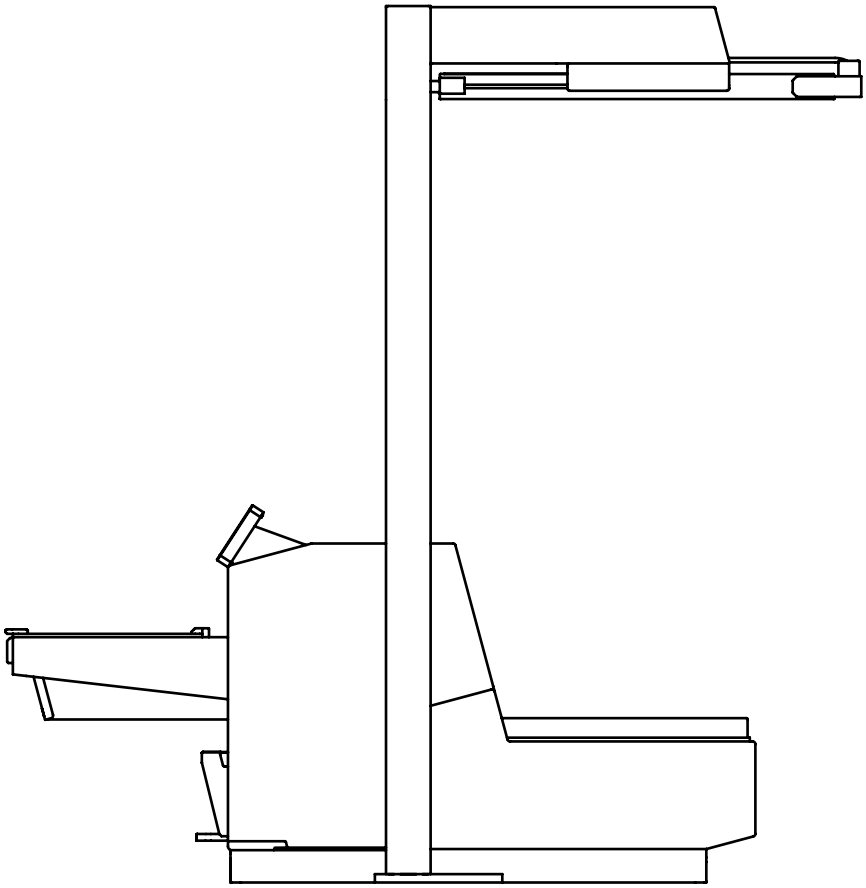
flexfactory
feeding success.



Assembly Instructions flexfeeder X-Series

Source file name: Assembly Instructions X-Series B.afpub

Path: /Users/felix.buechi/Documents/Montage Anleitung E

Revision: A unreleased/preliminary

Save Date: 19.01.2023

Document P/N: 700-000-002

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Table of contents

1.1 Obligation to read First

Before you start working with the product described here, you must have read and understood the contents Of this documentation in full.

1.2 Copyright

1.3 Manufacturer

flexfactory ag

Giessenstrasse 15
CH-8953 Dietikon
Switzerland

Tel: +41 44 774 55 66
Fax: +41 44 774 55 67

www.flexfactory.com
info@flexfactory.com

1.4 Declaration of Incorporation

in accordance with EC Machinery Directive 2006/42/EC, Annex II B

Manufacturer	**flexfactory ag** Giessenstrasse 15 8953 Dietikon, Switzerland Phone: +41 44 774 55 66 Homepage: www.flexfactory.com Email: info@flexfactory.com We hereby declare that, based on its conception, design and construction, the product named below, in the version placed on the market by us, complies with the essential safety requirements of the Machinery Directive, including the amendments applicable at the time of the declaration, up to the interfaces described in the enclosed technical documentation. The basic safety requirements according to the appendix of this declaration of incorporation have been complied with.
Product designation	**flexfeeder X-Series**
Machine models	**X185, X250, X350**
Relevant EC directives	Machinery directive 2006/42/EC **EMC 2014/30/EC**
Applied harmonised standards	**EN ISO 12100:2010** Safety of machines **EN ISO 13857:2020** Safety distances to prevent reaching hazardous areas **EN 61000-6-2:2019** EMC generic standards - immunity standards for industrial environments **EN 61000-6-4:2011** EMC generic standards - emission standards for industrial environments
Obligation	The manufacturer undertakes to transmit the documentation electronically to the competent national authority upon justified request. The special technical documents belonging to the machine according to Annex VII Part B have been prepared.
Authorised representative for compiling the technical documentation	Peter Ulrich, flexfactory ag, Giessenstrasse 15, 8953 Dietikon, Switzerland
Obligation	The manufacturer undertakes to transmit the documentation electronically to the competent national authority upon justified request. The special technical documents belonging to the machine according to Annex VII Part B have been prepared.
Intended product use	The flexfeeder X models are intended for installation in complete production systems. Their commissioning is prohibited until it has been ensured that the entire machine in which the mentioned partly completed machinery is installed complies with the provisions of the Machinery Directive.
Disclaimer	This declaration does not contain any guarantees. The safety instructions in the product documentation must be observed. If a change to the listed products is not agreed upon with the manufacturer, this declaration loses its validity.

Dietikon, May 2022; Felix Büchi, CEO

About this Manual

2.1.1 Using the Assembly Instructions

These assembly instructions enable the operator to take over, assemble and commission the flexfeeder within the framework of the instructions described here. The basic prerequisite for safe working is compliance with all the warnings and instructions given in these assembly instructions.

2.1.2 Reading Obligation

Personnel are required to carefully read and understand these installation instructions before beginning any work.

2.1.3 Reselling, Handover

If the flexeeder is passed on to third parties, these assembly instructions must also be handed over.

2.1.4 Additional applicable documentation

In addition to these assembly instructions, the flexfeeder instructions, notes and signs in the appendix also apply.

2.1.5 Regulations

In addition, the local accident prevention regulations and general safety regulations for the area of application of the machine apply.

2.1.6 Figures, Illustrations

Illustrations in these assembly instructions are for basic understanding and may deviate from the actual design of the machine.

2.1.7 Loss of the instructions

If the assembly instructions are lost, request a replacement immediately. For contact details, see imprint (page 2).

2.1.8 Online Documentation

The operating instructions available online apply in addition to these assembly instructions. The operating instructions enable safe and efficient handling of the flexfeeder throughout all phases of the machine's life. Among other things, the operating instructions provide the necessary information on operation, maintenance, and troubleshooting.

Danger Level Indicators used in this Manual

Danger Level	Symbol, Information, Explanation, Colors

2.2.1 Risk of Death

DANGER	RISK OF DEATH
	**Consequences in case of noncompliance** ——— **Notes on avoidance**

A warning at this danger level indicates an imminent dangerous situation. Failure to avoid the dangerous situation will result in death or serious injury. Follow the instructions in this warning to avoid the risk of death or serious personal injury.

2.2.2 Risk of Injury

WARNING	RISK OF INJURY
	**Consequences in case of noncompliance** ——— **Notes on avoidance**

A warning at this danger level indicates a potentially dangerous situation. Failure to avoid the dangerous situation may result in death or serious injury. Follow the instructions in this warning to avoid the potential risk of death or serious personal injury.

2.2.3 Caution

CAUTION	RISK OF INJURY
	**Consequences in case of noncompliance** ——— **Notes on avoidance**

A warning at this danger level indicates a potentially dangerous situation. Failure to avoid the dangerous situation may result in minor or moderate injury. Follow the instructions in this warning to avoid personal injury.

Danger Level	Symbol, Information, Explanation, Colors

2.2.4 Damage to Equipment

Possible Damage to Equipment

Consequences in case of noncompliance

Notes on avoidance

2.2.5 Safety Instructions

Safety Instructions

Place here your instructions for carrying out work safely.

2.2.6 Useful Information

Tips and Notes

Place here additional information that is important to simplify
a task or better understand a situation.

3.1 Introduction

This section provides an overview of all important safety aspects for the optimum protection of personnel and for safe and smooth operation. Noncompliance with the handling instructions and warnings provided in these instructions can result in significant dangers. In these instructions, only those risks can be considered that have beenidentified based on a risk assessment. Risks resulting from the working conditions, the location of use and interfaces to external components must be identified and warnings must be supplemented accordingly.

3.2 Responsibility of the operating company

The operating company is generally subject to the legal requirements for occupational safety, since the machine is intended for use in the commercial sector. In addition to the warnings in these instructions, the applicable safety, accident prevention and environmental protection regulations for the area in which the machine is used must therefore also be observed.

3.2.1 Risk assessment

The operating company must, by means of a risk assessment, inform itself about the applicable occupational health and safety regulations and identify additional dangers resulting from the specific working conditions at the machine's place of use.

3.2.2 Operating instructions

According to the results of the risk assessment at the workplace, the operating company must issue, implement and document a set of operating instructions. During the entire operating time of the machine, the operator is responsible for ensuring that the operating instructions that it has prepared comply with the current legal requirements.

3.2.3 Responsibilities

The operating company must regulate the responsibilities for work on or with the machine and designate a person responsible for ensuring the safe operation of the machine and the coordination of all activities.

3.2.4 Information flow

The operating company must ensure that all personnel who perform work on or with the machine have read and understood these instructions and other operating instructions. In addition, it must train the assigned personnel at regular intervals and inform them about the relevant hazards.

3.2.5 Personal protective equipment

The operating company must provide the relevant personnel with the required personal protective equipment.

3.2.6 Safety material

The operating company must provide all necessary safety materials, such as a padlock to secure the main switch, during maintenance.

3.2.7 Safety requirements

If necessary, the operating company must ensure that the machine into which this product is to be integrated or of which it is a component complies with the essential safety requirements and provisions of all relevant directives prior to commissioning.

3.2.8 Technically perfect condition

To keep the machine in a technically perfect condition at all times, the operating company must ensure that the maintenance intervals specified in these instructions are observed. In addition, the operating company must ensure that all necessary safety devices are properly installed on the machine. It must regularly check them for completeness and functionality.

3.3 Personnell Requirements

3.3.1 Generall personell requirements

Only persons who reliably carry out their work and whose ability to react is not impaired by the influence of, for example, drugs, alcohol or medication, may be assigned as operating personnel.

When selecting personnel, the job-specific age specifications applicable at the location where the machine is operated must be observed.

3.3.2 Qualifications

Improper handling due to insufficient qualification can result in significant injuries.

- Have all activities carried out by qualified personnel only
- Keep unqualified personnel away from the danger zones

The following qualifications for different areas of activity are specified in the instructions:

3.3.3 Qualified personell

Qualified personnel are able to perform the work assigned to them due to their technical training, knowledge and experience as well as their knowledge of the relevant standards and regulations, and to independently identify and avoid possible dangers.

3.3.4 Qualified electrician

Qualified electricians are able to perform the work assigned to them due to their technical training, knowledge and experience as well as their knowledge of the relevant standards and regulations, and to independently identify and avoid possible dangers.

Qualified electricians are trained for the specific location in which they work and know the relevant directives, standards and regulations.

3.3.5 Manufacturer

Some work may only be carried out by the manufacturer's qualified personnel. Other personnel are not authorised to carry out this work. Contact the manufacturer's service department to arrange for the necessary work to be carried out (see the imprint on page 2).

3.3.6 Forklift driver

A forklift driver is at least 18 years of age and is capable of driving industrial trucks equipped with a driver's seat or driver's platform due to his or her physical, mental and character traits.

In addition, the forklift driver has been trained to drive industrial trucks equipped with a driver's seat or driver's platform.

The forklift driver has demonstrated to the operating company that he or she is capable of driving industrial trucks equipped with a driver's seat or a driver's platform and has subsequently been instructed in writing by the operating company to perform this task.

3.3.7 Instructed person

The instructed person has been informed by the operating company about the tasks assigned to him or her and about possible dangers in case of improper behaviour.

3.3.8 Unauthorised personnel

Unauthorised personnel who do not satisfy the requirements described here are not aware of the dangers in the work area.

- Keep unauthorised personnel away from the work area.
- In case of doubt, approach the people concerned and direct them away from the work area.
- Stop work as long as unauthorised personnel are present in the work area.

3.4 Personal protective equipment

Some work requires personnel to use personal protective equipment in order minimise health hazards. In addition to the personal protective equipment specified in these instructions, the notes posted in the work area must be observed. The following personal protective equipment must be worn accordingly before beginning the respective tasks:

3.4.1 Appropriate work clothing

is tight-fitting work clothing with low tear resistance, tight sleeves and no protruding parts. It is primarily used for protection against entrapment by moving machine parts. Do not wear rings, chains or other jewellery.

3.4.2 Safety shoes

are used to protect against heavy falling parts and slipping on slippery surfaces.

3.4.3 Protective gloves

are used to protect the hands from friction, abrasions, punctures or deeper injuries as well as from contact with hot surfaces.

