AUTOMATIC TRANSFER SWITCH CONTROLLER

OMEGA-ATS/ATSO

USER'S MANUAL
FOR H/W VERSION 1.2/1.2α
FOR S/W VERSION 1.0 1925

1. GENERAL DESCRIPTION
1.1 INTRODUCTION

This module controls up to three power sources: mains and two generators (MGG). It is also possible to configure it to control mains and one generator (MG) or just two generators (GG). It features isolated measurement of the voltages and frequency on all three sources as well as the current on the load side.
It has four operating modes selectable by the user: OFF, AUTO, MAINS, G1 or G2.
This module can be configured to be used as ATS or ATSO.
The user interface consists of a Graphical LCD display. A mode push button is provided to select the operating mode and four push buttons are used to access a menu of parameters. The menu gives access to all timers, set points and other parameters relevant to the control and protection of the installation.
This module comes with RS485, USB and Ethernet communication ports. It also features a 4GB MicroSD card for data and event logging. Data and event retrieval is done by either USB port or Internet through a dedicated website.
The firmware could be easily upgraded on site via the USB interface using a desktop application or any smart phone with a free Android app.

1.2 FEATURES

- Microcontroller based design
- Measurement and display of the voltages and frequency on the three power sources
- Measurement and display of the current on the load side
- Measurement and display of the power on the load side
- All three supplies are monitored for over/under voltage, phase presence and sequence
- All three supplies are monitored for over/under frequency
- Load side is monitored for over current when it is not supplied by the Mains
- Display of Software version, the internet connection status, the date and time
- Alternate function to keep the running hours of the Gensets similar (For ATS)
- Automatic switching between the two Gensets based on the load (For ATSO)
- Weekly exerciser function
- Ability to control contactor, motorized circuit breakers and motorized changeover switches
- Easy to fit DIN standard 184X139 panel mount housing
- Connection is via locking plug and socket connectors
- Front panel LEDs for inputs status
- Menu to provide access to all timers, set points and other parameters
- Over / Under frequency alarm and shut down
- Over / Under voltage alarm and shut down
- Over current alarm and shut down
- Operation by push buttons
- USB interface
- Ethernet interface (optional)
- Serial RS485 Modbus protocol (optional)
- 4GB Micro SD card for event and data logging (optional)
- Internet communication: no software installation required
- Galvanic isolation for all three suppliers AC inputs
- Parameters can be edited and updated from any remote interface at any time even when an engine is running
- Menu accessible from front panel as well as from the internet.

	OMEGA v1.0/1.1	OMEGA v1.2
On-site Firmware Upgrade	Not Available	Available via USB
Remote Firmware Upgrade	Not Available	Available via Internet
Faults history	Not Available	Up to 100 faults if the SD card is mounted Up to 15 faults if the SD Card is not mounted
User interface	16-char alphanumeric LCD displays with 5 push buttons to select between operating modes	New Graphical LCD Display with: - Easy access to all measurements in one page - Easy access to the menu - One dedicated push button to select between modes - Four push buttons to navigate between displayed pages
Ethernet Interface	Not Available	Optional
Modbus Port	Not Available	Optional
SD Card	Not Available	Optional
Events/Time Logs	Not Available	Available if the SD card is mounted

1.3 OPERATION

Four operating modes are provided. To switch from one mode to another, press the mode push button till you reach the required operating mode and then wait for 2 seconds for the operating mode to be applied. Following is description of the operating modes:

- OFF: In this mode the module cuts power completely from the load.
- AUTO: In MGG and MG installation, the module monitors the Utility supply. When the Utility fails or its contactor fails to engage, the module counts a "Response" delay❶ before starting the genset.
In GG installation, the module monitors the remote control input. When the remote control input becomes active, the module counts a "Response" delay before starting the genset.
The genset is started only if it is in Ready mode❷
In MGG and GG installation:
o   For ATS type: Following a mains failure, G1 or G2 is started depending on the "Alternate hrs"❶ after a "Response" delay. Load is engaged after the elapse of the "Warm-up" delay❶.
If "Alternate hrs" is set to a value of hours, the genset with the less number of run hours is started.
If "Alternate hrs" is set to G1/G2, G1/G2 is started.
Once a genset is feeding the load, it keeps feeding it for the number of hours set in "Alternate hrs".
o   For ATSO type: Following a mains failure, G1 (the smaller genset) or G2 (the bigger genset) is started depending on the "Req priority"❶ after a "Response" delay. Load is engaged after the elapse of the "Warm-up" delay.
If the "Req priority" is set to Ld, G2 is requested if the load prior to mains failure was above the "G1 Max Load %"❶, Otherwise, G1 is requested. The value of the load supplied by the Mains is retained for 5 minutes only. So if 5 minutes have elapsed from the mains failure, G2 is started always. This could occur when switching to AUTO mode from Mains or OFF modes.
If the "Req priority" is set to G1/G2, G1/G2 is requested independently from Load.
If G1 is feeding the load and the current goes above the "G1 Max Load %" for a "G1 MaxLd del"❶ delay, G2 is requested. If G2 is feeding the load and the current goes below the "G2 Min Load %"❶ for a "G2 MinLd del"❶ delay, G1 is requested.

When the Mains is re-established, the power is switched back with a dead transfer time "Transfer"❶ after a restoration delay "Mains Rest."❶ and the genset is shut down after the elapse of the "Cooling" ❶ time. For MGG and GG installation, in case the requested genset fails to start or its contactor fails to engage or it shuts down due to any fault, the other genset will automatically start and supply the load. If the "Hold Start"❶ is enabled, and in case the genset failed to start, the start signal remains on so that when it restarts, it will feed the load after disengaging the running genset. When the "Hold Start" is disabled, the start signal is removed. Manual reset is required to recover from this failure. Please refer to section 2 for display description.

• Mains: The module monitors the Mains supply. The load is fed exclusively from this supply if it is within the acceptable limits. No gensets will be started if the Mains fails.

• G1: In this mode, G2 is always in standby mode. G1 is started when it is in ready mode❷ and the Mains fails.

• G2: In this mode, G2 is always in standby mode. G1 is started when it is in ready mode❷ and the Mains fails.

In case contactors are used for the transfer switch, each contactor is controlled by one dry contact. The other dry contact is used as an alarm output (CxD.NO).
If motorized circuit breakers or changeover switches are used, each motorized breaker/ switch is controlled by two relays. The first has one normally open dry contact (CxENG) and is used to engage the motorized circuit by giving a pulse of 2 seconds, the second is controlled by a contact that has a common (CxC), normally open (CxD.NO) and normally closed (CxD.NC) contacts to disengage the motorized circuit breaker by giving a pulse of 4 seconds.

❶Presettable in the menu. Refer to Section 2.4

❷Refer to Section 2.5

2. FRONT PANEL DESCRIPTION
2.1 MEASURED AND DISPLAYED MEASUREMENTS
2.1.1 DISPLAYED PAGES

• Graphical interface showing all power sources with their contactors states, voltages, frequencies, currents and power in KW.

Display	Notes
	The line-neutral and line-line voltages are all measured. The voltage displayed is either fixed on one voltage or allowed to scroll automatically between all six voltages (RN, SN, TN, RS, ST, and TR). The **ESC** push button is used to switch between the two display modes.

• Statuses page that shows the status of each power source.

Display	Notes
	Refer to section 2.3 for the available status displayed

• Separate page for each power source showing the status, contactor state, scrolling voltages, frequency, currents and power in KW.

Display	Notes
	The **ESC** push button is used to start/stop the voltages scrolling. Long press on the **Select** push button for 3 seconds resets the occurring fault.

• Page showing the running hours for each generator and The Omega operating mode currently selected.
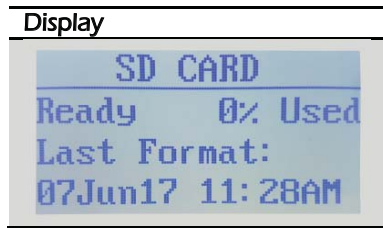
Display

• Page showing the running hours for each generator and The Omega operating mode currently selected.

Display

• Micro SD card page showing the SD card status, data consumption and last format date.

Display

```
        SD CARD
Ready        0% Used
Last Format:
07Jun17 11:28AM
```

• Ethernet page showing the Site ID, the Ethernet S/W version, revision number and the communication state.

Display

```
        ETHERNET
SITEID: SASTST
E.S/W: 1.00r0
No Eth. Cable
```
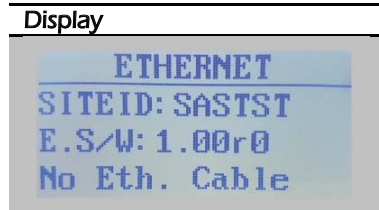
The **UP** and **Down** push buttons are used to scroll between the above pages. To access the parameters menu, Press and release the Select push button.

2.1.2 SYMBOLS DESCRIPTIONS

Symbol	Description
G1 G2	Generator is off.
G1 G2	When blinking, it indicates that the generator is requested to start/stop or it is running with an anomaly or/and no valid OK feedback. When On, it indicates that the generator supply is within the acceptable limits, the phases are all present and in the right sequence, and the OK signal is active.
(symbol)	Mains power source is absent.
(symbol)	When blinking, it indicates that the Mains power source is detected but with no valid measurements or/and wrong phase sequence. When On, it indicates that the Mains supply is within the acceptable limits, the phases are all present and in the right sequence.
!	Generator is in a faulty status with no start order, Fault reset is needed.
!	Generator Failed to start and the start order is active (hold start is enabled).
(symbol)	Order to disengage contactor is given.
(symbol)	Order to engage contactor is given.
(symbol) !	The exclamation mark blinks to indicate that Order to disengage contactor is given but the contactor feedback is active.
(symbol) !	The exclamation mark blinks to indicate that Order to engage contactor is given but the contactor feedback is inactive.

2.2 FRONT PANEL LEDS

- Five Leds used to indicate the operating mode.
- Seven input Leds used to indicate the status of the inputs.

2.3 STATUS AND FAULTS
2.3.1 GENSET STATUSES

Status	Display	Abbreviation
Standby (Not ready)	Standby	Standby
Ready	Ready	Ready
Counting Response delay to give start order	Response	RSP
Start order is given (ST.Gx engaged)	Starting	Starting
Gx OK signal active with No AC signals from genset	OK-WaitingAC	OK-NoAC
Counting Warm-up delay to engage load	Warm Up	WUp
Engaging load (CGx Engaged) with No CGx F/B detected yet	Engaging	Engaging
Load engaged (CGx Engaged with CGx F/B detected) with No CG F/B detected yet	Engaged	Engaged
Feeding the load (CGx Engaged with CGx F/B & CG F/B detected)	Feeding Load	Feeding
Disengaging the load (CGx Disengaged) with CGx and/or CG F/B still detected	Disengaging	Diseng.
Counting Cooling delay to disengage start order	Cooling	COL
Shutting down (Start order released)	Shutting	SDN

2.3.2 GENSET FAULTS

Fault	Display	Abbreviation
Start Fail caused by absence of Gx OK signal	StFail-NoOK	StF.NoOK
Start Fail caused by Failure of G contactor	StFail-CG-F	StF.CG-F
Start Fail caused by Failure of Gx contactor	StFailCGx-F	StF.CGxF
Start Fail caused by Absence of AC signals	StFail-NoAC	StF.NoAC
Start Fail caused by High voltage	StFail-HiV.	StF.HiV
Start Fail caused by Low voltage	StFail-LoV.	StF.LoV
Start Fail caused by High frequency	StFail-HiF.	StF.HiF
Start Fail caused by Low frequency	StFail-LoF.	StF.LoF
Start Fail caused by wrong phase sequence	StFail-Seq-F	StF.Seq
Start Fail caused by G contactor jam	StFail-CGJam	StF.CG-J
Start Fail caused by Mains contactor jam	StFail-CMJam	StF.CM-J
Start Fail caused by the other generator contactor jam	StFail-CGyJam	StF.CGyJ
Start Fail caused by the expire of start failure delay	StFail-Time	StF.Time
Gx OK Signal lost after generator has turned on	OK Failure	OK Fail
Global contactor failure	CG Fail	CG Fail
CGx Contactor failure	CGx Fail	CGx Fail
One of the three-phase voltages goes above the over voltage limits set by OVolt(L-N) for a delay of OVolt del.	Hi Voltage	Hi Volt.
One of the three-phase voltages goes below the under voltage limits set by UVolt(L-N) for a delay of UVolt del.	Lo Voltage	Lo Volt.
The frequency goes above the value set in Over Freq. for a delay of OFreq del.	Hi Freq.	Hi Freq.
The frequency goes below the value set in Under Freq. for a delay of UFreq del.	Lo Freq.	Lo Freq.
The phases are reversed	Wrong Seq.	Seq.Fail
The load exceeds the value set by Overload % for a delay of Overld del	Over Load	Over Ld.

2.3.3 UTILITY STATUSES

Status	Display	Abbreviation
Standby (not ready)	Standby	Standby
Ready	Ready	Ready
Utility Absent	Absent	Absent
Counting Restoring delay	Restoring	Rest.
Engaging load (CM engaged with No CM F/B detected yet)	Engaging	Engaging
Feeding the load (CM engaged with CM F/B detected)	Feeding Load	Feeding
Disengaging load CM Disengaged) with CM still detected	Disengaging	Diseng.

