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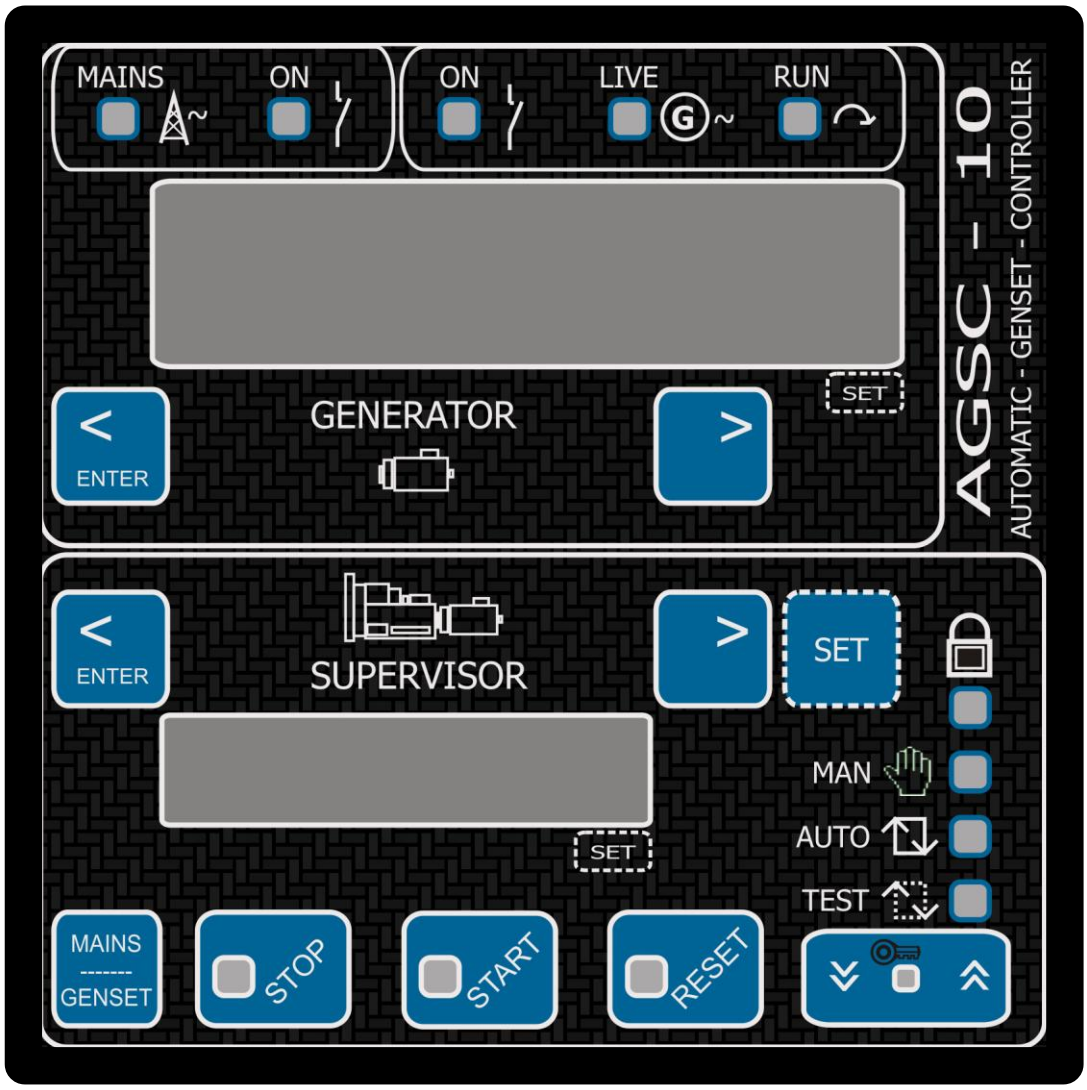
AGSC-10



AUTOMATIC GENSET CONTROLLER

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1 REFERENCES FOR AGSC-10

This manual, which covers device AGSC-10, is updated to the following revision status:

- File name:…….. **AGSC-10_01.docx**
- Revision:…… **01**
- Date:…….. **Sep.02, 2013**

The revision status of device AGSC-10 is as follows:

- "GENERATOR" section firmware:… **15.5 dated July 26, 2009**
- "SUPERVISOR" section firmware:… **28.3 dated Aug. 26, 2009**
- EEprom version, data and messages: **1.9 dated Aug. 05, 2008**
- Supported languages:…….. **Italian, English, French and Spanish**
- Hardware support:……..…. **BY3600C**

2 LEADING PARTICULARS AND GENERAL DATA OF AGSC-10

The device is an electronic controller that provides full manual and automatic control of three-phase or single-phase, 12V or 24V, diesel or gasoline engine powered generator sets.

The device is completely designed, manufactured and tested in Italy.

The device dimensions are 144x144x120mm (connectors excluded), and it is suitable for installation on the front of the electrical control panel.

Inside there are two separate sections:

- Engine control (diesel or gasoline engine) and system monitoring
- Supervision of the generator electrical generating section of the unit.

Each section has its own independent display, identified on the panel with legends "SUPERVISOR" and "GENERATOR." The device permits a very sophisticated monitoring of the entire system as it is possible to select customized electrical and functional conditions to control particular situations.
The "SUPERVISOR" section allows the selection of messages written in one of the four languages available.

The two sections include many, easily modifiable, operational parameters that ensure the optimal use of the AGSC-10.

The two sections can be programmed and monitored remotely; several options are provided in this regard, which will be described in a dedicated chapter.

Basically, the device includes a high-speed (up to 115,200 bps), 3 KV opto-isolated interface to which both sections are connected. Each section has a MODBUS RTU protocol and its own node number.

The "GENERATOR" section includes the "oscilloscope" function; this is a powerful diagnostic tool that enables the concurrent visualization of the waveform of all generator voltages on the computer, and is particularly useful in case of faults or abnormal operation that would be otherwise difficult to diagnose.

A 'BUS' connector for function expansion is available; it permits the use of several cards and optional devices that increase the controller performance levels and interface possibilities.

Special engines can also be controlled, e.g. also engines fitted with CAN BUS J1939.

2.1 Available versions

Controller model	Description
AGSC-10	Standard version. All devices are fitted with an RS485 interface.
AGSC-10.ETH2S	Ethernet version. It can be used as an Ethernet-RS485 bridge for access to a generic/hybrid RS485 network.
AGSC-10.ETH2WS.9600	Ethernet version with Web Server. It can be used as an Ethernet (via Web)-RS485 bridge for access to a RS485 network including ***ONLY AGSC-10*** devices, and only in a 9600 Bps network.
AGSC-10.BTH.<speed>	Bluetooth class 2 version. It can be used as a Bluetooth-RS485 bridge for access to a generic/hybrid RS485 network. In this case the Baud rate of the RS485 port of the Bluetooth card must be specified in the order because it is not programmable by the user. The standard model is AGSC–10.BTH.115200.
AGSC-10.RAD.868.<speed>	868MHz Radio Version. **(UNDER DEVELOPMENT – NOT YET AVAILABLE).** It can be used as a Radio-RS485 bridge for access to a generic/hybrid RS485 network. In this case the Baud rate of the RS485 port of the Bluetooth card (max 38200 Bps) must be specified in the order because it is not programmable by the user. The standard model is AGSC–10.RAD868.19200.

- All versions can be supplied for use with a voltage / V 100 transformer. This requirement must be specified in the order.
- The controller is the same also for single-phase generators sets. A programmable parameter permits its operation to be made suitable for such an application.

2.2 Options and accessories available as separate items

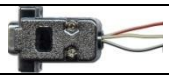
2.2.1 Cards and modules

	P/N	Type	Description
	**CNV-M-BY4750**	**Converter Module RS232/RS485 USB**	Converter module from RS232/RS485 to USB, to connect the AGSC-10 to a personal computer. The cable with the USB plug, which is about 180 cm long, is integral with the converter, and, therefore, there is no need to procure it separately. The drivers for installation are included. RS232 or RS485 connection cables are not included.
	**OPM-S-J1939**	**Card with display** – Attached inside the control panel.	Card for interface of the engines fitted with CAN J1939. The display inside the control panel provides for diagnostics because it shows ALL the engine data available, and not only the alarm codes and lamp statuses as shown on page J1939 of the AGSC-10. The AGSC-10 receives also the values measured by the engine instruments. Card dimensions: 130x110x22mm. The CAN connection cable is not included.
	**OPM-S-BY3550**	**Card with display** – Attached inside the control panel on omega bus.	Protocol converter RS485 Modbus RTU →RS233 Ascii Modbus. Adapter that permits the use of modems and GSM modems fitted with RS232. The converter accepts 5 Baud rates on the RS485 side and one speed only (9600Bps) on the RS232 side. Maximum dimensions: 92x77x40mm. The connection cables are not included. It is also supplied as a complete kit including the GSM modem.
	**OPM-M-GSM555.232.PAGSC-10**	**3 DIN Module** - Attached inside the control panel on omega bus.	GSM modem module. It is pre-programmed for use with the AGSC-10 controller. It is fitted with RS232 interface and can be supplied as a complete kit for use with the AGSC-10.
	**OPM-S-I2C-OR10.12** **OPM-S-I2C-OR10.24**	**Card with display** – Attached inside control panel on omega bus.	Relay-type remote signal card, contacts with load exchange, 8A, 250Vac on resistive load. It is manufactured in 2 versions, a 12 V and a 24 V version (see code '.12' o '.24'). Maximum dimensions: 135x126x55mm. It can be used in combination with the other cards of the OPM-S-I2C series. Additional information is provided in the applicable section.
	**OPM-S-I2C-IN8-CV4.12** **OPM-S-I2C-IN8-CV4.24**	**Card with display** – Attached inside control panel on omega bus.	Engine interfacing card. It has 8 opto-isolated outputs with indicator leds and resistors simulating lamp installation. It also has 4 converters from 0-10V to current signal for the engine sensors of the AGSC-10, a speed control trimmer and 3 resistors that can be enabled. It can be easily adapted for use with other engines. It is manufactured in 2 versions, a 12V and a 24V version (see code '.12' or '.24'). Maximum dimensions: 135x126x55mm. It can be used in combination with other cards of the OPM-S-I2C series. Additional information is provided in the applicable section.
	**OPM-S-I2C-OR3-18P.12** **OPM-S-I2C-OR3-18P.24**	**Card with display** – Attached inside control panel on omega bus.	VOLVO engines interface card. 3 Relay-type outputs, with load exchange, 8A 250Vac on resistive load, each with status indicating led. It also has 1 manual reset button for control panels EDC3 and 18 through-connections for connection of the entire interface cable. It is also fitted with 1 led for engine diagnostic indication with the related lamp simulation signal. It is manufactured in 2 versions, a 12V or a 24V version (see code '.12' or '.24'). Maximum dimensions: 135x126x60mm. It can be used in combination with other cards of the OPM-S-I2C series. Additional information is provided in the applicable section.
	**PGM-M-MSG-PROG**	**Stand-alone module**	RS232 programmer for programming of the AGSC-10 memory. Thanks to the software supplied with it, it permits several text messages shown by AGSC-10 to be modified and customized. The 20-pole connection cable for connection with the AGSC-10 is an integral part of the programmer, therefore, there is no need to procure it separately. Conversely, the RS232 connection cable for connection to the computer is not included.

Battery charger

	P/N	Type	Description
	CBTI-M-BY5165T	**Module 9 DIN** - Attached inside control panel on omega bus.	*** NEW'*** "Smart," microprocessor-driven battery charger with 2 independent, 13.2V, 4 A outputs. The outputs can be combined to obtain a 13.2V, 8A, or a 26.4V, 4A output. The battery charger has a display with 3 red digits that show voltage and current. It features several programmable parameters, which optimize its operation. It is fitted with a BUS connection that is compatible with the AGSC-10. When connected to the AGSC-10 it is capable of indicating all abnormal operations concerning the battery and its charge, including the battery disconnected condition. It can operate also as a stand-alone device, and is already available for supply. Weight is approx. 350 g. ***Coupling with the AGSC-10 will be possible starting from January 2010.***
	CBT-BY8000	**Module 6 DIN** - Attached inside control panel on omega bus.	Switching-type battery charger with standardized charge to DIN 41773 (IU), with 2, fully protected, independent, 13.2V, 2 A outputs. Outputs can be combined to obtain a 13.2V, 4A or a 26.4V, 2A output. Weight is approx. 220 g.
	CBT-2E12	**Assembled** - Wall mounting	Conventional 12 V, 2 A, current-limited converter. Maximum dimensions: 75x90x65mm. Weight: 770g.
	CBT-5SE12 CBT-5SE24	**Assembled** - Wall mounting	5A conventional automatic battery charger with normalized charge to DIN 41773 (IU). The charger is current-limited and comes in 2 versions: a 12 V version (5SE12) and a 24 V version (5SE24). It is suitable for charging batteries conforming to standard EN50342-1. Max. size: 135x85x160mm. Weight: 2.6Kg.
	CBT-12PRO24	**Assembled** - Wall mounting	24V – 12A conventional automatic battery charger to DIN 41773 (IU), able of continuous output also under short circuit conditions. It is suitable for charging batteries conforming to standard EN50342-1. It has several functions that are monitored through leds, such as double charging level, quick charging, charging time, alarm indicator, relay-based remote fault signal, etc. Max. size: 250x200x150mm. Weight: 11Kg.

2.2.2 Cables

	P/N	Type	Description
	CV-F-20P-FF. <length.>	**Connection cable**	20 pole flat cable for interconnection of cards OPM-S-I2C, OPM-S-J1939 and CBTI and their connection to the AGSC-10 (Ext BUS). Cable length in mm must be specified in the order. The standard cable is CV-F-20P-FF.1000 (1 meter).
	CV-F-DB9-CAN.<length>	**Connection cable**	Connection cable for CAN BUS, with free wires, for OPM-S-J1939. Wire length in mm must be specified in the order.
	CVA-JACK-BY4750-485	**Adapter cable**	Adapter to connect the "SERVICE" plug from the AGSC-10 to the RS485 port of module CNV-M-BY4750. Length is about 100 mm.
	CV- BY4750-485.500	**Connection cable**	RS485 connection cable between CNV-M-BY4750 and AGSC-10. Length: 0.5m
	CV-BY3550-GSM555.232.1500	**Connection cable**	RS232 connection cable between OPM-M-GSM555.232 and OPM-S-BY3550. Length: 1.5m
	CV-BY3550-AGSC-10.1500	**Connection cable**	RS485 connection cable between OPM-S-BY3550 and AGSC-10. Length: 1.5m

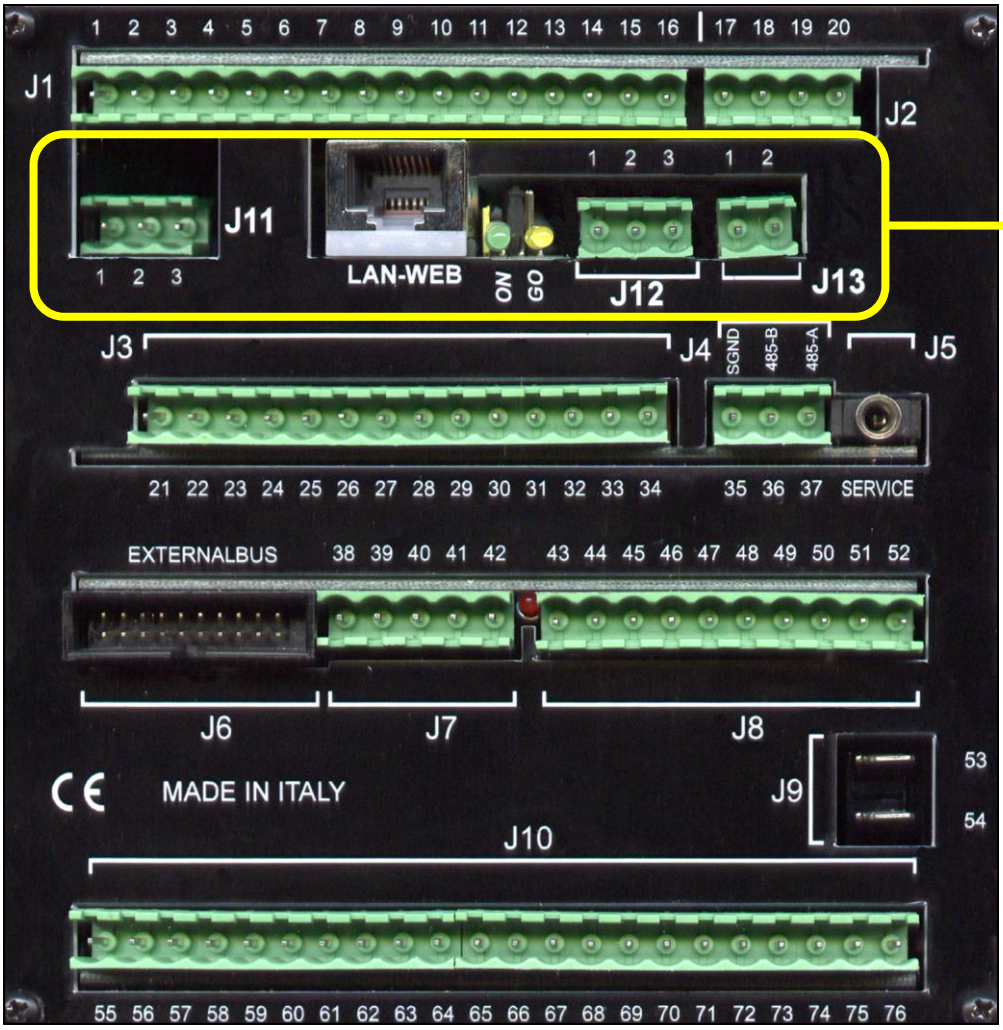
2.2.3 Kit

P/N	Type	Description
KIT-GSM-AGSC-10.1	**Connecting kit GSM Modem for AGSC-10**	The kit includes: No. 1 **OPM-M-GSM555.232.PAGSC-10 (GSM Modem)** No. 1 **OPM-S-BY3550 (Signal converter and protocol)** No. 1 **CV-BY3550-GSM555.232.1500 (Cable)** No. 1 **CV-BY3550-AGSC-10.1500 (Cable)** Software required

2.2.4 Software

	P/N	Type	Description
	**SW-BDST-ETH2S**	**Bytronic Device Server Toolkit**	Software for configuration and use of Ethernet versions ETH2S and ETH2SW.
	**SW-SUP-AGSC-10**	**Supervision software of AGSC-10**	It is used to connect Modbus RTU or ASCII Modbus to physical or virtual serial ports. It permits all measurements and parameters transmitted by AGSC-10 to be visualized.
	**SW-SCOPE-PRO**	**Software for electrical analysis of generator**	Software for the electrical analysis of the waveforms available on the electrical device. Harmonic analysis is also performed. This software is executed by the AGSC-10 in a special diagnostic mode.
	**SW-MBCOMM-DEMO**	**Demonstration software for generator**	It reads the generator values and shows them in numerical form on a virtual instrument panel. It can also show the waveforms of the generator in two different manners, but does not perform any analysis. It operates in Modbus RTU mode only on physical or virtual serial port.
	**SW-MSG-PROG**	**Software for the use of module PGM-M-MSG-PROG**	It permits the **PGM-M-MSG-PROG** module to be used to customize some memory areas of the AGSC-10. Refer to the applicable manual covering the programming software.

3 REAR PANEL (Connections)



3.1 List of connections

J1	Signal	Description	Notes
1	**Energization of alternator 24V** (D+)	Output of energization current of battery charger alternator	Available only if J1-16 is connected to the +24V battery terminal.
2	**Energization of alternator 12V** (D+)	Output of energization current of battery charger alternator	Available only if J1-16 is connected to the +12V battery terminal.
3	Command of mode **SCR** (or EJP2)	Input N.O. negative for call to service in mode "SCR"	It forces complete starting of the group and transfer of load to generator.
4	Sensor of **contactor circuit breaker in position Mains**	Input N.O. negative. Closed = contactor closed on Mains	Close to negative if not used.
5	Sensor of **contactor circuit breaker in position Generator**	Input N.O. negative. Closed = contactor closed on Generator	Close to negative if not used.
6	Command for inhibition of automatic start	Input N.O. negative. Closed = starting inhibited	It can be connected to an external timer, for instance. It has priority over the forcing commands at start.
7	Command of **Test** mode (or EJP1)	Input N.O. negative for call to service in test mode.	It forces the execution of an engine test cycle, but does not act on the mains-generator contactor.
8	Programmable multifunction command: • **LED test** • **"SPRINKLER"** mode • **"Low rpm"** mode	Input N.O. negative. Closed = command available	Function selection is made through the dedicated programmable parameter. It is possible to activate one function at a time only.
9	**Mains present** sensor	Input N.O. negative. Closed = mains present	
10	Output of rpm **regulator power supply**	Output N.O. positive. Closed = regulator power supply available	Available only if J1-16 is connected to the battery +.
11	Output of glow plug **pre-heating** (diesel)	Output N.O. positive. Closed = pre-heating available	Available only if J1-16 is connected to the battery +.
12	Programmable multifunction output 1: • Remote signal of **alarm or fault** • **Secondary start** • Remote signal of **device unavailable**.	Output N.O. positive. Closed = command available Secondary starting is used to operate the starting relay on the auxiliary battery as an alternative to the normal start command.	Available only if J1-16 is connected to the battery +. Function selection is made through the dedicated programmable parameter. It is possible to activate one function at a time only.
13	Programmable multifunction output 2: • Remote signal of **engine running** • **Fuel pump** command	Output N.O. positive. Closed = command available	Available only if J1-16 is connected to the battery +. Function selection is made through the dedicated programmable parameter. It is possible to activate one function at a time only.
14	Output of engine stop command (**Stop**)	Output N.O. positive. Behavior is dependent on the programmable parameter that sets "energized" or "not-energized"..	Available only if J1-16 is connected to the battery +.
15	Output of engine **start** command.	Output N.O. positive. Closed = command present	Available only if J1-16 is connected to the battery +. The available command is the actual start command, and can be programmed as to number, duration and pause.
16	Positive **common** to command **relays**.	External connection to battery positive for supply of contacts and alternator energization.	

J2	Signal	Description	Notes
17	Contact N.O. 1 Generator contactor	Contact N.O. relay. Closed to J2-18 = command present	
18	Contact N.O. 2 Generator contactor	Contact N.O. relay. Closed to J2-17 = command present	
19	Contact N.C. 1 Mains contactor	Contact N.C. relay. Closed to J2-20 = command present	
20	Contact N.C. 2 Mains contactor	Contact N.C. relay. Closed to J2-19 = command present	

J3	Signal	Description	Notes
21	Generator **V1** voltage input (VR)	Input for measurement of Generator voltage V1	Connect phase here if device is single-phase type.
22	Not connected (insulation)		
23	Generator **V2** voltage input (VS)	Input for measurement of Generator voltage V2	Do not connect if device is single-phase type.
24	Not connected (insulation)		
25	Generator **V3** voltage input (VT)	Input for measurement of Generator voltage V3	Do not connect if device is single-phase type.
26	Not connected (insulation)		
27	Generator neutral input (**VN**)	Generator neutral (4-wire connection)	Connect neutral here if device is single-phase type.
28	Not connected (insulation)		
29	Generator **I1** current input (IR)	Input for measurement of Generator current I1 from TA/5, S1 side	Connect S1 of TA/5 here if device is single-phase type.
30	Generator **I1** current input (IR)	Input for measurement of Generator current I1 from TA/5, S2 side	Connect S2 of TA/5 here if device is single-phase type.
31	Generator **I2** current input (IS)	Input for measurement of Generator current I2 from TA/5, S1 side	
32	Generator **I2** current input (IS)	Input for measurement of Generator current I2 from TA/5, S2 side	
33	Generator **I3** current input (IT)	Input for measurement of Generator current I3 from TA/5, S1 side	
34	Generator **I3** current input (IT)	Input for measurement of Generator current I3 from TA/5, S2 side	

J4	Signal	Description	Notes
35	RS485 interface reference ground	Insulated ground connection from battery negative.	Put in common with the grounds of networked devices to meet the requirements of standard EIA/TIA-485.
36	RS485 – B interface	Connection RS485 of both internal sections (SUPERVISOR and GENERATOR). Insulation > 3KV	In order to reach the GENERATOR section, the jack of connector J5 MUST be pulled out.
37	RS485 – A Interface	Connection RS485 of both internal sections (SUPERVISOR and GENERATOR). Insulation > 3KV	In order to reach the GENERATOR section, the jack of connector J5 MUST be pulled out.

J5	Jack RS485 Service	Service connection RS485 ONLY for local GENERATOR section	Permits the lines 485 to be CUT from connector J4 and to communicate at high speed in local mode without affecting the 485 ring connected to J4. It is basically used for the "oscilloscope" function.

J6	**External BUS** connection	Connection for all available optional devices	

J7	Signal	Description	Notes
38	Analog input **engine thermometer**	It is managed with 100-point sensor curve, 4 sensor types	Curve individually selectable through parameter.
39	Analog input **lube oil thermometer**	It is managed with 100-point sensor curve, 4 sensor types	Curve individually selectable through parameter.
40	Analog input **lube oil pressure gauge**	It is managed with 100-point sensor curve, 4 sensor types	Curve individually selectable through parameter.
41	Analog input **fuel level float**	It is managed with 100-point sensor curve, 5 sensor types	Curve individually selectable through parameter.
42	**Reference** negative of analog inputs		Connect to engine near the sensors.

J8	Signal	Description	Notes
43	Not connected		
44	Not connected		
45	Not connected		
46	Mains neutral input (**VN**)	Mains neutral	Connect neutral here if device is single-phase type.
47	Not connected (insulation)		
48	Mains **V3** voltage input (VT)	Input for the measurement of Mains voltage V3.	Do not connect if device is single-phase type.
49	Not connected (insulation)		
50	Mains **V2** voltage input (VS)	Input for the measurement of Mains voltage V2.	Do not connect if device is single-phase type.
51	Not connected (insulation)		
52	Mains **V1** voltage input (VR)	Input for the measurement of Mains voltage V1.	Connect phase here if device is single-phase type.

J9	Signal	Description	Notes
53	Shunt measuring battery charger current (-)	Input of battery charger current measurement	Connect to Negative of battery charger ONLY.
54	Shunt measuring battery charger current (+)	Input of battery charger current measurement	Connect to general battery Negative.

J10	Signal	Description	Notes
55	**+12V** power supply	Connection to battery positive for 12V devices	
56	**+24V** power supply	Connection to battery positive for 24V devices	
57	Ground	System ground connection	
58	Battery negative **(-)**	Connection to system battery negative	
59	External key 1	External key contact reference	Interconnect 59-60 if no external key is used.
60	External key 2	External key contact input (closed on ref. = key on ON)	Interconnect 59-60 if no external key is used.
61	Engine oil low pressure fault **(BPO)**	Input N.O. negative. Open = Lube oil under pressure	
62	Engine high temperature fault **(ATM)**	Input N.O. negative. Open = Temperature normal	
63	Engine overspeed fault **(SOVRAV)**	Input N.O. negative. Open = Speed normal	
64	Generator overload fault **(SOVRAC)**	Input N.O. negative. Open = No overload	Indicator showing "thermal switch triggered".
65	Fuel reserve caution **(RISCOMB)**	Input N.O. negative. Open = Fuel sufficient	It can manage fuel exhaustion through a programmable time period.
66	Fuel pump stop command **(HCOMB)**	Input N.O. negative. Open = Fuel pump Stop	Safe. Overrides pump Start.
67	Fuel pump start command **(LCOMB)**	Input N.O. negative. Closed = Fuel pump Start	Available only if pump Stop input is closed.
68	Tank overfilled fault **(MAXLIVC)**	Input N.O. negative. Open = Level normal	
69	Emergency stop **(STOPEM)**	Input N.O. negative. Open = Emergency stop	Safe. Connect to negative if not used.
70	Engine water low level fault **(LOWH2O)**	Input N.O. negative. Open = Level normal	
71	Spare fault 1	Input N.O. negative. Closed = Failure 1	
72	Spare fault 2	Input N.O. negative. Closed = Failure 2	
73	Spare alarm 1	Input N.O. negative. Closed = Alarm 1	The spare alarm 1 is memorized.
74	Spare alarm 2	Input N.O. negative. Closed = Alarm 2	The spare alarm 2 is NOT memorized
75	Not connected		
76	Not connected		

Optional connections (versions ETH2 and ETH2W only):

J11	Signal	Description	Notes
1	RS485-A ETH	RS485 connection of card ETH2.	Connect to J4-37.
2	Not connected		
3	RS485-B ETH	RS485 connection of card ETH2.	Connect to J4-36.

LAN-WEB	Ethernet connection to the Local Area Network.

J12	Signal	Description	Notes
1	Not connected		
2	ETH **Positive** power supply	Positive power supply connection	Connect to J10-55 in case of 12V systems. For 24V systems, connect to J1-56.
3	ETH **Negative** power supply	Negative power supply connection	Connect to J10-58.

J13	Signal	Description	Notes
1	Contact 1 of auxiliary relay N.O. ETH	Contact for signals max. 100V 0.5A, can be operated via WEB	**FOR MODEL ETH2W ONLY**.
2	Contact 2 of auxiliary relay N.O. ETH	Contact for signals max. 100V 0.5A, can be operated via WEB	**FOR MODEL ETH2W ONLY**.

4 EXPANSION OF CONNECTIONS

Given that the connections of AGSC-10 are a small number, a set of expansion cards has been made to support the most common requirements. The cards can be connected to connector J6 (EXTERNAL BUS) by use of cable **CV-F-20P-FF.___**.

Each expansion card has two BUS connections arranged in parallel to permit cascade connection of a number of such cards with no need for "customization" of the interconnecting cables through intermediate connectors.

It is essential that the order specifies, for each card, whether the card must be a 12V or a 24V card, depending on the type of system in use because double supply, or the extended power supply range is not supported.

AGSC-10 already manages internally the input and output signals to and from such peripherals, hence no adjustment or programming is required.

Conversely, the cards need be configured.
A general documentation is available for each card. Reference should be made to such a documentation, which is enclosed, in regard to all installation information and configuration procedures.

The configuration requirements applicable to each card and the functions the card can perform are conversely specified herein.

4.1 Remote signals extension

4.1.1 Standard remote signals

The available remote signals are 20. They are divided in two groups of 10 signals each, in turn divided in 2 sub-groups: A and B.

N.	*Active status*	*N.*	*Active status*
GROUP 1 – A (Address 1)		**GROUP 2 – A (Address 3)**	
1	Selector to "MAN"	1	Failed to start
2	Selector to "AUTO"	2	Low lube oil pressure
3	Selector to "TEST"	3	High engine temperature
4	Mains present	4	Water low level
5	Fuel reserve	5	Overspeed (from Frequency or Contact)
6	Battery low voltage	6	Overload / Thermal / Max Current
7	Selector locked by external key	7	Emergency Stop
8	Spare alarm 1	8	'Generator' section fault
GROUP 1 – B (Address 2)		**GROUP 2 – B (Address 4)**	
9	Spare alarm 2	9	Spare fault 1
10	Maintenance required	10	Spare fault 2

A single **OPM-S-I2C-OR10** card can manage each group (at 12V or 24V), with two "addresses," one for each sub-group.
Because the signal groups are "fixed," i.e. the individual signals cannot be exchanged between the two groups, 2 cards will be necessary even when just an individual signal in a group is needed.
On each card, select both addresses of the sub-groups (GROUP A = Group 1 Card, GROUP B = Group 2 Card) as specified in the documentation enclosed with card **OPM-S-I2C-OR10.**

4.1.2 Remote signals for group exchange

The remote signals available for group exchange are 4:

No.	*Active status*
GROUP 1 (Address 5)	
1	Cumulative Alarms
2	Cumulative Faults
3	Engine running
4	Intermittent = correct operation

Use an **OPM-S-I2C-OR10** card.
On the **OPM-S-I2C-OR10** card, select the group address as specified in the enclosed documentation.

4.2 Engine interface

There are engines that make available interface signals for the control and supervision of the engine.

Among the best known engines of such a type there are those by: VOLVO, SCANIA, DEUTZ, PERKINS, MTU, etc.

Two cards have been designed to cater for all the interface requirements of the engines outputting discrete signals.

The said cards are card **OPM-S-I2C-IN8-CV4** for supervision and card **OPM-S-I2C-OR3-18P** for control.

Depending on the type of engine control panel it is possible to use all the resources of a card, or only some of them, and also to make a partial use of an individual card.

Additionally, by use of card **OPM-S-J1939**, DCU engine control panels can be interfaced with CAN Bus in compliance with standard J1939.

4.2.1 Supervision with OPM-S-I2C-IN8-CV4

The card can read up to 8 digital signals fed by the engine control panels, with simulation of lamp presence to prevent possible faults in lamp diagnostic.
The card also has 4 signal converters to convert the 0–10V analog signals received from the engine to standard signals from analog sensors conventional for the AGSC-10.

	The envisaged response curves must be selected during programming of the AGSC-10 if analog signals from converters 1-10V are used.

Other options, described in the card documentation, permit additional adaptations.

The signals accepted by the AGSC-10 are:

N.	*Active status*
GROUP 1 (Address 7)	
1	Low lube oil pressure
2	High engine temperature
3	Overspeed
4	Water low level
5	Generic alarm 1
6	Generic fault 1
7	Generic alarm 2
8	Engine operating

On card **OPM-S-I2C-IN8-CV4**, select the group address in the manner specified in the enclosed documentation.
Lines must be connected so as the indicated signals are in active status, i.e. the related Led on the card = on.

4.2.2 Control with OPM-S-I2C-OR3-18P

The card is able to generate (on relays) the three fundamental control signals, and to carry out other functions described in the applicable documentation.
The signals fed by the AGSC-10 are:

N.	*Active status*
GROUP 1 (Address 6)	
1	Engine start
2	Engine stop
3	Reset command

	The supplied reset signal is given by pressing again button  , or through the reset control from remote (see Advanced use).

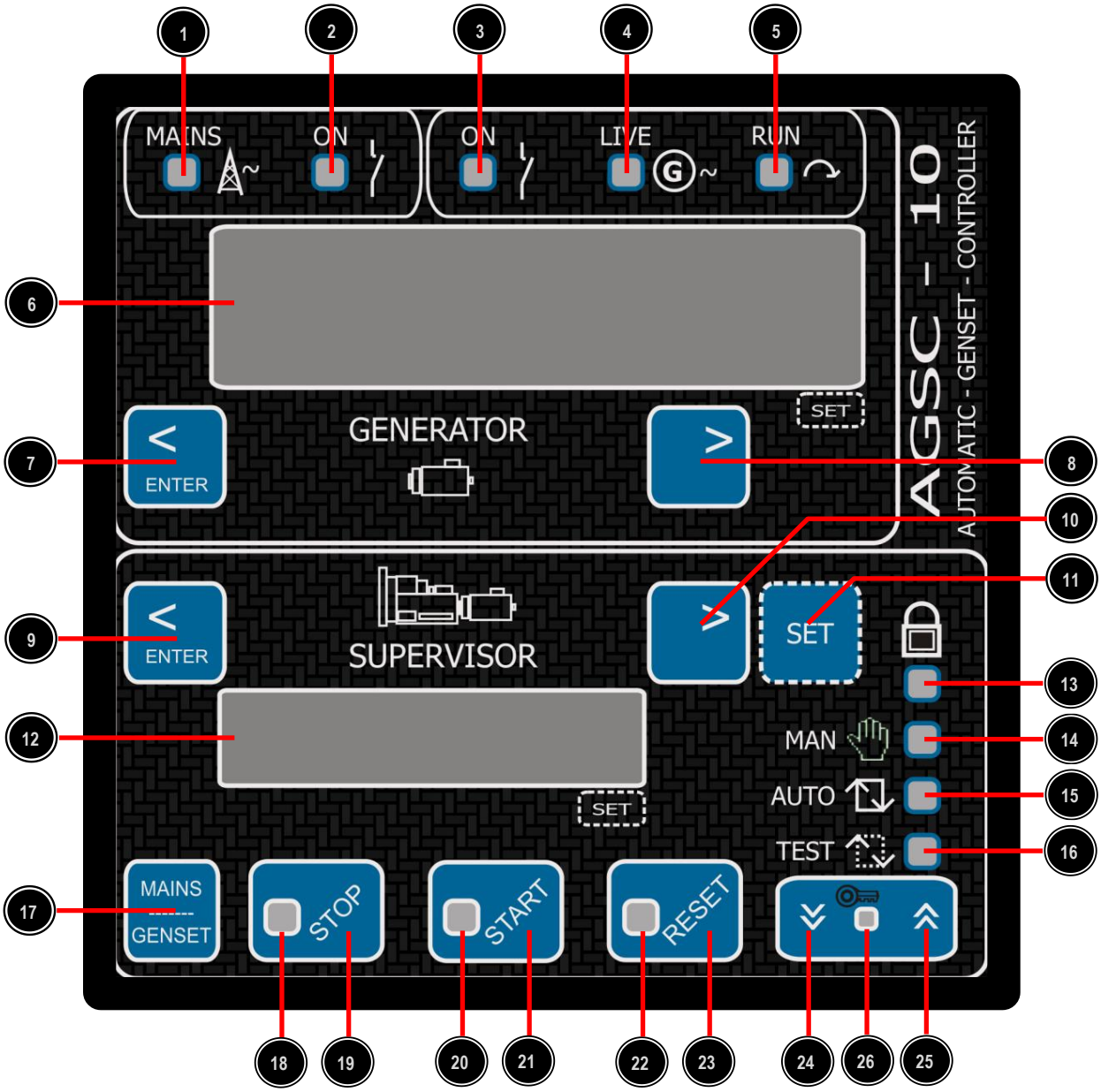
On card **OPM-S-I2C-OR3-18P**, select the group address in the manner specified in the enclosed documentation.

4.2.3 Control and supervision with OPM-S-J1939

The card permits engines with DCU that support protocol J1939 (e.g. VOLVO EMS2) to be managed.

The card can show on its display the complete set of messages and measurements available, while the AGSC-10 has a special visualization page that shows a summary of the operating modes and of the alarm statuses, if any.
The card permits interacting with the engine at various levels.
For additional details, see the description in section J1939 of AGSC-10 and the enclosed documentation related to card **OPM-S-J1939**.

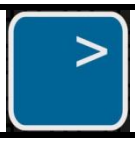
5 LAYOUT OF FRONT PANEL OF AGSC-10



1	Led, Mains present / Group inhibition	**14**	Selector Led: MANUAL mode
2	Led , Contactor on Mains	**15**	Selector Led: AUTOMATIC mode
3	Led, Contactor on Generator	**16**	Selector Led: TEST mode
4	Led, Generator live	**17**	Mains-Generator manual transfer button
5	Led, Engine running	**18**	Indicator led, engine stopping command available
6	16x2 LCD display, generator conditions	**19**	Engine manual stop button
7	“Backward” button of generator display / Confirmation of setting	**20**	Indicator led, engine start command available
8	“Forward” button of generator display	**21**	Engine manual start button
9	“Backward” button of supervisor display / Confirmation of setting	**22**	Led, alarms / faults detected
10	“Forward” button of supervisor display	**23**	Reset button / Silencing of aural warning
11	Input button of programmings and special functions	**24**	“Forward” button of group mode selector
12	16x2 LCD display of supervisor	**25**	“Backward” button of group mode selector
13	Selector Led: LOCKED mode	**26**	Led indicating selector locked from external key

5.1 Button operation

7 9 	**Previous page of display / Confirms the values in parameter programming.**	Button (7) operates on Display (6) "Generator." Button (9) operates on Display (12) "Supervisor."
Button is pressed – Button is held pressed:	• In normal mode the "title" of the page that comes in view when the button is released will show. • In parameter programming mode it gives access to the value or name of the parameter.	
Button is released:	• In normal mode, the selected page is visualized with all its values.	

8 10 	**Next page of display / Increase of values in parameter programming.**	Button (8) operates on Display (6) "Generator." Button (10) operates on Display (12) "Supervisor."
Button is pressed – Button is held pressed:	• In normal mode the "title" of the page that comes in view when the button is released will show. • In parameter programming mode, it gives access to the next parameter when the name of a parameter shows. If the parameter value is shown, it increases the parameter value. In the latter case, the parameter value increases quickly when the button is held pressed for some time.	
Button is released:	• In normal mode, the selected page is visualized with all its values.	

11 	**Access to parameter programming / Special functions.**
Button is pressed briefly in normal mode:	• With the selector at "OFF" (Led 13 on): If the visualized "Supervisor" page is the clock/calendar page, it gives access to date-time setting. If the visualized "Supervisor" page is another page, the "Event history" is shown / hidden.
Button is pressed briefly in the parameter programming mode:	• Immediately returns both the "Generator" and "Supervisor" sections to normal mode, and saves in each section the parameter that was the latest to be set in each section.
Button is pressed and held in normal mode:	• With the selector locking key in the unlocked position (Led 26 off) it gives access to the programming of the parameters of both the "Generator" and "Supervisor" sections.

17 	**MANUAL command for switching of load from Mains to Generator and vice-versa**	The button is enabled when 2 conditions occur concurrently: 1) Selector at "MAN" (Led 14 on) and 2) Generator ready to supply power (Led 4 on) Switching of the load from mains to generator and vice-versa occurs with a safety delay for load re-lock every time the button is pressed.

19 	**MANUAL Command of engine stop / Engine cooling cycle discontinued**	• If pressed in "MAN" (Led 14 on) it starts a stop cycle having the duration set through the special parameter. • In any mode, if an engine cooling cycle is in progress, pressing the button stops the cooling cycle.

21 	**MANUAL Command of Engine start**	The button is enabled when two conditions occur concurrently: 1) Selector at "MAN" (Led 14 on) and 2) Engine stopped (Led 5 off). To start the engine, hold the button pressed until starting occurs. Engine starting deactivates the button immediately, even if it is held pressed. This is done in order not to damage the starting devices.

23 	**Reset of faults / Silencing of aural warning / Special functions.**
Button is pressed briefly in normal mode:	• If the aural warning is sounding, it silences the warning. • If there are "frozen" measurements (displays flashing), it "releases" them. • If the aural warning has already been silenced and Led 22 flashes (i.e. there is more than one alarm), and the "Alarm Conditions" page of display 12 "Supervisor" is open, subsequent pushes on the button scroll the existing alarm messages.
Button is pressed and held in normal mode (after silencing):	• If there is a fault, but its cause does no longer exist, the button removes the lock conditions. • Under all conditions, if the engine stop cycle is in progress, the stop cycle is interrupted and the stop safety time is reset.

24 25 	**Operating mode selectors**	The buttons select the coming on of one of the Leds 13, 14, 15 or 16. They are enabled only if the Led between them (Led 26) is off.

5.2 Visualizations: operation of Leds

1		**Mains present / Group inhibition.** *Color: Green*	*Off:*	***No mains voltage present.*** Group NOT inhibited = Automatic start allowed.
			On:	***Mains voltage present.*** Group NOT inhibited = Automatic start allowed
			Flashing:	***Group inhibited*** = Automatic start not allowed. The command is available on J1-6.
2		**Contactor on Mains** *Color: Green*	*Off:*	***The load contactor is NOT closed on Mains.***
			On:	***The load contactor is closed on Mains.***
			Flashing:	*N/A*
3		**Contactor on Generator** *Color: Green*	*Off:*	***The load contactor is NOT closed on Generator.***
			On:	***The load contactor is closed on Generator.***
			Flashing:	*N/A*
4		**Generator present (live)** *Color: Green*	*Off:*	***Generator is NOT ready to supply the load.***
			On:	***Generator is ready to supply the load.***
			Flashing:	*N/A*
5		**Engine running** *Color: Green*	*Off:*	***Engine is NOT running.***
			On:	***Engine is running.***
			Flashing:	*N/A*
13		**"OFF" mode (LOCKED)** *Color: Red*	*Off:*	***The group is NOT in "Locked" mode.***
			On:	***The group is in "Locked" mode.***
			Flashing:	*N/A*
14		**"MAN" mode (MANUAL)** *Color: Yellow*	*Off:*	***The group is NOT in "Manual" mode.***
			On:	***The group is in "Manual" mode.***
			Flashing:	*N/A*
15		**"AUTO" mode (AUTOMATIC)** *Color: Green*	*Off:*	***The group is NOT in "Automatic" mode.***
			On:	***The group is in "Automatic" mode.***
			Flashing:	***Automatic start forced through SCR external request on line J1-3 is in progress.***
16		**"TEST" Mode (TEST)** *Color: Yellow*	*Off:*	***The group is NOT in "Test" mode.***
			On:	***The group is in "Test" mode from selector.***
			Flashing:	***The test request from external command on J1-7 or the weekly test request is present.***
18		**Led of engine STOP command** *Color: Red*	*Off:*	***Engine stop command is NOT present.***
			On:	***Engine stop command is present on output J1-14.*** Output behavior is regulated through parameter.
			Flashing:	*N/A*
20		**Led of engine start command** *Color: Red*	*Off:*	***The command to the starter motor is NOT present.***
			On:	***The command to the starter motor is present at output J1-15 (or J1-12).***
			Flashing:	*N/A*

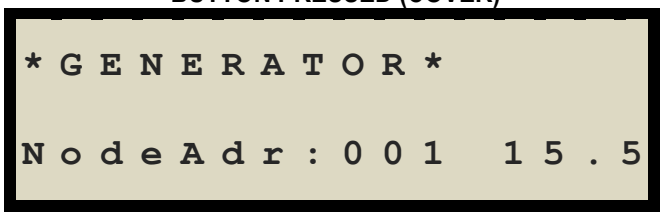
22		**Led of Alarms / Faults** *Color: Yellow*	*Off:*	***No alarm or fault present.***
			On:	***Only one alarm or fault condition is present.***
			Flashing:	***There are more than one alarm conditions.***
26		**Indication of status of selector lock key** *Color: Red*	*Off:*	***Key available (selection of buttons of modes 24 and 25 enabled).***
			On:	***No key (selection of buttons of modes 24 and 25 disabled).***
			Flashing:	*N/A*

5.3 Visualizations: visualization pages of displays

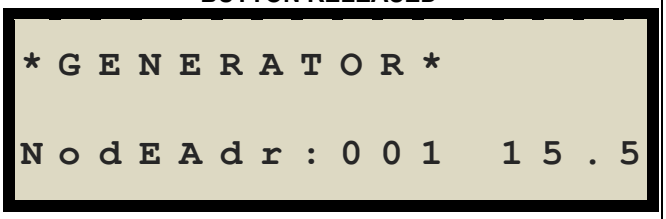
5.3.1 "Generator" Display – THREE-PHASE Mode

0

BUTTON PRESSED (COVER)



BUTTON RELEASED

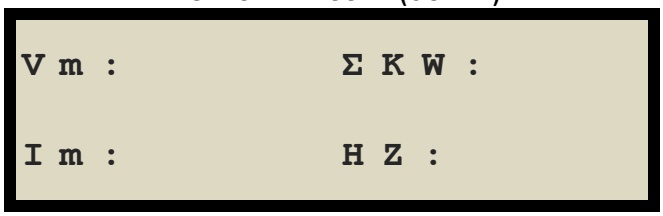


*** Visualization is the same when the button is pressed or released ***

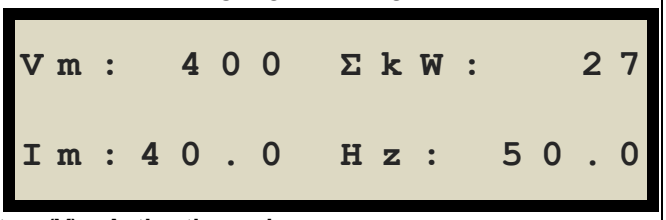
Line 1: Name of section
Line 2: Number of MODBUS node – Version.Revision

1

BUTTON PRESSED (COVER)



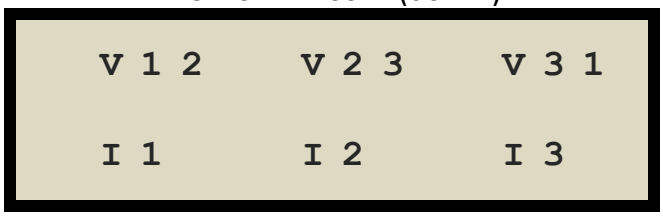
BUTTON RELEASED



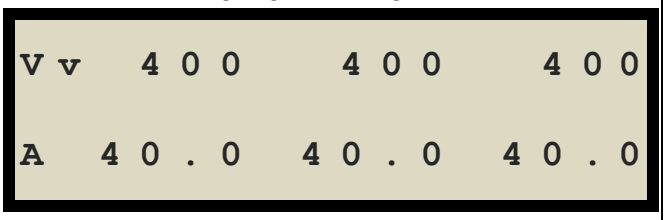
Line 1: Average three-phase voltage(V) – Active three-phase electrical power (kW)
Line 2: Average three-phase current (A) – Frequency (Hz)

2

BUTTON PRESSED (COVER)



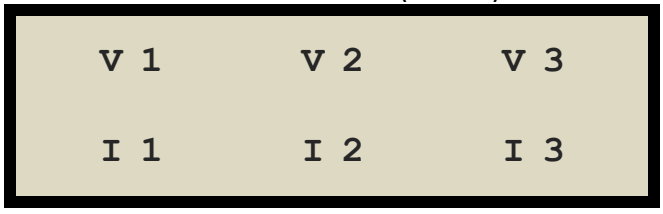
BUTTON RELEASED



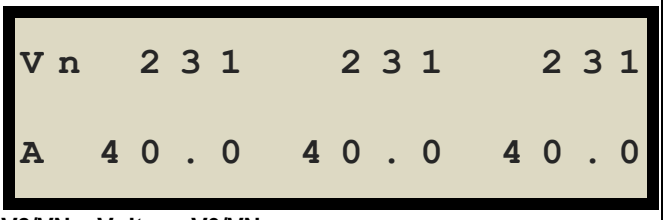
Line 1: Voltage V1/V2 – Voltage V2/V3 – Voltage V3/V1
Line 2: Current I1 – Current I2 – Current I3

3

BUTTON PRESSED (COVER)



BUTTON RELEASED

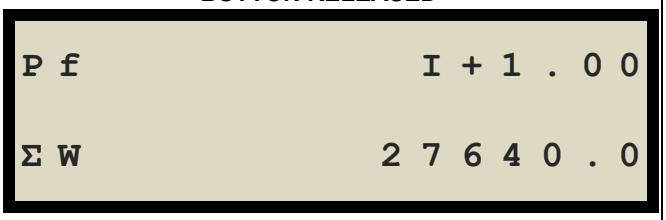


Line 1: Voltage V1/VN – Voltage V2/VN – Voltage V3/VN
Line 2: Current I1 – Current I2 – Current I3

4

BUTTON PRESSED (COVER)

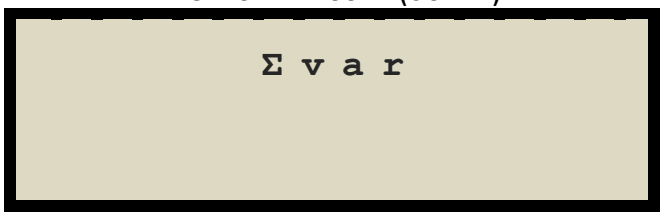
BUTTON RELEASED



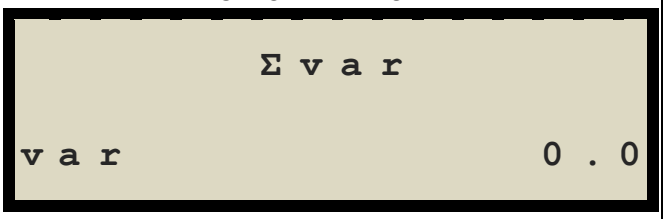
Line 1: Total Three-phase Power Factor (cosφ)
Line 2: Active Three-phase Power (W)

5

BUTTON PRESSED (COVER)



BUTTON RELEASED



Line 1: Title Total Three-Phase Reactive Power.
Line 2: Value of Total Three-phase Reactive Power (var)

6

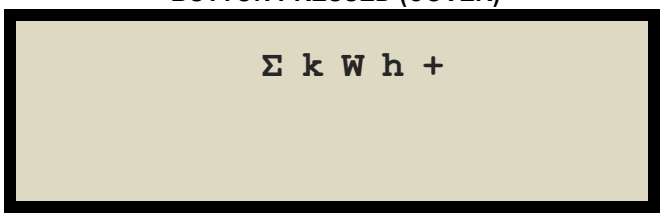
BUTTON PRESSED (COVER)

BUTTON RELEASED

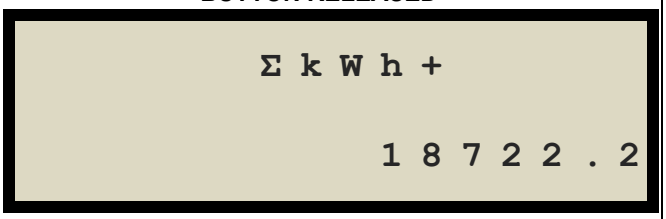
Line 1: Title Total Apparent Three-phase Power
Line 2: Value of Total Apparent Three-phase Power (VA)

7

BUTTON PRESSED (COVER)



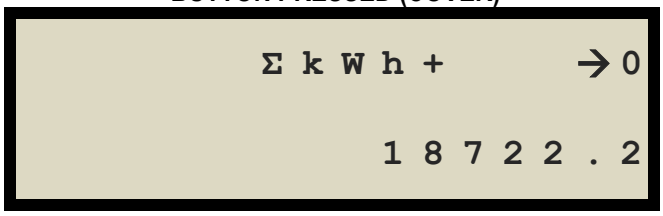
BUTTON RELEASED



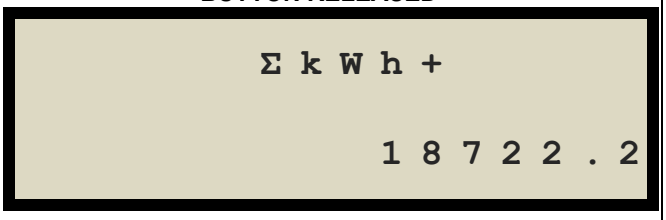
Line 1: Title Total Active Energy produced
Line 2: Value of Total Active Energy produced (kWh)

8

BUTTON PRESSED (COVER)



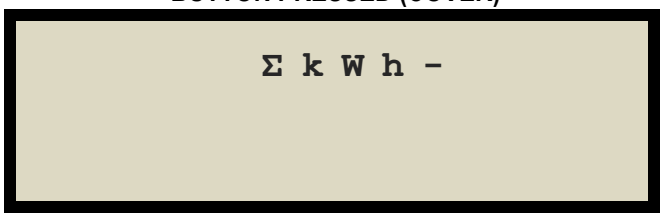
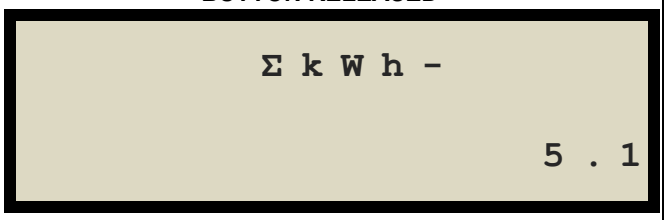
BUTTON RELEASED



***** Special procedure for zero-setting of accumulated Active Energy *****

Symbol " →0" (zero-setting pending) flashes on the first line while the button is pressed, the second line shows the value stored in the memory. The value flashes. If the button is held pressed during a few seconds, the value is set to zero and "0.0" will show flashing.	When the button is released, the zero-setting request is voided, and the normal visualization page is shown. If the button is released before the time necessary for zero-setting has elapsed, the shown value will remain unchanged; otherwise "0.0" will show.

