TLV 38

MICROPROCESSOR-BASED DIGITAL ELECTRONIC INDICATOR

OPERATING INSTRUCTIONS
Vr. 01 (ENG) - cod.: ISTR 06612

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FOREWORD

This manual contains the information necessary for the product to be installed correctly and also instructions for its maintenance and use; we therefore recommend that the utmost attention is paid to the following instructions.

Though this manual has been issued with the greatest care, TECNOLOGIC S.p.A. will not take any responsibility deriving from its use.

The same applies to each person or Company involved in the issuing of this manual.

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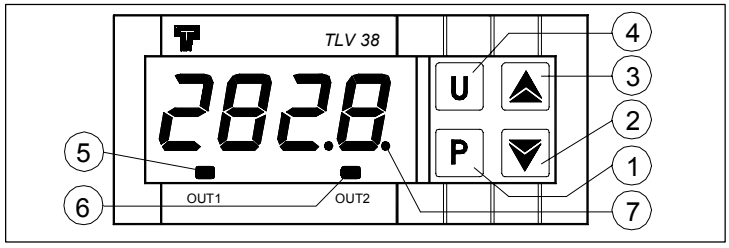
1 - INSTRUMENT DESCRIPTION

1.1 - GENERAL DESCRIPTION

TLV 38 is a digital microprocessor-based indicator.
Depending on the model required the input accept:
C: Thermocouples temperature probes (J,K,S and TECNOLOGIC IRS Infrared sensors), mV signals (0..50/60 mV, 12..60 mV), Thermoresistances PT100.
E : Thermocouples temperature probes (J,K,S and TECNOLOGIC IRS Infrared sensors), mV signals (0..50/60 mV, 12..60 mV), Thermistors PTC and NTC.
I : normalized analogue signals 0/4..20 mA
V : normalized analogue signals 0..1 V, 0/1..5 V, 0/2..10 V
The instrument can have up to 2 outputs: relay type or can drive solid state relays type (SSR).
The process value is visualized on 4 red displays, while the output status is indicated by 2 LED displays.
Other important available functions are:
maximum end minimum peak memory, Hold function, zero calibration (resetting) function and/or auto-ranging for normalized signals, parameters protection on different levels.

1.2 - FRONT PANEL DESCRIPTION



1 - Key P : This is used to access the programming parameters and to confirm selection.
2 - Key DOWN : This is used to decrease the values to be set and to select the parameters. If the key is held down, the user returns to the previous programming level until he exits the programming mode. Outside the programming mode it permits visualisation of the minimum peak measure.

3 - Key UP : This is used to increase the values to be set and to select the parameters. If the key is held down, the user returns to the previous programming level until he exits the programming mode. Outside the programming mode it permits visualisation of the maximum peak measure.
4 - Key U : This is a key with a function programmable by par. "USrb" (see par. 4.4). It permits to modify the visibility of the parameters in "ConF" menu (see par. 2.3).
5 - Led OUT1 : indicates the state of output OUT1
6 - Led OUT2 : indicates the state of output OUT2
7 - Led SET :It indicates access to the programming mode and parameter programming level.

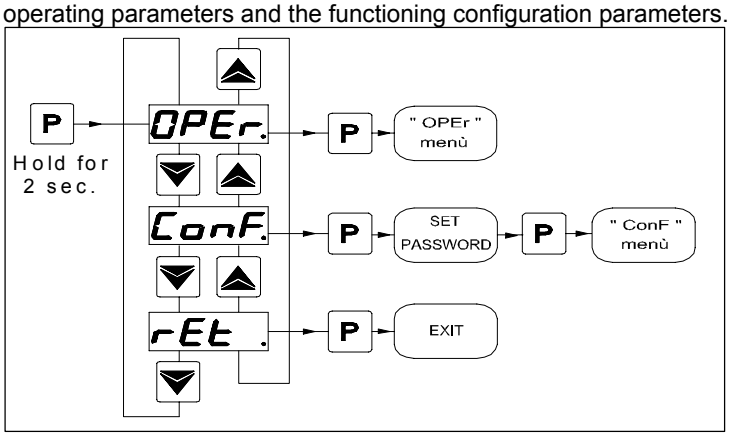
2 - PROGRAMMING

2.1 - PARAMETERS PROGRAMMING

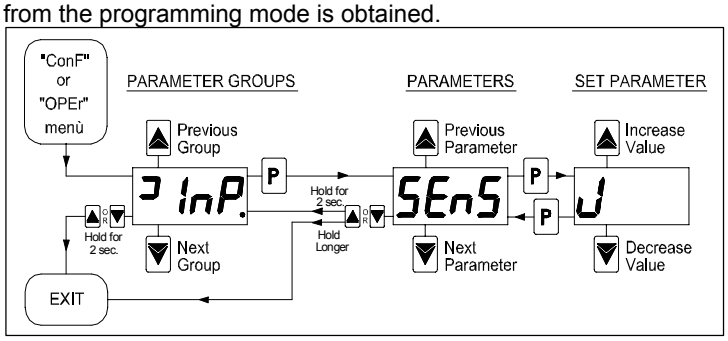
By pushing key "P" and holding it down for approx. 2 sec. it is possible to enter into the main selection menu.
Using the "UP" or DOWN" keys, it is then possible to roll over the selections:

"OPEr"	to enter into the operating parameters menu
"ConF"	to enter into the configuration parameters menu
"rEt"	to exit from the selection and come back to normal functioning

Once the desired item has been selected, push key "P" to confirm.
Selecting "OPEr" and "ConF" gives the possibility of accessing other menus containing additional parameters and more precisely :
"OPEr" – Operating parameters Menu: it's accessible without password, and can contain all the desired parameters (see par. 2.2).
"ConF" – Configuration parameters Menu: this contains all the operating parameters and the functioning configuration parameters.



