

EN

# OPTIMUM<sup>®</sup>

MASCHINEN - GERMANY

METAL WORKING MACHINERY

THE OPTIMUM IN TERMS OF QUALITY,

PRICE-PERFORMANCE AND SERVICE



MAIN CATALOGUE 2019

The OPTIMUM in terms of quality,  
price-performance and service



Sales and service Germany in Hallstadt/Bamberg

**Dear Customer,**

To support any conceivable metalworking application, we have composed an assortment in our OPTIMUM domain catalogue that covers many areas with suitable machines. Each of our products impresses with its quality, precision, long service life and value stability. OPTIMUM offers the right machine for most tasks - from bench-top drills to CNC lathes.

OPTIMUM has built up a good reputation in the course of the years on what is a continually changing and developing tool and machine market. We are proud to say that we combine expertise, experience and a balanced price-performance ratio. Our utmost priority is you as a satisfied customer. With our motivated and expert personnel we strive to complete OPTIMUM's know-how and propagate it to you our customers.

**Your requirements are our target**

For more than 25 years, we have focused on the design, development and production of OPTIMUM machines, and for more than 10 years on CNC machines. We work unceasingly on continually optimising our machines. One important point here is also production, which is of great importance to us. This is why we made a careful choice of manufacturers to supplement our own production facilities. We set great store by the fact that these manufacturers meet our internal quality requirements. Besides our own manufacturing operations, OPTIMUM exclusively relies on manufacturers who meet our requirements. This means that we can offer you metalworking machines that impress on many scores.



**Kilian Stürmer**  
Managing Directors



DISCOVER OUR PRODUCT VIDEOS NOW!

All of our product videos are available for you to watch on our YouTube channel **OPTIMUM Maschinen Germany GmbH**.  
Subscribe to our YouTube channel, to avoid missing any of the new videos.





sales service. And, of course, our expert staff is there to help you at any time. Please don't hesitate to contact our qualified team if you have any questions. We are happy to help.

machine and sheet metal working programme and are guaranteed to have the right machine variant for your needs in our assortment. You can rely on OPTIMUM, because we can realise every single one of your requirements in the metalworking environment. This main catalogue will give you an impression of our capabilities and our wide product portfolio.

[illegible]



All OPTIMUM products are produced under high quality requirements.



OPTIMUM plant in Yangzhou, China

## Production

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Since 2003, OPTIMUM Maschinen Germany GmbH has produced a large share of its metalworking machines in its own factory in Yangzhou China. The quality here is monitored by German quality management officers and production supervisors. A further major part of our OPTIMUM metalworking machines is exclusively produced for OPTIMUM in line with special requirements within the company group.



Production on our own CNC machines



Drilling machine assembly



## Quality

OPTIMUM products are produced under high quality requirements. A price comparison with equivalent and comparable products will give you the assurance that our OPTIMUM machines are always products that stand up to any comparison in terms of operating convenience, equipment level, quality, technology and value for money and are thus always a good buy. Check out the robust design and durability for yourself; this is what our machines stand for in a metalworking world.

You can purchase the OPTIMUM brand with confidence, and assure the best possible quality for your operations. There are many products that look identical, or similar, on the market, but which by no means achieve our OPTIMUM quality standards.



Lathe production



Metal-cutting band saw production



## German Quality – made in China



## Our production facilities

Optimum Maschinen Germany GmbH has commenced production in 2006 in Touqiao Town near Yangzhou in Jiangsu Province, only about three hours by car from Shanghai, on a total area of 20 000 square meters - a building floor space of 9 000 square meters with 180 employees, including 40 technicians.

Today, we produce our Optimum machine program in three production plants with a total area of 74 000 square meters and a building floor space of 30 000 m<sup>2</sup> with about 230 employees in production.

We permanently meet requirements for precision machining and economic efficiency.

We develop and configure the best solutions for our customers and take responsibility for them.

Our factories carry out strict technical process and quality controls Based on ISO 9001.

With a team of experienced experts and technicians and advanced production facilities, we produce quality products such as small and medium CNC machining centres, CNC lathes, CNC milling machines, milling and drilling machines and lathes for industrial and home use.



## DIN EN ISO 9001 Excellent quality

Our factory is DIN EN ISO 9001 certified. This means that all company departments and services are subject to strict quality requirements. And this means consistently high quality for you. The objective of high quality is thrilled customers. And it is this attitude that finally helps to achieve this

demanding certification. The key to the long-term success of our enterprise is also a relationship of trust with customers and suppliers. This explains why it is just as important to us as the sustainable quality of our products.







Our standards are high. And we strictly adhere to them

#### **Certified quality in our production facilities**

The excellence and safety of our products are assured by a system of internal processes, based on regular and frequent inspections in our factories and along the logistics chain. In order to ensure compliance with the strict requirements, each production site is regularly inspected.

Achieving our quality goals is an important management task



At Optimum, development and production are in the same hands, and the company sets high standards in all areas.

This is why our customers get what they expect from Optimum: innovative, well thought-out products with high practical suitability and an exceptionally long service life.



## Quality control



Our company has developed a carefully planned quality management system and is certified according to ISO 9001:2008.

This system is an integral part of our operations and no exceptions or compromises are made or entered into with regard to the quality level of the products from production. Our Quality Assurance department is staffed by skilled employees who ensure that only products of impeccable quality are sold

## Quality Assurance department

The Quality Assurance department consists of experienced technicians who are supervised by our German technicians, and attach great importance to high quality and impeccable product quality.

Each production step is checked and compared at all times with the available specifications



## We want satisfied customers



This explains why our products' compliance with the customer quality requirements described earlier on is our company's top priority.



## Production support

**Our Engineering department has a well-coordinated team of specialists with excellent engineering qualifications. Their established expertise allows flexible and creative implementation of all requirements posed for our products and services.**

A team of employees directly influences the production process on site through regular training and checks. It is only through this intensive support at the production site that we are in a position to achieve the proverbial OPTIMUM.







## Quality management Production Outbound goods inspection

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In addition to adherence to delivery deadlines and service, the quality of our products is extremely important to us. Continuous on-site checks by our quality manager ensure our quality. Our comprehensive incoming goods inspection is performed in line with generally accepted technical guidelines.



## Quality management Incoming goods inspection

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Our quality managers from Germany are our first contacts for quality compliance on site. They are responsible for the dimensional accuracy of the components, for monitoring and quality assurance of the manufacturing process; they collaborate closely with our Engineering department at head office in Germany, thus ensuring an optimal symbiosis.



## Planning

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As early as the planning phase our engineering department manages the development of new products, which are manufactured both at our facility and at facilities operated by our partners. Major benefits: this ensures that market factors and customer requirements are immediately adopted into our workflow, setting the stage for a successful product design.



## Development

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Development relies exclusively on state-of-the-art 3D CAD software, which we use to create a virtual model of the machine. Besides ensuring optimum functionality of the machines, our development process also targets re-usability of the data generated during the development phase. These data are not only used for devising production documents and manuals, but are also used for computations, for computer-aided manufacturing, and for visualisation and animations.



## Practical testing

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Our engineers combine theory and practice. To avoid leaving anything to chance in terms of product satisfaction, all of our machines and tools go through application engineering tests, and we also consistently involve selected customers in this process. This means that each new product is expected to prove itself in the daily grind before it comes as a fixed part of our product range. Engineering analysis helps us to discover and eliminate any remaining weak points.



The clearly engineering oriented approach of our staff – in addition to the premium quality of our products, and our expert service – contribute towards constantly high levels of customer satisfaction. And our focus on technically affine employees ensures our market success – today and looking forward!



## Technical customer support

Our customers rightly expect our specialists to use their knowledge and experience to their utmost satisfaction. Our product consultants support users with technical information. To allow this to happen, our customers can use our free telephone hotline and our info email address to request qualified information and solutions at short notice.



## Safeguarding copyrights

To secure the rewards of our technical development work for both ourselves and our customers, patent and utility model protection is essential for our in-house developments. This helps us permanently keep the technical lead that OPTIMUM products have. The entire catalogue is protected by copyright. Additionally, to protect our products, we register our rights to our brands, patents and designs where possible in each individual case. We take strong action against any violation of our intellectual property.



## Technical documentation and risk analyses

Our technical authors again achieve a high standardised level that meets or even exceeds all requirements. These huge efforts exclusively serve the purpose of facilitating the process of familiarisation with the machine for our customers, and ensuring permanent and safe operations. Risk mitigation measures are developed to compensate for any safety risks identified in the scope of analysis. Following this, the residual risk is evaluated after implementing the measures.



## Supplier management

Regular work meetings between our engineers and suppliers help to transfer our new developments and enhancements into series production at the manufacturing location in a targeted way. This direct support at our production facilities has been indispensable in manufacturing the quality products that our customers have trusted for more than 25 years.



## Sales support

The requirements for OPTIMUM machines are equally as diverse as the production requirements of our end customers and the workpieces to be machined. To ensure this, our representatives and retailers have access to the entire application-specific know-how of our engineers in case of queries.

In a qualified and explanatory sales talk, our customers are given the support they need to tune their choice of products to match their needs.



## Training

For employees from Engineering, Service and Sales as well as for our customers: Successful use of our products depends and is driven to a decisive extent by the fact that we pass on our technology know-how to our dealers, their sales and service staff and our customers through training sessions. The major benefits: this qualification offers the ability to ensure professionally founded consultancy and problem solving in all dealings with the customer. At our training centre, we offer practically-oriented product training that aim to disseminate professional knowledge in a highly intuitive way.





## Supply of spare parts

We know that rapid availability of spare parts is one of the major pre-conditions for a working, customer-oriented service solution. The planning, coordination and provisioning of spare parts is tuned at OPTIMUM Maschinen Germany GmbH so that our customers have the greatest possible benefits in terms of economic efficiency and speed.



## Siemens cooperation partner for CNC training

Siemens has for many years been the system supplier of the control and drive technology for CNC-controlled lathes and milling machines by OPTIMUM Maschinen Germany GmbH. Due to our long-standing and successful collaboration, a cooperation partnership for CNC training in Bavaria was agreed in June 2012. Target-group specific courses familiarise the participants of the training program with the various Sinumerik controls.



## Service support

...after all, good service is important to us!

In service cases, our OPTIMUM technicians are available at any time with their experience to support your workshop operations and ensure fast and targeted repairs.

In close cooperation with the service centre and its internal and external staff, weaknesses are analysed and customer needs registered. These weaknesses and needs are then evaluated from an engineering point of view and set out as tangible requirements or action catalogues.

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# MILLING MACHINES



## Machines with cast iron stands

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## Bench-top model

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## Entry-level class

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## Tool milling machines with digital 3-axis position display DP 700 by NEWALL

**TOP QUALITY**

### Facts that impress in terms of quality, performance and price

- ▶ Versatile range of applications
- ▶ Excellent damping characteristics and stability of machine chassis
- ▶ All guides tempered, precision ground, and adjustable using cleats
- ▶ X and Y axis with adjustable dovetail guide
- ▶ Automatic feed on X, Y and Z axis, continuously adjustable
- ▶ All axes with ball screws
- ▶ Central and clearly arranged control panel with integrated digital position and speed display
- ▶ Solid Cross table, generously dimensioned with precision surface finish and 5 T-slots
- ▶ Coolant system

- ▶ Control panel swivels centrally for a clear-cut overview
- ▶ Generously dimensioned hand wheels with scales
- ▶ Machine lamp
- ▶ Smooth action

### MZ 2:

- ▶ Manual centralised lubrication system

### MZ 4:

- ▶ Automatic centralised lubrication

### Control Cabinet



- › External
- › Generously dimensioned
- › 24-V electrical system

### Cross table housing

- › Supplied pre-assembled on the machine
- › Protection against chips and coolant
- › Folds away to allow optimal access to the workspace



Fig.: MZ4



### OPTI Control panel

- › Integrated switch panel
- › Integrated **digital position display DPA 700**

Fig.: MZ 4 Figure shows machine without housing

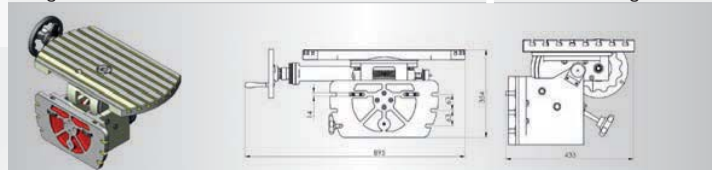




## Technical data and accessories

Model	MZ 2	MZ 4
Article no.	3346220	3346240
Technical specifications		
Electrical connection	400 V / 3 Ph ~50 Hz	
Total rated value	4 kW	5.4 kW
Drive motor	2.2 kW	3.75 kW
Motor rapid motion/feed	0.375 kW	0.75 kW
Coolant pump motor	95 W	
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 30 mm	Ø 32 mm
Continuous drilling performance in steel (S235JR)	Ø 26 mm	Ø 28 mm
Max. sensor head size	Ø 100 mm	Ø 100 mm
Max. shaft milling cutter size	Ø 25 mm	Ø 25 mm
Spindle drive		
Spindle speeds	50 - 1 890 rpm	30 - 2 250 rpm
Speeds	12 speeds	18 speeds
Spindle seat	ISO 40 DIN 2080	
Vertical		
Spindle sleeve stroke	120 mm	
Draw-in rod	M16	
Throat	max. 100 mm	max. 185 mm
Vertical rotation area	± 90°	
Clearance vertical spindle to cross table	75 - 410 mm	130 - 390 mm
Vertical Length x width	830 x 250 mm	1 200 x 250 mm
Max. load bearing capacity	385 kg	500 kg
T-slot size / spacing / count	14 mm / 63 mm / 2	14 mm / 63 mm / 3
Horizontal		
Clearance horizontal spindle to cross table	70 - 400 mm	130 - 390 mm
Horizontal Length x width	750 x 320 mm	900 x 500 mm
Max. load bearing capacity	385 kg	500 kg
T-slot size / spacing / count	14 mm / 63 mm / 5	14 mm / 63 mm / 7
Stroke during feed		
X axis (Cross table)	manual 400 mm / automatic 360 mm	manual 600 mm / automatic 560 mm
Y axis (milling head)	manual 200 mm / automatic 160 mm	manual 480 mm / automatic 440 mm
Z axis (Cross table)	manual 335 mm / automatic 295 mm	manual 385 mm / automatic 345 mm
Drive speed feed/rapid motion	50 - 450 rpm / 700 rpm	50 - 450 rpm / 800 rpm
Feed speed	10 / 600 mm/min.	10 / 600 mm/min.
Dimensions		
Length x width x height	1 239 x 1 168 x 1 900 mm	1 610 x 1 825 x 1 885 mm
Weight	1 180 kg	1 450 kg

<b>Angled table</b>	3346221
Table length x width/load bearing capacity max.	375 x 660 mm / 150 kg
T-Slot size / no / distance	12 mm / 8 / 45 mm
Dimensions	895 x 433 x 354 mm
Weight	140 kg



<b>Accessories</b>	Article no.
Collet chuck ISO 40/ER32	3352056
Hydraulic clamping device DIN69871* ex works only	3346226
Compressed air tool changer Can only be ordered ex works	3346225
Assortment of clamping tools size 12, 58 parts	3352017
» More accessories for milling machines from page 126	

### Scope of supply

- » 4 x arbour ISO 40 with counter-bearing
- 16 mm external diameter
- 22 mm external diameter
- 27 mm external diameter
- 32 mm external diameter
- » Adapter ISO40 - MK3
- » MT 2 collet
- » MT 1 collet
- » Operating tool



<b>Vices</b>	Article no.
MVSP 150 x 200	3530104
MVSP 150 x 300	3530108
» Infomation about vices from page 120	

\* Important information „Operation of machines with frequency co“Operation of machines with frequency converters“ on page 253  
The milling machines (frequency inverters) comply with standard DIN EN 55011:2011-04 class C3

## Multifunctional drilling/milling machine with tool clamping system for professional deployment. With digital 3-axis position display DPA 2000

### Facts that impress in terms of quality, performance and price

- ▶ Heavy, solid design using premium cast meehanite
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ 20 switchable speeds thanks to two-speed motor in combination with 5 belt stages and reduction gearbox
- ▶ Sturdy, square guide rails on Y and Z axis
- ▶ Solid Cross table, generously dimensioned with precision surface finish
- ▶ All axes adjustable in guides using cleats
- ▶ Detachable cross table housing for protection against chips and coolant
- ▶ Excellent concentricity thanks to tapered roller bearings, better than 0.01 mm measured in the spindle sleeve
- ▶ Coolant system
- ▶ Adjustable drilling depth stop with millimetre scale, can be read off on front
- ▶ LED machine lamp
- ▶ Chip tray
- ▶ Siemens electric
- ▶ Right-handed/left-handed rotation for thread tapping

### Compressed air tool clamping system

- › Short change times
- › Low eight thanks to optimised structure
- › Precise guiding thanks to optimised geometry
- › Lowest air consumption

### Horizontal milling position



- › with arrester and collet for disc milling cutter
- › Adjustable plain bearing



Fig.: MT 8 with horizontal and vertical milling position





## Technical data and accessories

Model	MT 8
Article no.	3336088
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	7.2 kW
Vertical spindle drive motor	5.5 kW
Horizontal spindle drive motor	4 kW
Coolant pump motor	90 W
Total rated value for compressed air	min. 6 bar
<b>Drilling/milling output</b>	
Drilling performance in steel (S235JR)	Ø 30 mm
Continuous drilling performance in steel (S235JR)	Ø 21 mm
Max. sensor head size	Ø 80 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Vertical spindle</b>	
Spindle sleeve stroke	140 mm
Spindle sleeve feed	3 speeds: 0.086 - 0.142 mm
Spindle seat	ISO 40 DIN 2080
Spindle speeds	60 - 4 660 rpm
Speeds	20 speeds
Milling head tilt angle	± 45°
<b>Horizontal spindle</b>	
Spindle seat	ISO 50 DIN 2080
Spindle speeds	58 - 1 800 rpm
Speeds	12 speeds
<b>Cross table</b>	
Clearance spindle to table	155 - 610 mm
Length x width	1 320 x 360 mm
Table feed (9 speeds)	15 / 370 mm/min.
T-Slot size / no / distance	18 mm / 3 / 80 mm
Max. load bearing capacity	350 kg
<b>X axis</b>	
Travel	manual 980 mm / automatic 900 mm
Table feed	15 / 370 mm/min.
<b>Y axis</b>	
Travel	manual 300 mm / automatic 220 mm
Table feed	15 / 370 mm/min.
Y boom swivel range	± 30°
<b>Z axis</b>	
Travel	manual 450 mm / automatic 370 mm
<b>Dimensions</b>	
Length x width x height	2 220 x 2 060 x 2 550 mm
Weight	2 500 kg

### Scope of supply

- › Quick clamping drill chuck Ø 1 - 16 mm / B18
- › Adapter 7:24 ISO 50 - MT 3
- › Adapter 7:24 ISO 50 - MT 2
- › Arbor for drill chuck 7:24 ISO 40 / B18
- › 1 each cutter spindle horizontal milling Ø27/Ø32 mm
- › Milling chuck set Ø 4 - Ø 16 mm
- › Operating tool

Accessories	Article no.
<b>Assortment of clamping tools</b> size 16, 58-parts	3352017
<b>Collet chuck set</b> 18-part ISO 40	3352056
<b>Collet chuck set</b> 18-part ISO 50	3352065
<b>Precision machine shoe</b> SEU1 (4 pcs. required) see page 132	3352985
<b>Blank holder</b> set of 2 18 mm/M16	3352032
<b>Morse cone</b> ISO50 B18 DIN2080	3352067
<b>Milling head holder</b> SK 50	3352066
<b>Arbor</b> for drill chuck ISO 40 / B16	3352070
<b>Copying and facing blade head</b> ISO 40 DIN 2080	3350216
<b>Precision bore head set</b> ISO 40	3352128
<b>Precision bore head set</b> ISO 50	3352129
› <b>More accessories for milling machines</b> from page 126	

Machine vices	Article no.
<b>FMS 200</b>	3354200
<b>HMS 150</b>	3355150
<b>FMSN 150</b>	3354130
<b>VMQ 150</b>	3354183
<b>MV3-75</b>	3354175
<b>MV3-125</b>	3354178
<b>ZAS 50</b>	3354170
<b>DAS 100</b>	3355500
<b>HCV 105</b>	3536210
<b>HCV 125</b>	3536214
› Information about vices from page 120	

## Versatility and easy retooling

the universal milling machine for workshops with digital 3-axis position display

### Facts that impress in terms of quality, performance and price

- ▶ Versatile range of applications
- ▶ Rugged machine construction
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ Heavy, solid design using premium cast meehanite
- ▶ All guides tempered and adjustable using cleats
- ▶ Central lubrication
- ▶ Generously dimensioned hand wheels with scales
- ▶ LED machine lamp
- ▶ Coolant system
- ▶ Easy operation of the switching elements
- ▶ Rugged, rectangular guide rails on Y and Z axis
- ▶ Table feed X, Y and Z axis automatic

- ▶ Digital position display DPA 21
- ▶ Feed system controllable by servomotor in fixed steps
- ▶ Decoupled hand wheels
- ▶ Solid and generously dimensioned cross table with precision surface finish including adjustable cleats and end stops
- ▶ Horizontal milling position
- ▶ Horizontal milling counterholder, attached to rear of machine for easy access
- ▶ Milling head with two axes of rotation, thus pivots and rotates to any spatial angle

### OPTI Control panel

- > Integrated switch panel
- > Integrated digital position display
- > Rotates about its own axis

### Horizontal milling position



- ▶ For work in horizontal milling position with arrester and collet for disc milling cutter
- ▶ Adjustable plain bearing

