

[In time with the robots]



A two-arm changer is fitted to provide a quick tool-changing process.

[Franz Schmidt GmbH]

Specialists in the series machining of forged parts. Series parts of up to 50 to 10,000 items are mainly turned, milled, and ground into curves in three stages.

34 employees



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[Requirements profile]

A long-standing customer contacted Managing Director Franz Schmidt and asked him to take on the final processing stage for a batch of similar forged parts. His machines were already working to capacity, so he had to look for a new machining concept. Because the job involved nearly identical pieces (with series of up to 10,000 parts), Mr. Schmidt could only consider an automated solution including three essential factors: robots, machine tools, and a tooling concept.



Series machining of forged parts

As an expert in the functions and benefits of industry robots (robots were first used to automate grinding processes in 1997), the only robot that Franz Schmidt, Managing Director of Franz Schmidt GmbH, could consider using for handling workpieces was an ABB robot. A local supplier, Ribis-Robotics was based in nearby Neustift.

Franz Schmidt felt just as confident in choosing EMCO as his machine partner. Having used these high-quality Austrian products for many years, he found the Hallein machine tool manufacturer's range, the EMCOTURN E-series, exactly right for his needs. To ensure flexible machining options, he intended to complete his range of equipment with two E45 and two E65 machines. These CNC turning centers are compact universal lathes for machining chuck, bar stock, and shaft parts and feature C-axis, driven tools, powerful digital drives and an optional, fully-equipped Siemens or Fanuc control system as standard. Not least, the excellent price/performance ratio of the series helped Mr. Schmidt to make his choice.

Designed for your profit

The next step was to automate the machines as a unit. This is where the principles of EMCO's 'Designed for your profit' philosophy fully come into their own. Because Mr. Schmidt took on the task of automation himself (even the parts transfer portal was constructed and manufactured by him), EMCO had to design the interfaces needed to ensure a seamless production process. The robot takes the forged part from a pallet using a double-jaw gripper and transfers it to one of the two EMCOTURN E65 machines so that it can be machined on the first side. The same robot then takes the partially machined workpiece back to a transfer portal. The second robot takes it from there and places it in one of the two EMCOTURN E45s, which carry out the finishing work. This means that the E65 and E45 both have a workpiece in progress in parallel at a slight

time delay so that the robots' capacity is perfectly balanced and waiting times are minimal. At the end, parts are placed into the transport container. "With quick and expert planning around my designs, EMCO met our automation requirements to the full," says Franz Schmidt contentedly.

"At Schmidt we are able to clearly demonstrate our company's flexibility. We are able to meet our customers' most diverse wishes and, depending on what these are, provide a fully-automated system with portals, bar stock loaders, or pallet loading, or, in specific cases, just the machines with the appropriate interfaces: exactly the right solution for the customer with the best cost/benefit factor," comments Anton Kranabetter from the West Austrian sales division on the advantages of EMCO.



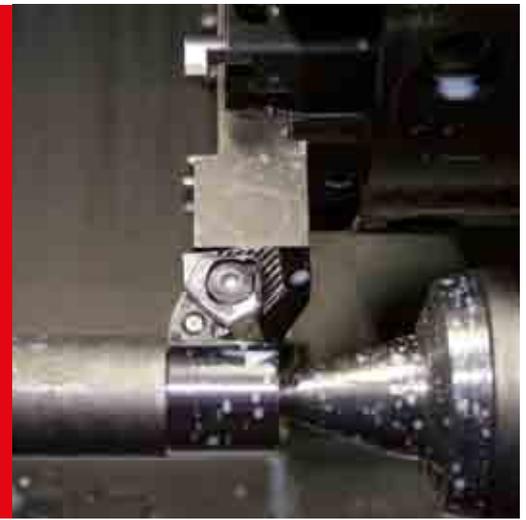
In this project, we have clearly lived up to our philosophy 'Designed for your profit' by developing the ideal solution for the customer along with the best cost/benefit concept.

Anton Kranabetter
Sales Manager for EMCO Maier



As well as a good product, I expect a professional working relationship, excellent customer service, and good personal support from our suppliers. EMCO and Seco Tools meet all these criteria perfectly.

Harald Ofer from Seco Tools, Franz Schmidt and EMCO Sales Manager Anton Kranabetter (Left to right)



The drum-type magazine offers 20 tool positions.

He continues: "Mr. Schmidt is an original and lateral thinker who has mastered this technology down to the last detail. He is one of the few people who can use, program, and automate every single one of our machines. The high proportion of automated processes at Schmidt originates from his ideas, which is why the demands made of machine suppliers are particularly high."