To enter the menu **"ConF"**, select the option "ConF" and press the key "P", the display will now show "0".
At this request, enter, using keys "UP" and "DOWN", the number reported on the last page of this manual and push key "P".
If an incorrect password is entered, the instrument returns to the previous state.
If the password is correct, the display will visualise the code identifying the first group of parameters ("**InP**") and with keys "UP" and "DOWN" it will be possible to select the desired group of parameters (see parameters table).
Once the desired group of parameters has been selected, the code identifying the first parameter of the selected group will be visualised by pushing the "P" key.
Again using the "UP" and "DOWN" keys, it is possible to select the desired parameter and, if the key "P" is pressed, the display will alternatively show the parameter's code and its programming value, which can be modified by using the "UP" or "DOWN" keys.
Once the desired value has been programmed, push key "P" once more: the new value will be memorised and the display will show only the code of the selected parameter.
By using the "UP" or "DOWN" keys, it is then possible to select a new parameter (if present) and modify it as described above.
To select another group of parameters, keep the "UP" or "DOWN" key pressed for approx. 2 sec., afterwards the display will return to visualise the code of the group of parameters.
Release the key and by using the "UP" and "DOWN" keys, it will be possible to select a new group.
To exit the programming mode, no key should be pressed for approx. 20 seconds, or keep the "UP" or "DOWN" pressed until exit from the programming mode is obtained.



ATTENTION: *The instrument is programmed in factory with all the parameters, to exception of the Alarm thresholds AL1, AL2 (if available) programmable in the menù "ConF" to the purpose to prevent wrong accidental programming from non experienced consumers.*

2.2 - PARAMETERS PROGRAMMING LEVELS

The menu **"ConF"** (protected by password) contains all the parameters, however it is possible to program all desired parameters in the menu **"OPEr"** (without protection by password) by following this procedure:
Enter the menu "ConF" and select the parameter to be made programmable or not programmable in the menu "OPEr".
Once the parameter has been selected, if the LED SET is switched off, this means that the parameter is programmable only in the menu "ConF", if instead the LED SET is on, this means that the parameter is also programmable in the menu "OPEr".
To modify the visibility of the parameter, push key "U" : the LED SET will change its state indicating the parameter accessibility level (on = menu "OPEr" and "ConF"; off = menu "ConF" only).
To enter the menu **"OPEr"**, select the option "OPEr" and press the key "P".
The display will now show the code identifying the first group of parameters present and by pressing the "UP" and "DOWN" keys it will be possible to select the group of parameters to be modified.
The programming and exit modes for the "OPEr" menu are the same as those described for menu "ConF".

2.3 - FAST PROGRAMMING OF THE ALARM THRESHOLDS

If the alarm outputs are used this procedure permits rapid programming of the the alarm thresholds.
This procedure is possible only if the relative parameters of alarm threshold are present in "OPEr" menu.
The possible modification of these value, with the procedure described, is instead subordinate to what is programmed in par. **"Edit"** (contained in the group " **PAn** ").
This parameter can be programmed as :
= AE : The alarm thresholds can be modified
= AnE : The alarm thresholds can be visualized on the dispay but cannot be modified
Once you have configure the alarm thresholds as "OPEr" parameters to visualize or visualize and program the value push key "P" then release it during the normal state of the instrument.
The display will visualise **"AL 1"** alternatively to the programmed value.
To modify the value, press "UP" key to increase it or the "DOWN" key to decrease it (this is possible only if "Edit"=AE).
These keys change the value one digit at a time but if they are pressed for more than one second, the value increases or decreases rapidly and, after two seconds in the same condition, the changing speed increases in order to allow the desired value to be reached rapidly.
Once the desired value has been reached, by pushing key P it is possible to exit by the fast programming mode or it is possible to visualise the other alarm thresholds.
To exit the fast alarm thresholds programming it is necessary to push key P, after the visualisation of the last threshold, or

alternatively, if no key is pressed for approx. 15 seconds, the display will return to normal functioning automatically.

3 - INFORMATION ON INSTALLATION AND USE

3.1 - PERMITTED USE

The instrument has been projected and manufactured as a measuring and control device to be used according to EN61010-1 for the altitudes operation until 2000 ms.The use of the instrument for applications not expressly permitted by the above mentioned rule must adopt all the necessary protective measures. The instrument CANNOT be used in dangerous environments (flammable or explosive) without adequate protection. The installer must ensure that EMC rules are respected, also after the instrument installation, if necessary using proper filters. Whenever a failure or a malfunction of the device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional devices which will guarantee safety.

3.2 - MECHANICAL MOUNTING

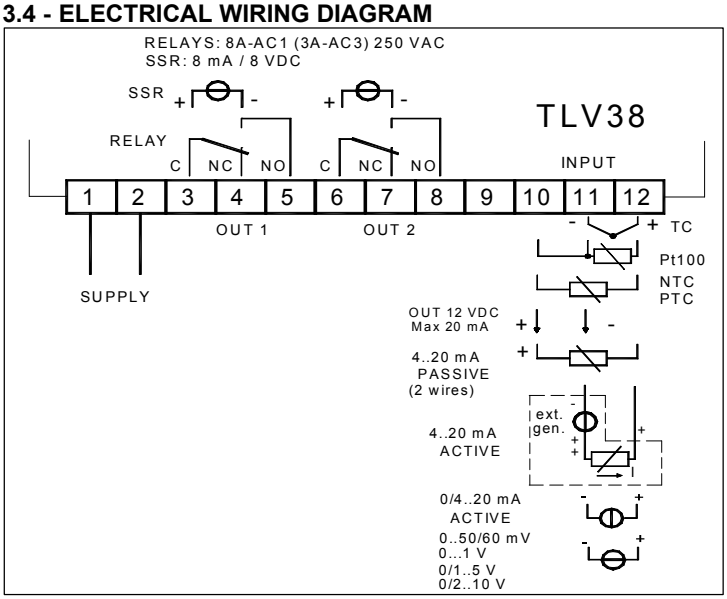
The instrument, in case 33 x 75 mm, is designed for flush-in panel mounting. Make a hole 29 x 71 mm and insert the instrument, fixing it with the provided special bracket. We recommend that the gasket is mounted in order to obtain the front protection degree as declared. Avoid placing the instrument in environments with very high humidity levels or dirt that may create condensation or introduction of conductive substances into the instrument. Ensure adequate ventilation to the instrument and avoid installation in containers that house devices which may overheat or which may cause the instrument to function at a higher temperature than the one permitted and declared. Connect the instrument as far away as possible from sources of electromagnetic disturbances such as motors, power relays, relays, solenoid valves, etc.