3.4.4 Safety goggles

are used to protect the eyes from flying particles and parts.

3.5 Intended use

The machine is designed and built exclusively for the intended use described here and must only bnbe operated accordingly:

3.5.1 Functional description of the flexfeeder

The flexfeeder is a flexible feeding system for bulk parts. It consists of a stock parts hopper with a retaining flap and a vibrating table with discharge function. This enables the rejection of NIO parts and a quick product change on the line. The bulk parts are poured from the hopper onto the conveyor platform where they are distributed as best as possible. The kinematics of the drive allows different movement patterns. Through these, the parts can be moved back and forth, redistributed or turned. The servo drives allow the movement of light as well as heavy parts.

The flexfeeder is equipped with a Linux-based/embedded controller. The communication between flexfeeder and robot or plant control is done via Ethernet TCP/IP.

The flexfeeder is set up via a browser-based user interface. With only two parameters - intensity and duration of the movement - the conveying behavior can be individually adjusted to the different parts.

3.5.2 Intended use

The flexfeeder is designed and constructed exclusively for the intended use described here and may only be operated accordingly:
The flexfeeder
- serves exclusively as a flexible feeding system for bulk material parts for, for example, assembly, testing or packaging machines.
- is intended exclusively for installation in a complete system.
- may only be operated in accordance with the operating and ambient conditions specified in the chapter Technical data p.31.
- may only be operated in accordance with the requirements of the locally applicable accident prevention regulations.
- may only be operated with additional protective measures (e.g. machine guarding) during automatic removal of parts from the vibrating table. Together with a collaborative robot, the formwork can be dispensed with, provided that this is permitted by the risk analysis of the higher-level machine/plant.
- May only be operated with additional protective measures (e.g. safety light grid) when parts are removed manually.

3.5.3 Improper use

There is a risk of serious injury or death if the flexfeeder is not used as intended due to:
- Operation in potentially explosive atmospheres
- feeding of unpacked foodstuffs
- operation without lateral fixation on the table

3.5.4 Misuse

Folgenden Fehlgebrauch dringend vermeiden:

Zuführung von nassen, stark verschmutzten und stark öligen Teilen.

Ansprüche jeglicher Art wegen Schäden aufgrund nicht bestimmungsmässiger Verwendung sind ausgeschlossen.

3.6 Residual risks

The following section lists residual risks that have been identified on the basis of a risk assessment.

Safety Instructions

Failure to observe the safety instructions, warnings and handling instructions given in these assembly instructions may result in considerable danger.

- It is essential to observe the listed safety and warning notes and instructions for action!
- Also observe the safety instructions contained in the applicable documents.

3.6.1 Dangers from electrical energy

In case of contact with electrically live parts, damage to the insulation or individual components, there is a danger to life due to electric current.

- To be ensured by the operator: The electrical connection of the machine in which the flexfeeder is installed must comply with the electrotechnical regulations.
- Work on the electrical system may only be carried out by qualified electricians
- In case of damage to the insulation, switch off the power supply immediately and arrange for repair.
- Before connecting the machine to the power supply, compare the data in the "Technical data" with the data of the power supply system and connect only if there is a match.
- Before starting work on active parts of electrical systems and equipment, ensure that they are de-energized for the duration of the work.
- Never bridge fuses or put them out of operation. When replacing fuses, observe the correct current rating.
- Keep moisture away from electrically live parts. This can lead to a short circuit.

3.6.2 Mechanical dangers

- Moving assemblies harbor the potential for injury from crushing, shearing and impact.
- In automatic mode, only operate the machine with installed and functioning protective covers.
- Before maintenance work and troubleshooting, switch off the machine and secure it against being switched on again.
- Operator responsibility: Manual operation of the machine within the machine enclosure is the responsibility of the operator and is subject to the safety concept of the relevant machine or its control system.

3.6.3 Dangers due noise

Depending on the material being conveyed, high noise levels may occur which can cause hearing damage.

- Depending on the material conveyed, wear hearing protection if necessary.
- Operator responsibility: It is the operator's responsibility to take additional measures to protect against noise emissions, if necessary. Possible measures include, for example, the use of special conveyor plates, lining the hopper and the return container, and adjustments to the machine casing (to improve sound insulation).

3.6.4 Dangers at the place of use

Safety deficiencies caused by incorrectly performed work due to insuffient lighting

- Ensure sufficient lighting at the workplace. Have defective lamps replaced immediately.
- Sharp edges, corners, and sharp-edged materials can cause abrasions and cuts on the skin.
- Exercise caution when working near sharp edges and corners and when handling sharp-edged materials.
- If in doubt, wear protective gloves (e.g. when cleaning the machine).
- Dirt and objects lying around are sources of slipping and tripping:
- Always keep the work area clean
- Remove objects that are no longer needed
- Mark tripping hazards with yellow-black marking tape

3.7 Safety Equipment

3.7.1 General

Danger due to non-functioning safety devices!

☑ Before starting work, ensure that the safety devices are functional and correctly installed.

☑ Never disable safety devices.

☑ Ensure that safety devices such as the EMERGENCY STOP button are always accessible.

☑ The cell protection device is mounted on the machine itself.

	Tips and Notes
	The flexfeeder must be integrated into the emergency stop concept of the entire plant

3.7.2 Protective measures at the feeder

Moving components, such as drive units, are either fully enclosed, or protective measures have been applied.

The flexfeeder is intended for operation within a safety fence. In case of other use, as described e.g. on page "Intended use", the manufacturer must assess the overall system according to the risks and take suitable measures .

☑ The protective covers attached to the flexfeeder must not be modified, dismantled or put out of operation.

☑ Protective covers removed during maintenance/repair work must be refitted before recommissioning.

☑ Protective covers must always be in place when the feeder is powered on.

3.8 Unrecognizable symbols and labels on

Risk of injury from unrecognizable symbols or pictograms on the machine:

- ☑ Ensure that all safety, warning and operating instructions are always in clearly legible condition.
- ☑ Replace damaged symbols and pictograms immediately.
- ☑ Never cover, block or remove symbols and pictograms.
- ☑ Pictograms may be located on the machine. They refer to the immediate environment in which they are located and indicate hazards or measures to be taken.

3.9 Securing against reconnection to electrical power

Risk of serious injury or death due to unauthorized or uncontrolled restarting (e.g. during troubleshooting or maintenance work):

- ☑ Before restarting, make sure that all enclosures and protective covers are mounted and in working order and that there is no danger to persons.
- ☑ Always follow the procedure described below for securing against restarting.
- ☑ Disconnect the machine from the power supply.
- ☑ Secure the main switch (of the complete system) with a lock or other adequate measures. Observe the information in the operating instructions for the complete system.
- ☑ After all work has been carried out, ensure that there is no danger to persons.
- ☑ Ensure that all safety and protective devices are installed and in working order.
- ☑ Only remove the lock from the main switch, after complying with all the points above.

3.10 Shutdown in case of emergency

In case of accidents and in case of danger, the machine must be stopped immediately.

The emergency stop circuits of the flexfeeder and the higher-level overall system must be connected to each other. When the emergency stop button on the overall system is pressed, the flexfeeder therefore also goes into emergency stop.

Pressing the emergency stop button triggers an emergency stop.

Risk of serious injury or death due to uncontrolled restart:

- ☑ Before restarting, make sure that the cause of the emergency stop has been eliminated and that all safety devices are mounted and functionall.
- ☑ Den Not-Halt-Taster erst entriegeln, wenn keine Gefahr mehr besteht.

3.11 Environmental protection

Danger to the environment due to incorrect handling of environmentally hazardous substances, in particular incorrect disposal, is posed by the following substances used in the flexfeeder:

- ☑ Lubricants such as greases and oils (e.g. In ball bearings) may contain toxic substances. They must not be released into the environment. Disposal must be carried out by a specialist disposal company in accordance with the locally applicable regulations.
- ☑ Replaced machine parts may be contaminated by greases and oils and thus contain toxic substances and must be disposed of professionally.
- ☑ All materials used in the flexfeeder can be disposed of in the usual channels such as: Scrap metal, plastics, electronic components

4.1. Safety instructions for transportation

Safety Instructions

Safe working during the transport of the machine!

Perform all work in compliance with the following safety instructions listed below

1 Observe the regulations listed in chapter Safety $? for all work on / with the machine..

2 Observe the instructions and personnel requirements according to chapter Personnel requirements.

3 Provide suitable forklift trucks for transport.

4 Do not step under heavy loads. Instruct unauthorized persons from danger areas.

4.2.1 Packaging crate

Contruction of packaging crate

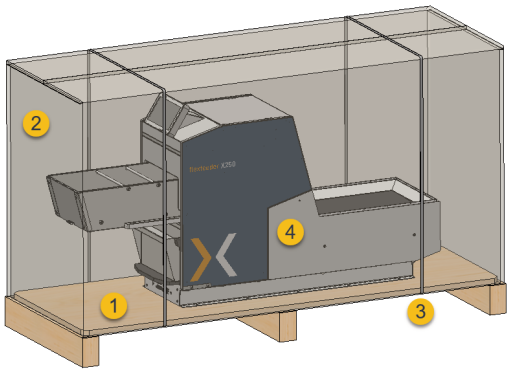
1 **Pallet (wood)**

2 **Crate (wood)**

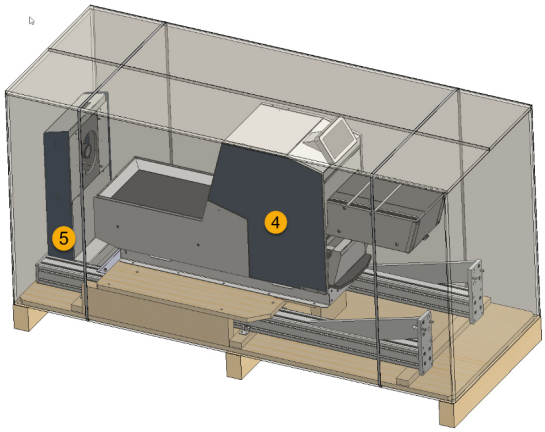
3 **Fixation tape**

4 **Feeder**

5 **Camera Tower**



Crate with feeder-unit only



Crate with feeder and camera tower

4.2.2 Lifting & Moving with a forklift

Prerequisites

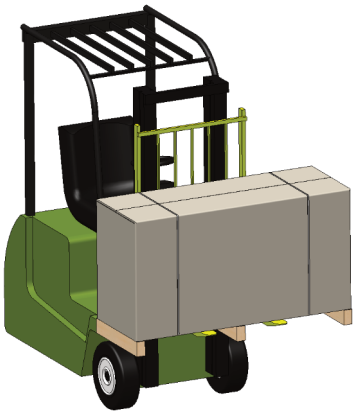
The feeders and accessories packed on a wooden pallet can be transported with a forklift under the following conditions:

- The center of gravity of the transport unit must be taken into account. This is +/- 200mm below the middle beam of the wooden pallet.
- The transport locks of the individual components (screws in wooden pallet) may only be removed at the destination.
- The forklift may only be operated by a licensed forklift driver

Center of gravitiy

Licensed fork lift driver

Transportation



Fork alignment
Center align forks

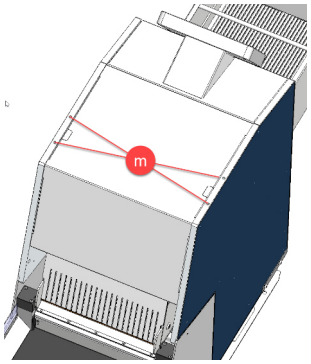
1. Make sure the forks are 600-800mm apart
2. Center the fork pair sideways under the pallet and make sure the fork tips protrude from unterneath the pallet.
3. Start lifting the pallet slowly. Lift it only as high as needed.

