

INSTRUCTION MANUAL

BC 7635

MICROPROCESSOR BASED CONTROLLER

Scale: -1999/9999
Input (+): 0/4 – 20 mA
Input (-): 0/4 – 20 mA

Option _____
S/N _____
REP N° _____

Power Supply: 85/264 Vac
Installed Firmware: R 1.0x



Cod. 28009766 Revision A

BC3531 - D - Rev. 01e

Index

1	PRODUCT PRESENTATION	2
1.1	Functional purpose of the unit	2
1.2	Functional principles	2
1.3	Accessories	2
2	GENERAL WARNINGS AND INFORMATION FOR ALL USERS	3
2.1	Warranty	3
2.2	After sales service	3
2.3	CE marking	3
2.4	Safety warnings	3
3	INSTRUCTION MANUAL CONTENTS	4
3.1	Manual revision	4
3.2	Symbols	4
3.3	how to read the instruction manual	5
4	SPECIFICATIONS	7
4.1	Functional specification	7
4.2	Technical specifications	10
5	OPERATING PROCEDURES	14
5.1	Keyboard	14
5.2	Operating instructions	15
5.3	Instruction for the maintenance staff	17
5.4	Instruction for the plant engineer	21
6	INSTALLATION	24
6.1	Packing list	24
6.2	Unpacking	24
6.3	Storage and transportation	24
6.4	Installation of the unit	24
6.5	Electrical installation	24
7	DISPOSAL	27
	Warranty certificate	30
	Repairs	30
	Technical support	31

1 PRODUCT PRESENTATION

1.1 FUNCTIONAL PURPOSE OF THE UNIT

The basic system for monitoring and control is made of two important parts:

- the controller described in this instruction manual;
- the 0/20 mA or 4/20 mA transmitter connected to a suitable sensor.

The instrument has the necessary electric circuits and firmware to perform the following functions:

- 1) visualization of the measuring in the selectable range from -1999 to 9999, corresponding to the 0/20 mA or 4/20 mA input from an external device;
- 2) it provides the Vdc power to the 4/20 mA loop powered transmitter;
- 3) it will automatically adjust the measuring, if dosing pumps or solenoids are connected to the specific relays;
- 4) it will give an alarm, if the measure goes outside the low/high limit values;
- 5) it provides an analog output for recording and acquiring the measuring values;
- 6) it receives an external free voltage contact that activates the alarm or the hold condition.

In some application it is necessary to measure before and after the process in order to obtain the difference of the two measuring. This unit allows a differential measuring, by using two transmitters featuring the same measuring scale.

The basic system for monitoring and control the differential measuring is made of 3 important parts:

- the controller described in this instruction manual;
- two 0/20 mA or 4/20 mA transmitters connected to a suitable sensor.

In this case the instrument performs the following functions:

- 1) visualization of the differential measuring between two 0/20 mA or 4/20 mA signals applied to the positive and negative input of the instrument;
- 2) it provides the Vdc power to the 4/20 mA loop powered transmitters;
- 3) it will automatically adjust the measuring, if dosing pumps or solenoids are connected to the specific relays;
- 4) it will give an alarm, if the measure goes outside the low/high limit values;
- 5) it provides an analog output for recording and acquiring the measuring values;
- 6) it receives an external free voltage contact that activates the alarm or the hold condition.

1.2 ACCESSORIES

The listed articles are the most commonly used ones.
They must be ordered separately.



BC 931.2 watertight enclosure for 1 controller. IP65

BC 931.3 watertight enclosure for 2 controllers. IP65

2 GENERAL WARNINGS AND INFORMATION FOR ALL USERS

2.1 WARRANTY

This product is guaranteed for all manufacturing defects.

Please take a look at the terms and conditions described on the Warranty Certificate at the end of the manual.

2.2 AFTER SALES SERVICE

B&C Electronics offers to all of its Customers the following services:

- a free of charge Technical Assistance over the phone for problems regarding installation, calibration and regular maintenance;
- a Repairing Service in our Carnate (Italy) headquarter for all types of damages, calibration or for a scheduled maintenance.

Please take a look at the Technical Support data sheet at the end of the manual for more details.

2.3 CE MARKING

This instrument is manufactured according to the following European Community directives:

- 72/23/EEC “Electrical safety – low tension” amended in 93/68/EEC
- 2004/108/CEE (previously 89/336/EEC) “Electromagnetic compatibility)

The  marking is placed on the packaging and on the S/N label of the instrument.

2.4 SAFETY WARNINGS

It is important to underline the fact that electronic instruments are subject to accidents. For this, it is important to take all necessary precautions to avoid damages caused by malfunctions.

All types of operations must be performed by authorized and trained staff.

The use of this controller must respect the parameters described in Charter 4.2 “Technical specification”, so to avoid potential damages and a reduction of its operating life.

3 INSTRUCTION MANUAL CONTENTS

This chapter describes the manual and gives suggestions to all users on how to read it and use it.

The manual is written according to the following norms:

- UNI 10893 “Instructions for use”.
- UNI 10653 “Quality of product technical documentation”.


3.1 MANUAL REVISION

This chapter shortly describes the differences between previously released versions of the same manual, so to help users that are already familiar with the product.

Rev. A: First release.

3.2 SYMBOLS

Throughout the manual You may find the following symbols, which are both dictated by a Norm or that are simply conventional:

Symbol	Meaning
	<i>Attention: pay great attention to what written next to this symbol</i>
<p>----- WARNINGS -----</p>	<i>This symbol is used to warn users that if the instructions are ignored or not correctly followed, damage to the instrument can be caused</i>
Note	<i>This symbol is to invite the user to pay particular attention to a specific section of the manual.</i>
“*”	<i>This symbol can be found in those chapters where there have been changes from the previous releases.</i>

3.3 HOW TO READ THE INSTRUCTION MANUAL

The manual includes all necessary information to fully comprehend the product, to install it correctly, to use it and preserving it, and finally to achieve the performances for which You have selected it and purchased it.

