

Availability:
Unrestricted

Master Document: General Engineering Drafting & Drawing Interpretation

Standard No.: **GS-0074** Revision level: **A** Revision date: 2009-12-10

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Administrator: Christine Holst

Approved by: Jeff Herrin Date: 2010-01-18
(Process owner)

Local Edition:

Language:

Author:

Process owners/
Reviewers:

Administrator:

Approved by : Date: (YYYY-MM-DD)

Most recent change history:

Revision	Description of Change
A to B	

Changes in relation to previous issue are written with red, alternatively for figures and tables with a red frame around

1 SCOPE:

This standard establishes uniform drafting practices for preparation of engineering drawings.

2 APPLICATION:

This standard applies to all new Sauer-Danfoss (SD) Engineering drawings.

3 GENERAL:

To ensure that drawings are unambiguous, international standards (ISO and IEC) are used for general principles of presentation, definitions, scales, dimensioning, symbols, tolerances, thread designations etc.

If no international standards are available, European standards (EN), national standards or Sauer-Danfoss Standards and Guidelines are used.

The reference to GS-0074 is as shown in figure 1.

If there is a reference to GS-0074, one or more of the Sauer-Danfoss documents listed in this Guideline are used.

If other standards are used, they must be the subject of special reference.

If a drawing refers to a standard that conflicts with a standard in the body of GS-0074, then the standard noted on the drawing shall have priority.

The English language version is the original and the reference in case of dispute.

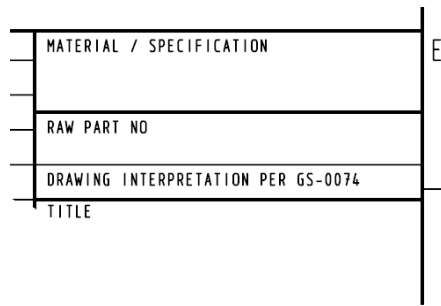
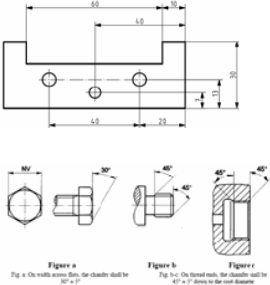
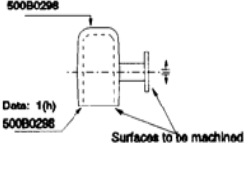




Figure 1

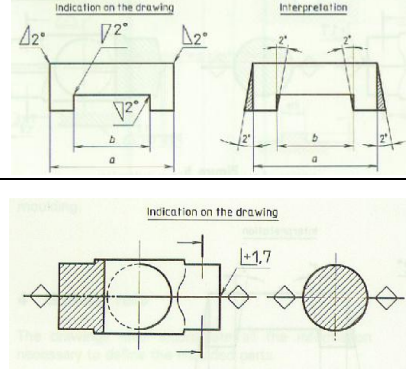
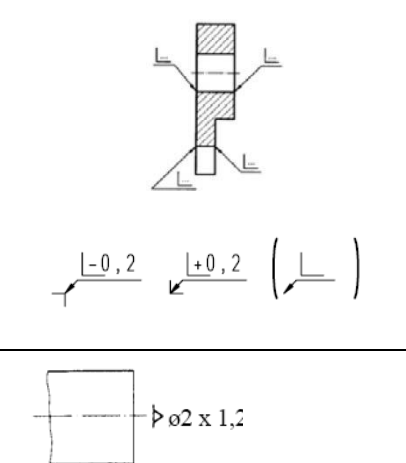
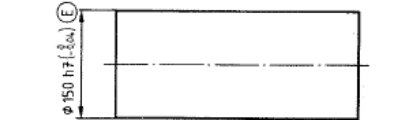

4 FUNDAMENTAL RULES:

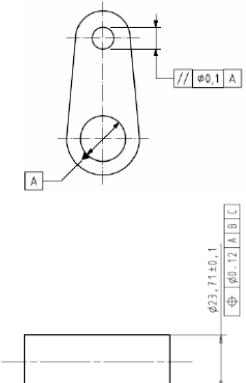
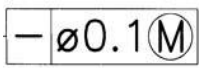
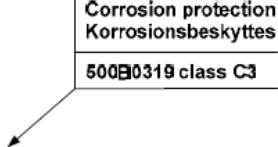

