ELECTRONIC WEIGHING
ados
PESATURA ELETTRONICA

INSTRUCTION MANUAL

A100E

SW Version 1.06

Rev.	Subject of the revision	Date	Prepared	Checked	Approved
5					
4	Changes to Rev 1.6	22/11/00	Golinelli G.	Paulitti G.	
3	Changes to Rev 1.5	10/04/99	Golinelli G.	Paulitti G.	
2	Changes to Rev 1.2 (password)	15/06/98	Golinelli G.	Paulitti G.	
1	MODBUS protocol	02/03/98	Golinelli G.	Paulitti G.	
0	Issue	27/11/97	Golinelli G.	Paulitti G.	

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Contents

1. INTRODUCTION

1.1 General

The A100E instrument is a microprocessor based weight amplifier and indicator.

It was designed to connected to a maximum of 6 load cells (350 ? bridge), connected in parallel.

The keyboard can be used to carry out all the programming, configuration and calibration functions.

A series of display messages guides the operator through all the phases.

A series of options sets up the instrument for the main functions related to electronic weighing.

1.2 Versions/options

A 1 0 0 E X X

Type of power supply 1 = 115 Vac - 2 = 230 Vac
3 = 24 Vac - 4 = 24 Vcc
5 = 12 Vcc

Version set up for management: Transpallet (T)

SAMPLE ORDER

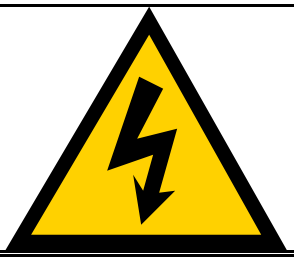
A100E wired for 230 Vac operation: A 1 0 0 E 2

1.3 Documentation

This technical manual is relevant to the base version of the instrument.
The technical manual is relevant to the transpallet management version is **538-MTU10007**.

1.4 Equipment marking description

A100E is marked with symbols compliant with European Standard 61010-1 (April 1993).

SYMBOL	DESCRIPION
?	Alternating current
	Protective conductor terminal
	Earth (ground) terminal
	Caution (refer to accompanying documents)
	Caution, risk of electric shock

2. OPERATING SPECIFICATIONS

2.1 Technical data

Power supply	230 Vac 50/60 Hz -15%...+10% 120 Vac 50/60 Hz (optional) -15%...+10%
Consumption	10VA (15 VA MAX.)
Fuse	230 Vac: 80 mA Time lag T 120 Vac: 160 mA Time lag T + 12 Vdc: 500 mA Fast + 24 Vdc 630 mA Fast
Operating temperature	from - 10 ?C to + 40 ?C
Storage temperature	from - 40 ?C to + 70 ?C
Relative humidity	95% non-condensing
Load cell power supply	8 Vdc (short-circuit proof)
Maximum current	90 mA (4 x 350 ? load cells in parallel)
Electric connection	4 wires
Analog signal	0.5 - 2.5mV/V
Resolution	0.8 ?V/Grad
Conversion speed	55 conversion/sec
Graduation	1000-2000-3000-4000-5000
Resolution	1-2-5-10-20-50
Off scale limit (UL/OL)	20% of full scale load
Display	five (5) digits LED
Polarity	sign -
Keyboard	six (6) keys
Status indicators	four (4) LED indicators
Decimal point	user defined: 0 - 0.0 - 0.00 - 0.000 - 0.0000
Zero tracking	user defined (0.5 - 1 - 2 - 5 - 10 div/s)
AZM aperture	user defined (OFF - 1.9% - 100% of F.S.)
Motion band	user defined (OFF - 0.5 - 1 - 2 - 5- 10- 20 div)
Serial outputs	main output RS232 or RS485 Half-duplex, aux output RS232, Tx only
Digital outputs	two (2) base relay outputs and eight (8) extra
Contact rating	0.5 A @ 24 Vdc
Housing	self extinguishing NORYL UL 94 V- (Black) for front panel mounting according toDIN 43700
Dimensions	72 x 144 x 129 mm
Drilling	68 x 138 mm
Weight	0.7 Kg
Mounting	Front panel mounting with two holding brackets mounted on the sides of the enclosure

3. INSTRUMENT OPERATIONS

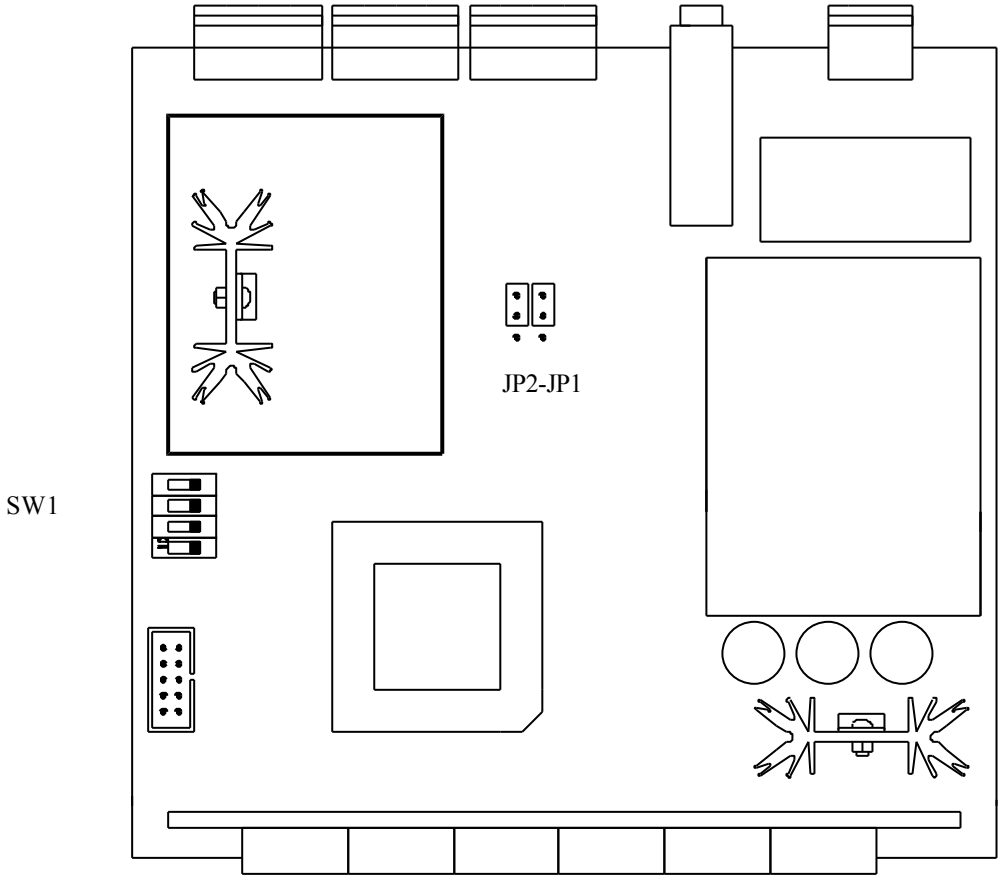
3.1 Turning on the instrument

When the instrument is turned on, the primary display indicates the following, at intervals of about two seconds:

