

TM Series 180 t – 500 t



Approved precision

Technology working for you.

Battenfeld
world of innovation

Special features and benefits of the TM Series 180 t – 500 t

The TM Series – with approved precision to business success

The compact power packages in a great machine series in 3 – platen technology with a 5-point toggle system. In the 180 to 500 t clamping force range, TM-models stand for ultimate performance, short footprint, simple operation and maintenance, energy savings and cost-efficiency.

Proven features have been retained, with a number of beneficial new features added.

The high-performance control system offers numerous process monitoring and documentation facilities.

With the help of an extensive options package, the TM is suitable for a variety of applications.

Put the TM to the test and see for yourself!



1 Clamping system

The clamping cylinder is equipped with differential circuit to promote high opening and closing speed, and to minimize dry cycle times.

Clamping unit

Rigid machine frame combined with reinforced cap bolts and low-maintenance toggle sleeves stand for high precision, low maintenance and long service life.

2





3 *Linear guides*

Support for the moving platen is provided by high-precision linear guides, which dispenses with the need for special adjustments to accommodate heavy molds. Lubrication is reduced to a minimum. The hard-chrome-plated tie-bars are free of contamination with lubricants.



4 *Injection units with linear movement, traversable*

Easy access to the nozzle without tools and rapid screw removal

Screws with a uniform L/D ratio

22:1 and an injection pressure of 2,000 bars for the medium-diameter screws ensure excellent melt homogeneity. Service lifting mechanism to facilitate maintenance and the removal of barrels and screws.

5



Energy-saving DFEE drive

This flexible drive concept based on electrically adjustable (DFEE) delivery pumps promotes short cycle times. Parallel strokes, higher injection and dosing performance can easily be achieved with an optional twin pump system.

