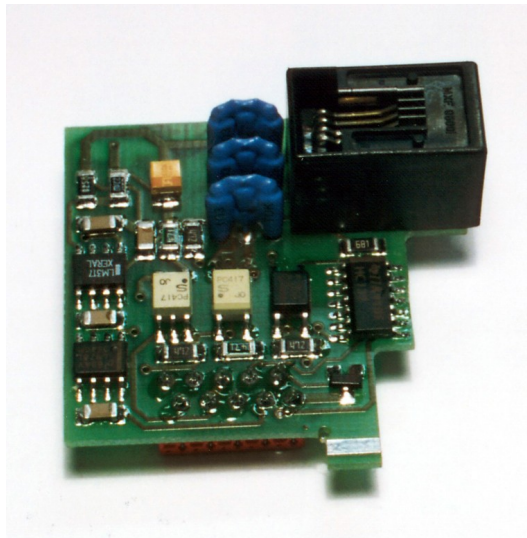


# KOSMOS SERIE

CODE: 307Z7014 EDITION: 24-10-2006



## INSTRUCTIONS MANUAL OUTPUT OPTION RS232C



## RS2



# OUTPUT OPTION RS232C

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# 1. RS232C OUTPUT OPTION

## INTRODUCTION

The RS232C output option consists of an additional card (reference RS2) that is installed in the M1 plug-in connector of the instrument's main board (ALPHA, BETA, GAMMA-M, KAPPA-M).

The card incorporates one 4 wires telephone socket protruding out of the rear of the instrument.

The serial output permits to construct a communications line through which a master device can request to the KOSMOS instrument the transmission of data such as display value, setpoints values, peak, valley and tare (or offset in case of thermometers) and to perform operations such as tare of display, reset of the peak, valley, or tare memories and update setpoint values.

The Beta-M model provides also a special command that allows to copy the programming data from one meter to other of the same type.

Fully software programmable, the option permits selection of the transmission rate (1200, 2400, 4800, 9600 or 19200 Baud), instrument's address (between 00 and 99) and communication protocol type (ASCII, standard ISO 1745 and MODBUS RTU).

The RS232C option allows one KOSMOS instrument be connected to a master device with RS232C output.

The operating mode is half-duplex. The serial channel does only function when the instrument is in the run mode and it normally stands in data reception mode until reception of a message.

A valid data transmission may cause the immediate execution of an action (tare, reset of the peak, valley or tare memories, modification of setpoints values) or the transmission of a response from the instrument (display value, one of the setpoint value, peak, valley, tare / offset).

The display value (solely) can be requested by means of an external button as shown in schematics of page 9.

From the web site [www.ditel.es](http://www.ditel.es) can be downloaded the specific software that allows to connect the KOSMOS instruments to a PC and whole programming, as well as to verify its communication's hardware.



**The communications Port shall not be connected to the telephone system.**

## 1.2. DESCRIPTION OF OPERATION

Three communication modes are provided; The ASCII mode utilizes an easy to use protocol, compatible with several models of DITEL instruments. The ISO mode, according to the ISO 1745 standard, permits a more safe communication in noisy environments since the data transfer is verified at the transmission and reception ends. In addition can be used a third protocol: MODBUS RTU (see manual on [www.ditel.es](http://www.ditel.es))

As it can be seen in the Functions TABLE (Addendum A.1), the ASCII protocol uses 1 or 2 bytes commands depending of the command type while the ISO 1745 protocol forces the use of two bytes per command.

### ASCII PROTOCOL

**The Transmission format is: 1 START bit, 8 DATA bits, NO parity bit and 1 STOP bit.**

- **FORMAT of MESSAGE TO BE SENT FROM MASTER**

A message sent from the master device to the instrument must be composed of the following sequence of ASCII characters:

*	D	d	C	C	X .....	X	CR
---	---	---	---	---	---------	---	----

- One " \* " byte [ASCII 42] of start of message.
- Two address bytes (from 00 to 99).
- One or two ASCII characters corresponding to the desired command according to the Functions TABLE (Addendum A.1).
- In case that the command request for a modification of parameters, the new value shall be transmitted with one byte of sign ( + [ASCII 43] or - [ASCII 45] ) followed by a block of N ASCII characters (depending on model), including the decimal point.
- One " CR " [ASCII 13] character of end of message.

