



-power in control



APPLICATION NOTES



Advanced Graphical Interface, AGI 3xx

- General information
- Product information
- Technical information
- Connections and ports



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1. General information

1.1. Warnings, legal information and safety.....	3
1.1.1. Warnings and notes	3
1.1.2. Legal information and disclaimer	3
1.1.3. Safety issues	3
1.1.4. Electrostatic discharge awareness	3
1.2. About the Application Notes.....	3
1.2.1. General purpose	3
1.2.2. Intended users	4
1.2.3. Contents and overall structure	4

2. Product information

2.1. Introduction, standards and approvals.....	5
2.1.1. Introduction.....	5
2.1.2. Standards and approvals.....	5
2.2. General product information.....	6
2.2.1. Unpacking/packing instructions.....	6
2.2.2. Getting started.....	6
2.2.3. System settings.....	7
2.2.4. Power supply, grounding and shielding.....	8
2.2.5. Battery.....	9
2.2.6. Cleaning of faceplates.....	10

3. Technical information

3.1. Specifications, conditions, compatibility and durability.....	11
3.1.1. Technical specifications.....	11
3.1.2. Environmental conditions.....	11
3.1.3. Electromagnetic compatibility (EMC).....	12
3.1.4. Durability.....	12
3.2. Technical data.....	13
3.2.1. Product data and dimensions, AGI 304.....	13
3.2.2. Product data and dimensions, AGI 307.....	16
3.2.3. Product data and dimensions, AGI 315.....	19
3.2.4. Installation environment.....	21
3.2.5. Installation procedure.....	23

4. Connections and ports

4.1. Connections.....	24
4.1.1. AGI 304.....	24
4.1.2. AGI 307, AGI 315.....	24
4.2. Ports.....	25
4.2.1. Serial port.....	25
4.2.2. Ethernet port.....	25
4.2.3. Optional plug-in modules.....	26

1. General information

1.1 Warnings, legal information and safety

1.1.1 Warnings and notes

Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings



Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

Notes



Notes provide general information, which will be helpful for the reader to bear in mind.

1.1.2 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the unit. If there is any doubt about how to install or operate the unit, the company responsible for the installation or the operation must be contacted.



The unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

1.1.3 Safety issues

Installation of the unit should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

1.1.4 Electrostatic discharge awareness

Sufficient care must be taken to protect the terminal against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

1.2 About the Application Notes

1.2.1 General purpose

This document includes application notes for DEIF's AGI 300 series. It mainly includes general product information, mounting instructions and wiring descriptions.

The general purpose of the application notes is to help the user with the first steps of installing and using the AGI 300 series touch screen.



Please make sure to also read the Installation Instructions before starting to work with the AGI 300. Failure to do this could result in human injury or damage to the equipment.

1.2.2 Intended users

The Application Notes are mainly intended for the panel builder in charge. On the basis of this document, the panel builder designer will give the electrician the information he needs in order to get started to install the AGI 300. For detailed electrical drawings, please refer to the Installation Instructions.

1.2.3 Contents and overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

2. Product information

2.1 Introduction, standards and approvals

2.1.1 Introduction

The guidelines described in this document is information which relates to the device, installation, transportation, storage, assembly, use and maintenance.

This document refers to the following products in the AGI 300 series:

- AGI 304 operator interface with TFT colour 4.3" widescreen display touch screen
- AGI 307 operator interface with TFT colour 7" widescreen display touch screen
- AGI 315 operator interface with TFT colour 15" display touch screen

2.1.2 Standards and approvals

The products have been designed for use in an industrial environment in compliance with the 2004/108/EC EMC Directive.

The products have been designed in compliance with:

EN 61000-6-4 EN 55011 Class A

EN 61000-6-2 EN 61000-4-2
 EN 61000-4-3
 EN 61000-4-4
 EN 61000-4-5
 EN 61000-4-6

The installation of these devices into residential, commercial and light-industrial environments is allowed only when special measures are taken in order to ensure conformity to EN 61000-6-3.

The products are in compliance with the Restrictions on Certain Hazardous Substances (RoHS) Directive 2002/95/EC.

In compliance with the above regulations, the products are CE-marked.

Product identification

The product may be identified through a plate attached to the rear cover. You will have to know which type of unit you are using for correct usage of the information given in the guide.

An example of the plate is shown below:

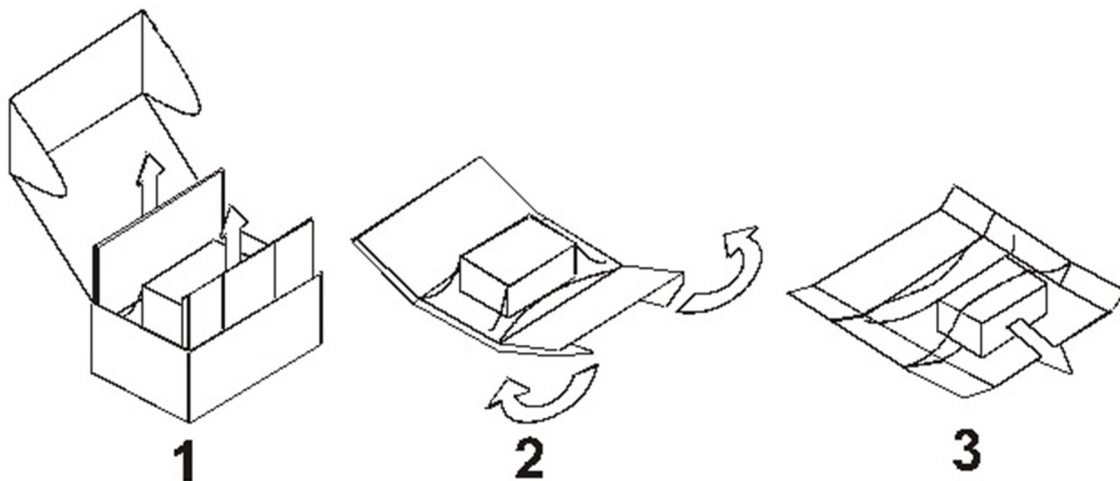


AGI 307
1241000031
11/13
09994847559
040902A09008xxx

Product model name
Product part number
Month/year of production
Serial number
Version ID of the product

2.2 General product information

2.2.1 Unpacking/packing instructions



To repack the unit, please follow the instructions in reverse order.

