



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 61800-3:2022**  
**01-april-2022**

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**Električni pogonski sistemi z nastavljivo hitrostjo - 3. del: Zahteve za elektromagnetno združljivost in posebne preskusne metode in obdelovalnih strojev**

Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods for PDS and machine tools

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33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

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# 22G/450/CDV

## COMMITTEE DRAFT FOR VOTE (CDV)

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IEC SC 22G : ADJUSTABLE SPEED ELECTRIC POWER DRIVE SYSTEMS (PDS)	
SECRETARIAT: United States of America	SECRETARY: Mr Christopher Johnson
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 77, SC 77B, ISO/TC 39	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input checked="" type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING <b>Attention IEC-CENELEC parallel voting</b> The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. <a href="https://standards.iteh.ai/catalog/standards/sist/524acf1f-a7af-4f0f-86f0-5fa8e11b16f5/osist-pren-iec-61800-3-2022">standards.iteh.ai/catalog/standards/sist/524acf1f-a7af-4f0f-86f0-5fa8e11b16f5/osist-pren-iec-61800-3-2022</a> The CENELEC members are invited to vote through the CENELEC online voting system.	

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TITLE:

**Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods for PDS and machine tools**

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

The text "with embedded PDS" has been removed from the project title (see 22G/441A/CC, JP1 on page 16).

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229 **Part 3: EMC requirements and specific test methods for PDS and machine**  
230 **tools**

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264 International Standard IEC 61800-3 has been prepared by subcommittee 22G: Adjustable  
265 speed electric drive systems (PDS), of IEC technical committee 22: Power electronic systems  
266 and equipment.

267 This fourth edition cancels and replaces the third edition published in 2017. This edition  
268 constitutes a technical revision.

269 This edition includes the following significant technical changes with respect to the previous  
270 edition:

- 271 a) extension of the scope to machine tools with one or more embedded PDS;
- 272 b) extension of the frequency range for radiated immunity tests to 6 GHz;
- 273 c) general updates in the normative part and the informative annexes.

274 The text of this standard is based on the following documents:

FDIS	Report on voting
22G/XXX/FDIS	22G/XXX/RVD

275 Full information on the voting for the approval of this International Standard can be found in the  
276 report on voting indicated in the above table.

277 This document has the status of a product EMC standard in accordance with IEC guide 107 and  
278 has been drafted in accordance with the ISO/IEC Directives, Part 2.

279 A list of all parts in the IEC 61800 series, published under the general title *Adjustable speed*  
280 *electrical power drive systems (PDS)*, can be found on the IEC website.

281 The committee has decided that the contents of this document will remain unchanged until the  
282 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to  
283 the specific document. At this date, the document will be

- 284 • reconfirmed,
- 285 • withdrawn,
- 286 • replaced by a revised edition, or
- 287 • amended.

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## ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

### Part 3: EMC requirements and specific test methods for PDS and machine tools

#### 1 Scope

295 This part of IEC 61800 specifies electromagnetic compatibility (EMC) requirements for  
296 adjustable speed power drive systems (PDSs). A PDS is an AC or DC motor drive including an  
297 electronic converter. It also specifies EMC requirements for machine tools (MTs). Requirements  
298 are stated for AC and DC PDSs and MTs with input and/or output voltages (line-to-line voltage),  
299 up to 35 kV AC RMS. This document applies to equipment of all power ratings.

300 As a product EMC standard, this document can be used for the assessment of PDS and MT. It  
301 can also be used for the assessment of complete drive modules (CDM) or basic drive modules  
302 (BDM).

303 NOTE 1 BDMs and CDMs are parts of the PDS which are often marketed separately.

304 Traction applications and electric vehicles are excluded. Equipment which is defined as Group  
305 2 in CISPR 11 is excluded.

306 NOTE 2 Examples of Group 2 equipment are:  
307 - welding equipment (arc welding, resistance welding, etc)  
308 - electro-discharge machining equipment (EDM).

309 This standard does not give requirements for the electrical machine which converts power  
310 between the electrical and mechanical forms within the PDS. Requirements for rotating  
311 electrical machines are covered by the IEC 60034 series. In this standard, the term “motor” is  
312 used to describe the electrical machine, whether rotary or linear, and regardless of the direction  
313 of power flow.

314 This document is applicable to BDMs, CDMs, PDSs and MTs with or without radio function.  
315 However, this document does not specify any radio transmission and reception requirements.