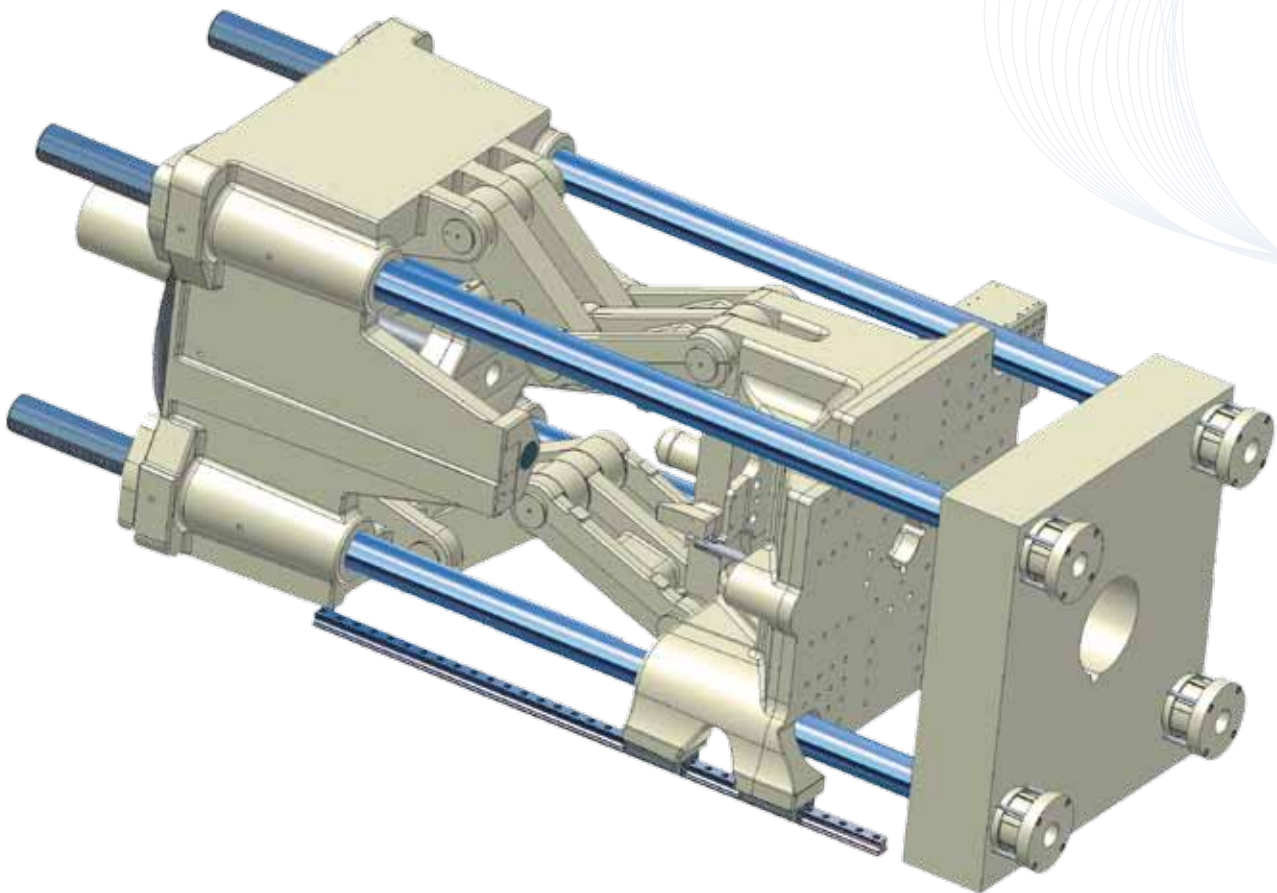
6



Clamping unit TM 180 t – 500 t

Outstanding features of the TM

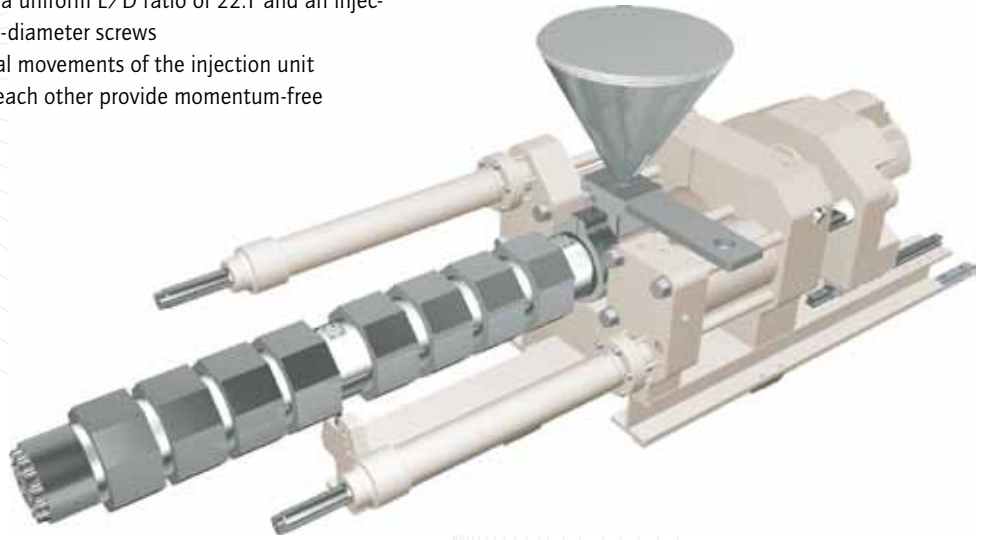
- short footprint
- extremely rigid, sturdy clamping plates and machine frame
- precise platen parallelism across the entire stroke
- low-maintenance linear guides to support the moving platen
- self-locking 5-point toggle system
- reinforced toggle bearings with low-maintenance toggle sleeves
- adhesive central oil lubrication of toggle system
- high opening and closing speeds thanks to differential gears
- short dry cycle times
- flexible parts removal in three directions
- high repeatability of all parameter settings
- sensitive mold safety device
- mold protection thanks to precise platen, parallelism, minimal platen deflection and linear guides
- low-maintenance and service-friendly design of all machine parts



Injection unit

A concept for improved parts quality

- optimized melt homogeneity thanks to a uniform L/D ratio of 22:1 and an injection pressure of 2000 bar with medium-diameter screws
- linear guide systems ensure precise axial movements of the injection unit
- carriage cylinders positioned opposite each other provide momentum-free nozzle carriage



Ultimate precision and repeatability

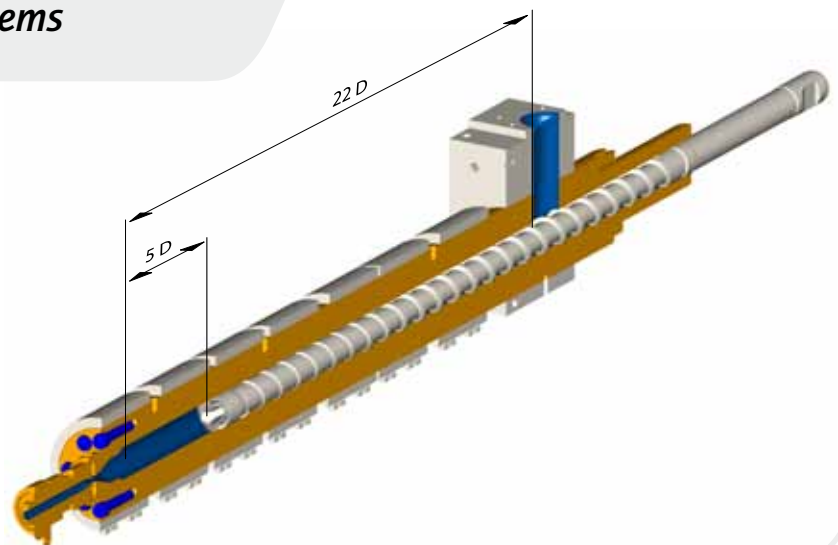
- compact design with integrated hydraulic block and easy access to all components
- direct screw drive via low-speed hydraulic motor with optimal adaptation to individual plasticizing demands
- ultimate repeatability thanks to controlled servo-valve

