

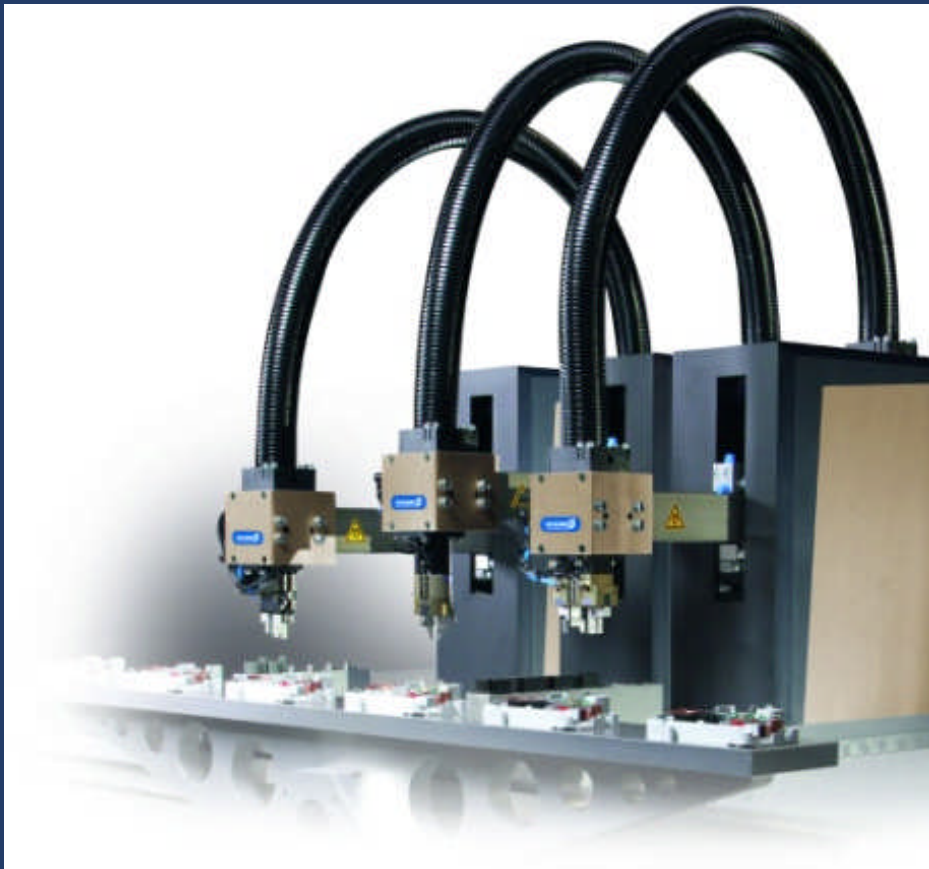
Superior Clamping and Gripping



Sales Manual

PPU-E

11/2010



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General information on the product

1.1 Market launch

The PPU-E product was presented to the trade for the first time at MOTTEK 2009.

1.2 Available documentation on the product

Print	Intranet	Media
Catalog	Global product	Short presentation
		
8-page flyer	CIS (core information sheet)	Detailed presentation
		
Operating manual		Film / Animation
		

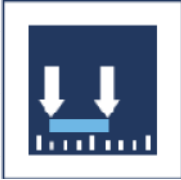
1.3 Product description / positioning

The PPU-E is a highly dynamic pick & place unit with a vertical stroke of 100 mm, a horizontal stroke of 270 mm and a moving mass of up to 3 kg. With a cycle time of just 0.58 s (40 mm vertical, 120 mm horizontal, 2 kg moving mass and 120 ms gripping time) and an excellent repeat accuracy of < 0.01 mm, it is the fastest pick & place unit on the market. With shorter strokes and a lower mass, e.g. 50 mm vertical, 10 mm horizontal stroke and 1 kg additional

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weight, the unit can achieve a cycle time of 0.53 s for a pure pick & place movement. It performs high-speed assembly tasks with maximum precision.

