User's Manual

CE

DAS-8000

Ver 2.5

Contents

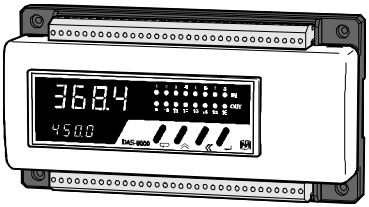
Introduction

General description

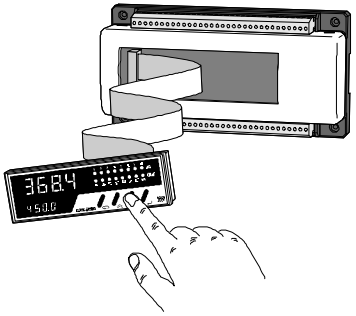
The **DAS-8000** module is a digital and analog signal acquisition device, which can function in an autonomous way, or supervised by an intelligent system (PC, PLC, etc.).

It accepts up to 8 analog inputs configurable for Pt-100, 0..4-20 mA., 0..10-50 mV and 8 thermocouples for 4-20 mA. Inputs from non- linearized converters, (E, J, K, T, S, R, B and N).

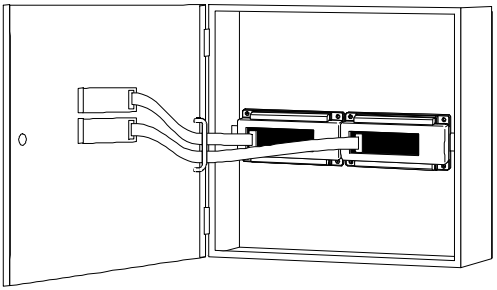
It has 8 digital inputs to capture logical data (Alarm recognition push-buttons, contacts, proximity detectors, etc.), and also has 8 digital outputs, that can be used as alarm outputs of the analog inputs, or controlled via remote control by communication with the central unit.



The DAS-8000 module has a detachable front panel with a display and keyboard for monitoring measurements. It can also function without the front panel, and is able to display data from other DAS-8000 modules, through the communications bus or supervisory PC.



This multifunction terminal can be removed from the main body, which allows you to mount it in the front panel, placing the main block of the DAS-8000 on the back as endpoint connection of the signal lines.



Communication among DAS-8000 modules is performed in RS-485 protocol, enabling the connection of a maximum of 32 instruments in the same communications line (it can reach 255 units using preamplifiers or RS-485 multiplexes). Thereby, it is possible to achieve a high level of immunity from electrical noise and industrial parasites.

One selectable serial port are available for communications with the Supervisory PC:

- RS-232 When you have only one DAS-8000 at a distance of less than 15 meters.

- RS-485 If there are two or more DAS-8000 modules in the network at a distance of over 15 meters (maximum 1200 m.).

It has a second RS-232 channel specifically for the connection of a serial printer. Data and measurements in tabular format are sent via this channel to generate printed reports, either manually or automatically, at a predefined time.

The management of the data and measurement acquired by the DAS-8000 modules, from a PC, is handled by the **PROASIS DAS-Win** software program, that is a SCADA application under Windows, composed of a series of supervision and control programs for industrial processes.

Versions

Basically, there are 2 versions:

- **DAS-8000** . Version with removable terminal (display and keyboard). It includes **PROASIS® DAS-Win** data management software.

- **DAS-8000 /ND** . Version without front panel terminal.
  It also includes the **PROASIS® DAS-Win**. management software.

It exists also two sets equipped with different elements:

- **DAS-8000 /KE**. EVALUATION KIT Version.
  This version includes all required items to make a system operational in a just a few minutes in order to evaluate all its features. The kit also includes the **PROASIS® DAS-Win** software preconfigured.

- **DAS-8000/DEMO KIT**. DEMO version.
  The specific suitcase apart the DAS-8000 module it includes different probes, 4-20 mA transmitters, light indicators, acoustical, etc. for a practical demonstration of DAS-8000 possibilities. Also includes the preconfigured PROASIS DAS-Win software suite.

Improvements and added features in version 2.5

As a general features to highlight in version 2.5 in relation to 2.1 version these are as follows:

- Display controlled by new microprocessor that allows to achieve until 2 m between display and main PCB by means of twenty-way, flat cable.
- New kind of alarm activated: Inverted window alarm (Explained in detail in paragraph **Alarm type selection** of **Configuration** chapter).
- A new option is added to **Delay of alarm activation** with selectable time between 0 and 9999 seconds. (Option explained in detail in paragraph **Alarm parameters** of **Configuration** chapter).
- Modification in criteria of switch on the OUT leds in display unit, these will show the status behind the digital output inverter in place of the front part (See the two **Action** diagrams: local and remote in **Configuration** chapter).
- Modification of adhesive template indicating connections (Possibility of write up the communications address and tag numbers of the whole analog inputs).
- Terminal block for mains power in different colour to minimize the risk of wrong connections.
- Five-way terminal blocks in place of eight-way, that allows to connect/disconnect exclusively two analog inputs.

- **IMPORTANT REMARK:**

Display Hardware has been modified and is NOT compatible with early versions and neither can be connected the early display units on DAS-8000 version 2.5 modules.

DAS-8000 ver 2.1

The DAS-8000 ver 2.1 has been updated, compared to version 2.0 in the following:

- PASSWORD Function for Alarm Configuration: A new PassWord, PASL, different from the general one is required to make up any changes in Alarm parameters, (SetPoint, Hysteresis, Status).

Improvements and added features in version 2.0

The main improvements of version 2.0 compared to 1.0 version are as follows:

- COUNTER function: Allows enabling of two digital input counters, with on-display indication and reset, disable and alarm SetPoint functions.
- Automatic unit change from Degrees Celsius to Degrees Fahrenheit.
- Alarm Acknowledgement function.
- On-display Communication test.
- Operation test for all display segments and LED's.
- Alarm dumping to a direct printer as they occur.
- Analog channel dumping to the printer by remote control (by turning a digital input on).
- UNDE and OVER indication on display when the user-selectable range is exceeded.
- Thermocouple linearization, (T, J, K, E, N, S, R and B) for 4-20 mA inputs from non-linearized converters.
- Linearization of one user curve (accessible through a communications link).
- Temperature Pt-100 range increase from -50 / 400 degrees Celsius to -150 / 600 degrees Celsius (-199 ºF / 999 ºF).
- Software version is displayed when turned on.

- Clamp selections straps to configure communication baud rate and RS-232/RS-485 port selection are located on the printed circuit component side (making it unnecessary to remove the circuit from its base and solder the straps).
- There are 2 “Jumper” contacts for analog input setting instead of 3.
- CE marked

Each of these new features is explained in the Operation Section, in the respective paragraph.

How this manual is organized

This manual is divided into eight chapters, that as a group describe from the installation and management, to the maintenance. The following describes the content of each chapter:

Introduction

A short explanation of the general description of the **DAS-8000**, as well as of the organisation of this Manual.

Installation

Information on how to carry out the installation of the module in different assemblies, the general precautions that should be taken, and the applications supported.

Description

Detailed description of the parts that compose the **DAS-8000**, its interior, and the different configurations that can be established.

Instructions for Use

Detailed explanation for a routine use, as well as when modifying the starting configuration.

Configuration

Detailed explanation of all the parameters that can be configured, both for a routine use, as well as when modifying the starting configuration.

Calibration

Process of setting and calibration of the analog inputs of the **DAS-8000** modules. Independently of the original calibration, this procedure explains how to perform a recalibration.

Communications

All the possible types of communications of the **DAS-8000** module with different systems are explained, whether it be with a PC, a printer or a network of **DAS-8000** modules. It describes how to perform the communication, diagrams of the different connections, etc., and finally, the list of memory addresses where to read and/or write data.

Maintenance

The last chapter, in which the message codes of the display are referenced, possible damages and the preventive maintenance that the **DAS-8000** modules should have. It includes some appendices with the technical specifications and the Hexadecimal Code tables used to number the **DAS-8000** modules.

Contents of the box

Standard versions

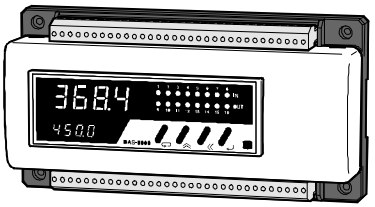
For regular applications, you can select one of the following versions:

- **DAS-8000**

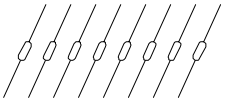
- **DAS-8000 /ND**.

Any of these versions includes the following material:

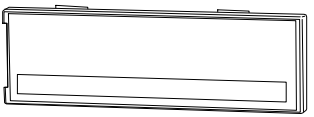
- 1 DAS-8000 Unit with neutral configuration.



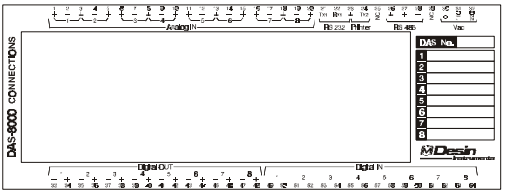
- 8 SHUNT resistances of 2.5 Ohm, for mA inputs.



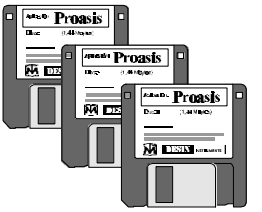
- 1 Protection Cover for the DAS-8000 with the front panel removed.



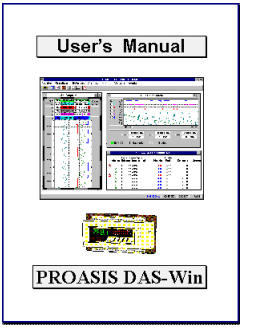
- 1 Adhesive template labelled to indicate the connections.



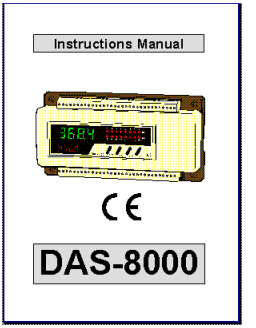
- Diskettes containing the **PROASIS® DAS-Win** software.



- 1 User's Manual for **PROASIS® DAS-Win** software.



- 1 DAS-8000 Instruction Manual.



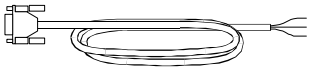
EK Evaluation Kit

The version EK is a presentation in the form of a kit prepared with all that is needed to evaluate the capabilities of the DAS-8000, including the standard **PROASIS® DAS-Win** software. This kit provides everything needed to make the equipment operational, connected to a PC under Windows, in order to learn all its capabilities.

The material includes is the one regarding to the standard version as well as the following parts:

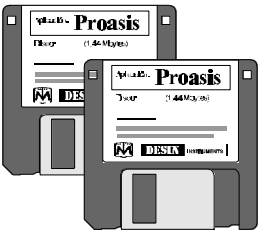
- 1 Main Power cable.

- 1 RS-232 Connection Cable to PC, with a 9-pin connector and one 9- to 25-pin adapter.



- 1 Pt-100 temperature probe including Connection Cable.

- Diskettes containing the software **PROASIS® DAS-Win EK version**.



- A Quick guide for users of the DAS-8000 Evaluation Kit.

In this version, the DAS-8000 module is supplied with a standard configuration, which conforms to the most common industrial processes.

(These configurations are completely accessible and can be modified by the user).

Preset Configuration

Each DAS-8000 module is supplied with a standard configuration, as follows:

Password: 0000 **(pass=0000)**
Alarm Password: 0000 **(pasl=0000)**

Configuration of analog channel parameters		
Analog Inputs Ch. 1 to 4:	Pt-100.	**(ch xt=0211)**
Analog Inputs Ch 5 to 8:	4-20 mA.	**(ch xt=0201)**
Ranges (only for linear):	0.0 - 100.0	
Ranges (Pt-100):	-150.0 - 600.0 ºC	
Indication Offset:	0.0	
Peaks Filter:	0 (Disabled).	
Average Filter:	2.	
Number of decimals:	1.	

Notes: **CH xt=0211 and 0201** are the channel configuration codes.

Alarm parameters configuration		
Setpoints:	Not Configured.	**(sP=xxxx)**
Hysteresis:	0.5	**(hy=005.0)**
Status :	ON (Active).	**(st=on)**
Type of Alarms:	1 (Maximum + without Acknowledge).	
Analog Channel:	Each Alarm loop number is assigned to the same Analog Channel number.	
Digital Input:	The Digital Input number 1 is configured to disabling all the alarms.	
Digital Output:	Each alarm loop number is assigned to the same channel number of digital output.	

Delay in alarm activation: 0 (instantaneous), in all channels.
(al x=1xx1 ; x is a value between 1 and 8)

Temperature Unit Configuration

Degrees Celsius (ºC)

Counters Configuration

Counter Enable:	0 (Off)
Memory Access:	0 (No access).
Preset Digital Output:	0 (No Output).
Control Digital Input:	0 (Disabled).

Alarm Acknowledgement set-up

Acknowledgement digital Input:	0 (Non Assigned)
Acknowledgement digital Output:	0 (Non Assigned).

Digital Outputs

Type of Digital Output:	LOCAL.	**(doxt = al)**
Status of Security:	0 (OFF).	
Active Security:	1 (Watch-Dog Active).	
Initial State:	0 (OFF).	
Output Inversion:	0, DIRECT Action, (Led On, contact closed).	

(do x c= 0100 ; x is a value between 1 and 8)

Communications

Type:	SLAVE.	**(mo = S)**
Output:	RS-232 (see chapter “Description in the User’s Manual”)	
Address:	1.	**(co ad=0001)**
Speed:	9600 bauds.	**(co sd=0000)**

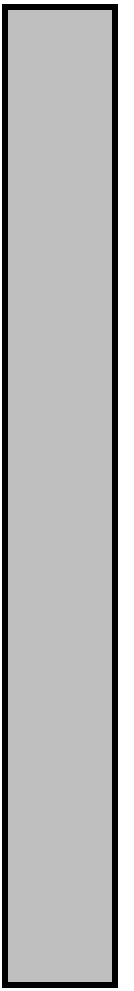
Printer Configuration		
Cycle Time:	3600 seconds.	**(pr cy=3600)**
First Module:	1.	**(pr fr=0001)**
Last Module:	1.	**(pr la=0001)**
Communications:	9600 bauds, 8 data bits, NO parity, 1 Stop bit.	**(pr c=0000)**

Alarm or Measurement printing Set-Up	
Remote measurement printing digital input:	0 (No printing)
Alarm Printing:	0 (Off)

NOTE:

- This configuration is totally modifiable by the user.
- See chapter “Instructions for Use” in the User’s Manual.

Installation



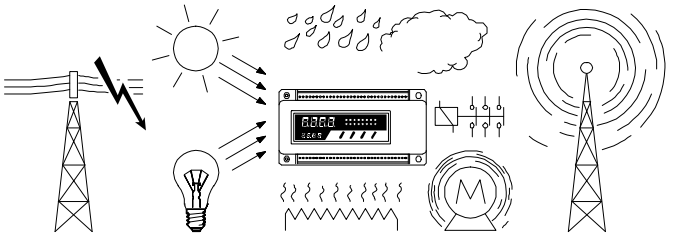
Precautions

NOTE:

- This equipment complies European Security Standards and **ECM** requirements. Nevertheless, it is responsibility of the installer to ensure the continuity of the fulfilment of this regulation for the rest of the installation.

The elementary installation standards for equipment controlled by a microprocessor, can be outlined in specific assembly precautions and general precautions in the electrical installation. The descriptions of such precautions are outlined in the following sections.

Precautions in the Assembly Area



- Avoid direct, intense sources of light.
- Find a location free of corrosive vapours, leaks, humidity, large vibrations, etc.
- Keep the temperature around the instrument from exceeding 50°C.
- Stay away from sources of electromagnetic radiation, high tension radio frequencies, microwaves, etc.

Precautions when connecting equipment

Before connecting to the electrical power or inputs and outputs, study carefully the wiring data.

It is advisable to carry out the wiring as much as possible according to the recommendations outlined below.

IMPORTANTS NOTES:

- DO NOT APPLY INPUT VOLTAGES OVER 5 Vdc DIRECTLY TO THE ANALOG INPUTS !!!
  Take special care when connecting 0..4-20 mA. signals to the analog inputs, since if a 2.5 Ω SHUNT resistor is broken, has a false contact or simply is not connected in parallel to the analog channel input, this channel will receive the 0..4-20 mA loop power supply voltage (generally 12 or 24 Vdc) directly, thus damaging the input circuit.
- If you will be measuring a signal of more than 50 mV, use a voltage divider at the channel input.
- An inadequate installation would leave the module exposed to transitory and parasite current of the power grid, that would be evidenced by frequent blinking in the display with a momentary display of the initialization message, or of a supposed line breakdown ERR 1).
- To protect the module and the process being supervised, the circuit has a security system called **Watch-Dog**, that detects any anomaly in the functioning of the microprocessor, caused by parasite current in the lines, re-establishing the standard status immediately after the error message.

Connecting to the Main Power.

- The electrical power of the modules should be as direct as possible from the general distribution panel, with a star-shaped distribution (to avoid the electrical power in parallel with other electrical equipment).
- Avoid the electrical power of the coils of the relays, contacts, etc., by not using the same network line as the instruments.

- In the event of a very disturbed network (due to power units, resistances for example), feed the instrumentation part through an insulation transformer, with the screen connected to ground.

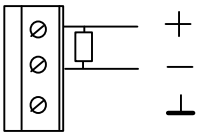
Connecting the transducer input.

- Separate physically throughout the whole trajectory, the signal lines (Pt-100, mA, mV), from the power lines or command relays, contacts, servomotors, actuators, etc.
- Use different and independent channels and conductors.
- For large signal line lengths, use cables with twisted and shielded wires.

IMPORTANT NOTE:
The screen should be connected to the ground at a single point pertaining to the reception area of the signal, in other words, a ground terminal near the instrument.
DO NOT CONNECT TO GROUND THE 2 END POINTS OF THE SHIELD.

- For **Pt-100** inputs: Use 3-wire copper cable to compensate for the errors caused by the parasite resistances of the connection cables of the probe (use a section of 1.5 mm^2 minimum).
- For **mV** inputs: Use copper cable of 1.5 mm^2 in section as a minimum. Respect the polarity.
- For **mA** inputs: Use copper cable of 1.5 mm^2 in section as minimum.

Respect the polarity and add in parallel with the input terminals a Shunt resistance of 2.5 Ohms (that are included with the module).



Connection to Ground.

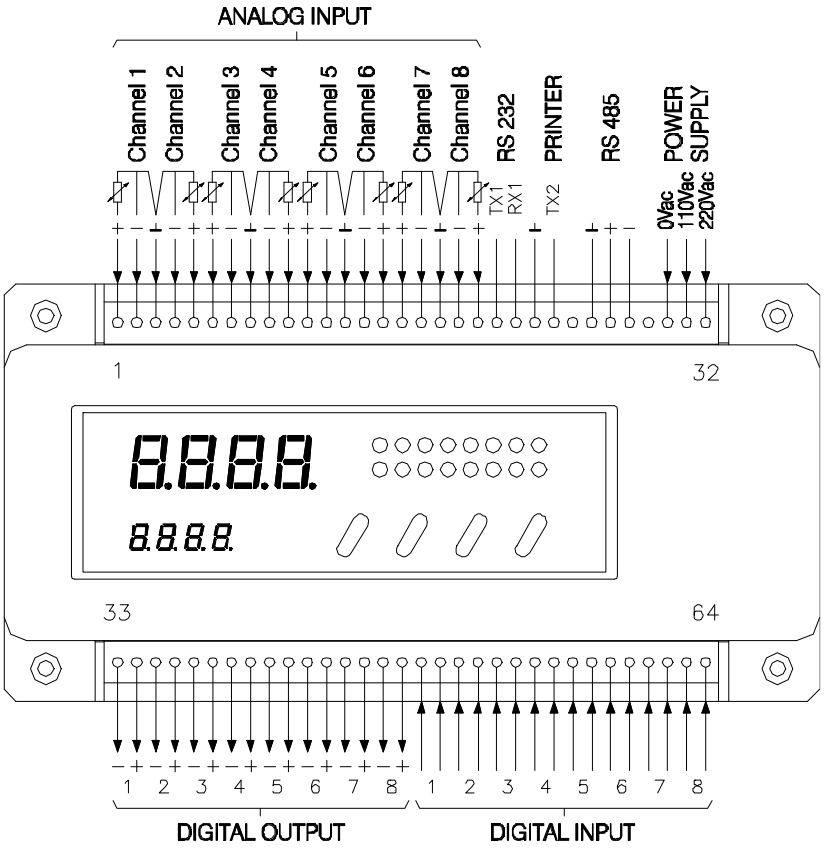
- The DAS-8000 modules do not have ground connections due to the total absence of metallic parts in their housing. Nevertheless, it is advisable to place near the module some general ground terminal to connect the shield screens of the connection or signal communication cables.
- In any installation, the ground terminals of the modules should be joined in the shape of a star on one point of the installation (metallic mass), with a conductor from the same section as the electrical power wires.

Digital serial communication.

The connection of the communications must be done with twisted and shielded cable. The shield should also be connected to ground.

General precautions

- Before connecting to the electrical power grid, or inputs and outputs, examine carefully the connection data label.



Assembly

The DAS-8000 modules allow you to mount it in different ways, achieving in any event a reduction in the cabling distance with a saving of time and space in the execution of mounting panels.

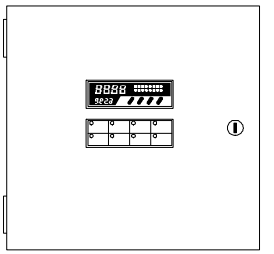
Assembly types

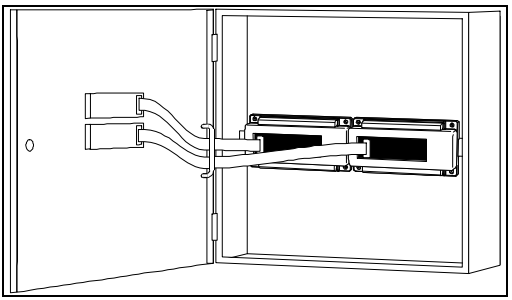
In DIN rail on mounting panels:

The format of the DAS-8000 allows you to mount it on DIN rail or screw it to the assembly plate.

The detachable front panel display, allows the separation from the main block, so that it can be mounted on the door of a mounting panel, leaving the main block of the DAS-8000 in the rear panel for the signal and control lines.

(The flat cable it can be enlarged until 2 m. length).





Assembly in standard electric connection box.

Its special design allows it to be mounted in a standard connection box of the type used to house magnetothermic devices and switches, salient or embedded, adjusting in measurements to the cut-off window of the covers of said boxes.

For this assembly, dismount the terminal front panel and exchange the direction of the circuit of the internal display.

Direct assembly on a wall.

Under certain working conditions and in clean environments, the DAS-8000 module can be held (or embedded) directly in a wall, avoiding the annoying control panels, necessary, nevertheless, in aggressive environments.

DETACHABLE TERMINAL DISPLAY

It is an indistinct and separable unit, embedded in the protecting front panel of the DAS-8000.

It is used to display the readings of the measured variables and the logical data collected by one or several modules, or to modify the general configuration of the DAS-8000 user parameters.

Its design allows it to be separated from the main block to use as:

- Interchangeable unit for local configuration of modules without display DAS-8000/ND.
- Presentation of the measured variables in an accessible zone other than the location of the DAS-8000.

EXTRACTION OF THE FRONT PANEL DISPLAY

The terminal display can be separated from the main block by removing it from its lodging in the front panel of the DAS-8000 module.

For this reason, the terminal has a flat cable with connectors at both ends, that allow you to disconnect it from the main printed circuit and to reconnect once it is located in another panel.

To remove it from the front panel of the DAS-8000, proceed as follows:

1) Remove the front panel protection of the DAS-8000 freeing the accessible anchorages from the outside.
2) With the protection of the DAS-8000 in your hands, observe in the interior the 4 anchorages, two on each side of the terminal display, that hold it in the opening of the front panel.
3) Proceed to press with a wide screwdriver, in order to free the terminal and remove it through the front.
4) After removing the terminal display, put the protection back on the DAS-8000, and plug the flat cable into its connector.
5) Close the opening with the front panel cover that is supplied with the DAS-8000, ensuring that the flat cable comes out through the opening provided at the end of the cover.

INVERTING THE DETACHABLE TERMINAL DISPLAY

The detachable terminal display is designed to have two front panel measurements (48 x 144 mm and 45 x 144 mm) based on the type of opening it is intended for.

Standard, it is supplied with the 48 x 144 mm size designed to be embedded in front of a panel with an opening of 45 mm high x 144 mm wide.

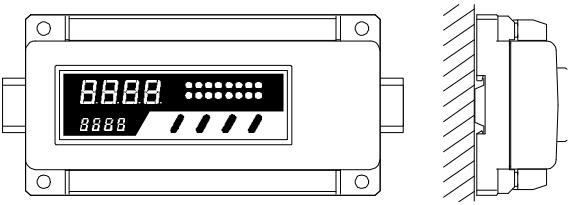
Nevertheless, the appearance of the display can be inverted to have front panel dimensions of 45 mm x 144 mm, enabling you to adapt it perfectly to the opening of a standard connection box of the type used for magnetothermic, switches, etc.

To invert the position of the display, you should proceed as follows:

1) Remove the terminal display by removing it from the front panel protection of the DAS-8000, as explained above.
2) Disconnect the flat cable from both sides: from its base, in both the main printed circuit and in the circuit display.
3) With the terminal display in your hands, observe that the back part is protected by an adhesive coat of polyester. Pull it off with care, and you will have access to the holding screws of the two parts of the terminal and the circuit display.
4) Unscrew them with a 5 mm screwdriver to separate the parts of the terminal and remove the circuit display.
5) Once you have removed the circuit display, put it in place inverting the position, ensuring that the connector of the flat cable remains lined up with its opening and screwing it in again.
6) Replace with care the adhesive templates of the terminal, and relocate the terminal display, this time, within the front panel protection of the DAS-8000. Connect the flat cable to both connectors.
7) Mount the front panel protection on the DAS-8000 again, this time with the terminal coming from the inside, thus allowing the module to fit in standard boxes, with a 45 mm opening.

