

Operating Manual

SP01162

Control device for vibratory conveyor



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1. General information

1.1 Preface



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.

1.2 Brief description

- Phase angle controller for vibratory conveyor
- Constant conveyor output by amplitude regulation
- Wide input voltage range for worldwide use without changes
- Constant conveyor output independent of mains voltage fluctuations
- Level control
- Sorting air control
- Setpoint input for potentiometer or prevalent standard signals
- Parameter setting with potentiometers/switches or PC-interface
- Backing up the user settings
- 2-pole mains switch
- Protection class IP54 for field installation
- ParaDesk interface: RS232 (logic level)

1.3 Scope of supply

The scope of supply includes:

- ◆ One SP01162 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.

1.4 Accessories

In order to set the parameters and monitor the SP01162 control device, the following accessories are recommended (see also chapter 12):

- ◆ PC with software "ParaDesk". You can download ParaDesk free of charge at <http://www.paradesk.de>.
- ◆ SP01056 interface converter

The vibration sensor SP01144 is needed for optional vibration control.

1.5 Proper use

- ◆ The SP01162 control device is provided for installation in a machine for setting up a vibratory conveyor system.
- ◆ Vibratory conveyor systems with the SP01162 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 foreseen
 - 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.

1.6 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 SP01162 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

1.7 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.

Beside 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 during 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 safe working 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

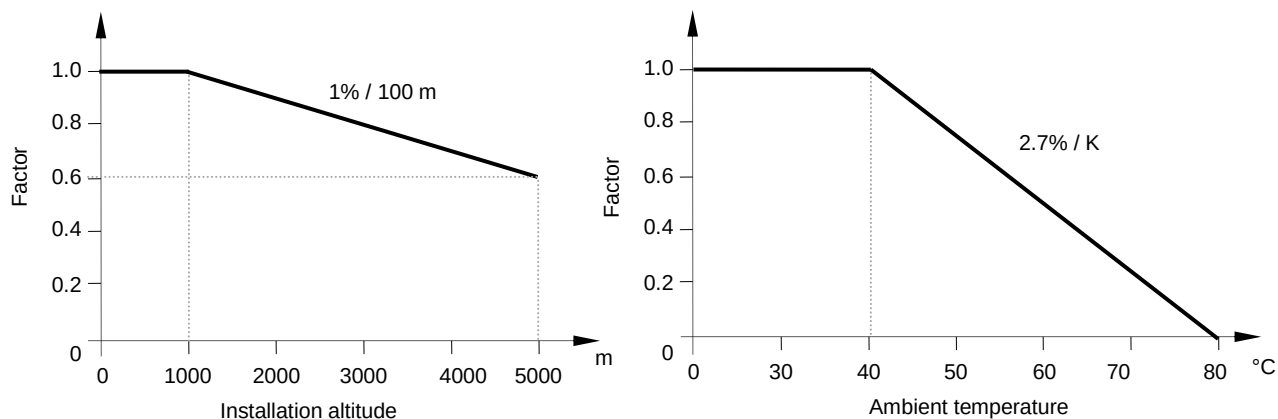
Parameter	Unit	Value
Input voltage	$V_{AC,RMS}$	100 ... 240
Input frequency	Hz	47 ... 63
Mechanical output frequency at $f_{in}=50$ Hz	Hz	100, 50, 33⅓, 25, 20 and 16⅔
Output current at $f_{out}=100$ Hz	$A_{AC,RMS}$	7 ⁽¹⁾
Output power at $f_{out}=100$ Hz	VA	1600 ⁽¹⁾
Control inputs	-	1x analog, 1x digital, 1x combined
Control outputs (Relay)	-	1x NO contact 24V or potential-free changeover contact
Power supply for external loads	V	24
Current limit for 24V supply	mA	100
Ambient temperature	°C	0...40 (>40° power output reduction of 2.7%/K)
Storage temperature	°C	-10 ... 80
Atmospheric humidity	%	Max. 80, non-condensing
Protection class	-	IP54 ^{(2) (3)}
Installation altitude	p	1,000m (>1,000 m power output reduction of 1% /100 m)

Remarks:

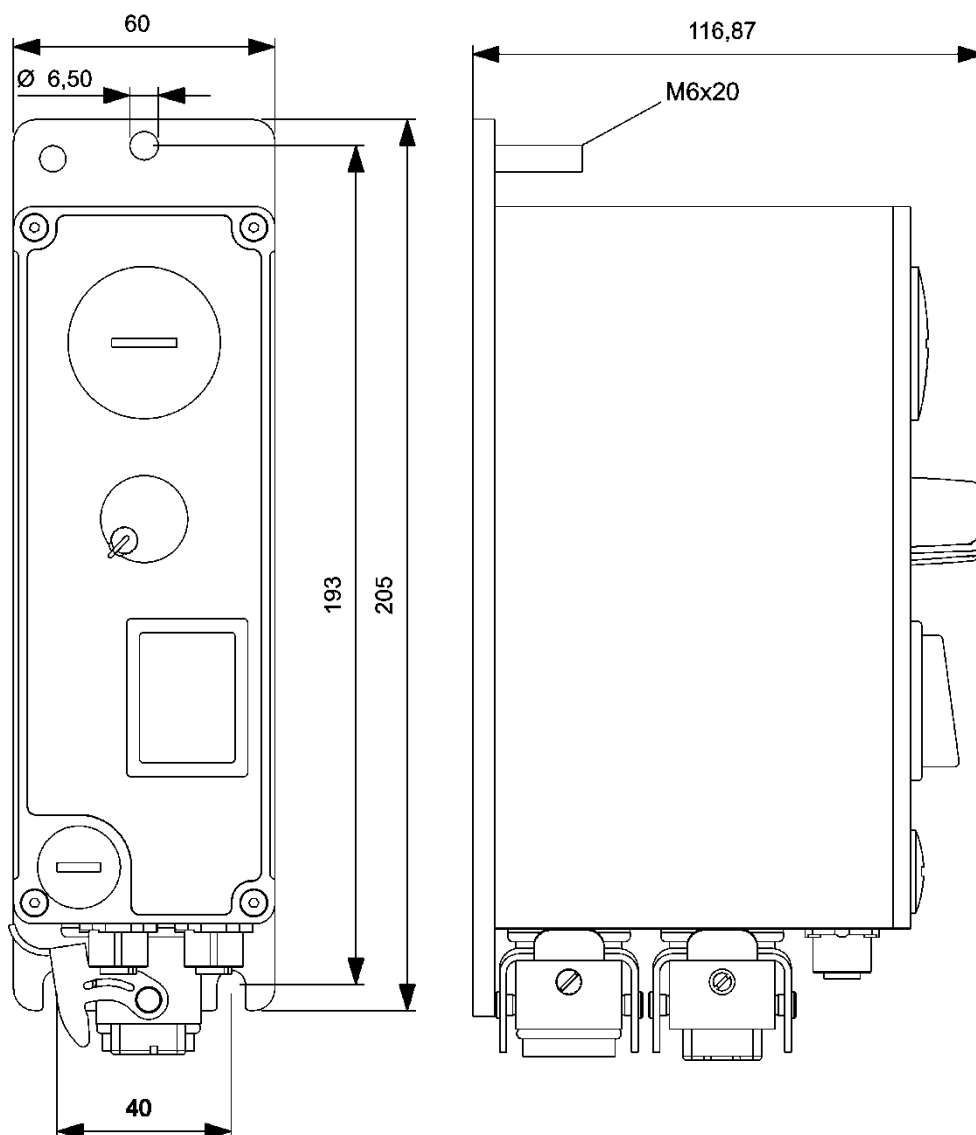
- (1) For output frequencies < 100 Hz, the continuous output current reduces proportionally to the output frequency, i.e. 3.5 $A_{AC,RMS}$ at 50 Hz, etc. This is caused by the fact that the peak current value should not exceed 10 A.
- (2) Only IP20 for opened front-side covers.
- (3) All connections at the bottom side of the device must be occupied with mating plugs having min. IP54 class of protection, or they must be sealed off in some other way, otherwise the protection class gets further reduced.

3.2 Conditions of use

With installation at altitudes above 1,000 m or at temperatures more than 40°C, the output power of the device must be reduced in accordance with the following diagrams.



