



# Sino-Russian Symposium on Materials Science and Processing Technology



## Automated selection model of the metalworking machine based on the analysis drawing manufactured part using the database

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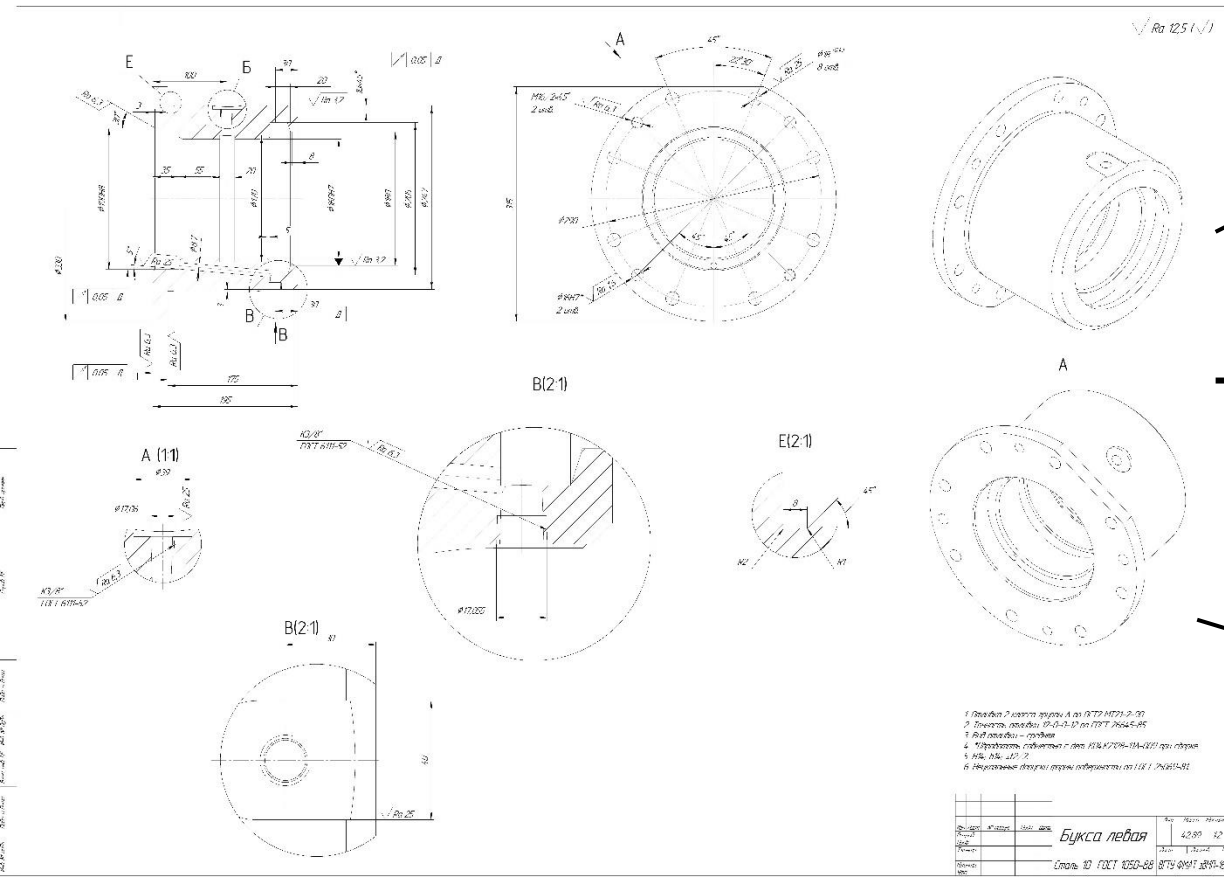
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## 1 Introduction



part weight;

material of the part;

dimensions of the part.



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## 1 Introduction

### Characteristics of technological equipment:

- dimensions of the manufactured part;
- machine power;
- machine dimensions.
- nominal press force;
- forging weight;
- machine dimensions.

