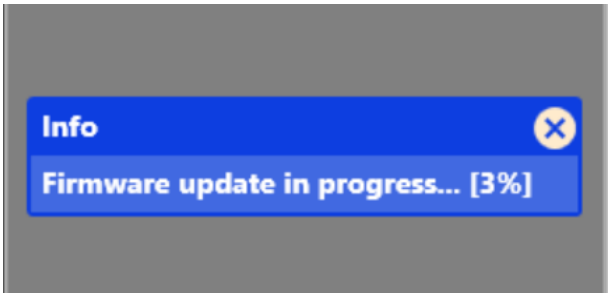
3.2.18 Read a configuration from the SD2DUG24

To read a configuration from the SD2DUG24 generator, follow this procedure:

Step	Action
1	Connect the SD2DUG24 to your PC
2	Click on

3.2.19 Upgrade the SD2DUG24 firmware

To upgrade the firmware of the SD2DUG24 generator, follow this procedure:

Step	Action
1	Connect the SD2DUG24 to your PC
2	Click on
3	The following blue window will appear, showing the status of the update:  ***Things to know*** While a firmware upgrade is in progress, no other operation can be carried out

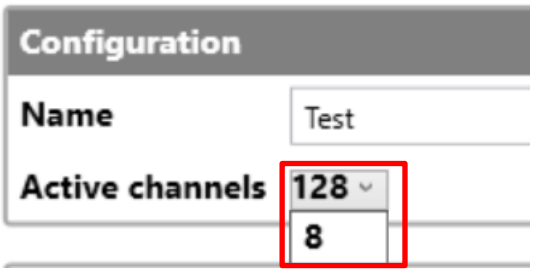
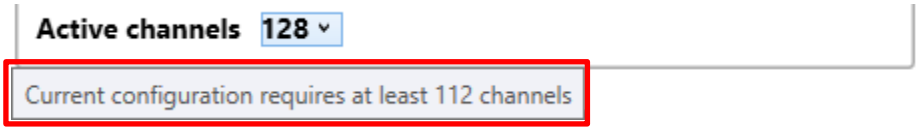
3.2.20 Set the name of a configuration

To set the name, follow this procedure:

Step	Action
1	Click on
2	Type-in the name: Click on ☑ **(**Save)

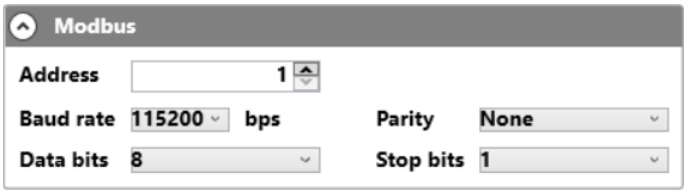
3.2.21 Set the number of Dupline channels

To set this number, follow this procedure:

Step	Action
1	Click on
2	Select the number required in the **Active channels** field:  ***Things to know*** By hovering over the channel field, the pop-up shows how many Active Channels the current configuration requires. 
3	Click on **(**Save)

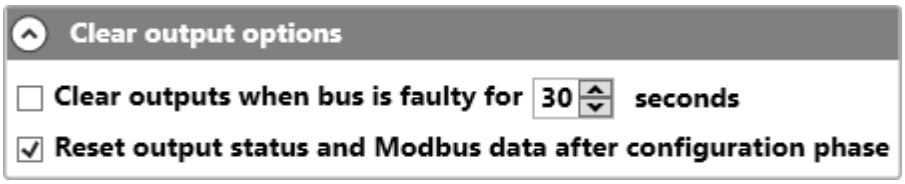
3.2.22 Set the communication parameters

To set the communication parameters of the **RS485 port**, follow this procedure:

Step	Action
1	Click on
2	Select the proper setting in **Modbus**:  Click on (Save) ***Things to know*** These settings are applied only to the RS485 port. The parameters are fixed and cannot be changed on the USB port.