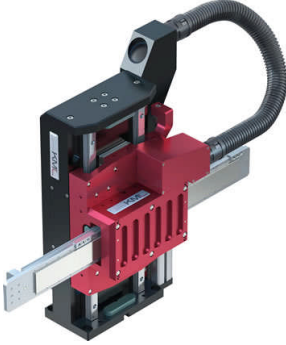
1.4 Brief overview of technical data

				
Baugrößen Sizes 30	Maximale Arbeitsebene Maximum working plane 270 mm x 100 mm	Wiederholgenauigkeit Repeat accuracy 0.01 mm	Maximalgeschwindigkeit Maximum speed 4 m/s	Maximale Nutzlast Max. load capacity 3 kg

2 Competitive situation

2.1 Brief overview of competitors' products

Analysis by the product manager and product specialist identified the following products as the main competitors to the SCHUNK Pick and Place PPU-E.

Weiss HP 140 T (strategic/operational competitor)	KML LMS-M (strategic/operational competitor)
	

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Weiss HP 140 T (strategic/operational competitor)	KML LMS-M (strategic/operational competitor)
	

2.2 Competitor comparison

	PPU-E	HP 140 T	LMS-M	HSP
PRODUCT-SPECIFIC				
Field of application	For highly dynamic pick & place applications that simultaneously call for high repeat accuracy, in handling and assembly technology, component marking and component assembly. Not yet certified for clean room applications. Suitable for controlled force fitting.	For highly dynamic pick & place applications that simultaneously call for high repeat accuracy, in handling and assembly technology. Separate construction line for clean room. Suitable for controlled force fitting.	Wherever highly dynamic movement of tools or workpieces arise. Applications in assembly and handling technology, machine and plant construction and clean room applications. Suitable for controlled force fitting.	For automatic feeding, turning and removal of small components. Not suitable for force fitting processes, as alternating forces occur during the operating cycle. Can only perform the pick & place movement.
	+++	+++	+++	+
Functional principle	Guide: Profiled rail guide in Z and Y axis Drive: 2 stationary linear motors, therefore no moving motor cables. Freely programmable working levels. No positively driven movements, full flexibility.	Guide: Profiled rail guide in Z and Y axis Drive: 1 stationary linear motor for the Z axis, therefore one moving motor cable (risk of cable breakage) Freely programmable working level. No positively driven movements, full flexibility.	Guide: Profiled rail guide in Z and Y axis Drive: 1 stationary linear motor for the Z axis, therefore one moving motor cable (risk of cable breakage) Freely programmable working level. No positively driven movements, full flexibility.	Guide: Profiled rail guide in Z and Y axis Drive: 1 stationary servo motor (turning unit) The rotary movement of the motor is converted into a pick & place movement by a rocker arm (acts as a cam). Not flexible, can only travel one path. Not suitable for force fitting processes.
	+++	+++	+	+

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Scope of delivery	Documentation, operating manual, no cables or add-on modules, controller is preconfigured (basic version equipment)..	Documentation, operating manual, Weiss controller software	Documentation, operating manual	Excellent documentation and operating manual
	++	+	+	+++
Warranty	24 months or 50 million cycles	24 months	24 months	24 months
	+	+	+	+
Service life	No specific information, maintenance free	Low maintenance or maintenance free	According to manufacturer, guides are maintenance free for 20,000 km or 5 years.	No information in documentation
	++	++	+	-
Sizes/Versions	1 size with 7 further configurations	1 size and two further configurations (different Z stroke)	2 different sizes	3 sizes
	+++	+	+++	+++
Product age structure	Launched 2010	End of 2008	Launched 2009	Mid-2006
	+	+	+	+

3 Unique selling propositions of PPU-E

The speed, repeat accuracy and the technical advantage of the non-moving motor cables are the critical unique selling propositions of the PPU-E.



(1) The fastest pick & place unit on the market

With a cycle time of 0.58 seconds (40 mm vertical, 120 mm horizontal; 2 kg moving mass and 120 ms gripping time), the PPU-E pick & place unit is the fastest on the market.

