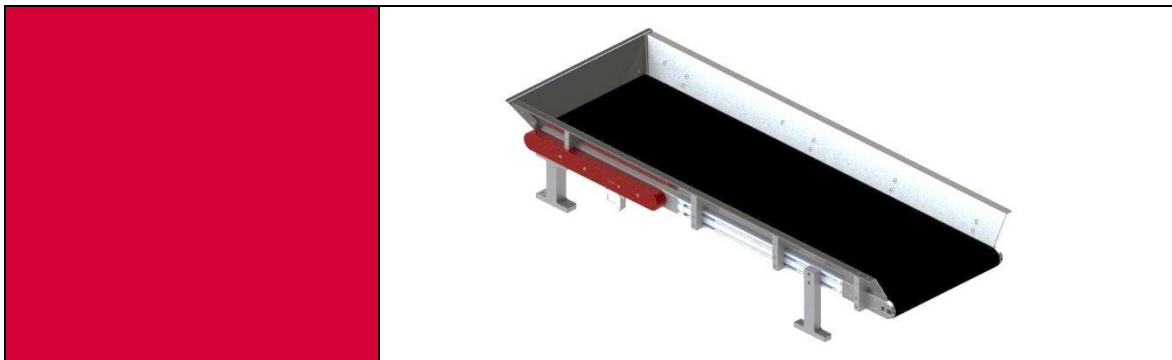


Flexible feed device

Flipband 200 / Flipband 300



Operating and assembly manual

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This operating manual is valid for:

Type		Order number
Flip conveyor 200	with black conveyor belt	50436249
	with white conveyor belt	50436250
Flip conveyor 300	with black conveyor belt	50436251
	with white conveyor belt	50436252

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History

version	changes
R03.0	Documentation of Flipband 200 and Flipband 300
R03.1	Changes of technical data regarding the maximal clockwise belt rotation length
R03.2	Correction of order numbers

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1 Safety instructions



1.1 Explanation of symbols and notices


Symbols: Installation and commissioning must be carried exclusively by qualified personal according to the operating manual.

Please observe the following explanation of symbols and notices. They are classified according to danger levels and in according to ISO 3864-2.

 DANGER	
	<p>Identifies an imminently threatening danger.</p> <p>If the information is not followed, death or severe injuries (invalidity) can occur.</p>

 WARNING	
	<p>Identifies a potentially dangerous situation.</p> <p>If the information is not followed, death or severe injuries (invalidity) can occur.</p>

 CAUTION	
	<p>Identifies a potentially dangerous situation.</p> <p>If the information is not followed, property damage and minor or moderate bodily injury can occur.</p>

NOTICE	
	<p>Identified general information, useful user tips and work recommendations that have an influence on the safety and health of the personnel.</p>

Principle safety information


This operating manual serves as a basis for safe use and operation of the flexible Flipband feed device. This operating manual, particularly the safety information, must be observed by all persons working on or with the Flipband. In addition, the rules and regulations for accident prevention for the respective place of use must be observed. The operating manual must always be available in the place of use of the Flipband.

Operation of the device must be carried out exclusively by technically qualified personnel. Qualified personnel are persons who, on the basis of their training, experience and instruction, as well as their knowledge of applicable standards, provisions, accident prevention regulations and operating conditions, have been authorized by the person responsible for the system of the equipment to carry out the respective necessary tasks, and are capable of recognizing and avoiding the potential dangers in the process (definition for specialized personnel according to IEC 364).


Faults that can impair the safety of persons, the Flipband or other property must be corrected immediately.

The following information is provided for personal safety of the operating personnel, safety of the described products and the connected equipment:

1.1.1 Electrical connection

NOTICE	
	<ul style="list-style-type: none">▪ Disconnect the supply voltage before assembly or disassembly work, as well as structural modifications.▪ Observe the accident prevention and safety regulations applicable in the specific usage case.▪ Prior to commissioning, it must be checked whether the rated voltage of the device matches the local mains supply.▪ EMERGENCY STOP devices must remain valid in all operating modes. Unlocking the EMERGENCY STOP devices must not enable uncontrolled restarting.▪ The electrical connections must be exposed!▪ Protective conductor connections must be tested for fault-free function after assembly!

1.1.2 Danger areas



NOTICE	
	<p>The flexible supply devices from Afag are designed in accordance with the EC Machinery Directive, according to the state-of-the-art and generally recognized good engineering practices. Nevertheless, the use can result in hazards to life and limb of the user or others and can cause damage to the Flipband or other property.</p>

1.2 Proper use

The Flipband is designed for the animation of transported goods, particularly bulk material, by means of pulses transferred from flip shafts to the belt. The information in chapter 2.3 (

Table **1: Technical Data**) regarding the maximum permissible dimensions and weights of conveyor belts must be observed.

The intended use also entails observance of all instructions from the operating manual, as well as the observance of all safety instructions.

 WARNING	
	<p>The Flipband must <u>not</u> be used:</p> <ul style="list-style-type: none"> a) in damp and wet areas. b) at temperatures below 10°C or above 45°C c) in areas with highly combustible media d) in areas with explosive media e) in highly aggressive or dust-laden environments f) in aggressive environments (e.g. atmospheres containing salt)

1.3 Obligations of the owner

The Flipband must be in a safe condition and used safely to ensure the safe operation. Consequently, the operating company is obligated to ensure that the following instructions are complied with:

Ensure that the Flipband is operated exclusively by authorized personnel.

Forbid unsafe and/or dangerous work procedures. Ensure the appropriate conduct and actions of personnel.

The personnel must have understood the operating instructions. Have this confirmed by signature.

Please ensure that a copy of the complete operating instructions is always ready to hand at the Flipband.

Check the operating manual regularly for completeness and legibility.

For activities with increased risk of injury, stipulate that appropriate personal safety gear (safety gloves, safety goggles) is worn.

Precisely specify the responsibilities appropriate for the various task areas, such as installation, commissioning and operation.

Obligate personnel to immediately report recognizable safety deficiencies that occur to their supervisor.

NOTICE



All persons who work on the Flipband, as well as persons who are active in accordance with the law on temporary employment bear a participatory obligation for Occupational Health & Safety. They must be instructed concerning the use of the Flipband.

NOTICE



Reasonably foreseeable misuse, which could pose a danger to the user, third parties or the Flipband, includes:

- a) The feed of components that deviates from the size and geometry that deviates specified for the Flipband.
- b) Operating the Flipband beyond the physical operating limits as described in the Chapter “Commissioning/Operation”
- c) Improper installation, commissioning and operation of the Flipband.
- d) Modifying the controller software without prior consultation with the manufacturer
- e) Operation of the Flipband with apparent malfunctions and / or defects.
- f) Cleaning tasks carried out without observing the local safety precautions for work on the Flipband.
- g) Improper installation, commissioning and operation of the Flipband.

NOTICE



Not modifications or changes to the Flipband are permitted without approval of the manufacturer.

NOTICE



Any further use or structural modification applies as improper and renders the warranty claim void.

2 Description of the device

2.1 General information

The Flipband consists of a conveyor belt and the integrated flip unit, with a control unit integrated in the flip unit. The control unit is designed for configuration of the possible operating modes.

