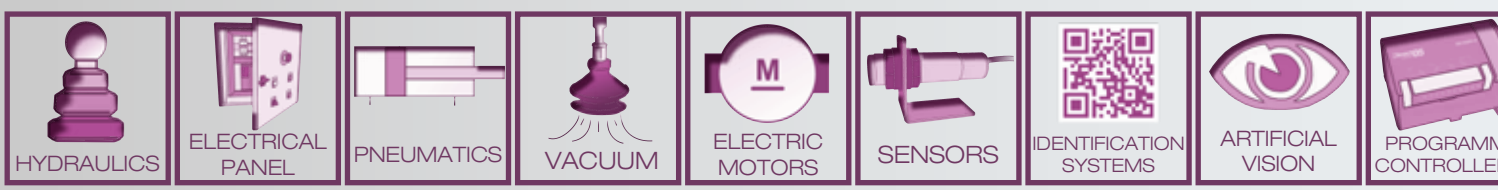
FAS-200

Flexible assembly system

New flexible assembly system for mechatronics and automation skills training

Many technologies in the same system

In the following TECHNOLOGIES...



SMC
INTERNATIONAL TRAINING

Develop the SKILLS...

ANALYSIS

TROUBLESHOOTING

DESIGNING

TECH DOCUM. CREATION

INSTALLATION AND ASSEMBLY

TECH DOCUM. UNDERSTANDING

OPERATION

PROGRAMMING

SETTING UP

More stations within the same space!

M. RS | MANIPULATORS | ROBOTICS | INDUSTRIAL COMMUNIC. | MOTION CONTROL | SCADA / HMI | AUTOMATED SYSTEMS

FAS-200 - Flexible assembly system

FAS-200 is a flexible and compact assembly system which includes industrial automation technologies.

FAS-200 comprises up to 18 independent stations with integrated control. This modular equipment features a higher number of stations in the same space, which means that more users will be able to work at the same time.

In addition, it enables making a staggered investment, i.e. starting with an initial basic configuration which can be easily enhanced by adding workstations.

FAS-200 offers professional skills training to suit the world of industry using standardised industrial components.

The different process stations assemble a turning mechanism. To provide the system with greater flexibility, the stations adapt to a wide variety of assemblies, introducing variations in the materials, colours and part sizes. The combination of all these options means that a total of 24 different assemblies can be produced enabling the use of production management strategies.

Each of the FAS-200 system stations carries out part of the process.

- FAS-201: Base feeding / verification station

This stations feeds the base for the rotation mechanism and verifies that its orientation / position is correct.

- FAS-202: Base rejection / transfer station

The second station positions the correctly placed bases on the pallet and rejects those which are incorrect.

• FAS-203: Bearing feeding / transfer station

This station supplies the bearing and moves it to the measuring position. There are two types of bearings with different heights.

• FAS-204: Bearing measuring / transfer station

The FAS-204 station measures the height of the bearing provided by the previous station.

• FAS-205: Hydraulic pressing station

This station emulates the pressing of the bearing against the base.

• FAS-206: Transfer station to the hydraulic press

The FAS-206 station feeds work-piece to the press and picks it up / drops it onto the pallet.

• FAS-207: Shaft classification station

This station feeds the assembly shafts and verifies their material and position. Two types of shafts exist with different materials.

• FAS-208: Shaft rejection / transfer station

The eighth station rejects the with incorrect material or faulty positioning and inserts the correct ones into the work-piece.

• FAS-209: Lid classification station

This station feeds and inspects that are to be added to the work-piece. There are 6 different types of lids with varying material, colour and height.

• FAS-210: Lid rejection / transfer station

The tenth station rejects incorrect lids or inserts them onto the pallet if they are of the required type for the work-piece.

• FAS-211: Screw dispensing station

FAS-211 feeds and transfers the screws to the following station.

• FAS-212: Screw insertion station

The FAS-212 station inserts the four screws into the base.

• FAS-213: Robotised screwing station

This station integrates robotics technology. The robot screws in the four screws inserted in the product by the previous station.

• FAS-214: Transfer and visual inspection station

This station performs the quality control for work-piece using an artificial vision system.

• FAS-215: Rejection station after visual inspection

This station rejects the work-piece if the inspection result is unsatisfactory.

• FAS-216: Storage station

The product is removed from the production line and stored using electric actuators.

