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APPLICATION AND USER MAUNAL

MAGIC APPLICATION SOFTWARE

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APPLICATION AND USER MAUNAL MAGIC APPLICATION SOFTWARE

Date	Edition number	Object of the modification
18/02/2004	00	 Original created from "MAG_Gb_Application_rev07.DOC" with the addition of : "Driver 5" on Com2 (Profibus with 1/10 of weight), Mode 3 for the analog output on the net weight in absolute value, Mono-product dosing mode with stock and totals management. (Available with the "RS FRAM" board)
15/03/2004	01	Addition of the Ethernet board, and the parameter for the rate supervision.
28/05/2004	02	Addition of commentaries on the power for the I/O.
13/12/2005	03	Correction of the 0-10V parameter and addition of the access to the Ethernet option board parameters.
30/01/2007	04	Correction of drivers COM2 n° 18 \Rightarrow MODBUS TCP on Ethernet.
02/11/2017	05	Removing description parts of MAGIC 20 and of Profibus DP option board. Addition CanMK-FB gateway management in RS485 (driver COM2 n°34) and in CAN bus.
11/02/2019	06	Update of the flow for FieldBus commands execution. (Refer to "7.5.4. Command launch")

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1. PRESENTATION OF THE APPLICATION SOFTWARE

1.1. The software

The software application is used to solve the problems of communication between PLCs or computers in industrial environment.

List of the traditional protocols of communication via serial link:

- ERIC (*)
- COMIDM (*)
- JBUS / MODBUS
- **CanMK-FB** gateway management. Fieldbus gateway (PROFUBUS, DEVICENET, MODBUS TCP...) only on **CO2** (COM2), see "3.1.4. COM2 serial link parameters function" and "7.2 MODBUS TCP FieldBus with ETHERNET XPORT".

(*): Software industry type only.

List of the option boards:

- RS232 option board.
- RS485 option board. (2 wires or 4 wires)
- 0-10V option board. (Optically isolated)
- 4-20mA option board. (Optically isolated)
- Current loop option board. (Active or passive)
- ETHERNET XPORT option board, for the transmission of the GROSS/ TARE / NET weights and the reception of the basic commands. (SAT, ZERO, PRINTING)

1.2. The peripherals

The **MAGIC** indicator have in standard version:

- > **CO1**: 1 RS232 serial link. (COM1)
- M1: 1 input for analog load cell(s) 6 wires,
 <u>Or</u> 1 input for analog load cell(s) 4 wires with MASTER CAN bus. (Only for peripherals)

On option:

- CO2: 1 serial link. (COM2)
 - RS232.
 - RS485. (2 wires or 4 wires)
 - 0-10V analog output. (Optically isolated)
 - 4-20mA analog output. (Optically isolated)
 - Current loop. (Active or passive)
 - ETHERNET XPORT, for the transmission of the GROSS / TARE / NET and reception of the basic commands.

CO3: 4 dry contacts relays free of all potential. <u>Maximum electrical characteristics (*):</u> V = 48V / I = 500mA.



CO4: 4 logic inputs <u>no external power supply required (*)</u>. (Maximum length of the cable: 3 m) (*) ATTENTION: If you don't take into account these instructions, you may breakdown the indicator.

▶ M1: 1 input for digital load cell(s). (Utilization of the MASTER CAN bus)

^{➤ 4} Inputs et 4 outputs:

Remarks:

- Only one cable must be connected to **M1**. Load cells are wired up in parallel separately in a junction box.
- Depending of the position of the jumpers (ST4 to ST7), the M1 connector allows the connection of
 - ARPEGE MASTER-K digital load cells on the MASTER CAN bus,
 - Or analog load cells 6 wires,
 - Or analog load cells 4 wires + peripherals on the MASTER CAN bus. (See "7.7. Use in 4-wire measurement and CAN bus link")

2. THE FRONT PANEL

Displays and LEDs 2.1.



- 2. Weight sign.
- 3. Led indicating a null weight at 1/4 scale division.
- 4. Led indicating the display of a NET weight.
- 1. Led indicating the level of the threshold 1.
- 2. Led indicating the level of the threshold 2.
- 3. Led indicating the level of the threshold 3.
- 4. Led indicating the weight display in pounds.
- 5. Led indicating the weight display in kilograms.

Remarks:

		ka or l	h alco	indicato	if tho	woight	ic immobilo:	
-	The LEDS	Kgori	D also	indicate	n the	weight	is immobile:	

nobile:	LED flashing	ightarrow weight unstable
	LED steady	\rightarrow weight stable.

- The LEDs kg or lb turn off to show that the display indicates a data and not a weight. (DATA)
- Conversion from kilogram to pound: 1 kg = 2.204 lb,

1 lb = 0.454 kg.

2.2. **Keypad**

Metrological Keys:



To move in the different menus and to seize data, we have six keys. (As follows)

	-0-	B/N t		O	SET UP kg/lb	
NAME OF THE KEY	Zero	Gross / Net	SAT (Semi-Automatic Tare)	Print	SET UP	DC / GO
IN THE FUNCTIONS OR MENUS	Not used.	Not used.	Previous function/menu.	Next Function / menu.	Not used.	Access to the function/menu. (ENTER)
IN THE SEIZURES	Decreases the flashing digit by one unit.	Increases the flashing digit by one unit.	Resets the value to seize, and in case of a signed value used to change the sign also.	Shift one digit to the left.	Exit key. (ESC).	Validates an entry.
DURING WEIGHING	Reset the weight	Permits to permute for few seconds the display between gross weight and net weight and vice versa.	Tare the indicator with the present gross weight.	Print a ticket of a weight	Access to the configuration menu	Start a dosing cycle or validate a data.

<u>Remark:</u> If the *MAGIC* indicator has been adjusted to operate with the two units (kg/lb), the commutation of a unit to the other is made by pushing <u>simultaneously</u> the two following keys:





Remark: To move inside the menu:

Кеуѕ	Effects
	Move to the previous function / menu.
٩	Move to the next function / menu.

