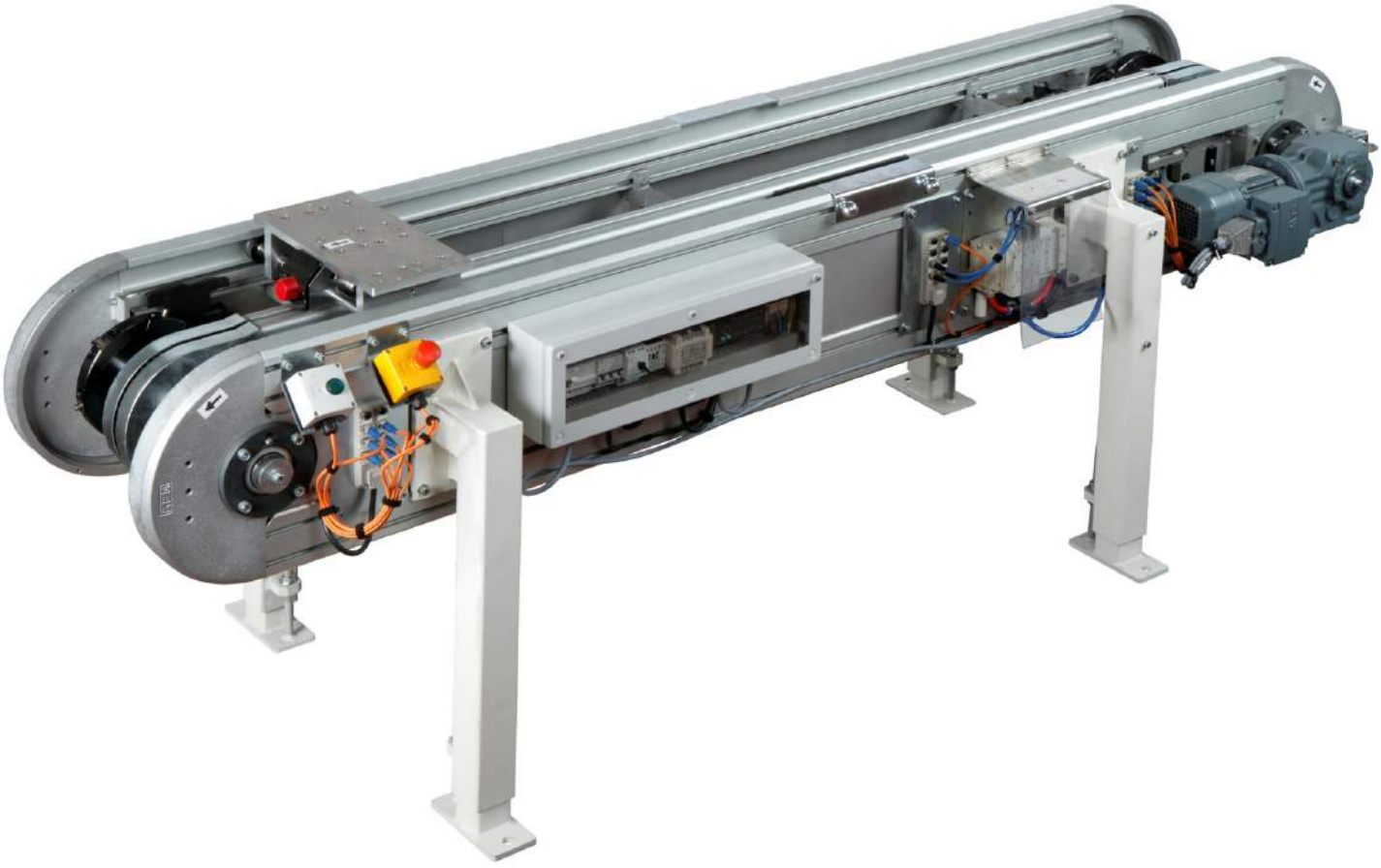
Dynamic Fluid Products Inc.

TUNKERS-MASTECH
Motion in Automation.

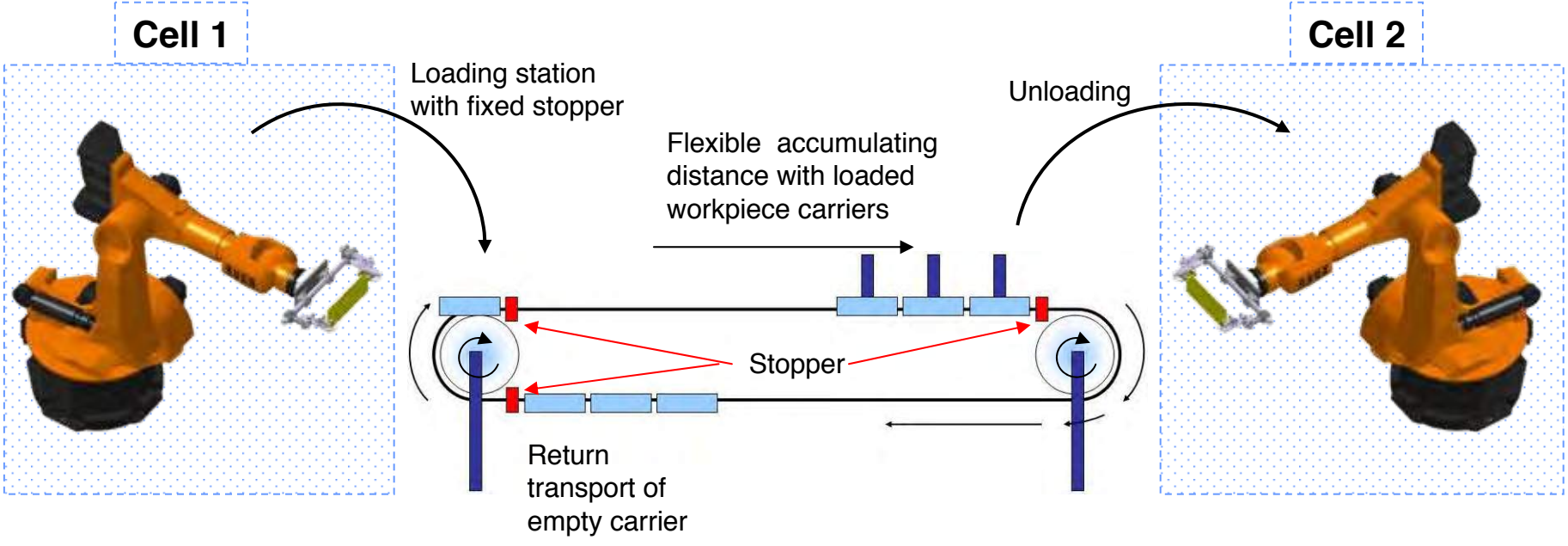
Tunkers Accumulating Conveyor Catalogue



EFS Pallet Accumulating Chain Conveyor

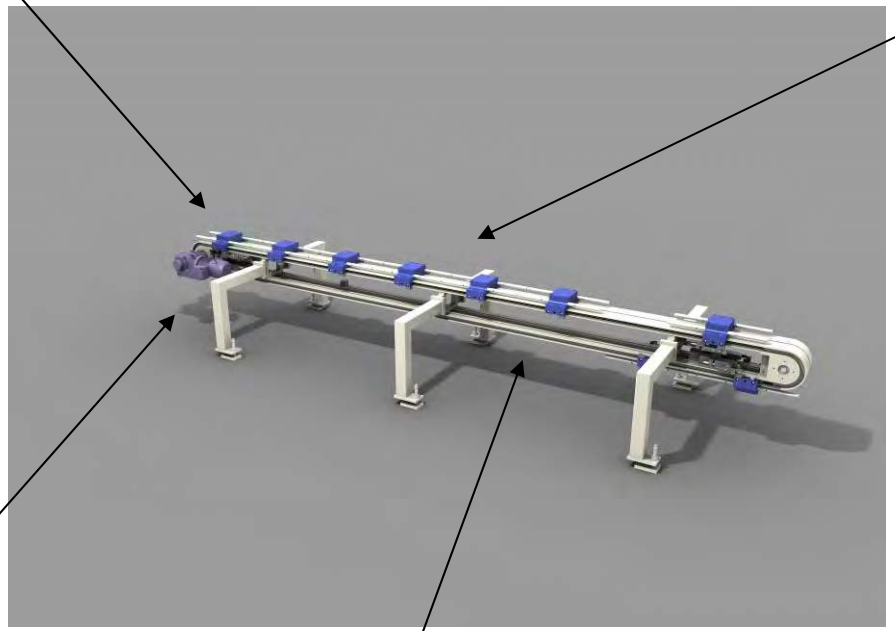
Task:
Transportation of workpieces in production lines between two work stations and accumulation of the workpieces on the transport route **independent of indexing time**.

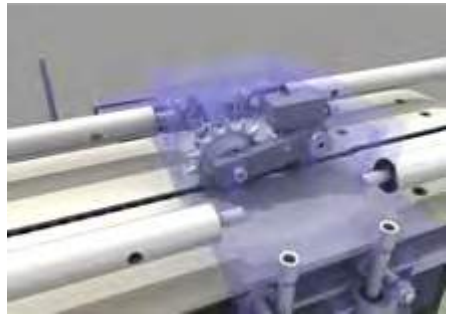
Functional principle:



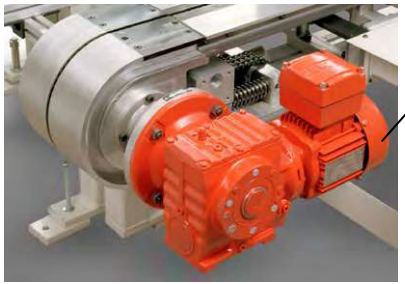
Cycle-time independent!
Loading of cell 1 and unloading from cell 2 independent of the respective production cycle.

Pneumatic stopper / isolator for carrier positioning





Carriers with patented friction unit and guide rollers



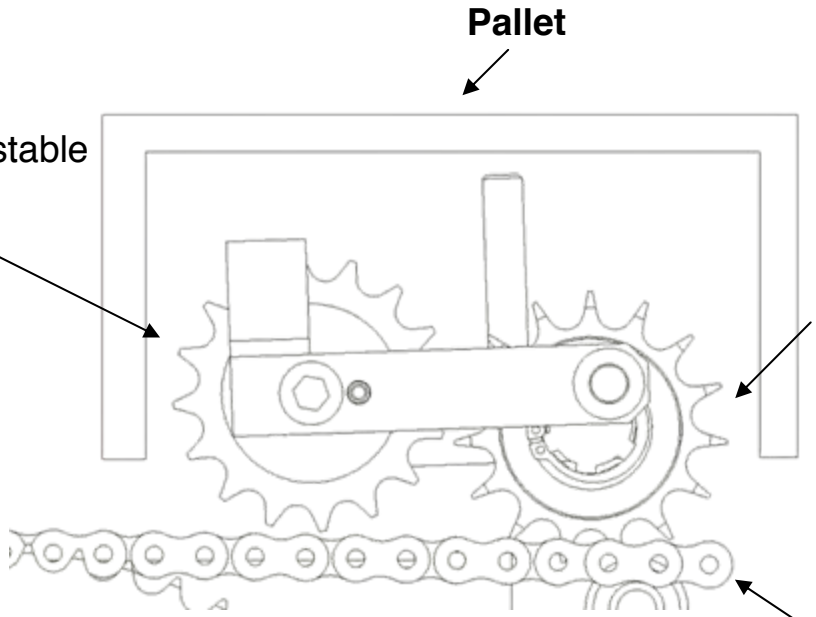
Drive and baffle units with geared motor, shafts and sprocket wheels safely protected by full cover

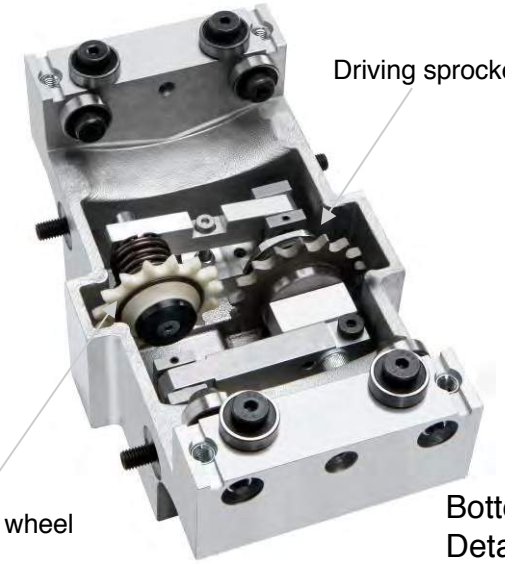
Supporting frame with horizontal guide profiles, cross and base supporting elements

Detail: Operating head and chain adjuster

- The fixed driving pin is replaced by a driving friction sprocket
- The driving sprocket is functionless on the level transport path and is located above the chain. The accumulating function is ensured by the first functional wheel

Driving sprocket
active only for baffling;
clutch is steplessly adjustable
via brake discs