ATTACHING AND DETACHING SYMMETRICAL DIN RAIL

DIN rail Assembly: DIN 46277/3 (IN 50022) Standard



Observe the DIN rail anchorage system of the DAS-8000. You can see that a retractable bolt exists, that is accessible from the outside, visible from the front on the lower part of the DAS-8000 module.

ATTACHING

First, place the DAS-8000 module hanging from the DIN rail by the upper clamps of the back guide. Next, squeeze from the front so that the bolt blocks the lower part of the DAS-8000 preventing it from freeing itself. If, due to tolerances of the DIN rail, the bolt does not slide, help the attachment by keeping the bolt down with the help of a flat screwdriver. Once in place, free the bolt so that it will be anchored.

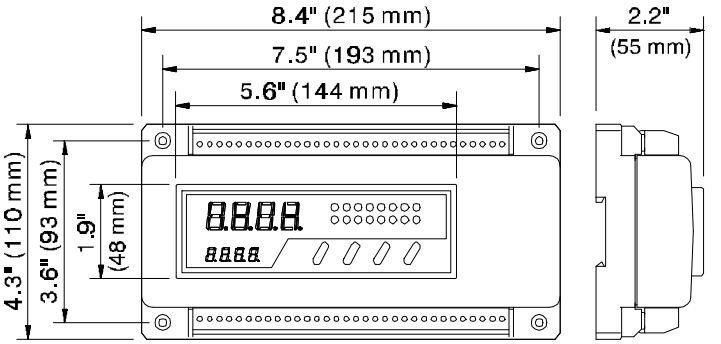
DETACHING

Through the lower part of the front panel, insert a screwdriver into the blockading bolt, pressing downward. Next, pull the DAS-8000 gently, and lift it to free it from the rail.

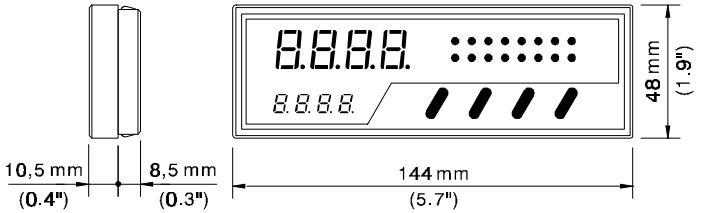
NOTE:

Disconnect the terminal connector cables before performing this operation.

Dimension and openings in panel.

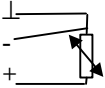


Box of nonflammable thermal plastic.
Weight of the complete instrument: 710 g.
Weight of the display alone: 76 g.



Connections.

Analog input connections

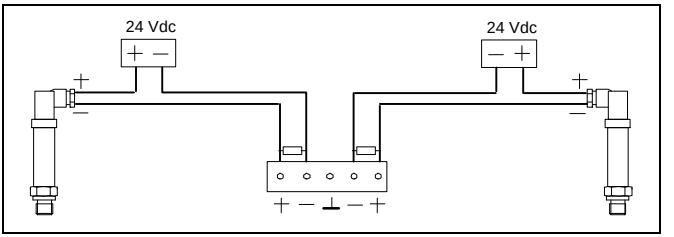
Analog input	Input Pt-100	Input mV.	Input mA.
Channel 1	1= + 2= - 3= ⊥ 	1= + 2= - 3= ⊥	1= + 2= - 3= ⊥ (SHUNT resistance of 2,5 W)
Channel 2	3= ⊥ 4= - 5= + 	3= ⊥ 4= - 5= +	3= ⊥ 4= - 5= + (SHUNT resistance of 2,5 W)
Channel 3	6= + 7= - 8= ⊥ 	6= + 7= - 8= ⊥	6= + 7= - 8= ⊥ (SHUNT resistance of 2,5 W)
Channel 4	8= ⊥ 9= - 10= + 	8 = ⊥ 9 = - 10= +	8 = ⊥ 9 = - 10= + (SHUNT resistance of 2,5 W)
Channel 5	11= + 12= - 13= ⊥ 	11= + 12= - 13= ⊥	11= + 12= - 13= ⊥ (SHUNT resistance of 2,5 W)
Channel 6	13= ⊥ 14= - 15= + 	13= ⊥ 14= - 15= +	13= ⊥ 14= - 15= + (SHUNT resistance of 2,5 W)
Channel 7	16= + 17= - 18= ⊥ 	16= + 17= - 18= ⊥	16= + 17= - 18= ⊥ (SHUNT resistance of 2,5 W)
Channel 8	18= ⊥ 19= - 20= + 	18= ⊥ 19= - 20= +	18= ⊥ 19= - 20= + (SHUNT resistance of 2,5 W)

Analog Inputs mA. Using the same power supply

In the case of mA. Signals coming from 2-wire transmitters powered with the same 24 Vdc power supply and are connected to the analog inputs of DAS-8000 module, the Shunt resistances should be connected between positive (+) and ground (⊥) terminals, instead of positive (+) and negative (-) terminals.

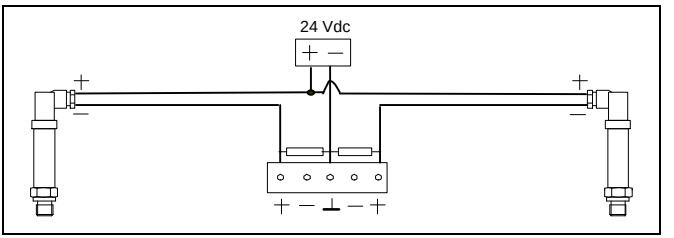
Example using independent power supply

Connection of two 4-20 mA. Signals coming from 2-wire transmitters to two analog inputs of the DAS-8000 module, powered with **independent power supply**.



Example using same power supply

Connection of two 4-20 mA. Signals coming from 2-wire transmitters to two analog inputs of the DAS-8000, powered with **the same power supply**.



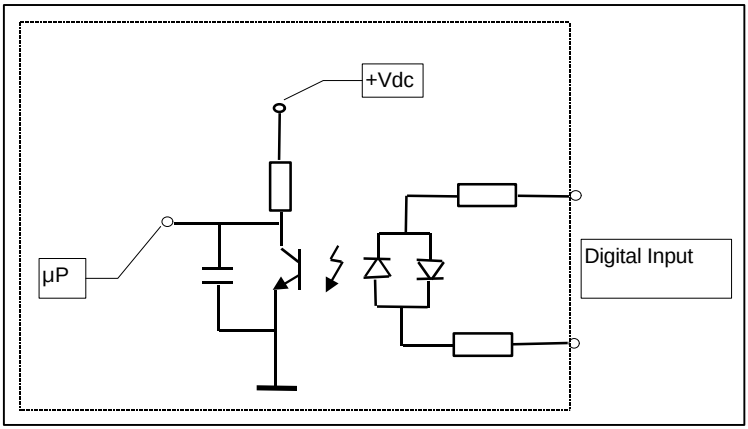
Digital input connections

The digital inputs allow you to detect HI logical signals between 12 and 48 volts, either in AC or DC.

Digital Input	Terminals
Digital input 1	49 50
Digital input 2	51 52
Digital input 3	53 54
Digital input 4	55 56
Digital input 5	57 58
Digital input 6	59 60
Digital input 7	61 62
Digital input 8	63 64

NOTE: The digital Inputs don't have polarity.

The electrical scheme of the digital inputs is as follows:



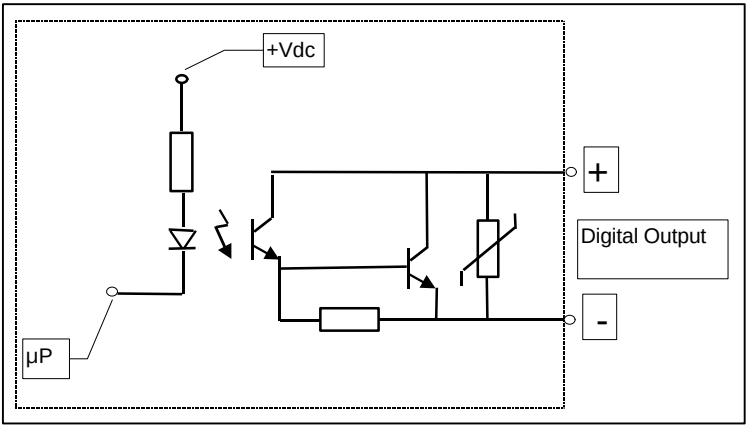
NOTE: The input impedance is approximately 12 KΩ.

Digital output connections

The digital output consist of an NPN transistor in an open collector, optically insulated and free of potential, allowing the switching of 100 mA loads with an external voltage of 48 VDC maximum.

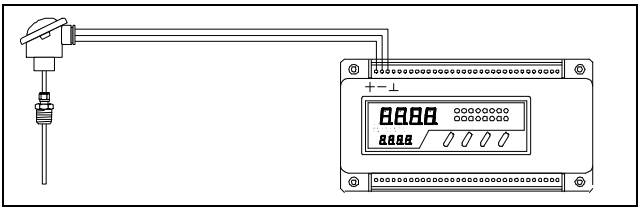
Digital Output	Terminals
Digital Output 1	33= - 34= +
Digital Output 2	35= - 36= +
Digital Output 3	37= - 38= +
Digital Output 4	39= - 40= +
Digital Output 5	41= - 42= +
Digital Output 6	43= - 44= +
Digital Output 7	45= - 46= +
Digital Output 8	47= - 48= +

The electrical scheme of the digital outputs is as follows:

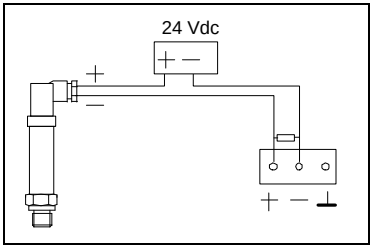


Examples of Connections

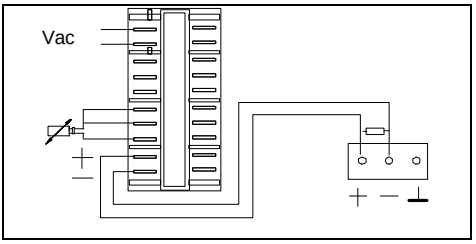
1) Connection of a Pt-100 Probe with direct output to an analog input of the DAS-8000 module.



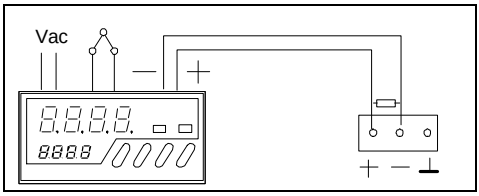
2) Connection of a 4-20 ma Pressure Transmitter. 2 wires to an analog input of the DAS-8000 module.



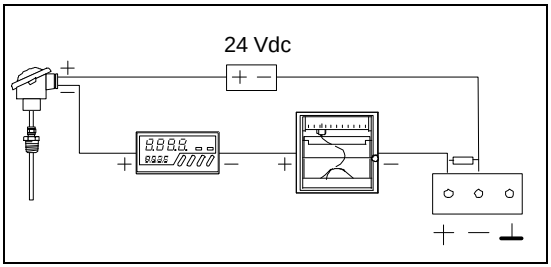
3) Connection of an RTD (Pt-100, Pt-1000, Ni 100, etc.) through a 4-20 mA Converter. 4 wires to an analog input of the DAS-8000 module.



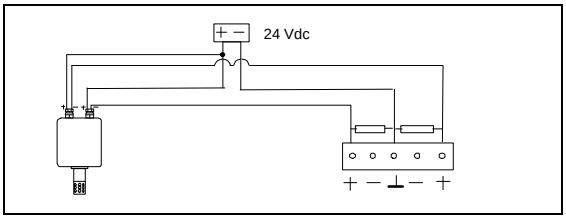
4) Connection of a Thermocouple through a retransmission 4-20 mA. output signal to an analog an Indicator with input of the DAS-8000 module.



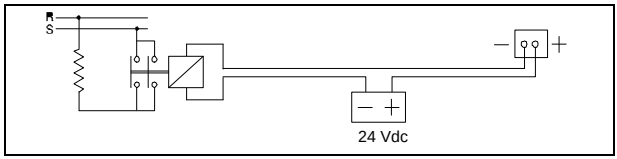
5) Connection of a temperature Transmitter with a 4-20 mA output converter in connection head. 2 wires (serial) to the analog input of the DAS-8000 in series with an indicator and a recorder.



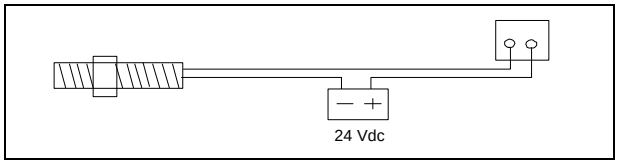
6) Connection of a double Temperature and Relative Humidity Transmitter, 4-20 mA 2 wire, to 2 analog channels of the DAS-8000 module.



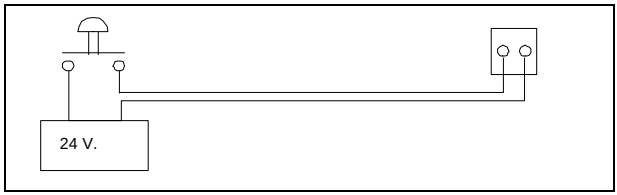
7) Actuation of a heating resistance from a Digital Output of the DAS-8000, through a 24 V relay or contact with external power supply.



8) Activation of a Digital Input of the DAS-8000 from a proximity sensor 2 wires (Namur, etc.) with an external power supply.



9) Activation of a Digital Input of the DAS-8000 through the signal of a push-button contact, with exterior power voltage from 12 to 48 Vac or Vdc.



Communications

In this section, there is a list of the connection terminals for the different types of communications available.

A more detailed explanation of the communications and of the diagrams of connections, will be found ahead, in the corresponding communications chapter.

RS-232 connection.

Signal	Terminals
Transmission **Tx**	21
Reception **Rx**	22
Ground **GND**	23

RS-232 connection to serial printer.

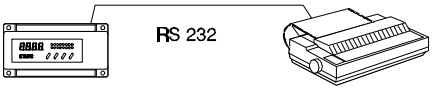
Signal	Terminals
Transmission **Tx**	24
Ground **GND**	23

RS-485 connection.

Signal	Terminals
+	27
-	28
Ground **GND**	26

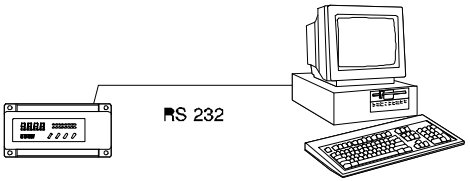
Communications architecture

The DAS-8000 can be used as an independent data acquisition system connected to a printer, dumping data periodically:

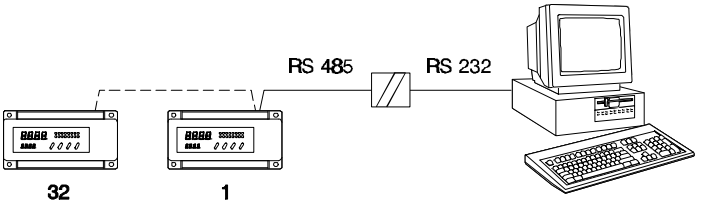


Another typical connection is the connection of one or several DAS-8000 modules connected to a central PC, supervising the measurements of the process:

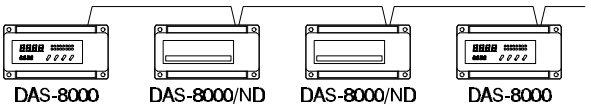
Connection of the DAS-8000 using RS-232:



Connection of a DAS-8000 network using RS-485:



DAS-8000 network connection, using RS-485, without PC:



Applications

The following are some of the applications for DAS-8000:

Measurement and data acquisition:

Research, Tests, Freezing chambers, Drying rooms, Butcher rooms, Pharmaceutical industry, Thermal processes, Industrial Processes in general, etc.

Supervising measurements:

Silos of grain or spoilable products, Level and tanks management, Fermentation process in tanks, Hotels, Intelligent buildings, etc.

Control:

Intelligent buildings, Air conditioning, Ceramic tunnel ovens, Painting, food industry, etc.

Management:

Productivity management, Time Counting, Presence control (by means of software on a PC).

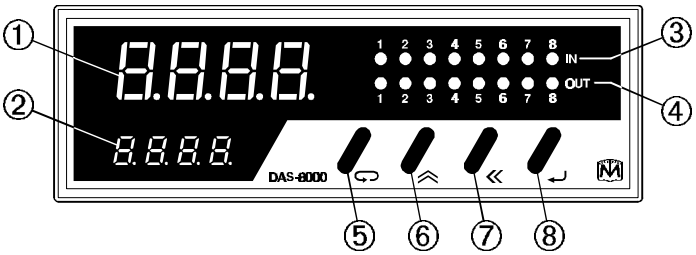
Description

Front panel description

The DAS-8000 has, in its complete version, a multifunction, detachable terminal, for data monitoring and parameter configuration. The display and keyboard are described in the following paragraphs.

Display

The data display is composed of 2 indicators of different sizes of 4 digits each, and also two 8 + 8 LED blocks:



- **1)** The main indicator (upper) consists of 4 green digits, 14 mm. high. It indicates the process value, the messages, and the configuration variables.

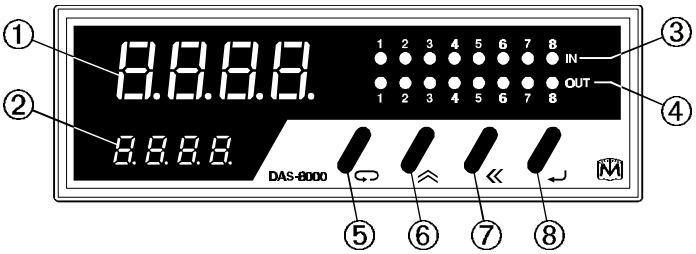
- **2)** The secondary indicator (lower), has 4 red digits, 7 mm. high. It indicates the channel number that is being displayed, the module number, and configuration messages.

- **3)** 8 LED, for the indication of activation or deactivation of the Digital Inputs (Lit = ON).

- **4)** 8 LED, for the indication of activation or deactivation of the Alarms (Lit =ON).

Keyboard

The keyboard of the removable terminal of the DAS-8000, consists of 4 keys situated under the LED, with the following functions:



- **5) FUNCTION / ESCAPE KEY**.

It has two functions:
- allows access to read the different channels, parameters, etc. of the display and configuration menus.
- allows you to exit in any branch of the menu tree.

- **6) INCREMENT KEY**.

It has two functions:
- Increments the value of the digit that is blinking (editing of the value), or selects menu positions.
- Allows manual printing.

- **7) SHIFT KEY**.

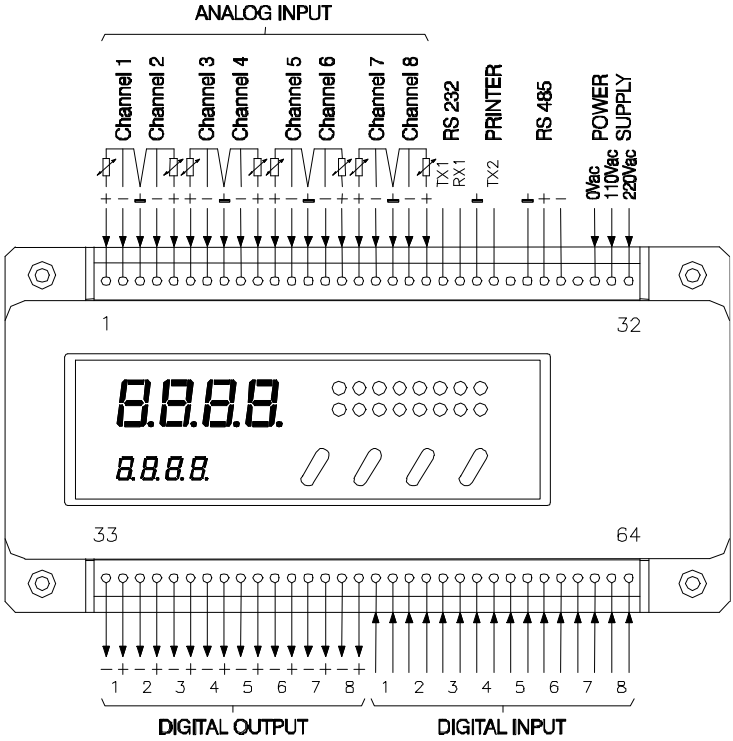
It has two functions:
- Allows you to select the digit to be edited, moving it to the left, enabling you to modify the value of a parameter with the **Increment** key.
- Activates/Deactivates the automatic scanning mode of analog inputs.

- **8) VALIDATION KEY (ENTER)**.

It has two functions:
- Saves the value that has been modified with the **Increment** and **Shift** key.
- Allows you to introduce the module number to be displayed.

Connection terminals

The DAS-8000 module has 2 rows of disconnectable terminals for wires of 2 mm. diameter.



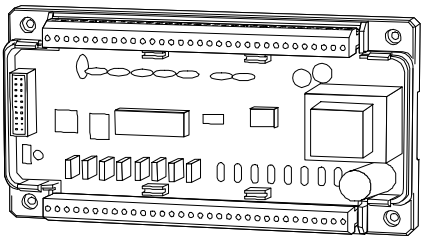
In the upper row, there are analog inputs connections consisting of 8 blocks of two terminals (+ and -) for mV or mA with shunt, sharing a third terminal, centered between every two channels, for line compensation in Pt-100 inputs.

It also has three terminal blocks for communications and a separate block for connection to the main power grid.

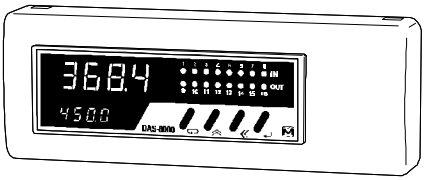
In the lower row, there are the digital input and output connections composed of two blocks of 8 channels with two terminals each one.

Inside

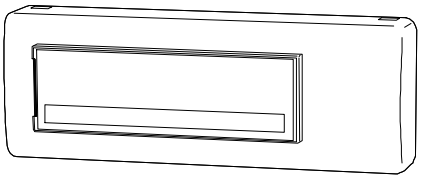
The module is composed of two well-differentiated parts: the removable front panel terminal (that consists of the keyboard and the display), and the main body with the module circuit, attached to the base.



The removable front panel is housed in a rectangular opening in the cover of the main body.



When the terminal front panel is not used jointly with the body, you need to close the housing opening with its protection cover that is included with each DAS-8000, that nevertheless, allows the passage of the Connection Cable when the front panel is mounted externally.

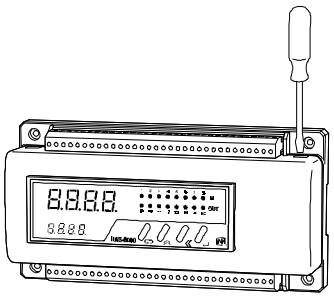


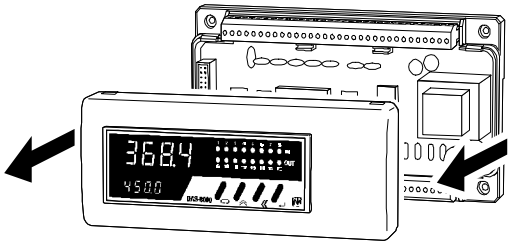
The electrical connection of these two parts (display and keyboard to the main circuit), is carried out with a flat 20-wire cable, integrated into the interior in a prefolded way.

How to open it

To open the instrument, you need to press any of the four clips placed at both sides of the base, that secure the upper cover of the module.

To push the clip towards the inside and free the cover, you can use a screwdriver, or even the fingers, removing the cover with the other hand.

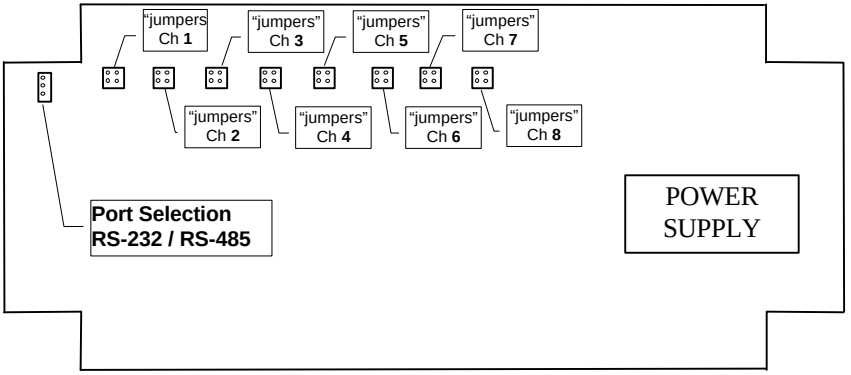




Analog input configuration “Jumpers”.

The DAS-8000 module allows you to configure from the keyboard **RTD** (Pt-100) or **LINEAR** (10-50 mV, 4-20 mA, 0-20 mA or Non-linearized thermocouples) signals, because they are shipped already calibrated. The adaptation of the input terminals for each type of signal depends on the positions of the internal jumpers of each channel.

When opening a DAS-8000 module and removing the cover, you will notice on the printed circuit board, on the side of the components, the layout of the jumpers for configuration of the analog channels, just as you see them in the following picture:



Each of the 8 channels has one disconnectable, black jumper, that should be connected according to the type of sensor used, as indicated in the following figure:

Pt-100 INPUT.

LINEAR INPUT. 10-50 mV.

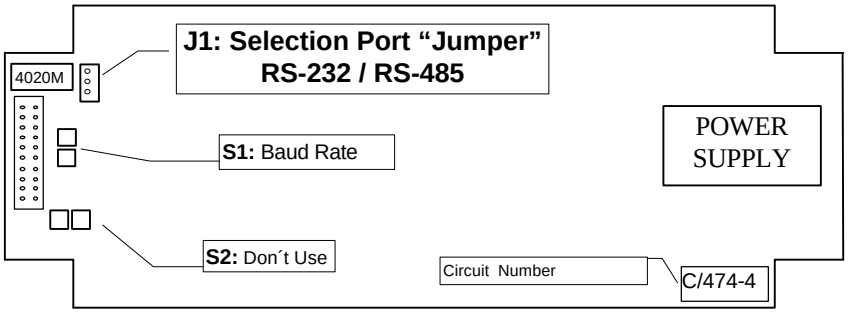
4-20 mA, 0-20 mA, Non-linearized thermocouples. (With SHUNT resistance of 2’5 W in parallel with input terminals).