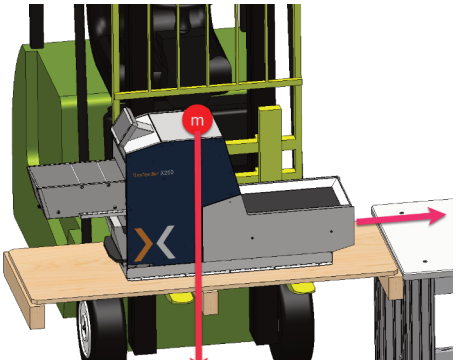
Level pallet with machine base

1. Position the pallet in front of the machine base and level the top of the pallet slightly above the machine base
2. Remove the screws which secure the feeder on the pallet
3. Carefully push the feeder onto the machine base

Center of gravitiy

Licensed fork lift driver





m: Center of gravitiy

4.2.3 Transport with crane

Prerequisites

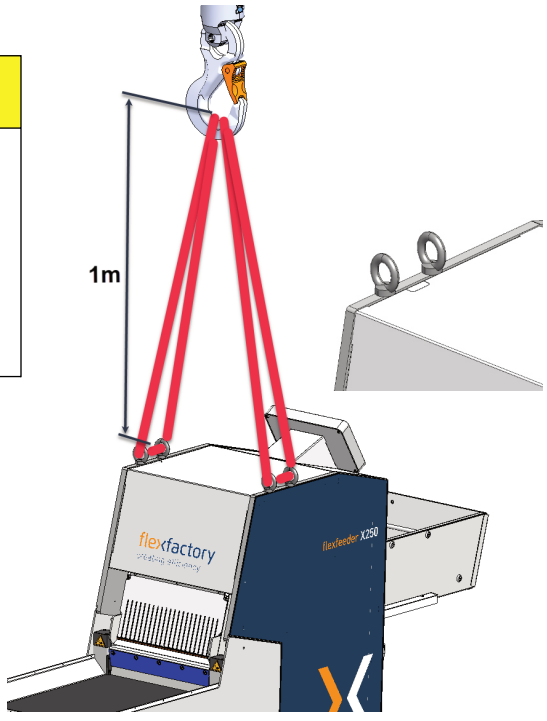
The flexfeeder can be transported with a crane in compliance with the company's internal regulations:

1. Screw the enclosed 4 eyebolts M6x13 (ISO3266) into the side plate.

2. Thread the belts into eyebolts or hang them with additional hooks. So that the eyebolts and the threads are not overloaded laterally, the hanger must have a minimum distance to the crane hook of 1m.

3. Ensure that ropes, belts, etc. are not twisted and that the transport pieces are securely fastened.

	CAUTION
⚠	Personal injury due to overloading when lifting loads: If the flexfeeder is lifted manually from the transport pallet, the operator's internal safety regulations must be observed (see weight specifications page 21)



5.1 Safety

Safety Instructions

All work must be carried out in compliance with the following safety instructions listed below:

☑ Observe the regulations listed in chapter [$?] for all work on or with the machine.

☑ All installation work may only be carried out by specially trained personnel (see chapter personnel requirements).

☑ Work on the electrical system may only be carried out by electrical specialists (see chapter Qualifications).

☑ For all installation work, wear protective equipment in accordance with the local accident prevention regulations.

☑ Before starting work, switch off the electrical supply and and secure it against being switched on again.

☑ Before starting work, ensure that there is sufficient space for the installation.

☑ Ensure tidiness and cleanliness at the installation site! Loose components and tools lying on top of each other are potential sources of accidents.

☑ If components have been removed or misaligned, make sure that they are correctly assemled and reinstall all fastening elements and observe screw tightening torques.

☑ Do not step under suspended loads/equipments.

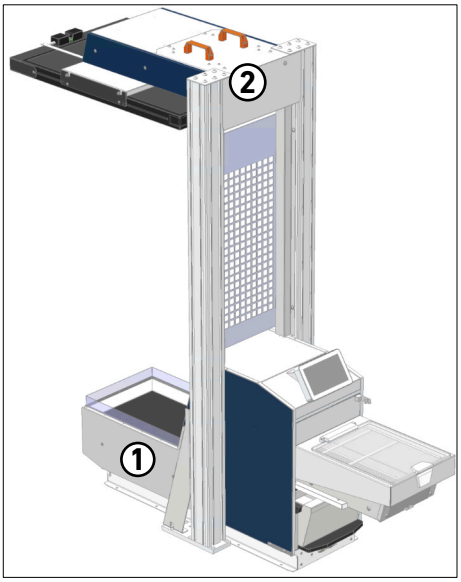
5.2 Overview of flexfeeder X shipping configurations options

5.2.1 Configurations based on the camera installation approach

A flexfeeder X system is comprised of

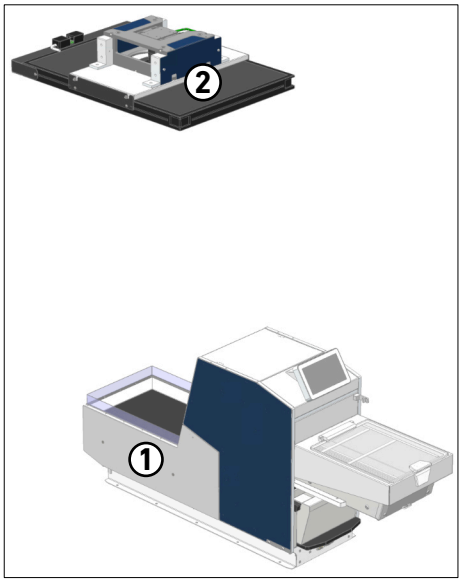
① Feeder + options
② Camera + options
and installation accessories (not shown here)

The toplight shown below is optional. If an optional backlight was ordered, it is factory installed inside the shaker.
All configurations shown below, are available for the flexfeeder X185, X250, and X350.



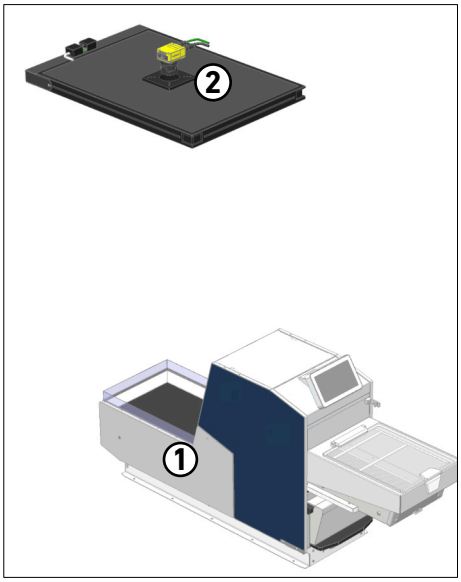
flexfeeder X with Camera Tower

flexfeeder X with camera tower, integrated camera, and toplight. Feeder and camera tower to be mounted separately by customer to a common base plate. Cables that connect camera to feeder are factory installed.
If an optional toplight is part of the order, it comes preinstalled with the tower.



flexfeeder X with Camera Module

flexfeeder X with camera module and toplight. Camera module to be mounted to customer provided cell framework. Feeder to be mounted by customer to base plate. Cables for connecting feeder and camera module and optional toplight are provided. Routing of cables lies with the customer.

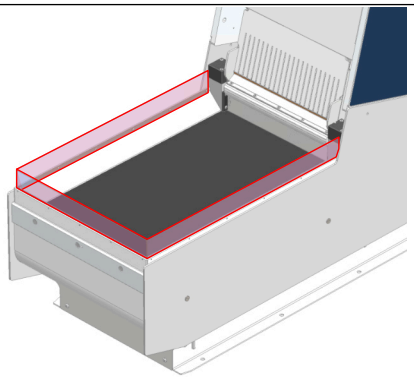
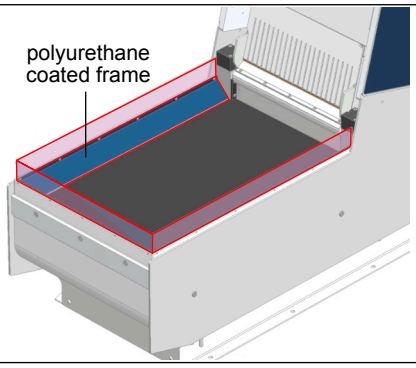
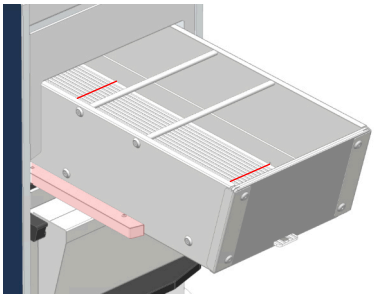
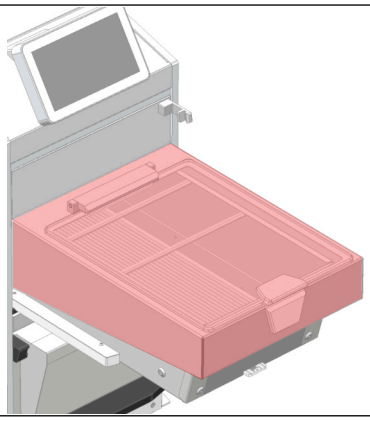


flexfeeder X with Camera

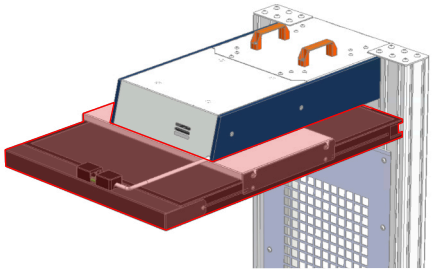
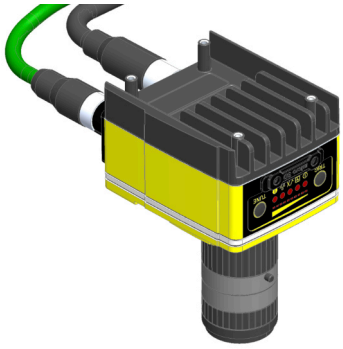
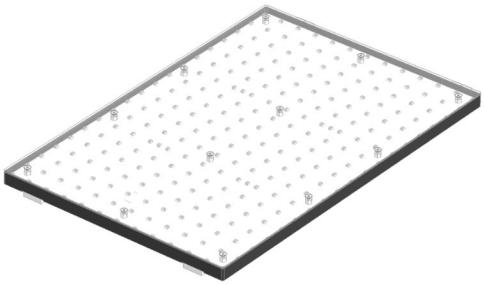
Flexfeeder X with separate camera and toplight. Camera and toplight. Cables for connecting feeder and camera and optional toplight are provided. Routing of cables lies with the customer.

Based on the shipping papers and the information above, determine which configuration your are about to assemble, install, and test.

5.2.2 Feeder Options

	Option
	**Light duty jump over protection** Used to prevent light weight parts from jumping out of the shaker. Available for all X models.
	**Heavy duty jump over protection** Used to prevent heavy metal parts from jumping out of the shaker. Strong noise supression in combination with polyurethande feed plate. Available for all X models.
	**Bulk bin level sensor** Used to predict when the bulk bin needs replenishing and to control on/off of an external bulk hopper. Available for all X models.
	**Bulk bin lid** Prevent parts in the bulk bin ambient contamination Bulk lid can be locked/unlocked via Ethernet TCP/IP or from the touch-screen. Allows implementation of a a controlled replenishing process e.g. In combination with a code reader to identify and track parts being entered into the bulk bin. Available for all X models.
Feed plates	There is a wide range of shaker feed plates for all model sizes. Please contact our sales or support team for further information and a current list of available feed plates.

5.2.3 Camera and lighting options

	Option
	**LED Toplight for the Camera Tower** Standard light color: white, IR on request Available sizes: X185/60x40, X250/70x50, X350/90x70 cm2. Same toplights are also available for the camera modules.
	**2MP Cognex In-Sight 7802 with Redline Patmax** Lens contingent upon feeder model and stand-off distance
	**5MP Cognex In-Sight 7905 with Redline Patmax** Lens contingent upon feeder model size and stand-off distance
	**LED Backlight** **Light color white, read, IR** Size contingent upon feeder model size

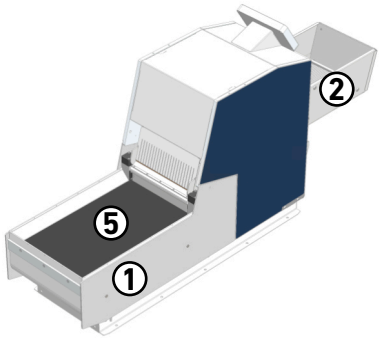
5.3 Scope of supply

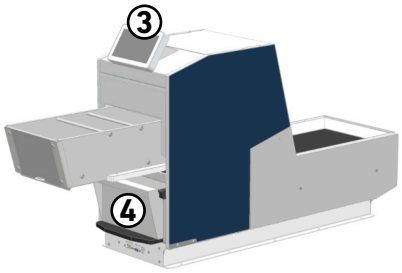
5.3.1 Does the shipment match up with your purchase order ?

