Operating instructions for the machine

VERTICAL MACHINING CENTER

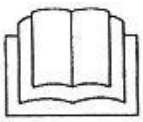
DOOSAN VERTICAL MACHINE CENTER - 90811061

Producer: **DOOSAN INFRACORE Co., LTD.**
601-3 Namsan-dong, Changwon
MADE IN KOREA

Operator: Honeywell Aerospace Olomouc s.r.o. Nádražní 400, 783 66 Hlubočky – Mariánské Údolí
Czech Republic

Machine name: VERTICAL MACHINING CEMTRUM
DOOSAN VERTICAL MACHINE CENTER - 90811061

Content



Before performing any work on the equipment, carefully read these instructions for operating the machinery.

These operating instructions for machinery should be kept near the machine in case they need to be consulted.

1. Manufacturer information, trade name and address

Manufacturer: (Business name, address)

DOOSAN INFRACORE Co., LTD.
601-3 Namsan-dong, Changwon
MADE IN KOREA

2. Machine information, designation, type, series, serial number, year of manufacture.

Machine name: **Vertical Machining Center**

Machine designation: **DOOSAN VERTICAL MACHINE CENTER 90811061**

Type, Series, Serial No.: DMV - 8035, s/n AV 900041
Year of manufacture 03/2007

3. Machine description, dimensions, weights, and technical parameters

Machine description

Machinery DOOSAN VERTICAL MACHINE CENTER registration number 90811061 serial number AV 900041, vertical machining centre with CNC control, consists of the following main parts: steel cast two-part screwed column, vertical headstock with drive sliding in the "Z" axis, tool magazine with tool changing device in the left rear part, table with drive sliding in the "x" and "y" axes, in the right rear part there is an electrical switchboard and a CNC control unit, in the rear part of the machine there is a hydraulic unit with cooling, filters and distribution for driving the tool magazine, pneumatic system, system with cooling fluid, central lubrication system, chip conveyor, electrical installation, transformer, control panel and safety elements with protective covers.
The machine is controlled by electric lever and button controls, which are clearly arranged on the control panel located on the front of the machine, and a pedal pedal. The main switch is located on the right, rear side of the machine and can be locked in the off position with a padlock if necessary.
The conceptual design of the vertical machining centre enables efficient machining of medium-sized workpieces in piece and series production. The main advantage of the numerically controlled machine is the quick preparation of machining programs, easy adjustment and automatic operation.

DOOSAN VERTICAL MACHINE CENTER registration number 90811061 serial number AV 900041, vertical machining center with CNC control, may only be operated by trained and knowledgeable operators, demonstrably trained professional operators, warned of residual risks.

For a detailed description, dimensions, weights and technical parameters of the machine, see "Original operating instructions".

General view of the DOOSAN VERTICAL MACHINE CENTER machinery registration number 90811061 serial number AV 900041, a vertical machining center with a description of the individual parts of the machine.

Fig. 1

Table 1

ozn	Machine Part Name
1	Stand Frame Machine
2	Saddle with vertical headstock for tool clamping
3	Main control panel with controls and monitor
4	Portable control panel with controls for setup and adjustment
5	Machine main switch
6	Movable work compartment guard, two-piece, locked with a safety lock
7	Electrical switchboard of the machine
8	Transformer located at the rear of the machine
9	Hydraulic unit located at the rear of the machine
10	Hydraulic fluid filtration
11	Hydraulic fluid cooling
12	Compressed air supply, pneumatic distribution and central lubrication of sliding surfaces
13	Chip conveyor with drive
14	Tool magazine with automatic loading
15	Work platform for machine operator - access to the working area
16	Work platform for the operator at the rear of the machine
17	Lubricant tank with pumps and cleaning equipment

Dimensions, weights and technical parameters

Length:	5960 mm
Width:	4840 mm
Height:	3630 mm
Weight:	18070 kg
Feed:	3x480V/60 Hz
Bus Fuses:	100A
Main safeguards:	90A
Maximum machine power:	60 kVA
Hydraulic motor:	2.2 kW
Cooling motor:	0.55 kW

Transformer power: 75kVA

For a detailed description, dimensions, weights and technical parameters of the machine, see "Translation and original of the machine operating instructions".

4. List of drawing documentation:

1. Panorama Fig. 1 and Table 1
2. Operator station Fig. 2
3. Lubrication system Fig. 3
4. Hydraulic system Fig. 4
5. Pneumatic system Fig. 5
6. Safety lock Fig. 6
7. Binding to the right Fig. 7
8. Controls – main power switch Fig. 8a, 8b
9. Controls - main control panel Fig. 9
10. Controls - Other Control Panels Fig. 10
12. Noise Level Measurement Report Appendix No. 1.
13. Electrical wiring diagram Appendix No. 2

5. Machine operator station

Safety, hygiene and protective requirements and measures for machinery DOOSAN VERTICAL MACHINE CENTER are governed by:

- Decree. ČÚBP 48/1982 Coll. as amended by No. 192/2005 Coll.
Machinery and machinery - Common provisions § 33; § 34; § 35; § 36; § 37; § 38; § 39; § 40; § 41;

Machinery and machinery - Starting and stopping machines § 42; § 43;
Machinery and machinery - Protective devices for machines § 46;
Machinery and Machinery - Transport, Repair and Maintenance of Machinery § 47;
Machinery and machinery - Work stations and equipment § 48; § 49; § 50;
Machinery and machinery - Displays and controls § 51; § 52; § 53;
Metalworking - Common provisions § 54(1); § 54(2); § 54(3); § 54(4); § 54(5); § 54(6); § 54(7); § 4(8), § 54(9), Metalworking

- ČSN EN:12417:2002 (200710) - Safety of machine tools. Machining centers. and the operator's internal regulations applicable to the site in question relating to occupational safety, fire protection and hygiene, and environmental protection (regulations applicable to waste management and disposal)
- ISO 13 857-2008 – Safety of machinery – Safety distances to avoid reaching danger points with the upper and lower limbs.
- and the operator's internal regulations applicable to the workplace concerning occupational safety, fire protection and hygiene and environmental protection (regulations applicable to waste management and waste disposal)

The manufacturer has set additional requirements for the environment in which the equipment can be operated as follows:

Environmental requirements.

All CNC cabinets and units of various units must be installed in an environment that meets certain requirements. A "cabinet" within the meaning of these instructions may be:

1)All CNC cabinets supplied (except hanging cabinets).
2)Cabinets manufactured by the machine manufacturer, including suspended CNC.
3)Pendant control panels and similar devices, including the CRT/MDI unit or control panel connection unit, manufactured by the machine manufacturer.
4)Cabinets containing various externally installed units (substations, I/O units, tape readers, speed controllers with digital servo amplifier, etc.) manufactured by the machine manufacturer.
5)Cabinets containing other electrical equipment and units.

1 Ambient temperature

Operating:	-5°C to 40°C
Storage or transport:	-20°C to 60°C

2 Temperature changes

Maximal:	1.1 °C / minute

3 Moisture

Common conditions:	75% or lower (relative humidity)
Short-term (up to one month):	maximum 95%

4 Vibration

During operation:	0.5 g or less

5 Ambient atmosphere

Contact the manufacturer when operating the system in environments with a higher level of dust particles, coolants or organic substances.

The location of the machinery must comply with the following conditions:

A place that is not exposed to direct sunlight or heat.
A well-ventilated area with low humidity.
A place where it is unlikely that the exhaust air will be drawn in due to air circulation inside the room.
Dust-free place without dirt, mineral dust, oil vapor, etc.
Provide free operating space to ensure smooth suction from the front and exhaust from the top of the unit, as well as to facilitate inspection and maintenance of the unit.

Machinery operator's station DOOSAN VERTICAL MACHINE CENTER, registration number 90811061.