3.1. <u>Configuration by the front panel of the indicator</u>

3.1.1. Date and Time update function

0F 1u5	: X	Choose the required format for the date and validate.
(0 = F <i>r</i> , 1 = US)		0 = French/European format: DD/MM/YY. (Day/Month/Year) 1 = American format: MM/DD/YY. (Month /Day/Year)
]]]	: XXXXXX	Enter the required date in the chosen format and validate. <u>Example for the 19th April 2002:</u> JJNNAA: Entry with the French/European format: "190402. NOJJY: Entry with the American format: "041902".
HHNNS5	: XXXXXX	Enter the required time and validate. <u>Example:</u> " 151230 " for 15h12mn30s.

3.1.2. Ticket number update function



6-digit ticket number. Enter the new ticket number then validate.

(**num**ber of the ticket)

3.1.3. COM1 serial link parameters function



- 04 = ERIC protocol.
- 07 = Print of a ticket in Gross.
- 08 = Print of a ticket in Net.
- 09 = Print of a ticket in Gross/Tare/Net.

NodE 1 :x	Enter the type of the serial link.
(communication mode com 1)	0 = RS232 without DTR test. 1 = RS232 with DTR test.
	Enter the communication speed.
(baud rate com1)	1 = 1200 bauds. 2 = 2400 bauds. 4 = 4800 bauds. 9 = 9600 bauds. 0 = 19200 bauds.
(number of bits com 1)	Enter the number of bits. 7 = 7 bits.
PRri i : x	Enter the parity type.
(parity type com1)	0 = No parity. 1 = Odd parity. 2 = Even parity.
SFoP 1	Enter the number of stop bits.
(number stop bits com 1)	1 = 1 stop bit. 2 = 2 stop bits.

<u>Remark:</u> Some combinations of number of bits, parity and number of stop bits are not available. Choose, if possible: 8 bits, no parity, and 1 stop bit.

3.1.4. COM2 serial link parameters function

	Enter the driver type of COM2 .
(driver com2)	00 = Nothing.
	01 = Weight remote display.
	02 = JBUS/MODBUS Protocol. (See 7.1.)
	03 = COMIDM protocol.
	04 = ERIC protocol.
	07 = Print of a ticket in Gross.
	08 = Print of a ticket in Net.
	09 = Print of a ticket in Gross/Tare/Net.
	16 = Emission of the Gross/Tare/Net weights on ETHERNET. (XPORT)
	17 = Weight remote display on ETHERNET. (XPORT)
	18 = MODBUS TCP Protocol on ETHERNET. (XPORT, see
	"7.2. MODBUS TCP FieldBus with ETHERNET XPORT")
	19 = COMIDM Protocol on ETHERNET. (XPORT)
	20 = ERIC Protocol on ETHERNET. (XPORT)



3.1.5. MAGIC slave station number

Slave station number Slave station number Enter the slave number of the indicator (2 digits) then validate. This number is used for the protocol of communication.

(number of the slave)

3.1.5.2. Number of line feed



Length of a paper page in number of line feed for 80 columns printers.

(number of the line feed)

3.1.6. Inputs/Outputs parameters

: XX



(type of input and output)

Give the operating type of the inputs/outputs. (Required application type)

0 = Industry application type. (Thresholds)

1 = Standard mono-product dosing application type.

2 = 3-products dosing application type.

9 = Industry application type, outputs managed by protocol. (See "7.5.1.2.1. Definition of "Outputs Forcing"")

Depending on the chosen application there is three menus to be filled:

3.1.6.1. <u>In</u>	dustry Application: F9P	
Nod		Enter the operating mode of the output 1.
(operating m	node of output 1)	 0 = Disable the output 1. 1 = The output 1 operates in threshold mode on the gross weight. 2 = The output 1 operates in threshold mode on net weight.
Nod		Enter the operating mode of the output 2.
(operating m	node of output 2)	 0 = Disable the output 2. 1 = The output 2 operates in threshold mode on the gross weight. 2 = The output 2 operates in threshold mode on net weight.
Nod		Enter the operating mode of the output 3.
(operating m	node of output 3)	 0 = Disable the output 3. 1 = The output 3 operates in threshold mode on the gross weight. 2 = The output 3 operates in threshold mode on net weight.
<u>Remark:</u>	If the last 3 parameters are in comparison mode. (Only weight) If not, the three outputs op parameters. (See "4.1. Desc	set to 0, the menu will stops here and the three outputs will operate one of the three outputs is activated according to the measured net perate in threshold mode and you must enter the following cription of the Inputs/Outputs")
LoGi		Enter your choice of the contact logic.

(**logi**c of the **o**utputs)

Enter your choice of the contact logic.

0 = Normally open. 1 = Normally closed.

Puls	: x		Enter the operat	ing type.
(operation into puls e of	r level)		0 = Level mode. 1 = Pulse mode.	
H95FEr	: - x , xxx		Enter the value o	of the hysteresis. You may change the sign due to the
(the value of hyster esis	;)		ксу 🤿 .	
3.1.6.2. <u>Mono-Produ</u>	ict Dosing A	pplica	tion: F 9 P 1 0	<u>] = 1</u>
<u>c 4 F9P</u>	: x		Enter the require	ed dosing type.
(cy cle ty pe)		0 or 2 or	 1 = Filling. 3 = Filling. 4 = Emptying. 5 = Emptying. 6 = Emptying. 7 = Emptying. 	 (HS then LS) (HS + LS then LS) (HS then LS without automatic filling) (HS + LS then LS without automatic filling) (HS then LS with automatic filling) (HS + LS then LS with automatic filling).
nb cy	: x		Enter the operat	ing mode of the required number of cycles.
(number of cycles)			0 = Execution of 1 = Seizure of the dosing. 2 = Execution of	one cycle only. e required number of cycles at the beginning of the an infinite number of cycles.
c FE	: x		Validate the ope	ration of the feed error correction.
(correction of the feed	error)		0 = No correction 1 = Correction of 2 = Correction of	n of the feed error. the feed error if weight is within the tolerances. the feed error in all cases.
L 5 + / 7	: x , x		Enter the time va the system is not	alue during which the Low Speed contact is closed and that c supervising the set values. (On 6 digits)
(low speed start tim e-c	out)			
E N + N	: x,x		Enter the value or goes less than th	of the hold time of the emptying output when the weight e low threshold. (Final flow of the product)
(em ptying tim e-out)				
(number of cycles)	: XX	00 or	Indicate to the sy making a tare for 01 = Tare at each 02 = Tare for one 03 = Tare for one etc.	ystem the number of doses to be executed without r the scale. o cycle. e cycle over two. e cycle over three.
			99 = No tare is de	one. (Even at the start of the cycle)