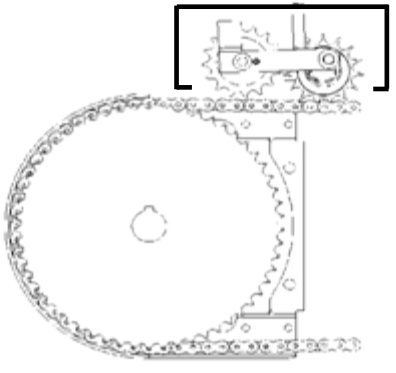




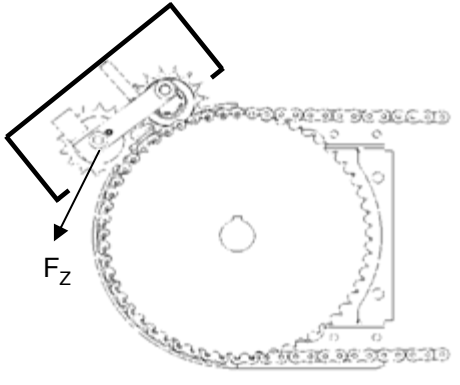
Bottom view of the pallet
Detail: dual friction

- Along the path of redirection, the driving sprocket engages with the chain and conveys the empty pallet from the top to the bottom and vice versa
- The force of the driving sprocket can be adjusted via the friction discs in such a way that the weight of the pallet is just compensated for, and simultaneously ensures safe conveyance
- The pallet can be stopped by hand in any position during directional change
  ⇨ Operator protection

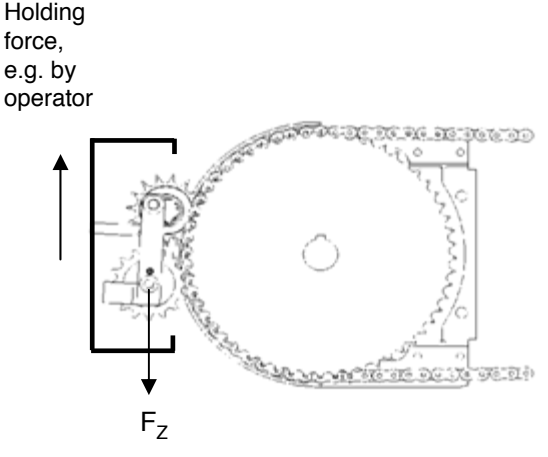
On level transport path: Driving sprocket above the chain



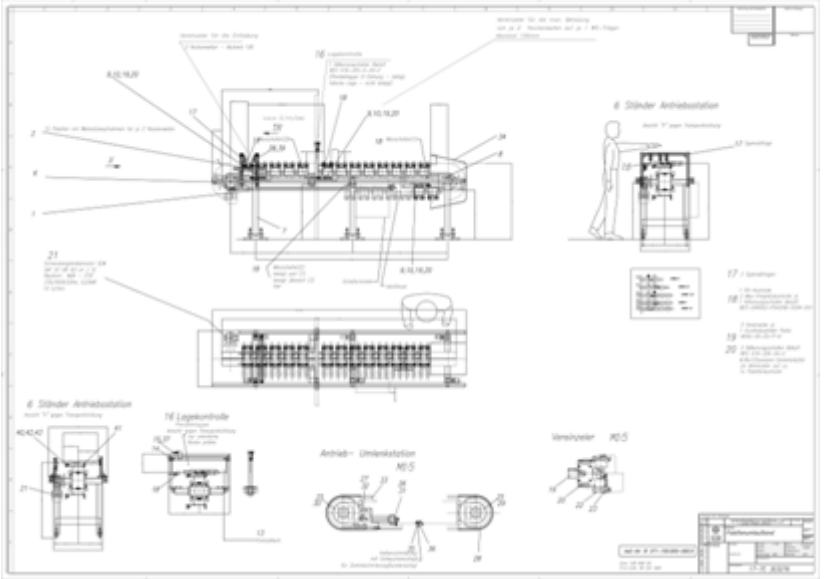
When turning: Driving sprocket engages with the chain and conveys the pallet; based on tractive force F_Z set via the clutch



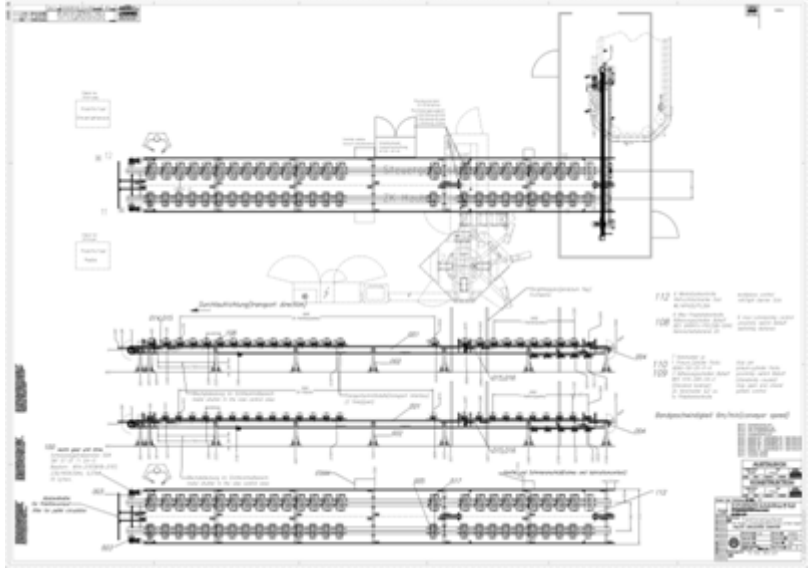
In reversion: The pallet can be **manually stopped** in any position!

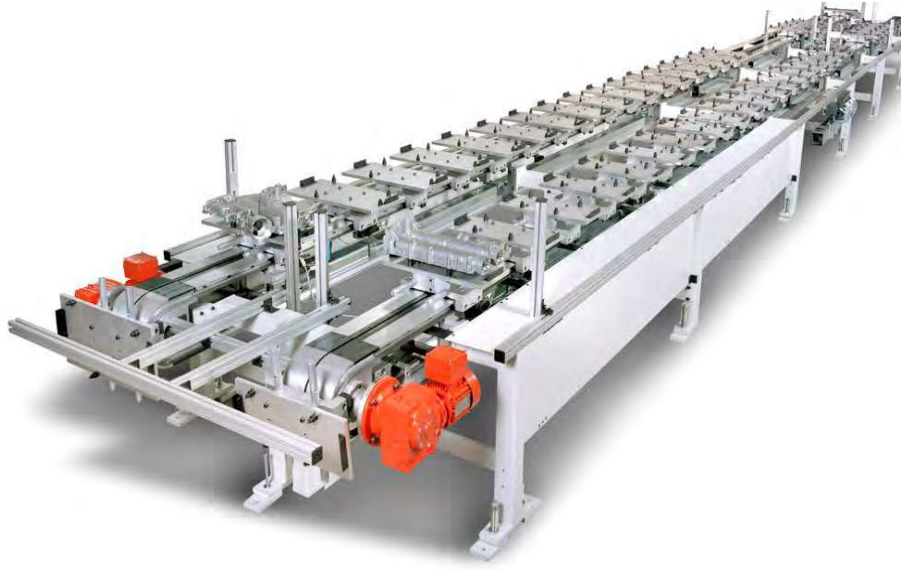


- Single-strand belt
- Component: crankshaft
- Customer: AuE
- Site: VW Salzgitter

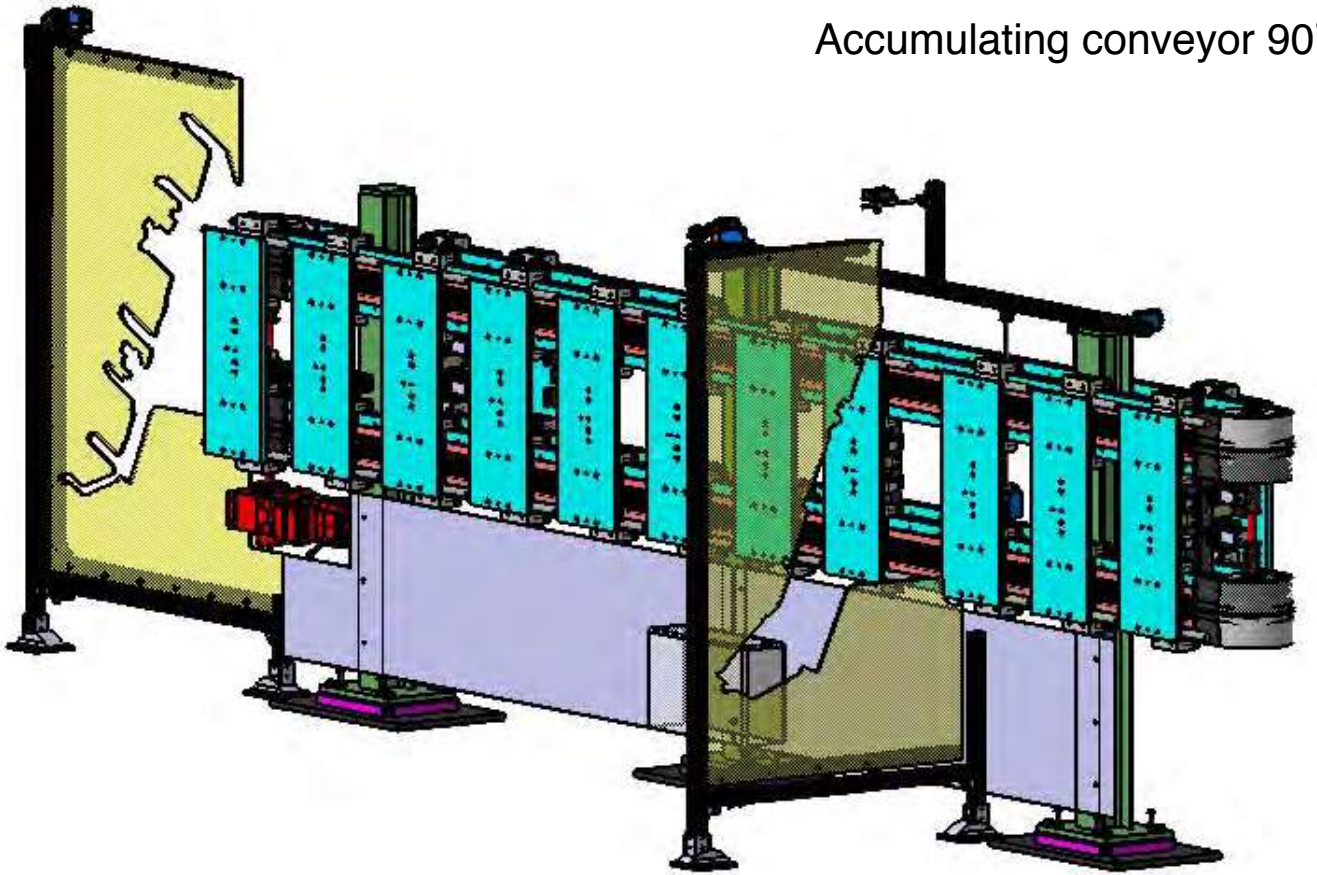


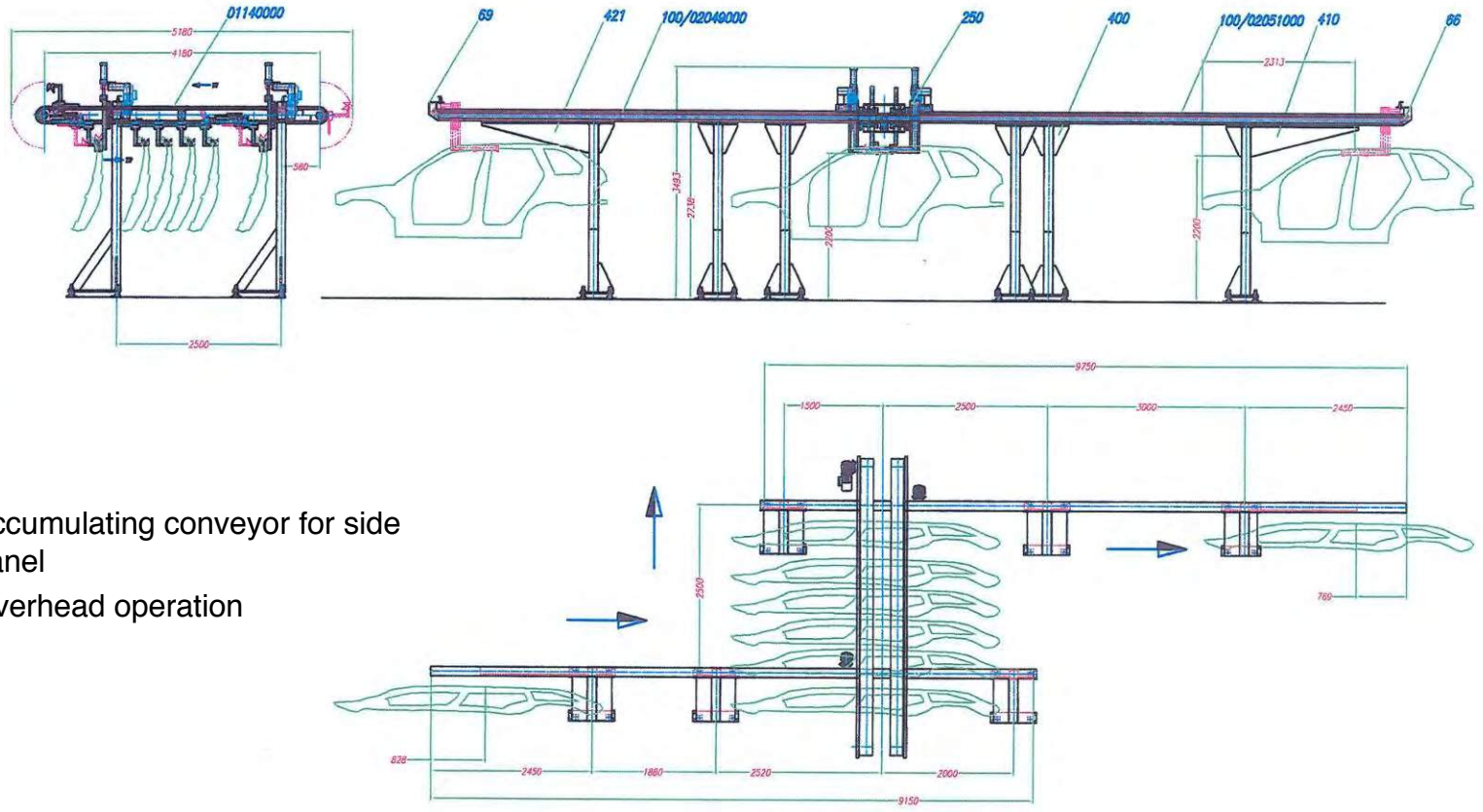
- Dual-strand belt
- Accumulating conveyor for cylinder head
- Customer: Claas
- Site: VW Shanghai