	A	D	O	S	
	A	1	0	0	E
V	E	R	1.	0	6

(Revision of the installed software)

Figure 1



3.2 Display indication

Under normal operating condition (i.e. during weighing) the display shows the value of the weight, using the following criteria:

? leading zeroes will presented as blank
? the polarity "minus" (in case of negative values) is indicated in the leftmost digit
? if the negative value is composed of six digits (for example -132400), the leftmost digit will show alternatively the "minus" and the fifth digit value.

Indication limits are the following:

lower limit: - 20% of full scale
higher limit: 120% of full scale

if the weight is under the lower limit the following will be displayed:

?	?	**U**	**L**	?	?

if the weight is over the upper limit (or if the load cell signal is higher than 20 mV the following will be displayed:

?	?	**O**	**L**	?	?

3.3 Tare

Pressing the **T** key (with the instrument setted in the Net mode and the weight stable) the instrument will copy the current value of the gross weight into the tare value, thus clearing the net weight value.

The Tare command can also be issued from serial line.

3.4 Manual Zero

Value of gross weight can be manually zeroed out by pressing the **>0<** key if the instrument is setted in GROSS, the weight is stable and the total zeroed value is lower than the limit defined by parameter "0 LIMIT".
The Zero command can also be issued from serial line.

The effect of a ZERO command is a translation of the response curve of the instrument, without affecting its slope: if 2000 Kg are zeroed out in a system having 5000Kgof full scale, the new full scale will become 3000 Kg.

3.5 Automatic Zero Tracking

Automatic Zero tracking can be achieved if the value of weight is stable, the total zeroed value is lower than the limit defined by parameter "0 LIMIT" and the rate of change of weight is lower than value defined by parameter "Zero Tracking".

3.6 LED status indicators

The indications provided by the signal LED's located on the front panel of the instrument are explained below:

? 0?

The LED is on when the value of the weight is 0 and is stable within 1/4 of a division.
The indication is available under gross weight and net weight conditions.

N

The LED is on when the instrument displays the net weight (gross weight minus the tare).
Pressing the **T** key in NET the instrument copies the current value of the gross weight into the tare value, thus clearing the value of the net weight.

S1

The LED is on when relay 1 is energized.

S2

The LED is on when relay 2 is energized.

3.7 Key functions

ZERO
Press this key (with the instrument in the Gross mode and the weight stable) to clear the divisions indicated on the display within the limits set by the configuration of the "AZM limit" parameter.

G/N
Press this key to toggle between the Gross and Net condition.

T
Press this key (with the instrument in the Net mode and the weight stable) the instrument to copy the current value of the gross weight into the tare value, thus clearing the net weight value.

F
Press this key to enter the configuration modality.

C
Press this key to enter the threshold configuration modality.

E

Press this key to perform a print request on the primary serial port. The request takes effect only if the serial port is configured for “print on request”.

3.8 Switch

The instrument is equipped with a DIP switch banck having the following functions:

Position	Function	Normal State
SW1-1	Not used	OFF
SW1-2	Not used	OFF
SW1-3	Not used	OFF
SW1-4	Initialization of configuration parameter memory Can be used as an alternative to the normal init procedure. See "Initialization" paragraph for operation details.	OFF

3.9 Self diagnostic

A100E transmitter has a number of built-in self diagnostic features intended to improve the overall operating safety.

Generally speaking, when a fault condition is detected, the instrument is driven to a safety condition deenergizing alarm relays.

Display indications are provided to help in fault finding.

3.9.1 Configuration memory integrity check

Check is carried out at power on.
If the configuration memory is found defective, the power on sequence will not be completed , all relays are driven to alarm condition (deenergized) and the serial line is deactivated.

A forced reconfiguration to default is then performed and the primary display shows the following message:

	I	N	I	T		Blinking

The transmitter stays in this condition as long as a key is pressed by operator to acknowledge the situation.
The instrument must be reconfigured and recalibrated.

3.9.2 Configuration parameter integrity check

Check is carried out every operating cycle.

If a configuration parameter is found defective, the message "**ER XX**" will be reported on display for half a second every two seconds, where **XX** is the code of the wrong parameter, according to the following table:

CODE	Meaning	Effect on indicator	Resolution
ER 01	Error in the CALIBRATION parameters	Relays are deenergized. Error code is reported on serial line.	Instrument must be recalibrated
ER 02	Error in the TARE parameters	Relays are deenergized. Error code is reported on serial line.	Redo tare
ER 03	Error in DIVIS e SENSIB parameters	Relays are deenergized. Error code is reported on serial line.	Reconfigure parameters
ER 04	Error in AVER and DEC. PNT	No effect Error code is reported on serial line.	Reconfigure parameters
ER 05	Error in LIM AZM - MOTION - ZERO TRACKING parameters	Relays are deenergized. Error code is reported on serial line.	Reconfigure parameters
ER 06	Error in SER P - SER A-BAUD - DLY SND - DLY RCV - AD485 parameters	No effect Probably malfunctions on serial line operation. The error code is reported on the serial line	Reconfigure parameters
ER 07	Error in the RELAY 1 parameters	Relay 1 is deenergized. Error code is reported on serial line.	Reconfigure parameters
ER 08	Error in the RELAY 2 parameters	Relays are deenergized. Error code is reported on serial line.	Reconfigure parameters

3.10 Output relay operation

The action of the relay depends on the weight condition (gross or net) defined in the configuration phase independently from what is indicated on the display. Therefore, the user can switch the display selection as required without accidentally enabling the thresholds.
The relay returns to "normal" conditions when the weight value again drops below the value calculated as the sum of the threshold value and the defined dead band value.

Each relay can be configured to operate in one of the following modes:

Off
The relay is permanently disabled.

Closing on Gross
The relay is de-energized (and the output contact opened) for all the gross weight values lower than the threshold set in the configuration. The relay is energized (and the output contact closed) for all the gross weight values greater than or equal to the threshold set in the configuration.

