1. **472-8700** attaches to the spine at the upper thoracic spine back plate and to the neo-implantation platform with the hardware provided.

2. **472-8702** attaches to rib #4 and rib #5 using the existing rib mounting hardware.

3. **472-8703** attaches to the thoracic spine flex joint adaptor plate and the lower abdomen rear attachment plate using the M4 x 10 and M6 x 10 screws provided in the tool kit.

4. **472-8701** attaches to the mid-sternum assembly and rib #4 using the existing rib mounting hardware and cable clamp mounting hardware.

5. **472-8704** attaches to the femur load cell when the load cell is installed.

6. **472-8706** attaches to the dummy at the lower abdomen rear attachment plate using the same M6 screws that attaches to note 5.
NOTES:

1. THE HEAD IS ATTACHED TO THE HEAD MOUNTING PLATE ON THE NECK ASSEMBLY AND IS SECURED WITH FOUR M6 X 1 X 25 FHCS WHICH ARE INSERTED THROUGH THE BOTTOM OF THE HEAD MOUNTING PLATE, THE BASE OF THE SKULL, AND THREAD INTO THE HEAD ACCELEROMETER MOUNTING PLATE.

2. ITEM 7 (M3 X .5 X 6 NYLON SCREW) IS USED TO MARK THE LOCATION OF THE HEAD C.G.

3. REFER TO CERTIFICATION MANUAL FOR PERFORMANCE SPECIFICATIONS FOR THIS ASSEMBLY.
NOTES:
1. TIGHTEN HEAD PLUG THEN GRIND FLUSH WITH SKULL OUTER SURFACE.
PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>5001107</td>
<td>M3 x 0.5 x 4.25 LG. MINI KEENSERT</td>
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</tbody>
</table>

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)

REVISION HISTORY

<table>
<thead>
<tr>
<th>ECO#</th>
<th>REV</th>
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<th>BY</th>
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<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM TIPCMITY KO3 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>8/24/11</td>
<td>BK</td>
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<tr>
<td>B</td>
<td></td>
<td>5000724 WAS 5001107; Ø3.3 THRU C'BORE Ø6.5 WAS Ø3.8 THRU C'BORE Ø7.1</td>
<td>3/16/2012</td>
<td>BK</td>
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<tr>
<td>C</td>
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<td>M3 X.5 KEENSERT WAS M4 X .7</td>
<td>5/25/2012</td>
<td>BK</td>
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SEE NOTE 2

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
NOTES:

1. STAMP OR ETCH PART NUMBER AND "R-EYE" (3mm CHARACTERS) AS SHOWN. (OPTIONAL)
LEFT EYE LOAD CELL PLATE

NOTES:
1. STAMP OR ETCH PART NUMBER AND "L-EYE" (3mm CHARACTERS) AS SHOWN. (OPTIONAL)

SCALE 1.000

REV: DRAWING NO.: SHEET
SCALE: 1/1
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED

REV: HISTORY
ECO#   REV   DESCRIPTION           DATE   BY
A      A     RENUMBERED FROM T1FCM113 R05 AND CONVERTED TO METRIC FOR THOR-M 8/25/2011 BK
B      B     Ø3.3 C'SINK Ø6.5 X 90° WAS Ø3.8 C'SINK Ø7.1 X 82 5/25/2012 BK

472-1412-1
L-EYE

3.2
440C STAINLESS STEEL
2X R6.4
4X Ø3.3 THRU
Ø6.5 X 90°

R1.6 TYP.
(93°)

SEE NOTE 1

4X

2X 27.4
2X 27.4
44.2
30.7

6.4

R6.42X
(93°)

6.4

2X 4.8
2X R1.6
2X 11.2
45.5

37.1

30.7

3.2
NOTES:
1. STAMP OR ETCH PART NUMBER AND "R-CHEEK" (3mm CHARACTERS) AS SHOWN. (OPTIONAL)
SCALE 1.000

NOTE:

1. STAMP OR ETCH PART NUMBER AND "L-CHEEK" (3mm CHARACTERS) AS SHOWN. (OPTIONAL)

REVISION HISTORY

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<td>B</td>
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<td>Ø3.3 CSINK Ø6.5 X 90° WAS Ø3.8 CSINK Ø7.1 X 82</td>
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<td>BK</td>
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LEFT CHEEK LOAD CELL PLATE

472-1100 1 440C STAINLESS STEEL 8/25/2011 BK

NEXT ASSEMBLY 472-1414-1 472-1414-1 472-1414-1

TOTAL QTY IN DUMMY 1 1 1
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER AND "CHIN" (3mm CHARACTERS) AS SHOWN. (OPTIONAL)
### PARTS LIST

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<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tr>
<td>INSERT, M4 X .7 X 4.7 (THERMOSET)</td>
<td>5001114</td>
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### TOLERANCES

- Decimal Angles: ±0.5
- Dimensions: ±0.2
- Tolerances: ±0.1

### FINISH

- Acetal, Black

### HEAT TREAT

- None

### MATERIAL

- THOR-M

### SCALE

- 1.000

### NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

### REVISION HISTORY

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<td>A</td>
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<td>RENUMBERED FROM T1FCM111 R04 AND CONVERTED TO METRIC FOR THOR-M; Ø3.03+.03/-.00 WAS Ø3.20+.03/-.00; 90° WAS 82°; Ø4.3 C'BORE Ø8.5 WAS Ø4.0 C'BORE Ø7.0; 50.80 WAS 50.9</td>
<td>8/25/2011</td>
<td>BK</td>
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### NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. DRILL Ø5.94 - Ø5.74 TAPERED HOLE \( 9.0 \), HEAT INSERT WITH SOLDER IRON AND INSERT FLUSH WITH SURFACE. (SEE MANUFACTURER INSTRUCTIONS)

### NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

### NEXT ASSEMBLY

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<td>ACETAL, BLACK</td>
<td>CHIN GUARD</td>
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### SHEET 1 OF 1

| 472-1411 | 1 |

### SCALE 1.000
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<td>472-1119</td>
<td>TOP BI-AXIAL ACCEL MOUNT, HEAD</td>
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### Parts List

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<td>SCALE 2.000</td>
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<td>RENUMBERED FROM THD-101 R01 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>8/30/2011</td>
<td>BK</td>
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<tr>
<td>B</td>
<td></td>
<td>UPDATE VIEWS TO SHOW CHANGE TO 472-1119</td>
<td>6/12/2012</td>
<td>BK</td>
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<tr>
<td>C</td>
<td></td>
<td>REMOVED SA572-S4, ACCELEROMETERS</td>
<td>5/20/2014</td>
<td>DW</td>
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### Sheet Information

- DRAWING NO.: 472-1101
- NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
- PROJECT NO.: NEXT ASSEMBLY
- CHECKED BY: J. WANG
- DRAWN BY: B. KIMES
- DATE: 8/25/2011
- DATE: 1/10/2012

### Tolerances

- UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION
- REMOVE BURRS & BREAK SHARP EDGES
PARTS LIST

<table>
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<td>PIN, DOWEL M3 X 12 mm</td>
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<td>2</td>
<td>2</td>
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<tr>
<td>M3 X 0.5 X 4.25 MINI KEENSERT</td>
<td>5001107</td>
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<td>4</td>
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NOTES:
1. DIMENSIONS SYMMETRIC ACROSS $\theta$, UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)

REVISION HISTORY

<table>
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<th>DESCRIPTION</th>
<th>DATE</th>
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<td>8/25/2011</td>
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<td>ADD 5000183; $\phi2.996+.00/-0.01$ 16.4 (P.F. DOWEL) WAS $\phi3.20+.03/-0.00$ 16.4 (S.F. DOWEL); ADD 2X 5.2</td>
<td>5/21/2012</td>
<td>TMV</td>
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</table>
HEAD BALLASTING NOTES:

1. Design and install the ballast weight, 472-1120, in the head so that the following design head weight and CG requirements are achieved.

2. All of the parts and assemblies listed are to be included in the weight and CG location determination.

3. Non-active instruments (without wires) are to be used in place of actual instrumentation.

4. The front and rear cables were shortened so that the cable would not extend below the occipital condyle location.

5. The design CG location is identified by a small hole in the skull and skin on each side of the head.

6. The head weight is 4.54 ±0.05 kg.

7. The design head CG location relative to the occipital condyle is as follows X = 7.6 Y = 0.0 Z = 58.4

---

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<tr>
<th>PART NUMBER</th>
<th>ASSEMBLY</th>
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</thead>
<tbody>
<tr>
<td>5000749</td>
<td>472-2000</td>
<td>SCREW, BHCS M3-0.5 x 5</td>
</tr>
<tr>
<td>5000674</td>
<td>472-2000</td>
<td>SCREW, BHCS M3-0.5 x 5</td>
</tr>
<tr>
<td>5000135</td>
<td>472-1000</td>
<td>SCREW, FHCS M6-1 x 25</td>
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<tr>
<td>5A572-5114</td>
<td>472-2000</td>
<td>ROTARY POTENTIOMETER</td>
</tr>
<tr>
<td>472-2130</td>
<td>472-2100</td>
<td>REAR CABLE ASSEMBLY, NECK SEE NOTE4</td>
</tr>
<tr>
<td>472-2150</td>
<td>472-2100</td>
<td>FRONT CABLE ASSEMBLY, NECK SEE NOTE4</td>
</tr>
<tr>
<td>5000144V</td>
<td>472-2000</td>
<td>NUT, HEX JAM M6-1</td>
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<td>472-2150</td>
<td>472-2000</td>
<td>FRONT CABLE ASSEMBLY, NECK SEE NOTE4</td>
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<tr>
<td>5000674</td>
<td>472-2000</td>
<td>SCREW, BHCS M3-0.5 x 5</td>
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<tr>
<td>5000749</td>
<td>472-2000</td>
<td>SCREW, BHCS M3-0.5 x 30</td>
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<td>472-2014</td>
<td>472-2000</td>
<td>ROTARY POTENTIOMETER COVER, NECK</td>
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<tr>
<td>5000082</td>
<td>472-2000</td>
<td>SCREW, SHCS M2-0.4 x 6</td>
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<td>472-2020</td>
<td>472-2000</td>
<td>ROTARY POTENTIOMETER CLAMP, NECK</td>
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<td>472-2021</td>
<td>472-2000</td>
<td>ROTARY POTENTIOMETER WASHER, NECK</td>
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<td>472-2013</td>
<td>472-2000</td>
<td>ROTARY POTENTIOMETER HOUSING, NECK</td>
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<td>472-2200</td>
<td>472-2000</td>
<td>MOUNTING PLATFORM ASSEMBLY, NECK</td>
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<td>472-1310</td>
<td>472-1000</td>
<td>CAP SKIN</td>
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<td>472-1320</td>
<td>472-1000</td>
<td>SKIN ASSEMBLY</td>
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<td>5001116</td>
<td>472-1000</td>
<td>SCREW, Phillips Nylon M3 X .5 X 6</td>
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<td>5000081</td>
<td>472-1000</td>
<td>M6 X 1 X 16 LG. SHCS</td>
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<tr>
<td>472-1110</td>
<td>472-1000</td>
<td>HEAD CAP</td>
</tr>
<tr>
<td>472-1200</td>
<td>472-1000</td>
<td>ACCELEROMETER MOUNTING PLATE ASSEMBLY, HEAD</td>
</tr>
<tr>
<td>472-1401</td>
<td>472-1000</td>
<td>CONFOR FOAM, FACE</td>
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<tr>
<td>472-1100</td>
<td>472-1000</td>
<td>SKULL ASSEMBLY</td>
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</tbody>
</table>
1. POWDER OR BEAD BLAST.
2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER Finish.
NOTES:

1. MAKE FROM M20 X 2.5 X 40 FHCS (5001115), MODIFY AS SHOWN.
2. PART IS MANUALLY MODIFIED AFTER ASSEMBLING IN SKULL, PROFILE IS GROUND FLUSH WITH OUTER SKULL SURFACE.

SEE NOTE 2
1. Foam tolerance ±1mm, unless otherwise specified.
### Parts List

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<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>QTY</th>
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<tbody>
<tr>
<td>1</td>
<td>ACCELEROMETER MOUNTING PLATE, HEAD</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>ACCELEROMETER ARRAY FIXTURE</td>
<td>1</td>
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<tr>
<td>3</td>
<td>SCREW, CHESSE HEAD M1.4-0.3 x 8</td>
<td>6000000</td>
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<td>4</td>
<td>SCREW, SHCS M1.4 - 0.3 X 3 LG.</td>
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<td>5</td>
<td>SCREW, FHCS M4x0.7 x 12 LG FROM PARTS LIST</td>
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<td>6</td>
<td>SCREW, FHCS M6 x 1.0 x 16mm</td>
<td>472-1212</td>
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<td>7</td>
<td>ACCELEROMETER MOUNTING PLATE ASSEMBLY, HEAD</td>
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<td>8</td>
<td>SCREW, CHESSE HEAD M6-0.4 x 12</td>
<td>3X SA572-S4, ACCELEROMETER</td>
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<td>SCREW, CHESSE HEAD M6-0.4 x 12</td>
<td>3X SA572-S55, ANGULAR RATE SENSOR</td>
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<td>10</td>
<td>SCREW, CHESSE HEAD M1.4-0.3 x 8</td>
<td>3X SA572-S113, TILT SENSOR, OPTIONAL</td>
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### Notes:

1. Z AXIS ACCELEROMETERS ARE MOUNTED UPSIDE DOWN ON THE FIXTURE IN ORDER TO HAVE THE SIGN CONVENTION MATCH SAE J211.
2. ORIENTATION OF THE ACCELEROMETERS CORRESPONDS TO SAE J211.

### Revision History

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<td>CHANGED QUANTITY OF SA572-S4; ACCELEROMETERS TO 3; ADDED ANGULAR RATE SENSORS; CHANGED DEFAULT TILT SENSOR TO SA572-S44; REMOVED PART #5001086 - SCREW, FHCS M4x0.7 x 12 LG FROM PARTS LIST</td>
<td>9/22/2014</td>
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### Dimension Notes:

- **X**
  - ±0.5
  - ±0.2
  - ±0.1
  - ±0.01

- **X.X**
  - ±0.05
  - ±0.02
  - ±0.01

### Drawing Information:

- **SCALE:** 1.000
- **DESCRIPTION:** ACCELEROMETER MOUNTING PLATE ASSEMBLY, HEAD
- **ENGINEER:** J. WANG
- **DATE:** 1/10/2012
- **REPORT:** 1
- **REV:** D
- **DRAWN BY:** B. KIMES
- **CHECKED BY:** N. HATAY
- **REVISION:** 2.0
- **DATE:** 9/22/2011
- **SIGNATURE:**
  - B. KIMES
  - N. HATAY

### Drawing Details:

- **DETAIL A**
  - Scale 1.000
  - (3X SA572-S4, ACCELEROMETER)
- **DETAIL B**
  - Scale 1.000
  - (3X SA572-S55, ANGULAR RATE SENSOR)
- **DETAIL C**
  - Scale 1.000
  - (SA572-S44, TILT SENSOR)
  - (SA572-S113, TILT SENSOR, OPTIONAL ATTACH WITH 1X 5001086 - M4-0.7 x 12)

### National Highway Traffic Safety Administration

- **ENGINEER:** J. WANG
- **DATE:** 1/10/2012
- **REPORT:** 1
- **REV:** D
- **DRAWN BY:** B. KIMES
- **CHECKED BY:** N. HATAY

### Notes:

- **NOTE 1:** Z AXIS ACCELEROMETERS ARE MOUNTED UPSIDE DOWN ON THE FIXTURE IN ORDER TO HAVE THE SIGN CONVENTION MATCH SAE J211.
- **NOTE 2:** ORIENTATION OF THE ACCELEROMETERS CORRESPONDS TO SAE J211.
### REVISION HISTORY

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<th>PART NUMBER</th>
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### NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER AND "UP" (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
3. (4X) GRIND KEENSERT HEIGHT TO 6.9mm BEFORE INSTALLING. (OPTIONAL)
4. INSTALL KEENSERTS AND DOWEL PINS AFTER FINISH.
NOTES:

1. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)

2. (4X) GRIND KEENSERT HEIGHT TO 8.0mm BEFORE INSTALLING. INSTALL AFTER ANODIZE.

4X DRILL TO CROSS HOLE AND TAP FOR M6 X 1 X 10 KEENSERT. SEE NOTE 2

4X Ø12.7 WAS SHOWN

DETAIL Z
SCALE 2.000
DIMENSIONS SYMMETRIC ABOUT θ

PARTS LIST

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<td>A</td>
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MATERIAL:
7075-T6 ALUMINUM

FINISH:
CLEAR ANODIZE

TOLERANCES:
UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

REV: D
DRAWING NO.: 472-1212
DATE: 1/10/2012

ENGINEER:
J. WANG

CHECKED BY:
B. KIMES 8/31/2011

TOTAL QTY IN DUMMY: 1

ECO# REV DESCRIPTION DATE BY
A 1 472-1212 RENUMBERED FROM T1HDM212 R14 AND CONVERTED TO METRIC FOR THOR-M
A 2 472-1212 ADD NOTE 2
8/31/2011 BK
SECTION A-A
SCALE 1.000

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
### Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-1321</td>
<td>HEAD SKIN, MOLDED</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-1324</td>
<td>HEAD/NECK SKIN ZIPPER</td>
</tr>
</tbody>
</table>

### Tolerances

- DO NOT SCALE DRAWING
- TOLERANCES
  - X
  - \( \theta \) 0.5
  - X.X
  - \( \theta \) 0.2
  - X.XX
  - \( \theta \) 0.1
  - X.XXX

### Other Information

- UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

### Revision History

<table>
<thead>
<tr>
<th>ECO #</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>RENUMERATED FROM T1HDS020 R10 FOR THOR-M</td>
<td>11/13/2012</td>
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<tr>
<td>B</td>
<td></td>
<td>REMOVE 472-1322, 472-1323</td>
<td>2/21/2013</td>
<td>BK</td>
</tr>
</tbody>
</table>

### Instructions

- GLUE SO EDGES ARE FLUSH
- REMOVE BURRS & BREAK SHARP EDGES
- GLUE SO EDGES ARE FLUSH
- NEXT ASSEMBLY

### Engineer

- J. WANG

### Date

- 1/23/2012
- 4/12/2012
- 4/13/2012
REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
OF
1 1
472-1321
HEAD SKIN, MOLDED
THOR

C

REVOLUTION HISTORY
ECO# REV DESCRIPTION DATE BY
8 CONVERTED FROM ENGLISH TO METRIC REMOVED VIEWS NOT USED 2/8/10 C. SPADE
A RENUMBERED FROM THDS021 R9 FOR THOR-M 11/27/2012 BK
B ADDED MATERIAL 4/16/2013 KHS
C ADDED HEAD LANDMARKS, CENTER OF GRAVITY (CG), EXTERNAL AUDITORY MEATUS (EAM), INFRA-ORBITAL FORAMEN (IOF), & NASION 7/10/2015 DW

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NEXT ASSEMBLY
QTY: 1
NEXT ASSEMBLY 472-1320 1

472-1321
HEAD SKIN, MOLDED
THOR

TOTAL QTY IN DUMMY
1
TOTAL QTY IN DUMMY 1

472-1321.ipt

4/12/2012
SRICE 4/12/2012

PRODUCT UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

1/23/2012
NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:

DATE:

J. WANG

J. WANG

3X CENTER OF GRAVITY (CG)

3X EXTERNAL AUDITORY MEATUS (EAM)

3X INFRA-ORBITAL FORAMEN (IOF)

3X CENTER OF GRAVITY (CG)

3X EXTERNAL AUDITORY MEATUS (EAM)

3X INFRA-ORBITAL FORAMEN (IOF)

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:

DATE:

J. WANG

J. WANG

3X CENTER OF GRAVITY (CG)

3X EXTERNAL AUDITORY MEATUS (EAM)

3X INFRA-ORBITAL FORAMEN (IOF)

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:

DATE:

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J. WANG

3X CENTER OF GRAVITY (CG)

3X EXTERNAL AUDITORY MEATUS (EAM)

3X INFRA-ORBITAL FORAMEN (IOF)

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:

DATE:

J. WANG

J. WANG

3X CENTER OF GRAVITY (CG)

3X EXTERNAL AUDITORY MEATUS (EAM)

3X INFRA-ORBITAL FORAMEN (IOF)
NOTES:

1. #5 BLACK OXIDE BRASS ZIPPER
   STANDARD AUTOLOCK SLIDER
   TOP AND BOTTOM SEPARATING
   COLOR: BLACK
   (LENZIP)

2. TOLERANCE: ±2mm

VINYL FLAP STITCHED ON UNDERSIDE OF ZIPPER
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\angle$, UNLESS OTHERWISE NOTED.
### Parts List

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Neck Load Cell (Optional)</td>
<td>SA572-S111</td>
<td>30</td>
</tr>
<tr>
<td>Upper Neck Load Cell (Optional)</td>
<td>SA572-S110</td>
<td>29</td>
</tr>
<tr>
<td>M5 X 0.8 X 12 LG. BHCS</td>
<td>50006542</td>
<td>28</td>
</tr>
<tr>
<td>Lower Neck Load Cell Bumper Cover</td>
<td>472-20011</td>
<td>27</td>
</tr>
<tr>
<td>Lower Neck Load Cell Bumper</td>
<td>472-20021</td>
<td>26</td>
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<tr>
<td>M3 X 0.5 X 3 LG. SSS Cone Pt.</td>
<td>5001112125</td>
<td>24</td>
</tr>
<tr>
<td>M3 X 0.5 X 30 LG. BHCS SSS</td>
<td>50007492</td>
<td>23</td>
</tr>
<tr>
<td>M3 X 0.5 X 8 LG. BHCS</td>
<td>50004103</td>
<td>22</td>
</tr>
<tr>
<td>M2 X 0.4 X 6 LG. SHCS</td>
<td>50000824</td>
<td>21</td>
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<tr>
<td>M4 X 0.7 X 8 LG. SHCS</td>
<td>50009891</td>
<td>20</td>
</tr>
<tr>
<td>NUT, HEX JAM M5</td>
<td>50000380V418</td>
<td>19</td>
</tr>
<tr>
<td>SCREW, SHCS M6-1 x 14 mm</td>
<td>50006048</td>
<td>18</td>
</tr>
<tr>
<td>M6 Hi-Collar Lock Washer S.S.</td>
<td>50011108</td>
<td>17</td>
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<tr>
<td>SCREW, FHCS M4-0.4 x 6</td>
<td>50004694</td>
<td>16</td>
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<tr>
<td>Lower Neck Load Cell Structural Replacement</td>
<td>472-26001</td>
<td>15</td>
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<tr>
<td>Upper Neck Load Cell Structural Replacement</td>
<td>472-27001</td>
<td>14</td>
</tr>
<tr>
<td>Rotary Potentiometer Housing, Neck</td>
<td>472-20131</td>
<td>13</td>
</tr>
<tr>
<td>Occipital Condyle Cam, Neck</td>
<td>472-20191</td>
<td>12</td>
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<tr>
<td>Rotary Potentiometer Cover, Neck</td>
<td>472-20141</td>
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<tr>
<td>Rotary Potentiometer Clamp, Neck</td>
<td>472-20202</td>
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<td>Rotary Potentiometer Washer, Neck</td>
<td>472-20211</td>
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<td>Neck Pulley Plate</td>
<td>472-20121</td>
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<tr>
<td>Occipital Condyle Pin, Neck</td>
<td>472-20111</td>
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<td>Mounting Platform Assembly, Neck</td>
<td>472-22001</td>
<td>6</td>
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<tr>
<td>Neck Pulley Bracket Assembly</td>
<td>472-23001</td>
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<tr>
<td>Cable Seat Cover, Neck</td>
<td>472-20152</td>
<td>4</td>
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<tr>
<td>Cable Assembly, Neck</td>
<td>472-21001</td>
<td>3</td>
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<td>Mechanical Assembly, Neck</td>
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<td>2</td>
</tr>
<tr>
<td></td>
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<td>1</td>
</tr>
</tbody>
</table>

**Notes:**

1. A M3 X .5 X 8 BHCS is used to attach the head-spine ground strap to the head-neck mounting platform.
2. Four M6 X 1 X 16 SCHS with nylon pellet are used to fasten the lower neck load cell to the upper thoracic spine neck pitch change mechanism.

**ECO Notes:**

- Item #17 Part #5000469 ± SCREW, SHCS M6-1 x 14mm was part #5000081 ± M6-1 x 16 LG. SHCS; added part #SA572-S114, ROTARY POTENTIOMETER.
- Item #18 Part #5000380V ± NUT, HEX JAM M5 was part #5000156 - M5 X 0.8 HEX LOCK NUT; SS; added part #SA572-S110 ± UPPER NECK LOAD CELL (OPTIONAL), and part #SA572-S111 - LOWER NECK LOAD CELL (OPTIONAL).
**NOTES:**

1. **AFTER THE FRONT AND REAR CABLES ARE ASSEMBLED INTO THE BONDED NECK ASSEMBLY, CLIP THE CABLE GUIDES OVER THE CABLES AND PRESS THEM INTO THE CORRESPONDING NECK PLATES. IF NECESSARY, USE LOCTITE SUPER BONDER 495 OR EQUIVALENT TO SECURE GUIDES INTO PLACE.**

**ECO # | REV | DESCRIPTION | DATE | BY**
--- | --- | --- | --- | ---
A | A | EQUIPMENT FROM PRINTED S-11 AND CONVERTED TO METRIC FOR THOR-M | 8/12/2011 | BK

**REVISION HISTORY**

<table>
<thead>
<tr>
<th>#</th>
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<th>DESCRIPTION</th>
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| A | A | RENUMBERED FROM T1NKM100 R11 AND CONVERTED TO METRIC FOR THOR-M | 8/12/2011 | BK

**DIMENSIONS ARE IN MILLIMETERS**

**TOLERANCES UNLESS OTHERWISE SPECIFIED**

<table>
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<tr>
<th>DECIMALS</th>
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<tr>
<td>X</td>
<td></td>
<td>0.5</td>
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<tr>
<td>X.X</td>
<td></td>
<td>0.2</td>
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<tr>
<td>X.XX</td>
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<td>0.1</td>
</tr>
</tbody>
</table>

**THIRD ANGLE PROJECTION**

**REMARKS:**

- **UNLESS OTHERWISE SPECIFIED**

**ENGINEER:** J. WANG  
**CHECKED BY:** B. KIMES 7/28/2011

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**PROJECT NO.**

**DRAWN BY:** B. KIMES  
**DATE:** 7/28/2011

**REV:** A  
**DRAWING NO.:** 472-2000

**QTY TOTAL QTY IN DUMMY**

<table>
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## REVISION HISTORY

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<tr>
<td>A</td>
<td></td>
<td></td>
<td>472-2100</td>
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</tr>
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<td>B</td>
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<td>472-2101</td>
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</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td>472-2104</td>
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<td>TOTAL QTY IN DUMMY</td>
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<td></td>
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<td>1</td>
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## NOTES:

1. PRESS 5000524 INTO PART UNTIL PIN IS FLUSH WITH THE TOP SURFACE OF THE PLATE.
2. BOND 472-2101 TO 472-2120 AND 5000524 AS SHOWN, USING A HIGH STRENGTH, FLEXIBLE, TWO PART EPOXY.
3. SECURE INTO PLACE USING LOCTITE SUPER BONDER 495 OR EQUIVALENT.

## PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5000524</td>
<td>TOP PLATE CABLE GUIDE, NECK</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5000525</td>
<td>FRONT STOP, NECK</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>5000568</td>
<td>M5 X 6 LG. DOWEL PIN</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>5000569</td>
<td>M5 X 6 LG. DOWEL PIN</td>
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## SCALE

1.000
### PARTS LIST

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<td>TOP PLATE, NECK</td>
<td>472-2125</td>
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<tr>
<td>NECK PLATE 1</td>
<td>472-2120</td>
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<tr>
<td>NECK PLATE 2</td>
<td>472-2123</td>
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<tr>
<td>NECK BASE</td>
<td>472-2122</td>
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**NOTES:**

1. MATERIAL: INJECTION MOLDED BUTYL RUBBER SHORE A 75±2.
2. PERFORMANCE SPEC TAKES PRECEDENCE OVER DUROMETER.
3. PLUG ALL HOLES PRIOR TO MOLDING.

**DIMENSIONS ARE IN MILLIMETERS**

**THIRD ANGLE PROJECTION**

<table>
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<th>TOLERANCES</th>
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<tr>
<td>X.X</td>
<td>±</td>
<td>0.2</td>
<td>± 0.2</td>
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**UNLESS OTHERWISE SPECIFIED**

**SEE NOTES**

1. MATERIAL: INJECTION MOLDED BUTYL RUBBER SHORE A 75±2.
2. PERFORMANCE SPEC TAKES PRECEDENCE OVER DUROMETER.
3. PLUG ALL HOLES PRIOR TO MOLDING.

**ENGINEER:** J. WANG
**DATE:** 1/9/2012

**CHECKED BY:** B. KIMES 7/28/2011
**DRAWN BY:** B. KIMES
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. GRIND KEENSERTS TO 5.9+0/-1 BEFORE INSTALLING.
SECTION A-A
SCALE .750

SCALE 1.000

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\phi$, UNLESS OTHERWISE NOTED.

REV: DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:

আরেকটি মুদ্রিত নির্দেশ পাওয়া যায় যে, এটি ডেটার উপরের থেকে পাওয়া যায়।

REVISION HISTORY
ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM T1NK112 R07 AND CONVERTED TO METRIC FOR THOR-M:59.5 MINOR Ø WAS 59.9; .8 X 45° CHAMFER WAS R.8; Ø5.3 WAS Ø5.1; 61.00 WAS 61.0 7/30/2011 BK
B ADDED VENT HOLES FOR MOLDING 6/12/2012 TMV
C DIM. 59.9 MINOR Ø WAS 59.5 MINOR Ø 6/31/15 DW

1. DIMENSIONS SYMMETRIC ABOUT $\phi$, UNLESS OTHERWISE NOTED.
SCALE .750

SECTION A-A
SCALE 1.000

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.

REV: DRAWING NO.: SHEET

SCALE:
SIZE:
DESCRIPTION:

TOLERANCES

FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF

REV
ECO#
DESCRITION
DATE
BY

A
RENUMBERED FROM T1NKM114 R08 AND CONVERTED TO METRIC FOR THOR-M;

8/22/2011
BK

B
ADD MISSING MAJOR, MINOR Ø

4/11/2012
BK

C
ADDED VENT HOLES FOR MOLDING

6/12/2012
TMV

4X Ø6.4 THRU
Ø7 X 90°
BOTH SIDES
EQ. SPACED ON
A Ø25.4 B.C.

Ø3.997+.000/-.012
THRU

(P.F. M4 DOWEL)

4X .8 X 45° Chamfer

2X .8 X 45° Chamfer

2X Ø6.73+.000/-.003 THRU

Ø5.3 THRU

Ø14.0 THRU

52.8 MINOR Ø
64.9 MAJOR Ø
71.1 MAJOR Ø
52.8 MAJOR Ø
64.9 MAJOR Ø
52.8 MINOR Ø
64.9 MINOR Ø
52.8 MINOR Ø
64.9 MINOR Ø
52.8 MAJOR Ø
64.9 MAJOR Ø
52.8 MINOR Ø
64.9 MINOR Ø
52.8 MAJOR Ø
64.9 MAJOR Ø
52.8 MINOR Ø
64.9 MINOR Ø
52.8 MAJOR Ø
64.9 MAJOR Ø
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
SECTION A-A
SCALE 1.000

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. NICKEL PLATE 0.003 mm - 0.008 mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

SECTION B-B
SCALE 1.000

DETAIL Z
SCALE 2.000

REV: DATE
A DRAWING NO.: SHEET
B SCALE:
C SIZE:
D DESCRIPTION:
E TOLERANCES
F DO NOT SCALE DRAWING
G FINISH:
H HEAT TREAT:
I MATERIAL:
J PROJECT NO.:
K CHECKED BY:
L DRAWN BY:
M DATE:
N DATE:
O 1 A 2 4 7 2 -2 1 2 5
P TOP PLATE, NECK
Q 1018 STEEL
R DECIMALS ANGLES FINISH
S 0.5 \( \theta \) 0.5 \( \theta \) 0.5
T X.X \( \theta \) X.X \( \theta \) X.XX \( \theta \)
U B. KIMES 7/28/2011
V SEE NOTES 1.000 UNLESS OTHERWISE SPECIFIED
W DIMENSIONS ARE IN MILLIMETERS
X THIRD ANGLE PROJECTION
Y NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Z ENGINEER: REMOVE BURRS & BREAK SHARP EDGES
AA J. WANG 1/9/2012
AB NEXT ASSEMBLY 472-2120
AC QTY
AD TOTAL QTY IN DUMMY
AE 1 1 A 2 4 7 2 -2 1 2 5
AF NOTE:
AG J. KIMES 1/9/2012
AH REVISION HISTORY
AI ECO# REV DESCRIPTION DATE BY
BJ A RENUMBERED FROM T1NKM116 R17 AND CONVERTED TO METRIC FOR THOR-M; ADD NOTES 2, 3, 4 8/16/2011 BK
BJ B ADD LOCATION DOWEL HOLE 12/19/2011 BK
BJ C  3.03+.02/-0 WAS  3.174 +0/-.013, S.F. DOWEL WAS P.F.; CHANGE THREAD DEPTH, (8.8) WAS 3.1; ADD 2X 11.0 FULL THREAD 4/24/2012 BK
BJ D 1.6 X 45° Chamfer
REVISION HISTORY

<table>
<thead>
<tr>
<th>ECO #</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1NKM123 R02 AND CONVERTED TO METRIC FOR THOR-M; ( \phi 4.0 ) WAS ( \phi 3.8 ); 8.4 WAS 8.3; 7.3 WAS 7.1</td>
<td>8/22/2011</td>
<td>BK</td>
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<td>B</td>
<td></td>
<td>MATERIAL WAS SBR RUBBER</td>
<td>3/02/2012</td>
<td>TMV</td>
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</table>

NOTES:

1. RUBBER TOLERANCE ±0.5mm, UNLESS OTHERWISE NOTED.
NOTES:

1. DIMENSIONS ARE SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
NOTES:
1. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
NOTE:

1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.
NOTES:
1. TENSIL STRENGTH OF CABLE ASSEMBLY: 1000 LBS.
2. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.
NOTES:
1. TENSIL STRENGTH OF CABLE ASSEMBLY: 1700 LBS.
2. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.
DETAIL Z
THREADED END
SCALE 2.000

DETAIL Y
BALL END
SCALE 2.000

NOTES:
1. TENSIL STRENGTH OF CABLE ASSEMBLY: 1700 LBS.
2. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.

