

# SmartPlus 60 – 180 t

Efficiency through proven technology

world of innovation



# ECONOMICAL – PROVEN – PRACTICAL

## For a wide range of applications

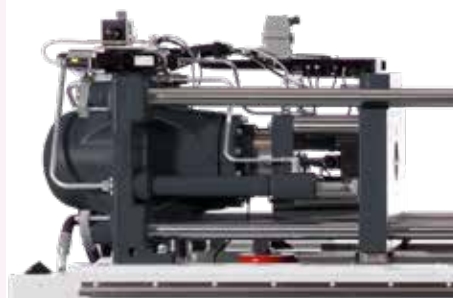
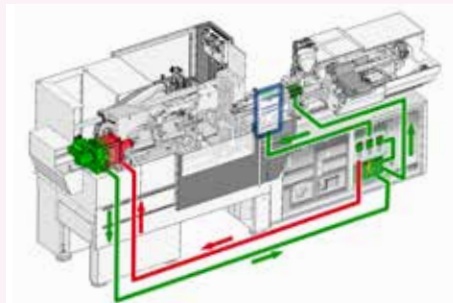
### The advantages of the SmartPlus for maximum efficiency

- » **Optimal use of production floor space**  
compact injection molding machine with proven stability
- » **Reproducible product quality**  
through high-precision injection units with 22:1 L/D ratio for optimal material homogeneity
- » **Production-oriented solutions**  
through practical equipment options as standard, optionally expandable
- » **Top energy efficiency**  
through "Drive-on-Demand 2.0" drive system as standard
- » **KERS as additional energy bonus**  
through patented energy recovery system
- » **Familiar user interface**  
in new Unilog B8X control system concept with integrated assistance systems
- » **Smart WorkCell**  
with WITTMANN auxiliary appliances and the "Plug & Produce" Wittmann 4.0 integration package
- » **Best price/performance ratio**  
through proven components and state-of-the-art technologies

### The Series

SmartPlus – clamping forces from 60 to 180 t





## SmartPlus

### The highlights

- » **Compact, maintenance-friendly plasticizing unit**  
All SmartPlus plasticizing/injection units are easily accessible, compact and swivel-mounted. All machines come with a wear-resistant plasticizing unit as standard.
- » **“Drive-on-Demand 2.0” hydraulic servo drive**  
The standard equipment in all SmartPlus machines is a combination of fast-response servo motors with powerful constant displacement pumps. The advantages of this system are maximum dynamism, speed and precision of the machine’s movements with simultaneous minimal energy consumption.
- » **KERS – for optimal energy utilization**  
In braking movements, the patented KERS (Kinetic Energy Recovery System) for injection molding machines transforms kinetic energy into electrical energy. The electricity thus generated is used inside the machine, for example for barrel heating. KERS further reduces the machine’s energy consumption by up to 5%.
- » **Mold-protecting clamping system**  
The 4-tie-bar clamping system equipped with central pressure pad force transmission and two diagonally positioned fast-stroke cylinders offers optimal force transmission to the mold, with simultaneous mold protection through above-average platen parallelism (only half of the tolerance stipulated for platen parallelism by EUROMAP 9).
- » **Highly sensitive mold protection**  
The machine’s moving platen is guided, without coming into contact with the tie-bars, via a stable moving carriage on linear guides and circular roller bearings with ample potential for carrying heavy molds. The minimal rolling friction of the moving platen’s guiding system offers optimal conditions for highly sensitive mold protection.

# CLAMPING UNIT

## Compact and precise

» **Ample space for the mold combined with symmetrical force distribution**

Generously dimensioned clamping plates and a clamping system with symmetrical force distribution all round offer the optimal environment for every mold including all utility connections. [1]

» **Highly sensitive and precise**

In the SmartPlus clamping system, the exclusive purpose of the tie-bars is to provide force transmission between the external platens. The moving platen travels without tie-bar contact virtually free of friction on its linear bearings [2]. Optionally, the tie-bars can be pulled and reset in just a few simple steps. [3]

