ADFweb
Industrial Electronic Devices

User Manual
Revision 1.000
English

BACnet / DeviceNet Master - Converter

(Order Code: HD67680-A1)

for Website information:
www.adfweb.com?Product=HD67680

for Price information:
www.adfweb.com?Price=HD67680-A1

Benefits and Main Features:

► Very easy to configure

► Electrical isolation

► Two BACnet ports

► Temperature range: -40°C/85°C (-40°F/185°F)

Other Products

For others BACnet products see also the following link:

Converter BACnet to

www.adfweb.com?Product=HD67056	**(M-Bus Master)**
www.adfweb.com?Product=HD67671	**(Modbus Master)**
www.adfweb.com?Product=HD67672	**(Modbus Slave)**
www.adfweb.com?Product=HD67673	**(Modbus TCP Master)**
www.adfweb.com?Product=HD67674	**(Modbus TCP Slave)**
www.adfweb.com?Product=HD67675	**(PROFIBUS Master)**
www.adfweb.com?Product=HD67676	**(PROFIBUS Slave)**
www.adfweb.com?Product=HD67677	**(CAN)**
www.adfweb.com?Product=HD67678	**(CANopen)**
www.adfweb.com?Product=HD67679	**(PROFINET)**
www.adfweb.com?Product=HD67680	**(DeviceNet Master)**
www.adfweb.com?Product=HD67681	**(DeviceNet Slave)**
www.adfweb.com?Product=HD67682	**(EtherNet/IP)**
www.adfweb.com?Product=HD67683	**(NMEA 2000)**
www.adfweb.com?Product=HD67684	**(Ethernet)**

Do you have an your customer protocol?
www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?
www.adfweb.com?Cmd=helpme

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INDEX:

UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:
- Updated
- Related to the product you own

To obtain the most recently updated document, note the "document code" that appears at the top right-hand corner of each page of this document.

With this "Document Code" go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper "Document Code" and download the updates.

To obtain the updated documentation for the product that you own, note the "Document Code" (Abbreviated written "Doc. Code" on the label on the product) and download the updated from our web site www.adfweb.com/download/

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.000	15/02/2013	Ff	All	First Release

WARNING:

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SECURITY ALERT:

GENERAL INFORMATION
To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device are required for each individual application, legal and safety regulation. The same applies also when using accessories.

INTENDED USE
Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).

QUALIFIED PERSONNEL
The device can be used only by qualified personnel, strictly in accordance with the specifications.
Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

RESIDUAL RISKS
The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

⚠ This symbol indicates that non-observance of the safety instructions is danger for people to serious injury or death and / or the possibility of damage.

CE CONFORMITY
The declaration is made by us. You can send an email to support@adfweb.com or give us a call if you need it.

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EXAMPLE OF CONNECTION:

BACnet network

DeviceNet network

HD67680-A1

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CONNECTION SCHEME:

Dip-Switch A:
-Dip1 – Must be at ON
-Dip2 – Functioning Mode

= Normal   = Boot

Led1:
Green
Not used

Led2:
Green
Device state

Led3:
Green
Not used

Rail DIN Clamp

Connector3:
Ethernet1 port
(RJ45 Plug)

Led4:
Green
Not used

Connector4:
Ethernet2 port
(RJ45 Plug)

Lo Shl Hi   +V 0V

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

Dip-Switch B:
-Dip1 – DeviceNet Termination Resistor
-Dip2 – Not used

= Open   = 120 Ohm

Connector2:
DeviceNet (Isolated port)

