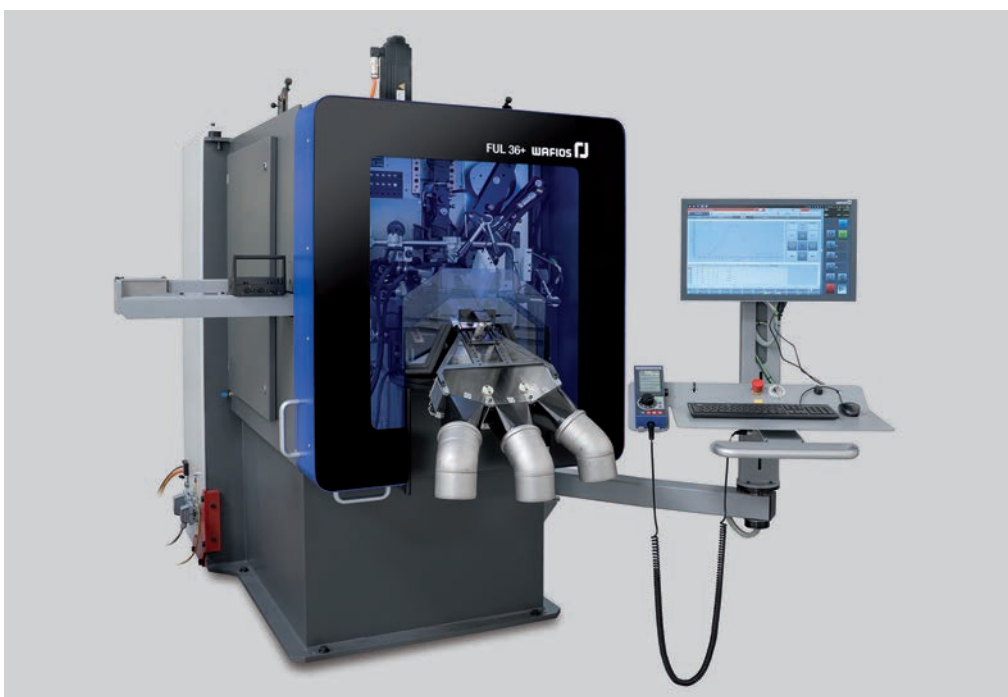


CNC Spring Coiling Machines with Multi-Cut System, 3D Former and PTP Coiling Finger for the Production of Compression, Torsion and Extension Springs

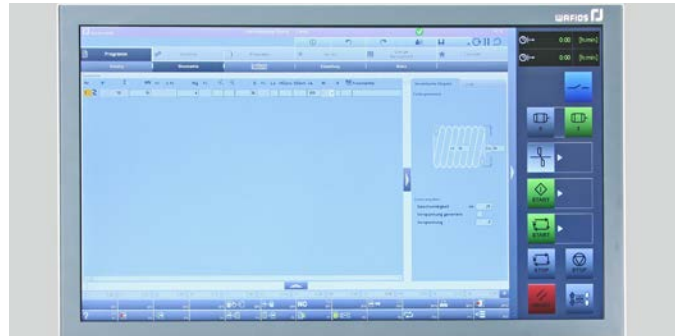
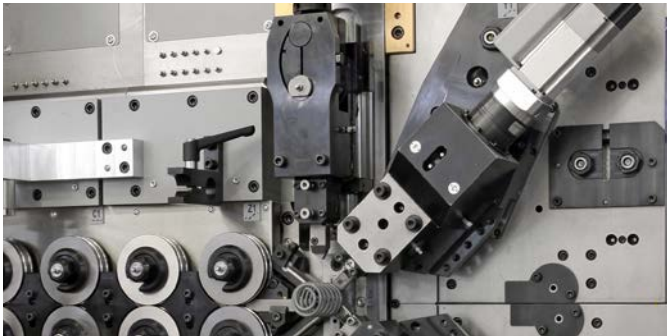