New injection units for more flexibility

- short footprint with two pulling cylinders
- high injection rates
- universal compatibility of barrels with different injection units
- The injection unit is also available in an electric version

High-Performance Plasticizing Systems

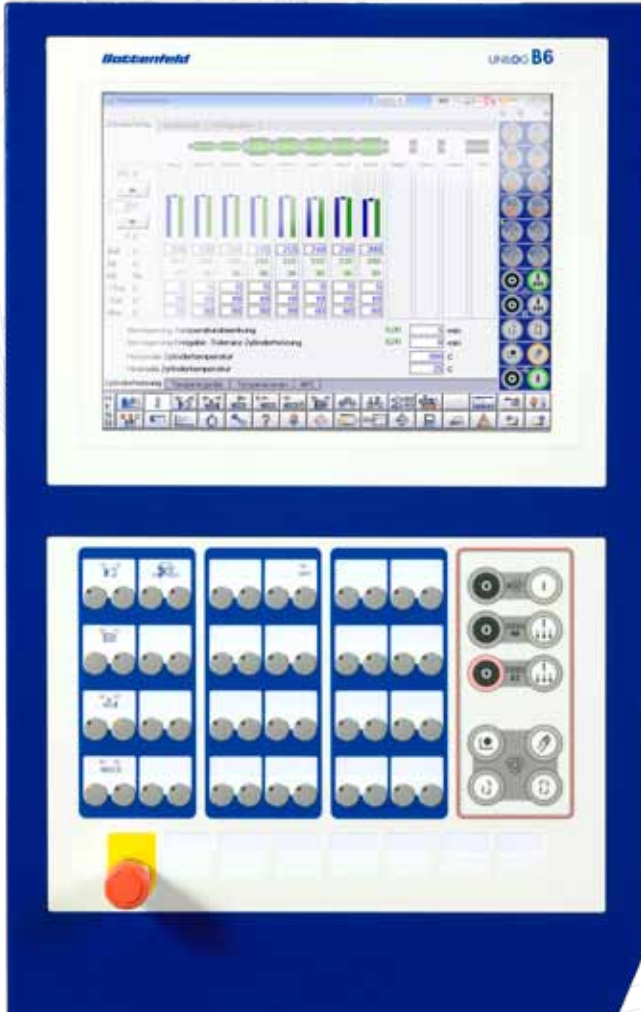
Plasticizing systems for injection molding machines must fulfill many different requirements. By applying a universal L/D ratio of 22:1 to the three screw sizes available for each injection unit, the processing window has been optimized to meet rising quality standards.



The UNILOG B6 control system generation

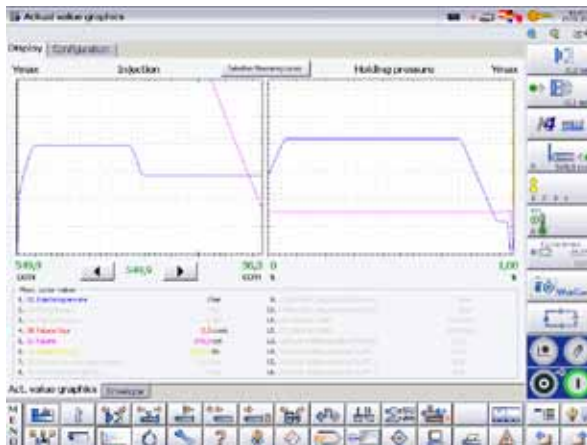
UNILOG B6 is the name of the new control system generation that is setting benchmarks in user-friendliness, speed and precision. It is used across the entire product portfolio. A powerful system concept optimally geared to the requirements of hydraulics / sensor technology ensures fast, accurate movements along all axes of the machine. Precise analysis of all important process parameters provides the user with the control required for demanding applications.