- **FORMAT of MESSAGE FROM INSTRUMENT**

The data sent from the instrument as a response to a data request type command from the master device is the following:

SP	X .....	X	CR
----	---------	---	----

- One byte of blank space [ASCII 32].
- One text (requested values) consisting of a byte of sign ( + [ASCII 43] or - [ASCII 45] ) followed by a block of N ASCII characters (depending on model) including the decimal point.
- One " CR " byte [ASCII 13] of end of message.
- If the command belongs to "orders" or "changing parameters", the instruments gives no response.

## PROTOCOLO ISO 1745

The Transmission format is 1 START bit , 7 DATA bits, 1 parity even bit and 1 STOP bit.

- MESSAGE FORMAT TO BE SENT

The message format, as sent from the master device, must consist of the following sequence of characters:

SOH	D	d	STX	C	C	X ..... X	ETX	BCC
-----	---	---	-----	---	---	-----------	-----	-----

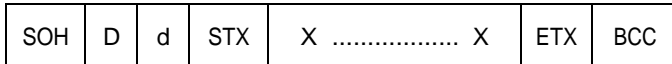
- One byte SOH of start of message [ASCII 01].
- Two bytes corresponding, the first to the tens and the second to the units of the instrument's address number.
- One byte STX of start of text [ASCII 02].
- Two command bytes according to the Functions TABLE (Addendum A.1).
- In case of commands that change parameters, a block of N bytes corresponding to the new value including sign and decimal point.
- One byte ETX of end of text [ASCII 03].
- One control byte BCC calculated in the following manner:  
Perform an **OR-exclusive** with all bytes comprised between the STX (not included) and the ETX (included)  
If the obtained byte (in ASCII format) is higher than 32, it can be taken as the BCC  
If the result (in ASCII format) is lower than 32, the BCC byte will be obtained by adding 32.

## ISO 1745 PROTOCOL

### TRANSMISSION OF DATA FROM THE INSTRUMENT

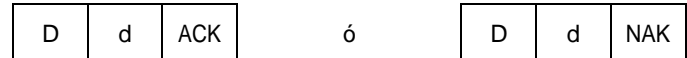
The format of a message as sent from the instrument in response to a command from the master device is the following:

**1. In case of commands that ask for the transmission of a value (data request type):**



- One byte SOH of start of message [ASCII 01].
- Two address byte.
- One byte STX of start of text [ASCII 02].
- N bytes corresponding to the requested value (including the sing and the decimal point)
- One byte ETX of end of text [ASCII 03].
- One control byte BCC calculated with the method described in page 5.

**2. In case of commands that do not imply the return of a value (command type or changing parameters):**



The instrument sends a confirmation to the master device when it receives a message.

- If the message has been correctly received and interpreted, the response will consist of two address bytes and one "ACK" (acknowledge) byte [ASCII 06].
- If the received message has not been well interpreted or it has been detected as to have an error, the response will be two address bytes and a "NAK" [ASCII 21].

When the master device transmits a message to the address of **00**, the command will be received by all the instruments on the bus and there will not be any response.

## PROTOCOL MODBUS

To use ModBus protocol, please consult specific **MODBUS** manual on web site [www.ditel.es](http://www.ditel.es)

## 2. SETUP AND CONNECTIONS

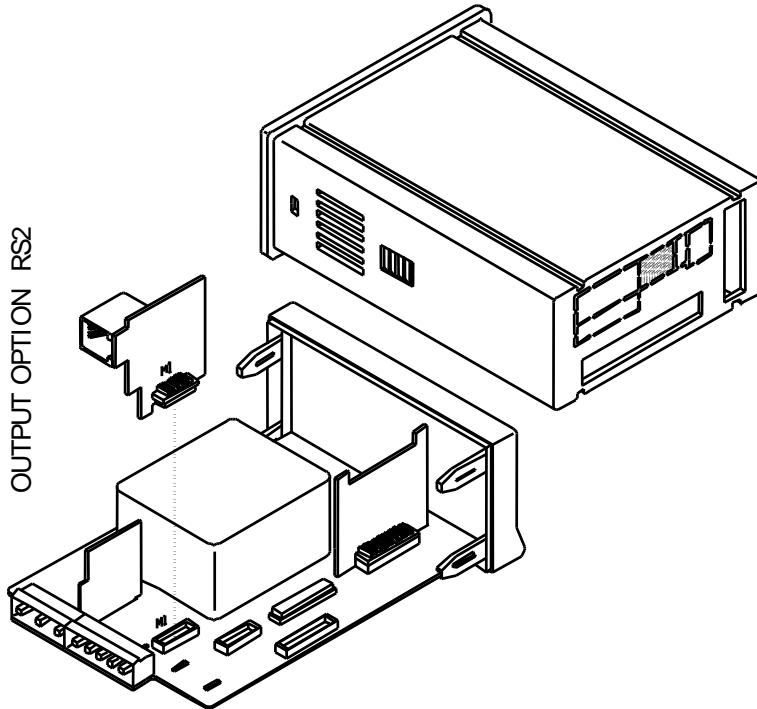


Fig.1

### 2.1. INSTALLATION

Lift out the electronics assembly from the case and use a screwdriver to pull on the junctions between the case and the gray market area to detach it from the case.

