



SLOVENSKI STANDARD

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Nadomešča:
SIST EN 16564:2015

Stroji in obrati za pridobivanje in obdelavo naravnega kamna - Varnost - Zahteve za žage/frezalne stroje, ki vključujejo računalniško krmiljenje (NC/CNC)

Machines and plants for mining and tooling of natural stone - Safety - Requirements for bridge type sawing/milling machines, included numerical control (NC/CNC) versions

Maschinen und Anlagen zur Gewinnung und Bearbeitung von Naturstein - Sicherheit - Anforderungen an Brücken-Säge-/Fräsmaschinen einschließlich numerischer Steuerungsversionen (NC/CNC)

Machines et équipements pour l'exploitation et l'usinage de pierres naturelles - Sécurité - Prescriptions relatives aux machines à scier/fraiseuses de type pont, y compris les versions à commande numérique (NC/CNC)

Ta slovenski standard je istoveten z: EN 16564:2020

ICS:

25.080.20	Frezalniki	Boring and milling machines
25.080.60	Strojne žage	Sawing machines
73.120	Oprema za predelavo rudnin	Equipment for processing of minerals

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

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ICS 25.080.20; 25.080.60; 73.120

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Machines and plants for mining and tooling of natural stone - Safety - Requirements for bridge type sawing/milling machines, included numerical control (NC/CNC) versions

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This European Standard was approved by CEN on 28 September 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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EN 16564:2020 (E)**European foreword**

This document (EN 16564:2020) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2021, and conflicting national standards shall be withdrawn at the latest by month year of May 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 16564:2014.

The following major changes were introduced:

- list of the significant hazards has been moved from Clause 4 to Annex A, according to 6.10.3.1 of CEN Guide 414;
- normative references have been modified and updated to Clause 2;
- terms and definitions have been introduced to Clause 3 (e.g. control power on, telecontrol, teleservice);
- requirements related to hand-held control sets have been added or modified to 4.2.2.2;
- requirements related to starting have been added or modified to 4.2.3;
- requirements related to teleservice have been added to 4.2.10;
- requirements related to transport and installation of machine have been added to 4.3.1;
- requirements related to stability have been added to 4.3.2;
- requirements related to prevention of access to moving parts and safeguards to minimize the effect of ejection have been added or modified to 4.3.5;
- requirements related to noise have been added or modified to 4.4.2 and Annex D;
- requirements related to electrical hazards have been added or modified to 4.4.3;
- requirements related to unintended movements have been added to 4.4.8;
- requirements related to information for use have been added or modified to Clause 5;
- Annex ZA has been modified according to the last edition of CEN Guide 414.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 16564:2020 (E)**Introduction**

This document has been prepared to be a harmonized standard to provide one means of conforming to the essential health and safety requirements of the Machinery Directive and associated EFTA Regulations.

This document is a type-C standard as stated in EN ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

1 Scope

This document deals with all significant hazards, hazardous situations and events which are relevant to:

- bridge sawing machines;
- bridge sawing and milling machines;
- numerical control bridge sawing/milling machines.

These machines are designed to saw and mill natural stone and engineered/agglomerated stone as defined by EN 14618:2009, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This document specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

This document deals with the foreseeable lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.

This document also applies to machines fitted with the following facilities/devices:

- mechanical, pneumatic, hydraulic or vacuum workpiece clamping;
- automatic tool change;
- loading and unloading conveyor system;
- tilting and/or rotating head axis;
- rotating workpiece support(s); [SIST EN 16564:2021](https://standards.iteh.ai/catalog/standards/sist/96eb623a-cfe3-4c83-8be2-82f13da29201/sist-en-16564-2021)
- tilting workpiece support(s) when loading;
- lathe unit;
- undercut grooving unit;
- axes operating in accordance with an NC work programme.