Hi = High wire
Shl = Shield* (to Isolated Ground)
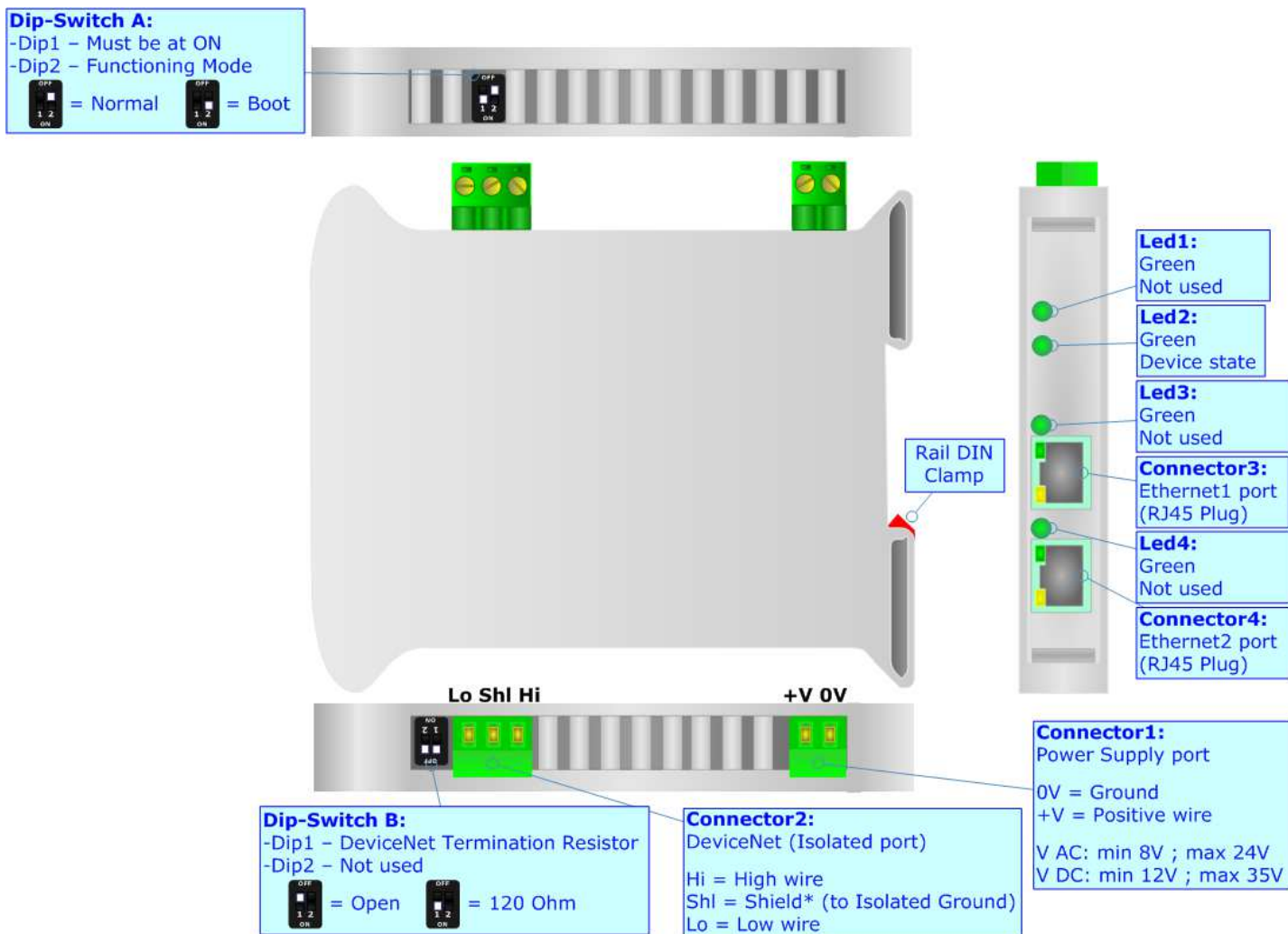Lo = Low wire

Figure 1: Connection scheme for HD67680-A1

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CHARACTERISTICS:

The HD67680-A1 is a BACnet / DeviceNet Master Converter.

It allows the following characteristics:

- Up to 2048 BACnet objects (Read+Write);
- Triple isolation between BACnet - Power Supply, BACnet - DeviceNet, Power Supply - DeviceNet.
- Two-directional information between BACnet bus and DeviceNet bus;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 8…24V AC or 12…35V DC;
- Wide temperature range: -40°C / 85°C [-40°F / +185°F].

CONFIGURATION:

You need Compositor SW67680 software on your PC in order to perform the following:

- Define the parameter of BACnet line;
- Define the parameter of DeviceNet line;
- Determinate which DeviceNet bytes transfer in BACnet and vice versa;
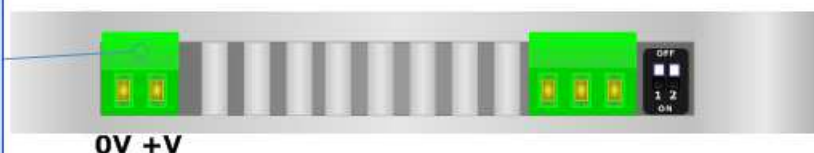- Update the device.

POWER SUPPLY:

The devices can be powered at 8…24V AC and 12…35V DC. For more details see the two tables below.

VAC		VDC	
Vmin	**Vmax**	**Vmin**	**Vmax**
8V	**24V**	**12V**	**35V**

Consumption at 24V DC:

Device	Consumption [W/VA]
HD67680-A1	3.5

Caution: Not reverse the polarity power

Connector1:
Power Supply port

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

0V +V

HD67680-A1

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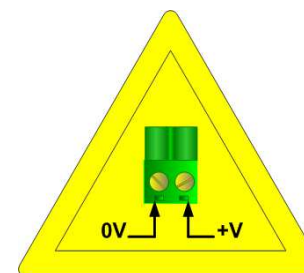
FUNCTION MODES:

The device has got two functions mode depending of the position of the 'Dip2 of Dip-Switch A':

- The first, with 'Dip2 of Dip-Switch A' at "OFF" position, is used for the normal working of the device.
- The second, with 'Dip2 of Dip-Switch A' at "ON" position, is used for upload the Project and/or Firmware.