The tooling concept as a factor for success

Tooling concepts play an extremely important role in a fully automated machining process, especially when shifts are unmanned and processes need to be safe and reliable. "Around 1,000 parts are manufactured per tool change using the four EMCO machines. We must ensure that this is also the case during the unmanned night shift, which is why process safety plays an extremely important role for us," explains Franz Schmidt. Thanks to a long-standing partnership with Seco Tools, Mr. Schmidt has incorporated this into his manufacturing plan and, together with Harald Ofer, an application engineer for Seco Tools, has developed a suitable tooling concept.

Manufacturing solutions [Made in the Heart of Europe]

The EMCO Group is an association of top suppliers from the machine tools industry. The companies involved work together in a network of European manufacturers to develop intelligent and innovative production solutions for the metal-cutting industry. Thanks to the individual companies' various areas of expertise, resources, and the transfer of knowledge between enterprises, new opportunities for the whole group arise constantly. The EMCO Group headquarters and central production facilities are located in Salzburg. There are also production facilities in Germany and Italy, as well as corporate sales offices in Germany, Italy, France, Spain, the Czech Republic and the USA. With over 160 sales and services offices, EMCO is present on all major international markets. The EMCO Group currently employs around 800 committed and highly qualified employees.



Images 1-5: Automated machining of forged parts using two ABB robots, equipped with two SCHUNK double-jaw grippers to handle the workpiece.

[Technical data]



Designed for your profit

EMCOTURN E45

EMCOTURN E65

Work area		
Swing over bed	Ø 430 mm (16.9")	Ø 540 mm (21.3")
Swing over cross slide	Ø 210 mm (8.3")	Ø 360 mm (14.2")
Distance between centers	600 mm (23.6")	680 mm (26.8")
Maximum turning diameter	Ø 220 mm (8.7")	Ø 310 mm (12.2")
Maximum part length	510 mm (20.1")	520 mm (20.5")
Maximum bar-stock diameter	Ø 45 mm (1.77")	Ø 65 mm (2.5")
Travel		
Travel in X	160 mm (6.3")	210 mm (8.3")
Travel in Z	310 mm (12.2")	610 mm (24")
Spindle		
Speed range	0 – 6300 rpm	0 – 4200 rpm
Drive performance	13 kW (17.4 hp)	18 kW (24.1 hp)
Spindle torque	78 Nm (57.5 ft/lbs)	192 Nm (141.5 ft/lbs)
Spindle nose DIN 55026	A2-5	A2-6
Spindle bearing (inner diameter at front)	80 mm (3.1")	100 mm (3.9")
Spindle bore	53 mm (2.1")	73 mm (2.9")
C axis		
Round axis resolution	0.001°	0.001°
Rapid motion speed	1000 rpm	1000 rpm
Spindle indexing	0.01°	0.01°
Tool turret		
Number of tool positions	12	12
Tool holding shaft in accordance with VDI (DIN 69880)	30 mm (1.2")	30 mm (1.2")
Tool cross-section for square-shank tools	20 x 20 mm (0.78 x 0.78")	20 x 20 mm (0.78 x 0.78")
Shank diameter for boring bars	Ø 32 mm (1.3")	Ø 32 mm (1.3")
Revolver switch time	0.14 sec	0.2 sec
Driven tools DIN 5480		
Number of stations	6	12
Power	4 kW (5.4 hp)	5 kW (6.7 hp)
Maximum torque	16 Nm (11.8 ft/lbs)	20 Nm (14.7 ft/lbs)
Speed range	0 – 5000 rpm	0 – 5000 rpm
Feed drive		
Rapid traverse X/Z	20 / 24 m/min (787.4 / 944.9 ipm)	24 m/min (944.9 ipm)
Feed force in the X/Z axes	4000 / 6000 N (899.2 / 1348.8 lbs)	5000 / 7000 N (1124 / 1573.6 lbs)
Time from 0 to rapid motion	0.1 sec	0.2 sec
Position variation Ps (according to VDI 3441) X/Z	0.0035 / 0.004 mm (899.2 / 1348.8 lbs)	0.003 / 0.0035 mm (0.00012 / 0.00014")
Tailstock		
Quill stroke	120 mm (4.7")	500 mm (19.7")
Quill thrust	5000 N (1124 lbs)	8000 N (1798.4 lbs)
Quill bore taper	MT 4	MT 4
Coolant system		
Tank volume	230 liters (60.8 Gal)	230 liters (60.8 Gal)
Pump performance	0.57 kW (0.77hp)	0.57 kW (0.77hp)
Dimensions		
Height of centers above floor	1152 mm (45.4")	1100 mm (43.3")
Machine height	1940 mm (0.24 – 1.77")	1880 mm (74")
Required space for machine (LxD)	2250 x 1630 mm (88.6 x 64.2")	2852 x 1722 mm (112.3 x 67.8")
Total weight	3300 kg (7260 lb)	4300 kg (9460 lb)

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