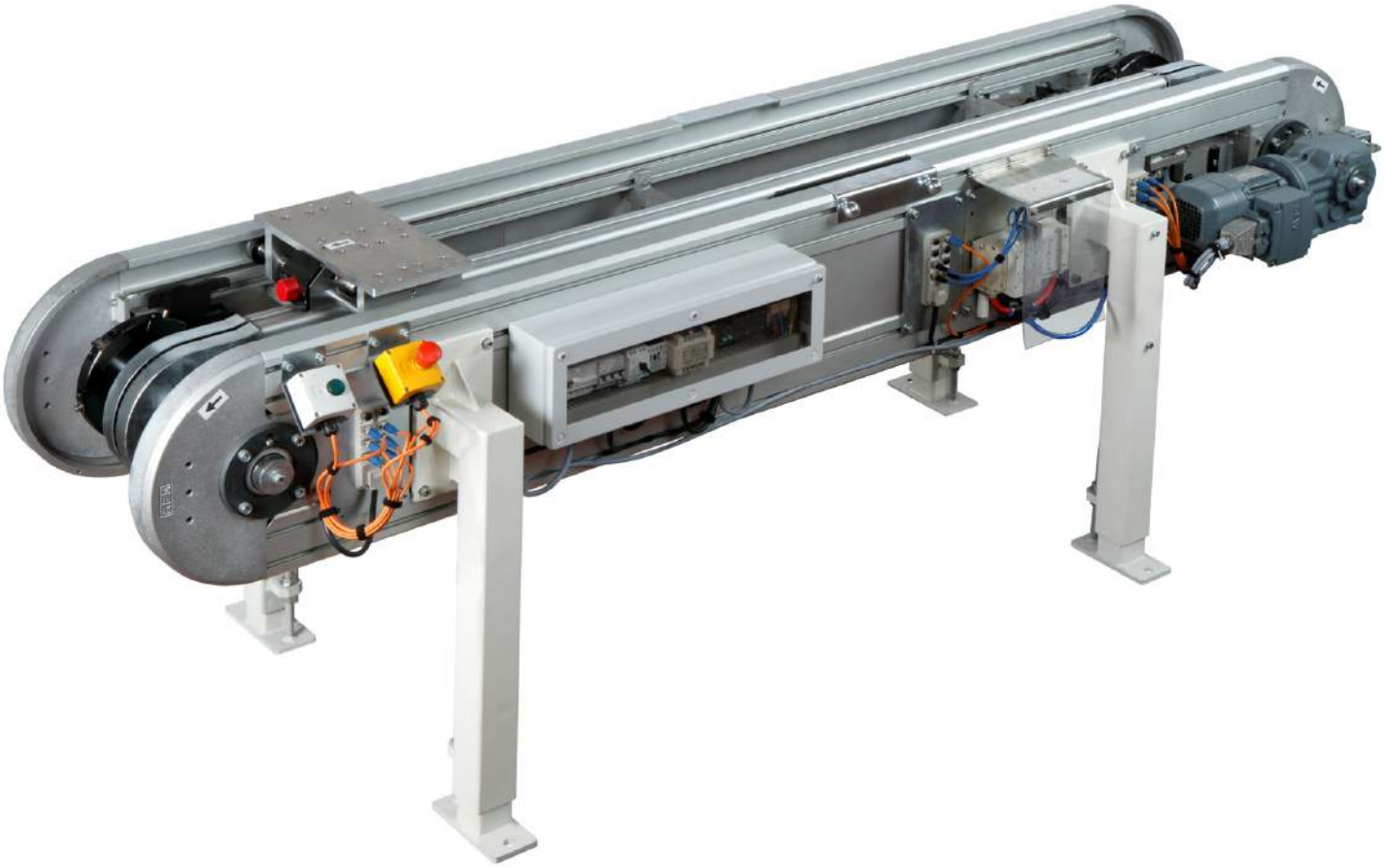
Accumulating conveyor 90° design

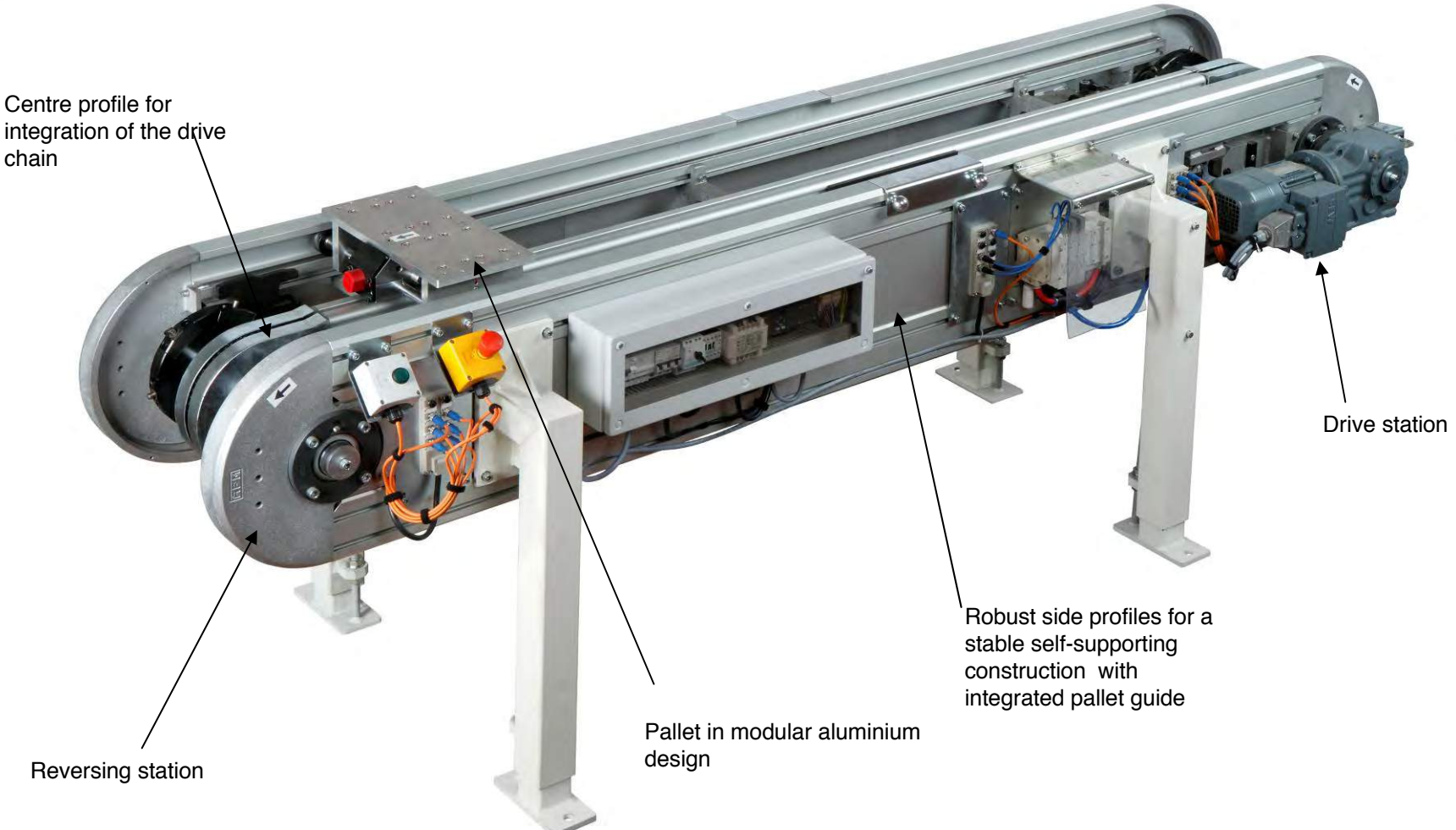


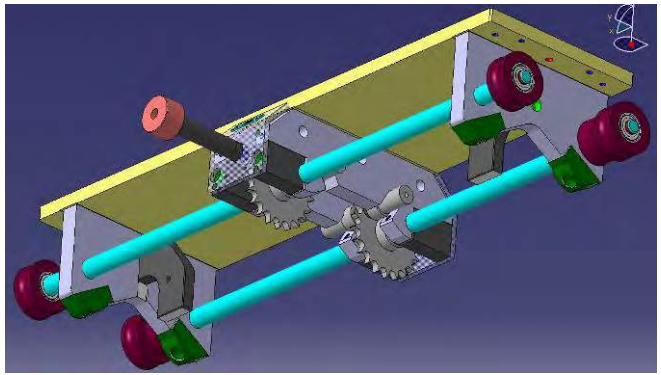


- Accumulating conveyor for side panel
- Overhead operation

AFS Pallet Accumulating Chain Conveyor



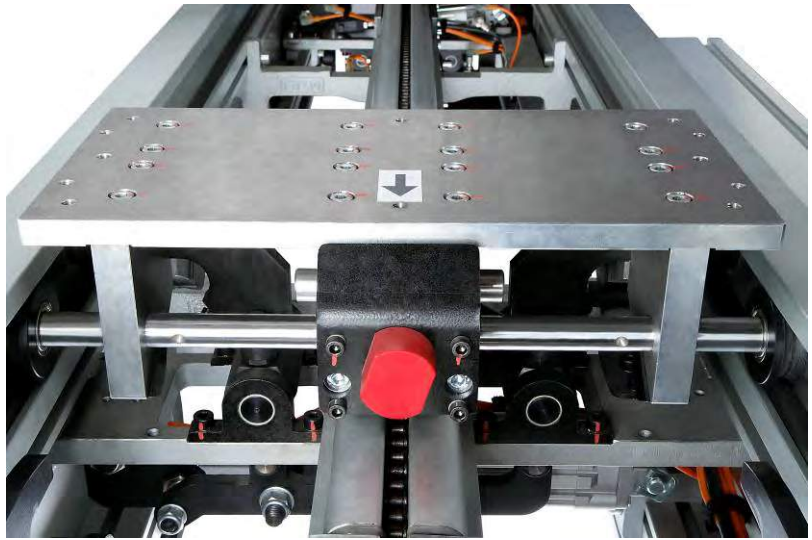

Centre profile for integration of the drive chain
Drive station
Robust side profiles for a stable self-supporting construction with integrated pallet guide
Pallet in modular aluminium design
Reversing station