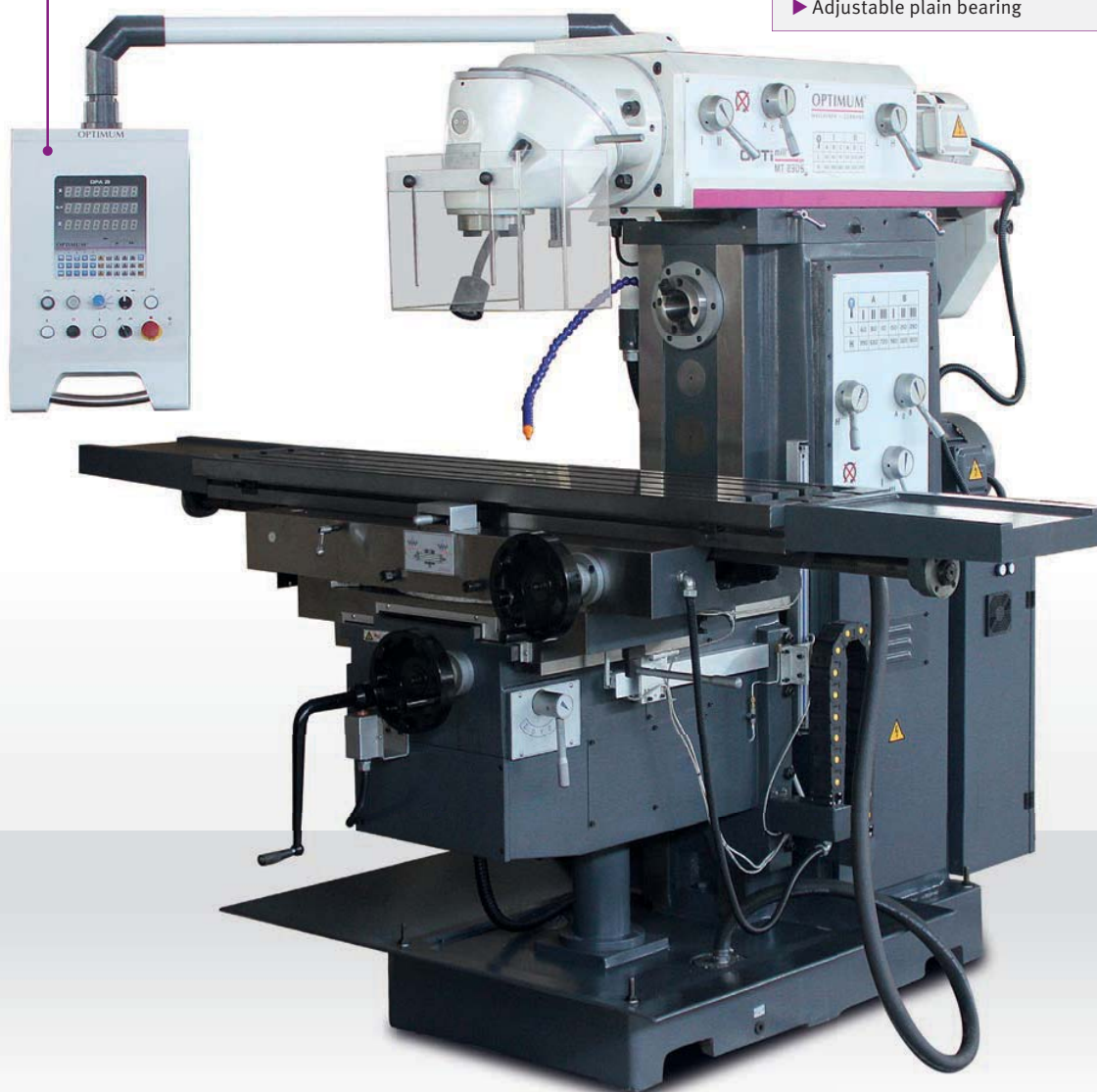


Fig.: MT 230S

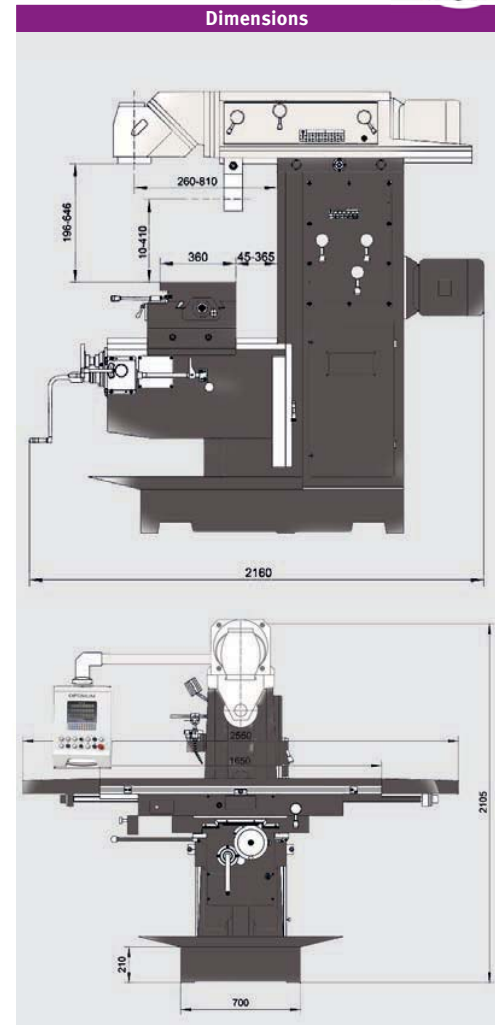




## Technical specifications, accessories and dimensions

Model	MT 230S
Article no.	3344125
<b>Technical specifications</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	12 kW
Vertical drive motor	4 kW
Horizontal drive motor	5.5 kW
Coolant pump output	90 Watts
<b>Milling capacity</b>	
Max. sensor head size	Ø 160 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Spindle</b>	
Spindle seat	ISO 50 DIN 2080
<b>Vertical</b>	
Draw-in rod	M24
Spindle speeds	60 - 1 750 rpm
Speeds	12 speeds
Clearance spindle to cross table	190 - 590 mm
Distance spindle to column	260 - 910 mm
Milling head tilt angle	360°
<b>Horizontal</b>	
Clearance spindle to cross table	20 - 420 mm
Spindle speeds	60 - 1 800 rpm
Speeds	12 speeds
<b>Cross table</b>	
Length x width	1 600 x 360 mm
Max. load bearing capacity	400 kg
T-Slot size / no / distance	18 mm / 3 / 80 mm
Rotating	35°
<b>X axis</b>	
Travel	manual 1 300 mm / automatic 1 220 mm
Table feed automatic	30 - 750 mm/min.
Table feed rapid motion	1 200 mm/min
<b>Y axis</b>	
Cross table stroke	manual 300 mm / automatic 220 mm
Table feed automatic	20 - 500 mm/min.
Table feed rapid motion	800 mm/min
<b>Z axis</b>	
Travel	manual 400 mm / automatic 320 mm
Table feed automatic	15 - 375 mm/min.
Table feed rapid motion	600 mm/min
<b>Dimensions</b>	
Length x width x height	2 520 x 2 160 x 2 030 mm
Overall weight	2 800 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Assortment of clamping tools size 16, 58-parts	3352017
Collet chuck set ISO 50/ER32	3352065
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Blank holder set of 2 18 mm/M16	3352032
Morse cone ISO50 B18 DIN2080	3352067
Precision bore head set ISO 50	3352129
› <b>More Accessories</b> from page 126	



### Scope of supply

- › Cutter spindle horizontal milling ISO 50 Ø 22 mm
- › Cutter spindle horizontal milling ISO 50 Ø 27 mm
- › Milling head holder ISO 50 Ø 40 mm
- › Adapter ISO 50 ( 7:24 ) / MK4
- › Collet chuck ISO 50 Ø 4 - Ø 16 mm
- › Horizontal and vertical tie rod M24
- › Spring collets Ø 4 - Ø 26 mm
- › Operating tool

Machine vices	Article no.
FMS 200	3354200
HMS 125	3355127
MV3-75	3354175
MV3-125	3354178
ZAS 50	3354170
DAS 100	3355500
HCV 105	3536210
HCV 125	3536214
› Information about vices from page 120	

## Versatility and easy retooling

the universal milling machine for workshops with digital 3-axis position display

### Facts that impress in terms of quality, performance and price

- ▶ Versatile range of applications
- ▶ Heavy, solid design using premium cast meehanite
- ▶ Vertical and horizontal milling position
- ▶ Rugged machine construction
- ▶ Milling head pivots and rotates to any spatial angle
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ Milling head with two axes of rotation, thus pivots and rotates to any spatial angle
- ▶ Counterholder for horizontal milling attached to rear for easy access
- ▶ All guides tempered and adjustable using cleats
- ▶ Central lubrication
- ▶ Generously dimensioned, decoupled hand wheels with scales
- ▶ LED machine lamp
- ▶ Coolant system
- ▶ Easy operation of the switching elements
- ▶ Sturdy, square guide rails on Y and Z axis
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots
- ▶ Table feed X, Y and Z axis
- ▶ Digital position display DPA 2000
- ▶ Feed motor with fixed speeds

### Horizontal milling position



- > with arrester and collet for disc milling cutter
- > Adjustable plain bearing

### OPTi Control panel

- > Integrated switch panel
- > Integrated digital position display
- > Rotates about its own axis



Fig.: MT 200

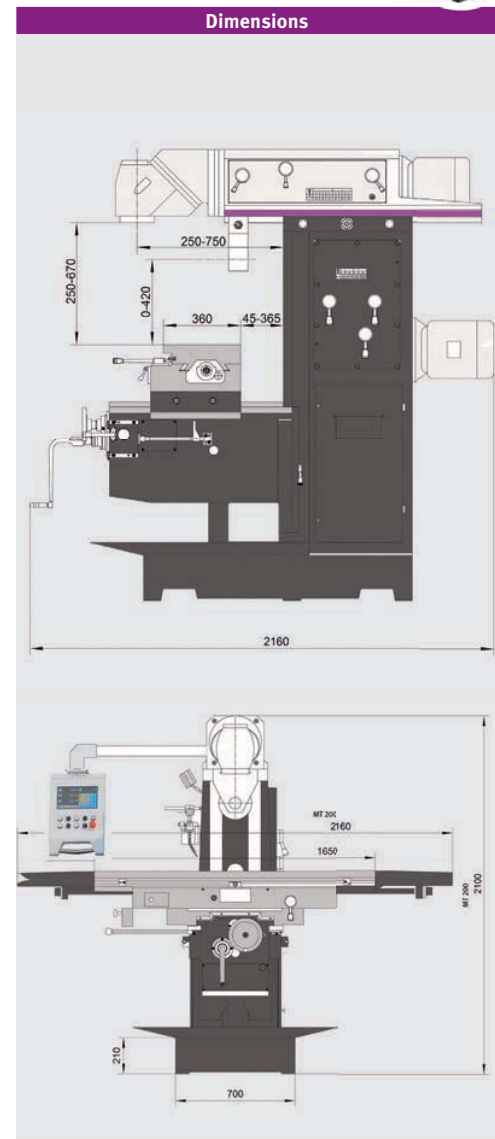


## Technical specifications, accessories and dimensions

Model	MT 200
Article no.	3336120
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	9.2 kW
Horizontal and vertical drive motor	4 kW
Feed motor output	1.1 kW
Coolant pump motor	90 Watts
<b>Milling capacity</b>	
Max. sensor head size	Ø 100 mm
Max. shaft milling cutter size	Ø 20 mm
<b>Spindle</b>	
Horizontal and vertical spindle seat	ISO 50 DIN 2080
<b>Vertical</b>	
Draw-in rod	M24
Clearance spindle to cross table	250 - 670 mm
Distance spindle to column	250 - 750 mm
Spindle speeds	60 - 1 750 rpm
Speeds	12 speeds
Milling head tilt angle	360°
<b>Horizontal</b>	
Clearance spindle to cross table	0 - 420 mm
Spindle speeds	58 - 1 800 rpm
Speeds	12 speeds
<b>Cross table</b>	
Length x width	1 650 x 360 mm
Max. load bearing capacity	450 kg
T-Slot size / distance / no	14 mm / 95 mm / 3
Rotating	35°
<b>X axis</b>	
Travel	manual 1 209 mm / automatic 1 210 mm
Table feed automatic	22 - 380 mm/min.
Table feed, stages	8 speeds
Table feed rapid motion	1 290 mm/min.
<b>Y axis</b>	
Cross table stroke	manual 280 mm / automatic 200 mm
Table feed automatic	20 - 380 mm/min.
Table feed, stages	8 speeds
Table feed rapid motion	200 mm/min
<b>Z axis</b>	
Travel	manual 400 mm / automatic 320 mm
Table feed automatic	7 - 127 mm/min.
Table feed, stages	8 speeds
Table feed rapid motion	342 mm/min.
<b>Dimensions</b>	
Length x width x height	1 920 x 2 350 x 2 200 mm
Weight	2 220 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Assortment of clamping tools size 12, 58-parts	3352017
Blank holder set of 2 14 mm/M12	3352031
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Morse cone ISO50 B18 DIN2080	3352067
› More accessories for milling machines from page 126	

\* Important information on transport surcharge and lump sum see page 251



### Scope of supply

- › Cutter spindle horizontal milling ISO 50 Ø 22 mm
- › Cutter spindle horizontal milling ISO 50 Ø 27 mm
- › Milling head holder ISO 50 Ø 32 mm
- › Collet chuck ISO 50 Ø 4 - Ø 26 mm
- › Operating tool

Machine vices	Article no.
FMS 200	3354200
HMS 125	3355127
MV3-75	3354175
MV3-125	3354178
ZAS 50	3354170
DAS 100	3355500
HCV 105	3536210
HCV 125	3536214
› Information about vices from page 120	



## Versatile and easy retooling.

The universal milling machine for workshops

### Facts that impress in terms of quality, performance and price

- ▶ Versatile range of applications
- ▶ Heavy, solid design using premium cast meehanite
- ▶ Vertical and horizontal milling position
- ▶ Rugged machine construction
- ▶ Milling head pivots and rotates to any spatial angle
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ All guides tempered and adjustable using cleats
- ▶ Central lubrication
- ▶ Generously dimensioned, decoupled hand wheels with scales
- ▶ LED machine lamp
- ▶ Coolant system
- ▶ Easy operation of the switching elements
- ▶ Sturdy, square guide rails on Y and Z axis
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots
- ▶ Digital position display DPA 21
- ▶ Feed system controllable by servomotor in fixed steps
- ▶ Table feed X, Y and Z axis

#### Horizontal milling position



- › with arrester and collet for disc milling cutter
- › Adjustable plain bearing

#### OPTi Control panel

- › Integrated switch panel
- › Integrated digital position display
- › Rotates about its own axis



Fig.: MT 130S

## Technical specifications, accessories and dimensions

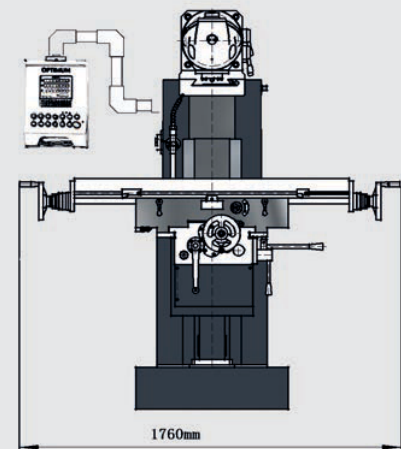
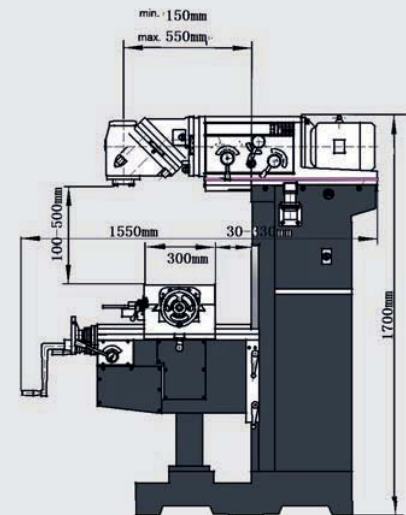
Model	MT 130S
Article no.	3344110
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	6 kW
Drive motor	3 kW
Feed motor output	3 kW
Coolant pump motor	60 Watt
<b>Milling capacity</b>	
Max. sensor head size	Ø 100 mm
Max. shaft milling cutter size	Ø 100 mm
<b>Vertical</b>	
Spindle seat	ISO 40 DIN 2080
Draw-in rod	M16
Clearance spindle to cross table	196 - 646 mm
Spindle speeds	45 - 1 660 rpm
Speeds	11 speeds
Throat	150 - 550 mm
Milling head tilt angle	360°
<b>Cross table</b>	
Length x width	1 270 x 300 mm
Max. load bearing capacity	200 kg
T-slot size / spacing / count	14 mm / 80 mm / 3
<b>X axis</b>	
Cross table stroke	manual 720 mm / automatic 650 mm
Table feed automatic	30 - 830 mm/min.
Rapid traverse	1 335 mm/min
<b>Y axis</b>	
Cross table stroke	manual 300 mm / automatic 220 mm
Table feed	30 - 830 mm/min.
Rapid traverse	1 335 mm/min
<b>Z axis</b>	
Cross table stroke	manual 400 mm / automatic 320 mm
Table feed	23 - 625 mm/min.
Rapid traverse	1 335 mm/min
<b>Dimensions</b>	
Length x width x height	1 760 x 1 550 x 1 700 mm
Weight	1 450 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Assortment of clamping tools size 12, 58 parts	3352017
Blank holder set of 2 14 mm/M12	3352031
End mill set HSS 12-part	3352250
End mill set HSS 20-part	3352255
Precision machine shoe SEU1	3352985
(4 pcs. required) see page 132	
Arbor for drill chuck ISO 40/B16	3352070
Collet chuck set 18-part ISO40	3352056
› More accessories for milling machines from page 126	

\*\* Important information „Operation of machines with frequency converters“ on page 253  
The milling machines (frequency inverters) comply with standard DIN EN 55011:2011-04 class C2



### Dimensions



### Scope of supply

- › ISO 40 taper shank with arrester for horizontal milling
- › Cutter arbour Ø 32 mm
- › Operating tool

Machine vices	Article no.
HMS 125	3355127
FMS 150	3354150
FMSN 150	3354130
VMQ 150	3354183
MV3-75	3354175
MV3-125	3354178
DAS 100	3355500
HCV 105	3356210

› Information about vices from page 120

## Versatile and easy retooling.

The universal milling machine for workshops

### Facts that impress in terms of quality, performance and price

- ▶ Versatile range of applications
- ▶ Heavy, solid design using premium cast meehanite
- ▶ Vertical and horizontal milling position
- ▶ Rugged machine construction
- ▶ Milling head pivots and rotates to any spatial angle
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ All guides tempered and adjustable using cleats
- ▶ Central lubrication
- ▶ Generously dimensioned, decoupled hand wheels with scales
- ▶ LED machine lamp
- ▶ Coolant system
- ▶ Easy operation of the switching elements
- ▶ Sturdy, square guide rails on Y and Z axis
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots
- ▶ Digital position display DPA 2000
- ▶ Feed motor with fixed speeds
- ▶ Table feed X and Y axis
- ▶ Z axis with electrical table height adjustment

### Horizontal milling position



- › with arrester and collet for disc milling cutter
- › Adjustable plain bearing

### OPTI Control panel

- › Integrated switch panel
- › Integrated digital position display
- › Rotates about its own axis



Fig.: MT 100



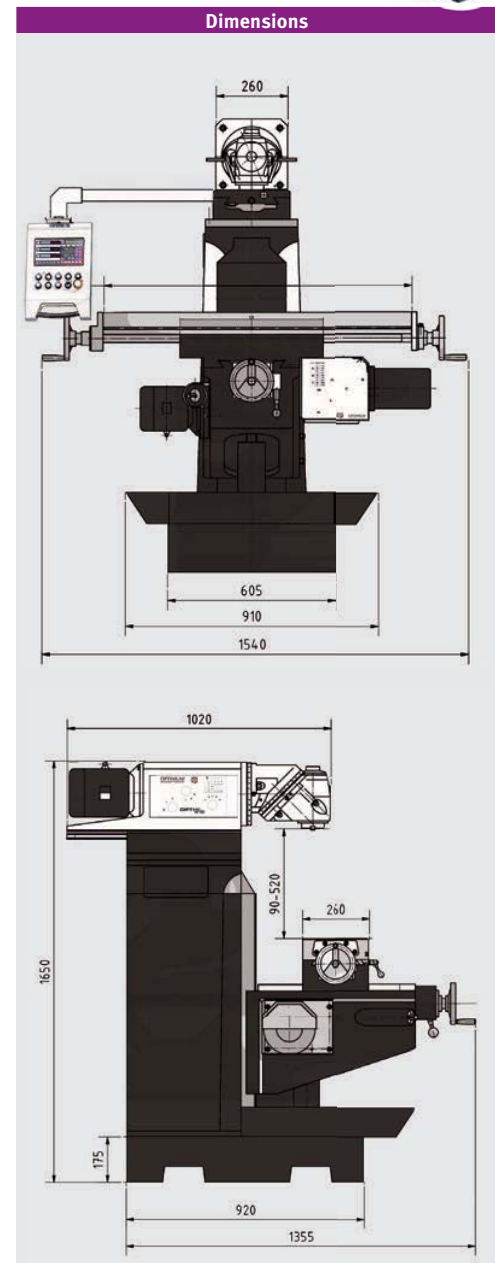


## Technical specifications, accessories and dimensions

Model	MT 100
Article no.	3336110
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	3.36 kW
Drive motor	2.2 kW
Feed motor output X-Y axis	370 Watts
Feed motor output Z-axis	750 Watts
Coolant pump motor	40 Watts
<b>Drilling/milling output</b>	
Max. sensor head size	Ø 85 mm
Max. shaft milling cutter size	Ø 20 mm
<b>Vertical</b>	
Spindle seat	ISO 40 DIN 2080
Draw-in rod	M16
Clearance spindle to cross table	90 - 520 mm
Spindle speeds	45 - 1 600 rpm
Speeds	11 speeds
Milling head tilt angle	360°
<b>Cross table</b>	
Length x width	1 120 x 260 mm
Max. load bearing capacity	350 kg
T-slot size / spacing / count	14 mm / 63 mm / 3
<b>X axis</b>	
Travel	manual 600 mm/automatic 480 mm
Manual table feed	24 - 402 mm/min.
<b>Y axis</b>	
Cross table stroke	manual 270 mm/ automatic 215 mm
Table feed automatic	24 - 402 mm/min.
<b>Z axis</b>	
Travel	manual 380 mm
Table feed automatic	402 mm/min
<b>Dimensions</b>	
Length x width x height	1 540 x 1 355 x 1 650 mm
Weight	1 300 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Universal dividing head TA 125	3356125
End mill set HSS 12-part	3352250
End mill set HSS 20-part	3352255
Assortment of clamping tools size 12, 58 parts	3352017
Blank holder set of 2 14 mm/M12	3352031
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Arbor for drill chuck ISO 40/B16	3352070
Collet chuck set 18-part ISO40	3352056
Precision bore head set ISO 40	3352128
Copying and facing blade head ISO 40 DIN 2080	3350216
› More accessories for milling machines from page 126	

\* Important information on transport surcharge and lump sum see page 251



### Scope of supply

- › Cutter spindle horizontal milling Ø 32 mm
- › Cutter arbour Ø 32 mm
- › Operating tool

Machine vices	Article no.
HMS 125	3355127
FMS 150	3354150
FMSN 150	3354130
VMQ 150	3354183
MV3-75	3354175
MV3-125	3354178
DAS 100	3355500
HCV 105	3356210

› Information about vices from page 120

**Multifunctional drilling/milling machines for professional deployment.** Electronic continuously variable drive with frequency inverter "made in EU" and digital 3-axis position display DPA 21

## Facts that impress in terms of quality, performance and price

- ▶ Heavy, solid design using premium cast meehanite
- ▶ Tilting drilling/milling head  $\pm 45^\circ$
- ▶ Excellent concentricity thanks to tapered roller bearings, better than 0.01 mm measured in the spindle sleeve
- ▶ Automatic spindle sleeve feed
- ▶ Adjustable drilling depth stop with millimetre scale, can be read off on front
- ▶ Right-handed/left-handed rotation for thread tapping
- ▶ X and Z axis with adjustable dovetail guide
- ▶ Coolant system
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out

- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots

### MF 2V:

- ▶ Y axis with adjustable dovetail guide

### MF 4V:

- ▶ Y axis with flat guide
- ▶ Large Y axis stroke of 400 mm
- ▶ Motorised table height adjustment (Z axis)

### Siemens inverter SINAMICS G110M



### Tool clamping system

- › optional (Article no.: 3352394)
- › › Short change times through single-handed operation
- › Low eight

### X-axis



- › Motor milling table feed
- › Continuous speed control
- › Rapid motion
- › Right-handed/left-handed rotation

### OPTi Control panel

- › Integrated switch panel
- › Integrated digital position display DPA 21
- › Rotates



