

# Project application training TS 7 Gen 1

# Components

# TS 7 components

## Drive unit

### AS 7/OC-2; 3842998965

b: 455 – 2600mm, in 1mm increments

l: 390 – 4160mm, roller pitch in 130mm increments

BG:1 = Bevel wheel material: 1: Plastic

TR:1 = Roller material: 1: Steel

vN : 6, 9, 12, 15, 18 m/min

GM: Gear motor: 0: without (interface SW27); 1: with gear motor SW27;

2: without (interface to SEW connection, round shaft Ø20)

U: 0 (without motor); 200 (±10%); 220 (±10%); 400 (f50 +10% /-12%; f60 ±10%); 460 (+10%/-12%); 575 (±10%)

f: 50; 60 Hz

AT: K: with terminal box; S: with cable/plug

DP<sub>r</sub>: 1; 2 ... n; DP<sub>i</sub>: 1;2; ... n



# TS 7 components

## Drive unit

### AS 7/OC-3; 3842998966

b: 515 – 2600mm, in 1mm increments

l: 390 – 4160mm, roller pitch in 130mm increments

BG:1 = Bevel wheel material: 1: Plastic

TR:1 = Roller material: 1: Steel

vN : 6, 9, 12, 15, 18 m/min

GM: Gear motor: 0: without (interface SW27); 1: with gear motor SW27;

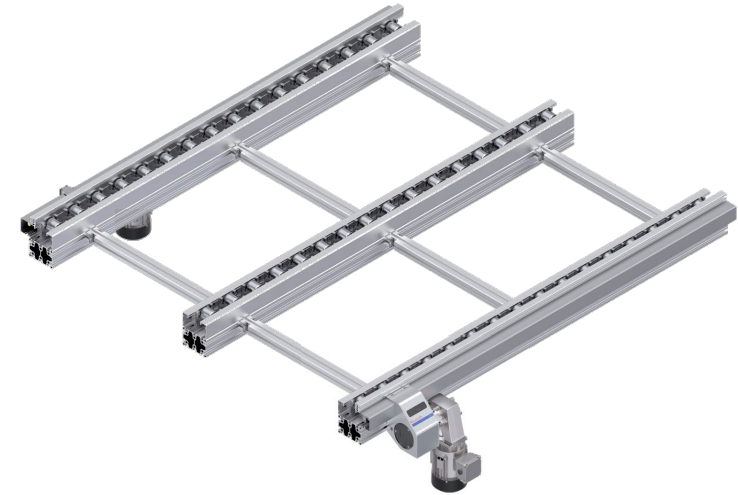
2: without (interface to SEW connection, round shaft Ø20)

U: 0 (without motor); 200 ( $\pm 10\%$ ); 220 ( $\pm 10\%$ ); 400 (f50 +10% /-12%; f60  $\pm 10\%$ ); 460 (+10%/-12%); 575 ( $\pm 10\%$ )

f: 50; 60 Hz

AT: K: with terminal box; S: with cable/plug

DP<sub>r</sub>: 1; 2 ... n; DP<sub>i</sub>: 1;2; ... n



# TS 7 components

## Drive unit

### AS 7/OCS-2; 3842998990

b: 455 – 2600mm, in 1mm increments

l: 390 – 4160mm, roller pitch in 130mm increments

BG:3 = detent clutch with sintered bevel gears + TR:3 = full material rollers

vN : 6, 9, 12, 15, 18 m/min

U: 0 (without motor); 200 ( $\pm 10\%$ ); 220 ( $\pm 10\%$ ); 400 (f50 +10% /-12%; f60  $\pm 10\%$ ); 460 (+10%/-12%); 575 ( $\pm 10\%$ )

f: 50; 60 Hz

AT: K: with terminal box; S: with cable/plug

DP<sub>r</sub>: 1; 2 ... n

DP<sub>i</sub>: 1;2; ... n



# TS 7 components

## Drive unit

### AS 7/OCS-3; 3842998991

b: 515 – 2600mm, in 1mm increments

l: 390 – 4160mm, roller pitch in 130mm increments

BG:3 = detent clutch with sintered bevel gears + TR:3 = full material rollers in the inside, outside standard rollers

vN : 6, 9, 12, 15, 18 m/min

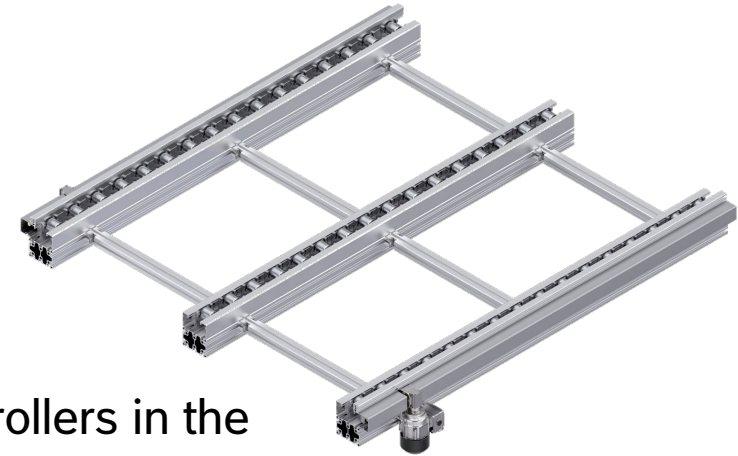
U: 0 (without motor); 200 ( $\pm 10\%$ ); 220 ( $\pm 10\%$ ); 400 (f50 +10% /-12%; f60  $\pm 10\%$ ); 460 (+10%/-12%); 575 ( $\pm 10\%$ )

