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I437GB04 16

ATL900 (GB)

AUTOMATIC TRANSFER SWITCH

INSTRUCTION MANUAL

CAUTION
- Read this manual before use and installation.
- This equipment must be installed by qualified personnel according to applicable standards in order to prevent injury or damage to property.

- *Before any maintenance operation on the device, remove all voltages from measuring and supply inputs.*
- *The manufacturer cannot be held responsible for electrical safety in case of improper use of the equipment.*
- *The product illustrated herein are subject to alteration and changes without prior notice. Descriptions and information in the catalogue consequently have no contractual relevance.*
- *A circuit breaker must be included in the electrical installation of the building. It must be installed close by the equipment and within easy of the operator. It must be marked as the equipment's disconnecting device: IEC/ EN 61010-1 § 6.12.2.1.*
- *Clean the equipment with a soft cloth; do not use abrasive products, liquid detergents or solvents.*

Contents

Introduction

The ATL900 control unit implements state-of-the-art functions required for automatic transfer applications.
The system incorporates a unique series of hardware and software features which guarantee high flexibility, e.g. management of three supply source lines and two tie breakers, graphic display, double power supply, expansion modules, programmable system layout, integrated PLC etc., for use in a wide variety of possible conditions of application, all of which can be programmed by the user. The graphic display shows and allows to control the system situation effectively. The expansion slots allows to increase the hardware resources also allowing adaptability to future needs.

Description

- Graphic LCD 128x112 pixel, backlit, 4 grey levels.
- Texts for measurements, settings and messages in 8 languages (ENG-ITA-FRA-SPA-DEU-POR-POL-RUS).
- 14 possible system configurations, with 2 or 3 power sources and 1 or 2 tie breakers.
- 3 voltage measuring inputs, three phase + neutral.
- Free source type configuration (mains or genset) and respective priority for all system configurations.
- Non-priority load management.
- Control of motorised breakers, motorised changeover switches or contactors.
- Management of gensets with automatic test and emergency rotation.
- Control of three-phase, two-phase and single-phase networks.
- Control of concatenated voltages and/or phase voltages.
- Control of minimum voltage, maximum voltage, phase loss, asymmetry, minimum frequency, maximum frequency with independent enabling and tripping delay.
- Voltage thresholds with programmable hysteresis.
- Possibility of transferring load with closed transition and spontaneous or controlled genset synchronisation.
- 100-240Vac auxiliary power supply.
- 12-24-48Vdc battery power supply.
- Front optical programming interface.
- Advanced programmable I/O functions.
- Integrated programmable PLC logic (50 lines, 8 columns).
- Alarm properties entirely definable by the user.
- High accuracy of true RMS measurements (TRMS)
- 12 programmable digital inputs (negative).
- 11 digital outputs:
  - 3 relays with NO contact 12A 250VAC.
  - 3 relays with NO contact 8A 250VAC.
  - 4 relays with changeover contact 8A 250VAC.
  - 1 static output.
- Integrated RS-485 isolated interface.
- 3 expansion slots for EXP series modules.
- Storage of last 250 events.
- Real Time Clock.
- IP40 front protection expandable to IP65 by means of optional gasket.
- Compatible with *App SAM1*, *Lovato NFC configurator*, supervision software *Synergy* and setup and remote control software *Xpress*.

Front button functions

OFF button - Selects OFF operating mode.
AUT button - Selects automatic operating mode.
MAN button - Selects manual operating mode.
TEST button - Select test operating mode.
<< and >> buttons - Breaker selection for manual control.
OPEN and CLOSE buttons - Manual controls of breakers.
▲ ▼ ◄ ► buttons -For scrolling the display and selecting menu options.
✓ button - Recall the main menu and confirm a selection.

Front LEDs

OFF-MAN-AUT-TEST mode LEDS (yellow) - indicate the selected mode.
Alarm LED (red) - Blinking, indicates that an alarm is active.
LINE1 voltage present LED (green) - Indicates that the SRC1 line voltage is within the set limits.
LINE2 voltage present LED (green) - Indicates that the SRC2 line voltage is within the set limits
LINE3 voltage present LED (green) - Indicates that the SRC3 line voltage is within the set limits

BRK1 switch state LED (yellow) - When fixed, indicates the open or closed state of line breaker 1 (BRK1). When blinking, indicates incoherence between required state of the breaker and real state detected by the feedback signal.
BRK2 switch state LED (yellow) - When fixed, indicates the open or closed state of line breaker 2 (BRK2). When blinking, indicates incoherence between required state of the breaker and real state detected by the feedback signal.
BRK3 switch state LED (yellow) - When fixed, indicates the open or closed state of line breaker 3 (BRK3). When blinking, indicates incoherence between required state of the breaker and real state detected by the feedback signal.

Operating modes

OFF mode - The equipment is off and no actions are performed in this mode. All measurement and state LED displays remain active. If the transfer device control is of the pulse type, both open/close controls remains deactivated in OFF mode. In continuous control mode, instead, the behaviour may be selected by means of P07.n.06. Set to OFF mode before accessing the programming menus. Press the OFF-RESET button to reset the retaining alarms providing the conditions which generated the alarm have been removed.

MAN (manual) mode - The breakers can be controlled manually in manual mode. The breaker to be controlled can be selected on the display by pressing buttons << and >>. The selected breaker appears surrounded by a blinking box. Press the OPEN and CLOSE buttons to change the selected breaker state.
If the closing of a breaker is manually controlled while one other breaker is still closed, the equipment will not allow the simultaneous closing.
When working with gensets, the starting and stopping of the genset can be manually controlled in the manner similar to that of the breakers. In this case, the MAN button must be held pressed to start and stop the genset. The genset corresponding to the breaker highlighted by the blinking box will be started.

AUT (Automatic) mode - In automatic mode, the equipment autonomously carries out the opening and closing operations of the breakers and to start and stop any gensets. When the priority line is out of limits for a time higher than the set delay (green line presence LED off), the device disconnects the load from the priority line and connects to the immediately next priority line, starting of the genset (if applicable) and managing the operation and interlock times. The equipment can be programmed to open the priority line breaker either before or after the alternative line is made available .
When the priority line return within the limits, the device switches the load back onto it and runs the genset cooling cycle, if needed. The automatic return to priority lines can be locked. If possible and necessary, the load can be transferred with closed transition, i.e. with the two power sources momentarily in parallel. There are very many automatic operating cycles which vary according to the defined system configuration (14 possibilities) and according to the type of transfer devices used (motorised breakers, motorised changeover switches or contactors). Refer to the possible system configurations and the respective truth tables which describe the system behaviour in automatic mode.
Note: The use of *closed transition* function is not compatible with compliance with IEC / EN 60947-6-1.

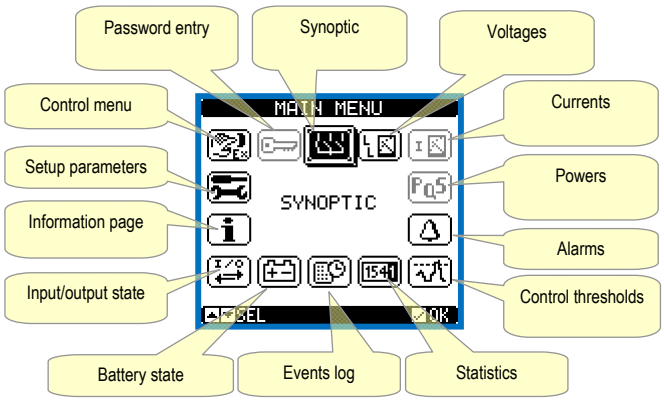
TEST mode - In test mode, the equipment starts the gensets, if present, to test their operation. If the TEST button is held pressed for 5 seconds, the equipment will run a cycle which simulates loss of the priority line anticipated by a notification message with consequent load transfer. **Caution**: this will momentarily interrupt power supply to the load. Lack of the secondary line is then simulated with the further transfer to the third line, if present. Two minutes later, the cycle will go back to the secondary line and finally to the main line in sequence. During this cycle, the message *SIMUL* appears on the display with a countdown to indicate TEST progress. The simulation cycle may be started on the *command menu*.

Energising the equipment

- ATL900 has two power supplies: 100-240VAC or 12-24-48VDC. Priority is given to the AC power if both are present at the same time.
- The equipment is normally set to the OFF mode when it is switched on. Modify parameter P01.03 in the *M01 Utility* menu if the operating mode selected before switch-off must be maintained.
- If may be powered at 12 or at 48VDC but the battery voltage must be set correctly in the *M04 battery* menu otherwise a battery voltage alarm will be generated.
- All LEDs blink during the energising procedure to check operation.

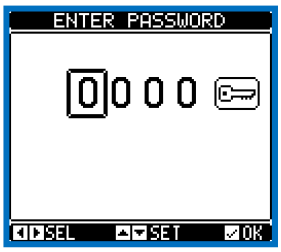
Main menu

- The main menu consists of a set of graphic icons which allow rapid access to measurements and settings.
- Press button ✓ starting from the normal measurement view. The rapid menu appears on the display.
- Press ◄or► to turn clockwise/anticlockwise and select the required function. The selected icon is highlighted and the message in the middle of the display indicates the description of the function.
- Press ✓to activate the selected function.
- If some functions are not available, the corresponding icon will be deactivated, i.e. will greyed out.
- etc. - Operate as short cuts which allow to speed up access to pages for displaying measurements, going directly to the selected measurement unit, from which it is possible to move forwards and backwards are usual.
- - Setting the numeric code which allows to access protected functions (setting parameters, executing controls).
- - Parameter programming access point. See the dedicated chapter.
- - Control menu access point, where authorised users can perform a number of resetting and restoring operations.
- - Access point to statistic operating data supplied by the controller.
- - Access point to the events list.



Password protected access

- The password is used to enable or block access to the setting menu and the command menu.
- The password is deactivated and access is free on new equipment (default). If the passwords are enabled, they must be entered to access the equipment (the passwords are numeric).
- See *M03 Password* setting menu for how to enable and define passwords.
- There are two access levels, according to the entered code:
  - User level access – it's allowed to reset the programmable counters, limits and changing the parameters of the menu Utilities - M01.
  - Advanced level access - the same rights as the user, with the addition of being able to edit all settings.
- In the normal measurements display, press ✓ to recall the main menu, then select the password icon and press ✓.
- The password setting window shown in the figure will appear:



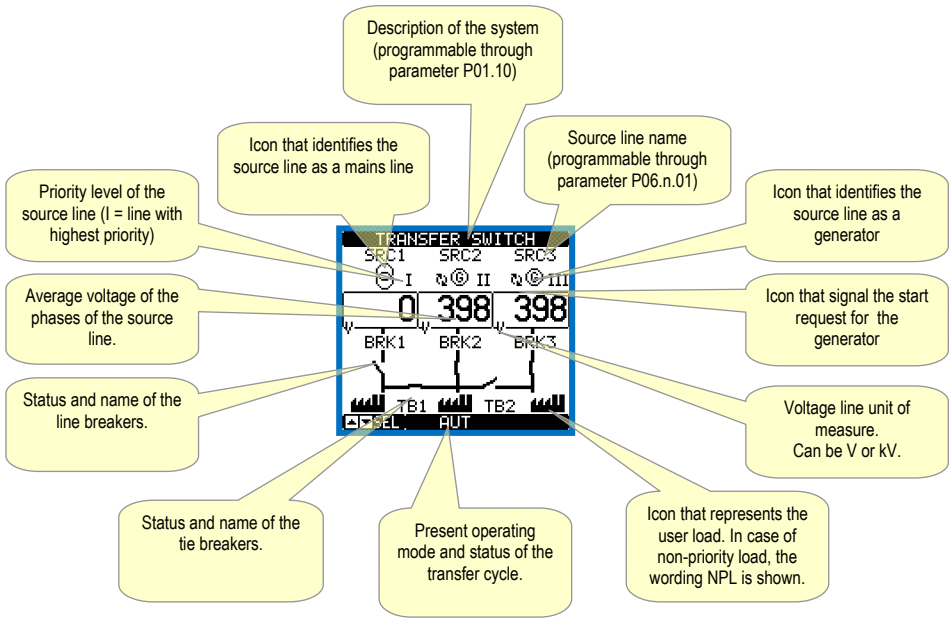
- Press ▲ and ▼ to change the value of the selected digit.
- Press ◄ and ► to go from one digit to the next.
- Enter all the digits of the password and then go to the *key* icon.
- The respective unlock message will appear when the entered password corresponds to the *User level password* or to the *Advanced level password*.
- After having unlocked the password, access will remain enabled until:
  - the equipment is switched off.
  - the equipment is reset (after closing the settings menu).
  - two minutes elapse without the operator touching any button.
- Press ✓ to close password setting and exit.

Navigating the display pages

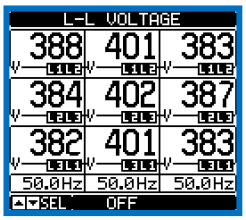
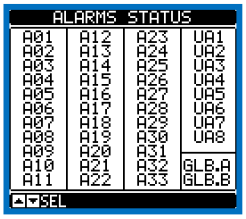
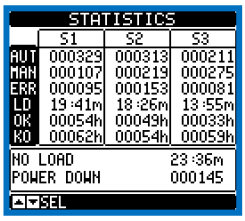
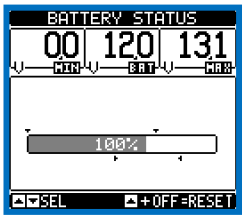
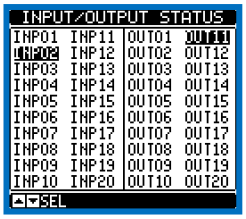
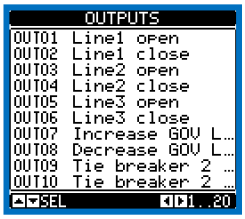
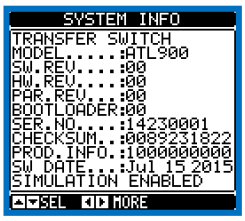
- The ▲ and ▼ buttons allow the measurement display pages to be scrolled one at a time. The current page is shown on the title bar.
- Some measurements may not be viewed according to the programming and connection of the equipment (e.g. the respective page will not appear if no fuel level sensor is set).
- Some pages have sub-pages which can be accessed by pressing ► (e.g. to view voltages and currents in form of graphic bars).
- The user can specify the page and sub-page to return to automatically after no buttons have been pressed for a given time.
- The system can be programmed so that the view always remains in the position in which is was left.
- See menu *M01 - Utility* for how to set these functions.

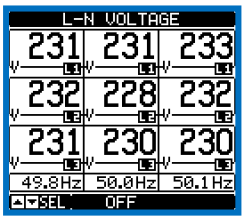
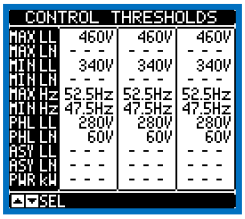
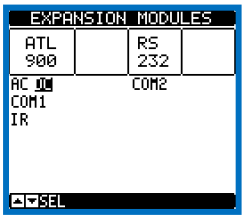
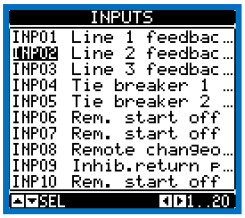
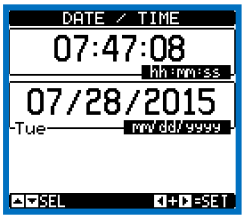
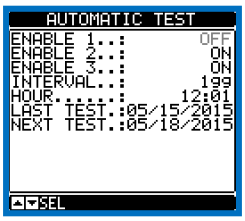
Synoptic

- Normally, the main display page shows a synoptic of the system, whose configuration (layout) has been defined by parameter P02.01.
- In the synoptic will find all the most important information, which in combination with the state of the LEDs allow to have a full picture of the supply lines.
- The following is an example of a mimic diagram on the display, with the explanation of the meaning of the various symbols.



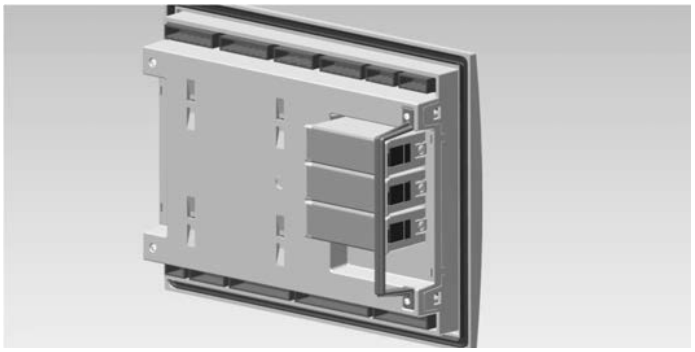
[Display pages table]

PAGES	EXEMPLE
Phase to phase voltage	
Alarm status	
Statistics	
Battery status	
Inputs and outputs status	
Outputs	
System info	

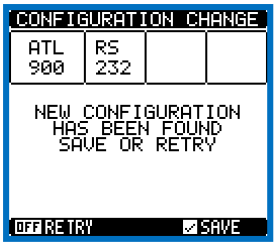
PAGES	EXEMPLE
Phase voltage	
Control thresholds	
Events list	
Expansion modules	
Inputs	
Date / Time	
Automatic test	

Expandability

- With its expansion bus, the ATL900 can be expanded with the additional modules of the EXP…. series.
- Up to three EXP… modules can be installed at the same time.
- The EXP… modules supported by the ATL900 are divided into the following categories:
  - communication modules
  - digital I/O modules
  - analog I/O modules
- To add an expansion module:
  - remove power from the ATL900.
  - remove one or more protective covers from the expansion slots.
  - insert the upper hook of the module in the specific slot to the left of the expansion slot.
  - turn the module rightwards inserting the bus connector.
  - press until the specific clip on the lower side of the module couples by snapping.