316 NOTE 3 It is planned that the future Edition 7 of CISPR 11 will contain a procedure how to address radio transmission  
317 and reception requirements, which is also applicable to products in the scope of this document.

318 This document defines the minimum emission and immunity requirements in the frequency  
319 range from 0 Hz to 400 GHz. Tests are not required in frequency ranges where no requirements  
320 are specified.

321 BDMs, CDMs, PDSs and MTs covered by this document are those installed in residential,  
322 commercial and industrial locations. Requirements are given according to the environment  
323 classification.

324 BDMs, CDMs and PDSs are often included in a larger system. The system aspects are not  
325 covered by this document, but guidance is provided in the informative annexes.

326 This document is intended as a complete EMC product standard for the EMC conformity  
327 assessment of products. As an EMC product standard for BDMs, CDMs, PDSs and MTs,  
328 according to IEC Guide 107 this document takes precedence over all aspects of the generic  
329 standards.

330 NOTE 4 If a PDS or MT is included as part of equipment covered by a separate EMC product standard, the separate  
331 EMC standard applies to the complete equipment.

332 NOTE 5 The requirements have been selected to ensure EMC for PDSs and MTs at residential, commercial and  
333 industrial locations. Changes in the EMC behaviour of a PDS or an MT as a result of fault conditions are not  
334 considered.

335 NOTE 6 This document does not specify any safety requirements for the equipment such as protection against electric  
336 shocks, insulation co-ordination and related dielectric tests, unsafe operation, or unsafe consequences of a failure.  
337 It also does not cover safety and functional safety implications of electromagnetic phenomena.

## 338 2 Normative references

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

343 IEC 60146-1-1:2009, *Semiconductor convertors – General requirements and line commutated*  
344 *convertors – Part 1-1: Specifications of basic requirements*

345 IEC 61000-2-2:2002, *Electromagnetic compatibility (EMC) – Part 2-2: Environment –*  
346 *Compatibility levels for low-frequency conducted disturbances and signalling in public low-*  
347 *voltage power supply systems*  
348 IEC 61000-2-2:2002/AMD1:2017/AMD2:2018

349 IEC 61000-2-4:2002, *Electromagnetic compatibility (EMC) – Part 2-4: Environment –*  
350 *Compatibility levels in industrial plants for low-frequency conducted disturbances*  
351 IEC 61000-2-4:2002/COR1:2014

352 IEC 61000-3-2:2018/AMD1:2020, *Electromagnetic compatibility (EMC) – Part 3-2: Limits –*  
353 *Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase)*

354 IEC 61000-3-3:2013, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of*  
355 *voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for*  
356 *equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection*  
357 IEC 61000-3-3:2013/AMD1:2017

358 IEC 61000-3-11:2017, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of*  
359 *voltage changes, voltage fluctuations and flicker in public low-voltage supply systems –*  
360 *Equipment with rated current  $\leq 75$  A and subject to conditional connection*

361 IEC 61000-3-12: 2011, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for*  
362 *harmonic currents produced by equipment connected to public low-voltage systems with input*  
363 *current  $> 16$  A and  $\leq 75$  A per phase*  
364 IEC 61000-3-12: 2011/ISH:2012

365 IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and*  
366 *measurement techniques – Electrostatic discharge immunity test*

367 IEC 61000-4-3:2006/ISH1:2008, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and*  
368 *measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*  
369 IEC 61000-4-3:2006/AMD1:2007/AMD2:2010

370 IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and*  
371 *measurement techniques – Electrical fast transient/burst immunity test*

372 IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and*  
373 *measurement techniques – Surge immunity test*  
374 IEC 61000-4-5:2014/AMD1:2017

