TOSHULIN

Vertical Turning Centre

BASICTURN 1600 C1

Machine Serial Number 1728

2.

MACHINE SPECIFICATION

Manufacturer: **TOSHULIN, a.s.**

2.0 List of sections about machine specification

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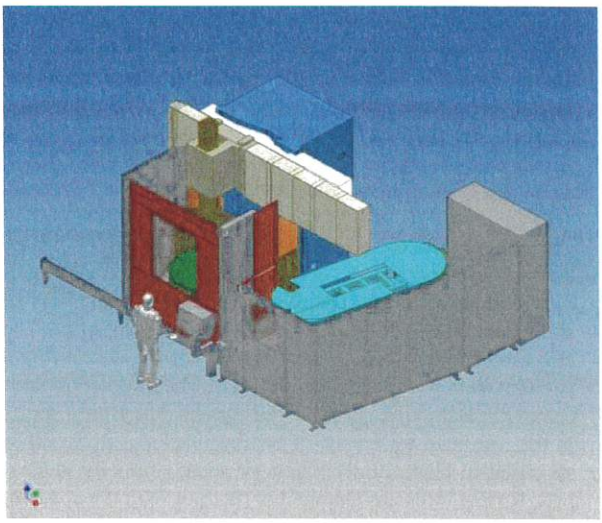
2.1 Machine designation, its application method and machine description

Machine designation



The machine is specified for the efficient turning of workpieces in the single-part production and in the repeated production of small and medium-sized series. In addition to the usual turning operations, it allows to execute taper turning, thread turning, turning the general surfaces, grinding, axial and extra-axial drilling, reaming, thread cutting and milling the general surfaces. The machine is not specified for machining of workpieces of inflammable materials.

Application method

The machine is specified for regions with mild climate according to ČSN IEC 721-2-1:1995. It is specified for mechanical shops in metal-working industry which are located in closed objects having natural ventilation, usual industrial atmosphere and low dustiness. There shall not be aggressive vapours or gases and dust, especially dust with electrical conductivity in these objects. The machine is able to work in a shop as stated below or in a climate and surroundings according to a special agreement.

Range of temperature: 41°F to 104°F (+5°C to +40°C) - it guarantees the trouble-free machine run and operation

Temperature average during 24 hours shall not exceed 95°F (+35°C)

Maximum relative air humidity during 24 hours:

e. g. at temperature of: 68°F 90% (+20°C 90%)

e. g. at temperature of: 104°F 50% (+40°C 50%)

Maximum absolute air humidity: 0,24 lb/ft^3 (15 g/m^3)

In order to obtain the optimum performance and to increase average time between failures it is recommended to keep the ambient temperature within 59°F to 77°F (+15°C to +25°C) and relative air humidity 40% to 70%. The machine accuracy depends also on the ambient temperature variation during a working day. The biggest accuracy can be obtained only in rooms with air conditioning. No mechanical shocks or vibrations can be transferred to the control system.

The protection against an electrical accident is performed according to ČSN 33 2000-4-41 (mod. IEC 364-4-41: 1992) and ČSN EN 60204-1, Ed. 2:2007. The protection against a dangerous contact with live parts is performed by means of coverage, insulation and application of PELV circuits.

The protection against a dangerous contact with dead parts is performed by automatic disconnecting from the source, electric separation of circuits and application of PELV circuits. It is completed to be the increased one. Completing is done by connecting.

According to ČSN EN 60204-1, Ed. 2:2007 the machine is equipped with protection by covering all electrical devices to prevent entering rigid foreign bodies and liquids at least IP 54. All live parts of electrical devices in the electrical switch box have covering at least IP 2X.

According to ČSN EN 60204-1, Ed. 2:2007 Art. 4.3.1 the machine works in the reliable way in the whole working range, even if it is fully loaded with the workpiece weight or if the voltage varies from 90% to 110% and the frequency deviation is ± 1%.

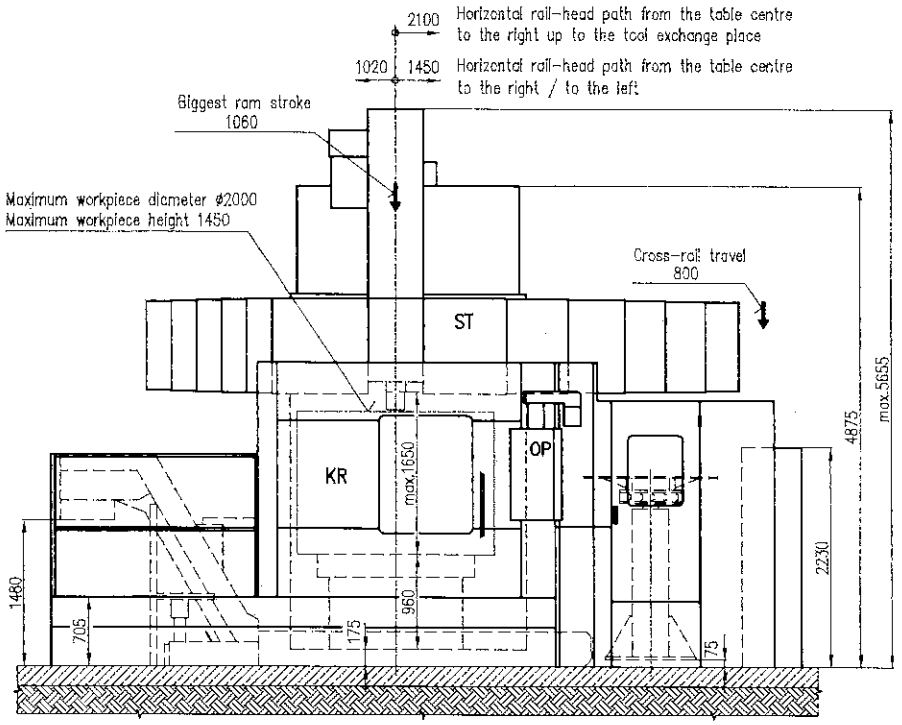
coolant is pumped by the pump and then it is led through the hose to the filtering equipment ASTOS AŠ, which is a part of the main coolant tank made by TOSHULIN. The tank volume is 119 gal (450 litres). The coolant is then pumped from the main coolant tank by the pump made by GRUNDFOS under the pressure up to 290 psi (2 MPa). The coolant is led through the hoses to the ram and to the tool.