This document does not apply to:

- machines intended for operation in a potentially explosive atmosphere;
- machines operating in severe environmental conditions (e.g. extreme temperatures, corrosive environment);
- machines intended for outdoor operation;
- machines which are manufactured before the date of their publication as EN.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 166:2001, *Personal eye-protection — Specifications*

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EN 1005-2:2003+A1:2008, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 1005-4:2005+A1:2008, *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*

EN 14618:2009, *Agglomerated stone — Terminology and classification*

EN 50370-1:2005, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 1: Emission*

EN 50370-2:2003, *Electromagnetic compatibility (EMC) — Product family standard for machine tools — Part 2: Immunity*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016, mod.)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60529:1991/A1:2000, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989/A1:1999)*

EN 60529:1991/A2:2013, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989/A2:2013)*

EN 60825-1:2007, *Safety of laser products — Part 1: Equipment classification and requirements (IEC 60825-1:2007)*

EN 61439-1:2011, *Low-voltage switchgear and controlgear assemblies — Part 1: General rules*

EN 61496-1:2013, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2012)*

EN 61800-5-2:2017, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional (IEC 61800-5-2:2016)*

EN 82079-1:2012, *Preparation of instructions for use — Structuring, content and presentation — Part 1: General principles and detailed requirements (IEC 82079-1:2012)*

EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 3746:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

EN ISO 3747:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering/survey methods for use in situ in a reverberant environment (ISO 3747:2010)*

EN ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414:2010)*

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11202:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11204:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)* <https://standards.iteh.ai/catalog/standards/sist/96eb623a-cfe3-4c83-8be2-82f43da29201/sist-en-16564-2021>

EN ISO 13854:2019, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13856-3:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices (ISO 13856-3:2013)*

EN ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14118:2018, *Safety of machinery — Prevention of unexpected start-up (ISO 14118:2017)*

EN ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

EN ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

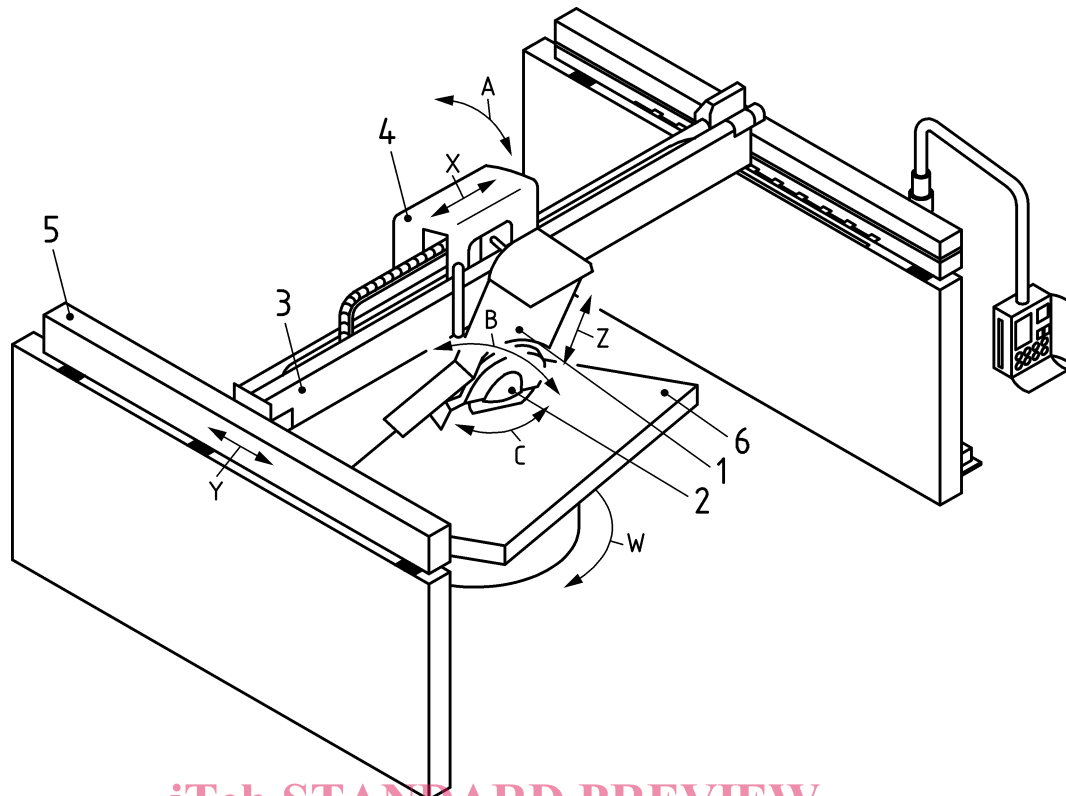
bridge sawing machine

integrated fed machine designed for sawing and/or shaping workpieces (see Figure 1) by the use of a diamond disk water-cooled during the working process having at least two squared axes which the working head moves over

Note 1 to entry: This machine can be equipped with the following facilities:

- a) loading and unloading conveyor system;
- b) tilting (A/B) and/or rotating (C) head axis;
- c) rotating workpiece support(s);
- d) tilting workpiece support(s) when loading;
- e) lathe unit (see Figure 2);
- f) workpiece vacuum moving system; [SIST EN 16564:2021](https://standards.iteh.ai/catalog/standards/sist/96eb623a-cfe3-4c83-8be2-82f43da29201/sist-en-16564-2021)
- g) undercut grooving unit; <https://standards.iteh.ai/catalog/standards/sist/96eb623a-cfe3-4c83-8be2-82f43da29201/sist-en-16564-2021>
- h) axes operating in accordance with an NC work programme.

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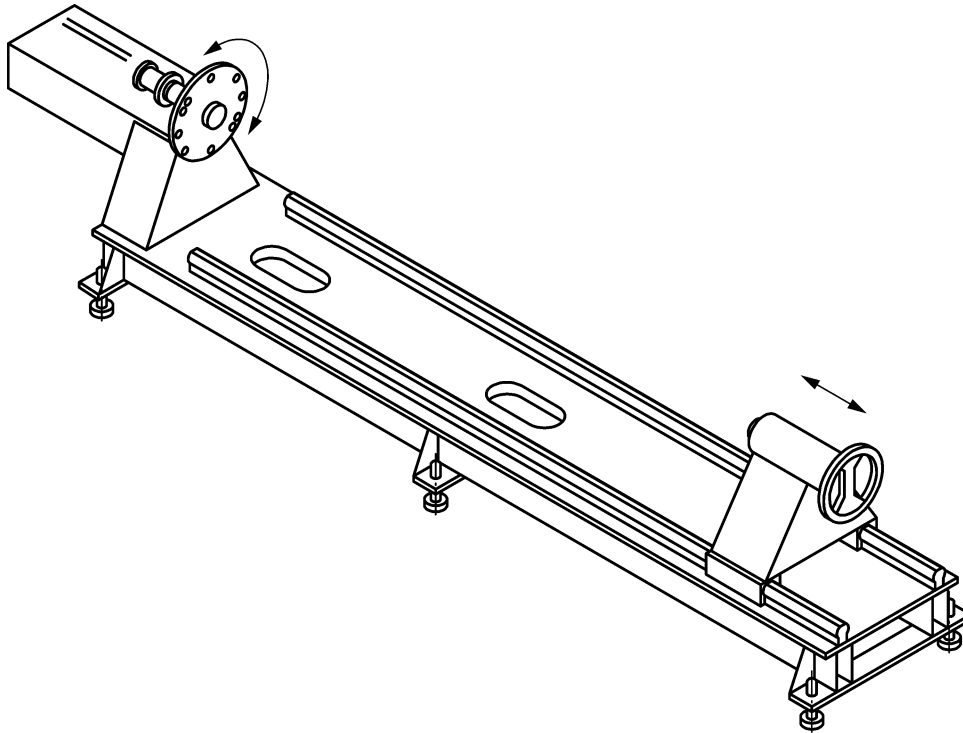


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Safeguarding devices are not illustrated
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Key

1	tool holder head (tilting version)	A	direction of the tilting movement of the head
2	diamond disk	B	direction of the tilting movement of the head
3	bridge	C	direction of the rotating movement of the head
4	carriage	W	direction of the rotating movement of the workpiece support(s)
5	slide rail	X	longitudinal movement of the head along the carriage
6	tilting and rotating workpiece support(s)	Y	transverse movement of the bridge along the slide rail
		Z	vertical movement of the head

Figure 1 — Example of a bridge sawing machine upper tilting head, rotating workpiece support