2.2.2 Getting started

The AGI 300 series panels must be programmed with the programming software AGI Creator.

To programme a panel, you will have to connect it to a personal computer running the AGI Creator software package. The panel must be in configuration mode to be programmed. AGI 300 series units are programmed via the Ethernet interface.

The software package for AGI is a Windows™ application and must be properly installed.

AGI Creator uses the personal computer Ethernet interface to communicate with the target device. Make sure that the proper firewall policy is configured in order to allow AGI Creator to access the network.

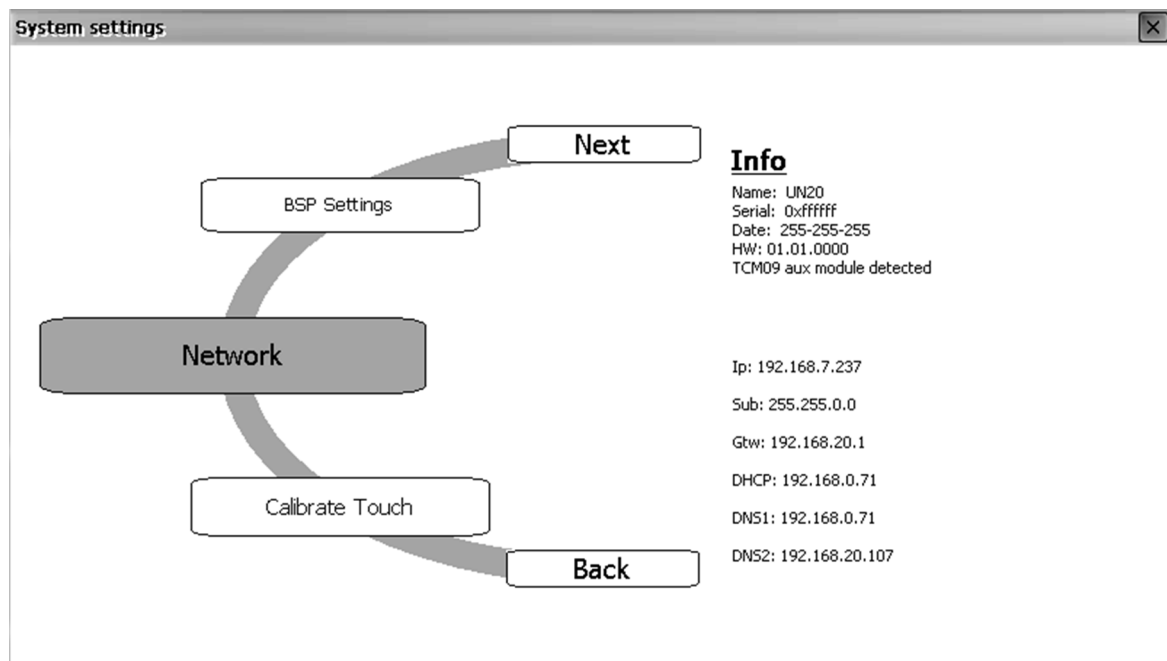
The version of the AGI Creator used must be compatible with the AGI Runtime version installed on the panel to be programmed.

2.2.3 System settings

The AGI 300 series has a system settings tool to allow basic and preliminary settings of the unit.

The system settings tool comes in the shape of a rotating menu with navigation buttons at the top and bottom to scroll between the available options. The tool is shown in the figure below.

On the left side, the several components and functions are highlighted and, for each of them, the right side ("Info" pane) shows information about the current version, when applicable. The figure below shows the version of the Main OS component.



There are two operating modes in the system settings: User mode and system mode. The difference between them is only in the number of available options.

System settings in user mode is activated from the context menu. The context menu can be recalled by clicking and holding any unused area of the touch screen for a few seconds. Default holding time is 2 seconds. Holding time is a runtime parameter that can be changed.

System settings in system mode can be activated with the so-called emergency system access procedure. This procedure consists in tapping in the middle of the touch screen with a finger at a high frequency while the system is powering up. The emergency procedure can only be accessed at power-up.

User mode is the simplest possible interface where a generic user can get access to the basic settings of the panel:

Calibrate touch:	Allows to calibrate the touch screen interface.
Network:	Allows to change the options of the panel on-board network card.
Time:	Allows to change the panel RTC options, including time zone and DST.
Display settings:	Automatic backlight switch-off and brightness adjustment.
BSP settings:	Allows to check the BSP (board support package) version (example 2.37), check the operating hours timers for the unit and separately for the backlight, enable/disable the buzzer, enable/disable the use of the "low battery" front LED indicator.
Plug-in list:	Allows to check the presence of optional plug-in modules installed.

System mode is the complete interface of the system settings tool where all options are available. In addition to the options available in the user mode, the following important options are available:

Format flash:	Allows to format the internal panel flash disk.
Resize image area:	Allows to resize the flash portion reserved to store the splash screen image displayed by the unit at power-up; default settings are normally OK for all the units.
Download configuration OS:	Allows to check current version and upgrade the backup operating system.
Download main OS:	Allows to check current version and upgrade the main operating system.
Download splash image:	Allows to change the splash screen image displayed by the unit at power-up; the image should be provided in a specific format. We suggest to update splash screen image directly from the AGI Creator software.
Download bootloader:	Allows to check the actual version of the system bootloader and to upgrade it.

Only for AGI 315:

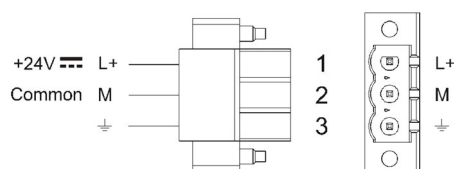
Download main FPGA:	Allows to check the current version and upgrade the main FPGA firmware.
Download safe FPGA:	Allows to check the current version and upgrade the backup (safe) copy of the FPGA firmware.
Download system supervisor:	Allows to check the current version and upgrade the system supervisor firmware responsible for RTC and power supply handling.



The system settings tool also includes other options, which are not described and documented at this moment.

2.2.4 Power supply, grounding and shielding

The power supply terminal block is shown below.





