



**Increased productivity  
with robotised  
press-brake operation**

# *Robot + press brake machine = increased productivity!*

## **Productivity**

Robotised press-brake operation will, in the long run, have a much higher production capacity than manual operation. Since the robot is working within a safe zone it will be possible to run the press at top speed, something that cannot be done with manual operation.

In order to maintain productivity when introducing new products, the standstill can be reduced by using Motoman's predefined macro jobs and special software for offline programming.

A robot in the cell also means that a heavy, monotonous and perhaps risky task is removed from the staff's duties and they become robot operators instead. This is often a positive change which increases motivation.

## **Flexibility**

The robot equipment from Motoman is designed for quick changes between different sheet dimensions.

The grippers can be made from standard aluminium profiles and this makes them easy to design when new products are introduced.

By mounting the robot on a servo powered rotating robot base, or track, its working range in front of the press is

increased. Regardless of the sheet's size the robot can always find the best position for every bend. This means that both small and large sheets can be handled in the same cell. The increased working area also means that the press' whole bending length can be used for bending.

## **Profitability**

Generally speaking, the larger the sheets and more bends the better profitability in the plant. However, the smallest robot cells are designed to be profitable even for sheets with small dimensions.

A good rule of thumb is that the products to be manufactured in the cell should be a recurring production and then in batches of between 30 and 200 sheets (depending on sheet size and the number of bends).

If the opportunity for unmanned operation is used, the press brake cell will become profitable even faster. To increase the productive time in the cell during unmanned operation it is a good idea to add a system of conveyors for the finished products.

The increased quality, which is a result of the robot's exact movements, also leads to higher profits as the number of products that needs to be discarded is diminished.



*Motoman's turnkey system with robotised press-brake operation. The turnkey systems have different options for collecting sheets and placing the finished products on pallet or roller conveyor.*

# Robot and press brake machine

## Robot

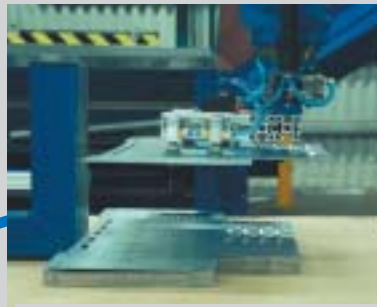
The Motoman robot family comprises servo controlled robots with 4-15 axes and a maximum payload capacity up to 500 kg. Suitable robots for press brake applications are available with a maximum payload capacity, including gripper tools, up to 280 kg.

In order to increase the robot's reach a seventh axis, a servo powered rotating robot base, is usually integrated to the control system. It increases the reach with up to 1100 mm and enables the robot to find the ultimate position for each bend.

## Press brake machine

The robot and press brake machine communicates during the bending with an exchange of signals. The robot controls the press' movements and receives information from it, e.g. that the workpiece is in contact with the back gauge.

Motoman has experience with press brake machines of the most common brands on the market.



1. The robot picks up a sheet from the in-pallet or sheet magazine.



5. When the bending is complete, the robot places the finished workpieces in a desired pattern on a pallet or conveyor.



2. At the orientation table the workpiece is automatically positioned before bending.



4. The regrip station, in front of the press, is used when the robot needs to change its grip between different bends.



3. The robot takes the workpiece to the press and the bending sequence starts.

# Offline-programming

## Offline-programming and simulation

The MotoBend PC software is specially designed for Motoman products, and not limited to any kind of press-brake brand.

It makes it possible to create and edit robot jobs or to introduce new products, without interfering with the production in the robot cell. It is also possible to check robot access and to optimize cycle times in the virtual environment before downloading the robot files to the robots control system.

MotoBend can make a suggestion of the most optimal bending sequence and a suitable position of tools and back gauges.

The software also includes a library with 3D models of Motoman standard products, press-brake machine, conveyors and other equipment.



