





# **DIGI-MIX**

### THE REPLACEMENT FOR THE MECHANICAL BEER PUMP

#### A MIXTURE OF CARBON DIOXIDE/NITROGEN ADAPTED TO THE CHANGING POURAGE CON-DITIONS IS USED.

#### Exact CO, ratio:

For consistent CO2 content in the beverage.

Exact N<sub>2</sub> ratio: To compensate for the vertical loss of pressure and all pipe friction losses, no foaming.

### BASICS

#### Constant CO2 pressure ensures consistent quality of the products served.

In order to guarantee a consistent CO2 ratio in the poured beer from full to empty barrel, it is necessary to feed the barrel with the correct CO2 pressure.

The correct CO2 pressure is the so-called equilibrium pressure. Then in the gas-filled part of the barrel there is as much CO2 as there is CO2 dissolved in the beer. This ensures that while pouring the entire contents of the barrel, the beer in the barrel neither becomes flat nor is enriched with CO2 (increase in carbonation).

The beverage will then always taste the same until the very end, even if a tapped barrel is emptied a little slower once in a while.

In order to deliver the beer from the stockroom to the beer tap, it often needs to negotiate a rise. For every metre of rise, a pressure increase of 0.1 bar is required.

If the beer is drawn quickly, the velocity of the beer in the beer pipe increases accordingly. The pipe friction loss rises with the square of the speed of the beer in the pipe.

The longer the pipe, the higher the pressure loss. This pressure loss rises linear to the pipe length.

These pressure losses, resulting from the height and from the pipe friction through the speed and the pipe length must be compensated for. Otherwise the equilibrium pressure of the dissolved CO2 will be too low and dischargement will occur in the pipe, CO2 bubbles form, this foam in the hose leads to major problems when pouring the beer into the glass.

## **ADVANTAGES**

#### Hygienically clean

• There are, as opposed to the mechanical beer pump, no components installed in the beer pipe, and thus no hygiene problems areas.

#### Monitoring via mobile phone and PC

- Constant online monitoring of the operating status, error reports and filling levels of the gas bottles on your smart phone and PC.
- Connection facility for the pre-alarm of the gas warning device. In this case, gas generation is switched off and an error report can be sent online.
- Notification of empty gas bottle, the system temporarily switches into "emergency mode" and supplies the pump with the available gas to 100%.

#### **Consistent quality**

- The CO2 mixed gas ratio is calculated automatically based on the CO2-concentration in the beer and the beverage temperature.
- The N2 ratio is calculated automatically based on the geodesic level and the total pipe friction loss. These losses are compensated for with the precise nitrogen ratio.
- In changing temperatures the CO2 mixed gas ratio is readjusted. Accordingly, the N2 mixed gas ratio also changes automatically.
- Consistent beer quality thanks to always correct CO2 equilibrium pressure until the barrel is empty.

### Easy to handle

- As carrier gas, 100% nitrogen or mixed gas with 30% CO2 and 70% N2 can be used, in this case only one CO2 warning device is required. This avoids having to monitor the lack of oxygen.
- The current gas bottle content can be calculated via the gas consumption. This will be shown on the display.
- Connection facility for a volumetric flow meter for the beer. This allows an additional automatic mix ratio change (changed pipe friction losses through variable flow speed).
- By entering the operating times you can detect any leakages in the system during downtimes.

## USER INTERFACE DIGI-MIX Home



### **Notifications**

Notific	ation	<u>↑</u> ॐ <u>∓</u> ∓ ⊘	GRUBER SCHANK SYSTEME
Datum	Uhrzeit	Meldung	G/K
04.05.22	10:31:04	Device working	
04.05.22	10:31:03	Emergency run mode OFF	
04.05.22	10:30:22	CO2 tank changed	
04.05.22	10:22:04		
04.04.22	10:22:01		

### Settings DIGI-Mix System

### Short calculation

Settings	$\triangle$	×  +	袋 	¢	GRUBER SCHANK SYSTEME
Digimix-system App settings					
Content weight CO2 tank ③		(0-100) kợ	-	10	+
Volume N2 tank ①		(0-10) m3	• -	4	+
N2 concentration ①			70% N2		100% N2
Gas flow rate < n ①	(0,1	-1,0) l/mir		0,7	+
Max. tolerable gas flow rate ①		(50) l/mir		50	+
Start working day ①		(0-24) Uh	r <b>e</b>	10	+
End working day ①		(0-24) Uh		2	+

Mixed Gas Calculat	or	$\triangle$	-×=	ŝ	ф	GRUMR SOHANK SYSTEME
Quick calculation	ulation					
Operating pressure ①		(0,5-	7,0) in bar	e	2,3	+
Beverage CO2 content	6	(0,0-1	0,0) in g/l	e	5,2	+
Temperature settings				nstant		with sensor
Beverage temperature		(4	1-25) in *C	e	5,2	)+
Min-alarm temperature 🛈		(0	)-35) in *C	e	5,2	)+
Max-alarm temperature 🛈		(0	)-70) in *C	e	5,2	)+
Temperature sensor ()	saturation	n pressure	regulation	$\square$	) display	and record
Sea level altitude ①		(0	)-3500) m	e	300	+
Puffertank ON ①	(min. Betr	iebsdruc	:k + 2) bar	e	4,3	+
Puffertank OFF ①	(min. Puffe	rtank Ell	N + 1 ) bar	e	5,3	+
Kurzberechnung Misch	gas					
Operating pressure					2	<b>,3</b> bar
Beverage CO2 content 5,2 g/l					5	<b>,2</b> g/l
Beverage temperature					5	<b>,0</b> •c
Sea level altitude					30	<b>10</b> m
Puffertank ON					4	,3 bar
Puffertank OFF					5	,3 bar
CO2 pressure (saturation)					0,9	5 bar
N2 pressure (friction- and altitude	e loss)				1,3	5 bar
CO2 rate %					ę	9 %
N2 rate %					4	11 %
The results are transferred into the device	e automatically					

### **Exact calculation**

Mixed Gas Calculator	
Quick calculation Exact calculation	
Time to tap 0,5 l beverage ①	(5-30) sec - 15 +
Inner diameter tube ①	(1,0-15,0) mm - 6,7 +
Tube length ①	(1-200) m 🗕 🚺 🕂
Operating pressure ①	(0,5-7,0) in bar - 2,3 +
CO2 content beverage ①	(0,0-10,0) in g/l - 5,2 +
Temperature settings	constant ( with sensor
Beverage temperature ①	(4-25) in °C - 5,2 +
Min-alarm temperature	(0-35) in °C - 5,2 +
Max-alarm temperature 🛈	(0-70) in *C - 5,2 +
Temperature sensor () satu	uration pressure regulation ( display and record
Sea level altitude ③	(0-3500) m - 300 +
Difference in altitude ①	(0-40) m - 3 +
Pressure safety margin ①	(0,0-1,0) bar - 0,1 +
Puffertank ON ③ (min. open	rating pressure + 2) bar - 4,3 +
Puffertank OFF ① (min.	puffertank ON + 1 ) bar - 5,3 +

### Exact calculation mixed gas

Time to tap 0,5 l beverage	<b>12</b> sec
Inner diameter tube	<b>6,7</b> mm
Tube length	<b>10</b> m
Operating pressure	<b>2,3</b> bar
Beverage CO2 content 5,2 g/l	<b>5,2</b> g/l
Temperature	<b>5,0</b> °C
Sea level altitude	<b>300</b> m
Difference in altitude	<b>3</b> m
Pressure safety margin	<b>0,1</b> bar
Puffertank ON	<b>4,3</b> bar
Puffertank OFF	<b>5,3</b> bar
Operating pressure	<b>2,30</b> bar
CO2 pressure (saturation)	<b>0,95</b> bar
N2 pressure (friction- and altitude loss)	<b>1,35</b> bar
CO2 rate %	73 %
N2 rate %	27 %
The results are transferred into the device automatically	

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## PHYSICS

There are two ways to compensate for the pressure loss:

#### 1. The mechanical beer pump

The barrel is preloaded with pure CO2, with the correctly calculated saturation pressure. To compensate for the pressure losses, it is best to use a beer pump that is installed directly after the barrel. The pressure increase of the pump ensures that the overall pressure never falls below the saturation pressure of the beer and the CO2 in the beer is not discharged. The beer pump can only be cleaned chemically, mechanical-chemical cleaning with a foam ball is not possible. No foam ball can pass through such a pump. In order to ensure optimum beer hygiene, a beer pump should be replaced with a new pump at regular intervals after a few years.

#### 2. **GRUBER DIGIMIX GAS PUMP –** the hygienic-virtual nitrogen pump

The sum of the pressure losses from the pipe friction and the necessary pressure to negotiate the rise is simply compensated for directly onto the barrel with nitrogen instead of with a mechanical pump. To this end, a gas mix is generated that apart from the required precise CO2 ratio of nitrogen as carrier gas to negotiate the height difference and to compensate for the pressure losses, which result from the pipe friction.

Nitrogen as opposed to CO2-gas dissolves approximately 100 times worse in beer and is sensorially neutral.



Source: Dr.-Ing. Markus Rammert

### **Dimensions:**

### H 358 x W 430 x D 120 mm





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