ASM
Assembly Systems

SIPLACE

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SIPLACE X-Series
The World‘s Fastest SMT Platform

Specification from SR.605.xx, 08/2011 Edition

SIPLACE X-Series

Content

SIPLACE X-Series

Content

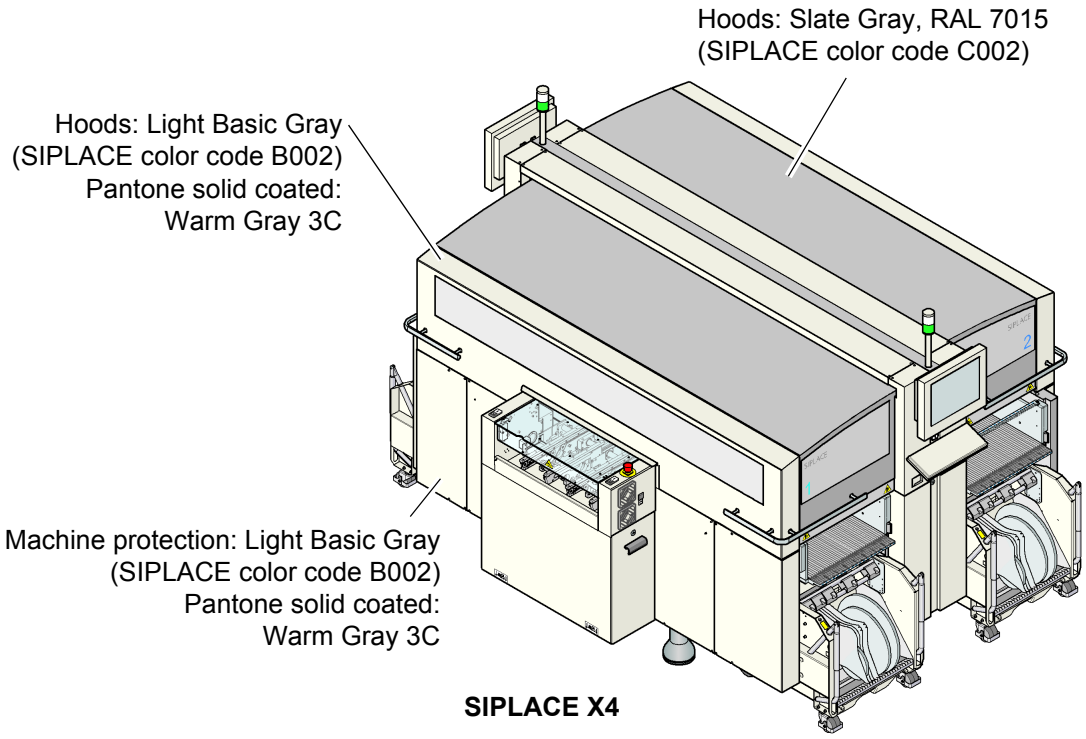
Overview of the Technical Data

Maximum Values

Placement rate[a] IPC value Benchmark value Theoretical value	 81,000 comp./h 90,000 comp./h 124,500 comp./h
Component range	01005 - 200 x 125 mm²
Placement accuracy[b] / angular accuracy	± 22 µm, ± 0.05° / (3σ), ± 30 µm, ± 0.07° / (4σ)
Feeder module types	Tape feeder modules, waffle-pack trays, stick magazine feeders, bulk cases, dip modules, application-specific OEM feeder modules
Feeding capacity, (SIPLACE X component changeover table)	160 8 mm X feeder modules
Feeding capacity, (SIPLACE HF component changeover table)	180 tracks with 3 x 8 mm S
PCB format	max. 610 x 535 mm²
PCB thickness	0.3 - 4.5 mm (others available on request)
PCB weight	max. 3 kg
Camera	6 illumination levels

a) See page 10 for a definition of the output values.
b) The accuracy value was measured using the vendor-neutral IPC standard.

SIPLACE X-Series machine colors



SIPLACE X4

Machine Description

Intelligent placement solutions for the most rigorous demands

If you need maximum flexibility, output or quality in the placement process, the SIPLACE X-series has the technology you need to meet any challenge associated with SMT production. It offers all the innovations and features to ensure efficient electronics production today and in the future, and provides previously unavailable ways to increase both efficiency and productivity.

Maximum modularity for every need

The platform of the SIPLACE X-series has a modular structure, and can be perfectly adapted to meet all the requirements of electronics production. Three different variants of the placement machine are available:

- SIPLACE X4
- SIPLACE X3
- SIPLACE X2

There is a placement head on each gantry. True to the principle of head modularity, the placement machines can be reconfigured to suit changing requirements, and offer maximum flexibility during placement. In addition to the tried and trusted **6 and 12-nozzle Collect&Place heads**, and the flexible **TwinHead** for placing complex models, the SIPLACE X-series is also available with the high precision and extremely fast **SIPLACE 20-nozzle Collect&Place head**. During placement, the placement heads fetch the components from the at-rest component supply, and set them down on the PCB, which is also stationary. This proven SIPLACE principle guarantees reliable pick-up of even the smallest components, prevents the components slipping on the PCB and minimizes traversing paths.

The user also has access to different variants of the **PCB conveyor**: the **SIPLACE single conveyor and flexible SIPLACE dual conveyor**. The latter offers all the benefits of the conventional dual conveyor, such as reducing non-productive downtimes, combined with the option of using the single conveyor.

Other innovative features of the SIPLACE X-series at a glance:

Productivity Lane

The SIPLACE X-series can be equipped with a productivity lane. PCBs in the productivity lane are simply transported through the placement area so that they can be populated on a machine further downstream on the line. This results in a real increase in output.

01005 placement without compromise

The SIPLACE X-series is designed to place **01005** components as standard. Both the 20-nozzle Collect&Place head with its high-resolution camera and the SIPLACE X feeder modules work easily with the smallest components used at present.

There are also specially-developed nozzles for 01005 components that can be used. With these preparations, the tiny components can be processed without any loss of quality and speed. The components can be placed with minimal spacings and independently of large components that are beside the 01005 component. This equates to true 01005 capability.

Incredibly fast new product introduction (NPI) with external set-up preparation and SIPLACE vision teaching

The SIPLACE X-series demonstrates its strengths in terms of the flexible production environment, as well on the high-performance side. For example, NPI can be implemented as fast as possible with the **SIPLACE Virtual Product Build**.

This NPI solution allows you to program offline, set up and check offline and to make adjustments offline with the **SIPLACE Pro software**. This increases machine utilization and reduces waste.

Machine Description

And with respect to the current production run, the **SIPLACE vision teaching station** also makes it extremely simple and fast to generate package form descriptions, even for complex components. The set-up process starts once you have optimized the product and defined all the components in the programming system. This is also done externally and then checked by means of the barcode and data transfer. This makes the product change child's play: the program and all the data are sent to the line and the new production run can start. It just can't get any faster!

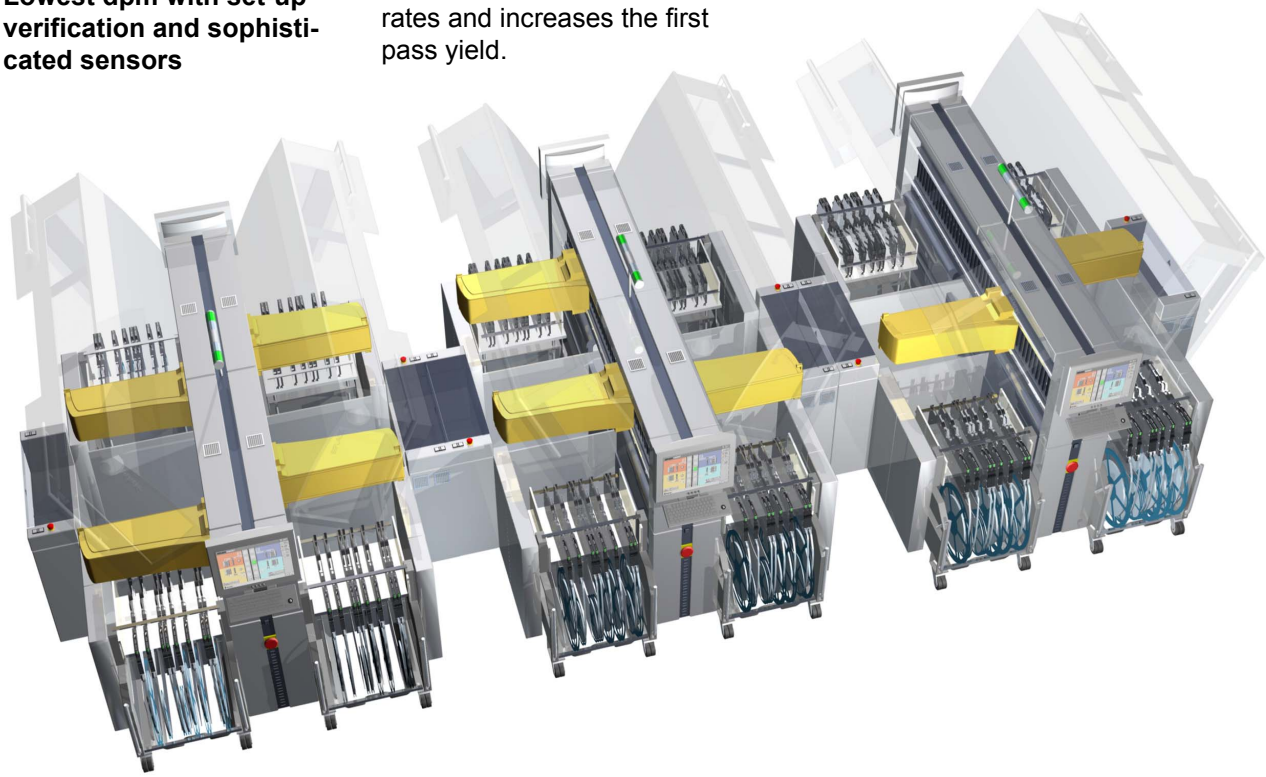
Lowest dpm with set-up verification and sophisticated sensors

The highest machine quality allows the SIPLACE X-series to produce the highest product quality. This is guaranteed by a number of additional features. Sensors check the presence and position of the components before and after every pick-up and placement operation at the placement head, and the digital **vision system** detects the components faster and more reliably than the old analog technology. In addition, set-ups are verified on the PCB, on the component roll and by the intelligent **SIPLACE X feeder modules** with reference to the barcode. This network of tests considerably lowers dpm rates and increases the first pass yield.

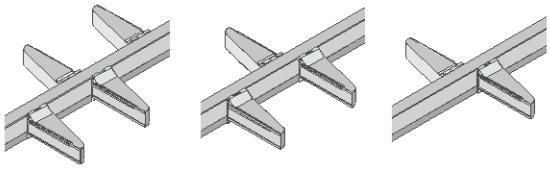
100% uptime with intelligent feeder modules

The SIPLACE X-series works with intelligent feeder modules that greatly simplify set-up and set-up change tasks. For example, the SIPLACE X feeder modules can even be simply converted while production is running, thus greatly reducing machine stoppages.

With all these features, the SIPLACE X-series is in a class of its own in SMT production, rising far above all the other placement solutions available on the market.



Modular Machine Concept

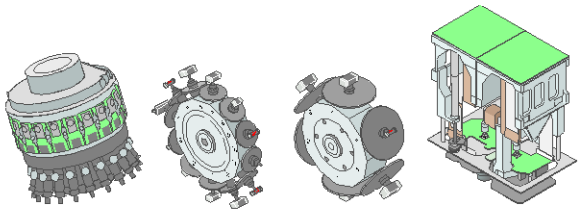


Step 1: Placement machine without heads and component changeover tables

SIPLACE X4

SIPLACE X3

SIPLACE X2



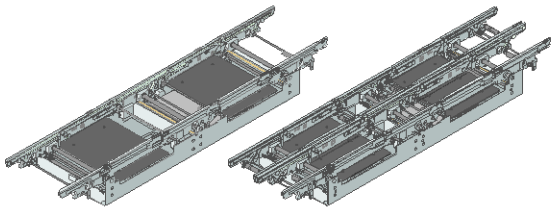
Step 2: Selection of the placement heads

20-nozzle C&P head

12-nozzle C&P head

6-nozzle C&P head

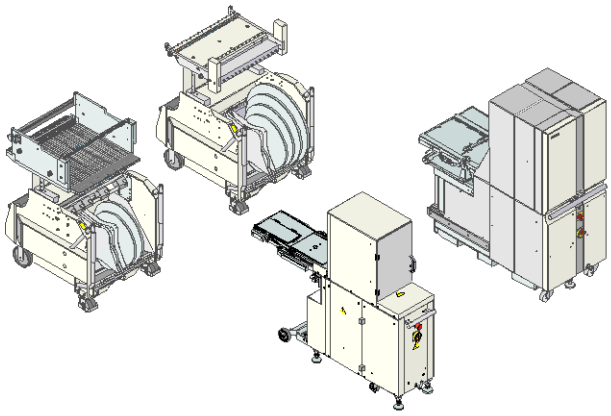
TwinHead



Step 3: Selection of the conveyor

Single conveyor

Flexible dual conveyor



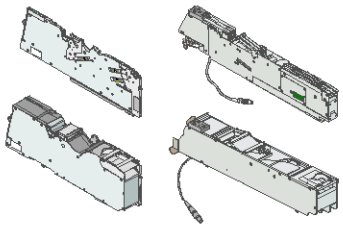
Step 4: Selection of the component changeover tables, MTC, WPC

SIPLACE X component changeover table

SIPLACE HF component changeover table

MTC

WPC



Step 5: Selection of the feeder modules

X tape feeder modules

S tape feeder modules

Label presenter module

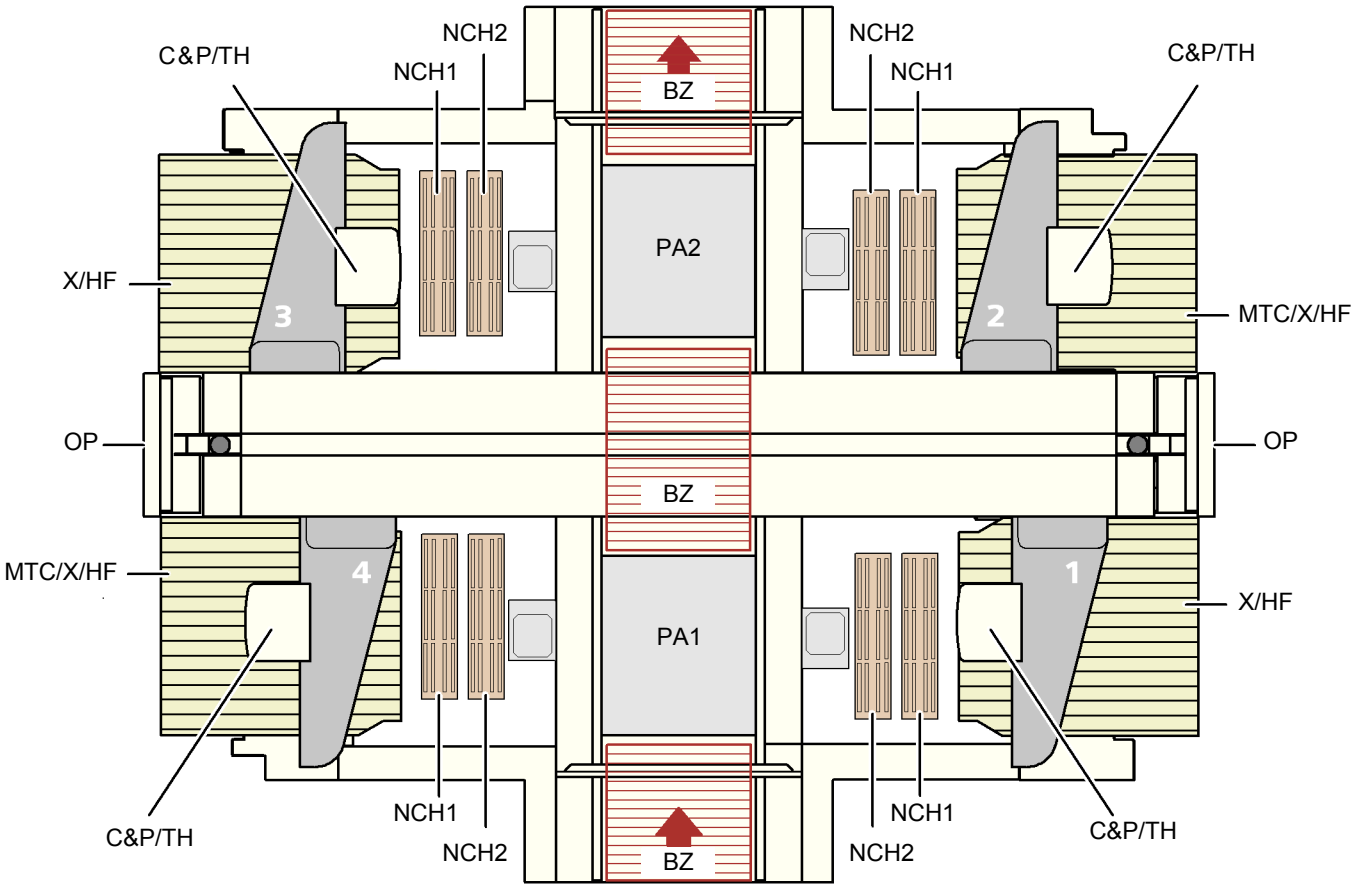
Reject conveyor

Linear vibratory feeder

Waffle-pack tray holder

Modular Machine Concept

Example of the SIPLACE X4



BZ	Buffer zone
C&P	Collect&Place head
HF	SIPLACE HF component changeover table
MTC	Matrix Tray Changer
NCH1	Nozzle changer, row 1
NCH2	Nozzle changer, row 2
OP	Operator panel
PA1	Placement area 1
PA2	Placement area 2
TH	TwinHead
X	SIPLACE X component changeover table

Machine Performance

Types of placement head	20-nozzle Collect&Place head (C&P20) 12-nozzle Collect&Place head (C&P12) 6-nozzle Collect&Place head (C&P6) SIPLACE TwinHead (TH)
PLEASE NOTE	**IPC value [comp./h]** According to the vendor-neutral conditions of the IPC 9850 standard published by the Association of Connecting Electronics Industries. **SIPLACE Benchmark value [comp./h]** The SIPLACE benchmark value is measured during the machine acceptance tests. It corresponds to the conditions set out in the SIPLACE scope of service and supply. **Theoretical maximum output value [comp./h]** The theoretical maximum output value is calculated from the most favorable conditions for each machine type and setting, and corresponds to the theoretical conditions normally used in the industry.

SIPLACE X4 placement system

Number of gantries	4			
Placement area 1	Placement area 2	IPC value	Benchmark value	Theoretical value
C&P20 / C&P20	C&P20 / C&P20	81,000	90,000	124,000
C&P20 / C&P20	C&P12 / C&P12	65,000	71,400	102,500
C&P20 / C&P20	C&P12 / C&P6	60,300	65,300	94,000
C&P20 / C&P20	C&P12 / TH	57,500	63,800	89,000
C&P20 / C&P20	C&P6 / C&P6	56,900	63,300	85,000
C&P20 / C&P20	C&P6 / TH	53,100	59,400	80,000
C&P20 / C&P20	TH / TH	47,800	52,500	75,000
C&P12 / C&P12	C&P12 / C&P12	49,000	52,800	81,500
C&P12 / C&P12	C&P12 / C&P6	44,300	46,700	72,500
C&P12 / C&P12	C&P12 / TH	41,500	45,200	67,500
C&P12 / C&P12	C&P6 / C&P6	40,900	44,700	64,000
C&P12 / C&P12	C&P6 / TH	37,100	40,800	59,000
C&P12 / C&P12	TH / TH	31,800	33,900	53,500
C&P12 / C&P6	C&P12 / C&P6	39,600	40,600	64,000
C&P12 / C&P6	C&P12 / TH	36,800	39,100	59,000
C&P12 / C&P6	C&P6 / C&P6	36,200	38,600	55,000
C&P12 / C&P6	C&P6 / TH	32,400	34,700	50,000
C&P12 / C&P6	TH / TH	27,100	27,800	45,000
C&P12 / TH	C&P12 / TH	34,000	37,600	53,500
C&P12 / TH	C&P6 / TH	29,600	33,200	45,000
C&P12 / TH	TH / TH	24,300	26,300	40,000
C&P6 / C&P6	C&P6 / C&P6	32,800	36,600	46,000
C&P6 / C&P6	C&P6 / TH	29,000	32,700	41,000
C&P6 / C&P6	TH / TH	23,700	25,800	36,000
C&P6 / TH	C&P6 / TH	25,200	28,800	36,000
C&P6 / TH	TH / TH	19,900	21,900	31,000
TH / TH	TH / TH	14,600	15,000	26,000

Machine Performance

SIPLACE X3 placement system				
For the placement head configuration and the placement rate see the note on page 10.				
Number of gantries	3			
Placement area 1	Placement area 2	IPC value	Benchmark value	Theoretical value
C&P20 / C&P20	C&P20	62,200	69,500	93,000
C&P20 / C&P20	C&P12	53,600	59,000	82,500
C&P20 / C&P20	C&P6	49,200	54,800	73,500
C&P20 / C&P20	TH	44,800	50,000	68,500
C&P12 / C&P12	C&P12	37,600	40,400	61,000
C&P12 / C&P12	C&P6	33,200	36,200	52,500
C&P12 / C&P12	TH	28,800	31,400	47,000
C&P12 / C&P6	C&P6	28,500	30,100	43,500
C&P12 / C&P6	TH	24,100	25,300	38,500
C&P12 / TH	TH	21,300	23,800	33,500
C&P6 / C&P6	C&P6	25,100	28,100	34,500
C&P6 / C&P6	TH	20,700	23,300	29,500
C&P6 / TH	TH	16,900	19,400	24,500
TH / TH	TH	11,600	12,500	19,500
SIPLACE X2 placement system				
For the placement head configuration and the placement rate see the note on page 10.				
Number of gantries	2			
Placement area 1	Placement area 2	IPC value	Benchmark value	Theoretical value
C&P20	C&P20	43,400	49,000	62,000
C&P20	C&P12	34,800	38,500	51,000
C&P20	C&P6	30,400	34,300	42,500
C&P20	TH	26,000	29,500	37,500
C&P12	C&P12	26,200	28,000	40,500
C&P12	C&P6	21,800	23,800	32,000
C&P12	TH	17,400	19,000	26,500
C&P6	C&P6	17,400	19,600	23,000
C&P6	TH	13,000	14,800	18,000
TH	TH	8,600	10,000	13,000

Placement Heads

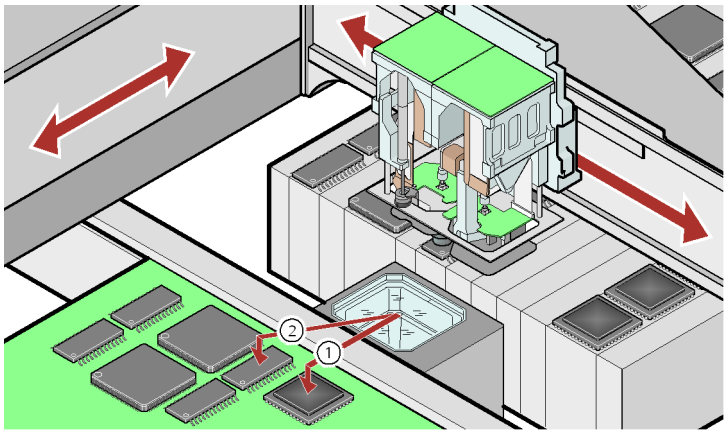
Overview

Head Modularity

The SIPLACE X series is characterized by maximum flexibility in the production process. This flexibility is partly due to the head modularity of the placement machines as it allows different placement head variants to be configured to suit the production requirements.