Fig. 2

For safe movement of the operator around the station, the machine operator's station is equipped with a suitable floor grate or anti-slip floor surface and the operator performs regular and sufficient cleaning of the station. Before starting work and after every 8 hours of continuous work, the operator's station must be cleaned of dirt, cooling lubricant and metal residues.

During all activities at the facility and workplace, it is necessary to comply with the applicable internal regulations of the operator concerning occupational safety, fire protection and

hygiene and environmental protection (regulations applicable to waste management and waste disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a detailed description and other information given by the manufacturer valid for the machine operator's station, see
"Translation and original of the operating instructions for the machine".

6. Intended use of the machine, inadmissible use of the machine

Intended use of the machine

The DOOSAN VERTICAL MACHINE CENTER 90811061 serial number AV 900041, a vertical machining centre with CNC control, is designed for chip machining of cold metal – workpieces, where the basic motion is the rotation of the cutting tool against the workpiece and the main energy for the machining process is supplied by the rotation of the cutting tool. The feed is performed by the workpiece or tool, usually in a direction perpendicular to the axis of planar or shaped surfaces. Numerical control is the automatic control of the machining process by means of a device in which digital data is used.

The machine is designed for chip machining of cold workpieces made of metals with a strength of up to 900 MPa, mainly flat or shaped surfaces, and for drilling, boring, reaming, etc.

When machining lightly flammable materials (wood, plastics, aluminium, magnesium and their alloys, etc.), the user and operator must comply with the requirements of the relevant standards (EN 1127-1:1997 Explosive atmospheres – Explosion prevention and protection) and fire safety directives for the workplace and operations in the country of the machine operator.

The DOOSAN VERTICAL MACHINE CENTER registration number 90811061, a vertical machining centre with CNC control, may only be operated by an instructed and knowledgeable operator, warned of residual risks, demonstrably instructed and trained by a professional operator.

The product is capable of safe work in the environment according to ČSN 33 2000-3:95, AB5 with the degree of corrosion aggressiveness according to ČSN EN 60721-3-3:97.

Unacceptable use of the machine

Machinery DOOSAN VERTICAL MACHINE CENTER registration number 90811061 serial number AV 900041 CNC-controlled vertical machining center may not be used for applications other than those specified in this paragraph.

All activities on the facility must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene, and environmental protection (regulations applicable to waste management and waste disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a detailed description and information on the intended use of the machine and its inadmissible use of the machine, see "Translation and original of the machine operating instructions".

7. Setting, anchoring, fixing, mounting and connecting the machine

Alignment, anchoring, fixing

The placement of the DOOSAN VERTICAL MACHINE CENTER 90811061 serial number AV 900041 will be carried out according to the floor plan. Install the machine on the workstation on a pre-built foundation or a prepared hall floor, mark and measure the points – anchor points. Then move the device away from the anchoring point. Drill the holes for anchors (chemical or mechanical) with the necessary precision. After re-seating the machine in the working (anchor) place, align the machine with the required accuracy and anchor the leveled machine. The machine must be bolted to the foundation.

Choose the installation location carefully.
Install the drive in a location that meets the following requirements:

Flat and solid floor.
A place that is not exposed to direct sunlight or heat.
A well-ventilated area with low humidity.
A place where it is unlikely that the exhaust air will be drawn in due to air circulation inside the room.
Dust-free place without dirt, mineral dust, oil vapor, etc.
Provide free operating space as well as space to facilitate inspection and maintenance of the unit.

MACHINE BASICS – the machine must be fixed to the floor. Use the steel bases under the leveling screws in the base under the machine and under the base screws. The floor plan of the machine shows the position of the anchor bolts. If the machine is installed in a location with excessive vibration, the machine, driveline and controls must be attached to vibration damping elements.

LEVELING – When levelling the machine, use a sensitive professional spirit level (level). Carpentry or assembly vials do not have sufficient sensitivity. The machine must be levelled to the required accuracy specified in the machine's operating instructions.

Place the vial carefully and make a longitudinal alignment. With the alignment bolt nut loosened, adjust the position of the machine with the alignment bolts in the corners of the foundation so that the vial indicates the horizontal position. The machine must be in a horizontal position in both longitudinal and transverse directions. All screws must be in perfect contact with the mounting elements in the floor.

Assembly

Assemble the anchored machine including all systems that are part of the equipment necessary for the safe operation of the system. Guards, safety features, electrical equipment, pneumatic, hydraulic systems. Check that the marking of the controls is carried out in accordance with the applicable standard.

LUBRICATION SYSTEM – Make all necessary connections according to the lubrication schedule. See chapter Lubrication system.

Fig. 3

HYDRAULIC SYSTEM – No additional connections are required. Check the hydraulic oil level in the inspection window. The prescribed type of oil can be found in the chapter Lubrication system.

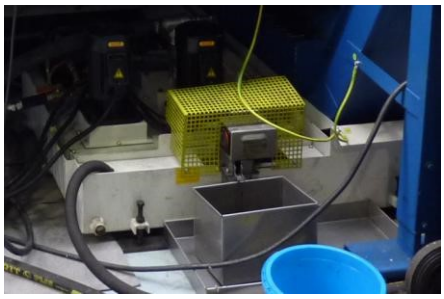
Fig. 4

PNEUMATIC SYSTEM – Connect compressed air to the device of the required parameters for machine operation, cleaning of the machine and products.

Fig. 5

COOLING SYSTEM – If the machine is equipped with a coolant tank, check the coolant level for the correct level before turning on the coolant pump.

Fig. 6



ELECTRICAL – The electrical control panel is mounted on the machine and all internal connections are made. Several external connections are required. AC supply voltage must be applied to the main switch.

Perform a visual and functional check of the completion of the installation of the device.

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

All activities on the facility must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene, and environmental protection (regulations applicable to waste management and waste disposal).

For a detailed description and information on transport, transport, alignment and assembly of the machine, see "Translation and original of the machine operating instructions".

Machine connection

The machine can only be connected to the power supply network by a person with the appropriate electrical qualification according to Decree No. 50/1978 Coll.!

The machine's rated supply voltage is given in point 3. Before connecting the machine to the power supply, always make sure that the voltage and frequency indicated on the rating plate of the machine correspond to the mains to which the machine is to be connected. The electrical supply installation must be carried out in accordance with the applicable regulations and requirements.

The conductors of the supply cable are connected to the input terminals (see also the electrical wiring diagram):

- Phase conductors to terminals marked for phase conductors
- middle conductor to the terminal marked with the letter N
- protective conductor for the PE marked terminal

The direction of rotation of the electric motors is indicated by an arrow on the machine. In the case of the opposite direction of rotation, it is necessary to replace the phase conductors.
The direction of rotation of the electric motors, pumps of the hydraulic and cooling system of the cooling lubricant should only be started and checked after filling with the prescribed materials.

Inspection of the electrical equipment of the machine

The electrical equipment of the machine is subject to regular inspections within the deadlines specified in Table a) ČSN 33 1500:1990+amendment Z3:1994 – Electrotechnical regulations – Revision of electrical equipment.

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a detailed description and information on setting, anchoring, fastening, mounting and connecting the machine, see
"Translation and original of the operating instructions for the machine".

8. Commissioning, use, preparation and professional requirements for operation

Commissioning of the machine

With regard to the age, state of wear and tear of the DOOSAN VERTICAL MACHINE CENTER 90811061 serial number 548, its equipment and the fact that the machinery has already been operated, dismantled and transported, it is necessary to take into account the possibility of more frequent occurrences of dangerous situations, failures and non-standard behaviour of the equipment during its commissioning and operation. Therefore, we recommend a thorough inspection of all machinery equipment (safety elements, electrical, hydraulic, pneumatic machinery components) and replace the non-functional and damaged components with new ones or repair them.