FUL 16 –
FUL 166

FUL 16 – FUL 166

▼ PTP Coiling finger for initial tension control at the spring body

▼ WAFIOS Programming System WPS 3.2 EasyWay



Our Accomplishments for your Benefit

- **High output, high flexibility**
 - Configuration of machine ensures a fast production of springs due to a high infeed speed, excellent axis acceleration values and very short cutting times
 - Different types of cuts are available
 - Versatile equipment options
- **Future-oriented machine concept**
 - Latest drive and control technology
 - Modular machine structure and innovative tool solutions
- **Convenient programming system WPS 3.2 EasyWay increases machine availability**
 - Programming of geometries for simplified spring input
 - Manual settings can be saved with the spring program
- **High quality standards ensure zero-defect production**
 - Optical measuring of product with subsequent adjustment
 - Sorting by fast sorting chutes
 - *iQcontrol* function for in-process measurement and control
 - Further process monitoring features like e.g. slip control and color detection

Design Features

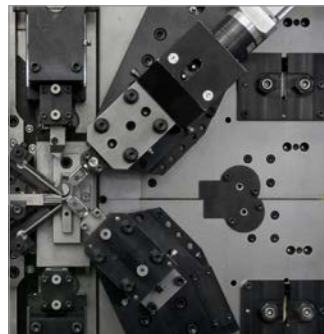
Machine structure

- High-precision roller feed
- Programmable vertical mandrel slide adjustment
- Programmable pitch, parallel and vertical to the spring axis
- Multi-cut system for straight/rotary and flying cut
- Individually programmable cutting speed
- Rigid spring-shaping device with 2-axes coiling unit and simple mechanical system for quick changeover from right- to left-hand coiled springs
- Two more CNC axes for convenient and simple changeover from right- to left-hand coiling at the push of a button
- Motor-adjustable coiling pin holder (PTP coiling finger) for the upper and lower slider
- Motor-adjustable torsion spring device (3D Former) for manufacturing torsion springs with tangentially bent spring legs (option for FUL 26+ - 86)
- Optimized cut now also available when using the guide plate and color detection
- Freely programmable cutting ellipse (Mult-E cut, option for FUL 36+, 46 and 56) for implementing different cutting angles, also: rotary cut even for small spring indexes

▼ 2-Axes coiling device



▼ 4-Axes coiling device



Programming

- Simple, program-supported configuration of tools
- Convenient operation via touchscreen
- Sensors available for unmanned process monitoring
- Graphical spring correction

4speed – max. output rate for FUL 26+ and 36+

- Highest feed speed up to 600 m/min due to water-cooled drive technology
- Optimum wire feed towards connected machine due to enhanced wire guiding concept

Universal, Powerful and Profitable – WAFIOS CNC Spring Coiling Machines

New Definition of Productivity

Designed for the production of precise, close-tolerance compression and extension spring bodies with high output due to pioneering design features.

Fast, easy cut type changes using the new multi-cut system give users more flexibility and operating convenience.

Set new standards of quality with the new motor-adjustable coiling pin holder (PTP coiling finger). Motor-adjustable torsion spring device (3D Former) for a universal production of the most different types of torsion springs.

Shorter set-up times thanks to fast, precise tool settings made with comprehensive CNC control technology.



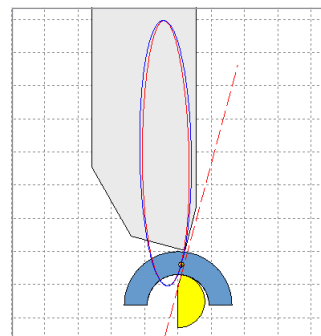
▲ Conical spring produced without motor-adjustable coiling pin holder (PTP coiling finger)



▲ Conical spring produced with motor-adjustable coiling pin holder (PTP coiling finger)

▼ Torsion spring with tangential bend (Motor-adjustable torsion spring device - 3D Former)

▼ Freely programmable cutting ellipse (Multi-E cut)



Quality

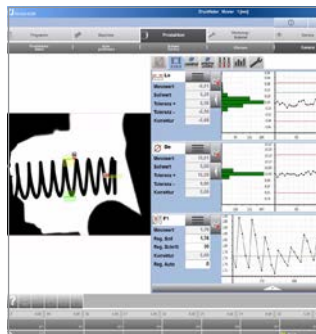
For more than 125 years, the name of WAFIOS has been synonymous with highest quality, safety standards, and technical innovations in the German machine manufacturing industry.