Fig.: MF 4V



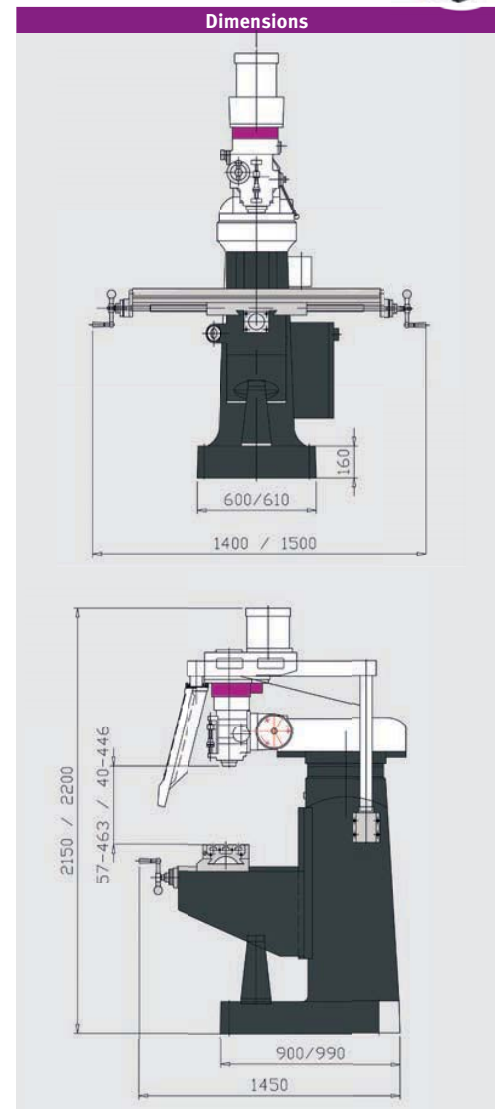
## Technical specifications, accessories and dimensions

Model	MF 2V	MF 4V
Article no.	3336030	3336050
Technical data		
Electrical connection	400 V / 3 Ph ~50 Hz	
Total rated value	2.2 kW	4 kW
Drive motor	1.5 kW	3 kW
Coolant pump motor	100 Watts	
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 24 mm	Ø 32 mm
Continuous drilling performance in steel (S235JR)	Ø 20 mm	Ø 28 mm
Max. sensor head size	Ø 76 mm	Ø 100 mm
Max. shaft milling cutter size	Ø 18 mm	Ø 20 mm
Spindle		
Spindle sleeve stroke	127 mm	
Spindle seat	ISO 40 DIN 2080	
Throat	213 - 533 mm	200 - 680 mm
Drilling/milling head		
Spindle speeds	10 - 5 100 rpm	9 - 6 750 rpm
Speeds	6 speeds, electronically controlled	8 speeds, electronically controlled
Pivoting spindle head	± 45°	
Automatic spindle sleeve feed	3 speeds: 0.038 / 0.076 / 0.152 mm/rev	
Cross table		
Length x width	1 245 x 230 mm	1 370 x 254 mm
Max. load bearing capacity	230 kg	275 kg
T-slot size / spacing / count	16 mm / 63 mm / 3	
Clearance spindle to cross table	57 - 463 mm	40 - 446 mm
Travel		
X axis	manual 800 mm / automatic 730 mm	manual 930 mm / automatic 850 mm
Y axis	manual 305 mm	manual 400 mm
Z axis	manual 406 mm	manual 406 mm / automatic 350 mm
Dimensions		
Length x width x height	1 400 x 1 450 x 2 150 mm	1 500 x 1 450 x 2 200 mm
Weight	950 kg	1 150 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Assortment of clamping tools size 14, 58-parts	3352018
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Levelling platen SE 85 (4 pcs. required)	3352982
Arbor for drill chuck ISO 40/B16	3352070
Collet chuck set 18-part ISO40	3352056
Copying and facing blade head ISO 40 DIN 2080	3350216
Precision bore head set ISO 40	3352128
Universal table feed V 250	3352025
Assembly table feed V250	9000489
Tool clamping system ISO 40	3352394

(Orders without assembly: Some adjustment work may be necessary.)

› More accessories for milling machines from page 126



### Scope of supply

- › Chip tray
- › Operating tool

Machine vices	Article no.
<b>ZAS 50</b>	3354170
<b>HMS 125</b>	3355127
<b>FMS 125</b>	3354125
<b>FMS 150</b>	3354150
<b>FMSN 125</b>	3354120
<b>FMSN 150</b>	3354130
<b>VMQ 125</b>	3354182
<b>VMQ 150</b>	3354183
<b>MV3-75</b>	3354175
<b>MV3-125</b>	3354178
<b>DAS 100</b>	3355500
<b>HCV 105</b>	3356210

Information about vices from page 120



## Multifunctional drilling/milling machines with mechanised continuously controllable drive for professional use

### Facts that impress in terms of quality, performance and price

- ▶ Solid design using premium cast meehanite
- ▶ Excellent concentricity thanks to tapered roller bearings, better than 0.01 mm measured in the spindle sleeve
- ▶ Continuously variable speed control
- ▶ Right-handed/left-handed rotation for thread tapping
- ▶ X and Y axis with adjustable 55 ° dovetail guide
- ▶ Y axis with flat guide
- ▶ Tilting drilling/milling head  $\pm 45^\circ$
- ▶ Coolant system
- ▶ Clockwise/Anti-clockwise run
- ▶ Automatic spindle sleeve feed, 3 stages, 0.04 - 0.15 mm/rev
- ▶ Motorised feed on X, Y and Z axes
- ▶ Precision micro feed
- ▶ Milling spindle with precision bearing

- ▶ Mechanical spindle brake
- ▶ Drilling depth scale and stop
- ▶ Cross table with T-slots and coolant channel
- ▶ Central lubrication
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots

### MF 4-B:

- ▶ Cross table load bearing capacity 300 kg
- ▶ Long travel: X / Y / Z axis
- ▶ 740 mm / 330 mm / 320 mm



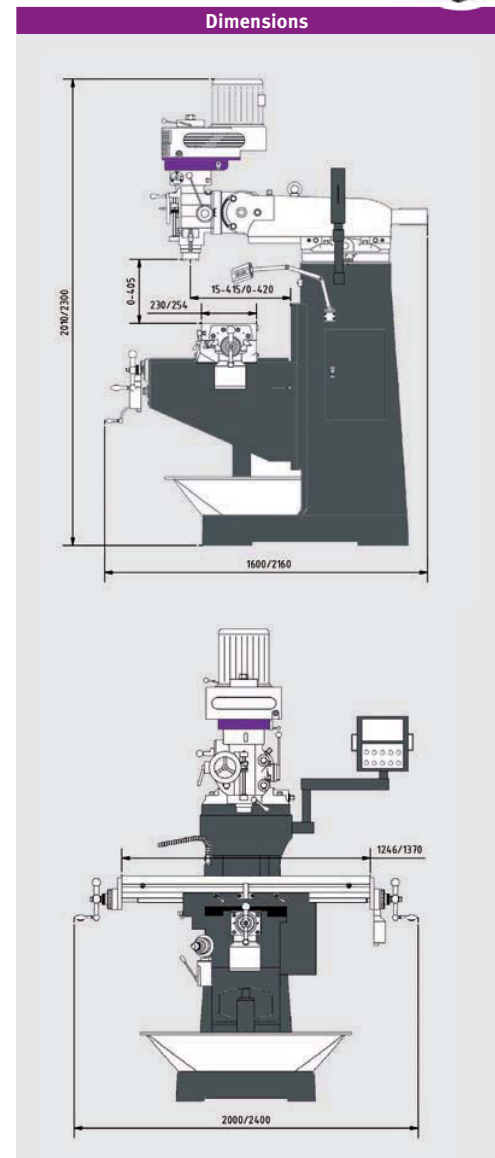
Fig.: MF 4-B

## Technical specifications, accessories and dimensions

Model	MF 2-B	MF 4-B
Article no.	3348330	3348340
Technical specifications		
Electrical connection	400 V / 3 Ph ~50 Hz	
Total rated value	3 kW	
Drive motor	2.2 kW	
Coolant pump motor	90 W	
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 24 mm	
Continuous drilling performance in steel (S235JR)	Ø 20 mm	
Max. sensor head size	Ø 76 mm	
Max. shaft milling cutter size	Ø 25 mm	
Spindle		
Spindle sleeve diameter	86 mm	
Spindle sleeve stroke	127 mm	
Spindle seat	ISO 40 DIN 2080	
Throat	15 - 415 mm	0 - 420 mm
Drilling/milling head		
Spindle speeds	60 - 4 200 rpm	
Speeds	2 speed, mechanically continuously controllable	
Milling cutter head travel	312 mm	470 mm
Swivel range spindle head horizontal	± 90°	
Swivel range spindle head vertical	± 45°	
Automatic spindle sleeve feed	3 speeds: 0.038 / 0.076 / 0.152 mm/rev	
Cross table		
Length x width	230 x 1 246 mm	254 x 1 370 mm
Cross table max. load bearing capacity	200 kg	300 kg
T-slot size / spacing / count	16 mm / 63 mm / 3	
Clearance spindle to cross table	405 mm	
Travel		
X axis	manual 690 mm / automatic 610 mm	manual 820 mm / automatic 740 mm
Y axis	manual 310 mm / automatic 230 mm	manual 410 mm / automatic 330 mm
Z axis	manual 390 mm / automatic 310 mm	manual 400 mm / automatic 320 mm
Dimensions		
Length x width x height	2 000x1 600x2 010 mm	2 400 x 2 160 x 2 300 mm
Weight	1 000 kg	1 260 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Assortment of clamping tools size 14, 58-parts	3352018
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Levelling platen SE 85 (4 pcs. required)	3352982
Arbor for drill chuck ISO 40/B16	3352070
Collet chuck set 18-part ISO40	3352056
Copying and facing blade head ISO 40 DIN 2080	3350216
Precision bore head set ISO 40	3352128
› More accessories for milling machines from page 126	

\* Important information on transport surcharge and lump sum see page 251



### Scope of supply

› Operating tool

Machine vices	Article no.
ZAS 50	3354170
HMS 125	3355127
FMS 125	3354125
FMS 150	3354150
FMSN 125	3354120
FMSN 150	3354130
VMQ 125	3354182
VMQ 150	3354183
MV3-75	3354175
MV3-125	3354178
DAS 100	3355500
HCV 105	3356210
› Information about vices from page 120	

Preface

Drilling

Milling

Turning

Saws

Grinding

Polishing

Lamps

Measuring

## Universal milling machine for horizontal and vertical milling work.

With digital 3-axis position display DPA 21

### Facts that impress in terms of quality, performance and price

- ▶ Tilting drilling/milling head  $\pm 90^\circ$
- ▶ Spindle head carrier moves to front and rear
- ▶ Heavy, solid design using premium vibration-absorbing grey cast material
- ▶ Counterholder for horizontal milling attached to rear for easy access
- ▶ Spindle sleeve feed via spindle sleeve lever or manual fine feed hand wheel
- ▶ X axis can be moved optionally with the hand wheel or the table feed unit
- ▶ Coolant system
- ▶ Automatic spindle sleeve feed
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with precision surface finish including adjustable cleats, tilting  $\pm 45^\circ$

### Horizontal milling position



› with arrester and collet for disc milling cutter

### OPTI Control panel

- › Integrated switch panel
- › Integrated digital position display
- › Rotates about its own axis



Fig.: MT 60



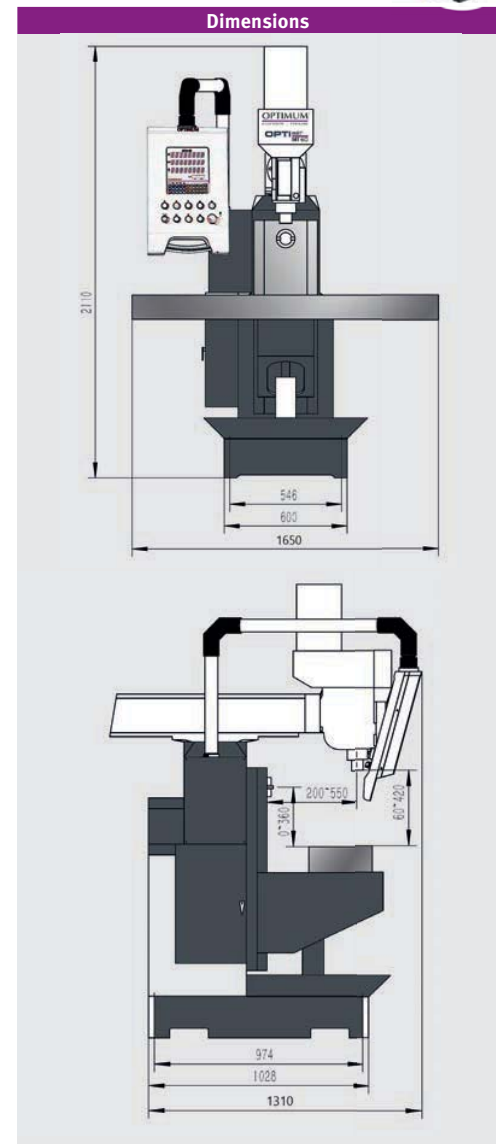


## Technical specifications, accessories and dimensions

Model	MT 60
Article no.	3336090
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	5 kW
Horizontal and vertical drive motor	2.2 kW
Coolant pump motor	40 W
<b>Drilling/milling output</b>	
Drilling performance in steel (S235JR)	Ø 30 mm
Continuous drilling performance in steel (S235JR)	Ø 25 mm
Max. sensor head size	Ø 100 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Spindle</b>	
Spindle seat	ISO 40 DIN 2080
<b>Vertical</b>	
Spindle sleeve stroke	120 mm
Clearance spindle to cross table	60 - 420 mm
Spindle sleeve diameter	Ø 90 mm
Draw-in rod	M16
Spindle speeds	90 - 2 000 rpm
Speeds	8 speeds
Throat	200 - 550 mm
Automatic spindle sleeve feed	3 speeds: 0.08 / 0.25 / 1 mm/rev
<b>Horizontal</b>	
Throat	35 - 370 mm
Spindle speeds	40 - 1 300 rpm
Speeds	9 speeds
<b>Cross table</b>	
Length x width	1 270 x 280 mm
Cross table max. load bearing capacity	150 kg
T-slot size / spacing / count	14 mm / 50 mm / 4
<b>Travel</b>	
X axis manual / automatic	750 mm / 680 mm
Y axis manual	230 mm
Z axis manual	360 mm
<b>Dimensions</b>	
Length x width x height	1 650 x 1 310 x 2 160 mm
Weight	1 300 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Assortment of clamping tools size 12, 58-parts	3352017
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Workpiece support WPS-4	3354264
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Levelling platen SE 85 (4 pcs. required)	3352982
Arbor for drill chuck ISO 40/M16/B16	3352070
Collet chuck set 18-part ISO40	3352056
Hold-down unit set of 2	3352031
Copying and facing blade head ISO 40 DIN 2080	3350216
Precision bore head set ISO 40	3352128
› More accessories for milling machines from page 126	

\* Important information on transport surcharge and lump sum see page 251



### Scope of supply

- › Key type drill chuck Ø 1 - 16 mm / B16
- › Arbor for drill chuck ISO40 / B16
- › Adapter ISO 40 / MT 3
- › Adapter ISO 40 / MT 2
- › Cutter spindle horizontal milling Ø 22 mm
- › Cutter spindle horizontal milling Ø 27 mm
- › Milling chuck Ø 4 - Ø 16 mm
- › Tie rod vertical and horizontal
- › Operating tool

Machine vices	Article no.
FMS 125	3354125
FMSN 125	3354120
VMQ 100	3354181
MV3-75	3354175
MV3-125	3354178
DAS 100	3355500
ZAS 50	3354170

› Information about vices from page 120

## Universal milling machine for horizontal and vertical milling work with digital 3-axis position display DPA 2000

### Facts that impress in terms of quality, performance and price

- ▶ Heavy, solid design using premium vibration-absorbing grey cast material
- ▶ Halogen machine lamp with tight beam
- ▶ Spindle sleeve feed via spindle sleeve lever or manual fine feed hand wheel
- ▶ Counterholder for horizontal milling attached to rear for easy access
- ▶ Automatic end position cut-off on X axis
- ▶ X axis can be moved optionally with the hand wheel or the table feed unit
- ▶ Spindle head carrier pivots through 90° left and right
- ▶ Gears in oil bath with polished, hardened gear wheels
- ▶ Right-handed/left-handed rotation
- ▶ Coolant system
- ▶ Precision Cross table, generously dimensioned with precision surface finish
- ▶ Cross table turns through 45° on both sides

### Horizontal milling position



› with arrester and collet for disc

### OPTi Control panel



- › Integrated control panel
- › Integrated digital position **DPA 2000**
- › Pivots to left and right side of machine

### Cross table housing



- › Removable
- › Swivelling



Fig.: OPTImill MT 50

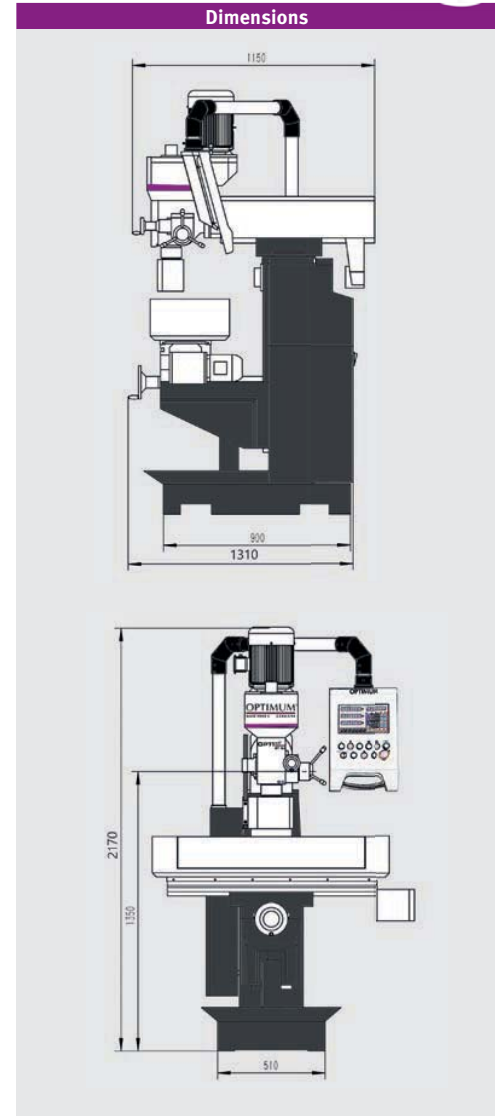


## Technical specifications, accessories and dimensions

Model	MT 50
Article no.	3336005
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~50 Hz
Total rated value	4.5 kW
Vertical drive motor	1.1 / 2.2 kW
Horizontal drive motor	1.5 kW
Coolant pump motor	40 W
<b>Drilling/milling output</b>	
Drilling performance in steel (S235JR)	Ø 30 mm
Continuous drilling performance in steel (S235JR)	Ø 25 mm
Max. sensor head size	Ø 100 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Spindle</b>	
Spindle seat	ISO 40 DIN 2080
<b>Vertical</b>	
Spindle sleeve stroke	120 mm
Spindle speeds	115 - 1 750 rpm
Speeds	8 speeds
Throat	240 - 650 mm
<b>Horizontal</b>	
Spindle speeds	60 - 1 350 rpm
Speeds	9 speeds
Throat	0 - 185 mm
<b>Cross table</b>	
Length x width	1 000 x 240 mm
Cross table max. load bearing capacity	160 kg
T-slot size / quantity	14 mm / 4
Rotating Cross table	± 45°
<b>Travel</b>	
X axis	manual 580 mm / automatic 500 mm
Table feed X axis (8 speeds)	24 / 720 mm/min.
Y axis manual	200 mm
Z axis manual	340 mm
<b>Dimensions</b>	
Length x width x height	1 290 x 1 090 x 2 170 mm
Weight	820 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Assortment of clamping tools size 12, 58 parts	3352017
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Workpiece support WPS-4	3354264
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Levelling platen SE 85 (4 pcs. required)	3352982
Arbor for drill chuck ISO 40/B16	3352070
Collet chuck set 18-part ISO40	3352056
Copying and facing blade head ISO 40 DIN 2080	3350216
Precision bore head set ISO 40	3352128
Hold-down unit set of 2	3352031
› More accessories for milling machines from page 126	

\* Important information on transport surcharge and lump sum see page 251



Scope of supply
› Key type drill chuck 1 - 16 mm / B18
› Arbor for drill chuck ISO40 / B18
› Cutter spindle horizontal milling Ø 22 / Ø 27 mm
› Reduction sleeve ISO 40-MT 3 / ISO 40-MT 2
› Tie rod vertical and horizontal
› T-slot nuts
› Push-out tool
› Operating tool

Machine vices	Article no.
FMS 125	3354125
FMSN 125	3354120
VMQ 100	3354181
MV3-75	3354175
MV3-125	3354178
DAS 100	3355500
ZAS 50	3354170
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## Universal drilling/milling machine with automatic table feed for X and Y axis

### Facts that impress in terms of quality, performance and price

- ▶ Vibration absorbing cast design
- ▶ Operation-friendly control panel
- ▶ LED lamp
- ▶ Milling head pivots through 45° to left and right
- ▶ Automatic feed of X and Y axis with speed adjustment
- ▶ Automatic and adjustable limit switch cut-off of the X axis
- ▶ Mechanical spindle sleeve feed for drilling via spindle sleeve lever
- ▶ Gears in oil bath with polished, hardened gear wheels
- ▶ Right-handed/left-handed rotation
- ▶ Coupling for switching from manual coarse feed to manual fine feed
- ▶ Large Y axis spindle head holder throat of 250 - 650 mm
- ▶ Precision Cross table, generously dimensioned with precision surface finish with adjustable V-ledges
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with dovetails, precision surface finish including T-slots and adjustable cleats, tilting  $\pm 45^\circ$
- ▶ Coolant system

