EcoDose 3K
Operating Manual

OPERATING MANUAL

EcoDose 3K

MDR00005EN
Material number: N10110001V

Release : 02
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TRANSLATION OF THE ORIGINAL INSTRUCTIONS

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Revision Status

Quality Assurance System is responsible to maintain updated this document in its last version applicable.

Version / Changes

Version of this document: 02 dated 03.07.2020
Story of version / changes:

Version	Date	Revision description
00	26.02.2019	Emission
01	03.04.2019	General revision. Detailed description of SW functioning by visualization of touch screen pages.
02	03.07.2020	Updated drawings and revised technical norms (new versions)

TABLE OF CONTENTS

1 Introduction

This document is intended for the assembly, operating and directing and maintenance personnel.

Everyone implied in operation, maintenance and repair must have read and understood this document – especially the texts marked with the safety symbol. This document should always be at the disposal of personnel.

Attached to this document there are drawings, parts lists, manuals of the main components that should be used for more information.

This manual reflects the state of the machine, at the time of input on the market and it is subject to amendment, at the sole discretion of Dürr Systems AG.
In case of amendments to the manual for further similar machines, Dürr Systems AG does not undertake to update the manuals for equipment already on the market.

Dürr Systems AG will refuse any liability for damages arising from the non-observance of the manual!

For any question, please contact either our service or spare parts departments, or one of Dürr Systems AG subsidiaries of (see chapter 12 “Contacts & Hotline”).

1.1 How to Use this Document

In this manual, you will find all the necessary information, specifications and warning notes for assembly, operating and maintenance operations.

ATTENTION

Read this manual and the attached documents attentively.
Respect the specifications therein contained.

1.2 Terminology

The terms used in this manual are supposed to facilitate an easy and quick comprehension of the text.

1.3 Explanation of Safety Notes and Symbols

In this manual, symbols and signal words are used to indicate specific dangers.

Symbols are integrated with a text. This text describes the danger and explains how to avoid it. Furthermore, the necessary precautions are specified.

It is assumed that before performing the operations therein described, the operator has fully understood the entire manual and knows its contents.
The sole observance of safety notes is by no means sufficient.

Dangers to life and limb

D A N G E R

Danger of lethal injuries
The red safety note "Danger" indicates a high risk that will result in death or a severe injury.

W A R N I N G

Danger of severe injuries
The orange safety note "Warning" indicates a medium risk that could result in death or a severe injury.

C A U T I O N

Danger of minor injuries
The yellow safety note "Caution" indicates a low risk that could result in an insignificant or minor injury.

Dangers for the production and the operation

If the jobs therein described in are not carried out correctly or unsuited tools or materials are used, a major breakdown may jeopardize the entire production and the normal course of operations. Such breakdowns may be very expensive.

Such dangers are referred to with the blue note "Attention

A T T E N T I O N

Danger of material damage and production interference

2 Technical Data

2.1 Range of Application and Intended Use

EcoDose 3K was built exclusively for use in the field of surface finish or similar activities.

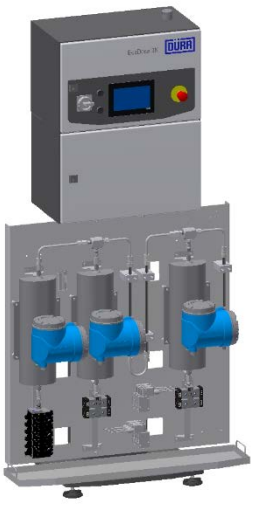
EcoDose 3K should be installed, maintained and repaired only by persons who know the equipment very well and have been made aware about the dangers.

The main rules for the prevention of accidents must be respected, as well as the rules for safety.

The commands of **Eco**Dose 3K have been designed exclusively for the activity of dosing components with the mixing machinery **Eco**Dose 3K**.**

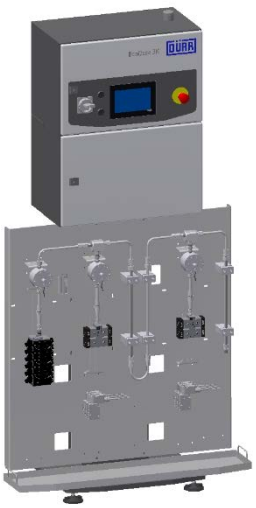
The password to change the input parameters has to be provided only to trained personnel.

Use **Eco**Dose 3K only for products that are compatible with its components.



Coriolis version

Remote magnetic switch panel
(optional)

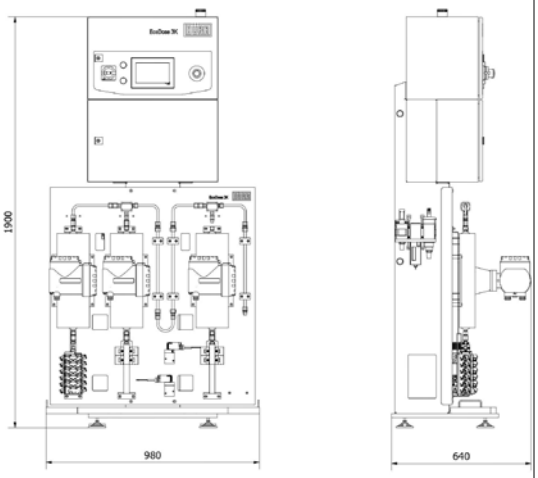
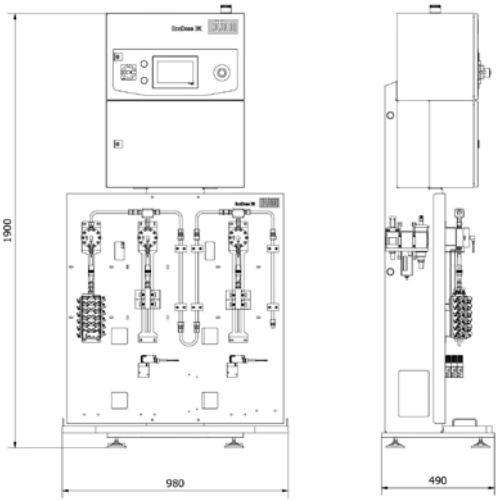


Gear version

D A N G E R

EcoDose 3K can not be installed in areas with potentially explosive atmospheres. In remoted option Fluidic Panel can be installed in Atex Zone 2 only.

2.2 Key Data

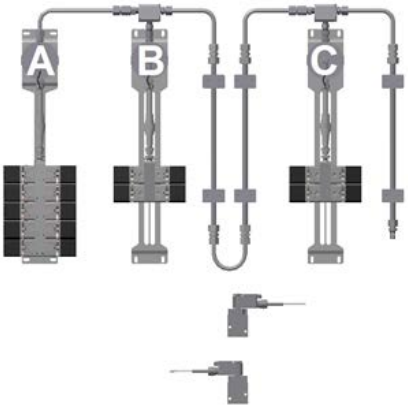
Dimensions in mm.	Dimensions in mm.
 **Coriolis version**	 **Gear version**

Product temperature		min 15°C max 40°C
Air inlet pressure		5,5 a 8 bar
Mixing ratio (variable)		da 1:0 a 30:1
Max. pressure in/out (with **low** pressure c. c. valves)		20 bar
Max. pressure in /out (with **high** pressure c. c. valves and gear)		200 bar
Max. pressure in /out (with **high** pressure c. c. valves and Coriolis)		160 bar
Ambient temperature, transport and storage temperature		da 10°C a 40° C
Power supply		100-240 Vac
Frequency		50 - 60 Hz
Breaking capacity		14kA
Rated Power		130W
Power consumption	Coriolis	92W
Power consumption	Gear	60W
Current consumption	Coriolis	0,4A
Current consumption	Gear	0,26A
Degree of protection		IP55
Weight Coriolis version		Round 230 kg
Weight Gear version		Round 190 kg

Flow Range: Obtainable flow range of mixed product varies in function of mixing ratio, type and size of flow meters, viscosity of the product, temperature of the product, etc. As general indication it could be defined a minimum limit of flow of mixed product of **50 cc/min**. This indication has to be confirmed and defined case by case during commissioning and set-up of the machine in real conditions with real products.

2.3 Version

Gear Flow Control



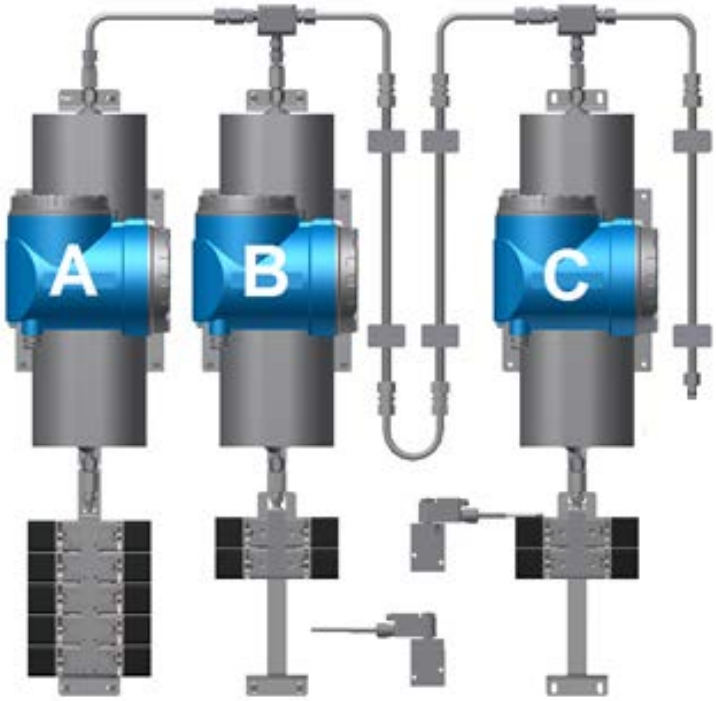
Gear Flowmeter **A,B** or **C** type **1** : 0,005-2 lt. 5cc-2000cc
type **2** : 0,02-3 lt. 20cc-3000cc

GFM A	GFM B	GFM C	Volume Flow Range	Mixing ratio Range	Range Viscosity A CPS	Range Viscosity B - C CPS
1	1	1	30cc / 1200 cc *	1:1 to 30:1	25-350	25-350
2	1	1	40cc / 2200cc **	1:1 to 30:1	25-500	25-350
2	2	2	130cc / 3200cc ***	1:1 to 30:1	25-500	25-500

* For Mixing Ratio range 5:1 to 10:1 volume flow range will be 60cc/1200cc.
** For Mixing Ratio range 5:1 to 10:1 volume flow range will be 60cc/2600cc.
*** For Mixing Ratio range 5:1 to 10:1 volume flow range will be 160cc/3400cc.

Color change block valves : Low or high Pressure
n. color with L.P. valves : 2 or 4 or 6 or 8 or 10
n. color with H.P. valves : 1 or 3 or 5 or 7 or 9
n. hardener : 1 or 3
n. gun : 1 or 2
n. EcoGun Cleaner M : 1 or 2
n. Low Pressure Regulator Flow : 1 or 2

Coriolis Flow Control



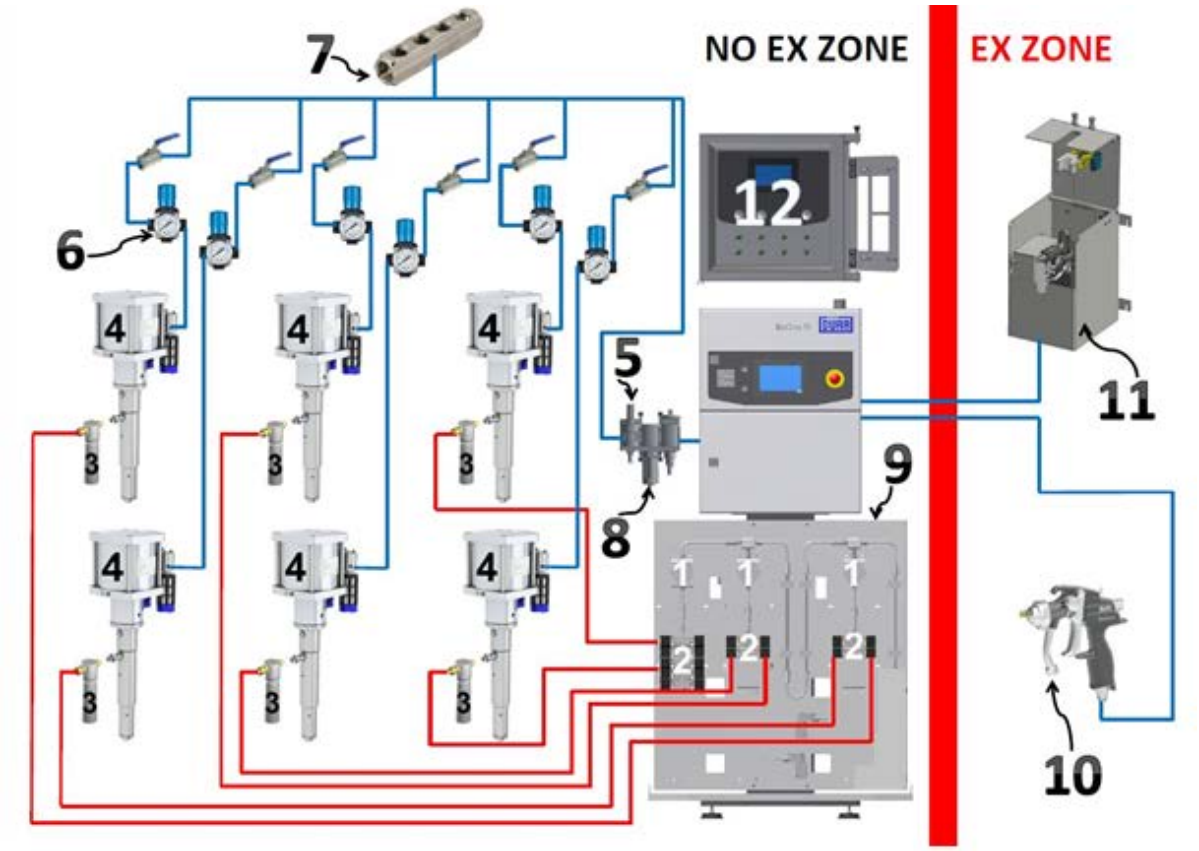
Coriolis Flowmeter **A,B** or **C** type **1**

Volume Flow Range	Mixing ratio Range	Range Viscosity A CPS	Range Viscosity B - C CPS
40cc / 3400cc	1:1 to 30:1	20-500	20-500

Color change block valves : Low or high Pressure
n. color with L.P. valves : 2 or 4 or 6 or 8 or 10
n. color with H.P. valves : 1 or 3 or 5 or 7 or 9
n. hardener : 1 or 3
n. gun : 1 or 2
n. EcoGun Cleaner M : 1 or 2
n. Low Pressure Regulator Flow : 1 or 2

2.4 Determination of the Ex Zones

Option : Stand Alone

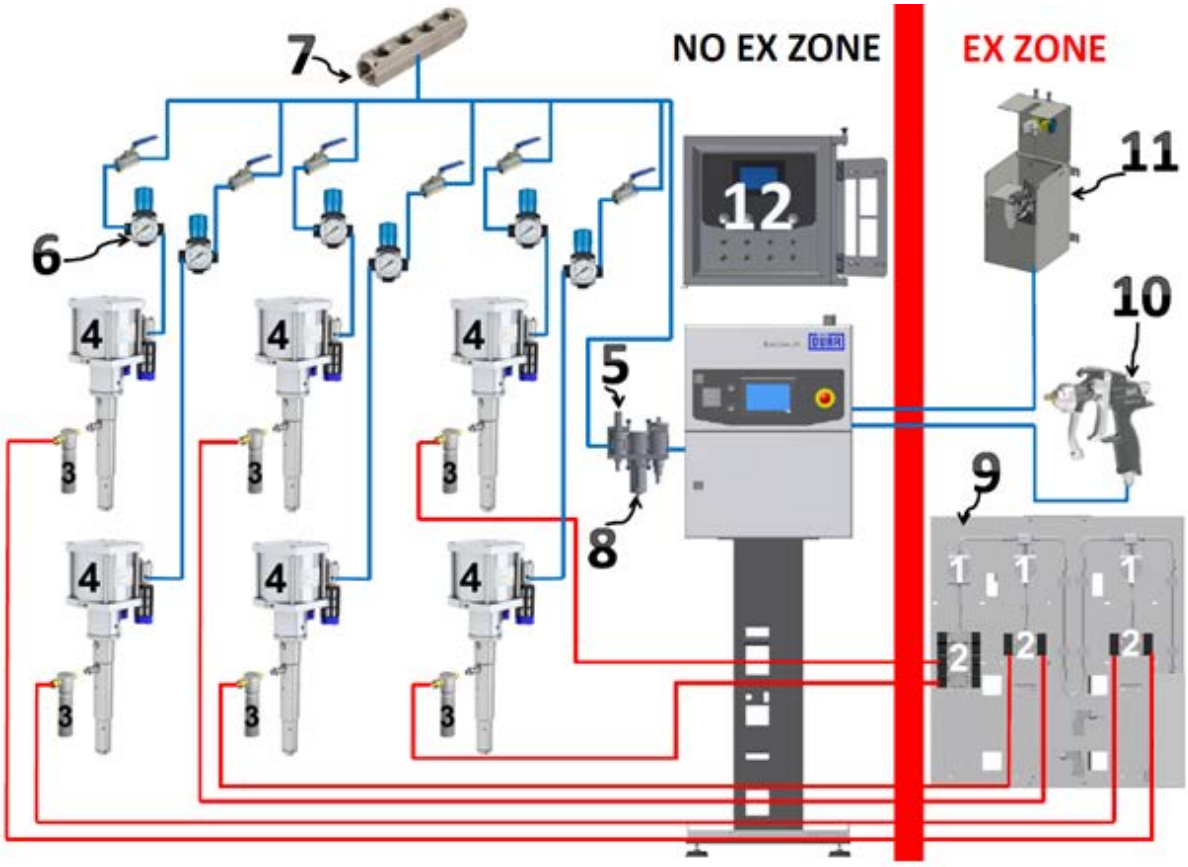


1	Flow control	7	Air manifold
2	Color change valves	8	Air filter
3	Filter product	9	Static Mixer
4	Pumping unit	10	Spray gun
5	Manual valve	11	EcoGun Cleaner M
6	Air regulator	12	Remote magnetic switch panel **(optional)**

ATTENTION

During normal operation, an explosive atmosphere is present only inside the spray booth

Option : Separated



1	Flow control	7	Air manifold
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3	Filter product	9	Static Mixer
4	Pumping unit	10	Spray gun
5	Manual valve	11	EcoGun Cleaner M
6	Air regulator	12	Remote magnetic switch panel **(optional)**

ATTENTION

During normal operation, an explosive atmosphere is present only inside the spray booth

2.5 Associated Documents

ATTENTION

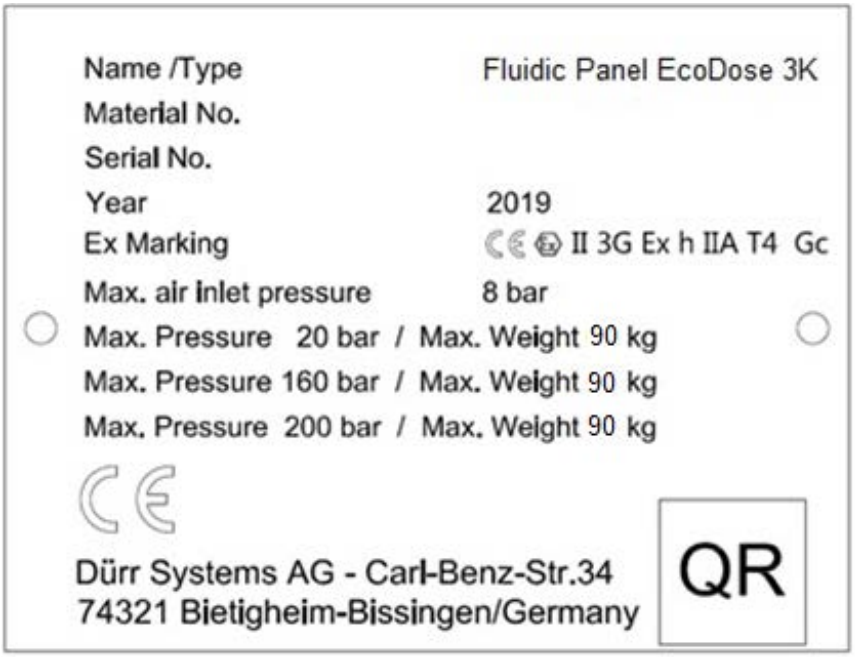
Besides the observance of safety instructions therein described, as far as transport operations, installation, normal functioning and maintenance are concerned, also refer to the instructions contained in the manuals of the equipment connected to **EcoDose 3K**.

For example:

- Filter product
- Pumping unit
- Manual valve
- Air regulator
- Air manifold
- Air filter
- Spray gun
- EcoGun Cleaner M

2.6 Plate data

Atex marking of Fluidic Panel:



2.7 Normative Requirements

Below is the table with the directives and regulations for the complete machine and just for the Fluidic Panel :

Complete machine declaration :

Machinery Directive 2006/42/EC
Low Voltag Directive2014/35/EC
Electromagnetic Compatibility Directive 2014 / 30 / CE

Regulations:

UNI EN ISO 12100:2010	Safety of machinery- General principles for design- Risk assessment and risk reduction
EN 60204:2016	Electrical equipment of machines
EN 60204-1	Safety machinery- Electrical equipment of machines
EN 62061;2005/A1 :2013	Safety of machinery- Functional safety of safety - related electrical, electronic and programmable electronic control systems
IEC 61439	General rule on electrical cabinets.
UNI EN ISO 13849-1:2016	Safety of machinery - Parts of the safety-related control systems - Part 1: General design principles
UNI EN ISO 13857:2020	Safety of machinery - Safety distances to prevent reaching hazard zones with upper and lower limbs
UNI EN ISO 13854:2020	Machinery Safety - Minimum spaces to prevent crushing of body parts
UNI EN ISO 13850:2015	Machinery Safety - Emergency Stop - Design Principles

Fluidic Panel declaration :

We, herein signers, declare on our own responsibility, that the components comply with the provisions of the Directive 2014/34 / EU (ATEX Directive) and can be classified as follows:

II 3G Ex h IIA T6 Gc

Regulations:

EN 60079-0:2018	Explosive atmospheres Part 0: Equipment - General requirements.
EN 60079-14:2014	Explosive atmospheres Part 14: Equipment - Design, choice and installation of electrical systems

3 Safety

3.1 Addresses for this Manual

It is therein assumed that only authorized, experienced personnel will perform installation, operating and maintenance activities.

The activities therein described may only be carried out by:

- sufficiently qualified personnel **[1]** for the operations to be carried out,
- particularly trained personnel **[2]** for the operations to be carried out,
- personnel having knowledge of the possible dangers
- personnel having knowledge of the applicable safety regulations.

The installation, maintenance and repair of **Eco**Dose 3K can only be carried out by experienced personnel **[3]**. An adequate advanced training or qualification of the personnel i has to be regularly performed.

[1] Therein meaning authorized, experienced and suited
[2] Therein meaning trained and experienced

[3] Qualification of operational personnel for jobs in explosive areas:

- knowledge of general principles for the protection from explosions;
- knowledge of general principles of the types of protection and the designation of protective devices;
- broad knowledge of inspection, maintenance and repair requirements in potentially explosive areas according to IEC 60079 -17

If a precise assignment of responsibilities is necessary, this operating manual distinguishes between:

- **Customer** (management, operations manager, installation manager or a comparable function in the enterprise)
- **Operator** (installation operator, maintenance personnel, programmer, fitter and cleaner or a comparable function in the enterprise).

The **customer** must ensure that the operator's tasks and responsibilities have been clearly defined.

The **customer** must ensure that every operator has been informed and instructed about all dangers. The customer must provide the operator with the necessary protective equipment. Each operator must have been informed and instructed about safety functions and safety equipment.

The operator may only carry out the installation, commissioning, maintenance, repair and cleaning activities expressly described in this operating manual. All the operations **not described** in this manual can only be carried out by the manufacturer. For all maintenance, repair and cleaning activities, you must observe the industrial safety regulations applicable at the place of the installation

3.2 Use of Tools in Ex Zones

The spray booth is classified once into ex zones according to **UNI EN 16985:2019**. Ex zones are defined beforehand and are effective independently of the installation's operating condition. Even a sufficiently ventilated spray booth which does not contain any inflammable material is still considered as ex zone.

According to DIN EN 50176, only accessories meeting the requirements of EN 60079-0 and/or EN13463-1 can be used in an ex zone.

UNI EN 16985:2019 always requires a technical ventilation inside the spray booth. Spray booths with fresh air inlets are provided a sufficient ventilation after 3 to 10 air exchanges. As a rule, the spray booth is sufficiently ventilated after 5 minutes. In air recirculation installations, a ventilating time of 30 minutes **[4]** is necessary to achieve a sufficient ventilation, depending on the mixture ratio of recirculating air to fresh air.

The use of not classified tools pursuant to the regulations for protection against explosions in hazardous areas is the customer's exclusive responsibility.

- The **customer** has to carry out a risk assessment for every operation performed, to document them and to prepare an operating manual on the basis of the resulting evaluation.
- The **customer** has to ensure that all operators carrying out their own respective tasks know and observe these measures.

[4] This value is dependent on the design and settings and must always be determined on the basis of the system-specific parameters.

3.2.1 Basic Information on Safety Notes

ATTENTION

General dangers relative to the plant where **EcoDose 3K** is going to be installed are not expressly referred to in this manual. The personnel must be informed by the customer and correspondingly trained on these dangers.

You must also observe the information in **chapter 2.5** "Associated Documentation".

In this operating manual, you will only find the safety notes specifically concerning the product described in this manual.

For the activities therein described, it is an indispensable requirement for the user of this operating manual to know and observe the additional installation documentation and safety notes.

Furthermore, the user of this manual must pay attention to and observe effective health and safety regulations in the place of operation.

The meaning of the symbols used in our operating manuals has been explained in **chapter 1** "Introduction".

3.3 Troubleshooting Instructions

Repairs can only be carried out by specifically trained personnel, otherwise any warranty from Dürr Systems GmbH will be invalidated.

Faults, their cause and their rectification have to be specifically recorded.

3.3.1 Special Safety Notes

Before performing maintenance and repairs you must make sure that **EcoDose 3K** does not contain any residual pressure (air and product).

W A R N I N G

Danger due to spraying or splashing material!

Potential chemical burns of the skin due to material spurting from defective paint pipes and color changers.
You must regularly check paint pipes and color changer and you must reduce residual pressure before working on color valves and paint pipes.

4 Transport and Storage

ATTENTION

The following operations can be performed only by adequately trained personnel. See chap. 3 of this manual.

CAUTION

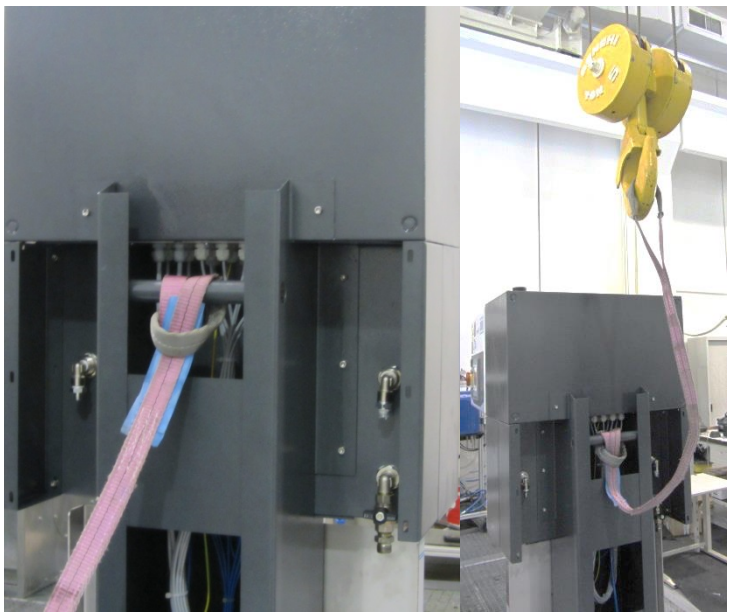
You must wear personal protective equipment
Always wear the following equipment during assembly operations.

4.1 Transport

Normally the **Eco**Dose 3K is shipped in a wooden crate. The wooden crate is made to be easily transported on pallet trucks.

image indicative

To remove **Eco**Dose 3K from the wooden crate, use the appropriate plank on the support frame.



C A U T I O N

Use a lift strap with a payload of at least 500 kg.

4.2 Storage

The **Eco**Dose 3K must be stored in a closed space.

Environmental conditions inside the storage place:

- Temperature: 10 °C - 40 °C
- Humidity: 35 % – 90 %

5 Description and operation

5.1 General Description

EcoDose 3K is a designed machine for dosing and mixing fluid components (typically bases and catalysts) according to pre-defined ratios.

The dosage is obtained within **Eco**Dose 3K by controlling the quantity of each component, through the timed opening of pneumatic valves.

The components thus dosed are mixed in a mixing section, which is connected to the dispensing devices.

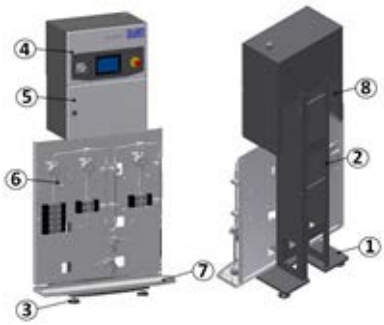
The mixed components can stay for a limited time inside the machine and in the delivery circuits.

The circuits in which fluid components pass through are cyclically flushed with specific solvents.

The flushing cycles are controlled by pneumatic valves controlled by **Eco**Dose 3K, placed inside the **Eco**Dose 3K itself.

In this standard configuration, EcoDose 3K includes:

Coriolis version



Gear version

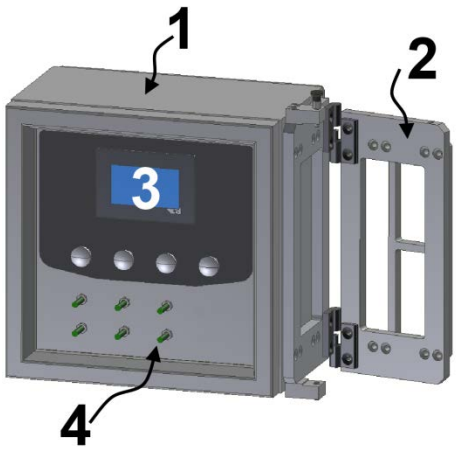
1	Base plate	5	Pneumatic cabinet
2	Main support	6	Fluidic panel
3	Support feet	7	Drain pan
4	Electrical cabinet	8	Side plate

ATTENTION

For a full list of the components and codes see design :
0300040.CM.GE.01 EcoDose 3K general assembly - GEAR flowmeter version LP
0300040.CM.GE.02 EcoDose 3K general assembly - GEAR flowmeter version HP
0300040.CM.GE.03 EcoDose 3K general assembly - CORIOLIS flowmeter version LP
0300040.CM.GE.04 EcoDose 3K general assembly - CORIOLIS flowmeter version HP
Available to be attached to this Manual

5.1.1 Remote magnetic switch panel

Optionally, you can equip the **Eco**Dose 3K with a special remote control panel equipped with magnetic switches, placed outside the glass of the booth, which allows the operator, staying in the cabin, start the main controls, with a magnet.