Collect&Place principle

The SIPLACE 20, 12 and 6-nozzle Collect&Place heads work on the Collect&Place principle. This means that, within each cycle, 20, 12 or 6 components are picked up and “collected” by the placement head, are optically centered on the way to the board and are rotated into the required placement angle. They are then placed gently and accurately on the PCB. This principle is particularly suitable for the high-speed placement of standard components.



Pick&Place principle

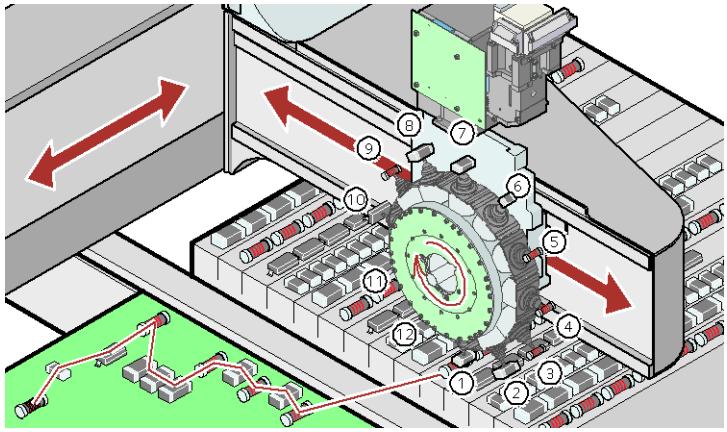
The high-precision SIPLACE TwinHead, which consists of two Pick&Place placement modules of the same design coupled together, works on the Pick&Place principle. Two components are picked up by the placement head, optically centered on the way to the placement position and rotated into the necessary placement angle. This principle has proved particularly suitable for fast and accurate placement of special components in the fine pitch and super-fine pitch range, and for complex and heavy components that require grippers, for example.

Checking and self-learning functions

The SIPLACE placement heads' reliability can be further increased with various checking and self-learning functions.

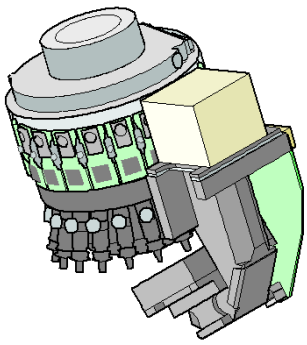
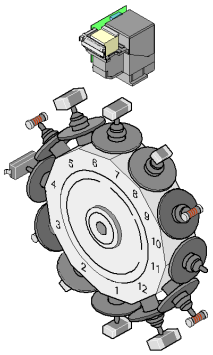
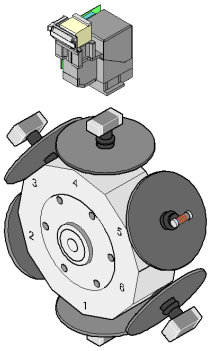
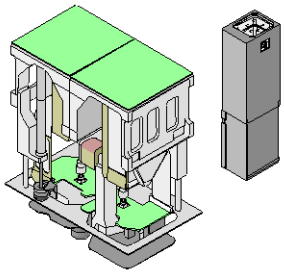
- Component sensor: It checks for the presence of a component at the nozzle before and after the pick-up and placement process.
- Digital camera on the placement head: Checks the position of each component at the nozzle. Any deviations from the required pick-up position are corrected before placement takes place.
- Force sensor: Monitors the specified component set-down forces. With the sensor stop method, differences in height during pick-up and any unevenness of the PCB surface are compensated during placement.
- Vacuum sensor: Checks whether the component was picked up or set down correctly.

Collect&Place principle



Placement Heads

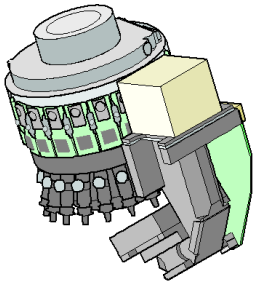
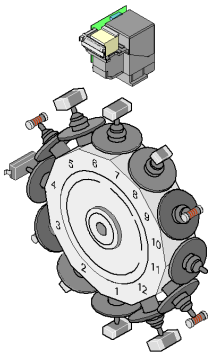
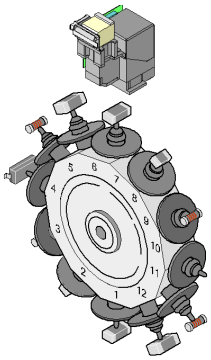
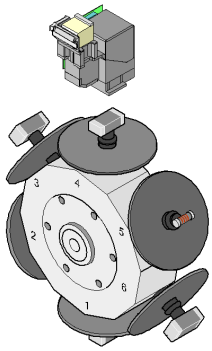
Standard Functions / Options

20-nozzle Collect&Place head		12-nozzle Collect&Place head	
			
Standard-functions	High-resolution head camera, vacuum sensor, force measurement, component sensor, integrated turning station for each segment, PCB warpage check, individual recording for each component	Standard-functions	Head camera, vacuum sensor, force measurement, PCB warpage, check, individual recording for each component
Options	Nozzle changer, special nozzles	Options	High-resolution camera, component sensor, short nozzle[a], short sleeve[a], nozzle changers, special nozzles
6-nozzle Collect&Place head		**TwinHead**	
			
Standard functions	High-resolution head camera, vacuum sensor, force measurement, PCB warpage, check, individual recording for each component	Standard functions	Stationary fine-pitch camera, vacuum sensor, force sensor, nozzle changer, PCB warpage check, individual recording for each component
Options	Short nozzle[a], short sleeve[a], nozzle changers, special nozzles	Options	Stationary flip-chip camera, special nozzles, grippers, coplanarity module

a) With SIPLACE HF component changeover table only.

Placement Heads

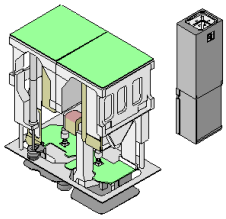
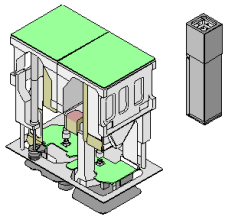
Collect&Place Heads

	20-nozzle Collect&Place head CO camera type 23	12-nozzle Collect&Place head CO camera type 28	12-nozzle Collect&Place head CO camera type 29	6-nozzle Collect&Place head CO camera type 29
				
Component range[a]	01005 to 2220, Melf, SOT, SOD	0402 to PLCC44, BGA, µBGA, flip-chip, TSOP, QFP, SO to SO32, DRAM	0201[b] to flip-chip, bare die, PLCC44, BGA, µBGA, TSOP, QFP, SO to SO32, DRAM	0201 to 27 x 27 mm²
Component spec.				
max. height	4 mm	6 mm	6 mm	8.5 mm
min. lead pitch	0.25 mm	0.5 mm	0.3 mm	0.3 mm
min. lead width	0.1 mm	0.2 mm	0.15 mm	0.15 mm
min. ball pitch	0.4 mm	0.35 mm	0.25 mm	0.25 mm[c] 0.35 mm[d]
min. ball diameter	0.2 mm	0.2 mm	0.14 mm	0.14 mm[c] 0.2 mm[d]
min. dimensions	0.4 x 0.2 mm²	1.0 x 0.5 mm²	0.6 x 0.3 mm²	0.6 x 0.3 mm²
max. dimensions	6 x 6 mm²	18.7 x 18.7 mm²	18.7 x 18.7 mm²	27 x 27 mm²
max. weight	1 g	2 g	2 g	5 g
Programmable set-down force	1.5 N - 4.5 N	2.4 N - 5.0 N	2.4 N - 5.0 N	2.4 N - 5.0 N
Nozzle types	10xx, 11xx, 12xx	9xx	9xx	8xx, 9xx
X/Y accuracy[e]	± 41 µm/3σ ± 55 µm/4σ	± 45 µm/3σ ± 60 µm/4σ	± 41 µm/3σ ± 55 µm/4σ	± 45 µm/3σ ± 60 µm/4σ
Angular accuracy	± 0.5° / 3σ ± 0.7° / 4σ	± 0.5° / 3σ ± 0.7° / 4σ	± 0.5° / 3σ ± 0.7° / 4σ	± 0.2° / 3σ ± 0.3° / 4σ
Component range	95%	98%	98.5%	99.5%
Component camera type	23	28	29	29
Illumination levels	5	5	5	5
Possible lighting level settings	256[5]	256[5]	256[5]	256[5]

a) Please note that the range of components that can be placed is also affected by the pad geometry, customer-specific standards, component packaging tolerances and component tolerances.
b) With 0201 package.
c) For components < 18 x 18 mm².
d) For components ≥ 18 x 18 mm².
e) The accuracy value was measured using the vendor-neutral IPC standard.

Placement Heads

TwinHead

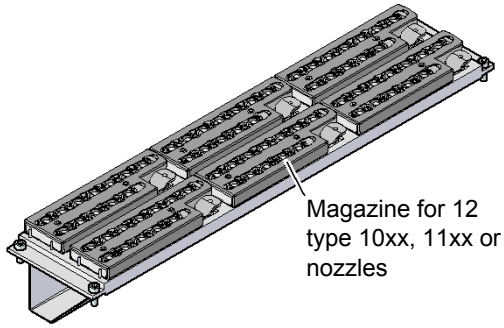
	TwinHead Fine-pitch camera[a] (component camera type 33)	TwinHead Flip-chip camera (option)[a] (component camera type 25)
		
Component range[b]	0402 to SO, PLCC, QFP, BGA, special components, bare dies, flip-chips	0201 to SO, PLCC, QFP, sockets, plugs, BGA, special components, bare dies, flip-chips, shields
Component specs[c]		
max. height	25 mm (larger heights on request)	25 mm (larger heights on request)
min. lead pitch	0.3 mm	0.25 mm
min. lead width	0.15 mm	0.1 mm
min. ball pitch	0.35 mm	0.14 mm
min. ball diameter	0.2 mm	0.08 mm
min. dimensions	1.0 x 0.5 mm²	0.6 x 0.3 mm²
max. dimensions	55 x 45 mm² (single measurement) For use with two nozzles 50 x 50 mm² or 69 x 10 mm² *For use with one nozzle*: 85 x 85 mm² or 125 x 10 mm² max. 200 x 125 mm² (with restrictions)	16 x 16 mm² (single measurement)
max. weight[d]	100 g	100 g
Programmable set-down force	1.0 N - 15 N 2.0 N - 30 N[e]	1.0 N - 15 N 2.0 N - 30 N[e]
Nozzle types[f]	5xx (standard) 4xx + adapter 8xx + adapter 9xx + adapter gripper	5xx (standard) 4xx + adapter 8xx + adapter 9xx + adapter gripper
Nozzle spacing for P&P heads	70.8 mm	70.8 mm
X/Y accuracy[g]	± 26 µm/3σ, ± 35 µm/4σ	± 22 µm/3σ, ± 30 µm/4σ
Angular accuracy	± 0.05° / 3σ, ± 0.07°/ 4σ	± 0.05° / 3σ, ± 0.07° / 4σ
Illumination levels	6	6
Possible lighting level settings	256[6]	256[6]

a) A maximum of two stationary cameras can be configured in one placement area.
b) Please note that the range of components that can be placed is also affected by the pad geometry, customer-specific standards, component packaging tolerances and component tolerances.
c) If the C&P head and the TwinHead are combined in one placement area, the maximum component height is restricted.
d) If standard nozzles are used.
e) SIPLACE High-Force Head.
f) Over 300 different nozzles and 100 gripper types are available, with an extensive nozzle database available online.
g) The accuracy value was measured using the vendor-neutral IPC standard.

Placement Heads

Nozzle Changer

Nozzle changer for the
20-nozzle Collect&Place head (NCH20)
(6 magazines in total → 72 nozzle holders)

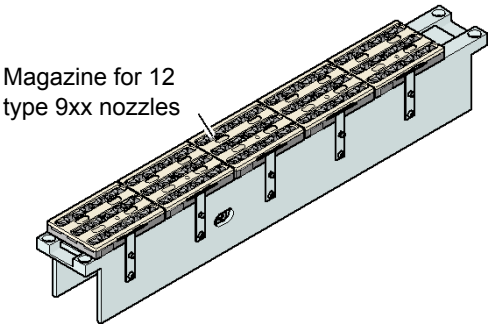


Description

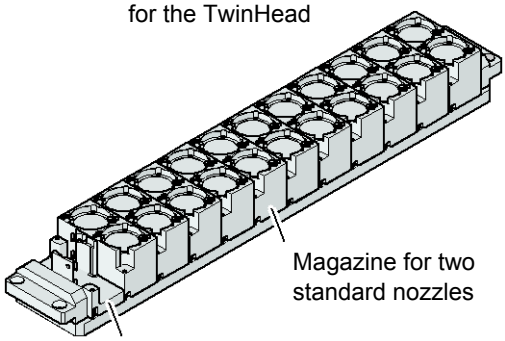
Nozzle changers increase the flexibility of placement heads when processing different components. The nozzle configuration can be quickly modified for new placement jobs. Exactly defined positions and the perfect seating of the nozzle in the garage guarantee minimal radial eccentricity at the placement head.

The nozzle changer for the 20-nozzle Collect&Place head is equipped with a monitoring circuit which checks whether the nozzle magazine is seated correctly on the mount.

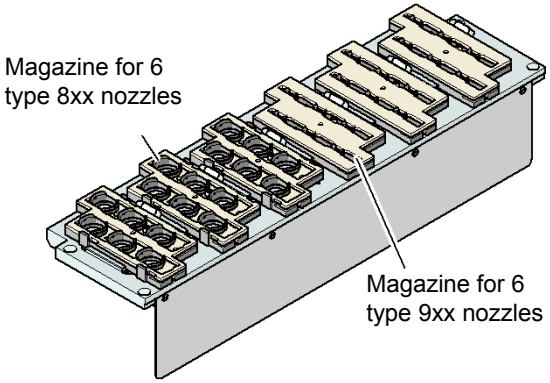
Nozzle changer for the
12-nozzle Collect&Place head (NCH12)
(5 magazines in total → 60 nozzle holders)



Nozzle changer
for the TwinHead



Nozzle changer for the
6-nozzle Collect&Place head (NC6)
(6 magazines in total → 36 nozzle holders)



Placement Heads

Nozzle Changer

Technical Data

Nozzle changer for the 20-nozzle Collect&Place head	
Dimensions (length x width x height)	449 x 94.5 x 79 mm³
Number of magazines	6, each with 12 nozzle holders[a]
Number of nozzle holders	72
Nozzle types	10xx, 11xx, 12xx
Compressed air connection	0.48 MPa (4.8 bar)
Nozzle changer for the 12-nozzle Collect&Place head	
Dimensions (length x width x height)	449 x 62.7 x 77.7 mm³
Number of magazines	min. 1 / max. 5, each with 12 nozzle holders
Nozzle types	9xx
Compressed air connection	0.48 MPa (4.8 bar)
Nozzle changer for the 6-nozzle Collect&Place head	
Dimensions (length x width x height)	448 x 122.5 x 97.7 mm³
Number of magazines	min. 1 / max. 6, each with 6 nozzle holders
Nozzle types	8xx, 9xx
Compressed air connection	0.48 MPa (4.8 bar)
Nozzle changers for the SIPLACE TwinHead	
Dimensions (length x width x height)	448 x 68.5 x 49 mm³
Number of magazines	a maximum of 12, each with two nozzle holders at locations 1 and 3 a maximum of 10, each with two nozzle holders at locations 2 and 4
Number of nozzle holders	may be freely configured
Nozzle types[b]	4xx with adapter 5xx (standard) 9xx with adapter Special nozzle, gripper

a) All 6 magazines must always be set up.
b) Over 300 different nozzles and 100 gripper types are available, with an extensive nozzle database available online.

The number of nozzle changers for the Collect&Place heads depends on the number of gantries in the placement area:

- up to four nozzle changers may be installed in the placement area with two gantries.
- up to three nozzle changers may be installed in the placement area with one gantry.

PCB Conveyor

Single Conveyor and Dual Conveyor

Conveyor principle

If the board has reached the placement area and passed a light barrier, it is braked. An additional laser light barrier determines the position of the board. As soon as the circuit board has reached its target position, the conveyor belt is stopped and the board is clamped from below. The placement process then starts immediately. Movement and clamping of the PCBs are monitored.

The conveyor can be easily matched to many different PCB widths by the automatic electrical width adjustment. The fixed conveyor rail may be located on the left or right for both the flexible dual conveyor and the single conveyor.

Single conveyor

On the single conveyor, PCBs are moved one after the other into the placement machine and placed on a conveyor track. This conveyor variant is particularly suitable for very wide PCBs.

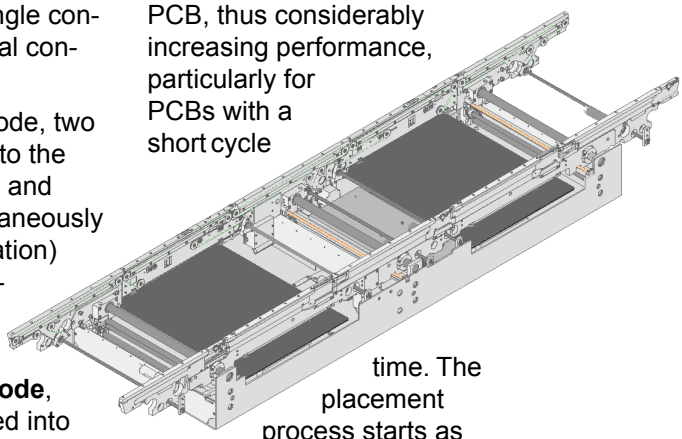
Flexible dual conveyor

To keep the range of PCBs to be processed as wide as possible - whilst maintaining maximum productivity - the flexible SIPLACE dual conveyor allows you to choose between single conveyor mode and dual conveyor mode.

In dual conveyor mode, two PCBs are moved into the placement machine and placed either simultaneously (synchronous operation) or alternately (asynchronous operation).

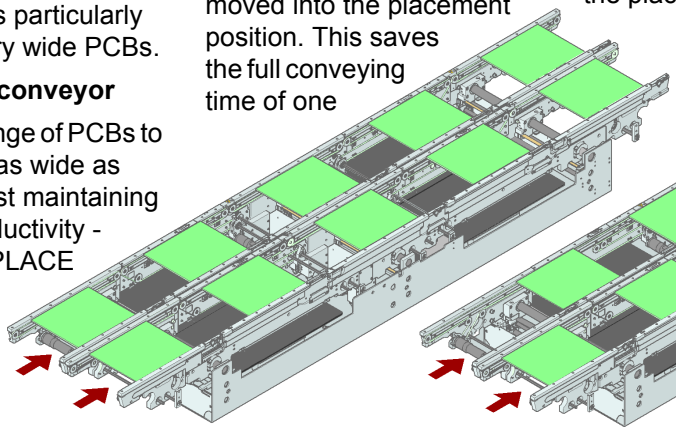
In **synchronous mode**, two PCBs are moved into the placement position at the same time. They are processed as a common panel. This allows the top and bottom of PCB to be processed on the same line and, for products with very different components to be placed, the common optimization of all the components to be placed on both PCBs makes it possible to increase output.

In **asynchronous mode**, only one PCB in a transport track is processed. At the same time, another PCB in the second transport track is moved into the placement position. This saves the full conveying time of one PCB, thus considerably increasing performance, particularly for PCBs with a short cycle time. The placement process starts as soon as one PCB is transported into the processing area.

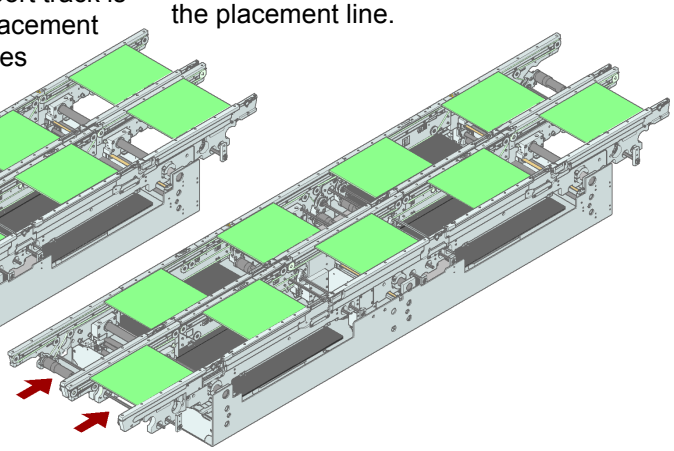


Conveyor buffer

SIPLACE PCB conveyors have three buffer zones. If shorter waiting times occur in a placement area (due to longer cycle times in the oven, for example), the downstream placement areas can continue to work since the unaffected area can easily access the PCB that is waiting in the buffer zone. This increases the true output of the placement line.



Flexible dual conveyor: synchronous mode



Flexible dual conveyor: asynchronous mode

PCB Conveyor
Technical Data

PCB formats

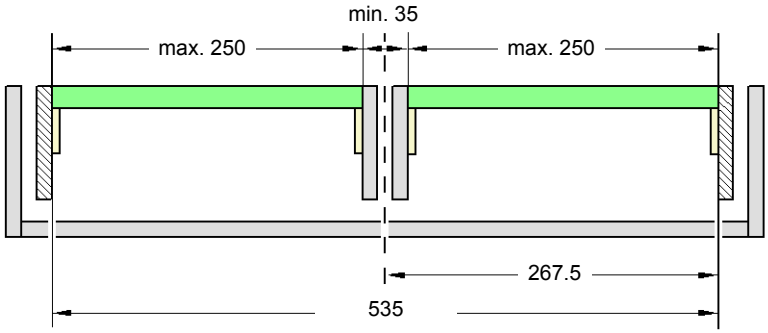
	Single conveyor	Flexible dual conveyor	Dual conveyor in Single conveyor mode
Maximum dimensions (length x width)	610 x 535 mm²[a]	610 x 250 mm² [a]	610 x 450 mm² [a]
Standard dimensions (length x width)	50 x 50 mm² to 450 x 535 mm² [b]	50 x 50 mm² to 450 x 250 mm²	50 x 50 mm² to 450 x 450 mm²
Long board option	50 x 80 mm² to 610 x 535 mm²	50 x 80 mm² to 610 x 250 mm²	50 x 80 mm² to 610 x 450 mm²
PCB thickness	Standard 0.3 mm to 4.5 mm (± 0.2 mm) (others available on request)		
PCB warpage	see page 23		
PCB weight	max. 3 kg		
Clearance on PCB underside	25 mm ± 0.2 mm (standard)		
PCB transport height	830 mm ± 15 mm (standard) 900 mm ± 15 mm (option) 930 mm ± 15 mm (option) 950 mm ± 15 mm (SMEMA option)		
Type of interface	SMEMA / Siemens		
Component-free PCB handling edge	3 mm		
PCB changeover time	< 2.5 s		
PCB positioning accuracy	± 0.5 mm		
Flexible dual conveyor	Conveyor mode: synchronous or asynchronous (selected via the software) Components to be placed on each conveyor track: same or different PCB width on each conveyor track: same or different		
	Single conveyor	Dual conveyor synchronous	Dual conveyor asynchronous
Bad fiducial detection	standard	Standard (no global ink spot)	standard
Automatic electrical width adjustment	standard	standard	standard

a) Long board option and Wide board configuration.
b) With PCB widths > 450 mm make sure that the peripheral modules are also able to process these widths.

