BS EN ISO 28927-2:2009+A1:2017

BSI Standards Publication

Hand-held portable power tools - Test methods for evaluation of vibration emission

Part 2: Wrenches, nutrunners and screwdrivers

bsi.

Documents
Document Sharing Hub

Full document details: BS EN ISO 28927-2:2009+A1:2017

National foreword

This British Standard is the UK implementation of EN ISO 28927-2:2009+A1:2017. It supersedes BS EN ISO 28927-2:2009, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee MCE/8/-/2, Hand-held, non-electric power tools - Safety.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017
Published by BSI Standards Limited 2017

ISBN 978 0 580 94338 6

ICS 13.160; 25.140.01; 25.140.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2010.

Amendments/corrigenda issued since publication

Date	Text affected
31 December 2017	Implementation of ISO amendment 1:2017 with CEN endorsement A1:2017

Documents
Document Sharing Hub

Full document details: BS EN ISO 28927-2:2009+A1:2017

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 28927-2:2009 +A1

August 2017

ICS 25.140.10; 13.160

English Version

Hand-held portable power tools - Test methods for evaluation of vibration emission - Part 2: Wrenches, nutrunners and screwdrivers (ISO 28927-2:2009)

Machines à moteur portatives - Méthodes d'essai pour l'évaluation de l'émission de vibrations - Partie 2: Clés, boulonneuses et visseuses (ISO 28927-2:2009)

Handgehaltene motorbetriebene Maschinen - Messverfahren zur Ermittlung der Schwingungsemission - Teil 2: Schrauber, Mutterndreher und Schraubendreher (ISO 28927-2:2009)

This European Standard was approved by CEN on 14 December 2009.

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 Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

© 2017 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members

Ref. No. EN ISO 28927-2:2009+A1:2017: E

Documents
Document Sharing Hub

Full document details: BS EN ISO 28927-2:2009+A1:2017

European foreword

This document (EN ISO 28927-2:2009) has been prepared by Technical Committee ISO/TC 118 "Compressors and pneumatic tools, machines and equipment" in collaboration with Technical Committee CEN/TC 231 “Mechanical vibration and shock” 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 June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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

This document supersedes EN ISO 8662-7:1997.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directives.

For relationship with EU Directives, see informative Annex ZA and ZB, which are integral parts of this document.

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

Endorsement notice

The text of ISO 28927-2:2009 has been approved by CEN as a EN ISO 28927-2:2009 without any modification.

Foreword to amendment A1

This document (EN ISO 28927-2:2009/A1:2017) has been prepared by Technical Committee ISO/TC 118 "Compressors and pneumatic tools, machines and equipment" in collaboration with Technical Committee CEN/TC 231 “Mechanical vibration and shock” the secretariat of which is held by DIN.

This Amendment to the European Standard EN ISO 28927-2:2009 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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

For the relationship with EU Directive(s) see informative Annex ZA and ZB, included in EN ISO 28927:2:2009.

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

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Endorsement notice

The text of ISO 28927-2:2009/Amd 1:2017 has been approved by CEN as EN ISO 28927-2:2009/A1:2017 without any modification.

Documents
Document Sharing Hub

Full document details: BS EN ISO 28927-2:2009+A1:2017

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC, amended by Directive 98/79/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 98/37/EC, Machinery, amended by Directive 98/79/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive, except ER 1.7.4 d) and 2.2, and associated EFTA regulations.

WARNING Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Annex ZB
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirement of that Directive, except ER 2.2.1.1, and associated EFTA regulations.

WARNING Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Contents

Page

Foreword ... **vii**

Introduction ... **ix**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms, definitions and symbols ... **1**
3.1 Terms and definitions ... 2
3.2 Symbols ... 3

4 Basic standards and vibration test codes ... **3**

5 Description of the family of machines ... **3**

6 Characterization of vibration ... **7**
6.1 Direction of measurement ... 7
6.2 Location of measurements ... 7
6.3 Magnitude of vibration ... 12
6.4 Combination of vibration directions ... 13