2.3.4 UTILITY FAULTS

Fault	Display	Abbreviation
Utility contactor failure	C-U Fail	CU Fail
One of the three-phase voltages goes above the over voltage limits set by OVolt(L-N) for a delay of OVolt del.	Hi Voltage	Hi Volt.
One of the three-phase voltages goes below the under voltage limits set by UVolt(L-N) for a delay of UVolt del.	Lo Voltage	Lo Volt.
The frequency goes above the value set in Over Freq. for a delay of OFreq del.	Hi Freq.	Hi Freq.
The frequency goes below the value set in Under Freq. for a delay of UFreq del.	Lo Freq.	Lo Freq.
The phases are reversed	Wrong Seq.	Seq.Fail

2.4 MENU DESCRIPTION
2.4.1 PASSWORD

A password is required for accessing the menu. The password consists of 4 digits. Two passwords can access the menu. The first is provided by S. & A.S. Co. Ltd. and is referred to as client password. This password can only be changed by S. & A.S. Co. Ltd. The second password is referred to as the user password. The user password can be modified in the menu. The client password accesses all the items in the menu whereas the user password is denied access to some of the menu items.

2.4.2 ACCESSING THE MENU

Follow the steps described below to access the menu:

1.   Press the Select push button once. You will be prompted to enter a four-digit code. The default password is 0000.
2.   Use the UP and DOWN push buttons to scroll to the desired number.
3.   Press the Select push button. "*" replaces the first digit.
4.   Repeat steps 2 and 3 until all four digits are entered.
5.   If the entered password is valid, the user will have access to the menu below for 10 minutes without the need to re-enter the password for every menu access.

While in the menu, if no push buttons are pressed for 25 seconds or if the ESC button is pressed, the system will automatically exit the menu.
While editing a parameter in the menu, if no push buttons are pressed for 10 seconds or if the ESC button is pressed, the system will automatically exit the edit mode.
While in the menu, The UP/DOWN push buttons are used to scroll up/down the submenus or the parameters list. The Select push button accesses the submenu or edits the parameter.
While editing a parameter in the menu, The UP/DOWN push buttons are used to increment/decrement the parameter value. The Select push button saves the changes done on the parameter edited.

2.4.3 SUBMENUS

What you see on the display	Description	Visibility Condition
Configuration	Configuration sub menu	N/A
Genset	Generator sub menu	N/A
Utility	Utility sub menu	For MGG & MG installation type
Modbus	Modbus sub menu	Modbus Hardware Available
Ethernet	Ethernet sub menu	Ethernet Hardware Available
LCD Display	LCD Display sub menu	N/A
SD Card	SD Card sub menu	SD Card Hardware Available
View Faults	View faults	At least one fault exists
Erase Faults	Erase faults	At least one fault exists

2.4.4 CONFIGURATION SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
Omega Type	Omega Type	Client P/W	ATS: for 2 gensets of the same rating ATSO: for 2 gensets of different rating	N/A
ATS Type	ATS Type	Client P/W	Cont: for contactor outputs MCB: for motorized circuit breakers MCO: for motorized changeover switches	Cont
Inst. Type	Installation Type	Client P/W	MGG: 1 Mains and 2 gensets MG: 1 Mains and 1 genset GG: 2 gensets	MGG
Company	Company Name	Client P/W	12 Characters long	S.& A.S. LTD
User P/W	User password	N/A	0000 to 9999	N/A
Date	Date	N/A	N/A	N/A
Time	Time	N/A	N/A	N/A

2.4.5 GENSET SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
Response	Response delay	N/A	0 to 999 sec	5 sec
Flt bypass	Fault bypass delay	N/A	0 to 999 sec	15 sec
Warm-up	Warming up delay	N/A	0 to (Start Fail - Transfer dead time - 10) sec	10 sec
Off delay	Off delay	**"Inst. Type"** set to GG	0 to 999 sec	10 sec
Transfer	Transfer dead time delay	N/A	0 to (Start Fail – Warm up - 10) sec	0 sec
Cooling	Cooling down delay	N/A	0 to 999 sec	30 sec
Over Freq	Over frequency	N/A	N, 10 Hz to 70 Hz	55 Hz
OFreq del.	Over frequency delay	N/A	0 to 999 sec	2 sec
Under Freq	Under frequency	N/A	N, 10 Hz to 70 Hz	45 Hz
UFreq del.	Under frequency delay	N/A	0 to 999 sec	2 sec
OVolt(L-N)	Over voltage (Line-Neutral)	N/A	N, 1 to 260 V	240 V
OVolt del.	Over voltage delay	N/A	0 to 999 sec	3 sec
UVolt(L-N)	Under voltage (Line-Neutral)	N/A	N, 1 to 260 V	180 V
UVolt del.	Under voltage delay	N/A	0 to 999 sec	5 sec
G-Seq Test	Generator phase sequence test	N/A	N: Phase sequence test disabled Y: Phase sequence test enabled	N

What you see on the display	Description	Visibility Condition	Range	Default Value
Start Fail	Start fail delay	N/A	(Warm up +Transfer dead time+10) to 999 sec	45 sec
Hold Start	Hold Start feature	Client P/W	N: Start order released after start failure Y: Start order held after start failure	
Time Switch	Time Switch operation	N/A	N: Operation disabled Y: Operation enabled	N
Ready @	Gensets ready at time	"Time Switch" set to Y	N/A	8:00 AM
Stdby @	Gensets standby at time	"Time Switch" set to Y	N/A	5:00 PM
All Days Ready	Gensets ready feature	N/A	N: Have to set the gensets ready days Y: Gensets ready all days of the week	Y
Sunday	Gensets readiness on Sunday	"All Days Ready" set to N	N: Genset not ready on Sunday Y: Genset ready on Sunday	N
Monday	Gensets readiness on Monday	"All Days Ready" set to N	N: Genset not ready on Monday	N
Tuesday	Gensets readiness on Tuesday	"All Days Ready" set to N	Y: Genset ready on Tuesday	N
Wednesday	Gensets readiness on Wednesday	"All Days Ready" set to N	N: Genset not ready on Wednesday	N
Thursday	Gensets readiness on Thursday	"All Days Ready" set to N	Y: Genset ready on Thursday	N
Friday	Gensets readiness on Friday	"All Days Ready" set to N	N: Genset not ready on Friday	N
Saturday	Gensets readiness on Saturday	"All Days Ready" set to N	Y: Genset ready on Saturday	N
Weekly Ex.	Weekly Exercising	N/A	N/Y	N
Alternate hrs	Alternate number of hours	"Omega Type" set to ATS	G1: Highest priority to G1 G2: Highest priority to G2 1 to 99 hours	4 hours
Req Priority	Request Priority	"Omega Type" set to ATSO	G1: Highest priority to G1 G2: Highest priority to G2 Ld (MGG only): Load dependent priority	G2
G1 hours	G1 running hours	Client P/W	0 to 999999 hours	0 hours
G2 hours	G2 running hours	"Inst. Type" set to MGG or GG Client P/W	0 to 999999 hours	0 hours
R.C.	Remote control configuration	N/A	Gensets Rdy: Gensets are ready U Present: Simulate utility presence v1.0 Compt.: Compatible with Omega v1.0	U Present
NB Phases	Gensets connection	N/A	1PH: 1 phase 3PH: 3 phases	3PH
CT ratio /5	Current transformer ratio	N/A	N, 1 to 9999	100
Overload %	Gensets Overload % of the current transformer	"Omega Type" set to ATS	0 to 100%	90%
Overld del	Gensets Overload delay	"Omega Type" set to ATS	0 to 999 seconds	10
G1 Overload %	G1 Overload % of the current transformer	"Omega Type" set to ATSO	0 to 100%	90
G1 Overld del	G1 Overload delay	"Omega Type" set to ATSO	0 to 999 seconds	10

What you see on the display	Description	Visibility Condition	Range	Default Value
G2 Overload %	G2 Overload % of the current transformer	**"Omega Type"** set to ATSO	0 to 100%	90
G2 Overld del	G2 Overload delay	**"Omega Type"** set to ATSO	0 to 999 seconds	10
G1 Max Load %	G1 Maximum Load % of the current transformer	**"Omega Type"** set to ATSO	0 to 100%	50
G1 Maxld del	G1 Maximum load delay	**"Omega Type"** set to ATSO	0 sec to 99 min	10 sec
G2 Min Load %	G2 Minimum Load % of the current transformer	**"Omega Type"** set to ATSO	0 to 100%	30
G2 Minld del	G2 Minimum load delay	**"Omega Type"** set to ATSO	0 sec to 99 min	10 sec
Recycle reset	Recycle after Utility reset	N/A	N: No automatic reset is done after a genset fault Y: Automatic reset is done on faulty genset when Mains is established	Y

2.4.6 UTILITY SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
Mains Rest.	Mains Restoration delay	**"Inst. Type"** set to MGG or MG	0 to 999 seconds	10 sec
Over Freq	Over frequency	**"Inst. Type"** set to MGG or MG	N, 10 Hz to 70 Hz	55 Hz
OFreq del	Over frequency delay	**"Inst. Type"** set to MGG or MG	0 to 999 seconds	2 sec
Under Freq	Under frequency	**"Inst. Type"** set to MGG or MG	N, 10 Hz to 70 Hz	45
UFreq del	Under frequency delay	**"Inst. Type"** set to MGG or MG	0 to 999 seconds	2 sec
OVolt(L-N)	Over voltage (Line-Neutral)	**"Inst. Type"** set to MGG or MG	N, 1 to 260 V	240 V
OVolt del	Over voltage delay	**"Inst. Type"** set to MGG or MG	0 to 999 seconds	3 sec
UVolt(L-N)	Under voltage (Line-Neutral)	**"Inst. Type"** set to MGG or MG	N, 1 to 260 V	180 V
UVolt del	Under voltage delay	**"Inst. Type"** set to MGG or MG	0 to 999 seconds	5 sec
U-Seq Test	Utility phase sequence test	**"Inst. Type"** set to MGG or MG	N: Phase sequence test disabled Y: Phase sequence test enabled	N
NB Phases	Utility connection	**"Inst. Type"** set to MGG or MG	1PH: 1 phase 3PH: 3 phases	3PH

2.4.7 MODBUS SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
Modbus	Modbus feature	Modbus HW available	N: Modbus disabled Y: Modbus enabled	Y
Slave ID	Slave node ID	**"Modbus"** set to Y	1 to 247	20
Baudrate	Baud rate	**"Modbus"** set to Y	9600 14400 19200 28800 38400 56000 57600 115200	9600
Parity	Parity	**"Modbus"** set to Y	None Odd Even	None
Stop Bits	Stop Bits	**"Modbus"** set to Y	1 1.5 2	1
Mode	Communication Mode	**"Modbus"** set to Y	RTU ASC	RTU

2.4.8 ETHERNET SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
Ethernet	Ethernet feature	Ethernet HW available	N: Ethernet disabled Y: Ethernet enabled	Y
DHCP	DHCP	**"Ethernet"** set to Y	N: DHCP disabled Y:DHCP enabled	Y
SITEID	SITE ID	**"Ethernet"** set to Y	6 Characters long	XXXXXX
IP ADDRESS	IP ADDRESS	**"Ethernet"** set to Y **"DHCP"** set to N	N/A	192.168.0.21
SUBNET MASK	SUBNET MASK	**"Ethernet"** set to Y **"DHCP"** set to N	N/A	255.255.255.0
GATEWAY	GATEWAY	**"Ethernet"** set to Y **"DHCP"** set to N	N/A	192.168.0.1
P.ServerName	Primary server name	**"Ethernet"** set to Y	30 Characters long	www.sascontrollers.com
S.ServerName	Secondary server name	**"Ethernet"** set to Y	30 Characters long	www.sascontrollers.com

2.4.9 LCD DISPLAY SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
LCD Contrast	LCD Contrast	N/A	0 to 30	12
LCD Backlight	LCD Backlight percentage	N/A	0 to 100 %	70 %

2.4.10 SD CARD SUBMENU

What you see on the display	Description	Visibility Condition	Range	Default Value
DSR	SD Data sampling rate	SD card available	N, 1 sec to 24 hours	20 sec

2.4.10 SD CARD SUBMENU

OMEGA v1.0/1.1 PARAMETER NAME	OMEGA v1.2 PARAMETER NAME	OMEGA v1.2 SUBMENU
Response	Response	GENSET SUBMENU
Flt bypass	Flt bypass	GENSET SUBMENU
Warm-up	Warm-up	GENSET SUBMENU
Mains Rest.	Mains Rest.	GENSET SUBMENU
Cooling	Cooling	GENSET SUBMENU
U-OverFrq. Hz	Over Freq	UTILITY SUBMENU
U-OvrFrq dly	OFreq del.	UTILITY SUBMENU
U-UndrFrq. Hz	Under Freq	UTILITY SUBMENU
U-UndrFrqdly	UFreq del.	UTILITY SUBMENU
U-OverVolt. V	OVolt(L-N)	UTILITY SUBMENU
U-OvrVlt.dly	OVolt del.	UTILITY SUBMENU
U-UnderVolt. V	UVolt(L-N)	UTILITY SUBMENU
U-UndrVltdly	UVolt del.	UTILITY SUBMENU
G-OverFrq. Hz	Over Freq	GENSET SUBMENU
G-OvrFrq dly	OFreq del.	GENSET SUBMENU
G-UndrFrq. Hz	Under Freq	GENSET SUBMENU
G-UndrFrqdly	UFreq del.	GENSET SUBMENU
G-OverVolt. V	OVolt(L-N)	GENSET SUBMENU
G-OvrVlt.dly	OVolt del.	GENSET SUBMENU
G-UnderVolt. V	UVolt(L-N)	GENSET SUBMENU
G-UndrVltdly	UVolt del.	GENSET SUBMENU
CT ratio /5	CT ratio /5	GENSET SUBMENU
Overload %	Overload %	GENSET SUBMENU
Overld dly	Overld del	GENSET SUBMENU
Start Fail	Start Fail	GENSET SUBMENU
Xfr deadtim	Transfer	GENSET SUBMENU
Hold Start	Hold Start	GENSET SUBMENU
Time switch	Time Switch	GENSET SUBMENU
G1 hh:mmy hh:mmy	G1 Rdy@, G1 Stby@	GENSET SUBMENU
G2 hh:mmy hh:mmy	G2 Rdy@, G2 Stby@	GENSET SUBMENU

OMEGA v1.0/1.1 PARAMETER NAME	OMEGA v1.2 PARAMETER NAME	OMEGA v1.2 SUBMENU
G1Alternat hrs	G1 Alt. hrs	GENSET SUBMENU
G2Alternat hrs	G2 Alt. hrs	GENSET SUBMENU
W.Exercise	Weekly Ex.	GENSET SUBMENU
ATS Type	ATS Type	CONFIGURATION SUBMENU
Installat.	Inst. Type	CONFIGURATION SUBMENU
LCD Contrast	LCD Contrast	LCD DISPLAY SUBMENU
Co.	Company	CONFIGURATION SUBMENU
Time	Time	CONFIGURATION SUBMENU
Date	Date	CONFIGURATION SUBMENU
User P/W	User P/W	CONFIGURATION SUBMENU
G1 hours	G1 hours	GENSET SUBMENU
G2 hours	G2 hours	GENSET SUBMENU

2.5 PARAMETERS DESCRIPTION

The over/under frequency/voltage could be disabled by setting the corresponding parameter in the menu to 'N'.

