



BSI Standards Publication

Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side impact dummy

Part 4: User's manual

National foreword

This British Standard is the UK implementation of ISO 15830-4:2022. It supersedes BS ISO 15830-4:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/7, Automobile occupant restraint systems.

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

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Date	Text affected
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**Road vehicles — Design and
performance specifications for the
WorldSID 50th percentile male side
impact dummy —**

**Part 4:
User's manual**

*Véhicules routiers — Conception et spécifications de performance
pour le mannequin mondial (WorldSID), 50e percentile homme, de
choc latéral —*

Partie 4: Manuel de l'utilisateur





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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 36, *Safety and impact testing*.

This third edition cancels and replaces the second edition (ISO 15830-4:2013), which has been technically revised.

The main changes are as follows:

- parts lists and disassembly and assembly procedures have been updated to the current production version of WorldSID;
- full arm parts list and the disassembly, assembly, and adjustment procedures have been removed;
- informative annex on general practices has been removed;
- informative annex on temperature sensitivity has been replaced by reference to ISO/TR 27957;
- informative annex on seating procedure has been replaced by reference to ISO 17949;
- all electrical components have been replaced by their respective mass or structural replacements;
- informative annex on cable routing has been removed;
- normative annex on electrical grounding scheme has been removed;
- informative annex on a permissible internal data acquisition system has been removed.

A list of all parts in the ISO 15830 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This third edition of the ISO 15830 series has been prepared on the basis of the existing design, specifications, and performance of the WorldSID 50th percentile adult male side impact dummy. The purpose of the ISO 15830 series is to document the design and specifications of this side impact dummy in a form suitable and intended for worldwide use.

In 1997, the WorldSID 50th percentile adult male dummy development was initiated, with the aim of defining a global-consensus side impact dummy with more human-like anthropometry, improved biofidelity and increased injury monitoring capabilities, suitable, for example, for regulatory use. Participating in the development were research institutes, dummy and instrumentation manufacturers, governments and vehicle manufacturers from around the world.

The original WorldSID drawings were available in electronic format. The updates are not available.

In order to apply the ISO 15830 series properly, it is important that all four parts be used together.

Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side impact dummy —

Part 4: User's manual

1 Scope

This document specifies requirements for assembling and disassembling of the WorldSID 50th percentile side impact dummy, a standardized anthropomorphic dummy for near-side-impact tests of road vehicles.

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.

ISO 15830-1, *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy — Part 1: Vocabulary and rationale*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15830-1 apply.

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

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

4 Requirements

4.1 Disassembly and assembly

The WorldSID shall be disassembled and assembled according to the procedures in [Annex A](#).

Unless noted otherwise, all fasteners shall be installed using the torques in [Annex B \(Table B.1\)](#). Refer to [Annex C \(Table C.1\)](#) for fastener abbreviations, descriptions, and ISO references.

4.2 Support equipment

The usual laboratory equipment and, in particular, the specialized support equipment in [Annex D \(Table D.1\)](#) shall be used.

5 Procedures and information

5.1 Joint adjustment procedures

The WorldSID arms, knee pivots and ankle joints shall be adjusted according to the procedures in [Annex E](#).

5.2 Seating procedure

Repeatable and reproducible crash test results are highly dependent upon systematic seating procedures. The recommended seating procedure is specified in ISO 17949. When implementing ISO 17949, the half arms should be positioned using the middle arm detent (the first detent downward from the uppermost detent). This detent creates a 32° differential between the rib angle sensor and the arm angle.

5.3 Temperature information

The WorldSID components with the most sensitivity to temperature change are the inner ribs, in particular, the energy absorbing material which covers the inner ribs. WorldSID temperature measurements should be made per procedures specified in ISO/TR 27957.

Annex A (normative)

Procedures for disassembly and assembly of the WorldSID

A.1 Head

A.1.1 Parts list for head

NOTE [Table A.1](#) lists the parts required for assembling the WorldSID head, which are shown in [Figure A.1](#) and [Figure A.2](#).

Table A.1 — Parts list for WorldSID head

Key number	Description	Quantity	Part number
1	Moulded head	1	W50-14014
2	Head core	1	W50-10007-1
3	Neck shroud assembly	1	W50-24017
4	Angular rate sensor mass replacement	3	477-3605
5	Neck load cell structural replacement	1	W50-71003
6	Tilt sensor mass replacement	1	476-3604
7	Triaxial accelerometer mass replacement and mount	1	7268C-SR
8	BHCS M4 × 0,7 × 10 LG	5	5001083
9	Flat washer M8 (8,9 mm ID × 18,8 mm OD × 2,3 mm thick) plain zinc	1	5000123
10	BHCS M8 × 1,25 × 30 LG	1	5001314
11	SHCS M6 × 1 × 14 LG	4	5000604
12	SHCS M3 × 0,5 × 8	6	5000388
13	SHCS M6 × 1 × 12	4	5000281
14	SHCS M4 × 0,7 × 10	1	5000151
15	SHCS M2 × 0,4 × 16	1	5000985
16	#2 flat washer	1	9003999
17	Cable retainer bracket	1	WS-1012
18	SHCS M1,6 × 0,35 × 3	1	5000063
19	SHCS M2 × 0,4 × 10	2	5000215
20	Mount, tilt sensor W50/W5 head	1	W50-00201
21	Mount, ARS, WSID	3	W50-00301
22	SHCS #0-80 × 3/8 "	6	9003146