f: 50; 60 Hz

AT: K: with terminal box; S: with cable/plug

DP<sub>r</sub>: 1; 2 ... n

DP<sub>i</sub>: 1;2; ... n



# TS 7 components

## Conveyor units

**ST 7/OC-2; 3842998967**

b: 455 – 2600mm, in 1mm increments

l: 390 – 4160mm, roller pitch in 130mm increments

BG:1 = Bevel wheel material: Plastic

TR:1 = Roller material: Steel



# TS 7 components

## Conveyor units

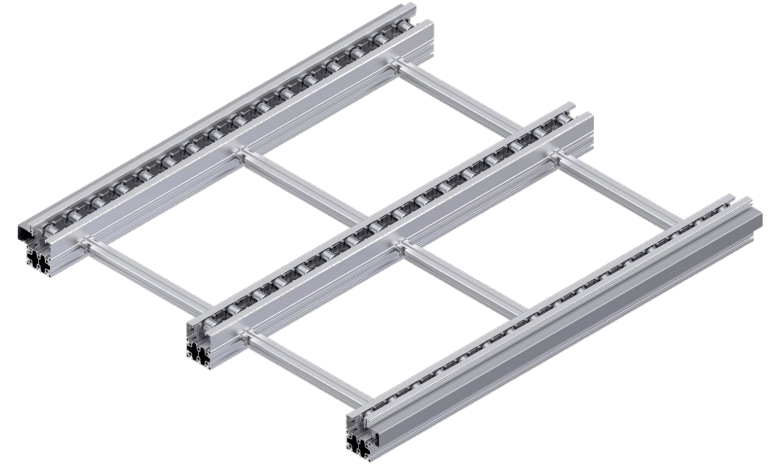
**ST 7/OC-3; 3842998968**

b: 515 – 2600mm, in 1mm increments

l: 390 – 4160mm, roller pitch in 130mm increments

BG:1 = Bevel wheel material: Plastic

TR:1 = Roller material: Steel





# TS 7 components

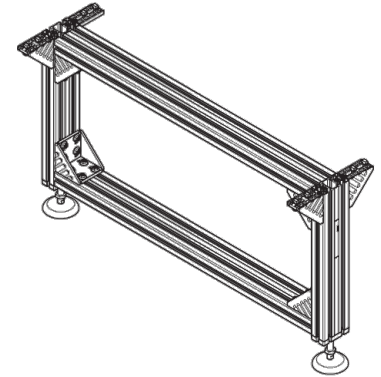
## Leg Sets

**SZ 7/OC-2; 3842998969**

b: 455 – 2600mm, in 1mm increments

H: 578 – 1200mm, in 1mm increments

MT: 0, 1 (unmounted, mounted)



# TS 7 components

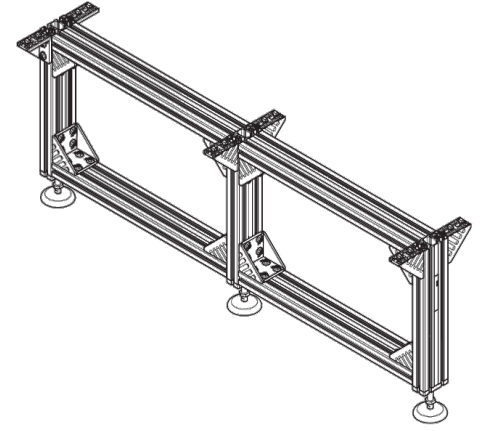
## Leg Sets

**SZ 7/OC-3; 3842998970**

b: 515 – 2600mm, in 1mm increments

H: 578 – 1200mm, in 1mm increments

MT: 0, 1 (assembled, not assembled)



# TS 7 components

## Lift-Transfer-Unit

**HQ 7; 3842998978**

bL: 1235; 1430; 1625mm

bQ: 1625; 1820; 2015; 2210; 2405; 2600mm

Longitudinal transport 2-tracks

Transverse transport 3-tracks

OFD: Direction of outfeed: 1: left; 2: right; 3: to both sides

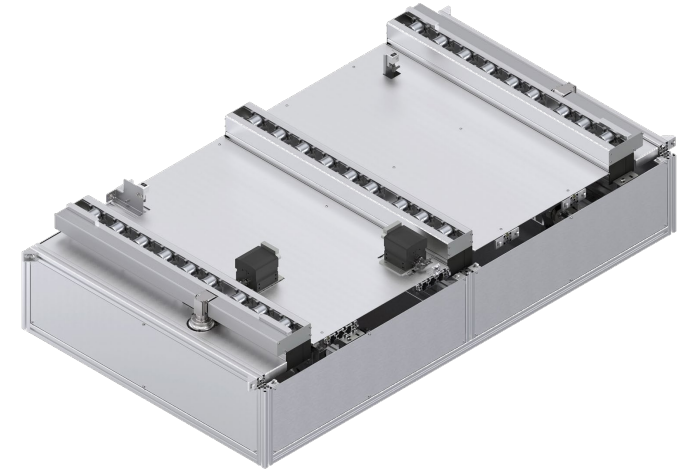
CT: Protective cover: 0: without protective cover, 1: with protective cover

$v_N$ : 6, 9, 12, 15, 18 m/min

U: 0 (without Motor); 200 ( $\pm 10\%$ ); 220 ( $\pm 10\%$ ); 400 (f50 +10% /-12%; f60  $\pm 10\%$ ); 460 (+10%/-12%); 575 ( $\pm 10\%$ )