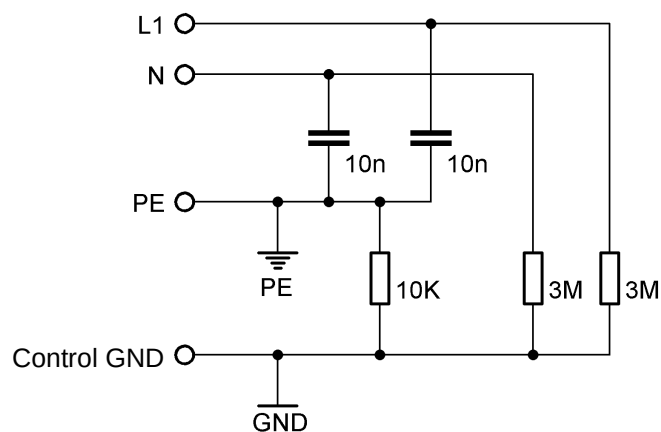
3.3 Dimensional drawing



3.4 Information on measuring the leakage current



The entire leakage current is composed of the leakage current of the Y capacitors as well as resistors between the mains input, PE and control GND, cf. the following diagram.



4. Installation



- ◆ Do not exceed the permissible range of the operating ambient temperature (see chapter 3).
- ◆ 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.
- ◆ Analog inputs must be installed with shielded lines.
- ◆ Dimension the wire cross-sections liberally accordingly!
- ◆ Observe the locally applicable safety provisions.

4.1 Wiring suitable for EMC



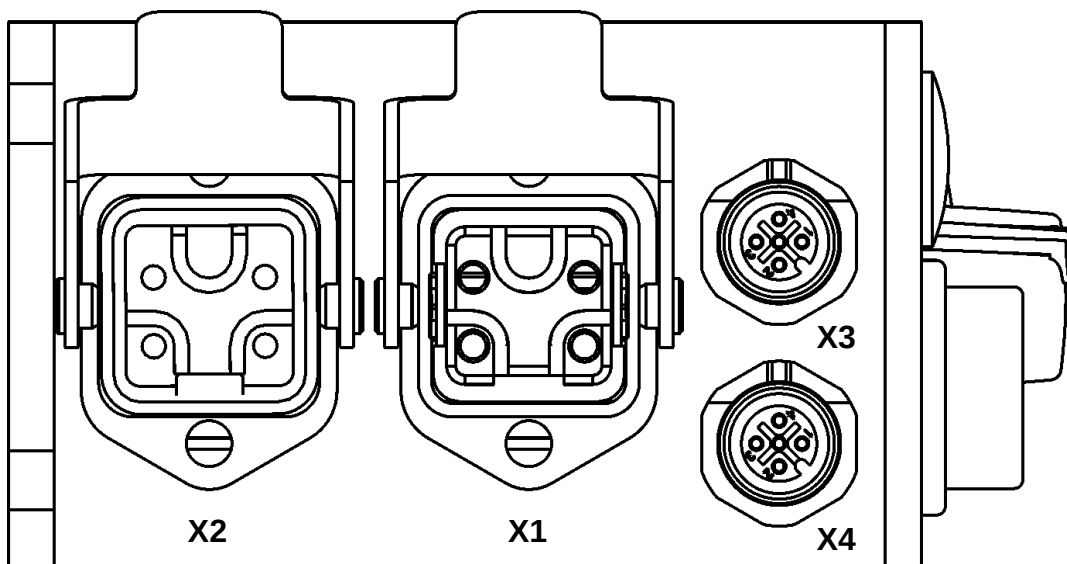
In order to ensure the electromagnetic compatibility (EMC) in your switching cabinets in electrically harsh environments, the following EMC rules must be observed and followed for the design and construction:

- ◆ 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 lines. Minimum distance: 20 cm.
- ◆ As far as possible, route signal lines from only one level into the cabinet. Unshielded lines of the same electrical circuit (signal and return conductor) must be twisted as far as possible.
- ◆ 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 signal lines must be connected on both sides (source and destination) such that they have a large area and are well-conducting to earth¹. With poor potential equalisation between the shield connections, an additional equalisation conductor of at least 10 mm² must be laid 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 far as possible close to the cabinet housing or to the installation plates. 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 laid to the housing ground. In the area where cables are routed into the housing, the insulation must be removed over a length of 2 cm in order to expose the shield meshing. The shield meshing should not get damaged when stripping the line. The cable must be connected at the stripped point by 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 plugin connectors. Pay attention to continuous shield even with plug-in connectors.

¹All 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



Pin assignment X1

Pin	Wire colour ⁽¹⁾	Designation	Function
1	Brown	L	Mains input L
2	Blue	N	Mains input N
3	-	-	Not assigned
PE	Green/Yellow	PE	Mains input PE

Pin assignment X2

Pin	Wire colour ⁽¹⁾	Designation	Function
1	Brown	Magnet L	Power output L
2	Blue	Magnet N	Power output N
3	-	-	Not assigned
PE	Green/Yellow	PE	Power output PE

(1) With open cable end, instead of plug/socket (optional)

Pin assignment X3 socket		
Pin	Designation	Function
1	24V	Supply output
2	IN1	Analog input IN1
3	GND	Control GND
4	IN2	Digital input IN2

Pin assignment of X4 socket		
Pin	Designation	Function
1	24V	Supply output
2	IN3	Analog / digital input IN3
3	GND	Control GND
4	OUT1	Output (NO contact to 24V)

Pin assignment of X4 pin		
Pin	Designation	Function
1	OUT1 COM	Relay COM contact
2	OUT1 NC	Relay NC contact
3	-	Not assigned
4	OUT1 NO	Relay NO contact

4.2.2 Examples of mating plugs

- ◆ X1: e.g. ILME: MKA V20 + CKSF03 or Harting: Han 3A-GG-M20 + Han 3A-F
- ◆ X2: e.g. ILME: MKA V20 + CKSM03 or Harting: Han 3A-GG-M20 + Han 3A-M
- ◆ X3, X4: M12 pin, A-coded, e.g. Phoenix Contact: SACC-MS-4QO-0.34-M SCO
- ◆ X4: M12 socket, A-coded, e.g. Phoenix Contact: SACC-FS-4QO-0.75-M SCO

4.2.3 Function inputs and outputs

4.2.3.1 Overview

	X3		X4	
Functions	IN1	IN2	IN3	OUT1
Setpoint Input	•			
Enable Input		•	•	
Controller Operation Sensor	•		•	
Level Control Sensor		•	•	
Universal Controller Input		•	•	
Status Output				•
Sorting Air Valve Output				•
Universal Controller Output				•

4.2.3.2 Electrical characteristics, IN1

Parameter	Value	Unit
Input impedance as voltage input	115	kΩ
$U_{in,0\%}$	0	V
$U_{in,100\%}$	10 or 24	V
Input impedance as current loop input	500	Ω
$I_{in,0\%}$	0 or 4	mA
$I_{in,100\%}$	20	mA

4.2.3.3 Electrical characteristics, IN2

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

4.2.3.4 Electrical characteristics, IN3

Parameter	Value	Unit
Input impedance	115	kΩ
$U_{in,low}$	< 5, configurable	V
$U_{in,high}$	> 15, configurable	V

4.2.3.5 Electrical characteristics, OUT1 (X4 socket)

Parameter	Value	Unit
Inactive	Open	-
Active	24	V
Max. switching current with resistive load	2	A
Max. switching current with inductive load	1.5	A



Note: The internal 24V power supply is short circuit-proof and delivers a total of max. 100 mA. If more current needs to be drawn at the outputs, the power supply must be supported externally. The external voltage can be connected to the 24V- and GND terminals.

4.2.3.6 Electrical characteristics, OUT1 (X4 pin)

Parameter	Value	Unit
Inactive	COM – NC connected	-
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

5. Operating modes

The control device can be adjusted for its characteristics with the help of the parameters (Pxxx). For this purpose, also see chapter 6 and 7.

5.1 Setpoint setting, scaling and mains voltage compensation

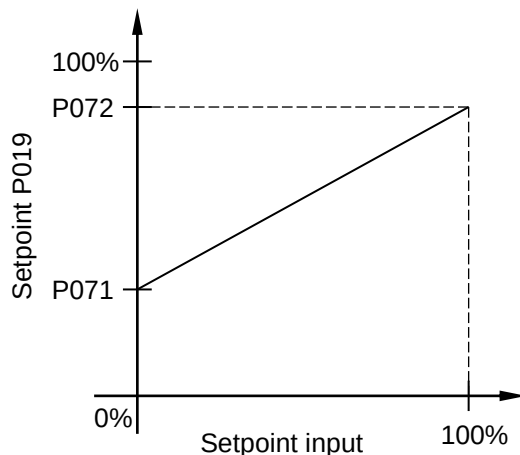
The setpoint value can be specified between 0...100% (P070, potentiometer or IN1). This is proportional to the peak value of the output current. In the process, 100% is equivalent to the respective peak current value of the vibration magnet if it is operated directly at 230V_{AC}.