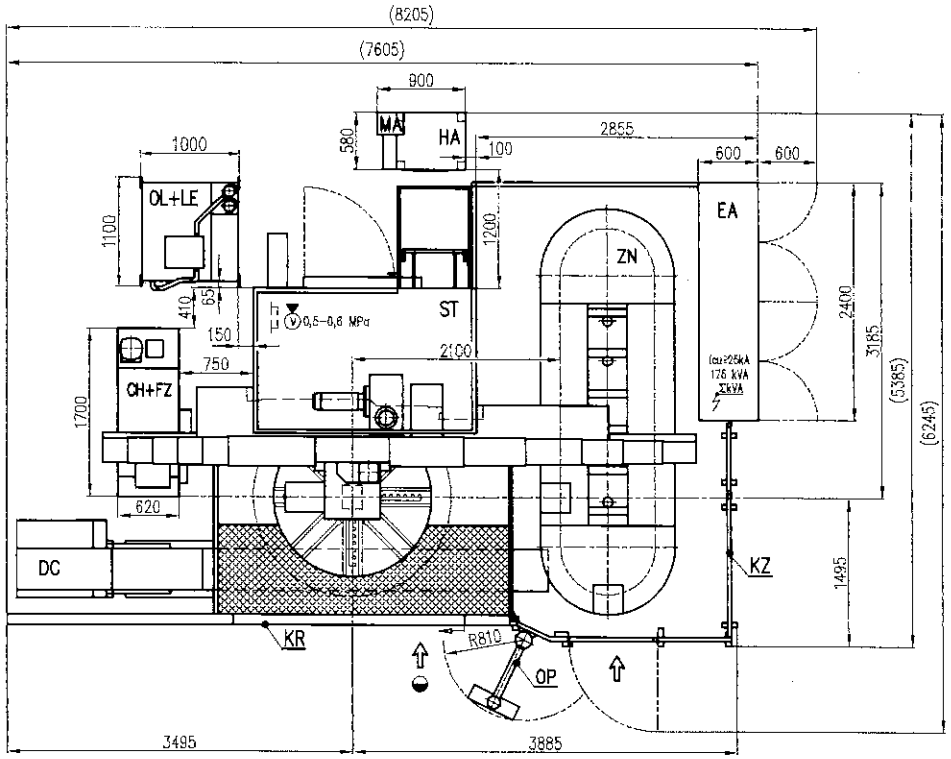
The protective guards protecting the complete working area ensure safety at working. The access to the machine working area to the table is enabled by the one-part hand-operated protective guards (door). The protective guards (door) are equipped with a big sight window. The area at the right side and at the left side at the table is equipped with the right working platform and with the left working platform in the machine working area. The working platforms are tilted manually. The outside entrance place to the machine working area can be equipped with the working platform.

The control system made by SIEMENS - SINUMERIK 840D Solution Line and the elements for operating some machine functions by hand (e. g. machine lighting, elements for starting the machine, START - STOP of drives and of hydraulics) are built-in in the main control panel located in front of the machine; there are also placed the elements signalling some machine functions there (gear shifting, clamping a tool holder or clamping a rotary tool with the covering plate, connecting the machine to the network, etc.). The main control panel cannot be adjusted in height and it is integrated in the machine protective guards in the fixed way.

The contouring control system fulfils all requirements for operating the machine and for its technological possibilities. It is necessary to prevent any unqualified intervention to the control system. Electrical installation is modified to single operated machine assembly groups. Switching devices and regulating devices are concentrated in the electrical switch box. The connecting material for connecting the machine with the electrical switch box is supplied in required lengths.

T7


2100
Horizontal rail-head path from the table centre to the right up to the tool exchange place
1020
1450
Horizontal rail-head path from the table centre to the right / to the left
Biggest ram stroke 1060
Maximum workpiece diameter ϕ2000
Maximum workpiece height 1450
Cross-rail travel 800
ST
KR
OP
max.1650
max.5655
4875
2230
1480
960
705
175
75


(8205)
(7605)
900
MA
HA
580
2855
100
600
600
1000
OL+LE
1100
1200
EA
ZN
410
65
150
ST
0,5-0,6 MPa
2100
750
CH+FZ
1700
2400
3185
(5385)
(6245)
620
DC
KZ
1495
KR
R810
OP
3495
3885

2.2 Machine technical data

Working range	metric		inches	
Maximum peripheral turning diameter	mm	2000	inch	78,7
Maximum facing diameter	mm	2000	inch	78,7
Maximum distance between the table working surface and the clamping surface on the inserted ram	mm	1650	inch	65
Ram cross section	mm	200 x 240	inch	7,87 x 9,45
Ram working stroke	mm	1060	inch	41,7
Ram stroke to the place for the automatic exchange of tool holders or rotary tools with the covering plate	mm	1060	inch	41,7
Working rail-head travel from the table centre to the left / to the right	mm	1020 / 1450	inch	40 / 57
Rail-head travel from the table centre to the right up to the place for the automatic exchange of tool holders or rotary tools with the covering plate	mm	2100	inch	82,6
Maximum workpiece diameter	mm	2000	inch	78,7
Maximum workpiece height – if the tool holder with the length of 7,1 inch (180 mm) is applied	mm	1450	inch	57
Maximum workpiece weight - in dependence on the entered table speed	kg	12000	lbs	26455
Maximum cutting force – in dependence on the ram extension, the torque on the table and on the applied tool	N	50000	lbf	11240

Cross rail	metric		inches	
Maximum cross-rail stroke	mm	800	inch	31,5
Cross-rail shifting speed	mm/min	287	ipm	11,3

Table	metric		inches	
Table diameter	mm	1600	inch	63
Table speed range (speed infinitely variable in two steps)	min^{-1}	2 - 400	rpm	2 - 400
1st step	min^{-1}	2 - 100	rpm	2 - 100
2nd step	min^{-1}	9 - 400	rpm	9 - 400
Main AC SIEMENS drive power output	kW	60	HP	82,5