Make sure that the power capacity of the power supply is sufficient for the operation of the equipment.

The unit must always be grounded to earth. Grounding helps limit the effects of noise due to electromagnetic interference on the control system.

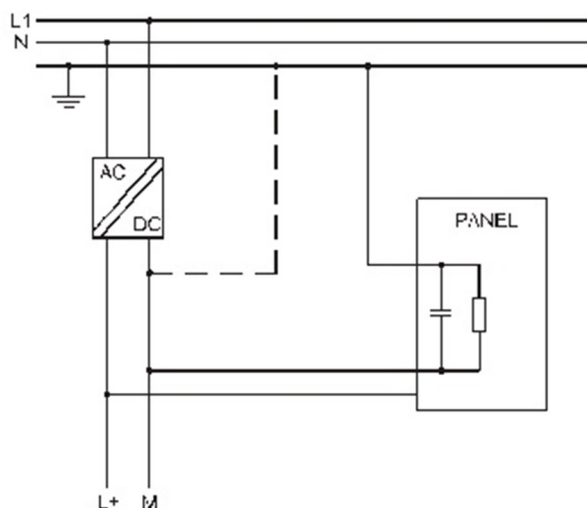
Earth connection will have to be done using either the screw or the chassis ground screw located near the power supply terminal block. A label helps identify the ground connection. Terminal 3 on the power supply terminal block must also be connected to ground.

The power supply circuit may be floating or grounded. In the latter case, the power source common must be connected to ground as shown with a dashed line in the figure below.

When using the floating power scheme, note that the panes internally connect the power common to ground with a 1 M Ω resistor in parallel with a 4.7nF capacitor.

The power supply must have double or reinforced insulation.

The suggested wiring for the power supply is shown below.



All the electronic devices in the control system must be properly grounded. Grounding must be performed according to applicable regulations.

2.2.5 Battery

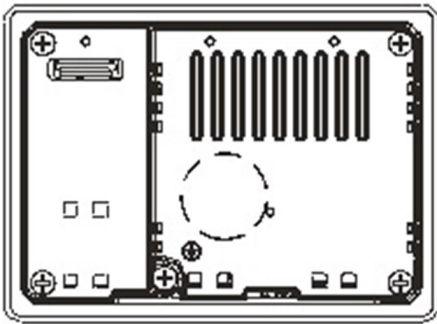
These devices are equipped with a rechargeable Lithium battery, not user-replaceable. The following information is maintained by the battery:

- Hardware real-time clock (date and time)

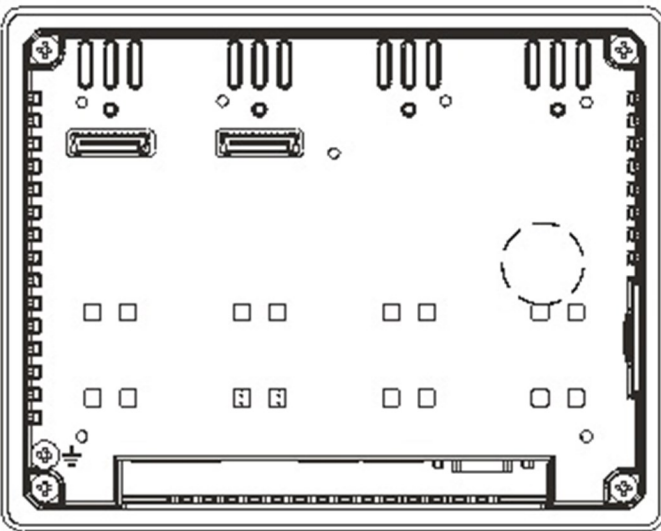
Charging of battery

At the first installation, the battery must be charged for 48 hours. When the battery is fully charged, it ensures a period of 3 months of data backup at 25 °C.

In the figures below, the position of the battery is illustrated with a dashed circle.



AGI 304



AGI 307, AGI 315



Dispose of batteries according to local regulations. 

2.2.6 Cleaning of faceplates

Use a soft cloth and neutral soap product to clean the equipment. Do not use solvents.

3. Technical information

3.1 Specifications, conditions, compatibility and durability

3.1.1 Technical specifications

Touch screen technology	Resistive
Backup battery	3V 50mAh Lithium, rechargeable, not user-replaceable, model VL2330
Fuse	Automatic
Serial port	RS-232, RS-485, RS-422 software configurable
User memory	Flash 128 Mb for AGI 304, 307 Flash 256 Mb for AGI 315
Recipe memory	Flash
Hardware clock	Clock/calendar with backup battery
Accuracy RTC (at 25 °C)	< 100 ppm

3.1.2 Environmental conditions

Operating temperature (surrounding air temperature)	0 to +50 °C	EN 60068-2-14
Storage temperature	-20 to +70 °C	EN 60068-2-14
Operating and storage humidity	5 to 85 % RH non-condensing	EN 60068-2-30
Vibrations	5 to 9 Hz, 7 mm _{p-p} 9 to 150 Hz, 1 g	EN 60068-2-6
Shock	± 50 g, 11 ms, 3 pulses per axis	EN 60068-2-27
Protection class	IP66 front panel *	EN 60529

* The front face of the AGI unit, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the "Environmental conditions". Even though the level of resistance of the AGI unit is equivalent to these standards, oils that should have no effect on the AGI can possibly harm the unit. This can occur in areas where vaporised oils are present, or where low viscosity cutting oils are allowed to adhere to the unit for long periods of time. If the front face protection sheet on the AGI is removed, these conditions can lead to the ingress of oil into the AGI, and separate protection measures are recommended.

If the installation gasket is used for a long period of time, or if the unit and the gasket are removed from the panel, the original level of protection cannot be guaranteed.