3.2.23 Output status

To reset the output status after writing a configuration, follow this procedure:

Step	Action
1	Click on
2	To reset the Modbus data and keep the output status after a new configuration has been written, in the *Clear output options* enable **Reset output status and Modbus data after configuration phase** 
3	Click on (Save)

3.2.24 Set the password

To set the password to read the configuration file or to read the configuration from the controller, follow this procedure:

Step	Action
1	Click on
2	Enter and confirm the password
3	Check **Read configuration from file,** if the password has to protect the configuration file Check **Read configuration from SD2DUG24,** if the password has to protect the reading from the SD2DUG24

4 FORMULAS

4.1 Procedures

4.1.1 Link a formula to an analogue value

To apply a formula to an analogue signal, follow this procedure:

Step	Action
1	Select the channel or the group to which the formula has to be applied
2	Click on the formula

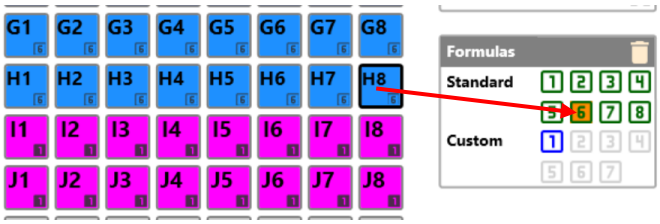
A small number will appear at the bottom right of the channel to indicate that a formula has been applied

Things to know

- The formula is applied to the raw data of the associated channels and the output will be available in the relevant Modbus address
- If the formula is a standard one, the small number indicating the formula is black and the background is the same colour of the tile containing the name of the channel

- If the formula is a customised one, the small number indicating the formula is same colour as the tile containing the name of the channel and the background is black

- If a channel with an associated formula is selected, the number indicating the formula will have a coloured background



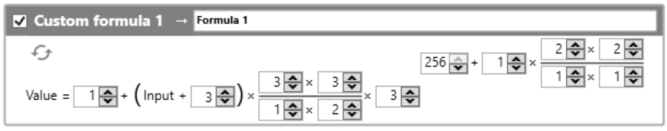
4.1.2 Formula standard

Number and name	Formula
1 – Lux type A (5 – 5000 lux)	Lux = (10 (3 * ANALINK) / 255)) * 5
2 – Lux type B (3000-300000 lux)	Lux = (10 (2 * ANALINK) / 255)) * 3000
3 – Wind speed	Speed [m/s] = ((ANALINK * 25) / 255) + 5
4 – Humidity 5-95%rH	Humidity [%rH] = ((ANALINK * 90) / 255) + 5
5 – Temperature 10-35°	Temperature [°C*10] = ((ANALINK * 250) / 255) + 100
6 – Temperature 0-50°	Temperature [°C*10] = ((ANALINK * 500) / 255)
7 – G432111120	Lux = (10 (3 * ANALINK) / 128)) * 0.1
8 – BSI-TEMANA temperature	See table in Appendix

Temperatures in formulas 5 and 6 are calculated in tenths of degrees, in the Modbus map temperature values are shown in tenths of degrees as well.

4.1.3 Customised formula

To create a customised formula, follow this procedure:

Step	Action
1	Click on
2	Enable the formula to set and name it
3	Set the formula  *Note: Click on* *to change the formula type from linear <-> to exponential*
4	Associate the formula to the relevant channel

5 MODBUS MAP

In the Modbus map, all the Modbus variables related to the Dupline channels set in the configuration are reported. The list of entries is automatically updated every time the configuration is changed. The variable types shown are *Holding registers, Input registers* and *Coils*.
The table below shows the description of the **Registers** parameters:

Table header	Description	
Register	Describing the register type, such as HR (Holding register), IR (Input register)	
R/W	Showing the reading (RO) or writing (RW) permissions of any entry. There are two exceptions:	
	RW*	The selected entry can be written, but the writing operations can be done by using a different register. *Tip: The remapped register is shown in the pop-up that appears by hovering over*
	RW-	The selected entry can be written but some of its output bits are read-only. This is because a protocol is set. The writing operations can be done by using a different register. *Tip: The remapped register is shown in the pop-up that appears by hovering over with mouse*
Read fx **Write fx**	Showing the function codes available for reading/writing operation	
Address	Showing the register address in decimal format	
Address (hex)	Showing the register address in HEX format	
Num words	Showing the number of words to be read / written for the register (length)	

The table below shows the description of the **Coils** parameters:

Table header	Description
R/W	Showing if the register has reading only (RO) or Reading and writing (RW) permissions
Read fx **Write fx**	Showing the function codes available for reading/writing operation
Address	Showing the coil address in decimal format
Address (hex)	Showing the coil address in HEX format
Description	Showing the relevant Dupline channel address

5.1 Procedure

5.1.1 Access to the Modbus map

To access the Modbus map, follow this procedure:

Step	Action
1	Click on
2	Click on to update the Modbus map with the saved configuration
3	The Modbus map relevant to the programmed channel will be shown