7 Instrumentation requirements ... **13**
7.1 General ... 13
7.2 Mounting of transducers ... 13
7.2.1 Specification of transducer ... 13
7.2.2 Fastening of transducers ... 13
7.3 Frequency weighting filter ... 13
7.4 Integration time ... 13
7.5 Auxiliary equipment ... 14
7.6 Calibration ... 14

8 Testing and operating conditions of the machinery ... **14**
8.1 General ... 14
8.2 Operating conditions ... 14
8.2.1 Pneumatic machines ... 14
8.2.2 Hydraulic machines ... 15
8.2.3 Electrical machines ... 15
8.3 Other quantities to be specified ... 15
8.4 Attached equipment, work piece and task ... 15
8.4.1 Loading device for wrenches, nutrunners and screwdrivers with impact or impulse mechanism ... 15
8.4.2 Selection of size of brake block and socket ... 15
8.4.3 Feed force ... 16
8.4.4 Test procedure ... 16
8.5 Operators ... 18

9 Measurement procedure and validity ... **19**
9.1 Reported vibration values ... 19
9.2 Declaration and verification of the vibration emission value ... 19

10 Measurement report ... **20**

Annex A (informative) **Model test report for vibration emission of wrenches, nutrunners and screwdrivers** ... **21**

Annex B (normative) **Determination of uncertainty** ... **23**

Annex C (normative) **Brake devices — Assembly specification and example drawings of parts** ... **25**

Annex D (informative) **Drawings, example of brake blocks** ... **31**

Bibliography ... **44**

© ISO 2009 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 28927-2 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 3, *Pneumatic tools and machines*.

This first edition of ISO 28927-2 cancels and replaces ISO 8662-7:1997, of which it constitutes a technical revision. The most important changes are

— vibration measurement in three axes and at both hand positions,

— new transducer positions,

— improved definition of transducer positions and orientation, and

— all types of screwdrivers and nutrunners, excepting one-shot nutrunners, now covered.

ISO 29827 consists of the following parts, under the general title *Hand-held portable power tools — Test methods for evaluation of vibration emission*:

— *Part 1: Angle and vertical grinders* [1)]

— *Part 2: Wrenches, nutrunners and screwdrivers*

— *Part 3: Polishers and rotary, orbital and random orbital sanders* [2)]

— *Part 4: Straight grinders* [3)]

— *Part 5: Drills and impact drills* [4)]

— *Part 6: Rammers* [5)]

---

1) Together with Part 4, replaces ISO 8662-4, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 4: Grinders*.

2) Replaces ISO 8662-8, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 8: Polishers and rotary, orbital and random orbital sanders.*

3) Together with Part 1, replaces ISO 8662-4, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 4: Grinders*.

4) Replaces ISO 8662-6, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 6: Impact drills.* Non-impacting drills now covered.

5) Replaces ISO 8662-9, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 9: Rammers.*

© ISO 2009 – All rights reserved

AVA Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

— *Part 7: Nibblers and shears* [6)]

— *Part 8: Saws, polishing and filing machines with reciprocating action and small saws with oscillating or rotating action* [7)]

— *Part 9: Scaling hammers and needle scalers* [8)]

— *Part 10: Percussive drills, hammers and breakers* [9)]

— *Part 11: Stone hammers* [10)]

6) Replaces ISO 8662-10, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 10: Nibblers and shears*

7) Replaces ISO 8662-12, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 12: Saws and files with reciprocating action and saws with oscillating or rotating action*

8) Together with Part 11, replaces ISO 8662-14, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 14: Stone-working tools and needle scalers.*

9) Replaces ISO 8662-2, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 2: Chipping hammers and riveting hammers,* ISO 8662-3, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 3: Rock drills and rotary hammers*, and ISO 8662-5, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 5: Pavement breakers and hammers for construction work.* Chipping and riveting hammers, rock drills and rotary hammers all covered.

10) Together with Part 9, replaces ISO 8662-14, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 14: Stone-working tools and needle scalers.*

© ISO 2009 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Introduction

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

When requirements of this type-C standard are different from those which are stated in type-A or -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.

The vibration test codes for portable hand-held machines given in ISO 28927 are based on ISO 20643, which gives general specifications for the measurement of the vibration emission of hand-held and hand-guided machinery. ISO 28927 specifies the operation of the machines under type-test conditions and other requirements for the performance of type tests. The structure/numbering of its clauses follows that of ISO 20643.

