



KORSCH
PRODUCT RANGE

X 5

Single-Sided **M**aximized



High-Output
Pharmaceutical
Tablet Press

KORSCH
The Specialist.

Innovation Made in Berlin Since 1919

Specialization is the key. Since 1919, KORSCH has focused on its core competency of tablet compression technology.

This focus and resulting experience base is the foundation for the broadest and most innovative product line for tablet compression technology.

KORSCH offers an optimal solution for virtually every tablet compression application – through initial feasibility, research, scale-up, clinical production, and full scale 24/7 production.

KORSCH presses are used successfully all over the world and are supported by a global network of sales and technical service specialists.

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MADE IN
GERMANY

X 5 Single-Sided Maximized

The KORSCH X 5 is a new addition to the KORSCH equipment portfolio that dramatically increases single-sided tablet output while maintaining the company's hallmark flexibility and fast change design. The machine features enhanced accessibility, ergonomics, and a compact design with an integrated control cabinet.

The advanced control system interface provides an intuitive operating environment and Smart-Touch HMI. The X 5 is smart and Pharma 4.0 ready, which permits a deeper understanding of what is happening in the compression suite.



- Maximum output in a single-sided tablet press
- Optional segmented die table for further output enhancement
- SFP Version: Dedicated single-layer only
- MFP Version: single, bi-layer, and tri-layer capability
- Through The Wall Installation
- Smart Pharma 4.0 Ready
- Intuitive Controls with Smart-Touch HMI
- DryCon® Version (OEB 3/4)

Operational Efficiency

With die turret design, the X 5 offers an output capability that is 20% higher than most single-sided tablet presses on the market without a significant increase in the machine footprint. Furthermore, the X 5 features an optional turret segment design, which uses standard upper and lower punches, and three die table segments which are configured for the size and shape of the tablet to be produced. For example, the standard B turret with conventional dies has 43 punch stations, and the segmented execution offers

54 punch stations, which represents a 25% increase in machine output.

With a powerful torque drive, a long feeder design in relation to the pitch circle, and a precision tablet weight control, the X 5 is geared for high-output manufacturing. The water-cooled chiller serves both the torque drive as well as the heat exchanger in the integrated electrical cabinet, which translates to a machine exterior that is completely sealed.

Maximum Single-Sided Tablet Output

- Up to 417,600 single-layer tablets/hour with dies
- Up to 518,400 single-layer tablets/hour with segments
- 25 % higher output than turret with dies

Optimal Filling

- Long feeder filling length (293 mm) for superior tablet weight control
- Optimized feeder volume for high throughput

Extended Dwell Time (Version 1.100/100)

- Adjustable upper and lower compression dwell bar between pre and main compression
- Extends compression dwell time
- Permits higher tablet hardness at high press speeds
- Extremely effective for difficult products





Lubrication

- Automatic punch lubrication system with 4 independently controlled zones
- Designed for high-processing speeds and long run durations