3.1.3 Electromagnetic compatibility (EMC)

Radiated disturbance test	Class A	EN 55011
Electrostatic discharge immunity test	8 kV (air electrostatic discharge) 4 kV (contact electrostatic discharge)	EN 61000-4-2
Radiated, radio-frequency, electro-magnetic field immunity test	80 MHz to 1 GHz, 10 V/m 1.4 GHz to 2 GHz, 3 V/m 2 GHz to 2.7 GHz, 1 V/m	EN 61000-4-3
Burst immunity test	± 2 kV _{dc} power port ± 1 kV signal line	EN 61000-4-4
Surge immunity test	± 0.5 kV _{dc} power port (line to earth) ± 0.5 kV _{dc} power port (line to line) ± 1 kV signal line (line to earth)	EN 61000-4-5
Immunity to conducted disturbances induced by radiofrequency field	0.15 to 80 MHz, 10 V	EN 61000-4-6
Voltage dips, short interruptions and voltage variations immunity test	Port: AC mains; Level: 100 % duration: 1 cycle and 250 cycles (50 Hz); 40 % duration: 10 cycles (50 Hz); 70 % duration: 25 cycles (50 Hz); Phase: 0° to 180°	
Test executed on the 230 V _{ac} side of the power supply		EN 61000-4-11

3.1.4 Durability

Backlight service life (LED type)	40000 hrs or more (Time of continuous operation until the brightness of the backlight reaches 50 % of the rated value when the surrounding air temperature is 25 °C) - see note 1 below.
Front foil (without direct exposure to sunlight or UV ray)	10 years if the surrounding air temperature is 25 °C
UV resistance	Indoor applications: After 300 hours cycled humidity in QUV accelerated weathering, some yellowing and brittleness may be present - see note 2 below.
Touch screen reliability	> 1 million operations



Extended use in environments where the surrounding air temperature is 40 °C or higher may degrade backlight quality/reliability/durability.

Solvent resistance:



Contact for 1/2 hour at 21 °C, no visible effect: Acetone, Butyl Cellosolve, Cyclohexanone, Ethyl Acetate, Hexane, Isopropyl Alcohol, MEK, Methylene Chloride, Toluene, Xylene.
Contact for 24 hours at 49 °C, no visible effect: Coffee, ketchup, lemon juice, mustard (slight yellow stain), tea, tomato juice.

3.2 Technical data

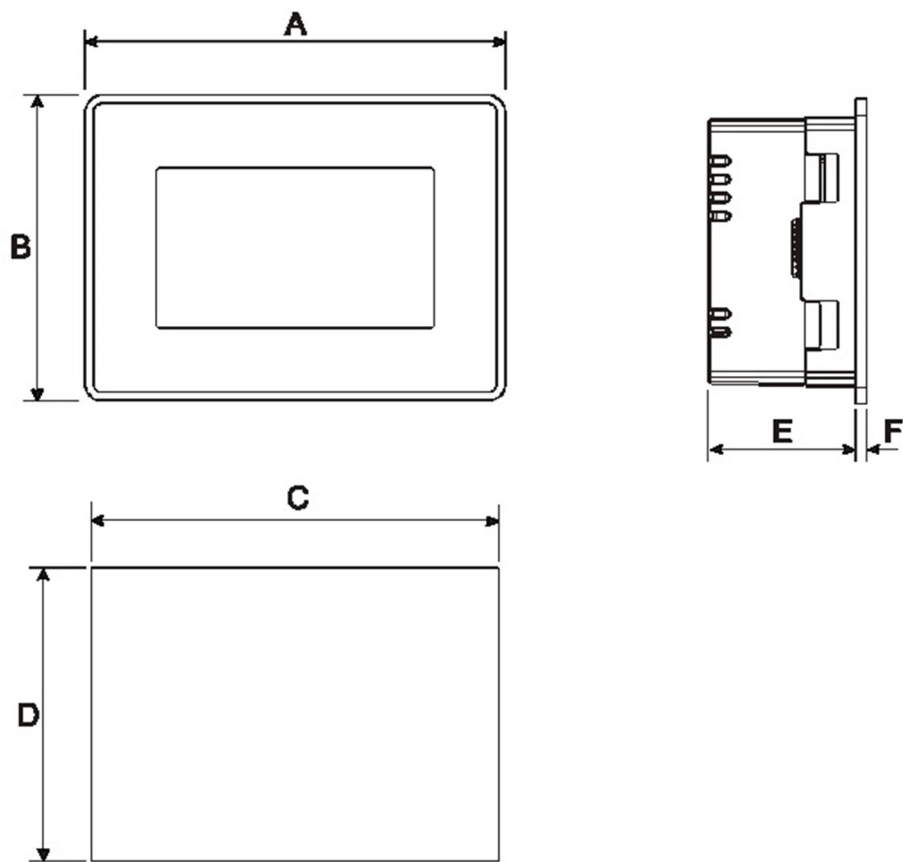
3.2.1 Product data and dimensions, AGI 304

Display	
Type	TFT
Resolution	480 x 272 pixel
Active display area	4.3" diagonal (95.4 x 53.9 mm)
Colours	64K
Backlight	LED
Brightness	150 Cd/m ² typ.
Dimming	Yes
Backlight service time	40,000 h or more*
System resources	
Operating system	Microsoft Windows CE 6.0
CPU	ARM Cortex-A8 - 600 MHz
User memory	128 MB Flash
RAM	256 MB DDR
Operator interface	
Touch screen	Analogue resistive
LED indicators	1 (dual colour)
Interface	
Ethernet	2 10/100 Mbit with integrated switch
USB	1 host interface v. 2.0
Serial	RS-232, RS-485, RS-422, software configurable
Expansion slot	1 optional plug-in
Memory card	SD card slot
Functionality	
Vector graphics	Yes. Includes SVG support
Object dynamics	Yes. Visibility, opacity, position, size, rotation for most object types
TrueType fonts	Yes
Multiple driver communication	Yes
Data acquisition and trend presentation	Yes. Flash memory storage limited only by available memory
Multi-language	Yes. With runtime language switching

Recipes	Yes. Flash memory storage limited only by available memory
Alarms	Yes
Historical event list	Yes
Users and passwords	Yes
Hardware real-time clock	Yes. With battery backup
Screen saver	Yes
Buzzer	Yes. Audible feedback for touch screen
Ratings	
Power supply voltage	24 V _{dc} (10 to 32 V _{dc})
Current consumption	0.55 A at 24 V _{dc} (max.)
Fuse	Automatic
Weight	Approximately 1.0 kg
Battery	Rechargeable Lithium battery, not user-replaceable
Environmental conditions	
Operating temperature	0 to 50 °C (vertical installation)
Storage temperature	-20 to +70 °C
Operating and storage humidity	5 to 85 % relative humidity, non-condensing
Protection class	IP66 (front) IP20 (rear)
Dimensions	
Faceplate A x B	147 x 107 mm (5.78 x 4.21")
Cutout C x D	136 x 96 mm (5.35 x 3.78")
Depth E + F	56 + 4 mm (2.40 + 0.16")
Approvals	
CE	Emission EN 61000-6-4 Immunity EN 61000-6-2 For installation in industrial environments
DNV	DNV Type Approval Certificate
UL	UL508 Listed Haz. Loc. Class I, Division 2, Groups A, B, C and D

* Time of continuous operation until the brightness of the backlight reaches 50 % of the rated value when the surrounding air temperature is 25 °C. Extended use in environments where the surrounding air temperature is 40 °C or higher may degrade backlight quality/reliability/durability.