The advantages of the Flipband system are:

- Configuration of an individual system, adapted to the respective application
- Fully-integrated embedded system
- Quick and easy parameterization of the modules with controls
- Simple assembly and commissioning

The various types of flexible feed devices differ in size and application spectrum (see Table 1: *Technical Data*)

2.2 Functional description

The components are transported on the Flipband and separated by means of pulsing. The loading of components onto the Flipband normally takes place with an electromagnetically controlled bunker.

With the movement of the belt, the bulk material is transported to the flip area for pulsing. The flip intensity must be adjusted depending on the component size, weight, characteristics and shape of the bulk material. The valid gripping coordinates are determined by a camera system in order to feed the separated components to the other stations with the handling system.

With optimal implementation of the Flipband, the belt transports the accumulated bulk material to the limit stop (hopper wall) and then to the center position, between the two flip shafts in order to separate it there. The camera results are used to determine whether a part can be grabbed, must be flipped again or more parts must be supplied. In an ideal case, it should be possible to pick up at least one component after each pulse.

The Flipband can be activated with digital inputs only, as well as analogue and digital inputs. Depending on the configuration, various parameters can be influenced via the inputs (see 4 Adjustment modes)

2.3 Technical Data

Figure 1: Flip belt dimension sheet

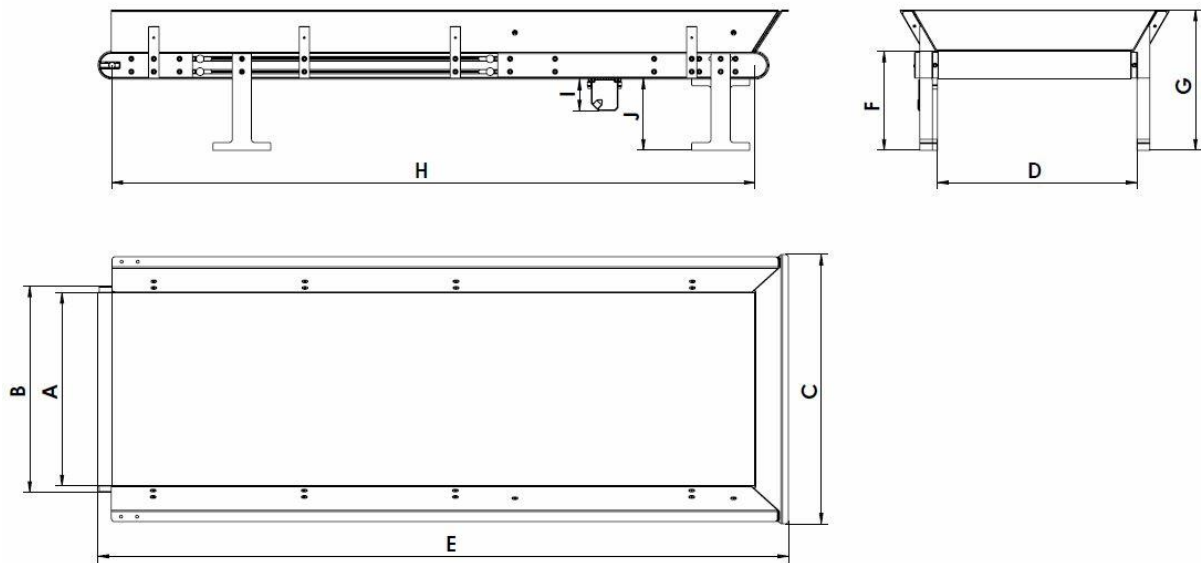






Table 1: Technical Data

Description		Unit	Flipband 200	Flipband 300
Dimensions	A	[mm]	200	300
	B	[mm]	220	320
	C	[mm]	318	418
	D	[mm]	210	310
	E	[mm]	~1044	~1044
	F	[mm]	154	154
	G	[mm]	218	218
	H	[mm]	1000	1000
	I	[mm]	51	51
	J	[mm]	112	112
Max. part size		[mm x mm]	□ 40x40	□ 40x40
Max. part weight		[g]	50	50
Control voltage		[V]	20 – 30	20 – 30
Load voltage		[V]	9 – 30	20 – 30
Total current [max]		[A]	7	7
Recommended backup fuse			7A D UL 1p C60N	7A D UL 1p C60N
Relative activation duration of actuators		[%]	< 15%	< 15%
Environmental & / storage temperature		[°C]	10° – 50° / 0° – 80°	10° – 50° / 0° – 80°
Weight		[kg]	23	25
Standard interface			Multi I/O	Multi I/O
Protection rating			IP50	IP50
Maximal clockwise belt rotation length			One full belt rotation	One full belt rotation

2.4 Transport

 WARNING	
	<p>Incorrect use of transport equipment (industrial trucks, hall crane, aids, slings, etc.) can result in crushing and other injuries. Required conduct:</p> <ul style="list-style-type: none">▪ Observe and adhere to the transport and assembly instructions▪ Use transport equipment appropriately

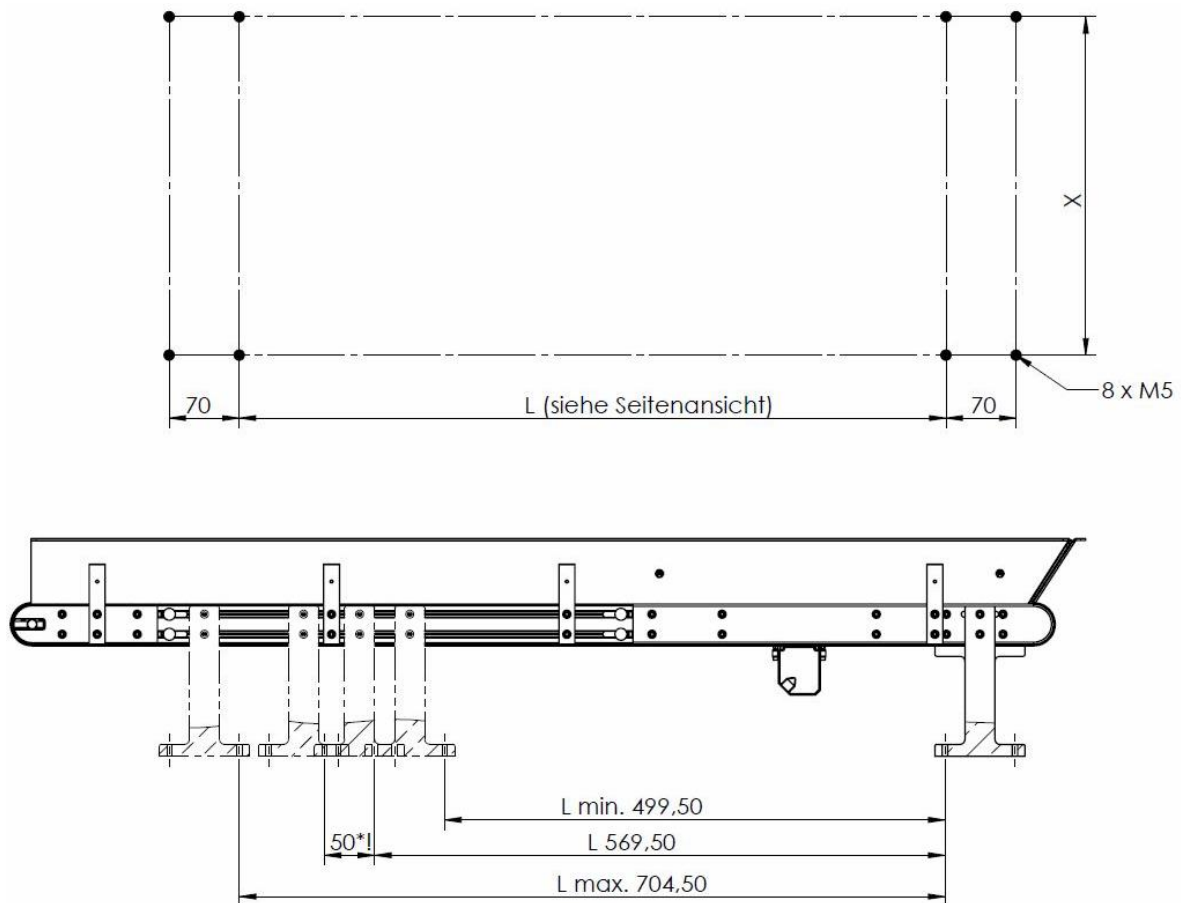
 CAUTION	
	<p>The Flipband must only be lifted by the base body for transport. The hopper is not a lifting point.</p>

