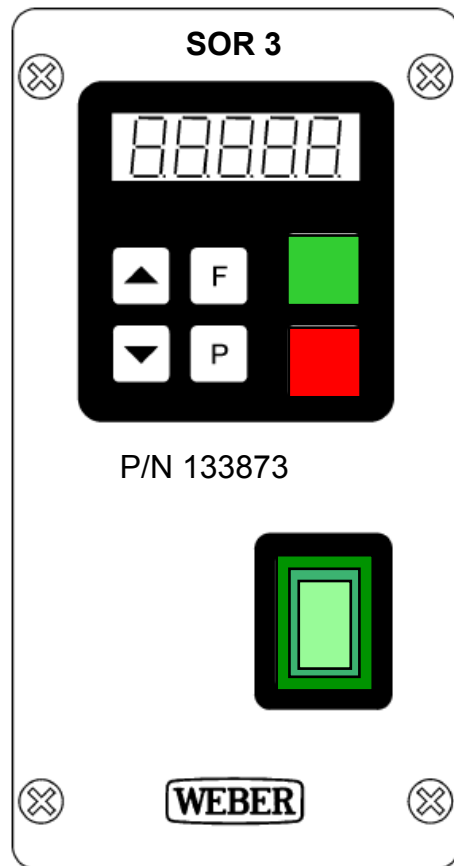


# SOR-3

## Frequency Controller

### Operator's Manual



## Safety Notice for the User

This description contains the required information about the intended usage of the products described herein. It is intended for use by technically qualified personnel.

Qualified personnel are those persons who, due to their training, experience and instruction, as well as their knowledge of the relevant standards, requirements, accident prevention regulations and operational conditions, are authorized by those responsible for the safety of the system to carry out their respective duties, and to recognize possible dangers and prevent them (Definition for experts according to IEC 364).

### Danger Notices

The following notices serve to protect the personal safety of the operators and the safety of the described products as well as the devices connected to them.



#### **Warning!**

Dangerous Voltage.

Inattention can lead to death, serious injuries or damage to equipment.

- Turn off the supply power before assembly or disassembly work and when fuses are changed or equipment modifications are undertaken.
- Observe the applicable accident prevention and safety regulations for the respective application.
- Before placing the equipment in operation, check whether the rated voltage of the device is in agreement with the supply voltage.
- Emergency OFF equipment must remain effective in all operating modes. Unlocking the emergency OFF equipment must not cause an uncontrolled startup of equipment.
- **The electrical connections must be covered!**
- **Ground lead connections must be inspected after mounting to insure that they function perfectly!**

### Usage According to the Regulations

The devices described herein are electrical operational equipment for application in industrial systems. They are constructed for the regulation of oscillating conveyor equipment.



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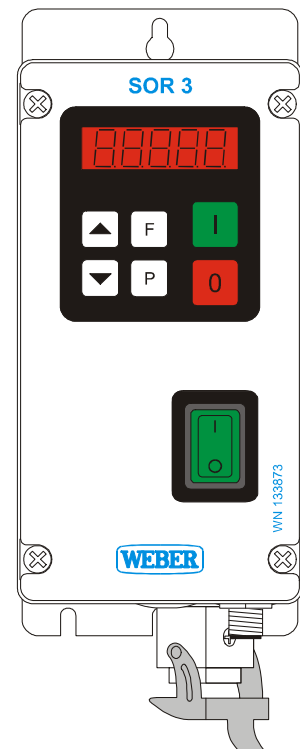
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## 1.0 General

The controllers of the production series SOR are microprocessor-controlled devices for the adjustment of the transport quantity for oscillating conveyors. The devices generate a power supply independent of the output frequency for the conveyor so that a precise tuning of the springs is not necessary. Due to the sinusoidal form of the output signal, a smooth running condition of the conveyor is achieved. The adjusted output frequency corresponds to the mechanical oscillation frequency of the conveyor. The optimal oscillation frequency is determined, and it is set up by means of the control panel. For normal operation of the oscillating conveyor, the frequency then remains constant, and the adjustment of the conveyor capacity corresponds to the level of the output voltage.

### Special Characteristics:

Supply voltage independent, adjustable output frequency  
 Constant conveyor capacity even with supply voltage variations  
 External release input



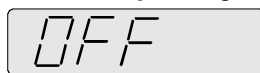
## 2.0 Function

The operation of the device is achieved by means of a control panel on the front plate (Keys and LED display). All adjustments can be made by means of this control panel. The setup of the parameters is achieved by means of a control menu that is accessible after the input of an operator code. In the chapter "Adjustment", the function of the control menu is explained in detail.