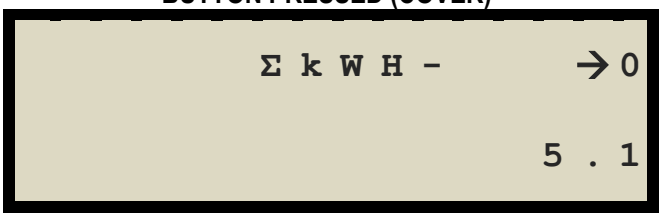
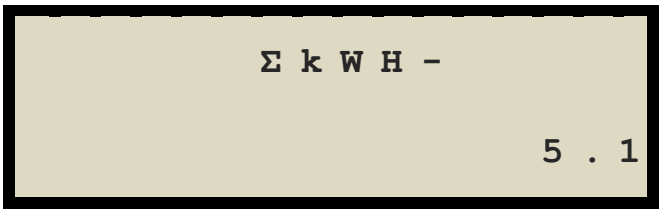
9

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

Line 1: Title Absorbed Total Active Energy

Line 2: Value of Total Active Energy absorbed under energy reversal conditions (kWh)

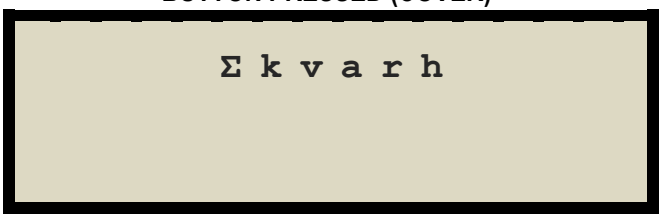
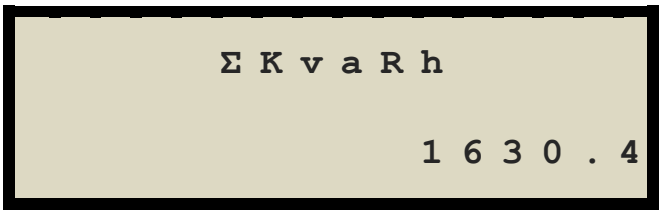
10

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

***** Special procedure for zero-setting of accumulated Active Energy *****

When the button is pressed, symbol " →0" (impending zero-setting) flashes on the first line, while the second line shows flashing the value contained in the memory. If the button is held pressed for a few seconds, the value will be set to zero and "0.0" will show flashing.	When the button is released, the request for zero-setting is voided, and the standard visualization page shows again. If the button is released before the time necessary for zero setting has elapsed, the value is shown unchanged. Otherwise, 0.0 will be shown.

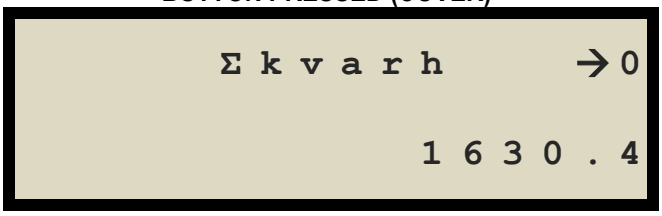
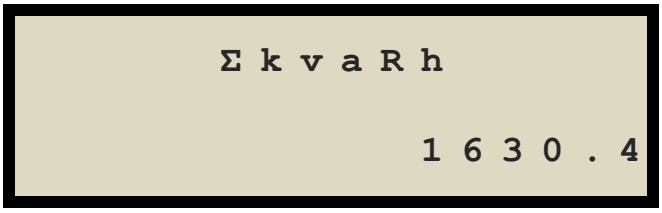
11

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

Line 1: Title Total Reactive Energy produced

Line 2: Value of Total Reactive Energy produced (kvarh)

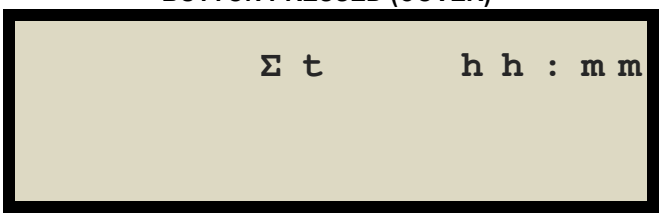
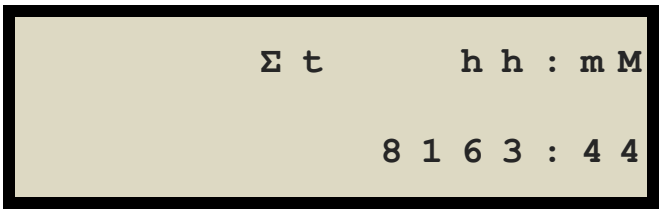
12

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

***** Special procedure for zero-setting of accumulated Reactive Energy *****

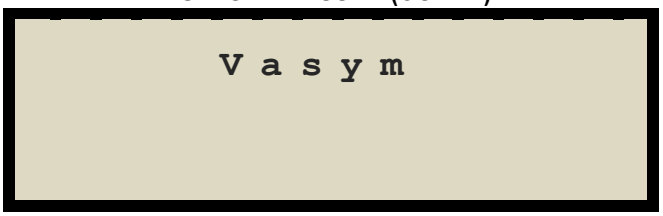
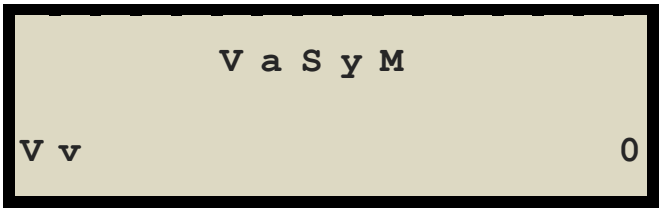
When the button is pressed, symbol " →0" (impending zero-setting) flashes on the first line, while the second line shows the value contained in the memory. The value flashes. If the button is held pressed for a few seconds, the value will be set to zero and "0.0" will show flashing.	When the button is released, the request for zero-setting is voided, and the standard visualization page shows again. If the button is released before the time necessary for zero setting has elapsed, the value is shown unchanged. Otherwise, 0.0 will be shown.

13

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

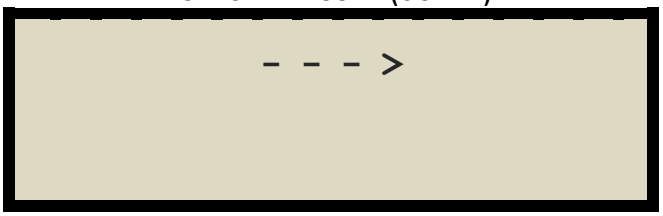
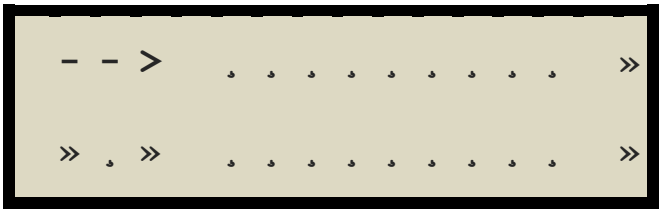
Line 1: Title Total Power Supply Time of AGSC-10
Line 2: Hours and minutes of power on (approximate)

14

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

Line 1: Title Three-phase Voltage Asymmetry
Line 2: Value of Three-phase Voltage Asymmetry (Volt phase/phase)

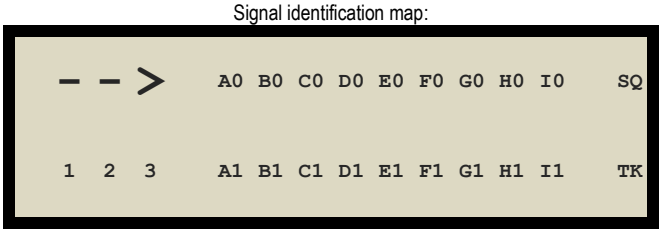
15

BUTTON PRESSED (COVER)	BUTTON RELEASED
	

***** Monitor of threshold conditions of "Generator" section *****

Page title "Monitor" thresholds	The empty boxes show the "FALSE" condition (condition not active). The filled boxes indicate the "TRUE" condition (condition active)

Signal identification map:



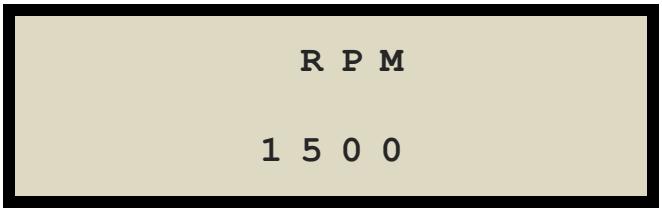
1 = Engine started from Frequency
2 = Overspeed from Frequency
3 = Generator present

SQ = Phase sequence (full = phases OK)
TK = Flashing indicates everything OK

A0 = Detection of average three-phase Max V exceeded condition
B0 = Detection of average three-phase Min V exceeded
C0 = Detection of three-phase voltages asymmetry
D0 = Detection of Max. Frequency exceeded condition
E0 = Detection of Min. Frequency exceeded condition
F0 = Detection of 1st level overload condition
G0 = Detection of 2nd level overload condition
H0 = Detection of power reversal exceeded condition
I0 = Detection of maximum current release condition

A1 = Condition of average three-phase Max V exceeded is valid
B1 = Condition of average three-phase Min V exceeded is valid
C1 = Condition of three-phase voltages asymmetry is valid
D1 = Condition of Max. Frequency exceeded is valid
E1 = Condition of Min. Frequency exceeded is valid
F1 = 1st level overload condition is valid
G1 = 2nd level overload condition is valid
H1 = Condition of power reversal exceeded is valid
I1 = Condition of maximum current release is valid

16

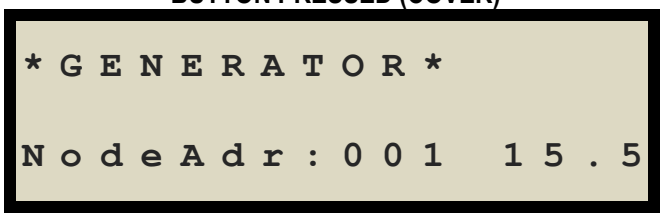
BUTTON PRESSED (COVER)	BUTTON RELEASED
	

Line 1: **Title of RPM counter**
RPM value
Line 2: **Activation from parameter is necessary to visualize RPM**

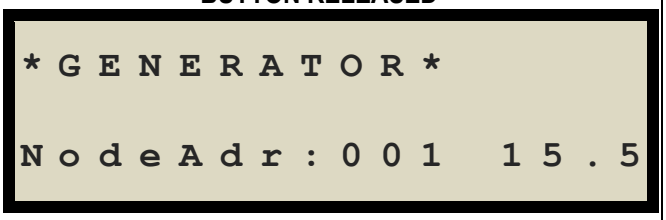
5.3.2 "Generator" display – SINGLE-PHASE mode

0

BUTTON PRESSED (COVER)



BUTTON RELEASED

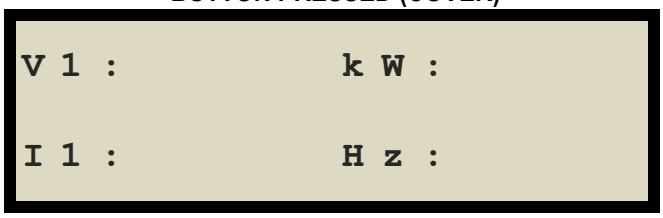


***** Visualization is the same irrespective whether the button is pressed or not *****

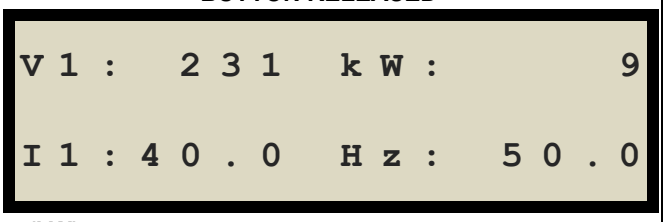
Line 1: Section name
Line 2: Number of MODBUS node – Version.Revision

1

BUTTON PRESSED (COVER)



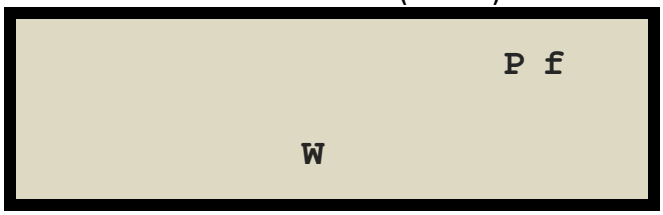
BUTTON RELEASED



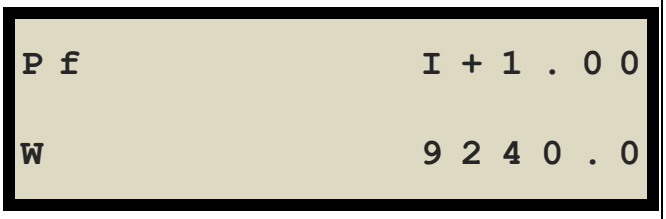
Line 1: Voltage (V) – Active Power (kW)
Line 2: Current (A) – Frequency (Hz)

2

BUTTON PRESSED (COVER)



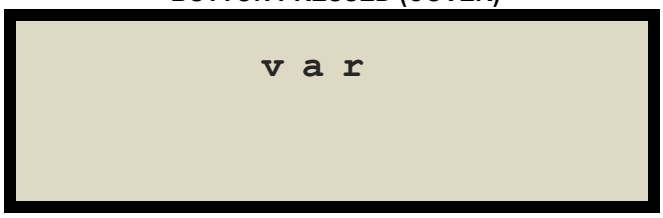
BUTTON RELEASED



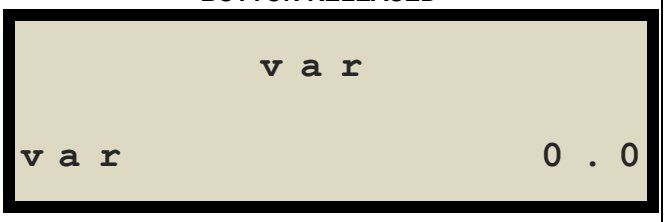
Line 1: Power factor (cosφ)
Line 2: Active Power (W)

3

BUTTON PRESSED (COVER)



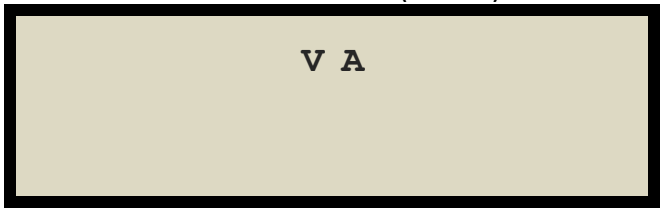
BUTTON RELEASED



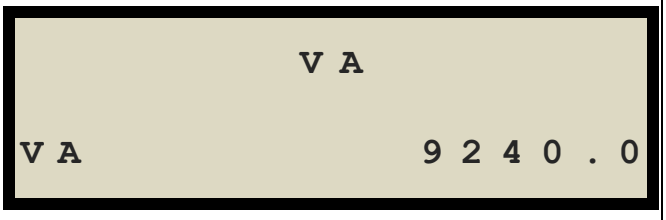
Line 1: Title of Reactive Power
Line 2: Value of Reactive Power (var)

4

BUTTON PRESSED (COVER)



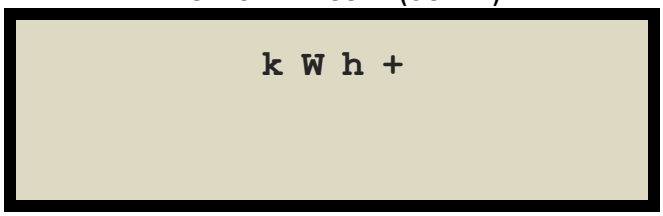
BUTTON RELEASED



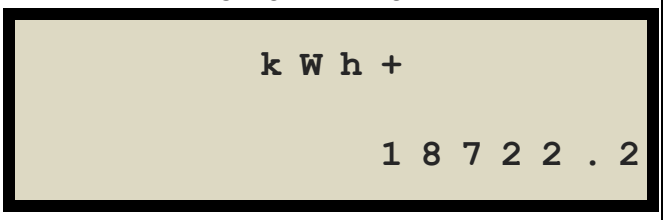
Line 1: Title of Apparent Power
Line 2: Value of Apparent Power (VA)

5

BUTTON PRESSED (COVER)



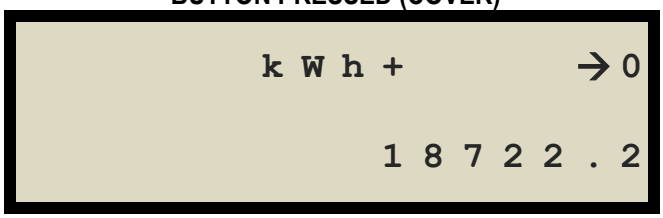
BUTTON RELEASED



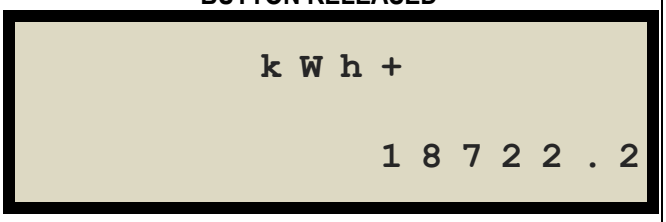
Line 1: **Title of Total Active Energy produced**
Line 2: **Value of Total Active Energy produced (kWh)**

6

BUTTON PRESSED (COVER)



BUTTON RELEASED



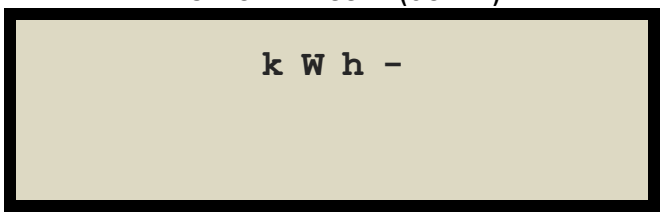
***** Special procedure for zero-setting of accumulated Active Energy *****

When the button is pressed, symbol " →0" (impending zero-setting) flashes on the first line, while the second line shows flashing the value contained in the memory.
If the button is held pressed for a few seconds, the value will be set to zero and "0.0" will show flashing.

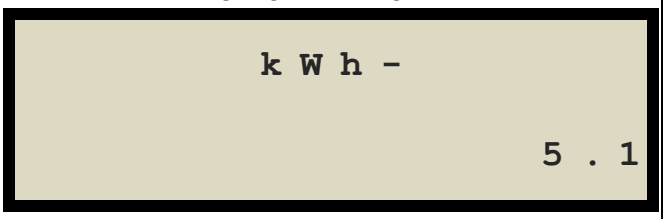
When the button is released, the request for zero-setting is voided, and the standard visualization page shows again.
If the button is released before the time necessary for zero setting has elapsed, the value is shown unchanged. Otherwise, 0.0 will be shown.

7

BUTTON PRESSED (COVER)



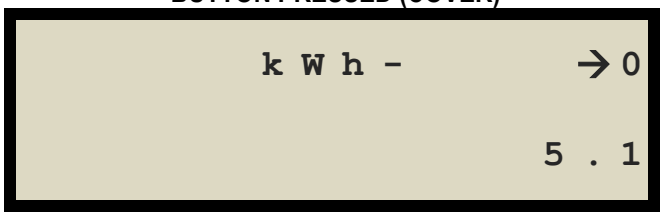
BUTTON RELEASED



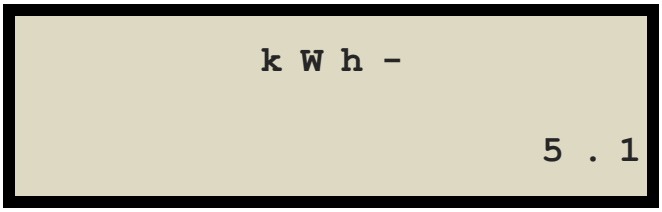
Line 1: **Title of absorbed Total Active Energy**
Line 2: **Value of Total Active Energy absorbed under energy reversal conditions (kWh)**

8

BUTTON PRESSED (COVER)



BUTTON RELEASED



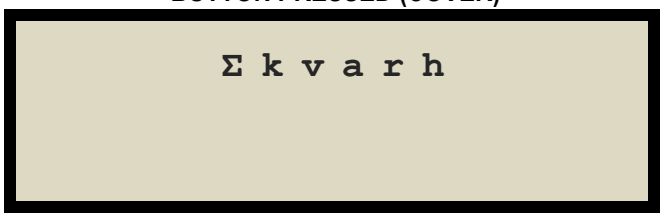
***** Special procedure for zero-setting of accumulated Active Energy *****

When the button is pressed, symbol " →0" (impending zero-setting) flashes on the first line, while the second line shows flashing the value contained in the memory.
If the button is held pressed for a few seconds, the value will be set to zero and "0.0" will show flashing.

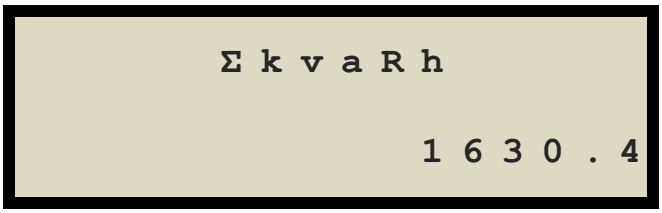
When the button is released, the request for zero-setting is voided, and the standard visualization page shows again.
If the button is released before the time necessary for zero setting has elapsed, the value is shown unchanged. Otherwise, 0.0 will be shown.

9

BUTTON PRESSED (COVER)



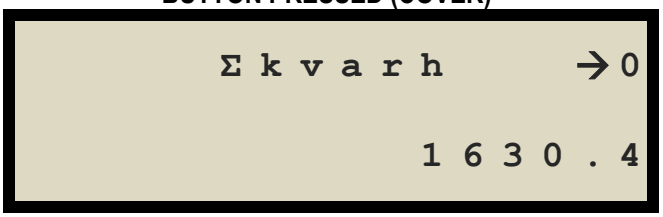
BUTTON RELEASED



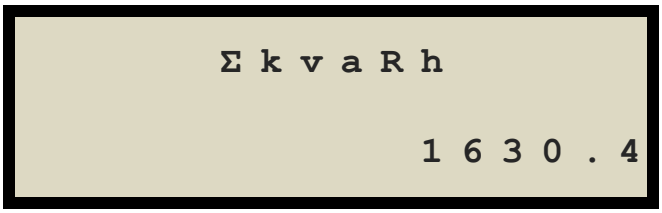
Line 1: **Title of Total Reactive Energy produced**
Line 2: **Value of Total Reactive Energy produced (kvarh)**

10

BUTTON PRESSED (COVER)



BUTTON RELEASED



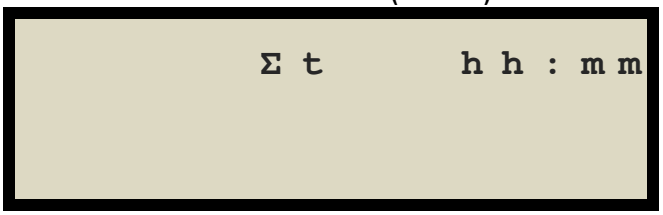
***** Special procedure for zero-setting of accumulated Reactive Energy *****

When the button is pressed, symbol " →0" (impending zero-setting) flashes on the first line, while the second line shows the value contained in the memory. The value flashes.
If the button is held pressed for a few seconds, the value will be set to zero and "0.0" will show flashing.

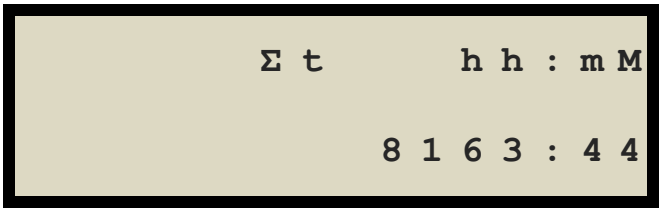
When the button is released, the request for zero-setting is voided, and the standard visualization page shows again.
If the button is released before the time necessary for zero setting has elapsed, the value is shown unchanged. Otherwise, 0.0 will be shown.

11

BUTTON PRESSED (COVER)



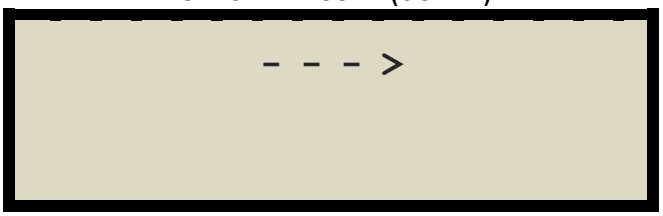
BUTTON RELEASED



Line 1: **Title of Total Power Supply Time of AGSC-10**
Line 2: **Hours and minutes of power on (approximate)**

12

BUTTON PRESSED (COVER)



BUTTON RELEASED

***** Monitor of threshold conditions of "Generator" section *****

Page title "Monitor" thresholds	The empty boxes show the "FALSE" condition (condition not active). The filled boxes indicate the "TRUE" condition (condition active)

Signal identification map:

1 = Engine started from Frequency 2 = Overspeed from Frequency 3 = Generator present SQ = Not used in single-phase mode TK = Flashing indicates everything OK	A0 = Detection of Max V exceeded condition B0 = Detection of Min V exceeded condition C0 = Not used in single-phase mode D0 = Detection of Max. Frequency exceeded condition E0 = Detection of Min. Frequency exceeded condition F0 = Detection of 1st level overload condition G0 = Detection of 2nd level overload condition H0 = Detection of power reversal exceeded condition I0 = Detection of maximum current release condition	A1 = Condition of Max V exceeded B1 = Condition of Min V exceeded C1 = Not used in single-phase mode D1 = Condition of Max. Frequency exceeded is valid E1 = Condition of Min. Frequency exceeded is valid F1 = 1st level overload condition is valid G1 = 2nd level overload condition is valid H1 = Condition of power reversal exceeded is valid I1 = Condition of maximum current release is valid

13

BUTTON PRESSED (COVER)

BUTTON RELEASED

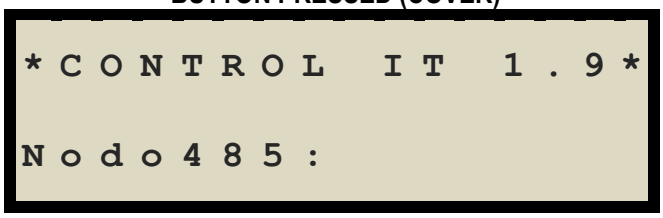
Line 1: Title RPM counter
RPM value
Line 2: Activation from parameter is necessary to visualize RPM

5.3.3 "Supervisor" Display – THREE-PHASE mode

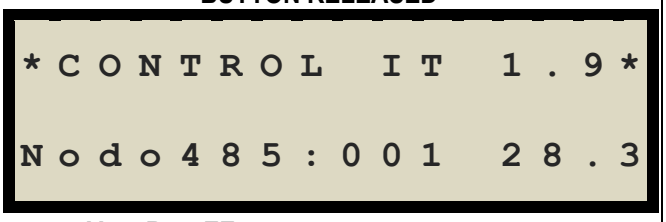
The following pages refer to the Italian language. The contents are available in three other languages, each of which can be selected through an operating parameter.

0

BUTTON PRESSED (COVER)



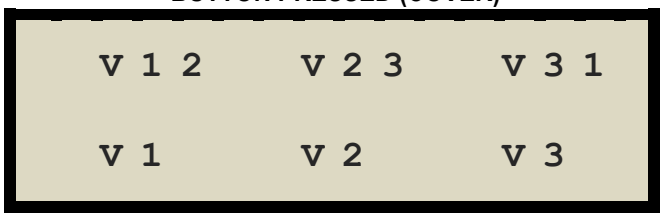
BUTTON RELEASED



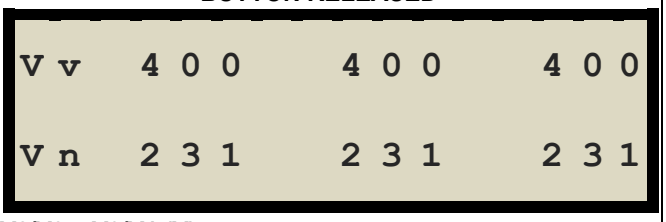
Line 1: Section name – Language – Vers.Rev. EEprom
Line 2: Number of MODBUS node – Version.Revision

1

BUTTON PRESSED (COVER)



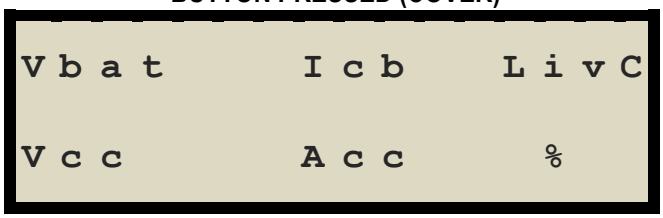
BUTTON RELEASED



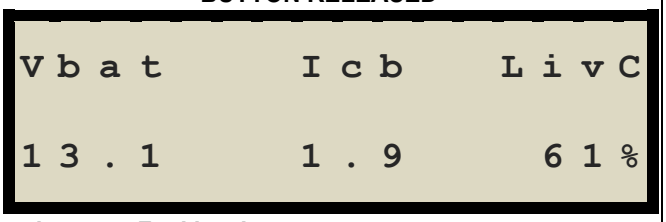
Line 1: Mains: Voltages V1/V2 – V2/V3 – V3/V1 (V)
Line 2: Mains: Voltages V1/VN – V2/VN – V3/VN (V)

2

BUTTON PRESSED (COVER)



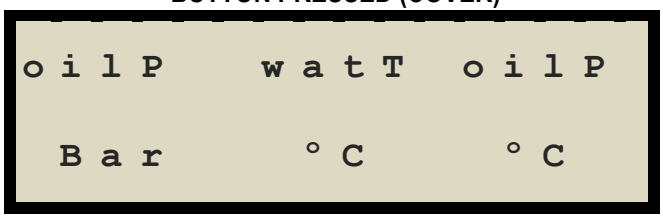
BUTTON RELEASED



Line 1: Titles V Battery – I Battery charger – Fuel level
Line 2: Measurements Vbat (V) – Icb (A) – LevC (%)

3

BUTTON PRESSED (COVER)

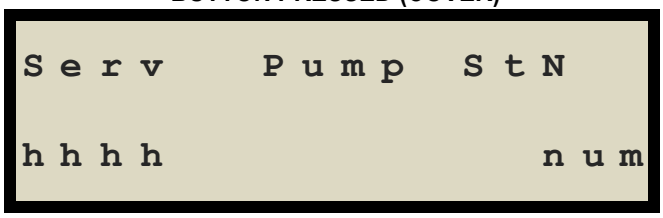


BUTTON RELEASED

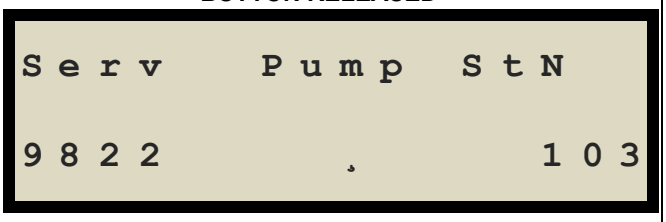
Line 1: Titles Oil press. – Engine temp. – Oil temp.
Line 2: Measurements P. oil (Bar) – T. water (°C) – T. oil (°C)

4

BUTTON PRESSED (COVER)



BUTTON RELEASED



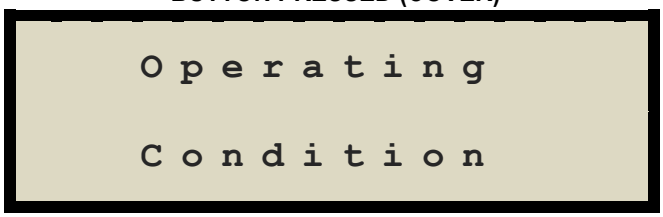
Titles

Line 1:
- **Hours to maintenance**
- **Fuel pump status ("---" = Not managed, ¸ = Off, ▩ = On).**
- **Number of starting operations accomplished**

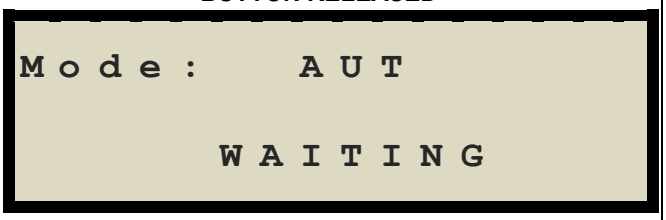
Line 2: **Values and status of Fuel Pump**

5

BUTTON PRESSED (COVER)



BUTTON RELEASED



Line 1: **Operating status (line 1)**

Line 2: **Operating status (line 2)**

This page is automatically recalled every time AGSC-10 carries out operations different from waiting, and shows the message related to the operation in progress.

6

BUTTON PRESSED (COVER)

BUTTON RELEASED

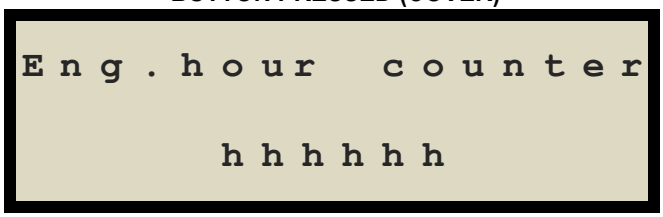
Line 1: **Alarm condition (line 1)**

Line 2: **Alarm condition (line 2)**

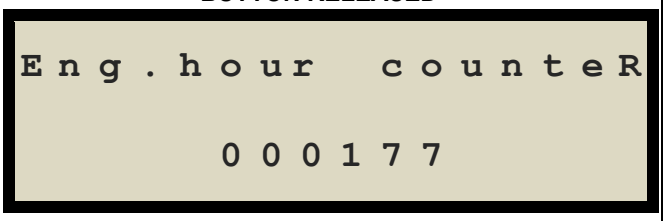
This page is automatically recalled every time there is an alarm or a fault. The automatic recall has priority over the recall of the Operating status.

7

BUTTON PRESSED (COVER)



BUTTON RELEASED

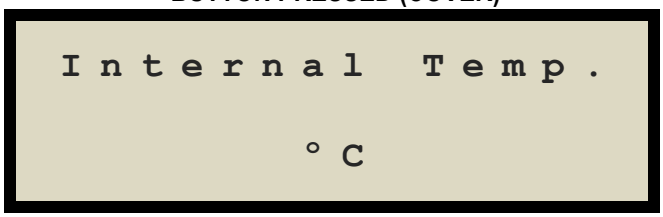


Line 1: **Title Engine hour counter**

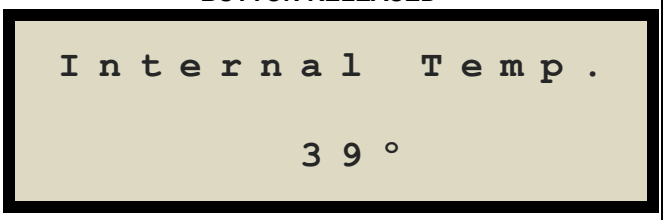
Line 2: **Number of engine running hours**

8

BUTTON PRESSED (COVER)



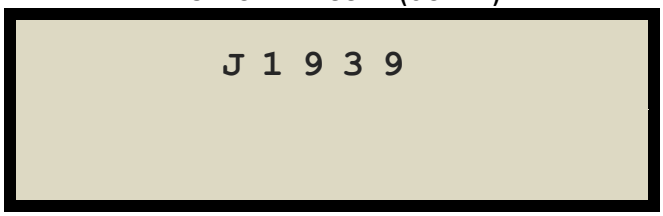
BUTTON RELEASED



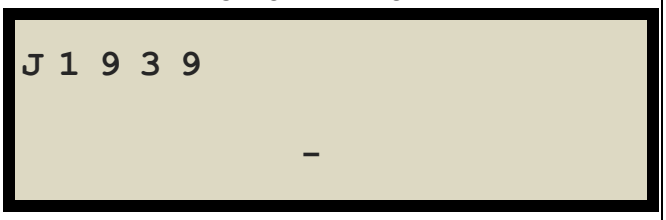
Line 1: **Title Control panel internal temperature**
Line 2: **Value of temperature (°C)**

9

BUTTON PRESSED (COVER)



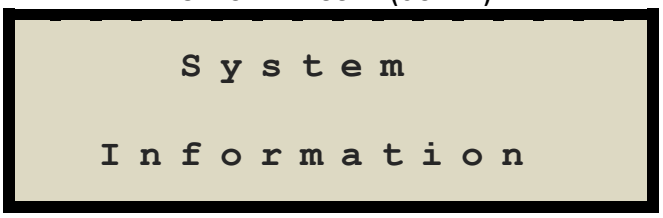
BUTTON RELEASED



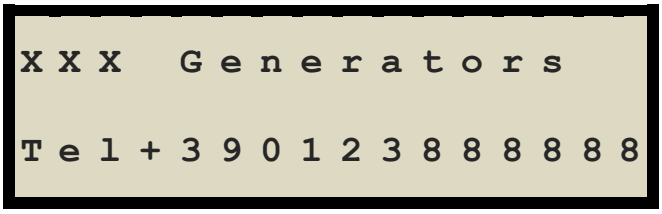
Line 1: **Title Monitor of option J1939**
Line 2: **Status:**
— = Option not available
□ = Option available – ECU off or disconnected
▒ = Option available – ECU connected and on

10

BUTTON PRESSED (COVER)



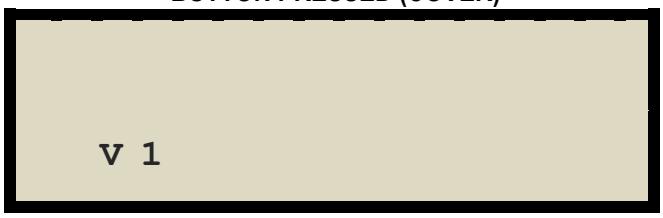
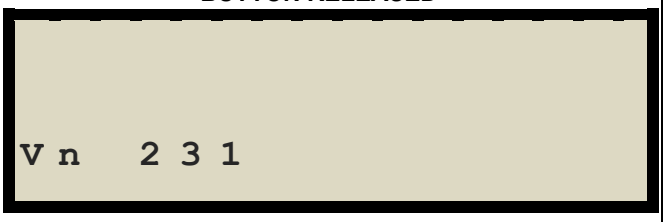
BUTTON RELEASED



Line 1: **Customized information (line 1)**
Line 2: **Customized information (line 2)**
The information contained in this page can be customized by the Customer by use of the optional device PGM-M-MSG-PROG and the related software. This page can show up to 8 messages (one at a time) that can be selected from parameter programming.

5.3.4 "Supervisor" Display – SINGLE-PHASE mode

The only difference between the three-phase mode and the single-phase mode is the visualization on page 1. All the rest remains unchanged.

	BUTTON PRESSED (COVER)	BUTTON RELEASED
1		

Line 1: Empty
Line 2: Mains: Voltage V1/VN (V)

6 FIRST POWER ON

6.1 Preliminary operations

After having performed the electrical connections correctly, and before you switch on the controller, be sure you are familiar with the information provided hereafter.

First of all, about 80 modifiable operating parameters are set at the factory together with more than 30 non-modifiable parameters. The latter are considered to be optimal for any use. Do check them ALL to make sure they do not cause dangerous operations or operations likely to cause damage.

For safety reasons, when the AGSC-10 is switched on for the first time, the group mode selector is at LOCKED (Led 13  on) and a 30 seconds long stop cycle is started (non-energized condition), which can be interrupted by pressing and holding the RESET (23) button.

Under the above condition, any power-on attempt is prevented to enable you to change parameter setting. In fact, parameter setting is possible only if the contact of the external key that locks the selector is closed (J10-59 and J10-60), hence the Led related to lock from external key 26  is off.

The modifiable parameters are included in each of the two sections, depending on whether they modify the generator monitoring functions or the supervisor control functions.

There are three different manners that permit the parameters to be modified:

1. By use of the keyboard (see *"Setting of operating parameters through the Keyboard")*
2. Through port RS485 in quick mode (called "recipe mode")
3. Through port RS485 by writing in MODBUS RTU in the setting registers.

The keyboard mode is the easiest to use and does not require any accessory. Conversely, it can be uncomfortable to use if there are many parameters to be modified.
The "recipe" mode is the ideal mode to achieve customization of several controllers if a pre-prepared parameter map is available, which is transferred by use of one operation only.
The MODBUS mode provides a more complete overall vision, depending on the software used for management.

All the related procedures are detailed in the applicable sections.

	To ensure maximum use flexibility, the parameters can be modified in ALL operating modes (not only in the locked mode). This, however, makes the modification dangerous because each modified parameter becomes operative immediately after it is memorized. If possible, proceed to modification only with the selector in LOCKED mode (Led 13 on).

To scroll the pages of each display, press the applicable 

(previous-backward) or  (next-forward) button. When the button is held pressed, the "title" of the page that will be visualized at the time the button is released is shown. When the button is released, the measurements specified in the title are visualized.

In addition to providing access to the programming of the operating parameters from the keyboard, button 

is also used to manage the "special functions" that will be described at a later time. For the moment it is sufficient to know that the action carried out by button 

can change as a function of the pages shown on the displays.

6.1.1 Setting of Clock – Calendar from Keyboard

The setting of the clock from the keyboard can be performed with the external selector lock key at any position (Led 26 related to locking from external key on or off), provided the selector is in the "Locked" position (Led 13 on).

To set the Calendar/Clock from the keyboard, it is necessary:

1. To make sure that the selector is at "Locked" (Led 13 on)
2. To select the "Clock" page on the "SUPERVISOR" display
3. To briefly press the SET button.

Seconds counting stops and the day of the month starts flashing.

Buttons < ENTER and > of the SUPERVISOR sections respectively increase and decrease the value that is flashing.

To confirm the value and go to the next value (month of the year), briefly press the SET button.
Using the same procedure, change month, year, hour, minutes, seconds and day of the week (1 = Monday, 7 = Sunday).

Memorization is AUTOMATIC, but occurs ONLY after the last brief push on the SET button subsequent to the setting of the day of the week.

Confirmation of correct setting is obtained when all values stop flashing and seconds resume running with all the new settings on the display.

	1) The setting of the clock can interrupt for several reasons. In this case NO already modified value is memorized. The reasons for which the setting procedure can become interrupted are the following: • The selector has been moved to a position different from "Locked" (Led 13 off). • The SET button has been pressed for a long time and the programming of parameters from keyboard has been entered (see the section applicable to the programming of parameters from keyboard). The clock remains steady as long as one of the values on the display flashes. 1) Any occurrence of a fault condition does not affect the setting procedure, which can be carried on. At the end of the procedure the "Alarms" page is shown immediately and clock setting memorization will be performed. 2) The setting of the calendar/clock can be made also remotely through MODBUS, at the address of the related registers (advanced functions).

6.1.2 Setting of operating parameters from keyboard

The setting of the parameters from keyboard can be carried out when the external selector lock key is in the unlocked position (Led 26 related to locking from external key off) and the legends on the displays DO NOT flash (= measurements "frozen").

	For safety reasons, if possible, always keep the selector in the LOCKED position (Led 13 on). If this is not possible, pay the UTMOST CARE not to enter values that can generate dangerous situations.

The procedure to follow is described hereafter:

a) After switching on the device, press the SET set button for a period long enough to have the "Generator" display show legend G01 and the "Supervisor" display show legend P01.

	Button SET permits the concurrent access to the programming of both sections. The parameters showing letter G as a prefix belong to the Generator section, those showing prefix P belong to the Supervisor section. If the selector is in the LOCKED position (Led 13 on), it is necessary "to go through" the visualization of the "History File" or the "Setting of clock-calendar" by continuing to hold the SET button pressed.

b) To select the number of the parameter to set, press only the > button of the section whose parameter must be modified as many times as necessary to bring in view the name of the parameter.

c) To access to the setting operation, press the < ENTER button. The current value shows.

d) To modify the value, use only button > (increase). In case the initial and the final values are wide apart, hold the button pressed. This gives a higher and higher increase speed.

	Both the selection of the parameter number and the modification of its value are allowed only by use of the > button (increase). If you need to select a previous parameter, you must reach last available parameter by subsequent brief pushes on the button and go on until the first parameter is shown. Quick scrolling through a prolonged push on the button is not possible in parameter selection. The same considerations apply to the modification of the value. This means that to set a lower value than the current one you must move forward until you reach and exceed the maximum value, then move on from the minimum value. Different from the parameter selection, quick scrolling through prolonged pushing of the button is possible.

e) When you attain the desired value and you want to memorize the value and proceed to the setting of another parameter, press the < ENTER button. The page showing only the parameter name will come in view. Then repeat steps b), c) and d).

f) To end the programming procedure, it is sufficient that you press the SET button at any time. Both the Generator and Supervisor sections return to show the normal display. If the setting of a value is in progress, the value is saved when the procedure is exited.

	The exit from the setting of a parameter value by use of button < ENTER or SET involves the immediate memorization and activation of the value.

7 OPERATING PARAMETERS

All the operating parameters, either programmable or fixed, that are currently available for each of the two sections are described hereafter.

7.1 "Generator" section – Programmable parameters

G01	**Re-setting of factory settings**		Factory-set value: **N/A**	Programmed value: **N/A**
	Setting limits (Min.-Max.)	**0 – 1**	This is not a true operating parameter, but the manner through which ALL the operating parameters of the "GENERATOR" section can be returned to the factory-set value. Totalized and counted values remain unchanged. To carry out this operation, set the parameter to 1: the GENERATOR section resets immediately. **It is highly recommended that you switch off, then on again the AGSC-10 after this operation to make sure that all the new parameters are initialized correctly.**	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**NO**		
G02	**Size of ammeter transformers /5 (CT)**		Factory-set value: **40 A**	Programmed value:
	Setting limits (Min.-Max.)	**5 – 4500 A**	It is the nominal value of the current transformers that will be used, with ratio /5.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (515)**		
G03	**GENERATOR display page to be visualized upon switching on**		Factory-set value: **0**	Programmed value:
	Setting limits (Min.-Max.)	**0 – Page number**	Zero indicates the first page available. The following numbers are the numbers of the pages starting from the factory page (0) that can be seen by scrolling the "Generator" display by use of button (8)  , up to the last page available.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (517)**		
G04	**Frequency threshold for "ENGINE RUNNING" condition**		Factory-set value: **20.0 Hz**	Programmed value:
	Setting limits (Min.-Max.)	**10.0 -20.0 Hz**	It is the frequency value measured from phase 1 of the generator voltage, above which the engine can be considered running.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (518)**		
G05	**Frequency threshold for protection from "OVERSPEED"**		Factory-set value: **60.0 Hz**	Programmed value:
	Setting limits (Min.-Max.)	**55.0 – 99.9 Hz**	This value must be modified if the electrical machine operates at 60 Hz instead of 50 Hz. It is the frequency value measured from phase 1 of the generator voltage above which the engine can be considered overspeeding.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (519)**		
G06	**Voltage threshold for "GENERATOR PRESENT" condition**		Factory-set value: **300 V**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 10000 V**	It is the voltage value above which the generator can be considered ready to supply power. If the system is set to operate as a three-phase system, this value is to be related to the average phase/phase voltage. If, conversely, the system is a single-phase system, this value is set as necessary to match the phase1 voltage between phase and neutral. The setting range permits operation also with systems fitted with voltage 100/V transformer for voltages up to 10kV.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (520)**		
G07	**Voltage threshold for protection from "MAXIMUM GENERATOR VOLTAGE" (MaxV)**		Factory-set value: **450 V**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 10000 V**	It is the voltage above which voltage is too high. If the system is set to operate as a three-phase system, this value is to be related to the average phase/phase voltage. If, conversely, the system is a single-phase system, this value is set as necessary to match the phase1 voltage between phase and neutral. The setting range permits operation also with systems fitted with voltage 100/V transformer for voltages up to 10kV.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (521)**		

G08	**Voltage threshold for protection from "MINIMUM GENERATOR VOLTAGE" (MinV)**		Factory-set value: **350 V**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 10000 V**	It is the voltage below which voltage is too low. If the system is set to operate as a three-phase system, this value is to be related to the average phase/phase voltage. If, conversely, the system is a single-phase system, this value is set as necessary to match the phase1 voltage between phase and neutral. The setting range permits operation also with systems fitted with voltage/ 100V transformer for voltages up to 10kV.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (522)**		
G09	**Voltage threshold for protection from "GEN. VOLTAGE ASYMMETRY" (AsymV)**		Factory-set value: **50 V**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 10000 V**	It is the difference in voltage between the phase/phase voltages above which voltage is to be considered too high. <u>It is meaningful only in the case of three-phase systems.</u> If the group is a single-phase one, this parameter is not managed. The setting range permits operation also with system fitted with voltage/100V transformer for voltages up to 10kV.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (530)**		
G10	**Lag Time for cut-in of G07, G08 and G09 (MaxV, MinV and AsymV)**		Factory-set value: **5 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 10 Sec**	It is the value of the delay that must be applied to each measurement of conditions MaxV, MinV and Voltage Asymmetry before the condition can be considered valid.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (523)**		
G11	**Frequency threshold for "MAXIMUM GEN. FREQUENCY" (MaxF)**		Factory-set value: **55.0 Hz**	Programmed value:
	Setting limits (Min.-Max.)	**52.0 – 99.9 Hz**	This value must be changed if the electrical machine is a 60 Hz machine and not a 50 Hz one. It is the frequency value measured on phase 1 of the generator voltage above which frequency is to be considered too high.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (524)**		
G12	**Frequency threshold for protection from "MINIMUM GEN. FREQUENCY" (MinF)**		Factory-set value: **55.0 Hz**	Programmed value:
	Setting limits (Min.-Max.)	**52.0 – 99.9 Hz**	This value must be changed if the electrical machine is a 60 Hz machine and not a 50 Hz one. It is the frequency value measured on phase 1 of the generator voltage below which frequency is to be considered too low.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (525)**		
G13	**Lag time for cutting in of G11 and G12 (MaxF and MinF)**		Factory-set value: **5 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 10 Sec**	It is the value of the delay that must be applied to the measurement of conditions MaxF and MinF before the condition can be considered valid.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (526)**		
G14	**Threshold for protection from "GENERATOR OVERLOAD (1st Level)" (Overload 1)**		Factory-set value: **115 %**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 120 %**	It is the percent three-phase (or single-phase) active power above which a warning signal is generated. The reference value, 100%, is given by the maximum apparent three-phase or single-phase power (= active power when cosφ 1) calculated based on the full-scale value set for voltage and the nominal current value of the current transformer. Should the voltage transformer be oversized, the threshold value must take into consideration the maximum current that can be output (machine size), hence take a suitable lower value.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (527)**		
G15	**Threshold for protection from " GENERATOR OVERLOAD (2nd Level)" (Overload 2)**		Factory-set value: **120 %**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 120 %**	It is the percent three-phase (or single-phase) active power above which the load is too high. The same considerations offered for the previous parameter apply.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (529)**		
G16	**Threshold for protection from "ENERGY REVERSAL" (EneRev)**		Factory-set value: **10 %**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 120 %**	This parameter is basically needed during operation in parallel. It is the value of the NEGATIVE percent three-phase (or single-phase) active power above which the reverse energy absorbed is too high. The same considerations offered for the previous parameters apply.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (531)**		

G17	**Lag time for cut-in of G14 , G15 and G16 (Overload1, Overload2 and EneRev)**	Factory-set value: **5 Sec**	Programmed value:

Setting limits (Min.-Max.): **1 – 30 Sec**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (528)**

It is the value of the delay that must be applied to each measurement of conditions Overload1, Overload2 and EneRev before the condition can be considered valid.