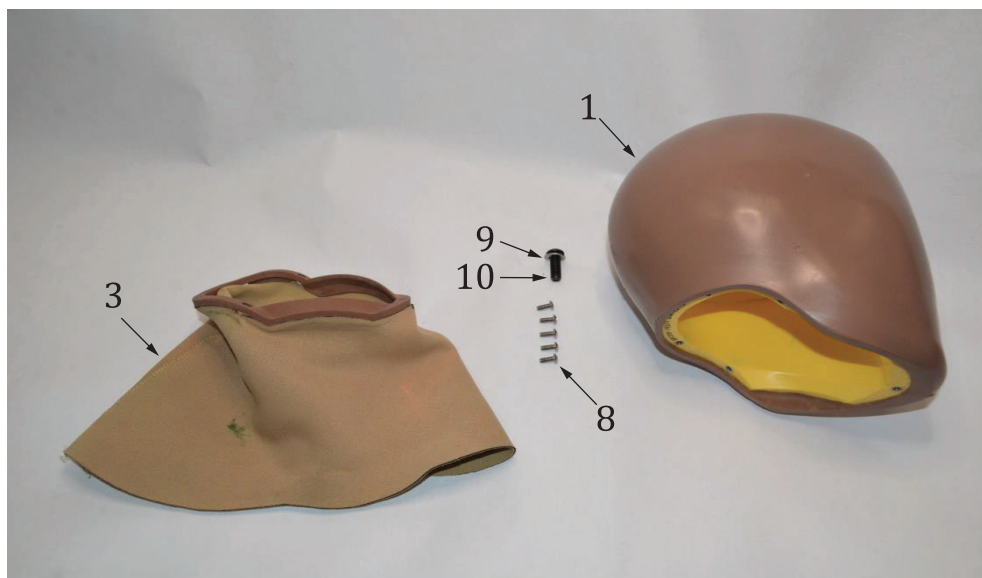


Figure A.1 — WorldSID moulded head and neck shroud components

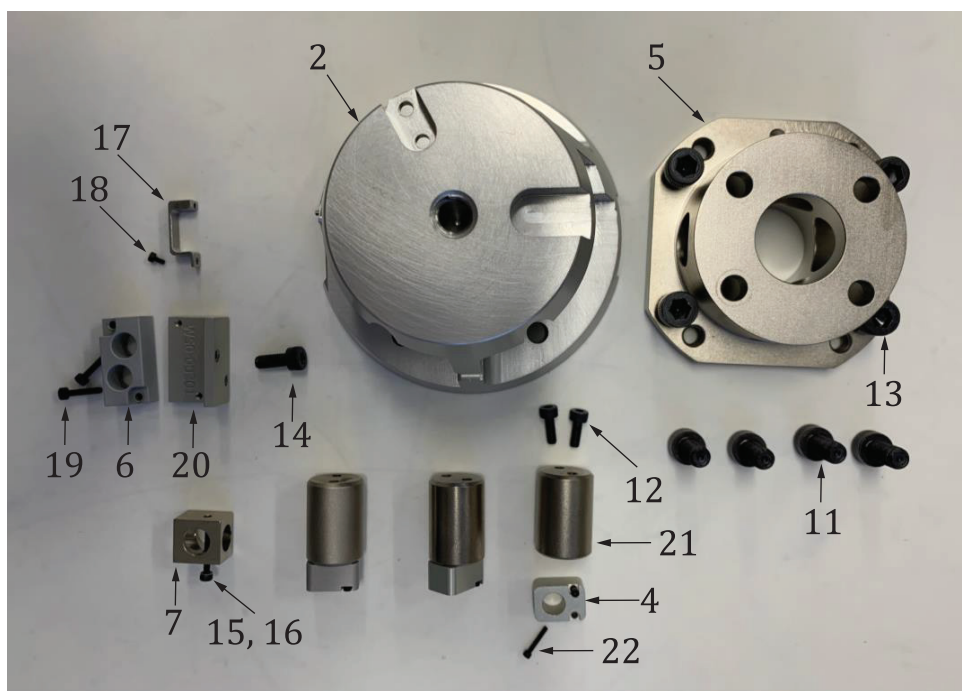


Figure A.2 — WorldSID head core components

A.1.2 Head disassembly

As shown in [Figure A.3](#), remove the BHCS M8 × 1,25 × 30 LG fastener ([Figure A.1](#), key 10) and M8 flat washer ([Figure A.1](#), key 9) from the top of the head. Lift the moulded head ([Figure A.1](#), key 1) off the head core ([Figure A.2](#), key 2). Detach the neck shroud assembly ([Figure A.1](#), key 3) from the head by removing five screws, BHCS M4 × 0,7 × 10 LG ([Figure A.1](#), key 8).



Figure A.3 — Removal of moulded head

Remove the four SHCS M6 × 12 ([Figure A.2](#), key 13) to remove the upper neck load cell structural replacement from the neck assembly (see [Figure A.4](#)).