UNILOG B6^S



UNILOG B6^E

- 15" TFT color screen with unlimited touch screen functionality for operation and display.
- 2 rows of soft keys to select machine functions.
- Manual operating panel with 48 membrane keys to operate the machine's axes and optional equipment (as standard with B6^S control system, optional with B6^E)
- Space for 7 additional optional mechanical switches/keys.
- 10 membrane keys with luminous rings are available for the basic machine functions (drive, operation modes, heaters).
- The complete machine documentation including all operation manuals, spare parts drawings and parts lists can also be retrieved. In addition, users can integrate their own PDF files and make them available to machine operators.
- USB interfaces are available on the operating unit to connect peripheral equipment such as a printer, keyboard or USB stick, or they may be used as an access control system in combination with the integrated password system. An Ethernet interface is installed in the control cabinet at the rear.



Energy measurement

Clear visualization of energy consumption is possible with Unilog B6. Various modes of operation can be displayed as required in terms of cycle time or material consumption.

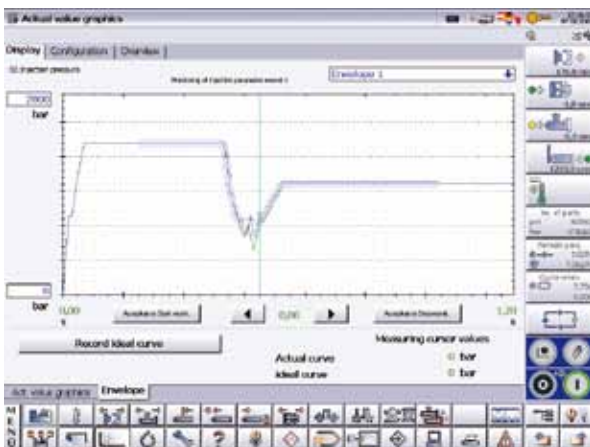
Consequently, the machine's energy- and cost-efficiency with regard to energy consumption can also be evaluated and calculated by means of accurate process analyses.

Included as standard with EcoPower machines, available as an option for other models.

Trend diagrams

Various functions can be clearly and concisely visualized. All data processing and monitoring functions are covered by a single control system.

Open interfaces facilitate access, simplify operation and integration in customers' networks.



Cycle time analysis

The purpose of cycle time analysis is to record and optimize all movements. It is a fast and simple method of defining the optimal cycle.

The ideal cycle is stored as part of the mold data set and can be retrieved for the next production run of the mold. This enables quick recognition and correction of any process deviations (as standard with B6^s control system, optional with B6^f).

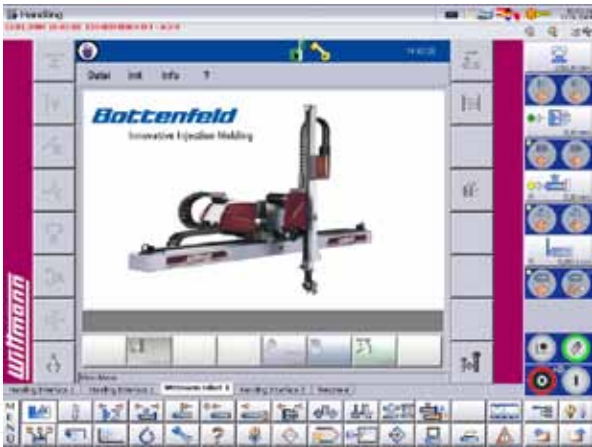
Quality monitoring

With up to four envelope curves, the monitoring parameters are optimally adapted to the individual process.

An ideal curve serves as monitoring reference within the tolerance margin. Whenever the tolerance margin is exceeded, an alarm is triggered and the faulty part automatically sorted out.

Every parameter can be visualized via the quality table and evaluated by means of an SPC chart.





Robot control

Wittmann robots are operated simply and flexibly via the machine's monitor screen, no switch-over is necessary between machine and robot control.

The total overview is given on one screen. The control system of the robot itself is still placed directly on the robot.

Communication takes place via a CAN bus system, the Euromap interface remains free.

Webcam

A webcam is integrated in the injection molding machine to visualize production monitoring. This makes it possible to display areas on the B6 control system that are normally not open to view, such as robot-assisted part deposition or the mold area.

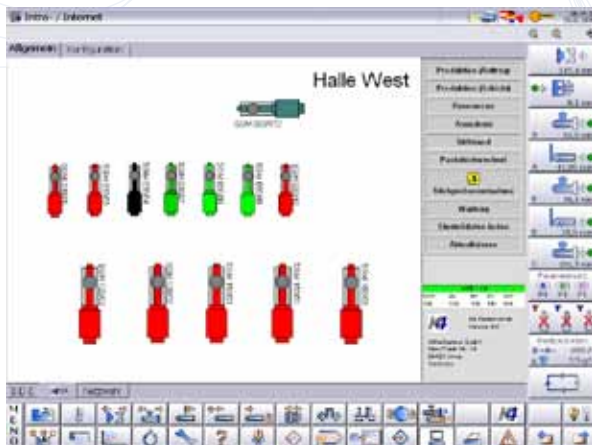
The integrated webcam is used in particular also for 24/7 web service. Intelligible pictures of the problem situation on site can be transmitted to our global support center to enable effective analysis.