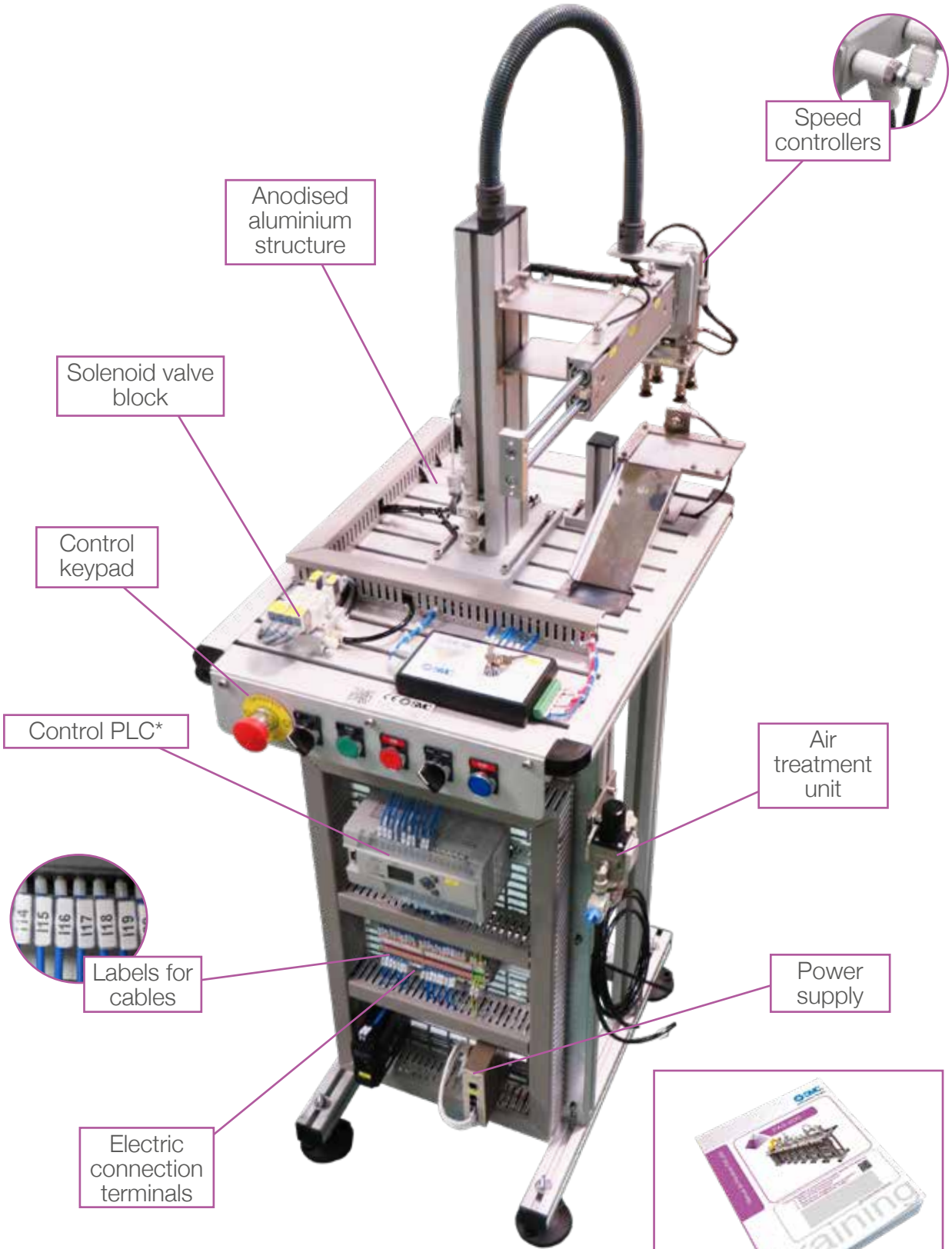
• FAS-220: Pallet transfer station

This stations transfers the pallet from one transfer line to another in a parallel transfer configuration.

• FAS-230: Linear transfer for 4 stations

The FAS-230 station transports the pallet between the stations. Each transfer connects 4 stations.

Common elements in all stations

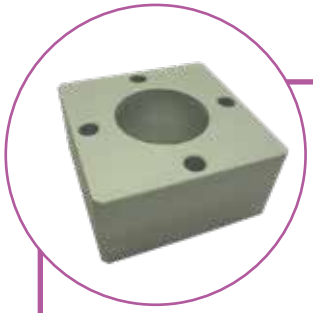


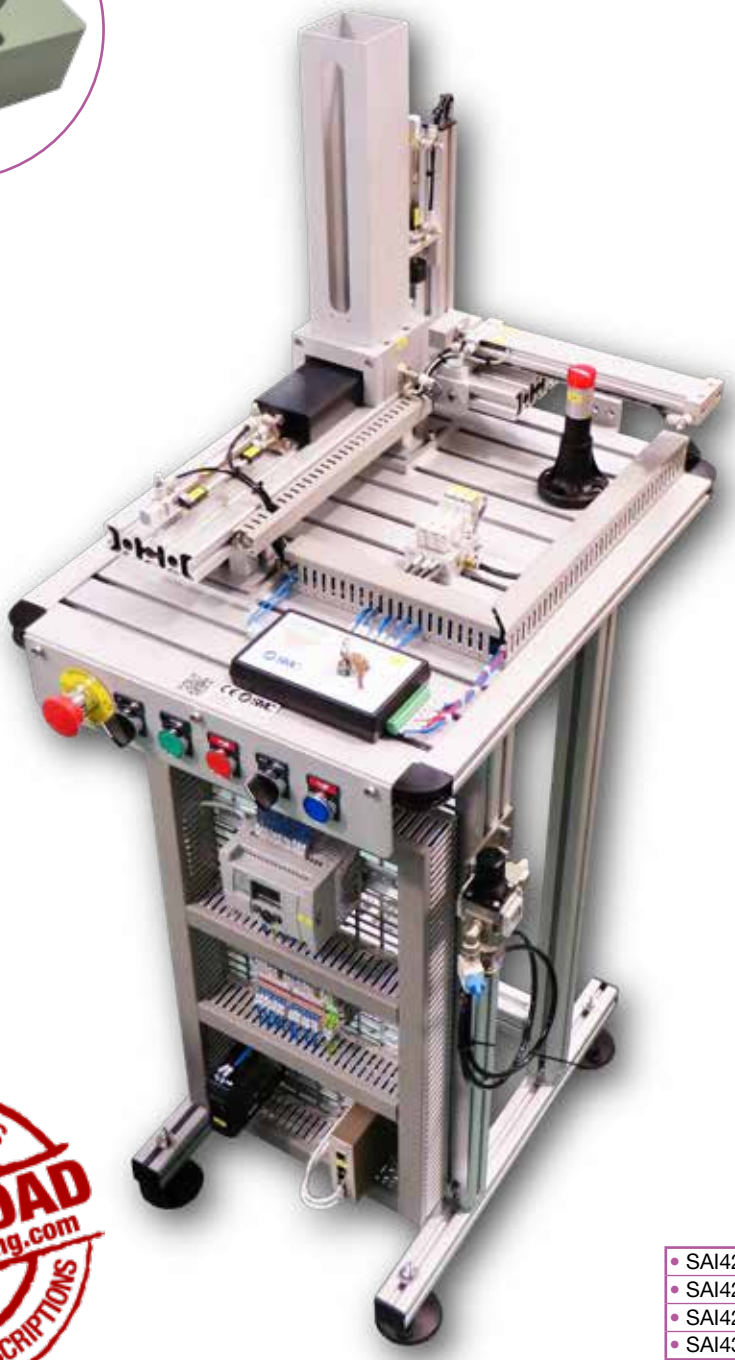
*Options: PLC Siemens, Omron, Allen Bradley, or without PLC.