Metalworking-machine      Forging and stamping equipment

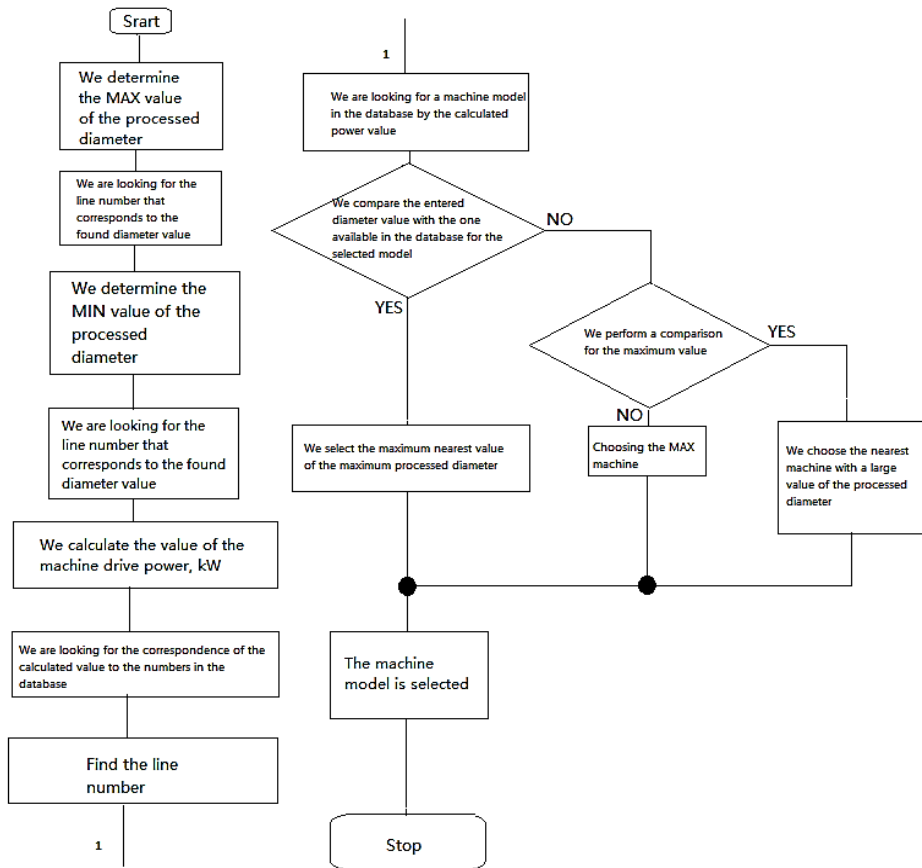


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## 2 Analysis of methods for solving the problem

# METALWORKING MACHINE



	A	B	C	D	E
	Maximum processed diameter, mm	Power, kW	The number of revolutions of the spindle, rpm	Maximum processing speed	Machine model
1					
2	180	22	5000	20106,19298	QT-PRIMOS 50 SG
3	180	15	5000	20106,19298	QT-Primos 100
4	250	25	4000	16084,95439	QT-PRIMOS 150 SG
5	280	11	6000	24127,43158	QUICK TURN 100MS
6	300	4	3500	14074,33509	DMTG CKE 6130