For the operations to follow for the updating, see 'UPDATE DEVICE' section.

According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.

Warning:
Dip1 of 'Dip-Switch A' must be at ON position for working even if the Ethernet cable isn't inserted.

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LEDS:

The device has got four LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

LED	Normal Mode	Boot Mode
1: Not used (green)	OFF	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
4: Device State (green)	Blinks slowly (~1Hz)	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
5: Not used (green)	OFF	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress
6: Not used (green)	OFF	**Blinks quickly:** Boot state **Blinks very slowly (~0.5Hz):** update in progress

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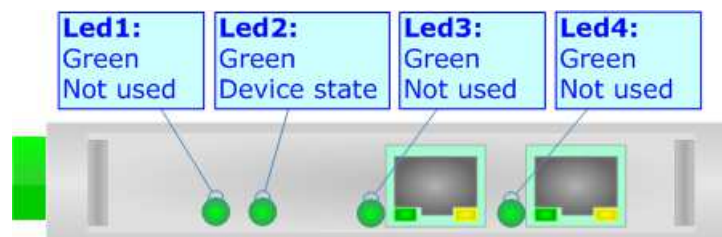
DeviceNet:

To terminate the DeviceNet line with a 120Ω resistor it is necessary that the Dip1 of 'Dip-Switch B' is at ON position.
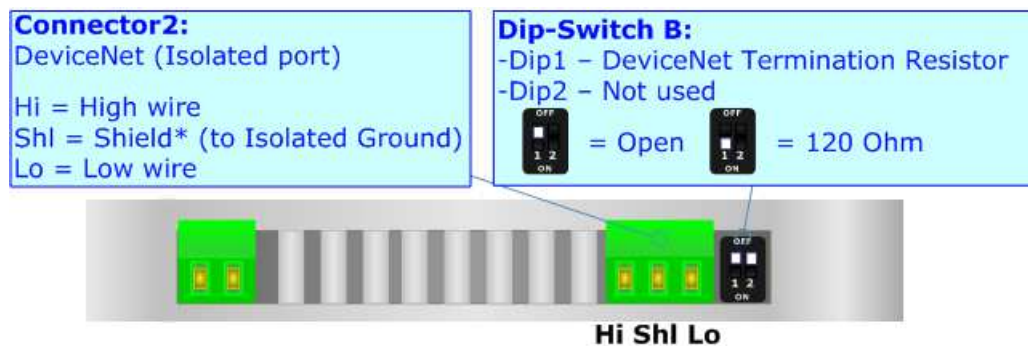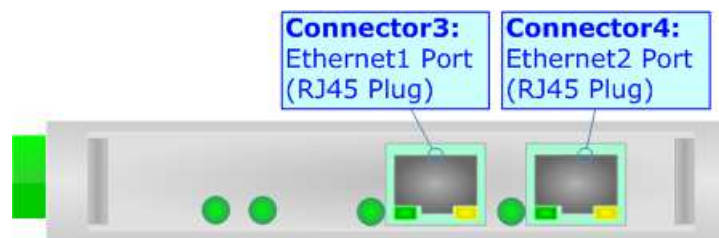

Cable characteristics:

DC parameter:		Impedance	70 Ohm/m

AC parameters:		Impedance	120 Ohm/m
		Delay	5 ns/m

Length		Baud Rate [bps]	Length MAX [m]
		10 K	5000
		20 K	2500
		50 K	1000
		100 K	650
		125 K	500
		250 K	250
		500 K	100
		800 K	50
		1000 K	25

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BACNET:

The BACnet connection must be made using Connector3 and/or Connector4 of HD67680-A1 with at least a Category 5E cable. The maximum length of the cable should not exceed 100m. The cable has to conform to the T568 norms relative to connections in cat.5 up to 100 Mbps. To connect the device to an Hub/Switch is recommended the use of a straight cable, to connect the device to a PC/PLC/other is recommended the use of a cross cable.

Connector3: Ethernet1 Port (RJ45 Plug) **Connector4:** Ethernet2 Port (RJ45 Plug)

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USE OF COMPOSITOR SW67680:

To configure the Converter, use the available software that runs with Windows, called SW67680. It is downloadable on the site www.adfweb.com and its operation is described in this document. *(This manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (MS 2000, XP, Vista, Seven, 8; 32/64bit).

