



GLOBAL METALFORMING SOLUTIONS

# CUSTOM-MADE BLANKING LINE

The capacity of providing turnkey metal stamping systems managing and coordinating various sources to ensure functionality, availability, reliability and accuracy increasingly represents a 'plus' with great added value.



MODEL  
**S4-8000/E**

TYPE  
**Blanking line**

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## TECHNICAL CHARACTERISTICS

Quality:	Cold rolled and/or galvanised steel
Ultimate strength:	Up to 1 mm thickness: 220-900 MPa
From 1 to 3 mm thickness:	230-550 MPa
Yield point:	Up to 1 mm thickness: 160-550 MPa
From 1 to 3 mm thickness:	170 – 380 MPa
From 2.5 to 3 mm thickness (max 880 mm width):	380 MPa
Slide adjustment (ADJ):	250 mm
General structural deflection:	0.100 mm/m
Slide dimensions:	5000x2630 mm
Moving bolster dimensions:	5000x2630 mm
Distance of moving bolster from floor:	650 mm
Continuous speed (variable):	15-65 s/min
Rated energy at 15 strokes/min (10% slow down):	25 kJ
Rated energy at 25 strokes/min (10% slow down):	50 kJ
Motor:	DC variable speed
Rated power:	132 kW
Type of motor control:	DC inverter
Max noise level:	80 dBA

### Coil parameters

Max coil width:	2150 mm
Min coil thickness:	0.5 mm
Max coil thickness:	2.5 mm
Coil weight:	35 t
Max outer coil diameter:	2000 mm

### Line speed

Working speed (feeder speed):	up to 100 m/min
Straightening speed:	15 m/min
Leveller:	6 HI
Number of straightening cylinders:	17
Actual cylinder length:	2300 mm



## TECHNICAL CHARACTERISTICS (CONT.)

### Exit stacker

Type of movement:	Start-Stop
Material to be handled:	Hot, cold rolled, galvanised steel and (prepared for) aluminium
Blank Thickness:	0.5 – 2.5 mm
Strands:	max 4
Blank width:	400-2150 mm
Blank length (each station):	400-4000 mm
Stack height (300 mm pallet included):	800 mm
Stacking accuracy:	1 mm (sheet to sheet) 3 mm (stack)
Stack weight:	10 t
Diameter of levelling rolls (cassette for structural parts):	45 mm
Number of intermediate rolls:	19
Number of back-up cylinders:	9 + 9
Main motor power:	250 kW

## MAIN TECHNICAL CHARACTERISTICS

Press type:	simple action
Rated power:	8000 kN
Rated distance from BDC:	6.3 mm
Slide kinematics:	Eccentric and con-rods
Quantity of con-rods:	4
Slide fixed stroke:	300 mm
Distance table/slide to BDC:	1200 mm
Line speed:	100 m/min
Press cycle time:	70 spm
Length of stacking stations:	4200 mm (each)
Stacker speed:	150 m/min
Belt top conveyor:	2 x 4 belts (each guided and adjustable in length)
Pushers:	4 each bank
No. of pusher bank:	6.each station
Number of trolleys:	2
Trolley size:	4200 x 2400 mm
Pusher control:	individual
Magnetic force:	permanent



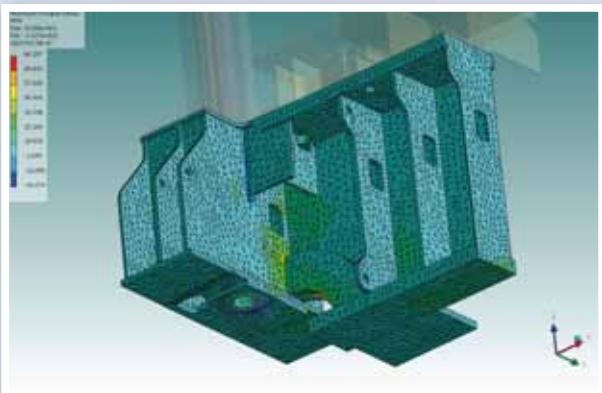


# CUSTOM-MADE BLANKING LINE

## DESIGNED FOR FLEXIBILITY AND QUALITY

The S4-8000/E blanking press was designed and manufactured by AIDA for the production of blanks for the production of structural details and body parts for the car industry. The entire line was conceived specifically to meet the requirements of a well-known Italian Tier 1 manufacturer with flexibility and quality as the main objectives of the project.