5.1.2 Search entries in the Modbus map

The table header of the Modbus map has a search box with additional search tools. To do a search, follow the procedure below:

Step	Action
1	Enter the search criteria in the box
2	The search box can operate in two ways. The results will be as follows:

Option	Behaviour
 Filter / Highlight toggle icon	▪ When is selected, **ONLY** the results that satisfy the search criteria will be shown. ▪ When is selected, the results that satisfy the search criteria will be highlighted in yellow colour, but any filter is applied;
 Case insensitive/ sensitive	The search operations can include case-sensitive matching or not;

3	To clear the search results, click on

5.1.3 Export the Modbus map

The Modbus map can be exported in *PDF* or in *XLSX* format. To generate the file, follow this procedure:

Step	Action
1	Click on
2	In the *Export settings* panel, select the entries type to be exported: ▪ Check the **Print register entries** to export all the *Modbus registers* ▪ Check the **Print coil entries** to export all the *Modbus coils*
3	*Optional:* Fill-in the *Title, Subject* and *Author* fields
4	a) Click on to export the Modbus map in *PDF* format b) Click on to export the Modbus map in *XLSX* format

Note: *The map can be exported only if live data are not active*

5.1.4 Enable Live data

To check the activity of the Dupline bus, follow this procedure:

Step	Action
1	Click on
2	In the bottom part of the Modbus map panel, click on ***Thing to know*** When live data is active, the icons will turn in light grey colour
3	When live data are active, the **Coils** will split into two groups: ▪ **Input channels status** ▪ **Output channels status** The active Input and Output channels are red-coloured, as shown in the example below:

*Note: In the **Live values** panel, it can be set the refresh rate (expressed in seconds)*

5.1.5 Change the output channels status

To change the output channels status, follow this procedure:

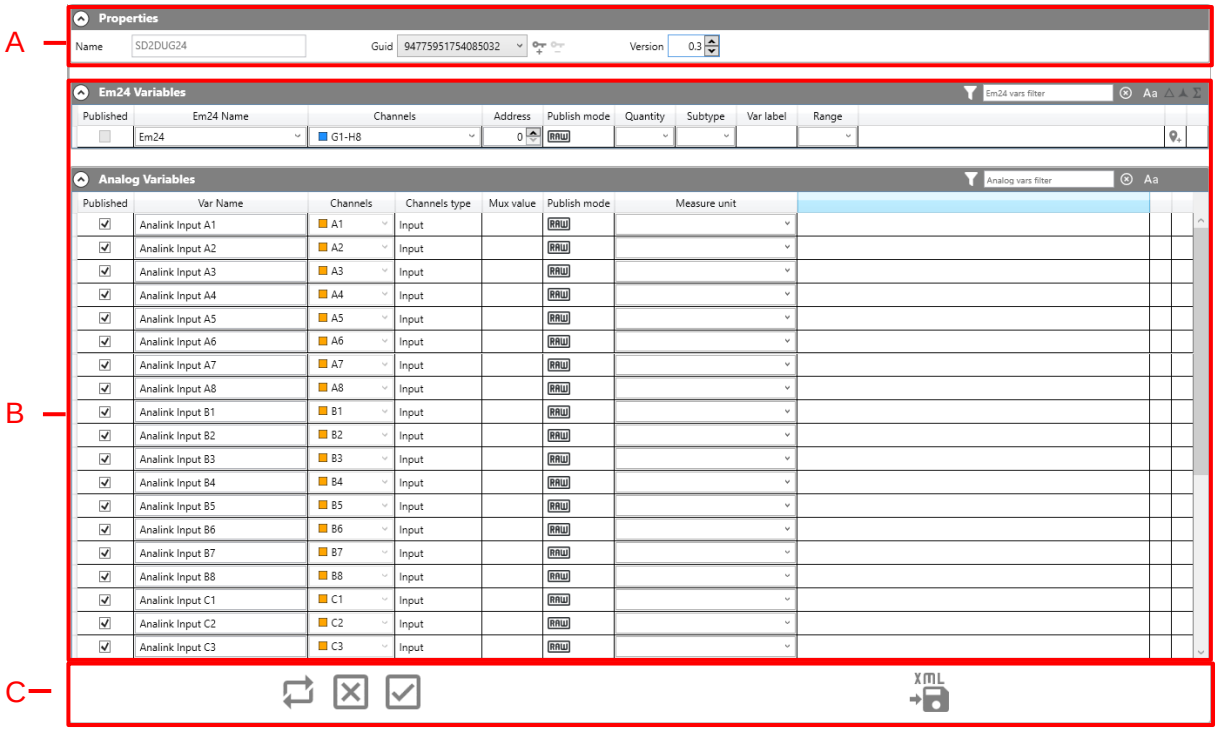
Step	Action
1	Enable the **Live data**
2	Open the **Output channels status**
3	a) Every channel can be individually activated by clicking on it: it will turn in red or; b) By clicking on the small square ( ) at the end of each group, the status of all the 8 channels will be as follows: - First click: all the channels are activated - Second click: all the channels are deactivated - Third click: all the channels are set back to (the status they had before the first click)
4	Click again on to exit the **Live data**.