Dimensions



Model	A	B	C	D	E	F
AGI 304	147 mm/5.78"	107 mm/4.21"	136 mm/5.35"	96 mm/3.78"	56 mm/2.40"	4 mm/0.16"

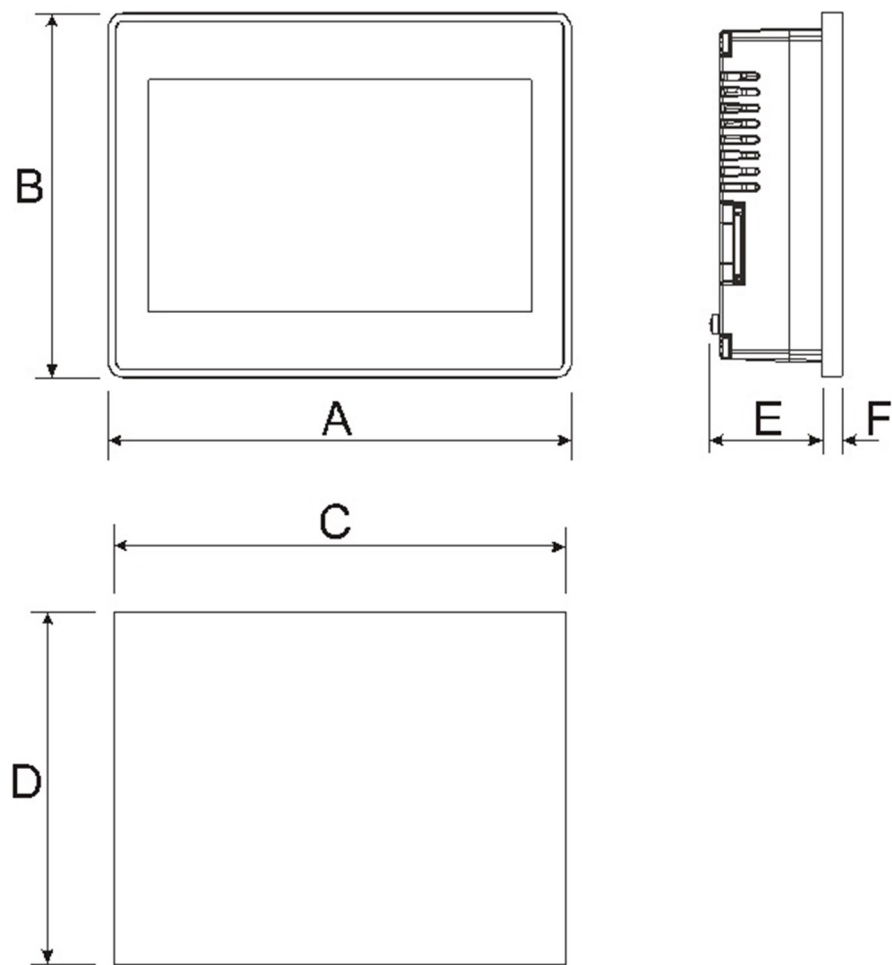
3.2.2 Product data and dimensions, AGI 307

Display	
Type	TFT
Resolution	800 x 480, WVGA
Active display area	7" diagonal
Colours	64K
Backlight	LED
Brightness	300 Cd/m ² typ.
Dimming	Yes
Backlight service time	40,000 h or more*
System resources	
Operating system	Microsoft Windows CE 6.0
CPU	ARM Cortex-A8 - 600 MHz
User memory	128 MB Flash
RAM	256 MB DDR
Operator interface	
Touch screen	Analogue resistive
LED indicators	1 (dual colour)
Interface	
Ethernet	2 10/100 Mbit with integrated switch
USB	2 host interface (1 v. 2.0, 1 v. 2.0 and 1.1)
Serial	RS-232, RS-485, RS-422, software configurable
Expansion slot	2 optional plug-in
Memory card	SD card slot
Functionality	
Vector graphics	Yes. Includes SVG support
Object dynamics	Yes. Visibility, opacity, position, size, rotation for most object types
TrueType fonts	Yes
Multiple driver communication	Yes
Data acquisition and trend presentation	Yes. Flash memory storage limited only by available memory
Multi-language	Yes. With runtime language switching
Recipes	Yes. Flash memory storage limited only by available memory

Alarms	Yes
Historical event list	Yes
Users and passwords	Yes
Hardware real-time clock	Yes. With battery backup
Screen saver	Yes
Buzzer	Yes. Audible feedback for touch screen
Ratings	
Power supply voltage	24 V _{dc} (10 to 32 V _{dc})
Current consumption	0.65 A at 24 V _{dc} (max.)
Fuse	Automatic
Weight	Approximately 1.0 kg
Battery	Rechargeable Lithium battery, not user-replaceable
Environmental conditions	
Operating temperature	0 to 50 °C (vertical installation)
Storage temperature	-20 to +70 °C
Operating and storage humidity	5 to 85 % relative humidity, non-condensing
Protection class	IP66 (front) IP20 (rear)
Dimensions	
Faceplate A x B	187 x 147 mm (7.36 x 5.79")
Cutout C x D	176 x 136 mm (6.93 x 5.35")
Depth E + F	47 + 4 mm (1.85 + 0.16")
Approvals	
CE	Emission EN 61000-6-4 Immunity EN 61000-6-2 For installation in industrial environments
DNV	DNV Type Approval Certificate
UL	UL508 Listed Haz. Loc. Class I, Division 2, Groups A, B, C and D

* Time of continuous operation until the brightness of the backlight reaches 50 % of the rated value when the surrounding air temperature is 25 °C. Extended use in environments where the surrounding air temperature is 40 °C or higher may degrade backlight quality/reliability/durability.