The manual is intended for experienced and prepared personnel, who has knowledge of electronic instrumentations and industrial plants' typical operations.

The index guides the reader through the chapters and through the contents that he wishes to know or exploit.

In particular, the first chapters narrate the general characteristics and they allow the reader to become more familiar with the product by describing its accessories and its use.

The user can then verify if he/she has the necessary know-how to use the controller.

As described in the following chapters, the instrument was designed by keeping in mind three different kinds of users: generic use (*end user*), control (*maintenance staff*), installation (*plant engineer*).

Notes

The user normally can read the values on the display and to check the LEDs on the front panel.

He will read the parts of the manual regarding the:

- users instructions.

Maintenance staff could be more interesting in the chapters regarding:

- users instructions;
- calibration;
- maintenance;
- warranty/repair terms and conditions.

The plant engineer will have to read the chapters and look at the application drawings in order to:

- verify that the technical and functional characteristics are conformed with the plants requirements;
- verify that the environmental and climatic conditions required by the instruments are respected;
- make the correct electronic connections;
- become familiar with the instrument's firmware;
- configure the instrument according to the application;
- run all of the necessary tests before starting the instrument ;
- calibrate the instrument once the transmitter is connected.

3.3.1 Using the instrument on the plant

For the generic use, the end user can operate with a locked keyboard (suggested mode and to be set by maintenance staff). By this, he can check the set point parameters without the possibility of changing the configured set points values and the zero/sensitivity calibration.

3.3.2 Plant maintenance staff

Maintenance staff can select the operating values, by setting the desired parameters of the “set up” menu and after inserting the password. He can also enable the user’s access to calibration, set point and alarm settings.

The location of this set parameters can be seen in the right column of the Technical Specifications table (Chapter 4.2) and they are identified by a letter “S” followed by a number.

The operations that need to be done during the start-up and the periodical tests are the following:

- to allow only the visualization of the measures during the normal use;
- to calibrate the sensors by means of ZERO and SENS keys;
- to set the following parameters:
 - set point 1 and 2 by means of SET 1 and SET 2 keys
 - set point 1 and 2 delay
 - min. and max. alarm value
 - alarm delay
 - activate/deactivate logic input;
- to modify password to access set up.

3.3.3 Installing the instrument in the plant

The plant engineer, by inserting the access password and by setting and modifying the “configuration” parameters, will be able to select the necessary functions required by the plant.

The location of this set parameters can be seen in the right column of the Technical Specifications table (Chapter 4.2) and they are identified by a letter “C” followed by a number.

The operations that need to be done during the instrument installation are the following:

- 0/20 mA o 4/20 mA input;
- single or differential input;
- decimal point position in the display;
- lower point of the scale;
- higher point of the scale;
- % or custom measuring unit;
- min/max function (Lo/Hi) of set point 1 and set point 2,
- alarm relay status activated/deactivated (Act/Dea) in alarm condition;
- analog output range 0/20 mA or 4/20 mA,
- hold/alarm function for the logic input;
- password to access the configuration.

4 SPECIFICATIONS

4.1 FUNCTIONAL SPECIFICATION

Display

The instrument has a 7 segments and 4 digits LED display. The display shows the measures vales and the messages to the operator.

In particular, the messages scroll on the display and they are preceded by the corresponding number of the Technical Specifications tables (Chapter 4.2).

After a 3' stand-by, the display goes back to showing the main measure.

Keyboard

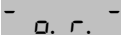
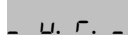
The instrument has 8 keys, which allow to access all of available functions.

The upper keys are for zero and sensitivity calibration of the readout and to confirm the set points value. All of this functions can be then protected by means of password.

The other keys will be described in the following chapters.

Scale



The scale of the instrument can be configured in the range -1999/9999, by selecting the lower and the higher values and the decimal point position.


In case of the over/under range the instrument shows the messages  or .

Input

The instrument features an input I_1 (I+) for a transmitter active output or from a two wire current loop transmitter that is powered by the instrument itself.

In addition it is available an input I_2 (I-) in order to allow a differential measuring between two transmitters with the same measuring scale.

In case of input current over/under range the instrument shows the messages  or .

In case of differential measuring, if one of the two input is in over/under range, the instrument shows the message  of indeterminate measuring. In this condition the set points are deactivated, the alarm relay is activated and the output current is fixed to the max value corresponding to 20.50 mA.

Input current measuring

The instrument provides the I_1 (I+) and I_2 (I-)input current measuring, in order to allow the check of the correct functioning of the transmitters.

Set-points

The instrument has two independent set-points which can be programmed across the whole scale to activate the correspondent relay contacts (SPST)..

When a relay is activated the corresponding Led, placed to the left side of the display, will light up.

During the phase of activated delay, the LED will flash.

Thanks to the specific front panel keys SET 1 and SET 2 , setting the set point value is very simple.

A password can be set in order to avoid that other users may change the settings.

For each relay, it is possible to select:

- min/max function;
- delay.

Alarm

The instrument has an alarm relay, which contact are SPDT type.

The alarm condition is activated during the indeterminate differential measuring and it can be configured for:

- higher or lower values of the measuring compared to the set ones;
- the presence of the contact on the logic input, coming from an external device (if this function is activated);

The alarm status can be seen on the LED marked ALM placed to the left of the display.

During the phase of activated delay, the LED will flash.

The operator can set the activated/deactivated (Act/Dea) status of relay corresponding to the alarm condition and the delay function.

Analog output

The instrument has an isolated analog output to send the measure value. The output can be programmed 0/20 mA or 4/20 mA and it is displayed by the main measure.

The galvanic isolated output allows the controller to communicate with a PLC or with a recorder and it does not need an external power supply.

Logic input

The instrument is equipped with a logic input to connect to external dry contacts.

The logic input function can be activated or deactivated from the set up menu.

The input function can be selected Hold/Alarm, which features are described in table 6.0 of Chapter 4.2 “Technical specifications”, and it is selected in the configuration menu.

Universal power supply

The instrument can operate with an 85/264 Vac power supply.

