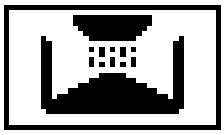
BASIC CHARGE DOSING (1 PRODUCT AT 1 OR 2 SPEEDS)



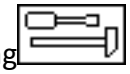
The intent of this AppManual is guide the user through the basic charge dosing for one product, at one or two speeds with MATRIX II indicator.
Dosing function allows loading and unloading of a product controlled by its weight in an automatic way.
Dosing electromechanical system control is performed through one or more external modules DIN-rail format that has digital outputs (relays) and inputs. These modules are connected to a Matrix II through a RS485 bus using COM3 port or COM4 (optional, galvanically isolated).
Dosing program allows interacting with other systems (light and sound alarm indicators, starting buttons, blocking security sensors, PLCs, etc) for easy integration of the doser to a complex machine.
To select any dosing function we should select the INDUSTRIAL APPLICATION menu in \SETUP\INDICADOR\CONFIG\APPLICATION.

Dosing phases in Basic Charge mode

1. Enter dosing parameters.
2. Wait for process start command.
3. Execute initial function (If required by configuration).
4. Wait stability and get initial weight.
5. Charge start at one or two speeds according to configuration. For that the corresponding relays are activated.
6. For two speeds: on reaching fast relay cut point, it is disconnected and only the slow relay will remain connected.
7. On reaching slow relay cut point it is disconnected.
8. Wait for weight stabilization.
9. Read final weight for calculating the dosed material.
10. Execute the final charge function.
11. Make the automatic ticket printing (If required by configuration).

Steps to follow to configure the indicador in Basic Charge mode

To perform any of the dosing functions, we should previously have configured all the scale parameters in SCALE DEF, in \SETUP\SCALE (1 or 2, which corresponds)\SCALE DEF.
Afterwards we should set the indicator as industrial application, inside the configuration menu \SETUP\INDICADOR\CONFIG\APPLICATION.

Once we have selected the industrial application we should get into the industrial menu by pressing  to congifure the dosifier, for scale 1 or for scale 2 in \MENU\DOSIFIER.

After being selected the scale we want configure, we have to indicate what kind of function we want to use, in our case BASIC CHARGE.

From now we can see in the front pannel two new buttons from the dosifier function:

 Performs the last dosing ticket printing

 Starts function *Charge*. According to the configuration the indicador will require us more or less parareters befote starts the dosification or just he starts automatically.

Next, enter in the configuration basic charge menu, for the scale 1 in \MENU\DOSIFIER\SCALE 1\CONFIG (Settings), in this menu we have the following parameters:

MODE: We can configure the dosification by weight or by pieces.
BEGIN FUCNTION: Choose how you will begin dosing, by pressing the keyboard front button, through an external digital input or by either.
CHARGE: Configuration menu parameters for basic charge

SPEEDS: Establishes if dosing is performed at one or two speeds or flow rates.

Possible options are:

1 SPEED: Only one valve works during the whole process.

2 SPEEDS: Two flow rates control relays are used. It allows faster dosing because initially two dosing valves are open (fast+slow) and from one point only one valve (slow) continues allowing a higher precision in the TARGET WEIGHT.

WEIGHT TYPE: Allows programming the type of charging, between NET and GROSS.

ASK WEIGHT: Parameter to establish if the weight or pieces to dose will be required to the user.

Possible values:

NO: Weight or pieces will not be required. The programmed parameter of TARGET WEIGHT will be used.

LAST: Weight or pieces to dose will be required to the user. When the screen is showed the last input will be shown as default.

ASK: Weight or pieces to dose will be required to the user showing zero as the default value.It is mandatory to input as value.

TARGET WEIGHT: Final weight to be dosified.

INFLIGHT: Inflight in a dosing is the quantity of product that is still falling once the valves or product control system is closed. To compensate that material fall the SLOW relay us cut before reaching the desired weight. That difference between the desired weight and the cut value is the INFLIGHT.

As this value may vary with time and is hard to predict exactly, equipment has an automatic correction system that adjusts INFLIGHT value according to the results of the different dosings. That system may be voided if desired.

Inflight configuration has three parameters: INFLIGHT, correction and maximum correction.

INFLIGHT: Weight value for SLOW relay cut point calculation.

We recommend do not configure this parameter, the unit will calculate automatically the inflight value using his internal algorithm.

CORRECTION: Correction percentage applied to the current INFLIGHT after a dosing. That means that after a dosing the final error is calculated (difference between real weight and target) and the percentage of this parameter is applied adding or subtracting to INFLIGHT value accordingly.