"The main need of our customer", said Alessandro Galli, area manager for the automotive sector, "was that of managing the entire coil process within the company, from coil to finished product. In the past, large car body parts (doors, side panels and so on) were pre-blanked by a sub-supplier and then stacked to be fed to the tandem lines where the drawing, blanking and trimming phases are carried out. Managing this step of the process provides the double advantage of reducing logistic costs dramatically, and of monitoring product quality with greater attention.



As already mentioned, the customer is a direct manufacturer for automotive OEMs with quality requirements for cosmetic parts, such as the car outer body, that call for the complete absence of visible defects (scratches, dents and the like) on the finished product. This requirement was one of the main constraints of the project".

The approx 60 m long blanking line is composed of:

- A loading cradle for a 25 t coil
- A single decoiler with hydraulic expansion
- A straightening unit with a double set of rolls (one for the management of the initial part of the coil and the second for the 'clean' part of same)
- Shears for cutting the initial part of the strip and scrapping the final part
- A washing and oiling unit to ensure the absence of dust on the strip during the working phase
- A six-high leveller – the core of the feeding system – having the possibility of changing the shape of the rolls to ensure the maximum flatness at the exit
- A pinch roll to keep the strip in traction during the levelling phase
- A loop to enable continuous levelling without any slowing or stoppage that could damage the strip
- An NC pinch roll for strip feeding
- A device to advance coil end to completion
- The S4-8000/E AIDA press
- A highly flexible NC stacking system that enables part stacking in multiple configurations.



## CUSTOM-MADE BLANKING LINE

The stacker is suitable for blanks ranging from 4 x 2 m, typical of car body sides, up to 400 x 400 mm parts. Each platform can hold up to six different stacks. The system is designed for the future installation of a rear stacker so as to enable the production of parts with lateral ejection.

In consideration of the increase in the use of aluminium body parts, the line can manage this type of production as well (material handled by suction cups instead of magnets).

AIDA has adopted specifically designed solutions in response to the customer's high-quality requirements.

"The leveller was designed taking into consideration the wide range of parts to be produced: outer components of large size and reduced thickness, parts of greater thickness and materials with high performance mechanical characteristics. "This requirement" Galli points out, "brought us to choose a machine with the possibility of replacing the cassette of the levelling rolls with one set dedicated to panels and another to structures".

Upon discharge of the blank from the press, the tool drops the part onto a specially provided servo driven magnetic conveyor which moves forward according to a program. The blank attaches to another magnetic conveyor to be discharged onto the stacking station. "The stacking station" continues Galli – "is not provided with a centring jig which could ruin the parts. The parts are simply dropped, by means of special ejectors, onto the stack. The centring occurs automatically (without centring devices) with a tolerance of 3 mm in total and less than 1 mm



from part to part, enabling the automatic pick-up of the parts to feed the machines for the subsequent operations. The protective tunnels before and after the blanking station have quality purposes as well: to avoid contact of sheet metal with dust. The same applies for the washing tunnel. I would like to underline the fact that for the sake of flexibility, a car body side and subsequently six structural bi-pillars can be automatically stacked only by reorganising production, without any equipment set-up. It can therefore be stated that the line has extreme flexibility".

### RIGIDITY AND MINIMAL VIBRATIONS

The 8,000kN press (Galli points out that AIDA manufactures presses of this type up to 12,500 kN) has a cycle time up to 65 strokes/min and a stroke of 300 mm, and is especially conceived for blanking operations. The table size is 5000 x 2650 mm,





## CUSTOM-MADE BLANKING LINE

typically suitable for the production of panels for the automotive sectors (doors, body sides). The slide motion is obtained by means of a simple reduction eccentric drive with a 4-point, double helical gear. This technical solution, in addition to being a must, due to the high peripheral gear speed, has the advantage of minimizing the noise level.



The press is designed for maximum rigidity: with a table area of 5000 mm it has a general structural deflection of only 0.100 mm/m with very reduced clearance limit vibrations and obtain maximum forming accuracy. The slide guides are of bronze.