2.5 Assembly of the Unit

In order to enable reliable function of the Flipband, the steps below must be followed. Fault-free operation cannot be guaranteed if it is disregarded.

2.5.1 Hole pattern for assembly

Figure 2: Hole pattern on assembly level



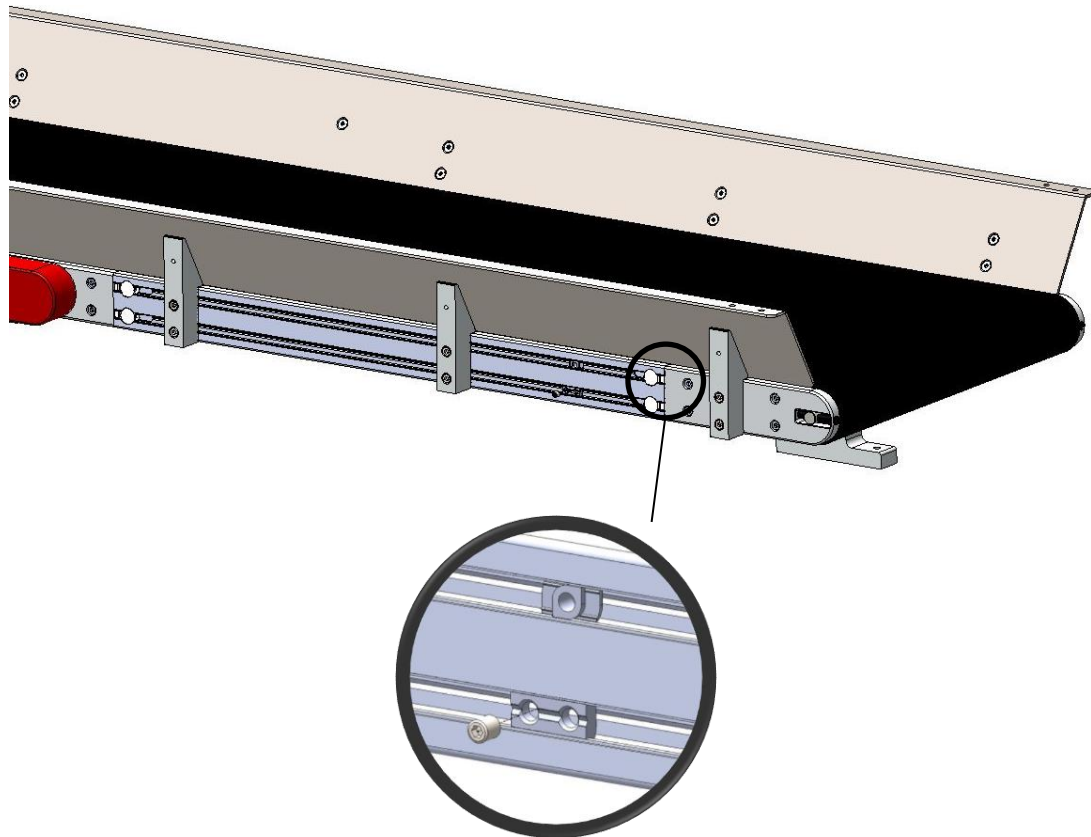
*!) L darf sich **nicht** in diesem Bereich ($619,5 < L < 569,5$) befinden, da dieser Platz für die Trichterbefestigung benötigt wird

Description	Flipband 200	Flipband 300
Hole distance X in [mm]	238	338
Hole distance L remains the same for both types		

2.5.2 Assembly of the 4 holders on the Flipband

2.5.2.1 Assembly of the two front holders in the slot of the aluminum profile

Figure 3: Insertion of T-nuts and slotted nuts, of the front holder



Proceed as follows to fasten the 2 holders on the slotted profile:

Slide one of the two accompanying slotted nuts into the upper slot at the desired position and secure one of the double T-nuts at the desired position in the lower slot with a setscrew. (The position depends on your desired L)

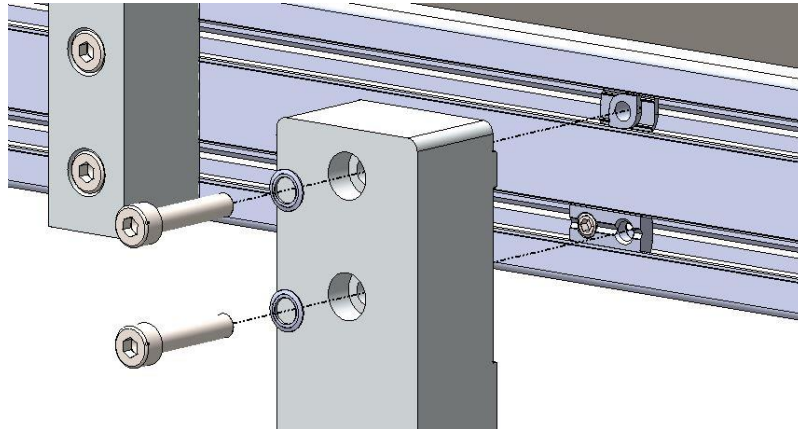
This is also repeated on the other side of the Flipband.

NOTICE



The slotted nuts must be installed in the upper slot and the T-nuts in the lower slot of the aluminum profile.

Figure 4: Assembly of the two front holders in the slot of the aluminum profile



Now the holder is fastened with the supplied M4x20 (10.9) cylinder head screws and the corresponding spring washers on the T-block and slotted nut.