1 Cabinet
2 Hinge
3 Operator panel
4 Magnetic field sensor

ATTENTION

For a full list of the components and codes see design:
F02030041 Available to be attached to this Manual

ATTENTION

For electrical connection see the wiring diagram:
Available to be attached to this Manual

5.2 Operating system

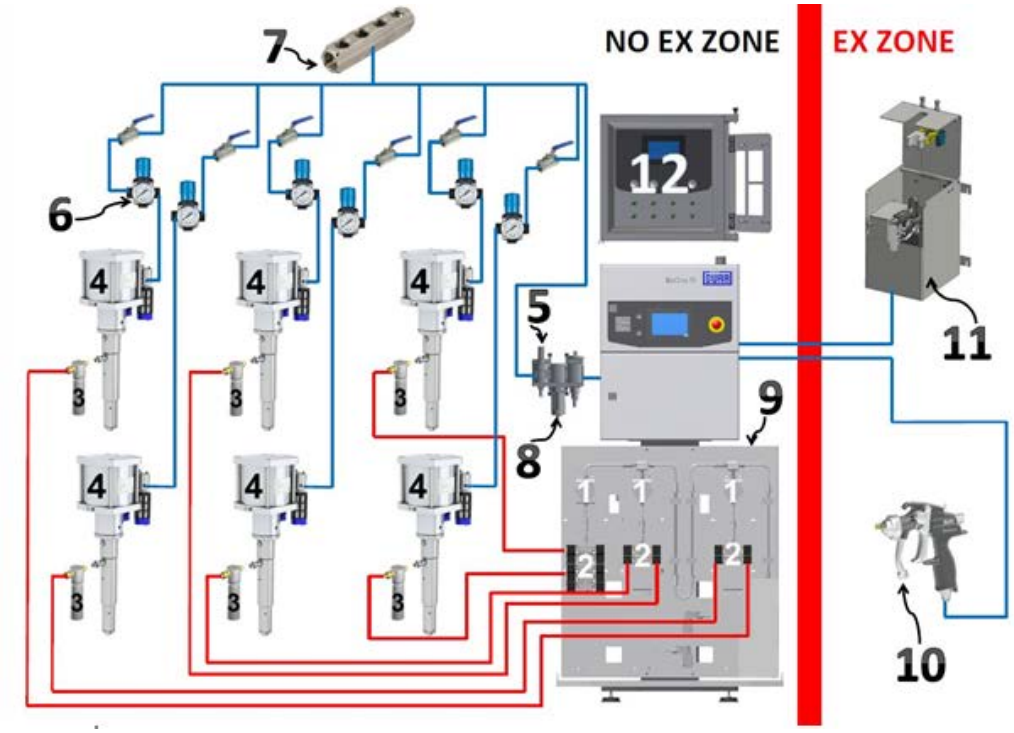


image indicative

Compressed air is provided to **Eco**Dose 3K from the compressed air network through the manual valve **(5).**

Power supply equipments consist of a pressure generator **(4)**, generally being a pump for the catalyst, basic components and the flushing products.

ATTENTION

It is absolutely necessary for the products to be filtered through the filter (3) between the pumps and the valves.

ATTENTION

For a correct functioning of **EcoDose 3K** the supply pressure of the catalyst circuit must be higher of 0.5 - 1 bar, than the supply pressure of the base circuit. This value may change depending on the viscosity of the used products.

From the control panel, the color change valves **(2)** are managed through air pipes.

The products (catalyst, base paint or flushing product) pumped through the pipes, already come under pressure to the valves **(2).**

Under the control of pneumatic control valves, the products are pumped through the measuring devices **(1)**, to the static mixer **(9).**

The components (catalyst, paint base) are combined and premixed. The exact mixing takes place in the static mixer **(9).**

When a gun **(10)** (Airmix too) is connected to **Eco**Dose 3K the equipment is activated and controlled with an air flowmeter, that is installed in the control panel.

A filter **(8)** controls and protects EcoDose3K from dirt particles coming from the compressed air network.

In case of emergency, compressed air can be removed from **Eco**Dose 3K by closing the ball valve **(5)**.

With the system control panel pages, you can set-up and view all the data Necessary for the correct functioning of the **Eco**Dose 3K **(see chapter 8).**

With the remote panel ***(optional)*** with magnetic switches **(12)** the operator, in the cabin, can use the main controls with a magnet. **(See chapter. 8.11).**

The following parts are not included in Eco Dose 3K:

3. Paint filter
4. Pumping unit
6. Air regulator
7. Air manifold
8. Air filter

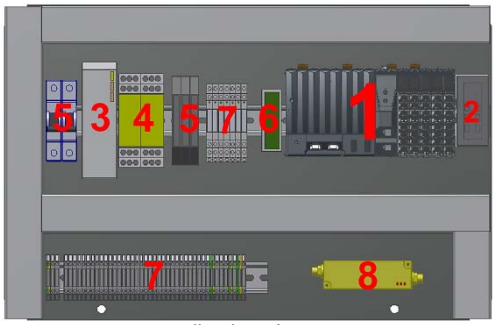
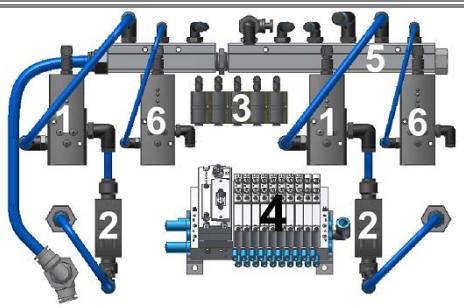
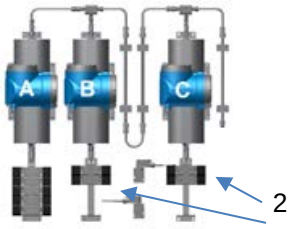
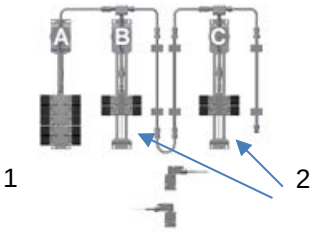
10 Spray gun

11 EcoGun Cleaner M

Air pipes and product IN

Air pipes and product OUT

5.3 Design of the Modules

Electrical panel		
1	CPU	 Indicative picture
2	Scalance switch 5 doors ♦♦♦	
3	Power supply 24 Vdc	
4	24 Vdc safety device♦♦♦	
5	Circuit breaker	
6	Relè ♦♦♦	
7	Terminal board	
8	Safety barrier ♦♦♦	
♦♦♦ where provided For the full list of the electrical panel's components, see the drawing: "Universal electrical cabinet - Parts list Available to be attached to this Manual		
Pneumatic panel		
1	Atomization air valves	 image indicative
2	Flow switch	
3	Pressure switch	
4	Series Y valves isle	
5	Air manifold	
6	Valves air flow	
♦♦♦ where provided For the full list of the pneumatic panel's components, see the drawing: "Universal pneumatic cabinet - Parts list Available to be attached to this Manual		
Fluidic panel		
A	Flowmeter - paint circuit	 Indicative picture
B	Flowmeter - paint circuit	
C	Flowmeter - catalyst circuit	
1	CC valves - paint circuit	
2	CC valves - catalysts circuit	
		 Indicative picture

6 Assembly Instructions

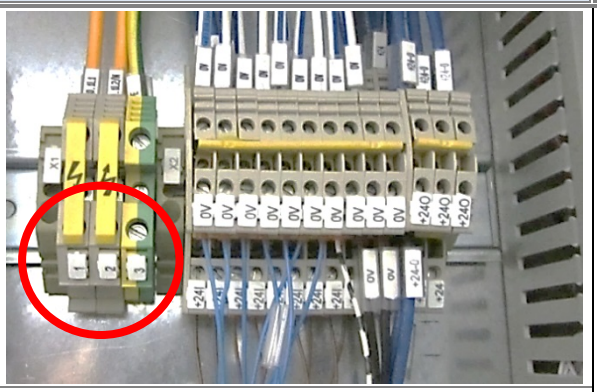
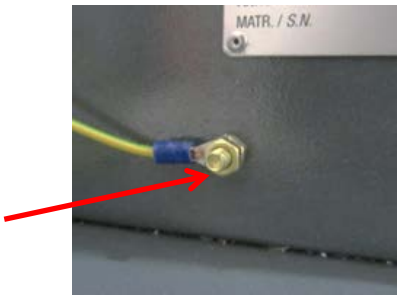
ATTENTION

The following operations can be performed only by adequately trained personnel. See chap. 3 of this manual.

CAUTION

You must wear personal protective equipment.
Always wear the following equipment during assembly operations.

6.1 Electrical connection

power supply	
Use terminals **1-2-3** Use cable sect. **2.5 mm²**	
See the wiring diagram Available to be attached to this Manual	
ground connection	
The frame has to be connected to the ground through the dedicated terminal	

6.2 Pneumatic Connections

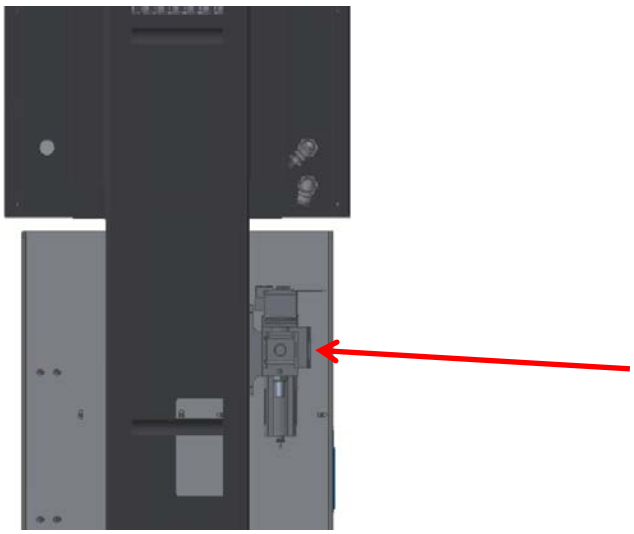
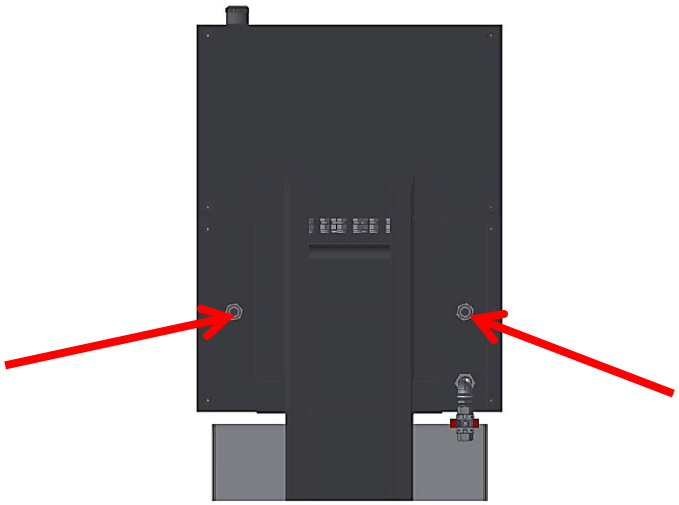
6.2.1 Compressed air specifications

Air quality must be DIN ISO 8573-1 Class 1-3-1 (water-oil particles).		
PARTICLES		
Class	**Max. Ø particles (1)**	**Max. concentration (2)**
1	0,1 micron	0,1 mg/m³
2	1 micron	1 mg/m³
3	5 micron	5 mg/m³
4	15 micron	8 mg/m³
5	40 micron	10 mg/m³
(1) The diameter of the particle is based on the relationship Beta Bn = 20 **(2)** at 1 bar absolute, + 20 ° C, steam pressure relative 0.6		

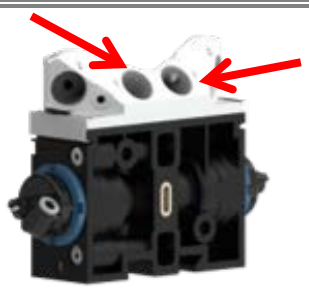
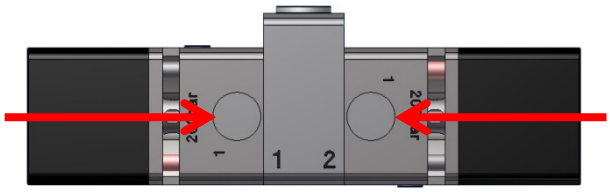
WATER	
Class	**Max. dew point in pressure**
1	- 70
2	- 40
3	- 20
4	+ 3
5	+ 7
6	+ 10

OIL	
Class	**Max. concentration (1)**
1	0,01 mg/m³
2	0,1 mg/m³
3	1 mg/m³
4	5 mg/m³
5	25 mg/m³
(1) at 1 bar absolute, + 20 ° C, steam pressure relative 0.6	

6.2.2 Pneumatic connection

Compressed air general power supply (min. 5 bar - max. 8 bar)

You must use the 1/2” gas F threaded connections. You must use a flexible pipe of at least **Ø 1/2 " gas**
Connection of the atomization air to the guns

You must use the **3/8”** gas F threaded connections on the back of **Eco**Dose 3K
Connection to EcoGun Cleaner M
When provided

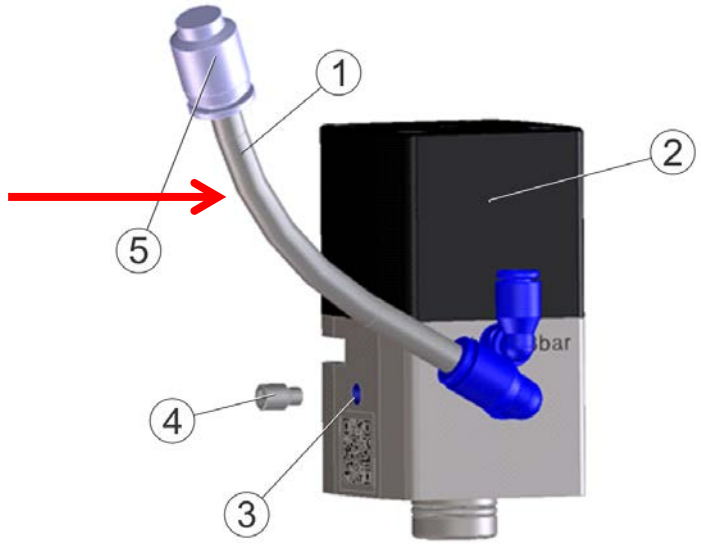
6.3 Product connection **IN**

EcoMCC3 *low pressure* color change valves max. 20 bar only used on circuit A (base)
 You must use 1/8 "gas female threaded connection **(1)** 1/8" gas female connections **(2)**, are normally plugged, and they are used only in case of paint recirculation.
EcoValve7 20 color *low pressure* change valves max. 20 bar only used on circuit B (hardener)
 You must use threaded 1/8 "gas female connection **(1-2)**
EcoMCC200 *high pressure* color change valves (max .160 bar with Coriolis) (max. 200 bar with Gear) Used on circuit A (base) and on circuit B (hardener).
 You must use threaded 1/8 "gas female connection

W A R N I N G

You must use suitable fittings and pipes to the operating pressure and to the paints
Follow the instructions by the fittings' manufacturer for tightening torques
You must install a shutoff valve on all product lines, in order to safely perform maintenance operations.

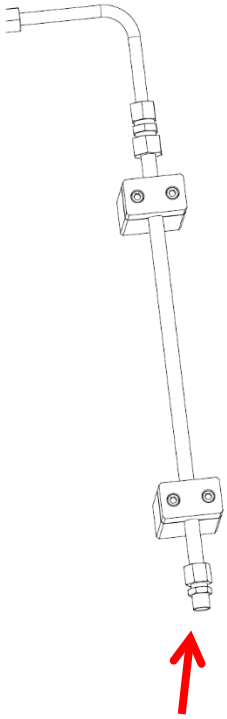
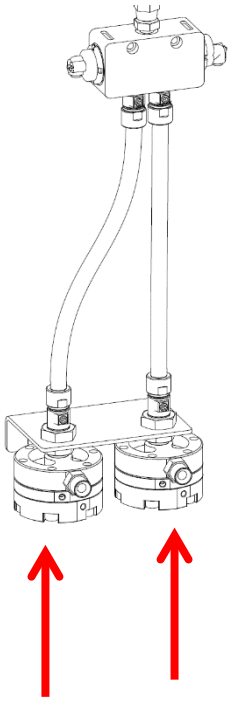
EcoMCC200 *high pressure* color change valves
(max. 160 bar with Coriolis) (max. 200 bar with Gear)
Used on circuit A (base) and on circuit B (hardener)



W A R N I N G

For the correct operation of the valves you must make sure that the tube (RIF.1) is always full of compatible lubricating oil with the products used.
EcoDose 3K is delivered with empty tubes. The user must, before starting up the machine, fill the tubes with a suitable product to the products used.

6.4 Product connection **OUT**

Version without Low Pressure Regulator Flow	One Spray Gun option complete with Low pressure regulator flow	Double Spray Gun option complete with Low pressure regulator flow
		
Use **1/4** "gas 60° cone threaded connection		

W A R N I N G

You must use suitable pipes to the operating pressure and to the products used.
Follow the instructions by the fittings' manufacturer for tightening torques.

7 Commissioning

ATTENTION

The following operations can be performed only by adequately trained personnel. See chap. 3 of this manual.

CAUTION

You must wear personal protective equipment.
Always wear the following equipment during assembly operations.

7.1 Starting

EcoDose 3K has been tested by the manufacturer, however before the first start-up, you must:

- ensure that you have complied with all the activities described in chap. 6
- check that all compressed air and product in / out connections are correctly tight.

ATTENTION

For the correct functioning, the supply pressure of the catalyst circuit must be higher (0.5 - 1 bar), than the supply pressure of the base circuit. This value may change depending on the viscosity of the products used, in order to respect the following concept.
If the values of the supply pressures are correctly set, the base circuit's valve stays constantly open, while the valve of the catalyst circuit opens / closes according to the set mixing ratio of the recipe in use.

7.2 System configuration

EcoDose 3K is configured by the manufacturer according to the specifications required by the customer and it is ready for commissioning.

ATTENTION

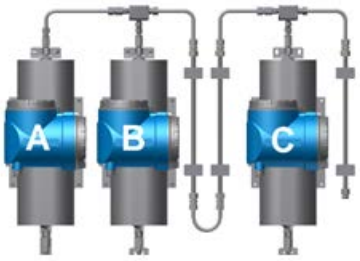
Changing the configuration of the system, also involves a consequent change of hardware in **Eco**Dose 3K and it can only be performed by trained personnel of Dürr Systems GmbH or authorized personnel from Dürr Systems GmbH.

7.3 Alarms management on PLC for consumable components

A T T E N T I O N

The control system provides a warning message "MAXIMUM NUMBER OF PULSES ACHIEVED, PROVIDE MAINTENANCE" for consumable components.

EcoMCC3 20 *low pressure* color change valves	**EcoValve7 20** *low pressure* color change valves	**EcoMCC 200** *high pressure* color change valves
		

Coriolis Flow Control	**Gear Flow Control**
	

The number of cycles life of such components, must be set the during installation, depending on the type of material, its degree of abrasiveness and on working conditions.

For the correct functioning of the apparatus, these parameters must be calibrated depending on the specific application chosen.

The initial settings on **Eco**Dose 3K are absolutely indicative, and they do not determine any definition of the guarantees.

Pre-set values are indicative and they refer to tests performed with Mesamol oil.

8 Operation

ATTENTION

The following operations can be performed only by adequately trained personnel. See chap. 3 of this manual.

CAUTION

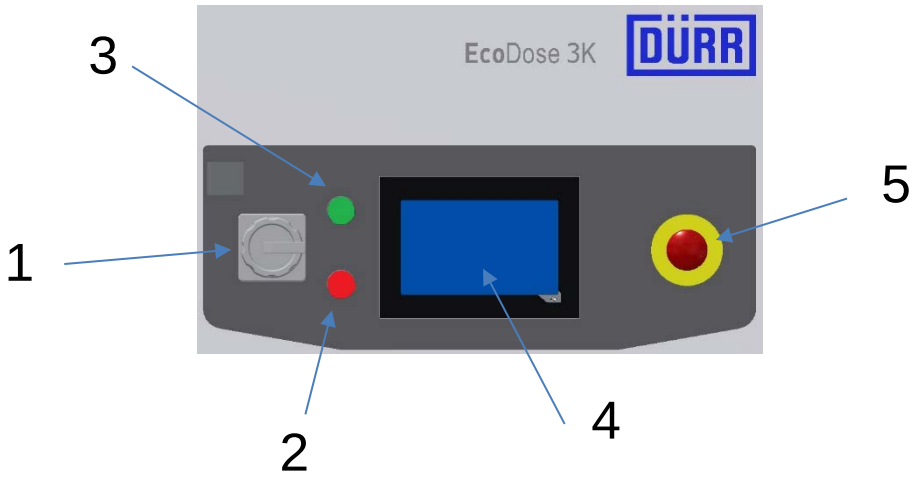
You must wear personal protective equipment.
Always wear the following equipment during assembly operations.

WARNING

Danger due to spraying or splashing material!

Potential chemical burns of the skin due to material spurting from defective paint pipes and color changers.
You must regularly check paint pipes and color changer and you must reduce residual pressure before working on color valves and paint pipes.

8.1 Controls overview



Picture 1 Controls

1. Rotary switch: turns on the power”
2. Illuminated red pushbutton: „Control voltage“: Turns off the system and lights up when there is an alarm.
3. Illuminated green pushbutton „Control voltage“: Turns on the system
4. Operator terminal: visualization for operating and monitoring **Eco**Dose 3K
5. Pressure switch „Emergency stop“ shutdown of the plant in an emergency situation

8.2 Operative modes

EcoDose 3K can be operated in the following modes.

Manual operation
This operating mode is reserved to maintenance technicians (password level 3) with the only purpose to check the equipment efficiency, during maintenance operation.
In manual mode valves can be operated individually.
Interlocks do not allow the opening of more than one valve at the time in the same channel, however valves have to be opened with caution and the system finally purged.

Recipe mode
In recipe mode (Semi-automatic) the required components for the application are automatically switched on. Process values, cycle quantities and sequences are deduced from a table (recipe table, purge program tables) or from set and assigned parameters to individual components.
In this mode the following activities can be performed:
- Start individual cycle programs (calibration, load, purge, long purge)
- Select the recipe in use (max. 100)

External recipe mode
In external recipe mode (automatic external) control commands are sent from a master controller.
Through the interface the following functions could be externally controlled:
- Selecting recipe dataset from the recipe table (selecting recipe datasets in internal visualization is not possible in this mode).
- Switching the station on and off
- Starting the individual cycle programs (load, purge and long purge)
- Change the recipe in use
- Synchronizing date and time

8.3 Visualization

Descriptive header and footer.

In the visualization each page has the same header and menu on the left side.

Header

The header displays the following information.

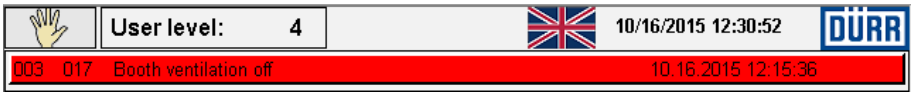


Figure 2 header

In the left outer side of the header the mode currently chosen is displayed through the following pictograms.

 Manual mode

 Recipe mode (semi-automatic)

 External recipe mode (automatic external)

The pictograms depending on the system status have different meanings:

 Grey: plant is shutdown.

 Green: plant is switched on and ready for use.

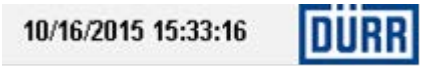
 Red: plant is not operating because of an existing fault.

Level of the user currently logged ranging from 0 up to 3. Tap on this rectangle to open a keyboard; key in user and password.

In the central part of the header the flag of the selected language is displayed

Display language 

On the right side of the header, the current date and time is displayed.



In the lower part of the header the last alarm text is displayed.

The active alarms' window opens by touching the alarm text.

Left side menu

The operating elements shown in the left side menu are used to navigate between the individual user interfaces (Configuration window, Spray window, Recipe window, Cycle program window, etc.).

	System page
	Spray page
	Spray data page
	Recipe page
	Cycle program page
	Parameter pages
	Purge program page

