MOSCA®
ELEKTRONIK UND ANTRIEBSTECHNIK GMBH

Operating Manual

SP01075
Control device for vibratory conveyor

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1. General information

Features
When you ordered your device, you have chosen a model with individual features.
This operating manual also describes optional features and a number of special accessories offered by Mosca Elektronik.
Please be aware that there may also be equipment variants described that you have not selected.

Notice concerning current status
Mosca Elektronik's high level of safety and quality is the result of ongoing development focusing on continuous improvement in design and engineering as well as equipment and accessories.
For this reason, some aspects of your device may vary from the descriptions in this operating manual.
In addition, Mosca Elektronik cannot guarantee the total absence of errors.
For this reason Mosca Elektronik is unable to recognize any claims stemming from the information, illustrations and descriptions in this manual.

1.1 Brief description

NEW FEATURES:

- **Automatic search for the resonance frequency** of the connected vibratory conveyor
- **Readjustment of amplitude and frequency** in ongoing operation without interruption
- **Master/Slave mode:** A slave device can be coupled to a master device with an adjustable phase offset

- Frequency inverter for vibratory conveyors
- Output frequency independent of the mains frequency
- Adjusting the mechanical spring system is omitted
- Wide input voltage range for worldwide use without changes
- Smooth and quiet conveyor operation and reduced noise generation (any output voltage waveform can be programmed)
- Constant conveyor output independent of mains voltage fluctuations
- Control and operation via display and buttons
- Start/Stop buttons for the conveyor in the operator display
- All settings can be made without opening the housing
- Logic functions: Level control, sorting air control,
  Universal **C**ontrol **M**odule UCM (e.g. Bunker control)
- Adjustable overload protection
- Setpoint inputs: 0…10 (24)V, 0 (4)…20mA, potentiometer 10kΩ
- 2-pole Mains switch
- High protection class IP54 for field installation
- RS485 interface

1.2 Scope of supply

The scope of supply includes:

- One SP01075 control device

After receiving the delivery, check immediately whether the scope of supply matches the delivery documents accompanying the goods. The manufacturer assumes no liability for complaints regarding defects or short supplies made subsequently.

1.3 Accessories

In order to set the parameters and monitor the SP01075 control device, the following accessories are necessary (see also chapter 12):

- PC with software "ParaDesk". You can download ParaDesk free of charge at http://www.paradesk.de.
- SP01056 interface converter
- Mating plug, vibration sensor, cables etc.

1.4 Proper use

- The SP01075 control device is provided for installation in a machine for setting up a vibratory conveyor system.
- Vibratory conveyor systems with the SP01075 control device, which are installed in accordance with the specifications of the CE-type guidelines, meet the EC Directive on EMC
- The CE-typical systems with this control device are designated
  - for the operation in public and non-public power grids
  - for use in industrial areas
- The control device is not a household appliance, but is meant for setting up vibratory conveyor systems for commercial use.
- The control device itself is not a machine in the sense of the EC Machinery Directive.

Operate the control device only under the conditions of use prescribed in this operating manual.

Observe and follow the instructions of this operating manual. This means:
Read the operating manual carefully before starting any work. Keep the operating manual near the control device.

1.5 Legal provisions

Liability
The information, data and instructions specified in this operating manual are up-to-date at the time of printing the same. No claims may be enforced based on the specifications, figures and descriptions of this operating manual for the control devices of the SP01075 model that have already been supplied.

The process-related instructions and schematic sections provided in this operating manual are recommendations whose transferability has to be checked for the respective application. The company Mosca Elektronik und Antriebstechnik GmbH does not assume any liability for the suitability of the processes and circuits recommended.
No liability is assumed for damage and operational fault that occur as a result of:

- ignoring this operating manual
- unauthorised modifications to the control device
- operational errors
- improper work on and with the control device

Warranty
Register warranty claims with the manufacturer immediately after detecting and identifying the error or fault. The warranty is rendered null and void in case of:

- improper use of the control device
- improper work on and with the control device

1.6 Definition of terminology used

Qualified personnel
Qualified personnel are persons who, based on their education, experience, training as well as knowledge about relevant standards and provisions, accident prevention regulations and operating relationships with those responsible for the safety, have been authorised to carry out the respective activities necessary and, in the process, can identify and avoid potential risks and hazards.
(Definition of specialists according to IEC 364)

Operator (or operating company)
An operator is any natural or juristic person who uses the control device or on whose behalf the control device is used.

2. Safety Instructions

2.1 Operating instructions

This operating manual is used to work safely on and with the control device. It contains instructions that must be observed and followed.

Besides the basic safety instructions in this chapter, the safety instructions provided in the progressive text must be observed and followed also.
No claim is made for completeness with these safety instructions. In case of queries or problems, please contact the manufacturer.

All persons who work on and with the control device, must have the operating manual available and observe it for relevant information and instructions.
This operating manual must always be complete and in legible condition.

2.2 Icons

Important explanations are highlighted with the following icons in this manual:

Attention: This explanation indicates risks and hazards that may possibly lead to personal injuries or damage to property as a consequence.

Pay special Attention / Check: Please give special attention to the circumstances described.

Information: This contains detailed information about the product.

2.3 General Safety Instructions

The control device is equivalent to state of the art at the time of delivery and is basically considered to be operationally safe. There are risks and hazards arising from the control device if:

- non-qualified personnel work on and with the control device,
- the control device is used improperly or other than as intended.

Under such circumstances, there are risks and hazards for:

- human beings
- the control device
- other valuable property of the operator.

The control devices must be configured in such a way that fulfil their function with error-free or fault-free operation when they are installed properly and used as intended, and do not cause any danger to human beings. This is also applicable to the interactions of the control device with the overall machine.

Adopt additional or supplementary measures in order to restrict the consequences of malfunctions, which may cause risks or hazards for human beings:

- other independent equipment, which safeguard against any malfunction of the control device.

- electrical or non-electrical protective devices (e.g. locking or mechanical blocking)
- comprehensive system-related measures

Make sure with the help of appropriate measures that no damage occurs to property in case of faults in the control device.

2.4 Operating company's obligations

The operator or its safety officer is obliged

- to check compliance with all relevant rules and regulations, instructions and laws,

- to ensure that only qualified personnel work on and with the control device,
- to ensure that the personnel has the operating manual available for all relevant work and
- to prohibit non-qualified personnel from working on or with the control device.

2.5 Personnel

Only qualified personnel should work on and with the control device.

2.6 Control device

Operate the control device only in proper condition. The permissible conditions of use and performance limits must be observed and complied with.

Retrofitting, modifications or attachments to the control device are basically prohibited. They require consultation with the manufacturer in any case.

The control device is a piece of equipment for use in industrial systems or machines. During operation, this equipment has dangerous, live parts. Hence, during operation, all covers must be put in place in order to ensure protection against contact.

2.7 Operation

The control device generates heat during operation. Under certain circumstances, there may be the risk of suffering burn injuries by touching the housing depending on the conditions of use. Maintain adequate safety clearance to combustible materials.

3. Technical Specifications

3.1 Technical Specifications

Electrical Parameters	Unit	Value
Input voltage	V_{AC}	100…240 +-10%
Input current at 110/230 V AC and 10 A output current *1	A_{AC}	5 / 2.5
Output frequency	Hz	5 … 300
Continuous output current *2	A_{AC}	10
Output power	VA	2200
Analog inputs		2 nos. of level configurable, also usable as digital input
Digital inputs		3 units
Digital outputs		4 nos. + switching
Power supply for external consumers		24 V / 100 mA
Ambient temperature	°C	0…70 (power output reduction of 2%/K)
Storage temperature	°C	-10 … 80
Atmospheric humidity	%	Max. 80, non-condensing
Protection class		IP20, IP54 depending on version
Installation altitude	p	1,000m (>1,000 m power output reduction of 1% /100 m)

*1 Input current is less than the output current since, as a result of the inductive load, a large part of the output power is reactive power.

*2 The device is designed for 10 A, and depending on the cooling surface area, ambient temperature and installation altitude, the current must be reduced. Also refer to chapter 3.3

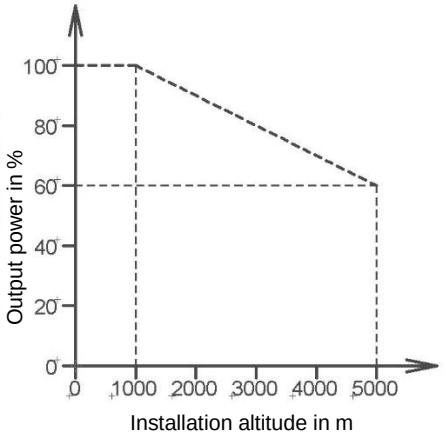
3.2 Ratio of input voltage to output voltage

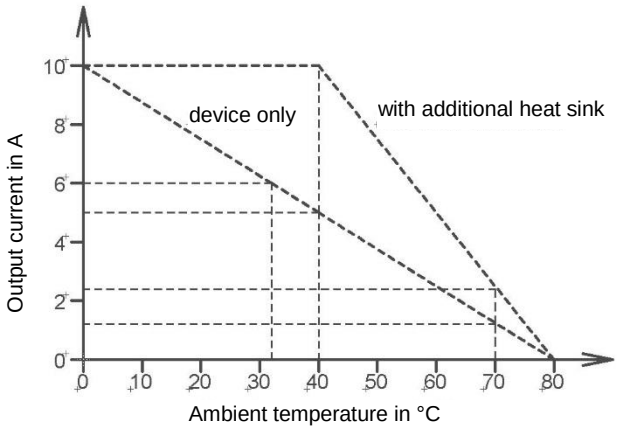
There is no PFC unit in the device. Thus, the possible output voltage depends on the input voltage present.
Moreover, the output voltage depends on the selected waveform. The following table provides a better overview:

Input voltage	Output voltage	
110 V_{AC} / 60 Hz	Sinusoidal:	103 V_{AC}
	Sinusoidal with 3rd harmonic:	118 V_{AC}
230 V_{AC} / 50 Hz	Sinusoidal:	208 V_{AC}
	Sinusoidal with 3rd harmonic:	239 V_{AC}