Power supply option 9/36 Vdc or 24 Vac

By installing this option, the instrument can be used with a 9/36 Vdc or 24 Vac power supply.

Set up

The instrument has the set up menu protected by a specific password.

In the menu, it is possible to:

- deactivate the functions of sensors calibration, set points values and parameters changing,
- to select the set point, alarm and logic input parameters.

Configuration

The instrument has a configuration menu protected by a specific password. In the menu, it is possible to select:

- the input current range 0/20 – 4/20 mA,
- the single or differential input,
- the decimal point position,
- the low/high scale limits,
- the measuring unit,
- the min/max (Lo/Hi) set point functions,
- the alarm relay activation type (Act/Dea),
- the analog output range,
- the logic input (Hold/Alarm) function,
- the new password to access the configuration menu.

4.2 TECHNICAL SPECIFICATIONS

The display number is next to the factory values in the following tables.

SETUP parameters are indicated by : "S x.y"

CONFIGURATION parameters are indicated by: "C x.y" x=table section y=sequence

Underlined words in the tables correspond to scrolling display messages.

1.0 TYPE OF MEASURE	Factory values	Display
TYPE OF MEASURE		
Input from transmitters: <u>4-20/0-20</u> mA	<u>4-20</u> mA	C1.1
Type of input: single/differential (<u>SInG./dIFF.</u>)	<u>SInG.</u>	C1.2
Power for current loop transmitters: 24Vdc/50 mA max		
DEFINITION OF THE SCALE (programmable)		
Min. display value: -1999		
Max. display value: 9999		
Decimal point position: <u>YYYY</u> / <u>YYY.Y</u> / <u>YY.YY</u> / <u>Y.YYY</u>	<u>YYY.Y</u>	C1.3
Scale: LO/HI point (programmable)		
Span within LO and HI HI – LO points > 100 digit		
LO point of the scale (in function of the decimal point): -1999/9999 -199.9/999.9 -19.99/99.99 -1.999/9.999	0.0	C1.4
HI point of the scale (in function of the decimal point): -1999/9999 -199.9/999.9 -19.99/99.99 -1.999/9.999	100.0	C1.5
Measuring unit: % / custom (<u>PErC./CUsT.</u>)	<u>PErC.</u> (%)	C1.6
Resolution: 1 digit		
Single input over/under range:		
Under range(0-20mA): input<-0.50mA or display<-1999		
Over range (0-20mA): input>20.50mA or display> 9999		
Under range(4-20mA): input< 3.50mA or display<-1999		
Over range (4-20mA): input>20.50mA or display> 9999		
Differential input over/under range:		
Under range(0-20mA): display<-1999		
Over range (0-20mA): display> 9999		
Under range(4-20mA): display<-1999		
Over range (4-20mA): display> 9999		
Indeterminate (0/20 mA): input 1 / 2 <-0.50 o >20.50mA		
Indeterminate (4/20 mA): input 1 / 2 < 3.50 o >20.50mA		
During the indeterminate measuring conditions:		
Display: ----		
Set point: deactivated		
Alarm: activated		
Analog output: fixed to 20.50 mA		
Zero: ±10% of the scale	0%	1.1
Sensitivity: 12.5%/250%	100%	1.2

2.0	SECONDARY MEASURE CHECK CURRENT mA	Factory values	Display
The display shows the mA values of I ₁ and I ₂ (I+ I-) inputs			
Input I ₁ (I+)			
Scale:	0.00/20.00mA (max. 30mA)		2.0
Resolution:	0.01mA		
Over range:	not available		
Under range:	not available		
Input I ₂ (I-)			
Scale:	0.00/20.00mA (max. 30mA)		2.1
Resolution:	0.01mA		
Over range:	not available		
Under range:	not available		

3.0	SET POINT	Factory values	Display
SET POINT 1			
Action:	ON-OFF		
Set point:	within scale limits	LO (0.0)	3.1
Hysteresis (function of the scale):	±0.1 % FS		
Delay:	0.0/100.0 seconds	0.2 s	S3.1
Function:	<u>Hi/Lo</u> (Max/Min)	<u>Lo</u>	C3.1
Relay contacts:	SPST 220V 5A resistive		
SET POINT 2			
Action:	ON-OFF		
Set point :	within scale limits	LO (0.0)	3.2
Hysteresis (function of the scale)	±0.1 % FS		
Delay:	0.0/100.0 seconds	0.2 s	S3.2
Function:	<u>Hi/Lo</u> (Max/Min)	<u>Hi</u>	C3.2
Relay contacts:	SPST 220V 5A resistive		

4.0	ALARM	Factory values	Display
Low value:	within scale limits		
High value:	within scale limits	LO (0.0)	S4.1
Hysteresis (function of the scale)	±0.1 % FS	HI (100.0)	S4.2
Delay:	0.0/100.0 seconds		
Status of the contacts:	<u>Act./dEA.</u>	1.0 s	S4.3
		<u>Act.</u>	C4.1
Relay contacts:	SPDT 220V 5A resistive		

5.0	ANALOG OUTPUT	Factory value	Display
Output range: <u>0-20/4-20</u> mA Under/Over range (0-20): <u>0.00/20.50</u> mA Under/Over range (4-20): <u>3.50/20.50</u> mA Response time: 2.5 seconds for 98% Isolation: 250 Vac R max: 600 ohm AN EXTERNAL POWER SUPPLY IS NOT NEEDED		<u>0-20</u> mA	C5.1

6.0	LOGIC INPUT	Factory value	Display
Logic input: activated/deactivated <u>(On/OFF)</u> Logic input function: <u>HoLd/ALAr.</u> HOLD conditions: Analog output keeps the value (HOLD) Set points keep the status (HOLD) Alarm state deactivated (OFF) ALARM conditions: Analog output activated (RUN) Set points deactivated (OFF) Alarm state activated (ON) External contacts must be free voltage		<u>OFF</u> <u>HoLd</u>	S6.1 C6.1