- Unless otherwise indicated, the insertion order of the modules is free.
- Fit the specific module lock accessory included in the package to improve expansion module fixing safety in applications subjected to strong vibrations.
- To fit this accessory:
  - remove the two right screws with a Torx T7 screwdriver
  - position the jumper over the previously coupled modules
  - fasten the screws back in their original seat.
- The ATL900 automatically recognises the EXP connected to it when it is powered.
- If the system configuration is different from the one last detected (a module was added or removed), the basic unit will ask the user to confirm the new configuration. If confirmed, the new configuration will be saved and become effective. Otherwise, the discrepancy will be indicated each time the equipment is powered up



- The current configuration of the system is shown on the specific display page (expansion modules), indicating the number, type and state of the connected modules.
- The I/O numbering is listed under each module.
- The I/O and communication channel state (on/off) is shown in negative print.

Additional resources

- The expansion modules provide additional resources which can be exploited by means of the respective setting menus.
- The setting menus of the expansion units are available also if the modules are not physically present.
- Since several modules of the same can be added (e.g. two communication interfaces), there are multiple setting menus all identified by a sequential number.
- The following table shows how many modules of each type can be fitted at the same time and in which slots they can be inserted. The total number of modules must be <= 3.

MODULE TYPE	CODE	FUNCTION	MAX No
COMMUNICATION	EXP 10 10	USB	2
	EXP 10 11	RS-232	2
	EXP 10 12	RS-485	2
	EXP 10 13	Ethernet	1
	EXP 10 14	Profibus® DP	1
	EXP 10 15	GSM - GPRS	1
DIGTAL I/O	EXP 10 00	4 INPUTS	2
	EXP 10 01	4 STATIC OUTPUTS	2
	EXP 10 02	2 INPUTS + 2 STATIC OUTPUTS	2
	EXP 10 03	2 SWITCHING RELAYS	2
	EXP 10 06	2 NO RELAYS	2
	EXP 10 07	3 NO RELAYS	2
	EXP 10 08	2 INPUTS + 2 NO RELAYS	2
ANALOG I/O	EXP 10 04	2 IN ANALOG V/I/TEMP	3
	EXP 10 05	2 OUT ANALOG V/I	3

Communication channels

- The ATL900 has an integrated RS-485 communication port named COM1.
- Up to two additional communication modules, named COM2 and COM3, can be connected.
- The communication settings menu has three parameter sections (n=1 ... 3) for setting the communication ports.
- The communication channels are completely independently from the hardware point of view (physical interface type) and from the point of view of the communication protocol.
- The communication channels may operate at the same time.
- By activating the Gateway function, it is possible to have an ATL900 equipped with an Ethernet port and the basic RS-485 port which works as a 'bridge' towards the other devices provided with the RS-485 port only, so obtain a saving (one Ethernet access point only). In this network, the ATL900 provided with Ethernet port will have the *Gateway* function set to ON for both communication channels (COM1, COM2) while the other devices will be normally configured with *Gateway* = OFF.

Inputs, outputs, internal variables, counters, analog inputs

- The inputs and outputs are identified by a code and a sequential number. For example, the digital inputs are named INPx, where x is the input number. Similarly, the digital outputs are named OUTx.
- The input/output numbering is based simply on the assembly position of the expansion modules with a sequential numbering from the top down.
- Up to 6 analog inputs (AINx) can be managed coming for external sensors (temperature measurements, consumption, pressure, flow rate etc.). The value read by the analog inputs may be converted into any engineering unit shown on the display and made available on the communication bus. The quantities read by the analog inputs are shown on the specific page. Limit thresholds (LIMx) may be applied to each one, which in turn can be connected to an inner or outer outputs, or inserted in a PLC logical function.
- The expansion I/O numbering starts from the last I/O fitted on the base unit. For example, for digital inputs, INP1…INP12 on the basic unit and thus the first digital input on the expansion modules will be named INP13. The I/O numbering is shown in the following table:

CODE	DESCRIPTION	BASIC	EXP
INPx	Digital inputs	1…12	13…20
OUTx	Digital outputs	1…11	12…20
COMx	Communication ports	1	2...3
AINx	Analog inputs	-	1…6
AOUx	Analog outputs	-	1…6
RALx	Remote relays for alarms/states	-	1…24

- Like the inputs/outputs, there are internal variables (bit) which may be associated to the outputs or combined. For example, limit thresholds can be applied to the measurements performed by the system (voltage, current etc.). In this case, the internal variable, named LIMx, will be activated when the measurement is beyond the limits defined by the user by means of the respective setting menu.
- Furthermore, up to 8 counters (CNT1…CNT8) which can count pulses come from the outside (thus from INPx inputs) or the number of times for which a given condition occurred. For example, by defining a LIMx threshold as counting source it will be possible to count how many times a measurement exceeds a given value.
- The following table shows all the internal variables managed by the ATL900 with their range (number of variables per type).

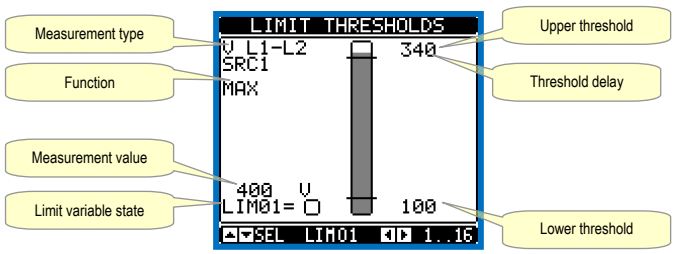
CODE	DESCRIPTION	RANGE
LIMx	Limit thresholds on measurements	1…16
REMx	Variables controlled remotely	1…16
UAx	User alarms	1…8
CNTx	Programmable counters	1…8
PLCx	PLC logic variables	1…32
TIMx	Timer	1…8

Limit thresholds (LIMx)

- The LIMn limit thresholds are internal variables the state of which depends on a measurement of those performed by the system going beyond the limits defined by the user, e.g. total active power higher than 25kW).
- To speed up setting considering that each threshold can span across an extremely wide range, each threshold can be set to a base value + a multiplying coefficient (e.g.: 25 x 1k = 25000).
- Two thresholds are available for each LIM (upper than lower). The upper threshold must always be set to a value higher than the lower value.
- The meaning of the thresholds depends on the following functions:

Min function: with the Min function the lower threshold is the tripping threshold and the upper threshold is the resetting threshold. The threshold is activated after the set delay when the value of the selected measurement is under the lower limit. Reset is activated after the set delay when the value of the measurement is higher than the upper threshold.
Max function: with the Max function the upper threshold is the tripping threshold and the lower threshold is the resetting threshold. The threshold is activated after the set delay when the value of the selected measurement is higher than the upper limit. Reset is activated after the set delay when the value of the measurement is lower than the lower threshold.
Min+Max function: with the Min+Max function both the upper and the lower thresholds are intervention thresholds. The threshold is activated after the respective delays when the value of the selected measurement is either lower than the lower limit or higher than the upper limit. Resetting is immediate as soon as the value returns within the limits.

- Tripping may mean energising or de-energising the LIMn limit according to the setting.
- If the LIMn limit is set with memory, manual resetting is possible using the specific control in the command menu.
- See the M15 settings menu.



Remote variables (REMx)

- The ATL900 can manage up to 16 variables controlled remotely (REM1…REM16).
- The state of these variables can be edited as required by the user by means of the communication protocol and may be used in combination with outputs, Boolean logic etc.
- Example: a relay using the control software can be freely activated and deactivated by using a remote variable (REMx) as source of an output (OUTx). This would allow to use ATL900 output relays to control loads, e.g. lighting or other.
- Another use of the REM variables may be to enable or disable given remote functions by inserting them in a Boolean AND logic with inputs or outputs.

User alarms (UAx)

- The user can define up to 8 programmable alarms (UA1…UA8).
- The following can be established for each alarm:
  - the *source*, i.e. the condition which generates the alarm;
  - the *text* of the message which must appear on the display when the condition occurs;
  - the *properties* of the alarm (like for the standard alarms), i.e. so as to interact with the genset control.
- For example, going beyond a threshold may be a condition which generates the alarm. In this case, the source must be one of the LIMx limit thresholds.
- If instead the alarm must be displayed as a consequence of the activation of an external digital input, then the source will be an INPx.
- The same criterion can be used to combine an alarm to complex conditions resulting from the logical Boolean combination of inputs and thresholds, etc. The PLCx variables will be used in this case.
- The user can defined a freely programmable message which will appear in the alarm pop-up window.
- Properties can be defined for the user alarms using the same method applied for normal alarms. In other words, it is possible to determined whether a given alarm must stop the motor, sound the siren, close the global alarm output etc. See the *Alarm properties* chapter.
- Multiple simultaneous alarms will be displayed in sequence and the total number of alarms will be shown.
- Use the specific control in the command menu to reset a programmed alarm with memory.
- See settings menu M21 for alarm definition.

PLC logic (PLCx)

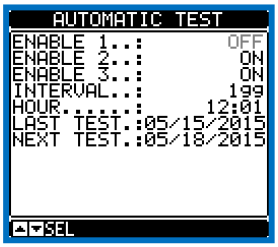
- *Xpress* can be set using a *ladder* program for creating a PLC internal logic inside the ATL900, so as to be able to freely create any function necessary for genset accessory applications.
- In the program logic, all the variables managed internally by the ATL900 can be entered, such as inputs (INPx), threshold limits (LIMx), remote variables (REMx), controller states (RALx) etc.
- The processing results of the various branches of the ladder logic are stored in internal variables (PLCx), which may later be used to control the ATL900 outputs, or as support memories to built a more complex logic or to control the alarms defined by the user (UAx).
- It is additionally possible to create timers inside the PLC program using the programmable timers of the M17 menu.
- The operation of the logic created with the ladder program may be checked in real time and possible corrected by means of the specific *Xpress* software window.

Timers (TIMx)

- The system includes 8 timer variables, named TIM1..TIM8.
- These variables may be used either in the PLC ladder logic or in combination with the OUTn outputs or in combination with UAn user alarms.
- Each timer variable has an input which controls it (e.g. a LIMn limit or an INPn inputs etc.). The state of this variable changes from false to true (ramp up) and the timing variable also changes from false to true but only remains true for the specified time and then returns false.
- Whenever the input variable becomes false, the TIMn variable also becomes false (this also occurs before the end of the programmed time) and the time counter is reset to zero.

Automatic test

- The automatic test is a periodical test which is run at fixed deadlines (frequency programmed during setup) if the system is in AUT mode and the function is enabled. The test consists in starting the gensets to check their efficiency.
- It is possible to decide which days of the week and what time of the day (hours-minutes) to run the test.
- See menu *M11 Automatic Test* for more information on programming.
- If there are multiple gensets in the system, only one is started for each automatic test. The others will be started in sequence the next time.
- After starting, the genset works for a programmable time after which it stops. The message *T.AUT* appears on the display before starting.
- The test can be enabled or disabled for each single genset using the parameters of menu M11 and on the Automatic Test display page without needing to open the setup menu.
  - On the Automatic Test page, press ◄ and ► at the same time.
  - Select the required genset by pressing ▲ and ▼. Enable the test with ► and disable it with ◄.
  - ✓ Save and exit the setting.



Keypad lock

- The keypad of the ATL900 can be locked by means of:
  - a programmable digital input.
  - a particular front button procedure.
  - Synergy-Xpress.
- The message **ACCESS LOCKED** will appear when attempting to use the locked buttons.
- Press ▲ and hold it pressed to lock or unlock the keypad. Press ▼ three times without releasing it at the end.
- Then release ▲ and press it five more times. Then release both buttons.
- The message **KEYPAD LOCKED** will appear on the display when the keypad is locked. The message **KEYPAD UNLOCKED** will appear when it is unlocked, instead.

IR programming port

- The ATL900 parameters may be configured by means of the front optical port using the IR-USB CX01 programming dongle or the IR-WiFi CX02 dongle.
- Simply approach a CX.. dongle to the front port and insert the plugs in the specific holds to obtain the mutual recognition of the devices as indicated by the green LINK LEDs on the programming dongle.

CX01 USB Dongle and CX02 WiFi Dongle

Parameter setting from PC

- The configuration and remote monitoring software *Xpress* can be used to transfer the set-up parameters (previously set) from ATL900 to the PC hard disk and vice versa.
- Parameter transfer from PC to ATL may be partial, i.e. only the parameters of the specified menus.

Parameter setting from smartphone or tablet with CX02

- It is possible to connect to the ATL900 by means of the app SAM1, available for tablet and Android or iOS smartphones, and the CX02 accessory.
- The app can be used to view alarms, send controls, read measurements, set parameters, download events and sent collected data via e-mail.

Parameter setting from smartphone or tablet via NFC

- Using the app *Lovato electric NFC Configurator*, available for Android-based smart devices (Smartphones or tablets), you can access the programming parameters in a simple and innovative way, which does not need any connection cable and is able to operate even with non-powered ATL900.
- You can transfer the programming parameters by simply placing a smart device on the front of the ATL900.

- Operation conditions:
  - The smart device must support the NFC function and have it enabled. The smart device must be unlocked (Active).
  - If ATL900 is powered, it must be in the OFF mode (automatic operation inhibited).
  - If an advanced password is set (see P03.03), this must be known, otherwise the access to parameters will not be possible.
  - We recommend to have the APP already installed on the smart device. Otherwise you can still continue to the next step and you will be automatically led to the installation site on the online store.
  - By placing the smart device in contact with the front panel of the ATL900, roughly in the position indicated by the picture on the side and holding it in place for a few seconds, you will hear a beep. The APP will automatically start and the parameters will be loaded and displayed.
  - Access to parameter menus and their editing is done in the same way as for the other APPs seen previously.
  - After having applied the desired changes, press the *Send* key and place again the smart device in contact with the front panel of ATL900. The parameters will be transferred and implemented after ATL900 re-initialization. This is shown by the NFC logo on ATL900 display.

Parameter settings (setup) from front panel

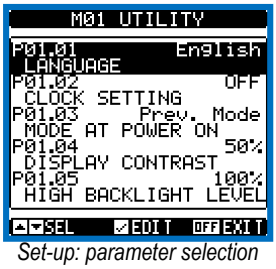
- To access the parameter programming menu (setup):
  - Set the board to **OFF** mode
  - On the normal measurement display, press ▲ and ▼ at the same time to recall the *main menu*
  - Select the icon . If it is not enabled (greyed out) it means that the password must be entered to unlock it (see *Password protected access*).
  - Press ✓to access the setup menu.
- The figure shows the setup sub-menus in which all the parameters are grouped according to their function.
- Press ▲ or ▼ to select the required menu and press ✓ to confirm.
- Press **OFF** to exit and go back to the measurements display.

Set-up: menu selection

- The available sub-menus are shown in the following table:

Code	MENU	DESCRIPTION
M01	UTILITIES	Language, brightness, display pages etc.
M02	GENERAL	Characteristic system data
M03	PASSWORD	Access code setup
M04	BATTERY	Battery parameters
M05	ACOUSTIC ALARMS	Control of internal buzzer and external siren
M06	SOURCE LINES (SRCx)	Characteristic source data
M07	BREAKERS (BRKn)	Characteristic breaker data
M08	SWITCH	Load transfer mode
M09	SOURCE LINE CONTROL (SLCx)	Source line acceptability limits n.
M10	COMMUNICATIONS	Communication parameters ()
M11	AUTOMATIC TEST	Period, time, automatic test mode
M12	DIGITAL INPUTS	Programmable digital input functions
M13	DIGITAL OUTPUTS	Programmable digital output functions
M14	MISCELLANEOUS	Functions, such as maintenance etc.
M15	LIMIT THRESHOLDS	Programmable limit thresholds
M16	COUNTERS	Programmable generic counters
M17	TIMERS	Programmable timers for PLC logic
M18	REMOTE ALARMS	Alarm remoting on RGKRR module
M19	ANALOG INPUTS	Voltage/current/temperature inputs
M20	ANALOG OUTPUTS	Voltage/current outputs
M21	USER ALARMS	Programmable alarms
M22	ALARMS TABLE	Alarm enabling and effect

- Select the sub-menu and press ✓to view the parameters.
- All parameters are shown with code, description, current value.



Set-up: parameter selection

Parameter table

M01 - UTILITIES		Unit	Default	Range
P01.01❶	Language		English	English Italiano Francais Espanol Deutsch Portuguese Polish Russian
P01.02❶	Clock setting after power-on		OFF	OFF-ON
P01.03❶	Power-on operative mode		Previous	OFF mode Previous
P01.04❶	LCD contrast	%	50	0-100
P01.05❶	Display backlighting intensity high	%	100	0-100
P01.06❶	Display backlighting intensity low	%	25	0-50
P01.07❶	Low backlighting switch time	sec	180	5-600
P01.08❶	Back to default page	sec	300	OFF / 10-600
P01.09❶	Default page		CONFIGURATION	(page list)
P01.10❶	Main page title		TRANSFER SWITCH	20 char. string

❶ **These parameters are also accessible with user level password.**
P01.01 - Language selection for text on display.
P01.02 - Automatic access activation to clock setup after energising.
P01.03 - When energised, the equipment starts in OFF mode in the mode which was selected when the equipment was switched off.
P01.04 - LCD contrast adjustment.
P01.05 - High display backlighting adjustment.
P01.05 - Low display backlighting adjustment.
P01.07 - Low display backlighting switch delay.
P01.08 - Reset to default page delay when buttons are not pressed. If set to OFF the last manually selected page will always remain on the display.
P01.09 - Default page shown on the display when it is switched on and after the delay.
P01.10 - Free text with alphanumeric name identifying the specific system.

