

FLOPURGE



User manual rel. 1.0

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PREVIEW

FLOPURGE manages four 4-20mA inputs, ten ON/OFF inputs with alarm and shut-off alarm functionality and four solenoid valves. Every inputs can be configure as alarm or shut-off event. The measurements 4-20mA and possible alarm or shut-off events are shown in real time on display 4x20 characters. Every shut-off event causes the immediate switch off of all solenoid valves. FLOPURGE automatically controls the solenoid valve of process gas (V3 or V3+V) and two solenoid valves for purging cycles (V2, V4).

INSTALLATION

The FLOPURGE housing is an IP 55 wall mounting plastic box.

Outside installation must be protected from direct sun and rain.

Technical information concerning cabling, mounting and further details are shown in the outlines at the bottom of the manual.

Earth

FLOPURGE unit needs an earth connection to protect the circuitry from surges, due to electrical discharges coming from power and phone networks (see connection layout).

To safeguard the equipment from over-voltages and for safety reasons, the earth connection must always and obligatorily exist.

The manufacturer denies all responsibility for whichever damage to people and things, including equipment, caused by fault of earth connection.

Backup battery

A NiCd backup accumulator, disconnected at the delivery, maintains the data in memory and real time clock function during thirty days about.

Turn ON the switch labeled BATTERY, located in the rear of the front panel, to connect the backup battery before the first power-up.

KEYBOARD OPERATION

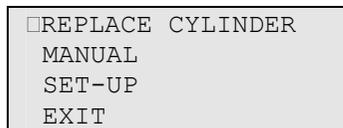
Programming, reading and command functions are performed by four keys on front panel, through a series of menus.



PASSWORD

Pushing  over three seconds, the system will require the password to enter into programming mode.

Push   to select desired digit,   to modify it.



MAIN MENU

After entering the keyword, push  to open the MAIN MENU and activate the programming mode.

In programming mode, the keys assume following functions:



- selecting options and menus
- scroll pages pertaining to same menu
- return to upper menu



- entering into selected menu
- setting variables values and alphanumeric characters
- setting options

System disables keyboard functions and returns in running mode selecting the *exit* option from main menu, or by keyboard time-out of 30 seconds.

CYLINDER REPLACEMENT sequence

By the Replacing Cylinder sequence, the system interacts with operator step by step and automatically performs purging cycles, to avoid releasing dangerous gases in ambient and introducing contaminants into supply line.

```
REPLACING CYLINDER 1
  CLOSE V (1)
  OPEN WASTE GAS LINE
v abort   continue ^
```

Step 1 – Selecting the option REPLACE CYLINDER from MAIN MENU, system automatically closes V3 and V (2), the page left appears on display. Push key ⏴ to

abort the sequence, or perform the manual operations suggested on display and then push ⏵ to continue.

```
REPLACING CYLINDER 2
  PURGING
V2:[s] V4:[s] C:
```

Step 2 – System starts the first purging sequence (purging); display shows current status of V2 and V4, and remaining cycles to the end of the purging sequence.

```
REPLACING CYLINDER 3
  REPLACE CYLINDER
  WEIGHT: .... Kg
  TARE:    .... Kg ^
```

Step 3 – Page left will appear on display at the end of first purging sequence.

Replace the empty cylinder and then push ⏵ to continue. In case the gas provision is detected by electronic scale, the display shows the current weight, so that the user can set the tare of the new cylinder using ⏴ ⏵. Push ⏵ to pass into next step.

```
REPLACING CYLINDER 4
  PURGING
V2:[s] V4:[s] C:
```

Step 4 – System starts the second purging sequence (washing); display shows same information of step 2.

```
REPLACING CYLINDER [5]
  CLOSE WASTE GAS LINE
  OPEN V (1)
                               end ^
```

Step 5 – At the end of second purging sequence, the page left appears on display. Perform the manual operations suggested on display and then push ⏵ to end.

Push ⏵ to end the sequence and return to MAIN MENU: system automatically opens V (2) and V3.