Closing on Net upon Loading
The relay is de-energized (and the output contact opened) for all the gross net values lower than the threshold set in the configuration. The relay is energized (and the output contact closed) for all the net weight values greater than or equal to the threshold set in the configuration.

Closing on Net upon Unloading
The relay is de-energized (and the output contact opened) for all the negative net weight values lower than (in terms of absolute value) the threshold set in the configuration. The relay is energized (and the output contact closed) for all the negative net weight values greater than or equal to (in terms of absolute value) the threshold set in the configuration.
Example: if the threshold set is 1250, the relay is de-energized for positive values and for the negative values from -1 to -1249. The relay is energized for values ranging between -1250 and -F.S.

Opening on Gross
The relay is energized (and the output contact closed) for all the gross weight values lower than the threshold set in the configuration. The relay is de-energized (and the output contact opened) for all the gross weight values greater than or equal to the threshold set in the configuration.

Opening on Net upon Loading
The relay is energized (and the output contact closed) for all the net weight values lower than the threshold set in the configuration. The relay is de-energized (and the output contact opened) for all the net weight values greater than or equal to the threshold set in the configuration.

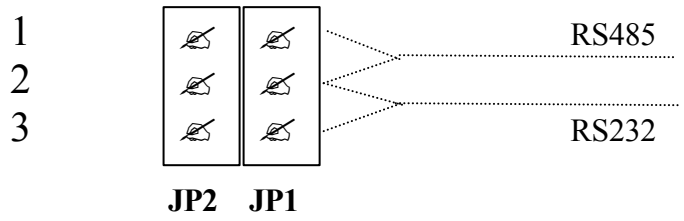
Opening on Net upon Unloading
The relay is energized (and the output contact closed) for all the net negative weight values lower than (in terms of absolute value) the threshold set in the configuration. The relay is de-energized (and the output contact opened) for all the net negative weight values greater than or equal to less (in terms of absolute value) the threshold set in the configuration.

Example: if the threshold set is 1250, the relay is energized for positive new values and for all the negative values from -1 to -1249. The relay is de-energized for values ranging between -1250 and -F.S.

3.11 SERIAL INTERFACE MANAGEMENT

3.11.1 Primary serial interface

The primary serial line is available in both the RS232 and RS485 mode.
The factory configuration is RS232 (see Figure 1).



JP1 e JP2 closed in position 1-2 RS485 mode
JP1 e JP2 closed in position 2-3 RS232 mode

If the instrument is used in the RS485 modality, an integrated circuit MAX483E must be mounted in the socket U4 (see Figure 1).

The primary serial line can be configured in one of the following operating modes:

? Off
? Continuous transmission
? Bi-directional (eventually with address for 485)
? Print On request from keyboard command or external button

The transmission parameters of the primary and auxiliary line are :
? 8 bit - No Parity - 1 Stop

The primary line speed can be configured as follows:
? 9600
? 4800
? 2400
? 1200

3.11.2 RS485 interface

The instrument can control an RS485 line as an alternative to the main line RS232.
The physical interface is on two balanced wires.
The logic protocol is half duplex master/slave and the instrument responds as a slave.

For the RS485 line connection the instrument must be equipped with the driver in U8 and the jumper Z8 must be positioned in 1-2.

The RS232 or RS485 selection is determined by the value of the configuration parameter "address 485": if the parameter is 0 the instrument controls the protocol RS232, otherwise it controls the protocol RS485. The modality is activated independently from the physical configuration of the board, therefore it is possible to operate with messages addressed also on the physical line RS232.

The data structure is the same, with the only addition of the addressed field (two characters from "01" to "32") in reception and in transmission.

3.11.3 Continuous modality

The instrument continuously transmits a string with the following format:

<STX><POL><WEIGHT><K><L/N><STATUS><CR><LF>

where:

<STX>	"Start Of Test" (Hex 02) character		
<POL>	"Blank" (Hex 20) or "-" (Hex 2D) character to indicate the polarity of the data		
< WEIGHT >	string of 7 numerical characters (Hex 30 .. 39) representing the weight shown on display and possibly with "." (Hex 2E)		
<K>	"K" (Hex 4B)		
<G/N>	"G" (Hex 47) or "N" (Hex 4E) character to indicate the Gross/Net state		
<STATUS>	one of the following characters:		
	"Blank"	(Hex 20)	System under normal operating conditions
	"I"	(Hex 43)	Instrument to calibrate (invalid data)
	"S"	(Hex 43)	Instrument being configured
	"O"	(Hex 4F)	Instrument off scale
	"M"	(Hex 4D)	Moving weight
<CR>	"Carriage Return" character (Hex 0D)		
<LF>	"Line Feed" character (Hex 0A)		

3.11.4 Bi-directional modality

In this modality the instrument transmits the data only when requested by an external system.
The protocol can be used with RS232 lines and with RS485 half-duplex lines. The selection depends on the configuration value of the RS485 address: if other than zero, the instrument controls the value of the address field in the received data and inserts the address field in the transmitted data.

The request string has the following format

<STX><ADDH><ADDL><CMD><DATA><CR><LF>

where:

<STX>	"Start Of Text" (Hex 02) character
<ADDH>	485 address character - high (Hex 30 .. 32)
<ADDL>	485 address character - low (Hex 30 .. 39)
<CMD>	Command identification character
<DATA>	Any data related to the command
<CR>	"Carriage Return" (Hex 0D) character
<LF>	"Line Feed" (Hex 0A) character

Commands from host to A100E

P (hex 50)	weight request command. A string is transmitted with the same format of what is described for continuos mode. If 485 address is other than zero, the <ADDR> field is inserted after STX
p (hex 70)	weight request command. A string is transmitted with the following format: <STX><G_P><GROS_W><T_P><TARE_W><K/L><L/N><STATO><CR><LF where: <G_P><GROSS_W> polarity and value of the gross weight (8 char) <T_P><TARE_W> polarity and value of the tare weight (8 char) If 485 address is other than zero, the <ADDR> field is inserted after STX
l (hex 5C)	gross weight request command. A string is transmitted with the same format of what is described for continuos mode, but always sending the value of the gross weight, independently from display selection. If 485 address is other than zero, the <ADDR> field is inserted after STX
Z	ZERO command. The command is always accepted, even if the instrument is in Net mode or the Motion is ON. The command is effective only if the gross weight is lower then the defined AZM limit, otherwise en error message is issued
G	GROSS command. The command is always accepted.
N	NET command. The command is always accepted.
T	Tare execution command. The command is always accepted, even if the instrument is in Net mode or the Motion is ON.
SRn	request for the value of the set point "n", with "n" equal to 1 or 2 The answer message has the following format: <STX><SRnt(0001234) where: n is the set point number t is the code of the relay function 0 = OFF 1 = Closing on Gross 2 = Closing on Net upon Loading 3 = Closing on Net upon Unloading 4 = Opening on Gross 5 = Opening on Net upon Loading 6 = Opening on Net upon Unloading

	0001234 is the value of the set point (7 char including decimal point, if any)
SEnt(ddddddd)	set value of the set point “n” to type “t” and to value “dddd”

3.11.5 Print On Request modality

The weight string is transmitted like in the continuous transmission when operator pressing the “E” key (when the instrument is not being configured).