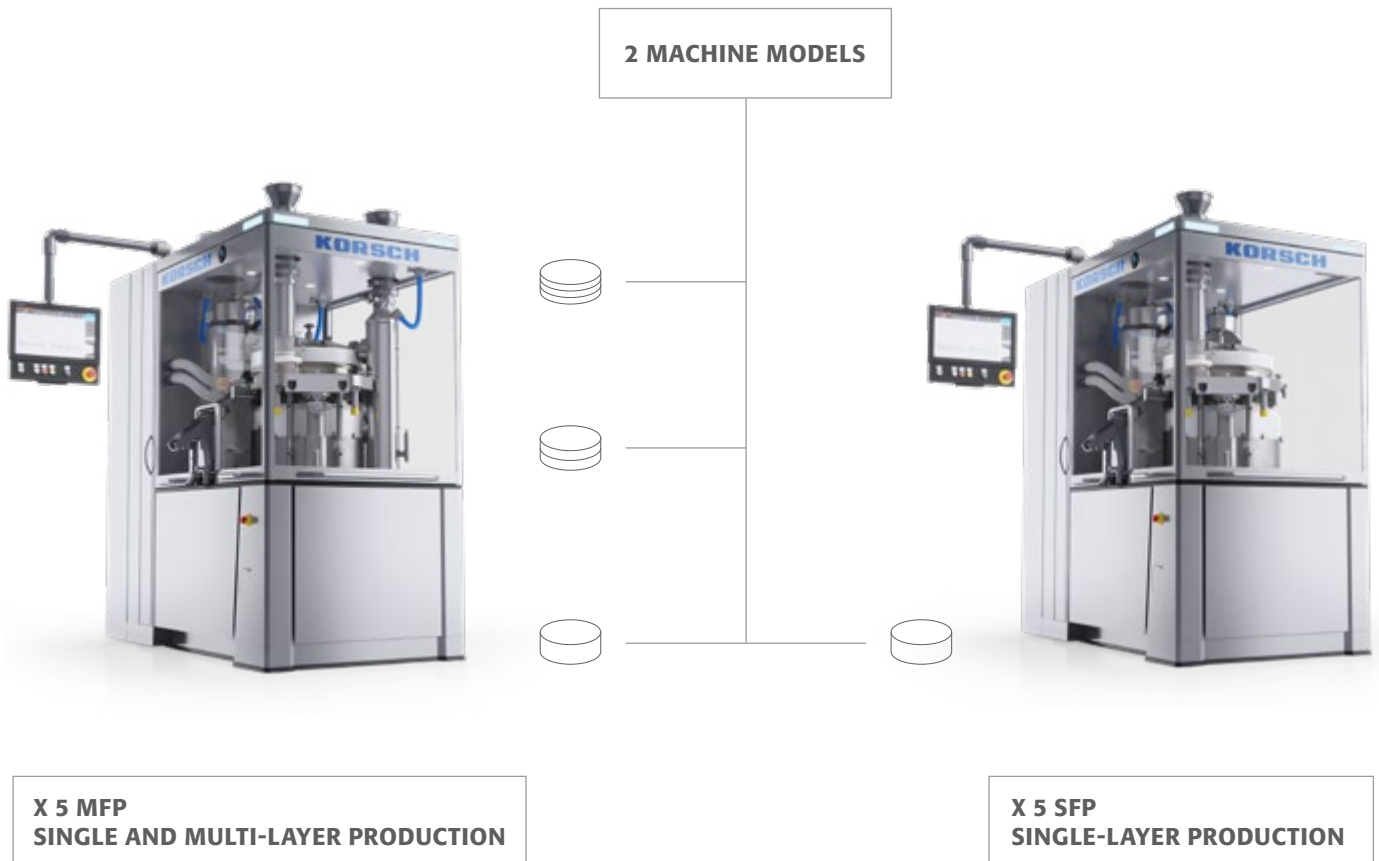
Minimal Noise and Vibration

- Very low noise emission < 80 dB(A)
- Carrier plate design to ensure no vibration transmission to the floor or the headpiece of the machine
- No segregation of powder in the feeding system which can occur with machine vibration

Superior Yields

- Zero clearance feeder seal design
- Feeder height adjustment (Optional)
- Auto set-up of machine with product recipe
- Tangential dust extraction via air channel around the turret

One Common Platform – Two Machine Models



The X 5 is offered in two versions: the X 5 SFP provides dedicated single-layer capability, while the X 5 MFP combines single-layer, bi-layer, and tri-layer flexibility. Both models share a common turret and interchangeable product contact parts for maximum efficiency and flexibility in high-speed, high-volume production environments.

X 5 MFP:

Flexible Single, Bi, and Tri-Layer High-Speed Production

- Up to 518,400 single-layer tablets per hour
- Up to 259,200 bi-layer tablets per hour
- Up to 216,000 tri-layer tablets per hour
- 20/100 kN precompression capability
- 100 kN main compression capability
- 120 RPM maximum press speed

X 5 SFP:

Dedicated Single-Layer High-Speed Production

- Up to 518,400 single-layer tablets per hour
- 20/100 kN precompression capability
- 100 kN main compression capability
- 120 RPM maximum press speed

Fast and Easy Changeover

For changeovers, superior compression zone access through the lack of corner columns, smooth surfaces, and minimal fast change parts yield an expedited process for maximized machine uptime. The machine base features an open framework and ergonomic arrangement of components for extreme

serviceability. The new concept for routing the dust extraction hoses through a dedicated chamber in the Multi-Function Column at the rear of the machine permits full accessibility for dismounting and cleaning. As a result, the machine base is free of hoses and therefore cannot be contaminated.

Optional Segmented Die Table

The optional segmented die table enhances the fast-change capability of the KORSCH design. Removal of each segment requires only a single screw to be loosened. Both the conventional and segmented turret may be utilized on the same machine platform.