The DOOSAN VERTICAL MACHINE CENTER registration number 90811061 a vertical machining center with CNC control, may only be operated by an instructed and knowledgeable operator, warned of residual risks, demonstrably instructed and trained by professional operators.

It is also necessary to warn the operator of the equipment that phenomena may occur during the operation of machinery that prevent dangerous situations and warn of the subsequent occurrence of a dangerous situation. These phenomena are mainly:

- increased noise, whistling, knocking, vibrations (warn of the danger of insufficient lubrication – possibility of seizing of the bearing, setting of incorrect machining parameters, incorrect or insufficient function of the cooling system, loosening of a part of the device, etc.)
- the smell of combustion products, the smell of overheating (they warn of the danger of overheating, burning – damage to insulation, possible short circuit in electrical equipment or insufficient – non-functional cooling or overloading of machinery.)
- flashing light or signalling lights (warn of the danger of lighting failure, danger of damage to the wiring, loosening of wires at terminals.)

The basic description of the activities for putting machinery into operation is summarized in the following points:

1. The employer may only entrust work on machinery to a worker who meets the requirements for operation listed below in this point.
2. Perform a visual inspection of the machine alignment and anchorage.
3. Perform a visual and functional check of the device's readiness for operation.
4. Checking the filling of tanks with operating materials. Use the prescribed propulsion materials (hydraulic oil, metalworking or coolants) recommended by the manufacturer of the machinery specified in the operating instructions. Bleed hydraulic systems. Check hydraulic and pneumatic systems for leaks. Check that the amount of operating fluids in the systems is sufficient.
5. Turn on the main switch of the machine.
6. Check the emergency stop function of the machine and that the main switch function is correct.
7. Check the work area lighting.
8. Check the correct direction of rotation of the spindle by briefly starting the machine. The direction of rotation is indicated by an arrow on the machine.
9. Check all safety features, including guards.
10. Check the functionality of all movements and movements of the parts of the device.
11. Check the functionality of the clamping elements for all workpiece and tool clamping variants.
12. Check the workpiece and tool clamping functionality and check the movements and feeds of all parts of the machine in a safe manner.
13. Perform a leak check of hydraulic and pneumatic systems.
14. Check that the amount of fluids in the systems is sufficient.
15. Check whether the parameters of the systems are satisfactory.
16. Perform all types of machining for which the machinery has been designed in a safe way.
17. Carry out a visual and functional inspection of the machinery and remove any deficiencies or defects found or report them to the responsible person.
18. Perform machining according to the technological procedures issued by the operator for the machinery in a safe manner.
19. After finishing work, clean and tidy up the machine and secure the machine against unauthorised use, e.g. by locking it.
20. Make a written record of the successful commissioning of the machine (without defects).

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a detailed description of how to put the machine into operation and its use, see "Translation and original of the operating instructions for the machine".

Professional requirements for machine operation

1. The employer may only entrust work on machinery to a worker trained in the field, or depending on the nature of the work and the practice of the equipment operator, to a worker demonstrably trained under supervision.
2. The employer may only authorise a worker who is medically fit to perform work on the equipment.

3. The employer may only entrust work on machinery to a worker who is familiar with the instructions for operating the equipment for the performance of work activities on the equipment, has knowledge to the extent enabling the safe use of the equipment, has successfully and demonstrably completed basic or regular training.
4. The employer may only entrust work on machinery to a worker who is demonstrably familiar with the directives issued by the operator applicable to the given workplace, especially in the field of safety, fire protection and environmental protection.
5. The employer may only authorize work on machinery to a worker who is demonstrably familiar with the technological procedures and work activities on the equipment in accordance with the operator's requirements for the performance of work activities on the given machinery.

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

For a detailed description and information on how to put the machine into operation and use, see "Translation and original of the operating instructions for the machine".

9. Hazards, risks, protective measures, protective equipment

Before the first start-up of the machine DOOSAN VERTICAL MACHINE CENTER registration number 90811061 carefully read and understand these safety instructions, the operating instructions and the instructions issued by the operator. The operator must be familiar with all the controls and functions of the machine.

The DOOSAN VERTICAL MACHINE CENTER registration number 90811061 a vertical machining center with CNC control, may only be operated by an instructed and knowledgeable operator, warned of residual risks, demonstrably instructed and trained by professional operators.

With regard to the age, the state of wear and tear of the machinery and its equipment and the fact that the machinery has already been operated, dismantled and transported, it is necessary to take into account the possibility of more frequent occurrences of dangerous situations, failures and non-standard behaviour of the equipment during its operation. Therefore, we recommend a thorough inspection of all machinery equipment (safety elements, electrical, hydraulic pneumatic equipment components) and replace the non-functional and damaged components with new ones or repair them.

The list of serious hazards, safety requirements and protective measures for machinery DOOSAN VERTICAL MACHINE CENTER registration number 90811061 is governed by the standard - ČSN

EN:12417+A2:2002 (200710) - Machine tool safety. Machining centers.

Danger

During training, the operator must be warned of serious hazards that may occur during his service life (commissioning, operation, cleaning, maintenance, adjustment, etc.).

1) Mechanical hazards: hazards caused by throwing objects or parts thereof, snagging, contact with moving parts of the machine, compression, shearing, cut, pulling, impact, stabbing, danger of discharge of high-pressure liquid and compressed air.
2) Electrical hazards: Touching of persons with living parts and touching of persons with parts that have become alive after a fault
3) Heat-related hazards: Burns, scalds
4) Hazards caused by neglecting ergonomic principles: Inappropriate positioning, excessive effort, neglect of personal protective equipment, insufficient lighting, incorrect placement of controllers and consolidators.
5) Noise hazards: Hearing loss, psychological disorders, interference with speech communication and audio signals.
6) Hazards caused by materials and substances: inhalation of vapours, contact with particles of the workpiece or machining and hydraulic fluids. Risk of fire and explosion due to the processing of flammable materials and flammable operating materials.
7) Hazards caused by unexpected starting, overrunning or increasing speed: Control system failure, restoration of power supply and external influences on electrical equipment.
8) Dangers caused by slipping, tripping and falling.

Residual risks

The DOOSAN VERTICAL MACHINE CENTER registration number 90811061 a vertical machining center with CNC control, may only be operated by an instructed and knowledgeable operator, warned of residual risks, demonstrably instructed and trained by professional operators.

The risks arising from the use of the DOOSAN VERTICAL MACHINE CENTER registration number 90811061 under conditions of anticipated use and logically foreseeable misuse have been minimized by available technical means.

Despite the measures taken, certain residual risks remain on the equipment, mainly caused by the inattention of workers and non-compliance with safety regulations and principles at work. To increase the effectiveness of safety protection, we draw attention to subsequent residual risks.

Carrying out a risk assessment with the assessment procedure for DOOSAN VERTICAL MACHINE CENTER machinery registration number 90811061.

The hazard list is the result of hazard identification and risk assessment carried out for a wide range of machines in the relevant standards for these type "C" machines. Subsequently, the identification of the hazard in the machinery is accompanied in accordance with the Czech technical standards ČSN EN ISO 14121-1, ČSN EN ISO 12100-1 and ČSN EN ISO 12100-2 for the entire life cycle of the machine. After the analysis of significant hazards, risk estimation, risk assessment, proposal of risk reduction measures, we arrive at estimating the size of the residual risk, taking into account the implemented risk reduction measures. Each estimated residual risk must be assessed and decided whether it is acceptable, bearing in mind the fact that there is never the possibility of total elimination of the risk.

Subsequently, the residual risks resulting from the assessment are indicated.