» **Dynamic movements**

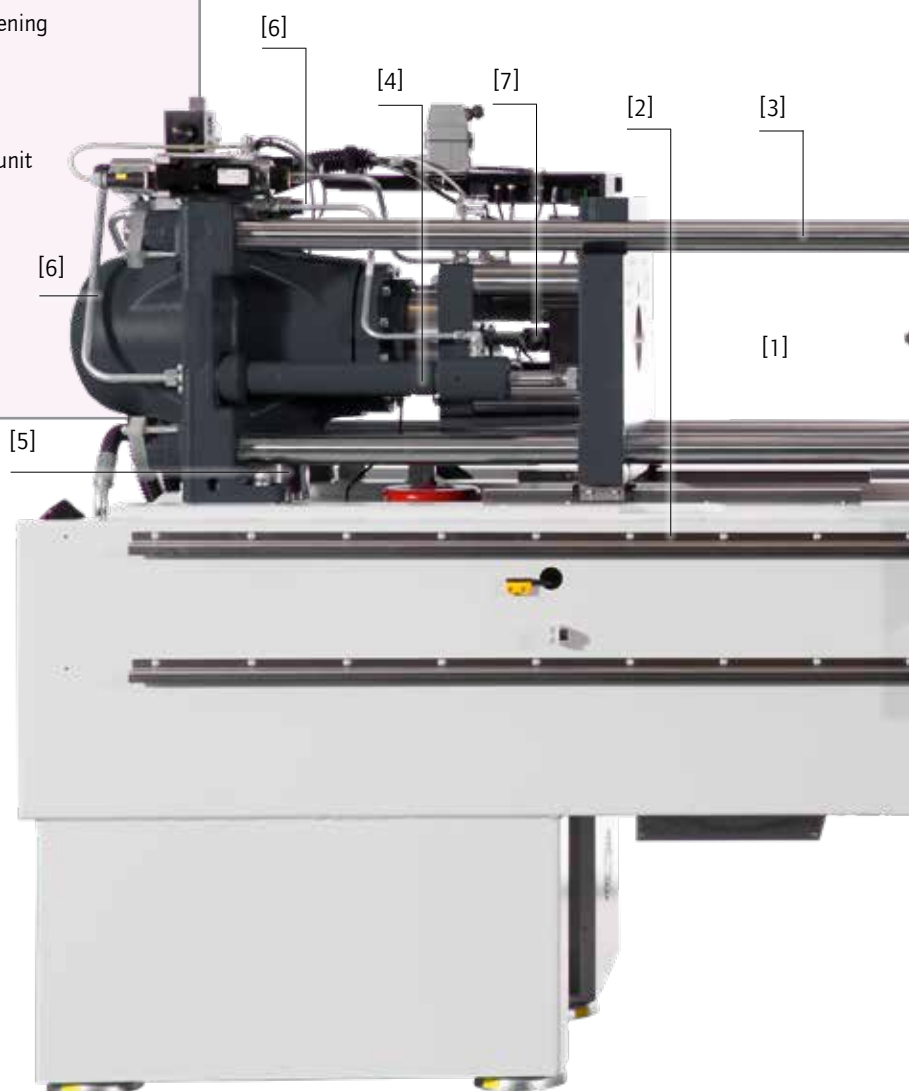
- The moving platen is driven by two diagonally positioned traveling cylinders. [4]
- The combination of the traveling cylinders with a hydraulic differential control system enables dynamic movements by means of a further improved hydraulic system with a proportional valve.
- The traveling cylinders are dimensioned for high opening forces. [4]

» **Compact design for minimal footprint**

Positioning of the suction valve at the bottom of the pressure cylinder shortens the length of the clamping unit to a minimum. [5]

» **Maintenance-friendly and easy to clean**

- Extensive use of hydraulic pipes instead of hoses reduces potential maintenance expenses. [6]
- The ejector area and the platen environment are easily accessible for machine setting. [7]



# INJECTION UNIT

Reliable and repeatable

**Wittmann**

- » **Everything provided for series consistency**
  - All screws > 25 mm have a 22:1 L/D ratio.
  - High repeatability through standardized injection pump control system
  - Moment-free nozzle contact through axis-aligned traveling cylinder positioning [8]
  - Plasticizing barrels can be mounted on different injection units with the same screw diameters.
  - In combination with the WITTMANN BATTENFELD HiQ software modules (optional), sensitive control strategies are available to compensate external impacts such as variations in temperature and/or moisture, regrind or masterbatch content.
- » **Optimal user-friendliness**
  - Free access to the injection unit for easy material loading as well as machine setting and maintenance work
  - All injection units up to size 1000 swivel-mounted (for fast screw and barrel change)