	Configure the rate value for the supervision of the rate according to the formula: Rate = \mathbf{Y} weight scale divisions in \mathbf{X} seconds.
(debit's monitoring) X:	$0 = \mathbf{Y}$ scale divisions in 0 second \Rightarrow <u>Rate supervision disabled</u> .
v	1 (to 4) = Y scale divisions in 1 (to 4) second(s). $0 = 0$ scale divisions in X second \rightarrow Bate supervision disabled
±.	1 (to 9) = 1 (to 9) scale divisions in X second \Rightarrow <u>hate supervision disabled</u> .
	Enter the value of the low threshold. (On 6 digits)
(low threshold)	
	Enter the value of the high threshold. (On 6 digits)
(high threshold)	
	Define the inputs to be used.
(operating mode of input 12 / 14)	Ω – The inputs 12 and 14 are not used
	1 = Only the input 13 is used.
	2 = Only the input I4 is used.
	3 = The inputs I3 and I4 are used.
	Enter the operating mode of the output 3.
(operating mod e of output 3)	0 = Indicates the off tolerances.
	1 = Indicates that dosing is in progress.
	2 = Indicates that dosing is finished.
<u>iioo 0 4 </u>] :x	Enter the operating mode of the output 4.
(operating mod e of output 4)	U = Indicates the emptying phase.
	the low threshold)
	2 = Indicates that the high threshold is activated. (Weight > value of
	the high threshold)
	3 = Indicates the filling phase.
3.1.6.3. <u>3-Product Dosing Application</u>	
	Enter the operating mode of the required number of cycles.
(number of cycles)	$\Omega = F_{xecution}$ of one cycle only
(1 = Seizure of the required number of cycles at the beginning of the
	dosing.
	2 = Execution of an infinite number of cycles.
	Enter the value of the low threshold. (On 6 digits)
(low threshold)	

Enter the value of the high threshold. (On 6 digits)

(high threshold)

3.1.7. Analog output parameters (0-10V / 4-20mA)



3.1.8. MASTER CAN link parameters



Enter the additional peripheral CAN type.

(**driver** can)

- 0 = Automatic detection of peripherals.
- 1 = Weight remote display.
- 2 = Reserved to use **CanMK-FB** with specific table.

3.1.9. Configuration using a computer

Proceed as follows:

- Connect the PC (on Com1) with the **MAGIC**. (On **COM1**)
- Run the program HyperTerminal. (Path of Hyperterm.exe: "C:\Program Files\Accessoires\HyperTerminal\HYPERTRM.EXE").
- Name the connection and validate.
- Then in the header "Connect using" choose "Send to Com1".
- Configure the connection as follows: 9600 Bauds, no parity, one stop bit, no flow control.
- Validate the function -PcHy in the indicator. The message "PRESS → ON THE PC" is displayed on the PC screen. Validate with the → key.

- The following menu will be displayed:

1	:	COMPANY NAME
2	:	NAMES OF REFERENCES
3	:	CONFIGURABLE TICKET
4	:	ETHERNET SETUP MODE
5	:	END AND RETURN ON MAGIC

(See below the section "3.2. Configuration on computer")

3.1.10. Save of the parameters and return to the main menu

Saving of the parameters in the EEPROM memory. This operation may take several seconds. (20 seconds) Then return to the application.

Warning! If there is a power cut before or during the save, the new parameters will be lost.

3.2. **Configuration on computer**

3.2.1. COMPANY NAME

Press on key 1. The following information will be displayed on the PC screen:

First line of the company name: 20 double width characters.

>******

Validate with \downarrow . Second line of the company name: 39 characters. ">------" Validate with \downarrow . Third line of the company name: 39 characters. ">------" Validate with \downarrow . First line of the end of ticket: 39 characters. Signature " ">Observations Validate with \dashv , et on retourne au menu principal.

If the first line of the company name is filled with "*" the weighing printing will be done in Remark: condensed mode on a single line.

3.2.2. NAMES OF REFERENCES

Press on the key 2, the following information will be displayed on the PC screen: First line: name of the reference 1, 15 characters. "R1 :-----" Validate with \downarrow . Second line: name of the reference 2, 15 characters. "R2 :-----"

Validate with \dashv , and you will return to the main menu.

3.2.3. CONFIGURABLE TICKETS

Press on the key 3. The following information will be displayed on the PC screen:

```
" STD TICKET (0=n 1=y): 1"
```

If you answer "1" (yes), the weighing ticket will be printed according to a standard ticket type defined in the indicator's memory

If you answer "0" (no), the weighing ticket will be printed according to the ticket configuration See below the section" *3.3. Configurable tickets*".

The standard tickets are always in the memory of the indicator. They are produced in a format which can be printed on an IBA40 printer (on 40 columns). They include all information collected during the weighing.

3.2.4. ETHERNET SETUP MODE (XPORT)

Press on the key 4, the following information will be displayed:

```
RESET XPort IN PROGRESS WAIT...
MAC address 00204A862D4D
Software version 01.8 (040806) XPTEXE
AES library version 1.8.2.1
Press Enter to go into Setup Mode
```

Validate with \dashv , the configuration of the Ethernet chip of the option board defiles, it is followed by the configuration menu of the chip, see below. In the opposite case, press on CTRL/E to return to the parameters menu of the **MAGIC** and verify that the driver of **COM2** corresponds for an Ethernet link driver, in worst case, you will get a default. (Wrong implantation of the board, deficient option board ...)

```
Change Setup:

0 Server

1 Channel 1

3 E-mail

5 Expert

6 Security

7 Factory defaults

8 Exit without save

9 Save and exit Your choice ?
```

(For the configuration, refer to the documentation of the Ethernet chip)

3.2.5. END AND RETURN ON MAGIC

Press on the key 5, you will end the communication with the PC and return to the main menu of the **MAGIC** indicator.

3.3. <u>Configurable tickets</u>

If you disable the standard ticket parameter, the system proposes the configurable ticket. It offers customized page layout and the choice of printed data. This ticket is produced by programming, using simple commands.

<u>Remark:</u> It is recommended to create the ticket in successive steps. Configure just a few commands and print the ticket to see the result, and so on.