Residual risks on the mechanical part of the device:

- Guards mounted on the machine or supplied with the stand in accordance with the standard ČSN EN:12417+A2:2002, are intended only to minimize the risk of ejection and not to completely eliminate it, INFORM!
- Possibility of influencing the safety functions after component replacement, removal or replacement of the software INFORM!
- possibility of fire, explosion or harmful dust during machining of materials such as aluminum, magnesium and the like INFORM!
- possibility of incorrect mode selection, tool selection or tool clamping - possibility of access to dangerous points of the device INFORM!
- Possibility of access of external workers to the workplace INFORM!

Residual risks on the electrical part of the device:

- Possibility of access to live electrical equipment
- Possibility of damage to the electrical equipment of the device

Residual risks on the pneumatic part of the device:

- Possibility of compressed air emission (compressed air for machine operation, lubrication unit and cleaning of the machine and workpiece). Pneumatic systems must comply with ČSN EN 983 + A1:1996.

Residual risks on the hydraulic part of the plant:

- Possibility of pressure fluid discharge (from a hydraulic system designed for propulsion, movement of machine parts or from a coolant or cooling fluid system). Hydraulic systems must comply with ČSN EN 982 + A1:1996

To eliminate or minimize them, we propose subsequent technical and organizational measures.

- keep the safety equipment of the machine in perfect condition, regular inspections, inspections and inspections of the equipment.
- selection of qualified operators, to maintain qualification through regular operator training, o operator training
  keep records (records, planning).

Protective measures

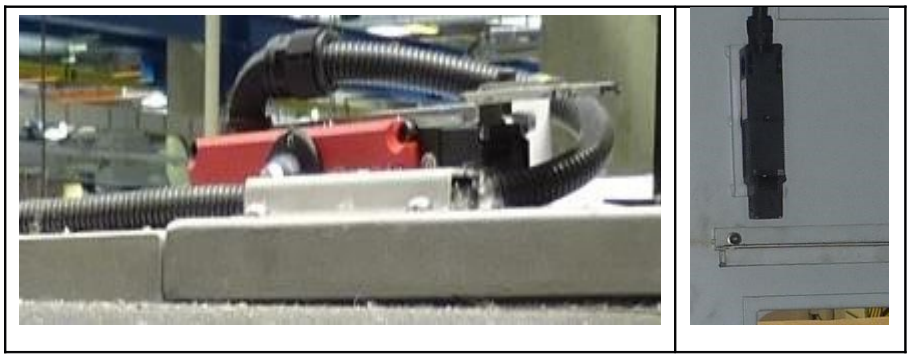
Protective measures for machinery DOOSAN VERTICAL MACHINE CENTER, registration number 90811061, are governed by the standard - ČSN EN:12417 + A2:2002 (200710) - Safety of machine tools. Machining centers.

Work areas must be provided with safety protection. The design of the protective device must prevent access to hazardous points (situations).

For the purposes of this Article:

1. All protective devices must comply with ČSN EN 61496-1 ed.2:1997 (ESPE), ČSN CLC/TS 61496-2, category 4 (AOPD) and EN61496-1:1997 (PSPD)
2. Protective covers must comply with ČSN EN 953 + A1:1997 and interlocking devices with ČSN EN 1088 + A2:1995.

Fig. 7



The device is equipped with protective covers for the work area from the manufacturer. These guards must be maintained and must be fitted to the device during operation. They are only dismantled for maintenance, adjustment, cleaning, lubrication or failure purposes.

Before starting work or once per shift, check the function of the safety guard with interlock and the emergency stop control of the machine.

On the basis of technological procedures and activities carried out on the equipment, the operator shall prepare an operating regulation for the use of protective equipment, ensure that the operator of the equipment is acquainted with this operating regulation, including his regular and demonstrable training.

Work on machinery may only be carried out if the protective devices are in a position to protect the operator from the dangers created by the machinery.

To eliminate or reduce the danger, the following protective measures must be observed:

1. To set up the equipment according to the foundation plan and, above all, to maintain sufficient space for work activities, operation and maintenance.
2. The floor of the operator's workplace must be insulated against cold and moisture and must allow chips to fall through, thus allowing safe movement of the operator.
3. Before commissioning, carry out an initial inspection of the electrical equipment of the machine according to the applicable standards, decrees and directives in the country of the operator for putting the machines into operation (in the Czech Republic according to ČSN 33 1500 and ČSN 33 2000-6).
4. Perform regular tests and measurements of electrical equipment within the specified deadlines according to valid standards, decrees and directives in the country of the operator for putting the machines into operation (in the Czech Republic according to ČSN 33 1500).
5. The connection of the equipment to the electrical network and work on the electrical equipment may only be performed by a person knowledgeable in the sense of ČSN EN 60 204-1 ed.2 or IEC 204-1 Article 3.30.
6. Machinery and its electrical equipment may only be operated by a person instructed in the sense of ČSN EN 60 204-1 ed.2 or IEC 204-1 Article 3.30.
7. Protection against electric shock according to ČSN EN 61140 ed.2:
   - Basic protection: insulation, covering, position
   - Failure protection: automatic disconnection from the source, bonding
   - Protection against the effects of static electricity: by bonding, connecting to the existing earthing network
8. If the noise level measurement indicates that it is necessary to reduce the noise level, the machine must be equipped with protective equipment to reduce the sound level.
9. The operator entrusts work on machinery to a worker trained in the field, or depending on the nature of the work and the practice of the equipment operator, to a worker trained under supervision.
10. The operator shall ensure that the operator of the equipment is acquainted with the instructions for operating the equipment
    and his regular and demonstrable training.

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

Protective equipment

Operators must be warned during training about the use of protective equipment:

1. Wear protective clothing
2. Wear safety glasses or protective shields
3. Use protective gloves for handling workpieces, lubricants and lubricants
4. Use of floor gratings, suitable work shoes and headgear
5. If the noise level measurement indicates that the use of hearing protection equipment is required, the machine workplace must be equipped with this protective equipment and the machine operator must use it.

Protective equipment must meet the requirements of the relevant standards.

On the basis of technological procedures and activities carried out on the equipment, the operator shall prepare an operating regulation for the use of personal protective equipment, shall ensure that the operator of the equipment is acquainted with this operating regulation, including his regular and demonstrable training.

All activities on the equipment must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene and environmental protection (regulations applicable to waste management and waste disposal)

For a description and information on the hazards and protective measures of the machine, see "Translation and original of the machine operating instructions".

10. Transport, transport, storage, dismantling

Conveying the machine

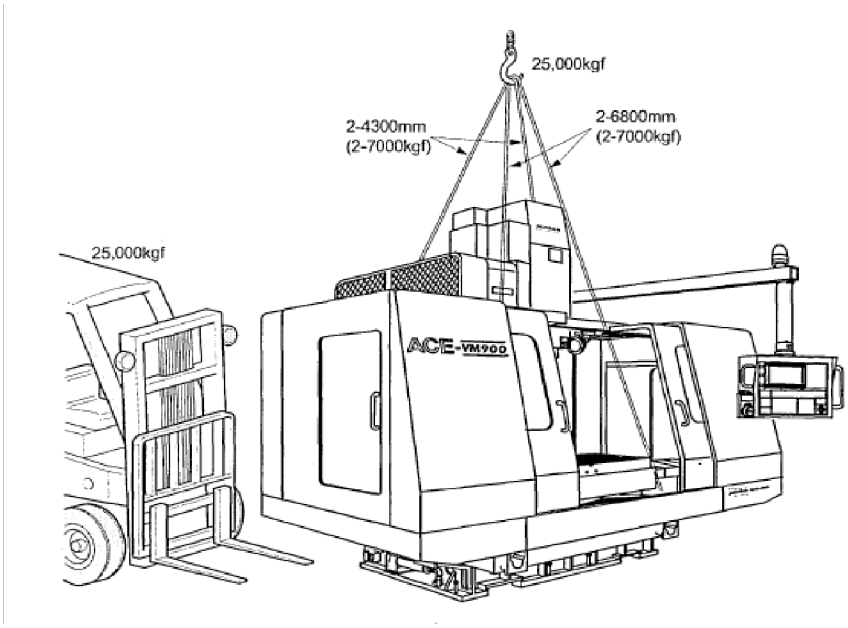
The DOOSAN VERTICAL MACHINE CENTER registration number 90811061 in the package is transported by common means of transport. The machine can be transported by forklift or crane. For tying, use the equipment shown in Fig. 3 and ropes designed for the load capacity stated on the packaging.