The basic principle for transducer positioning first introduced in the EN 60745 series of European standards is followed, representing a deviation from ISO 20643 for reasons of consistency. The transducers are primarily positioned next to the hand in the area between the thumb and the index finger, where they give the least disturbance to the operator gripping the machine.

It has been found that vibrations generated by wrenches and nutrunners during tightening and unfastening of threaded fasteners vary considerably in typical use. For impact and impulse machines, this is largely due to misalignment between the machine and the fastener, to worn sockets or to the use of universal joints and angle heads. Owing to the very short tightening times in real use, the response times in the vibration measurement system used also become critical for the measurement results.

In order to provide a method that gives good measurement reproducibility, this part of ISO 28927 adopts a procedure for testing impact and impulse machines using a test device based on break blocks acting on the outer diameter of a test socket, and a free running test for other machines. The procedures of ISO 5349 are required whenever exposure at the workplace is to be assessed.

The values obtained are type-test values intended to be representative of the average of the upper quartile of typical vibration magnitudes in real-world use of the machines. However, the actual magnitudes will vary considerably from time to time and depend on many factors, including the operator, the task and the inserted tool or consumable. The state of maintenance of the machine itself might also be of importance. Under real working conditions the influences of the operator and process can be particularly important at low magnitudes. It is therefore not recommended that emission values below 2,5 m/s^2 be used for estimating the vibration magnitude under real working conditions In such cases, 2,5 m/s^2 is the recommended vibration magnitude for estimating the machine vibration.

If accurate values for a specific work place are required, then measurements (according to ISO 5349) in that work situation could be necessary. Vibration values measured in real working conditions can be either higher or lower than the values obtained using this part of ISO 28927.

Higher vibration magnitudes can easily occur in real work situations, caused by either misalignment between the machine and fastener, worn sockets or the use of universal joints or angle heads. The operator's hands ought never to be in contact with rotating parts such as the sockets or the extensions used.

The vibration test codes given in ISO 28927 supersede those given in ISO 8662, whose parts have been replaced by the corresponding parts of ISO 28927 (see Foreword).

NOTE ISO 8662-11, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 11: Fastener driving tools*, and ISO 8662-13, *Hand-held portable power tools — Measurement of vibrations at the handle — Part 13: Die grinders*, could be replaced by future parts of ISO 28927.

© ISO 2009 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

This page deliberately left blank

Documents
Document Sharing Hub

Full document details: BS EN ISO 28927-2:2009+A1:2017

INTERNATIONAL STANDARD **ISO 28927-2:2009+A1:2017(E)**

Hand-held portable power tools - Test methods for evaluation of vibration emission —

Part 2: Wrenches, nutrunners and screwdrivers

1 Scope

This part of ISO 28927 specifies a laboratory method for measuring hand-transmitted vibration emission at the handles of hand-held power-driven wrenches, nutrunners and screwdrivers used for tightening and loosening threaded fasteners. It is a type-test procedure for establishing the magnitude of vibration in the gripping areas of a machine when operating at a specified load. The method has been tested for fastening tasks only. It is intended that the results be used to compare different models of the same type of machine.

This part of ISO 28927 is applicable to hand-held machines (see Clause 5), driven pneumatically or by other means, with impact or impulse action, of shut-off, ratchet or stall type, and of all designs — straight, pistol-grip, angle or bow handle. It covers machines with 6,3 mm to 40 mm (1/4 in to 11/2 in) male or female drive output shafts, as well as other geometries. It is not applicable to nutrunners designed to be used only in torque reaction arms.

NOTE To avoid confusion with the terms “power tool” and “inserted tool”, *machine* is used for the former throughout this document.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 691:2005, *Assembly tools for screws and nuts — Wrench and socket openings — Tolerances for general use*

ISO 2787:1984, *Rotary and percussive pneumatic tools — Performance tests*

ISO 5349:2001 (all parts), *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration*

ISO 5391:2003, *Pneumatic tools and machines — Vocabulary*

ISO 17066:2007, *Hydraulic tools — Vocabulary*

ISO 20643:2005, *Mechanical vibration — Hand-held or hand guided machinery — Principles for evaluation of vibration emission*

EN 12096:1997, *Mechanical vibration — Declaration and verification of vibration emission values*

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in ISO 5391, ISO 17066 and ISO 20643, and the following terms, definitions and symbols, apply.