- Ensures streamlined installation and disassembly
- Permits the die table segments to be inverted to utilize both the top and bottom surfaces for extended life
- The segments are hardened through

Extreme Cleanability

Due to the streamlined design of the compression zone, a minimized number of quick disconnect components need to be removed to go from full production to turret removal. Large smooth surfaces facilitate the cleaning of the compression zone. For roll service, turret exchange, or machine cleaning, the compression columns are easily moved to a service position to provide extreme access.

- Toolless assembly and disassembly
- Quick disconnects
- Isolated dust collection housing with optimal access

Streamlined Turret Removal

The X 5 turret may be exchanged – quickly, easily, and safely – including the cams, and press tools. A lifting arm is installed in the carrier plate to facilitate turret removal and installation. The turret locking is automatic. The control system has a turret recognition capability to permit the turret parameters to be configured automatically.

- Turret removal in less than 10 minutes
- Same lifting arm permits the removal of the compression columns
- Transport cart for turret preparation and offline cleaning



Smart and Pharma 4.0 Ready

The X 5 is fully prepared to fit into the smart factory concept. The KORSCH control system features an open architecture and the ability to easily integrate the machine to a central network, with domain authentication, central recipe management, and central batch report archiving. In addition, a standard OPC UA Server permits press parameters to be passed to a SCADA or Historian system in real time. Advanced capabilities further leverage the data through Edge Computing

solutions for OEE assessment and predictive maintenance. In addition, machine data may be made available for sharing with external systems through secure Cloud or VPN connection. This digitalization strategy for the machine design will provide a higher product quality, lower total cost of ownership, and significant advantages and convenience in the day-to-day machine operations, from electronic production monitoring to online operator assistance.

Programming Suitable for Industry 4.0

To reach the goal of Industry 4.0 which is a fully digital supply chain, the key point is that all components can communicate inside the machine and to external systems. Programming carried out according to international standards guarantees the communication with other machines and systems.

The X 5 is MTP (Modul Type Package) Ready: It features a standardized interface for the integration of the machine with upstream and downstream process equipment.

- Programming of all machine components on one single platform (SIMATIC Drive Controller)
- Programming according to Norm PackML (Packaging Machine Language) from OMAC
- Tableting control algorithms based on our Specialists' knowledge are constantly optimized

Intelligent Components Industry 4.0 Ready

In order to support required advances in operational efficiency, the X 5 is smarter. This means that the machine features intelligent sensors which play a key role in making Industry 4.0 a reality. They are the interface between the real and digital worlds. Sensors which function on a fully digital basis enable data to be interpreted accurately for process monitoring and control.

- Smart sensors, featuring IO link, to preprocess data
- Memorizing sensor technology enables machine to be stored directly in the sensor
- Electronic type plates record identity, configuration, and calibration of components

Edge and Cloud Solutions

Digitalization of the machine permits data to be transmitted to an Edge device or a secure cloud solution. Edge or Cloud computing can analyze and process these data via different apps and software. Data can also be made available for external service providers, if required.

- Calculate and visualize key performance indicators to detect optimization potential
- Calculate and assess OEE and efficiency optimization strategies
- Track and optimize energy consumption of your machine

Intuitive Controls with Smart-Touch HMI

The advanced control system interface provides an intuitive operating environment and Smart-Touch HMI. The HMI environment offers a comprehensive On-Board help capability, which includes a vast array of multi-media help files to present procedures and to support the operation and maintenance

of the machine. At the heart of the control system is a Siemens Simatic Drive Controller, which merges PLC and motion controls in a single, integrated system. This permits extensive remote diagnostic support.

On-Board Help Capability

The Smart-Touch HMI sets a new standard for help content which is integrated in the HMI environment to permit direct access during the machine operation and maintenance.