Process data acquisition via K4

In cooperation with our partner Wille System GmbH we offer K4, a process data acquisition software that provides access to a central database. Centralized data administration runs on a server and is also directly integrated in the Unilog B6. Thus the plant's entire machinery can be monitored and all machine data accessed via every machine control system.

K4 provides a unique scope of functions. It not only offers machine parameter settings and quality assurance, but also maintenance records, preliminary and final costing, order-related staff work time logging and hall layout, as well as innumerable evaluation options including open item management, everything covered by and available from a single system.



Web-Service 24/7

WITTMANN BATTENFELD meets the plastics industry's demand for 24/7 availability with a global network of experts.

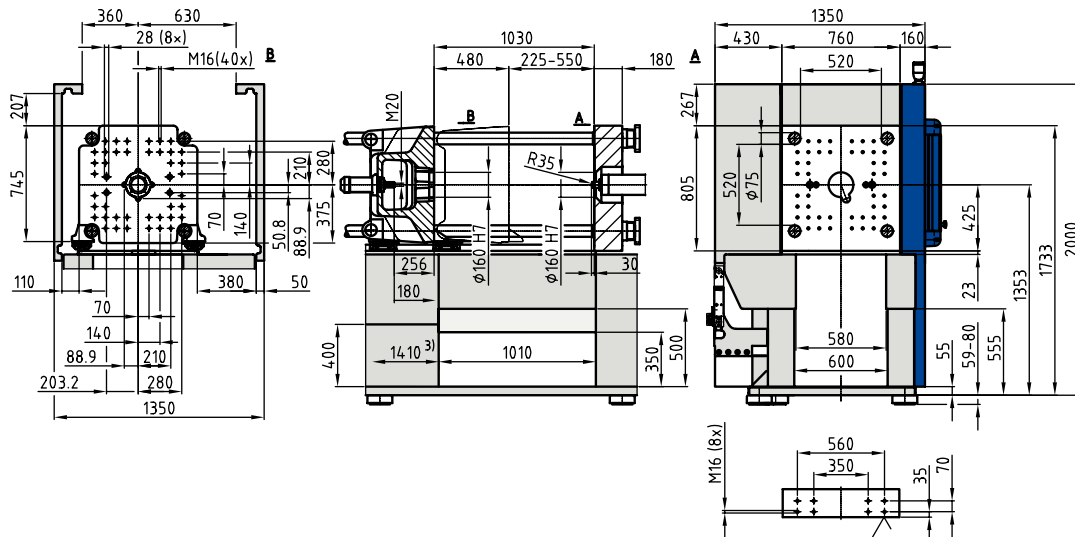
With the help of the web service center, experienced service engineers establish a direct link to the customer's injection molding machine via the Internet.

In this way, actual service tasks on the machines are performed quickly and flexibly, which ensures optimal productivity and conservation of value.