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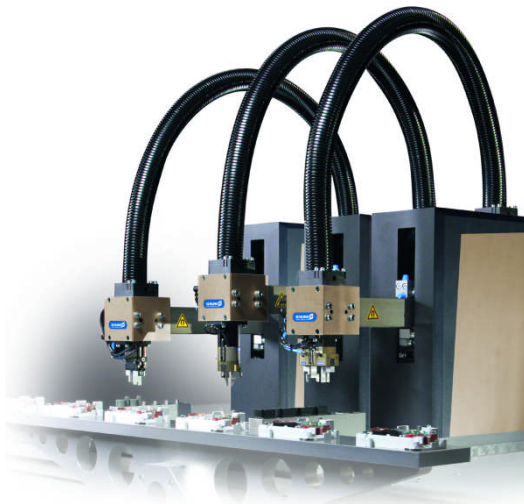


(2) Modularity

As well as the basic version, there are up to 6 extended versions. Media feed through from 2x air / 2x sensors up to 6x air / 6x sensors and 2 vacuum versions, as well as the option of attaching an electric rotary module with media feed through.

(3) Compact design

The compact design is a crucial reason why sandwich constructions are possible. The PPU-E operates without moving motor cables, guaranteeing a long system service life. All feed lines are plugged into the rear stationary connection. Cable breakages and system malfunctions are all but eliminated.



4 Other product features



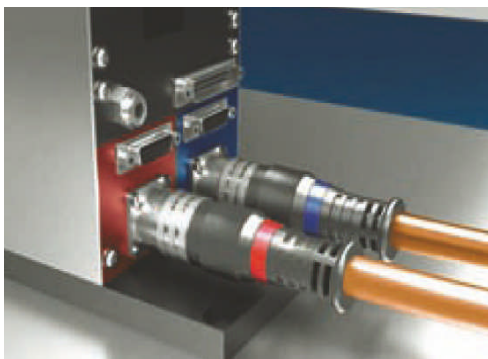
Winner of the Industry Prize 2010
Production technology and machine manu-
facture category



Product of the Month, November 2009,
awarded by editors of the industry journal **ke**
Konstruktion und Engineering

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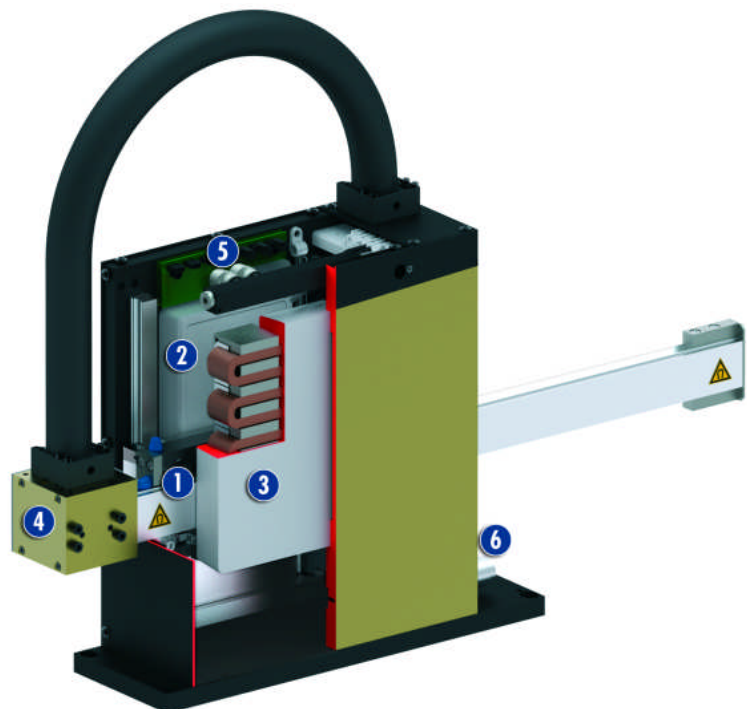
- Cycle time of 0.58 s (see also Page 3) and a repeat accuracy of less than 0.01 mm. This enables the PPU-E to perform high-speed assembly tasks with the maximum possible precision.
- Maximum precision thanks to low vibration and high measuring system resolution. Two integrated stroke measuring systems monitor the vertical and horizontal movement and guarantee the high repeat accuracy.
- Intelligent controllers can control both the extension arm and the actuators without a master controller. The required software is integrated. This gives the unit easy plug & play functionality.
- Minimal space requirements and a back panel to simplify maintenance and assembly of the media feed through – ideal for sandwich assemblies.