Before starting with the installation:

- ☑ Cross check the packing slip items with your purchase order
- ☑ Check if all items on the packing slip have been delivered
- ☑ Check all items for visible damages
- ☑ Report incomplete or damaged items to flexfactory ag

5.3.2 Standard scope of supply flexfeeder X feeder-unit





Checklist flexfeeder X feeder-unit

☑	Shaker with purge gate, preconfigured for backlight installation	①
☑	Bulk parts dispenser with bulk storage bin, including one grooved POM and one polyurethane floor liner (factory installed)	②
☑	All required/built-in controlls components to operate the feeder	
☑	7“ touch panel	③
☑	Bulk return bin including polyurethane floor liner	④
☑	Feed plate (at least one must be selected at order time)	⑤
☑	Cable, Ethernet Cat 6, 5m	*
☑	Cable, 24V power supply, 5m	*
☑	Cable, Safety I/O, 5m	*
☑	XOS operating software (factory installed)	*
☑	Tool for changing feed plate	*
☑	4 pcs. Eyebolts M6x13	

* Item is not shown here or hidden inside the feeder

Feed plate for the shaker

5.3.3 Standard scope of supplies camera/installation options

Component	Retrofitable	Description	Figure see 5.4.4
Scope of supply feeder options			
Light duty jump-over protection	yes	Set of transparent PE sheets, pressure plates, and screws X185, X250, X350	**1**
Heavy duty jump-over protection	yes	Set of transparent PE sheets, PU coated sheet metal covers, and screws X185, X250, X350	**2**
Bulk bin cover	no	Interlockable bulk bin cover, factory installed X185, X250, X350	**4**
Bulk bin level sensor	no	Sensor bar with 3 thru-beam light sensors Available for X185, X250, X350	**3**
Backlight	yes	LED Backlight, flashable, cable preinstalled in feeder Available with light color white/red/IR Available for X185, X250, X350	**5**
Scope of supply camera/installation options			
Camera tower with 2MP camera	yes	Complete camera stand including vibration damper, 2MP Cognex In-Sight 7802 redline, lens; cable, power I/O camera-to-feeder; cable, Ethernet camera-to-feeder Available for X185, X250, X350	6
Camera tower with 5MP camera	yes	Complete camera stand including vibration damper, 5MP Cognex In-Sight7905 redline, lens; cable, power I/O camera-to-feeder; cable, Ethernet camera-to-feeder Available for X185, X250, X350	7
Toplight for camera tower/module	yes	Toplight, cable toplight-feeder*; cable feeder-24V, 5m Tower/module installation hardsware kit Available for X185, X250, X350; *5m version for camera module	8
Camera 2MP, user-installation	yes	2MP Cognex In-Sight 7802 redline, lens; cable, power I/O camera-to-feeder, 5m; cable, Ethernet camera-to-feeder, 5m Available for X185, X250, X350	9
Camera 5MP, user-installation	yes	2MP Cognex In-Sight 7802 redline, lens, cable, power I/O camera-to-feeder, 5m; cable, Ethernet camera-to-feeder, 5m Available for X185, X250, X350	10
Toplight, user-installation	yes	Toplight, cable toplight-feeder,5m, cable feeder-24V, 5m	11

5.3.4 Figures standard scope of supplies camera/installation options

Figure 1

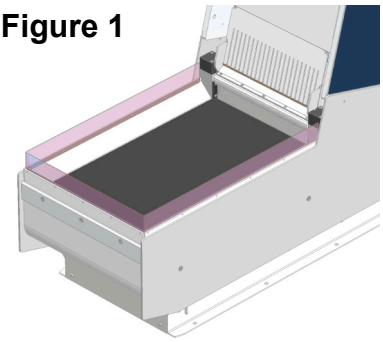


Figure 2

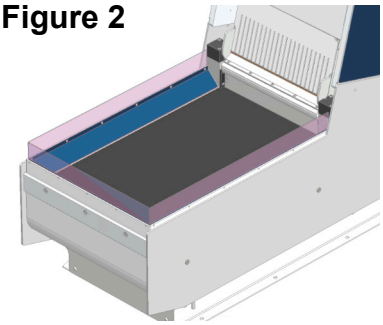


Figure 3

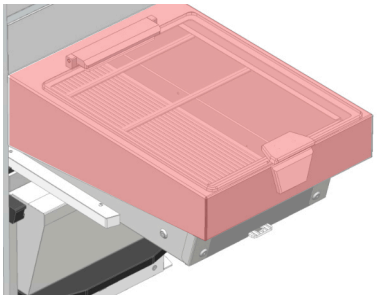


Figure 4

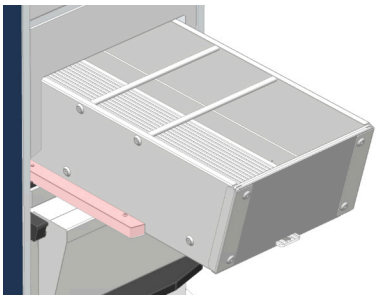


Figure 5

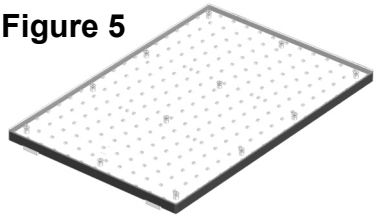


Figure 6

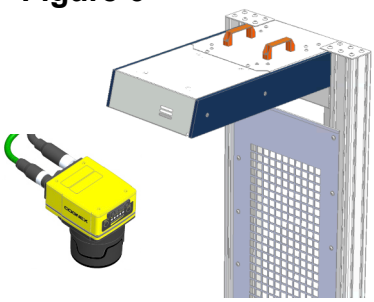


Figure 7

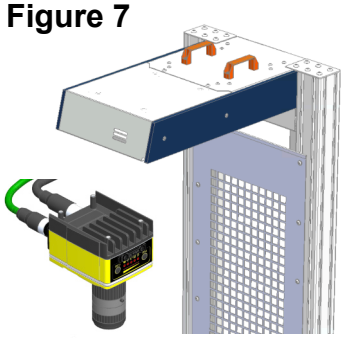


Figure 8

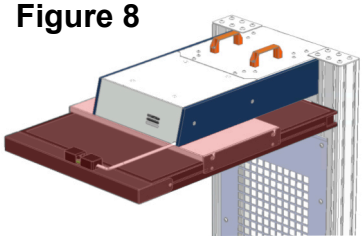


Figure 9

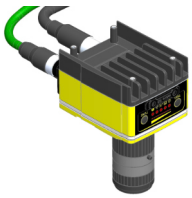
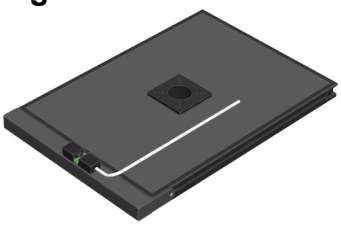
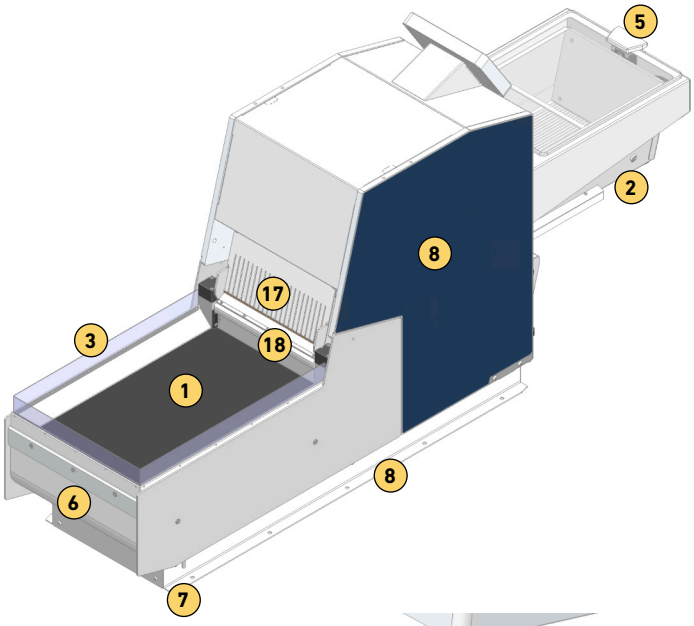


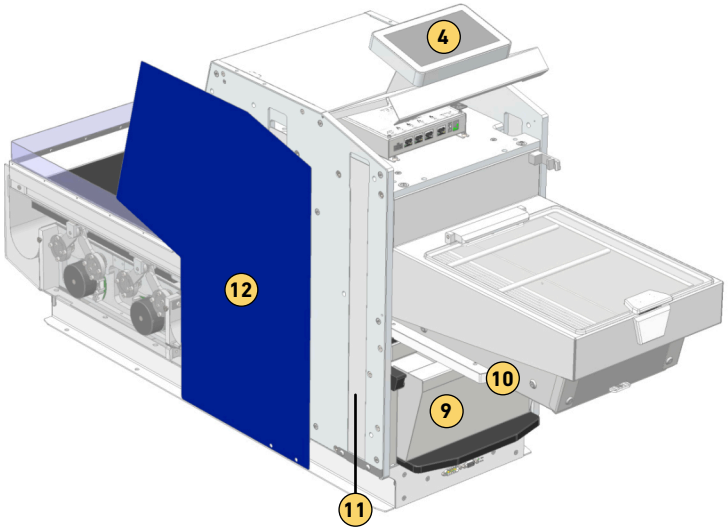
Figure 10

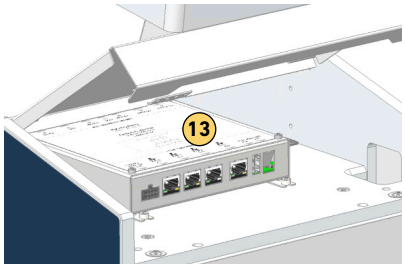
Figure 11

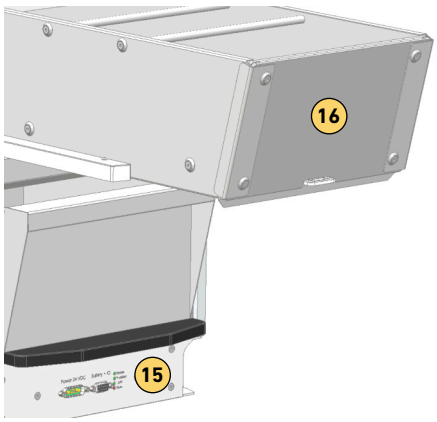


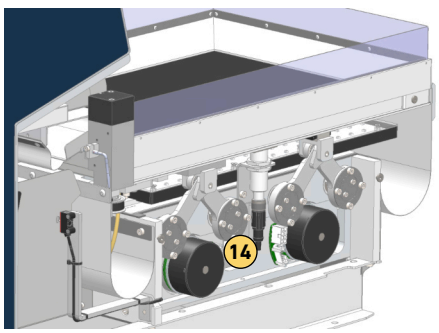
5.4 Functional parts and assemblies of the flexfeeder X



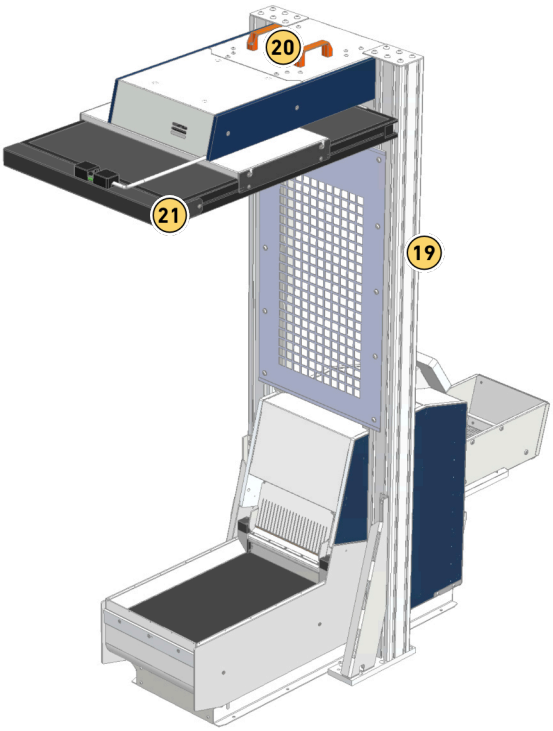


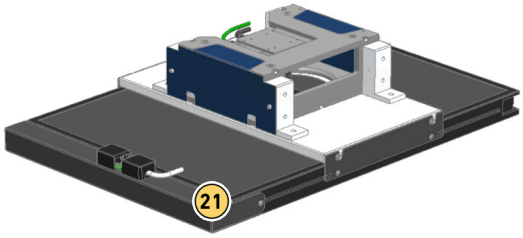






1. Shaker with quick change feed plates
2. Bulk bin dispenser
3. Jump over protection
4. Touch screen
5. Bulk bin lid (interlockable)
6. Below, access to backlight
7. M6 grounding stud
8. Mounting rail
9. Bulk return bin
10. Bulk level sensors
11. Cable way
12. Magnetic side cover
13. System controller
14. Shaker drive
15. Interface panel
16. Bulk bin service gate
17. Dispenser gate
18. Purge gate