When transferring load from one generator to another, the transfer dead time and the warm up delay are counted. To avoid getting a fault on the generator, the sum of these delays should not exceed the start fail delay of the generator. Thus, the "Start Fail" delay should never fall below ("Transfer" + "Warm-up" +10sec).

When "Hold Start" feature is enabled, the start signal is held on the generator after a start failure or an OK failure fault occurs. Thus, when this fault no longer exists, the generator starts without user intervention. When it is disabled, the start signal is removed and a manual reset of the fault is required to resume use of the specific generator.

For ATS, the "Alternate hrs" parameter indicates the number of hours that a generator must run before the other generator is requested. If set to G1, G1 is given priority and if set to G2, G2 is given priority.

The "Weekly Ex." parameter enables/disables the weekly exerciser. When enabled, any generator that did not operate between Sunday and Friday would be started on Saturday at 8:00 am for half an hour. If both were not used during the whole week, they will be started on Saturday at 8:00AM in sequence and each for half an hour.

The "Time Switch" manages the operating time of the genset daily. Two parameters control the daily time switch: "Ready @" and "Stdby @". "Ready @" sets the time at which the genset becomes ready. "Stdby @" sets the time at which the genset goes to standby mode. If genset is required to be in ready mode all day then set "Time Switch" to N.

The "All Days Ready" manages the operating time of the genset weekly. Under "All Days Ready", if Y is selected then the genset will be ready all week long. Otherwise, the genset will be ready only in days set to Y. It will be in standby in days set to N.

As a result, the genset will be ready during the hours set by "Ready @" and "Stdby @" only on days set to Y under Rdyday.

When "R.C." is set to "Gensets Rdy", when remote control is active and genset in ready mode, following a mains failure, the genset is started. Otherwise, the genset is stopped.

When "R.C." is set to "U Present", when remote control is active and genset in ready mode, the genset is stopped.

When "R.C." is set to "v1.0 Compt.", the remote control input will be at the place of CM F/B as in Omega v1.0 & v1.1

2.6 MODBUS REGISTERS

Name	type	Address	Size	Access	Description
Omega Type	input register	30001	1	R	Omega Type 0 = ATS 1 = ATSO
Hardware Version	input register	30002	1	R	Hardware Version
Software Version	input register	30003	1	R	Software Version
Revision number	input register	30004	1	R	Revision number
Modbus Status	input register	30005	1	R	Modbus status: 0(normal), 1(malfunction)
Operating Mode	input register	30006	1	R	Operating Mode: 1 = Auto Mode 2 = Mains-Only Mode 3 = G1-Only Mode 4 = G2-Only Mode
Status	input register	30010 Utility	1	R	0 = Utility Standby 1 = Utility Ready 2 = Utility Absent 3 = Utility Counting restoring delay 4 = Utility Engaging 5 = Utility Feeding Load 6 = Utility Disengaging 7 = C-U Fail 8 = Utility High Voltage 9 = Utility Low Voltage 10 = Utility High Frequency 11 = Utility Low Frequency 12 = Utility Wrong Sequence
G1 Status	input register	30011	1	R	13 = Engine Standby 14 = Engine Ready 15 = Engine Counting response delay 16 = Engine Starting 17 = Engine OK-WaitingAC 18 = Engine Warming Up 19 = Engine Engaging load 20 = Engine Cooling down 21 = Engine Shutting down 22 = Engine's Contactor Engaged 23 = Engine Feeding Load 24 = Engine Disengaging load 25 = Engine OK Failure 26 = Engine - CG Fail 27 = Engine - CGx Fail 28 = Engine - High Voltage 29 = Engine - Low Voltage 30 = Engine - High Frequency 31 = Engine - Low Frequency 32 = Engine - Wrong Sequence 33 = Engine - Over Load 34 = Engine - Start Fail-NoOK 35 = Engine - Start Fail-CG-F 36 = Engine - Start FailCGx-F 37 = Engine - Start Fail-NoAC 38 = Engine - Start Fail-High Voltage 39 = Engine - Start Fail-Low Voltage 40 = Engine - Start Fail-High Frequency 41 = Engine - Start Fail-Low Frequency 42 = Engine - Start Fail-Seq-Fail 43 = Engine - Start Fail-CGJam 44 = Start Fail-CMJam 45 = Engine - Start Fail-CGyJam 46 = Engine - Start Fail-Time
G2 Status	input register	30012	1	R	Same as G1 Status

Name	type	Address	Size	Access	Description
G1 Exercising status	input register	30014	1	R	0 = Not Exercising 1 = Exercising Needed 2 = Exercising requested 3 = Exercising stopped
G2 Exercising status	input register	30015	1	R	0 = Not Exercising 1 = Exercising Needed 2 = Exercising requested 3 = Exercising stopped
Utility RN voltage	input register	30016	1	R	Utility phase R-Neutral voltage in V
Utility SN voltage	input register	30017	1	R	Utility phase S-Neutral voltage in V
Utility TN voltage	input register	30018	1	R	Utility phase T-Neutral voltage in V
Utility RS voltage	input register	30019	1	R	Utility phase R to phase S voltage in V
Utility ST voltage	input register	30020	1	R	Utility phase S to phase T voltage in V
Utility TR voltage	input register	30021	1	R	Utility phase T to phase R voltage in V
G1 RN voltage	input register	30022	1	R	G1 phase R - Neutral voltage in V
G1 SN voltage	input register	30023	1	R	G1 phase S - Neutral voltage in V
G1 TN voltage	input register	30024	1	R	G1 phase T - Neutral voltage in V
G1 RS voltage	input register	30025	1	R	G1 phase R to phase S voltage in V
G1 ST voltage	input register	30026	1	R	G1 phase S to phase T voltage in V
G1 TR voltage	input register	30027	1	R	G1 phase T to phase R voltage in V
G2 RN voltage	input register	30028	1	R	G2 phase R - Neutral voltage in V
G2 SN voltage	input register	30029	1	R	G2 phase S - Neutral voltage in V
G2 TN voltage	input register	30030	1	R	G2 phase T - Neutral voltage in V
G2 RS voltage	input register	30031	1	R	G2 phase R to phase S voltage in V
G2 ST voltage	input register	30032	1	R	G2 phase S to phase T voltage in V
G2 TR voltage	input register	30033	1	R	G2 phase T to phase R voltage in V
Utility frequency	input register	30034	1	R	Utility frequency in Hz *10 format (i.e. if this register value is 504 this means that the frequency is 50.4Hz)
G1 frequency	input register	30035	1	R	G1 frequency in Hz *10 format (i.e. if this register value is 504 this means that the frequency is 50.4Hz)
G2 frequency	input register	30036	1	R	G2 frequency in Hz *10 format (i.e. if this register value is 504 this means that the frequency is 50.4Hz)
RN current	input register	30037	1	R	Line R current in A *10 format (i.e. if this register value is 125 this means that the current is 12.5A)
SN current	input register	30038	1	R	Line S current in A *10 format (i.e. if this register value is 125 this means that the current is 12.5A)
TN current	input register	30039	1	R	Line T current in A *10 format (i.e. if this register value is 125 this means that the current is 12.5A)
Power (KW)	input register	30040	1	R	Power in KW
Digital Inputs	input register	30041	1	R	Surf Digital Inputs Each bit represents an input (first input is the LSB) Bit0: IP1 Bit1: IP2 ... Bit6: IP7
Digital Outputs	input register	30042	1	R	Surf Digital Outputs Each bit represents an output (first output is the LSB) Bit0: OP1 Bit1: OP2 ... Bit7: OP8
Operating Mode	holding register	40001	1	R/W	Operating Mode: 1 = Auto Mode 2 = Mains-Only Mode 3 = G1-Only Mode 4 = G2-Only Mode

2.6 TERMINAL DESCRIPTION

		CONNECTOR				
		P1			P2	
TERMINAL	1	-V_{BAT} SUP	-ve battery supply	8	CG F/B	Feedback from G contactor (-ve)
	2	+V_{BAT} SUP	+ve battery supply	9	CM F/B	F/B M contactor (-ve)
	3	G1 OK	Signal from Autostart of G1 (-ve)	10	ST.G1 C	Output to start G1 - common
	4	G2 OK	Signal from Autostart of G2 (-ve)	11	ST.G1 NO	Output to start G1 - normally opened
	5	CG1 F/B	Feedback from G1 contactor (-ve)	12	ST.G2 C	Output to start G2 - common
	6	CG2 F/B	Feedback from G2 contactor (-ve)	13	ST.G2 NO	Output to start G2 - normally opened
	7	RC	Remote control input (-ve)			

		CONNECTOR				
		P3			P4	
TERMINAL	14	CG1 C	Contactor (or motorized CB) G1 – common	20	CG2 D.NC	Motorized CB G2 disengage – normally closed
	15	CG1 ENG	Contactor (or motorized CB) G1 engage – normally opened	21	CG2 ❶ D.NO	Motorized CB G2 disengage – normally opened
	16	CG1 D.NC	Motorized CB G1 disengage – normally closed	22	CM C	Contactor (or motorized CB) Mains – common
	17	CG1[1] D.NO	Motorized CB G1 disengage – normally opened	23	CM ENG	Contactor (or motorized CB) Mains engage – normally opened
	18	CG2 C	Contactor (or motorized CB) G2 – common	24	CM D.NC	Motorized CB Mains disengage – normally closed
	19	CG2 ENG	Contactor (or motorized CB) G2 engage – normally opened	25	CM ❷ D.NO	Motorized CB Mains disengage – normally opened

		CONNECTOR				
		P5			P6	
TERMINAL	26	CT T P2	Current transformer on line T – p2	32	N MAIN	Neutral - Mains supply
	27	CT T P1	Current transformer on line T – p1	33	LINE TM	Line T - Mains supply
	28	CT S P2	Current transformer on line S – p2	34	NOT USED	Not used
	29	CT S P1	Current transformer on line S – p1	35	LINE SM	Line S - Mains supply
	30	CT R P2	Current transformer on line R – p2	36	NOT USED	Not used
	31	CT R P1	Current transformer on line R – p1	37	LINE RM	Line R - Mains supply

		CONNECTOR				
		P7			P8	
TERMINAL	38	N G1	Neutral - G1 supply	44	N G2	Neutral – G2 supply
	39	LINE TG1	Line T - G1 supply	45	LINE TG2	Line T – G2 supply
	40	NOT USED	Not used	46	NOT USED	Not used
	41	LINE SG1	Line S - G1 supply	47	LINE SG2	Line S – G2 supply
	42	NOT USED	Not used	48	NOT USED	Not used
	43	LINE RG1	Line R – G1 supply	49	LINE RG2	Line R – G2 supply

❶ Used as an alarm output if fault exists on G1 or G2 in case contactors are used for the transfer switch
❷ Used as an alarm output if utility is absent in case contactors are used for the transfer switch

3. TECHNICAL SPECIFICATIONS

Supply voltage range	5 to 33Vdc
Maximum supply current	190mA on 12Vdc – 95mA on 24Vdc
Standby supply current ❹	80mA on 12Vdc – 40mA on 24Vdc
Digital inputs activation logic	Low (ground)
Output relays rating	10A 250V ac1
AC inputs range (L-N)	0 to 280Vac
CT inputs range	0 to 5Amps
Operating temperature	-30 to 70°C
User access	Mode push button and four navigation push buttons
Data sampling rate	1.2 samples/sec
Dimensions	208x160x40
IP	IP20: once installed in panel, unit is splash proof and can be installed outdoors as long as no direct sunlight hits it

❹ In AUTO mode with Mains ON.