*A simulation of the complete work cycle provides an opportunity to improve access and optimize cycle times.*



*It is easy to add new grippers, tools and workpieces with the user friendly interface.*

*You can either set up the bending sequence manually, or let MotoBend generate a complete robot program with the most optimal bending cycle and tool positioning.*

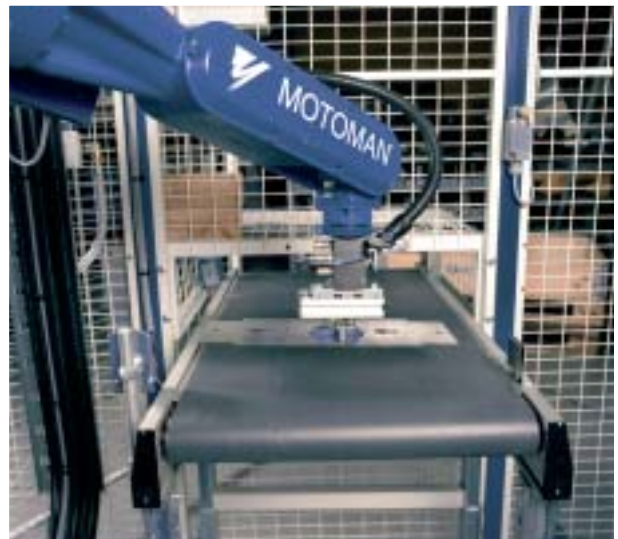
*Robot jobs created with MotoBend can be stored on the regular network. The robot operator can use the programming pendant to download them.*

## Efficient bending of small, light weight parts

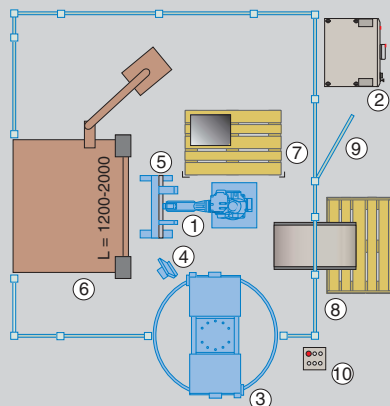


A robotised press-brake cell for small parts does not need much floor space. With a rotating infeed magazine, a small conveyor and a MOTOMAN industrial robot with 6 kg handling capacity, this means very efficient bending on a small space.

Incoming sheets are fed to the robot from a rotating sheet magazine table. Finished products can be placed on a pallet, or a small belt conveyor down to a Euro-pallet with a box. The latter is very practical for small products where a placing pattern is not required.



*The alternative with a small conveyor is particularly suitable for small workpieces that can be dropped into a pallet with a collar.*



### Example of robot cell for small parts

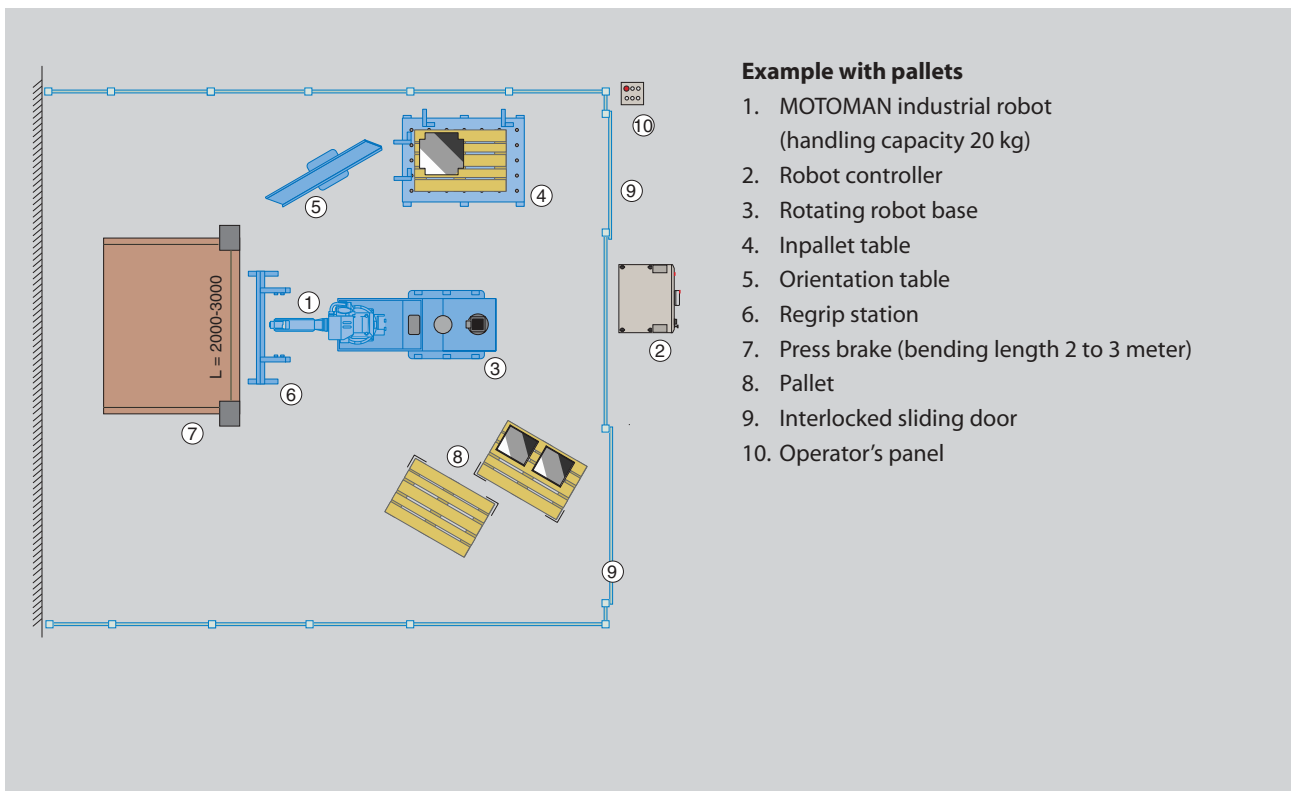
1. MOTOMAN industrial robot (handling capacity 6 kg)
2. Robot controller
3. Sheet magazine table (rotating)
4. Orientation table
5. Regrip station
6. Press brake (bending length 1.2 to 2 meter)
7. Outfeed pallet
8. Outfeed pallet with small belt conveyor
9. Interlocked service door
10. Operator's panel