Operating data	metric		inches	
Noisiness – equivalent sound level LAeq in the operator's place	dB(A)	max. 80	dB(A)	max. 80
Lubricating oil consumption for approx. 1000 operating hours	litre	5	gal	1,3
Lubricant pressure	MPa	3	psi	435
Lubrication oil charge in the lubrication set made by VOGEL	litre	3	gal	0,79
Pressure in the hydraulic distribution system (it depends on the applied machine tooling)	MPa	9,5	psi	1377,5
Oil charge in the hydraulic set made by HYTOS VRCHLABÍ and in the distribution system on the machine	litre	130	gal	34
Oil charge in the lubrication oil tank TOSHULIN – lubrication of the table bearing and in the distribution system on the machine	litre	250	gal	66
Charge of the coolant tank at the front elevating chip conveyer made by ASTOS AŠ, including the charging hopper	litre	~ 300	gal	~ 79
Charge of the coolant tank made by TOSHULIN	litre	450	gal	119
Tool magazine: chain tool magazine with 45 chain links				
- number of storage places for tool holders	-	16	-	16
- number of storage places for ISO 50/CAT 50 rotary tools	-	19	-	19
- number of storage places for the covering plate which is used together with rotary tools	-	1	-	1
Maximum weight of cut chips – at maximum chip removal	kg/min	7	lbs/min	15,43
Nominal voltage of the machine	V	3 x 460	V	3 x 460
Frequency	Hz	60	Hz	60
Total machine power input	kVA	175	kVA	175
Rated current	A	250	A	250

for the executed machine assembly according to the conditions. The electrical wiring must be prepared according to the foundation plan in advance. The customer shall also prepare oil filling, auxiliary supports according to the foundation plan and material for sealing the anchor bolts. The anchor bolts are included in the machine delivery. The machine part being lifted must be lifted over the ground at first; then it is necessary to leave this machine part at stillstand, check the load binding and its balancing. Only then it is possible to continue manipulation.

The method for hanging the particular main machine assembly groups is shown in **Drwg. T1**. The ropes and the metal rod for transporting the column are not included in the machine delivery. Four hinged pins PMON 1 shall be used for hanging the bed with the table and with the main drive (electric motor). The hinged pins are included in the machine delivery. The ropes are not included in the machine delivery.

The cross rail, the rail head and the ram can be transported by means of two methods:

- The method for hanging the particular main machine assembly groups is shown in **Drwg. T2-1**. The suspension eyes fixed on the cross rail and the assembly jig P MON 3 serve for hanging the cross rail together with the rail-head slide part. The hinged pins fixed on the sides of the rail-head ram part and the assembly jig P MON 4 serve for hanging the rail-head ram part together with the ram. After the rail-head ram part is mounted with the rail-head slide part, it is necessary to dismantle all suspension eyes from the cross rail and all hinged pins from the rail-head ram part sides and the holes must be closed with covers. The covers are included in the machine delivery.
- The method for hanging the complete mounted machine assembly group "CROSS RAIL – RAIL HEAD – RAM" is shown in **Drwg. T2-2**. When hanging is performed, it is necessary to use the suspension eyes fixed on the cross rail and the hinged pins, which are fixed on the sides of the rail-head ram part. It is also necessary to use the assembly jig P MON 2. After the complete machine assembly group is mounted, it is necessary to dismantle all suspension eyes from the cross rail and all hinged pins from the rail-head ram part sides and the holes must be closed with covers. The covers are included in the machine delivery.

  The assembly jigs, ropes, suspension eyes and hinged pins are included in the machine delivery.

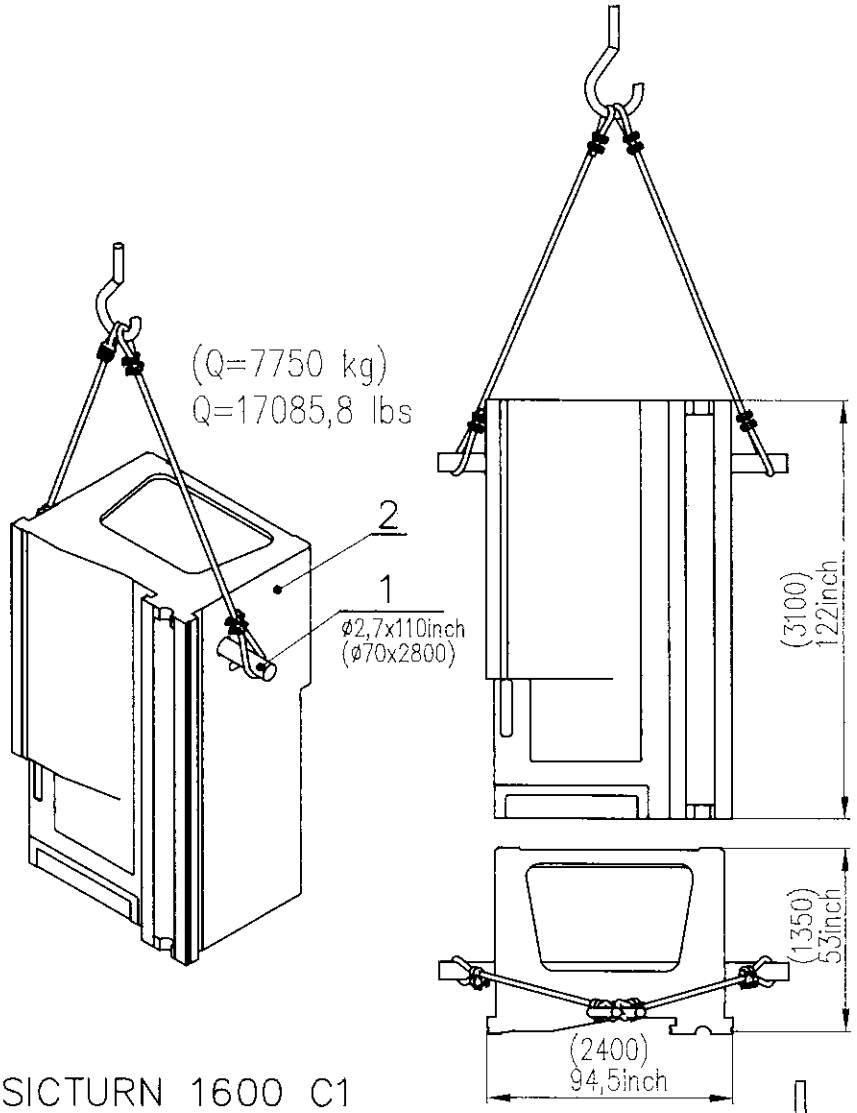
The method for hanging the particular main machine assembly groups is shown in **Drwg. T3**. The ropes and metal rods for transporting the chain tool magazine and the electrical switch box are not included in the machine delivery.