6 XML DRIVER PANEL

Note: all settings made in this section are saved only in the software configuration and not in the SD2DUG memory. The configuration file must be saved and it can be used as further reference. Reading the configuration from the SD2DUG will not import these settings.

The *XML driver* can be used to export the Modbus map as an *XML driver* that will be imported in the UWP 3.0 configuration software. Please refer to the UWP 3.0 tool manual.

Clicking on the , the following panel will appear:



The different areas are as follows:

<table>
<tr><th>Area</th><th>Description</th></tr>
<tr><td>A</td><td>Properties
Set the driver Name, assign the GUID and Driver version number.
Note: the GUID is a unique identifier number that is used by the UWP 3.0 Tool to recognize the driver versions, even if they have the same name.</td></tr>
<tr><td>B</td><td>The Modbus variables are sorted by type. Click on the variable type to see the procedure that describes how to publish the variables:
<table>
<tr><th>Variable type</th><th>Description</th></tr>
<tr><td>EM24 Variables</td><td>Showing the EM24 variables related to the protocols:
EM24 analogue data
EM24 counters</td></tr>
<tr><td>Analog Variables</td><td>Showing the analogue variables related to the protocols:
Analink
BCD
8 bit</td></tr>
<tr><td>Realtime word inputs</td><td rowspan="2">Showing the input/output channels where the channels are grouped in Word format.
All the word entries are selected by default.</td></tr>
<tr><td>Realtime word outputs</td></tr>
<tr><td>Realtime bit inputs</td><td rowspan="2">Showing the input/output channels where the channels are exported in bit format.</td></tr>
<tr><td>Realtime bit outputs</td></tr>
</table></td></tr>
<tr><td>C</td><td>Generate the XML driver for the current configuration</td></tr>
</table>

6.1 Things to know

The variable configuration depends on the applied protocol and the list is automatically updated every time a change is made.

Before exporting the XML file, the variables must be configured correctly and published.

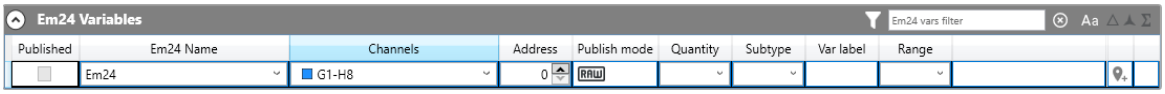
Refer to the relevant procedures below that describe how to publish them.

6.2 Procedures

6.2.1 Publish EM24 Analog data

Important note: The EM24 analogue data and counter variables have to be set manually in the XML driver panel. The fields must be compiled according to the information on the EM24 display. *Please refer to the EM24 Dupline documentation.*

To publish the *EM24 analogue data* variables in the XML driver, follow this procedure:

Step	Action
1	If at least 1 analogue data value is present in the current configuration, a row is shown in the *EM24 Variables* (see below): 
2	Enter the custom name in the **EM24 Name** field; otherwise, it will be entered the default name.
3	The **Channels** field shows the channels range that is used to read the analogue variables group.
4	In the **Address** field, enter the multiplexer address for the selected analogue variable, as displayed in the EM24 device. *Note: If more than one EM24 Dupline devices is present in the configuration, refer to the table to set the Address properly.*
5	**Publish mode** Depending on the protocol settings, the variable can be exported in the XML format in two ways: 1. Select RAW to publish the raw value; 2. Select fx to publish the scaled value. The second option is automatically proposed whenever a formula is applied to the variable; *Note: if both options are selected, both values will be exported in the XML driver file.*
6	In the **Quantity** field, select the measure unit value according to what is set in the EM24 device.
7	In the **Subtype** field, set the subtype value according to what is set in the EM24 device. *Note: the variables such as **Ph** and **Hz** do not require this parameter.*
8	In the **Range** field, set the range value according to what is set in the EM24 device. *Note: the variables such as **Ph** and **Hz** do not require this parameter.*
9	By clicking on , a new row will be added. *Note: The new row is created with the same properties of the first one.*