M02 - GENERAL		Unit	Default	Range
P02.01	System layout		E 3S - 0T	A: 2S – 0T B: 2S – 1T – PL C: 2S – 1T - SI D: 2S – 1T – AI E : 3S – 0T F: 3S – 1T – PL G: 3S – 1T – AI H: 3S – 1T – PS I: 3S -1T - RI J: 3S – 1T - 12 K: 3S – 2T – M2 L: 3S – 2T - FL M: 3S – 2T – 3N N: 3S – 2T – 2L O: (custom)
P02.02	Rated system voltage	V	400	50 – 50000
P02.03	VT Use		OFF	OFF-ON
P02.04	VT Primary	V	100	50-50000
P02.05	VT Secondary	V	100	50-500
P02.06	Phase sequence check		OFF	OFF L1-L2-L3 L3-L2-L1
P02.07	Connection type		L1-L2-L3-N	L1-L2-L3-N L1-L2-L3 L1-N-L2 L1-N
P02.08	Rated control type		L-L	L-L L-N L-L + L-N
P02.09	Rated frequency	Hz	50Hz	50 Hz 60 Hz
P02.10	CT position		OFF	OFF LOAD S1 S2 S3
P02.11	CT No. 1-2-3 primary	A	5	1-10000
P02.12	CT No. 1-2-3 secondary	A	5	1-5
P02.13	CT No. 4 primary	A	5	1-10000
P02.14	CT No. 4 secondary	A	5	1-5
P02.15	CT No. 4 current reading		OFF	OFF Neutral

P02.16	Non-priority load management		OFF	OFF Pulse breaker Continuous breaker Contactor
P02.17	Breaker operation max. time non-priority load	sec	5	1…900
P02.18	Open pulse time	sec	10	0-600
P02.19	Close pulse time	sec	1	0-600
P02.20	Minimum coil opening pulse time	sec	1.0	0.1 … 10.0
P02.21	Delay between min. coils and spring load	sec	0.2	0.1 … 10.0
P02.22	Tie breaker management (TBx)		OFF	OFF Pulse breaker Continuous breaker Contactor
P02.23	Maximum tie breaker operation time	sec	5	1…900
P02.24	Open pulse time	sec	10	0-600
P02.25	Close pulse time	sec	1	0-600
P02.26	Minimum coil opening pulse time	sec	1.0	0.1 … 10.0
P02.27	Delay between min. coils and spring load	sec	0.2	0.1 … 10.0
P02.28	Description of tie breaker 1		TB1	(char*4)
P02.29	Description of tie breaker 2		TB2	(char*4)
P02.30	Tie breaker closing delay	sec	5.0	0.1 … 60.0
P02.31	Pre-transfer time load 1	sec	OFF	OFF / 1-1000
P02.32	Post-transfer time load 1	sec	OFF	OFF / 1-1000
P02.33	Pre-transfer time load 2	sec	OFF	OFF / 1-1000
P02.34	Post-transfer time load 2	sec	OFF	OFF / 1-1000
P02.35	Pre-transfer time load 3	sec	OFF	OFF / 1-1000
P02.36	Post-transfer time load 3	sec	OFF	OFF / 1-1000
P02.37	Tie breaker TB1 continuous control in RESET/OFF mode		NOC	OFF NOC
P02.38	Tie breaker TB2 continuous control in RESET/OFF mode		NOC	OFF NOC
P02.39	Tie breaker TB1 conditional enable		OFF	OFF INPx OUTx LIMx REMx PLCx Ax UAx
P02.40	Function index (x)		OFF	OFF / 1…99
P02.41	Tie breaker TB2 conditional enable		OFF	OFF INPx OUTx LIMx REMx PLCx Ax UAx
P02.42	Function index (x)		OFF	OFF / 1…99

P02.01 - System layout, description of the various configurations with respective logical diagrams is shown in this manual in the *system layout* section at the end of the parameter description section:
P02.02 - Rated system voltage. Set the concatenated voltage for polyphase systems.
P02.03 - Use voltage transformers (VT) on the voltage measuring inputs.
P02.04 - Primary value of any voltage transformers.
P02.05 - Secondary value of any voltage transformers.
P02.06 - Phase sequence control enabling. **OFF** = no control. **Direct** = L1-L2-L3. **Inverted** = L3-L2-L1. Note: The corresponding alarms must also be enabled.
P02.07 - Connection type choice, three-phase with/without neutral, two-phase or single-phase.
P02.08 - Voltage controls on concatenated voltages, phase voltages or both.
P02.09 - Rated system frequency.
P02.10 - CT positioning for reading currents and powers. OFF = CT not used. LOAD = CT positioned on load. S1,S2,S3 = CT positioned on specified source line.
P02.11 - P02.12 - Primary and secondary of CT triad used for all three phases.
P02.13 - P02.14 - Primary and secondary of fourth CT used for neutral.
P02.16 - Defines whether to manage non-priority load management (for system layouts which does not require it specifically). In addition to enabling management, it defines the control type for the breaker which controls it.
P02.17 - Timeout between sending of a control to the non-priority load breaker and the actual execution of the operation. After having sent an opening or closing control to the breaker, alarm A31 is generated if it is not positioned correctly within the timeout. It works when the auxiliary state contacts of the breaker is programmed and wired.
P02.18 - Minimum opening control time. For applications with motorised breakers, this must be set to a sufficient time to allow complete charging of the springs. This time is considered also when working in continuous control mode.
P02.19 - Closing control pulse time.
P02.20 - Minimum coil deactivation pulse for breaker opening pulse.
P02.21 - Time elapsed between minimum voltage opening pulse and breaker spring loading control.
P02.22 - This defines the control type for tie breakers (TBx). If the system layout includes tie breakers, this parameter must be set to a value other than OFF.
P02.23-P02.24-P02.25-P02.26-P02.27 - Control parameters of breakers used as tie breakers. Similar to P02.17…P02.21
P02.28-P02.29 - Alphanumeric description (code) which will be displayed on the synoptic panels on the display to indicate the two tie breakers (where used), respectively.
P02.30 - Tie breaker closing delay after closing the corresponding line breakers.
P02.31 - P02.33 - P02.35 - Advance time between energising of pre-transfer output and the actual de-energising of the respective load. This controls the outputs programmed with the pre-transfer function.

P02.32-P02.34-P02.36 - Post-transfer output energising time after conclusion of the load transfer from one line to the other.
P02.37-P02.38 – When the breaker command mode is set to Continuous (P08.01 = Continuous control brk), this parameter defines the ATL behaviour when moving to OFF mode. **OFF** = Command relays are de-energized. **NOC** = Command relays hold their previous status (NO Change).
P02.39, P02.40 – Conditional enable of TB1 tie breaker. **OFF** = Tie breaker is enabled normally. **(Any other setting)** = TB1 tie breaker is enabled only if the selected variable is active. When the variable is not active, if the tie breaker is open, its closing will be avoided. If the tie breaker is closed, it will be opened.
P02.41, P02.42 – Like previous parameters, referred to TB2.

M03 - PASSWORD		Unit	Default	Range
P03.01	Enable password		OFF	OFF-ON
P03.02	User level password		1000	0-9999
P03.03	Advanced level password		2000	0-9999
P03.04	Remote access password		OFF	OFF/1-9999

P03.01 - If set to OFF, password management is deactivated; access to settings and the command menu is free.
P03.02 - With P03.01 active, value to be specified to activate user level access. See Password Access section.
P03.03 - As P03.02, referred to Advanced level access.
P03.04 - If set to a numeric value, it comes the code to be specified via serial line before being able to send remote controls.

M04 - BATTERY		Unit	Default	Range
P04.01	Rated battery voltage	V	AUTO	AUTO 12 24 48 OFF
P04.02	MAX voltage limit	%	130	110-140
P04.03	MIN voltage limit	%	75	60-130
P04.04	MIN/MAX voltage delay	sec	10	0-120
P04.05	Local battery charger communication		OFF	OFF / 01…255
P04.06	Genset battery charger 1 communication		OFF	OFF / 01…255
P04.07	Genset battery charger 2 communication		OFF	OFF / 01…255
P04.08	Genset battery charger 3 communication		OFF	OFF / 01…255

P04.01 - Rated battery voltage. If set to OFF, disables the battery state alarms and messages on the display.
P04.02 - MAX battery voltage alarm tripping threshold.
P04.03 - MIN battery voltage alarm tripping threshold.
P04.04 - Tripping delay between MIN and MAX battery alarms**.**
P04.05-P04.06-P04.07-P04.08 - Serial communication enabling between ATL900 and any BCG…RS series communicating battery chargers. It allows to read the voltages, charging currents and alarms concerning the corresponding battery charger and to view information on the dedicated video page. 'Local' means the battery charger connected to the battery which powers the ATL900 in DC.

M05 - ACOUSTIC ALARMS		Unit	Default	Range
P05.01	Siren sound mode on alarm		Timed	OFF Keypad Timed Repeated
P05.02	Sound activation time on alarm	sec	30	OFF/1-600
P05.03	Sound activation time before starting	sec	OFF	OFF / 1-60
P05.04	Sound activation time on remote control start	sec	OFF	OFF / 1-60
P05.05	Sound activation time for no line SRC1	sec	OFF	OFF / 1-60
P05.06	Sound activation time for no line SRC2	sec	OFF	OFF / 1-60
P05.07	Sound activation time for no line SRC3	sec	OFF	OFF / 1-60
P05.08	Acoustic indication device		BUZZER+SIREN	OFF SIREN BUZZER BUZZER+SIR
P05.09	Buzzer on key press	sec	0.15	OFF / 0.01-0.50

P05.01 - **OFF** = siren deactivated. **Keypad** = Siren sounds continuously until it is cancelled by pressing a button on the front panel. **Timed** = Sounds for the time specified in P06.02. **Repeated** = Sounds for the time in P06.02, pause for a triple time, and then repeats cyclically.
P05.02 - Acoustic signal activation time on alarm.
P05.03 - Acoustic signal activation time before any starting of the engine.
P05.04 - Acoustic signal activation time following activation of a remote control via communication channel.
P05.05 - P05.06 - P05.07 - Acoustic signal activation time following lack of power on SRC1/2/3 line.
P05.08 - Acoustic signalling device choice.
P05.09 - Buzzer activation and time following button pressing.

M06 - SOURCE LINES (SRCx, n=1…3)		Unit	Default	Range
P06.n.01	Source description		SRCx	(char*6)
P06.n.02	Signal priority		n	1 – 3
P06.n.03	SRCx source type		Mains	Mains Genset
P06.n.04	Genset cooling time	sec	120	1-3600
P06.n.05	Rated source power	kW	1000	1-100000
P06.n.06	Max. power use limit	%	OFF	OFF / 1-200
P06.n.07	Max. power use delay	sec	60	1 - 9999
P06.n.08	Power use return limit	%	OFF	OFF / 1-200
P06.n.09	Power use return delay	sec	60	1 - 9999
P06.n.10	Power use max. limit for non-priority load disconnection	%	OFF	OFF / 1-200
P06.n.11	Power use max. delay for non-priority load disconnection	sec	60	1 - 9999
P06.n.12	Power use return limit for non-priority load connection	%	OFF	OFF / 1-200
P06.n.13	Power use return delay for non-priority load connection	sec	60	1 - 9999

Note: This menu is divided into 3 sections for source lines SRC1..3.

P06.n.01 - Alphanumeric description on the respective power source line which will be shown on the display synoptic panel.

P06.n.02 - Power line priority. In case of simultaneous presence of multiple power lines on the same load, the one with priority 1 is connected. If the line with priority 1 is not present, the one with priority 2 is used etc. If two sources are programmed with the same priority, the software attribute higher priority to the one most on the left.

P06.n.03 - This defines the type of power source of the SRCx line. **Mains** = The mains symbols is shown on the synoptic panel. **Genset** = The genset symbol is shown and the start/stop outputs are managed; is sought.

P06.n.04 - Maximum cooling cycle time. Example: time which elapses between the load disconnection of the genset and the actual stopping of the engine.

P06.n.05 - Max. rated power available on the SRCx source.

P06.n.06 - Max. power limit (in percentage) which can be taken from the SRCx line. If this limit is exceeded by the load, the load is transferred onto another source line.

P06.n.07 - Delay referred to the previous parameter.

P06.n.08 - Power value (in percentage) which defines the hysteresis with respect to P06.n.06 for the load return to SRCx.

P06.n.09 - Delay referred to the previous parameter.

P06.n.10 - **P06.n.11 - P06.n.12 - P06.n.13** - Thresholds and delays which define the power levels for connecting and disconnecting the non-priority load.

M07 - BREAKERS (BRKn, n=1…3)		Unit	Default	Range
P07.n.01	Breaker description		BRKn	(char*6)
P07.n.02	Interlock time SRCx → …	sec	6.0	0.1…1800.0
P07.n.03	Breaker operation max. time (alarm delay A03 and A04)	sec	5	1…900
P07.n.04	Open pulse time	sec	10	0-600
P07.n.05	Close pulse time	sec	1	0-600
P07.n.06	Continuous control in RESET/OFF mode		NOC	OFF NOC
P07.n.07	Breaker following no closing (with feedback open only)		OFF	OFF ON
P07.n.08	Minimum coil opening pulse time	sec	1.0	0.1 … 10.0
P07.n.09	Delay between min. coils and spring load	sec	0.2	0.1 … 10.0
P07.n.10	Closing retry		AUT	OFF AUT AUT+MAN CLOSING
P07.n.11	Breaker conditional enable		OFF	OFF INPx OUTx LIMx REMx PLCx Ax UAx
P07.n.12	Function index (x)		OFF	OFF / 1…99

Note: This menu is divided into 3 sections for controlling the source line breakers BRK1..3.

P07.n.01 - Alphanumeric description which identifies the line breaker on the display synoptic panel.

P07.n.02 - Interlock time from the opening instant of the breaker BRKn to the closing of another breaker.

P07.n.03 - Timeout between sending of a control from a line breaker and the actual execution of the operation. After having sent an opening or closing control to the breaker, alarms A03 or A04 are generated if it is not positioned correctly before the timeout. It works when the auxiliary state contacts of the breakers is programmed and wired.

P07.n.04 - Minimum opening control time, when the breaker control is defined by means of a pulse (P08.01 = Pulse breaker). For applications with motorised line breakers, this must be set to a sufficient time to allow complete charging of the springs. This time is considered also when working in continuous control mode.

P07.n.05 - Closing control pulse time.

P07.n.06 – Otherwise, the breaker control is selected as continuous (P08.01 = Continuous breaker), defines the behaviour of the board when it switches to the OFF operating mode. **OFF** = The control relays are de-energised. **NOC** = The control relays remain in in their original state (No Change).

P07.n.07 - In case of timeout caused by the line breaker BRKn failing to close (open feedback contact) causes the transfer of the load on an alternative line.

P07.n.08 - Minimum coil deactivation pulse duration for breaker opening pulse.

P07.n.09 - Time elapsed between minimum voltage opening pulse and breaker spring loading control.

P07.n.10 - This defines whether in case of failure to close the ATL900 must perform a retry consisting of a cycle of opening/spring recharging cycles followed by a new closing attempt. The failed closing alarm will be generated if the second attempt also fails. **OFF** = Closing is not retryed.
AUT = Retry is manual only. **AUT+MAN** = Retry enabled in both modes. **CLOSING** = Closing retry is executed in AUT or MAN only in case of failed closing but not when breaker opens unexpectedly.

P07.n.11, P07.n.12- Conditional enable of breaker. **OFF** = Breaker is enabled normally. **(Any other setting)** = The breaker is enabled only if the selected variable is active. When the variable is not active, if the breaker is open, its closing will be avoided. If the breaker is closed, it will be opened.

M08 - SWITCH		Unit	Default	Range
P08.01	Transfer device type		Pulse control breakers	Pulse control brk. Continuous control brk. Contactor
P08.02	Transfer strategy		OBP	OBP OAP
P08.03	Maximum load not powered time (alarm A09 tripping delay)	sec	60	OFF / 1…3600
P08.04	Automatic return on priority line inhibition		OFF	OFF / ON
P08.05	Genset start delay	sec	OFF	OFF / 1-6000
P08.06	Genset rotation interval		OFF	OFF 1h-2h-3h- 4h-6h-8h- 12h- 1d-2d-3d 4d-5d-6d-7d
P08.07	Genset rotation time	h	0	0...23/OFF
P08.08	Genset rotation minutes	min	0	0...59
P08.09	Distance between genset startups	sec	15	0-9999
P08.10	EJP operating mode		Normal	Normal EJP EJP-T SCR
P08.11	EJP start delay	min	25	0-240
P08.12	EJP switch delay	min	5	0-240
P08.13	EJP re-switch block		ON	OFF / ON
P08.14	Closed transition enable		OFF	OFF ON OFF-SYNC
P08.15	Max. V delta	%	5	0 - 25
P08.16	Max. Hz delta	Hz	0.5	0.0 - 10.0
P08.17	Max. Phi delta	°	5.0	0.0 - 10.0
P08.18	Synchronisation dwell time	sec	0.50	0.00 - 10.00
P08.19	Max. synchronisation time	sec	60	0 - 1000
P08.20	Instantaneous parallel time	sec	0.25	0.01 – 5.00
P08.21	Increase-decrease voltage/frequency pulse ON time	sec	0.5	0.1-10.0
P08.22	Increase-decrease voltage/frequency pulse OFF time	sec	1.0	OFF / 0.1-10.0

P08.01 - This defines the transfer device type for power lines valid for all breakers BRKn defined in menu M07. **Pulse breaker** = Motorised breakers with pulse control. **Continuous breaker** = motorised breakers with continuous control. **Contactor** = Contactor coil control.

P08.02 - This defines the transfer strategy. **OBP** = (Open Before Presence) this means that in automatic mode the opening control of a switch is generated when the line is beyond the limits regardless of the alternative line state. **OAP** = (Open After Presence) this means that in automatic mode the opening control of a breaker is only sent after an alternative line is present in the limits.

P08.03 - If in automatic mode all the sources are simultaneously non available for longer than this time alarm *A09 load timeout not powered***.**

P08.04 - If this parameter is enabled after a transfer to an alternative line the return on the priority line does not occur automatically when it is re-established but must be controlled in manual mode. **OFF** = Automatic return **ON** = Return to manual.

P08.05 - Motor start-up delay when the priority line is not within the set limits. If it is set to OFF, the starting cycle starts at the same time as the opening of the priority line breaker.

P08.06 - P08.07 - P08.08 - These parameters allow a timed rotation in the application with multiple gensets exchanging the priority between the gensets. P08.06 defines the rotation interval between the gensets. The day of the day at which the rotation will occur is defined by P08.07 and P08.08. If the rotation range is higher than 24h, then the rotation always occurs at the indicated time every n days. If it is lower than 24h, then it occurs at the indicated time and in the sub-multiples. For example, if the time is set to 12:30 with the rotation every 6h, there will be a rotation at 12:30, one at 18:30, one at 0:30 etc.