3.11.6 Bi-directional modality with MODBUS protocol

The RTU version of MODBUS is used.

Received and transmitted frame structure

General frame structure is as follows:

ADDRESS	FUNCTION	DATA	CHECK
8 bits	8 bits	N x 8 bits	2 x 8 bits

ADDRESS 8 bit defining the slave address and ranging from 1 to 32
FUNCTION 8 bit defining the required function.
The functions supported by A100E are the following
Code 03 Read Holding Registers
Code 05 Force Single Coil
Code 06 Preset Single Register
Code 16 Preset Multiple Registers
DATA All data relevant to the specific function
CHECK CRC-16 (Cyclic Redundancy Check) frame validation

Exception responses
When A100E receives a request involving illegal functions or illegal data an exception response is generated containing address, function code, error code and checksum.
To indicate that the response is a notification of an error, the high order bit of the function code is set to "1".

Supported error code are:

01 Illegal function. The message function received is not an allowable action for the addressed slave.
02 Illegal data address. The address referenced in the data field is not an allowable address in the address slave location
03 Illegal data value. The value referenced in the data field is not allowable in the addressed slave location

A100E supported functions

For a complete description of MODBUS available functions, please refer to detailed MODBUS documentation.

Function 03 - Read Holding Registers

Allows the host to obtain the binary value of the content of A100E registers

All registers can be transferred in a single read request.

The below example reads registers 0 through 2 from slave 01:

ADDR	FUNC	START REG HI	START ERG LOW	# OF ERG HI	# OF ERG LOW	CHECK
01	**03**	**00**	**00**	**00**	**03**	**05 CB**

Slave answer is as follows:

ADDR	FUNC	BYTE COUNT	REG 0 HI	REG 0 LOW	REG 1 HI	REG 1 LOW	REG 2 HI	REG 2 LOW	CHECK
01	03	06	00	0F	00	00	01	C0	74 B4

Value of register 0 is 15, register 1 is 0 and register 2 is 448.

Function 05 - Force Single Coil

Allows the host to force a single coil. In A100E the command is used to issue a ZERO, G/N, TARE or POF reset command.
If the ZERO cannot be done (not enabled or weigh higher than the allowable limit) an "Illegal Data Value" exception response will be generated

The below is a valid example:

ADDR	FUNC	COIL # HI	COIL # LOW	DATA VALUE HI	DATA VALUE LOW	CHECK
01	**05**	**00**	**00**	**FF**	**00**	**8C 3A**

The normal response is to retransmit the query message:

ADDR	FUNC	COIL # HI	COIL # LOW	DATA VALUE HI	DATA VALUE LOW	CHECK
01	**05**	**00**	**00**	**FF**	**00**	**8C 3A**

Function 06 - Preset Single Register

Allows the host to modify the contents of an holding register

The below example preset register 12 of slave 01 with 54:

ADDR	FUNC	REG	REG	DATA	DATA	CHECK

		# HI	# LOW	VALUE HI	VALUE LOW	
01	06	00	0C	00	36	C9 DF

The normal response is to retransmit the query message:

ADDR	FUNC	REG # HI	REG # LOW	DATA VALUE HI	DATA VALUE LOW	CHECK
01	06	00	0C	00	36	C9 DF

NOTE: The function cannot be used to operate on double word or read only registers.

Funzione 16 - Preset Multiple Registers

Allows the host to modify the contents of more subsequent holding register

The below example preset register 12, 13 and 14 of slave 01 with 5, 0, 342:

ADDR	FUNC	STRT REG HI	STRT REG LOW	# OF REG HI	# OF REG LOW	BYTE CNT	DATA VAL. HI	DATA VAL. LOW	DATA VAL. HI	DATA VAL. LOW	DATA VAL. HI	DATA VAL. LOW	CHECK
01	16	00	16	00	03	06	00	05	00	00	01	56	4A A4

Teh normal response to a function 16 query is to echo the adrress, function code, starting address and number of registers to be loaded:

ADDR	FUNC	STRT REG HI	STRT REG LOW	# OF REG HI	# OF REG LOW	CHECK
01	16	00	16	00	03	61 CC

NOTE: The function cannot be used to operate on read only registers.
The first register cannot be the low side of a double word register

A100E Registers list

Register 0 is a special coded register (see details).

All weigh related registers (gross value, zeroed value, alarm level values and dead band values) are coded on two consecutive registers as 2's complement binary value.

Configuration parameters are coded as explained in "Configuration" paragraph.

Registers marked as "**R**" are read only, those marked as "**R/W**" are read-write

Register Number	Function	Type
0	Status word	**R**
1-2	Gross weigh value	**R**
3-4	Tare weigh value	**R**
5	Division	**R/W**
6	Resolution	**R/W**
7	Decimal point position	**R/W**
8	Averages	**R/W**
9	AZM limit	**R/W**
10	MOTION band	**R/W**
11	ZERO tracking limit	**R/W**
12	Primary serial port operating mode	**R/W**
13	Auxiliary serial port operating mode	**R/W**
14	Transmission delay	**R/W**
15	Receiver time out	**R/W**
16	Baud rate	**R/W**
17	Slave address	**R/W**
18	Relay 1 function	**R/W**
19-20	Relay 1 alarm level	**R/W**
21-22	Relay 1 dead band	**R/W**
23	Relay 2 function	**R/W**
24-25	Relay 2 alarm level	**R/W**
26-27	Relay 2 dead band	**R/W**

List of Coils supported by A100E

Coil Number	Function	
0	Power On Flag reset request	
1	GROSS (Data = $0000) or NET (Data = $FF00) set	
2	ZERO request	
3	TARE request	

Status word coding

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
POF	**0**	**S**	**Diagnostic error code**					**G/N**	**0**	**0**	**0**	**0**	**0**	**R2**	**R1**

POF	Power On Flag. Indicates a return of power supply to the transmitter. Flag is set to 1 by A100E and can be resetetd to 0 by host by forcing Coil #1
S	if = 1 indicates configuration in progress
Diagnostic err code	error code (see “self diagnostic” paragraph
G/N	if = 1 indicates that the instrument is in NET mode
R2,R1	if = 1 indicates that the relevant relay is energized

3.11.7 Auxiliary serial interface

The auxiliary line can be configured in one of the following ways:
? TCONT
? DENAMD

The speed of the auxiliary line is set at 1200 baud.