(1) – messages appearing if V CONTROL = Manual only (see forward)

(2) – actions occurring if V CONTROL = Flopurge only (see forward)

MANUAL OPERATIONS

Selecting MANUAL option from the MAIN MENU, you can transfer the control of the valves from the system to the keyboard.

MANUAL	
V : [s]	V2 : [s]
V3 : [s]	V4 : [s]
EXIT	

SYSTEM CONTROL MODE

V does not appear with VALVE V CONTROL set to MANUAL (see previous paragraph).

Automatic / Manual

Select this option and press the buttons   to change the control of the system from *automatic* to *manual* mode and vice versa.

Leaving the system in *manual mode*, the message MANUAL CONTROL MODE will appear cyclically on display.

[s]

Field indicating the current status of the corresponding valve.

Select the valve and press the buttons   to change the status from ON to OFF and vice versa.

PROGRAMMING

<input type="checkbox"/> SYSTEM INPUT VALVE V CONTROL PASSWORD

SET-UP MENU

System goes into programming menu after selecting SET-UP option from MAIN MENU and pushing .

PURGING CYCLES : VALVE ON TIME : BUZZER VOLUME : RECOVERY TIME :

System

This menu allows defining purging parameters, alarm volume and alarm recovery time.

Purging cycles

This field sets the total number of cycles before disconnecting an empty cylinder or after connecting a new cylinder. Each cycle include two phases: charging nitrogen (V4 open) and discharging waste gas (V2 open)

Valid range is from 1 to 99.

Valve ON time

This field sets the duration of the single phase, equal for the charge and the discharge phases.

Valid range is from 1 to 99 seconds.

Buzzer volume

The variable defines the buzzer volume: valid settings are numeric values from 1 to 10 and the OFF option, corresponding to buzzer disabled.

Recovery time

This function reactivates the acoustic signal and resends the acknowledged alarm status into the unacknowledged condition, if this persists longer than the recovery time.

Valid range is from 0 to 99 minutes and the option OFF, which disables the recovery function.

Input setup

The menu allows defining all parameters concerning analog and digital inputs.

```

4/20 mA INPUT
1 2 3 4
ON/OFF INPUT
1 2 3 4 5 6 7 8 9 10
    
```

Push  and  to move the cursor on the desired input;  to select it.

4...20 mA INPUT CONFIGURATION

Page # 1: MEASUREMENT

```

IN1 4/20mA CNF
ID:      .....
Unit:    ...
Zero: ... FS: ...
    
```

Page # 3: ALARM

```

IN1 4/20 mA CNF
ALARM THRESHOLD
MIN:      MAX:
MODE:
    
```

IN1 4/20 mA CNF

TARE :
DELAY :

Page # 2: Tare / AI delay

Push  and  to move the cursor on the desired field;  and  to edit the value / option

Page 1: MEASUREMENT

Identifier (ID)

Alphanumeric string defining the measurement associated to the input, with maximum length 8 characters.

Warning !!

- Input results configured and enabled if first character of corresponding ID is different from (blank).

Unit

Units of measurement associated to the input.
Following options are available: bar, mb, Kg, ton, %, ppm.

Zero – FS (Full Scale)

Limits of range of the transducer, defined with measurement units selected in *measurement unit*.

Zero and FS values correspond to the measurements supplied by the analog transducer when the output current is respectively 4 and 20 mA.

Valid range is 0.0 ÷ 999.

Page 2: TARE/DELAY

Tare

Define the weight corresponding to the conditions: storage completely empty expressed in Kg.

The field appears when *unit* is set to Kg only.

Delay

Minimum duration of the alarm condition before generating the alarm status, expressed in seconds.

Alarm conditions correspond to:

- input signal outside alarm thresholds, for analog inputs
- input signal different from normal status, for digital inputs

Valid range is 0 to 99 seconds.

Page 3: ALARM

Min, MAX

Minimum and maximum alarms thresholds.
Values must be set within the interval Zero – FS.