© ISO 2009 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

3.1 Terms and definitions

3.1.1
loading device
brake device
device used to obtain a stable rotational frequency of the output shaft of the machine and to absorb the output energy of the machine

3.1.2
impact wrench
rotary machine fitted with a rotating or oscillating motor driving a hammer that periodically strikes an anvil to tighten nuts and bolts without producing any considerable reaction torque on the machine

Note 1 to entry: Adapted from ISO 5391:2003, definition 3.2.1.

3.1.3
ratchet wrench
angle drive wrench that progressively rotates a socket by means of a ratchet and pawl coupling

[SOURCE: ISO 5391:2003, definition 3.1.2.8]

3.1.4
screwdriver
rotary, reversible or non-reversible machine that drives a spindle fitted with a screwdriver bit

[SOURCE: ISO 5391:2003, definition 3.1.1]

Note 1 to entry: *Nutrunner* or *screwdriver* can designate the same machine fitted with a socket or screwdriver bit, respectively.

3.1.5
nutrunner
rotary, reversible or non-reversible machine incorporating a socket adapter for the tightening of nuts and bolts

Note 1 to entry: Adapted from ISO 5391:2003, definition 3.1.2.

Note 2 to entry: *Nutrunner* or *screwdriver* can designate the same machine fitted with a socket or screwdriver bit, respectively.

3.1.6
automatic shut-off nutrunner
nutrunner where the setting of the tightening torque is achieved by shutting off the motor when the set torque is achieved

Note 1 to entry: Adapted from ISO 5391:2003, definition 3.1.2.5.

3.1.7
impulse nutrunner
impulse wrench
machine fitted with a motor that drives an hydraulic impulse mechanism for tightening threaded fasteners, applying torque to a fastener in discontinuous increments through a hydraulic impulse unit

Note 1 to entry: Adapted from ISO 5391:2003, definition 3.3.1.

3.1.8
stall-type nutrunner
nutrunner whose tightening torque can only be set by air pressure adjustments

Note 1 to entry: Adapted from ISO 5391:2003, definition 3.1.2.3.

© ISO 2009 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

3.2 Symbols

Symbol	Description	Unit
a_{hw}	root-mean-square (r.m.s.) single-axis acceleration value of the frequency-weighted hand-transmitted vibration	m/s^2
a_{hv}	vibration total value of frequency-weighted r.m.s. acceleration; root sum of squares of a_{hw} values for the three measured axes of vibration	m/s^2
$\overline{a_{hv}}$	arithmetic mean value of a_{hv} values of runs for one operator for one hand position	m/s^2
a_h	arithmetic mean value of $\overline{a_{hv}}$ values for all operators for one hand position	m/s^2
$\overline{a_h}$	arithmetic mean value of a_h values for one hand position on several machines	m/s^2
a_{hd}	declared vibration emission value	m/s^2
s_{n-1}	standard deviation for a test series (for a sample, s)	m/s^2
σ_R	standard deviation of reproducibility (for a population, σ)	m/s^2
C_v	coefficient of variation for a test series	
K	uncertainty	m/s^2

4 Basic standards and vibration test codes

This part of ISO 28297 is based on the requirements of ISO 20643 and corresponds to its structure in respect of clause subjects and numbering except for the annexes.

Annex A presents a model test report, Annex B the means for determining the uncertainty, *K*, and Annex C specifies brake devices.

5 Description of the family of machines

This part of ISO 29827 applies to hand-held machines intended for tightening and loosening threaded fasteners. It does not apply to one-shot type impact nutrunners, where a rotating mass is accelerated to a given rotational speed and then connected to the bolt.

Figures 1 to 10 show examples of typical wrenches, nutrunners and screwdrivers covered by this part of ISO 29827.