3.3.1. Ticket configuration commands

8 commands are available to control the printer. A command **always** consists of three characters '**;1 letter;**'. The semi-colon ';' is the separator that **must** follow each command. It may also be used to finish a line and be replaced later by a command.

;A; = Number of line feeds

- ;B; = Number of spaces
- ;G; = Switch to large characters
- ;P; = Switch to standard characters
- ;T; = Text
- ;E; = System label
- ;C; = Control character

;?; = End of ticket (no data)

The syntax must be as follows:

The command ;A; always followed by 2 digits (number of line feeds) e.g.: ;A;02; The command ;B; always followed by 2 digits (number of spaces) e.g.: ;B;09; The command ;G; always alone The command ;P; always alone The command ;C; always followed by 2 characters (value in hexadecimal) e.g.: ;C;1B; The command ;E; always followed by 3 characters (name of one of the system labels) e.g.: ;E;RS1; The command ;T; always followed by the text to be printed (variable length) e.g.: ;T; THIS IS THE TEXT ; The command ;?; always alone

3.3.2. The special keys for the configurable ticket editor

CTR / E	= completely deletes the line the cursor is a	on.

- CTR / D = deletes the character at the cursor's position.
- CTR / I = inserts a space at the cursor's position.
- CTR / A = moves the cursor forward one character.
- BACK SPACE = moves the cursor backward one character.
- \downarrow = moves to the next line.

3.3.3. System labels

These labels are used to print the data stored in the system memory.

- **RS1**: 1st line of the company name (20 characters)
- RS2: 2nd line of the company name (39 characters)
- RS3: 3rd line of the company name (39 characters)
- FT1: 1st line of the end of ticket (39 characters)
- **DNP**: Ticket number (4 digits)
- DDA: Date (present date, 8 characters)
- **DHE**: Time (present time, 5 characters)
- DP1: Gross weight (5 digits + weight unit and decimal point)
- DP2: Tare weight (5 digits + weight unit and decimal point)
- **DP3**: Net weight (5 digits + weight unit and decimal point)
- EP1: Gross weight name
- EP2: Tare name
- **EP3**: Net weight name.

4. INDUSTRY APPLICATION: **FUP** 0 = 0

4.1. Description of the Inputs/Outputs

I1: Print.
I2: Reset.
I3: Delete of a tare.
I4: Tare. (SAT)

O1: Threshold 1.
O2: Threshold 2.
O3: Threshold 3.
O4: Acknowledge command of an input.

4.2. The operating modes

There are two operating modes for the thresholds.

If the three operating modes of the outputs 1 to 3 are set to" 0", then the indicator is in comparison mode : According to the net weight if it is greater or lower than the threshold value, the threshold is or is not manipulated.

Example:

Mode of the output 1: $n = 0$, Mode of the output 2: $n = 0$,		
Mode of the output 3: $\begin{bmatrix} \mathbf{D} & \mathbf{D} \\ \mathbf{D} & \mathbf{D} \end{bmatrix} = 0.$		
Threshold 1 value: $5EF 1 = 10$ kg, Threshold 3 value: $5EF 3 = 30$ kg.		
Net weight < 10kg	\Rightarrow	Set1 Set2 Set3
Net weight from 10kg to 30kg included	\Rightarrow	
Net weight > 30kg	\Rightarrow	Set1 Set2 Set3 - Set2 +

If one of the three operating modes of the outputs 1 to 3 is different from" 0", then the indicator is in threshold mode:

The threshold is manipulated as long as the net weight (or gross weight according to the configuration) is greater than the threshold value.

Example:

Mode of the output 1: $nod o 1 = 2$,	
Mode of the output 2: $n \circ d \circ c = 2$,	
Mode of the output 3: $nod of = 2$.	
Threshold 1 value: $ S E + = 10$ kg,	
Threshold 2 value: $5EF = 20$ kg,	
Threshold 3 value: $5EF3 = 30$ kg.	
	Set1 Set2 Set3
Net weight \geq 10kg \Rightarrow	
Net weight > 20kg →	Set1 - Set2 - Set3 +
Net weight \ge 30kg \Rightarrow	Set1 OK Set3

4.3. Modification of the thresholds value



<u>Remark:</u> If the indicator is in comparison mode, the value of the threshold 2 is not modifiable.

Description of the Inputs/Outputs 5.1.

- **I1**: Start cycle resume cycle.
- 12: Pause cycle/ cancel.
- **13**: Dosing authorization. (*)
- **I4**: Emptying / filling Authorization. (*)
- O1: High speed contact. (HS) O2: Low speed contact. (LS)
- O3: Off tolerance, dosing in progress, end of dosing contact. (*)
- **O4**: Emptying, low threshold, high threshold, filling contact. ^(*)

(*): To determine the use of the contacts O3/O4 and the inputs I3/I4 refer to section 3.1.6.2.

Modification of the dosing parameters 5.2.



(off tolerance plus)

Then return to the application.

5.3. **Dosing cycle**

5.3.1. Starting a dosing cycle

To start the dosing we have two possibilities: either by the front panel of the indicator, or through the "I1" input.

5.3.1.1. Starting a dosing cycle through the front panel

Press on the key $\overline{\bullet}$, the indicator then displays:



: **XXXXXX** Enter the set value, and validate. (On 6 digits)

(dosing set value)



Enter the number of the required cycles, and validate. (Required parameter if $\boxed{\textbf{nb} \ \textbf{cycl}} = 1$, see 3.1.6.2.)

(number of cycles)

Dosing is launched. (The LED" Set 2" flashes quickly to indicate that you are in HS)

 Remark:
 When you are in HS dosing, the LED "Set 2" flashes quickly.

 When you are in LS dosing, the LED "Set 2" flashes slowly.

 At the end of dosing:
 The LED "Set 2" indicates that dosing is correct,
The LED " Set 1" indicates that dosing is stopped by an off tolerance
underflow,
The LED " Set 3" indicates that dosing is stopped by an off tolerance
overflow.

5.3.1.2. Starting a dosing cycle through the input "I1"

You must activate the "I1" input. (Pulse of \approx 1 second)

If $n = 1$ or 3 (see 3.1.6.2.), the indicator then displays	¦	nf	כ	3] , you must activate the " I3 "
input. (Pulse of \approx 1 second)					

Dosing is launched with the dosing parameters predefined. (See 5.2.)