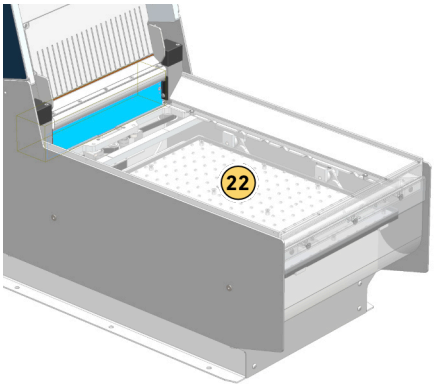
19 Camera tower

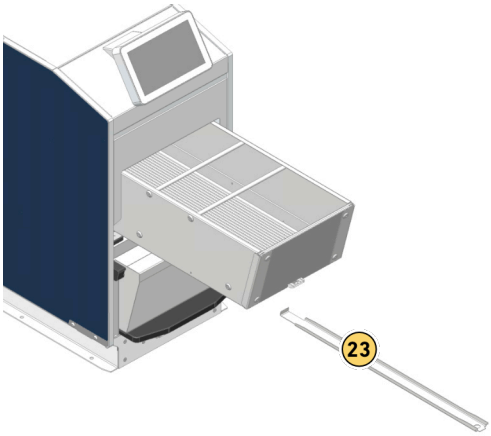
20 Vibration damper

21 Toplight

22 Backlight

23 Tool for changing the feed plate





5.5 Installing the Feeder

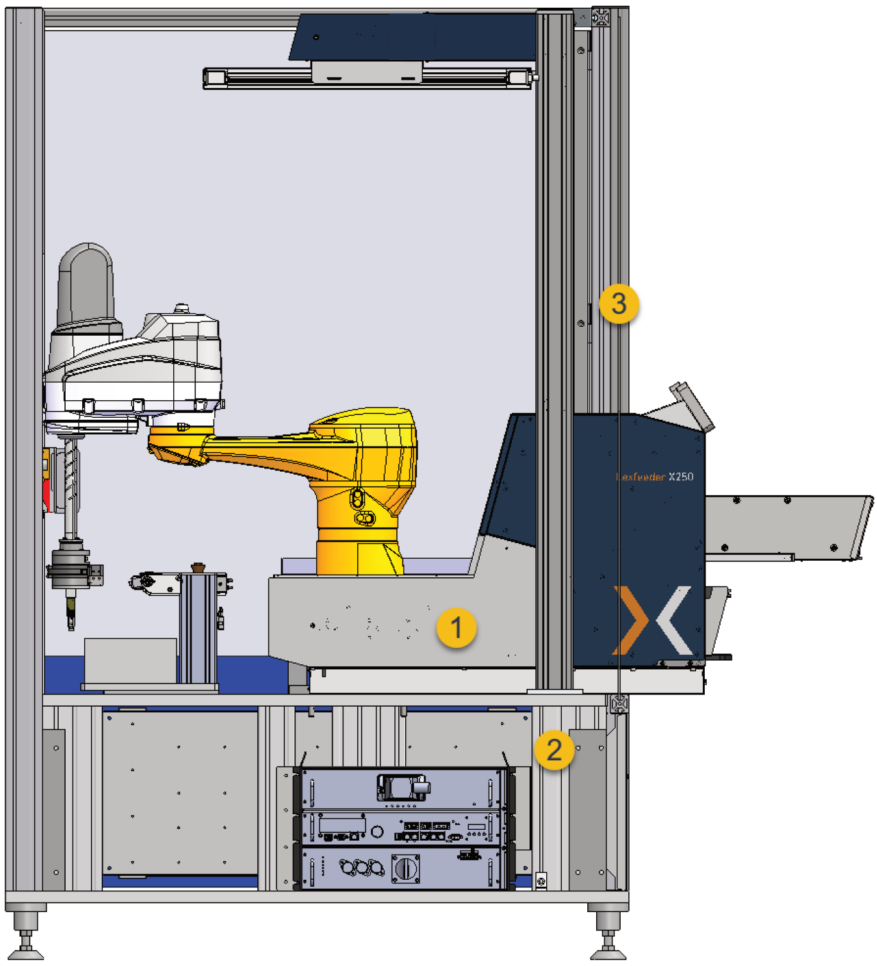
5.5.1 Installation Instructions

WARNING	RISK OF INJURY
	Danger due to vibrations If the feeder is not installed correctly, there are various dangers due to vibrations occurring during operation. The feeder may never be operated without being firmly bolted down to the machine base. The vibrations the feeder generates lead to reaction forces which can move it off the table. Make sure you comply with the safety instructions listed below.

	Safety Instructions
	☑ Make sure the machine base is leveled and rests stable on the floor. ☑ Place the feeder exklusively on metal machine base, made from steel or aluminim. For a steel table top plate , we recommend a thickness of at least 15mm, for an aluminum plate at least 20mm. ☑ The table top plate shall have a flatness better then 0.5mm within the footprint of the feeder. ☑ Secure the feeder on the table top with at least 6 M6 steel screws. ☑ Install a grounding wire between the machine base and the feeder. The feeder comes with a dedicated M6 grounding stud.

5.5.2 Example of a robot cell with a flexfeeder X

1. flexfeeder X with camera tower and toplight
2. Heavy duty machine base
3. Toplight



5.5 Installing the flexfeeder X on the machine base

5.5.1 Plan and prepare the installation

① Prepare the machine base and mounting patterns for feeder and robot

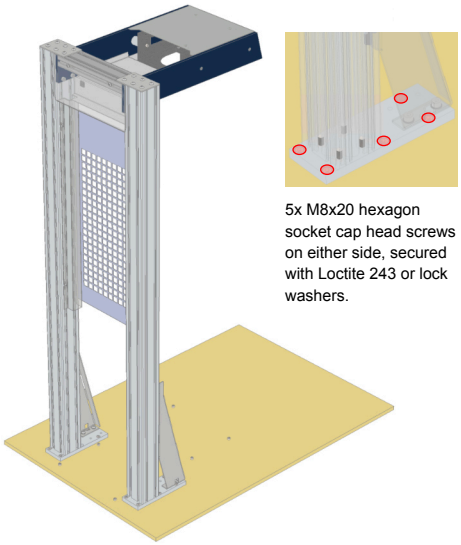
flexfeeder X185: pattern for feeder with or without camera tower
flexfeeder X250: pattern for feeder with or without camera tower
flexfeeder X350: pattern for feeder with or without camera tower

② **Checklist of installation materials:**

- flexfeeder X unit with backlight and feed plate
- Fasteners to secure feeder on machine base
- 1 24VDC power cable and 1 safety I/O cable
- Camera tower, vibration damper, fasteners to secure tower on machine base
- Toplight with 24VDC power cable
- Ethernet patch cable feeder/robot and feeder/setup PC
- 24VDC Power supply

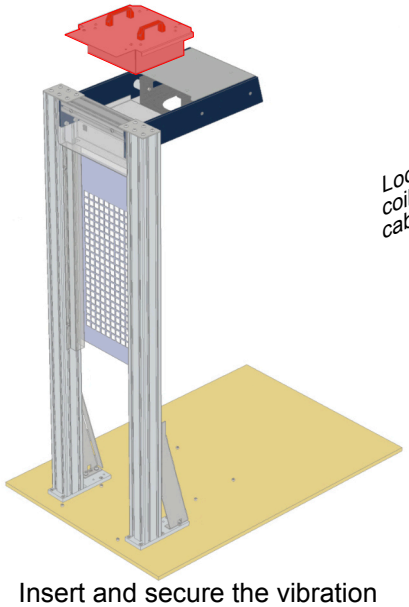
5.5.2 Mechanical installation

① Install and secure the camera tower on the machine base



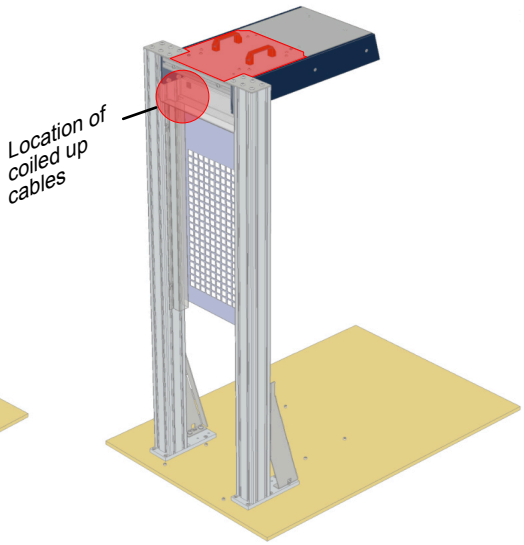
For transportation, the vibration damper was removed from the tower. Erect and install the tower without the damper on the base plate.

② Install and secure the vibration damper



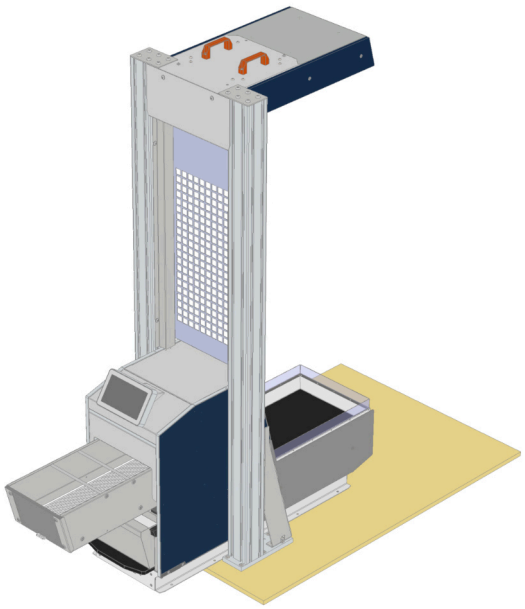
Insert and secure the vibration damper once the tower is secured on the base. The fasteners required for that are attached to the damper.

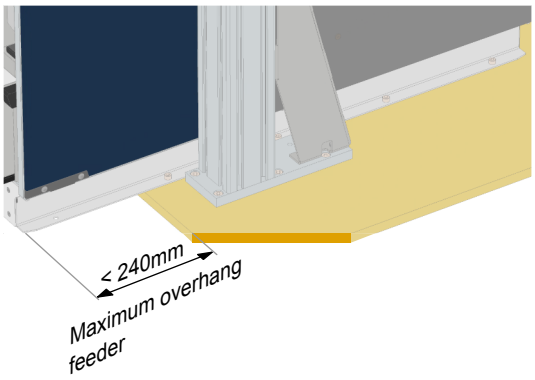
③ Uncover the camera and toplight cables

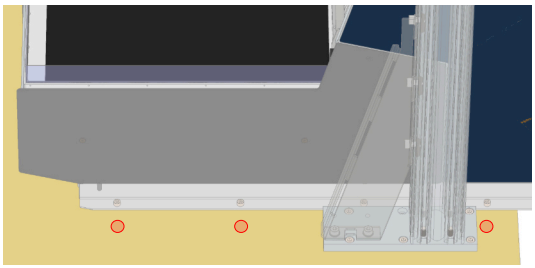


Remove the cover at the top rear side of the tower to find 2 or 3 cables which are connected to the feeder once its in place.

④ Install and secure the feeder unit to the base plate

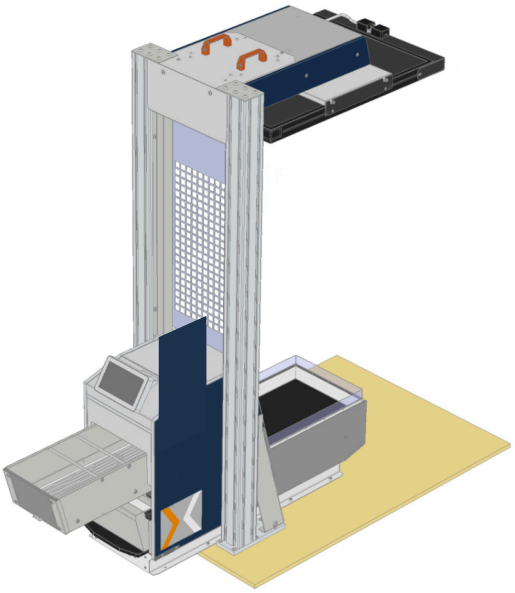


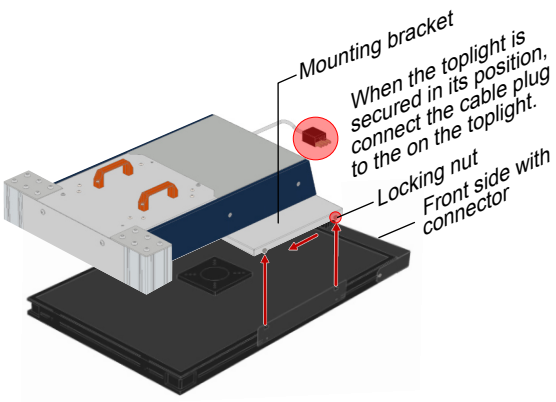




3x M8x20 hexagon socket cap head screws + washer on either side, secured with Loctite 243 or lock washers.