G18	**Speed of serial port RS485 of "Generator" section**	Factory-set value: **4**	Programmed value:

Setting limits (Min.-Max.): **0 – 4**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **NO**

It selects the speed of the serial port of the "Generator" section among the five available speeds:
0 = 9600 bps
1 = 19200 bps
2 = 38400 bps
3 = 57600 bps
4 = 115200 bps
In order to avoid problems, this parameter CANNOT be modified through remote control.

G19	**Node number on MODBUS network of "Generator" section**	Factory-set value: **1**	Programmed value:

Setting limits (Min.-Max.): **1 – 255**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **NO**

It is the address assigned to the "Generator" section in the MODBUS instrument network, if any. The section is connected to the network as if it were a separate device. It is, therefore, required that the MODBUS number is UNIQUE throughout the network (i.e. different from the number of the "Supervisor" section of the same AGSC-10). In order to avoid problems, the parameter CANNOT be modified through remote control.

G20	**Value of full scale voltage of phase/neutral (VT)**	Factory-set value: **231 V**	Programmed value:

Setting limits (Min.-Max.): **50 – 4615 V**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (516)**

It is the nominal full scale value of phase/neutral voltage of each phase.
The equivalent phase/phase value is this value multiplied by 1.732.
The setting range is such as to permit the use of voltage/100V transformers for the measurement of up to 10 kV, phase/phase. **The AGSC-10 version permitting the use of the voltage/100V transformer is a special version that must be specified in the order.**

G21	**Average of electrical measurements of "Generator" section**	Factory-set value: **3**	Programmed value:

Setting limits (Min.-Max.): **1 -15**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (514)**

It is used to "stabilize" the electrical measurement values. When set to 1, measurements are not averaged out.
The highest the value, the slowest the measurement.

G22	**Selection of THREE-PHASE or SINGLE-PHASE mode of "Generator" section**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.): **0 -1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (538.0)**

It is used to select the mode of operation of the "Generator" section of AGSC-10.
0 = THREE-PHASE mode of operation
1 = SINGLE-PHASE mode of operation
It must contain the same value programmed in P54 of the "Supervisor" section.

G23	**Frequency multiplier to obtain rpm**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.): **0 -50**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (539)**

Number that, multiplied by the frequency of phase 1 of the generator causes the display to show the equivalent number of engine rpm.
When set to zero, sets the rpm measurements to off.

7.2 "Generator" section – Fixed parameters

Time during which button SET must be pressed and held to access parameter programming	**5 s**
Time during which button > must be pressed and held to start quick increase of values	**3 s**
Delay of inhibition of generator status update at power on	**10 s**
Safety timeout in "SCOPE" mode (Electrical analysis)	**30 s**
Threshold for maximum current release condition	**G02 * 1.38**
Delay of cut-in of maximum current release condition	**4 s**

7.3 "Supervisor" section – Programmable parameters

P01 Re-setting of factory settings — Factory-set value: **N/A** — Programmed value: **N/A**

Setting limits (Min.-Max.): **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **NO**

This is not a true operating parameter, but the manner through which ALL the operating parameters of the "Supervisor" section can be returned to the factory-set value. Totalized and counted values remain unchanged. To carry out this operation, set the parameter to 1: the Supervisor section resets immediately. **It is highly recommended that you switch off, then on again the AGSC-10 after this operation to make sure that all the new parameters are initialized correctly.**

P02 Customer page — Factory-set value: **0** — Programmed value:

Setting limits (Min.-Max.): **0 – 7**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (512)**

The parameter is not accessible directly, neither from the keyboard nor from remote control. The Customer is directly informed about the applicable modification procedure.

P03 "Supervisor" section messages language — Factory-set value: **0** — Programmed value:

Setting limits (Min.-Max.): **0 – 3**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (513)**

The available languages are four and may change depending on the geographical destination of the device.
The AGSC-10 standard European version currently includes:
0 = Italian
1 = English
2 = French
3 = Spanish.

P04 SUPERVISOR display page to be visualized upon switching on — Factory-set value: **0** — Programmed value:

Setting limits (Min.-Max.): **0 – Page number**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (514)**

Zero indicates the first page available. The following numbers are the numbers of the pages starting from the factory page (0) that can be seen by scrolling the "Supervisor" display by use of button (8) >, up to the last page available.

P05 Programming of clock HOURS (alternative method) — Factory-set value: **N/A** — Programmed value: **N/A**

Setting limits (Min.-Max.): **0 – 23 h**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **YES (258)**

It is not a true operating parameter.
It is used to set the hour of the clock in an alternative manner, as if it were a normal parameter.
WARNING: As long as the parameter value is shown on the display, the hour of the clock stays THE SAME.

P06 Programming of clock MINUTES (alternative method) — Factory-set value: **N/A** — Programmed value: **N/A**

Setting limits (Min.-Max.): **0 – 59 min**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **YES (259)**

It is not a true operating parameter.
It is used to set the minutes of the clock in an alternative manner, as if it were a normal parameter.
WARNING: As long as the parameter value is shown on the display, the minute of the clock stays THE SAME.

P07	**Programming of clock DAY OF THE WEEK (alternative method)**	Factory-set value: **N/A**	Programmed value: **N/A**

Setting limits (Min.-Max.) **1 – 7**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **YES (257)**

It is not a true operating parameter.
It is used to set the day of the week in an alternative manner, as if it were a normal parameter. Conventionally: 0=Monday and 7=Sunday.

P08	**Voltage threshold for determination of "MINIMUM MAINS VOLTAGE" (MinV)**	Factory-set value: **320 V**	Programmed value:

Setting limits (Min.-Max.) **0 – 10000 V**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (524)**

It is the voltage below which voltage is too low, hence activation of the generator is necessary.
If the system is set to operate as a three-phase system, this value is to be related to the average phase/phase voltage.
If, conversely, the system is a single-phase system, this value is set as necessary to match the phase 1 voltage between phase and neutral. The setting range permits operation also with systems fitted with voltage/100/V transformer for voltages up to 10kV.

P09	**Voltage threshold for determination of "MAXIMUM MAINS VOLTAGE" (MaxV)**	Factory-set value: **480 V**	Programmed value:

Setting limits (Min.-Max.) **0 – 10000 V**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (525)**

It is the voltage above which voltage is too high, hence activation of the generator is necessary.
The same considerations listed for the previous parameter apply.

P10	**Delay for group cut-in**	Factory-set value: **2 Sec**	Programmed value:

Setting limits (Min.-Max.) **1 – 3600 Sec**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (526)**

It is the delay between the moment in which a condition of group-start-request due to "No Mains" (contact and threshold) has been detected, and the moment in which the automatic start sequence must be commenced.

P11	**Delay for Mains restore**	Factory-set value: **60 Sec**	Programmed value:

Setting limits (Min.-Max.) **1 – 3600 Sec**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (527)**

It is the delay between the moment in which a condition of group-stop-request due to "Mains restore" has been detected and the moment in which the engine automatic stop sequence must be commenced.

P12	**Engine cooling time**	Factory-set value: **60 Sec**	Programmed value:

Setting limits (Min.-Max.) **1 – 3600 Sec**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (528)**

It is the delay time with engine running from the moment in which load has been removed from the group to the moment in which the automatic stop sequence must be commenced.

P13	**Behavior of engine stop command on J1-14**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (529.0)**

0 = **Stop, not energized** = No positive command during Stop command, but available during both starting and when engine is running.
1 = **Stop, energized** = Positive command available only during the duration of the Stop command.

P14	**Behavior of multifunction output 2 on J1-13**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (523.0)**

0 = Positive command for **Fuel Pump**
1 = Remote signal of **Engine Running**.

P15	**Duration of engine stop command (Stop) on J1-14**	Factory-set value: **30 Sec**	Programmed value:

Setting limits (Min.-Max.) **1 – 255 Sec**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (530)**

It is the time the positive output stays in the status fixed by P13 (energized or non-energized) when the Stop command is executed.

P16	**Duration of diesel-engine glow-plug pre-heating on J1-11**		Factory-set value: **1.0 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**0.2 – 25.5 Sec**	It is the time during which positive is available at output from the moment in which the start request is accepted to the moment the first start command reaches J15 (or J12).	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (531)**		
P17	**Maximum number of engine automatic start attempts**		Factory-set value: **3**	Programmed value:
	Setting limits (Min.-Max.)	**1 – 15 Sec**	Total number of command pulses (and pauses) that can be applied to J15 (and J12 in the alternate starting mode) before the engine starts. After the last pulse is applied, if the engine has not started, the engine-not-started condition is managed.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (532)**		
P18	**Maximum duration of engine automatic start pulse**		Factory-set value: **5.0 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**1.0 – 25.5 Sec**	It is the maximum command time of J5 (or J12 in the alternate starting mode) when the automatic start request is active. It is the duration of the pause that is waited for before a new pulse is applied in case the engine has not started.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (533)**		
P19	**Delay for the detection of the engine running-related alarms**		Factory-set value: **10.0 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**1.0 – 25.5 Sec**	It is the delay between the moment the engine starts running and the moment in which monitoring of the alarms requiring that engine is running can begin. It is used to let the measurements "settle" and avoid an untimely cut-in of the alarms.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (534)**		
P20	**Delay for power supply from group due to "Generator present"**		Factory-set value: **4 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 255 Sec**	It is the delay between the moment in which the "Generator" section indicates that the value of parameter G06 has been exceeded (= ready to supply power), to the moment in which load transfer to the group can begin (opening of contacts J2-19 and J2-20 and closing of contacts J2-17 and J2-18).	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (535)**		
P21	**Pause for load exchange between Mains – Generator and Generator – Mains**		Factory-set value: **2.0 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**1.0 – 25.5 Sec**	It is the delay applicable to load reconnection, i.e. the time elapsing from the moment in which the load is disconnected from the Mains or the Generation to the moment in which it can be reconnected to the Generator or the Mains.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (536)**		
P22	**Duration of aural warning**		Factory-set value: **60 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 255 Sec**	It is the duration of the alarm warning command. 0 = Aural warning disabled.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (537)**		
P23	**Hour of weekly test start**		Factory-set value: **0**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 23**	It is the hour shown by the clock for the start of the weekly test.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (539)**		
P24	**Minute of start of the weekly test**		Factory-set value: **0**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 59**	It is the minute shown by the clock for the start of the weekly test.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (540)**		

P25	**Day of the week for performance of the weekly test**		Factory-set value: **0**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 7**	It is the day (1-7) shown by the clock for the start of the test. 0 = No weekly test.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (538)**		
P26	**Duration of weekly test**		Factory-set value: **3 min**	Programmed value:
	Setting limits (Min.-Max.)	**3 – 60 min**	It is the duration of the weekly test cycle.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (541)**		
P27	**"Freezing" of measurements at fault (locking)**		Factory-set value: **1**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 1**	Set to 1 permits the measurement values of both the "Generator" and the "Supervisor" sections to be kept in the frozen condition only in case of a fault that caused the group stop. This helps the subsequent diagnosis of the causes of the fault.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (542.0)**		
P28	**MINIMUM FUEL LEVEL threshold**		Factory-set value: **0 %**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 150 %**	It is the value below which the fuel level measurement causes a request for fuel pump start. It operates only if P14 is programmed to manage the pump on J1-13. 0 = Threshold disabled.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (543)**		
P29	**MAXIMUM FUEL LEVEL threshold**		Factory-set value: **150 %**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 150 %**	It is the value above which the fuel level measurement causes a request for fuel pump stop. It operates only if P14 is programmed to manage the pump on J1-13. 150 = Threshold disabled.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (544)**		
P30	**Delay for cut-in of FUEL OVER fault**		Factory-set value: **0 min**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 60 min**	It is the delay that must elapse between the detection of the FUEL RESERVE condition and the occurrence of the FUEL OVER condition and the related failure is generated. 0 = FUEL OVER condition is never generated.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (545)**		
P31	**Fuel level threshold for FUEL RESERVE condition**		Factory-set value: **0 %**	Programmed value:
	Setting limits (Min.-Max.)	**0 – 100 %**	It is the value below which the fuel level measurement causes the activation of the FUEL RESERVE warning. 0 = Threshold disabled.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (546)**		
P32	**Voltage threshold for detection of "MINIMUM BATTERY VOLTAGE" (MinVbatt)**		Factory-set value: **10.0 V**	Programmed value:
	Setting limits (Min.-Max.)	**0.0 – 50.0 V**	It is the voltage value below which voltage is too low, hence the related alarm is triggered.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (547)**		
P33	**Voltage threshold for detection of "MAXIMUM BATTERY VOLTAGE" (MaxVbatt)**		Factory-set value: **17.0 V**	Programmed value:
	Setting limits (Min.-Max.)	**0.0 – 50.0 V**	It is the voltage value above which voltage is too high, hence the related alarm is triggered.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (548)**		

P34	**Selection of curve of engine temperature analog sensor**	Factory-set value: **0**	Programmed value:
Setting limits (Min.-Max.)	**0 – 3**	It selects a response curve of the engine thermometer connected to J7-38 among the four currently available pre-set curves. See the section that covers the analog sensors.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (518)**		

P35	**Selection of curve of engine lube oil pressure analog sensor**	Factory-set value: **0**	Programmed value:
Setting limits (Min.-Max.)	**0 – 3**	It selects a response curve of the engine lube oil pressure gauge connected to J7-40 among the four currently available pre-set curves. See the section that covers the analog sensors.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (520)**		

P36	**Selection of curve of fuel level analog sensor**	Factory-set value: **0**	Programmed value:
Setting limits (Min.-Max.)	**0 – 4**	It selects a response curve of the fuel level float connected to J7-41 among the five currently available pre-set curves. See the section that covers the analog sensors.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (521)**		

P37	**Selection of curve of engine lube oil temperature analog sensor**	Factory-set value: **0**	Programmed value:
Setting limits (Min.-Max.)	**0 – 3**	It selects a response curve of the engine lube oil thermometer connected to J7-39 among the four currently available pre-set curves. See the section that covers the analog sensors.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (519)**		

P38	**Behavior of multifunction output 1 on J1-12**	Factory-set value: **0**	Programmed value:
Setting limits (Min.-Max.)	**0 – 2**	0 = Remote signal of **Alarm** or **Fault** in progress 1 = Positive command of **Starting 2** in the alternate starting mode 2 = Remote signal of **Group not available** (active in case of both fault and with the selection NOT at automatic)	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (549)**		

P39	**Percent offset of fuel level measurement**	Factory-set value: **0 %**	Programmed value:
Setting limits (Min.-Max.)	**0 – 100 %**	It is the value below which the fuel level measurement is shown to be zero. It is used to compensate for fuel tank irregularities when the float is not at lowest end of travel.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (522)**		

P40	**Maintenance due time interval**	Factory-set value: **9999 h**	Programmed value:
Setting limits (Min.-Max.)	**0 – 9999 h**	It is the time that must elapse before a request for maintenance is generated. Once programmed here, the time decreases and shows on the related page on the display. When the time reaches zero, it remains at zero and generates the request for maintenance. After maintenance action, the new time must be entered manually.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (256)**		

P41	**Behavior of multifunction input on J1-8**	Factory-set value: **0**	Programmed value:
Setting limits (Min.-Max.)	**0 – 2**	0 = Negative input of **LED Test** 1 = Negative input for **"SPRINKLER"** mode command 2 = Negative input for **"Low rpm"** mode command.	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (550)**		

P42	**Delay for safety stop cutting-in**	Factory-set value: **180 s**	Programmed value:
Setting limits (Min.-Max.)	**30 – 255 Sec**	It is the time that elapses (**with the engine stopped**) between the moment in which the rpm regulator has been supplied with power, or the moment of the last starting attempt, to the moment in which an automatic safety stop cycle is triggered. The availability of this timer ensures, among other things, that the alternator-battery charger does not remain constantly energized, that the electrically-operated fuel selector returns to the rest condition, etc. . WARNING: This timer is disabled in the "Low rpm" mode (P41=2).	
Modifiable in "Recipe" mode:	**YES**		
Modifiable from remote via MODBUS:	**YES (552)**		

P43	**Detection of engine running condition from alternator energization**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (551.0)**

When set to 1 permits the energization condition of the alternator-battery charger to be used as an additional engine running sensor.

P44	**Delay of group starting cut-in in EJP1 mode**	Factory-set value: **0 Sec**	Programmed value:

Setting limits (Min.-Max.) **0 – 9999 Sec**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (553)**

It is the time that elapses from the moment in which the request for group starting in EJP1 mode (from negative command on J1-7, test from external position) is detected, to the moment in which the automatic starting sequence must commence.

P45	**Enabling of inhibition from engine running on Available Fault 1 (J10-71) line**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (554.0)**

0 = Instantaneous fault with command on J10-71
1 = Line subject to P19 (inhibition time with engine running).

P46	**Enabling of inhibition from engine running on Available Fault 2 (J10-72) line**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (555.0)**

0 = Instantaneous fault with command on J10-72
1 = Line subject to P19 (inhibition time with engine running).

P47	**Enabling of inhibition from engine running on Available Alarm 1 (J10-73) line**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (556.0)**

0 = Instantaneous alarm with command on J10-73
1 = Line subject to P19 (inhibition time with engine running).

P48	**Enabling of inhibition from engine running Available Alarm 2 (J10-74) line**	Factory-set value: **0**	Programmed value:

Setting limits (Min.-Max.) **0 – 1**
Modifiable in "Recipe" mode: **YES**
Modifiable from remote via MODBUS: **YES (557.0)**

0 = Instantaneous alarm with command on J10-74
1 = Line subject to P19 (inhibition time with engine running).

P49	**Speed of RS485 serial port of "Supervisor" section**	Factory-set value: **4**	Programmed value:

Setting limits (Min.-Max.) **0 – 4**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **NO**

It selects the speed of the serial port of the "Supervisor" section among the five available speeds:
0 = 9600 bps
1 = 19200 bps
2 = 38400 bps
3 = 57600 bps
4 = 115200 bps.
In order to avoid problems, this parameter is NOT modifiable through remote control.

P50	**Node number in MODBUS network of the "Supervisor" section**	Factory-set value: **2**	Programmed value:

Setting limits (Min.-Max.) **1 – 255**
Modifiable in "Recipe" mode: **NO**
Modifiable from remote via MODBUS: **NO**

It is the address assigned to the "Supervisor" section in the MODBUS instrument network, if any. The section is connected to the network as if it were a separate device. It is, therefore, required that the MODBUS number is UNIQUE throughout the network (i.e. different from the number of the "Generator" section of the same AGSC.10). To avoid problems, the parameter CANNOT be modified through remote control.

P51	**Value of full scale voltage of mains phase/neutral (VT)**		Factory-set value: **231 V**	Programmed value:
	Setting limits (Min.-Max.)	**50 – 4615 V**	It is the nominal full scale value of phase/neutral voltage of each phase. The equivalent phase/phase value is this value multiplied by 1.732. The setting range is such as to permit the use of voltage/100V transformers for the measurement of up to 10 kV, phase-to-phase. **The AGSC-10 version permitting the use of the voltage/100V transformer is a special version that must be specified in the order.**	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (517)**		
P52	**Average of the electrical measurements of "Supervisor" section**		Factory-set value: **3**	Programmed value:
	Setting limits (Min.-Max.)	**1 -15**	It is used to "stabilize" the electrical measurement values. When set to 1, the measurements are not averaged out. The highest the value, the slowest the measurement.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (515)**		
P53	**Filter on engine instrument measurements**		Factory-set value: **20**	Programmed value:
	Setting limits (Min.-Max.)	**1 – 40**	It is used to slow down and average out the measurement values from the engine sensors (connector J7), and should usually generate measurements that are slow versus time. When set to 1, the measurements are instantaneous with respect to the signals fed by the sensors. The highest the value, the slowest the measurement.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (516)**		
P54	**Selection of the THREE-PHASE or SINGLE-PHASE mode of "Supervisor" section**		Factory-set value: **0**	Programmed value:
	Setting limits (Min.-Max.)	**0 -1**	It is used to select the mode of operation of the "Supervisor" section of AGSC-10. 0 = THREE-PHASE mode of operation 1 = SINGLE-PHASE mode of operation It must contain the same value programmed in G22 of the "Generator" section	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (558.0)**		
P55	**Delay for engine alarm inhibition in "LOW RPM" mode**		Factory-set value: **5.0 Sec**	Programmed value:
	Setting limits (Min.-Max.)	**0.0 – 25.5 Sec**	It is active only when P41=2 (multifunction input J1-8 programmed for "Low rpm" mode). It is the time between the moment at which the "Low rpm" command is removed and the moment at which there is return to the "standard" mode of monitoring the fault conditions. In particular, it will begin the monitoring of the MinVgen, MinFen thresholds, which are covered when the "Low rpm" command is available.	
	Modifiable in "Recipe" mode:	**YES**		
	Modifiable from remote via MODBUS:	**YES (559)**		

7.4 "Supervisor" section – Fixed parameters

Pressing time of the SET button to access parameter programming	**5 s**
Pressing time of the > button to begin fast increase of values	**3 s**
Pressing and holding time of the RESET button	**2.5 s**
Delay for detection of untimely engine stop	**3 s**
Delay for detection of oil low pressure condition from contact or optional engine card	**4 s**
Delay for detection of engine high temperature condition from contact or optional engine card	**2 s**
Delay for detection of overspeed condition from contact or optional engine card	**0.1 s**
Delay for detection of thermal protection from contact	**2 s**
Delay for detection of fuel reserve condition from contact or level sensor	**2 s**
Delay for detection of fuel pump stop condition from contact or level sensor	**2 s**
Delay for detection of fuel pump start condition from contact or level sensor	**2 s**
Delay for detection of fuel tank too full condition from contact	**2 s**
Delay for detection of emergency stop condition from contact	**0.1 s**
Delay for detection of low water level condition from contact or engine card	**2 s**
Delay for detection of automatic start condition in "SCR"(EJP2) mode from contact	**2 s**
Delay for detection of no cutting-in of microswitch of Mains Contactor from contact	**10 s**
Delay for detection of no cutting-in of microswitch of Generator Contactor from contact	**10 s**
Delay for detection of automatic start inhibition from contact	**2 s**
Delay for detection of automatic start condition in Test (EJP1) mode from contact	**2 s**

Delay for detection of Test Led (or Sprinkler or Low rpm) condition from contact	**2 s**
Delay for detection of available alarm 1 condition from contact	**2 s**
Delay for detection of available alarm 2 condition from contact	**2 s**
Delay for detection of lock 1 available condition from contact	**2 s**
Delay for detection of lock 2 available condition from contact	**2 s**
Delay for detection of minimum battery voltage condition	**30 s**
Delay for detection of maximum battery voltage condition	**30 s**

8 FUNCTIONAL DESCRIPTION

8.1 Overview

The operating modes of the AGSC-10 are four:

1. **Locked** (OFF), indicated by Led 

,
2. **Manual** (MAN), indicated by Led 

,
3. **Automatic** (AUT), indicated by Led 

,
4. **Test** (TEST), 

.

In order to be able to change mode, it is necessary that the contact provided for the external key is closed, hence that Led 26  is off.
There are behaviors that are common to all the operating modes, with small differences.
The behaviors described hereafter are among the most important ones:

- The control of the alarms (that generate a warning only) and of the faults (that cause the engine to stop) is always active in all modes.
  The only exception is the "Locked" mode, in which no aural warning is emitted.
  The measurements in each section are carried out irrespective of the operating mode
  The applicable operating parameter allows the measurements to be set to "frozen" in case of fault. This is not possible in the "Locked" mode.
- Every engine stop attempt involves a stop CYCLE that has the duration set through the applicable operating parameter.
  Also a short push on the "STOP" button in manual mode causes the entire cycle to be executed.
- Every movement of the selector through the "Locked" position causes the performance of an engine stop cycle.
- The command on the automatic start inhibition line J1-6 causes not only the inhibition of the engine automatic start, but also the commencement of the stop cycle if the operating mode is "Automatic" or "Test."
- The detection of the Engine running condition (Led 5 

on) is always "Memorized", i.e. it is considered valid as soon as it is sensed and until the AGSC-10 carries out the stop sequence. The accidental power off of the engine will cause the management of the related fault.
- The detection of the engine running condition instantaneously inhibits the starting command should the command be active under any condition.
- The performance of the engine stop cycle removes the Engine running condition from the memory.
- The engine stop cycle can always be interrupted in any operating mode by pressing and holding the 

button. This also causes the erasure of the alarms the causes of which were removed.

8.2 Operating mode "Locked" (OFF)

This is the operating mode to which the AGSC-10 sets at power on.
An engine safety stop cycle begins every time such a mode is entered.
The execution of the stop cycle is ALWAYS indicated, in any operating mode, by the illumination of the Led (18) that stays on during the entire performance of the cycle, and by the message (in the applicable language) that shows on the Operating Mode page of the "Supervisor" display:

The Operating Mode page comes in view automatically unless there is an alarm or a fault that causes the visualization of the alarm condition page to take priority. The following will be shown at the end of the engine stop cycle, when the system is in rest conditions.

The buttons for manual starting of the engine and load transfer are disabled, thus the engine cannot be started in any manner.
The alarm and fault commands are always active, and are managed normally, except for the aural warning, which is not emitted.
No tests are to be performed in the "locked" mode, i.e. neither the weekly test nor the test from command on line J1-7.
This is the only position which permits access to the direct programming of the clock-calendar (see "*Setting of Clock-Calendar from Keyboard*"), and to the visualization of the *History File"*.

8.2.1 History File

The system records the **latest 16 events** that occur in the various operating modes, except the "locked" mode.

The monitored events have five different causes, which are specified in the following table:

CAUSE NUMBER	DESCRIPTION	TYPE EVENT / CODE
01	Mains voltage	0 = Voltage drop-off 1 = Voltage restored
02	Engine status (memorized)	0 = Stopped 1 = Running
03	Load transfer	0 = Released from group 1 = Restored to group
04	Engine stop cycle	0 = Over 1 = In progress
05	Fault occurred	| 01 | Generator control fault | 02 | Low oil pressure | 03 | High engine temperature | 06 | No load closing on generator | 08 | Overspeed from contact | 09 | Thermal protection | 10 | Emergency stop | 12 | No start | 13 | Fuel exhaustion | 15 | Unexpected engine stop | 16 | 2nd level overload | 17 | Overspeed due to frequency | 18 | Energy reversal | 19 | Voltage asymmetry | 20 | Generator undervoltage | 21 | Generator overvoltage | 22 | Generator underfrequency | 23 | Generator overfrequency | 27 | Spare 1 | 28 | Spare 2 | 32 | Maximum current release

Each recorded data set contains:

- Day
- Month
- Year
- Hour
- Minute
- Seconds
- Switch status (MAN, AUTO or TEST)
- Event cause
- Type or code of event

When detected, all events are stored in the temporary memory of the AGSC-10 so that they can be canceled by removing power.
However, they can be held stored in the permanent memory.

In fact, when you select the visualization of the history file, or, in general, if you press the 

button briefly (except when you are in the clock setting mode) the events are automatically copied to the permanent memory.
Keep this characteristic in mind if you want to bring up to date the event status before you switch the AGSC-10 off.

Only the events recorded before the last pressure of the 

button only will be memorized.

The history file can be viewed and memorized also in remote mode via Modbus. See the "Advanced" section, serial communications.

To view the history file locally, select the "Locked" mode, choose a display page of the "Supervisor" section different from the clock page, and press the SET button briefly.

The visualization page is available in English only, and is as shown here below:

```
<-Old        Last->

     History
```

If you hold the SET button pressed while the external key for selector locking is in the unlocked position (Led of locking from external key 26 off), you get access to the "Setting of operating parameters from keyboard" mode.

If you press the > button (Last) of the "Supervisor" section, you get access to the LAST recorded event, which has number 00.

If, conversely, you press the < ENTER button (Old), you get access to the oldest event available. Currently, this is the sixteenth event before the last one, which is labeled -15.
In both cases, you get:

	BUTTON PRESSED = Event chronology	BUTTON RELEASED = Event info
>	`00  14.09.09` `11:32,03`	`00  M  C  E` `AUT 03 01`
	Line 1: Event number – Day – Month – Year **Line 2: Hours– Minutes – Seconds**	**Line 1: Event Number – Titles of Mode/Cause/Event** **Line 2: Mode – Cause – Event**
	In the example given the last event occurred at 11:32,03 on September 14, 2009, while the mode selector was at "AUT" due to transfer of the load (03) to the group (01).	

	BUTTON PRESSED = Event chronology	BUTTON RELEASED = Event info
< ENTER	`-15  10.09.09` `12:00,01`	`-15  M  C  E` `AUT 01 00`
	Line 1: Event number – Day – Month – Year **Line 2: Hours– Minutes - Seconds**	**Line 1: Event Number – Titles of Mode/Cause/Event** **Line 2: Mode – Cause – Event**
	In the example given the last event occurred at 12:00,01 on September 10, 2009, while the mode selector was at "AUT" due to lack of power supply (01) from the mains (00).	

In both cases, it is possible to scroll among records time-wise, from the oldest to the latest, and vice-versa.

To move forward in time, use the > button, to move backward, use the < ENTER button.

If the recorded events are less than 16, the still "empty" positions will be filled as follows: ZEROS will show in lieu of the time values, and dashes will show in lieu of the status values:

BUTTON PRESSED = Event chronology	BUTTON RELEASED = Event info
`-07  00.00.00` `00:00,00`	`-07  M  C  E` `---  --  --`

The "normal" mode to exit from the history file visualization mode consists of pressing the 

button briefly.

The "alternative" mode applicable consists of exiting the "Locked" operating mode.

	The history file stored in the permanent memory is set to zero when you use parameter P01- Reset of factory-set values.

8.3 Operating mode "Manual" (MAN)

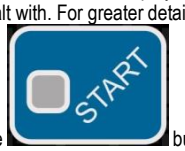
8.3.1 Commands of "Manual" mode

This mode is the mode in which you can operate by use of the buttons on the control panel.
The access from the rest condition causes the following page to be visualized on the "Supervisor" display, in the Operating Mode:

No automatic start operation is allowed. This applies also in case there are indications such as those of weekly test in progress or deriving from a command on line Test J1-7.

The 

button remains always active. Every brief push on the button causes the performance of a stop cycle, even if the engine seems already stopped. Holding the button pressed does not lengthen the stop cycle as the duration of the cycle is set through the special operating parameter. The only result that is obtained if the button is still pressed when the stop cycle is completed is the beginning of a new stop cycle. The manner in which the stop cycle operates has been described when the "Locked" mode has been dealt with. For greater detail, refer to the section explaining engine starting and stopping.

The 

button is active only when the engine is not running and provided there are no faults.
When you press and hold the button before you activate the start command you enable the other signals necessary to prepare the engine for starting (power supply to the rpm regulator, alternator energization, pre-heating, etc.), with the prescribed timing. Some of such phases are shown on the operating mode page of the "Supervisor" display. After the preparation is completed, the actual starting command will be input, which lasts as long as the button is held pressed, i.e. until start-up is achieved.
If the engine fails to start, you should perform a stop cycle to prevent the alternator-battery charger, the electrically-operated fuel selector valve, the rpm regulator, etc. from remaining energized. However, should you forget to command the stop cycle, the available safety timer will operate and begin an automatic stop cycle.
For greater detail, refer to the section describing engine starting and stopping.

The 

becomes active when the load is switched over from the Mains to the Generator, only when the engine is running and the "Generator Live" (Led 4 

on) condition has been detected. If the "Generator Live" condition becomes no longer valid after the load has been switched over to the Generator, the load still remains connected to the generator to allow tests under load to be performed (a qualified operator must be present to carry out and monitor the manual phases).
If the "Generator Live" condition is not valid, the button can be used only to switch the load over from Generator to Mains.
Switching over is not instantaneous but is controlled through a programmable an interval between the disconnection and the re-connection of the load to prevent dangerous opposite phase conditions.

8.3.1 Alarms and faults in the "Manual" mode

The occurrence of alarms and faults is indicated throughout the emission of an aural warning when the applicable operating parameter specifies the requirement.
Management is the standard one described in the special section.
The stop due to a fault begins the applicable automatic stop sequence also in "Manual" mode.
The reset is also described in the related section.

8.4 "Automatic" (AUTO) Operating Mode

This is the operating mode in which the AGSC-10 operates usually.

The normal operation of the system in this mode consists of the monitoring of the conditions that cause the "No mains" condition (Undervoltage, Overvoltage) in order to start the automatic engine starting sequence and the subsequent transfer of the load from the Mains to the Generator, then of looking for the conditions that indicate a "Mains present" condition and proceed to transfer the load back to the Mains and to stop the engine in the correct sequence. All the above is accomplished by taking into account that alarms and faults may occur, and that there may be requests of engine starting – stopping due to tests or emergencies that are fed from a local or remote control.

The access from the rest condition (no fault warnings or requests) causes the following page to be visualized on the "Supervisor" display, in Operating Mode:

8.4.1 Start / Stop conditions in "Automatic" mode

There are several conditions that can be combined to modify the system behavior as necessary for it to satisfy all requests.

The following table summarizes the local conditions according to which the group starts or stops in lack of faults, and the effects of such conditions in regard to the engine and load statuses.
Other conditions that can be set from a remote workstation are available; they will be described at a later stage, in the "Advanced" functions section.
"YES" indicates that the command or the effect is available, "NO" indicates that the command or effect is not available, and "x" indicates that the availability or lack of the command is irrelevant.

	LOCAL COMMANDS						EFFECTS	
	Start inhibit (J1-6)	Mode SCR or EJP2 (J1-3)	Test or EJP1 (J1- 7)	Cut-in of weekly test	Mains present (J1-9)	VMains in range	Engine	Load on Generator
1	YES	X	x	x	x	x	STOPPED	NO
2	NO	YES	x	x	x	x	RUNNING	YES
3	x	NO	NO	NO	YES	x	STOPPED	NO
4	x	NO	NO	NO	x	YES	STOPPED	NO
5	NO	NO	NO	NO	NO	NO	RUNNING	YES
6	NO	NO	YES	x	NO	NO	RUNNING	YES
7	NO	NO	YES	x	x	YES	RUNNING	NO
8	NO	NO	YES	x	YES	x	RUNNING	NO
9	NO	NO	x	YES	NO	NO	RUNNING	YES
10	NO	NO	x	YES	x	YES	RUNNING	NO
11	NO	NO	x	YES	YES	x	RUNNING	NO

1. **Presence of command on line "Automatic starting inhibited" J1-6.**
   In addition to prevent engine starting, it is also able to stop the group if it was started in automatic mode even for test only.
   The command is active after a fixed time of 2 seconds.
   This command overrides all the other commands.

   The presence of the inhibit command is indicated by the flashing of Led (1) 

   .
   Any request for engine starting that should be received will be indicated (if specified), but will result in no other action.

2. **Presence of command on line "SCR mode" J1-3.**
   It forces the complete starting of the group, including load transfer to the generator.
   The command is active after a fixed time of 2 seconds.
   This command overrides all the other starting commands.

   The presence of the inhibit command is indicated by the flashing of Led (15) 

   .

3. **Presence of command on "Mains present" J1-9 with no other starting commands available.**

   The presence of the mains present command is indicated by the Led (1) 

   coming on with steady light.
   The condition of "Mains present" after the occurrence of a "No mains" condition begins the stop sequence after the time of "Restore mains" established by use of parameter **P11** elapses. The "Mains present" condition must persist during the said time. The elapsing of the time is indicated by the following text message coming in view on the "Supervisor" display, at the "Operating mode" page:

   After the time set through P11 has elapsed, the load is switched over to the mains, and the stop sequence begins with engine cooling.

4. **Presence of condition "Mains Voltage in Range' with no other starting commands available.**
   Same behavior as per point 3.

5. **Lack of both "Mains present" conditions' (= "No mains") with no other starting commands available.**
   This is the normal condition for group cut-in.
   The starting sequence begins only after the time set through parameter **P10** has elapsed**.** The "No mains" condition must persist during the said time. The elapsing of the time is indicated by the following text message coming in view on the "Supervisor" display, at the "Operating mode" page.

   After the time set through P10 has elapsed, the engine starting sequence begins.

6. **Presence of command on line "Test" J1-7 in case of no mains.**
   The command becomes active after the time set through parameter **P44** has elapsed. The group outputs no signals as long as the time is still running.

   When the time has elapsed, the presence of the "Test" command is indicated by the flashing of Led (16) 

   .
   The lack of both "No mains" conditions during the test causes the transfer of the load to the generator.

7. & 8. Presence of command on line "Test" J1-7 with mains present.
The engine starts in the modes and with the delay set forth in point 6, but the presence of one of the "Mains present" conditions prevents the load transfer to the generator.

8., 9 & 10. Availability of command 'Weekly test'.
Except for the delay applicable to starting, which is missing in this case, the starting mode and signals are the same as in points 6, 7 and 8.

	The engine start - stop modes and the modes in which the load is transferred between the mains and the generator and vice-versa are described in the applicable sections.

8.4.2 Alternative behaviors in "Automatic" mode – SPRINKLER mode

The AGSC-10 can be utilized for special purposes, for instance as a generator for the supply of a fire-fighting motor pump.
In this case the generator must never stop in case of fault, but must continue to supply the motor pump for as long as necessary.

The "SPRINKLER" mode was thus designed, which can be activated by programming the **programmable multifunction line** J1-8 to support this mode.
It is necessary to set **P41=1**.

If the command is not supplied to line J1-8, the behavior of the AGSC-10 is the usual one, i.e. the one described thus far.

When the command is present on line J1-8, the device behavior changes as follows:

- The possibility of carrying out a test from the Test line or from the weekly test is canceled
- The group start and stop occur only from the command lines "Mains present" or "SCR mode", envisaging the connection of the lines to pressure switches so that start and stop from the mains voltage present condition are prevented
- The faults that should occur change into alarms, i.e. they do not stop the engine.
  An exception to this is the "Emergency stop" command fed from J10-69.

If a fault different from "Emergency stop" occurs when the "SCR" or "Mains present" commands are still active, you can stop the engine by carrying out the following operations:

- Cause the Emergency stop cut-in, or
- Move the selector to "Manual" (Led 14 

on) and press the 

button, or
- Apply the inhibit command on line J1-6, or
- Remove the command on line J1-8 (exit from "SPRINKLER" mode).

8.4.3 Alternative behavior in "Automatic" mode – Group exchange

AGSC-10 can provide a "Group unavailable" signal to enable an alternative group.

When you set **P38 = 2,** multifunction output 1 on J1-12 gives the related signal.
The "Group unavailable" function consists of activating the output ONLY when:

- There is a FAULT (but not an alarm), or
- The operating mode selector is NOT at "Automatic."

8.5 Operating mode "Test" (TEST)

It is the automatic mode that permits the engine to be checked for correct operation from the keyboard.

For this mode to be active, it is necessary that the "Automatic start inhibit" command is not present on J1-6.

The engine is started in automatic mode as soon as the "Test" mode is entered (Led 16 

on with steady light).

During the test, no load change-over from the Mains to the Group and vice-versa is allowed, unless:

- A command is fed on the "SCR mode" line by forcing the load onto the generator, and/or
- The condition of No mains / Mains present (restore to mains) is sensed.

The inhibit command on line J1-6 is in any case able to stop the test and turn off the engine even if the selector remains at "Test."

8.6 Engine start and stop

Several parameters must be set to optimize start and stop of the diesel engine under every condition.
Some of the parameters are general, and are applicable to both the automatic and manual sequences.
The other parameters are used exclusively for the automatic sequence.

8.6.1 Parameters common to manual and automatic start

It is essential that you set the parameters that define the "Engine running" condition with the utmost care in order not to damage the starting devices and, more in general, to assure a correct operation of the engine-generator group.
The three parameters that can determine the condition are concurrent, hence it is sufficient that only one of them satisfies the set requirement to consider the engine running:

- G04 = Threshold above which the engine is considered started from generator frequency
- G06 = Threshold above which the engine is considered started from voltage (generator ready to supply power)
- P43 = If at 1, the engine is considered started at the time the alternator-battery charger becomes energized.

You must then set the parameters that modify the starting and heating commands, which are:

- P13 = Behavior of stop command on J1-14 ("Energized" or "Not energized"')
- P16 = Time for glow plug pre-heating
- P41 = When set at 2 permits the multifunction input line on J1-8 to be used to perform the "Low rpm" mode. This means that when the command is present on the line the engine can run at low rpm to heat up, without any cutting-in of the generator protections that stop the engine. When the command is removed from J1-8 the protections return to be active after the time period set in P55.

8.6.2 Parameters related to automatic start only

- P18 = Duration of the command to the starter motor; it is the same as the interval between two subsequent commands
- P17 = Maximum number of start attempts to preserve the battery (batteries)
- P38 = When set at 1, it determines the alternate start attempts between the "standard" start line J1-15 and the secondary line J1-12 (double battery).

8.6.3 Parameters common to stop (the same in all modes)

Engine stop occurs essentially according to two different procedures:
- With cooling cycle
- Without cooling cycle.

This difference exists because in a normal operating cycle, i.e. start – supply – stop, a running time at idle no-load is required after the disconnection of the generator and before the stop command is fed. But, should significant malfunctions occur, such time, called the cooling time, cannot be waited for because the engine must be stopped immediately.
The parameters that affect the stop cycle are:

- P12 = Duration of engine "Cooling" after disconnection of the load
- P15 = Duration of the engine stop command on J1-14
- P42 = Delay for safety stop cut-in.

8.6.4 During the starting sequence

In "Manual" mode, pressing of the 

button does not only give the actual start command, but always triggers the correct signal sequence, according to the times and manners defined during programming. The sequence stops automatically when the engine starts, even if the button is not released. If the engine fails to start the button should be held pressed until positive starting is achieved.
Independent of the mode (Manual or Automatic) in which you begin to start the engine, before the start command is fed, there are activated the necessary commands related to the power supply to the rpm regulator, to the electrically-operated fuel valve and to the energization of the alternator – battery charger.
The glow plug pre-heating command can also be fed, which is indicated by the following text message on the "Supervisor" display, at the "Operating mode" page.

At the end, the availability of the start command is indicated by both the coming on of Led 20 near the 

button and the text message:

	In "Manual" mode parameter P38 (alternate starting) has no effect. Every time the START button is pressed, the starting command is fed only to the "standard" output on J1- 15.

Every time a starting pulse is fed, the safety stop timer is reset at the value given to P42.
In the "Manual" mode, every time you release the button when the engine has not started yet, the starting in progress indication is removed.
Conversely, the indication remains in view in the "Automatic" and "Test" modes as long as the alarm sequence is in progress because it indicates the starting cycle and not an individual start attempt. The start attempts can be as many as specified in P17.

If the engine starts, (Led 5 RUN on) by satisfying the requirements applicable to G04, or G06, or P43, the starting command is deactivated immediately, and the "Engine running" condition is memorized. .
The successfully completed start attempt is added to the total number of performed attempts; the result is shown on page 4 of the "Supervisor" display.
Engine starting in automatic mode does not provide the count of the number of failed starting attempts.

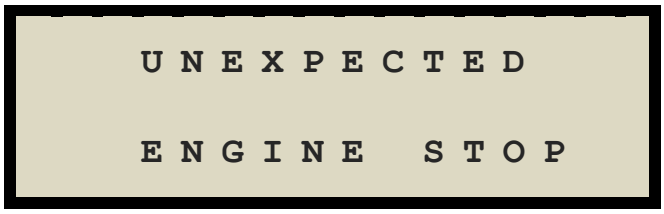
Conversely, if the automatic starting attempts run out without achieving engine starting, the starting failure is managed with the related stop cycle, and the "Alarm condition" page will show the following text message:

In "Manual" mode it is possible that the engine does not start after the starting attempt.
However, the start operation can be repeated as many times as necessary with no fault being detected since the count of the starting attempts is not active in the "Manual" mode.

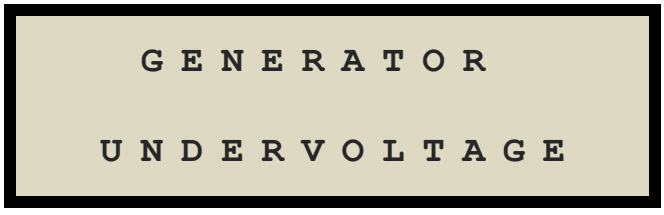
If the engine remains stopped, and you have forgotten to press the STOP button to set the commands of the supply circuit to the rest condition, the safety stop time will provide for such an operation after the time set in P42 has elapsed since the latest starting attempt.

8.6.5 With the engine running …

Should the engine stop after it has begun running, the "Unexpected engine stop" fault is detected, and a stop cycle begins immediately.
On the "Alarm conditions" page of the display the following text message comes in view:



When the engine is running, and the condition "Generator present" is satisfied (condition G06), the safety stop timer is held at the value set in P42.
If the "Generator present" condition stops to exist during a period equal to the time for safety stop set in P42, **a safety stop cycle** (with cooling cycle) begins, which is managed exactly as the "Generator undervoltage" fault, the text message related to which is shown on the "Alarm conditions" page of the "Supervisor" section:



It is possible to distinguish between the cut-in of the safety stop timer and the normal "Generator undervoltage" fault (MinVgen) because, in the latter case, there is no indication on the "Threshold condition monitor" page of the "Generator" display.

8.6.6 During the stop sequence…

The following text message comes in view on the "Operating Mode" page of the "Supervisor" display while engine cooling time is running:

The "Cooling" time can be interrupted by briefly pressing the 

button.
The actual stop cycle begins immediately afterwards.

If the engine stops long before the time has expired, it is possible to obtain an earlier end of the stop command by pressing and holding the 

button.

8.7 Scheduled weekly test

You can select an automatic weekly test of group start and stop.

It can be performed ONLY in "Automatic" mode (Led 15 

on).

You must set the following parameters:

- P25 = Day on which the test is executed (1 – 7, by convention 1 = Monday)
- P23 = Hour at which the test must start (0 – 23)
- P24 = Minute at which the test must start (0 - 59)
- P26 = Duration of the test (minimum 3 minutes – maximum 60 minutes).

After the parameters have been set, and the selected time has been attained, the group will start (Led 16 

flashing), and will remain in operation during the time specified in P26, without transferring the load to the generator.
If, during the test, the "No mains condition" of the "SCR mode" command is sensed, the load is transferred to the generator, and the group is fully active.
The test can be shortened or interrupted by feeding the inhibit command on line J1-6 during all the remaining time (based on P26), i.e. until the Led stops flashing.

8.8 Management of load transfer

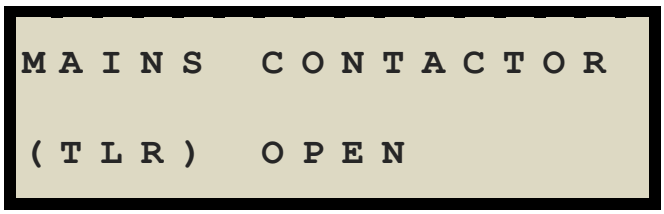
The transfer of the load to the generator involves several signals and parameters.
The commands for the contactor are from potential-free relay contacts:

- J2-17 e J2-18 = Command for closing on Generator, usually open. When it is closed (relay energized), the load is on the Generator
- J2-19 e J2-20 = Command for closing on Mains, usually closed. When it is closed (relay not energized), the load is on the Mains.

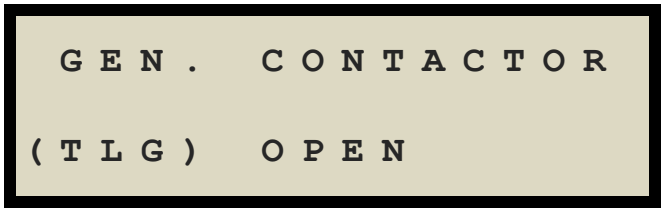
In case of lack of power supply to the AGSC-10, the system thus permits the load to stay closed on the Mains.
In addition to the command signals there are two monitoring signals coming from the status of the microswitches that are fitted to almost all contactors. Their purpose is to make sure that the operation has been actually completed. They are:

- J1 - 4 = Negative command from microswitch of "Mains" position
- J1 - 5 = Negative command from microswitch of "Generators" position.

If these commands are not used, they must be closed on negative to prevent the alarm of failed closing of contactor on Mains, and/or the alarm of lack of contactor closure on generator, which cut in after a fixed time of 10 seconds has elapsed since the end of the operation.
The text messages that come in view on the "Alarm conditions" page of the "Supervisor" section in this case are:



which is a mere alarm, while



is a fault that triggers an engine stop cycle with engine cooling.

8.8.1 Parameters concerning load transfer – manual and automatic

- G06 = Threshold above which the engine is considered started from voltage (generator ready to supply power).
  The selection of the correct value is essential.
  When the threshold is exceeded, the consents to transfer are activated. The consents are both the instantaneous ones ("Manual" mode) and the delayed ones ("Automatic" mode).
- P21 = It is the delay between change from Mains to Generator and from Generator to Mains.
  This is the time period during which both commands to the exchange contactor are absent to prevent dangerous opposite-phase conditions.
  The delay is waited for also when the operation is carried out in "Manual," as described in the applicable section.

8.8.2 Parameters concerning load transfer – automatic only

- P20 = Delay concerning power supply from the group when there exists the "Generator present" G06 condition.
  After the condition is sensed, it is essential that it remains valid throughout the time period set in P20 before transfer from Mains to Generator is commanded.
- P11 = Delay concerning "Restore to mains."
  After the condition is detected, it is essential that it remains valid throughout the time period set in P11 before transfer from Mains to Generator and engine shut-down are commanded.

8.8.3 During transfer from Mains to Generator …

The elapsing of the time set in P21 is indicated by the following text message coming in view at the "Operating mode" page of the "Supervisor" display:

8.8.4 During transfer from Generator to Mains …

The elapsing of the time set in P21 is indicated by the following text message coming in view at the "Operating mode" page of the "Supervisor" display:

8.9 Analog sensors of engine

The AGSC-10 is fitted with four configurable inputs destined for the reading of the engine sensors data, i.e.:

- Engine thermometer (cooling water, usually), J7-38
- Engine oil thermometer, J7-39
- Engine oil pressure gauge, J7-40
- Fuel float (tank level), J7-41.

8.9.1 Configuration of engine sensors

The AGSC-10 includes the characteristic curves of the sensors that are mostly widely used at present. The curves are pre-configured in the device memory.
By use of the parameter related to the selection of the curve type, you can obtain four different behaviors of each sensor (five in the case of the fuel float).
Because the response is not linear in most cases, each curve has been plotted using at least 100 points.