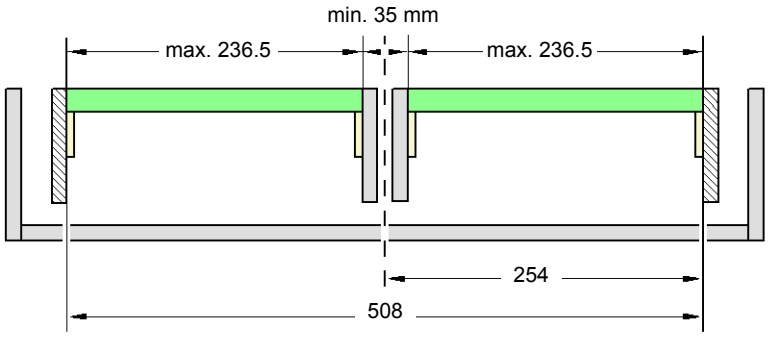
PCB Conveyor

Conveyor Widths of the Flexible Dual Conveyor

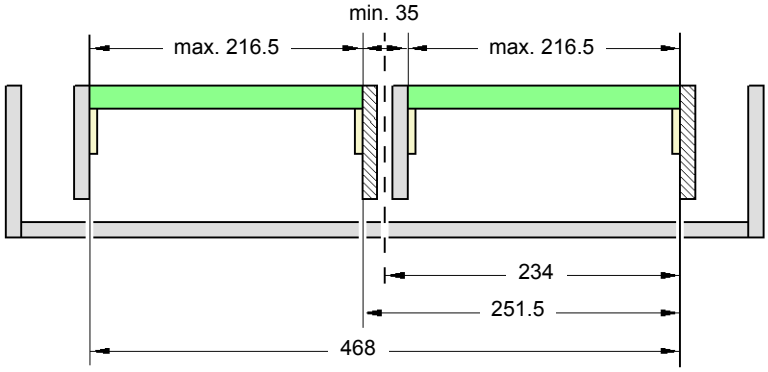
Distance between outer conveyor edges: 535 mm, 2 tracks, stationary outer conveyor edge



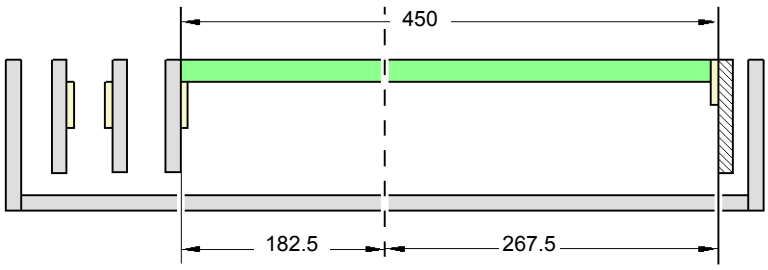
Distance between outer conveyor edges: 508 mm, 2 tracks, stationary outer conveyor edge



Distance between outer conveyor edges: 468 mm, 2 tracks, right conveyor edges are stationary [a]



Distance between outer conveyor edges: 535 mm, dual conveyor in Single conveyor mode, right conveyor edge is stationary [a]



Movable conveyor side

Stationary conveyor side

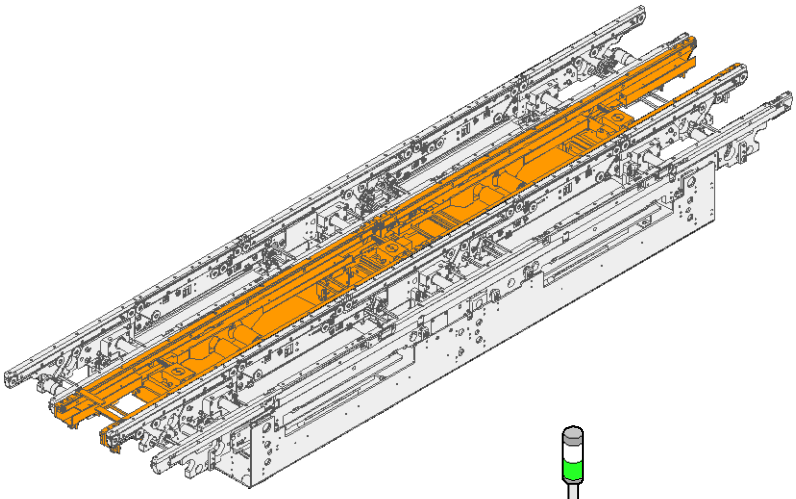
a) Only settings with stationary conveyor edge on the right are shown. A setting with the stationary conveyor edge on the left is also possible. All dimensions in millimeters.

PCB Conveyor

Productivity Lane (XPL) and Shuttle (XPS)

SIPLACE X-Series Productivity Lane (XPL)

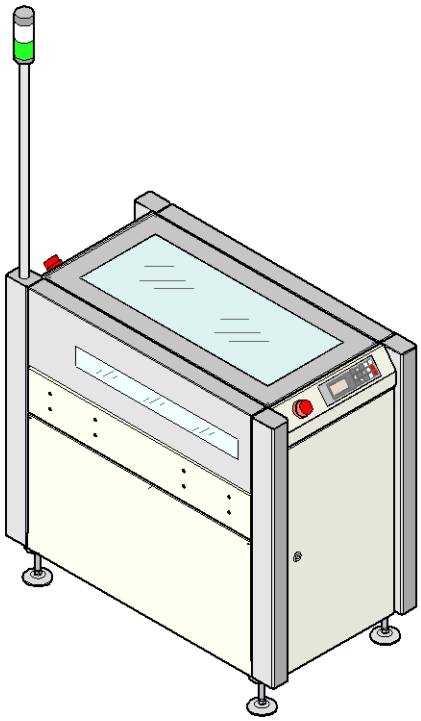
Conveyor mode	PCB width lane 1 [mm]	PCB width XPL [mm]	PCB width lane 2 [mm]
XPL	max. 154	max. 154	max. 154



The “Productivity Lane” option in the middle of the PCB conveyor allows PCBs to be overtaken in the placement machine. As with the Productivity Lift, the placement machines are operated in parallel. Shuttles at the start and end of a cluster distribute the PCBs to be processed to the required lane of the PCB conveyor or to the third conveyor lane.

SIPLACE X-Series Productivity Shuttle (XPS)[a, b]

The shuttle module transfers PCBs from up to three incoming conveyor tracks to up to three outgoing conveyor tracks. The virtual PCB panel coming in on a conveyor track is transferred to an outgoing conveyor section. This function for distributing the PCBs on the shuttle is adjustable.



a) Essential for use with the Productivity Lane.
b) A shuttle is necessary if machines with a stationary left or right conveyor side are mixed together in a line.

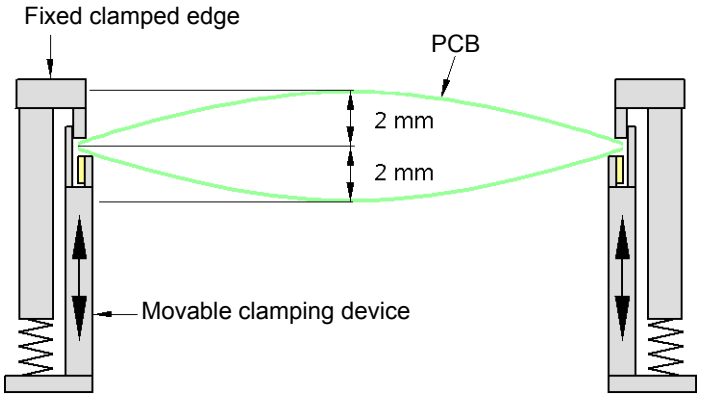
PCB Conveyor

Productivity Shuttle (XPS)

Technical Data

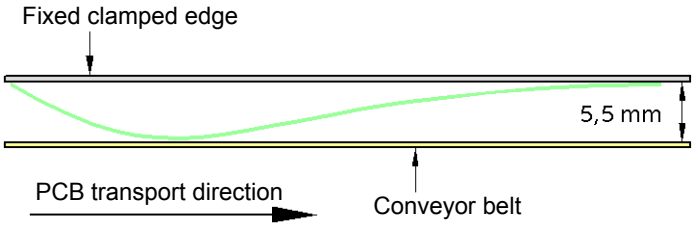
Dimensions (LxW)	540 x 1000 mm²
Height	965 mm for 830 mm PCB transport height 1035 mm for 900 mm PCB transport height 1065 mm for 930 mm PCB transport height 1085 mm for 950 mm PCB transport height
Height with indicator lamp	max. 1938 mm
Ground clearance	120 mm for 830 mm PCB transport height 190 mm for 900 mm PCB transport height 220 mm for 930 mm PCB transport height 240 mm for 950 mm PCB transport height
Weight	180 kg
Footprint	0.54 m²
Load per unit area	1.96 kN/m²
Number of machine feet	4
Maximum noise emissions	62 dB (A)
Room temperature	between 15°C and 35°C
Atmospheric humidity	30 to 75 % (no higher than 45% on average to prevent any possibility of condensation on the machine)
Traversing path of the shuttle	560 mm
Number of belt segments	1
Width adjustment	Stepping motor
PCB transport height	950 mm ± 50 mm 850 mm ± 50 mm (option)
PCB width	50 - 154 mm
Component-free PCB handling edge	3 mm
Interface between the input side/output side	Siemens, SMEMA
Automatic tracking	none at the input side at the output side
Electrical ratings	
Supply voltage	230 VAC / 50 Hz 110 VAC / 60 Hz
Power consumption	0.4 kW
Fuses	1 x 6.3 A

PCB Warpage

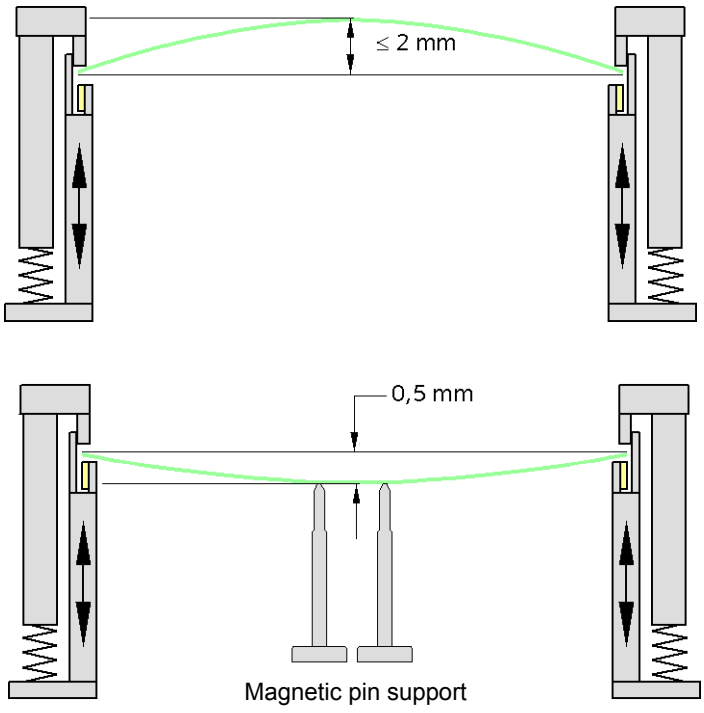


PCB warpage on the conveyor

PCB warpage across the direction of travel
max. 1 % of the PCB diagonal, but not exceeding 2 mm



PCB warpage in direction of travel
+ PCB thickness < 5.5 mm



PCB warpage during placement

For warpage of less than 2 mm, the ink spots are also in the middle of the PCB in the digital camera's focus. When all the tolerances are taken into account, this value is reduced to 1.5 mm.

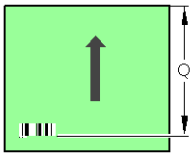
You should also note that the warpage reduces the component height.

PCB warpage downwards, max. 0.5 mm

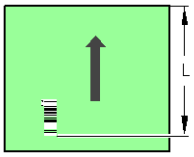
Use magnetic pin supports to achieve this value.

PCB Barcode for Product-Controlled Production (Option)

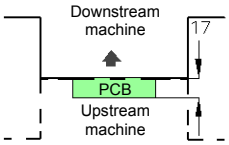
Label dimensions	Stroke width (W): 0.19 < W ≤ 0.3 mm (corresponds to high and medium density), Stroke length: ≥ 4 mm, length of the barcode template window: ≤ 90 mm
Recommended label colors	Coding: black, dark green, dark blue, background: white, beige, yellow, orange (contrast ratio > 70% to DIN 66236)
Code types	Code 39, Code 128 / EAN 128, Codabar, 2/5 IATA 2/5 industrial, 2/5 interleaved, UPC, EAN, Pharma Code, EAN Addendum (others available on request), a bar-code filter may be defined
Laser scanner safety	Laser diode 670 nm (red) / 1.2 mW Laser protection class 2, degree of protection IP65



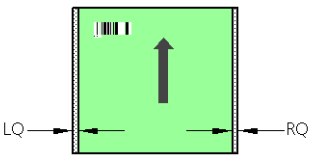
PCB barcode scanner	Q [mm]
2D topside	390
1D topside	390
2D underside	430
1D underside	430



PCB barcode scanner	L [mm]
1D topside	320 - 350
1D underside	380 - 410

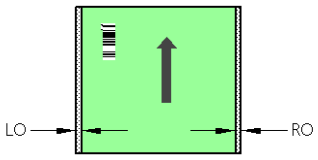


PCB barcode scanner	PCB rear projection [mm]
2D underside on the dual conveyor	17



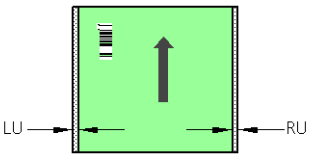
PCB barcode scanner	LQ [mm]	RQ [mm]
2D topside	3	3
1D topside	3	3
2D underside	5	5
1D underside	5	5

PCB barcode scanner 1D on top



PCB dimensions/conveyor	LO [mm]	RO [mm]
460 mm SC	3	20
508 mm SC	3	44
216 mm DC1	3	24
250 mm DC1, 450 mm SM1	3	58
216 mm DC2	3	3
250 mm DC2, 450 mm SM2	3	3

PCB barcode scanner 1D on bottom



PCB dimensions/conveyor	LU [mm]	RU [mm]
460 mm SC	20	3
508 mm SC	44	3
216 mm DC1	3	3
250 mm DC1, 450 mm SM1	3	3
216 mm DC2	24	3
250 mm DC2, 450 mm SM2	58	3

SC - Single conveyor, DC1/2 - Dual conveyor, track 1/2, SM1/2 - Dual conveyor in Single conveyor mode, track 1/2

If there is a PCB dual conveyor installed on the placement machine, we can provide a special design for retrofitting the 2D PCB barcode scanner “bottom”.

Component Feeding

Component Changeover Table

SIPLACE X component changeover table

The SIPLACE X component changeover tables are stand-alone and easily maneuverable modules that are moved into the machine with the automatic docking unit. This ensures that the table is accurately positioned in the placement machine. Reels are kept in the tape container on the component changeover table.

A cutting device on the machine automatically cuts the used tape. The component changeover tables can be set up directly on the machine or in an external set-up area with feeder modules. The benefits of offline set-up are that the set-ups can be prepared without stopping the line. This allows the set-up to be changed very quickly using the changeover table principle.

The SIPLACE X component changeover table also support extremely high-speed attachment and removal of the feeder modules while the placement process is running. The component feeders are at rest during the placement process - allowing tapes to be spliced without stopping the machine.

If an optional component barcode reader and the Setup Center option are installed, it is possible to read and check the barcodes on the tape reels. This makes sure that the component is allocated to the right track, and the PCB placement can be traced using traceability software.

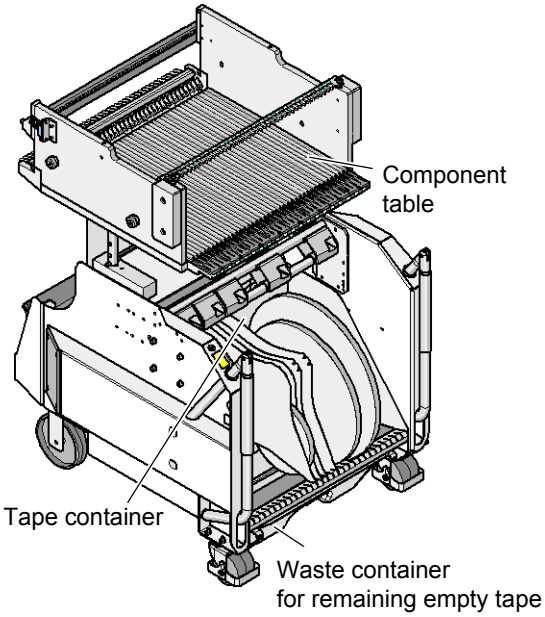
Dummy feeder modules are used at unassigned locations to protect the operators.

SIPLACE HF component changeover table

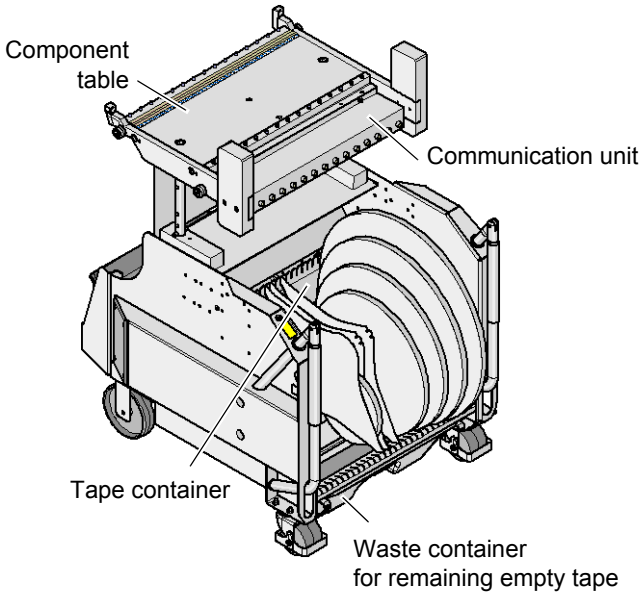
The SIPLACE HF component changeover table can also be used on SIPLACE X2, X3 and X4 machines, which means that all S tape feeder modules and all other feeder modules from this generation can still be used. This ensures maximum protection for your investment.

You must make sure, however, that the appropriate docking unit is fitted for component changeover tables from the SIPLACE HF series. The SIPLACE HF series component changeover table also cannot be used with the 20-nozzle Collect&Place head.

SIPLACE X component changeover table



SIPLACE HF component changeover table



Component Feeding

Component Changeover Table

Technical Data

	SIPLACE X component changeover table (COT)	SIPLACE HF component changeover table (COT) [a]
Length x width	752 x 592 mm²	
Height for		
830 mm PCB transport height	820 mm	830 mm
900 mm PCB transport height	890 mm	900 mm
930 mm PCB transport height	920 mm	930 mm
950 mm PCB transport height	940 mm	950 mm
Weight		
without feeder modules	80.4 kg	88.9 kg
with feeder module at all locations	139.6 kg	143.7 kg
Reel diameter		
standard	up to 432 mm (17")	up to 432 mm (17")
maximum	483 mm (19")	483 mm (19")
Locations for feeder modules	max. 40 (8 mm X)	max. 15 (3 x 8 mm S)
Changeover time	< 1 minute	< 1 minute
Component Feeding (SIPLACE X component changeover table)	4 COTs with tape reel holders and integral waste containers 40 x 8 mm feeder module locations per COT or matrix tray changer in COTs at locations 2 and 4	
Feeder module types (SIPLACE X)	Component tapes, waffle-pack trays, stick magazines and label feeders with adapter	
Feeding capacity (SIPLACE X component changeover table)	160 8 mm X feeder modules 80 12 mm X feeder modules 52 16 mm X feeder modules 52 24 mm X feeder modules 40 32 mm X feeder modules 32 44 mm X feeder modules 24 56 mm X feeder modules 20 72 mm X feeder modules 16 88 mm X feeder modules	
Component feeding (HF component changeover table[a])	4 COTs with tape reel holders and integral waste containers 15 slots, 30 mm wide per COT matrix tray changer rather than a COT at locations 2 and 4	
Feeder module types (SIPLACE HF[a])	Component tapes, bulk cases, stick magazines, Dip module, waffle-pack trays, OEM feeder modules (surf tape, component disposal module, waffle-pack trays, Jedec trays, label feeder modules, inline programming feeder modules)	
Feeding capacity (SIPLACE HF component changeover table[a])	60 tape feeder modules 3 x 8 mm S (180 tracks) 60 tape feeder modules 2 x 8 mm S (120 tracks) 60 tape feeder modules 12/16 mm S 40 tape feeder modules 24/32 mm S 28 tape feeder modules 44 mm S 24 tape feeder modules 56 mm S 20 tape feeder modules 72 mm S 16 tape feeder modules 88 mm S	

a) The SIPLACE HF component changeover table and feeder modules cannot be used together with the 20-nozzle Collect&Place head.

Component Feeding
X Tape Feeder Modules

SIPLACE X tape feeder modules are intelligent tape feeder modules for flexible production environments. They greatly simplify set-up and conversion tasks. All SIPLACE X feeder modules support tape splicing as standard, which prevents machine stoppages when refilling.

The benefits at a glance:

Conversion-friendly

- All SIPLACE X tape feeder modules are designed as single-track feeder modules. This minimizes any restrictions during conversion.
- Conversion is fast and straightforward, and can even be done during a production run.
- Omega profiles on both the tape feeder module and the table allow the tape feeder modules to be attached and removed while production is running.

Operator-friendly

- Contactless data and power transmission make it easier to attach/remove the tape feeder modules
- Menu-driven LCD display with full graphics capability supports the operator with the latest information
- A multicolor status display signals the operating statuses of the X tape feeder module:

  - Green: “Standby/Set-up in progress”

  - Orange: “Component running out”

  - Red: “Fault”

  - LED off: “Tape feeder module is not in current set-up and may be removed”

Robust

- Brushless motors extend the service life of the X tape feeder modules.

