# XL 400$^{\underline{4}}$

## The 4$^{th}$ Generation

Pharmaceutical
Single-Sided
Rotary Tablet Press

KORSCH

The Specialist.

# Innovations 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

# XL 400⁴ – The 4ᵗʰ Generation

The XL 400⁴ offers a new level of innovation and advancement, while maintaining the flexibility that is the hallmark of the XL 400 design. Smarter and featuring a complete new control system interface, the machine offers an intuitive operating experience. The integration of the electrical cabinet, a sealed machine design without cooling fans or vents, and the use of an advanced torque drive, enhance the proven design of the XL 400 platform. All key components, including turrets, feeders, and cams are fully interchangeable with the 3ʳᵈ generation XL 400 design.

- Integrated electrical cabinet – no remote cabinet

- New Smart-Touch HMI with comprehensive on-board help

- Technological breakthrough with the use of intelligent components, ready for Industry 4.0

- Advanced torque drive

- Contamination free machine base and Multi-Function Column

- Clean and transparent design concept for streamlined product changeover

- Isolated dust collection housing with optimal access for cleaning

- Ergonomic placement of major components in machine base for extreme serviceability

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# 1 Common XL 400⁴ Platform ...

The XL 400 platform permits complete turret and spare parts compatibility between the SFP and the MFP models. The SFP and MFP share an identical control system and HMI environment, and a process equivalent design to permit the transfer of single-layer products between machines. The SFP and MFP share common procedures for setup, changeover, and turret exchange.

## XL 400⁴ MFP
## Maximum Flexibility for Multi-Layer Formats

Offering single-layer, bi-layer, tri-layer, tablet-in-tablet, and microchip-in-tablet capability in a single machine, and an exchangeable turret design, the XL 400⁴ MFP can produce a tablet of any size, shape, and format. The modular feeders, compression stations, and cam tracks permit the press to be reconfigured for every application using an innovative, patented design.

- Modified carrier plate and head piece for plug and play configuration

- Single-layer is fully process equivalent to the XL 400⁴ SFP model

- Flexible control system with seamless transition between operating modes

Discharge Chute

Compression Stations

Feeder
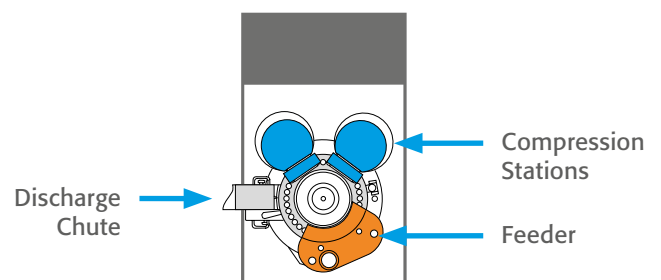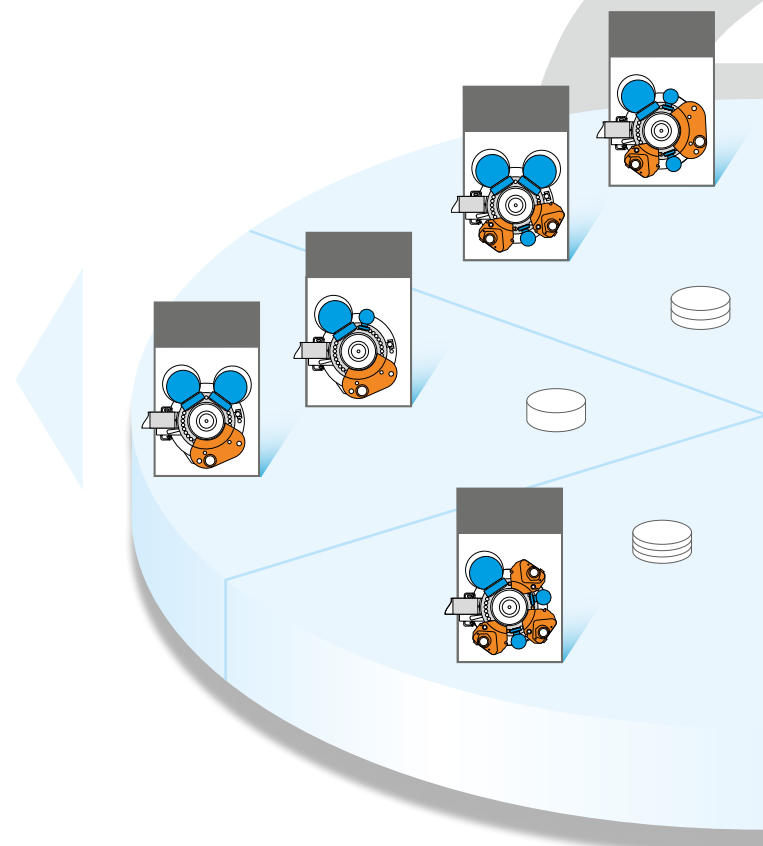
# ... 2 Machine Models