5.3.2. Pause/cancel a dosing cycle by the "I2" input

During a cycle, you must activate the "I2" input. (Pulse of \approx 1 second)

The indicator then displays $5 \rho \rho$, then you have two choices:

- > Resume the cycle in progress by activating the "I1" input. (Pulse of \approx 1 second)
- > Or cancel the cycle in progress by activating the "I2" input. (Pulse of \approx 1 second)



Remark:

6. 3-PRODUCT DOSING APPLICATION: $F_{9}P_{1} = 2$

6.1. Description of the Inputs/Outputs

- I1: Start cycle resume cycle.
- **12**: Pause cycle/ cancel.
- 13: Dosing authorization.
- **I4**: Emptying Authorization.

- **O1**: Product n°1 dosing contact.
- **O2**: Product n°2 dosing contact.
- **O3**: product n°3 dosing contact.
- O4: Emptying contact.

6.2. Modification of the dosing parameters



Then return to the application.

6.3. Dosing cycle

6.3.1. Starting a dosing cycle

To start a dosing cycle you have two choices: either by the front panel of the indicator, or through the "**I1**" input.

6.3.1.1. Starting a dosing cycle by the front panel

Press on the key $\underbrace{\overset{\mathfrak{ll}}{\underbrace{\bullet}}}$, the indicator then displays:



: XXXX

Enter the number of cycles required, and validate. (Required parameter if $\boxed{\textbf{b}}$ $\boxed{\textbf{c}}$ $\boxed{\textbf{y}}$ = 1, see 3.1.6.3.)

(number of cycles)

The indicator then displays $\left| \begin{array}{c|c} | n | P | \\ \hline \end{array} \right|$, you must activate the "I3" input. (Pulse of \approx 1 second) The dosing of the product 1 is launched. (The LED "Set 1" flashes)

At the end of the dosing of the product 1, the indicator displays P P P , you must activate the "I3" input. (Pulse of \approx 1 second) The dosing of the product 2 is launched. (The LED "Set 2" flashes)
At the end of the dosing of the product 2, the indicator displays P , you must activate the "I3" input. (Pulse of \approx 1 second) The dosing of the product 3 is launched. (The LED "Set 3" flashes)
At the end of the dosing of the product 3, the indicator displays $P P P$, you must activate the "I4" input. (Pulse of \approx 1 second) The emptying of dosing is launched, the indicator displays $P P P P$. (The three LEDs "Set 1", "Set 2" and "Set 3" are ON)
6.3.1.2. <u>Starting a dosing cycle by the "I1" input</u>
You must activate the "II" input. (Pulse of \approx 1 second)
The indicator displays μ μ μ μ , you must activate the "I3" input. (Pulse of \approx 1 second)
6.3.2. Pause/cancel a dosing cycle by the "I2" input
During a cycle, you must manipulate the " 12 " input. (Pulse of \approx 1 second)
The indicator then displays $[5]$ $[-0]$ $[-0]$, then you have two choices:

> Resume the cycle in progress by activating the "I1" input. (Pulse of \approx 1 second)

> Or cancel the cycle in progress by activating the "I2" input. (Pulse of \approx 1 second)

<u>**Remark:**</u> It is possible to resume a cycle by pressing on the key $\underbrace{\overset{(0)}{\longleftarrow}}_{\bullet}$.

7. APPENDICES

7.1. JBUS/MODBUS protocol

An external system can communicate with the indicator by serial link. It can control the process or collect weight data in real time. This is transparent to the user as this function is run in multi-tasking by the indicator.

This functionality is activated if the driver type of **COM1** or **COM2** is "02", see "3.1.3. COM1 serial link parameters function" and "3.1.4. COM2 serial link parameters function". For more information on the protocol refer to the manual "**JBUS PROTOCOL IMPLEMENTATION ON INDUSTRY SOFTWARE INDICATOR**".

7.2. MODBUS TCP FieldBus with ETHERNET XPORT option

An external system can communicate with the indicator (*Point-to-point communication*, description of data exchanges see 7.5.1.) by fieldbus link. It can control the process or collect weight data in real time. This is transparent to the user as this function is run in multi-tasking by the indicator.

This functionality is activated if the driver type of **COM2** is "**18**", see "*3.1.4. COM2 serial link parameters function*".

For more information on the ETHERNET MODBUS TCP XPORT option board refer to the manual "APPPLICATION NOTE ETHERNET MODBUS/TCP AMK BOARD (XPort) FOR THE MAGIC AND IDe INDICATORS".

7.3. FieldBus with CanMK-FB gateway controlled in RS485

An external system can communicate with the indicator (*Point-to-point communication*, description of data exchanges see 7.5.1.) by fieldbus link. It can control the process or collect weight data in real time. This is transparent to the user as this function is run in multi-tasking by the indicator.

This functionality is activated if the driver type of **COM2** is "**34**", see "*3.1.4. COM2 serial link parameters function*", the indicator can managed a **CanMK-FB** gateway using an ANYBUS CompactCOM fieldbus device Profibus-DP, DeviceNet, Ethernet Modbus TCP, ProfiNet or EtherNet/IP.

For more information on the "CanMK-FB" gateway and its ANYBUS CompactCOM fieldbus devices refer to the manual "SPECIFICATION OF THE MASTERCAN GATEWAY CANMK-FB".

7.4. Fieldbus with CanMK-FB gateway shared on CAN bus

An external system can communicate with the indicator (*Shared communication via CAN network*, description of data exchanges see 7.5.2.) by fieldbus link. It can control the process or collect weight data in real time. This is transparent to the user as this function is run in multi-tasking by the indicator.

This functionality is activated if the slave station number is included between "1" and "8", see "3.1.5.1. Slave station number", the indicator can managed a **CanMK-FB** gateway using an ANYBUS CompactCOM fieldbus device Profibus-DP, DeviceNet, Ethernet Modbus TCP, ProfiNet or EtherNet/IP.

For more information on the "CanMK-FB" gateway and its ANYBUS CompactCOM fieldbus devices refer to the manual "SPECIFICATION OF THE MASTERCAN GATEWAY CANMK-FB".

7.5. Fieldbus Data Exchanges

7.5.1. Point-to-point communication

In the case of a communication between an indicator and an external system using <u>FieldBus with CanMK-FB</u> <u>gateway controlled in RS485</u> (see 7.3.) or using <u>MODBUS TCP FieldBus with ETHERNET XPORT</u> (see 7.2.) the data exchanged are composed of 11 words emitted by the indicator (see 7.5.1.1.) and 4 words received by the indicator. (See 7.5.1.2.)