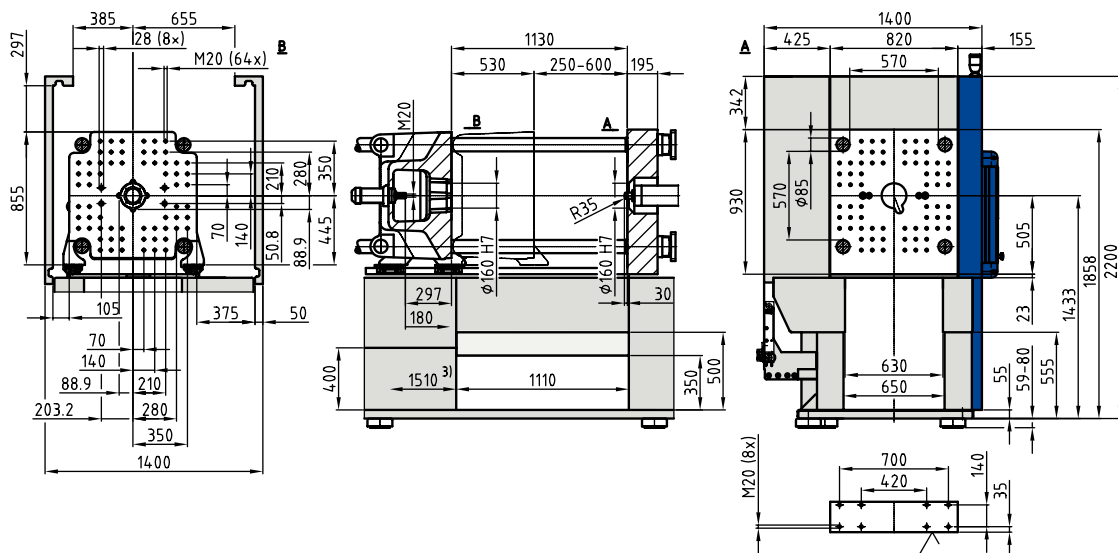
Clamping unit		TM 180/...								
Clamping force / locking force	kN	1,800								
Distance between tier-bars	mm x mm	520 x 520								
Mold height (min.)	mm	225 550								
Opening stroke	mm	480								
Maximum daylight	mm	1,030								
Ejector stroke/ejector force	mm/kN	180/41.2								
Dry cycle time ¹⁾	s-mm	1.8 - 364								
Injection unit		.../525			.../750			.../1000		
Screw diameter	mm	35	40	45	40	45	50	45	50	55
Screw stroke	mm	200			225			250		
Screw L/D ratio		22			22			22		
Theoretical shot volume	cm ³	193	251	318	283	358	442	398	491	594
Specific injection pressure	bar	2,743	2,100	1,659	2,678	2,116	1,714	2,490	2,016	1,666
Max. screw speed	min ⁻¹	378			291			190		
Max. plasticizing rate (PS) ²⁾	g/s	22.7	36.2	47.1	27.9	36.3	43.9	23.7	28.6	35.5
Max. screw torque	Nm	770			998			1,540		
Nozzle stroke/nozzle contact force	mm/kN	350/86			350/86			400/100		
Injection rate into air	cm ³ /s	121	158	200	124	157	194	134	165	200
Injection rate into air with twin-pump (option)	cm ³ /s	172	225	285	176	223	276	190	234	284
Injection rate into air with hydraulic accumulator (option)	cm ³ /s	287	375	475	376	476	588	478	590	714
Drive										
Drive power	kW	22			22			22		
Oil tank volume	l	350			350			350		
Electrical power supply without/with Europackage	kVA	43/72			46/75			47/76		
Weights, Dimensions										
Netweight (exclusive oil)	kg	6,300			6,400			7,100		
Length x width x height ³⁾	m	4.8 x 1.6 x 2.2			5.0 x 1.6 x 2.2			5.3 x 1.6 x 2.2		
Max. mold weight/min. mold diameter ⁴⁾	kg/mm	1,400/400			1,400/400			1,400/400		

1) according to Euromap 6 2) according to Battenfeld norm, higher plasticizing rates possible with twin-pump (option)
 3) max. length with middle screw diameter in back position and min. mould height 4) max. 2/3 on clamping platen



Clamping unit		TM 240/...								
Clamping force / locking force	kN	2,400								
Distance between tier-bars	mm x mm	570 x 570								
Mold height (min.)	mm	250 600								
Opening stroke	mm	530								
Maximum daylight	mm	1,130								
Ejector stroke/ejector force	mm/kN	180/41.2								
Dry cycle time ¹⁾	s-mm	2.1 - 399								
Injection unit		.../750			.../1000			.../1330		
Screw diameter	mm	40	45	50	45	50	55	50	55	65
Screw stroke	mm	225			250			275		
Screw L/D ratio		22			22			22		
Theoretical shot volume	cm ³	283	358	442	398	491	594	540	653	913
Specific injection pressure	bar	2,678	2,116	1,714	2,490	2,016	1,666	2,470	2,041	1,461
Max. screw speed	min ⁻¹	398			260			207		
Max. plasticizing rate (PS) ²⁾	g/s	38.1	49.6	60	32.4	39.2	48.5	31.2	38.7	46.2
Max. screw torque	Nm	998			1,540			1,940		
Nozzle stroke/nozzle contact force	mm/kN	350/86			400/100			400/100		
Injection rate into air	cm ³ /s	170	215	265	183	226	273	184	223	311
Injection rate into air with twin-pump (option)	cm ³ /s	222	281	347	239	296	357	241	292	407
Injection rate into air with hydraulic accumulator (option)	cm ³ /s	376	476	588	478	590	714	567	686	958
Drive										
Drive power	kW	30			30			30		
Oil tank volume	l	400			400			400		
Electrical power supply without/with Europackage	kVA	55/84			57/86			60/89		
Weights, Dimensions										
Netweight (exclusive oil)	kg	8,100			8,800			9,000		
Length x width x height ³⁾	m	5.2 x 1.6 x 2.4			5.5 x 1.6 x 2.4			5.6 x 1.6 x 2.4		
Max. mold weight/min. mold diameter ⁴⁾	kg/mm	1,800/500			1,800/500			1,800/500		