4. FIRMWARE UPGRADE
4.1 INSTALLING THE SAS DEVICE FIRMWARE UPGRADE SOFTWARE

In order to upgrade firmware on site, a CD will be provided by S. &A.S.Ltd & the below steps shall be followed:

1. Run file "SAS_Patch.exe" located in "SAS_PTool\SAS_PTool" folder.
2. Setup the application located in "SAS _PTool\SAS_PTool \SAS_PTool_Setup" folder
3. SAS_PTool will appear in the programs list. Send it to Desktop as shortcut.

4.2 INSTALLING THE SAS DEVICE USB DRIVER

1. Plug in the USB cable to the SAS device before turning power on
2. Turn on power of the SAS device. All the leds on the front starts blinking.

4.2.1 DRIVER SETUP FOR WINDOWS VISTA/WIN7

The first SAS device plugged into the PC USB port may not launch an automatic start. In this case, right-click my computer and choose properties. The following window appears.
On the left side of the window, click on Device Manager.
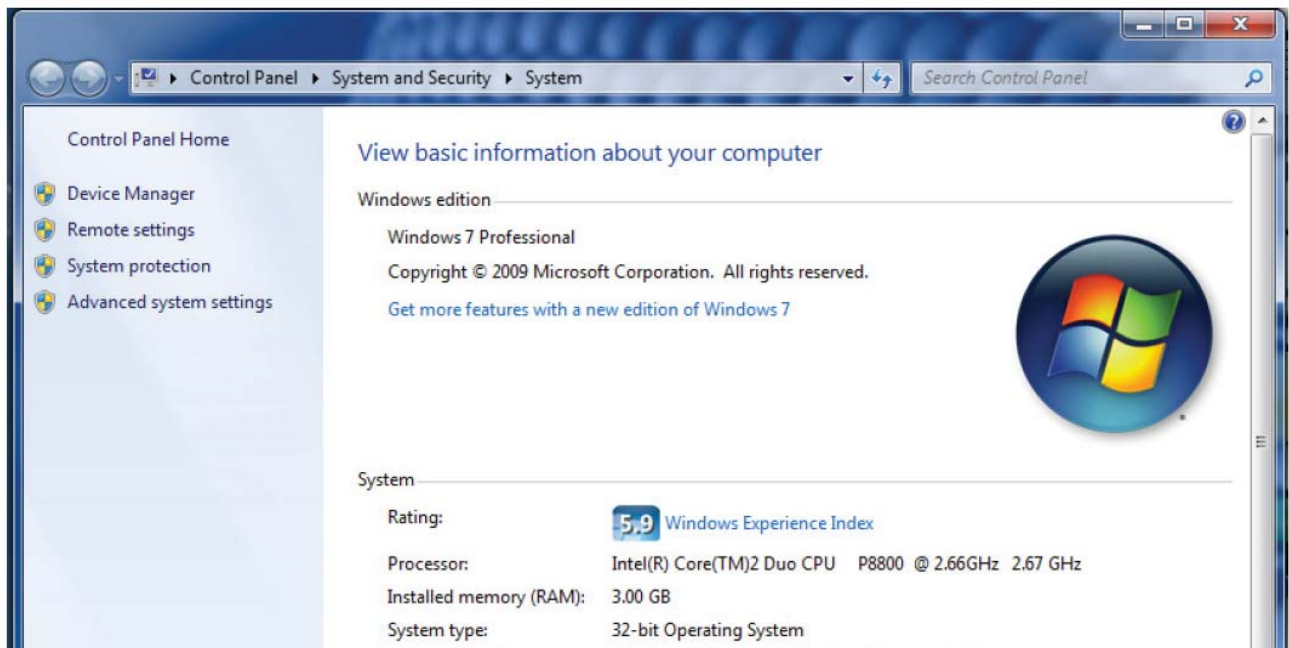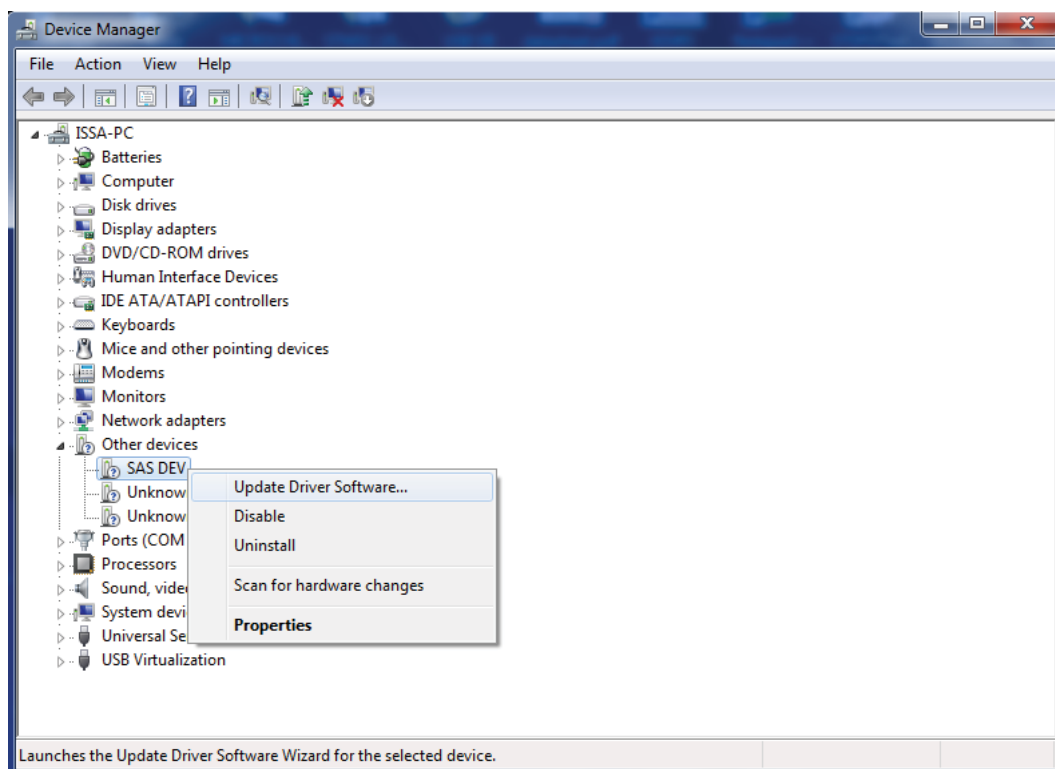
Select "Search automatically for updates driver software".
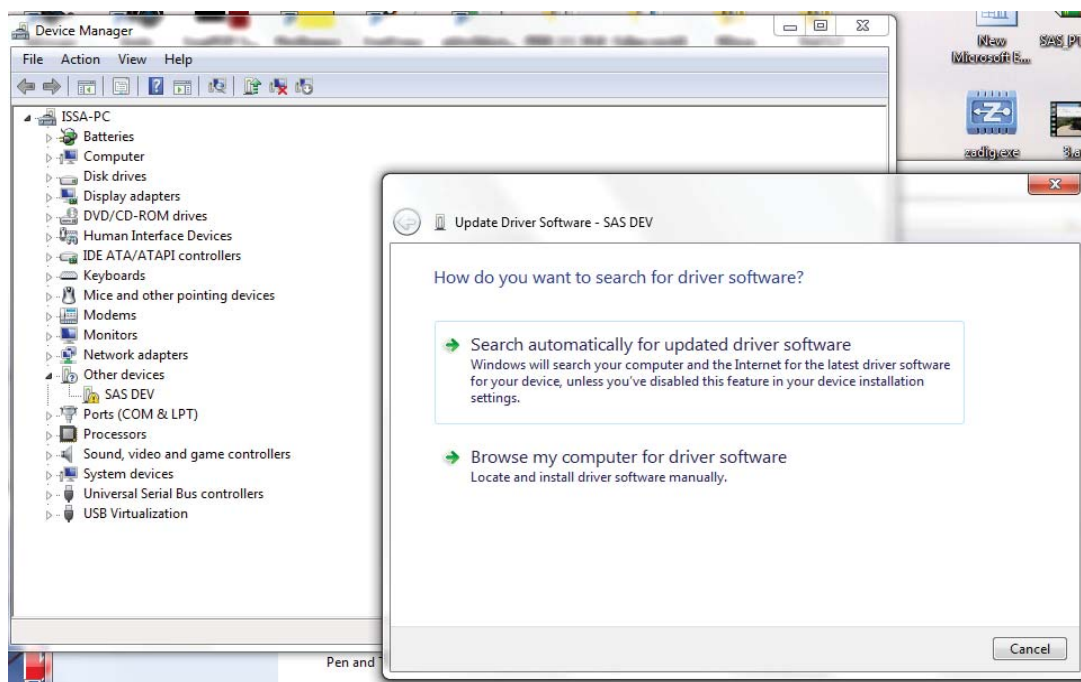
Select install this driver software anyway.
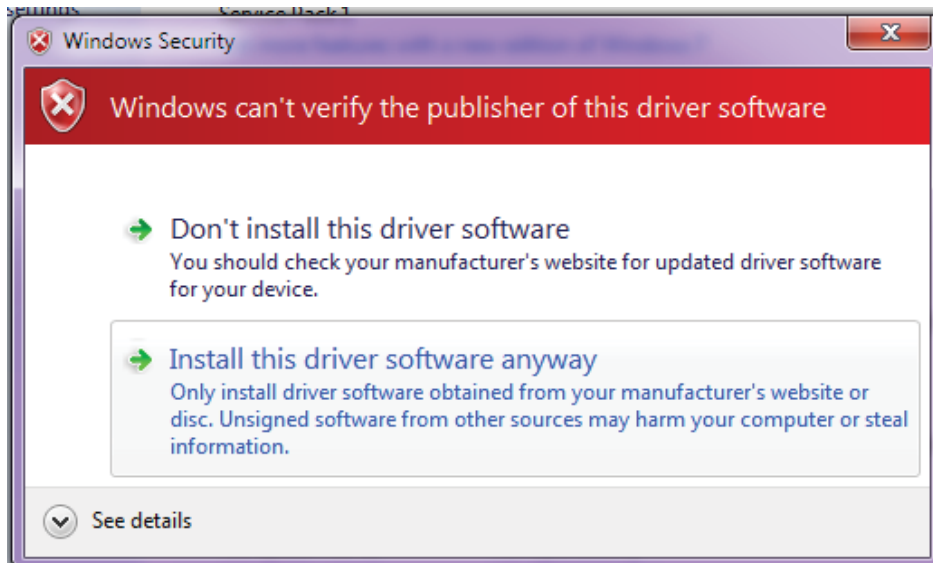
The Driver SETUP procedure will be done only once For Windows vista/Win7.
So, the driver of any new SAS Device connected to the PC USB port will be installed automatically.

4.2.2 DRIVER SETUP FOR WINDOWS XP

Each time New SAS Device is plugged into the PC USB port, a "Found New Hardware Wizard" window appears.
Select "Install the software automatically (Recommended)" and click next.

Select "Continue Anyway".

The driver of the new SAS Device connected to the PC USB port will be installed automatically.

4.3 FIRMWARE UPGRADE PROCESS
Run "SAS_PTool" application.
The following window will appear prompting the user that the SAS board is detected on the USB port:

Click Open to choose the *.sas file that will be used to upgrade the firmware.
A Footnote will appear showing the file name, the software version and its date:
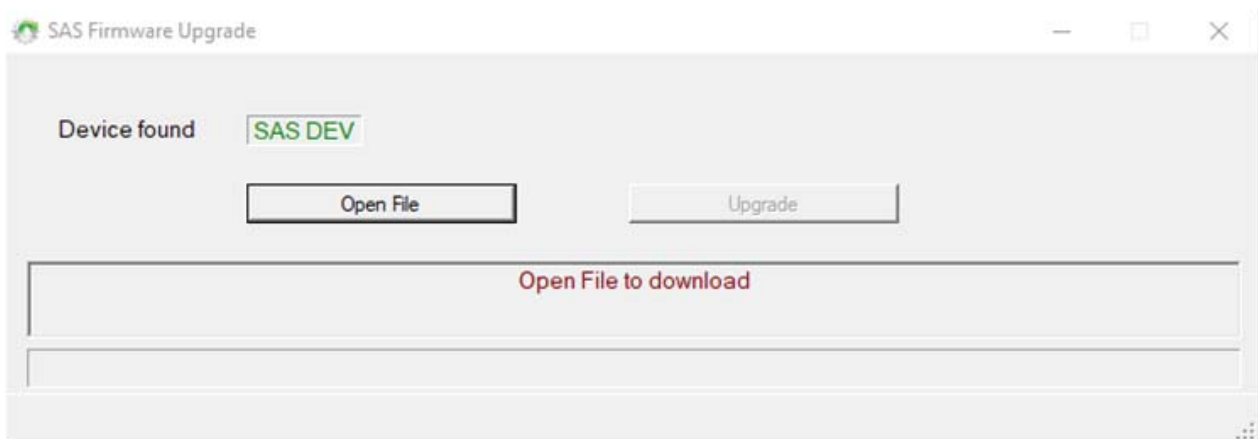
Click upgrade.