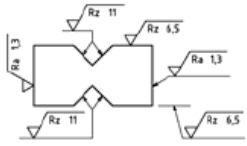
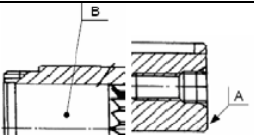
Established by standard	Drawing method
<p>GS-0075 Technical drawings Title Block</p>	
<p>GS-0004 Identification and Documentation of Special Characteristics</p>	

Established by Standard	Drawing Method
<p>ISO 128: Technical drawings - General principles of presentation</p> <p>Part 1: Introduction and index</p> <p>Part 20: Basic conventions for lines</p> <p>Part 22: Basic conventions and applications for leader lines and reference lines</p> <p>Part 24: Lines on mechanical engineering drawings (line Group 0,5)</p> <p>Part 30: Basic conventions for views</p> <p>Part 34: Views on mechanical engineering drawings</p> <p>Part 40: Basic conventions for cuts and sections</p> <p>Part 44: Sections on mechanical engineering drawings</p> <p>Part 50: Basic conventions for representing areas on cuts and Sections</p>	<p>Projection method shall follow historic data of product family.</p>
<p>ISO 129-1, 2004</p> <p>Technical drawings - Indication of dimensions and tolerances</p> <p>- Part 1: General principles</p> <p>Chamfers on hexagons and threads shall be made in accordance with the figures, a, b or c, if no dimensions are given.</p>	 <p>Figure a: Chamfer on hexagon. Figure b: Chamfer on thread. Figure c: Chamfer on thread.</p>
<p>EDS-111</p> <p>Minimally Dimensioned Casting Drawings (Optional method for RAW part drawings)</p>	<p>B35 THE MASTER SOURCE OF INFORMATION REQUIRED FOR THE PRODUCTION OF THIS PART IS THE ASSOCIATED COMPUTER DATABASE FILE, VERSION 13</p>
<p>502B0257</p> <p>Data code marking for castings (NOR)</p>	 <p>Data: 1(h) 500B0298</p> <p>Surfaces to be machined</p>
<p>500B0297</p> <p>Technical drawing. Dimensions for arrows</p>	<p>A=10, 500B0297</p>
<p>500B0324</p> <p>Technical drawing. Electrical documentation Diagram symbols. (IEC 60617)</p>	 <p>Symbol no 04-01-03</p>
<p>502B0078</p> <p>Marking of finished products and transport packaging</p>	<p>F275C12</p>


<p>GS-0072 Product Brand communication</p>	
<p>500B0378 Technical drawing. Protective earth (ground). Outline of dimension</p>	<p>10 mm earth mark lowered: $d = 10s, 500B0378$</p>

5 GEOMETRY INDICATION AND DIMENSIONS

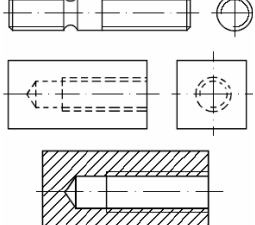
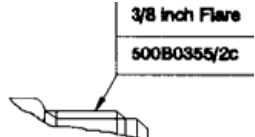
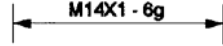

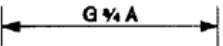
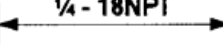
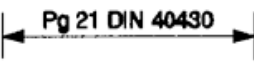
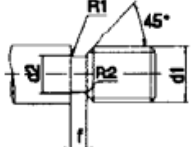
<p>ISO-10135 Technical drawing Indication of draft and parting surfaces</p>	
<p>ISO 13715 Technical drawing Part edges and spigots on turned parts Terms, Indications on drawings (DIN 6785)</p> <p>Example: default symbols / values for raw part and finished part drawings.</p>	
<p>ISO 8015 Technical drawing Fundamental tolerancing principle</p>	
<p>ISO 5459, 1981 Technical drawings; Geometrical tolerancing; Datums and datum-systems for geometrical tolerances</p>	