Intelligent

- A unique tape feeder module ID ensures that the component is assigned exactly to the tape feeder module. This makes reliable set-up verification very simple.
- Component pitch, feeding speed and other functions are set automatically when you download the set-up program.

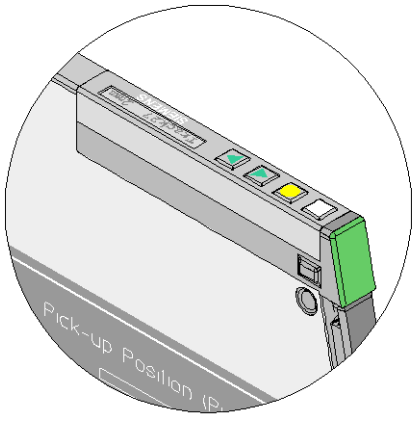
High feeding accuracy

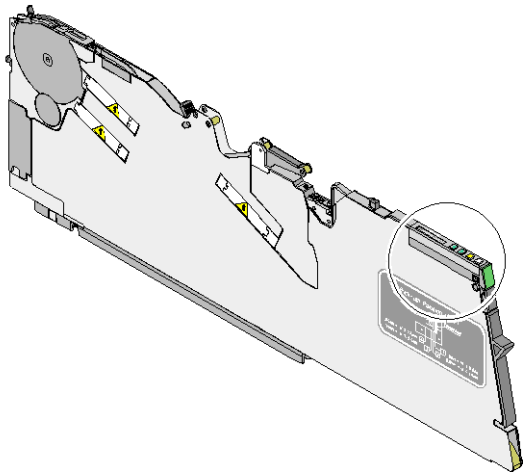
- Closed-loop control distance measurement guarantees highly accurate component feeding, even with 01005 components.

Technical data

Tape feeder module	Width [mm]	Location	Transport increment [mm]	Max. tape height [mm]
8 mm X[a,b]	10.8	1	1/2/4/8	3.5
12 mm X[a]	22.6	2	4 - 16[c]	6.5
16 mm X[d]	34.4	3	4 - 20[c]	25
24 mm X[d]	34.4	3	4 - 32[c]	25
32 mm X[d]	46.2	4	4 - 40[c]	25
44 mm X[d]	58.0	5	4 - 52[c]	25
56 mm X[d]	69.8	6	4 - 64[c]	25
72 mm X[d]	81.6	7	4 - 80[c]	25
88 mm X[d]	105.2	9	4 - 96[c]	25
Tape reels	178 to 483 mm in diameter (7" - 19")			
Changeover time	≤ 8 s			

a) PSA Kit available as an option.
b) 01005-compliant.
c) In 4 mm increments.
d) PSA Kit, standard.



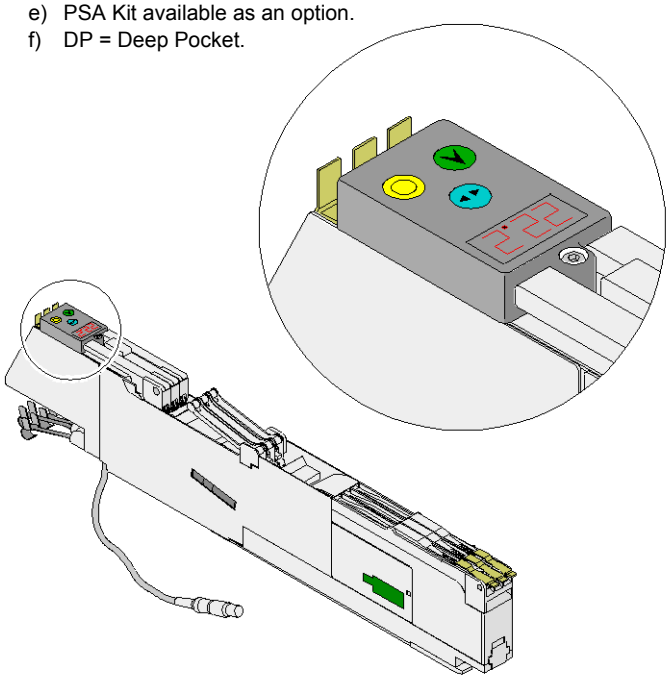


Component Feeding

S Tape Feeder Modules

Packaging	Model	Width [mm]	Loca-tions	Transport increment [mm]	Max. tape height [mm]
Paper and blister tapes	2 x 8 mm S[a]	30.6	1	2/4	3.5 [e]
	3 x 8 mm S [a]	30.6	1	2/4/8	3.5
	3 x 8 mm S 0201[b]	30.6	1	2/4	1.5
	3 x 8 mm SL[c]	30.6	1	2/4/8	3.5
	1 x 12/16 mm S	30.3	1	4/24 [d]	15 [e]
Blister tapes	1 x 24/32 mm S	42.4	1.5	4/40 [d]	15
	1 x 24/32 mm SDP[f]	42.4	1.5	4/40 [d]	25
	1 x 44 mm S	54.6	2	4/52 [d]	15
	1 x 44 mm SDP[f]	54.6	2	4/52 [d]	25
	1 x 56 mm S	66.6	2.5	4/68 [d]	15
	1 x 56 mm SDP[f]	66.6	2.5	4/68 [d]	25
	1 x 72 mm S	82.6	3	4/80 [d]	15
	1 x 88 mm S	98.6	3.5	4/96 [d]	15
Tape reels	178 - 483 mm diameter (7" - 19")				
Cycle	S feeder modules up to 20 mm transport distance < 150 ms				
Changeover time	≤ 15 s				

a) Extra fiducials provided for feeder position detection.
b) For 0201 and 0402 in paper tapes.
c) SL = Shutterless, for all components in the 8 mm component tape ≥ 0201 (paper, blister)
d) Variable in 4 mm increments.
e) PSA Kit available as an option.
f) DP = Deep Pocket.



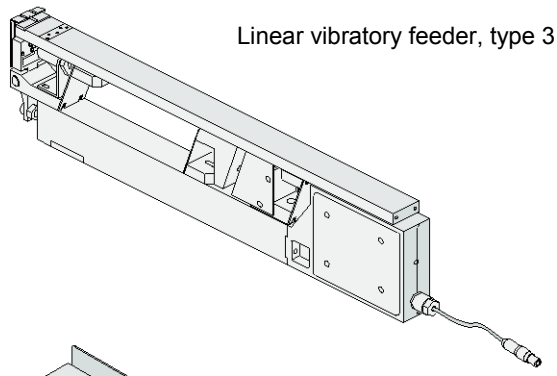
Component Feeding

Alternative SIPLACE Feeder Modules

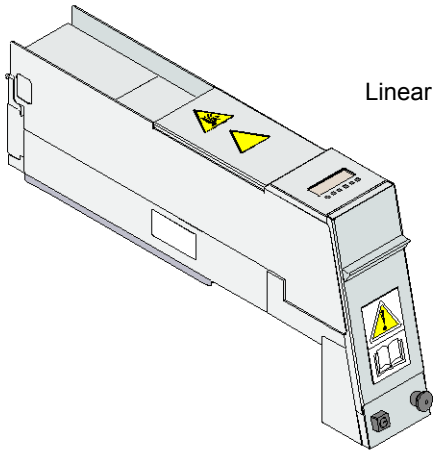
Technical data

Linear vibratory feeder, type 3		
Packaging form	Stick magazines	
Number of tracks and width	SIPLACE X component changeover table[a]	SIPLACE HF component changeover table
	3 x ≤ 9.5 mm	3 x ≤ 9.5 mm
	2 x ≤ 15 mm	2 x ≤ 15 mm
	1 x ≤ 30 mm	1 x ≤ 30 mm
Location	Takes up 3 locations of a 3 x 8 mm X feeder module	Takes up 1 location of a 3 x 8 mm S feeder module
Dip module		
for SIPLACE HF component changeover table	Takes up 3 locations of a 3 x 8 mm S feeder module	
Linear dip module (LDU X)		
for SIPLACE X component changeover table	Takes up 9 locations of an 8 mm X feeder module, no more than 1 per head	

a) with X adapter.



Linear vibratory feeder, type 3



Linear dip module

Description

Linear vibratory feeders are used to process components in stick magazines. They are easy to set up on the SIPLACE HF or SIPLACE X component changeover table using the X adapter. They can be refilled without stopping the machine.

The **DIP module** is suitable for dip-fluxing flip-chips, CSPs (chip-scale/size packages) and for wetting flip-chip bumps with isotropic, conductive adhesive.

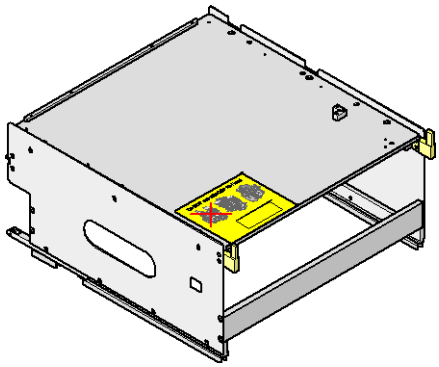
Other alternative feeder modules for the SIPLACE HF component changeover table are the label presenter, the surftape feeder module and the reject conveyor. The adapter X allows both the label presenter module and the reject conveyor to be set up on the SIPLACE X component changeover table.

Component Feeding

Waffle-Pack Tray Holders

Technical data for SIPLACE X waffle-pack tray

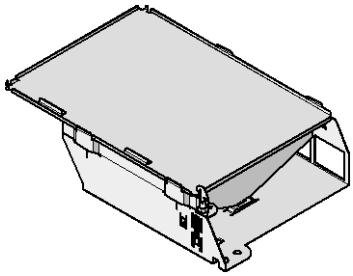
Dimensions LxWxH	429 x 376 x 200 mm³
Location assignment on the SIPLACE X component changeover table	32
Positioning options on the X-series machines	Locations 2 and 4
Range of placement heads	TwinHead, C&P6, C&P12
Max. waffle-pack tray height including component	
C&P12	16 mm
C&P6	16 mm
TwinHead	30 mm



Waffle-pack tray holder SIPLACE X

Technical data for SIPLACE HF waffle-pack tray

Holder for large waffle-pack tray	
Dimensions LxWxH	425 x 264 x 113 mm³
Location assignment on the SIPLACE HF component changeover table	9
Positioning options on the X-series machines	Locations 2 and 4
Range of placement heads	TwinHead, C&P6, C&P12
Holder for small waffle-pack tray	
Dimensions LxWxH	425 x 140 x 113 mm³
Location assignment on the SIPLACE HF component changeover table	5
Positioning options on the X-series machines	Locations 2 and 4
Range of placement heads	TwinHead, C&P6, C&P12
Max. waffle-pack tray height including component	
C&P20	Not possible
C&P12	12.5 mm
C&P6	12.5 mm
TwinHead	28.5 mm



Waffle-pack tray holder SIPLACE HF

Component Feeding

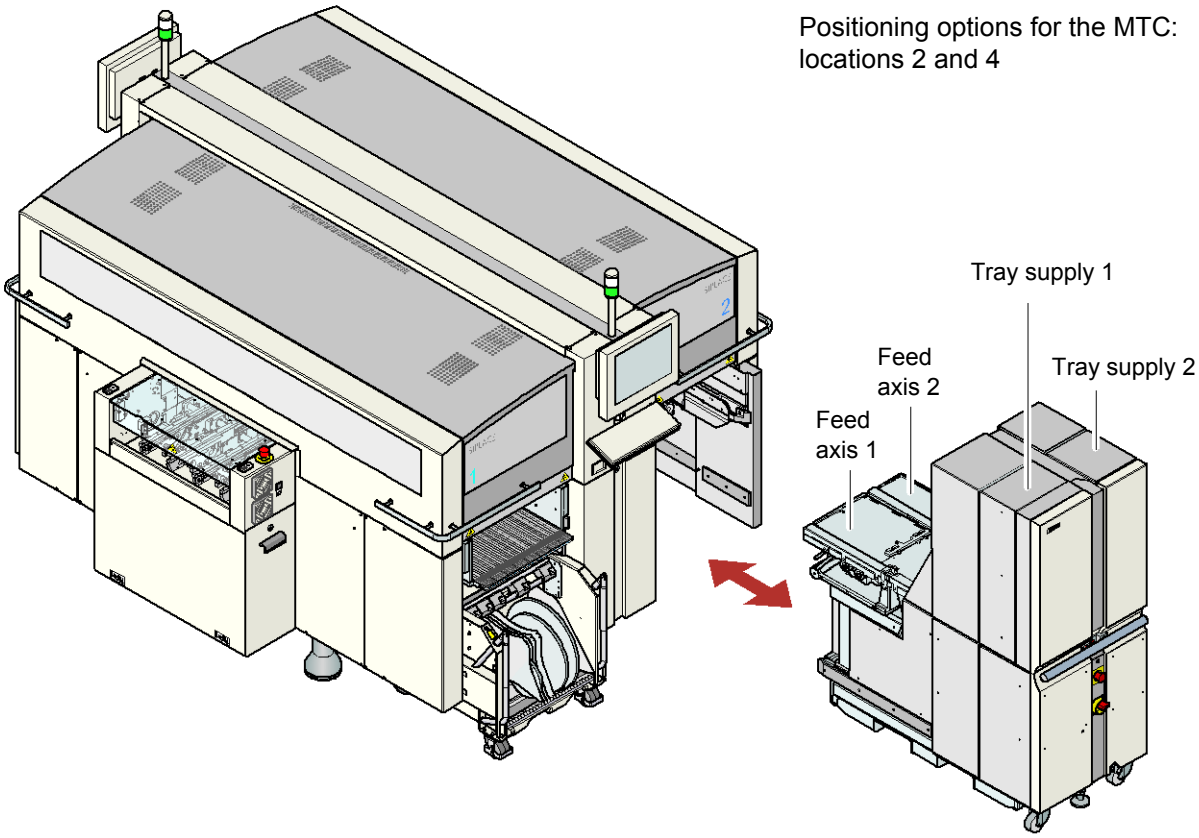
Matrix Tray Changer (MTC)

For numerous tray fed components we recommend an automatic tray change using a matrix tray changer (MTC). The MTC set-up is precisely matched to the placement sequence in order to optimize the timings and distances traveled.

Two bins with component trays move independently of one another in the vertical direction until the desired magazine is within the range of the feed axis. The horizontal feed axis transports the waffle-pack tray from the bin into the access area of the placement head.

The first magazine is made available as soon as a PCB moves onto the PCB conveyor, and valid panel and set-up data is available. All other magazine changes are carried out time-neutrally during the placement process. The magazines can be refilled without stopping the machine. Defective components are returned to the original tray.

The matrix tray changer cannot be used with the 20-nozzle Collect& Place head.



Positioning options for the MTC: locations 2 and 4

Component Feeding

Matrix Tray Changer (MTC)

Technical Data

	Tray supply 1 (XL)	Tray supply 2
Dimensions		
Length x width	1305 x 600 mm²	
Height	1490 mm for 830 mm PCB transport height 1560 mm for 900 mm PCB transport height 1590 mm for 930 mm PCB transport height 1640 mm for 950 mm PCB transport height	
Weight (basic equipment)	approx. 500 kg (with PCB magazines and waffle-pack tray carriers)	
Weight (fully equipped)	approx. 534 kg (with components)	
Weight (moving mass)	approx. 80 kg	approx. 43.5 kg
Cassette size (L x W x H)	391.2 x 305.6 x 93.3 mm³	352.7 x 154.8 x 133.8 mm³
Cassette weight (fully equipped) (without waffle-pack tray carrier)	 approx. 11 kg approx. 1.7 kg	 approx. 7.5 kg approx. 1.35 kg
Weight of the waffle-pack tray carrier	850 g	150 g
Dimensions of the waffle-pack tray carrier (L x W x H)	386.5 x 295.8 x 11.1 mm³	371 x 146 x 10.1 mm³
Distance from cassette to cassette	96 mm	135 mm
Distance from level to level	12 mm	11.8 mm
Storage capacity	30 XL waffle-pack tray carriers with 60 JEDEC or 30 special magazines of maximum size	40 waffle-pack tray carriers with 40 JEDEC waffle-pack trays
Changeover time (over 5 levels)	approx. 2 s	approx. 1.5 s
Max. height of component and waffle-pack tray, including tolerances		
all levels filled	8.5 mm	8.5 mm
one level free	19.5 mm	19.5 mm
two levels free	31.5 mm	–

Electrical ratings

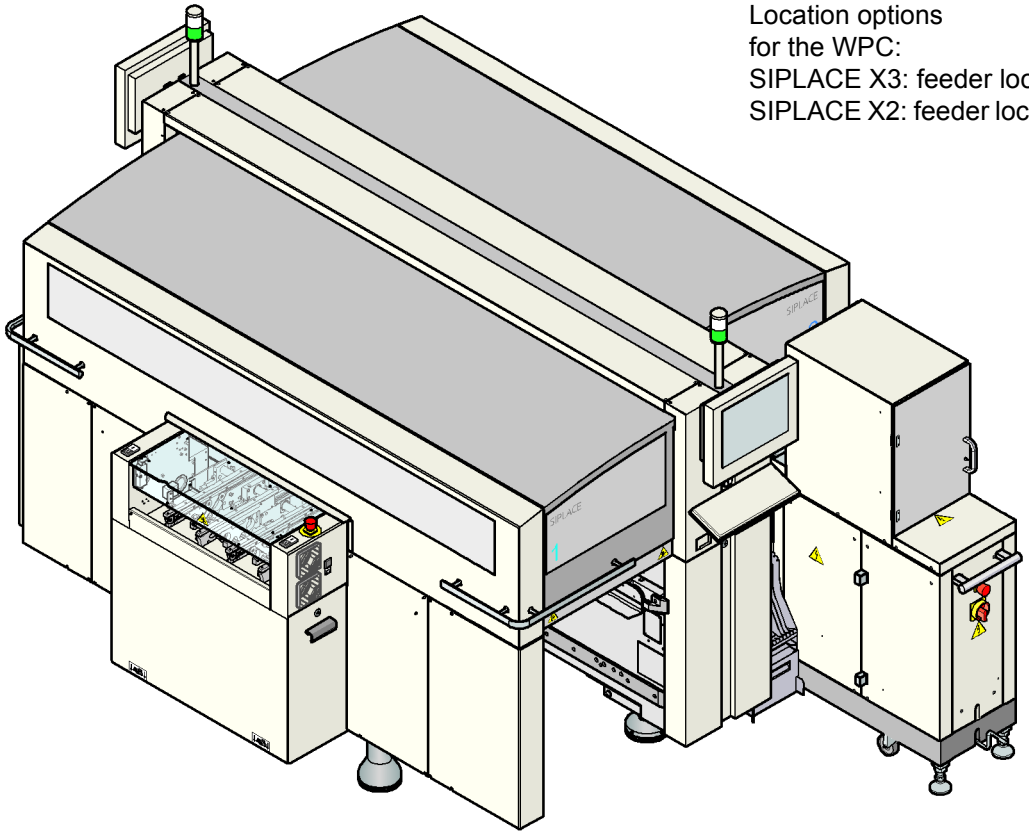
Supply voltage	3 x 400 VAC, 50 Hz (Europe) 3 x 208 VAC, 60 Hz (U.S.A.)
Total power	1.5 kW
Apparent power	3.85 kVA
Rated current	2.7 A at 3 x 400 VAC 4.2 A at 3 x 208 VAC
Fuses	3 x 16 A
Rated power consumption of the largest consumer	2 A

Component Feeding

Waffle-Pack Changer (WPC)

The waffle-pack changer makes the Flatpack IC available in the waffle-pack trays to avoid unnecessary loss of time during storage and automatic changing of the waffle-pack trays. Programmable, random access to up to 28 waffle-pack trays also considerably increases the range of components that can be made available. The waffle-pack changer has an integral chassis, and is easy to move to other locations.

It is supplied with the PCB conveyor height implemented for the machines, but can also be adapted for the 830, 900, 930 and 950 mm PCB conveyor heights with just a few simple operations. There are 4.5 locations for 30 mm width S feeder modules available on the component table.



Location options
for the WPC:
SIPLACE X3: feeder location 2
SIPLACE X2: feeder locations 2 + 4

Component Feeding

Waffle-Pack Changer (WPC)

Technical Data

Dimensions (L x W)	1560 x 360 mm²
Height	
830 mm ± 15 mm PCB transport height	1360 mm ± 15 mm
900 mm ± 15 mm PCB transport height	1430 mm ± 15 mm
930 mm ± 15 mm PCB transport height	1460 mm ± 15 mm
950 mm ± 15 mm PCB transport height	1480 mm ± 15 mm
Weight	approx. 240 kg
Load per unit area	4.19 kN/m²
Dimensions of the waffle-pack tray carrier (L x W x H)	360 x 260 x 6 mm³
Weight of the waffle-pack tray carrier	0.8 kg
Dimensions of the waffle-pack tray including components	341 x 235 x 15 mm³ max. 341 x 235 x 23 mm³
Weight of the waffle-pack tray carrier including the waffle-pack tray and components	max. 1.2 kg
Storage capacity	max. 28 waffle-pack tray carriers
Total weight of the 28 waffle-pack tray carriers	27.6 kg
Weight of the magazine storage unit, waffle-pack tray carriers, waffle-pack trays and components	max. 50 kg
Changeover time for waffle-pack tray carrier	
over 1 level	1.9 s
over 10 levels	2.3 s
over 27 levels	2.9 s

Electrical ratings

Supply voltage	3 x 208 VAC ± 5%; 50/60 Hz (U.S.A.) 3 x 230 VAC ± 5%; 50/60 Hz 3 x 380 VAC ± 5%; 50/60 Hz 3 x 400 VAC ± 5%; 50/60 Hz (European version) 3 x 415 VAC ± 5%; 50/60 Hz
Nominal apparent power	800 VA
Rated current	0.7 A at 3 x 400 VAC
Fuses	3 x 10 or 3 x 16 A

Digital Vision System

The digital vision system guarantees extremely fast and reliable component recognition, while being very simple to use. The system identifies each individual component from its shape and color. Even complex component shapes, such as flip-chip or CCGA are detected extremely reliably.

The system is not only used in the placement head cameras; it can also be found in the PCB camera. As well as ensuring that components are detected accurately, it also ensures reliable detection of the ink spots and PCB fiducials.

The benefits at a glance:

- Extremely fast and reliable component detection
- Shortest cycle times
- Robust measurement with reference to the shape and color
- Straightforward programming
- Offline programming of package forms
- Rapid introduction of new products (NPI)
- Open architecture allows you to quickly adapt to new requirements
- Optimum placement results through individual measurement of each component

Digital vision cameras

20-nozzle Collect&Place head camera
12-nozzle Collect&Place head camera
6-nozzle Collect&Place head camera
TwinHead standard and high-resolution camera
2 PCB cameras

Examples of digital vision system analysis times

01005	9 ms
PLC44	17 ms
BGA 225 balls	18 ms

Digital Vision System

Checking the Component Quality

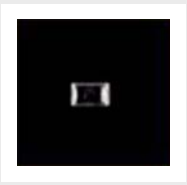
SIPLACE vision algorithms help with the recognition of

- flipped components,
- upright components,
- poor component quality.