It is recommended to use the hemp rope with the length of 2,18 yd (approx. 2 m) at the assembly of the column for the main control panel revolving arm. This rope is not included in the machine delivery.

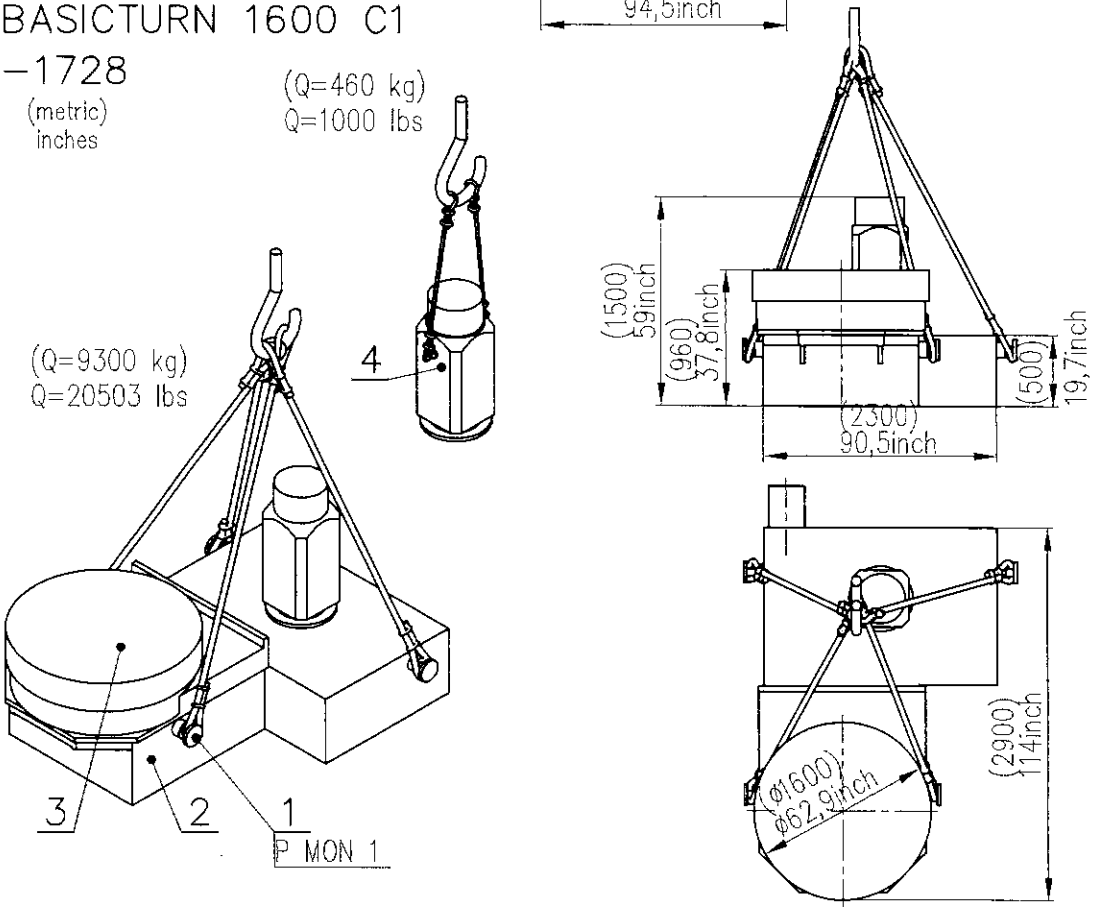
If the machine shall be stored for longer time, it is necessary to perform the following:

- Cover the machine carefully with a waterproof cover and store in on a dry and safe place.
- Ambient air must be clean, without acids, salts and aggressive elements.