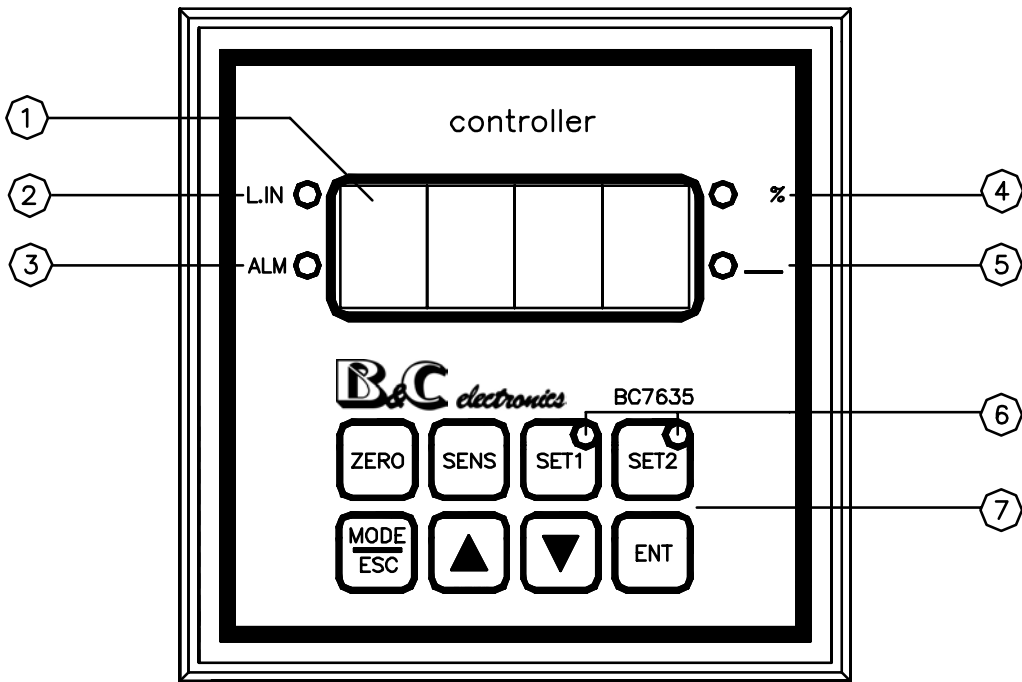
10.0	SET UP PARAMETERS	Factory values	Display
Password of the SETUP (0/999) Calibration and set points <u>On/OFF</u> Set 1 delay Set 2 delay LO alarm HI alarm Alarm delay Logic input <u>On/OFF</u> Password changing		0 <u>On</u> 0.2 s 0.2 s 0.0 100.0 1.0 s <u>OFF</u> 0	10.1 S1.1 S3.1 S3.2 S4.1 S4.2 S4.3 S6.1 S10.1

11.0	CONFIGURATION PARAMETERS	Factory value	Display
			11.0
	Password to access CONFIGURATION (0/999)	0	11.1
	Input 4-20/0-20 mA	4-20	C1.1
	Type of input <u>SinG./diFF.</u>	<u>SinG.</u>	C1.2
	Decimal point <u>YYYY/YYY.Y/YY.YY/Y.YYY</u>	<u>YYY.Y</u>	C1.3
	Low point of the scale (LO)	0.0	C1.4
	High point of the scale (HI)	100.0	C1.5
	Measuring unit <u>PErC./CUSt.</u>	<u>PErC.</u>	C1.6
	Setpoint 1 function <u>Lo/Hi</u>	<u>Lo</u>	C3.1
	Setpoint 2 function <u>Lo/Hi</u>	<u>Hi</u>	C3.2
	Alarm relay status <u>Act./dEA.</u>	<u>Act.</u>	C4.1
	Analog output range <u>0-20/4-20 mA</u>	<u>0-20 mA</u>	C5.1
	Logic Input function <u>HoLd/ALAr.</u>	<u>HoLd</u>	C6.1
	Password to CONFIGURATION changing	0	C11.1

GENERAL SPECIFICATIONS

Display:	LED 7 segments and 4 digits
Led indicators:	-set1 and set2 relay status -Alarm status -logic input contact status -measuring unit % -measuring unit custom
Operating temperature:	0/50°C
Humidity:	95% without condensation
Power supply:	85/264 Vac 50/60 Hz
Isolation:	4000 Vdc (2350 Vac) between primary and secondary (IEC 348)
Power consumption:	6 VA max.
Terminal blocks:	extractable
Weight:	450 g
Dimensions:	96 x 96 x 104 mm including frame.
Dimensions (internal to switch board):	90 x 90 x 95 mm

5 OPERATING PROCEDURES



1.

Values and messages display
2.

Logic input contact visualization
3.

Active alarm visualization
4.

Selected measure (%)
5.

Selected measure (custom)
6.

Set point relay activated
7.

Keyboard

Fig. 1

5.1 KEYBOARD

<div><div>ZERO</div><div>"Zero"</div></div>	Starts zero calibration	<div><div>MODE ESC</div><div>"Mode - Esc"</div></div>	<div>- Visualizes instrument functions</div> <div>- Exit without changing the values</div>
<div><div>SENS</div><div>"Sens"</div></div>	Starts sensitivity calibration	<div><div>▲</div><div>"Up"</div></div>	<div>- Increase the values</div> <div>- Changes the options</div>
<div><div>SET1</div><div>"Set1"</div></div>	Starts set point 1 calibration	<div><div>▼</div><div>"Down"</div></div>	<div>- Decrease the values</div> <div>- Changes the options</div>
<div><div>SET2</div><div>"Set2"</div></div>	Starts set point 2 calibration	<div><div>ENT</div><div>"Enter"</div></div>	<div>- Enter the new values</div> <div>- Starts the visualized function</div>

5.2 OPERATING INSTRUCTIONS

5.2.1 Main measuring

Il display shows the measuring value (or the differential value if the differential input has been selected) in % or in a CUSTOM unit as configured.

The front panel LED is lit according to the selected measure

Display 1.0



If the measuring value is under range/over range, the following messages will appear:

u. r. and **o. r.**.