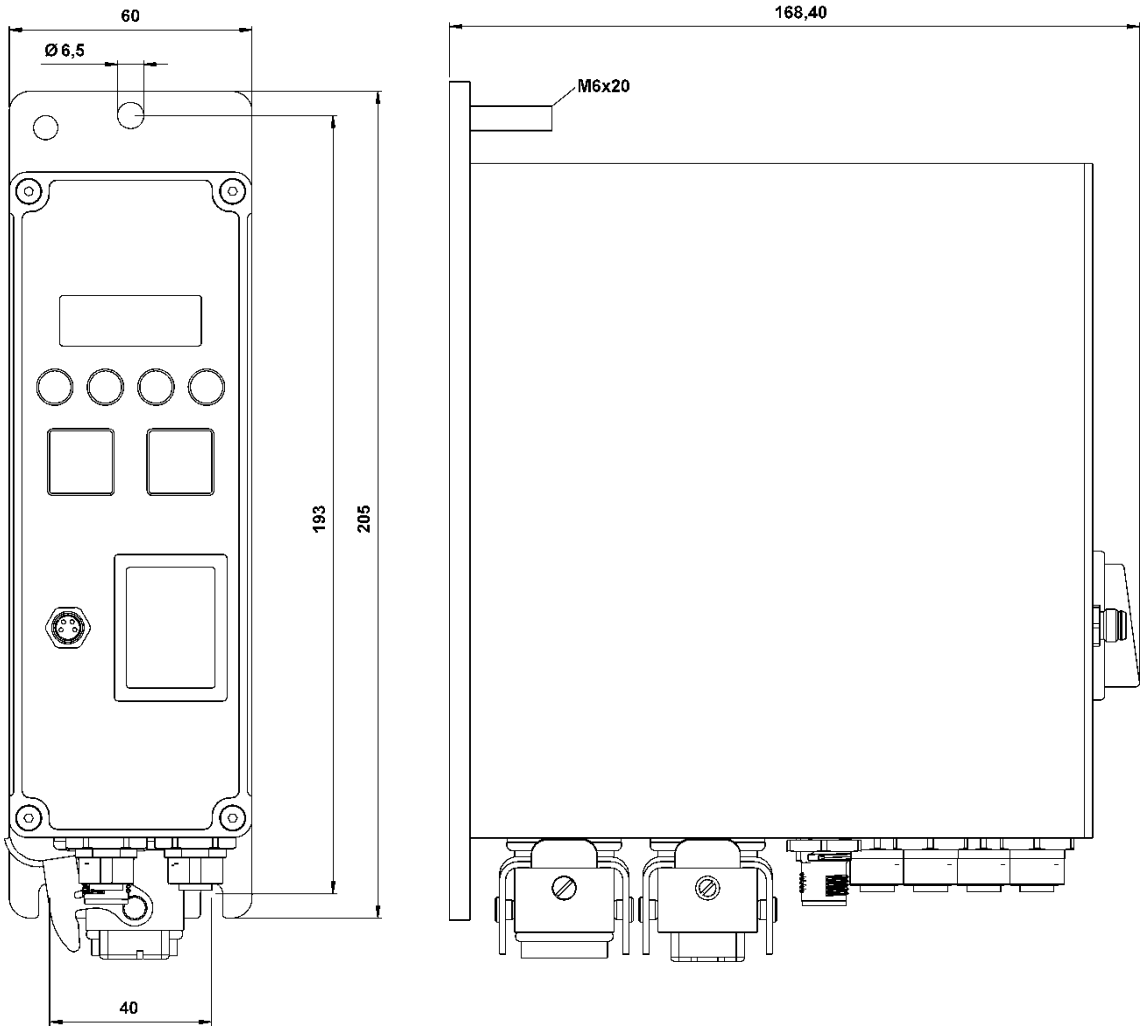
3.3 Conditions of use

With installation at altitudes above 1,000 m or at high temperatures, the output power of the device must be reduced in accordance with the following diagrams.
The characteristic pertains to the device with base plate standing freely.
If the device with the base plate is installed on a heat-dissipating surface, the characteristic shifts up (refer to additional heat sink).
The max. continuous current is limited to 10 A.

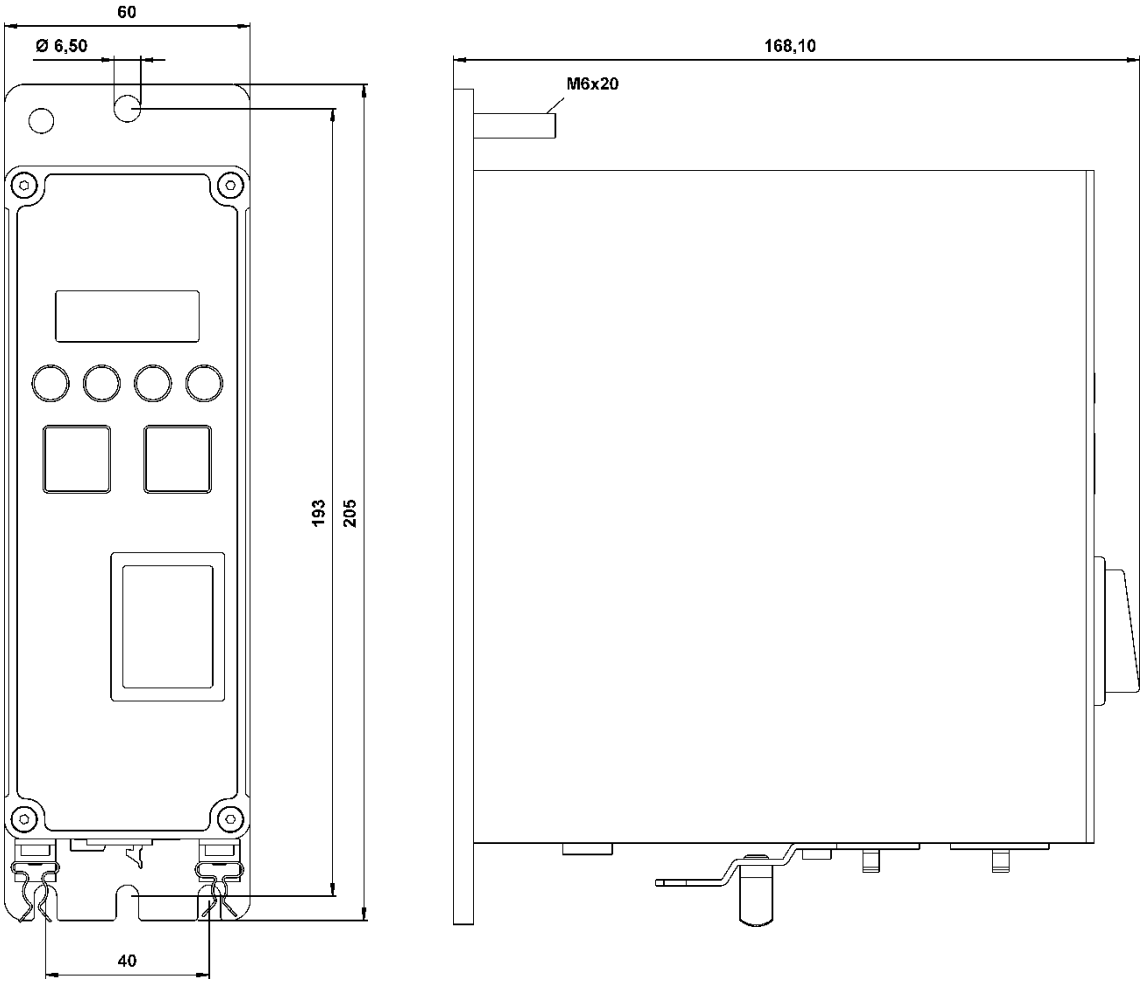




3.4 Dimensional drawing IP54

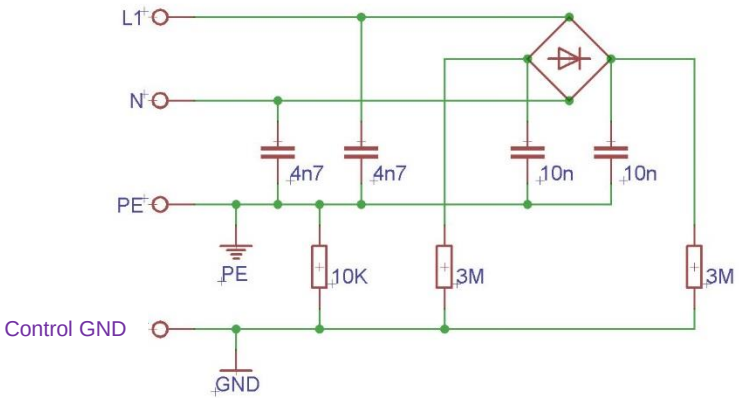


3.5 Dimensional drawing IP20



3.6 Information on measuring the leakage current

The entire leakage current is composed of the leakage current of the Y capacitors as well as a resistor between the DC-link and GND, cf. the following diagram.



4. Installation

- Do not exceed the permissible range of the operating ambient temperature (see chapter 3.2)
- The control device contains electrostatic-sensitive components. Before doing installation or service work near the connecting terminals, the personnel must discharge themselves electrostatically. The discharge can be done by first touching an earthed metallic surface.

- An appropriate line protection fuse is necessary for protecting the supply line
- Setpoint value inputs must be installed with shielded cables.
- Dimension the wire cross-sections liberally accordingly!
- Observe the locally applicable safety provisions

4.1 Wiring suitable for EMC

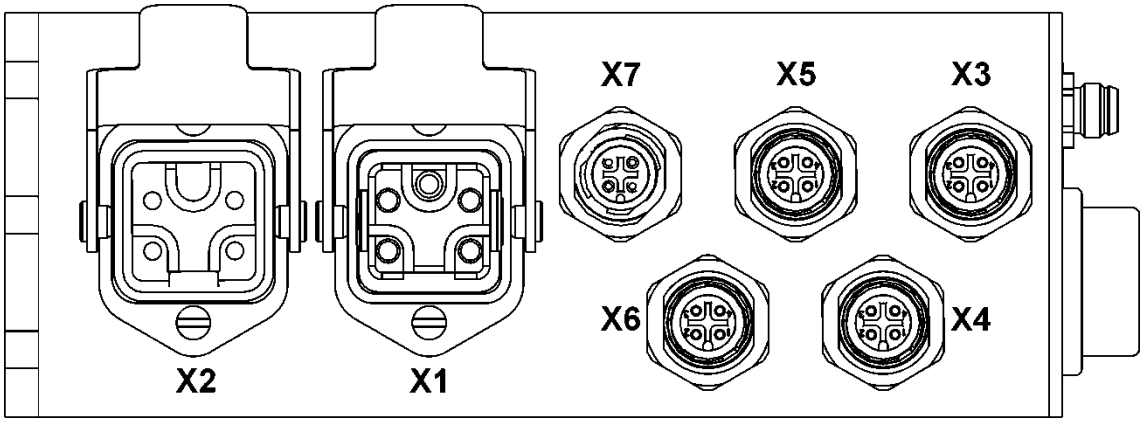
In order to ensure the electromagnetic compatibility (EMC) in your switching cabinets in electrically harsh environments, the following EMC rules must be observed and followed for the design and construction:

- All metallic parts of the switching cabinet must be connected with one another such that they are well-conducting. (Not coating on coating!) If necessary, use contact or serrated washers. The cabinet door must be connected using earthing tapes (above, middle, below) with the cabinet, keeping them as short as possible.
- As far as possible, signal lines and power cables must be laid spatially isolated from one another in order to avoid coupling. Minimum distance: 20 cm.
- As far as possible, route signal lines from only one level into the cabinet. Non-shielded lines of the same electrical circuit (signal and return conductor) should be twisted.
- Contactors, relays and solenoid valves in the cabinet, or possibly in adjacent cabinets, must be wired with suppressor combinations, e.g. with RC snubbers, varistors or diodes.
- The shields of shielded lines must be connected on both sides (source and destination) such that they have a large area and are well-conducting to earth.[1] With poor potential equalisation between the shield connections, an additional equalisation conductor of at least 10 mm^2 must be wired in parallel to the shield in order to reduce the shield current.
- Do not lay the wiring loosely in the cabinet but route them as close as possible to the cabinet housing or to the installation panels. This also applies to spare cables. These must be connected to earth at least at one end, but preferably on both ends (additional shielding effect).
- Unnecessary line lengths must be avoided. As a result of this, coupling capacitances and inductances can be kept low.
- The shield of supply lines must be connected to the housing ground. In the area where lines are routed into the housing, the insulation must be removed in order to expose the shield meshing. The shield meshing should not get damaged when stripping. The line must be connected at the stripped point to connecting terminals or clamping yoke connected to earth.
- Use high-quality lines with low shield capacitance.
- Lay shielded lines without interruption. Avoid unnecessary terminal points and plug-in connectors. Pay attention to continuous shield even with plug-in connectors.