## Flexible production of small to medium sized parts

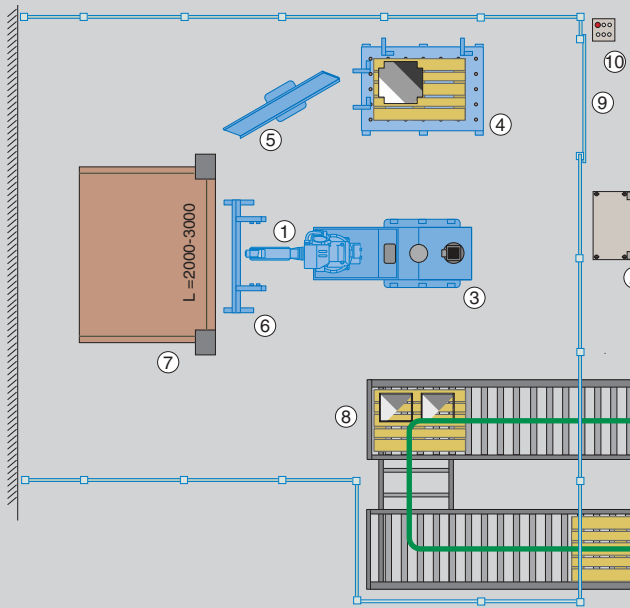


The MOTOMAN industrial robots with handling capacity 20 kg are suitable for press-brake cells where the production mainly consists of small parts, but larger sheets must also be possible to process occasionally.

The layout examples shows cells where the robot picks up the sheets from an in-pallet table and finished products are placed on a pallet or roller conveyor. The roller conveyor can have a pallet magazine for empty pallets.