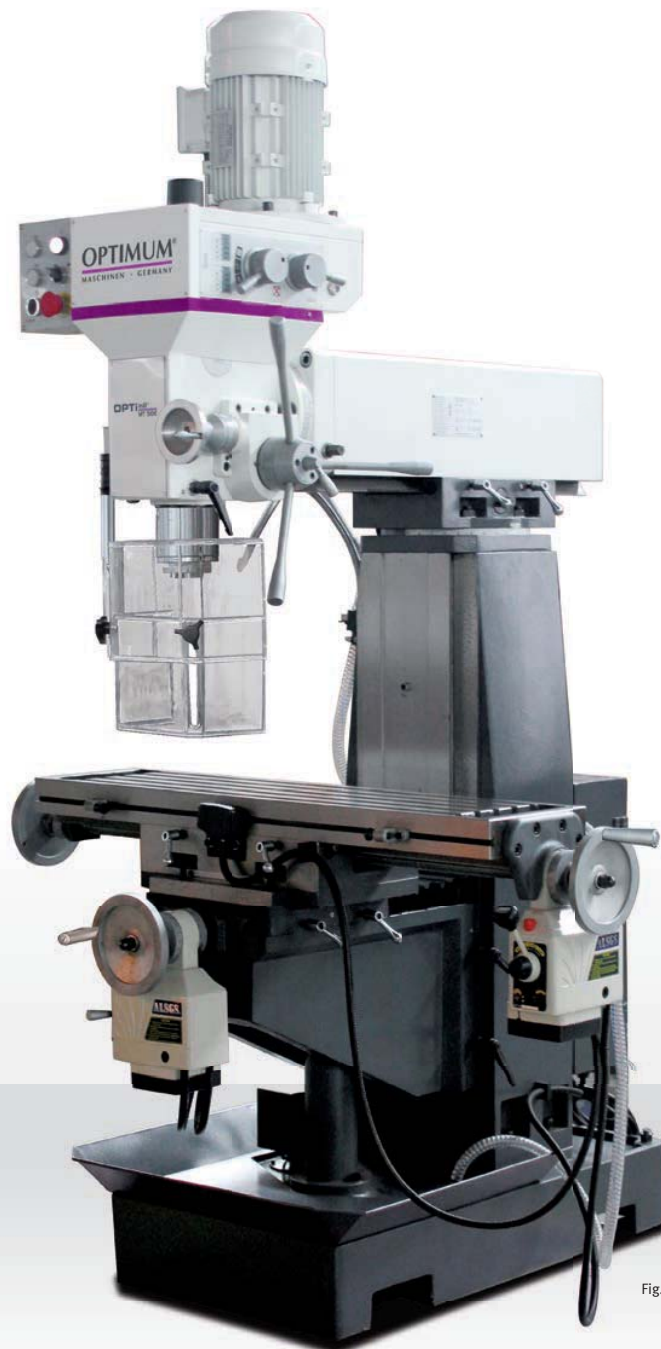


Fig.: MT 50E

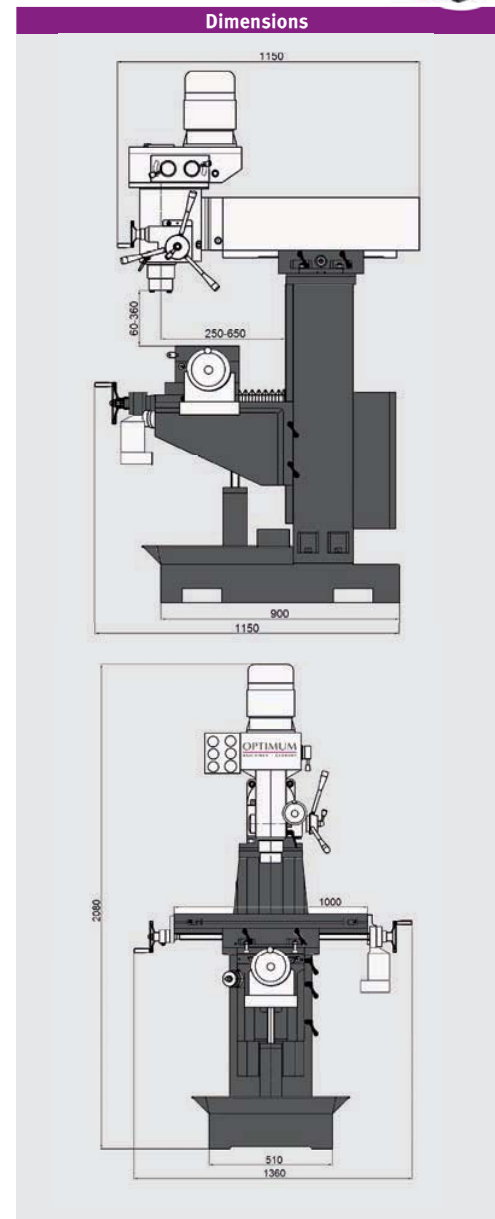


## Technical specifications, accessories and dimensions

Model	MT 50E
Article no.	3336010
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~ 50 Hz
Drive motor	0.85 / 1.5 kW
Coolant pump motor	40 W
<b>Drilling performance</b>	
Drilling performance in steel (S235JR)	Ø 30 mm
Continuous drilling performance in steel (S235JR)	Ø 25 mm
Max. sensor head size	Ø 63 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Spindle</b>	
Spindle seat	SK40 DIN 2080
Spindle sleeve stroke	120 mm
Draw-in rod	M16
Distance spindle to cross table	60 - 360 mm
<b>Drilling/milling head</b>	
Spindle speeds	115 - 1 750 rpm
Gears / motor speeds	4-speed / 2-speed
Milling head tilt	± 45°
Throat	250 - 650 mm
<b>Cross table</b>	
Length x width	1 000 x 240 mm
Cross table max. load bearing capacity	150 kg
T-slot size / quantity	14 mm / 4
Swivel range	± 45°
<b>Travel</b>	
X axis	manual 580 mm / automatic 500 mm
Y axis	manual 230 mm / automatic 150 mm
Z axis manual	400 mm
<b>Dimensions</b>	
Length x width x height	1 360 x 1 150 x 2 080 mm
Weight	760 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RT 200	3356200
Horizontal-vertical rotary indexing table RTE 165	3356365
Horizontal-vertical rotary indexing table RTU 165	3354165
Assortment of clamping tools size 12, 58 parts	3352017
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Workpiece support WPS-4	3354264
Precision machine shoe SEU1 (4 pcs. required) see page 132	3352985
Levelling platen SE 85 (4 pcs. required)	3352982
Arbor for drill chuck ISO 40/B16	3352070
Collet chuck set 18-part ISO40	3352056
Copying and facing blade head ISO 40 DIN 2080	3350216
Precision bore head set ISO 40	3352128
Hold-down unit set of 2	3352031
› <b>More accessories for milling machines</b> from page 126	

\* Important information on transport surcharge and lump sum see page 251



### Scope of supply

- › Key type drill chuck 3 - 16 mm / B18
- › Arbor for drill chuck ISO40 / B18
- › T-slot nuts
- › Push-out tool
- › Reduction sleeve ISO40- MT 3 and MT 3-MT 2
- › Operating tool

Machine vices	Article no.
FMS 125	3354125
FMSN 125	3354120
VMQ 100	3354181
MV3-75	3354175
DAS 100	3355500
ZAS 50	3354170
› Information about vices from page 120	

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## Universal precision drilling/milling machines with manual gearbox and electrical Z axis adjustment. MH 50V with electronically controlled drive.

Control unit with dirt- and water-resistant membrane keyboard

### Facts that impress in terms of quality, performance and price

- ▶ Control panel with user-friendly dirt and water resistant foil keyboard
- ▶ Easily readable digital display
- ▶ Easily readable spindle sleeve display in milling head
- ▶ Drilling depth stop
- ▶ Right-handed/left-handed rotation
- ▶ Thread tapping mode
- ▶ Rotary pushbutton on control panel for adjusting the drilling depth, optionally in mm or inches, with zero point
- ▶ Excellent concentricity thanks to tapered roller bearings, better than 0.015 mm measured in the spindle sleeve
- ▶ Gear head pivots through  $\pm 30^\circ$
- ▶ Electrical milling head height adjustment
- ▶ Manual fine feed
- ▶ Adjustable cleats
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Heavy, sturdy and solid columns made of premium cast material with ground and shaven dovetail guide for excellent stability and precision
- ▶ Z axis with slatted, stainless steel protective cover
- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots
- ▶ Optional, solid, heavy steel chassis ensures stability

### MH 50G:

- ▶ Two-stage industrial quality electric motor

### MH 50V:

- ▶ 6 speeds, electronically controlled

### Energy chain



- › cable guidance easy on material

### Mechanical Quick change clamping system



- › The milling head is equipped with spring collet for pull stud BT40x45°
- › To change, simply release the mechanical lock on the quick-clamping system and push the spindle sleeve lever upwards



Fig.: MH 50V

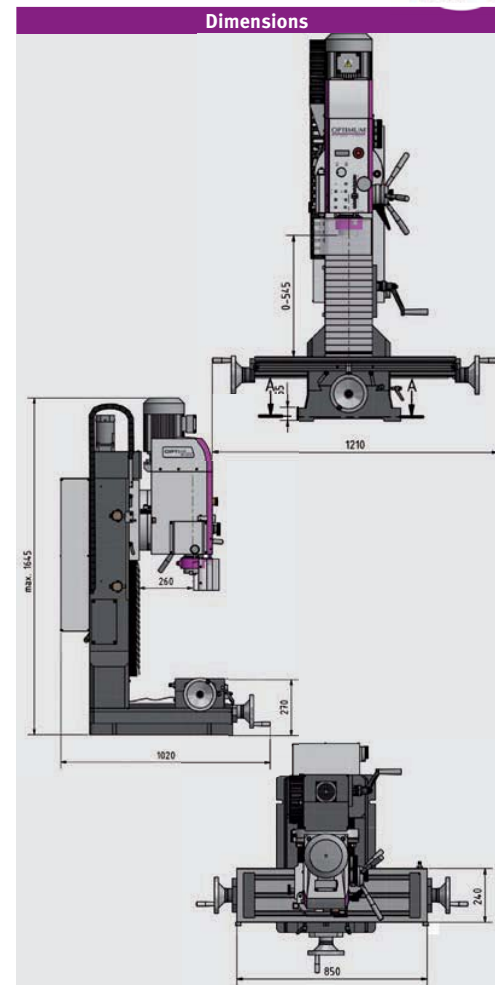


## Technical specifications, accessories and dimensions

Model	MH 50G	MH 50V***
Article no.	3338180	3338185
Technical data		
Electrical connection	400 V / 3 Ph ~ 50 Hz	
Motor output	1.5 / 2.2 kW	2.2 kW
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 38 mm	
Continuous drilling performance in steel (S235JR)	Ø 32 mm	
Max. sensor head size	Ø 80 mm	
Max. shaft milling cutter size	Ø 32 mm	
Spindle		
Spindle sleeve stroke	115 mm	
Spindle seat	BT 40	
Spindle sleeve diameter	80 mm	
Throat	260 mm	
Drilling/milling head		
Spindle speeds	225 - 3 260 rpm	50 - 3 260 rpm
Speeds	2 x 6 speeds	6 speeds electr. controlled
Pivot range	± 30°	
Cross table		
Length x width	850 mm x 240 mm	
T-Slot size / no / distance	18 mm / 3 / 80 mm	
Max. load bearing capacity	175 kg	
Clearance spindle to cross table	max. 545 mm	
Travel		
X axis manual	520 mm	
Y axis manual	260 mm	
Z axis	manual 465 mm / automatic 385 mm	
Dimensions		
Length x width x height max.	1 210 x 1 020 x 1 645 mm	
Weight	525 kg	

Accessories	Article no.
Milling head holder Ø 27 mm	3353336
Quick clamping drill chuck 1 - 13 mm	3536303
Weldon holder Ø 6 mm	3353340
Weldon holder Ø 8 mm	3353341
Weldon holder Ø 10 mm	3353342
Weldon holder Ø 12 mm	3353343
Weldon holder Ø 16 mm	3353344
Weldon holder Ø 20 mm	3353345
BT 40 - MT 3 adapter	3353335
Spring collet holder ER 32	3353334
Spring collet holder spanner ER 32	3353307
Collet kit ER 32	3441122
Height-adjuster	3536290
Assembly and tool adjustment gauge	3536193
Taper squeegee	3353331
Pull stud 40 x 45° M16	3353332
Pull stud DIN2080 M16	3536179
Universal table feed V99	3352022
Assembly kit V99 - X axis	3352036
Assortment of clamping tools size 16, 58-parts	3352019
Steel chassis (information on page 135)	3353015
Levelling platen SE 55 (4 pcs. required)	3352981
Vibration damping machine base SE1 (4 pcs. required)	3381012
› More accessories for milling machines from page 126	

\*\* Important information on transport surcharge and „Operation of machines with frequency converters“ on page 253  
\*\*\*The milling machine complies with the DIN EN 55011 standard: class C2.



### Scope of supply

› Operating tool

Accessories	Article no.
<b>Starter set BT 40</b>	3353284
› Milling head holder Ø 27 mm	
› Quick-action drill chuck 1 - 13 mm	
› 2 pcs. Weldon Ø 6 mm and 20 mm	
› 1 pc. each Weldon Ø 8 / 10 / 12 / 16 mm	
› BT 40 - MT 3 adapter	
› 3 pcs. spring collet holder ER 32	
› Spring collet key ER 32	
› 18-part Collet kit ER 32	
› Height-adjuster	
› Assembly and tool adjustment gauge	
› 14 pcs. pull studs	
› Taper squeegee	

Machine vices	Article no.
<b>FMS 125</b>	3354125
<b>FMSN 125</b>	3354120
<b>VMQ 100</b>	3354181
<b>MV3-75</b>	3354175
<b>DAS 100</b>	3355500
<b>ZAS 50</b>	3354170
› Information about vices from page 120	

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## Universal precision drilling/milling machines with manual gearbox. MH 35V with electronically controlled drive. Control unit with dirt- and water-resistant membrane keyboard

### Facts that impress in terms of quality, performance and price

- ▶ Control panel with user-friendly dirt and water resistant foil keyboard
- ▶ Easily readable digital display
- ▶ Easily readable spindle sleeve display in milling head
- ▶ Drilling depth stop
- ▶ Thread tapping mode
- ▶ Right-handed/left-handed rotation
- ▶ Rotary pushbutton on control panel for adjusting the drilling depth, optionally in mm or inches, with zero point
- ▶ Excellent concentricity thanks to tapered roller bearings, better than 0.015 mm measured in the spindle sleeve
- ▶ Gear head pivots through  $\pm 30^\circ$
- ▶ Manual fine feed
- ▶ Adjustable cleats
- ▶ Z axis with slatted, stainless steel protective cover
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Solid and generously dimensioned cross table with precision surface finish and T-slots
- ▶ Heavy, sturdy and solid columns made of premium cast material with ground and shaven dovetail guide for excellent stability and precision
- ▶ Optional, solid, heavy steel chassis ensures stability

#### MH 35G:

- ▶ Two-stage industrial quality electric motor

#### MH 35V:

- ▶ 6 speeds, electronically controlled



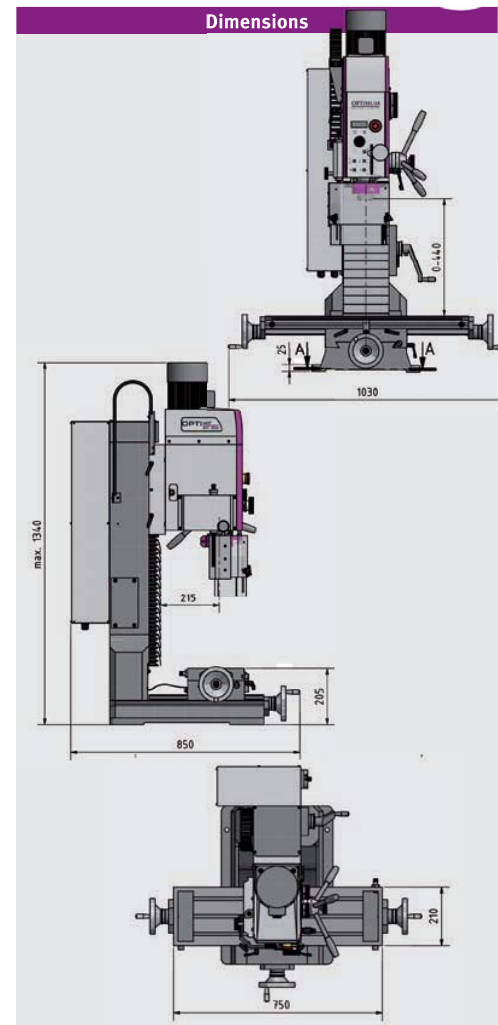
Fig.: MH 35V

## Technical specifications, accessories and dimensions

Model	MH 35G	MH 35V***
Article no.	3338165	3338170
Technical data		
Electrical connection	400 V / 3 Ph ~50 Hz	
Motor output	1.1 / 1.5 kW	1.5 kW
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 32 mm	
Continuous drilling performance in steel (S235JR)	Ø 28 mm	
Max. sensor head size	Ø 80 mm	
Max. shaft milling cutter size	Ø 28 mm	
Spindle		
Spindle sleeve stroke	90 mm	
Spindle seat	BT 30	
Spindle sleeve diameter	68 mm	
Throat	215 mm	
Drilling/milling head		
Spindle speeds	220 - 3 100 rpm	50 - 3 260 rpm
Speeds	2 x 6 speeds	6 speeds Electr. controlled
Pivot range	± 30°	
Cross table		
Length x width	750 mm / 210 mm	
T-slot size / spacing / count	12 mm / 63 mm / 3	
Load bearing capacity	max. 170 kg	
Clearance spindle to cross table max.	440 mm	
Travel		
X axis	450 mm	
Y axis	200 mm	
Z axis	460 mm	
Dimensions		
Length x width x height	850 x 1 030 x 1 340 mm	
Weight	316 kg	

Accessories	Article no.
Milling head holder Ø 22 mm	3353306
Quick clamping drill chuck 1 - 13 mm	3536303
Weldon holder Ø 6 mm	3353310
Weldon holder Ø 8 mm	3353311
Weldon holder Ø 10 mm	3353312
Weldon holder Ø 12 mm	3353313
Weldon holder Ø 16 mm	3353314
Weldon holder Ø 20 mm	3353315
Adapter BT 30 - MT 2	3353305
Spring collet holder ER 32	3353304
Spring collet holder spanner ER 32	3353307
Collet kit ER 32	3441122
Height-adjuster	3536290
Assembly and tool adjustment gauge	3536193
Taper squeegee	3353301
Pull stud 40 x 45° M12	3353302
Pull stud DIN2080 M12	3536177
Universal table feed V99	3352022
Assembly kit V99 - X axis	3352035
Assortment of clamping tools size 10, 58-parts	3352016
Steel chassis (information on page 135)	3353014
Levelling platen SE 55 (4 pcs. required)	3352981
Vibration damping machine base SE1 (4 pcs. required)	3381012
➤ More accessories for milling machines from page 126	

\*\* Important information „Operation of machines with frequency converters“ on page 253  
\*\*\*The milling machine complies with the DIN EN 55011 standard: class C2.



### Scope of supply

➤ Operating tool

Machine vices	Article no.
FMS 125	3354125
VMQ 100	3354181
MV3-75	3354175
DAS 100	3355500
ZAS 50	3354170

Accessories	Article no.
Starter set BT 30	3353282
➤ Milling head holder Ø 22 mm	
➤ Quick-action drill chuck 1 - 13 mm	
➤ 2 pcs. Weldon Ø 6 mm and 20 mm	
➤ 1 pc. each Weldon Ø 8 / 10 / 12 / 16mm	
➤ BT 30 - MT 2 adapter	
➤ 3 pcs. spring collet holder ER 32	
➤ Spring collet key ER 32	
➤ 18-part Collet kit ER 32	
➤ Height-adjuster	
➤ Assembly and tool adjustment gauge	
➤ 14 pcs. pull studs	
➤ Taper squeegee	

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## Universal drilling/milling machine with digital position display DRO 5 and cast machine chassis. MB 4PV with continuously variable electronically controlled drive

### Facts that impress in terms of quality, performance and price

- ▶ Heavy, solid cast design
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ Right-handed/left-handed rotation
- ▶ Automatic spindle sleeve feed with manual fine feed
- ▶ Motorised positioning of the Z axis
- ▶ Motorised table feed on X axis
- ▶ Coolant system
- ▶ Machine lamp
- ▶ Gear head pivots through  $\pm 60^\circ$
- ▶ Adjustable cleats
- ▶ Solid dovetail guide on column, hand honed for maximum stability and greatest possible precision
- ▶ Height-adjustable, large protective screen with micro switch
- ▶ Drilling depth stop
- ▶ Digital position display DRO 5

- ▶ Drilling/Thread tapping function
- ▶ Solid and generously dimensioned cross table with precision surface finish with T-slots and adjustable cleats
- ▶ Solid cast machine chassis with chip channel

### MB 4P:

- ▶ Two-stage industrial quality electric motor
- ▶ Large speed range from 95 - 3 200 rpm thanks to 12 switchable speeds

### MB 4PV:

- ▶ Single-speed, premium, industrial electric motor
- ▶ Large speed range from 60 - 2 760 rpm thanks to 2 continuously variable speeds



Fig.: MB 4PV



## Technical specifications, accessories and dimensions

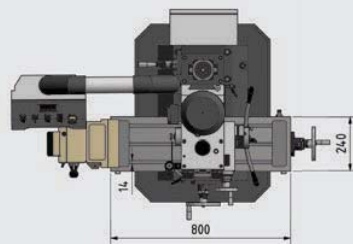
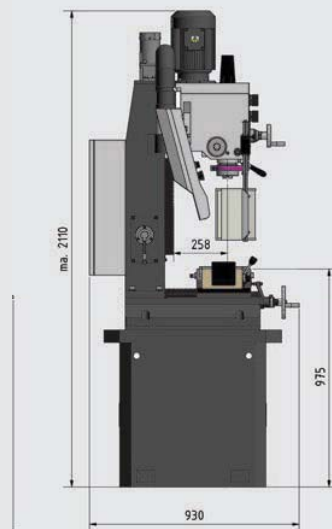
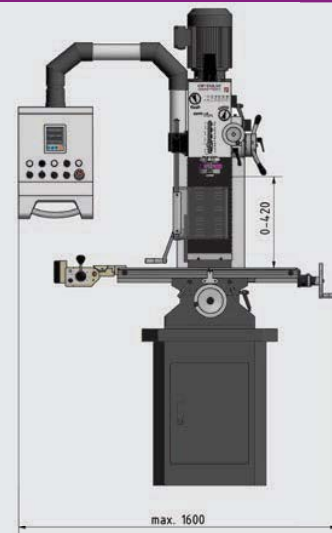
Model	MB 4P	MB 4PV***
Article no.	3338460	3338465
Technical data		
Electrical connection	400 V / 3 Ph ~50 Hz	230 V / 1 Ph ~50 Hz
Motor output	1.1 / 1.5 kW	1.5 kW
Coolant pump motor	100 W	
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 32 mm	Ø 24 mm
Continuous drilling performance in steel (S235JR)	Ø 28 mm	Ø 20 mm
Max. sensor head size	Ø 63 mm	Ø 63 mm
Max. shaft milling cutter size	Ø 28 mm	Ø 26 mm
Spindle		
Spindle sleeve stroke	120 mm	
Spindle seat	MT 4	
Spindle sleeve diameter	75 mm	
Throat	258 mm	
Draw-in rod	M16	
Drilling/milling head		
Spindle speeds	95 - 3 200 rpm	60 - 2 760 rpm
Speeds	2 x 6 speeds	2 speeds. electronically controlled
Pivot range	± 45°	± 45°
Cross table		
Clearance spindle to cross table max.	420 mm	
Length x width	800 x 240 mm	
T-slot size / spacing / count	14 mm / 80 mm / 3	
Automatic spindle sleeve feed	0.1 / 0.18 / 0.26 mm/rev	
Travel		
X axis	manual 560 mm / automatic 480 mm	
Y axis manual	195 mm	
Z axis manual	350 mm	
Dimensions		
Length x width x height	1 600 x 930 x 2 110 mm	
Weight	495 kg	

### Scope of supply

- › Machine chassis
- › Morse taper MT 3/B16
- › Adapter MT 3 - MT 4
- › Draw-in rod M16
- › Operating tool

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RTE 165	3356365
Height-adjustable tailstock RST 1	3356155
Height-adjustable tailstock RST 2	3356157
Assortment of clamping tools size 12, 58-parts	3352017
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Copying and facing blade MT 4	3350214
Vibration dampers SE1 (4 pcs. required)	3381012
Bore head set MT 4	3352084
Arbor for drill chuck MK4	3350304
Collet chuck MT 4/M16	3352094
Thread tapping chuck M3 - M12	3050705
Thread tapping chuck M8 - M20	3050706
› More „Accessories for milling machines“ from page 130	

### Dimensions



Machine vices	Article no.
FMS 100	3354100
FMS 125	3354125
HMS 100	3355100
FMSN 125	3354120
VMQ 100	3354181
MV3-75	3354175
DAS 100	3355500
ZAS 50	3354170
› Information about vices from page 120	

\*\* Important information on transport surcharge and lump sum and „Operation of machines with frequency converters“ on page 253  
\*\*\*The milling machine complies with the DIN EN 55011 standard: class C2.