# DRIVE TECHNOLOGY

## Energy efficiency through „Drive-on-Demand 2.0“



### Fast-response, precise, economical

„Drive-on-Demand 2.0“ is the innovative combination of a fast-responding, speed-controlled and air-cooled servo motor with a high-quality constant displacement pump. The fast response speed is further enhanced by a booster unit specially developed in-house, which enables a higher clock frequency. This drive unit is only activated as long as required for movements and pressure generation. During cooling times or cycle breaks for parts handling, the servo drive is switched off and consumes no energy. During operation, „Drive-on-Demand 2.0“ provides the basis for highly dynamically controlled machine movements and short cycle times.

The „Drive-on-Demand 2.0“ system is standard equipment of the SmartPlus machine series.

### Operating cost-cutting features

- » „Drive-on-Demand 2.0“ cuts energy consumption by up to 35% compared to modern regulating pump systems.
- » Additional energy cost cut by reduction of electric reactive power
- » Lower overall cooling expenses, since oil cooling can normally be dispensed with
- » Reduced maintenance expenses, since the oil quality is preserved longer, due to less thermal load.
- » Lower sound emissions reduce investments required for sound-proofing



# PLUS SERIES

## Optional highlights

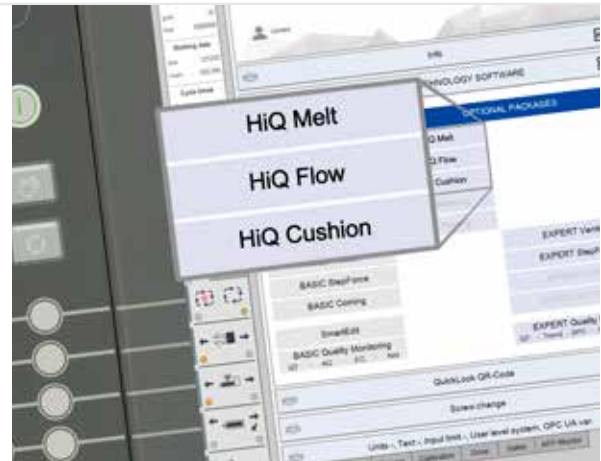
**Wittmann**

### HiQ packages

#### Compensating material fluctuations

Viscosity fluctuations of the plastic melt and/or the closing behavior of the checkvalve have a significant influence on the quality of the molded part. This is precisely where WITTMANN BATTENFELD's application software comes in, more widely known as HiQ packages. These deal to a varying extent with monitoring, documentation and regulation of the injection molding machine.

The HiQ packages are add-ons to the existing Unilog B8X machine control software. They provide additional features to grant machine operators more insights into the process and to facilitate operation of the equipment as well.



### Numerous interface extensions

Standardized interfaces are a fundamental prerequisite for successful comprehensive introduction of Industry 4.0 technologies. On the basis of the OPC UA industrial M2M communication protocol and under the umbrella of EUROMAP, the plastics industry is developing standards for a vast range of different types of communication.

The WITTMANN Group plays a leading role in their development and standardization, and offers the following standard communication options between the individual appliances of a production cell and an MES system in a variety and consistency which is unique in the world:

- » EUROMAP 63, 77, 82.1, 82.3
- » OPC UA



### WITTMANN auxiliaries

#### For a fully integrated production cell

The comprehensive range of WITTMANN auxiliary appliances offers appropriate solutions for all secondary injection molding processes, from parts handling, material transport and drying all the way to sprue recycling and mold cooling. Via the optional Wittmann 4.0 integration package, all additional appliances can be integrated into the production cell in line with the "Plug & Produce" principle.



# UNILOG B8X

## Complex tasks simplified

The proven Unilog B8 control system logic with the high-performance B8X hardware is the WITTMANN BATTENFELD solution to make the operation of complex processes easy. To this end, the integrated industrial PC has been equipped with an enlarged intuitive touch-screen control surface. The visualization is the interface to the new Windows® 10 IoT operating system, which offers extensive capacity for process control. In addition to the swivel-mounted monitor screen unit, a fixed manual operating panel is installed in the central console.