The illustration below shows the correct way to tie and lift the device for safe transport as follows.
Lift the machine gently. When the lifting rope becomes tight, stop lifting and check that the lifting rope is properly tied. Then, when the machine is lifted off the ground, check the lifting status again and then raise the machine to the desired height. Also, start the machine slowly and stop starting it immediately before the machine reaches the ground. Then check its position and place the machine on the ground.

IMPORTANT: Avoid any shocks or impacts that could impair the accuracy of the machine

Working with the crane:

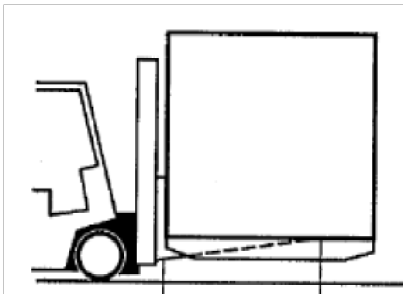
Fig. 8a



Lift the machine gently. When the lifting rope becomes tight, stop lifting and check that the lifting rope is properly tied. Then, when the machine is lifted off the ground, check the lifting status again and then raise the machine to the desired height. Also, start the machine slowly and stop lowering just before the machine reaches the ground. Then check its position and place the machine on the ground.

Working with a forklift:

Fig. 8b



ATTENTION! A forklift truck with sufficient load capacity must be used!

When lifting the machine, first lift it slowly until it rises off the ground, and then place it on the fork in a position where the machine's centre of gravity is most stabilised in both longitudinal and transverse directions. Then you can slowly lift the device and move it.

Transporting the machine

For transport and storage needs, machinery must be protected with domestic or overseas packaging. All functional surfaces must be protected by spraying or coating with preservation wax to protect the equipment against corrosion in the covered area. For overseas transport, it is necessary to wrap the device in plastic wrap, store it in a transport box and secure the device against shifting in the box, or consult other conditions of transport with the carrier. The equipment to be transported must be visibly and adequately marked on the packaging, including weight, binding options, transport methods and handling marks.

Machine storage

Machinery must not be transported and stored together with substances whose vapours create an aggressive environment. Storage must be provided in covered areas. If the storage of the device lasts longer than 6 months, the protection with preservative wax should be renewed. Temperature of transport and storage of the device according to the manufacturer's requirements: -20°C to 60°C.

Disassembling the machine

Disconnecting the machine from the power supply network may only be carried out by a person with the appropriate electrical qualification according to Decree No. 50/1978 Coll.!

The basic description of the activities during the disassembly of machinery DOOSAN VERTICAL MACHINE CENTER, registration number 90811061, is summarized in the following points:

- Turning off the machine using the stop control
- The main switch will turn off
- A voltage-free state is ensured at the supply terminals of the machine (depending on the installation design, e.g.
  by tripping the circuit breaker or unscrewing the fuses)
- By checking (measuring) it is verified that there is no voltage on the supply terminals
- Removing the power cable wires
- Safe disconnection from other energy sources (from the compressed air distribution system and subsequent depressurization of the entire pneumatic system) Proceed in a similar way with the hydraulic and cooling system, pump out used liquids and store them, or dispose of them in accordance with valid waste regulations and regulations.
- dismantle parts of the equipment or secure them as needed for transport, transport or
  storage

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

For a detailed description and information for transport, transport, storage and disassembly of the machine, see "Original and translation of the machine operating instructions".

11. Controlling, switching on, switching off and emergency shutdown of the machine

Machine control

Before starting the DOOSAN VERTICAL MACHINE CENTER registration number 90811061 for the first time, you must carefully read and understand these safety instructions, the operating instructions and the instructions issued by the operator.

The DOOSAN VERTICAL MACHINE CENTER registration number 90811061 a vertical machining center with CNC control, may only be operated by an instructed and knowledgeable operator, warned of residual risks, demonstrably instructed and trained by professional operators.

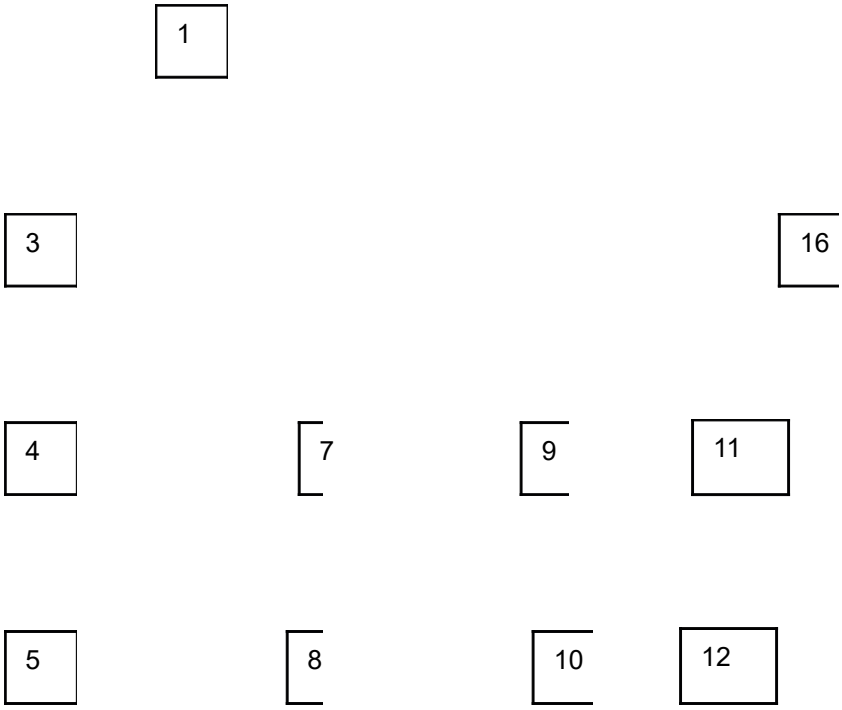
The operator must learn and learn how to use all the controls and functions of the machine safely. These are mainly the following controls.

Main lockable switch of the machine (1) and subsidiary switch of the machine (2) on the electrical switchboard of the DOOSAN VERTICAL MACHINE CENTER registration number 90811061

Fig. 8

Main control panel

Fig. 9



1– control computer screen
2– keyboard of the control computer
3– buttons on and off control
4– machine on buttons, alarm reset
5– emergency switch button of the machine
6– Program function switches – single block, alt.stop, alt.block skip, no-load, program restart, manual interruption, on, cooling off, on, chip conveyor shutdown, automatic machine shutdown
7– machine mode selector
8– stop motion, cycle start buttons
9– zero point signalling
10 – axis selector for manual movement
11 – selector for changing the feed speed compared to the set one, step changes of speed, manual speed entry
12 – buttons for manual jogging axes, quick feed button
13 – spindle load gauge
14 – spindle speed change selector
15 – start, stop spindle rotation buttons
16 – machine alarm signaling, program memory lock
17 – work light switch, machine lock
18 – safety gate opening button

Control panels for clamping, adjustment and maintenance

Fig. 10

	
Tool tray control panel located at the back machinery	**Portable Motion Controller**

For a detailed description of how to operate, switch on, switch off and emergency stop the machine, see "Translation and original of the machine operating instructions".