## Universal precision drilling/milling machine with manual gearbox for optimum power transmission

### Facts that impress in terms of quality, performance and price

- ▶ Heavy, solid cast design
- ▶ Two-stage industrial quality electric motor
- ▶ Operation-friendly control panel with emergency stop shock switch
- ▶ Thread tapping function
- ▶ Height-adjustable, large protective screen
- ▶ Manual spindle sleeve feed with fine feed
- ▶ Smooth action due to polished gearwheels running in an oil sump
- ▶ Drilling depth stop
- ▶ Large speed range from 95 - 3 200 rpm thanks to 12 different speeds
- ▶ Right-handed/left-handed rotation
- ▶ Gear head pivots through  $\pm 60^\circ$
- ▶ Column with dovetail guide, hand honed
- ▶ Solid and generously dimensioned cross table with precision surface finish and adjustable cleats
- ▶ Adjustable cleats

### Thread tapping



- › The motor is activated by moving the spindle sleeve down
- › When the preset depth is reached, the spindle reverses
- › The machine thread tapping drill moves back out of the workpiece
- › When the spindle sleeve has moved in to the switching point, the spindle rotation is stopped

### Accessories

#### Steel chassis

Dimensions L x W x H: 650 x 550 x 750 mm

Art. no. 3353014

#### Vibration dampers machine base SE 1

(4 pcs. needed)

Art. no. 3381012



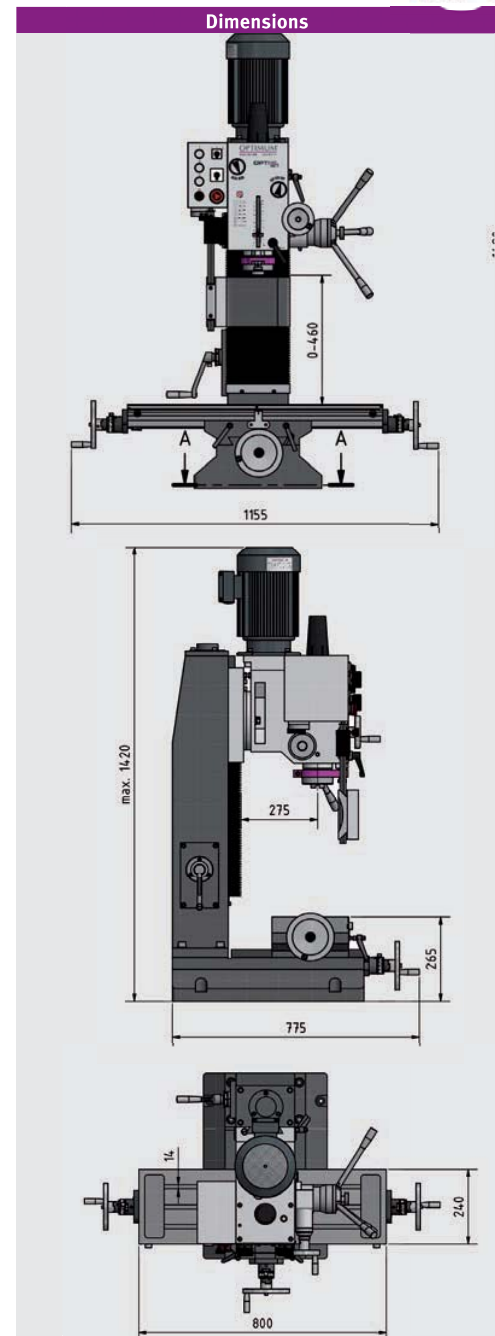
Fig. MB 4 with optional accessories



## Technical specifications, accessories and dimensions

Model	MB 4
Article no.	3338450
<b>Technical data</b>	
Electrical connection	400 V / 3 Ph ~ 50 Hz
Motor output	1.1 / 1.5 kW
<b>Drilling/milling output</b>	
Drilling performance in steel (S235JR)	Ø 32 mm
Continuous drilling performance in steel (S235JR)	Ø 28 mm
Max. sensor head size	Ø 63 mm
Max. shaft milling cutter size	Ø 28 mm
<b>Spindle</b>	
Spindle sleeve stroke	120 mm
Spindle seat	MT 4
Spindle sleeve diameter	75 mm
Throat	275 mm
Draw-in rod	M16
<b>Drilling/milling head</b>	
Spindle speeds	95 - 3 200 rpm
Speeds	2 x 6 speeds
Pivot range	± 60°
<b>Cross table</b>	
Length x width	800 x 240 mm
T-slot size / spacing / count	14 mm / 63 mm / 3
Load bearing capacity	80 kg
Clearance spindle to cross table	460 mm
<b>Travel</b>	
X axis	450 mm
Y axis	195 mm
Z axis	430 mm
<b>Dimensions</b>	
Length x width x height	1 155 x 775 x 1 420 mm
Weight	320 kg

Accessories	Article no.
Parallel shim set, 20-part	3354001
Horizontal-vertical rotary indexing table RT 100	3356110
Horizontal-vertical rotary indexing table RT 150	3356150
Horizontal-vertical rotary indexing table RTE 165	3356365
Height-adjustable tailstock RST 1	3356155
Assortment of clamping tools size 12, 58-parts	3352017
T-slot nut M12 / 14 mm	3353025
Blank holder 14 mm	3352031
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Copying and facing blade MT 4	3350214
Vibration dampers SE1 (4 pcs. required)	3381012
Levelling platen SE 55 (4 pcs. required)	3352981
Bore head set MT 4	3352084
Arbor for drill chuck MK4	3350304
Collet chuck MT 4/M16	3352094
Thread tapping chuck M3 - M12	3050705
Thread tapping chuck M8 - M20	3050706
Universal table feed V99	3352022
Assembly kit V99 - X axis	3352035
Universal coolant unit 230 V	3352002
Coolant mist lubricator MMC 1 with magnetic holder	3356663
Coolant hose KMS 2	3356660
Steel chassis (information on page 135)	3353014
› More „Accessories for milling machines“ from page 130	



### Scope of supply

- › Adapter MT 4 - MT 3
- › Draw-in rod M16
- › Operating tool

Machine vices	Article no.
FMS 100	3354100
FMS 125	3354125
FMSN 125	3354120
VMQ 100	3354181
MV3-75	3354175
DAS 100	3355500
ZAS 50	3354170

› Information about vices from page 120

## Sturdy milling machines with continuously variable electronic speed control. MH 25SV with stepper motors and digital position display DRO 5

### Facts that impress in terms of quality, performance and price

- ▶ Inverter motor
- ▶ Precision workmanship
- ▶ Particularly smooth action
- ▶ Counterweight facilitates Z axis adjustment
- ▶ Variable speed control
- ▶ Easy tool changing thanks to tool quick clamping system
- ▶ Wide rail on Z axis
- ▶ Groove prepared for easy retroactive mounting of magnetic strips
- ▶ Feed spindles can be adjusted thanks to adjustable spindle nuts
- ▶ Sturdy dovetail guide, precision ground and shaved with adjustable cleats
- ▶ Angular ball bearings on the axes
- ▶ Drilling/milling head pivots through  $\pm 45^\circ$
- ▶ Right-handed/left-handed rotation

- ▶ Height-adjustable protective screen with microswitch
- ▶ Limit switches for all three axes

#### MH 25V:

- ▶ Easily readable speed display in milling head

#### MH 25SV:

- ▶ Continuously variable feed on all axes
- ▶ Rapid motion X/Y axis for fast positioning
- ▶ Digital 3-axis position display DRO 5
- ▶ Feed cut-off at end position
- ▶ Transportable control panel
- ▶ The feed switches off when the spindle is stationary

### Mechanical quick change clamping system



- › The milling head is equipped with spring collet for pull studs BT30x45°
- › Easy to change by turning an Allen key in the adapter bore.

### Energy chain



- › cable guidance easy on material

### Control panel

- › User-friendly membrane keyboard with touch and switch control
- › Easy to clean
- › Excellent operability



- › Control panel MH 25SV
- › Good mobility thanks to ability to remove control panel from holder



- › Control panel MH 25V



Fig.: MH 25SV

## Technical specifications, accessories and dimensions

Model	MH 25V	MH 25SV
Article no.	3338155	3338160

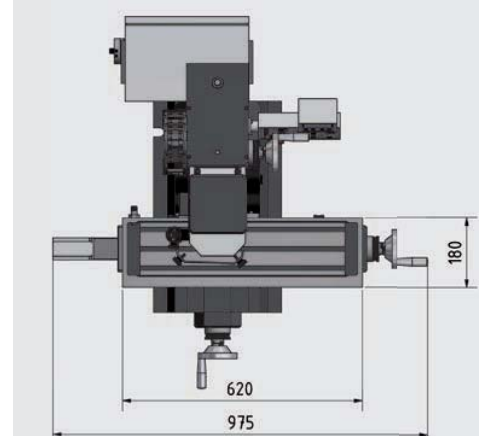
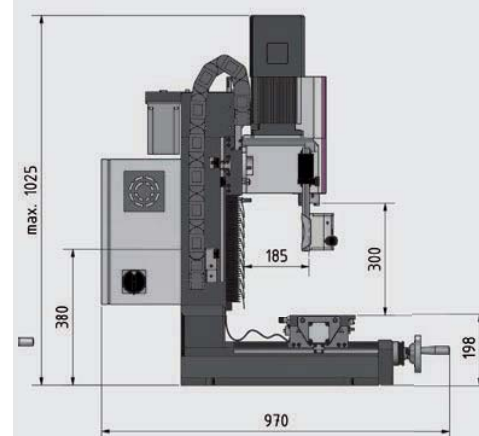
Technical specifications		
Electrical connection	230 V / 1 Ph ~50 Hz	
Total rated value	2 kW	
Milling spindle		
Drive motor	1.5 kW	
Drive motor torque	10 Nm	
Drilling/milling output		
Max. sensor head size	Ø 52 mm	
Max. shaft milling cutter size	Ø 25 mm	
Spindle		
Spindle seat	BT 30	
Throat	185 mm	
Drilling/milling head		
Spindle speeds	200 - 4 000 rpm	
Speeds	Electronic speed control	
Pivot range	45°	
Cross table		
Length x width	620 x 180 mm	
T-slot size / spacing / count	12 mm / 50 mm / 3	
Cross table max. load bearing capacity	30 kg	
Clearance spindle to cross table	300 mm	
Travel		
X axis	manual 400 mm	automatic 380 mm manual 400 mm
Y axis	manual 210 mm	automatic 130 mm manual 210 mm
Z axis	manual 270 mm	automatic 190 mm manual 270 mm
Torque		
X/Y/Z axis	-	2.2 / 2.2 / 4.2 Nm
Travel speeds		
X axis	-	150 - 930 mm/min.
Y axis	-	100 - 580 mm/min.
Z axis	-	80 - 450 mm/min.
Dimensions		
Length x width x height	970 x 975 x 1 025 mm	
Weight	192 kg	200 kg

Accessories	Article no.
Milling head holder Ø 22 mm	3353306
Chuck 1 - 13 mm	3536303
Weldon holder Ø 6 mm	3353310
Weldon holder Ø 8 mm	3353311
Weldon holder Ø 10 mm	3353312
Weldon holder Ø 12 mm	3353313
Weldon holder Ø 16 mm	3353314
Weldon holder Ø 20 mm	3353315
Adapter BT 30 - MT 2	3353305
Spring collet holder ER 32	3353304
Spring collet holder spanner ER 32	3353307
Collet kit ER 32	3441122
Height-adjuster	3536290
Assembly and tool adjustment gauge	3536193
Taper squeegee	3353301
Pull stud 40 x 45° M12	3353302
Pull stud DIN2080 M12	3536177
Assortment of clamping tools size 10, 58-parts	3352016
Universal chassis (information on page 135)	3353009
› More accessories for milling machines from page 126	

Important information on „Operation of machines with frequency converters“ on page 253  
The milling machines comply with DIN EN 55011:2011-04 class B Directive



### Dimensions



Accessories	Article no.
<b>Starter set BT 30</b>	3353282
› Milling head holder Ø 22 mm	
› Chuck 1 - 13 mm	
› 2 pcs. Weldon Ø 6 mm and 20 mm	
› 1 pc. each Weldon Ø 8 / 10 / 12 / 16 mm	
› BT 30 - MT 2 adapter	
› 3 pcs. spring collet holder ER 32	
› Spring collet key ER 32	
› 18-part Collet kit ER 32	
› Height-adjuster	
› Assembly and tool adjustment gauge	
› 14 pcs. pull studs	
› Taper squeegee	

Machine vices	Article no.
<b>FMS 100</b>	3354100
<b>VMQ 80</b>	3354180
<b>MV3-75</b>	3354175
<b>ZAS 50</b>	3354170
› Information about vices from page 120	

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## Sturdy drilling/milling machines with continuously variable electronic speed control. MH 22VD with digital position display DRO 5

### Facts that impress in terms of quality, performance and price

- ▶ Precision workmanship
- ▶ Clear-cut control panel with user friendly membrane keyboard
- ▶ Safety electrical system 24-volt version
- ▶ Easily readable digital display for speed and drilling depth
- ▶ Emergency stop button
- ▶ Motor with two-speed gear ratio for powerful transmission of motor output
- ▶ Powerful DC motor with permanent current monitoring
- ▶ Control electronics with integrated relay control
- ▶ Drilling/milling head pivots through  $\pm 90^\circ$  for milling and drilling work in any angled position
- ▶ Feed spindles can be adjusted without play thanks to adjustable spindle nuts
- ▶ Right-handed/left-handed rotation
- ▶ Machine lamp
- ▶ Excellent concentricity thanks to tapered roller bearings,  $\leq 0.015$  mm measured in the spindle sleeve

- ▶ Sturdy dovetail guide with adjustable V-ledges
- ▶ Solid cross table with precision surface and T-slots
- ▶ Adjustable cleats
- ▶ Adjustable limit stops
- ▶ Bore for easy oiling of the trapezoidal spindle
- ▶ Two-row angular contact ball bearings in the axes, adjustable without play
- ▶ Gaiter as guide protection
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Fine feed

### MH 22VD

- ▶ With digital position display DRO 5



Fig.: MH 22VD with optional accessories

## Technical specifications, accessories and dimensions

Model	MH 22V
Article no.	3338135
Model	MH 22VD
Article no.	3338136

Technical data	
Electrical connection	230 V / 1 Ph ~50 Hz
Motor output	950 W
Drilling/milling output	
Drilling performance in steel (S235JR)	Ø 20 mm
Cont. drilling performance steel	Ø 16 mm
Max. sensor head size	Ø 52 mm
Max. shaft milling cutter size	Ø 12 mm
Spindle	
Spindle sleeve stroke	50 mm
Spindle sleeve diameter	Ø 60 mm
Spindle seat	BT 20
Throat	170 mm
Drilling/milling head	
Spindle speeds	90 - 3 000 rpm
Speeds	2-speed, electronic speed control
Pivot range	± 90°
Cross table	
Length x width	700 x 180 mm
T-slot size / spacing / count	12 mm / 63 mm / 3
Max. load bearing capacity	50 kg
Clearance spindle to cross table	360 mm
Travel	
X axis	480 mm
Y axis	175 mm
Z axis	270 mm
Dimensions	
Length x width x height	745 x 650 x 950 mm
Overall weight	120 kg

Accessories	Article no.
<b>Starter kit BT 20</b> (info on page 127)	3353281
<b>Milling head holder</b> Ø 16 mm BT 20	3352728
<b>Chuck adapter</b> BT 20 - B16	3352727
<b>Weldon holder</b> Ø 6 mm BT 20	3352732
<b>Weldon holder</b> Ø 8 mm BT 20	3352734
<b>Weldon holder</b> Ø 10 mm BT 20	3352736
<b>Weldon holder</b> Ø 12 mm BT 20	3352738
<b>Collet chuck</b> ER 16	3352741
<b>Spring collet holder spanner</b> ER 16	3352742
<b>Collet kit</b> ER 16, 12-part, 1 - 10 mm	3440282
<b>Pull stud</b> BT 20	3352726
<b>Quick clamping drill chuck</b> 1 - 13 mm; B16	3050623
<b>Collet kit</b> MT 2/ M10, direct	3351980
<b>Collet kit</b> ER 25, 15-part	3441109
<b>End mill set</b> HSS TiN-coated	3352250
<b>Assembly kit for DRO5</b> on MH22V	3383990
<b>Universal chassis</b> (information on page 135)	3353000
<b>Chip tray</b> (information on page 135)	3352999
<b>Levelling platen</b> SE 55 (4 pcs. required)	3352981
› More accessories for milling machines from page 126	

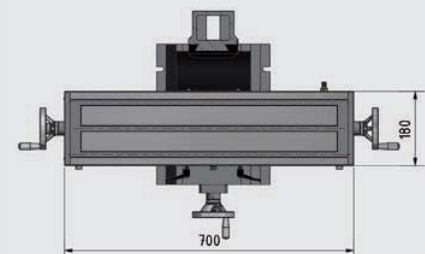
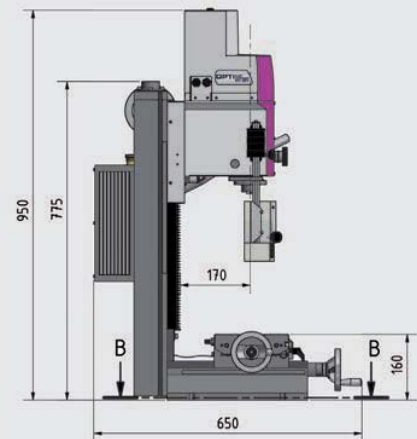
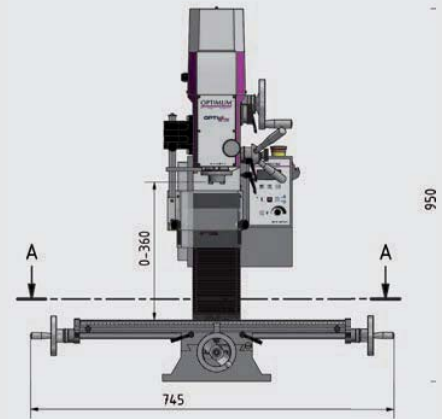
Machine vice	Article no.
<b>VMQ 80</b>	3354180
› Information about vices from page 120	

Important information on „Operation of machines with frequency converters“ on page 253

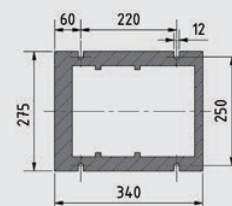
The milling machine MH 20V complies with the DIN EN 55011 standard: class C1. The milling machines MH 22V / VD comply with standard DIN EN 55011: class C2.



Dimensions MH 22V



B-B



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## Sturdy drilling/milling machines with continuously variable electronic speed control. MH 20VLD with digital position display DRO 5

### Facts that impress in terms of quality, performance and price

- ▶ Precision workmanship
- ▶ Clear-cut control panel with user friendly membrane keyboard
- ▶ Safety electrical system 24-volt version
- ▶ Easily readable digital display for speed and drilling depth
- ▶ Emergency stop button
- ▶ Motor with two-speed gear ratio for powerful transmission of motor output
- ▶ Powerful DC motor with permanent current monitoring
- ▶ Control electronics with integrated relay control
- ▶ Drilling/milling head pivots through  $\pm 90^\circ$  for milling and drilling work in any angled position
- ▶ Feed spindles can be adjusted without play thanks to adjustable spindle nuts
- ▶ Right-handed/left-handed rotation
- ▶ Machine lamp
- ▶ Excellent concentricity thanks to tapered roller bearings,  $\leq 0.015$  mm measured in the spindle sleeve
- ▶ Sturdy dovetail guide with adjustable V-ledges
- ▶ Solid cross table with precision surface and T-slots
- ▶ Adjustable cleats
- ▶ Adjustable limit stops
- ▶ Bore for easy oiling of the trapezoidal spindle
- ▶ Two-row angular contact ball bearings in the axes, adjustable without play
- ▶ Gaiter as guide protection
- ▶ Height-adjustable protective screen with microswitch for best possible user protection against chips and parts being flung out
- ▶ Fine feed
- ▶ X, Y and Z column axis with groove prepared for easy retroactive mounting of magnetic strips

### MH 20VD / MH 20VLD

- ▶ With digital position display DRO 5



Fig.: MH 20V



## Technical specifications, accessories and dimensions

Model	MH 20V	MH 20VL
Article no.	3338115	3338111
Model	MH 20VLD	
Article no.	-	3338112

Technical data		
Electrical connection	230 V / 1 Ph ~50 Hz	
Motor output	750 W	
Drilling/milling output		
Drilling performance in steel (S235JR)	Ø 16 mm	
Cont. drilling performance steel	Ø 12 mm	
Max. sensor head size	Ø 52 mm	
Max. shaft milling cutter size	Ø 20 mm	
Spindle		
Spindle sleeve stroke	50 mm	
Spindle sleeve diameter	Ø 60 mm	
Spindle seat	MK 2	
Throat	170 mm	
Drilling/milling head		
Spindle speeds	100 - 3.000 min <sup>-1</sup>	
Speeds	2 Stufen, Drehzahl elektronisch regelbar	
Pivot range	± 90°	
Cross table		
Length x width	510 x 180 mm	700 x 180 mm
T-slot size / spacing / count	12 mm / 63 mm / 3	
Max. load bearing capacity	50 kg	
Clearance spindle to cross table	255 mm	360 mm
Travel		
X axis	280 mm	480 mm
Y axis	175 mm	
Z axis	210 mm	
Dimensions		
Length x width x height	750 x 650 x 820 mm	770 x 714 x 917 mm
Overall weight	94 kg	99 kg

Accessories	Article no.
Quick clamping drill chuck 1 - 13 mm; B16	3050623
Collet kit MT 2/ M10, direct	3351980
Collet kit ER 25, 15-part	3441109
End mill set HSS TiN-coated	3352250
Assembly kit for DRO5 on MH22V	3352255
Universal chassis (information on page 135)	3441109
Chip tray (information on page 135)	3383990
Universal chassis (Informationen on page 135)	3353000
Chip tray (information on page 135)	3352999
Vibration dampers machine base SE1	3381012
Levelling platen SE 55 (4 pcs. required)	3352981
> „Accessories for milling machines“ on page 130	

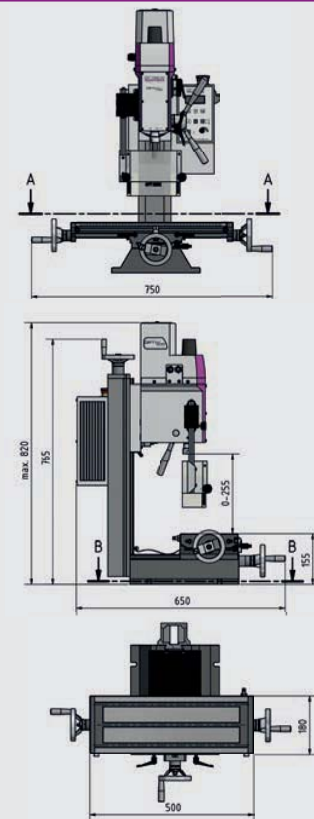
Machine vice	Article no.
VMQ 80	3354180
FMS 100	3354100
FMSN 100	3354110
VMQ 80	3354180
VMQ 100	3354181
ZAS 50	3354170
> Information about vices from page 120	

Important information on „Operation of machines with frequency converters“ on page 253

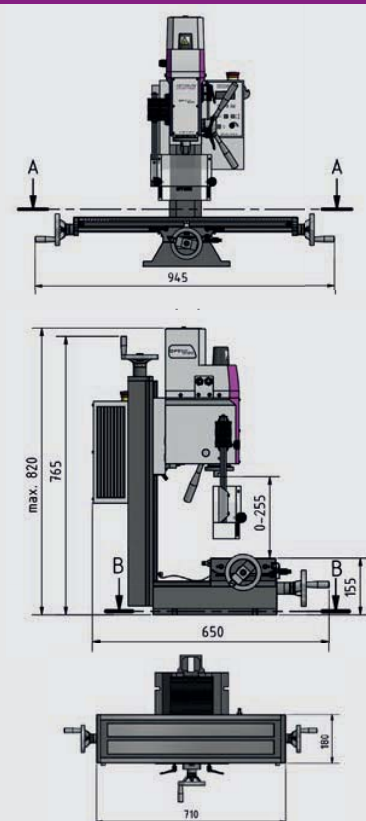
The milling machine MH 20V complies with the DIN EN 55011 standard: class C1. The milling machines MH 22V / VD comply with standard DIN EN 55011: class C2.