***Note:** The **published flag** will be selectable only if all the parameters are set correctly. Once a variable is published, it can be selected/deselected by using the check option.*

6.2.2 Publish EM24 counter variables

To publish the *EM24 counter* variables in the XML driver, follow this procedure:

Step	Action
1	If at least 1 counter value is present in the current configuration, a row is shown in the *EM24 Variables* (see below):
2	Enter the custom name in the **EM24 Name** field; otherwise, it will be entered the default name.
3	The **Channels** field shows the channels range that is used to read the counters group.
4	In the **Address** field, enter the multiplexer address for the selected counter according to what is displayed in the EM24 device. *Note: If more than one EM24 Dupline device is present in the configuration, refer to the table to set the Address properly.*
5	**Publish mode** Depending on the protocol settings, the variable can be exported in the XML format in two ways: 1. Select RAW to publish the raw value; 2. Select fx to publish the scaled value. The second option is automatically proposed whenever a formula is applied to the variable; *Note: if both options are selected, both values will be exported in the XML driver file.*
6	In the **Quantity** field, select the counter type according to what is set in the EM24 device.
7	In the **Subtype** field set the subtype value according to what is set in the EM24 device.
8	For all the counter variables, the ***Range*** field is not required.
9	By clicking on , a new row will be added. *Note: The new row is created with the same properties of the first one.*

Note: *The **published flag** will be selectable only if all the parameters are set correctly. Once a variable is published, it can be selected/deselected by using the check option.*

6.2.3 Publish Analog Variables

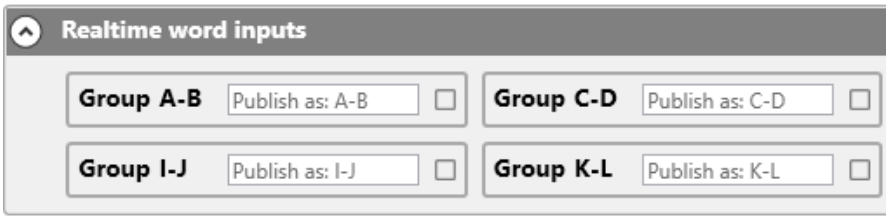
Follow the procedure below to configure and publish the Analogue Variables that have to be exported in the XML Driver:

Step	Action
1	The **Var Name** field shows the Protocol and the Dupline channels used for the selected variable. The text can be changed by entering the new value.
2	The **Channels** field shows the Dupline channels reference. *Note: the value cannot be changed.*
3	The **Channels Type** field shows the type of the selected variables, such as Input or Output. *Note: the value cannot be changed.*
4	**Mux value (**Only for multiplexed protocol) In the numeric field, select the Multiplexer address that is used to read the selected variables.
5	**Publish mode** Depending on the protocol settings, the variable can be exported in the XML format in two ways: 1. Select RAW to publish the raw value; 2. Select f_x to publish the scaled value. The second option is automatically proposed whenever a formula is applied to the variable; *Note: if both options are selected, both values will be exported in the XML driver file.*
6	In the **Measure unit** enter the value for the selected variables. *Note: The list does not contain any predefined values.*
7	By clicking on , a new row will be added. *Note: The new row is created with the same properties of the first one.*

Note: *The* ***published flag*** *will be selectable only if all the parameters are set correctly. Once a variable is published, it can be selected/deselected by using the check option.*

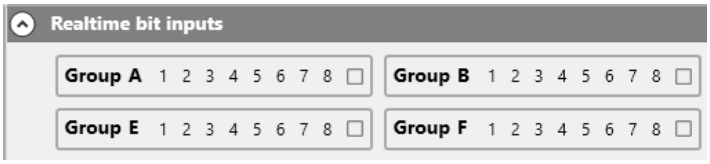
6.2.4 Publish Realtime word inputs / outputs

To publish the Realtime word input or Realtime word outputs values that have to be exported in the XML Driver, follow the procedure below:

Step	Action
1	In the XML Driver panel, click on the Realtime word inputs/ Realtime word outputs to see the entries: 
2	Enter the custom name in the ***Group X-Y*** name field; otherwise, it will be entered the default value.
3	By clicking on the small square ( ) at the end of each group, all the variables belonging to the group will be published. The icon changes as shown in the example below:

6.2.5 Publish Realtime bit inputs/outputs

To publish the Realtime bit input or Realtime bit outputs values that have to be exported in the XML Driver, follow the procedure below:

Step	Action
1	In the XML Driver panel, click on the Realtime bit inputs/ Realtime bit outputs to see the entries: 
2	a) Every channel can be individually published by clicking on it: it will turn in red. In the example below, the channels 2, 5, 7 are selected manually, or; b) By clicking on the small square ( ) at the end of each group, all the 8 channels will be as follows: - First click: all the channels are published ; - Second click: all the channels are deselected ; - Third click: all the channels are set back to the status they had before the first click

6.2.6 Generating the XML driver

Once all the required variables have been added (see the procedures above), to generate the driver file in XML format please refer to the following procedure:

Step	Action
1	In the **Name** field, enter the driver name; otherwise, it will be used the *configuration file name.*
2	The driver will be generated with a GUID value that is assigned by the software as the file is created. If a new GUID value is required, click on to generate it.
3	In the **Version** field, define the driver version. By clicking on , the Driver version can be changed according to the customers' requirements.
4	Click on to create the XML file.

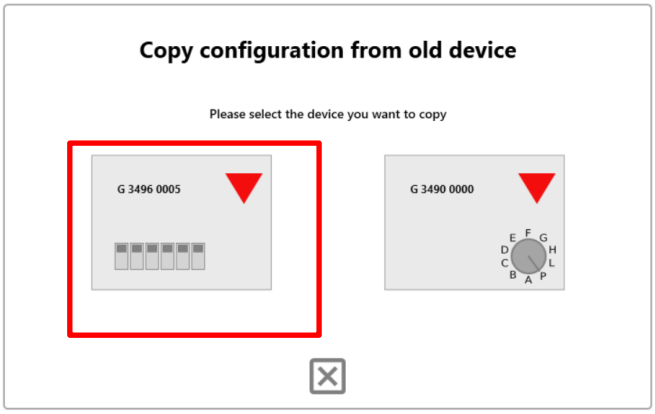
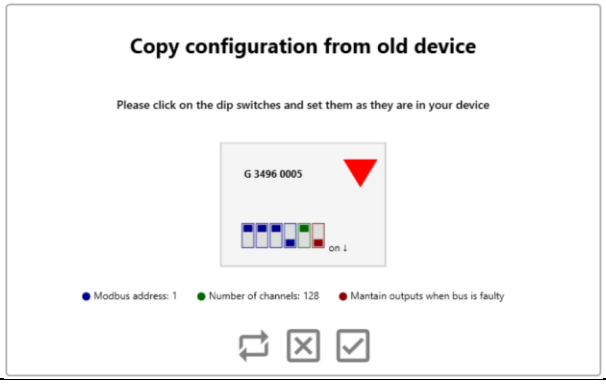
Note: to import the XML Driver file, refer to the UWP 3.0 user manual (the Modbus commander paragraph)

7 G34960005 OR G34900000 QUICK SUBSTITUTION

7.1 Procedures

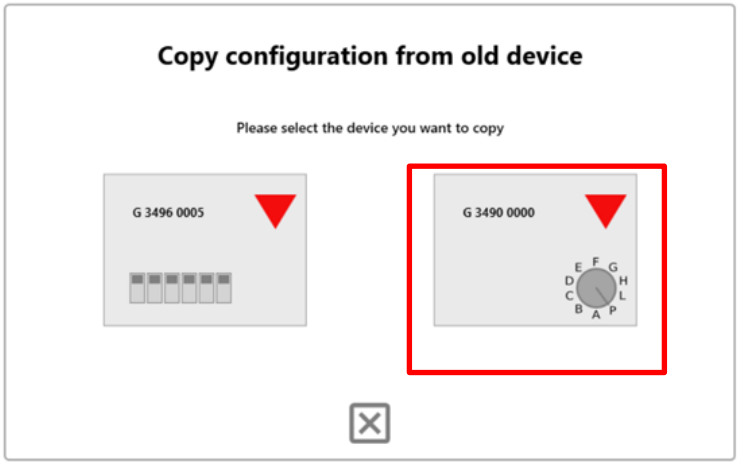
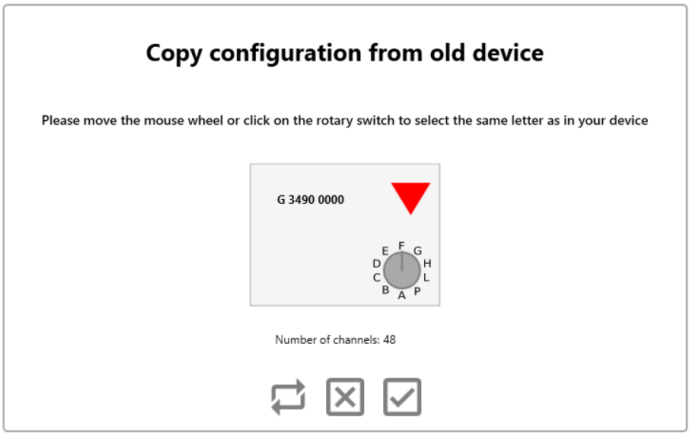
7.1.1 Substitute a G34960005