Dimensions



Model	A	B	C	D	E	F
AGI 307	187 mm/7.36"	147 mm/5.79"	176 mm/6.93"	136 mm/5.35"	47 mm/1.85"	4 mm/0.16"

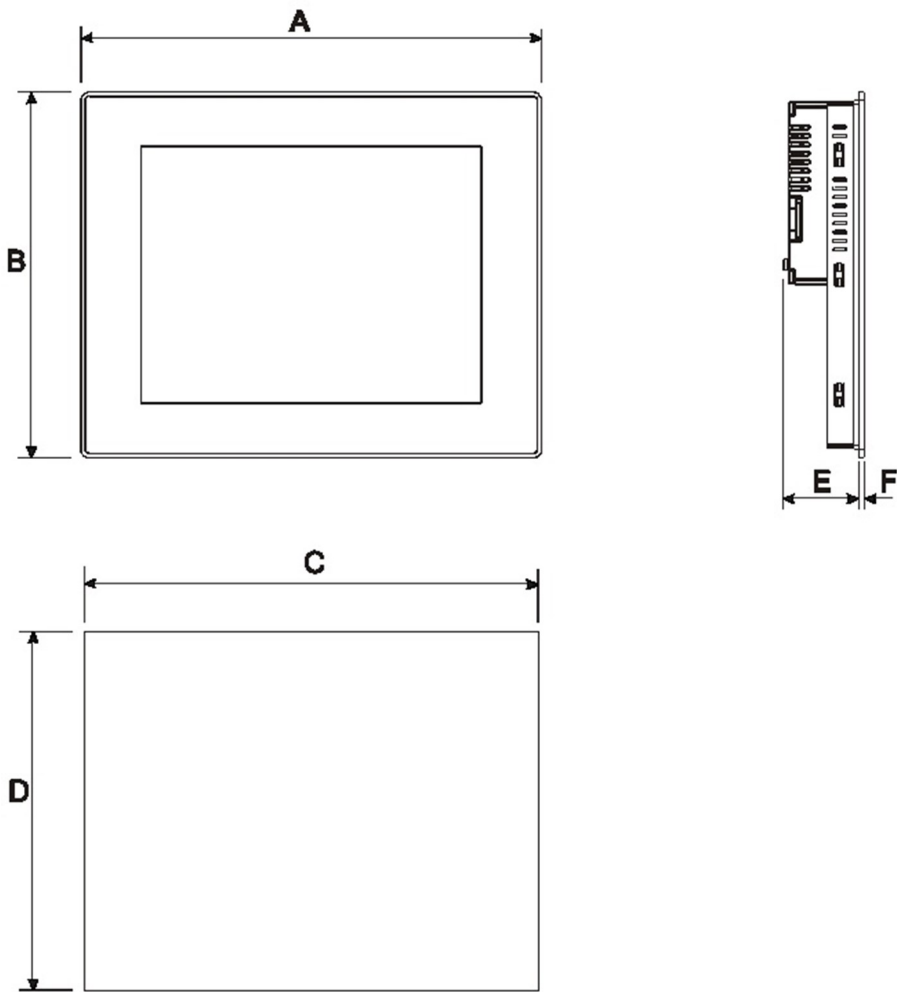
3.2.3 Product data and dimensions, AGI 315

Display	
Type	TFT
Resolution	1024 x 768, XGA
Active display area	15"
Colours	64K
Backlight	LED
Brightness	300 Cd/m ² typ.
Dimming	Yes
Backlight service time	40,000 h or more*
System resources	
Operating system	Microsoft Windows CE 6.0
CPU	ARM Cortex-A8 - 1 GHz
User memory	256 MB Flash
RAM	256 MB DDR
Operator interface	
Touch screen	Analogue resistive
LED indicators	1 (dual colour)
Interface	
Ethernet	2 10/100 Mbit with integrated switch
USB	2 host interface (1 v. 2.0, 1 v. 2.0 and 1.1)
Serial	RS-232, RS-485, RS-422, software configurable
Expansion slot	2 optional plug-in
Memory card	SD card slot
Functionality	
Vector graphics	Yes. Includes SVG support
Object dynamics	Yes. Visibility, opacity, position, size, rotation for most object types
TrueType fonts	Yes
Multiple driver communication	Yes. Max. 2 drivers
Data acquisition and trend presentation	Yes. Flash memory storage limited only by available memory
Multi-language	Yes. With runtime language switching
Recipes	Yes. Flash memory storage limited only by available memory

Alarms	Yes
Historical event list	Yes
Users and passwords	Yes
Hardware real-time clock	Yes. With battery backup
Screen saver	Yes
Buzzer	Yes. Audible feedback for touch screen
Ratings	
Power supply voltage	24 V _{dc} (10 to 32 V _{dc})
Current consumption	1.25 A at 24 V _{dc} (max.)
Fuse	Automatic
Weight	Approximately 3.5 kg
Battery	Rechargeable Lithium battery, not user-replaceable
Environmental conditions	
Operating temperature	0 to 50 °C (vertical installation)
Storage temperature	-20 to +70 °C
Operating and storage humidity	5 to 85 % relative humidity, non-condensing
Protection class	IP66 (front) IP20 (rear)
Dimensions	
Faceplate A x B	392 x 307 mm (15.43 x 12.08")
Cutout C x D	381 x 296 mm (15.00 x 11.65")
Depth E + F	60 + 4 mm (2.36 + 0.16")
Approvals	
CE	Emission EN 61000-6-4 Immunity EN 61000-6-2 For installation in industrial environments
DNV	DNV Type Approval Certificate
UL	UL508 Listed Haz. Loc. Class I, Division 2, Groups A, B, C and D

* Time of continuous operation until the brightness of the backlight reaches 50 % of the rated value when the surrounding air temperature is 25 °C. Extended use in environments where the surrounding air temperature is 40 °C or higher may degrade backlight quality/reliability/durability.