The so performed orifice will allow to RS2 output board connector be brought out at the rear of the instrument.

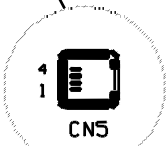
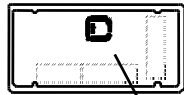
Install the circuit board so that the lower pin fits into the corresponding main board insertion slot and push down to plug the M1 option connector in the main board M1 location.

If the instrument is to be installed in high vibrating environments, it is recommended to solder the card to the main board making use of the copper tracks on both sides of the card pin and around the main board hole on its solder side.

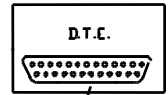
Before inserting the electronics in the case, you should verify that the access to the programming modules is enabled, since this is the next operation to be made after powering the unit.



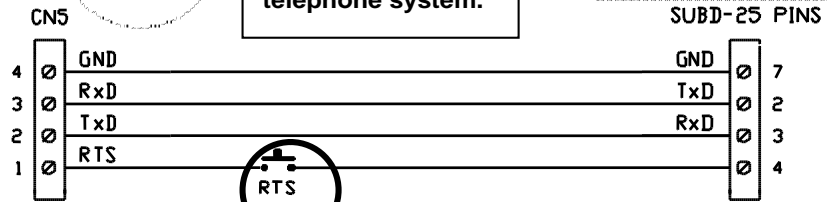
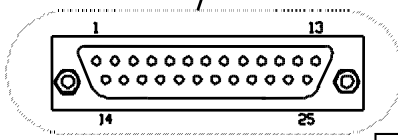
# CONNECTIONS SCHEMATIC



The communications Port shall not be connected to the telephone system.



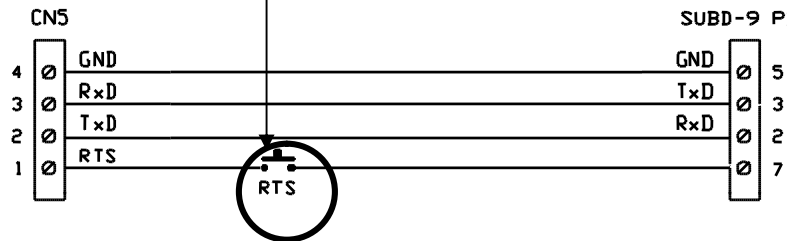
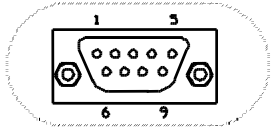
PC, PCL or similar



The display value can be requested through a push button on RTS line.

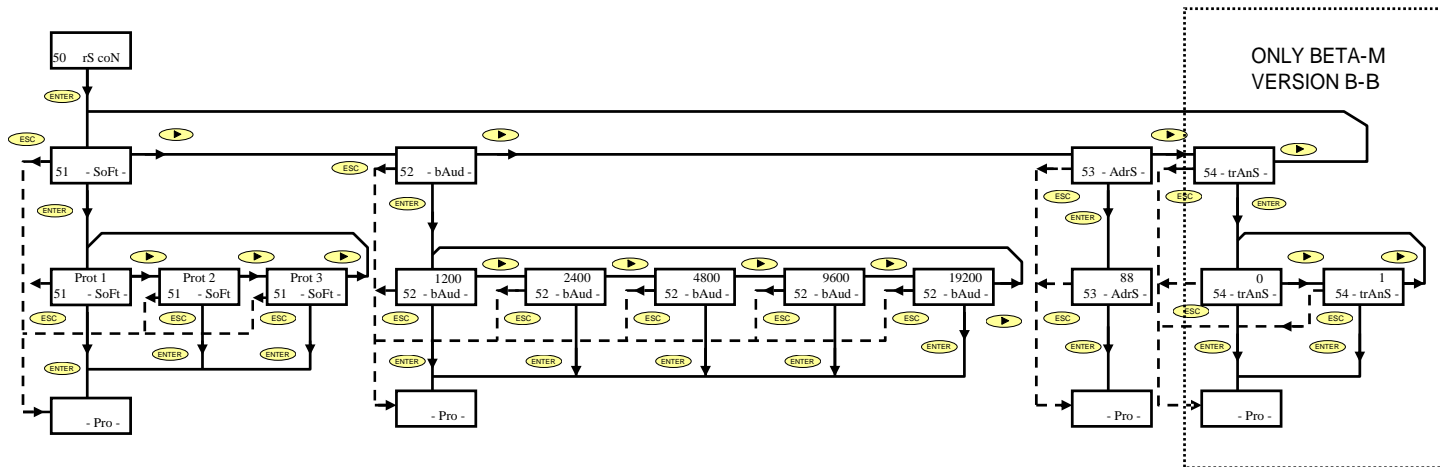
If this push button is held closed the display value is continuously transmitted at 1 second intervals and the instrument won't respond to any command of a external software