Configuration straps and “Jumper”

The straps are small printed circuit board areas that allow you to join its edges by means of welding, in order to modify aspects of its operation.

To locate the Strap of the DAS-8000 related to the modification of the type and speed of communications, you need to access the circuit from the components side.

Locate the strap visually, just as you see them in the following picture (visually make sure the printed circuit number on the lower right side corresponds to the C/477-4 code):



Configuration of communication type

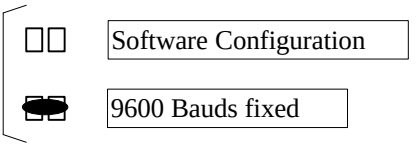
J1 Jumper: Setting pin layout for RS-232 or RS-485 output terminals.

The position of this "Jumper" allows you to select the RS-232 or RS-485 standard of communication, between the DAS-8000 module and the PC, determining at the same time the output terminals:
21, 22, and 23 for RS-232, or 26, 27, and 28 for RS-485.

Communication speed setup

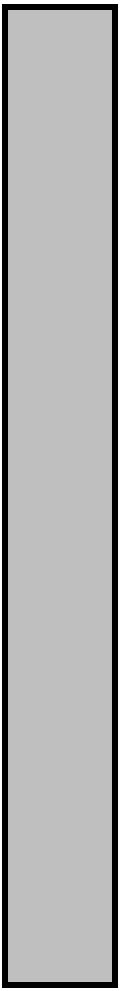
S1 Strap: Communications speed: Set to 9600 baud, or selectable from the configuration menu.

The joining of the S1 Strap will set the communications output. already in RS-232 or RS-485, to a speed of 9600 baud. Normally, this strap is open, thus allowing you to modify the communications speed by means of the configuration menu, selecting 9600, 19200 or 38400 baud.



S2 Strap: DO NOT USE.
The strap are reserved for future implementations and factory settings. They should not be modified.

Instructions for use



Menu tree

The operation of the DAS-8000 in its operational level, both in standard use, as well as in configuration, is based on 2 menus that allow you to have access to the totality of DAS-8000 functions:

- **Display menu:** It is the main operation menu, and the one that will be most frequently used. With it, you can access the viewing of the analog measurements and alarm parameter modification of the module being used, or of any another connected to the same communication network.

- **Configuration menu:** This menu allows you to access the parametrization and configuration of all the DAS-8000's available options. Access to the Configuration Menu is protected by means of the access password.

The following is a description of the two menus.

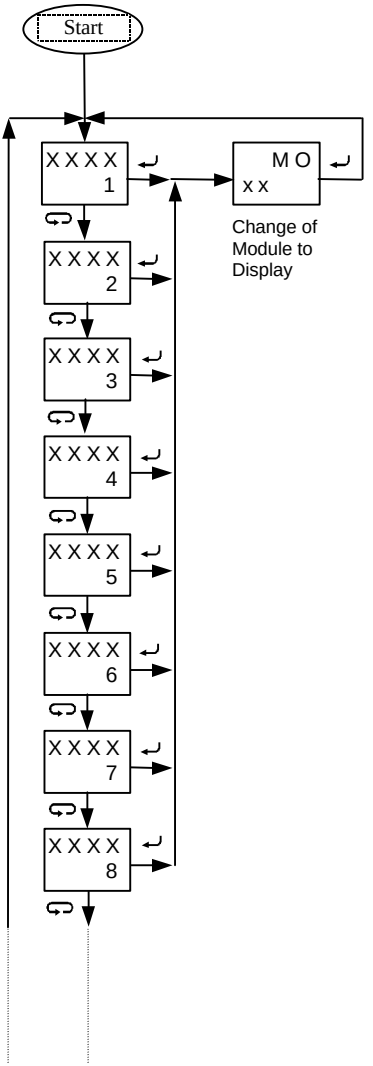
Display menu

The Display Menu appears when you start the module, allowing you to display the 8 measurements received by the analog channels, change the parameters most frequently changed in the configuration of alarms, setpoint, hysteresis, and status, (Password Alarm is required to enabled the access to alarm menu) and display the 2 counters.

The last level of the menu (PASS) requests the access Password to enter the configuration menu.

The diagram of operation of the Display Menu is shown in the following figure:

DISPLAY MENU



Display Channel 1

Display Channel 2

Display Channel 3

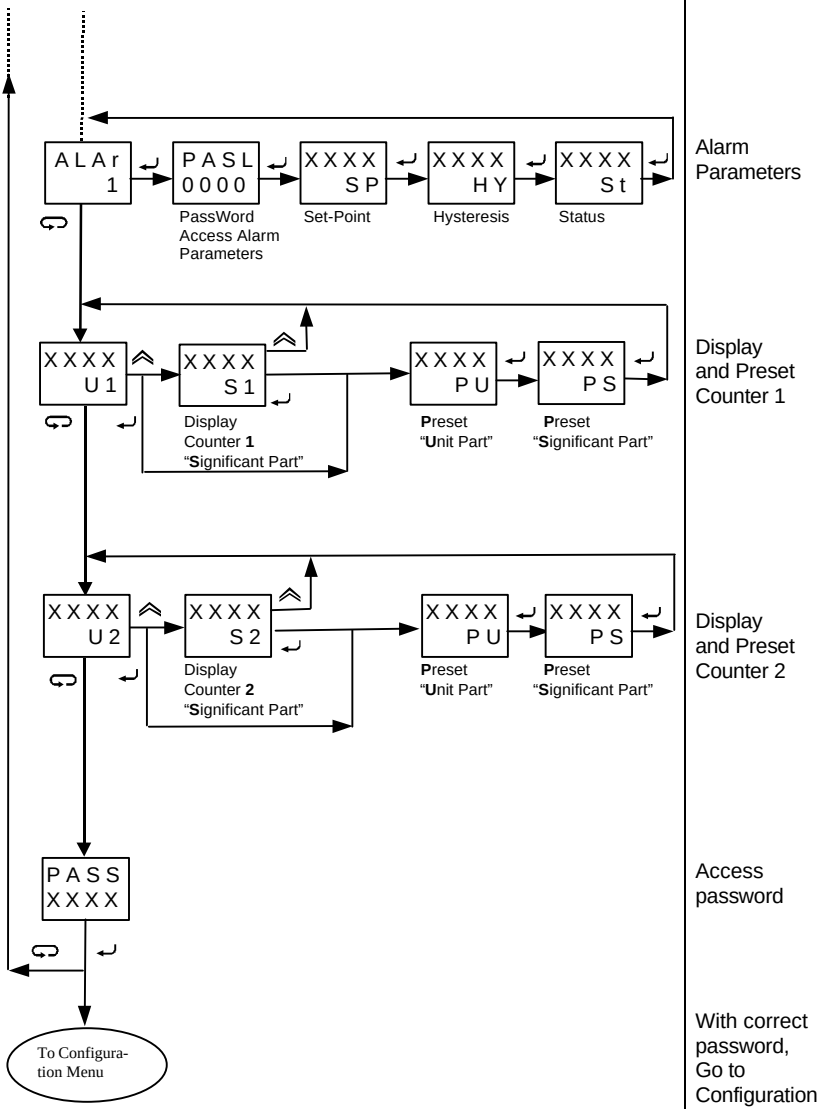
Display Channel 4

Display Channel 5

Display Channel 6

Display Channel 7

Display Channel 8



The operation of the Display Menu, is explained in the chapter, "Description of Display Menu Parameters".

Configuration Menu

The Configuration Menu displays upon introducing in PASS the correct access password. Through it you can modify all the parameters of the instrument (type of input, ranges, type of alarms, communications, counters and change of the access password), and to proceed to a recalibration of the analog inputs.

NOTES:

- The DAS-8000 is supplied without any PassWord (0000).
- To introduce a PassWord, refer to section "**Change of General PassWord**" in the "**Configuration**" chapter.

VERY IMPORTANT:

Access to the Configuration Menu is for exclusive use of the **instrumentation technicians and managers process**, because it enables you to modify important parameters, possibly including the decalibration of the analog inputs if a person without sufficient knowledge enters the calibration section.

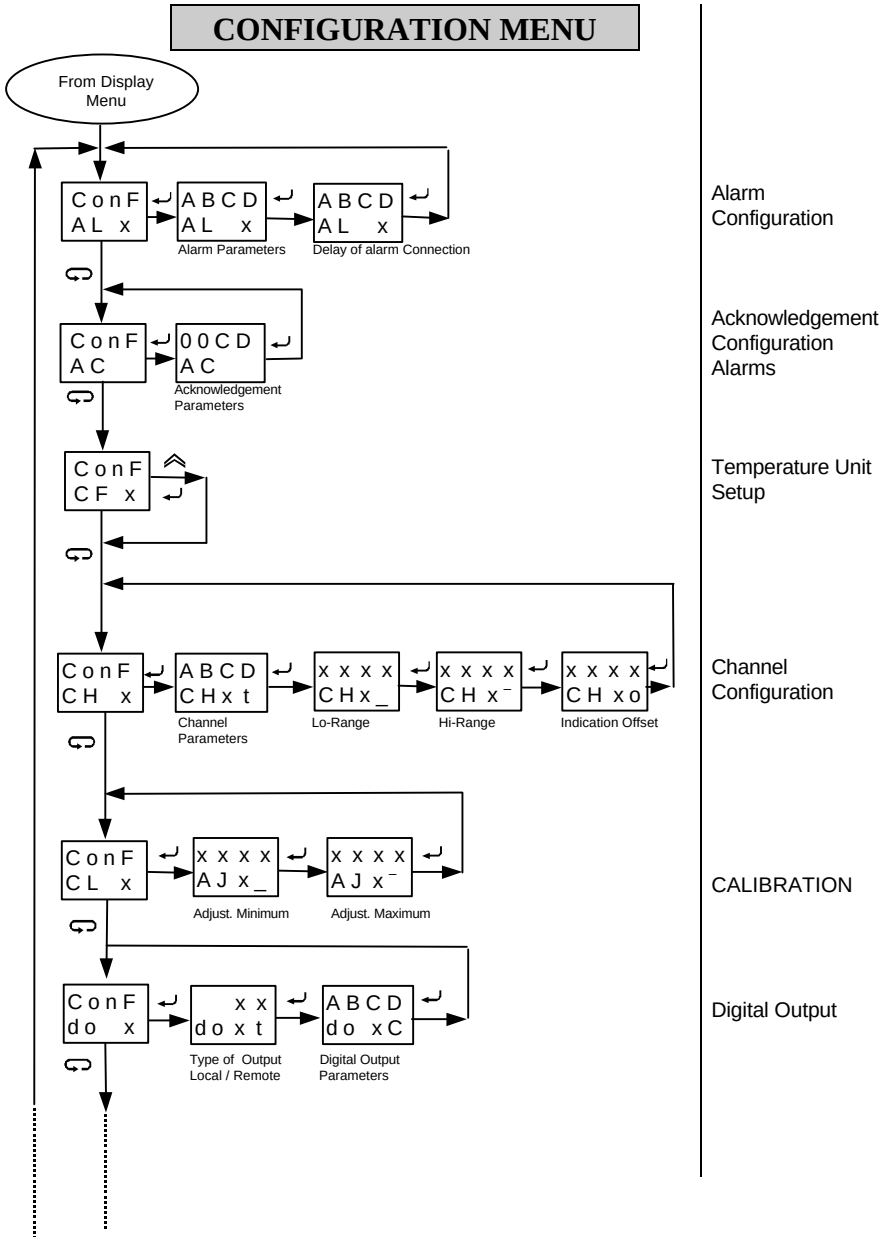
If you access the calibration menu without first connecting a signal generator to the inputs, do NOT press the **Validation** key. Exit with the **Function** key**.**

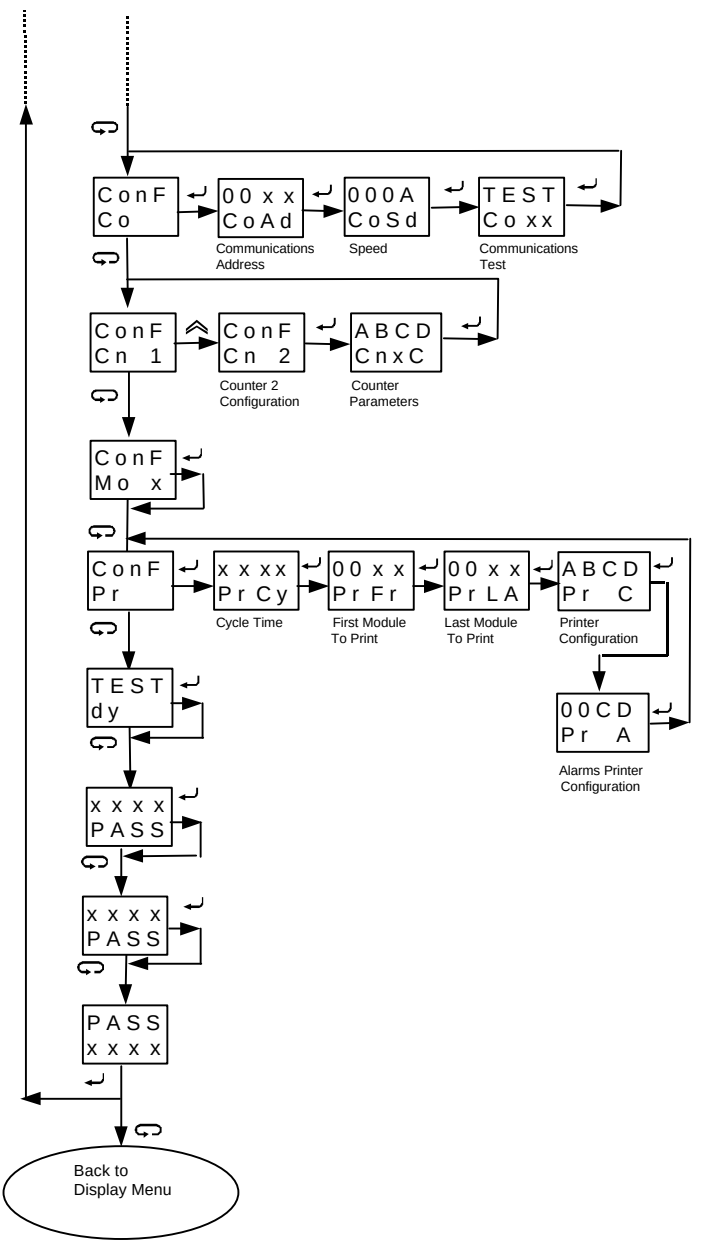
The final positions of the configuration menu allow:

- To Modify the General PASSWORD, PASS Menu.
- To Modify alarm configuration Password, PASL Menu.
- Introducing PassWord PASS enables to acced to configuration menu again.

The operation of the Configuration Menu is explained in the "Description of Configuration Menu Parameters" section.

The operation diagram of the Configuration Menu displays in the following figure:


CONFIGURATION MENU
From Display Menu
ConF AL x
ABCD AL x
Alarm Parameters
ABCD AL x
Delay of alarm Connection
Alarm Configuration
ConF AC
00CD AC
Acknowledgement Parameters
Acknowledgement Configuration Alarms
ConF CF x
Temperature Unit Setup
ConF CH x
ABCD CHxt
Channel Parameters
xxxx CHx_
Lo-Range
xxxx CHx⁻
Hi-Range
xxxx CHxo
Indication Offset
Channel Configuration
ConF CL x
xxxx AJx_
Adjust. Minimum
xxxx AJx⁻
Adjust. Maximum
CALIBRATION
ConF do x
xx doxt
Type of Output Local / Remote
ABCD doxC
Digital Output Parameters
Digital Output


ConF Co
00 xx CoAd
Communications Address
000A CoSd
Speed
TEST Coxx
Communications Test
Communications
ConF Cn 1
ConF Cn 2
Counter 2 Configuration
ABCD CnxC
Counter Parameters
Counters Configuration
ConF Mo x
Type of Monitoring (Master / Slave)
ConF Pr
xxxx Pr Cy
Cycle Time
00 xx Pr Fr
First Module To Print
00 xx Pr LA
Last Module To Print
ABCD Pr C
Printer Configuration
Printer Configuration
TEST dy
Display Test
00CD Pr A
Alarms Printer Configuration
xxxx PASS
PassWord Change
xxxx PASS
PassWord Change of Alarm Parameters
PASS xxxx
Input PassWord
Back to Display Menu
With correct PassWord, go to Configuration Menu again

Description of Display Menu parameters

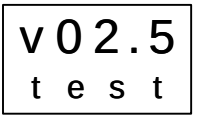
The following is a description of the process for the display of measurements and data, of the module being used as well as others, in the case that several are linked in a network, from one terminal display.

Displaying the Software version

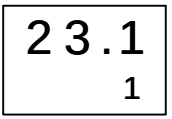
As soon as the DAS-8000 module is started, three messages appear on the display, the first one does a test of display unit switching on all segments.

The second message identifies the self-test performed by the device when it is started:

After approximately one second, the display shows the software version that is operational in the DAS-8000 module:



This indication remains on the display for a few seconds, then the next message shown is the one displayed for the first analog channel and, thus, the DAS-8000 is already operational.



Manual display of module measurements.

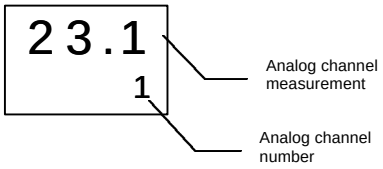
The measurements of the 8 channels are displayed on the upper display, and the channel number is displayed on the lower display.

The channels that are not enabled will not show a measurement, but the message **OFF** will be displayed on the upper display.

To display any of the channels press the **Function** key consecutively, and the channel number with its measurement will be displayed.

After channel 8 is displayed, the parameters **ALAr**, Counters, and **PASS**, will be displayed with the cycle beginning again with channels 1, 2, 3, etc.

The channel selected will remain on the display until the **Function** or **Shift** keys are pressed.

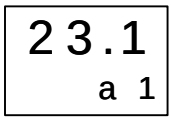


Automatic Display of module measurements.

You can make the 8 channels, or the ones that are enabled, be displayed sequentially on the display in endless rotation.

To accomplish this, press **Shift** once, and a blinking "A" will be displayed on the lower display, next to the channel number indicating that it is in "automatic viewing" mode.

This **Function** will remain active until you press the **Shift** key. The sequence time is approximately 2 seconds, and is fixed, since it cannot be modified.



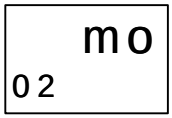
Manual Display of the measurements of other modules.

This **Function** allows you to read from a central module that has a terminal display, and in addition, any another module connected to its network is configured as Master. As in the previous case, the display function can be Manual or Automatic.

To display any channel of another module in the network, press the **Validation** key once, starting with the normal status displaying any channel (having no effect from the messages: **Alar** and **Pass**).

On the upper display, the message **Mo** will be displayed, and on the lower one the module number read the last time (if there is only one DAS-8000, its number is displayed).

Modify with the **Shift** and **Increment** keys, and enter the module number you wish (different from the one that you use for display). Press the **Validation** key.



NOTE:

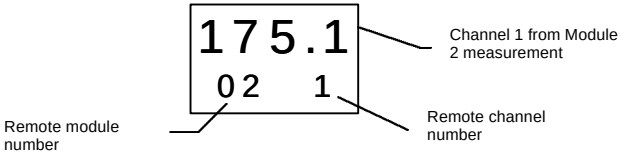
If the module is configured as Slave, the **Validation** key has no effect. It is indispensable that the DAS-8000 be configured as a Master.

If the module number selected is incorrect, this indicates that it is not in the communications line, has a different communications speed, or is configured as RS-232 output, will be displayed briefly on the display the message **ErrC**, indicating that a communication error exits.

If the communication is correct, the reading of the remote module will be shown on the display and on the Leds the status of its digital channels.

On the lower display, 2 digits will be displayed to the left with the module number that is being displayed.

Then you can read the channels of that module:



Press the **Function** key consecutively, and the channel number and the value of its measurement will be displayed. After channel 8, the **ALAr** and **PASS** parameters appear, beginning again with channel 1.

The channel selected will remain on the display as long as you do not press the **Function** or **Shift** keys.

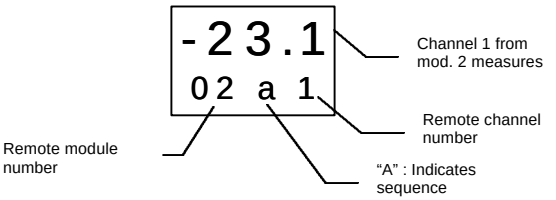
NOTE:

When the channels of another module are read from a local module, upon reaching **PASS**, only entering the access password will allow you to enter the configuration of your own module, and it is impossible to gain access to the configuration of the remote module.

Automatic Display of measurements of other modules.

You can display the 8 channels, or the ones those that are enabled, in the display sequentially in an endless rotation.

To this end, press the **Shift** key once, and a blinking "A" will be displayed on the lower display, next to the channel number indicating that it is in "automatic display" mode.



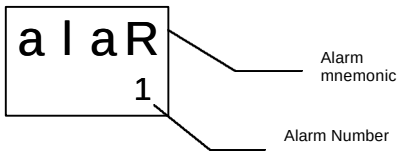
This **Function** will remain active until you press the **Shift** key again.

The sequence time is approximately 2 seconds, is fixed from the start, and not subject to modification.

Alarm data display.

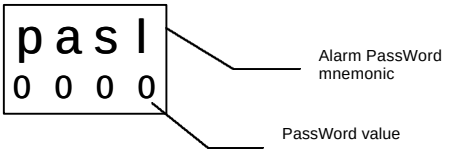
The display and/or modification of the Alarm parameters (set-point, hysteresis, and status) can be performed within the Alarm Parameters section of the display menu. This section is protected with PassWord (PASL).

In order to access the DAS-8000 module alarm, press the Function key consecutively until **ALAr** is displayed on the upper display.



The number of the last alarm will be displayed blinking. Select with the **Increment** key the alarm number that you wish to display and/or modify.

If the alarm password is enabled, in the upper display will appear PASL, and in the lower one 0000 with the right side digit blinking. Introduce using **Increment** and **Displacement** keys the password and press the **Validation** key, and you will enter the Alarm Configuration section.



If the password introduced is not correct, the access to the alarm sub-menu is denied. If it has been introduced correctly then will appear the sub-menu to display and/or modify alarm parameters, explained in the following sections.

NOTES:

- If through configuration, the alarm is disabled, the access to these parameters is denied.
- The unit is supplied without any Password (0000).
- To introduce a password, refer to section "**Change of password of alarm parameters**".

Manual alarm acknowledgment.

For certain industries, this is a unique and useful function, featuring a characteristic behavior, which has been implemented in the alarm functions already featured on the DAS-8000 module.

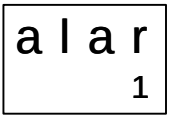
Its main characteristics are:

- Acknowledgement alarms have special features.
- All alarms are recognized by the same actuator (digital input or manually from the keyboard).
- All alarms acts on the same digital output ("horn" output).
- Acknowledgement is timed, such that the acknowledgement digital output will act again after a preset time (in the DAS-8000 module a fixed time of 15 minutes has been preset), if the alarm condition has not yet disappeared.
- If, another acknowledgement alarm trips while an alarm acknowledgement is being timed, the "horn" digital output is again tripped and the alarm must be acknowledged again.

The DAS-8000 module allows any normal alarm to be set up, as an acknowledgement alarm (please see the section on alarm and acknowledgement alarm setup). In this setup, you can enable or disable this function and set the acknowledgement digital inputs and output (also called "horn" output).

The alarm acknowledgement function can be implemented through the digital inputs mentioned above or manually through the DAS-800 keyboard.

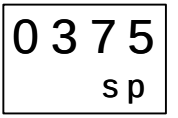
To perform the alarm acknowledgement function manually, press the **Shift** key while it appears on the alarm option display.



Pressing this key (or an acknowledgement by a digital input occurs) will cause the previously tripped acknowledgement output to return to its stand-by condition and start timing (15 minutes). If the alarm trip condition has not disappeared after this time period has elapsed, the acknowledgement output will trip again.

How to see and/or modify the setpoint of an alarm.

In the lower display, the **SP** (set-point) symbol is displayed, and on the upper display the value of the set-point that it has assigned. If you only wish to see the value, press the **Function** or **Validation** key, and nothing is modified. If you wish to change the value of the set-point, use the **Increment** and **Shift** keys to enter the new data. Once completed, press the **Validation** key to save the new value.

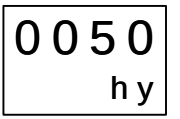


NOTE:

SETPOINT is the value in physical units where the alarm changes its status.

How to see and/or modify the hysteresis of an alarm

After pressing **Validation**, the HY (Hysteresis) symbol will be displayed on the lower display, and on the upper the preset current value. If you wish to see the value only, press the **Function** or **Validation** key to exit, without modifying the data. If you wish to change the value, use the **Increment** and Shift keys to enter the new data. Then, press the **Validation** key to store the new value.



NOTE:

Hysteresis of commutation is the margin in engineering units between the activation and deactivation of an Alarm. It allows you to separate the alarm status 1 and 0, in order to avoid continuous changes in the commutation of the Digital Output.

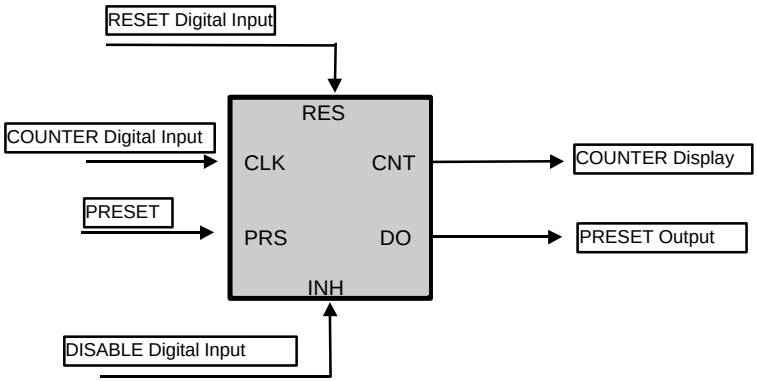
How to see and/or modify the status of alarm

After pressing **Validation**, St (Status) symbol will be displayed on the lower display, and on the upper display, the current status **ON** or **OFF** (enabled or not) of the alarm selected. If you only wish to see the status, you can exit by pressing the **Function** or **Validation** key, without modifying the data. If you wish to modify the enabling of the Alarm, use the **Increment** key to select ON or OFF. Then, press the **Validation** key to store the new status.