NOTICE

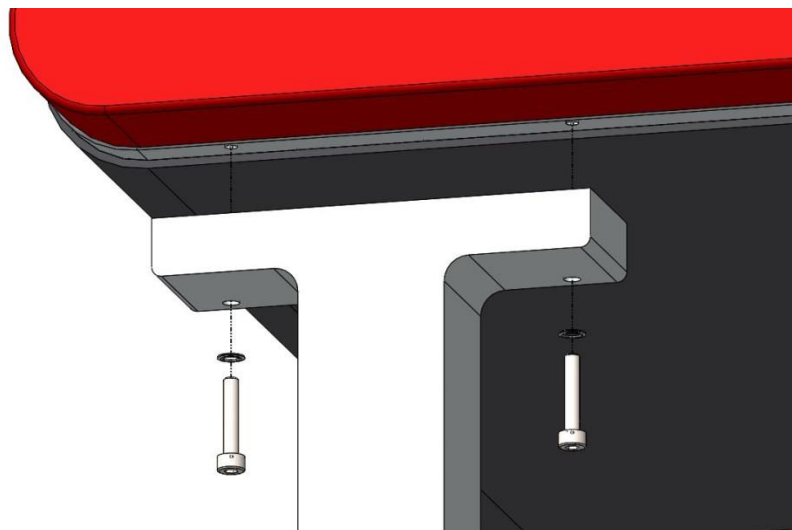


Observe the following:

- **Maximum torque: 3.5Nm**

2.5.2.2 Assembly of the holder for the gear cover

Figure 5: Assembly of the holder for the gear cover



This holder is fastened with the M3x16 (10.9) cylinder head screws and corresponding spring washers on the side with the holes, facing the belt, below the gear cover.

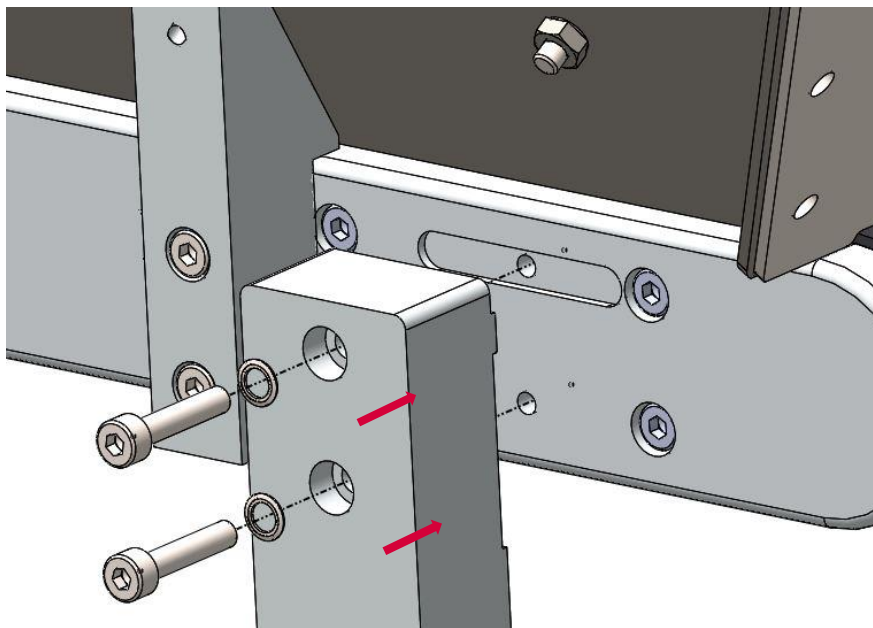
NOTICE



Observe the following:
- Maximum torque: 1.8Nm

2.5.2.3 Assembly of the holder opposite the gear cover

Figure 6: Assembly of the holder opposite the gear cover



The last holder is fastened in the same manner as the first two, with M4x20 (10.9) and the corresponding spring washers.

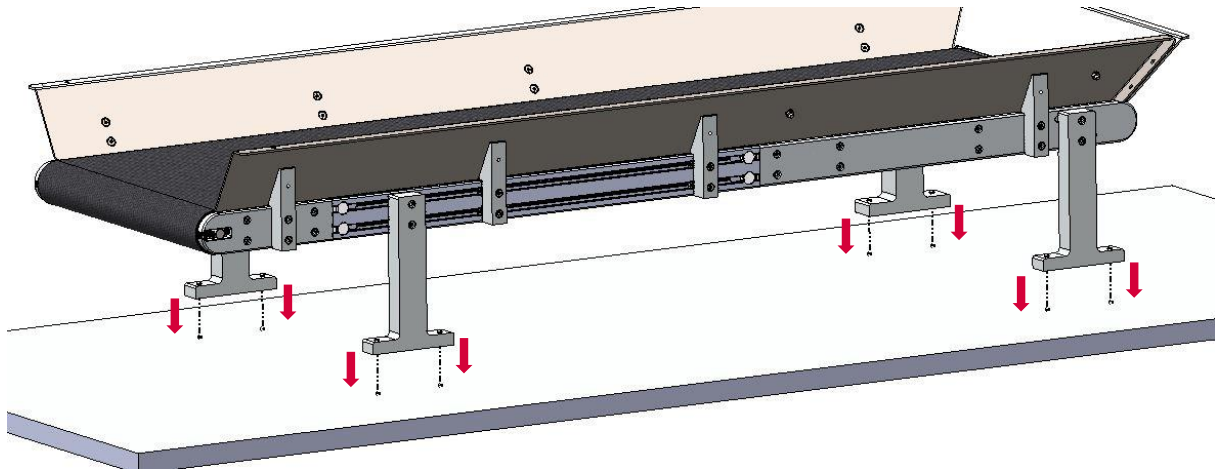
NOTICE



Observe the following:
- Maximum torque: 3.5Nm

2.5.3 Assembly of the Flipband on the base plate

Figure 7: Assembly of the Flipband on the base plate



The belt is then mounted with 8 M5 cylinder head screws on the base plate. (These screws are not included in the scope of supply)

NOTICE



Observe the following:

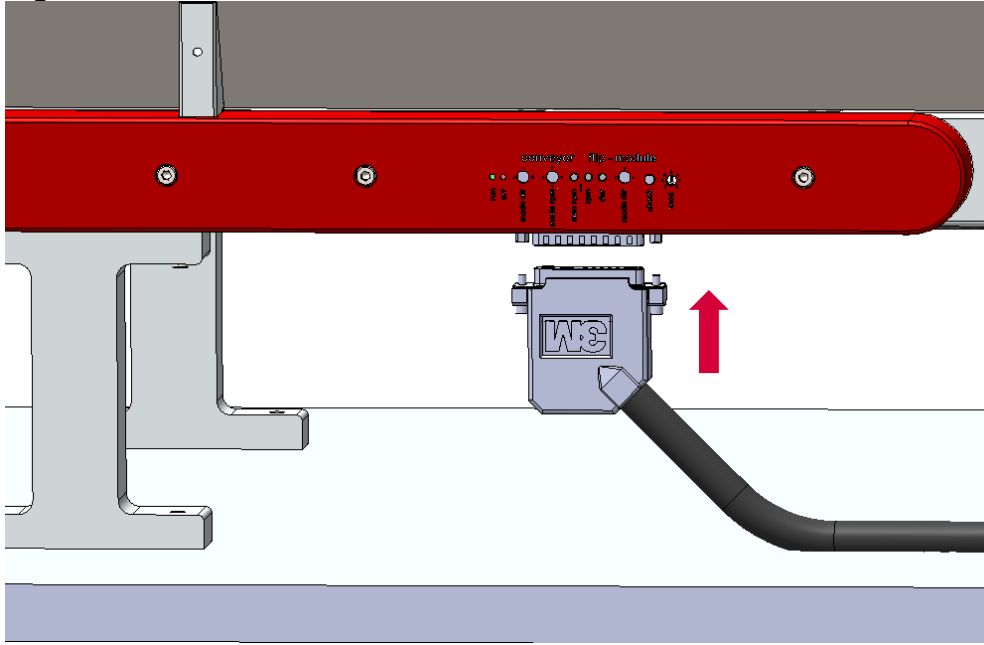
- Base plate executed as steel plate $\geq 15\text{mm}$
- Base plate executed as steel plate $\geq 20\text{mm}$

2.6 Connection of the unit



The actuators of the Flipband are connected by means of the 16-pin socket on the underside.