FAS-201: Base feeding / verification station

This station feeds the base that serves as support to the assembled product and verifies its correct orientation.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.





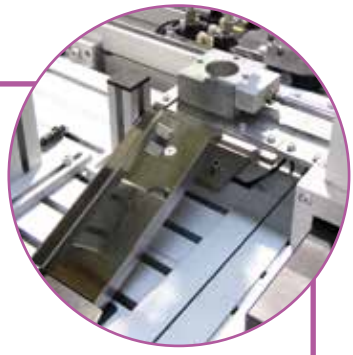
Breakdown simulation system

- SAI4201 FAS-201 with Siemens PLC
- SAI4217 FAS-201 with Omron PLC
- SAI4241 FAS-201 with Allen Bradley PLC
- SAI4301 FAS-201 without PLC

FAS-202: Base rejection / transfer station

This second station positions the correctly placed bases on the pallet and rejects those which are incorrect.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Breakdown simulation system

- SAI4202 FAS-202 with Siemens PLC
- SAI4218 FAS-202 with Omron PLC
- SAI4242 FAS-202 with Allen Bradley PLC
- SAI4302 FAS-202 without PLC

FAS-203: Bearing feeding / transfer station

This station supplies the bearing and moves it to the measuring position. Bearings can be inserted with two different heights.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

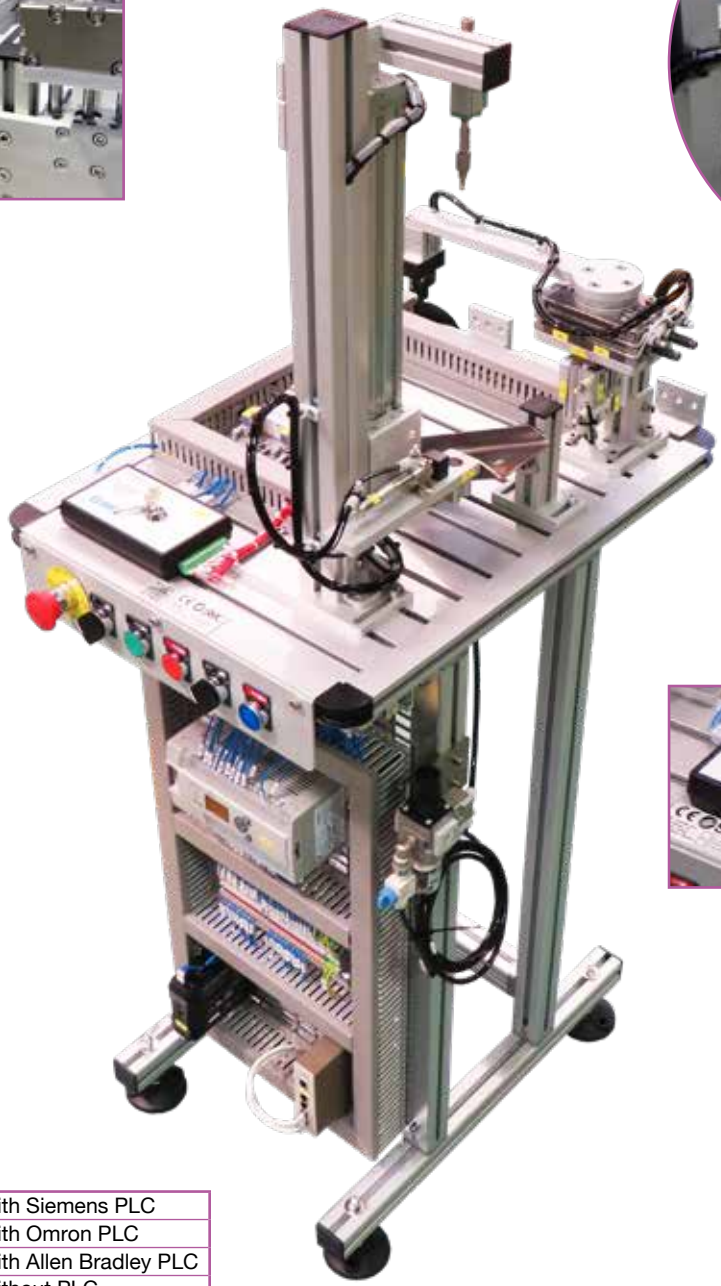
Breakdown simulation system

- SAI4203 FAS-203 with Siemens PLC
- SAI4219 FAS-203 with Omron PLC
- SAI4243 FAS-203 with Allen Bradley PLC
- SAI4303 FAS-203 without PLC