		Pos.	Type	Range T	Range R	Notes
P34	Engine Temperature (J7-38)	0	VDO	40°- 120°C	278 – 23 Ω	
		1	Veglia Borletti	70° - 120°C	340 – 79 Ω	
		2	DATCON	60° - 120°C	350 – 49 Ω	
		3	0-10V **(*)**	0° - 120°C	-	**(*) WITH OPTIONAL CARD OPM-S-I2C-IN8-CV4 ONLY** Indication beginning at 40°C

		Pos.	Type	Range T	Range R	Notes
P37	Engine Lube Oil Temp. (J7-39)	0	VDO	50°- 150°C	290 – 18.5 Ω	
		1	- empty -	-		
		2	- empty -	-		
		3	0-10V **(*)**	0° - 150°C	-	**(*) WITH OPTIONAL CARD OPM-S-I2C-IN8-CV4 ONLY** Indication beginning at 50°C

		Pos.	Type	Range P	Range R	Notes
P35	Engine Lube Oil Press. (J7-40)	0	VDO	0 – 10 bar	9.5 –172 Ω	
		1	Veglia Borletti	0 – 8 bar	222 – 11.5 Ω	
		2	DATCON	0 – 10 bar	240 – 40.5 Ω	
		3	0-10V **(*)**	0 – 10 bar	-	**(*) WITH OPTIONAL CARD OPM-S-I2C-IN8-CV4 ONLY** Indication beginning at 0.5 bar

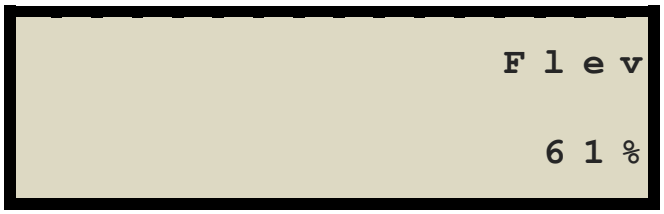
		Pos.	Type	Range %	Range R	Notes
P36	Fuel Level (J7-41)	0	VDO	0 – 100%	12 –181 Ω	
		1	Veglia Borletti	0 – 100%	304 – 0 Ω	
		2	DATCON	0 – 100%	240 – 37 Ω	
		3	Custom 1 (lin.)	0 – 100%	20 – 200 Ω	
		4	Custom 2 (lin.)	0 – 100%	82 – 3 Ω	

Response speed and measurement stability are related to the value of an individual parameter, namely **P53 (Filter of analog sensor measurements)**, which contains a value between 1 and 40.
The higher the said value, the slower and stabler the measurements. As these signals are slow versus time, it is recommended that a suitable value is set to prevent swings or unwanted threshold activation (e.g. concerning fuel level during fuel top up).

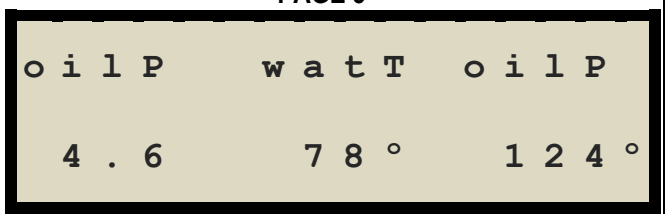
8.9.2 Visualization of engine sensor measurements

The measurements are visible as text messages on pages 2 and 3 of the "Supervisor" display and are available also from remote control (see advanced operation).

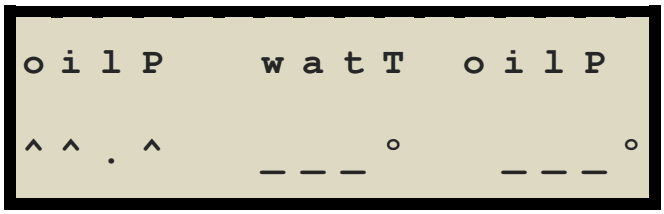
PAGE 2



PAGE 3



On page 3 you can see also "Out of measurement range" indications; note that the fuel level indication always remains in the 0 – 100% range.



In this example, symbols ^^ indicate that the measurement exceeds the upper limit.

Symbols ---- indicate that the measurement is below the lower limit.

	If you use the optional card **OPM-S-J193** the values fed from the ECU can replace some measurements from the analog lines of the sensors. See the applicable section of the manual.

8.10 Fuel management

AGSC-10 has the monitoring and command devices needed to manage fuel that are described hereafter.

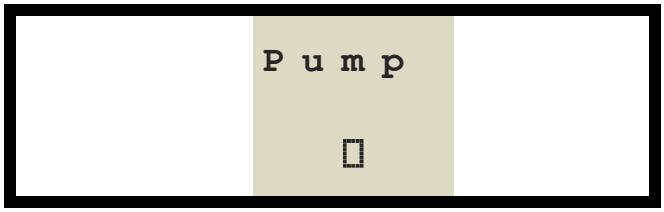
8.10.1 Fuel pump

It is an additional function that requires the configuration of several parameters.
It is used to operate a motor pump that maintains the selected fuel tank level by drawing fuel from storage or a tank truck.
At the factory, the AGSC-10 is set to manage the pump on programmable output 2, connection J1-13.

It is essential that P14 is = 0 (programmable output for pump command).
In order to permit pump start, it is necessary that the AGSC-10 is NOT in the "Locked" mode.
In this case the command lines are active and are:

- J10-66 (Pump stop = HCOMB), safe, i.e. the open line causes a pump stop that overrides pump start
- J10-67 (Pump start = LCOMB), to be closed to ground to start the pump in lack of an overriding stop condition
- J10-68 (Monitoring for maximum stop level and pump safety stop = MAXLIVC), active to ground.

The pump status is shown as a text message on page 4 of the "Supervisor" section display:



The second line shows the symbol regarding the current pump status:

- Dash – = Pump management cut out (P14=1). The command line is used as remote signal of engine running.
- Empty box □ = Pump management active (P14=0) and pump stopped
- Filled-in box ▩ = Pump management active (P14=0), and pump operating

The pump command can be taken also from the fuel level. To do so, you must set the pump starting level in **P28** and the pump stop level in **P29.**
The pump starting command does NOT activate if there is one pump stop condition, as follows:

- HCOMB command line active or P29 threshold exceeded, or
- MAXLIVC command line active, or

- Failure, or
- AGSC-10 in "Locked" mode (OFF).

8.10.2 Fuel reserve – Empty tank

There are two manners in which the "Fuel reserve" condition is detected:

- From the command line J10-65 closed to ground = "Fuel reserve"
- From the threshold set for fuel level by use of parameter **P31.**

Both conditions are able to activate the "Fuel reserve" alarm, which is shown as a text message at the "Alarm conditions" page of the "Supervisor" display:

You can stop the group based on time in regard to an assumed "Empty tank" condition by setting a time in **P30.** This time can range from 1 minute to 1 hour since the "Fuel reserve" condition is detected. The failure that will stop the group will be visualized as follows:

8.10.3 Use with option OPM-S-J1939

Option **OPM-S-J1939** permits the interfacing of engines fitted with Engine Control Units (ECU) that support protocol J1939 on CAN Bus.
It is available in two versions, a 12V version and a 24 V version. The applicable version must be specified in the order.
Depending on the model and manufacturer, the ECUs are able to provide different functions depending on whether they are able to support the commands and measurements specified in standard SAE J1939.
For example, some ECUs cannot support the engine start and stop commands, or the on-board equipment of some engines is only partially complete in that, for instance, it does not have analog sensors for the measurement of temperature, oil pressure, etc..
While option **OPM-S-J1939** is fully able to support all the envisaged functions and commands even if used as stand-alone equipment and locally (i.e. without using the AGSC-10), the AGSC-10 uses partially the information received from the cards, and behaves according to the received information.
As already seen, there is a "Monitor" page that visualizes the card operating status and, if necessary, shows the first detected alarm or fault condition. Such a condition is indicated by use of the codes as specified in the standard. The alarm indication shown on this page is an addition with respect to the indication shown on the "Alarm conditions" page, and concerns exclusively the ECU status.
In order to permit communication between the card and the AGSC-10, you must set parameter **X02** of **OPM-S-J1939** = 0 and the parameter **X04** as necessary for the model of the connected ECU.
In any case, refer to the cards manual.

The second line on the monitor page that shows on the "Supervisor" display contains the status indicator of interface J1939:

OPM-S-J1939 Not available (Off – Bus cable J6 disconnected)	J 1 9 3 9 –
OPM-S-J1939 Available – ECU does not communicate (ECU off or in error – CAN cable disconnected)	J 1 9 3 9 □
OPM-S-J1939 Available – ECU Available (There are neither errors nor alarms)	J 1 9 3 9

No programming is required when the **OPM-S-J1939** card is connected to the AGSC-10.
The AGSC-10 is able to automatically adapt to the card presence.
The ACGS-10 behaves like the card were not present until the filled-in box indicating the full functionality of interface J1939 comes in view.

When the indicator box becomes filled-in, ***the values read by the following sensors REPLACE the values normally read by the AGSC-10 IF the ECU indicates that the sensors are available:***

- Battery voltage (SPN 158)
- Water temperature (SPN 110)
- Oil temperature (SPN 175)
- Oil pressure (SPN 100).

Some ECUs, such as, for instance, the VOLVO EMS2 ECU, also provide the "Engine running" condition indication.
If the AGSC-10 reads the availability of such an option, it manages the condition together with the other conditions in order to be able to contribute to the determination of the engine running condition.

The AGSC-10 sends the engine start and stop commands to the ECUs that support them.

The ONLY TWO faults detected by the ECU that the AGSC-10 manages to stop the engine are:

- Low oil pressure (SPN 100, FMI 01)
- High engine temperature (SPN110, FMI 00)

No other fault cuts in to attempt engine stopping.
In case of alarm or failure, page J1939 of the display always shows the first cause of DTC1, complete with SPN, FMI and lamp status:

Example of J1939 alarm from ECU:
"Water level too low"

The four positions in the lower right part of the filled-in box refer to "Lamp status" according to standard SAE J1939.
The dash indicates the lamp off condition, a letter (the lamp initial letter) indicates that the lamp is on.
The initials are in a fixed position, according to the sequence that follows:

M R A P

M = Malfunction Indicator Lamp
R = Red Stop Lamp
A = Amber Warning Lamp
P = Protect Lamp.

Refer to standard SAE J1939 for the correct interpretation of the error message codes.

8.11 Serial communications

8.11.1 Basic version - Overview

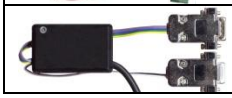
AGSC-10 provides for the interface with MODBUS RTU networks in several manners in order to ensure the greatest use flexibility.

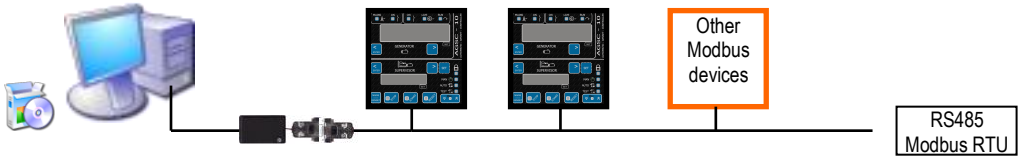
First of all, the two sections of which it is made ("Generator" and "Supervisor") are related to two different addresses, as if they were two separate devices.
In particular cases, they can also have a different Baud rate and even communicate on two different networks.

The native interfaces of AGSC-10 are RS485, 3kV insulated with respect to the power supply, which permit communications at five different speeds between 9600 and 115200 bps.
The reference A, B and Negative signals are available both on J4 and the connection Jack J5.

Connection J4 is the preferred connection to the "Supervisor" section and, if Jack J5 is not connected, it also connects the "Generator" section. Under normal conditions, the RS485 network is connected to J4 and both nodes can be accessed.

The connection J5 is conversely available for the "Generator" section only, and is used for the exclusive communication with the "Generator" section, which disconnects automatically from the "Supervisor" section that can continue communicating with the field through J4.
Under this condition (Jack in) the field can no longer communicate with the "Generator" section and the communication through J5 cannot reach the field.
If your requirement is simply to connect the "Generator" section to a computer through J5, you can use an adapter cable **CVA-JACK-BY4750-485** and the conversion module **CNV-M-BY4750** (RS485-USB) with the related installation software.
If, conversely, you want to carry out a standard connection to a computer through J4, you need cable **CV- BY4750-485.500,** and, again, a converter module and the related software.

	**CVA-JACK-BY4750-485**	**Adapter cable for CNV-M-BY4750** Adapter J5 – Converter
	**CV- BY4750-485.500**	**Connecting cable for CNV-M-BY4750** Adapter J4 – Converter
	**CNV-M-BY4750**	**Converter module RS232/RS485 - USB**

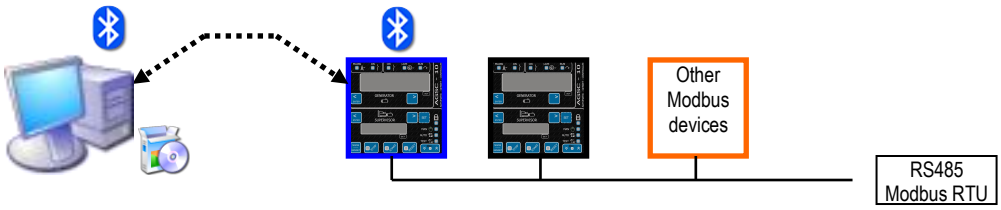


The special diagnostic function "SCOPE" of the "Generator" section (see advanced functions), can be used by J5 or J4 when J5 is not fitted.

8.11.2 Special versions -AGSC-10.BTH (Bluetooth)

The Bluetooth Class II option is installed inside the AGSC-10 and is not visible from the outside.
The Baud rate is programmed at the factory, therefore you must specify it in the order. The speed of the "standard model" is 115200 bps.

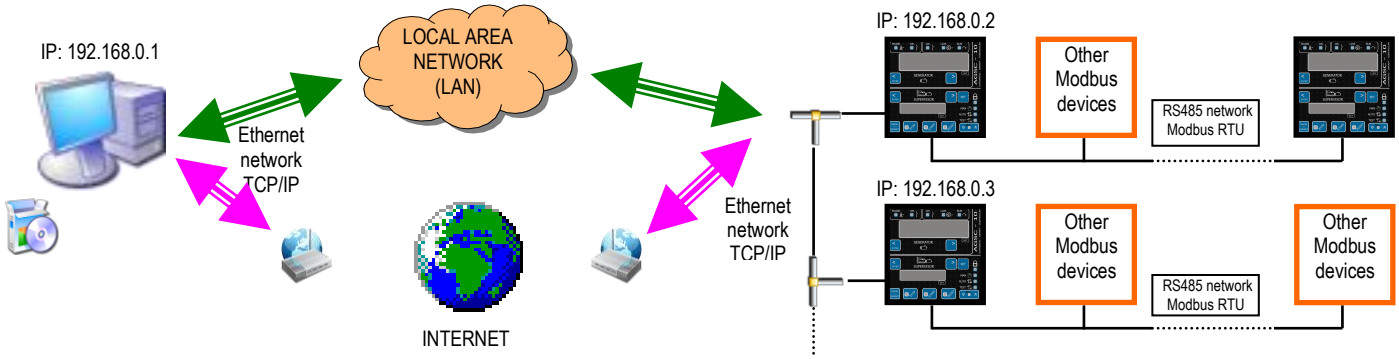
The interface coexists with the native RS485 and permits a Bluetooth access point to be obtained for the RS485 network, provided the network speed is compatible with the speed of the Bluetooth module.
The computer must also be fitted with a Bluetooth interface or with a suitably installed commercial-type adapter and the supervisor software.



	The Bluetooth interface is basically connected to the "Generator" section. This means that it can communicate with the RS485 network on J4 only if J5 is not used. If you want to use the "Scope" diagnostic mode through the Bluetooth interface, it MUST communicate at 115200 bps.

8.11.3 Special versions - AGSC-10.ETH2S (Ethernet)

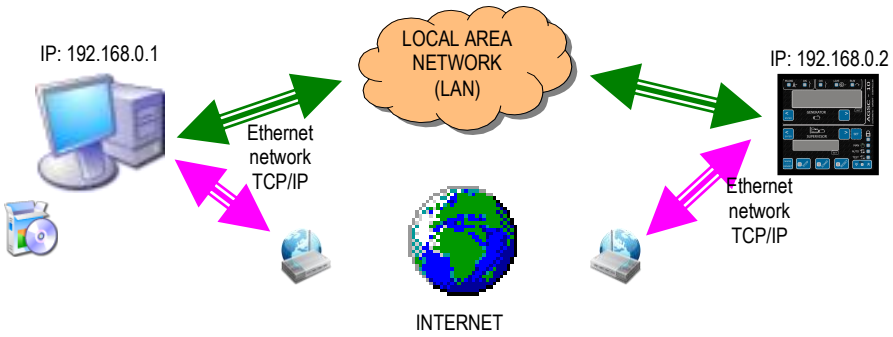
This version can provide an Ethernet access point for an RS485 network provided the RS485 network speed is compatible with the speed of the Ethernet options, RS485 side.
The RS485 side Baud rate of the ETHERNET version is programmed by use of the special utility contained in the installation software kit **SW-BDST-ETH2S**.
The connection of the Ethernet section is accessible to the user and obtained between connectorsJ4 and J11.
If you want to use the Ethernet (LAN-WEB) section with a computer, it is essential that the computer has an Ethernet connection too.
The **SW-BDST-ETH2S** software kit contains the utility for the creation of the virtual serial port that enables the supervisor software to communicate by the port in Modbus RTU.



	If you want to use the "SCOPE" diagnostic mode through the Ethernet interface, the latter MUST be configured for RS485 communications at a speed of 115200 bps.

8.11.4 Special versions - AGSC-10.ETH2WS.9600 (Web Server)

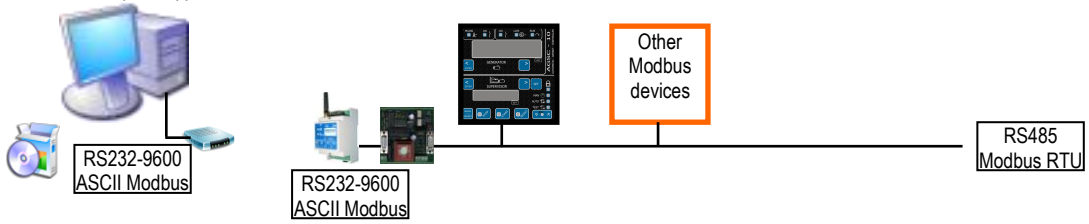
This version is fitted with a Web-Server for the monitoring of an RS485 sub-network at the fixed speed of 9600 bps.
It is used in direct-connection intranet networks, or networks connected through the Internet, after all the required interconnection means have been installed.
The connection of the Ethernet section to the AGSC-10 is accessible to the user and is obtained between connectors J4 and J11.
No communication management software is necessary (an Internet browser is sufficient).
The **SW-BDST-ETH2S** software is used only to suitably configure option ETH2SW.
For all the information, refer to the specific description of system ETH2SW.



	The "SCOPE" diagnostic mode is not available for the ETH2WS version.

8.11.5 Use with KIT GSM KIT-GSM-AGSC-10.1

This option is used to reach very far remote workstations to which a standard connection via telephone cable or LAN is not possible.
In this case you must use the protocol converter **OPM-S-BY3550** together with module **OPM-M-GSM555.232.PAGSC-10** and related accessories.
The use of the external conversion module permits the speed of the RS485 ring to be maintained independent of the speed of the GSM Modem because the module adapts automatically to the speed of the RS485 ring.
It is essential that the supervisor computer uses software that supports the ASCII Modbus protocol, or that it includes a protocol converter.
For all information, refer to the description applicable to the kit.



	The "SCOPE" diagnostic mode is not available via GSM Modem.

8.12 Alarms and Faults

The AGSC-10 manages:

- **ALARMS**, i.e. conditions that are more or less critical, which DO NOT stop the engine and are indicated on the display, together with an aural warning tone, if selected, with remote signals, etc.
- **FAULTS**, i.e. critical conditions that require an action to stop the engine and the disconnection of the load from the generator in addition to being indicated.
-

The management of the said conditions is different, and is according to the general behavior described hereafter:

The ALARM conditions are managed in multiple mode, i.e. more conditions can be shown concurrently on the display and remotely.

The occurrence of more than one condition is indicated by the flashing of Led 22 near button 

. If you want to visualize the conditions, go to the "Alarm conditions" page of the "Supervisor" display and press the applicable button repeatedly with a brief push. The alarm conditions will show as a text message one after the other.
When an alarm condition does no longer exist, it is automatically removed after the aural warning stops.

The FAULT conditions, conversely, are "memorized" when they occur. If there is more than one fault condition at the same time, it is only the first one that is active and is indicated as a cause. A fault condition is indicated as an alarm. In addition, if P27 = 1, it freezes the values measured by both the "Generator" and "Supervisor" sections (displays are flashing) to permit the system conditions at the time of fault occurrence to be seen by scrolling the display pages. Following a "FAULT" the load is always disconnected from the generator and an appropriate engine stop cycle is initiated (with or without cooling). The failure condition must be removed by use of a RESET of the alarms from a local keyboard, or a remote workstation.
There are two exceptions, one concerning the ALARMS, and one concerning the FAULTS: the first occurs if there is a memorized alarm (Alarm available 1, J10-73) that requires to be removed by use of an alarm RESET, the second regards the "SPRIKLER" mode, in which a fault does not cause the engine to be stopped.

When you want to remove locally one or more alarm or fault conditions you must press and hold pressed the 

button when no aural warning is sounding. If the aural warning is sounding you must first silence it by pressing the button briefly. If one or more conditions are still present, they are managed again, and the aural warning (if enabled) begins sounding anew when the button is released.

The enabling of some alarms and faults is conditional on the detection of some conditions, such as the engine running conditions or the "Generator present" condition. These conditions will be highlighted in the special summary table provided at a later stage.

8.12.1 Aural warning

The aural warning of the AGSC-10 is emitted in alarm or fault conditions only if:

- AGSC-10 is in an operating mode different from "Locked" OFF (Led 13  off) and
- Parameter P22 (aural warning sounding time) contains a value different from zero (0 = Aural warning disabled).

When the aural warning sounds, it can be silenced by pressing the 

button BRIEFLY.
If the management of a fault with "freezing" of the measurements is in progress (displays flashing), a new, BRIEF push on the button removes the "freezing" of the measurements (AGSC-10 resumes taking the measurements).

8.12.2 Different behavior of ALARMS and FAULTS

Indication or command	ALARM	STOP
Aural warning	YES if P22 > 0	
Possibility to sense another failure	YES	NO (except "emergency stop")
Led 22 on	Only 1 alarm = steady, > 1 = flashing	steady
Measurement freezing (Displays flashing)	NO	YES if P27 = 1
Automatic operation inhibit	NO	YES
"FAULT" remote signal	YES if P38 = 0 or 2	
Switch over from Generator to Mains	NO	YES
Engine stop sequence	NO	YES (except "Sprinkler" mode)
Automatic reset if fault is removed (no aural warning)	YES (Except for J10-73 Alarm avail.1)	NO

8.12.3 List of available FAILURES

Emergency stop	Due to: **J10-69 open**
Activated by engine running: **NO** Activated by "Generator present": **NO** Performs cooling before engine stopping: : **NO** It is generally connected to contact N.C. of the emergency mushroom-shaped pushbutton. Cutting-in is instantaneous. ***This is the only FAULT that can override a previously existing fault.***	E M E R G E N C Y S T O P

Release due to maximum current	Due to: **Measured generator current exceeds threshold G02 * 1.38**
Activated by engine running: **NO** Activated by "Generator present": **NO** Performs cooling before engine stopping: : **NO** Cutting-in occurs after a fixed time of 4 seconds and takes place when any of the three-phase currents of the generator exceeds the threshold.	G E N E R A T O R C U R R . O V E R L I M I T

Overspeed from contact	Due to: **J10-63 closed on negative**
Activated by engine running: **NO** Activated by "Generator present": **NO** Performs cooling before engine stopping: : **NO** Cutting-in is instantaneous.	O V E R S P E E D (I n t e r n a l)

Overspeed from frequency	Due to: **Measured frequency (measured at V1) exceeds G05**
Activated by engine running: **NO** Activated by "Generator present": **NO** Performs cooling before engine stopping: : **NO** Cutting-in is instantaneous.	O V E R S P E E D (E X t e r n a l)

Fault of "Generator" section	Due to: **No flashing of card available signal (TK)**
Activated by engine running: **NO** Activated by "Generator present": **NO** Performs cooling before engine stopping: : **NO** Cutting-in occurs instantaneously when, as a result of a serious malfunction, the "Generator" section stops informing the "Supervisor" section that it is present.	G E N E R A T O R C O N T R O L F A U L T

Failed engine starting

Due to: **Number of automatic start attempts as per P17 exceeded**

Activated by engine running: **NO**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

Cutting-in is instantaneous.

Empty tank

Due to: **Time P30 exceeded after cutting-in of fuel reserve alarm**

Activated by engine running: **NO**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

It cuts in only when the time set in P30 expires if P30 > 0 and when the "Fuel reserve" condition continues to be present.

Failed contactor closing on generator

Due to: **Line J1-5 open with closing command carried out**

Activated by engine running: **NO**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **YES**

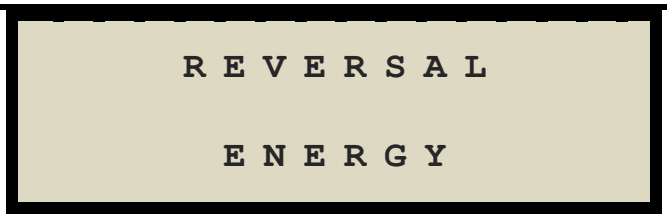
It cuts in after a fixed delay of 10 s from the switching over command with the contactor still open, or when an unwanted opening of the contactor occurs. To remove this fault, permanently close J1-5 on the negative.

Energy reversal

Due to: **Measured negative active power exceeds threshold G16**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

The check starts after the "Generator present" condition is detected. It cuts in after the time set in G17 since the condition is detected has elapsed, provided the condition persists.



Generator voltage asymmetry

Due to: **Voltage difference between two phases higher than G09**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

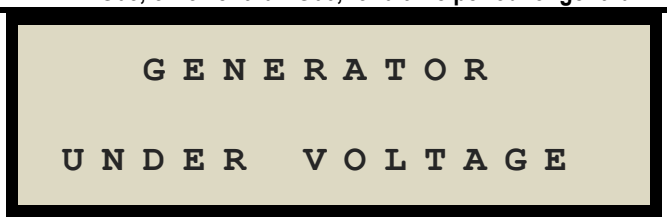
The check starts after the "Generator present" condition is detected. It cuts in after the time set in G10 has elapsed provided the condition persists.

Generator undervoltage

Due to: **Average three-phase, or single-phase voltage lower than G08, or lower than G06, for a time period longer than P42**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

Low voltage fault:
Cuts in after the time set in G10 since the condition is detected has elapsed, provided the condition persists.
Generator presence lost fault:
Cuts in after P42 is voltage is below G06.

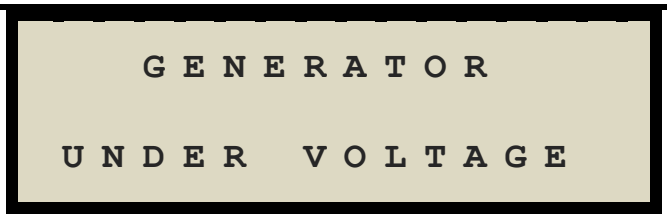


Generator overvoltage

Due to: **Average three-phase, or single phase voltage higher than G07**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

The check starts after the "Generator present" condition is detected. Cuts in after the time set in G10 since the condition is detected has elapsed, provided the condition persists.

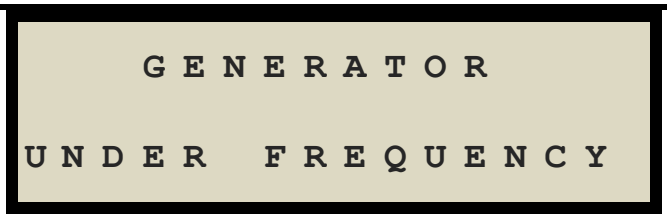


Generator underfrequency

Due to: **Frequency (measured on V1) below G12**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

The check starts after the "Generator present" condition is detected. Cuts in after the time set in G13 since the condition is detected has elapsed, provided the condition persists.

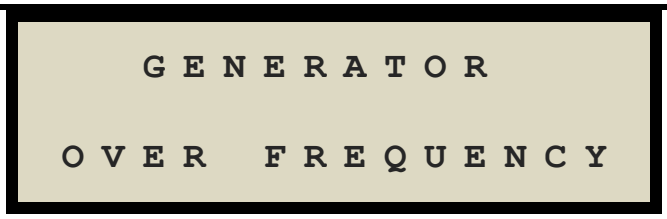


Generator overfrequency

Due to: **Frequency (measured on V1) above G11**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

The check starts after the "Generator present" condition is detected. Cuts in after the time set in G13 since the condition is detected has elapsed, provided the condition persists.

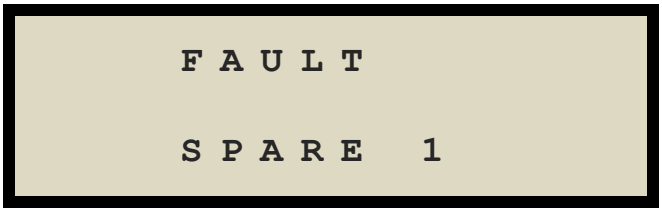


Spare fault 1

Due to: **J10-71 closed on negative**

Activated by engine running: **YES if P45=1**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

If P45=1, the check is carried out after the time set in P19 since engine starting has elapsed.
If P45=0, the check is always active, also when the engine is stopped.
Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists all the time.



Spare fault 2

Due to: **J10-72 closed on negative**

Activated by engine running: **YES if P45=1**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

If P46=1, the check is carried out after the time set in P19 since the engine has started.
If P46=0, the check is always active, also when the engine is stopped.
Cutting-in has a delay of 2 seconds after the condition is detected, provided the condition persists all the time.

Unexpected engine stop

Due to: **No engine running after memorization**

Activated by engine running: **YES**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

The check starts after the time set in P19 since the engine has started has elapsed. Cutting-in has a delay of 3 seconds since the condition is detected, provided the condition persists.

Low engine oil pressure | Due to: **J10-61 closed on negative (oil pressure switch)**

Activated by engine running: **YES**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

The check starts after the time set in P19 since the engine has started has elapsed. Cutting-in has a delay of 4 seconds since the condition is detected, provided the condition persists.

Engine high temperature | Due to: **J10-62 closed on negative (water thermostat)**

Activated by engine running: **YES**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **NO**

The check starts after the time set in P19 since the engine has started has elapsed. Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.

Generator overload (2nd level) | Due to: **Measured active power above threshold G15**

Activated by engine running: **NO**
Activated by "Generator present": **YES**
Performs cooling before engine stopping: : **YES**

The check starts after the "Generator present" condition is detected. It cuts in after the time set in G17 since the condition is detected has elapsed, provided the condition persists.

Thermal protection triggered | Due to: **J10-64 closed on negative**

Activated by engine running: **YES**
Activated by "Generator present": **NO**
Performs cooling before engine stopping: : **YES**

The check starts after the time P19 since the engine has started has elapsed. Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.

8.12.4 List of available ALARMS

Programmable alarm 1 | Due to: **J10-73 closed on negative**

Activated by engine running: **YES if P47=1**

If P47=1, the check is carried out after P19 from when the engine started.
If P47=0, the check is always active, also when the engine is stopped.
Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.
This alarm is memorized and must be erased manually.

Programmable alarm 2 | Due to: **J10-74 closed on negative**

Activated by engine running: **YES if P48=1**

If P46=1, the check is carried out after the time set in P19 since the engine has started has elapsed.
If P46=0, the check is always active, also when the engine is stopped.
Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.

Request for maintenance action	Due to:	**Maintenance due time expired (it has reached 0)**

Activated by engine running: **NO**

It occurs when the count-down of the maintenance hours (that you can see on page 4 of the "Supervisor" display) reaches zero. The request remains deactivated until you enter a new interval in P40.
Cutting-in is instantaneous when the time has expired.
This alarm is memorized and must be erased manually.

Maximum fuel level (overfull)	Due to:	**J10-68 closed on negative**

Activated by engine running: **NO**

Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.
This alarm removes the command to the fuel pump, if managed and present.

Engine cooling water low level	Due to:	**J10-70 closed on negative**

Activated by engine running: **NO**

Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.

Fuel reserve	Due to:	**J10-65 closed on negative and/or below reserve threshold P31**

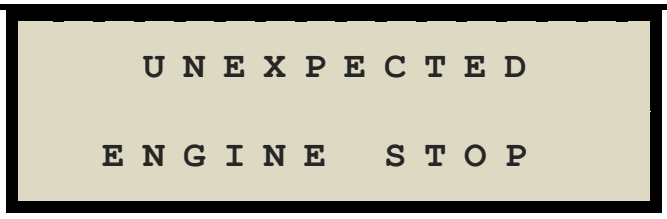
Activated by engine running: **NO**

Cutting-in has a delay of 2 seconds since the condition is detected, provided the condition persists.

Unexpected engine stop	Due to:	**Engine turning sensed after end of stop cycle**

Activated by engine running: **NO**

Cutting-in has a delay of 3 seconds since the condition is detected, provided the condition persists.



Failed closing of contactor to mains	Due to:	**Line J1-4 opened but contactor position at mains**

Activated by engine running: **NO**

Cutting-in has a delay of 10 seconds since the condition is detected, provided the condition persists.

Generator overload (1st level)	Due to:	**Measured active power above threshold G14**

Activated by engine running: **NO** **The check begins after the detection of the "Generator present" condition.** It cuts in after the time set in G17 since the condition is detected has elapsed, provided the condition persists.	O V E R L O A D W A R N I N G

Battery undervoltage	Due to:	**Measured battery voltage below threshold P32**
Activated by engine running: **NO** Cutting-in has a delay of 30 seconds since the condition is detected, provided the condition persists.	B A T T E R Y U N D E R V O L T A G E	

Battery overvoltage	Due to:	**Measured battery voltage above threshold P33**
Activated by engine running: **NO** Cutting-in has a delay of 30 seconds since the condition is detected, provided the condition persists.	B A T T E R Y O V E R V O L T A G E	

8.12.5 System FAILURES Err(n) - Malfunctions

The "Supervisor" section of AGSC-10 is able to diagnose and monitor some serious system malfunctions.

They are shown on the display through legend "Err" followed by a number that is not meaningful for the user, but is so for Customer Service.

"Err's" 0 through 3 can occur only at the time of AGSC-10 power on, and can sometimes be removed by simply switching off the device, waiting for a short time, then powering it on again.

"Err9" can take place during operation. It indicates a serious and permanent fault of the AGSC-10, which must then be sent to a Customer Service center.

9 ADVANCED USE – Setting of parameters from workstation

9.1 General

In order to make the setting of parameters easier with no need of using the AGSC-10 keyboard, you are given the possibility to set ALMOST all the parameters of the "Generator" and "Supervisor" sections by use of a computer and a commercially available computer emulation program.
The AGSC-10 must be accessible from one of the available serial communication lines and not from Web Server (if available).
Because all models have a serial interface RS485, it is recommended that you get a direct connection through J4 using the converter model **CNV-M-BY4750** (USB-RS485).
Some particular parameters, such as the Modbus node number and the serial port speed cannot be modified through the serial port because the immediate loss of the communication in progress may cause problems and would compel you to re-configure the computer.
There is no need for special configuration or device to interact with the AGSC-10. The set is able to discriminate between the programming commands and the normal request from the Modbus RTU.
When characters are sent to the AGSC-10, it provides no reply and does not do character echo in order not to occupy the serial line at the wrong time.
A special command is provided to check the correct modifications of one or more parameters.

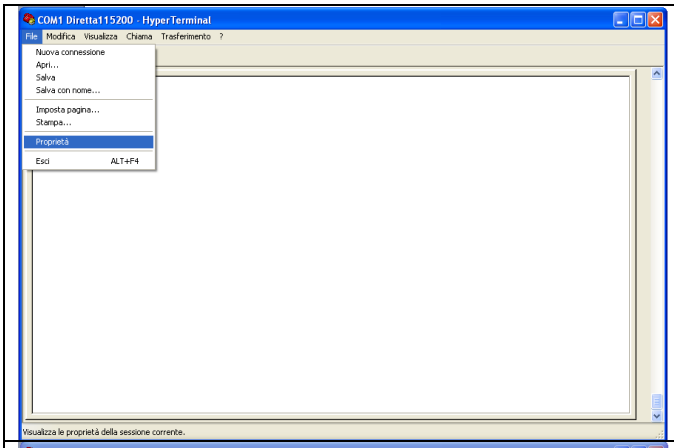
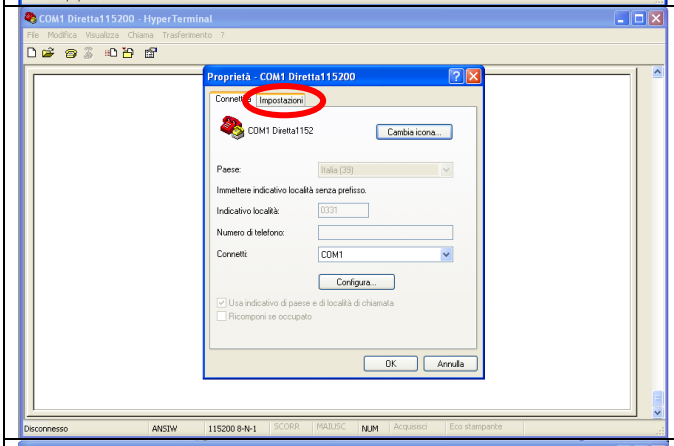
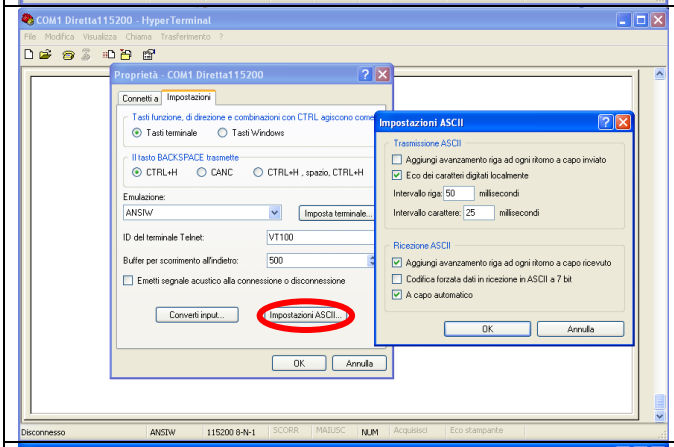
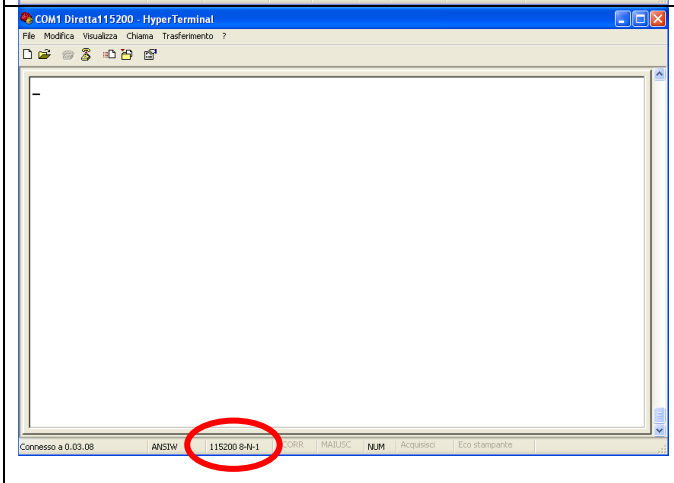
9.2 Setup

For safety reasons and to avoid that wrong values assigned to the parameters may cause unexpected or dangerous behavior, keep the system in safe conditions whenever possible, i.e. with the selector at LOCKED (Led 13 on), or with the inhibition command present at J1-6.
The new values become operative IMMEDIATELY and change the behavior of the AGSC-10 instantaneously.

- Connect the AGSC-10 to the computer and power it on
- If you want to modify the parameters of both the "Generator" and "Supervisor" sections, make sure they have a different Modbus node number (factory set values are G19=1 and P50=2), and that they have the same speed (factory set value G18=P49=115.200 bps)
- Make sure that neither section of the AGSC-10 stays in the programming from keyboard mode, i.e. "Pxx" or "Gxx" must not be in view on the display
  If the programming from keyboard mode is active, no parameter can be modified from the computer, and the input is ignored without any related indications.
- Open a standard computer emulation program, which is generally available in the operating system.
  The computers using Windows™ make available the "Hyperterminal" program, to which reference is made herein for simplicity, but any other emulation program will do, provided it can be configured in an equivalent manner.
- Configure the computer emulation program communication parameters as follows:

Parameter	Setting
Baud rate	As parameters [G18] = [P49]
Parity	None (N)
Data bits	8
Stop bits	1
Flow control	None

- Configure the computer emulation program parameters as follows:

	Select “Properties”
	Select “Settings”
	Select “ASCII Setup.” Select: √ ECO typed characters locally Line delay = 50 milliseconds Character delay = 25 milliseconds √ Append line feeds to incoming line ends √ Wrap lines that exceed terminal width
	At the end of configuration, establish communication checking that the set communication parameters are shown in the lower status bar. No communication is possible as long as the parameters do not come in view.

9.3 Command format

In order to be able to be recognized and executed by the AGSC-10 the commands must have a special format.
The format is as follows:

NNN:RR:VVVVV

NNN = ***Number of Modbus node [:]***.
You must always enter it as three decimals, fixed length, followed by colon.
At the factory, number 1 (**G19**) is assigned to the "Generator section," and number 2 (**P50**) to the Supervisor" section.

RR = ***Number of the parameter to be modified [:]***.
You must always enter it as two decimals, fixed length, followed by colon.
Parameter G (RR) will be the parameter applicable to the "Generator" section, while the one applicable to the "Supervisor" section is parameter P (RR), as described in the pages covering the parameters.

VVVVV = ***Parameter value [enter]***.
You must always enter it as five decimals, fixed length, followed by Enter.
The acceptable range for each parameter is specified in the parameter section, and is the same in any setting mode.
If a parameter outside the accepted limits is set, it will be ignored, and the parameter will retain the value at which it is set at the time.

To read the full list of the parameters that can be modified of each section, input special command NNN: 00:00000 where NNN is the node number of the "Generator" or "'Supervisor" section.
The list that is generated in this case is very useful for three reasons:

1) It automatically excludes all parameters that cannot be programmed from a computer
2) It gives all the values of the parameters so that they can be checked
3) The provided list can be saved and changed as you like to be used in the "Recipe" mode, thus you have no need to write a new list from scratch.

9.4 Change in manual mode

In order to modify the chosen parameter, just type-in the characters one at a time according to the applicable format. As an example the procedure applicable to the manual change of a parameter of the "Generator" section is provided hereafter. The same applies to the "Supervisor" section as well.

An example is provided in the following.

9.5 Change in "Recipe" mode

In order to speed up the operations and configure several systems in the same manner, you can prepare a text file that contains a column with a list of the commands written in the described, applicable format, and send it with one operation.
Any text editor can be used to prepare the list.
Pay the utmost attention not to add anything, and thus make sure you comply strictly with the command format.
Make sure you do not add special characters, alphabet letters and notes.
The sequence in which the parameters are written is not relevant.
The same list can include commands for each of the two sections of the AGSC-10, with no special sequence required. It is clear that the full list of each section must be read to make sure that all operations have been completed successfully.
It is not necessary that you include all parameters in the list, unless you want to make sure you set the AGSC-10 in a thoroughly special manner irrespective of the previous values assigned to the parameters. In fact, only the parameters included in the list are modified, if they are found to be consistent. All the other parameters remain unchanged.

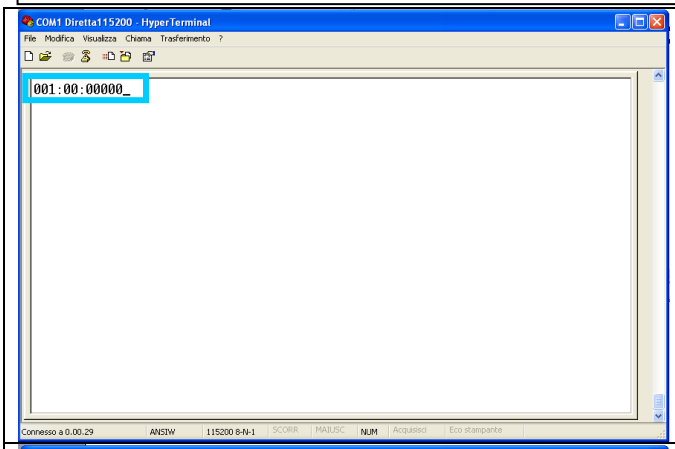
To make recipe writing easier, you can proceed as follows:

- Read the parameters of the "Generator" section for instance by use of command 001:00:00000 and save the list. The list contains the parameters that can be modified in the correct format
- Read the parameters of the "Supervisor" section for instance by use of command 002:00:00000 and save the list. The list contains the parameters that can be modified in the correct format
- Put the two files together, if necessary, and change the value of the parameters you want to modify. You can also cancel the parameters that you want to keep unchanged
- Save the resulting text file with the configuration name you want.

An example is provided in the following:

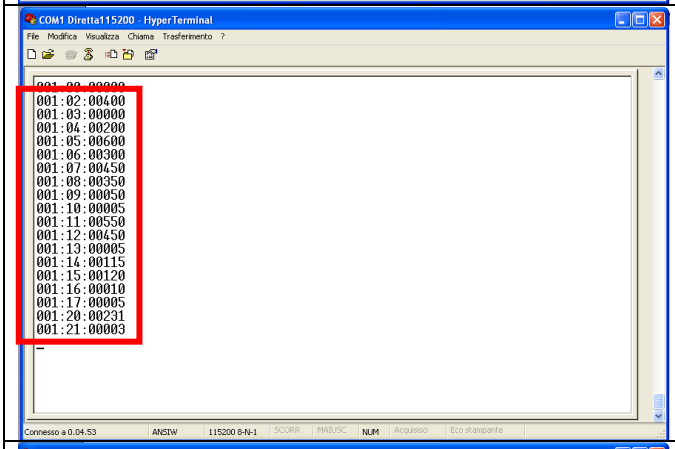
9.6 Example of change in manual mode

In order to change the desired parameter, type in the characters one at the time in the correct format.
The following is a sample change procedure applicable to a parameter of the "Generator" section. Obviously, the same applies to the "Supervisor" section as well.

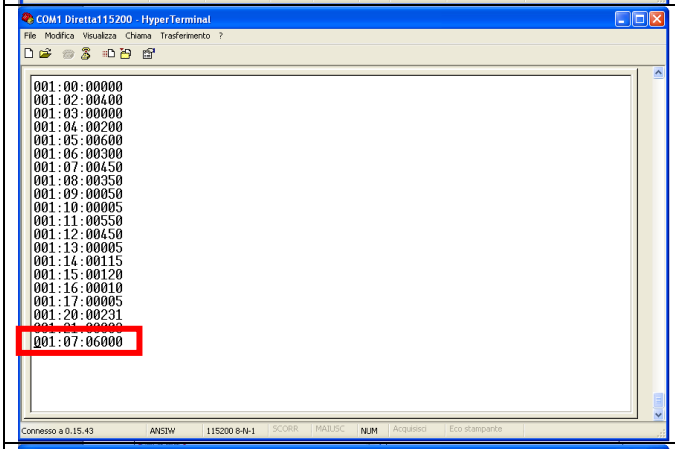


Ask the programming list to the "Generator" section, at node number 001.

After typing-in the command, press ENTER.



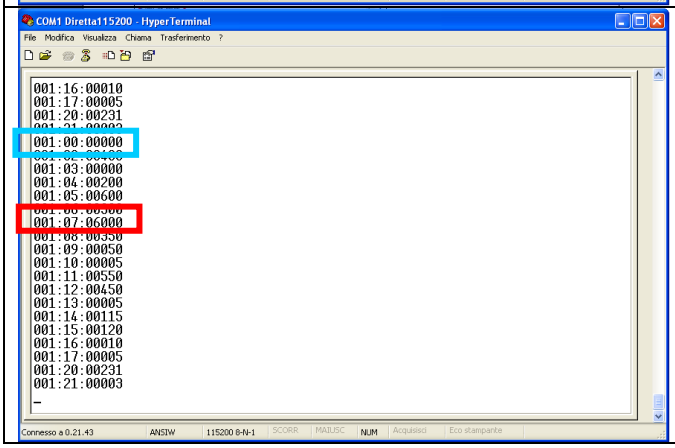
The device gives a response. You can copy it and keep it on file.



If you want to change parameter G07 only, from 450 to 6000 (range 10 – 10000), the operation is as follows:

After you confirm, the cursor moves to the left.

<u>The AGSC-10 gives no response.</u>

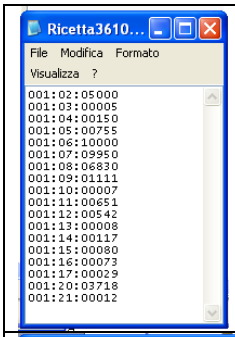
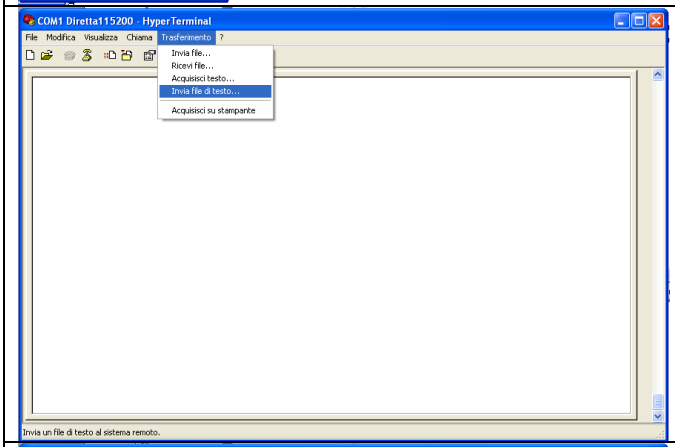
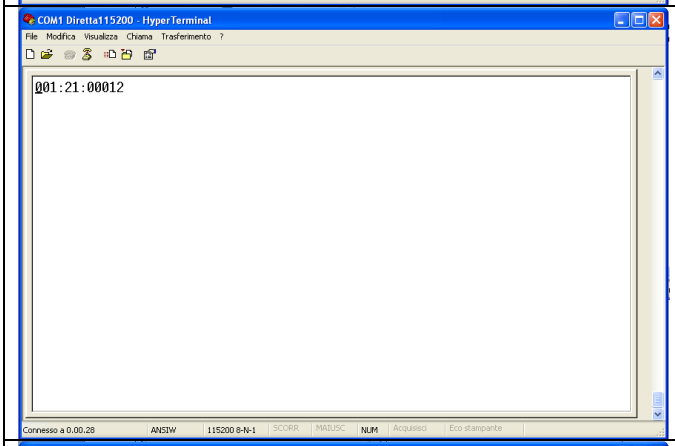
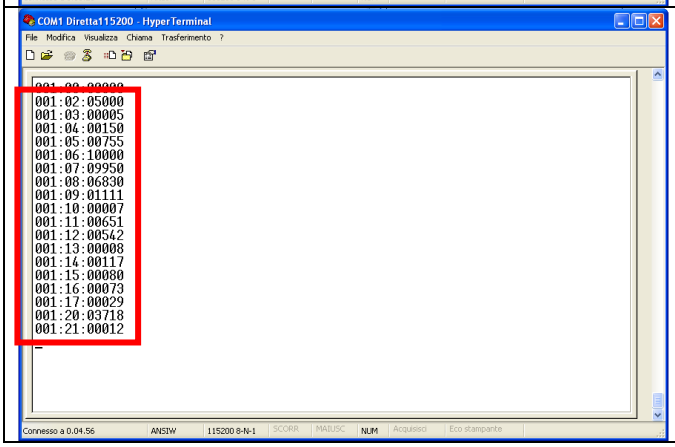


In order to check whether the parameter has been modified, request a new list (you can overwrite the existing characters).

You can thus make sure that the parameter has been actually changed.

9.7 Example of change in "Recipe" mode

The following is a sample change procedure applicable to a parameter of the "Generator" section. Obviously, the same applies to the "Supervisor" section as well, and to both at the same time.

	Prepare the recipe to change the parameters of the "Generator" section you want to change, at address 001.
	Select the sending of a text file, then open the recipe file that will be sent.
	On the same line you must write the characters that will then be sent one after the other.
	In order to make sure that the parameters have been modified, request the list (you can overwrite the existing characters) You can see that ALL the parameters have been actually modified.