Structure of the database table

Algorithm of the automated search database



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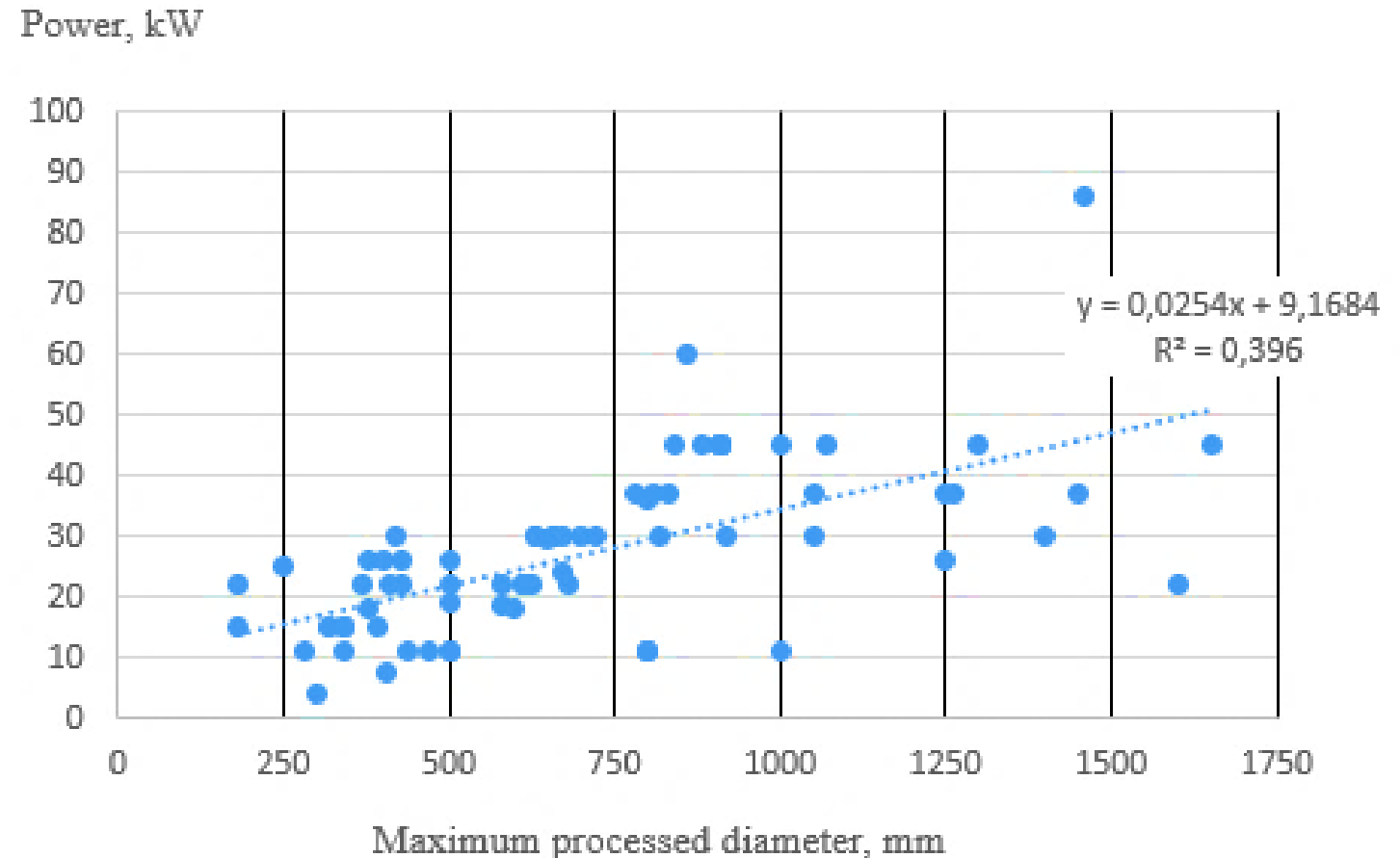


## 2 Analysis of methods for solving the problem

Data analysis shows  
that the first criterion  
for choosing a model  
can be dependence

$$P = f(D_{max})$$

## **METALWORKING MACHINE**





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## 3 Results of the study

## METALWORKING MACHINE

MAX		Machine model	MIN		Machine model
1650	76	Mega Turn 1600M	180	1	QT-PRIMOS 50 SG
The calculation is presented below					
Processed diameter			300		
Estimated power, kW			17		
Required machine model				UN-600/30H	

An example of the operation of the developed database algorithm



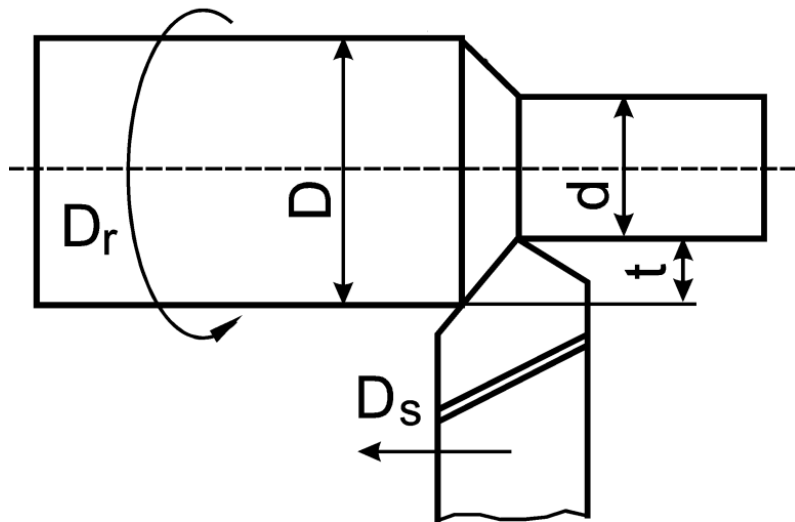


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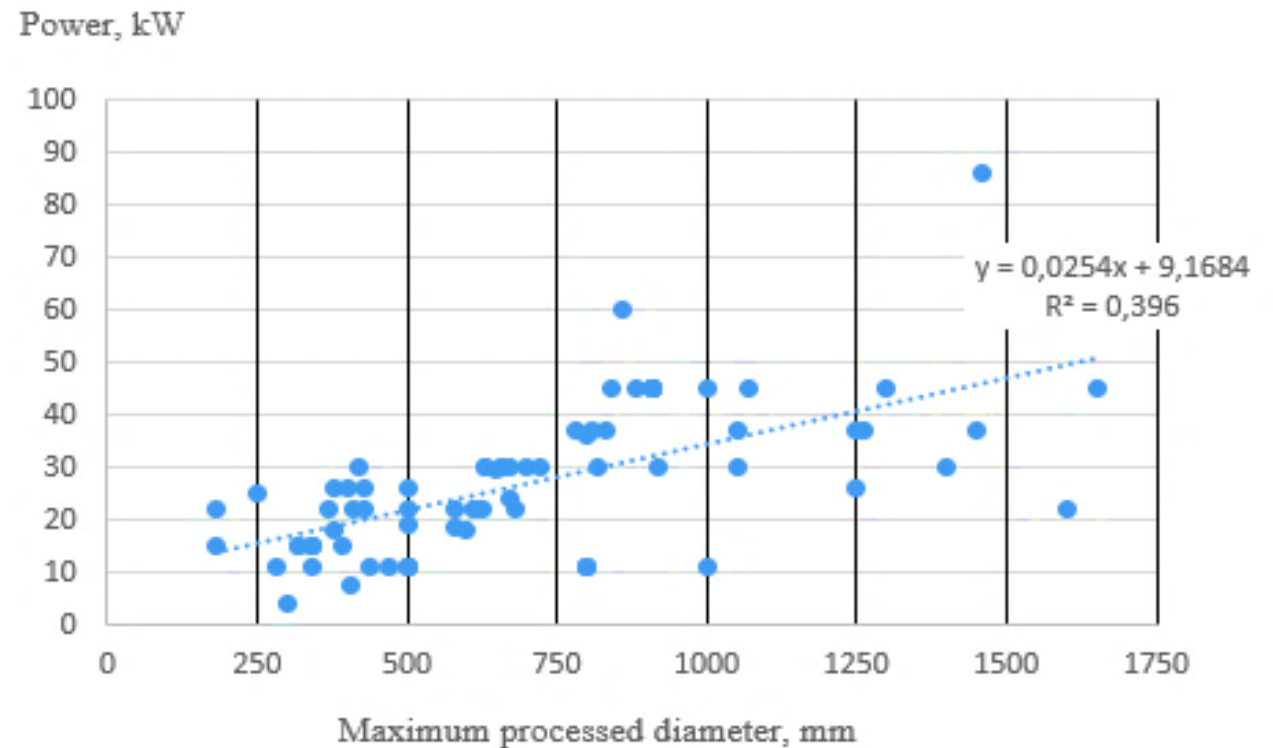


## 4 Automated search procedures

### Source data and target function



## METALWORKING MACHINE



$D$  substitute instead of  $x = 0,0254 * D + 9,1684 = P$



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## 4 Automated search procedures

## METALWORKING MACHINE

**P**



	A	B	C	D	E
1	Maximum processed diameter, mm	Power, kW	The number of revolutions of the spindle, rpm	Maximum processing speed	Machine model
2	180	22	5000	20106,19298	QT-PRIMOS 50 SG
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The desired metalworking machine model - **QUICK TURN 100MS**





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## 4 Automated search procedures