T1



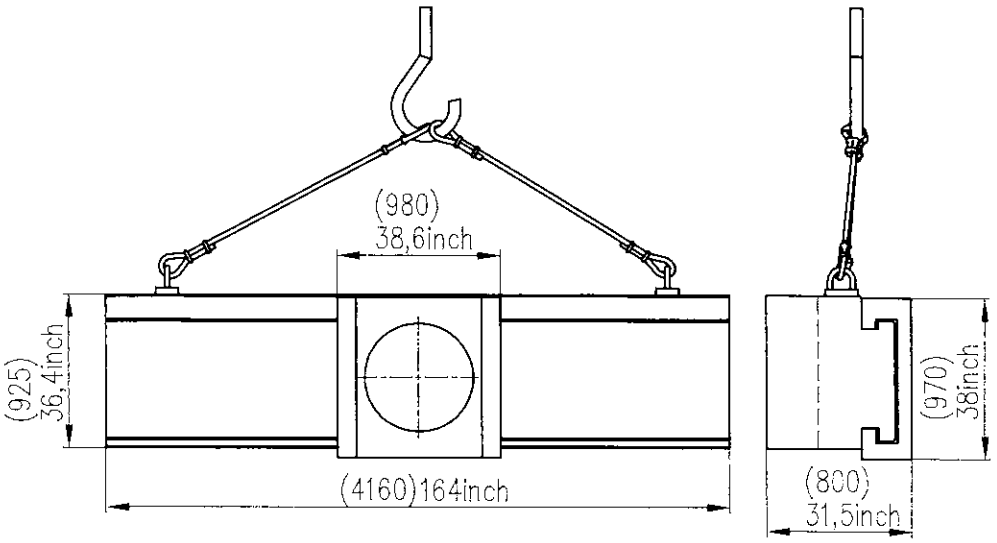
BASICTURN 1600 C1
−1728
(metric)
inches

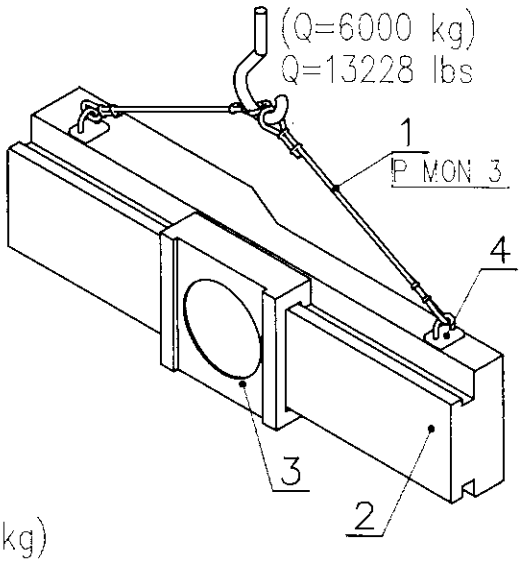


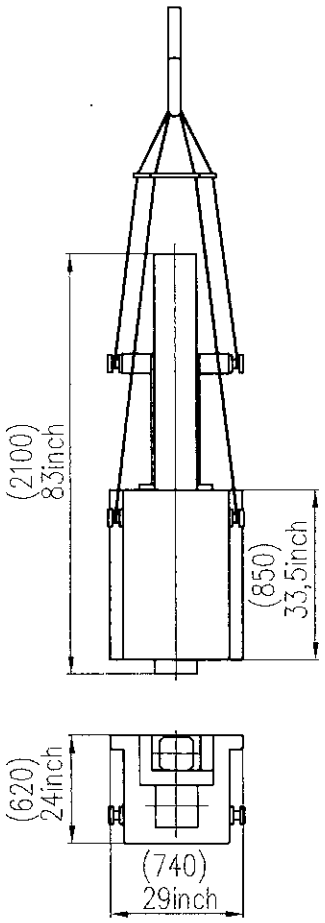
S 5897

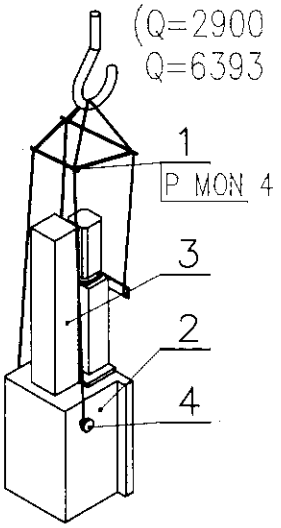