In the normal operating mode, the rated value of the conveyor capacity is displayed in percent on the LED display. In the programming mode, the corresponding dimensions corresponding to the setup instructions are to be used. Modified setup values are permanently stored either when the programming mode is exited or when no key is actuated within 30 seconds.

## 2.3 Control Input

**Release input:** Signal voltage 24 V, DC



Display indicator when Release not yet entered

## 3.0 Construction

- Power switch.
- Operation and display panel.
- Coupling socket for connecting supply power cable.
- Output connection socket for connecting the conveyor.
- Plug connection for connecting a release signal.

#### 4.0 Technical Data

Type	SOR 3
Supply power connection	100...230 V, +/- 10 %, 50/60 Hz
Output	0...210 V, 0...3 A / (0...100 V, 0...3 A)
Recommended* Master fuse	10 A Slow blow Circuit breaker 16 A, trigger characteristic "D"
Release	Input 24 V, DC
Operating temperature	0...+45 °C
Storage temperature	-10...+80 °C
Installation altitude	1000 m, 0.5 % rated current reduction for each additional 100 m
Standards	61000-6-2, EN 61000-6-4,

**\*Due to internal capacitors, at the instant of switch-on there is a load current impulse. Especially when multiple devices are simultaneously switched on, the master fuses can be activated. For this reason, slow-blow fuses, or circuit breakers with slow-blow characteristics must be used.**

#### 5.0 Order Nomenclature

Identification	ID Number	Brief Description
SOR 3	133873	3 A, Chassis model controller with no additional function

#### 6.0 Conformity Declaration

We declare herewith the conformity with the EMC Guideline

## 7.0 Adjustment Possibilities

After alignment of the controller associated with the oscillating conveyor, the necessary adjustments by the user are limited to the setup of the conveyor capacity.

Parameter:	Code	Basic Factory Adjustment:	Access code:
<b>Oscillating conveyor</b>			
• Oscillation amplitude (conveyor capacity)	0...100 %	A.	50 %
			000, 406

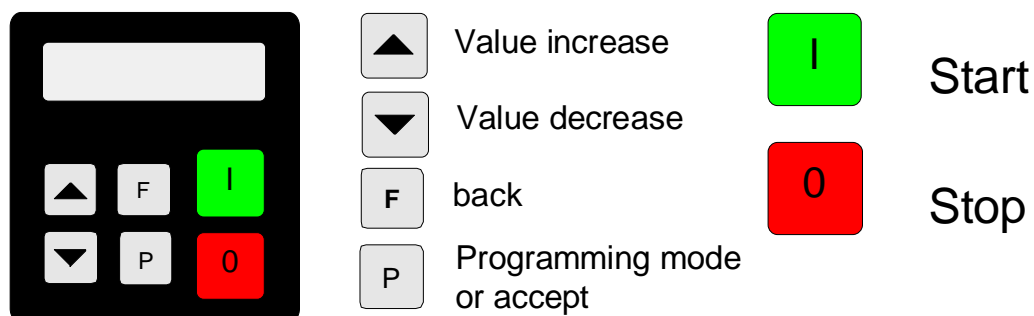
To adapt the oscillating conveyor, the following adjustments are possible

Parameter:	Code	Basic Factory Adjustment:	Access code:
<b>Oscillating conveyor</b>			
• Oscillation amplitude (conveyor capacity)	0...100 %	A.	50 %
			000, 406
<b>Service</b>			
• Oscillation frequency	30...140 Hz	F.	100 Hz
			406
• Soft start ramp time	0...10 sec.	/.	0.1 sec.
			406
• Soft stop ramp time	0...10 sec.	\.	0.1 sec.
			406
• Enable function invert	0 / 1	-En.	0
			406
• Display software version number			001

Access Code: 406

## 8.0 Operating Panel

### 8.1 Adjustment Procedure



When depressing the arrow keys, a quick depression of the key will increase or decrease the display by one place (one or ten), respectively. If the key remains depressed, after the next full decade the display changes by decades.

In order to prevent accidental or unauthorized adjustment, the adjustment parameters in operating menus are secured via operator codes. To access the operating menus, an operator code must be entered. Different operator codes (functional depth) are available.