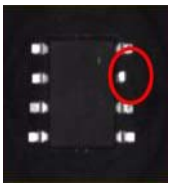
The digital vision system automatically saves the last 500 images of components that were identified as “bad”. SIPLACE users can then easily demonstrate poor component quality.

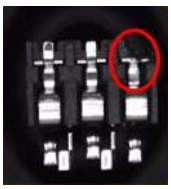
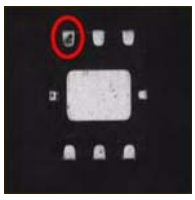
The benefits at a glance:

- Maximum placement quality
- High first pass yield
- Reduced operating costs

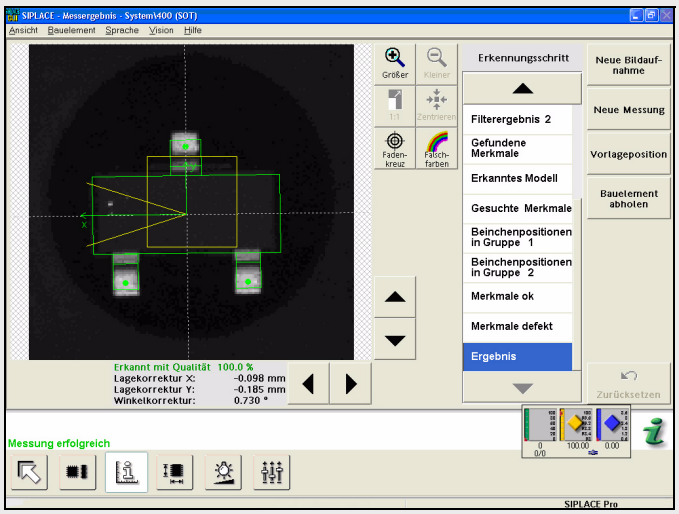
Flipped components	Upright components
	
	

Poor component quality



Vision Teach menu at the station



Vision Sensor Technology

PCB Position Recognition

Description

Different fiducial shapes prove to be optimal depending on the condition of the surface.

Particularly advisable for bare copper surfaces with little oxidation is the single cross. Maximum accuracy is achieved due to the high information content.

Rectangle, square and circle are less “informative” but save space and can even be used when oxidation is at an advanced stage. Advisable for tinned structures are circle or square because in this case the ratio of the fiducial dimensions to the presolder thickness is particularly favorable.

Fiducial criteria

Locate 2 fiducials Locate 3 fiducials	X-/Y-position, rotation angle, mean PCB distortion in addition: shear, distortion in X- and Y-direction separately
Fiducial shapes	Synthetic fiducials: circle, cross, square, rectangle, rhombus, circular, square, and rectangular contours, double cross, any pattern
Fiducial surface: copper tin	 Without oxidation and solder resist Fiducial warp ≤ 1/10 of structure width, both with good contrast to environment
Dimensions of synthetic fiducials min. X/Y size for circle and rectangle: min. X/Y size for annulus and rectangle: min. X/Y size for cross: min. X/Y size for double-cross: min. X/Y size for lozenge: min. frame width for annulus and rectangle: min. bar width / bar distance for cross, double-cross: max. X/Y size for fiducial shapes: max. bar width for cross / double-cross: min. tolerances, general: max. tolerances, general:	 0.25 mm 0.3 mm 0.3 mm 0.5 mm 0.35 mm 0.1 mm 0.1 mm 3 mm 1.5 mm 2% of nominal dimension 20% of nominal dimension
Dimensions of patterns min. size max. size	 0.5 mm 3 mm
Fiducial environment	Clearance around reference fiducial not necessary if there is no similar fiducial structure in the search area

Vision Sensor Technology

PCB Position Recognition

Bad Board Recognition

Technical data for PCB position detection

PCB fiducials	up to 3 (subpanels and multiple panels) up to 6 for the Long board option (Optional PCB fiducials are output by the optimization.)
Local fiducials	up to 2 per PCB (may be of different type)
Library memory for recognition of bad panels	up to 255 fiducial types per subpanel
Image analysis	Edge detection method (Singular feature) based on gray-scale values
Lighting method	Front lighting
Fiducial recognition time	0.1 s
Field of vision	5.78 x 5.78 mm

Description

In the cluster technology each subpanel is assigned an ink spot. If this is present during the measurement via the PCB vision module, the corresponding subpanel is populated. With this function it is possible to eliminate costs due to unnecessary population of faulty subpanels.

Ink Spot Criteria

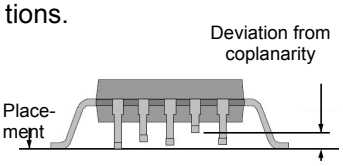
Methods	• Synthetic fiducial recognition method • Mean grayscale value • Histogram method • Template matching
Shapes and sizes of fiducials/structures for synthetic fiducials	For dimensions of synthetic fiducials, see page 37
other methods	min. 0.3 mm max. 5 mm
Masking material	good coverage
Recognition time	depends on the method: 20 ms - 200ms

Vision Sensor Technology

3D Coplanarity Laser Module

Description

Coplanarity of connections on a component means that all connections lie on a level, the so-called placement plane. This level is created from the height information from the coplanarity measurement. This ensures that the same soldering conditions apply for all connections.



Measuring principle

Measurement of the heights of the connections occurs contact-free according to the principle of laser-triangulation. For the 3D method, a laser beam line scans the component. The reflected light from the laser is reproduced on a camera. In this way the height information for the connections is obtained from the reflected light from the laser.

Restrictions

- Lead or ball recognition can get worse if the surface is oxidized or glossy.
- The following components cannot be measured: a PLCC, SOJ, socket, chip, bare die, Moulded, Melf, ECV, DPack, CCGA, screening plate, components with internal connections.

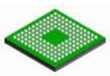
Technical data

Components	QFP, SO, BGA, gull-wing, plug
Accuracy[a]	± 15 µm (3σ) ± 20 µm (4σ)
Max. component size	50 x 50 mm²
Max. connector size	120 x 20 mm²
min. ball diameter / distance	400 µm / 800 µm
Min. number of balls	6
Min. lead width / pitch	300 µm[b] / 500 µm
Min. lead number	5
Max. CO height	17 mm
Positioning option	Location 3 on SIPLACE X2 and X3, alternative to the 2D coplanarity laser module
Placement head type	TwinHead

a) Per ball / lead.
b) Please contact your local product manager in the case of smaller lead widths.

3D coplanarity module

Component inspection possible



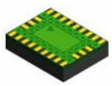
Lead/ball size within specification

Also gull-wing connections

Component inspection not possible

Only 5 pins

With internal connections, no gull-wing form



The same applies to screening plates, plugs with connections on the underside, bare die etc.

Vision Sensor Technology

2D Coplanarity Laser Module

See page 39 for a description of the coplanarity properties.

Measuring principle

Measurement of the heights of the connections occurs contact-free according to the principle of laser-triangulation. For the 2D method, a point laser beam scans the component. The reflected light from the laser is projected onto a sensor. In this way the height information for the connections is obtained from the reflected light from the laser.

Restrictions

- The component must have a minimum of two and a maximum of four rows of gull-wing leads.
- The row of leads should be located orthogonally to each other.
- The leads should be trained orthogonally to the row of leads.
- The ends of the leads lie on a straight line.
- Measurement of components with just one row of leads is not possible.

Technical data

Components	Gullwing
Accuracy	± 18.5 µm (3σ) (reference CO) ± 24.7 µm (4σ) ± 30.5 µm (3σ) (CO up to 32 mm) ± 40.7 µm (4σ) ± 31.3 µm (3σ) (CO up to 55 mm) ± 41.7 µm (4σ)
Max. component size	55 x 55 mm²
Min. lead pitch	300 µm
Max. component height	25 mm
Positioning option	Location 3 on SIPLACE X2 and X3, alternative to the 3D coplanarity laser module
Placement head type	TwinHead

01005 Placement

The SIPLACE X-series is designed to place 01005 components (0.4 mm x 0.2 mm) as standard. It needs to be running the station software version 603.01 and SIPLACE Pro 4.1. This will also improve the detection capability at the associated nozzles.

The SIPLACE component library already contains the contours and dimensions of the 01005 components. There are also specially-developed type 1005 component nozzles for the SIPLACE X-series. The shape and size of these nozzles is adapted for the 01005 components and - like all other SIPLACE nozzles - they have an extremely wear-resistant ceramic tip and a flexible nozzle seat. This guarantees maximum precision and process reliability.

Optimized pick-up is guaranteed by the ideal feeding conditions in the SIPLACE X feeder module. The smaller the elements to be picked up, the more accurate the pick-up must be. Even the tiniest inaccuracy may result in components not being sucked up or being sucked up incorrectly. The SIPLACE X feeder modules are ideally designed for this. New motors and fewer precision mechanical parts also help. The tiny components can be processed **without any loss of performance**, and can be placed with minimal spacings and regardless of any large components beside the 01005 component. This equates to **true 01005 capability**. As a rule with 01005 placement, a finely tuned overall 01005 process is the basic requirement if you want to achieve excellent results. All the process parameters must be optimized. The SIPLACE team will be pleased to advise you on how to do this.

01005 measurement results and ambient conditions

Dpm values and pick-up rates for 01005 placement are highly dependent on the measuring conditions, so it is important to specify them without the corresponding ambient conditions.

The following table lists some typically values for 01005 placement that can be achieved with a SIPLACE X-series if the listed marginal conditions are fulfilled:

Machine type	SIPLACE X4, X3, X2
Placement head	20-nozzle Collect&Place head
Nozzle type	1005
Feeder module type	8mm SIPLACE X tape feeder module
Station software	603.01 or later
SIPLACE Pro	4.1 or later
Pickup rate	≥ 99.9%
Dpm rate	≤ 50
Pad width	≥ 200 µm
Distance	≥ 100 µm
Components (L x W x H)	400 x 200 x 200 µm³ (±20 µm)
Solder paste type	5
Stencil thickness	60 µm

SIPLACE Software

SIPLACE offers holistic solutions based on modular software tools for SMT machine, line and production management: **the SIPLACE software suite**.

Product definition, optimization and line control

Fast, fault-free introduction of products and optimum utilization of production lines are essential to maximize production output. The programs from the SIPLACE software suite allow you to easily program products, fine-tune the programs you have created and then find the balance for them within your SMT production lines.

Production monitoring & process control

To achieve the production targets that are set, it is important to constantly monitor and check the production facilities. The SIPLACE software suite contains monitoring products tailored to suit the user group. These signal immediately if limits are exceeded on the machine or the production line.

Set-up verification & traceability

Set-up errors lead to series errors. The user-friendly SIPLACE software programs help you to avoid such errors, and thus ensure high quality in your electronics production.

The benefits of the SIPLACE software suite at a glance:

- Fast programming and error detection
- Reduces changeover times and stoppages
- Ensures optimum utilization of your production line's productivity
- Real-time information from the production area
- Incredibly fast distribution of information
- Optimum use of resources
- Timely notification when production materials need to be re-ordered
- Coordination of maintenance

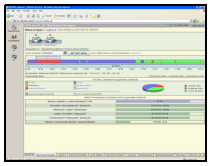
Example times for SIPLACE Pro

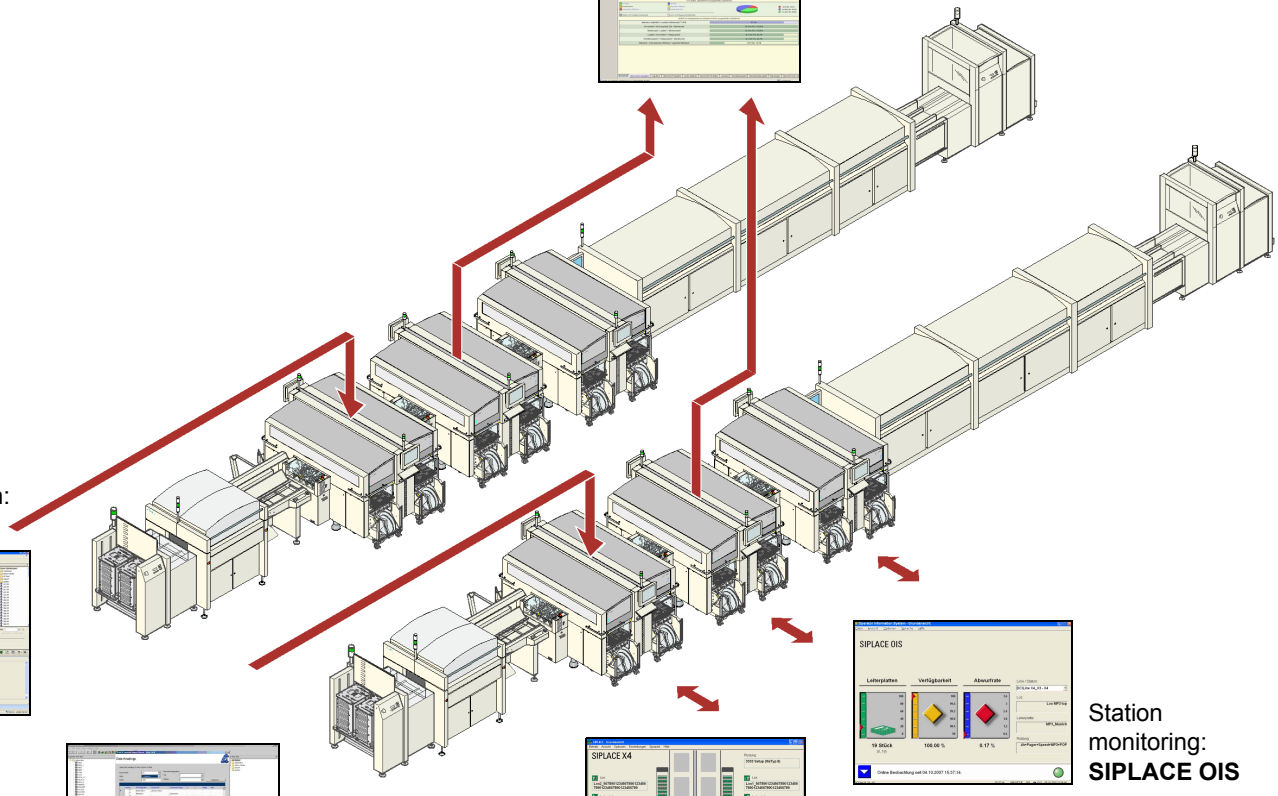
Average time for programming a PCB	10 minutes
Minimum line optimization time	< 1 minute

SIPLACE Software

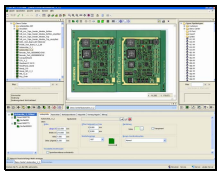
	SIPLACE software product	Standard	Option
Product definition, optimization and line control	SIPLACE Pro A single application for all programming tasks	X	
	SIPLACE CAD Fast and easy data conversion		X
	SIPLACE SiCluster Fully automatic product grouping		X
	SIPLACE EDM Straightforward data management for placement programs		X
Production monitoring & process control	SIPLACE OIS Operator Information System	X	
	SIPLACE Explorer Line monitoring system		X
Set-up verification & traceability	SIPLACE Setup Center Avoids set-up errors with reliable set-up verification		X
	SIPLACE Traceability Traceability of the placement processes		X

Production monitoring:
SIPLACE Explorer

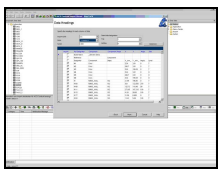




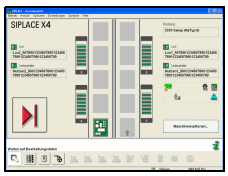
Product definition:
SIPLACE Pro



Station monitoring:
SIPLACE OIS



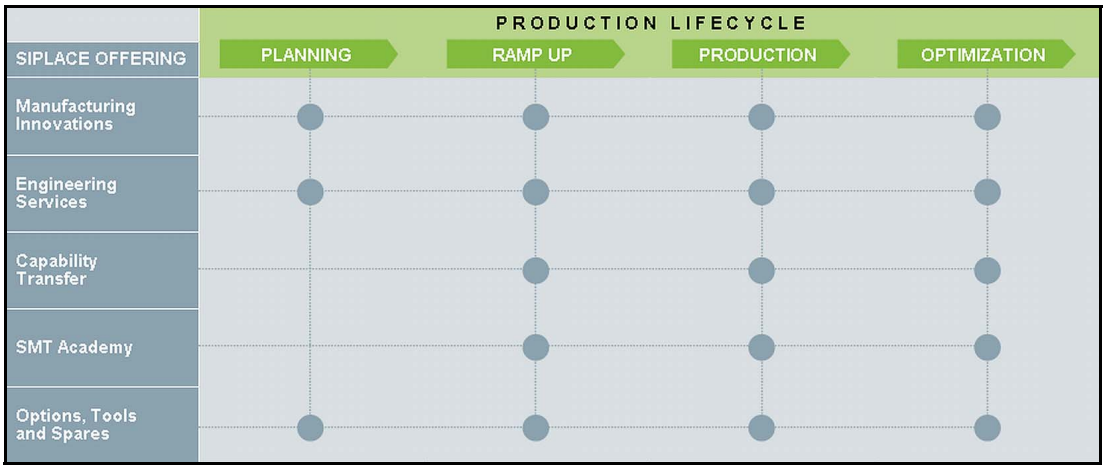
Product definition:
SIPLACE Pro



Station control:
SIPLACE station software

SIPLACE Services

Production life cycle



SIPLACE offers a comprehensive worldwide portfolio of services to support customers across the entire production life cycle. From planning a new factory or extending an existing production facility, via start-up and series production of new products through to optimizing the performance of equipment and the production team, SIPLACE (with over 20 years' experience in the field of SMT technology and best-practice experience gained all around the world) offers innovative solutions to its customers. We are committed to your success! Contact your local SIPLACE sales partner who will be happy to discuss the entire range of services with you in detail.

The SIPLACE services are tailored to the customer's needs and give customers the option of choosing the right solution for their situation from the alternatives on offer.

Manufacturing Innovations

SIPLACE customers frequently have to test the efficiency and profitability of production equipment and processes in order to meet the constantly changing market requirements and devise competitive advantages. With its Manufacturing Innovations, the SIPLACE team is working in close collaboration with the customer team to devise innovative, customized best-practice solutions. The precise problem is identified, then the existing solution or an existing process is analyzed, key indicators are determined and suggested solutions are drawn up and the potential for improvement is indicated. The SIPLACE team has access to a whole range of standardized optimization tools for this process.

Engineering Services

With SIPLACE Engineering Services, SIPLACE experts can bring their technical expertise, experience and SIPLACE quality standards to help with your tasks. Typical tasks include the development of programming data for special components, the development of customer-specific hardware solutions (such as nozzles, grippers or special feeders), machine maintenance or calibration services to demonstrate placement accuracy, repair services or hotline support. SIPLACE experts can be called upon when you need them. You benefit from their rapid availability, their incredible experience and the knowledge network created between the individual service experts, not to mention the close collaboration between the experts and the SIPLACE R&D department.

SIPLACE Services

Training Courses for the SIPLACE X-Series

Capability Transfer

Under the heading of Capability Transfer we offer solutions that will enable your team to carry out tasks such as verifying placement accuracy or the serviceability of SIPLACE feeder modules to SIPLACE standards. Not only will we provide you with all the tools or testing systems you will need for the desired period, but we will also train and coach your team, even on site on your premises. We will certify your team and provide certificates stating that its work conforms to the SIPLACE standards. We provide the Capability Transfer solutions in the form of standard packages. You decide when you want the solution and how often.

SMT Academy

The SMT Academy provides training courses to give your team the necessary technical skills - from basic SIPLACE operator training through to advanced courses for your experts. We can run courses on your site or in one of our SIPLACE Training Centers around the world. In addition to our range of standardized courses, we can also tailor training programs to your specific needs. Before we do that, we recommend that we first carry out a knowledge gap analysis as this will enable us to identify very easily where you have a need to refresh technical knowledge and skills.

SIPLACE training units are always modular. This means that you can register for a standard course, but we can also put together individual topics to create a special course specifically for your production situation.

We can also provide upgrade training that covers just the differences between the machines that you already have in use and the newly-installed machine platform.

If necessary we can also modify the content of courses to cover your specific requirements.

All of our courses take account of the roles and responsibilities of the participants, and can be run either at a SIPLACE Training Center or at your own production facility.

The courses are also offered in a wide range of languages. Please ask for further details.

Options, Tools and Spares

Under Options, Tools and Spares we offer machine accessories and options (some of which are listed in this document), a range of tools that you can use to check or adjust your equipment and original SIPLACE spare parts to ensure top quality repairs.

Training Courses Especially for the SIPLACE X-Series

Special operator training, maintenance training and technical training (setting up and repairing systems) courses are available for the SIPLACE X-series.

Standard Training Courses for the SIPLACE X-Series	• SIPLACE Training for Operators • SIPLACE Minor and Major Maintenance Training for the X-Series • SIPLACE Technical Training for the X-Series
Advanced Courses and Customer-specific Training for the SIPLACE X-Series	• SIPLACE X-Series Advanced Training Module • SIPLACE X-Series Upgrade Training Module
Reference to other training courses	• SIPLACE Programmer Training for SIPLACE Pro • SIPLACE Vision Training • SIPLACE Feeder Care Training

Maximum Quality in Production

Maximum quality in production

The SIPLACE X-series not only provides market-leading machine quality; it also guarantees maximum product quality through a combination of the following features:

100% placement process control

The SIPLACE X-series has various control mechanisms as standard that guarantee maximum placement reliability. For example, sensors check whether the component was picked up or set down correctly. Force sensors also check the specified component set-down forces and compensate for differences in height during pick-up and any bumps on the PCB during placement.

Digital vision inspection

The digital vision system guarantees extremely fast and reliable component recognition, while being very simple to use. The system identifies each individual component from its shape and color. Using different illumination and brightness levels, almost every package form can be easily detected. The system also stores images of the components, known as “vision dumps”. These show which components were rejected. As a result, errors can be detected earlier when introducing new products, thus increasing process reliability. The vision dumps also provide good negotiation tools if defective components are supplied.

Intelligent software for set-up verification

The SIPLACE X series set-ups are verified on the PCB, on the component roll and by the intelligent SIPLACE X feeder modules with reference to the barcode. This helps to avoid set-up errors. This network of tests considerably lowers dpm rates and increases the first pass yield.

Quality values for the SIPLACE X-series

Pickup rate	≥ 99.95 %[a]
Dpm rate	≤ 3 dpm[a]

a) Based on average values from evaluations.