The TCONT modality is used to link with the remote repeaters such as RIP14, RIP51, RIP70 or with instruments for remote thresholds.

In the TCONT modality, the instrument continuously transmits a string with the following format:

<STX><POL><WEIGHT><K><L/N><STATUS><CR><LF>

where:

<STX>	"Start Of Test" (Hex 02) character		
<POL>	"Blank" (Hex 20) or "-" (Hex 2D) character to indicate the polarity of the data		
< WEIGHT >	string of 7 numerical characters (Hex 30 .. 39) and possibly with "." (Hex 2E)		
<K>	"K" (Hex 4B)		
<G/N>	"G" (Hex 47) or "N" (Hex 4E) character to indicate the Gross/Net state		
<STATUS>	one of the following characters:		
	"Blank"	(Hex 20)	System under normal operating conditions
	"I"	(Hex 43)	Instrument to calibrate (invalid data)
	"S"	(Hex 43)	Instrument being configured
	"O"	(Hex 4F)	Instrument off scale
	"M"	(Hex 4D)	Moving weight
<CR>	"Carriage Return" character (Hex 0D)		
<LF>	"Line Feed" character (Hex 0A)		

4. INSTALLATION

4.1 Material receiving

Remove the instrument from its packing and check if it has been damaged during transport.

Claims for any damage must be submitted immediately and in writing to the supplier and to the carrier which delivered the goods.

The instrument should be delivered with the following :

? 1 kit of removable female terminal blocks for power supply and I/O wiring
? 2 attachment brackets
? 1 copy of the instruction manual
? 2 copies of the instrument testing certificate (check that the serial no. reported in the special area on the back corresponds to what is reported on the testing sheet)

4.2 Instrument mounting

The instrument is designed for panel mounting. The cut-out dimensions are indicated in Figure 2.

Insert the instrument, hook the two attachment brackets into the special holes located on the side of the box. Then, use a screwdriver to adjust the set screws until the front frame is flush with the board.

For the necessary depth, consider the length of the instrument plus about 5 cm for the connection cables.

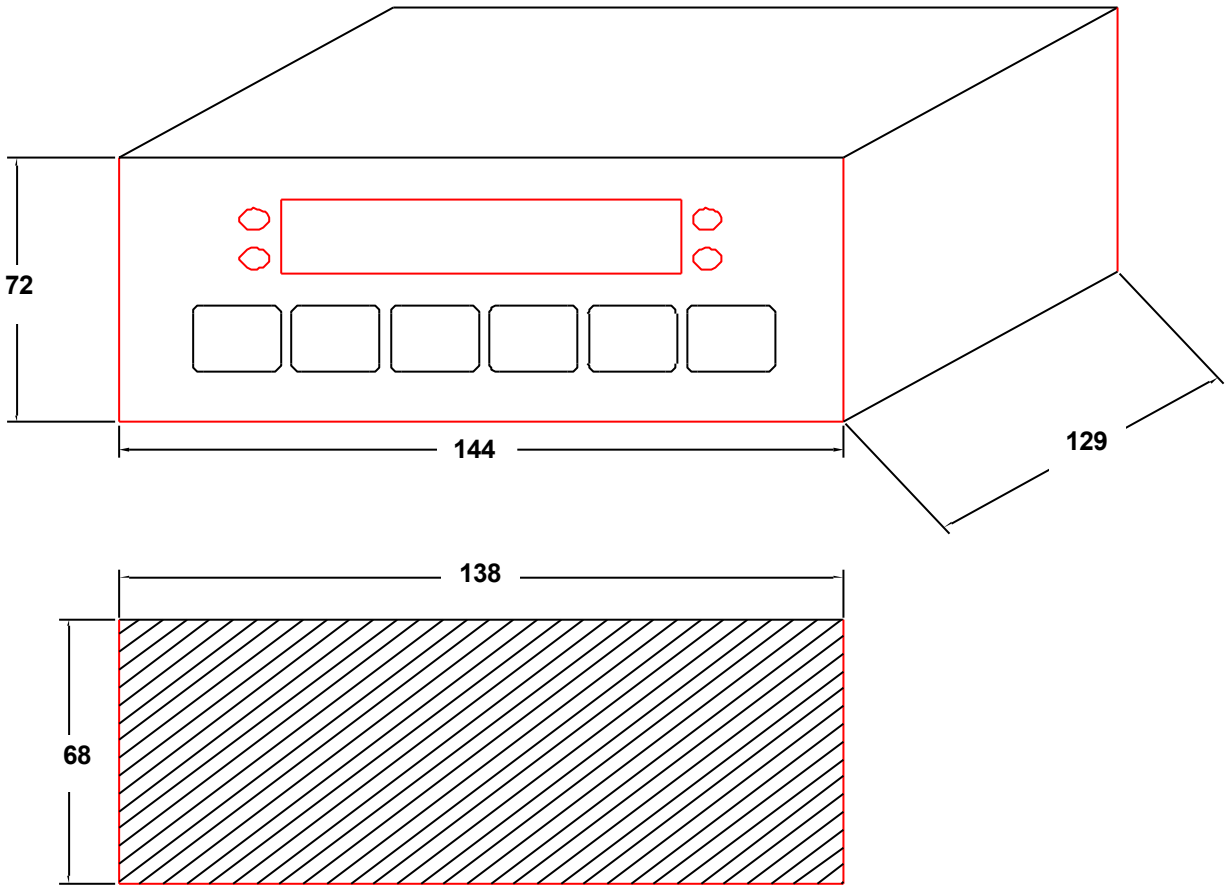


Figure 2 - A100E drilling template

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4.3 Connections

All the connections to the instrument are available on the back panel of the instrument.

Except for the load cell, all the connections are made using pull-out terminal blocks using flexible wire 0,5...1,5 mmq.

WARNING

Any wiring must be done when the instrument is powered off

Chech carefully the value of the power supply and the power supply wiring

ANY CONNECTION ERROR VOIDS WARRANTY

The connection to the safety ground must always be done.