7.5.1.1. Data issued from the indicator

The frame emitted by the indicator allows to the external system (PLC, PC) to read the supervision and weighing data.

Designation	Size (bytes)	Encoding	Offset (bytes)
Life counter. (See 7.5.1.1.1.)	1	Byte	0
Image of Inputs/Outputs. (See 7.5.1.1.2.)	1	Bits	1
State response. (See 7.5.1.1.3.)	2	-	2
Data response. (See 7.5.1.1.3.)	4	Signed long integer	4
Gross. (See 7.5.1.1.4.)	4	Signed long integer	8
Tare. (See 7.5.1.1.4.)	4	Signed long integer	12
Net. (See 7.5.1.1.4.)	4	Signed long integer	16
Channel state. (See 7.5.1.1.5.)	2	Bits	20

Remarks:

- The coma of weights is coded in the field "Channel state", see 7.5.1.1.5.
- Frame length: 11 words / 22 bytes.

7.5.1.1.1. Definition of "Life counter»

This field is incremented from **00** H to **FF** H at each new transmission.

7.5.1.1.2. Definition of "Image of Inputs/Outputs"

This is the image of the Inputs/Outputs status.



✤ Inputs status bits:

- \succ b0 ⇒ State of input I1.
- > b1 \Rightarrow State of input I2.
- > b2 ⇒ State of input I3.
- \succ b3 ⇒ State of input I4.

Outputs status bits:

- \succ b4 ⇒ State of output O1.
- \succ b5 ⇒ State of output O2.
- \succ b6 ⇒ State of output O3.
- \succ b7 ⇒ State of output O4.

7.5.1.1.3. Definition of "State response" and "Data response"

The field "**State response**" and "**Data response**" are the command results previously sending to the indicator, for more details refer to "7.5.4. *Command launch*" and "7.5.3. *List of commands*".

7.5.1.1.4. Definition of "Gross" / "Tare" / "Net"

The gross / tare / net weights are transmitted in integer of 32 bits signed, the weights' comma is coded in the field "**Channel state**", see 7.5.1.1.5.

7.5.1.1.5. Definition of "Channel state"



- ◆ <u>Unused bits:</u> These bits are always 0.
 > b0 à b7.
- Decimal point position: Number of digits after the decimal point for weights.

▶ b8 to b9.

- 0 \Rightarrow No digit after the decimal point.
- 1 \Rightarrow One digit after the decimal point.
- 2 \Rightarrow Two digits after the decimal point.
- **3** \Rightarrow Three digits after the decimal point.
- Status bits:
 - ightarrow b10 \Rightarrow This bit indicates if the displayed weight is stable or not stable.
 - 0 \Rightarrow Unstable displayed weight.
 - 1 \Rightarrow Stable displayed weight. (According to the criteria defined during the instrument calibration)
 - ightarrow b11 \Rightarrow This bit indicates whether the zero is correct. (At ¼ scale division)
 - 0 \Rightarrow Zero not correct.
 - 1 \Rightarrow Zero correct
 - \rightarrow b12 \Rightarrow If this bit is set to 1, the weight is 'Out of scale +'. (A This is a fault!)
 - > b13 \Rightarrow If this bit is set to 1, the weight is 'Out of scale -'. (\triangle This is a fault!)
 - > b14 \Rightarrow If this bit is set to 1, the converter is out of range. (\triangle This is a fault!)
 - > b15 ⇒ Not used, always 1.

7.5.1.2. Data received by the indicator

The frame received by the indicator allows to the external system (PLC, PC) to control the process.

Designation	Size (bytes)	Encoding	Offset (bytes)
Outputs Forcing. (See 7.5.1.2.1.)	2	-	0
Command Code. (See 7.5.1.2.2.)	2	Integer	2
Command Data. (See 7.5.1.2.2.)	4	Long integer	4

<u>Remark:</u> Frame length: 4 words / 8 bytes.

7.5.1.2.1. Definition of "Outputs Forcing"



- Outputs forcing bits: (Used only if the parameter "type of input and output" is set to "9", see "3.1.6. Inputs/Outputs parameters")
 - \succ b0 ⇒ Forcing output O1.
 - \succ b1 ⇒ Forcing output O2.
 - > b2 ⇒ Forcing output O3.
 - > b3 ⇒ Forcing output O4.
- Unused bits: These bits are always left at 0.
 - ≻ b4 à b15.

7.5.1.2.2. Definition of "Command Code" et "Command Data"

The field "**Command Code**" and "**Command Data**" are used for command execution, for more details refer to "7.5.4. *Command launch*" and "7.5.3. *List of commands*".

7.5.2. Shared communication via CAN network

In the case of a communication between serval indicators (up to 8 **MAGIC**) and an external system using <u>Fieldbus with CanMK-FB gateway shared on CAN</u> (see 7.4.) the data exchanged are composed of 32 words emitted by the indicators (see 7.5.2.1.) and 32 words received by the indicators. (See 7.5.2.2.)





WARNING: For use the **MAGIC** indicators on a CAN bus network as shown above it must be configured in 4-wires measurement, see "7.7. Use in 4-wire measurement and CAN bus link", to choose the indicator's station number see "3.1.5.1. Slave station number".

7.5.2.1. Data issued from the indicators

The frame emitted by the indicators using the **CanMK-FB** gateway allows to the external system (PLC, PC) to read the supervision and weighing data.