Counter operation criteria

The criteria used for designing DAS-8000 module internal counters are given below.

In each DAS-8000 module two counters have been implemented, each provided with three digital inputs: counting input, reset input, and disable input, as shown in the figure below.



The various counter blocks inputs and outputs are as follows:

- **Counting Digital Input**: Used to enter the pulses to be counted. The counter will count up each time a pulse rise edge is available and the maximum frequency does not exceed 40 Hz with pulse on-time values of at least 15 ms.
- **Reset Digital Input:** Resetting the counter can be performed by activating a digital input or by manually pressing a key on the DAS-8000 keyboard.
- **Disable Digital Input:** The counter can be stopped at any moment, when so requested by the disable digital input. This input has priority over the counting input, i.e. while the disable input is on, the counter will hold its last accumulated value.

- **Preset:** Freely-configurable numeric value that allows a value to be assigned to each counter, and activates the digital output when exceeded by the counter.
- **Preset digital output:** Freely configurable digital output indicated above.

Some of these digital input/outputs are fixed and others are configurable for the two counters. The relationship is as follows:

	DIGITAL INPUT No.			***DIGITAL OUTPUT No.***
	COUNTER	DISABLE	RESET	
COUNTER 1	**1**	**2**	**3**	**0**= Without Output **1/8**= Output No.
COUNTER 2	**4**	**5**	**6**	**0**= Without Output **1/8**= Output No.

Both the counter itself and its disable and reset input can be enabled or disabled (please see item Counter setup).

NOTES:

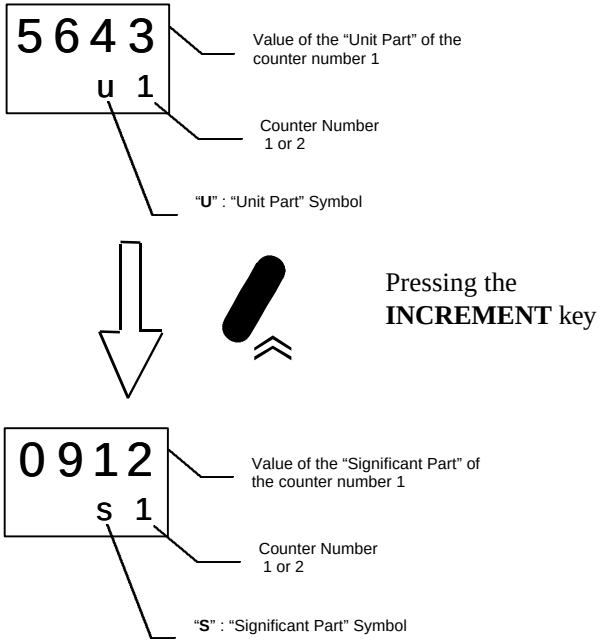
- The default counter settings when a reset is performed or a counter is set up is 0.
- Counters do not allow negative values.
- Counter display and/or counter preset setup are only possible if they are enabled.

Counter Display

Counter display is presented in two data groups, the first is called "unit part" and consists of the first counter digit and the other group is known as the "significant part", consisting of the four most significant digits. The maximum value indicated by the counter is, therefore, 99,999,999, i.e. 8 numeric digits.

Since the DAS-8000 has only a 4-digit display, counter display will be performed by first showing the unit part and then displaying the significant part sequentially when the **Increment** key is pressed. Continuous pressing of the **Increment** key toggles between the "unit part" and the "significant part".

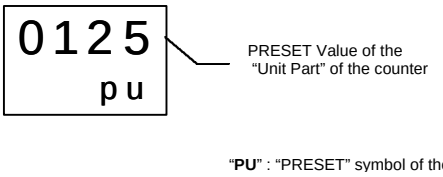
The image appearing on the display is as follows:



In this case, the counter number 1 value would be 09.125.643

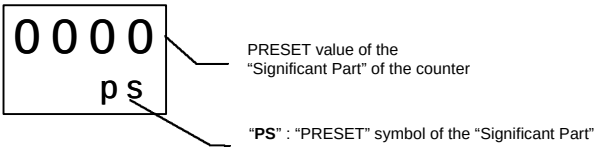
Displaying and/or changing the counter preset value

From the counter display, whether you are displaying the unit part or the significant part, pressing the **Enter** key allows the preset unit part display to be accessed.



If you only want to see the value, press the **Validation** or **Function** keys, which does not cause any changes. To change the PRESET value in the unit part, use the **Increment** and **Shift** keys to enter the new data, then press the **Enter** key to accept the new values.

Press the **Enter** key to access the preset significant part display.



To edit the value or leave them as is, the same criterion will apply.

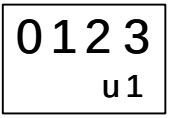
NOTES:

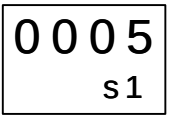
- Only positive decimal system values are allowed for the unit or significant part PRESET value.
- The minimum PRESET value will be 0 and the maximum one will be 99,999,999.
- The count can be displayed only if the counter is enabled (to enable it, please see the section Counter Setup).
- The counter value can be displayed only if the counter preset digital output is enabled (to enable it, please see the section Counter preset setup).

Performing a Counter Reset

Counter reset can be performed at any time in one of two ways:

- By activating the corresponding digital input (digital input number 3 for counter number 1 and digital input number 6 for counter number 2).
- By pressing the **Shift** key 3 times while in the counter display (both in the significant part and in the unit part).





The first time the **Shift** is pressed causes the first digit of the upper display to blink, the second time key is pressed causes the second digit of the same display to blink, and the third time that this key is pressed, the counter is reset, the display returns to its normal status (blinking indicates that a reset is going to be performed). When a counter reset is not desired, press the **Shift** key to prevent presetting.

Printing measurements of DAS-8000 modules

The DAS-8000 is able to send directly, to a serial printer (without PC), the measurements read in its analog channels, both automatically (with a preconfigured interval between print jobs) and manually (optional). Also, when they are linked in a network, besides its own channels, they can dump the channels of the other preconfigured DAS-8000 Modules.

The listing generated by the printer uses a relative value of time corresponding to the moment when the system of DAS-8000 modules was created, printing in HHHH:MM:SS (hours : minutes : seconds) format. When the time reaches its maximum, it begins again at 0000:00:00. This value is not saved in the event of electrical power network failures.

Automatic mode

To dump the data in an automatic way, the DAS-8000 module should have preset the printer parameters in the Configuration Menu (cycle time, modules to print, and transmission format).

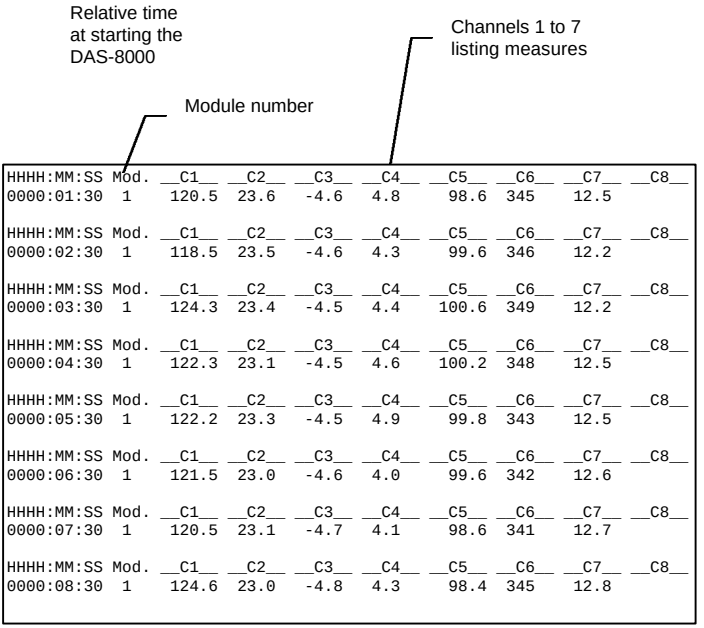
Sending printer data occurs from the moment the DAS-8000 is configured, with the data being sent to the RS-232 channel even if the printer is not connected.

Manual mode

To dump data to a printer manually, press the Increment key only once, with the DAS-8000 module in a normal channel display mode.

The Manual dump is independent of the automatic one, so that if you press the increment key during the interval between automatic print-outs, a dumping of the existing data at that time will be produced as well.

Sample of data listing in printer with dump frequency of 60 seconds, and with channel 8 inactive:




```
HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:01:30  1    120.5  23.6   -4.6   4.8     98.6  345    12.5

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:02:30  1    118.5  23.5   -4.6   4.3     99.6  346    12.2

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:03:30  1    124.3  23.4   -4.5   4.4    100.6  349    12.2

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:04:30  1    122.3  23.1   -4.5   4.6    100.2  348    12.5

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:05:30  1    122.2  23.3   -4.5   4.9     99.8  343    12.5

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:06:30  1    121.5  23.0   -4.6   4.0     99.6  342    12.6

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:07:30  1    120.5  23.1   -4.7   4.1     98.6  341    12.7

HHHH:MM:SS Mod. __C1__ __C2__ __C3__ __C4__ __C5__ __C6__ __C7__ __C8__
0000:08:30  1    124.6  23.0   -4.8   4.3     98.4  345    12.8
```

Dumping data to printer from other network modules

A DAS-8000 MASTER module allows, besides sending its data to a printer, the collection for printing purposes of the data from all the other DAS-8000 modules connected to the network and in the order they were enabled.

Besides, a system of DAS-8000 modules connected in a network, allows you to generate reports on several printers at the same time, from one or several of the modules, provided they were configured as

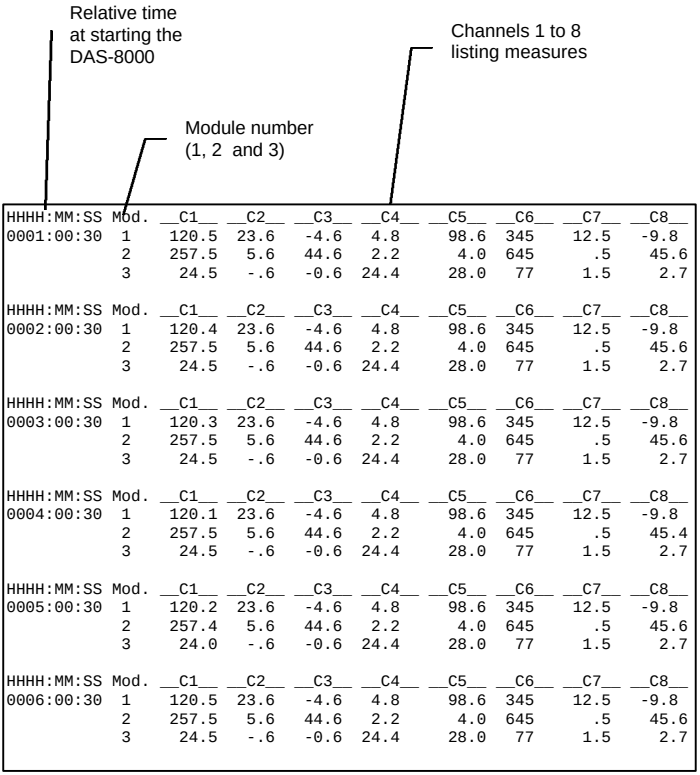
MASTER, being a matter of indifference whether the rest are configured as MASTERS or SLAVES.

Nevertheless, to avoid data collisions in the communications, you will need to generate a data dump (with the **Increment** key) from a single Master module at a time.

To dump data automatically, you must preestablish the printer parameters for the DAS-8000 module in the Configuration Menu: cycle time, transmission format, and also the number of the first and last module to be printed.

This multiple method of printing, allows, as with a single module, both the automatic as well as the manual dump by means of the **Increment** key.

A sample of automatic listing with a listing frequency of 3600 seconds (1 hour), with 3 modules on the network (numbers 1, 2, and 3) follows:



HHHH:MM:SS	Mod.	C1	C2	C3	C4	C5	C6	C7	C8
0001:00:30	1	120.5	23.6	-4.6	4.8	98.6	345	12.5	-9.8
	2	257.5	5.6	44.6	2.2	4.0	645	.5	45.6
	3	24.5	-.6	-0.6	24.4	28.0	77	1.5	2.7
HHHH:MM:SS	Mod.	C1	C2	C3	C4	C5	C6	C7	C8
0002:00:30	1	120.4	23.6	-4.6	4.8	98.6	345	12.5	-9.8
	2	257.5	5.6	44.6	2.2	4.0	645	.5	45.6
	3	24.5	-.6	-0.6	24.4	28.0	77	1.5	2.7
HHHH:MM:SS	Mod.	C1	C2	C3	C4	C5	C6	C7	C8
0003:00:30	1	120.3	23.6	-4.6	4.8	98.6	345	12.5	-9.8
	2	257.5	5.6	44.6	2.2	4.0	645	.5	45.6
	3	24.5	-.6	-0.6	24.4	28.0	77	1.5	2.7
HHHH:MM:SS	Mod.	C1	C2	C3	C4	C5	C6	C7	C8
0004:00:30	1	120.1	23.6	-4.6	4.8	98.6	345	12.5	-9.8
	2	257.5	5.6	44.6	2.2	4.0	645	.5	45.4
	3	24.5	-.6	-0.6	24.4	28.0	77	1.5	2.7
HHHH:MM:SS	Mod.	C1	C2	C3	C4	C5	C6	C7	C8
0005:00:30	1	120.2	23.6	-4.6	4.8	98.6	345	12.5	-9.8
	2	257.4	5.6	44.6	2.2	4.0	645	.5	45.6
	3	24.0	-.6	-0.6	24.4	28.0	77	1.5	2.7
HHHH:MM:SS	Mod.	C1	C2	C3	C4	C5	C6	C7	C8
0006:00:30	1	120.5	23.6	-4.6	4.8	98.6	345	12.5	-9.8
	2	257.5	5.6	44.6	2.2	4.0	645	.5	45.6
	3	24.5	-.6	-0.6	24.4	28.0	77	1.5	2.7

Printing DAS-8000 module alarms

The DAS-8000 allows the alarms generated to be sent directly to a serial printer (without a PC computer), listing both the on and off data.

The alarm listing generated in the printer uses a relative time value corresponding to the time the DAS-8000 module was started, with this time printed in the format HHHH:MM:SS (hours:minutes:seconds). When this time reaches its maximum, it starts from 0000:00:00 again. This value is not stored when a power failure occurs.

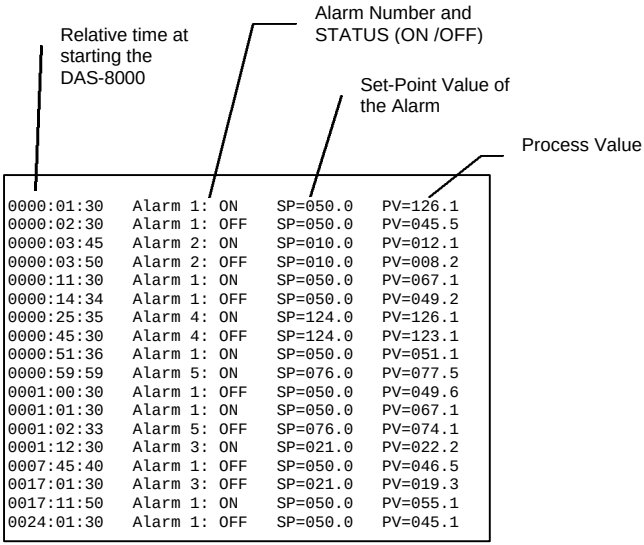
It should be stressed that alarm dumping occurs only when the DAS-8000 module is connected to a printer. It is not possible to dump alarms for other DAS-8000 modules that may be connected through a communications network.

Alarm Printing

To dump the alarms, the DAS-8000 module must have its printer parameters preset in the setup menu (transmission format) as well as the alarm printing parameter activated (please see “Alarm printing parameters”).

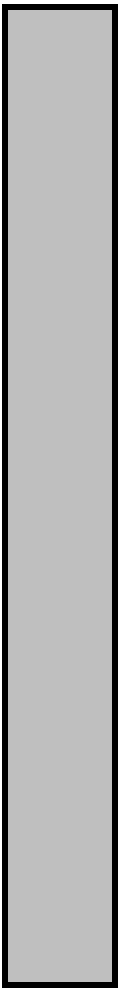
Alarms are sent to the printer from the moment the DAS-8000 is set up, with data sent to the RS 232 channel even if the printer is not connected.

Example of a printed alarm listing:




```
0000:01:30   Alarm 1: ON    SP=050.0   PV=126.1
0000:02:30   Alarm 1: OFF   SP=050.0   PV=045.5
0000:03:45   Alarm 2: ON    SP=010.0   PV=012.1
0000:03:50   Alarm 2: OFF   SP=010.0   PV=008.2
0000:11:30   Alarm 1: ON    SP=050.0   PV=067.1
0000:14:34   Alarm 1: OFF   SP=050.0   PV=049.2
0000:25:35   Alarm 4: ON    SP=124.0   PV=126.1
0000:45:30   Alarm 4: OFF   SP=124.0   PV=123.1
0000:51:36   Alarm 1: ON    SP=050.0   PV=051.1
0000:59:59   Alarm 5: ON    SP=076.0   PV=077.5
0001:00:30   Alarm 1: OFF   SP=050.0   PV=049.6
0001:01:30   Alarm 1: ON    SP=050.0   PV=067.1
0001:02:33   Alarm 5: OFF   SP=076.0   PV=074.1
0001:12:30   Alarm 3: ON    SP=021.0   PV=022.2
0007:45:40   Alarm 1: OFF   SP=050.0   PV=046.5
0017:01:30   Alarm 3: OFF   SP=021.0   PV=019.3
0017:11:50   Alarm 1: ON    SP=050.0   PV=055.1
0024:01:30   Alarm 1: OFF   SP=050.0   PV=045.1
```

Configuration



Description of Configuration Menu parameters

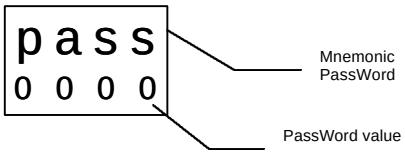
The Configuration Menu is protected by means of an access password.

NOTES:

- The unit is supplied without PassWord (0000).
- To introduce a password, refer to section "**Change of general PassWord**", at the end of the "**Configuration**" chapter.

PassWord Input

To enter, press the Function key consecutively until the Password symbol is displayed:



"0000" will appear on the lower display with the right digit blinking. Enter the access password with the **Increment** and **Shift** keys, and press the **Validation** key.

If the password is not correct, you will not be able to access the display menu. If it has been entered correctly, CONF will be displayed on the upper display, and on the lower one the first section of the Configuration Menu: "AL x" Alarms (with "x" as the alarm no.)

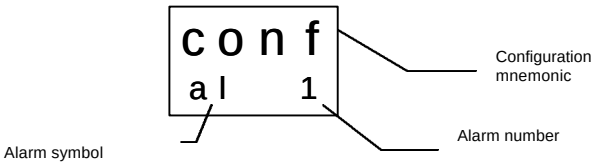
Click the Function key consecutively to display, one after another, the rest of the configuration sections:

“AC”	Alarm acknowledgement parameters.
“CF x”	Temperature unit configuration
“CH x”	Channel Configuration.
“CL x”	Calibration.
“Do x”	Digital Output Configuration.
“Co”	Communications Configuration.
“Cn x”	Counter configuration.
“Mo x”	Type of Monitoring.
“Pr”	Printer Configuration.
“TEST dy”	Display test
“PASS”	Modification of the Access Password.
“PASL”	Modification of the Alarm Password.

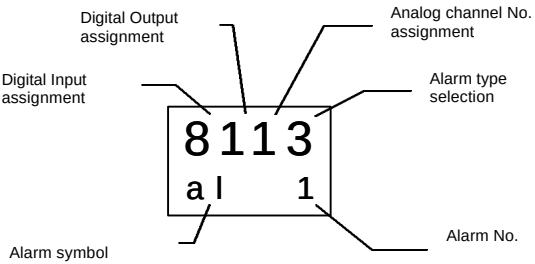
In the following sections, we provide a detailed explanation of all the sections of the Configuration Menu listed above, except the Calibration section, that has an independent chapter dedicated to it.

Alarm parameters

The first section of the Configuration Menu is the pre-configuration of Alarms. On the upper display, **ConF** is displayed, and on the lower one, **AL** together with the last Alarm number configured. Use the **Increment** key to indicate the Alarm number that you wish to configure, and press the **Validation** key.



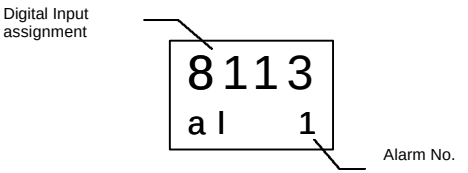
A 4-digit code is displayed on the upper display, with the current configuration of the Alarm no:



Use the Shift key to select the digit that you wish to modify. Each digit of that code represents an Alarm configuration parameter, with the value of the digit a number that represents one of several possibilities that this parameter can assume.

Select each one of them based on the configuration you want and what is explained in the following sub-sections:

Disabling the Alarm Output. Digital Input Assignment.



This digit allows you to select the Digital Input no. that you wish to use as alarm Disabling.

When, in situation of alarm, you send an activation signal to the digital input selected, the digital output assigned will be deactivated, so that, although a condition of alarm still exists, the digital output will remain canceled.

This function is used to cancel provisionally the luminous displays, acoustic, etc. connected to the digital outputs acting as an alarm activation, allowing the attendant to turn off the warning until the situation that caused the alarm has been solved.

Another practical application is in freezing chambers, in which the action of defrosting is not an alarm situation, but can lead to a rise in temperature above the alarm value established.

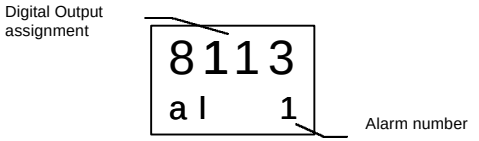
The assignment values of possible Digital Input are:

0: No Digital Input will be assigned.
1 to 8: Selection of the Digital Input number that you will assign as a Disabling of the Alarm no. in the configuration.

NOTE:

The Digital Input number can not only be assigned to an alarm, but can also be repeated in any alarm (using it then as a general disabling of all the alarms).

Assignment of Digital Output.



This digit allows you to select the Digital output number that you will use as the output of the alarm.

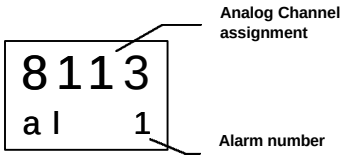
The possible assignment values of the Digital Output are:

0: No Digital Output will be assigned.
1 to 8: Selection of the Digital Output no. that will be assigned to the Alarm number being configured.

NOTE:

The Digital Output No. can be assigned not only to one alarm, but can also be repeated in any alarm (using it then as the general output of any alarm).

Assignment of Analog Channel.



This digit allows you to select the Analog Channel no. that will be linked to the Alarm Number being configured.

The possible Analog values of Channels are:

0: No Analog Channel will be assigned.
1 to 8: Selection of the Analog Channel no. that will be assigned to the Alarm Number in configuration.

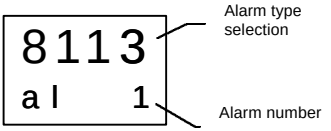
NOTE:

The Analog Channel no. can be assigned not only to one alarm, but can also be repeated in any alarm (thus one analog channel can have up to 8 alarms).

Selection of Alarm type.

IMPORTANT NOTES ABOUT ALARMS:

- You should not confuse the Alarm number with the Analog Channel number, or the Digital Output number.
- In the DAS-8000 the concept of Alarm is independent and assignable to each Channel and Output, so that through the Configuration Menu, it is possible to have an Analog Channel of measurement with one or more Alarms, and one or more Digital Outputs.
- This system is capable of assigning up to 8 alarm levels to a single analog channel, with output through one or more digital channels, and several analog channels sharing only one digital output for each alarm level.



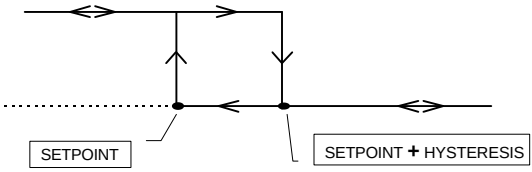
This digit allows you to select the type of alarm activation that the Alarm no. in configuration will have.

The possible types of activation are:

0: INACTIVE. No Alarm activation.
1: Maximum Alarm without Acknowledgement.
2: Minimum Alarm without Acknowledgement.
3: Window Alarm without Acknowledgement.
4: Maximum Alarm with Acknowledgement.
5: Minimum Alarm with Acknowledgement.
6: Window Alarm with Acknowledgement.
7: Inverted Window Alarm with Acknowledgement.
8: Inverted Window Alarm without Acknowledgement.

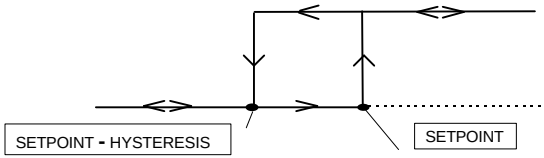
Each one of the possible types of alarms is described below:

MINIMUM ALARM



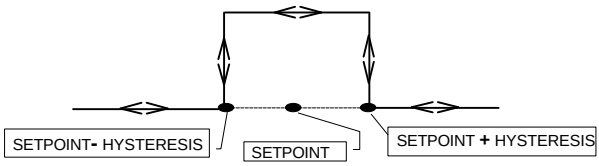
In the **Minimum** type, the alarm is activated while the value of the measurement is rising and it is below the limit of **Set-point + Hysteresis**. When it reaches this value it becomes inactive, and is reactivated when the measurement goes below the **Set-point**.