The upgrade progress is shown as below:
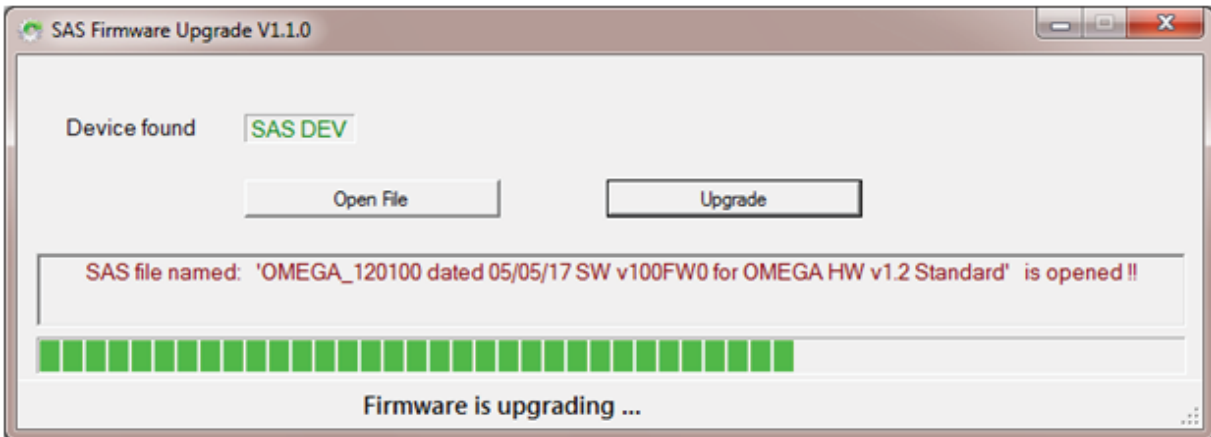
Once the upgrade is complete, the footnote "Firmware upgraded successfully" will appear:
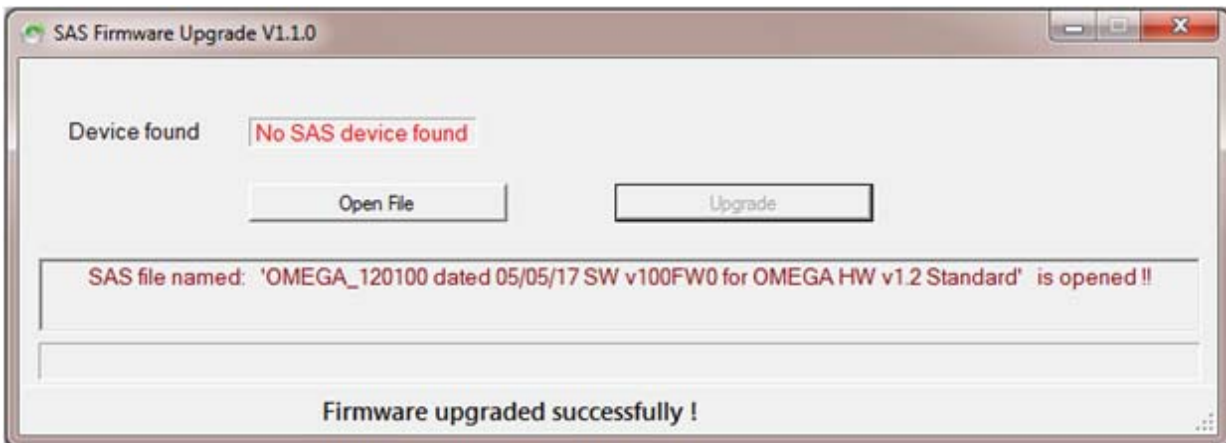
Then the SAS device firmware upgraded successfully, and the SAS device will automatically run the new firmware.

4.4. FIRMWARE UPGRADE USING GOOGLE PLAY STORE ON SMART PHONE
4.4.1 INSTALLING THE SASPTOOL FIRMWARE APPLICATION ON THE MOBILE

In order to upgrade the firmware from your mobile, follow the below steps:

1. Search for the application "SASPTool" on Google play store and install it, or follow the link below:

   https://play.google.com/store/search?q=SASPTool.

FIRMWARE UPGRADE PROCESS

2. Run "SAS_PTool" application from the mobile.

The below window appears showing all *.sas files already saved

3.   Power off the SAS board
4.   Use a USB cable to connect board to the mobile.
5.   Turn SAS device on.

The following window will appear showing that a SAS Device is now connected:

6.   Click on the sas file that you need to download.
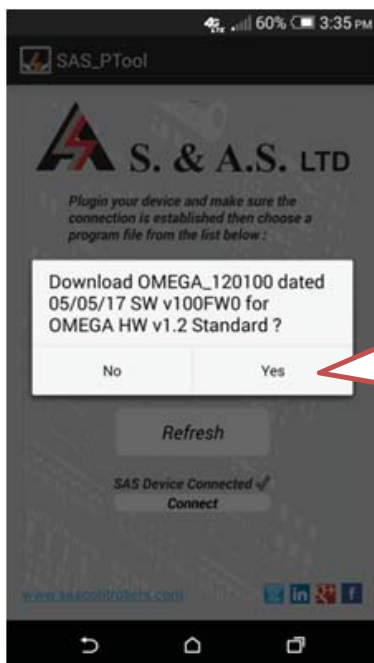
A POPUP window will appear showing the file name, its description and its date:
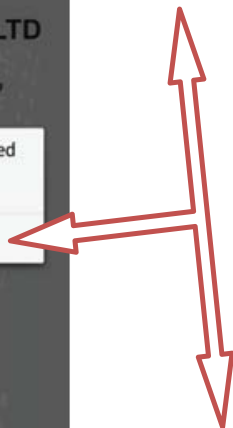
7.   Click Yes

The Download Will Start:
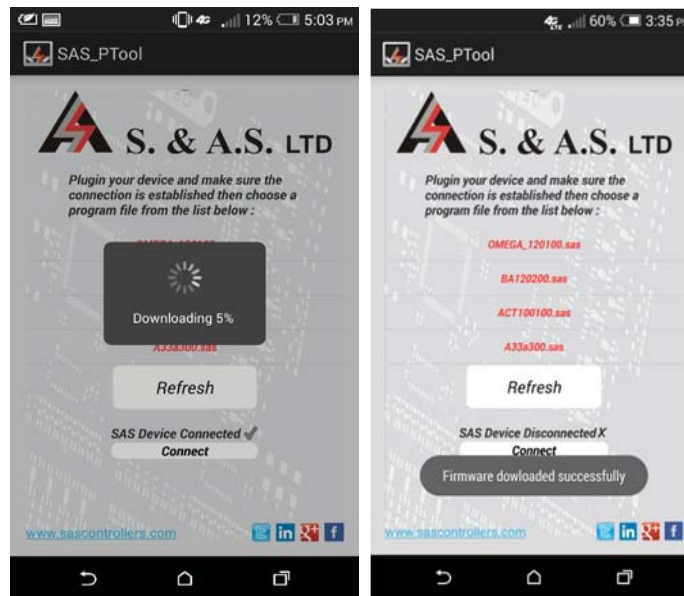
Once the download is completed, the message "Firmware downloaded successfully" will appear:

8.   Disconnect the USB cable.

The user can now process with normal operation.

If you desire to delete any sas file from the mobile list, press and hold on the filename until a POPUP window appears showing multiple choices and then click on Remove from list:
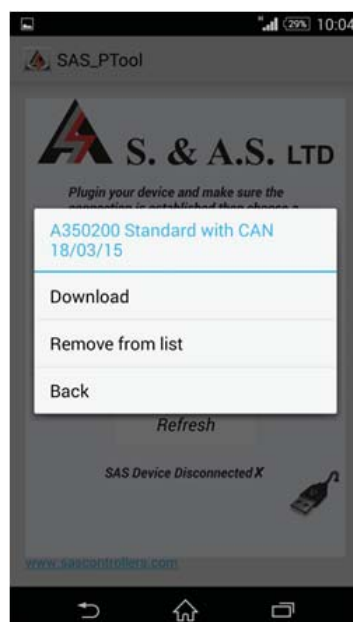
4.3 ONLINE FIRMWARE UPGRADE

In order to upgrade firmware remotely, the OMEGA must be connected to the internet and its status must be online & the below steps shall be followed:

1. Run the OMEGA Web application on our website www.sascontrollers.com.
2. Enter the username and the correspondent password to access your already registered account.
3. A list of your OMEGA controllers appears (see the figure below).

4. Check Controller Ver. and Eth. Ver. of the OMEGA to see if any upgrade is needed.
5. To upgrade the OMEGA, make sure the gensets are turned off, and then click on the button "Firmware Upgrade" as shown in the image below.

6. The user is prompted to enter a password. This password is provided by S. & A. S. Ltd.
7. The below window appears if the valid password is entered.
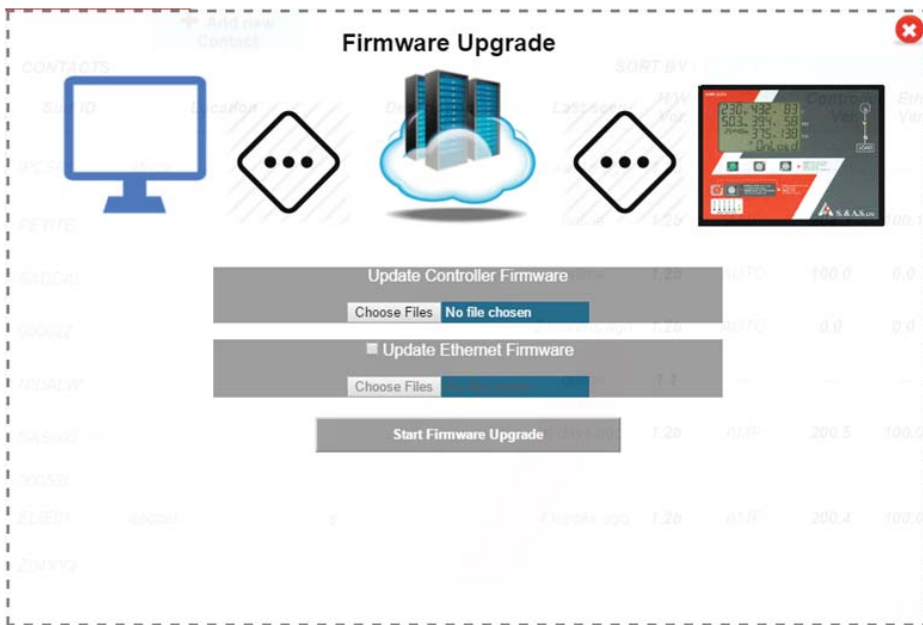
8.   Under Update Controller Firmware, select "Choose Files" button to choose the online controller software to be upgraded. Double check the filename and its extension (*_online.sas).
9.   The Ethernet firmware upgrade is optional. In case it's needed, select the "Update Ethernet Firmware" check box and select "Choose files" to choose the Ethernet software to be upgraded Double check the filename and its extension (ICSP_OMEGA*_online.sas).
10.   Click "Start Firmware upgrade" Button. A pop-up window shows the description of both Firmwares. Double check the description before confirming the start of the upgrade process.
11.   The Ethernet firmware and Controller firmware download will be started consecutively, once finished a green symbol (☒) is displayed indicating that the upgrade process on the OMEGA itself has started. During Upgrade, the OMEGA will go Offline.
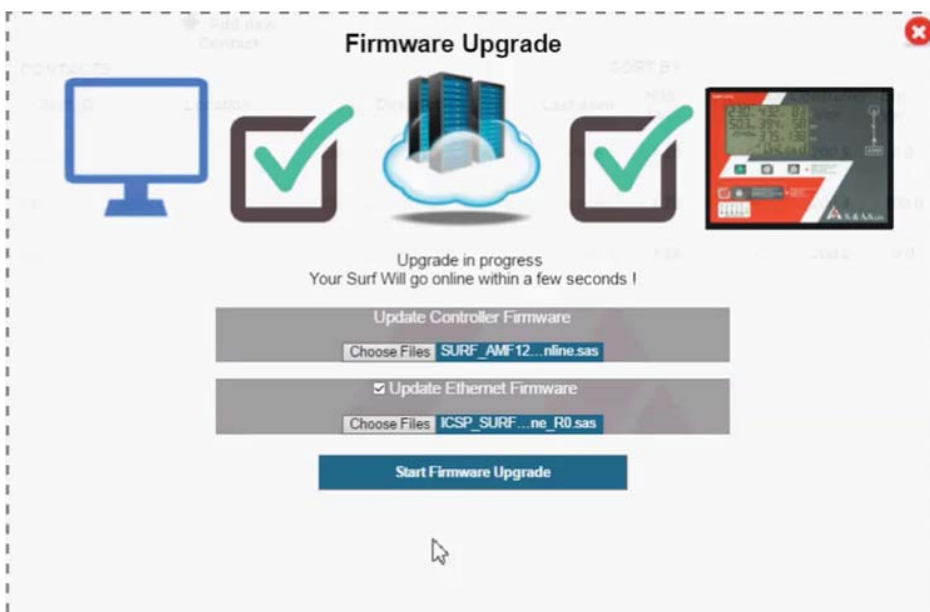
12. When the Ethernet/Controller firmware upgrade is done successfully, the OMEGA will go Online showing the newest Controller Ver. And Eth. Ver. on the control screen.

5. SD CARD RETRIEVAL

In order to retrieve Event or Time logs from OMGEA v1.2, a desktop application will be provided by S. & A. S. Ltd & the below steps shall be followed:

1.   Run file "Log_Retrieve_Utility_windows.exe".
2.   Setup the application "Log_Retrieve_Utility_windows.exe".
3.   "S. &A. S - Log Retrieve Utility" will appear in the programs list. Send it to Desktop as shortcut.