3.3 - ELECTRICAL CONNECTION

Carry out the electrical wiring by connecting only one wire to each terminal, according to the following diagram, checking that the power supply is the same as that indicated on the instrument and that the load current absorption is no higher than the maximum electricity current permitted. As the instrument is built-in equipment with permanent connection inside housing, it is not equipped with either switches or internal devices to protect against overload of current: the installation will include an overload protection and a two-phase circuit-breaker, placed as near as possible to the instrument, and located in a position that can easily be reached by the user and marked as instrument disconnecting device which interrupts the power supply to the equipment. It is also recommended that the supply of all the electrical circuits connected to the instrument must be protect properly, using devices (ex. fuses) proportionate to the circulating currents. It is strongly recommended that cables with proper insulation, according to the working voltages and temperatures, be used. Furthermore, the input cable of the probe has to be kept separate from line voltage wiring. If the input cable of the probe is screened, it has to be connected to the ground with only one side. Whether the instrument is 12 V version it's recommended to use an external transformer TCTR, or with equivalent features, and to use only one transformer for each instrument because there is no insulation between supply and input. We recommend that a check should be made that the parameters are those desired and that the application functions correctly before connecting the outputs to the actuators so as to avoid malfunctioning that may cause irregularities in the plant that could cause damage to people, things or animals.

Tecnologic S.p.A. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument's features.

3.4 - ELECTRICAL WIRING DIAGRAM



4 - FUNCTIONS

4.1 - MEASURING AND VISUALIZATION

All the parameters referring measurements are contained in the group **"InP".**

Depending on the model required the input accept:

C: Thermocouples temperature probes (J,K,S and TECNOLOGIC IRS Infrared sensors), mV signals (0..50/60 mV, 12..60 mV), Thermoresistances PT100.

E : Thermocouples temperature probes (J,K,S and TECNOLOGIC IRS Infrared sensors), mV signals (0..50/60 mV, 12..60 mV), Thermistors PTC and NTC.

I : normalized analogue signals 0/4..20 mA

V : normalized analogue signals 0..1 V, 0/1..5 V, 0/2..10 V

Depending on the model, using par. **"SEnS",** it's possible to select the type of input probe, which can be :

- for thermocouples J (J), K (CrAL), S (S) or for infrared sensors serie TECNOLOGIC IRTC1 with linearization J (Ir.J) or K (Ir.CA)
- for thermoresistances Pt100 IEC (Pt1) or thermistors PTC KTY81-121 (Ptc) or NTC 103AT-2 (ntc)
- for normalised signals in current 0..20 mA (0.20) or 4..20 mA (4.20)
- for normalised signals in tension 0..1 V (0.1), 0..5 V (0.5), 1..5 V (1.5), 0..10 V (0.10) or 2..10 V (2.10).
- for normalised signals in tension 0..50 mV (0.50), 0..60 mV (0.60), 12..60 mV (12.60).

We recommend to switch on and off the instrument when these parameters are modified, in order to obtain a correct measuring.

For the instruments with input for temperature probes (tc, rtd) it's possible to select, through par. **"Unit",** the unit of measurement (°C, °F) and, through par. **"dP"** (Pt100, PTC and NTC only) the desired resolution (0=1°; 1=0,1°).

Instead, with regards to the instruments with normalised analogue input signals, it is first necessary to program the desired resolution on par. **"dP"** (0=1; 1=0,1; 2=0,01; 3=0,001) and then, on par. **"SSC"**, the value that the instrument must visualise at the beginning of the scale (0/4 mA, 0/12 mV, 0/1 V o 0/2 V) and, on par. **"FSC",** the value that the instrument must visualise at the end of the scale (20 mA, 50 mV, 60 mV, 5 V or 10 V).

Only for the instruments with normalized signals input, the parameters "SSC" and "FSC" determines the measurement range and the parameter **"0.Pot"** determines the zero value (inside the range "SSC" ... "FSC").

Always for the instruments with normalized signals input it is possible to effect the input setting through auto-ranging (see functioning of key "U") in this case the values of the parameters "SSC", "FSC" and "0.Pot" are automatically calculated by the instrument.

The instrument allows for measuring calibration, which may be used to recalibrate the instrument according to application needs, by using par. **"OFSt"** and **"rot".**
Programming par. "rot"=1,000, in par. "OFSt" it is possible to set a positive or negative offset that is simply added to the value read by the probe before visualisation, which remains constant for all the measurements.
If instead, it is desired that the offset set should not be constant for all the measurements, it is possible to operate the calibration on any two points.
In this case, in order to decide which values to program on par. "OFSt" and "rot", the following formulae must be applied :

"rot" = (D2-D1) / (M2-M1) **"OFSt" = D2 - ("rot" x M2)**

where:
M1 =measured value 1
D1 = visualisation value when the instrument measures M1
M2 =measured value 2
D2 = visualisation value when the instrument measures M2
It then follows that the instrument will visualise :

DV = MV x "rot" + "OFSt"

where: DV = visualised value MV= measured value
Example 1: It is desired that the instrument visualises the value effectively measured at 20° but that, at 200°, it visualises a value lower than 10° (190°).
Therefore : M1=20 ; D1=20 ; M2=200 ; D2=190
"rot" = (190 - 20) / (200 - 20) = 0,944
"OFSt" = 190 - (0,944 x 200) = 1,2
Example 2: It is desired that the instrument visualises 10° whilst the value actually measured is 0°, but, at 500° it visualises a 50° higher value (550°).
Therefore : M1=0 ; D1=10 ; M2=500 ; D2=550
"rot" = (550 - 10) / (500 - 0) = 1,08
"OFSt" = 550 - (1,08 x 500) = 10
By using par. **"FiL"** it is possible to program time constant of the software filter for the input value measured, in order to reduce noise sensitivity (increasing the time of reading).
Using par. **"diSP",** located in the group **"[]PAn",** it is possible to set normal visualization of the display which can be the measure (dEF) or the alarm threshold AL1, AL2 (AL1, AL2).