MAXIMUM ALARM



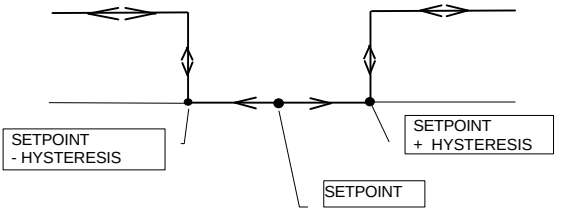
In the **Maximum** type, the alarm is deactivated while the value of the measurement is rising and below the **Set-point**. When it reaches the Set-point, it is activated, deactivating itself when the measurement goes below **Set-point - Hysteresis**.

WINDOW ALARM



In the **Window** type, the alarm is inactive while the value of the measurement is below **Set-point- Hysteresis** and above **Set-point + Hysteresis**. Inside this margin, the alarm is activated.

INVERTED WINDOW ALARM



On **Inverted Window** mode the alarm is activated while the measurement value is within the margin set point ± hysteresis. Out of this margin the alarm remains deactivated

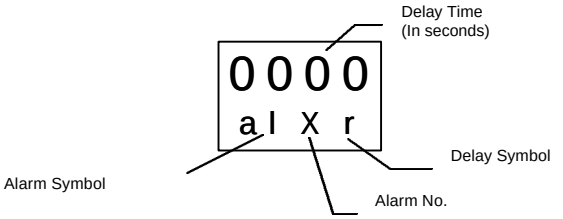
.

After modifying or displaying the configuration parameters, press the **Function** or **Validation** key to return to the Configuration Menu.

Press the **Increment** key to configure another Alarm number, or press the **Function** key to continue to the next chapter.

Delay of Alarm Connection

After press **Enter** key, it appears the parameter Time delay of alarm. A four-digit code is displayed on the upper display showing the last configured time delay.



Please use **Shift** and **Increase** keys to modify value. It can be selected from 1 up to 9999 seconds.

If 0 is selected this function is deactivated.

After configuration please press **Enter** key to confirm or **Function** key to leave it without save the new data.

REMARKS:

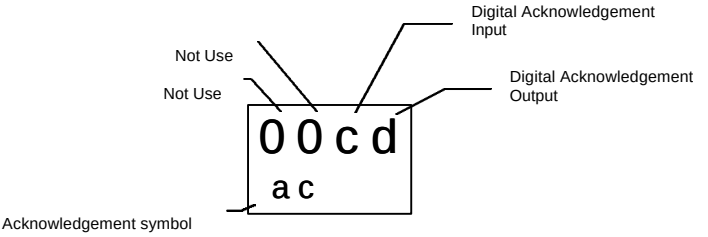
- When an alarm is activated the action is not immediate, it must pass the configured time.
- If the alarm status is deactivated, this step is immediate

Alarm Acknowledgment Parameters

The next setup menu item is the alarm acknowledgement parametrization. The upper display shows the text **ConF** and the lower one **AC**. Press the **Enter** key to acceded to the Alarm acknowledgement section.

Alarm Acknowledgement Setup

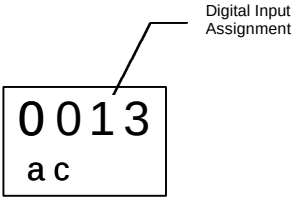
A numeric 2-digit code will appear on the upper display with the current alarm acknowledgement configuration (the two digits on the left side are 0 or are not accessible):



Use the **Shift** key to select the digit to be changed. Each digit of this code represents an Alarm Acknowledgement Parameter, where the digit value is a number representing one of several choices allowed by the parameter.

Choose one of the choices depending on the desired configuration, as explained in the following subsections:

Digital Acknowledgement Input Assignment.



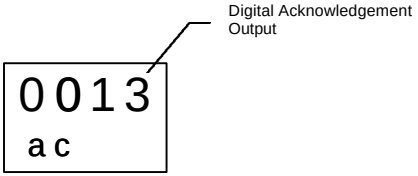
This digit allows the Digital Input number to be used as a digital alarm acknowledgement input.

The Digital Input setting values available are as follows:

0: No Digital Input will be assigned.
1 to 8: Digital input number setting for the input that will be set as Acknowledgement for the Alarm Number during the configuration.

NOTE:
- The digital input number may not be assigned exclusively and may rather be used repeatedly for any alarm (then it is used for alarm acknowledgement).

Digital Acknowledgement Output Assignment.



This digit allows the Digital Output number to be selected that will be used for alarm acknowledgement output.

Digital output settings available are:

0: No Digital Output will be assigned.
1 to 8: Digital Output number setting for Alarm Acknowledgement

NOTE:

- The Digital Output number may be assigned exclusively and can rather be used repeatedly for any alarm (there is no priority in any case).

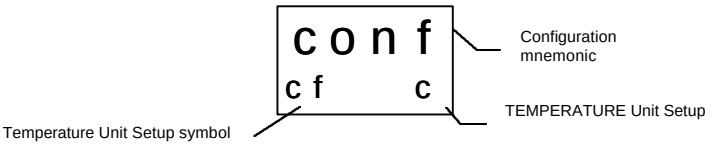
After changing or displaying the alarm acknowledgement setup parameters, press the **Function** or **Enter** key to return to the Setup menu**.**

Press the **Function** key to move to the next section, "**CF**", to set the temperature unit.

Temperature Unit Setup

The next section in the setup menu is choosing the engineering unit type to be used for temperature measurement (degrees Celsius or Fahrenheit). Please note that the unit defined in this section will be adopted for all DAS-8000 module temperature channels.

The upper display shows the text **ConF** and the lower one **CF** as well as the selection symbol (C or F). Use the **Shift** key to choose one of the two possible temperature units.



C: **DEGREES CELSIUS.**
F: DEGREES FAHRENHEIT.

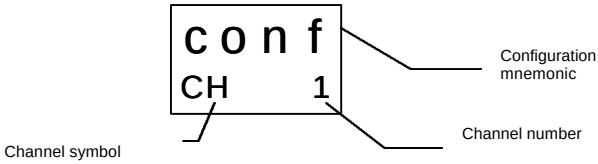
Once the setting is completed, press the **Enter** key to save the data or the **Function** key to exit without confirmation.

NOTES:

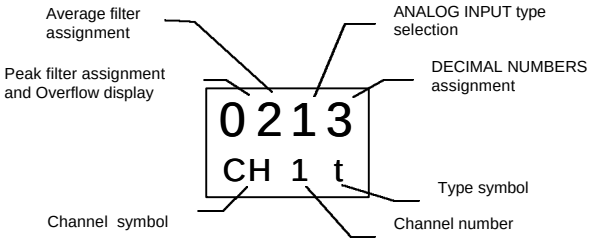
- The default setting is degrees Celsius.
- Unit change is performed instantaneously by the DAS-8000 module by internal calculations.
- This change will affect the temperature channel specification (minimum and maximum range). However, it will not affect the indication offset or the alarm parameters, (Setpoint and hysteresis).
- The maximum Fahrenheit value, equivalent to 600 °C, is 1112ºF. However, this value cannot be reached, since the maximum value that can be displayed is 999.9. Therefore, the maximum range in degrees Fahrenheit is 999.9, which is equivalent to 537.7 °C. For ranges higher than 999.9 °F, a 4-20 mA converter with a configurable input range should be inserted between the temperature sensors and the input.

Analog Channel Parameters

The next section of the Configuration Menu is the preconfiguration of Analog Channels. On the upper display **ConF** is displayed, and on the lower **CH** with the last channel number configured. Use the **increment** key to indicate the channel number that you wish to configure, and press the **Validation** key.

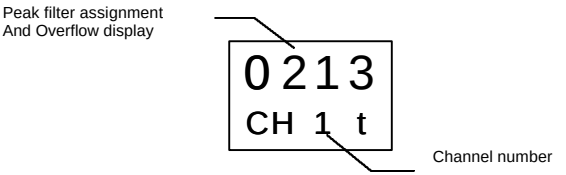


A numeric 4-digit code will be displayed on the upper display, with the current configuration of the current Analog Channel no:



Use the **Shift** key to select the digit that you wish to modify. Each digit of that code represents a configuration parameter of the Analog Channel, with the value of the digit representing the possibilities that this parameter can assume.

Peak filter and range Oveflow display



This digit activates or deactivates the Peak Filter signal and also enables the display of the **UNDE** and **OVER** messages when the range is exceeded.

The installations with parasites, electrical noises, etc. produce signal peaks which affects the measurement, and the activation of the Peak filter eliminates said disturbances from the reading in the DAS-8000.

On the other hand, if the analog signal entered to the DAS-8000 module is higher or falls slightly lower than the physical range limit set (for example, if 20.4 mA or 0 mA are the measured levels for a 4-20 mA input) the following occurs: In order to display the extrapolated value outside the scale range or to directly display the OVER message, if the maximum limit is exceeded and UNDE if a minimum value underflow occurs, there is a possibility to change this setting.

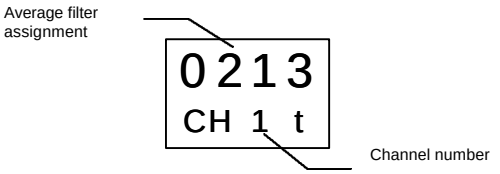
The following options are available:

0: No Peak Filter and no UNDE and OVER display.
1: Peak Filter on and no UNDE and OVER display.
2: No Peak Filter and UNDE and OVER display.
3: Peak Filter on and UNDE and OVER display.

NOTES:

- The Peak Filter operates if the measurement deviation is larger than ±500 converted points and no longer than 2 seconds.
- The UNDE and OVER display messages appear if the analog input display range is exceeded by 1% (for example, for a 0-100 degree scale, OVER will be displayed when the value in degrees exceeds 101 degrees and UNDE will be displayed when the value in degrees drops below -1 degree).

Average filter

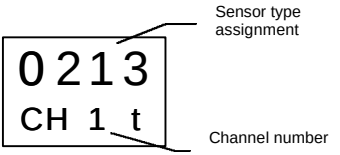


This digit allows you to adjust the Average Filter. This type of filter subdues the abrupt jumps of the measurement signal, performing operations with continued readings to obtain a measurement of more stable behavior than the original signal.

The possible integration values of the Average filter are:

0: INACTIVE. There is no Average filter.
1 to 7: ACTIVE. Average Filter Active.
The value "1" indicates minimum filtering and the "7" its maximum.

Selection of Sensor Type



This digit selects the type of Sensor to be adapted to the Analog Channel no. being configured. The possible values are:

0: **LINEAR** Input. (10-50 mV or 4-20 mA.).
1: **Pt 100** Input. s/IEC-751 (DIN-43760).
2: **LINEAR** Input. (0-20 mA. or 0-50 mV.)
3: **T type thermocouple**. (Cu - Const.).
4: **J type thermocouple**. (Fe - Const).
5: **K type thermocouple**. (NiCr - NiAl).
6: **E type thermocouple**. (NiCr - Const.).
7: **N type thermocouple**. (NiCrSi - NiSi).

8: **S type thermocouple**. (PtRh 10% - Pt.).
9: **R type thermocouple**. (PtRh 13% - Pt.).
A: **B type thermocouple**. (PtRh 30% - PtRh 6%.).
B: User configurable linearization curve.
F: **Inactive** Input **(OFF).**

NOTES:

- The Type of Input selected should match the "jumper" setting of the channel being configured.
- The "OFF input" disables the channel to display.
- The user configurable Linearization Curve can only be accessed through communications means.
- The thermocouple inputs are 4-20 mA inputs linearized in accordance with the respective thermocouples.
- The thermocouple curves have been linearized from the IEC-584 international tables for each one of the thermocouples.

WARNING:

The DAS-8000 modules are shipped with their **LINEAR** inputs calibrated to 10-50 mV or 4-20 mA in factory. This type of signal is more common than other signals such as: 0-1V, 0-5 V, 0-10 V or 0-20 mA.

- Signals of 0-50 mV or 0-20 mA should be measured by changing the input type to 2 which correspond to the type of input 0-20 mA or 0-50 mV.

NOTE:

- If the type of input is changed, the corresponding channel must not be recalibrated.

Available Input Ranges and Accuracy

The maximum ranges and accuracy associated to each of the Pt-100 or thermocouple inputs are fixed depending on the type of sensor to be connected.

The table below lists all these values:

SENSOR	*MINIMUM*	*MAXIMUM*	*ACCURACY*
4-20 mA.	-1999	9999	0.1%
0-20 mA.	-1999	9999	0.1%
Pt-100	-150ºC / -199ºF	600ºC / 999ºF	0.2%
Tp T	-150ºC / -328ºF	400ºC / 752ºF	0.2%
Tp J	-200ºC / -328ºF	1200ºC / 2192ºF	0.2%
Tp K	-200ºC / -328 ºF	1300ºC / 2372ºF	0.2%
Tp E	-200ºC / -328 ºF	1000ºC / 1832ºF	0.2%
Tp N	0ºC / 32ºF	1300ºC / 2372ºF	0.2%
Tp S	0ºC / 32ºF	1700ºC / 3092ºF	0.2%
Tp R	0ºC / 32ºF	1700ºC / 3092ºF	0.2%
Tp B	600ºC / 1112ºF	1800ºC / 3272ºF	0.2%
User Curve	-1999	9999	0.1%

NOTES:

- Changes in input type may not cause changes in the range, if its value is within its minimum and maximum range limits. If the scale lies outside any of the input limits, the DAS-8000 module does not allow out-of-range data to be enabled and changes the minimum or maximum automatically. (For example, changing from a -190 / 900 scale at one 4-20 mA input to a Pt-100 input will cause the scale to be automatically changed to the values -150 and 600, respectively).

User curve setup

The DAS-8000 module allows a curve to be linearized in accordance with the specification of up to 15 segments consisting of 16 pair of points, which allow a non-linear scale to be adapted to a linear scale.

Using this property is particularly useful when working in processes with a non-proportional or non-linear response to the physical scale. For example, an irregular tank volume can be calculated from a measurement supplied by a level transmitter. The tank volume should be known and broken down into segments and the value pairs should be entered: measured volume with actual volume in the linearization table such that the DAS-8000 module displays and works with the actual measurement.

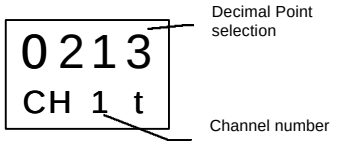
The X-Y point pairs are entered through the specific communication addresses (please see communication addresses between 86 and 117 in the output area table).

To do this, you can use either a communications program that uses the MOD-BUS protocol or the corresponding PROASIS DAS-Win program setup section (please see the Setup section in the software manual).

NOTES:

- The curve is set with a maximum of 16 X-Y points, (X: Input, Y: Value).
- Up to 15 X-Y segments can be used. Nevertheless, is not necessary to use it all.
- The curve should start with the first X1-Y1 points.
- Starting point can be different from 0 value (the curve can be offset).
- The X values should match the Y values (X1=Y1 and Xn=Yn) at the curve start and end points.
- The segments must always be sorted in ascending order.
- Enter the X-Y data without decimal point.
- Input range and the configured curve range end may be different.

Number of Decimals Points Selection



This digit allows you to assign the decimals of the range associated with the Analog Channel no. being configured.
The possible values are:

0:	Without Decimals	0000
1:	1 Decimal	000.0
2:	2 Decimals	00.00
3:	3 Decimals	0.000

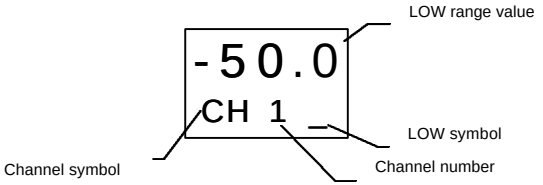
NOTE:

- When selecting the Pt-100 input for an Analog Channel, there is an unmodifiable "1" assigned automatically (one decimal).
- Thermocouples inputs not allows decimals, (0).
- Linear Inputs and User's curve allows 0, 1, 2 or 3 decimals.

The imposition of a number of decimals to an Analog Channel affects all its associated parameters: measurement, maximum and minimum indication, minimum and maximum setting, set-point and hysteresis, and indication offset.

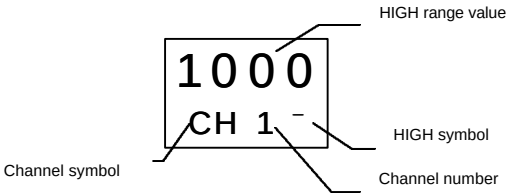
Low and High ranges

If the Analog Channel was configured as **LINEAR**, when you press the **Validation** key, you should define the high and low values of the scale associated with the signal range received in its input.



Enter with the **Increment** and **Shift** keys the new low range value, and press **Validation**.

When the request for the high range is displayed, perform the same previous operation, and press the **Validation** key.

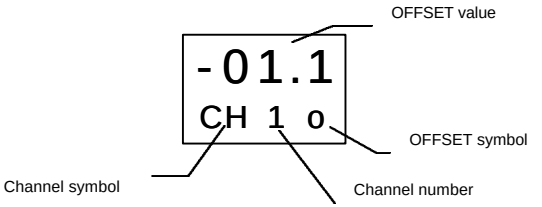


In a signal 4-20 mA with a range of -500 a +1000 mm H2O, the low range will be -500 and the high +1000 (does not need exterior Reference of signal or Calibration).

The values of minimum and maximum are independent of the range value, in other words, the scale can be incremental (low less than high) or decremental (low greater than high).

Indication Offset

If the channel was configured as **LINEAR** or **Pt-100**, the next sub-section to define is the Indication offset. It is a parameter by which small settings in the indication of the measurement can be performed without altering the calibration constants.



The value that is entered in this parameter, will be added or subtracted (based on the sign that has been given it), to the value of the measurement in all the range.

This function will be very practical to perform small settings of the measurement when it becomes necessary to homogenize readings with other measurements in the same process.

To leave the Analog Channel section, press the **Validation** or the **Function** key**.**

NOTES:

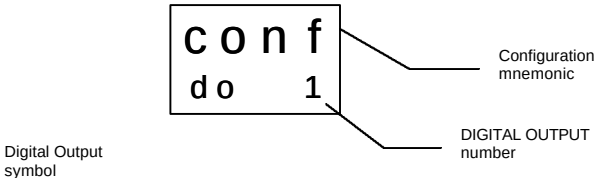
- **Pt 100** inputs allow a maximum offset of ± 50 degrees.
- **Thermocouple** inputs allow a maximum offset of ± 500 degrees.
- Linear inputs and the user curve allow any offset value.

Digital Output parameters

The next section of the Configuration Menu allows you to impose the preconfiguration of the Digital Outputs.

On the upper display, the text displayed is **ConF**, and on the lower one **DO** (**D**igital **O**utput), together with the Digital output no. from the last time it was configured.

Press the **Increment** key to indicate the Digital output no. you wish to assign, and then press the **Validation** key.



This section allows you to configure:

- Digital Output Type
- Security Status
- Active security (Communication Watch-Dog)
- Initial Status at start-up
- Inversion of the digital output status

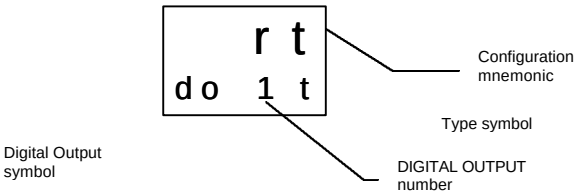
That are explained next:

Digital Output type

The parameter of The Digital output type will be displayed. The possible values are:

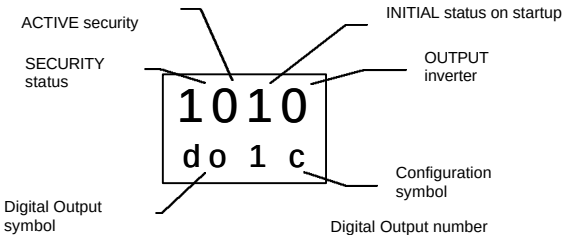
AL: LOCAL alarm.
The Digital Output will act as Alarm output.

RT: REMOTE activation.
The Digital Output will act as output of remote activation (switch at a distance) opening or closing based on commands sent to the DAS-8000 module by its communications bus.



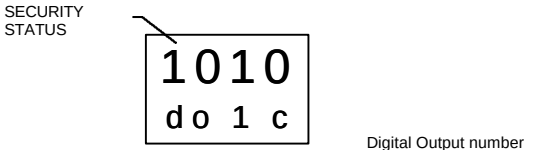
Select by means of the **Increment** key the type of Digital output desired. Once selected, press the **Validation** key.

A 4-digit code will be displayed on the upper display, with the current configuration of the Digital Output:



Press the **Shift** key to select the digit that you wish to modify. Each digit of that code represents a configuration parameter of the Digital Output, with the value of the digit representing the possibilities that this parameter can have.
Select each one of them based on the configuration desired that is explained in the following sub-sections:

Security Status



The Security status parameter allows you to predetermine the status that the **Alarm** or the **Remote Action** and its **Digital Output** will assume in the absence of signal of measurement or of interruption of communications. The possible values are:

0: The Remote Activation/Alarm will pass to 0 in Security status
1: The Remote Activation/Alarm will pass to 1 in Security status

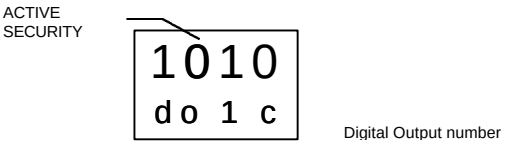
In Alarm: If a breakdown of the measurement line occurs, the **Security Status** that the Alarm will assume (1 or 0) will be the same one that has been entered in the parameter.

In Remote Activation: If the communication with the PC is interrupted for more than 30 seconds (time lapse of the Communications Watch-Dog) and the **Active Security** parameter is **1**, the **Security Status** that the **Remote Action** will assume (1 or 0) will be the same one that has been entered in said parameter.

NOTE: This parameter affects equally both parameters, Alarms and Remote Activation as well as its LED in the front panel. Nevertheless the Digital Output will assume one value or another based on the Direct or Inverse status assigned to it (See "The Digital output Inversion").

Security Status = 1	Alarm = 1	Direct: Digital Output: ON Inverse: Digital Output: OFF
Security Status = 0	Alarm = 0	Direct: Digital Output: OFF Inverse: Digital Output: ON

Active security



This digit allows you to configure the Active Security status. It allows you to cancel or activate the action of the communications Watch-Dog. The possible values are:

0: **Watch-Dog cancelled**. In any communication status, the **Digital Output** will be the last one imposed by the **Remote Action**, and in the event of power failure, it will assume the value preselected in the **Initial Status**.

1: **Watch-Dog activated**. In a standard communication situation, the **Digital Output** of the **Remote Action** will behave, in a power failure, assuming the value preselected in the **Initial Status**. On the contrary, in the event of a communications failure, it will assume the value preselected in the **Security Status** parameter.

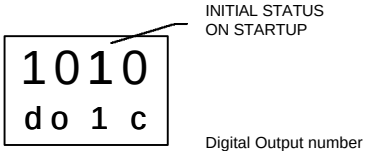
The Communication Watch-Dog is a protection device that forces the Digital Output to assume a value (1 or 0) of security if no communications take place during the 30 seconds after the last transmission. This device allows you to protect the process being controlled by preventing, in the event of a breakdown in communications or disconnection from the PC, some of the digital outputs in Remote Action from remaining activated in a continuous mode, causing a action that is dangerous or out of control.

If a value of **0** is assigned to **Active Security**, whether communication has been established or not, the Digital Output will be kept at the last status given by the **Remote Action**.

If a value of **1** is assigned to **Active Security**, in the event of an interruption in communications with the PC, the Digital Output of the **Remote Action** will go to the status (1 or 0) previously entered in the **Security Status** parameter.

NOTE: This parameter affects the Remote Action exclusively.

Initial Status on startup



This digit allows you to configure the Initial Status when the device is started up (after a power failure). The possible values are:

0: Initial Status at **0**.
1: Initial Status at **1**.

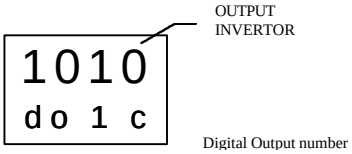
Three possibilities can occur:
a) In a standard communication situation, this **Initial Status** parameter allows you to predetermine the On/Off Status that digital output of the **Remote Action** will assume automatically when the module is started up after a power failure.

b) If the communication is interrupted for more than 30 sec. and the **Active Security** is in 0 (Watch-Dog cancelled) the **Initial Status** parameter will act the same as in the previous section a).

c) If the communication is interrupted for more than 30 sec. and the **Active Security** is at **1** (Watch-Dog activated), the Initial Status parameter will be inactive regardless of its value, passing the responsibility to the **Security Status** parameter, that will be the one to impose the Digital Output value of the **Remote Action**, if there is an communications error.

NOTE: This parameter works exclusively in Remote Activation.

Digital Output inversion



This digit allows you to configure the **Direct** or **Inverse** action of the **Digital Output** regarding the status of the **Alarm** or of the **Remote Action**. The possible values are:

0:	Direct Action.	Digital Output NOT Inverted.
1:	Inverse Action.	Digital Output Inverted.

If the action is **Direct**, the **Digital Output** will be at ON when the **Alarm** or the **Remote Action** are set at 1

If the action is **Inverse**, the **Digital Output** will be at OFF when the **Alarm** or the **Remote Action** are set at 1

NOTE: The output inversion does not affect the alarm LEDs on the front panel.

When the **Digital Output** is configured as **Direct Output**, it assumes the same value of the **Alarm Status** or the **Remote Action**, and when it is configured as **Inverse Output**, it assumes the opposite value.