Technical Data

SMEMA Interface

Connector Assignment

Signal interface (14-pole connecting socket, interface standard 1.2)

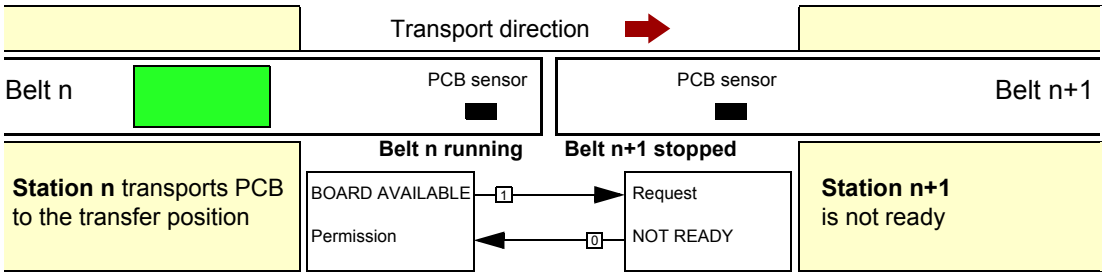
Upstream station X1		Downstream station X2	
Pin 1	NOT READY +	Pin 1	NOT READY +
Pin 2	NOT READY –	Pin 2	NOT READY –
Pin 3	BOARD AVAILABLE +	Pin 3	BOARD AVAILABLE +
Pin 4	BOARD AVAILABLE –	Pin 4	BOARD AVAILABLE –
Pin 5	Not used	Pin 5	Not used
Pin 6	Not used	Pin 6	Not used
Pin 7	Not used	Pin 7	Not used
Pin 8	Reserved	Pin 8	Reserved
Pin 9	Reserved	Pin 9	Reserved
Pin 10	Reserved	Pin 10	Reserved
Pin 11	Reserved	Pin 11	Reserved
Pin 12	Reserved	Pin 12	Reserved
Pin 13	Reserved	Pin 13	Reserved
Pin 14	Reserved	Pin 14	Reserved

Technical Data

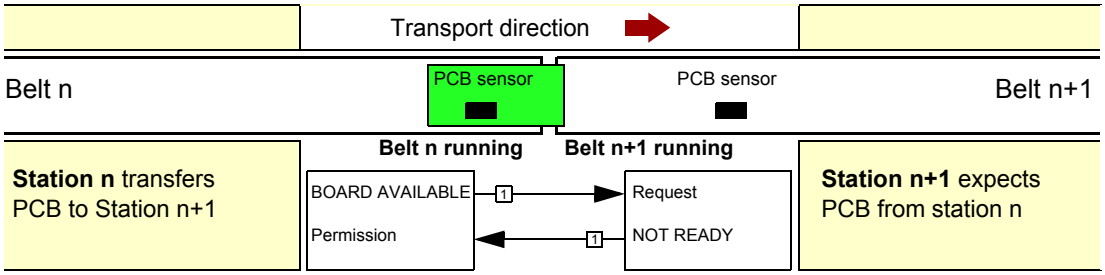
SMEMA Interface

Signal Sequence

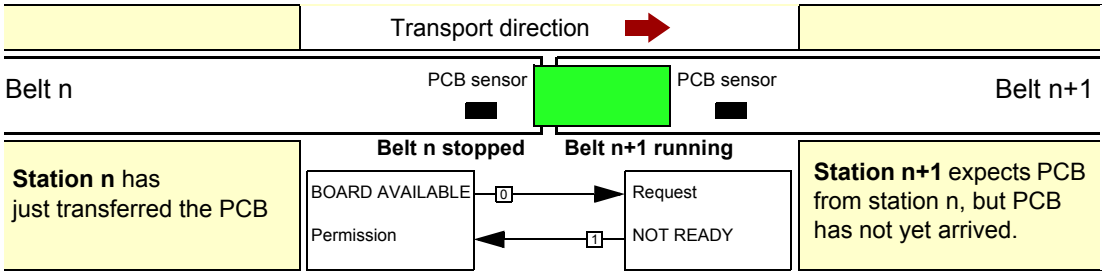
1. After switching on the station



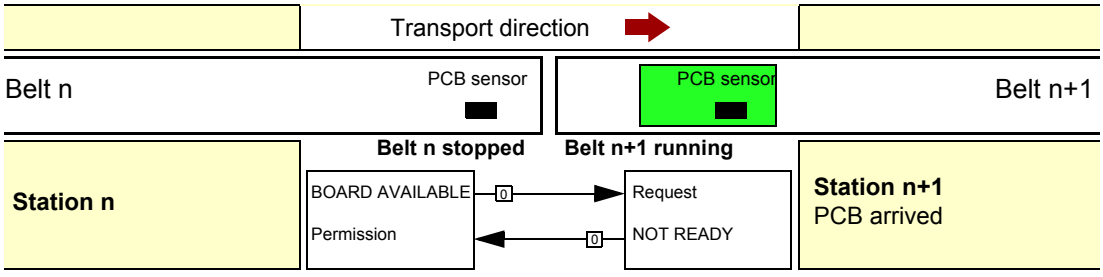
2. The PCB transfer has started



3. PCB is transferred



4. PCB transfer is complete



To start a new PCB transfer, both signals must be “0” for at least 50 ms.

Technical Data

Siemens Signal Interface

Connector Assignment

Signal interface (20-pin ribbon cable connector)

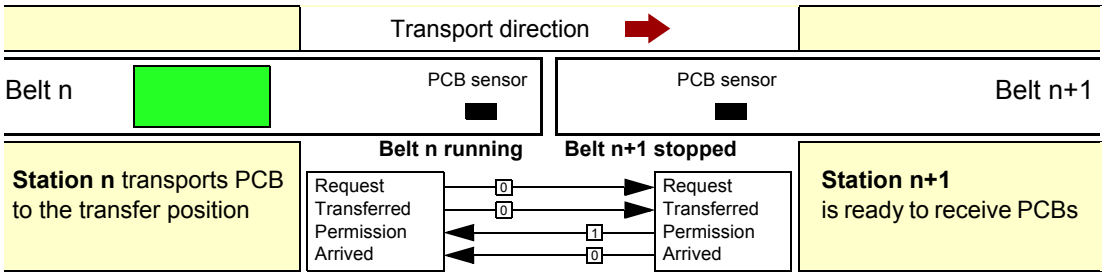
Upstream station X1		Downstream station X2	
Pin 1	Reserved	Pin 1	Reserved
Pin 2	GND 24 VDC	Pin 2	Reserved
Pin 3	+ 24 VDC	Pin 3	Reserved
Pin 4	Reserved	Pin 4	Reserved
Pin 5	Reserved	Pin 5	GND 24 VDC
Pin 6	Reserved	Pin 6	+ 24 VDC
Pin 7	Reserved	Pin 7	Reserved
Pin 8	Reserved	Pin 8	Reserved
Pin 9	Reserved	Pin 9	Reserved
Pin 10	Reserved	Pin 10	Reserved
Pin 11	Interfering signal loop	Pin 11	Interfering signal loop
Pin 12	Interfering signal loop	Pin 12	Interfering signal loop
Pin 13	GND 24 VDC	Pin 13	GND 24 VDC for permission / arrived (galvanic isolation)
Pin 14	Arrived	Pin 14	Arrived
Pin 15	Permission	Pin 15	Permission
Pin 16	Reserved	Pin 16	Reserved
Pin 17	Reserved	Pin 17	Reserved
Pin 18	Transferred	Pin 18	Transferred
Pin 19	Request	Pin 19	Request
Pin 20	GND 24 VDC for request / transferred (galvanic isolation)	Pin 20	GND 24 VDC

Technical Data

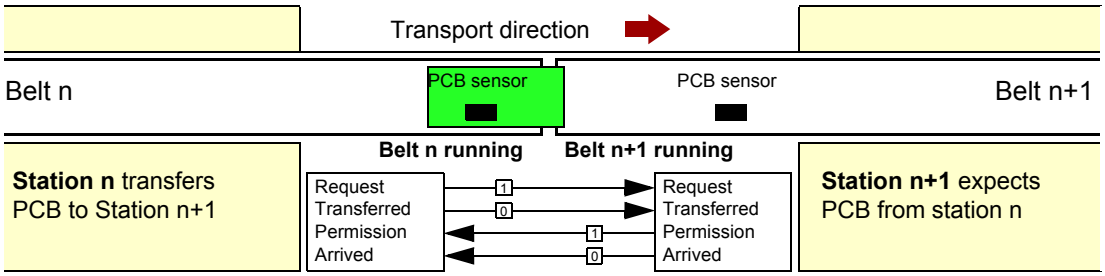
Siemens Signal Interface

Signal Sequence

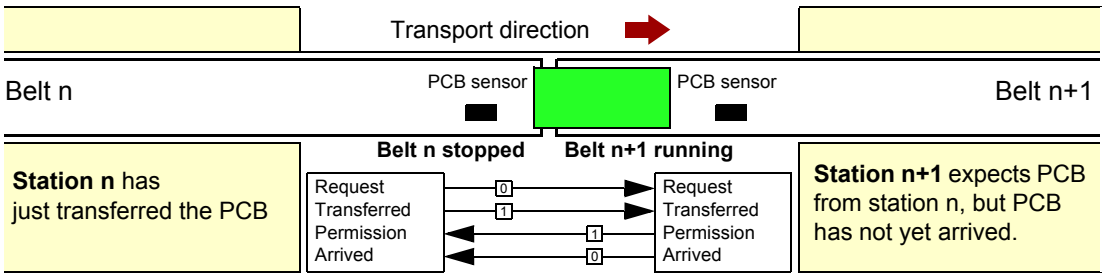
1. After switching on the station



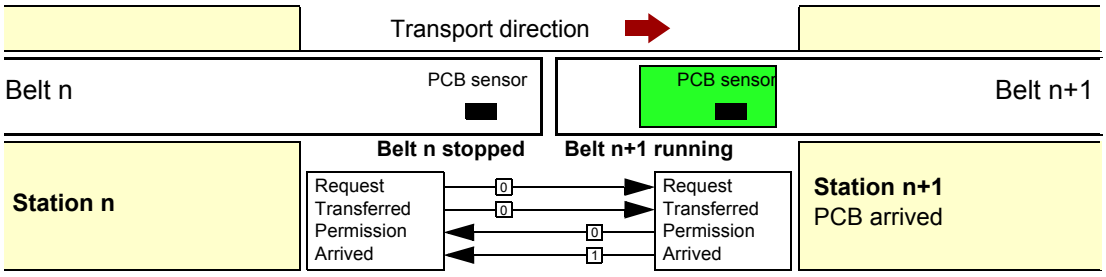
2. The PCB transfer has started



3. PCB is transferred



4. PCB transfer is complete



Technical Data

Electrical Ratings and Compressed Air Supply

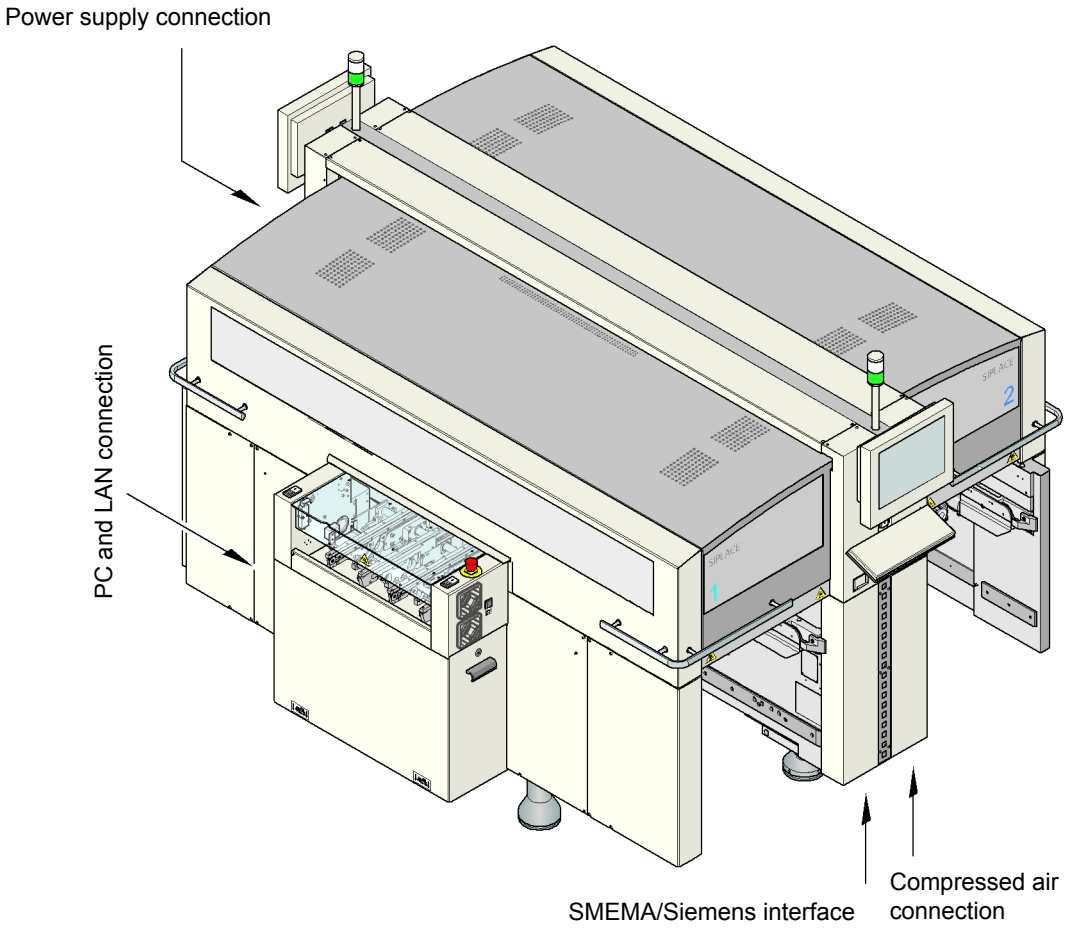
Electrical ratings		
Supply voltage	3 x 200 VAC ± 5%; 50/60 Hz (Japanese version) 3 x 208 VAC ± 5%; 50/60 Hz (U.S.A. version) 3 x 230 VAC ± 5%;50/60 Hz 3 x 380 VAC ± 5%;50/60 Hz 3 x 400 VAC ± 5%; 50/60 Hz (European version) 3 x 415 VAC ± 5%;50/60 Hz	
Fuses	3 x 32 A (3 x 200 VAC / 3 x 208 VAC / 3 x 230 VAC) 3 x 16 A (3 x 380 VAC / 3 x 400 VAC / 3 x 415 VAC)	
Power connector	5 x 6 mm² cable with CEKON plug 5 x 32 A (3 x 200 VAC/208 VAC/230 VAC) 5 x 4 mm² cable with CEKON plug 5 x 16 A (3 x 380 VAC/400 VAC/415 VAC)	
Nominal apparent power	SIPLACE X4: 4.7 kVA SIPLACE X3: 4.1 kVA SIPLACE X2: 3.3 kVA	
Active power	SIPLACE X4: 2.7 kW SIPLACE X3: 2.15 kW SIPLACE X2: 1.83 kW	
Rated current consumption	SIPLACE X4: 11.3 A / 3 x 400 VAC SIPLACE X3: 9.7 A / 3 x 400 VAC SIPLACE X2: 8.1 A/ 3 x 400 VAC	
Compressed air supply		
Compressed air pressure	0.5 MPa = 5.0 bar (p_{min}) to 1.0 MPa = 10 bar (p_{max})	
Operating pressure	0.48 MPa ± 0.025 MPa (4.8 bar ± 0.25 bar)	
Compr. air connection	R 3/4" internal thread (pipe thread) with 1/2" hose connector	
Type of machine	Placement head configuration	Compressed air consumption[a] *without* vacuum pump[b]
SIPLACE X4	C&P20/C&P20/C&P20/C&P20	960 Nl/min
	C&P20/C&P20/C&P12/C&P12	880 Nl/min
	C&P20/C&P20/C&P12/C&P6	880 Nl/min
	C&P20/C&P20/C&P6/C&P6	880 Nl/min
	TH/TH/TH/TH	400 Nl/min
SIPLACE X3	C&P20/C&P20/C&P20	720 Nl/min
	C&P20/C&P20/C&P12	680 Nl/min
	C&P20/C&P20/C&P6	680 Nl/min
	TH/TH/TH	300 Nl/min
SIPLACE X2	C&P20 / C&P20	480 Nl/min
	C&P20/C&P12	440 Nl/min
	C&P20/C&P6	440 Nl/min
	TH / TH	200 Nl/min
Compressed air specification		
Particle size	5 µm ISO class 3	
Particle density	5 mg/m³ ISO class 3	
Maximum oil content	0,01 mg/m³ ISO class 1	
Pressure dewpoint	+ 3°C ISO class 4	

a) Under normal atmospheric conditions at 20°C and 1013 hPa.
b) It is not possible to use the vacuum pump with the 20-nozzle Collect&Place head under software version SR.605.xx.

Technical Data

Electrical Connection, Interfaces and Compressed Air Connection

Power connector
5 x 6 mm² cable with CEKON plug 5 x 32 A (3 x 208 VAC / 3 x 230 VAC)
5 x 4 mm² cable with CEKON plug 5 x 16 A (3 x 380 VAC / 3 x 400 VAC / 3 x 415 VAC)



Technical Data

Dimensions and Set-up Conditions

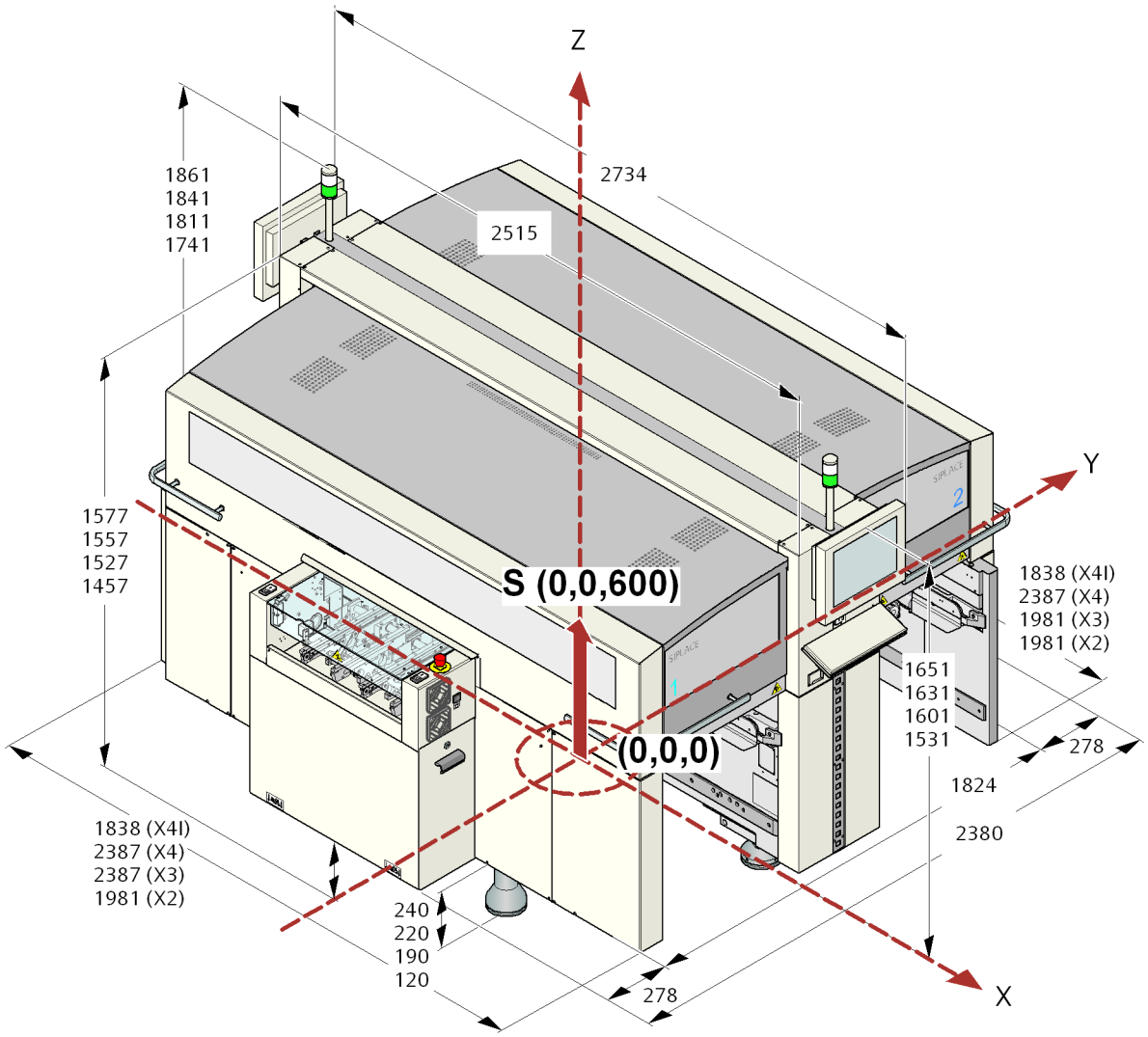
Length	
with both extension kits	2380 mm
with one extension kit	2103 mm
with no extension kits	1826 mm
Width of the basic machine	
X4 with component changeover table (locations 1 + 4)	2815 mm
X4 with component changeover table (locations 2 + 3)	2815 mm
X3 with component changeover table (locations 1 + 4)	2815 mm
X3 with component changeover table (locations 2 + 3)	2395 mm
X2 with component changeover table (locations 1 + 4)	2395 mm
X2 with component changeover table (locations 2 + 3)	2395 mm
with monitors	2766 mm
with keyboards	2804 mm
Height of the machine	
with indicator lamp	max. 1863 mm
with folded-up protective covers	1990 mm (PCB transport height 830 mm) 2060 mm (PCB transport height 900 mm) 2090 mm (PCB transport height 930 mm) 2112 mm (PCB transport height 950 mm)
Machine ground clearance	120 mm (PCB transport height 830 mm) 190 mm (PCB transport height 900 mm) 220 mm (PCB transport height 930 mm) 240 mm (PCB transport height 950 mm)
Weight	
X4 (machine with component changeover table)	3880 kg
X4 (full configuration with feeder modules)	4255 kg
X3 (machine with component changeover table)	3790 kg
X3 (full configuration with feeder modules)	4171 kg
X2 (machine with component changeover table)	3705 kg
X2 (full configuration with feeder modules)	4086 kg
Footprint	
X4, X3 and X2	6.70 m²
Load per unit area[a]	
X4	5.98 kN/m²
X3	5.84 kN/m²
X2	6.20 kN/m²
Number of machine feet	6
Maximum noise emissions	75 dB (A)
Room temperature	between 15°C and 35°C
Atmospheric humidity	30 to 75 % (no higher than 45% on average to prevent any possibility of condensation on the machine)

a) The load per unit area calculation included an additional working space of 0.5 m on each side of the machine.