We recommend set this value to 70%

MAX. CORRECTION: Maximum correction value to be performed at once. If after making the correction value calculation, that value is higher than the MAX. CORRECTION parameter, only that correction will be applied. If it is set to zero that comparison is disabled and so there is no correction limit.

We recommend set the max. correction value once the inflight value is fixed, setting a value 20% higher than the inflight value, ie, we have to multiply the inflight value per a factor of 1,2.

SLOW SECTION: That parameter is only valid if dosing at two speeds. Establishes, along with INFLIGHT, the FAST relay cut point, only leaving the SLOW relay activated.

ERROR MARGIN: Menu option to configure the TARGET WEIGHT check allowing to give an error if TARGET WEIGHT is out of the margins programmed here.

That check may be activated or deactivated. Inferior margin is independent from superior and may be programmed in weight or in percentage with respect the dosed value.

TYPE OF MARGIN: Indicates if we program the margin values in weight or percentage.

ERROR MARGIN+: Positive error margin. If TARGET WEIGHT is above in that value or percentage to the desired weight an error on screen will be shown and DOSING ERROR and ERROR relays will be activated (if configured).

ERROR MARGIN-: Negative error margin. If desired weight minus TARGET WEIGHT is above that value or percentage weight an error on screen will be shown and DOSING ERROR and ERROR relays will be activated (if configured).

If a margin is set to zero its check will be disabled.

MATERIAL ERROR: Option for lack of material programming. If activated will provide an error if while dosing it is detected that the weight does not increase.

Detection is configured through two parameters:

TIME: Indicates detection time in seconds. If set to zero, detection is deactivated. Default value: 0

WEIGHT CHANGE: Possible values are: 2, 5, 10, 20, 50, 100 or 200 divisions. That value indicates how much has the weight to change during the time programmed in the parameter TIME. Default value: 2.

That number of divisions indicates that weight has to increase more than such divisions per programmed times. If speed is lower a lack of material will be produced.

WAIT TIME: That parameter is an optional time that the equipment will wait after the weight becomes stable after ending the dosing. When that time ends the process continues checking margins and weighing end. If during *wait time* weight becomes unstable time counter starts back to zero.

INITIAL FUNCTION: Allows selecting a function that will be executed just before starting dosing

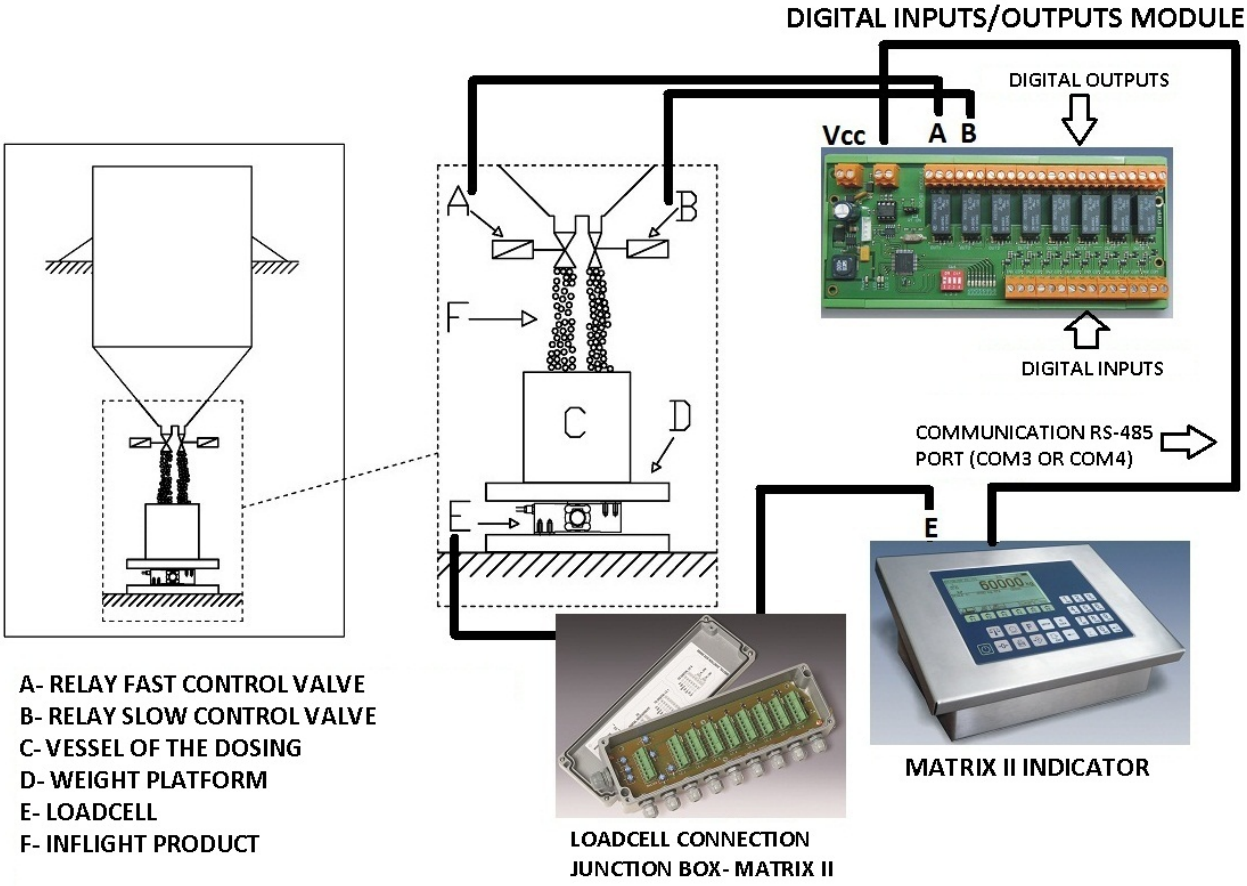
END FUNCTION: Allows selecting a function that will be executed just after ending dosing.
POSSIBLE FUNCIONS TO PERFORM(Final as initials):