The impact of the mains voltage on the output current peak value is compensated automatically, provided the trigger angle is larger than 80...90°.

The source of the setpoint value is determined with P075.

The setpoint specification can be restricted by defining "Setpoint scaling lower limit" (P071) and "Setpoint scaling upper limit" (P072). In the process, P071 specifies the setpoint for the left stop (internal potentiometer), 0V or 0/4 mA (IN1). Accordingly, P072 specifies the setpoint for the right stop (internal potentiometer), 10/24 V or 20 mA (IN1).

Sample diagram:



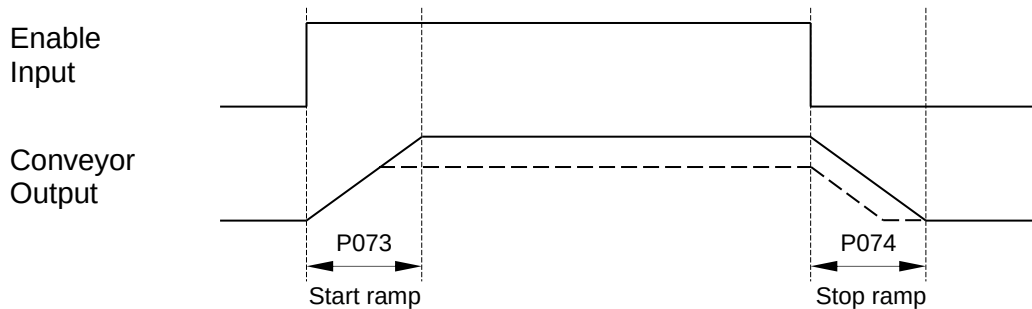
Note: If via P075, "IN1 ext. pot 0...24V" is selected, the ratio of IN1 to the 24 V supply is used for the setpoint calculation. In this way, the setpoint remains constant even with fluctuating 24 V supply (e.g. load change by OUT1).

Hence, with this setting, the external potentiometer must be fed with 24 V from the control device. If a fixed voltage is specified, the setpoint would additionally depend on the 24 V supply. For this purpose, you have to use the setting "IN1 0...10V".

5.2 Start-up ramp, shut-down ramp

In order to enable the conveyor to be switched on and off gently, the setpoint value is started up or shut down via a time ramp. The slopes of these ramps can be adjusted separately with the help of P073 and P074. With controller operation activated, the controller output is started up or shut down with these ramps.

Sample diagram:



5.3 Controller operation

With controller operation activated, the acceleration amplitude is measured continuously and controlled. For this purpose, it is necessary to connect a vibration sensor (chapter 1.4) at IN1 or IN3 (P089).

The control takes place with the help of a PI controller. The controller parameters P090 and P091 can be adjusted if required. The setpoint value (in %) is converted with the help of P092 to an acceleration amplitude.

In order that after interruption of the enable signal, the controller does not need several seconds in order to reach the setpoint value, the previous controller state is saved as long as the device is switched on. In this way, only the first control operation requires several seconds. Next, in case of interruptions, the controller output (P027) is controlled with the ramps P073 and P074. See also parameter P093.

5.4 Level control / Queue control with one sensor

It is possible to implement level control with the help of the inputs IN2 or IN3 as well as the integrated timing elements.



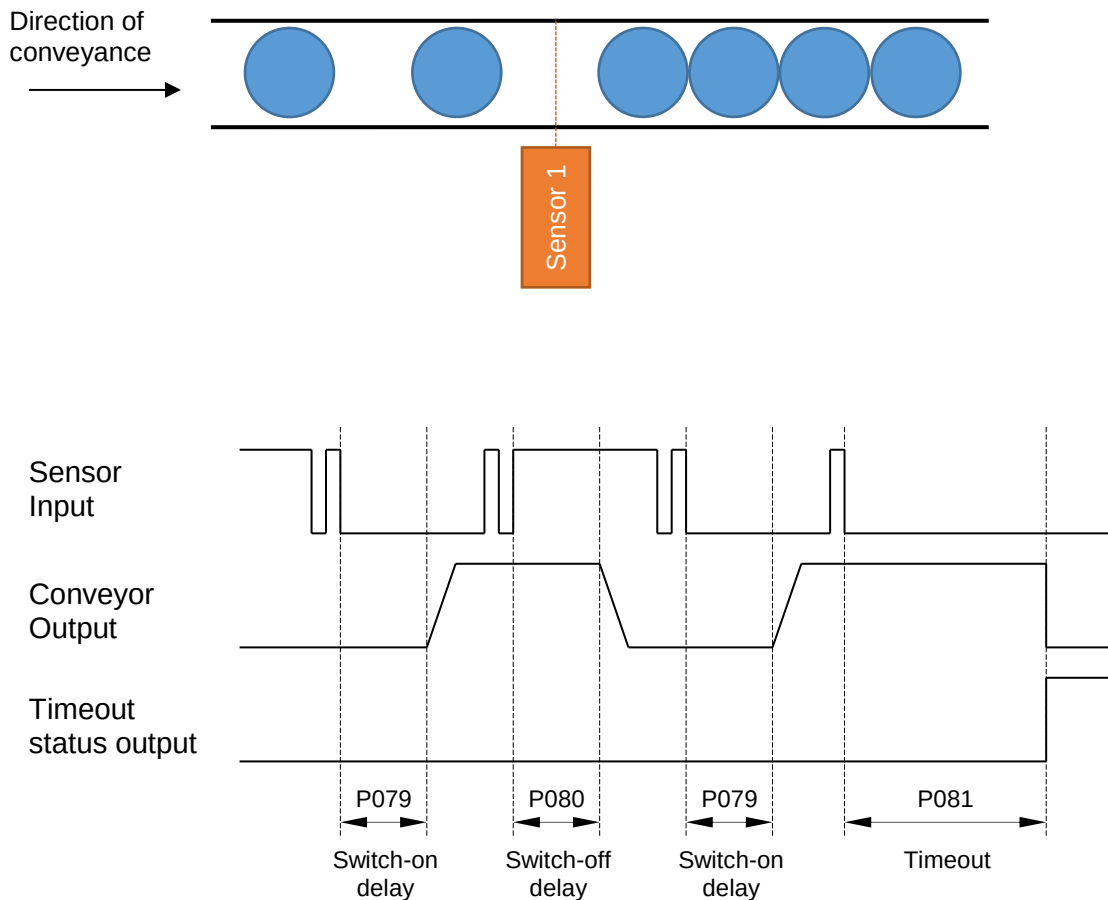
Note: The inputs IN2 and IN3 should not be used more than once (Enable, UCM).

The conveyor is switched on if the sensor input was inactive uninterruptedly for the period of the switching on delay (P079). The conveyor is switched off if the sensor was active uninterruptedly for the period of the switching off delay (P080). In this way, the level of the material to be transported oscillates around the position of the sensor.

The max. on time of the conveyor can be monitored using the separate time stage "LC Time-out" (P081). If this function is activated, the conveyor switches off after this time period has elapsed, provided that no parts have been detected by the sensor.

If the parameter "Error reset via enable" (P044) is set to "only E5: LC timeout" or "all errors", the reset can be done by another enable command via the enable input (edge from inactive to active). The output OUT1 can be used as a status output for the timeout condition (P082).