8.4 Browsing windows

8.4.1 System page

System page

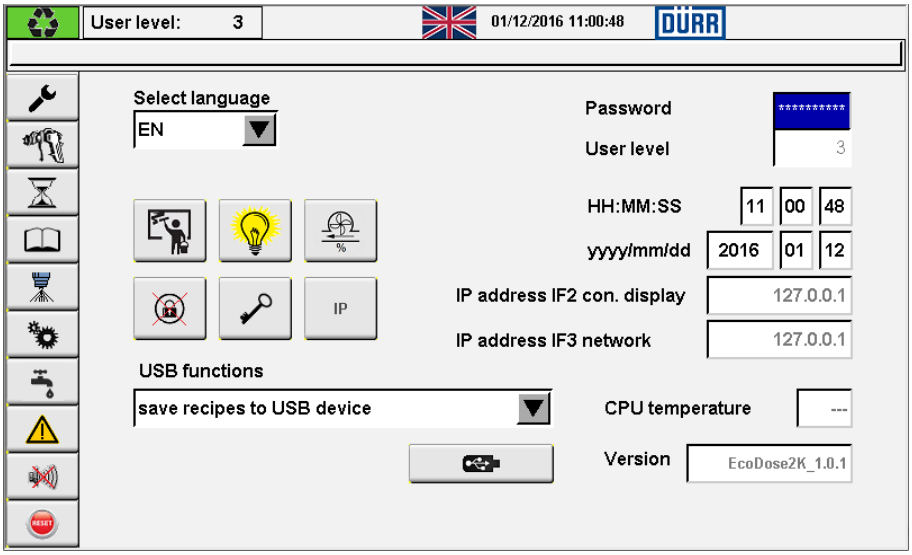


Figure 3 System page

Spray page

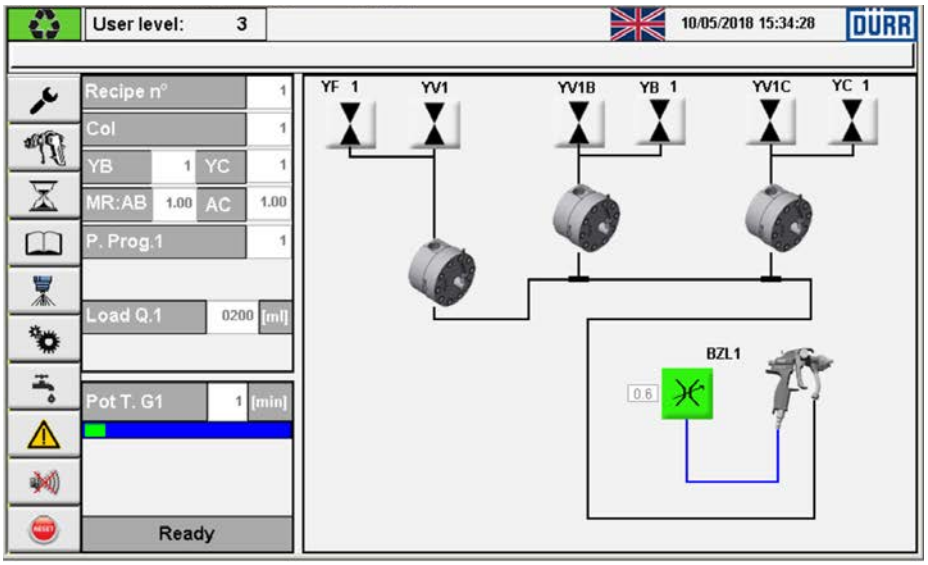


Figure 4 Spray page

Spray data page

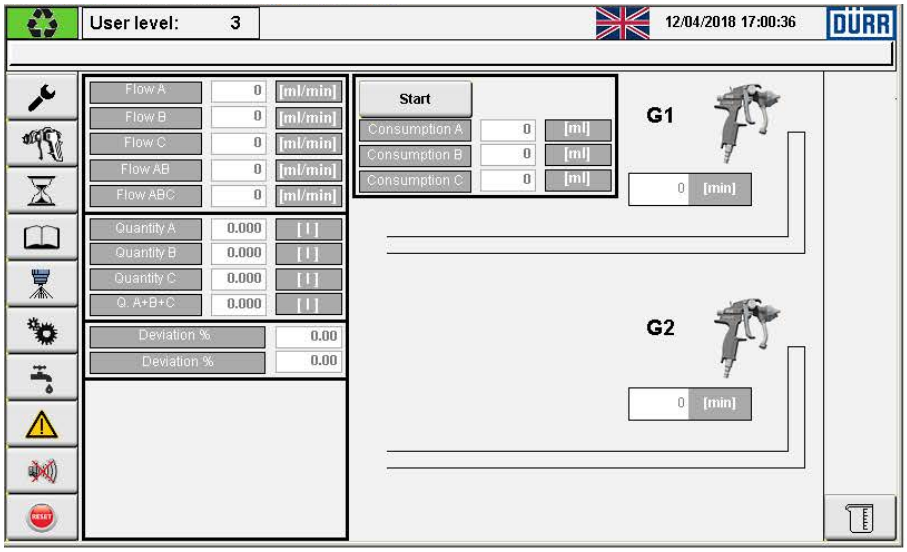


Figure 5 Spray data page

Recipe page

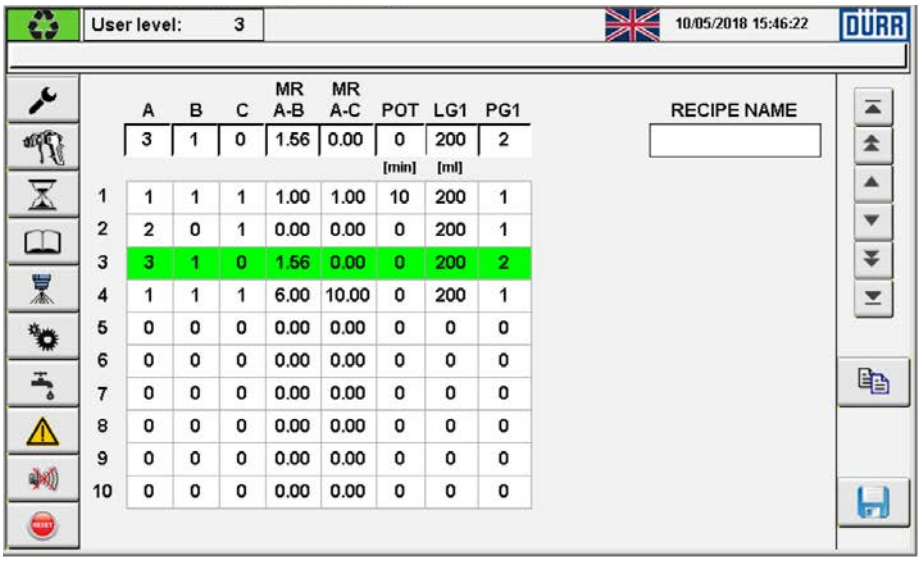


Figure 6 Recipe page

8.4.2 Cycle program page

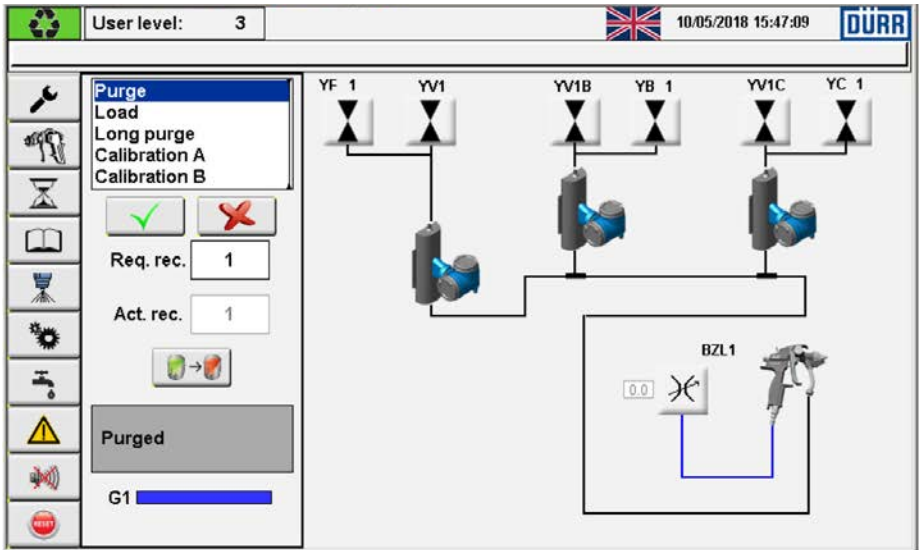


Figure 7 Cycle program page

8.4.3 Parameters pages

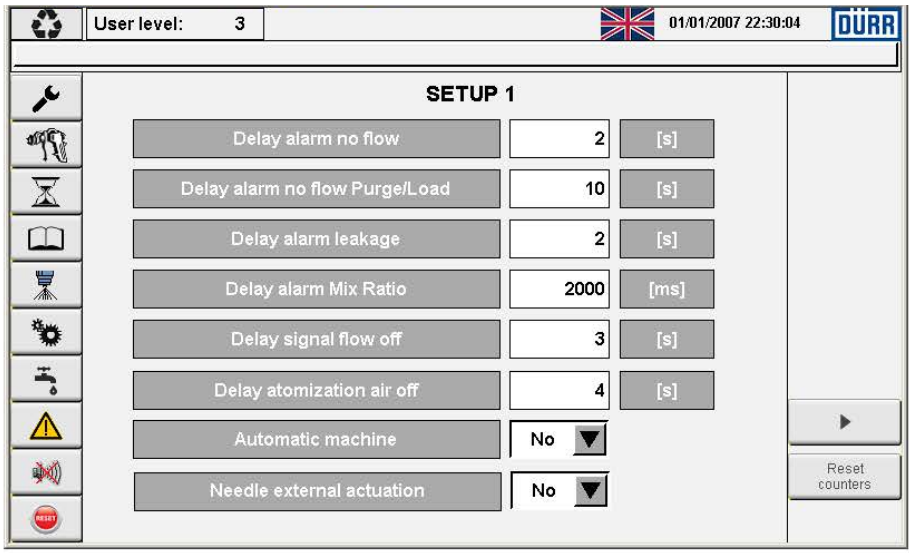


Figure 8 Parameters page 1

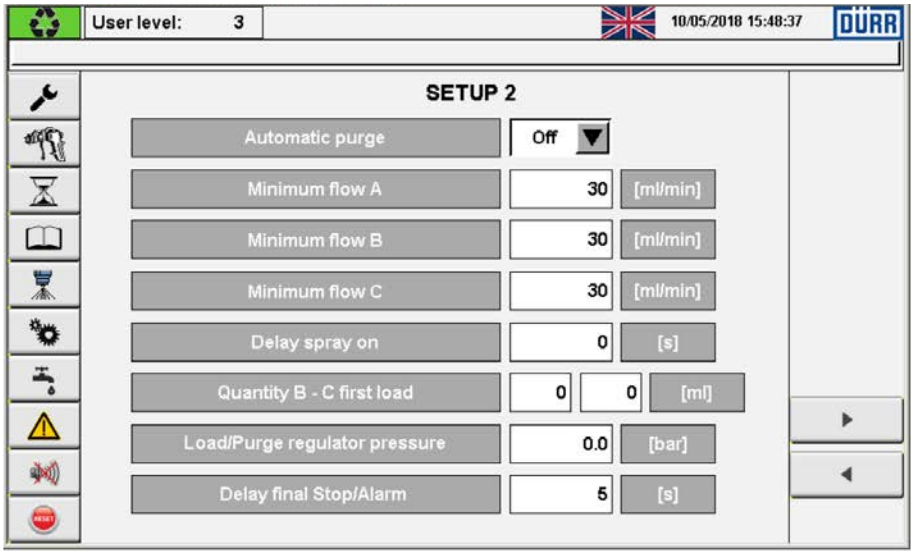


Figure 9 Parameters page 2

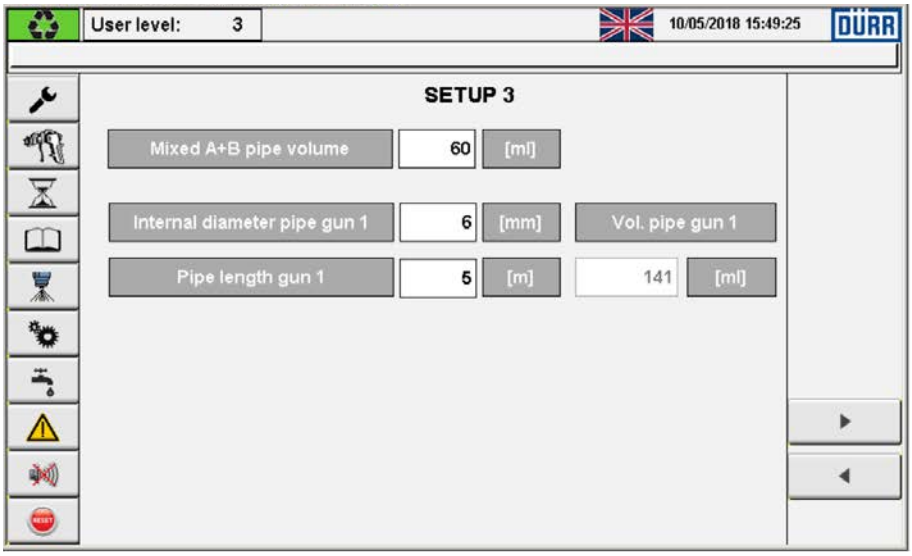


Figure 10 Parameters page 3

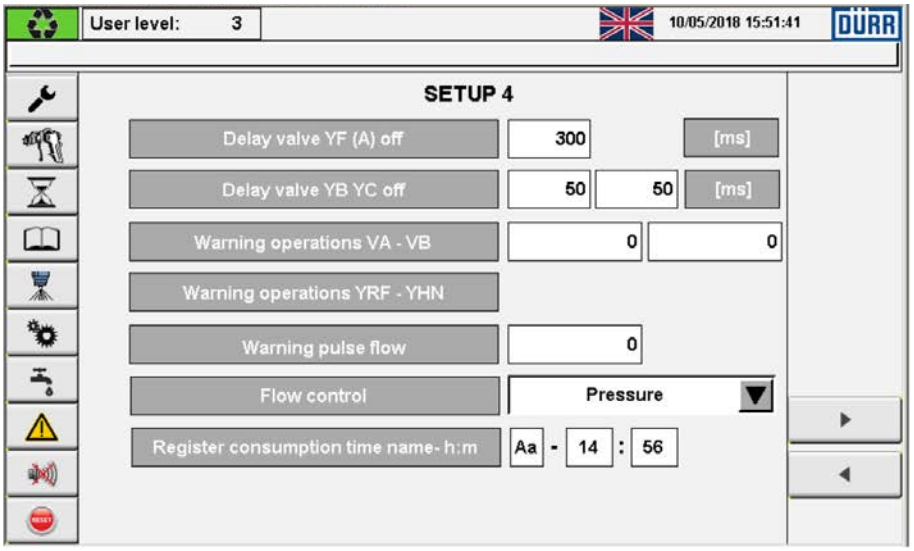


Figure 11 Parameters page 4

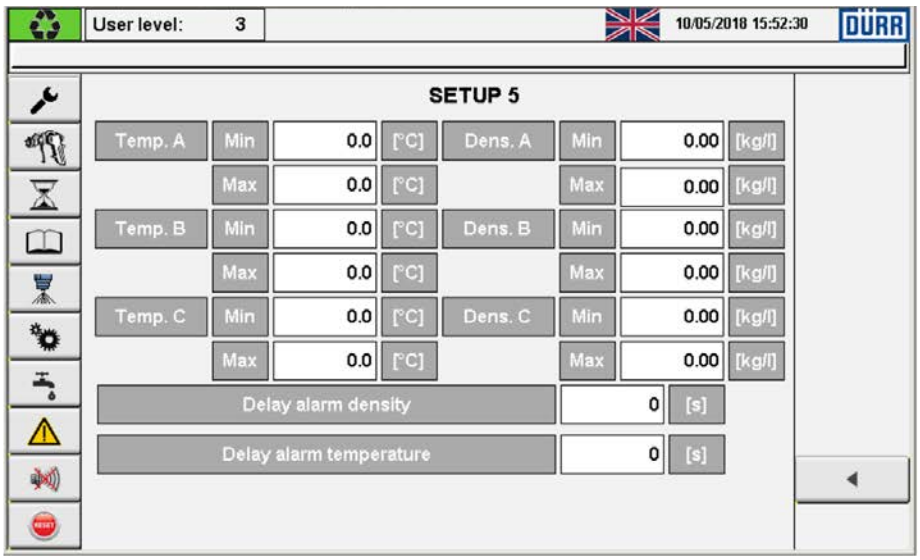


Figure 12 Parameters page 5

Reset counters

Valves operation number pages
(button located in parameters page 1)

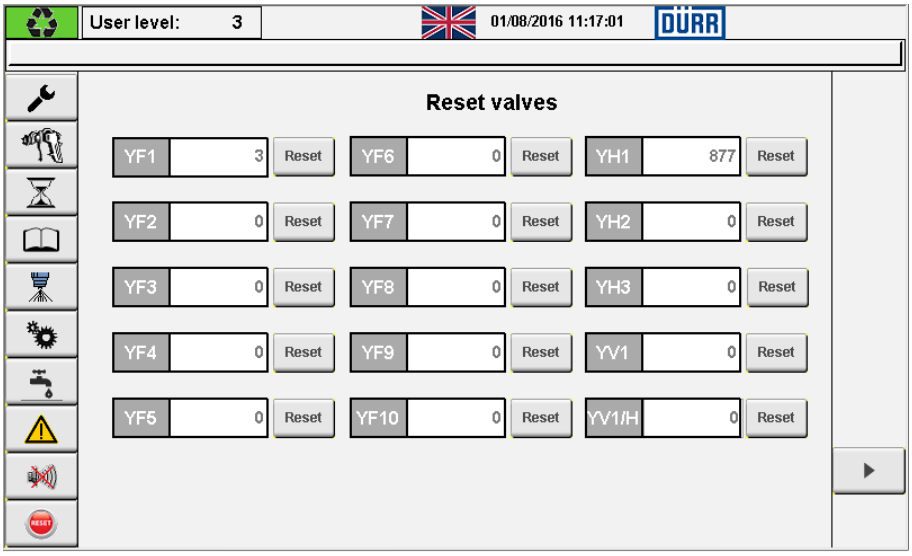


Figure 13 Valves operations - page 1

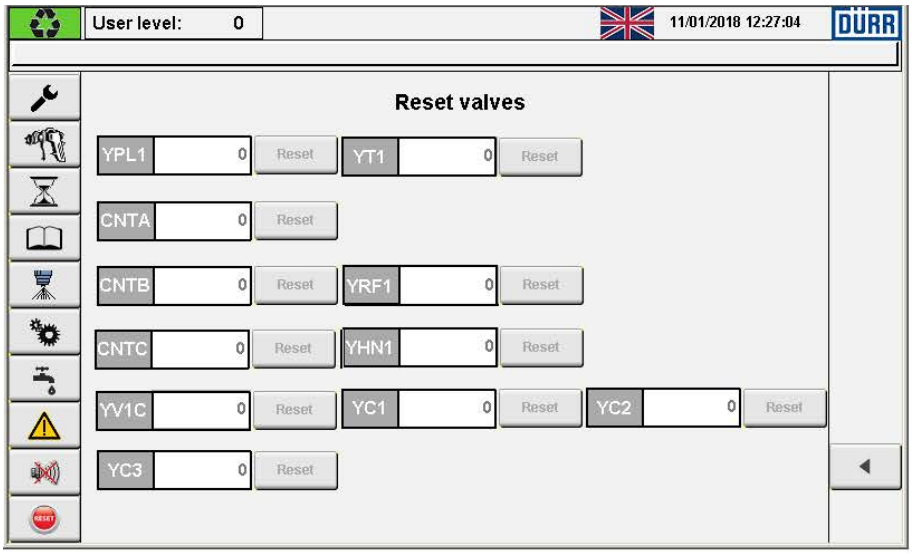


Figure 14 Valves operations - page 2

8.4.4 Pre-purge and purge cycle page

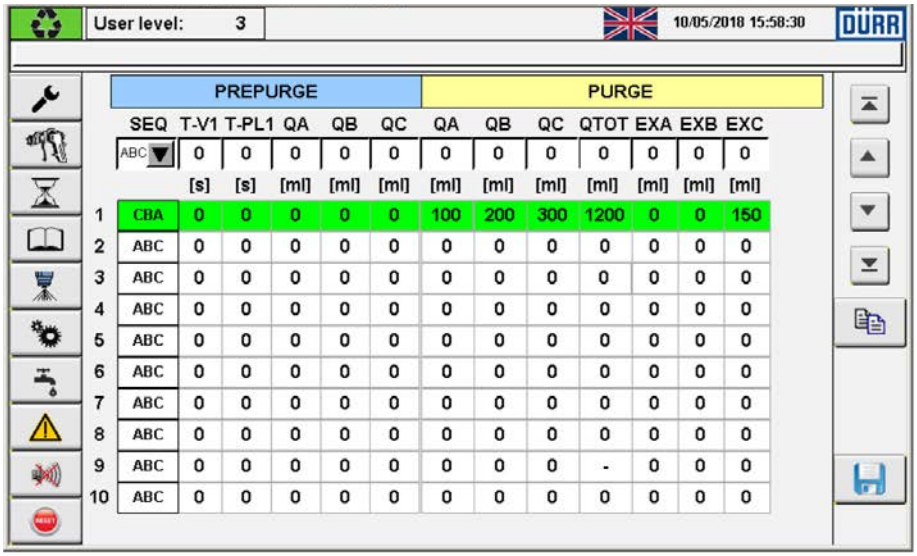


Figure 15 Pre-purge and purge cycle page

8.4.5 Active alarm page

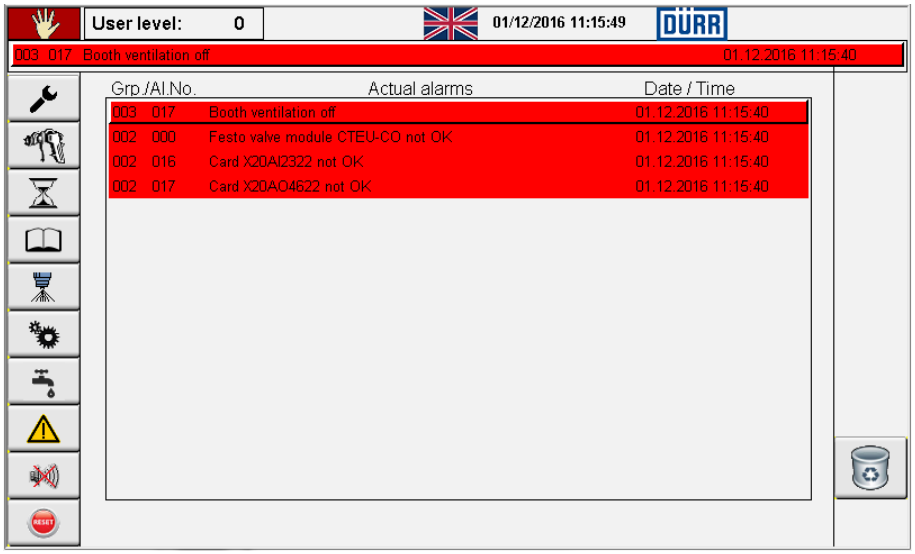


Figure 16 Active alarm page

8.4.6 Alarm history page

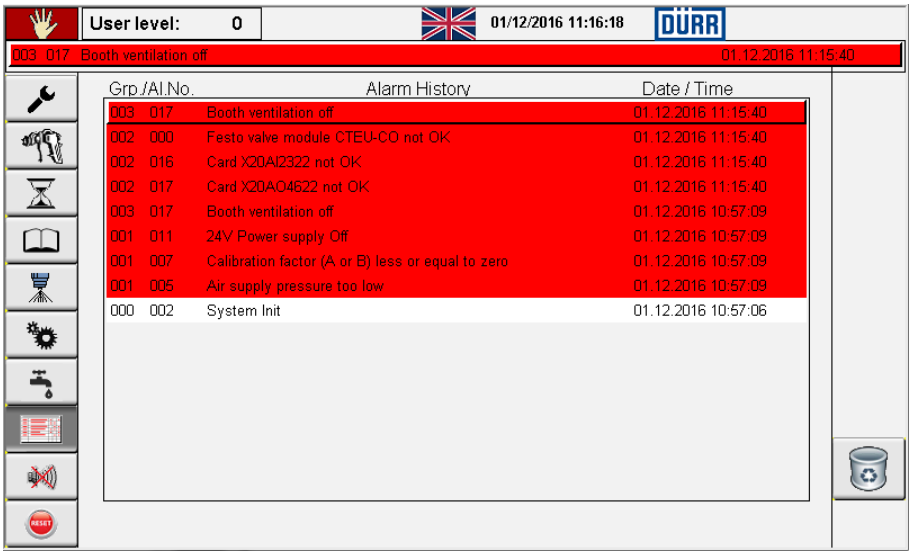


Figure 17 Alarm history page

8.4.7 Consumptions page (button located in spray data page)

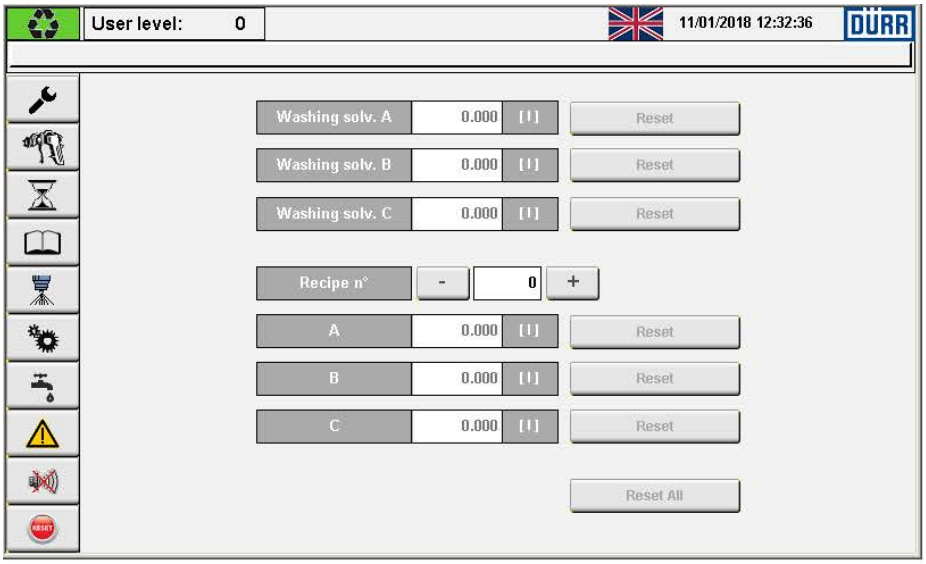


Figure 18 Consumption page

8.4.8 External control interface signal page

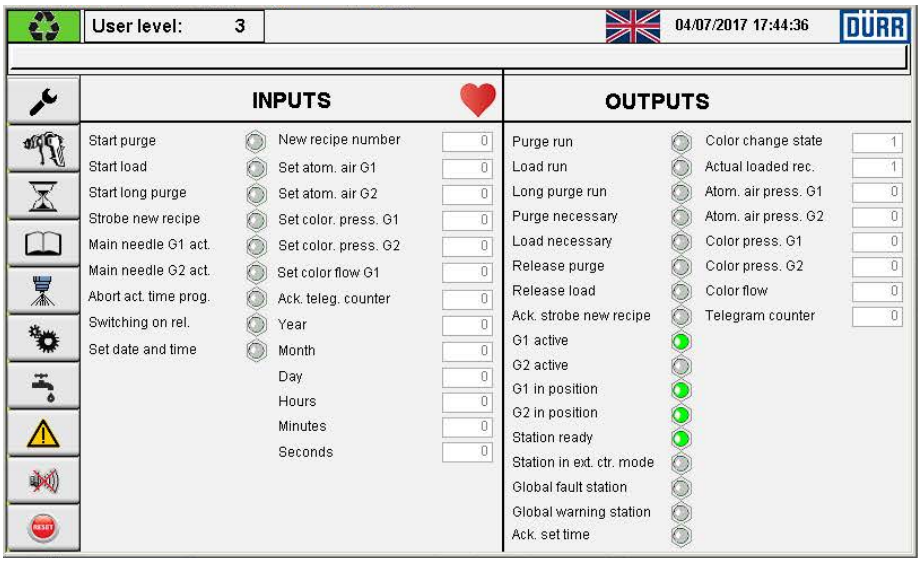


Figure 19 External interface control signal page

8.4.9 Calibration data page

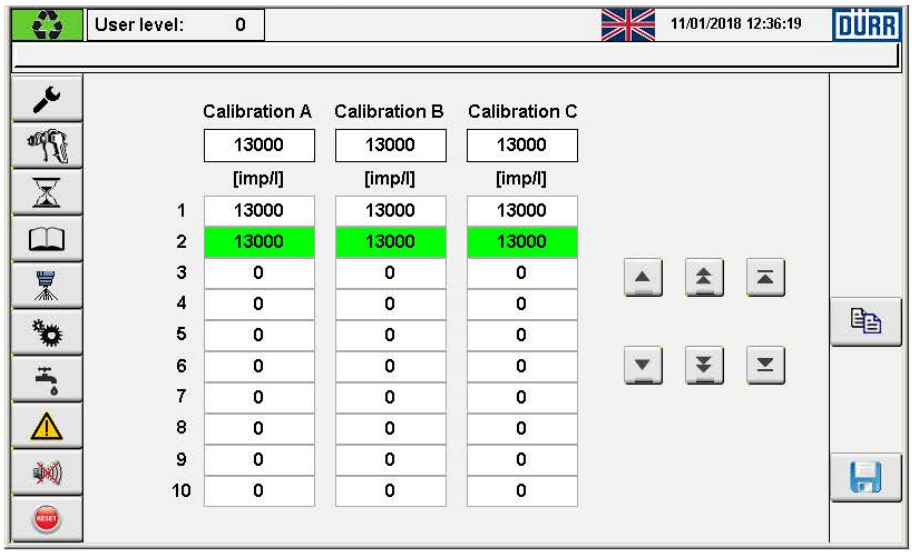


Figure 20 External Calibration data page

8.4.10 User management page

Figure 21 User management page

8.4.11 Reset passwords page

Figure 22 Reset passwords page

8.4.12 Settings page

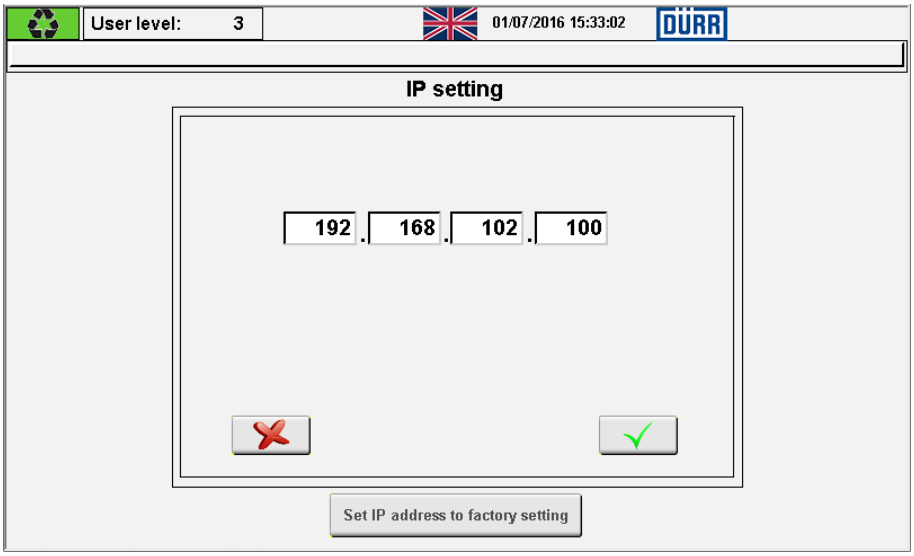


Figure 23 IP settings page

8.5 Description and operation of each visualization window

8.5.1 System page functions

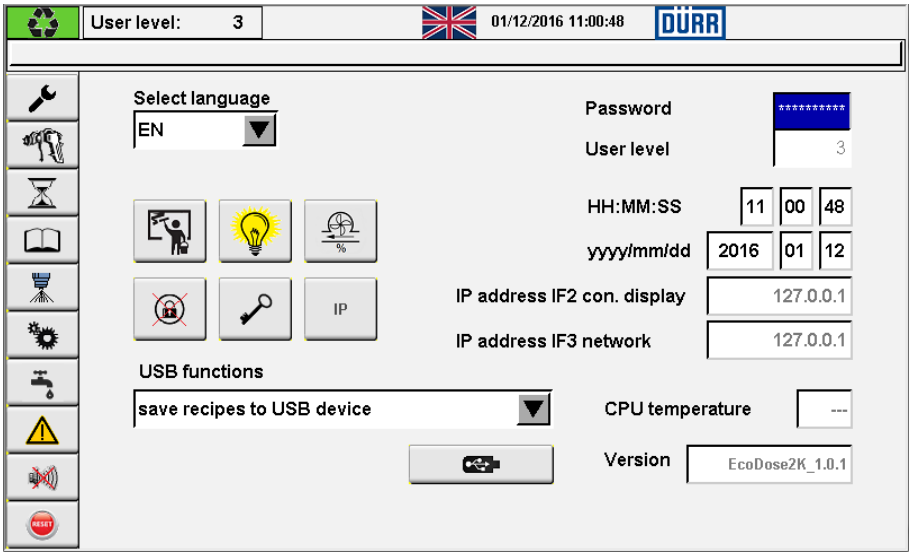


Figure 24 switch mode “System page”

8.5.1.1 Switching the operating modes

By tapping the mode symbol in the header, a sub-window opens, through which you can switch into different modes.
This sub-window can be opened from the headers of all main windows.

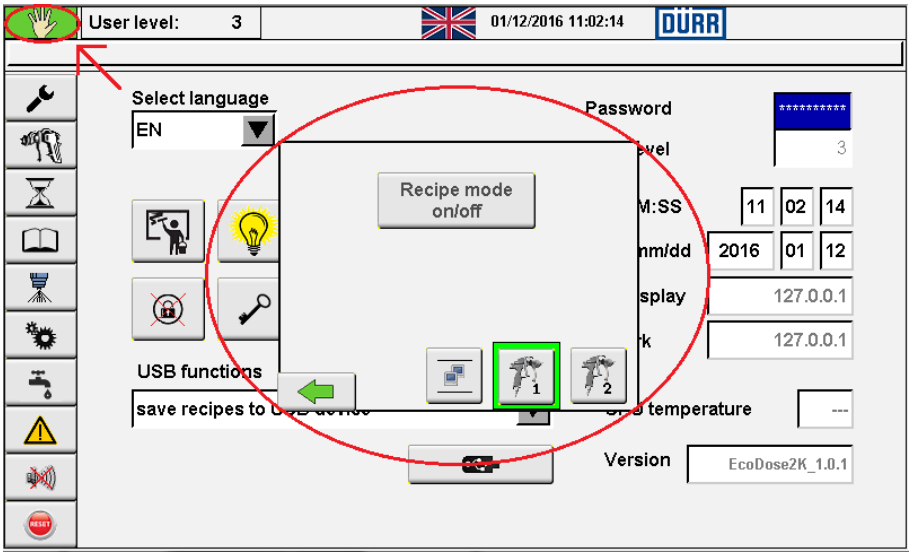
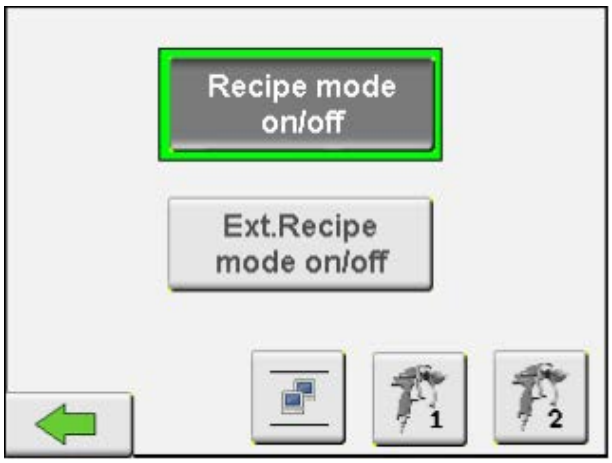


Figure 25 switch mode “Recipe mode on/off” 1



When the key “Recipe mode on/off” is green the system is in **Recipe mode**. In this mode the operator can change the recipe in use and start the cycle programs.

Login with a level 3password, tap on the button “Recipe mode on/off“ to leave the Recipe mode and enter the **Manual mode**. The button “Recipe mode on/off” becomes grey color and the manual mode icon is shown on the top left corner. This mode is reserved to maintenance technician to command the valve individually to test component efficiency. Tap on the button again to leave the manual mode and enter again the Recipe mode.

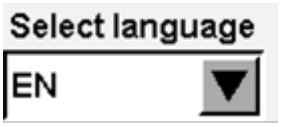
When the system is in recipe mode, login with a level 1 or higher password , tap on the button “Ext. Recipe mode on/off” to enter the **External Recipe Mode**. The button becomes green color and the external recipe mode icon is shown on the top left corner. In this mode the machine is controlled by an external controller with command sent through the ethernet port in ethernet UDP protocol.

Select active spray guns

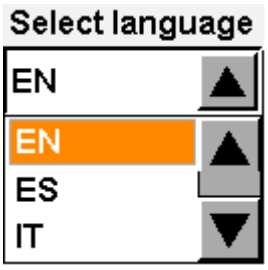
If the system is equipped with two guns is possible to activate each gun individually. Once the system is purged, tap on the button of the gun you want to enable or disable. The enabled buttons of the guns are greencolor. Cycle programs, as load and purge, are activated only on enabled guns.