⑤ Install and secure the feeder unit to the base plate



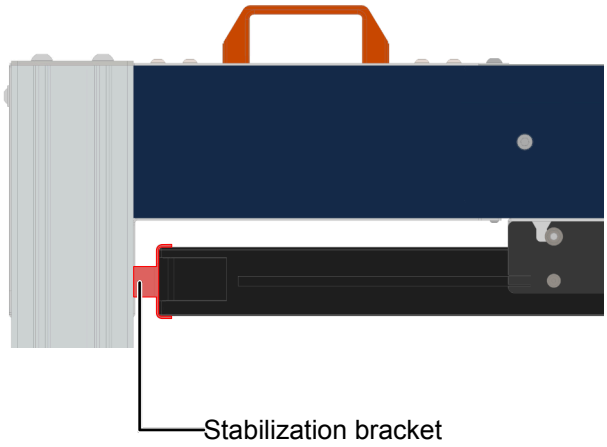


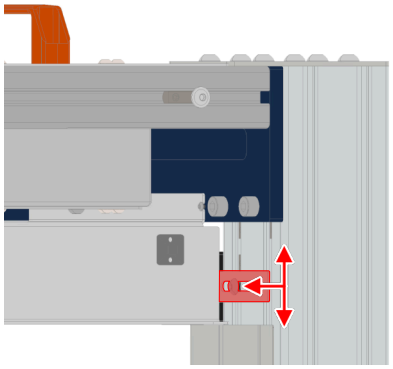
Unscrew the 4 locking nuts until the faces of nuts and studs are aligned.

Position and align the toplight underneath the mounting bracket with the connector at the front. Then push it up all the way into the key slots and backwards, so that all for key slots hang on the M6 studs. You can now tighten the four locking nuts.

CAUTION	Risk of Injury and/or Equiment Damage
⚠	**Engage at least two people to carry out the installation of the toplight.**

Adjust the toplight stabilization bracket:





To access the stabilization brackets, remove the cover on the rear side of the tower. Make sure the bracked is fully engaged with the toplight by pushing it towards the toplight and then tightening the screw.

5.6 Electrical installation

It is assumed at this point, that the mechanical installation of the feeder components is completed.

① Make sure the power supply is turned off ! **Details see 5.6.1**

Install the 24VDC power supply near the machine base. Connect the 24VDC power cable with flying leads to the power supply or to the designated terminals of your cell controls, including ground earth.

② The feeder requires 24VDC/20A power plus a separate external ENABLE signal, which controls the ON/OFF state of the feeder's electrical drives. If 24VDC are applied to the the ENABLE input, the drives can be turned ON. With the ENABLE input pulled to ground, the feeder's drives are turned OFF in safe way. **Details see 5.6.1**

③ Connect the flying leads of power cable P/N 007-003-693 (5m) or 007-005-749 (10m) to the 24VDC/20A power supply, including ground earth wire. **Details see 5.6.1**

④ Connect the safety I/O cable 007-005-749 or 007-005-499 to the cell control safety circuits as shown on page $? or use the cable and the wire clamp to apply 24V to the Enable-Input as explained on page $?.Plug and secure the Dsub 9-connector into the designated receptacle J10 on the feeder interface panel. **Details see 5.6.1**

⑤ Install the Ethernet patch cable between the feeder and the robot controller. If the robot is not available at this point, you can test most feeder functions without connecting a robot. The connection between feeder and robot can be established anytime later. **Details see 5.6.2**

⑥ Install the Ethernet patch cable between the feeder and the setup PC. If not setup PC is available at this point, you can test most feeder functions with the touch screen. The patch cable can be installed anytime later. **Details see 5.6.2**

⑦ Connect camera tower cables with the feeder controls **Details see 5.6.3**

⑧ Install an secure all covers on the feeder and camera tower.

⑩ Be aware, the feeder is factory configured, to automaticall initialize all drives whem starting up. During initialization, shaker/purge gate, bulk bin/dispenser gate and the locking gate will make slow/small motions.

Starting the feeder up:

Make sure again, that all cables are propery connected and then start up the feeder by turning the external power supply on. If everything is setup correctly and if there are no technical issues with the feeder itself, the touch screen will come up with its home screen.

5.6.1 Connecting the Feeder to Power, HW Interface for Emergency & Door Handling

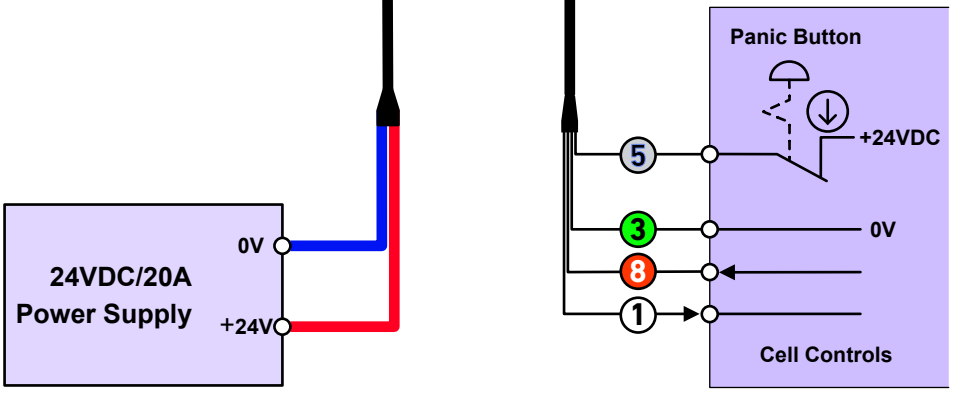
Items/work provided by customer

Connect cable here

	Part number	Length
Cable	007-003-693	5m
Cable	007-004-028	10m

Connect cable here

	Part number	Length
Cable	007-005-749	5m
Cable	007-005-499	10m

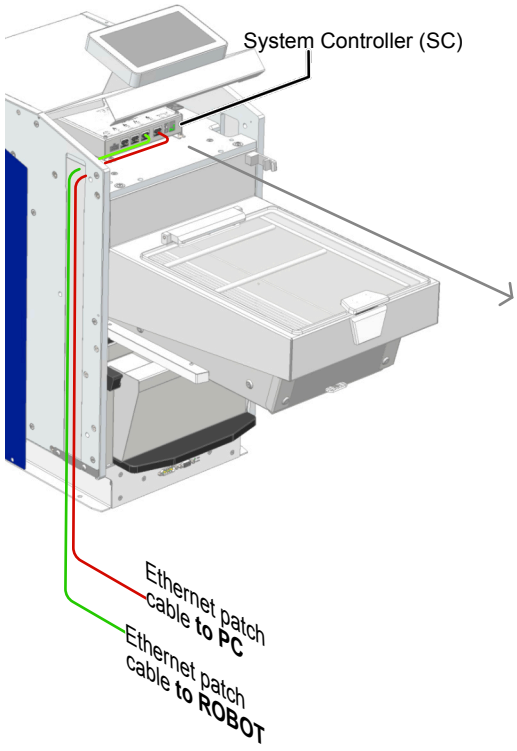


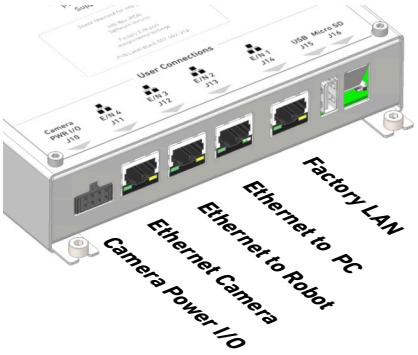
DSub9 Pin #	Signal	Feeder	Wire color
5	Enable	Output	gray
3	GND	-	green
8	Action stop request controlled by cell	Input	red
1	All actions stopped controlled by feeder	Output	white

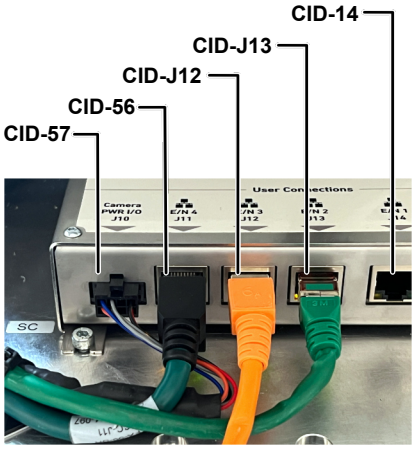
For test purposes you may use the wire clamp provided with the cable to connect the BLACK and GRAY wire of cable Nr. 007-005-749, in order to apply 24V to the enable input.

CAUTION	RISK OF INJURY
⚠	**Applying permanent 24V to the Enable input may only be used during a test phase and by expert users.** **Make sure you connect the enable signal as shown above for the final installation, if that is a requiremenmt of the risk analysis.**

5.6.2 Interfacing Robot, Setup PC, Camera, Facility LAN



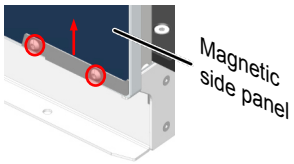




Port SC	CID Schematic	Cable P/N	Cable Label	Function	Scope of supply
J10	**57**	**007-004-488**	FX-57-BJ SC-J10 007-004-488	Camera Power I/0 (24V, Trigger)	✓
J11	**56**	**007-001-097**	**FX-56-BH** **SC-J11** **007-001-097**	**Ethernet SC-to-Camera (Cognex In-Sight)**	✓
J12	**EN3**	007-002-472	-	Ethernet SC-to-Robot	
J13	**EN2**	007-002-472	-	Ethernet SC-to-Setup PC or for remote support	✓
J14	**EN1**	007-002-472		**Facility LAN (optional)**	-
SC stands for System Controller					

How to install the Ethernet patch cables ?

① **Remove the 2 screws and the plate as shown below:**



② **Pull off the magnetic side panel**

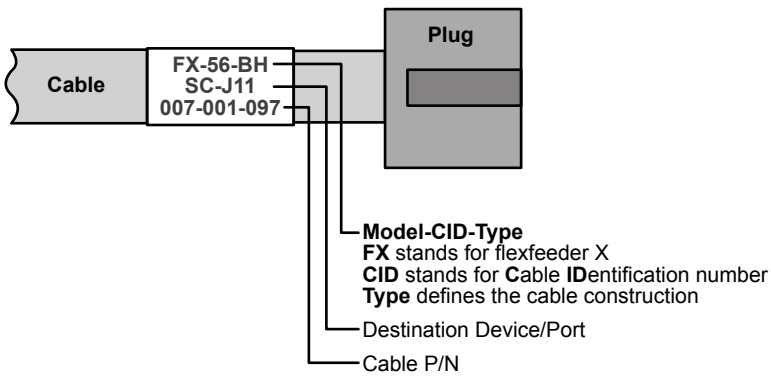
③ **Pull the cable way cover up and out**

④ **Place the patch cables inside the cable way and plug them into the designated port**