To easily and quickly copy the settings of a G34960005 to be substitute by an SD2DUG24, follow this procedure:

Step	Action
1	Click on
2	Select the device by clicking on the relevant icon: 
3	Set the “virtual” dip-switches, copying the ones of the G34960005 
4	Click on (done) and then, on the pop-up that will appear, click on (save)
5	Click on to write the configuration into the SD2DUG24

7.1.2 Substitute a G34900000

To easily and quickly copy the settings of a G34900000 to be substituted by an SD2DUG24, follow this procedure:

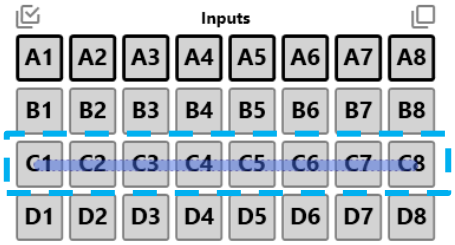
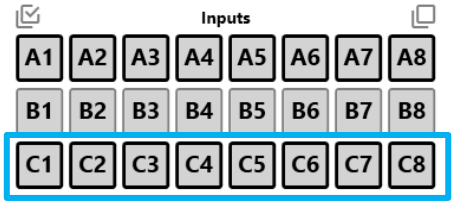
Step	Action
1	Click on
2	Select the device by clicking on the relevant icon: 
3	Set the “virtual” rotary switch, copying that of the G34900000 
4	Click on (done) and then, on the pop-up that will appear, click on (save)
5	Click on to write the configuration into the SD2DUG24

8 APENDIX

8.1 Tips and tricks

8.1.1 Select multiple channels

To easily and quickly select multiple channels that are not consecutive, use the drag and drop, following this procedure:

Step	Action
1	Hold down the Ctrl key
2	Hold down the left mouse button
3	With the left mouse button held down, move the pointer over the channels that have to be selected 
4	Release the left mouse button to complete the selection 
5	Repeat the steps above to select other channels