Dimensions MH 20V



Dimensions MH 20VL



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## Small drilling/milling machine with electronic, continuously controllable drive for model makers

### Facts that impress in terms of quality, performance and price

- ▶ Versatile deployment options
- ▶ Two-speed transmission ratio
- ▶ Tool holder MT 2
- ▶ Safety electrical system 24-volt version
- ▶ EMC filter class C1
- ▶ Drilling-milling head pivots through  $\pm 90^\circ$  for drilling and milling work at angles when required
- ▶ Height-adjustable, large protective screen with micro switch
- ▶ Precise feed thanks to positioning capable scale rings on all handwheels
- ▶ Simple and clear-cut operating unit with on/off switch, potentiometer and emergency-stop shock switch
- ▶ Infinitely variable speed from 100 to 3 000 rpm
- ▶ Excellent concentricity thanks to tapered roller bearings, better than 0.015 mm measured in the spindle sleeve
- ▶ Stable column with dovetail guide, adjustable on all 3 axes via V-ledges
- ▶ Feed spindle play adjustable and re-adjustable
- ▶ Column can be displaced laterally to extend the range of applications
- ▶ Solid cross table with T-slots, coolant channel and adjustable limit stops
- ▶ Longitudinal scale inset in Cross table
- ▶ All travel can be read off on scales
- ▶ Perfect milling surface thanks individually clampable guideways
- ▶ Inexpensive, lasting value



#### Accessories

**Digital position display DRO 5**  
Art. no. 3383975

**Factory assembly DRO 5**  
Art. no. 9000420

**Magnetic strip per metre**  
Art. no. 3383980

#### Accessories

**Universal chassis**  
Dimensions L x B x W: 420 x 340 x 800 mm  
Art. no. 3353000

**Chip tray**  
Dimensions L x W x H: 720 x 470 x 30 mm  
Art. no. 3352999

**Vibration dampers machine base SE 1**  
(4 pcs. needed)  
Art. no. 3381012



Fig.: BF 16 Vario with optional accessories

## Technical specifications, accessories and dimensions

Model	BF 16 Vario
Article no.	3338116
<b>Technical data</b>	
Electrical connection	230 V / 1 Ph ~50 Hz
Motor output	500 W
<b>Drilling/milling output</b>	
Drilling performance in steel (S235JR)	Ø 16 mm
Continuous drilling performance in steel (S235JR)	Ø 12 mm
Max. sensor head size	Ø 52 mm
Max. shaft milling cutter size	Ø 20 mm
<b>Spindle</b>	
Spindle sleeve stroke	50 mm
Spindle seat	MT 2 / M10
Throat	170 mm
Draw-in rod	M 10
<b>Drilling/milling head</b>	
Spindle speeds	100 - 3 000 rpm
Speeds	2-speed, electronic speed control
Pivot range	± 90°
<b>Cross table</b>	
Length x width	400 x 120 mm
T-slot size / spacing / count	10 mm / 35 mm / 3
Clearance spindle to cross table	275 mm
<b>Travel</b>	
X axis	220 mm
Y axis	160 mm
Z axis	210 mm
<b>Dimensions</b>	
Length x width x height	505 x 465 x 795 mm
Weight	62 kg

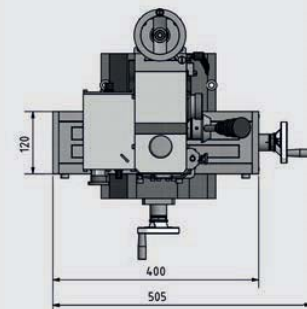
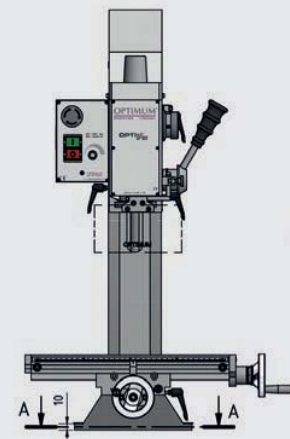
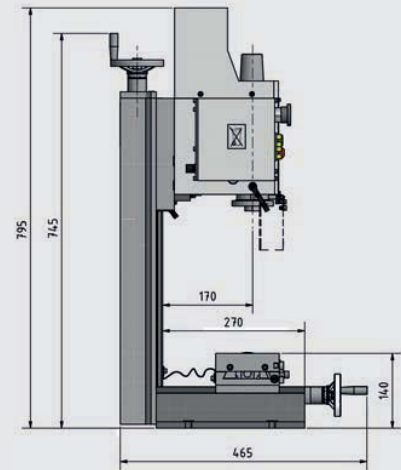
Accessories	Article no.
Collet kit MT 2 / M10, 5-part	3351980
Collet kit ER 25, 15-part	3441109
Collet chuck set MT 2/ ER 25	3352052
Collet chuck set MT 2/ ER 32	3352053
End mill set HSS TiN-coated 12-part	3352250
End mill set HSS TiN-coated 20-part	3352255
Quick clamping drill chuck 1 - 13 mm B16	3050623
Assortment of clamping tools size 8	3352015
T-slot nut M 8 / 10 mm	3353020
Universal coolant unit 230 V	3352002
Coolant mist lubricator MMC 1 with magnetic holder	3356663
Coolant hose KMS 2	3356660
› More accessories for milling machines from page 126	

Machine vice	Article no.
VMQ 80	3354180
› Information about vices from page 120	

Important information on „Operation of machines with frequency converters“ on page 253  
The milling machine complies with the DIN EN 55011 standard: class C1.



### Dimensions



### Scope of supply

- › Tapered mandrel MT 2/B16
- › Draw-in rod M10
- › Operating tool

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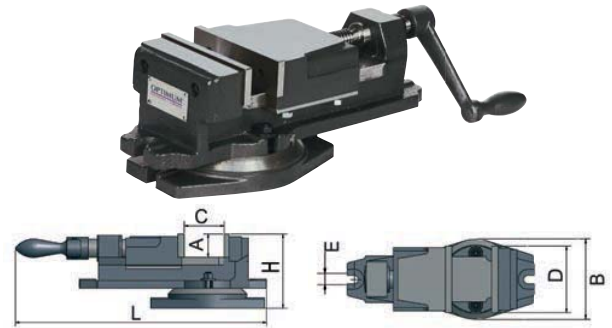
## Compatibility overview vises for milling machines

Accessories		Article no.	BF 16	MH 20	MH 22	MH 25	MB 4	MH 35	MH 50	MB 4P	MB 4PV	MT 50E	MT 50	MT 60	MF 2-B	MF 4-B	MF 2V	MF 4V	MT 130	MT 100	MT 200	MT 230	MT 8	MZ 2	MZ 4
Machine vices FMS	100	3354100	●	●	●	●	●			●	●														
	125	3354125					●	●	●	●	●	●	●	●	●		●							●	●
	150	3354150														●		●	●	●				●	●
	200	3354200																			●	●	●		
Machine vices HMS	100	3355100					●	●		●	●														
	125	3355127													●	●	●	●	●	●	●	●		●	●
	150	3355150																					●		●
	200	3355200																						●	●
Machine vices FMSN	100	3354110	●	●	●	●																			
	125	3354120					●	●	●	●	●	●	●	●	●		●							●	●
	150	3354130														●		●	●	●			●	●	●
Machine vices VMQ	80	3354180	●	●	●	●																			
	100	3354181	●	●	●		●	●	●	●	●	●	●	●	●		●							●	●
	125	3354182														●		●	●	●			●	●	●
	150	3354183																						●	●
Three-axis vices MV3	75	3354175	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	125	3354178											●	●	●	●	●	●	●	●	●	●	●	●	●
Two-axis vice ZAS	50	3354170	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three-axis vice DAS	100	3355500					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Machine vice HCV	105	3536210													●	●	●	●	●	●	●	●	●	●	●
	125	3536214													●	●	●	●	●	●	●	●	●	●	●
Machine vice MVSP	150 x 200	3530104																						●	●
	150 x 200	3530108																						●	●

**Precision machine vices FMS**

- › Robust design for milling, drilling and grinding
- › Vice body made of premium cast material
- › Guide surfaces tempered and polished
- › Hardened and polished clamping jaws, replaceable
- › With turntable, rotating through 360°

	Art.no.
<b>FMS 100</b>	3354100
<b>FMS 125</b>	3354125
<b>FMS 150</b>	3354150
<b>FMS 200</b>	3354200
<b>Prism jaws</b>	<b>Art.no.</b>
for <b>FMS 100</b>	3354102
for <b>FMS 125</b>	3354127
for <b>FMS 150</b>	3354152
for <b>FMS 200</b>	3354202



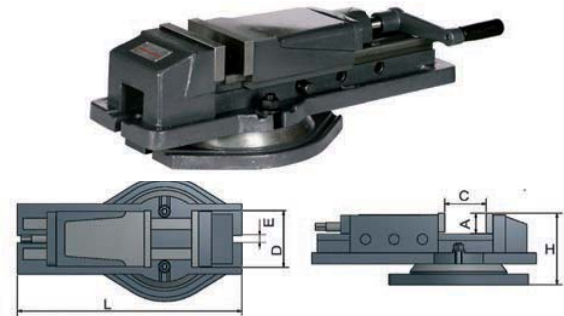
Tech. data	A	C	D	E	L	B	H	kg
FMS 100 mm	30	62	100	13	295	124	100	11
FMS 125 mm	37	85	125	13	370	148	128	17
FMS 150 mm	40	114	150	13	462	180	145	28
FMS 200 mm	58	150	200	16.5	620	237	202	58

**Hydraulic machine vices HMS**

- › Robust design for milling, drilling and grinding
- › Vice body made of premium cast material
- › Guide surfaces tempered and polished
- › Booster system: requires little force, high pressure build-up during clamping
- › Large clamping range due to lock bolts with various hole spacings
- › With turntable, rotating through 360°. Protected spindle

	Art.no.
<b>HMS 100</b>	3355100
<b>HMS 125</b>	3355127
<b>HMS 150</b>	3355150
<b>HMS 200</b>	3355200

Prism jaws	Art.no.
for <b>HMS 100</b>	3355102
für <b>HMS 125</b>	3355129
for <b>HMS 150</b>	3355152
for <b>HMS 200</b>	3355202



	A	D	E	L	B	H	kg
HMS 100 mm	36	100	15	525	Ø 270	122	27
HMS 125 mm	46	127	16	670	Ø 290	151	46
HMS 150 mm	51	150	17	800	Ø 328	169	64
HMS 200 mm	65	200	19	710	Ø 358	158	100

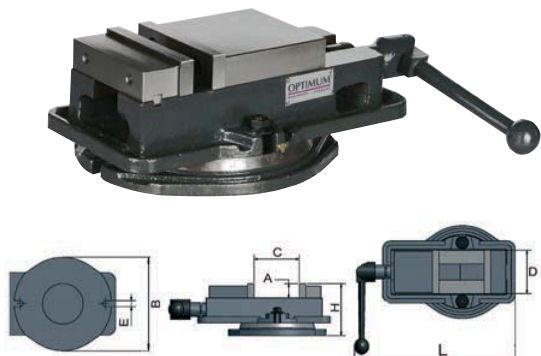
C	Span			Clamping pressure	
HMS 100	0 - 60 mm	57 - 115 mm	110 - 170 mm	2 500 kg	24,5 kN
HMS 125	0 - 76 mm	72 - 150 mm	146 - 224 mm	4 000 kg	39.25 kN
HMS 150	0 - 100 mm	98 - 200 mm	195 - 300 mm	4 500 kg	44.1 kN
HMS 200	0 - 100 mm	98 - 200 mm	195 - 300 mm	7 500 kg	73.6 kN

**Precision machine vices FMSN**

- › Vice body made of premium cast material
- › Guide surfaces tempered and polished
- › Hardened and polished clamping jaws, replaceable
- › Protected spindle
- › Clamping outward by repositioning the clamping jaws
- › With turntable, rotating through 360°

	Art.no.
<b>FMSN 100</b>	3354110
<b>FMSN 125</b>	3354120
<b>FMSN 150</b>	3354130

Prism jaws	Art.no.
for <b>FMSN 100</b>	3354112
for <b>FMSN 125</b>	3354122
for <b>FMSN 150</b>	3354132

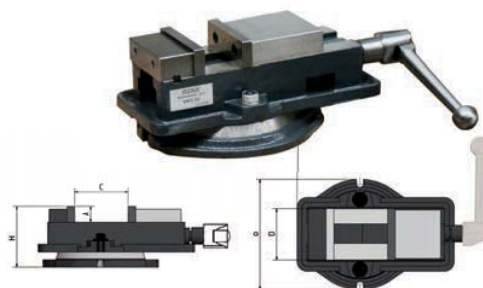


Tech. data	A	C	D	E	L	B	H	kg
FMSN 100 mm	36	101	100	14.5	319	Ø 240	319	19
FMSN 125 mm	36	108	135	16.5	369	Ø 278	369	29
FMSN 150 mm	46	146	155	18.5	425	Ø 332	425	36

## Machine vices

### Milling machine vices VMQ

- › Robust design for milling, drilling and grinding
- › Vice body made of premium cast material
- › Guide surfaces tempered and polished
- › Hardened and polished clamping jaws
- › With turntable, rotating through 360°



	Art. no.
<b>VMQ 80</b>	3354180
<b>VMQ 100</b>	3354181
<b>VMQ 125</b>	3354182
<b>VMQ 150</b>	3354183

Tech. data		A	C	D	L	B	H	kg
VMQ 80	mm	26	80	80	305	160	100	9,5
VMQ 100	mm	34	105	105	385	222	126	21
VMQ 125	mm	36	130	134	430	247	135	30
VMQ 150	mm	46	145	158	488	290	162	39

### Three-axis vice MV3

- › Horizontal swivel movement to 90°
- › Vertical swivel movement to  $\pm 45^\circ$
- › Hardened and polished clamping jaws
- › With turntable, rotating through 360°



	Art. no.
<b>MV3-75</b>	3354175
<b>MV3-125</b>	3354178

Tech. data		A	C	D	E	L	B	H	kg
MV3-75	mm	34	82	75.5	12	380	139	150	11
MV3-125	mm	45	97	125	12	290	185	206	26

### Two-axis vice ZAS

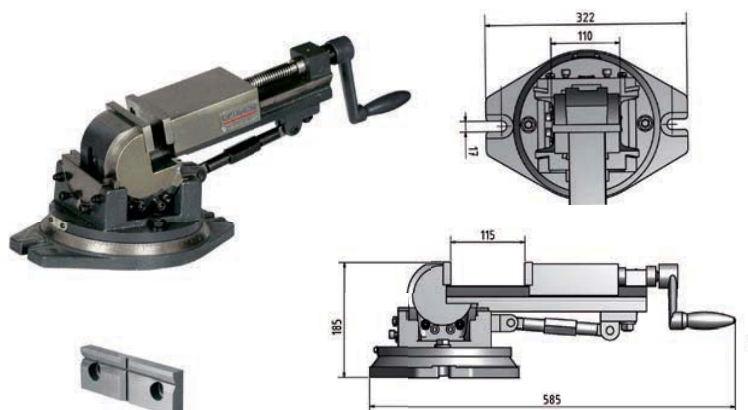
- › Tilts to  $-90^\circ$
- › Hardened and polished clamping jaws
- › Easily readable scales for both axes
- › With turntable, rotating through 360°
- › Weight 3.4 kg



	Art. no.
<b>ZAS 50</b>	3354170

### Three-axis vice DAS 100

- › Premium cast material
- › Guide surfaces tempered and polished
- › With turntable, rotating through 360°
- › Horizontal swivel movement to 90°
- › Vertical swivel movement to  $\pm 45^\circ$  above thread spindle
- › Weight: 32 kg

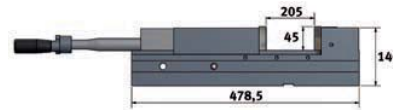


	Art. no.
<b>DAS 100</b>	3355500
<b>Prism jaws</b>	
for <b>DAS 100</b>	3355502



#### Hydraulic machine vice HCV 125

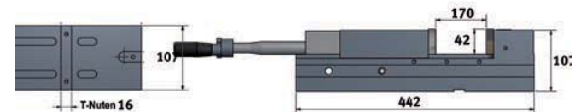
- › Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines
- › Robust design for milling
- › Guide surfaces tempered and polished
- › Booster system: requires little force, high pressure build-up during clamping
- › Large clamping range due to lock bolts with various hole spacings
- › Made of premium grade stainless steel



	Art. no.
<b>HCV 125</b>	3536214
<b>Soft jaws 2 pcs.</b>	3536221
<b>L jaws 2 pcs.</b>	3536222

#### Hydraulic machine vice HCV 105

- › Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines and machining centres
- › Robust design for milling
- › Guide surfaces tempered and polished
- › Booster system: requires little force, high pressure build-up during clamping
- › Large clamping range due to lock bolts with various hole spacings
- › Made of premium grade stainless steel
- › Long service life thanks to high quality
- › High clamping force

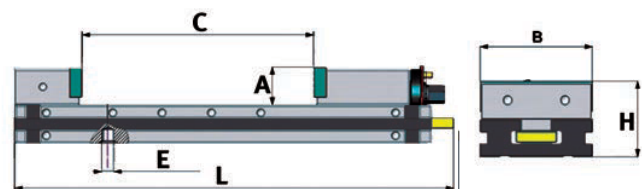


	Art. no.
<b>HCV 105</b>	3536210

C	Span	Clamping pressure	Weight
0 - 85 mm	85 - 170 mm	2 500 kg	24.5 kN
			22 kg

#### Modular machine vice

- › Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines and machining centres
- › Robust design for milling
- › Modular machine vice made completely of NiCrMo steel with hardness HRC60, tolerance 0.0015 mm
- › Mobile jaws with extra long guides to prevent lift-off and slingshot risk
- › Guide surfaces tempered and polished
- › Large clamping range due to lock bolts with various hole spacings
- › Long service life thanks to high quality
- › Includes spanner
- › Model MVSP with fixed jaws



	Art. no.
<b>MVSP 150 x 200</b>	3530104
<b>MVSP 150 x 300</b>	3530108

Tech. data	A	C	E	L	B	H	kg
MVSP 150x200 mm	50	205	16	480	149	100	34
MVSP 150x300 mm	50	305	16	580	149	100	38.6

## Compatibility overview accessories for milling machines

Accessories		Article no.	BF 16	MH 20	MH 22	MH 25	MB 4	MH 35	MH 50	MB 4P	MB 4PV	MT 50E	MT 50	MT 60	MF 2-B	MF 4-B	MF 2V	MF 4V	MT 130	MT 100	MT 200	MT 230	MT 8		MZ 2	MZ 4	
			MT 2	MT 2	BT 20	BT 30	MT 4	BT 30	BT 40	MT 4	MT 4	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 50	ISO 50	ISO 40	ISO 50	ISO 40	ISO 40	ISO 40
Horizontal-vertical rotary indexing table	RT 100	3356110	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○
	RT 150	3356150					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	RT 200	3356200										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Horizontal-vertical rotary indexing table	RTE 165	3356365					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	RTU 165	3354165					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Universal dividing head	TA 125	3356125					○	○	○	○	○	○	●	●	○	○	○	○	○	●	●	●	●	●	●	●	●
End mill set HSS	12-part	3352250	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	20-part	3352255	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Twist drill HSS	MT 2	3051002					●																				
	MT 3	3051003					●		●								●	●	●	●			●		●	●	
Milling cutter set HM	Hard metal	3352118	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Milling cutter set HM	Radius	3352116	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Assortment of clamping tools	Size 8	3352015	●																								
	Size 10	3352016		●	●	●		●																			
	Size 12	3352017					●			●	●	●	●	●						●	●	●			●	●	
	Size 14	3352018													●	●	●	●									
	Size 16	3352019							●													●	●	●			
Edge sensor		3351171	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●
Quick release chuck	1 - 8 mm B16	3050608	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●
	1 - 10 mm B16	3050610	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●
	1 - 13 mm B16	3050623	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●
	1 - 16 mm B16	3050626	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●
	1 - 16 mm B18	3050630																			○	○		●			
Morse cone	SK50 B18	3352067																			●	●		●			
Extension sleeve	MK2-MK3	3050667																									
	MK3-MK4	3050668																									
Reducing sleeve	MK3-MK2	3350313							●								●	●	●	●				●		●	●
	MK4-MK3	3350314					●			●	●																
Arbor for drill chuck	MT 2	3050670	●	●																							
	MT 4	3350304					●			●	●																
	ISO 40	3352070										●	●	●	●	●	●	●	●	●	●		●		●	●	
Shank Blade head	MT 2	3352102	●	●																							
Copying and facing blade head	BT 20	3350202			●																						
	BT 30	3350203				●		●																			
	MT 2/M10	3350212	●	●																							
	BT 40	3350204																									
	MT 4/M16	3350214					●			●	●																
	ISO 40	3350216							●				●	●	●	●	●	●	●	●	●		●		●	●	
Pull stud	BT 20	3352726			●																						
	BT 30	3536302				●		●																			
	BT 40	3536332							●																		
Precision Bore head set	ISO 40	3352128										●	●	●	●	●	●	●	●	●	●		●		●	●	
	ISO 50	3352129																			●	●		●			

Accessories		Article no.	BF 16	MH 20	MH 22	MH 25	MB 4	MH 35	MH 50	MB 4P	MB 4PV	MT 50E	MT 50	MT 60	MF 2-B	MF 4-B	MF 2V	MF 4V	MT 130	MT 100	MT 200	MT 230	MT 8	MZ 2	MZ 4
			MT 2	MT 2	BT 20	BT 30	MT 4	BT 30	BT 40	MT 4	MT 4	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40	ISO 40
Bore head set		MT 4	3352084																						
Collet chuck set	MT 2/ER25	3352052																							
	MT 2/ER32	3352053																							
	MT 4/M16	3352094																							
	ISO 30	3352054																							
	ISO 40	3352056																							
Collet kit	ER 16	3440282																							
	ER 25	3441109																							
	ER 32	3441122																							
Collet chuck set	MT 2 direct	3351980																							
Vibration damper	SE 1	3381012																							
	SE 2	3381016																							
	SE 3	3381018																							
Try square 90	90°	3385052																							
Prism elbow	WP30	3352195																							
Levelling platen/ vibration damper	SE 55	3352981																							
	SE 85	3352982																							
Precision machine shoe	SEU1	3352985																							
Table feed	V 99	3352022																							
	V 250	3352029																							
Tool clamping system	ISO 40	3352394																							
Thread tapper	M5-M12	3352042																							
Workpiece support	WPS-1	3354261																							
	WPS-2	3354262																							
	WPS-3	3354263																							
	WPS-4	3354264																							
T-slot nut	M8 -10 mm	3353020																							
	M10 -12 mm	3353022																							
	M12 -14 mm	3353025																							
	M14 -16 mm	3353026																							
	M16 -18 mm	3353028																							
Hold-down device	14 mm	3352031																							
	18 mm	3352032																							
Parallel spacer kit		3354001																							
Coolant pump	230 V	3352002																							
Coolant hose	KMS2	3356660																							
Coolant mist lubricator	MMC1	3356663																							
Starter set	BT 20	3353281																							
	BT 30	3353282																							
	BT 40	3353284																							
Base structures		3353000																							
		3353009																							
		3353014																							
		3353015																							

This equipment table covers all recommended equipment options. Depending on the individual case, use of accessories can be meaningful beyond this.