Use the supplied connection cable with corresponding plug connector for this purpose.

Figure 8: Connection of the unit



2.7 Power supply

 WARNING	
	<ul style="list-style-type: none"> ▪ Work on the electrical supply must only be carried out by trained, approved qualified personnel! ▪ The mains supply must be provided by the customer via a ground fault circuit breaker! ▪ The Flipband must only be operated with the mains supply specified on the type plate!

The power supply to the Flipband takes place with 24V DC low voltage. The power supply must be provided by the owner. The manufacturer recommends a 10A slow-burn melt fuse or a C10A automatic circuit breaker.

Please refer to *2.3 Technical Data* for exact specifications.

Assembly must only be performed by a qualified expert.

2.8 Signal designation

The Sub-D interface of the Flipband has three analogue inputs, four digital inputs and three digital outputs. The supply voltage is fed via the same supply line. The supply to the control unit via the control voltage is separate from the supply of the motors via the load voltage. In the process, the load voltage can be interrupted in case of an emergency stop without making re-referencing necessary.

All signals are listed with the appropriate abbreviations in the following table. These abbreviations are used in the following text.

Table 2: Signal abbreviation

Abbreviation	Designation	Description
U_{Load}	Load voltage	Supply of the motors
U_{Logic}	Control voltage	Supply of the control unit
GND	Ground	
U_{A_Csp}	Belt speed	Belt speed analogue input
U_{D_Cdir}	Belt direction	Belt direction digital input
U_{D_Con}	Belt start	Belt start digital input
U_{A_Fdur}	Flip duration	Flip duration analogue input
U_{A_Fsp}	Flip speed	Flip speed analogue input
U_{D_Fon}	Start flipping	Start flipping digital input
U_{D_AckErr}	Acknowledge error	Acknowledge error digital input
U_{DO_rdy}	Stop flipper	Stop flip motors digital output
U_{DO_err}	Error/initialization	Error/initialization active digital output
U_{DO_run}	Ready for operation (run)	Ready for operation digital output (LED run)

2.9 Cable signal assignment

Figure 9: Circuit diagram

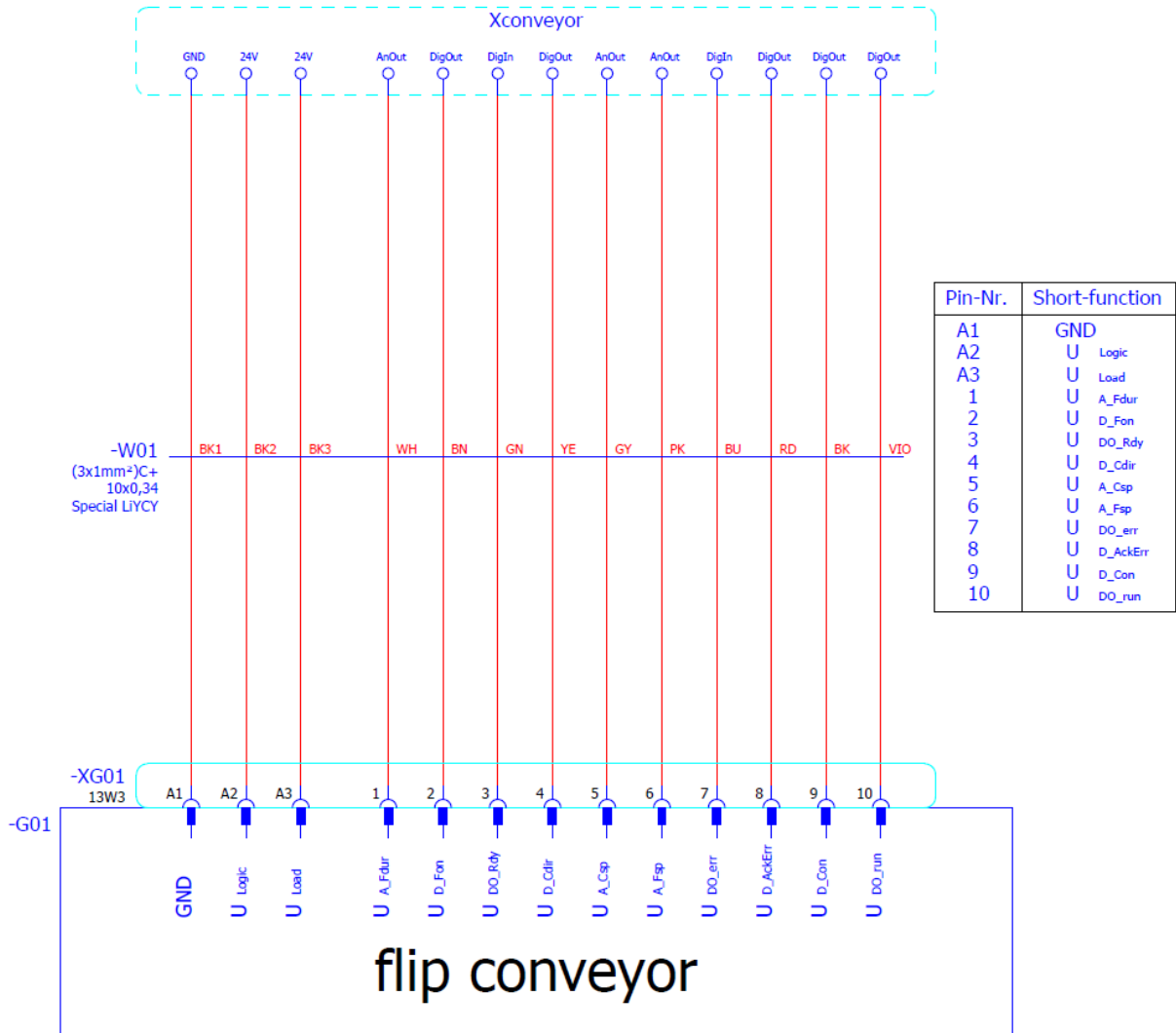
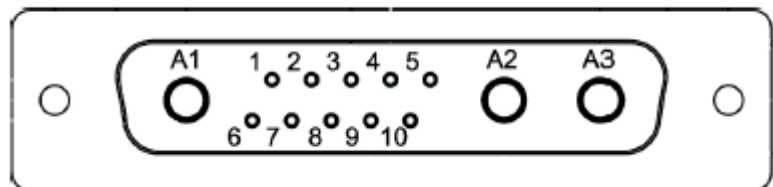


Figure 11: Conductor cross-section Figure 10: Plug pin assignment

Picture: W01



Picture: XG01



3 Referencing

Once the supply voltage is connected to the logic and load feed, the belt begins to reference. This means that it starts the search process for the center position of the flip shafts. This process is mandatory in order to perform end positioning of the shafts after each flip process.

If an error occurs during referencing, the referencing is canceled. Then the control voltage U_{Logic} must be interrupted and re-activated in order to start a new referencing.

Possible causes of error:

- No load voltage
- Overcurrent on belt motor

NOTICE



If an error occurs during referencing, the referencing is canceled. Then the control voltage U_{Logic} must be interrupted and re-activated in order to start a new referencing.