	Designation	Size (bytes)	Encoding	Offset (bytes)
	Life counter. (See 7.5.2.1.1.)	1	Byte	0
۱°۱	Image of Inputs/Outputs. (See 7.5.2.1.2.)	1	Bits	1
or N	Channel state. (See 7.5.2.1.3.)	1	Bits	2
licat	Command Status. (See 7.5.2.1.4.)	1	Bits	3
Ind	Gross. (See 7.5.2.1.5.)	2	Signed integer	4
	Net. (See 7.5.2.1.5.)	2	Signed integer	6
	Life counter. (See 7.5.2.1.1.)	1	Byte	8
۵°۲	Image of Inputs/Outputs. (See 7.5.2.1.2.)	1	Bits	9
or N	Channel state. (See 7.5.2.1.3.)	1	Bits	10
licat	Command Status. (See 7.5.2.1.4.)	1	Bits	11
Ind	Gross. (See 7.5.2.1.5.)	2	Signed integer	12
	Net. (See 7.5.2.1.5.)	2	Signed integer	14
	Life counter. (See 7.5.2.1.1.)	1	Byte	16
:3	Image of Inputs/Outputs. (See 7.5.2.1.2.)	1	Bits	17
or N	Channel state. (See 7.5.2.1.3.)	1	Bits	18
licat	Command Status. (See 7.5.2.1.4.)	1	Bits	19
Ind	Gross. (See 7.5.2.1.5.)	2	Signed integer	20
	Net. (See 7.5.2.1.5.)	2	Signed integer	22
	Life counter. (See 7.5.2.1.1.)	1	Byte	48
۲°۱	Image of Inputs/Outputs. (See 7.5.2.1.2.)	1	Bits	49
or N	Channel state. (See 7.5.2.1.3.)	1	Bits	50
icat	Command Status. (See 7.5.2.1.4.)	1	Bits	51
Ind	Gross. (See 7.5.2.1.5.)	2	Signed integer	52
	Net. (See 7.5.2.1.5.)	2	Signed integer	54
	Life counter. (See 7.5.2.1.1.)	1	Byte	56
8.	Image of Inputs/Outputs. (See 7.5.2.1.2.)	1	Bits	57
or N	Channel state. (See 7.5.2.1.3.)	1	Bits	58
licat	Command Status. (See 7.5.2.1.4.)	1	Bits	59
Ind	Gross. (See 7.5.2.1.5.)	2	Signed integer	60
	Net. (See 7.5.2.1.5.)	2	Signed integer	62

Remarks:

- The coma of weights is coded in the field "Channel state", see 7.5.2.1.3.

- Frame length: 32 word / 64 bytes.

7.5.2.1.1. Definition of "Life counter"

This field is incremented from **00** H to **FF** H at each new transmission.

7.5.2.1.2. Definition of "Image of Inputs/Outputs"

This is the image of the Inputs/Outputs status.



Inputs status bits:

 \succ b0 ⇒ State of input I1.

> b1 ⇒ State of input I2.

 \succ b2 ⇒ State of input I3.

 \succ b3 ⇒ State of input I4.

Outputs status bits:

- \succ b4 ⇒ State of output O1.
- > b5 ⇒ State of output O2.
- ▶ b6 \Rightarrow State of output O3.
- ▶ b7 ⇒ State of output O4.

7.5.2.1.3. Definition of "Channel state"



Decimal point position: Number of digits after the decimal point for weights.

▶ b0 to b1.

- 0 \Rightarrow No digit after the decimal point.
- 1 \Rightarrow One digit after the decimal point.
- 2 \Rightarrow Two digits after the decimal point.
- 3 ⇒ Three digits after the decimal point.

Status bits:

- ightarrow b2 \Rightarrow This bit indicates if the displayed weight is stable or not stable.
 - 0 ⇒ Unstable displayed weight.
- 1 \Rightarrow Stable displayed weight. (According to the criteria defined during the instrument calibration)
- > b3 \Rightarrow This bit indicates whether the zero is correct. (At ¼ scale division)
 - 0 \Rightarrow Zero not correct.
 - 1 \Rightarrow Zero correct
- ▶ b4 \Rightarrow If this bit is set to 1, the weight is 'Out of scale +'. (^A This is a fault!)
- > b5 \Rightarrow If this bit is set to 1, the weight is 'Out of scale -'. (A This is a fault!)
- > b6 ⇒ If this bit is set to 1, the converter is out of range. (^A This is a fault!)
- > b7 ⇒ Not used, always 1.

7.5.2.1.4. Definition of "Command Status"

The field "**Command State**" is the command results previously sending to the indicator, for more details refer to "7.5.4. *Command launch*" and "7.5.3. *List of commands*".



★ <u>Code of the command launched</u>: Code of the command in progress is encoding on 4 bits.
 ▶ b0 à b3

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Encoding of "State response": (See "7.5.4. Command launch")

- ≻ b4 à b5
 - 0 \Rightarrow NONE : no command in progress.
 - 1 \Rightarrow END_OK : the command has been correctly run.
 - 2 \Rightarrow END_KO : the command hasn't been correctly run.
 - 3 \Rightarrow IN_PROGRESS : command in progress.
- ✤ <u>Additional status bits of the indicator:</u>
 - ▶ b6 ⇒ Not used, always 0.
 - ightarrow b7 \Rightarrow If this bit is set to 1, setting of the indicator is in progress.

7.5.2.1.5. Definition of "Gross" / "Net"

The gross / net weights are transmitted in integer of 16 bits signed, the weights' comma is coded in the field "**Channel state**", see 7.5.1.1.5.



WARNING: The signed 16-bit integer encoding limits the transmission range of the weight between +32 767 and -32 767.

7.5.2.2. Data received by the indicator

The frame received by the indicators using the **CanMK-FB** gateway allows to the external system (PLC, PC) to to control the process.

	Designation	Size (bytes)	Encoding	Offset (bytes)
or	Outputs Forcing. (See 7.5.2.2.1.)	2	-	0
dicat N°1	Command Code. (See 7.5.2.2.2.)	2	Integer	2
Inc	Command Data. (See 7.5.2.2.2.)	4	Integer	4
or	Outputs Forcing. (See 7.5.2.2.1.)	2	-	8
dicat N°2	Command Code. (See 7.5.2.2.2.)	2	Integer	10
Ine	Command Data. (See 7.5.2.2.2.)	4	Integer	12
or	Outputs Forcing. (See 7.5.2.2.1.)	2	-	16
dicat N°3	Command Code. (See 7.5.2.2.2.)	2	Integer	18
pul	Command Data. (See 7.5.2.2.2.)	4	Integer	20
or	Outputs Forcing. (See 7.5.2.2.1.)	2	-	48
dicat N°7	Command Code. (See 7.5.2.2.2.)	2	Integer	50
Inc	Command Data. (See 7.5.2.2.2.)	4	Integer	52
or	Outputs Forcing. (See 7.5.2.2.1.)	2	-	56
Indicat N°8	Command Code. (See 7.5.2.2.2.)	2	Integer	58
	Command Data. (See 7.5.2.2.2.)	4	Integer	60

<u>Remark:</u> Frame length: 32 words / 64 bytes.