NONE: Does not perfomr any function.
TARE: Perfomrs a tare.
CLEAR TARE: Removes the tare.
RELAY A, RELAY B: Activates the indicated relay, waiting the selected time to deactivate it (1 to 250s.).
INPUT A, INPUT B: Waits for the activation of the selected input, to continue with the process.

AUTO. TICKET: Parameter to select if a ticket is automatically printed after every dosing process.
RELAY CONFIG.: Menu for the assignation of the relays that each funtion will activate. Is is mandatory to program the SLOW relay to work at 1 speed or the FAST and SLOW for 2 speeds. If not, the equipment will return an error on trying to dose. The use of the rest of relays is optional.
INPUT CONFIG.: Menu to configure the inputs that will be used for dosing, assigning a physical input (module and position).

Once configured all these parameters, we can perform a basic charge dosing.
Following is the wiring shematic that we must take to dosing.

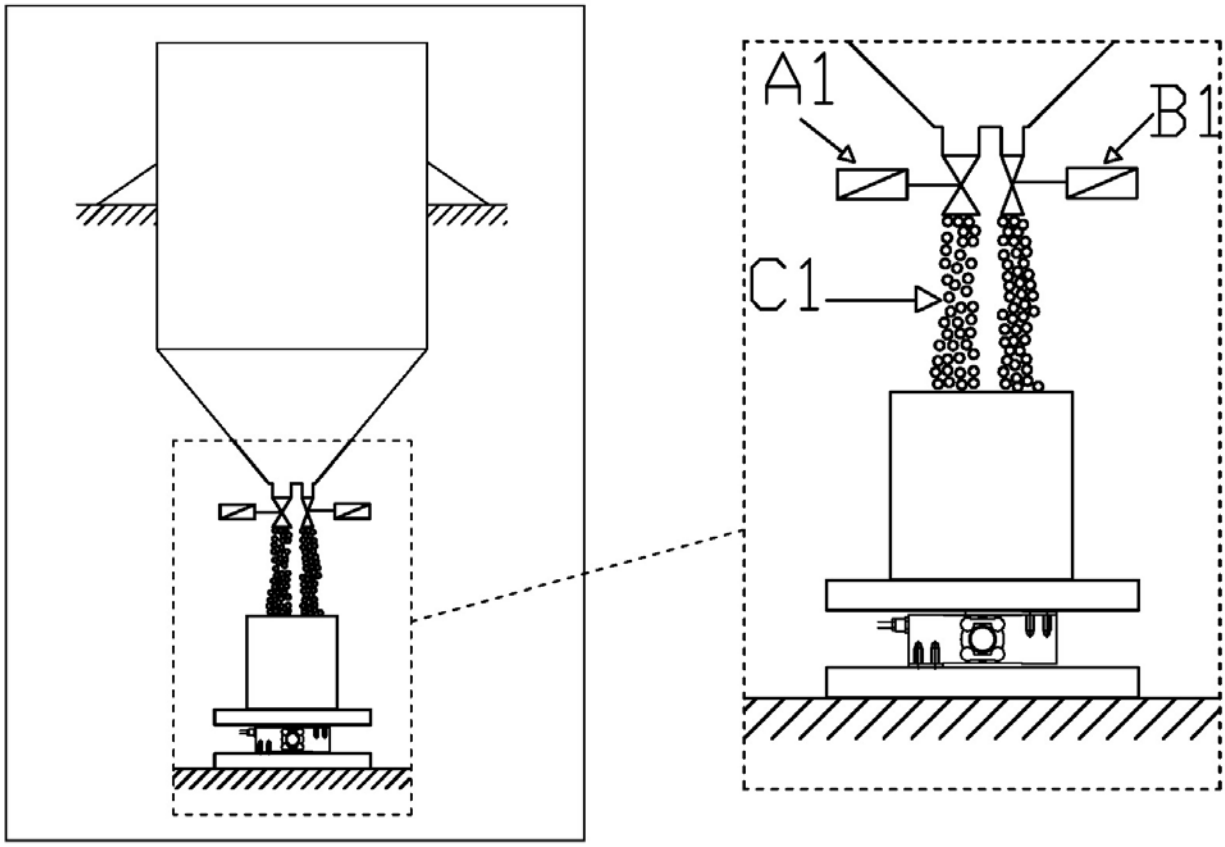
Wiring schematic



MATRIX II Indicator - ref.: 89400
Digital Inputs/Outputs Module - ref.: 89406

Practical example of a basic charge dosing configuration

We have a tank of 100kg capacity with chemical colorant and we want to dosing by using the basic charge function, dosifying 5kg cans with an error of ±5gr, the last 1000gr of the dosification only will works the slow relay. The structure weight (platform) is 3kg.
We have chosen a 20kg loadcell capacity to perform this application. We need to do a tare before starts the dosing and a exit tare at the end of the process. Also we need an auto ticket at the end of the dosing.



MATRIX II dosing configuration

To perform a dosification we should have previously configured the basic parameters of the scale as Capacity, Display resolution, Calibration, Span, etc.

After have being programmed all these parameters we should configure the indicator as dosing mode **\SETUP\INDICADOR\CONFIG\APPLICATION\INDUSTRIAL.**