4 Adjustment modes

The Flipband supports different control profiles. The profile is selected via rotary switch on the Flipband. The adjustment options of individual rotary switches are listed below.

4.1 Belt direction, "mode dir" rotary switch


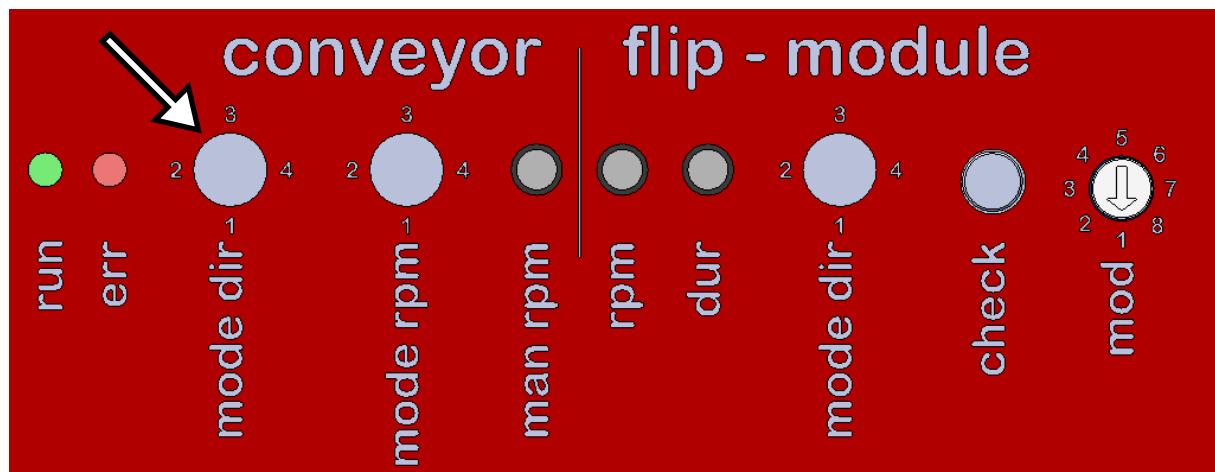
NOTICE	
	<p>Observe adjustment constellations!</p> <p>Only turn the switch to Setting 4 in mode dir if Setting 4 is also selected for mode rpm.</p> <p>Examples for control, see 5.1 Profiles for belt control</p>

Figure 12: Belt direction mode





HINWEIS	
	<p>The maximal allowed Belt clockwise rotation length is specified to one full belt rotation.</p> <p>In case of several full belt clockwise rotations the parallel belt position is not guaranteed.</p>

Table 3: Belt direction mode selection options

Actuation	Switch position	Description
Belt clockwise	1	Belt direction is permanently defined and cannot be changed by the superordinate control unit.
Digital input U_{D_Cdir}	2	Digital control of the belt direction. "0"-Low = counterclockwise (Low=GND or 0V) "1"-Hi = clockwise (High = open end or 24V)
Belt counterclockwise	3	Belt direction is permanently defined and cannot be changed by the superordinate control unit.
Analogue input U_{A_Csp}	4	<u>Combination with "mode rpm" Mode 4.</u> Travel direction is controlled via analogue input $U_{A_Csp} < \text{clockwise} \mid > 5V \text{ counterclockwise}$

4.2 Belt operating mode, rotary switch "mode rpm"

NOTICE	
	<p>Observe adjustment constellations!</p> <p>Only turn the switch to Setting 4 in mode rpm if Setting 4 is also selected for mode dir.</p> <p>Examples for control, see 5.1 Profiles for belt control</p>

The different speed operating modes of the conveyor belt are listed below.

Figure 13: Belt speed mode

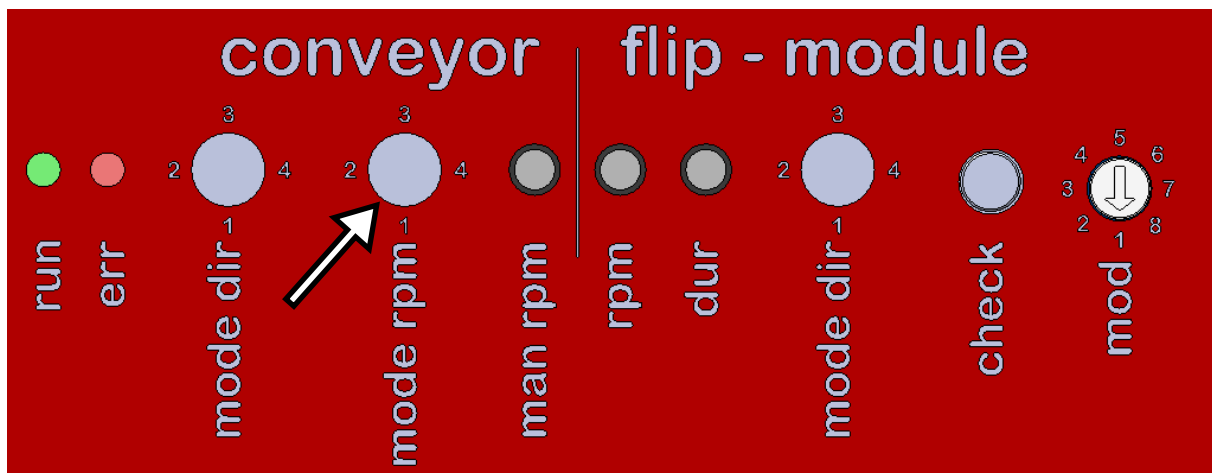


Table 4: Speed mode selection options

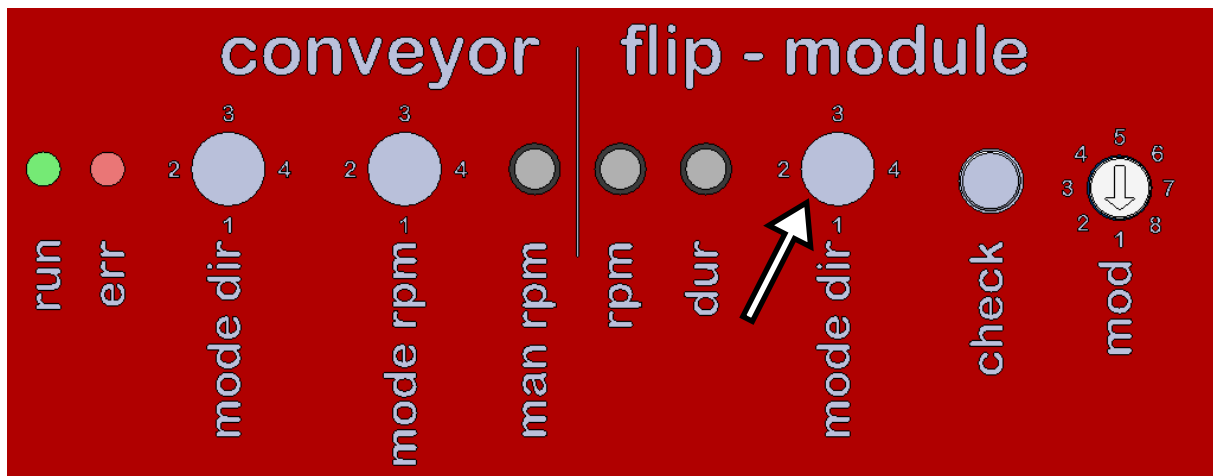
Actuation	Switch position	Description
Speed manual (Potentiometer)	1	The belt speed is permanently adjusted via the "man rpm" potentiometer. The digital input U_{D_con} is used to switch on the belt. 0V = OFF 24V = ON
Analogue input U_{A_Csp}	2	Belt speed is controlled via the 10V analog input. 0V = OFF 10V = Max
Belt motor off	3	Belt motor is deactivated.
Analogue input Analog belt speed U_{A_Csp}	4	<u>Combination with "mode dir" Mode 4.</u> An analog input is used for speed and direction. Belt speed is controlled via analogue input U_{A_Csp} . The belt is switched off at 5V. $U_{A_Csp} < 5V$ clockwise, $U_{A_Csp} > 5V$ counterclockwise. 5V = belt off (stop range 4.6V-5.4V) 0V / 10V = maximum belt speed.