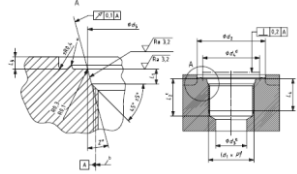
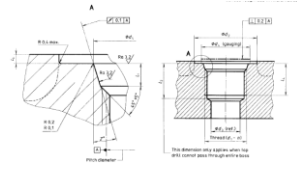
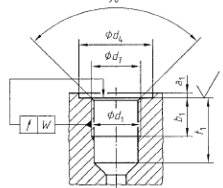
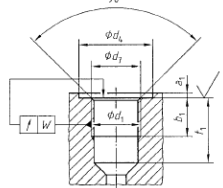
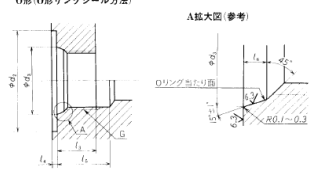
Established by standard	Drawing method
<p>ISO 1101, 2004 Geometrical Product Specifications (GPS) - Geometrical tolerancing - Tolerances of form, orientation, location and run-out</p> <p>Exception to ISO 1101, True Position may be placed directly under the dimension value.</p>	
<p>500B0358 Technical drawing. The Maximum Material Principle Geometrical tolerancing. (ISO 2692)</p>	
<p>500B0319 Technical drawing. Specification of corrosion protection</p>	
<p>500B0318 Technical drawing Specification of galvanic and chemical coatings</p>	
<p>500B0332 Specification of surface coatings</p>	<p>Fe/Zn8c2C</p>
<p>ISO 1302-2002 Technical drawing; Specification of roughness requirements</p> <p>Example: default symbols/values for raw part and finished part drawings.</p>	 <p>✓ (✓)</p> <p>3,2/ (✓)</p>
<p>GS-0062 Case hardening and tempering Definitions, indications on drawings and specification (ISO 15787)</p>	 <p>Case hardening + tempering A. 700 ± 100 HV10 B. CHD 550 HV1 = 0,6 ± 0,2 mm</p>

6 SPRINGS

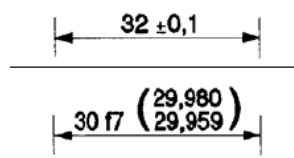
Established by standard	Drawing method
ISO 2162-1 Technical product documentation; springs; part 1: simplified representation	

7 THREADS

Established by standard	Drawing method
ISO 6410-1, 1993 Technical drawings; screw threads and threaded parts; part 1: general conventions	
500B0355 Flared connections, ISO inch thread (UNF thread)	
500B0480 ISO metric screw threads Basic profile, profile data, tolerance data, designations on Drawings	
500B0481 ISO inch threads. Basic profile, profile data, tolerance data, drawing specifications	
500B0482 ISO pipe threads - where pressure-tight joints are made and not made on the threads. Basic profiles, profile data, tolerance data, drawing specifications	
500B0483 American pipe threads - NPT threads, NPTF threads	
500B0484 Metric threads for cable glands M10 x 1 – 7H (For new Sauer-Danfoss products, it is recommended that cable gland threads be metric threads. See 500B0484)	M10 x 1 – 7H Steel conduit thread 
500B0485 Thread run outs and thread undercuts. ISO metric screw threads and ISO inch screw threads	

<p>ISO 6149-1 Connections for hydraulic fluid power and general use - Ports and stud ends with ISO 261 metric threads and O-ring sealing - Part 1: Ports with truncated housing for O-ring seal</p>	
<p>ISO 11926-1 Connections for general use and fluid power - Ports and stud ends with ISO 725 threads and O-ring sealing - Part 1: Ports with O-ring seal in truncated housing</p>	
<p>DIN 3852-1 Studs ends, ports, for fittings, valves. Part 1: Plug screw with metric fine pitch thread . General outlay of types</p>	
<p>DIN 3852-2 Studs ends, ports, for fittings, valves. Plug screw with Whitworth pipe thread. General outlay of types</p>	
<p>JIS B2351-1 Metallic tube connections for fluid power and general use -- Part 1</p>	<p>O形 (O形) リングシール方法</p>  <p>△拡大図 (参考)</p>

8 CAD DRAWINGS

<p>Established by standard 500B0467 Technical drawing Dimensions and tolerances in CAD</p>	<p>Established by standard</p> 
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9 REFERENCES