Dimensions



Model	A	B	C	D	E	F
AGI 315	392 mm/ 15.43"	307 mm/ 12.08"	381 mm/ 15.00"	296 mm/ 11.65"	60 mm/2.36"	4 mm/0.16"

3.2.4 Installation environment

The equipment is not intended for continuous exposure to direct sunlight. This might accelerate the aging process of the front panel film.

The equipment is not intended for installation in contact with corrosive chemical compounds. Check the resistance of the front panel film to a specific compound before installation.

Do not use tools of any kind (screwdrivers, etc.) to operate the touch screen of the panel.

In order to meet the front panel protection classifications, proper installation procedure must be followed:

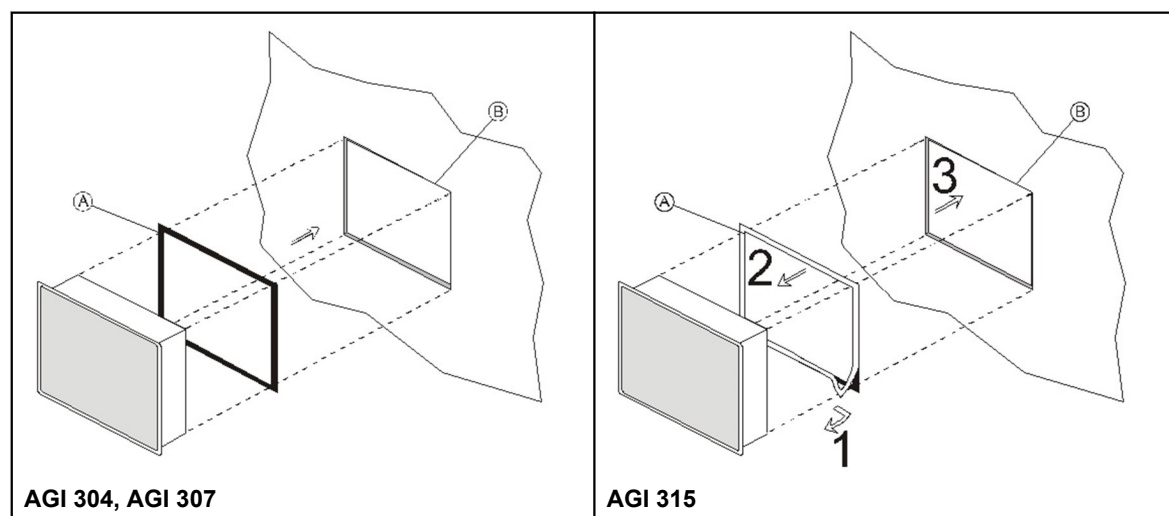
- The borders of the cutout must be flat.
- Tighten each fixing screw until the plastic bezel corner touches the panel.
- The cutout for the panel must be of the dimensions indicated in this document.

The IP66 is guaranteed only if:

- Max. deviation from the plane surface to the cutout is < 0.5 mm
- Thickness of the case in which the equipment is mounted is from 1.5 mm to 6 mm.
- Max. surface roughness where the gasket is applied is < 120 μm .

Applying the gasket

The gasket should be applied on the rear of the frame.

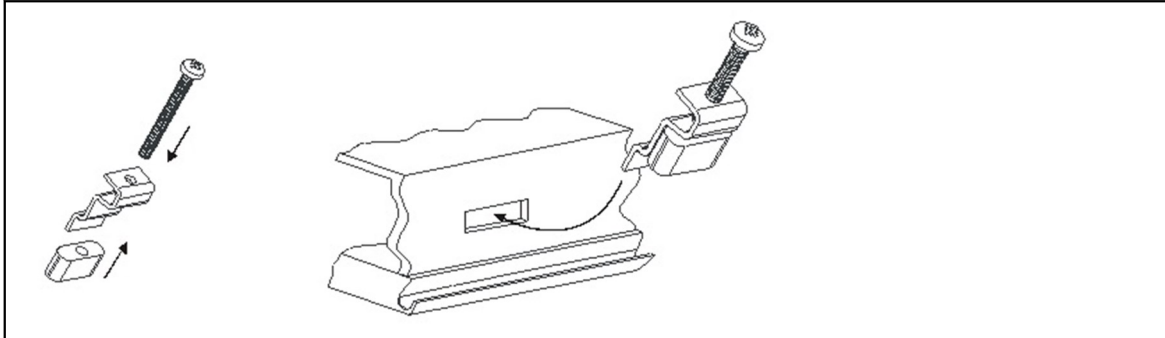


A: Gasket

B: Installation cutout

3.2.5 Installation procedure

Place the fixing brackets as shown in the figure below.

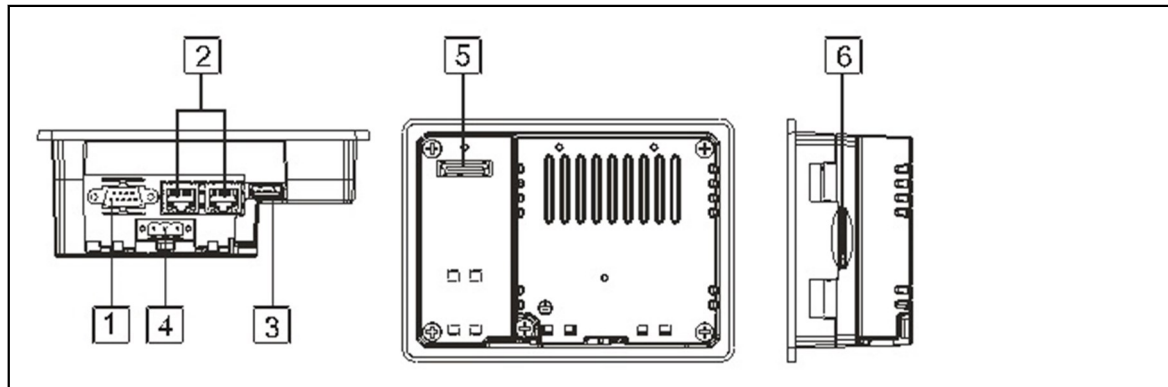
**CAUTION!**

Tighten each fixing screw until the bezel corner touches the panel.