Easy to assemble media feed through via the back panel to enable excellent sandwich assembly.

- All-in-one package available including valves

4.1 Description of function of PPU-E



- (1) Y-axis profiled rail guide with 4 linear ball bearings
- (2) Z axis (vertical) motor permanently attached
- (3) Y axis (horizontal) motor permanently attached
- (4) As well as functioning as a mechanical interface, the distributor box provides the interface function for sensor inputs and pneumatic outputs.
- (5) Up to 6 micro valves for use of optional accessories such as grippers, rotary units, etc.
- (6) Back panel connection for controller and power supply.

5 Price positioning

It is not possible to provide detailed information for the price positioning yet for the current version of the sales manual. The basic list price for the PPU-E product includes 2 x 5m cables and 2 Indra Drive CS controllers.

Overview of pick & place price range

	PPU-E	HP 140 T	LMS-M	HSP
Prices	On request €	€	€	€
Date: 2010				

The calculation of the utility index provides a basis for evaluating value for money.

$$\text{Value for money} = \frac{\text{Product utility index}}{\text{Price}}$$

It is not currently possible to provide an outline of the value for money as no product utility evaluation is available at present, and the prices of the competitor products are not available.

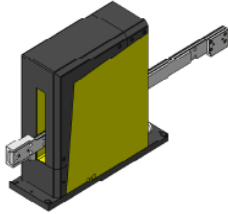
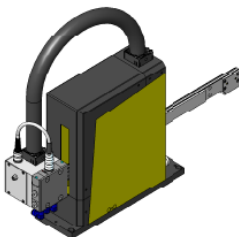
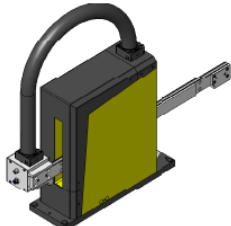
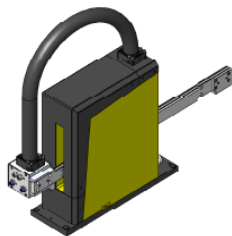
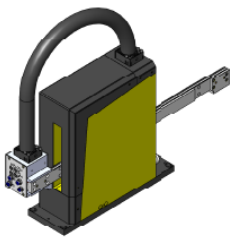
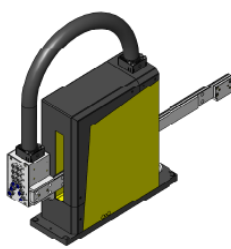
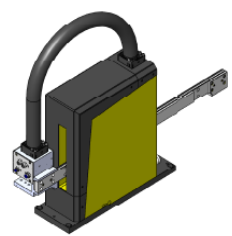
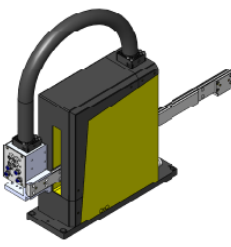
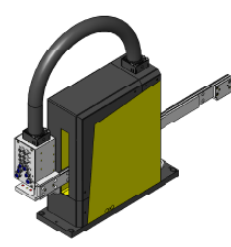
6 Complementary products/adaptation options

The PPU-E not only has highly impressive technical characteristics, such as the cycle time and repeat accuracy, it also offers a wide variety of adaptation options.