[1] All metallic conducting parts, which can be connected to a protective earth conductor, e.g. cabinet housing, motor housing, foundation earth etc. are designated as earth.

4.2 Electrical connection

4.2.1 Pin assignment, IP54



I/O overview	
Function	**Connector pin**
IN1	X3-4
IN2	X4-4
IN3/OUT3	X5-4
IN4	X3-2
IN5	X4-2
OUT1	X6-4
OUT2	X6-2
OUT4	X5-2, X7

X1 compatible with HAN3A 3+PE pin insert (M)		
Pin	**Function**	**Remarks**
1	L	Mains input
2	N	Mains input
3	NC	
PE	PE	Mains input

X2 compatible with HAN3A 3+PE socket insert (F)		
Pin	**Function**	**Remarks**
1	Magnet AC1	Magnet connection
2	Magnet AC2	Magnet connection
3	NC	
PE	PE	Magnet connection

X3 M12 socket 4-pin A-coded		
Pin	**Function**	**Remarks**
1	24V	Supply
2	IN4	Signal input
3	GND	Supply
4	IN1	Signal input

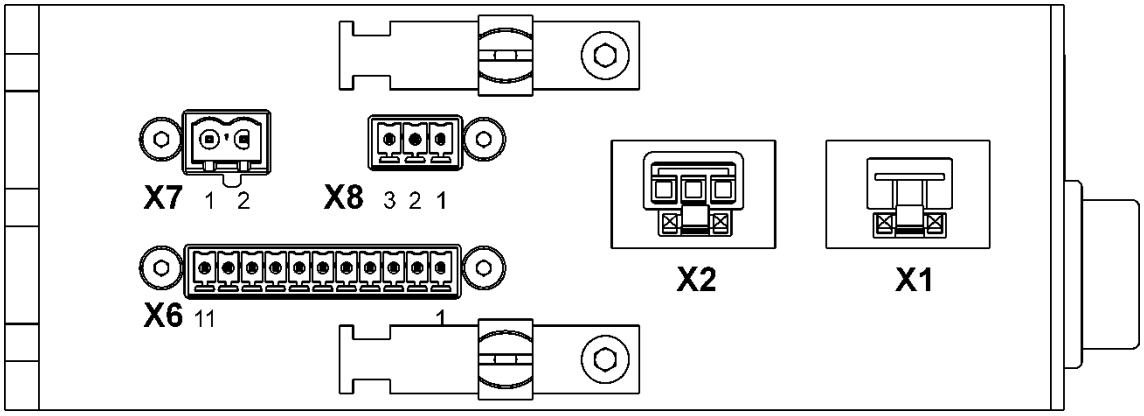
X4 M12 socket 4-pin A-coded		
Pin	**Function**	**Remarks**
1	24V	Supply
2	IN5	Signal input
3	GND	Supply
4	IN2	Signal input

X5 M12 socket 4-pin A-coded		
Pin	**Function**	**Remarks**
1	24V	Supply
2	OUT4	Signal output
3	GND	Supply
4	IN3, OUT3	Signal input, signal output

X6 M12 socket 4-pin A-coded		
Pin	**Function**	**Remarks**
1	24V	Supply
2	OUT2	Signal output
3	GND	Supply
4	OUT1	Signal output

X7 M12 connector 4-pin A-coded		
Pin	**Function**	**Remarks**
1	COM	Relay contact OUT4
2		
3		
4	NO	Relay contact OUT4

4.2.2 Pin assignment IP20



Connector X1		
Pin	**Function**	**Remarks**
L	L	Mains input
N	N	Mains input
PE	PE	Mains input

Connector X2		
Pin	**Function**	**Remarks**
1	Magnet AC1	Magnet connection
2	Magnet AC2	Magnet connection
PE	PE	Magnet connection

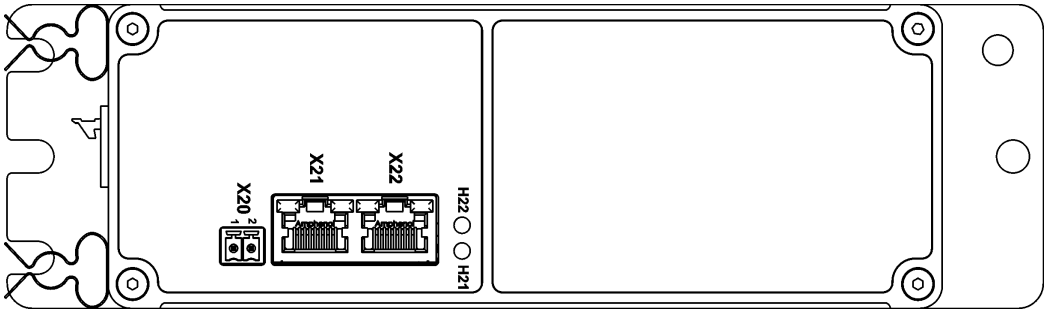
Connector X6		
Pin	**Function**	**Remarks**
1	GND	Power supply reference
2	IN1	Signal input
3	IN2	Signal input
4	IN3	Signal input
5	IN4	Signal input
6	IN5	Signal input
7	OUT1	Signal output
8	OUT2	Signal output
9	OUT3	Signal output
10	OUT4	Signal output
11	24V	Power supply

Connector X7		
Pin	**Function**	**Remarks**
1	COM	Relay contact OUT4
2	NO	Relay contact OUT4

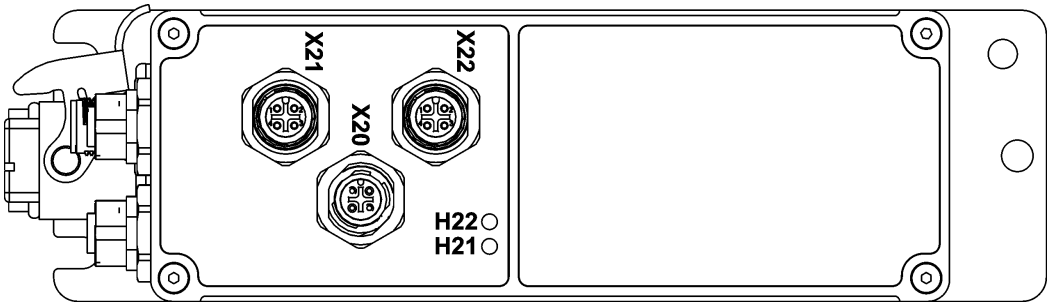
Connector X8		
Pin	**Function**	**Remarks**
1	A	RS485
2	B	RS485
3	GND	RS485

4.2.3 Pin assignment, Profinet, Ethernet IP

4.2.3.1 ***Front view, IP20***



4.2.3.2 ***Front view, IP54***



4.2.3.3 ***Technical Specifications:***

Parameter	Unit	Value
Supply voltage	V DC	18…30
Current consumption	mA DC	100
Isolation		The bus interface to the device is potential-isolated
Connection, bus, IP20		RJ45 jacks
Connection, bus, IP54		M12 socket 4-pin D-coded

4.2.3.4 ***X20 bus supply voltage:***

Function	Pin terminal strip	Pin M12 connector, A-coded
24 V bus	2	1
GND bus	1	3

4.2.3.5 ***X21 port1, X22 port2***

Signal	Pin RJ45	Pin M12
TD+	1	1
TD-	2	3
RD+	3	2
RD-	6	4

4.2.3.6 ***LEDs:***

Desig-nation	Function	Remarks
H21 H22	Link/Traffic port 1 Link/Traffic port 2	OFF=no link to the bus ON= link to the bus FLASHES=Data packets are being transmitted/received

4.2.4 Function inputs and outputs

4.2.4.1 Possible function assignments

The function outputs or inputs can be assigned depending on the parameter setting (cf. chapter 6) either as an analog input, digital input or digital output.
Not all function outputs or inputs can handle all three variants. The following overview illustrates the various assignment options:

Designation	Analog IN (AIN)	Digital IN (DIN)	Digital OUT (DOUT)
IN1		X	
IN2		X	
IN3		X	
IN4	X	X	
IN5	X	X	
OUT1			X
OUT2			X
OUT3			X
OUT4			X

Note: If the connections IN4 and IN5 are used as DIN, they are nonetheless read as analog values and digitised with switching thresholds for HIGH and LOW.

4.2.4.2 Electrical level definition of the digital inputs (IN1 to IN3):

Parameter	Value	Unit
$V_{in,low}$	< 5	V
$V_{in,high}$	> 15	V
Input impedance	4	kΩ

4.2.4.3 Electrical level definition of the analog inputs (IN4 and IN5):

Parameter	Value	Unit
$V_{in,low}$	< 5	V
$V_{in,high}$	> 15	V
Analog input voltage range	0…24	V
Input impedance	100k/500	Ω

4.2.4.4 Electrical level definition of the outputs (OUT1…OUT4):

Parameter	Value	Unit
Min. $V_{out,high}$ at 24 V supply	> 23 (at 1,000 mA)	V
Low	Open	

The outputs are conditional short circuit-proof.
The internal 24 V power supply provides max. 100 mA. If more current in sum needs to be drawn at the outputs, the power supply must be supported externally. The connection of the external supply can be done at the 24 V and GND connections. Attention! Total current max. 2 A, provide appropriate fuse at the external power supply.

4.2.4.5 Level definition of output OUT4 at X7

Parameter	Value	Unit
Active	COM – NO connected	-
Max. switching voltage DC	30	V
Max. switching voltage AC	250	V
Max. switching current with resistive load	2	A
Max. switching current with inductive load	1.5	A

4.2.4.6 Terminal functions

- Unused (configured) input terminal functions are passive.
- The input functions can be applied simultaneously to multiple terminals. The terminals are then ORed.
- All digital input functions can be inverted.
- The output terminal functions can be applied simultaneously to multiple terminals.
- The output terminal functions can be inverted.

5. Operating modes

The complete control device can be adjusted and modified with respect to its properties based on the parameters. For this purpose, cf. also chapter 6.