Use the “back button”  to close the window.

8.5.1.2 Language switching



By tapping on “Select language” dialog box



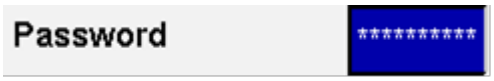
A list box opens and you can make your language choice.

By tapping on the appropriate language in the list box, the selection is confirmed and the texts of all images and alarms are displayed in the selected language.

8.5.1.3 User administration

Level	User	Password	Authorization
0	Simple worker	-	- password entry - menu choices - language change - start cycle programs - save consumption data to USB stick - change date and time
1	Expert worker	duerr12	- switch external recipe mode on/off - select active guns - save data to USB stick
2	Process expert	apt	- change recipes data - change purge program data
3	Administrator	duerr123	- password management - change IP address - operating mode manual - reset valves counter - change calibration values - change parameters - load data from USB stick

The input dialog box where the password has to be entered opens by tapping on the input field “Password” or the user level rectangle on the page’s header.



Passwords can be entered only through the keyboard that appears on the screen.

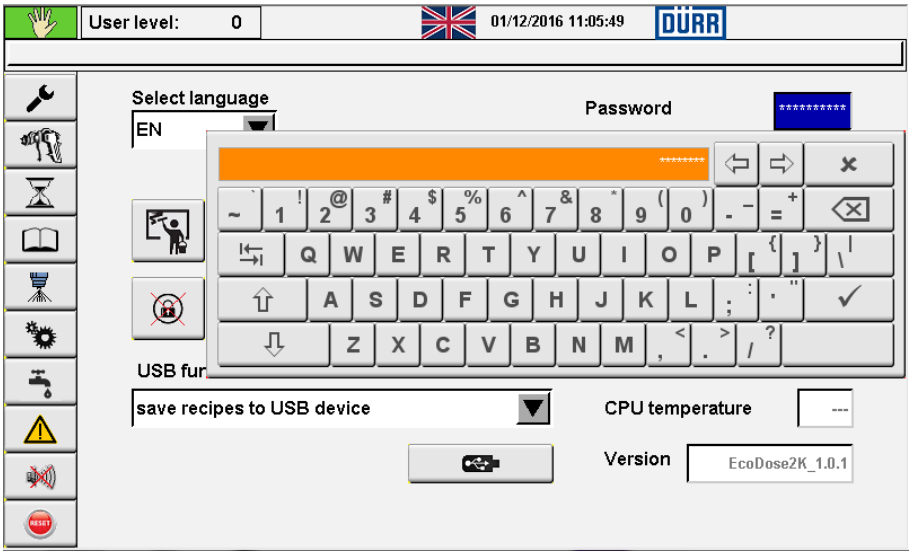


Figure 26 Enter password page

After confirming the password, the currently active user level is displayed.

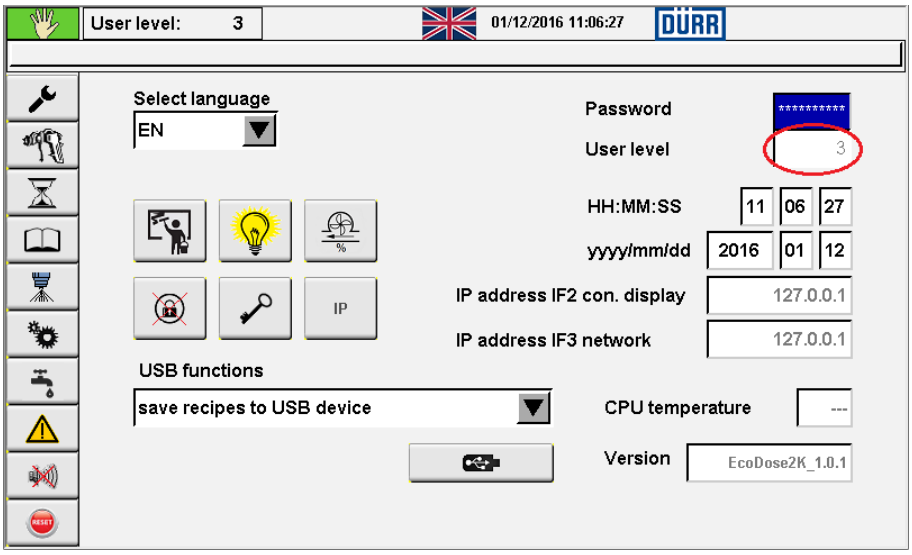


Figure 27 System page

By tapping on the display of previously described user levels, the value will be reset to level zero.

8.5.1.4 Date and time settings

Date and time fields can be entered after tapping on each field:

In External recipe mode a specific command can be sent from an external controller to synchronize date and time.

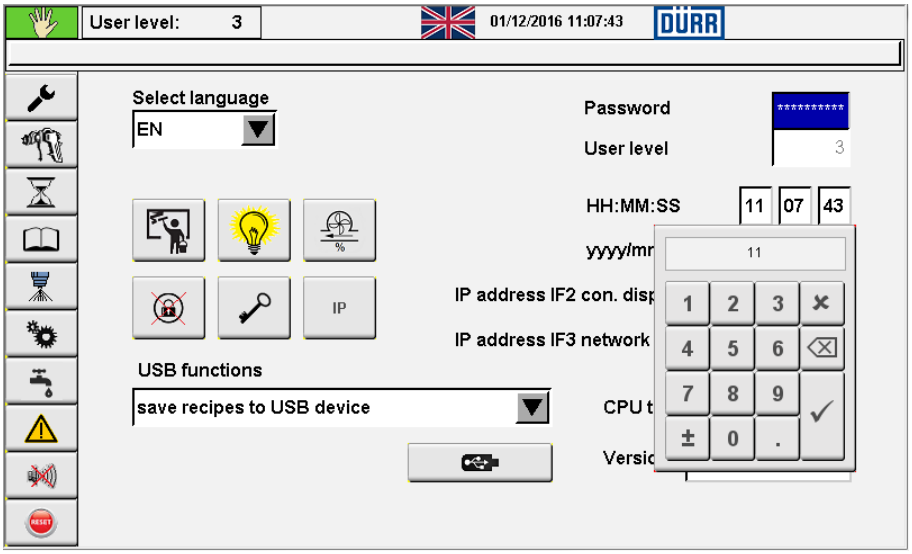


Figure 28 Date and time

8.5.1.5 Data backup to USB storage

Using the dropdown menu “USB functions” you will be able to secure the following data on a USB stick or to transfer them from a USB stick to the internal flash of the controller.

- Recipe data (Recipe table) and Calibration data (Calibration table)
- Consumption data
- Configuration data (Station configuration)
- Purge cycle data (Purge cycle table)
- Parameters
- Wear counters

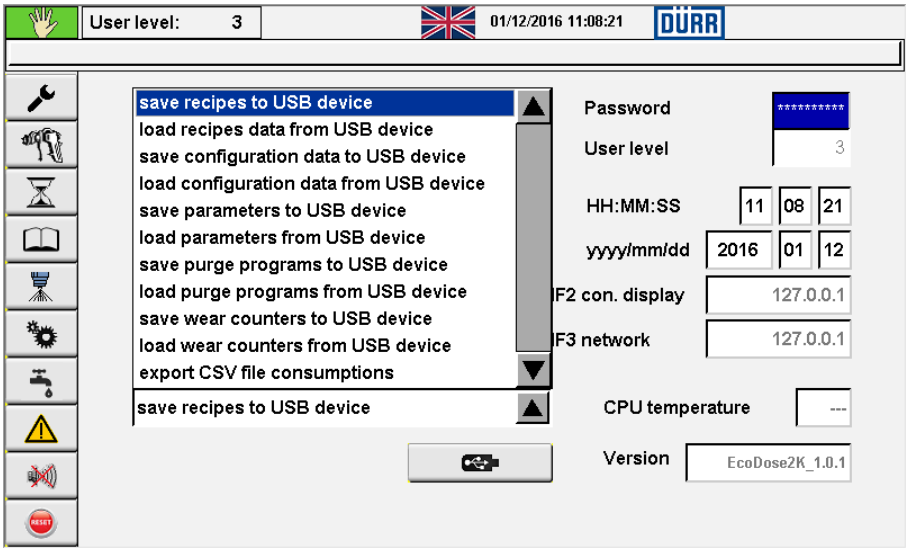
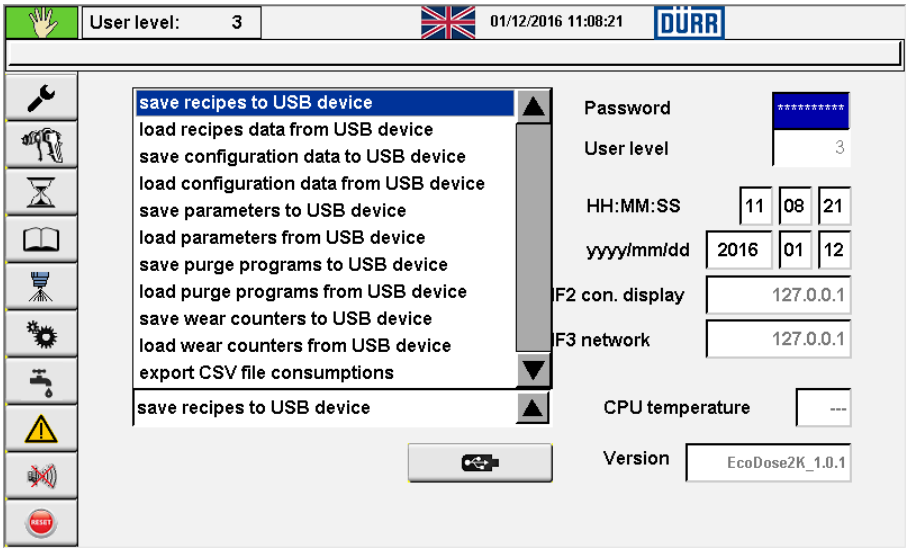


Figure 29 USB functions

Once the desired function is selected from the dropdown menu, it can be activated by the following key:

8.5.1.6 USB Data Save/Load Operations



1) Insert USB stick in the IF4 – USB port.

2) Log-in with appropriate user level

3) Select the action that you want to perform

4) Push this button to execute the action

5) A message will be displayed with the result of the operation:

The message disappears automatically after five seconds.

On the USB Stick are created:

- “EcoDose3K_ConfigData\Configuration” after saving Configuration to USB device,
- “EcoDose3K_ParamData\Parameters” after saving Parameters to USB device,
- “EcoDose3K_PurgeData\PurgePrograms” after saving Purge Programs to USB device,
- “EcoDose3K_RecipeData\Recipes” after saving Recipes to USB device,
- “EcoDose3K_Consumptions\Consumptions.csv” after saving Consumption to USB device,
- “E EcoDose3K_Weardata\Wearcounters” after saving the Wear counters to USB device
- With these files on the USB stick is possible to restore the complete configuration in case of failure.

The following data will be saved in the configuration files:

- Number of guns
- Type of flowmeter
- Presence of purge air valve
- Number of color valves
- Number of hardener valves
- Presence of EcoGun Cleaner M
- Presence of pressure regulator
- Valves output position
- Serial number

8.5.1.7 Screen cleaning

The screen cleaning can be activated through the following key:

The screen goes black for 15 seconds and all key functions are disabled.

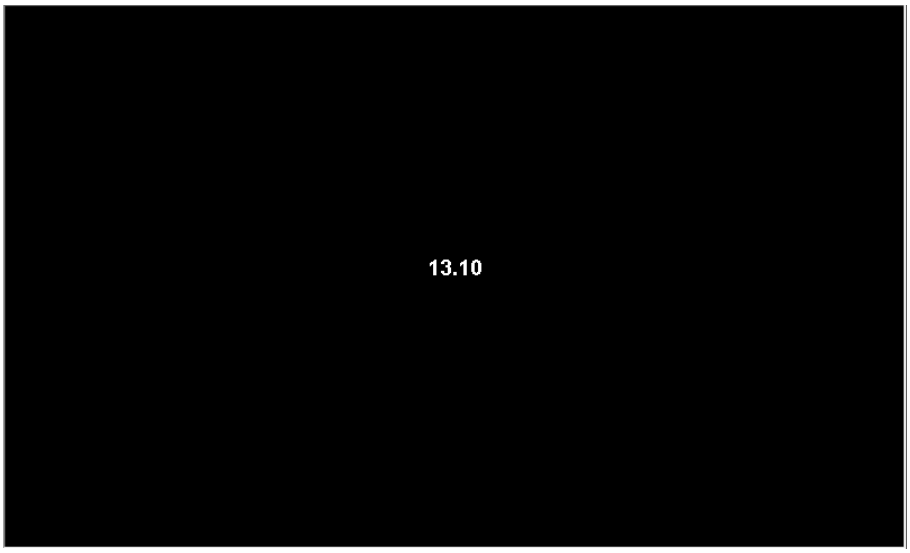


Figure 30 Screen cleaning

8.5.1.8 Change passwords

"User management" key opens the menu where passwords can be changed. Only the highest user level (Level 3) has the authorization to change passwords.

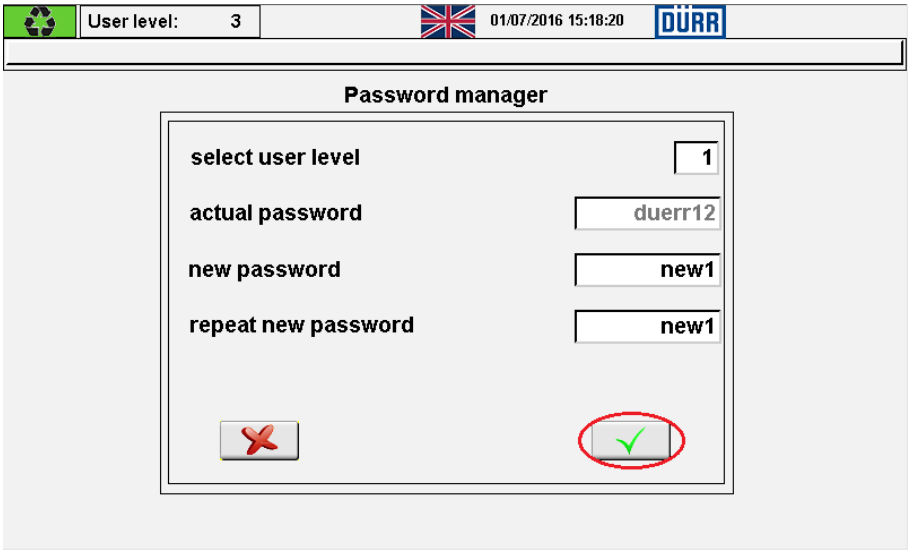


Figure 31 Page change password

The level of the changed password (Level 1-3) will be selected in the "User level" field.
After the new password has been entered in the appropriate field, change can be activated by the confirmation button. 

Figure 32 Page confirmation change password

After confirmation the widow is closed. Using the "exit button"  you can exit without changing the menu.

8.5.1.9 Reset passwords

This window, which can be accessed by pressing this key  is used to reset user passwords.

The confirmation key to reset the passwords will appear if the correct “PIN CODE” is entered.
PIN CODE : eco-auc-axb-cyd.

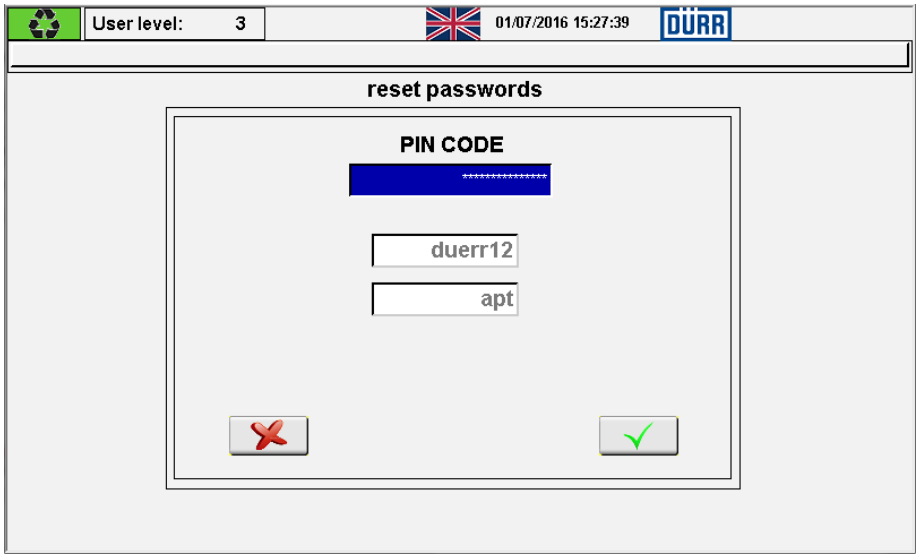


Figure 33 Resetting all passwords

Pressing the following button  all passwords are reset to factory settings.

See section “User administration”. Chapter 8.5.1.3

Use the exit button  to close the window without taking any action.

8.5.1.10 Change IP address

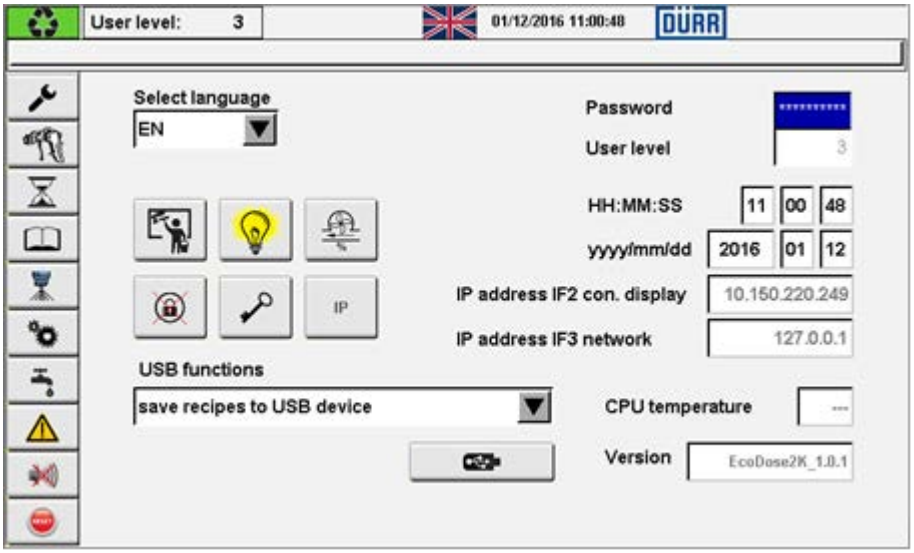


Figure 34 System page

Using the IF2 IP port connection, the display is connected to the controller. This address cannot be changed.

IP Address:	192.168.102.100
Subnet Mask:	255.255.255.0

Using the IF3 IP port connection, the controller can be connected to an external controller. Tapping the “IP” key a window opens to change the IF3 IP address.

Login with authorization level 3 to change the address.

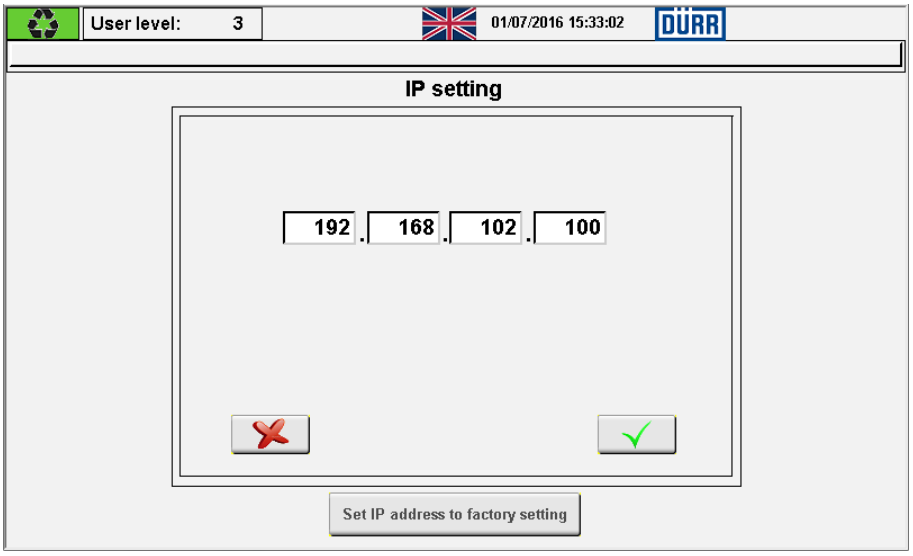


Figure 35 Changing IF2 IP address interface

Here the required IP address can be entered, using the corresponding input fields.

The input is activated through the “confirmation button  .

The menu can be left through the “exit button”  .

In the display field “IP IF3 address” the new IP address will be displayed

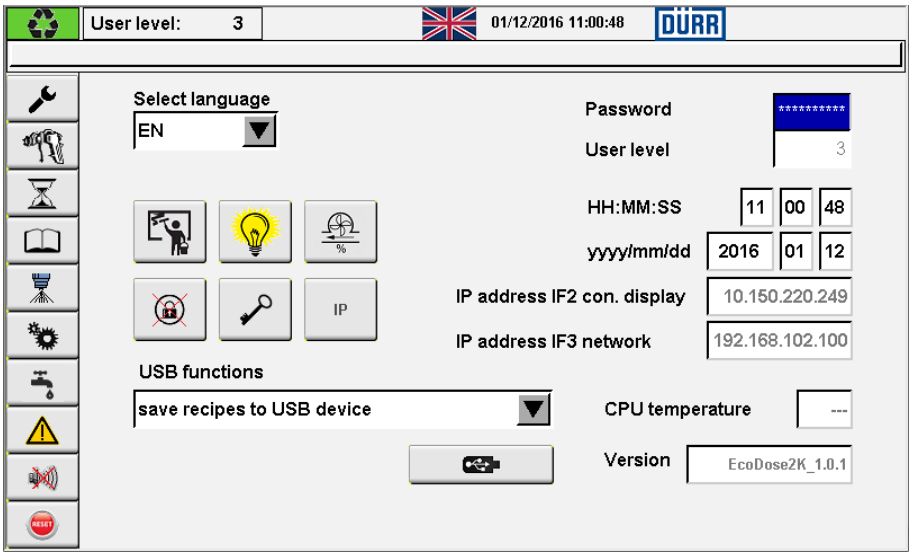


Figure 36 System page

The IP address of the interfaces IF2 and IF3 can be in different sub-networks.

8.5.1.11 Change calibration data

Flowmeters need to be parameterized by entering the number of pulses generated for each liter of flowing material. This value can be figured out with a specific measure carried out in a specific cycle program.

The number of impulses per liter, however, can be entered manually as described below, for all the channels A, B and C.

Different calibration values are associated to each recipe.

Use the button  to open the window in order to change the calibration values.

In this window, the calibration values for channel A, B and C can be entered.

Invalid input range: x <0

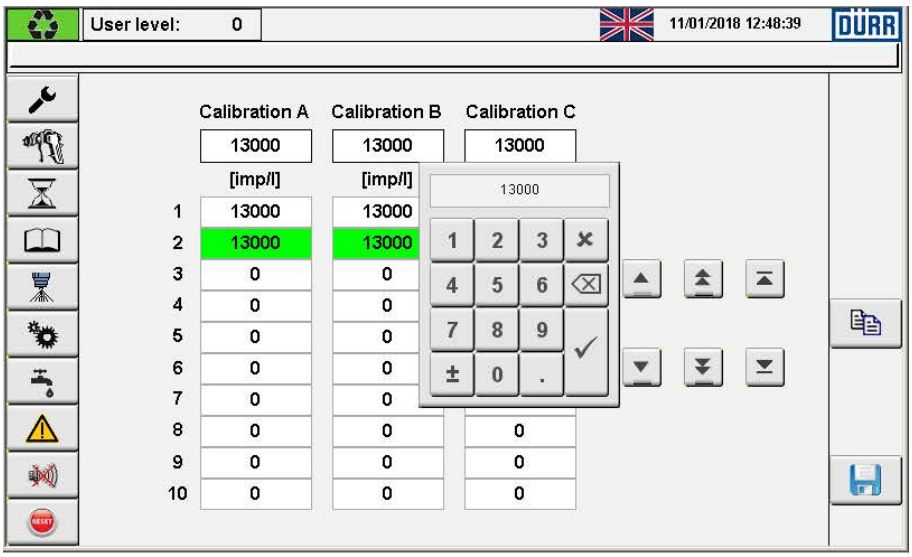
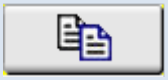


Figure 37 Calibration page

The first unnumbered row on the top, is used to enter a value in the table: by tapping on the input fields a key box appears where you can enter the calibration values.

In the right center of the screen there are buttons allowing to scroll the calibration values list: you can browse them one at the time, ten at the time go to the to last and to the first row.

In the right bottom of the screen there are three other buttons: copy, paste and save.

Copy button		using this button you can copy temporarily a row of the table
Paste button		using this button you can replace a previously row line with another
Save button		using this button you can save all the changes

Tap on the row of the recipe whose calibration value you want to change. The current values are copied in the first row, change the values and press the save button.

8.5.1.12 Lamp test

Pressing lamp test button  the lamp test function is activated.

All the lamps are lit and the siren sounds.

8.5.2 Cycle programs – recipe selection

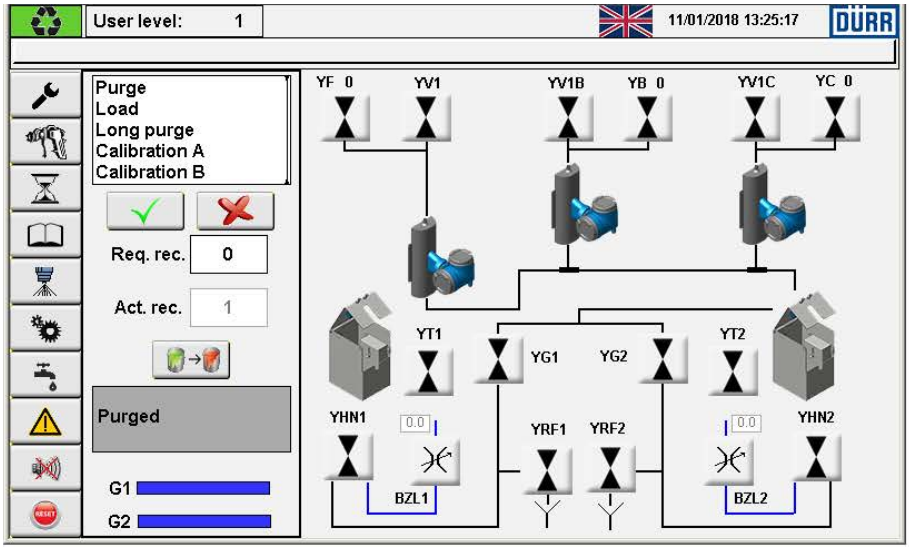


Figure 38 Cycle programs – recipe selection

In this window the hydraulic and pneumatic circuits are shown in a schematic form. The scheme can vary slightly according to the equipment installed on the machine. From this window, in recipe mode, each cycle program (“purge”, “load”, “long purge”, “calibration A”, “calibration B” and “calibration **C**”) can be launched separately.

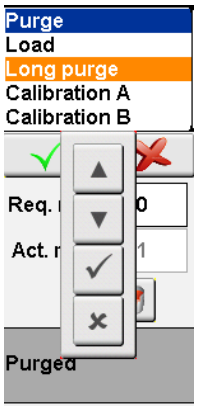
At the bottom left there are two pargraphs representing the progress of the various cycle programs for both the spray guns. Over them there is a grey rectangle in which the system status is displayed.

8.5.2.1 Cycle programs

In order to allow the operator to run a cycle program, the system must be in recipe mode.

Tap on the cycle program list, a popup window is opened. Browse the list with the up-down arrow keys.

The last active selected cycle program raw is colorblue, the temporarily selected cycle program is highlighted in orange. Select the cycle tapping on the check key.



Once the cycle is selected press the button  to start the cycle.

If the system is equipped with EcoCleaner M, the valves to pull the spray gun's trigger in the flushing box are automatically activated

While a cycle program is running, the bar of the related gun is filled in greencolor, to show the progress of the cycle.

Cycle programs are:

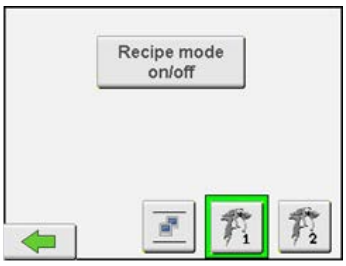
Purge, to clean the system. The purged programs defined in the recipe in use are launched in sequence on active guns.

Load, to load the system. The mixed quantities defined in the recipe in use are loaded in sequence on active guns.

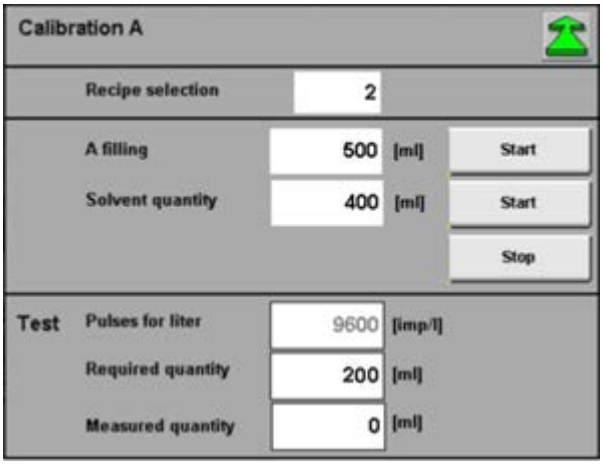
Paint check. After having loaded the machine, to spray the mixed product without atomizing air and make viscosity and flow tests

Calibration A or B or C. The flowmeters' impulses are counted to measure the fluid quantity. The quantity of pulses generated per liter has to be configured through a specific procedure

- Log on with the access level 3
- There must be only one spray gun selected in Mode Switch page, gun 1 in the example picture



- Once you have selected the required calibration, the calibration pop-up window appears.



The window is divided in three sections.

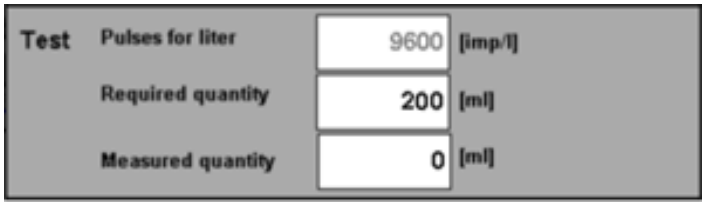
In the first there is the selection of the recipe on which you want to perform the calibration.

In the second section there are the available commands:

- to fill just the house portion involved in the calibration with one product, can be color or component B or C; this is particularly useful to predispose the machine for the calibration measurement, when measuring the product weight.
- to clean with solvent, while repeating the test for different recipes.

Set the correct quantity values in the displays.

Each command has its own start button, and can be arrested with the stop button.