Figure A.4 — Separating the upper neck load cell structural replacement from the neck

Remove the four SHCS M6 × 1 × 14 LG ([Figure A.2](#), key 11) from the bottom of the upper neck load cell structural replacement ([Figure A.2](#), key 5) that attach it to the bottom of the head core (see [Figure A.5](#)).

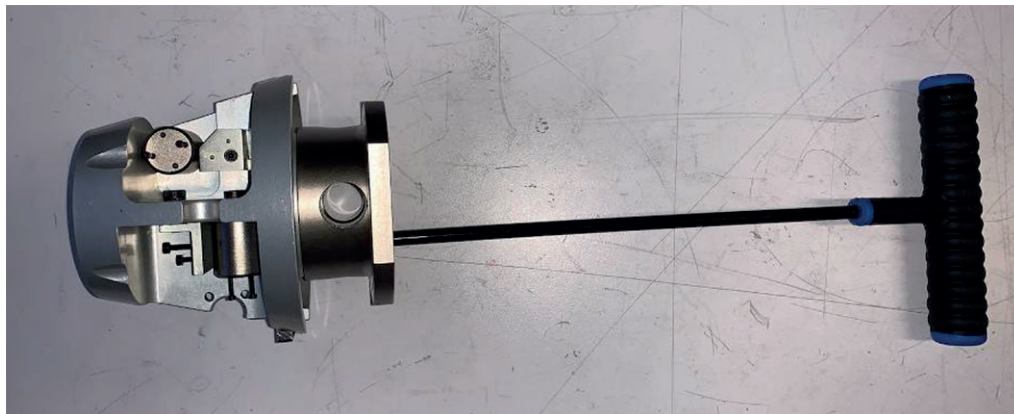


Figure A.5 — Removing upper neck load cell structural replacement from head core

Remove the tilt sensor mount (Figure A.2, key 20) from the head core (Figure A.2, key 2) by removing the SHCS $M4 \times 0,7 \times 10$ (Figure A.2, key 14). Remove the tilt sensor mass replacement (Figure A.2, key 6) from the tilt sensor mount (Figure A.2, key 20) by removing two SHCS $M2 \times 0,4 \times 10$ (Figure A.2, key 19). Remove each ARS mount (Figure A.2, key 21) from the head core (Figure A.2, key 2) by removing two SHCS $M3 \times 0,5 \times 8$ (Figure A.2, key 12). Remove each ARS mass replacement (Figure A.2, key 4) from its ARS mount (Figure A.2, key 21) by removing two SHCS $\#0-80 \times 3/8$ (Figure A.2, key 22).

Remove the triaxial accelerometer mass replacement and mount (Figure A.2, key 7) from the head core by removing the SHCS $M2 \times 0,4 \times 16$ (Figure A.2, key 15) and flat washer (Figure A.2, key 16).

Remove the cable retainer bracket (Figure A.2, key 17) from the head core (Figure A.2, key 2) by removing the SHCS $M1,6 \times 0,35 \times 3$ (Figure A.2, key 18).

A.1.3 Head assembly

Inspect inside the head/skull and the head skin for damage before reassembling the head.

Attach the cable retainer bracket (Figure A.2, key 17) to the head core (Figure A.2, key 2) with the SHCS $M1,6 \times 0,35 \times 3$ (Figure A.2, key 18). Attach the triaxial accelerometer mass replacement (Figure A.2, key 7) to the head core with the SHCS $M2 \times 0,4 \times 16$ (Figure A.2, key 15) and flat washer (Figure A.2, key 16).

Attach the ARS mass replacements (Figure A.2, key 4) to their ARS mounts (Figure A.2, key 21) with SHCS $\#0-80 \times 3/8$ (Figure A.2, key 22). Attach each ARS mount (Figure A.2, key 21) to the head core (Figure A.2, key 2) with two SHCS $M3 \times 0,5 \times 8$ (Figure A.2, key 12).

NOTE ARS mounting screws are English fasteners.

Attach the tilt sensor mass replacement (Figure A.2, key 6) to the tilt sensor mount (Figure A.2, key 20) with two SHCS $M2 \times 0,4 \times 10$ (Figure A.2, key 19). Attach the tilt sensor mount (Figure A.2, key 20) to the head core (Figure A.2, key 2) with the SHCS $M4 \times 0,7 \times 10$ (Figure A.2, key 14). Figure A.6 shows the proper orientation of the head instrumentation mass replacements in the head core.



a) Right side



b) Back

Figure A.6 — Orientation of WorldSID head instrumentation mass replacements

Attach the upper neck load cell structural replacement (Figure A.2, key 5) to the head core (Figure A.2, key 2). Attach the neck shroud assembly (Figure A.1, key 3) to the moulded head (Figure A.1, key 1) using five BHCS M4 × 0,7 × 10 LG (Figure A.1, key 8). Place the head and neck shroud assembly over the head core. Place the M8 flat washer (Figure A.1, key 9) into the recess at the top of the head and attach the head and neck shroud assembly to the head core using the BHCS M8 × 1,25 × 30 LG (Figure A.1, key 10).

A.2 Neck

A.2.1 Parts list for neck

NOTE Table A.2 lists the parts required for assembling the WorldSID neck, which are shown in Figure A.7.