## Forging and stamping equipment

Forging weight, kg	Productivity pcs/h with press force (ts)												
	630	1000	1600	2000	2500	3150	4000	6300	8000	10000	12000	16000	20000
< 0,25	550												
0,25-0,4	530												
0,4-0,63	510	490											
0,63-1,0	490	470	450										
1,0-1,6		450	430										
1,6-2,5		430	410	390									
2,5-4,0			390	370	350								
4,0-6,3				350	330	310							
6,3-10					310	290	270						
10-16						270	250						
16-25							230	210					
25-40								190	170				
40-63								170	150	140			
63-100										130	120		
100-120											110	100	
120-140												90	80
140-160													70

KGSHP performance during stamping





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## 4 Automated search procedures

## Forging and stamping equipment P/100

	A	B	C	D	
1	Тяжмехпресс	КА8538	1120	Nominal force, t	6,3
2	НКМЗ	КД8040Б	1360	Nominal force, t	10
3	Kurimoto	КД8040	1420	Nominal force, t	10
4	Smeral	КБ8042	1360	Nominal force, t	16
5		КГ8042А	1360	Nominal force, t	16
6		КБ8544А	1600	Nominal force, t	25
7		КБ8544Б	1600	Nominal force, t	25
8		КИ8044	1800	Nominal force, t	25
9		КД8044	1800	Nominal force, t	25
10		КБ8046	1700	Nominal force, t	40
11		КГ8048	1860	Nominal force, t	63
12		КА8549	1960	Nominal force, t	80
13		К04.086.851	2830	Nominal force, t	125
14		К8552	3000	Nominal force, t	140
15		К8052	3000	Nominal force, t	160

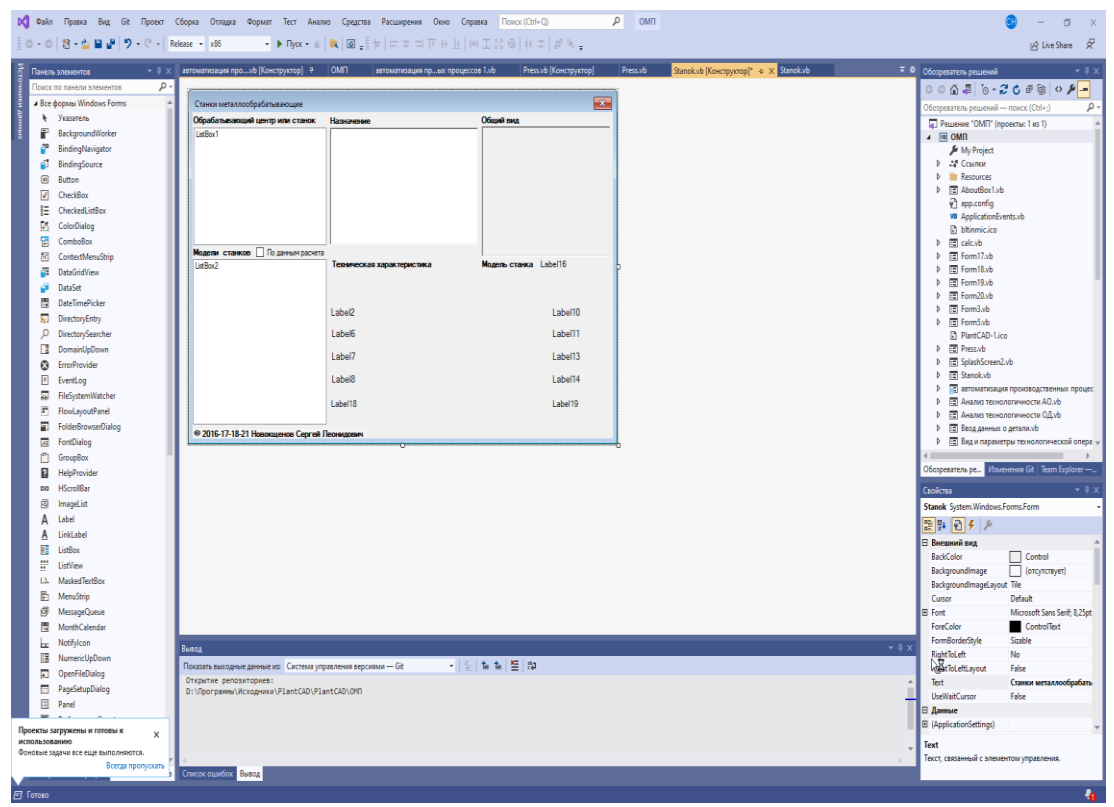
The desired metalworking machine model – **КА8538**