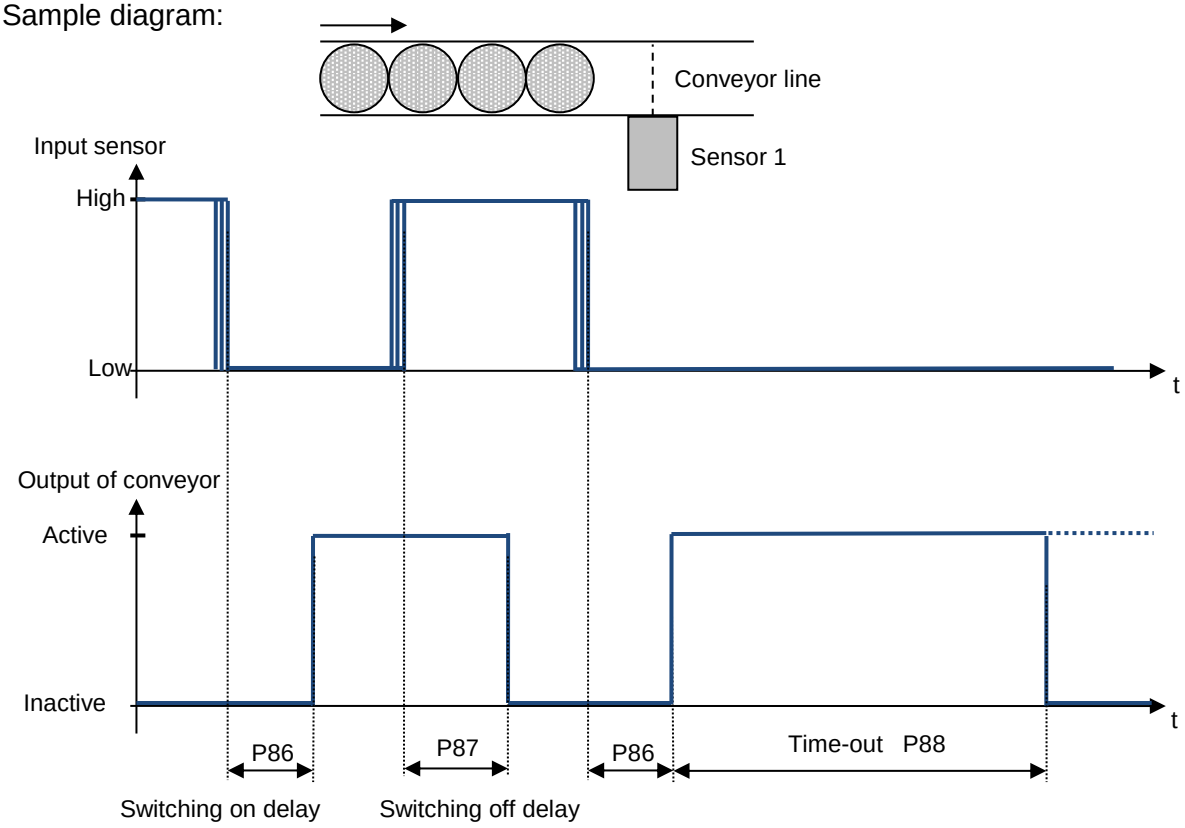
5.1 Level control with one sensor

With the help of the input sensor 1 as well as the switching on and switching off delay of the conveyor, it is possible to implement a level controller.
The conveyor is switched on if the sensor is passive and the switching on delay has elapsed. The conveyor is switched off if the sensor is active and the switching off delay has elapsed. In this way, the level of the material to be transported oscillates around the position of the sensor. Level changes during the delay time periods reset these to 0 again.

Note: An enable signal must be active. The enable signal can be activated either by pressing "RUN" on the device or by an external input provided that this has been configured.
In the "LC" parameter group, the operating mode "1 sensor on/off" has to be activated for this purpose.

The max. run time of the conveyor can be monitored using a separate time stage "Sensor Time-out".
If this function is activated, the conveyor switches off after this time period has elapsed. This function can also be configured at an indication output.
A parameter value of zero deactivates the monitoring.

Sample diagram:

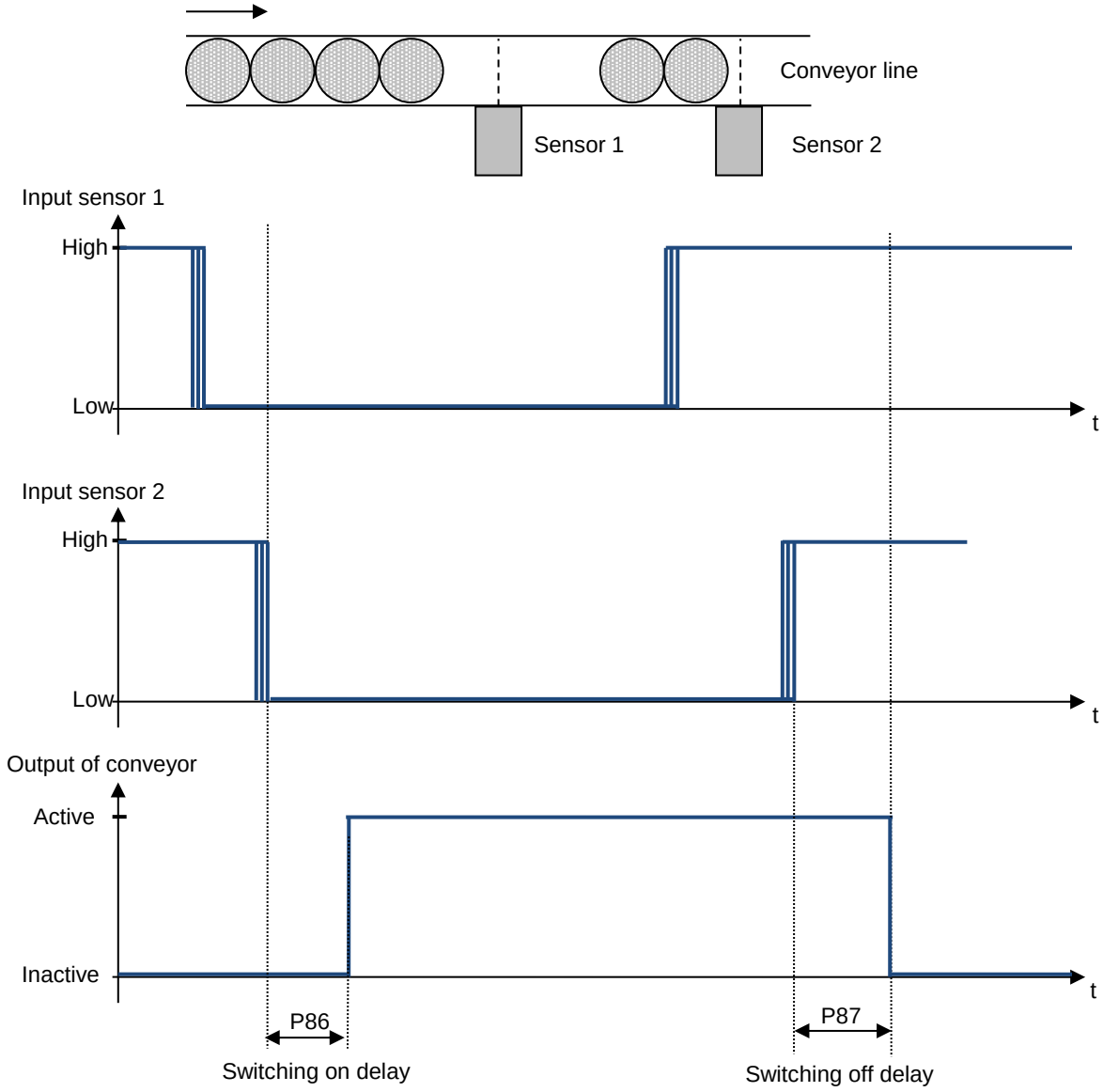


5.2 Level controller with two sensors

In combination with two material sensors, a material level is stored within a filling line.
Only if both sensors are low (no material to be transported) the conveyor is switched on after the switching on time delay.
If both sensors are high (material available), the conveyor is switched on after the switching off time delay.

Note: An enable signal must be active. The enable signal can be activated either by pressing "RUN" on the device or by an external input provided that this has been configured.
In the "LC" parameter group, the operating mode "2 sensor on/off" has to be activated for this purpose.

Sample diagram:



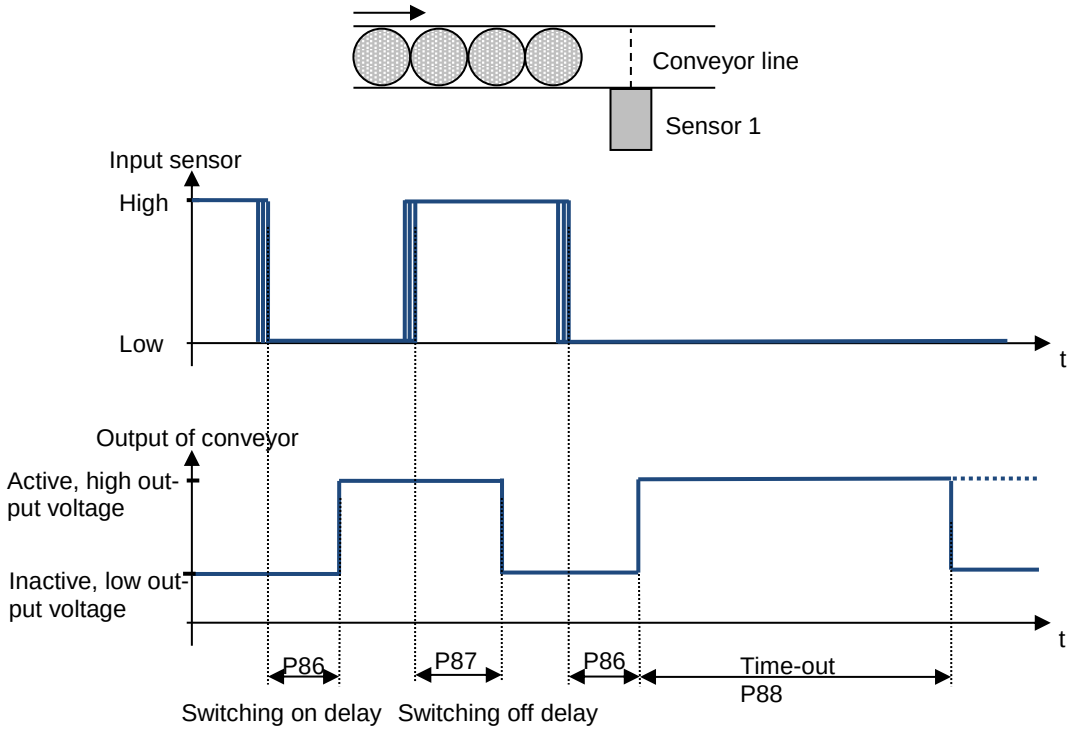
5.3 Operation with two setpoints

Instead of the level control by switching the conveyor on and off, alternatively, you can also change over the output voltage of the conveyor between two values. The conveyor is then always active and only the output voltage is changed depending on the state of the filling level logic.

Note: An enable signal must be active. The release can be activated either by pressing "RUN" on the device or by an external input provided that this has been configured.
In the "LC" parameter group, the operating mode "1 sensor low/high" or "2 sensor low/high" must be activated for this purpose.

For the operating mode, the parameters "Setpoint low" and "Setpoint high" must be adjusted in the "LC" parameter group.