- ISO 128-1, 2004 Technical drawings - General principles of presentation - Part 1: Introduction and index
- ISO 128-20, 1996 Technical drawings - General principles of presentation - Part 20: Basic conventions for lines
- ISO 128-22, 1999 Technical drawings - General principles of presentation - Part 22: Basic conventions and applications for leader lines and reference lines
- ISO 128-24, 1999 Technical drawings - General principles of presentation - Part 24: Lines on mechanical engineering drawings
- ISO 128-30, 2001 Technical drawings - General principles of presentation - Part 30: Basic conventions for views
- ISO 128-34, 2001 Technical drawings - General principles of presentation - Part 34: Views on mechanical engineering drawings
- ISO 128-40, 2001 Technical drawings - General principles of presentation - Part 40: Basic conventions for cuts and sections
- ISO 128-44, 2001 Technical drawings - General principles of presentation - Part 44: Sections on mechanical engineering drawings
- ISO 128-50, 2001 Technical drawings - General principles of presentation - Part 50: Basic conventions for representing areas on cuts and sections
- ISO 129-1, 2004 Technical drawings - Indication of dimensions and tolerances - Part 1: General principles
- ISO 1101, 2004 Technical drawings - Geometrical tolerancing - Tolerancing of form, orientation, location and run-out - Generalities, definitions, symbols, indications on drawings
- ISO 1302, 2002 Geometrical Product Specifications (GPS) - Indication of surface texture in technical product documentation
- ISO 6149-1 Connections for hydraulic fluid power and general use - Ports and stud ends with ISO 261 metric threads and O-ring sealing - Part 1: Ports with truncated housing for O-ring seal
- ISO 11926-1 Connections for general use and fluid power - Ports and stud ends with ISO 725 threads and O-ring sealing - Part 1: Ports with O-ring seal in truncated housing
- ISO 13715, Technical drawings - Edges of undefined shape - Vocabulary and indications
- ISO 2162-1, 1993 Technical product documentation; springs; part 1: simplified representation
- ISO 5459, 1981 Technical drawings; Geometrical tolerancing; Datums and datum systems for geometrical tolerances
- ISO 6410-1, 1993 Technical drawings; screw threads and threaded parts; part 1: general Conventions

Danfoss documents:

(If no date is given, the latest issue applies)

- 500B0276 Marking of finished products and transport packaging
- 500B0286 Design classes and product colors
- 500B0297 Technical drawing Dimensions for arrows
- 500B0308 Technical drawings Title block
- 500B0317 Technical drawing Drawings for product labels
- 500B0318 Technical drawing Specification of galvanic and chemical coatings
- 500B0319 Technical drawing Specification of corrosion protection requirements
- 500B0322 Technical drawings Indication of draft and parting surfaces

- 500B0323 Technical drawing Part edges and spigots on turned parts. Terms, Indications on drawings (ISO 13715 and DIN 6785)
- 500B0324 Technical drawing. Electrical documentation Diagram symbols (IEC 60617)
- 500B0332 Specification of surface coatings
- 500B0355 Flared connections, ISO inch thread (UNF thread)
- 500B0358 Technical drawing. The Maximum Material Principle Geometrical tolerancing (ISO 2692)
- 500B0378 Technical drawing. Protective earth (ground). Outline of dimension
- 500B0467 Technical drawing Dimensions and tolerances in CAD
- 500B0480 ISO metric screw threads. Basic profile, profile data, tolerance data, designations on drawings
- 500B0481 ISO inch threads. Basic profile, profile data, tolerance data, drawing specifications
- 500B0482 ISO pipe threads - where pressure-tight joints are made and not made on the threads. Basic profiles, profile data, tolerance data, drawing specifications
- 500B0483 American pipe threads - NPT threads, NPTF threads
- 500B0484 Metric threads for cable glands
- 500B0485 Thread runouts and thread undercuts. ISO metric screw threads and ISO inch screw threads

Sauer-Danfoss Documents:

- GS-0062 Global Heat-Treat Standard
- GS-0004 Identification and Documentation of Special Characteristics
- GS-0072 Product Brand communication
- GS-0075 Technical drawings Title Block
- EDS-111 Minimally Dimensioned Casting Drawings
- 502B0078 Marking of finished products and transport packaging
- 502B0257 Data code marking of castings

CHANGE HISTORY:

Date	Old/New Rev.	Description of Change
	A / B	