REV: DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY: DATE:
DATE:
OF
FRONT CABLE ASSEMBLY, NECK

TOLERANCES

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

NEXT ASSEMBLY

TOTAL QTY IN DUMMY

REVISION HISTORY
ECO#
REV
DESCRIPTION
DATE
BY
A
RENUMBERED FROM TINK/M122 R12 AND CONVERTED TO METRIC FOR THOR-M
8/1/2011
BK
B
5.85 WAS 6.4
6/13/2012
BK
C
ADD 2.5 DIMENSION; (15.5) WAS 15.5
6/25/2012
BK

ENGINEER:

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

5.85 ±0.0

2.5

ø8.0 ±0.5

M5x0.8 THREAD

ø3.2 (ø1/8") 7X19 STRAND S.S. CABLE

ø4.6

ø4

0.1

2.5

1.3

0.5

0.2

0.1

31

29

28

54

331.3

A RENUMBERED FROM T1NKM122 R12 AND CONVERTED TO METRIC FOR THOR-M 8/1/2011 BK
B ø5.85 WAS ø6.4 6/13/2012 BK
C ADD 2.5 DIMENSION; (15.5) WAS 15.5 6/25/2012 BK
NOTES:

1. BOND 472-2511 TO 472-2510 USING A FLEXIBLE, HIGH STRENGTH, TWO PART RUBBER EPOXY.

REV: DRAWING NO.: SHEET

SCALE: SIZE:

DESCRIPTION:

TOLERANCES

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY:

DRAWN BY: DATE:

DATE:
SCALE 3.000

NECK STOP

SCALE: 3.000

### Dimensions

- **Ø11.2**
- **Ø9.6 ± 0.2**
- **10.4**
- **0.8**
- **M5 x 0.8**
- **∅6.4**

### Notes

- **DO NOT SCALE DRAWING**
- **UNLESS OTHERWISE SPECIFIED**
- **DIMENSIONS ARE IN MILLIMETERS**
- **THIRD ANGLE PROJECTION**
- **REMOVE BURRS & BREAK SHARP EDGES**

### Tolerances

- **X**
- **±0.5**
- **X.X**
- **±0.2**
- **X.XX**
- **±0.1**
- **X.XXX**
- **±0.01**

### Material

- **303 STAINLESS STEEL**

### Revisions

- **A**
  - **RENUMBERED FROM T1NKM510 R06 AND CONVERTED TO METRIC FOR THOR-MØ9.6+/-0.0 WAS 9.5**
  - **8/19/11 BK**

### Specifications

- **ENGINEER:**
- **DRAWN BY:**
- **CHECKED BY:**
- **DATE:**
- **PROJECT NO.:**
- **TOLERANCES:**
- **FINISH:**
- **HEAT TREAT:**
- **MATERIAL:**
- **SCALE:**
- **SIZE:**
- **DESCRIPTION:**
- **REV:**

### ECO History

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<th>DESCRIPTION</th>
<th>DATE</th>
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<td>RENUMBERED FROM T1NKM510 R06 AND CONVERTED TO METRIC FOR THOR-MØ9.6+/-0.0 WAS 9.5</td>
<td>8/19/11</td>
<td>BK</td>
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### Assembly Details

- **472-2500**
  - **QTY:** 1
  - **TOTAL QTY IN DUMMY:** 1
  - **NEXT ASSEMBLY:**

- **472-2510**
  - **QTY:** 1
  - **TOTAL QTY IN DUMMY:** 1
  - **NEXT ASSEMBLY:**

---

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**NECK STOP 2**

**ENGINEER:**

- **B. KIMES 7/28/2011**

**DRAWN BY:**

- **B. KIMES 7/28/2011**

**CHECKED BY:**

- **3. WANG 1/10/2012**

**DATE:**

- **1/10/2012**

**PROJECT NO.:**

- **472-2510**

**REVISION:**

- **A31 of 1**

---

**SCALE 3.000**

**NECK STOP 2**

**ENGINEER:**

- **B. KIMES 7/28/2011**

**DRAWN BY:**

- **B. KIMES 7/28/2011**

**CHECKED BY:**

- **3. WANG 1/10/2012**

**DATE:**

- **1/10/2012**

**PROJECT NO.:**

- **472-2510**
NOTES:

1. RUBBER TOLERANCE ± 0.5 AND DUROMETER ±5, UNLESS OTHERWISE NOTED.
NOTES:
1. BOND TWO PARTS TOGETHER WITH HIGH STRENGTH, FLEXIBLE RUBBER EPOXY.
SCALE 3.000

φ9.6 +0.2

φ11.2

MS x 0.8 T6.4

DO NOT SCALE DRAWING

REVOLUTION FROM TANK#12 R06

AND CONVERTED TO METRIC FOR THOR-M;
φ9.6 +0.2/-.0 WAS φ9.5

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY

<table>
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<td>A</td>
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<td>RENUMBERED FROM TANK#12 R06 AND CONVERTED TO METRIC FOR THOR-M; φ9.6 +0.2/-.0 WAS φ9.5</td>
<td>8/19/11</td>
<td>BK</td>
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ECO:

REV:

DESCRIPTION:

DATE:

BY:

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

NEXT ASSEMBLY 472-2501

QTY

TOTAL QTY IN DUMMY 1

NEXT ASSEMBLY 472-2512

QTY

TOTAL QTY IN DUMMY 1

472-2512

A31 of 1

RENUMBERED FROM T1NKM512 R06 AND CONVERTED TO METRIC FOR THOR-M; φ9.6 +0.2/-.0 WAS φ9.5

NECK STOP 1

472-2501

1

303 STAINLESS STEEL

B. KIMES 7/28/11

DATE:

1/10/2012

DATE:

1/10/2012

DATE:

1/10/2012

DATE:

1/10/2012

DATE:

1/10/2012

DATE:
SCALE 5.000

A

B

C

D

NOTES:

1. RUBBER TOLERANCE ±0.5 AND DUROMETER ±5, UNLESS OTHERWISE NOTED.

REV: DRAWING NO.: SHEET

SCALE:
SIZE:
DESCRIPTION:

TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:

OF

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

DATE:

NEXT ASSEMBLY

472-2513

QTY

TOTAL QTY IN DUMMY

REVISION HISTORY

ECO#  ECO  REV  DESCRIPTION  DATE  BY

A  RENUMBERED FROM T1NKM513-R02  8/19/11  BK
FOR THOR-M; ø9.4+ .1/- .0 WAS ø9.5

RUBBER TOLERANCE ±0.5 AND DUROMETER ±5, UNLESS OTHERWISE NOTED.

NOTES:

A
SCALE 2.000

- Ø25.4
- Ø6.5 THRU
- 2.5

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CENTER CABLE WASHER, NECK

REVISION HISTORY

<table>
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<tr>
<th>ECO #</th>
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<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>A</td>
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<td>RENUMBERED FROM T1NK029 R01 FOR THOR-M</td>
<td>7/29/11</td>
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472-2017

472-2100

Acetal Resin, Black

B. KIMES 7/28/2011

REM: A

ENGINEER:

J. WANG

DATE: 1/9/2012

QTY

TOTAL QTY IN DUMMY 1

NEXT ASSEMBLY 472-2000

CENTER CABLE WASHER, NECK

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

FINISH:

REMOVE BURRS & BREAK SHARP EDGES

DECIMALS ANGLES FINISH X X

X.X X.X X.XX

0.5 0.2 0.1

0.01

25.4 THRU 6.5

2.5
NOTES:

1. RUBBER TOLERANCE ±0.5 AND DUROMETER ±5, UNLESS OTHERWISE NOTED.
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
# Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>REAR PULLEY BRACKET, NECK</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>REAR PULLEY SHAFT, NECK</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>BEARING, NEEDLE ROLLER (3/16 BORE)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>NECK REAR CABLE PULLEY</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>WASHER, Teflon .187 X .50 X .04 THK.</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>M3 X 18 LG. Dowel Pin SS</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>M3 Flat Washer Plain Zinc</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>M3 X 0.3 Hex Lock Nut SS</td>
</tr>
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</table>

**Notes:**

1. Press fit Dowel Pins as shown.
2. Press the bearings (9002597) into place, flush with outside surface of 472-2310.
REVISION HISTORY

<table>
<thead>
<tr>
<th>ECO#</th>
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<td></td>
<td>A</td>
<td>RENUMBERED FROM TUNK310 R07 AND CONVERTED TO METRIC FOR THOR-M; REMOVE NOTE 3, RENUMBER NOTES; C'BORE Ø2.998+.000/-010 WAS Ø3.175+.000/-013</td>
<td>8/18/2011</td>
<td>BK</td>
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<tr>
<td></td>
<td>B</td>
<td>ADD TOLERANCE; 21.3 WAS 21.4</td>
<td>4/26/2012</td>
<td>BK</td>
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<tr>
<td></td>
<td>C</td>
<td>ADD DIMENSION</td>
<td>11/27/2012</td>
<td>BK</td>
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NOTES:

1. REMOVE ALL BURRS AND BREAK ALL SHARP EDGES.
2. DIMENSIONS SYMMETRIC ABOUT Ø, UNLESS OTHERWISE NOTED.
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT 4, UNLESS OTHERWISE NOTED.

2X .2 X 45° Chamfer

2X Ø2.4 X .8 THREAD RELIEF

Ø1.4 ⊥ 1.6 BOTH ENDS

REVISION HISTORY

<table>
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<th>REV</th>
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<td>A</td>
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<td>RENUMBERED FROM T1NKM311 R05 AND CONVERTED TO METRIC FOR THOR-M; REMOVE NOTE 1, RENUMBER NOTES</td>
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8/18/2011  BK

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

B. KIMES 7/28/2011

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NEXT ASSEMBLY

TOTAL QTY IN DUMMY 2
SCALE 5.000

SECTION A-A
SCALE 5.000

NECK REAR CABLE PULLEY

OILITE BRONZE (SAE 841)

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

SHEET

REV: DRAWING NO.:

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY:

DRAWN BY:

DATE:

DATE:

TOLERANCES

X

\( \pm 0.5 \)

\( \pm 0.2 \)

\( \pm 0.1 \)

\( \pm 0.01 \)

R2.3

(1.0)

6.4

14.1

ECO# | REV | DESCRIPTION | DATE | BY
---|---|---|---|---
A | | RENUMBERED FROM T1NKM312 R04 FOR THOR-M | 8/19/11 | BK

REVISION HISTORY

REV

DESCRIPTION

DATE

BY

472-2400 1

472-2300 1

QTY

TOTAL QTY IN DUMMY

NEXT ASSEMBLY

QTY

3. WANG 1/10/2012

472-2312 1

A31 of 1

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

J. WANG

ENGINEER:

MATCHING HOLE 12.7

4.80

- .00

.02 + THRU

R2.3

(1.0)

6.4

14.1

1.6

THRU
REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:

OCCIPITAL CONDYLE SCREW

A A
B B
C C
D D

SCALE 5.000

NOTES:
1. MAKE FROM M4 X0.7 X 14 SHCS (5000459), MODIFY AS SHOWN.

A ø3.15 +0.00 -0.05
0.2 X 45° Chamfer

8.3 12.7

REV: DESCRIPTION DATE BY
A RENUMBERED FROM T1NK0027 R05 AND CONVERTED TO METRIC FOR THOR-M; 8.3 WAS 8.6, 12.7 WAS (12.7); ADD (5000459) TO NOTE 7/28/2011 BK

ECO # REV DESCRIPTION DATE BY

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES
J. WANG

DATE:
1/9/2012

NEXT ASSEMBLY
472-2000
QTY
1

TOTAL QTY IN DUMMY
1

REVISION HISTORY

ECO # REV DESCRIPTION DATE BY

A

NOTES:

12.7 8.3

0.2 X 45° Chamfer

A

A A
B B
C C
D D

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES
J. WANG

DATE:
1/9/2012

NEXT ASSEMBLY
472-2000
QTY
1

TOTAL QTY IN DUMMY
1

REV: DESCRIPTION DATE BY
A RENUMBERED FROM T1NK0027 R05 AND CONVERTED TO METRIC FOR THOR-M; 8.3 WAS 8.6, 12.7 WAS (12.7); ADD (5000459) TO NOTE 7/28/2011 BK

ECO # REV DESCRIPTION DATE BY

A

A A
B B
C C
D D

NOTES:

1. MAKE FROM M4 X0.7 X 14 SHCS (5000459), MODIFY AS SHOWN.
### Parts List

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<th>ITEM</th>
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<th>PART NUMBER</th>
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<tr>
<td>1</td>
<td>MOUNTING PLATFORM ASSEMBLY, NECK</td>
<td>472-2200</td>
</tr>
<tr>
<td>2</td>
<td>OC STOP ASSEMBLY</td>
<td>472-2210</td>
</tr>
<tr>
<td>3</td>
<td>HEAD/NECK MOUNTING PLATFORM</td>
<td>472-2210</td>
</tr>
<tr>
<td>4</td>
<td>NECK SPRING LOAD CELL STRUCTURAL REPLACEMENT</td>
<td>472-2201</td>
</tr>
<tr>
<td>5</td>
<td>FRONT SPRING ASSEMBLY</td>
<td>472-2220</td>
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<tr>
<td>6</td>
<td>REAR SPRING ASSEMBLY</td>
<td>472-2240</td>
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<td>7</td>
<td>FRONT CABLE BUSHING, NECK</td>
<td>472-2204</td>
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<td>8</td>
<td>NECK FRONT/REAR SPRING TUBE</td>
<td>472-2203</td>
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**Notes:**

1. CHEMICALLY CLEAN THE PART AND ITS MATING PART (472-2210). BOND WITH CYANOACRYLATE, MAKING SURE THE BOTTOM SURFACE IS FLUSH WITH ITS MATING PART.

2. SPRING LOAD CELL, SA572-S112, CAN BE USED INSTEAD OF 472-2201.

---

### Overview

- **Scale:** 1.000
- **Revision History:**
  - A: RENUMBERED FROM T1NKM200 R13 AND CONVERTED TO METRIC FOR THOR-M 8/19/11 BK
  - B: ADDED PART #SA572-S112 - .850 SKULL SPRING LOAD CELL (OPTIONAL) 9/2/2015 DW

### General Notes

1. CHEMICALLY CLEAN THE PART AND ITS MATING PART (472-2210). BOND WITH CYANOACRYLATE, MAKING SURE THE BOTTOM SURFACE IS FLUSH WITH ITS MATING PART.

2. SPRING LOAD CELL, SA572-S112, CAN BE USED INSTEAD OF 472-2201.

### Design Considerations

- **Dimensions:**
  - 0.5
  - 0.2
  - 0.1
  - 0.01

- **Angles:**
  - THIRD ANGLE PROJECTION

- **Material:**
  - UNLESS OTHERWISE SPECIFIED

- **Finish:**
  - REMOVE BURRS & BREAK SHARP EDGES

- **Heat Treat:**
  - B. KIMES 7/28/2011

- **Tolerances:**
  - DIMENSIONS ARE IN MILLIMETERS

- **Project No.:**
  - NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

- **Engineer:**
  - J. WANG

- **Date:**
  - 1/10/2012

- **Revision History**
  - A: RENUMBERED FROM T1NKM200 R13 AND CONVERTED TO METRIC FOR THOR-M 8/19/11 BK
  - B: ADDED PART #SA572-S112 - .850 SKULL SPRING LOAD CELL (OPTIONAL) 9/2/2015 DW

---

**R2009**

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**472-2200**

---

**NOTES:**

- SEE NOTE 1
SCALE 5.000

φ11.08 +0.02
-0.00

φ7.8 THRU

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

OCCIPITAL CONDYLE BUSHING

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ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

472-2210
472-2220

QTY
TOTAL QTY IN DUMMY
NEXT ASSEMBLY

472-2202

FOR THOR-M

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ECO#
REV
DESCRIPTION
DATE
BY

A

OILITE BRONZE (SAE841)

B. KIMES 7/28/2011
J. WANG

4/10/2012
5/000

A31 of 1

472-2202

9.4 +.0
-.1

1.6

3.0

3.0

7.8 THRU

11.08

.02

0.0

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.02

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### Parts List

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<tr>
<td>1</td>
<td>1</td>
<td>472-2233</td>
<td>Neck Rear OC Stop</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-2232</td>
<td>Neck Front OC Stop</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-2231</td>
<td>Flexion-Extension Stop Plate, Neck</td>
</tr>
</tbody>
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### Notes:
1. Bond parts 472-2232 and 472-2233 to 472-2231 using high strength, flexible, two part rubber epoxy.

### Scale 2.000

---

### Revised History

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<th>ECO#</th>
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<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tr>
<td>A</td>
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<td>Renumbered from T1NM045 R02 for Thor-M</td>
<td>8/4/11</td>
<td>BK</td>
</tr>
</tbody>
</table>
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.

2. STAMP OR ETCH "F" (3mm CHARACTERS) AT LOCATION SHOWN TO REPRESENT FRONT.

3. STAMP OR ETCH "R" (3mm CHARACTERS) AT LOCATION SHOWN TO REPRESENT REAR.
1. Neoprene tolerance ±0.5 and durometer ±5, unless otherwise specified.
NOTES:

1. NEOPRENE TOLERANCE ±.5 AND DUROMETER ±5, UNLESS OTHERWISE SPECIFIED.
NOTES:
1. PRESS THE BEARINGS (9002597) INTO PLACE, FLUSH WITH OUTSIDE SURFACE OF 472-2410.
SCALE 1.000

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:

SEE NOTES 1.000 UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

REVISION HISTORY
ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM TINKM410 R11 AND CONVERTED TO METRIC FOR THOR-M 8/19/2011 BK
B M3 x .5 6.5 DP WAS M4 x .7 6.40 DP 6/14/2012 BK

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
HEAD/NECK PULLEY BRACKET, NECK

REV: 472-2410

TOTAL QTY IN DUMMY QTY
NEXT ASSEMBLY 1 SEE NOTES 1

B B

A A

C C

D D

2X 7.6 X 45° Chamfer
2X R3.8

\( \phi 8.729 + .000 - .013 \) THRU ALL
2X R3.8

2X \( \phi 4.3 \) THRU
\( \phi 8.6 \times 90° \)
2X R1.6

\( \phi 6.4 \) THRU
SCALE 2.000

NECK SPRING LOAD CELL STRUCTURAL REPLACEMENT

- TOLERANCES
  - UNLESS OTHERWISE SPECIFIED
  - DIMENSIONS ARE IN MILLIMETERS
  - THIRD ANGLE PROJECTION
  - DO NOT SCALE DRAWING

- MATERIAL:
  - 303 STAINLESS STEEL

- FINISH:
  - REMOVE BURRS & BREAK SHARP EDGES

- CHECKED BY:
  - B. KIMES

- DRAWN BY:
  - J. WANG

- DATE:
  - 1/10/2012

- DRAWING NO.:
  - 472-2201

- SHEET:
  - A3

- PROJECT NO.:
  - 472-2200

- QTY:
  - 2

- TOTAL QTY IN DUMMY:
  - 2

- NEXT ASSEMBLY:
  - 472-2200

- REV:
  - A

- DATE:
  - 7/28/2011

- BY:
  - BK

- REVISION HISTORY

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<td>RENUMBERED FROM T1NKM028 R05 FOR THOR-M</td>
<td>8/1/2011</td>
<td>BK</td>
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</table>
NOTES:

1. NOMINAL SPRING RATE IS SUPERSEDED BY STATIC TESTING REQUIREMENTS:
   SPRING RATE 17.8 ± 0.9 N/mm.
   MAXIMUM DEFLECTION TO SOLID HEIGHT MUST EXCEED 36mm.

2. NECK SPRING BUSHING: CHEMICALLY CLEAN THE MATING SURFACE AND JOIN WITH
   5 MINUTE EPOXY UNDER LIGHT PRESSURE.

3. INSERT THE ELASTOMETRIC SPRING ELEMENT MATERIAL INTO THE COMPRESSION
   SPRING AND CUT TO LENGTH SPECIFIED ABOVE. THIS ASSEMBLY MUST BE
   STATICALLY TESTED TO MEET THE FOLLOWING
   REQUIREMENTS:
   DEFLECTION: AT 30mm, FORCE TO BE 710N TO 790N.
   SPRING CAP MUST BE IN PLACE AT EITHER END DURING THIS TEST.
   TEMPERATURE RANGE: 18-27°C 1 HOUR RECOVERY BETWEEN TESTS.

SEE NOTE 2

SCALE 1.000
SCALE 3.000

NOTES:
1. POWDER OR BEAD BLAST.
2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

REVOLUTION HISTORY

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<td></td>
<td>Ø6.4 WAS Ø5.8</td>
<td>6/13/2012</td>
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472-2240 2 4140 STEEL
472-2220 2 B. KIMES 7/28/2011

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
NECK SPRING BUSHING

SEEMS 002

472-2221 1/10/2012

472-2216 4 QTY 10/10/2012

TOTAL QTY IN DUMMY 4 SEE NOTES 3. WANG
A. RENUMBERED FROM T1NM031 R04 FOR THOR-M
8/4/11  BK

1. FINAL LENGTH TO BE DETERMINED DURING SPRING ASSEMBLY CERTIFICATION.

- 1.6

SEE NOTE 1

61.0

NOTES:

1. FINAL LENGTH TO BE DETERMINED DURING SPRING ASSEMBLY CERTIFICATION.
NOTES:

1. NOMINAL SPRING RATE IS SUPERSEDED BY STATIC TESTING REQUIREMENTS:
   SPRING RATE 20.9 ± 1.0 N/mm.
   MAXIMUM DEFLECTION TO SOLID HEIGHT MUST EXCEED 40mm.

2. NECK SPRING BUSHING: CHEMICALLY CLEAN THE MATING SURFACE AND JOIN WITH
   5 MINUTE EPOXY UNDER LIGHT PRESSURE.

3. INSERT THE ELASTOMETRIC SPRING ELEMENT MATERIAL INTO THE COMPRESSION
   SPRING AND CUT TO LENGTH SPECIFIED ABOVE. THIS ASSEMBLY MUST
   BE STATICALLY TESTED TO MEET THE FOLLOWING REQUIREMENTS:
   DEFLECTION: AT 30mm, FORCE TO BE 68N TO 756N.
   SPRING CAP MUST BE IN PLACE AT EITHER END DURING THIS TEST,
   TEMPERATURE RANGE: 18-27°C 1 HOUR RECOVERY BETWEEN TESTS.

SEE NOTE 2
SCALE 1.000

NOTES:
1. FINAL LENGTH WILL BE DETERMINED DURING SPRING ASSEMBLY CERTIFICATION.
FRONT CABLE BUSHING, NECK

Acetal Resin, Black

0.5 X 45° Chamfer

Ø5.9 THRU

Ø9.49 +0.00

-0.01

2.7 +0.0

-0.1

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

ENGINEER:

J. WANG

DATE: 1/10/2012

NEXT ASSEMBLY 472-2200

QTY

5.9 THRU

FOR THOR-M

B. KIMES 7/28/2011

REVISION HISTORY

ECO# REV DESCRIPTION DATE BY
A A RENUMBERED FROM T1NM2214 R07 FOR THOR-M 8/4/11 BK

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DO NOT SCALE DRAWING

TOLERANCES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REV: DRAWING NO.: SHEET

SCALE:

SIZE:

DESCRIPTION:

TOLERANCES

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY:

DRAWN BY:

DATE:

DATE:

OF1 1 A3 472-2204

REV

ECO# REV DESCRIPTION DATE BY
NOTES:
1. ENGRAVE A 0.2mm DEEP LINE THRU THE CENTER OF HOLE TO END AS SHOWN.
2. POWDER OR BEAD BLAST.
3. NICKEL PLATE 0.003mm-0.008mm MAX. AFTER MACHINING AND HEAT TREAT.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
SCALE 3.000

NOTES:

1. DIMENSION SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.

- $2\times \Phi 3.5$ THRU

- Acetal Resin, Black

- DO NOT SCALE DRAWING

REVISION HISTORY

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<td>RENUMBERED FROM T1NK014 R05 AND CONVERTED TO METRIC FOR THOR-M; $\Phi 3.5$ WAS $\Phi 4.0$; REMOVE NOTE 1, RENUMBER NOTES</td>
<td>8/23/2011</td>
<td>B KIMES</td>
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REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF 3.000

SCALE 3.000

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT t, UNLESS OTHERWISE NOTED.

REVISI0N HISTORY
ECO # | REV | DESCRIPTION | DATE | BY
A | A | RENUMBERED FROM T1NKM053 R01 AND CONVERTED TO METRIC FOR THOR-M | 7/30/2011 | BK


4X Ø2.8 THRU Ø13.0 Ø20.0

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

J. WANG 1/9/2012

NEXT ASSEMBLY 472-2000
QTY TOTAL QTY IN DUMMY
1 CLEAR ANODIZE 3. WANG 5/4/2012

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT t, UNLESS OTHERWISE NOTED.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT φ, UNLESS OTHERWISE NOTED.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.
**NOTES:**

1. GRIND KEENSERT TO 4.2mm BEFORE INSTALLING.
2. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
3. STAMP OR ETCH (3mm CHARACTERS) AS SHOWN.

**PARTS LIST**

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<td>1</td>
<td>5000724</td>
<td>M4 X 0.7 X 5.25 LG. MINI KEENSERT</td>
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**REVISION HISTORY**

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<td>8/22/2011</td>
<td>BK</td>
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<tr>
<td>B</td>
<td></td>
<td>POCKET WAS THRU TO $\theta$; ADD CBORE DIMENSION</td>
<td>4/3/2012</td>
<td>BK</td>
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<tr>
<td>C</td>
<td></td>
<td>16.00 WAS 16.0; 19.20 +0.05/-0 WAS 19.2 +0.1/-0; $R_4$ WAS 6.30 +0/-0.03; ADD DATUMS A, B, C; ADD FEATURE CONTROL BOX; $\Theta 7.97 +0.01/0$ WAS Ø8.1; ADD 4X CHAMFER, SEC B-B, $R_3$</td>
<td>2/13/2013</td>
<td>BK</td>
</tr>
</tbody>
</table>
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \text{\&} \), UNLESS OTHERWISE NOTED.
2. INSTALL HELICOILS AFTER FINISH.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
5. WEIGHT: \( 0.46 \pm 0.03 \) kg

REVISION HISTORY

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<tr>
<td></td>
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<td>RENUMBERED FROM T1NKMK700 R02 AND CONVERTED TO METRIC FOR THOR-M; ( \phi 6.5 ) THRU C'BORE ( \phi 10.6 ) 1 20.3 EQUI-SPACED ON A ( \phi 38.10 ) B.C. WAS ( \phi 6.7 ) THRU C'BORE ( \phi 10.3 ) 1 19.0 EQUI-SPACED ON A ( \phi 38.1 ) B.C.; 19.05 WAS 19.10+0/-0.03; 12.70 WAS 12.7+1/-0.00; 44.0 WAS 43.0; 11.45+0.03/-0.00 WAS 11.40+0.05; WEIGHT ( 0.426 \pm 0.03 ) WAS ( 0.435 \pm 0.01 )</td>
<td>7/29/2011</td>
<td>BK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B ADD LOACTING DOWEL HOLE</td>
<td>7/28/2011</td>
<td>BK</td>
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SECTION A-A
SCALE .750

REV: DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
OUT OF DRAWING
TOTAL QTY IN DUMMY: SEE NOTES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ECO# REV DESCRIPTION DATE BY
472-2000 1 1018 STEEL B. KIMES 7/28/2011
NEXT ASSEMBLY 1 QTY
TOTAL QTY IN DUMMY 1 SEE NOTES
3. WANG 1/10/2012
472-2700 1 0.750

A31 of 1
Parts List

<table>
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<tr>
<td>4</td>
<td>1</td>
<td>5000934</td>
<td>M3 X 12 LG. DOWEL PIN</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5000108</td>
<td>M6 X 1 X 18 LG. FHCS</td>
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<tr>
<td>2</td>
<td>1</td>
<td>472-2612</td>
<td>BOTTOM PLATE, LOWER NECK LOAD CELL STRUCTURAL REPLACEMENT</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-2610</td>
<td>TOP, LOWER NECK LOAD CELL STRUCTURAL REPLACEMENT</td>
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REVISION HISTORY

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<tr>
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<td>RENUMBERED FROM T1N600 R03 AND CONVERTED TO METRIC FOR THOR-M; ADD DOWEL, ITEM 4</td>
<td>7/29/2011</td>
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<td>B</td>
<td>5000934 WAS 5000592</td>
<td>7/25/2012</td>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NEXT ASSEMBLY: 472-2000

472-2600

TOTAL QTY IN DUMMY: 1
SCALE .750

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.

2. POWDER OR BEAD BLAST.

3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.

4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.

2. POWDER OR BEAD BLAST.

3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING AND HEAT TREAT.

4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSIONS SYMMETRICAL ABOUT \( \ell \), UNLESS OTHERWISE NOTED.

2. RUBBER DIMENSIONAL TOLERANCE \( \pm 0.5 \) UNLESS OTHERWISE SPECIFIED.

3. MATERIAL: BUNA-N RUBBER, 50 \( \pm 5 \) SHORE A DURAMETER.

REVOLUTION HISTORY

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<td>9/7/2011</td>
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<td>B</td>
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<td>MATERIAL WAS BUNA-N RUBBER</td>
<td>3/2/2012</td>
<td>TMV</td>
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<tr>
<td>C</td>
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<td>ADDED NOTES 2 &amp; 3; MATERIAL WAS NATURAL RUBBER</td>
<td>7/27/2015</td>
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LOWER NECK LOAD CELL BUMPER COVER

Acetal Resin, Black

DIMENSIONS:
- 19.10 mm
- 2X Ø5.5 Thru C'BoRE Ø10.5 ≥ 2.8
- 2X Ø5.5 Thru C'BoRE Ø9.3
- 2.8
- 8.4

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
DATE:
OF

TOLERANCES
- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION
- DO NOT SCALE DRAWING
- UNLESS OTHERWISE SPECIFIED

REVISION HISTORY
ECO# | REV | DESCRIPTION
--- | --- | ---
A | | RENUMBERED FROM T1NKM024 R03 AND CONVERTED TO METRIC FOR THOR-M; Ø5.5 THRU C'BORE Ø10.5 WAS Ø5.2 THRU C'BORE Ø9.3

9/7/2011 BK

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PROJECT: 472-2000

NEXT ASSEMBLY
QTY
TOTAL QTY IN DUMMY

472-2000
1
1

B. KIMES 9/7/2011

REMOVED FROM T1NKM024 R03 AND CONVERTED TO METRIC FOR THOR-M; Ø5.5 THRU C'BORE Ø10.5 WAS Ø5.2 THRU C'BORE Ø9.3

472-2000
1
Acetal Resin, Black

J. WANG 1/9/2012

ECO# REV DESCRIPTION DATE BY
A 1 RENUMBERED FROM T1NKM024 R03 AND CONVERTED TO METRIC FOR THOR-M; Ø5.5 THRU C'BORE Ø10.5 WAS Ø5.2 THRU C'BORE Ø9.3 9/7/2011 BK
1. Insert the thorax elliptical rib #1 assembly (472-3110) and thorax elliptical rib stiffener (472-3510) through strap before assembling.
2. Orient the u-join as shown, with the pivot pins in the vertical and horizontal direction.

NOTES:

1. Insert the thorax elliptical rib #1 assembly (472-3110) and thorax elliptical rib stiffener (472-3510) through strap before assembling.
2. Orient the u-join as shown, with the pivot pins in the vertical and horizontal directions.

IRTRACC ASSEMBLY
SCALE 1.000

RIBS AND BIB REMOVED TO SHOW INTERIOR ASSEMBLIES

PARTS LIST

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<td>IRTRACC CONNECTING BOLT, UPPER THORAX472-35182 37</td>
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<td>M5 FLAT WASHER LARGE OD SS500112614 36</td>
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<td>CLIP NUT, M5 (MONADNOCK #130300-M5-1)500051310 35</td>
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<td>M10 X 1.5 X 25 LG. FHCS50011272 34</td>
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<td>LOWER ABDOMEN MECHANICAL ASS'Y472-47001 32</td>
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<td>IRTRACC ASSEMBLY, LOWER LEFT472-35801 31</td>
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<td>1/4 COATED CABLE CLAMP90037232 24</td>
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<td>THORAX ELLIPTICAL RIB #3 - ASSEMBLY 472-33301 7</td>
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<tr>
<td>THORAX ELLIPTICAL RIB #4 - ASSEMBLY 472-33401 6</td>
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<td>THORAX ELLIPTICAL RIB #5 - ASSEMBLY 472-33501 5</td>
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<tr>
<td>THORAX ELLIPTICAL RIB #6 - ASSEMBLY 472-33601 4</td>
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<tr>
<td>THORAX ELLIPTICAL RIB #7 - ASSEMBLY 472-33701 3</td>
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<tr>
<td>SPINE MECHANICAL ASSEMBLY472-36001 1</td>
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REV: D
DRAWING NO.: 472-3000
SIZE: 1
SCALE: 1
DOCUMENT NO.: A
FINISH: B
HEAT TREAT: 0.5
MATERIAL: 0.5
PROJECT NO.: C
CHECKED BY: D
DRAWN BY: E
DATE: 10/17/2011
OF
NTS
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
NOTE:
1. SEPARATE X-1 (X-2) FROM X-1 (X-2) AND ASSEMBLE THE PELVIX 360 TO MOUNT THE PELVIX ASSEMBLY TO THE PEELITE.
2. MATH 0-45 DEGREES ARE SHOWN, MATH 0-45 DEGREES CAN BE MOUNTED DIFFERENTLY.}

SCALE: .750
 NOTES:
1. INSTALL THESE DOWELS (2x) FLUSH OR BELOW SURFACE.
2. THREADED END OF DOWELS SHOULD FACE OUT, AS SHOWN.

**SEE NOTE 1**

**STAR PATTERN MECHANISMS AND BOLTS HIDDEN TO SHOW DOWELS SCALE 1.000**

**SCALE 1.500**

**REV. HISTORY**

<table>
<thead>
<tr>
<th>ECO</th>
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<td>RENUMBERED FROM T1SPM200 R10 AND CONVERTED TO METRIC FOR THOR-M 9/27/2011 BK</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>REVISED PART #472-3636 - NECK PITCH CHANGE MECHANISM TOP PLATE 9/14/2015 DSW</td>
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**PARTS LIST**

<table>
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<tr>
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<tr>
<td>4472-3630</td>
<td>NECK PITCH CHANGE MECHANISM ASSEMBLY</td>
</tr>
<tr>
<td>4472-3631</td>
<td>NECK PITCH CHANGE MECHANISM, STAR PATTERN 1</td>
</tr>
<tr>
<td>4472-3632</td>
<td>NECK PITCH CHANGE MECHANISM, STAR PATTERN 2</td>
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<tr>
<td>4472-3633</td>
<td>NECK PITCH CHANGE MECHANISM, TOP PLATE</td>
</tr>
<tr>
<td>4472-3634</td>
<td>NECK PITCH CHANGE MECHANISM BOLT</td>
</tr>
<tr>
<td>4472-3635</td>
<td>NECK PITCH CHANGE MECHANISM, BASE PLATE</td>
</tr>
</tbody>
</table>

**NOTES:**
1. INSTALL THESE DOWELS (2x) FLUSH OR BELOW SURFACE.
2. THREADED END OF DOWELS SHOULD FACE OUT, AS SHOWN.

**SCALE:**

1.000
1.500

**FINISH:**

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

**ENGINEER:** J. WANG

**DATE:** 1/16/2012

**TOTAL QTY IN DUMMY:** 462-3600
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.

2. FIRST CUT OF STAR PATTERN IS ALIGNED WITH VERTICLE; TOTAL OF 120 RADIAL LINES ARE REQUIRED FOR THE STAR PATTERN.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT 3°, UNLESS OTHERWISE NOTED.

2. FIRST CUT OF STAR PATTERN IS OFFSET 1.5° FROM VERTICAL; TOTAL OF 120 RADIAL LINES ARE REQUIRED FOR THE STAR PATTERN.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:

TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:

OF1 1 A2 472-3633
NECK PITCH CHANGE MECHANISM BASE PLATE
1018 STEEL

SEE NOTES 1.000 UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM T1SPM213 R10 AND CONVERTED TO METRIC FOR THOR-M 9/26/2011 BK
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
**NOTES:**

1. MAKE FROM M6 x 10 SHOULDER SCREW (5001122), MODIFY AS SHOWN.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. WELDMENT TOLERANCE $\pm$0.5mm, UNLESS OTHERWISE NOTED.
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER WELDING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
6. INSTALL DOWEL PINS AFTER NICKEL PLATE.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.

Scale 1.000

Dimensions:
- Length: 15.98
- Width: 20.0
- Diameter: 20.0
- Hole Diameter: 78.72 +0.2 -0.0

Material: 1018 Steel

Tolerances:
- Decimal: X.X
- Angle: X.X
- Angle: X.XX
- Angle: X.XXX

Finish:
- Remove burrs & break sharp edges

Heat Treat:
- As per specification

Tolerances:
-除非另有说明，尺寸均为毫米。
-第三角投影

图纸号：472-3624

图纸编号：A3

图纸数量：1

日期：2012年1月16日

设计：D. WASHENKO

审核：D. WASHENKO
NOTES:

1. USE LOCTITE ANTISEIZE LUBRICANT OR EQUIVALENT ON THE M12 X 16 S.H.C.S. PRIOR TO INSERTION. TORQUE BOLT TO 50 FT-LB TO TIGHTEN PITCH CHANGE MECHANISM.


POSTURE SETTINGS

SCALE 3.000

POSTURE CHART

<table>
<thead>
<tr>
<th>POSTURE</th>
<th>COLOR</th>
<th>ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERECT</td>
<td>RED</td>
<td>0°</td>
</tr>
<tr>
<td>NEUTRAL</td>
<td>WHITE</td>
<td>0°</td>
</tr>
<tr>
<td>SLOUCHED</td>
<td>ORANGE</td>
<td>9°</td>
</tr>
<tr>
<td>SUPER SLOUCHED</td>
<td>YELLOW</td>
<td>12°</td>
</tr>
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1. ASSEMBLE SCREWS USING LOCTITE 271 THREADLOCKER OR EQUIVALENT.
REV: DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF
1
A
2
472-3691
1
LUMBAR SPINE PITCH CHANGE BOTTOM PLATE
1018 STEEL
DECIMALS ANGLES FINISH
X  0.5
X  0.5
 X.X
 0.2
X.XX
 0.1
B. KIMES 9/22/2011
SEE NOTES
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES
DATE:
1/16/2012
NEXT ASSEMBLY
472-3690
QTY
TOTAL QTY IN DUMMY
1
REVISION HISTORY
ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM T1SPM521 R06 AND CONVERTED TO METRIC FOR THOR-M 9/22/2011 BK
B ADD DOWEL LOCATION HOLE 12/19/2011 BK

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT , UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. NECKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PAT NUMBER (3mm CHARACTERS) WHERE SHOWN, (OPTIONAL)
3. FIRST CUT OF STAR PATTERN OFFSET 1.5° FROM VERTICLE, TOTAL OF 120 RADIAL LINES ARE REQUIRED.
4. ENGRAVE LINES WITH MAXIMUM THICKNES OF 0.5mm, PAINT IN LINE AS SHOWN.
NOTES:
1. ASSEMBLE SCREWS USING LOCTITE 271 THREADLOCKER OR EQUIVALENT.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PAT NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
3. FIRST CUT OF STAR PATTERN OFFSET 1.5° FROM VERTICAL, TOTAL OF 120 RADIAL LINES ARE REQUIRED.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \epsilon \), UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND ThreadED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\phi$, UNLESS OTHERWISE NOTED.

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY: DATE:
REV:
DESCRIPTION
DATE
BY
ECO#
REV
REF. DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENGINEER:
DATE:
NEXT ASSEMBLY
TOTAL QTY IN DUMMY

LUMBAR SPINE PITCH CHANGE INDICATOR
THOR-M
Brass, Soft Yellow

B. KIMES 9/21/2011

ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM T1SPM523 R0 AND CONVERTED TO METRIC FOR THOR-M 9/21/2011 BK
B DIM. 2.0 WAS 1.6, AND HOLE DIM 2X Ø3.2 THRU Ø6.3 X 90 WAS 2X Ø3.3 THRU 8/26/2015 DW

1.6
2.0
6.4
8.0

19.1
12.7
3.2

60°

6.3 X 90°

2X Ø3.2 THRU Ø6.3 X 90°

2X Ø3.2 THRU Ø6.3 X 90°
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.

2. POWDER OR BEAD BLAST.

3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.