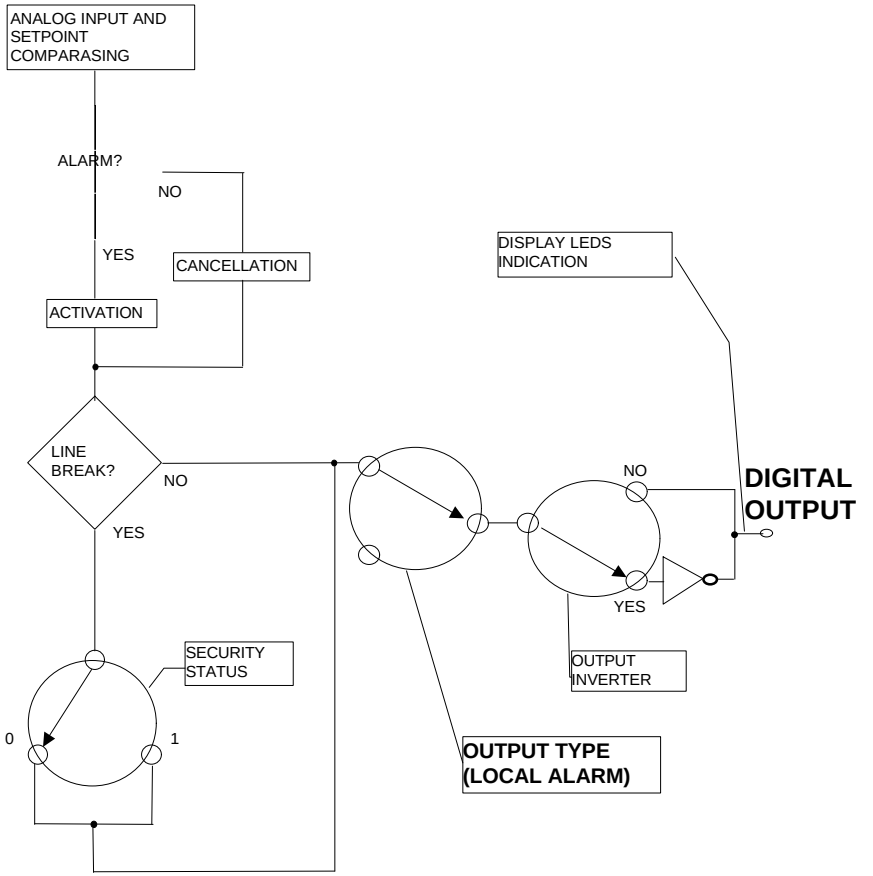
DIRECT output

Alarm or Remote Action = 1	LED front panel = 1	Digital Output = ON
Alarm or Remote Action = 0	LED front panel = 0	Digital Output = OFF

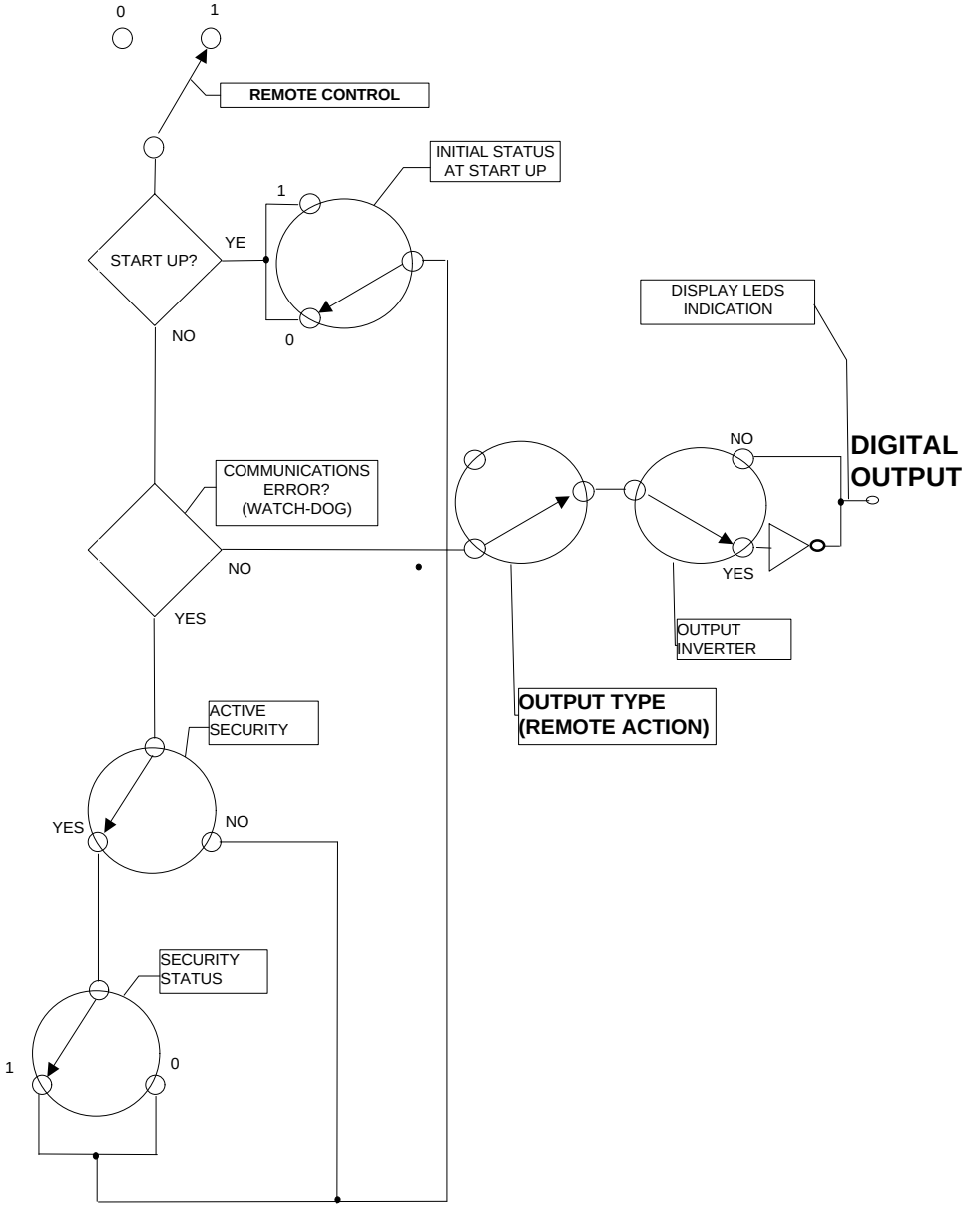
INVERSE output

Alarm or Remote Action = 1	LED front panel = 1	Digital Output = OFF
Alarm or Remote Action = 0	LED front panel = 0	Digital Output = ON

Local Alarm diagram



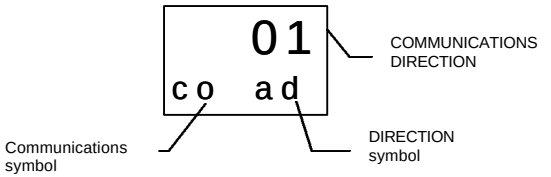
Remote Action diagram



Communications parameters

The next section of the Configuration Menu is the customization of the Communications. On the upper display, the text **ConF** is displayed, and on the lower one Co. Use the **Validation** key to enter the Communications section.

Communications address



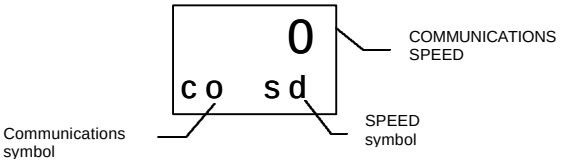
The Communications address no. assigned during the last configuration will be displayed. Use the **Shift** and **Increment** keys to enter the new address no.

Press the **Validation** key if you wish to display and/or configure the communications speed, or the **Function** key, if you wish to exit the Configuration Menu.

NOTES:

- The address no. in the DAS-8000 has been implemented using two digits in Hexadecimal Code. To number them, you should use from 0 to the 9 and the letters A, B, C, D, E and F, obtaining 255 combinations (the 00 is excluded because it is used as a General Transmission).
- To address modules, you can use the numbers 01, 02, 03, etc. up to 99; if the number of modules is over 99, you can continue with A1, A2, A3, etc. F1, F2, F3, etc., and then with AA, AB, AC, etc. until you reach FF (no. 255). Also, you can use the Hexadecimal numbering system (see Appendix 1, Hexadecimal Code).

Communications speed



The Communications speed parameter assigned in the last configuration will be displayed. Use the **Increment** key to enter the new value. The possible values are:

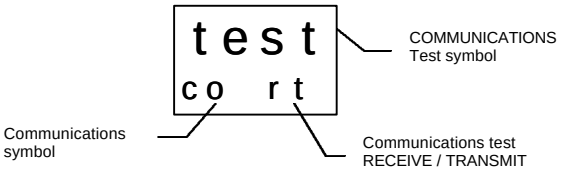
0: Communication at 9.600 baud.
1: Communication at 19.200 baud.
2: Communication at 38.400 baud.

Press the **Validation** key if you wish to save it or the **Function** key, if you wish to exit to the Configuration Menu.

NOTE:

- To access and modify this parameter, the Communications Speed Strap should be open (see section on configuration Straps in the Description chapter).

Communication test



The Communication Test will appear. If a communications link is established, the symbols **r** (RECEIVE) and **t** (TRANSMIT) will be

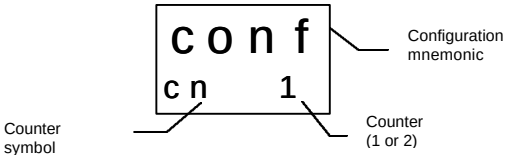
displayed. To exit the communication test, press the **Enter** or **Function key**.

NOTES:

- Only r will be displayed if data is being received from another DAS-8000 module.
- e will be displayed, instead of r , whenever CHECK errors occur during communication.

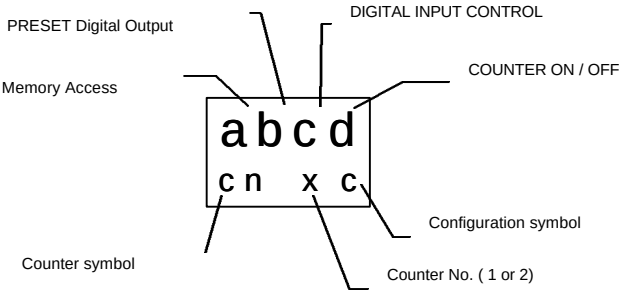
Counter parameters

The next setup menu item is the parametrization of the two counters available for the DAS-8000 module. The upper display shows the text **ConF** and the lower display **Cn** as well as the numeric signal (1 or 2) to select the counter to be configured. Use the **Increment** key to choose one of the two counters available.



Counter setup

After pressing the **Enter** key, the upper display shows 4 digits, each one corresponding to a given parameter.



Press the **Shift** key to choose the parameter to be changed and the **Increment** key to choose the data shown below:

A).- MEMORY ACCESS: This digit sets the time period between successive memory access operations to store the counter value.

Available settings are:

0: No access.
1: Access every 1 minute.
2: Access every 15 minutes
3: Access every 30 minutes
4: Access every 60 minutes

IMPORTANT NOTE:

- To prevent power failures from affecting or losing the DAS-8000 counter value, periodic storing of the counter value is enabled. The user must consider the trade-off between memory access frequency (number of writes at the same memory location) and writing service life (approximately 100,000 write operations) of an E2PROM memory location.
- For instance, if a write operation is performed every 60 minutes, the memory location would have a writing service life for more 11 years. A

frequency of every 1 minute, however, would shorten the writing service life to approx. 70 days.

B).- PRESET DIGITAL OUTPUT: This field allows the digital output number to be used as a PRESET output to be chosen.

Available Digital Output settings are as follows:

0: No Digital Output will be assigned.
1 to 8: Choosing the number of the digital output that will be assigned to a PRESET value counter overflow.

NOTES:

- The Digital Output No. May not be assigned exclusively to one output but can rather be assigned repeatedly for any alarm (e.g. in the case that this output is being used by one alarm output, by the other PRESET output or by the acknowledgment output).
- If no digital output is designed, the counter PRESET value cannot be displayed or changed.

C).- CONTROL DIGITAL INPUTS: This field can be used to enable or disable the two types of digital control inputs. Available settings are as follows:

0: Enable and reset digital inputs are off.
1: Only the Disable Digital Inputs are on.
2: Only the Reset Digital Inputs are on.
3: Disable and Reset Digital Inputs are on.

D).- TURNING THE COUNTER ON: This digit is used to turn the counter on. Available settings are as follows:

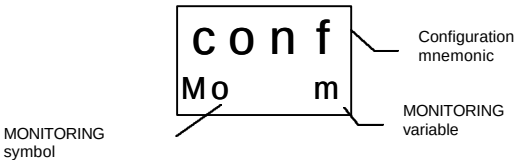
0: OFF. Counter off.
1: ON. Counter on.

Once these parameters have been set, press the **Enter** key to confirm or the **Function** key to exit without saving.

Monitoring parameter

The next section of the Configuration Menu is the selection of the type of Monitoring that is the MASTER or SLAVE function mode that the module will assume.

On the upper display **ConF** is displayed, and on the lower one **Mo** and the selection symbol (M or S). Use the **Increment** key to select between the two functions.



M: **MASTER:** The DAS-8000 module thus configured can have access to the data of the modules connected in its network.

S: SLAVE: The DAS-8000 module thus configured can only read its data, and does not have access to the data of the others.

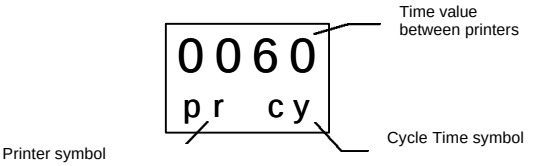
Once it is configured, press the **Validation** key to save the data, or the **Function** key to exit without confirming.

Report Printing parameters

The next section of the Configuration Menu is the parametrization of Printing Reports. On the upper display **ConF** is displayed, and on the lower one **Pr** (**P**rinter). Press the **Validation** key to enter the section.

Printing Periodicity

After pressing the **Validation** key, the Time between Dumps parameter is displayed. On the upper display, 4 digits will be displayed, with the last Time configured:

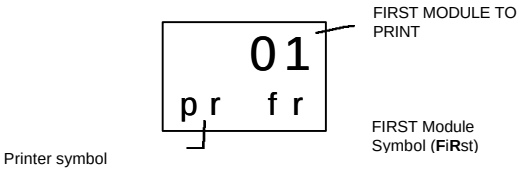


Use the **Shift** and **Increment** keys to modify the value. You can select between 1 and 9999 seconds (if it is configured with a value of 0, this function is deactivated).

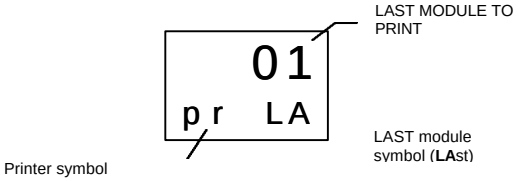
Once configured, press the **Validation** key to confirm or the **Function** key to leave without saving the new data.

Selection of Modules to Print

The following step is to indicate to the DAS-8000 module the number of the first and last DAS-8000 to print. After pressing the **Function** or **Validation** keys in the previous parameter, the number of the first module to print will be displayed on the upper display, press the **Increment** and **Shift** keys to modify the data, and then press **Validation**.



Next, the number of the last module to be PRINTED should be entered:



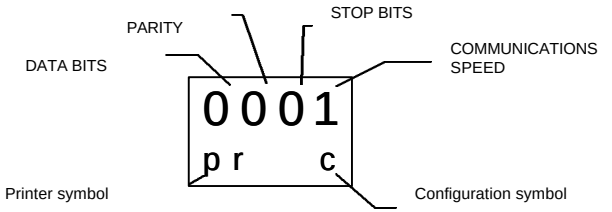
Once configured, press the **Validation** key to confirm or the **Function** key to leave without saving. This function is valid only when configured in a module configured as a MASTER.

NOTE:

The number of the last module should be greater or the same as the number of the first module TO PRINT.

Printer Communications parameters

The parameters that can be configured in the communication with the printer are the following:



Press the **Shift** key to choose the parameter to be modified, and the **Increment** key to select the following values:

DATA BITS: This digit selects the number of data bits used in the communication. The possible values are:

0: Word of 8 Bits. **1:** Word of 7 Bits.

PARITY: This digit allows you to configure the type of parity used in the communication. The possible values:

0 or1: Without Parity. **2:** Even Parity. **3:** Odd Parity.

STOP BITS: This digit allows you to configure the number of stop bits used in the communication. The possible values are:

0: 1 Bit. **1:** 2 Bits.

SPEED: This digit allows you to configure the communications speed. The possible values are:

0: 9.600 bauds. **1:** 19.200 bauds. **2:** 38.400 bauds

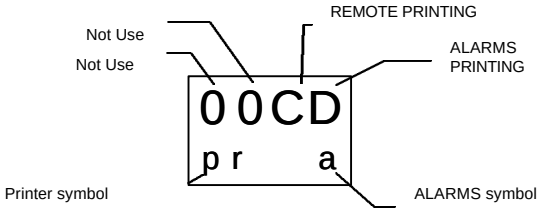
Once configured these parameters, press the **Validation** key to confirm it or the **Function** key to leave without saving.

NOTE:

Normally, the standard communication formats used are 8-bit data no parity, 1 stop bit and 9600 baud.

Alarm or Measurement Printing Parameters

A numeric 2-digit code will appear on the upper display with the current alarm printing configuration (the 2 digits on the left are 0 and are not accessible):

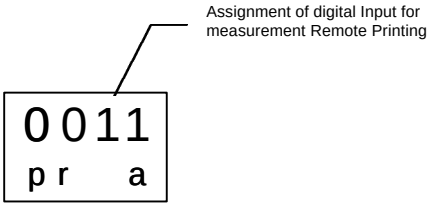


Use the **Shift** key to select the digit to be changed. Each digit of this code represents a parameter for printing alarms and/or remote printing of the measurements, where the digit value is a number representing the several choices of this parameter.

Choose each one in accordance to the desired configuration, as explained in the following subsection:

Assignment of Digital Input for Measurement Remote Printing

This digit permits selection of the Digital Input Number to be used to produce an analog measurement printing each time a rise edge is detected.

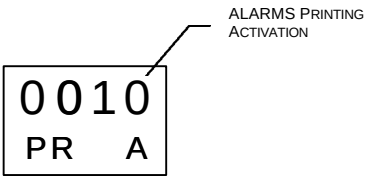


Digital Input settings available are:

0: No Remote Printing, (No Digital Input will be assigned).
1 to 8: Digital Input Number that will produce the printer listing.

NOTE:
- The digital input number may not be exclusively assigned and can be used repetitively for any alarm or alarm acknowledgement (there is no priority in any case).

Alarm Printing Activation.



This digit allows to turn alarm printing to be turned On or Off.

Available settings are:

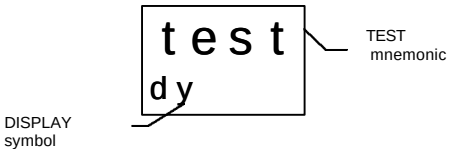
0: Printing Off.
1: Printing On.

After changing or displaying the alarm printing parameters, press the **Function** or **Enter** key to return to the setup menu.

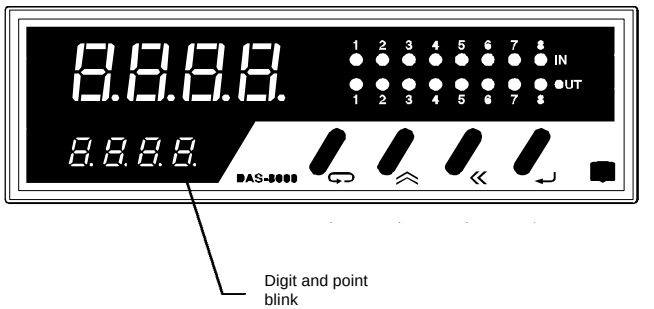
Display test

The next setup menu is used to perform a display test such that the proper operation of all its segments and display points as well as the input/output LEDs can be checked.

The upper display shows the text **Test** and the lower one **dy** (**d**ispla**y**). Press the **Enter** key to perform the display test.



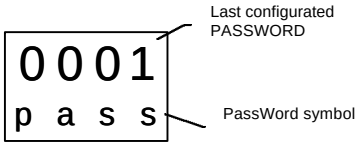
After pressing the **Enter** key, all display segments, the 8 display points and the 16 input/output LEDs should be on. In the lower display, the first digit as well as the point will blink, thus indicating proper operation of the edit function:



Once proper operation of all display elements has been checked, press the **Enter** or the **Function** key to exit the display test.

Change of General Password

The next section of the Configuration Menu is the modification of the Access Password (PASSWORD). On the upper display the last password configured will be displayed, and on the lower one the message **PASS**. Press the **Increment** and **Shift** keys to enter the new password.



The access password allows the use of 10 digits, 0 to 9, and the letters A, B, C, D, E and F, in any combination.

After modifying the password, press the **Validation** key to confirm it or the **Function** key to leave without saving it.

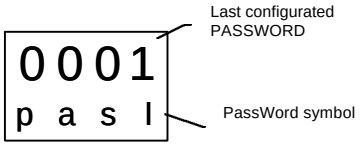
NOTES:

- The change of Password should be done associating it with some number or word that is easy to remember, since you will use it to enter the Configuration Menu very frequently.
- If on the contrary, it is not going to be used for a long time, it is advisable to write it in the Manual in case you need it in the future.
- If you do forget your password, a procedure exists for returning to the factory Password, that is not explained here, but can ask the supplier of the DAS-8000 about the procedure.

Change of Password Alarm parameters

The following section of the Configuration Menu describes how to change the Alarm parameter's password (PASL).

In the upper display the last password configured will be displayed, and on the lower one the message **PASL**. Press the **Increment** and **Shift** keys to enter the new password.



The access password allows the use of 10 digits, 0 to 9, and the letters A, B, C, D, E and F, in any combination.

After modifying the password, press the **Validation** key to confirm it or the **Function** key to leave without saving it.

NOTES:

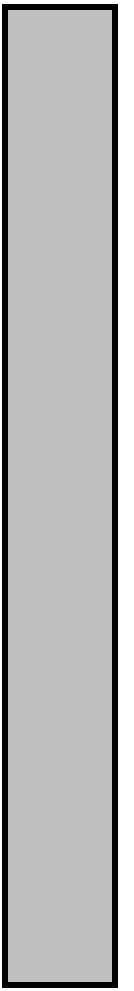
- The change of Password should be done associating it with some number or word that is easy to remember, since you will use it to enter the alarm parameters very frequently.
- If on the contrary, it is not going to be used for a long time, it is advisable to write it in the Manual in case you need it in the future.

Summary of Configuration Parameters

DISPLAY	DESCRIPTION	CONFIGURATION
ABCD A L X	Configuration of Alarm x parameters	A: Digital Recognition Input (**0 / 8**) B: Digital Alarm Output (**0 / 8**) C: Analog Reference Channel (**0 / 8**) D: **0**: Off; **1**: Max.; **2**: Min.; **3**: Window **4**:Max. + ACK; **5**:Min.+ ACK; **6**:Win.+ ACK
0 0 c d a l x r	Configuration of time delay on alarms	xxxx: **0** No Delay xxxx: **1 – 9999** Seconds of delay in alarms connection
0 0 c d a c	Configuration of Acknowledgement parameters of alarms	c: Acknowledgement Digital Input (**0 / 8**) d: Acknowledgement Digital Output (**0 / 8**)
c o n f c f x	Temperature Unit Configuration	x: c; Degrees CELSIUS x: F; Degrees FAHRENHEIT
ABCD c h X t	Configuration of channel x parameters	A: **0**: Without Peak Filter and without Overflow; **1**: With Peak Filter and without Overflow; **2**: Without Peak Filter and with Overflow **3**: With Peak Filter and with Overflow; B: **1 – 7** Average Filter; **0**: Without Filter C: **0**: 4-20 mA; **1**: Pt-100; **2**: 0-20 mA **3**: T; **4**: J; **5**: K; **6**: E; **7**: N; **8**: S; **9**: R; **A**: B **B**: User Curve; **F**: Off d: **0 - 3** Number of Decimals
XX d o X t	Type of Digital Output	XX: **AL** (Local Alarm) XX: **RT** (Remote Action)
ABCD d o X c	Digital Output Configuration	A: Security Status **0**: Off; **1**: On B: Active Security **0**: Off; **1**: On C: Initial Status at Startup **0**: Off; **1**: On D: Output Inverter **0**: NO; **1**: YES
0 0 x x c o a d	Communications Address	**0 - 255** (0 for general transmission)

000x c o s d	Communications Speed	x: **0**; 9.600 bauds x: **1**; 19.200 bauds x: **2**; 38.400 bauds
t e s t c o r t	Communications Test	r : Receive t : Transmit E: Check Error
a b c d c n x c	Counter x Parameters Configuration	a : Memory Access **0**: Without Access; **1**: 1'; **2**: 15'; **3**: 30'; **4**: 60' B: Preset Digital Output (**0 / 8**) C: Control Digital Input **0**: NO Dis+NO Reset; **1**: Dis; **2**: Reset; **3**: Dis + Reset d : Counter On **0**: NO; **1**: YES
c o n f m o X	Type of Monitoring	x: M; MASTER x: S; SLAVE
xxxx p r c y	Printer Configuration Cycle Time	xxxx: **0**; Do Not Print xxxx: **1 - 9999** Seconds between consecutive printings.
00xx p r f r	Printer Configuration. First module	xx: **1 – 255**
00xx p r l a	Printer Configuration. Last module	xx: **1 – 255**
ABCD p r c	Printer configuration; Communications	A: Data Bits **0**=8 bits ; **1**=7 bits B: Parity **0,1**= NO; **2**= Even; **3**= Odd C: Stop Bits **0**=1 bit; **1**=2 bits d : Speed **0**=9.600; **1**=19.200; **2**=38.400
00CD p r a	Printer Configuration of alarms and measurements	C: Remote Printer **0**=NO; **1/8**=ED d : Alarms printer **1**=YES **0**=NO
X x x x p a s s	Configuration of the general PassWord	xxxx: **0000 – FFFF**
X x x x p a s l	Configuration of the Alarm PassWord	xxxx: **0000 – FFFF**

Calibration



Calibration procedure

The DAS-8000 modules are delivered from the factory, calibrated and prepared so that a process engineer can change each input (from Pt-100 to LINEAR, or viceversa) without needing to recalibrate.

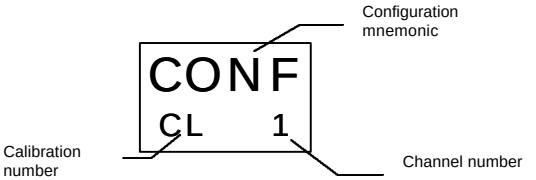
Even if it comes preset from the factory, it may be necessary to recalibrate an analog channel, for example, if you wish to change from 4-20 mA to 0-20 mA, or if a number of measurement errors relative to the standard used in the business were observed.