Safeguarding devices are not illustrated

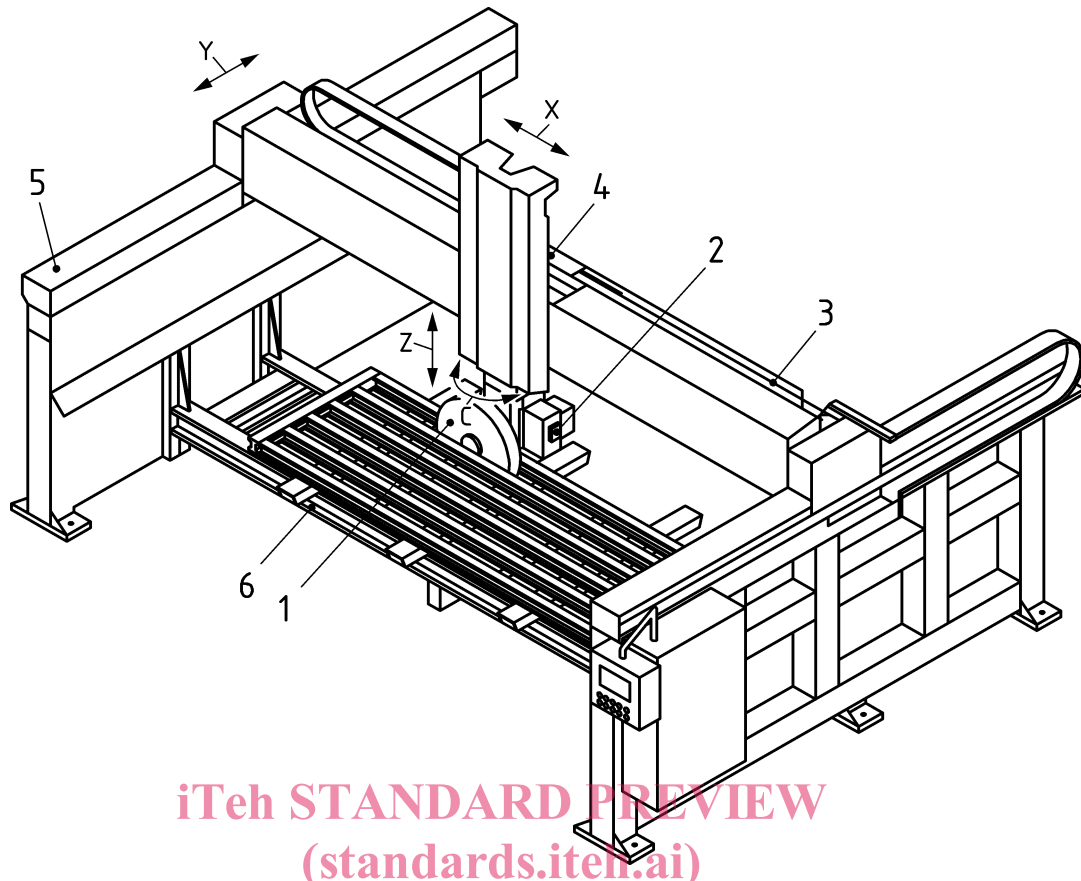
Figure 2 — Example of a lathe unit
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3.2 bridge sawing and milling machine

integrated fed machine designed for sawing, milling and boring workpieces (see Figure 3) by the use of a diamond disk and by a milling tool water-cooled installed in the same head unit equipped with a single or double spindle having at least three squared axes (XYZ)

Note 1 to entry: This machine can be equipped with the following facilities:

- a) loading and unloading conveyor system;
- b) tilting (A/B) and/or rotating (C) head axis;
- c) rotating workpiece support(s);
- d) tilting workpiece support(s) when loading;
- e) lathe unit (see Figure 2);
- f) workpiece vacuum moving system;
- g) undercut grooving unit;
- h) mechanical, pneumatic, hydraulic, or vacuum workpieces clamping;
- i) axes operating in accordance with an NC work programme.



Safeguarding devices are not illustrated

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Key

- | | | | | |
|---|---|------------------|---|--|
| 1 | main drive - diamond disk | 82f43da29201c51d | C | direction of the rotating movement of the head |
| 2 | milling unit | | X | longitudinal movement of the head along the carriage |
| 3 | bridge | | Y | transverse movement of the bridge along the slide rail |
| 4 | carriage | | Z | vertical movement of the head |
| 5 | slide rail | | | |
| 6 | tilting and rotating workpiece support(s) | | | |

Figure 3 — Example of a bridge sawing and milling machine with double spindle

3.3

numerical control bridge sawing/milling machine

integrated fed machines provided with automatic tool change designed for machining of workpieces (see Figure 4) by the use of milling/boring/sanding/grinding tools and/or diamond disks water-cooled with at least three square axes programmable by the user (X, Y, Z) for positioning and/or machining and axes operated in accordance with an NC work programme

Note 1 to entry: This machine can be equipped with the following facilities:

- a) loading and unloading conveyor system;
- b) tilting (A/B) and/or rotating (C) head axis;
- c) rotating workpiece support(s);