Sample diagram:

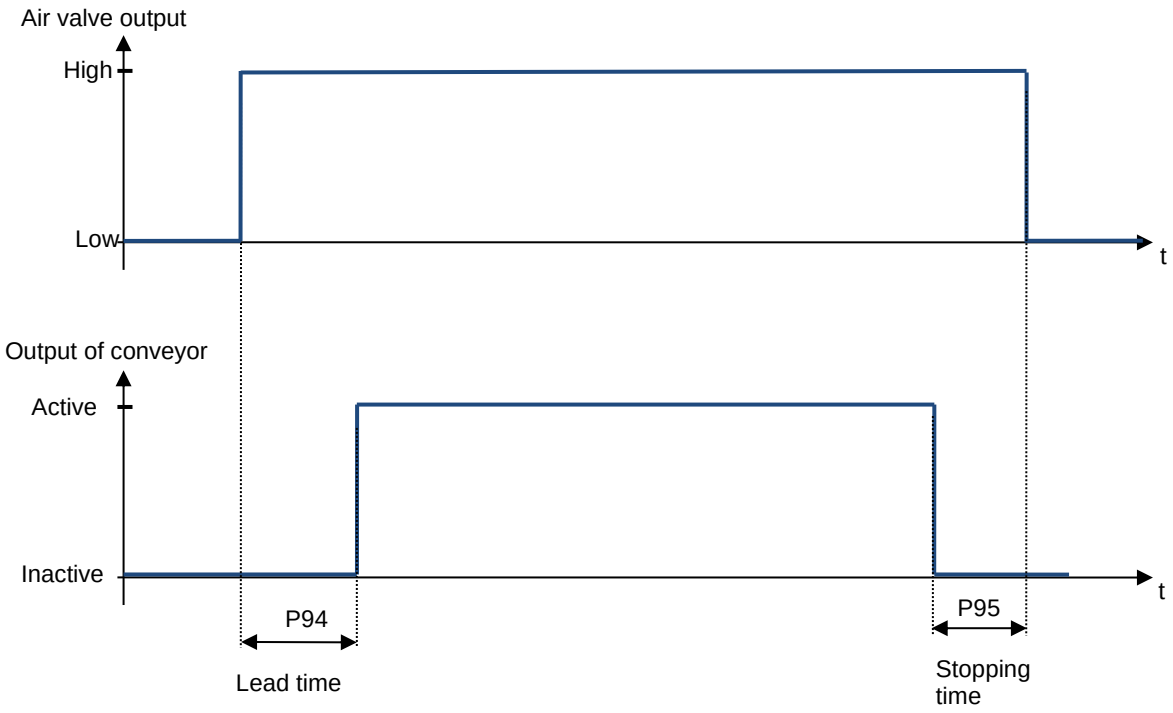


5.4 Air valve output

In order to support transporting parts by air, the output "Air" can be used to control an air valve.
When enabling the conveyor, first the output "Air" is switched on and after a lead time delay, the output voltage of the conveyor is started up.

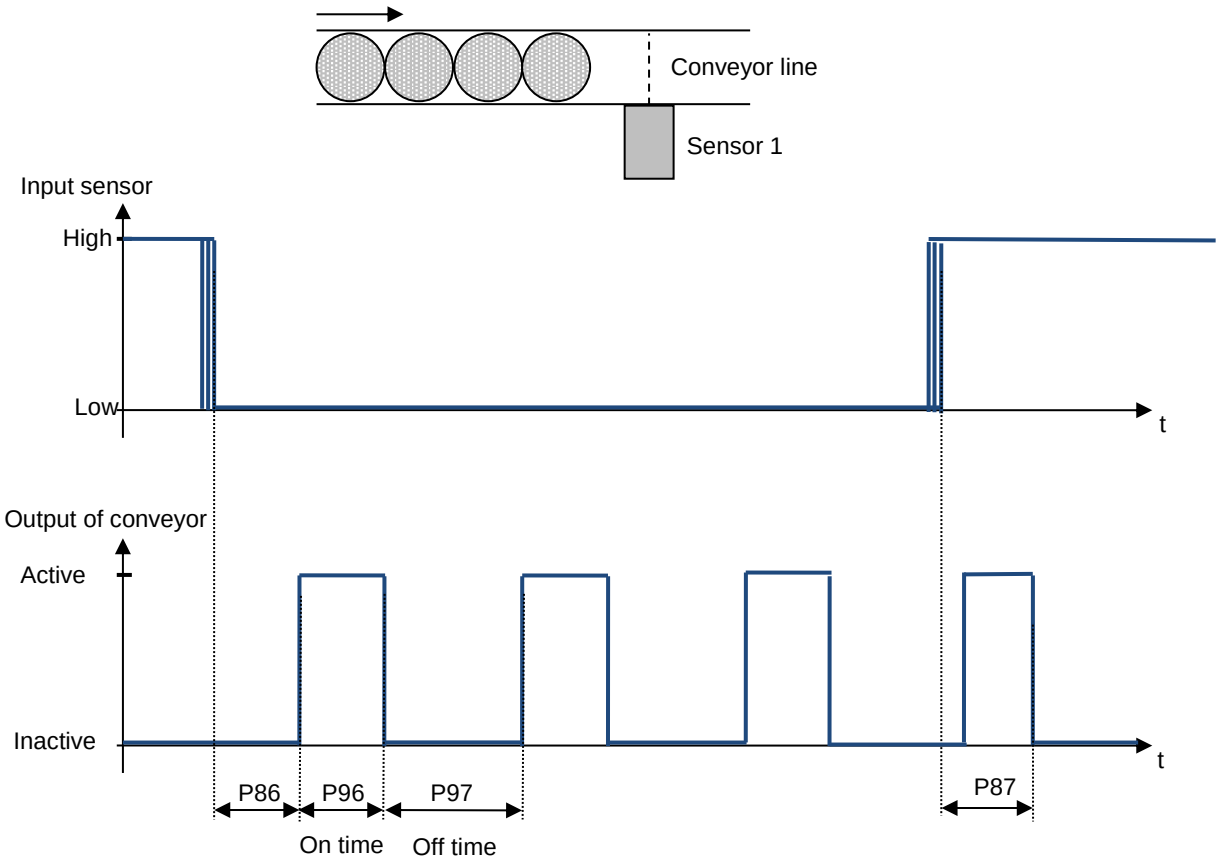
The output "Air" remains active for a stopping time after disabling the conveyor.
The lead time and stopping time can be adjusted separately.

Sample diagram:



5.5 Pulsed operation

For some conveyor applications, it is necessary to pulse the conveyor, e.g. if a cyclic flow of parts is beneficial. The times for switching on and switching off can be set separately.



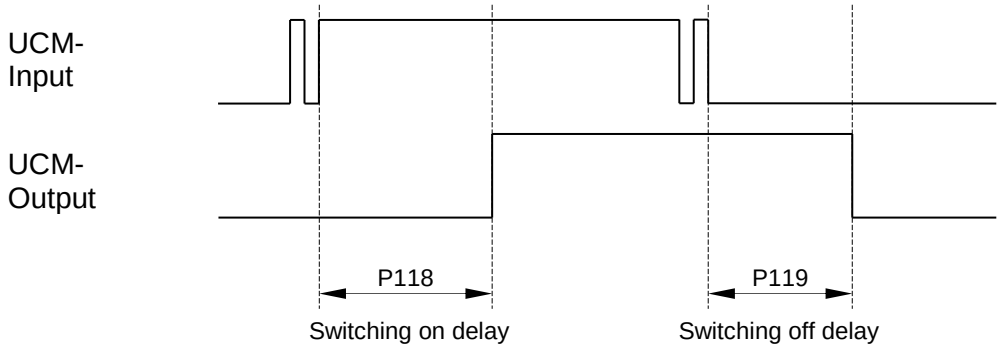
5.6 Universal Controller Module UCM

This module can be used if an indication output, instead of the inverter output, should be controlled by a sensor. Examples of this include the control of a pneumatic valve via a material sensor for sorting out wrong positioned parts, or a bunker conveyor for material replenishment of the connected conveyor/sorting equipment.

5.6.1 Operating mode "State"

The UCM output is switched on as soon as the UCM input was uninterruptedly active for the period of the switching on delay. The UCM output is shut down as soon as the input was uninterruptedly inactive for the period of the switching off delay.

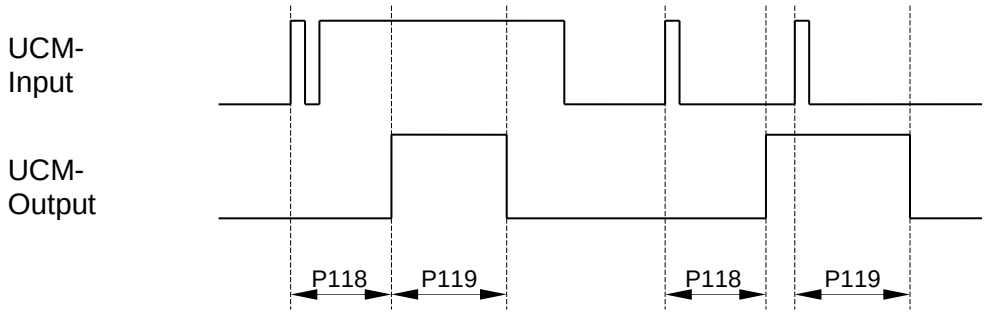
Sample diagram:



5.6.2 Operating mode "Positive edge"

The UCM output is switched on as soon as after a positive signal edge at the UCM input the switching on delay period has elapsed. The UCM output is shut down as soon as the switching off delay has elapsed after the last positive signal edge.

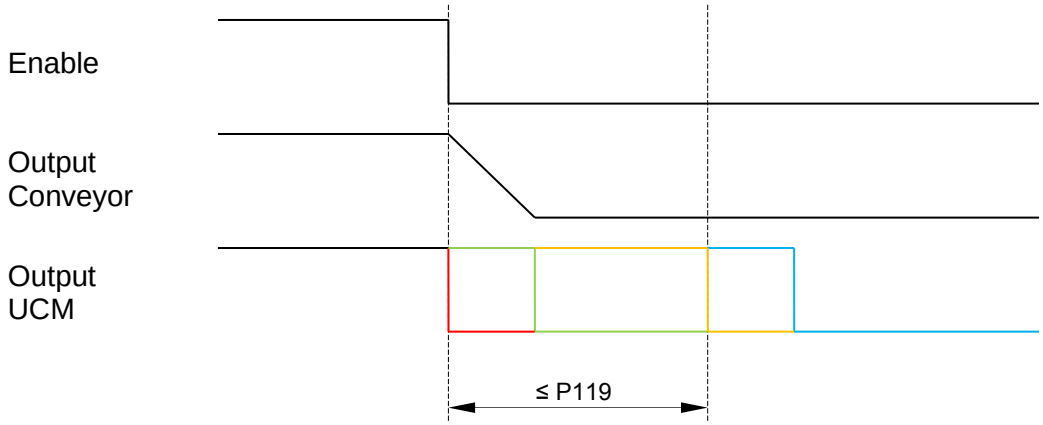
Sample diagram:



5.6.3 Combination of UCM output with enable signal

With P120, the UCM output can be blocked depending on the enable signal or the operating status.