f: 50; 60 Hz

AT: K: with terminal box; S: with cable/plug

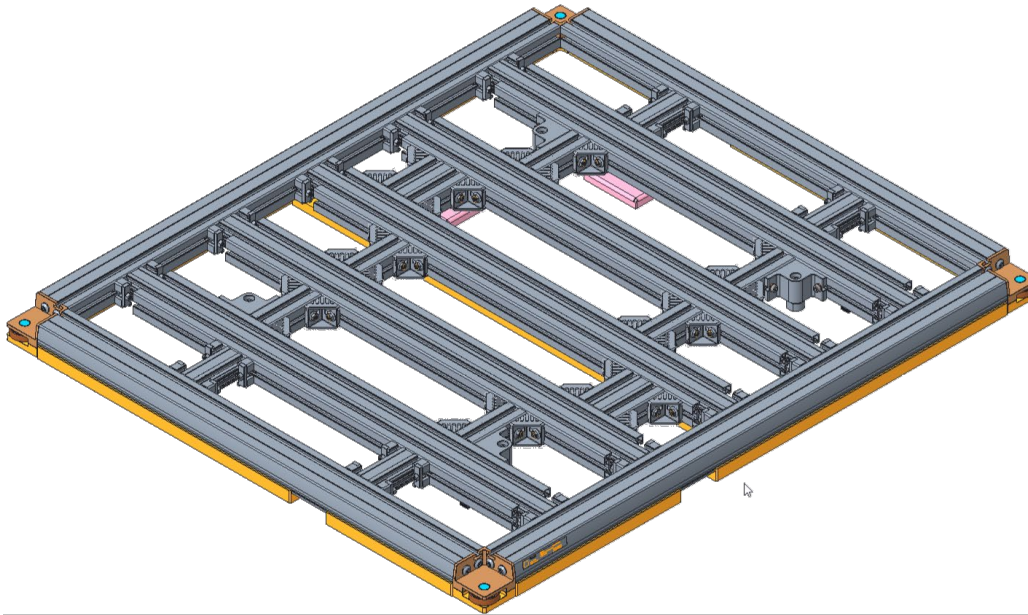


# TS 7 components Workpiece pallet

**WT 7; 3842998989**

bWT: 1235; 1430; 1625mm

IWT: 1625; 1820; 2015; 2210; 2405; 2600mm

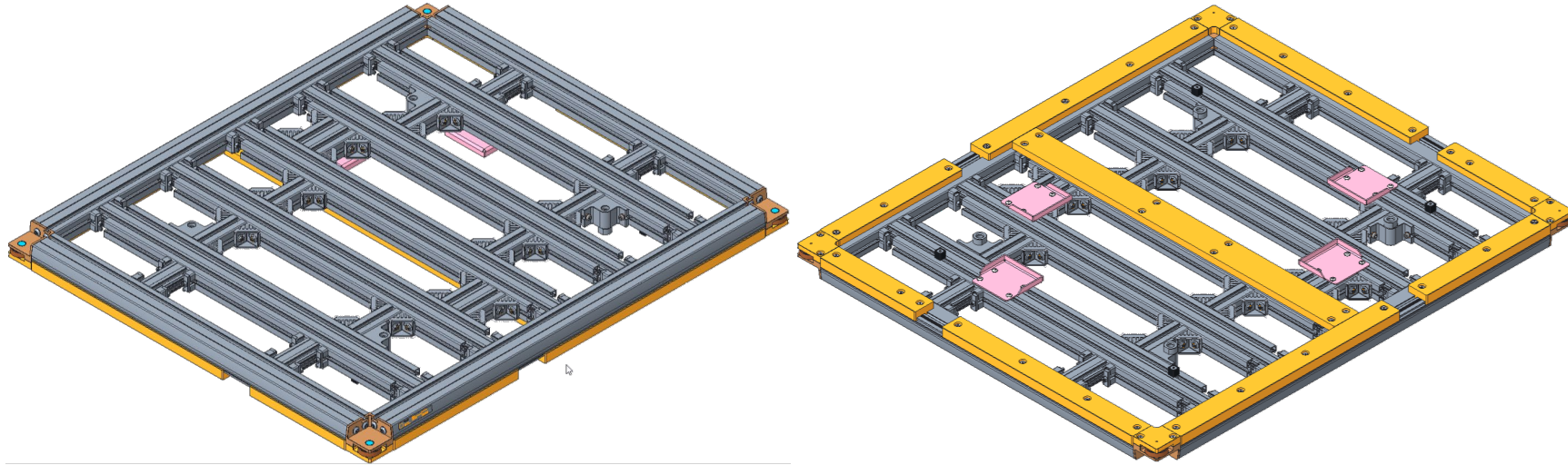


$b_{WT}$	$l_{WT}$
1235	1235
	1430
	1625
	1820
1430	1430
	1625
	1820
	2015
	2210
1625	1625
	1820
	2015
	2210
	2405
	2600

# TS 7 components

## Interfaces within workpiece pallet WT 7

### Construction of TS 7 workpiece pallet



Drawing shows top and bottom of WT 7 at bWT= 1430mm, lWT= 1820mm

Detail coordination of the construction when placing the order

# TS 7 components

## Interfaces within workpiece pallet WT 7

- Wear strip: Thickness: 20mm, Width: 65mm, Material: PE-UHMW,
- Passage channel separating stop: width: 90mm
- Steel stop (galvanized steel plate) for separating stop 325mm inside measured from outer edge of outsole to stop surface. This can also be inserted into the steel structure of the customer's WT
- Cross transport: 3rd track is placed centrally in the standard
- To minimize friction at the side guide, a guide roller should be installed in the corners of the workpiece carrier, guide roller 57mm diameter, material: PA66 (optionally with carbon and Teflon fibers)
- Flatness tolerance of the assembled wear plate in unloaded condition of 2mm
- Positioning bushings can be set relatively flexibly; see next page for general conditions
- Deflection of max. 2mm in loaded condition at any time
- Height of side guide: 33.5mm measured from top edge of roller to top edge of side guide