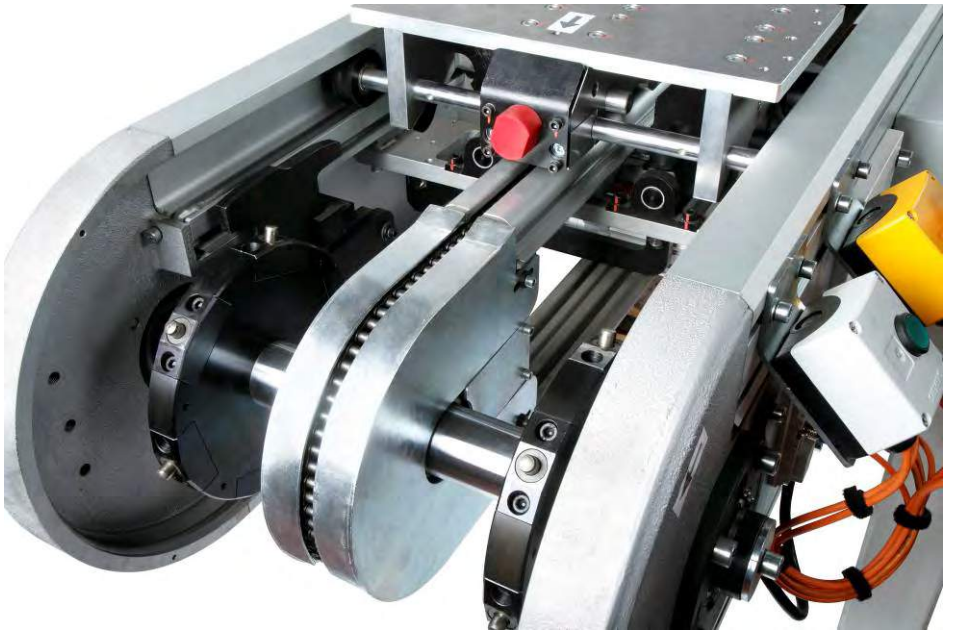
Dual friction sprocket

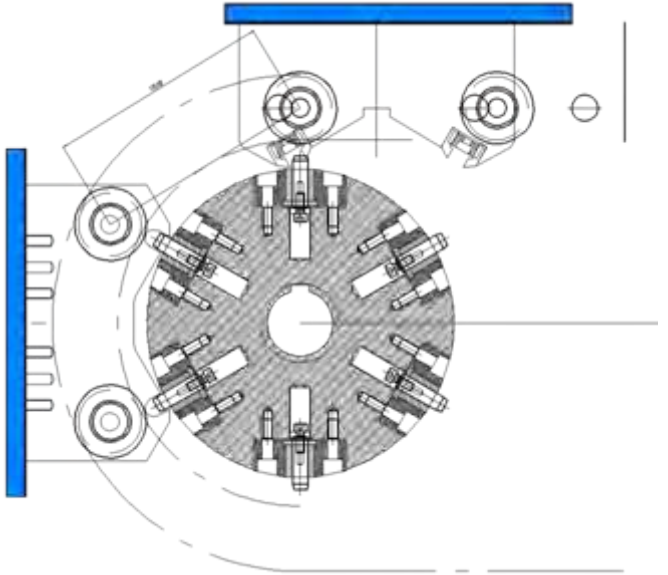
Plastic roller with concave running surface

Steel tube guide rail flush-mounted into the profile

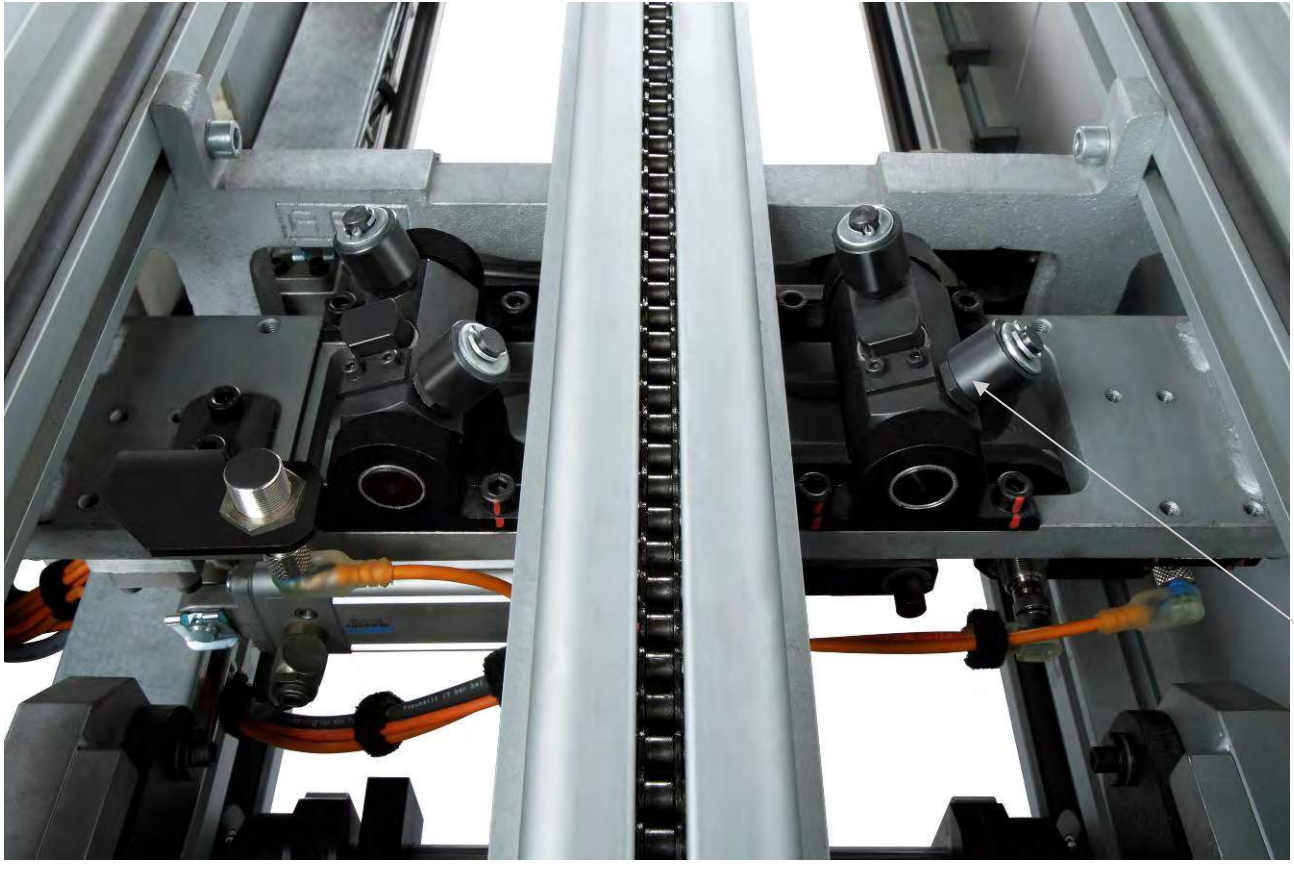


- Through spring-supported pins, the pallet is conveyed by the driving sprocket and changes direction with positive fit



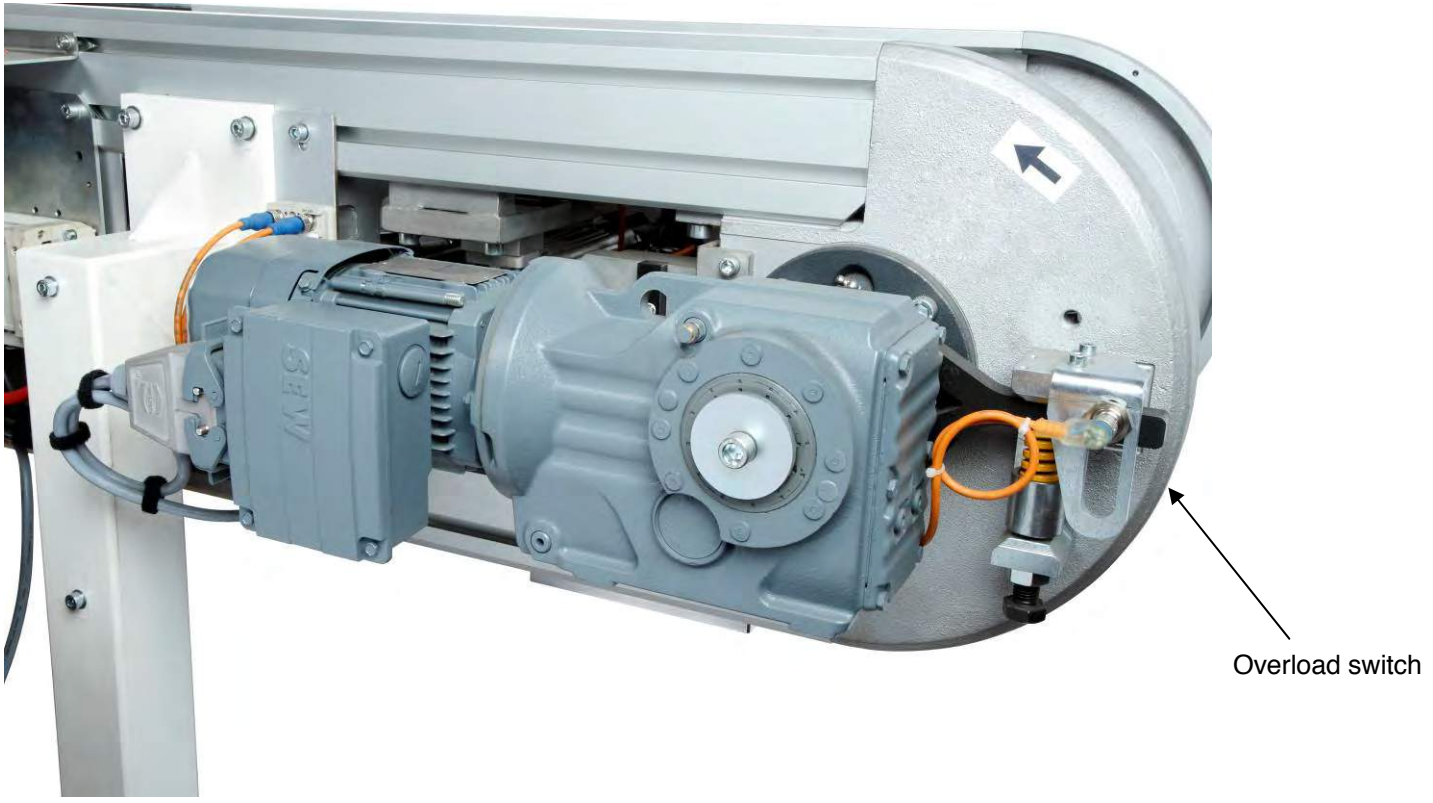


- Situation of pallet shortly before it engages into the driving sprocket

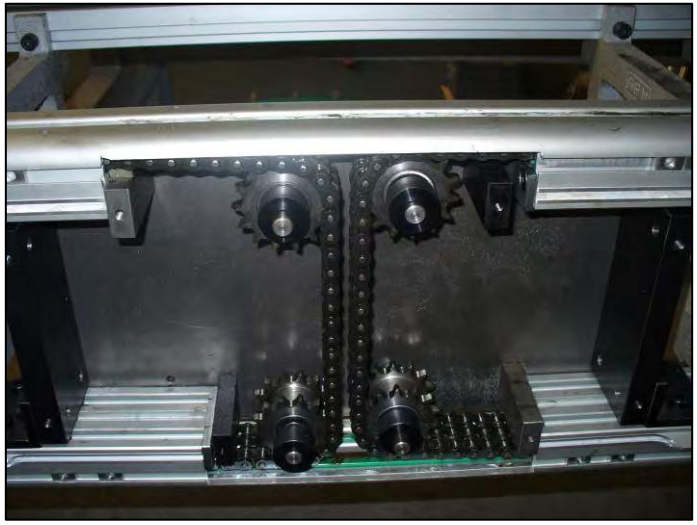


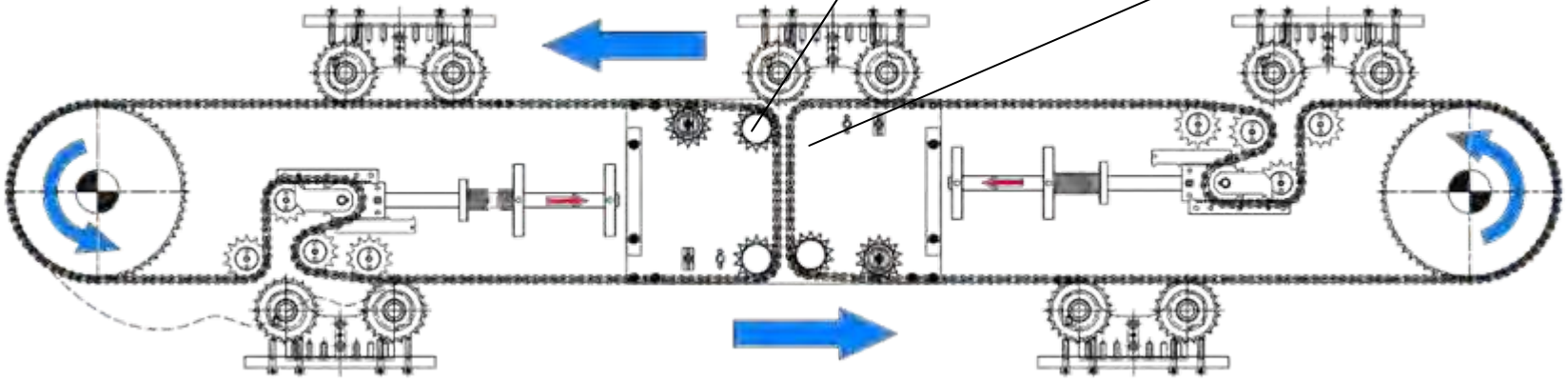
Synchronised rockers
with one stopping and
one isolating roller each