4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

5. PART WEIGHT: 1.03 ±0.01 kg (2.27 ±0.02 LBS).
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-3600</td>
<td>LOWER THORACIC SPINE WELDED ASSEMBLY</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5000284</td>
<td>PIN, DOWEL M3 x 10 LG.</td>
</tr>
</tbody>
</table>

**Parts List**

- **Item 1**: 472-3600, LOWER THORACIC SPINE WELDED ASSEMBLY
- **Item 2**: 5000284, PIN, DOWEL M3 x 10 LG.

**Revision History**

<table>
<thead>
<tr>
<th>ECO#</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
<td>RENUMBERED FROM T1SPM460 R3 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>9/28/2011</td>
<td>BK</td>
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<td></td>
<td>B</td>
<td>ADDED COUNTERSINK TO HOLES IN ITEM #1 PART #472-3660; QTY. OF ITEM #2 PART 5000284 WAS 6; REVISED COUNTERSINK HOLES IN ITEM #1 PART #472-3660 – LOWER THORACIC SPINE WELDED ASSEMBLY</td>
<td>6/10/2015</td>
<td>DW</td>
</tr>
</tbody>
</table>

**Notes**

- Dimensions are in millimeters
- Tolerances
  - **X**: ±0.5
  - **XX**: ±0.2
  - **XXX**: ±0.01
- Third angle projection
- Remove burrs & break sharp edges
- National Highway Traffic Safety Administration
- NEXT ASSEMBLY: 472-3600
- Total qty in dummy: 5

**Drawing Information**

- Drawing No.: 472-3650.iam
- Sheet: A3
- Scale: 1.000
### Parts List

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>Top Plate, Lower Thoracic Spine</td>
<td>472-3661</td>
<td>2</td>
</tr>
<tr>
<td>Lower Thoracic Spine Bottom Plate</td>
<td>472-3663</td>
<td>2</td>
</tr>
<tr>
<td>Central Plate, Lower Thoracic Spine</td>
<td>472-3662</td>
<td>4</td>
</tr>
<tr>
<td>Ribs Mounting Plate, Lower Thoracic Spine</td>
<td>472-3664</td>
<td>4</td>
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</table>

### Tolerances

<table>
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<tr>
<th>Decimals</th>
<th>Angles</th>
<th>Finish</th>
<th>Heat Treat</th>
<th>Material</th>
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<tbody>
<tr>
<td>X</td>
<td>B</td>
<td></td>
<td></td>
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<td>X.X</td>
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<td></td>
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<tr>
<td>X.XXX</td>
<td>B</td>
<td></td>
<td></td>
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### Notes:

1. Before plating, check fit with 472-4611.
2. Powder or bead blast.
3. Nickel plate 0.003mm - 0.008mm max. after welding.
4. Dimensional limits and threaded hole sizes apply after finish.

### Revision History

<table>
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<td>ADDED COUNTERSINK TO HOLES IN LEFT SIDE VIEW AND HOLE IN RIGHT SIDE VIEW IN ITEM #4 PART #472-3662 - CENTRAL PLATE, LOWER THORACIC SPINE 6/9/2015 DW</td>
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<td>C</td>
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<td>REVISED COUNTERSINK HOLES TO ITEM #4 PART #472-3662 - CENTRAL PLATE, LOWER THORACIC SPINE 6/10/2015 DW</td>
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### Notes:

- 1. Before plating, check fit with 472-4611.
- 2. Powder or bead blast.
- 3. Nickel plate 0.003mm - 0.008mm max. after welding.
- 4. Dimensional limits and threaded hole sizes apply after finish.
SCALE .750

SECTION A-A

SCALE 1.000

NOTES:

DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.

REVOLUTION HISTORY

<table>
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<td>9/19/2011</td>
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<td>B</td>
<td>.013</td>
<td>WAS .013 (TYPO)</td>
<td>6/15/2012</td>
<td>BK</td>
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<tr>
<td>C</td>
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<td>ADD DATUMS A, B, C, D, BASIC DIMENSIONS, AND POSITIONAL TOLERANCING; DIMENSION HOLES FROM DATUM A; 11.53, 43.76, 75.16 WAS 11.5, 43.8, 75.2</td>
<td>10/3/2012</td>
<td>BK</td>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

RID MOUNTING PLATE, LOWER THORACIC SPINE

B. KIMES 9/19/2011

J. WANG 1/16/2012

DATE OF 1 A3 472-3664

NEXT ASSEMBLY 472-3660

472-3664 C 1 1018 STEEL B. KIMES 9/19/2011

TOTAL QTY IN DUMMY 1 J. WANG 1/16/2012

A31 of 1 1.000

DO NOT SCALE DRAWING

TOLERANCES

RIB MOUNTING PLATE, LOWER THORACIC SPINE

NOTES:

DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \ell \), UNLESS OTHERWISE NOTED.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \xi \), UNLESS OTHERWISE NOTED.
SCALE 1.000

- **Central Plate, Lower Thoracic Spine**

- **Dimensions**: All dimensions are in millimeters.

- **Tolerances**:
  - Tolerances are given in decimal form.
  - Angles are specified.
  - Finish and heat treatment notes are included.

- **Material**: 1018 Steel

- **Revision History**:
  - **Eco#**: A
  - **Rev**: D
  - **Description**: Renumbered from T1SPM413 R01 and converted to metric for THOR-M.
  - **Date**: 9/19/2011
  - **By**: BK

- **Changes**:
  - Added holes as shown.
  - Removed burrs and break sharp edges.

- **Drawing Information**:
  - **Drawing Number**: 472-3662
  - **Sheet Number**: 1
  - **Name**: J. Wang
  - **Date**: 1/16/2012
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT (S), UNLESS OTHERWISE NOTED.
2. POWDER OR BRAD BLAST.
3. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
5. INSTALL DOWEL PINS AFTER PLATING.

REV: D
DRAWING NO.: 472-3760
SCALE: 1.000
SIZE: 472-3760
DESCRIPTION: PELVIS/LUMBAR MOUNTING BLOCK ASSEMBLY

PROJECT NO.:
CHECKED BY: B. KIMES
DRAWN BY: J. WANG
DATE: 9/16/2011

SEE NOTES UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY
ECO#  REVISION  DESCRIPTION  DATE  BY
A  RENUMERATED FROM T1SPM805 R0 AND CONVERTED TO METRIC FOR THOR-M, REDESIGNED TILT SENSOR ORIENTATION; 2X 9/16/2011 BK
B  24.3 WAS 27.3; 31.8, (31.8) WAS 30.3, (30.3) 2/14/2012 BK
C  HOLE NOTE 2X Ø4.3 THRU Ø8.00 8.2 X 90° WAS 2X Ø4.3 THRU Ø8.0 4.0 6/1/2015 DW
D  HOLE NOTE 2X Ø4.3 THRU Ø9.2 X 90° WAS Ø4.3 THRU Ø8.0 4.0 Ø8.2 X 90° 6/9/2015 DW

MATERIAL: 1018 STEEL
FINISH:
HEAT TREAT:
TOLERANCES
X 1.6
B 0.5
B 0.5
X 0.2
B 0.1

UNLESS OTHERWISE SPECIFIED
X 0.01
B

THREADED HOLE SIZES APPLY AFTER FINISH.
M12 VINYL NUT COVER

M12x1.75 LOCKNUT, MODIFIED

WASHER FLAT 1/2 PTFE

LUMBAR SPINE FLEX JOINT CABLE ASSEMBLY

LUMBAR SPINE FLEX JOINT MOLDED ASSEMBLY

1

2

3

4

5

6

PARTS LIST

DESCRIPTION

PART NUMBER

QTY

ITEM

1

2

3

4

5

6

7

8

A

B

C

D

E

F

REV

DRAWING NO.

SCALE:

SIZE:

DESCRIPTION:

TOLERANCES

DO NOT SCALE DRAWING

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.

CHECKED BY:

DRAWN BY:

DATE:

OF

A2

472-3746

SCALE 1.000

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:

DATE:

1/17/2012

NEXT ASSEMBLY

472-3600

TOTAL QTY IN DUMMY

1

REVISION HISTORY

ECO#    REV   DESCRIPTION   DATE   BY

A RELEASE TO PRODUCTION 10/25/2011 BK

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

REMOVE BURRS & BREAK SHARP EDGES

B. KIMES 10/25/2011

1.6
NOTES:
1. DIMENSIONS REPRESENT PART SIZE AFTER MOLDING.
2. RUBBER TOLERANCE ±0.5, UNLESS OTHERWISE SPECIFIED.
SCALE 1.000

SECTION A-A

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.

2. POWDER OR BEAD BLAST.

3. SATIN FLASH CHROME PLATE 0.008mm MAX. AFTER MACHINING.

4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

REV: DRAWING NO.: SHEET

SCALE:

SIZE:

DESCRIPTION:

TOLERANCES

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY:

DRAWN BY:

DATE:

DATE:

OF

LUMBAR SPINE FLEX JOINT BOTTOM PLATE

REVISION HISTORY

<table>
<thead>
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<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1SPM712 RB0 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>9/20/2011</td>
<td>BK</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>2X M8 x 1.25 HOLES WERE ( \phi )6.6</td>
<td>6/15/2012</td>
<td>BK</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>CHANGED NICKEL PLATE TO SATIN FLASH CHROME</td>
<td>7/23/2012</td>
<td>CEF</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>FINISH .008mm MAX. WAS .0003 MAX.</td>
<td>11/9/2012</td>
<td>BK</td>
</tr>
</tbody>
</table>

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: REMOVED BURRS & BREAK SHARP EDGES

DATE: 1/17/2012

NEXT ASSEMBLY 472-3740

QTY TOTAL QTY IN DUMMY 1 SEE NOTES

1.6

472-3742

1018 STEEL

B. KIMES 9/20/2011

LUMBAR SPINE FLEX JOINT BOTTOM PLATE

DO NOT SCALE DRAWING

TOLEERANCES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

A31 of 1

A31 of 1

1.000
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.

2. POWDER OR BEAD BLAST.

3. SATIN FLASH CHROME PLATE 0.008mm MAX. AFTER MACHINING.

4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. USE LOCTITE 271 OR EQUIVALENT TO LOCK 472-3743 IN PLACE AS SHOWN.

2. ONE SAMPLE FROM EACH ASSEMBLY BATCH NEEDS TO BE TESTED TO INSURE NO SLIPAGE OF THE BALL OR THREADED SLEEVE ON THE CABLE SHALL OCCUR UNDER 1,700 LBS OF TENSILE LOAD.
1. DIMENSIONS SHOWN ARE FINAL DIMENSIONS AFTER SWAGING.
1. MAKE FROM 5000462 (M12x1.75 HEX HEAD LOCKNUT), MODIFY AS SHOWN.

M12x1.75 LOCKNUT, MODIFIED

DO NOT SCALE DRAWING

ECO# REV DESCRIPTION DATE BY
A A RELEASE TO PRODUCTION 10/25/2011 BK

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY

ECO# REV DESCRIPTION DATE BY
A A RELEASE TO PRODUCTION 10/25/2011 BK

NOTES:

1. MAKE FROM 5000462 (M12x1.75 HEX HEAD LOCKNUT), MODIFY AS SHOWN.
NOTES:

1. MATERIAL: POLYURETHANE OR EQUIVALENT, DUROMETER 50±5 SHORE A.
2. MUST COVER THE TOP OF A STANDARD METRIC LOCK NUT (REF #5000462).
UPPER THORACIC SPINE FLEX JOINT CABLE ASS'Y. 472-36452
M12 VINYL NUT COVER 472-36472
M12x1.75 LOCKNUT, MODIFIED 472-37472
WASHER FLAT 1/2 PTFE 90001352
UPPER THORACIC SPINE FLEX JOINT MOLDED ASSEMBLY 472-36401

PARTS LIST

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER THORACIC SPINE FLEX JOINT CABLE ASS'Y.</td>
<td>472-36452</td>
</tr>
<tr>
<td>M12 VINYL NUT COVER</td>
<td>472-36472</td>
</tr>
<tr>
<td>M12x1.75 LOCKNUT, MODIFIED</td>
<td>472-37472</td>
</tr>
<tr>
<td>WASHER FLAT 1/2 PTFE</td>
<td>90001352</td>
</tr>
<tr>
<td>UPPER THORACIC SPINE FLEX JOINT MOLDED ASSEMBLY</td>
<td>472-36401</td>
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SCALE 1.000

REV: DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY: DATE:

ECO# REV DESCRIPTION DATE BY

NEXT ASSEMBLY

TOTAL QTY IN DUMMY

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REMOVE BURRS & BREAK SHARP EDGES

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED

REV
A
RELEASE TO PRODUCTION
A

472-3646
NOTES:
1. DIMENSIONS REPRESENT PART SIZE AFTER MOLDING.
2. RUBBER TOLERANCE ±0.5, UNLESS OTHERWISE SPECIFIED.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. SATIN FLASH CHROME PLATE 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. POWDER OR BEAD BLAST.
3. SATIN FLASH CHROME PLATE 0.008mm MAX. AFTER MACHINING.
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. USE LOCTITE 271 OR EQUIVALENT TO LOCK 472-3743 IN PLACE AS SHOWN.

2. ONE SAMPLE FROM EACH ASSEMBLY BATCH NEEDS TO BE TESTED TO INSURE NO SLIPPAGE OF THE BALL OR THREADED SLEEVE ON THE CABLE SHALL OCCUR UNDER 1,700 LBS OF TENSILE LOAD.

SCALE 2.000
1. DIMENSIONS SHOWN ARE FINAL DIMENSIONS AFTER SWAGING.
### Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
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<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-3773</td>
<td>TILT SENSOR MOUNT, T6 SA572-S113 &amp; SA572-S44</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5000646</td>
<td>M4 X 0.7 X 8 LG. FHCS</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5000215</td>
<td>M2 X 0.4 X 10 LG. SHCS</td>
</tr>
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</table>

### Revision History

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<th>DESCRIPTION</th>
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<tr>
<td>A</td>
<td></td>
<td>RELEASE TO PRODUCTION</td>
<td>11/10/2011</td>
<td>BK</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>DESCRIPTION OF ITEM #1 PART #472-3773 WAS &quot;TILT SENSOR MT, UPPER SPINE&quot; AND REVISED ITEM #1 PART #472-3773; DRAWING TITLE WAS TILT SENSOR ASSEMBLY SA572-S113 &amp; SA572-S44</td>
<td>7/6/2015</td>
<td>DW</td>
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</table>

### Tolerances

- **X**
- **X.X**
- **X.XX**
- **X.XXX**

- **B**
- **0.5**
- **0.2**
- **0.1**
- **0.01**

**Third Angle Projection**

**Positions**

1. **A**
2. **B**
3. **C**
4. **D**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**Engineer:** J. Wang

**Date:** 1/17/2012

**Notes:**

- Remove burrs & break sharp edges.
- Dimensions are in millimeters.

**Drawing Title:** TILT SENSOR ASSEMBLY, T6, SA572-S113 & SA572-S44

**Drawing No.:** 472-3775-1 & 2

**Rev.:** D

**Drawing Size:** A3

**Scale:** 2.000

**Rev.:** D

**Drawing Date:** 11/10/2011

**Next Assembly:** 472-3600

**QTY:** 1

**Date:** 11/10/2011

**Drawn By:** B. Kimes

**Date:** 1/17/2012

**Date:** 12/2012

**Check:** 1

**Remark:** 1

**Total QTY In Dummy:** 1

**Date:** 12/2012

**Remark:** 1

**Remark:** 1

**Remark:** 1

**Remark:** 1

**Remark:** 1

**Remark:** 1

**Remark:** 1

**Remark:** 1

**Remark:** 1
PARTS LIST

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<tbody>
<tr>
<td>ITEM</td>
<td>PART NUMBER</td>
<td>QTY</td>
</tr>
<tr>
<td>A</td>
<td>NEW DESIGN TO CORRECT SA572-S44 TILT SENSOR ORIENTATION</td>
<td>10/7/2011</td>
</tr>
<tr>
<td>B</td>
<td>DIMENSION 5.0 WAS 3.0 AND 2.0 WAS 3.0; ADDED HOLE Ø3.10 +.13/-01 THRU; ITEM #1 PART NUMBER 5000384 WAS 5000385 AND DESCRIPTION WAS M3 X 6 LG. DOWEL PIN; DRAWING TITLE WAS TILT SENSOR MT, UPPER SPINE SA572-S113 &amp; SA572-S44</td>
<td>7/6/2015</td>
</tr>
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</table>

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

TOLERANCES

UNLESS OTHERWISE SPECIFIED

CLEAR ANODIZE 2.000

PROJECT NO.: DRAWN BY: DATE: CHECKED BY: REMOVED BURRS & BREAK SHARP EDGES

REV: DRAWING NO.: SHEET: SCALE: SIZE:

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: DATE: NEXT ASSEMBLY

ECO# REV DESCRIPTION DATE BY

A NEW DESIGN TO CORRECT SA572-S44 TILT SENSOR ORIENTATION 10/7/2011 JW

DIMENSION 5.0 WAS 3.0 AND 2.0 WAS 3.0; ADDED HOLE Ø3.10 +.13/-01 THRU; ITEM #1 PART NUMBER 5000384 WAS 5000385 AND DESCRIPTION WAS M3 X 6 LG. DOWEL PIN; DRAWING TITLE WAS TILT SENSOR MT, UPPER SPINE SA572-S113 & SA572-S44 7/6/2015 DW

1 5000384 PIN, DOWEL M3 x B

1 5000384 PIN, DOWEL M3 x B

REV: 1 472-3773

PARTS LIST

<table>
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<th>ITEM</th>
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<tr>
<td>472-3775.2</td>
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<td></td>
</tr>
<tr>
<td>472-3775.1</td>
<td>1</td>
<td>6061-T6 ALUMINUM</td>
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<tr>
<td>472-3775.3</td>
<td>1</td>
<td>TILT SENSOR MOUNT, T6 SA572-S113 &amp; SA572-S44</td>
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<tr>
<td>NEXT ASSEMBLY QTY</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>TOTAL QTY IN DUMMY</td>
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<td>CLEAR ANODIZE</td>
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PRESS FIT DOWEL PIN FLUSH WITH THIS SURFACE

472-3773.iam
**PARTS LIST**

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<th>DESCRIPTION</th>
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<tr>
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<td>1</td>
<td>472-3771</td>
<td>TILT SENSOR MOUNT T12, SA572-S44 &amp; SA572-S113</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-3776-1</td>
<td>(SA572-S113 TILT SENSOR)</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>5000215</td>
<td>M2 X 0.4 X 10 LG. SHCS</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5000646</td>
<td>M4 X 0.7 X 8 LG. FHCS</td>
</tr>
</tbody>
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**REVISION HISTORY**

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<th>ECO #</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
<td>RELEASE TO PRODUCTION</td>
<td>1/11/2011</td>
<td>BK</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>DRAWING TITLE WAS TILT SENSOR ASS'Y., THORACIC SPINE SA572-S113 &amp; SA572-S44; REVISED ITEM #1 PART #472-3771 - TILT SENSOR MOUNT, T12, SA572-S44 &amp; SA572-S113; MOVED TILT SENSOR, SA572-S113 TO UNDERSIDE OF BRACKET IN PART #472-3776-1</td>
<td>6/1/2015</td>
<td>DW</td>
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</table>

**NOTES**

- DIMENSIONS ARE IN MILLIMETERS
- TOLERANCES UNLESS OTHERWISE SPECIFIED
- DO NOT SCALE DRAWING
- THIRD ANGLE PROJECTION
- REMOVE BURRS & BREAK SHARP EDGES

**PROJECT NO.**

- NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

**CHECKED BY**

- B. KIMES 11/11/2011

**DRAWN BY**

- J. WANG 1/17/2012
# Parts List

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>5000384</td>
<td>M3 X 8 LG. DOWEL PIN</td>
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## Revision History

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<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBER FROM T1SPM612-00. REDesign TO CORRECT SA572-S44 TILT SENSOR MOUNTING ORIENTATION</td>
<td>10/5/2011</td>
<td>J.WANG</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>HOle DIMENSION 2X Ø4.4 ThiRU Ø9.0 X 90° C'SiNK WAS 2X Ø4.4 ThiRU, DiM. 34.0 WAS 38.0, AND 28.0 WAS 32.0; RELOCATED DOWEL PiN AND CHAnGE PROTRUSiON FROM TOP SiDE TO BOTTOM SiDE; MOVED C'SiNK OF HOle - Ø4.3 ThiRU Ø9.0 X 90° C'SiNK - TO TOP SiDE; AdDEd MATERiAL - 6061-T6 ALUM.; DRaWING TiTLE WAS TILT SENSOR MOUNT, THORACiC SPINE SA572-S44 &amp; SA572-S44</td>
<td>7/6/2015</td>
<td>DW</td>
</tr>
</tbody>
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**DO NOT SCALE DRAWING**

**TOLERANCES**

<table>
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<tr>
<th>DIMENSIONS ARE IN MILLIMETERS</th>
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**SCALE 1.000**

**Third Angle Projection**

**Finish:**

**Heat Treat:**

**Material:**

**Project No.:**

**Checked By:**

**Drawn By:**

**Date:**

---

**Rev: Drawing No.: Sheet**

**Size:**

**Description:**

**Tilt Sensor Mount T12, SA572-S44 & SA572-S113**

**National Highway Traffic Safety Administration**

**Engineer:**

**Remove Burrs & Break Sharp Edges**

---

**Revision History**

<table>
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<tr>
<th>ECO#</th>
<th>REV</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>A</td>
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<td>RenumbeR FROM t1spm612-00. reDesign to correct sa572-s44 tilt sensor mounting orientation</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>Hole Dimension 2x Ø4.4 thru Ø9.0 X 90° C'Sink Was 2x Ø4.4 Thru, Dim. 34.0 Was 38.0, and 28.0 was 32.0; Relocated Dowel Pin and Change Protrusion from Top Side to Bottom Side; Moved C'Sink of Hole - Ø4.3 Thru Ø9.0 X 90° C'Sink - to Top Side; Added Material - 6061-T6 Alum.; Drawing Title Was Tilt Sensor Mount, Thoracic Spine SA572-S44 &amp; SA572-S44</td>
</tr>
<tr>
<td>ITEM</td>
<td>QTY</td>
<td>PART NUMBER</td>
</tr>
<tr>
<td>------</td>
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<td>-------------</td>
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<tr>
<td>1</td>
<td>1</td>
<td>472-3772</td>
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<tr>
<td>2</td>
<td>1</td>
<td>5000646</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>5000215</td>
</tr>
</tbody>
</table>

**TILT SENSOR MOUNT, REAR THORACIC**

**SA572-S113, TILT SENSOR**

**SA572-S44, TILT SENSOR**
NOTES:

1. POWDER OR BEAD BLAST.
2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>3</td>
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<td>5001086</td>
<td>SCREW, FHCS M4-0.7 x 12</td>
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<td>2</td>
<td>1</td>
<td>SA572-S113</td>
<td>TILT SENSOR, DUAL AXIS</td>
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<td>1</td>
<td>472-3635</td>
<td>LOWER NECK TILT SENSOR MOUNT</td>
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**Vehicle Research and Test Center**

- **Materials:**
  - Material: [specify material]
  - Heat Treat: [specify heat treat]
  - Finish: [specify finish]

- **Approvals:**
  - Drawn: [drawn by]
  - Checked: [checked by]
  - Approved: [approved by]

- **Scale:**
  - 2:1

- **Drawing Number:**
  - A3 472-3778

**Third Angle Projection**

**National Highway Traffic Safety Administration**

**Department of Transportation**

**United States of America**

**Date:** 7/6/2015
SCALE 3.000

NOTES:
1. INSTALL DOWEL PIN AFTER ANODIZE.

REV: DRAWING NO.: SHEET
SCALE: SIZE: DESCRIPTION:
TOLERANCES DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF
NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

REVISION HISTORY
ECO#  REV  DESCRIPTION  DATE  BY
A  RENUMERATED FROM T1SPM225 R00 9/27/2011 BK
AND CONVERTED TO METRIC FOR THOR-M
B  ADD PARTS LIST; ADD PARTS LIST;
Ø3.000+ .000/- .013 WAS +.000/+ .013 (TYPO)
AND WAS +.00/- .02; Ø3.03 +.02/- .0 WAS Ø3.05 2/6/2012 FINK

DESCRIPTION
PART NUMBER
QTY
ITEM
5000384 M3 X 8 LG. DOWEL PIN

NOTES:
1. INSTALL DOWEL PIN AFTER ANODIZE.

PARTS LIST
M3 X 8 LG. DOWEL PIN

472-3630 1 7075-T6 ALUMINUM
B. KIMES
9/27/2011
NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

472-3635
TILT SENSOR, DUAL AXIS

TILT SENSOR SPECIFICATIONS:

- **Mass:** 20g
- **Range:** ±80°
- **Resolution:** 0.1°
- **Accuracy:** ±0.5°
- **Supply Voltage:** 6-7 V
- **Power Consumption:** 15 mA

3X SLIP FIT FOR 3mm DOWEL

3X M4x0.7 THREAD
TILT SENSOR SPECIFICATION:

MASS: 5g
RANGE: ±80°
RESOLUTION: 0.1°
ACCURACY: ±0.5°
SUPPLY VOLTAGE 5 V
POWER CONSUMPTION: 6 mA
Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
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<th>DESCRIPTION</th>
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<tr>
<td>1</td>
<td>1</td>
<td>SA572-S4</td>
<td>UNIAXIAL ACCELEROMETER</td>
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<tr>
<td>2</td>
<td>6</td>
<td>5000068</td>
<td>M1.4 X 0.3 X 3 LG. SHCS</td>
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<td>SA572-S80M</td>
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REVISION HISTORY

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<tr>
<td>A</td>
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<td>RENUMBERED FROM T1INM100 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>9/1/2011</td>
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DO NOT SCALE DRAWING

TOLERANCES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

TRI-PACK ACCEL. ASSY.

472-4203 A 1 OF 1
Specifications:

- Range: ±2000 g
- Sensitivity: ±20 mV/g MIN
- Mounted Resonance Frequency: 22,000 Hz MIN
- Clamping force: 2 Holes #4.71/11.03
- Center of seismic mass: 24 ± 0.03/6.10 ± 0.76
- Diameter: 1.52/3.86
- Direction of positive output

- Damping ratio: Undamped (0.005)
- Transverse sensitivity: ±1% MAX
- Non-linearity & hysteresis: ±2% MAX
- Excitation: ±25 mV
- Zero offset: 10V DC
- Thermal sensitivity: -5% typ at 0°F to 150°F
- Temperature exposure limits: 0°F to 200°F without damage
- Weight: 1 gram (without cable)
- Humidity: Sealed

Revision Record:

- A - HP 01/09/99 - Tolerances
- B1 - DW 09/27/99 - Updated note
- B2 - DW 09/27/99 - Change transverse sensitivity to 1%
- B3 - DW 09/27/99 - Revised format, enlarged tolerances
- C1 - DW 02/8/00 - Revised tolerance
- D1 - DW 08/15/01 - Changed single decimal place tolerance from ± 0.1/2.5 to ± 0.1/2.5
- D2 - DW - Corrected metric equivalents
- D3 - DW - Added dimensions
- E - ER 11/30/05 - Added dimension
- F1 - JHC 05/11/06 - Changed dimension, was 1.50/3.810
- F2 - JHC - Added dimensions

Released:
Sept. 15, 2006
NHTSA

Units are in/in/mm

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
UNIAXIAL PIEZORESISTIVE ACCELEROMETER
HYBRID III DUMMY FAMILY

Tolerances:
- Decimals: ±0.1/2.5
- Angles: ±0.01/25°
- Weight: ±0.005/127
- Units otherwise noted
SCALE 1 : 1

<table>
<thead>
<tr>
<th>PART NUMBER</th>
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<td>5000068</td>
<td>6</td>
<td>3</td>
<td>SCREW, SHCS M1.4 - 0.3 X 3 LG.</td>
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<tr>
<td>SA572-S4</td>
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TOLERANCES

DIMENSIONS ARE IN MILLIMETERS

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

DATE: 9/9/2014

CHECKED BY: Dave Walker

NEXT ASSEMBLY:

TOTAL QTY IN DUMMY 1
NOTES:
1. THE RIB IS ASSEMBLED BY VACUUM BONDING THE SPRING STEEL TO THE DAMPING MATERIAL USING HYSOL 9430 EPOXY ADHESIVE.
THORAX ELLIPTICAL RIB #1 - STEEL

- **MATERIAL:** 1070 SPRING STEEL
- **FINISH:** E-COAT FULL
- **TOLERANCES:**
  - X.X: 0.2
  - X.XX: 0.1
  - X.XXX: 0.01
  - **ANGLE TOLERANCES:** ±0.5
- **DIMENSIONS ARE IN MILLIMETERS**
  - **COLOUR:** THIRD ANGLE PROJECTION

**NOTES:**

1. MAKE RIB FROM 1070 ANNEALED SPRING STEEL 1.57MM THICK X 19.05MM WIDE.
2. ELLIPTICAL SHAPE SEMI-AXIS OUTSIDE DIMENSIONS ARE: X:107.95MM  Y:93.22MM
4. ENGRAVE DWG. #472-3311 AT THE LOCATION SPECIFIED.

**REVISION HISTORY**

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<td>3.10 WAS 3.03; REMOVE NOTE 5; ADD DATUM A,B, BASIC DIMENSIONS, AND POSITIONAL TOLERANCE; DIMENSION HOLES FROM DATUM B; ADD 4.75, 25.40 8/14/2012 BK</td>
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**ENGINEER:** J. WANG

**DATE:** 1/17/2012

**CHECKED BY:** THANH 9/21/2011
THORAX ELLIPTICAL RIB #1 - DAMPING MATERIAL

DIMENSIONS ARE IN MILLIMETERS

SHOWN FORMED
SCALE 1.000

2X 15°

2X 6.6

2X 3.3

184.1

19.1

ECO # | REV | DESCRIPTION | DATE | BY
---|---|---|---|---
A | | RENUMBER FROM T1TXM312 R2 AND CONVERTED TO METRIC FOR THOR-M | 9/20/2011 | TKN

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: J. WANG
DATE: 1/17/2012

NEXT ASSEMBLY 472-3310
QTY 2

TOTAL QTY IN DUMMY 2
ISO VIEW
SCALE 1 : 2

NOTES:
1. THE RIB IS ASSEMBLED BY VACUUM BONDING THE SPRING STEEL TO THE DAMPING MATERIAL USING HYSOL 9430 EPOXY ADHESIVE.
NOTES:

1. MAKE RIB FROM 1070 ANNEALED SPRING STEEL 1.57MM THICK X 19.05MM WIDE.

2. ELLIPTICAL SHAPE SEMI-AXIS OUTSIDE DIMENSIONS ARE: X:114.30MM Y:104.14MM


4. ENGRAVE DWG. #472-3321 AT THE LOCATION SPECIFIED.
THORAX ELLIPTICAL RIB #2 - DAMPING MATERIAL

FINISH: ISODAMP CN-62

REVISION HISTORY

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<td>9/20/2011</td>
<td>TKN</td>
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DIMENSIONS ARE IN MILLIMETERS

DO NOT SCALE DRAWING

TOLERANCES

QUANTITY

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

472-3320 2 ISODAMP CN-62 Thanh 9/20/2011

NEXT ASSEMBLY QTY

TOTAL QTY IN DUMMY 2 1/17/2012
ISO VIEW
SCALE 1 : 2

NOTES:
1. THE RIB IS ASSEMBLED BY VACUUM BONDING THE SPRING STEEL
TO THE DAMPING MATERIAL USING HYSOL 9430 EPOXY ADHESIVE.
1. MAKE RIB FROM 1070 ANNEALED SPRING STEEL 1.57MM THICK X 19.05MM WIDE.

2. ELLIPTICAL SHAPE SEMI-AXIS OUTSIDE DIMENSIONS ARE: X:127.00MM Y:112.52MM

3. AFTER RIB IS FORMED - PRIOR TO HEAT TREAT, ORIENT THE RIB SO THAT THE HOLE PATTERN IS AS SHOWN. THEN TWIST THE RIB AT THE 20.3MM FLAT AREA BY BENDING THE BOTTOM OUTWARD BY 17°.

4. ENGRAVE DWG. #472-3331 AT THE LOCATION SPECIFIED.
ISO VIEW
SCALE 1:2

THORAX ELLIPTICAL RIB #3 - DAMPING MATERIAL

REVISION HISTORY

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<td>RENUMBER TLTXM332 R80 AND CONVERTED TO METRIC FOR THOR-M. INCREASE THE LENGTH FROM 241.3 TO 246.1 TO MAINTAIN THE SAME SPACING BETWEEN LEFT AND RIGHT DAMPING MATERIAL &amp; REDUCE THICKNESS FROM 13.2 TO 9.0</td>
<td>9/20/2011</td>
<td>TKN</td>
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<td>ADD 1.6 X 19.1 GROOVE, CHANGE 9.0 TO 10.6 TO COMPENSATE DAMPING THICKNESS.</td>
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UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: J. WANG

DATE: 1/17/2012

NEXT ASSEMBLY 472-3330

TOTAL QTY IN DUMMY 2

REVISION HISTORY

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THORAX ELLIPTICAL RIB #3 - DAMPING MATERIAL

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: J. WANG

DATE: 1/17/2012

NEXT ASSEMBLY 472-3330

TOTAL QTY IN DUMMY 2

REVISION HISTORY

ECO# | REV | DESCRIPTION | DATE | BY |
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<td>ADD 1.6 X 19.1 GROOVE, CHANGE 9.0 TO 10.6 TO COMPENSATE DAMPING THICKNESS.</td>
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**Parts List**

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**Notes:**

1. The rib is assembled by vacuum bonding the spring steel to the damping material using Hysol 9430 epoxy adhesive.

**Revision History**

| ECN | RENUMERS FROM TTY52039 RBO AND CONVERTED TO METAL FOR THOR-M. MODIFY DAMPING COMPONENT BY INCREASE THE LENGTH FROM 257.3 TO 262.1 (TO MAINTAIN THE SAME SPACING BETWEEN LEFT AND RIGHT DAMPING MATERIAL) & REDUCE THICKNESS FROM 13.2 TO 9.0 | 9/20/2011 TKN |
1. MAKE RIB FROM 1070 ANNEALED SPRING STEEL 1.57MM THICK X 19.05MM WIDE.

2. ELLIPTICAL SHAPE SEMI-AXIS OUTSIDE DIMENSIONS ARE: X:133.35MM Y:118.62MM


4. ENGRAVE Dwg. #472-3341 AT THE LOCATION SPECIFIED.
ISO VIEW
SCALE 1 : 2

THORAX ELLIPTICAL RIB #4 - DAMPING MATERIAL

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<td>TKN</td>
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<td>B</td>
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<td>ADD 1.6 X 19.1 GROOVE, CHANGE 9.0 TO 10.6 TO COMPENSATE DAMPING THICKNESS.</td>
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DIMENSIONS ARE IN MILLIMETERS

DO NOT SCALE DRAWING

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: J. WANG

DATE: 1/17/2012

NEXT ASSEMBLY 472-3340

QTY

TOTAL QTY IN DUMMY 2

REVISION HISTORY

ECO# | REV | DESCRIPTION | DATE    | BY   |
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<td>RENUMBER FROM T1TXXM32Z R 80 AND CONVERTED TO METRIC FOR THOR-M. INCREASE THE LENGTH FROM 257.3 TO 262.1 TO MAINTAIN THE SAME SPACING BETWEEN LEFT AND RIGHT DAMPING MATERIAL &amp; REDUCE THICKNESS FROM 13.2 TO 9.0</td>
<td>9/20/2011</td>
<td>TKN</td>
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<tr>
<td>B</td>
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<td>ADD 1.6 X 19.1 GROOVE, CHANGE 9.0 TO 10.6 TO COMPENSATE DAMPING THICKNESS.</td>
<td>1/30/2012</td>
<td>ZJW</td>
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</table>
1. The rib is assembled by vacuum bonding the spring steel to the damping material using Hysol 9430 epoxy adhesive.
Notes:

1. Make rib from 1070 annealed spring steel 1.57mm thick x 19.05mm wide.

2. Elliptical shape semi-axis outside dimensions are: X:139.70MM Y:122.17MM

3. After rib is formed - prior to heat treatment, orient the rib so that the hole pattern is as shown. Then twist the rib at the 20.3mm flat area by bending the bottom outward by 8°.

4. Engrave dwg. #472-3351 at the location specified.
ISO VIEW
SCALE 1 : 2

ISOVIEW THORAX ELLIPTICAL RIB #5 - DAMPING MATERIAL

**REV:** DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE: DATE:

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THORAX ELLIPTICAL RIB #5 - DAMPING MATERIAL

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**ECO HISTORY**

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THORAX ELLIPTICAL RIB #5 - DAMPING MATERIAL

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**REVISION HISTORY**

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<td>ADD 1.6 X 19.1 GROOVE, CHANGE 7.9 TO 9.5 TO COMPENSATE DAMPING THICKNESS. 1/30/2011 ZJW</td>
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**TOLERANCES**

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**ENGINEER:**
NORMAL BE SEEN AND CONVERTED TO METRIC FOR THOR-M 9/20/2011 TKN

**DATE:**
NEXT ASSEMBLY 472-3350

**ENGINEER:**

**TOTAL QTY IN DUMMY:** 2

**REVISION HISTORY**

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THE RIB IS ASSEMBLED BY VACUUM BONDING THE SPRING STEEL TO THE DAMPING MATERIAL USING HYSOL 9430 EPOXY ADHESIVE.
ISO VIEW
SCALE 1 : 2

VIEW PERPENDICULAR
TO HOLE AXIS
SCALE 1.000

NOTES:

1. MAKE RIB FROM 1070 ANNEALED SPRING STEEL 1.57MM THICK X 19.05MM WIDE.

2. ELLIPTICAL SHAPE SEMI-AXIS OUTSIDE DIMENSIONS ARE: X:147.32MM Y:119.38MM


4. ENGRAVE DWG. #472-3361 AT THE LOCATION SPECIFIED.
### Parts List

<table>
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**DESCRIPTION:**
- THORAX ELLIPTICAL RIB #7 - DAMPING MATERIAL
- THORAX ELLIPTICAL RIB #7 - STEEL

**Notes:**
1. The rib is assembled by vacuum bonding the spring steel to the damping material using Hysol 9430 epoxy adhesive.

**Revision History:**
- ECO# 25.42X
- Date: 9/21/2011
- 2.5
- The rib is assembled by vacuum bonding the spring steel to the damping material using Hysol 9430 epoxy adhesive.

**Dimensions:**
- All dimensions are in millimeters.
- Unless otherwise specified, dimensions are in decimals.
- First angle projection.

**Drawing Details:**
- Scale: 1:2
- Description: ISO VIEW

**Drawing Information:**
- Drawn by: Thanh 9/21/2011
- Checked by: J. Wang 1/18/2012
- National Highway Traffic Safety Administration

**Notes (cont.):**
- Always use the Hysol 9430 epoxy adhesive for bonding.
- Ensure all burrs and sharp edges are removed and broken.

**Assembly:**
- Next assembly: 472-3371
- Total QTY in dummy: 1

**Diagram:**
- The diagram shows the assembly of the rib, highlighting the bonding process.

---

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<td>472-3371</td>
<td>THORAX ELLIPICAL RIB #7 - STEEL</td>
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**Notes:**
- Always use the Hysol 9430 epoxy adhesive for bonding.
- Ensure all burrs and sharp edges are removed and broken.

**Assembly:**
- Next assembly: 472-3371
- Total QTY in dummy: 1

**Diagram:**
- The diagram shows the assembly of the rib, highlighting the bonding process.
THORAX ELLIPTICAL RIB #7 - STEEL

NOTES:

1. MAKE RIB FROM 1070 ANNEALED SPRING STEEL 1.57MM THICK X 19.05MM WIDE.

2. ELLIPTICAL SHAPE SEMI-AXIS OUTSIDE DIMENSIONS ARE: X:147.32MM Y:115.32MM

3. AFTER RIB IS FORMED - PRIOR TO HEAT-TREAT, ORIENT THE RIB SO THAT THE HOLE PATTERN IS AS SHOWN. THEN TWIST THE RIB AT THE 20.3MM FLAT AREA BY BENDING THE BOTTOM OUTWARD BY 5°.

4. ENGRAVE DWG. #472-3371 AT THE LOCATION SPECIFIED.

REFERENCES:

ECO# REV DESCRIPTION DATE BY
A RENUMBER FROM T1TXM371 R4 AND CONVERTED TO METRIC FOR THOR-M0 9/21/2011 TKN
B FINISH E-COAT WAS BLK. OXIDE; REMOVE NOTES 6,7; ADD HEAT TREAT TO TITLE BLOCK 5/8/2012 BK
C ADD VIEW TO SHOW HOLES 7/11/2012 BK
D 3.10 WAS 3.03; REMOVE NOTE 5; ADD DATUM A,B, BASIC DIMENSIONS, AND POSITIONAL TOLERANCE; DIMENSION HOLES FROM DATUM B; ADD 4.75, 25.40 8/14/2012 BK

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
THORAX ELLIPTICAL RIB #7 - STEEL

472-3371
### REVISION HISTORY

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<td>1/30/12</td>
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**THORAX ELLIPTICAL RIB #7 - DAMPING MATERIAL**

- **ISO VIEW**
  - **SCALE 1 : 2**

**DIMENSIONS**

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<td>2X 14.8</td>
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<td>2X 6.2</td>
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**TOLERANCES**

- **FINISH:** FULL UNLESS OTHERWISE SPECIFIED
- **ANGLES:** 15°
- **DECIMALS:**
  - **X:** 0.5
  - **XX:** 0.1
  - **XXX:** 0.01

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

- **ENGINEER:** J. Wang
- **DATE:** 1/18/12

**NEXT ASSEMBLY**

- **QTY:** 472-3370
- **TOTAL QTY IN DUMMY:** 2

**REVISION HISTORY**

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<td>1/30/12</td>
<td>ZJW</td>
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ISO VIEW
SCALE 1 : 1

SECTION A-A
SCALE 1 : 1

NOTES:
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=107.9MM, Y=93.2MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3510 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****,# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

THORAX ELLIPTICAL RIB STIFFENER #1

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF
1
1
A
2
472-3510
THORAX ELLIPTICAL ASSEMBLY #1

TOTAL QTY IN DUMMY
1
REVISION HISTORY
ECO#
REV
DESCRIPTION
DATE
BY
A
RENUMBER FROM T1TXM010 R5 AND CONVERTED TO METRIC FOR THOR-M 9/22/2011 TKN
B
REMOVE FIT NOTES (4 & 5), ADD FINISH E-COAT; ADD 2X 70.3, 2X 70.9 3/22/2012 BK

SEE NOTES
E-COAT FULL
UNLESS OTHERWISE SPECIFIED

DECIMALS ANGLES FINISH
X
\[0.5\]
\[0.5\] \[\text{X}\]
\[0.2\] \[\text{X.X}\]
\[0.1\] \[\text{X.XX}\]

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

DATE:
1/18/2012

NEXT ASSEMBLY

QTY
TOTAL QTY IN DUMMY
1

SEE NOTE #1
SEE NOTE #6
SEE NOTE #5
SEE NOTE #4
SEE NOTE #3
SEE NOTE #2

1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=107.9MM, Y=93.2MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3510 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****,# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)
ISO VIEW
SCALE 1 : 1

SECTION A-A
SCALE 1 : 1

NOTES:

1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=114.3MM, Y=104.1MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3511 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****-# AT THE LOCATION SPECIFIED, WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

SEE NOTE #5
2X ø3.03 THRU
R1.6 TYP.

SEE NOTE #6
2X ø8.40 THRU

SEE NOTE #1

REV: D
DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

REV: B
ECO# REV DESCRIPTION DATE BY
A A RENUMBER FROM T1TXM011 R6 AND CONVERTED TO METRIC FOR THOR-M 9/22/2011 TKN
B B REMOVE FIT NOTES (4 & 5), ADD FINISH E-COAT; ADD 2X 81.2, 2X 71.5 3/22/2012 BK

ECO# REV DESCRIPTION DATE BY

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

SEE NOTES

E-COAT FULL

UNLESS OTHERWISE SPECIFIED

X.XXX  0.01

X.XX  0.1

X.X  0.2

X  0.5

X.XX  0.2

DIMENSIONS ARE IN MILLIMETERS
ISO VIEW
SCALE 1 : 1

SECTION A-A
SCALE 1 : 1

THORAX ELLIPTICAL RIB STIFFENER #3

NOTES:
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXIS ARE X=127.0MM, Y=112.5MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE Dwg. # 472-3512 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

SPECIFICATIONS:
FINISH: E-COAT FULL
MATERIAL: TOOL STEEL

TOLERANCES:
DECIMALS

ANGLES

THIRD ANGLE PROJECTION

TOTAL QTY IN DUMMY
1

REVISION HISTORY
ECO#   REV   DESCRIPTION
A  RENUMBER FROM T1TXM012 R6 AND CONVERTED TO METRIC FOR THOR-M 9/22/2011 TKN
B  REMOVE FIT NOTES (4 & 5), ADD FINISH E-COAT; ADD 2X 92.3, 2X 72.6 9/22/2012 BK

SEE NOTES
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPICAL CURVES SHOWN.
3. SEMI-AXIS ARE X=127.0MM, Y=112.5MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3512 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)
ISO VIEW
SCALE 1 : 1

NOTES:
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=133.4MM, Y=118.6MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3513 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****-# AT THE LOCATION SPECIFIED, WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

SECTION A-A
SCALE 1 : 1

SEE NOTE #5
2X Ø3.03 THRU

SEE NOTE #6
2X Ø8.40 THRU

SEE NOTE #1
2X Ø3.03 THRU

SEE NOTE #1
2X Ø8.40 THRU

SEE NOTE #4
2X Ø3.03 THRU

SEE NOTE #4
2X Ø8.40 THRU

SEE NOTE #1
2X Ø3.03 THRU

SEE NOTE #1
2X Ø8.40 THRU

SEE NOTE #1
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SEE NOTE #1
2X Ø8.40 THRU

SEE NOTE #1
2X Ø3.03 THRU
NOTES:
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=139.7MM, Y=122.2MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3514 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****-# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

SEE NOTE #1
SEE NOTE #5
SEE NOTE #6

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
ISO VIEW
SCALE 1 : 1

SECTION A-A
SCALE 1 : 1

NOTES:
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=147.3MM, Y=119.4MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3515 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****-# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

REVOLUTION HISTORY
ECO# REV DESCRIPTION DATE BY
A RENUMBER FROM T1TXM015 R5 AND CONVERTED TO METRIC FOR THOR-M 9/23/2011 TKN
B REMOVE FIT NOTES (4 & 5), ADD FINISH E-COAT; ADD 2X 103.5, 2X 73.5 5/22/2012 BK

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THORAX ELLIPTICAL RIB STIFFENER #6

SEE NOTES

SEE NOTE #1

SEE NOTE #6

SEE NOTE #5

SEE NOTE #3

SEE NOTE #2

SEE NOTE #4

THANH 9/23/2011

DATE:
1/18/2012

DATE:
1/18/2012

ENGINEER:
J. WANG

1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=147.3MM, Y=119.4MM
4. HEAT TREAT TO Rc 50 +/- 2
5. ENGRAVE DWG. # 472-3515 AT THE LOCATION SPECIFIED.
6. ENGRAVE SERIAL NUMBER ****-# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)
ISO VIEW
SCALE 1 : 1

SECTION A-A
SCALE 1 : 1

NOTES:
1. LENGTH PRIOR TO BENDING IS 152.4MM
2. BENT ENDS FOLLOW THE ELLIPTICAL CURVES SHOWN.
3. SEMI-AXES ARE X=147.3MM, Y=115.3MM
4. HEAT TREAT TO Ra 50 < 2
5. ENGRAVE DWG. # 472-3516 AT THE LOCATION SPECIFIED
6. ENGRAVE SERIAL NUMBER ****# AT THE LOCATION SPECIFIED. WHERE **** IS A FOUR DIGIT SERIAL NUMBER FOR THE RIB SET AND # IS THE NUMBER OF THE RIB (1-7)

SEE NOTE #1

SEE NOTE #5

SEE NOTE #4

SEE NOTE #6

SEE NOTE #1

REVOLUTIONARY

ECO#      REV      DESCRIPTION      DATE      BY

A        RENUMBER FROM T1TXM016 R5 AND CONVERTED TO METRIC FOR THOR-M 9/23/2011 TKN
B        REMOVE FIT NOTES (4 & 5), ADD FINISH E-COAT ADD 2X 99.9, 2X 73.7 3/22/2012 BK

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
<table>
<thead>
<tr>
<th>PARTS LIST</th>
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</thead>
<tbody>
<tr>
<td>ITEM</td>
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<tr>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
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</tbody>
</table>

**Diagram:**

The diagram shows the shoulder assembly with various parts labeled. The parts include:
- Shoulder cover, right and left
- Modified M8 bolt
- Shoulder cover bushing
- Rod end spacer assembly
- Sternum bracket
- Right clavicle assembly
- Left clavicle assembly
- Right shoulder assembly
- Left shoulder assembly

**Revision History:**

- A REVISED ITEMS 3, 4, 5, ADDED ITEM 12 2/10/2014 JHC
- DRAWING NUMBER WAS AXSDM000;

**Date:**

- 9/9/2014 DW

**Note:**

- DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- TOLERANCES ARE:
  - DECIMAL:  ANGLES:  MACHINED:
  - X .5
  - .5
  - X .1

**Details:**

- 8/5/2013
- 1:1 SCALE
- DRAWING NUMBER WAS AXSDM000;
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-3811</td>
<td>LEFT SHOULDER PIVOT ASSEMBLY</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-3829-1</td>
<td>ARM LINK, LH</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>472-3818</td>
<td>WASHER LINK, 18 x 8 x 1.5</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>5000467</td>
<td>SCREW, FHCS M5 x 0.8 x 16</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>472-3830-1</td>
<td>SCAPULA, LH</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>5001164V</td>
<td>LOCKNUT, M8 x 1.25, SNEP #ESN H100</td>
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<tr>
<td>7</td>
<td>1</td>
<td>472-3831</td>
<td>ARM CLEVIS ASSEMBLY</td>
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**Parts List**

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<th>DESCRIPTION</th>
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<tbody>
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<td>472-3811</td>
<td>LEFT SHOULDER PIVOT ASSEMBLY</td>
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<tr>
<td>472-3829-1</td>
<td>ARM LINK, LH</td>
</tr>
<tr>
<td>472-3818</td>
<td>WASHER LINK, 18 x 8 x 1.5</td>
</tr>
<tr>
<td>5000467</td>
<td>SCREW, FHCS M5 x 0.8 x 16</td>
</tr>
<tr>
<td>5001164V</td>
<td>LOCKNUT, M8 x 1.25, SNEP #ESN H100</td>
</tr>
<tr>
<td>472-3831</td>
<td>ARM CLEVIS ASSEMBLY</td>
</tr>
</tbody>
</table>

**Revision History**

- Drawing number was AXSDM300; 472-3811 was AXSDM600, 472-3829-1 was AXSDM028, 472-3818 was AXSDM300, 472-3830-1 was AXSDM0108 & 472-3831 was AXSDM500.

**Date of Drawing:** 8/5/2013

**Drawing Number:** 472-3810

**Scale:** 0.750

**Vehicle Research and Test Center:**

**Approval:**

**National Highway Traffic Safety Administration:**

**Sheet 1 of 1**
Material: Acetal Resin, Black

Dimensions Are in Millimeters

Tolerances Are:
- Decimal: ±X.5
- Angles: ±X.5
- Machined: ±X.X

Heat Treat

Revision History

<table>
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<th>ZONE</th>
<th>RE</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tbody>
<tr>
<td>A</td>
<td></td>
<td>ADDED DIMENSION 16.5</td>
<td>8/20/2013</td>
<td>DW</td>
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<tr>
<td>B</td>
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<td>DRAWING NUMBER WAS AXSDM025B</td>
<td>9/10/2014</td>
<td>DW</td>
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</tbody>
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NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT t
VEHICLE RESEARCH and TEST CENTER

DESCRIPTION
APPROVALS
DATE
PROOFREAD

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SPRING SHAFT

MATERIAL: Steel
FINISH: ELECTROLESS NICKEL .008 MAX.

SCALE: 1:1
DRAWING NUMBER
REV
DATE
BY

ZONE REV DESCRIPTION DATE BY
A DRAWING NUMBER WAS AXSDM001B 9/10/2014 DW
B ADDED FINISH - ELECTROLESS NICKEL .008 MAX. 6/30/2015 DW

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
CRITICAL ANGLES: TANGENTED
X .5 X .2
X .1
DRAFT OR LRA
DO NOT SCALE DRAWING

REVISION HISTORY

REV
DESCRIPTION
DATE
BY
A DRAWING NUMBER WAS AXSDM001B 9/10/2014 DW
B ADDED FINISH - ELECTROLESS NICKEL .008 MAX. 6/30/2015 DW

88.0

5.5

9.0 SQUARE

R29.6

(14.5)

81.1

108.0

2.0

5.5

34.0°

Spring Shaft.ipt
**Material:** Steel, SPRING

**Dimensions:**
- Ø14.1 INSIDE
- Ø35.0 OUTSIDE
- 32.0
- 4.7
- 1.7

**Notations:**
- Do not scale drawing
- Unless otherwise specified, dimensions are in millimeters
- Tolerances are: 1.6
- Machined: ±0.5
- X.X
- X.XX
- X.X

**Revision History:**

<table>
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<th>DATE</th>
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<td>DRAWING NUMBER WAS AXSDM018</td>
<td>9/10/2014</td>
<td>DW</td>
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**Drawing Information:**

- Sheet 1 of 1
- Date: 8/21/2013
- Design: JIM CLEVENDER
- Checked: DW

**Vehicle Research and Test Center Approvals:**

**Scale:** 1:1

---

*This is a sample representation of the information found in the image. The actual data might vary.*
# Arm Clevis Assembly

**DESCRIPTION**

1. **SCREW, SHSS M10 x 20mm LG.**
2. **LOCKNUT, NYLON, M12 x 1.75**
3. **TABBED WASHER**
4. **DISC SPRING WASHER, 25 x 12.2 x 1.25**
5. **DISC SPRING WASHER, 20 x 10.2 x 1.1**
6. **WASHER, ARM CLEVIS**
7. **BUSHING, ARM PIVOT**
8. **WASHER, UPPER ARM**
9. **NUT, UPPER ARM PIVOT**
10. **PIN, DOWEL M4 x 8**
11. **PIN, DOWEL M4 x 6**
12. **ARM CLEVIS**

**PARTS LIST**

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<tr>
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<td>LOCKNUT, NYLON, M12 x 1.75</td>
</tr>
<tr>
<td>472-3838</td>
<td>TABBED WASHER</td>
</tr>
<tr>
<td>5001167V</td>
<td>DISC SPRING WASHER, 25 x 12.2 x 1.25</td>
</tr>
<tr>
<td>5001166V</td>
<td>DISC SPRING WASHER, 20 x 10.2 x 1.1</td>
</tr>
<tr>
<td>472-3837</td>
<td>WASHER, ARM CLEVIS</td>
</tr>
<tr>
<td>472-3836</td>
<td>BUSHING, ARM PIVOT</td>
</tr>
<tr>
<td>472-3835</td>
<td>BUSHING, UPPER ARM</td>
</tr>
<tr>
<td>472-3834</td>
<td>WASHER, UPPER ARM</td>
</tr>
<tr>
<td>472-3833</td>
<td>NUT, UPPER ARM PIVOT</td>
</tr>
<tr>
<td>5000680</td>
<td>PIN, DOWEL M4 x 6</td>
</tr>
<tr>
<td>472-3832</td>
<td>ARM CLEVIS</td>
</tr>
<tr>
<td>5000524</td>
<td>PIN, DOWEL M4 x 8</td>
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**REVISION HISTORY**

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<td>ARM CLEVIS ASSEMBLY</td>
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</table>
NUT, UPPER ARM PIVOT

M8x1.25 - 6H

∅20.00

∅22.5 B.C.

∅4.1

3 PLACES - EQUALLY SPACED

REVISION HISTORY

ZONE REV DESCRIPTION DATE BY
1 4.1 WAS 4.0; 20.00 WAS 20.0 8/20/2013 JHC
A DRAWING NUMBER WAS AXSDM043B 9/10/2014 DW

MATERIAL: 303 S.S.

DEFINITIVE DRAWING NUMBER: 472-3833

SCALE: 2X

REV 1

DRAWN BY: JIM CLEVINGER
CHECKED BY: JHC
APPROVED BY: JHC

DATE: 8/20/2013

NOT DRAWN UNLESS OTHERWISE SPECIFIED.

DIMENSIONS ARE IN MILLIMETERS.

TOLERANCES ARE:

X.5
X.2
X.1

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED.

© 2013 ASME
WASHER, UPPER ARM

Acetal Resin, Black

Material:

Dimensions:

\[ \varnothing 28.0 \]
\[ \varnothing 14.1 \]
\[ R2.0 \]
\[ 14.0 \]
\[ 3.0 \]

Tolerances are:

1.6

Angles: 5 degrees

1:1 Scale

DRAWING NUMBER

472-3834

REV

A

贞

DATE

9/10/2014

BY

DW

REVISION HISTORY

DRAWING NUMBER WAS AXSDM046

8/20/2013

JIM CLEVENGER

CHECKED

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

DIMENSIONS AND TOLERANCES ARE IN MILLIMETERS

UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

VEHICLE RESEARCH AND TEST CENTER

APPROVALS

DATE

AMERICAN NATIONAL STANDARDS INSTITUTE

APPROVED

DRAWN

CHECKED

ENGINEER

DESIGNER

PREPARED

SHEET

1 OF 1
Bushing, Upper Arm

Material: Acetal Resin, Black

Dimensions and Tolerances:

- Diameter:
  - Ø28.0
  - Ø14.0
  - Ø10.0

- Radius:
  - R2.0

- Linear Dimensions:
  - 11.0
  - 3.5
  - 14.0

- Angular Dimensions: 
  - X.5
  - X.5

Tolerances:

- Decimal: ±0.5
- Angular: ±2.5
- Machined: ±0.2

Revision History:

- Date: 8/20/2013
- By: DW

Drawing Information:

- Drawing Number: 472-3835
- Sheet: 1 of 1
- Scale: 2X

Approval: Drawn by Jim Clevenger, 8/20/2013

Additional Notes:

- DO NOT SCALE DRAWING
- MATERIAL
- HEAT TREAT
- APPROVED
- DRAWING NUMBER
- SCALE
- SHEET

Vehicle Research and Test Center
National Highway Traffic Safety Administration

FINISH APPROVALS
APPROVED
DRAWN
CHECKED
ENG
JIM CLEVENGER
472-3835
OF DATE
Acetal Resin, Black

DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

1.6
DECIMAL:  ANGLES:  MACHINED:
X
.5
X.5
X.2
X.X
X.XX
.1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DO NOT SCALE DRAWING
# Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tr>
<td></td>
<td>1</td>
<td>472-3831</td>
<td>ARM CLEVIS ASSEMBLY</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>472-3818</td>
<td>WASHER LINK, 18 x 8 x 1.5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5000467</td>
<td>SCREW, FHCS M5 x 0.8 x 16</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>5001154V</td>
<td>LOCKNUT, M8 x 1.25, SNEP #ESN H100</td>
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<td></td>
<td>3</td>
<td>472-3830-2</td>
<td>SCAPULA, RH</td>
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<td>2</td>
<td>472-3829-2</td>
<td>ARM LINK, RH</td>
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<td>1</td>
<td>472-3841</td>
<td>RIGHT SHOULDER PIVOT ASSEMBLY</td>
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## Parts List

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<th>DESCRIPTION</th>
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<td>472-3840A</td>
<td>RIGHT SHOULDER ASSEMBLY</td>
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</table>

## Diagram

- **Item 1:** ARM CLEVIS ASSEMBLY
- **Item 2:** WASHER LINK, 18 x 8 x 1.5
- **Item 3:** SCREW, FHCS M5 x 0.8 x 16
- **Item 4:** LOCKNUT, M8 x 1.25, SNEP #ESN H100
- **Item 5:** SCAPULA, RH
- **Item 6:** ARM LINK, RH
- **Item 7:** RIGHT SHOULDER PIVOT ASSEMBLY

---

**Revision History**

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<th>BY</th>
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**Vehicle Research and Test Center Approvals**

- Date: 9/11/2014

---

**NHTSA National Highway Traffic Safety Administration**

- Drawing Number: 472-3840A
- Sheet: 1 of 1
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<tr>
<td>QTY</td>
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<tr>
<td>ITE</td>
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| 1 | B500166V | NYLOCK, M8 x 1.25 |
| 2 | B500164V | LOCKNUT, M8 x 1.25, SNEF #ESN H100 |
| 3 | B500092V | SCREW, SSFP M4 x 125000292V2 |
| 4 | B50006994 | SCREW, FHMS M4 x .7 x 8 PHILLIPS50006994 |
| 5 | 472-3828-2 | RIB GUIDE LOWER, RH |
| 6 | 472-3827110 | SPRING |
| 7 | 472-38261 | WASHER |
| 8 | 472-38251 | SPRING HOUSING WASHER, LOWER |
| 9 | 472-3824 | SPINDLE |
| 10 | 472-3822 | SPRING HOUSING BUSHING, LOWER |
| 11 | 472-3813-2 | SHOULDER SUPPORT ASSEMBLY, RH |
| 12 | 472-3813-2 | SPRING HOUSING COVER, RH |
| 13 | 472-3812-2 | SPRING HOUSING COVER, RH |
| 14 | 472-3812-2 | SPRING HOUSING COVER, RH |
| 15 | 472-3812-2 | SPRING HOUSING COVER, RH |

REVISION HISTORY

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<tr>
<td>A</td>
<td>MOVED BALLOON CALLOUTS TO EXPLODED VIEW</td>
<td>7/27/2015</td>
<td>DW</td>
</tr>
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FINISH

APPROVALS

APPROVED

DRAWN

CHECKED

ENG

JIM CLEVENGER

472-3841

OF

date

ASME Y14.5M - 1994

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

1.6

DECIMAL:  ANGLES:  MACHINED:

X

.5

"X.X

.5

"X.XX

.1

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

RIGHT SHOULDER PIVOT ASSEMBLY
Rod End, Clavicle Assy.ipt
CLAVICLE COVER PLATE

MATERIAL: Steel

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

DECIMAL: ±0.1 mm
ANGLES: ±0.1°
MACHINED: ±0.2 mm

R2.0 TYP

Ø3.4 THRU

Ø6.3 X 90.0°

HEAT TREAT

DRAWING NUMBER WAS AXSDM102

DATE: 8/14/2014

ENGINEER: JIM CLEVENGER

NOTES:

1. DO NOT SCALE DRAWING

2. DIMENSIONS ARE IN MILLIMETERS

3. TOLERANCES ARE:
   - DECIMAL: ±0.1 mm
   - ANGLES: ±0.1°
   - MACHINED: ±0.2 mm

4. MATERIAL: Steel

5. DRAWING NUMBER WAS AXSDM102

6. DATE: 8/14/2014

7. ENGINEER: JIM CLEVENGER

Scale: 4X

Sheet 1 of 1
R1.0 TYP - 4 PLACES

φ20.0

18.0
12.0

7.6 GROOVE DIA
7.95 ± .03 DIA

φ8.05 ± .03 THRU

R8.5

25.0
13.0
39.2
5.0
12.0
1.1

R2.5

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS.

TOLERANCES ARE:

DECIMAL: ± .5
MACHINED: ± .2

DO NOT SCALE DRAWING

HeAT TReAT

MATERIAL

STEEL

DIA

7.6 GROOVE DIA
7.95 ± .03 DIA

R8.5

8.05 ± .03 THRU

R2.5

REV

DESCRIPTION

ZONE

REV

DATE

BY

A

DRAWING NUMBER WAS AXSDM107

9/11/2014

DW
Inboard Clavicle Linkage Spacer

- Material: Aluminum 6061
- Dimensions: Ø10.0, Ø8.0, 2.0
- Tolerances: 1.6, 0.5, X, 0.2, XX, 0.1
- Heat Treat: Heat treated
- Rod End Bearing Spacer, Inboard

Revision History:

<table>
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<tr>
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<th>DESCRIPTION</th>
<th>DATE</th>
<th>DESI</th>
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<td>9/11/2014</td>
<td>DW</td>
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<td>A</td>
<td>CHANGED SHEET SIZE TO C; REPLACED ITEMS AXSDM104B, AXSDM034B, AND AXSDM021B ITEM 7, 8, 9, &amp; 10; REMOVED ITEM 5001175V</td>
<td>2/5/2014</td>
<td>JHC</td>
<td></td>
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<tr>
<td>C</td>
<td>ADDED EXPLODED VIEW, MOVED BALLOON CALLOUTS TO EXPLODED VIEW</td>
<td>7/27/2015</td>
<td>DW</td>
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### REVISED DESCRIPTIONS

A. CHANGED SHEET SIZE TO C; REPLACED ITEMS AXSDM104B, AXSDM034B, AND AXSDM021B ITEM 7, 8, 9, & 10; REMOVED ITEM 5001175V


C. ADDED EXPLODED VIEW, MOVED BALLOON CALLOUTS TO EXPLODED VIEW

### PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>11</td>
<td>2</td>
<td>472-3856</td>
<td>ROD END BEARING SPACER, INBOARD</td>
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<tr>
<td>10</td>
<td>2</td>
<td>5001174V</td>
<td>8mm RETAINING RING</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>472-3899</td>
<td>LINKAGE PIN, INBOARD CLAVICLE</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>472-3855</td>
<td>LINKAGE BASE, INBOARD</td>
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<tr>
<td>7</td>
<td>1</td>
<td>472-3854</td>
<td>ROD END HOUSING, INBOARD</td>
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<tr>
<td>6</td>
<td>1</td>
<td>5000377</td>
<td>SCREW, FHCS M3 x 12</td>
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<td>5</td>
<td>1</td>
<td>472-3853</td>
<td>CLAVICLE COVER PLATE</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>5000946</td>
<td>METRIC SPHERICAL BEARING</td>
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<td>3</td>
<td>4</td>
<td>5000196</td>
<td>ROLL PIN, M3 x 14</td>
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<td>472-3852</td>
<td>ROD END HOUSING, OUTBOARD</td>
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<td>472-3851</td>
<td>CLAVICLE</td>
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### RIGHT CLAVICLE ASSEMBLY

**472-3860C**
**NOTES:**

1. **MATERIAL:**
   - OUTER RING: NATURAL RUBBER, 50 ±5 SHORE A DUROMETER.

**SECTION A-A**

**SCALE:** 2:1

**RUBBER OUTER RING MOLDED AROUND ALUMINUM INNER HUB, SEE NOTE 1**
SHOULDER COVER BUSHING

MATERIAL: Aluminum 6061

DIMENSIONS:
- Ø8.1
- Ø11.0
- Ø18.0
- 13.6
- 1.5

TOLERANCES ARE:
- DECIMAL: ±0.2
- ANGLES: ±0.1°
- MACHINED: ±0.1

DRAWING NUMBER: 472-3890

REVISION HISTORY

ZONE REV DESCRIPTION DATE BY
A DRAWING NUMBER WAS AXSDM037A 9/11/2014 DW

SCALE: 2X

NOTE:
- DO NOT SCALE DRAWING
- UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS
- TOLERANCES ARE:
  - DECIMAL: ±0.2
  - ANGLES: ±0.1°
  - MACHINED: ±0.1
- MATERIAL: Aluminum 6061

VEHICLE RESEARCH and TEST CENTER

APPROVALS

DATE

DESIGN

CHECKED

10/29/2013

JIM CLEVINGER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
MATERIAL

START WITH A M8-1.25 x 50mm LONG BHCS (5000260V) MODIFY AS SHOWN.

**REVISION HISTORY**

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<td>9/11/2014</td>
<td>DW</td>
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</table>
NOTE:
A 3-D FILE IS AVAILABLE FOR REFERENCE FROM NHTSA
NOTES:

1. RUBBER DIMENSIONAL TOLERANCE ±0.5 UNLESS OTHERWISE SPECIFIED.

2. MATERIAL: BUNA-N RUBBER, 50 ±5 SHORE A DURAMETER.
NOTES:

1. STRAIN RELIEVE THE ACCELEROMETER WIRE TO THE MID-STERNUM PLATE AS SHOWN.

SEE NOTE 1

(SA572-54, ACCELEROMETER)
NOTES:

1. SAND BLAST AND CLEAN WITH ACETONE, THE AREA OF EACH METAL PLATE THAT WILL MAKE CONTACT WITH EITHER THE FOAM OR RUBBER.

2. ALIGN AND CENTER THE FRONT EDGE OF 472-3414 WITH 472-3413. MAKE SURE THE HOLE PATTERN ON THE METAL PLATE IS AS SHOWN.

3. CENTER EACH MID-STERNUM MASS PLATE (472-3411) ON EACH MASS DAMPING FOAM (472-3414 AND 472-3412).

4. BOND FOAM AND RUBBER PADS TO PLATES USING THERMOSETTING CONTACT ADHESIVE OR EQUIVALENT.
**STEP 1: MACHINING**

- 4x M5x0.8 THRU
- 2x M1.4x0.3 THRU
- M4x0.7 THRU

**TOLERANCES**
- UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- Rc 40-43
- TEFLON COATING 1.000

**SCALE .750**

**SCALE .750**

**REVISION HISTORY**

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<tr>
<td>A</td>
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<td>RENUMBERED FROM T1MSM010 R80 AND CONVERTED TO METRIC FOR THOR-M; ADD CENTER HOLE</td>
<td>9/13/2011</td>
<td>BK</td>
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</table>
1. DIMENSION TOLERANCE ±.8, UNLESS OTHERWISE NOTED.
NOTES:

1. POWDER OR BEAD BLAST.
2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSION TOLERANCE ±.8 , UNLESS OTHERWISE NOTED.
1. RUBBER TOLERANCE ±.5 AND DUROMETER ±5, UNLESS OTHERWISE SPECIFIED.
PART IS SYMMETRICAL ACROSS CENTERLINE
BIB INSERT - THICK, LARGE

Dimensions are in millimeters.

Third angle projection.

Unless otherwise specified, decimals indicate one significant figure.

Finish: remove burrs & break sharp edges.

Heat treat: natural.

Material: aluminum-7075.

Projection: 2:1.

Tolerances:

- 8X R0.8
- Ø22.0
- 4X Ø4.0
- Ø9.75 +0.03 -0.00 ¹THRU

Notes:

- Remove burrs & break sharp edges
- Natural heat treat
NOTES:

1. **CUT THE NYLON WEBBING TO A LENGTH OF 336mm AND OVERLAP AS DIMENSIONED.**

2. **STITCH THE NYLON WEBBING USING KEVLAR THREAD AS NECESSARY.**

3. **MAKE FROM NYLON WEBBING WITH A 10 kN BREAKING STRENGTH MIN.**

SEE NOTE #2

DO NOT SCALE DRAWING

TOLERANCES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REV:DRAWING NO.:SHEET

SCALE: SIZE:

DESCRIPTION:

TOLERANCES

DO NOT SCALE DRAWING

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY:

DRAWN BY: DATE:

REV: DATE:

ECO# REV DESCRIPTION DATE BY

A RENUMBER T1TXM017 RN/C AND CONVERTED TO METRIC FOR THOR-M 9/23/2011 TKN

B REMOVED PARTS LIST; DIM. 150 MIN WAS 152, 76 MIN WAS 76, AND 38 MIN WAS 38; REMOVED STITCHING DIMENSIONS; ADDED DIMENSION 20 MAX; IN NOTE 1, 336mm WAS 343MM; IN NOTE 2, AS NECESSARY WAS AS DIMENSIONED; ADDED NOTE 3 8/27/2015 DW

SEE NOTE #2

THOR-MAX ASSEMBLY

472-3000 1 Thanh 9/23/2011

NEXT ASSEMBLY QTY

TOTAL QTY IN DUMMY 1 1,000 762/3517

19 MAX

150 MIN

472-3517.iam

472-3517.png

ISO VIEW

SCALE 1:1
ISO VIEW
SCALE 3.000

NOTES:
1. POWDER OR BEAD BLAST.
2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
4. STAMP OR ETCH "LT" (3mm MIN. CHARACTERS) WHERE SHOWN.
PARTS LIST

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<td>LOAD DISTRIBUTION PLATE</td>
<td>472-46251</td>
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<td>ACCELEROMETER MOUNT, UPPER ABDOMEN</td>
<td>472-46241</td>
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<td>INTERNAL FOAM FRONT LAYER</td>
<td>472-46231</td>
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<td>INTERNAL FOAM MIDDLE LAYER</td>
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<td>INTERNAL FOAM REAR LAYER</td>
<td>472-46211</td>
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<td>UPPER ABDOMEN INTERN. MOUNT PLATE</td>
<td>472-46201</td>
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<td>SPINAL MOUNT BRACKET ASSEMBLY</td>
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<td>C</td>
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<td>SCALE:</td>
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| DIMENSIONS ARE IN MILLIMETERS       |     |              |       |
| X.X                               |     |              |       |
| X.XX                              |     |              |       |
| X.XXX                             |     |              |       |

| TOLERANCES                         |     |              |       |
| X                                 |     |              |       |
|                                  |     |              |       |
| 0.5                               |     |              |       |
|                                  |     |              |       |
| 0.5                               |     |              |       |

**REVISION HISTORY**

- **A** RENUMBERED FROM T1UAM000 R05 AND CONVERTED TO METRIC FOR THOR-M 9/8/2011 BK
- **B** UPDATE TO SHOW CHANGES TO 472-4622, 472-4623 2/4/2012 BK
- **C** UPDATE TO SHOW PROPER VELCRO LOCATION 4/3/2012 BK

**ECO#**

- **ECO#**
- **REV**
- **DESCRIPTION**
- **DATE**
- **BY**
## PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>THORACIC INSTR. BRACKET BASE PLATE</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>THORACIC INSTR. BRACKET, UPPER ABDOMEN</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>UPPER ABDOMEN SPINAL MOUNT BRACKET</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>X 1 X 12 LG. PKS</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>X 1 X 30 LG. PKS</td>
</tr>
</tbody>
</table>

### NOTES:

1. ASSEMBLE USING PERMANENT LIQUID THREAD LOCKER.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.002in - 0.008in MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.

2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)

3. POWDER OR BEAD BLAST.

4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.

5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
**NOTES:**

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.

2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)

3. POWDER OR BEAD BLAST.

4. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.

5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. MATERIAL: BUNA-N (SHORE 60A ±5)
   SAE J2000 SPECIFICATION: 2BG617B14K11 Z1Z2Z3
   2-GRADE 2
   BG-SWELL 405 @ CONSTANT TEMP 100°C
   6-DUROMETER 60
   17-17 MPA
   B14-COMPRESSION SET 22H @ 110°C < 50%
   K11-ADHESION > 1.4 MPA
   Z1-BUNA-N
   Z2-DUROMETER 55-65A
   Z3-PERFORMANCE SPECIFICATIONS TAKE PRECEDENCE OVER DUROMETER

2. NOMINAL STIFFNESS @ 25% COMPRESSION: 900±50 KPA (130±7 PSI)
   REFER TO THOR CERTIFICATION MANUAL FOR DYNAMIC PERFORMANCE SPECIFICATIONS.