● Recommended ○ Recommended - restrictions apply

## Rotary indexing tables

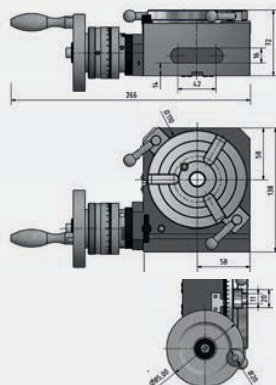
### Horizontal-vertical rotary indexing tables

- › Quality rotary indexing tables made of premium cast meehanite
- › Precision bearing
- › Stability also under high load
- › Large spindle bore for clamping longer workpieces
- › Fast indexing via serrated locking plates for higher production speeds for mass-produced parts
- › Worm gear tempered and polished
- › Work table with 360° scale
- › 1 revolution of handwheel 4° rotation
- › Scale division on handwheel 2'
- › Indexing via handwheel with vernier scale possible
- › Up to 150 items (RT 150) and 400 items (RT 200) various indexing options possible with indirect indexing disks

Technical specifications		RT 100	RT 150	RT 200
Centring cone		MT 2	MT 2	MT 3
Transmission ratio		90:1	90:1	90:1
disc size	mm	110	150	200
Closed height x L x W	mm	72 x 138 x 118	79 x 204 x 156	104 x 265 x 199
Max. height	mm	80	102	133
Slot width/count	mm	11/3	11/3	16/3
Weight	kg	5	10	25

### Horizontal-vertical rotary indexing table RT 100

Article no.



#### Rotary indexing table RT 100

- › 2 Clamping blocks
- › Centring cone MT 2

3356110

#### Three-jaw lathe chuck 75 mm

3356111

#### Tailstock Rst 1

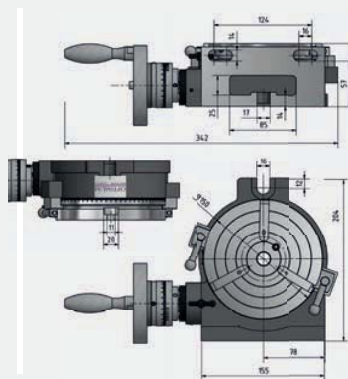
Centre height 72 - 108 mm

3356155



### Horizontal-vertical rotary indexing table RT 150

Article no.



#### Rotary indexing table RT 150

- › 2 Clamping blocks
- › Centring cone MT 2

3356150

#### Chuck flange

3356154

#### Three-jaw lathe chuck Ø 130 mm centric

3356100

#### Indirect indexer IT 150

- › 3 Indexing disks
- › Sector arm
- › Angle shears with spring plate

3356152



#### Tailstock Rst 1

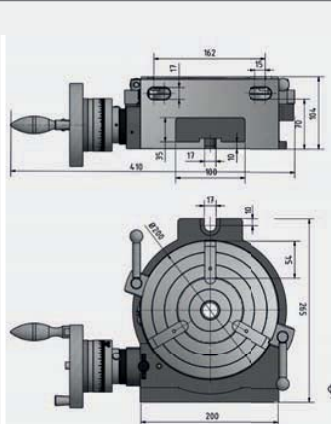
Max. height 72 - 108 mm

3356155



### Horizontal-vertical rotary indexing table RT 200

Article no.



#### Rotary indexing table RT 200

- › 2 Clamping blocks
- › Centring cone MT 3

3356200

#### Chuck flange

3356254

#### Three-jaw lathe chuck 165 mm

3356225

#### Indirect indexer IT 200

- › 2 Indexing disks
- › Sector arm
- › Angle shears with spring plate

3356205



#### Tailstock Rst 2

› Max. height 110 - 145 mm

3356157





### Horizontal-vertical rotary indexing table with 3-jaw chuck

- › Quality rotary indexing tables made of premium cast meehanite
- › Precision taper roller bearing
- › Stability also under high load
- › Large spindle bore for clamping longer workpieces
- › Direct indexing via serrated locking plates for higher production speeds for mass-produced parts
- › Degree indexing via 360° scale (RTE 165)
- › 7 serrated locking plates for 2/3/4/6/8/12/24x divisions (RTE 165)
- › Degree indexing via 360° scale with crank and vernier scale (RTU 165)
- › Direct indexing via serrated locking plate
- › 24 positions (15° indexing)
- › Three-jaw chuck
- › Including clamping disc with 3 grooves

Technical specifications		RTE 165	RTU 165
Table diameter	mm	165	165
Closed height x width x length	mm	200 x 260 x 218	221 x 250 x 235
Centre height	mm	130	130
Clamping disc	mm	203	203
Passageway	mm	36	36
Weight	kg	32.5	48

Technical specifications		RTE 165	RTU 165
Direct indexing disc		24x division (= 15°)	
Indirect indexing disc		2, 3, 4, 6, 8 and 12x division	
Indexing precision of direct indexer		45'	
Clamping options		Horizontal and vertical	
Workpiece mounting surface		With scale 360°	

### Horizontal-vertical rotary indexing table RTE 165

Article no.



#### Rotary indexing table RTE 165

- › 3-jaw chuck (mounted)
- › Clamping disc
- › Main indexing disk (24x division, mounted)
- › 6 Indexing disks

3356365

#### Tailstock Rst 2

Max. height 110 - 145 mm

3356157

### Horizontal-vertical rotary indexing table RTU 165

Article no.



#### Rotary indexing table RTU 165

- › 3-jaw chuck (mounted)
- › Clamping disc
- › Main indexing disk (24x division, mounted)
- › 6 Indexing disks
- › Grips for handwheel

3354165

#### Indirect indexer IT 200

- › 3 Indexing disks
- › Sector arm
- › Angle shears with spring plate

3356205

#### Tailstock Rst 2

Max. height 110 - 145 mm 72 - 108 mm

3356157

### Universal dividing head TA 125

3356125

- › Swivels from -10° to +90°
- › Hardened and polished worm gear
- › Precision taper roller bearing
- › Hardened and polished main indexing disc (24x division), to index directly at 15°
- › Up to 300 indexing options possible with indirect indexing disks



#### Scope of supply

- › Tailstock Rst1 (peak height 72 - 108 mm)
- › Centre point 60° / MT 2
- › Lathe dog (tang)
- › Chuck flange (Ø 140 mm, t = 12 mm) for carrier p
- › mounting a lathe chuck
- › 3 pcs. Indirect indexing disc

Technical specifications	
Transmission	40:1
Closed height x width with centre x length	175 x 205 x 230 mm
Max. height	100 mm
Bore in mounting shaft (keyway)	18 mm
Slot width	16 mm
Direct indexing disc (Pitch)	15° / Ø 110 mm
Indirect indexing disc (Bore on reference circle)	15, 16, 17, 18, 19, 20, 21, 23, 27, 29, 31, 33, 37, 39, 41, 43, 47
Concentricity	0.015 mm
Weight	12 kg

## Accessories for milling machines

### End mill set HSS

- › Titanium coated
- › Improved hardness and stability with 2x to 5x service life
- › Twice the machining performance
- › Improved workpiece finish
- › Cylindrical shank and lateral lugs
- › Version with 2 cutting edges for milling keyways/fixing grooves and milling out the workpiece centre
- › Vertical or lateral milling possible
- › Version with 4 cutting edges and 30° right-hand twist for good chip removal in normal to hard materials

**12-part** 3352250

- › 6 end mills, short version · Version with 2 cutting edges.  
DIN 1835 B (Ø12x73, Ø10 x 63, Ø8 x 61, Ø6 x 52, Ø5 x 52, Ø4 x 51 mm)
- › 6 end mills, short version · Version with 4 cutting edges.  
DIN 1835 B (Ø12 x 83, Ø10 x 73, Ø8 x 61, Ø6 x 57, Ø5 x 57, Ø4 x 55 mm)

**20-part** 3352255

- › 10 end mills DIN 327 D · Short version · 2 cutting edges  
DIN 1835 B, (3/4/5/6/8/10/12/14/18/20 mm)
- › 10 end mills DIN 844 B · Short version · 4 cutting edges  
DIN 1835 B, (3/4/5/6/8/10/12/14/18/20 mm)



### Carbide end mill set

3352118

- › **18-part**; 3 each in the sizes 3/4/6/8/10 and 12 mm
- › 4-cutting edge version
- › Coated solid carbide end mill (TiAlN)
- › Centre cut for plunging
- › Rake angle 35°

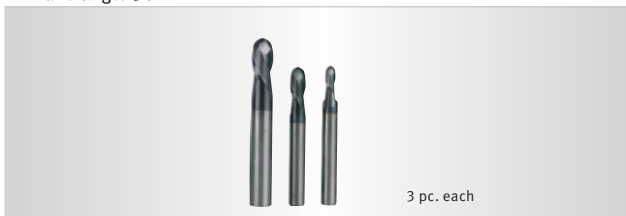


3 pc. each

### Radius end mill set

3352116

- › **9-part**; 3 each in the sizes 4 mm / 6 mm / 8 mm
- › 2-cutting edge version
- › Coated solid carbide end mill (TiAlN)
- › Face cutting geometry for plunging
- › Rake angle 30°



3 pc. each

### Twist drill HSS with morse taper

- › 9-part; sizes 14.5/16/18/20/22/24/26/28/30 mm
- › Long service life.
- › Good chip removal
- › Right handed

<b>MT 2</b>	3051002
<b>MT 3</b>	3051003



### Assortment of clamping tools size

- › 58-part, in practical wall-mount holder
- › Metric thread
- › 24 pcs. pull studs
- › 6 pcs. T-slot nuts
- › 6 pcs. nuts
- › 4 pcs. extension nuts
- › 6 pcs. step blocks
- › 12 pcs. step blocks

**Size 8** 3352015

- › T-slot nuts 10 mm; locking thread M 8

**Size 10** 3352016

- › T-slot nuts 12 mm; locking thread M10

**Size 12** 3352017

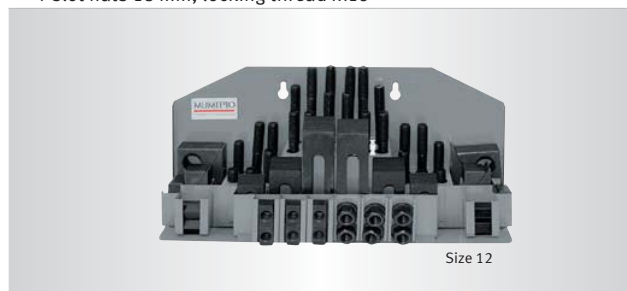
- › T-slot nuts 14 mm; locking thread M12

**Size 14** 3352018

- › T-slot nuts 16 mm; locking thread M 14

**Size 16** 3352019

- › T-slot nuts 18 mm; locking thread M16



### Edge sensor

3351171

- › Rotating spindle
- › Probe Ø 10 mm
- › Shaft 10 mm



#### Precision quick release chuck

Concentricity better than 0.06 mm

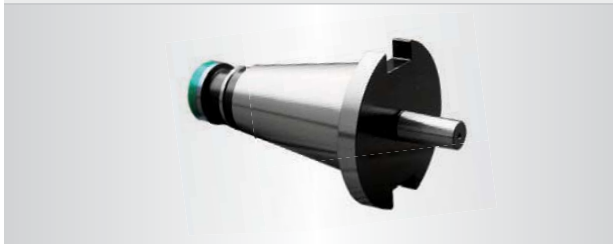
<b>1 - 8 mm; B16</b>	3050608
<b>1 - 10 mm; B16</b>	3050610
<b>1 - 13 mm; B16</b>	3050623
<b>1 - 16 mm; B16</b>	3050626
<b>1 - 16 mm; B18</b>	3050630



#### Morse cone SK 50

3352067

B18 DIN2080



#### OPTIMUM Direct quick release chuck

<b>MT 2 1 - 16 mm; up to 6 000 rpm</b>	3050571
<b>MT 2 1 - 13 mm; up to 8 000 rpm</b>	3050572
<b>MT 3 1 - 16 mm; up to 6 000 rpm</b>	3050573
<b>MT 4 1 - 16 mm; up to 6 000 rpm</b>	3050574



#### Extension sleeves

<b>MT 2 - MT 3</b>	3050667
<b>MT 3 - MT 4</b>	3050668



#### Reducing sleeve

<b>MT 3 - MT 2 / M12</b>	3350313
<b>MT 4 - MT 3 / M16</b>	3350314



#### Arbor for drill chuck

External taper <b>MT 2 / M10 / B16</b>	3050670
External taper <b>MT 3 / M12 / B16</b>	3350303
External taper <b>MT 4 / M16 / B16</b>	3350304



#### Arbor for drill chuck

External taper <b>ISO 30 / M12 / B16</b>	3352069
External taper <b>ISO 40 / M16 / B16</b>	3352070



#### Milling head holder

<b>SK 50</b>	3352066
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› External taper Ø 27 mm DIN2080



#### Milling head holder

<b>MT 2</b>	3352102
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› External taper MT 2 / end mill holder Ø 16 mm



#### Adapter

<b>ISO 30 / MT 3</b>	3352068
<b>BT 30 / MT 3</b>	3536316



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## Accessories for milling machines

### Copying and facing blade head

Univ. deployment in machining of all steels and NF metals	
For facing and copying	
Made of special steel - highly quenched	MADE IN GERMANY
Excellent planarity and concentricity	
Milling body with asymmetrical division for extremely smooth action and uniform cutting	
Body and clamping shank form a unit for a short projection length and stable clamping	
No additional end mill mandrel used	
Special geometry for high-speed milling	
Economical as the platen can simply be rotated forward when the cutting edge is blunt (usable up to twelve times)	
Indexable inserts Ø 10 mm	
Includes five turning plates RDET 1003 MOSN 8026	
Includes Torx TX15	
Tool holder shank <b>BT 20</b>	3350202
Tool holder shank <b>BT 30</b>	3350203
Pull stud <b>BT 20</b>	3352726
Pull stud <b>BT 30</b>	3536302
Tool holder shank <b>MT 2/M10</b>	3350212
Tool holder shank <b>MT 3/M12</b>	3350213
Tool holder shank <b>ISO 30/DIN 2080</b>	3350215
Outer diameter 52 mm	
ISO designation RD X 1003 D52/R5	



Tool holder shank <b>BT 40</b>	3350204
Pull stud <b>BT 40</b>	3536332
Tool holder shank <b>MT 4/M16</b>	3350214
Tool holder shank <b>ISO 40/DIN 2080</b>	3350216

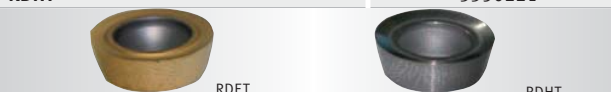
Outer diameter 63 mm  
ISO designation RD X 1003 D63/R5



### HM indexing inserts 5 pcs.

- › RDET 1003 MOSN8026 . Positive cutting geometry
- › PVD coated . For machining steel up to 900 N/mm<sup>2</sup>, stainless steel, aluminium, non-ferrous metal, cast iron

<b>RDET</b>	3350220
› RDHT 1003 MO-FA HF7 . Extremely positive cutting geometry, polished	
› For machining AL alloys, copper alloys, plastics	
<b>RDHT</b>	3350221



### Precision bore head set

- › 8 drill rods: BJ2008-32L/BJ2010-40L/BJ2014-53L/BJ2016-68L/BJ2020-83L/BJ2025-96L/BJ2030-115L/BJ20-L20-100L
- › Adjustment range 8 - 280 mm
- › Including drill rods, studs, circle extension, tools, case
- › Without indexable inserts

<b>ISO 30/ER32 - M12/BT 30</b>	3352127
<b>ISO 40/ER32 - M16/BT40</b>	3352128
<b>ISO 50/ER32 - M24/BT50</b>	3352129



### Indexable insert set



### Indexable insert set (10 pcs.)

<b>for steel</b> (for drill rod no. 8 and 7)	3352136
<b>for aluminium</b> (for drill rod no. 8 and 7)	3352141
<b>for steel</b> (for drill rod no. 6 and 5)	3352137
<b>for aluminium</b> (for drill rod no. 6 and 5)	3352142
<b>for steel</b> (for drill rod no. 4, 3, 2 and 1)	3352138
<b>for aluminium</b> (for drill rod no. 4,3,2 and 1)	3352143

### Dimensions

Art. no.	ISO	D1	D2	S1	right
3352136	TPGT110304L-FY-EH10	11	3.4	3.18	0.4
3352141	TBGT060104L-W-T1200A	11	3.4	3.18	0.4
3352137	TPGT090204L-FY-EH10	9.6	2.8	2.38	0.4
3352142	TPGT090204L-W-T1200A	9.6	2.8	2.38	0.4
3352138	TBGT060104L-W-H1	6.9	2.2	1.59	0.4
3352143	TBGT060104L-W-T1200A	6.9	2.2	1.59	0.4

Cutting depth 0.2 - 0.6 - 1.0 mm

Feed 0.05 - 0.15 - 0.25 mm

Speed 100 - 250 - 400 mm



### Cutterhead set

- › For external and vertical machining
- › Adjustment range 10 - 220 mm
- › Includes boring cutter, shank, clamping sleeve; socket wrench

<b>MT 3</b>	3352083
<b>MT 4</b>	3352084





Collet chuck set	
<b>MT 2/ ER 25 - M10</b>	3352052
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 15 spring collets; sizes Ø 1.5 - Ø 16 mm/DIN ISO 15488</li> <li>› Hook wrench · Aluminium case</li> </ul>	
<b>MT 2/ ER 32 - M10</b>	3352053
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 18 spring collets; sizes Ø 2 - Ø 20 mm/DIN ISO 15488</li> <li>› Hook wrench · Aluminium case</li> </ul>	
<b>MT 3/ ER 32 - M12</b>	3352093
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 18 spring collets; sizes Ø 2 - Ø 20 mm/DIN ISO 15488</li> <li>› Hook wrench · Aluminium case</li> </ul>	
<b>MT 4/ ER 32 - M16</b>	3352094
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 18 spring collets; sizes Ø 2 - Ø 20 mm/DIN ISO 15488</li> <li>› Hook wrench · Aluminium case</li> </ul>	
<b>ISO 30/ER32 - M12/BT 30</b>	3352054
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 18 spring collets; sizes Ø 2 - Ø 20 mm/DIN ISO 15488</li> <li>› Pull stud M12/M12 and pull stud BT 30</li> <li>› Hook wrench · Aluminium case</li> </ul>	
<b>ISO 40/ER32 - M16/BT40</b>	3352056
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 18 spring collets; sizes Ø 2 - Ø 20 mm/DIN ISO 15488</li> <li>› Pull stud M16/M16 and pull stud BT 40</li> <li>› Hook wrench · Aluminium case</li> </ul>	
<b>ISO 50/ER32 - M24/BT50</b>	3352065
<ul style="list-style-type: none"> <li>› Collet chuck</li> <li>› 18 spring collets; sizes Ø 2 - Ø 20 mm/DIN ISO 15488</li> </ul>	

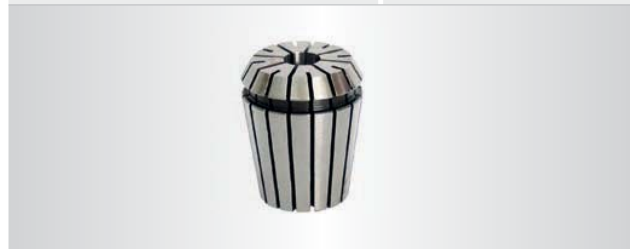


<b>Collet chuck ISO 30/ER25</b>	3352046
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› Hook wrench



Spring collet ER32 (individual)	
Ø 6 mm	3441126
Ø 8 mm	3441128
Ø 10 mm	3441130
Ø 12 mm	3441132



Spring collet (individual)	
› MT 3 direct-clamping / M12	
Ø 4 mm	3352004
Ø 6 mm	3352006
Ø 8 mm	3352008
Ø 10 mm	3352010
Ø 12 mm	3352012
Ø 16 mm	3352013



Collet kit	
<b>MT 2 direct-clamping / M10</b>	3351980
› 5-part; sizes Ø 4 / Ø 6 / Ø 8 / Ø 10 / Ø 12 mm	
<b>MT 3 direct-clamping / M12</b>	3352014
› 6-part; sizes Ø 4 / Ø 6 / Ø 8 / Ø 10 / Ø 12 / Ø 16 mm	



Collet kit	
<b>ER 16</b>	3440282
› 12 spring collets; sizes Ø 1 - 10 mm	
<b>ER 25</b>	3441109
› 15 spring collets; sizes Ø 1 - Ø 16 mm/DIN ISO 15488	
<b>ER 32</b>	3441122
› 18 spring collets; sizes Ø 3 - Ø 20 mm/DIN ISO 15488	



## Accessories for milling machines

### Vibration damping machine base

- › The machines and equipment can be installed without anchors and precisely levelled using the height adjustment system.
- › Effective impact and vibration damping improves the machine's capability

<b>SE 1</b>	3381012
<b>SE 2</b>	3381016
<b>SE 3</b>	3381018

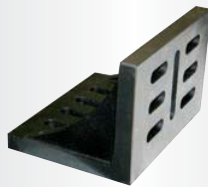


Load	SE 1	SE 2	SE 3
Milling machines	340 kg	460 kg	1 600 kg
Sawing/gen. Machine	570 kg	1 460 kg	3 500 kg
Threading	M12	M16	M 20
Base Ø/Base height	120/32	160/35	185/39

### Try square 90°

3385052

- › For clamping in case of mechanical processing of workpieces, checking and scribing work
- › Precision: Parallelism and trueness 0.01 to 100 mm
- › Lateral reinforcing ribs
- › Dimensions L x W x H: 202 x 126 x 150 mm . Weight 7 kg



### Universal compressed air tool clamping system

- › Includes tool clamp, cap, maintenance unit, gear rim, Draw-in rod, control box, operator control
- › High negative pressure achievable
- › Short change times through single-handed operation
- › Low eight thanks to optimised structure
- › Safe locking through toggle lever principle
- › Precise guiding thanks to optimised geometry
- › Low air consumption

### ISO 40

3352394

- › For OPTimill MF 2V / MF 4V

### Factory assembly clamping system

9000490



(Note: For orders without factory assembly: Some adjustment work may be necessary.)

### Levelling platen/vibration damper

Article no.