P08.09 - This defines the time which separates the starting for one unit from the following one. If this time elapses after sending a start control without having detected the presence of voltage, alarm *A2n Line n genset not available* is generated and the system starts a second genset, where available.

P08.10 - This defines the EJP operating mode. **Normal** = Standard opening mode in AUT mode. **EJP** = Two programmable inputs are used set with Start remote load off and remote transfer for operation as EJP. When the start input is closed, the motor start delay time (P08.11) is activated at the end of which time the starting cycle is run. Subsequently, when the transfer enable is received, is the generated started correctly, the load is transferred from the main line to the genset line. The load goes back to the priority line when the transfer enable opens and the genset runs the start cycle when the start input opens. The EJP function is enabled only if the system is in automatic mode. The protections and alarms work as usual. **EJP-T** = The EJP/T function is a simplified variant of the previous EJP, where the genset start-up is controlled identically, but the load is transferred in timed manner instead of with a specific external signal. This function thus uses a single digital input, i.e. the starting input. The transfer delay time starts from when the starting control is closed and can be set by means of parameter P08.12. **SCR** = The SCR function is very similar to the EJP function. In this mode, the start input enables the genset start up as EJP, but without waiting for the start delay time P08.11. The remote transfer input has the function of enabling the transfer which occurs after the transfer delay P08.12.

P08.11 - Delay between arrival of the EJP genset start signal and the actual start signal.

P08.12 - Load switch delay from priority line to secondary line in EJP and SCR mode.

P08.13 - If ON, in EJP mode, EJP-T and SCR the load is not transferred back on the priority line in case of genset failure but only when the signals on the EJP inputs enable them.

P08.14 - Closed transition enable. This allows to define how the load will be transferred between two power sources, which are both present. **OFF** = the load will be transferred with transition open (default). **ON** = the two sources are synchronised (where possible) or spontaneous synchronisation will be expected within a limit time. The synchronisation thresholds are defined by parameters P08.15 - P08.16 - P08.17 - P08.18. In presence of all synchronisation conditions the load will be transferred with closed transition and instantaneous parallel. Obviously, the breakers and external protections must be appropriately configured in this case. **IN-PHASE** = In this case, the synchronisation conditions will be sought but transfer will occur in all cases with the transition open. In this case, the load is passed to a new source the amplitude and phase of which is synchronised with the previous one.

P08.15 - Maximum voltage difference between the two sources to be synchronised expressed as a percentage of the rated voltage.

P08.16 - Maximum frequency difference between the two sources to be synchronised.

P08.17 - Maximum phase angle difference between the two sources to be synchronised.

P08.18 - Minimum simultaneous dwell time between the three previous conditions before the synchronism is considered reliable.

P08.19 - Maximum waiting time for the synchronisation conditions. After this time, an open transition is performed.

P08.20 - Instantaneous parallel time in closed transition.

P08.21 - P08.22 - These define the ON and OFF time of the pulse controls for increasing or decreasing the voltage or frequency, respectively. These times influence the programmed outputs with the increase voltage, decrease voltage, increase frequency and decrease frequency functions. The signals are intended to be sent to a genset control unit with the purpose of reaching synchronisation conditions.

M09 - SOURCE LINE CHECK (SLC, n=1…3)		Unit	Default	Range
P09.n.01❶	MIN release voltage limit	%	85	70-100
P09.n.02❶	MIN reset threshold	%	90	70-100
P09.n.03❶	MIN voltage delay	sec	5	0-600
P09.n.04❶	MAX release voltage limit	%	115	100-130 / OFF
P09.n.05❶	MAX reset threshold	%	110	100-130 / OFF
P09.n.06❶	MAX voltage delay	sec	5	0-600
P09.n.07❶	Mains return delay in limits (when no alternative line is available)	sec	10	1-6000
P09.n.08❶	Mains return delay in limits (when alternative line is available)	sec	60	1-6000
P09.n.09❶	No phase threshold	%	70	60% - 80% / OFF
P09.n.10❶	No phase threshold delay	sec	0.1	0.1s-30s
P09.n.11❶	MAX asymmetric threshold	%	15	1% -20%/OFF
P09.n.12❶	MAX asymmetric delay	sec	5	0.1-900
P09.n.13❶	MAX frequency limit	%	105	100-120/OFF
P09.n.14❶	MAX frequency delay	sec	3	0-600
P09.n.15❶	MIN frequency limit	%	95	OFF/80-100
P09.n.16❶	MIN frequency delay	sec	5	0-600
P09.n.17❶	SRCn line control in OFF/RESET mode		OFF	OFF ON OFF+GLOB ON+GLOB
P09.n.18❶	SRCn line control in MAN mode		OFF	OFF ON OFF+GLOB ON+GLOB
P09.n.19	Line conditional enable		OFF	OFF INPx OUTx LIMx REMx PLCx Ax UAx
P09.n.20	Function index (x)		OFF	OFF / 1…99

❶ These parameters are also accessible with user level password.

Note: This menu is divided into 3 sections for Source Line Controls SLC1..3.

P09.n.01, P09.n.02, P09.n.03 - The first two parameters define the minimum voltage threshold and the respective reset hysteresis. P09.n.02 cannot be set to a value lower than P09.n.01. P09.n.03 this defines the tripping delay time of this protection.

P09.n.04, P09.n.05, P09.n.06 - The first two parameters define the maximum voltage threshold and the respective reset hysteresis. P09.n.05 cannot be set to a value higher than P09.n.04. By setting P09.n.04 to OFF, the maximum voltage control is disabled. P09.n.06 defines the maximum voltage tripping delay.

P09.n.07 - Delay time for SRCx to return within the limits, used when an alternative threshold is not available. Normally shorter than P09.n.08, because the load is not powered and supplying voltage is urgent.

P09.n.08 - Delay time for SRCx to return within the limits, used when the load cannot be connected to an alternative line. Normally longer than P09.n.07, because the load is covered and it is possible to wait for longer before conditions that voltage is stably re-established.

P09.n.09, P09.n.10 - Voltage threshold under which lowering is rapid because of a missing phase. Delay time for the missing phase is specified in P09.n.10.

P09.n.11, P09.n.12 - P09.n.11 These define the maximum imbalance threshold between the phases referred to rated voltage and P09.n.12 is the respective tripping delay. This control may be disabled by setting P09.n.11 to OFF.

P09.n.13 - Maximum frequency tripping threshold; may be deactivated.

P09.n.14 - Maximum frequency tripping delay.

P09.n.15 - Minimum frequency tripping threshold; may be deactivated.

P09.n.16 - Minimum frequency tripping delay.

P09.n.17 - **OFF** = voltage control SLCn in OFF mode is deactivated. **ON** = voltage control in OFF mode is active. **OFF+GLOB** = voltage control in OFF mode is deactivated but the relay programmed with the global alarm function may intervene or not according to whether the mains are absent or present, respectively. **ON+GLOB** = voltage control in OFF mode is activated but the relay programmed with the global alarm function may intervene or not according to whether the mains are absent or present, respectively.

P09.n.18 - See P09.n.17 but referred to MANUAL mode.

P09.n.19, P09.n.20 - Conditional enable of the source line. **OFF** = The source line is normally available. **(Any other setting)** = The source line can be used only if the set variable is active.

M10 - COMMUNICATION COMn (n=1…3)		Unit	Default	Range
P10.n.01❶	Serial node address		01	01-255
P10.n.02❶	Serial speed	bps	9600	1200 2400 4800 9600 19200 38400 57600 115200
P10.n.03❶	Data format		8 bit - n	8 bit, no parity 8 bit, odd bit, even

				7 bit, odd 7 bit, even
P10.n.04❶	Stop bit		1	1-2
P10.n.05❶	Protocol		Modbus RTU	Modbus RTU Modbus ASCII Modbus TCP
P10.n.06❶	IP address		192.168.1.1	000.000.000.000 – 255.255.255.255
P10.n.07❶	Subnet mask		0.0.0.0	000.000.000.000 – 255.255.255.255
P10.n.08❶	IP port		1001	0-32000
P10.n.09❶	Channel function		Slave	Slave Gateway Battery charger
P10.n.10❶	Client / server		Server	Client Server
P10.n.11❶	Remote IP address		000.000.000.000	000.000.000.000 – 255.255.255.255
P10.n.12❶	Remote IP port		1001	0-32000
P10.n.13❶	IP gateway address		000.000.000.000	000.000.000.000 – 255.255.255.255

❶ These parameters are also accessible with user level password.

Note: This menu is divided into 3 sections for communication channels COM1..3.

The channel COM1 identifies the standard RS-485 port, while COM2 and COM3 are reserved to the possible communication ports on expansion modules EXP. The infrared frontal programming port has fixed communication parameters and no setting menu is required.

P10.n.01 - Serial address (node) of the communication protocol.

P10.n.02 - Communication port transmission speed (1200 bps not available on slot 1 and 4).

P10.n.03 - Data format. 7-bit settings available for ASCII protocol only.

P10.n.04 - Stop bit number.

P10.n.05 - Communication protocol selection.

P10.n.06, P10.n.07, P10.n.08 - TCP-IP coordinates for applications with Ethernet interface. Not used with other communication module types.

P10.n.09 - Port operating mode. **Slave** = normal operation, the device reply to the messages of an external master. **Gateway** = The device analyses the message intended to it (serial address) and forwards those address to other nodes through the RS485 interface. See chapter *Communication channels*. **Mirror** = the communication channel is used to connect a ATL900RD repeater.

P10.n.10 - TCP-IP connection activation. **Server** = Waits for connection from a remote client. **Client** = Establishes the connection towards a remote server. This parameter also conditions the behaviour of the GSM/GPRS modem. If set to client, the modem attempt a PSD connection towards the remote server/port.

P10.n.11 - P10.n.12 - P10.n.13 - Coordinates for connecting the remote server when P10.n.10 is set to client.

M11 - AUTOMATIC TEST		**Unit**	**Default**	**Range**
P11.01❶	Automatic TEST enable group 1		OFF	OFF / ON
P11.02❶	Automatic TEST enable group 2		OFF	OFF / ON
P11.03❶	Automatic TEST enable group 3		OFF	OFF / ON
P11.04❶	Interval between TESTS	gg	7	1-60
P11.05❶	Enable TEST for Monday		ON	OFF / ON
P11.06❶	Enable TEST for Tuesday		ON	OFF / ON
P11.07❶	Enable TEST for Wednesday		ON	OFF / ON
P11.08❶	Enable TEST for Thursday		ON	OFF / ON
P11.09❶	Enable TEST for Friday		ON	OFF / ON
P11.10❶	Enable TEST for Saturday		ON	OFF / ON
P11.11❶	Enable TEST for Sunday		ON	OFF / ON
P11.12❶	TEST start hour	h	12	00-23
P11.13❶	TEST start minutes	min	00	00-59
P11.14❶	TEST time	min	10	1-600
P11.15❶	Automatic TEST with load switching		OFF	OFF Load Dummy load

❶ These parameters are also accessible with user level password.

P11.01 - P11.02 - P11.03 - This activate execution of the periodical test of the respective three gensets.

P11.04 - Interval time between one periodical test and the next. If the test is not enabled on the period expiration date, the interval will be extended as a consequence to the following enabled day.

P11.05…**P11.11** This enables automatic test execution in the single days of the week. OFF means that the test will not be performed on that day. Caution: The clock must be set correctly.

P11.12 - **P11.13** This establishes the date and minutes from the beginning of the periodical test. Caution: The clock must be set correctly.

P11.14 - Periodical test time in minutes.

P11.15 – Load management during periodical test execution: **OFF** = The load is not transferred. **Load** = This enables load transfer to the genset. **Dummy load** = This applies the dummy load while the system load is not switched.

M12– DIGITAL INPUTS (INPn, n=1…20)		**Unit**	**Default**	**Range**
P12.n.01	INPn input function		(miscellaneous)	(see *Input functions table*)
P12.n.02	Function index (x)		OFF	OFF / 1…99
P12.n.03	Contact type		NO	NO/NC
P12.n.04	Closing delay	sec	0.05	0.00-600.00
P12.n.05	Opening delay	sec	0.05	0.00-600.00

Note: This menu is divided into 20 sections for each programmable digital input INP1..INP20.

The inputs on the basic board are numbered from INP1 to INP12, while the remaining number refer to the expansion module inputs.

P12.n.01 - Selection input function selection (see *programmable input function table*).

P12.n.02 - Index possibly associated to the function programmed under the previous parameter. Example: If the input function is set to *Control menu execution Cxx*

and this input must execute control C.07 in the command menu, then P12.n.02 is set to value 7.
P12.n.03 - Contact type selection: NO normally open or NC normally closed.
P12.n.04 - Selected input contact closing delay.
P12.n.05 - Selected input contact opening delay**.**

M13 – DIGITAL OUTPUTS (OUT1…20)		**Unit**	**Default**	**Range**
P13.n.01	OUTn output function		(miscellaneous)	(see *Output functions table*)
P13.n.02	Function index (x)		1	OFF / 1…99
P13.n.03	Normal/reverse output		NOR	NOR / REV

Note: This menu is divided into 20 sections, referred to digital outputs OUT1…OUT20.
The outputs on the basic board are numbered from OUT1..OUT10, while the remaining to the those on the expansion modules.
P13.n.01 – Output function selection (see *Programmable output function table*).
P13.n.02 - Index possibly associated to the function programmed under the previous parameter. Example: If the function of the output is set to the *Alarm Axx* function and this output must be energised when alarm A16 occurs, then P11.n.02 is set to value 16.
P13.n.03 – This sets the output state when the associated function is not active: **NOR** = de-energised output, **REV** = energised output.

M14 - MISCELLANEOUS		**Unit**	**Default**	**Range**
P14.01	Maintenance interval hours	h	OFF	OFF / 1…99999
P14.02	Maintenance interval operations		OFF	OFF 1…99999
P14.03	Operative mode output		OFF	OFF O M M - O A …

P14.01 - This defines the programmed maintenance frequency, expressed in hours. If set to OFF, this maintenance frequency can be deactivated.
P14.02 - This defines the programmed maintenance frequency, expressed in number of operations. If set to OFF, this maintenance frequency can be deactivated.
P14.03 - This defines in which operating modes to activate the output programmed with the *Operating mode* function. For example, if this parameter is programmed on M-O, the *Operating mode* output will be activated when the ATL900si is in MAN or OFF mode.

M15 - LIMIT THRESHOLDS (LIMn, n = 1…16)		**Unit**	**Default**	**Range**
P15.n.01	Reference measurement		OFF	OFF- (measurements list) AINx CNTx ….
P15.n.02	Reference measurement source		OFF	OFF SRC1 SRC2 SRC3
P15.n.03	Channel no. (x)		1	OFF/1..99
P15.n.04	Function		Max	Max Min Min+Max
P15.n.05	Upper threshold		0	-9999 - +9999
P15.n.06	Multiplier		x1	/100 - x10k
P15.n.07	Delay	sec	0	0.0 – 600.0
P15.n.08	Lower threshold		0	-9999 - +9999
P15.n.09	Multiplier		x1	/100 - x10k
P15.n.10	Delay	sec	0	0.0 – 600.0
P15.n.11	Home state		OFF	OFF-ON
P15.n.12	Memory		OFF	OFF-ON

Note: This menu is divided into 16 sections for limit thresholds LIM1..16.
P15.n.01 - This defines which measurements supplied by the ATL900 to apply the limit threshold.
P15.n.02 - If the reference measurement is an electric measurement, this defines whether it refers to the mains or the genset.
P15.n.03 - If the reference measurement is a multichannel internal measurement (e.g. AINx), this defines which channel.
P15.n.04 - This defines the limit threshold operating mode. **Max** = LIMn active when the measurement is higher than P15.n.03. P15.n.06 is the resetting threshold. **Max** = LIMn active when the measurement is lower than P15.n.06. P15.n.03 is the resetting threshold. **Min+Max** = LIMn active when the measurement is higher than P15.n.03 or lower than P15.n.06.
P15.n.05 and **P15.n.06 -** These define the upper threshold which is given by the value of P15.n.03 multiplied by P15.n.04.
P15.n.07 - Tripping delay on the upper threshold.
P15.n.08, P08.n.09, P08.n.10 - as above referred to the lower threshold.
P15.n.11 - This allows to reverse the LIMn limit state.
P15.n.12 - This defines whether the threshold remains stored or must be manually reset using the command menu (ON) or whether it resets automatically (OFF).

P16 - COUNTERS (CNTn, n = 1…8)		**Unit**	**Default**	**Range**
P16.n.01	Counter source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx

				UAx RALx
P16.n.02	Channel no. (x)		1	1-99
P16.n.03	Multiplier		1	1-1000
P16.n.04	Splitter		1	1-1000
P16.n.05	Counter description		CNTn	(Text - 16 characters)
P16.n.06	Unit of measurement		UMn	(Text - 6 characters)
P16.n.07	Reset source		OFF	OFF ON INPx OUTx LIMx REMx PLCx Axx UAx RALx
P16.n.08	Channel no. (x)		1	1-99

Note: This menu is divided into 8 sections for counters CNT1..8.

P16.n.01 - Signal which causes the counter increments (on ramp up). It may be energised by the ATL900 (ON), the exceeding of a threshold (LIMx), the activation of an external input (INPx), a logical condition (PLCx) etc.

P16.n.02 - Channel number x referred to the previous parameter.

P16.n.03 - Multiplying K. The counted pulse are multiplied by this value before being displayed.

P16.n.04 - Fractioning K. The counted pulse are divided by this value before being displayed. If different from 1, the counter is displayed with two decimal digits.

P16.n.05 - Description of the counter. Free text 16 characters.

P16.n.06 - Counter unit of measurement. Free text 6 characters.

P16.n.07 - Signal which causes the resetting of the counter. The counter remains equal to zero for as long as this signal is active.

P16.n.08 - Channel number x referred to the previous parameter.

M17 - TIMER (TIMn, n = 1…8)		**Unit**	**Default**	**Range**
P17.n.01	Timer source			OFF ON INPx OUTx LIMx REMx PLCx Axx UAx RALx
P17.n.02	Channel no. (x)		1	1-99
P17.n.03	Delay	sec	0	0.0 – 6000.0

Note: This menu is divided into 8 sections for the timers TIM1..8.