10 ADVANCED USE – Remote control and supervision - MODBUS

10.1 General

All AGSC-10 models give the possibility to interact from remote through native port RS485 of both the "Generator" and "Supervisor" sections on J4 or J5 as described in the foregoing, by use of the data exchange protocol MODBUS RTU.

It is underscored that the "Generator" and "Supervisor" sections must have a node number that is different from each other, and, more specifically, is UNIQUE in the entire RS485 network in use.
For instance, if you have two AGSC-10s connected in a network, and addresses 1 and 2 are assigned to the "Generator" and "Supervisor" sections of the first device, two different addresses, such as 3 and 4, must be assigned to the second unit.

Each of the sections of an AGSC-10 can communicate at a different speed.
If there are no special requirements, it is recommended that the same Baud rate be used throughout the RS485 network.

The AGSC-10 uses some of the standard commands according to specification "Modbus Application Protocol Specification V1.2B –Dec. 28, 2006."
Given the characteristics of the AGSC-10 system, a simplified structure was selected.

The Function Codes, which are used in the same manner by each section of the AGSC-10, fully support their own Error Codes and Exception Codes.

Please refer also to the MODBUS specifications you can find at: http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b.pdf

The **SW-SUP-AGSC-10** software permits the complete monitoring of the AGSC-10 via Modbus.
The **SW-MBCOMM-DEMO** software permits only the "Generator" section to be monitored, and to visualize the waveforms of voltages and currents in a simple manner.

An Ethernet connection is also available for model **AGSC-10.ETH2S**. Refer to manual ETH2S.
The model AGSC-**10.ETH2WS.9600** also has a Web-Server. Refer to manual ETH2WS.

10.2 Communication parameters

Parameter	Setting
Baud rate [G18] e [P49]	9600 – 19200 – 38400 – 57600 – 115200
Parity	None (N)
Data bits	8
Stop bits	1
Flow control	None

10.3 Function Codes

Function	Command
READING	**0x03** (Read Holding Registers)
	0x04 (Read Input Registers)
WRITING	**0x06** (Write Single Register)

The reading Function Codes have the same behaviour for compatibility.

10.4 Basic structure of the registers in each section

Area of application	Address range	
	HEX	DECIMAL
System Info/Configuration	0x000 – 0x0FF	000 - 255
Measurements	0x100 – 0x1FF	256 - 511
Parameters	0x200 – 0x2FF	512 - 767
Operating modes	0x300 – 0x3FF	768 -1023

Three types of registers can be available in each area:

Register type	Description
WO (Write Only)	The registers tagged WO can only be written by use of command [06], they cannot be read.
RW (Read/Write)	The registers tagged RW can be both read and written [03]=[04] / [06].
RO (Read Only)	The registers tagged RO can only be read [03]=[04].

10.5 Non-standard registers of the "Generator" section

Some "virtual" registers have been implemented to permit the execution of "Special" functions.
The syntax of the command is standard, but the response is non-standard.
These pseudo-registers are as follows:

HEX	DECIMAL	TYPE	FUNCTION
0x500	1280	Writing (06)	**Access to the "SCOPE" diagnostic function.**

Description:
The value of the byte to write is not significant. The "SCOPE" mode is activated as soon as the command is received.
The Baud rate of the "Generator" section goes directly to 115,200 bps and control is handed over to the high-speed proprietary protocol. *The "'Generator" section does no longer respond to the Modbus commands*.
In order to return to the normal mode, you must give back control through a suitable command of the proprietary protocol, or an automatic exit from the "SCOPE" mode must occur.
Refer to the applicable section for further details.

HEX	DECIMAL	TYPE	FUNCTION
0x501	1281	Writing (06)	**Enabling/disabling of "GRAPH" scope mode (1=enables, 0=disables)**

Description:
If you write value "1" (enable) you cause the Baud rate of the "Generator" section to go automatically to 115,200 bps and enable the controls for the issue of V and I samples in "GRAPH" mode.
Value "0" causes the return to the standard speed and disables the commands for "GRAPH" issue.

HEX	DECIMAL	TYPE	FUNCTION
0x500	1280	Reading (03) or (04)	**Request for issue of V and I samples of Phase 1 in "GRAPH" mode**

Description:
The response to the command does NOT follow the Modbus standard:

- The returned Function Code is always 03, even if the command given was 04
- The number of returned bytes is ALWAYS 248, independent of the requested bytes
- The meaning of the response bytes is proprietary.

HEX	DECIMAL	TYPE	FUNCTION
0x501	1281	Reading (03) or (04)	**Request for issue of V and I samples of Phase 2 in "GRAPH" mode**

Description:
As above.

HEX	DECIMAL	TYPE	FUNCTION
0x502	1282	Reading (03) or (04)	**Request for issue of V and I samples of Phase 3 in "GRAPH" mode**

Description:
As above.

10.6 Expansion of the registers of the "Supervisor" section

Area of application	Address range	
	HEX	DECIMAL
Expansion of registers	0x400 – 0x47C	1024 – 1148
"Event history" area	0x500 – 0x57D	1280 – 1405

10.7 Reading of registers

Reading is allowed on the RW and RO registers both as Holding (03) and Input (04) registers. ONLY the device the node number of which corresponds to the number in the request will respond, and that number MUST BE UNIQUE in the network.

Reading function			
Request frame		**Response frame**	
Field	Range	Field	Description
Node	1 – 255	Node	Same as for request
Function	3 – 4	Function	Same as for request
High part of address	0 – 65535 (0-0xFFFF)	Number of Bytes	Length in BYTES of the returned data block. Usually, it is the double of the requested registers.
Low part of address			
High part of req. register number	Always 0		
Low part of req. register number	1 – 125 (1-0x7D)		
Low part of CRC	Calculated, between 0 and 65535 (0-0xFFFF)	Low part of CRC	Calculated, between 0 and 65535 (0-0xFFFF)
High part of CRC		High part of CRC	

The associated response in case of error is as follows.

Reading function error framing		
Field	Range	Description
Node	Same as for the request	
Function	Same as for the request + 128 (0x80)	If request =3, function =131 (83 Hex), if =4, function=132 (84 Hex)
Exception Code	1 – 4	1 = Function not supported 2 = Invalid register address or range 3 = Invalid quantity of requested addresses 4 = Function not available / busy
Low part of CRC	Calculated, between 0 and 65535 (0-0xFFFF)	
High part of CRC		

10.8 Writing of registers

Writing is permitted in registers WO and RW only.
Only the Single Register (06) writing function is implemented. ONLY the device the node number of which corresponds to the number in the request will respond, and that number MUST BE UNIQUE in the network.

Writing function			
Request frame		**Response frame**	
Field	Range	Field	Description
Node	1 – 255	Node	Same as the request frame.
Function	6	Function	
High part of address	0 – 65535 (0-0xFFFF)	High part of address	
Low part of address		Low part of address	
High part of data	0 – 65535 (0-0xFFFF)	High part of data	
Low part of data		Low part of data	
Low part of CRC	Calculated, between 0 and 65535 (0-0xFFFF)	Low part of CRC	
High part of CRC		High part of CRC	

In case of error, the response is as follows:

Writing function error framing		
Field	Range	Description
Node	Same as for the request	
Function	Same as for the request + 128 (0x80)	Request 6, function=134 (86 Hex)
Exception Code	1 – 4	1 = Function not supported 2 = Invalid register address 3 = Invalid value 4 = Function not available / busy
Low part of CRC	Calculated, between 0 and 65535 (0-0xFFFF)	
High part of CRC		

10.9 List of available registers

Key:

ADDRESS = Number of modbus register [.Bit of register]. When the register contains a numerical value, its address is an INTEGER. When, conversely, it contains the boolean value of one of its specific bits (flag), the bit is identified by a dot followed by its position value 0-15 starting from the right (ex. 258.10 indicates the eleventh bit of register 258).
TYPE = **BBBB - BB - Bb -bB**. This is the management identifier of composite register (32bit), full 16bit register, or half-register (8 bit). BBBB indicates a value to be obtained from two subsequent registers, the high part of which is at the specified address, followed by the low part at address+1. BB indicates a value that you want to obtain from the entire register (16bit). Bb indicates an 8 bit value contained in the high half of the register. bB indicates an 8 bit value contained in the low part of the register.
FORMAT = **DEC - DECS - BOL - HEX - BCD**. The 32, 16, or 8 bit primary value must be transformed into: DEC = Decimal value without sign DECS = Decimal value with sign BOL = True or false value of bit specified in argument address HEX = Value BCD = A 0-9 character every 4 bits.
AUTHORIZATIONS = RO – RW – WO authorizations from remote. RO does not permit register value to be changed. RW permits the register value to be changed by use of the write command. WO permits the register to be written by use of the write command, but does not permit it to be read (command transmission mode – the physical command does not exist)
FACTOR = D – C – M – DM – N decimal separator position. It is meaningful only in the Decimal formats (DEC or DECS). N, the number is an integer D, the value is to be considered multiplied by 0.1 C, the value is to be considered multiplied by 0.01 M, the value is to be considered multiplied by 0.001 DM, the value is to be considered multiplied by 0.0001.

TLR = MAINS BREAKER
TLG = GENERATOR BREAKER

10.9.1 "Generator" CONFIGURATION

*** NOT IMPLEMENTED ***

10.9.2 "Generator" MEASUREMENTS

ADDRESS	TYPE	DESCRIPTION	FORMAT	MU	AUTH.	FACTOR
256	BB	Generator VR VOLTAGE	DEC	Volt	RO	N
257	BB	Generator VS VOLTAGE	DEC	Volt	RO	N
258	BB	Generator VT VOLTAGE	DEC	Volt	RO	N
259	BB	Generator VRS VOLTAGE	DEC	Volt	RO	N
260	BB	Generator VST VOLTAGE	DEC	Volt	RO	N
261	BB	Generator VTR VOLTAGE	DEC	Volt	RO	N
262	BB	Generator IR Current	DEC	Amp	RO	D
263	BB	Generator IS Current	DEC	Amp	RO	D
264	BB	Generator IT Current	DEC	Amp	RO	D
265	BB	Generator frequency	DEC	Hz	RO	D
266	BB	Total power factor	DEC	Cos	RO	C
267.0	BB	sign Cosphi Tot (1=Cap / 0=Ind) Gen.	BOL		RO	N
267.1	BB	sign Cosphi phase R (1=Cap / 0=Ind) Gen.	BOL		RO	N
267.2	BB	sign Cosphi phase S (1=Cap / 0=Ind) Gen.	BOL		RO	N
267.3	BB	sign Cosphi phase T (1=Cap / 0=Ind) Gen.	BOL		RO	N
268	BBBB	Generator total active power	DECS	W	RO	D
270	BBBB	Generator total reactive power	DECS	var	RO	D
272	BBBB	Generator total apparent power	DEC	VA	RO	D
274	BBBB	Generator active energy produced	DEC	kWh	RO	D**[1]**
276	BBBB	Generator reactive energy	DEC	kvarh	RO	D**[1]**
278	BBBB	Total hour timer	DEC	h	RO	N
280	BB	Minutes of total hour timer	DEC	min	RO	N
281	BBBB	Partial hour timer (- OFF -)	DEC	h	RO	N
283	BB	Minutes of partial hour timer (- OFF -)	DEC	min	RO	N
284.0	BB	1 = Generator Overflow IR current	BOL		RO	N
284.1	BB	1 = Generator Overflow IS current	BOL		RO	N
284.2	BB	1 = Generator Overflow IT current	BOL		RO	N
284.3	BB	1 = Generator Overflow VR VOLTAGE	BOL		RO	N
284.4	BB	1 = Generator Overflow VS VOLTAGE	BOL		RO	N
284.5	BB	1 = Generator Overflow VT VOLTAGE	BOL		RO	N
285	BBBB	Phase R Generator Active power	DECS	W	RO	D
287	BBBB	Phase S Generator Active power	DECS	W	RO	D
289	BBBB	Phase T Generator Active power	DECS	W	RO	D
291	BBBB	Phase R Generator Reactive power	DECS	var	RO	D
293	BBBB	Phase S Generator Reactive power	DECS	var	RO	D
295	BBBB	Phase T Generator Reactive power	DECS	var	RO	D
297	BBBB	Phase R Generator Apparent power	DEC	VA	RO	D
299	BBBB	Phase S Generator Apparent power	DEC	VA	RO	D
301	BBBB	Phase T Generator Apparent power	DEC	VA	RO	D
303	BB	Phase R Generator power factor	DEC	Cos	RO	C
304	BB	Phase S Generator power factor	DEC	Cos	RO	C
305	BB	Phase T Generator power factor	DEC	Cos	RO	C
306	BBBB	Generator active energy absorbed	DEC	kWh	RO	D**[1]**
308	BB	Average tri-phase generator VOLTAGE	DEC	Volt	RO	N
309	BB	Gen. VOLTAGE phase asymmetry (Vff).	DEC	Volt	RO	N
310	BB	Average generator three-phase current	DEC	Amp	RO	D

Note [1]:
If CT is < 100.0, factor is D, otherwise it is N.

10.9.3 "Generator" PARAMETERS

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
512	Bb	Family (Gen.)	DEC		RO	N
512	bB	Instrument type (Gen.)	DEC		RO	N
513	Bb	Version (Gen.)	DEC		RO	N
513	bB	Revision (Gen.)	DEC		RO	N
514	BB	[G21] Generator average values	DEC		RW	N
515	BB	[G02] Generator CT value	DEC	Amp	RW	D
516	BB	[G20] Generator VT value	DEC	Volt	RW	N
517	BB	[G03] Generator default page	DEC		RW	N
518	BB	[G04] Engine started (from frequency) threshold	DEC	Hz	RW	D
519	BB	[G05] Overspeed (from frequency) threshold	DEC	Hz	RW	D
520	BB	[G06] Voltage threshold generator present	DEC	Volt	RW	N
521	BB	[G07] Generator voltage maximum threshold	DEC	Volt	RW	N
522	BB	[G08] Generator voltage minimum threshold	DEC	Volt	RW	N
523	BB	[G10] Cut-in delay time, V and AsymV gen. thresholds	DEC	s	RW	N
524	BB	[G11] Generator frequency maximum threshold	DEC	Hz	RW	D
525	BB	[G12] Generator frequency minimum threshold	DEC	Hz	RW	D
526	BB	[G13] Cut-in delay time, gen. frequency thresholds	DEC	s	RW	N
527	BB	[G14] Gen. Overload alarm threshold (1st level)	DEC	%	RW	N
528	BB	[G17] Cut-in delay time, gen.overload thresholds	DEC	s	RW	N
529	BB	[G15] Generator overload fault threshold (2nd Level)	DEC	%	RW	N
530	BB	[G09] Generator voltage asymmetry threshold (Vff)	DEC	Volt	RW	N
531	BB	[G16] Generator energy reversal threshold	DEC	%	RW	N
532	BB	Generator IR full scale calibration value	DEC		RO	N
533	BB	Generator IS full scale calibration value	DEC		RO	N
534	BB	Generator IT full scale calibration value	DEC		RO	N
535	BB	Generator VR full scale calibration value	DEC		RO	N
536	BB	Generator VS full scale calibration value	DEC		RO	N
537	BB	Generator VT full scale calibration value	DEC		RO	N
538.0	bB	[G22] 1 = Generator SINGLE PHASE mode	BOL		RW	N
539	bB	[G23] Generator F multiplier to obtain RPM	DEC		RW	N

10.9.4 "Generator" STATES

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
768.0	BB	1 = Parameter setting from keyboard in progress	BOL		RO	N
768.1	BB	Generator phases in sequence	BOL		RO	N
768.2	BB	1 = Freezing of generator measurements	BOL		RO	N
768.3	BB	1 = Generator Scope Mode active	BOL		RO	N
768.4	BB	1 = Check of generator live thresholds	BOL		RO	N
768.7	BB	GeneratorTAK signal (intermittent=OK)	BOL		RO	N
769.0	BB	1 = inst. condition Gen. ENERGY REVERSAL	BOL		RO	N
769.1	BB	1 = Inst. condition Gen. MAX CURRENT DISCONNECT	BOL		RO	N
769.8	BB	1 = Inst. condition Gen. OVERVOLTAGE	BOL		RO	N
769.9	BB	1 = Inst. condition Gen. UNDERVOLTAGE	BOL		RO	N
769.10	BB	1 = inst. condition Gen. VOLTAGE ASYMMETRY	BOL		RO	N
769.11	BB	1 = inst. condition Gen. OVERFREQUENCY	BOL		RO	N
769.12	BB	1 = inst. condition Gen. UNDERFREQUENCY	BOL		RO	N
769.13	BB	1 = condition GENERATOR PRESENT	BOL		RO	N
769.14	BB	1 = inst. condition Gen. 1st Lev. OVERLOAD	BOL		RO	N
769.15	BB	1 = inst. condition Gen. 2nd Lev. OVERLOAD	BOL		RO	N
770.1	BB	1 = Command for Gen. MAXV lock	BOL		RO	N
770.2	BB	1 = Command for Gen. MINV lock	BOL		RO	N
770.3	BB	1 = Command for Gen. MAXF lock	BOL		RO	N
770.4	BB	1 = Command for Gen. MINF lock	BOL		RO	N
770.5	BB	1 = Command for Gen. ENERGY REV. lock	BOL		RO	N
770.6	BB	1 = Commad for Gen. ASYMV lock	BOL		RO	N
770.7	BB	1 = OVERLOAD1 (+ OVERLOAD2 = MAXI. RELEASE)	BOL		RO	N
770.10	BB	Gen TAK command output (intermittent=OK)	BOL		RO	N
770.12	BB	0 = Generator section left button pressed	BOL		RO	N
770.13	BB	0 = Generator section right button pressed	BOL		RO	N
771.0	BB	0 = SET button pressed (Generator section)	BOL		RO	N
771.8	BB	0 = Status of Gen. Section HOLD line	BOL		RO	N
771.9	BB	1 = condition ENGINE STARTED (from Gen. freq.)	BOL		RO	N
771.10	BB	1 = Command of OVERLOAD lock from Gen. Frequency	BOL		RO	N
772.2	BB	1 = OVERLOASD2 (+OVERLOAD1 = MAXI RELEASE)	BOL		RO	N

10.9.5 "Supervisor" CONFIGURATION

ADDRESS	TYPO	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
0	Bb	Family	DEC		RO	N
0	bB	Instrument type	DEC		RO	N
1	Bb	Version	DEC		RO	N
1	bB	Revision	DEC		RO	N
2	BB	Serial number	DEC		RO	N
3	BB	VR full scale calibration value	DEC		RO	N
4	BB	VS full scale calibration value	DEC		RO	N
5	BB	VT full scale calibration value	DEC		RO	N

10.9.6 "Supervisor" MEASUREMENTS

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
256	BB	[P40] Maintenance due in	DEC	h	RW	N
257	bB	[P07] Clock Day Week	HEX	DW	RW	N
258	bB	[P05] Clock Hours	HEX	h	RW	N
259	bB	[P06] Clock Minutes	HEX	Min	RW	N
260	bB	Clock Seconds	HEX	s	RO	N
261	BB	Mains VRS voltage	DEC	Volt	RO	N
262	BB	Mains VST voltage	DEC	Volt	RO	N
263	BB	Mains VTR voltage	DEC	Volt	RO	N
264	BB	Average three-phase mains voltage	DEC	Volt	RO	N
265	BB	Mains VR voltage	DEC	Volt	RO	N
266	BB	Mains VS voltage	DEC	Volt	RO	N
267	BB	Mains VT voltage	DEC	Volt	RO	N
268.0	bB	1 = mains VR voltage overflow	BOL		RO	N
268.1	bB	1 = mains VS voltage overflow	BOL		RO	N
268.2	bB	1 = mains VT voltage overflow	BOL		RO	N
269	BB	Battery voltage	DEC	Volt	RO	D
270	BB	Battery charging current	DEC	Amp	RO	D
271	bB	Control panel internal temperature	DECS	°C	RO	N
272	bB	Engine cooling water temperature	DECS	°C	RO	N
273	bB	Engine lube oil temperature	DECS	°C	RO	N
274	bB	Engine lube oil pressure	DECS	Bar	RO	D
275	bB	Fuel level	DEC	%	RO	N
276	bB	Current number of start attempts	DEC		RO	N
277	BB	Number of successful starts	DEC		RO	N
278	BBBB	Engine hour counter	DEC	h	RO	N
280	BB	Time remaining before warranty expiry	DEC	h	RO	N
281	BB	Remaining time E9	DEC	h	RO	N

10.9.7 "Supervisor" PARAMETERS

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
512	bB	[P02] Customization Number	DEC		RO	N
513	bB	[P03] Control Display Language	DEC		RW	N
514	bB	[P04] Default Control Page	DEC		RW	N
515	bB	[P52] Average of Mains electrical measurements	DEC		RW	N
516	bB	[P53] Engine instrument filtering	DEC		RW	N
517	BB	[P51] Mains VT Value	DEC	Volt	RW	N
518	bB	[P34] Water temperature instrument table	DEC		RW	N
519	bB	[P37] Lube oil temperature instrument table	DEC		RW	N
520	bB	[P35] Lube oil pressure instrument table	DEC		RW	N
521	bB	[P36] Fuel level transducer table	DEC		RW	N
522	bB	[P39] Tank zero level threshold	DEC	%	RW	N
523.0	bB	[P14] 0=Out fuel pump / 1=Remote Eng. Start (=1)	BOL		RW	N
524	BB	[P08] Mains Min. V threshold	DEC	Volt	RW	N
525	BB	[P09] Mains Max. V threshold	DEC	Volt	RW	N
526	BB	[P10] Grup cut-in delay	DEC	s	RW	N
527	BB	[P11] Rete Mains return delay	DEC	s	RW	N
528	BB	[P12] Engine cooling time	DEC	s	RW	N
529.0	bB	[P13] 0=Stop de-ener. / 1=Energ.)	BOL		RW	N
530	bB	[P15] STOP command duration	DEC	s	RW	N
531	bB	[P16] PREHEATING command duration	DEC	s	RW	D
532	bB	[P17] Number of start attempts	DEC		RW	N
533	bB	[P18] Duration of start command	DEC	s	RW	D
534	bB	[P19] Inhibition time of alarms from started engine	DEC	s	RW	D
535	bB	[P20] Cut-in delay of TLG when gen. On	DEC	s	RW	N
536	bB	[P21] Delay time TLG/TLR exchange	DEC	s	RW	D
537	bB	[P22] Aural warning sounding time	DEC	s	RW	N
538	bB	[P25] Initial day of periodic test	DEC	DW	RW	N
539	bB	[P23] initial hour of periodic test	DEC	h	RW	N
540	bB	[P24] Initial minute of periodic test	DEC	min	RW	N
541	bB	[P26] Duration of periodic test	DEC	min	RW	N
542.0	bB	[P27] 1 = Freezing of measurements in case of fault	BOL		RW	N
543	bB	[P28] Fuel pump activation threshold	DEC	%	RW	N
544	bB	[P29] Fuel pump stoping threshold	DEC	%	RW	N
545	bB	[P30] Fuel exhausted lock time (0=Off)	DEC	min	RW	N
546	bB	[P31] Fuel reserve alarm threshold	DEC	%	RW	N
547	BB	[P32] Battery minimum voltage alarm threshold	DEC	Volt	RW	D
548	BB	[P33] Battery maximum voltage alarm threshold	DEC	Volt	RW	D
549	bB	[P38] Behavior of FAULT/START2 output	DEC		RW	N
550	bB	[P41] 0=Test Led / 1=Sprinkler / 2=Low rpm	DEC		RW	N
551.0	bB	[P43] 1 = Detection of engine started from alternator en	BOL		RW	N
552	bB	[P42] Cut-in time of emergency stop	DEC	s	RW	N
553	BB	[P44] Cut-in time of EJP1 (0=immediate start)	DEC	s	RW	N
554.0	bB	[P45] 1 = Enabling of GENERICFAULT1 inhibition	BOL		RW	N
555.0	bB	[P46] 1 = Enabling of GENERICFAULT2 inhibition	BOL		RW	N
556.0	bB	[P47] 1 = Enabling of GENERICALARM1 inhibition	BOL		RW	N
557.0	bB	[P48] 1 = Enabling of GENERICALARM2 inhibition	BOL		RW	N
558.0	bB	[P54] 1 = Mains single phase mode	BOL		RW	N
559	bB	[P55] MinV and MinF inhibition time for low rpm	DEC	s	RW	D

10.9.8 "Supervisor" STATES

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
768.0	BB	1 = REMOTE: Short reset request (Silencing)	BOL		RW	N
768.1	BB	1 = REMOTE: Long reset request (Reset)	BOL		RW	N
768.2	BB	1 = REMOTE:	BOL		RW	N
768.3	BB	1 = REMOTE:	BOL		RW	N
768.4	BB	1 = REMOTE:	BOL		RW	N
768.5	BB	1 = REMOTE:	BOL		RW	N
768.6	BB	1 = REMOTE:	BOL		RW	N
768.7	BB	1 = REMOTE:	BOL		RW	N
768.8	BB	1 = REMOTE: SCR / EJP2 mode	BOL		RW	N
768.9	BB	1 = REMOTE: EJP1 mode	BOL		RW	N
768.10	BB	1 = REMOTE:	BOL		RW	N
768.11	BB	1 = REMOTE:	BOL		RW	N
768.12	BB	1 = REMOTE:	BOL		RW	N
768.13	BB	1 = REMOTE:	BOL		RW	N
768.14	BB	1 = REMOTE:	BOL		RW	N
768.15	BB	1 = REMOTE:	BOL		RW	N
769.0	BB	0 = SCR input active	BOL		RO	N
769.1	BB	0 = uTLR input active	BOL		RO	N
769.2	BB	0 = uTLG input active	BOL		RO	N
769.3	BB	0 = EXTINHIBIT input active	BOL		RO	N
769.4	BB	0 = EXTTEST/EJP input active	BOL		RO	N
769.5	BB	0 = LEDTEST/SPRINKLER input active	BOL		RO	N
769.6	BB	0 = MAINSON input active	BOL		RO	N
769.7	BB	0 = POSD input active	BOL		RO	N
769.8	BB	0 = SET button pressed	BOL		RO	N
769.9	BB	0 = RIGHT button pressed	BOL		RO	N
769.10	BB	0 = LEFT button pressed	BOL		RO	N
769.12	BB	0 = Dipswitch 1 ON	BOL		RO	N
769.13	BB	0 = Dipswitch 2 ON	BOL		RO	N
769.14	BB	0 = Dipswitch 3 ON	BOL		RO	N
769.15	BB	0 = Dipswitch 4 ON	BOL		RO	N
770.0	BB	1 = ENGRUNF input(internal) Active	BOL		RO	N
770.1	BB	1 = OVERSPEEDF input(internal) Active	BOL		RO	N
770.2	BB	1 = input(internal) GENON Active	BOL		RO	N
770.3	BB	1 = input(internal) MAXV Active	BOL		RO	N
770.4	BB	1 = input(internal) MINV Active	BOL		RO	N
770.5	BB	1 = input(internal) MAXF Active	BOL		RO	N
770.6	BB	1 = input(internal) MINF Active	BOL		RO	N
770.7	BB	1 = input(internal) ENEREV Active	BOL		RO	N
770.8	BB	1 = input(internal) IVERLOAD1 Active	BOL		RO	N
770.9	BB	1 = input(internal) OVERLOAD2 Active	BOL		RO	N
770.10	BB	input(internal) TAK (intermittent=OK)	BOL		RO	N
770.11	BB	1 = input(internal) ASYMV Active	BOL		RO	N
771.0	BB	0 = MAXFUELLIV input active	BOL		RO	N
771.1	BB	1 = EMESTOP input active	BOL		RO	N
771.2	BB	0 = LOWH2O input active	BOL		RO	N
771.3	BB	0 = GENERICFAULT1 input active	BOL		RO	N
771.4	BB	0 =GENERICFAULT2 input active	BOL		RO	N
771.5	BB	0 = GENERICALARM1 input active	BOL		RO	N
771.6	BB	0 = GENERICALARM2 input active	BOL		RO	N
771.8	BB	0 = TLG button pressed	BOL		RO	N
771.9	BB	0 = STOP button pressed	BOL		RO	N
771.10	BB	0 = START button pressed	BOL		RO	N
771.11	BB	0 = RESET button pressed	BOL		RO	N
771.12	BB	0 = MODE DOWN button pressed	BOL		RO	N

10.9.9 "Supervisor" STATES – CONT.D 1

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
772.0	BB	1 = TEST led on	BOL		RO	N
772.1	BB	1 = OFF led on	BOL		RO	N
772.2	BB	1 = MANUAL led on	BOL		RO	N
772.3	BB	1 = AUTOMATIC led on	BOL		RO	N
772.4	BB	1 = ALARM led on	BOL		RO	N
772.5	BB	1 = START led on	BOL		RO	N
772.6	BB	1 = STOP led on	BOL		RO	N
772.7	BB	1 = LOCK led on	BOL		RO	N
772.8	BB	0 = KEY input active	BOL		RO	N
772.9	BB	0 = LOWOILPRES input active	BOL		RO	N
772.10	BB	0 = HTEMP input active	BOL		RO	N
772.11	BB	0 = OVERSPEED input active	BOL		RO	N
772.12	BB	0 = OVERLOAD input active	BOL		RO	N
772.13	BB	0 = FUELRES input active	BOL		RO	N
772.14	BB	1 = HLEVFUEL input active	BOL		RO	N
772.15	BB	0 = LLEVFUEL input active	BOL		RO	N
773.0	BB	1 = START output on	BOL		RO	N
773.1	BB	1 = STOP output on	BOL		RO	N
773.2	BB	1 = ENGRUN/FUELPUMP output on	BOL		RO	N
773.3	BB	1 = FAULT/START2 output on	BOL		RO	N
773.4	BB	1 = PREHEAT output on	BOL		RO	N
773.5	BB	1 = SPEEDGOVERNOR output on	BOL		RO	N
773.6	BB	1 = TLG output on	BOL		RO	N
773.7	BB	0 = TLR output on	BOL		RO	N
773.8	BB	1 = HORN on	BOL		RO	N
773.9	BB	1 = MAINS LIVE led on	BOL		RO	N
773.10	BB	1 = MCB ON led on	BOL		RO	N
773.11	BB	1 = GCB ON led on	BOL		RO	N
773.12	BB	1 = GENSET LIVE led on	BOL		RO	N
773.13	BB	1 = ENG. RUNNING led on	BOL		RO	N
773.14	BB	1 = SPARE led on	BOL		RO	N
774.0	BB	1 = TAK Overflow (Gen. Control fault)	BOL		RO	N
774.1	BB	1 = EMESTOP inhibition in progress	BOL		RO	N
774.2	BB	1 = EMESTOP inhibition over	BOL		RO	N
774.3	BB	1 = Alarm inhibition in progress	BOL		RO	N
774.4	BB	1 = Alarm Inhibition over	BOL		RO	N
774.5	BB	1 = warning sounding	BOL		RO	N
774.6	BB	1 = warning sounding over	BOL		RO	N
774.7	BB	1 = Check time of ERR9 running	BOL		RO	N
774.8	BB	1 = LOWOILPRES inhibition in progress	BOL		RO	N
774.9	BB	1 = LOWOILPRES inhibition over	BOL		RO	N
774.10	BB	1 = HTEMP inhibition in progress	BOL		RO	N
774.11	BB	1 = HTEMP inhibition over	BOL		RO	N
774.12	BB	1 = MAXFUELLEV inhibition in progress	BOL		RO	N
774.13	BB	1 = MAXFUELLEV inhibition over	BOL		RO	N
774.14	BB	1 = LOWH2O inhibition in progress	BOL		RO	N
774.15	BB	1 = LOWH2O inhibition over	BOL		RO	N

10.9.10 "Supervisor" STATES – CONT.D 2

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
775.0	BB	1 = Delay of start engine	BOL		RO	N
775.1	BB	1 = Delay of start engine over	BOL		RO	N
775.2	BB	1 = OVERLOAD inhibition in progress	BOL		RO	N
775.3	BB	1 = OVERLOAD inhibition over	BOL		RO	N
775.4	BB	1 = OVERSPEED inhibition in progress	BOL		RO	N
775.5	BB	1 = OVERSPEED inhibition over	BOL		RO	N
775.6	BB	1 = Safety stop time running	BOL		RO	N
775.7	BB	1 = Safety stop time over	BOL		RO	N
775.8	BB	1 = PRE-HEAT time running	BOL		RO	N
775.9	BB	1 = PRE-HEAT time over	BOL		RO	N
775.10	BB	1 =uTLR inhibition in progress	BOL		RO	N
775.11	BB	1 = uTLR inhibition over	BOL		RO	N
775.12	BB	1 = uTLG inhibition in progress	BOL		RO	N
775.13	BB	1 = uTLG inhibition over	BOL		RO	N
775.14	BB	1 = COOLING time running	BOL		RO	N
775.15	BB	1 = COOLING time over	BOL		RO	N
776.0	BB	1 = TLG closing delay running	BOL		RO	N
776.1	BB	1 = TLG closing delay over	BOL		RO	N
776.2	BB	1 =TLG/TLR change-over pause running	BOL		RO	N
776.3	BB	1 = TLG/TLR change-over pause over	BOL		RO	N
776.4	BB	1 = Restore to mains time running	BOL		RO	N
776.5	BB	1 = Restore to mains time over	BOL		RO	N
776.6	BB	1 = Periodic test in progress	BOL		RO	N
776.7	BB	1 = Periodic test over	BOL		RO	N
776.8	BB	1 = RESET button filter time running	BOL		RO	N
776.9	BB	1 = RESET button filter over	BOL		RO	N
776.10	BB	1 = Start command time running	BOL		RO	N
776.11	BB	1 = Start command time over	BOL		RO	N
776.12	BB	1 = Start command pause time running	BOL		RO	N
776.13	BB	1 = Start command pause time over	BOL		RO	N
776.14	BB	1 = STOP cycle in progress	BOL		RO	N
776.15	BB	1 = STOP cycle over	BOL		RO	N
777.0	BB	1 = TESTEXT/EJP inhibition in progress	BOL		RO	N
777.1	BB	1 = TESTEXT/EJP inhibition over	BOL		RO	N
777.2	BB	1 = TESTLED/SPRINKLER inhibition in progress	BOL		RO	N
777.3	BB	1 = TESTLED/SPRINKLER inhibition over	BOL		RO	N
777.4	BB	1 = SCR inhibition in progress	BOL		RO	N
777.5	BB	1 = SCR inhibition over	BOL		RO	N
777.6	BB	1 = EXTINHIBIT inhibition in progress	BOL		RO	N
777.7	BB	1 = EXTINHIBIT inhibition over	BOL		RO	N
777.8	BB	1 = FUELRES inhibition in progress	BOL		RO	N
777.9	BB	1 = FUELRES inhibition over	BOL		RO	N
777.10	BB	1 = Fuel exhausted delay running	BOL		RO	N
777.11	BB	1 = Fuel exhausted delay over	BOL		RO	N
777.12	BB	1 = HFUEL inhibition in progress	BOL		RO	N
777.13	BB	1 = HFUEL inhibition over	BOL		RO	N
777.14	BB	1 = LFUEL inhibition in progress	BOL		RO	N
777.15	BB	1 = LFUEL inhibition over	BOL		RO	N
778.0	BB	1 = Engine uncommanded stop inhibition in progress	BOL		RO	N
778.1	BB	1 = MinV battery inhibition in progress	BOL		RO	N
778.2	BB	1 = MaxV battery inhibition in progress	BOL		RO	N
778.3	BB	1 = Low rpm inhibition in progress	BOL		RO	N
778.4	BB	1 = Low rpm inhibition over	BOL		RO	N
778.8	BB	1 = GENERICFAULT1 inhibition in progress	BOL		RO	N
778.9	BB	1 = GENERICFAULT1 inhibition over	BOL		RO	N
778.10	BB	1 = GENERICFAULT2 inhibition in progress	BOL		RO	N
778.11	BB	1 = GENERICFAULT2 inhibition over	BOL		RO	N
778.12	BB	1 = GENERICALARM1 inhibition in progress	BOL		RO	N
778.13	BB	1 = GENERICALARM1 inhibition over	BOL		RO	N
778.14	BB	1 = GENERICALARM2 inhibition in progress	BOL		RO	N
778.15	BB	1 = GENERICALARM2 inhibition over	BOL		RO	N

10.9.11 "Supervisor" STATES – CONT.D 3

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
779.0	BB	1 = Engine FAILED START condition	BOL		RO	N
779.1	BB	1 =Engine FAILED STOP condition	BOL		RO	N
779.2	BB	1 = Engine UNEXPECTED STOP condition	BOL		RO	N
779.8	BB	1 = Common FAULT active	BOL		RO	N
779.9	BB	1 = Common ALARM active	BOL		RO	N
779.10	BB	1 = MULTIPLE ALARMS on condition	BOL		RO	N
779.11	BB	1 = MAINTENANCE request present	BOL		RO	N
779.12	BB	1 = MIN V BATT condition present	BOL		RO	N
779.13	BB	1 = MAX V BATT condition present	BOL		RO	N
779.14	BB	1 = MIN V MAINS condition present	BOL		RO	N
779.15	BB	1 = MAX V MAINS condition present	BOL		RO	N
780.0	bB	1 = ENGINE RUNNING condition (memorized)	BOL		RO	N
780.1	bB	1 = ENGINE RUNNING condition (direct)	BOL		RO	N
780.2	bB	1 = Engine COOLING request present	BOL		RO	N
780.3	bB	1 = STOP request present	BOL		RO	N
781.0	bB	0 = BUS: LOWOILPRES remote input active	BOL		RO	N
781.1	bB	0 = BUS: HTEMP remote input active	BOL		RO	N
781.2	bB	0 = BUS: OVERSPEED remote input active	BOL		RO	N
781.3	bB	0 = BUS: GENERICALARM1 remote input active	BOL		RO	N
781.4	bB	0 = BUS: GENERICFAULT1 remote input active	BOL		RO	N
781.5	bB	0 = BUS: ENGINE RUNNING condition from remote	BOL		RO	N
781.6	bB	0 = BUS: GENERICALARM2 remote input active	BOL		RO	N
781.7	bB	0 = BUS: LOWH2O remote input active	BOL		RO	N
782.0	bB	1 = HOLD of measurements (frozen)	BOL		RO	N
782.1	BB	1 = MAINS present condition (direct)	BOL		RO	N
782.2	BB	1 = MAINS present condition	BOL		RO	N
782.3	BB	1 = SPRINKLER mode active	BOL		RO	N
782.4	BB	1 = Request of TLR/TLG change-over present	BOL		RO	N
782.5	BB	1 = Engine TEST in progress	BOL		RO	N
782.8	BB	1 = Parameter setting from keyboard in progress	BOL		RO	N
782.9	BB	1 = Lock of parameter setting from remote	BOL		RO	N
782.10	BB	1 = Parameter setting from remote in progress	BOL		RO	N
782.11	BB	1 = Clock setting in progress	BOL		RO	N
782.12	BB	1 = Calibration mode active	BOL		RO	N
782.13	BB	1 = Voltage offset calibration in progress	BOL		RO	N
782.14	BB	1 = Voltage full scale calibration in progress	BOL		RO	N
783.0	bB	1 = Check E9 started (used)	BOL		RO	N
783.2	bB	1 = E9 resolved (removed)	BOL		RO	N
783.3	bB	1 = Not covered by warranty	BOL		RO	N
784	Bb	Selector status (0=OFF/1=MAN/2=AUTO/3=TEST)	DEC		RO	N
784	bB	Visual. level (0=Meas / 1=Cover / 2=Para)	DEC		RO	N
785	Bb	Number of visualized page/cover	DEC		RO	N
785	bB	Number of parameter page	DEC		RO	N
786	Bb	Number of current alarm	DEC		RO	N
786	bB	Number of current mode message	DEC		RO	N
787	Bb	Alarm message 0 pointer (0=No alarm)	DEC		RO	N
787	bB	Alarm message1 pointer (0=No alarm)	DEC		RO	N
788	Bb	Alarm message 2 pointer (0=No alarm)	DEC		RO	N
788	bB	Alarm message 3 pointer (0=No alarm)	DEC		RO	N
789	Bb	Alarm message 4 pointer (0=No alarm)	DEC		RO	N
789	bB	Alarm message 5 pointer (0=No alarm)	DEC		RO	N
790	Bb	Alarm message 6 pointer (0=No alarm)	DEC		RO	N
790	bB	Alarm message 7 pointer (0=No alarm)	DEC		RO	N
791	Bb	Alarm message 8 pointer (0=No alarm)	DEC		RO	N
791	bB	Alarm message 9 pointer (0=No alarm)	DEC		RO	N
792	Bb	Alarm message 10 pointer (0=No alarm)	DEC		RO	N
792	bB	Alarm message 11 pointer (0=No alarm)	DEC		RO	N
793	Bb	Alarm message 12 pointer (0=No alarm)	DEC		RO	N
793	bB	Alarm message 13 pointer (0=No alarm)	DEC		RO	N
794	Bb	Alarm message 15 pointer (0=No alarm)	DEC		RO	N
794	bB	Alarm message 15 pointer (0=No alarm)	DEC		RO	N

10.9.12 "Supervisor" EXPANSION

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
Registri 1024 - 1027 = Esp. Futura WO						
1028	bB	Clock date	HEX	Day	RW	N
1029	bB	Clock month	HEX	Month	RW	N
1030	bB	Clock year	HEX	Year	RW	N
Registers 1031 - 1087 = Esp. Futura R/W						
1088	bB	Engine minutes counter	DEC	min	RO	N
1089.0	bB	J1939: 1=Option present	BOL		RO	N
1089.1	bB	ECU communication established	BOL		RO	N
1089.2	bB	J1939: 1=Engine running	BOL		RO	N
1089.3	bB	J1939: 1=Preheating in progress	BOL		RO	N
1089.4	bB	Sending of start request in progress	BOL		RO	N
1089.5	bB	Sending of stop request in progress	BOL		RO	N
1090.0	bB	J1939: 1=Protect Lamp ON	BOL		RO	N
1090.1	bB	J1939: 1=Amber Warning Lamp ON	BOL		RO	N
1090.2	bB	J1939: 1=Red Stop Lamp ON	BOL		RO	N
1090.3	bB	J1939: 1=Malfunction Indicator Lamp ON	BOL		RO	N
1091.0	bB	J1939: 1=Cumulative of lamps	BOL		RO	N
1091.1	bB	J1939: 1=Low lube oil pressure (from engine)	BOL		RO	N
1091.2	bB	J1939: 1=High water temperature (from engine)	BOL		RO	N
1092	BBBB	J1939: SPN (DTC1) Code	DEC		RO	N
1094	bB	J1939: (DTC1) Code	DEC		RO	N
Registers 1095 - 1148 = Esp. Futura RO						

10.9.13 "Supervisor" EVENTS LOG

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
1280	Bb	00 LOG: Date	HEX	Day	RO	N
1280	bB	00 LOG: Month	HEX	Month	RO	N
1281	Bb	00 LOG: Year	HEX	Year	RO	N
1281	bB	00 LOG: Hour	HEX	h	RO	N
1282	Bb	00 LOG: Minutes	HEX	min	RO	N
1282	bB	00 LOG: sonds	HEX	s	RO	N
1283	Bb	00 LOG: Switch status /cause	HEX		RO	N
1283	bB	00 LOG: Event code	DEC		RO	N
1284	Bb	-01 LOG: Date	HEX	Day	RO	N
1284	bB	-01 LOG: Month	HEX	Month	RO	N
1285	Bb	-01 LOG: Year	HEX	Year	RO	N
1285	bB	-01 LOG: Hour	HEX	h	RO	N
1286	Bb	-01 LOG: Minutes	HEX	min	RO	N
1286	bB	-01 LOG: sonds	HEX	s	RO	N
1287	Bb	-01 LOG: Switch status /cause	HEX		RO	N
1287	bB	-01 LOG: Event code	DEC		RO	N
1288	Bb	-02 LOG: Date	HEX	Day	RO	N
1288	bB	-02 LOG: Month	HEX	Month	RO	N
1289	Bb	-02 LOG: Year	HEX	Year	RO	N
1289	bB	-02 LOG: Hour	HEX	h	RO	N
1290	Bb	-02 LOG: Minutes	HEX	min	RO	N
1290	bB	-02 LOG: sonds	HEX	s	RO	N
1291	Bb	-02 LOG: Switch status /cause	HEX		RO	N
1291	bB	-02 LOG: Event code	DEC		RO	N
1292	Bb	-03 LOG: Date	HEX	Day	RO	N
1292	bB	-03 LOG: Month	HEX	Month	RO	N
1293	Bb	-03 LOG: Year	HEX	Year	RO	N
1293	bB	-03 LOG: Hour	HEX	h	RO	N
1294	Bb	-03 LOG: Minutes	HEX	min	RO	N
1294	bB	-03 LOG: sonds	HEX	s	RO	N
1295	Bb	-03 LOG: Switch status /cause	HEX		RO	N

10.9.14 "Supervisor" EVENTS LOG – CONT.D 1

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
1296	Bb	-04 LOG: Date	HEX	Day	RO	N
1296	bB	-04 LOG: Month	HEX	Month	RO	N
1297	Bb	-04 LOG: Year	HEX	Year	RO	N
1297	bB	-04 LOG: Hour	HEX	h	RO	N
1298	Bb	-04 LOG: Minutes	HEX	min	RO	N
1298	bB	-04 LOG: Seconds	HEX	s	RO	N
1299	Bb	-04 LOG: Switch status /cause	HEX		RO	N
1299	bB	-04 LOG: Event code	DEC		RO	N
1300	Bb	-05 LOG: Date	HEX	Day	RO	N
1300	bB	-05 LOG: Month	HEX	Month	RO	N
1301	Bb	-05 LOG: Year	HEX	Year	RO	N
1301	bB	-05 LOG: Hour	HEX	h	RO	N
1302	Bb	-05 LOG: Minutes	HEX	min	RO	N
1302	bB	-05 LOG: Seconds	HEX	s	RO	N
1303	Bb	-05 LOG: Switch status /cause	HEX		RO	N
1303	bB	-05 LOG: Event code	DEC		RO	N
1304	Bb	-06 LOG: Date	HEX	Day	RO	N
1304	bB	-06 LOG: Month	HEX	Month	RO	N
1305	Bb	-06 LOG: Year	HEX	Year	RO	N
1305	bB	-06 LOG: Hour	HEX	h	RO	N
1306	Bb	-06 LOG: Minutes	HEX	min	RO	N
1306	bB	-06 LOG: Seconds	HEX	s	RO	N
1307	Bb	-06 LOG: Switch status /cause	HEX		RO	N
1307	bB	-06 LOG: Event code	DEC		RO	N
1308	Bb	-07 LOG: Date	HEX	Day	RO	N
1308	bB	-07 LOG: Month	HEX	Month	RO	N
1309	Bb	-07 LOG: Year	HEX	Year	RO	N
1309	bB	-07 LOG: Hour	HEX	h	RO	N
1310	Bb	-07 LOG: Minutes	HEX	min	RO	N
1310	bB	-07 LOG: Seconds	HEX	s	RO	N
1311	Bb	-07 LOG: Switch status /cause	HEX		RO	N
1311	bB	-07 LOG: Event code	DEC		RO	N
1312	Bb	-08 LOG: Date	HEX	Day	RO	N
1312	bB	-08 LOG: Month	HEX	Month	RO	N
1313	Bb	-08 LOG: Year	HEX	Year	RO	N
1313	bB	-08 LOG: Hour	HEX	h	RO	N
1314	Bb	-08 LOG: Minutes	HEX	min	RO	N
1314	bB	-08 LOG: Seconds	HEX	s	RO	N
1315	Bb	-08 LOG: Switch status /cause	HEX		RO	N
1315	bB	-08 LOG: Event code	DEC		RO	N
1316	Bb	-09 LOG: Date	HEX	Day	RO	N
1316	bB	-09 LOG: Month	HEX	Month	RO	N
1317	Bb	-09 LOG: Year	HEX	Year	RO	N
1317	bB	-09 LOG: Hour	HEX	h	RO	N
1318	Bb	-09 LOG: Minutes	HEX	min	RO	N
1318	bB	-09 LOG: Seconds	HEX	s	RO	N
1319	Bb	-09 LOG: Switch status /cause	HEX		RO	N
1319	bB	-09 LOG: Event code	DEC		RO	N
1320	Bb	-10 LOG: Date	HEX	Day	RO	N
1320	bB	-10 LOG: Month	HEX	Month	RO	N
1321	Bb	-10 LOG: Year	HEX	Year	RO	N
1321	bB	-10 LOG: Hour	HEX	h	RO	N
1322	Bb	-10 LOG: Minutes	HEX	min	RO	N
1322	bB	-10 LOG: Seconds	HEX	s	RO	N
1323	Bb	-10 LOG: Switch status /cause	HEX		RO	N
1323	bB	-10 LOG: Event code	DEC		RO	N

10.9.15 "Supervisor" EVENTS LOG – CONT.D 2

ADDRESS	TYPE	DESCRIPTION	FORMAT	U.M.	AUTH.	FACTOR
1324	Bb	-11 LOG: Date	HEX	Day	RO	N
1324	bB	-11 LOG: Month	HEX	Month	RO	N
1325	Bb	-11 LOG: Year	HEX	Year	RO	N
1325	bB	-11 LOG: Hours	HEX	h	RO	N
1326	Bb	-11 LOG: Minutes	HEX	min	RO	N
1326	bB	-11 LOG: Seconds	HEX	s	RO	N
1327	Bb	-11 LOG: Switch status /cause	HEX		RO	N
1327	bB	-11 LOG: Event code	DEC		RO	N
1328	Bb	-12 LOG: Date	HEX	Day	RO	N
1328	bB	-12 LOG: Month	HEX	Month	RO	N
1329	Bb	-12 LOG: Year	HEX	Year	RO	N
1329	bB	-12 LOG: Hours	HEX	h	RO	N
1330	Bb	-12 LOG: Minutes	HEX	min	RO	N
1330	bB	-12 LOG: Seconds	HEX	s	RO	N
1331	Bb	-12 LOG: Switch status /cause	HEX		RO	N
1331	bB	-12 LOG: Event code	DEC		RO	N
1332	Bb	-13 LOG: Date	HEX	Day	RO	N
1332	bB	-13 LOG: Month	HEX	Month	RO	N
1333	Bb	-13 LOG: Year	HEX	Year	RO	N
1333	bB	-13 LOG: Hours	HEX	h	RO	N
1334	Bb	-13 LOG: Minutes	HEX	min	RO	N
1334	bB	-13 LOG: Seconds	HEX	s	RO	N
1335	Bb	-13 LOG: Switch status /cause	HEX		RO	N
1335	bB	-13 LOG: Event code	DEC		RO	N
1336	Bb	-14 LOG: Date	HEX	Day	RO	N
1336	bB	-14 LOG: Month	HEX	Month	RO	N
1337	Bb	-14 LOG: Year	HEX	Year	RO	N
1337	bB	-14 LOG: Hours	HEX	h	RO	N
1338	Bb	-14 LOG: Minutes	HEX	min	RO	N
1338	bB	-14 LOG: Seconds	HEX	s	RO	N
1339	Bb	-14 LOG: Switch status /cause	HEX		RO	N
1339	bB	-14 LOG: Event code	DEC		RO	N
1340	Bb	-15 LOG: Date	HEX	Day	RO	N
1340	bB	-15 LOG: Month	HEX	Month	RO	N
1341	Bb	-15 LOG: Year	HEX	Year	RO	N
1341	bB	-15 LOG: Hours	HEX	h	RO	N
1342	Bb	-15 LOG: Minutes	HEX	min	RO	N
1342	bB	-15 LOG: Seconds	HEX	s	RO	N
1343	Bb	-15 LOG: Switch status /cause	HEX		RO	N
1343	bB	-15 LOG: Event code	DEC		RO	N

10.10 Solution of Modbus communication problems

The system does NOT respond only in three cases:

- Hardware Failure (wrong connections, card off, hardware fault, ...)
- The Node Address is not the nose address of the card
- The CRC of the telegram is incorrect.

10.11 Programming of parameters from remote

Make sure the group is not in a condition to cause dangerous situations, in particular at unattended workstations.
The new values of the parameters that are accepted are operative IMMEDIATELY, and modify the behavior of the AGSC-10 instantaneously.

Nearly all the programmable parameters of the AGSC-10 can be accessed and modified through the Modbus registers.
For the new values to be accepted, it is necessary that the AGSC-10 section affected by the parameter modification attempt is NOT in the programming from keyboard mode, i.e. the display does not show legend "Pxx" or "Gxx."

10.12 Commands from remote

Make sure the group is not in a condition to cause dangerous situations, in particular at unattended workstations.
The accepted commands are operative IMMEDIATELY, and modify the behavior of the AGSC-10 instantaneously.