- › Effective vibration and structure-borne noise insulation and noise reduction
- › Fast and technically uncomplicated levelling
- › Eliminates floor unevenness up to 5°
- › Precision levelling by means of a regular threaded screw

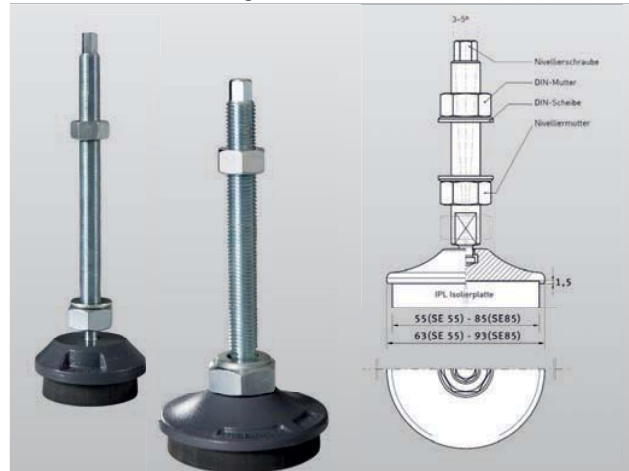


**SE 55** 3352981

- › Jackscrew M12 x 1 x 150
- › Maximum load: 600 kg

**SE 85** 3352982

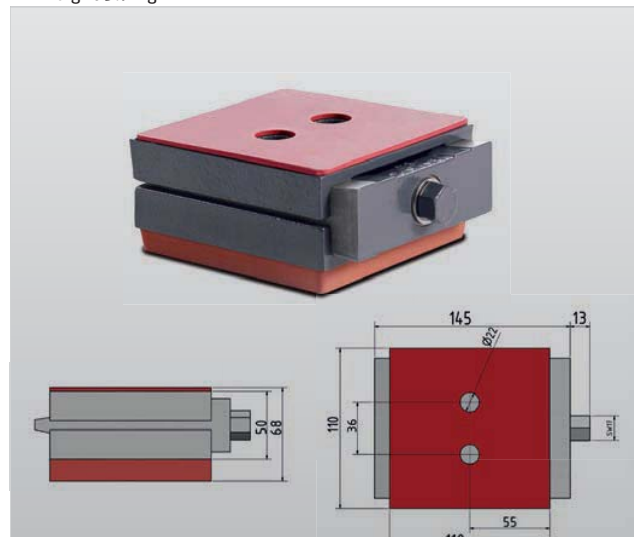
- › Jackscrew M16 x 150
- › Maximum load: 1 500 kg



### Precision machine shoe SEU1

3352985

- › Features vibration and structure-borne noise insulation
- › With slip-protection plate at top
- › Maximum load 60 kN
- › Suitable for M16 threaded rod
- › Vibration-insulation plate for particularly loads. Good structure-borne noise insulation
- › Adjustment range +5 / -4 mm
- › High-precision, jerk-free levelling even of heavy loads
- › Fast and precise installation even for heavy machines. Installation time savings of up to 50 % thanks to precision levelling and freedom of installation.
- › Improves the dynamic behaviour of machines while reducing noise
- › Weight 3.7 kg



#### Universal milling table feed

- › Continuous speed control and rapid motion
- › Right-handed/left-handed rotation
- › 230 Volt, overload protection and end point switch
- › Motor: V99 - 90W, V250 - 130W
- › For self-assembly!

**Milling table feed V 99** 3352022

- › Horizontal assembly

**Assembly kit MH 35 Vario X axis** 3352035

**Assembly kit MH 50 Vario X axis** 3352036

**Milling table feed V 250** 3352029

- › Vertical assembly

**Milling table feed V 250** 3352025

- › For the Y axis MF 2V / MF 4V

- › Includes assembly kit



NEW

#### Workpiece support

- › Material S 45C

**WPS-1** adjustment stroke 40 - 50 mm 3354261

**WPS-2** adjustment stroke 65 - 90 mm 3354262

**WPS-3** adjustment stroke 90 - 140 mm 3354263

**WPS-4** adjustment stroke 140 - 230 mm 3354264



**Prism WP 30** 3352195

- › Robust design for use on tool machines.
- › High-precision design
- › Adjustable from 0° to 60° and from 0° to -30°
- › Tempered and ground carbon steel
- › Precision trueness 0.005 mm
- › Angle tolerance 0.01°
- › Dimensions L x W x H: 75 x 25 x 32 mm



#### Cross tables KT

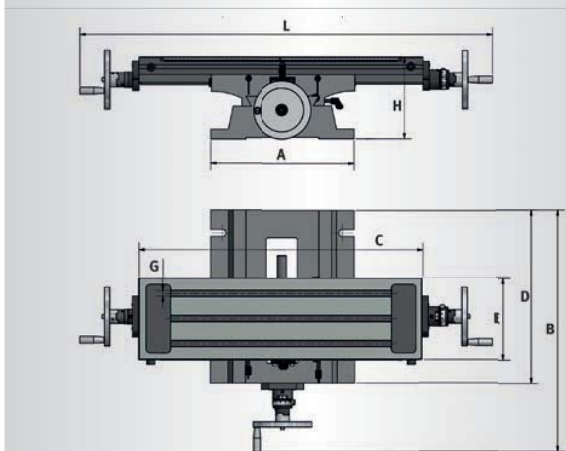
- › Coolant channel
- › Dovetail guide adjustable
- › Adjustable handwheel scaling with 0.05 mm scale

**KT 120** 3356595

**KT 179** 3356596

**KT 180** 3356591

**KT 210** 3356600



Technical specifications	KT 120	KT 179	KT 180	KT 210
A (Base width)	222 mm	274 mm	274 mm	370 mm
D (base length)	280 mm	340 mm	340 mm	445 mm
C (table length)	400 mm	500 mm	700 mm	730 mm
E (table width)	120 mm	180 mm	180 mm	210 mm
G (T-slot size)	10 mm	12 mm	12 mm	14 mm
L x W x H (mm)	506 x 400 x 140	748 x 483 x 155	948 x 483 x 155	1060 x 620 x 210
Weight	22 kg	46 kg	54 kg	84 kg
Travel				
X axis	220 mm	287 mm	480 mm	480 mm
Y axis	165 mm	167 mm	170 mm	210 mm
Max. load	40 kg	55 kg	55 kg	80 kg

#### Hold-down unit set of 2

- › Clamping height adjustable
- › Brass plate below the clamping arm protects material against damage

**Table groove 14 mm/M12** 3352031

- › L x W x H: 115 x 42 x 39 mm Height adjustment: 0 - 89 mm

**Table groove 18 mm/M16** 3352032

- › L x W x H: 133 x 50 x 49 mm . Height adjustment: 0 - 101 mm



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## Accessories for milling machines

T-slot nut (individual)	
M 8 / 10 mm	3353020
M10 / 12 mm	3353022
M12 / 14 mm	3353025
M 14 / 16 mm	3353026
M16 / 18 mm	3353028



Universal coolant unit	
3352002	
<ul style="list-style-type: none"> <li>› Connection 230V / 1 Ph</li> <li>› Max. delivery height 2.5 m / delivery rate 8 l/min</li> <li>› Tank content 11 l / dimensions L x W x H: 370 x 245 x 170 mm</li> <li>› Complete with tank, flexible tube, hose and switch/plug combination</li> <li>› Magnetic base fastener for coolant hose</li> </ul>	



Parallel shim set 18-part	
3536191	
<ul style="list-style-type: none"> <li>› For precision work for parallel mounting of workpieces in machines, vices on scoring boards or tool machines</li> <li>› Finely polished to 0.01 mm precision</li> <li>› Length 150 mm x width 8.5 mm</li> <li>› 2 pcs. each: 14 mm; 16 mm; 20 mm; 24 mm; 30 mm; 32 mm; 36 mm; 40 mm; 44 mm</li> </ul>	



Parallel shim set 20-part	
3354001	
<ul style="list-style-type: none"> <li>› For precision work for parallel mounting of workpieces in machines, vices on scoring boards or tool machines</li> <li>› Finely polished to 0.01 mm precision</li> <li>› Thickness 3 mm</li> <li>› Length 150 mm</li> <li>› 2 pcs. each: 8 mm; 13 mm; 16 mm; 19 mm; 22 mm; 25 mm; 31 mm; 35 mm; 38 mm; 41 mm</li> </ul>	



Thread tapping device M5 - M12/B16	
3352042	
<ul style="list-style-type: none"> <li>› Quick reverse built-in, immediately effective on changing the feed direction</li> <li>› Slip clutch 4-stage adjustable.</li> </ul>	
<b>Scope of delivery:</b>	
<ul style="list-style-type: none"> <li>› Two flexible spring collets</li> <li>› Two open-ended spanners</li> <li>› Hand grip</li> <li>› Allen key</li> </ul>	



Technical specifications	
Self-release path	4 mm
Freewheel	1.5 mm
Length compensation tensioned	8.5 mm
Max. speed	1 000 rpm
Transmission ratio forward and reverse	1 : 1.75
Cutting range	M5 - M12
Clamping range	3.5 - 10
Length	B16 DIN 238
Length compensation compressed	156 mm
Shank holder	5 mm

NEW

AQUACUT C1	
3530030	
<ul style="list-style-type: none"> <li>• 10 litre cannister</li> <li>• For mixing emulsions</li> <li>• Drilling and cooling emulsion</li> <li>• High-pressure resistant and containing mineral oil, for long tool life and clean surfaces</li> <li>• Emulsifiable with water, microbe-resistant and kind to the skin</li> </ul>	



Coolant hose KMS 2	
3356660	
<ul style="list-style-type: none"> <li>› Two flexible and stable coolant hoses made of individual plastic elements</li> <li>› Not electrically conductive</li> <li>› Magnetic base holding force up to 50 kg</li> <li>› Length of coolant hoses each 335 mm</li> <li>› Insensitive to most solvents and chemicals</li> <li>› Universally deployable on all tool machines</li> </ul>	

Coolant mist lubricator MMC1	
3356663	
<ul style="list-style-type: none"> <li>› Magnetic base with a holding force of 75 kg</li> <li>› Base size L x W x H: 62 x 50 x 55 mm</li> <li>› Screw connection for external compressed air supply</li> <li>› Flexible and stable hose with a length of 500 mm</li> </ul>	



KMS 2



MMC1



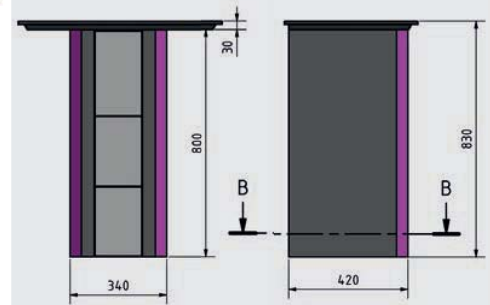
## Universal chassis and chip tray

- › for milling machine models MH 20V / MH 22V / VD
- › Chassis weight 28 kg
- › Chassis dimensions 420 x 340 x 800 mm
- › Chip tray dimensions 720 x 470 x 30 mm

<b>Universal chassis</b>	3353000
<b>Chip tray</b>	3352999



## Dimensions

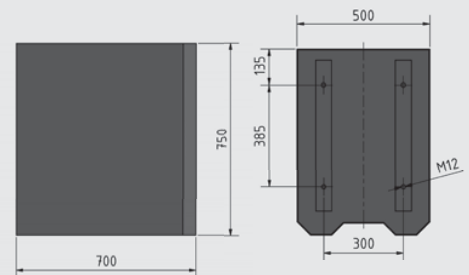


## Machine chassis 3353009

- › Solid design and weight ensure stability
- › For milling machine models MH 25V / MH 25SV
- › Weight 51 kg
- › Dimensions 500 x 700 x 750 mm



## Dimensions

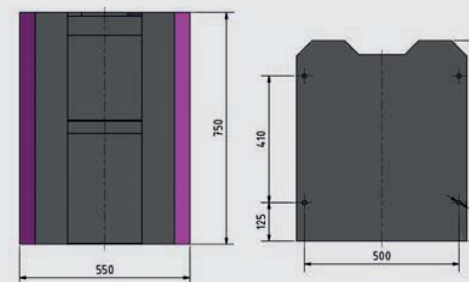


## Machine chassis 3353014

- › Solid design and weight ensure stability
- › For milling machine models MH 35G / MB 4
- › Weight 76 kg
- › Dimensions 650 x 550 x 750 mm



## Dimensions

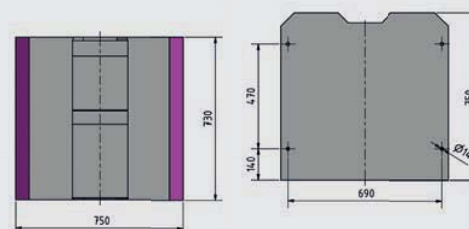


## Machine chassis 3353015

- › Solid design and weight ensure stability
- › For milling machine MH 50G / MH 50V
- › Weight 134 kg
- › Dimensions 650 x 550 x 750 mm



## Dimensions



NEW

## Starter set BT 20

3353281

### Comprises:

- 1 pc. milling head holder Ø 16 mm
- 2 pcs. Weldon holder Ø 6 mm
- 2 pcs. Weldon holder Ø 8 mm
- 1 pcs. Weldon holder Ø 10 mm
- 1 pcs. Weldon holder Ø 12 mm
- 1 pc. tool fitting BT20/B16
- 11 pcs. pull studs
- 1 pc. quick-release drill chuck 1 - 13 mm
- 1 Facing and copying blade head
- 2 pcs. collet chuck ER 25
- 1 pc. spring collet spanner ER 25
- 12-part Collet kit ER 16

## Milling head holder

3352728

› Collet Ø 16 mm



## Weldon holder

Ø 6 mm	3352732
Ø 8 mm	3352734
Ø 10 mm	3352736
Ø 12 mm	3352738



## Tool holder

3352727

› BT 20/B16



## Pull stud

3352726

› Optimum custom build (no standard BT 20 bolts)



## Precision quick release chuck

Concentricity better than 0.06 mm

1 - 8 mm; B16	3050608
1 - 10 mm; B16	3050610
1 - 13 mm; B16	3050623
1 - 16 mm; B16	3050626
1 - 16 mm; B18	3050630



## Copying and facing blade head

3350202

Univ. deployment in machining of all steels and NF metals

For facing and copying

Made of special steel - highly quenched and tempered

Excellent planarity and concentricity

Includes Torx TX15

Outer diameter 52 mm

ISO designation RD X 1003 D52/R5



Fig. with optional pull stud

## Collet chuck

ER 16	3352741
ER 25	3352744

NEW



## Spring collet holder spanner

ER 16	3352742
ER 25	3352745

NEW



## Collet kit ER 16

3440282

› 12 spring collets; sizes Ø 1 - 10 mm



**Starter set BT 30**

3353282

## Comprises:

- 1 pc. milling head holder Ø 22 mm
- 1 pc. quick-release drill chuck 1 - 13 mm
- 2 pc. Weldon 6 mm
- 1 pc. Weldon 8 mm
- 1 pc. Weldon 10 mm
- 1 pc. Weldon 12 mm
- 1 pc. Weldon 16 mm
- 2 pc. Weldon 20 mm
- 1 pc. adapter BT 30 /MT 2
- 3 pcs. spring collet holder ER 32
- 1 pc. spring collet spanner ER 32
- 18-part Collet kit ER 32
- 1 pc. height adjuster
- 1 pc. assembly and tool adjustment gauge
- 14 pcs. pull studs
- 1 pc. taper squeegee

**Milling head holder**

3353306

- › Collet Ø 22 mm

**Chuck**

3356303

- › Clamping range 1 - 13 mm

**Weldon holder**

Ø 6 mm	3353310
Ø 8 mm	3353311
Ø 10 mm	3353312
Ø 12 mm	3353313
Ø 16 mm	3353314
Ø 20 mm	3353315

**Adapter**

- › BT 30 to MT 2 3353305
- › BT 30 to MT 3 3356316

**Spring collet holder ER 32**

3353304

**Spring collet holder spanner ER 32**

3353307

**Height-adjuster**

3536290

- › Analogue version
- › For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- › Housing height 50 mm

**Assembly and tool adjustment gauge**

3536193

- › For easy and precise adjustment of tools
- › Vertical and horizontal collet for tools with a steep-angle taper

**Taper squeegee**

3353301

**Pull stud**

- › BT 30 DIN 2080 M12 3353302
- › BT 30 DIN 2080 M12/M12 3536177

**Collet kit ER 32**

3441122



## Starter set BT 40 3353284

Comprises:

- 1 pc. milling head holder Ø 27 mm
- 1 pc. quick-release drill chuck 1 - 13 mm
- 2 pc. Weldon 6 mm
- 1 pc. Weldon 8 mm
- 1 pc. Weldon 10 mm
- 1 pc. Weldon 12 mm
- 1 pc. Weldon 16 mm
- 2 pc. Weldon 20 mm
- 1 pc. adapter BT 40 /MT 3
- 3 pcs. spring collet holder ER 32
- 1 pc. spring collet spanner ER 32
- 18-part Collet kit ER 32
- 1 pc. height adjuster
- 1 pc. assembly and tool adjustment gauge
- 14 pcs. pull studs
- 1 pc. taper squeegee

## Milling head holder 3353336

› Collet Ø 27 mm



## Chuck 3536333

› Clamping range 1 - 13 mm



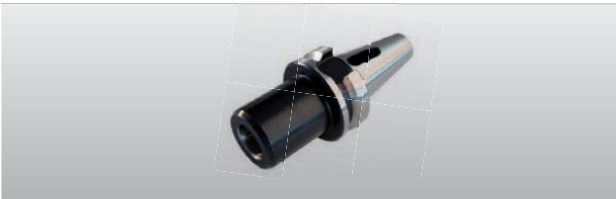
## Weldon holder

Ø 6 mm	3353340
Ø 8 mm	3353341
Ø 10 mm	3353342
Ø 12 mm	3353343
Ø 16 mm	3353344
Ø 20 mm	3353345



## Adapter 3353335

› BT 40 to MT 3



## Spring collet holder ER 32 3353334



## Spring collet holder spanner ER 32 3353307



## Height-adjuster 3536290

- › Analogue version
- › For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- › Housing height 50 mm



## Assembly and tool adjustment gauge 3536194

- › For easy and precise adjustment of tools
- › Vertical and horizontal collet for tools with a steep-angle taper



## Taper squeegee 3353331



## Pull stud

- › BT 40 DIN 2080 M16 3353332
- › BT 40 DIN 2080 M16/M16 3356179



## Collet kit ER 32 3441122





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## SIEMENS SINAMICS G 120D Frequency inverters

Machines as per  
standard EN  
61800

DIN

Information on the Vario lathes

TH 4010V / TH 4210V / TH 4615V / TH 5620V / TZ4V

### SINAMICS G120D

#### Brief overview of benefits

##### Highlights at a glance

Advanced safety function (STO, SLS)

**STO - safe torque off as per EN 61800-5**

**SLS - Safely limited speed as per EN 61800-5**

Recovery, low circuit feedback

Energy savings up to 20 %

No brake resistors required

Fast and easy diagnostic capability through LEDs

Standardised plug connections throughout

Rugged and flat design (IP65)

EMC class C1 as per EN 61800-3

Safety Integrated without encoder!

More direct switch-over

Faster braking

Resilient to high overload

#### The best possible single drive for high-performance solutions

The SINAMICS G120D impresses with its extremely flat design, an identical drill pattern for all versions, and the high degree of protection. The local frequency inverter offers safety functions that are unique in its class.

For example, its ability to provide line-commutated regeneration in generator operation removes the need for braking resistors. It thus makes a decisive contribution to saving energy. Of course it is also capable of communication.

The SINAMICS G120D sets new standards in local deployment. It has a modular design – consists of power modules and control unit – and covers a wide power range from 0.75 kW to 7.5 kW.



- ▶ A comprehensive safety package that helps to protect both persons and machines. And in an extremely efficient and economic way thanks to complete integration of the safety functions in the control and drive technology. In addition, it ensures safe and practical operation of your machine under all required operating conditions. The safety functions meet the requirements of DIN EN 61508 for use up to and including SIL (Safety Integrity Level) 2 and categories 3 and PL (Performance Level) d as per DIN EN ISO 13849.

#### The feature scope includes, for example:

- ▶ Functions for safe monitoring of speed and standstill
- ▶ Functions for establishing workspace and protected space boundaries, and for area detection
- ▶ Direct connection of all safety-related signals and their internal logical links

Siemens  
**SAFETY INTEGRATED**

## Please note

- › These offers are intended exclusively for business owners, retailers and tradespersons who are making a purchase in pursuit of their profession or self-employment. This is an explicit **CONDITION FOR THE CONCLUSION OF A CONTRACT**. Consumers are not eligible to purchase as per Section 13 BGB (German Civil Code)
- › We accept no liability for printing errors, mistakes or incorrect representation.
- › Subject to technical modifications and visual changes.
- › Illustrations show optimal accessories in some cases
- › Delivery is effected solely on the basis of our terms of delivery and payment.
- › The machines are delivered partly knocked down for transportation reasons.
- › All items are sold through specialist retailers.
- › The goods shall remain our property until payment has been received in full.
- › Our retention of title shall remain valid in case of sale to a third-party.
- › Legal warranty conditions apply for businesses.
- › Copying and reproduction in full or in part is subject to written approval by us.
- › Please note that transport packaging surcharges apply for some machines in this catalogue to cover transport units, packaging and packaging overheads.

## Warranty conditions

- › Independently of your legal warranty entitlement, OPTIMUM provides a guarantee on the basis of the following provisions for the period as stated in the catalogue for the respective machine; the guarantee period starts on the date of sale of the machine to the end customer. OPTIMUM offers a guarantee on catalogue products where a guarantee is specifically indicated. The guarantee exclusively covers defects resulting from material or manufacturing errors. The warranty exclusively covers spare parts but not the transport and installation costs or labour and ancillary services necessary for eliminating defects. The guarantee excludes unintended use or improper application such as overloading of the machine or the use of non-approved and unsuitable tools, use of force, damage caused by external influences or by foreign bodies, e.g., dust, chips or stones, damage caused by failure to observe the Operating Instructions, e.g., connection to the wrong mains voltage or current, failure to observe assembly instructions, conversions and extensions carried out by the customer, as well as normal wear. The guarantee also excludes partially or fully disassembled machines and machine tools. When claiming against guarantee/warranty, you must submit the original sales receipt showing the date of purchase. Repairs under guarantee/warranty may be performed by authorised partners only who will be named by the guarantee/warranty provider. The guarantee/warranty is restricted to the end customer of the new machine and is not transferrable.

## General notes on operating our machines

- › Our machines must be supervised at all times during operation. Leaving the machine during operations constitutes gross negligence.
- › The details on machine precision are found in the technical data of the catalogue pages. If you do not find any values here, please contact [info@optimum-maschinen.de](mailto:info@optimum-maschinen.de) for more detailed information.
- › The stated precisions are achieved under standardised conditions (correct installation of the machine and ambient temperature of 20 °C). The machines are not designed for continuous operation.
- › Please note that operators are required to make conversions in the event of installing third-party chucks or flanged chucks to reach the stated, technically possible rotating diameter.

## Operation of machines with frequency converters

### › Electrical connection only by a qualified electrician

Machines with frequency inverters or inverters must not be operated via an ordinary plug. A permanent connection is required. The drive components conduct a high leakage current via the protective conductor. Touching conductive parts when the protective conductor is interrupted can result in death or serious injury.

### › Building electrics:

In order to avoid tripping of residual current circuit breakers - if present in the building electrics - an all-current-sensitive residual current circuit breaker type B is required.

AC - sensitive AC type RCDs (AC only) are not suitable for frequency inverters. AC sensitive earth-leakage circuit breakers of type AC are no longer in use and are no longer permitted in Germany.

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