7.5.2.2.1. Definition of "Outputs Forcing"



- Outputs forcing bits: (Used only if the parameter "type of input and output" is set to "9", see "3.1.6. Inputs/Outputs parameters")
 - \succ b0 ⇒ Forcing output O1.
 - \succ b1 ⇒ Forcing output O2.
 - > b2 ⇒ Forcing output O3.
 - \succ b3 ⇒ Forcing output O4.
- ❖ <u>Unused bits:</u> These bits are always left at 0.
 ➢ b4 à b15.

7.5.2.2.2. Definition of "Command Code" et "Command Data"

The field "**Command Code**" and "**Command Data**" are used for command execution, for more details refer to "7.5.4. *Command launch*" and "7.5.3. *List of commands*".

WARNING: The 16-bit integer encoding of "Command Data" limits its value to 65 535.

7.5.3. List of commands

Val	lue	Description						
Hex.	Decimal	Description						
0000 н	0 d	No command / Initialise command.						
0001 H	1 d	Semi-automatic zero command.						
0002 Н	2 d	Semi-automatic tare command.	emi-automatic tare command.					
0003 H	3 d	Programmable tare command. (PT)						
0004 H	4 d	Cancelation of the tare command.						
0005 н	5 d	Printing of the weight command.		-				
0006 н	6 d	Reading of the ticket number command.		le fo				
0015 н	21 d	Value of threshold 1 writing command.	Commands only	ailab <i>int</i> <i>ion</i>				
0016 н	22 d	Value of threshold 2 writing command.	available if the	y ava -poi icat				
0019 н	25 d	Value of threshold 1 reading command.	parameter " type of	only nt-to mun				
001A H	26 d	Value of threshold 2 reading command.	est à " 0 ", see	ands Poir com				
001B H	27 d	Value of threshold 3 reading command.	"3.1.6. Inputs/Output	:um				
001С Н	28 d	Value of hysteresis reading command.	s parameters"	Co				

Remarks:

- The command "3" requires to update the "**Data command**" field with the desired programmable tare value.
- The command "5" returns the DSD number in the "**Data response**" and the gross / tare / net weights are frozen during 1 second to be sure that the weights printed / stored in the DSD are the same that those received by the external system.
- The command "6" returns the DSD number in the "Data response".
- The commands "21" to "22" requires to update the "**Data command**" field with the desired threshold value.
- The commands "25" to "27" returns the threshold value in the "Data response".
- The commands "28" returns the hysteresis value in the "Data response".

Value of "State response":

> $IN_PROGRESS = 03 H.$

= 00 H,

= 01 H,

= 02 H,

> NONE

END OK

END_KO

7.5.4. Command launch

It's possible to send commands to the indicator by writing in the "Command data" field.

To be sure of the validity and the correct execution of command, it's important to manipulate it as described in the flow below.



"State response" and	"Data response'	' are read in the	frame emitted by	the indicator.

7.5.5. Command launch examples

7.5.5.1. Semi-automatic tare command: 0002 H

External system frame to be sent to the indicator:

1	Out forc		Command code					Com	ma	nd c	lata	4			
00	н	00	н	00	н	02	н	00	н	00	н	00	н	00	н
	2 by	/tes	rtes 2 bytes			4 bytes									

7.5.5.2. Programmable tare command: 0003 H

External system frame to be sent to the indicator:

	Out for	iput cing		Command code		Command data								
00	н	00	н	00	н	03	н	00 н	00	н	03	н	E8	н
	0 2 b	(d) ytes		3 (d) 2 bytes		1 000 (d) 4 bytes								

The programmable tare value is **000003E8** H or 1 000 decimal.

If the channel is set:

- in kg with 2 digits after the decimal point this tare will be translated by 10.00kg,
- in kg with 3 digits after the decimal point this tare will be translated by 1.000kg,
- ...

7.5.5.3. Value of threshold 1 writing command: 0015 H

External system frame to be sent to the indicator:

Out forc	put ing	Comi co	nand de	Command data					
00 н	00 н	00 н	15 H	00	H	00 н	21	н	34 н
0 ((d)	21 (d)		8 500 (d)					
2 bytes		2 by	ytes			4 b	ytes		

The value of threshold 1 is **00002134** H or 8 500 decimal. If the channel is set:

- in kg with 2 digits after the decimal point this value will be translated by 85.00kg,
- in kg with 3 digits after the decimal point this value will be translated by 8.500kg,
- ...

7.6. CanMK-FB gateway connection with weight remote display



7.7. Use in 4-wire measurement and CAN bus link



7.8. Error messages





Error: calculation capacity overflow.

Error: one or more digital load cell(s) no longer respond.

Error: serial number of a digital load cell, settings of digital load cells not valid.

Error: dosing set value equal 0.

Error: dosing set value is greater than the high threshold.

Error: dosing set value is lower than the feed error.

7.9. **Breakdown**

• The indicator displays the following message:

Verify the indicator's supply voltage, it must be between 9.6V and 25V, position the jumper correctly.

a mossago.		0	ſ
ig message.			

 The indicator displays the followin The range of the converter's voltage doesn't suit the signal provided by the weighing cell, modify the range of the converter's voltage or unload the weighing cell.

• The indicator displays the following message:

				0	r	•	
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The range of the converter's voltage doesn't suit the signal provided by the weighing cell, modify the range of the converter's voltage or load the weighing cell or check the cables' connection. (M+/M -)

• The indicator displays the following message: Restart the indicator, and set the adjustment again.



• The indicator displays the following message: The analog load cell is not connected correctly; verify that the reversions of the supply (R+/R-) are connected correctly.

• The indicator displays the following message: Restart the indicator, and set the adjustment again.





• The indicator displays the following message: Check if the CAN Bus is working properly. (Example: bad connection, positioning of the ST4 to ST7 jumpers in digital load cell configuration, put the terminal resistor of 120 ohms if necessary)



• The indicator displays the following message: The adjustment of the digital load cells is not valid, please set it again.

• The indicator displays the following message:





• The indicator displays the following message: The indicator waits for the emptying/filling authorization. (14 input)

If your problems persist, contact the technical support of the ARPEGE MASTER-K Company.

7.10. Summary of the parameters menu



NOTE:

