



**metkon**  
Technology behind Specimen



# PLANAR GRINDING **FORCIPLAN 352**

FORCIPLAN 352 is an automatic planar grinder for the first step plane grinding of metallographic specimens.



## HIGH CAPACITY PLANAR GRINDING MACHINE

### DESIGN

FORCIPLAN 352 is an automatic planar grinder for the first step plane grinding of metallographic specimens. It can easily provide enough specimens for two or three grinding/polishing machines.

Heavy duty steel construction with precise vertical drive provides accurate control. High-torque 4 kW grinding motor with a variable speed between 500 and 1500 RPM enables quick planar grinding of the specimen surface. Powerful 350 Watt head motor can rotate both clockwise and counterclockwise direction with a variable speed between 50 and 200 RPM. Variable motor speed makes possible to prepare wide range of materials with different application requirements and guarantees high material removal rate. By using different grinding stones, ferrous as well as non-ferrous specimens can be prepared easily. Grinding depth measurement system allows you to measure the amount of material removed from the surface. The desired grinding depth can be set to grind different type of samples and also for applications that need special accuracy. All important parameters of the grinding process are preset with digital display. A variety of sample holders are available for different sample sizes. Sample holders can be removed and inserted easily with the help of quick release chuck.



Ability to Grind & Polish Mounted Specimens With Specimen Holders as Well as Irregular Shaped Unmounted Samples



## FORCIPLAN

# 352

FORCIPLAN 352 Automatic Planar Grinder is designed for first step initial planar grinding of very large specimens or a high volume of specimens in specimen holders. It is fast and efficient in providing high quality flat specimen surface thus saving time on the subsequent fine grinding and polishing steps. Specimen holders of up to 210 mm diameter having 10 specimens can be prepared in less than a minute with 350 mm diameter grinding stone.



FORCI System Combination



Perfectly Polished and Planar Specimen Surfaces

A recirculating cooling unit is strongly recommended so that a rust inhibitor can be added and the grinding swarf can be collected. The entire working area is totally enclosed. Sliding door provides easy access in the grinding area. Electronic brake is integrated to the system for a rapid stop of the grinding stone. The interlocking safety device does not allow the door to be opened before the grinding motor is stopped.

The FORCIPLAN 352 uses the same central force specimen holders with FORCIMAT 102 Automatic Head and ACCURA 102, therefore the additional grinding and/or polishing steps can be carried out without transferring to a new specimen holder.



# AUTOMATIC OPERATION

## Grinding Parameters

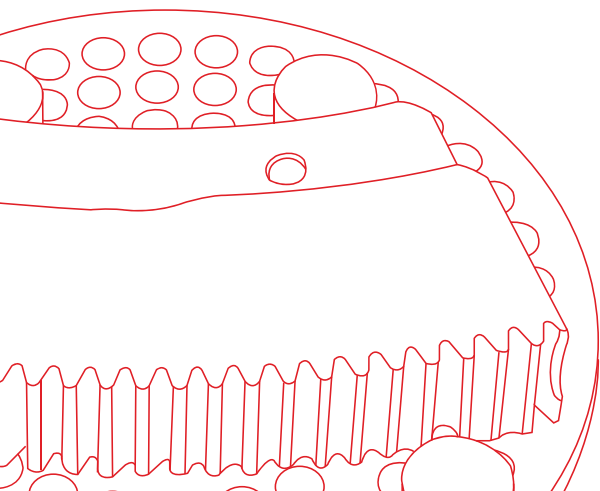
All preparation parameters can be stored in memory under a specific program number. Each program can be saved for a material specific name such as "Cast Iron, Bronze, A-Si Alloy, etc." The parameters which can be saved are; Force, Wheel speed, Head speed, Rotation direction, Mode of operation (Time or Removal Rate). These parameters are entered and stored in memory and displayed on the LCD screen as preset values. All the operator needs to do is to call up a specific program and press the "Start" button.



FORCIPLAN 352, Grinding chamber



Automatic dressing of the grinding stone







Integration with Forcimat 102 and Accura 102

FORCIPLAN 352 has advanced techniques and software with programmable HMI touch screen controls increasing the productivity, sample consistency and operator comfort.

#### **Controlled Material Removal**

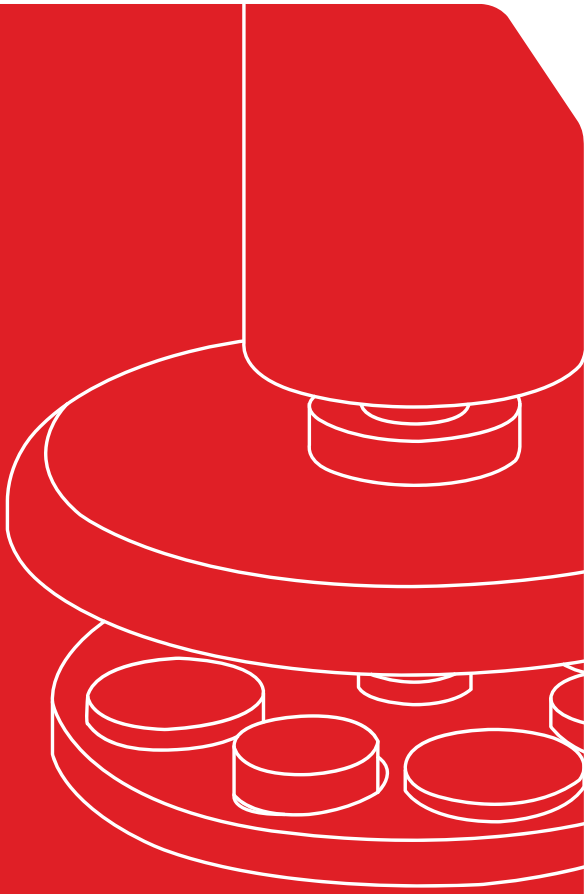
FORCIPLAN 352 allows you to preset the amount of material to be removed very accurately. The desired grinding depth can be set from 0.01 – 5.00 mm. The vertical movement of the grinding head is motorized with digital positioning and display on the touch screen LCD. The robust design of the column guarantees high reproducibility. The material to be removed from the specimen can be preset in increments of 10 microns

#### **Barcode Scanner**

Optional Barcode Scanner allows easy and quickly loading of correct parameters for different samples. This will eliminate the risk of loading wrong programs due to operator error and increases efficiency. You can simply develop a barcode system for your each specimen on your laboratory to enable fast data entry with less errors.



Barcode Scanner



### Automatic Dressing Unit

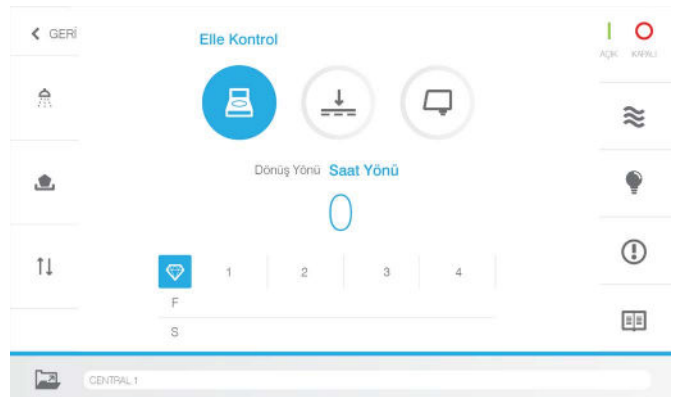
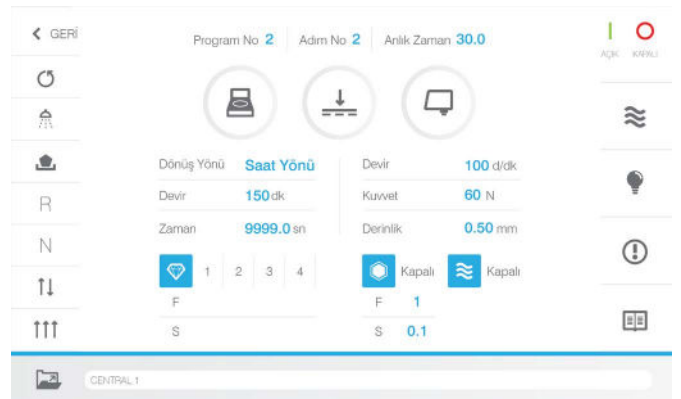
FORCIPLAN 352 is equipped with a precise automatic dressing unit to provide a flat grinding surface and maintain the performance of the grinding stone at an optimum. Dressing depth can be set 10  $\mu\text{m}$  to 100  $\mu\text{m}$  with 1  $\mu\text{m}$  increments.