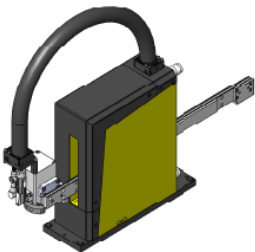
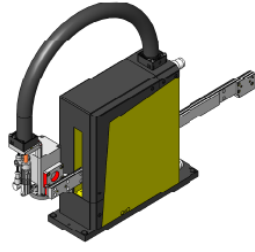
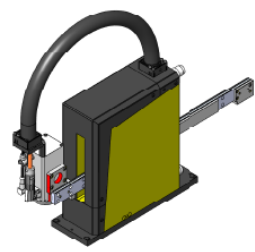
6.1 PPU-E adaptation options

	Basic PPU-E model	PPU-E Venturi version	PPU-E 2x1 version
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Basic versions PPU-E			
	Basic PPU-E model without media feed through and energy supply	PPU-E with Venturi nozzle for vacuum generation (1x vacuum connection and 1x exhaust air).	PPU-E with simple direct feed through to mechanical interface (e.g. for external vacuum generation).
Standard mechanical interface	Extended version 2	Extended version 3	Extended version 4
Standard versions			
	PPU-E with 2x2 media feed through (2 sensor inputs and 2 pneumatic outputs)	PPU-E with standard 2x4 interface (4 sensor inputs and 4 pneumatic outputs)	PPU-E with standard 2x6 interface (6 sensor inputs and 6 pneumatic outputs)
Modular assembly automation mechanical interface	Extended version 2	Extended version 3	Extended version 4
Standard versions with mechanical interface for modular assembly automation			
	PPU-E with 2x2 media feed through (2 sensor inputs and 2 pneumatic	PPU-E with 2x4 media feed through (4 sensor inputs and 4 pneumatic	PPU-E with 2x6 media feed through (6 sensor inputs and 6 pneumatic

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	outputs)	outputs)	outputs)
	Extended version 5 MRD-S 04	Extended version 5 MRD-S 08	Extended version 5 MRD-S 12
With electric rotary module as C axis			
* Only available with MRD-S	PPU-E for direct connection of an electric MRD-S 04* rotary actuator, with 2x2 media feed through	PPU-E for direct connection of an electric MRD-S 08* rotary actuator, with 2x2 media feed-through	PPU-E for direct connection of an electric MRD-S 12* rotary actuator, with 2x2 media feed-through

6.2 Other benefit comparison features

	PPU-E	HP 140 T	LMS-M	HSP (electric)
Strokes	Horizontal = Y 270 mm Vertical = Z 100 mm	Horizontal = Y 268 mm (Horizontal = Y 157 mm) Vertical = Z 65 mm (Vertical = Z 100 mm)	Horizontal = Y 300 mm Vertical = Z 100 mm (small version) Horizontal = Y 400 mm Vertical = Z 150 mm (large version)	Horizontal = Y 52 mm to 170 mm Vertical = Z 20 mm to 70 mm (positively driven, therefore not freely programmable)
Sizes	++ 1 size	+++ 1 size	++ 2 sizes	+ 3 sizes
Mechanical dimensions	++ Height = 314.5 mm (Height with hose = approx. 500mm) Max. length = 557 mm Width = 113 mm	+++ Height = 225 mm (Height with hose = approx. 450mm) Max. length = 512 mm Width = 121 mm	+++ Height = 370 mm (Version 2 height up to approx. 460 mm) Max. length = 335 - 535 mm Width = 135 mm	++ Height = 370 mm Max. length = 484 mm Width = 80 mm Note: Data for largest series.
Drives	++ See page 5	+++ See page 5	+ See page 5	+ See page 5
Force and torque load	+++ Fy = 100 N Fz = 200 N Mx = 10 Nm My = 10 Nm Mz = 10 Nm	+++ Fy = 100 N Fz = 100 N Mx = 15 Nm My = 4 Nm Mz = 12 Nm	++ Fy = 75 N Fz = 200 N	+ Fy = 50 N Fz = 120 N Mx = 15 Nm My = 15 Nm Mz = 15 Nm
Options/Versions	+++ 2x pneumatic (including valves in housing) 2x sensors 4x pneumatic and 4x sensors 6x pneumatic and	+++ 2x pneumatic connection on rear panel 4-way sensor distributor, no direct gripper interface, externally mounted valve terminal	+ Motor and motor cable move in Z direction	+ Accessories: Numerous adaptation options with grippers and proximity switches