For load cell, analog output and serial line wiring shielded cable is recommended.

Load cell, analog output and serial line wiring must be separated from power lines

The A100 mounting panel or cabinet must be properly grounded.

A100E output relays must be used only to drive relay coils (with nominal current and voltage beyond contact rating and using dumping networks) or logic input or signaling lamps; they cannot be used to drive power actuator.

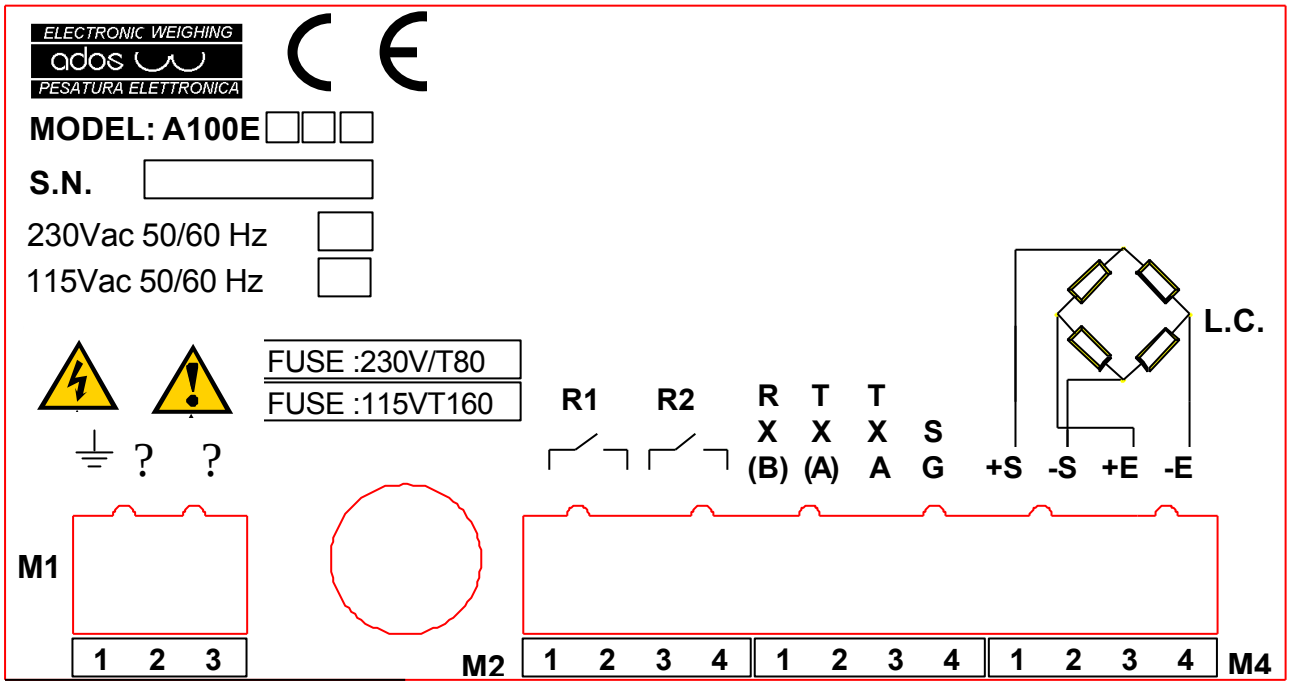

Figure 3 - A100E connection layout

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IN CASE OF PROBLEMS PLEASE REFER TO THE ADOS SERVICE ORGANIZATION

4.3.1 Wiring the instrument to the protective earthing system

Protective conductor terminal must be connected to the protective earthing system by means of flexible wire having a minimum section of 2,5mmq.

4.3.2 Power supply connection

Connect the power supply to terminals " 2 " and " 3 " of terminal block M1.

Terminal " 3 " must be connected to the earth.

TERMINAL BOARD	PIN	FUNCTION
M1	1	Earth
M1	2	230 Vac line (0 Vdc with dc version)
M1	3	230 Vac line (+ Vdc with dc version)

UNLESS OTHERWISE INDICATED, THE INSTRUMENT IS SUPPLIED FOR USE WITH 230 Vac POWER SUPPLY

4.3.3 Load cell connection

The load cell must be connected to the instrument with a shielded cable according to the attached table. To this regard, we recommended the use of our shielded cable (Type CS-4).
The cable shield at A100E side must be grounded.
The connection must be made in accordance with the color code reported on the load cell (when using ADOS cells refer to table 167-MTSCACOC).

The A100E includes the standard connection of load cells with 4 wires. For a connection to load cells equipped with senses (therefore with a 6-wire connection), contact ADOS.

THE CONNECTION CABLE BETWEEN THE LOAD CELLS AND THE INSTRUMENT MUST FOLLOW A COMPLETELY SEPARATE LAYOUT, TO AVOID UNWANTED COUPLING THAT CAN REDUCE THE QUALITY OF MEASUREMENT.

TERMINAL	PIN	FUNCTION	ADOS COLOR CODE
M4	1	+ SIGNAL	GREEN
M4	2	- SIGNAL	WHITE
M4	3	+ POWER SUPPLY	RED
M4	4	- POWER SUPPLY	BLACK

Cable shield must be connected to a good ground reference plane.

4.3.4 Relay output connection

The A100E can control two relay outputs.
The outputs can be associated to digital thresholds that can be programmed as required.
Refer to "Threshold control" paragraph for the functional aspects.
Refer to "CONFIGURATION" section of the manual for the programming modalities.

As output, a normally open (NO) contact that is voltage free is available to the user for each relay.

The contact rating is 0.5A at 24 Vdc.
If contact drives relay coils or inductive loads, a shut-off circuit must be provided in parallel to the contact.

TERMINAL BOARD	PIN	FUNCTIONS
M2	1	Relay 1 - NO
M2	2	Relay 1 - C
M2	3	Relay 2 - NO
M2	4	Relay 2 - C

4.3.5 Serial port connection

The primary transmission line can be used in the R232 or RS485 mode (refer to section "CONFIGURATION" for the operating modalities).

The auxiliary transmission line can be used in the R232 mode (refer to section "CONFIGURATION" for the operating modalities).

Connections must be done with a shielded cable (RS232 lines) or with a twisted pair (RS 485 lines).

In the RS485 modality, put a 50 ? resistor in parallel (where necessary) to the signal of the unit that is farthest from the HOST to correct for possible signal reflections.