Once selected the inductrial application we can start configuring the dosification in Basic Charge mode in **\MENU\DOSIFIER\SCALE 1\FUNCTION\BASIC CHARGE.**
After select the kind of dosing we should configure their own parameters in **\MENU\DOSIFIER\SCALE1\CONFIG(settings).**
MODE: Weight
BEGIN FUNCTION: Digital input
CHARGE:
Inside charge **\MENU\DOSIFIER\SCALE 1\CONFIG(settings)\CHARGE** configure the following parameters:

SPEEDS: 2 Speeds
WEIGHT TYPE: Net
ASK WEIGHT: No
TARGET WEIGHT: 5000 (In the same units as we have configured our scale, in our case in grams)
INFLIGHT: 0 (**In the figure is C1)**
CORRECTION: 70%
MAX. CORRECTION: 0, At the beginning is deactivated, after the dosing is being stabilized we can set a value 20% higher to the INFLIGHT value
SLOW SECTION: 1000 (It is the final section, here only works the slow relay)
TYPE OF MARGIN: Weight
ERROR MARGIN + : 5
ERROR MARGIN - : 5
MATERIAL ERROR:
TIME: 5 Seconds
WEIGHT CHANGE: 2 div.
WAIT TIME: 0.0s
INITIAL FUNCTION: Tare
FINAL FUNCTION: Clear Tare

AUTO. TICKET: Yes

RELAY CONFIG.: We already have configured the digital inputs/outputs accessory in the address memory number 1, so the reference of all the relays is [01: x] (module: position).

CHARGE FAST: [01:1] (In the figure is A1)
CHARGE SLOW: [01:2] (In the figure is B1)
ERROR: [01:3]
DOSING ERROR: [--:-] Not configured
MATERIAL ERROR: [01:5]
ACTIVATED: [01:6]
RELAY A: [--:-] Not configured
RELAY B: [--:-] Not configured
INPUT CONFIG: [--:-] Not configured
BEGIN FUNCTION: [01:1]
PAUSE: [01:2]
CANCEL: [01:3]
CONTINUE: [01:4]
BLOCKING: [--:-] Not configured
INPUT A: [--:-] Not configured
INPUT B: [--:-] Not configured

Now the indicator is configured for dosing in basic charge mode, the only thing we need to do is wiring the relays and the digital inputs associated.