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## 5 Data bases software



```

171         Case DialogResult.No
172             e.Cancel = True
173         End Select
174         Case "Rus" : Dim dr As DialogResult = MsgBox("Завершить просмотр?",
175             MsgBoxStyle.YesNo Or MsgBoxStyle.Question,
176             "PlantCAD - САПМ")
177
178         Select Case dr
179             Case DialogResult.Yes
180                 SplashScreen2.Close()
181                 Excel_close()
182             Case DialogResult.No
183                 e.Cancel = True
184         End Select
185     End Sub
186
187     Private Sub Excel_Open(path As String)
188         Exc = CreateObject("Excel.Application")
189         Exc.Workbooks.Open(path).Activate()
190         Exc.Application.DisplayAlerts = False
191         Exc.UserControl = True
192         Exc.Visible = False
193     End Sub
194
195     Private Sub Form18_Load(sender As Object, e As EventArgs) Handles MyBase.Load
196         Select Case Form22.Language
197             Case "Rus" : Label1.Text = "Обрабатывающий центр или станок"
198                 Label5.Text = "Модели станков"
199                 Label4.Text = "Назначение"
200                 Label9.Text = "Техническая характеристика"
201                 Label17.Text = "Модель станка"
202                 Label13.Text = "Общий вид"
203                 CheckBox1.Text = "По данным расчета"
204             Case "Eng" : Label1.Text = "Machining center or machine"
205                 Label5.Text = "Machine models"
206                 Label4.Text = "Appointment"
207                 Label9.Text = "Technical characteristics"
208                 Label17.Text = "Machine model"
209                 Label13.Text = "General view"
210                 CheckBox1.Text = "According to the calculation data"
211         End Select
212         k = 0
213         Label16.Text = " "
214         Label9.Hide()
215         Kat = False
216         kategoriya = 1
217         Try
218             If IO.File.Exists("D:\Программы\PlantCAD\данные PlantCAD\станки\назначение.xlsx") Then
219                 Excel_Open("D:\Программы\PlantCAD\данные PlantCAD\станки\назначение.xlsx")
220                 For i = 1 To 20
221                     s = Exc.Sheets(1).Range("A" + i.ToString).Value()
222                     If s <> "" Then

```

# Microsoft Visual Studio Community



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## 5 Data bases software

### 1) An example the search of the model mechanical presses

Mechanical presses

**Manufacturer company**

- HKM3
- Kurimoto
- Smeral

**Press models**  According to the calculation data

- KA8538
- КД8040Б
- КД8040
- КБ8042
- КТ8042А
- КБ8544А
- КБ8544Б
- КИ8044
- КД8044
- КБ8046
- КТ8048
- КА8549

**Appointment**

The press is designed for hot stamping forgings from ferrous and non-ferrous metals from piece heated blanks and can be used both as part of automated complexes and as an independent

**General view**

**Technical characteristics**

Nominal force	40	(4000 тс)
Slider stroke	400	
Number of automatic slider moves	50	
The number of single moves of the slider	14	

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## Automated selection

### 2) An example the search of the model metalworking machine

Metalworking machines

**Machining center or machine**

- Токарный
- фрезерный
- сверлильный
- шлифовальный
- карусельный
- расточный
- зубонарезной

**Appointment**

The machine is designed for cutting (turning) workpieces made of metals and alloys in the form of bodies of rotation.

**General view**

**Machine models**  According to the calculation data

- QUICK TURN 250MB
- GLS-1500L
- Mega Turn 400
- HAAS TL-1
- QTU-350 HP
- QUICK TURN 350M
- MULTIPLEX 6300-II
- MULTIPLEX W-300
- HEADMAN HCL 400
- TAKISAWA LA-150(L)
- MEGA TURN 500MS
- INTEGREX J-200
- INTEGREX J-300
- INTEGREX J-400
- INTEGREX i-100
- intregrex j-200
- TURNING CENTER M-S

**Technical characteristics**

Machine model	TURNING CENTER M-S
Maximum processed diameter	580
Power, kW	22
Length, mm	5520
Width, mm	2420
Height, mm	2780

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# Thank you!

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