FAS-204: Bearing measuring / transfer station

This station measures the height of the bearing provided by the previous station and inserts it into the base. The measurement is performed using a series of actuators and a probe that acts on a linear potentiometer. In the event that the bearing height is not suitable, it will be rejected.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Breakdown simulation system

- SAI4204 FAS-204 with Siemens PLC
- SAI4221 FAS-204 with Omron PLC
- SAI4244 FAS-204 with Allen Bradley PLC
- SAI4304 FAS-204 without PLC

FAS-205: Hydraulic pressing station

In this phase of the process is emulated the pressing of a bearing is emulated.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

Breakdown simulation system

- SAI4205 FAS-205 with Siemens PLC
- SAI4222 FAS-205 with Omron PLC
- SAI4245 FAS-205 with Allen Bradley PLC
- SAI4305 FAS-205 without PLC

FAS-206: Transfer station to the hydraulic press

This station feeds the work-piece to the FAS-205, the hydraulic pressing station. After pressing it picks it up / drops it on the pallet.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

Breakdown simulation system

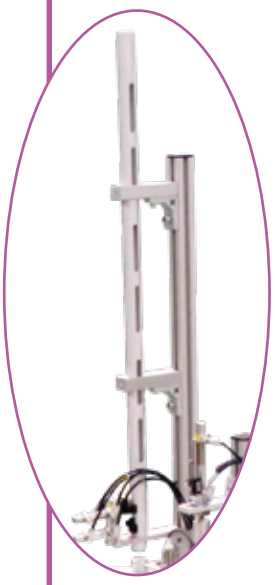
- SAI4206 FAS-206 with Siemens PLC
- SAI4223 FAS-206 with Omron PLC
- SAI4246 FAS-206 with Allen Bradley PLC
- SAI4306 FAS-206 without PLC

FAS-207: Shaft classification station

This station feeds the assembly shafts and verifies their material and position. Two types of shafts exist depending on the material: aluminium and nylon. This increases the number of possible finished products which are assembled, while also increasing the didactic capacities of the FAS-200.

The different operations undertaken in this station are distributed around an index plate. The operations are: shaft feeding, measuring shaft height and material detection.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Gravity feeder

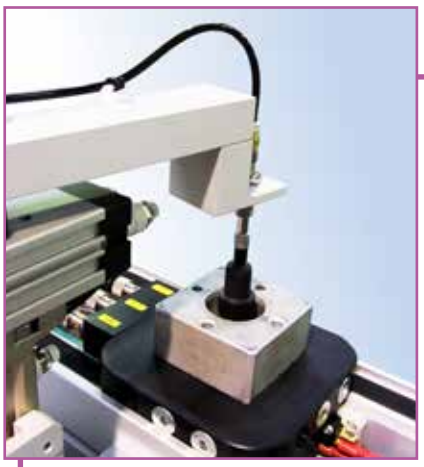
Breakdown simulation system

- SAI4207 FAS-207 with Siemens PLC
- SAI4224 FAS-207 with Omron PLC
- SAI4247 FAS-207 with Allen Bradley PLC
- SAI4307 FAS-207 without PLC

FAS-208: Shaft rejection / transfer station

This station rejects the shafts which are incorrectly aligned or are the wrong material and inserts the correct ones into the work-piece.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Breakdown simulation system

- SAI4208 FAS-208 with Siemens PLC
- SAI4225 FAS-208 with Omron PLC
- SAI4248 FAS-208 with Allen Bradley PLC
- SAI4308 FAS-208 without PLC

FAS-209: Lid classification station

This station feeds and inspects the lids to be assembled in the work-piece. There are 6 different types of lids depending on the material (aluminium or nylon), colour (light or dark) and height (high or low).This variety offers the station more didactic possibilities. The operations carried out in this station are distributed around an index plate.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

Breakdown simulation system

- SAI4209 FAS-209 with Siemens PLC
- SAI4226 FAS-209 with Omron PLC
- SAI4249 FAS-209 with Allen Bradley PLC
- SAI4309 FAS-209 without PLC

FAS-210: Lid rejection / transfer station

The tenth station rejects the lids or inserts them in the work-piece if the lid provided by the previous station is of the required type.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

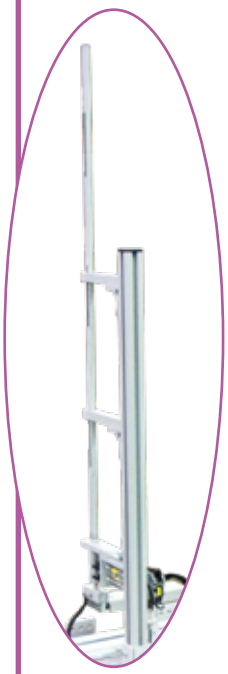
Breakdown simulation system

- SAI4210 FAS-210 with Siemens PLC
- SAI4227 FAS-210 with Omron PLC
- SAI4250 FAS-210 with Allen Bradley PLC
- SAI4310 FAS-210 without PLC