The XL 400 design offers a single-layer only, and a flexible single and multi-layer capability in two machine models that share a common platform, and fully interchangeable compo-

nents. Depending on your product portfolio, you can select the SFP or MFP or combine both models and benefit from their common advantages and maximized compatibility.

## XL 400⁴ SFP
## Maximum Efficiency for Single-Layer Production
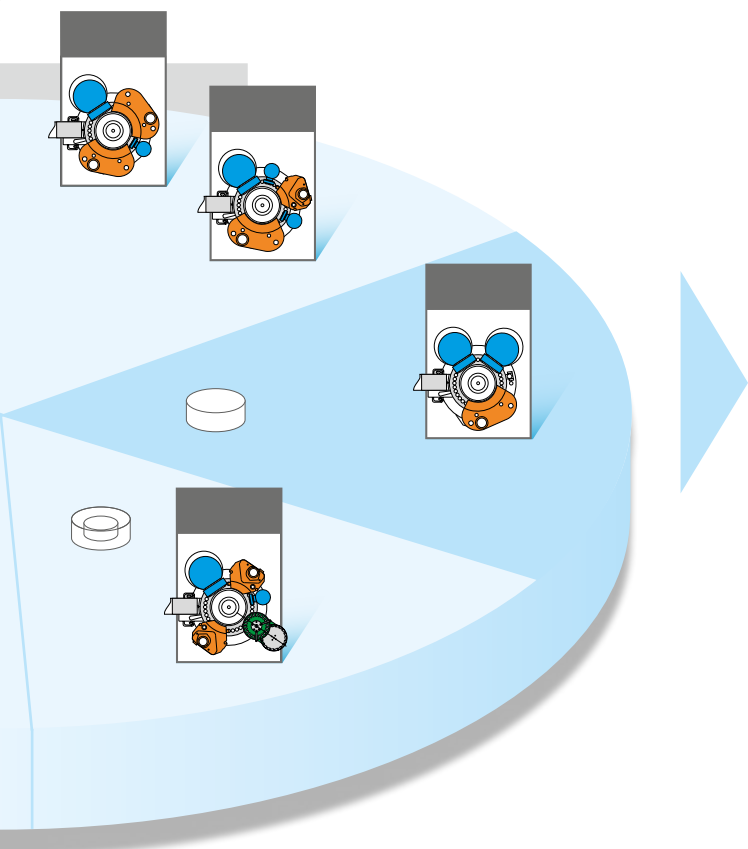
Offering a 100kN pre and main compression capability, a maximum press speed of 120 RPM, and an extended feeder length, the SFP is geared for high-speed production, with a maximum output of 338,400 tablets per hour. An ergonomic and accessible design permits the fastest change-over of any machine in its class.

- Compression dwell bar for increased tablet hardness at high speeds

- Streamlined turret exchange and product changeover

- Extended feeder length for perfect weight uniformity at high speeds

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# Intuitive Controls with Smart-Touch HMI

The completely new control system interface provides an intuitive operating environment and Smart-Touch HMI, which permits move, zoom, and scroll gestures. 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. At the heart of the control system is a Siemens SIMOTION controller, which merges PLC and motion controls in a single, integrated system. This permits extensive remote diagnostic support.