Control – basic procedure

1. We will perform a visual inspection of the equipment. If we do not find any defect, we move on to point 2.
2. We turn on the machine with the main switch.
3. To illuminate the work area, turn on the switch for lighting.
4. Clamp the workpiece on the workbench. Clamping is carried out in a safe way with regard to its shape, size, weight and material of the workpiece.
5. Set the required spindle speed (1/min).
6. Set the required feed speed (mm).
7. Set the cutting depth of the tool (mm).
8. Turn on the rotation of the tool according to the requirements of the operation to the right or left using the control button. The direction of rotation is indicated by the controls.
9. We turn on the working feed of the table and perform machining in a safe way while visually observing it.
10. To stop the spindle rotation, use the stop button only after the tool is pulled out of the cut.
11. Stop the spindle rotation with the stop button.
12. In the event of an accident, danger or other dangerous situation (non-standard noises, smoke, smell of combustion products, etc.) Stop the machine with the emergency stop button, which will block the machine from being started again. To restart the machine, turn the emergency stop button in the direction of the arrow and start the spindle rotation as described in step 6.
13. We will activate the cooling system later. When the machine is stationary, check the level of the cooling lubricant in the tank, set the required direction of the coolant supply nozzle to the machining area and turn on the cooling pump switch.
14. We turn off the machine in the following way. We end the machining process by pulling the cutting tool out of the workpiece, turn off the spindle rotation with the control button, turn off the cooling

system, turn off the lighting and turn off the main switch. If we have to leave the machine unattended, we secure it by securing the main switch in the off position with a lock.

All activities on the facility must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene, and environmental protection (regulations applicable to waste management and waste disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a detailed description of how to operate, switch on, switch off and stop the machine, see "Original and translation of the machine operating instructions".

12. Adjustment, maintenance, lubrication and cleaning of the machine

Machine adjustment

This work shall only be carried out by a person professionally qualified for this activity who is familiar with the safety requirements for this machine and with the requirements, directives and ordinances applied by the operator of the equipment to this activity.

With regard to the age and condition of wear and tear of the machinery and its equipment and the fact that the machinery has already been operated, dismantled and transported, it is necessary to take into account the possibility of more frequent occurrences of dangerous situations, failures and non-standard behaviour of the equipment during its operation. Therefore, we recommend regular and sufficient maintenance, adjustment and thorough inspection of all machinery equipment (safety elements, electrical, hydraulic and pneumatic equipment components) and to replace any non-functional and damaged components with new ones or repair them. Therefore, it is necessary to make adjustments on time, to the necessary extent and quality. Adjustment, special service and maintenance for machinery are carried out according to the current market offer by a reputable supplier company selected by the operator.

When maintaining and adjusting the machine regularly, observe the following basic rules:

- When manually lubricating, cleaning or adjusting the machine, the machine must be stopped by the main switch.
- The equipment is adjusted when a tool is being replaced, a jig is replaced or the equipment or other parts of the equipment needs to be set or other working parameters need to be set after the need for equipment adjustment is reported (inaccuracy of machining, adjustment of machine or its parts, etc.), by the operator of the equipment, or the need for adjustment results from the result of regular maintenance, inspection of the equipment, this work is performed only by a person with professional qualifications for this activity who is familiar with the safety requirements for and the requirements, directives and ordinances applied by the plant operator to this activity.
- If it is necessary to replace certain components, this work shall only be carried out by a person professionally qualified for this activity who is familiar with the safety requirements for this machine and with the requirements, directives and ordinances applied by the plant operator to this activity

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

All activities on the facility must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene, and environmental protection (regulations applicable to waste management and waste disposal).

For a detailed description and information for maintenance and maintenance plans for individual parts of the machine, see "Original and translation of the machine operating instructions".

Maintenance and cleaning of the machine

The DOOSAN VERTICAL MACHINE CENTER registration number 90811061 is a machine of relatively complex construction and requires special maintenance and repair interventions. Maintenance, lubrication and adjustment of the machine have the greatest share in maintaining the accuracy of the machine, its reliable operation and the service life of the functional surfaces of the machine. Provision of spare parts (for a list of spare parts see the Original Instructions for Operating the Machine), special service and maintenance for machinery should be carried out according to the current market offer by a reputable supplier company selected by the operator.

When maintaining and cleaning the machine regularly, follow these basic rules:

- When maintaining, manually lubricating, cleaning or adjusting the machine, the machine must be stopped by the main switch.
- The machine must be regularly cleaned of dust, material residues and cooling lubricant before starting work and after every 8 hours of continuous work. This work is carried out by the machine operator.

- The machine must be inspected regularly and kept in perfect condition in accordance with the inspection, maintenance and inspection schedule that must be followed for reliable and error-free operation of the equipment.
- If it is necessary to replace certain components, this work shall only be carried out by a person professionally qualified for this activity and familiar with the safety requirements for this machine and with the requirements, directives and ordinances applied by the operator of the equipment to this activity.
- After installation, remove the protective lubricant from the guideways using a suitable solvent before moving any sliding parts. Do not use cellulose-based solvents as they may damage the surface. After carefully and carefully cleaning all surfaces, cover them with a sufficient layer of suitable machine oil.

The following is the general maintenance information given by the manufacturer:

This work shall be carried out only by a person professionally qualified for this activity, familiar with the safety requirements for this machine and with the requirements, directives and ordinances applied by the operator of the equipment to this activity.

a. Make sure that all parts of the appliance are kept properly lubricated in accordance with the instructions. Keep the machine clean.
b. Do not make any mechanical or hydraulic adjustments until the machine and hydraulic oil are at normal operating temperature – WARM.
c. Keep the hydraulic oil absolutely clean, follow the filter cleaning instructions and maintain the correct oil level.
d. Do not use a file, abrasive or polishing cloth on hydraulic valves. Keep all valve corners sharp and correct, keeping the original diameters.
e. Do not block any electrical pressure switch. These safety switches are installed to protect the machine.
f. Do not sand in the immediate vicinity of these machines. Abrasive sand that could stick to the runways and piston rods causes premature wear and possible failure.
g. Individual round nuts on shafts are generally nuts with a jaw lock and cannot be rotated before the jaw is released. To unscrew a jaw lock nut, unscrew the set screws in the nut flange, tap out the screws to release the jaw lock underneath, and then unscrew the nut counterclockwise.
h. If the electrical wiring, hydraulic pipe or lubrication pipe is removed, label it. The labels are used to mark the part and facilitate assembly.
i. Seal the open ends of hydraulic pipes and equipment to prevent ingress and debris.
j. When removing oil seals from shafts, wrap a thin tape around the shaft over key routes and threads to prevent damage to the seal edge.
k. Perform regular inspections to keep the machine leveled on its foundations.
l. Carry out regular checks and keep the hydraulic pressure at the correct level.
m. Carry out regular inspections and ensure that the tracks of the rack and cross slide are properly lubricated. It should be clearly visible if oil were to leak on the track, when the carrier or the cross slide stops at one end of the travel path or the other.
n. Perform regular checks to make sure that the guide rail settings have not changed.
o. If there is a lubrication failure or the clogged filter indicator light comes on, do not operate the machine.
p. If the machine is started for the first time after maintenance or cleaning of the hydraulic system, it is best to start the machine several times, let it run for a few seconds and then turn it off again. This will allow the oil to gradually fill the circuit.

Other general principles and detailed information, including illustrative pictures for the maintenance of the equipment, are described in the translation and in the original instructions for operating the machine.

In addition, the translation and original of the machine operating instructions includes a maintenance and inspection plan that must be followed for reliable and error-free operation of the equipment.

WARNING: - Any sliding part should never be moved in the bed before the machine has been carefully cleaned and the guide surfaces properly lubricated.