T2-1

BASICTURN 1600 C1
−1728
(metric)
inches









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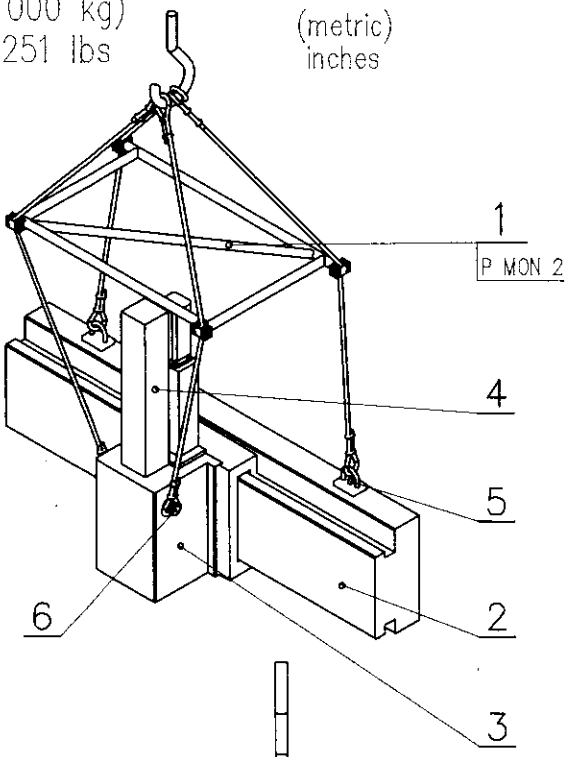
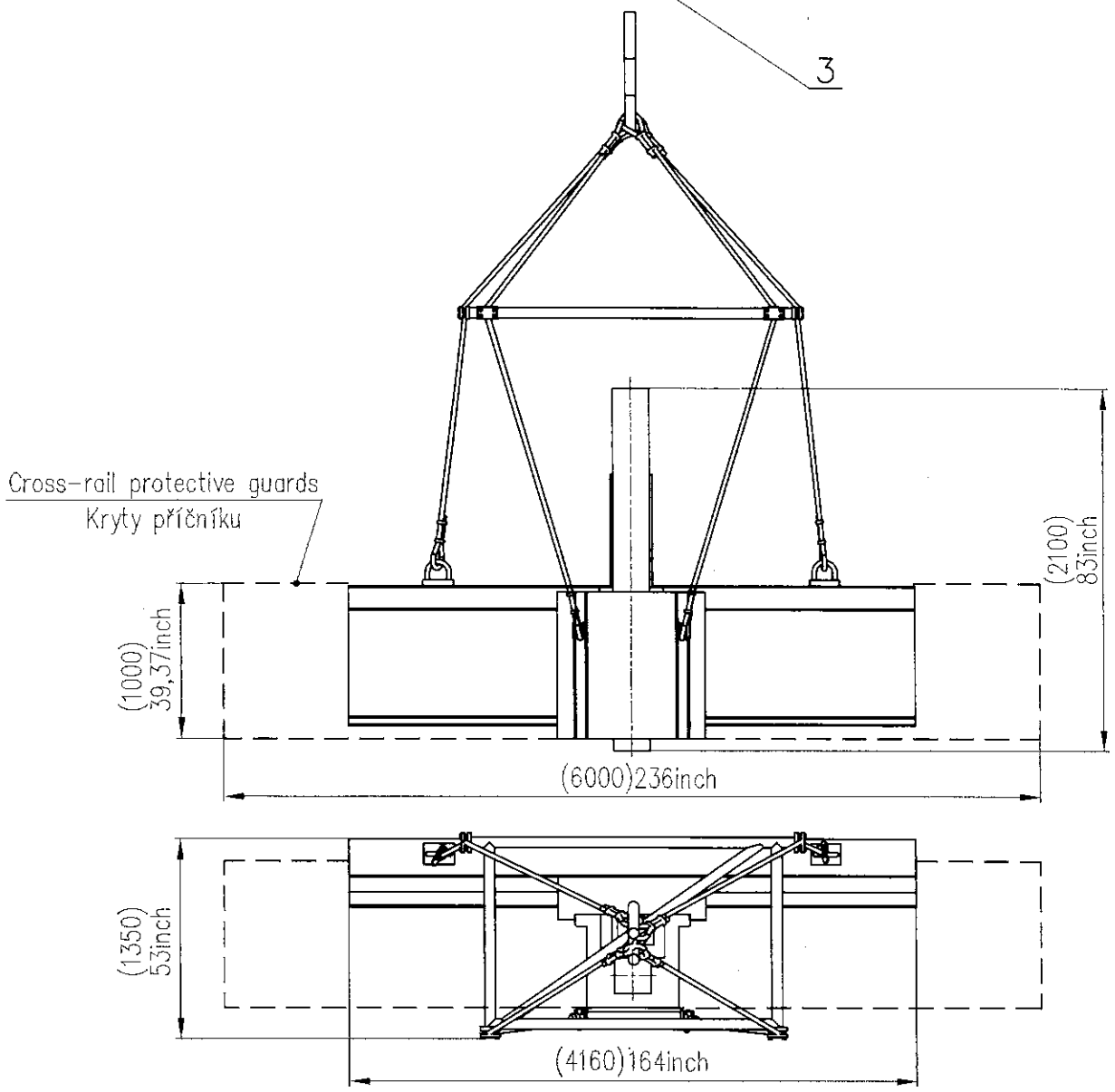
T2-2