3. FOAM TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.
NOTES:

1. FOAM MATERIAL IS BLENDED SPONGE RUBBER
   NEOPRENE/SBR/EPDM FOAM RUBBER (NOMINAL DUROMETER 20A ±5)
   SAE J18 SPECIFICATION: 1A5
   1-OPEN CELL FOAM
   A-NON-OIL RESISTANT
   S-COMPRESSION DEFLECTION 25% 119-168 KPA (17-24 PSI)

2. NOMINAL STIFFNESS @ 50% COMPRESSION: 200±15 KPA (29±2 PSI)
   REFER TO THOR CERTIFICATION MANUAL FOR PERFORMANCE SPECIFICATIONS.

3. FOAM TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.
SCALE .750

SECTION A-A
SCALE 1.000

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.
2. FOAM TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.
3. MATERIAL: CHARCOAL POLYESTER FOAM WITH NOMINAL DENSITY OF 6 LB/CU FT OR EQUIVALENT. MATERIAL CAN BE ADJUSTED TO MEET CERTIFICATION REQUIREMENT.

REVISED FROM NTHIA DESIGN REV D WITHOUT HOLES 2/4/2012 BK

ECO# REV DESCRIPTION DATE BY
A A RENUMBERED FROM T1UAM012 R04 FOR THOR-IN, ADD NOTE 1 & 2 9/8/2011 BK
B B REDESIGN TO ORIGINAL NHTSA DESIGN REV 3 (WITHOUT HOLES) 2/4/2012 BK

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

INTERNAL FOAM FRONT LAYER

472-4623
# Parts List

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>5001107</td>
<td>M3 X 0.5 X 4.25 LG. MINI KEENSERT</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

# Scale 2.000

- Dimensions are in millimeters
- Do not scale drawing
- THIRD ANGLE PROJECTION

## Notes:

1. Dimensions symmetric about $\theta$, unless otherwise noted.
2. Stamp or etch part number (3mm characters) where shown. (Optional)

## Tolerances

- Decimal
- Angles
- Finish: Clear anodize 3.000
- Heat treat: 6061-T6 aluminum

## Revisions

<table>
<thead>
<tr>
<th>ECO#</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1UAM015 R05 AND CONVERTED TO METRIC FOR THOR-M; ADD NOTE 1 AND (OPTIONAL) TO NOTE 2</td>
<td>9/7/2011</td>
<td>BK</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>INSTALL KEENSERTS FROM OTHER SIDE; ADD NOTE</td>
<td>7/19/2012</td>
<td>BK</td>
</tr>
</tbody>
</table>
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH PART NUMBER (3mm CHARACTERS) WHERE SHOWN. (OPTIONAL)
ACCELEROMETER MOUNT PLATE

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\perp$, UNLESS OTHERWISE NOTED.

REVISION HISTORY

<table>
<thead>
<tr>
<th>ECO#</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1UAM014 R03 AND CONVERTED TO METRIC FOR THOR-M; ADD NOTE 1; $\phi 7.0 \times 90^\circ$ WAS $\phi 6.9 \times 82^\circ$</td>
<td>9/7/2011</td>
<td>BK</td>
</tr>
</tbody>
</table>
NOTES:
1. PUNCH GROMMET TO FLAPS OF COMPLETED ASSEMBLY USING GROMMET TOOL.

NOTES:
1. THE NUMBERING SCHEME IS USED TO IDENTIFY WHICH PATTERN EDGES ARE SEWN TOGETHER TO CREATE THE UPPER ABDOMEN.
2. STITCHES MUST BE CONSISTENT AND SECURE.
3. THE BAG IS STITCHED WITH KEVLAR THREAD (MINIMUM 3 STITCHES/CM).
4. FABRIC: CORDURA NYLON (TAN) ZIPPER: STIFFENED NYLON (WHITE) SIZE #10, LENGTH 406mm, BRASS, OPEN TOP, CLOSED BOTTOM
5. ADD 2X 3.2 HOLES AFTER SEWING.
NOTES:
1. USE BLACK LOOP VELCRO MATERIAL AND SEW TO THE FRONT OF THE UPPER ABDOMEN FRONT OVERLAY FABRIC PATTERN (472-4655).

2. TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.

3. PRINT SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL.

4. CUT OUT ACCELEROMETER MOUNTING HOLE AFTER SEWING.

LEGEND
- - - - - - PATTERN EDGES
- - - - - - STITCH LINES
NOTES:

1. USE CORDURA NYLON FABRIC (1000 DENIER 10 OZ/YD).
2. TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.
3. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL.
4. SEE DRAWING 472-4650 FOR ASSEMBLY PROCEDURE.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \Theta \), UNLESS OTHERWISE NOTED.

2. MATERIAL: NYLON STIFFENING CLOTH (DUCK CLOTH) (20 OZ/YD MEETS MIL-C-3953)

3. CLOTH TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.

4. ADD ACCELEROMETER MOUNTING HOLES AFTER SEWING.

5. SEE DRAWING 472-4650 FOR ASSEMBLY PROCEDURE.
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
2. USE CORDURA NYLON FABRIC (1000DENIER 10 OZ/YD)
3. FABRIC TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.
4. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING MATERIAL.
5. PUNCH HOLES THROUGH FLAP AFTER SEWING.
6. CUT OUT ACCELEROMETER MOUNTING HOLES AFTER SEWING.
7. THE DRAWING AS SHOWN REPRESENTS THE FRONT VIEW OF THE BAG.
   (AS IF VIEWING THE THOR FROM THE FRONT)
8. SEE DRAWING 472-4650 FOR ASSEMBLY PROCEDURE.
NOTES:

1. SIZE: #10, BROWN POLYESTER, METAL (BRASS)
   ZIPPER TYPE: OPEN TOP -CLOSED BOTTOM STYLE.

2. THE ENDS SHOULD BE SEWN TOGETHER TO PREVENT THE SLIDER FROM PULLING OFF THE TRACK.

3. ZIPPER TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.
REVISION HISTORY

<table>
<thead>
<tr>
<th>ECO#</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1IRM118 R01 FOR THOR-M 2.3 DIA. HOLES WERE M2THREADED; ADD 2.3 DIA. HOLE; 2X R6.0 WAS 4.8; Ø9.5 WAS Ø9.53; FINISH WAS RED ANODIZE</td>
<td>10/5/2011</td>
<td>BK</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>ADD 2X 1.0 X 45° CHAMFERS; Ø6.4 WAS 26.0; 31.3 WAS 24.0; C'BORE Ø 4.8 WAS Ø4.3</td>
<td>10/11/12</td>
<td>BK</td>
</tr>
</tbody>
</table>

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
**SPECIFICATIONS**

- **SHAFT GUIDING:** BALL BEARINGS
- **INDEPENDENT LINEARITY (TEA):** ±0.5%
- **OMHIC VALUES:** 1000 OHMS
- **ACTUAL ELECTRICAL ANGLE 330°:** ±5%
- **MAXIMUM POWER RATING @ 70°C:** 0.2 WATTS
- **WEIGHT:** 54±2g (LESS CABLES)
- **OPERATING TEMPERATURE RANGE:** -55°C TO +125°C
- **MAXIMUM SPEED ROTATION:** 600

**PIN DESIGNATION**

1 = -EXCITATION  
2 = +SIGNAL  
3 = +EXCITATION

**REFERENCE:** VISHAY SFERNICE #ECO-50-ESC-102

**UNLESS OTHERWISE SPECIFIED:** ALL MACHINED SURFACES 1.60 OR BETTER.

---

**PARTS LIST**

<table>
<thead>
<tr>
<th>REFERENCE</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A INDEPENDENT LINEARITY (TEA) WAS ±0.25%</td>
<td>9/17/2015</td>
<td>DW</td>
<td></td>
</tr>
</tbody>
</table>
SCALE 4.000

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT θ, UNLESS OTHERWISE NOTED.
SCALE 3.000

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
**NOTES:**

THE IRTRACC IS AN INHERENTLY NON-LINEAR TRANSDUCER. AN IRTRACC'S RAW VOLTAGE VALUES MUST BE ADJUSTED BY THE APPLICATION OF A LINEARIZATION EXPONENT APPLIED THROUGH POST TEST PROCESSING SOFTWARE IN ORDER TO ACHIEVE ACCURATE DISPLACEMENT DATA.

---

**WIRE ASSIGNMENTS**

<table>
<thead>
<tr>
<th>WIRE #</th>
<th>WIRE COLOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RED</td>
<td>+EXC</td>
</tr>
<tr>
<td>2</td>
<td>GREEN</td>
<td>+SIG</td>
</tr>
<tr>
<td>3</td>
<td>ORANGE</td>
<td>ID</td>
</tr>
<tr>
<td>4</td>
<td>SHIELD</td>
<td>GROUND</td>
</tr>
<tr>
<td>5</td>
<td>WHITE</td>
<td>-SIG</td>
</tr>
<tr>
<td>6</td>
<td>BLACK</td>
<td>-EXC</td>
</tr>
<tr>
<td>7</td>
<td>NONE</td>
<td>GUIDE</td>
</tr>
</tbody>
</table>

---

**LINEARITY SPECIFICATIONS:**

- **MAXIMUM DISPLACEMENT:** 90mm
- **MAXIMUM ERROR:** 2% FS
- **INPUT VOLTAGE:** 5V @20mA
- **OUTPUT VOLTAGE:** 0V to 1.7V
NOTES:

1. MAKE FROM 9002660V, MODIFY AS SHOWN.
<table>
<thead>
<tr>
<th>PARTS LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
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<td>7</td>
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<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
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<tr>
<td>10</td>
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</tbody>
</table>

REVOLUTION HISTORY

<table>
<thead>
<tr>
<th>ECN</th>
<th>EXC</th>
<th>REVISION</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1IRM102 RB FOR THOR-M</td>
<td>10/7/2011</td>
<td>BK</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>ADDED ITEMS 8 AND 2 VISIBLE IN PARTS LIST</td>
<td>6/8/2012</td>
<td>JBH</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>REDESIGN PARTS FOR NEW LOCATION; ADD 8X LOCK WASHERS; 8X M2 X 6 SHCS WERE M2 X 8 SHCS</td>
<td>10/11/2012</td>
<td>BK</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>5000456 WAS 5000600</td>
<td>12/17/2014</td>
<td>BK</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>REVISED ITEM #8 SA572-S117 - IRTRACC CHEST, THOR-M</td>
<td>6/2/2014</td>
<td>DW</td>
<td></td>
</tr>
</tbody>
</table>

SCALE 2.000
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT T, UNLESS OTHERWISE NOTED.

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF

1. DIMENSIONS SYMMETRIC ABOUT T, UNLESS OTHERWISE NOTED.
SCALE 2.000

NOTES:
1. DIMENSIONS SYMMETRIC ABOUT $\perp$, UNLESS OTHERWISE NOTED.
<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>472-3580 Mod.iam</td>
<td>IRTRACC ASSEMBLY, LOWER LEFT</td>
<td>1</td>
</tr>
<tr>
<td>5000216</td>
<td>M2 SPLIT LOCK WASHER SS</td>
<td>8</td>
</tr>
<tr>
<td>5000083</td>
<td>M2 X 6 X 8 LC. SPICE</td>
<td>10</td>
</tr>
<tr>
<td>5000456</td>
<td>M2.5 X 0.45 X 10 LG. SHCS</td>
<td>1</td>
</tr>
<tr>
<td>5000578</td>
<td>M2.5 X 0.45 X 3 LG. SSCP</td>
<td>2</td>
</tr>
<tr>
<td>472-3555</td>
<td>CLAMP, IRTRACC</td>
<td>2</td>
</tr>
<tr>
<td>472-3553</td>
<td>ADAPTOR, SERVO/IRTRACC</td>
<td>1</td>
</tr>
<tr>
<td>472-3552</td>
<td>IRTRACC ARM MOUNTING BRACKET, LIFT</td>
<td>1</td>
</tr>
<tr>
<td>5000278</td>
<td>M3 FLAT WASHER LARGE DD. SS</td>
<td>2</td>
</tr>
<tr>
<td>9000201</td>
<td>FLANGE BEARING (2 3/4&quot; O.D. x 1 3/8&quot; I.D.)</td>
<td>2</td>
</tr>
<tr>
<td>5072-5114</td>
<td>ROTATIVE TRANSUDER</td>
<td>2</td>
</tr>
<tr>
<td>472-3571</td>
<td>UPPER IRTRACC BASE</td>
<td>1</td>
</tr>
</tbody>
</table>

**REVISION HISTORY**

- A: RENUMBERED PART T1IRM104 RA FOR THOR-M 10/27/2011 BK
- B: MADE ITEMS 9 AND 2 VISIBLE IN PARTS LIST 6/8/2012 JBH
- C: REDESIGN PARTS FOR NEW LOCATION; ADD 8X LOCK WASHERS; 8X M2 X 6 SHCS WERE M2 X 6 SHCS 10/11/2012 BK
- D: MATERIAL WAS 5000600 12/17/2012 BK
- E: REVISED ITEM #9 SA572-S117 - IRTRACC CHEST, THOR-M 6/2/2014 DW

**DATES**

- 472-3580 Mod.iam DATE: 1/11/2012
- IRTRACC ASSEMBLY, LOWER LEFT DATE: 1/11/2012

**TOLERANCES**

- UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION

**CHECKED BY:**

- B. KIMES 10/27/2011

**DRAWN BY:**

- J. WANG 10/27/2011
ATTACH LOWER ABDOMEN FRONT FOAM - 472-4764 TO LOWER ABDOMEN REAR FOAM - 472-4765 USING DOUBLE SIDED TAPE, MATERIAL PLASTIC FILM, 3 MIL THICKNESS MAX., 23 OZ/IN ADHESION STRENGTH MAX., OR EQUIVALENT.

VELCRO COVER NOT SHOWN IN THESE 3 VIEWS
NOTES:

1. 472-4713 PARTS WILL OVERHANG 472-4711 PLATE SLIGHTLY IN SEVERAL PLACES.
2. USE M6 BOLTS TO AFFIX 472-4712 PARTS TO 472-4711 PLATE DURING WELDING.
3. CLEAR ALL HOLES OF EXCESS WELD MATERIAL.
4. POWDER OR BEAD BLAST.
5. NICKEL PLATE 0.003mm-0.008mm MAX. AFTER MACHINING.
6. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

FILLET WELD AROUND EACH CONE

FILLET WELD AROUND EACH THREADED PLUG

DIMENSIONS SYMMETRIC ABOUT CENTERLINE
SCALE 3.0

threaded plug

\( \Phi 12.5 \)

M6x1

DRILL AND TAP THRU

6.000

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

\( X.XXX \)

\( \Phi 0.01 \)

\( X.XX \)

\( \Phi 0.1 \)

\( X.X \)

\( \Phi 0.2 \)

\( X \)

\( \Phi 0.5 \)

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

D. WASHENKO

DATE:

1/11/2012

NEXT ASSEMBLY

472-4710

QTY

4

QTY

TOTAL QTY IN DUMMY

4

472-4712

A

REVISION HISTORY

ECO# | REV | DESCRIPTION | DATE | BY

A | | RENUMBERED FROM TILLAM083 R02 AND CONVERTED TO METRIC FOR THOR-M | 8/22/2011 | DW
SCALE 1.000

SECTION A-A

SCALE 1.000

3.00

R 1.0
INNER & OUTER EDGES

19.00

6.55

10°

Ø(66.02) S.C.

Ø(59.94) S.C.

Ø56.00 S.C.

Ø60.0 S.C.

REV: DRAWING NO.: SHEET

SCALE:

SIZE:

DESCRIPTION:

TOLERANCES

DO NOT SCALE DRAWING

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY:

DRAWN BY: DATE:

DATE:

DATE:

DO NOT SCALE DRAWING

SCALE:

SIZE:

DESCRIPTION:

TOLERANCES

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

D. WASHENKO 6/16/2010

1.000

ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM T1LAM082 R6 AND CONVERTED TO METRIC FOR THOR-M 08/30/11 DW

REVISION HISTORY

ECO# REV DESCRIPTION DATE BY
A RENUMBERED FROM T1LAM082 R6 AND CONVERTED TO METRIC FOR THOR-M 08/30/11 DW

QTY TOTAL QTY IN DUMMY

472-4710 2 1018 STEEL dwashenko 6/16/2010

NEXT ASSEMBLY QTY

TOTAL QTY IN DUMMY

472-4713 2 2 D. WASHENKO 1/11/2012

1 OF 1 A31

FLARED OVERLOAD CONE
NOTES:

1. EXTERIOR BUTT WELDS TO BE GROUND DOWN TO STOCK FINISH.
2. CLEAR ALL HOLES OF EXCESS WELD MATERIAL.
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm-0.008mm MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
SIDE BRACKET PLATE, LEFT

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

A 3 X 45° Chamfer

3 X 45° Chamfer

SCALE 1.000

1.000

1018 STEEL

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

REV:

DRAWING NO.:

SIZE:

DESCRIPTION:

TOLERANCES

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ECO# REV DESCRIPTION DATE BY

A RENUMBERED FROM TILAP042 R4 FOR THOR-M; ADD CHAMBERS TO CREATE LEFT SIDE 8/31/2011 DW

REVISION HISTORY

REV
ECO# DESCRIPTION DATE BY

472-4720-1 1 1018 STEEL dwashenko 8/31/2011

472-4723-1 1 A3 1 OF 1 1/12/2012

NEXT ASSEMBLY QTY

TOTAL QTY IN DUMMY 1

DATE:

CHECKED BY:

DRAWN BY:

DATE:

PROJECT NO.:

MATERIAL:

HEAT TREAT:

FINISH:

DECIMALS ANGLES FINISH

X X

0.5

0.5

0.2

X.X

0.1

X.XX

0.01

1.000

100°

R44.5

82.4

69.9

100°

38.0

3 X 45° Chamfer

27.8

68.0

82.5

82.4

6.5

38.0

3 X 45° Chamfer

76.5

100°

R44.5

82.5

R44.5

3 X 45° Chamfer

A

A

A

A

A
NOTES:
1. EXTERIOR BUTT WELDS TO BE GROUND DOWN TO STOCK FINISH.
2. CLEAR ALL HOLES OF EXCESS WELD MATERIAL.
3. POWDER OR BEAD BLAST.
4. NICKEL PLATE 0.003mm-0.008mm MAX. AFTER MACHINING.
5. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

1. ASSEMBLE IRTRACC TO PIVOT ASSEMBLY AS SHOWN.

2. PROVIDE INDIVIDUAL CERT SHEETS FOR IRTRACC AND (2) POTENTIOMETERS.
THE IRTRACC IS AN INHERENTLY NON-LINEAR DISPLACEMENT TRANSDUCER. AN IRTRACC'S RAW VOLTAGE VALUES MUST BE ADJUSTED BY THE APPLICATION OF A LINEARIZATION EXponent APPLIED THROUGH POST TEST PROCESSING SOFTWARE IN ORDER TO ACHIEVE ACCURATE DISPLACEMENT DATA.

SPECIFICATIONS:
- **MECHANICAL TRAVEL:** 123 mm
- **MEASURED RANGE:** 105 mm
- **PRE/POST TRAVEL:** 7.5 mm
- **MAXIMUM ERROR:** ± 3%
- **INPUT VOLTAGE:** 5 VOLTS (± 1%) @20mA
- **OUTPUT RANGE:** 0 TO 4.0 VOLTS
- **WEIGHT:** 163 g (36 LBS) LESS MAIN CABLE
- **NONLINEARITY:** (LINEARIZED DATA) < 2% FULL SCALE
- **SEE CALIBRATION REPORT FOR LINEARITY CONST ANT FIGURE.**
- **DIMENSIONS NOT SHOWN TO BE MANUFACTURER'S STANDARDS.**

NOTES:
- CONVERSION TO METRIC FOR THOR-M; MECHANICAL TRAVEL WAS 120mm; ADD COLLAPSED VIEW AND SEC B-B
- NEXT ASSEMBLY 472-4730-2 472-4730-1
- QTY 1 1
- TOTAL QTY IN DUMMY 2
- REV: D - DRAWING NO.: SA572-S121
- SCALE: 0.75
- FULLY EXTENDED
- SCALE: 0.500

**WIRE COLOR** | **FUNCTION**
--- | ---
RED | +EXC
GREEN | +SIG
ORANGE | ID
SHIELD | GND
WHITE | -SIG
BLACK | -EXC

**REV:** 1
**DRAWN BY:** dwashenko 8/23/2011
**DATE:** 1/12/2012

**PROJECT NO.** 472-4730-1
**ENGINEER:** D. WASHENKO

**ECO#** | **REV** | **DESCRIPTION** | **DATE** | **BY**
--- | --- | --- | --- | ---
A | | CONVERTED TO METRIC FOR THOR-M; MECHANICAL TRAVEL WAS 120mm; ADD COLLAPSED VIEW AND SEC B-B | 8/23/2011 | DW

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**TOTAL QTY IN DUMMY:** 0.75

**UNIVERSAL JOINT ASSY, 472-4751**
- M10x1.5 HEX JAM NUT
- FLAT WASHER 10.5 ID x 20 OD
- MS X 0.8 THREAD THRU UNIVERSAL JOINT SEGMENT

**DIMENSIONS:**

- **SECTION A-A**
  - FULLY EXTENDED
  - SCALE: 0.75
  - 192.3 FULLY EXTENDED
  - Ø27.7

- **SECTION B-B**
  - FULLY COLLAPSED
  - SCALE: 0.75
  - 69.3
NOTES:
1. UNIVERSAL JOINT ASSEMBLY IS PURCHASED IN KIT FORM.
2. MODIFY "RIGHT SEGMENT" AS SHOWN ON SHEET 2.
3. MODIFY "LEFT SEGMENT" AS SHOWN ON SHEET 3.
4. NICKEL PLATE "RIGHT SEGMENT" AFTER MACHINING. 0.008mm MAXIMUM PER SIDE.
5. PRESASSEMBLE UNIVERSAL JOINT WITHOUT GREASE TO VERIFY SMOOTH AND CORRECT MOVEMENT.
6. REMOVE NICKEL PLATE MATERIAL FROM I.D. OF RIGHT SEGMENT, AS NECESSARY.
7. DISASSEMBLE JOINT ASSEMBLY. LIGHTLY GREASE AL BEARING AND CONTACT SURFACES.
8. ORIENT LEFT SEGMENT OVER BLOCK WITH CENTER HOLES ALIGNED.
9. PLACE THE ASSEMBLED JOINT ON A FLAT, HARD SURFACE AND PEEN THE ENDS OF THE SMALL PIN WITH A PUNCH AND HAMMER.
10. CHECK THE ASSEMBLY FOR CORRECT MOVEMENT. THE SMALL PIN SHOULD NOT HAVE ANY SIDE TO SIDE MOVEMENT.

(CAUTION: DO NOT CRUSH THE YOKE OR OVER PEEN THE PIN.)
UNIVERSAL JOINT ASSEMBLY

LEFT SEGMENT

M2.5x0.45 TAP THRU TO CENTER
4 HOLES EQUALLY SPACED ON O.D.

45°

3.12

9.893 ± .000

1.4 ± .013

2.39 SLOT CENTERED

5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

2.8

2.39 SLOT CENTERED

2

3.0 SLOT CENTERED

5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

2.8

2.39 SLOT CENTERED

2

3.0 SLOT CENTERED

5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

2.8

2.39 SLOT CENTERED

2

3.0 SLOT CENTERED

5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

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5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

2.8

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5.59 ± .05

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(R1.19)

(R1.52)

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1.8

2.3

2.8

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5.59 ± .05

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5.59 ± .05

3.0 SLOT CENTERED

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(R1.52)

4.45

1.8

2.3

2.8

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2

3.0 SLOT CENTERED

5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

2.8

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2

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5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3

2.8

2.39 SLOT CENTERED

2

3.0 SLOT CENTERED

5.59 ± .05

3.0 SLOT CENTERED

(R1.19)

(R1.52)

4.45

1.8

2.3
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ⌀, UNLESS OTHERWISE NOTED.
**SECTION A-A**

- **Dimensioning and Tolerancing:**
  - \( \phi 1.510 \pm .010 \)
  - \( \phi 6.070 \pm .013 \) to pocket
  - \( 2X \) 4.94
  - \( 2X \) 4.32
  - \( \phi 0.8000 \pm .025 \) ream thru

- **Material and Finish:**
  - 7075-T6 Aluminum
  - Clear Anodize

- **Electrical Characteristics:**
  - 472-4740-1
  - QTY: 2
  - Dummy: 472-4743

- **Drawing Information:**
  - **Scale:** 1.50
  - **Drawing No.:** 472-4740-1
  - **Date:** 8/22/2011
  - **Checked by:** D. Washenko

- **Revision History:**
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<th>DATE</th>
<th>BY</th>
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<td>RENUMBERED FROM TIHRM203 CK0 FOR THOR-M; 12.0 WAS 12.02; 4.2 WAS 4.24</td>
<td>8/22/2011</td>
<td>DW</td>
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<tr>
<td>B</td>
<td></td>
<td>ADD ADD TOLERANCES, GD&amp;T BOXES, MISSING DIMENSIONS; ADD CHAMFER</td>
<td>8/1/2012</td>
<td>BK</td>
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</tbody>
</table>
SHAFT HORIZONTAL

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

THIRD ANGLE PROJECTION

ENGINEER: D. WASHENKO

DATE: 1/12/2012

NEXT ASSEMBLY 472-4740-2

QTY 1

TOTAL QTY IN DUMMY 2

D. WASHENKO

DATE 12/2012

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REV: A

DRAWING NO.: 472-4740

PROJECT NO.: 303 S.S. OR EQUIVALENT

TOLERANCES

0.013 REAM 12.0 MIN./14.5 MAX. DEPTH

0.025 A

ECO # REV DESCRIPTION DATE BY

A 1 RENUMBERED FROM T1IRM204 R00 FOR THOR-M; Ø1.613 +.010/-.000 WAS Ø1.613; Ø6.060 +.000/-.012 WAS Ø6.060 +.000/-.013 9/1/11 DW

B 2 ADD GD&T BOX 6/1/2012 BK

REVISION HISTORY

Eco # Rev Description Date By

A 1 RENUMBERED FROM T1IRM204 R00 FOR THOR-M; Ø1.613 +.010/-.000 WAS Ø1.613; Ø6.060 +.000/-.012 WAS Ø6.060 +.000/-.013 9/1/11 DW

B 2 ADD GD&T BOX 6/1/2012 BK
REV: DRAWING NO.: SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY: DATE:
DATE:
REV
ECO#
REVISION HISTORY
DESCRIPTION
DATE
BY
A
A

RENUMBERED FROM T11RM20S-R00 FOR THOR-M; Ø5.990+.000/-.012 WAS Ø5.990+.000/-.013
9/1/11
DW

SCALE 4.000

SHAFT VERTICAL

Ø3.00 C’BORE TO DEPTH SHOWN Ø2.60 DRILL THRU TO CENTER HOLE

Ø3.180+.013 REAM 0.000 12.0 MIN./14.5 MAX. DEPTH Ø5.990-.000)

A
A

5.990-.012
5.990-.013

1.5 SLOT CENT.

R.75 TYP.

4.5 SLOT CENT.

2.60

9.00

10.75

12.0 MIN./14.5 MAX. DEPTH

Ó.025 0.013

3.00 Ø

1.5 SLOT CENT.

R.75 TYP.

4.5 SLOT CENT.

2.60

9.00

10.75

12.0 MIN./14.5 MAX. DEPTH

Ó.025 0.013

3.00 Ø

1.5 SLOT CENT.

R.75 TYP.

4.5 SLOT CENT.

2.60

9.00

10.75

12.0 MIN./14.5 MAX. DEPTH

Ó.025 0.013

3.00 Ø
NOTES:

1. ASSEMBLE IRTRACC TO PIVOT ASSEMBLY AS SHOWN.
2. PROVIDE INDIVIDUAL CERT SHEETS FOR IRTRACC AND (2) POTENTIOMETERS.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $t$, UNLESS OTHERWISE NOTED.
NOTES:

1. POWDER OR BEAD BLAST.
2. NICKEL PLATE 0.003mm-0.008mm MAX. AFTER MACHINING.
3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
NOTES:

D 1. STAMP OR ETCH "F" AS SHOWN.
**NOTES:**

1. MATERIAL: CHARCOAL POLYESTER FOAM WITH NOMINAL DENSITY OF 6 LBS/CU FT
   - SAE J18 SPECIFICATION: 1AO
   - OPEN CELL
   - NONOIL RESISTANT
   - COMPRESSION DEFLECTION 25% 3.5-14 KPA (0.5-2 PSI)
   - REFER TO CERTIFICATION MANUAL FOR PERFORMANCE SPECIFICATIONS FOR THIS PART.

2. NOMINAL STIFFNESS @ 75% COMPRESSION: 43\pm3 KPA (6.2\pm0.5 PSI)
   - @ 90% COMPRESSION: 420\pm30 KPA (62\pm0.5 PSI)

---

**SCALE .500**
NOTES:
THE FOAM MATERIAL IS BLENDED SPONGE RUBBER
NEOPRENE / EPDM / SBR FOAM RUBBER (NOMINAL DUROMETER 20A ± 5A)
SAE J18 SPECIFICATION: 1A5
1-OPEN CELL FOAM
2-NON-OIL RESISTANT
5-COMPRESSION DEFORMATION 25% 119-168 kPa (17-24 PSI)
NOMINAL STIFFNESS @ 50% COMPRESSION: 200± 15 kPa (29± 2 PSI)
REFER TO THE CERTIFICATION MANUAL FOR PERFORMANCE
SPECIFICATION FOR THIS PART.
NOTES:

1. EXPLODED VIEW SHOWS SOME COMPONENTS IN PARTIALLY FOLDED STATE.

2. ISO VIEW SHOWS COMPONENTS IN IDEAL STATE.

3. STITCH ALL ADJACENT TABS TO FORM SEWN ASSEMBLY AS SHOWN. SEE INDIVIDUAL PATTERN DRAWINGS FOR MORE INFORMATION.

4. 472-4763-8 ASSEMBLES BETWEEN THE LOWER AND UPPER ABDOMEN AT THORAX ASSEMBLY.
NOTES:
1. USE CORDURA NYLON FABRIC (1000 DENIER NYLON - 10 OZ/YD)
2. ADD HOLES AFTER SEWING.
3. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL.
4. PATTERN IS SYMMETRICAL ABOUT CENTERLINE.
NOTES:
1. MATERIAL: CORDURA NYLON FABRIC (1000 DENIER NYLON - 10 OZ/YD.)
2. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL.
1. Material: Cordura nylon fabric (1000 denier nylon - 10 oz/yd)

2. Print to scale and use as pattern for cutting out material.

NOTES:

1. Material: Cordura nylon fabric (1000 denier nylon - 10 oz/yd)

2. Print to scale and use as pattern for cutting out material.

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1. Material: Cordura nylon fabric (1000 denier nylon - 10 oz/yd)

2. Print to scale and use as pattern for cutting out material.

NOTES:

1. Material: Cordura nylon fabric (1000 denier nylon - 10 oz/yd)

2. Print to scale and use as pattern for cutting out material.
LEGEND
- - - PATTERN EDGE
- - - FOLD LINE

NOTES:
1. MATERIAL: CORIJRA NYLON FABRIC (1000 DENIER NYLON - 10 OZ/YD)
2. ADD HOLES AFTER SEWING
3. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL
4. DIMENSIONS ARE SYMMETRIC ABOUT CENTERLINE.
NOTES:
1. ZIPPER SHOWN AS EXTERNAL SHAPE ONLY.
2. SIZE: #10, LENGTH: 406mm, MATERIAL: BROWN POLYESTER METAL (BRASS), ZIPPER TYPE: OPEN TOP - CLOSED BOTTOM STYLE.
3. THE END SHOULD BE SEWN TOGETHER TO PREVENT THE SLIDER FROM PULLING OFF THE TRACK.
NOTES:
1. MATERIAL: NYLON STIFFENING CLOTH (DUCK CLOTH)
   (20 OZ/YD; MEETS MIL-C-3953)
   SEW TO THE INSIDE OF PATTERN 472-4763-4
2. CUT HOLES AFTER SEWING
3. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING MATERIAL.
NOTES:
2. CUT HOLES AFTER SEWING.
3. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL.
NOTES:
1. MATERIAL: BLACK VELCRO - HOOK SIDE
2. VELCRO COVER ATTACHES TO MATCHING FRONT VELCRO PATCH OF UPPER ABDOMEN BAG (472-4627)
3. PRINT TO SCALE AND USE AS PATTERN FOR CUTTING OUT MATERIAL.

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY

ECO#  REV  DESCRIPTION  DATE  BY
A  RENUMBERED FROM T1LAF117 R1 FOR THOR-M; 55 WAS 56  9/8/2011  DW
ISO VIEW
SCALE 3.000

NOTES:

1. POWDER OR BEAD BLAST.

2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.

3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

4. STAMP OR ETCH "UT" (3mm MIN. CHARACTERS) WHERE SHOWN.

A B

SEE NOTE 4

\[ \theta = 0.5 \quad \theta = 0.2 \quad \theta = 0.1 \]

\[ X.X \quad X.XX \quad X.XXX \]

1. POWDER OR BEAD BLAST.

2. NICKEL PLATE 0.003mm - 0.008mm MAX. AFTER MACHINING.

3. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.

4. STAMP OR ETCH "UT" (3mm MIN. CHARACTERS) WHERE SHOWN.

ECO# REV DESCRIPTION DATE BY
A RENUMBER FROM T1CXM010 R2 AND CONVERTED TO METRIC FOR THOR-M; ADD NOTES 9/23/2011 TKN
B 8.0 WAS 10.49; 10.0 WAS 12.52; QTY 2 WAS 4 7/25/2012 BK
C CHANGE DESC, "UPPER THORAX" WAS "THORAX"; STAMP "UT" ON PART AND ADD NOTE 4; ADD VIEW 7/11/2013 BK

PROJECT NO.
CHECKED BY
DRAWN BY DATE
OF 1 1 A3 472-3518

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NEXT ASSEMBLY 472-3000 1018 STEEL HEX Thanh 6/21/2011
TOTAL QTY IN DUMMY 2 SEE NOTES 2 J. WANG 1/18/2012
### REVISION HISTORY

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<td>RENUMBERED FROM T1PLM015 R3 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>8/24/2011</td>
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</table>

### MATERIAL

- **Aluminum-6061**

### TOLERANCES

- **DIMENSIONS ARE IN MILLIMETERS**
- **DO NOT SCALE DRAWING**
- **UNLESS OTHERWISE SPECIFIED**
- **THIRD ANGLE PROJECTION**
- **TOLERANCES**

### NOTES

- **REMOVE BURRS & BREAK SHARP EDGES**
- **CLEAR ANODIZE 1:1**

### REV: DRAWING NO.: SHEET

### SCALE:

### SIZE:

### DESCRIPTION:

### TOLERANCES

- **0.5**
- **0.2**
- **0.1**
- **0.01**

### DIMENSIONS

- **1.6**
- **56.7**
- **19.05**

### NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

### NEXT ASSEMBLY

- **472-4000**
- **472-4340-2**

### QTY

- **1**

### TOTAL QTY IN DUMMY

- **1**

### CHECKED BY:

- **TMV 10/26/2011**

### DRAWN BY:

- **jjordan 8/24/2011**

### DATE:

- **1/23/2012**

### QTY

- **TOTAL QTY IN DUMMY**

### NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SECTION C-C
SCALE 1 : 1

SCALE .750

16.5 x 30° CHAMFER
R8.9
3.8

PIN, DOWEL M6 x 20 mm

Parts List

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<th>DESCRIPTION</th>
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<td>472-4350</td>
<td>PELVIS COCCYX</td>
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PROJECT NO.: TMV
CHECKED BY: jjordan
DRAWN BY: J. WANG
DATE: 1/23/2012

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY

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<td>8/23/2011</td>
<td>35J</td>
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NOTES:
1. FRONT PELVIC CASTING IS A CONTOURED CAST PART WHICH REPRESENTS THE CURVATURE AT THE FRONT OF THE PELVIS.
2. ENGRAVE DWG. # 472-4370 ON THE SPECIFIED AREA ABOVE. (OPTIONAL)
3. THE FRONT PELVIC CASTING IS A URETHANE CASTING, THE CASTING MATERIAL IS CIBI-GIEGY RP6430 URETHANE (75 ± 3 D)

(2X) Ø5.5 TRUØ12.0 TRUØ11.5 X 90.0°

SEE NOTE 2

REVISION HISTORY

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<th>DATE</th>
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<td>8/22/2011</td>
<td>JSJ</td>
</tr>
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MACHINED FRONT PELVIC CASTING

ECO # 472-4370

472-4000

NEXT ASSEMBLY

QTY 3

TOTAL QTY IN DUMMY 1

Thermoplastic Resin

DLW 01/21/2011

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

MACHINED FRONT PELVIC CASTING

FIELD MEASUREMENT

TOTAL QTY IN DUMMY 1

472-4370

J. WANG 2/13/2011

1/23/2012

20.3

15.9

63.5

31.8
REVISION HISTORY

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<td>8/18/2011</td>
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<tr>
<td>B</td>
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<td>ADDED VIEW WITH PIN HEIGHT DIMENSION</td>
<td>7/24/2012</td>
<td>TMV</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>REVISED PART #472-4382-2 PELVIS WING MACHINING (RIGHT)</td>
<td>8/25/2015</td>
<td>DW</td>
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PARTS LIST

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<th>DESCRIPTION</th>
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<tr>
<td>4</td>
<td>3</td>
<td>5000433</td>
<td>PIN, DOWEL M6 X 12 mm</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>5000183</td>
<td>PIN, DOWEL M3 X 12 mm</td>
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<tr>
<td>2</td>
<td>1</td>
<td>472-4382-2</td>
<td>PELVIS WING MACHINING (RIGHT)</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-4381</td>
<td>PELVIS H-PT. TOOL BEARING</td>
</tr>
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472-4381 TO BE INSTALLED AS SHOWN LONGER DIMENSION OF OPENING IS TO BE HORIZONTAL

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

FINISH:

HEAT TREAT:

MATERIAL:

PROJECT NO.:

CHECKED BY: TMV 9/21/2011

DRAWN BY: DW 1/24/2012

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REV. HISTORY

<table>
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<td>8/18/2011</td>
<td>JSJ</td>
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<td>TMV</td>
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<td>REVISED PART #472-4382-2 PELVIS WING MACHINING (RIGHT)</td>
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TOTAL QTY IN DUMMY: 1

REFERENCE: 472-4000

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: TMV

DATE: 1/24/2012

REVISION HISTORY

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<td>TMV</td>
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<td>REVISED PART #472-4382-2 PELVIS WING MACHINING (RIGHT)</td>
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Parts List

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<tr>
<td>1</td>
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<td>5000183</td>
<td>PIN, DOWEL M3 X 12 mm</td>
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<td>1</td>
<td>1</td>
<td>5000433</td>
<td>PIN, DOWEL M6 X 12 mm</td>
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<tr>
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<td>1</td>
<td>472-4381</td>
<td>PELVIS H-PT. TOOL BEARING</td>
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<td>1</td>
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<td>PELVIS WING MACHINING (LEFT)</td>
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472-4381 TO BE INSTALLED AS SHOWN LONGER DIMENSION OF OPENING IS TO BE HORIZONTAL.