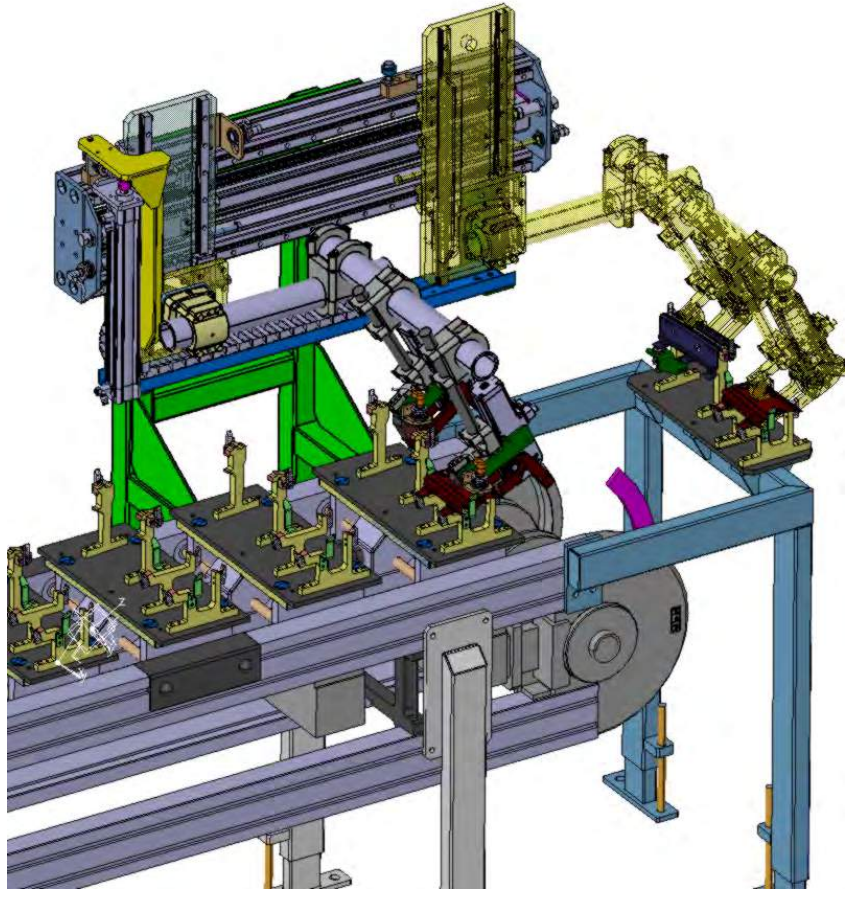
- If the predefined load torque is exceeded, e.g. due to pallet crash etc., the drive unit is switched off

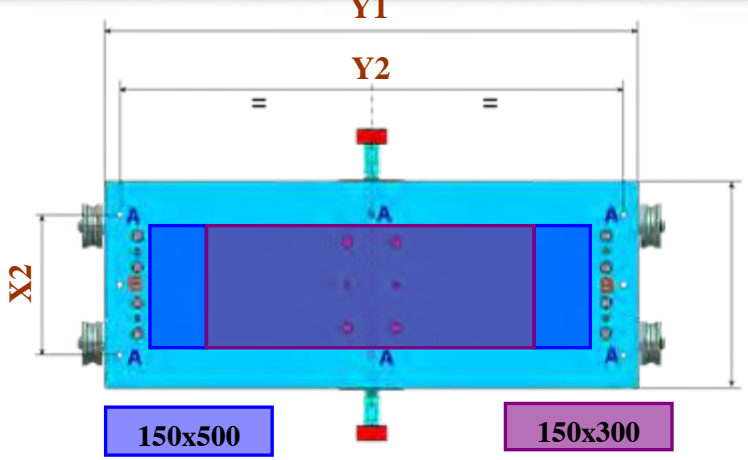


- Connection of individual segments through synchronous operation





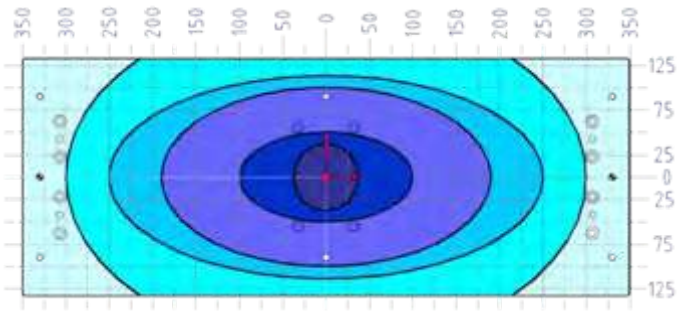


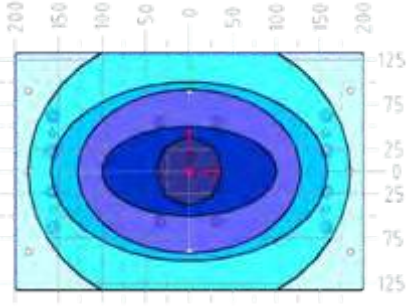


	PALLET WIDTH [mm]	
Y1	700	400
Y2	660±0.05	370±0.05
X1	265	265
X2	180±0.2	180±0.2
A	(x6)M8	(x6)M8
B	(x2)Ø8H7	(x2)Ø8H7

1.2 - Weight: workpiece + workpiece carrier

As to conveyance, we have to consider the following graphic illustrations for the distribution of the centre of gravity in relation to the sum of the weights **(P1+P2)**:

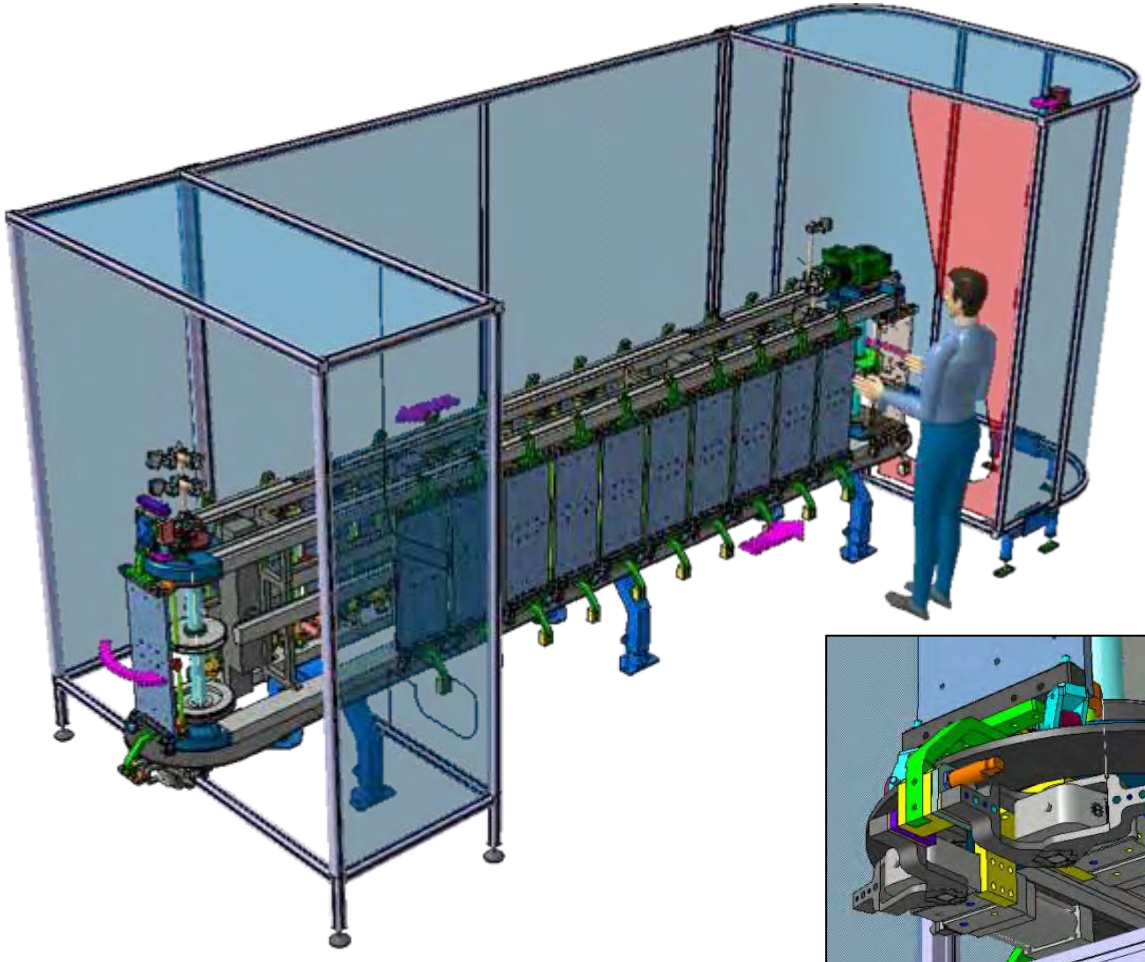


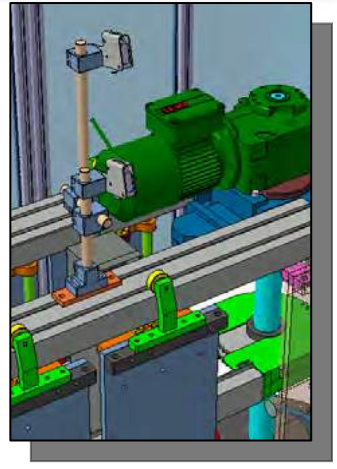


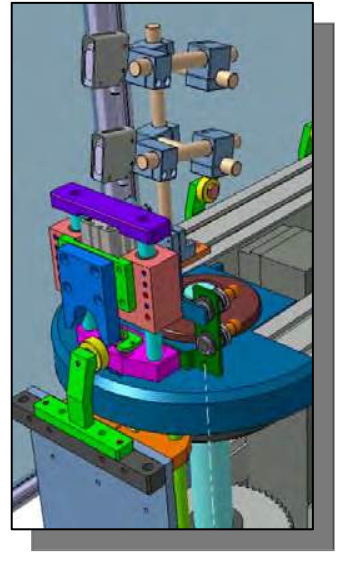
100 Kg
50 Kg
90 Kg
30 Kg
75 Kg
10 Kg

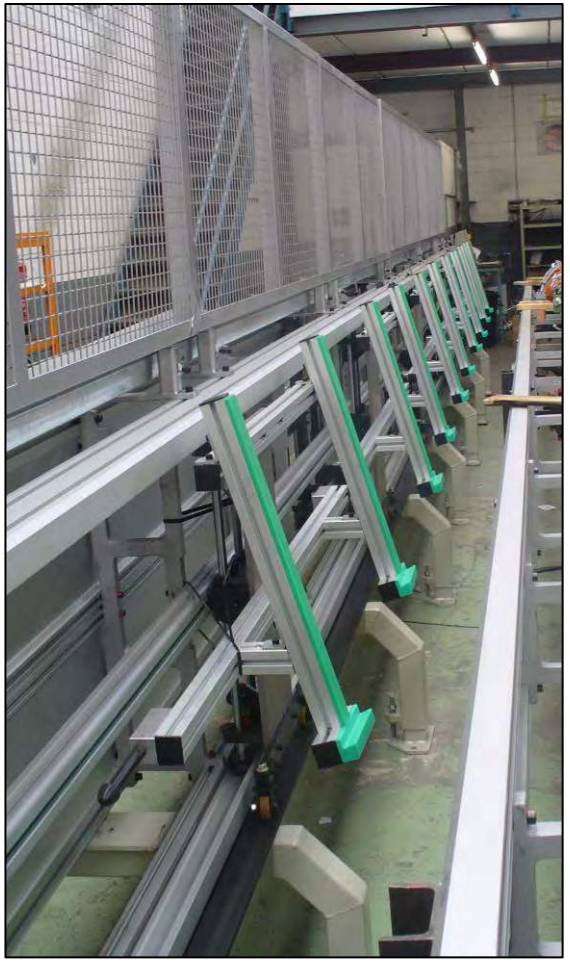
Mass centre of gravity of the empty tool (*P1*)
Centre of the workpiece to be transported (*P2*)