The third section, Test, contains three displays:

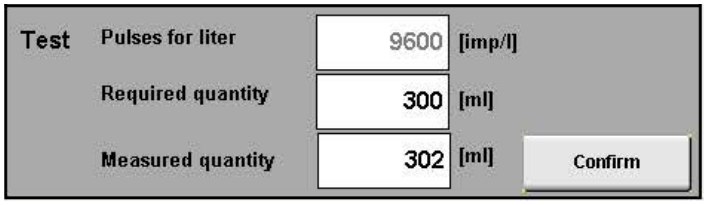
Pulses for liter if this field is not already filled in, go to the system page and press the button  to open the calibration table. Key in the theoretical value of the flowmeter installed in your machine, or copy it from another recipe.

Required quantity.

Measured quantity.

In the second display “Required quantity” you must enter the amount of the product on which you want to perform the calibration, then press  to start the cycle program. The volume of product sprayed must be collected into a measuring cup.
Once the calibration cycle program is ended without error, a confirmation key is shown at the bottom of the calibration popup window. In the third display “Measured quantity” you must enter the actual amount of product collected in the measuring cup.

Press the “Confirmation key” (you must be logged in with user level 3), the actual calibration value is recalculated, and automatically saved in the calibration table.



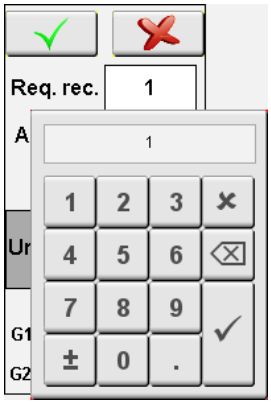
8.5.2.2 System status list

Purging	cycle program “Purge” is running, the entire system is flushed.
Purged	the entire system is free of paint residues. This status is displayed when cycle program “Purge” is completed without error.
Loading	cycle program “Load” is running
Loaded	the system is loaded with a color. This status is displayed when the time program “Load” is completed without errors.
Calibration	this status appears after the calibration cycle program is activated and remains until the system is purged.
Ready	this status comes automatically after the system is loaded. If there are the necessary conditions, the atomization air valve is opened and the guns are ready to spray. The atomization air is opened, a gun is not in the EcoGun Cleaner M, the EcoGun Cleaner M cover is closed and there are no alarms.
Undefined	if the system is not in in any of the above listed status, it means not loaded and not purged, and not in calibration, it is in an undefined status.
Paint check	this status appears when has been activated the cyclic program paint check, spray is active without atomization air flow

8.5.2.3 Recipe selection

To change recipe in use fill out the field “Requested recipe” with a recipe number, 1 in the example.

Tap on the requested recipe field, a display will appear on the screen with a keyboard with which you can type the number of the recipe you want to use.



After entering the required recipe number, you have to press the  to start recipe change.

If the system is not already purged, a purge cycle is carried out, and right after a loading cycle, with the colors, mixing ratio and quantities set in the new recipe. The sequence ends with the system in status Ready.

8.5.3 Spray - valves

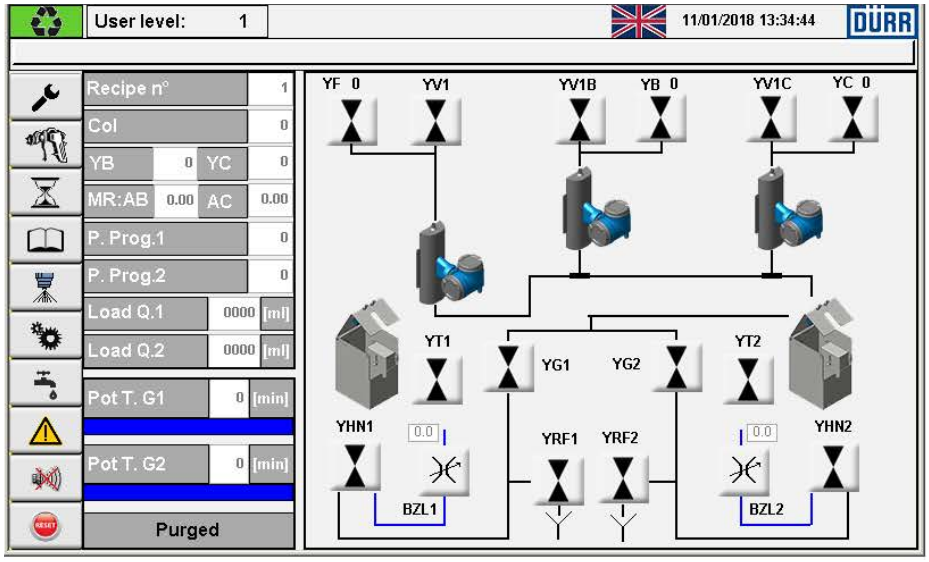


Figure 39 Cycle programs – Spray page

At the left side of the atomizer page are present the current process values and the status of the machine

Recipe n°:	number of the recipe in use.
Col	number of the color valve of the recipe in use
YB	number of the B channel valve of the recipe in use
YC	number of the C channel valve of the recipe in use
Mix ratio AB	the mixing ratio of the recipe in use between A and B
Mix ratio AC	the mixing ratio of the recipe in use between A and C
P. Prog. 1	number of the purge program of the spray gun one
P. Prog. 2	number of the purge program of the spray gun two
Load Q.1	quantity to load in the spray gun 1 in milliliters
Load Q.2	quantity to load in the spray gun 2 in milliliters
Pot T. G1	the elapsed time of gun 1 pot life in minutes
Pot T. G2	the elapsed time of gun 2 pot life in minutes

An additional green bar shows graphically the elapsed time values on the total pot life time.

Valves

YF	color valve
YV1	solvent valve for color
YPL1	purge air valve
YB	channel B valve
YV1B	solvent valve for channel B
YC	channel C valve
BZL1	atomizing air pressure gun 1
BZL2	atomizing air pressure gun 2
YG 1	selection valve gun 1
YG 2	selection valve gun 2
BFDS	color pressure valve
BFDS1	mixed pressure gun 1
BFDS2	mixed pressure gun 2
YT1	EcoCleaner M trigger valve gun 1
YT2	EcoCleaner M trigger valve gun 2
YRF1	dump valve gun 1
YRF2	dump valve gun 2
YHN1	needle valve gun 1
YHN2	needle valve gun 2

8.5.3.1 Valves status indicator

Valve closed

Valve open

8.5.3.2 Valves manual control

Requirement for manual control valves:

- control voltage must be switched on
- manual mode must be selected

To toggle the valve status, open or closed, you must tap the valve symbol

Valve closed. Valve opens with a touch

Valve opened. Valve closes with touch

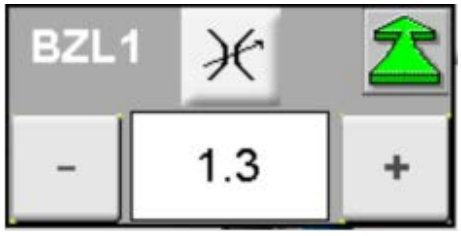
The number of color and hardener valve to command, is selected by means of dropdown menus near the valve symbol.

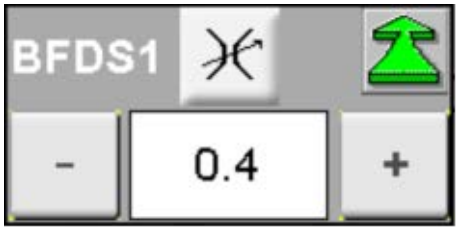
Interlocks do not allow to open more valves at the same time in the same channel, however valves must be opened with caution and the system finally purged.

BZL1, BFDS1 for gun 1, and BZL2, BFDS2 for gun 2 are analog valves.

Tap on the valve symbol to open a popup window, in Manual mode tap on the symbol  to switch on the valve.

Adjust the analog set value of the valve: the set value can be written directly, or incremented / decremented of 0.1 bar at a time, with the + / - keys.





8.5.4 Spray data

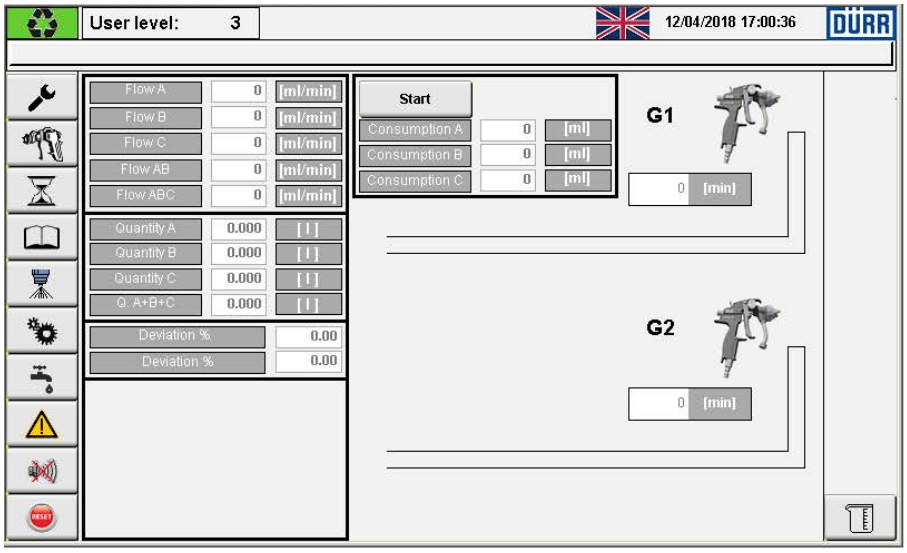


Figure 40 Spray data page

While the system is spraying the window displays:

- the current flow in channel A (color channel) in ml/min
- the current flow in channel B (channel) in ml/min
- the current flow in channel C (channel)
- the current flow of mixed material in ml/min
- the dispensed quantity of A, B and mixed A+B and A+B+C in liter.
- The quantities are reset each time there is an alarm which locks the spray.
- The mixing ratios deviation: difference between the requested ratio and the actual ratio in percentage.
- For the equipped systems with Coriolis flowmeter the temperature and the density of fluids in A, B and C channels are also available.
- Current consumption during the spraying cycle in progress. The consumption totalization can be activated locally pressing the button START, or in external recipe mode with the command mStartCons in the command interface; the totalization continues until the signal is on and is reset on a new rising edge of the signal.
- For the equipped systems with Coriolis flowmeter the temperature and the density of fluids in A, B and C channels are also available.

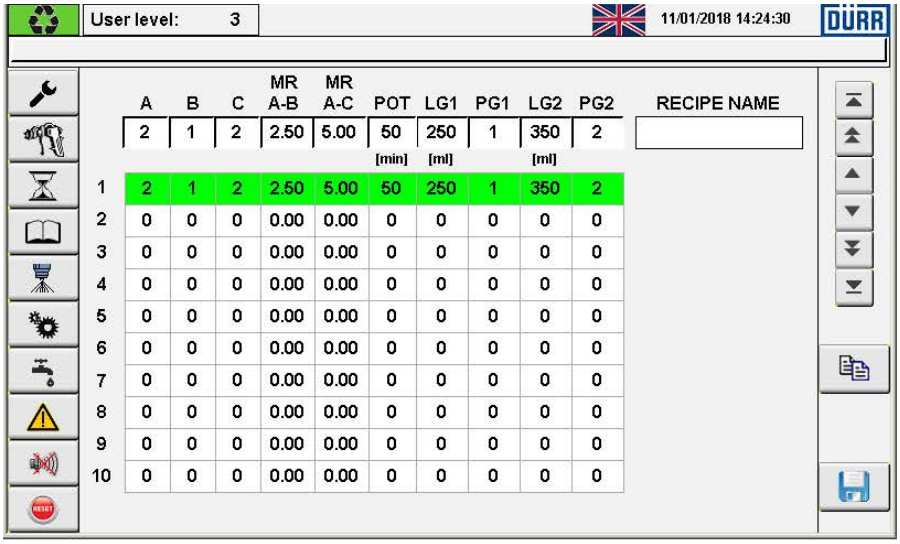
On the right the mixed material flow in the gun hoses is shown.

The hoses are split in section, colored according to the elapsed time of the pot life:

green	**between 0 and 50% of the pot life**
yellow	**between 51% and 80% of the pot life**
red	**between 81% and 100% of the pot life**

Nearby the spray gun, a textbox shows the elapsed time of the oldest mixed material, at the end of the hose.

8.5.5 Recipes data



	A	B	C	MR A-B	MR A-C	POT	LG1	PG1	LG2	PG2
	2	1	2	2.50	5.00	50 [min]	250 [ml]	1	350 [ml]	2
1	2	1	2	2.50	5.00	50	250	1	350	2
2	0	0	0	0.00	0.00	0	0	0	0	0
3	0	0	0	0.00	0.00	0	0	0	0	0
4	0	0	0	0.00	0.00	0	0	0	0	0
5	0	0	0	0.00	0.00	0	0	0	0	0
6	0	0	0	0.00	0.00	0	0	0	0	0
7	0	0	0	0.00	0.00	0	0	0	0	0
8	0	0	0	0.00	0.00	0	0	0	0	0
9	0	0	0	0.00	0.00	0	0	0	0	0
10	0	0	0	0.00	0.00	0	0	0	0	0

Figure 41 recipe page

In this page all the recipes are listed and numbered from one to one hundred.

Each recipe includes a set of parameters and a name that appears in a display at the top right.

A	Color valve number
B	Channel B valve number
C	Channel C valve number
MR A-B	Mixing ratio: Color part for each B part
MR A-C	Mixing ratio: Color part for each C part
POT	Pot life of the mixed material
LG1-LG2	Load quantity of spray gun 1 or 2
PG1-PG2	Purge program of spray gun 1 or 2

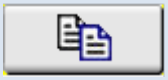
To change the recipe data you must login at least with user level 2.

The first unnumbered row at the top, is used to enter the recipe data in the table. You can fill out every single field using the keyboard, to input the value, that will appear by touching it.

By touching a recipe and selecting it, the corresponding row becomes green and its data are copied in the top row.
After filling in all the parameters press the “Save button  .

In the right center of the screen there are buttons that allows to scroll the recipes list: it's possible to browse them one at a time, ten at a time or go to the first and to last directly.

In the right bottom of the screen there are three other buttons: copy, paste and save.

Copy button		By using this button you can copy temporarily a row of the recipes table.
Paste button		By using this button you can paste a previously copied line onto another.
Save button		By using this button you can save all the changes made.

8.5.6 Pre-purge, purge program

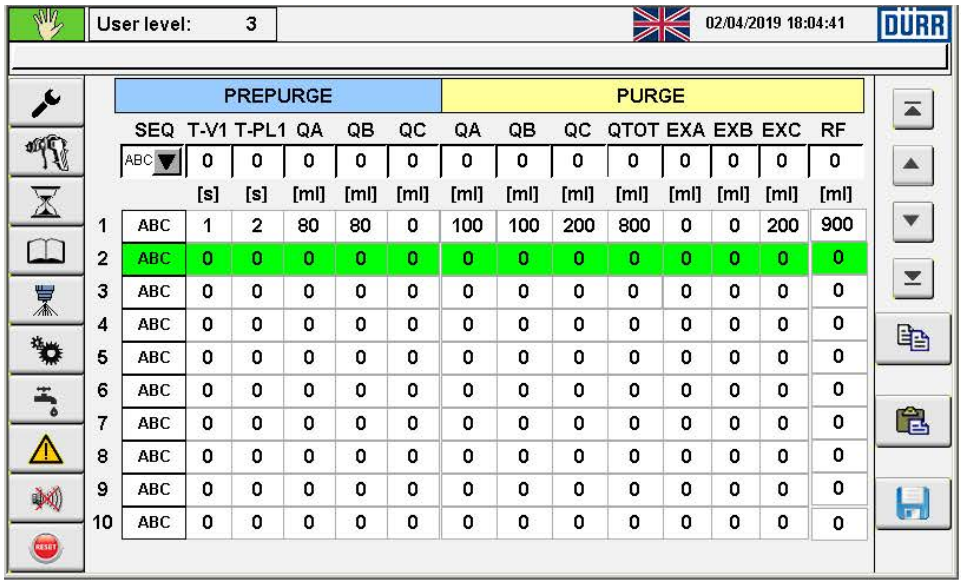


Figure 42 Pre purge and purge cycle page

Twenty different purge programs are available, each one can be associated in a recipe to a spray gun.

In this page all the purge programs are listed, and numbered from one to twenty.

If the system is equipped with the purge air valve YPL1 the data table has also the columns of the pre-purge-cycle data.

Programs 11 and 12 are used during the wash cycles long, for the spray guns 1 and 2 respectively.

8.5.6.1 Pre-purge

PREPURGE	**SEQ**	purging sequence: sequence order of A, B or C
	T-V1	solvent time in seconds
	T-PL1	air time in seconds
	QA	quantity of color solvent (channel A) in milliliter
	QB	quantity of solvent channel B in milliliter
	QC	quantity of solvent channel C in milliliter

Phase 1: YV1 valve is opened for T-V1 seconds, then YPL1 valve is opened for T-PL1 seconds; the sequence is repeated until the QA quantity has flowed through YV1.

Phase 2: YV1/B valve is kept open until the quantity QB has flowed.

Phase 3: YV1/C valve is kept open until the quantity QC has flowed

The order on which the steps are executed is assigned in the sequence SEQ

8.5.6.2 Purge

PURGE	**QA**	quantity of color solvent (channel A) in milliliter
	QB	quantity of solvent (channel B) in milliliter
	QC	quantity of solvent (channel C) in milliliter
	QTOT	total quantity of color and hardener solvent in milliliter
	EXA	extra quantity of solvent channel A in milliliter
	EXB	extra quantity of solvent channel B in milliliter
	EXC	extra quantity of solvent channel C in milliliter
	YRF	Quantity of solvent Pre-purge + Purge, while YRF is kept open

Phase 1: YV1valve is kept open until the quantity QA has flowed, then YV1/B valve is kept open until the quantity QB has flowed, then YV1/C valve is kept open until the quantity QC has flowed. The sequence is repeated until the total quantity QTOT has flowed.

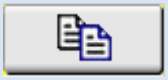
Phase 2: YV1 valve is kept open until the quantity EXA has flowed, then YV1/B valve is kept open until the quantity EXB has flowed, then YV1/C valve is kept open until the quantity EXC has flowed.

The order of the valve opening sequence is assigned in SEQ.

The first unnumbered row at the top is used to enter the recipe data in the table. You can fill out every single field using the keyboard, to input the value, that appears touching it.
By touching a recipe and selecting it, the corresponding row becomes green and its data are copied in the top row.
After filling in all the parameters press the “Save button  .

In the right center of the screen there are buttons that allows to scroll the recipes list: you can browse them one at a time, ten at a time or go to the first and to last directly.

In the right bottom of the screen there are three other buttons: copy, paste and save.

Copy button		By using this button you can copy temporarily a row of the recipes table.
Paste button		By using this button you can paste a previously copied line to another.
Save button		By using this button you can save all the changes made.

8.5.7 Consumption

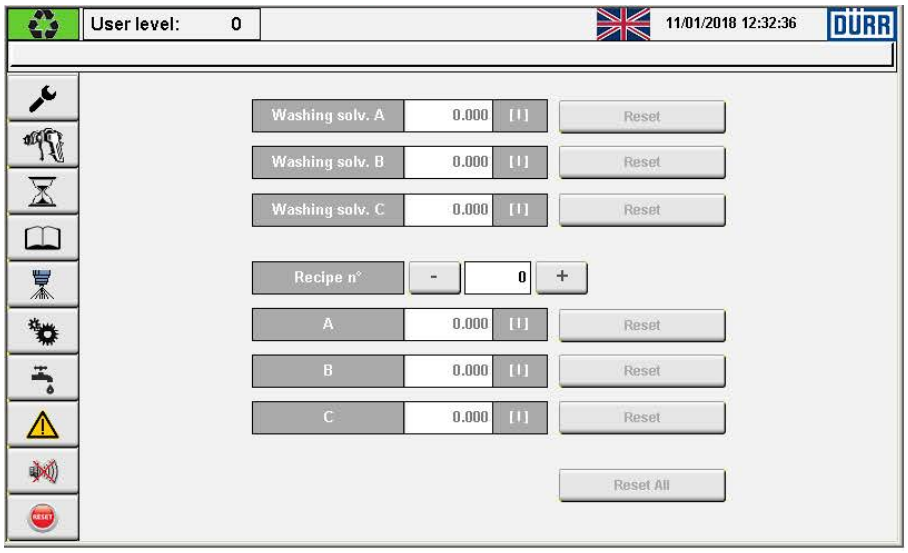


Figure 43 Consumption page

In this page the consumption values for all the products used in the system are displayed:

- Color and Color solvent
- Component B and component B solvent
- Component C and component C solvent

You can browse recipes to control the consumptions of color and hardener for each recipe.
To reset the consumption data login with user level 1 or higher
Every display has a “reset” button to reset the counters.
There is also a “reset all” button to set all the counters to zero at once.

Consumption data can be saved on the flash memory of the controller in a csv file which is possible to access in read and write mode, with a FTP connection, connecting to the Ethernet port IF3 with the credentials

user:	user
password	Ecodose3k

The file is saved daily in the folder F: \ consumption, with a name consisting of a pair of letters assigned in the parameters settings section 4, followed by the date of the day in which the file is written.

After successful file write the totalized consumption data are cleared. Leave the name file field blank , if you do not want to occur writing and consequent data reset; the data are always accessible and storable via USB port.

8.5.8 Parameters

Parameters are divided in five pages of setup.

To change a parameter value you must login with user level 3.

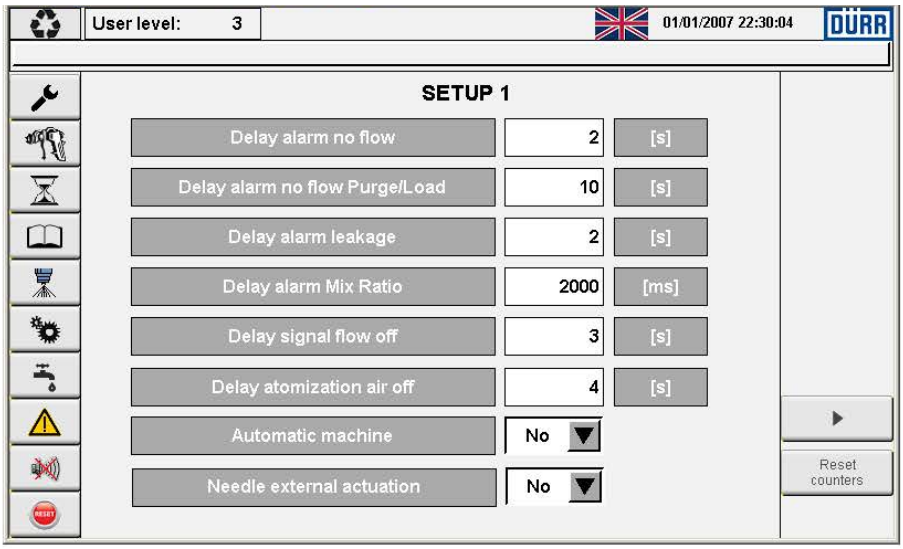


Figure 44 Parameters page 1

DELAY ALARM NO FLOW [s]	During the spraying process, the flow of the products is controlled. When the measured flow is consistently less than the quantity assigned in MINIMUM FLOW A, for channel A, or MINIMUM FLOW B for channel B, or MINIMUM FLOW C for channel C an alarm is raised after the seconds here specified. Default value 2 [s]
DELAY ALARM NO FLOW PURGE/LOAD [s]	During the loading/purging operation, the flow of the products is controlled. When the measured flow is consistently less than the quantity assigned in MINIMUM FLOW A, for channel A, or MINIMUM FLOW B for channel B, or MINIMUM FLOW C for channel C,an alarm is raised after the seconds here specified. This time can be longer than the time specified in DELAY ALARM FLOW, to let the operator enter the painting booth and pull the gun's trigger after starting the cycles. Default value 10 [s
DELAY ALARM LEAKAGE [s]	When the valves are closed, the absence of flow is checked. When a consistent flow is measured from channel A or B, an alarm is raised after the seconds here specified. Default value 2 [s]
DELAY ALARM MIX RATIO [ms]	When the mix ratio error is consistently greater than 1%, an alarm is raised after the time here specified. Default value 2000 [ms]
DELAY SIGNAL FLOW OFF [s]	While spraying, after the gun's trigger is released, color and hardener valves are closed after the time here specified. Default value 3 [s]
DELAY ATOMIZATION AIR OFF [s]	While spraying, in case of alarm, color and hardener valves are closed. Atomization air valve is closed too, with the delay here specified. Default value 4 [s]
AUTOMATIC MACHINE Yes/No	If the EcoDose 3K supplies an automatic machine, set this option as YES. In this case automatic POT LIFE purge is allowed without checking signals from gun-flushing box; a missing-flow alarm causes, after the delay time set in the parameter DELAY ALARM NO FLOW, an immediate stop of spraying, closing the valves .
Needle external actuation Yes/No	Used when the **EcoDose 3K** supplies an automatic machine and is equipped with a valve to control the guns' needle. Choosing YES the needle valve is opened also while spraying, controlled by the external signal commands needle G1 or needle G2. If set to NO the needle is opened during the loading and purging cycle, when YRF is closed.

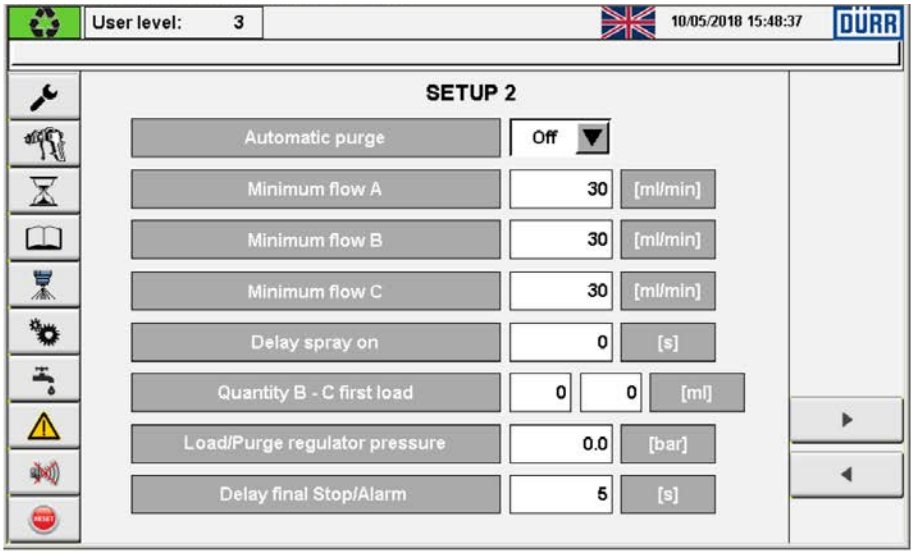


Figure 45 Parameters page 2

AUTOMATIC PURGE Yes/No	If the system is equipped with EcoCleaner M device, with the option Yes the pot life alarm activates an automatic purge cycle
MINIMUM FLOW A [ml/min]	While spraying loading or purging, the flow of the medium is controlled. When the measured flow in channel A is consistently less than the quantity here specified, an alarm is raised with the delay specified in DELAY ALARM NO FLOW / DELAY ALARM NO FLOW PURGE/LOAD. Default value 30 [ml/min]
MINIMUM FLOW B [ml/min]	While spraying, loading or purging, the flow of the medium is controlled. When the measured flow in channel B is consistently less than the quantity here specified, an alarm is raised with the delay specified in DELAY ALARM NO FLOW / DELAY ALARM NO FLOW PURGE/LOAD. Default value 20 [ml/min]
MINIMUM FLOW C [ml/min]	While spraying, loading or purging, the flow of the medium is controlled. When the measured flow in channel C is consistently less than the quantity here specified, an alarm is raised with the delay specified in DELAY ALARM NO FLOW / DELAY ALARM NO FLOW PURGE/LOAD. Default value 20 [ml/min]
DELAY SPRAY ON [s]	After the loading cycle is finished the atomizing air is enabled with the delay here specified. This parameter is useful when the system is not equipped with EcoCleaner M. If the system is equipped with EcoCleaner M, to be the atomizing air enabled after the time above here specified, the gun must be out of the EcoCleaner M and the cleaner box cover closed. Default value 3 [s]
QUNTITY B - C FIRST LOAD [ml]	Once the system has been purged, at the first following load, the YB (YC) valve is kept opened, with the color valve closed, until the quantity here specified has flowed, then the color and the YB (YC) valves are opened according to the recipe mixing ratio. Default value 0 [ml]
LOAD / PURGE REGULATOR PRESSURE [bar]	Set of pressure during loading and purging cycle. Default value 6 [bar].

DELAY FINAL STOP ALARM [s]	To access this parameter, the option AUTOMATIC MACHINE must be set to No, it means the system is not used to supply an automatic machine. While spraying, if the flow of A or B falls consistently below the minimum set limit MINIMUM FLOW A or B or C, after the time DELAY ALARM NO FLOW, an acoustic alarm is raised. The operator has still the time here specified to solve the problem and let the medium flow before the alarm stops the system. Then a reset command on the panel is necessary. Default value 4 [s]

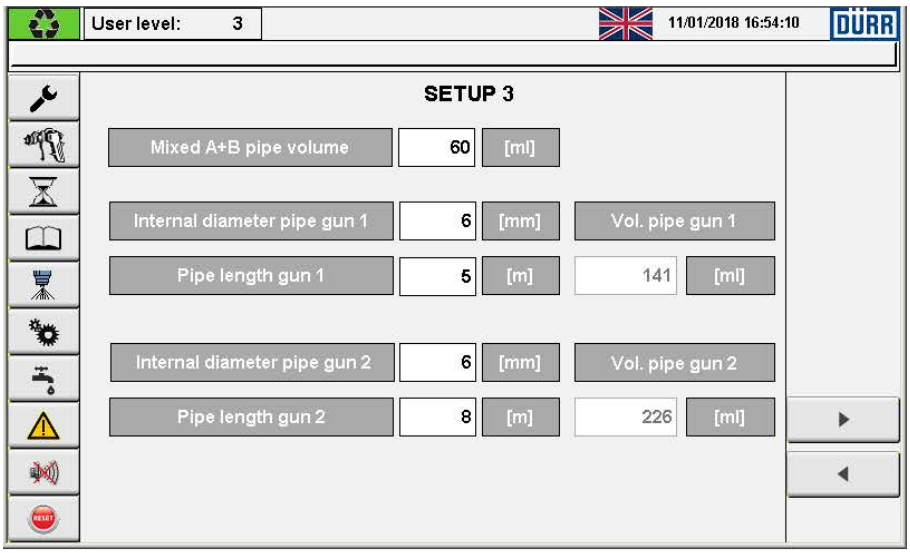


Figure 46 Parameters page 3

PIPE SIZE
In order to save component C, in the first loading operation, the valve C is open to mix A+B with C, after the quantity specified in milliliter in the parameter “Mixed A+B pipe volume” has flowed.

HOSES SIZE
Here is set the internal hose diameter, default value 6 [mm], and the hoses length, default value 7 [m].

Accordingly the hose volume is calculated in ml.