FAS-211: Screw dispensing station

This station feeds and transfers the screws to be assembled in the work-piece to the following station.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Gravity feeder

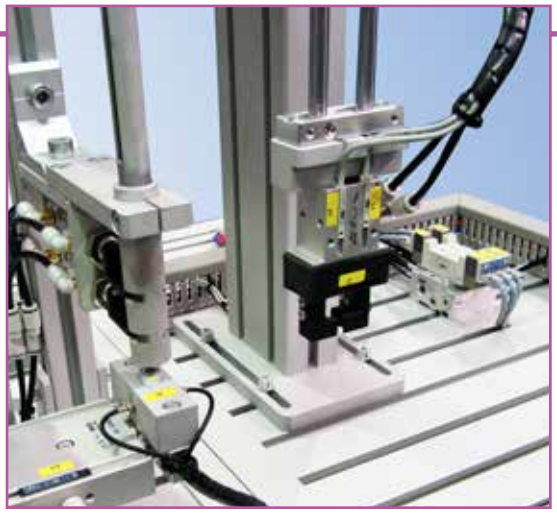
Breakdown simulation system

- SAI4211 FAS-211 with Siemens PLC
- SAI4228 FAS-211 with Omron PLC
- SAI4251 FAS-211 with Allen Bradley PLC
- SAI4311 FAS-211 without PLC

FAS-212: Screw insertion station

This station inserts the screws into the base of the work-piece. Given that screw feeding is carried out at only one point, an additional mechanism has been included in the transfer to carry out the successive rotations of the pallet.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Breakdown simulation system

- SAI4212 FAS-212 with Siemens PLC
- SAI4229 FAS-212 with Omron PLC
- SAI4252 FAS-212 with Allen Bradley PLC
- SAI4312 FAS-212 without PLC

FAS-213: Robotised screwing station

This station integrates robotics technology which is widely used in automated environments.

In this part of the process, an industrial robot fastens the four screws inserted into the product by the previous station.

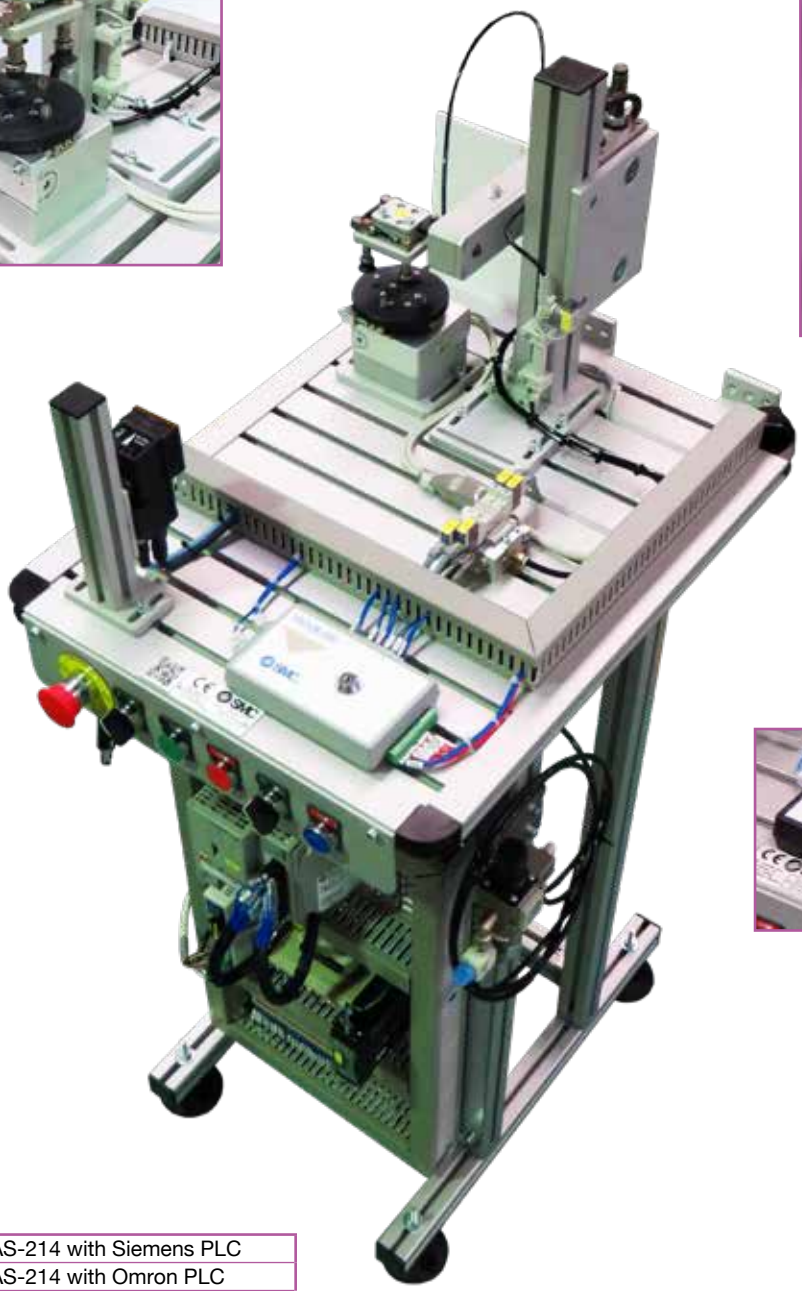
**Check available robot options.*

- SAI4213 FAS-213 with Siemens PLC
- SAI4231 FAS-213 with Omron PLC
- SAI4253 FAS-213 with Allen Bradley PLC
- SAI4313 FAS-213 without PLC