1) according to Euromap 6 2) according to Battenfeld norm, higher plasticizing rates possible with twin-pump (option)
 3) max. length with middle screw diameter in back position and min. mould height 4) max. 2/3 on clamping platen



Standard features TM UNILOG B6^E, B6^S

UNILOG B6^E

Hydraulic

Hydraulic unit with variable pressure and speed axial piston pump
Oil filtration by fine flow filter with electrical clogging indicator
Oil level indicator with alarm
Closed-loop oil temperature control with oil pre-heating
Oil temperature monitoring
Oil tank with connections for external oil filtration
Separate hand keys for core pulls
Hydraulic pressure displayed

Clamping unit

Clamping force adjustable via touchscreen incl. clamping-force-control
Closing and opening speed adjustable
Closing and opening force adjustable
Mould safety program
Moving platen supported by positioned linear guides
Platen drillings and register rings according to EUROMAP
Fixing holes for robot on top of the fixed platen according to EUROMAP/VDMA
Hydraulic mold close inhibit, electrically monitored on operator side
Central hydraulic multi-stroke ejector, adjustable
Flexible parts removal from 3 directions

Injection unit

Pump closed loop controlled
Screw L/D=22 with check valve, screw and barrel nitrated
Thermocouple failure monitor
Maximum temperature supervision
Plug-in ceramic heater bands
Temperature control of feed throat integrated
Open nozzle
Swiveling injection unit up to ... /1330 injection unit
Purge guard electrically monitored
Hopper of V2A stainless steel can be shut and emptied
Selectable barrel stand-by temperature
Physical units -bar, ccm, mm/s etc.
Screw protection
Linear bearings for the injection unit

Safety gate

Monitored safety gate, CE-confirmed
Maintenance-free safety gate locked by electromagnet
Safety gate free for mould change and handling by robot

Cooling and conditioning

Cooling-water flow controller with temperature gauges in return lines, 4-way, from 400 t 6-way
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Electrical components

Operating voltage 230/400 V-3Ph, 50 Hz
Common voltage supply <=TM 180 with 230/400 V
Software for operating hours counter
Closing/Opening - 5 profile steps
Ejection forward/back - 3 profile steps
Nozzle forward/back - 3 profile steps
Injection/Holding pressure - 10 profile steps
Screw speed/Back pressure - 6 profile steps
Purging program
Stroke zero offset settings
Start-up program
Adjustable injection pressure limitation
Switchover to holding pressure MASTER / SLAVE by injection time, screw stroke/injection volume and injection pressure
Self-teaching temperature controller
Display of temperature inside electrical cabinet
Seven-day timer
Access authorization via USB stick
Access protected via password system
Freely configurable status bar
Process setup
Physical, process-related units
15" TFT colour screen
Machine control via touch screen
Automatic dimming
Logbook with filter function
Hardcopy function
Internal data storage via USB connection or network
Online language selection
Online selection of imperial or metric units
Operator manual incl. hydr., mech. and el. schedules online
Time Monitoring
Quality table, 1.000 storage depth
Events protocol (logbook) for 1.000 events
Parts counter with good/bad part evaluation
Actual value graphics with 5 curves
1 Envelope curve monitoring
Injection Integral supervision
Metering Integral supervision
Alarm message via E-MAIL
USB - 1x at operating unit
1x Ethernet interface at the switch cabinet
Printing via USB connection or network
Paint RAL 9002 grey white / RAL 5002 ultramarine blue

UNILOG B6^S

Servo closed loop control
Manual board with foil buttons
User programming system „APS“
Cycle time analysis
4 freely configurable network connections
Freely configurable screen pages „User page“
Notepad function
Actual value graphics with 16 curves
Quality table, 10.000 storage depth
Events protocol (logbook) for 10.000 events
Trend diagram
SPC charts
4 Envelope curves monitorings
USB 2x at operating unit