If the instrument is configured for differential measuring, if one of the two input current is over/under range, the following message of indeterminate measuring will appear: **- - - -**.

From this display 1.0 it is possible to start the calibration procedure, the set points setting (if those functions have been enabled in the set up menu).



by pressing the key, the LED 4 or 5 on the front panel are switched off and the analog output range and the expected current on the load are displayed.

out 0-20 mA 10.00 or **out 4-20 mA 10.00**

5.2.2 Input current I_1 visualization



by pressing this key from the display 1.0, the unit will show the message **(I₁ mA)**, followed by the input current value.

Display 2.0



5.2.3 Input current I_2 visualization

If the differential input has been activated (Display C1.2):



by pressing this key the unit will show the message **(I₂ mA)**, followed by the input current value

Display 2.1



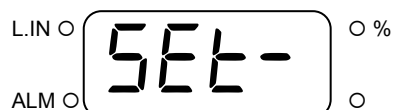
5.2.4 Set up

The set up parameter changing can be enabled/disabled by the operator.



by pressing two times the key from the display 1.0, the unit will show the message **SEt-UP PrESS Ent** and it is possible to access to the menu reserved to maintenance staff (set-up) through the password.

Display 10.0

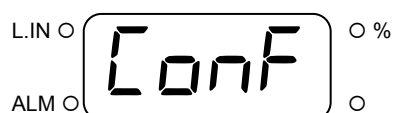


5.2.5 Configuration



by pressing three times the key from the 1.0 display, the unit will show the message **ConF g. PrESS Ent** and it is possible to access to the menu reserved to the plant engineer (configuration) through the password.

Display 11.0

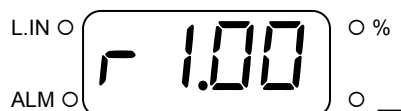


5.2.6 Firmware release



by pressing four times the key from the 1.0 display, the unit will show the message **bc7635 r 1.00** (it shows the unit p/n and the release of the firmware installed in the unit).

Display 12.0



by pressing the key, the unit turn back to the main display.

5.3 INSTRUCTION FOR THE MAINTENANCE STAFF

5.3.1 Preliminary operations

All the functioning operations must be done with sensor or simulator connected to the unit.

If the input terminals are not connected to a current source, the unit will show 0 mA.

Verify if the configuration, the set point and the alarm parameter are suitable for the current application .

Follow the procedures described in the chapter 5.3.5 to verify the parameters without modifying the values.

Verify if the configuration, the set point and the alarm parameter are suitable for the current application.

The display, LED and keys in the front panel allow the operator to perform the preliminary check.

The a light display indicates that the unit s powered and the power circuits work correctly.

5.3.2 Measuring operations

In order to operate the system, verify previously the following:

- transmitters are connected and in operation;
- analog output if necessary;
- eventual actuation of the relays 1 and 2;
- alarm relay if necessary;
- logic input if necessary;
- power supply and ground;

Power the unit and read the corresponding measuring from the transmitter.

If the transmitter is connected correctly as described in charter 6 "Installation", the system will operate properly and it will need only the calibration and the set point/ alarm values setting.

5.3.3 Calibration

The following calibration is suggested to check periodically the operation of the unit.
Use a mA simulator (example the BC 125 from B&C Electronics).

Simulate the mA values from 0 to 20 mA or from 4 to 20 mA.

We suggest to simulate 0 mA or 4 mA to calibrate the zero and 10/12 mA to calibrate the sensitivity.
The readout will correspond to the selected scale in the configuration menu.

The user can calibrate the unit according to the readout of the specific transmitter as well.



by pressing the key it will appear the message

ZERO CAL, followed by the actual value, or **CAL. OFF** if the calibration has been disabled in the Setup (Display S1.1).



and press the keys to change the value according to the value of the input



press to confirm and to end the calibration.

UPDATE or **ZERO Error** messages will appear.

The message of error must be confirmed and the calibration is not performed.



by pressing the key it will appear the message

SENS. CAL, followed by the actual value, or **CAL. OFF** if the calibration has been disabled in the Setup (Display S1.1).



and press the keys to change the value according to the value of the input



press to confirm and to end the calibration.

UPDATE or **SENS. Error** messages will appear.

The message of error must be confirmed and the calibration is not performed.

If the operator needs to turn to the factory calibration of the zero or the sensitivity



press the three keys together instead of using the keys

The two error messages inform the operator that:

the new value has been changed > 10% of the full scale (message **ZERO Error**);

the sensitivity is <12,5% or > 250% (message **SENS. Error**).

Check periodically the calibration.

5.3.4 Set point



o by pressing the key, the unit will show the message

SET1 (SET2) Hi or **Lo** (depending of the configuration done in display C3.1 o C3.2) followed by the actual value,



or



press the keys to change the value

CAL. OFF will appear if the calibration has been disabled in the set up display S1.1).



press to confirm and to end the calibration .



press the key in case of exit from the procedure without changing the data (this key allows to exit from all the procedure without changing the previous data/setting).

5.3.5 Set-up



by pressing two times the key from display 1.0, the unit will show the message

5Et-UP PrESS Ent (display 10.0).



By pressing the key the unit will require the password insertion (display 10.1)

PASS ---




or



, press the key to insert the password



press to confirm the password and to enter the set up menu (if the password is not used, press

again the key ).

Into the set up menu the keys have the following functions:



or



to change values or options shown on the display



to confirm the value/option (if value/option have been modified it will appear the message

UPdAtE)



to exit from the procedure and to turn to display 10.0 without any changing.

Display S1.1: Inhibition of zero/sensitivity calibration and set point changing

The following message will appear:

1.1 CAL. Function followed by the actual setting (**On/Off**)

Display S3.1: Delay (in seconds) of the set point 1 relay

The following message will appear:

3.1 SEt 1 dELAY followed by the actual value.

Display S3.2: Delay (in seconds) of the set point 2 relay

The following message will appear:

3.2 SET DELAY followed by the actual value.

Display S4.1: Minimum alarm value

The following message will appear:

4.1 LO ALARM followed by the actual value (the measuring unit is shown by the corresponding LED 4 or 5 on the front panel).