## More Efficiency at all Levels

Reduced wiring, increased data availability, speed and precision of regulation, extensive diagnostics – these are some of the main advantages obtained with the combination of intelligent components and advanced software. All this makes the machine well prepared for the next steps towards Industry 4.0.

- HMI and control PC merged in one single unit

- Sensors with IO-Link communication: true values available (not only on/off), quick and easy set-up directly from HMI

- Components with an electronic type plate recording identity, configuration and calibration data: quicker and safer machine changeover

- Servomotors combined with encoder: no calibration required, fast and precise regulation with SIMOTION

# 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

- Troubleshooting and diagnostic support
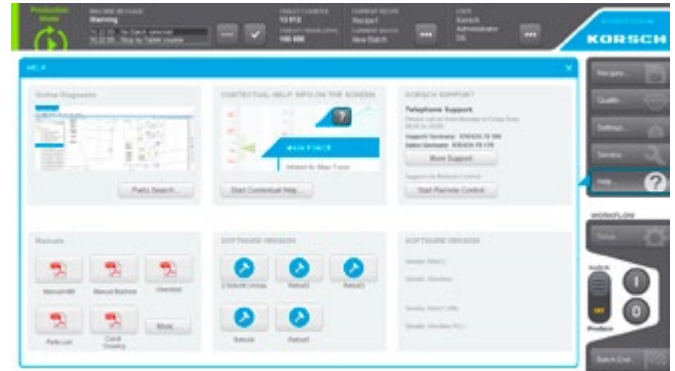
# PharmaControl® Press Force Control System

The XL 400$^4$ 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

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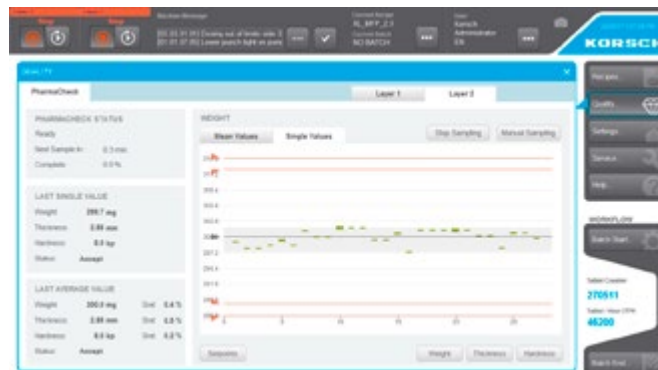
# Functional Design Maximizes Productivity

The XL 400[4] leverages the combination of form and function to maximize performance. The machine features large windows for excellent visibility and unlimited access to the compression zone. At the rear of the machine, the Multi-Function Column is divided in two separate compartments: the electrical cabinet on one side and the dust extraction and main energy supplies on the other side.

The integrated control cabinet avoids additional space and cabling in the room. The water-cooled torque drive and Multi-Function Column permit a completely sealed machine exterior and eliminate heat transfer to the compression zone and to the room. An innovative dust extraction design isolates the dust extraction ducts and streamlines access and cleaning.

## Superior Accessibility by Design



- Compression zone without corner columns
- Machine base with large doors
- Ergonomic arrangement of components in machine base and rear electrical cabinet for extreme serviceability
- Large and easily accessible central connection panel for peripherals

## Superior Yields



- Extended filling length permits superior weight uniformity at high speeds
- Seal between feeder plate and die table minimizes material loss
- Air channel around the turret with tangential dust extraction
- Efficient layer separation with zero clearance feeders configured with an integrated dust extraction manifold.

## True Separation of GMP and Technical Zone



- Through-The-Wall (TTW) installation minimizes the GMP footprint
- Service of the electrics and utilities from grey zone
- Conventional installation also possible

# Minimal Noise and Vibration

The carrier plate that supports the precompression and main compression columns is mounted on pneumatic dampers. This unique and patented design fully isolates vibration from the head piece and machine base.

The result is an extreme reduction in operating noise level.

- Very low noise emission < 80 dB(A)

- No vibration transmission to the floor of the compression room

- No segregation of powder in the feeding system which can occur with machine vibration

# Fast and Easy Changeover

The XL 400[4] offers superior accessibility to the compression zone with a combination of quick-disconnects and large smooth surfaces that permit fast cleaning and changeover. A streamlined turret removal process and the ergonomic installation of the dust extraction system ensure a higher level of serviceability.