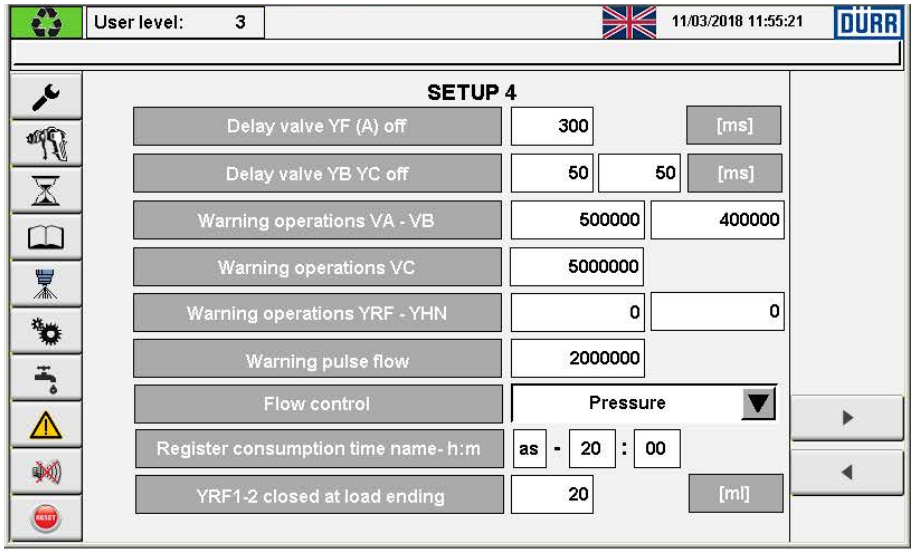


Figure 47 Parameters page 4

DELAY VALVE YF (A) OFF [ms]	In order to keep YF color valve always open during the component B injection, it can be kept opened for a short time here specified, even when there is a surplus of color in the A/B mixing ratio. Default value 300 [ms]
DELAY VALVE YB (C) OFF [ms]	In order to reduce the number of operations (frequency) of the B (C) channel valve, it can be kept opened for a short time here specified, even when there is a surplus of B (C) in the A/B (A/C) mixing ratio. Default value 0 [ms]
WARNING OPERATION VA	When the number operations of one of the valves connected to channel A is beyond this limit, a warning message is generated. The same limit is used to check the number of operations for YG1, YG2 and YT1, YT2 valves. If this limit is set to zero, no warning messages are generated. Provide for maintenance and press the “Rest counters” button in SETUP 1 page, to enter the reset counters values pages..
WARNING OPERATION VB	When the number operations of one of the valves connected to channel B is beyond this limit, a warning message is generated. If this limit is set to zero, no warning messages are generated. Provide for maintenance and press the “Rest counters” button in SETUP 1 page, to enter the reset counters values pages.
WARNING OPERATION VC	When the number operations of one of the valves connected to channel C is beyond this limit, a warning message is generated. If this limit is set to zero, no warning messages are generated. Provide for maintenance and press the “Rest counters” button in SETUP 1 page, to enter the reset counters values pages.
WARNING OPRATION YRF-YHN	When the number operations of the valves YRF1/2 is beyond this limit, a warning message is generated. If this limit is set to zero, no warning messages are generated. Similarly for the valves YHN1/2. Provide for maintenance and press the “Rest counters” button in SETUP 1 page, to enter the reset counters values pages.
WARNING PULSE FLOW	When the number of impulses generated by one of the flowmeters is beyond this limit, a warning message is generated. If this limit is set to zero, no warning messages are generated. Provide for maintenance and press the “Rest counters” button in SETUP 1 page, to enter the reset counters values pages.

FLOW CONTROL	Pressure or Closed loop. Pressure standard value: a consistent value of pressure, assigned by the operator, is applied to the flow regulator. On system with one spray gun, equipped with a flow modulating valve, can be activated, when available, a closed loop flow control: assigned a flow set point value, while spraying, the control pressure of the regulator is automatically adjusted, to control the flow.
REGISTER CONSUMPTION TIME name-h:m	At the time here indicated the daily quantity consumed of solvents, colors and components B and C for each recipe, is saved in a CSV format file on the flash memory of the controller, accessible by FTP connection. The saved file name is composed of the pair of characters written in the name box, followed by the date of the day when the writing took place. Leave empty the name field if you do not want to write the file, with subsequent reset of consumption totalizations.
YRF1-2 closed at load ending	For system equipped with valves which control the gun's needle, at the end of the load YRF can be closed and the needle is automatically opened. Here is defined the quantity, at the end of the loading cycle, which has to pass through the needle. Set this quantity to zero to keep YRF always open while loading.

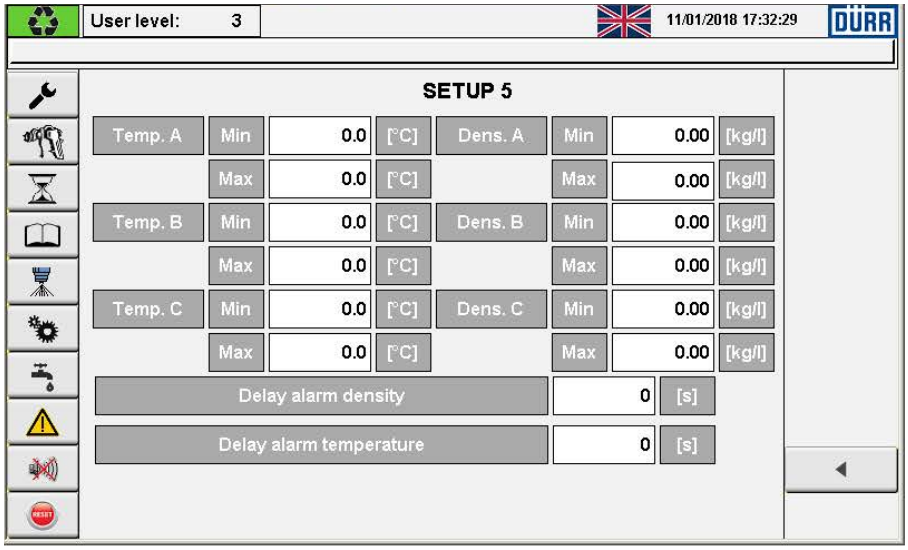


Figure 48 Parameters page 5

TEMPERATURE ALARM THRESHOLDS [C°], DELAY ALARM TEMPERATURE [s]	**Only for system equipped with Coriolis flowmeter** While spraying the temperature of color and component B and C are controlled. If the values of the temperature are consistently out of the intervals here specified, after the time specified in DELAY ALARM TEMPERATURE, an alarm is raised. If the temperature threshold values are set to 0 [C°] this alarm is excluded.
DENSITY ALARM THRESHOLDS [kg/l], DELAY ALARM DENSITY [s]	**Only for system equipped with Coriolis flowmeter** While spraying the density of color and component B and C are controlled. If the values of the density is consistently out of the intervals here specified, after the time specified in DELAY ALARM DENSITY, an alarm is raised. If the temperature threshold values are set to 0 [C°] this alarm is excluded.

From the Parameter page SET UP 1 press the key Reset counters to access the valves and flowmeter wear counters.

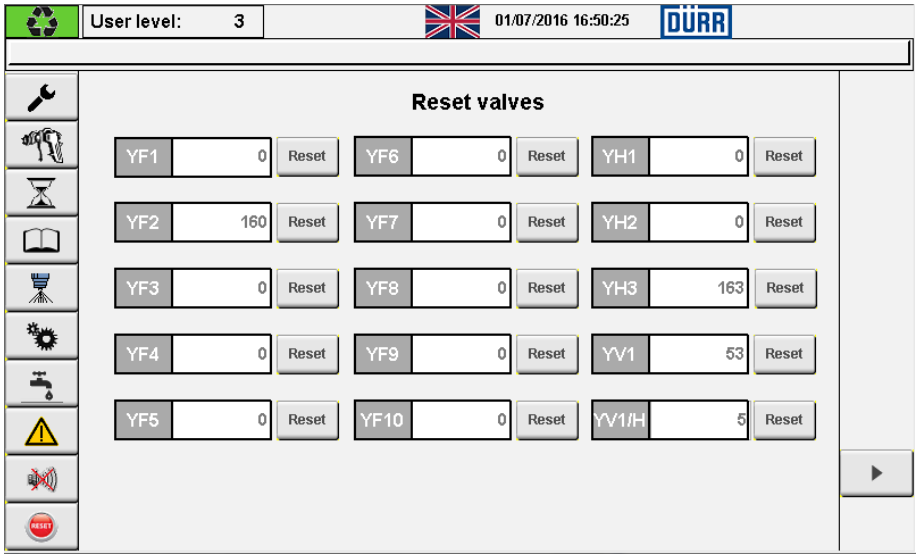


Figure 49 Valves operations - page 1

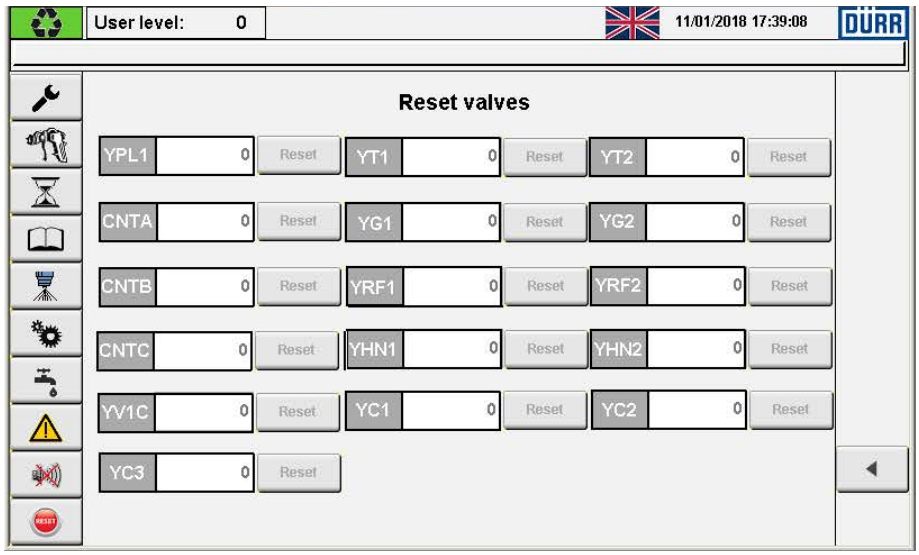


Figure 50 Valves operations - page 2

In order to reset the counters, you must log in with user level 3 and press the specific reset keys.

A warning message shows when the operations counter value has reached the limit and the component should be revised or replaced.

8.5.9 Alarms windows

By pressing the alarm line you can open the alarm window.

There are two alarms windows: active alarms and alarms history

Press the button at the page footer to toggle the windows view:

 Actual alarms

 Alarm history

8.5.9.1 Actual alarms

In this page are displayed all currently pending alarms and warnings.

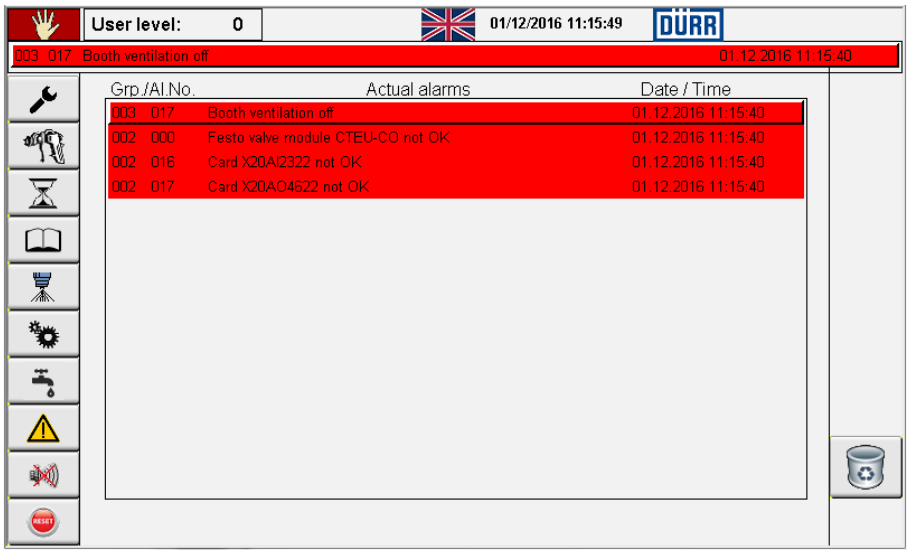


Figure 51 Actual alarms page

Structure of alarm messages

Column 1	number of alarm group
Column 2	number of alarm within the alarm group
Column 3	alarm text
Column 4	date and time of the alarm event

Use the key  to empty the buffer

8.5.9.2 Alarm history

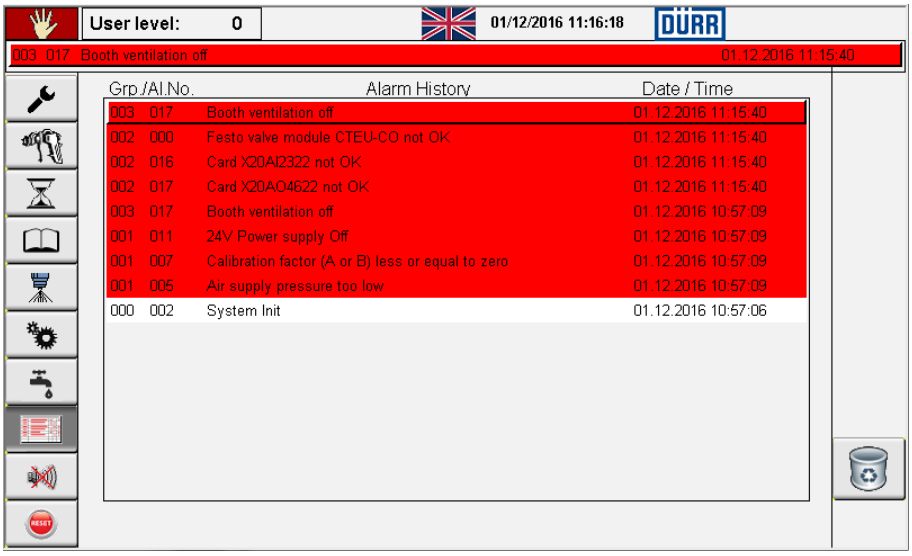


Figure 52 Alarm history page

Column 1	number of alarm group
Column 2	number of alarm within the alarm group
Column 3	alarm text
Column 4	date and time of the alarm event

Alarm history records up to 1000 alarms

Use the key  to empty the buffer

8.6 Messages and alarm groups

Group 0: System messages

Alarm number	Alarm
0	Acknowledged all
1	Bypassed all
2	System init
5	Cannot read alarm data

Group 1: Process alarms

Alarm number	Alarm
0	External recipe out of range
1	Component A is not flowing
2	Component B is not flowing
3	Component C is not flowing
4	Leakage valve channel A
5	Leakage valve channel B
6	Leakage valve channel C
7	Air supply pressure too low
8	POT life alarm
9	Calibration factor (A or B or C) less or equal to zero
10	POT life pre-alarm
11	Plant switched off and not purged
12	External alarm
13	24V Power supply off
14	Mix ratio MR 1 out of tolerance
15	Mix ratio MR 2 out of tolerance
16	Gun 1 not in gun flushing box
17	Gun 2 not in gun flushing box
18	Analog input temperature A Error
19	Temperature A out of range
20	Analog Input Density A Error
21	Density A out of range
22	Analog Input Temperature B Error
23	Temperature B out of range
24	Analog Input Density B Error
25	Density B out of range
26	Analog Input Temperature C Error
27	Temperature C out of range
28	Analog Input Density C Error
29	Density C out of range
30	Actual recipe zero - Initialized to one
31	Flow out of range

External recipe out of range	the recipe number from the external controller is null or beyond the maximum recipe number.
Component A is not flowing	**Possible cause**: after YF or YV1 and YG1/YG2 valves (when present)are opened and the spray gun is open, no impulses are measured by the flowmeter. **Fault elimination**: you must trigger the gun into waiting time flow control until the product is delivered. Extend the waiting time (DELAY ALARM NO FLOW - DELAY ALARM NO FLOW PURGE/LOAD) in the machine's parameters if necessary (even if this increases the possibility of dosing error). If the product does not flow despite the spray gun is open, the delivery system of the base paint is faulty (no pressure product) or the valve of the corresponding product does not open. If you receive an error message although the product flows within the waiting time, the flowmeter on channel A is defected. WARNING! The wrong dosage can reach the gun due to repeated error messages and subsequent dispensed material. There is the possibility that only one component flows. This alarm can be automatically reset on a manual system installation, where the paint is delivered through a manual spray gun, see parameter DELAY ALARM NO FLOW
Component B (C) is not flowing	same as above described, but for channel B.(C)
Leakage on valve channel A	**Possible cause**: the flow-meter of the paint base indicates that the product flows, although the valve of the corresponding product is closed. **Fault elimination**: check valves of the product in the paint base channel. If the system is equipped with Coriolis flowmeter, remove the air from the fluid; this can be done by controlling the valve in manual mode. Counted impulses by the flowmeters are shown in VALVE OPERATION page 2. If the problem persists, you must contact your supplier
Leakage on valve channel B (C)	same as above described, but for channel B (C)
Air supply pressure too low	**Possible cause**: lack of compressed air and / or air pressure to the valves of the product is less than 5 bar **Fault elimination**. open the compressed air and / or increase the air pressure on the pressure regulator in the control to a value higher than 5 bar. Check if the pressure switch is defected.
POT life alarm	**Possible cause**: the POT-LIFE is expired **Fault elimination**. Purge the equipment to reset the alarm.
Calibration factor (A or B or C) less or equal to zero	**Possible cause**: for the selected recipe, calibration factors are not yet defined. **Fault elimination**: you must login as user level 3 and enter the right values in the calibration table; however the exact values must be obtained with a specific calibration procedure, see on the manual at the relative section.
POT life pre-alarm	**Possible cause**: the POT-LIFE time has reached 90%. **Fault elimination**: the mixed material in the houses need to be renewed as soon as possible: spray it out, with a new load cycle or purge cycle

Plant switched off and not purged	**Possible cause**: the plant was switched off while it was not purged. **Fault elimination**: if the station was switched off with the red push button, press the green button to switch it on again, reset the alarm, run a purge cycle if you want to turn the plant off immediately after. If the station was switched off cutting the main power, once powered again it must be purged to reset the alarm.
External alarm	reserved - not used in this application
24V Power supply off	**Possible cause**: missing output power supply - Tripped overcurrent protection on the 24V output circuits **Fault elimination**: it requires maintenance intervention in order to check the electrical connections
Mix ratio out of tolerance	**Possible cause:** the error of the mixing ratio has exceeded 1.0%. **Fault elimination:** check the valves for leakage; if the system is equipped with Coriolis flowmeter, make sure there are no air bubbles in the fluid circuits.
Gun 1 not in gun flushing box	**Possible cause**: In a system equipped with EcoCleaner M, a purge or load cycle is started and the spray gun is not in the gun flushing box. **Fault elimination**: put the spray gun inside EcoCleaner M and restart the cycle. The system can carry out the required cycle as long as the operator pulls manually the spray gun's trigger, within the time set for the alarm, see parameter DELAY ALARM NO FLOW PURGE/LOAD
Gun 2 not in gun flushing box	same as above described, but for gun 2
Analog input temperature A only with Coriolis flowmeter	**Possible cause** : wrong analog signal of temperature from PLC analog input card **Fault elimination**: it requires maintenance intervention to check the electrical connections
Temperature A out of range only with Coriolis flowmeter	**Possible cause** : while spraying the temperature of the fluid component in channel A is beyond the limits assigned in parameters TEMPERATURE ALARM THRESHOLDS **Fault elimination**: check the fluid condition and the electrical connectionsP
Analog Input Density A only with Coriolis flowmeter	**Possible cause** : wrong analog signal of density from PLC analog input card **Fault elimination**: it requires maintenance intervention to check the electrical connections
Density A out of range only with Coriolis flowmeter	**Possible cause** : while spraying the density of the fluid component in channel A is beyond the limits assigned in parameters DENSITY ALARM THRESHOLDS **Fault elimination**: check the fluid condition and the electrical connectionsP
Analog Input Density B (C) only with Coriolis flowmeter	**Possible cause:** wrong analog signal of density from PLC analog input card **Fault elimination:** it requires maintenance intervention in order to check the electrical connections
Density B (C) out of range only with Coriolis flowmeter	**Possible cause**: while spraying the density of the fluid component in channel B (C) is beyond the limits assigned in parameters DENSITY ALARM THRESHOLDS **Fault elimination**: check the fluid condition and the electrical connectionsP

Analog Input Temperature B (C) only with Coriolis flowmeter	**Possible cause**: wrong analog signal of temperature from PLC analog input card **Fault elimination**: it requires maintenance intervention to check the electrical connections
Temperature B (C) out of range only with Coriolis flowmeter	**Possible cause**: while spraying the temperature of the fluid component in channel B (C) is beyond the assigned limits in parameters TEMPERATURE ALARM THRESHOLDS **Fault elimination**: check the fluid condition and the electrical connections
Actual recipe zero - Initialized to one	**Possible cause**: at the power-up the actual recipe was zero. The actual recipe is a retentive data and is not deleted switching off the machine. **Fault elimination**: if not at the first start up, verify all the other machine parameters. Contact your supplier.
Flow out of range	**Possible cause:** while working with closed loop flow control, the current flow run out of tolerance**.** **Fault elimination:** check the efficiency of the flow regulator and the gun's hose. Verify the parameters value of the closed loop regulator. If possible extend the tolerance or the alarm delay in the regulation parameters**.**

Group 3: Hardware alarms

Alarm number	Alarm
0	Festo valve module CTEU-CO not OK
16	Card X20AI2322 not OK
17	Card X20AO4622 not OK
18	Card X20AI4322 not OK
19	Card X20PS2100 not OK
20	Card X20DO8322 not OK
21	Card X20BT9100 not OK
22	Profibus Eco PUC not OK
24	No heart beat from external control
25	Wrong serial number. Use the right configuration file

All the hardware alarms require a maintenance personnel intervention to check the electrical components status and their connections

Group 4: General system alarms

Alarm number	Alarm
0	Error in program initialization routine
1	Error in recipes initialization routine
2	Error in configuration initialization routine
3	Error in parameters initialization routine
4	Error in consumptions initialization routine
5	Error in program save routine
6	Error in recipes save routine
7	Error in configuration save routine
8	Error in parameters save routine
9	Error in consumptions save routine
10	External emergency
13	Error in global initialization routines
13	USB key was not found while trying to import/export data
14	Fire alarm
15	Emergency relè off
16	Booth ventilation off
17	Emergency push button triggered
18	Error in output regulation table data
20	Error in consumption data save to flash

Error in program initialization routine	**Possible cause**: when powered, the PLC loads all the working data: cycle program, recipes, configuration, parameters and consumption from files in the memory storage area. If the operation is unsuccessful this alarm is set. **Fault elimination**: try to restore the missing data from a previous backup saved on a USB memory stick. See the manual specific section. Repeat a power cycling of the machine. If the error persists contact your supplier.
Error in recipes initialization routine	
Error in configuration initialization routine	
Error in parameters initialization routine	
Error in consumptions initialization routine	
Error in program save routine	**Possible cause**: each time the working archive is modified with a save command, the relative file in the memory storage area of the PLC is updated. If the operation is unsuccessful this alarm is set. Memory data are probably inconsistent. **Fault elimination**: try to restore the missing data from a previous backup saved on a USB memory stick. See the manual specific section. Repeat a power cycling of the machine. If the error persists contact your supplier.
Error in program recipes save routine	
Error in configuration save routine	
Error in parameters save routine	
Error in consumptions save routine	
External emergency	**Possible cause**: the safety relay is off due to an external cut-off signal. **Fault elimination**: reset the external alarm. If the problem persists it requires maintenance intervention to check the electrical connections
Error in global initialization routines	**Possible cause**: when powered, the PLC loads all the working data. If the operation is unsuccessful this alarm is set. **Fault elimination**: try to restore the missing data from a previous backup saved on a USB memory stick. See the manual specific section. Repeat a power cycling of the machine. If the error persists contact your supplier.
USB key was not found while trying to import/export data	**Possible cause**: while saving or loading data from the USB memory stick the operation is unsuccessful. **Fault elimination**: check if the memory stick is properly insert and properly formatted.
Fire alarm	**Possible cause**: the safety relay connected to the fire input signal is de-energized **Fault elimination**: if the condition is inconsistent check the external wiring connection. Tap on the reset alarm button on the panel.
Emergency relay off	**Possible cause**: the safety relay connected to the emergency input signal is de-energized. **Fault elimination**: due to the external emergency signal circuit opened, or to the emergency button activated on the panel .If the condition is inconsistent, check the external/internal wiring connection. Tap on the reset alarm button on the panel.

Booth ventilation off	**Possible cause**: missing signal from booth external ventilation system control. **Fault elimination:** if the condition is inconsistent, check the external wiring connection. Tap on the reset alarm button on the panel.
Emergency push button triggered	**Possible cause**: the emergency push button on the control panel is pressed. **Fault elimination:** release the emergency button and tap on the reset alarm button on the panel. if the condition is inconsistent, check the internal wiring connection
Error in output regulation table	**Possible cause:** while working with closed loop flow control in automatic mode, the output cannot be calculated for the request flow from the recipe regulation table data**.** **Fault elimination:** check if the regulation data table for the recipe in use are correct: growing values left to right, covering the requested flow set point.
Error saving the consumption of flash	**Possible Cause:** There was an error during the daily process of writing data consumption on the flash memory accessible via FTP. **Fault elimination** : check the label name (couple of letters) to the saved data files (see parameter section 4 page settings). Check that the flash is present consumption folder, path F: \ Consumption \ where the file is saved. Leave blank the file name field to disable the daily save function if not used

Group 5: Warnings

Alarm number	Alarm
0	YF1 valve has been activated too many times, provide for maintenance
1	YF2 valve has been activated too many times, provide for maintenance
2	YF3 valve has been activated too many times, provide for maintenance
3	YF4 valve has been activated too many times, provide for maintenance
4	YF5 valve has been activated too many times, provide for maintenance
5	YF6 valve has been activated too many times, provide for maintenance
6	YF7 valve has been activated too many times, provide for maintenance
7	YF8 valve has been activated too many times, provide for maintenance
8	YF9 valve has been activated too many times, provide for maintenance
9	YF10 valve has been activated too many times, provide for maintenance
10	YB1 valve has been activated too many times, provide for maintenance
11	YB2 valve has been activated too many times, provide for maintenance
12	YB3 valve has been activated too many times, provide for maintenance
13	YV1B valve has been activated too many times, provide for maintenance
14	YVC1 valve has been activated too many times, provide for maintenance
15	YVC2 valve has been activated too many times, provide for maintenance
16	YVC3 valve has been activated too many times, provide for maintenance
17	YV1C valve has been activated too many times, provide for maintenance
18	YV1 valve has been activated too many times, provide for maintenance
19	YPL1 valve has been activated too many times, provide for maintenance
20	YG1 valve has been activated too many times, provide for maintenance
21	YG2 valve has been activated too many times, provide for maintenance
22	Max pulse amount reached on channel A, provide for maintenance
23	Max pulse amount reached on channel B, provide for maintenance
24	Max pulse amount reached on channel C, provide for maintenance
25	YT1 valve has been activated too many times, provide for maintenance
26	YT2 valve has been activated too many times, provide for maintenance
27	No gun selected, please select at least one gun.
28	Commands while the plant is not inserted, insert the plant!
29	Calibration with two guns selected, unselect one!
30	Recipe in editing is in use - Purge before
31	Is not possible to switch on/off the station in external recipe mode
32	Before to start time program please select one recipe.
33	Please select one time program.
Alarm number	**Alarm**
34	Purge before loading
35	Controller band limit reached

36	Wrong calibration data in required recipe
37	Wrong purge program in required recipe
38	YRF1 valve has been activated too many times, provide for maintenance
39	YRF2 valve has been activated too many times, provide for maintenance
40	YHN1 valve has been activated too many times, provide for maintenance
41	YHN2 valve has been activated too many times, provide for maintenance

8.7 External recipe mode

From Switch mode window, you can open the external recipe mode window by touching this button  .

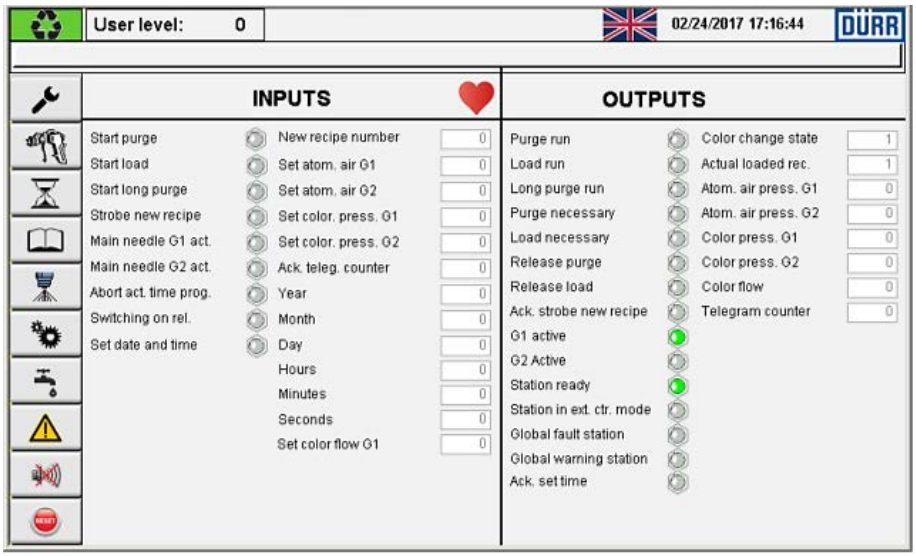


Figure 53 External interface control signal page

This page summarizes input and output signals that are received from the external plc when the system is in “External recipe mode”. The window contains:

- Boolean signals about time programs, errors and station states.
- Integer-Real signals about recipes, colors, pressures and date/time.