To be connected only if wish to transmit the display value without auxiliary software



### **3. RS232C PROGRAMMING OUTPUT MODELS BETA-M, BETA-D AND KAPPA-M**

# CONFIGURATION DIAGRAM OF RS232C FOR MODELS BETA-M, BETA-D, KAPPA-M



## 3.1. PROGRAMMING INSTRUCTIONS

The upper figure represents the MODULE 50 for the serial output configuration, valid for instruments models BETA-M, BETA-D and KAPPA-M.

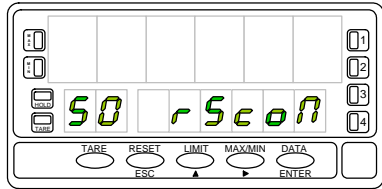
The module is composed of different menus of independent access that allow configuration of the following parameters:

- **Menu 51 -SoFt-** : Protocol selection 1= ASCII , 2= ISO 1745 and 3= MODBUS.
- **Menu 52 -bAud-** : Baud rate selection.
- **Menu 53 -AdrS-** : Instrument's address programming.
- **Menu 54 -trAnS-**: Validation or inhibition of the **Send** command. This command, if validated, permits to copy the configuration of the meter BETA-M to BETA-M connected using RS232C link and working with ISO 1745 protocol. (Only BETA-M version B-B)

Detailed instructions for each step menu are given on pages 13, 14, 15 y 16.

# ACCESS TO THE SERIAL OUTPUT PROGRAMMING

## [13.1]

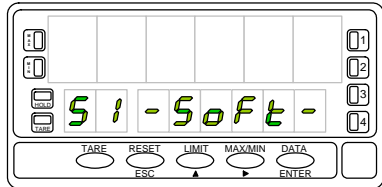


Press the **ENTER** key to pass from the run mode to the programming mode (The -Pro- indication appears on the second display) and press repeatedly the **▶** key until the meter displays the indication given by figure 13.1. Press **ENTER** to accede to the first programming menu, or

- ▶** : to advance to the next programming module.
- ESC** : to return to the(-Pro-) stage.

## MENU 51 - COMMUNICATIONS PROTOCOL

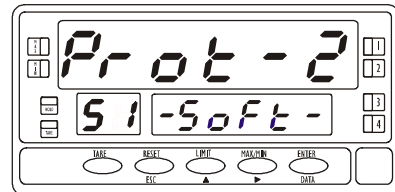
## [13.2]



The figure 13.2 shows the indication corresponding to the entry stage of the communications protocol selection menu. Press **ENTER** to accede this menu, or

- ▶** : to pass to the next programming menu.
- ESC** : to return to the programming access level (-Pro-).

## [13.3]

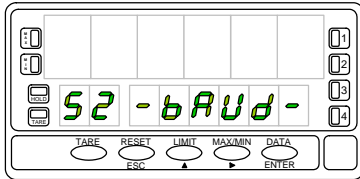


The main display shows the previously selected type of protocol, [**Prot1** = ASCII protocol, **Prot2** = ISO 1745 protocol and **Prot3** = MODBUS]. See pages 4, 5 y 6 for a detailed description of each protocol type.

Press **▶** key if desired to change the option present on display and the **ENTER** key to save the choice and automatically return to the -Pro- stage.  
**ESC** Returns the meter to the (-Pro-) stage without saving changes.