Table A.2 — Parts list for WorldSID neck

Key number	Description	Quantity	Part number
1	Lower neck bracket	1	W50-20101-1
2	Upper neck bracket	1	W50-20102
3	Moulded neck	1	W50-22003
4	Neck interface plate	2	W50-20002
5	Half-spherical screw	1	175-2004
6	Neck compression tool	1	175-9500
7	Neck load cell structural replacement	1	W50-71003
8	SHCS M6 × 1 × 12 LG	8	5000281
9	Lateral neck buffer	1	W50-20006 (A, B or C) ^a
10	Flexion extension neck buffer	4	W50-20016
11	SHCS M6 × 1 × 30	2	5000008
12	Neck spacer	2	W50-20103

^a The letters and colour bands designate different stiffnesses. A, red is softest, B, yellow is middle, and C, blue is stiffest.

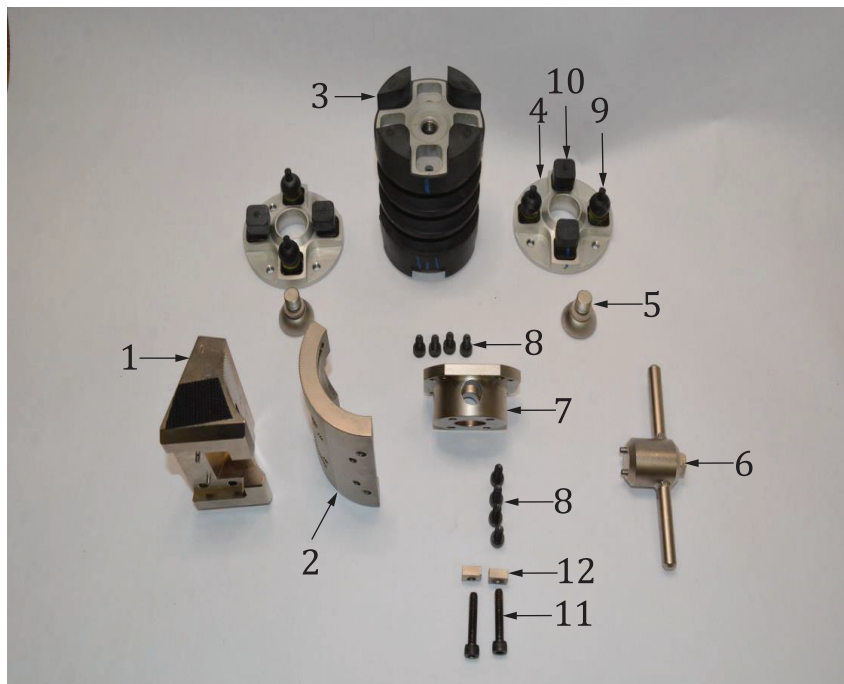


Figure A.7 — WorldSID neck components

A.2.2 Neck disassembly

To separate the neck assembly from the torso, detach the lower neck bracket ([Figure A.7](#), key 1) from the spine box upper weldment by removing four SHCS M6 × 1 × 16 LG. Refer to [Figure A.8](#).

NOTE The four SHCS M6 × 1 × 16 LG are part of the thorax/abdomen/shoulder assembly. Refer to [Table A.3](#), key 30.



Figure A.8 — Removal of upper and lower neck bracket from torso

Remove the moulded neck ([Figure A.7](#), key 3) from the lower neck load cell structural replacement ([Figure A.7](#), key 7) by removing four SHCS M6 × 1 × 12 LG ([Figure A.7](#), key 8). Refer to [Figure A.9](#).



Figure A.9 — Removal of moulded neck from lower neck load cell structural replacement

Remove the lower neck load cell structural replacement ([Figure A.7](#), key 7) from the upper and lower neck brackets ([Figure A.7](#), keys 1 and 2) by removing four SHCS M6 × 1 × 12 LG ([Figure A.7](#), key 8). Refer to [Figure A.10](#).

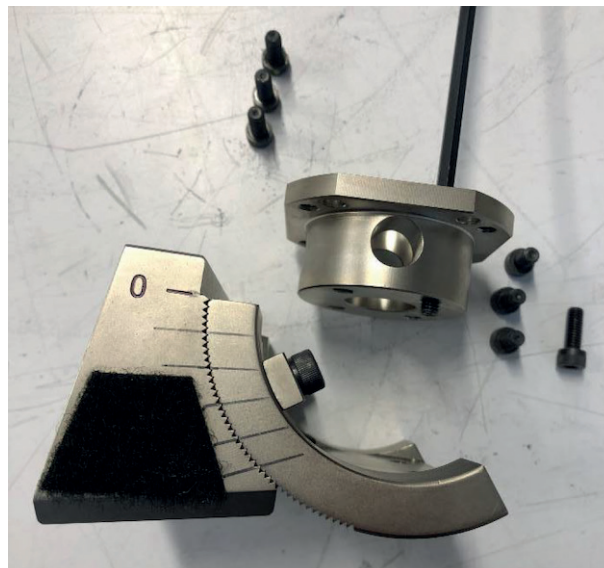


Figure A.10 — Removal of the lower neck load cell structural replacement from the upper and lower neck brackets

Use the neck compression tool ([Figure A.7](#), key 6) to loosen the half-spherical screw ([Figure A.7](#), key 5). Remove the half-spherical screw to remove the neck interface plates ([Figure A.7](#), key 4) from the top and bottom of the moulded neck. Refer to [Figure A.11](#).