You can also send some commands from remote to the ASGC-10 via Modbus; the address is address 768 of the "Supervisor" section.
For the new values to be accepted, it is necessary that the AGSC-10 section affected by the parameter modification attempt is NOT in the programming from keyboard mode, i.e. the display does not show legend "Pxx" or "Gxx."

The supported commands are:

- **Short reset (768.0).**
  Sending "1" to bit 0 of address 768 has the same effect as a short push on the Reset button of the keyboard. This is particularly useful to silence an aural warning.
- **Long reset (768.1).**
  Sending "1" to bit 1 of register 768 has the same effect as pressing and holding the Reset button of the keyboard. This is particularly useful to carry out a fault reset from remote.
- **Enabling/disabling of automatic start request in "SCR" mode (EJP2) (768.8).**
  The command operates only if the AGSC-10 is in "Automatic" mode.
  Sending "1" to bit 8 of register 768 has the same effect as controlling line J1-3, while sending "0" is the same as removing the command.
  All the limits and conditions already described for automatic starting from the "SCR" line apply.
  See the details in the "Automatic operating mode" section.
- **Enabling/disabling of automatic start request in "Test" mode (EJP1) (768.9).**
  The command operates only if the AGSC-10 is in "Automatic" mode.
  Sending "1" to bit 9 of register 768 has the same effect as controlling line J1-7, while sending "0" is the same as removing the command.
  All the limits and conditions already described for automatic starting from the "SCR" line apply.
  See the details in the "Automatic operating mode" section. .

11 ADVANCED USE – "SCOPE" Diagnostic Mode

The "Generator" section of the AGSC-10 is capable of showing the waveforms of the measured voltages and currents.
This is done in two manners:

- Through suitable Modbus commands (low speed), designated "GRAPH MODE."
  It is transparent to the normal operating mode and does not create any type of interference.
  It is executed as any Modbus command, except that Baud rate MUST be 115,200 bps.
  The three-phase segment of voltages and currents is shown on 62 actual points in a time window of approximately 26 ms, i.e. slightly more than a 50 Hz sinusoidal curve.

- In exclusive mode, called "SCOPE MODE" (high speed).
  It requires that the "Generator" section temporarily suspends its functions for the measurement and control of the electrical parameters to perform the high speed transmission of the current and voltage samples by use of a proprietary protocol operating at 115,200 bps.
  The three-phase segment of voltages and currents is shown on 240 actual points in a time window of approximately 100 ms, i.e. about two 50 Hz sinusoidal curves.
  This mode is accessed from the normal operating mode through a special Modbus command as described in the section covering the Modbus registers.
  Given that the engine is generally running when this mode is accessed, dangerous situations may arise because the electrical protections are no longer available. Therefore, a warning comes in view on the display, and a 30-second safety time has been included at the expiry of which, if you have not yet exited the "SCOPE" mode, the AGSC-10 carries out an automatic reset of the "Generator" section, and stops the engine, for safety reasons.

  If you want to extend the diagnosis time beyond 30 seconds, you must press the 

button of the "Generator" section, and the 30 seconds are set again.

Two software packages are currently available to permit these functions to be used:

- **SW-MBCOMM-DEMO**: it gives an overview of the behavior of the electrical signals in both modes (GRAPH and SCOPE)
- **SW-SCOPE-PRO**: it is applicable to the "SCOPE" mode only and provides accurate measurements and harmonic analyses.

See the User's manual of the software programs for further detail.

12 Leading Particulars

Auxiliary power supply

Voltage:	
- nominal value in Vdc from battery	**12 or 24 Vdc**
- field of use	**0.9...1.3 UAUX**
- maximum burden	**4 W**

Type of measurement

Voltages, currents and powers	**True RMS up to 20th harmonics**
Voltages and currents	**Peak factor = 2.5**

Voltage input circuits

Line-line voltage:	
- direct input models	**max 500 V**
- models with input from TV/100	**max 125 V**
- permanent overload	**120%**
- thermal overload (1 s)	**150%**
- input impedance of direct input circuits	**≈ 2 MΩ Phase-Neutral/Phase-Phase**
- input impedance of circuits with input from TV/100	**≈ 500 KΩ Phase-Neutral/Phase-Phase**
- adjustment range of TV ratio	**50…4615VLN (87… 8kVLL)**

Current input circuits

Current:	
- nominal current	**5 A**
- permanent overload	**120%**
- thermal overload (5 s) (1.2VA at the terminals)	**200%**
- adjustment range of TA ratio	**5…4500**

Voltage measurement at terminals

Measurement range:	
- measurement range VLN (phase voltage with direct input)	**0...290 V (0…500VLL)**
- measurement range VLN (phase voltage with input from TV/100)	**0... 72.5 V (0…125VLL)**
- precision	**0.5% f.s ± 2 digits**

Current measurement at terminals

Measurement range:	
- measurement range with input on secondary TA	**0.05...5.00 A**
- precision within measurement range 0.05...5.00 A	**0.5% f.s ± 2 digits**

Frequency measurement on single-phase V1

Measurement range:	
- nominal value (1)	**50 / 60 Hz**
- measurement range	**45...80 Hz**
- precision	**0.3% vm ± 1 digit**
- response time	**< 300mS**

Active Power Measurement (P1, P2, P3)

- measurement range	**85 MW**
- precision	**1% f.s ± 2 digits**

Reactive Power Measurement (Q1, Q2, Q3)

- measurement range	**85 MVAR**
- precision	**1% f.s ± 2 digits**

Apparent Power Measurement (S1, S2, S3)

- measurement range	**85 MVA**
- precision	**1% f.s ± 2 digits**

Active Energy Measurement (Wh)

- import / export counters	**Two, separate**
- can be set to zero	**Yes**
- counting time	**15 minutes**
- energy count	**4.294.967.295 kWh**
- precision with current 0.05...1.0 In	**2% fs ± 2 digits**

Reactive Energy Measurement (VARh)

- energy count	**4.294.967.295 kVARh**
- can be set to zero	**Yes**
- counting time	**15 minutes**
- precision with current 0.05...1.0 In	**2% fs ± 2 digits**

Power factor measurement

- measurement range cosφ	**-1…0…+1**
- precision with current 0.1...1.0 In and voltage 0.8...1.2 Un	**2% fs ± 2 digits**

Measurement of equivalent three-phase voltages

- equivalent voltage measurement on 3-phase sys. without neutral	**V=(V12+V23+V31)/3**

Operating hours

- Total operating hours	**hh:mm auxiliary power present**
- Partial operating hours	**hh:mm from previous reset**

Digital filter

- Time constant of measurement integration	**Average 1…15**

Compatible current transformers

- Nominal current	**5 A**
- Transformation ratio	**1…900**

Mechanical characteristics

- mounting type	**built-in according to DIN43700**
- protection grade	**full device IP20/ front IP55**

Electrical characteristics of serial port

Electrical insulation

- RS 485	**3kV**

Environmental conditions

Ambient temperature:

- Nominal range	**0...+45 °C**
- Extreme range	**-5...+55 °C**
- Storage temperature	**-10...+70 °C**
- Relative humidity	**10...95 %**
- Atmospheric pressure	**70...110 kPa**

Reference standards:

CEI standards:

- Safety	CEI EN 61010-1 300V CLASS III
- Precision	CEI EN 60688
- Electromagnetic compatibility (Immunity)	CEI EN 61000-6-2 (ex EN 50082-2)
- Electromagnetic compatibility (Emission)	CEI EN 61000-6-4 (ex EN 50081-2)
- Case protection grade (IP rating)	CEI EN 60529

13 Annex – Version ETH2S (Ethernet-RS485)

13.1 Introduction

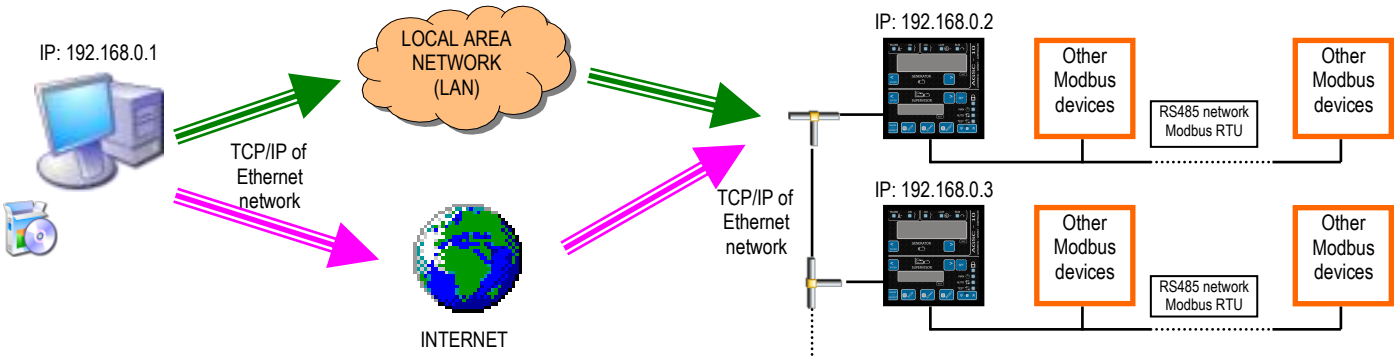
AGSC-10.ETH2S has a transparent and totally autonomous Ethernet-RS485 conversion section.

The software installation kit **SW-BDST-ETH2S (Bytronic Device Server Toolkit)** is supplied, which permits configuring both the LAN section so that it can be used as a virtual RS232 serial port, and the personal computer to use its TCP/IP connection as any RS 232 serial port.
The TCP/IP packages on the Ethernet LAN are converted to serial binary data in a manner that is completely transparent for the user.

Hence, after you have installed the software package on the PC and connected an AGCS-10 to the same LAN as the PC, the utilities allow you to:

- Assign a **unique IP address** to the unit (e.g. 192.168.0.2)
- Create a **virtual port** "COMx" (e.g. COM6) on the PC for every AGSC-10.ETH2S available in the network, which refers to the IP address of the AGSC-10 provided the latter is reachable, for instance through a successful performance of the "ping" of its address. Any supervision software (SCADA or other) that has the communication protocol Modbus RTU that sends its data to the created virtual RS232 port will be able to dialog with the corresponding AGSC-10 with no need for protocol conversion.

After the above procedure is completed, communication will be possible not only with the corresponding AGSC-10.ETH2S, but also with ALL the MODBUS devices connected in its RS485 network, which, as already specified, must communicate at the same Baud rate and can receive the Modbus RTU requests at their node address.



13.2 ETH2S Connections

J11	Signal	Description	Notes
1	RS485-A ETH	RS485 connection of ETH2 card.	To be connected to J4-37
2	Not connected		
3	RS485-B ETH	RS485 connection of ETH2 card.	To be connected to J4-36

LAN-WEB	Ethernet connection to the Local Area Network.

J12	Signal	Description	Notes
1	Not connected		
2	ETH **Positive** Power supply	Positive power supply connection	Connect to J10-55 in case of 12V systems. For 24V systems, connect to J1-56
3	ETH **Negative** Power supply	Negative power supply connection	Connect to J10-58

J13	Not used in version ETH2

13.3 Leading particulars of the ETH2S version

As to the Ethernet interface (LAN-WEB connection):

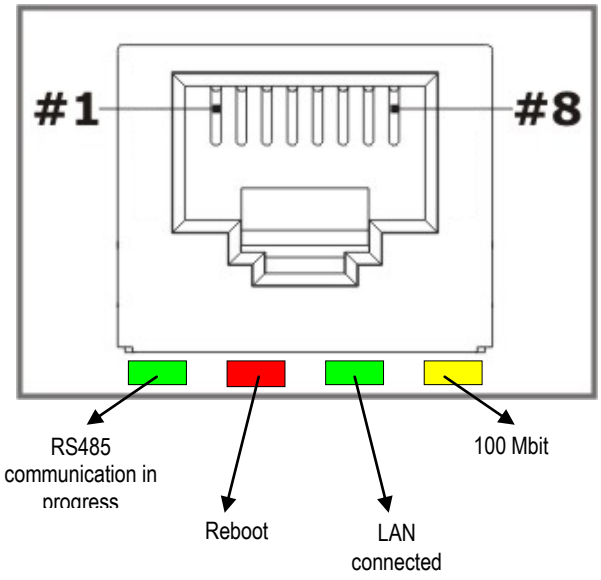
- Ethernet connector to standard **RJ45**
- Baud rate of the Ethernet: port **10/100 Mbit**
- Indication of operating status through **four diagnostic leds**
- **Electrically insulated** Ethernet port
- Independent power supply (it is not supplied through the Ethernet cable or the data network)
- Supports **protocols UDP, ICMP (ping), DHCP** (without Virtual COM)
- Operating temperature [-5 ÷ +55] °C

As to the RS485 section (connection J11):

- Transmission Baud rate on RS485 **from 150 to 115200 bps,** to be specified in the order
- RS485 **electrically insulated** up to 3kV

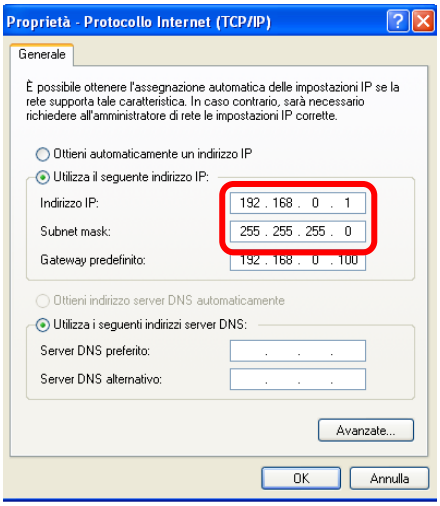
The green led (**ON**) indicates that the option ETH2 is supplied with electrical power.
The yellow led (**GO**) is not used.

Below the network connector there are four leds (below the white plastics mask) that have the following meaning:



13.4 Pre-requirements and important advice

- In order to achieve a correct communication between the PC and the AGSC-10 via LAN it is necessary that the IP address of the PC and the IP address that will be assigned to the AGSC-10 by use of the configuration software belong to the same subnet.
  The IP address and the subnetwork on a PC that uses a Windows (™) operating system can be read in the network connection properties, in the Network Protocol item (TCP/IP):



  In the example we see that the subnet mask "locks" the first three digits of the IP address of the network, hence the first three digits of the AGSC-10 will have to be the same (192.168.0).
  The last digit must be unique in the network, i.e. it must be different from the last digit of any other device connected in the same LAN.

- The Baud rate RS485 of the two AGSC-10 sections ("Generator" and "Supervisor") must be the same as that in the ETH2S option because each section has its own parameter (G18 for the "Generator" section and P49 for the "Supervisor" section). Refer to the manual covering the AGSC-10.

- The Modbus node numbers of the two AGSC-10 sections ("Generator" and "Supervisor") must be unique in the RS485 network because each section has its own parameter (G18 for the "Generator" section and P49 for the "Supervisor" section). Refer to the manual covering the AGSC-10.

13.5 Example of an expansion project of a Modbus network with AGSC-10.ETH2S

Let's assume that there is a pre-existing RS485 Modbus RTU network with three devices having addresses 1, 2 and 3.
Let's assume that the devices communicate at 19200 bps with a PC on which there is installed a management system that uses the serial port fitted with an RS485 converter.
For logistics reasons, it is preferred to retain the original management software with a possible extension to the management of the AGSC-10, but the PC will no longer have direct access to the local RS485 network that will have to be managed from remote via LAN or INTERNET.
You will have to proceed as follows:

- Order an AGSC-10 with code **AGSC-10.ETH2S**
- Get the installation kit **SW-BDST-ETH2S (Bytronic Device Server Toolkit)**
- Using the special AGSC-10 configuration utility (**DS Manager – Network Settings**), correctly set the IP address in full consistency with the subnet, and also set the other Network configuration parameters (see use of DS Manager) making first of all sure that the PC port is not already used by the PC for TCP or UDP (for example use command NETSTAT –A to obtain a list of the ports in use)
- With the same utility (**DS Manager – Serial Settings**), set the serial communication parameters to 19200,n,8,1
- Install the AGSC-10 in the RS485 network by assigning unique node numbers to the two sections ("Generator" and "Supervisor") (e.g. 4 and 5) ,and set the Baud rate of each section to 19200 bps (G18 = 1 and P49 = 1)
- Connect the AGSC-10 to its local area network and make sure it can be accessed by the PC (for instance, use the "ping" command at the IP address of ASGC-10 to make sure it responds). In case of connection via Internet, you will have to correctly configure the gateways of the respective access points and make a test to check accessibility.
- On the PC, install the virtual serial port by use of the **VSP Manager** utility so that the so-created COM port refers to the IP address and TCP/UDP port number of the AGSC-10.
- Configure the Modbus RTU configuration software as necessary to use the so-created virtual COM port.

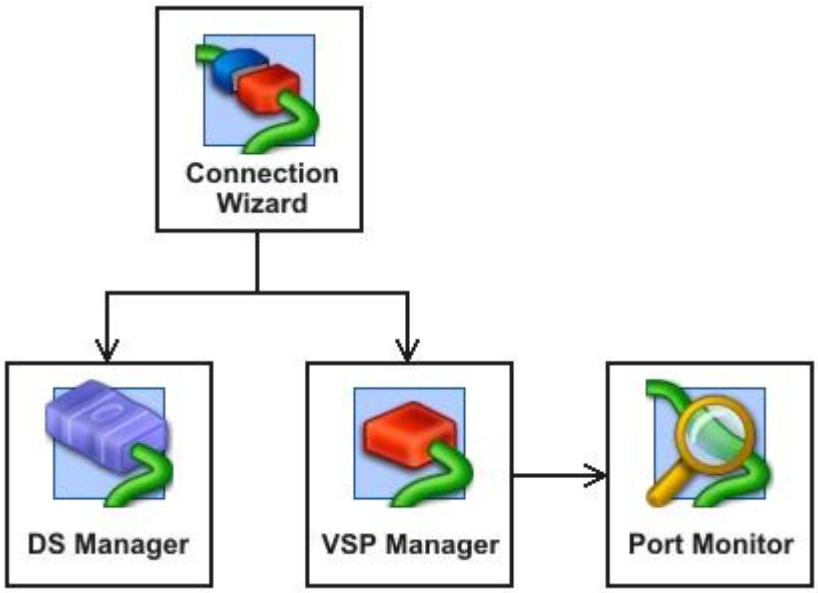
If you have carried out all operations correctly, the management software can connect in a fully transparent manner to the same devices with which it communicated before, without requiring any modification (Modbus addresses 1, 2 and 3). In addition, it will now be able to be expanded to manage the data of the AGSC-10 at addresses 4 and 5.

The big advantages provided are essentially two:

- Remote control via LAN/Internet has been achieved not only as to the AGSC-10 device, but as to an entire RS485 network
- The original management software has been retained, which has no need to be re-written, but only expanded.

13.6 BDST – Bytronic Device Server Toolkit

It is a software package for Windows XP (SP2 or SP3) or Windows 7 featured by 4 main software components, that will be installed in the same workgroup:

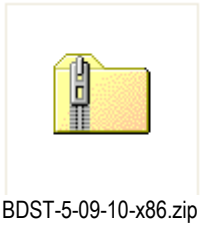


- **DS Manager (Device Server Manager)** – it is used to localize and program the **ETH2S** device (assignment of IP, programming of the serial port, etc.)
- **VSP Manager (Virtual Serial Port Manager)** –it is used to create a virtual serial port associated to an **ETH2S** device starting from the IP assigned to the latter
- **Connection Wizard** – it supplies a simplified procedure for the association of an **ETH2S** device to a virtual serial port
- **Port Monitor** – it records every change (opening and closing) and all the traffic on the created virtual serial port.

13.6.1 BDST - Installation

The package comes as an archive file (.Zip) whose name is included in the version that characterizes the interface software of the device **ETH2S**.

32bit Version



BDST-5-09-10-x86.zip

64bit Version

BDST-5-09-10-amd64.zip

(In the file indicated in the figure, the software version is 5.9.10).

1. Unpack the archive into a folder (e.g. C: \ TMP).
2. In this folder, locate the file**. EXE**

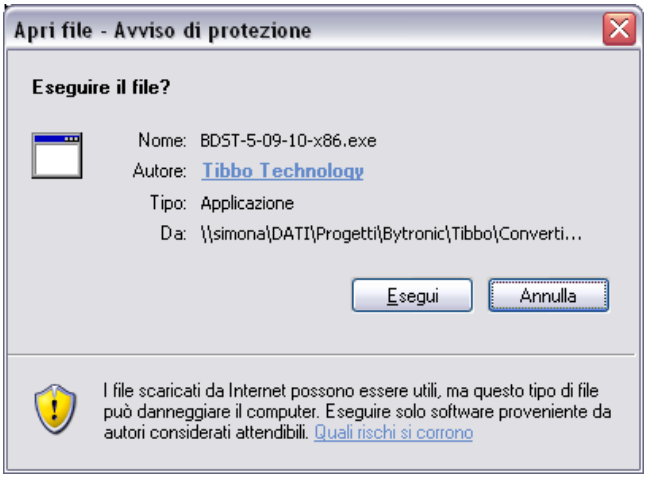
32bit Version

BDST-5-09-10-x86.exe

64bit Version

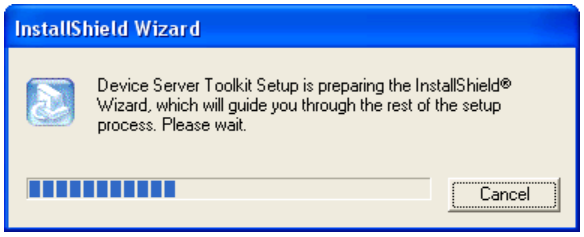
BDST-5-09-10-amd64.exe

3. Start the program. EXE with a double-click of the mouse. The following Windows appear:



Continue pressing the button: RUN

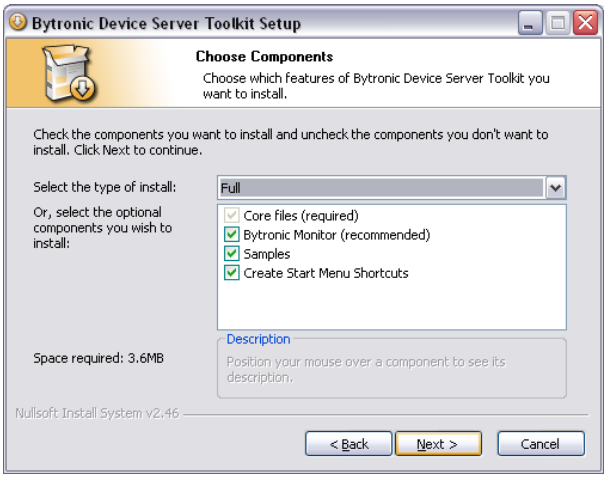
4. Start the installation procedure:



5. When the bar will come to the end, a new window will appear regarding the acceptance of the license terms

Press the button I AGREE to continue, CANCEL to exit the installation

6. At this point the user can select which optional components to install.
We suggest you do not install the examples (SAMPLES), nor shortcuts (MENU SHORTCUTS).

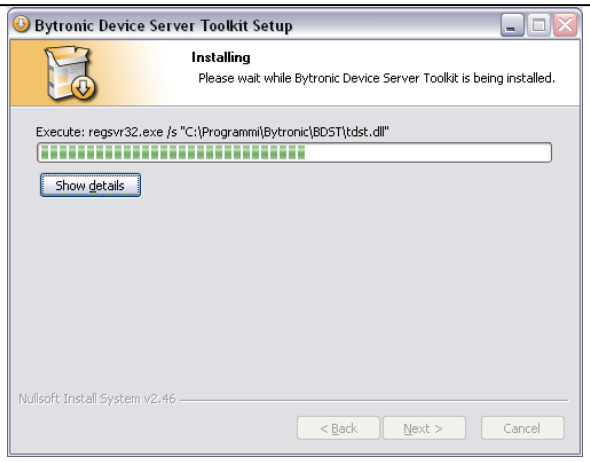


Press BACK to return to the previous window, NEXT to accept and continue, CANCEL to end

It is proposed to the user a route to install the necessary files. By default, the route is ..\PROGRAMMI\BYTRONIC\BDST

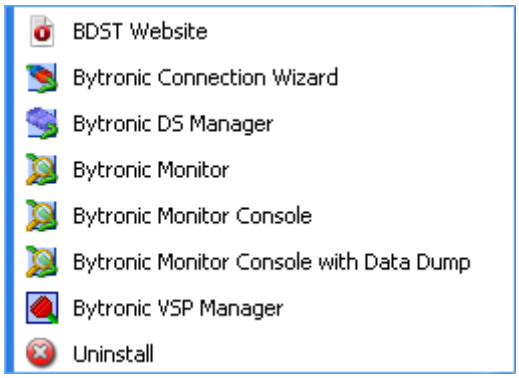
By default will be created in the programs bar a *Bytronic* group containing the various software components.
Press BACK to return to the previous window, INSTALL to continue, CANCEL to end, and BROWSE to provide an additional route

7. Copy the necessary files. Wait until the operation is completed.



8. Procedure completed.

The process is completed, the files have been copied to HD in the chosen route and the working group with the components of the package has been created on the programs bar.

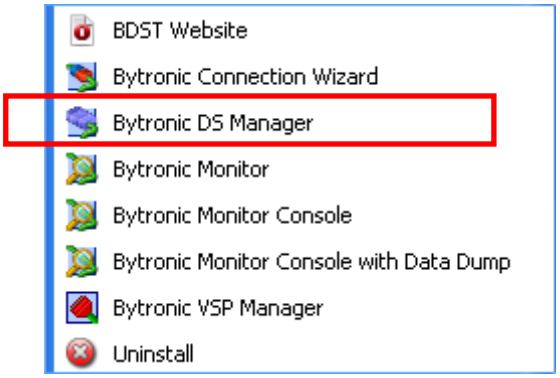


Press FINISH to finish.

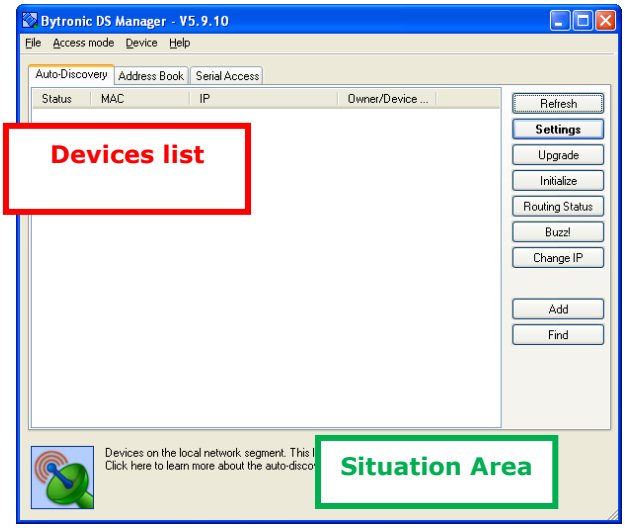
13.6.2 DS Manager – Device Server Manager

This component **BDST** allows you to program the device **ETH2S.**
Start the program

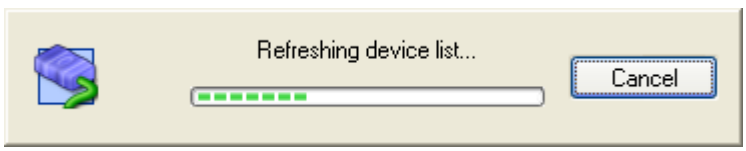
by the working group on the programs bar:

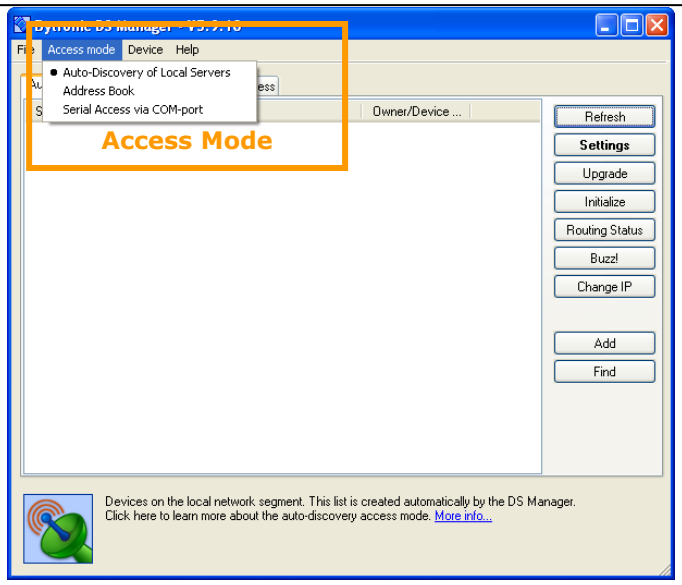


The program will show a window like this:



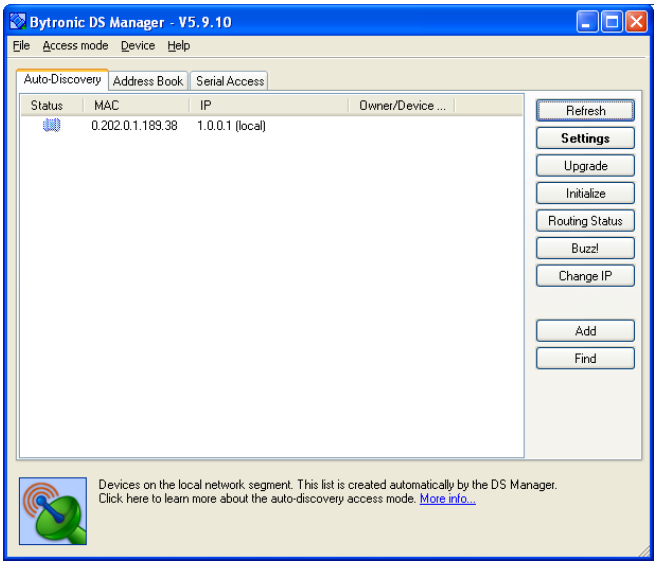
After connecting and powering up the device **ETH2S** to your network using the proper cable, start the program. On the area of the list of devices will be highlighted all devices **ETH2S** detected. The update of this list shall apply when the user presses the REFRESH button





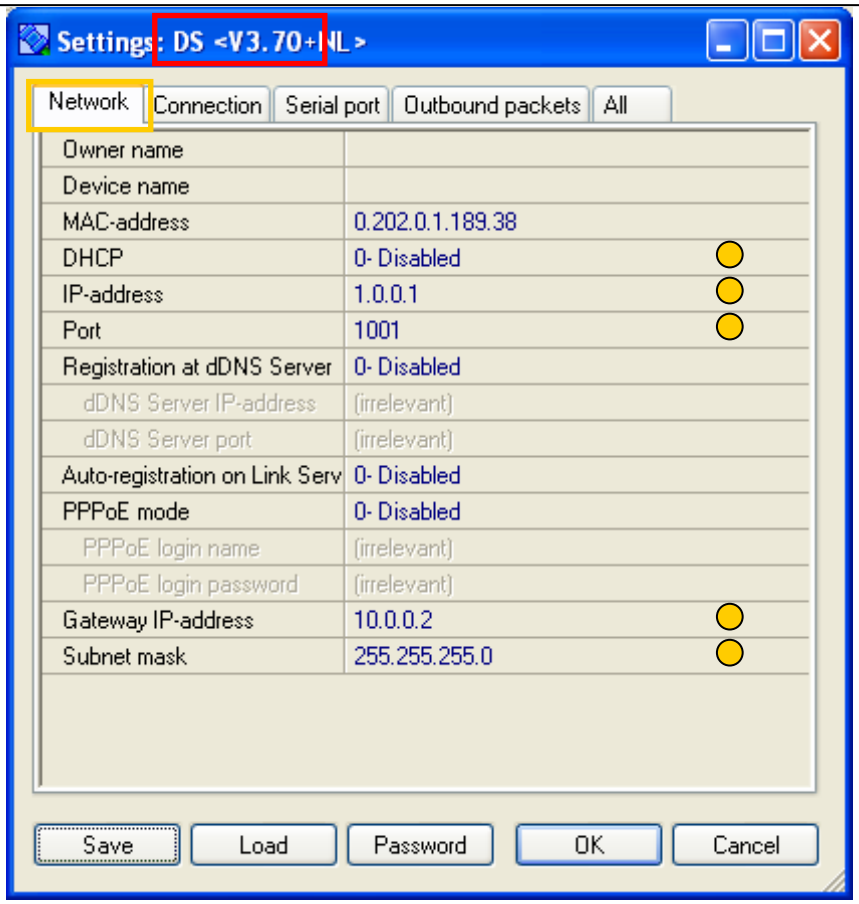
Make sure that the ACCESS MODE option (located in the homonymous menu) is set to AUTO-DISCOVERY OF LOCAL SERVERS so that the research done on the entire LAN (meaning that the search will be performed on the same subnet or on devices connected through HUB / SWITCH without Routers, Bridges, Firewall, etc.).

For each device identified, his MAC code (a unique identifier) and the IP address will be displayed. The default IP address is owned by the device IP = 1.0.0.1 and should certainly be changed to allow their use. In addition, only two alphanumeric parameters are displayed (OWNER and DEVICE N.) that does not have a value to use, but serve to better identify the different devices. Initially, these two parameters have no value.



When the device has not yet been programmed and the IP is the default one, it is not reachable through the TCPIP protocol and for this reason its icon is knurled (GRAYED) and its status is indicated in the status area (bottom part of the window):

To use the device you will have to program by pressing the SETTINGS button that shows the next page:



In the title of the window, appears the version of the software component (in the figure that version is 3.70)

in the **NETWORK SETTINGS** tab, you can set the following parameters by clicking with the mouse to the right of the parameter of interest (for brevity will be documented only those of interest):

- OWNER NAME: optional, is used to identify the device(TEST in the example)
- DEVICE NAME:
  Optional, used to identify the device(Device 1 in this example)
- MAC-ADDRESS: This is the 6 fields identification code of the device.
  We suggest to DO NOT change it even if you can do it (it is an option that you can use only in very special cases)
- DHCP: can be ENABLED or DISABLED. When this option is disabled, then the device will use the IP as the setting of the next parameter IP-ADDRESS. If it is enabled, then the device will wait to receive an IP from the network server. Ask to your system administrator whether to enable or not this option
- IP-ADDRESS: is the IP address that the device **ETH2S**, will assume, if the DHCP option has been disabled. When choosing the IP address must meet two basic requirements:

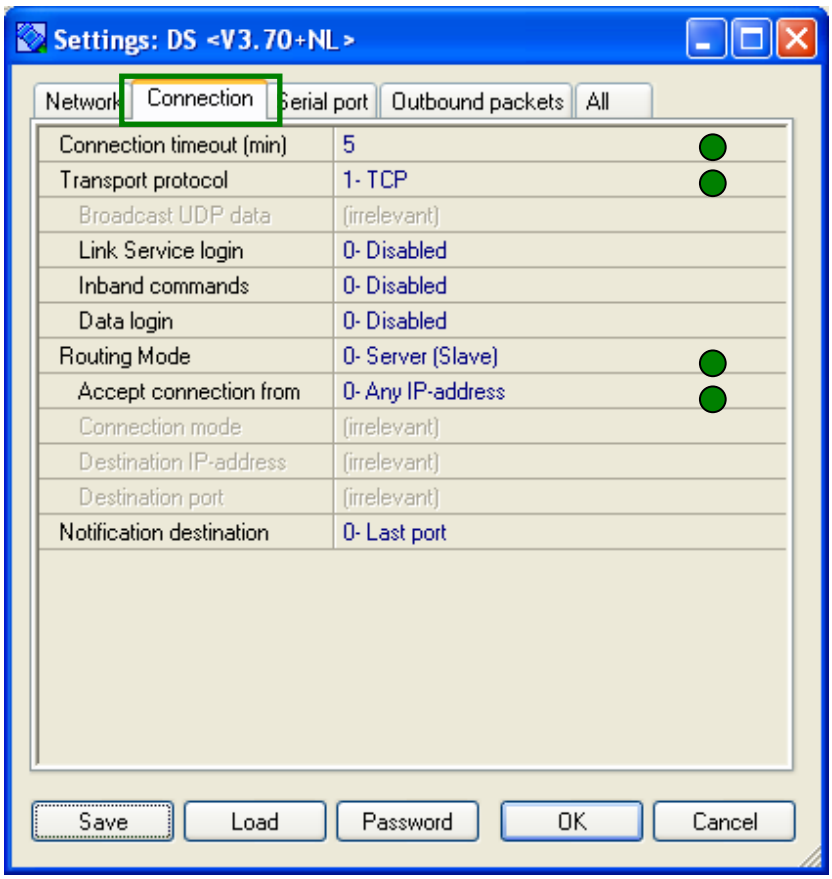
  1. the chosen IP must be **free**, that is not used by any other device connected to the network
  2. IP chosen must be **accessible**, i.e. it must be possible, through the PING command of this address to get a response (see Appendix A for the PING command).

  If you need to change only the IP of the device you can directly use the IP CHANGE button on the main window (in the example IP = 10.0.0.110).

  PORT: is the logical port that will be used by the transport protocol and should be a free port of the system. Usually, the port 1001 is free (to know what their free ports you need to use the NETSTAT command from the command prompt - see Appendix B).

- GATEWAY IP-ADDRESS: (in the example: 10.0.0.2)

- SUBNET MASK: usually 255.255.255.0



On **CONNECTION** tab you can set some basic parameters for the mode of transport (TCP / IP).

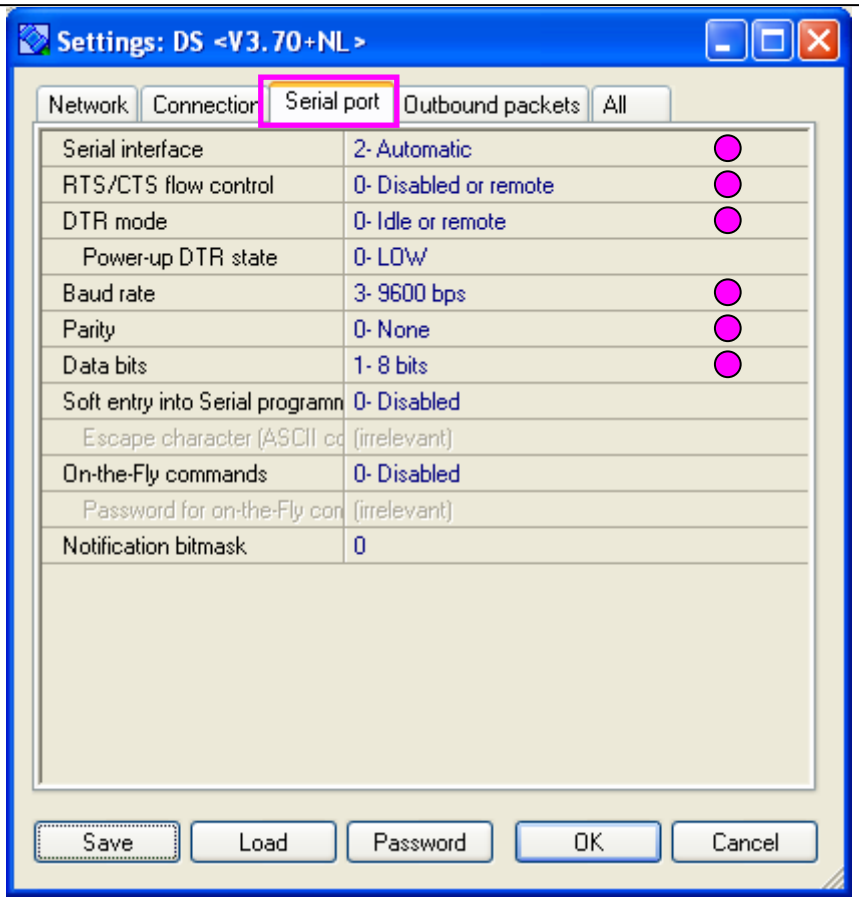
- CONNECTION TIMEOUT: Indicates after how many minutes of inactivity, the connection of device **ETH2S** will have to consider fallen.
- TRANSPORT PROTOCOL:indicates the transport protocol. When used for communication with the meter, the protocol TCP/IP must be used.
- ROUNTING MODE: defines the direction of the connections. There are 3 possible ways:

1.SERVER – The device does not start connections but is passive, then wait for someone else to ask for a connection on logical specified port and accept a connection with anyone who requests to this port
2.SERVER/CLIENT - The device allows both input and output connections
3.CLIENT – the device allows only outgoing connections and therefore will not accept any incoming connection request to port

To connect the multimeter use the SERVER mode

- ACCEPT CONNECTION FROM: Indicates which connections will be accepted. 2 options are available:

1. ANY IP-ADDRESS: any IP
2. IP MATCHING DESTINATION IP-ADDRESS: one specific IP



In the **SERIAL PORT** tab you program the virtual serial port that will be created with the program VSP.

- SERIAL INTERFACE: 3 possibilities are available :

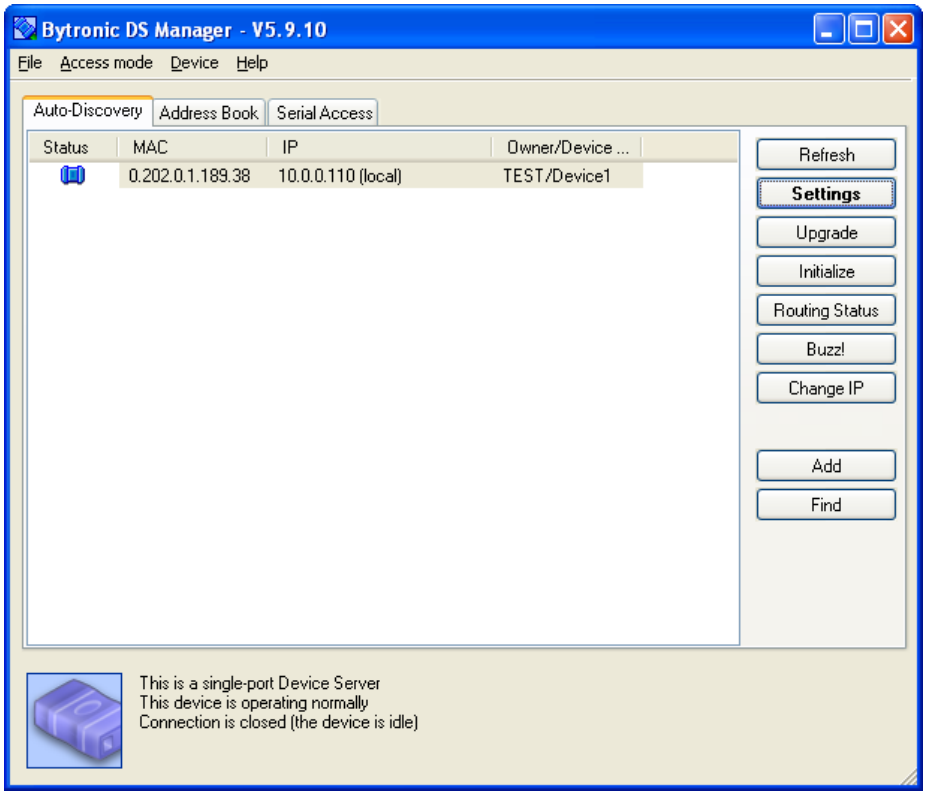
  1. FULL DUPLEX (typical of the connections RS232)
  2. HALF DUPLEX (typical of the connections RS485)
  3. AUTOMATIC (depend by the hardware). This is the option usually recommended
- RTS/CTS FLOW CONTROL Enable or disable the hardware flow control.
- DTR MODE defines the behavior of the DTR signal of the serial line.
- BAUD RATE defines the rate of data flow. Possible speeds from 150 bps to 115200 bps
- PARITY defines the parity control.
- DATA BITS defines the bit of the data: 7 or 8.

NOTE
These parameters, exception made for the type of interface) are usually controlled by the application software that will start the communication with the field, then we suggest you to leave the default settings. Otherwise they should be set in the same way as required by the field.

The card **Outband Packets** not relevant for this type of application.
The card **All** collects the other 4 cards.

After completing the program, press the OK button to save the configuration by performing a re-initialization of the device

In the main window you will see some of the changes:



At this point the icon that characterizes the device has full color and the device is reachable through the TCPIP protocol (check using the PING command - see Appendix A)

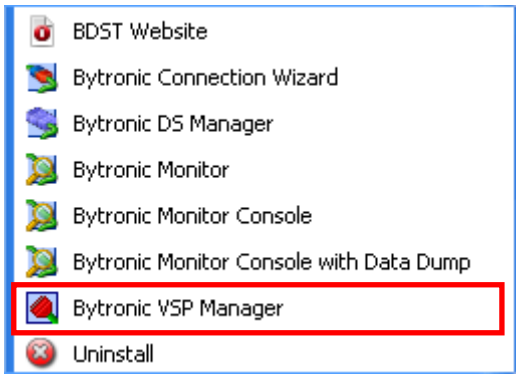
13.6.3 VSP Manager – Virtual Serial Port Manager

This component **BDST** allows you to create a virtual serial port on your PC from an IP address of a device **ETH2S** and use it later as if it were a normal serial port. In fact VSP redirects the TCP / IP packets that transit on the network and which are destined to the serial port acting as a converter in an absolutely transparent way to the user.

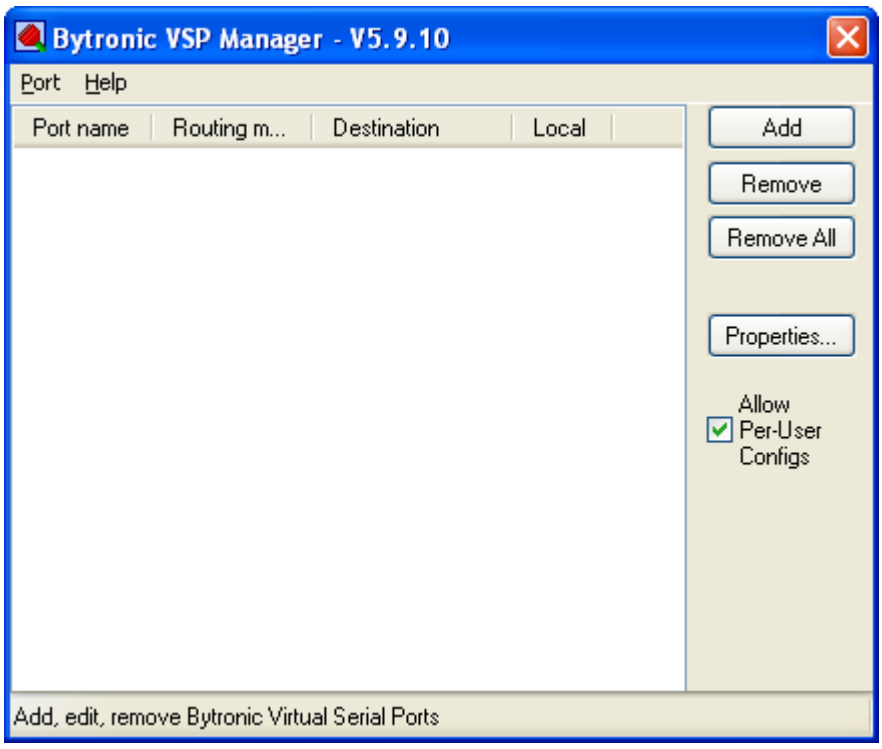
VSP Manager, therefore, allows you to add, remove, and set up virtual serial ports in your Windows operating system.

Start the program VSP Manager

acting on the icon that can be traced in the working group on the programs bar:

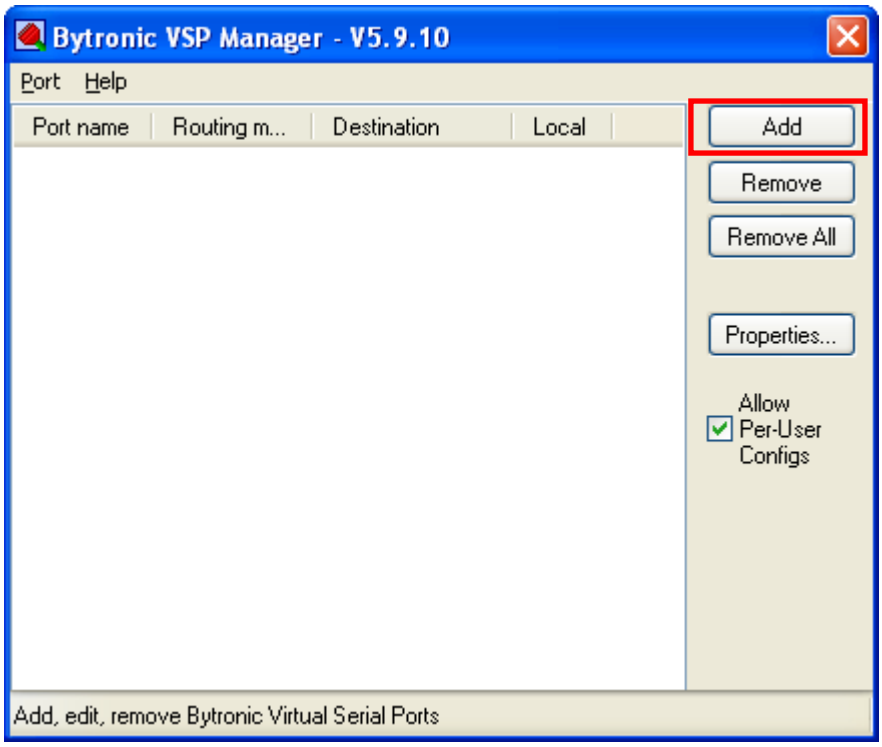


When you start the program displays a window like this:



Adding a serial port

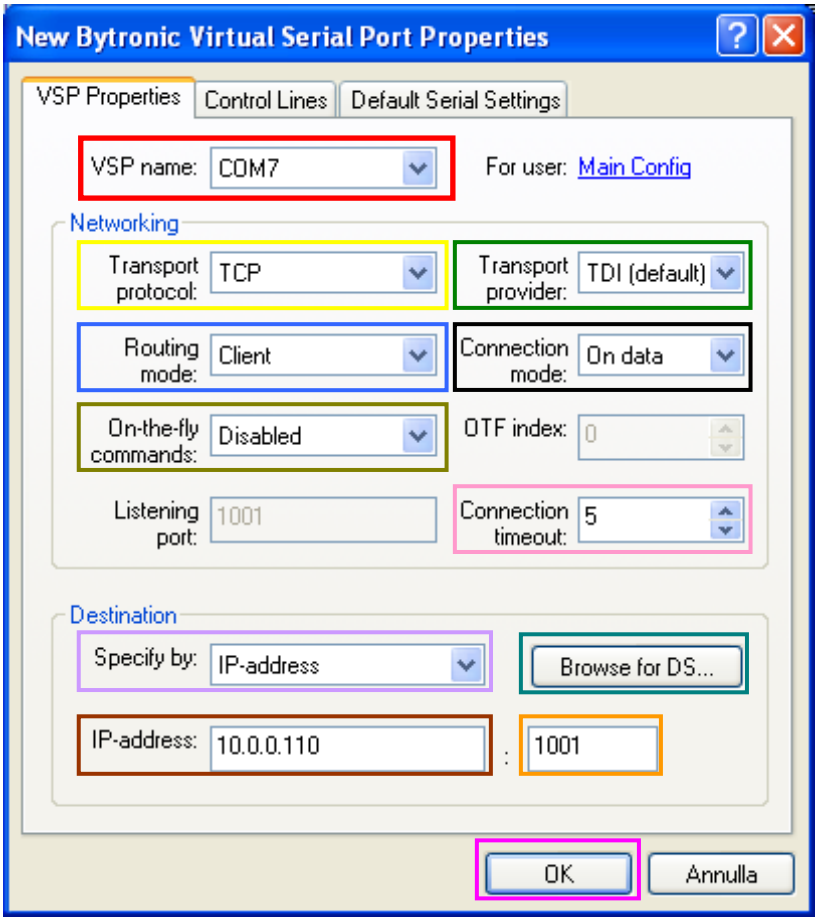
After programming the device **ETH2S** assigning an IP and establishing the programming of the serial port, you must create the port. Press the ADD button to add a new port



The following dialog warning of Windows appears:

press the CONTINUA button. You will see the following window in which to make changes.