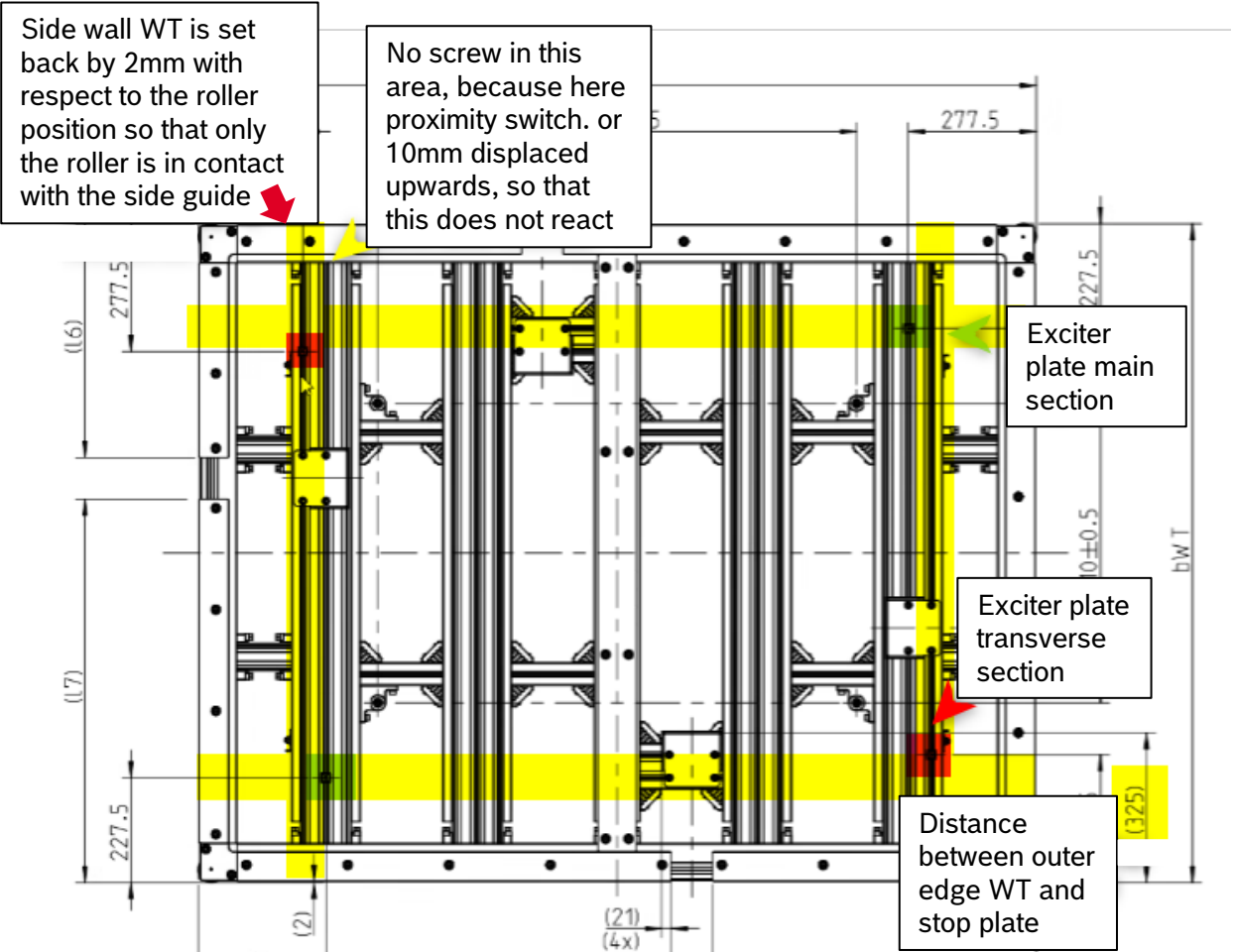
# TS 7 components

## Interfaces within workpiece pallet WT 7

- After stopping and releasing the workpiece pallet, the stop gate must not return to the receiving position until the entire workpiece carrier has been passed over.
- No screws may be attached in the yellow area shown, unless they are offset 10mm upwards and do not give a signal to the proximity switch.
- The sum of the individual indications does not result in automatic functionality of the workpiece carrier. We recommend a function test before the final order.

# TS 7 components

## Interfaces within workpiece pallet WT 7





# TS 7 components

## Stop Gate

**VE 7/D-1000-2; 3842998971**

**VE 7/D-1000-3; 3842997013**

**VE 7/D-1200-2; 3842998988**

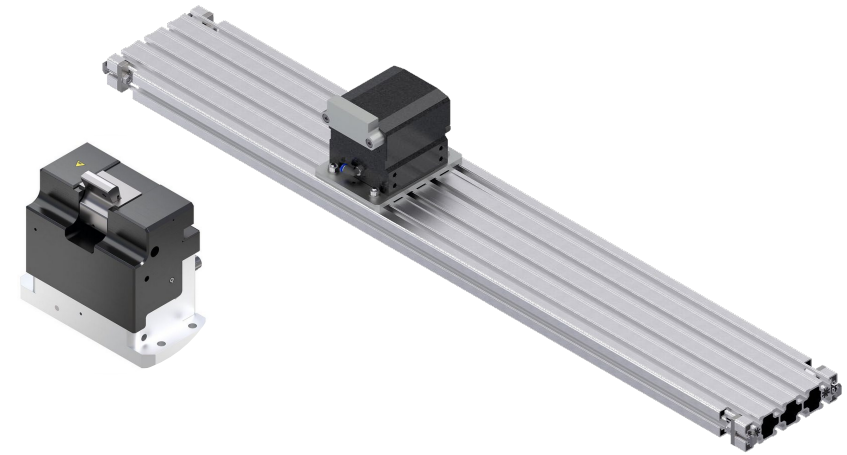
**VE 7/D-1200-3; 3842997014**

b: 1235; 1430; 1625; 1820; 2015; 2210; 2405; 2600mm

Minimum weight of 50kg, permissible slinging force:

- 1000 kg at max. 9 m/min
- 900 kg at max. 12 m/min
- 700 kg at max. 18 m/min

VE 7/D-1200: 1200kg with 9m/min



# TS 7 components

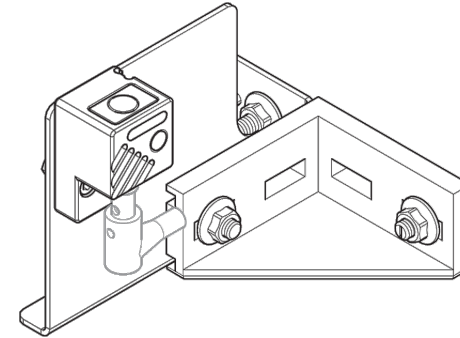
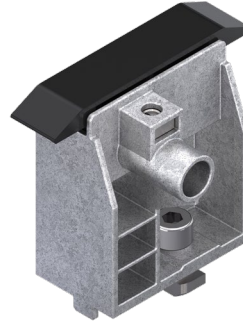
## Accessory