When launching the SW67680 the right window appears (Fig. 2).
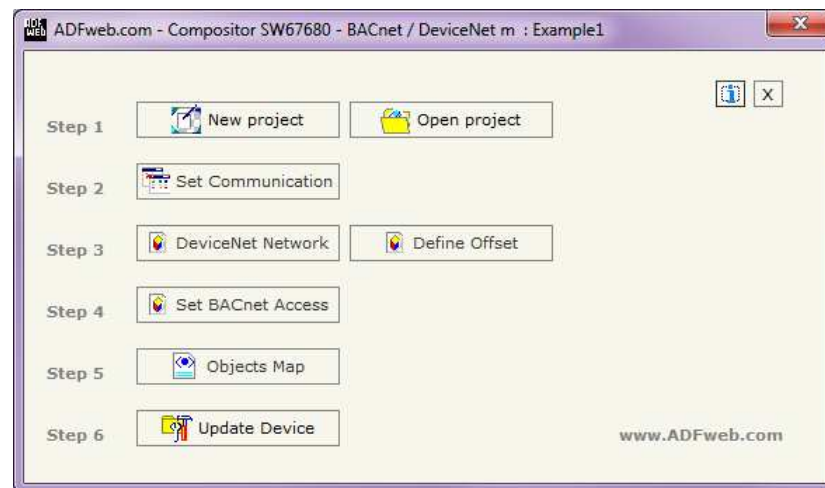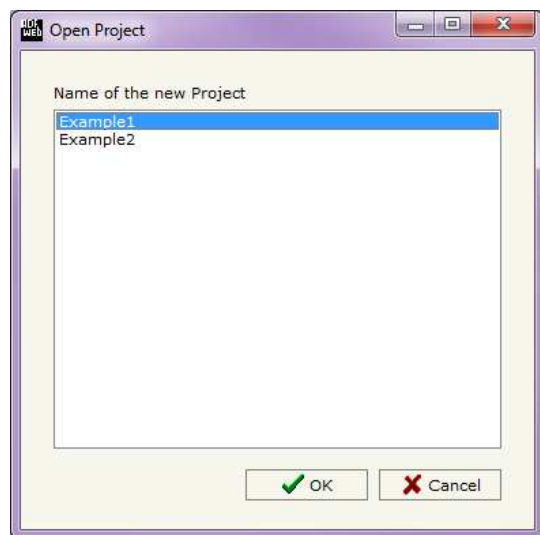
Note:
It is necessary to have installed .Net Framework 4.
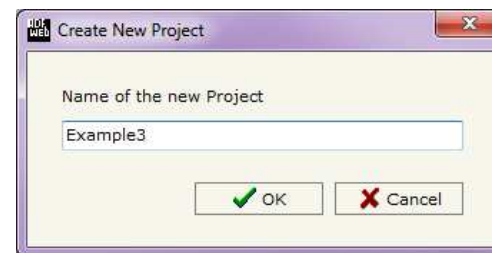
Figure 2: Main window for SW67680

NEW PROJECT / OPEN PROJECT:

The "**New Project**" button creates the folder which contains the entire device configuration.

A device configuration can also be imported or exported:

➔ To clone the configurations of a programmable "BACnet / DeviceNet Master – Converter" in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;

➔ To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "**Open Project**".

SET COMMUNICATION:

This section define the fundamental communication parameters of two buses, BACnet and DeviceNet.

By Pressing the "**Set Communication**" button from the main window for SW67680 (Fig. 2) the window "Set Communication" appears (Fig. 3).
The window is divided in two sections, one for the BACnet and the other for the DeviceNet.

The means of the fields for "BACnet" are:

➔ In the fields "**IP ADDRESS**" insert the IP address that you want to give to the Converter;
➔ In the fields "**SUBNET Mask**" insert the SubNet Mask;
➔ In the fields "**GATEWAY**" insert the default gateway that you want to use. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net;
➔ In the field "**Port**" the port used for BACnet communication is defined. The port has a fixed value of 47808;
➔ In the field "**BACnet Device Name**" is possible to assign a name to the BACnet node;
➔ In the field "**Device Identifier**" is possible to assign a number to the BACnet node (Used for the Device Identifier).

The means of the fields for the "DeviceNet Master" section are:

➔ In the field "**ID Device**" the address for the DeviceNet Master side is defined;
➔ In the field "**Baudrate**" the baudrate of the DeviceNet line is defined.
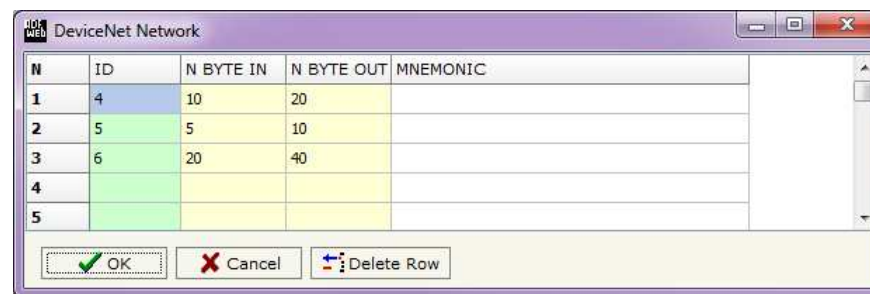
Figure 3: "Set Communication" window

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DEVICENET NETWORK:

By pressing the "**DeviceNet Network**" button from the main window for SW67680 (Fig. 2) the window "DeviceNet Network" appears (Fig. 4).