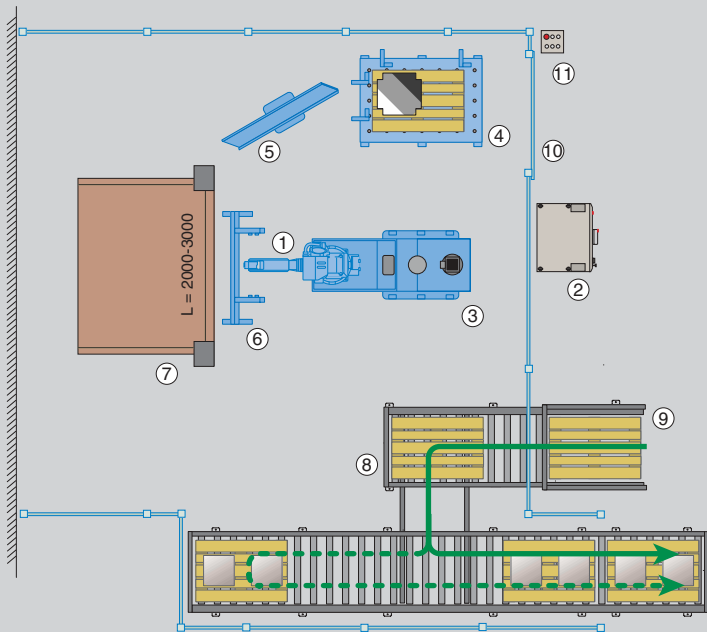


# Flexible production of small to medium sized parts



## Example with roller conveyor

1. MOTOMAN industrial robot (handling capacity 20 kg)
2. Robot controller
3. Rotating robot base
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake (bending length 2 to 3 meter)
8. Roller conveyor for Euro-pallet
9. Interlocked sliding door
10. Operator's panel



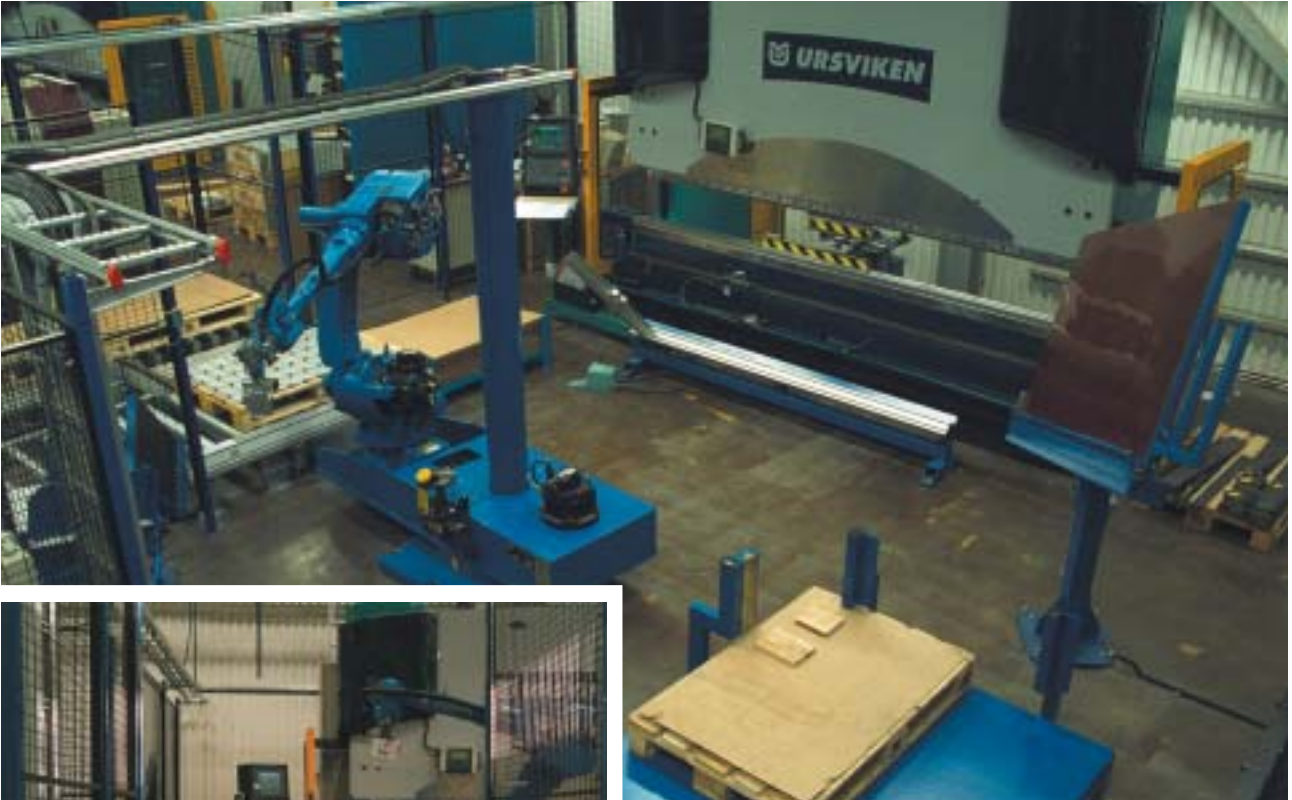
## With roller conveyor and infeed magazine