P17.n.01 - Source variable which controls the starting and resetting of the concerned timer.

P17.n.02 - Channel number referred to the previous parameter.

P17.n.03 - Timer time.

M18 – REMOTE ALARMS (RALn, n = 1…24)		**Unit**	**Default**	**Range**
P18.n.01	RALn output function		(miscellaneous)	(see Output functions table)
P18.n.02	Function index (x)		OFF	OFF / 1…99
P18.n.03	Normal/reverse output		NOR	NOR / REV

Note: this menu is divided into 24 sections for state/alarm remoting variables RAL1…RAL24, available in combination with the external unit RGKRR

P18.n.01 - This selects the remote output function RALn. The remote outputs (remote unit relay RGKRR) may assume the same functions as the local outputs, including the operating states, the alarms etc.

P18.n.02 - Index possibly associated to the function programmed under the previous parameter. Example: If the function of the output is set to the *Alarm Axx* function and this output must be energised when alarm A31 occurs, then P18.n.02 is set to value 31.

P18.n.03 - This sets the output state when the associated function is not active: **NOR** = de-energised output, **REV** = energised output.

M19 - ANALOG INPUTS (AINn, n=1…6)		Unit	Default	Range
P19.n.01	Input type		OFF	OFF 0..20mA 4….20mA 0…10V -5V…+5V PT100
P19.n.02	Start scale value		0	-9999 - +9999
P19.n.03	Multiplier		x1	/100 - x1k
P19.n.04	Full scale value		100	-9999 - +9999
P19.n.05	Multiplier		x1	/100 - x1k
P19.n.06	Description		AINn	(Text - 16 characters)
P19.n.07	Unit of measurement		UMn	(Text - 6 characters)

Note: this menu is divided into 8 sections for the analog inputs AIN1…AIN8, available in combination with the expansion modules EXP1004.

P19.n.01 - This specifies the sensor type connected to the analog input. According to the selected type, the sensor must be connected to the appropriate terminal. See the input module manual.

P19.n.02 and P19.n.03 - These define the value to be viewed when the sensor signal is low, i.e. at the beginning of the range defined by the type (0mA, 4mA, 0V, -5V etc). Note: these parameters are not used for PT100 type sensors.

P19.n.04 and P19.n.05 These define the value to be viewed when the sensor signal is maximum, i.e. at the full scale of the range defined by the type (20ma,10V, +5V etc). These parameters are not used for PT100 type sensors.

P19.n.06 - Description of the measurement related to the analog input. Free text 16 characters.

P19.n.07 - Unit of measurement. Free text 6 characters. If the input is PT100 type and text of the unit of measurement is *°F*, the temperature will be displayed in degrees Fahrenheit, otherwise it will be in degrees Celsius.

Example of application:The analog input AIN3 must reach a 4…20mA signal from an electronic level sensor which must be indicated on the display with the message 'Tank reserve level', and a full scale of 1500 litres.
Section 3 of this menu, referred to AIN3 will be programmed as follows.
P19.3.01 = 4…20mA

P19.3.02 = 0	*(0 x 1 = 0 litres, scale start value corresponding to 4mA)*
P19.3.03 = x1	
P19.3.04 = 1500	*(1500 x 1 = 1500 litres, full scale value corresponding to 20mA)*
P19.3.05 = x1	
P19.3.06 = 'Tank reserve level' *P19.3.07 = 'litres'*	

M20 - ANALOG OUTPUTS (AOUn, n=1…6)		Unit	Default	Range
P20.n.01	Output type		OFF	OFF 0..20mA 4….20mA 0…10V -5V…+5V
P20.n.02	Reference measurement		OFF	OFF- (measurements)
P20.n.03	Reference source		OFF	OFF SRC1 SRC2 SRC3
P20.n.04	Channel no. (x)		1	1-99
P20.n.05	Start scale value		0	-9999 - +9999
P20.n.06	Multiplier		x1	/100 - x10k
P20.n.07	Full scale value		0	-9999 - +9999
P20.n.08	Multiplier		x1	/100 - x10k

Note: this menu is divided into 8 sections for the analog outputs AOU1…AOU8, available in combination with the expansion modules EXP1005.

P20.n.01 - This specifies the analog output signal type. According to the selected type, the connection must be made on the appropriate terminal. See the analog output module manual.

P20.n.02 - Measurement from which the anlogue output value depends.

P20.n.03 - Number of the source line SRCx to which the measurement selected in the previous parameter refers (if applicable).

P20.n.05 and **P20.n.06** - These define the value of the measurement which corresponds to an output value at the low end of the range (0mA, 4mA, 0V, -5V etc).

P20.n.07 and **P20.n.08** - These define the value of the measurement which corresponds to the top end of the range (20ma,10V, +5V etc).

Example of application: Analog output AOU2 must emit a 0..20mA signal proportional to the total active power of the SRC2 line, from 0 to 500 kW. Section 2 of this menu, referred to AOU2 will be programmed as follows.
P20.2.01 = 0…20mA
P20.2.02 = kW tot
P20.2.03 = SRC2
P20.2.04 = 1 (not used)

P20.2.05 = 0	*(0 x 1 = 0 W, start scale value)*
P20.2.06 = x1	
P20.2.07 = 500	*(500 x 1 = 500 kW, full scale value)*
P20.2.08 = x1k	

M21 - USER ALARMS (UAn, n=1…8)		Unit	Default	Range
P21.n.01	Alarm source		OFF	OFF INPx OUTx LIMx REMx PLCx TIMx
P21.n.02	Channel no. (x)		1	OFF/1...99
P21.n.03	Text		UAn	(text - 20 characters)
P21.n.04	Breaker 1 open		OFF	OFF ON
P21.n.05	Breaker 2 open		OFF	OFF ON
P21.n.06	Breaker 3 open		OFF	OFF ON

Note: This menu is divided into 8 sections for defining the user alarms UA1…UA8.
P21.n.01 - This defines the digital input or internal variable the activation of which generates the user alarm.
P21.n.02 - Channel number referred to the previous parameter.
P21.n.03 - Free text which will appear in the alarm window.
P21.n.04-P21.n.05-P21.n.06 - This defines whether one or more line breakers must be open when a user alarm occurs.

Example of application: User alarm UA3 must be generated by the closing of the input INP5 and must show the 'Doors open' message without opening any breaker. In the case, set menu section 3 (for alarm UA3):
P21.3.01 = INPx
P21.3.02 = 5
P21.3.03 = 'Doors open'
P21.3.04, P21.3.05, P21.3.06 = OFF

Alarms

- When an alarm occurs, an alarm icon will appear on the display together with an ID code and the description of the alarm in the selected language.

- If the page navigation buttons are pressed, the pop-up window with the alarm indications momentarily disappear and then reappear after a few seconds.
- The red LED next to the alarm icon on the front panel will blink for as long as an alarm is active. If enabled, the local and remote acoustic alarms are activated.
- The alarms can be reset by pressing the OFF button.
- If the alarm is not reset, it means that its cause persists.
- If one or more alarms occur, the behaviour of the ATL6.. will depend on the alarm *property* setting.

Alarm properties

Various properties can be assigned to each alarm, including the user alarms (User Alarms, Uax):

- **Enabled alarm** – General alarm enable. If not enabled, it is as if it does not exist.
- **AUT only** – The alarm may only be generated when ATL is in automatic mode.
- **Retaining alarm** – This remains stored even if its cause was removed.
- **Global alarm A** – This activates the outputs assigned to this function.
- **Global alarm B** – This activates the outputs assigned to this function.
- **Block BRK1** – controls are no longer sent to breaker BRK1 when the alarm occurs.
- **Block BRK2** – as above referred to breaker BRK2.
- **Block BRK3** – as above referred to breaker BRK3.
- **Siren** – Activates the output assigned to this function as configured in the alarms table.
- **Inhibit** – The alarm may be temporarily deactivated by activating a programmable input with the alarm inhibit function.
- **Modem** – The alarm will be sent via modem (SMS or FTP).
- **No LCD** – The alarm is normally managed but not shown on the display.

Alarms table

The following table shows the alarm codes, together with a description and the default properties of each one.

CODE	Description	Enabled	AUT only	Retaining	All. Glob. A	All. Glob. B	Block BRK1	Block BRK2	Block BRK3	Siren	Inhibit	Modem	No LCD
A01	Battery voltage too low	●		●		●				●		●	
A02	Battery voltage too high	●		●		●				●		●	
A03	BRK1 breaker timeout	●	●	●	●		●			●		●	
A04	BRK2 breaker timeout	●	●	●	●			●		●		●	
A05	BRK3 breaker timeout	●	●	●	●				●	●		●	
A06	Incorrect phase sequence Line SRC1	●		●	●					●		●	
A07	Incorrect phase sequence Line SRC2	●		●	●					●		●	
A08	Incorrect phase sequence Line SRC3	●		●	●					●		●	
A09	Load timeout not powered	●	●		●					●		●	
A10	Local battery charger failure	●		●	●					●		●	
A11	Genset battery charger 1 failure	●		●	●					●		●	
A12	Genset battery charger 2 failure	●		●	●					●		●	
A13	Genset battery charger 3 failure	●		●	●					●		●	
A14	Emergency	●		●	●					●		●	
A15	BRK1 breaker protection trip	●		●	●		●	●	●	●		●	
A16	BRK2 breaker protection trip	●		●	●		●	●	●	●		●	
A17	BRK3 breaker protection trip	●		●	●		●	●	●	●		●	
A18	BRK1 breaker withdrawn	●	●	●	●		●			●		●	●
A19	BRK2 breaker withdrawn	●	●	●	●			●		●		●	●
A20	BRK3 breaker withdrawn	●	●	●	●				●	●		●	●
A21	SRC1 genset line not available	●			●					●		●	
A22	SRC2 genset line not available	●			●					●		●	
A23	SRC3 genset line not available	●			●					●		●	
A24	Maintenance hours SRC1	●				●						●	
A25	Maintenance hours SRC2	●				●						●	
A26	Maintenance hours SRC3	●				●						●	
A27	Maintenance operations BRK1	●				●						●	
A28	Maintenance operations BRK2	●				●						●	
A29	Maintenance operations BRK3	●				●						●	
A30	Auxiliary voltage breaker alarm	●			●					●		●	
A31	Non-priority load breaker timeout	●	●	●	●					●		●	
A32	Tie breaker TB1 timeout	●	●	●	●		●	●	●	●		●	
A33	Tie breaker TB2 timeout	●	●	●	●		●	●	●	●		●	
A34	NPL (Non-Priority-Load) breaker protection trip	●		●	●		●	●	●	●		●	
A35	TB1 tie breaker protection trip	●		●	●		●	●	●	●		●	
A36	TB2 tie breaker protection trip	●		●	●		●	●	●	●		●	
A37	NPL (Non-Priority-Load) breaker withdrawn	●	●	●	●					●		●	●
A38	TB1 tie breaker withdrawn	●	●	●	●					●		●	●
A39	TB2 tie breaker withdrawn	●	●	●	●					●		●	●
UA1 … UA8	User alarms												

Description of the alarms

CODE	DESCRIPTION	REASON FOR THE ALARM
A01	Battery voltage too low	Battery voltage under minimum threshold for a time longer than set.
A02	Battery voltage too high	Battery voltage under maximum threshold for a time longer than set.
A03	BRK1 breaker timeout	Breaker BRK1 of line SRC1 did not perform the opening or closing operation before the timeout. The opening or closing control is inhibited after the alarm has been generated. The alarms are only generated if one of the power sources is present, i.e. higher than the minimum programmed thresholds.
A04	BRK2 breaker timeout	As above, referred to BRK2.
A05	BRK3 breaker timeout	As above, referred to BRK3.
A06	Incorrect phase sequence Line SRC1	The phase sequence detected on line SRC1 does not correspond to the programmed value.
A07	Incorrect phase sequence Line SRC2	As above, referred to SRC2.
A08	Incorrect phase sequence Line SRC3	As above, referred to SRC3.
A09	Load timeout not powered	The load was not powered for a time longer than that programmed under P08.03 either because there were no available power lines or because the breakers were both open.
A10	Local battery charger failure	Alarm generated by the input programmed with the *Local battery charger alarm* function connected to an external battery charger when at least one of the sources is in the limits.
A11	Genset battery charger 1 failure	Alarm generated by the input programmed with the *genset 1 battery charger alarm* function connected to an external battery charger when at least one of the sources is in the limits.
A12	Genset battery charger 2 failure	As above, referred to genset 2.
A13	Genset battery charger 3 failure	As above, referred to genset 3.
A14	Emergency	Alarm generated by the opening of the external *Emergency* input. All breakers are opened.
A15	BRK1 breaker protection trip	Breaker BRK1 opened because its overcurrent protection tripped, as indicated by the specific input with the *Line 1 breaker protection trip* function.
A16	BRK2 breaker protection trip	As above, referred to BRK2.
A17	BRK3 breaker protection trip	As above, referred to BRK3.
A18	BRK1 breaker withdrawn	Breaker BRK1 is not available because the input with the *Line 1 breaker withdrawn* indicates that the breaker is not present in its housing.
A19	BRK2 breaker withdrawn	As above, referred to BRK2.
A20	BRK3 breaker withdrawn	As above, referred to BRK3.
A21	SRC1 genset line not available	Alarm generated by the *SRC1 line genset ready input.*
A22	SRC2 genset line not available	As above, referred to SRC2.
A23	SRC3 genset line not available	As above, referred to SRC3.
A24	Maintenance hours SRC1	Alarm generated when the maintenance hours related to the SRC1 line reach zero. See menu M12. Use the *Control menu* to restore the operating hours and reset the alarm.
A25	Maintenance hours SRC2	As above, referred to SRC2.
A26	Maintenance hours SRC3	As above, referred to SRC3.
A27	Maintenance operations BRK1	Alarm generated when the number of operations related to breaker BRK1 of line SRC1 reach the value set in menu M12. Use the Control menu to restore the operation and reset the alarm.
A28	Maintenance operations BRK2	As above, referred to BRK2.
A29	Maintenance operations BRK3	As above, referred to BRK3.
A30	Auxiliary voltage breaker alarm	The device which manages the draw of auxiliary voltage from the available line (e.g. Lovato ATLDPS1) indicates a fault/malfunctioning.
A31	NPL (Non-Priority Load) breaker timeout	The non-priority load breaker did not perform the opening or closing operation before the timeout. The opening or closing control is inhibited after the alarm has been generated. The alarms are only generated if one of the power sources is present, i.e. higher than the minimum programmed thresholds.
A32	TB1 Tie breaker timeout	Tie breaker TB1 did not perform the opening or closing operation before the timeout. The opening or closing control is inhibited after the alarm has been generated. The alarms are only generated if one of the power sources is present, i.e. higher than the minimum programmed thresholds.
A33	TB2 Tie breaker timeout	As above, referred to tie breaker TB2.
A34	NPL (Non-Priority Load) breaker protection trip	NPL breaker opened because its overcurrent protection tripped, as indicated by the specific input with the *NPL breaker protection trip* function.
A35	TB1 tie breaker protection trip	TB1 tie breaker opened because its overcurrent protection tripped, as indicated by the specific input with the *TB1 tie breaker protection trip* function.
A36	TB2 tie breaker protection trip	As above, referred to TB2 tie breaker.
A37	NPL (Non-Priority Load) breaker withdrawn	NPL breaker is not available because the input with the *NPL breaker withdrawn* function indicates that the breaker is not present in its housing.
A38	TB1 tie breaker withdrawn	TB1 tie breaker is not available because the input with the *TB1 tie breaker withdrawn* function indicates that the breaker is not present in its housing.
A39	TB2 tie breaker withdrawn	As above, referred to tie TB2 breaker.
UA1 … **UA8**	User alarms	The user alarm was generated by the activation of the variable or the associated input by means menu M15.

Programmable input functions table

- The following table shows all the functions which can be associated to the programmable digital inputs INPn.
- Each input may be set so as to have inverted function (NO - NC) because the energising or de-energising may be reset with independent times.
- Other functions require a further numeric parameter defined by index (x) specified by parameter **P12.n.02**.
- See menu *M12 Digital inputs* for more details.