## MENU 52 – TRANSMISSION RATE

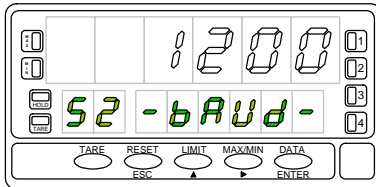
### [14.1]



The figure 14.1 shows the indication corresponding to the entry stage of the Baud rate configuration menu. Press **ENTER** to accede to this menu. If the programming of this parameter has been made and it is desired to pass to the following menu, press **▶** and go to figure 15.1.

**ESC** : Returns the meter to the programming access level (-Pro-).

### [14.2]

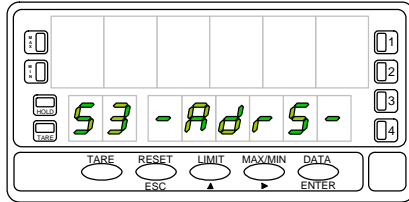


A press of **ENTER** made at the previous step makes the main display show the initially programmed transmission rate. The available options are **1200**, **2400**, **4800**, **9600** and **19200** Baud.

Press repeatedly **▶** key until the desired option appears on the display and press **ENTER** to validate the choice and automatically go to the -Pro- stage.

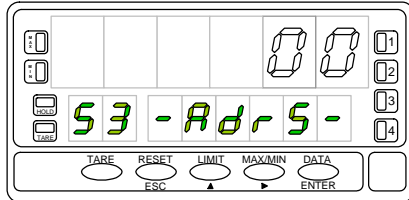
**ESC** : Returns the meter to the (-Pro-) stage without data memory storage.

### [15.1]



From the phase represented in figure 13.1, press **ENTER** key to accede to the menu selection level and **▶** to bring the meter to the entry stage of the address programming menu (see figure 15.1). Press the **ENTER** key, to get access to the programming of this parameter, or **▶** key to go to the next menu.  
**ESC** : to return to the programming access level (-Pro-).

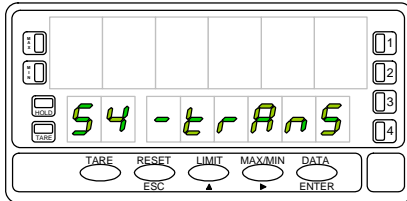
### [15.2]



The main display shows a two digits number corresponding to the previously programmed address, with the first digit in flash.  
If it is wanted to change the number, press repeatedly the **▲** key to make the flashing digit rotate from 0 to 9 and once it has taken the desired value, press **▶** key to advance to the next digit to be modified. Repeat this operation until the desired address appears on the display. It can be assigned address numbers between 00 and 99.  
Once the instrument's identification number has been composed on the display, press **ENTER** key to store data in the memory and return to the -Pro- stage.  
**ESC** : to return to the programming access level (-Pro-).

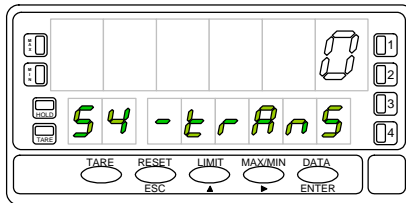
## MENU 54 – VALIDATION OF COMMAND "Send Configuration" (only BETA-M version B-B)

### [16.1]



From the phase represented in (Fig. 13.1), press **ENTER** key to access to the menu selection level and press three times **▶** key to bring the meter to the entry stage of the TRANS menu (auxiliary display shows **54 -trAnS**). This menu allow to validate or inhibit a very peculiar function of the BETA-M; The ability of copying the configuration parameters from one instrument to another via the serial link. Press the **ENTER** key to access this menu, or **▶** : to skip over this menu and advance to the next one. **ESC** : to return to the programming access level (-Pro-).

### [16.2]



A flashing number appears on the main display(0 or 1 depending on previous selection). The " 0 " means that the " (SEND CONFIGURATION) is disabled, and the " 1 " means that is possible to use this option. If the display corresponds to the desired option, press **ENTER** key or **ESC** key to go to the -Pro- stage. If not so, press **▶** key to change the number and **ENTER** to save the entry and return to the -Pro- stage.