- 375 IEC 61000-4-6:2013/COR1:2020, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and*  
 376 *measurement techniques – Immunity to conducted disturbances, induced by radio-frequency*  
 377 *fields*
- 378 IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measure-*  
 379 *ment techniques – Power frequency magnetic field immunity test*
- 380 IEC 61000-4-11:2020/COR1:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing*  
 381 *and measurement techniques – Voltage dips, short interruptions and voltage variations*  
 382 *immunity tests for equipment with input current up to 16 A per phase*
- 383 IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and*  
 384 *measurement techniques – Harmonics and interharmonics including mains signalling at a.c.*  
 385 *power port, low frequency immunity tests*  
 386 IEC 61000-4-13:2002/AMD1:2009/AMD2:2015
- 387 IEC 61000-4-28:1999, *Electromagnetic compatibility (EMC) - Part 4-28: Testing and*  
 388 *measurement techniques - Variation of power frequency, immunity test for equipment with input*  
 389 *current not exceeding 16 A per phase*  
 390 IEC 61000-4-28:1999+AMD1:2001+AMD2:2009
- 391 IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and*  
 392 *measurement techniques – Voltage dips, short interruptions and voltage variations immunity*  
 393 *tests for equipment with input current more than 16 A per phase*  
 394 IEC 61000-4-34:2005/AMD1:2009
- 395 IEC 61000-6-1:2016, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards -*  
 396 *Immunity standard for residential, commercial and light-industrial environments*
- 397 IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards -*  
 398 *Immunity standard for industrial environments*
- 399 IEC 61000-6-8:2020, *Electromagnetic compatibility (EMC) – Part 6-8: Generic standards -*  
 400 *Emission standard for professional equipment in commercial and light-industrial locations*
- 401 IEC 61400-21-1:2019, *Wind energy generation systems - Part 21-1: Measurement and*  
 402 *assessment of electrical characteristics - Wind turbines*
- 403 CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance*  
 404 *characteristics – Limits and methods of measurement*  
 405 CISPR 11:2015/AMD1:2016/AMD2:2019
- 406 CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and*  
 407 *methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices*  
 408 *for conducted disturbance measurements*  
 409 CISPR 16-1-2:2014/AMD1:2017
- 410 CISPR 16-1-4:2019+AMD1:2020 CSV, *Specification for radio disturbance and immunity*  
 411 *measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring*  
 412 *apparatus – Antennas and test sites for radiated disturbance measurements*
- 413 CISPR 16-2-3:2019, *Specification for radio disturbance and immunity measuring apparatus and*  
 414 *methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated*  
 415 *disturbance measurements*
- 416 CISPR 32:2015+AMD1:2019 CSV, *Electromagnetic compatibility of multimedia equipment –*  
 417 *Emission requirements*

### 418 3 Terms and definitions

419 For the purposes of this document, the following terms and definitions apply.

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

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

#### 424 3.1 Content of the Power Drive System (PDS) and its installation

##### 425 3.1.1

##### 426 basic drive module

##### 427 BDM

428 electronic power converter and related control, connected between an electric supply and a  
429 motor

430 Note 1 to entry: The BDM is capable of transmitting power from the electric supply to the motor and can be capable  
431 of transmitting power from the motor to the electric supply.

432 Note 2 to entry: The BDM controls some or all of the following aspects of power transmitted to the motor and motor  
433 output: current, frequency, voltage, speed, torque, force.

434 Note 3 to entry: This note applies to the French language only.

##### 435 3.1.2

##### 436 complete drive module

##### 437 CDM

438 drive module consisting of, but not limited to, the BDM and extensions such as protection  
439 devices, transformers and auxiliaries, but excluding the motor and the sensors which are  
440 mechanically coupled to the motor shaft