The Dressing Unit moves across the grinding stone surface to return the stone to its original by removing the embedded material and expose fresh grains to increase removal rates. Dressing is done at a pre-set periodic intervals during each grinding cycle. Also with pre-dressing function, automatic dressing is processed before each operation to start with a fresh grinding stone surface.

The HMI Screen gives a visual pop-up message to notify the operator when the grinding stone has to be replaced.



Programmable HMI Touch Screen Controls





# NEW CUTTING FEATURES

## High Sample Capacity

FORCIPLAN 352 can accommodate sample holders up to Ø210 mm. 8 pieces of Ø50 mm samples or 10 pcs of Ø40 mm samples can be prepared at the same time. As well as irregular shaped or larger size samples can also be prepared. Special sample holders can be designed by Metkon according to application requirements.

## Cost Effective Grinding

FORCIPLAN 352 has Ø350 mm flat grinding stone. Comparing with traditional SiC papers, the flat grinding stone offers faster preparation times and higher removal rates.

## Reduces Total Preparation Time

With extremely high material removal performance and reducing several grinding steps without changing paper, the FORCIPLAN 352 increases the productivity and total sample preparation time reduces significantly.

## Final Grinding Feature

The final grinding parameter can be set after each grinding operation with a lower force and with a pre-set time.



Central Lubrication System

# SPECIFICATIONS

## 44 00 - FORCIPLAN 352

Automatic Planar Grinding Machine

For initial planar grinding of large size irregular shaped specimens or mounted specimens in specimen holders up to 220 mm diameter, reduces total preparation time and saves consumables, fully automatic operation, Siemens PLC control unit, programmable with colored 7" HMI touch screen control, robust construction, safe operation in closed housing, easy handling with sliding door, maximum safety provided with interlocking switch, large working space with powerful LED illumination, high torque 4 kW grinding motor, 500-1500 rpm variable speed for grinding stone to obtain optimum surfaces on different materials, powerful 350 Watt DC head motor, 50-200 rpm variable specimen holder speed with clockwise and counterclockwise rotation direction, controlled material removal with digital setting of grinding depth up to 5 mm, high precision automatic dressing unit with diamond tip, with adjustable depth and time period for dressing, automatically informs operator when grinding stone needs to be replaced, Sample cooling available with cooling fluid, ready for operation. Without specimen holders.  
Without cooling tank.  
400V, 3-phase, 50Hz.

## Accessories for FORCIPLAN 352

**GR 1988** - Recirculation Cooling Tank, 80 lt, for FORCIPLAN 352

**YM 8813** - Fine filter sheets for recirculation cooling tank [GR 0018/0019/1675/1945/1988], 10 pcs

**GR 1559** - Coolant level sensor for recirculation cooling tank  
Informs operator when coolant level is insufficient. (for MA and AA models)

**GR 1540** - Magnetic collector rod for recirculation cooling tank

**GR 0140** - 3-lights warning beacon with audible signal  
(To be ordered simultaneously together with the machine order)

**GR 0665** - Barcode Scanner for easy loading correct programs for different samples

**YM 10871-00** - Diamond Tip for Dressing Unit, FORCIPLAN 352/VELOX 102

**GR 0440** - Air filtering and lubricating unit

## Spare Part Kit for FORCIPLAN 352

**GR 2221** - Recommended Set of Spare Parts, FORCIPOL 352

## 45 60 - LEVOMAT

Specimen Loading Fixture, to level the specimens within the central force specimen holders, without specimen loading plate.

## Specimen Loading Plates

**45 50** - Specimen Loading Plate Ø160 mm

**45 40** - Specimen Loading Plate Ø210 mm

## Specimen Holders for FORCIPLAN 352

**46 45** - Clamp type specimen holder, Ø 160 mm, 3 rectangular specimens with 40 x 70 mm.

**46 91** - Clamp type specimen holder, Ø160 mm, 10 specimens with Ø25 mm.

**46 92** - Clamp type specimen holder, Ø160 mm, 8 specimens with Ø30 mm.

**46 93** - Clamp type specimen holder, Ø160 mm 6 specimens with Ø40 mm.

**46 94** - Clamp type specimen holder, Ø160 mm, 4 specimens with Ø50 mm.

**46 95** - Clamp type specimen holder, Ø160 mm, 10 specimens with Ø1"

**46 96** - Clamp type specimen holder, Ø160 mm, 8 specimens with Ø1 1/4"

**46 97** - Clamp type specimen holder, Ø160 mm, 6 specimens with Ø1 1/2"

**46 98** - Clamp type specimen holder, Ø160 mm, 4 specimens with Ø2"

**46 77** - Universal specimen holder for large and irregular shaped specimens, Ø160 mm with 6 clamping fixture

**46 78** - Universal specimen holder for large and irregular shaped specimens, Ø210 mm with 10 clamping fixtures

**46 73** - Teardrop specimen holder, Ø210 mm, 10 specimens with 40 - 25 mm diameter

**46 74** - Teardrop specimen holder, Ø210 mm, 8 specimens with 50 - 25 mm diameter

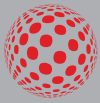
**46 39** - Clamp type specimen holder, Ø220 mm, 3 specimens for irregular shaped samples [Including loading plate]

\* Other voltages and frequencies available upon request.  
Please state when ordering. All specifications are subject to change without notice.



# SPECIFICATIONS

ORDER NO	44 00
MODEL NO	FORCIPLAN 352
Max. Sample Holder Diameter	Up to Ø220 mm
Grinding Modes	- Time Mode - Removal Rate Mode - Final Grinding Feature
Application of Force	Central Force
Central Force Range	50 – 750 N
Grinding Stone Diameter	Ø350 mm / 14"
Grinding Motor Power [S1]	4 kW
Grinding Stone Speed	500 – 1500 RPM
Grinding Stone Rotation Direction	CCW
Grinding Stone Cleaning & Drying	Standard
Head Motor Power	350 Watt
Head Motor Speed	50-200 RPM
Head Motor Rotation Direction	CW/CCW
Grinding Depth Measurement	Standard
Grinding Depth Range	0 – 5 mm
Automatic Dressing System	Standard
Dressing Modes	- Dressing while Grinding - Dressing without Grinding - Dressing before Operation
Dressing Tip	Diamond
Dressing Depth	10 µm – 100 µm
Dressing Period	20 s – 600 s
HMI Touch Screen	7" Colored Touch Screen
Program Memory	99 Programs
Barcode Scanner	Optional
3-Lights Warning Beacon	Optional
Recirculation Cooling Unit	Optional, 80 lt
Coolant Level Sensor	Optional
Dimensions, WxDxH	111x84x160 cm
Weight	630 kgs
Mains	3-phase, 400V, 50/60 Hz. AC



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