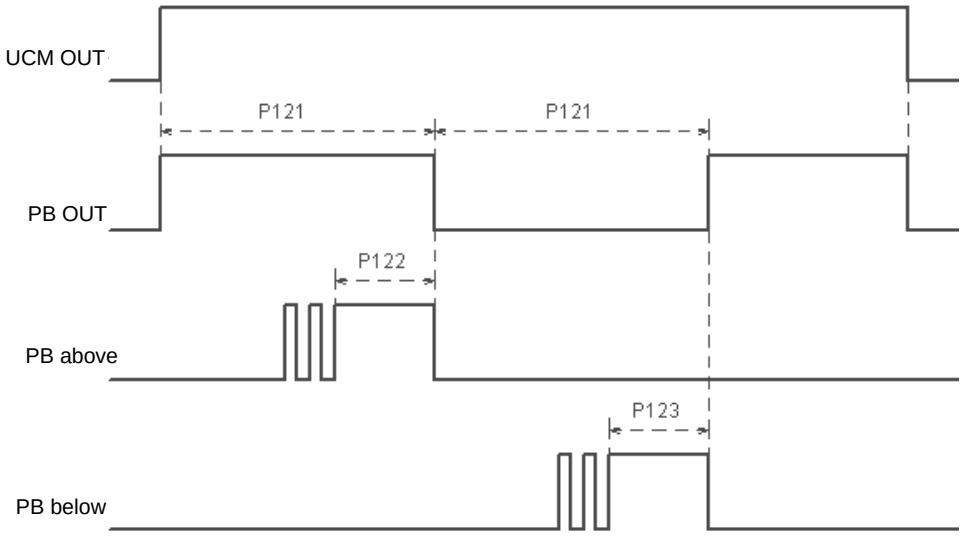
Sample diagram:



P120 = Enable off
P120 = Enable off, delay
P120 = Output off
P120 = Output off, delay

5.6.4 UCM + PB

In order to operate pneumatic bunkers, for example, the output function PB OUT can be used.
If the UCM OUT function is active, the PB OUT function also becomes active as long as the PB input above becomes active. The function PB OUT remains passive as long as the PB input below becomes active.
The max. switching on time and switching off time of the PB OUT function is monitored by the time-out function.



5.7 Controlled operation

With controlled operation active, the amplitude as well as the resonance frequency is measured and controlled continuously and without interruption.

Only one parameter (Sens.Ref) has to be set to adjust the quantity transported. The controller determines all other values on its own.

Note: A vibration sensor is necessary for controller operation.
This must be connected to an analog input.

In this way, it is ensured that the vibratory conveyor always works exactly at the resonance point with a constant vibration amplitude, regardless of the mass of the vibratory conveyor or the quantity of parts to be transported.
The advantage of this control lies in the efficient energy consumption and, as a result, low heat development in the magnets. With constant control of the system, only the least possible amount of energy is needed for the operation of the vibratory conveyor. Moreover, low-noise and gentle operation is ensured as a result of this.

The device can also be configured with parameters in such a way that the vibration amplitude works only via voltage control without frequency control.
Similarly, purely manual controlled operation is possible.
The operating modes of the controller should be modified only with the controller turned off.

5.8 Automatic resonance search

The control device can determine the optimal resonance point of the vibratory conveyor automatically if it is not known.

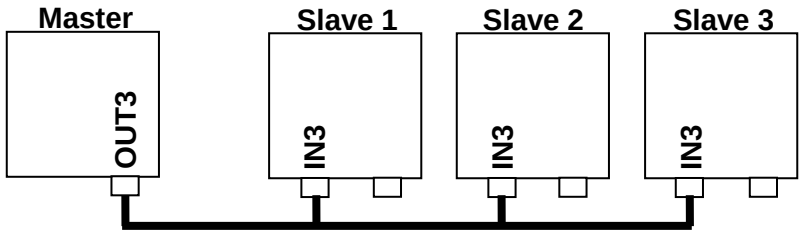
Using the display menu, you can enable the resonance search in the category "CONTROL" with "SCAN = ON", cf. chapter 6.2.
If the resonance search is activated, the current frequency is measured with each start and then controller operation is started.

Note: This is useful only if a new unknown drive is being connected to the device. When disabling the device, the previous frequency is saved automatically. If the resonance search is shut down, this frequency is used as the start frequency for the controller when it is enabled the next time.

Note: For the resonance search, the parameter of the max. magnet current must be set according to the data sheet.

5.9 Master/Slave operation

It is possible to operate multiple control devices in a group. To do this, for example, one control device can be configured as the master and several others can be configured as slaves. The master device specifies the frequency via synchronisation pulses to the slave devices.



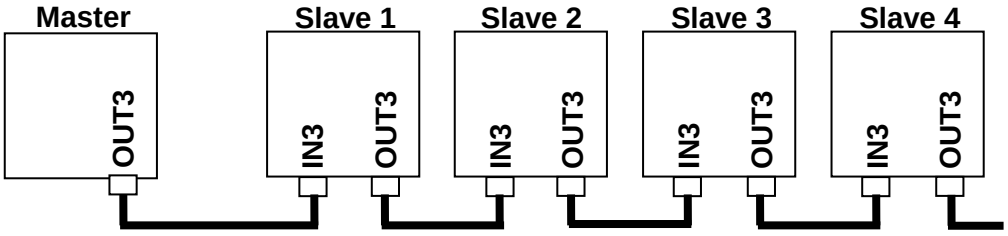
A device configured as slave switches on (RUN), if synchronisation pulses from the master are incoming at its slave pulse input.
If no more synchronisation pulses are present (Master off), the device switches off (STOP) again after a short delay.

Attention: Up to max. 10 devices can be operated from one master on a bus. In order to be able to control more devices from only one master, please follow the recommendation as explained below.

Note: If a device is configured as a slave, it can be operated only with amplitude control but not with frequency control. The frequency is fixed and specified by the master.
However, the master can carry out both amplitude control and frequency control.

Attention: If the device is configured for Master/Slave operation, the output OUT3 or the input IN3 is specifically needed for this operation. In this mode, it is not possible to use the two I/Os for other functions.

A slave device can also work for a subsequent slave device as the master. However, the signal propagation delay gets bigger by feeding through the individual devices. The higher the number of devices that are wired between the master and slave, the greater is the offset in the response speed to change specifications of the master.



6. Display menu

6.1 Menu control

Button	Function
ESC	Cancel, Return
-	Navigation by menu, adjustment of parameters
+	Navigation by menu, adjustment of parameters
Enter	Display menu, display sub-menu, save parameters

The status of the device is output on the display by default. You can jump to the menu by pressing the Enter key.
Moreover, you can display sub-menus and confirm entered values with the Enter key.

With the "+" and "-" keys, you can switch between menu entries.
Moreover, values can be changed after they have been selected for adjustment. The appropriate value in the display begins to flash.

NOTE: For a flashing value, the values are changed live and the device works with the adjusted values.

By pressing the ESC key, you can return from a sub-menu to a higher-level menu.
In addition, changes of values can be cancelled with ESC and the originally set values at the time of displaying the menu can be restored.

By pressing the Enter key, you can return from the input mode to a higher-level menu. The changed parameter is saved.

Quick jump into the menu:
In order to quickly be able to display parameters that are needed often, you can use the + - keys to jump directly to menu options of your choice.
By pressing the + - key in the status level, you can switch directly in the menu to the menu structure.
From here, the operation is as described above.

6.2 Menu structure

POWEROUT	LC	AIR	CONTROL	SETTINGS	Service
Vout int xxx.x V	Mode [OFF] [1S 0-1], [2S 0-1], [1S L-H], [2S L-H]	Pretime xxxxx ms	Control [OFF], [ON]	RS485 Ad xx	Vout act xxx V
Freq. xxx.x Hz	ON-del. xxxxx ms	Posttime xxxxx ms	Sens Ref xxxx	Contrast xxxx	Ixt xx A
Curve [Sin], [Sin 3.OW], [Tab]	OFF-del. xxxxx ms		Cont. P xx	RUN/OFF [OFF], [ON]	Sens act xxxx
Current xx.xx A	Timeout xxxxx ms		Cont. I xxxx	En. Ex 1 [OFF], [ON]	Temp xxx.x °C
	V min xxx V		Cont. f [OFF], [ON]	En. Ex 2 [OFF], [ON]	VDC Link xxx V
	V max xxx V		Slave [OFF], [ON]	En. Ex 3 [OFF], [ON]	Input xxxxx
			Scan [OFF], [ON]	En. Ex 4 [OFF], [ON]	Output xxxx
				En. Ex 5 [OFF], [ON]	ON-Time xxxxxx
					Run-Time xxxxxx
					FW xx.xx
					HW xx.xx
					Freq.act xx.x Hz

6.2.1 En. Ex 1…5

The enable signal settings En. Ex 1…5 overwrite the current selection. When the enable signal setting is set to OFF, the input will be completely disabled.
All other input functions can only be set with the user control software.

6.2.2 Input and output

The menu entries “Input” and “Output” show the logic state of the inputs and outputs.
When an input is configured for analog use, an “A” is displayed.
The digits are counted from right to left, meaning IN1 or OUT1 are on the right side.

For a detailed description of the menu items and setting options, refer to chapter 7.

7. Configuration

The complete device can be adjusted and modified with respect to its properties based on the parameters.

The parameters can be displayed and edited with the help of the free-of-charge software tool "ParaDesk" from the company, Mosca Elektronik. For more details on the software and on downloading it, refer to chapter 12.

The texts in brackets are the designators shown by the device display.

7.1 Parameter Overview

Para-meter	Function (Name in the display menu)	Physical range of values or selec-tion in ParaDesk	Page
Parameter			
2	Firmware (FW)		40
3	Hardware status (HW)		40
4	Total operating hours (ON-Time)		40
6	Conveyor drive operating hours (Run-Time)		40
10	Status	Not ready (Nready) Ready (Ready) Enabled (Run) F1 Under-voltage (UV) F2 Over-voltage (OV) F3 Over-temperature (OT) F4 Over-current (OC) F5 Output stage (Outstage) F6 Time-out (Timeout) F7 Vibration sensor	40
11	Temperature (Temp)		40
12	DC link voltage (VDC link)		40
13	Status of IN1		40
14	Status of IN2		40
15	Status of IN3		40
21	Status of IN4 level		40
22	Status of IN5 level		40
16	Status of IN4 function		40
17	Status of IN5 function		40
18	Output current		40
24	Output current I * t (Ixt)		40
20	Output voltage (Vout act)		40
28	Modulation level		41
26	Actual value of vibration sensor (Sens act)		41

8	Actual output frequency (Freq act)		41
General device parameters			
110	RS485 address (RS485 Ad)	1 ... 32	41
111	Auto reset fault	0 ... 655 s 0=auto reset disabled	41
61	Display contrast (Contrast)	0 … 4,095	42
93	RUN/OFF keys (RUN/OFF)	Passive Active	42
116	Enable menu keys	Passive Active	42
128	Quick jump to function menu - key	Off/all menu items	42
129	Quick jump to function menu + key	Off/all menu items	42
Input functions			
52	Input IN1 function	No function Reset fault Sensor 1 Sensor 2 Enable (EN EX 1) UCM input PB upper PB lower	43
53	Input IN2 function	No function Reset fault Sensor 1 Sensor 2 Enable (EN EX 2) UCM input PB upper PB lower	43
54	Input IN3 function	No function Reset fault Sensor 1 Sensor 2 Enable (EN EX 3) Slave pulse UCM input PB upper PB lower	43
55	Input IN4 function	No function Reset fault Sensor 1 Sensor 2 Enable (EN EX 4) UCM input PB upper PB lower Analog function	43
56	Input IN5 function	No function Reset fault Sensor 1 Sensor 2 Enable (EN EX 5) UCM input PB upper PB lower Analog function	43