PROCEDURE: Enter the Calibration section of the Configuration Menu of the DAS-8000 module as follows:

Press the **Function** key twice until the message input PassWord is displayed. Enter the Password, and press the **Validation** key.

CONF will be displayed on the upper display (indicating that you have entered the Configuration menu). Press the **Function** key 2 times until **CL** is displayed on the lower one. This indicates that you are in the calibration section of analog channels.

At the same time, the channel number can be seen blinking. Select the channel number that you wish to recalibrate with the **Increment** key.



Once selected, press the **Validation** key (NOTE: if the channel is deactivated, it will not allow you to readjust it. You should activate the channel beforehand).

Next, the procedure for the three possible cases that may occur will be explained:

- Pt-100 Input signal.
- Input signal from 4-20 mA, 0-20mA, or thermocouples.
- Input signal from 10-50 mV (or 0-50mV)

Pt-100 Input

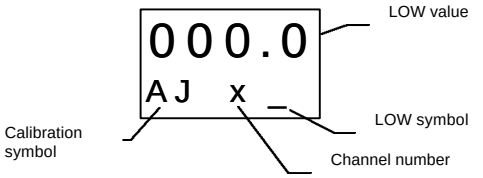
To calibrate a Pt-100 signal, it is necessary to have a Pt-100 signal generator, with values of 0°C and 400°C. These values correspond to 100 Ohms and 247.05 Ohms, respectively (s/IEC-751 DIN-43760).

NOTE:

- A different setting range can be used. Nevertheless, the accuracy specified in the technical data sheet will be achieved with the 0 - 400ºC.

"ZERO" SETTING OR LOW VALUE:

When you are in the Calibration menu, 4 digits will be displayed on the upper display, with the value 000.0, and on the lower display **Ajx**, with "x" as the channel no. to recalibrate and "_" the indicator of the low level of calibration (corresponding to "Zero").



Enter through the terminals corresponding to the number of the channel being calibrated, the signal of the low value: 100 Ohms (0°C of Pt-100).

NOTES:

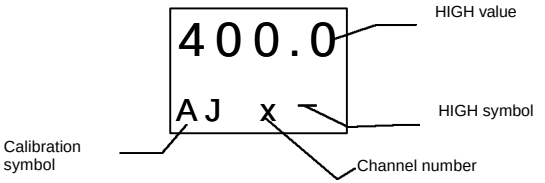
- If the Pt-100 Signal Generator has a calibration certificate with an error curve, or if a fixed resistance generator is being used and its deviation error is known, it should be entered through the **Increment** and **Shift** keys on the upper display, so that it marks that deviation
- For example, if the generator has a real value of -0.2° when 0.0° is demanded, the display should indicate -000.2°.
- Note that the decimal point is fixed, since it is not possible to eliminate it, or to change its position.

Once the numerical value of the generator error is entered on the display, press the **Validation** key.

"SPAN" OR HIGH VALUE SETTING:

Repeat the same process for the Span (range width).

Once the **Validation** key is pressed, 4 digits will be displayed on the upper display, with the value 400.0, and on the lower display Ajx -, with "x" as the channel no. to recalibrate and " - " the indicator of the high level of calibration (corresponding to "Span").



Enter via the terminals corresponding to the channel no., the signal of the high value: 247.05 Ohms (400.0° C of Pt-100).

Enter the error of the generator, as before, via the **Increment** and **Shift** keys on the upper display, so that the deviation of that error is marked.

Once the numerical value of the error of the generator is entered on the display, press the **Validation**.

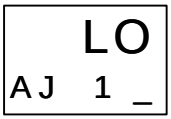
Test the calibration performed, returning with the **Function** key to the Display menu and generating from the generator mean values, so that its precision in the scale is ensured, (from -150.0° C to 600.0° C).

4-20 mA (or 0-20 mA) milliamps Input

To calibrate an mA signal, you will need a current generator of 0.00 to 25.00 mA (with a minimum of two decimals).
VERY IMPORTANT: The channel to be calibrated should have in the input terminals a precision resistance in parallel:
Shunt of 2.5 Ohms 10 ppm. for a scale range of 50 mV.

"ZERO" OR LOW VALUE SETTING:

In the Calibration menu, **LO (LOW)** will be displayed io the upper display, and on the lower one **Ajx_**, with **"x"** the channel no. to recalibrate and "_" the indicator of the low calibration level (corresponding to "Zero").

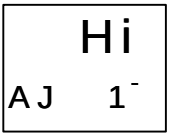


Enter via the terminals corresponding to the channel no. being calibrated, the signal of the low value: 4.00 mA (or 0.00 mA).
Press the **Validation** key.

"SPAN" OR HIGH VALUE SETTING:

Repeat the same process for the Span (range width).

Once the **Validation** key is pressed, **HI (HIgh)** will appear on the upper display, and on the lower display **Ajx _**, with **"x"** the channel number to be recalibrated and " - " the indicator of the high calibration level (corresponding to "Span").



Enter via the terminals corresponding to the channel no. being calibrated, the signal of the high value: 20.00 mA

Press the **Validation** key.

At this point the channel is calibrated as a signal, but a scale has not been defined, and accordingly the DAS-8000 module will ask next:

RANGE ASSOCIATED WITH "ZERO" AND "SPAN":

(See "Instruction for Use chapter", part "Low and High range".)

The 0..4-20 mA measurement signals in instrumentation always imply an associated range in engineering units (°C, bar, pH, etc.). The procedure to enter them is explained:

Press the **Function** key until **PASS** appears on the upper display. Enter the password and re-enter Configuration in the same analog channel that you just finished calibrating.

Press the **Validation** key twice until you reach the message CHx_on the lower display, to enter the minimum of the range.

Enter with the **Increment** and **Shift** keys the value of the minimum of the scale (associated with 0 or 4 mA) on the upper display, and press the **Validation** key.

Next it will request the maximum of the scale indicating Chx -, on the lower display.

Enter with the **Increment** and **Shift** keys the value of the maximum of the scale (associated with 20 mA) on the upper display, and press the **Validation** key.

Test the calibration by returning to the Display menu with the **Function** key and generating from the generator mean values, so that its precision is assured throughout the scale.

Millivolt (mV) Input

To perform the setting of the channel with mV signals, you must have an mV generator, with the minimum and maximum between 0 and 50 millivolts.

The calibration process is exactly the same one as for milliamps, with the exception that the resistance in parallel with the input is not needed. Because of it, the same steps should be followed as in the calibration process of an mA input, but removing any Shunt resistance that may be present in the input terminals of the channel being reset.

To calibrate an mA signal, you need a voltage generator of 0.00 to 100.00 mV (with a minimum of two decimals), although it will be used only in the margin 0.00 mV for “Zero” and 50.00 mV for “Span”.

NOTES VERY IMPORTANT ABOUT CALIBRATION:

- If for any reason, mistake, etc. and at any time during the previous procedures, you wish to leave without modifying any of the parameters, press the Function key several times (the Function key acts like the **Escape** key on this occasion), and none of the previously entered data will be validated.

- It is important to be aware of this operation, because if you inadvertently press the **Validation** key, entering as valid, erroneous or non-existent calibration signals, the channel will be improperly set, giving incoherent measurement values, that will force you to readjust the channel, or to retrieve the "factory setting", a security procedure that is explained below.

Small errors correction “Offset”.

The correction of small deviations in the display of the measurement, can be performed acting upon the Indication offset of the channel without altering the calibration constant.

This function should be used only to perform small settings of the measurement when it is necessary to homogenize readings with other measurements in a same process.

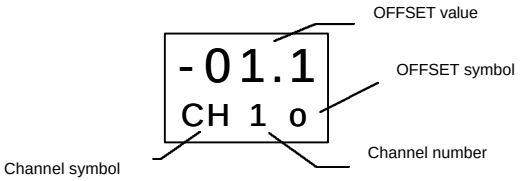
The modification of the Indication offset should be performed by entering the Configuration Menu of the DAS-8000.

Press the **Function** key until **PASS** is displayed on the upper display. Enter the password and reenter Configuration in the analog channel that you wish to adjust.

Press the **Function** key until you reach the **CH** message on the lower display, indicating that it is being configured, and at the same time the channel number can be seen blinking.

Select the channel no. that you wish to recalibrate with the **Increment** key, and press the **Validation** key.

Press the **Validation** key until the message **CHxo** is displayed on the lower display, with "**x**" corresponding to the channel no. to be modified.



Press the **Shift** and **Increment** keys to enter the required Offset value. Once the data is entered, press the **Validation** key.

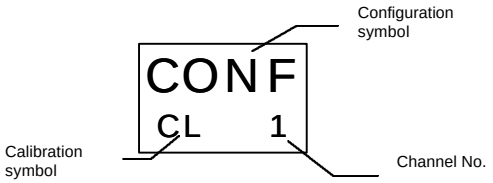
The value entered in this parameter, will be added or subtracted (based on the sign that has been given to it), to the value of the measurement throughout the scale.

How to recover the original calibration

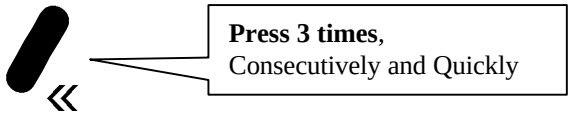
If by any chance you entered the Calibration section and validated the values of Zero and Span, without connecting the generator signal to the input terminals, or, if in the process of recalibrating a channel, signals with erroneous reference values were entered, the analog channel would be incorrectly adjusted.

In this case, the DAS-8000 modules have the capability of allowing you to retrieve the original "factory setting" by means of a simple procedure, that allows you to return immediately to full functionality.

To accomplish this, enter Configuration and with the Function key reach the calibration section CL x,



Select with the **Increment key** the maladjusted channel, and without needing any external signal generator, press 3 times, consecutively and quickly, the **Shift key.**



And the DAS-8000 will return to the original "factory setting" values from the memory locations where they are permanently stored.

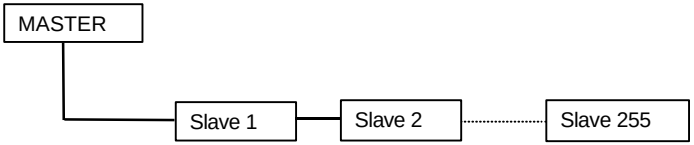
Repeat the process for each analog channel that was maladjusted and that you need to recover.

Communications

Communications description

DAS-8000 modules have MOD-BUS communications in RTU (binary) mode.

The MOD-BUS communications protocol is a MASTER-SLAVE type network language, in which communications follow the Question/Answer principle.



The Master module generates the request messages, while the Slave provides the answer to these requests. You must keep in mind that only the Master can initiate the exchange of messages.

The protocol system for the communication of data controls the structure of the language and the common message format of all the devices of a channel. The protocol determines:

- How the Master and the Slave establish and finish the contact.
- How the receiver and transmitter are identified.
- How messages are exchanged in an orderly way.
- How communication errors are detected.

The protocol controls the queue and the answering function when communication is established between the Master and the Slave.

Certain characteristics of the MOD-BUS protocol are fixed, such as the message format, management of the communication errors, exception conditions, and the functions to be performed.

Other characteristics are definable by the user. They include the selection of the means of transmission, the communications format, and the communications speed.

The communication is carried out in the following format:

Speed: Selectable among 9600, 19200 or 38400 baud.
Parity: Without parity.
Data Bits: 8 bits.
Stop Bits: 1 bit.

In a PC/ DAS-8000 network, the PC will always be the Master and the DAS-8000 the Slaves, since it is not possible to have more that one Master at the same time.

The DAS-8000 is able to communicate in RS-232 or RS-485. The RS-485 standard allows you to connect up to 255 modules in groups of 32, but the RS-232 standard allows you to connect only one module.

The protocols are the same for both systems.

This type of MOD-BUS protocol allows reading and writing from the Master to any Slave. However, it is not possible to read or write from the Slaves.

The DAS-8000 can be configured as Master or Slave:

- As **SLAVE**, it can read and write the addresses according to the tables defined in the input and output areas.

- As **MASTER**, the DAS-8000 can display measurements on its display and change the alarm parameters.

Numbering the modules

The address that will be established for each module will be a two-digit number in Hexadecimal corresponding between 1 and 255, assignable by means of the keyboard of the DAS-8000 module (to assign them, see the section Communication Parameters in the **Operation Instructions** chapter).

The DAS-8000 display uses only two digits to assign the communications address, but from 100 until 255, three digits are needed; therefore, two systems can be used to establish the order of the modules:

Use for the assignment the sequence of numbers between 01 and 99. If you need to go above this address, continue with A1, A2, A3, etc. F1, F2, F3, etc. Later follow with AA, AB, AC, etc. until you reach FF (number 255).

Use the Hexadecimal Code directly, which forces you to work between 01 and FF (equivalent to 1 to 255) with a different correlation from the previous explanation.

(To learn its positional order, see **Appendix 1** that has a listing of equivalencies with the order of the decimal code compared).

In a network of DAS-8000 modules a repeated number cannot exist. The only exception will be made when the address number used is 0, this being a special case, that will be used exclusively as General Transmission, in which all the DAS-8000 modules that have this address assigned, will interpret as their own any message sent from the PC to the network.

Types of communications.

The DAS-8000 has 2 communications ports, one selectable like RS-232 or RS-485 coming out through two groups of terminals, and another independent RS-232, specifically to connect a serial printer.

The communications that can be established with one or several DAS-8000 are of 3 types:

- Network of DAS-8000 modules communicating among them in the RS-485 standard.
- Communications between one or more DAS-8000 modules with a PC or intelligent system (PLC, etc. in the RS-232 standard (only 1 DAS-8000 module), or in the RS-485 standard (from 1 to 255 DAS-8000).
- Communication between one or more DAS-8000 modules with a serial printer in the RS-232 standard.

The DAS-8000s accept communications with a PC in RS-232 or RS-485 standard, using only one of them. It also allows you to communicate with a PC at the same time, and to communicate independently with a printer by means of its specific serial port.

In the following sections, each one of the possible connections is described.

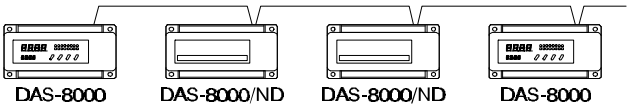
RS-485 communications with a network of DAS-8000

The system allows the connection of a maximum of 255 units in a network made up of DAS-8000 only. To create this type of network, you should use RS-485 line conditioners for each line of 32 modules connected.

For example, for a network of 64 DAS-8000, an RS-485 line conditioner would be required for each one of the lines with 32 modules.

The capabilities that are obtained with this option are:

- **Displaying data**: Capability of displaying the measurements, alarm status and parameters of the DAS-8000 modules centralized in one DAS-8000 module acting as a Master. All other DAS-8000 modules should be configured as Slaves.
- **Modification of data**: Possibility of preselection in a centralized way, in one or more DAS-8000 modules working as Master, the more customary alarm parameters (set-point, hysteresis and status), of all the DAS-8000s connected to the line, with a single precaution of not working with more than one Master module at the same time. All the other DAS-8000 modules should be configured as Slaves.

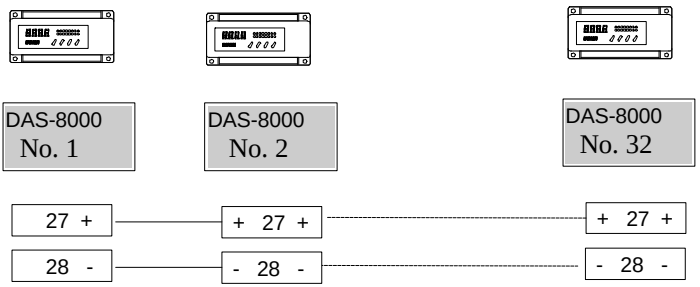


This option has the advantage being able to display and change remotely the most customary parameters without having to resort to communication with a PC, and also the alternative of being able to connect in the network DAS-8000 modules/ND without display, that not having a display, they can be read remotely by a DAS-8000 Master.

Wiring diagram

The connections should be carried out with a standard cable with a twisted and shielded pair. The maximum distance of the network should not surpass 1200 meters.

The numbers correspond to the numbering of the terminals of the DAS-8000, and the polarity of the connections should be respected.



RS-232 communications with a PC

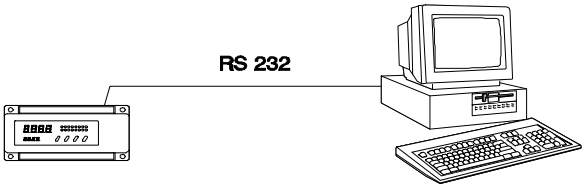
This system allows the connection of a PC and only one DAS-8000, in the RS-232C standard and at **a distance not greater than 15 meters**.

The PC will act as the Master, and the DAS-8000 is not necessary configured as the Slave.

It is recommended that you use a three-wire, shielded cable, and even if the distance is short, avoid nearby power conductors that can cause problems.

NOTE:

- Remember that the configuration "Jumper" of communications type must be placed in the RS-232 position. See the "**Description Chapter**", part "**Configuration of Communication Type**"

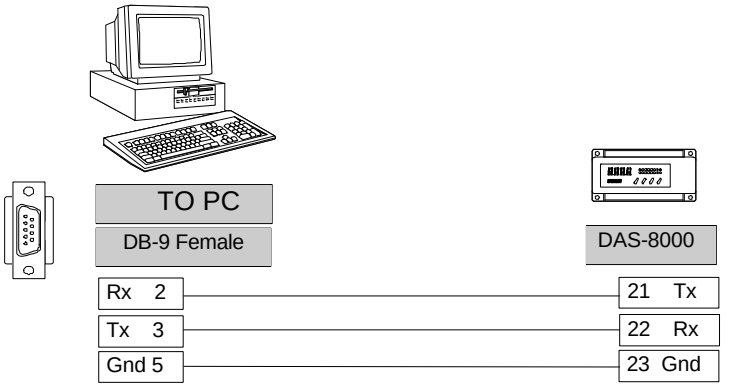


Wiring diagram

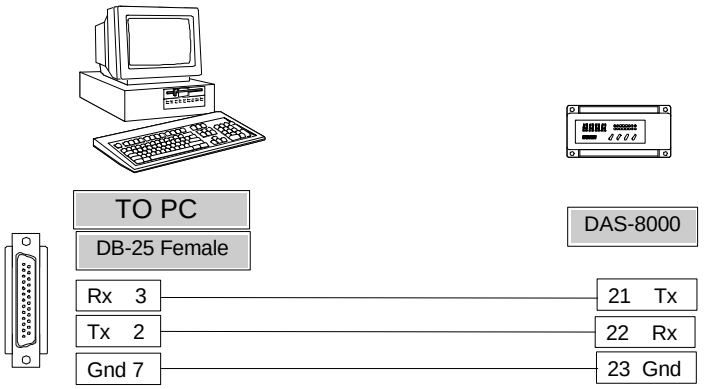
The connection to the PC will be performed on serial port 1 or 2 (COM1 or COM2). You may use a 9- or 25-pin female connector (Cannon type).

In the following figures both types are shown:

- PC with serial output and 9-pin female connector type:

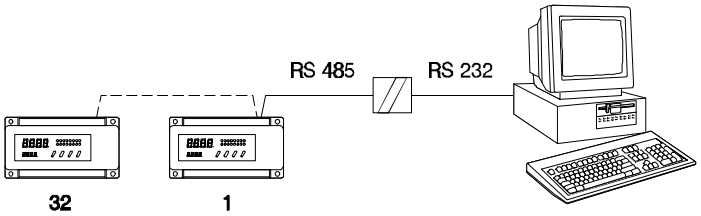


- PC with serial output and 25-pin female connector type:



RS-485 Communications with a PC

The system allows communication of up to 255 DAS-8000 modules connected via RS-485 to a host computer with a maximum distance of 1200 meters. If there are more than 32 DAS-8000 modules, an RS-485 repeater for 32 modules or a multiplexor for several RS-485 lines should be inserted in the communications network.



IMPORTANT NOTE:

- The maximum Distance between PC and the RS-232 to RS-485 converter is 15 meters.

Communication is established on a multipoint basis, 2-wire and in half-duplex or semiduplex mode.

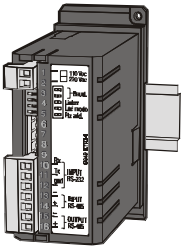
Conversion from RS-232 to RS-485 and viceversa is performed by an RS-232 to RS-485 converter. This can switch from receive to transmit and back in several ways:

- Automatic data flow control using the switching function of the receive and transmit drivers.
- Data flow control using the **RTS** signal (**R**equest **T**o **S**end) of the RS-232. One way to control the **RTS** signal via hardware is to connect it to the transmit Tx signal using jumpers such that the **RTS** signal will have a high level when transmitting and switch to a low level when it is receiving.

- In a 25-pin connector, 2 (Tx) and 4 (RTS) should be connected with a jumper.
-In a 9-pin connector, 3 (Tx) and 7 (RTS) should be connected with a jumper.

VERY IMPORTANT NOTE:

To assure the reliability of the communications, it is completely indispensable to use a converter that has galvanic isolation between the RS-232 input and the RS-485 output.



The **AC-1000** model converter is a device provided with a galvanic isolation and an RS-485 line that allows connection of up to 32 DAS-8000 modules. The transmit and receive lines are turned on automatically (data from the RS-232 line activate the transmit drivers. When data are no longer available, the converter returns to the receive mode.)

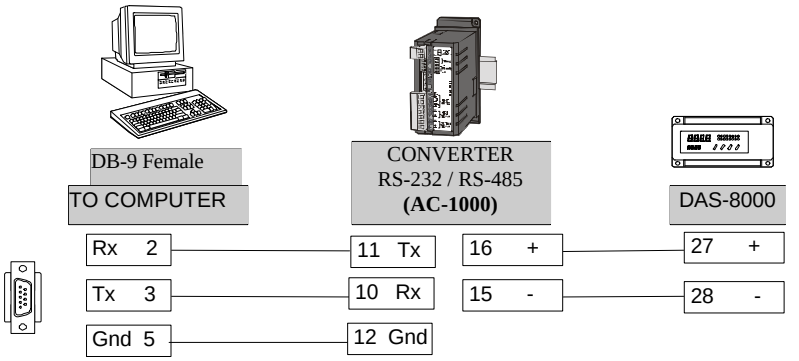
NOTE:

- Remember that the "jumper" which configures the type of communications should be placed at the RS-485 position (see section "**Description**", item "**Communications Type Setup**".)

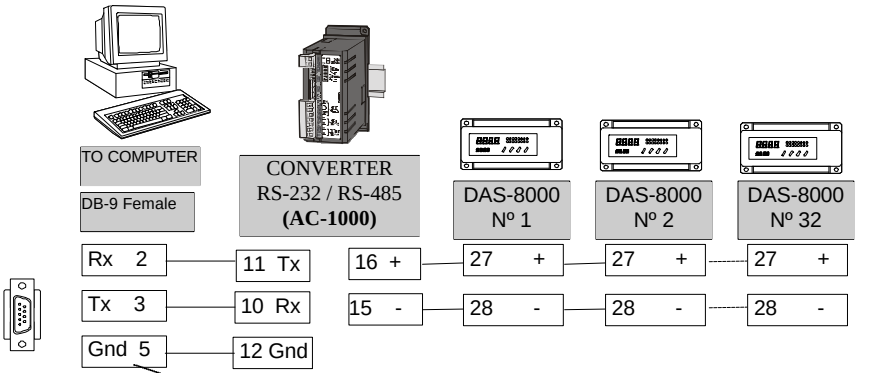
The figures below show the connection diagrams for these modules, both for a point-to-point connection and a multi-point connection.

Wiring diagram in RS-485

CONNECTION WITH ONLY 1 DAS-8000 THROUGH AC-1000



CONNECTION UP 32 MODULES DAS-8000 THROUGH AC-1000



NOTE:

If the connector of the computer is a DB-25M, use a DB9M-DB25F adapter, or replace it for a DB25F connector with the followings equivalents:

Connector 9 pins	Connector 25 pins
Rx 2	Rx 3
Tx 3	Tx 2
Gnd 5	Gnd 7

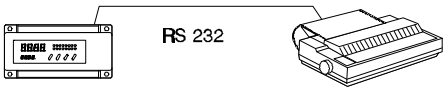
RS-232 Printer Communications

The connection of a DAS-8000 module with a printer with an RS-232 serial interface, allows you to dump the data originating in the measurements taken by the network of DAS-8000 modules, in the form of an automatic or manual printout, as a numerical listing.

The maximum distance will be 15 meters and will use only the direction of the sending of data from the DAS-8000 to the printer.

The DAS-8000 module should be MASTER.

NOTE:
The communications parameters between the two devices should coincide (baud, data bits, parity and stop bits). See the "**Instructions for Use Chapter**", part "**Communication Parameters**"



Wiring diagram

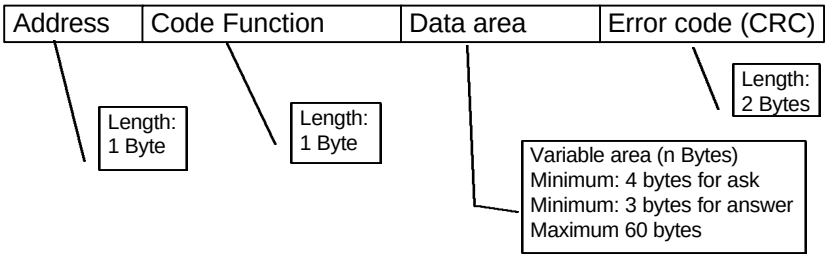
You can use a cable that is single wire with metallic shield or two-wire, shielded or not. The maximum distance will be 15 meters.

Communication protocols

Communication protocols are the different characters and codes that an intelligent device uses to communicate with another. If both know this language they will be able to exchange information.

Estructure of the messages

The messages that will be exchanged between the PC or intelligent system with the DAS-8000 modules connected to the communications line, will always have the same format, being divided into the following fields:



The **MOD-BUS RTU** messages are binary, and they do not use any character that identifies the beginning and the end of the message.