The data of the columns have the following meanings:

- In the field "**ID**" the ID of a DeviceNet slave device is defined;
- In the field "**N BYTE IN**" the number of input byte of the DeviceNet slave is defined;
- In the field "**N BYTE OUT**" the number of output byte of the DeviceNet slave is defined;
- In the field "**Mnemonic**" is possible to insert a description. It isn't necessary compiling this field, is only a label.

Figure 4: "DeviceNet Network" window

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DEFINE BYTE:

By pressing the "**Define Byte**" button from the main window for SW67680 (Fig. 2) the window "Define Offset" appears (Fig. 5a e 5b).

In the field "**Select a Slave**" it is possible to select the slave to configure between those defined in the "DeviceNet Network" step.

The data of the column have the following meanings:

Byte IN (Fig. 5a):

- In the column "**Offset**" it is possible to define the desired byte of BACnet which will update the DeviceNet. If it is set with "NONE", the DeviceNet byte will not be updated by the BACnet;
- In the column "**Mnemonic**" is possible to insert a description. It isn't necessary compiling this field, it is only a label.

Figure 5a: "Byte IN" window

Byte OUT (Fig. 5b):

- In the column "**Offset**" it is possible to define the desired byte of BACnet which will be updated by the DeviceNet. If it is set with "NONE", the DeviceNet byte will not update the BACnet;
- In the column "**Mnemonic**" is possible to insert a description. It isn't necessary compiling this field, it is only a label.
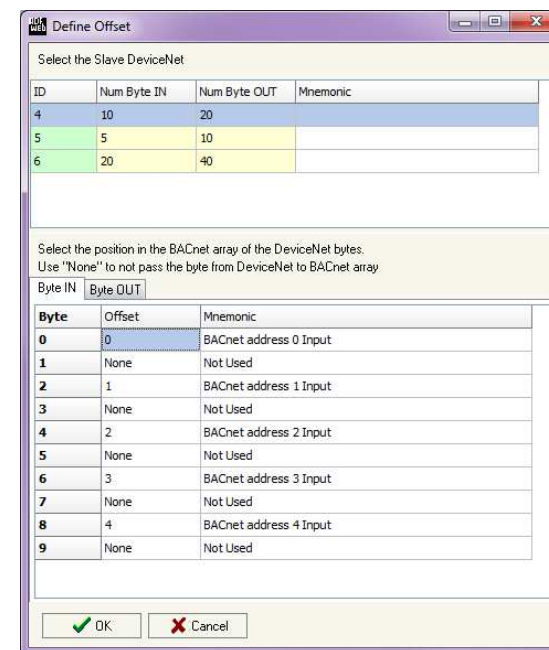
Figure 5b: "Byte OUT" window
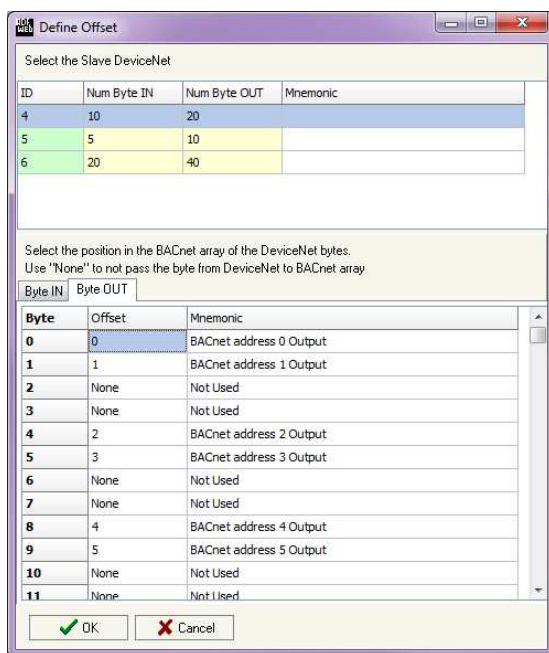
SET BACNET ACCESS:

By Pressing the "**Set BACnet Access** " button from the main window for SW67680 (Fig. 2) the window "BACnet Set Access" appears (Fig. 6).

The window is divided in two parts, the "BACnet in Read" that contains the BACnet objects readable by a BACnet Master (the DeviceNet data associated to these objects arrives to the converter) and "BACnet in Write" that contains the BACnet objects writeable by a BACnet Master (the DeviceNet data associated to these objects are sent by the Converter).

The meaning of the fields in the window are the follows:

- In the field "**Data Type**" is possible to select the BACnet object data type;
- In the field "**Eng. Unit**", with double click the window "*Select the BACnet Engineering Unit*" appears (Fig. 7);
- In the field "**Position**" is possible to select the position where take/save the data from a 6000 bytes array;
- The field "**Start Bit**" is used for the "Binary In" and "Binary Out" BACnet objects;
- The field "**Length**" is used for all the others BACnet objects;
- In the field "**Mnemonic**" the description for the BACnet Object is defined.