#### **SEnd** Command (Send configuration)

**To be able to use this command it is necessary to have selected the " 1 " option in the 54 -trAnS menu and the ISO protocol in the menu 51 -SoFt-.**

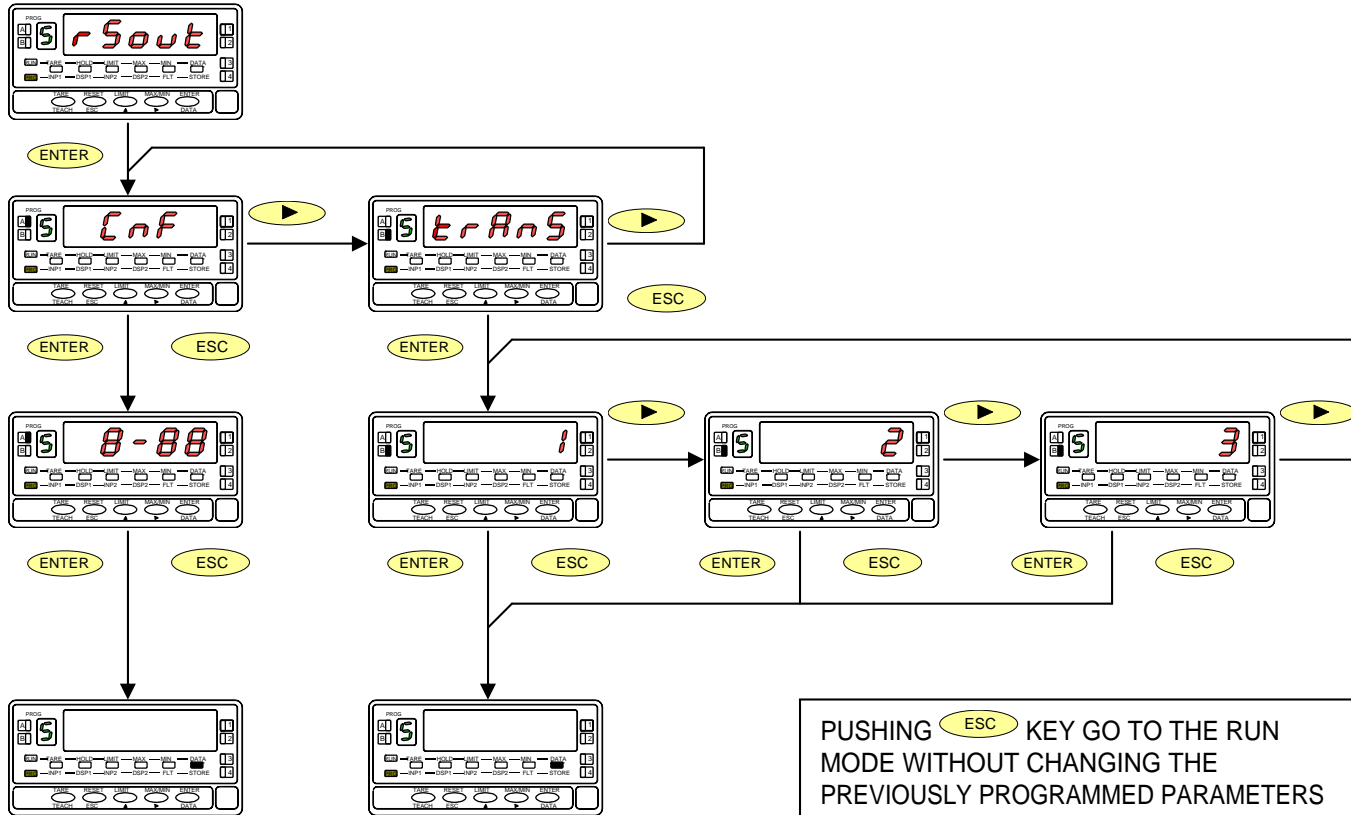
To program one instrument connected via the RS232C line it is sufficient to give the BETA-M receiver the same address as the BETA-M transmitter (see page 15 for instructions about this item)..

After doing this operation, press **ENTER** key while the transmitter is in the run mode to pass to the -Pro- stage. Press "TARE" key and the second display will show the indication **SEnd**.

At this point, press **ENTER** to start sending the programming parameters to the receiver or press **ESC** to cancel. [1.level -Pro-. 2. "TARE" key. 3. "ENTER" key].

# **RS2 OUTPUT OPTION PROGRAMMING FOR ALPHA'S and GAMMA-M MODELS**

# ALPHA AND GAMMA MODELS RS232C OUTPUT CONFIGURATION DIAGRAM



## 4.1. PROGRAMMING INSTRUCTIONS

The figure 19.1 represents the MODULE 5 for the serial output configuration, which is valid for models ALPHA-P, ALPHA-C, ALPHA-T, ALPHA-L, ALPHA-D and GAMMA-M.