TERMINAL	PIN	FUNCTION
M3	1	RX232 - RTX485 B
M3	2	TX232 - RTX485 A
M3	3	TX AUX
M3	4	SGROUND

5. MAINTENANCE

5.1 Preventive maintenance

The instrument needs no particular preventive maintenance.

For safety reason is a good practice to check periodically, by visual inspection, the connections to the protective earthling system.

5.2 Corrective maintenance

Any corrective maintenance to possible failures must be carried out at ADOS laboratories or at least by ADOS authorized personnel

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6. INSTRUMENT CONTROL

6.1 Introduction

The A100E indicator is a programmable instrument that performs a set of functions which can be adapted and/or personalized by the user to implement a variety of applications.

These functions can be modified using the configuration parameters.

Therefore, the instrument must be configured on the basis of the specific application before being used.

All the configuration parameters are maintained in non-volatile storage.
The parameter storage state is controlled when the instrument is turned on: if the result is negative the instrument is automatically re-initialized with the base configuration and must be reconfigured and re-calibrated.

During the instrument configuration process, the state of the signal LED's remains congruent with that of the process; however, the LED's flash to indicate to the user that it is not in normal operating condition.

The thresholds associated to the relays are controlled normally.

If the serial is active, the status flag in the transmitted message indicates that the instrument is in the configuration process.

6.2 Control function selection

The A100E includes the following control functions:

1. parameter configuration
2. weight calibration
3. test
4. system initialization

All the operations are guided by messages in plain text displayed on the display.
The display is used to display/set the value of the parameter to be modified.

To enter the instrument control modality just press the **F** key.

The instrument prepares to configure the parameters and displays the following message:

C	O	N	F	I	G

pressing the **F** key switches the control level and the following messages appear:

C	O	N	F	I	G
C	A	L	I	B	R
	T	E	S	T	
	I	N	I	T	

pressing the **E** key confirms the selection made.

Pressing the **C** key cancels the control request and the system returns to the normal operating modality.

6.2.1 Password

The operator access to configuration, weight calibration and system initialization is controlled by keyng of a defined sequence of keys (password).

The sequence is:

C E N/G T >O<

The password value is fixed and there are no procedures to modify while in operation. The scope of the password is not intended for security but only to prevent unwanted access to system functions.

The instrument shows the password request message on display:

P	A	S	S	W

and the message characters are substituted with "-" when the operator keys in the password.

When a correct access code is fully keyed the selected function menu will appear, otherwise the instrument will go back to the function selection menu.

6.2.2 Keyboard time out

After 30 seconds of no keyboard activity the instrument automatically generates a **C** key code, so if the instrument is abandoned while in configuration or calibration it will go back to the operation menu and than to the operating status.

6.3 Operating parameter configuration

6.3.1 Operating parameter selection

Entering the configuration from the configuration level selection menu the instrument prepares to configure the first parameter and displays the following message:

	G	R	A	D	

Press the **F** key to sequentially select all the configurable parameters (after reaching the last one it returns automatically to the first one).

Pressing the numeric keys directly sets the number of the parameter to be configured.

Press the **N/G** key to decrease the number of the parameter selected (after reaching the last one it returns automatically to the first one).

Press the **C** key to cancel the configuration request and return to the configuration level selection menu.

Press the **E** key to confirm the selection made and the instrument prepares to configure the parameter selected: the primary display indicates the value or the code of the parameter and the auxiliary display flashes to indicate that the instrument is prepared to accept the change to the value of the parameter.

6.3.2 Modifying the value of the operating parameters

Entering the configuration from the parameter selection menu the instrument indicates the value or the code of the parameter on the primary display.
The auxiliary display flashes to indicate that the instrument is prepared to accept the change to the value of the parameter.

Press the **F** key to increase the value of the parameter selected (after reaching the maximum it returns automatically to 0).
If the data displayed is a weight (for example a relay threshold) the increase will occur on the basis of the configured resolution.
By keeping the **F** key pressed, the increase gradient is increased automatically up to a maximum of 128 times the base value.

Press the **N/G** key to decrease the value of the parameter selected (after reaching the minimum it returns automatically to the maximum).
If the data displayed is a weight (for example a relay threshold) the decrease will occur on the basis of the configured resolution.
By keeping the **N/G** key pressed, the decrease gradient is increased automatically up to a maximum of 128 times the base value.

Pressing the numeric keys directly sets the number of the parameter to be configured.

Press the **>0<** key to clear the value of the selected parameter.

Press the **C** key to cancel the configuration request and return to the selection menu of the next parameter.

Press the **E** key to confirm the modification made.
The instrument checks if the value set is formally acceptable and displays the following message for 2 seconds:

	D	O	N	E	

and returns automatically to the selection menu of the next parameter.

6.3.3 Graduation

	G	R	A	D	

It is possible to set the following values:
? 1000
? 2000
? 3000
? 4000
? 5000 (default configuration)

6.3.4 Resolution

R	E	S	O	L	U

It is possible to set the following values:
? 1 (default configuration)
? 2
? 5
? 10
? 20
? 50
The system does not accept a resolution setting of 50 with 4000 and 5000 graduation (it would not be possible to present the data on the display).

6.3.5 Decimal point

D	E	C	P	N	T

It is possible to set the following values:
? 0 (default configuration)
? 0.0
? 0.00
? 0.000
? 0.0000

6.3.6 Averages

A	V	E	R	A	G

It is possible to set the following values:
? 4
? 8 (default configuration)
? 16

? 32

6.3.7 Zero limit

0		L	I	M	

This is the maximum load value that the instrument can clear.
It is possible to set the following values:
? OFF (default configuration)
? 1.9%
? 100%

6.3.8 Motion band

M	O	T	I	O	N

It is possible to set the following values:
? OFF (default configuration)
? 0.5 div/sec
? 1 div/sec
? 2 div/sec
? 5 div/sec
? 10 div/sec
? 20 div/sec

6.3.9 Zero tracking limit

0	T	R	A	C	K

It is possible to set the following values:
? OFF (default configuration)
? 0.5 div
? 1 div
? 2 div
? 5 div
? 10 div

6.3.10 Primary serial port

S	E	R		P	

It is possible to set the following values:
? OFF Off (default configuration)
? BIDIR Bi-directional
? CONT Continuous transmission
? DE Print on demand
? MODBUS

6.3.11 Auxiliary serial port

A	u	x	.		S	e	r

It is possible to set the following values:
? CONT Continuous transmission (default configuration)
? DE Print on demand

6.3.12 Transmission delay

D	L	Y	S	N	D

Values from 0 (default value) to 200 mS can be defined.