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	6x sensors C axis (fully integrated) with 2x2 or 4x4 Multiple gripper interfaces, modular assembly technology interface, allowing attachment of pneumatic linear module or vacuum unit, for example			
	+++	++	+	++
Maintenance	Central lubricant connection	Central lubricant connection, pneumatically operated individual lubricating pump	Central lubricant connection, pneumatically operated individual lubricating pump	No details
	++	+++	+++	
Actuation	Bosch Rexroth 2x Cs Bosch Rexroth 1x C Advanced + 1x Cs with own software In progress: Siemens Sinamics motor parameters for B&R (Beckhoff) Freely programmable	B&R with own software "WEISS WAS" Others unknown Freely programmable	B&R Others unknown Not known	FCT software from FESTO Not known
	+++	+++	+++	+
Useful load	Up to 3 kg	Up to 3 kg	Up to 10 kg (continuous 3	Up to approx. 1.6 kg
	++	++	+++	+

7 Guidelines for benefits and sales arguments

The unique selling propositions compared to competitors have already been defined in detail in section 3. Accuracy and speed are the most important advantages, along with the extension options using the mechanical interface. For sales, the following information should simplify and support sales arguments. In terms of options, the PPU-E represents the benchmark in the competitive environment in question.

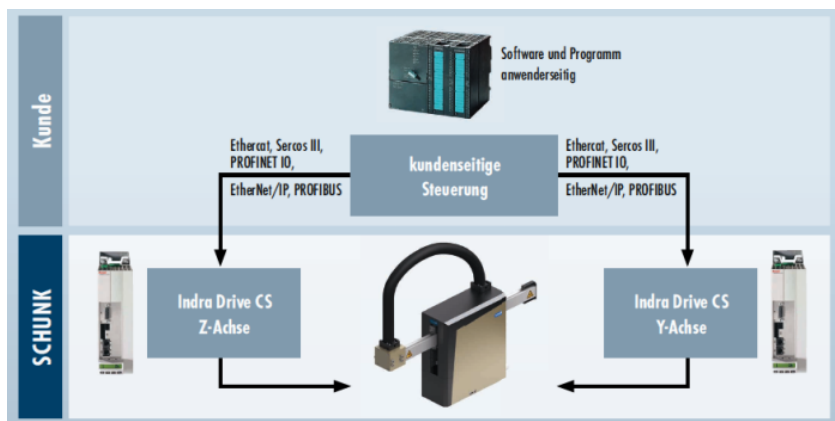
Cost effectiveness / Customer benefits	Line of argument
- Maximum productivity thanks to the shortest cycle times, maximum repeat accuracy and maximum strength. - Higher operating speeds lead to shorter cycle times. More cycles per unit of time means more products produced per unit of time. - In competitor products, the motors mostly move concurrently. Consequently, the motor cables also move. This highly dynamic movement leads to cable breakage in the short or long term. The motors on the PPU-E are stationary. No cable movement -> No cable breakage.	- As well as the basic version, a huge variety of PPU-E versions are available. Because of the integrated standard interface, it is possible to make use of the huge range of SCHUNK modules. A huge range of different actuators open up almost unbeatable scope for customers to meet their requirements. - The range of services for the PPU-E demonstrates SCHUNK's expertise: Product optimization, on site commissioning, maintenance and functional test in plant. - Freely programmable controller provides the