BACnet Set Access

BACnet in Read | BACnet in Write

N	Data Type	Eng. Unit	Position	Start Bit	Length	Mnemonic
1	Analog Input	95	0	0	2	
2	Positive Integer Value	160	2	0	2	
3	Binary Input	95	4	0	0	
4	Binary Input	95	4	1	0	
5						

✔ OK   ✘ Cancel   Delete Row

BACnet Set Access

BACnet in Read | *BACnet in Write*

N	Data Type	Eng. Unit	Position	Start Bit	Length	Mnemonic
1	Positive Integer Value	82	0	0	4	
2	Large Analog Value	55	4	0	8	
3	Binary Out	95	12	0	0	
4						
5						

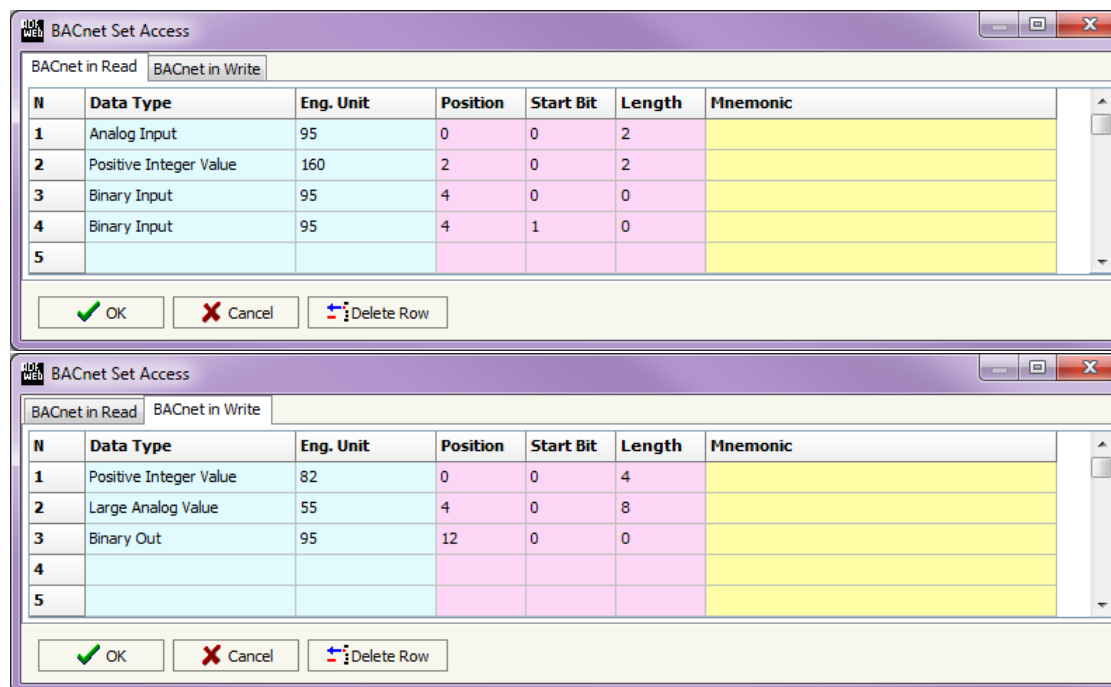✔ OK   ✘ Cancel   Delete Row

Figure 6: "BACnet Set Access" window

Is possible to insert directly the Unit (using its unique number) by compiling the "**Selected BACnet Engineering Unit**" field; or by selecting with the fields "**Select the Type**" and "**Select unit**" the Type/Unit desired. If the second way is used, is necessary to press the "**Select Engineering Unit**" button for confirm the choice.
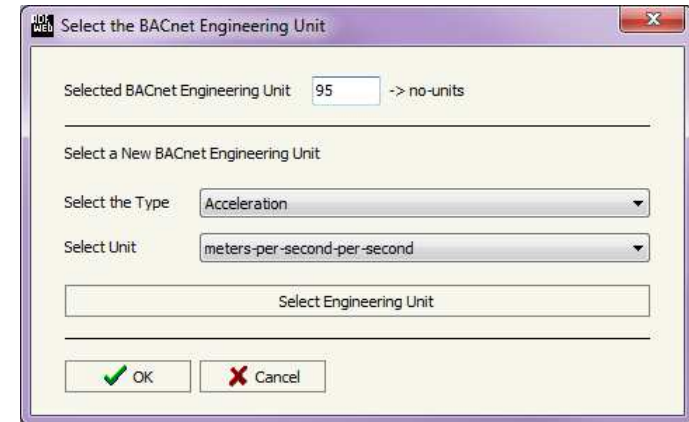
Figure 7: "Select the BACnet Engineering Unit" window

OBJECTS MAP:

By Pressing the "**Objects Map**" button from the main window for SW67680 (Fig. 2) is possible to create a .csv document with the map of BACnet Objects.