Sample diagram:

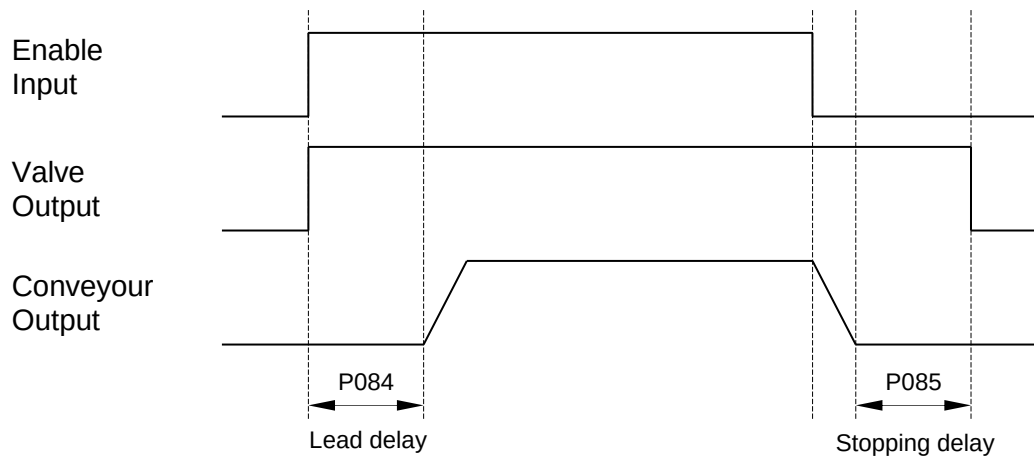


5.5 Air valve control

In order to support transporting parts through air, the output OUT1 can be used to control a pneumatic valve (P082). When enabling the conveyor, first OUT1 is switched on and with a time delay (P084) the output voltage of the conveyor is started up. The OUT1 remains active for a delay time (P085) after shutting down the conveyor. To deactivate this function, both times must be set to 0 sec.

For controlling the pneumatic valve depending on a sensor, refer to chapter 5.6.

Sample diagram:



5.6 Universal controller module

This module can be used if output OUT1 should be controlled via a sensor (IN2/IN3) instead of the magnet output. Examples of this include the control of a pneumatic valve via a material sensor for sorting out parts or enabling a bunker conveyor for material replenishment of the connected conveyor/sorting equipment.

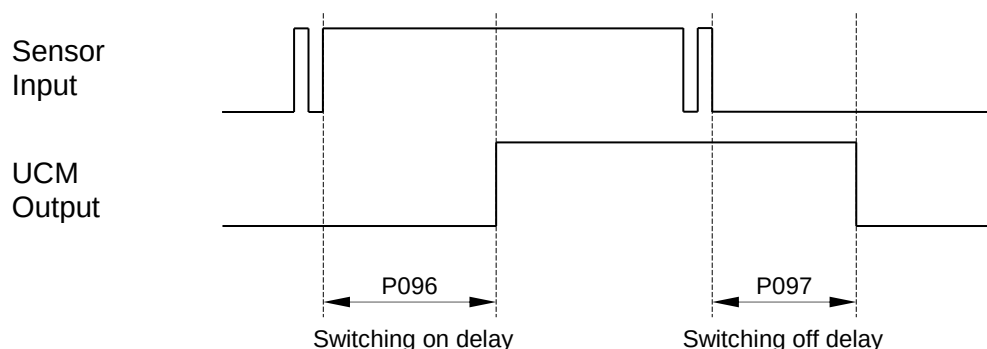


Note: The inputs IN2 and IN3 should not be used more than once (Enable, LC).

5.6.1 Operating mode "State"

The UCM output is switched on as soon as the 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.

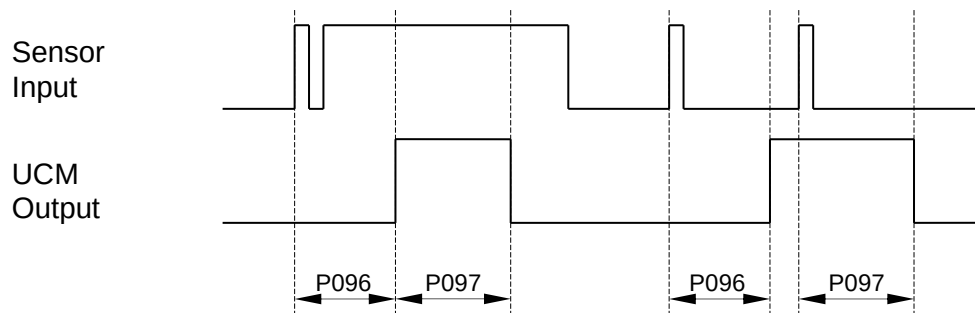
Sample diagram:



5.6.2 Operating mode "Positive edge"

The UCM output is switched on as soon as after a positive signal edge 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.

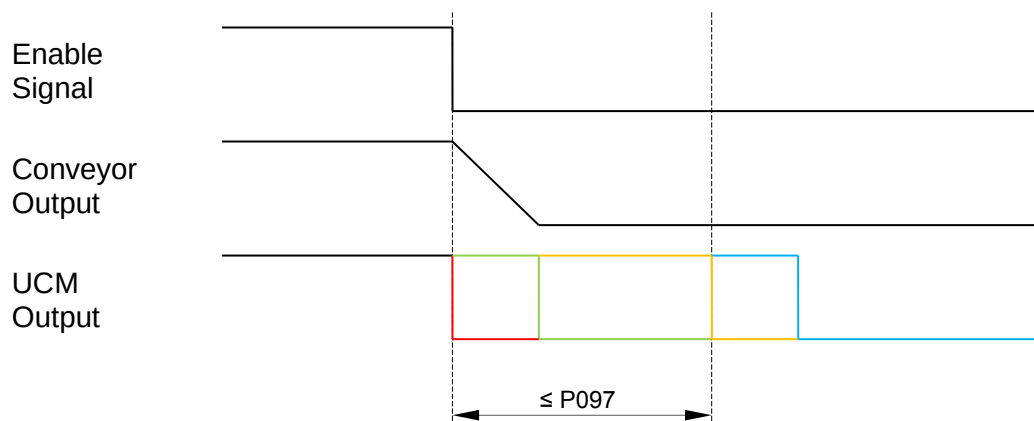
Sample diagram:



5.6.3 Linking UCM output to the enable signal

With P098, the UCM output can be inhibited depending on the enable signal or the operating state.

Sample diagram:



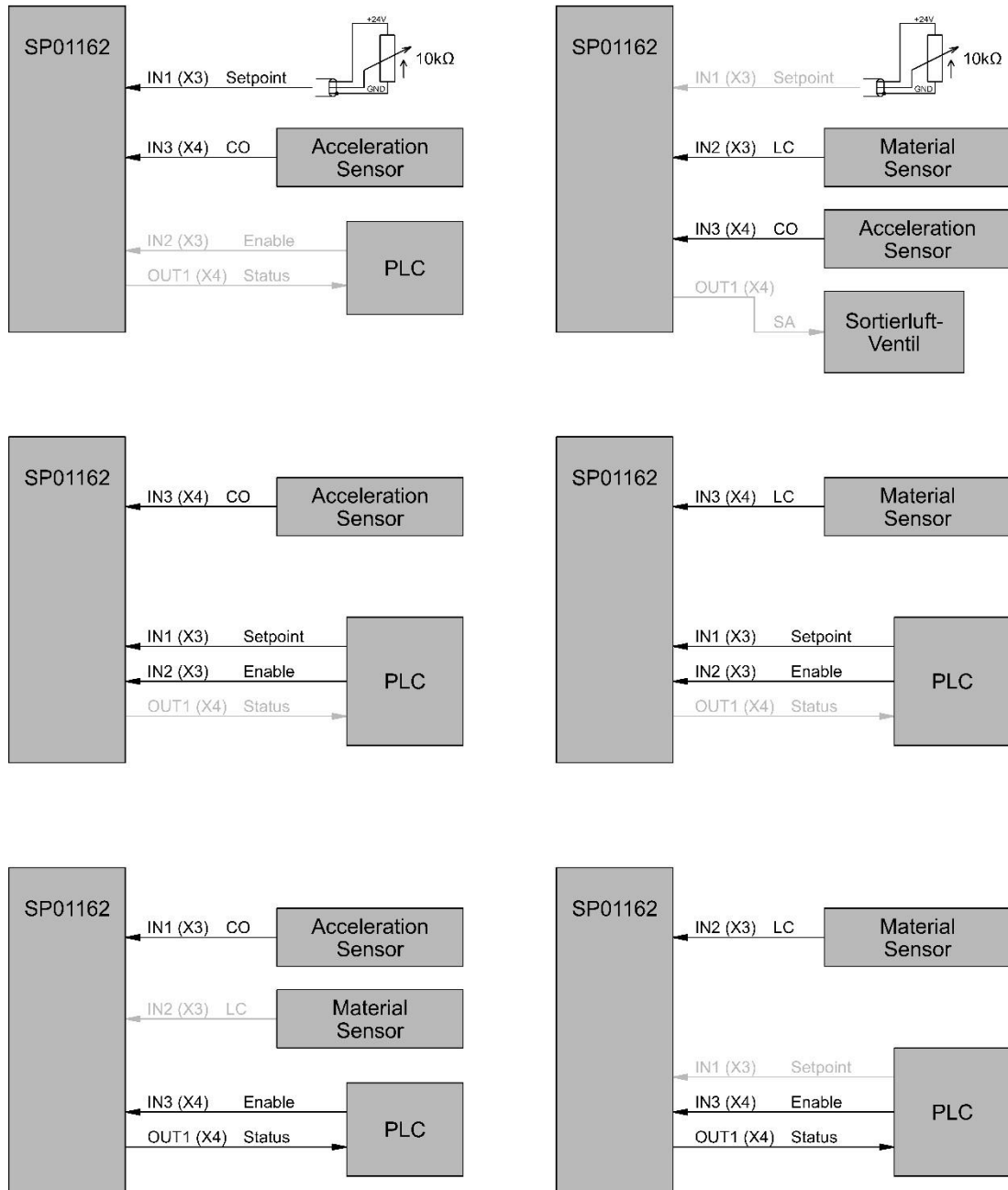
P098 = Enable off

P098 = Enable off, delay

P098 = Output off

P098 = Output off, delay

5.7 Connection examples



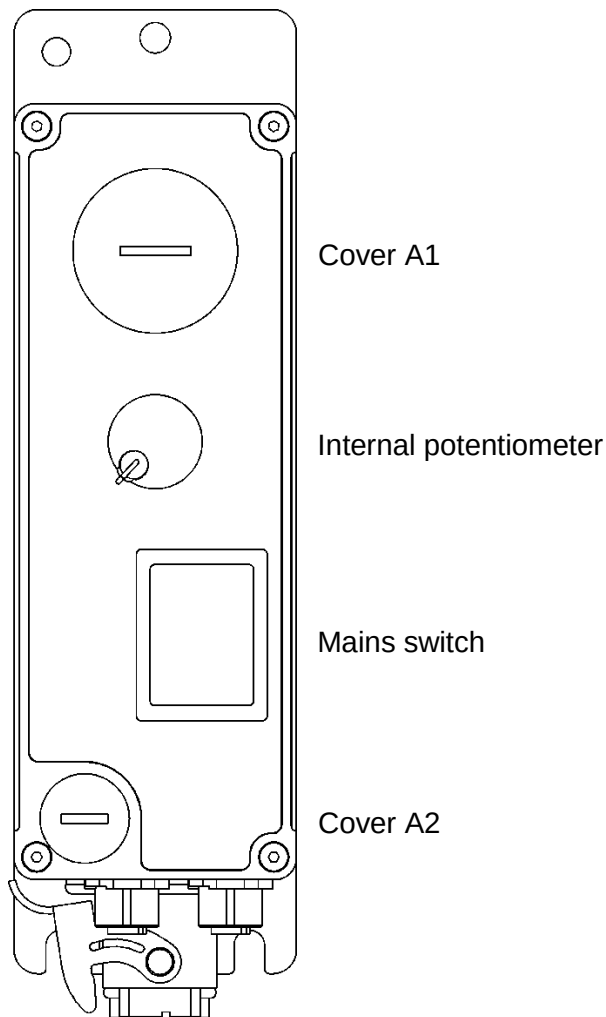
In general, the connections marked in black can be made directly, but Y-type distributors are necessary for the connections marked in grey.



Note: The combined analog/digital input IN3 (X4) is on pin 2 (cf. chapter 4.2.1), since it is primarily an analog input. When using a sensor with digital output, the assignment on the connector side may have to be adapted.

6. Control elements

6.1 General



You can access a majority of the settings via the potentiometer and switches behind the cover A1.



Note: Parameters, which are not mentioned in chapter 6.4 can be set via ParaDesk. The same is true for parameters whose adjustment range with the potentiometers is not sufficient.

To do this, the cover A2 has to be opened. The interface adapter SP01056 is necessary for the connection to a PC.



Note: When using ParaDesk, the internal controls (A1) must be deactivated by P045.

➔ For configuring parameters with ParaDesk, refer to chapter 7



Attention: The protection class IP54 is ensured only if the covers are closed tightly. When closing them, you need to pay attention to proper seat of the gaskets.

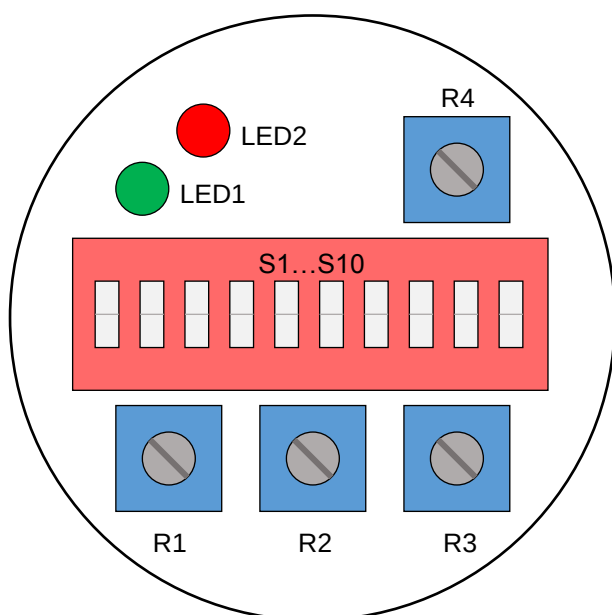
6.2 Internal potentiometer

You can specify the setpoint with this potentiometer. In the process, the left stop is equivalent to 0% and the right stop is equivalent to 100%.

6.3 Mains switch

Disconnects the device from the mains supply using two poles.

6.4 Cover A1



Potentiometer:
MIN – Left stop
MAX – Right stop

Switches:
OFF – Lower position
ON – Upper position



There is an overview of the functions from R1 to R3 and S1 to S5 on the top of the device.

6.4.1 LED1 and LED2

LED1 and LED2 indicate the status of the device provided that the switches S6 to S10 are in the "off" position (chapter 6.4.6).

LED1	LED2	P010 Device status
off	off	No mains / Not ready / Save parameters
on	off	Ready
flashes	off	Enabled
off	on	Error E1: Under-voltage
on	on	Error E2: Over-voltage
flashes	on	Error E3: Over-temperature
off	flashes	Error E4: Vibration sensor signal
on	flashes	Error E5: LC Timeout

6.4.2 Potentiometer R1 to R3

Pot	Parameter	Range	Default value	Unit
R1	P071 Setpoint scaling lower limit	0...50	-	%
R2	P072 Setpoint scaling upper limit	50...100	-	%
R3	P073 Slope start-up ramp	0.1...10	-	s/100%



Time parameters are scaled logarithmically for better adjustability, i.e. e.g. for "Slope start-up ramp": Left stop = 0.1 s/100%, middle position = 1 s/100% and right stop = 10 s/100%.

6.4.3 Switches S1 to S3

S1	S2	S3	P075 Setpoint source
off	off	off	Setpoint value fixed
off	off	on	Internal potentiometer (Default)
on	off	off	External potentiometer IN1 0...24 V
on	off	on	IN1 0...10 V
on	on	off	IN1 0...20 mA
on	on	on	IN1 4...20 mA



If the internal potentiometer is selected, the set value can be stored by deactivating S3. In this way, inadvertent adjustment of the setpoint value can be prevented.

6.4.4 Switch S4

S4	P076 Enable
off	Enable on (Default)
on	Enable via IN2

6.4.5 Switch S5

S5	P077 Mechanical output frequency at $f_{in}=50$ Hz (60 Hz)
off	100 Hz (120 Hz), full-wave (Default)
on	50 Hz (60 Hz), only positive half-waves



Note: S5 is only effective if P077 is set to "Setting of switch S5" in the extended settings.

6.4.6 Extended settings with potentiometer R4 and switches S6 to S10

6.4.6.1 Parameter list

LC – Level control

SA – Sorting air

CO – Controller operation

S6	S7	S8	S9	Parameter	Range	Default	Unit
off	off	off	off	-			
off	off	off	on	P074 Shut-down ramp	0.1...10	1	s/100%
off	off	on	off	P078 LC Mode	Chap. 6.4.6.3	off	
off	off	on	on	P079 LC On delay	0...60	5	s
off	on	off	off	P080 LC Off delay	0...60	5	s
off	on	off	on	P081 LC Timeout	1...180	60	s
off	on	on	off	P089 CO Mode	Chap. 6.4.6.4	off	
off	on	on	on	P082 OUT1 Function	Chap. 6.4.6.5	off	
on	off	off	off	P083 Invert OUT1	Chap. 6.4.6.6	off	
on	off	off	on	P084 SA Lead delay	0...10	0	s
on	off	on	off	P085 SA Stopping delay	0...10	0	s
on	off	on	on	-			
on	on	off	off	P086 Invert IN2	Chap. 6.4.6.7	off	
on	on	off	on	P087 Invert IN3	Chap. 6.4.6.8	off	
on	on	on	off	P077 Output frequency	Chap. 6.4.6.9	100	Hz
on	on	on	on	-			



Time parameters are scaled logarithmically for better adjustability, i.e. e.g. with "Slope shut-down ramp": Left stop = 0.1 s/100%, middle position = 1 s/100% and right stop = 10 s/100%.