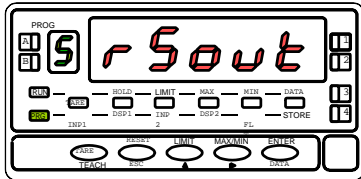
The module is composed of two menus of independent access that allow configuration of the following parameters :

- **Menu 5A CnF** : Configuration of the transmission rate and instrument's address.
- **Menu 5B trAnS** : Selection among ASCII, ISO 1745 and MODBUS protocols.

Detailed instructions for each step menu are given on pages 20 and 21.

## ACCESS TO THE SERIAL OUTPUT PROGRAMMING

[19.1]

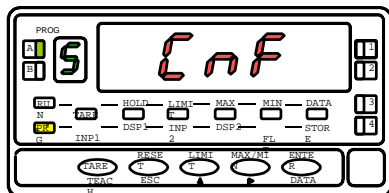


Press **ENTER** key to pass from the run mode to the programming mode (-**Pro**- indication, **PROG** led activated) and press repeatedly **▶** key until the meters goes to the level shown in figure 19.1, corresponding to the entry stage of the serial output programming module. Press **ENTER** to get access to this modules, or

- ▶** : to go to the next programming module.
- ESC** : to return to the normal operation.

## MENU 5A – OUTPUT CONFIGURATION

### [20.1]

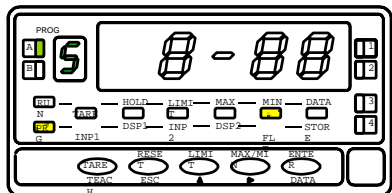


The figure 20.1 represents the access to the output configuration menu (display **5 CnF**, leds **A** and **PROG** activated), that allows to configure the Baud rate and the instrument address number. Press **ENTER** key to accede this menu, or

**▶** : to skip this menu and go to the next one.

**ESC** : to return to the normal operation.

### [20.2]



A press of **ENTER** made at previous sep makes the display show two numbers separated by a hyphen, the first of them in flash.

The leftmost number (1 digit) corresponds to the transmission rate:

**[ 1 = 1200, 2 = 2400, 3 = 4800, 4 = 9600 y 5 = 19200 baudios. ]**

The number at right (2 digits) corresponds to the instrument address, that can be programmed between 00 and 99.

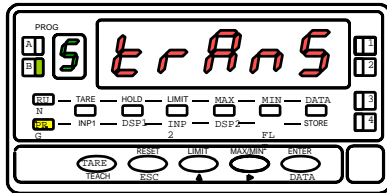
Press repeatedly **▲** key to change the value of the flashing digit and press **▶** to go to the next digit to be programmed. Repeat these operations until the display reads the desired parameters and press **ENTER** to save changes in the memory and go automatically go to normal operation.



**NOTE:** If " 00 " address has been programmed, the instrument only accepts command that don't return information, nor change parameter. e.g. TARE

## MENU 5B - SELECTION OF THE COMMUNICATIONS PROTOCOL

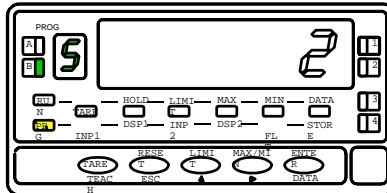
### [21.1]



From the entry stage 5 (Fig. 20.1), press **ENTER** key to accede to programming menus and press twice **▶** key to bring the meter to the phase represented in figure 21.1 (**5 trAnS** indication, leds **B** and **PROG** activated). In this menu it is possible to select the communications protocol used to communicate the instrument and D.T.E.(Data Terminal Equipment) Press **ENTER** to select this menu, or

- ▶** : to skip over this menu and go back to the **CnF** menu.
- ESC** : to return to normal operation.

### [21.2]



The display shows a flashing number (1,2 or 3 depending on previous selection) corresponding to the present communications protocol [ 1 = ASCII protocol, 2 = ISO 1745protocol and 3 = MODBUS protocol ]. If the displayed value corresponds to the desired option press **ENTER** or **ESC** to return to the run mode. If not so, press the **▶** key to change the number and **ENTER** key to save the choice and automatically go to the normal operation.