Technical Data

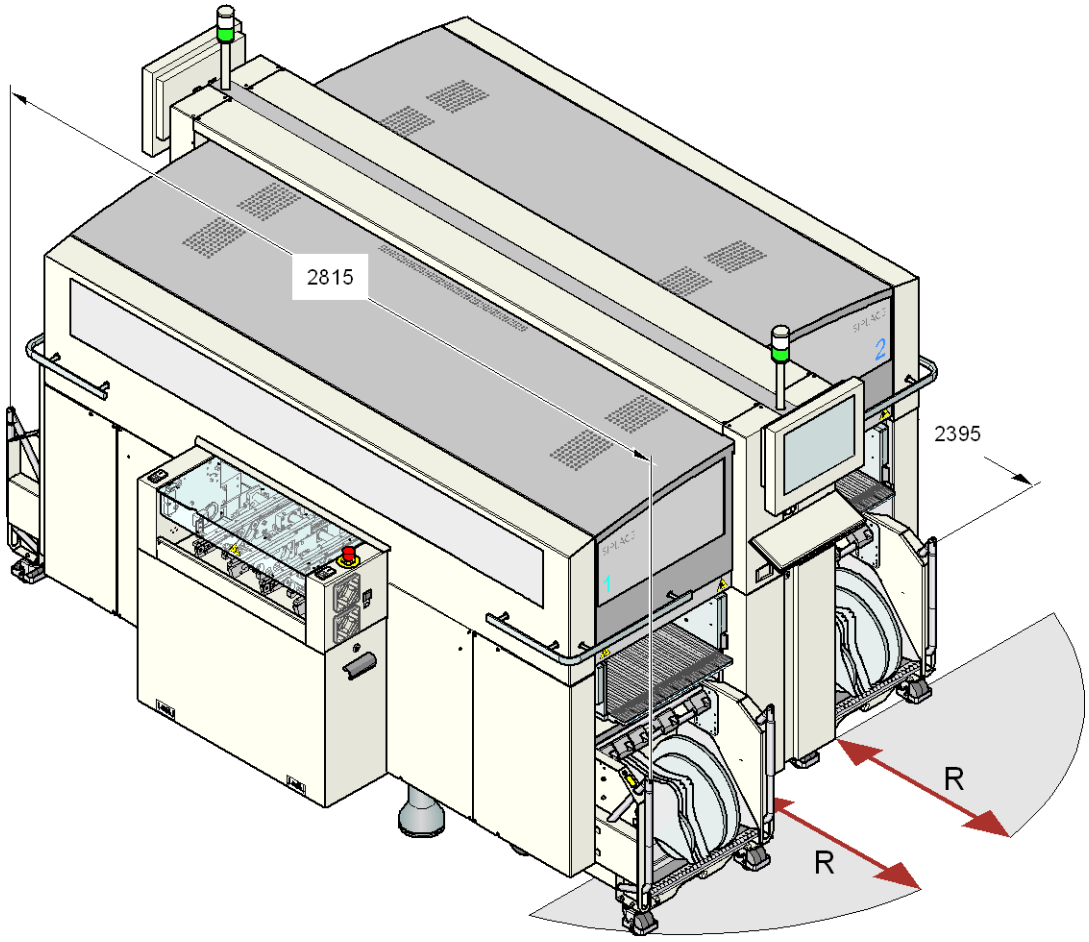
Dimensions of the Placement System

Placement System's Center of Gravity



Technical Data

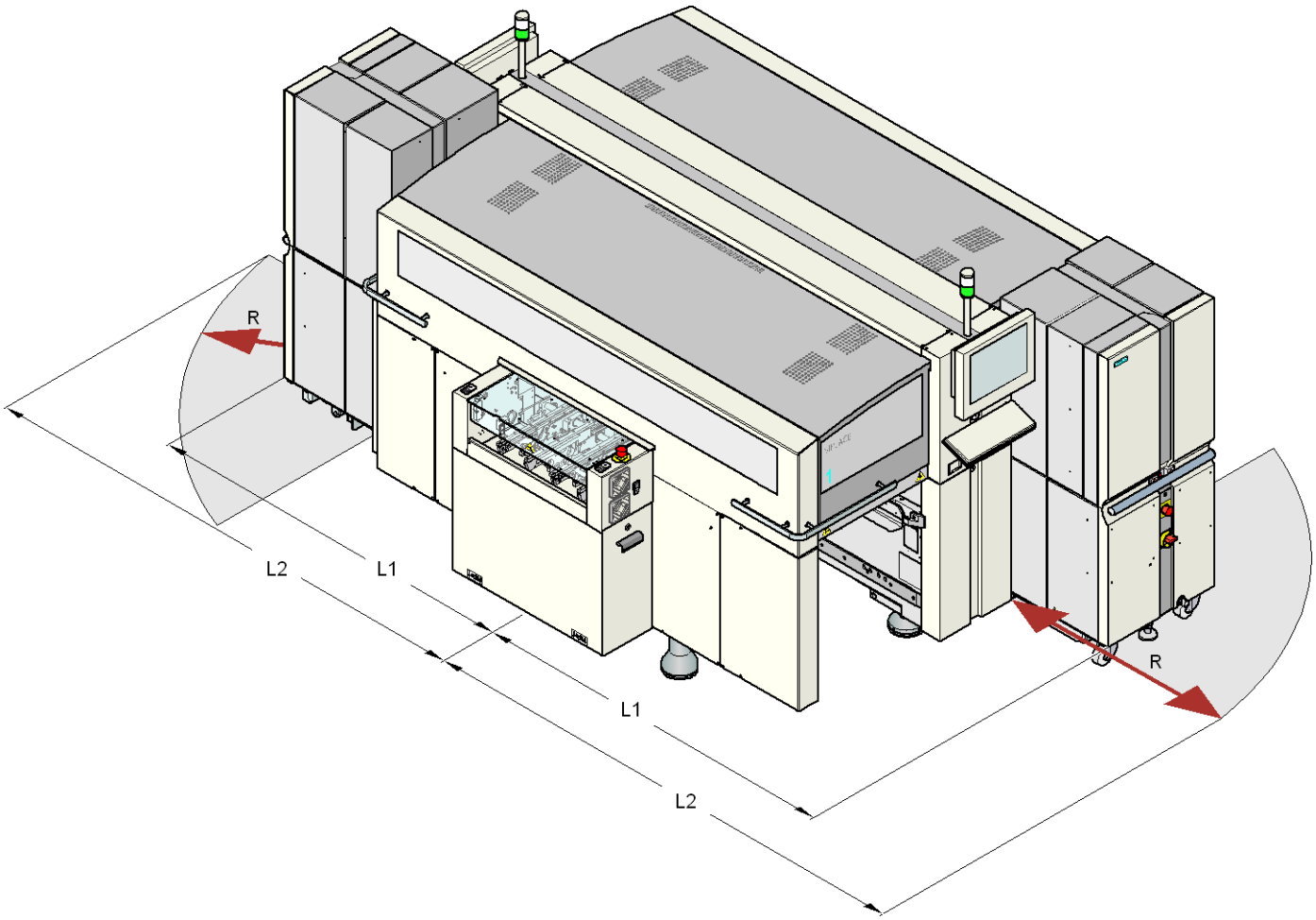
Maneuvering Radii for the Component Changeover Tables



Machine	Maneuvering radius R			
	Location 1	Location 2	Location 3	Location 4
X4	750	750	750	750
X3	750	600	750	750
X2	750	600	750	600

Technical Data

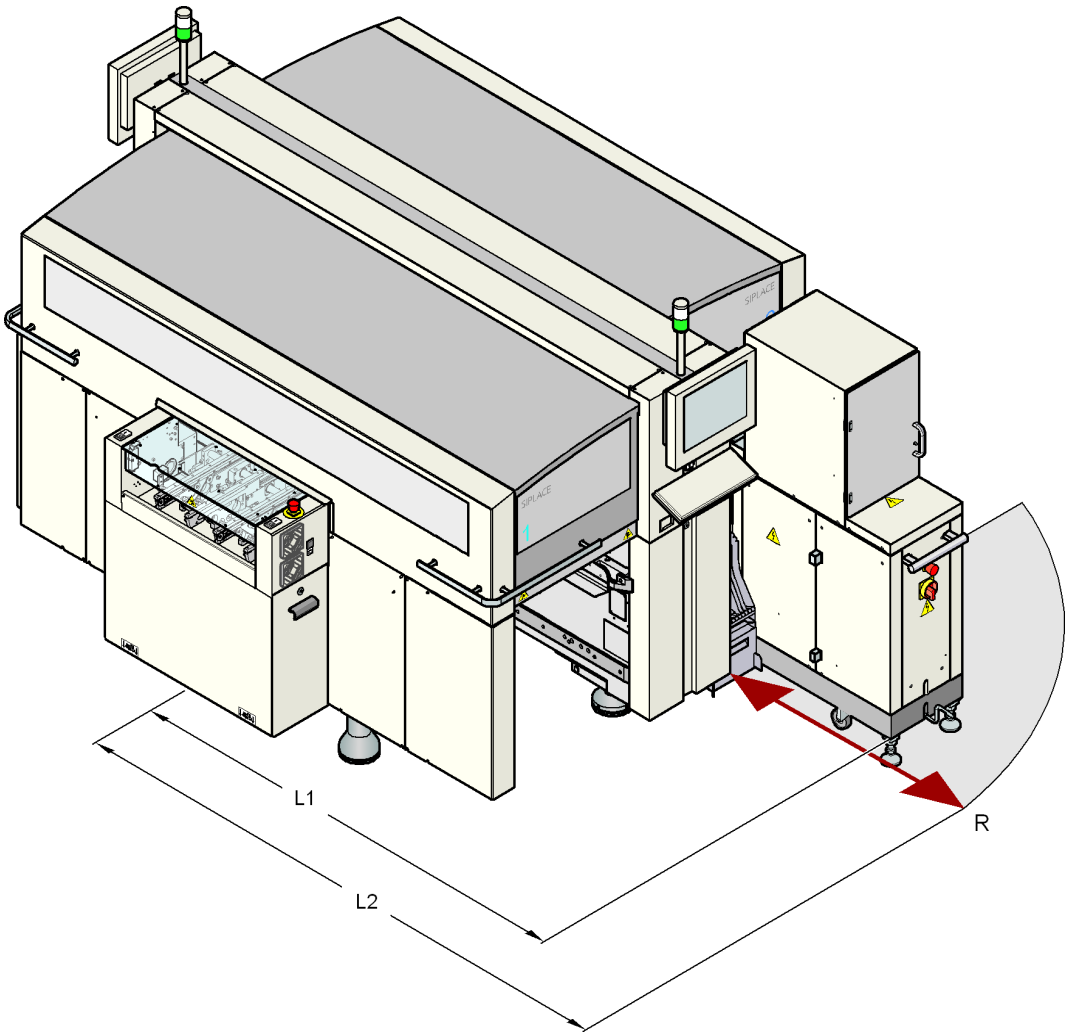
Maneuvering Radius for the MTC



Machine	Location 2	Location 4
	Maneuvering radius R	
X4	1303	1303
X3	1123	1303
X2	1123	1123
	Distance L1: Middle of machine to outer edge of MTC	
X4	1802	1802
X3	1622	1802
X2	1622	1622
	Distance L2: Middle of machine to the wall	
X4	2562	2562
X3	2382	2562
X2	2382	2382

Technical Data

Maneuvering Radii for the WPC

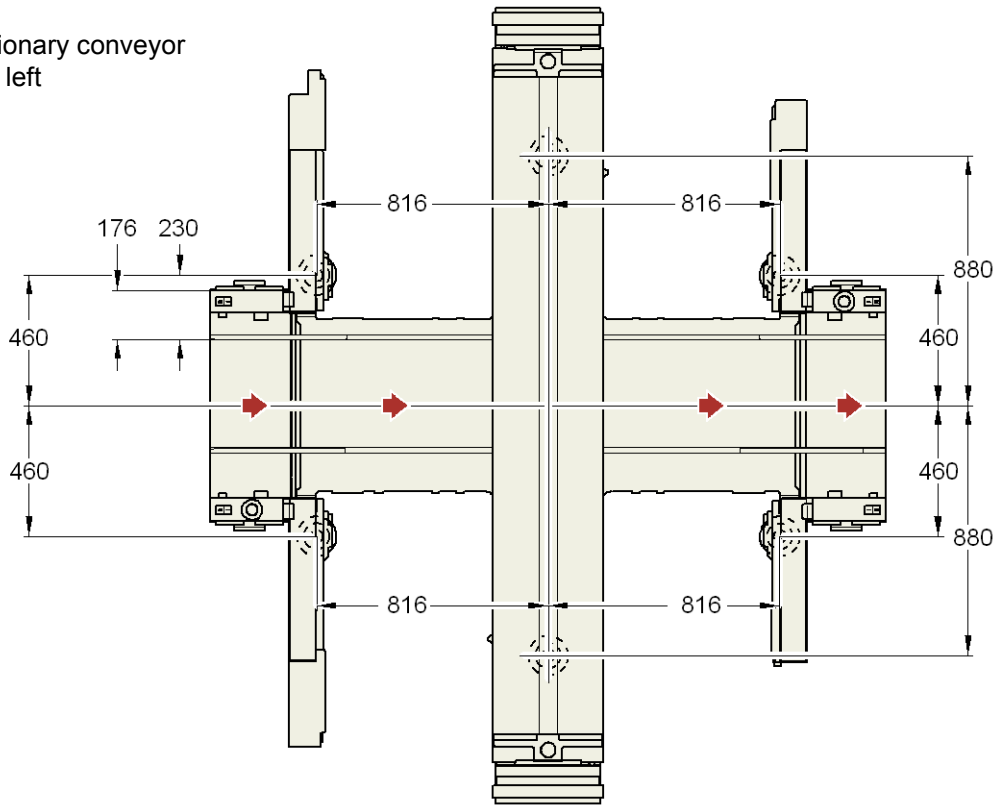


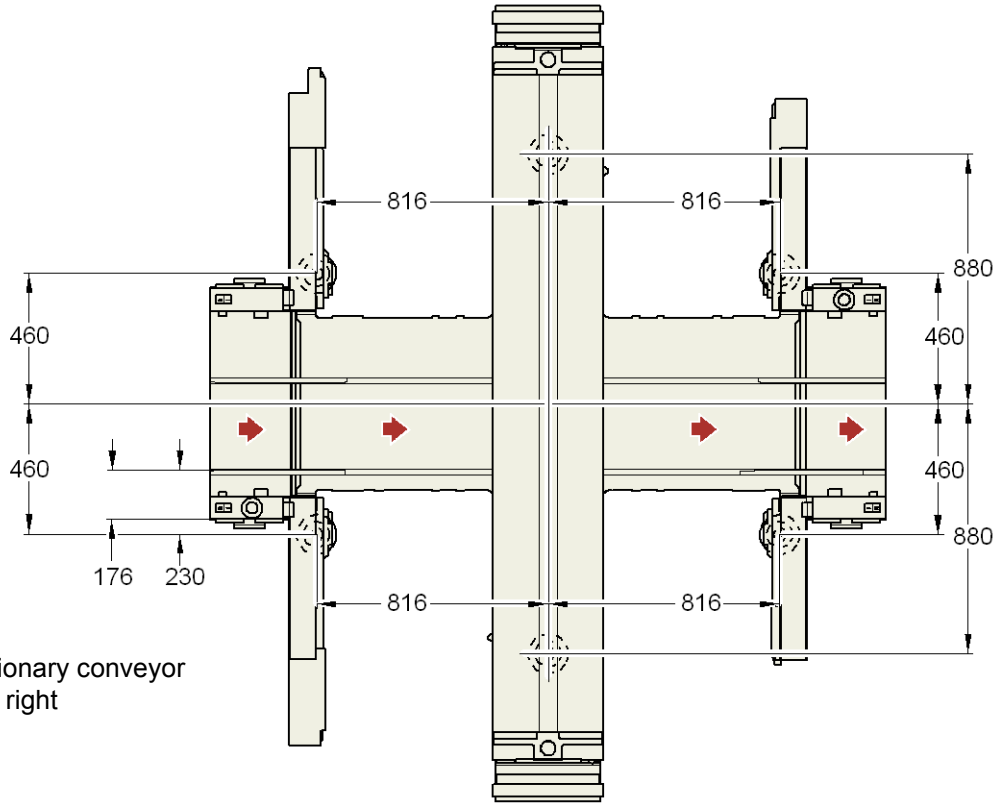
Machine	Location 2	Location 4
	Maneuvering radius R	
X3	1300	-
X2	1300	1300
	Distance L1: Middle of machine to outer edge of WPC	
X3	1824	-
X2	1824	1824
	Distance L2: Middle of machine to the wall	
X3	2558	-
X2	2558	2558

Technical Data

Spacing Distances for the Single Conveyor

Stationary conveyor
side left

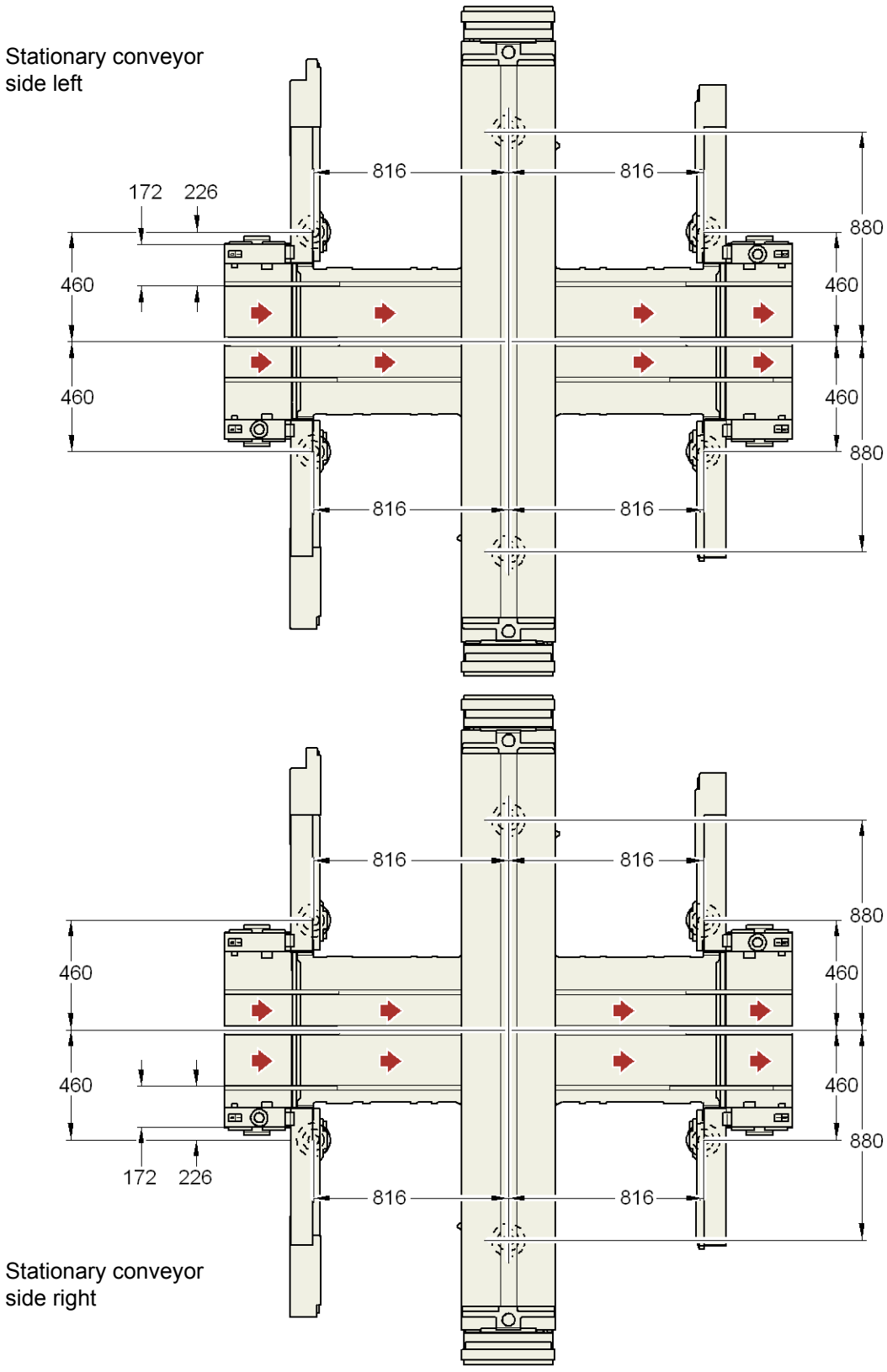




Stationary conveyor
side right

Technical Data

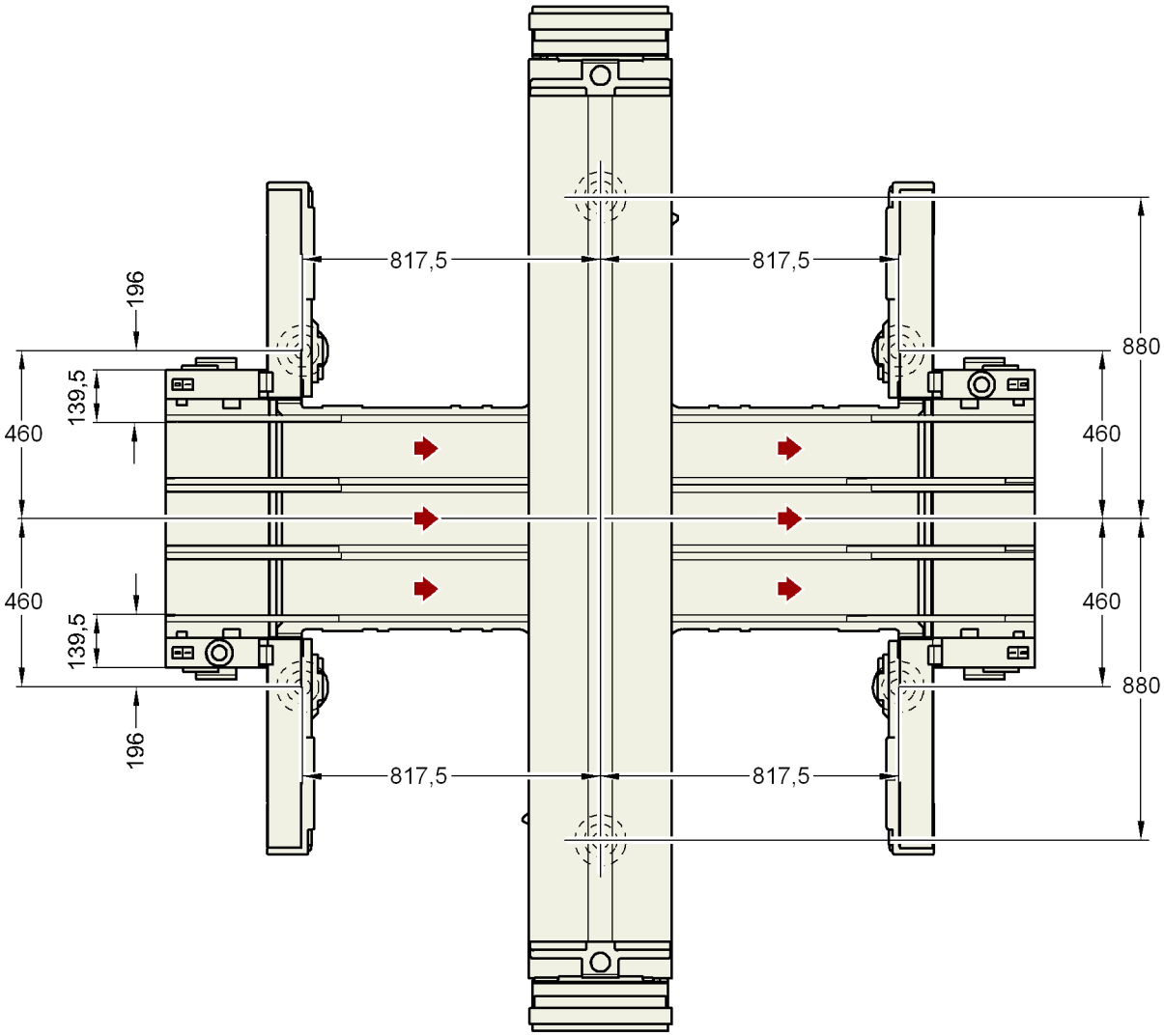
Spacing Distances for the Flexible Dual Conveyor