8.8 External control interface

8.8.1 Outputs to external control interface

	OUTPUT TO EXTERNAL CONTROLLER		
0.0	iTelCount	INT	Telegram Counter. It has to be copied to AckTelCounter on the remote controller
2.0	iAlarmGrpIfoGlb1	INT	Alarm group information byte 0/1 (global alarm)
4.0	iAlarmGrpIfoGlb2	INT	Alarm group information byte 2/3 (global alarm)
6.0	iAlarmGrpIfoApl1	INT	Alarm group information byte 0/1 (application specific alarm)
8.0	iAlarmGrpIfoApl2	INT	Alarm group information byte 2/3 (application specific alarm)
10.0	iSpare_10	INT	
12.0	iSpare_12	INT	
14.0	iSpare_14	INT	
16.0	iSpare_16	INT	
18.0	iSpare_18	INT	
20.0	mSatatOn	BOOL	Station On
20.1	mStatExtMode	BOOL	Station in external control mode (data from remote controller will use only this mode)
20.2	mStatFault	BOOL	Global Fault Station
20.3	mStatWarning	BOOL	Global Warning Station
20.4	mAckSetTime	BOOL	Acknowledge date and time sync request
20.5	mSpare_20_5	BOOL	
20.6	mSpare_20_6	BOOL	
20.7	mSpare_20_7	BOOL	
21.0	mSpare_21_0	BOOL	
21.1	mSpare_21_01	BOOL	
21.2	mSpare_21_02	BOOL	
21.3	mSpare_21_03	BOOL	
21.4	mSpare_21_04	BOOL	
21.5	mSpare_21_05	BOOL	
21.6	mSpare_21_06	BOOL	
21.7	mSpare_21_07	BOOL	
22.0	iColorChangeState	INT	State 0 = undefined, 1 = purged , 2 = loaded, 3 = Ready
24.0	iActRecipe	INT	Number of actual recipe
26.0	iSpare_26	INT	
28.0	iActualSetAtomizz_G1	INT	Actual set atomizing air Gun 1 mbar
30.0	iActualSetAtomizz_G2	INT	Actual set atomizing air Gun 2 mbar
32.0	iActualSetColPress_G1	INT	Actual set out pressure Gun 1 mbar
34.0	iActualSetColPress_G2	INT	Actual set out pressure Gun 2 mbar
36.0	iColorFlow	INT	Actual color flow
38.0	iConsA	INT	Consumption color spray cycle in progress [ml]
40.0	iConsB	INT	Consumption component B spray cycle in progress [ml]
42.0	iConsC	INT	Consumption component C spray cycle in progress [ml]
44.0	iValveSate1_08	BOOL	Color 9 Valve On

44.1	iValveSate1_09	BOOL	Color 10 Valve On
44.2	iValveSate1_10	BOOL	YB1 Valve On
44.3	iValveSate1_11	BOOL	YB2 Valve On
44.4	iValveSate1_12	BOOL	YB3 Valve On
44.5	iValveSate1_13	BOOL	YV1 Valve On
44.6	iValveSate1_14	BOOL	YV1B Valve On
44.7	iValveSate1_15	BOOL	YPL1 Valve On
45.0	iValveSate1_00	BOOL	Color 1 Valve On
45.1	iValveSate1_01	BOOL	Color 2 Valve On
45.2	iValveSate1_02	BOOL	Color 3 Valve On
45.3	iValveSate1_03	BOOL	Color 4 Valve On
45.4	iValveSate1_04	BOOL	Color 5 Valve On
45.5	iValveSate1_05	BOOL	Color 6 Valve On
45.6	iValveSate1_06	BOOL	Color 7 Valve On
45.7	iValveSate1_07	BOOL	Color 8 Valve On
46.0	iValveSate2_08	BOOL	YC1 Valve On
46.1	iValveSate2_09	BOOL	YC2 Valve On
46.2	iValveSate2_10	BOOL	YC3 Valve On
46.3	iValveSate2_11	BOOL	YV1C Valve On
46.4	iValveSate2_12	BOOL	Valve
46.5	iValveSate2_13	BOOL	Valve
46.6	iValveSate2_14	BOOL	Valve
46.7	iValveSate2_15	BOOL	Valve
47.0	iValveSate2_00	BOOL	YG1 Valve On
47.1	iValveSate2_01	BOOL	YG2 Valve On
47.2	iValveSate2_02	BOOL	YT1 Valve On
47.3	iValveSate2_03	BOOL	YT2 Valve On
47.4	iValveSate2_04	BOOL	YRF1 Valve On
47.5	iValveSate2_05	BOOL	YRF2 Valve On
47.6	iValveSate2_06	BOOL	YHN1 Valve On
47.7	iValveSate2_07	BOOL	YHN2 Valve On
48.0	iSpare_48	INT	
50.0	iSpare_50	INT	
52.0	iSpare_52	INT	
54.0	iSpare_54	INT	
56.0	iSpare_56	INT	
58.0	iSpare_58	INT	
60.0	iSpare_60	INT	
62.0	mPurgeRun	BOOL	Program Purge is active
62.1	mLoadRun	BOOL	Program Load is active
62.2	mLongPurgeRun	BOOL	Program Long Purge is active
62.3	mPurgeNecessary	BOOL	Purge is necessary for the new recipe
62.4	mLoadNecessary	BOOL	Load is necessary for the new recipe
62.5	mReleasePurge	BOOL	Release start purge recipe change
62.6	mReleaseLoad	BOOL	Release load
62.7	mAckStrNewRecipe	BOOL	Acknowledge new recipe
63.0	mG1Active	BOOL	Gun 1 active
63.1	mG2Active	BOOL	Gun 2 active

63.2	mG1inPos	BOOL	Gun 1 in EcoGun Cleaner M
63.3	mG2inPos	BOOL	Gun 2 in EcoGun Cleaner M
63.4	mStartAck	BOOL	Acknowledge signal stat consumption
63.5	mPotLifeAlarm	BOOL	System in pot life alarm
63.6	mPotLifePrealarm	BOOL	System in pot life pre-alarm
63.7	mSpare_63_7	BOOL	
64.0	mSpare_64_0	BOOL	
64.1	mSpare_64_1	BOOL	
64.2	mSpare_64_2	BOOL	
64.3	mSpare_64_3	BOOL	
64.4	mSpare_64_4	BOOL	
64.5	mSpare_64_5	BOOL	
64.6	mSpare_64_6	BOOL	
64.7	mSpare_64_7	BOOL	
65.0	mSpare_65_0	BOOL	
65.1	mSpare_65_1	BOOL	
65.2	mSpare_65_2	BOOL	
65.3	mSpare_65_3	BOOL	
65.4	mSpare_65_4	BOOL	
65.5	mSpare_65_5	BOOL	
65.6	mSpare_65_6	BOOL	
65.7	mSpare_65_7	BOOL	

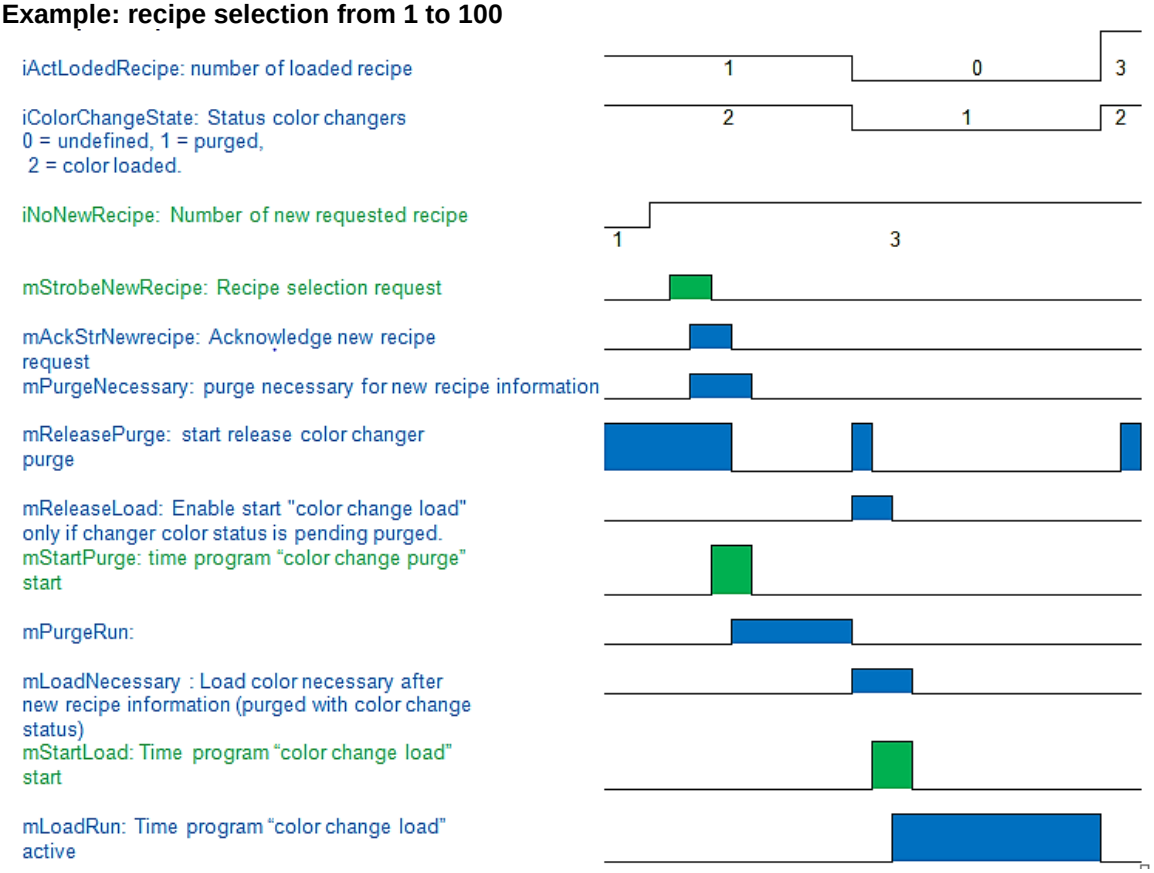
8.8.2 Input from external control interface

	INPUT FROM EXTERNAL CONTROLLER		
0.0	iAckTelCount	INT	Acknowledge telegram counter => Ext
2.0	iDateYear	INT	Date year => Ext
4.0	bDateMonth	BYTE	Date month => Ext
5.0	bDateDay	BYTE	Date day => Ext
6.0	bTimeHours	BYTE	Time hours => Ext
7.0	bTimeMinutes	BYTE	Time minutes => Ext
8.0	bTimeSeconds	BYTE	Time seconds => Ext
9.0	iSpareO_9	BYTE	
10.0	iSpareO_10	INT	
12.0	iSpareO_12	INT	
14.0	iSpareO_14	INT	
16.0	iSpareO_16	INT	
18.0	iSpareO_18	INT	
20.0	mrelStOn	BOOL	Release switch on EcoDose3K from main station
20.1	mSpare	BOOL	
20.2	mTimeSync	BOOL	Set date and time from external control
20.3	mSpareO_20_3	BOOL	
20.4	mSpareO_20_4	BOOL	
20.5	mSpareO_20_5	BOOL	
20.6	mSpareO_20_6	BOOL	
20.7	mSpareO_20_7	BOOL	
21.0	mSpareO_21_0	BOOL	
21.1	mSpareO_21_1	BOOL	
21.2	mSpareO_21_2	BOOL	
21.3	mSpareO_21_3	BOOL	
21.4	mSpareO_21_4	BOOL	
21.5	mSpareO_21_5	BOOL	
21.6	mSpareO_21_6	BOOL	
21.7	mSpareO_21_7	BOOL	
22.0	iNoNewRecipe	INT	New recipe number
24.0	iSpareO_24	INT	
26.0	iG1_AtomizPressure	INT	Atomizing air pressure gun 1 , 0-6000 [mbar]
28.0	iG2_AtomizPressure	INT	Atomizing air pressure gun 2 , 0-6000 [mbar]
30.0	iG1_ColorPressure	INT	Color pressure regulator gun 1 0-6000 [mbar]
32.0	iG2_ColorPressure	INT	Color pressure regulator gun 2 0-6000 [mbar]
34.0	iG1_ColorFlow	INT	Set point color flow [ml/min]
36.0	iSpareO_36	INT	
38.0	iSpareO_38	INT	
40.0	iSpareO_40	INT	
42.0	iSpareO_42	INT	
44.0	iSpareO_44	INT	
46.0	iSpareO_46	INT	
48.0	iSpareO_48	INT	
50.0	iSpareO_50	INT	

52.0	iSpareO_52	INT	
54.0	iSpareO_54	INT	
56.0	iSpareO_56	INT	
58.0	iSpareO_58	INT	
60.0	iSpareO_60	INT	
62.0	mStartPurge	BOOL	Start Purge
62.1	mStartLoad	BOOL	Start Load
62.2	mStartLongPurge	BOOL	Start Long Purge
62.3	mStrobeNewRecipe	BOOL	Strobe for request new recipe
62.4	mMainNeedleG1Active	BOOL	Main needle Gun 1 active
62.5	mMainNeedleG2Active	BOOL	Main needle Gun 2 active
62.6	mTpAbort	BOOL	Abort Program
62.7	mStartCons	BOOL	Start consumption measure
63.0	mSpareO_63_0	BOOL	
63.1	mSpareO_63_1	BOOL	
63.2	mSpareO_63_2	BOOL	
63.3	mSpareO_63_3	BOOL	
63.4	mSpareO_63_4	BOOL	
63.5	mSpareO_63_5	BOOL	
63.6	mSpareO_63_6	BOOL	
63.7	mSpareO_63_7	BOOL	
64.0	mSpareO_64_0	BOOL	
64.1	mSpareO_64_1	BOOL	
64.2	mSpareO_64_2	BOOL	
64.3	mSpareO_64_3	BOOL	
64.4	mSpareO_64_4	BOOL	
64.5	mSpareO_64_5	BOOL	
64.6	mSpareO_64_6	BOOL	
64.7	mSpareO_64_7	BOOL	
65.0	mSpareO_65_0	BOOL	
65.1	mSpareO_65_1	BOOL	
65.2	mSpareO_65_2	BOOL	
65.3	mSpareO_65_3	BOOL	
65.4	mSpareO_65_4	BOOL	
65.5	mSpareO_65_5	BOOL	
65.6	mSpareO_65_6	BOOL	
65.7	mSpareO_65_7	BOOL	

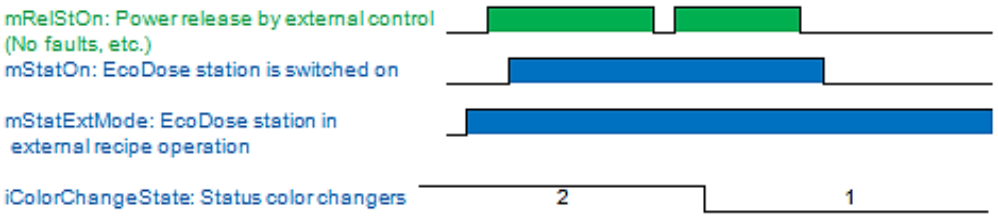
8.9 External interface flowchart

Example: recipe selection from 1 to 100



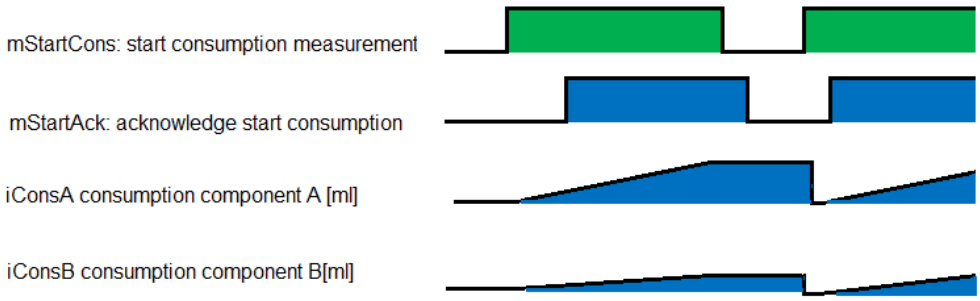
Timing Diagram external control interface

Example: On or Off

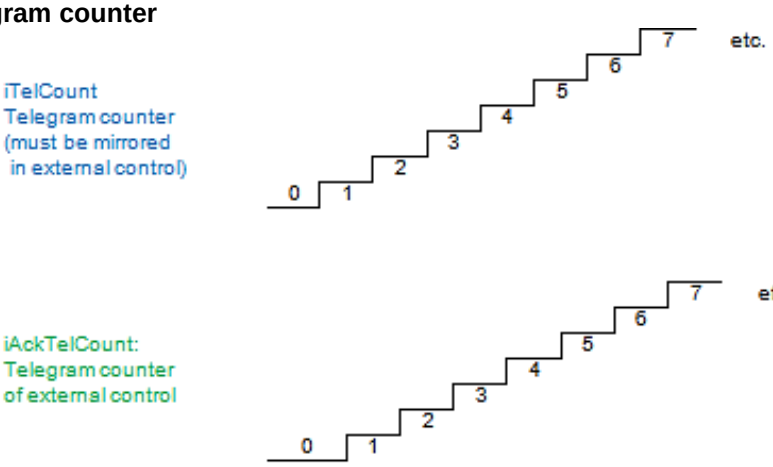


External command Off allowed when the station is purged

Example: consumption measure

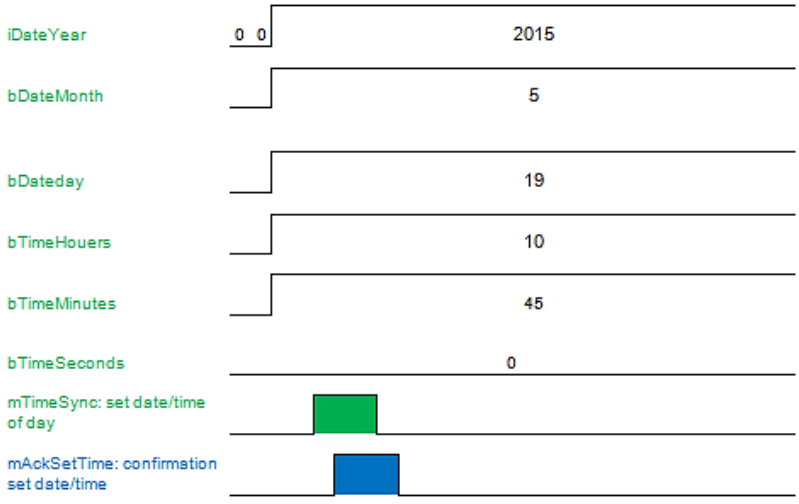


Example: life signal of telegram counter



Example: abort active cycle program

Example: set date and time



8.10 UDP connection EcoDose and external control

To use external recipe mode it must be connected to the master controller through an UDP connection with the “EcoDose control”.

To connect the IF3 interface the X20CP1381 B&R module must be used.

On EcoDose control a UDP server is programmed, the corresponding external control must be programmed to connect a UDP client.

On the external control the following parameters for the UDP connection must be specified:

- port number EcoDose control = 2000 remote port
- IP address EcoDose control = this address must be taken from IF3 interface

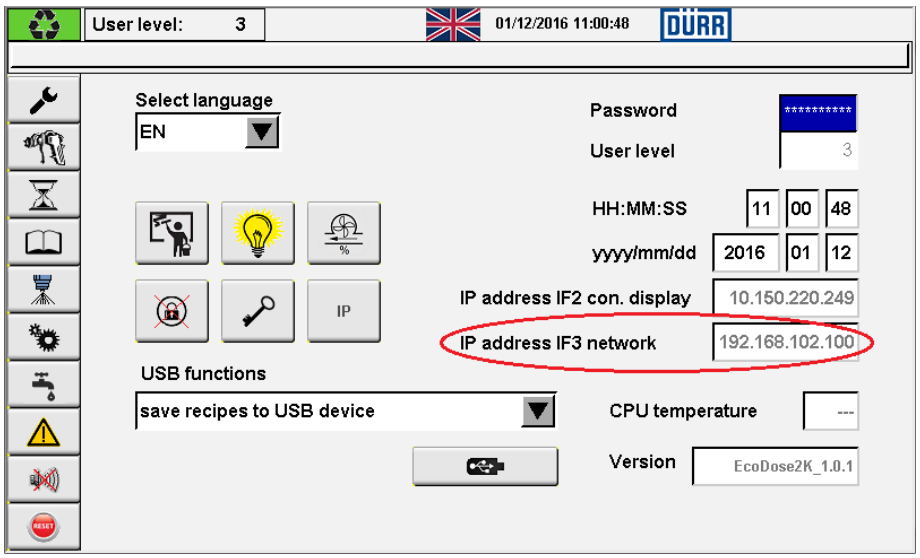


Figure 54 System page

- port number external control = 2001 local port

The IP address of external controller and EcoDose must be in the same subnet.

Subnet mask 255.255.255.0

8.11 Closed loop flow regulation

On a system with one spray gun, equipped with a flow modulating valve, can be activated, when available, a closed loop flow control.

In the parameter page SETUP 4 activate, when available, the flow control option ”Closed loop”.

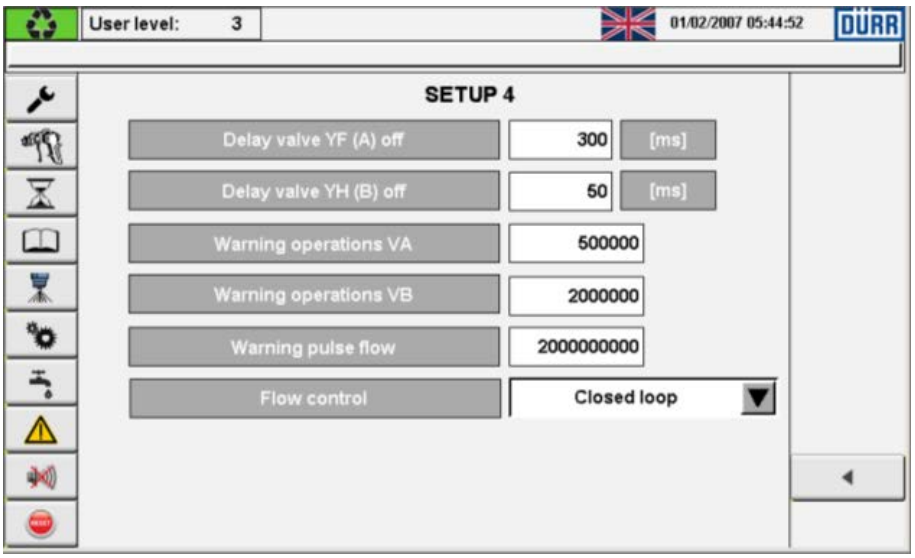


Figure 55

In this condition, assigned a flow set point value, while spraying, the control pressure of the regulator is consistently automatically adjusted, to control the flow.

When the flow control “Pressure” is active a touch on the valve BFDS1 let you set a fix value of pressure for the valve.

When the option “Closed loop” is active, the system is working with a flow set, a touch on the valve BFDS1 opens the regulator page.

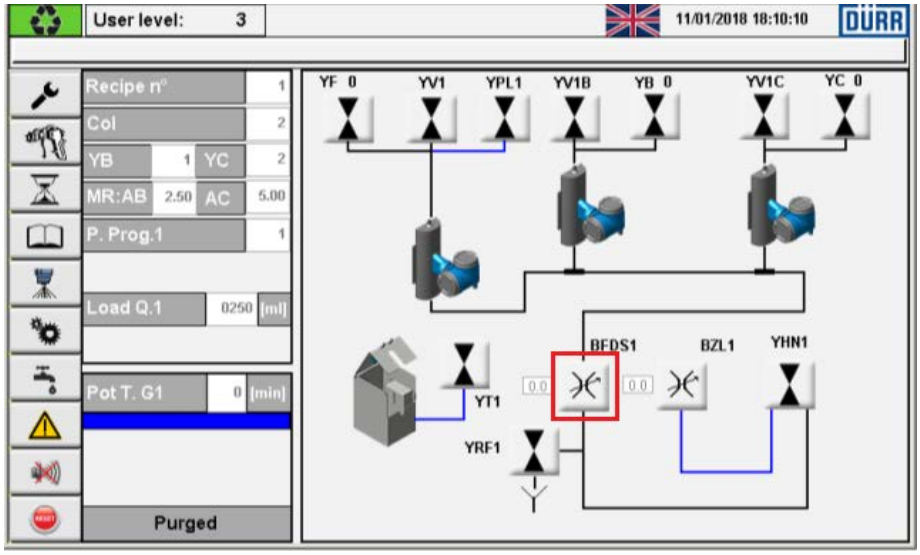


Figure 56 spray page

8.11.1 Regulator page

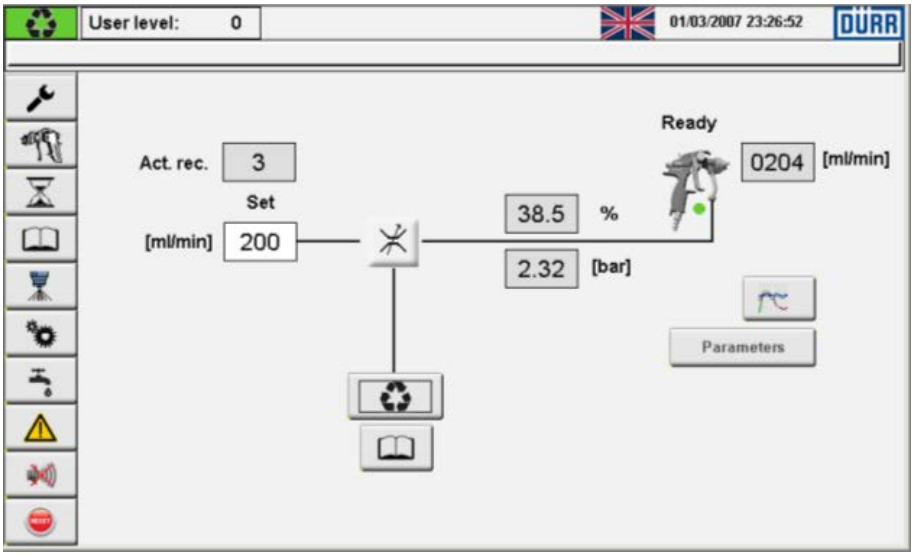
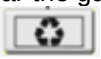


Figure 57 flow regulation automatic mode

This page shows on the left the actual recipe in use, the value of the set point in [ml/min], and on the right, the system status, the value of the regulator output in percentage and in bar, the current measured value of the flow.

A green circle, near the gun's trigger, shows when the signal spray gun's trigger pulled is active
Press on the key  to change the regulator status from automatic to manual.

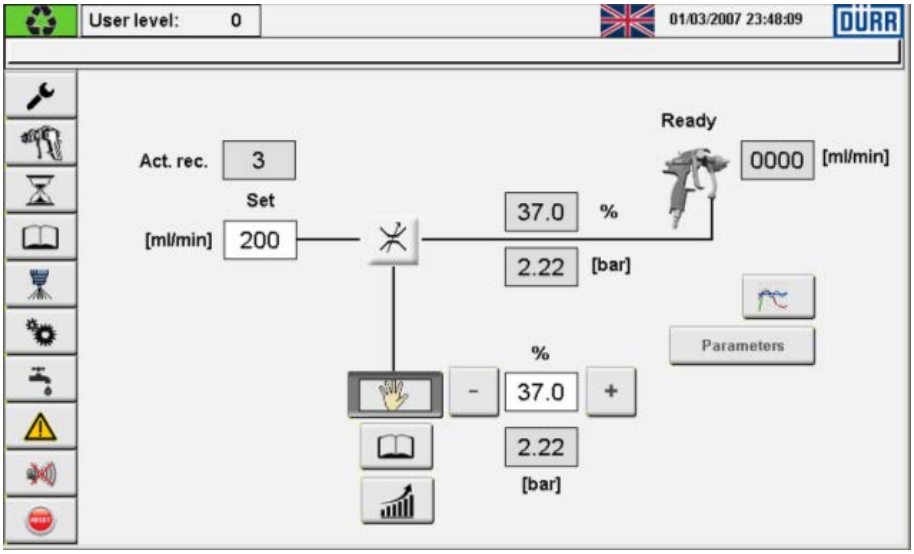
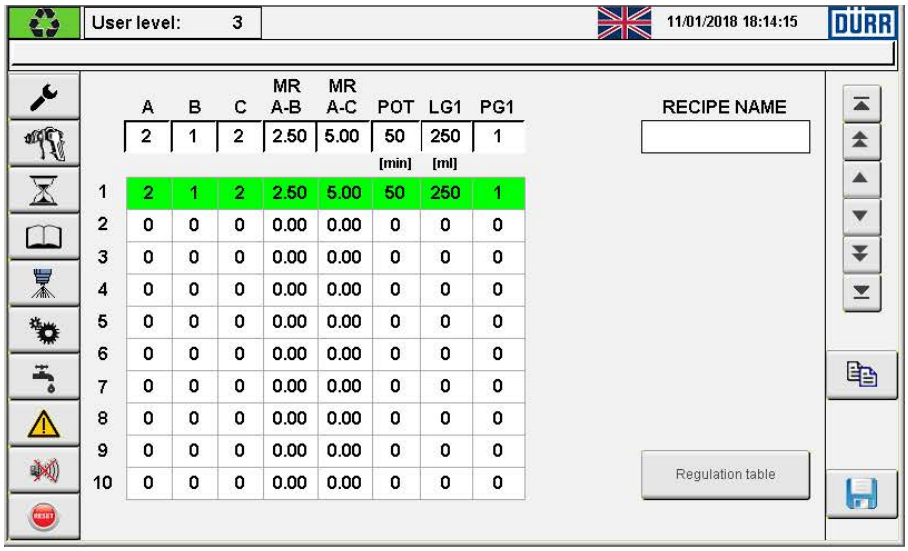


Figure 58 flow regulation manual mode

In manual mode the output value in percentage of the regulator can be directly assigned.

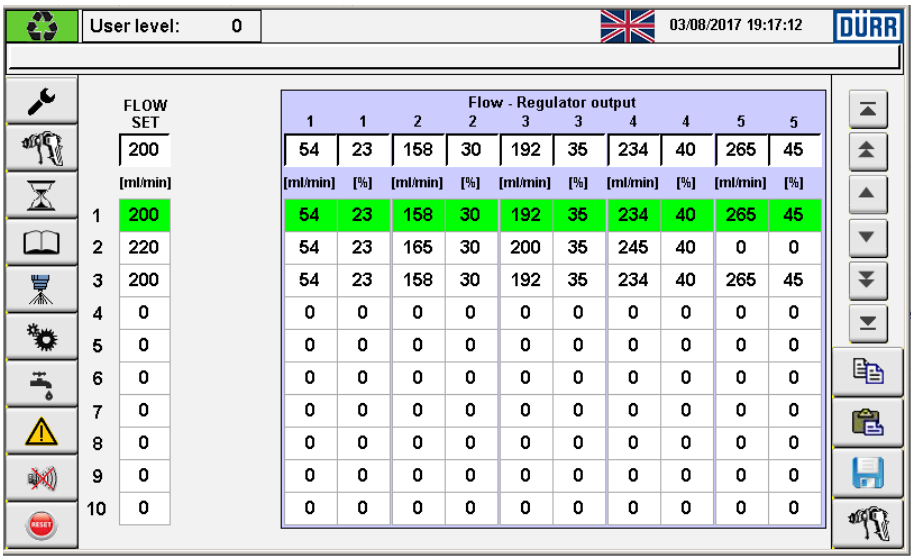
Even if in the parameters setting the system is configured as closed loop, operating the regulator in manual mode, the system can be controlled while spraying as if it were regulated in pressure.
Press on the key  to access the recipe regulation data later described.



	A	B	C	MR A-B	MR A-C	POT [min]	LG1 [ml]	PG1
	2	1	2	2.50	5.00	50	250	1
1	2	1	2	2.50	5.00	50	250	1
2	0	0	0	0.00	0.00	0	0	0
3	0	0	0	0.00	0.00	0	0	0
4	0	0	0	0.00	0.00	0	0	0
5	0	0	0	0.00	0.00	0	0	0
6	0	0	0	0.00	0.00	0	0	0
7	0	0	0	0.00	0.00	0	0	0
8	0	0	0	0.00	0.00	0	0	0
9	0	0	0	0.00	0.00	0	0	0
10	0	0	0	0.00	0.00	0	0	0

Figure 59 recipe page – Closed loop option active

In the recipe page press the button  to access the page with the recipe flow data.