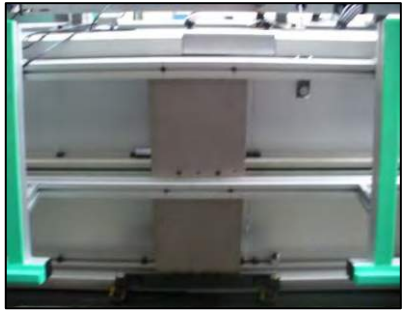

TUFFAK
TUFFAK

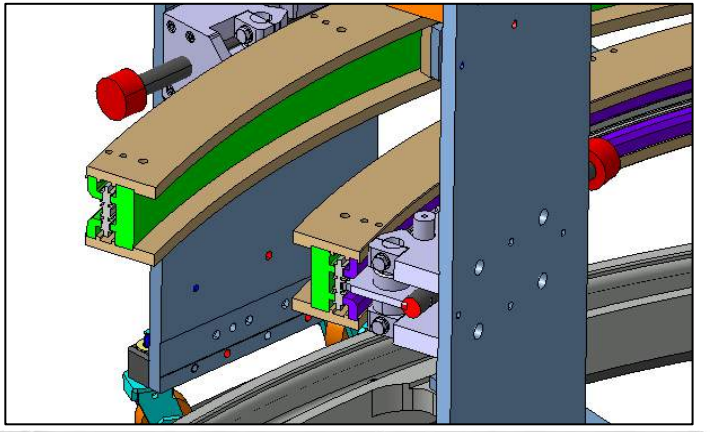


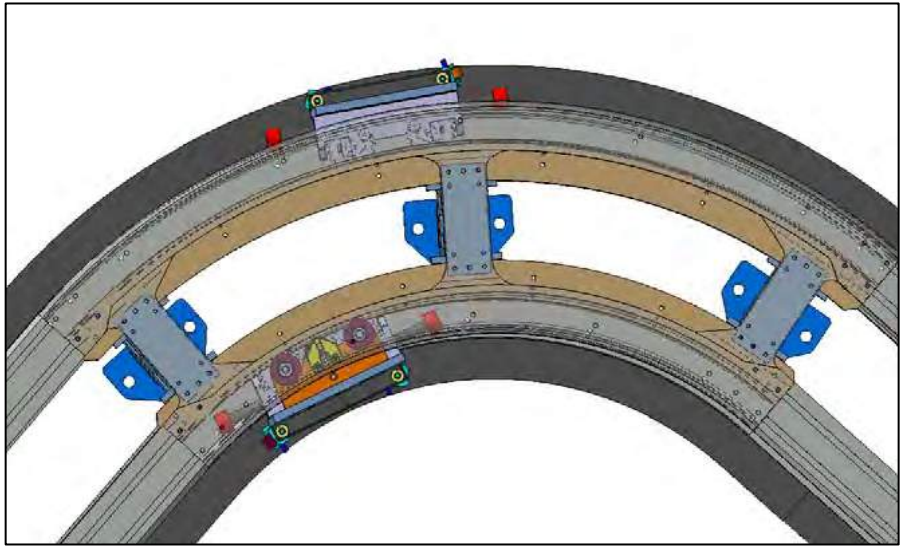


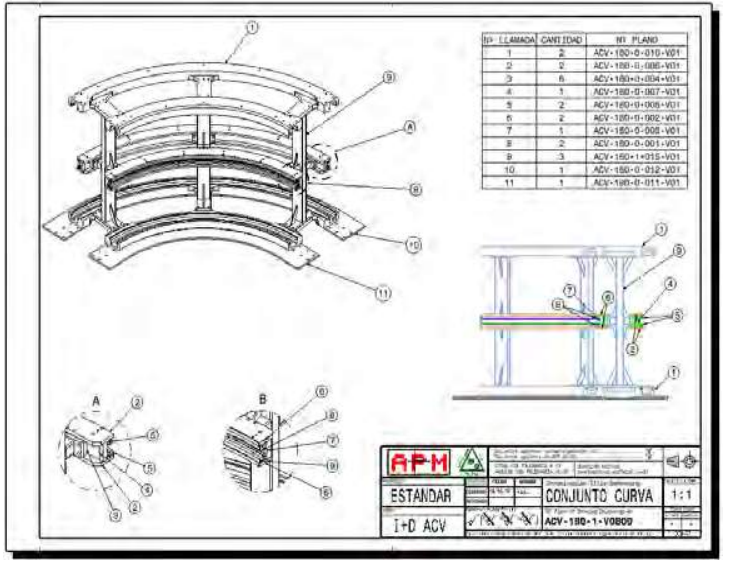




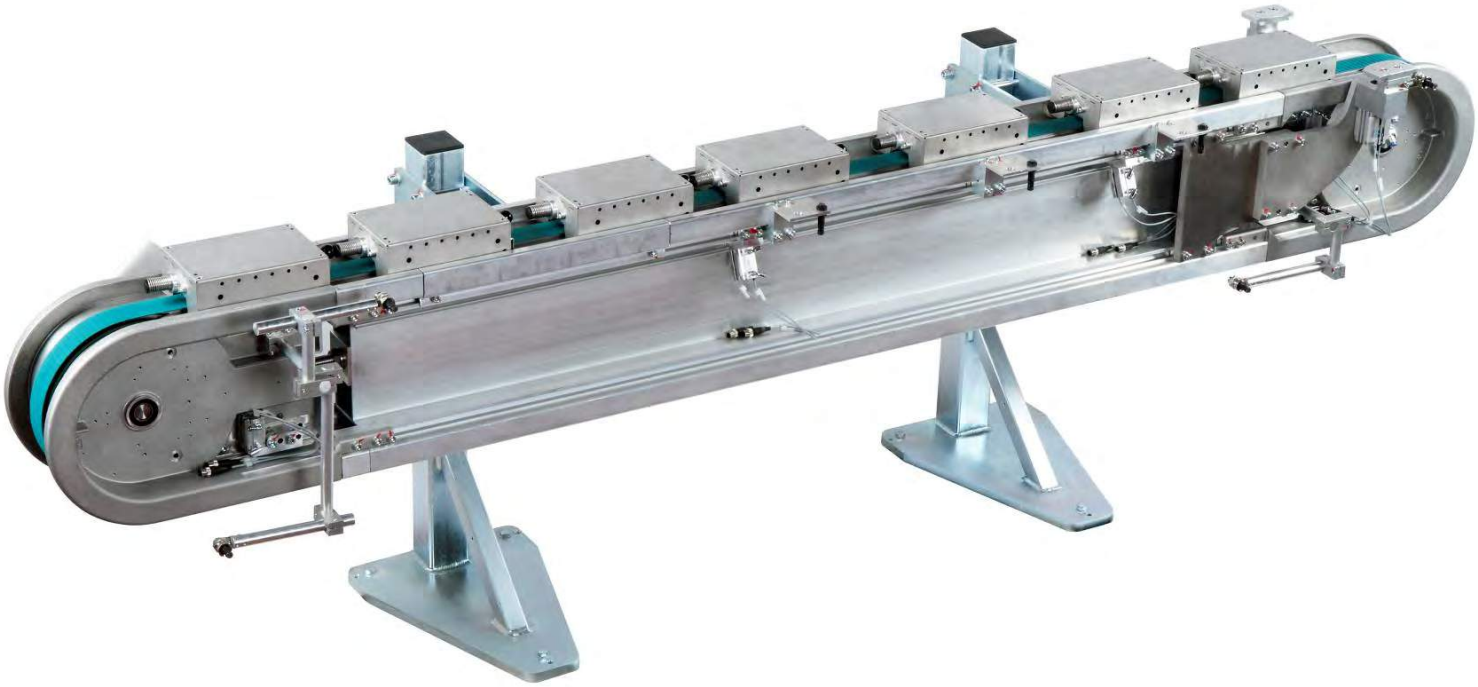




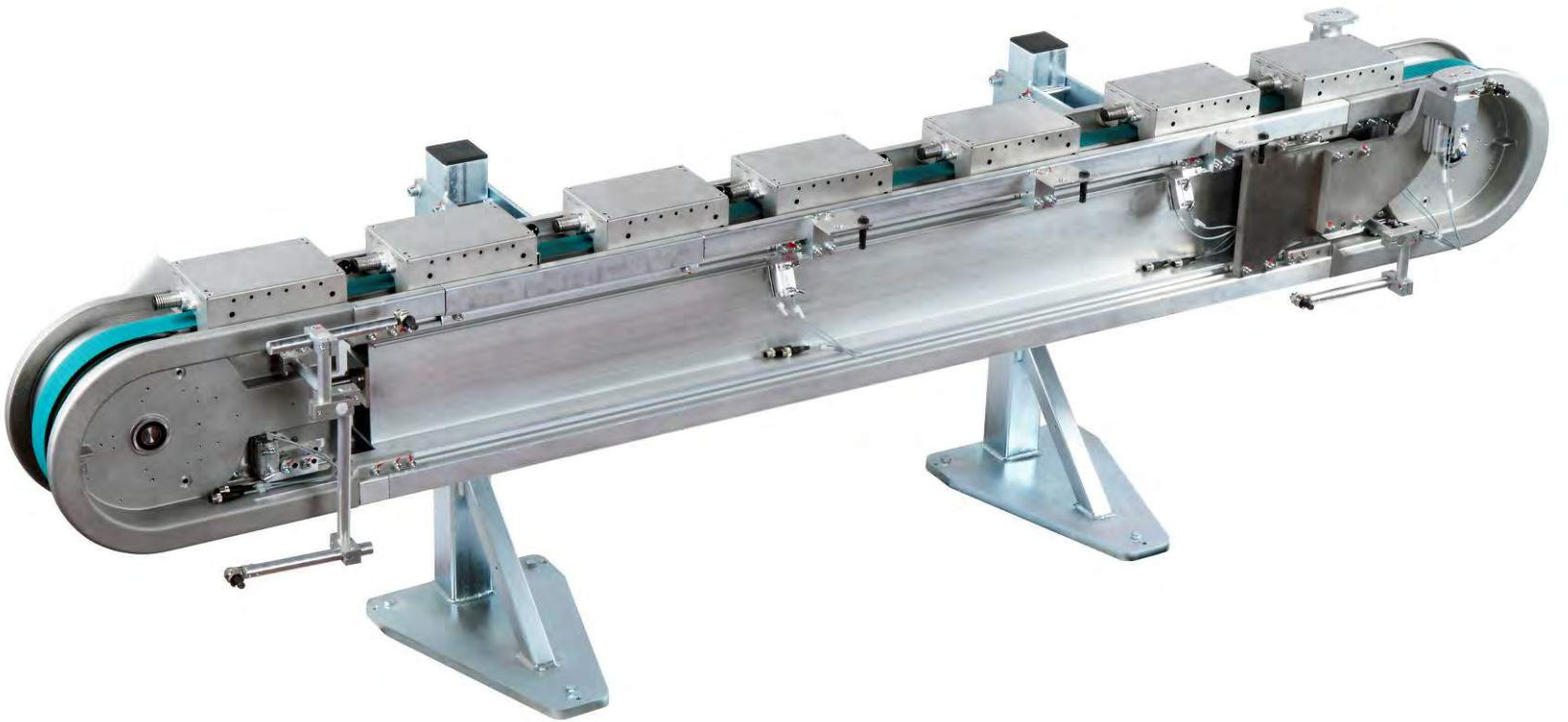


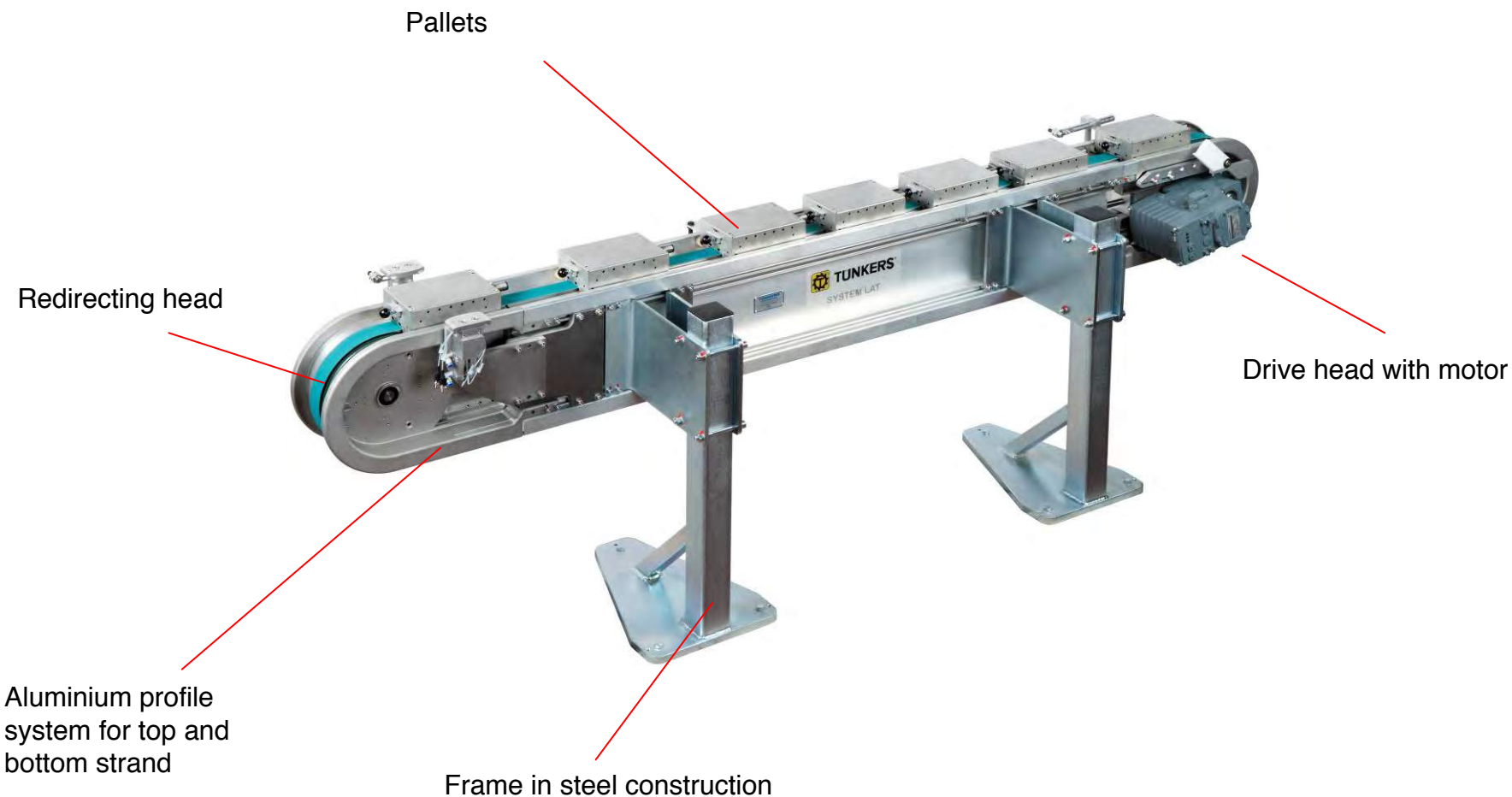

Nº LLAMADA
CANTIDAD
Nº PLANO
1 2 ACV-180-0-010-V01
2 2 ACV-180-0-006-V01
3 6 ACV-180+0+004+V01
4 1 ACV-180-0-007-V01
5 2 ACV-180-0-005-V01
6 2 ACV-180-0-002-V01
7 1 ACV-180-0-008-V01
8 2 ACV-180-0-001-V01
9 3 ACV-150+1+015-V01
10 1 ACV-180-0-012-V01
11 1 ACV-180-0-011-V01
A
B
APM
ESTANDAR
I+D ACV
CONJUNTO CURVA
ACV-180-1-V0809
1:1