88	Level IN1	Low active High active	43
89	Level IN2	Low active High active	43
90	Level IN3	Low active High active	43
91	Level IN4	Low active High active	43
92	Level IN5	Low active High active	43
Output functions			
106	Output OUT1 function	No function Continuously active Ready Air Time-out Output on Over-current UCM output PB OUT	44
107	Output OUT2 function	No function Continuously active Ready Air Time-out Output on Over-current UCM output PB OUT	44
108	Output OUT3 function	No function Continuously active Ready Air Time-out Output on Over-current UCM output PB OUT Master pulses	44
109	Output OUT4 function	No function Continuously active Ready Air Time-out Output on Over-current UCM output PB OUT	44
94	OUT1 level	Positive Inverted	44
95	OUT2 level	Positive Inverted	44
96	OUT3 level	Positive Inverted	44
97	OUT4 level	Positive Inverted	44

Analog inputs adjustment			
57	Offset IN4	-24 … +24 V	45
58	Multiplier IN4	0.1 ... 4	45
62	Input resistance IN4	100 kOhm 500 Ohm	45
59	Offset IN5	-24 … +24 V	45
60	Multiplier IN5	0.1 ... 4	45
63	Input resistance IN5	100 kOhm 500 Ohm	45
Output voltage (POWEROUT)			
66	Output voltage waveform (Curve)	Sinusoidal Sinusoidal with 3rd harmonic Table	45
67	min. output voltage	0 … 250 V	45
68	max. output voltage	0 … 250 V	45
69	Output frequency (Freq)	1 … 300 Hz	45
76	Output voltage internal (Vout int)	0 … 250 V	45
77	Output voltage source	Output voltage internal IN4 IN5 Output voltage bus	45
98	Start-up ramp	43 … 3,150 ms to 100 V AC change	45
99	Shut-down ramp	43 … 3,150 ms to 100 V AC change	45
65	Continuous output current	0.4 ... 10 A	45
100	I*t output current	1…23 sec.	45
Level controller LC (LC)			
70	LC operating mode (Mode)	off (OFF) 1 Sensor on/off (1S 0-1) 2 Sensor on/off (2S 0-1) 1 Sensor low/high (1S L-H) 2 Sensor low/high (2S L-H)	46
71	LC switch on delay (ON del)	0 … 100,000 ms	46
72	LC switch off delay (OFF del)	0 … 100,000 ms	46
73	LC sensor time-out (Timeout)	0 … 655,400 ms	46
74	LC setpoint value low (V min)	0 … 250 V	46
75	LC setpoint value high (V max)	0 … 250 V	46
Sorting air SA (AIR)			
79	SA pre time (Pretime)	10 … 655,000 ms	46
80	SA post time (Posttime)	10 … 655,000 ms	46
Pulsed operation PO			
81	PO on time	0 … 655,000 ms	47
82	PO off time	0 … 655,000 ms	47
Universal controller module UCM+PB			
117	UCM mode	off UCM state UCM edge UCM state, IN continuously active	47
118	UCM on delay		47

119	USM off delay		47
120	UCM disable condition	Never Release off Release off, delay Output off Output off, delay	47
121	UCM+PB time-out	0 … 599,000 ms	47
122	PB upper delay time	0 … 599,000 ms	47
123	PB lower delay time	0 … 599,000 ms	47
Controller operation CO (CONTROL)			
83	CO on/off (Control)	off on	47
104	Frequency control (Cont. f)	on off	47
64	CO setpoint source	CO internal setpoint IN4 IN5 CO bus setpoint	47
86	CO internal setpoint (Sens ref)	0 … 40	47
78	Vibration sensor source	None IN4 IN5	47
84	CO P-factor (Cont. P)	0 … 16	47
85	CO I-factor (Cont. I)	0 … 4,095	47
87	Search resonance frequency (Scan)	off on	47
105	Slave operation (Slave)	on off	47
103	Phase offset slave operation	-360 … +360 °	47

7.2 Parameter description

The parameters are divided into groups for better overview. Each group represents one function block with all its parameters, which, in interaction with the function block, can change its properties.

7.2.1 Parameter group parameters

7.2.1.1 Firmware, Hardware status

Information about the device.

7.2.1.2 Total operating hours

The operating hours counter counts the operating time of the device. This is active as soon as the device is connected to the mains voltage and switched on.

7.2.1.3 Conveyor drive operating hours

This operating hours counter counts only the effective run time of the conveyor.

7.2.1.4 Status

The device status is displayed here (in the error-free condition: Operating status, otherwise: error code).

7.2.1.5 Temperature

The temperature of the device at the rear panel. If a critical temperature limit is exceeded, the control device shuts down.

7.2.1.6 DC link voltage

The DC link voltage is monitored continuously. If an error is present, the output stage is locked, the control device shuts off and an over-voltage or under-voltage fault is displayed.

7.2.1.7 State of IN1 ...3

Indicates the digital state of the inputs IN1 ... IN3.

7.2.1.8 State of IN4 ...5 level

Indicates the analog voltage value at the input terminal.

7.2.1.9 Status of IN4 ...5 function

Displays the percentage value of the selected analog function including offset and multiplier setting.

7.2.1.10 Output current

The output current is monitored and displayed continuously.

*7.2.1.11 Output current I * t*

The output current is calculated with a time constant. If the value exceeds the continuous current limit, the device is shut down.

7.2.1.12 Output voltage

Instantaneous output voltage at the magnet output.

7.2.1.13 Modulation level

Level of the PWM at the magnet output. If this value is 100%, the voltage at the conveyor output cannot be increased further.
The input mains voltage is too small for the desired output voltage.

7.2.1.14 Actual value of vibration sensor (Sens act)

Displays the currently measured value of the vibration sensor.

7.2.1.15 Actual output frequency

Displays the actual output frequency.

7.2.2 Parameter group sensor settings

7.2.2.1 Voltage limit for sensor monitoring low/high, time constant

The sensor is monitored continuously. The sensor values are integrated with a filter.
If the output of the filter exceeds the limits, a sensor error is generated.

7.2.3 Parameter group general device parameters

7.2.3.1 RS485 address

The address of the controller on the RS485 bus.

Note: After this value has been modified, the communication with ParaDesk gets cancelled and it has to be restored with the new address.

7.2.3.2 Auto reset fault

After the set time, error states of the device are reset if the cause of the error has been corrected. If the value is set to zero, the auto reset function is deactivated.

Attention: According to the Machinery Directive, the fault acknowledgement and restart of the vibratory conveyor should not be possible with the same command device (e.g. button). If you would like to activate this function, you have to ensure with the help of other means (e.g. supervisory controller) the safety of the entire system and compliance with statutory regulations.

7.2.3.3 Contrast display (Contrast)

You can adjust the contrast of the display with this parameter.

7.2.3.4 RUN/OFF keys (RUN/OFF)

Using this parameter, you can set whether the RUN/OFF keys on the front side of the device are activated or deactivated. If they are deactivated, the status is RUN, as long as no external enable input is configured.

7.2.3.5 Menu keys

With this parameter, you can set whether the menu keys on the front side of the device are activated or deactivated. In this way, you can prevent the adjustment of parameters on the device.

The quick jump function is active, even if the menu keys are deactivated. Thus, the parameters selected for these keys can still be adjusted. If this is not desired, the quick jump function needs to be set to “off”.

7.2.3.6 Selection Menu + - keys

For quick selection of parameters using the menu keys, you can assign a given parameter to the particular key.

7.2.4 Parameter group functions inputs IN1 … IN5

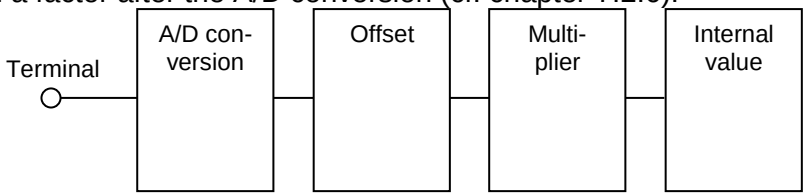
- No function
- Reset fault
- Sensor 1
- Sensor 2
- Enable

The inputs IN4 ... IN5 can also be assigned with the following function:

- Analog function

Note:
The function "Enable" can also be assigned in the SETTINGS menu to the respective input.
ATTENTION! If this is used on the device, only the functions "Release" and "No function" are available. ON=Enable, OFF=no function
The other functions can be selected only via ParaDesk.

The physical input voltage at the terminals IN4 ... IN5 can be added with an offset and multiplied with a factor after the A/D conversion (cf. chapter 7.2.6).



The following provides an explanation of the individual selection options:

7.2.4.1 No function

The input terminal is not activated.

7.2.4.1 Reset fault

An existing fault can be reset.

7.2.4.2 Sensor 1…2

The filling line sensors can be connected to these inputs.

7.2.4.3 Enable

The vibratory conveyor can be activated with this input.

7.2.4.4 Analog function

The input needs to process an analog input voltage. If the input is not configured explicitly for an analog function, the input is treated as a digital input.

7.2.4.5 Vibration sensor source

You can choose whether no vibration sensor is active or this is connected either to the IN4 or IN5.

7.2.5 Parameter group functions outputs OUT1 ... OUT4

The outputs OUT1 ... OUT4 can be assigned to the following output functions:

- No function
- Continuously active
- Ready
- Air
- Time-out
- Output on
- Over-current

The following provides an explanation of the individual selection options.

7.2.5.1 No function

The output terminal is not activated.

7.2.5.2 Continuously active

The output terminal can be activated permanently. In this way, it is possible to use the output terminal as power supply for an external load.

Please note the electrical level definitions of the outputs in chapter 4.2.4.3

7.2.5.3 Ready

If no fault is present, an active high is put out at this output.

7.2.5.4 Air

A pneumatic valve can be connected to this output, cf. chapter 5.4.

7.2.5.5 Time-out

If no signals arrive from the sensors for an adjustable period of time, this output is set. Cf. chapter 5.1.

7.2.5.6 Output on

If the magnet output is active, this output gets activated.

7.2.5.7 Over-current

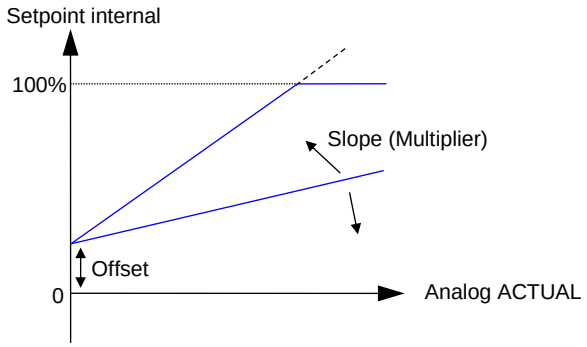
If an over-current situation has arisen at the magnet output, this output gets activated.

7.2.6 Parameter group analog inputs IN4 and IN5 adjustment

7.2.6.1 Offset, Multiplier

Is used to adjust the offset to the inputs. To the voltage applied, first the "Offset" is added to the digitised value (negative values are also possible) and the result is then multiplied with the "Multiplier".

Please note: The physical input range 0 ... 24 V is not enlarged as a result of this. Similarly, the result remains 0 ... 100%. As a result of these setting options, it is possible to set various input voltage ranges, e.g. 0 … 10 V or with the associated load resistance a current loop 0 … 20 mA or 4 … 20 mA



7.2.6.2 Input resistance

You can choose between two input resistances. With this it is possible to implement a current loop input for 0 … 20 mA or 4 … 20 mA.