Figure A.11 — Removal of neck interface plates using neck compression tool

Disassemble the upper and lower neck bracket components ([Figure A.7](#), keys 1 and 2) by removing the two SHCS M6 × 1 × 30 ([Figure A.7](#), key 11) and two neck spacers ([Figure A.7](#), key 12). Refer to [Figure A.12](#).

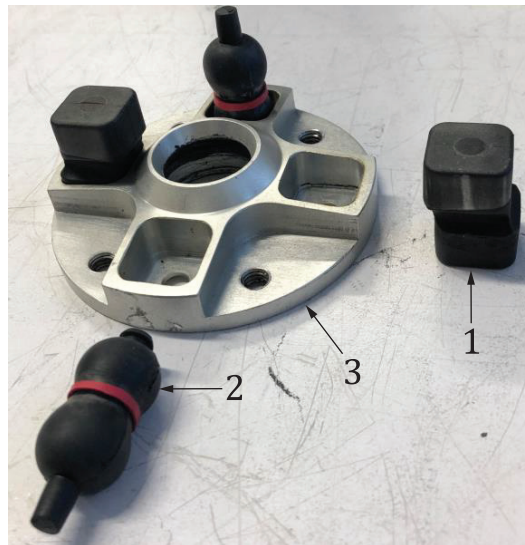


Figure A.12 — Separation of neck bracket assembly

A.2.3 Neck assembly

Before reassembling the neck, inspect the moulded neck and buffers by flexing them to check for cracks of the rubber material.

Press the shorter ends of the lateral neck buffers ([Figure A.7](#), key 9) into the lateral positions of the neck interface plates ([Figure A.7](#), key 4). The buffers might need a twist to fully seat in the neck interface plate. The colour of the buffers depends on the required stiffness. Red is softest, yellow is middle, and blue is stiffest. Press the flexion extension neck buffers with the square cross-sections ([Figure A.7](#), key 10) into the fore and aft positions of the neck interface plate with the bias towards the centre. Refer to [Figure A.13](#).



Key

- 1 flexion extension neck buffer
- 2 lateral neck buffer
- 3 neck interface plate

Figure A.13 — Position of neck buffers in neck interface plate

Attach the neck interface plates to the moulded neck using the neck compression tool ([Figure A.7](#), key 6) with a socket and torque wrench (not shown). Lubricate the half-spherical screws well with high pressure grease. Tighten the half-spherical screws to 10 N·m. Refer to [Figure A.14](#).



Figure A.14 — Assembly of neck interface plates to moulded neck

Place the upper neck bracket ([Figure A.7](#), key 2) over the lower neck bracket ([Figure A.7](#), key 1) and engage the teeth in the desired orientation. Insert the neck spacer ([Figure A.7](#), key 12) into the slot on one side and orient it so the hole in the nut lines up with the hole accessed from the back of the lower neck bracket. Insert the SHCS M6 × 1 × 30 ([Figure A.7](#), key 11) to secure the brackets together. Repeat with the second neck bracket nut and SHCS on the other side. Refer to [Figure A.10](#).

Attach the lower neck load cell structural replacement ([Figure A.7](#), key 7) to the upper neck bracket ([Figure A.7](#), key 2) with four SHCS M6 × 1 × 12 ([Figure A.7](#), key 8). Refer to [Figure A.9](#).

Attach the moulded neck ([Figure A.7](#), key 3) to the lower neck load cell structural replacement ([Figure A.7](#), key 17) with four SHCS M6 × 1 × 12 ([Figure A.7](#), key 8) accessed from the bottom. Refer to [Figure A.8](#).

A.3 Thorax, abdomen, and shoulder

A.3.1 Parts lists

A.3.1.1 Parts list for thorax, abdomen, and shoulder assembly

NOTE [Table A.3](#) lists the parts required for assembling the WorldSID thorax, abdomen, and shoulder, which are shown in [Figure A.15](#) and [Figure A.16](#).