## Unilog B8X

### The highlights

- » **Operating logic**  
with a high level of self-explanation, oriented on modern communication devices
- » **2 important operating concepts**
  - operating/movement functions with selectable haptic keys
  - process functions on screen (access via RFID, key card or key ring)
- » **Process visualization**  
via bright 21.5" multi-touch screen in full HD, laterally swiveling
- » **New screen functions**
  - uniform layout for all WITTMANN appliances
  - operation via gesture control (wiping and zooming via finger movements)
  - container function - screen display partitionable for simultaneous display of two process graphics one above the other
- » **Status visualization**  
uniform signal design for the entire WITTMANN Group:
  - headlines on screen with colored status bars and pop-up menus
  - AmbiLED display on the machine
- » **Operator assistance**
  - QuickSetup: assistance for process parameter setting via an integrated material database with preselection of machine settings
  - extensive help library included



» **SmartEdit**

SmartEdit is a visual, icon-based cycle sequence programming facility, which enables direct addition of special functions (core pulls, air valves, etc.) based on a standard process via touch operation on the screen. In this way, a total user-defined sequence can be compiled from a sequence menu. This machine cycle, visualized either horizontally or vertically, can be adjusted simply and flexibly to the process requirements by finger touch with "Drag & Drop" movements.

**The advantages**

- icon display ensures clarity
- clear sequence of events through node diagram
- inconsequential alterations in "dry tests"
- fast transfer of theoretical sequence to real operation possible
- automatic sequence calculation based on the parameter setting data set without actual machine movements

» **SmartScreen**

- partitionable screen displays to visualize and operate two different functions simultaneously (e. g. machines and auxiliaries)
- uniform design of the screen pages within the WITTMANN Group
- max. 3 containers can be selected simultaneously for the SmartScreen function.
- Alterations of values can be entered directly into the set values profile.



**Remote communication**

» **QuickLook 4.0**

- Production status checks possible simply and comfortably via a Smartphone:
- operating data and condition of all important appliances in a production cell
  - general overview of the most important production parameters
  - access to operating data, alarm input and user-defined data
  - the production cell overview provides a simple and clear overview of the production cell's overall status and that of its Wittmann 4.0 appliances.

» **Global online service network**

- Web-Service 24/7: direct internet contact to WITTMANN BATTENFELD service
- Web Training: efficient staff training via the virtual training center

# WITTMANN 4.0

## Communication in and with production cells

With its communication standard Wittmann 4.0, the WITTMANN group offers a uniform data transfer platform between injection molding machines and auxiliary equipment from WITTMANN. In case of an appliance change, the corresponding visualizations and settings are loaded automatically via an update function, following the principle of "Plug & Produce".

### Integration of auxiliaries under Wittmann 4.0

- » **WITTMANN WFC 120 flow controllers, Gravimax blenders and Aton dryers**
  - Direct activation and control of the appliances via the machine's control system
  - Shared data storage in the production cell, in the machine and via MES in the network.
- » **WITTMANN robots with R9 control system**
  - Robot operation via the machine's monitor
  - High-speed communication between the machine and the robot to synchronize movements
  - Important machine movements can be set via the R9 robot control system
- » **WITTMANN Tempro plus D temperature controllers**
  - Temperature can be set and controlled via the machine's control system
  - All functions can be operated on the appliance as well as via the machine's control system.

### Integration in MES system

The integration of machines and complete production cells in an MES system is a prerequisite for an efficient and transparent production facility according to the Industry 4.0 concept. Depending on customers' requirements, small and medium-sized companies as well as global players are offered a compact MES solution based on TEMI+. With the Windows® 10 IoT operating system it is also possible to have selected status information from all connected machines on the production floor shown under SmartMonitoring on the display screen of every machine.



### System Wittmann 4.0

With Wittmann 4.0, a machine and its robots and auxiliaries are transformed into a uniform technical organism, which communicates externally via a specific IP address. Such a "Single point entry" with an integrated internal firewall substantially increases cyber security.

# TYPICAL APPLICATION EXAMPLES

of the *Plus* series



© Mayer & Co Beschlaege GmbH



# TECHNICAL DATA

## SmartPlus

**Wittmann**



### COMBINATION OPTIONS

Clamping unit	Injection unit						
	t	130	210	350	525	750	1000
60	•	•					
90		•	•				
120			•	•			
180					•	•	

Material	Factor
ABS	0.88
CA	1.02
CAB	0.97
PA	0.91
PC	0.97
PE	0.71
PMMA	0.94
POM	1.15
PP	0.73

The maximum shotweights (g) are calculated by multiplying the theoretical shot volume (cm<sup>3</sup>) by the above factor.