LFS Accumulating Belt Conveyor



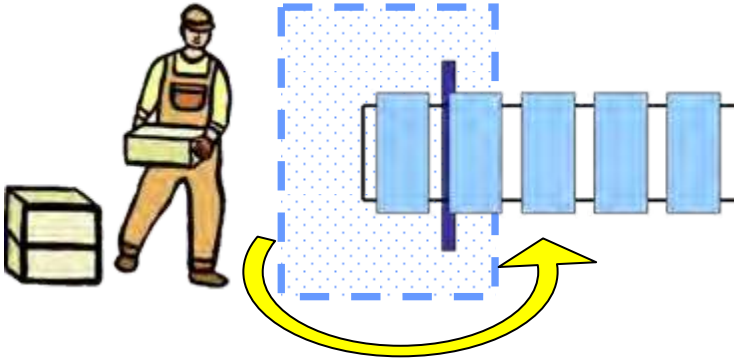
Accumulating conveyor transporting the pallets via a belt instead of a chain.




Pallets
Redirecting head
Drive head with motor
Aluminium profile system for top and bottom strand
Frame in steel construction
TUNKERS
SYSTEM LAT

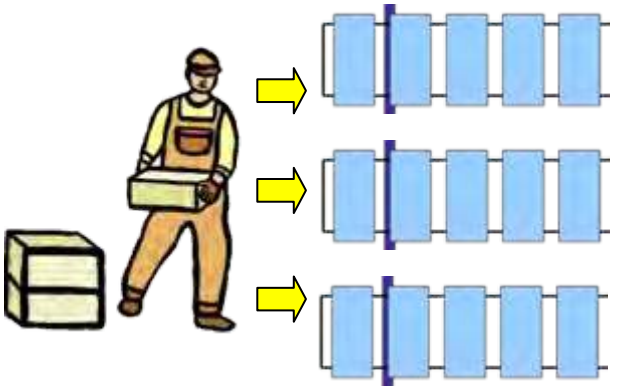
- Contrary to standard accumulating conveyors, the pallets are transported via a belt ⇨ frictional connection not form closure
- The frinctional connection is precisely adjusted to the pallet and workpiece carrier weight during directional change
- That is why the pallet can be stopped by the operator in any given position
- Special safety devices such as housings, light grids or pressure mats are rendered obsolete

- Loading from the side



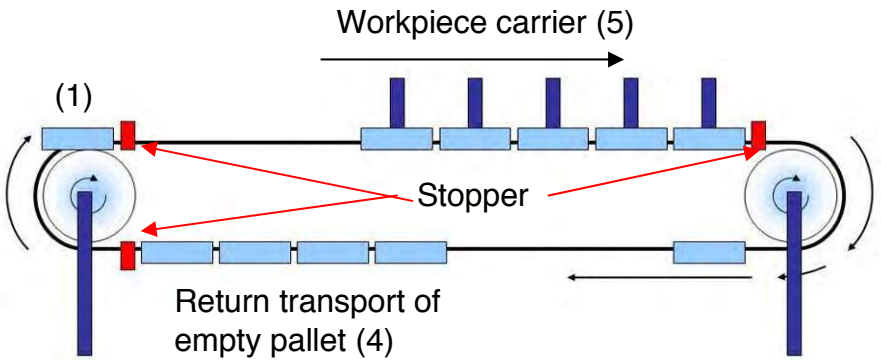
as is the case with standard accumulating conveyors which require a lot of space and cause a loss in conveying distance

- Loading from the front



of TÜNKERS belt conveyors in space-saving and battery-like design

- **Standard accumulating conveyors: Energy dissipators!**
  Each pallet is equipped with an independent friction unit.
  The motor output must be designed to correspond to the total friction of the pallets accumulated in front of the stopping points



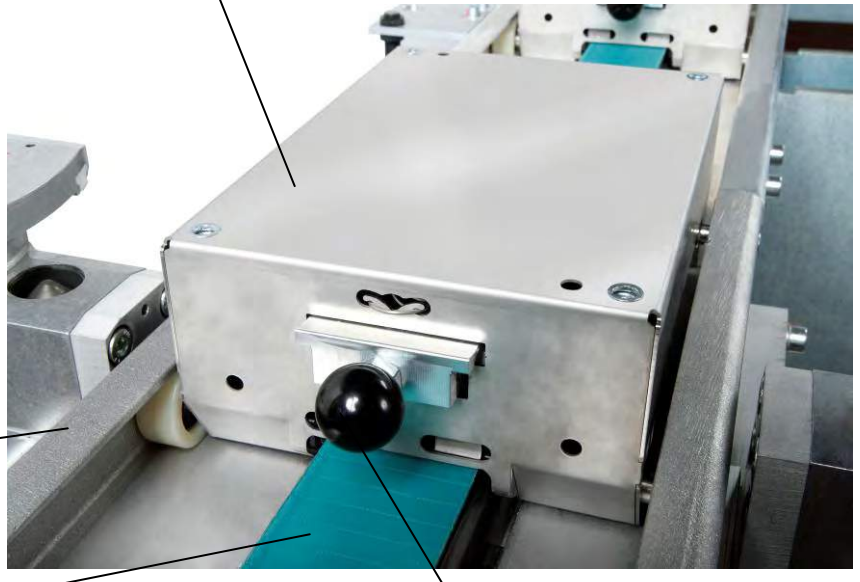
- Motor design for
  = 1 + 5 + 4 pallets
  = 10 friction units
- Limitation of accumulating distance
  ca. 10 pallets

- As to the TÜNKERS belt conveyor, the pallets are mechanically decoupled from the belt when accumulating, only one remains in frinctional connection per stopping point

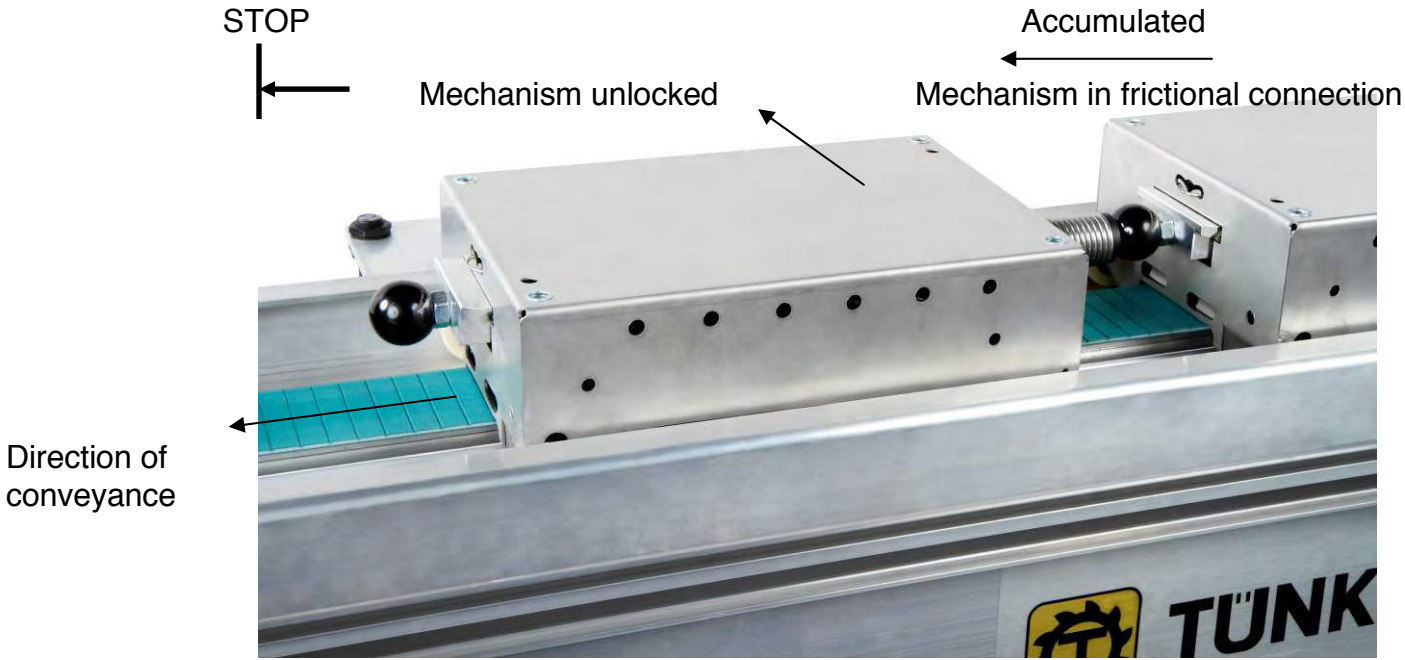
- Motor design for 3 pallets
  (ca. 150 N = watts)
- No limitation of accumulating distance

Functional principle:

- The pallet interlocks with the belt via a spring-loaded mechanism
- No positive fit but a frictional connection
- The retention mechanism can be unlocked with the release button

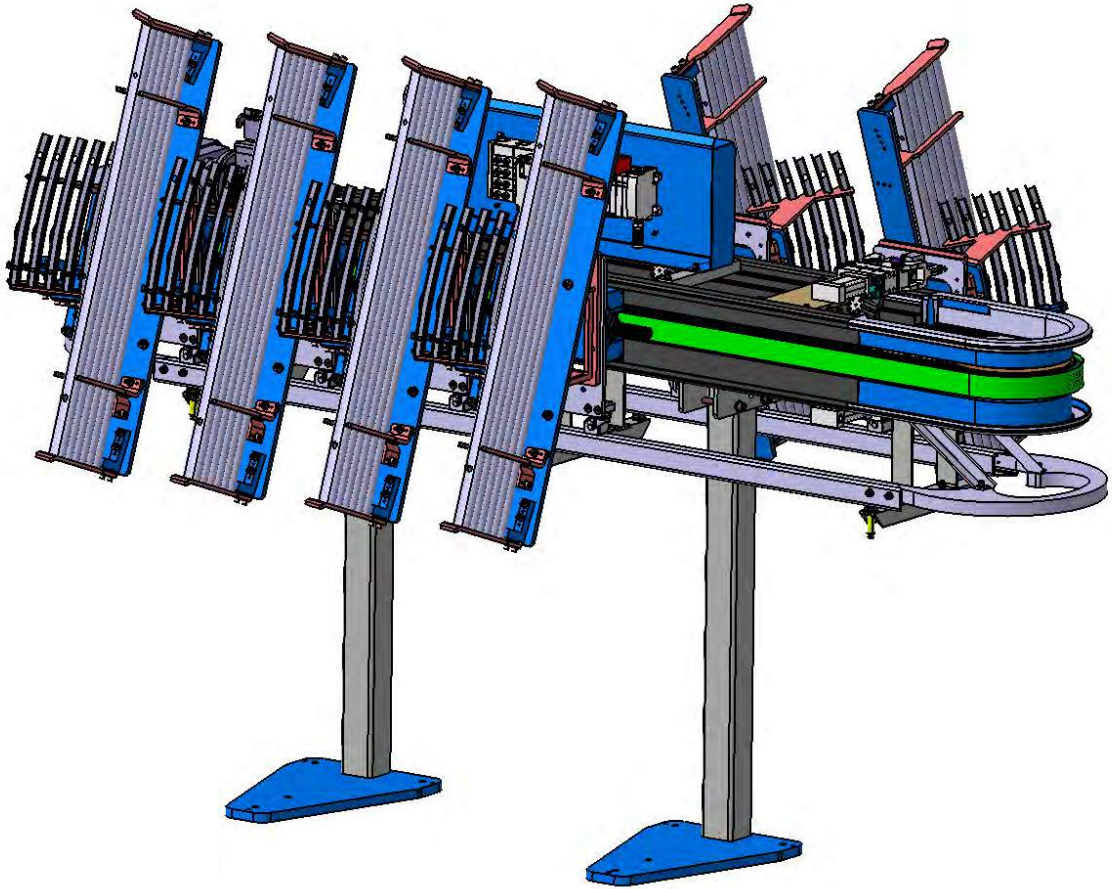


- When the pallets accumulate, the retention mechanism of the first pallet is unlocked. Only the last of the accumulated pallets is in frictional connection with the conveyor belt
- The motor output only needs to be designed for the work of the frictional force of **one** pallet, even if there are several accumulating pallets



Two ISO standard cylinders lift the pallet and secure the end position in x-y-z.