6.4.6.2 Adjusting a parameter

A parameter is selected with S6 to S9 in order to modify it. In doing so, S10 remains in the "off" position.

Continuous parameters (unit s or s/100%):

If needed, the saved value can be transferred to the potentiometer R4 by using the two LEDs. If **LED2** lights up, the setting is higher, and if **LED1** lights up, the setting is lower than the saved value.

S10 is set to "on" to change the parameter. The parameter can now be set with R4. The modifications come into effect in real time.

While the parameter is being set, the LEDs continue to indicate the position of the old value.

S10 is set to "off" again to save the parameter.

Step parameters:

The two LEDs indicate the stored value directly.

S10 is set to "on" to change the parameter. The parameter can now be set with R4. The modifications come into effect in real time. During the modification, the new setting is displayed with the LEDs.

S10 is set to "off" again to save the parameter.

While saving, the output is disabled for 2 seconds every time.

If while editing a parameter (S10 is "on"), the parameter selection is changed, then this impermissible condition is indicated by alternate flashing of the LEDs. R4 is ignored in this condition and the previously set value remains as it is. As soon as the correct parameter is selected again, it can be modified again. If in the impermissible condition, S10 is put to "off", then the last value set with R4 is saved.

If no parameter is selected, the LEDs indicate the status of the device. For this purpose, refer to chapter 6.4.1.

6.4.6.3 Parameter "LC Mode"

You can activate the operating mode Level Control with the "LC Mode" parameter. For this purpose, refer to chapter 5.4

LED1	LED2	P078 LC Mode / Source
off	off	off (Default)
on	off	on, IN2
flashes	off	on, IN3
off	on	on, with timeout, IN2
on	on	on, with timeout, IN3



Note: If IN2 is used as the sensor input, the external enable signal has to be deactivated with S4, since IN2 is evaluated independently from the LC operating mode for the enable signal.

6.4.6.4 Parameter "CO Mode"

You can activate controlled operation with the "CO Mode" parameter. An external acceleration sensor is necessary for this purpose. The controller is preset for prevalent vibratory conveyor drives. If adjustments are still necessary you have to use ParaDesk.

LED1	LED2	P089 CO Mode / Source
off	off	off (Default)
on	off	on, acceleration sensor at IN1
flashes	off	on, acceleration sensor at IN3

6.4.6.5 Parameter "OUT1 Function"

The behaviour of the output OUT1 can be set with the "OUT1 Function" parameter.

LED1	LED2	P082 OUT1 Function
off	off	off (Default)
on	off	on
flashes	off	Status output status: active if there is no error
off	on	Status output status: active if conveyor operation
on	on	Output SA
flashes	on	Status output LC timeout: active if timeout
off	flashes	UCM output (can only be selected via ParaDesk)

6.4.6.6 Parameter "Invert OUT1"

LED1	LED2	P083 Invert OUT1
off	off	Not inverted (Default)
on	off	Inverted

6.4.6.7 Parameter "Invert IN2"

LED1	LED2	P086 Invert IN2
off	off	Not inverted (Default)
on	off	Inverted

6.4.6.8 Parameter "Invert IN3"

LED1	LED2	P087 invert IN3
off	off	Not inverted (Default)
on	off	Inverted

6.4.6.9 Parameter "Output frequency"

LED1	LED2	P077 Mechanical output frequency at $f_{in}=50$ Hz (60 Hz)
off	off	Setting of switch S5 (Default)
on	off	50 Hz (60 Hz), only negative half-waves
flashes	off	33⅓ Hz (40 Hz)
off	on	25 Hz (30 Hz)
on	on	20 Hz (24 Hz)
flashes	on	16⅓ Hz (20 Hz)



If two conveyor systems are operated in parallel with 50 Hz (mechanically) each, one control device can be set to the positive half-wave and the other can be set to the negative half-wave. In this way, the DC current in the feeding grid can be decreased.

7. Parameter settings with ParaDesk

The control device can be adjusted 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.

7.1 Device-specific characteristics



Note: When using ParaDesk for setting parameters, the internal controls must be deactivated by P045. Otherwise, some of the parameters cannot be modified.

If parameters are modified via the internal controls while ParaDesk is active, the link must be disconnected and set up again so that the modified parameters can be updated in ParaDesk.

When writing a parameter, the device switches briefly to the "Save parameters" status. The output is shut down when doing so. Next, the device behaves similar to that when the mains power supply is switched on.

7.2 Parameter overview

The parameters are divided into groups for better overview. Each group represents one function block of the device.

Parameter	Function	Value range or selection	Page
002	Firmware		35
003	Hardware status		35
900	Serial number		35
902	Device variant		35
Measured parameters			
10	Status	Not ready Ready Enabled E1 Under-voltage E2 Over-voltage E3 Over-temperature E4 Vibration sensor E5 LC Timeout Save parameters	35
011	Output stage temperature	Measured parameter	35
012	Input voltage	Measured parameter	35
019	Setpoint value	Measured parameter	35
014	Trigger Angle	Measured parameter	35
015	State IN1 analog	Measured parameter	35
028	State IN2 analog	Measured parameter	35
013	State IN3 analog	Measured parameter	35
016	State IN2 digital	Measured parameter	35

Parameter	Function	Value range or selection	Page
017	State IN3 digital	Measured parameter	36
018	State OUT1	Measured parameter	36
020	CO Acceleration sensor	Measured parameter	36
027	CO Controller output	Measured parameter	36
004	Total operating hours	Measured parameter	36
006	Operating hours conveyor operation	Measured parameter	36
General device parameters			
045	Internal controls	inactive active	36
042	Restart	at new enable at pending enable	36
043	Auto reset fault	0 ... 60 s	36
044	Fault reset via enable	off all errors only E5 LC Timeout	37
General operating parameters			
070	Internal setpoint	0...100 %	37
071	Setpoint scaling lower limit	0...100 %	37
072	Setpoint scaling upper limit	0...100 %	37
073	Slope start-up ramp	0.1...10 s/100%	37
074	Slope shut-down ramp	0.1...10 s/100%	37
077	Mechanical output frequency	100 Hz 50 Hz positive half-waves 50 Hz negative half-waves 33 ⅓ Hz 25 Hz 20 Hz 16 ⅔ Hz	38
Inputs			
075	Setpoint source	internal pot IN1 ext. pot 0 ... 24 V IN1 0 ... 10 V IN1 0 ... 20 mA IN1 4 ... 20 mA internal setpoint off (not relevant) setpoint fixed (not relevant)	38
076	Enable	off (not relevant) on IN2 IN3	38
060	IN2 Lower threshold	0...24 V	39
061	IN2 Upper threshold	0...24 V	39
086	Invert IN2	off on	39
062	IN3 Lower threshold	0...24 V	39
063	IN3 Upper threshold	0...24 V	39
087	Invert IN3	off on	39

Parameter	Function	Value range or selection	Page
Outputs			
082	OUT1 Function	off on Status output: Ready or enabled Status output: Output on SA output Status output: LC Timeout UCM output	39
083	Invert OUT1	off on	40
Controller operation CO			
089	CO Mode / Source	off on, sensor at IN1 on, sensor at IN3	40
090	CO Loop gain	0...40 %/g	41
091	CO Integration time	0.1...30 s	41
092	CO Setpoint scaling	0...50 g/100%	41
093	CO Resetting	at restart at enable always	41
Level controller LC			
078	LC Mode / Source	off on, sensor at IN2 on, sensor at IN3 on, with timeout, sensor at IN2 on, with timeout, sensor at IN3	41
079	LC Switching on delay	0...200 s	42
080	LC Switching off delay	0...200 s	42
081	LC Timeout	1...500 s	42
Sorting air SA			
084	SA Lead delay	0...30 s	42
085	SA Stopping delay	0...30 s	42
Universal Controller Module UCM			
095	UCM Mode / Source	off on, IN2 state on, IN3 state on, IN2 +edge on, IN3 +edge	42
096	UCM Switching on delay	0...200 s	43
097	USM Switching off delay	0...200 s	43
098	UCM OUT Inhibit condition	none enable off enable off, delay output off output off, delay	43

7.3 Parameter group: Parameters

7.3.1 Firmware, hardware status, serial number, device variant

Information about the device.