5.1 DATA SAMPLING AND RETRIEVAL

1.   With the OMEGA powered on and set to one of the four operating modes (Auto, Mains-Only or G1-Only or G2-Only mode), establish a USB Connection between the OMEGA and your PC.
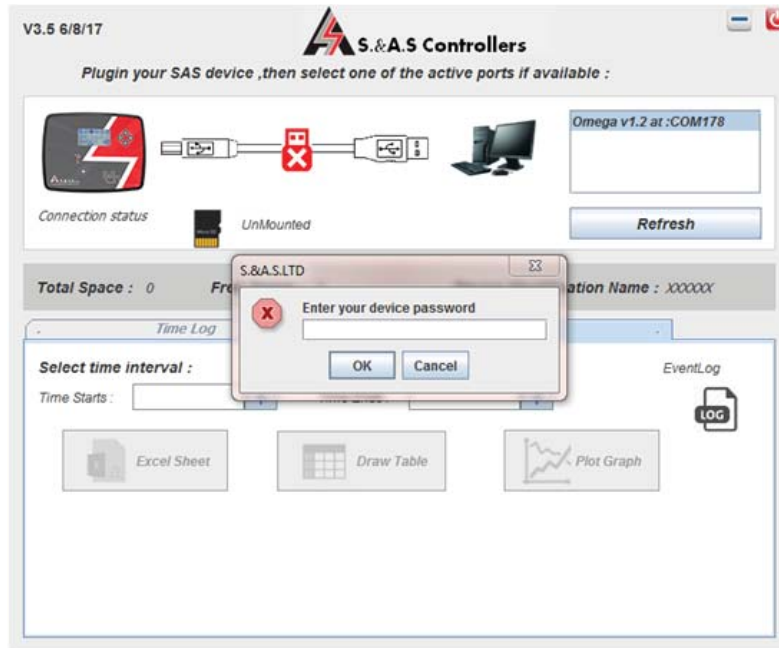
2.   Open the Desktop Application.

3.   A Virtual COM port should appear as shown in the figure below (OMEGA 1.2 at: COM#).
Otherwise, press the "Refresh" button or try to re-plugin the USB cable.
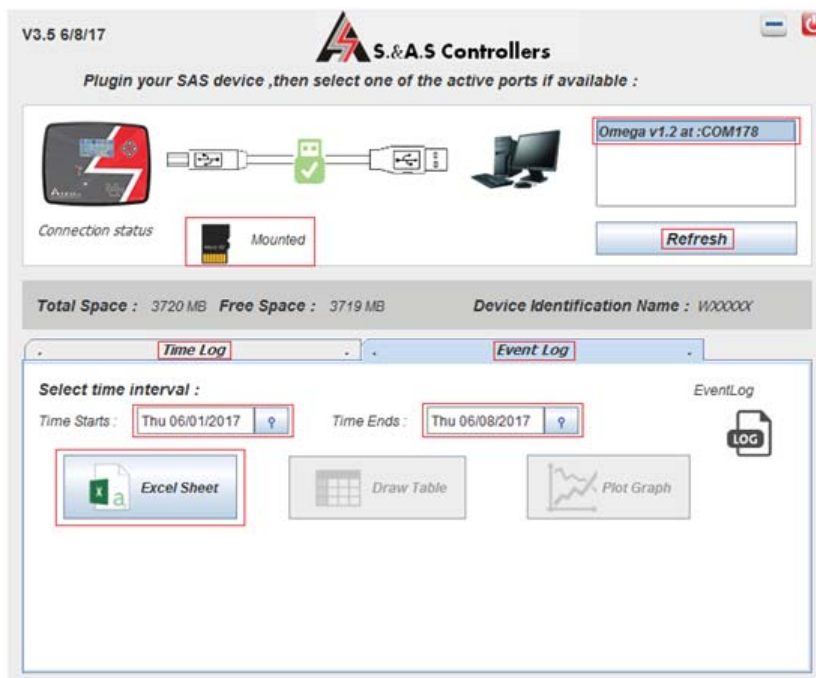If the problem persists, consider using another PC USB port or replacing the USB Cable.
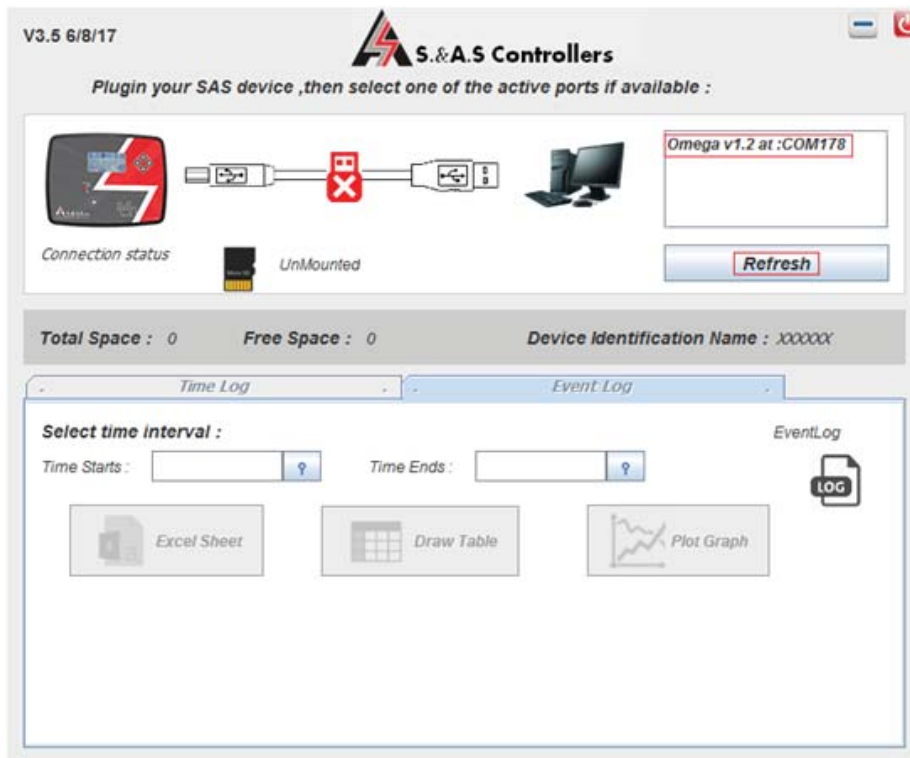
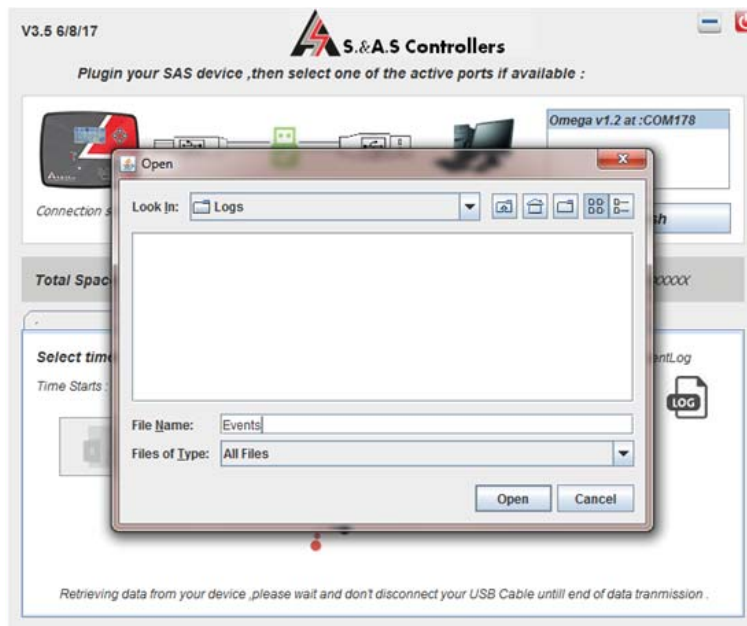4.   Select the port and enter the password.

5.   If the entered password is valid, make sure the SD-CARD is considered "Mounted" and select the type required (Time Log or Event Log), then choose the Start/End dates and press the "Excel Sheet" Button.
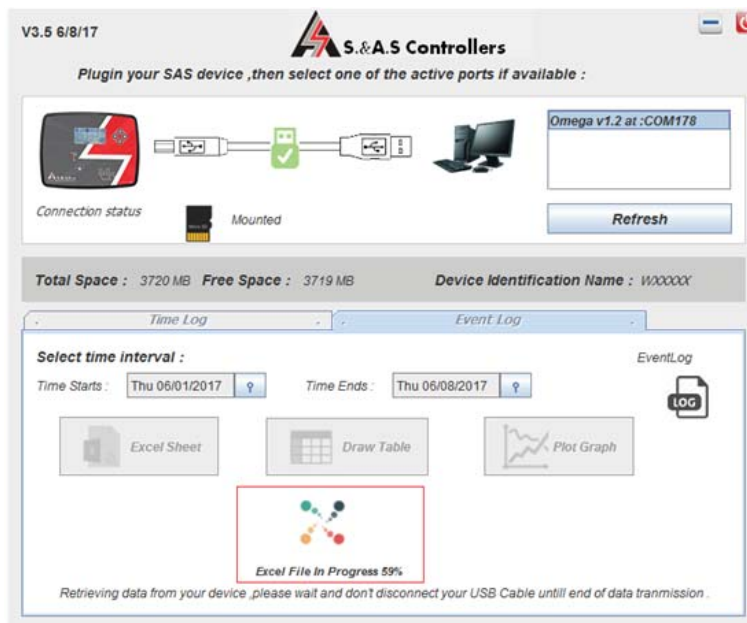

6.   Select the path and name for the Excel file to be exported.

7.   The retrieve process should start and the progress will be indicated by an animated loader with the completed percentage.

8.   Wait until the loader disappears, at this stage the progress is finished and you can find the exported file at the path specified in step #5.
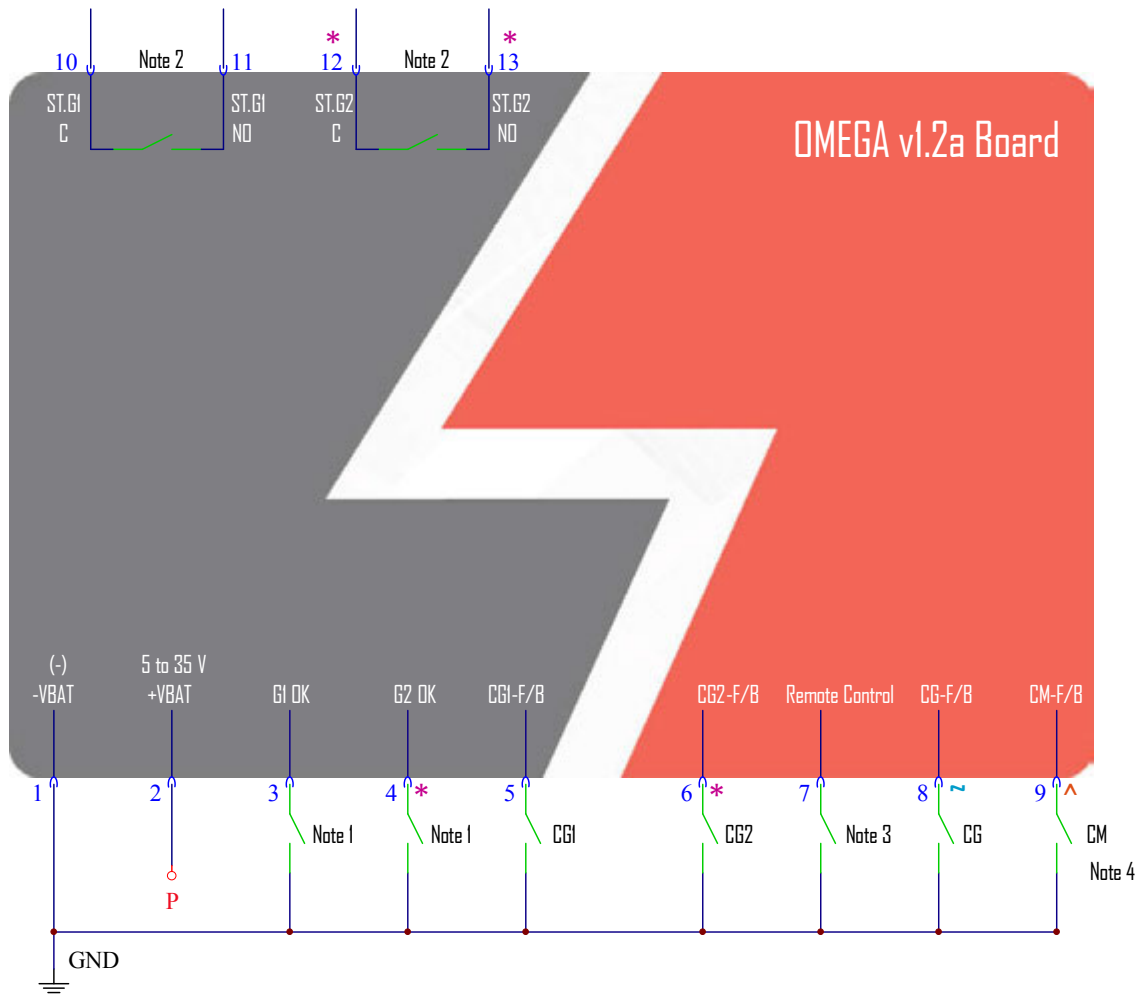
## 6.	DIMENSIONS & TYPICAL WIRING DIAGRAM

○	DIMENSIONS

Front dimensions — 208mm — 160mm

Side depth — 40mm

Back dimensions — 182mm — 137mm

Panel Cutout dimensions: 184mm x 139mm

○	TYPICAL WIRING DIAGRAM

DC Inputs

OMEGA v1.2a Board

10 — ST.G1 C — Note 2 — 11 — ST.G1 NO — *12 — ST.G2 C — Note 2 — *13 — ST.G2 NO

(-) -VBAT — 5 to 35 V +VBAT — G1 OK — G2 OK — CG1-F/B — CG2-F/B — Remote Control — CG-F/B — CM-F/B

1 — 2 — 3 Note 1 — *4 Note 1 — 5 CG1 — *6 CG2 — 7 Note 3 — 8 CG — ^9 CM Note 4

P

GND

Note 1: External contact supplied from the autostart of the genset:
    Contact closed: Genset is running & ready to supply the load (no need for warm-up delay).
    Contact open: Genset has a fault or cannot supply the load.