## 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

- Lightweight feeder ($<$ 12 kg)

## Streamlined Turret Removal

The XL 400[4] turret may be exchanged – quickly, easily, and safely – including the cams, and press tools. A lifting arm is installed in the carrier plate and secured at the machine head piece to facilitate turret removal and installation. The turret locking is automatic. The control system has a turret recognition capability to permit the parameters to be setup automatically.

- Turret removal in less than 10 minutes

- Lifting arm permits also the removal of the compression columns

- Transport cart for turret preparation and off-line cleaning

## Serviceability of Dust Extraction

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 not contaminated.

- No dust extraction hoses in machine base

- Extreme cleanability and serviceability

- No cross-contamination

# Containment Solutions

KORSCH offers a fully integrated solution for all containment applications, including related peripherals and make/break connections, with centralized negative pressure control and dust collection system.

## Medium Containment Level OEB 3

- 100 µg/m$^3$ > OEL > 10 µg/m$^3$ e.g. for hormones or antiretrovirals

- Respirator free environment during production incl. 3rd party SMEPAC reports in -100Pa isolator like containment

- Ergonomic arrangement of glove ports and rapid transport ports (RTP) as an option for manual interventions

- Manual decontamination in place with integrated vacuum dry cleaning

- Manual contained intervention eg. for tablet jams or punch removal



## High Containment Levels OEB 4/5

- OEL > 0,1 µg/m$^3$ e.g. for cytotoxic products

- Manual or fully automatic Wip Cycles

- Turnkey High Containment Solutions available for all sizes of KORSCH tablet presses from small scale R&D to high speed production

- Third party SMEPAC testing available to validate the integrity of the contained system



# KORSCH
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# KORSCH Global
# Service Network



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# XL 400⁴

## The 4th Generation

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# Technical Data

## KORSCH XL 400⁴ 1-/2-/3-Layer

| | EU/TSM | | | | |
|---|---|---|---|---|---|
| **Number of punch stations** | | 47 | 44 | 35 | 29 |
| **Press Tools** | EU/TSM | BBS | BB | B | D |
| **Main Compression Force** | kN | 100 | 100 | 100 | 100 |
| **Precompression Force** | kN | 20/100 | 20/100 | 20/100 | 20/100 |
| **Tamping Force** | kN | 5 | 5 | 5 | 5 |
| **Tablet Diameter max.** | mm | 11 | 13 | 16 | 25 |
| **Filling Depth max.** | mm | 18 | 18 | 18 | 22 |
| **Filling Depth, Second and Third Layer max.** | mm | 10 – identical for all Versions | | | |
| **Turret Speed, Single-Layer** | RPM | 5 – 120 | 5 – 120 | 5 – 120 | 5 – 100 |
| **Turret Speed, Bi-Layer** | RPM | 5 – 60 | 5 – 60 | 5 – 60 | 5 – 50 |
| **Turret Speed, Tri-Layer** | RPM | 5 – 50 | 5 – 50 | 5 – 50 | 5 – 40 |
| **Tablet Output, Single-Layer max.** | tabs/h | 338,400 | 316,800 | 252,000 | 174,000 |
| **Tablet Output, Bi-Layer max.** | tabs/h | 169,200 | 158,400 | 126,000 | 87,000 |
| **Tablet Output, Tri-Layer max.** | tabs/h | 141,000 | 132,000 | 105,000 | 69,600 |
| **Pitch Circle Diameter** | mm | 410 | 410 | 410 | 410 |
| **Tablet Thickness** | mm | 8.5 | 8.5 | 8.5 | 8.5 |
| **Machine Dimensions** | mm/ L x W x H | 1941 x 1199 x 2162 – Dimensions are identical for all Versions | | | |
| **Net Weight of the Machine** | kg | 4300 | 4300 | 4300 | 4300 |
| **Electrical Load** | kVA | 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.

Standard compression rollers are suitable for most applications. Heavy duty compression rollers are available at no extra cost for high compression force applications.

2C core-coated tablets technical data on request.