1. MOTOMAN industrial robot (handling capacity 20 kg)
2. Robot controller
3. Servo powered turntable
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake (bending length 2 to 3 meter)
8. Roller conveyor for Euro-pallet without collar
9. Infeed magazine (max 15 pallets)
10. Interlocked sliding door
11. Operator's panel



The large conveyor has room for six filled Euro-pallets without collar. Infeed magazine for 15 empty pallets.

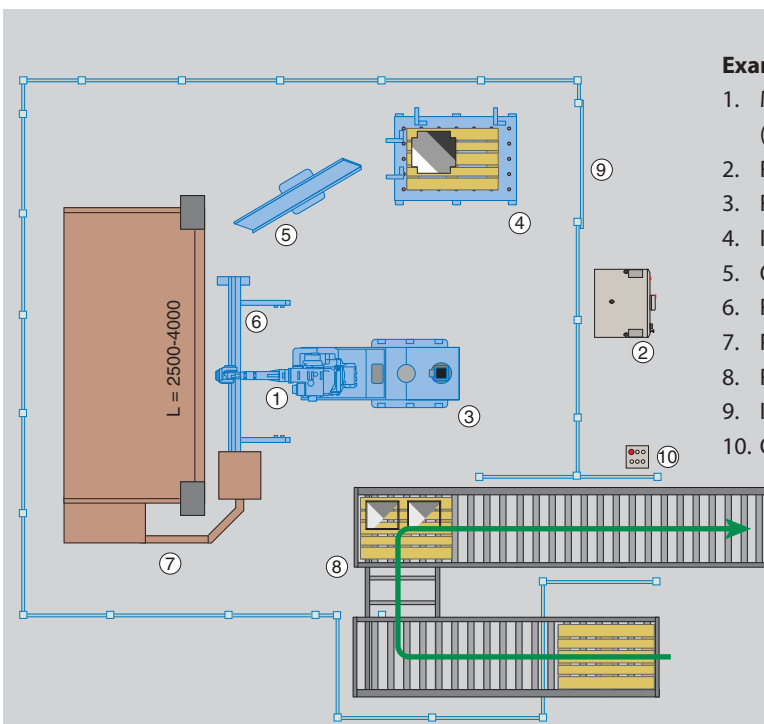
## Flexible production of medium sized parts



A system with a MOTOMAN industrial robot with 50 kg handling capacity is ideal for a mixed production. Using optional equipment it is possible to efficiently produce both small and large products in the same cell.

Incoming workpieces are picked up from a pallet or sheet magazine. Finished products can be placed on a pallet on the floor, or on a roller conveyor.

The roller conveyor has room for up to four filled Euro-pallets without collar, or three filled Euro-pallets with collar.



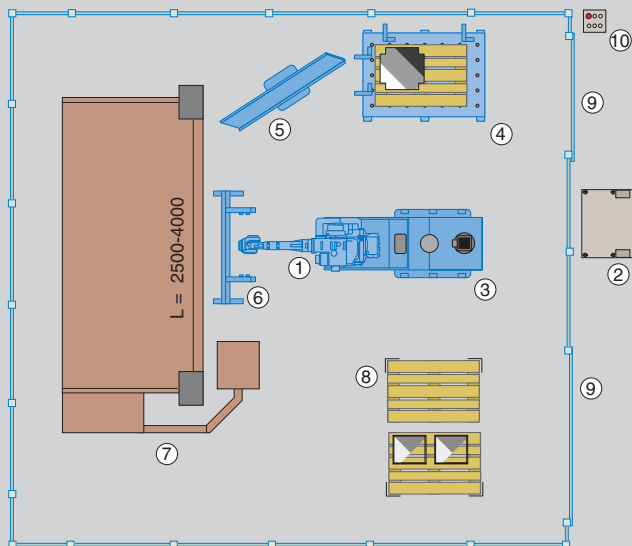
### Example with roller conveyor

1. MOTOMAN industrial robot (handling capacity 50 kg)
2. Robot controller
3. Rotating robot base
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake (bending length 2.5 to 4 meter)
8. Roller conveyor for EUR-pallets
9. Interlocked sliding door
10. Operator's panel