REVISED PART #472-4382-1 PELVIS WING MACHINING (LEFT) 8/25/2015 DW

ADDED VIEW WITH PIN HEIGHT DIMENSION 7/24/2012 TMV

RENUMBERED FROM T1PLM401-00 AND CONVERTED TO METRIC FOR THOR-M 8/18/2011 JSJ

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

REVISION HISTORY

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<td>TMV</td>
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<tr>
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<td>REVISED PART #472-4382-1 PELVIS WING MACHINING (LEFT)</td>
<td>8/25/2015</td>
<td>DW</td>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LEFT ILIAC ASSEMBLY

PROJECT NO.:

CHECKED BY:

DRAWN BY:

DATE:

REV.

DESCRIPTION

TOLERANCES

DO NOT SCALE DRAWING

FINISH:

HEAT TREAT:

MATERIAL:

SCALE:

FINISH:

PRODUCT:

SMILEYS:

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NEXT ASSEMBLY

QTY

TOTAL QTY IN DUMMY

1

1

1

1

6.0 mm TYP.
ILIAC CABLE COVER, PELVIS

SCALE 5.000

2X Ø2.9 THRU Ø5.5 X 90°

2X Ø6.4

14.0

8.4

4.2

1.3

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

DATE:
DATE:

ECO # REV. DESCRIPTION DATE BY
A  RENUMBERED FROM T1PLM020 FOR THOR-M;
2X Ø2.9 THRU C'SINK Ø5.5 X 90° WAS Ø2.3 THRU C'SINK Ø5.1 X 82°

8/18/2011 JSJ

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

DATE:

NEXT ASSEMBLY

TOTAL QTY IN DUMMY

472-4000 B Acetal Resin, White DLW 8/10/2011

472-4372 A J. WANG 1/24/2012

REVISION HISTORY

ECO # REV.
A

DESCRIPTION

DATE

BY

8/18/2011 JSJ

RENUMBERED FROM T1PLM020 FOR THOR-M;
2X Ø2.9 THRU C'SINK Ø5.5 X 90° WAS Ø2.3 THRU C'SINK Ø5.1 X 82°
ASSEMBLY INSTRUCTIONS

1. PRESS THE M3 ROLL PINS INTO PART #472-4376 AS SHOWN.
2. PLACE THE M5 X 0.8 X 16MM LG. BHCS IN THE CLEARANCE HOLES.
3. PRESS PART #472-4377 ONTO THE ROLL PINS AS SHOWN.
4. FASTEN THE TWO SIDES TOGETHER USING M5 X 0.8 X 16MM LG SHCS WITH LOCTITE® BLUE 242 AS SHOWN. TORQUE TO 7 Nm [60 IN-LBF]
FEMUR RETAINING RING

SECTION A-A
SCALE 1 : 1

DETAIL B
SCALE 2 : 1

SECTION A-A
SCALE 1 : 1

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

EREC: 9/8/2011
TMV 8/17/2011

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY

ECO # | REV. | DESCRIPTION | DATE | BY
--- | --- | --- | --- | ---
A | | RENUMBERED FROM T1FMM130 R4 FOR THOR-M; REMOVE NOTES | 8/22/2011 | JSJ
**NOTES:**

1. Once the shaft is bent to 15°, the diameter near the bend will need remachining.
NOTES:
1. ENGRAVE THE LETTER "L"

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

ACETAL RESIN, WHITE

REMOVE BURRS & BREAK SHARP EDGES

SEE NOTE 1

SEE NOTE 1

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

TOLERANCES

DIMENSIONS

TROCHANTER, LEFT

PROJECT NO.:

CHECKED BY:

DRAWN BY:

DATE:

TIMING VERSUS

DATE:

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ECO #

REV.

DESCRIPTION

DATE

 BY

A RENUMBERED FROM T1FM/M112 R2 THOR-M 8/18/2011 JSJ

REV.

DESCRIPTION

DATE

BY

1  472-4800-1

1  Acetal Resin, White

HORCHLER 8/17/2011

472-4812-1

1

NEXT ASSEMBLY

QTY

TMV

TOTAL QTY IN DUMMY

1

J. WANG 1/25/2012
NOTES:
1. BREAK ALL SHARP EDGES.
2. PLUG Ø19.05 AND M6x1 HOLES BEFORE APPLYING SURFACE FINISH.
1. BREAK ALL SHARP EDGES
2. PLUG Ø19.05 AND M6x1 HOLES BEFORE APPLYING SURFACE FINISH.
NOTES:
1. ENGRAVE THE LETTER "R"

(4X) \( \phi 6.8 \) \( \varnothing \) THRU

\[ \varnothing 10.5 \] \( \varnothing \) AS SHOWN

R12.7 TO R.2
VAR. FILLET

SEE NOTE 1

65.0°

R3.2

12.7

38.1

19.0

16.5

20.3

8.9

(43.8)

8.9

20.3

63.5

55.9

8.9

10.2

15.3

(28.0)

1. ENGRAVE THE LETTER "R"
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
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<td>5000451</td>
<td>HELICOIL, M2.5x0.45 X 2.5 mm</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>5000385</td>
<td>M3 X 6 LG. DOWEL PIN</td>
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**Parts List**

<table>
<thead>
<tr>
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<tr>
<td>472-4000</td>
<td>1</td>
<td>5061-T6 ALUMINUM</td>
<td>Jordan 9/29/2011</td>
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<tr>
<td>472-4361</td>
<td>1</td>
<td>CLEAR ANODIZE</td>
<td>J. Wang 1/31/2012</td>
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**REV: DRAWING NO.: SHEET**

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**SCALE:**

- 6061-T6 ALUMINUM
- CLEAR ANODIZE

**DIMENSIONS ARE IN MILLIMETERS**

- 2.3 X 45.0° Chamfer
- 11.6
- 20.1
- 7.5
- 37.3
- 5.5
- 4.8
- 45.7
- 11.1
- 7.5
- 23.0
- 25.4
- 12.7
- 25.4
- 28.7
- 2.3 X 45.0° Chamfer
- 2.3 X 45.0° Chamfer

**FINISH:**

- CLEAR ANODIZE

**HEAT TREAT:**

- 1:1

**DATE:**

- 1/23/2012

**MATERIAL:**

- 6061-T6 ALUMINUM

**TOLERANCES:**

- UNLESS OTHERWISE SPECIFIED

**CHECKED BY:**

- J. WANG

**DRAWN BY:**

- jjordan 8/23/2011

**REVOLUTION HISTORY**

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<td>8/23/2011</td>
<td>JSJ</td>
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</table>
NOTE:

1. OUTER SKIN MATERIAL IS VINYL AND THE FILLER MATERIAL IS 3 LB/IN EXPANDABLE POLYURETHANE FOAM.

2. MOLDED PART WEIGHT IS TO BE 3.2 KG ± .15 KG
NOTES:
1. ENGRAVE 472-4330 ON THE AREA SPEC'D ABOVE. (OPTIONAL)
2. INSTALL HELICOILS AFTER ANODIZE.
SCALE 1.000

PART BEFORE BENDING

ENGRAVE PART # IN APPROX. LOCATION (OPTIONAL)

PART BEFORE BENDING

R3.2 MIN BEND RADIUS

REVISION HISTORY

ECO #  REV  DESCRIPTION  DATE  BY

A  472-4204  RENUMBERED FROM T1PLM213 R05 AND CONVERTED TO METRIC FOR THOR-M; 8/25/2011 JSJ
THRU C’SINK WAS 5.2 THRU C’SINK (10.2 X 82); ADD SLOT TO BOTTOM; (OPTIONAL) TO NOTE

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

DATE: 1/18/2012

NEXT ASSEMBLY 472-4300

QTY

TOTAL QTY IN DUMMY

1

43.46

38.71

15.88
NOTE:
1. ENGRAVE DWG. #472-4205 AT APPROXIMATE LOCATION SHOWN. (OPTIONAL)
<table>
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<tr>
<td>1</td>
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<td>472-4311</td>
<td>FRICTION ADJUSTMENT NYLON TIP</td>
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<td>2</td>
<td>1</td>
<td>472-4312</td>
<td>FRICTION ADJUSTMENT SET SCREW</td>
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**Parts List**

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<th>TOLERANCES</th>
<th>NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION</th>
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<tr>
<td>472-4000</td>
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<td>FRICTION ADJUSTMENT SET SCREW ASSEMBLY</td>
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**ECo # | REV | DESCRIPTION                                | DATE  | BY**
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<td>8/24/2011</td>
<td>JSJ</td>
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</table>

**TOLERANCES**

- X.XXX 0.01
- X.XX 0.1
- X.X 0.2
- X 0.5

- angles
- dimensions are in millimeters
2.5 X 45.0° Chamfer

M20x2.5

NOTES:
1. MAKE FROM 5000508 (M20 X 2.5 X 20 CUP POINT SET SCREW), MODIFY AS SHOWN
# Parts List

<table>
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<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tr>
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<td>50001831</td>
<td>4</td>
</tr>
<tr>
<td>PIN, DOWEL M6 X 12 mm</td>
<td>50004333</td>
<td>3</td>
</tr>
<tr>
<td>HELICOIL, M6x1x12mm</td>
<td>50004223</td>
<td>2</td>
</tr>
<tr>
<td>HELICOIL M20x2.5 X 20 mm</td>
<td>50004301</td>
<td>1</td>
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---

### Notes:

1. Begin by machining the 15° plane. Machine 30° plane from 15° top view plane
2. Aux view is perpendicular to the machining surface.
3. The extra lines are the representation of the computer curved contours; they are not machined.
4. The pin hole is centered on the 30°/15° cross-section and drilled perpendicular to the 15°/30° surface.
5. The centerline of the hole is threads passes through the center of the spherical socket.
6. The pin hole is #4D 45.35 x 0.70 at the location specified.
7. Pin hole and shaft press to hard coat anodizing.
8. Hard coat anodizes part upon completion, clean up as necessary and add holes. Hard coat thickness is 20% of the size.
9. Dimensional limits and threaded holes apply after finish.
**Parts List**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
<th>QTY</th>
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<tbody>
<tr>
<td>HELICOIL M20x2.5 X 20 mm</td>
<td>50004301</td>
<td>1</td>
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<tr>
<td>HELICOIL, M6 X 1 X 12</td>
<td>50004223</td>
<td>2</td>
</tr>
<tr>
<td>PIN, DOWEL M6 X 12 mm</td>
<td>50004333</td>
<td>3</td>
</tr>
<tr>
<td>PIN, DOWEL M3 X 12 mm</td>
<td>50001831</td>
<td>4</td>
</tr>
</tbody>
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---

**Notes:**

1. Begin by machining the 15° Plane, Machine 30° plane from 15° Top View Plane.
2. Aux View is perpendicular to the resulting surface.
3. The top two M6 holes are on a line parallel with the cutout.
4. The extra lines are the representation of the computer’s curved contours; they are not machined.
5. The spherical ball is centered on the 76.2 cross-section, and drilled perpendicular to the 15°/30° surface.
6. The center line of the M20x2.5 thread passes through the center of the spherical socket.
7. Engrave Dwg # 472-4321-2 at the location specified.
8. Mask pin holes and shaft prior to hard coat anodizing.
9. Hard coat anodize part upon completion - clean up as necessary and add HELICOIL. Hard coat thickness is 0.025mm per side 0.20%.
10. Tolerances and threaded holes apply after finish.

---

**Rev:** D

**Drawing No.:** 472-4321-2

**Date:** 7/3/2012

**Scale:** 1:1

**Material:** 7075-T6 ALUMINUM

**Engineer:** J. WANG

**Date:** 1/23/2012

**Drawing By:** jjordan

**Date:** 8/25/2011

**Dimensions are in millimeters**

---

**Revision History**

<table>
<thead>
<tr>
<th>REV</th>
<th>ZONE</th>
<th>DESCRIPTION</th>
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<tr>
<td>A</td>
<td>GLOBAL</td>
<td>RENUMERATED FROM T1PLM218-10 AND CONVERTED TO METRIC FOR THOR-M; P45.35 WAS P44.45; P6.00 +.000/-.012 WAS P6.4, P31.75 B.C. WAS P31.8 B.C.; 1.6 THREAD RELIEF WAS .8; ADD 2.998+.000/-.012 DOWEL HOLE</td>
</tr>
<tr>
<td>B</td>
<td>GLOBAL</td>
<td>INCREASE BALL SOCKET SIZE TO 44.51 FROM 44.35. REVISED AND ADDED DIMENSIONS/NOTE FOR BEFORE AND AFTER HARD COAT. ADD 3mm RADIUS TO OUTER EDGE.</td>
</tr>
<tr>
<td>C</td>
<td>A,4</td>
<td>GLOBAL</td>
</tr>
<tr>
<td>D</td>
<td>B,2</td>
<td>GLOBAL</td>
</tr>
</tbody>
</table>

---

**Notes:**

- Before hard coat:
  - M6x1 x 12mm HELICOIL
  - M20x2.5 x 20mm HELICOIL
- After hard coat:
  - M6x1 x 12mm HELICOIL
  - M20x2.5 x 20mm HELICOIL

---

**Engrave Dwg # 472-4321-2 at the location specified.**

**Remove burrs & break sharp edges.**

---

**Dimensions/Note for Before and After Hard Coat:**

- M6x1 x 12mm HELICOIL: 5.997 +0.000/-.012 mm
- M20x2.5 x 20mm HELICOIL: 7.62 +0.000/-0.012 mm

---

**THIRD ANGLE PROJECTION**

---

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

---

**Check by: jjordan 8/25/2011**

---

**Remove mask upon completion - clean up as necessary and add HELICOIL. Hard coat thickness is 0.025mm per side 0.20%.**
TABLE "A"

UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS ARE IN INCHES.
2. BREAK ALL SHARP EDGES.
3. ALL MACHINED SURFACES .25 OR BETTER.

Mass: .467 Kg [1.06 lbs.]

UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS ARE IN INCHES.
2. BREAK ALL SHARP EDGES.
3. ALL MACHINED SURFACES .25 OR BETTER.
NOTES:

1. MATERIAL: NATURAL RUBBER, 60 ± 5 SHORE "A"  
   ADJUST DUROMETER TO MEET DYNAMIC PERFORMANCE

2. TOLERANCE ± 0.5 mm ALL DIMENSIONS

SCALE 1.000

Ø73.5 mm

Ø27.0 mm THRU

51.5 mm
NOTES:

1. SHOULDER TO BE CONCENTRIC TO AXIS OF THREAD WITHIN .02 MM TOTAL INDICATOR READING.

2. REMOVE BURRS AND BREAK SHARP EDGES

3. FINISH: .002 - .008 ZINC PER SIDE YELLOW DICHROMATE

4. DIMENSIONAL LIMITS AND THREAD SIZES APPLY AFTER FINISH
NOTES:
1. BOND ITEM 1 TO ITEM 2 BEFORE FINAL MACHINING.
SCALE .750

NOTES:
1. MUST BE ACETAL HOMOPOLYMER, PTFE FILLED, MIN. COMPRESSIVE STRENGTH 80 Mpa. COLOR BROWN
### Parts List

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNEE CAP ASSY., LEFT</td>
<td>472-5300</td>
</tr>
<tr>
<td>SCREW, FHCS #2-56 X 1/8&quot; PHILLIPS HEAD</td>
<td>90040032</td>
</tr>
<tr>
<td>PLATE, MOUNT</td>
<td>472-5305</td>
</tr>
<tr>
<td>ASSEMBLY, POT STRING HOLDER (LEFT)</td>
<td>472-5306</td>
</tr>
<tr>
<td>BOLT, SHOULDER</td>
<td>472-5302</td>
</tr>
<tr>
<td>WASHER, COMPRESSION</td>
<td>472-5304</td>
</tr>
<tr>
<td>WASHER, SLIDING KNEE</td>
<td>472-5303</td>
</tr>
<tr>
<td>SCREW, FNCS M2.5-0.45 x 55000723212</td>
<td>10752 9</td>
</tr>
<tr>
<td>KNEE FLESH INSERT-MOLDED</td>
<td>472-5301</td>
</tr>
<tr>
<td>ASS'Y, INBOARD/OUTBOARD SLIDER</td>
<td>472-5310</td>
</tr>
<tr>
<td>BHCS, M4 X .7 X 650010752 9</td>
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<tr>
<td>PIN, KNEE STOP</td>
<td>472-5763</td>
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<tr>
<td>KNEE CAP ASSEMBLY472-5350111</td>
<td></td>
</tr>
</tbody>
</table>

### TOLERANCES

- **X**
  - UNLESS OTHERWISE SPECIFIED
  - DIMENSIONS ARE IN MILLIMETERS
  - THIRD ANGLE PROJECTION

### Revision History

- A RENUMBERED FROM T1FMM209 R0 AND CONVERTED TO METRIC FOR THOR-M 8/19/2011 JSJ
- B 5000723 WAS 5000595 7/19/2012 BK
- C CORRECTED SIDE VIEWS 9/29/2015 DW
NOTE:

1. DATA SOURCE
   MP950
   HI-TUFF THERMOSET PRODUCTS

   MECHANICAL PROPERTY:

   DUROMETER (± 5)  95A
   TENSILE PSI       6000-7000
   ELONGATION %     300-350
   ELONGATION SET   9
   TEAR DIE B (#/IN) 550-650
   TEAR DIE C (#/IN) 450-550
   MODULUS @ 300%   4500-5500
   COMPSET %        1.0
   BASE              ETHER

   2. DATA SOURCE:
   MP950
   HI-TUFF THERMOSET PRODUCTS

   MECHANICAL PROPERTY:

   DUROMETER (± 5)  95A
   TENSILE PSI       6000-7000
   ELONGATION %     300-350
   ELONGATION SET   9
   TEAR DIE B (#/IN) 550-650
   TEAR DIE C (#/IN) 450-550
   MODULUS @ 300%   4500-5500
   COMPSET %        1.0
   BASE              ETHER
NOTE:

1. MAKE FROM 5000588, M10 X 12 (M8 THREAD) SOCKET HEAD SHOULDER SCREW, MODIFY AS SHOWN.
Notes:
Bonding instructions:
1. Sand surfaces to be bonded.
2. Clean surfaces with MEK.
3. Clean surfaces with alcohol.
4. Apply Loctite 411, or equivalent, to one surface.
5. Press parts together and apply pressure for 30 seconds after adhesive becomes tacky.
SCALE 1.000

REVOLUTION HISTORY

<table>
<thead>
<tr>
<th>ECO #</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
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<td>A</td>
<td>RENUMBERED FROM 880995-1648-1 REV F AND CONVERTED TO METRIC FOR THOR-M; FINISH WAS ELECTROLESS NICKEL PLATE .0003 MAX.</td>
<td>8/19/2011</td>
<td>JSJ</td>
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DESIGNATION

472-5306 1 4140 STEEL  KSG 8/17/2011
NEXT ASSEMBLY QTY: 35-48  TMV 9/12/2011
TOTAL QTY IN DUMMY: 1 ELECTROLESS NICKEL PLATE .008 MAX 1, WANG 9/26/2011
NOTES:

1. MATERIAL: NEOPRENE RUBBER SHORE A 70 ±5.

2. RUBBER DIMENSIONS ±0.5mm, UNLESS OTHERWISE NOTED.
NOTES:

1. MATERIAL: NEOPRENE RUBBER SHORE A 70 ±5.
2. RUBBER DIMENSIONS ±0.5mm, UNLESS OTHERWISE NOTED.
REV: DRAWING NO.: 472-5305
SCALE: 1
SIZE: 1
DESCRIPTION: PLATE, MOUNT
TOLERANCES
FINISH: CLEAR ANODIZE
HEAT TREAT: UNLESS OTHERWISE SPECIFIED
MATERIAL: Aluminum-6061-T6

PROJECT NO.: KSG
CHECKED BY: J. WANG
DRAWN BY: 472-5300
DATE: 1/26/2012

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

REVISION HISTORY
ECO # REV DESCRIPTION DATE BY
A RENUMBERED FROM 880995-1638-1 REV G AND CONVERTED TO METRIC FOR THOR-M; ADD FINISH: CLEAR ANODIZE 8/17/2011 JSJ
B ø2.8 C'SINK ø5.0 WAS ø2.39 C'SINK ø4.39 7/19/2012 BK

QTY TOTAL QTY IN DUMMY

2X ø2.8 THRU ø5.0 X 90°

2X ø2.4 THRU ø4.4 X 82°

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

NEXT ASSEMBLY 472-5300
QTY
TOTAL QTY IN DUMMY CLEAR ANODIZE

ECO # REV DESCRIPTION DATE BY
A RENUMBERED FROM 880995-1638-1 REV G AND CONVERTED TO METRIC FOR THOR-M; ADD FINISH: CLEAR ANODIZE 8/17/2011 JSJ
B ø2.8 C'SINK ø5.0 WAS ø2.39 C'SINK ø4.39 7/19/2012 BK
NOTE:

1. MATERIAL IS PER SAE J200/ASTM D 2000
   BUTYL 45 DUR.
   4AA725A13 B13K11Z1Z2Z3
   Z1= BUTYL
   Z2= 40 TO 50 DUROMETER
   Z3= KNEE IMPACT TEST

- R63.5
- R59.5
- 57.2
- 33.9
- 55.2
- 30.3°
- 120.7
- 44.5

ECO # | REV | DESCRIPTION | DATE | BY
---|---|---|---|---
A | | RENUMBERED FROM 78051-27 REV A AND CONVERTED TO METRIC FOR THOR-M | 8/29/2011 | JSJ

DO NOT SCALE DRAWING
DIMENSIONS ARE IN MILLIMETERS

NEXT ASSEMBLY QTY
TOTAL QTY IN DUMMY

NOTE:

1. MATERIAL IS PER SAE J200/ASTM D 2000
   BUTYL 45 DUR.
   4AA725A13 B13K11Z1Z2Z3
   Z1= BUTYL
   Z2= 40 TO 50 DUROMETER
   Z3= KNEE IMPACT TEST
RACE, INNER

1 472-5320

RACE, OUTER

1 472-5310

Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<td>472-5320</td>
<td>RACE, INNER</td>
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<tr>
<td>1</td>
<td>2</td>
<td>472-5321</td>
<td>RACE, OUTER</td>
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</table>

NOTES:

1. RUBBER DUROMETER OF 30±5 SHORE "A"
2. ADJUST DUROMETER FOR DYNAMIC PERFORMANCE.
NOTES:

1. HEAT TREAT:
   - MAKE ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

- 2X M2.5x0.45 OVERSIZE TAP H11 THRU ø2.5 x 90°
- 4X M6x1 THRU EQUALLY SPACED ON A ø25.40 B.C.
NOTES:

1. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65
NOTES:
1. RUBBER DUROMETER OF 30±5 SHORE "A"
2. ADJUST DUROMETER FOR DYNAMIC PERFORMANCE.

SCALE 1.500
NOTES:
1. DIMENSIONS SYMMETRIC ABOUT \( \xi \), UNLESS OTHERWISE NOTED.
2. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65
NOTES:

1. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

REV: D
DRAWING NO.: 472-5332
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
OF

1.6
THIRD ANGLE PROJECTION

1.0

DIMENSIONS ARE IN MILLIMETERS

SEE NOTES

UNLESS OTHERWISE SPECIFIED

MATERIAL:
4140 STEEL

EOC #| REV | DESCRIPTION | DATE | BY
---|---|---|---|---
A |  | A RENUMBERED FROM 880995-1643 REV F AND CONVERTED TO METRIC FOR THOR-M 8/19/2011 JSJ
B |  | ADD HEAT TREAT NOTE;  ADD 2X 4.775+/-.050 4/12/2012 BK
C |  | P 10.03+.05/-0 C'BORE P 16.2+.13/-0 12.32 DEEP WAS P 9.550+.050/-0 C'BORE P 15.875+.127/-0 12.319+/-.127 DEEP 7/19/2012 BK

HEAT TREAT:
- MASK ENTIRE PART EXCEPT THE PATHWAYS
- CARBURIZE PART @ 1700°F FOR 6 HOURS
- FURNACE COOL, DO NOT QUENCH
- REHARDEN @ 1520°F AND OIL QUENCH
- TEMPER @ 350°F FOR 2 HOURS
- SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

472-5332.ipt
A

B

STOP, BALL

472-5310

ECO #

REV

DESCRIPTION

DATE

BY

A

RENUMBERED FROM 880995-1636 AND CONVERTED TO METRIC FOR THOR-M; FINISH WAS .0003 ELECTROLESS NICKEL OR EQUIVALENT

8/19/2011

JSJ

2X Ø2.9 mm ⊥ THRU

Ø5.5 mm X 90°

2X Ø2.9 mm ⊥ THRU

Ø5.5 mm X 90°

3.7

6.4

7.1

6.4

20.6

2.0 STOCK

472-5738
### Parts List

<table>
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<tr>
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<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tr>
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<td>472-5356</td>
<td>STOP - SLIDER</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-5357</td>
<td>BUMPER - SLIDER</td>
</tr>
</tbody>
</table>

### Notes:

1. BOND ITEM 2 TO ITEM 1 USING CYANOACRYLATE

---

### Diagram Details:

- **SEE NOTE 1**
- **SANDBLAST THIS SURFACE**
- **2 mm Typ**
TOLERANCE ALL DIMENSIONS: ±1.5 mm
MATERIAL: 40 SHORE "A" URETHANE, ADJUST DUROMETER TO MEET DYNAMIC TEST CORRIDORS
COLOR: BLACK
**REVOLUTION HISTORY**

<table>
<thead>
<tr>
<th>ECO #</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
<td>RENUMERATED FROM EX593-122 AND CONVERTED TO METRIC FOR THOR-M; ADD THREAD RELIEF</td>
<td>9/6/2011</td>
<td>JSJ</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>FINISH ELECTROLESS NICKEL PLATE WAS BLACK OXIDE</td>
<td>1/30/2012</td>
<td>BK</td>
</tr>
</tbody>
</table>

**TOLERANCES**

- .8 X 45° Chamfer
- 7.620 ± .0025
- 7.87 ± .0025
- .600
- 1.27
- 2.5
- 6.40

**FINISH**

- ELECTROLESS NICKEL PLATE
- BLACK OXIDE

**MATERIAL**

- 4140 STEEL

**PROJECT NO.**

- 472-5700
- 472-5300

**QTY**

- 1

**CHECKED BY**

- J. WANG

**DRAWN BY**

- TMV 9/21/2011

**DATE**

- 1/28/2012

**TOTAL QTY IN DUMMY**

- 2

**ENGINEER**

- 472-5763

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**PIN, KNEE STOP**

**DO NOT SCALE DRAWING**

**TOLERANCES**

- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION

**REVISION HISTORY**

- RENUMERATED FROM EX593-122 AND CONVERTED TO METRIC FOR THOR-M; ADD THREAD RELIEF
- FINISH ELECTROLESS NICKEL PLATE WAS BLACK OXIDE

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**PIN, KNEE STOP**

**DO NOT SCALE DRAWING**

**TOLERANCES**

- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION

**REVISION HISTORY**

- RENUMERATED FROM EX593-122 AND CONVERTED TO METRIC FOR THOR-M; ADD THREAD RELIEF
- FINISH ELECTROLESS NICKEL PLATE WAS BLACK OXIDE
NOTES:
1. ALL DIMENSIONS AFTER HARDCOAT EXCEPT WHERE NOTED.
NOTE:

1. MAKE FROM M8 X 1.25 X 12 LIGHTWEIGHT KEENSERT (5000585), MODIFY AS SHOWN.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
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<th>DESCRIPTION</th>
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<tr>
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<td>50004332</td>
<td>PIN, DOWEL M6 X 12 mm</td>
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<tr>
<td>1</td>
<td>1</td>
<td>472-5411</td>
<td>FEMUR BALL JOINT ATTACHMENT PLATE</td>
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</table>

**Parts List**

**Description:**

- **Parts List**
  - **Item:** 1
  - **QTY:** 1
  - **Part Number:** 472-5411
  - **Description:** FEMUR BALL JOINT ATTACHMENT PLATE

**Revision History**

<table>
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<td>8/19/2011</td>
<td>JSJ</td>
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</table>
NOTES:

1. ALL DIMENSIONS APPLY AFTER NICKEL PLATE.
## Parts List

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<td>472-5421</td>
<td>END STOP</td>
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<tr>
<td>2</td>
<td>1</td>
<td>472-5422</td>
<td>PLUNGER - FEMUR</td>
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</tbody>
</table>

### Notes:

1. BOND ITEM 1 TO ITEM 2 USING LOCTITE 401 OR EQUIVALENT.
MATERIAL: URETHANE, 42±5 SHORE "A"
COLOR: BLACK

SCALE 1.000

38
19

(4X) R3

Ø27 R THRU

3 ± 0.5

EBO # REV. DESCRIPTION DATE BY
A RENUMBERED FROM T1FMM204 R0 AND CONVERTED TO METRIC FOR THOR-M 8/19/2011 JSJ

TOTAL QTY IN DUMMY 4

1. WANG 07/2011
CHECK FOR HARDNESS
THIS SURFACE ONLY

USE CAD GEOMETRY
TO SURFACE CORNERS
OR HAND FILE

SECTION A-A

REVISED FOR DRAWING NO. S1472-5422

USE CAD GEOMETRY
TO SURFACE CORNERS
OR HAND FILE

SECTION A-A

ECO #   REV.   DESCRIPTION   DATE   BY
A   RENUMBERED FROM T1FM207 R0 AND
CONVERTED TO METRIC FOR THOR-M   8/19/2011   JSJ
B   ADD HARDNESS CHECK NOTE   3/20/2013   SKK
C   99 DEPTH WAS 102   11/26/2012   BK

REVISION HISTORY

ECO #   REV.   DESCRIPTION   DATE   BY
A   RENUMBERED FROM T1FM207 R0 AND
CONVERTED TO METRIC FOR THOR-M   8/19/2011   JSJ
B   ADD HARDNESS CHECK NOTE   3/20/2013   SKK
C   99 DEPTH WAS 102   11/26/2012   BK
NOTES:

1. THE OUTER SKIN IS VINYL AND FILLER MATERIAL IS A 3lb/in³ POLYURETHANE EXPANDABLE FOAM.
2. FEMUR SKIN IS SPLIT ALONG SIDE AS SHOWN AND A BONDED ZIPPER IS APPLIED ON OUTSIDE.
3. THIS DRAWING IS ONLY A REPRESENTATION OF THE SKIN AND IS NOT MEANT TO BE SCALABLE.
4. THE ZIPPER IS LENGTH IS 165.1 mm, BLACK POLYESTER, MESH = #9 METAL (BRASS) ZIPPER TYPE = SEPARATING STYLE, SLIDER TYPE = 30-0 (AUTO LOCK).
5. WEIGHT: 1.00 ±0.05KG.
NOTES:
1. REFERENCE HYBRID III 50TH KNEE FLESH 78051-5
2. TRIM FLAP SKIN FROM INSIDE KNEE
MOULDING PROCEDURES (C.S.P.)

TOTAL WT. I:
INJECTION WT. I:
SKIN WT. I:
FOAM WT. I:
SKIN CURVE: MOLD TEMPERATURE: CURVE TIME:
FOAM PRECURSOR MOLD TEMPERATURE FOR FOUR HOURS:
EXPANSION CURVE: GATE TEMPERATURE:

NOTES:

ALL MOLDED ASSEMBLY LINEAR DIMENSIONS MUST CONFORM TO MODEL T8001-C & WITHIN ± 0.005 INCHES
USE MODEL NO. T8001-2 (LEFT) T8001-1 (RIGHT)
FOR MOLDEMARKED

SECTION A-A

BLEND TO PART 572 MOLD CONTOUR WITHIN THIS DISTANCE

BLEND TO PART 572 MOLD CONTOUR WITHIN THIS DISTANCE

SECTION B-B

BLEND TO PART 572 MOLD CONTOUR WITHIN THIS DISTANCE

VINYL FOAM

VINYL SKIN

NOTE: READ CAREFULLY BEFORE STARTING. REPORT ALL ERRORS.

DO NOT SCALE

GENERAL MOTORS CORPORATION

REMARKS:

PLEASE LEAVE TIE-DOWN & SKIN ADDIT.

MOLDED HYDRU XI

NOTE: MAKE TIE-DOWN & SKIN ADDIT.

MOLDED HYDRU XI

NOTE: MAKE TIE-DOWN & SKIN ADDIT.

MOLDED HYDRU XI

NOTE: MAKE TIE-DOWN & SKIN ADDIT.

MOLDED HYDRU XI

NOTE: MAKE TIE-DOWN & SKIN ADDIT.