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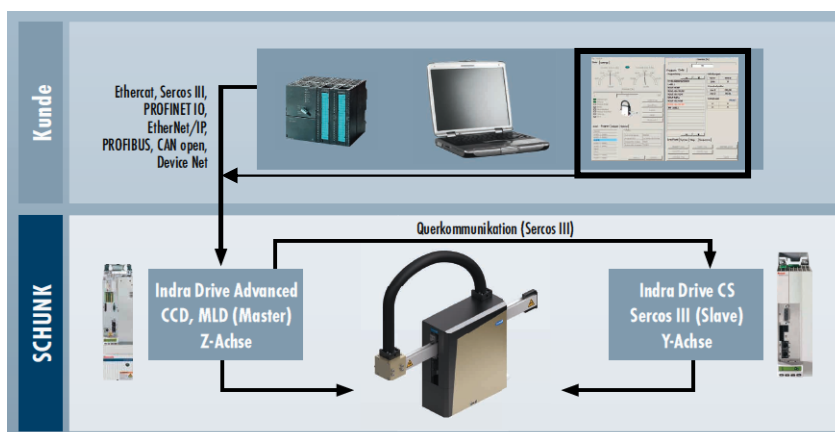
• Forced guidance pick & place units can only move within these tight limits. Thanks to the free programmability of the PPU-E, processes can be changed flexibly. • Thanks to the high repeat accuracy, joining and placing processes can be performed with much greater reliability.	customer with a tailored control concept. • You get an unbeatable combination of maximum dynamics, maximum flexibility and outstanding accuracy. No other drive system gives you this. • This unit gives you much greater flexibility and speed than a pneumatic unit. You can make your assembly system more flexible and cut setup work to an absolute minimum when changing workpieces. The main wearing part on pneumatic units is eliminated. This also eliminates time-consuming testing and replacement of the dampers.
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8 PPU-E module options



• Concept 1

The customer programs the selected operating cycle on their controller. The controller communicates with the Indra Drive CS controller supplied by SCHUNK.