Technical Data

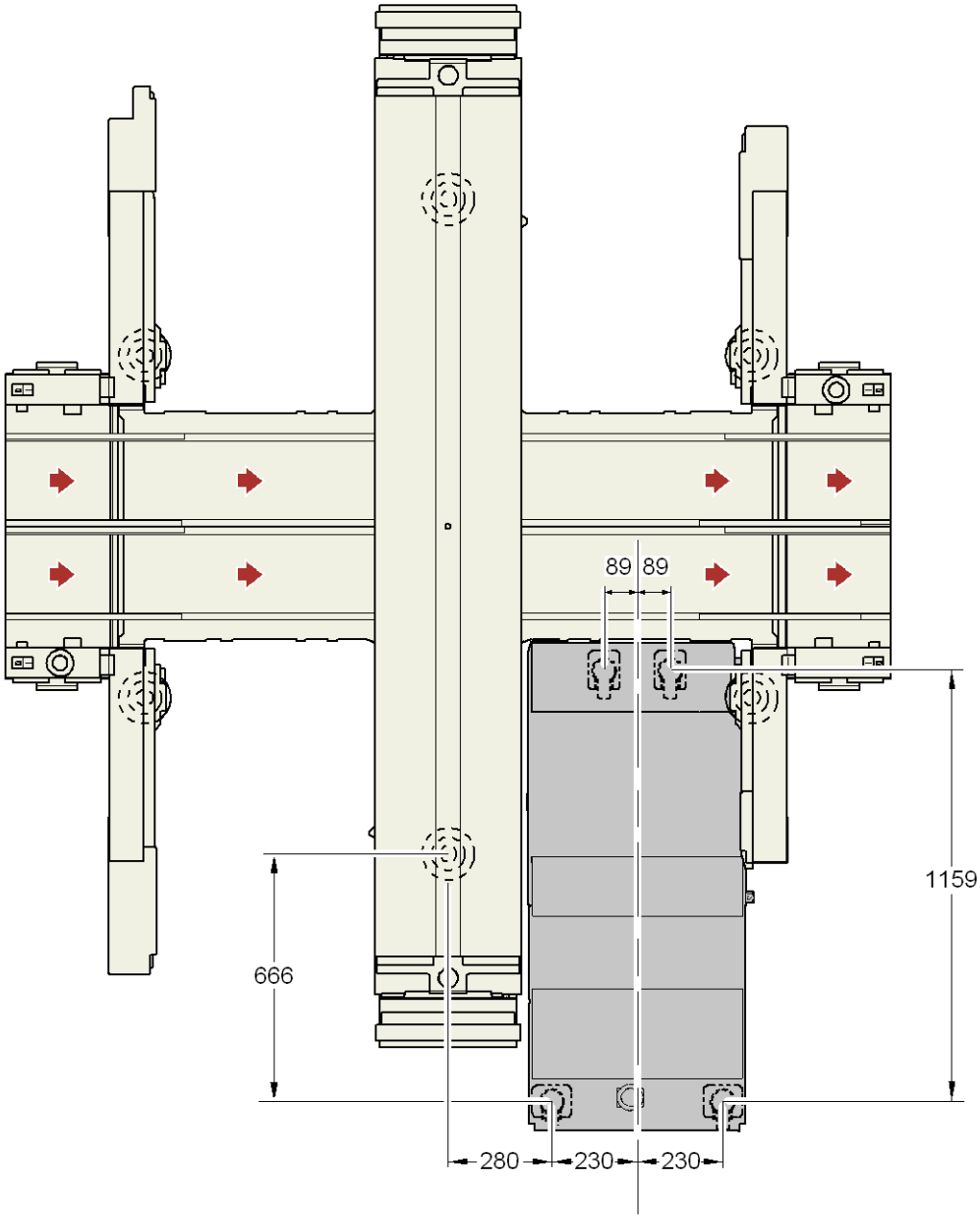
Spacing Distances for the Flexible Dual Conveyor with Productivity Lane

Stationary conveyor edges on the outside
Distance 535 mm



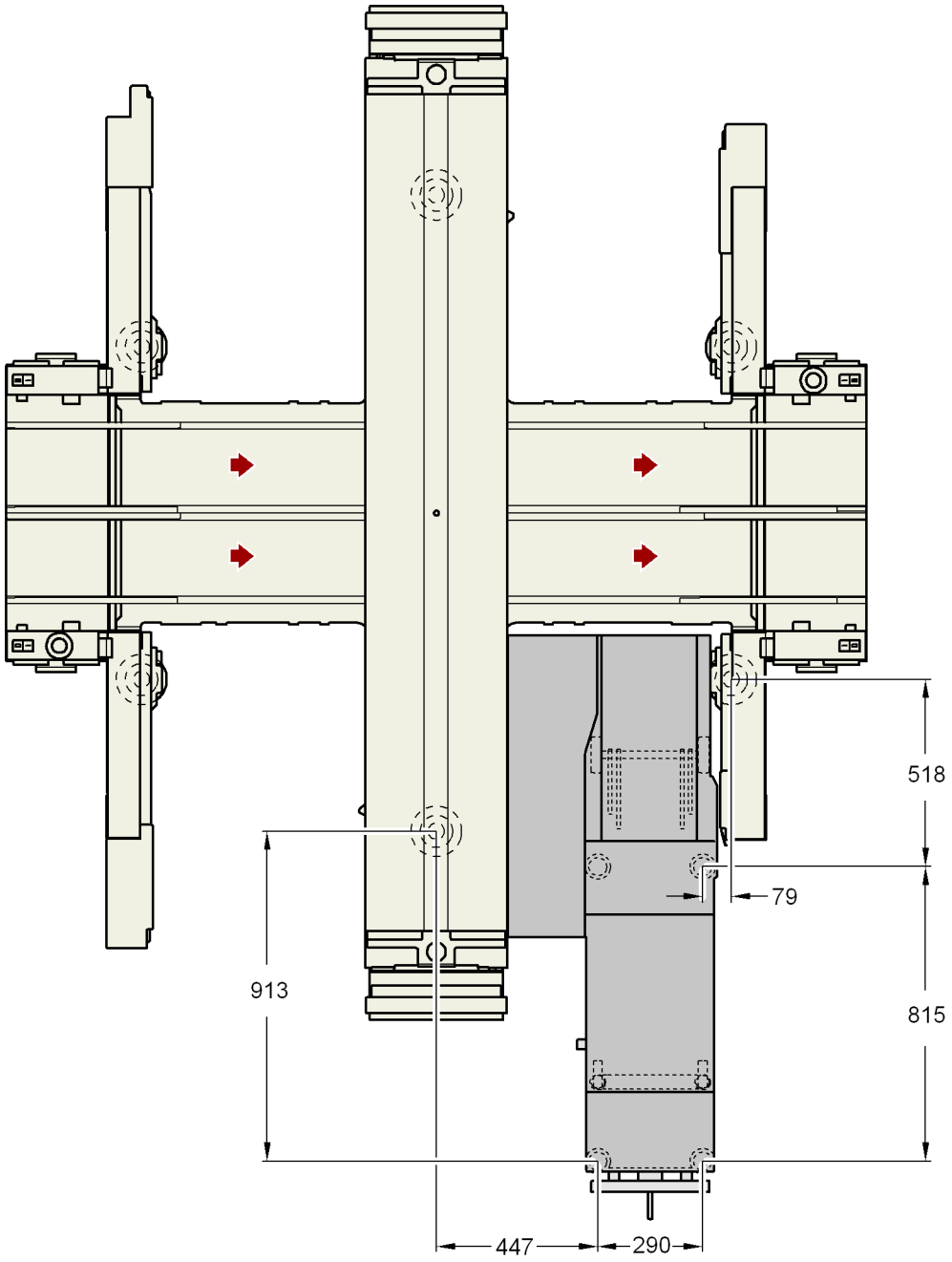
Technical Data

Spacing Distances for the Placement Machine with MTC



Technical Data

Spacing Distances for the Placement Machine with WPC



Technical Data

Transport and Delivery Configuration

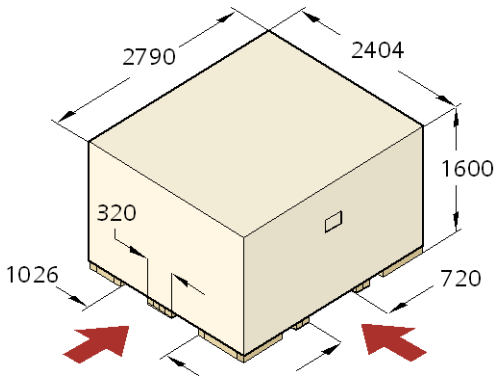
Transport dimensions and weight

Length	2404 mm	
Width	2790 mm	
Height	1600 mm	
Weight	Dispatch within Europe	Dispatch overseas
X4	4004 kg	4504 kg
X3	3980 kg	4420 kg
X2	3836 kg	4336 kg

Means of transport

A fork-lift truck with the following specification will be needed to carry the machine in its crate:

Fork length	min. 1800 mm
Lifting power	min. 6000 kg
Clear fork width	min. 350 mm



Engagement point for the fork-lift

Engagement point for the fork-lift

Description

Within Europe, the machine is delivered on a robust wooden pallet. If sent overseas, the machine is packaged in a wooden crate.

Configuration when delivered

- The extension kit on the PCB input side with the computer unit or the box PC are disconnected from the basic machine.
- All electrical cables to the basic machine are disconnected.
- The track on the single conveyor is set to a width of 210 mm. On the dual conveyor, the default width of lane 1 is 100 mm and of lane 2 is 210 mm.
- The input conveyors of the single and dual conveyor are dismantled. The electrical cables to the conveyor motors and light barriers are disconnected.
- Both keyboards and the monitors are disconnected.
- The main fault indicator is dismantled.

Standard List

The following functions are contained as standard in the SIPLACE X-series without any extra charge:

Standard features	X4	X3	X2
Vacuum sensor	X	X	X
Force measurement	X	X	X
Force sensor	X	X	X
Fiducial & ink spot detection	X	X	X
Nozzle changer for the TwinHead	X	X	X
Set of TwinHead nozzles	X	X	X
Set of standard nozzles per head	X	X	X
Single conveyor, stationary conveyor side right	X	X	X
Single conveyor, stationary conveyor side left	X	X	X
Wide board configuration	X	X	X
PCB buffer function on conveyor	X	X	X
PCB stopper laser light barrier	X	X	X
Automatic electrical PCB width adjustment	X	X	X
Operation on both sides	X	X	X
LCD monitors	X	X	X
Touch-screen monitor	X	X	X
indicator lamps	X	X	X
Tape cutter with reject bin	X	X	X
Tape separating plates	X	X	X
01005 placement	X	X	X
Magnetic pin support	X	X	X

List of Options

Available options	X4	X3	X2	Notes
Bypass function	X	X	X	
Flexible dual conveyor fixed side right	X	X	X	
Flexible dual conveyor fixed side left	X	X	X	
PCB alignment, single conveyor	X	X	X	
PCB alignment, dual conveyor	X	X	X	
Long board	X	X	X	
Mechanical stopper	X	X	X	
1D PCB barcode scanner	X	X	X	Restrictions for a PCB longer than 430 mm
2D PCB barcode scanner	X	X	X	Restrictions for a PCB longer than 430 mm
PCB barcode scanner assembly kit	X	X	X	
20-nozzle Collect&Place head	X	X	X	In the two-gantry area, only in combination with another 20-nozzle Collect&Place head
12-nozzle Collect&Place head	X	X	X	
High-resolution component camera, type 29, for C&P12	X	X	X	
C&P12 component sensor	X	X	X	
0201 package	X	X	X	
6-nozzle Collect&Place head	X	X	X	
TwinHead	X	X	X	
High-Force Head	X	X	X	
Stationary component camera, type 25, 16 x 16, digital	X	X	X	For the TwinHead or High-Force Head only
Vision Teaching Station	X	X	X	
Coplanarity module	n.a.[a]	X	X	For the TwinHead or High-Force Head at location 3 only
Nozzle Changer	X	X	X	Depending on the placement head
Sensor for the component reject bin	X	X	X	
SIPLACE X component changeover table	X	X	X	
Splice detection for X feeder modules	X	X	X	
Waffle-pack tray holder SIPLACE X	X	X	X	Can be used at locations 2 and 4 but only with the SIPLACE X component changeover tables; not in combination with the C&P20 placement head

a) Not applicable.

List of Options

Available options	X4	X3	X2	Notes
Support for an additional tape reel, SIPLACE X	X	X	X	
Feeder module adapter for the X-series	X	X	X	S linear vibratory feeders and label presenter modules can be set up on component changeover tables for the SIPLACE X using this adapter
SIPLACE HF component changeover table	X	X	X	Not in combination with the C&P20 placement head
Waffle-pack tray holder	X	X	X	Only for SIPLACE HF component changeover tables, not in combination with the C&P20 placement head
Linear dip module (LDU X)	X	X	X	Only for SIPLACE X component changeover tables, not in combination with the C&P20 placement head
External power supply for the SIPLACE HF COT	X	X	X	
Compressed air distributor for bulk case feeder modules	X	X	X	Only for SIPLACE HF COTs not in combination with the C&P20 placement head
Tape reel holder, 3 x 8 mm feeder module, V2	X	X	X	Only for SIPLACE HF component changeover tables, not in combination with the C&P20 placement head
Tape reel holder adapter plate	X	X	X	Only for SIPLACE HF component changeover tables, not in combination with the C&P20 placement head
Feeder module cover flap	X	X	X	
Feeder module fixing	X	X	X	Only for SIPLACE HF component changeover tables, not in combination with the C&P20 placement head
110/208 V conversion kit	X	X	X	
Vacuum pump	X	X	X	Not for the TwinHead or High-Force Head
MTC	X	X	X	At locations 2 and 4, not in combination with the C&P20 placement head
WPC	n.a.[a]	X	X	X3: on location 2 X2: At locations 2 and +4 Not in combination with the C&P20 placement head Only in combination with S feeder modules on the WPC feeder location
Productivity lift	X	X	X	Maximum PCB width: - single track 460 mm - double track 216 mm Maximum component height: 17 mm on the underfloor section If the Productivity lift is installed at location 4, then no MTC may be attached to the SIPLACE X2.
Productivity Lane	X	X	X	

a) Not applicable.

List of Languages

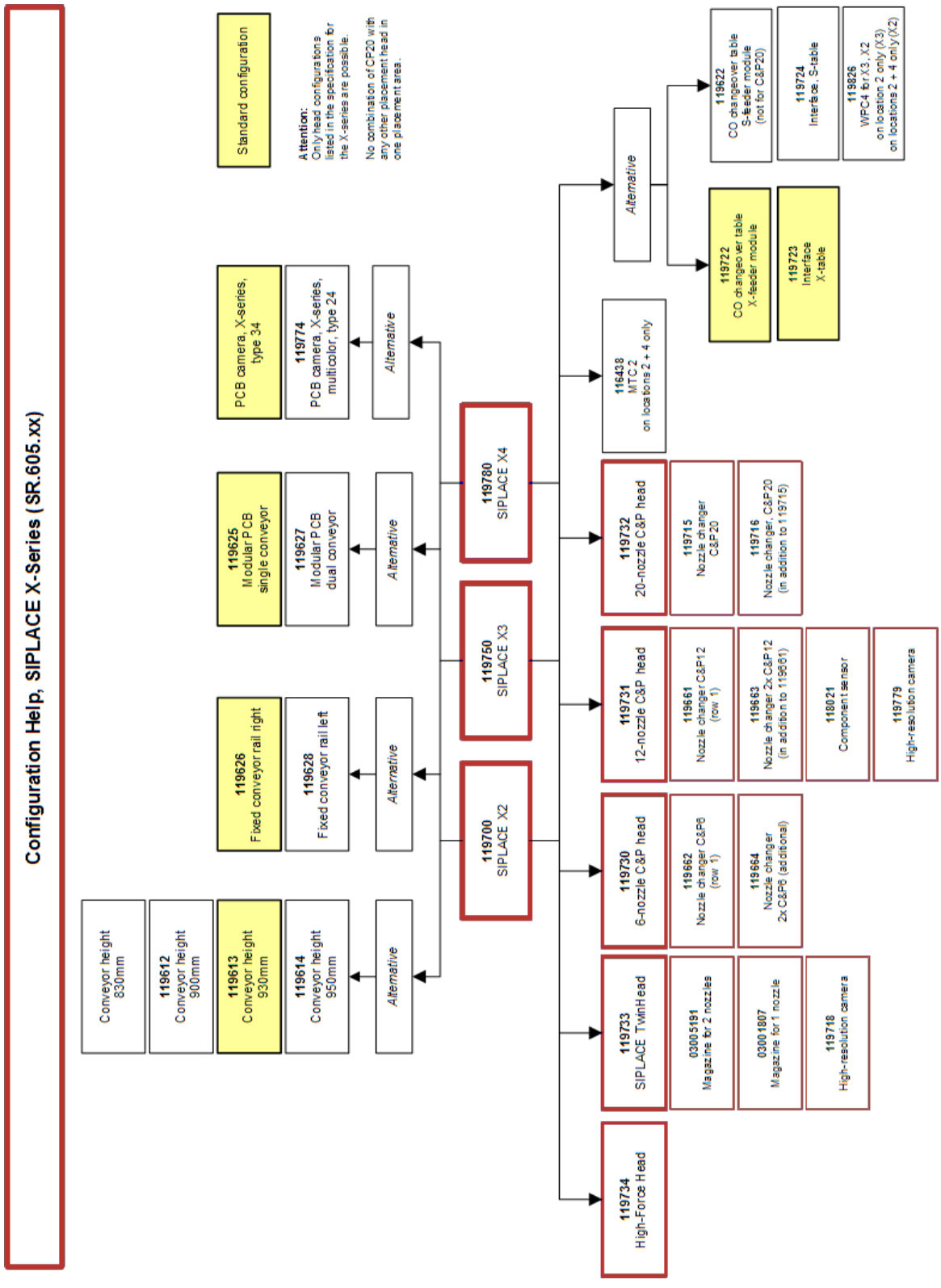
	Documentation packages	SIPLACE Pro 9.3	SIPLACE OIS 9.3	Station software 605
German	X	X	X	X
English	X	X	X	X
French	X	X	X	X
Italian	X	X	X	X
Spanish	X	X	X	X
Portuguese	X	X	X	X
Hungarian	X	X	X	X
Czech	X	X[a]	X[a]	X
Russian	X[a]	X[a]	X[a]	X
Turkish	–	X[a]	X[a]	–
Polish	X[a]	X[a]	X[a]	X
Estonian	X	X[a]	X[a]	X
Finnish	X[a]	–	–	–
Swedish	X	–	–	–
Danish	X[a]	–	–	–
Dutch	X[a]	–	–	–
Romanian	X[a]	–	–	–
Korean	X	X	X	X
Trad. Chinese	X	–	–	X
Simplified Chinese	X	X	X	X
Japanese	X	X	X	X

a) On request.

Other languages available on request

SIPLACE X-Series Configuration Help

SR.605.xx

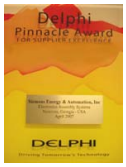


Awards

Vision Award
SMT Magazine
The panel of judges was particularly impressed by the SIPLACE X4I's performance-improving innovations. Evaluation criteria of the award include manufacturing quality, customer service, sales improvements, innovation and employee motivation.

EM Innovation Award
EM Asia
The SIPLACE X4I was honored with the EM Asia Innovation Award. It is a prestigious award for machines which set themselves apart from the competition in the Asian electronics market with qualitative brilliance and high performance.

Best Supplier Award
VDO
Category “Production Equipment”



Delphi Pinnacle Award
Delphi
With the award the Delphi selection committee appreciated the long-time and exceedingly successful cooperation with the SIPLACE team, quoting process, delivery, installation and technical support to warranty claims and spare parts deliveries.

EM Innovation Award
EM Asia
The criteria are based on innovativeness, cost effectiveness, speed/throughput improvements, quality contribution, ease of use, maintainability/repairability and technology advancement.

reddot design award

Reddot Design Award
Category “Industrial Design”
SIPLACE was awarded for high quality design that expresses innovation in form and functionality.

Vision Award
SMT Magazine
The committee pays special attention to the following requirements: responsiveness to major industry challenges, creative use of new or existing technologies, general quality and performance consistency, economy and throughput. The SIPLACE X-Series impressed the jury with its unique combination of maximum speed and precision.

Global Technology Award
International Magazine Global SMT&Packaging
The panel was particularly impressed with the new SIPLACE platform’s innovations such as the digital vision system, the linear drives and the state-of-the-art software, all of which provide users with sustained time and cost savings in the manufacturing process.

Beste Fabrik
INSEAD and WHU and Wirtschaftswoche
The jury was especially impressed by how consistently and comprehensively the SIPLACE team uses its unique and tight-knit global network to provide all its customers anywhere in the world with the same level of SIPLACE quality.

Awards

Global Technology Award
International Magazine Global SMT & Packaging
With its consistent SIPLACE software concept the SIPLACE team prevailed against the competition. Important factors were overall quality, innovative strength, economic efficiency and consistent performance.

Manufacturing Excellence Award (MX Award)
Financial Times Germany
The SIPLACE global supply chain was honored for its process consistency – at any place in the world.

iF Product Design Award
Category "Industrial Design"
The panel evaluated not only the form and function of the products, but also their ergonomics and use of environmentally friendly materials and processes.

Reddot Design Award
The coveted trophy is an international seal of quality for outstanding design.

Technology Equipment Vendor Award
Seagate
The award is to honor the overall performance as a reliable supplier, such as knowledge exchange, reaction time in service and spare part delivery, effectiveness of the offered solutions and the excellent supply chain management.

Service Excellence Award
Circuit Assembly

Technology Leadership Award
Frost & Sullivan
"We selected Siemens, because SIPLACE provides complete turnkey solutions the features maximum flexibility, not incompatible placement machines. We were especially impressed by the concept of modular, universally utilizable equipment."

Supplier Award for Backend Equipment
Infineon
Excellence in quality, technology and costs

Manufacturing Excellence Award (MX Award)
Financial Times Germany
The SIPLACE global supply chain was honored for it's process consistency – at any place in the world.

Award For Excellent Products And Services by EPP Magazine

Bosch Supplier Award for Best Quality and Best Supplier
"This award was not just for the excellent SIPLACE products, but particularly for the good service, attention for customer requirements and the cost-of-ownership."

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