Table A.3 — Parts list for the WorldSID thorax, abdomen, and shoulder

Key number	Description	Quantity	Part number
1	Spine box assembly	1	W50-31000
2	Thorax rib assembly 1, WorldSID	2	W50-32111
3	Thorax rib assembly 2 and 3 and abdomen rib assembly 1 and 2, WorldSID	8	W50-32131
4	Sternum, thorax bib	1	W50-35022
5	Rib coupler, abdominal, WorldSID	1	W50-35021
6	Shoulder rib sternum mounting strip	2	W50-32177
7	Thorax and abdominal rib sternum mounting strip	10	W50-32178
8	Thorax and abdominal rib mounting strip, threaded	10	W50-32176
9	Screw, BHCS M5 × 0,8 × 10 LG	24	5000003
10	Shoulder rib assembly, inner band, WorldSID	2	W50-32160-2
11	Thorax rib assembly, inner band, WorldSID	6	W50-32150-2
12	Abdomen rib assembly, inner band, WorldSID	4	W50-32155-2
13	Shoulder rib mounting bracket, WorldSID	2	W50-32171
14	Thorax and abdominal rib accelerometer mounting bracket, WorldSID	10	W50-32172
15	Rib assembly, shoulder	2	W50-32001
16	Shoulder rib sternum mounting strip, threaded	2	W50-32175
17	Thorax and abdominal rib clamping bracket, WorldSID	10	W50-32173
18	Screw, FHCS M5 × 0,8 × 20 LG	8	5000386
19	Screw, rib displacement measurement device mount	6	W50-32179
20	Rib doubler, shoulder	2	W50-32010
21	Shoulder assembly, left	1	W50-61053-1
22	Clamp, damping	24	W50-32180
23	Screw, FHCS M5 × 0,8 × 10 LG	48	5000084
24	Screw, BHCS M5 × 0,8 × 6 LG	24	5000214
25	Shoulder pad, left, WorldSID	1	W50-35023-1
26	Shoulder pad, right, WorldSID	1	W50-35023-2
27	Screw, SHCS M2,5 × 0,45 × 10	10	5000456
28	Nut, locknut M12 × 1,75	2	5000462
29	Thorax pad	2	W50-35124
30	Screw, SHCS M6 × 1 × 16 LG	4	5000081
31	Screw, SHCS M2 × 0,4 × 16 LG SS	6	5000509
32	Cable tie mount, 13 mm × 13 mm, nylon, adhesive backed	10	6002035
33	Cable tie mount, #4 screw, nylon	1	6002036
34	Screw, BHCS M3 × 0,5 × 6 LG	1	5000399

Table A.3 (continued)

Key number	Description	Quantity	Part number
35	Cable tie, hook and loop, 280 mm (not shown)	8	6002055
36	Battery mounting bracket	1	W50-37013
37	Spine ballast stand offs	2	W50-37014
38	DAS mounting bracket, WorldSID thorax	1	W50-37015
39	DAS structural replacement	1	W50-74307
40	Screw, SHCS M5 × 0,8 × 25 LG	2	5000721
41	Screw, BHCS M5 × 0,8 × 12 LG	40	5000654
42	Screw, BHCS #6-32 × 1-1/4 " LG	4	9003044
43	Screw, SHCS M3 × 0,5 × 12	6	5000568
44	DAS interposer structural replacement	1	W50-51052-4
45	Screw, SHCS M6 × 1 × 12 LG	1	5000281
46	Screw, LHCS M5 × 0,8 × 10 LG	24	5000774
47	Shoulder assembly, right	1	W50-61053-2
48	Temperature logger structural replacement	1	476-3605
49	Screw, SHCS M2,5 × 0,45 × 16 LG	2	5000069
50	Triaxial accelerometer structural replacement	6	7268C-SR
51	Washer #2 flat plain L SS	6	9003999