Nr.	Function	Description
0	Disabled	Disabled input.
1	Configurable	Freely configurable by the user.
2	Line 1 breaker closed (Feedback BRK1)	Auxiliary contact which informs the ATL of the open/closed state of breaker BRK1. If this signal is not connected, ATL considers the state of the breaker corresponding to the control output state.
3	Line 2 breaker closed (Feedback BRK2)	As above, referred to BRK2.
4	Line 3 breaker closed (Feedback BRK3)	As above, referred to BRK3.
5	Line 1 in breaker tripped (Trip BRK1)	The input generates breaker BRK1 protection tripping when the contact closes.
6	Line 2 in breaker tripped (Trip BRK2)	As above, referred to BRK2.
7	Line 3 in breaker tripped (Trip BRK3)	As above, referred to BRK3.
8	Line 1 breaker withdrawn (Withdrawn BRK1)	The input generates the breaker BRK1 withdrawn alarm when the contact opens.
9	Line 2 breaker withdrawn (Withdrawn BRK2)	As above, referred to BRK2.
10	Line 3 breaker withdrawn (Withdrawn BRK3)	As above, referred to BRK3.
11	Transfer to secondary load (remote start on-load)	When closed, causes the priority line detachment and transfer to the first available line. Also if the main line voltage returns within limits. The secondary line breaker remains active until it is comprised in the limits. May also be used for the EJP function.
12	Automatic return to priority line inhibition	In AUT mode, when closed, prevents automatic return to the priority line after it returns into the limits. (Prevents opening of the line in use in the following conditions: input closed and so line in limits). This prevents the second energy interruption caused by retransfer occuring automatically in an unpredictable moment.
13	Automatic return to priority line in open transition inhibition	In AUT mode, when closed, prevents automatic return to the priority line in open transition after it returns into the limits. (Prevents opening of the line in use in the following conditions: input closed and so line in limits). This prevents the second energy interruption caused by retransfer occurring automatically in an unpredictable moment in open transition.
14	Priority genset start (Off load)	In AUT mode, when closed, causes the starting of the priority genset after the time set with Pxx.xx. May also be used for the EJP function.
15	Start genset 1	In AUT mode, when closed, overrides starting of genset 1.
16	Start genset 2	As above, referred to genset 2.
17	Start genset 3	As above, referred to genset 3.
18	Emergency	NC contact which, if open, opens all the breakers and generates alarm *A14 Emergency* (block property of A14 are priority) .
19	Line SRC1 genset ready	When closed, indicates that the genset connected to the SRC1 line is available for use. Error A21 is generated if this signal is missing.
20	Line SRC2 genset ready	When closed, indicates that the genset connected to the SRC2 line is available for use. Error A22 is generated if this signal is missing.
21	Line SRC3 genset ready	When closed, indicates that the genset connected to the SRC3 line is available for use. Error A23 is generated if this signal is missing.
22	External line SRC1 check	Line SRC1 voltage from external equipment check signal. Activated indicates voltage within limits.
23	External line SRC2 check	As above, referred to line SRC2.
24	External line SRC3 check	As above, referred to line SRC3.
25	Load enable on line SRC1	Enables load connection on line SRC1, in addition to internal controls.
26	Load enable on line SRC2	As above, referred to line SRC2.
27	Load enable on line SRC3	As above, referred to line SRC3.
28	Reset line SRC1 delay	Resets line SRC1 presence delay.
29	Reset line SRC2 delay	As above, referred to line SRC2.
30	Reset line SRC3 delay	As above, referred to line SRC3.
31	Keypad lock	If closed, locks all front keyboard functions except for measurement display.
32	Parameter setting lock	If closed, the setup menu access is locked.
33	Remote control lock	Locks control and writing operations via serial port. Data reading is always possible.
34	Siren OFF	Deactivates the siren.
35	Automatic test	Starts a periodical test managed by an external timer.
36	Local battery charger alarm	With the input active, alarm signal *A10 External battery charger failure* supplied by a line. The alarm is generated only when mains voltage is present.
37	Battery charger 1 alarm	With the input active, indicates alarm *A11 genset 1 battery charger failure* supplied by line SRC1. The alarm is generated only when SRC1 voltage is present.
38	Battery charger 2 alarm	As above, referred to line SRC2 (alarm A12).
39	Battery charger 3 alarm	As above, referred to line SRC3 (alarm A13).
40	Alarm inhibition	This allows, when active, to enable the alarms with alarms active inhibition properties
41	Reset alarms	Reset retraining alarms the causing condition of which has ceased.
42	Control menu C(xx)	Executes the command menu control defined by the index parameter (xx).
43	Simulate OFF button	Closing the input is equivalent to pressing the button.
44	Simulate MAN button	Closing the input is equivalent to pressing the button.
45	Simulate AUT button	Closing the input is equivalent to pressing the button.
46	Simulate TEST button	Closing the input is equivalent to pressing the button.

47	Automatic test inhibition	Prevents automatic test execution.
48	LED test	Lights up all LEDs on the front panel making them blink.
49	Close BRK1	Closes breaker BRK1 in manual mode.
50	Open BRK 1	Opens breaker BRK1 in manual mode.
51	Toggle BRK1	Toggles the state of breaker BRK1 in manual mode.
52	Close BRK2	Closes breaker BRK2 in manual mode.
53	Open BRK2	Opens breaker BRK2 in manual mode.
54	Toggle BRK2	Toggles the state of breaker BRK2 in manual mode.
55	Close BRK3	Closes breaker BRK3 in manual mode.
56	Open BRK3	Opens breaker BRK3 in manual mode.
57	Toggle BRK3	Toggles the state of breaker BRK3 in manual mode.
58	Auxiliary voltage ready	NC contact which, if opened, generates alarm *A30 Auxiliary voltage breaker alarm.* Used in combination with the ATLDPS1 alarm relay.
59	Service mode	If enable for system Service, this causes: • Switching to OFF mode • Deactivation of feedback timeout alarms A03 A04 A05 • Energising of minimum voltage coils.
60	Non-priority load breaker feedback	Auxiliary contact which informs the ATL of the open/closed state of breaker which breaks the non-priority load. If this signal is not connected, ATL considers the state of the breaker corresponding to the control output state.
61	Maximum priority line SRC1	When closed, line SRC1 becomes the priority line.
62	Maximum priority line SRC2	As above, referred to line SRC2.
63	Maximum priority line SRC3	As above, referred to line SRC3.
64	Tie breaker TB1 feedback	Auxiliary contact which informs the ATL of the open/closed state of tie breaker TB1. If this signal is not connected, ATL considers the state of the tie breaker corresponding to the control output state.
65	Tie breaker TB2 feedback	As above, referred to TB2.
66	NPL breaker protection trip	The input generates NPL breaker protection tripping when the contact closes.
67	TB1 tie breaker protection trip	As above, referred to TB1.
68	TB2 tie breaker protection trip	As above, referred to TB2.
69	NPL breaker withdrawn	The input generates NPL breaker withdrawn alarm when the contact opens.
70	TB1 tie breaker withdrawn	As above, referred to TB1.
71	TB2 tie breaker withdrawn	As above, referred to TB2.
72	Close TB1	When in MAN mode, commands TB1 closing.
73	Open TB1	When in MAN mode, commands TB1 opening.
74	Toggle TB1	When in MAN mode, commands TB1 toggle.
75	Close TB2	When in MAN mode, commands TB2 closing.
76	Open TB2	When in MAN mode, commands TB2 opening.
77	Toggle TB2	When in MAN mode, commands TB2 toggle.

Programmable input default

Input	Terminals	Default function
INP1	40	Breaker BRK1 closed (Feedback 1)
INP2	41	Breaker BRK2 closed (Feedback 2)
INP3	42	Breaker BRK3 closed (Feedback 3)
INP4	43	Breaker BRK1 closed (Trip 1)
INP5	44	Breaker BRK2 closed (Trip 2)
INP6	45	Breaker BRK3 closed (Trip 3)
INP7	46	Priority genset start (Off load)
INP8	47	Transfer to secondary load (remote start on-load)
INP9	49	Automatic return to priority line inhibition
INP10	50	Disabled
INP11	51	Disabled
INP12	52	Disabled

Programmable outputs functions table

- The following table shows all the functions which can be associated to the programmable digital outputs OUTn.
- Each output may be controlled in normal or inverted function (NOR or REV).
- Other functions require a further numeric parameter defined by index (x) specified by parameter **P13.n.02**.
- See menu *M13 Programmable outputs* for more details.

Nr.	Function	Description
0	Disabled	Output disabled.
1	Configurable	Freely configurable by the user.
2	Close contactor/breaker line 1	Closing control of relay/switch / Line 1 (BRK1).
3	Open breaker Line 1	Opening control of breaker Line 1 (BRK1) and possible spring loading.
4	Close contactor/breaker line 2	Closing control of relay/switch / Line 2 (BRK2).
5	Open breaker Line 2	Opening control of breaker Line 2 (BRK2) and possible spring loading.
6	Close contactor/breaker line 3	Closing control of relay/switch / Line 3 (BRK3).
7	Open breaker Line 3	Opening control of breaker Line 3 (BRK3) and possible spring loading.
8	Open BRK1/2/3	Opening of both breakers/neutral position motorised transfer.
9	Minimum coil BRK1	Controls the minimum voltage coil by opening breaker BRK1 before the spring loading cycle.
10	Minimum coil BRK2	As above, referred to BRK2.
11	Minimum coil BRK3	As above, referred to BRK3.
12	Control genset 1	Control remote start/stop of genset on line SRC1.
13	Control genset 2	As above, referred to SRC2.
14	Control genset 3	As above, referred to SRC3.
15	ATS ready	ATS in automatic, without alarms, ready to transfer.
16	Global alarm A	Output activated in presence of any alarm with *Global alarm* A property activated.
17	Global alarm B	Output activated in presence of any alarm with *Global alarm* B property activated.
18	Voltage state line SRC1	Output energised when all consitions exit to connect the load to the SRC1 line.
19	Voltage state line SRC2	As above, referred to SRC2.
20	Voltage state line SRC3	As above, referred to SRC3.
21	Siren	Powers the acoustic warning siren.
22	Operative mode	Output energised when the ATL900 is in one of the modes set with parameter P14.03.
23	OFF mode	Energised when ATL900 is in OFF mode.
24	MAN mode	Energised when ATL900 is in MANUAL mode.
25	AUT mode	Energised when ATL900 is in AUT mode.
26	TEST mode	Energised when ATL900 is in TEST mode.
27	REM(x) remote variable	Output controlled by remote variable REMx (x=1..16).
28	LIM (x) limits	Output controlled by limit threshold state LIM(x) (x=1..16) defined by the index parameter.
29	Dummy load Line SRC1	Output enabled when the automatic test is performed with dummy load line SRC1.
30	Dummy load Line SRC2	As above, referred to line SRC2.
31	Dummy load Line SRC3	As above, referred to line SRC3.
32	Load on Line SRC1	Breaker BRK1 closed.
33	Load on Line SRC2	Breaker BRK2 closed.
34	Load on Line SRC3	Breaker BRK3 closed.
35	Alarms A01-Axx	Output energised when alarm Axx is active (xx=1…alarm number).
36	Alarms UA1..Uax	Output energised when alarm Uax is active (x=1…8).
37	Alarm remoting	RGKRR unit control pulse output
38	Timer TIM(x)	Output controlled by state of timer variable TIM(x). (x=1..8) is defined by the index parameter.
39	Close NPL	Closing control of non-priority load relay / breaker .
40	Open NPL	Opening of non-priority load breaker and possible spring loading.
41	NPL minimum voltage coil	Controls the minimum voltage coil by opening the non-priority breaker before the spring loading cycle.
42	PLC(x)	Output controlled by state of timer variable PLC(x). (x=1..32) is defined by the index parameter.
43	Pre-transfer load 1	Energised output before the load is transferred from one source to another, both present. Programmable advance time using parameter P02.22.
44	Post-transfer load 1	Energised output after the load is transferred from one source to another. Programmable indicating time using parameter P02.23.
45	Pre-transfer load 2	As above, referred to load 2.
46	Post-transfer load 2	As above, referred to load 2.
47	Pre-transfer load 3	As above, referred to load 3.
48	Post-transfer load 3	As above, referred to load 3.
49	Increase voltage line SRC1	Signal to AVR of line SRC1 genset to increase voltage.
50	Increase voltage line SRC2	As above, referred to line SRC2.
51	Increase voltage line SRC3	As above, referred to line SRC3.
52	Decrease voltage line SRC1	Signal to AVR of line SRC1 genset to decrease voltage.
53	Decrease voltage line SRC2	As above, referred to line SRC2.
54	Decrease voltage line SRC3	As above, referred to line SRC3.
55	Increase line SRC1 frequency	Signal to governor of line SRC1 genset to increase rpm/frequency.
56	Increase line SRC2 frequency	As above, referred to line SRC2.
57	Increase line SRC3 frequency	As above, referred to line SRC3.
58	Decrease line SRC1 frequency	Signal to governor of line SRC1 genset to decrease rpm/frequency.
59	Decrease line SRC2 frequency	As above, referred to line SRC2.
60	Decrease line SRC3 frequency	As above, referred to line SRC3.
61	Close contactor/tie breaker 1	Closing control of relay/breaker TB1.
62	Open contactor/tie breaker 1	Opening control of breaker TB1 and possible spring loading.
63	Minimum coil tie breaker 1	Controls the minimum voltage coil by opening breaker TB1 before the spring loading cycle.
64	Close contactor/tie breaker 2	Closing control of relay/breaker TB2.
65	Open tie breaker 2	Opening control of breaker TB2 and possible spring loading.
66	Minimum coil tie breaker 2	Controls the minimum voltage coil by opening breaker TB2 before the spring loading cycle.
67	Sync 1<->2	Active during synchronization between SRC1 and SRC2

68	Sync 2<->3	Active during synchronization between SRC2 and SRC3
69	Sync 3<->1	Active during synchronization between SRC3 and SRC1

Programmable outputs default

Output	Terminals	Default function
OUT1	55-56	Open breaker Line 1 (BRK1)
OUT2	56-57	Close contactor/breaker line 1 (BRK1)
OUT3	58-59	Open breaker Line 2 (BRK2)
OUT4	59-60	Close contactor/breaker line 2 (BRK2)
OUT5	61-62	Open breaker Line 3 (BRK3)
OUT6	62-63	Close contactor/breaker line 3 (BRK3)
OUT7	19-20-21	Global alarm A
OUT8	28-29	ATS Ready
OUT9	30-31-32	Control genset 1
OUT10	33-34-35	Control genset 2
OUT11	36-37-38	Control genset 3

System layout

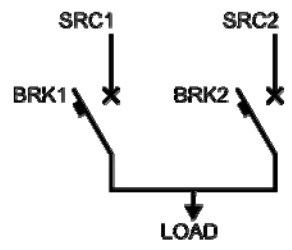
The possible system layouts supported by the ATL900 are listed below. The following information is provided for each one:

- The code used for selecting the layout type in the parameter setting P02.01 of the GENERAL menu (example: B: 2S-1T-PL)
- An example of synoptic
- A truth table
- A description of a typical application.

Codes are used by way of examples in these synoptic to identify the single elements. Note that the text of these codes can be freely programmed to make them correspond to the real system. In our examples, the code indicate the following:

- SRCx = SOURCE power line Corresponding to the SRCx power lines.
- BRKx = Line breaker. Corresponding to the BRKn breakers.
- TBx = Tie Breaker.
- LOADx = User load.
- NPL = Non-Priority Load.

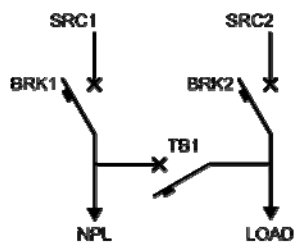
Case A: 2S – 0T



SRC1	SRC2	BRK1	BRK2
0	0	Open	Open
0	1	Open	Closed
1	x	Closed	Open

Two sources with only one load.

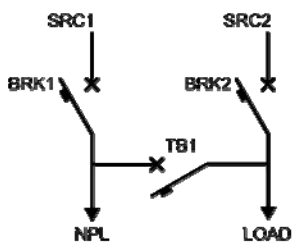
Case B: 2S - 1T - PL



SRC1	SRC2	BRK1	BRK2	TB1
0	0	Open	Open	Open
0	1	Open	Closed	Open
1	x	Closed	Open	Closed

Two sources with one tie breaker.
Load split between priority and non-priority (NPL).
Source 2 may power only the priority load (LOAD).

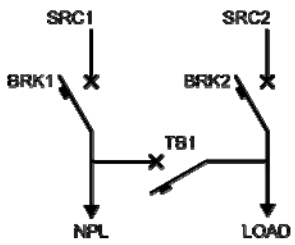
Case C: 2S – 1T - SI



SRC1	SRC2	BRK1	BRK2	TB1
0	0	Open	Open	Open
0	1	Open	Closed	Closed
1	0	Closed	Open	Closed
1	1	Closed	Closed	Open

Two sources with one tie breaker.
Two independent loads normally each powered by its own source.
If one of the sources is lost, the other source powers both loads.

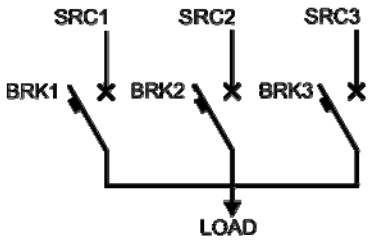
Case D: 2S – 1T - AI



SRC1	SRC2	BRK1	BRK2	TB1
0	0	Open	Open	Open
0	1	Open	Closed	Open
1	0	Closed	Open	Closed
1	1	Closed	Closed	Open

Two sources with one tie breaker.
Two independent loads normally each powered by its own source.
If source SRC2 is lost, SRC1 may power both loads while SRC2 can only power its own load.

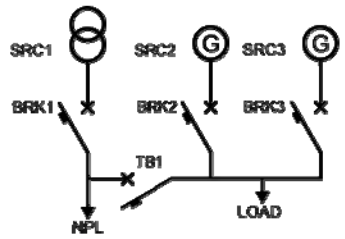
Case E: 3S – 0T



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3
0	0	0	Open	Open	Open
1	x	x	Closed	Open	Open
0	1	x	Open	Closed	Open
0	0	1	Open	Open	Closed

Three sources with only one load.

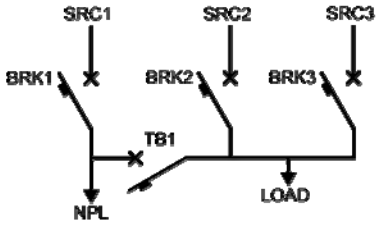
Case F: 3S – 1T - PL



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1
0	0	0	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open
0	1	x	Open	Closed	Open	Open
1	x	x	Closed	Open	Open	Closed

Three sources with one tie breaker between SRC1 and SRC2.
Load split between priority and non-priority (NPL).
Sources 2 and 3 may power only the priority load (LOAD).

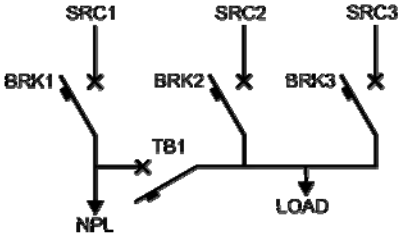
Case G: 3S – 1T - AI



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1
0	0	0	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open
0	1	x	Open	Closed	Open	Open
1	0	0	Closed	Open	Open	Closed
1	0	1	Closed	Open	Closed	Open
1	1	x	Closed	Closed	Open	Open

Three sources with one tie breaker between SRC1 and SRC2.
Two independent loads normally each powered by SRC1 and SRC2.
If source SRC2 is lost, the priority load is powered by SRC3.
In case of simultaneous loss of SRC2 and SRC3, SRC1 may power both loads.