**Area monitoring WI 7: 3842580063**

**Sensor holder: 3842527849**

**Inductive sensor: 3842549814**

**Sensor holding plate: 3842580059**



Assembly instruction AS 7/OC de: 3842580005

Assembly instruction AS 7/OC en: 3842580006

Assembly instruction AS 7/OCS de: 3842580007

Assembly instruction AS 7/OCS en: 3842580008

Assembly instruction HQ 7 de: 3842580011

Assembly instruction HQ 7 en: 3842580012

# TS 7 Transfer System versus AGV's

- **Cycle Time** > Speeds up to 18m/min allow for quick transfer of pallets in/out of stations; ability to accelerate and decelerate.
- **Repeatability** > Space savings positioning accuracy options from 2mm to 0.5mm reduce requirement for secondary repeatability systems (e.g. – vision systems).
- **Footprint** > Tighter footprint realized through LTU's, result – less floorspace.
- **Modular Flexibility** > Add/change stations while maintaining initial capital investment.
- **ROI** > lower initial investment, minimal maintenance, minimal spare parts, no power drops/no floor modifications.
- **Field-Proven.** Constructed from robust TS5 modules and components. 10+ years of proven field experience, hundreds of systems installed worldwide.

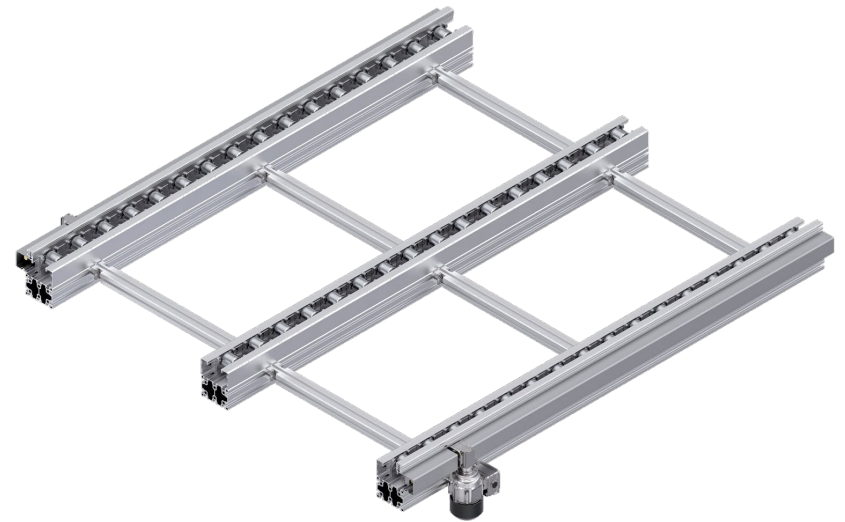
# Application information for sales/country units or customers



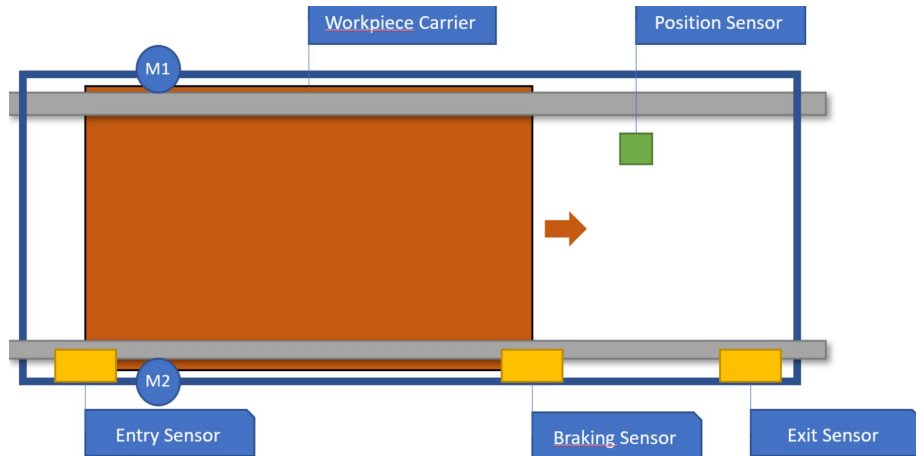
# Segmented drive unit AS 7/OCS

## Accumulation with zero back-pressure

Due to process requirements, a non-accumulation transfer without impact between workpiece pallet and stop gate is needed. To cover this use case, we offer a segmented, zero back-pressure conveyor section that can accelerate and decelerate the workpiece carrier via an intelligent control system.



# Segmented drive unit AS 7/OCS



To ensure a collision free transport each segment has to control its entire length for objects. This is implemented using so called "seesaws", sensors which are triggered whenever an element is in their vicinity. Also, each segment requires individual motors to be able to operate independent of neighbouring segments. Following segments in conveying direction are referred to as "downstream", in the opposite direction as "upstream".

Minimum length depending on length of workpiece pallet, see calculation on the left

Each segment should be controllable individually to avoid stop gates → individual segments, which means many motors

The position of the WT must be monitored → We need the rockers

$$v_{conveyor} \leq 0.15m/s$$

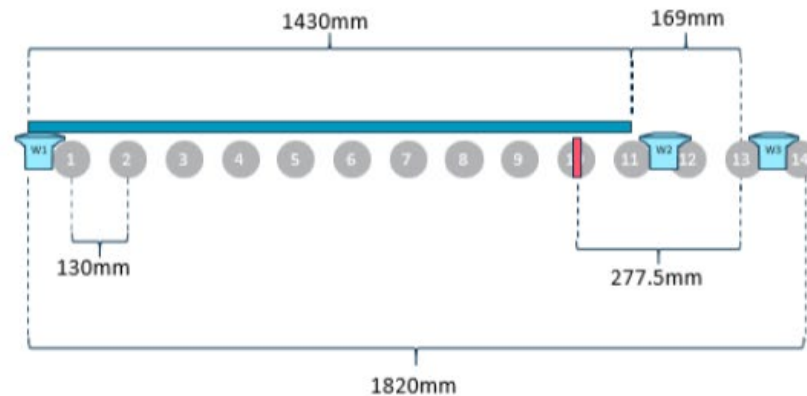
$$l_{min\ segment\ length} = (\lceil \frac{l_{workpiece\ carrier}}{p_{roll}} \rceil + 2) * p_{roll}$$

$$v_{conveyor} \leq 0.3m/s$$

$$l_{min\ segment\ length} = (\lceil \frac{l_{workpiece\ carrier}}{p_{roll}} \rceil + 3) * p_{roll}$$