4.2 - PEAK VALUES MEMORIZATION AND HOLD FUNCTION

The instrument memorizes the highest and lowest peak measurement values.
To visualize such values simply press the **UP** key to visualize the highest peak or the **DOWN** key for the lowest peak during normal operation of the instrument.
When the instrument is switched off, such values are always re-set. However, it is also possible to re-set these values if the instrument is switched on by using the U key that has been suitably programmed (see par. U key with function "USrb" = r.Pic).
Again, using the U key it is possible to visualize the difference between the two peaks on the display (see par. U key with function "USrb" = d.Pic).
Besides the function of the peak values, the instrument also has a HOLD function through which it is possible to lock the visualization of the display on the measured value.
This function can be operated using the U key (see par. U key with function "USrb" = Hold).
When the HOLD function is actived, the instrument works on the alarms in operation depending on the memorized measurement.

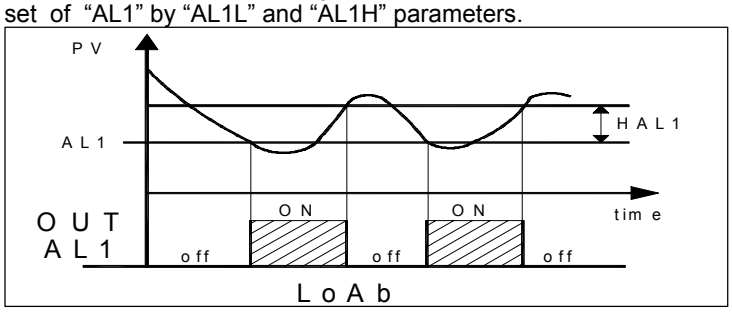
4.3 - ALARMS OUTPUTS FUNCTIONS (AL1, AL2)

The alarms (AL1, AL2) are depending on the process value and before to set his functioning it's necessary to establish to which output the alarm has to correspond to.
First of all it's necessary to configure, in the parameters group **"[]Out",** the parameters relative to the outputs required as alarm ("O1F" , "O2F") programming the parameter relative to the desired output as follows :
= ALno if the alarm output has to be ON when the alarm is active, while it's OFF when the alarm is not active
= ALnc if the alarm output has to be ON when the alarm is not active, while it's OFF when the alarm is active
= ALni if the alarm output has to be ON when the alarm is not active, while it is OFF when the alarm is active but with reverse led indication (led ON= alarm OFF).

Note: *In all the examples that follow is made reference to the alarm AL1. Naturally the operation of the other alarms results analogous.*

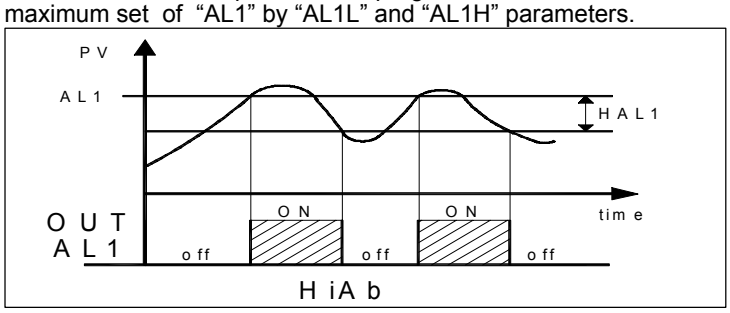
Have now access at the group **"[]AL1",** and program on par. **"OAL1"** , to which output the alarm signal has to be sent.
The alarm functioning is instead defined by parameters :
"AL1t " - ALARM TYPE
"Ab1" - ALARM CONFIGURATION
"AL1" - ALARM THRESHOLD
"AL1L" - LOW ALARM THRESHOLD (for band alarm) OR MINIMUM SET OF AL1 ALARM THRESHOLD (for low or high alarm)
"AL1H" - HIGH ALARM THRESHOLD (for band alarm) OR MAXIMUM SET OF AL1 ALARM THRESHOLD (for low or high alarm)
"HAL1" - ALARM HYSTERESIS
"AL1d" - ALARM ACTIVATION DELAY (in sec.)
"AL1i" - ALARM BEHAVIOUR IN THE EVENT OF MEASUREMENT ERROR

"AL1t" – ALARM TYPE : the alarm output can behave in 3 different ways.
LoAb = LOW ALARM: The alarm is activated when the process value goes below the alarm threshold set on parameter "AL1" and will be deactivated when it goes above the value [AL1+HAL1]. With this mode is possible to program the minimum and the maximum set of "AL1" by "AL1L" and "AL1H" parameters.



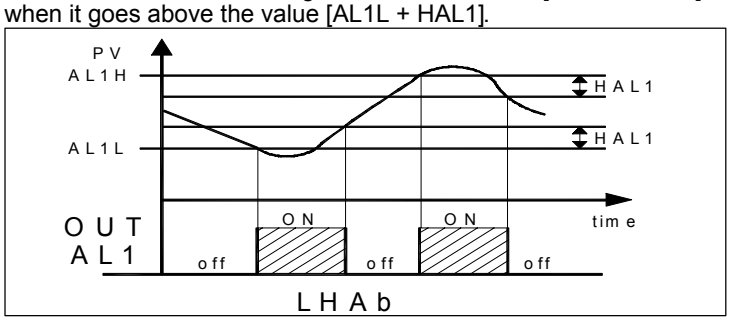
L o A b

HiAb = HIGH ALARM: The alarm is activated when the process value goes higher than the alarm threshold set on parameter "AL1" and will be deactivated when it goes below the value [AL1 - HAL1]. With this mode is possible to program the minimum and the maximum set of "AL1" by "AL1L" and "AL1H" parameters.



H iA b

LHAb = BAND ALARM: The alarm is activated when the process value goes under the alarm threshold set on parameter "AL1L" or goes higher than the alarm threshold set on parameter "AL1H" and will be deactivated when it goes below the value [AL1H - HAL1] or when it goes above the value [AL1L + HAL1].