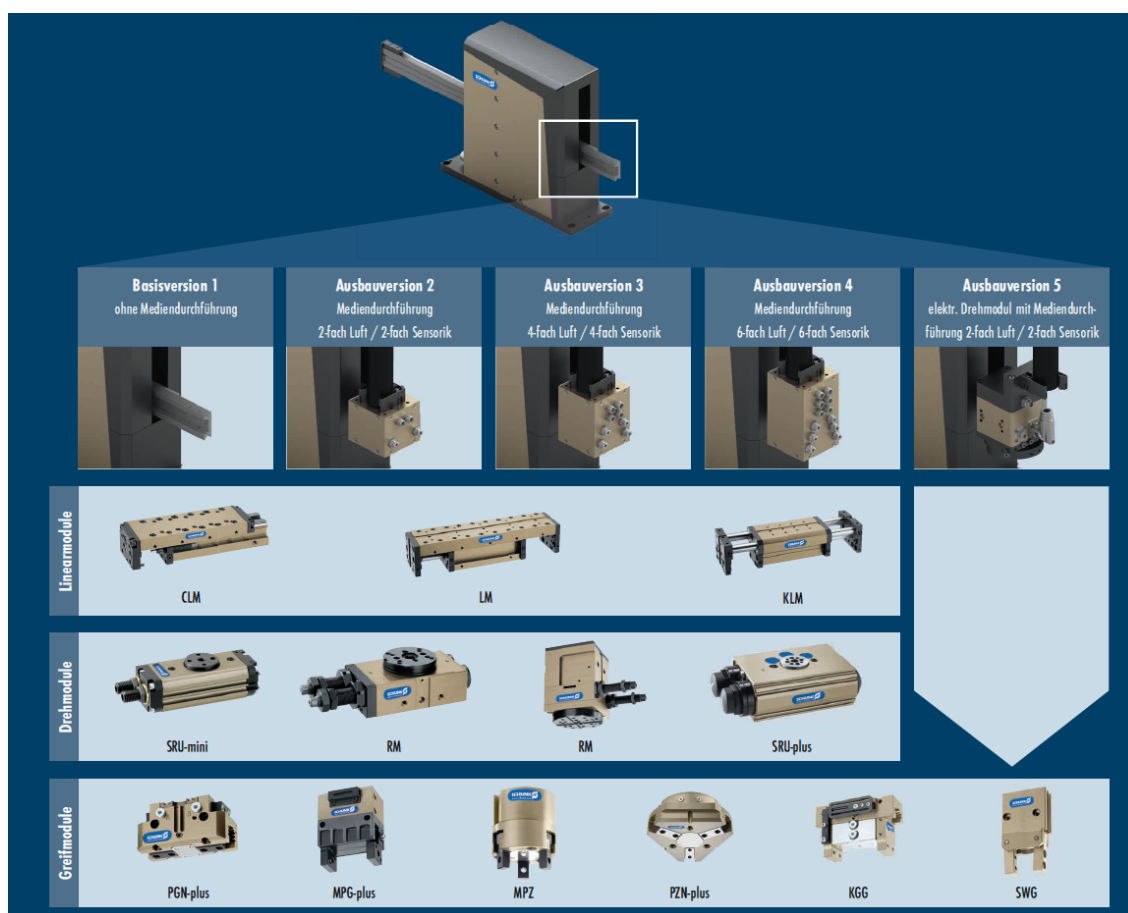
• Concept 2

The customer programs the desired motion sequences using the free software provided by SCHUNK. The program runs on the master on the Indra Drive Advanced's own PLC. The program is operated by digital I/O signals.

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German	Englisch
Kunde	Customer
Software und Programm anwenderfähig	User software and program
Kundenseitige Steuerung	Customer controller
Indira Drive CS Z-Achse	Indra Drive CS Z axis
Indira Drive CS Y-Achse	Indra Drive CS Y axis
Indira Drive Advanced CCD, MLD (Master) Z-Achse	Indra Drive Advanced CCD, MLD (master) Z axis
Indira Drive CS Sercos III (Slave) Y-Achse	Indra Drive CS Sercos III (slave) Y axis

8.1 Example overview of PPU-E module options



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German	Englisch
Basisversion 1 Ohne Mediendurchführung	Basic version 1 Without media feed through
Ausbauversion 2 Mediendurchführung 2-fach Luft / 2-fach Sensorik	Extended version 2 2x air / 2x sensor media feed through
Ausbauversion 3 Mediendurchführung 4-fach Luft / 4-fach Sensorik	Extended version 3 4x air / 4x sensor media feed through
Ausbauversion 4 Mediendurchführung 6-fach Luft / 6-fach Sensorik	Extended version 4 6x air / 6x sensor media feed through
Ausbauversion 5 Elektr. Drehmodul mit Mediendurchführung 2-fach Luft / 2-fach Sensorik	Extended version 5 Elec. rotary module with media feed through, 2x air / 2x sensors
Linearmodule	Linear modules
Drehmodule	Rotary modules
Greifmodule	Gripping modules

9 Limits of the PPU-E

Stärken/Strength The cycle time of 0.58 s (with 40 mm vertical stroke, 120 mm horizontal stroke, 2 kg moving mass and 120 ms gripping time) and the repeat accuracy of less than 0.01 mm is a key strength of the PPU-E product, along with the variety of versions available .	Schwächen/Weakness However, the price of the PPU-E reflects the accessories and the different versions.
Chancen/Opportunities There are few competitors. Range of versions with just a few sizes. The motor cables are not subjected to movements, increasing the service life of the system.	Bedrohungen/Threads Competitors retrofit technical features at more favorable conditions.

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The **strengths** of the PPU-E lie in the combination of fast cycle time and excellent repeat accuracy (**factual USP**). In addition, the range of versions of available thanks to the possible combinations of SCHUNK actuators via the interface and the non-moving motor cables are a strong competitive advantage.

The price is likely to be the biggest **weakness** of the PPU-E. However, this is justified by the number of possible versions. The costs of modularity can be incorporated into price arguments.

Opportunities for the PPU-E lie in the range of versions available thanks to the compatible SCHUNK actuators (linear modules, rotary modules, gripping modules). In the small group of competitors, only Weiss can be viewed as a genuine strategic and operational competitor in terms of technology.

Threats to the product could occur in the future in value for money, if competitors are able to offer similar modularity at better prices.

10 Contact person for the product

Your contact person at Product Management is Jakob Khoury (+49-7133-103-2667).

Your contact person as a Product Specialist is Arno Kern (+49-7133-103-2647).