## Flexible production of medium sized parts

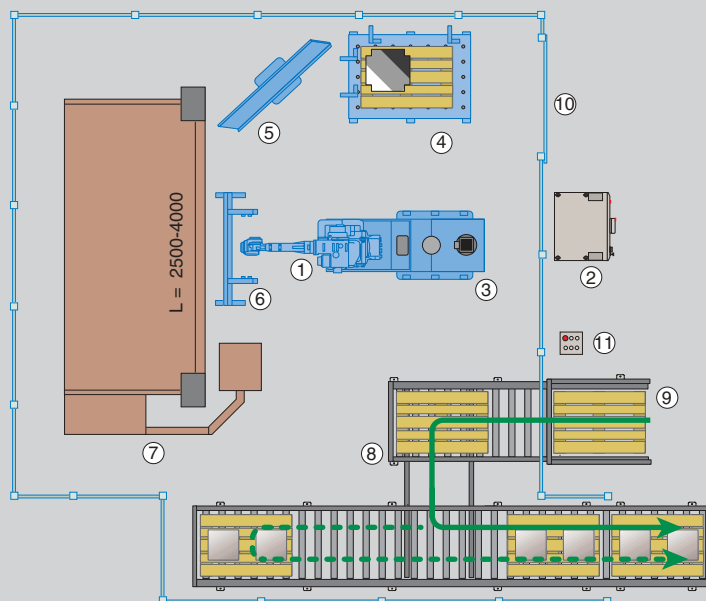


The rotating sheet magazine has two stations and can be loaded while the cell is in operation.



### Exampel with pallets

1. MOTOMAN industrial robot (handling capacity 50 kg)
2. Robot controller
3. Rotating robot base
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake (bending length 2.5 to 4 meter)
8. Pallet
9. Interlocked sliding door
10. Operator's panel



### With roller conveyor and infeed magazine

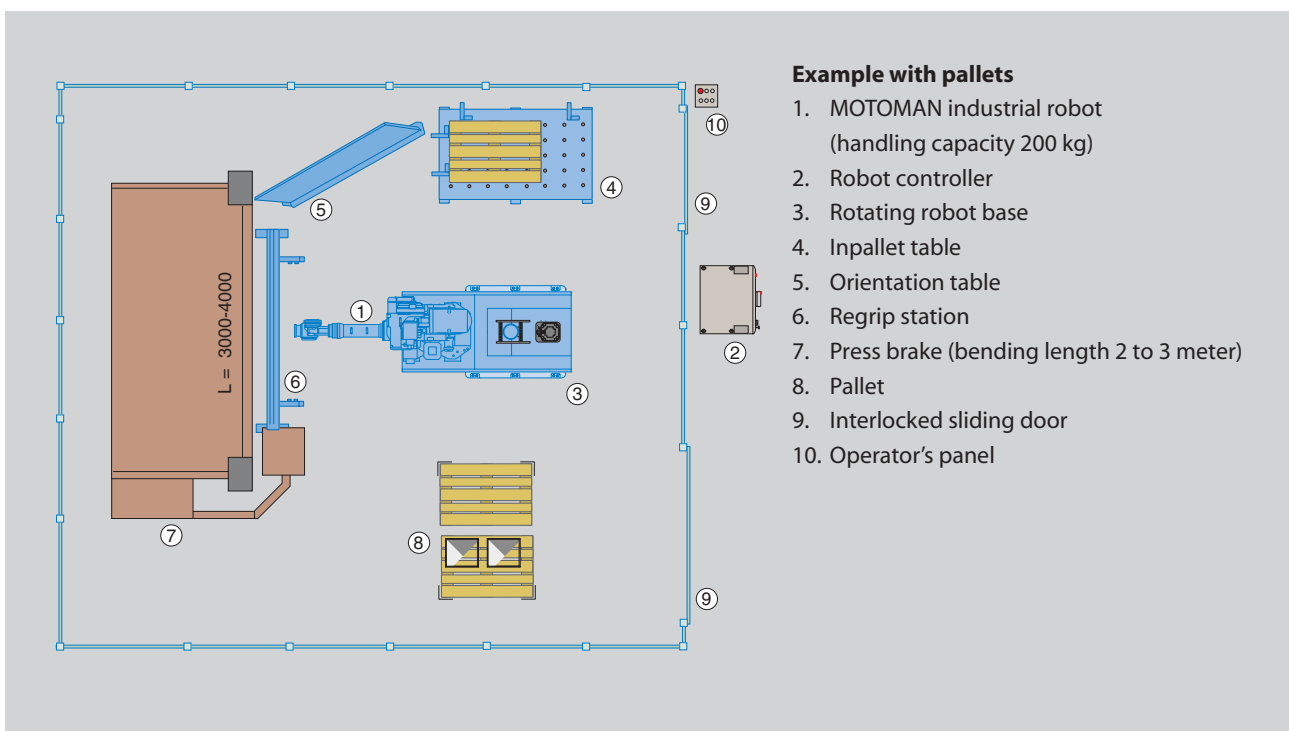
1. MOTOMAN industrial robot (handling capacity 50 kg)
2. Robot controller
3. Rotating robot base
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake
8. Roller conveyor for Euro-pallet without collar
9. Infeed magazine (max 15 pallets)
10. Interlocked sliding door
11. Operator's panel