MOLDED HYDRU XI

NOTE: MAKE TIE-DOWN & SKIN ADDIT.
NOTE:
1. TOLERANCE ALL DIMENSIONS: ±.5 mm
2. MATERIAL A: URETHANE 37 ± 5 SHORE A
   MATERIAL B: URETHANE 65 ± 5 SHORE D

SECTION A-A
<table>
<thead>
<tr>
<th>ECO</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
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<td>A</td>
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<td>RENUMBERED FROM 880995-1638-2 REV F AND CONVERTED TO METRIC FOR THOR-M;</td>
<td>8/19/2011</td>
<td>JSJ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIMENSION Ø2.39 THRU C'SINK Ø4.39 X 90° WAS Ø2.26 1 THRU C'SINK Ø4.06 X 82°;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ø2.4 THRU C'SINK Ø4.4 X 82° WAS Ø2.26 1 THRU C'SINK Ø4.06 X 82°; FINISH WAS</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>BLUE ANODIZED (OPTIONAL)</td>
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<tr>
<td>B</td>
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<td>Ø2.8 C'SINK Ø5.0 WAS Ø2.39 C'SINK Ø4.39</td>
<td>7/19/2012</td>
<td>BK</td>
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</tbody>
</table>

**Dimensions in Millimeters**

- 1.6 THIRD ANGLE PROJECTION
- 2.29 2X Ø2.8 THRU Ø5.0 X 90°
- 19.05
- 9.53
- 28.70
- 24.13

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

- PLATE, MOUNT
- NEXT ASSEMBLY
- QTY
- TOTAL QTY IN DUMMY
- CLEAR ANODIZE
- 472-5308

**Revision History**

- A
  - RENUMBERED FROM 880995-1638-2 REV F AND CONVERTED TO METRIC FOR THOR-M;
  - DIMENSION Ø2.39 THRU C’SINK Ø4.39 X 90° WAS Ø2.26 1 THRU C’SINK Ø4.06 X 82°;
  - Ø2.4 THRU C’SINK Ø4.4 X 82° WAS Ø2.26 1 THRU C’SINK Ø4.06 X 82°; FINISH WAS BLUE ANODIZED (OPTIONAL)
- B
  - Ø2.8 C’SINK Ø5.0 WAS Ø2.39 C’SINK Ø4.39

**TOLERANCES**

- DECIMALS
- ANGLES
- FINISH: CLEAR ANODIZE 2:1 UNLESS OTHERWISE SPECIFIED
- MATERIAL: Aluminum-6061-T6
- HEAT TREAT: KSG 8/17/2011

**Checklist**

- REMOVE BURRS & BREAK SHARP EDGES

**Drawing Information**

- DRAWING NO.: 472-5308
- SHEET: 3
- SCALE: 1
- SIZE: 1

**Engineer:** J. WANG

**Date:** 1/27/2012

**1.6**
NOTES:
1. SAND SURFACES TO BE BONDED.
2. CLEAN SURFACES WITH MEK.
3. CLEAN SURFACES WITH ALCOHOL.
4. APPLY LOCTITE 411, OR EQUIVALENT, TO ONE SURFACE.
5. PRESS PARTS TOGETHER AND APPLY PRESSURE FOR 30 SECONDS AFTER ADHESIVE BECOMES TACKY.
NOTES:
1. THE OUTER SKIN IS VINYL AND FILLER MATERIAL IS A 3lb/in³ POLYURETHANE EXPANDABLE FOAM.
2. FEMUR SKIN IS SPLIT ALONG SIDE AS SHOWN AND A BONDED ZIPPER IS APPLIED ON OUTSIDE.
3. THIS DRAWING IS ONLY A REPRESENTATION OF THE SKIN AND IS NOT MEANT TO BE SCALED.
4. THE ZIPPER IS LENGTH IS 165.1 mm, BLACK POLYESTER, MESH = #9 METAL (BRASS) ZIPPER TYPE = SEPARATING STYLE, SLIDER TYPE = 30-0 (AUTO LOCK).
5. WEIGHT: 1.00±0.05KG.
<table>
<thead>
<tr>
<th>PART#</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 X 1.75 X 30</td>
<td>LG. SHCS50004411</td>
<td>12</td>
</tr>
<tr>
<td>M10 X 25</td>
<td>LG. SHSS50004921</td>
<td>11</td>
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<tr>
<td>M12 X 30</td>
<td>LG. SHSS50005061</td>
<td>10</td>
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<tr>
<td>WASHER, 1.06 OD x .53 ID x .06 THK.</td>
<td>900126019</td>
<td>9</td>
</tr>
<tr>
<td>HAND ASM MOLDED</td>
<td>THOR-M472-6900-1</td>
<td>7</td>
</tr>
<tr>
<td>LOWER WRIST ROTATION ASSY.</td>
<td>472-67001</td>
<td>6</td>
</tr>
<tr>
<td>LOWER ARM MOLDED</td>
<td>THOR-M472-65201</td>
<td>6</td>
</tr>
<tr>
<td>NUT - ELBOW PIVOT THOR-M472-66101</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>WASHER - SHOULDER JOINT SPRING</td>
<td>472-69501</td>
<td>4</td>
</tr>
<tr>
<td>BUSHING, UPPER ARM AND ELBOW PIVOT</td>
<td>472-65901</td>
<td>3</td>
</tr>
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<td>WASHER - UPPER ARM &amp; ELBOW PIVOT</td>
<td>THOR-M472-66001</td>
<td>2</td>
</tr>
<tr>
<td>UPPER HUMERUS ASSEMBLY</td>
<td>472-62001</td>
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**PARTS LIST**

<table>
<thead>
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<td>1.06 OD x .53 ID x .06 THK. WASHER</td>
<td>900126019</td>
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<tr>
<td>THOR-M472-6900-1 HAND ASM MOLDED</td>
<td>472-6900-1</td>
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<tr>
<td>THOR-M472-67001 LOWER WRIST ROTATION ASSY.</td>
<td>472-67001</td>
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<tr>
<td>THOR-M472-65201 LOWER ARM MOLDED</td>
<td>472-65201</td>
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<tr>
<td>THOR-M472-66101 NUT - ELBOW PIVOT</td>
<td>472-66101</td>
</tr>
<tr>
<td>THOR-M472-69501 WASHER - SHOULDER JOINT SPRING</td>
<td>472-69501</td>
</tr>
<tr>
<td>THOR-M472-65901 BUSHING, UPPER ARM AND ELBOW PIVOT</td>
<td>472-65901</td>
</tr>
<tr>
<td>THOR-M472-66001 WASHER - UPPER ARM &amp; ELBOW PIVOT</td>
<td>472-66001</td>
</tr>
<tr>
<td>472-62001 UPPER HUMERUS ASSEMBLY</td>
<td>472-62001</td>
</tr>
</tbody>
</table>

**ACCESSORY PARTS**

- **THOR-M472-6300** - STRUCTURAL ASS'Y. UPPER ARM LOWER PART THOR-M
- **PART NUMBER 5000857** - M10 x 35 LG. SHSS

**REVISION HISTORY**

- **ECO#: A** RENUMBERED FROM T1APM000 R2 AND CONVERTED TO METRIC FOR THOR-M 10/5/2011 TKN
- **ECO#: B** ITEM #1 PART NUMBER AXAMM000 - SD3
  - **UPPER HUMERUS ASSEMBLY WAS 472-6120 - UPPER ARM ASSEMBLY, MOLDED; REMOVED PART NUMBER 472-6300 - STRUCTURAL ASS'Y. UPPER ARM LOWER PART THOR-M AND PART NUMBER 5000857 - M10 x 35 LG. SHSS**
  - **DATE: 3/24/2014 DW**
- **ECO#: C** 472-6200 WAS AXAMM000 AND DESCRIPTION WAS "SD3 UPPER HUMERUS ASSEMBLY" 9/15/2014 DW

**DRAWING INFORMATION**

- **SCALE:**
- **DIMENSIONS ARE IN MILLIMETERS**
- **THIRD ANGLE PROJECTION**
- **UNLESS OTHERWISE SPECIFIED**

---

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

- **ENGINEER:**
- **REMOVE BURRS & BREAK SHARP EDGES**
- **DATE:** 1/28/2012

---

**REV: D**

---

**DATE:** 10/5/2011

---

**DATE OF NEXT ASSEMBLY:** 472-0000
UPPER HUMERUS WELDMENT

MATERIAL: Steel, Mild, Welded

Upper Humerus Assy.iam

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

UPPER ARM MOUNT

1 1 472-6212

UPPER ARM TUBE

1 1 472-6211

REVISION HISTORY

<table>
<thead>
<tr>
<th>ZONE</th>
<th>REV</th>
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<th>DATE</th>
<th>BY</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>DRAWING NUMBER WAS AXAMM010, IN PARTS LIST 472-6211 WAS AXAMM012, 472-6212 WAS AXAMM011</td>
<td>9/15/2014</td>
<td>DW</td>
</tr>
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</table>

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

X .5
X .5
XXX .1

DO NOT SCALE DRAWING

VEHICLE RESEARCH AND TEST CENTER

APPROVALS DATE

DESIGN: JIM CLEVENGER 6/28/2013

CHECKED:

SCALE: 1:1

DRAWING NUMBER: 472-6210 A

1 OF 1
M5x0.8 - THRU
2 REQ - 180° APART

Ø6.1 THRU TO BORE
4 REQ - 90° APART

Ø10.0 x .75 DEEP
4 REQ - 90° APART

DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: ANGLES: MACHINED:
X .5
.5
X .2
.1

Steel

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

UPPER ARM TUBE

REVISION HISTORY

ZONE REV DESCRIPTION DATE DESI
A DRAWING NUMBER WAS AXAMM012 9/15/2014 DW

REV
DESCRIPTION
DATE
DESI
A DRAWING NUMBER WAS AXAMM012 9/15/2014 DW

DRAWING NUMBER
SIZE
SCALE
PAGE

1
UPPER ARM TUBE.ipt
Upper Arm Mount.ipt

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

1.6
DECIMAL:  ANGLES:  MACHINED:
.X
.X
.X
.X

2.0 X 45.0° CHAMFER
TYP BOTH SIDES

Upper Arm Mount

Material: Steel

Drawing Number: 472-6212

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

VEHICLE RESEARCH and TEST CENTER

APPROVALS
DATE

DESIGN
JIM CLEVENGER
8/20/2013
CHECKED

REVISION HISTORY
ZONE
REV
DESCRIPTION
DATE
BY

A
DRAWING NUMBER WAS AXAMM011
9/15/2014
DW
NOTES:

1. REMOVE BURRS AND BREAK SHARP EDGES
2. STAMP OR ETCH PART NUMBER AS SHOWN
3. NICKEL PLATE .012 MAX. AFTER MACHINING
4. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH

MATERIAL: Steel
FINISH: NICKEL PLATE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

X .5
XX .1
SEE NOTE #2

W50-61041.ipt
ARM END PLATE

Material: Aluminum 6061

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
X " +.030 .009 .006 .002
X X +.030 .009 .006 .002

THE OUTER Diameter IS 50MM
THE INNER Diameter IS 32MM
THE THICKNESS IS 2MM

2 REQ

NS

VEHICLE RESEARCH and TEST CENTER

APPROVALS    DATE

Jim Cleverger     8/28/2013

CHECKED

Drawing Number:

B 472-6230

Scale: 1:1

Sheet 1 OF 1

FINISH
APPROVED
DRAWN
CHECKED
ENG
JIM CLEVENGER
472-6230

DATE

DO NOT SCALE DRAWING

Aluminum 6061

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

X " +.030 .009 .006 .002
X X +.030 .009 .006 .002

THE OUTER Diameter IS 50MM
THE INNER Diameter IS 32MM
THE THICKNESS IS 2MM

2 REQ
NOTE:

1. MAKE FROM PART # 5000016V SCREW, SHCS M6-1 x 45 mm.
NOTE:

A 3-D FILE IS AVAILABLE
FOR REFERENCE FROM NHTSA
ISO VIEW
SCALE 1 : 1

\[ \phi 39.62 \]
\[ \phi 46.99 \]
\[ 6.35 +.00 \]
\[ -.13 \]
\[ .64 \]
\[ R.4 \text{ MAX.} \]

\[ \phi 19.05 +.05 \]
\[ -.00 \]
\[ .36 \]

\[ 5.005 +.050 \]
\[ -.000 \]

\[ 22.23 +.13 \]
\[ -.00 \]

\[ 472-6600 \]


dimensions are in millimeters

\[ \text{Unless otherwise specified} \]

\[ \text{Third angle projection} \]

\[ \text{Remove burrs & break sharp edges} \]

\[ \text{WASHER, ELBOW PIVOT THOR-M} \]

\[ \text{REFERENCE DWG #7805-200 AND CONVERTED TO METRIC FOR THOR-M 9/30/2011 TKN} \]

\[ \text{Engineer: J. WANG DATE: 1/30/2012} \]

\[ \text{NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION} \]

\[ \text{TOTAL QTY IN DUMMY: 2} \]

\[ \text{CHECKED BY:} \]

\[ \text{DRAWN BY:} \]

\[ \text{QTY:} \]

\[ \text{NEXT ASSEMBLY:} \]

\[ \text{ECONOMICAL DWG #7805-200} \]

\[ \text{CONVERTED TO METRIC FOR THOR-M 9/30/2011 TKN} \]

\[ \text{Engineer: J. WANG DATE: 1/30/2012} \]

\[ \text{NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION} \]

\[ \text{TOTAL QTY IN DUMMY: 2} \]

\[ \text{CHECKED BY:} \]

\[ \text{DRAWN BY:} \]

\[ \text{QTY:} \]

\[ \text{NEXT ASSEMBLY:} \]
ISO VIEW
SCALE 1 : 1

SECTION A-A
SCALE 1 : 1

NOTES:
1. MATERIAL: DELRIN 500 ACETAL RESIN ® DUPONT

REVOLUTION HISTORY

ECO# REV DESCRIPTION DATE BY
A A REFERENCE DWG #78051-199 AND 9/30/2011 TKN
CONVERTED TO METRIC FOR THOR-M

THRU ALL

1.6

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

BUSHING, ELBOW PIVOT

BUSHING, ELBOW PIVOT

A

A

3.18
17.5
.8
R1.5
.8 X 45° CHAMFER.

.13

33.78

.25

6.35

.13A

19.02

.00A

22.23

.13

5.005

.05

.25

33.78

.25

39.62

25A

12.00

.05

.00+

.03+

22.23

.13

5.005

.05

.00+

.03+

12.00

.05

.00+

.03+

19.02

.05

.00+

.03+

39.62

.25

33.78

.25

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A

A
ISO VIEW
SCALE 1 : 1

3X Ø6.10 +.05
EQUI-SPACED ON A Ø35.56 B.C.

Ø31.57 +.00
-.08
M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
---  ----  ------------------  ---------  ----
A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
---  ----  ------------------  ---------  ----
A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

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12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
---  ----  ------------------  ---------  ----
A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
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A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.

REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

THRN

ECO#  REV  DESCRIPTION       DATE       BY
---  ----  ------------------  ---------  ----
A    A     REFERENCE DWG #78051-202 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011  TKN

NUT - ELBOW PIVOT THOR-M

12.7
/.05

31.57
/.08

M10x1.5 THRU.
NOTES:
1. PART WEIGHT: 1.29 Kg ± 0.05 Kg (2.85 LBS ± 0.10 LBS)
NOTES:
1. INSTALL DOWEL PINS AFTER NICKEL PLATE.
NOTES:
1. PART MAY REQUIRE STRAIGHTENING TO MEET 25.4 + .25/-.00 DIM BEFORE MACHINING.
2. FIRST MACHINE OPERATION.
1. MATERIAL: SEAMLESS STEEL MECHANICAL TUBING SAE 1018. (Ø1¼" 14 ga. WALL)

ISO VIEW
SCALE 1 : 1

NOTES:

TUBE - LOWER ARM
## Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tr>
<td>472-6580</td>
<td>1</td>
<td></td>
<td>STOP, BACKING, LOWER ARM</td>
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</tbody>
</table>

### Dimensions

- **8.9**: Diameter
- **12.4**: Diameter

### Notes

- **MAT'L**: SAE J200D-AA 815 Z
- Where Z=SBR (STYRENE BUTADIENE RUBBER)
- **75±5 SHORE A DUROMETER**
- **POWDER BLAST**
- **THIRD ANGLE PROJECTION**

### Tolerances

- **±0.5**
- **±0.2**
- **±0.1**

### Revisions

<table>
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<th>ECO#</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>REFERENCE DWG #78051-198 AND CONVERGED TO METRIC FOR THOR-M</td>
<td>10/5/2011</td>
<td>TKN</td>
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### Additional Notes

- **DIMENSIONS ARE IN MILLIMETERS**
- **DO NOT SCALE DRAWING**
- **UNLESS OTHERWISE SPECIFIED**

### Checking

- Thanh 10/5/2011
- J. WANG 1/30/2012

### Material

- **SHELLASTONE**
- **75±5 SHORE A DUROMETER**
- **POWDER BLAST**

### Project

- **ENGINEER**
- **REMOVE BURRS & BREAK SHARP EDGES**

### Conversion

- **REFERENCE DWG #78051-198 AND CONVERTED TO METRIC FOR THOR-M 10/5/2011 TKN**

### Conversion

- **REFERENCE DWG #78051-198 AND CONVERTED TO METRIC FOR THOR-M 10/5/2011 TKN**
ISO VIEW
SCALE 2:1

1.91 (STOCK SIZE)

Ø12.4 +.0 -.3

REFERENCE DWG #78051-321 AND CONVERTED TO METRIC FOR THOR-M

10/5/2011 TKN

ECO# REV DESCRIPTION DATE BY
A REVISION HISTORY
REFERENCE DWG #78051-321 AND CONVERTED TO METRIC FOR THOR-M 10/5/2011 TKN

STOP, BACKING, LOWER ARM

472-6570 1 1018 STEEL Thanh 10/5/2011
NEXT ASSEMBLY QTY
TOTAL QTY IN DUMMY 4 TKN 1/30/2012

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STRAIN BURRS & SHARP EDGES

THIRD ANGLE PROJECTION

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

DECIMALS ANGLES FINISH
X  0.5  0.5
X.X  0.2 X.XX  0.1

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

472-6580

A 31 OF 1
ISO VIEW
SCALE 2:1

5.04 +.13 -.00

Ø19.05 +.00 -.08

1.6 X 45° CHAMFER.

9.5

10.13 +.13 -.00

38.1

1.6

REVISION HISTORY

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<th>REV</th>
<th>DESCRIPTION</th>
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<td>REFERENCE DWG #78051-207 AND CONVERTED TO METRIC FOR THOR-M</td>
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<td></td>
<td>DATE</td>
<td>BY</td>
</tr>
<tr>
<td></td>
<td>10/3/2011</td>
<td>TKN</td>
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</tbody>
</table>

SHAFT - WRIST ROTATION

472-6700 1 1018 STEEL Thanh 02/2011

NEXT ASSEMBLY QTY

TOTAL QTY IN DUMMY 2

A31 or 1 472-6730
ISO VIEW
SCALE 1 : 1

25.4 +0.5

61.2 +0.0

12.2 +0.0

CENTER OF THRU HOLE.

FULL R.

φ12.7 +0.0 THRU.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LUG - WRIST, UPPER

REFERENCE DWG #78051-205 AND CONVERTED TO METRIC FOR THOR-M

DECIMALS  ANGLES  FINISH
X   0.5   0.5  
X.X   0.2  X.XX   0.1

FRAME OF REFERENCE DWG #78051-205

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

DATE:
1/30/2012

QTY
1

TOTAL QTY IN DUMMY
1

TOTAL QTY IN DUMMY
2

REVOLUTION HISTORY

ECO#  REV  DESCRIPTION  DATE  BY

A  REFERENCE DWG #78051-205 AND CONVERTED TO METRIC FOR THOR-M  10/4/2011 TKN

472-6700  1  1018 STEEL  Thanh  10/4/2011

NEXT ASSEMBLY

TOTAL QTY IN DUMMY

472-6710

A
ISO VIEW
SCALE 1 : 1

1.6

M12x1.75 THRU.
CENTER OF TAP HOLE.

25.4 +.0 - .5

FULL R.

61.2 +.0 - .5

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LUG - WRIST, LOWER

REFERENCE DWG #78051-206 AND CONVERTED TO METRIC FOR THOR-M

ECO# REV DESCRIPTION DATE BY
A 10/4/2011 TKN

REFERENCE DWG #78051-206 AND CONVERTED TO METRIC FOR THOR-M

ENGINEER:
J. WANG
DATE: 1/30/2012

QTY TOTAL QTY IN DUMMY
1 2

CENTER OF TAP HOLE.

472-6700

472-6720

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

FINISH

REMOVE BURRS & BREAK SHARP EDGES

DIMENSIONS

X.X

X.XX

X.XXX

DECIMALS ANGLES FINISH

1.6

5

1018 STEEL

CENTER OF TAP HOLE.

4.8

CENTER OF TAP HOLE.
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   PIECEMARK USING PART NUMBER AND
   REVISION LETTER, SERIALIZE.

2. PART WEIGHT .57 Kg ± .05 Kg (1.25 LBS ± .10 LBS).
ISO VIEW
SCALE 1 : 1

47.8

19.1

28.4

14.2

R3.0 ±1.5

Ø19.1 THRU.

4.6 (STOCK SIZE)

REFERENCE DWG #78051-213 AND CONVERTED TO METRIC FOR THOR-M

REFERENCE DWG #78051-213 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011

TKN

1/30/2012

THANH

1018 STEEL

472-6940

HAND PLATE - OUTER

ENGINEER:

J. WANG

TOTAL QTY IN DUMMY

NEXT ASSEMBLY

1. WANG

472-6940

A31 of 1

FULL

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DO NOT SCALE DRAWING

TOLERANCES

FULL UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

EXCEPTIONS:

STOCK SIZE

STOCK SIZE

(SETICAL)

(SETICAL)

(SETICAL)

(SETICAL)
ISO VIEW
SCALE 1 : 1

[Diagram of a plate with dimensions and tolerances]

ISO VIEW
SCALE 1 : 1

[Diagram of a plate with dimensions and tolerances]
ISO VIEW
SCALE 2:1

ø13.1 +.20 - .05

ø25.4
(STOCK SIZE)

18.92 +.00 -.13

A REFERENCE DWG #78051-211 AND CONVERTED TO METRIC FOR THOR-M
B CHANGED Ø13.1 +.20/- .2 TO Ø13-1 +.20/- .05

REFERENCE DWG #78051-211 AND CONVERTED TO METRIC FOR THOR-M

10/4/2011 TKN
10/4/2011 JSJ

ECO# | REV | DESCRIPTION | DATE   | BY
--- | --- | ----------- | ------ | ---
A   |     | REFERENCE DWG #78051-211 AND CONVERTED TO METRIC FOR THOR-M | 10/4/2011 | TKN
B   |     | CHANGED Ø13.1 +.20/- .2 TO Ø13-1 +.20/- .05 | 10/4/2011 | JSJ

1018 STEEL

Thinh 10/4/2011

472-6920
<table>
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<tr>
<th>ITEM</th>
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<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-6910</td>
<td>STRUCTURAL ASSY-HAND THOR-M</td>
</tr>
</tbody>
</table>

NOTES:

1. **UNLESS OTHERWISE SPECIFIED:**
   PIECEMARK USING PART NUMBER AND REVISION LETTER. SERIALIZE

2. PART WEIGHT .57 Kg ± .05 Kg (1.25 LBS ± .10 LBS).

![Diagram of a hand with label 1 and notes](image.png)
VEHICLE RESEARCH and TEST CENTER
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOWER LEG ASSEMBLY, COMPLETE - LEFT

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>11</td>
<td>1</td>
<td>472-7370-1</td>
<td>LOWER LEG FLESH, LEFT</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>9010453</td>
<td>SCREW, BHCS M6-1.0 x 16</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>9003042</td>
<td>SCREW, BHCS M5 x 10</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>472-7115</td>
<td>TIBIA GUARD</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>472-7110</td>
<td>KNEE BUMPER, MOLDED</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>900826</td>
<td>SCREW, FHCS M6-1.0 x 16</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>472-7700-1</td>
<td>FOOT ASS'Y., LEFT</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>900852</td>
<td>SCREW, SHCS M6 x 1.0 X 16mm LONG</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>472-7200</td>
<td>KNEE CLEVIS WELDMENT</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-7500-1</td>
<td>ANKLE ASSEMBLY, LEFT</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-7300</td>
<td>LOWER LEG MECHANICAL ASSEMBLY</td>
</tr>
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</table>

REVOLUTION HISTORY

<table>
<thead>
<tr>
<th>ZONE</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>CHANGED TO METRIC DIMENSIONS</td>
<td>12/5/2008</td>
<td>BLW</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>ADDED ITEM #11</td>
<td>7/14/2015</td>
<td>DW</td>
</tr>
</tbody>
</table>

DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

X    ±.5
X.X    ±.2
X.XX   ±.1

Machined Angles ±.5°

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED

SCALE: 12/5/2008

DRAWING NUMBERSIZE

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA
THIRD ANGLE PROJECTION

SCREW, FHCS M6-1.0 x 16
SCREW, SHCS M6 x 1.0 X 16mm LONG
KNEE CLEVIS WELDMENT
ANKLE ASSEMBLY, LEFT
LOWER LEG MECHANICAL ASSEMBLY

LOWER LEG ASSEMBLY, COMPLETE - LEFT
MACHINING/ASSEMBLY NOTES:

1. FOR HELICOILS INSTALLED INTO FLATS ON PART, REMOVE 2 3/4 TREADS PRIOR TO INSTALLATION.
2. FOR HELICOILS INSTALLED INTO ROUNDS OF PART, REMOVE 5/8 OF A THREAD PRIOR TO INSTALLATION.
3. HELICOILS MUST NOT PROTRUDE INTO 25.4mm HOLE IN TOP CENTER OF PART.
4. INSTALL BEARING AFTER INSTALLATION OF HELICOILS.
5. REAM CENTER OF BEARING TO SPECIFIED DIMENSION.

PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-7311</td>
<td>LOWER TIBIA TUBE</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>9010423</td>
<td>IGUS IGLIDE J BEARING, 1&quot; OD x 3/4&quot; ID x 1&quot; LG (PART #JSI-1216-16)</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>9010437</td>
<td>HELICOIL, M6 x 1 x 6</td>
</tr>
</tbody>
</table>

REVISED NOTES:

A REMOVED NOTES 4, 5, & 6; REMOVED DIMENSION; .38 WAS .375; ADD MACHINING ASSEMBLY NOTES
B CHANGE TO METRIC HELICOILS 10/14/2008 BLW
C CHANGE TO METRIC DIMENSIONING 11/16/2008 BLW
D THRU HOLE WAS 76mm DEEP 11/19/2008 DW
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS. TOLERANCES ARE:

DECIMAL
1.6
X    ±.5
X.X    ±.2
X.XX    ±.1

MACHINED
15°
ANGLES
A.5°

DO NOT SCALE DRAWING

MATERIAL:
1018 STEEL

FINISH:
FRENCHED

ENGRAVE P/N AS SHOWN

REV
DESCRIPTION
DATE
BY

ZONE
A
A CHANGE TO METRIC DIMENSIONING
11/11/2008
BLW

B
ADDED 3.02 DIA PIN HOLE
7/29/2015
JHC

UPPER TIBIA LOAD CELL BLANK
THOR M

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

VEHICLE RESEARCH
and TEST CENTER

APPROVALS
DATE

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

1:1

SHEET
OF

DRAWING NUMBER

1

472-7320

ENG B.WADE
THOR M
472-7320 Upper Tibia Load Cell Blank.ipt

Ø12.7 THRU

Ø25.63 ± 0.02

2.5 X 45° CHAMFER

60.2

41.1

Ø44.5

Ø19.1 ± 38.1

45°

4X M6x1 ± 9.7
EQUALLY SPACED
ON Ø28.58 B.C.

9.52 ± 0.10

-0.02 < 0.00 < 6.4

Ø3.02

4X M6x1 ± 3.02
THRU TO BORE
EQUALLY SPACED AS SHOWN

ENGRÁVE P/N AS SHOWN
UNLESS OTHERWISE SPECIFIED:

1. BREAK ALL SHARP EDGES.
2. BOND ASSEMBLY WITH LORD 305 ADHESIVE, HOLE IN ITEM 1 MUST HAVE SAME ANGULAR ORIENTATION ABOVE CENTER AXIS HOLES IN ITEM 3.
3. METAL AND RUBBER SURFACES MUST BE SANDBLASTED & CLEANED WITH SOLVENT PRIOR TO BONDING.
4. CYCLE ASSEMBLY THROUGH TEN 50% COMPRESSION LOADING CYCLES PRIOR TO ASSEMBLY TO LEG.
ENGRAVE P/N AS SHOWN

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

SECTION A-A
SCALE 1 : 1

<table>
<thead>
<tr>
<th>ECO</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>E00609</td>
<td>A</td>
<td>.188 +/- .002 WAS .188 SLOT</td>
<td>7/25/2008</td>
<td>BLW</td>
</tr>
<tr>
<td>E00609</td>
<td>B</td>
<td>.373 +.000/- .002 WAS .375; HOLES WERE .257 THRU C.B. .313 DOWN .220 C.B. .500 DOWN .050; ADDED CHAMFER</td>
<td>8/29/2008</td>
<td>KHS</td>
</tr>
<tr>
<td>E00609</td>
<td>C</td>
<td>CHANGED TO METRIC DIMENSIONING</td>
<td>11/20/2008</td>
<td>BLW</td>
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</table>
### REV. HISTORY

<table>
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<th>BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
<td>REDRAWN IN INVENTOR</td>
<td>7/19/2007</td>
<td>KSG</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>CHANGED TO METRIC DIMENSIONING</td>
<td>11/20/2008</td>
<td>BLW</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>DIMENSION WAS Ø19.1 $\Phi$ THRU; REVISED NOTES</td>
<td>7/14/2015</td>
<td>DW</td>
</tr>
</tbody>
</table>

### DIMENSIONS

| Ø38.1 | Ø19.8 $\pm\frac{0.2}{0.0}$ $\Phi$ THRU |

### NOTATIONS

1. BREAK ALL SHARP EDGES
2. MATERIAL: NEOPRENE RUBBER 65 ±3 SHORE A (MEASURED ON CUT END OF CYLINDER)
3. DUROMETER CAN BE SUPERCEDED BY STATIC OR DYNAMIC TEST RESULTS.

### TEST RESULTS

<table>
<thead>
<tr>
<th>COMPRESSION (mm)</th>
<th>FORCE RANGE (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9 (25%)</td>
<td>1270-1550</td>
</tr>
<tr>
<td>15.9 (50%)</td>
<td>2750-3370</td>
</tr>
</tbody>
</table>

### NOTES

- UNLESS OTHERWISE SPECIFIED:
  - 1. BREAK ALL SHARP EDGES
  - 2. MATERIAL: NEOPRENE RUBBER 65 ±3 SHORE A (MEASURED ON CUT END OF CYLINDER)
  - 3. DUROMETER CAN BE SUPERCEDED BY STATIC OR DYNAMIC TEST RESULTS.

- FLAT RIGID SURFACES ON BOTH SIDES. ALL TESTING IS 50% COMPRESSION. A MINIMUM RECOVERY TIME OF 1 HOUR MUST BE ALLOWED BETWEEN TESTS.

- DATA FOR 25% COMPRESSION IS TO BE TAKEN FROM GRAPH OF 50% TESTING.

### DRAWING NUMBER

A3 472-7318 E
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
SLIGHT FLAT OR CHAMFER

5.00 HEX SOCKET
2.80 DEEP MIN.
PRE-DRILL 7.0 DEEP
MAX. TO POINT

NOTES:
1. SHOULDER TO BE CONCENTRIC TO AXIS OF THREAD WITHIN .02 MM TOTAL INDICATOR READING.
2. REMOVE BURRS AND BREAK SHARP EDGES
3. FINISH: .002 - .008 ZINC PER SIDE YELLOW DICHRROMATE
4. DIMENSIONAL LIMITS AND THREAD SIZES APPLY AFTER FINISH
UNLESS OTHERWISE SPECIFIED:

1. ADJUST NUT AS DESCRIBED IN THOR-LX/HYBRID III VERSION 2.0 USER'S MANUAL
2. SPRING RATE LISTED AT NOMINAL 24 N/mm
NOMINAL SPRING RATE IS SUPERCEDED BY STATIC TESTING REQUIREMENTS:
SPRING RATE: 25.0 ±1.3 N/mm
MAX DEFORMATION TO SOLID HEIGHT MUST EXCEED 46 mm.
**SECTION A-A**

**SCALE 1 : 1**

- **BORE Ø34.0 TYP ± 35**
- **TAP M36x4 TYP ± 31.8**
- **R6.4 TYP ± 44.5**
- **(2X) R6.4 TYP ± 19.9**
- **10.1**

---

**VEHICLE RESEARCH and TEST CENTER**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**FINISH APPROVALS**

**APPROVED**

**DRAWN**

**CHECKED**

**ENG WADE**

**472-7351**

---

**DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED**

**DIMENSIONS ARE IN MILLIMETERS**

**TOLERANCES ARE:**

- ±.5
- ±.2
- ±.1

---

**HEAT TREAT MATERIAL**

---

**TUBES BASE, ACHILLES SPRING**

---

**ENGRAVE P/N**

**(4X) DRILL & TAP FOR M4x0.7 HELICOIL TAP TYP ± 8.8**

**INSTALL 4 EA. ITEM 1 AFTER ANODIZE**

---

**PARTS LIST**

<table>
<thead>
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<tr>
<td>9009073</td>
<td>4</td>
<td>M4 x .7 x 6mm HELICOIL</td>
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**REVISION HISTORY**

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<th>DATE</th>
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<tbody>
<tr>
<td>A</td>
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<td>CHANGE TO METRIC DIMENSIONING</td>
<td>11/21/2008</td>
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<tr>
<td>B</td>
<td></td>
<td>M36X2 WAS M36X4, CORRECTED ANGLE DIM WAS 8.1°</td>
<td>7/20/2015</td>
<td>JHC</td>
</tr>
</tbody>
</table>

---

**REV SIZE**

- **DRAWING NUMBERSIZE**

---

**Blue Anodize**

---

**THOR M**

---

**NOTE:**

- **SLOT THRU THIS SIDE ONLY**
- **R20.6**
- **Ø6.6 THRU R20.6**
- **19.1**
- **33.0 - 0.0**
- **33.3**
- **10.1 - 0.0**
- **50.8**
- **50.8**
- **19.9 TYP ± 19.9**
- **69.9 ± 69.9**
- **9.5 ± 9.5**
- **10.3 ± 10.3**
- **42.1 ± 42.1**
- **48.7 ± 48.7**
- **20.7 ± 20.7**
- **41.3 ± 41.3**

---

**NOTE:**

- **VEHICLE RESEARCH and TEST CENTER**
- **NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**
- **APPROVALS DATE**
- **DATE**
- **ASME Y14.5M - 1994**
- **7075-T6 ALUMINUM**
- **BLUE ANODIZE**
- **FABRICATION DRAWING**
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

- \( \varnothing 32.8 \)
- \( \varnothing 12.7 \)
- \( \varnothing 6.6 \) THRU
- R0.8 ALLOWED
- 6.4
- 1.6

**VEHICLE RESEARCH and TEST CENTER**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**SPRING BASE CAP, ACHILLES**

**THOR M**

**REVISION HISTORY**

<table>
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<tbody>
<tr>
<td>E00609</td>
<td>B</td>
<td>REDRAWN IN INVENTOR</td>
<td>7/19/2007</td>
<td>KSG</td>
</tr>
<tr>
<td>8292</td>
<td>C</td>
<td>.261 WAS .250</td>
<td>6/17/2008</td>
<td>TF</td>
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<tr>
<td>E00609</td>
<td>D</td>
<td>CHANGE TO METRIC DIMENSIONING</td>
<td>12/1/2008</td>
<td>BLW</td>
</tr>
</tbody>
</table>
SPRING RATE: 24 N/mm

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
### Material

MATERIAL: BUNA-N/SBR RUBBER HOSE (1/2" OD X 1/4" ID)

**UNLESS OTHERWISE SPECIFIED:**
1. Break all sharp edges.

### Tolerances

<table>
<thead>
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<th>Tolerance</th>
<th>Description</th>
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<tbody>
<tr>
<td>X</td>
<td>± .5</td>
</tr>
<tr>
<td>X.X</td>
<td>± .2</td>
</tr>
<tr>
<td>X.XX</td>
<td>± .1</td>
</tr>
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</table>

### Revision History

<table>
<thead>
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<th>DESCRIPTION</th>
<th>DATE</th>
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<tbody>
<tr>
<td>E00609</td>
<td>B</td>
<td>REDRAWN IN INVENTOR</td>
<td>7/19/2007</td>
<td>KSG</td>
</tr>
<tr>
<td>E00609</td>
<td>C</td>
<td>CHANGE TO METRIC DIMENSIONING</td>
<td>12/1/2008</td>
<td>BLW</td>
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</tbody>
</table>

### Notes

- **UNLESS OTHERWISE SPECIFIED:**
  - Break all sharp edges.
- **MATERIAL:**
  - BUNA-N/SBR RUBBER HOSE (1/2" OD X 1/4" ID)

---

**VEHICLE RESEARCH and Test Center**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**THOR M**

**DRAWING NUMBER:** 472-7357

**SCALE:** 2:1

**THIRD ANGLE PROJECTION**

**REV:** C

**Sheet:** 1 of 1
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES

\( \varnothing 25.4 \)
\( \varnothing 6.4 \upnu \text{THRU} \)

15.2 ± 0.8
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

\[ \phi 25.0 \]

\[ \phi 6.4 \psi \text{ THRU} \]
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOlarANCES ARE:

DECIMAL:
X ±.5
X.X ±.2
X.XX ±.1

MACHINED ANGLES ±.5°

MACHINED ANGLES ±.5°

DO NOT SCALE DRAWING

MATERIAL:
Delrin, White

FINISH:
N/A

APPROVALS

THOR M

SPRING CAP, ACHILLES

DATE
7/19/2007
12/1/2008

ECO
E00609
E00609

REV
A
B

DESCRIPTION
REDRAWN IN INVENTOR
CHANGE TO METRIC DIMENSIONS

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

VEHICLE RESEARCH and TEST CENTER

THIRD ANGLE PROJECTION

SCALE: 2:1

DRAWING NUMBERSIZE

REV
A3

472-7355

OF 1

472-7355 Spring Cap, Achilles.ipt
NOTE: MAKE FROM M6X1.0 X 20mm SHCS

0.8 X 45° CHAMFER

\( \varnothing 4.70 +0.00 -0.05 \)

20.0

6.0

\( \diamond \)
### Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-7331</td>
<td>Z ROTATION WEDGE</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>9010459</td>
<td>DOWEL PIN, 4mm X 10mm</td>
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</table>

### Revision History

<table>
<thead>
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<th>REV</th>
<th>DESCRIPTION</th>
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<th>BY</th>
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<tbody>
<tr>
<td>A</td>
<td></td>
<td>CHANGE TO METRIC DIMENSIONING</td>
<td>11/20/2008</td>
<td>BLW</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>PIN LENGTH DESCRIPTION WAS 18mm</td>
<td>7/21/2015</td>
<td>JHC</td>
</tr>
</tbody>
</table>

### National Highway Traffic Safety Administration

**Z ROTATION WEDGE ASSY**

**THOR M**

**Vehicle Research and Test Center**
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

(2X) \( \varnothing 4.00 \pm .00 \mp 6.4 \) ON \( \varnothing 30.48 \) B.C.

R11.25 +.00 -.05

45° TYP.

R18.11 +.05 -.00

30° TYP.

(4X) R1.6

10.9

4.8

1.5

14.7

\( \varnothing 3.2 \) THRU

\( \varnothing 6.4 \) \( \mp 3.2 \)

---

**REVISION HISTORY**

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<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>CHANGE TO METRIC DIMENSIONING</td>
<td>11/20/2008</td>
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**UNITED STATES OF AMERICA**

**DEPARTMENT OF TRANSPORTATION**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**THOR M**

**Z ROTATION WEDGE**
ASSEMBLY INSTRUCTIONS
1. SAND 4 EA OF ITEM 2 TO ACHIEVE SNUG ASSEMBLY
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

PARTS LIST

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<th>DESCRIPTION</th>
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<tr>
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<td>PIN, SPRING 6mm x 20mm</td>
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<tr>
<td>3</td>
<td>1</td>
<td>472-7513</td>
<td>TORQUE SHAFT, LOWER</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-7512</td>
<td>TORQUE SHAFT, UPPER</td>
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<tr>
<td>1</td>
<td>1</td>
<td>472-7511</td>
<td>CENTER BLOCK, ANKLE</td>
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</table>

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL:
X ±.5
X.X ±.2
X.XX ±.1

MACHINED ANGLES ±.5°

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

REVISION HISTORY

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<td>7/23/2007</td>
<td>KSG</td>
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<td>10/6/2008</td>
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<td>12/1/2008</td>
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<tr>
<td>8894</td>
<td>E</td>
<td>CREATE EXPLODED VIEWS</td>
<td>4/30/2009</td>
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THOR M

ANKLE CENTER BLOCK ASS'Y.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

30°
45°
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

\[ \varnothing 22.2 \]

\[ \varnothing 12.730^{+0.05}_{-0.00} \]

\[ 1.8^{+0.1}_{-0.00} \]
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
MATERIAL:

NATURAL RUBBER (70 ±5 SHORE A)
DUROMETER MAY BE SUPERCEDED BY
DYNAMIC TEST REQUIREMENTS

REVISION HISTORY

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<td>12/3/2008</td>
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<td>D</td>
<td></td>
<td>MADE DUROMETER REFERENCE, ADDED TEST REQUIREMENT NOTE</td>
<td>7/22/2015</td>
<td>JHC</td>
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VEHICLE RESEARCH and TEST CENTER

APPROVALS | DATE
DRAWN      | B. WADE | 12/3/2008

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

TORQUE CYLINDER
THOR M

MATERIAL: SEE ABOVE
HEAT TREAT: ENG
FINISH: APPROVED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: 
X ±.5
X.X ±.2
X.XX ±.1

MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

UNinstalled. ipt

SCALE: 2:1
SIZE A
DRAWING NUMBER 472-7524
REV D

SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. SANDBLAST ITEM 1 & CLEAN WITH MEK.
3. ABRADE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
4. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE.