7.2.6.3 Calculation of offset and multiplier for analog control of Sens ref

Multiplier = max. Sens ref in g_{ss} * 0.3 / (max. control voltage in V - offset in V)

Example 1: Control signal 0…10V (or 0…20mA) for 0…20g_{ss}
Offset = 0V
Multiplier = 20g_{ss} * 0.3 / (10V - 0V) = 0.6

Example 2: Control signal 4…20mA for 0…30g_{ss}
Offset = 4mA * 500R = 2V
Multiplier = 30g_{ss} * 0.3 / ((20mA - 4mA) * 500R) = 1.125

7.2.7 Parameter group, output voltage

7.2.7.1 Output voltage waveform

You can choose the output waveform of the voltage for the vibratory conveyor with this parameter.
You can choose from waveforms defined and available in the device (sinusoidal and sinusoidal with the 3rd harmonic) or a unique waveform (table).

For a detailed description and all tools necessary for preparing and transferring a unique waveform please enquire with the manufacturer.

7.2.7.2 Output frequency

The selected output frequency, with which the set waveform needs to be output periodically.

7.2.7.3 Output voltage internal

Internal fixed value for specifying the output voltage.

7.2.7.4 Output voltage source

Source of the output voltage value.

7.2.7.5 Ramps

When switching the vibratory conveyor on or off, you can set a ramp in order to implement a gentle start-up or shut-down.

7.2.7.6 Continuous output current

Effective continuous current of the vibratory conveyor output.

*7.2.7.7 I*t output current*

Time constant of the current shut-down. The I*t current value is the time for which the continuous current limit may get exceeded.
If this value is exceeded, the output of the device shuts down. It is used to protect the connected vibratory conveyor.

7.2.8 Parameter group level controller LC

7.2.8.1 Operating mode

You can adjust the operating mode of the vibratory conveyor with this parameter. A detailed explanation on the operating modes is given in chapter 5.

7.2.8.2 Switching on and switching off time delay

The switching on or switching off time point of the vibratory conveyor can be specified with this parameter. Cf. e.g. Diagram in chapter 5.1.

7.2.8.3 Sensor time-out

If the sensor(s) (depending on the operating mode) do not provide any signal for the time set with this parameter, the vibratory conveyor is shut down. Cf. diagram in chapter 5.1.

7.2.8.4 Setpoint value low and high

For the operating modes "1 sensor low/high" and "2 sensor low/high", you can specify with the two output voltages here that the vibratory conveyor works with. Cf. diagram in chapter 5.3.

7.2.9 Parameter group sorting air SA

7.2.9.1 Lead (pre-)time and stopping (post-)time

With the release of the conveyor, first the output "Air" is switched on and after a time delay, the output voltage of the conveyor is started up.

The output "Air" remains active for a stopping time after shutting down the conveyor.
The lead time and stopping time can be adjusted separately.

Note: To activate the sorting air, one output must be assigned to the function "Air".

Cf. diagram in chapter 5.4.

7.2.10 Parameter group pulsed operation PO

7.2.10.1 On and off time

On and off time in cyclic operation. Cf. diagram in chapter 5.5.

Note: To deactivate cyclic operation, the on time must be set to "0".

7.2.11 Parameter group Universal Controller Module UCM

7.2.11.1 Operating mode

The operating mode of the Universal Controller Module can be set with this parameter. A detailed explanation on the operating modes is given in chapter 5.6.

7.2.11.2 Switching on and switching off time delay

The switching on or switching off time point of the Universal Controller Module can be specified with this parameter. Cf. e.g. Diagram in chapter 5.6.

7.2.11.3 Disable condition

The switching off condition for the output of the Universal Controller Module can be specified here.

7.2.11.4 UCM+PB time-out

The max. switching on time and switching off time of the PB OUT function is monitored. In case of exceedance, the magnet output is shut down and the time-out error is displayed. For operation without PB, the max. switching on duration of the USM OUT function is monitored.

7.2.11.5 PB upper delay time, PB lower delay time

The inputs can be evaluated with a delay e.g. in order to debounce the signals or to implement a delayed changeover to the other direction of the conveyor.

If both inputs (PB above and PB below) are active simultaneously, the conveyor is shut down and time-out is displayed.

7.2.12 Parameter group controller operation CO

7.2.12.1 CO on/off

Activates or deactivates the controller operation.

7.2.12.2 CO Setpoint value

Setpoint value for the vibration amplitude in g_{ss}.

Note: Conversion of the digits to physical acceleration depends on the vibration sensor used and on the scaling of the corresponding analog input.
Recommended values for sensor SP01144:

- Connected to IN4
- P101=5V
- P102=11V
- P158=1sec
- P162=300mV/g
- P55=analog function
- P78=IN4

- P57=0
- P58=1,023
- P62=100kOhm

7.2.12.3 CO P and I factor

The response of the PI controller can be changed by these two values.

7.2.12.4 Frequency control (Cont. f)

You can activate or deactivate the frequency control with this parameter.
If the frequency control is switched off, the device controls only the output voltage.

7.2.12.5 Slave operation (Slave)

With this parameter, you can decide whether the device works as a slave. In the slave mode, an active frequency control is ignored. Only the specification of the synchronisation pulse at the IN3 input is evaluated.

7.2.12.6 Phase offset, slave operation

With this you can set the phase angle offset that the output waveform on the slave device should have relative to the master device.

7.2.12.7 Scan (Search) for resonance frequency

Starts the scan for the optimal resonance frequency always when the device is enabled. Note: This is useful only if a new unknown conveyor is being connected to the device. When disabling the device, the previous frequency is saved automatically. If the resonance search is shut down, this frequency is used as the start frequency for the controller when it is enabled again.

8. Sequence of putting into operation for the first time

➔ The pin assignment is given in chapter 4.2.

Attention: When putting the system into operation for the first time, you have to pay attention to the fact that based on installation or parameter setting errors, incorrect vibration start-up is possible. You have to adopt measures that rule out hazardous situations (e.g. decouple vibrations mechanically from the machine).
Please read chapter 5 "Parameters" before you put the device into operation for the first time.

Observe the following start-up sequence:

Without automatic resonance scanning (searching):

- Disconnect the vibratory conveyor from the device
- Make sure that the enable signal is inactive.
- Switch on the supply voltage
- Set the device parameters (cf. chapter 5)
- Specify the enable signal and setpoint values (waveform / output voltage / Output frequency)
- Switch off the device
- Connect the vibratory conveyor to the device
- Switch on the device, enable it and check all settings once again.

With automatic resonance scan (search):

- Set the max. magnet current in parameter P78
- Activate resonance scan (search) in the display menu (CONTROL | SCAN) and confirm
- Press RUN, and the resonance frequency is measured
- After one second, the device switches to controlled or regulated frequency operation (in case the frequency regulation is activated).
- Press STOP
- Deactivate resonance scan (search) in the display menu

9. Troubleshooting and fault elimination

9.1 Resetting fault messages

- OFF / ON of the supply voltage (Attention, before restarting wait > 1 min. until the internal energy storage is drained (LCD off)
- Fault reset via the terminal function
- Auto reset

9.2 Possible causes of the error

Some possible causes of error are listed in the following table.

Error	Possible Cause	Rectification
Message "RUN", but the vibration magnet is not running despite enable	The vibration magnet or the cabling is defective, output voltage is too low	check the magnet and repair it if required, Check the parameters
"Not ready"	Supply voltage is absent or too low	Check the voltage source, cabling and fuses
"Under-voltage" "UV"	Supply voltage (power) was too low during enable (possibly also for a short time)	Check the voltage source, cabling and their impedance. Possibly, the voltage has dropped as a result of high current demand. Perform a reset.
"Over-voltage" "OV"	Supply voltage is too high (possibly also only for a short time)	Check the voltage source Perform a reset.
"Over-temperature" "OT"	Device rear panel too hot	Allow it to cool down, ensure adequate ventilation and perform reset.
"Over-current" "OC"	I*t monitoring of the magnet current has triggered.	Check the limit value specified and check the magnet current
"Timeout"	Timeout with UCM or level control	Check the sensors, Check the parameters
"Sens"	No correct signal from the vibration sensor	Check the vibration sensor and its installation

If you are sending the device for testing or repair, please specify the following:

- ♦ Type of the error
- ♦ Accompanying circumstances
- ♦ Suspected cause of error
- ♦ Previous unusual events

10. Maintenance

The control device is maintenance-free if the prescribed conditions of use are observed and followed (refer to chapter 3.2).

11. Manufacturer's declaration

The manufacturer, i.e. the company Mosca Elektronik und Antriebstechnik GmbH, declares herewith that the control device SP01075 described in this technical documentation is meant for incorporation in a machine or for assembly with other components into a machine. The control device SP01075 is not a machine in the sense of the Machinery Directive 2006/42/EC.

This technical documentation contains information and recommendations for installation and proper or intended operation.

It is prohibited to put the machine into operation until it has been established that the protective and safety requirements of the Machinery Directive 2006/42/EC are met.

There are measures described in this technical documentation with the help of which the device complies with the EMC limit values. The electromagnetic compatibility of the machine is based on the type and care of the installation carried out. The responsibility for compliance with the EMC Directive 2004/108/EC in the machine application lies with the user.

Standards and regulations considered

- IP classes of protection:
  EN 60529, issues in 1991
- Basic material for printed circuits:
  DIN IEC 60249 Part 1, issued in October 1986
- Printed circuits, PCBs:
  DIN IEC 326 Part 1, issued in March 1985
- Determination of air gaps and creep paths:
  DIN VDE 0110 Part 1-2, issued in October 1985
- Emitted interference:
  IEC61000-6-4:2006+A1:2010
  IEC610003-3-2:2005+A1:2008+A2:2009
  IEC61000-3-3:2013
- Interference immunity:
  IEC61000-6-2:2005
  IEC61000-4-2:2008
  IEC61000-4-3:2007+A1:2007+A2:2010
  IEC61000-4-4:2012
  IEC61000-4-5:2005
  IEC61000-4-6:2008
  IEC61000-4-8:2008
  IEC61000-4-11:2004

12. Operating software

In order to be able to parameter and monitor the SP01075 control device, the monitor software "ParaDesk" is required.
The respective current version is available for download free of charge on the homepage at http://www.paradesk.de.

Note: Please observe and follow the operating manual of ParaDesk for installation and operation of the software. This is also available at the website address given above.

13. Table of Revision

Date	Modification
2016-01	Original version
2016-03	Pin assignment, technical specifications and menu structure modified
2016-08-28	Changed pin assignment, dimensional drawings supplemented, Profinet supplemented
2016-08-31	Changed pin assignment, dimensional drawings supplemented, Profinet supplemented
2016-09-06	Input current supplemented
2016-10-19	Figure, characteristics replaced
2016-11-08	Input currents corrected, parameter numbers corrected, various minor issues corrected, leakage current sketch, standards
2016-11-16	Data for relay output supplemented
2016-12-06	Assignment X7, relay contact extended by OUT4, Profinet H21, H22 exchanged
2016-12-14	Supplements in the chapter on controller operation, chapter UCM with parameters added, parameters for blocking keys added
2016-12-22	Menu expanded
2017-01-11	Fast jump +- key supplemented
2017-01-16	Saving parameters without additional prompt from FW209
2017-01-31	Designation M12 extended for sockets and connectors
2017-10-11	Display table corrected
2017-10-19	Various minor issues corrected
2017-12-02	Chap. 7.1 P86, Chap. 7.2.3.5 extended, Chap. 7.2.6.3 extended, Chap. 7.2.12.2 extended
2018-01-16	Product image renewed
2018-04-05	Chapter 1 expanded