Optional features TM UNILOG B6^E, B6^S

Caption: standard • | optional ◦ | not available –

Hydraulic	B6 ^E	B6 ^S
Hydr. accumulator for fast injection incl. loading pump and parallel ejector movement and core pull movement via double pump	–	◦
Extra large oil cooler	◦	◦
Core pull movement and parallel ejection with double pump	◦	◦
Core pull movement and parallel ejection incl. fast injection with double pump	◦	◦
Injection parallel to clamp force build-up	–	◦
Hydraulic core pulls. Limit switch function according to EUROMAP 13. Pressure and speeds adjustable	◦	◦
Pneumatic core pull	◦	◦
Pneumatic manifold for Mouldmaster nozzle (controlled 1 nozzle or more parallel in the mould)	◦	◦
Hydraulic manifold for Mouldmaster nozzle (controlling 1 nozzle or more parallel in the mould)	◦	◦
Filter in water inlet of oil cooler	◦	◦
Adapter with ball valve on the oil tank for oil maintenance	◦	◦
Separate bypass filtration unit	◦	◦
Clamping unit	B6 ^E	B6 ^S
Non-standard mould height after customers request	◦	◦
T-slots in mould platens	◦	◦
SPI bolt pattern	◦	◦
Ejector cross in clamping platen as per EUROMAP/SPI	◦	◦
Maximum ejector force increased	◦	◦
Mechanical ejector couple	◦	◦
Ejector platen safety device	◦	◦
Mechanical mould safety mechanism	◦	◦
Parts chute for separation of good/bad parts	◦	◦
Photoelectric ejection check	◦	◦
Air valve, action initiated (ON) and timer (OFF)	◦	◦
Manual or semiautomatic tiebar retract device	◦	◦
Quick mold clamping system magnet., hydr. or mech.	◦	◦
Injection unit	B6 ^E	B6 ^S
Servo closed loop controlled	◦	•
Grooves in the feeding zone	◦	◦
High torque screw motor in lieu of standard	◦	◦
High temperature heaterbands (max. 450°C)	◦	◦
Screw drive by a.c. servo-motor	–	◦
Ball type screw tip (from Ø 30)	◦	◦
Needle type shutoff nozzle with spring, pneumatic operated or hydraulic operated	◦	◦
Melt temperature- or pressure sensor in cylinder head	–	◦
Hydr. cross-bolt type shut-off nozzle (from injection unit 2250)	◦	◦
Open Airmould®-nozzle, pressure controlled	–	◦
Relief valve for nozzle pressure control (standard from 400t)	◦	◦
Wear resistant screw and barrel AK+	◦	◦
Barrel insulation	◦	◦
Screw with mixing section or barrier section	◦	◦
Hoppermagnet	◦	◦
Hopper loader UNIFEED A1 (till injection unit 1330)	◦	◦

Possible combinations of clamping units/injection units

Clamping unit							
t	525	750	1000	1330	2250	3400	5100
180	•	•	•				
240		•	•	•			
300			•	•	•		
400				•	•	•	
500					•	•	•

Safety gate	B6 ^E	B6 ^S
Operating safety gate at the rear side	◦	◦
Front side gate safety system for manual part removal	◦	◦
Pneumatic safety gate at the operator side	◦	◦
Initiate next cycle by closing safety gate in semi-auto operation	◦	◦
Safety gate clearance operator side/rear side extended	◦	◦
Safety gate rear side lowered at the top of the upper tiebar	◦	◦
Cooling and conditioning	B6 ^E	B6 ^S
Additional flow controller with temperature gauges	◦	◦
Shut-off valve for cooling water battery	◦	◦
Blow out valve for cooling water battery	◦	◦
Hosting of cooling circuits on the fix. platen for the moving platen	◦	◦
Electrical components	B6 ^E	B6 ^S
Temperature control zone for hot runner	◦	◦
Non-contact stroke transducers (standard from 400 t)	–	◦
Special voltage	◦	◦
Control cabinet cooler	◦	◦
Closed loop temperature control of platen and mould	◦	◦
Additional sockets	◦	◦
Fuse protection for sockets	◦	◦
Interface for handling equipment	◦	◦
Energy consumption analysis	–	◦
Switch over to holding pressure by cavity or melt pressure	–	◦
Switch over to holding pressure by external signal	–	◦
Purging program through the open mold	◦	◦
Melt cushion control	–	◦
Audible alarm	◦	◦
Analoge temperature control interface	◦	◦
Temperature control interface digital, serial 20mA TTY protocol	◦	◦
CAN-Bus-interface for mold conditioner as per EUROMAP 66-2	–	◦
CAN-Bus-interface for hot runner as per EUROMAP 66-2	–	◦
Interface for Airmould® mobile	–	◦
Adapter from EUROMAP 67 to EUROMAP 12	◦	◦
Interface for robots as per EUROMAP 67	◦	◦
Interface for conveyor belt	◦	◦
Scale interface	◦	◦
Host computer interface/PDA (EUROMAP 63)	–	◦
Relays contact parallel to plasticizing	◦	◦
Machine fault (potential-free contact)	◦	◦
BNC connectors for injection process analysis	◦	◦
Web- and remote service	–	◦
Interface fully integration of robot	◦	◦
Interface for vacuum pump	◦	◦
Second injection data setting for automatic start up	–	◦
Control button Wille system incl. Interface EUROMAP 63 - K4	◦	◦
Accessories	B6 ^E	B6 ^S
Special paint and/or Touch-up paint	◦	◦
Tool kit	◦	◦
Levelling pads	◦	◦
USB stick for data storage	◦	◦
Webcam	◦	◦



Technology working for you.

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