Display S4.2: Maximum alarm value

The following message will appear:

4.1 HI ALARM followed by the actual value (the measuring unit is shown by the corresponding LED 4 or 5 on the front panel).

Display S4.3: Delay (in seconds) of the alarm relay

The following message will appear:

4.3 ALARM DELAY followed by the actual value.

Display S6.1: Logic input

The following message will appear:

6.1 LOG IC INPUT followed by the actual setting (**ON/OFF**)

Display S10.1: Password for the set up menu

The following message will appear:

10.1 SET-UP PASS followed by **---**

5.3.6 Maintenance

Quality components are used to give the controller a high reliability.

The frequency of such maintenance depends on the nature of each particular application.

As in any electronic equipment, the mechanical components, such as switches, relays and connectors, are the most subject to damage.

5.4 INSTRUCTION FOR THE PLANT ENGINEER

5.4.1 Safety instruction



Read the installation instruction (Chapter 6) and check the following before switching on the unit and performing the configuration:

- Check if the terminal 3 is connected to the round;
- check if the connections are correct;
- check if connections are well fastened to the terminals;
- check if eventual protective fuses have the correct value.

WARNINGS

Eventual damages coming from wrong connections are not covered by warranty.

5.4.2 Configuration




by pressing three times the key from display 1.0, the unit will show the message

`CONFIG PRESS Ent` (display 11.0).




By pressing the key the unit will require the password insertion (display 11.1) `PASS ---`




or  , press the key to insert the password



press to confirm the password and to enter the configuration menu (if the password is not used, press again the key ).

Into the configuration menu the keys have the following functions:



or  to change values or options shown on the displayed



to confirm the value/option (if value/option have been modified it will appear the message `UPDATE`)



to exit from the procedure and to turn to display 11.0 without any changing.

Display C1.1: Input current range

The following message will appear

I.1 I nPUt followed by the actual setting (**4-20/0-20**)

Display C1.2: Input type (single or differential)

The following message will appear

I.2 tYPE I nPUt followed by the actual setting (**Si nG./d iFF.**)

Display C1.3: Decimal point position

The following message will appear

I.3 dECi MAl Pn t followed by the actual setting (**yyyy/yyyy/yyyy/yyyy**)

Display C1.4: Value corresponding to 0(4) mA input current

The following message will appear

I.4 Lo Pn t followed by the actual setting.

Display C1.5: Value corresponding to 20 mA input current

The following message will appear

I.5 Hi Pn t followed by the actual setting.

Display C1.5: Measuring unit (% or custom)

The following message will appear

I.6 MEAS. Un t followed by the actual setting (**PERc./CUSt.**)

Display C3.1: Min/max function of the set point 1 (LO/HI)

The following message will appear

3.1 SEt I Functn t followed by the actual setting (**Lo/Hi**)

Display C3.2: Min/max function of the set point 2 (LO/HI)

The following message will appear

3.2 SET2 Function followed by the actual setting (**LO/HI**)

Display C4.1: Status of the alarm relay (activated/deactivated)

The following message will appear

4.1 ALARM Function followed by the actual setting (**ACT/DEACT**)

Display C5.1: Analog output range (0/20 mA or 4/20 mA)

The following message will appear

5.1 OUT followed by the actual setting (**0-20/4-20**) in mA.

Display C6.1: Logic input function (hold or alarm)

The following message will appear

6.1 LOGIC INPUT followed by the actual setting (**HOLD/ALARM**)

Display C11.1: Changing of the password to access the configuration menu

The following message will appear

11.1 CONF. PW followed by the actual password.

6 INSTALLATION

6.1 PACKING LIST

The carton box contains:

- N° 1 the instrument with s/n label,
- N° 2 fixing clamp,
- N° 1 instruction manual.

6.2 UNPACKING

- 1) Remove the instruction manual.
- 2) Remove the controller from the carton box.
- 3) Remove the plastic protective envelope and keep the two fixing clamp.

6.3 STORAGE AND TRANSPORTATION

In case of long storage period, keep the instrument in a dry area.

In case of transportation, use the original carton box.

6.4 INSTALLATION OF THE UNIT

The instrument can be installed in a watertight enclosure or in a switch board.

The panel mounting must be done on a flat surface in a position protected from hits, moisture and corrosive fumes.

6.5 ELECTRICAL INSTALLATION

Refer to figure 2. or to the connections drawing on the back panel of the instrument.

The electrical installation consists of:

- 1) connecting the power supply;
- 2) connecting the electrodes or probes;
- 3) connecting the temperature sensor;
- 4) connecting the set points and alarm relays;
- 5) connecting the analog output;
- 6) connecting the logic input.

All connections to the instrument are made on detachable terminal strips located on the rear side.

The power connections are on a 10 terminals strip.

The signals connections are on a 5 terminals strip.

The analog output and logic input connections are on a 4 terminals strip.

6.5.1 Connecting the power



- Connect the ground to 3 terminal.
- Connect the 86/264 Vac power to 1-2 terminals

----- WARNINGS -----

- *power the device by means of an isolation transformer*
- *avoid mains voltage from an auto-transformer*
- *avoid mains voltage from a branch point with heavy inductive loads*
- *separate power supply wires from signal ones*
- *control the mains voltage value before powering the unit.*

The electronic equipment can occasionally be damaged.

The plant engineer must consider this event to prevent eventual damages caused by the instrument malfunctioning.

6.5.2 Connecting the transmitters

The input signals connection is the most critical part because of possible interferences.

Make sure to send just signals coming from simulators or transmitters in order to avoid damages to the input circuits.

- Use a good quality cable.
- Avoid cable interruption. If necessary use an high isolation junction box and protect from the moisture.
- Keep the cable far from power cables into the switch board as well.

Verify if the transmitters have the passive or the active analog output.

The passive output transmitters need the power from the BC 7635.

The active output transmitters are already provided with the power supply and they do not need the power from the BC 7635.