**Modified adjustment values are only permanently stored either when the programming mode is exited or after 60 seconds have elapsed with no key depression.**

## 9.0 Placing in Operation

### 9.1 Preliminary Measures

- Check whether the local supply power is compatible with that of the device (refer to name plate) and that the connection value of the conveyor is within the allowable power range.
- Connect controller according to the delivered connection schematic
- Set rated value to zero
- Turn off release (as far as relevant)

**The controller is now basically functional and can be switched on (power, release).**



#### Notice

With the control device described herein, it is possible to adjust the resonant frequency of the connected conveyor. Because in this case even a slight rated-value preset can result in the full amplitude oscillations of the conveyor, one must be especially careful to prevent damage to the conveyor due to the limiting operation of the magnet.

The range of the resonant frequency is practically without feedback of the acceleration, but would not be useful anyway, since the conveyor can be neither used under load nor would it be controllable. Therefore, a certain frequency interval from the resonant frequency must be adjusted. The frequency interval can be under as well as over the resonant frequency.

**Resonant frequencies:** Due to the construction of the spring-mass system of the conveyor, the system can resonate at a number of oscillation frequencies. The additional resonance points are at a multiple of the desired frequency. In critical cases, the automatic frequency search cannot recognize them; the frequency must then possibly be set by hand.

### 9.2 Working Frequency of the Built-in Magnets

Because at small frequency adjustments the current flowing through the magnet may possibly increase, by the first usage of the current in the magnet circuit the current should be checked with an effective value meter, and the warmth developing in the magnet should be monitored.

In order to prevent an unduly high current passing through the magnet and the possible overloading of the magnet, it must be observed that the magnets also operate within the allowable working frequency range.

### 9.3 Measurement of the Output Voltage and the Output Current

Because there is an electronic converter with pulse amplitude modulated switching signals at the device output, the voltage and current values cannot be measured with a conventional meter. To measure these values, effective value measurement devices must be used; for example, an iron vane instrument (analog meter). It is recommended that analog instruments be used, because electronic multi-meters will not indicate reliable value readings in this case.

### 9.4 Restore Rated Value

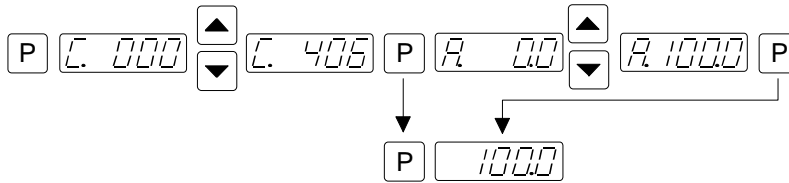
If, after the adjustment process, the device is found to be out of its allowed state, for example limit operation or an excessively high current flow which necessitates a quick main power switch-off, then by the next power on operation, the adjusted rated value can be reset as follows:

With device still switched off, depress  key and then switch on the main power switch.

By this procedure, the previously set rated-value for the oscillation amplitude will be set to zero. Now, the rated-value can be again increased or the frequency adjustment can be changed, among other possible modifications.

**10.0 Adjustment**

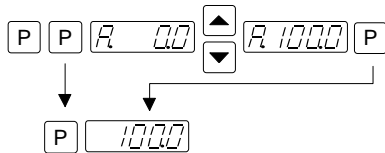
Depressing the programmer key "P" initializes each type of setup.



1. Depress "P key".
2. With arrow keys, scroll to desired code number.
3. Depress "P Key". The first menu point will appear. If necessary, search further for the desired menu point with the "P key" (scrolling).
4. With arrow keys, make the selection on the selected menu point.
5. Scroll with the "P key" to the next menu point, or scroll to the end of the menu, until the rated-value again appears on the display.
6. The menu can also be directly exited, and return to the normal operation is achieved, by depressing the "P key" longer (5 sec.).