Maintenance of the electrical part of the machine

Carry out all maintenance and repair operations only on the machine with the main switch switched off and locked!

Any interventions or repairs in the electrical installation may only be carried out by a person with the appropriate electrical qualification according to Decree No. 50/1978 Coll.!

Maintenance of the electrical part – carried out:

1 x per week
- Checking the status of electrical devices and equipment in the control cabinet, on the control panel
- Inspection of signalling luminaires
- Emergency stop function check

1 x per month
- Checking the tightening of electrical connections, especially in the case of protective conductors
- checking the condition of electrical equipment in the switchboard (relays and contactors)
- Checking the integrity of the insulation condition of wires and cables, especially for cables routed outside machine housings, including mains inlets

1 x per year
- clean (vacuum) dust from the switchboard, control panel
- replace devices that do not ensure proper and reliable operation
- verify the correct operation of the electric motor (bearing noise)

When replacing the safety elements – fuses, circuit breakers, they must always be replaced with the same nominal value.

A higher level of maintenance always includes all other tasks of lower levels.

All activities on the equipment must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene and environmental protection (regulations applicable to waste management and waste disposal)

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

Machine lubrication

To ensure the proper functioning of the machine, it is necessary to keep the machine clean, regularly check the lubricating fluids in the machine, observe the intervals for changing the lubricating fluids and regularly lubricate the sliding surfaces.

When maintaining and lubricating the machine regularly, follow these basic rules:

- When manually lubricating, cleaning or adjusting the machine, the machine must be stopped by the main switch. • Check the oil in the casing at the beginning of a shift after the machine has been idle for several hours. The oil level must be checked regularly in accordance with the lubrication plan, maintenance and inspections developed by the manufacturer or equipment operator. This work is carried out by the machine operator.
- Lubricate the lifting device and other freely accessible sliding surfaces after prior cleaning in accordance with the lubrication plan, maintenance and inspection prepared by the manufacturer or operator of the equipment
- Gear oil should be replaced or lubricated after 1000 operating hours or every 1/2 year in accordance with the maintenance, inspection lubrication plan developed by the manufacturer or equipment operator
- After 1000 operating hours, the bearings of a used motor electric motor must be dismantled, cleaned and refilled, or lubricated in accordance with the lubrication plan for maintenance and inspections drawn up by the manufacturer or operator of the equipment • Use only lubricating oils and greases recommended by the manufacturer (operator) of the machine.
- Except for points 1 and 2, the work is carried out only by professional maintenance.

Maintenance, adjustment of the lubrication unit is described in detail in the translation and original instructions for operating the machine
The lubrication plan and inspections of lubricating fluids, lubricating greases, lubricating and hydraulic oils recommended by the manufacturer are described in detail in the translation and original instructions for operating the machine.

Operating and lubricating fluids recommended by the equipment operator:

1) Coolant tank volume litres.
2) Hydraulic oil tank capacity litres.
3) Gear oil tank capacity litres. 4) Lubricating oil tank volume liters.

To use the machine safely, this information must be observed for maintenance and lubrication.

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

For a detailed description and information for adjustment, maintenance, lubrication and cleaning of the machine, see "Translation and original of the machine operating instructions".

13. Safety instructions for operating, adjusting, maintaining and cleaning the machine

Due to the dangers described in Chapter 9, it is necessary to observe safety precautions and use the correct setting of the parameters of the machinery, i.e. type and diameter of the tool, recommended spindle speed and feeds of the workpiece and tool, operating masses, etc.

General safety instructions to be followed

- Always observe the safety instructions on the labels attached to the machine. Do not remove or damage these labels. In case of damage or illegibility of the label, inform the responsible person.
- Do not connect the machine to the mains when the door or guard is removed.
- Always ensure sufficient working space and unobstructed access to the machine and peripherals. Place the tool and other potential obstructions in a designated location away from the machine.
- Make sure there is adequate lighting in the work area.
- Remember the position of the E-STOP switch so that you can use it from any position.

- To avoid incorrect operation, familiarize yourself with the location of the switches before starting the machine. ▪ Be careful not to accidentally touch any of the switches while the machine is running.
- Before each start-up of the machine, check that all safety and security elements of the machine are working properly and check the condition and attachment of the tool.
- Check the clamping and other fixtures to see if their workpiece clamping screws are loose.
- Allow the spindle and all feed mechanisms to warm up before starting the machine. ▪ If there is a fault in the power supply, switch off the power switch immediately.

  Wear close-fitting work clothes when working. Never wear loose work clothes. Always fasten buttons and hooks on the sleeves of work clothes to avoid the risk of loose parts of the garment getting tangled in the drive mechanism.

  Wear safety equipment (safety shoes, etc.) whenever possible.
- Tie your long hair back - it could be caught and wound around by the moving mechanism.
- Do not operate the switches on the control panel while wearing gloves, as this may result in an incorrect selection or other mistake.
- Do not enter the machine unless maintenance and cleaning are required.
- Do not remove the machine's protective and safety elements while working. The removal of protection, safety and security elements supplied by the manufacturer with the machine is prohibited.
- In order to prolong the travel of the axle, do not remove or otherwise interfere with safety devices such as bumpers, limit switches or engage them with each other.
- Regularly check that the safety covers are correctly installed and that they are not damaged. Repair or replace damaged covers immediately**.**
- Do not start the machine with the cover removed.
- Take fire precautions whenever you work with flammable material or cutting oil.
- Do not touch the coolant with bare hands as it may cause irritation. Special precautions apply to allergy sufferers.
- Do not adjust the coolant nozzle while the machine is running.
- Be careful not to catch your fingers with the tool.
- Do not exceed the permissible speed when the accessory is mounted on the spindle.
- If the tool mounting spindle or other accessories used is not a device recommended by the manufacturer, check with the manufacturer for a safe (recommended) speed.
- Whenever you work at the machine, be careful of chips and the possibility of slipping on the coolant, oil.
- Avoid chip accumulation during power machining. Splinters are very hot and can cause fire.
- Do not wipe the workpiece or remove chips with your hands or a rag while the tool is rotating. Stop the machine and use the brushes to do this.
- Do not touch the rotating workpiece or tool with your bare hands or anything else under any circumstances.
- Replace blunt tools as soon as possible, as blunt tools are often the cause of accidents or damage.
- Stop all machine functions before changing the tool.
- Always use a tool suitable for the job and that meets the specifications of the machine.
- Make sure that the length (or other size) of the accessory tool is such that it will not interfere with the fixture or other objects.
- Do not use the tool measuring device (or length measuring device unit) until you are sure that it is out of the way
- When clamping blanks in machines or when removing machined parts from machines that do not have automatic workpiece changing, make sure that the tool is as far away from the work area as possible and does not rotate.
- Wear gloves when loading and removing workpieces and tools, as well as when removing chips from the work area, to protect your hands from injuries from sharp edges and hot machined components.
- To lift heavy fixtures, supports and workpieces that are beyond your means, request assistance or use the appropriate lifting equipment.
- Check and verify that there is no abnormal noise during machining.