Material	Factor
PP + 20% Talc	0.85
PP + 40% Talc	0.98
PP + 20% GF	0.85
PS	0.91
PVC hard	1.12
PVC soft	1.02
SAN	0.88
SB	0.88
PF	1.3
UP	1.6

Dark grey boxes = thermosets

# STANDARD

<b>Complete system</b>
Voltage 230/400 V/3p+N-TN/TT, 50 Hz
Paint RAL 7047 tele grey 4 / RAL 7016 anthracite / RAL 3004 crimson
Air cooling system for drive and amplifier units, water cooling system open for feed zone and oil cooler with membrane valve
<b>One-piece basic frame with disposal channels in 3 directions</b>
Ejection area - ejection shaft cover according to EN201 incl. interface for ejection flap control
Test run with HLP32 zinc-free hydraulic oil according to DIN 51524 T2 / purity class 17/15/12 according to ISO 4406 (Please note: oil is not included in the delivery), lubricants in H2 quality
Printed operating instructions including user manual on USB stick
Injection molding machine incl. declaration of conformity and CE marking
Levelling pads
<b>Hydraulic system/pneumatic systems/temperature control</b>
S0 drive unit with speed-controlled servo motor for hydraulic pump for increased energy efficiency
Hydr. system with oil cooler and temp. controller, oil level monitoring
Fine oil filter with electric contamination indicator
Oil pre-heating of the hydraulic aggregate with closed safety gate
Air valves on fixed platen, Compressed air service unit
Hydr. core pulls on clamping platen/fixed platen, EUROMAP 13
4-fold cooling water flow controller with blow-off valve
<b>Clamping unit</b>
Clamping force, opening and closing forces all adjustable
<b>Mold safety program</b>
Exact platen parall., low-friction linear guides for clamping plate support
Clamping plates with drillings according to EUROMAP 2, clamping plate surface bright metal, all other surfaces painted
Drillings on fixed platen according to WP80, and EUROMAP 18 for robot
<b>Hydraulic ejector with multiple stroke</b>
Clamp. cylinder piston coated with hard chrome subst., ejector piston rod induction hard. and hard chrome plated, position sensor with linear potentiom.
<b>Injection unit</b>
Hydraulic screw drive system
Injection, holding and back press. pump-contr. with def. nozzle contact press.
Plasticizing unit AK+ for thermoset processing, 3-zone universal screw, flow-optimized check valve, heater bands up to 350 °C with heat insulation of feed zone grooving
<b>Thermocouple failure monitor</b>
<b>Maximum temperature monitor</b>
Plug-in ceramic heater bands – heater band multi connector for fast barrel change, nozzle heater band with separate plug
Temperature-controlled feed zone
Swivel device for barrel
Hard chromed injection cylinder piston rods and linear guides as standard, position sensor with linear potentiometer
Lowering of barrel temperature
Decompression before and/or after metering
Input of physical units – bar, cm <sup>3</sup> , mm/s, etc.
Cold start screw protection
Peripheral screw speed indication
Linear interpolation of set holding pressure values
Bar diagram for barrel temp. with set value and control deviation display
Adjustable injection pressure limit
Changeover from injection to holding pressure (depend. on stroke, time and pressure)
Open nozzle R35, split, nozzle tip M24x1.5
Standardized injection and barrel guard according to EN 201, L/D 22, limits-switch monitored
Feed hopper 6 l (MH206) for autom. loading sliding gate with slide guide