Mode

Function associated to the input.
ALARM the active status of the input generates ALARM status
SHUT-OFF the active status of the input generates SHUT-OFF status

```

IN 1  ON/OFF CNF
ID..... NO/NC
DELAY:
MODE:
    
```

ON/OFF INPUTS CONFIGURATION

Push  and  to move the cursor on desired field;
 and  to edit it.

NO/NC

Status of the sensor associated to the normal conditions (non-alarm or non-active): NO as normally open, NC as normally closed.

For remaining fields refer to previous paragraph *analog inputs configuration*.

Valve V control

```

VALVE V CONTROL
V: FLOPURGE CONTROL
    
```

This menu allows including or excluding the valve V from the system management, in function of the valve type: solenoid or manual.
Available options are FLOPURGE CONTROL and

MANUAL.

PASSWORD

This option allows setting and modifying the password.
Push   to select desired digit,   to modify it.

Warning !! - Password authentication is skipped setting the keyword to 000.

FUNCTIONS

Monitoring

In absence of alarm, shut-off and halt status, the display shows the status page, containing all measurements related to the configured inputs 4/20 mA.

ID An.1	value 1	un1
ID An.2	value 2	un2
ID An.3	value 3	un3
ID An.4	value 4	un4

Typical status page

Example left shows the typical status page including all analog inputs, where the fields *identifier* and *un* were still explained in previous section *programming*, and *value* indicates the current value of the measurement.

In case no setup parameter is defined (first power-up) or no analog input is configured, the status page assumes following shapes:

First power-up

FLOPURGE NO SETUP PARAMETER

No configured analog inputs

FLOPURGE NO ALARM

Alarms management

Alarm page management differs from monitoring of status pages due to following details:

- When an alarm status begins, the display shows a blinking page containing alarm information (alarm page), until the acknowledgement operation;
- After the acknowledgement, the display alternates the status page to the blinking alarm page in sequence, with refresh period 5 seconds.

The **acknowledgement** of the alarm page occurs by pushing the **ACK** pushbutton on front panel when this appears on display.

When more than four alarms are in progress, these are shown by more alarm pages, each requiring a distinct **ACK** (acknowledgement sequence); in this case, the display will resume the cyclical visualization of status page and alarm pages after completing the acknowledging sequence.

In case a new alarm goes active when all current alarm pages are acknowledged, the display stops on alarm page showing new information.

Whichever acknowledged alarm status persisting longer than the **recovery time** automatically returns into the unacknowledged condition and requires a new cumulative acknowledgement operation (only one for all alarms pages).

The **acoustic signal** continues until unacknowledged alarm pages exist.

The **red light signal** remains alight until the alarm status exists.

Typical ALARM PAGE

```
Ident.1 value 1 un1
Ident.2 value 2 un2
Ident.3
```

The example left shows an Alarm Page including alarms by analog transmitters and switch sensors.

Fails

FLOPURGE periodically performs a self-test to recognize possible fails.

The system fails are classified and monitored as alarms, and include:

Fail message or signal	Fail origin	Effects
Sensors power fault	Onboard auxiliary power supply	All inputs out of order
Valves power fault	24Vdc auxiliary power supply	Solenoid valves out of order
ID1...4 --- un	Transmitter 1...4 disconnected	Signal out of range
Slow blinking of fault red led	Electronic system	System fault

Remote alarm

Remote alarm output is a relay output available on screw connector CN2.

Output relay is energized when system is in Alarm, Shut-off or Halt status.

Shut-off

The shut-off status is an additional alarm condition that interrupts the gas supply, by closing V and V3.

Each input classified as shut-off also generates alarm status; for this reason, the shut-off status is notified like an alarm status, adding the suffix EMO to the ID of each shut-off input that have generated it, and by the fast-blinking of the red alarm light.

Differently from the alarm, the shut-off status requires a manual restoring and the shut-off status events are managed “with memory”.

That means the alarm monitoring continue until the ACK, even if the event is already terminated, and only when all events are closed and acknowledged the system enters into HALT status.

Halt

The *Halt status* always occurs after SHUT-OFF or the POWER-UP and is testified by the **yellow light signal** blinking.