"The clearance is reduced to the minimum so as to ensure the greatest blanking accuracy and therefore also limited tool wear and reduced vibrations. AIDA carried out a detailed analysis of finite elements aimed at limiting deformation of the components under load and at ensuring that the strains - especially in welded areas – be contained within the values

set by European regulation (Euro code 3). AIDA increasingly shares these tests with its customers who then analyse the results for a constructive dialogue on strain and deformation values. In this way the customer knows exactly how its press works from both the functional and structural viewpoint. The struggle against vibrations led our engineers to shift their interest towards ancillary equipment and therefore from the press to the outer soundproofing booth. Valves, adjusters and power packs are fitted to this booth, and not to the press. As a result, the components are completely isolated from the vibrations of the press, which are significant, in particular when high-tensile steel body parts are being stamped".

The stamping force is continuously monitored and checked against the typical values of the tool so as to be able to intervene immediately should a malfunctioning or worsening of the performance level occur.





# CUSTOM-MADE BLANKING LINE

## HIGH AVAILABILITY AND RELIABILITY LEVEL

The press is controlled by a supervision system displaying all the press and line functions. Single stations are positioned all along the line; one for press control, one for the stacker, one for the feeding line and one for the leveller. Further local stations are provided. The control system is by Siemens whereas each machine has its own control system with PLC S7 in Ethernet. There is a data exchange between the various machines to identify the tool code and any anomalies. The overall safety system of the equipment is managed by a Pilz system supervising all operator/machine functions (door, photocell management, machine control, safety level of the various areas before operator access, etc.), alarm diagnostics, teleservice system.

"Within AIDA there is a specific automation department dealing with PLC programming, transfer units, motors, inverter configuration, etc, and skilled personnel for programming the safety PLCs and the man-machine interface". The setting is automatic on the basis of the tool code. While the press is working, it is possible to set up the subsequent production on an external moving bolster. When new production starts, the machine automatically resets based on the new parameters, the tool is inserted in the press and the new production can start in a very limited period of time. The line was completed by the customer with the addition of a system which discharges scraps into the pit and from which they are conveyed to the collecting system.



"The line will work 3 shifts , 6 days a week. Everything was conceived according to this perspective given the key role of the press (compared to the equipment positioned after the press which can feed up to 4 or 5 tandem lines), its availability must be such as to ensure the attainment of this target.

## A REAL "PLUS": THE "TURN-KEY" SYSTEM

"The S4-8000/E press – says Paolo Mauri, of the Marketing Dept. – is one of AIDA's latest productions and is part of a heritage consolidated over the years in the field of blanking lines. AIDA Engineering (the Japanese parent company) placed its know-how at our disposal, thus providing the presses manufactured in the Italian workshops, (due to the specific requirements of the European market), with those characteristics of reliability and performance





# CUSTOM-MADE BLANKING LINE

typical of the presses manufactured in Japan. As to the equipment positioned before and after our press (i.e.: the coil feeding line, the stacking system, the strip washing system and the soundproof booth), our suppliers are among the leading experts in the field and in the manufacture of dedicated lines - in order to ensure the high quality level of the entire line. In this project, AIDA acted as main contractor, as happens more and more frequently in the supply of complex stamping systems.

Capability of supplying turnkey systems is a real 'plus' in this market. In fact, ensuring the coordination of all the activities, acting as an interface with the suppliers and managing quality control require uncommon expertise and leadership. Among our most recent accomplishments I would mention a line delivered to Eastern Europe composed of an S4-8,000/E blanking press together with a tandem line for car body parts composed of a 20,000 kN leading press, two 10,000 kN presses and two 8,000 kN presses. The line is completely automated by means of robots.

AIDA's capability of following large projects is proven by the fact that we are simultaneously manufacturing three large 12000kN transfer presses for a well-known German car maker. Last but not least, I would like to underline the financial stability and the monetary liquidity of the group - aspects that are becoming increasingly important in order to ensure production continuity alongside our costumers.

## STRONG POINTS

### High degree of flexibility:

- Possibility of stamping blanks for car body parts from high tensile steels with medium and greater thickness and limited size
- Possibility of producing blanks for panels with less resistant steel, medium, great thickness and larger size.
- Prepared for aluminium.