<b>Safety gates</b>
Guarding on injection side with screwed-on service gate
Standardized safety gates, Perspex glass clear / frame RAL 3004 crimson
Manually operated safety gates on operator and non-operator side
<b>Electrics</b>
Nozzle control socket for nozzle heating 230 V
AmbiLED status indicator
FI safety switches for sockets
Circulating control cabinet fan for ambient temp. up to max. 30 °C
Emergency stop switch in operating console
<b>Printer socket</b>
1 x USB operating unit
1 x Ethernet -interface (control cabinet)
Printer via USB connection or network
Interface for full R8 or R9 robot integration
Interface for clocked conveyor belt
Wittmann 4.0 integration package for 2 temperature controllers
<b>Control system</b>
Unilog B8X control with 21.5" multi-touch screen in full HD
Operating panel with selectable haptic keys
Hour counter/shot counter software
Closing/opening 5 profile steps
Ejection 3 profile steps
Nozzle movement 3 profile steps
Injection/holding pressure 10 profile steps
Screw speed/back pressure 6 profile steps
Part counter with good/bad parts evaluation
Purging program through open mold
Stroke zero offset settings
Start-up scrap program
MASTER/SLAVE holding pressure changeover dependent on time, stroke/volume and injection pressure
Self-learning temperature controller
Control cabinet temperature indicator
<b>Weekly timer</b>
Access author. via USB interface, password system and RFID author. system (1 x IT level 15 check card, 1 x customer level 30 token and 1 x customer support level 20 token included in the delivery)
<b>Freely configurable status bar</b>
Product-related physical units
Automatic dark switching
Logbook with filter options
User programming system (UPS)
User page
<b>Notebook function</b>
Cycle time analysis
<b>Hardcopy function</b>
Internal data memory, data storage via USB connection or network
Online language switching
Online unit switching
<b>Real time monitoring</b>
Basic quality control, Basic Coining
<b>Flow Monitoring</b>
Metering integral monitoring
Alarm signal via email
SmartEdit – process editor
QuickSetup – assistance program for initial setup
Energy consumption indicator for drive units and barrel heating

## Basic machine

Country-specific regional package  
 Power supply line 1 with special voltage, supply line 2  
 Handling package with open rear safety gate  
 Ejection chute  
 Parts chute (good/bad parts separation)

## Hydraulic / pneumatic systems

Coarse filter in flowline to cooling system and connections with ball valves on the oil tank for oil care  
 Pneum. core pulls on clamping platen/fixed platen, incl. compr. air regulator  
 Hydr. blocks for activating two or several shutoff nozzles in the mold

## Clamping unit

Mold plates with special drillings according to SPI, JIS  
 Hydraulic ejector in reinforced design  
 Twin check valve to hold the ejector in end position  
 Ejector cross according to EUROMAP, SPI, JIS  
 Mechanical or pneumatic ejector coupling  
 Ejector plate safety device

## Injection unit

Hydraulic screw drive - torque-boosted  
 Open nozzle in special design  
 Needle shut-off nozzle, with spring or pneumatic activation  
 Material hopper MH330  
 Unifeed

## Safety gate

Safety gate on clamping side, operator and/or non-operator side raised or lowered

## Cooling

Cooling water flow controller with blow through valve  
 Shut-off valve for cooling water flow controller  
 WFC120 controlled or regulated  
 Cooling water distribution block on fixed platen / moving platen

## Electrics

Temperature control units for hot runners  
 Acoustic elements integrated in signal lamps  
 Socket combinations  
 Additional ventilators in control cabinet for higher ambient temperatures  
 Control cabinet air conditioner  
 Additional emergency shut-off sensor  
 Interface for robots EUROMAP 67, conveyor belt, temperature controller, blender, mold monitoring, BDE, hazard area delineation, ejector middle plate, potential-free contacts

## Control system

BNC connectors for injection process analysis  
 Expert quality monitoring (4 freely configurable network drive connections, quality table with 10000 memory depth, event log for 10000 events, actual value graphics with 16 curves, 4-fold envelope curve monitoring, SPC analysis, trend diagrams)  
 Special programs to customers' specifications  
 HiQ Package  
 Energy consumption analysis  
 Clamping force monitoring  
 Transfer molding and ventilation programs  
 Cycle start-up with safety gate closing  
 Special program with interim ejector shut-off  
 Additional exit / entry card, freely programmable  
 Wittmann 4.0 integration package

## Accessories

Tool kit  
 Integration package (robot, material loader, blender, temperature controller, mold integration)  
 WITTMANN BATTENFELD Web-Service - free of charge during warranty period  
 Remote control package

The Wittmann logo is displayed in a stylized, italicized font within a magenta-colored parallelogram shape.

**WITTMANN BATTENFELD GmbH**

Wiener Neustädter Strasse 81

2542 Kottlingbrunn | Austria

Tel.: +43 2252 404-0

[info@wittmann-group.com](mailto:info@wittmann-group.com)

[www.wittmann-group.com](http://www.wittmann-group.com)