Connecting the transmitter with active analog output

- Connect the positive of the transmitter to the terminal 22 marked I+ (see fig. 2).
- Connect the zero of the transmitter to the terminal 23 marked 0V.

Connecting two transmitters with active analog output for differential measuring

- Connect the positive output of the transmitter 1 to the terminal 22 marked I+
- Connect the positive output of the transmitter 2 to the terminal 21 marked I-
- Connect the zero of the transmitters 1 and 2 to the terminal 23 marked 0V.

In this case the display will show the difference between I+ and I- signals.

Connecting the transmitter with passive analog output (two wire 4/20 mA power loop)

- Connect the positive of the transmitter output to the terminal 20 marked 24V (see fig. 2).
- Connect the negative of the transmitter output to the terminal 22 marked I+

Connecting two transmitters with passive analog output for differential measuring

- Connect the positive output of the transmitters 1 and 2 to the terminal 20 marked 24V .
- Connect the negative of the transmitter 1 output to the terminal 22 marked I+
- Connect the negative of the transmitter 2 output to the terminal 21 marked I-

In this case the display will show the difference between I+ and I- signals.

WARNINGS

Do not supply the power to the active output transmitter, taken from the terminal 20 marked 24 V, in order to avoid to damage the BC 7635 and the transmitter.

6.5.3 Connecting the analog output

The instrument provides an isolated output current, proportional to the main measuring to send to an external recorder, PLC or similar devices.

- Connect (+) terminal of the recorder to the 15 terminal of the unit.
- Connect (-) terminal of the recorder to the 16 terminal of the unit.

If the output current will drive more loads, connect the devices in series.

The total resistance must be lower than 600 Ω .

WARNINGS

Do not supply any voltage to the analog output terminals to avoid damages on the output circuits. Connect only to passive input devices.

6.5.4 Connecting the pumps, solenoids and alarms

The contacts of the control and alarm relays are available on the rear terminal strip of the instrument. The contacts are SPST type corresponding to set point 1 and set point 2 and SPDT type corresponding to the alarm function.

SET POINT 1

terminal 5 marked C : common contact
 terminal 4 marked NO : normal open contact

SET POINT 2

terminal 7 marked C : common contact
 terminal 6 marked NO : normal open contact.

Power the load through an independent power supply in order to avoid interferences from inductive load. Install snubbers if necessary.

Install fuses as protection of the relays contacts in case of short circuit of the load.

Do not exceed the nominal current rate of the contacts (5 A resistive load).

At this step of the connection remember that each relay can be configured as min/max function.

The set point values can be adjusted only if the calibration has not been disabled; the delay can be adjusted in the set up menu. (see chapters 5.3.5).

To modify the function min/max (Lo/Hi) of the set points see the chapter 5.4.2 .

ALARM

terminal 9 marked C : common contact

terminal 8 marked NO : normal open contact

terminal 10 marked NC : normal closed contact

The alarm relay can be configured as activated/deactivated (Act/Dea) during the alarm conditions of the measuring.

The alarm condition occurs when the measuring is lower/higher than min/max selected values (see chapter 5.3.5); the delay of the relay action can be selected (see chapter 5.4.2).

If the configuration “Deactivated” (dEa) is selected, the relay will provide the alarm contact even when the unit is switched off or the it is not in operation.

6.5.5 Connecting to the logic input

The dry contacts (voltage free) coming from an external device must be connected to the logic input terminals 17 – 18.

The activation and the configuration of the input logic is described in the Display S6.1 (chapter 5.3.5) and C6.1 (chapter 5.4.2).

The hold or alarm functions are described in the item 6.0 of the chapter 4.2 “Technical specifications”.

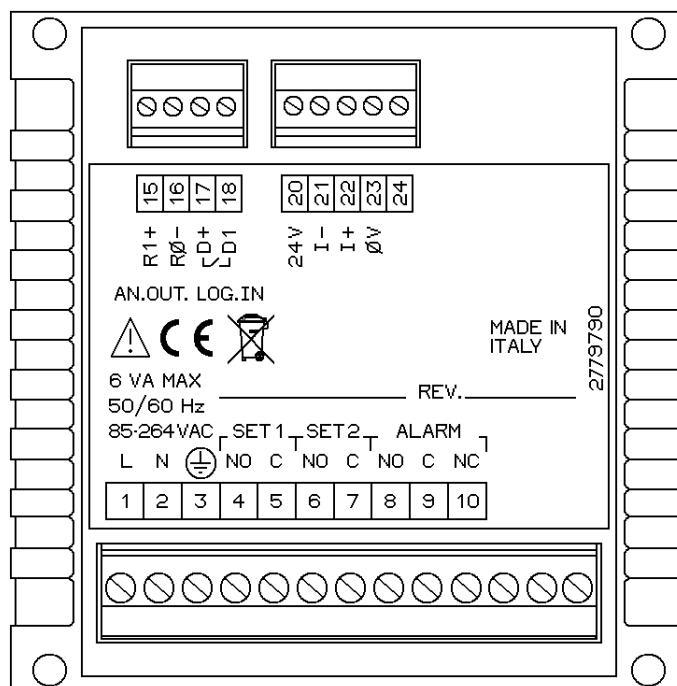
WARNINGS

Do not supply any voltage to the logic input terminals to avoid damages on the circuits.

7 DISPOSAL

If it shall became necessary to throw away this electronic equipment, please follow the disposal laws of your Country.