⚠ CAUTION	
	<p>If Mode 4 is selected with "man rpm", a 5V level must be connected to U_{A_Csp} before the supply voltage U_{Logic} is switched on. Otherwise, the belt starts up.</p>

4.3 Flip direction, "mode dir" rotary switch

The different rotating directions of the flip shafts are listed below.

Figure 14: Flip direction mode



The rotating direction of the flip shafts is permanently adjusted via the rotary switch. Switching of the superordinate control unit is not possible.

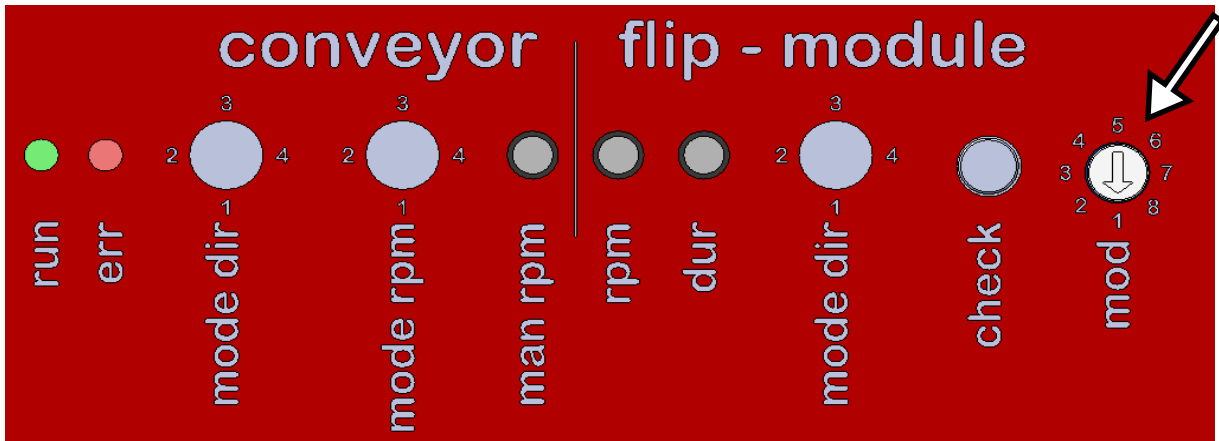
Table 5: Flip direction selection options

Switch position	Layout	Function
1		Opposite activation with inward rotating direction
2		Synchronous counterclockwise operation of the flip shafts
3		Opposite activation with outward rotating direction
4		Synchronous clockwise operation of the flip shafts

4.4 Flipping operating mode, "mod" rotary switch

The supported flip modes that are adjusted with the "mod" rotary switch are listed below.

Figure 15: Flip configuration mode



Activated flipping:

The flipping is activated by a rising flank on the digital input UD_Fon. Depending on the flip mode, the flip motors remain switched on for a specific duration (Mode 2,4-6) or as long as there is a high level at the digital input (Mode 3 and 7). Otherwise, the modes are 1 and 8. In these modes, the digital input U_{D_Fon} is ignored.

Table 6: Flip configuration selection options

Flip mode	Switch position	Description
Off (Afag test mode)	1	Test program for diagnosis See 4.4.1 Afag test mode.
Flip duration Analog U _{A_Fdur} Flip speed Analog U _{A_Fsp}	2	Rising flank at U _{D_Fon} starts the flipping process. If an additional rising flank is recognized, the flip duration starts from nine.
Flip duration not active Flip speed Analog U _{A_Fsp}	3	U _{D_Fon} directly controls the flipping process High level: Flipping active Low level: Flipping switched off
Flip duration Analog U _{A_Fdur} Flipping speed Manual (PT1)	4	Rising flank at U _{D_Fon} starts the flipping process. If an additional rising flank is recognized, the flip duration starts from nine.
Flip duration Manual (PT1) Flip speed Analog U _{A_Fsp}	5	Rising flank at U _{D_Fon} starts the flipping process. The flipping process is ended automatically after the flip duration expires. If an additional rising flank is recognized, the flip duration starts from nine. There is no reaction to the "check" button.

Flip duration Manual (PT1) Flipping speed Manual (PT1)	6	Rising flank at U_{D_Fon} or the "check" button starts the flipping process. The flipping process is ended automatically after the flip duration expires. If an additional rising flank is recognized, the flip duration starts from nine.
Flip duration not active Flipping speed Manual (PT1)	7	U_{D_Fon} or the "check" button directly control the flipping process High level: Flipping active Low level: Flipping switched off
Permanent flipping operation (Flipping speed Manual (PT1))	8	Permanent flipping operation with the speed adjustment via the flipping speed potentiometer

4.4.1 Afag test mode

The Afag test mode is intended for checking the toothed belt tension of the flipper shafts. This check must only be started with the belt disassembled, because the flipper must move freely during the check. The minimum current required to move the respective flipper is evaluated. If one of the two flipper motors requires too much current, or the current deviates too much from the motor current of the second motor, it is displayed as an error.

Sequence of test mode

1. Select Mode 1
2. Press the "check" button 6x
3. LEDs blink
4. Start counterclockwise test
5. LEDs blink
6. Start clockwise test
7. End test
8. Green LED blinks

The red LED blinks in case of an error
 In order to end the mode, press the button 6x again.

NOTICE



This check must only be started with the belt disassembled, because the flipper must move freely during the check.

5 Control profiles

The combination of rotary switches described in the previous chapter indicates the different control profiles. One of these profiles should be selected depending on the required flexibility and available control options.

5.1 Profiles for belt control

5.1.1 Belt direction and speed via an analog input

In order to control the belt direction and belt speed with input U_{A_Csp} , the direction selection and belt speed switches must be turned to position 4. Now the belt can be stopped from turning clockwise or counterclockwise via the supplied voltage can be stops. The belt drive stops with a voltage of 5V. Reduction of the voltage turns the belt clockwise; if it is increased, the belt turns clockwise. There is a limit zone of +/- ~0.4V in the range of 5V, which prevents an erroneous start-up of the belt. The greater the supplied value deviates from the stop value 5V, the greater the belt speed.

NOTICE



The supply voltage in this mode should only be activated if 5V is connected at U_{A_Csp} , otherwise the belt begins to run clockwise at maximum speed.