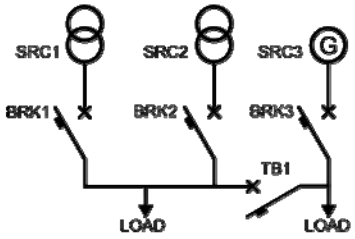
Case H: 3S – 1T – PS



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1
0	0	0	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Closed
0	1	x	Open	Closed	Open	Closed
1	0	0	Closed	Open	Open	Closed
1	0	1	Closed	Open	Closed	Open
1	1	x	Closed	Closed	Open	Open

Three sources with one tie breaker between SRC1 and SRC2.
Load split between priority and non-priority (NPL).
Each of the three sources can power both loads.
In case of presence of SRC1 and at least either SRC2 or SRC3 the loads are powered separately.

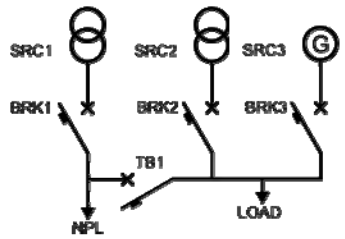
Case I: 3S -1T - RI



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1
0	0	0	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open
0	1	x	Open	Closed	Open	Closed
1	x	x	Closed	Open	Open	Closed

Three sources with one tie breaker between SRC2 and SRC3.
Load split between priority and non-priority (NPL).
Load NPL may be powered only by SRC1 or SRC2.

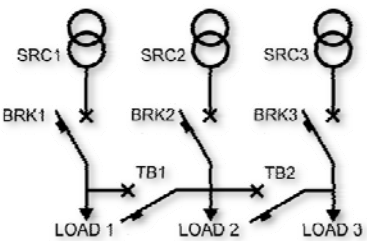
Case J: 3S – 1T - 12



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1
0	0	0	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open
0	1	x	Open	Closed	Open	Closed
1	0	0	Closed	Open	Open	Closed
1	0	1	Closed	Open	Closed	Open
1	1	x	Closed	Closed	Open	Open

Three sources with one tie breaker between SRC1 and SRC2.
Load split between priority and non-priority (NPL).
SRC1 and SRC2 can power both loads.
In case of presence of SRC1 and at least either SRC2 or SRC3 the loads are powered separately.

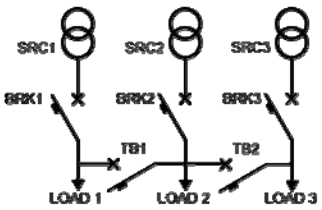
Case K: 3S – 2T – M2



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1	TB2
0	0	0	Open	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open	Closed
0	1	0	Open	Closed	Open	Closed	Open
0	1	1	Open	Closed	Closed	Closed	Open
1	0	0	Closed	Open	Open	Closed	Open
1	0	1	Closed	Open	Closed	Closed	Open
1	1	0	Closed	Closed	Open	Open	Closed
1	1	1	Closed	Closed	Closed	Open	Open

Three sources with two tie breakers, three loads.
If all three sources are present, the loads will be powered separately.
Each source can power up to two loads.

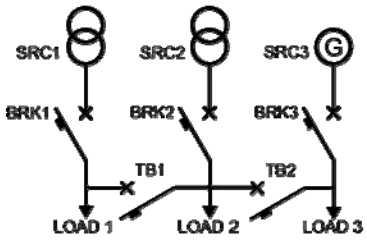
Case L: 3S – 2T - FL



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1	TB2
0	0	0	Open	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Closed	Closed
0	1	0	Open	Closed	Open	Closed	Closed
0	1	1	Open	Closed	Closed	Closed	Open
1	0	0	Closed	Open	Open	Closed	Closed
1	0	1	Closed	Open	Closed	Closed	Open
1	1	0	Closed	Closed	Open	Open	Closed
1	1	1	Closed	Closed	Closed	Open	Open

Three sources with two tie breakers, three loads.
If all three sources are present, the loads will be powered separately.
Each source can power all loads by itself.

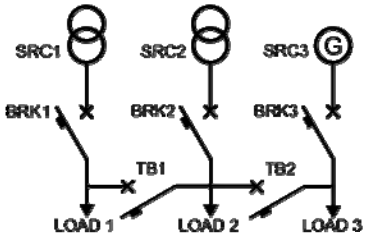
Case M: 3S – 2T – 3N



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1	TB2
0	0	0	Open	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open	Open
0	1	x	Open	Closed	Open	Closed	Closed
1	0	x	Closed	Open	Open	Closed	Closed
1	1	x	Closed	Closed	Open	Open	Closed

Three sources with two tie breakers, three loads.
SRC3 is an emergency source.
SRC1 and SRC2 can power all loads, while SRC3 can power only its own load.

Case N: 3S – 2T – 2L



SRC1	SRC2	SRC3	BRK1	BRK2	BRK3	TB1	TB2
0	0	0	Open	Open	Open	Open	Open
0	0	1	Open	Open	Closed	Open	Open
0	1	0	Open	Closed	Open	Closed	Open
0	1	1	Open	Closed	Closed	Closed	Open
1	0	0	Closed	Open	Open	Closed	Open
1	0	1	Closed	Open	Closed	Closed	Open
1	1	x	Closed	Closed	Open	Open	Closed

Three sources with two tie breakers, three loads.
SRC1 can power up to two loads.
SRC2 can power up to two loads.
SRC3 can only power its own load.

Case Z: Custom
Reserved for custom configurations.

Command menu

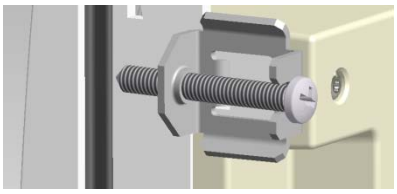
- The C*ommand menu* is used to perform occasional operations, like resetting measurements, counters, alarms etc.
- If the advanced access password was entered, the command menu can also be used to perform automatic operations useful for configuring the instrument.
- The following table shows the functions which are available with the command menu divided according to the required access level.

CODE	CONTROL	ACCESS LEVEL	DESCRIPTION
C01	RESET MANTENACE HOURS 1	ADVANCED	Reset maintenance interval hours of the breaker 1
C02	RESET MANTENACE HOURS 2	ADVANCED	Reset maintenance interval hours of the breaker 2
C03	RESET MANTENACE HOURS 3	ADVANCED	Reset maintenance interval hours of the breaker 3
C04	RESET MANTENACE COUNTER 1	ADVANCED	Reset maintenance interval operations of the breaker 1
C05	RESET MANTENACE COUNTER 2	ADVANCED	Reset maintenance interval operations of the breaker 2
C06	RESET MANTENACE COUNTER 3	ADVANCED	Reset maintenance interval operations of the breaker 3
C07	RESET GENERIC COUNTERS CNTX	USER	Resets generic counters CNTx
C08	RESET LIMX	USER	Reset limits LIMx variable status
C09	RESET HOURS SOURCE 1	ADVANCED	Reset hours counter of load supplied by source 1
C10	RESET HOURS SOURCE 2	ADVANCED	Reset hours counter of load supplied by source 2
C11	RESET HOURS SOURCE 3	ADVANCED	Reset hours counter of load supplied by source 3
C12	RESET HOURS BREAKER 1	ADVANCED	Reset hours counter breaker 1 closed
C13	RESET HOURS BREAKER 2	ADVANCED	Reset hours counter breaker 2 closed
C14	RESET HOURS BREAKER 3	ADVANCED	Reset hours counter breaker 3 closed
C15	RESET OPERATION BREAKER 1	ADVANCED	Reset breaker 1 operations counter
C16	RESET OPERATION BREAKER 2	ADVANCED	Reset breaker 2 operations counter
C17	RESET OPERATION BREAKER 3	ADVANCED	Reset breaker 3 operations counter
C18	RESET EVENTS LIST	ADVANCED	Resets the list of historical events

C19	SETUP TO DEFAULT	ADVANCED	Resets all the parameters in the setup menu to the default values
C20	SAVE SETUP COPY	ADVANCED	Copies the parameters currently set to a backup for restoring in the future
C21	RELOAD PARAMETERS FROM BACKUP MEMORY	ADVANCED	Transfers the parameters saved in the backup memory to the active settings memory
C22	FORCED I/O	ADVANCED	Enables test mode so you can manually energize any output. ***Warning! In this mode the installer alone is responsible for the output commands***
C23	RESET A03/04/05 ALARMS	ADVANCED	Restores the opening and closing command of the commutation devices after generating alarms A03 – A04 – A05
C24	SIMULATE LINE FAILURE	ADVANCED	The device moves to AUT mode and simulates the lack of the priority source for one minute. It then switches the load with the automatic procedure as programmed
C25	RESET PLC MEMORY	ADVANCED	Reset PLCx variable status

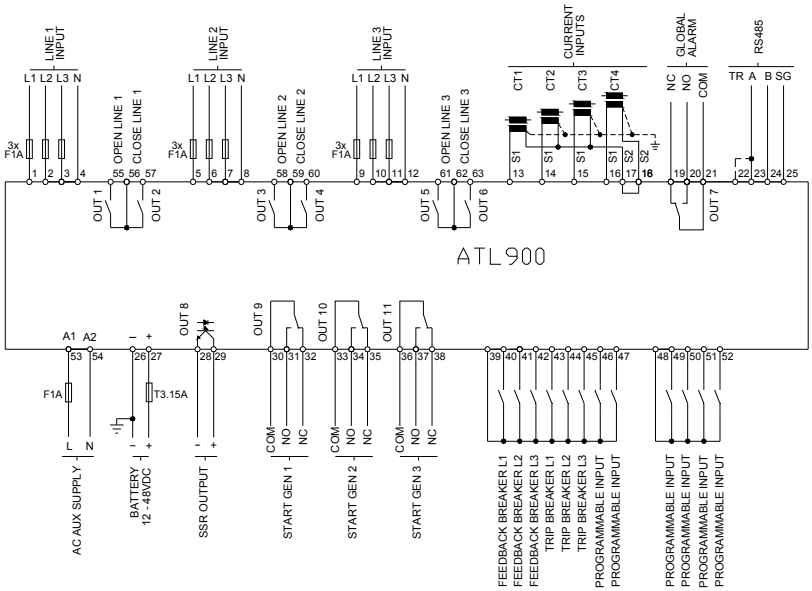
Installation

- ATL900 is designed to be flat panel mounted. Frontal protection of IP65 is guaranteed with correct assembly and optional sealing.
- Insert the system in the panel hole making sure that the seal, if present, is correctly positioned between the panel and instrument frame.
- Make sure that the customisation label is not folded under the seal, which would compromise sealing. The label must be positioned correctly inside the panel.
- In the panel, for each of the four fixing clips, place the metallic clip in the hole on the sides of the container and then move it backwards to insert the hook in the seat.

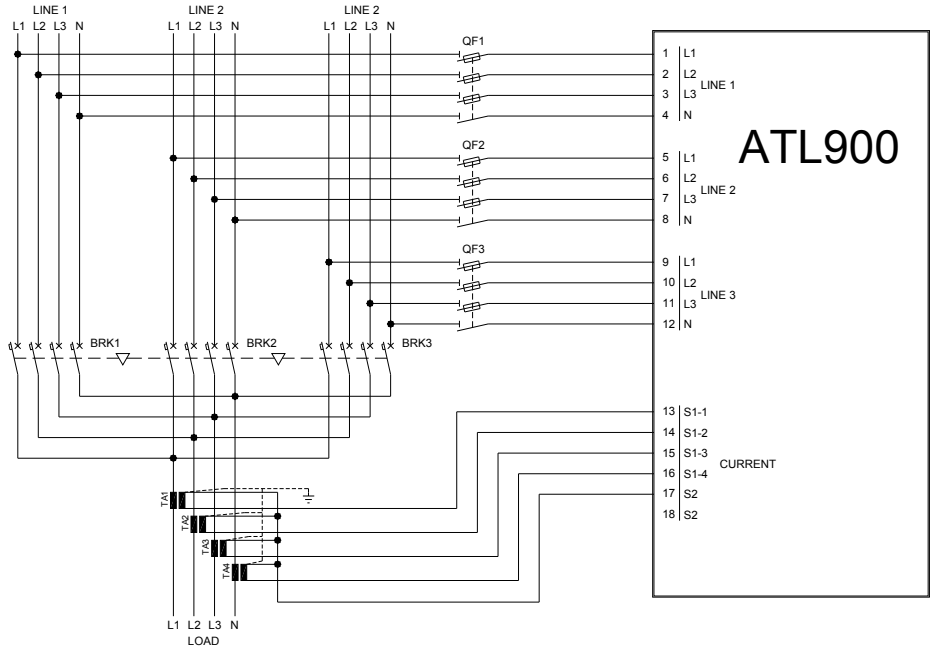


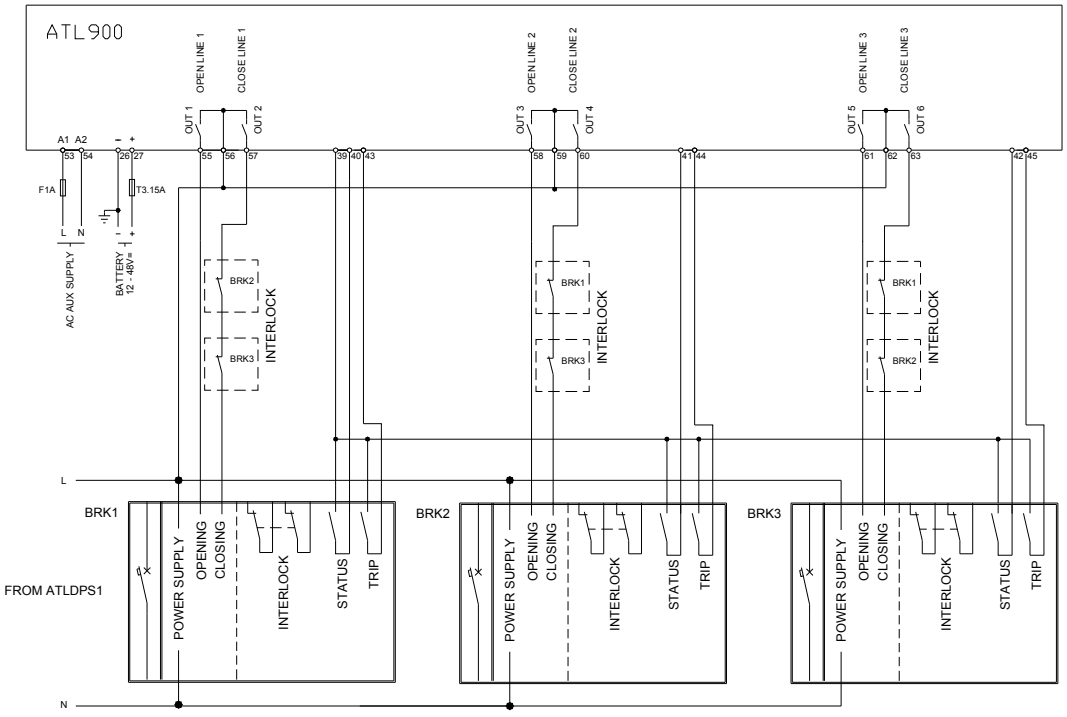
- Repeat the operation for the four clips.
- Tighten the fixing screw with a maximum torque of 0.5Nm.
- If the device must be disassembled, loosen the four screws and reverse the order.
- For electric connections, refer to the connection diagrams shown in the specific chapter and the requirements shown in the technical features table.

Wiring diagrams

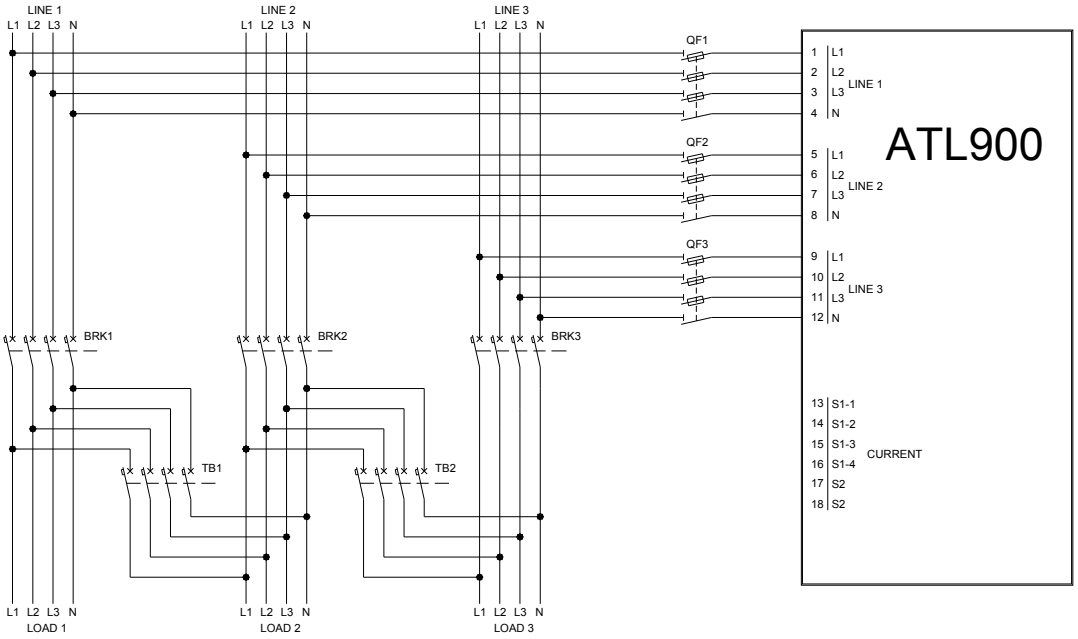


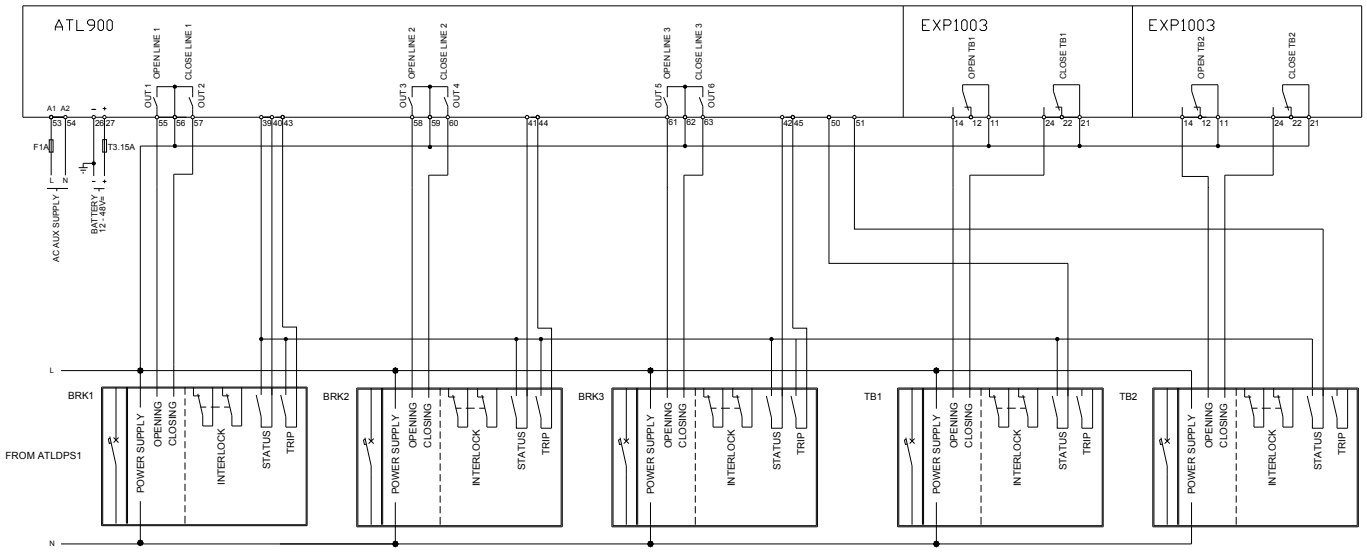
Example of power line connection + breakers