7.4 Parameter group: Measurement parameters

7.4.1 P010 Status

Displays the device status (in the error-free condition: Operating status, otherwise: error code).

7.4.2 P011 Output stage temperature

Displays the temperature of the device at the rear panel of the device. If the maximum temperature is exceeded, the control device shuts down. The error E3 Over-temperature is displayed.

7.4.3 P012 Input voltage

The input voltage is monitored continuously. In case of an error, the output stage is shut down and the error E1 Under-voltage or E2 Over-voltage is displayed.

7.4.4 P019 Setpoint value

Displays the latest setpoint value in percentage, depending on the selected setpoint source and setpoint scaling. The value is independent of the enable state.

7.4.5 P014 Trigger angle

Specifies the actual trigger angle. At 180° the output is off, and at <180° it is active. The angle is limited to 80° since the vibration magnets are primarily inductive and therefore a trigger angle below 90° is not usable.

7.4.6 P015 State IN1 analog

Displays the voltage at the analog input IN1. If IN1 is configured as a current input, the voltage drop across the 500Ω input resistance is displayed.

7.4.7 P028 State IN2 analog

Displays the voltage at the digital input IN2.

7.4.8 P013 State IN3 analog

Displays the voltage at the analog/digital input IN3.

7.4.9 P016 State IN2 digital

Displays the state at the digital input IN2.

7.4.10 P017 State IN3 digital

Displays the digital stats at the input IN3.

7.4.11 P018 State OUT1

Displays the switching state of OUT1.

7.4.12 P020 CO Acceleration sensor

Shows the measured peak value of the acceleration in g ($=9.81\text{m/s}^2$).

A connected vibration sensor and activated controller operation is required.



The scaling of this value is designed for the sensor Mosca-Elektronik SP01144. If another sensor is used, you may have to deal with different values. This also concerns all other parameters in whose unit "g" appears.

7.4.13 P027 CO Controller output

Output value of the vibration controller. This value is used at activated controller operation instead of the setpoint for the calculation of the trigger angle.

7.4.14 P004 Total operating hours

The operating hours counter counts the operating time of the device.



The counter is active as soon as the device is connected to the mains voltage and switched on.

7.4.15 P006 Operating hours conveyor operation

This operating hours counter counts only the run time with enable present.

7.5 Parameter group: General device parameters

7.5.1 P045 Internal controls

With this parameter, the controls behind the front panel can be deactivated.



Note: If ParaDesk is used, it is absolutely necessary to set this parameter to "inactive". Otherwise, some of the parameters cannot be modified.

7.5.2 P042 Restart

Behaviour of the device when switching on the mains supply. It is relevant only if an external enable input is selected with P076.

7.5.3 P043 Auto reset fault

After the set time, error states of the device are reset if the cause of the error has been rectified. P043 = 0 deactivates the automatic resetting.



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.

7.5.4 P044 Fault reset via enable

If activated, error states of the device are reset with another enable edge if the cause of the error is rectified.



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.

7.6 Parameter group: General operating parameters

7.6.1 P070 Internal setpoint

Specifies a fixed setpoint value alternatively to the internal potentiometer or IN1.

7.6.2 P071 Setpoint scaling lower limit

Specifies the setpoint value at left stop / 0V / 0(4) mA.

Refer to the diagram in chapter 5.1.

7.6.3 P072 Setpoint scaling upper limit

Specifies the setpoint value at right stop / 10(24) V / 20 mA.

Refer to the diagram in chapter 5.1.

7.6.4 P073 Slope start-up ramp

Specifies the slope of the setpoint integrator in the positive direction. The value is equivalent to the time until the setpoint value has risen from 0% to 100%. With the setpoint value < 100% the time is accordingly shorter until the setpoint value is reached.

In controller operation CO, the ramp is also used for the controller output P027 if the enable signal is interrupted.

Refer to the diagram in chapter 5.1.

7.6.5 P074 Slope shut-down ramp

Specifies the slope of the setpoint integrator in the negative direction. The value is equivalent to the time until the setpoint value has fallen from 100% to 0%. With the setpoint value < 100% the time is accordingly shorter until 0% is reached.

In controller operation CO, the ramp is also used for the controller output P027 if the enable signal is interrupted.

Refer to the diagram in chapter 5.1.

7.6.6 P077 Mechanical output frequency

Indicates the vibration frequency of the conveyor relative to the 50 Hz mains frequency. In the 100 Hz position, all mains half-waves are output, at 50 Hz only the positive or negative half-waves, and at 33⅓Hz only every 3rd half-wave etc.



If two conveyor systems are operated in parallel with 50 Hz (mechanically) each, one control device can be set to the positive half-wave and the other can be set to the negative half-wave. In this way, the DC current in the feeding grid can be decreased.

7.7 Parameter group: Inputs

7.7.1 P075 Setpoint source

Source selection for the setpoint value (P019).

7.7.1.1 *internal pot*

Potentiometer on the front side of the device is used for the setpoint value setting.

7.7.1.2 *IN1 ext. pot 0...24 V*

An external 10kΩ potentiometer at IN1 is used for the setpoint value.



Note: The potentiometer must be operated from the internal 24 V supply. The 24 V supply is measured internally and included in the setpoint value so that load-related voltage changes do not affect the setpoint value.

7.7.1.3 *IN1 0...10 V*

The setpoint value is derived from a 0...10 V standard signal at IN1.

7.7.1.4 *IN1 0...20 mA*

The setpoint value is derived from a 0...20mA standard signal at IN1. The 500Ω load is active.

7.7.1.5 *IN1 4...20 mA*

The setpoint value is derived from a 4...20mA standard signal at IN1. The 500Ω load is active.

7.7.1.6 *internal setpoint*

P070 is used as the setpoint.

7.7.2 P076 Enable

7.7.2.1 *on*

The output is permanently enabled. The conveyor starts running automatically 1 s after switching on the mains supply.

7.7.2.2 IN2

An external enable signal via IN2 is necessary for operation.

7.7.2.3 IN3

An external enable signal via IN2 is necessary for operation.

7.7.3 P060 IN2 Lower threshold

Indicates the voltage from which the input comparator of IN2 switches over to inactive (Display via P016). Must be less than P061.

7.7.4 P061 IN2 Upper threshold

Indicates the voltage from which the input comparator of IN2 switches over to active (Display via P016). Must be greater than P060.

7.7.5 P086 Invert IN2

The digital signal of IN2 gets inverted if P086 is "on".

7.7.6 P062 IN3 Lower threshold

Indicates the voltage from which the input comparator of IN3 switches over to inactive (Display via P017). Must be less than P063.

7.7.7 P063 IN3 Upper threshold

Indicates the voltage from which the input comparator of IN3 switches over to active (Display via P017). Must be greater than P062.

7.7.8 P087 Invert IN3

The digital signal of IN3 gets inverted if P087 is "on".

7.8 Parameter group: Outputs

7.8.1 P082 OUT1 Function

Source selection for the switching output OUT1.

7.8.1.1 off

OUT1 is continuously inactive.

7.8.1.2 on

OUT1 is continuously active.

7.8.1.3 Status output: Ready or enabled

OUT1 is in active in the states Ready or Enabled (P010).

7.8.1.4 Status output: Output on

OUT1 is active, if the setpoint value is greater than 1.0% after the setpoint ramp.

7.8.1.5 SA output

OUT1 is the output for a pneumatic valve in conjunction with the parameter group "Sorting air SA".

7.8.1.6 Status output: LC Timeout

OUT1 is a status output for the error "E5 LC Timeout" (P010). For use in conjunction with the parameter group "Level Control LC".

7.8.1.7 UCM output

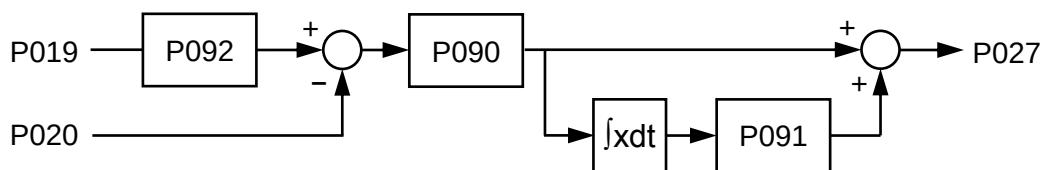
OUT1 is the output for the Universal Controller Module UCM.