## Press-brake cell for large and heavy parts



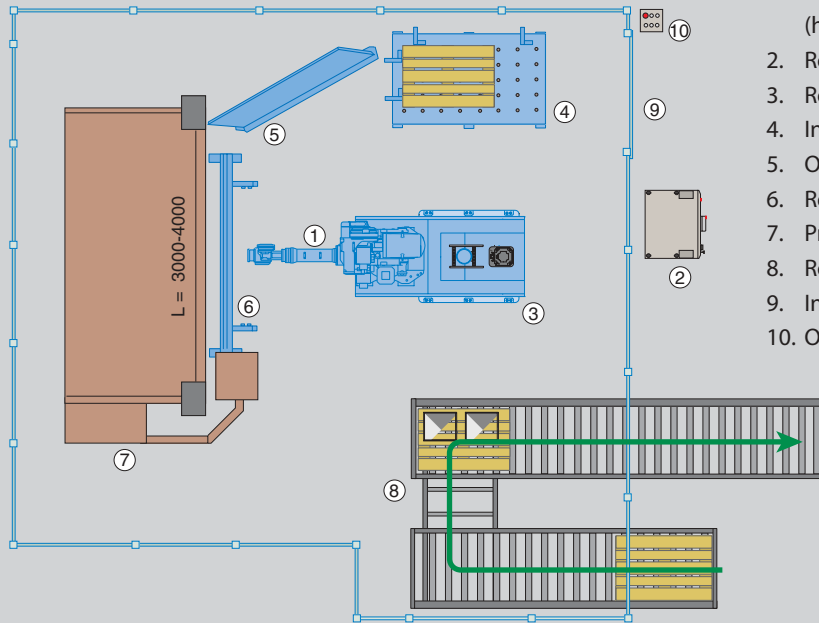
For the very large and heavy workpieces there are MOTOMAN industrial robots, available with handling capacity up to 280 kg. When designing the safety fencing for this type of press-brake cell it is important to include the size and weight of the robot's gripper as well as the workpiece.

The layout example shows cells where the robot picks up the sheets from an inpallet table and finished products are placed on a pallet or roller conveyor. The roller conveyor can have a pallet magazine for empty pallets.



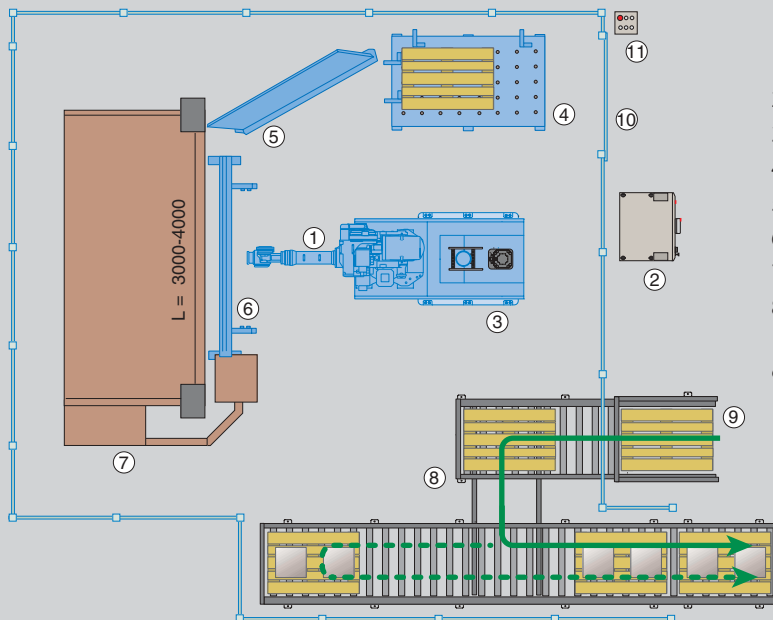
# Press-brake cell for large and heavy parts