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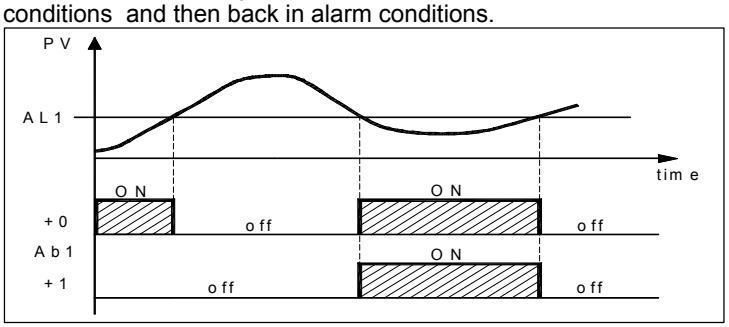
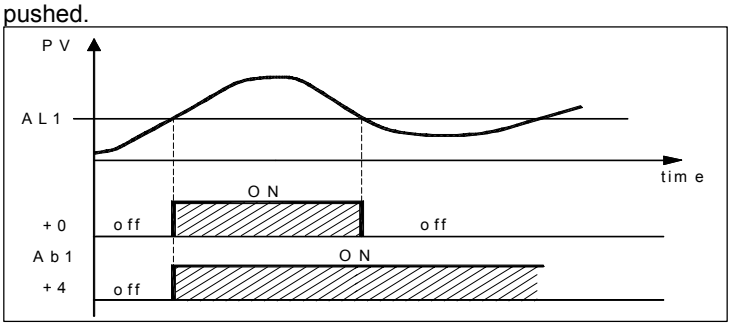
"**Ab1" - ALARM CONFIGURATION:** This parameter can assume a value between 0 and 15.
The number to be set, which will correspond to the function desired, is obtained by adding the values reported in the following descriptions :
ALARM BEHAVIOUR AT SWITCH ON: the alarm output may behave in two different ways, depending on the value added to par. "Ab1".
+0 = NORMAL BEHAVIOUR: The alarm is always activated when there are alarm conditions.
+1 = ALARM NOT ACTIVATED AT SWITCH ON: If, when switched on, the instrument is in alarm condition, the alarm is not activated. It will be activated only when the process value is in non-alarm conditions and then back in alarm conditions.



exemple with absolute low alarm

ALARM DELAY: the alarm output may behave in two different ways depending on the value added to par. "Ab1".
+0 = ALARM NOT DELAYED: The alarm is immediately activated when the alarm condition occurs.
+2 = ALARM DELAYED: When the alarm condition occurs, delay counting begins, as programmed on par. "AL1d" (expressed in sec.) and the alarm will be activated only after the elapsing of that time.
ALARM LATCH: : the alarm output may behave in two different ways depending on the value added to par. "Ab1".
+ 0 = ALARM NOT LATCHED: The alarm remains active in alarm conditions only.
+ 4 = ALARM LATCHED: The alarm is active in alarm conditions and remains active even when these conditions no longer exist, until the correctly programmed key "U", ("USrb"=Aac) has been pushed.



exemple with absolute high alarm

ALARM AKNOWLEDGEMENT: : the alarm output may behave in two different ways depending on the value added to par. "Ab1".
+ 0 = ALARM NOT AKNOWLEDGED: The alarm always remains active in alarm conditions.
+ 8 = ALARM AKNOWLEDGED: The alarm is active in alarm conditions and can be deactivated by key "U" if properly programmed ("USrb"=ASi), and also if alarm conditions still exist.

"AL1i" - ALARM ACTIVATION IN CASE OF MEASUREMENT ERROR: This allows one to establish how the alarm have behave in the event of a measurement error (yES=alarm active; no=alarm deactivated).

4.4 - FUNCTIONING OF KEY "U"

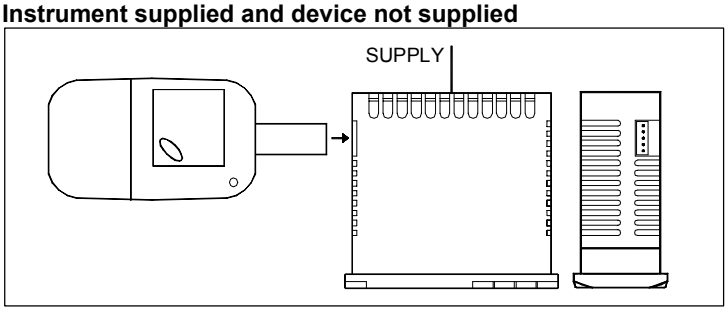
The function of key "U" can be set through par. **"USrb"** contained in the group **"[PAn".**
The parameter can be programmed as :
= noF : no function
= Aac : Pushing the key for 1 sec. at least, it is possible to acknowledge the alarm. (see par. 4.3)
= ASi : Pushing the key for 1 sec. at least, it is possible to acknowledge an active alarm (see par. 4.3)
= HoLd: Pushing the key the measurement taken at that moment is blocked (N.B.: not the reading on the display, therefore the indication may stabilise itself with a delay that is proportional to the measuring filter). With the hold function turned on, the instrument carries out control according to the memorised measurement. Releasing the key, the instrument starts normal measurement acquisition once more.
= d.Pic: Pressing the key, the maximum variation of the measurement recorded since the instrument was switched on is visualized on the display (highest peak - lowest peak).
= 0.Pot: For the instruments with normalized signals input, it is possible to set the "zero" value with this function. Pressing the key for at least 1 sec., the display will show the writing **"0.Pot"** for approx. 1 sec, and then "0", assuming the value measured in that instant as 0 .
= r.Pic: Pressing the key, the highest and lowest peak values are re-set.
= r.P0P: For the instruments with normalized signals input, it is possible to set the "zero" value and contemporarily re-set the highest and lowest peak values with this function . Pressing the key for at least 1 sec., the display will show the writing **"r.P0P"** for approx. 1 sec., and then "0", assuming the value measured in that instant as 0 and re-setting the memorized peak values.
= t.Pot: For the instruments with normalized signals input, with this function it is possible to set the points of measurement by means of auto-ranging procedure through which the parameters "SSC", "FSC" and "0.Pot." are automatically re-calculated.
Pressing the key for at least 1 sec., the display will show **"P1"** alternatively to the value of the first point of setting. Now, give to the input the first point value of setting and program the value desired for that point using the UP and DOWN keys. Once the value has been set, press the P key : the instrument will memorize the value and the display will show **"P2"** alternatively to the value of the second point of setting. Give to the input the second point value of setting and program the value desired for that point using the UP and DOWN keys. Pressing the P key, the second value is also acquired and the instrument will automatically exit from the self-learning mode, re-calculating the measuring range.