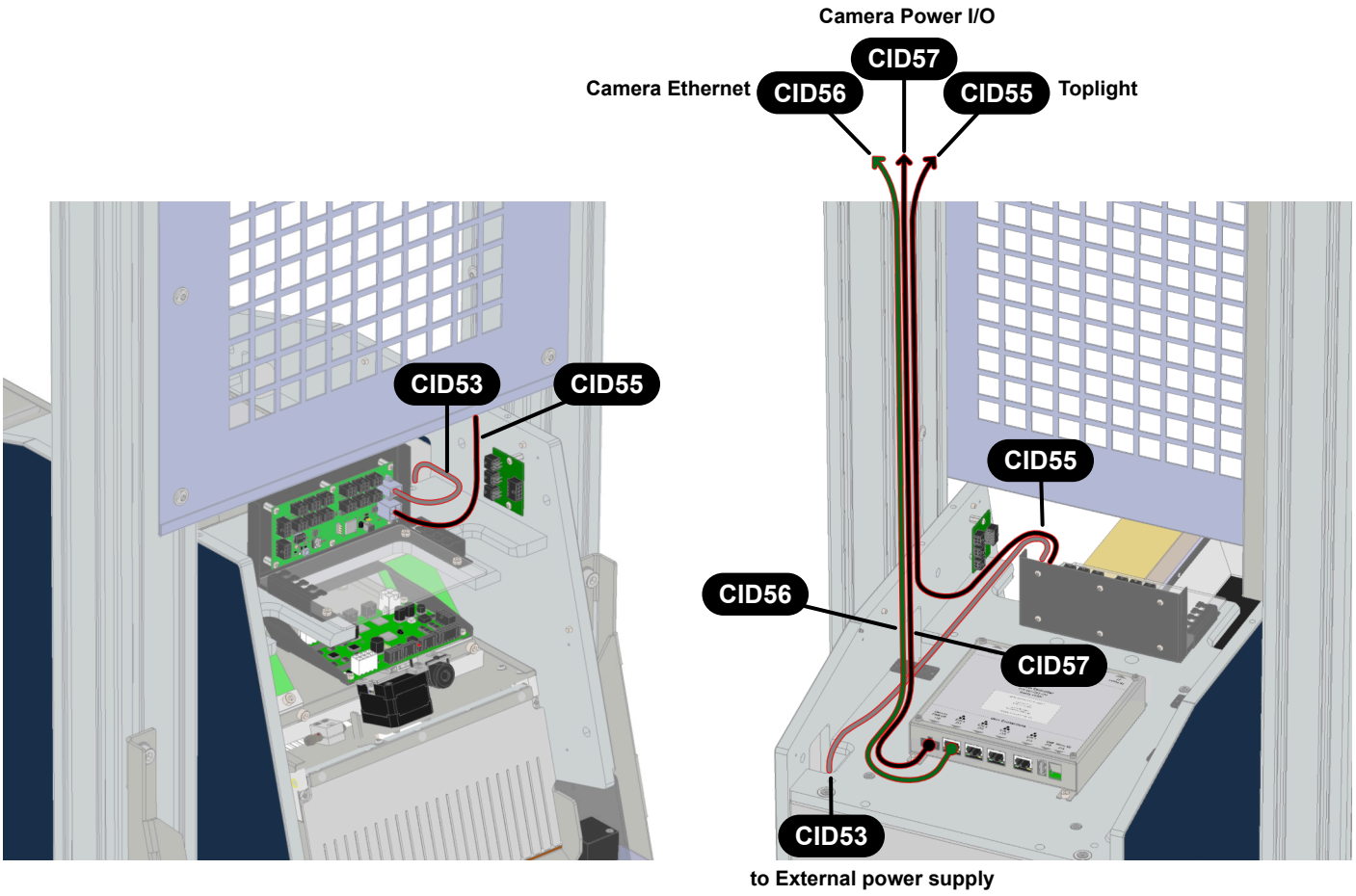
⑤ **Insert the cable way cover from the top and push it all the way down to secure the cables**

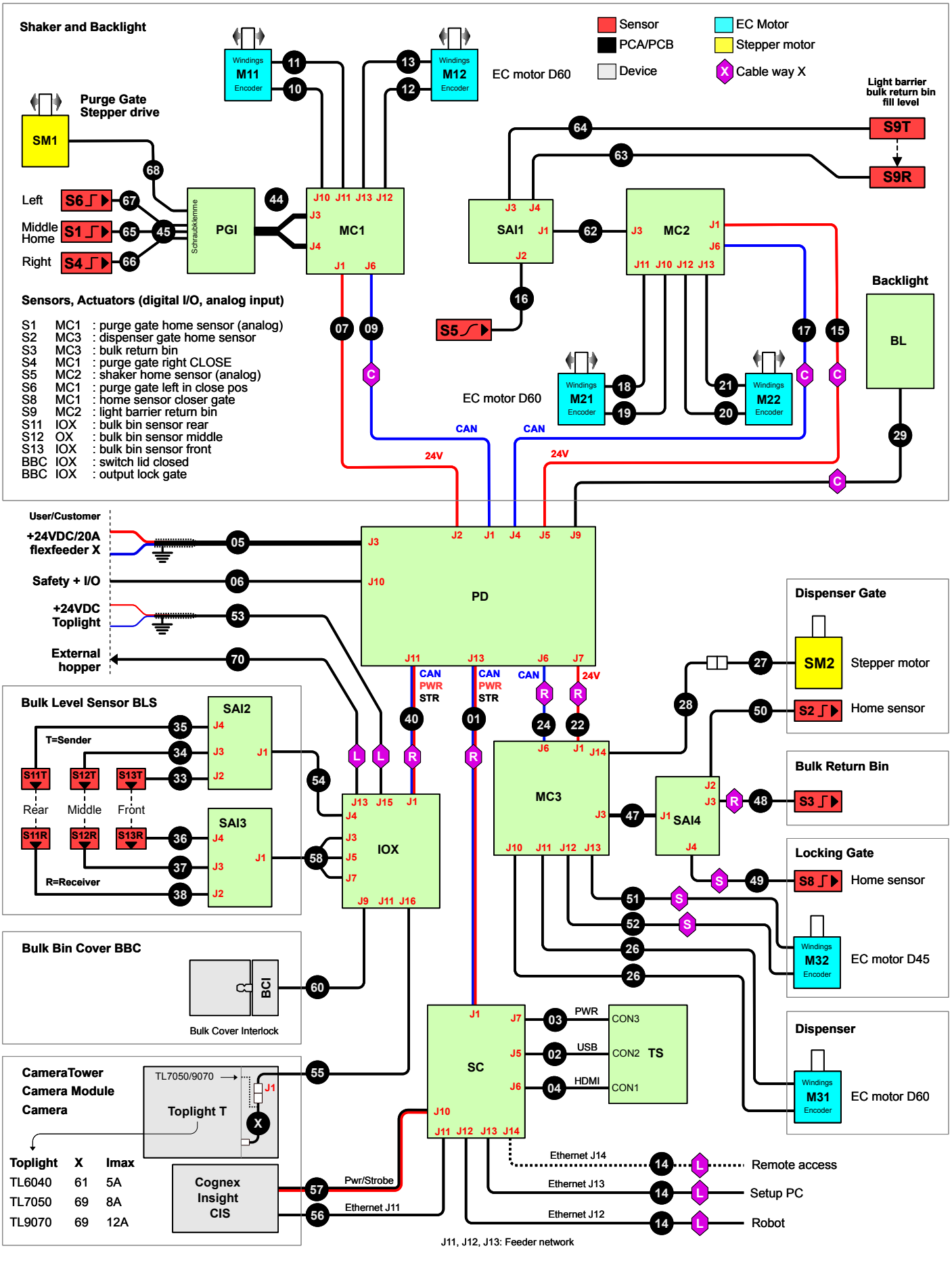
⑥ **Install the magnetic side panel and secure it again.**

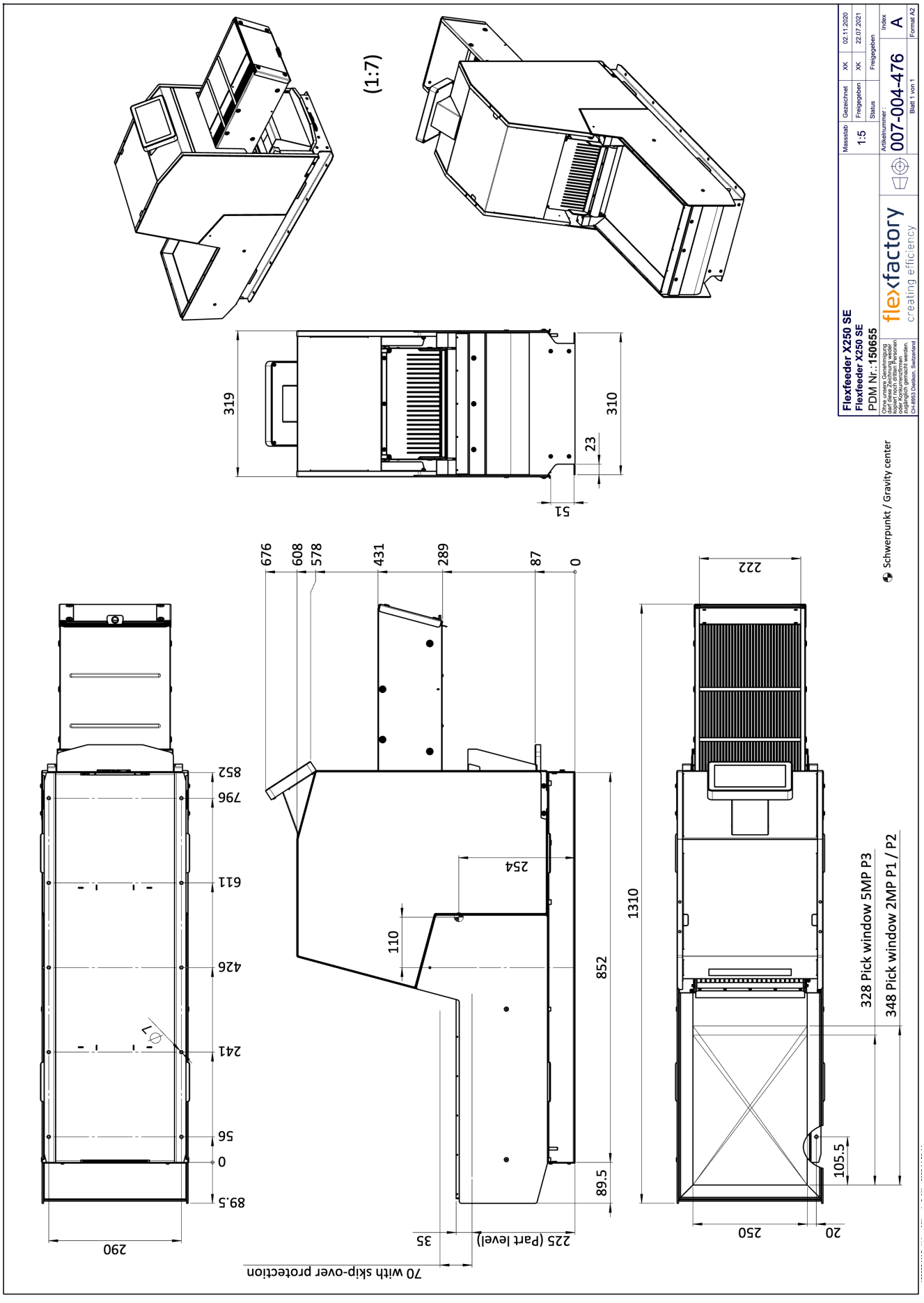
Labeling of cables in the flexfeeder X:



5.6.3 Connecting camera tower cables with the feeder controls




Shaker and Backlight
Sensor
PCA/PCB
Device
EC Motor
Stepper motor
Cable way X
Windings M11 Encoder
Windings M12 Encoder
EC motor D60
Purge Gate Stepper drive
SM1
Left S6
Middle Home S1
Right S4
Schraubklemme
PGI
MC1
SAI1
MC2
Light barrier bulk return bin fill level
S9T
S9R
Backlight
BL
S5
Windings M21 Encoder
Windings M22 Encoder
EC motor D60
CAN
24V
Sensors, Actuators (digital I/O, analog input)
S1 MC1 : purge gate home sensor (analog)
S2 MC3 : dispenser gate home sensor
S3 MC3 : bulk return bin
S4 MC1 : purge gate right CLOSE
S5 MC2 : shaker home sensor (analog)
S6 MC1 : purge gate left in close pos
S8 MC1 : home sensor closer gate
S9 MC2 : light barrier return bin
S11 IOX : bulk bin sensor rear
S12 OX : bulk bin sensor middle
S13 IOX : bulk bin sensor front
BBC IOX : switch lid closed
BBC IOX : output lock gate
User/Customer
+24VDC/20A flexfeeder X
Safety + I/O
+24VDC Toplight
External hopper
PD
Dispenser Gate
SM2
Stepper motor
S2
Home sensor
Bulk Return Bin
S3
Bulk Level Sensor BLS
SAI2
SAI3
T=Sender
Rear
Middle
Front
R=Receiver
S11T
S12T
S13T
S11R
S12R
S13R
IOX
MC3
SAI4
Locking Gate
S8
Home sensor
Windings M32 Encoder
EC motor D45
Bulk Cover Bulk Cover Interlock
BCI
Dispenser
Windings M31 Encoder
EC motor D60
CameraTower
Camera Module
Camera
TL7050/9070
Toplight T
Toplight X Imax
TL6040 61 5A
TL7050 69 8A
TL9070 69 12A
Cognex Insight CIS
SC
PWR
USB
HDMI
CON3
CON2 TS
CON1
Pwr/Strobe
Ethernet J11
Ethernet J14
Ethernet J13
Ethernet J12
Remote access
Setup PC
Robot
J11, J12, J13: Feeder network