- Only use stable work platforms and make sure that nothing can slip off them.
- Never place tools or other potential objects on the headstock or on guards.
- The machine may be used by persons over 18 years of age who are duly acquainted with the machine's operating instructions.
- Persons from 16 to 18 years of age may only work on the machine as part of an apprenticeship course under the direct supervision of the responsible person.
- Do not operate the machine under the influence of drugs or alcohol. ▪ If you suffer from dizziness, weakness or fainting, do not operate the machine.
- All operations related to the assembly and adjustment of the machine must be carried out with the main switch switched off and locked in position 0 by the locking lock.
- Maintenance work must be carried out by qualified personnel in accordance with the instructions of the responsible person.
- Use only specified types of hydraulic and lubricating oils and lubricants or their equivalents.
- Follow the instructions on the instruction plates on the types of oils to be used, lubrication locations, quantities to be used and oil change intervals.
- Check that the electrical cables are not damaged to prevent accidents (electric shock) due to electric leakage.
- Make sure that all doors and guards are installed before connecting the machine to the power supply. If necessary, remove the door or protective cover, turn off the main switch and lock it.
- Moving parts of the el. The cables must be protected against mechanical damage and must not be an obstacle in the work or communication area.
- When working inside the control cabinet or when repairing a machine, always turn off the main switch and lock it.
- When working with the machine's electrical equipment, hands and clothes must be dry.
- When replacing a fuse, check that the new fuse is of the correct rating (using a fuse of a higher rating may damage the device).
- Do not move away from the machine while the machine is running and you have secured it against unauthorised use.
- The machine must be worked in such a way that it has been marked or prescribed as safe and correct and in such a way that workers in the vicinity are not endangered or bothered by excessive noise. The instructions and instructions contained in the instructions for safe operation of the machine or other safety operating regulations must be strictly observed. Any other type of work that does not ensure the same degree of safety is not permitted. It is not allowed to disable protective devices.
- When manually lubricating, cleaning or leaving the workplace, the machine must be stopped by the main switch. The spindle must stop when changing tools, checking surface quality, clamping and scanning workpieces and measuring (unless this is done automatically).
- In the event of an interruption of the power supply, the operator must immediately switch off the main switch of the machine and put all other devices and control components in such a position that the machine does not start spontaneously or some of its parts move after the power supply is restored.
- When the rapid feed is switched on, the operator must pay close attention to the approaching part of the machine and turn off the rapid feed at a safe distance from the workpiece.
- For workpieces protruding from the clamping device circumference, it must be checked that their paths do not exceed the maximum running diameter. Also in the case of workpieces whose dimensions exceed the clamping surface of the table, it must be checked whether they have enough space for passage between the column, crossbar, headstock, etc.
- Only those objects for which it is designed and whose shape and size guarantee perfect clamping are allowed to be clamped into the clamping device.
- When clamping heavy workpieces with a hoist, the workpiece must remain suspended from the hoist until it is reliably seated. Correct and undamaged clamps, washers, etc. must be used to support the workpiece.

- The contact surfaces for tool clamping must be clean and undamaged. The tool must be securely clamped and its unloading should be chosen so that it does not cause harmful stress during machining and the chip can easily leave.
- Any defects in the machine must be reported by the worker to their superior, who is obliged to arrange repairs, or to notify the worker who is starting the next shift.
- When removing chips from the machine during operation and cleaning, hooks with handles and hand guards, brooms, scrapers, etc. must be used as required.
- Only suitable and undamaged tools must be used for clamping. It is not permitted to leave clamping wrenches inserted in the clamping device even when it is stationary, or to use wrenches with extended levers to generate more force.
- A full or partial inspection of the machine must always be carried out when a machine part important for the safety of operation fails or fails. Detected defects or defects reported by the operator must be rectified immediately. Work must not be done on a defective machine.
- When machining long and thin components, supports must be used.
- Before starting the machine, it must be checked that the workpiece is properly clamped in the clamping device used,
- For all manual operations, the tool clamped on the machine must be removed, covered or moved away to a safe distance
- When selecting cutting speeds and chip cross-sections, the operator must take into account the method of clamping the workpiece, its height, size.
- After finishing the work, the operator must put the workplace in order, in particular remove chips and cooling fluid residues from the machine; clean uncovered guide surfaces, put gauges, tools, workpieces, waste, etc. in designated places.

Attention!!!

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

Any interventions or repairs in the electrical installation may only be carried out by a person with the appropriate electrical qualification according to Decree No. 50/1978 Coll.!
All activities on the equipment must comply with the operator's internal regulations relating to occupational safety, fire protection and hygiene and environmental protection (regulations applicable to waste management and waste disposal)

For a description and information of the safety instructions for operating, adjusting, maintaining and cleaning the machine, see "Translation and original of the operating instructions for the machine".

For safe use of the machine, this information must be observed.

14. Safety guards, accessories and warning signs

Safety requirements and protective measures for machinery DOOSAN VERTICAL MACHINE CENTER, registration number 90811061, are governed by the standard **-** ČSN EN:12417+A2:2002 (200710) - Safety of machine tools. Machining centers. There must be safety protection in the workspaces of machining centres.

The device is equipped with a protective cover of the working area according to ČSN EN 953 + A1:1997 and a locking device according to ČSN EN 1088 + A2:1995.

The device is equipped with protective covers for the work area from the manufacturer. These guards must be maintained and must be fitted to the device during operation. They are only dismantled for maintenance, adjustment, cleaning, lubrication or failure purposes.

Before starting work or once per shift, check the function of the safety guard with interlock and the emergency stop control of the machine.

Work on machinery may only be carried out if the protective devices are in a position to protect the operator from the dangers created by the machinery.

On the basis of technological procedures and activities carried out on the equipment, the operator shall prepare an operating regulation for the use of protective equipment, ensure that the operator of the equipment is acquainted with this operating regulation, including his regular and demonstrable training.

Safety warning markings on the machine and its meaning

If a machine or equipment is fitted with safety warning markings to alert the operator to the hazard created by the machine or equipment, this will be done as shown in the following table.

	Danger warning.	Location: Operating instructions
		Meaning:!**ATTENTION! Breach hereof Requirement threatens Security**

	Caution dangerous voltage	Location: - on electrical equipment housings - on permanently living electrical parts even after the main switch has been switched off - for electrical circuits not switched off by the main switch **!CAUTION DANGEROUS VOLTAGE!**
	Caution risk of hearing damage	Location: The front of the machine. Meaning:!**ATTENTION!** **The operator is obliged to wear hearing protection equipment** **Protective**
	Caution risk of eye damage.	Location: The front of the machine. Meaning:!**ATTENTION!** **The operator is obliged to wear eye protection equipment** **Protective**
	Caution risk of damage to the health of the upper limbs	Location: The front of the machine. Meaning:!**ATTENTION!** **The operator is obliged to wear protective gloves at Handling with workpieces, Machining liquid and lubricants**
	Caution Risk of flying and thrown objects	Location: Machine front at guard Meaning:!**ATTENTION!** **Guards mounted on the machine are only intended to minimize risk and not completely exclude them**
	Beware of the danger of people slipping, tripping or falling.	Location: Both front and back of the machine. Meaning:!**ATTENTION!** **The operator is obliged to move with regard to the danger of slipping, tripping and falling persons.**
	Unauthorized persons are prohibited from entering	Location: Both front and back of the machine.

		Meaning:!**ATTENTION!** **No entry for unauthorized persons to machine operator area**

All activities on the equipment must comply with the operator's internal regulations concerning occupational safety, fire protection and hygiene, and environmental protection (regulations applicable to waste management and disposal).

For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a description and information on the safety guards, accessories and warning markings on the machine, see "Original and translation of the machine operating instructions".

15. Information on noise emissions

For a protocol on noise level measurement, see Appendix No. 1.

16. Environmentally friendly disposal of the machine

At the end of the machine's service life, the operator is obliged to dispose of the machine in an environmentally friendly manner. The machine must be dismantled, disassembled and disposed of in parts in accordance with the applicable waste disposal legislation in the country of the operator.

All activities on the equipment must comply with the applicable internal regulations of the operator regarding occupational safety, fire protection and hygiene and environmental protection
(regulations applicable to waste management and disposal).

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For all work that may come into contact with electrical equipment, make sure that all prescribed safety regulations are observed. In particular, make sure that the main switch of the machine is switched off and locked before any intervention in the electrical equipment of the machine.

For a description and information on environmentally friendly disposal of the machine, see "Original and translation of the machine operating instructions".