4.5 - PARAMETERS CONFIGURATION BY "KEY01"

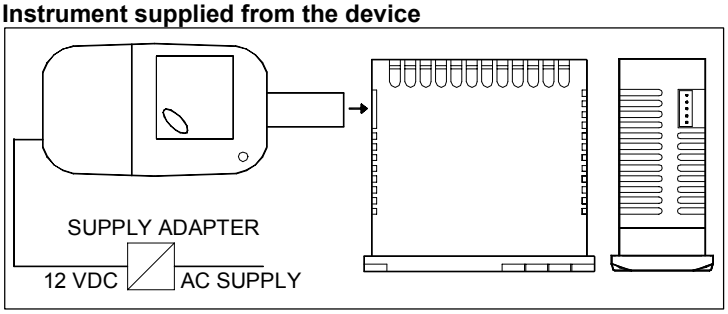
The instrument is equipped with a connector that allows the transfer from and toward the instrument of the functioning parameters through the device **TECNOLOGIC KEY01** with **5 poles** connector.
This device it's mainly useable for the serial programming of the instruments which need to have the same parameters configuration or to keep a copy of the programming of an instrument and allow its rapid retransmission.
To use the device KEY01 it's necessary that the device or instrument are being supplied.
To transfer the configuration of an instrument into the device **(UPLOAD)** it is necessary to proceed in the following way:
1) position both dip switch of KEY 01 in the **OFF** mode.
2) connect the device to the instrument TLV plugging the special connector.
3) verify that the instrument or the device are supplied
4) observe the indication led on the device KEY 01: if it results green this means that a configuration is already loaded on the device while if it results green blinking or red blinking this means that it has not been loaded any valid configuration on the device .
5) press the button placed on the device.
6) observe the indication led : after having pressed the button, the led becomes red and therefore, at the end of the data transfer, it becomes green.
7) now it is possible to disconnect the device.
To transfer the configuration loaded on the device onto an instrument of the same family **(DOWNLOAD)**, it is necessary to proceed in the following way:
1) position both dip switch of KEY 01 in the **ON** mode.
2) connect the device to an instrument TLV having the same features of the one from which has been downloaded the desired configuration, plugging the special connector.

3) verify that the instrument or the device are supplied
4) observe the indication led on the device KEY 01: it has to result green, because if the led results green blinking or red blinking, this means that on the device it has not been downloaded any valid configuration and therefore it's useless to continue.
5) if the les results green, press the button placed on the device.
6) observe the indication led : after having pressed the button, the led becomes red and therefore, at the end of the data transfer, it becomes green.
7) now it is possible to disconnect the device.

Instrument supplied and device not supplied



Instrument supplied from the device



For additional info, please have a look at the KEY01 instruction manual.

5 - PROGRAMMABLE PARAMETERS

Here following are described all the parameters available on the instrument. Some of them could be not present or because they are depending on the type of instrument or because they are automatically disabled as unnecessary.

Group "] InP" (parameters relative to the measure input)

Par.		Description	Range	Def.	Note
1	**SEnS**	Probe type: J= thermocoupled J CrAL= termocoupled K S= thermocoupled S Ir.J=Infrared Sen. IRS J Ir.CA= Infrared Sen. IRS K Pt1= thermores. Pt100 0.50= 0..50 mV 0.60= 0..60 mV 12.60= 12..60 mV Ptc= thermistor PTC KTY81-121 ntc= thermistor NTC 103-AT2 0.20= 0..20 mA 4.20= 4..20 mA 0.1= 0..1 V 0.5=0..5 V 1.5= 1..5 V 0.10= 0..10 V 2.10= 2..10 V	<u>input C :</u> J / CrAL / S / Ir.J / Ir.CA / Pt1 / 0.50 / 0.60 / 12.60 <u>input E :</u> J / CrAL / S / Ir.J / Ir.CA / Ptc / ntc / 0.50 / 0.60 / 12.60 <u>input I :</u> 0.20 / 4.20 <u>input V :</u> 0.1 / 0.5 / 1.5 / 0.10 / 2.10	J Ptc 4.20 0.10	
2	**SSC**	Low scale limit input with V / I signals	-1999 ÷ FSC	0	
3	**FSC**	High scale limit input with V / I signals	SSC ÷ 9999	100	
4	**0.Pot**	Zero value with V / I signals	SSC ÷ FSC	0	
5	**dP**	Number of decimal figures	<u>Pt1 / Ptc / ntc:</u> 0 / 1 <u>norm sig.:</u> 0 ÷ 3	0	
6	**Unit**	Temperature unit of measurement	°C / °F	°C	
7	**FiL**	Input digital filter	0FF÷ 20.0 sec.	1.0	
8	**OFSt**	Measuring Offset	-1999 ÷ 9999	0	
9	**rot**	Rotation of the measuring straight line	0.000 ÷ 2.000	1.000	

Group"] Out" (parameters relative to the outputs)

Par.		Description	Range	Def.	Note
10	**O1F**	Functioning of output 1: ALno= Alarm Out normally opened ALnc= Alarm Out normally closed ALni= Alarm Out normally closed with reverse led func.	ALno / ALnc ALni / OFF	ALno	
11	**O2F**	Functioning of output 2: see "O1F"	ALno / ALnc ALni / OFF	ALno	

Group "] AL1" (parameters relative to alarm AL1)

Par.		Description	Range	Def.	Note
12	**OAL1**	Output where alarm AL1 is addressed	Out1 / Out2 / OFF	Out1	
13	**AL1t**	Alarm AL1 type: LoAb= Low HiAb= High LHAb= Band	LoAb / HiAb LHAb	LoAb	
14	**Ab1**	Alarm AL1 functioning: +1 = not activated at power on +2 = delayed +4 = latch +8 = aknowledged	0 ÷ 15	0	
15	**AL1**	Alarm AL1 threshold	AL1L÷ AL1H	0	
16	**AL1L**	Low threshold band alarm AL1 or Minimum set alarm AL1 for high or low alarm	-1999 ÷ AL1H	-1999	
17	**AL1H**	High threshold band alarm AL1 or Maximum set alarm AL1 for high or low alarm	AL1L ÷ 9999	9999	
18	**HAL1**	Alarm AL1 hysteresis	OFF ÷ 9999	1	
19	**AL1d**	Activation delay of alarm AL1	OFF ÷ 9999 sec.	OFF	
20	**AL1i**	Alarm AL1 activation in case of measuring error	no / yES	no	