Reliability

Strict quality controls, state-of-the-art production systems, and many years of experience guarantee that your investment is safe in our hands. Our global service network ensures high availability of WAFIOS machinery.

Cost efficiency

High production output and a long service life will save money and shorten the amortization time of your investment.



▲ WAFIOS Programming System WPS 3.2 EasyWay with WVS and iQcontrol

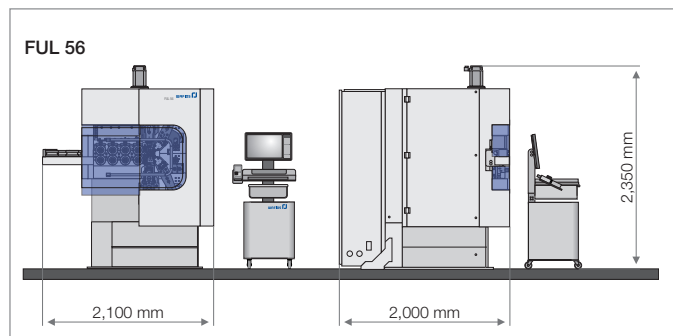


▲ WAFIOS Vision System (WVS)

Technical Data	FUL 16**	FUL 26+**	FUL36+**	FUL 46	FUL 56	FUL 76	FUL 86	FUL 126	FUL 166**
Wire Ø: [mm]	0.12 – 0.6 (Wm > 4)	0.2 – 1.6 (Wm > 4)	0.5 – 2.8 (Wm > 4)	0.9 – 4.0 (Wm > 4)	1.5 – 5.0 (Wm > 4)	2.1 – 7.0 (Wm > 4)	3.1 – 8.0 (Wm > 4)	5.1 – 12.0 (Wm > 5)	6.1 – 16.0 (Wm > 5)
R _m : [N/mm ²]	2,600	2,300	2,300	2,000	2,000	2,000	2,000	2,000	2,000
Wire Ø: [mm]	0.12 – 0.8 (Wm > 6)	0.2 – 1.8 (Wm > 5)	0.5 – 3.0 (Wm > 4)	0.9 – 4.5 (Wm > 5)	1.5 – 5.5 (Wm > 5)	2.1 – 7.5 (Wm > 5)	3.1 – 9.0 (Wm > 5)	5.1 – 13.0 (Wm > 5)	6.1 – 17.0 (Wm > 5)
R _m : [N/mm ²]	2,600	1,900	2,000	1,900	1,900	1,700	1,700	1,700	1,700
Wire Ø: [mm] 4speed		0.5 – 1.6 (Wm > 4)	1.0 – 2.8 (Wm > 4)						
R _m : [N/mm ²]		2,300	2,000						
Feed roller pairs:	2 (option)	2	2	2	4	4	4	4	6
Outer spring Ø: [mm]	20	45	65	95	95	140	150	220	240
Max. Feed speed: Standard [m/min] 4speed [m/min]	240	240 600	220 500	175	150	130	130	100	70
Max. output: [springs/min] [rings/min]	1.500	600 1,100	500 800	350 700	300 600	250 400	160 250	140	50
Dimensions: [mm] (w×h×l)	900 × 1,700 × 900	1,200 × 1,850 × 1,650*	1,650 × 2,100 × 1,800*	1,900 × 2,350 × 2,000*	2,100 × 2,400 × 2,000*	4,000 × 2,500 × 2,670*	4,000 × 2,600 × 2,670*	4,600 × 2,700 × 3,500*	6,560 × 3,200 × 4,200*
Weight: Machine with switch cabinet [kg]	700	1,200	1,800	4,000	4,200	8,000	8,200	16,000	21,800

* Length without control panel carriage

** FUL 16, 26+, 36+, 166 see separate flyers



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Precision Machinery for Wire and Tube