FAS-214: Transfer and visual inspection station

This station performs the quality control of the work-piece using an artificial vision system. From the inspection position, an artificial viewing system examines the assembled components.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.



Breakdown simulation system

- SAI4214 FAS-214 with Siemens PLC
- SAI4232 FAS-214 with Omron PLC
- SAI4254 FAS-214 with Allen Bradley PLC
- SAI4314 FAS-214 without PLC

FAS-215: Rejection station after visual inspection

This station rejects the work-piece if the inspection result is unsatisfactory.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

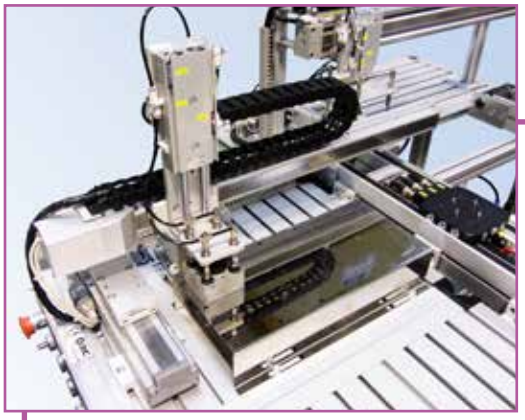
Breakdown simulation system

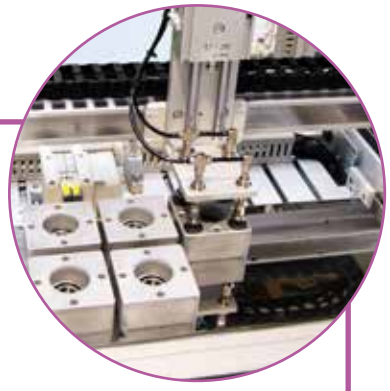
- SAI4215 FAS-215 with Siemens PLC
- SAI4233 FAS-215 with Omron PLC
- SAI4255 FAS-215 with Allen Bradley PLC
- SAI4315 FAS-215 without PLC

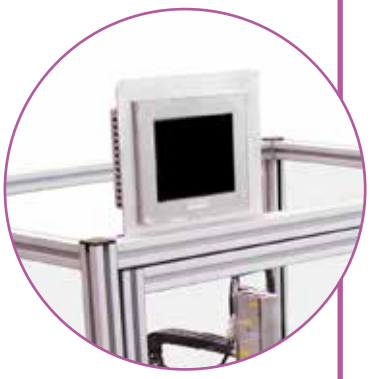
FAS-216: Storage station

This station stores the finished product.

The warehouse has been set up using a system based on three coordinate shafts, one of them servo-controlled.







Optional HMI screen SAI0811

- SAI4216 FAS-216 with Siemens PLC
- SAI4234 FAS-216 with Omron PLC
- SAI4256 FAS-216 with Allen Bradley PLC
- SAI4316 FAS-216 without PLC

FAS-220: Pallet transfer station

This station transfers the pallet with the work-piece from one transfer to another in a parallel configuration.

The troubleshooting simulation system TROUB-200 is included, which generates up to 16 different breakdowns to be diagnosed by the user.

Breakdown simulation system

- SAI4220 FAS-220 with Siemens PLC
- SAI4235 FAS-220 with Omron PLC
- SAI4257 FAS-220 with Allen Bradley PLC
- SAI4317 FAS-220 without PLC

FAS-230: Linear transfer for 4 stations

The FAS-230 transports the pallet between the stations. Each transfer connects 4 stations.

• SAI4230 FAS-230 linear transfer for 4 stations

FAS-200 - With this system you could...

FAS-200 comes up with different practical activities targeting skills in the technologies featuring in the table (below).

TECHNOLOGIES

SKILLS

	HYDRAULICS	ELECTRICAL PANEL	PNEUMATICS	VACUUM	ELECTRIC MOTORS	SENSORS	IDENTIFICATION SYSTEMS	ARTIFICIAL VISION	PROGRAMM. CONTROLLERS	MA
ANALYSIS										
TROUBLESHOOT										
DESIGNING										
TECH DOCUM. CREATION										
INSTALLATION AND ASSEMBLY										
TECH DOCUM. UNDERSTANDING										
OPERATION										
PROGRAMMING										
SETTING UP										

This shows how the FAS-200 is suitable to develop skills in the specific technology.

This shows that FAS-200 can help develop skills in the specific technology even though there are other more appropriate products in the range.

eLEARNING-200

Find out more about the theory behind the technologies developed in FAS-200 with our eLEARNING-200 courses.