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UPDATE DEVICE:

By pressing the "**Update Device**" button it is possible to load the created Configuration into the device; and also the Firmware, if is necessary.

If you don't know the actual IP address of the device you have to use this procedure:

- Turn off the Device;
- Put Dip2 of 'Dip-Switch A' at ON position;
- Turn on the device
- Connect the Ethernet cable;
- Insert the IP "**192.168.2.205**";
- Press the "**Ping**" button, must appear "Device Found!";
- Press the "**Next**" button;
- Select which operations you want to do;
- Press the "**Execute update firmware**" button to start the upload;
- When all the operations are "OK" turn off the Device;
- Put Dip2 of 'Dip-Switch A' at OFF position;
- Turn on the device.

At this point the configuration/firmware on the device is correctly updated.
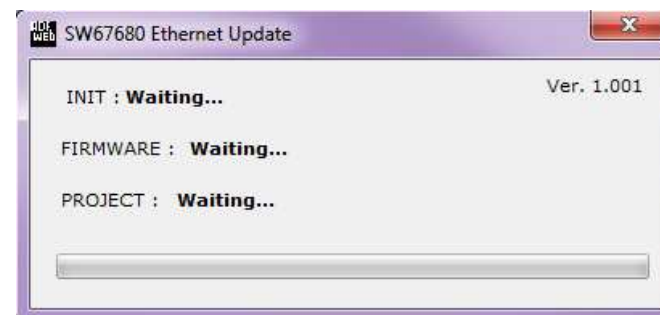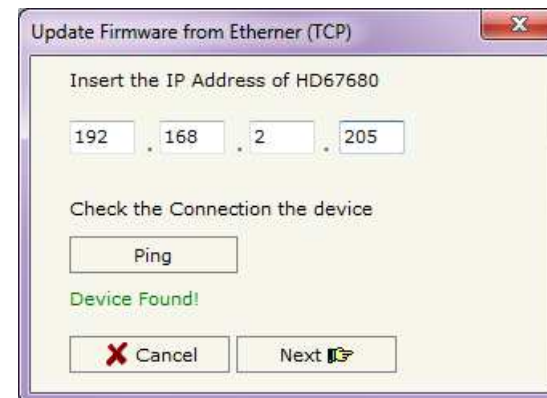
Figure 8: "Update device" windows

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If you know the actual IP address of the device you have to use this procedure:

➤ Turn on the Device with the Ethernet cable inserted;
➤ Insert the actual IP of the Converter;
➤ Press the "**Ping**" button, must appear "Device Found!";
➤ Press the "**Next**" button;
➤ Select which operations you want to do;
➤ Press the "**Execute update firmware**" button to start the upload;
➤ When all the operations are "OK" the device automatically goes at Normal Mode.

At this point the configuration/firmware on the device is correctly update.

Note:
When you install a new version of the software it is better if the first time you do the update of the Firmware in the HD67680-A1 device.

Note:
When you receive the device, for the first time, you have to update also the Firmware in the HD67680-A1 device.

Warning:
If the Fig. 9 appears when you try to do the Update before require assistance try these points:

➤ Try to repeat the operations for the updating;
➤ Try with another PC;
➤ Try to restart the PC;
➤ If you are using the program inside a Virtual Machine, try to use in the main Operating System;
➤ If you are using Windows Seven or Vista or 8, make sure that you have the administrator privileges;
➤ Take attention at Firewall lock;
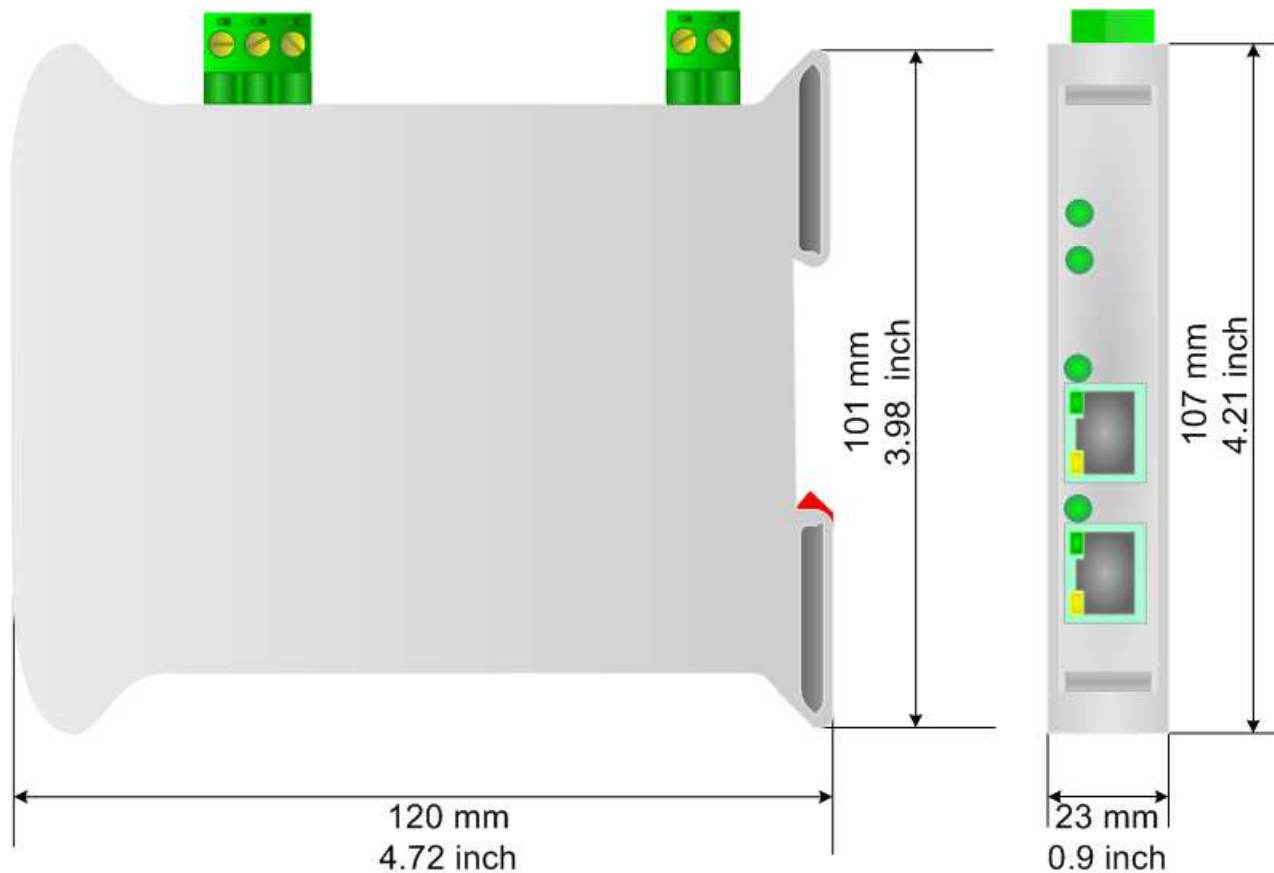➤ Check the LAN settings.

Figure 9: "Protection" window

⚠ In the case of HD67680-A1 you have to use the software "SW67680": www.adfweb.com\download\filefold\SW67680.zip.

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MECHANICAL DIMENSIONS:

101 mm
3.98 inch

107 mm
4.21 inch

120 mm
4.72 inch

23 mm
0.9 inch

Housing: PVC
Weight: 200g (Approx)

Figure 10: Mechanical dimensions scheme for HD67680-A1

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ORDERING INFORMATIONS:

The ordering part number is formed by a valid combination of the following:

HD67680 – A 1

Connectors Type
1: Removable 5mm Screw Terminal

Enclosure Type
A: 1M, 35mm DIN Rail mounting

Device Family
HD67680: BACnet / DeviceNet Master - Converter
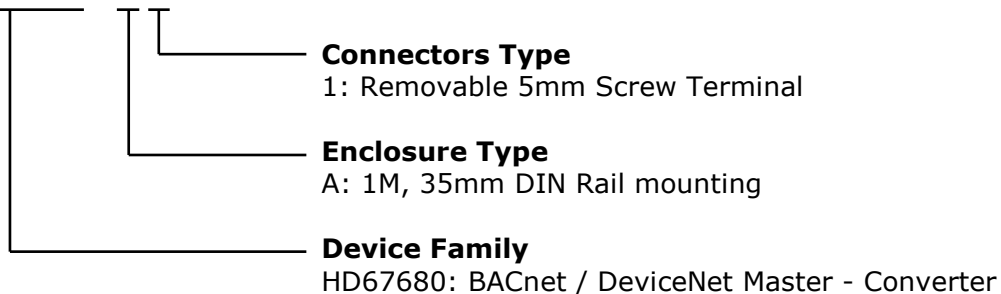
Order Code: **HD67680-A1**   -   BACnet / DeviceNet Master - Converter

ACCESSORIES:

Order Code: **AC34001**   -   35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC

Order Code: **AC34002**   -   35mm Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC

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OTHER REGULATIONS AND STANDARDS

WEEE INFORMATION

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).

This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE

The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

CE MARKING

The product conforms with the essential requirements of the applicable EC directives.

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WARRANTIES AND TECHNICAL SUPPORT:

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com.
Otherwise contact us at the address support@adfweb.com

RETURN POLICY:

If while using your product you have any problem and you wish to exchange or repair it, please do the following:
1) Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
2) Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks. If the product is no longer under warranty, you will receive a repair estimate.