# Segmented drive unit AS 7/OCS

## Calculate Dimensions Example 1





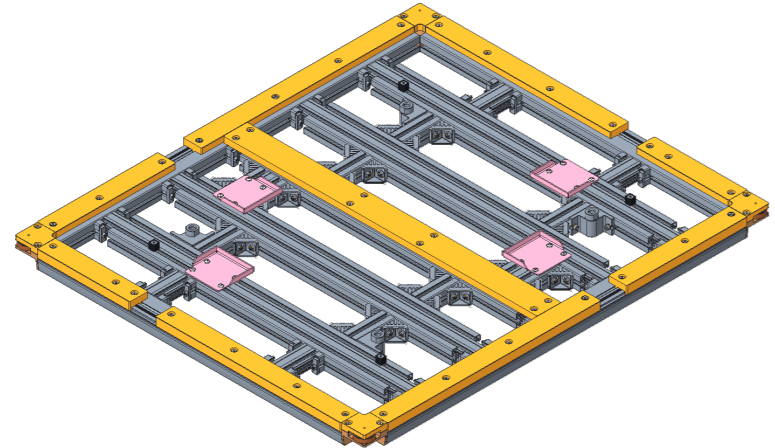
# Testings of Stop Gates



- Most Stop Gates are tested on the drop test bench
- A defined mass is dropped onto the Stop Gates from a defined height
- The Stop Gates have to withstand this for several million cycles
- The test parameters are defined in a test specification

# Technical details

- Minimum transportation height of around 600mm (with safety covers), 550mm without safety covers
- Speed is up to 18m/min
- The carrier will be stopped inside the workpiece pallet due to safety reasons (pink metal sheet)
- Wear stripes underneath the pallet (yellow)



# Technical details - example

## Accelerations:

Strongly dependent on weight and speed

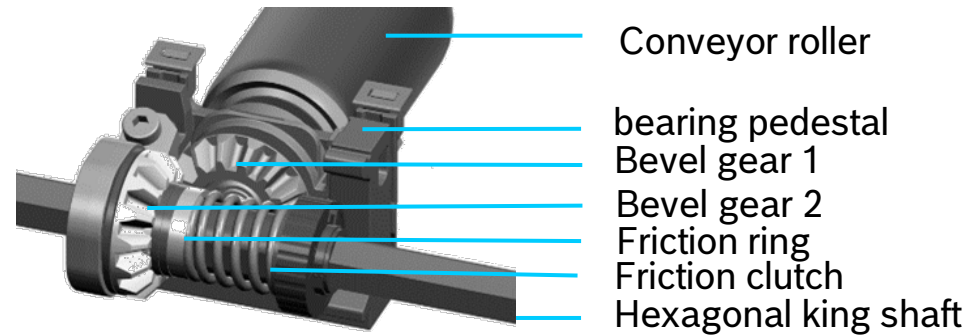
Assumption 1000kg

15m/min nominal speed

2500mm WT length

actual speed: 13,85m/min, Acceleration: 0,23m/s<sup>2</sup>, Deceleration without stop gate: 0,15m/s<sup>2</sup>, Delay with stop gate: 0,69m/s<sup>2</sup>