Note 2: Should be connected to the remote control terminals of the autostart of the genset.
    Contact closed: Genset should start (no need for response delay).
    Contact open: Genset should shutdown (no need for cooling delay).

Note 3: This pin can be used when the remote control (R.C.) is set to "Gensets Rdy" or "U Present".

Note 4: This input can be used as Remote Control when the installation type is set to GG installation and the R.C. is set to "v1.0 Compt."
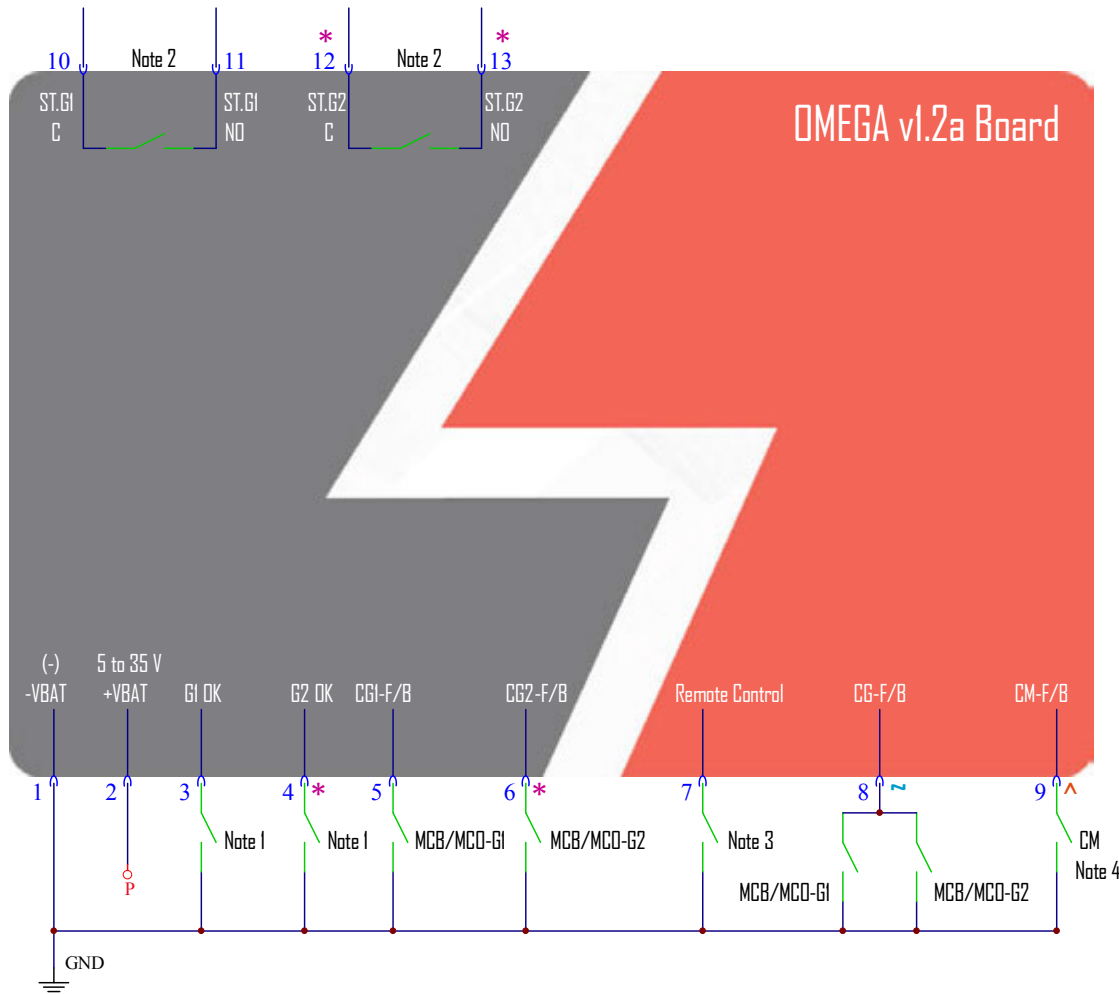
ATS12a Wiring

* Not connected in MG installation

^ Not connected in GG installation

~ Connected only in MGG installation

S.&A.S. Ltd.
Jieh Chouf
Lebanon
support@sascontrollers.com

ATS12a WIRING DIAG:
DC Input/Output

Size B	FCSM No.	DWG No. ATS12a.Sch	Rev 1
	-		
Scale -		Sheet	1 of 5

DC Inputs with MCB/MCO

OMEGA v1.2a Board

10 Note 2 11 * 12 Note 2 * 13

ST.G1 C | ST.G1 NO | ST.G2 C | ST.G2 NO

(-) -VBAT | 5 to 35 V +VBAT | G1 OK | G2 OK | CG1-F/B | CG2-F/B | Remote Control | CG-F/B | CM-F/B

1 | 2 | 3 | 4 * | 5 | 6 * | 7 | 8 ~ | 9 ^

Note 1 | Note 1 | MCB/MCO-G1 | MCB/MCO-G2 | Note 3 | | CM Note 4

MCB/MCO-G1 | MCB/MCO-G2

GND

Note 1: External contact supplied from the autostart of the genset:
    Contact closed: Genset is running & ready to supply the load (no need for warm-up delay).
    Contact open: Genset has a fault or cannot supply the load.

Note 2: Should be connected to the remote control terminals of the autostart of the genset.
    Contact closed: Genset should start (no need for response delay).
    Contact open: Genset should shutdown (no need for cooling delay).

Note 3: This pin can be used when the remote control (R.C.) is set to "Gensets Rdy" or "U Present".

Note 4: This input can be used as Remote Control when the installation type is set to GG installation and the R.C. is set to "v1.0 Compt."
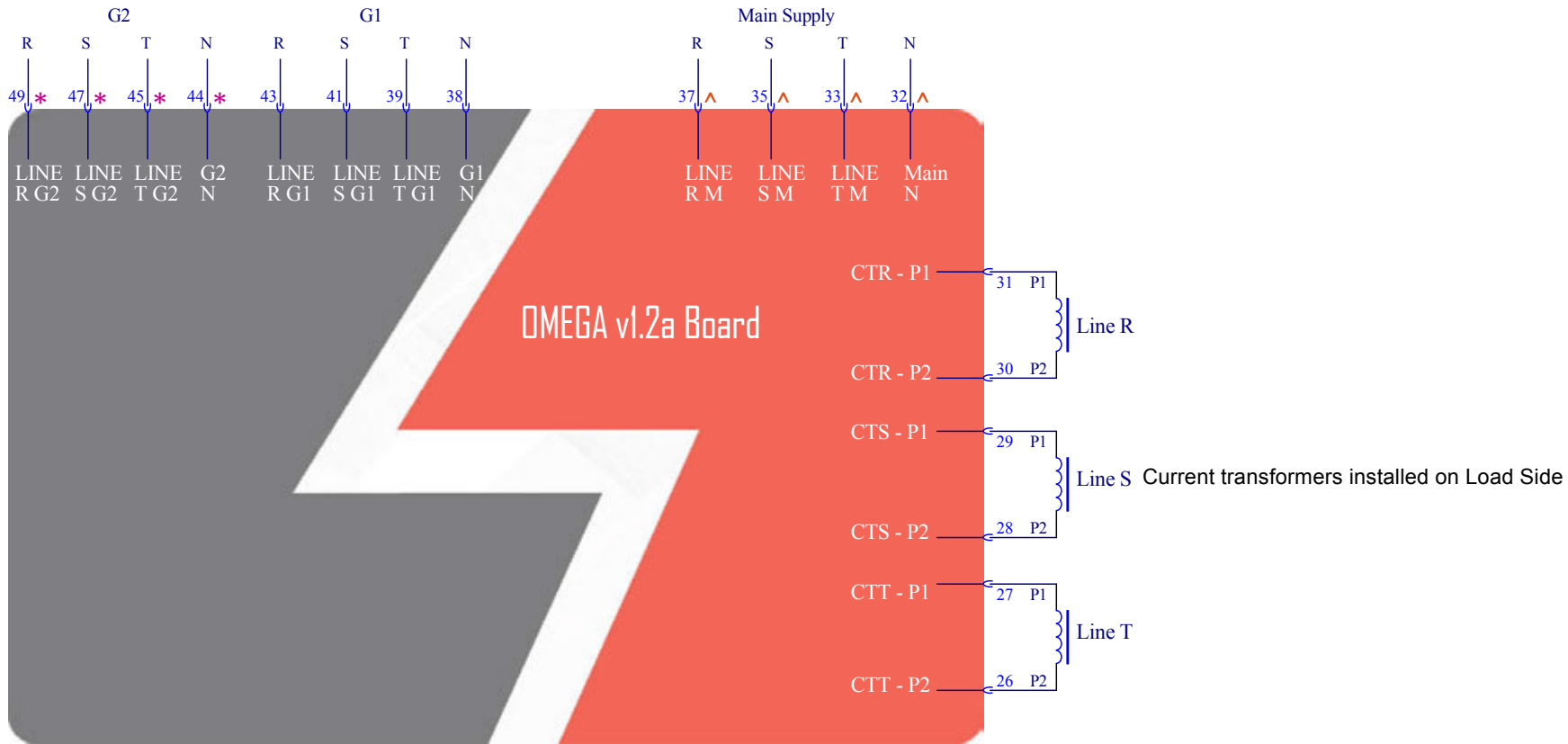
ATS12a Wiring

* Not connected in MG installation

^ Not connected in GG installation

~ Connected only in MGG installation

Size B	FCSM No.		DWG No. ATS12a.Sch		Rev 1
Scale -				Sheet	2 of 5

AC Inputs

G2

G1

Main Supply

R S T N R S T N R S T N

49 * 47 * 45 * 44 * 43 41 39 38 37 ^ 35 ^ 33 ^ 32 ^

LINE LINE LINE G2 LINE LINE LINE G1 LINE LINE LINE Main
R G2 S G2 T G2 N R G1 S G1 T G1 N R M S M T M N

OMEGA v1.2a Board

CTR - P1 — 31 P1
Line R
CTR - P2 — 30 P2

CTS - P1 — 29 P1
Line S Current transformers installed on Load Side
CTS - P2 — 28 P2

CTT - P1 — 27 P1
Line T
CTT - P2 — 26 P2

ATS12a Wiring

* Not connected in MG installation

^ Not connected in GG installation

~ Connected only in MGG installation

AC OUTPUTS with Contactors

OMEGA v1.2a Board

LINE R G
(Taken from output of CG1 & CG2)

LINE R M

LINE R G1

LINE R G2

FUSE

FUSE ~

22 ^ FUSE

14 FUSE

18 * FUSE

Single line diagram

G1 G2

CG1 CG2 *

^ CM CG ~

LOAD

CM
C

CG1
C

CG2
C

CM Eng — NOTE 3
CM D.NO — NOTE 4
CM D.NC

CG1 Eng — NOTE 3
CG1 D.NO — NOTE 4
CG1 D.NC

CG2 Eng — NOTE 3
CG2 D.NO — NOTE 4
CG2 D.NC

23 25 24
NOTE 2

15 17 16
NOTE 1

19 21 20
NOTE 1

CM
CG
A1
A2
CG

CG
CM
A1
A2
CM

CG2
CG1
A1
A2
CG1

CG1
CG2
A1
A2
CG2

NG
(Taken from output of CG1 & CG2)