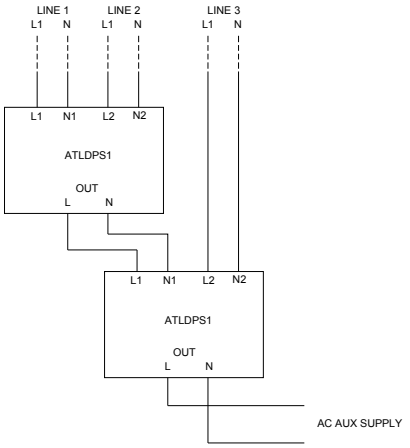


Example of power line connection + breakers + tie breakers

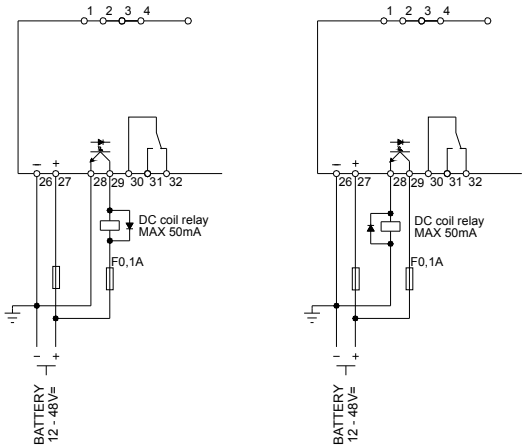




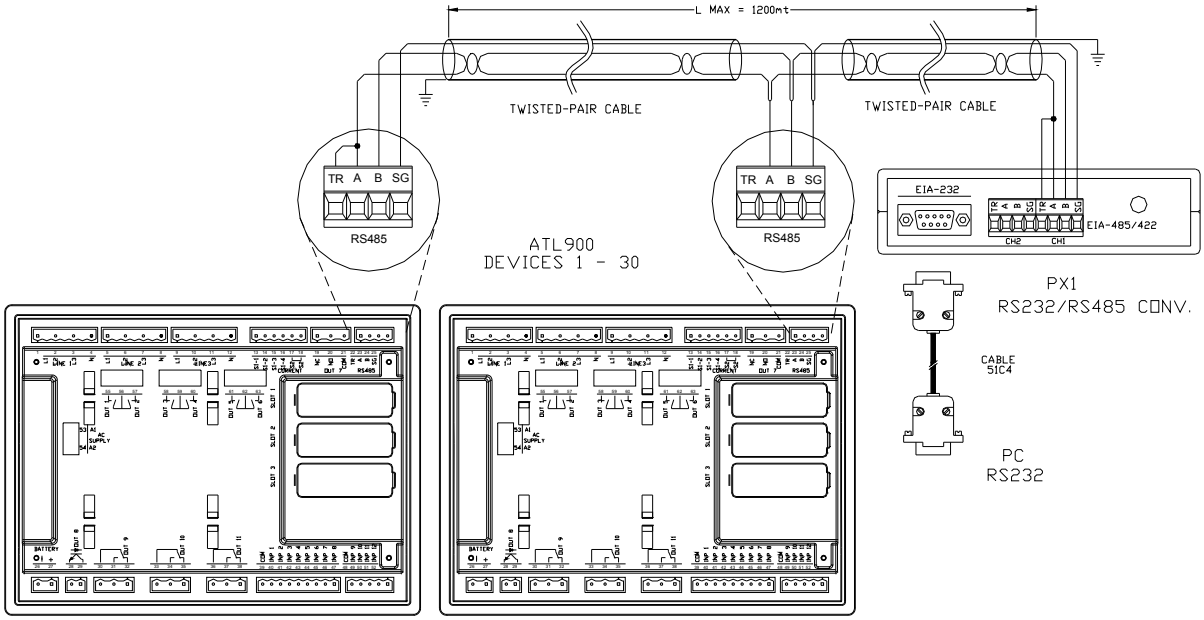
AC supply from three sources



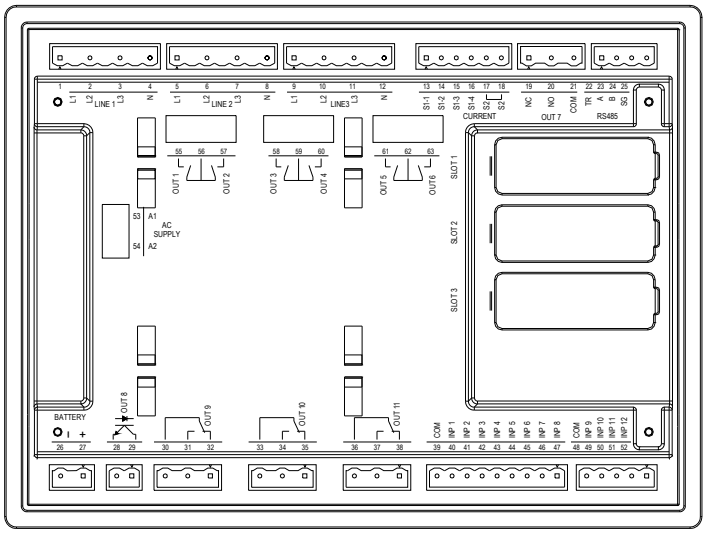
Static output (OUT8)



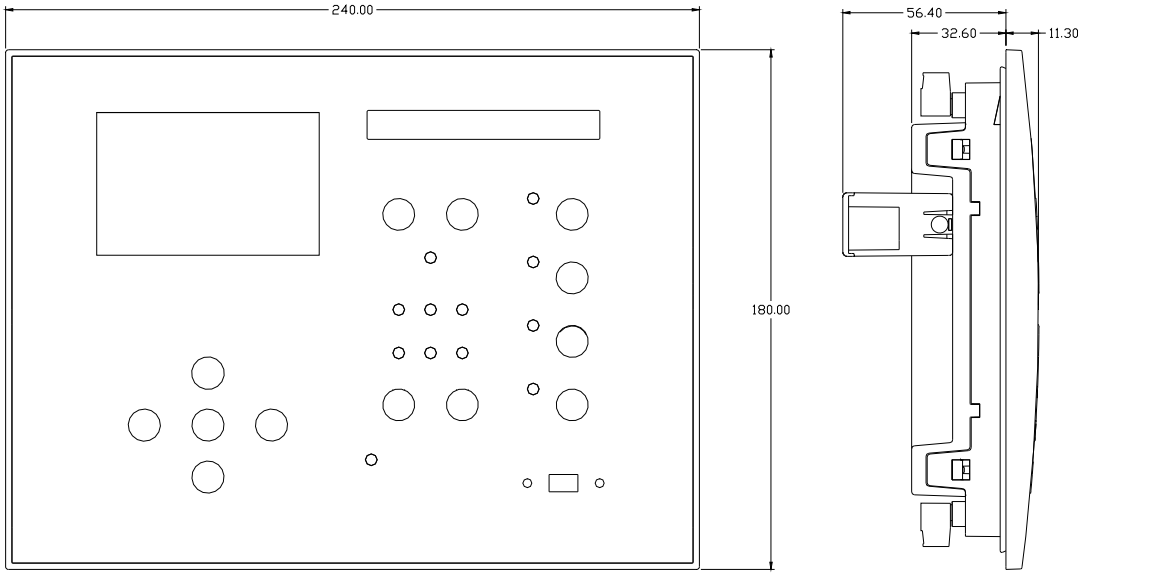
RS-485 serial interface

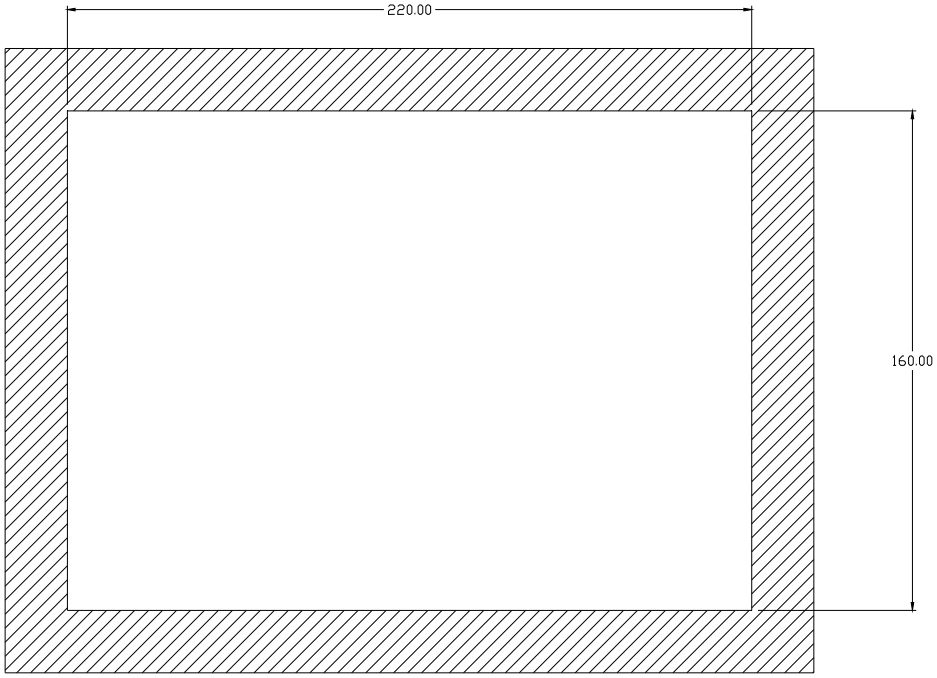


[Terminal arrangement]



Mechanical dimensions and panel cutout





AC power: terminals 53, 54	
Us rated voltage	100 – 240V~
Operating limits	90 – 264V~
Frequency	45 – 66Hz
Drawn/dissipated power	100V~ 12,5VA, 7W 240V~ 16,5VA, 7,3W
Micro-interruption immunity time (without expansion modules)	≤40ms (110V~) ≤200ms (220V~)
Micro-interruption immunity time (with 3 expansion modules)	≤20ms (110V~) ≤100ms (220V~)
Recommended fuses	F1A (fast)
DC Power: terminals 26, 27	
Rated battery voltage	12 – 48V=
Operating limits	7,5 – 57,6V=
Maximum drawn current	510mA a 12V= 260mA a 24V= 135mA a 48V=
Maximum drawn/dissipated power	6,5W
Recommended fuses	T3,15A (delayed)
Voltmeter inputs Line 1, Line 2 , Line3: terminals 1-4, 5-8 and 9-12	
Ue max rated voltage	600VAC L-L (346VAC L-N)
Measuring range	50…720V L-L (415VAC L-N)
Frequency range	45…65Hz – 360…440Hz
Measurement type	True RMS (TRMS)
Measurement input impedance	> 0.55MΩ L-N > 1,10MΩ L-L
Connection modes	Three-phase line with or without neutral balanced three-phase
Current measurng inputs: terminals 13-18	
Ie rated current	1A~ o 5A~
Measuring range	For 5A range: 0,02 – 6A~ For 1A range: 0,02 – 1,2A~
Input type	Shunt resistors powered by external low voltage current transformer (5A).
Measurement type	True RMS (TRMS)
Permanent thermal limit	+20% Ie
Short duration thermal limit	50A for 1 sec
Burden	<0,6VA
Measurement accuracy	
AC voltage inputs	±0,25% f.s. ±1digit
Digital inputs: terminals : 39 – 47 and 48-52	
Input type	negative
Input current	≤8mA
Low input signal	≤2,2V
High input signal	≥3.4V
Input signal delay	≥50ms
RS485 serial interface: terminals 22-25	
Interface type	Isolated
Baudrate	programmable 1200…38400 bps
Real Time Clock	
Reserve charge	Back-up capacitor
Operation without power voltage	Approximately 14 days
Outputs OUT1, OUT3 and OUT5: terminals 55-56, 58-59 and 61-62	
Contact type	3 x 1 NO
Rating	AC1 – 12A 250V~ AC15 -1,5A 250V~
UL use data	B300
Maximum usage voltage	300V~
Electrical/mechanical time	$1x10^7$ / $1x10^5$ operations
Maximum current on terminals 55, 59 and 62	12A
Outputs OUT2, OUT4 and OUT6: terminals 56-57, 59-60 and 62-63	
Contact type	3 x 1 NO
Rating	AC1 – 8A 250V~ AC15 -1,5A 250V~
UL use data	B300
Maximum usage voltage	300V~
Electrical/mechanical time	$1x10^7$ / $1x10^5$ operations
Maximum current on terminals 55, 59 and 62	12A
Outputs OUT7, OUT9, OUT10 and OUT 11: terminals 19-21, 30-32, 33-35 and 36-38	
Contact type	1 in scambio
Rating	AC1 – 8A 250V~ DC1 – 8A 30V= AC15 -1,5A 250V~
UL use data	B300 30V= 1A Auxiliary duty
Maximum usage voltage	300V~
Electrical/mechanical time	$1x10^7$ / $1x10^5$ operations

Static output OUT 8			
Output type	NO		
Voltage range	10 – 30V=		
Maximum current	50mA		
Insulation voltage			
AC power			
Rated insulation voltage	Ui 250V~		
Rated impulse withstand voltage	Uimp 7,3kV		
Operating frequency withstand voltage	3kV		
Voltmeter inputs Line 1, Line 2 and Line 3			
Rated insulation voltage	Ui 600V~		
Rated impulse withstand voltage	Uimp 9,8kV		
Operating frequency withstand voltage	5,2kV		
Uscite OUT1-2, OUT3-4, OUT5-6			
Rated insulation voltage	Ui 250V~		
Rated impulse withstand voltage	Uimp 7,3kV		
Operating frequency withstand voltage	3kV		
Uscita OUT7, OUT9, OUT10, OUT11			
Rated insulation voltage	Ui 250V~		
Rated impulse withstand voltage	Uimp 7,3kV		
Operating frequency withstand voltage	3kV		
Uscite SSR OUT8			
Operating frequency withstand voltage	1kV		
RS485 serial interface			
	Towards Line1-2-3 inputs	Towards relay outputs and AC supply	Towards DC logic
Rated impulse withstand voltage	Uimp 9,8kV	Uimp 7,3kV	Uimp 7,3kV
Operating frequency withstand voltage	5,2kV	3kV	3kV
Ambient operating conditions			
Temperature of use	-30 - +70°C		
Storage temperature	-30 - +80°C		
Relative humidity	<80% (IEC/EN 60068-2-78)		
Maximum environmental pollution	Degree 2		
Overvoltage category	3		
Measurement category	III		
Climate sequence	Z/ABDM (IEC/EN 60068-2-61)		
Shock resistance	15g (IEC/EN 60068-2-27)		
Vibration resistance	0.7g (IEC/EN 60068-2-6)		
Connections			
Terminal types	Removable screw-type		
Wire cross-section area (min. and max.)	0,2-2,5 mmq (24÷12 AWG)		
UL use data Wire cross-section area (min. and max.)	0,75-2.5 mm² (18-12 AWG)		
Tightening torque	0,56 Nm (5 Lbin)		
Housing			
Installation	Flush mount		
Material	Polycarbonate		
Frontal degree of protection	IP40 on front, IP65 with optional gasket IP20 on terminals		
Weight	680g		
Certifications and compliance			
Certifications obtained	cULus –EAC		
Comply with standards	IEC/EN 61010-1, IEC/EN 61010-2-030, IEC/EN 61000-6-2, IEC/ EN 61000-6-4, IEC/EN 60947-1*, IEC/EN 60947-6-1*, UL508, CSA C22.2-N°14		
UL Marking	Use 60°C/75°C copper (CU) conductor only / AWG Range:18 – 12 AWG / tranded or solid / Field Wiring Terminals Tightening Torque: 4.5lb.in Flat panel mounting on a Type 1 or 4X enclosure		

*Warning: this product is designed for environment A. Using this product in the environment B may cause unwanted electromagnetic interferences; in this case the user may have to take adequate measures for their mitigation. Other requirements for ATSE are under study, such as the TSE with no-breaking transfer (transfer operation with closing before breaking).

Manual revision history

Rev	Date	Notes
00	28/07/2015	• First release
01	05/10/2015	• Updated alarms default
02	03/12/2015	• Updated technical data
04	09/03/2016	• Description of NFC programming • Added functions to the input function list. • Added functions to the output function list • Added parameters P02.37, P02.39, P02.40, P07.n.10, P07.n.11, P07.n.12, P09.n.19, P09.n.20. • Added alarms A35, A38 • Added indication of parameters that can be accessed with user password rights.
5	29/04/2016	• Update of parameter description