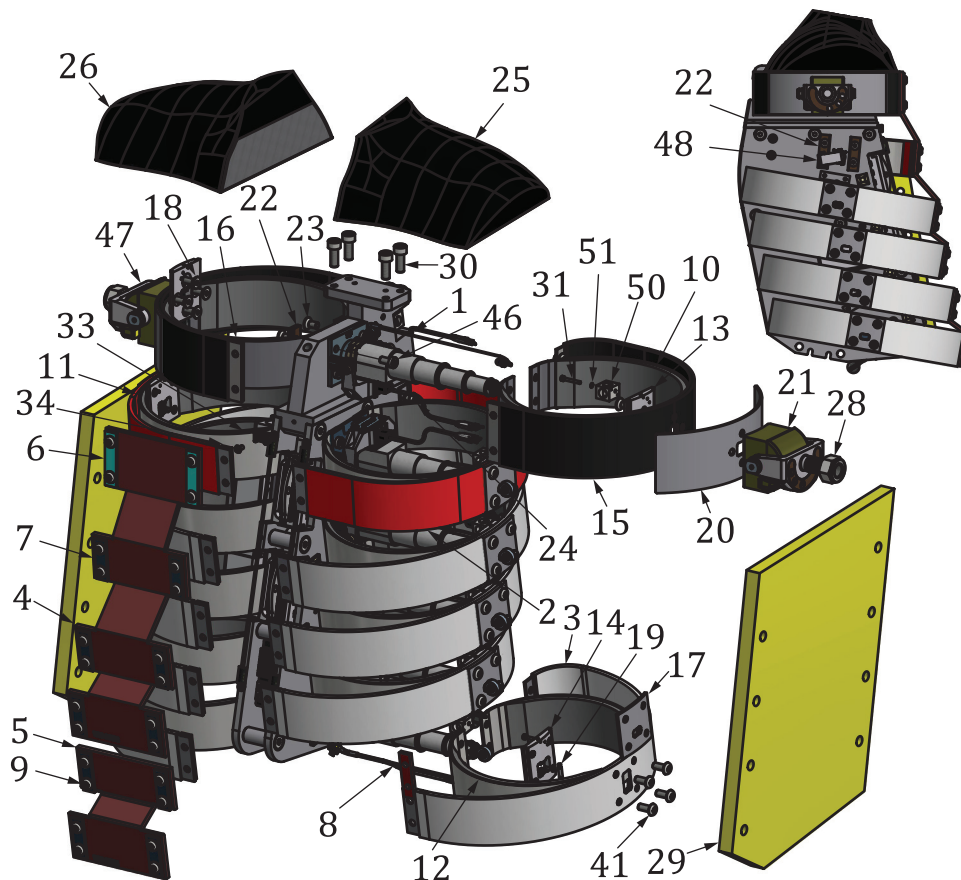


Figure A.15 — WorldSID thorax and abdomen components

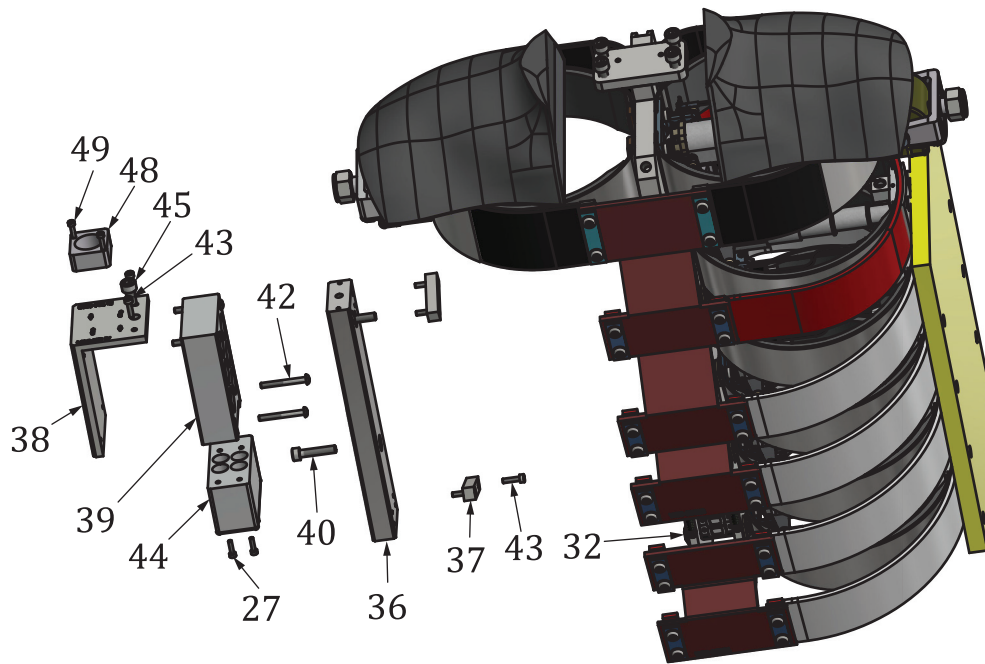


Figure A.16 — WorldSID thorax and abdomen non-impacted side components

A.3.1.2 Parts list for shoulder

NOTE [Table A.4](#) lists the parts required for assembling the WorldSID shoulder, which is shown in [Figure A.17](#).

Table A.4 — Parts list for WorldSID shoulder assembly

Key number	Description	Quantity			Part number
		Left	Right	Total	
1	Shoulder load cell structural replacement	1	1	2	W50-71092
2	Shoulder pivot shaft	1	1	2	W50-61049
3	Shoulder pivot washer	2	2	4	W50-61050
4	Shoulder clevis assembly, right	-	1	1	W50-63111
Not shown	Shoulder clevis assembly, left	1	-	1	W50-63112
5	M6 × 1 hex locknut zinc	1	1	2	5000143
6	SSNT M4 × 0,7 × 4, nylon tip	2	2	4	5000201
7	SSFP M6 × 1 × 12 LG	1	1	2	5001340

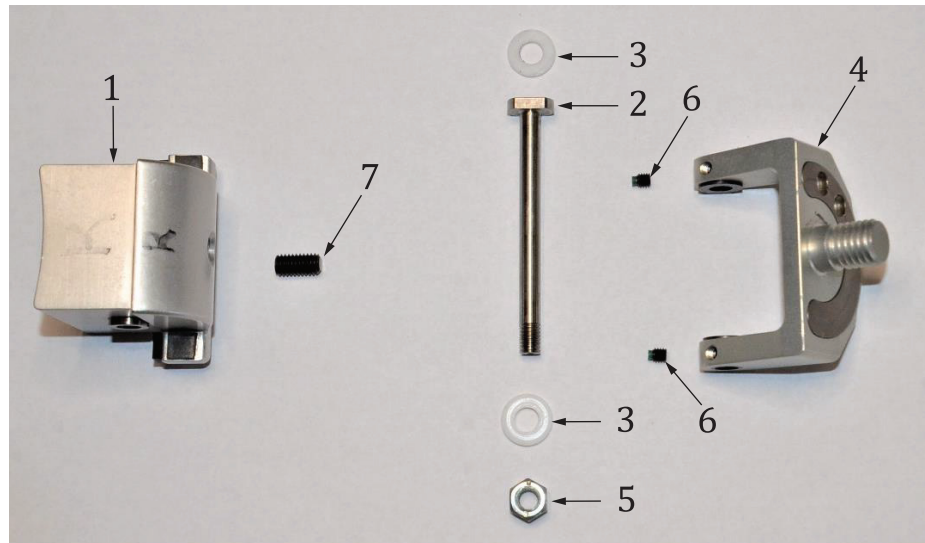


Figure A.17 — WorldSID shoulder components

A.3.1.3 Parts list for spine box assembly

NOTE [Table A.5](#) list the parts required for assembling the WorldSID spine box, which are shown in [Figure A.18](#).