Gruppo "] AL2" (parametri relativi all'allarme AL2)

Par.		Description	Range	Def.	Note
21	**OAL2**	Output where alarm AL2 is addressed	Out1 / Out2 / OFF	Out2	
22	**AL2t**	Alarm AL2 type: see "AL1"	LoAb / HiAb LHAb	LoAb	
23	**Ab2**	Alarm AL2 functioning: see "AL1"	0 ÷ 15	0	
24	**AL2**	Alarm AL2 threshold	AL2L÷ AL2H	0	
25	**AL2L**	Low threshold band alarm AL2 or Minimum set alarm AL2 for high or low alarm	-1999 ÷ AL2H	-1999	
26	**AL2H**	High threshold band alarm AL2 or Maximum set alarm AL2 for high or low alarm	AL2L ÷ 9999	9999	
27	**HAL2**	Alarm AL2 hysteresis	OFF ÷ 9999	1	
28	**AL2d**	Activation delay of alarm AL2	OFF ÷ 9999 sec.	OFF	

29	**AL2i**	Alarm AL2 activation in case of measuring error	no / yES	no	

Group "PAn" (parameters relative to the user interface)

Par.		Description	Range	Def.	Note
30	**USrb**	Functioning of key "U" : noF = No Function Aac= Reset Alarms latch ASi= Aknowledged Alarms HoLd = Hold measur. d.Pic = display differen-ce high peak -low peak 0.Pot = set "zero" value r.Pic = Reset high and low peaks r.P0P = set "zero" va-lue and Reset high and low peaks t.Pot = set measure by auto-ranging	noF / Aac ASi / HoLd d.Pic / 0.Pot / r.Pic / r.P0P / t.Pot	noF	
31	**diSP**	Variable visualized on the display: dEF= Process Value AL1 = AL1 threshold AL2 = AL2 threshold	dEF / AL1 / AL2	dEF	
32	**Edit**	Set Fast program.: AE= alarm thresholds can be modified AnE= alarm thresholds cannot be modified	AE / AnE	AE	

6 - PROBLEMS, MAINTENANCE AND GUARANTEE

6.1 - ERROR SIGNALLING

Error	Reason	Action
- - - -	Probe interrupted	Verify the correct connection between probe and instrument and then verify the correct functioning of the probe
uuuu	The measured variable is under the probe's limits (under-range)	
oooo	The measured variable is over the probe's limits (over-range)	
ErEP	Possible anomaly of the EEPROM memory	Push key "P"

In error conditions, the instrument provides to activates the desired alarms, if the relative parameters "ALni" have been programmed = yES.

6.2 - CLEANING

We recommend cleaning of the instrument with a slightly wet cloth using water and not abrasive cleaners or solvents which may damage the instrument.

6.3 - GUARANTEE AND REPAIRS

The instrument is under warranty against manufacturing flaws or faulty material, that are found within 12 months from delivery date.
The guarantee is limited to repairs or to the replacement of the instrument. The eventual opening of the housing, the violation of the instrument or the improper use and installation of the product will bring about the immediate withdrawal of the warranty's effects.
In the event of a faulty instrument, either within the period of warranty, or further to its expiry, please contact our sales department to obtain authorisation for sending the instrument to our company. The faulty product must be shipped to TECNOLOGIC with a detailed description of the faults found, without any fees or charge for Tecnologic, except in the event of alternative agreements.