5.1.2 Belt direction and belt start via a digital input, manual belt speed

For this mode, the belt direction selector switch is moved to 2 and the belt speed selector switch is moved to 1. With this setting, the belt speed is defined with the belt speed potentiometer. This speed is used for clockwise and anticlockwise operation. Now the belt travel direction can be controlled via the digital input U_{D_Cdir} (0V clockwise | 24V counterclockwise). As long as there is a high signal (24V) at U_{D_Con} , the belt operation is started.

NOTICE



If the input U_{D_Cdir} does not have a fixed level (open end), the belt runs counterclockwise.

5.1.3 Belt direction and belt start via a digital input, analog belt speed control

For this mode, the belt direction selector switch is moved to 2 and the belt speed selector switch is moved to 2. In this setting mode, the belt travel direction is adjusted with the digital input U_{D_Cdir} (0V[GND] counterclockwise | 24V clockwise). With a

change from a level of 0V to a voltage value (depending on selection of the desired belt speed) at U_{A_Csp} , the belt is started.

NOTICE



If the input U_{D_Cdir} does not have a fixed level (open end), the belt runs counterclockwise.

5.2 Profiles of the flipper control

5.2.1 Flipper directions

Selection of the flipper direction is made with the flip direction switch; this can have an influence of the separation of the bulk material for the respective material and selected speed.

5.2.2 Profiles of the flipper modes

Define flip duration and flip speed manually mode.

In order to manually define the flip duration and speed, the flip mode switch (mod) is set to 6. In doing so, it is possible to adjust the flip duration and speed via the respective potentiometer. An increase of the respective value is achieved by turning the screw head clockwise in both potentiometers. With activation of the input U_{D_Fon} , the flipping process is started. The process ends after the expiration of the adjusted time. If an additional change of the signal U_{D_Fon} from Low to High takes place during the flipping process, the flip duration is restarted. End positioning is carried out after the time has expired if there is a High signal at U_{DO_rdy} to signal that the belt is ready to flip again.

Define flip duration manually and flipping speed dynamically mode

In order to define the flip duration manually, but define the flipping speed dynamically via the analogue input U_{A_Fsp} , the flip mode switch (mod) is set to 5. Now it is possible to adjust the flip duration via potentiometer and to change the flipping speed dynamically via the input A_Fsp both before activation of the flipping process and during the rotational movement. With activation of the input U_{D_Fon} , the flipping process is started. The process ends after the expiration of the adjusted time. If an additional change of the signal U_{D_Fon} from Low to High takes place during the flipping process, the flip duration is restarted. End positioning is carried out after the time has expired if there is a High signal at U_{DO_rdy} to signal that the belt is ready to flip again.

Define flip duration dynamically and flip speed manually mode

In order to define the flipping speed manually, but define the flip duration dynamically via the analogue input U_{A_Fsp} , the flip mode switch (mod) is set to 4. Now it is possible to adjust the flipping speed via potentiometer and to change the flip duration dynamically via the input U_{A_Fdur} before activation of the flipping process. With activation of the input U_{D_Fon} , the flipping process is started. The process ends after the expiration of the adjusted time. If an additional change of the signal U_{D_Fon} from Low to High takes place during the flipping process, the currently adjusted flip duration is restarted. End

positioning is carried out after the time has expired if there is a High signal at U_{DO_rdy} to signal that the belt is ready to flip again.

Define flip duration and flipping speed dynamically mode

In order to define the flipping speed and flip duration manually, but define the flip duration dynamically via the analogue inputs U_{A_Fdur} and U_{A_Fsp} the flip mode switch (mod) is set to 2. Now it is possible to adjust the flipping speed via U_{A_Fsp} at any time and the flip duration via U_{A_Fdur} before actuation of the flipping process. With activation of the input U_{D_Fon} , the flipping process is started. The process ends after the expiration of the adjusted time. If an additional change of the signal U_{D_Fon} from Low to High takes place during the flipping process, the currently adjusted flip duration is restarted. End positioning is carried out after the time has expired if there is a High signal at U_{DO_rdy} in order to signal that the belt is ready to flip again.

Define flipping speed dynamically and flip duration according to signal length mode

In order to define the flipping speed dynamically and to control the duration of the flip pulse according to the input signal, the flip mode switch is set to 3. Now it is possible to adjust the flipping speed via U_{A_Fsp} at any time and to control the duration of the flipping with the presence of the signal at U_{D_Fon} . After the signal has switched from High to Low, end positioning is carried out; when this is completed, a High signal is sent to U_{DO_rdy} to signal that the belt is ready to flip again.

Define flipping speed manually and flip duration according to signal length mode




In order to define the flipping speed manually and to control the duration of the flip pulse according to the input signal, the flip mode switch is set to 7. Now it is possible to adjust the flipping speed via potentiometer and to control the duration of the flipping with the presence of the signal at U_{D_Fon} . After the signal has switched from High to Low, end positioning is carried out; when this is completed, a High signal is sent to U_{DO_rdy} to signal that the belt is ready to flip again.

Continuous flipping mode

If mode 8 is selected, flipping takes place continuously with the speed adjusted via potentiometer. The flipping direction can vary during the flipping.

6 LED displays

The LED status of the control modules must be checked in case of an error. A list of possible messages is provided below

Figure	Legend
	LED on
	LED off
	LED blinking

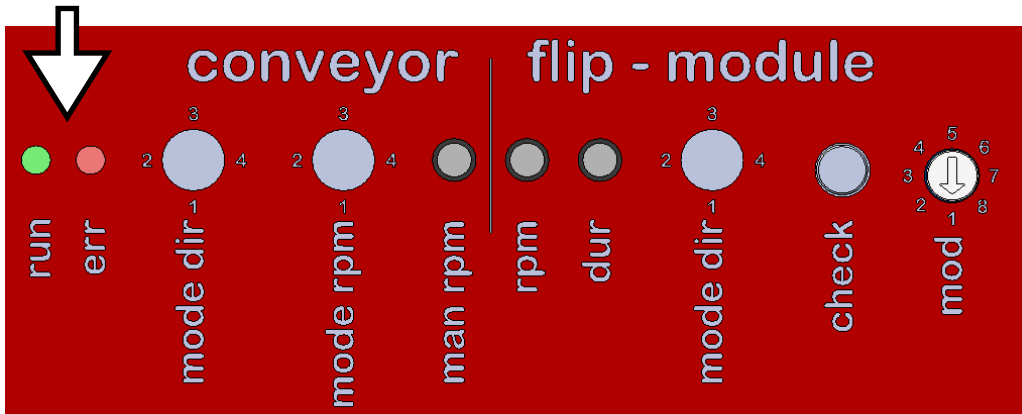












Table 7: Flipband LED display

run	err	Message
		IO
		Error occurred during operation
		Initialization
		Afag test mode
		Off

7 Acknowledge error

If an error occurs during operation, it must be acknowledged with the "check" button or via the connection U_{D_AckErr} . If there is still an error pending after the error has been confirmed, the Flipband switches to error mode.

8 Maintenance instructions

NOTICE	
	<p>The flip belt is designed to be maintenance-free.</p> <p>However, if repairs or maintenance work are necessary, please contact the manufacturer of the Flipband.</p>

9 Ordering address:

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10 Disposal

Devices that are no longer used should not be disposed of as a complete unit. They should be dismantled and the parts should be sorted according to material type and recycled. Non-recyclable components must be disposed of correctly according to the type of component.