"We provided the customer with a complete response to the requirements of a line suitable for the manufacture of the widest range of parts possible in terms of materials, thickness and size.

### High level of productivity:

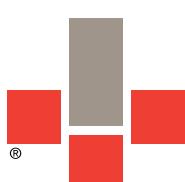
- This line is of critical importance in that it supplies blanks to all the subsequent stamping lines and was therefore designed to work 3 shifts, 6 days a week.

### High level of rigidity:

- Thanks to detailed FEM analysis aiming at limiting the deformation of components during operation and at ensuring that the strain level on welded areas does not exceed the values indicated in the European regulation (Euro code 3).

### High level of accuracy and reliability:

- Thanks to the optimisation of the highly rigid frame, the minimisation of the clearance (as well as limited tool wear and vibrations) and the optimal stacking solution.



**AIDA**<sup>®</sup>  
Europe

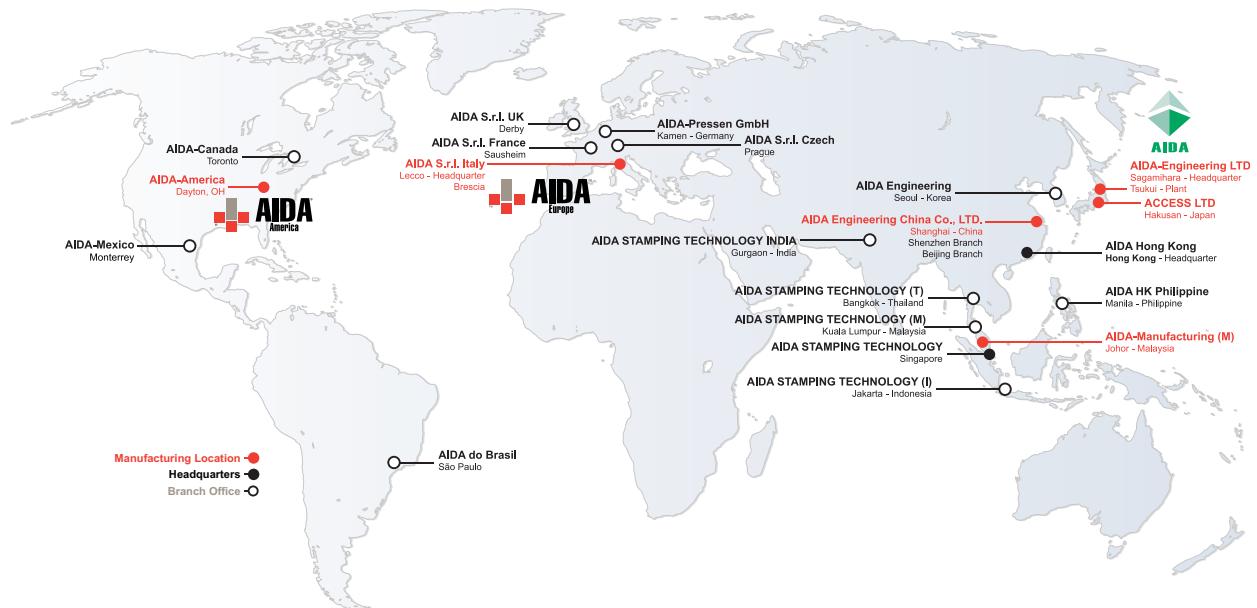


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## MORE THAN 90 YEARS EXPERIENCE

AIDA has a manufacturing space of 185,800 square meters divided into eight main manufacturing locations worldwide in Japan, Malaysia, China, USA and Italy. Annual sales are of approximately 415 million Euros with 5% of the annual revenue reinvested into research and development activities. AIDA has more than 1600 associates worldwide working in its manufacturing facilities and numerous customer support centers and service bases spanning more than 50 countries. More than 70,000 presses have been manufactured since beginning of operations 90 years ago. AIDA offers state of the art industrial technology in metal forming and automation based on the following reference principles: global presence together with highly qualified regional service; commitment to R&D for continuous improvement of productivity, product value and AIDA's products overall competitiveness.



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