6.3.13 Receiver Time out

D	L	Y	R	C	V

Values from 0 (default value) to 200 mS can be defined.

6.3.14 Address on RS485

4	8	5		A	d	d	r

? It is possible to set values ranging from 0 (default configuration) to 32

6.3.15 Baud rate

B	a	u	d	R	a	t	e

It is possible to set the following values:
? 9600 (default configuration)
? 4800
? 2400

? 1200

6.3.16 Relay function

R		1		M	o	d	e
R		2		M	o	d	e

It is possible to set the following values:

? OFF Off (default configuration)
? C L Closing on Gross
? C NL Closing on Net upon Loading
? C NU Closing on Net upon Unloading
? O L Opening on Gross
? O NL Opening on Net upon Loading
? O NU Opening on Net upon Unloading

6.3.17 Relay threshold

S	E	T		R	1
S	E	T		R	2

It is possible to set a value ranging from 0 (default configuration) to the full scale (given by the product of graduation by resolution).

6.3.18 Dead Band

D	E	A	D	B	1
D	E	A	D	B	2

It is possible to set a value ranging from 0 (default configuration) to the 2% of full scale (given by the product of graduation by resolution).

6.4 Calibration

After a system initialization, the instrument must be calibrated before performing any weighing operation.

The calibration operation consists of two phases:
? zero calibration
? Span calibration

The two phases must be carried out at least once, otherwise the instrument does not exit the FAULT condition.
It is possible to carry out successive single calibrations, zero only or Span only.

To enter the calibration mode the user must enter the instrument control mode, and use the **F** key to select the:

C	A	L	I	B	R

and press the **E** key.

The instrument prepares for the zero scale calibration function and the following message is displayed:

C	A	L		O	

Press the **F** key to switch to Span calibration function and the following message is displayed:

C	A	L		F	S
	1	2	3	4	5

where 12345 is the value of the weight currently on the balance.

Press the **E** key to request to start the selected calibration sequence.

Press the **C** key to cancel the calibration request and to return to the instrument control menu.

6.4.1 Zero calibration

The weighing system must be set with ZERO weight.

After selecting the modality:

C	A	L		O	

press the **E** key.
The instrument prepares to receive the confirmation command and flashes the message on the display.

Press the **E** key again and the instrument starts the zero calibration procedure. The display shows the waiting time:

W	A	I	T				5

During the waiting time the load cell signal is integrated and it must stay stable.
When the wait time expires instrument performs the zero calibration and displays the following message for 2 seconds:

	D	O	N	E	

and returns automatically to the calibration menu.

6.4.2 Span calibration

The weighing system must be set with a KNOWN weight that is greater than 12.5% of the Span.
The precision of the Span calibration is greater the closer the known weight is to the full scale value.

The system is set to perform the calibration with a known weight corresponding to the value of the weight currently on the balance.
The operator can modify this setting by changing the value of the known weight directly (using the numeric keys) and by using the **F** key to increase the value on the display. The increase is performed in steps of one division or, by continuing to press the **F** key, in larger and larger steps up to a maximum of 128 graduation.

After pressing the **E** key, the instrument prepares to receive the confirmation command and flashes the following writing on the display:

C	A	L		F	S
	1	2	3	4	5

Press the **E** key again and the instrument starts the zero calibration procedure. The display shows the waiting time:

W	A	I	T				5

During the waiting time the load cell signal is integrated and it must stay stable.
When the wait time expires instrument performs the zero calibration and displays the following message for 2 seconds:

		D	O	N	E		

and returns automatically to the calibration menu.

If the value of the known weight set is lower than 12.5% of FS, the instrument displays the following signal for two seconds:

E	R	R	O	R	1

and returns automatically to the calibration menu.

If the load cell signal available is too low, the instrument displays the following signal for two seconds:

E	R	R	O	R	2

and returns automatically to the calibration menu.

6.5 Test

This function allows the user to check the correct connection of the relay outputs.

To enter the test modality, the user must enter the instrument control model and use the **F** key to select the modality:

	T	E	S	T	

and press the **E** key. Instrument shows:

	R	E	L	A	Y

Pressing again the **E** key the test will start and the message become:

	T	E	S	T		flashing

Press the **N/G** key to sequentially and individually excite each relay of the instrument.

Press the **C** key to return to the operating modality.

6.6 System Initialization

The instrument can be reset to the default configuration by mean of the System initialization function.

To enter the system initialization mode , the user must enter the instrument control mode and use the **F** key to select the modality:

S	Y	S		I	N	I	T

and press the **E** key.
The instrument will ask for password and, if correct, the following message will be displayed:

*		I	N	I	T		*

Press the **E** key to request to start the sequence and the instrument prepares to receive the confirmation command:

O	K		I	N	I	T	?

flashing

Press the **E** key to confirm the selection made and the instrument initializes the parameters and restarts automatically.

Press the **C** key to cancel the initialization request and return to the instrument control menu.

6.6.1 Switch controlled initialization

Initialization by switch can only be performed at power-on time.
The procedure is the following:

? DIP switch SW1-4 must be ON prior to power on
? The display shows the message:

O	K		I	N	I

flashing

? if the switch is setted to OFF in less than 5 seconds the initialization is carried out and the message on display changes to

	I	N	I	T	

flashing

and stays in this condition as long as a key is pressed, thus proceeding with startup sequence.
? if the switch is left unchanged the instrument proceeds with normal startup sequences

7. INSTRUMENT CONFIGURAZIONE TABLE

Parameter							
Grad	1000	2000	3000	4000	5000		
Resolution	1	2	5	10	20		50
Decimal point	0	0.0	0.00	0.000	0.0000		
Averages	4	8	16	32			
Zero limit	OFF	1.9	100				
Motion band	OFF	0.5	1.0	2.0	5.0	10.0	20.0
Zero tracking	OFF	0.5	1.0	2.0	5.0		10.0
Primary serial port	OFF	BIDIR	CONT	DEMAN	MODBUS		
Aux serial port	CONT	DEMAN					
Transmission delay	0..200 mS	(0)					
Receiver time out	0..200 mS	(0)					
BaudRate	9600	4800	2400	1200			
Address on RS485	0,1..32	(0)					
Relay 1 function	OFF	C G	C NL	CNU	O G	O NL	O NU
Relay threshold	0..FS	0					
Dead band	0.. 2% FS	0					
Relay 2 function	OFF	C G	C NL	CNU	O G	O NL	O NU
Relay threshold	0..FS	0					
Dead band	0.. 2% FS	0					