- Direct link to support documents, including manuals, drawings, and schematics
- Multi-media support files (videos, pictures) to support equipment procedures (turret change, machine changeover, calibration, etc.)
- Access to an electronic spare parts catalog

Energy Consumption

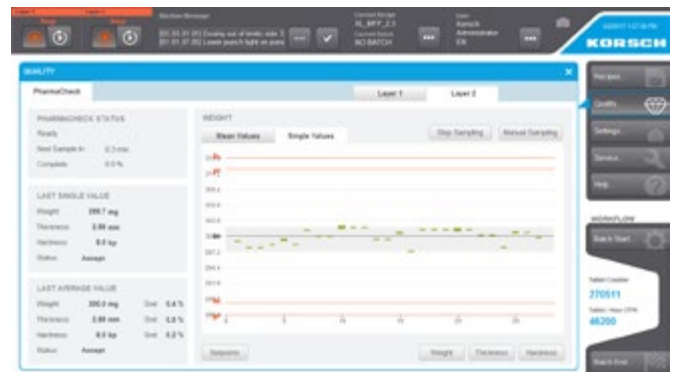
Real-time display of the energy consumption: Monitoring and display of energy consumption to support sustainability initiatives at site level.



PharmaControl® Press Force System

The X 5 uses the proven PharmaControl® press force control system to monitor individual compression forces and to provide closed loop feedback to the dosing cam for precise tablet weight control. The Smart-Touch HMI displays average force and the single force on each punch station in real time. The optional single-tablet rejection system will reliably reject an individual tablet from a known punch station across the full speed range and build a reject log which may be viewed in real time, and included in the electronic batch report.

- Press force monitoring and regulation for precise tablet weight control
- Single-tablet rejection across the full speed range
- Real-time reject log and reject log report at batch end



Containment Solutions

The X 5 is offered in a dry containment execution (DryCon®) for OEB 3 and OEB 4 applications. For all containment projects, KORSCH provides a fully integrated and turnkey system, including support documentation and SMEPAC testing.

X 5 DryCon® Execution

- OEB 3/4 containment capability
- Ergonomic placement of glove ports and RTP permit contained access to the compression zone
- Negative pressure control and integrated vacuum wand for dry cleaning
- Eliminates requirements for PPE
- Formal SMEPAC Testing for containment level certification





Augmented Reality Support with PharmaView®

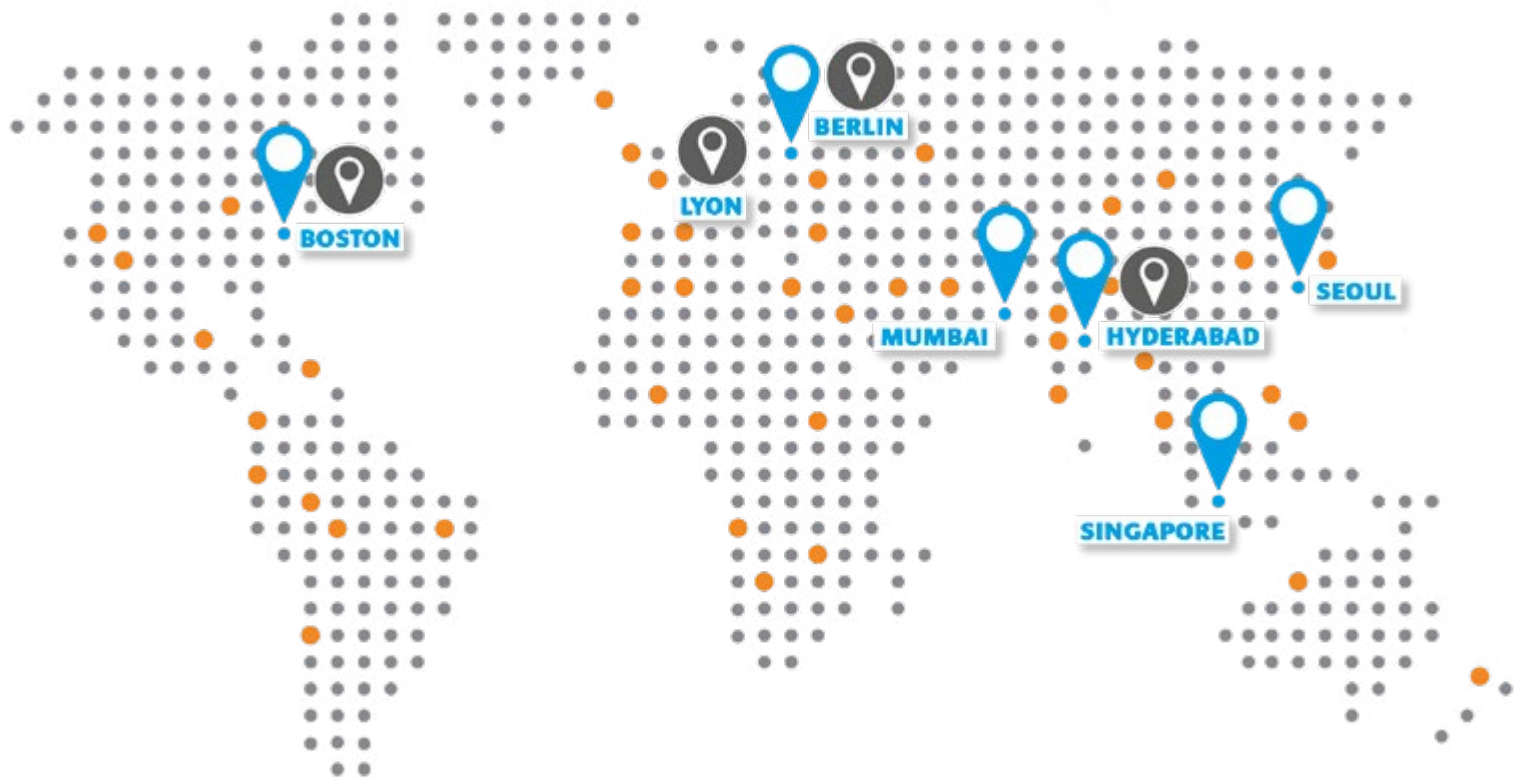
KORSCH PharmaView® is an interactive operational assistant based on Microsoft HoloLens augmented reality technology. The smart glasses beam holograms and additional information into the user's actual visual axis, enabling guided, hands-free setup, operation, and maintenance. The remote service via video call function permits a secure, streamlined, remote troubleshooting capability that will save time, reduce costs, and improve overall efficiency and uptime.