(1:7)
319
310
23
51
676
608
578
431
289
87
0
254
110
852
89.5
225 (Part level)
35
70 with skip-over protection
290
852
796
611
426
241
56
0
89.5
222
1310
105.5
250
20
328 Pick window 5MP P3
348 Pick window 2MP P1 / P2
Schwerpunkt / Gravity center
Flexfeeder X250 SE
Flexfeeder X250 SE
PDM Nr.:150655
Massstab 1:5
Gezeichnet XK 02.11.2020
Freigegeben XK 22.07.2021
Status Freigegeben
Artikelnummer: 007-004-476
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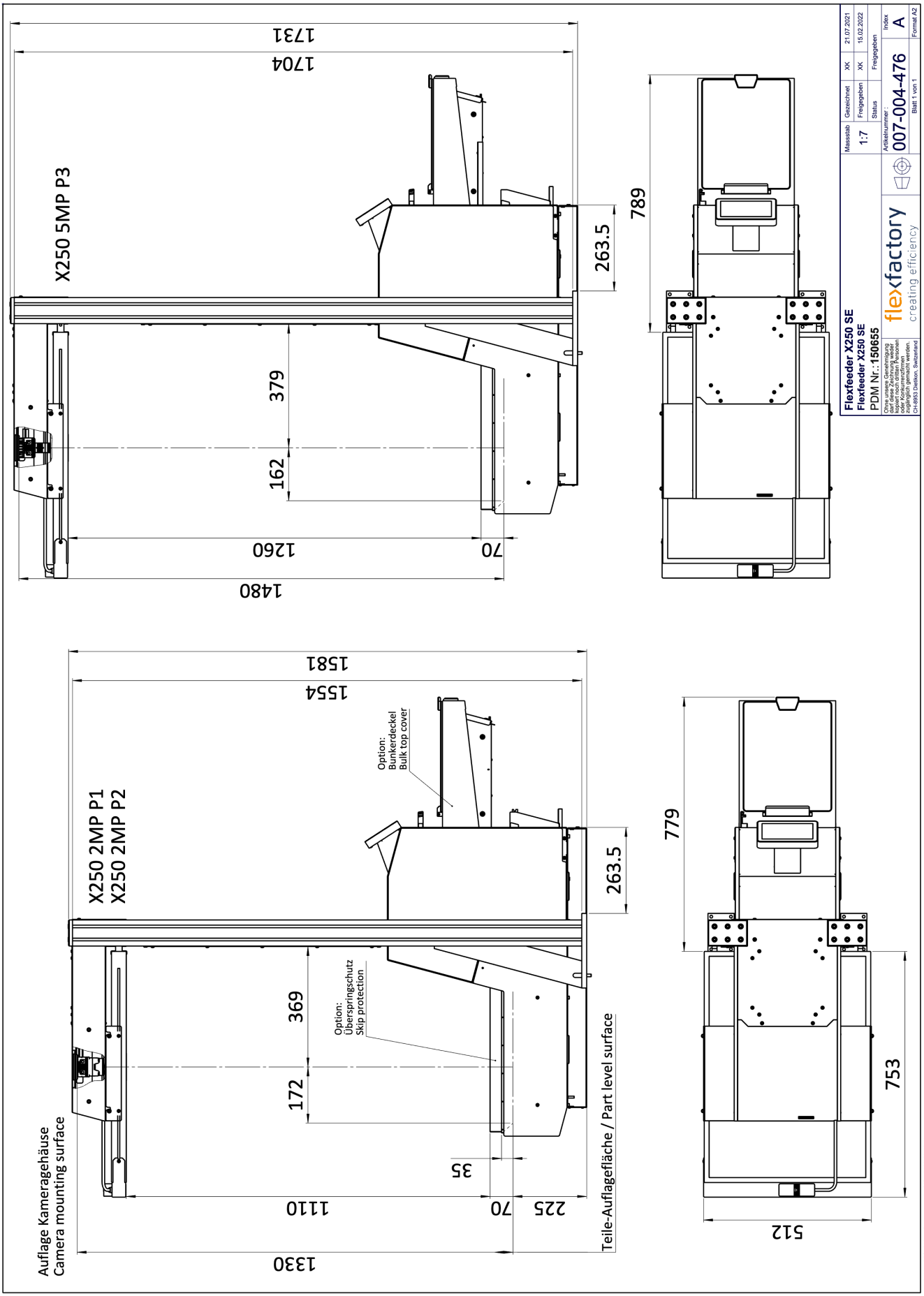
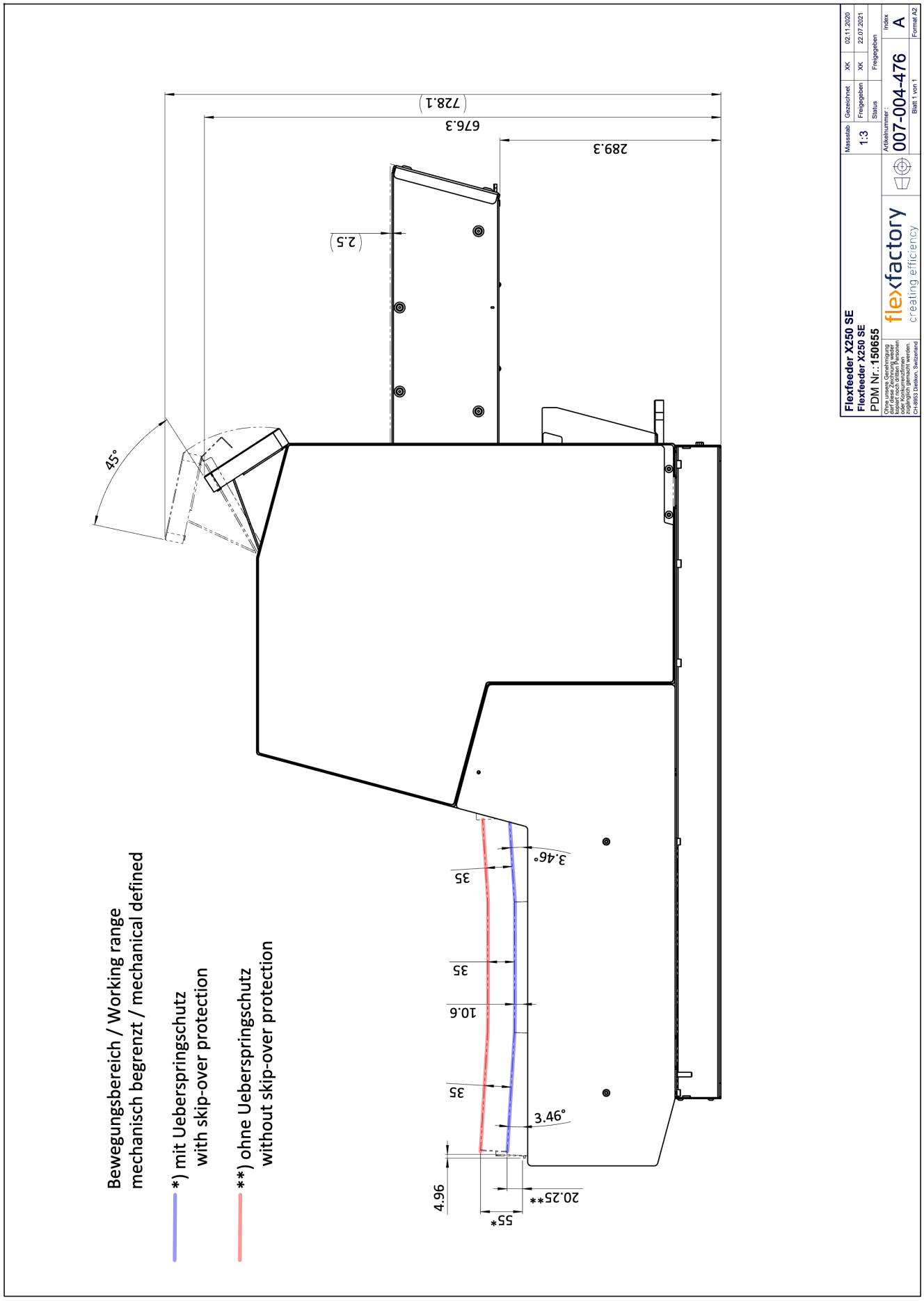
creating efficiency

I Appendix A2 I Dimensions flexfeed X250 with tower




Bewegungsbereich / Working range
mechanisch begrenzt / mechanical defined
*) mit Ueberspringschutz
with skip-over protection
**) ohne Ueberspringschutz
without skip-over protection
728.1
676.3
289.3
2.5
45°
3.46°
35
35
10.6
35
3.46°
4.96
55*
20.25**
Flexfeeder X250 SE
Flexfeeder X250 SE
PDM Nr.: 150655
Massstab
1:3
Gezeichnet
XK
02.11.2020
Freigegeben
XK
22.07.2021
Status
Freigegeben
Artikelnummer:
007-004-476
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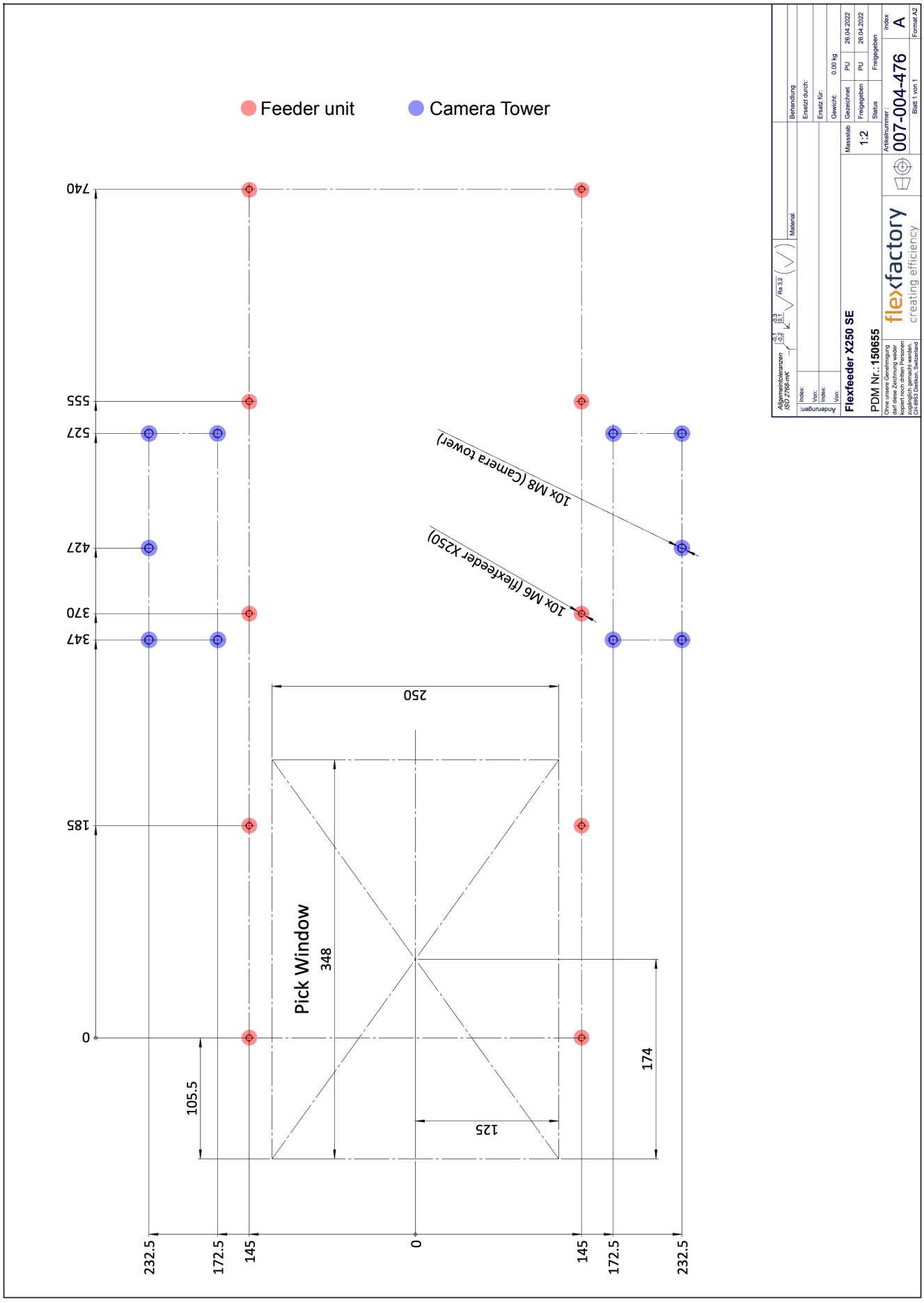
Feeder unit
Camera Tower
740
555
527
427
370
347
185
0
232.5
172.5
145
0
145
172.5
232.5
250
Pick Window
348
125
174
105.5
10x M8 (Camera tower)
10x M6 (flexfeeder X250)
Flexfeeder X250 SE
PDM Nr.: 150655
007-004-476
flexfactory
creating efficiency

I Appendix I Manual Revision History

A released preliminary	Initial version for a Swedish Customer This version was sent to customer as revison Rev. 2.3 Replaced 2.3 in the source file name to A	Dec 2022	FB
B unreleased	Replaced E-Schematics with the latest Rev. B Assigned a P/N 700-000-002 to the document, which is shown on the front page Open ToDos: Replace pictures with obsolete bulk bin cover Add product specifications and equivalent german sections in english Check all information about toplights including cables	Jan 2023	FB