**A.1** Commands TABLE for KOSMOS type: ALPHA-C, ALPHA-P, ALPHA-T, ALPHA-L, ALPHA-D, BETA-M, BETA-D, GAMMA-M and KAPPA-M

Command		Function	Type function	Instrument model								
Protocol ASCII	Protocol ISO1745			ALPHA-C	ALPHA-P	ALPHA-T	ALPHA-L	ALPHA-D	BETA-M	BETA-D	GAMMA-M	KAPPA-M
D	ØD	Transmission display value	Trans	•	•	•	•	•	•	•	•	•
T	ØT	Transmission TARA value (offset in thermometers, preset in ALPHA-D)	Trans	•	•	•	•	•	•		•	•
T	ØT	Transmission Total value	Trans							•		
P	ØP	Transmission Peak value	Trans	•	•	•	•	•	•		•	•
V	ØV	Transmission Valley value	Trans	•	•	•	•	•	•		•	•
Y	ØY	Transmission Peak-Peak value	Trans								•	
Z	ØZ	Transmission Total value	Trans						•			
X	ØX	Transmission batch number	Trans					•	•			
L1	L1	Transmission setpoint 1 value	Trans	•	•	•	•	•	•	•	•	•
L2	L2	Transmission setpoint 2 value	Trans	•	•	•	•	•	•	•	•	•
L3	L3	Transmission setpoint 3 value	Trans	•	•	•	•	•	•	•	•	•
L4	L4	Transmission setpoint 4 value	Trans	•	•	•	•	•	•	•	•	•
M1	M1	Modify setpoint 1 value	Modif	•	•	•	•	•	•	•	•	•
M2	M2	Modify setpoint 2 value	Modif	•	•	•	•	•	•	•	•	•
M3	M3	Modify setpoint 3 value	Modif	•	•	•	•	•	•	•	•	•
M4	M4	Modify setpoint 4 value	Modif	•	•	•	•	•	•	•	•	•
I	ØI	Transmission active logical inputs	Trans	•	•	•	•	•	•	•	•	•
F	ØF	Transmission multiplier factor	Trans					•				
C	ØC	Transmission input function type	Trans					•				•

Follows in next page

Follows from previous page

Command		Función	Type function	Instrument model								
Protocol ASCII	Protocol ISO1745			ALPHA-C	ALPHA-P	ALPHA-T	ALPHA-L	ALPHA-D	BETA-M	BETA-D	GAMMA-M	KAPPA-M
t	Øt	Make tare (or preset in Beta-D)	order	•	•		•	•	•	•	•	•
r	Ør	Reset tare (or preset in Alpha-D/ Beta-D)	order	•	•		•	•	•	•	•	•
p	Øp	Reset peak	order	•	•	•	•	•	•		•	•
v	Øv	Reset valley	order	•	•	•	•	•	•		•	•
y	Øy	Reset peak-peak	order								•	
z	Øz	Reset total and batch (reset counter in Alpha-D)	order					•	•			•
z	Øz	Reset 1 group of variables	order							•		
n	Øn	Reset setpoints latch	order	•	•	•	•		•	•	•	•
h	Øh	Hold + reset 1	order							•		
x	Øx	Reset batch counter	order					•				
	TT	Transmission type of instrument	Trans	•	•	•	•	•	•	•	•	•

To use ModBus protocol, please consult specific manual **MODBUS** available on [www.ditel.es](http://www.ditel.es)



The instruments are warranted against defective materials and workmanship for a period of three years from date of delivery.

If a product appears to have a defect or fails during the normal use within the warranty period, please contact the distributor from which you purchased the product.

This warranty does not apply to defects resulting from action of the buyer such as mishandling or improper interfacing.

The liability under this warranty shall extend only to the repair of the instrument. No responsibility is assumed by the manufacturer for any damage which may result from its use.



All the DITEL products benefit from an unlimited and unconditional warranty of THREE (3) years from the date of their purchase. Now you can extend this period of warranty up to FIVE (5) years from the product commissioning, only by fulfilling a form.

Fill out the form in our website:

**<http://www.ditel.es/warranty>**



## INSTRUCTIONS FOR THE RECYCLING

This electronic instrument is covered by the **2002/96/CE** European Directive so, it is properly marked with the crossed-out wheeled bin symbol that makes reference to the selective collection for electrical and electronic equipment which indicates that at the end of its lifetime, the final user cannot dispose of it as unsorted municipal waste.

In order to protect the environment and in agreement with the European legislation regarding waste of electrical and electronic equipments from products put on the market after 13 August 2005, the user can give it back, without any cost, to the place where it was acquired to proceed to its controlled treatment and recycling.

### **DISEÑOS Y TECNOLOGIA, S.A.**

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