7 - TECHNICAL DATA

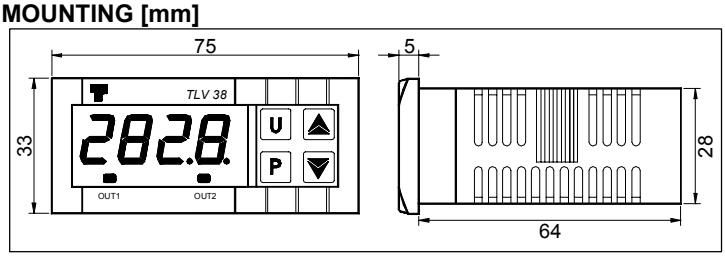
7.1 - ELECTRICAL DATA

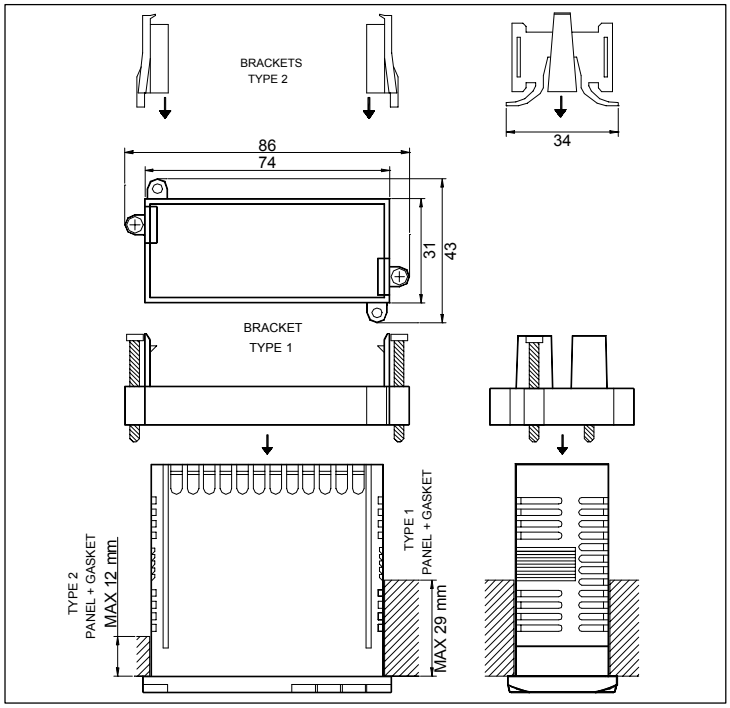
Power supply: 12 VAC/VDC, 24 VAC/VDC, 100.. 240 VAC +/- 10%
Frequency AC: 50/60 Hz
Power consumption: 4 VA approx.
Input/s: 1 input for temperature probes: tc J,K,S ; infrared sensors TECNOLOGIC IRS J e K; RTD Pt 100 IEC; PTC KTY 81-121 (990 Ω @ 25 °C); NTC 103AT-2 (10KΩ @ 25 °C) or mV signals 0...50 mV, 0...60 mV, 12 ...60 mV or normalized signals 0/4...20 mA, 0..1 V, 0/1...5 V , 0/2...10 V.
Normalized signals input impedance: 0/4..20 mA: 51 Ω; mV and V: 1 MΩ
Output/s: Up to 2 outputs. Relay SPDT (8 A-AC1, 3 A-AC3 / 250 VAC) ; or in tension to drive SSR (8mA/ 8VDC).
Auxiliary supply output: 12 VDC / 20 mA Max.
Electrical life for relay outputs: 100000 operat.
Installation category: II
Measurement category: I
Protection class against electric shock: Class II for Front panel
Insulation: Reinforced insulation between the low voltage part (power supply 115 / 230 V and relay outputs) and front panel; Reinforced insulation between the low voltage section (Supply 115 / 230 V and relay outputs) and the extra low voltage section (input, SSR outputs); Reinforced between power supply and relay; No insulation between supply 12 V and input. No insulation between input and SSR outputs.

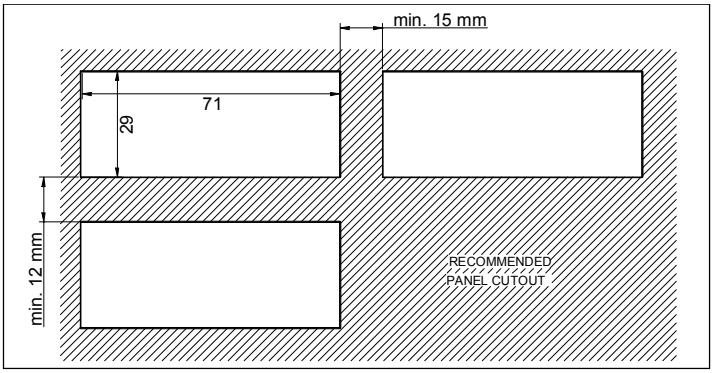
7.2 - MECHANICAL DATA

Housing: Self-extinguishing plastic, UL 94 V0
Dimensions: 33 x 75 mm, depth 64 mm
Weight: 110 g approx.
Mounting: Flush in panel in 29 x 71 mm hole
Connections: 2,5 mm^2 screw terminals block
Degree of front panel protection : IP 65 mounted in panel with gasket
Pollution situation: 2
Operating temperature: 0 ... 50 °C
Operating humidity: 30 ... 95 RH% without condensation
Storage temperature: -10 ... +60 °C

7.3 - MECHANICAL DIMENSIONS, PANEL CUT-OUT AND MOUNTING [mm]







7.4 - FUNCTIONAL FEATURES

Measurement range: according to the used probe (see range table)
Display resolution: according to the probe used 1/0,1/0,01/0,001
Overall accuracy: +/- 0,5 % fs (tc S: +/- 1 % fs)
Sampling rate: 130 ms.
Display: 4 Digit Red h 12 mm
Compliance: ECC directive EMC 89/336 (EN 61326), ECC directive LV 73/23 and 93/68 (EN 61010-1)
Approvals: C-UL (file n. E206847)

7.5 - MEASURING RANGE TABLE

INPUT	"dP" = 0	"dP"= 1, 2, 3
tc J **"SEnS" = J**	0 ... 1000 °C 32 ... 1832 °F	- - - -
tc K **"SEnS" = CrAl**	0 ... 1370 °C 32 ... 2498 °F	- - - -
tc S **"SEnS" = S**	0 ... 1760 °C 32 ... 3200 °F	- - - -
Pt100 (IEC) **"SEnS" = Pt1**	-200 ... 850 °C -328 ... 1562 °F	-199.9 ... 850.0 °C -199.9 ... 999.9 °F
PTC (KTY81-121) **"SEnS" = Ptc**	-55 ... 150 °C -67 ... 302 °F	-55.0 ... 150.0 °C -67.0 ...302.0 °F
NTC (103-AT2) **"SEnS" = ntc**	-50 ... 110 °C -58 ... 230 °F	-50.0 ... 110.0 °C -58.0 ... 230.0 °F
0..20 mA **"SEnS" = 0.20**	-1999 ... 9999	-199.9 ... 999.9 -19.99 ... 99.99 -1.999 ... 9.999
4..20 mA **"SEnS" = 4.20**		
0 ... 50 mV **"SEnS" = 0.50**		
0 ... 60 mV **"SEnS" = 0.60**		
12 ... 60 mV **"SEnS" = 12.60**		
0 ... 1 V **"SEnS" = 0.1**		
0 ... 5 V **"SEnS" = 0.5**		
1 ... 5 V **"SEnS" = 1.5**		
0 ... 10 V **"SEnS" = 0.10**		
2 ... 10 V **"SEnS" = 2.10**		

7.6 - INSTRUMENT ORDERING CODE

TLV38 a b c d ee f

a : POWER SUPPLY
F = 12 VAC/VDC
L = 24 VAC/VDC
H = 100... 240 VAC

b : INPUT
C = thermocouples (J, K, S, I.R), mV, thermoresistances (Pt100)
E = thermocouples (J, K, S, I.R.), mV, thermistors (PTC, NTC)
I = normalized signals 0/4..20 mA
V = normalized signals 0..1 V, 0/1..5 V, 0/2..10 V.

c : OUTPUT OUT1
- = None
R = Relay
O = VDC for SSR

d : OUTPUT OUT2
- = None
R = Relay
O = VDC for SSR

ee: SPECIAL CODES

f: SPECIAL VERSIONS

TLV 38 PASSWORD = 381