4. Connections and ports

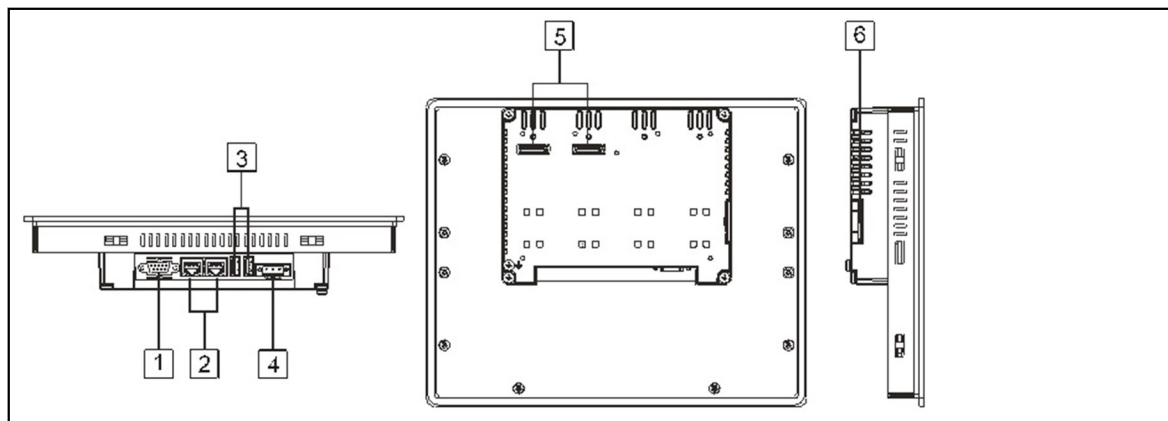
4.1 Connections

4.1.1 AGI 304



1. Serial port
2. 2 Ethernet ports
3. USB port
4. Power supply
5. Expansion slot for plug-in module
6. SD card slot

4.1.2 AGI 307, AGI 315



1. Serial port
2. 2 Ethernet ports
3. 2 USB ports
4. Power supply
5. 2 expansion slots for plug-in module
6. SD card slot

4.2 Ports

4.2.1 Serial port

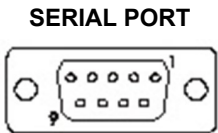
The serial port is used to communicate with the PLC or with another type of controller.

Different electrical standards are available for the signals in the PLC port connector: RS-232, RS-422, RS-485.

The serial port is software programmable. Make sure you select the appropriate interface in the programming software.

RS-232

Pin	Description
1	GND
2	
3	TX
4	RX
5	
6	+5 V output
7	CTS
8	RTS
9	



RS-422, RS-485

Pin	Description
1	GND
2	
3	CHA-
4	CHB-
5	
6	+5 V output
7	CHB+
8	CHA+
9	

To operate in RS-485, pins 4-3 and 8-7 must be connected externally.

The communication cable must be chosen for the type of device being connected.

4.2.2 Ethernet port

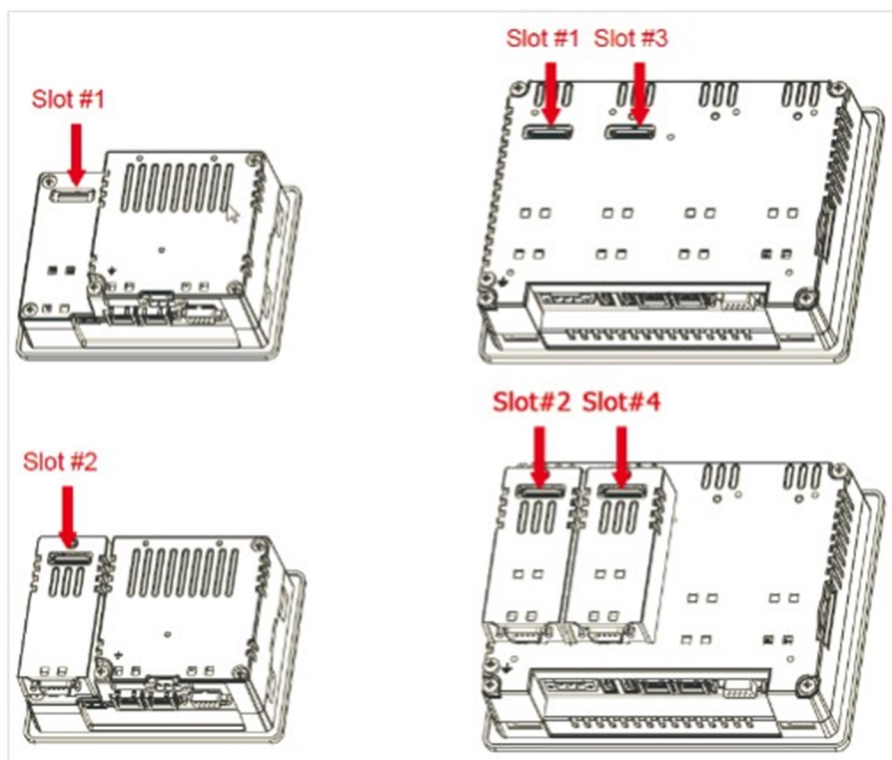
The Ethernet port has two status indicators - please see description in the figure below.



- 1: OFF: Valid link has NOT been detected
ON: Valid link has been detected
- 2: ON: No activity
BLINKING: Activity

4.2.3 Optional plug-in modules

The AGI 300 series HMI panels have several optional plug-in modules, multiple module configurations are possible.



Slot #2 and slot #4 are available only if the plug-in module has a "bus extension connector".



It is not possible to stack two modules that are using the same type of interface.

Below you can find relation between modules and max. number of modules that can be used in the AGI 300 series HMI panels, based on their interface type:

Module	Application	Max. modules	Interface type	Bus extension connector
EXM CAN-CDS	CANopen CoDeSys	1 for AGI 304 2 for AGI 307, AGI 315	CAN	Y

Max. modules refers to the max. number of modules that can be plugged into the HMI (all slots).

If you are planning to use two CAN modules, you will obtain the following slot # association:

- A module plugged into slot #1 or slot #2 will be the CAN port 0.
- A module plugged into slot #3 or slot #4 will be the CAN port 1.