Table A.5 — Parts list for WorldSID spine box assembly

Key number	Description	Quantity	Part number
1	Mounting bracket #1	2	W50-31042
2	Upper bracket weldment, spine box, WorldSID	1	W50-31010
3	Interposer mass replacement	2	W50-75001
4	Side plate, left WorldSID	1	W50-31020
5	SHCS M3 × 0,5 × 10 LG	13	5000119
6	Spacer, WorldSID	6	W50-31041
7	T12 accelerometer mount, WorldSID	1	W50-37024
8	Side plate, right WorldSID	1	W50-31030
9	Connector housing mass replacement	2	W50-75002
10	Backup plate mounting bracket	2	W50-37022
11	Cable assembly, W50 spine box	2	W50-75810
12	BHCS M3 × 0,5 × 5 LG	4	5000674
13	SHCS M4 × 0,7 × 10	4	5000151
14	FHCS M6 × 1 × 12 LG	18	5000139
15	SHCS M2 × 0,4 × 12 LG	8	5000382
16	BHCS M6 × 1 × 18	4	5000465
17	Angular accelerometer/tilt sensor mount bracket	1	W50-37023
18	Mounting bracket #2	2	W50-31043
19	DAS mass replacement	3	W50-74307
20	Cover plate spine box	2	W50-31045
21	Bracket, rotational accelerometer mount	1	W50-37029
22	SHCS M4 × 0,7 × 25 LG	8	5000461
23	FHCS M3 × 0,5 × 10	2	5000203

Table A.5 (continued)

Key number	Description	Quantity	Part number
24	SHCS M4 × 0,7 × 30 LG	2	5000463
25	SHCS M2 × 0,4 × 16 LG SS	2	5000509
26	Mount kit, tilt sensor	1	W50-00204
27	Triaxial accelerometer mass replacement	2	7268C-SR
28	Mount kit, ARS	1	W50-00311
29	Mount kit, dual-axis ARS, WS thorax	1	W50-00312
30	Washer, #2 flat plain SS	2	9003999

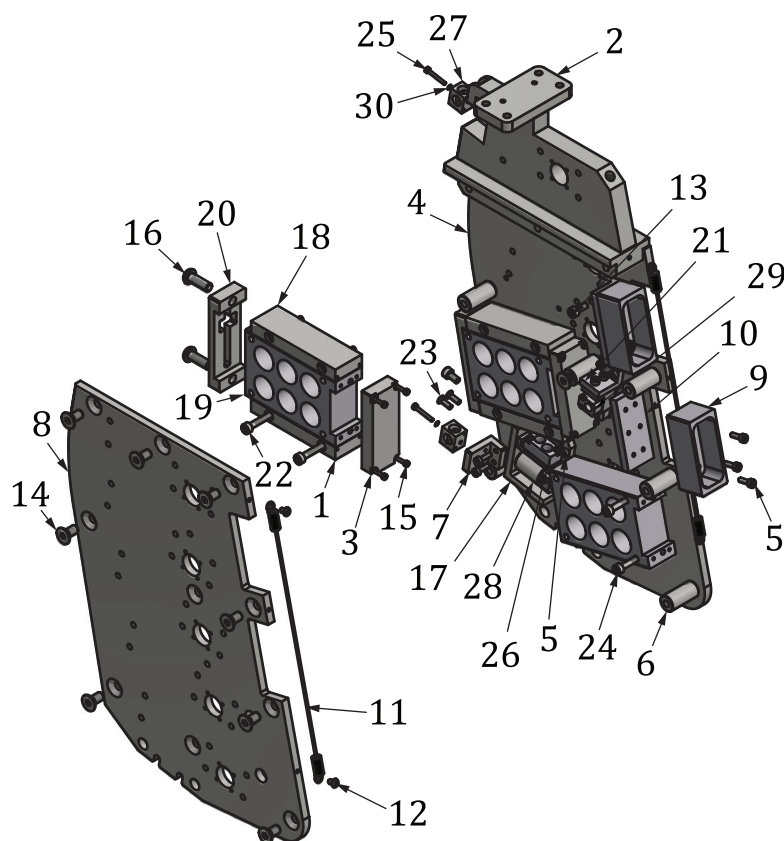


Figure A.18 — WorldSID spine box assembly

A.3.2 Thorax, abdomen and shoulder disassembly

A.3.2.1 Separation of upper and lower torso

Remove the four SHCS M8 × 1,25 × 18, two on each side of the bottom of the spine box, to separate the upper torso from the lower torso.

NOTE The four SHCS M8 × 1,25 × 18 are part of the pelvis assembly. Refer to [Table A.7](#), key 20.

A.3.2.2 Shoulder disassembly

As shown in [Figure A.19](#), remove the shoulder assemblies ([Figure A.15](#), keys 21 and 47) by removing the four FHCS M5 × 0,8 × 20 LG ([Figure A.15](#), key 18) that hold each in place.

To remove the clevis assembly ([Figure A.17](#), key 4), take off the M6 × 1 hex nut ([Figure A.17](#), key 5) with the nylon washer ([Figure A.17](#), key 3) at the threaded end. Next, loosen the two SSNT M4 × 0,7 × 4