Achtung
481
485
C7
OP11
OP12



TÜNKERS Conveying Technology

Accumulatig Conveyors

Technical design and selection criteria

Product range of accumulating conveyors

- EXPERT-TÜNKERS One-strand-Accumulating conveyor-Chain EFS-1
- EXPERT-TÜNKERS Dual-strand-Accumulating conveyor-Chain EFS-2
- APM System Dual-strand-Accumulating conveyor-Chain AFS-2
- LAT System One-strand-Accumulating conveyor -Belt LFS-1

Technical data as to accumulating conveyors
Overview

TÜNKERS
Erfindergeist serienmäßig.

	Horizontalbetrieb			
	EFS-1	**EFS-2**	**APM**	**LAT**
Max. carriage load (Weight of component+ carrier)	35.00 kg	70.00 kg	130.00 kg	60,00 kg.
Max. weight of component carrier	(30.00 kg)	(60.00 kg)	(100.00 kg)	(10.00 kg)
Max. torque M centre of gravity of component carrier (s) * distance to carriage	50 Nm (25.00 kg – 200 mm)	100 Nm (50.00 kg – 200 mm)	150 Nm (75.00 kg – 200 mm)	5 Nm (2.50 kg – 200 mm)
Max. component width	1,000 mm	3,000 mm	3,000 mm	1,500 mm
Max. component length	150 – 700 mm	150 – 700 mm	150 – 700 mm	150 – 700 mm
Max. number of carriages before stopper	10	10	10	>> 10 (der Endkopplung)
Max. incline	≤ 1°	≤ 1°	≤ 1°	≤ 3°

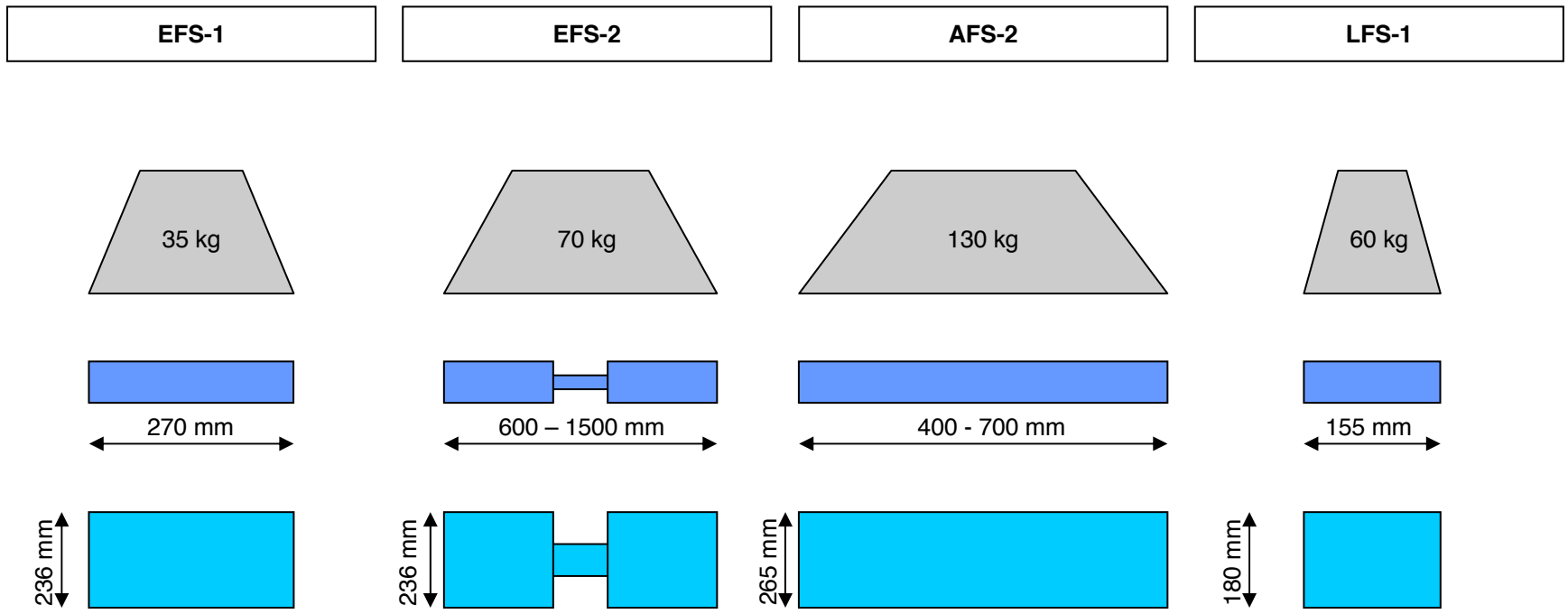
Performance specifications of accumulating conveyors in comparison

TÜNKERS
Erfindergeist serienmäßig.

	EXPERT-TÜNKERS One-strand	EXPERT-TÜNKERS Dual-strand	APM	LAT
Suitability for small parts	✚	○	○	✚
Suitability for medium-sized parts	○	✚	✚	✖
Suitability for large parts	✖	○	✚	✖
Suitability of robot / robot linkage	✚	✚	✚	✖
Suitability of robot / operator linkage	○	○	○	✚
Stop in the bend	✖	✖	✚	✖
Fully electric version	**in prep.**	**in prep.**	✚	✖
90° version	✚	✚	✚	✚
Overhead operation	✚	✚	✚	✚

Maximum carriage load
Sum of component carrier and component

TÜNKERS
Erfindergeist serienmäßig.



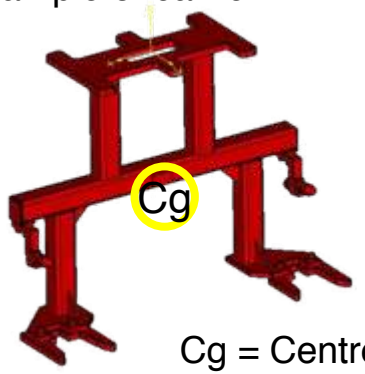
Precondition: Overall centre of gravity is at the centre of the carriage.

Weight increase by multiple carriage installation!!!

Maximum load due to component carrier

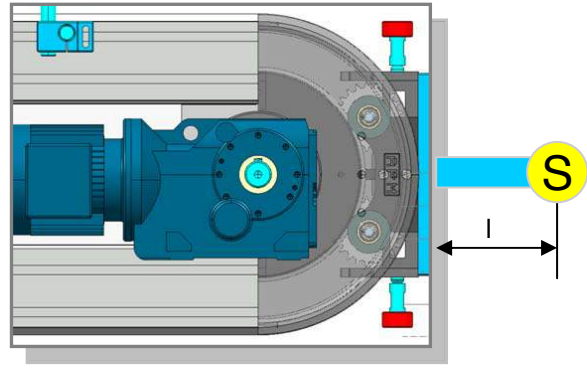
- Critical size, as the mass of the component carrier needs to be conveyed upward at the turning point and the centre of mass generates a reverse torque to the drive motor.

Example of carrier



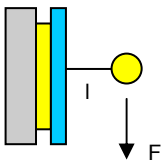
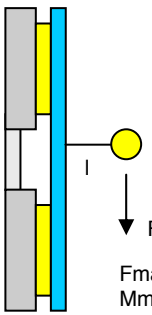
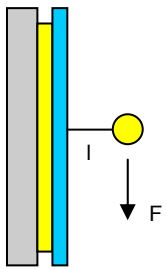
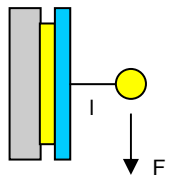
Cg = Centre of gravity

	EFS-1	EFS-2	AFS-1	LFS-1
Max. torque	S * l ≤ 50 Nm	S * l ≤ 100 Nm	S * l ≤ 150 Nm	S * l ≤ 5 Nm
Max. weight	30 kg	60 kg	100 kg	10 kg



Maximum radial carriage load with 90° belt

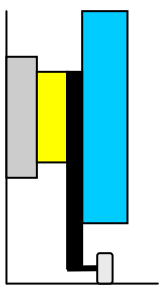
TÜNKERS
Erfindergeist serienmäßig.

EFS-1	EFS-2	AFS-2	LFS-1
 Fmax = 30 kg Mmax = 40 Nm (F*l) Lmax = 400 mm	 Fmax = 40 kg Mmax = 80 Nm (F*l) Lmax = 800 mm	 Fmax = 60 kg Mmax = 90 Nm (F*l)	 Fmax = 60 kg Mmax = 15 Nm (F*l)

Carrier and component

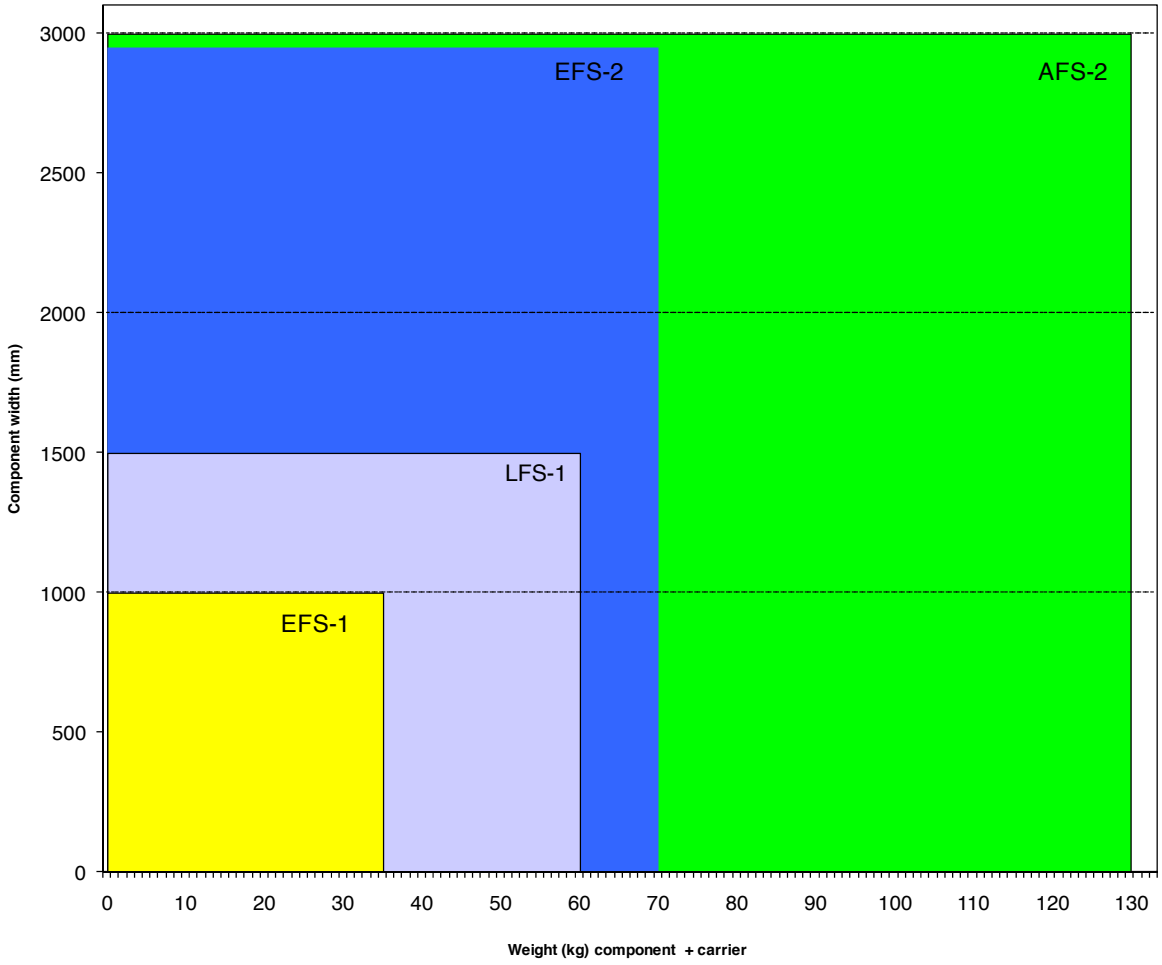
Carriage

Belt



⇨ 80 kg
Weight increase via additional support rollers at the base

Recommendend application of accumulating conveyor in relation to component width and weight (component + carrier)



Recommended application in relation to component width and weight of component carrier