ANIPULATORS	ROBOTICS	INDUSTRIAL COMMUNIC.	MOTION CONTROL	SCADA / HMI	AUTOMATED SYSTEMS

RELATED eLEARNING-200 COURSES

- Introduction to industrial automation (SMC-100)
- Principles of pneumatics (SMC-101)
- Introduction to electricity (SMC-102)
- DC electricity (SMC-103)
- Solid state (SMC-105)
- Introduction to wiring (SMC-106)
- Sensors technology (SMC-108)
- Programmable controllers (SMC-109)
- Hydraulics / electrohydraulics (SMC-111)
- Robotics (SMC-113)

**See eLEARNING-200 chapter for more information*

FAS-200 - Options

FAS -200 has a series of optional extras.

• Programming tools

The programming tools comprise the appropriate programming software, the industrial system communication programming software and cables for the chosen PLC.

*See Programming Tools chapter

• SCADA: Supervisory Control and Data Acquisition

This is a standard-use software application in industry, making it easier to supervise and control processes from the computer screen.

• SAI4998 SCADA APPLICATION FAS-200

• FAS-200 application for autoSIM-200

We have a 3D application where users can simulate, supervise and control FAS-200 from an autoSIM environment.

autoSIM is required. See autoSIM-200 chapter

LICENSES	ONE YEAR (electronic dispatch)	PERMANENTS (electronic dispatch)	PERMANENTS (physical dispatch)
3D simulator for FAS-200, 1 license	SAI1971-001	SAI1979-001	SAI2536
3D simulator for FAS-200, 8 licenses	SAI1971-008	SAI1979-008	SAI2537
3D simulator for FAS-200, 16 licenses	SAI1971-016	SAI1979-016	SAI2538

FAS-200 - Configuration

Getting the right FAS-200 specification is as easy as:

• Steps to follow

1.- Choose the PLC.
2.- Select the required stations.
3.- Add any optional extras.

• Considerations

- Any station can operate independently and be purchased separately.
- The following stations must be ordered together in these configurations of 2 or more stations.
  - The FAS-201 and FAS-202 stations, feeding and transfer of the bases.
  - The FAS-203 and FAS-204 stations, feeding and measuring / transfer of the bearings.
  - The FAS-205 and FAS-206 stations, transfer and hydraulic pressing.
  - The FAS-207 and FAS-208 stations, classification and transfer of the shafts.
  - The FAS-209 and FAS-210 stations, classification and transfer of the lids.
  - The FAS-211 and FAS-212 stations, feeding and insertion of the screws.
  - The FAS-214 and FAS-215 stations, transfer and rejection after visual inspection.

- To work with the full system, it is necessary to include a FAS-230 transfer for every 4 stations.
- In order to work with the full system, we recommend:
  - The FAS-201 and FAS-202 stations, feeding and transfer of the bases.
  - FAS-216 storage station.

Some possible configurations

Configuration of 2 stations without transfer

Configuration of 4 stations with transfer

Configuration of 8 stations with transfer

Configuration of 10 stations with transfer

FAS-200 - Technical features

FAS-201
450x600x1310mm

Modules	Sensors (type & quantity)	Input / Output
Base feeder Position verification Movement to the point of transfer	Auto switch, Reed type (x4) Inductive (x1)	Digital 9/5
Other devices (quantity)	**Actuators (type & quantity)**	
Three-colour indication light (x1) Breakdown simulation system (x1)	Pneumatic linear (x3)	

FAS-202
450x600x1500mm

Modules	Sensors (type & quantity)	Input / Output
Incorrect base handling device Insertion of the base in the pallet	Auto switch, Reed type (x4) Vacuum pressure switch(x1)	Digital 9/7
Other devices (quantity)	**Actuators (type & quantity)**	
Vacuum pad(x4) - Vacuum ejector(x1) Breakdown simulation system (x1)	Pneumatic linear (x3)	

FAS-203
450x600x1320mm

Modules	Sensors (type & quantity)	Input / Output
Bearing feeder Transfer to the measuring station	Auto switch, Reed type (x4) Microswitch (x1)	Digital 9/7
Other devices (quantity)	**Actuators (type & quantity)**	
Three-colour indication light (x1) Breakdown simulation system (x1)	Pneumatic linear (x1) Pneumatic gripper (x1) Pneumatic rotary actuator (x1)	

FAS-204
450x600x1410mm

Modules	Sensors (type & quantity)	Input / Output
Height measurement Bearing insertion	Auto switch, Reed type (x6) Linear potentiometer (x1)	Digital 10/9 Analog 1/0
Other devices (quantity)	**Actuators (type & quantity)**	
Breakdown simulation system (x1)	Pneumatic linear (x4) Pneumatic gripper (x1) Pneumatic rotolinear (x1)	

FAS-205
450x600x1370mm

Modules	Sensors (type & quantity)	Input / Output
Pulling out set Bearing pressing	Auto switch, Reed type (x6) Security magnetic (x1)	Digital 10/5
Other devices (quantity)	**Actuators (type & quantity)**	
Breakdown simulation system (x1) Safety relay (x1) Hydraulic equipment (x1) Frequency converter (x1)	Pneumatic linear (x2) Hydraulic linear (x1)	

FAS-206
450x600x1210mm

Modules	Sensors (type & quantity)	Input / Output
Insertion/extraction of the product in process Feeding the hydraulic press	Auto switch, Reed type (x5) Vacuum pressure switch(x1)	Digital 10/6
Other devices (quantity)	Actuators (type & quantity)	
Vacuum pad (x4) - Vacuum ejector(x1) Breakdown simulation system (x1)	Pneumatic rotary actuator (x1) Pneumatic linear (x1)	