REAR PANEL CONNECTIONS BC 7635

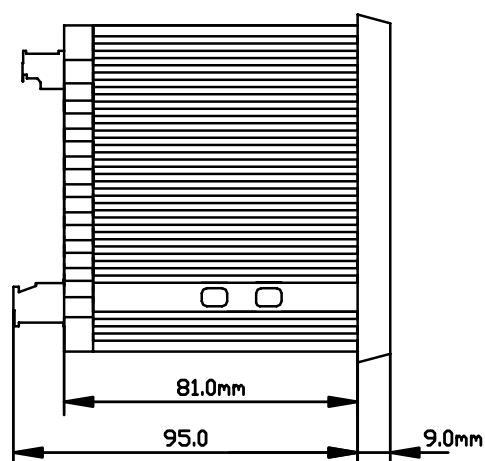
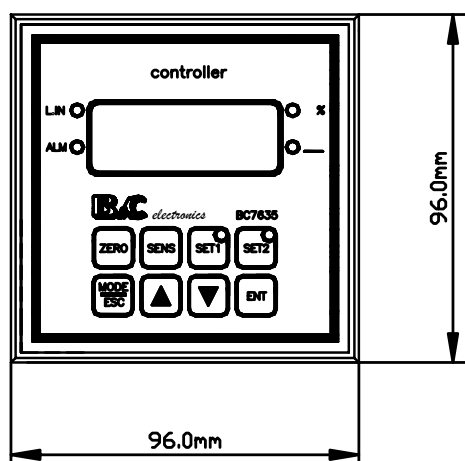


BC7635 rev.A - A4 - 1:1

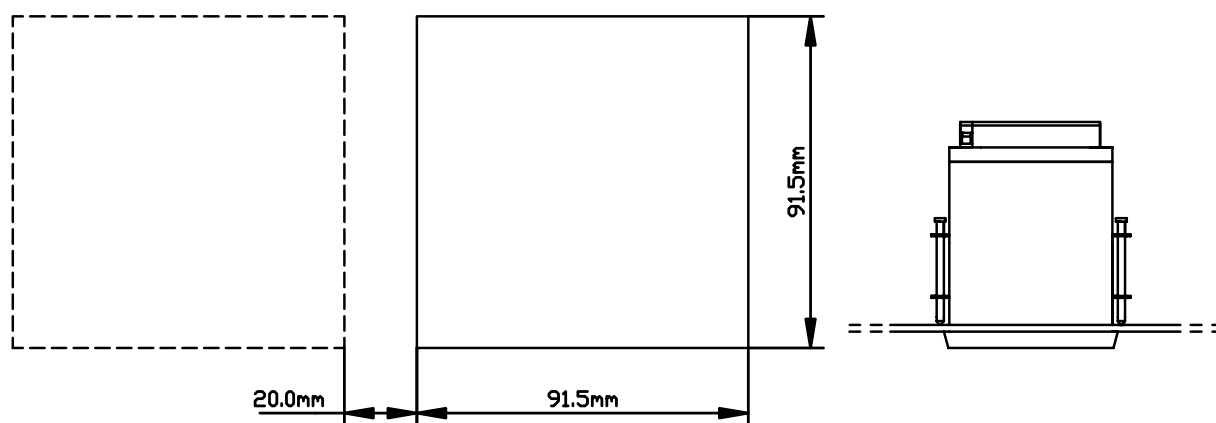
1. 2	Power supply 85-264 Vac
3.	Ground
4. 5	Set point 1 N. O. contacts
6. 7	Set point 2 N. O. contacts
8. 9	Alarm N.O. contacts
9. 10	Alarm N.C. contacts
15.	Analog output (+)
16.	Analog output (-)
17. 18	Logic input
20.	+ 24 Vdc power supply (max 60 mA)
21.	I ₂ input mA signal (I-)
22.	I ₁ input mA signal (I+)
23.	I ₁ and I ₂ Input signals (0V)

Fig. 2

DIMENSIONS



DRILL PLAN



INGOMBROBC7635 - A4 -1:2

A4 -1:4

Fig. 3

WARRANTY CERTIFICATE

- 1) Your product is covered by B&C Electronics Warranty for 5 years from the date of shipment. In order for this Warranty to be valid, the Manufacturer must determine that the instrument failed due to defective materials or workmanship.
 - 2) The Warranty is void if the product has been subject to misuse and abuse, or if the damage is caused by a faulty installation or maintenance.
 - 3) The Warranty includes the repair of the instrument at no charge. All repairs will be completed at the Manufacturer's facilities in Carnate, Italy.
 - 4) B&C Electronics assumes no liability for consequential damages of any kind, and the buyer by accepting this equipment will assume all liability for the consequences of its use by the Customer, his employees, or others.
-

REPAIRS

- 1) In order to efficiently solve your problem, we suggest You to ship the instrument along with the Technical Support's Data Sheet (following page) and a Repair Order.
- 2) The estimate, if requested by the Customer, is free of charge when it is followed by the Customer confirmation for repair. As opposite, if the Customer shall not decide to have the instrument repaired, he will be charged to cover labor and other expenses needed.
- 3) All instruments that need to be repaired must be shipped pre-paid to B&C Electronics. All other expenses that have not been previously discussed will be charged to Customer.
- 4) Our Sales Dept. will contact You to inform You about the estimate or to offer you an alternative, in particular when:
 - the repairing cost is too high compared to the cost of a new instrument,
 - the repairing results being technically impossible or unreliable
- 5) In order to quickly return the repaired instrument, unless differently required by the Customer, the shipment will be freight collect and through the Customer's usual forwarder.

B&C Electronics Srl - Via per Villanova 3 - 20040 Carnate (Mi) - P.IVA 00729030965
Tel (+39) 039 63 1721 - Fax (+39) 039 607 6099 - info@bc-electronics.it - www.bc-electronics.it

TECHNICAL SUPPORT

Data sheet

In case of damage, we suggest You to contact our Technical Support by email or phone. If it is necessary for the instrument to be repaired, we recommend to photocopy and fill out this data sheet to be sent along with the instrument, so to help us identifying the problem and therefore accelerate the repairing process.

☐ *ESTIMATE*

☐ *REPAIR*

COMPANY NAME

ADDRESS

ZIP

CITY

REFER TO MR./MISS.

PHONE

MODEL

S/N

DATE

Please check the operator's manual to better identify the area where the problem seems to be and please provide a brief description of the damage:

☐ SENSOR

☐ ANALOG OUTPUT

☐ POWER SUPPLY

☐ SET POINT

☐ CALIBRATION

☐ RELAY CONTACTS

☐ DISPLAY

☐ PERIODICAL MALFUNCTIONING

➤ *DESCRIPTION*

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