SYSTEM HALTED	
UP Key:	SUPPLY
DOWN Key:	MANUAL

During the HALT status, V and V3 remain close; the display suspends the scrolling functions and shows following message.

Press  or  to exit from HALT status and enter into manual or automatic mode.

Resetting alarm thresholds

Whilst FLOPURGE is operating, push the push-button behind the front panel, until the message *erasing* appears on display.

This operation, effective over all analog inputs, sets to Zero the minimum alarm thresholds and sets to Full Scale the maximum alarm thresholds.

Erasing setup parameters

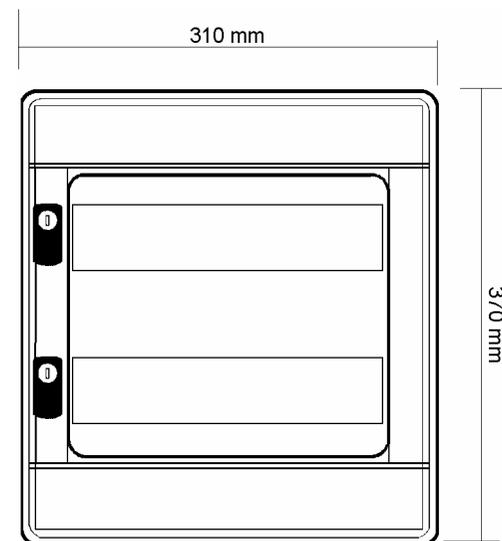
Setup parameters are stored in a non-volatile memory and retained also in power-off condition, without time limits.

If you like to erase all current setup parameters and set them to default values, observe following sequence of operations.

1. Disconnect the power supply;
2. Push and hold the button behind the front panel, close the battery switch;
3. Connect the power supply;
4. Release the pushbutton when the message *erasing* appears on display.

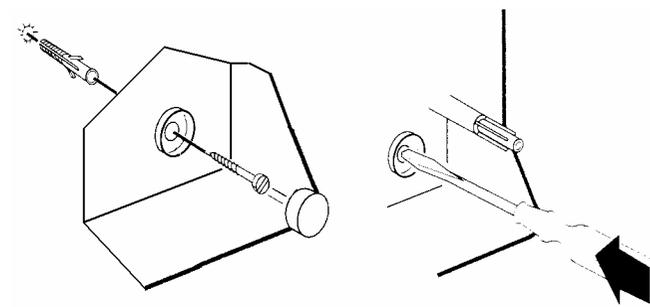
This operation set all input ID = *blank* (all inputs disabled), V = manual, Purging cycles = 5, Valve ON time = 3 seconds, Buzzer volume = 10, Recovery time = OFF.

MOUNTING

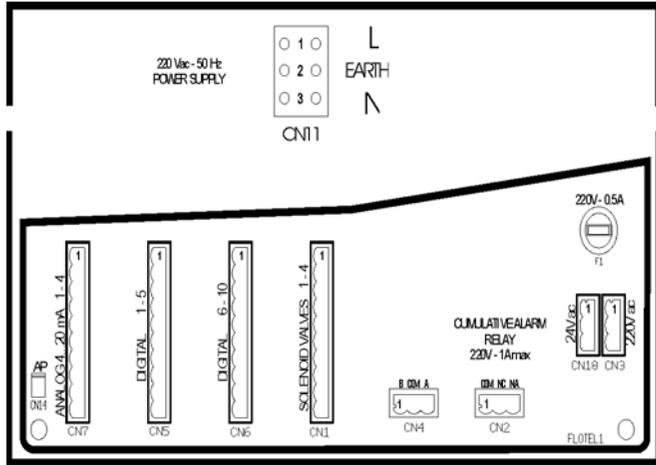


Mounting tools
Drilling layout

4 Ø 6 mm expansion nails
220 mm X 160 mm



ELECTRICAL CONNECTIONS



- CN7** 4...20 mA analog inputs
- CN5** Digital inputs from 1 to 5
- CN6** Digital inputs from 6 to 10
- CN1** Solenoid valves control
- CN2** outputs alarm relay
- CN11** 220Vac power supply