7.8.2 P083 Invert OUT1

Inverts the state of OUT1 if "on".

7.9 Parameter group: Controller operation CO

Simplified controller structure (PI controller):



7.9.1 P089 CO Mode / Source

Activation and source selection for the controller module. The controller operation can be activated only if the module has been enabled by the manufacturer.

7.9.1.1 off

The controller operation module is deactivated, the setpoint value specification is used directly for the calculation of the trigger angle. The other parameters of the group have no effect on the operational behaviour.

7.9.1.2 on, sensor at IN2

Controller operation is activated, acceleration sensor must be connected to IN2. Sensor monitoring is active.

7.9.1.3 on, sensor at IN2

Controller operation is activated, acceleration sensor must be connected to IN3. Sensor monitoring is active.

7.9.2 P090 CO Loop gain

Specifies the controller amplification in % of controller output per g of measured setpoint deviation.

7.9.3 P091 CO Integration time

Specifies the integration time of the controller in seconds. Equivalent to the time that the integrator output requires in order to change itself by the value of the input signal.

7.9.4 P092 CO Setpoint scaling

Conversion factor for interpretation of the setpoint value in g ($=9.81\text{m/sec.}^2$) per 100%.

7.9.5 P093 CO Resetting

In order that after interruption of the enable signal, the controller does not need several seconds in order to reach the set-point value, the previous controller status is saved as long as the device is switched on. In this way, only the first transient requires several seconds. Next, in case of interruptions, the controller output (P027) is controlled with the ramps P073 and P074.

7.9.5.1 at restart

The controller is reset when the device is restarted.

7.9.5.2 at enable

The controller is reset on restart and with a new enable.

7.9.5.3 always

The controller is reset with every restart of the output (even after inhibit by LC).

7.10 Parameter group: Level controller LC

7.10.1 P078 LC Mode / Source

Activation and source selection for the level controller module. The level controller can be activated only if this module has been enabled by the manufacturer.

7.10.1.1 off

The level controller module is deactivated. The other parameters of the group have no effect on the operational behaviour.

7.10.1.2 on, sensor at IN2

The level controller module is activated. The level sensor must be connected to IN2.

7.10.1.3 on, sensor at IN3

The level controller module is activated. The level sensor must be connected to IN3.

7.10.1.4 on, with timeout, sensor at IN2

The level controller module is activated. The level sensor must be connected to IN2. The timeout function is activated.

7.10.1.5 on, with timeout, sensor at IN3

The level controller module is activated. The level sensor must be connected to IN3. The timeout function is activated.

7.10.2 P079 LC Switching on delay

Time in seconds that the sensor signal must be uninterruptedly inactive before the output is switched on.

Refer to the diagram in chapter 5.4.

7.10.3 P080 LC Switching off delay

Time in seconds that the sensor signal must be uninterruptedly active before the output is switched off.

Refer to the diagram in chapter 5.4.

7.10.4 P081 LC Timeout

Maximum time in seconds, during which the output may be switched on, before error 5 gets triggered.

Refer to the diagram in chapter 5.4.

7.11 Parameter group: Sorting air SA

The sorting air module can be used only if this has been enabled by the manufacturer. To deactivate the module, both the parameters P084 and P085 have to be set to zero.

7.11.1 P084 SA Lead delay

Time in seconds for which the sorting air output is switched on before switching on the conveyor output.

Refer to the diagram in chapter 5.5.

7.11.2 P085 SA Stopping time

Time in seconds for which the sorting air output remains switched on after shutting down the conveyor output.

Refer to the diagram in chapter 5.5.

7.12 Parameter group: Universal Controller Module UCM

7.12.1 P095 UCM Mode / Source

Activation and source selection for the universal controller module. The controller can be activated only if this module has been enabled by the manufacturer.

7.12.1.1 off

The Universal Controller Module is deactivated. The other parameters of the group have no effect on the operational behaviour.

7.12.1.2 on, IN2 state

UCM is activated, IN2 is used as input signal.

7.12.1.3 on, IN3 state

UCM is activated, IN3 is used as input signal.

7.12.1.4 on, IN2 +edge

UCM is activated, positive edges at IN2 are used as input signal.

7.12.1.5 on, IN3 +edge

UCM is activated, positive edges at IN3 are used as input signal.

7.12.2 P096 UCM Switching on delay

P095 state: Time that the input signal must be uninterruptedly active before the output is switched on.

P095 edge: Time delay until the output is switched on after the first input edge.

Refer to the diagram in chapter 5.6.

7.12.3 P097 UCM Switching off delay

P095 state: Time that the input signal must be uninterruptedly inactive before the output is switched off.

P095 edge: Time delay until the output is switched off after the last input edge.

Refer to the diagram in chapter 5.6.

7.12.4 P098 UCM OUT Inhibit condition

Determines how the UCM output responds to the enable signal.

7.12.4.1 none

UCM output is independent of the enable signal.

7.12.4.2 enable off

UCM output is switched off immediately if the enable signal is inactive.

7.12.4.3 enable off, delay

UCM output is switched off if the enable signal is inactive and the switching off delay has elapsed.

7.12.4.4 output off

UCM output is switched off immediately if the output is shut down (shut-down ramp arrived at zero).

7.12.4.5 output off, delay

UCM output is switched off if the output is shut down and the switching off delay has elapsed.

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 make yourself conversant with the chapters 6 and 7 before you put the device into operation for the first time.

Observe the following switching on sequence:

- Disconnect the vibratory conveyor from the device
- Connect the enable, setpoint and acceleration sensor if available
- With external enable: Make sure that the enable signal is inactive
- Switch on the supply voltage
- Set the device parameters (cf. chapter 5, 6 and 7)
- Switch off the device
- Connect the vibratory conveyor to the device
- Switch on the device, activate the enable and check all settings once again
- Measure the current consumption or the magnet current and make sure that the rated device current is not exceeded

9. Troubleshooting and fault elimination

9.1 Resetting fault messages

- OFF / ON of the supply voltage
- Fault reset via enable signal if activated via P044
- Auto fault reset via P043

9.2 Possible causes of the error

Some possible causes of error are listed in the following table. Since only limited diagnostic options are available in the device, a PC with RS232 interface adapter and the operating software "ParaDesk" (refer to chapter 12) are recommended.

Error	Potential cause	Rectification
No function, no connection to ParaDesk	No power supply	Check the voltage
No connection to ParaDesk	RS232 interface	Check the adapter and cabling
Message "Enabled", but the vibration magnet is not running	The vibration magnet or the cabling is defective	Check and repair them if required
	Setpoint value too low	Increase the setpoint value
Message "E1 Under-voltage"	Supply voltage too low	Check the voltage source. Reset the device.
Message "E2 Over-voltage"	Supply voltage too high	Check the voltage source. Reset the device.
Message "E3 Over-temperature"	Temperature of the device rear panel too high	Allow it to cool down and ensure adequate ventilation. Reset the device.
Message "E4 Vibration sensor"	DC component of the sensor signal is outside the limits	Check the sensor and cabling, deactivate the controller mode if no sensor is connected. Reset the device.
Message "E5 LC Timeout"	LC module reports timeout	Adjust the parameter settings, check the material sensor and conveyor. Reset the device.

If you send 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).

11. Manufacturer's declaration

The manufacturer, i.e. the company Mosca Elektronik und Antriebstechnik GmbH, declares herewith that the control device SP01162 described in this technical documentation is meant for incorporation in a machine or for assembly with other components into a machine. The control device SP01162 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, issued 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
IEC61000-3-2:2005+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 SP01162 control device, you need the monitor software "ParaDesk".

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 the installation and operation of the software. This is also available at the website address given above.

13. Table of Revision

Version	Date	Modification
1.00	11/2016	Original version
1.01	11/2016	P089 via DIP
1.02	12/2016	Software module UCM, CO extension
1.03	12/2016	Table for extended parameters corrected
1.04	05/2017	Product image updated, information for overview on the top of the device, wire colours
1.05	07/2017	Standards updated
1.06	10/2017	Various minor issues corrected
1.07	04/2018	Inserted preface, expanded examples for mating plugs, included overview of I/O functions