FAS-207
450x600x1800mm

Modules	Sensors (type & quantity)	Input / Output
Indexing plate Shaft feeder Shaft height measurement Detection of material	Auto switch, Reed type (x2) Inductive (x1) Capacitive (x1)	Digital 8/6
Other devices (quantity)	Actuators (type & quantity)	
Three-colour indication light (x1) Breakdown simulation system (x1)	Pneumatic linear (x7)	

FAS-208
450x600x1310mm

Modules	Sensors (type & quantity)	Input / Output
Incorrect shaft rejection Shaft insertion	Auto switch, Reed type (x8) Vacuum pressure switch(x2)	Digital 14/10
Other devices (quantity)	Actuators (type & quantity)	
Vacuum pad (x2) - Vacuum ejector(x2) Breakdown simulation system (x1)	Pneumatic rotolinear (x1) Pneumatic linear (x2)	

FAS-209
450x600x1400mm

Modules	Sensors (type & quantity)	Input / Output
Indexing plate Lid feeder Detection of material Lid height measurement	Auto switch, Reed type (x1) Inductive (x1) Photoelectric (x2) Linear encoder (x1)	Digital 10/7
Other devices (quantity)	Actuators (type & quantity)	
Breakdown simulation system (x1) Three-colour indication light (x1) Pressure regulator (x1)	Pneumatic linear (x3) Pneumatic gripper (x2)	

FAS-200 - Technical features

	Modules	Sensors (type & quantity)	Input / Output
FAS-210 450x600x1310mm	Incorrect lid removal Lid insertion	Auto switch, Reed type (x7) Vacuum pressure switch(x1)	Digital 12/10
	Other devices (quantity)	Actuators (type & quantity)	
	Breakdown simulation system (x1) Vacuum pad(x3) -Vacuum ejector(x1)	Pneumatic linear (x2) Pneumatic rotolinear (x1) Pneumatic gripper (x1)	
FAS-211 450x600x1910mm	Modules	Sensors (type & quantity)	Input / Output
	Screw feeder Transfer handling device	Auto switch, Reed type (x2) Fibre optic photocell (x1)	Digital 7/5
	Other devices (quantity)	Actuators (type & quantity)	
	Breakdown simulation system (x1) Three-colour indication light (x1)	Pneumatic linear (x3)	
FAS-212 450x600x1550mm	Modules	Sensors (type & quantity)	Input / Output
	Screw insertion handling device	Auto switch, Reed type (x4) Solid state auto switch (x2)	Digital 10/6
	Other devices (quantity)	Actuators (type & quantity)	
	Breakdown simulation system (x1)	Pneumatic linear (x2) Pneumatic gripper (x1)	
FAS-213 450x760x1700mm	Modules	Sensors (type & quantity)	Input / Output
	Robot tool Robot arm and controlling components		Digital 7/7
	Other devices (quantity)	Actuators (type & quantity)	
	Robot controlling unit (x1) Robot programming console (x1)	Electric screwing tool (x1) 6 axis robot (x1)	
FAS-214 450x600x1200mm	Modules	Sensors (type & quantity)	Input / Output
	Insertion/extraction handling device Rotary table Artificial vision industrial system	Auto switch, Reed type (x3) Vacuum pressure switch(x1) Artificial vision camera (x1)	Digital 11/14
	Other devices (quantity)	Actuators (type & quantity)	
	Vacuum pad(x4)-Vacuum ejector(x1) Servocontroller (x1) Vision processing unit (x1) Breakdown simulation system (x1) Vision system programming software and cable (x1)	Pneumatic rotary actuator (x1) Electric turntable (x1)	

FAS-215
450x600x1500mm

Modules	Sensors (type & quantity)	Input / Output
Faulty product removal	Auto switch, Reed type (x4) Vacuum pressure switch(x1)	Digital 9/6
Other devices (quantity)	**Actuators (type & quantity)**	
Vacuum pad(x4)-Vacuum ejector(x1) Breakdown simulation system (x1)	Pneumatic linear (x2)	

FAS-216
450x600x1800mm

Modules	Sensors (type & quantity)	Input / Output
Vertical axis Positioning axes	Auto switch, Reed type (x4) Digital vacuum pressure switch (x1)	Digital 12/12
Other devices (quantity)	**Actuators (type & quantity)**	
Vacuum pad(x4)-Vacuum ejector(x1) Servocontroller (x1) Driver programming software and cable (x1)	Pneumatic linear (x2) Servo-controlled linear actuators (x1)	

FAS-220
900x410x1310mm

Modules	Sensors (type & quantity)	Input / Output
Pallet transfer	Auto switch, Reed type (x4) Vacuum pressure switch(x1)	Digital 9/6
Other devices (quantity)	**Actuators (type & quantity)**	
Vacuum pad(x4)-Vacuum ejector(x1) Breakdown simulation system (x1)	Pneumatic linear (x2)	

FAS-230
1800x320x940mm

Modules	Sensors (type & quantity)	Input / Output
Transfer	Inductive (x6) Microswitch (x2)	Digital 8/2
Other devices (quantity)	**Actuators (type & quantity)**	
	Pneumatic linear (x2) DC motor (x1)	