Figure 1 — Impact wrench/impulse nutrunner with pistol grip

© ISO 2009 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Figure 2 — Impact wrench/impulse nutrunner with pistol grip and support handle

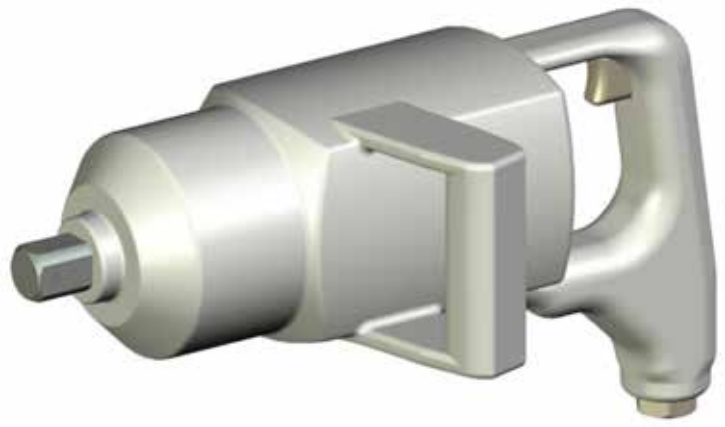

Figure 3 — Impact wrench/impulse nutrunner with bow grip and bow-shaped support handle

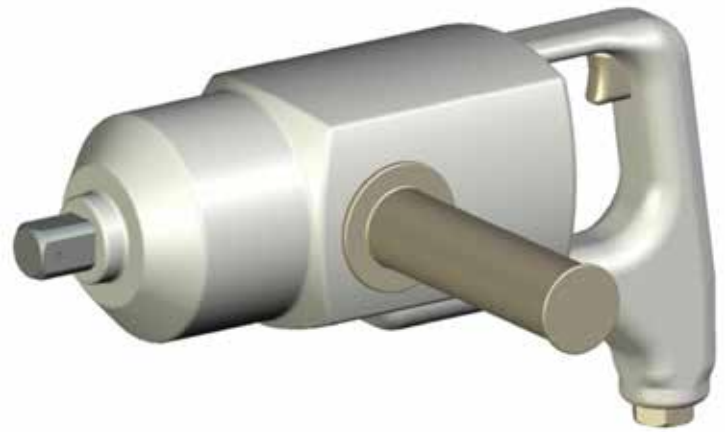

Figure 4 — Impact wrench/impulse nutrunner with bow grip and straight support handle

© ISO 2009 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

Figure 5 — Ratchet wrench

Figure 6 — Angle nutrunner

Figure 7 — Straight screwdriver

© ISO 2009 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017

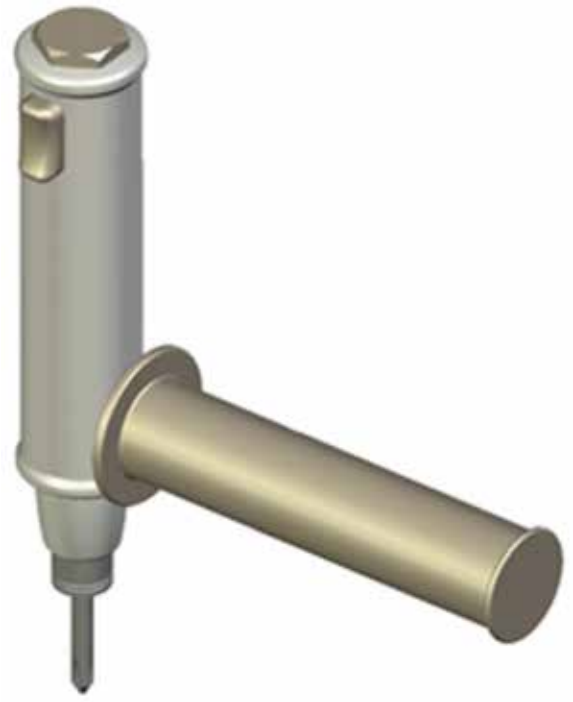

Figure 8 — Screwdriver with support handle

Figure 9 — Screwdriver with drill-type pistol grip

© ISO 2009 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS EN ISO 28927-2:2009+A1:2017