## Example with roller conveyor



1. MOTOMAN industrial robot (handling capacity 200 kg)
2. Robot controller
3. Rotating robot base
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake
8. Roller conveyor for Euro-pallets
9. Interlocked sliding door
10. Operator's panel

## With roller conveyor and infeed magazine



1. MOTOMAN industrial robot (handling capacity 200 kg)
2. Robot controller
3. Rotating robot base
4. Inpallet table
5. Orientation table
6. Regrip station
7. Press brake (bending length 2 to 3 meter)
8. Roller conveyor for Euro-pallet without collar
9. Infeed magazine (max. 15 pallets)
10. Interlocked sliding door
11. Operator's panel

## Standard equipment



### Gripper

The robot's gripper is built by standard aluminium profiles and this makes them easy to design or modify to a low cost. Quick plug-in contacts for electricity and air makes it easy to change between several grippers. In order to be able to handle perforated sheet and other materials not suitable for the regular vacuum cups, it can be equipped with magnets or gripper fingers instead.



### Rotating robot base

A servo powered robot base that will increase the robot's reach with up to 1100 mm. Longer workpieces can be handled, and the whole press' bending length can be used. It enables the robot to find the optimal distance from the press in every moment. The rotating base is integrated in the robot's contry system and is available in sizes suitable for MOTOMAN's industrial robots with handling capacity up to 500 kg.

## Robot tools and accessories



### Regrip station

Adjustable regrip station built in modules from aluminium profiles and furnished with magnets, adjustable reference stops and built-in position meters. Can be supplied with extra support and grippers, separate vacuum cups for small sheets and floor fastener.



### Orientation table

The orientation table is equipped with a roller chain which quickly orients the sheet and a sensor which indicates when it is in correct position. There are models available for different sheet thickness and width, and with the orientation tilted to the left or right.

## Standard equipment



### Rotating sheet magazine

A rotating infeed magazine with two stations, for small sheets. The magazine can be loaded while the cell is in operation, and the change of station is performed manually. It is equipped with magnetic separators that can be adjusted to suit different sheet sizes.



### Stationary magazine table

Magazine table for small sheets with adjustable magnetic separators and a built-in scale. The magazine table can be divided into two or three sections. Below the table it is possible to mount a separate orientation table for small sheets.

## Equipment for material handling



### Inpallet table

The inpallet table is designed for loading with a forklift truck or a truck with supporting beam. It has adjustable side guides and is available in different widths. Sheet separating can be done either with magnets, or brushes and air curtain. Double sheet control equipment as an option.



### Sheet feeder

Letting the sheet feeder pick up and transfer sheets from the inpallet table to the orientation table helps reduce the cell's cycle time. The robot is freed from that particular task and can concentrate on the bending sequence. When not in use, the feeder can simply be put into a parking mode and allow the robot to pick up the sheets from the inpallet on its own.



### Customised solutions

If our standard range of robot gripper tools and equipment for material handling is not enough, you could always adapt or modify our standard products to suit your specific needs. Over the years we have developed a number of special solu-

tions like the automatic tool change unit, where the robot selects the right gripper depending on the work piece, and accompanying equipment that travels with the robot with extra space for spare sheets that can help minimize the cycle



time. We have also developed combination tools with gripper fingers capable of handling very small parts and difficult positions during the bending sequence, as well as flexible regrip stations. MOTOMAN also has a lot of experience of

how to handle the material efficiently before and after the press-brake cell.

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