**10.1 User Adjustment, Conveyor Capacity**

Code 000

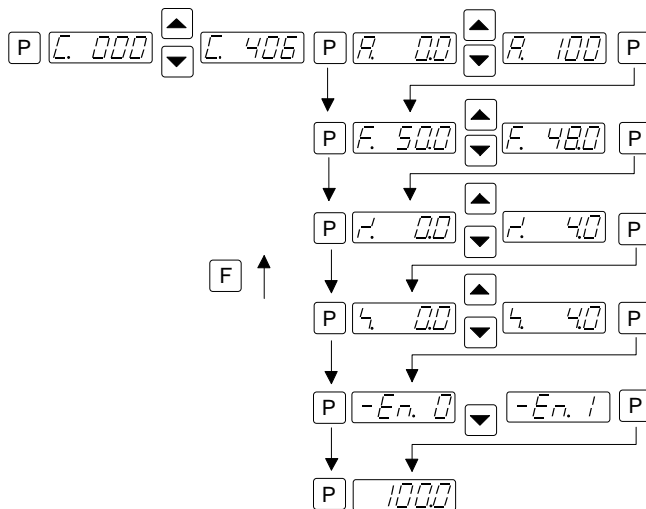


Oscillation amplitude (conveyor capacity) [%]

Return to the operating mode

**10.2 Adaptation to the Conveyor**

Code 406



Oscillation amplitude (conveyor capacity) [%]

Vibrating frequency [Hz]

Soft start ramp time 0...10 Sec.

Soft stop ramp time 0...10 Sec.

0 = Enable  
I = Invert Enable

Operating mode



**11.0 Error Messages**

Error messages are displayed in short form with "ERROR", blinking alternatively.

Overload limit

Short circuit shutdown

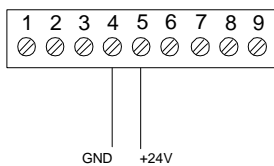
Main power over-voltage or feedback from magnet

**By depressing the "P" key or by an Off and On switching of the main power switch, the device will be reset.**

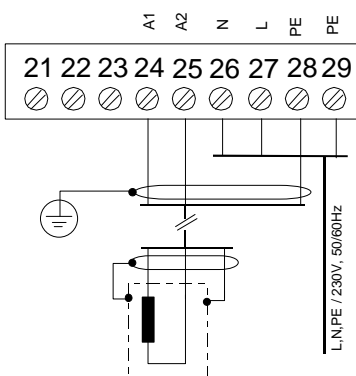
**12.0 Internal Connection**

Via the release input, the device can be turned on or off with an external signal voltage of 24 V, DC.

Release:



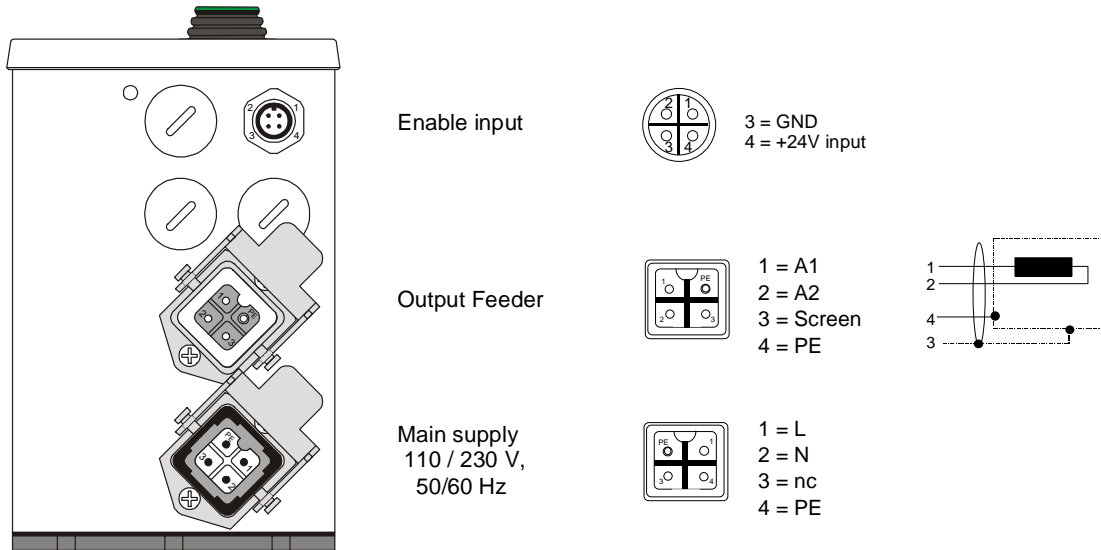
Supply power and conveyor:



In order to meet the EMC Guidelines, a shielded output cable must be used. The shielding must be connected to ground at both ends of the cable.

**13.0 Device Connections**

In order to meet the EMI requirements, a shielded output cable to the conveyor must be used.



**14.0 Dimensional Diagram**

Chassis dimensions SOR 3 (3A)