"VSP Properties" card



VSP NAME: Select a port from those suggested by not indicate an already used or present in the system (eg COM7)

TRANSPORT PROTOCOL: Select TCP/IP. protocol

TRANSPORT PROVIDER: Transport mode: choose TDI

ROUTING MODE: Determines whether VSP must be passive or active: on CLIENT mode (which is to be set) VSP reject all incoming connection requests from **1RINT-ETH2S** and activate itself outbound connections (active mode) to **ETH2S**. In SERVER mode, behavior would be exactly the opposite ; so mode would be passive

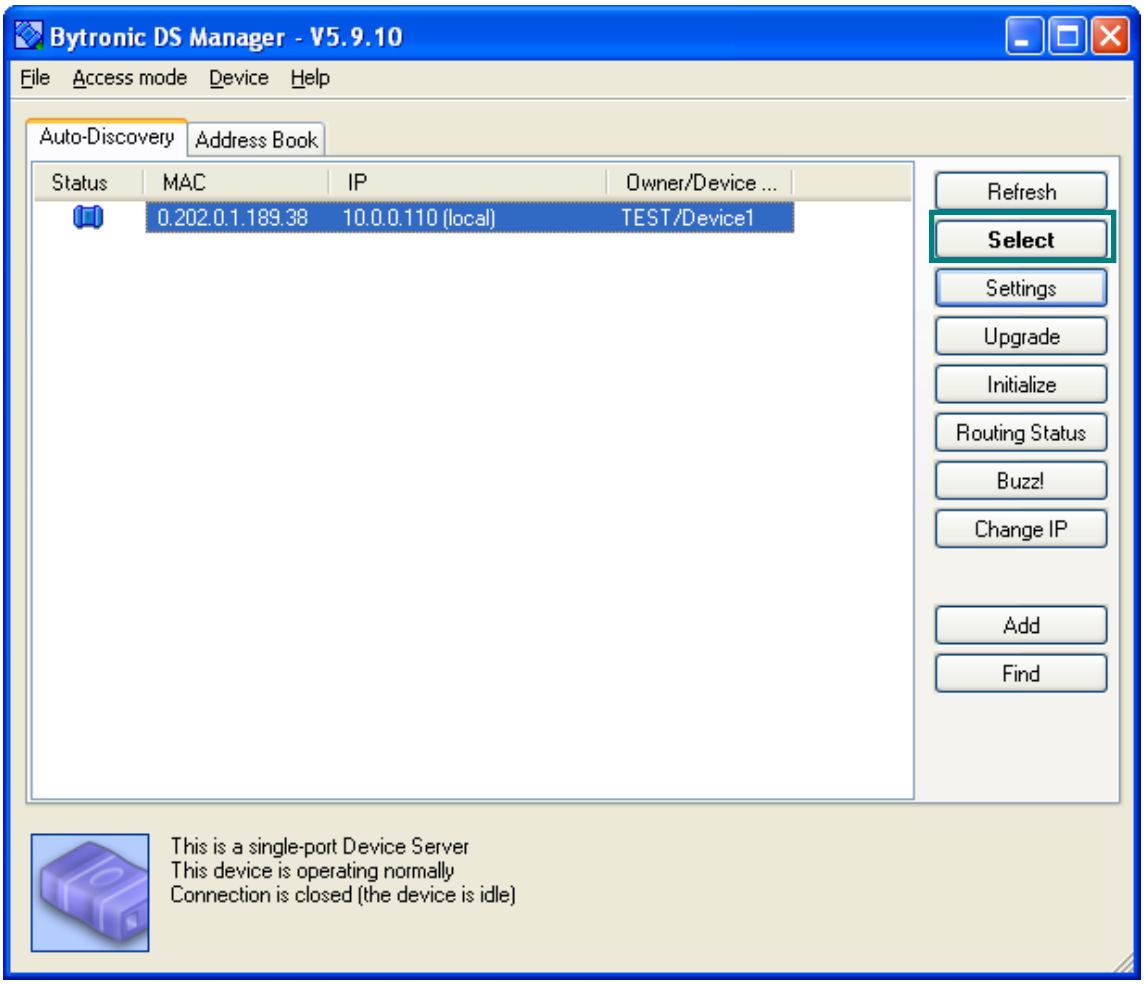
CONNECTION MODE: Defines when VSP attempts to establish an outgoing connection. The mode to set is ON DATA so when the data traffic will begin.

ON-THE-FLY-COMMANDS: Set DISABLED to make sure that the port settings of the software that will interface with that port, are fixed permanently. This option makes it possible to change "on the run" the setup of door's parameters.

CONNECTION TIMEOUT: This sets after how many minutes of VSP inactivity it will decide the loss of connection with **ETH2S**

DESTINATION SPECIFIED BY:Choosing SINGLE DESTINATION,VSP will force you to connect only with the device whose IP address is specified in the parameter below.

BROWSE FOR DS..: allows you to select the device directly from those detected by the component DS MANAGER



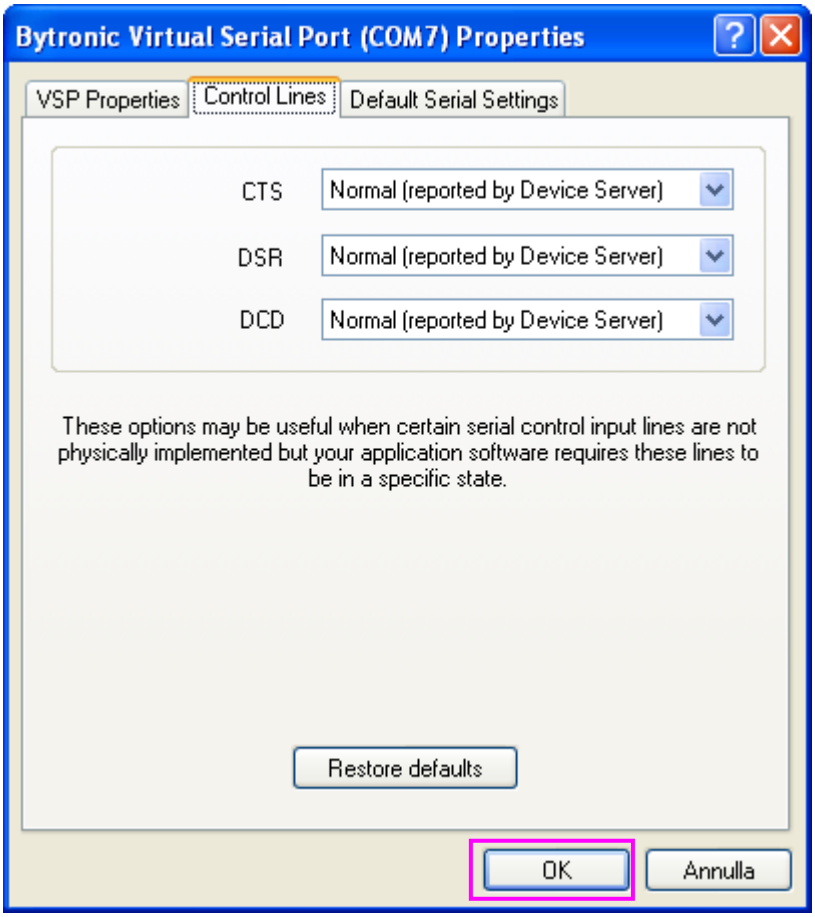
In this window, select the device of interest and press the SELECT button, which will close this window and will return to the previous, filling the fields related to the IP ADDRESS and to the door.

IP-ADDRESS: Enter the same IP address that was assigned to the device **ETH2S** (in the example 10.0.0.110)

Enter the same port that has been assigned to the device **ETH2S** (in this example 1001)

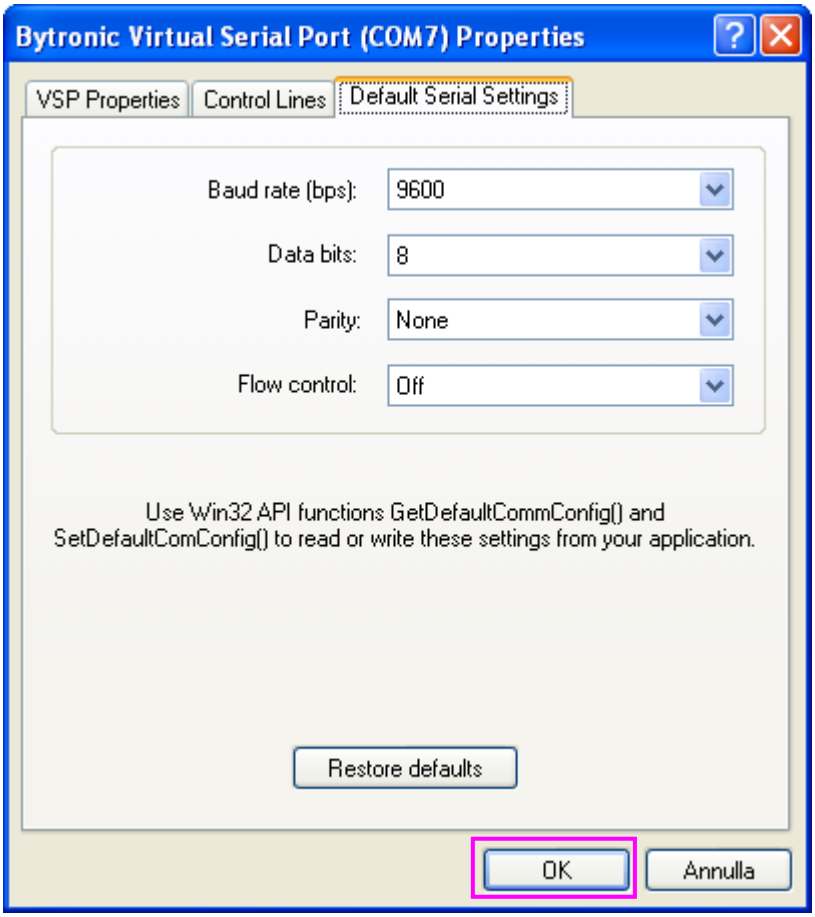
Card "Control Lines"

Sets the control signals of the serial port (CTS, DSR, DCD).
The default setting is the one that allows the server to drive these signals.
Leave this setting if the software that will use the serial, ensure its programming (most likely situation)

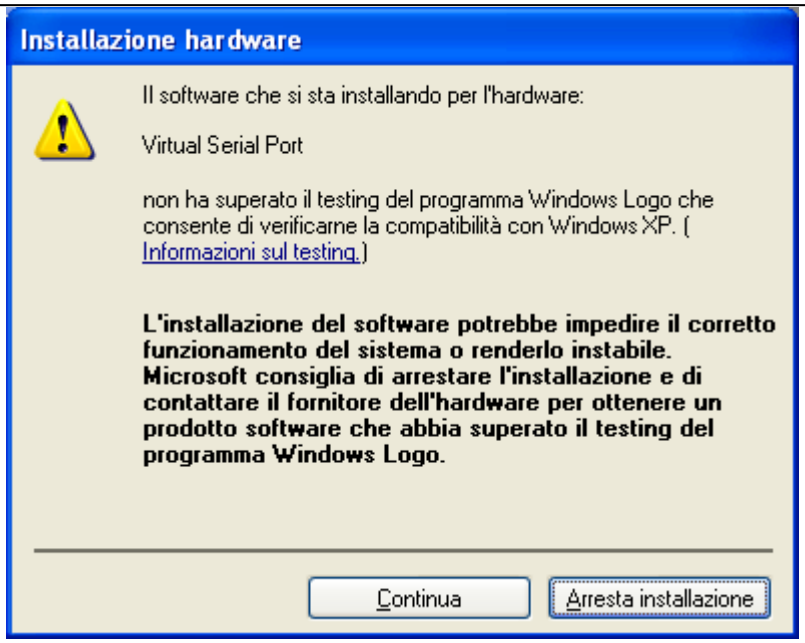


Card "Default Serial Settings"

Allows to program the transmission / reception data (speed, data, parity, and flow control).
Normally the user program that uses the serial provide for the planning of these parameters (see what has been said about the control signals from the previous card) then you do not need to make any changes



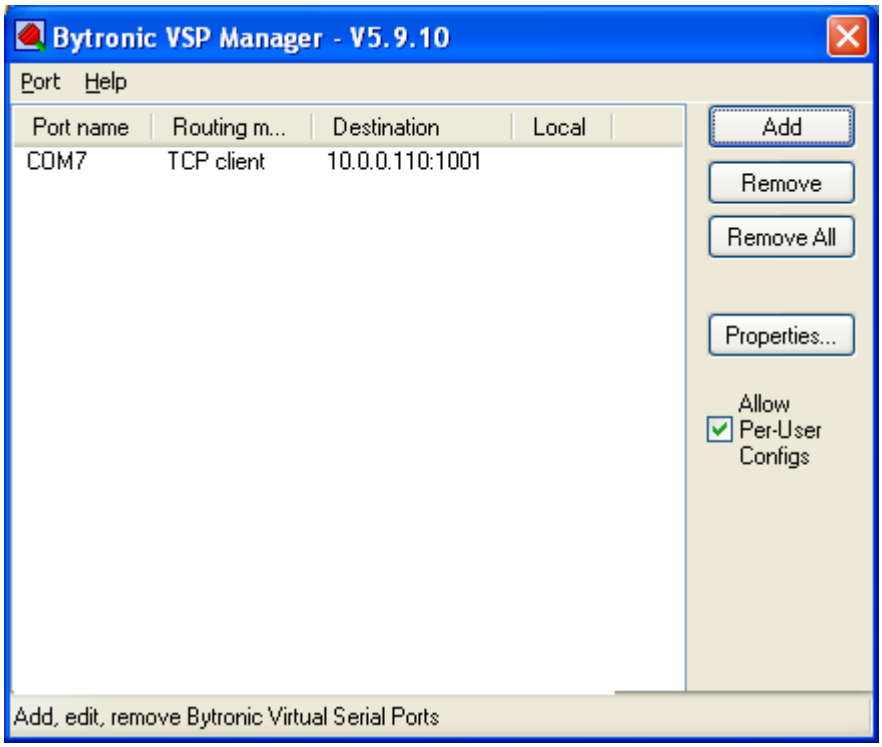
Press the OK button to apply your settings.
The window will again be presented:



on which you will have to press the button CONTINUE

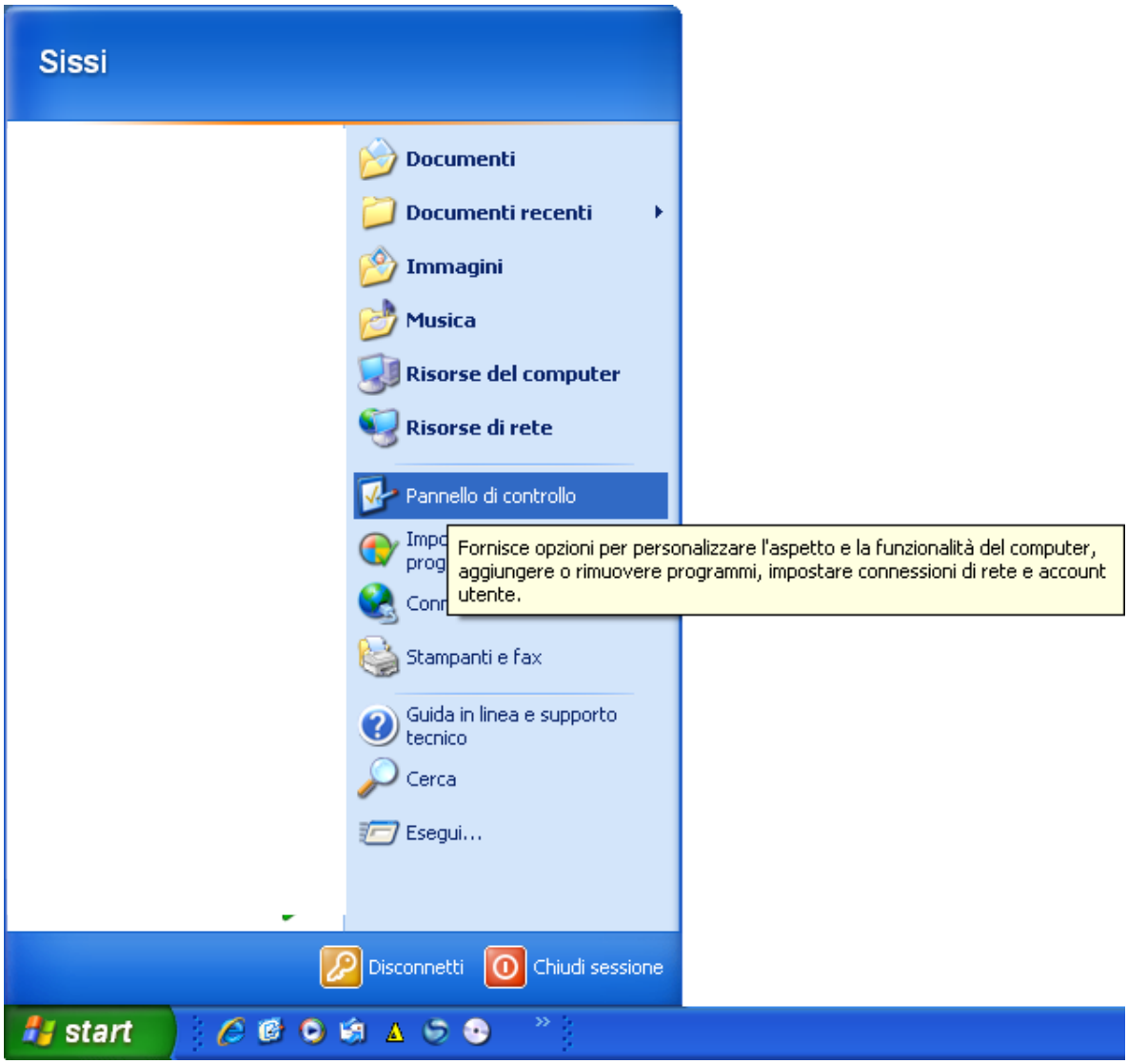
In case of failure an error message will be presented as in the following example, in which you tried to create a port that already exists..

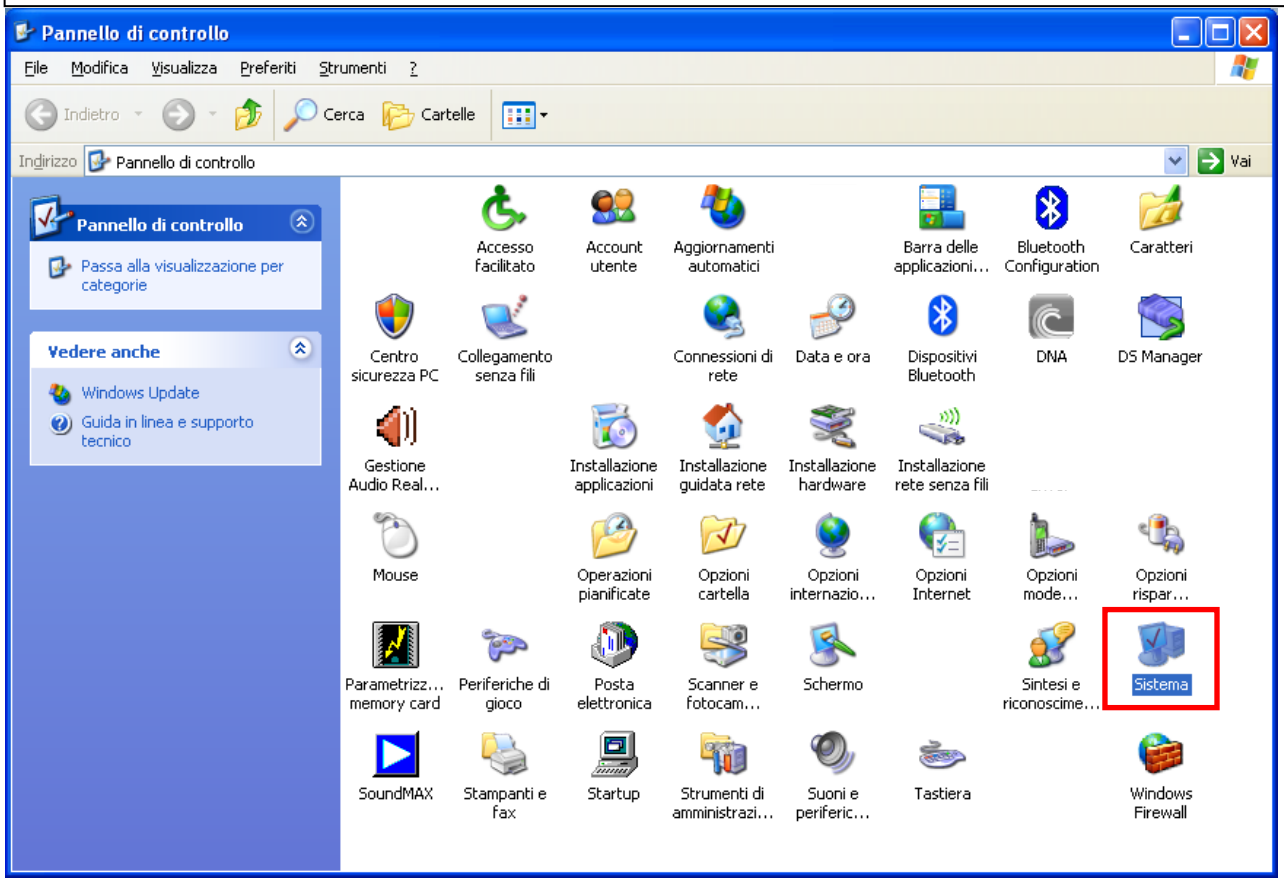
However, in successful case, in the main window of the program VSP, the newly created port (in this example COM7), will be presented



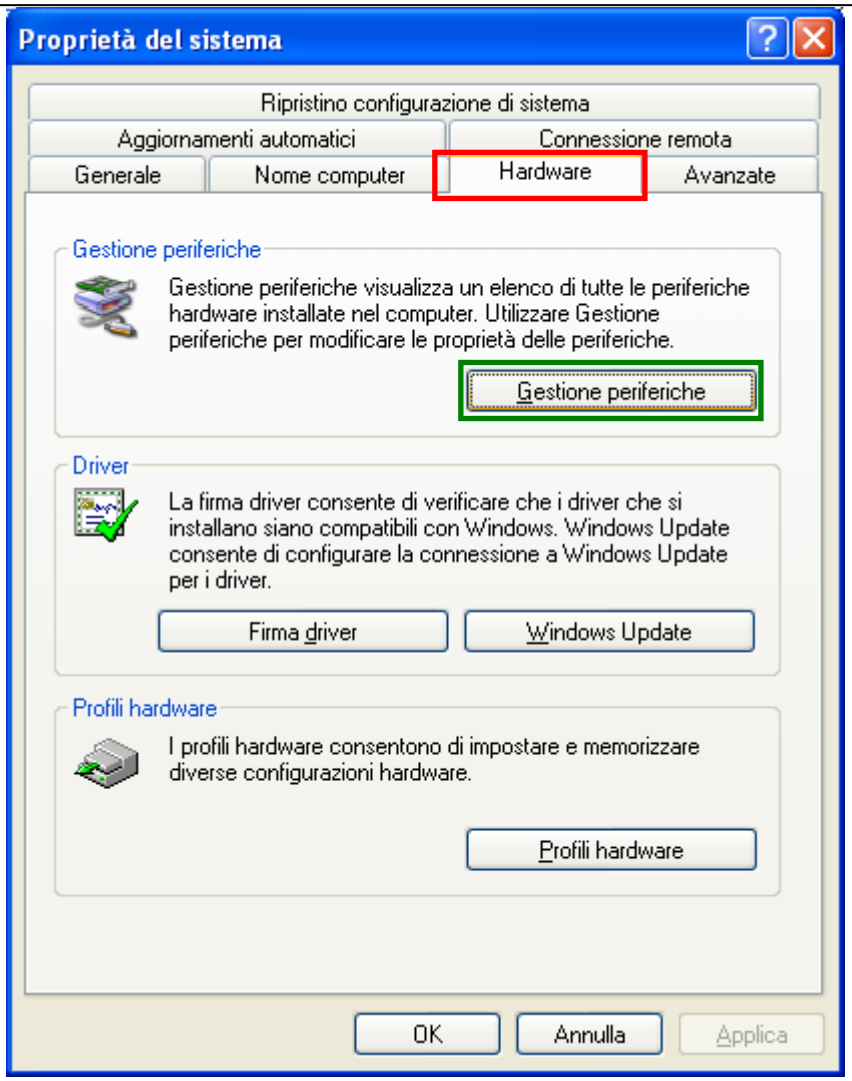
The VSP program can now be completed and the new COM7 serial port can be used to communicate with the meter via the 10.0.0.110 IP address assigned, to the device **ETH2S.**

In fact, this new port is now present as a hardware resource in the Windows operating system and this fact can be checked by going to the Control Panel window bar by pressing the START / AVVIO:

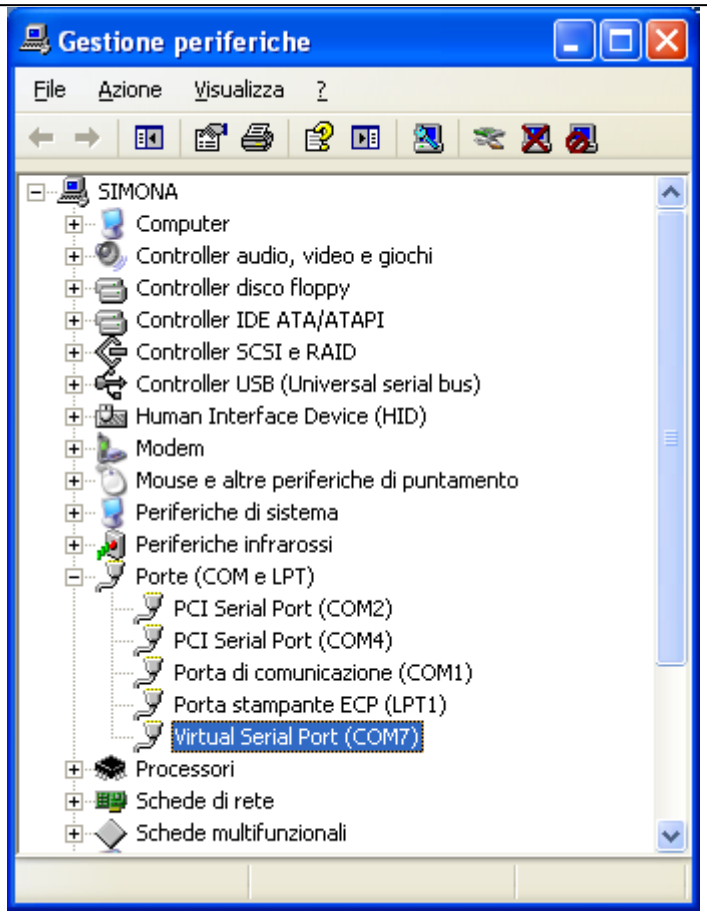




Select the SySTEM icon and start the program by double-clicking of mouse. This will open the following window in which you must select the HARDWARE tab and then press the GESTIONE PERIFERICHE button:



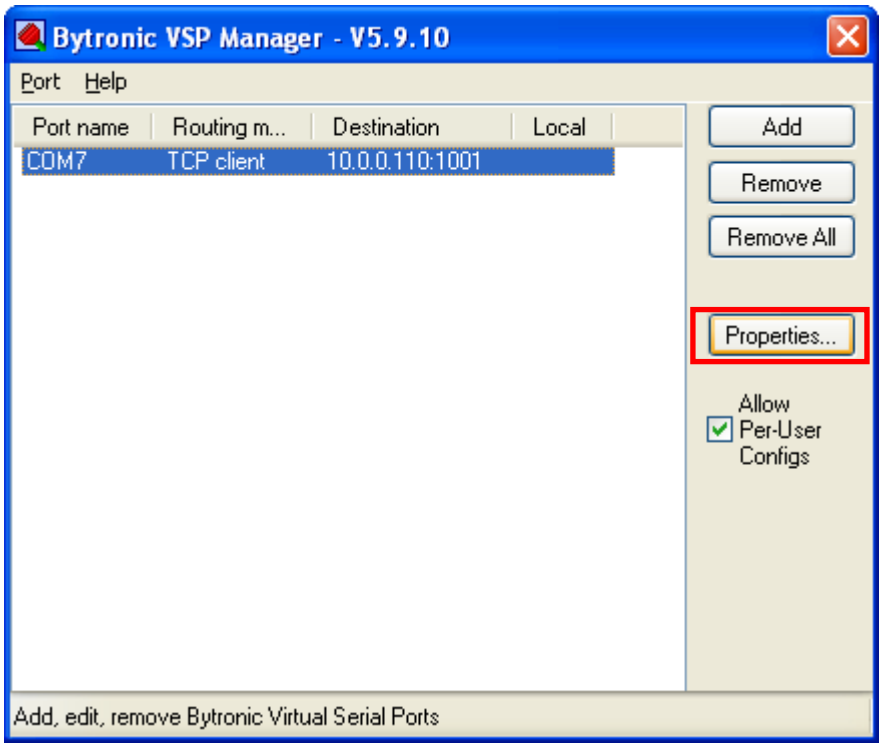
This will open a window like this:



In the PORTE section (COM and LPT) you will see the presence of the newly created virtual port COM7.

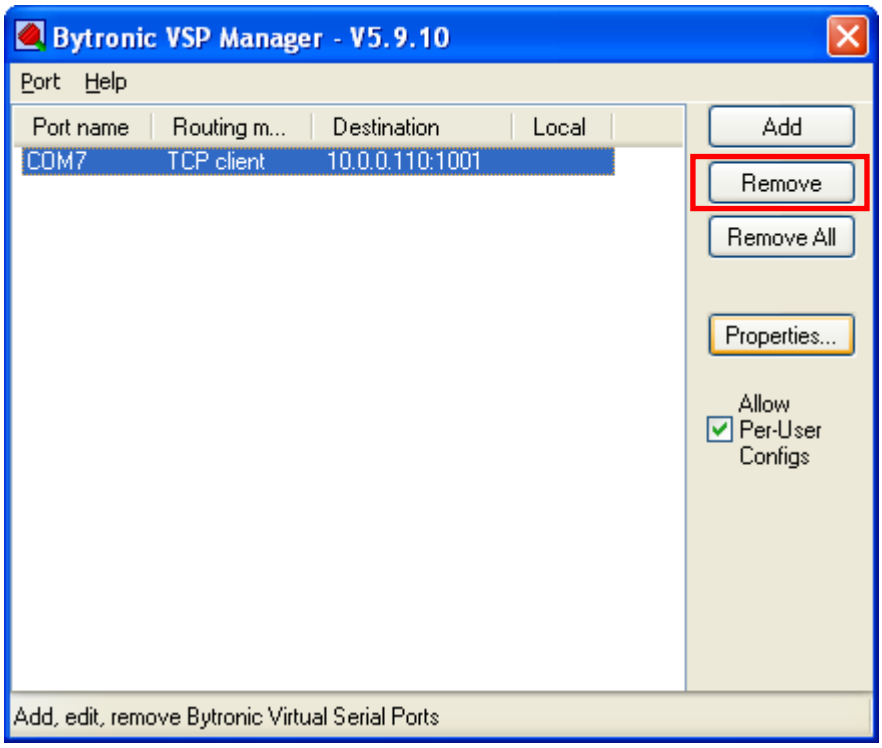
Editing a serial port

Once a port has been created, you can change its settings by pressing the button PROPERTIES of VSP after selecting it in the list:



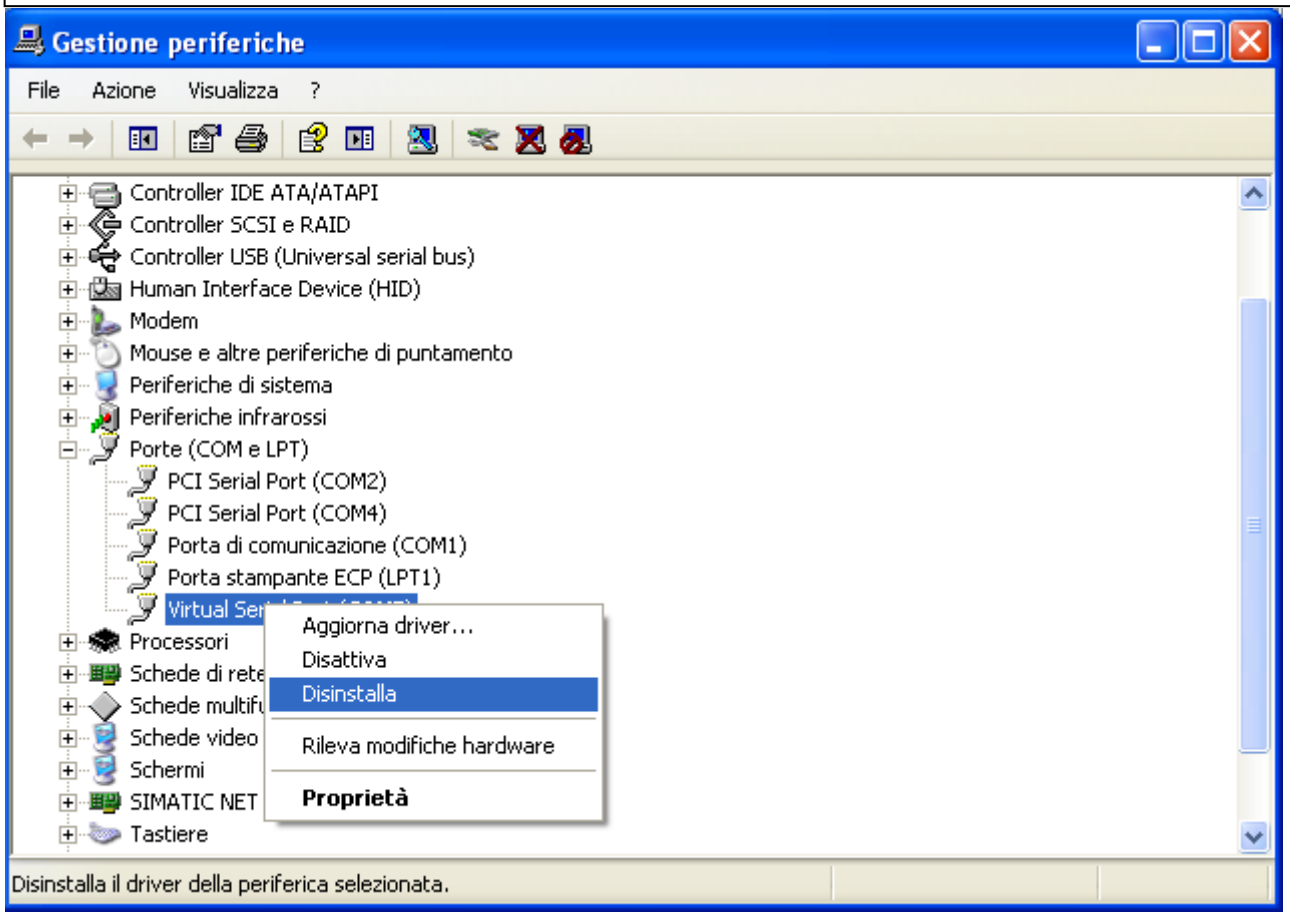
Removing a virtual port

When the virtual port is no longer needed, it is recommended to remove it from the system.
To do this, start the VSP Manager program that will show the list of virtual ports set in the system .

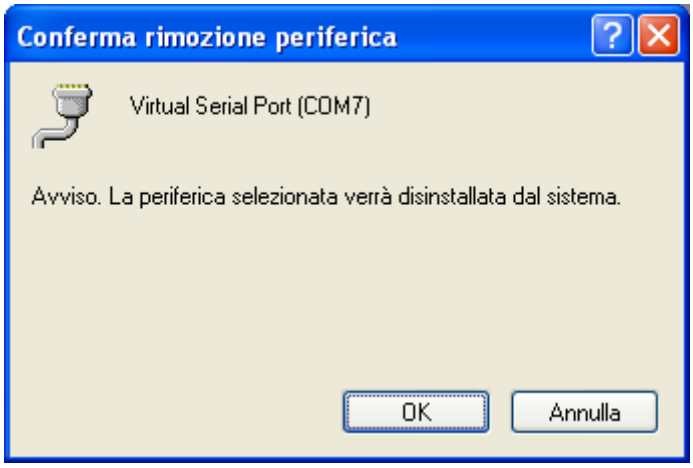


Select the port of interest and press the REMOVE button. When the procedure is finished, the window will be updated and the door will no longer be present in the system (this can also be checked in the computer's hardware resources).

Alternatively, the virtual port can also be uninstalled using the Windows Device Manager to identify the port in question and with the right mouse button to select the menu item that concerns the uninstall:



Windows will asks you to confirm the operation by means of a notice like this:



Confirm with OK and perform a re-reading of the state of the system by closing and then reopening the window of the Device Manager in case of necessity

13.6.4CW - Connection Wizard

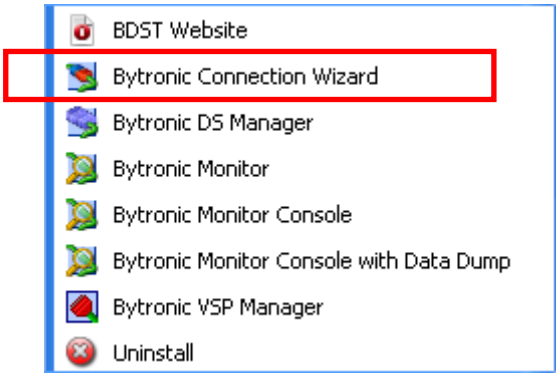
It is a support program that guides you through the creation and configuration of virtual serial port programs as VSP Manager and DS Manager programs would do.

Below all the steps suggested by the program.

13.6.4.1 STEP1

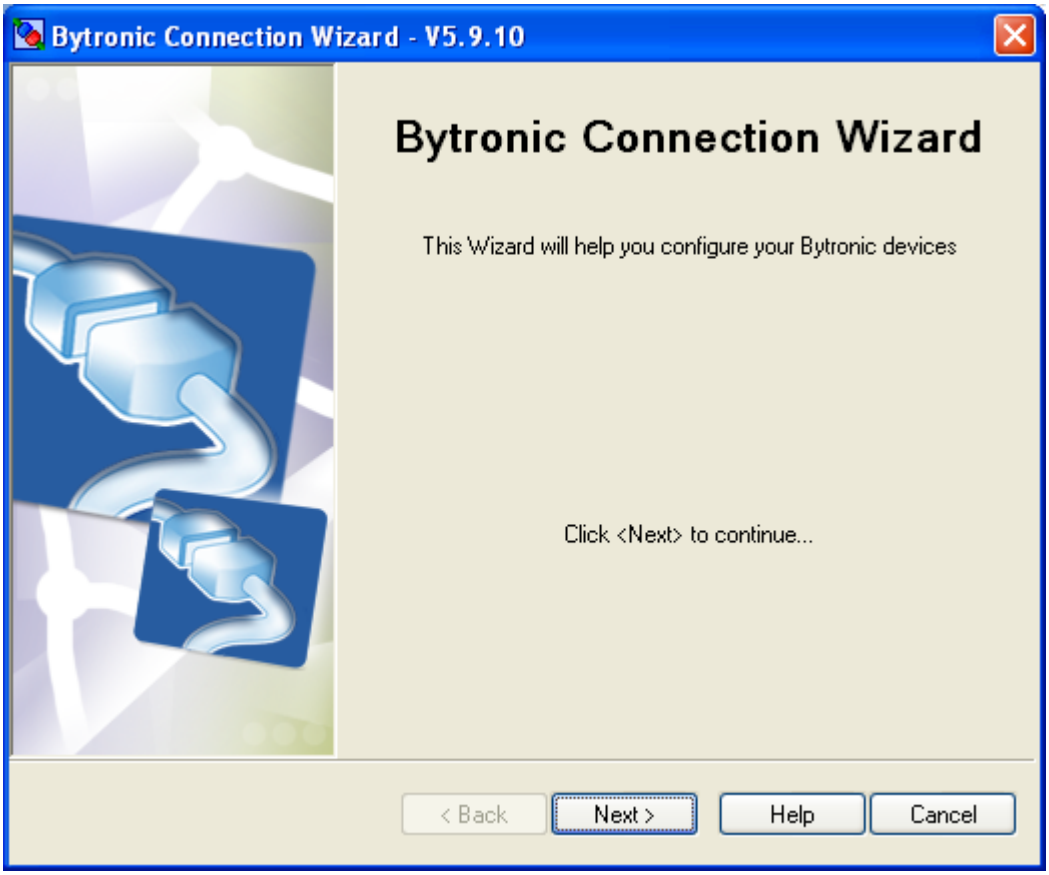
Start the program CW

acting on the icon that can be traced in the working group on the task bar of programs:



13.6.4.2 STEP2

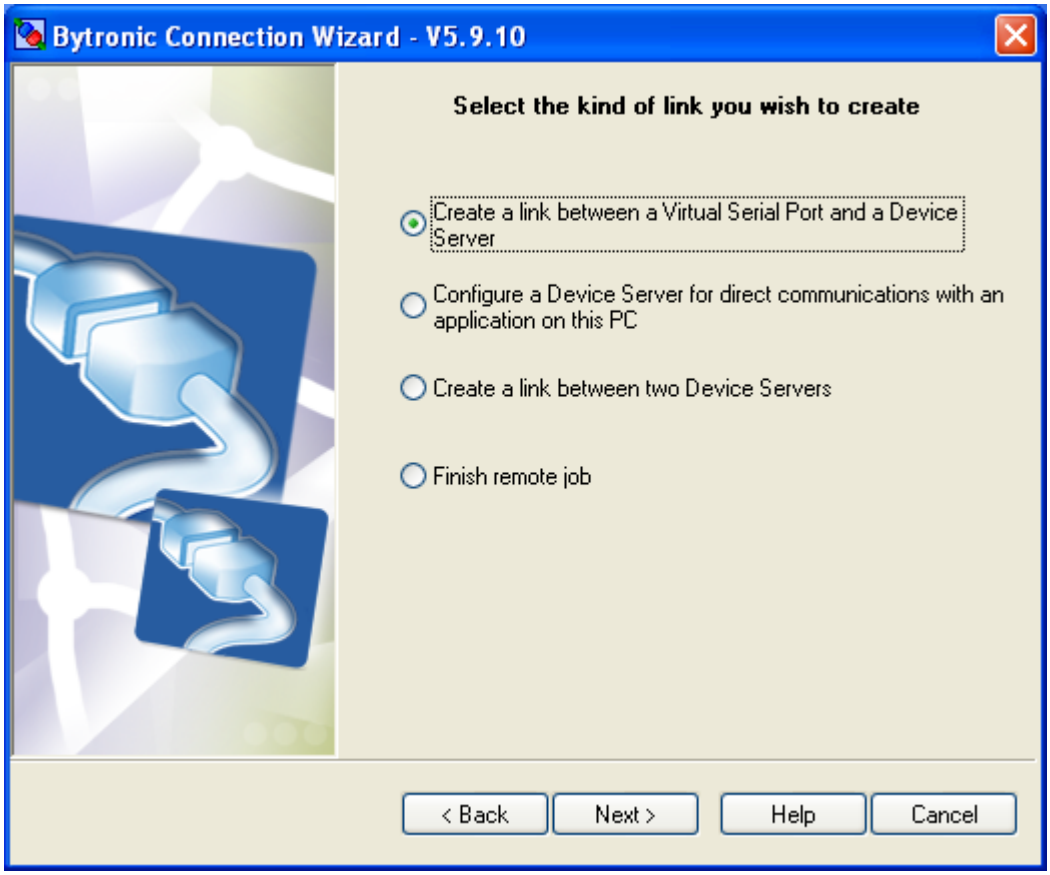
When you start the program displays a window like this:



In this and subsequent screens, the NEXT button will allow to continue, the BACK button to return to the previous step and the CANCEL button to close the application without ending the procedure, and then without creating a virtual serial port.

13.6.4.3 STEP 3

CW will ask for the type of action you want to take.
It is possible to establish different types of links depending on the need.



- ***Create a link between a Virtual Serial Port and a Device Server***
  Establishes a connection between a virtual serial port already created (with VSP Manager) and a Device Server (**ETH2S**) already planned through DS or Manager to create a virtual serial port and connect it to an existing Device Server.
  See step 4A

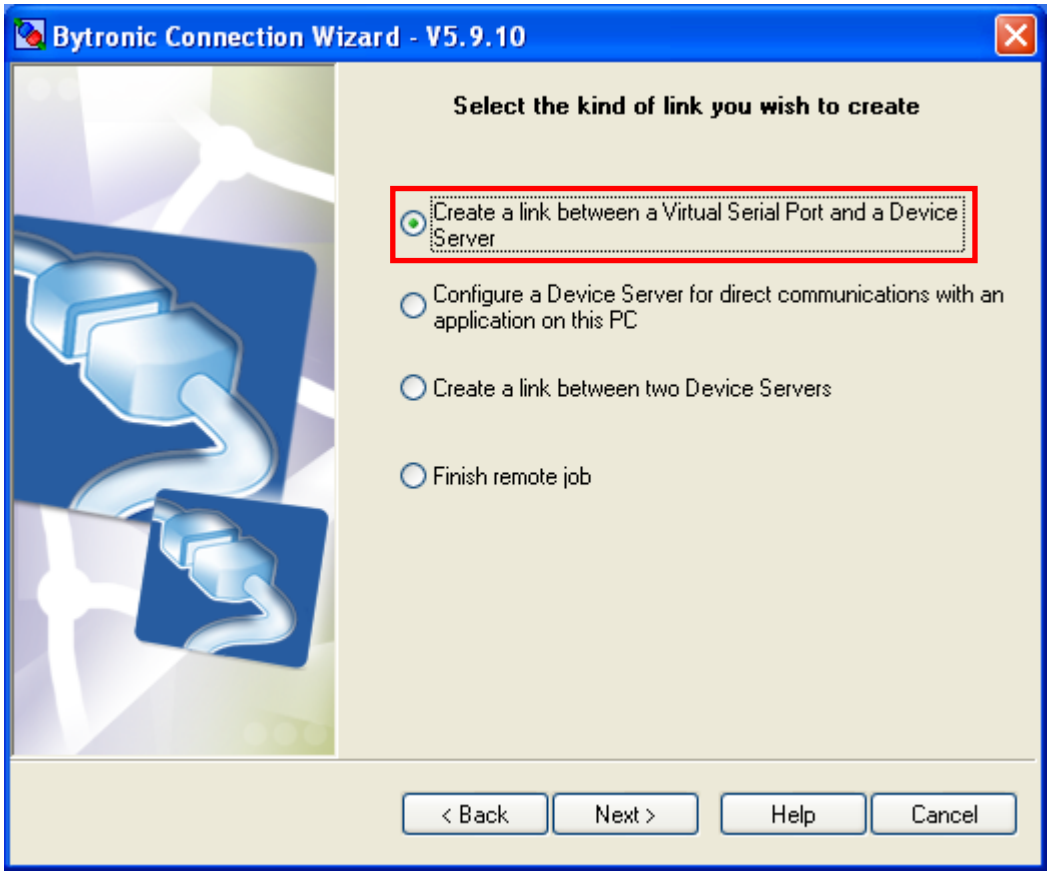
- ***Configure a Device Server for direct communications with an application on this PC***
  Allows you to configure a Device Server (**ETH2S**) and to couple it to a virtual serial port. See step 4B.

- ***Create a link between two Device Servers***
  Not documented.

- ***Finish remote job***
  Not documented.

13.6.4.4 STEP 4A - Create a link between a Virtual Serial Port and a Device Server

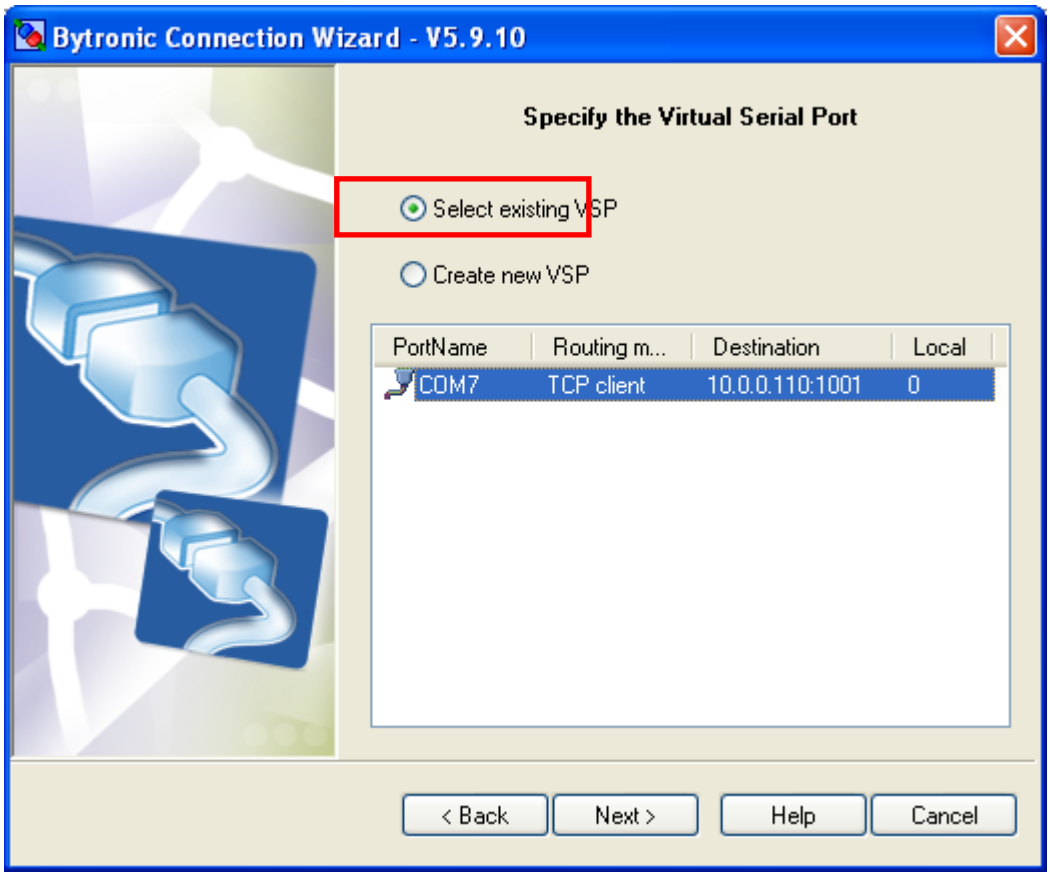
To use this option you must have programmed before a Device Server (**ETH2S**) using the program DS Manager



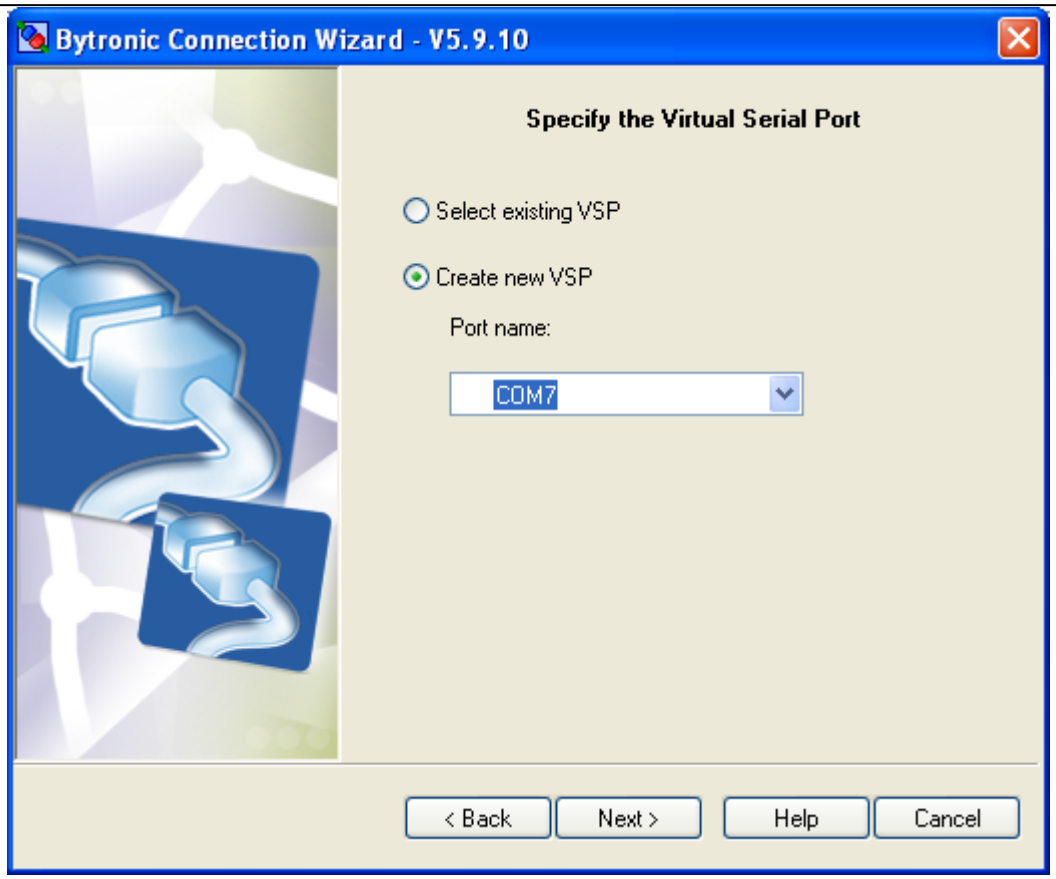
13.6.4.5 STEP 5

In the next window you will have to choose between two alternatives depending on what has already been programmed:

a) If a virtual serial port has already been created by VSP Manager, then you can choose it directly in the proposed list that fill it self as soon as you select that option.



b) If a virtual serial port has not yet been created by VSP Manager, then you can create it on this occasion.