The differents fields are:

ADRESS: (1 byte). Number of the Slave with which it will communicate. It is a value between 1 and 255 (1 to FF in Hexadecimal). The number 0 is also valid, called General Transmission. All the Slaves will receive the message sent by the Master but none will respond. It would be used only to send messages to all the modules connected on the same communications line.

CODE FUNCTION: (1 byte). The Function Code field indicates, to the Slave being addressed, the function to perform and the meaning of the data area sent in the next field.

The DAS-8000 uses 3 Function Codes exclusively:

Code Function	Description
3	**Reading** of N words from the **Read / Write** area
4	**Reading** of N words from the **Read** area
16	**Writing** of N words from the **Read / Write** area

DATA AREA: Depending on the previous Function Code, it will have its own area, with a maximum of 60 bytes, and a minimum of 3 bytes for answer message, or a minimum of 4 bytes for Question message.

Data area for a Question message.

Code Function	**QUESTION** Data Area
3	**2 bytes:** Address of the first word to be **Read** **2 bytes:** Quantity of words to be read (maximum 29)
4	**2 bytes:** Address of the first word to be **Read** **2 bytes:** Quantity of words to be read (maximum 29)
16	**2 bytes:** Address of the first word to **Write** **2 bytes:** Quantity of words to **Write** **1 byte:** Number of words for 2 **n bytes:** Values To write for each word

Data area for an Answer message.

Code Function	**ANSWER** Data Area
3	**1 byte:** Length in bytes of the message **n bytes:** Readings of the words (2 bytes per word)
4	**1 byte:** Length in bytes of the message **n bytes** Readings of the words (2 bytes per word)
16	**2 bytes:** Address of the first word written **2 bytes:** Quantity of words written

ERROR CODE (CRC16): (1 byte). The Error Code field uses the CRC-16 error checking sequence. It uses the last 2 bytes of the message.

Calculation of CRC-16

Before the transmission of each message, an error checking sequence is calculated and added to the message, called **CRC-16** (**C**yclic **R**edundancy **C**heck). The receiver recalculates the **CRC-16** with the message received, and compares it with the **CRC-16** transmitted to verify its good reception.

When a different CRC-16 is detected or a communications error occurs, the process generates an error algorithm, and the Slave cannot guarantee that it has understood the transmission. Thus, the CPU cannot answer with a message. It is essential then to program the Master so that, if there is no answer in a reasonable period of time, it will assume that a communications error has occurred. The period of this time depends on the baud speed, the length of the message, and the cycle time of the Slave. Once this time is determined (TIME-OUT), the Master can be programmed for automatic retransmission of the message.

CRC-16 calculation example

The following two examples of **CRC-16** calculation are shown, in **C** language and in **BASIC**.

Example in BASIC

```
FUNCTION crc16 ( txt, lon) AS INTEGER
        DIM flag AS LONG
        DIM crc AS LONG
        DIM car AS INTEGER
        DIM bit AS INTEGER
        crc = &HFFFF&
        FOR car = 1 TO lon
                crc = crc XOR ASC(MID$( txt, car, 1))
                FOR bit = 0 TO 7
                        flag = crc AND 1&
                        crc = crc \ 2&
                        IF flag = 1 THEN
                                crc = crc XOR &HA001&
                        END IF
                NEXT bit
        NEXT car
        crc16 = INT ( crc AND &HFFFF&)
END FUNCTION
```

Example in C:

```
unsigned int sir_DoCRC (char *bufer, int len)
{
        int i;
        unsigned int crc, flag;
        crc = 0xFFFF;
        while (len > 0)
        {
                crc ^= *((unsigned char *)bufer);
                for (i=0 ; i<8; ++i)
                {
                        flag = (crc & 1);
                        crc >>=1;
                        if (flag == 1) crc ^= 0xA001;
                }
                ++bufer;
                --len;
        }
        return crc;
}
```

- char *buffer: pointer to the message (does not use any terminator.
- int len: length of the message
- returns the value of the CRC of the message in crc

If you wish to verify if the **CRC-16** is correct, you should calculate the **CRC** of the complete message, including the **CRC**. If this calculation is 0, the message is correct.

List of words

As we said before, the DAS-8000 has 2 different areas in memory, the Input area in which the data in memory can only be read, and the Output area, in which data in memory can be read and written.

The list of memory addresses of the 2 areas is presented in the following sections.

Input Area (Reading only)

(Function Code 4)

ADDR. Dec. /Hex.	**DESCRIPTION**	**FORMAT**
00 / 00	Version of memory	0x**vvvv** (In BCD)
01 / 01	Analog measurement channel **1**	**-1999 / 9999**
02 / 02	" channel **2**	"
03 / 03	" channel **3**	"
04 / 04	" channel **4**	"
05 / 05	" channel **5**	"
06 / 06	" channel **6**	"
07 / 07	" channel **7**	"
08 / 08	" channel **8**	"
09 / 09	Status Digital Inputs.	0x**00##** **0=** OFF, **1=** ON
10 / 0A	Status Digital Outputs.	0x**00##** **0=** OFF, **1=** ON
11 / 0B	Status Alarms.	0x**00##** **0=** Standard, **1=** Alarm
12 / 0C	Analog measurement points channel **1**	**0 - 65535**
13 / 0D	" channel **2**	**0 - 65535**
14 / 0E	" channel **3**	**0 - 65535**
15 / 0F	" channel **4**	**0 - 65535**
16 / 10	" channel **5**	**0 - 65535**
17 / 11	" channel **6**	**0 - 65535**
18 / 12	" channel **7**	**0 - 65535**
19 / 13	" channel **8**	**0 - 65535**

Output area (Read and/or Written)

(Function Code 3 or 16 respectively).

ADDR. Dec./ Hex.	DESCRIPTION	FORMAT
00 / 00	Status Remote Digital Outputs	0x**00##**: **0**= OFF, **1**= ON (This status is not preserved in the event of a power failure).
01 / 01	Configuration channels: Selection of inputs to configure	0x**AABB**: 1 bit for each input to Adjust: **AA:** Max. Adjust.; **BB:** Min. Adjust. **0**= Do not Change, **1**= Adjust.
02 / 02	Special Functions	**1**= Ranges and inputs type **2**= Reset counter 1 **3**= Reset counter 2
03 / 03	Maximum Indication Channel **1**	**-1999 / 9999** Physical Units without decimals
04 / 04	" Channel **2**	"
05 / 05	" Channel **3**	"
06 / 06	" Channel **4**	"
07 / 07	" Channel **5**	"
08 / 08	" Channel **6**	"
09 / 09	" Channel **7**	"
10 / 0A	" Channel **8**	"
11 / 0B	Minimum Indication Channel **1**	"
12 / 0C	" Channel **2**	"
13 / 0D	" Channel **3**	"
14 / 0E	" Channel **4**	"
15 / 0F	" Channel **5**	"
16 / 10	" Channel **6**	"
17 / 11	" Channel **7**	"
18 / 12	" Channel **8**	"
19 / 13	Not Used	
20 / 14	Communications Address	**1-255** **0**= Only general Transmission
21 / 15	Baud Speed	**0**=9600, **1**=19200, **2**=38400
22 / 16	Digital Output Securities	0x**XXYY**: **XX**= Active Security, **YY**= Security Status
23 / 17	Configuration Digital Outputs	0x**XXYY**: **XX**= Initial Status, **YY**= Inverters
24 / 18	Digital Outputs Type	0x**00##**: **0**= Local Alarm, **1**= Remote Action
25 / 19	Activation Alarms	0x**00##**: **0**= Alarms enabled, **1**= Alarms disabled
26 / 1A	Setpoint Alarms **1**	**-1999 / 9999**
27 / 1B	" Alarms **2**	"
28 / 1C	" Alarms **3**	"
29 / 1D	" Alarms **4**	"
30 / 1E	" Alarms **5**	"
31 / 1F	" Alarms **6**	"

ADDR. Dec./ Hex.	DESCRIPTION	FORMAT
32 / 20	·" Alarms **7**	"
33 / 21	·" Alarms **8**	"
34 / 22	Hysteresis Alarms **1**	**0 / 9999**
35 / 23	" Alarms **2**	"
36 / 24	" Alarms **3**	"
37 / 25	" Alarms **4**	"
38 / 26	" Alarms **5**	"
39 / 27	" Alarms **6**	"
40 / 28	" Alarms **7**	"
41 / 29	" Alarms **8**	"
42 / 2A	Configuration Alarms **1**	0x**ABCD**: **A**: **0-8** Disabled Digital Input **B**: **0-8** Digital Alarm Output **C**: **0-8** Reference Analog Channel **D**: **0**= OFF; **1**= Max., **2**= Min., **3**= Window **4**= Max.+ACK; **5**= Min.+ACK; **6**=Win.+ACK
43 / 2B	" Alarms **2**	"
44 / 2C	" Alarms **3**	"
45 / 2D	" Alarms **4**	"
46 / 2E	" Alarms **5**	"
47 / 2F	" Alarms **6**	"
48 / 30	" Alarms **7**	"
49 / 31	" Alarms **8**	"
50 / 32	Configuration Channel **1**	0x**ABCD**: **A**= **0 - 1** Peaks Filter + Overflow **B**= **0 - 7** Average Filter **C**= **0**: 4/20 mA; **1**: Pt-100; **2**: 0/20 mA. **3**:T; **4**:J; **5**:K; **6**:E; **7**:N; **8**:S; **9**:R; **A**:B; **B**: User Curve; **F**:OFF **D**= **0 - 3** Decimal Point
51 / 33	" Channel **2**	"
52 / 34	" Channel **3**	"
53 / 35	" Channel **4**	"
54 / 36	" Channel **5**	"
55 / 37	" Channel **6**	"
56 / 38	" Channel **7**	"
57 / 39	" Channel **8**	"
58 / 3A	Indicates if can be MASTER	**0** = Slave; **1**= Master
59 / 3B	First Module TO PRINT	**1 – 255**
60 / 3C	Las Module TO PRINT	**1 – 255**
61 / 3D	Time between printouts	**0**= Do Not Print; **1 - 9999** Time in Second
62 / 3E	Printer Configuration	0x**ABCD**: **A**: **0**= 8 bits; **1**= 7 bits **B**: Parity; **0 ó 1**= NO; **2**= Even; **3**= Odd **C**: Stop Bits; **0**= 1 bit; **1**= 2 bits **D**: Baud; **0**=9600; **1**=19200; **2**=38400
63 / 3F	Configuration PassWord	**0 – FFFF**
64 / 40	Offset Channel **1**	**-1999 – 9999**
65 / 41	Offset Channel **2**	"
66 / 42	Offset Channel **3**	"
67 / 43	Offset Channel **4**	"
68 / 44	Offset Channel **5**	"

ADDR. Dec./ Hex.	DESCRIPTION	FORMAT
69 / 45	Offset Channel **6**	"
70 / 46	Offset Channel **7**	"
71 / 47	Offset Channel **8**	**-1999 - 9999**
72 / 48	Not Use	
73 / 49	Temperature Unit	**0=** Degrees CELSIUS**; 1=** Degrees Fahrenheit
74 / 4A	Printer Options	0x00**CD**: **C**: **0-8** Remote Printer Digital Input **D**: Alarms Printer **0**= OFF; **1**= ON
75 / 4B	Alarms Acknowledgement options	0x00**CD**: **C**: **0-8** Digital Input of Acknowledgement **D**: **0-8** Digital Output of Acknowledgement
76 / 4C	Counter 1 Configuration	0x**ABCD**: **A:** Memory Access (**0**:NO; **1**=1'; **2**=15'; **3**=30';**4**=60') **B:** Preset Digital Output (**0**:NO; **1 / 8**) **C**: **0**=NO; **1**=Dis.; **2**=Res.; **3**=Dis.+Res. **D**: Counter ON; **0**=ON; **1**=OFF
77 / 4D	Counter 2 Configuration	"
78 / 4E	Preset "Unit Part" Counter 1	**0-9999**
79 / 4F	Preset "Significant part" Counter 1	"
80 / 50	Preset "Unit Part" Counter 2	"
81 / 51	Preset "Significant part" Counter 2	"
82 / 52	Value "Unit Part" Counter 1	"
83 / 53	Value "Significant Part" Counter 1	"
84 / 54	Value "Unit Part" Counter 2	"
85 / 55	Value "Significant Part" Counter 2	"
86 / 56	Linearized Table: Point X1	**-1999 / 9999** (Without decimal point)
87 / 57	" Point X2	"
88 / 58	" Point X3	"
89 / 59	" Point X4	"
90 / 5A	" Point X5	"
91 / 5B	" Point X6	"
92 / 5C	" Point X7	"
93 / 5D	" Point X8	"
94 / 5E	" Point X9	"
95 / 5F	" Point X10	"
96 / 60	" Point X11	"
97 / 61	" Point X12	"
98 / 62	" Point X13	"
99 / 63	" Point X14	"
100 / 64	" Point X15	"
101 / 65	" Point X16	"
102 / 66	Linearized Table: Point Y1	**-1999 / 9999** (Without decimal point)
103 / 67	" Point Y2	"
104 / 68	" Point Y3	"
105 / 69	" Point Y4	"
106 / 6A	" Point Y5	"
107 / 6B	" Point Y6	"
108 / 6C	" Point Y7	"
109 / 6D	" Point Y8	"
110 / 6E	" Point Y9	"
111 / 6F	" Point Y10	"
112 / 70	" Point Y11	"

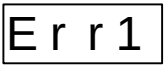
ADDR. Dec./ Hex.	DESCRIPTION	FORMAT
113 / 71	" Point Y12	"
114 / 72	" Point Y13	"
115 / 73	" Point Y14	**-1999 / 9999** (Without decimal point)
116 / 74	" Point Y15	"
117 / 75	" Point Y16	"
118 / 76	Max. Adjust. Point Pt-100 Analog Input 1	**-1999 / 9999** (Without decimal point and only in ºC)
119 / 77	" Analog Input 2	"
120 / 78	" Analog Input 3	"
121 / 79	" Analog Input 4	"
122 / 7A	" Analog Input 5	"
123 / 7B	" Analog Input 6	"
124 / 7C	" Analog Input 7	"
125 / 7D	" Analog Input 8	"
126 / 7E	Min. Adjust. Point Pt-100 Analog Input 1	"
127 / 7F	" Analog Input 2	"
128 / 80	" Analog Input 3	"
129 / 81	" Analog Input 4	"
130 / 82	" Analog Input 5	"
131 / 83	" Analog Input 6	"
132 / 84	" Analog Input 7	"
133 / 85	" Analog Input 8	"
134 / 86	PassWord of Alarms parameters	**0 - FFFF**
135 / 87	Delay Time for activate Alarm 1	**0 - 9999**
136 / 88	" Alarm 2	"
137 / 89	" Alarm 3	"
138 / 8A	" Alarm 4	"
139 / 8B	" Alarm 5	"
140 / 8C	" Alarm 6	"
141 / 8D	" Alarm 7	"
142 / 8E	" Alarm 8	"

Maintenance

Display messages codes

The following message codes that can appear in the display of the DAS-8000 are indicated, as well as a brief description of them.

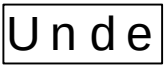
Channel inactive.



Saturation of the A/D (Analog/Digital converter). Could be due to a failure in the A/D, or that the input signal has surpassed the lower or upper limits of the A/D.

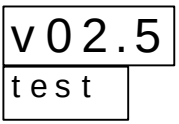
Communications Error. The CPU of the DAS-8000 module detects a communications failure in a DAS-8000 network, appearing as a blinking message.

Measurement signal greater than the **high** limit of the scale. The value of the input signal is above the upper range of the display.



Measurement signal less than the **low** limit of the scale. The value of the input signal is below the lower range of the display.

Message of initialization of the module at the beginning. It performs the loading of the program and the data, verifying the correct operation of all the systems. Its duration is approximately 1 second.



Displays the software version that is operational when the software started.

Locating failures

EFFECT	CAUSE
Display always indicates **Err1**	It can originate due to loss of calibration, breakdown of the receiver, etc. Reset by disconnecting from electrical power for 10 sec. Recalibrate or retrieve "factory settings".
Display indicates **OVEr**	Value of signal above the maximum of the scale. Pt-100 Probes or mA line open. Communication to ground or to electrical power of network of the analog input signals.
Display indicates **UnDE**	Value of signal lower than the minimum of the scale Pt-100 Probes or mA line short-circuited. Communication to ground or to electrical power of network of the analog input signals.
The display does not illuminate or lights up weakly.	Failure of electrical power: Low or fluctuating electrical power. Electrical power of 110V. in the input for 220 V. Excessive heat within the unit.
In the display it indicates (-) signal, but the signal is positive.	Signal with connection inverted in the receiver, transmitter, converter or input terminals.
The measurement is indicated with an error.	Incorrect signal, or mA Shunt inadequate. Receivers installed incorrectly. If the error is constant in origin, it can be corrected with the Indication OFFSET.
The reading is correct up to a point in which it is saturated under the maximum of scale.	In 4-20 mA inputs, the serial loads are over the VDC voltage of the electrical power of the transmitter.
The reading is erroneous and fluctuates periodically, displaying **OVEr**, **Err 1**, and **UnDE** messages.	Weak connections. Signal lines have parasites. Pt-100 Probes have bad contacts. Receiver installed incorrectly.
The reading is correct but there are sporadic leaps or fluctuations on the display	Line of input signal or of electrical power has many parasites. Activate peak filters.

Maintenance

The DAS-8000 module does not contain components of mechanical nature that are susceptible to depleting its intrinsical characteristics over time. At any rate, the electronic components can suffer an aging due to multiple factors, such as the environmental conditions in which it operates, (temperature, humidity, pollution), the stability of the signals and the electrical power that it receives, the electrical noise, and the electromagnetic radiation that they withstand, etc.

Therefore, with the passing of time, it may have fluctuations in measurement, directly related to the above-mentioned factors.

To solve the time-related effects, there are two solutions:

- Recalibrate the inputs with a generator.
- Correct the measurement throughout the scale by modifying its OFFSET.

NOTE:
To perform any of these options, see chapter 5, **Calibration**.

Spare Parts.

- Main base.
- DIN rail anchor.
- Circuit protection cover.
- Protection covers for DAS-8000 with the front panel removed.
- Multifunction terminal.
- Adhesive front panel of the display.
- Adhesive to the back side of the display.
- Adhesive template with wiring diagram.
- Flat cable.
- Connection block of 8 terminals.
- SHUNT resistances of 25 W.
- DAS-8000 Instruction Manual.
- **PROASIS® DAS- Win** Software User Manual
- Diskettes containing the **PROASIS® DAS-Win** software.

Material included in the Evaluation Kit (EK):

- Connection Cable to the electrical power supply.
- Connection Cable to a PC in RS-232 mode, with a 9-pin connector and a 9-to-25-pin adapter.
- Pt-100 temperature probes, including connection cable.

Appendix 1.- Hexadecimal Code

The Hexadecimal Code is normally used in the data processing field. Also, most current instruments are based on a microprocessor with an internal program that uses this code, allowing you to handle with greater ease all the input/output data used.

This code is composed of 16 characters: the first 10 numeric digits and the first 6 letters of the alphabet generating the following sequence:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.

The first 10 characters coincide with the decimal code with which we are familiar, next the A is employed as number 10, the B is the 11, the C is the 12, the D is the 13, the E is the 14, and the F is the 15. After 15, we begin counting again by incrementing by 1 the preceding digit, etc.

The formula for converting the Hexadecimal Code to Decimal for a piece of data of 2 digits is the following one:

$$H_2\,H_1 = H_2*16\text{^}1 + H_1*16\text{^}0$$

Hexadecimal number composed by 2 digits

To a decimal number connection

For example.: The value 1F in Hexadecimal corresponds to 1*16^1 + 15*16^0, or, 16 +15 = 31 in decimal.

Hexadecimal code listing

The table that follows contains the hexadecimal codes of the first 255 decimal digits. This table can be used for the assignment of communication addresses, in the DAS-8000 modules, in hexadecimal order.

DEC.	HEX.	DEC.	HEX.	DEC.	HEX.	DEC.	HEX.	DEC.	HEX.	DEC.	HEX.
1	1	44	2C	87	57	130	82	173	AD	216	D8
2	2	45	2D	88	58	131	83	174	AE	217	D9
3	3	46	2E	89	59	132	84	175	AF	218	DA
4	4	47	2F	90	5A	133	85	176	B0	219	DB
5	5	48	30	91	5B	134	86	177	B1	220	DC
6	6	49	31	92	5C	135	87	178	B2	221	DD
7	7	50	32	93	5D	136	88	179	B3	222	DE
8	8	51	33	94	5E	137	89	180	B4	223	DF
9	9	52	34	95	5F	138	8A	181	B5	224	E0
10	A	53	35	96	60	139	8B	182	B6	225	E1
11	B	54	36	97	61	140	8C	183	B7	226	E2
12	C	55	37	98	62	141	8D	184	B8	227	E3
13	D	56	38	99	63	142	8E	185	B9	228	E4
14	E	57	39	100	64	143	8F	186	BA	229	E5
15	F	58	3A	101	65	144	90	187	BB	230	E6
16	10	59	3B	102	66	145	91	188	BC	231	E7
17	11	60	3C	103	67	146	92	189	BD	232	E8
18	12	61	3D	104	68	147	93	190	BE	233	E9
19	13	62	3E	105	69	148	94	191	BF	234	EA
20	14	63	3F	106	6A	149	95	192	C0	235	EB
21	15	64	40	107	6B	150	96	193	C1	236	EC
22	16	65	41	108	6C	151	97	194	C2	237	ED
23	17	66	42	109	6D	152	98	195	C3	238	EE
24	18	67	43	110	6E	153	99	196	C4	239	EF
25	19	68	44	111	6F	154	9A	197	C5	240	F0
26	1A	69	45	112	70	155	9B	198	C6	241	F1
27	1B	70	46	113	71	156	9C	199	C7	242	F2
28	1C	71	47	114	72	157	9D	200	C8	243	F3
29	1D	72	48	115	73	158	9E	201	C9	244	F4
30	1E	73	49	116	74	159	9F	202	CA	245	F5
31	1F	74	4A	117	75	160	A0	203	CB	246	F6
32	20	75	4B	118	76	161	A1	204	CC	247	F7
33	21	76	4C	119	77	162	A2	205	CD	248	F8
34	22	77	4D	120	78	163	A3	206	CE	249	F9
35	23	78	4E	121	79	164	A4	207	CF	250	FA
36	24	79	4F	122	7A	165	A5	208	D0	251	FB
37	25	80	50	123	7B	166	A6	209	D1	252	FC
38	26	81	51	124	7C	167	A7	210	D2	253	FD
39	27	82	52	125	7D	168	A8	211	D3	254	FE
40	28	83	53	126	7E	169	A9	212	D4	255	FF
41	29	84	54	127	7F	170	AA	213	D5		
42	2A	85	55	128	80	171	AB	214	D6		
43	2B	86	56	129	81	172	AC	215	D7		

Appendix 2.-
Technical Specifications

CONFIGURABLES CHANNELS

Analog Inputs: .....8 channels in common mode.
Configurable by internal "jumpers" such as:
- **RTD** (Pt 100) ..... Variable range; limits -150 + 600 ºC (three-wire).
According s/IEC-751 (DIN-43760).
- **LIN** (Voltage).....0 - 50 mV (Impedance 1 MΩ).
- **LIN** (Current).....0..4-20 mA (Shunt resistor of 2,5 Ω).
- **LIN** (Non-Linearized Thermocouples)..... 4-20 mA (Shunt of 2,5 Ω).
Thermocouples Types (IEC-584 international standards):
T Type thermocouple. (Cu - Const.).
J Type thermocouple. (Fe - Const.).
K Type thermocouple. (NiCr - NiAl.).
E Type thermocouple. (NiCr - Const.).
N Type thermocouple. (NiCrSi - NiSi.).
S Type thermocouple. (PtRh 10% - Pt.).
R Type thermocouple. (PtRh 13% - Pt.).
B Type thermocouple. (PtRh 30% - PtRh 6%.).
- User configurable linearization curve (15 segments)
(Configurable only via communications means).

Definable ranges (LIN): ..... -1999 a 9999 points.
Precision:.....0,1% F.R.
Resolution of A/D converter:..... 40.000 points.
Sampling time: ..... 120 miliseconds.
Filters: ..... Active and passive, software configurable.

Logic Inputs:.....8 optoinsulated channels.
Margin of input HI:..... from 12 to 48 Vdc/ac
Margin of input LO:..... from 0 to 7 Vdc/ac
NOTE:..... All the inputs are electrically insulated among themselves.

Logical Outputs:.....8 optoinsulated channels.
Type of output:..... NPN, Open Collector, 48 Vdc, 100 mA maximum.

NOTE:.....All the outputs are insulated electrically among themselves.

Counters: ..... 2 independent counters.
Fixed counting input.
Configurable reset and disable digital inputs.
Configurable counter preset output.
Counter increase: ..... Rise edge.
Maximum frequency: ..... 40 Hz.
Minimum pulses: ..... 15 ms.

DIGITAL COMMUNICATION

Output ..... selectable RS-485 (2 wire) ó RS-232 (3 wire).
Protocol: ..... MOD-BUS mode RTU binary.
Transmission speed: ..... 9600, 19200 or 38400 baud.
Access: ..... Read/Write access of all the parameters.
Adressability: ..... from 1 to 255 stations.
Direct output to serial printer ..... RS-232 (EPSON protocol).

GENERAL CHARACTERISTICS

Terminal of programming and monitoring ..... Detachable.
Display front panel: ..... 4+4 digits, 16 pilot LEDs, 4 keys.
Connection: ..... Two rows of 32 terminals unplugable.
Section of cables: ..... 2 millimeters maximum.
Attachment: ..... DIN rail 46277/3 (EN 50022) or by screws.
Working Temperature: ..... From 0° to 50° C.
Electrical power: ..... 110/220 Vac.
Consumption: ..... 5 VA.

STANDARDS
Applicable Standards: ..... DIN 43760, NFC 60742
..... UTE 46406, UL 94-V0.
European Directive 89/336 EEC:
EN 50081-1:1992..... EN 55022 Conducted 150 Khz. to 30 Mhz.
..... Radiated 30 Mhz.to 1Ghz.

EN 50082-1:1992..... IEC 801-2:1984 Electrostatic discharges.
..... IEC 801-3:1984 Immunity to Radiation.

Notes:

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