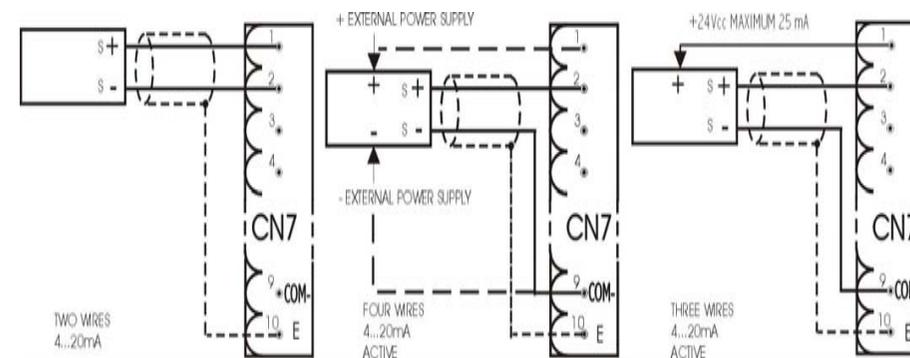
CN7 <i>Analogs 4...20 mA</i>		CN5 <i>Digitals 1- 5</i>		CN6 <i>Digitals 6- 10</i>		CN1 <i>Solenoid valve controls</i>		
Pin	Input	Pin	Input	Pin	Input	Pin	Signal	Type
1	+ AN 1	1	+ D 1	1	+ D 6	1	V 1 (+)	OUT
2	- AN 1	2	- D 1	2	- D 6	2	V 2 (+)	OUT
3	+ AN 2	3	+ D 2	3	+ D 7	3	V 3 (+)	OUT
4	- AN 2	4	- D 2	4	- D 7	4	V 4 (+)	OUT
5	+ AN 3	5	+ D 3	5	+ D 8	5	reserved	--
6	- AN 3	6	- D 3	6	- D 8	6	reserved	--
7	+ AN 4	7	+ D 4	7	+ D 9	7	24 V (+)	IN
8	- AN 4	8	- D 4	8	- D 9	8	24 V (+)	IN
9	COM -	9	+ D 5	9	+ D 10	9	24 V (-)	IN
10	ground	10	- D 5	10	- D 10	10	reserved	---

CN2
Relay output

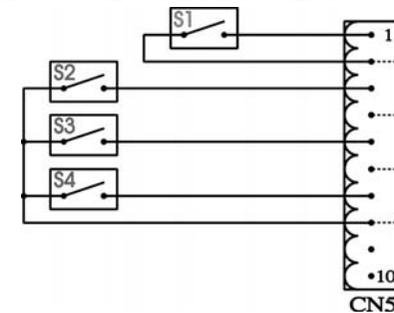
Pin	Output
1	COM
2	NC
3	NO

TYPICAL APPLICATIONS

ANALOG SENSORS



DIGITAL SWITCH SENSORS



Warning !!

- Pins 2 – 4 – 6 – 8 – 10 of screw connectors CN5 e CN6, labeled by– D, are interconnected on FLOPURGE board.
- Do not connect external power supply to switch sensors

TECHNICAL CHARACTERISTICS

4...20 mA Analog Inputs

Compatibility	4...20 mA transmitters
Maximum voltage (open circuit)	24 Vdc
Minimum voltage @ I = 20 mA	16 Vdc
Short circuit current	25 mA
Resolution	10 bit

Digital Inputs

Compatibility	Switch sensors
Maximum voltage (open circuit)	15 Vdc
Short circuit current	15 mA

Alarm relais output

Maximum switching voltage	250 Vac / Vdc
Maximum switching current	100 mA

Power supply

Supply voltage	220 Vac – 50 Hz
Maximum supply current	100 mA

Valves driver outputs

Nominal voltage	24 Vcc
Maximum switching current	100 mA
Insulation voltage	> 4 KV

Mechanical protection degree

IP 55

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