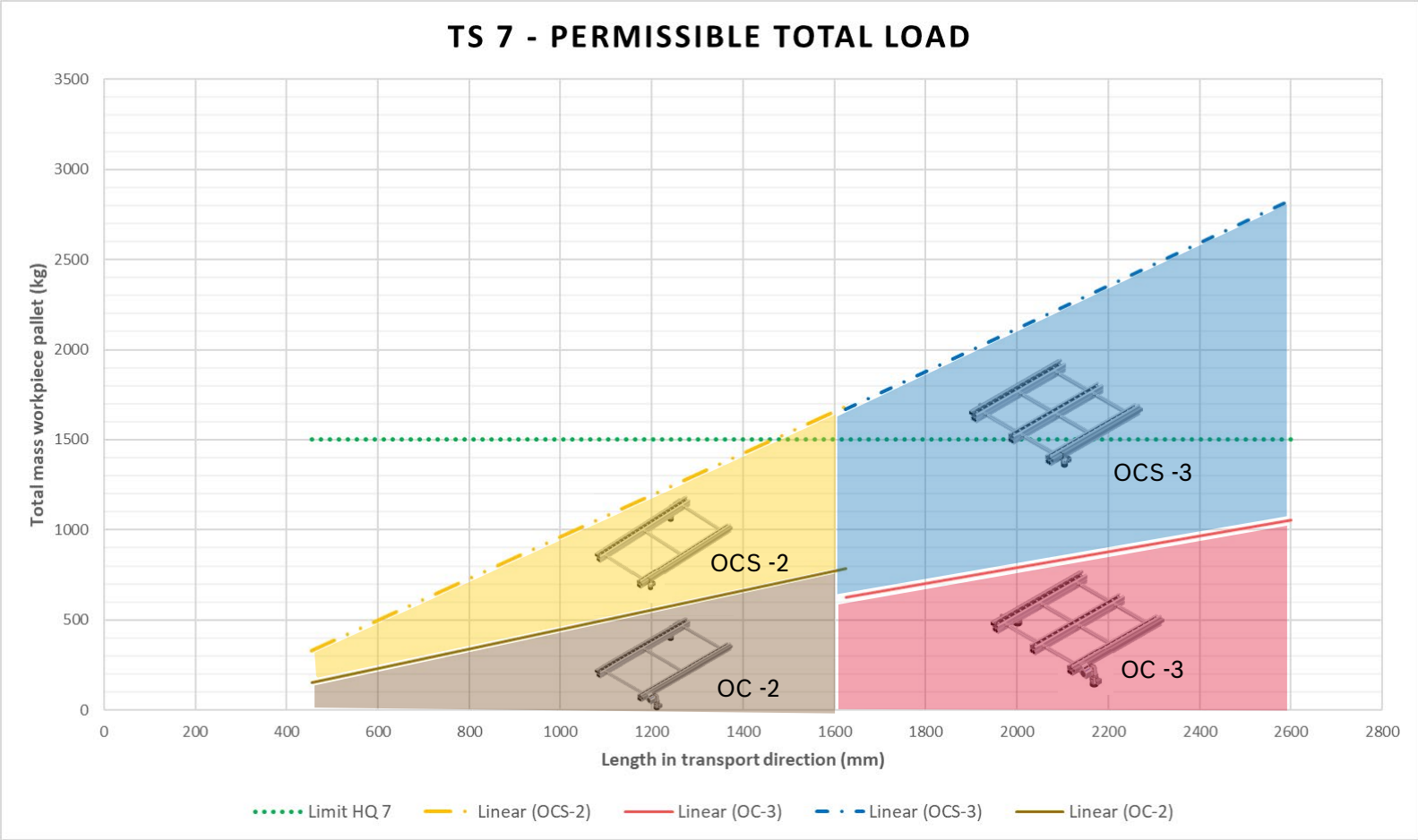
# Basics – drive concept OC version



- The king shaft is located below the transport level and can therefore be overrun by the workpiece carrier.
- Friction drive: Drive by friction, in which rotating discs transmit their torque to the wheels
- 0.5 Nm torque per friction coupling
- With OCS version detent clutches are used