	FLOW SET [ml/min]	Flow - Regulator output 1 [ml/min]	1 [%]	2 [ml/min]	2 [%]	3 [ml/min]	3 [%]	4 [ml/min]	4 [%]	5 [ml/min]	5 [%]
	200	54	23	158	30	192	35	234	40	265	45
1	200	54	23	158	30	192	35	234	40	265	45
2	220	54	23	165	30	200	35	245	40	0	0
3	200	54	23	158	30	192	35	234	40	265	45
4	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0

Figure 60 flow regulation data table

8.11.2 Regulation table data

In this table for each recipe is assigned a table of couples of values (regulator output percentage and corresponding flow) which should cover the working range of the recipe.

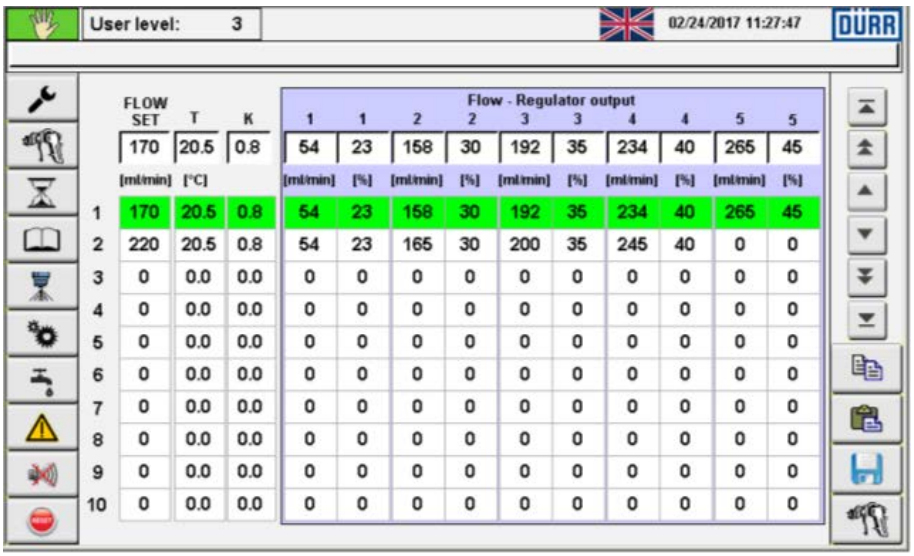
After a recipe is loaded, these values of the output in percentage are taken as initial value of the output, then, while spraying, a PI algorithm will control the output regulator and therefore the flow.

To fill out the table set the regulator output in manual mode, set an output value in percentage, spray and wait for the indicated flow to be stabilized; write the values of the percentage output and the corresponding flow in the table. The points describe a curve, which should cover the range of the possible working flow set points.

Values of the output for intermediate flows set points are calculated as linear interpolation from the table data.
Not all the five couples of values for a recipe needed to be filled out. They must be ordered from the first with growing values of flow left to right.

If for a recipe, the requested flow set point which is higher than the highest value in the table, the regulator output is set to zero, with an error message.

For system equipped with Coriolis flow meters is possible to have a temperature compensation.



	FLOW SET [ml/min]	T [°C]	K	1 [ml/min]	1 [%]	2 [ml/min]	2 [%]	3 [ml/min]	3 [%]	4 [ml/min]	4 [%]	5 [ml/min]	5 [%]
	170	20.5	0.8	54	23	158	30	192	35	234	40	265	45
1	170	20.5	0.8	54	23	158	30	192	35	234	40	265	45
2	220	20.5	0.8	54	23	165	30	200	35	245	40	0	0
3	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
4	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
5	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
6	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
7	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
8	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
9	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0
10	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0

Figure 61 regulation data table with temperature compensation

The table has two additional columns T and K.

While filling out the table, write in the column T [C°] the temperature shown on the screen, measured by the Coriolis flow meters.

While spraying at different temperatures, the calculated values of the output are corrected adding a Δ term obtained multiplying the difference in temperature between the value in the table and the actual temperature for the coefficient K. Δ = (Ttable –Tactual)*K

In the table above for instance, in the recipe 1, with a requested set point of 170 ml/min interpolating the data the calculated output to the regulator is 31.8% at 20.5 °C.

Spraying at 25°C Δ = (20.5 -25)*0.8 = - 3.6 and the corrected output 31.8 - 3.6 = 28.2 [%].

The value of K, has to be determined experimentally; generally the values of K are positive: at a defined flow setup the greater is the temperature, the lower is the output regulator value needed.

Start with a zero value of K and rise it gradually to compensate the temperature effect on the values previously saved in the table.

Write zero in the temperature T and K columns if the temperature compensation is not needed.

If the system is equipped with an EcoCleaner M the table can be filled with an automatic quick procedure.

Place the gun already loaded in the EcoCleaner M, login with user level two or higher.

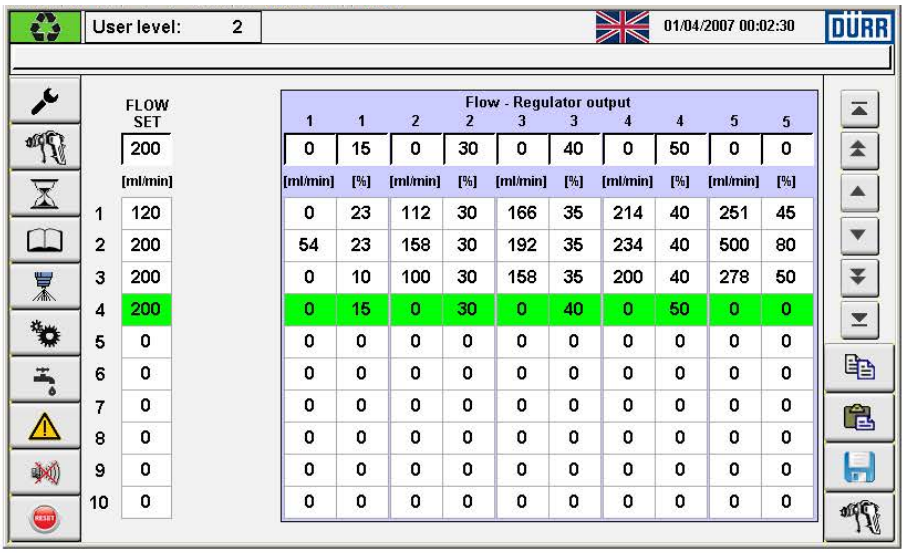


Figure 62 regulation data table automatic fill out procedure

Write in the recipe the output percentages of the regulator you want to measure the corresponding flow,

set the output regulator in manual mode and press the key  .

An automatic procedure is carried out where, the sequence of the set points written in the recipe is assigned to the output, and the corresponding values of the measured flow saved in the recipe regulation table.

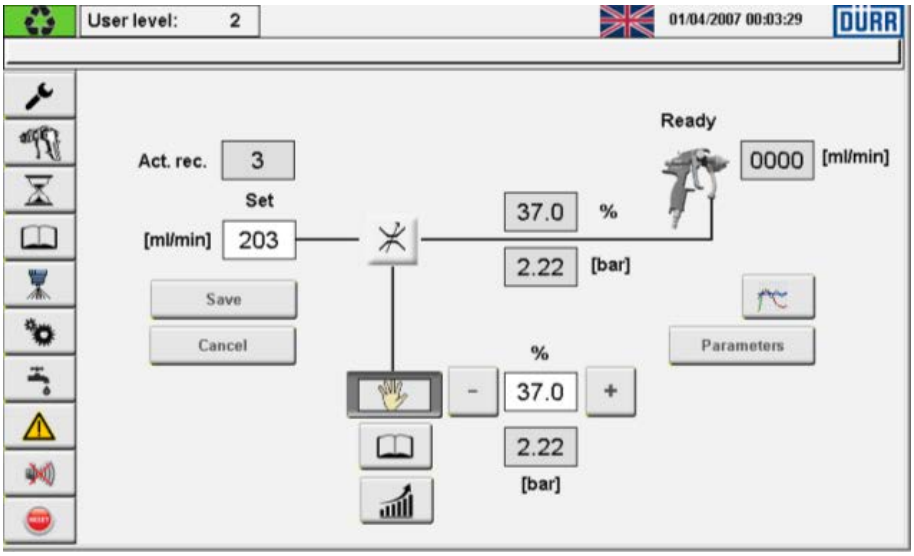


Figure 63 flow regulation – save flow set point in recipe data

The recipe set point can be change directly in this page, and then saved in the recipe data. The key cancel restores the original flow set from the recipe.

8.11.3 Graphic representation

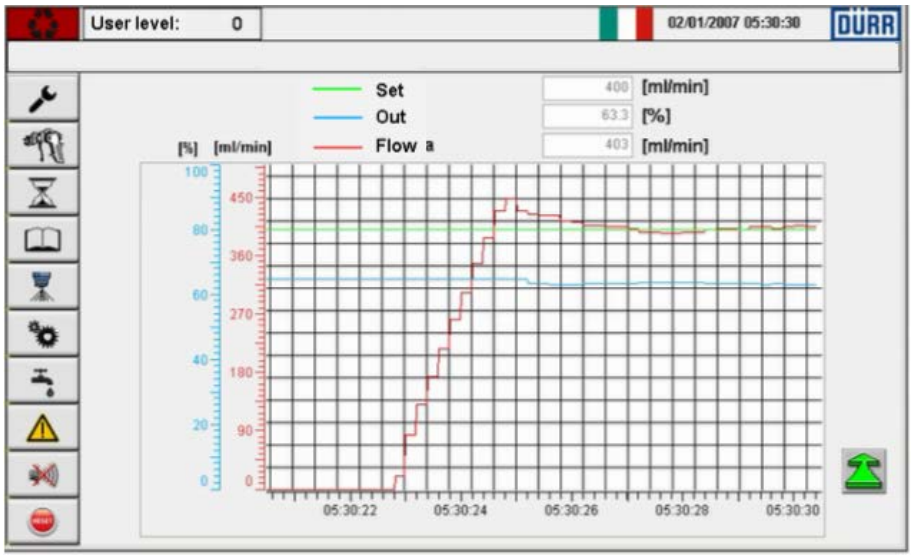


Figure 64 flow regulation – Graphic

In the regulation page, press the button  to open the graphic page, where are represented the values of the set point, the current flow, and the regulator output.

You can zoom the graph by changing the parameters as described below.

8.11.4 Regulation parameters

In the regulation page, press the button 

to open the page of the regulation parameters. Log in with level 3 to modify the parameters.

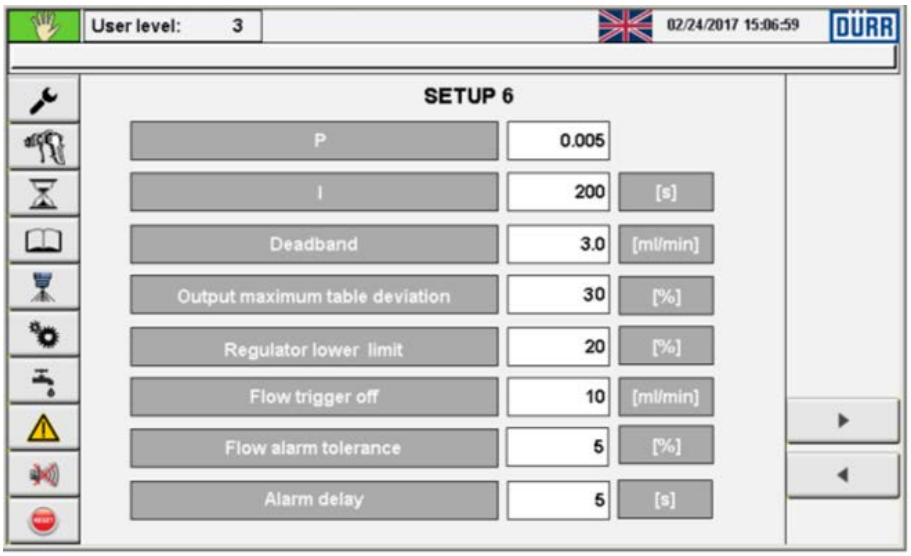


Figure 65 flow regulation – Parameters 6

P	Is the proportional gain of the PI regulator. Increase the value of this factor until you get a prompt response of the regulator, with no overshoot. Default value 0.005. Minimum value 0, maximum 10.
I	Is the integral time. Decrease the value to reduce the residual error, without oscillations. Default value 200 [s]. Minimum value 0, maximum 100000.
Deadband	The regulator output is “frozen” when the flow error is contained within the deadband. Default value 3 [ml/min]
Output Maximum table deviation	While spraying, the deviation of the regulator output, compared to the value obtained from the table data calculation, can be limited inside a band, defined in percentage. A warning message appears when the limit of the band is reached. Unexpected output values could be due to obstructions in the house or changed conditions of the paint. Set this value big enough to let the output value change, if the regulation table data are not compensated with temperature (system equipped with Coriolis mass flow). Set this value to zero to exclude the control, working with no output limitation. Default value 30%.
Regulator lower limin	Set this value at the lowest limit of the regulator output in percentage, which let the material pass through the spray gun; this avoid the regulator output gets stuck at such a low value doesn’t let the material pass. Default value 20%.

Flow trigger off	If air is sprayed with the gun, use this parameter to avoid the regulator output rises while the gun trigger is released. The regulator output gets frozen as soon as the measured flow falls below this limit. Rise the value of this parameter in order to get a prompt reaction of the regulation: releasing the trigger the regulator output gets quickly frozen. If material is passing and still the gun trigger indicator (the circle in the regulator page next to the trigger) is red coloured, reduce the value of this parameter. Set this parameter to zero to exclude its effect.
Flow alarm tolerance **Alarm delay**	If the difference in percentage between the flow set point and the current flow is greater than the threshold here assigned, for a time longer than the delay here assigned, an alarm is activated. Set the alarm tolerance to zero to exclude the alarm. Default values 5%, 5 seconds.

Figure 66 flow regulation – Parameters 7

The graphic trends of the regulation can be scaled with a zoom factor.

8.11.5 External interface signal

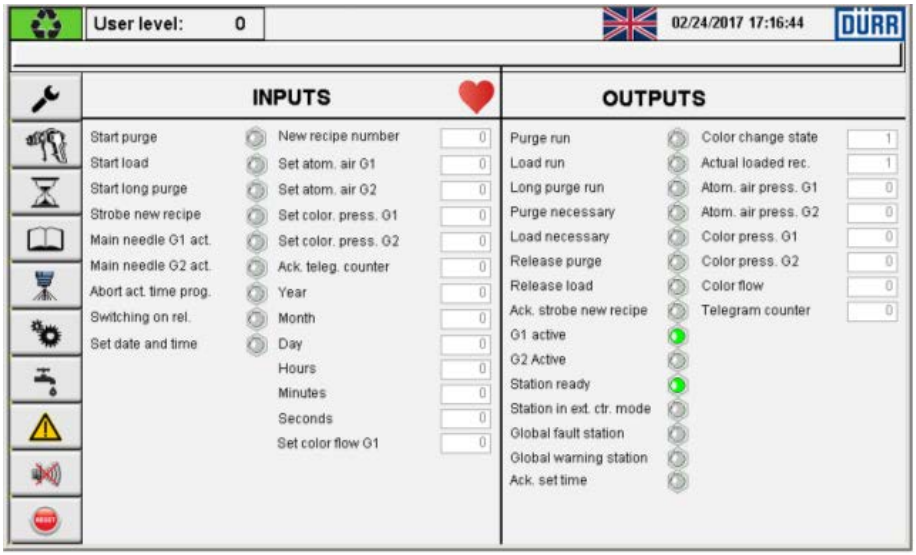
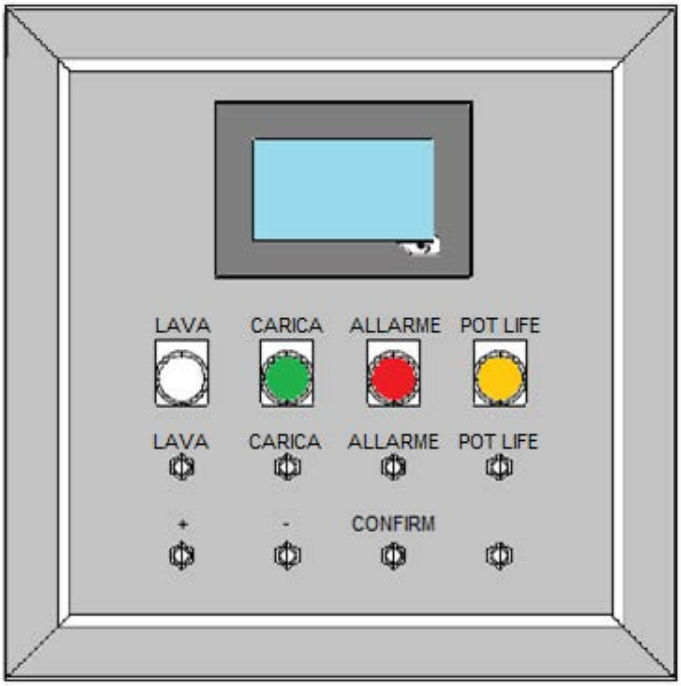


Figure 67 flow regulation – External interface control signal page

In external recipe mode when the option “closed loop” is active, flow can be controlled through the signal interface in the variable Set Colour flow. If the value of Set colour flow is zero, the flow set point value is taken from the actual recipe in use.

8.12 Remote magnetic switch panel

The system can be equipped with a remote magnetic switch panel, separated from an Ex hazardous area by a glass wall. The operator, staying in the paint booth, can activate the main commands with a magnet.



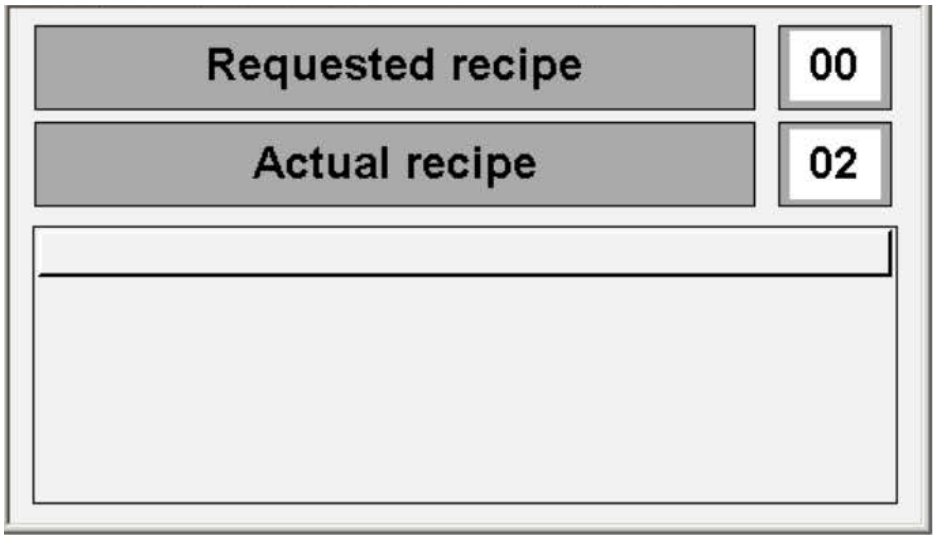
8.12.1 Available commands

The available commands are:

PURGE	to start a purging cycle. The magnet must be placed in front of the sensor and hold in place for a short time. While the purging cycle is running the white lamp is flashing. Activate again the switch while the cycle is running to stop it. Once the system is purged the white lamp is steady on.
LOAD	to start a loading cycle. The magnet must be placed in front of the sensor and hold in place for a short time. While loading cycle is running the green lamp is flashing. Activate again the switch while the cycle is running to stop it. Once the system is loaded, the green lamp is steady on.
RESET ALARM	to silence the siren and reset an alarm. When there is an alarm and the siren is on, the red lamp is flashing. Place the magnet in front of the sensor a first time to silence the siren. The red lamp is steady on. Alarm messages and warning can be red on the panel. Place the magnet in front of the sensor a second time to reset the alarm.

8.12.2 Recipe change + / - and confirm

When the system is purged the recipe in use can be changed.
The panel shows in the lower row the actual recipe number.
The panel shows in the upper row the requested recipe number.
Put the magnet in front of the sensors + or - and hold it in place for a short time, to increase or decrease the required recipe number. Activate the confirmation sensor with the magnet. The actual recipe number is then updated. Loading operation can be started.



The panel shows the actual and the required recipe values, the alarms and the warnings messages.

8.12.3 Pot life lamp

When the pot life pre-alarm is active (90% of the pot-life time already passed) the yellow lamp is flashing. The old mixed material inside the gun hose needs to be renewed in a short time; spray it out or purge the system. When the pot-life time is expired the orange lamp is steady on, and the system must be purged.

9 Maintenance

A T T E N T I O N

The following operations can be performed only by adequately trained personnel. See chap. 3 of this manual.

C A U T I O N

You must wear personal protective equipment.
Always wear the following equipment during assembly operations.

W A R N I N G

Before performing any maintenance, on **EcoDose 3K**, the operator must ensure that:

- the power is shut down
- air and product supplies are intercepted all circuits (product / solvent / air) are depressurized

W A R N I N G

Danger due to spraying or splashing material!

Potential chemical burns of the skin due to material spurting from defective paint pipes and color changers.
You must regularly check paint pipes and color changer and you must reduce residual pressure before working on color valves and paint pipes

W A R N I N G

Attention: energized equipment

9.1 Control panel

The electrical equipment must be examined once a year to ensure it is in a suitable condition.

In particular, check the correct tightening of terminal screws

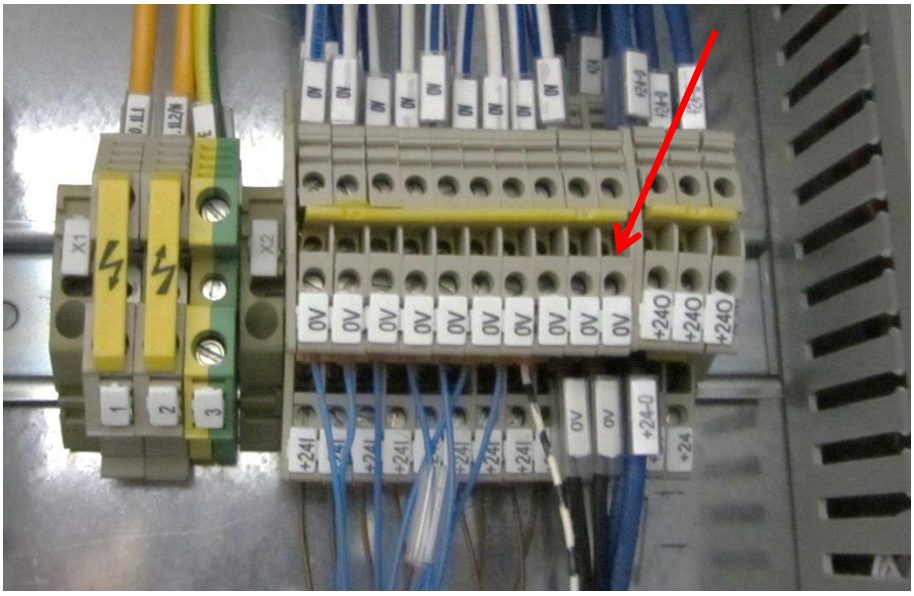
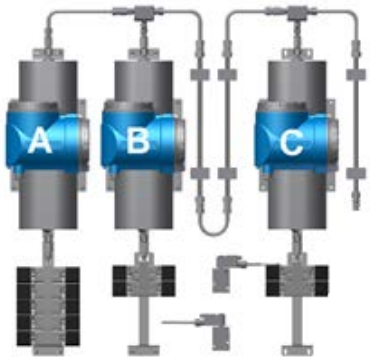
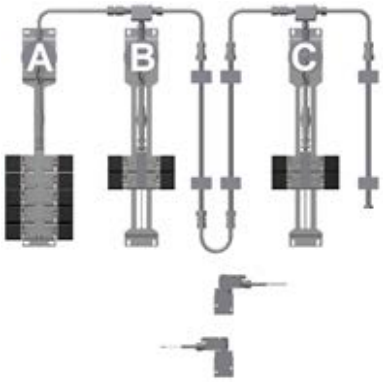


image indicative

The **EcoDose 3K** PLC usually does not need any maintenance.

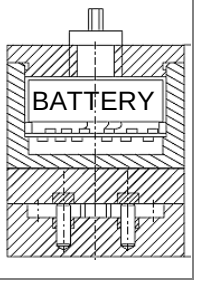
The **EcoDose 3K** PLC is provided by a flash memory and does not need the installation of a buffer battery.

9.2 Fluidic panel

Complete “fluidic panel”	
 Coriolis version	 Gear version
Daily inspect fluidic panel for visible damage.	

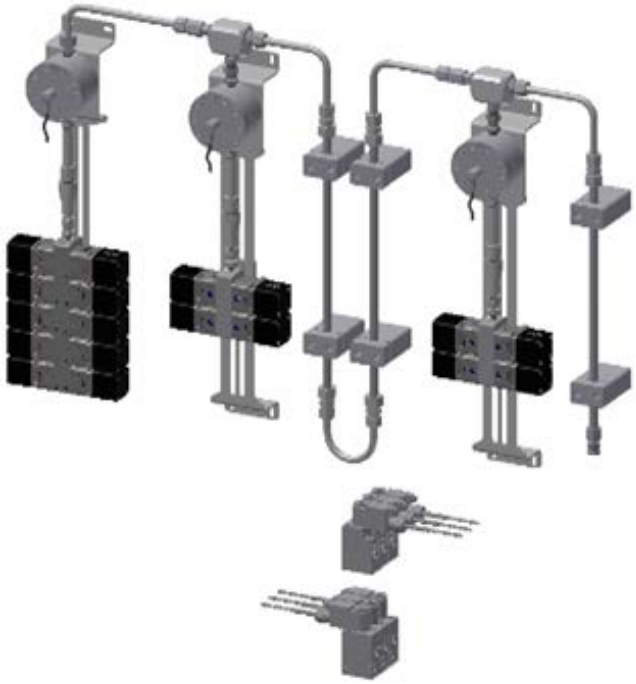
C.C. Valves		
 **EcoMCC3**	 **EcoValve7 20**	 **EcoMCC 200**
C.c valves should be inspected periodically following the manufacturer's instructions (attached to this manual). The valve activity is controlled by the PLC, and if the number of switching operations carried out exceeds the programmed value, the display shows the following message: "MAXIMUM NUMBER OF PULSES ACHIEVED, PROVIDE MAINTENANCE". When the message appears, you must replace the valve as soon as possible		

“Coriolis” flowmeter	
	**“Coriolis”** mass flowmeters do not need any maintenance in addition to the normal calibration tests to ensure the suitable conditions.

“Gear“ flowmeter	
 Standard	For “Gear” flowmeters, if a measurement cell is not used for a long period, it must be washed with a suitable solvent. The washing is particularly important for measuring instruments, since the products release particles that can stick to the gear wheels. For disassembly, follow the manufacturer's instructions (see Chapter 11 documents) The accuracy of the measuring cell must be checked at regular intervals by means of calibration. After about 8000 hours of activity, the calibration must be controlled by the manufacturer. The activity of the “gear” flowmeter is controlled by the PLC, and if the number of switching operations carried out exceeds the programmed value, the display shows the following message: "MAXIMUM NUMBER OF PULSES ACHIEVED, PROVIDE MAINTENANCE". When the message appears, you must replace the flowmeter as soon as possible On flowmeters with optical fiber there is a battery. The battery must be replaced every year to ensure the correct operation of the machine. 
 With fibre optic	

“GEAR FILTER” (only for versions with gear Flowmeter)	
	Daily remove the filter, clean the cartridge or replace if necessary. For the model, see drawing mixing panel attached to this manual.

EXCLUSION “GEAR FILTER” (only for versions with gear Flowmeter)



If there should be the need of removing one or both “GEAR FILTER” from the mixing panel due to the particular kind of paint and/or catalyst used, proceed as follows:

A Remove the “GEAR FILTER”
B Loosen the screws that secure the "CC valves group" on the rail
C Slide the "group CC valves " upwards and fix it directly to the gear flowmeter
D Tighten the screws that secure the "CC valves group " on the rail

10 Parts List

See the drawings **attached**

10.1 Drawings

drawing n.	rev.	description
0300040.CM.GE.01	00	**EcoDose 3K** general assembly - GEAR flowmeter version LP
0300040.CM.GE.02	00	**EcoDose 3K** general assembly - GEAR flowmeter version HP
0300040.CM.GE.03	00	**EcoDose 3K** general assembly - CORIOLIS flowmeter version LP
0300040.CM.GE.04	00	**EcoDose 3K** general assembly - CORIOLIS flowmeter version HP
0300040.DT.GE.01	00	Universal fluidic panel_CORIOLIS flowmeter_HP
0300040.DT.GE.02	00	Universal fluidic panel_GEAR flowmeter_HP
0300040.DT.GE.03	00	Universal fluidic panel_CORIOLIS flowmeter_LP
0300040.DT.GE.04	00	Universal fluidic panel_GEAR flowmeter_LP
0300040.PD.GE.01	00	Universal pneumatic cabinet - Part list
0300040.WD.GE.01	01	Universal electrical cabinet - Part list
N32500027	01	Mixing unit calibrated pipe - **EcoDose 3K**
N32500028	00	Mixing unit calibrated high ratio
N26990005	00	Kit 1 fluid regolator
F02030041	00	Remote magnetic switch panel
	01	ED3K Wiring diagram

11 Attached documents

Documentation of vital components

Supplier	Description	Model	Code
Endress + Hauser	Coriolis flow meter	Promass 80	W07020175
DÜRR	Gear flow meter 0,005-2 l/min.	ZHM 01/1	W07020134
	Gear flow meter 0,02-3 l/min.	ZHM 01/2	W07020133
	Low Pressure Regulator Flow	EcoFlow LPF P 7	N26010101
	Valves CC	EcoValve7 20 2C	N32350011
	Valves CC	EcoValve7 20 4C	N32350012
	Valves CC	EcoMCC 200 2C D SST	N14100001
	Valves CC	EcoMCC 200 4C D SST	N14100002
	Valves CC	EcoMCC 200 8C D SST	N14100004
	Valves CC	EcoMCC 200 10C D SST	N14100005
	Valves CC	EcoMCC3 20 2C	N14800102
	Valves CC	EcoMCC3 20 4C	N14800103
	Valves CC	EcoMCC3 20 6C	N14800104
	Valves CC	EcoMCC3 20 8C	N14800105
	Valves CC	EcoMCC3 20 10C	N14800106
	gun selection valve	SE4	N32040087

Certificates and Declarations of Conformity

Supplier	Description	Code
Dürr	DECLARATION OF INCORPORATION (according to Directive 2006/42 EC Annex II par.1B)	
	UL declaration of conformity electrical cabinet (only when required)	

12 Contacts & Hotline

For any question or further technical information, please contact your dealer or sales partner.