441 Note 1 to entry: This note applies to the French language only.

##### 442 3.1.3

##### 443 power drive system

##### 444 PDS

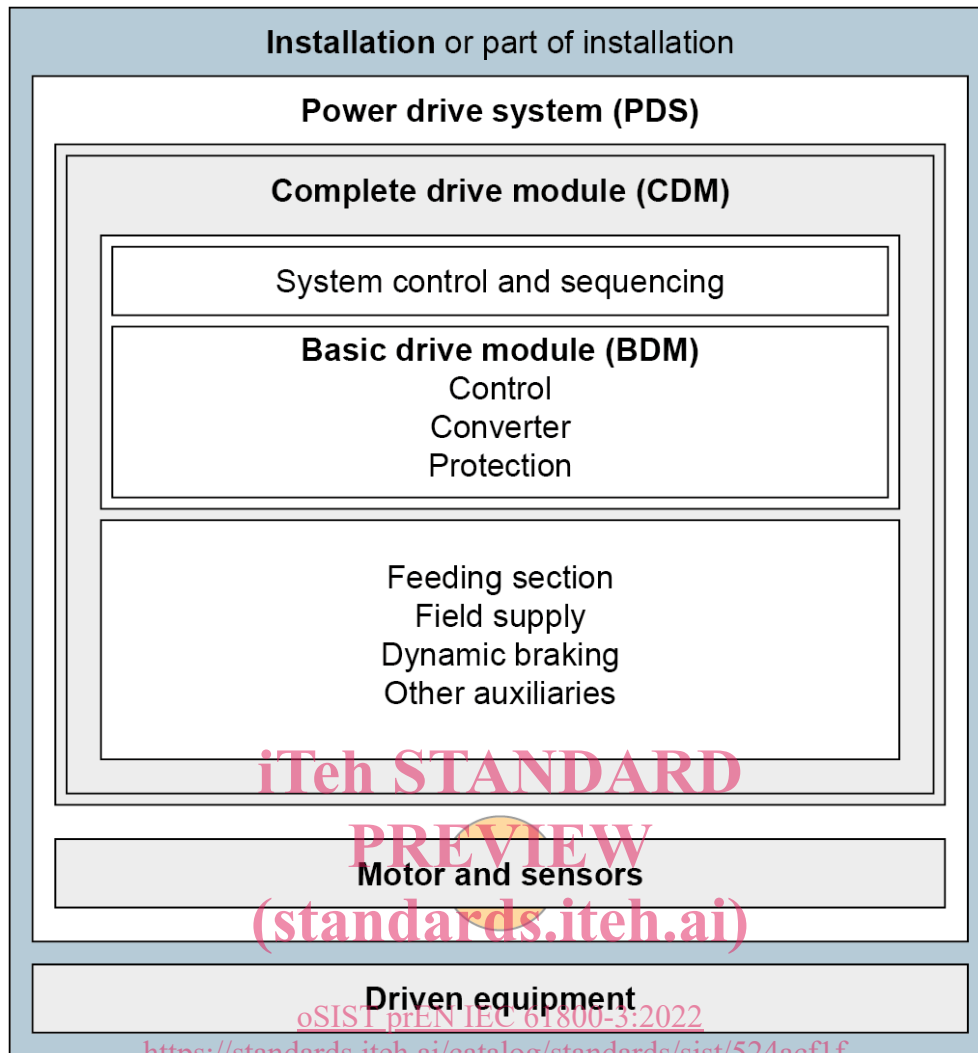
445 system consisting of one or more complete drive module(s) (CDM) and a motor or motors and  
446 any sensors which are mechanically coupled to the motor shaft but not including the driven  
447 equipment

448 Note 1 to entry: Figure 1 illustrates the major items in the PDS. It also shows the relationship between the PDS and  
449 the installation.

450 Note 2 to entry: This note applies to the French language only.

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oSIST prEN IEC 61800-3:2022  
<https://standards.iteh.ai/catalog/standards/sist/524acf1f-a7af-4f0f-86f0-5fa8e11b16f5/osist-pren-iec-61800-3-2022>



oSIST prEN IEC 61800-3:2022  
<https://standards.iteh.ai/catalog/standards/sist/524ac1fa7af-4f0f-86f0-5fa8e11b16f5/osist-pren-iec-61800-3-2022>  
**Figure 1 – Content of the PDS and its installation**

451

452

**3.1.4****installation**

455 equipment (one or more) which include at least both the PDS and the driven equipment

**3.2 Content of the machine tool (MT) and its installation****3.2.1****machine tool****MT**

460 mechanical device which is fixed (i.e. not mobile) and powered (typically by electricity and  
 461 compressed air), used to process workpieces by selective removal/addition of material and/or  
 462 by mechanical deformation

463 Note 1 to entry: Machine tool operation can be mechanical, controlled by humans or by computers. Machine tools  
 464 can have a number of peripherals used for machine tool cooling/heating, process conditioning, workpiece and tool  
 465 handling (workpiece feeding excluded), recyclables and waste handling and other tasks connected to their main  
 466 activities.

467 Note 2 to entry: The machine tool is normally equipped with a power supply, an electrical and electronic assembly  
 468 for power and control and one or more power drive systems for the movement of mobile elements or workpieces.

469 Note 3 to entry: Figure 2 illustrates the major parts of the machine tool. It also shows the position of the machine  
 470 tool in the installation.

471 [ISO 14955-1:2017 modified – “typically used” has been replaced by “used”, “may” has been  
 472 replaced by “can” in Note 1 to entry, and Note 3 to entry has been added.]