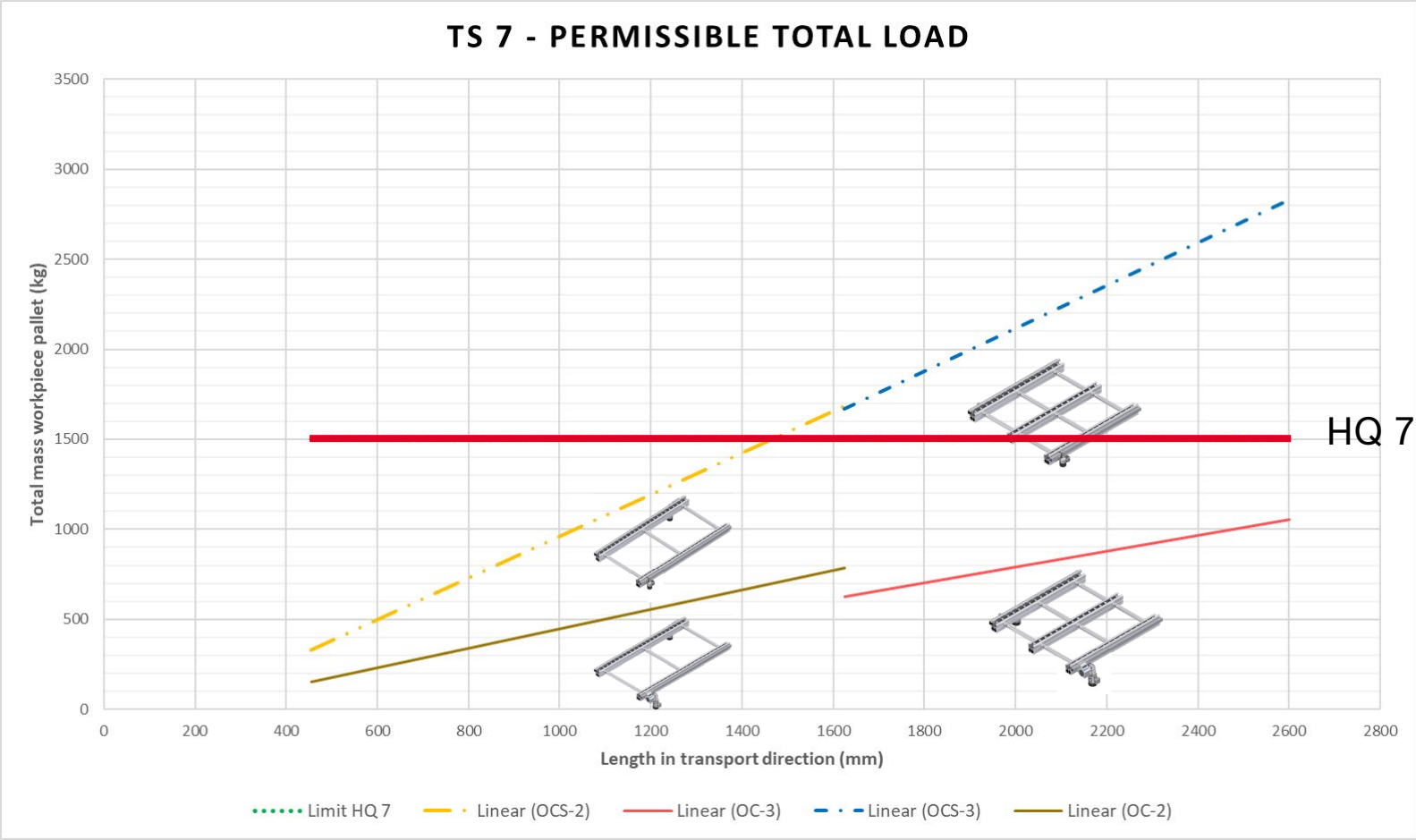
# Application information

## Permissible load



# Application information

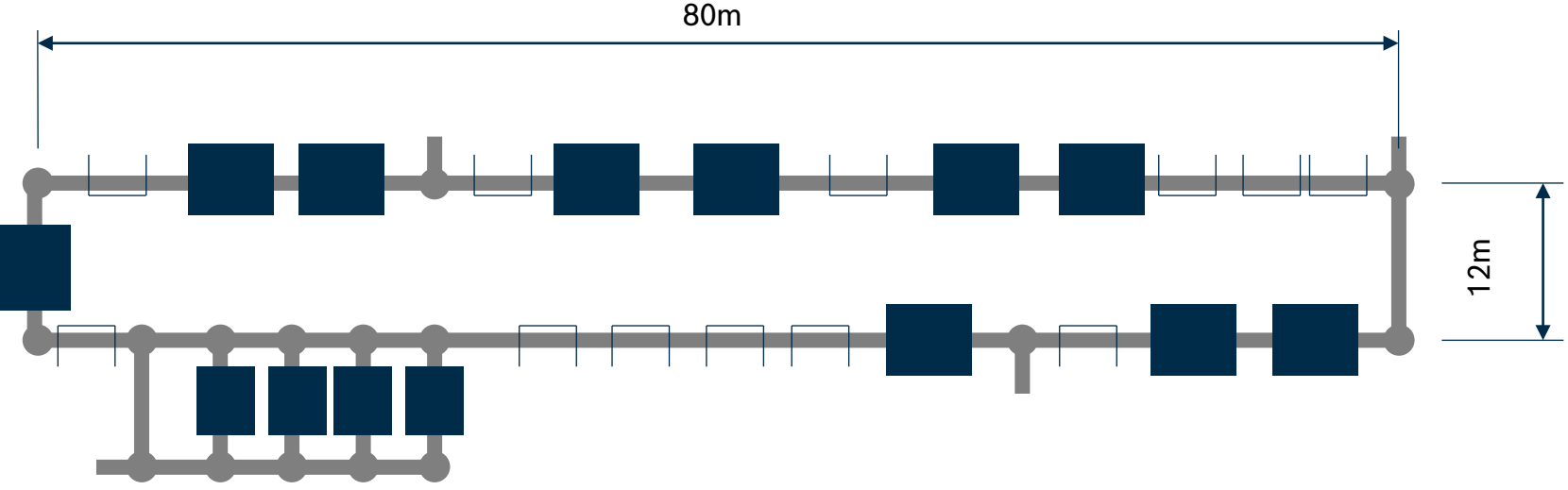
## Permissible load






HQ 7 limit of 1500kg

# Application information

## Example



-  Automatic station
-  Manual Station
-  In / Outfeed

Pack size: 1350 x 2000 mm  
 Pack weight inclusive workpiece pallet and fixtures: 1.200 kg  
 Turning of workpiece pallet is needed -> transverse operation

# Application information

## Example

Pack size: 1350 x 2000 mm

Next workpiece pallet standard size:

1430 x 2015 mm

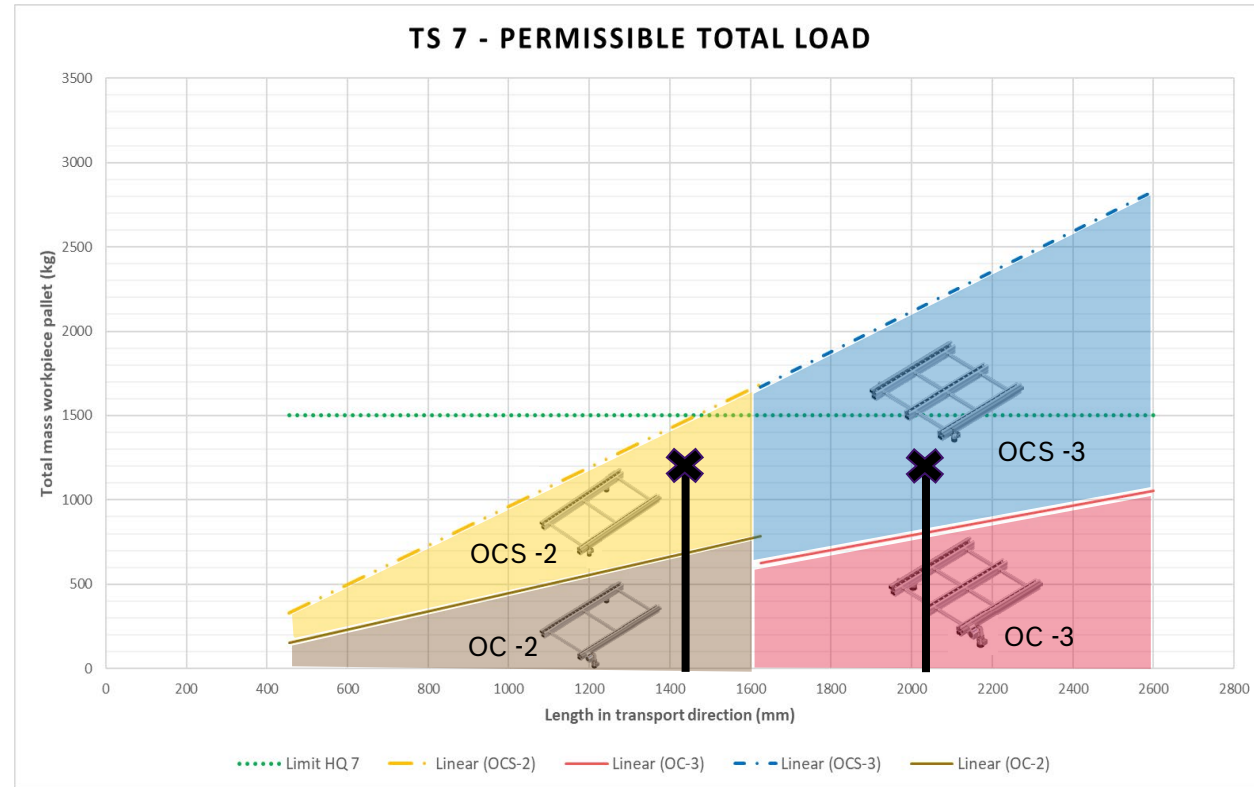
Weight: 1.200 kg

In longitudinal and transverse

OCS is needed

→ segmented driving

$b_{WT}$	$l_{WT}$
1235	1235
	1430
	1625
	1820
1430	1430
	1625
	1820
	2015
	2210
1625	1625
	1820
	2015
	2210
	2405
	2600





# Application information

## Example

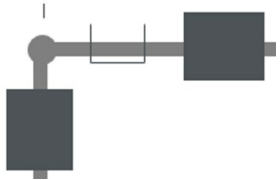
### Comments



We recommend no accumulation with loaded workpiece pallet

One stopper and one pre-stopper at each station

Speed should be reduced before reaching a stop gate, see stop gate table with speeds/weights



Rotation unit is needed, so that workpiece pallet orientation stays the same



Lift-transfer unit is needed, so that workpiece pallet can change in orientation

HQ 5 can handle up to 1500kg