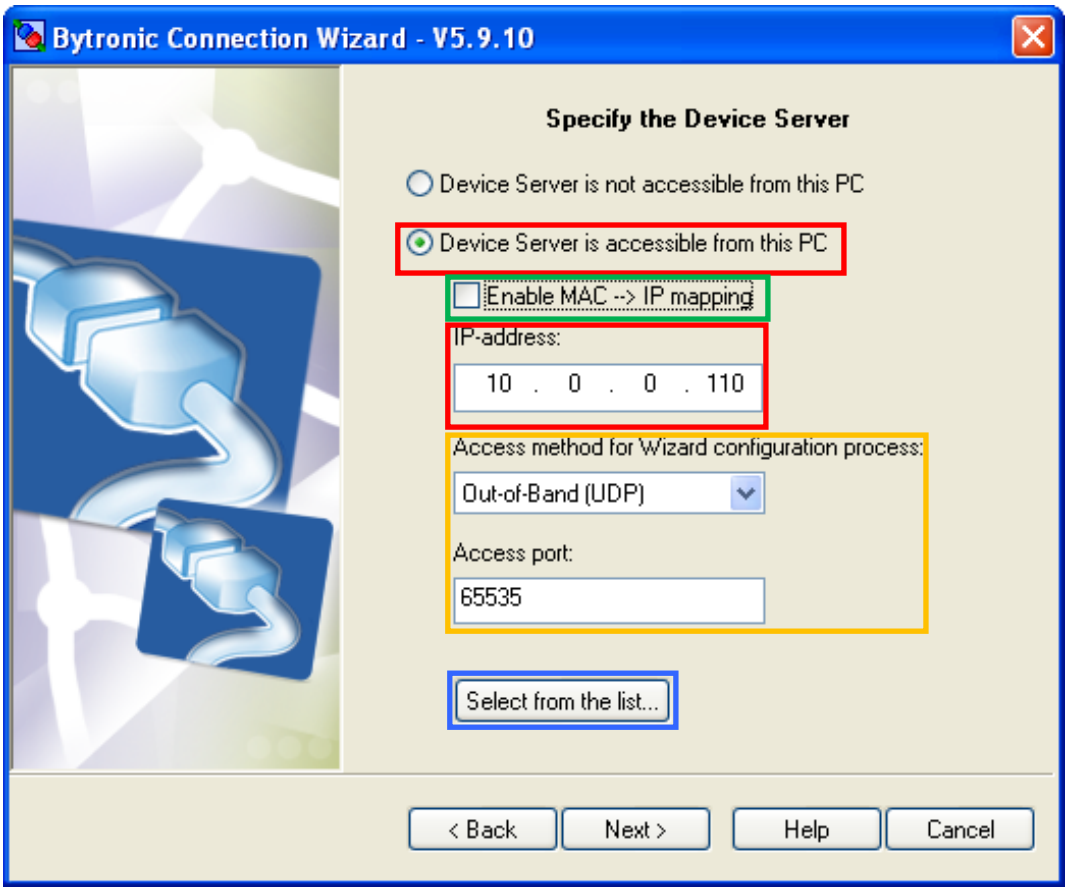
Select the port that you want to create using the option

Create new VSP

and choosing it in the drop-down menu that shows the available (eventual VSP *ports already created will be not showed).* In *the example* the port *COM7* is chosen.

13.6.4.6 STEP 6

After you have entered the virtual serial port it is necessary to tell to the program which Device Server (**ETH2S**) associate to it.



Typically the device will be connected to the PC and it will be sufficient to indicate the IP address previously assigned using the program DS Manager.

The option "**Enable MAC →IP Mapping**" allows you to use the MAC address of the Device Server.

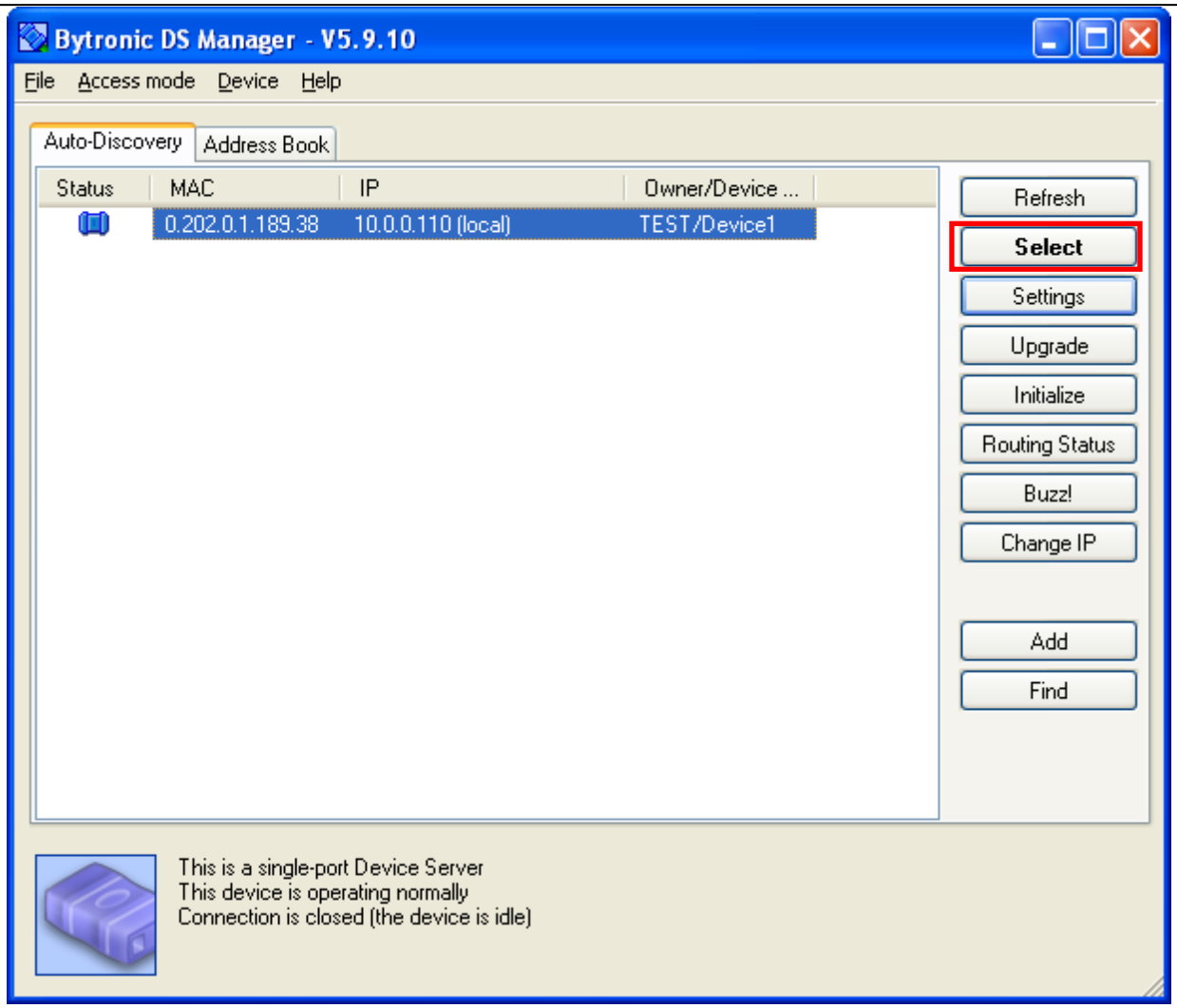
It must be necessary also to specify which method should be used CW to program the device **ETH2S**. Basically, there are two possibilities:

♣ OUT-BAND (UDP) that uses the UDP protocol on port 65535

♣ IN-BAND (TCP) that will use the TCPIP protocol on logic port that will be indicated by the user (typically 1001 because it is usually free - see Appendix B to determine the logical ports free on your system) or CW propose, finding the settings DS Manager.

Please note that this option does NOT apply to the transport protocol that will be used between the PC application and the device **ETH2S** but only the transport used for programming **ETH2S**. It is therefore recommended to don't not change the default settings

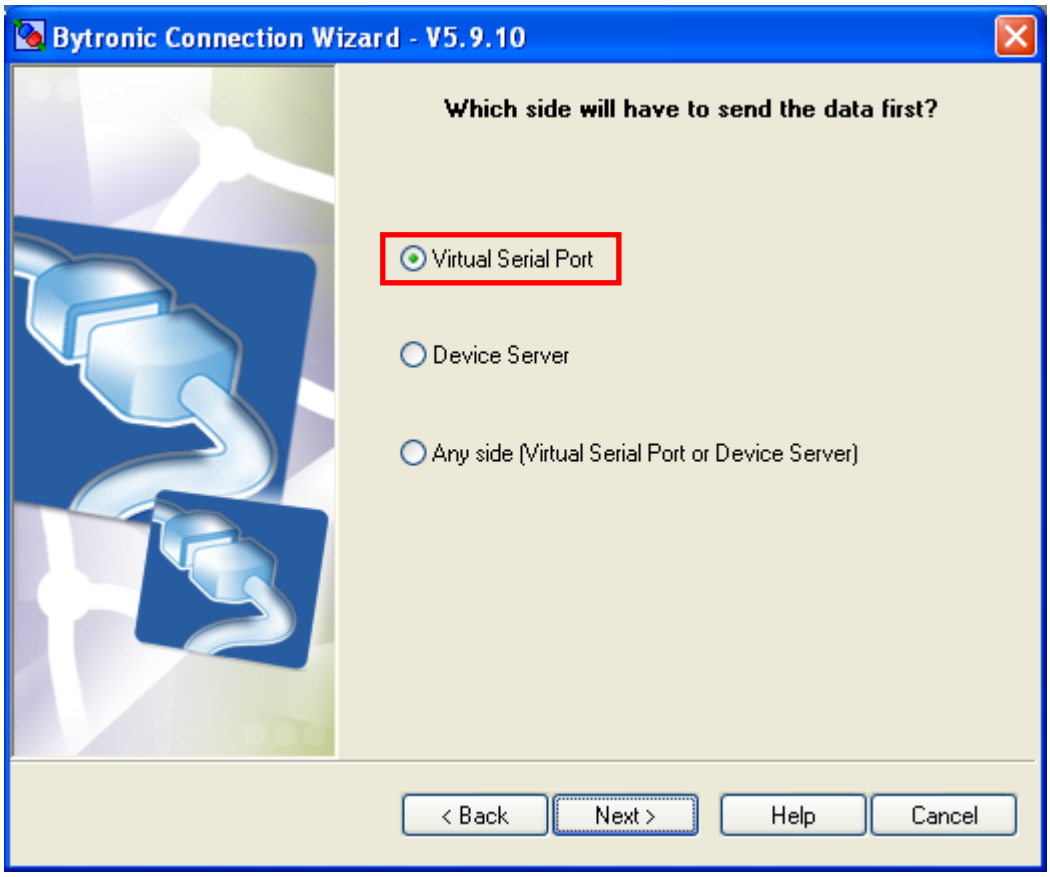
Alternatively you can use the button "Select from the list ..." that, through the program DS Manager, will present the list of available Device Server.



In this window, select the device of interest and press the SELECT button, which will close this window and return you to the previous, filling the fields related to IP ADDRESS

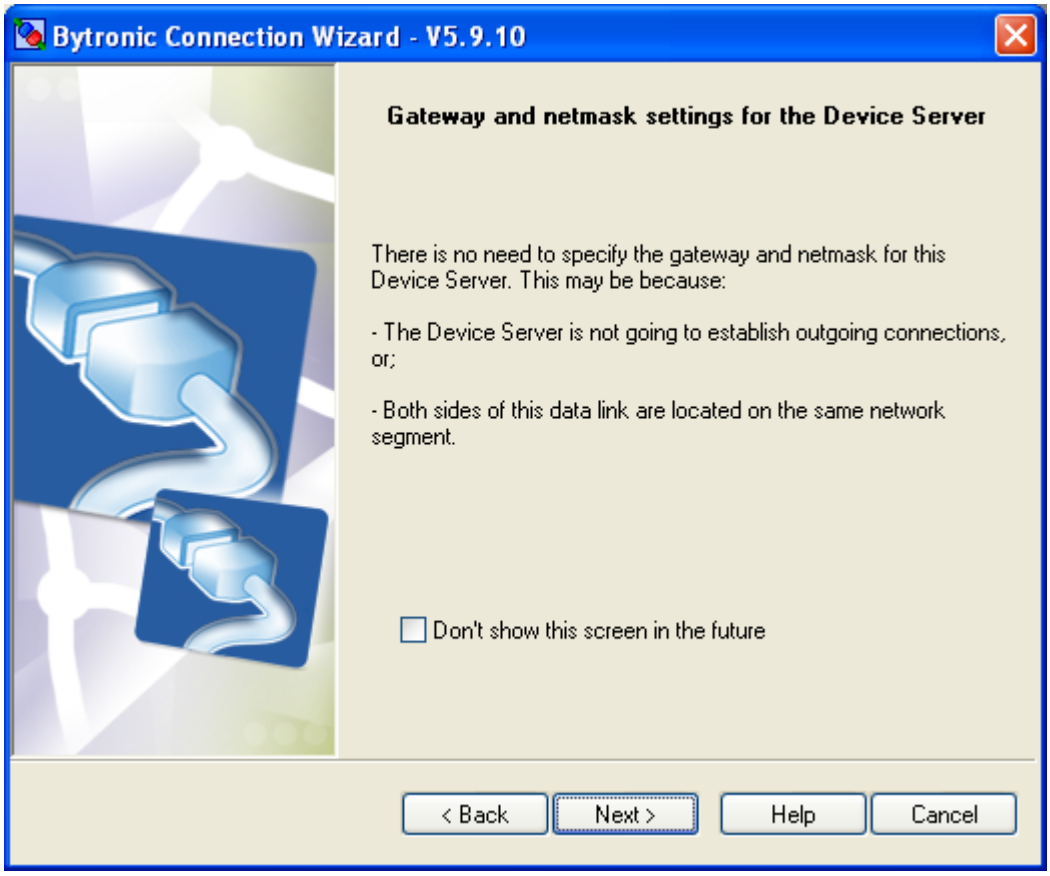
13.6.4.7 STEP 7

It set out the roles of Device Server (**ETH2S)** and the virtual serial port.
For example, if it is a program on the PC that gives start to a communication with the field through the virtual serial port (most likely) then you must select the **"Virtual Serial Port".** Otherwise you will have to select the option **"Device Server".**
If both devices can initiate communication, then simply select the last option **"Any side (or Virtual Serial Port Device Server)" .**



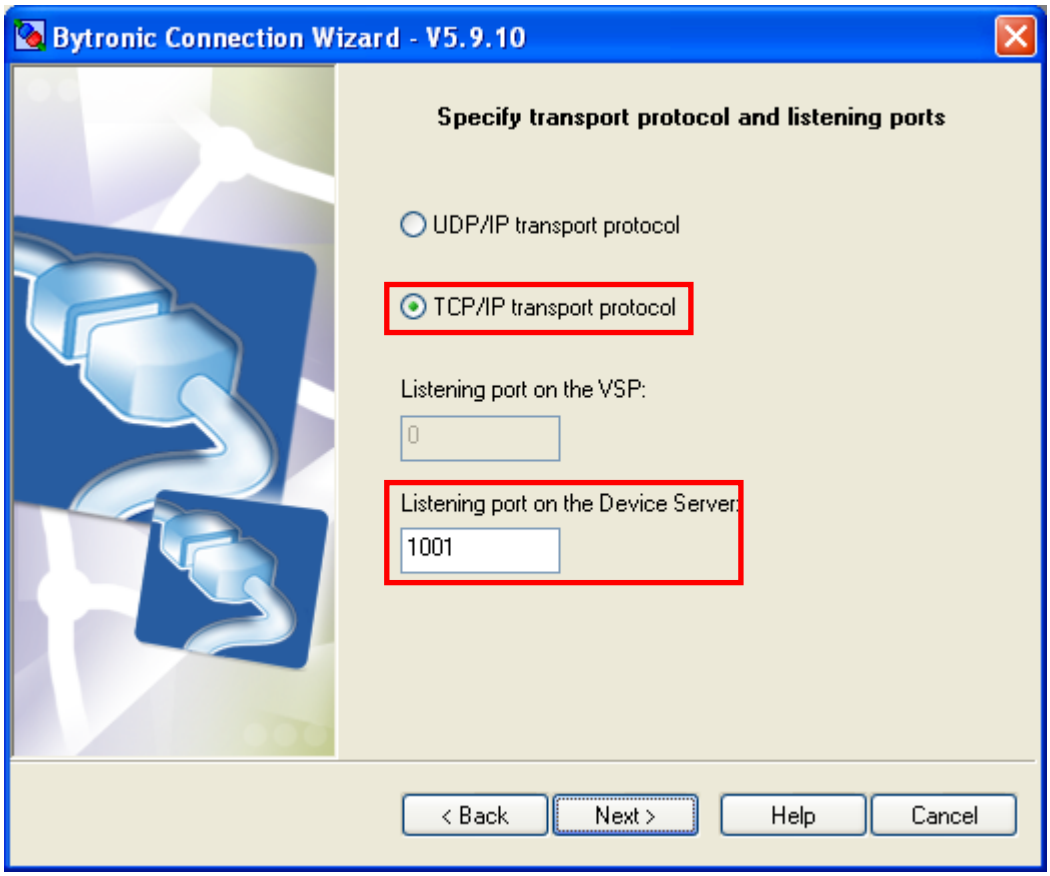
13.6.4.8 STEP 8

It is only an information window, which realizes that the devices which reside on the same subnet, do not need to specify any Gateway.



13.6.4.9 STEP 9

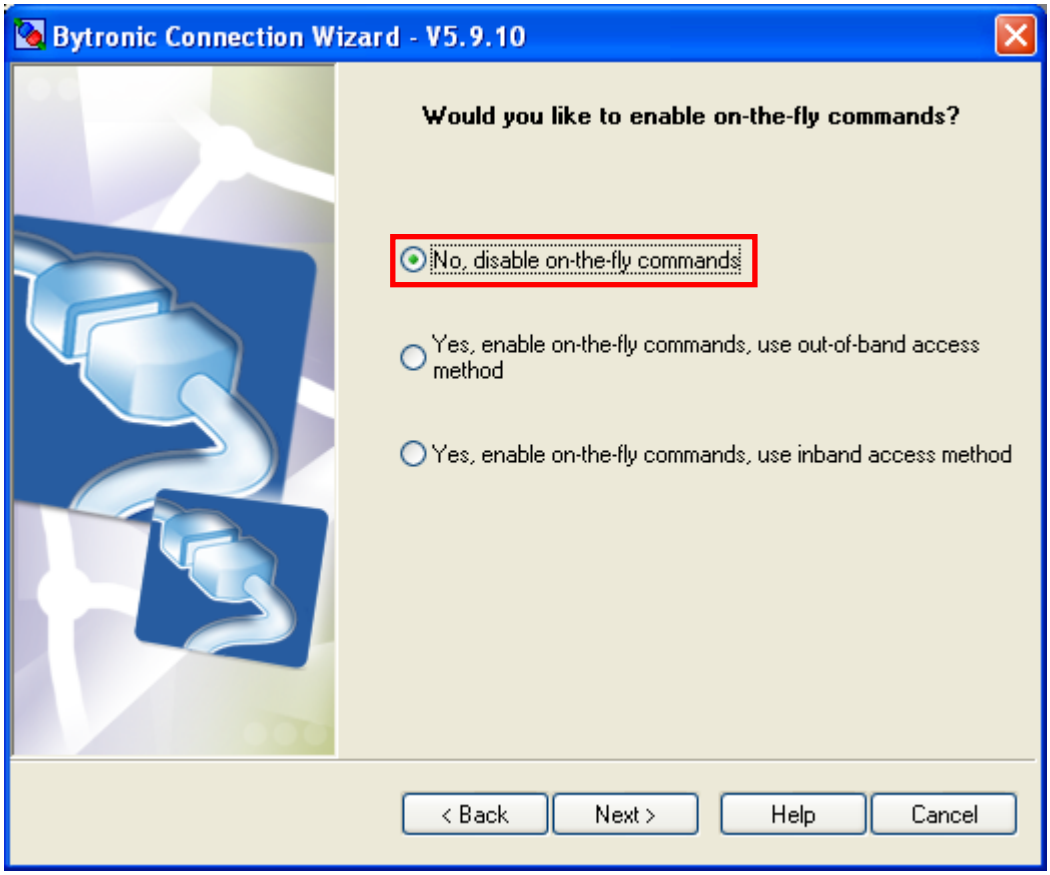
It is necessary to specify the transport protocol between the network and the virtual serial port.
Typically you are using TCP / IP on the logical port that is proposed (1001 in this case, but you can specify another - see Appendix B for a list of available ports)



13.6.4.10 STEP 10

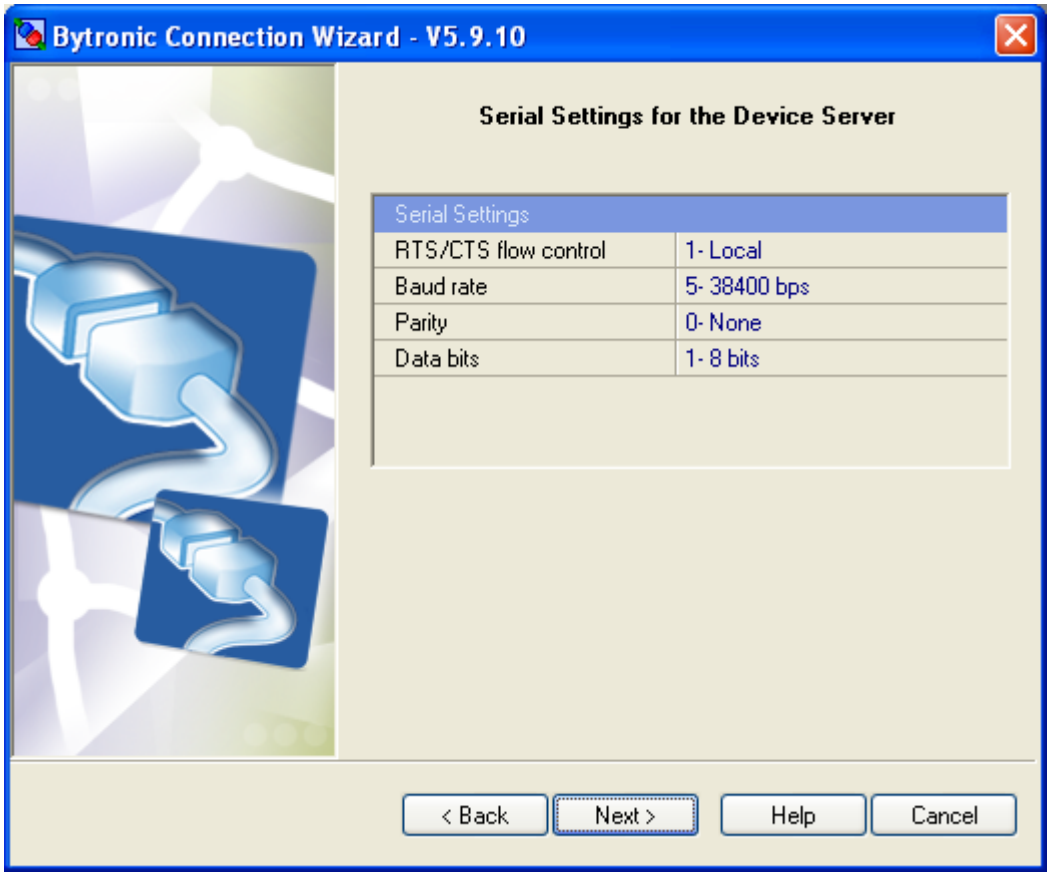
You are asked if the setting of the virtual port, as it is created, it should remain permanent, or if changes will be permitted by appropriate commands sent through the data in UDP frames.
This option is not used except in special cases then you must select

No, disable on-the-fly commands



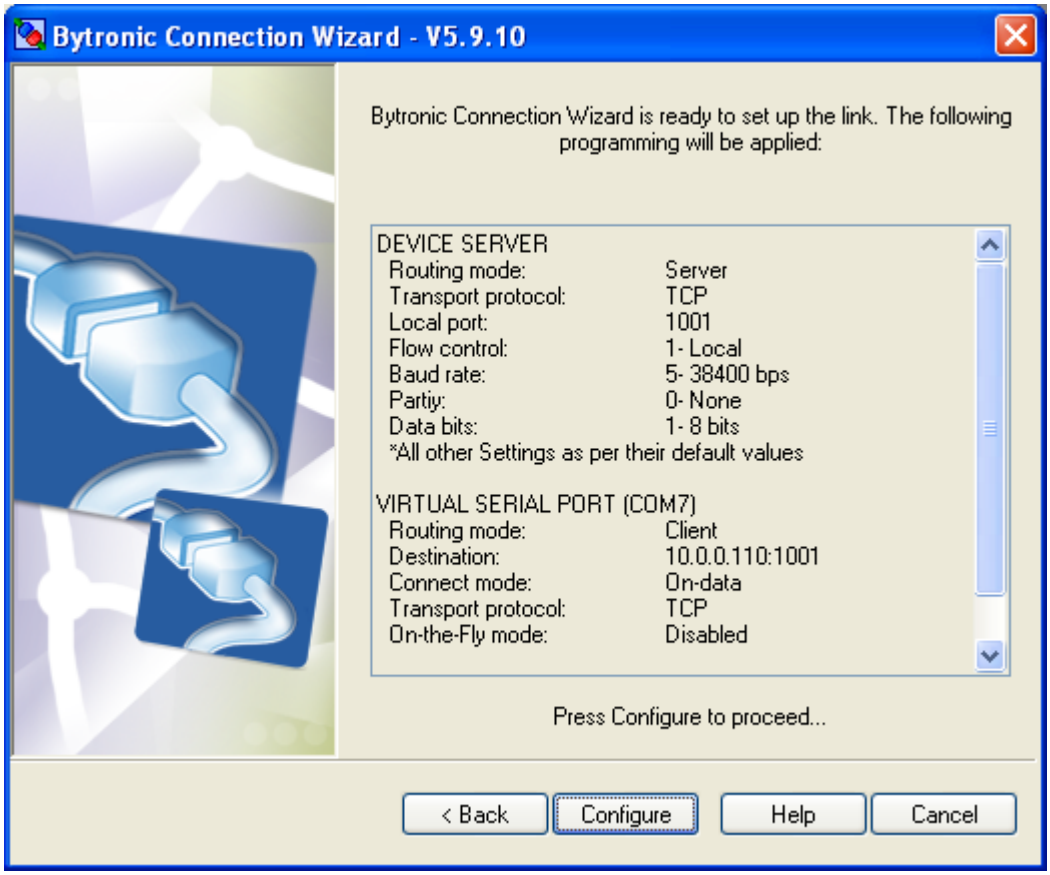
13.6.4.11 STEP 11

The settings of the virtual serial port you are creating are summarized.
These settings are usually irrelevant because the user program on the PC that implements the communication before you open the virtual serial port provide the plant with these settings



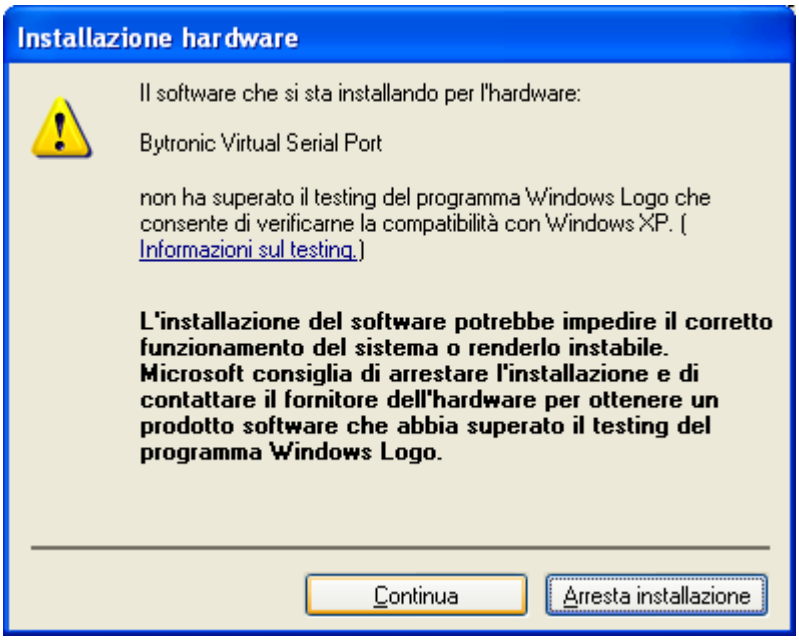
13.6.4.12 STEP 12

Summarizes the settings made prior to final programming.



With the CONFIGURE button will start the programming

13.6.4.13 STEP 13
Windows reporting

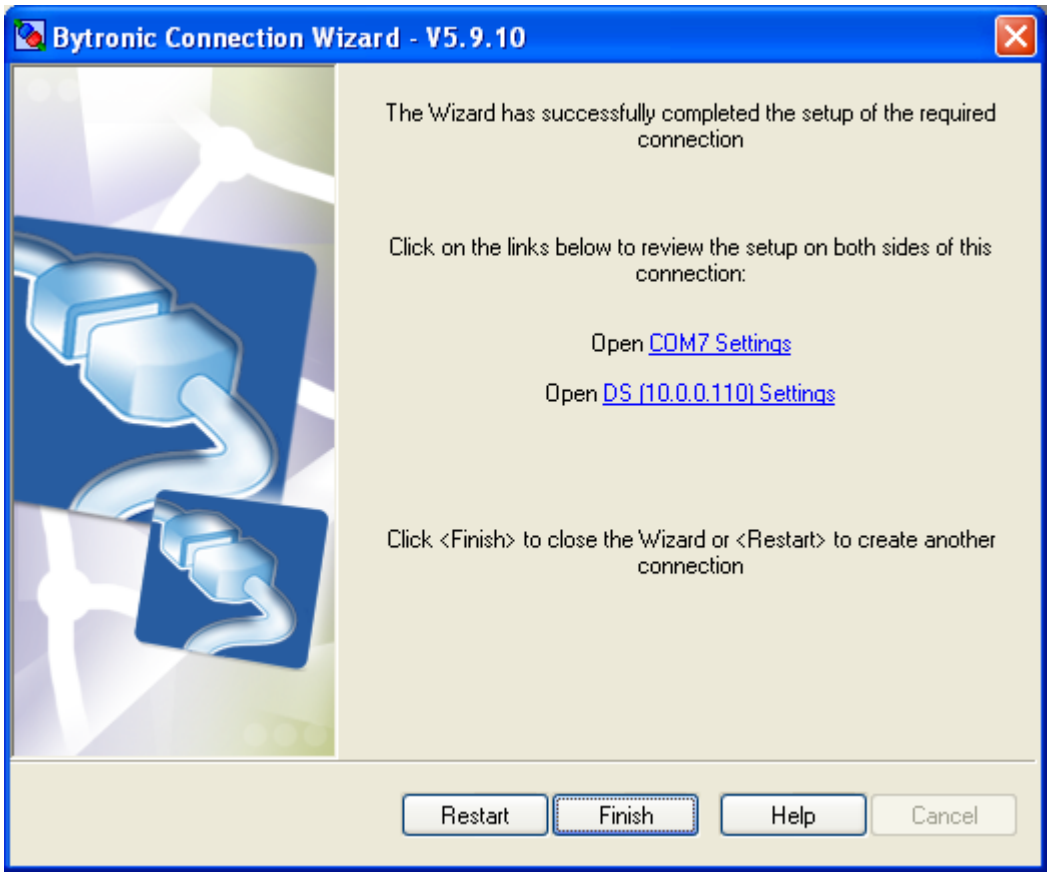


Press button CONTINUE.

13.6.4.14 STEP 14
Programming

13.6.4.15 STEP 15

Report of the successfully termination of the procedure



Clicking on any link, you will:

♣ COM7 settings

go directly to the page of VSP Manager regarding the properties of the virtual serial port created

♣ DS (10.0.0.110) settings

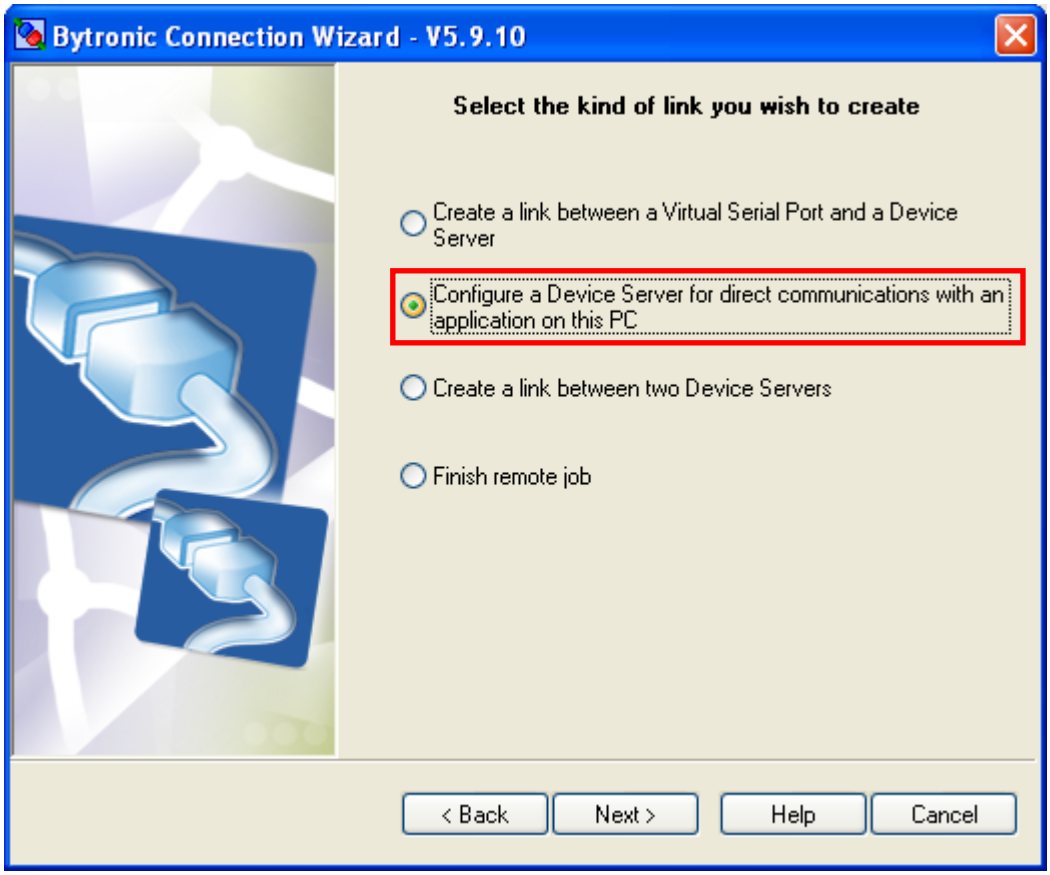
access to the DS Manager regarding the properties of the device **ETH2S**.

Press the FINISH button to end the procedure.

The effect of this procedure can be controlled by the VSP program or through the Windows Device management (in both cases, see paragraph VSP Manager).

13.6.4.16 STEP 4B - Configure a Device Server for direct communications with an application on this PC

Connect the device **ETH2S** to the LAN (eg through a HUB / SWITCH) and power it.
Select the shown option



The procedure consist to follow the steps outlined from STEP 6.

STEP 6 the conclusion is the programming of the device **ETH2S**

In case of problems you will have some informations like:

Indicating that the device is not ONLINE or is not connected to the network or is not powered.
Another typical signaling is as follows:

which suggests to change the transport protocol for programming.

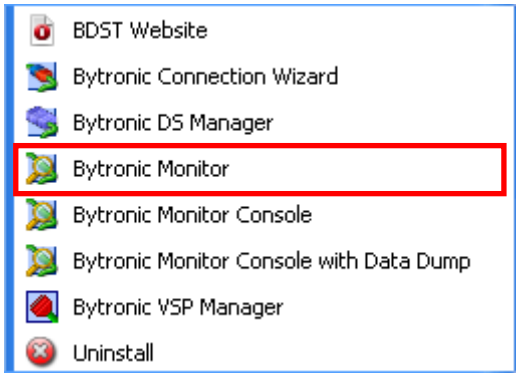
When the programming will be terminated, then will be accessed to the next stage (see STEP 7)

13.6.5Port Monitor

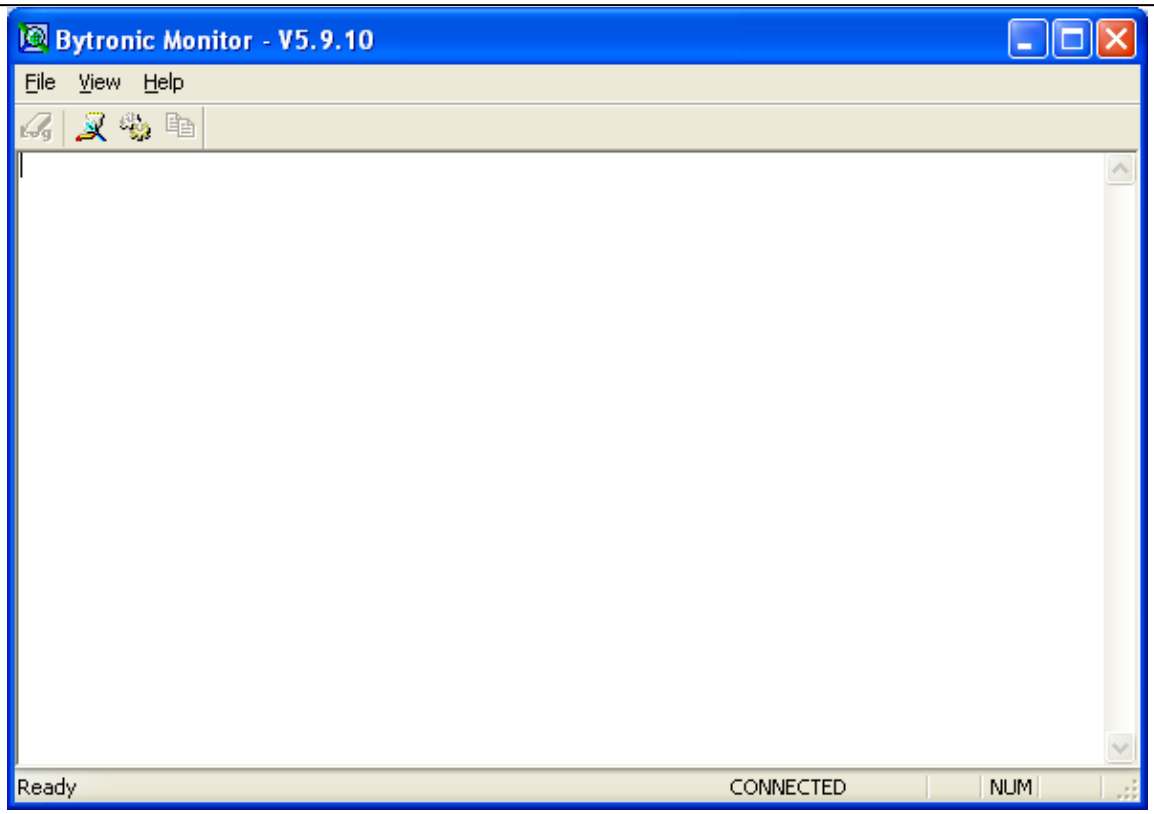
It is a program which is used to monitor the behavior of a virtual serial port created with VSP, for example in the case of communication problems.

Start the program Port Monitor

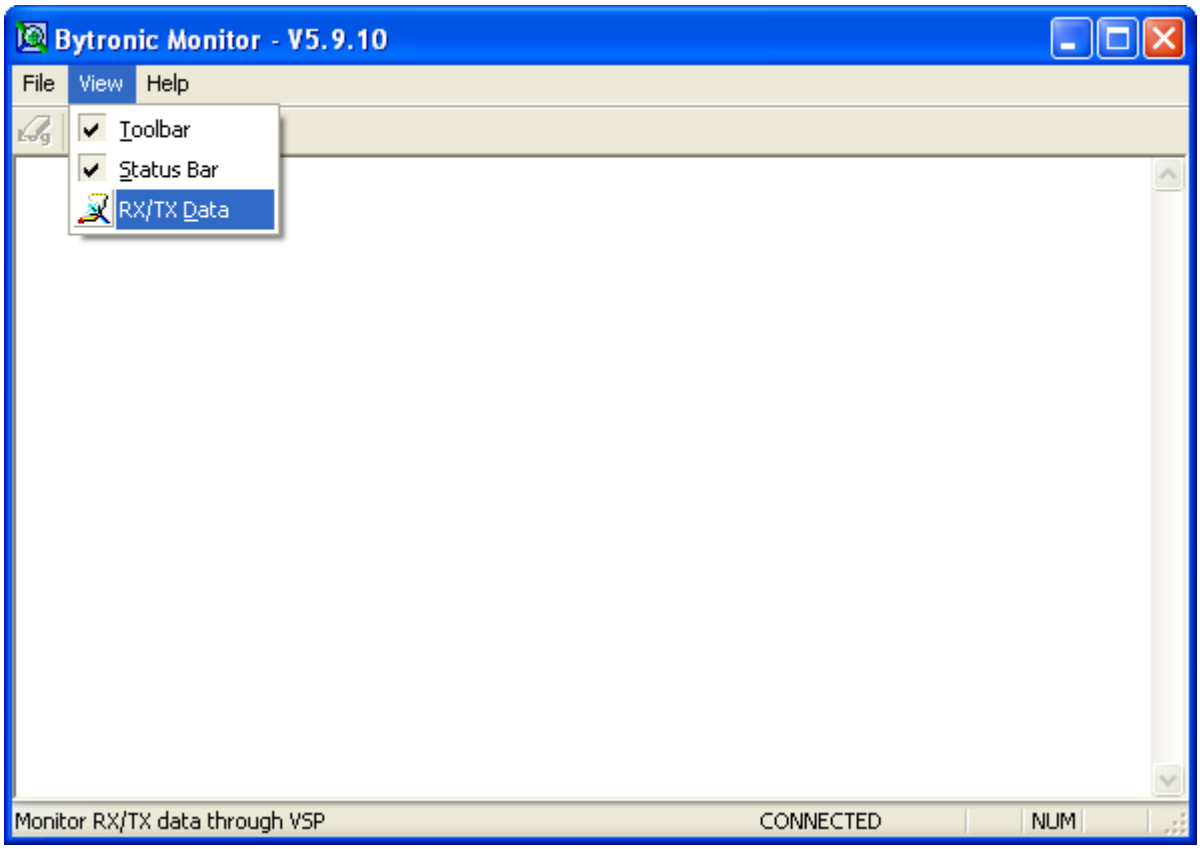
acting on the icon that can be traced in the working group on the programs bar:



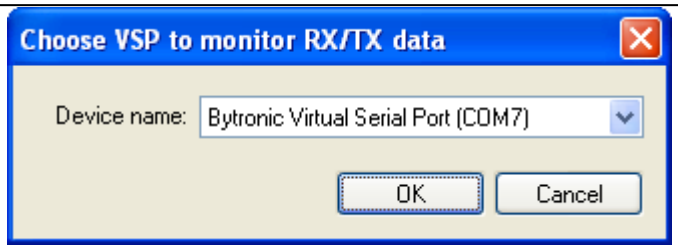
You will see the following window:



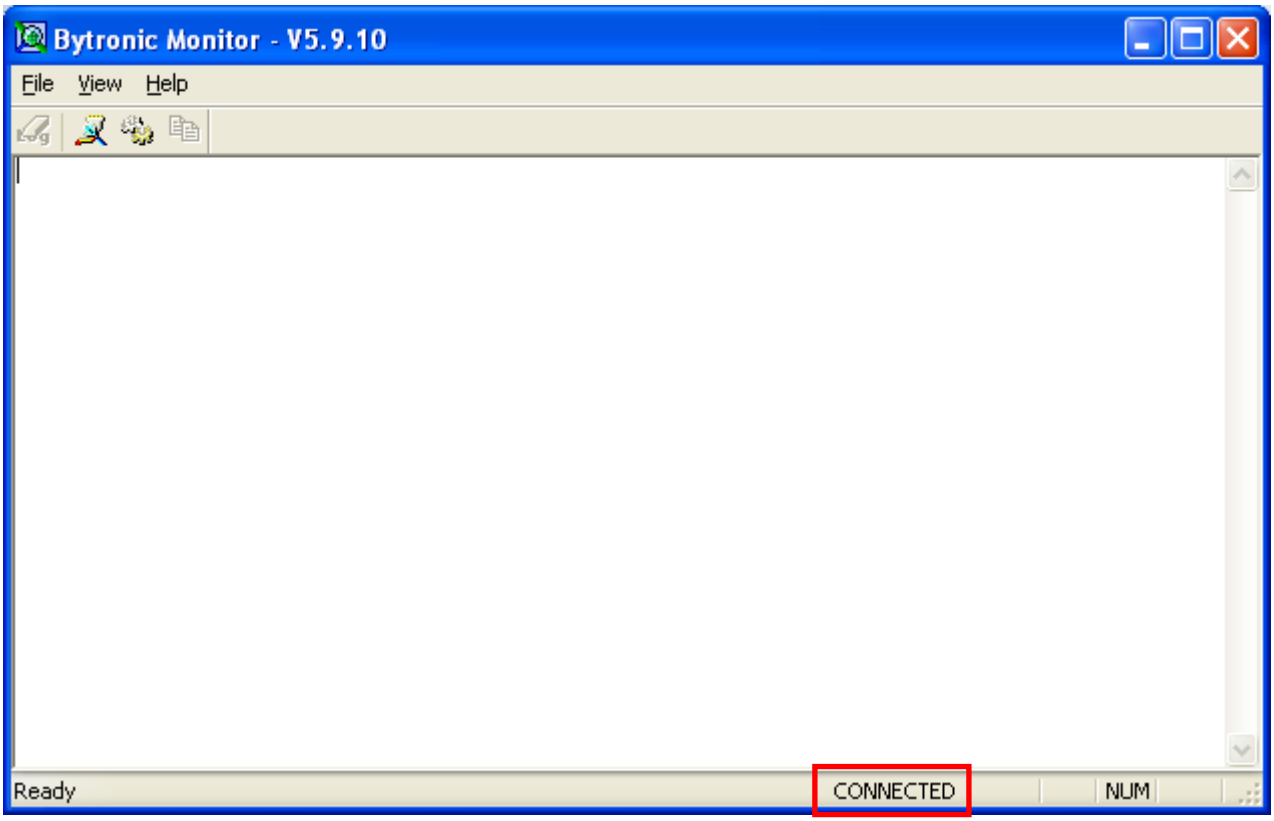
Select the port of interest using the menu VIEW -> RX / TX DATA)



which will offer a drop down list where you can select one of the VSP port present in the system:

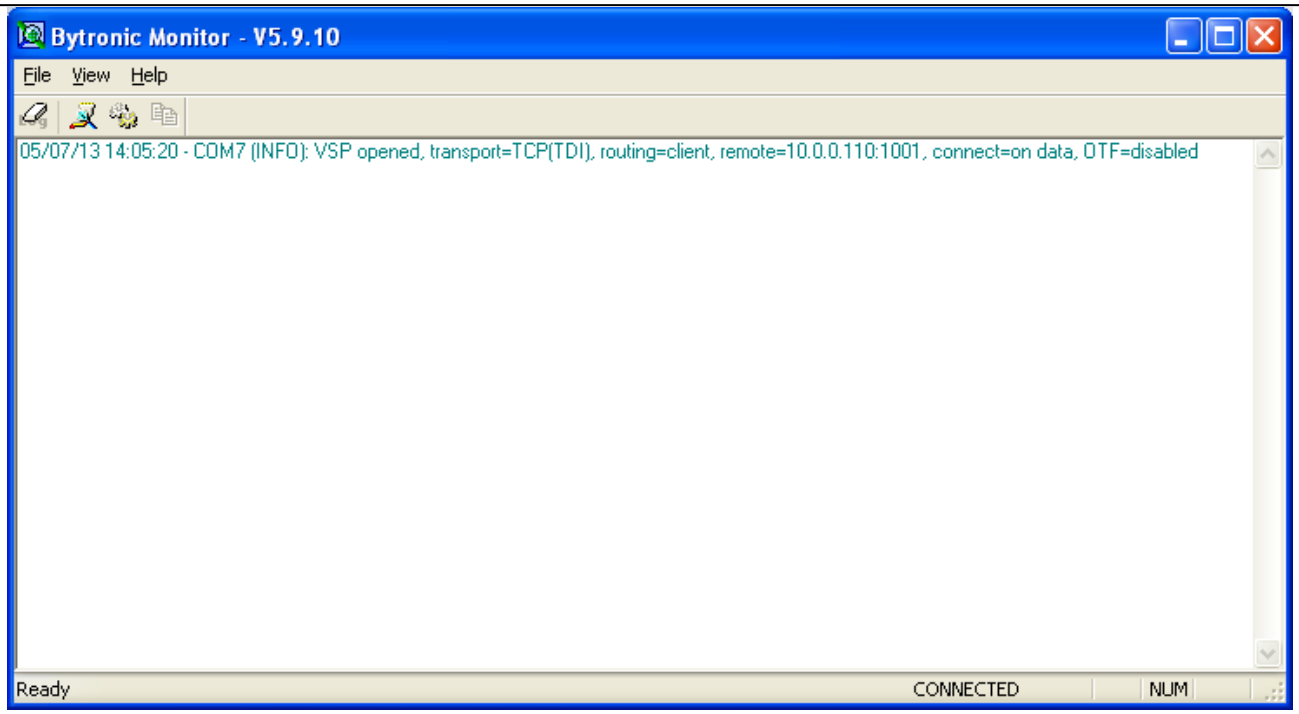


Confirm with OK.
Close the window which was opened in order to observe the Port Monitor window that on the status bar (at the bottom) show that the program is connected to the chosen virtual serial port and is ready for monitoring the traffic data.

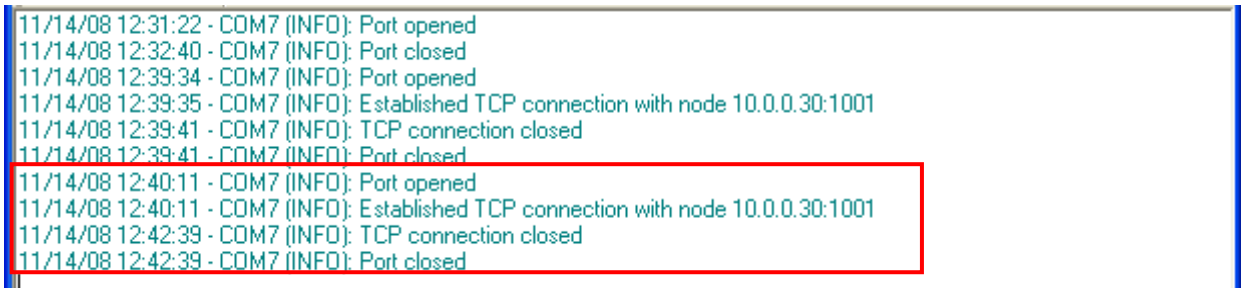


In this window you can observe the data traffic on the virtual serial port choice.
To perform a test put the execution application responsible for communication with the field on this virtual serial port.

It will be observed a first change in status of the selected port and that is its openness:



In the next window, it is showed an example of the log in the case of a communication with a multimeter on COM7 scheduled at 9600:



In this example, at 12:40:11 supervision software has opened the virtual serial port COM7 for querying an instrument, and in fact in the same instant the device **ETH2S** has established a TCP / IP connection between the IP address 10.0.0.30 (its address) and the virtual COM7 associated with it. About 2 minutes later the TCP / IP and port have been closed. In this case there was no exchange of data, on contrary, would be observed sequences of transmission (TX) from the serial port to the device server virtual COM7 **ETH2S** and receiving (RX) in the opposite direction.

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