N Main

NG1

NG2
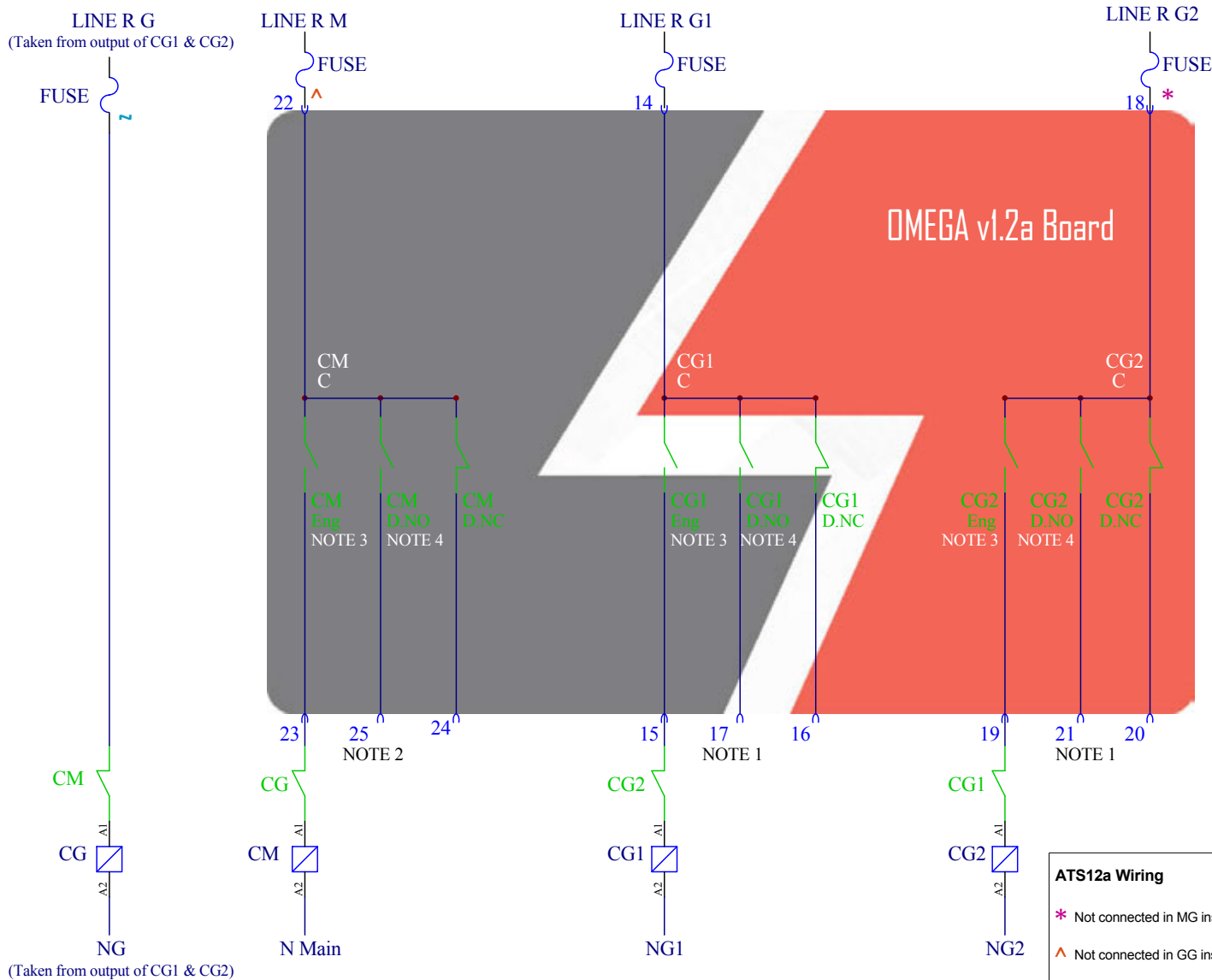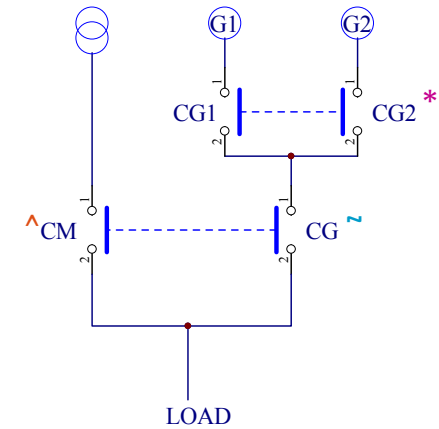
Note 1: Used as an alarm output if fault exists on G1 or G2 in case contactors are used for the transfer switch

Note 2: Used as an alarm output if utility is absent in case contactors are used for the transfer switch

Note 3: For use with motorized circuit breaker to engage it.

Note 4: For use with motorized circuit breaker to disengage it.

- This wiring diagram is for 4-poles contactors.
- 3-poles contactors can be used if it is acceptable to connect the neutrals of the Mains, G1 & G2 together.

ATS12a Wiring

* Not connected in MG installation

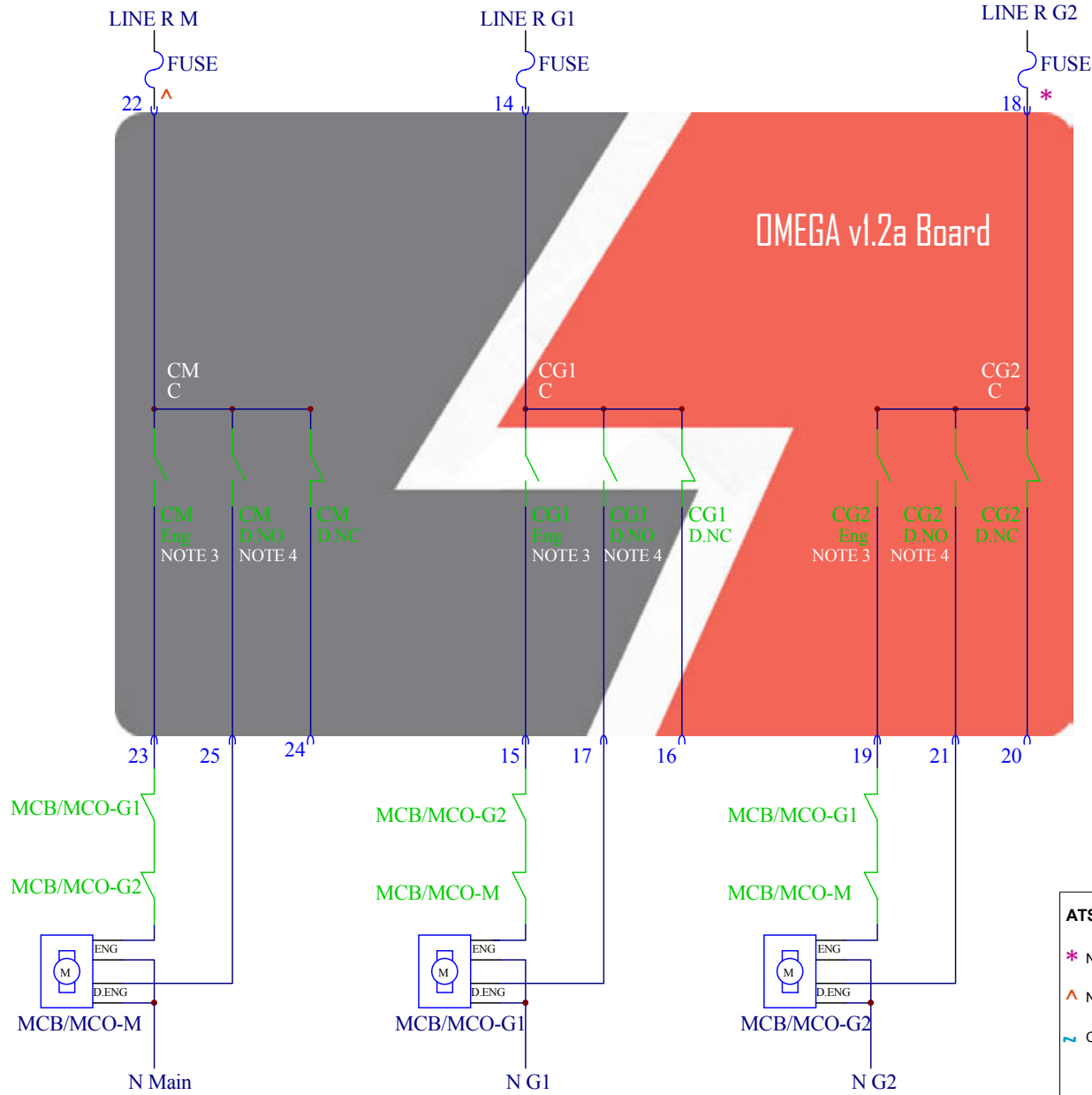^ Not connected in GG installation

~ Connected only in MGG installation

S.&A.S. Ltd.
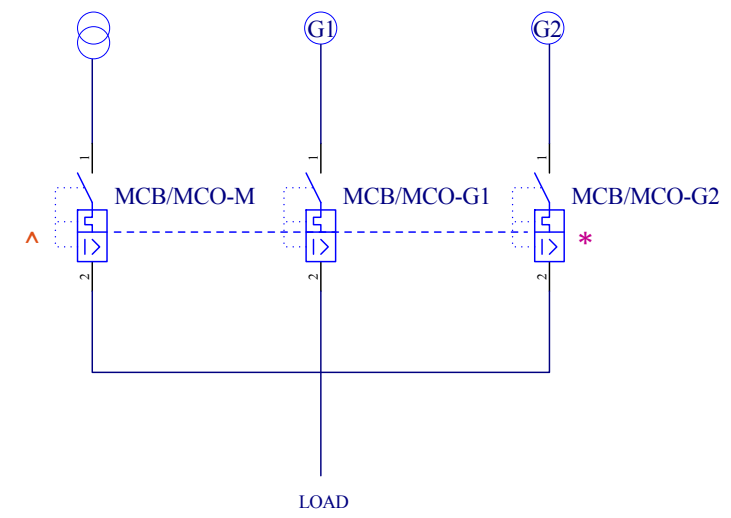Jieh Chouf
Lebanon
support@sascontrollers.com

ATS12a WIRING DIAG:
AC Outputs with Contactors

Size B	FCSM No. -	DWG No. ATS12a.Sch	Rev 1
Scale -		Sheet 4 of 5	

AC OUTPUTS with MCB/MCO

LINE R M

LINE R G1

LINE R G2

FUSE

FUSE

FUSE

22 ^

14

18 *

OMEGA v1.2a Board

CM C

CG1 C

CG2 C

CM Eng
NOTE 3

CM D.NO
NOTE 4

CM D.NC

CG1 Eng
NOTE 3

CG1 D.NO
NOTE 4

CG1 D.NC

CG2 Eng
NOTE 3

CG2 D.NO
NOTE 4

CG2 D.NC

23   25   24

15   17   16

19   21   20

MCB/MCO-G1

MCB/MCO-G2

MCB/MCO-G2

MCB/MCO-M

MCB/MCO-G1

MCB/MCO-M

M
ENG
D.ENG

M
ENG
D.ENG

M
ENG
D.ENG

MCB/MCO-M

MCB/MCO-G1

MCB/MCO-G2

N Main

N G1

N G2

Single line diagram

G1

G2

MCB/MCO-M

MCB/MCO-G1

MCB/MCO-G2

^

*

LOAD

ATS12a Wiring

* Not connected in MG installation

^ Not connected in GG installation

〜 Connected only in MGG installation

Size	FCSM No.	DWG No.		Rev
B	-	ATS12a.Sch		1
Scale	-		Sheet	5 of 5

WHICH GENERATOR CONTROLLER IS RIGHT FOR YOU?

	Smart Turbo v1.2	Smart GT v1.0	Surf LT v1.0	Surf 1.2c
Automatic engine starting and stopping	✓	✓	✓	✓
Automatic mains failure	—	—	✓	✓
User Access	3 Push Buttons	3 Push Buttons	8 Push Buttons	5 Push Buttons
Dimensions (WidthxHeightxDepth)	72x72x32 mm	72x72x32 mm	208x160x32 mm	196x144x33 mm
Panel cut out	68.5x68.5 mm	68.5x68.5 mm	184x139 mm	182x137 mm
Number of Phases	1 Phase	1 Phase	1phase/3Phases	1phase/3Phases
Digital Outputs	4	4	6	10
Digital Inputs	5	5	5	5
Analog Inputs	—	2	4	4
Voltage Measurement	1 L-N	1 L-N	3 L-N, 3L-L	3 L-N, 3L-L
Frequency Measurement	✓	✓	✓	✓
Current Measurement	—	✓	✓	✓
Power Measurement	—	✓	✓	✓
Energy Measurement	—	✓	✓	✓
Run hours counter	✓	✓	✓	✓
Oil run hours counter	✓	✓	✓	✓
Over / Under voltage alarm and shut down	✓	✓	✓	✓
Over / Under frequency alarm and shut down	✓	✓	✓	✓

	Smart Turbo v1.2	Smart GT v1.0	Surf LT v1.0	Surf 1.2c
Overload alarm and shut down	—	✓	✓	✓
Low oil pressure alarm and shut down	✓	✓	✓	✓
High engine temperature alarm and shut down	✓	✓	✓	✓
Battery alarm	✓	✓	✓	✓
Dynamo fail alarm and shut down	✓	✓	✓	✓
Low coolant level alarm and shut down	✓	✓	✓	✓
Low fuel alarm and shut down	✓	✓	✓	✓
Tank Empty alarm and shut down	—	—	✓	✓
Automatic shutdown on fault condition	✓	✓	✓	✓
Solid-state short circuit protected outputs	✓	✓	✓	✓
Galvanic isolation for utility and Genset AC inputs	—	—	—	✓
Oscilloscope	—	—	✓	—
Faults Logging	—	Up to 10 faults	Up to 15 faults	Up to 100 faults

	Smart Turbo v1.2	Smart GT v1.0	Surf LT v1.0	Surf 1.2c
EVENTS AND DATA LOGGING	—	—	—	✓
USB interface	✓	✓	✓	✓
CAN Module (J1939 Protocol)	—	—	Optional	✓
Ethernet Module	—	—	—	✓
RS485 (Modbus)	—	—	Optional	✓
MicroSD Card	—	—	—	✓
SMS via GSM Module (RS232 Interface)	—	—	—	✓
On-site Firmware Upgrade	✓	✓	✓	✓
Remote Online Firmware Upgrade	—	—	—	✓

S. & A.S. Co. Ltd