***TIP:** By using the **Alt** key instead of the **Ctrl** key, the channels can be deselected*

8.2 BSI-TEMANA conversion table

Analink	Temp. (°C)	Analink	Temp. (°C)	Analink	Temp. (°C)	Analink	Temp. (°C)	Analink	Temp. (°C)
0	-30	**52**	-11,6	**104**	6,7	**156**	24,7	**208**	43,4
1	-30	**53**	-11,2	**105**	7	**157**	25,4	**209**	43,7
2	-29,6	**54**	-10,9	**106**	7,4	**158**	25,7	**211**	44,4
3	-29,5	**55**	-10,5	**107**	7,7	**159**	26,1	**212**	44,4
4	-28,9	**56**	-10,2	**108**	8,1	**160**	26,4	**213**	45,1
5	-28,5	**57**	-9,8	**109**	8,4	**161**	26,8	**214**	45,5
6	-28,2	**58**	-9,5	**110**	8,8	**162**	27,1	**215**	45,8
7	-27,5	**59**	-9,1	**111**	9,1	**163**	27,5	**216**	46,2
8	-27,1	**60**	-8,8	**112**	9,5	**164**	27,8	**217**	46,6
9	-26,8	**61**	-8,4	**113**	9,8	**165**	28,2	**218**	46,9
10	-26,4	**62**	-8,1	**114**	10,2	**166**	28,2	**219**	47,3
11	-26,1	**63**	-7,7	**115**	10,5	**167**	28,5	**220**	47,6
12	-25,7	**64**	-7,4	**116**	10,9	**168**	29,3	**221**	48
13	-25,4	**65**	-7	**117**	11,3	**169**	29,6	**222**	48,3
14	-25	**66**	-6,7	**118**	11,6	**170**	30	**223**	48,3
15	-24,7	**67**	-6,3	**119**	12	**171**	30,3	**224**	48,7
16	-24,3	**68**	-5,9	**120**	12,3	**172**	30,3	**225**	49,4
17	-23,9	**69**	-5,6	**121**	12,7	**173**	30,7	**226**	49,7
18	-23,6	**70**	-5,2	**122**	13	**174**	31	**227**	50,1
19	-23,2	**71**	-4,9	**123**	13,4	**175**	31,4	**228**	50,4
20	-22,9	**72**	-4,5	**124**	13,7	**176**	32,1	**229**	50,8
21	-22,5	**73**	-4,2	**125**	14,1	**177**	32,4	**230**	51,1
22	-22,2	**74**	-3,8	**126**	14,4	**178**	32,8	**231**	51,5
23	-21,8	**75**	-3,5	**127**	14,8	**179**	33,1	**232**	51,8
24	-21,5	**76**	-3,1	**128**	15,1	**180**	33,5	**233**	52,2
25	-21,1	**77**	-2,8	**129**	15,5	**181**	33,8	**234**	52,6
26	-20,8	**78**	-2,4	**130**	15,8	**182**	33,1	**235**	52,9
27	-20,4	**79**	-2,1	**131**	16,2	**183**	34,2	**236**	53,3
28	-20,1	**80**	-1,7	**132**	16,5	**184**	34,5	**237**	53,6
29	-19,7	**81**	-1,4	**133**	16,9	**185**	35,3	**238**	53,6
30	-19,4	**82**	-1	**134**	17,3	**186**	35,6	**239**	54,3
31	-19	**83**	-0,7	**135**	17,6	**187**	36	**240**	54,7
32	-18,7	**84**	-0,3	**136**	18	**188**	36,3	**241**	55
33	-18,3	**85**	0	**137**	18,3	**189**	36,7	**242**	55,4
34	-17,9	**86**	0,3	**138**	18,7	**190**	37,4	**243**	55,7
35	-17,6	**87**	0,7	**139**	19	**191**	37,4	**244**	56,1
36	-17,2	**88**	1	**140**	19,4	**192**	37,7	**245**	56,4
37	-16,9	**89**	1,4	**141**	19,7	**193**	38,1	**247**	57,1
38	-16,5	**90**	1,7	**142**	20,1	**194**	38,4	**248**	57,5
39	-16,2	**91**	2,1	**143**	20,4	**195**	38,8	**249**	57,8
40	-15,8	**92**	2,4	**144**	20,8	**196**	38,8	**250**	58,2
41	-15,5	**93**	2,8	**145**	21,1	**197**	39,1	**251**	58,6
42	-15,1	**94**	3,1	**146**	21,5	**198**	39,8	**252**	58,9
43	-14,8	**95**	3,5	**147**	21,8	**199**	40,2	**253**	59,3
44	-14,4	**96**	3,8	**148**	22,2	**200**	40,6	**254**	59,6
45	-14,1	**97**	4,2	**149**	22,5	**201**	40,9	**255**	60
46	-13,7	**98**	4,5	**150**	22,9	**202**	40,9		
47	-13,4	**99**	4,9	**151**	23,3	**203**	41,3		
48	-13	**100**	5,2	**152**	23,6	**204**	42		
49	-12,7	**101**	5,6	**153**	24	**205**	42,3		
50	-12,3	**102**	6	**154**	24,3	**206**	42,7		
51	-11,9	**103**	6,3	**155**	24,7	**207**	43		

8.3 EM24 analog variables table

In case more than one EM24 Dupline device is present in a configuration, consider the numbers in the following table in order to publish the EM24 variables:

EM24 Dupline		Dupline Groups				
		G-H	I-J	K-L	M-N	O-P
Multiplexer Index	0	0	16	32	48	64
	1	1	17	33	49	65
	2	2	18	34	50	66
	3	3	19	35	51	67
	4	4	20	36	52	68
	5	5	21	37	53	69
	6	6	22	38	54	70
	7	7	23	39	55	71
	8	8	24	40	56	72
	9	9	25	41	57	73
	10	10	26	42	58	74
	11	11	27	43	59	75
	12	12	28	44	60	76
	13	13	29	45	61	77
	14	14	30	46	62	78
	15	15	31	47	63	79