- Holographic support for production, trouble shooting and maintenance
- Access to multi-media support files
- Augmented training (without machine or on the machine to see inside the assemblies)


The technical data included in this document are optimal parameters and are dependent on product quality and machine settings.


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Technical Data

KORSCH X 5 1-/2-/3-Layers

Description		Turret with Dies				Turret with Segments		
Number of Punch Stations		58	52	43	35	72	54	42
Press Tools	EU/TSM	BBS	BB	B	D	IH 12	B	D
Main Compression Force	kN	100	100	100	100	100	100	100
Precompression Force	kN	20/100	20/100	20/100	20/100	20/100	20/100	20/100
Tamping Force	kN	20	20	20	20	20	20	20
Max. Tablet Diameter	mm	11	13	16	25	11	16	25
Max. Filling Depth – Layer 1	mm	18	18	18	22	18	18	22
Max. Filling Depth – Layer 2 and Layer 3	mm	10	10	10	10	10	10	10
Turret Speed Single-Layer	RPM	5 – 120	5 – 120	5 – 120	5 – 100	5 – 120	5 – 120	5 – 100
Turret Speed Bi-Layer	RPM	5 – 60	5 – 60	5 – 60	5 – 50	5 – 60	5 – 60	5 – 50
Turret Speed Tri-Layer	RPM	5 – 50	5 – 50	5 – 50	5 – 40	5 – 50	5 – 50	5 – 40
Max. Tablet Output (Single-Layer)	Tabs/h.	417,600	374,400	309,600	210,000	518,400	388,800	252,000
Max. Tablet Output (Bi-Layer)	Tabs/h.	208,800	187,200	157,800	105,000	259,200	194,400	126,000
Max. Tablet Output (Tri-Layer)	Tabs/h.	174,000	156,000	129,000	84,000	216,000	162,000	100,800
Pitch Circle Diameter	mm	490	490	490	490	490	490	490
Max. Tablet Thickness	mm	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Net Weight of the Machine	kg	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Machine Dimensions	mm L x W x H	1,950 x 1,238 x 2,169 – Dimensions are identical for all versions						
Main Motor	kVA	18.5	18.5	18.5	18.5	18.5	18.5	18.5

Technical modifications reserved.

KORSCH tablet presses comply with the EC machinery directive, the current GMP and FDA regulations, as well as with the EMC guidelines. KORSCH tablet presses are delivered with CE certificate and meet the requirements of 21 CFR Part 11.

Peripherals delivered with KORSCH tablet presses also comply with these regulations.

The technical specifications included in this document represent optimal parameters and are dependent on product quality and machine settings. The maximum compression force varies in relation to tablet/punch size, and output. The maximum output varies in relation to material, tablet/punch size, and compression force.