BASICTURN 1600 C1
−1728

(Q=11000 kg)
Q=24251 lbs

(metric)
inches

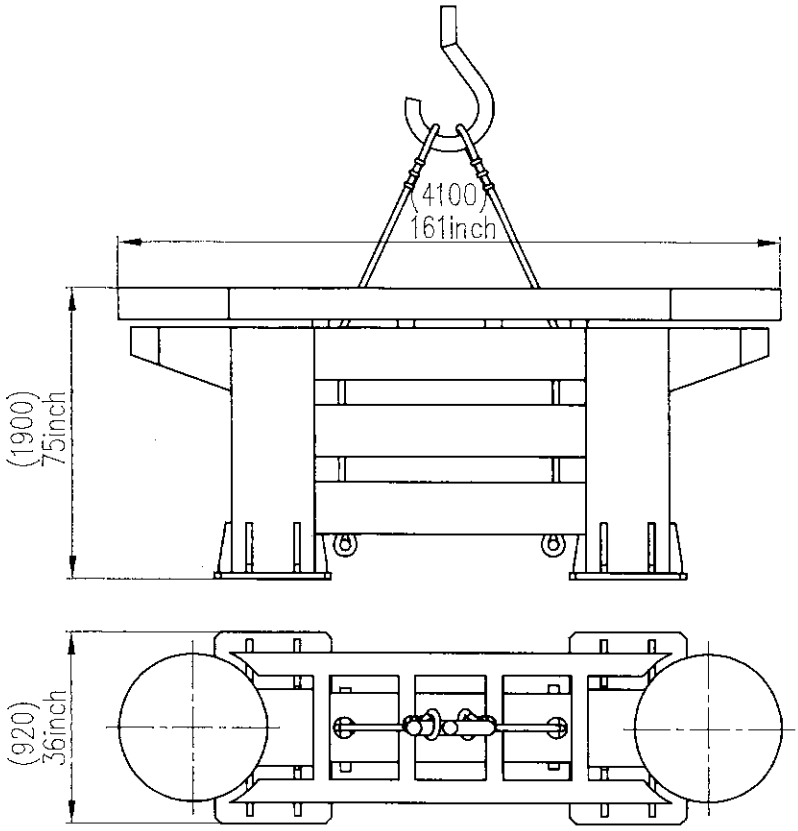


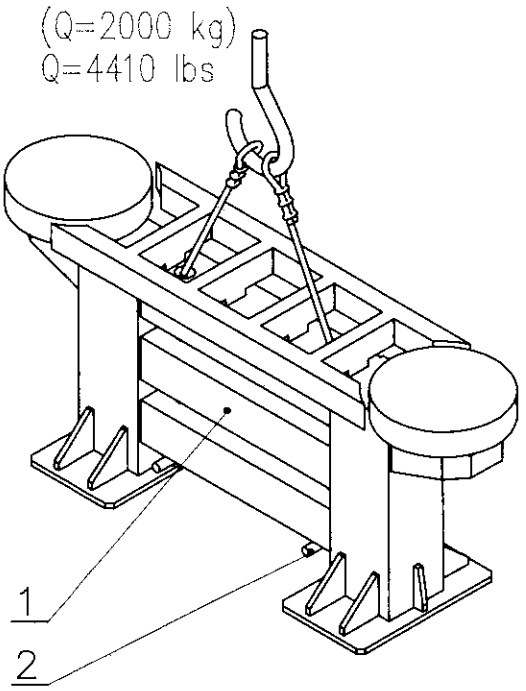


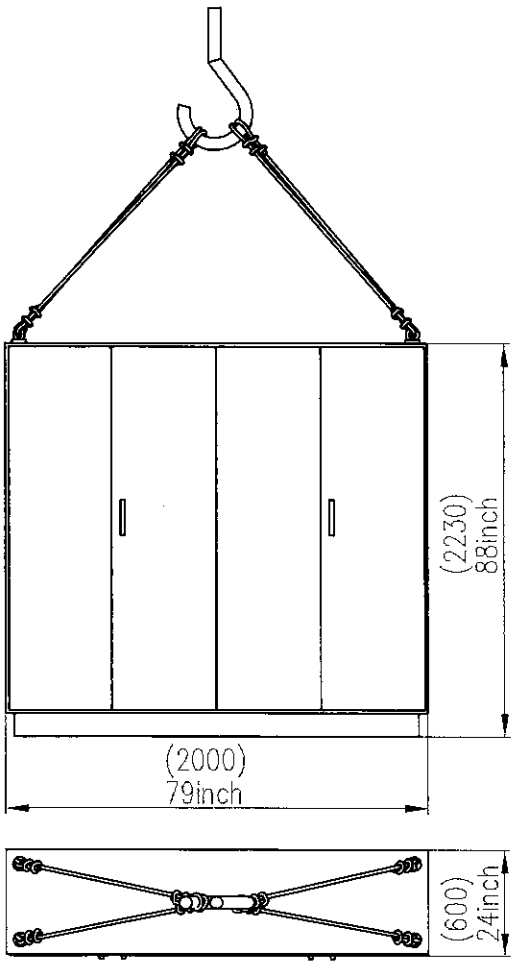
S 6344

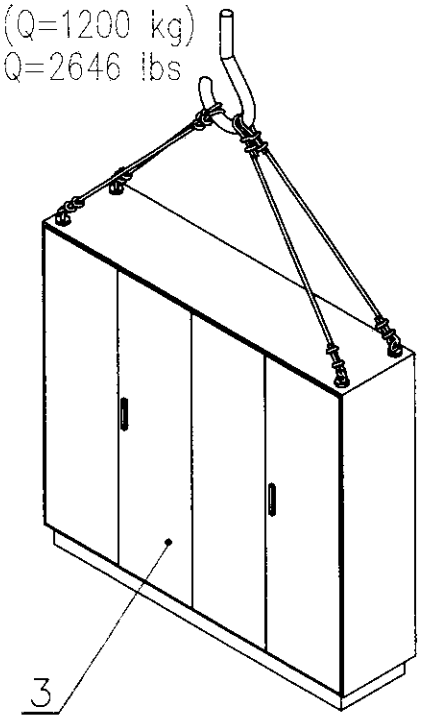
T3

BASICTURN







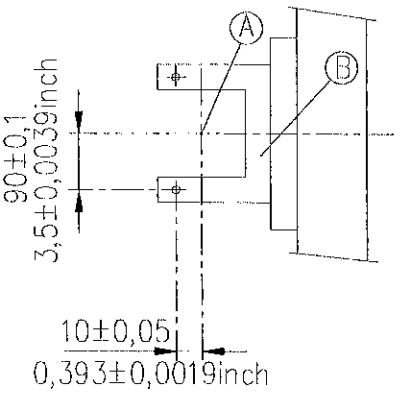


S 5824

In order to obtain the exact tool exchange, it is necessary to set and level the tool magazine in dependence on the following instructions:

1) Check the parallelity of the ram face with the upper surface of the magazine storage holder (place) in the distance of 7,87inch (200mm) = max.0.0078inch (0,2mm).

2) Check the ram position in the place for the tool exchange. The check is done using the jig made by the machine manufacturer. (It is recommended to order it.) The specified values are given in the sketch.



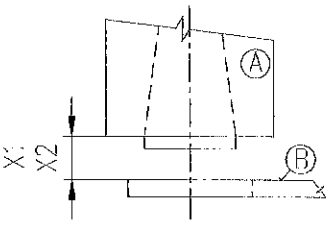
A – ram axis

B – magazine storage holder (place)

3) Check the distance between the ram face and the upper surface of the magazine storage holder (place).

- dimension X1=0,7 $^{+0,0078}$ inch (17,8 $^{+0,2}$ mm) – motion of the ram without the clamped tool holder to the automatic tool exchange place to take a tool holder.
- dimension X2= 1,04 $^{+0,0078}$ inch (26,5 $^{+0,2}$ mm) – motion of the ram with the clamped tool holder to the automatic tool exchange place to store the tool holder.

The specified data are given in the sketch.



A – ram

B - magazine storage holder (place)

Considering the importance and exacting character of the correct machine setting and levelling, it is recommended that the machine setting and levelling as well as setting and levelling of the chain tool magazine shall be executed by a manufacturer's service technician. In order to seal the anchor bolts of the bed and of the chain tool magazine finally, it is necessary to use the sealing compound "Mapefill" (manufacturer MAPEI) or another sealing compound made by another manufacturer with the corresponding rigidity and short ripening time.

The electrical switch box, the hydraulic set, other sets and other accessories are arranged and fixed and then it is necessary to perform hydraulic, lubrication and electric connection to the machine. All oil tanks including the hydraulic set are filled with oil. Quantities and sorts of oils are given in Drwg. T17. The main coolant tank made by TOSHULIN shall be filled with coolant. This tank has the volume of 119 gal (450 litres). Recommended coolant technical parameters are given in Section 4.15 "Coolant distribution on the machine". Connect two pressure air supplies to the machine – pressure air technical data are given in Section 4.16 "Pressure air distribution on the machine".

NOTICE FOR MACHINE ASSEMBLY:

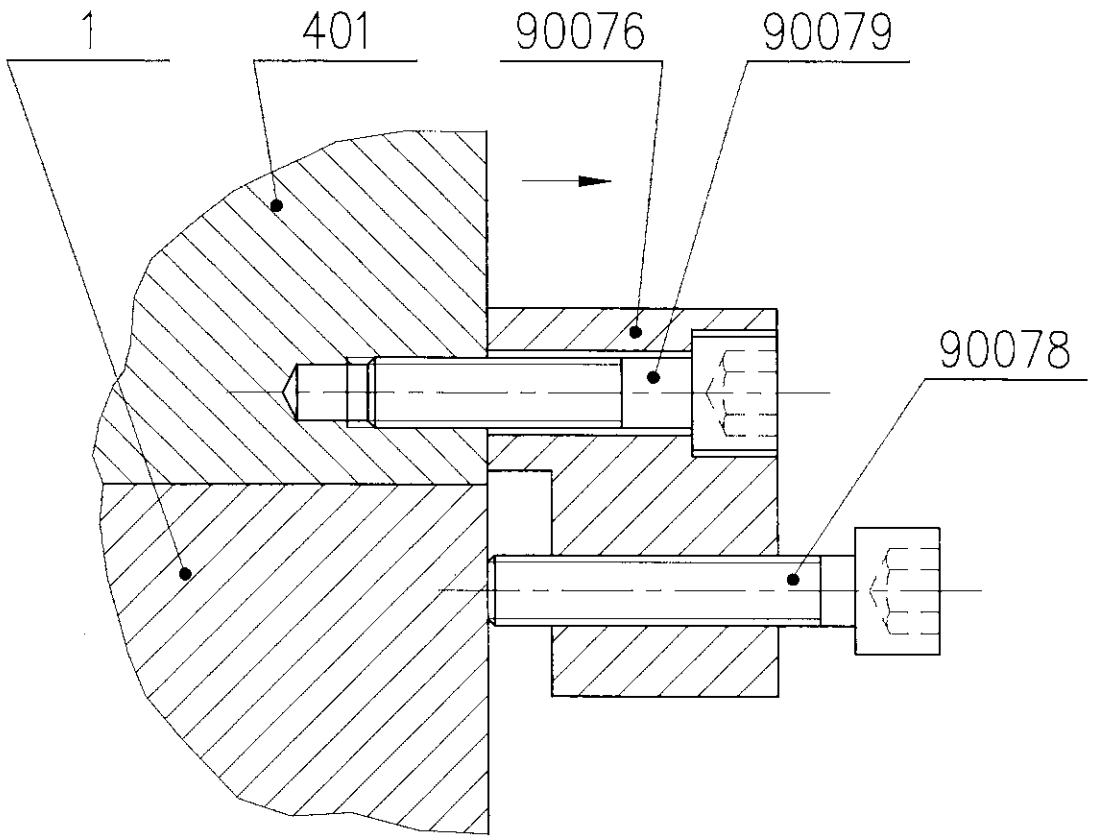
Before the machine is started for the first time, the lubrication circuit must be bled. Bleeding the lubrication circuit shall be performed by means of the bleeding valve **QC54** (Drwg. 440-4), if repeating the lubrication cycle more times – by switching all drives off (**button 18**) on the main machine control panel (Drwg. T4) and by switching them again on (**button 17**). Before starting this operation, first the cross rail and the ram must run to their lower position.

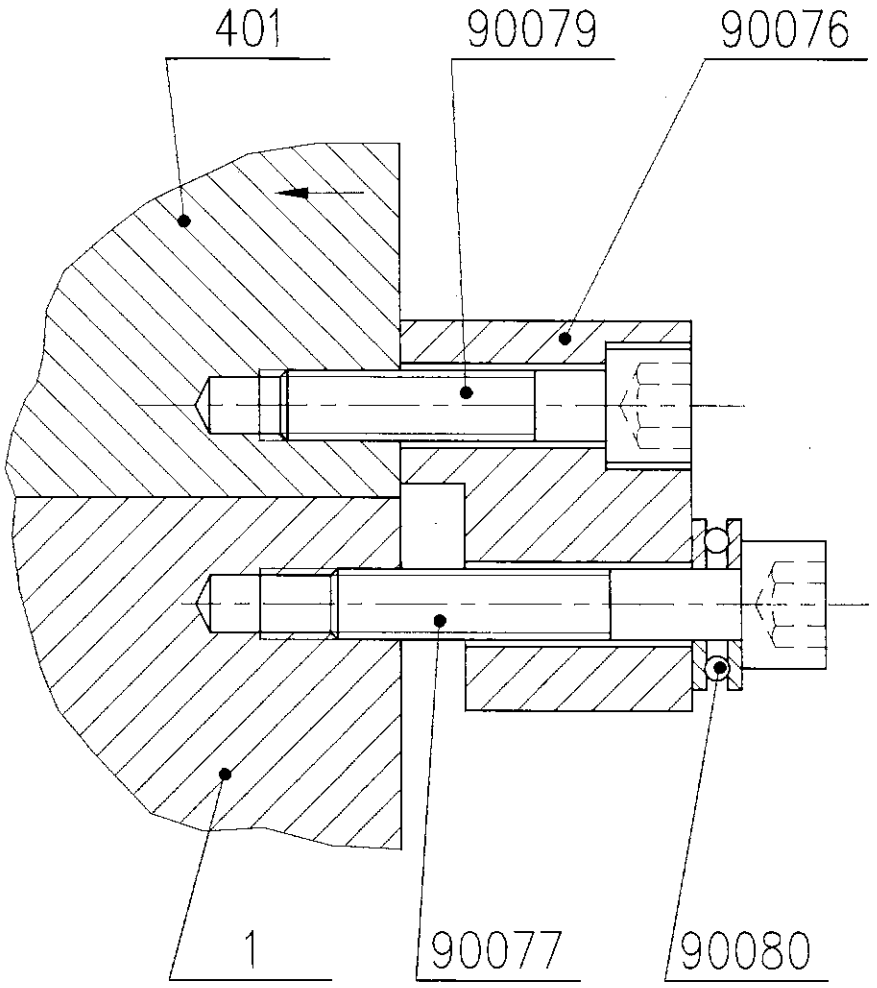
or 2nd gear step of the rotary tool drive on the ram. Then, connect the spindle drives by the **button 29**. The pilot light over this button begins lighting. Connect the servo drives for travel of axes by the **button 39**. The pilot light over this button begins lighting.

The state "Machine technological readiness" will occur, after all drives are connected to the network. This state is signalled by the **pilot light 2** (H3).

After the machine is started, single lubrication points will be lubricated automatically on the machine from the lubrication set. Then, the preliminary accuracy tests and the machine running-in shall be executed. All covers and accessories are mounted. All machine functions and the machine accuracy are tested again - some corrections are executed if necessary. At the end, the machine accuracy tests and its performance tests are executed as specified in the supplied records about accuracy.

T5





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