**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
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<td>FRONT STOP, SOFT-DORSI/PLANTAR</td>
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<tr>
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<td>1</td>
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<td>BRACKET, FRONT STOP-DORSI/PLANTAR</td>
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**REVISION HISTORY**

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<td>CHANGE TO METRIC DIMENSIONING</td>
<td>12/3/2008</td>
<td>BLW</td>
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**NOTES:**

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. SANDBLAST ITEM 1 & CLEAN WITH MEK.
3. ABRADE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
4. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL:
X ± .5
X.X ± .2
X.XX ± .1

MACHINED ANGLES ± .5°

ALUMINUM 6061-T6
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THIRD ANGLE PROJECTION

SCALE: 2:1

DATE: 12/10/2008

TMV

APPROVED

REV

472-7531 B

A3

ECO  REV  DESCRIPTION  DATE  BY
E00609  A  REDIM FOR METRIC HARDWARE  10/2/2008  BLW
E00609  B  CHANGE TO METRIC DIMENSIONING  12/3/2008  BLW
MATERIAL: NEOPRENE (84 ± SHORE A)

DUROMETER MAY BE SUPERCEDED BY DYNAMIC TEST REQUIREMENTS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: ±.5
XX ±.2
XX ±.1

MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS

DATE

DRAWN
B. WADE
12/3/2008

CHECKED
ENG

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STOP, DORSI/PLANTAR
THOR M

MATERIAL: NEOPRENE (84 ± SHORE A)

DUROMETER MAY BE SUPERCEDED BY DYNAMIC TEST REQUIREMENTS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: ±.5
XX ±.2
XX ±.1

MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS

DATE

DRAWN
B. WADE
12/3/2008

CHECKED
ENG

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STOP, DORSI/PLANTAR
THOR M

MATERIAL: NEOPRENE (84 ± SHORE A)

DUROMETER MAY BE SUPERCEDED BY DYNAMIC TEST REQUIREMENTS.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

472-7543 Ankle Bushing Plate, Free End.ipt
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

\[ \phi 12.75^{+0.02}_{-0.00} \]

\[ \phi 9.550^{+0.02}_{-0.00} \downarrow 4.760 \]
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

(2X) $\phi 3.2 \vee$ THRU
$\phi 6.6 \times 90^\circ$

THRU

V. R. E. S. E. A. H. L. C. E. N. T. E. R

VEHICLE RESEARCH and TEST CENTER

APPROVALS

NAME:

DATE:

B. WADE

12/4/2008

THOR M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

MATERIAL:

Aluminum-7075-T6

TMV

FINISH:

BLUE ANODIZED

APPROVED

THIRD ANGLE PROJECTION

SCALE: 2:1

REVISION HISTORY

ECO  REV  DESCRIPTION  DATE  BY

E00609  A  CHANGE TO METRIC DIMENSIONING  12/4/2008  BLW

DO NOT SCALE DRAWING

Aluminum-7075-T6

UNLESS OTHERWISE SPECIFIED:

1. BREAK ALL SHARP EDGES.

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

X ±.5
X.X ±.2
X.XX ±.1

1.6 DECIMAL:

1.6

MACHINED ANGLES ±.5°

THRU

3.4 3.4 3.4 3.4

(2X) R6.4

R1.6

R1.6

$\phi 8.72 \pm 0.01 \vee$ THRU

22.1 22.1 22.1 22.1

31.2 31.2 31.2 31.2

32.9 32.9 32.9 32.9

14.6 14.6 14.6 14.6

30° 30° 30° 30°

4.3 4.3 4.3 4.3

4.3 4.3 4.3 4.3

7.5 7.5 7.5 7.5

9.40 ±0.07 ±0.00

11.1 11.1 11.1 11.1

23.9 23.9 23.9 23.9

472-7560 Achilles Pulley Bracket.ipt

472-7560 Achilles Pulley Bracket.ipt
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

**DIMENSIONS ARE IN MILLIMETERS**

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<tr>
<th>TOLERANCES</th>
<th>TOLERANCE</th>
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<tr>
<td>X .5</td>
<td>±.1</td>
</tr>
<tr>
<td>X.X .1</td>
<td>±.01</td>
</tr>
<tr>
<td>X.XX .01</td>
<td>±.001</td>
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**MACHINED ANGLES**

±.5°

**HEAT TREAT**

Machined

**MATERIAL**

Bronze, Cast

**NOTICE**

DO NOT SCALE DRAWING

**ASME Y14.5M - 1994**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**THOR M**

**PULLEY, ACHILLES CABLE**

**REV C**

**DRAWING NUMBER**

472-7562

**SHEET**

1 OF 1

**REVISION HISTORY**

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<td>12/4/2008</td>
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**NOTE**

UNLESS OTHERWISE SPECIFIED:

1. BREAK ALL SHARP EDGES.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. SANDBLAST ITEM 1 & CLEAN WITH MEK.
3. ABRATE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
4. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE.

ITEM  | QTY | PART NUMBER | DESCRIPTION
--- | --- | ----------- | ---------------
472-7536 | 1 | STOP, EVERSION
472-7535 | 1 | BRACKET, SOFT STOP - LOWER

PARTS LIST

THOR M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STOP ASSEMBLY - EVERSION

VELICHE RESEARCH and TEST CENTER

APPROVALS | DATE
--- | ---
B. WADE | 12/3/2008

MATERIAL | CHECKED | TMV
--- | --- | ---
N/A | N/A | N/A

TOLERANCES ARE:

DECIMAL: X ±.5 X.X ±.2 X.XX ±.1

MACHINED ANGLES ±.5°

DO NOT SCALE DRAWING

HEAT TREAT N/A

FINISH N/A

APPROVED

REV

ECO | REV | DESCRIPTION | DATE | BY
--- | --- | ----------- | --- | ---
E00609 | A | CHANGE TO METRIC DIMENSIONING | 12/3/2008 | BLW

NOTES

1. BREAK ALL SHARP EDGES.
2. SANDBLAST ITEM 1 & CLEAN WITH MEK.
3. ABRATE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
4. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE.

 quốc gia

THIRD ANGLE PROJECTION

SCALE: 2:1

A3

472-7533

REV A

Sheet 1 of 1
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
MATERIAL: NEOPRENE (75-85 SHORE A)

DUROMETER MAY BE SUPERCEDED BY DYNAMIC TEST REQUIREMENTS.

MATERIAL: NEOPRENE (75-85 SHORE A)

DUROMETER MAY BE SUPERCEDED BY DYNAMIC TEST REQUIREMENTS.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. SANDBLAST ITEM 1 & CLEAN WITH MEK.
3. ABRADE ITEM 2 WITH SANFDPAPER & CLEAN WITH MEK & ALCOHOL.
4. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE.

THOR M

STOP ASSEMBLY - INVERSION

PARTS LIST

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<td>STOP, INVERSION</td>
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VEHICLE RESEARCH and Test Center

APPROVALS

DATE

DRAWN
B. WADE 12/3/2008

CHECKED
TMV 12/12/2008

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STOP ASSEMBLY - INVERSION

PAGE 1

REV A

E00609 A CHANGED TO METRIC DIMENSIONING 12/3/2008 BLW
MATERIAL: NEOPRENE (65-75 SHORE A)

DUROMETER MAY BE SUPERCEDED BY DYNAMIC TEST REQUIREMENTS.

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS.

TOLERANCES ARE:

DECIMAL: ±0.5

X ±0.5

XX ±0.2

X.X ±0.1

ANGLES ±0.5°

ASME Y14.9M - 1994

DO NOT SCALE DRAWING

VEHICLE RESEARCH AND TEST CENTER

APPROVALS

DATE

DRAWN

B. WADE

12/3/2008

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STOP, INVERSION

THOR M

REV

472-7537

1 OF 1

472-7537 Stop, Inversion.ipt
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. REMOVE OIL FROM ITEM 2 WITH SOLVENT.
3. APPLY LOCTITE 262 TO THREADS AND ASSEMBLY ITEMS 1 & 2.
4. MACHINE OD AND CHAMFER AS NOTED.

0.8 X 45° CHAMFER

11.10 +0.00 -0.05

REVISION HISTORY

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<td>1</td>
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<td>SCREW, SHCS M8-1.25 x 35</td>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

BOLT & SLEEVE ASSEMBLY, ANKLE THOR M

PARTS LIST

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UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

(\(\Phi 4.4\) \(\psi\) THRU)

(9.5)

(4.8)

(\(\Phi 6.4\))

(8.3)

DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL:
X ±.5
X.X ±.2
X.XX ±.1
MACHINED
ANGLES ±.5°

SCALE: 3:1
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THOR-M

CLAMP, NYLON LOOP

9/29/2015 DW

A3

REV

9005135 A

ECO
REV
DESCRIPTION
DATE
BY
A
REMOVED MCMASTER P/N AND ADDED DIMENSIONS

VINYL

VEHICLE RESEARCH and TEST CENTER

APPROVALS
DATE
DRAWN
B. WADE
1/12/2009

MATERIAL:
Nylon 6/6

FINISH
N/A

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

(8.3)

(4.8)

(9.5)

(\(\Phi 4.4\) \(\psi\) THRU)
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. SANDBLAST ITEM 1 & CLEAN WITH MEK.
3. ABRADE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
4. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE.

<table>
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<th>DESCRIPTION</th>
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<td>2</td>
<td>1</td>
<td>472-7528</td>
<td>DORSI/PLANTAR SOFT STOP</td>
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TOP ASSEMBLY, REAR DORSI

SEE ASME Y14.5M - 1994

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

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<th>TOLERANCE</th>
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<td>±.5</td>
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<tr>
<td>X.X</td>
<td>±.2</td>
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<tr>
<td>X.XX</td>
<td>±.1</td>
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</table>

MACHINED ANGLES ±.5°

MATERIAL: N/A

FINISH: N/A

HEAT TREAT: N/A

APPROVED: N/A

DRAWN: B. WADE

CHECKED: 5/11/2009

THIRD ANGLE PROJECTION

SCALE: 2:1

A3 SCALE DRAWING NUMBER

REV

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

THOR M

STOP ASSEMBLY, REAR DORSI

472-7527

472-7529 Stop Assembly - Rear Dorsi.iam
**Vehicle Research and Test Center**

**National Highway Traffic Safety Administration**

**Stop Bracket, Rear Dorsi/Plantar**

**Thor M**

**Material:** Aluminum 6061

**Heat Treat:** Eng

**Finish:** Blue Anodize

**Dimensions are in millimeters. Tolerances are:**

- **Decimal:**
  - X ±.5
  - XX ±.2
  - XXX ±.1

- **Machined Angles:** ±.5°

**ASME Y14.5M - 1994**

**Do not scale drawing.**

**Approved:**

- **Drawn:** Jim Clevenger
- **Checked:**
- **Date:** 7/30/2015

**Heat Treat:**

- **2X Ø4.4 Thru**

**Scale:** 1:1

**Drawing Number:** 472-7528

**Sheet 1 of 1**

**Rev:** A
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
UNLESS OTHERWISE NOTE:
1. BREAK ALL SHARP EDGES.
NOTES:
1. AFTER ANODIZE, INSTALL ITEM 1 WITH LOCTITE 262, AND ITEM 2. 
2. MACHINE HOLES AS INDICATED.

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

HELICOIL, M6 x 1 x 6
1 1 472-7511 THRUST BUSHING

PARTS LIST

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tr>
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THOR M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PARTS LIST

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<td>THRUST BUSHING</td>
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</tbody>
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NOTES:
1. AFTER ANODIZE, INSTALL ITEM 1 WITH LOCTITE 262, AND ITEM 2. 
2. MACHINE HOLES AS INDICATED.

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

HELICOIL, M6 x 1 x 6
1 1 472-7511 THRUST BUSHING

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NOTES:
1. AFTER ANODIZE, INSTALL ITEM 1 WITH LOCTITE 262, AND ITEM 2. 
2. MACHINE HOLES AS INDICATED.

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

HELICOIL, M6 x 1 x 6
1 1 472-7511 THRUST BUSHING

PARTS LIST

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</table>

NOTES:
1. AFTER ANODIZE, INSTALL ITEM 1 WITH LOCTITE 262, AND ITEM 2. 
2. MACHINE HOLES AS INDICATED.

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

HELICOIL, M6 x 1 x 6
1 1 472-7511 THRUST BUSHING

PARTS LIST

<table>
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THOR M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PARTS LIST

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<tr>
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<td>THRUST BUSHING</td>
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</table>

NOTES:
1. AFTER ANODIZE, INSTALL ITEM 1 WITH LOCTITE 262, AND ITEM 2. 
2. MACHINE HOLES AS INDICATED.

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
ANKLE BUSHING PLATE ASSEMBLY - POT END

THOR M

PARTS LIST

<table>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>472-7542</td>
<td>BUSHING, ANKLE</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-7583</td>
<td>BUSHING PLATE, POT END</td>
</tr>
</tbody>
</table>

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS.

TOLERANCES ARE:

DECIMAL:
- ±0
- ±0.2
- ±0.5

MACHINED:
- ±0.2
- ±0.5

ANGLES:
- ±0.5°

HEAT TREAT:
- ASMA Y14.5M - 1994
- DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED

MADE IN USA

THIRD ANGLE PROJECTION

DRAWN
JIM CLEVENGER
3/31/2015

APPROVED
JIM CLEVENGER
3/31/2015

BOISE IDaho - USA
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL:
X ±.5
XX ±.1

MACHINED
ANGLES
±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
Aluminum 6061

HEAT TREAT
CHECKED

FINISH
BLUE ANODIZE

THIRD ANGLE PROJECTION

472-7581 Clamp, Potentiometer.ipt
**NOTES**

1. HEAT TREAT AFTER WELDING
2. ANODIZE AFTER HEAT TREAT
3. INSTALL ITEM 5 & 6 AFTER ANODIZE

**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
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<th>DESCRIPTION</th>
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<tr>
<td>1</td>
<td>1</td>
<td>472-7200</td>
<td>Knee Clevis Weldment</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-7212</td>
<td>Clevis, Knee - Left</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>472-7210</td>
<td>Clevis, Knee - Right</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>472-7214</td>
<td>Bottom Plate, Knee Clevis</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>472-7216</td>
<td>Stiffener, Knee Bumper</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>9010688</td>
<td>Pin, Dowel M3 x 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9010040</td>
<td>M5 x .8 x 5mm Helicoil</td>
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</table>

**DIMENSIONS ARE IN MILLIMETERS**

**TOLERANCES ARE:**

- ±.5
- ±.2
- ±.1

**SCALE:**

1:1

**DATE:**

11/19/2008

**ASME Y14.5M - 1994**

**DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED**
ENGRAVE P/N AT THIS LOCATION

(2X) Ø6.7 THRU

(4X) Ø12.70 ±.02 THRU

(2X) 1.3 X 45° CHAMFER
ALONG BOTTOM EDGE

(2X) R3.2 ALL AROUND PERIMETER
(EXCEPT ON BOTTOM EDGE AS SHOWN)
ENGRAVE P/N AT THIS LOCATION

(2X) Ø12.70 +.02 THRU

(2X) 1.3 X 45° CHAMFER
ALONG BOTTOM EDGE

M4x0.7 THRU

(4X) Ø6.7 THRU
(2X) √ Ø13.2 X 90°
EQUALLY SPACED
ON Ø25.4 B.C.

R22.2

3.0°

(104.5)

472-7212 Clevis, Knee - Left
(2X) M2.5x0.45 THRU

(2X) Ø3.5 THRU

Ø6.4 X 90°
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

1.6 DECIMAL:
X ±0.5
X.X ±0.2
X.XX ±0.1

MACHINED ANGLES ±0.5°

Aluminum 6061-T6
UNLESS OTHERWISE SPECIFIED:

ENGRAVE P/N
(7X) Ø6.4 THRU
Ø13.6 X 90°

R31.8
15.9
31.8

22.1
10.6

19.1

49.9
51.1
56.0
60.5
(92.1)

12.7

25.4

22.3

44.5

R9.5

UNIVERSITY OF MICHIGAN

DO NOT SCALE DRAWING

TWO DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

THOR M
MOUNTING-HEEL/ACHILLES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ECO REVISION HISTORY

<table>
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<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>E00609</td>
<td>A</td>
<td>CHANGED TO Metric DIMENSIONING</td>
<td>12/4/2008</td>
<td>BLW</td>
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472-7714 Foot Sole Reinforcement Plate. ipt
**NOTES:**

CARBON CLOTH - 3K, 2 X 2 TWILL WEAVE 5.7 oz/sq. yd. 
.012" THICK (SOURCE: FIBRE GLAST) FG# 1069-B

EPOXY - 2000 EPOXY RESIN SYSTEM BY FIBRE GLAST
2000 EPOXY RESIN AND 2020 EPOXY HARDENER 
FG# 2000-A AND 2020-A

EPOXY MIX RATIO PER FOOT LAY-UP
100 g - EPOXY RESIN (2000)
23 g - EPOXY HARDENER (2020)

LAYOUT SCHEDULE:

25 PLYS OF CARBON CLOTH TOTAL
LAYOUT IS SYMMETRIC ABOUT THREE CENTRAL 0-90 PLYS
45 INDICATES A PLY WITH +/- 45° FIBER ORIENTATION
RELATIVE TO THE LONG AXIS OF THE FOOT PLATE
90 INDICATES A PLY WITH 0° & 90° FIBER ORIENTATION
RELATIVE TO THE LONG AXIS OF THE FOOT PLATE.

MOLDING PROCEDURE:

PLIES ARE HAND LAID INTO AN EPOXY MOLD USING
WET-LAYUP TECHNIQUES.
MOLD IS COATED WITH PART-ALL PASTE WAX (FG#1016)
AND REN RP78-2 SILICONE RELEASE AGENT (CIBI-GIEGY)
PLIES ARE LAID INTO MOLD AND BRUSHED WITH EPOXY
RESIN AND COMPLETELY WET-OUT.
MOLD IS TOPPED WITH POLYESTER PEEL PLY AND FOUR
LAYERS OF BREATHER MATERIAL.
VACUUM BAG AT 350°F FOR 3 HOURS AT 20 in-Hg

**UNLESS OTHERWISE SPECIFIED:**
1. BREAK ALL SHARP EDGES.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. MATERIAL: NEOPRENE RUBBER 50A ±5.
3. STATIC HEEL PAD RESPONSE SPECIFICATIONS:
   COMPRESSION: 3.54 mm
   FORCE RANGE: 4770 TO 5830 N.
4. DUROMETER SPECIFICATION CAN BE SUPERCEDED BY
   DYNAMIC HEEL IMPACT RESPONSE SPECIFICATIONS.

<table>
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<tr>
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<th>TOLERANCES ARE:</th>
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<tbody>
<tr>
<td>DECIMAL</td>
<td>X ±.5</td>
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<tr>
<td>DECIMAL</td>
<td>X.X ± .2</td>
</tr>
<tr>
<td>DECIMAL</td>
<td>X.XX ± .1</td>
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</table>

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. MATERIAL: NEOPRENE RUBBER 50A ±5.
3. STATIC HEEL PAD RESPONSE SPECIFICATIONS:
   COMPRESSION: 3.54 mm
   FORCE RANGE: 4770 TO 5830 N.
4. DUROMETER SPECIFICATION CAN BE SUPERCEDED BY
   DYNAMIC HEEL IMPACT RESPONSE SPECIFICATIONS.

VEHICLE RESEARCH and Test CENTER
APPROVALS DATE
DRAWN N/A 12/4/2008 BLW
CHECKED N/A 12/11/2008 TMV
FINISHED N/A APPROVED

THOR M
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REV. 472-7717 E SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES
2. MATERIAL: SELF SKINNING URETHANE FOAM.
3. TOTAL MASS: 34 ±.02 KG.
4. EXTERNAL SHAPE DEFINED BY 78051-600.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. MATERIAL: URETHANE 37 ±5 SHORE A.
3. SANDBLAST AND CLEAN WITH SOLVENT SIDE OF ITEM 1 TO BE BONDED TO URETHANE.

THOR M

472-7110 Knee Bumper, Molded
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

ENGRAVE P/N

(2X) R3.2

(2X) Ø5.4 THRU

472-7111

34.8

12.7

5.4

25.4

36.1

1.6

±.5

±.2

±.1

MACHINED
ANGLES
±.5°

DO NOT SCALE DRAWING

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

1018 STEEL

FINISH

N/A

APPROVED

TMV

11/11/2008
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. MATERIAL: URETHANE 85 ±5 SHORE A.
3. GEOMETRY SPECIFIED BY 3-D MODEL NO. 472-7115.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. PART TO BE MOLDED VINYL AND URETHANE FOAM.
3. TOTAL MASS: .63 ±.05 KG.
4. ATTACH ZIPPER TO CLOSE FLESH AT BACK.
5. EXTERNAL SHAPE DEFINED BY UNTIL 50TH PERCENTILE LOWER LEG.

THIRD ANGLE PROJECTION
NOTE:
CARBON CLOTH - 3K, 2 X 2 TWILL WEAVE 5.7 oz/sq. yd. .012" THICK (SOURCE: FIBRE GLAST) FG# 1069-B

EPOXY - 2000 EPOXY RESIN SYSTEM BY FIBRE GLAST 2000 EPOXY RESIN AND 2020 EPOXY HARDENER FG# 2000-A AND 2020-A

EPOXY MIX RATIO PER FOOT LAY-UP
100 g - EPOXY RESIN (2000)
23 g - EPOXY HARDENER (2020)

LAY-UP SCHEDULE:
[45/45/45/45/90/90/45/45/45/90/90/90]

25 PLIES OF CARBON CLOTH TOTAL LAYUP IS SYMMETRIC ABOUT THREE CENTRAL 0-90 PLIES 45 INDICATES A PLY WITH +/- 45° FIBER ORIENTATION RELATIVE TO THE LONG AXIS OF THE FOOT PLATE 90 INDICATES A PLY WITH 0° & 90° FIBER ORIENTATION RELATIVE TO THE LONG AXIS OF THE FOOT PLATE.

MOLDING PROCEDURE:
PLIES ARE HAND LAIRED INTO AN EPOXY MOLD USING WET-LAYUP TECHNIQUES. MOLD IS COATED WITH PART-ALL PASTE WAX (FG#1016) AND REN RP78-2 SILICONE RELEASE AGENT (CIBI-GIEGY) PLIES ARE LAID INTO MOLD AND BRUSHED WITH EPOXY RESIN AND COMPLETELY WET-OUT. MOLD IS TOPPED WITH POLYESTER PEEL PLY AND FOUR LAYERS OF BREATHER MATERIAL. VACUUM BAG AT 350°F FOR 3 HOURS AT 20 in-Hg

NOTES:
1. BREAK ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED:

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<td>INSERT, M3 KNUREALED TREADED PRESS</td>
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<td>CHANGE TO METRIC DIMENSIONING</td>
<td>12/4/2008</td>
<td>BLW</td>
</tr>
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</table>
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. MATERIAL: SELF SKINNING URETHANE FOAM.
3. TOTAL MASS: 3.4 ±.02 KG.
4. EXTERNAL SHAPE DEFINED BY 78051-601.
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. PART TO BE MOLDED VINYL AND URETHANE FOAM.
3. TOTAL MASS: .63 ± .05 KG.
4. ATTACH ZIPPER TO CLOSE FLESH AT BACK.
5. EXTERNAL SHAPE DEFINED BY UMTRI 50TH PERCENTILE LOWER LEG.
NOTES:
1. SEW COMPONENTS TO NEOPRENE WITH THE DARK (WINE COLOR) SIDE UP.
2. CORDURA COMPONENTS ARE SEW WITH THE LAMINATED SIDE FACING DOWN.
3. SEW ABDOMEN IN PLACE ALIGNED WITH BOTTOM EDGE AND CENTERED, STRETCH NEOPRENE TO FIT IF NECESSARY.
4. SEW SHOULDER PATCH IN PLACE; STRETCH NEOPRENE TO FIT IF NECESSARY.
5. SEW VELCRO INTO PLACE AS NOTED; CENTERED ACROSS.
6. SEW CHEST POCKET, LEFT & RIGHT FOAM POCKETS, AND LEFT & RIGHT STIFFENER POCKETS INTO PLACE AS SHOWN.
7. SEW ASSEMBLED NEOPRENE TO FRONT CORDURA PANEL, STRETCH NEOPRENE WHERE NECESSARY.
8. TRIM EDGES WITH BIAS TAPE.
9. SEW ZIPPERS THRU ENTIRE ASSEMBLY MAKING SURE ZIPPER CLOSURE DIRECTION IS DOWNWARDS.
10. SEW VELCRO FLAPS AS NOTED.
11. INSERT SIDE FOAM, STEEL STIFFENERS, AND WEIGHTED BIB.
SEE NOTES

NOTES:
1. MATERIAL: NEOPRENE G-231-N 3/16" (4.8mm) THICK WITH 2 SIDES OF NYLON (N-2-S). COLORS BLACK AND RED.
2. PATTERN IS SYMMETRIC ABOUT X.
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
4. CUT THIS PATTERN WITH THE RED COLOR SURFACE FACING UPWARDS.
5. MARK PART NUMBER WITH PERMANENT MARKER ON RED COLORED SIDE.

TABLE 1

<table>
<thead>
<tr>
<th>POINT</th>
<th>X (+/-0.5mm)</th>
<th>Y (+/-0.5mm)</th>
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<td>9</td>
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<td>184.5</td>
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ECO#   REV   DESCRIPTION
A        1    RENUMBERED FROM T1JKF111 RB1 AND CONVERTED TO METRIC FOR THOR-M; ADD TOLERANCE AND SYMMETRY NOTE; MODIFIED 3mm SMALLER THAN CORDURA PANEL, SIDES 6mm SMALLER

B        1    BLACK WAS WINE, REMOVE COLOR NUMBER IN NEOPRENE MATERIALS
NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED.
2. PATTERN IS SYMMETRIC ABOUT $\theta$.
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
4. CUT THIS PATTERN WITH THE RED COLOR SURFACE FACING UPWARDS.
NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. SEE DRAWING 472-3912, TABLE 1, FOR RADIUS OF CURVATURE.
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

SEE NOTE 2

REVOLUTION HISTORY

<table>
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<th>REV</th>
<th>DESCRIPTION</th>
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<td>RENUMBERED FROM T1JKF120 RB1 AND CONVERTED TO METRIC FOR THOR-M; ADD NOTE 3</td>
<td>11/30/2011</td>
<td>BK</td>
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SECTION A-A
BIAS TAPE NOT SHOWN
SCALE 3.000

NOTES:
1. PATTERN IS SHOWN WITH INSIDE (NEOPRENE) UP.
2. SEW VELCRO LOOP, CENTERED AT AREA SHOWN, DIRECTLY TO NEOPRENE ONLY.
3. CORDURA AND NEOPRENE LAYERS ARE SEWN TOGETHER AND LINED WITH RED BIAS TAPE. NEOPRENE IS TO BE STRETCHED TO 711mm DURING SEWING.
4. MARK PART NUMBER (6.4mm CHARACTERS MIN.) WITH PERMANENT MARKER, WHERE SHOWN.

SEE NOTE 2
SEE NOTE 3
SEE NOTE 4

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
OF:

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ECO# REV DESCRIPTION DATE BY
A

3 1 RENUMBER FROM T1JKF130 RB1 AND CONVERTED TO METRIC FOR THOR-M; REMOVE NOTES 4,5 AND RENUMBER
11/29/2011 BK

PARTS LIST

REAR CROTCH STRAP PROOF VELCRO
472-3923

OUTER CROTCH STRAP PATTERN, JACKET
472-3924

INNER CROTCH STRAP PATTERN, JACKET
472-3923

ITEM QTY PART NUMBER DESCRIPTION
1 1 472-3923 REAR CROTCH STRAP PROOF VELCRO
1 1 472-3924 OUTER CROTCH STRAP PATTERN, JACKET
1 1 472-3923 INNER CROTCH STRAP PATTERN, JACKET

B. KIMES 11/29/2011
J. WANG 1/11/2012

TOTAL QTY IN DUMMY 1
NOTES:

1. MATERIAL: NEOPRENE 0.25" X 3/16" (4.8mm) THICKNESS, WITH 2 SIDES OF NYLON (N-2-S); COLORS BLACK AND RED.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

3. REMOVE BURRS & BREAK SHARP EDGES.

4. ADD NOTE 2.

PROJECT NO.: 472-3923

CHECKED BY: B. KIMES

DATE: 11/29/2011

DRAWN BY: J. WANG

DATE: 1/11/2012

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
NOTES:

1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.

   TOLERANCES: ±0.5 mm, UNLESS OTHERWISE NOTED.
NOTES:

1. MATERIAL: BLACK NYLON LOOP VELCRO, SHEAR STRENGTH 17 PSI.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)

FOLD LINES

---

REV: A
DRAWING NO.: 472-3914
SCALE: 1:1
SIZE: 22 x 22
DESCRIPTION: CHEST FOAM POCKET

TOLERANCES

FINISH: SEE NOTES

HEAT TREAT: REMOVE BURRS & BREAK SHARP EDGES

MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.

TOTAL QTY: 50

DATE: 1/11/2012
CHECKED BY: J. WANG
DRAWN BY: B. KIMES
11/30/2011

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ECO# REV DESCRIPTION DATE BY
251 A RENUMBERED FROM T1JKF113 RB1 AND CONVERTED TO METRIC FOR THOR-M; REMOVE 2X VELCRO PATCH; 251 WAS 270 (TO MATCH ACTUAL PART) 11/30/2011 BK

NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

SEW 203mm X 16mm BLACK HOOK VELCRO
(ON LAMINATED SIDE)
NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. CUT WITH LAMINATED SIDE DOWNWARDS.
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:

1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.

2. CUT WITH LAMINATED SIDE DOWNWARDS.

3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:

1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
SCALE 1.000

NOTES:
1. MATERIAL: BLUE TEMPERED SPRING STEEL SHIM STOCK (GRADE 1095 Rc 48-51).
2. APPLY POLYOLEFIN THIN WALLED TUBING (SHRINK WRAP) AROUND SHIM. (I.D 12.7mm)

152.4
19.1

4X R6.4

3. RENUMBERED FROM TLXK0101 R2 AND CONVERTED TO METRIC FOR THOR-M;
REMOVE NOTES 2,3 AND RENUMBER

REVOLUTION HISTORY

<table>
<thead>
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<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
</thead>
</table>
| A    |     | RENUMBERED FROM TLXK0101 R2 AND CONVERTED TO METRIC FOR THOR-M;
REMOVE NOTES 2,3 AND RENUMBER                  | 11/29/11 | BK  |

1.000 UNLESS OTHERWISE SPECIFIED
X.XXX □
0.01

DIMENSIONS ARE IN MILLIMETERS

3RD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:
J. WANG
DATE: 1/11/2012

NEXT ASSEMBLY 472-3910

QTY 4 SEE NOTES
472-3926

B. KIMES 11/29/2011

TOTAL QTY IN DUMMY 4

3. WANG 11/1/2012

1.000
NOTES:

1. MATERIAL: WEIGHTED ACOUSTICAL SOUND CONTROL MATTING, 3.2±0.5mm (1/8") THICK WITH 6.4mm THICK OPEN CELL FOAM BACKING.

2. REMOVE AND DISCARD 6.4mm FOAM BACKING FROM MATTING.

3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. PATTERN IS SYMMETRIC ABOUT .
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

TABLE 1

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<thead>
<tr>
<th>POINT</th>
<th>X (+/-0.5mm)</th>
<th>Y (+/-0.5mm)</th>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

DATE:
1/11/2012

NEXT ASSEMBLY
472-3910

QTY
TOTAL QTY IN DUMMY
1

REVISION HISTORY

ECO# | REV | DESCRIPTION | DATE | BY
--- | --- | ----------- | --- | ---
     |     | RENUMERATED FROM T1JKF111 RB1 AND CONVERTED TO METRIC FOR THOR-M; ADD TOLERANCE AND SYMMETRY NOTE | 11/30/2011 | BK
NOTES:

1. 304.8 (12"), BLACK, BRASS ZIPPER
   YKK, MODEL #MGM0L-106 DA G 3/4 OR EQUIVALENT.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
1. 127.0 (5"), BLACK, BRASS ZIPPER
YKK, MODEL #MGMOL-106 DA G 3/4 OR EQUIVALENT.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:

1. MATERIAL: #6 CHARCOAL POLYESTER FOAM OR EQUIVALENT.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

SCALE .500

ECD# REV DESCRIPTION DATE BY
A 2 RENUMBERED FROM T100138 RB2 AND CONVERTED TO METRIC FOR THOR-M; REMOVE RADIUS AND OBSOLETE -1/-2 VERSIONS; ADD NOTE 2 2/8/2012 BK

REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
OF

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER: REMOVE BURRS & BREAK SHARP EDGES

DATE: 1/11/2012

NEXT ASSEMBLY 472-3910

472-3919

QTY TOTAL QTY IN DUMMY
2 2

ECO# REV DESCRIPTION DATE BY
A 2 RENUMBERED FROM T100138 RB2 AND CONVERTED TO METRIC FOR THOR-M; REMOVE RADIUS AND OBSOLETE -1/-2 VERSIONS; ADD NOTE 2 2/8/2012 BK

NOTES:

1. MATERIAL: #6 CHARCOAL POLYESTER FOAM OR EQUIVALENT.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
REAR VIEW

FRONT VIEW

SCALE .250

PARTS LIST

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<td>REAR PANEL LOOP VELCRO</td>
<td>472-39581</td>
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<td>UPPER BACK FOAM</td>
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<td>MID BACK FOAM</td>
<td>472-39571</td>
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<td>MID BACK FOAM POCKET</td>
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<td>UPPER BACK FOAM POCKET</td>
<td>472-39541</td>
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<td>OUTSIDE REAR PANEL PATTERN</td>
<td>472-39531</td>
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<tr>
<td>INSIDE REAR PANEL PATTERN</td>
<td>472-39521</td>
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<td></td>
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NOTES:
1. JACKET PATTERNS SHOWN WITH INSIDE (DARK SIDE) FACING UP.
2. SEW INSIDE VELCRO STRIPS AS NOTED.
3. SEW POCKETS AS SHOWN, WITH LAMINATED SIDE FACING DOWN.
4. SEW VELCRO TO FRONT CORDURA PANEL BEFORE SEWING PANEL TO NEOPRENE.
5. AFTER SEWING VELCRO AND POCKETS, ASSEMBLE OUTSIDE CORDURA PANEL ON THE OUTER SURFACE (BRIGHT RED) OF THE NEOPRENE WITH LAMINATED SIDE DOWN, STRETCH NEOPRENE TO CORDURA PROFILE, AND SEW ALONG EDGE WITH RED BIAS TAPE.
6. DIMENSIONS ARE BEFORE BIAS TAPE IS SEWN IN, FROM NEOPRENE PANEL.
7. AFTER SEWING, INSERT FOAM PANELS INTO POCKETS.

REV: D
DRAWING NO.: S1A0472-3951
SCALE: .250
SIZE: A
DESCRIPTION:
TOLERANCES:
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.: 1
CHECKED BY: B. Kimes 12/5/2011
DRAWN BY: J. Wang
DATE: 1/11/2012

ECO# 1
REV 1
DESCRIPTION A RENUMBERED FROM T1JKF201 RB3 AND CONVERTED TO METRIC FOR THOR-M 12/5/2011 BK

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENGINEER:

REV: D
DRAWING NO.: S1A0472-3951
SCALE: .250
SIZE: A
DESCRIPTION:
TOLERANCES:
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.: 1
CHECKED BY: B. Kimes 12/5/2011
DRAWN BY: J. Wang
DATE: 1/11/2012

ECO# 1
REV 1
DESCRIPTION A RENUMBERED FROM T1JKF201 RB3 AND CONVERTED TO METRIC FOR THOR-M 12/5/2011 BK

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENGINEER:

REV: D
DRAWING NO.: S1A0472-3951
SCALE: .250
SIZE: A
DESCRIPTION:
TOLERANCES:
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.: 1
CHECKED BY: B. Kimes 12/5/2011
DRAWN BY: J. Wang
DATE: 1/11/2012

ECO# 1
REV 1
DESCRIPTION A RENUMBERED FROM T1JKF201 RB3 AND CONVERTED TO METRIC FOR THOR-M 12/5/2011 BK

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENGINEER:

REV: D
DRAWING NO.: S1A0472-3951
SCALE: .250
SIZE: A
DESCRIPTION:
TOLERANCES:
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.: 1
CHECKED BY: B. Kimes 12/5/2011
DRAWN BY: J. Wang
DATE: 1/11/2012

ECO# 1
REV 1
DESCRIPTION A RENUMBERED FROM T1JKF201 RB3 AND CONVERTED TO METRIC FOR THOR-M 12/5/2011 BK

DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENGINEER:
NOTES:

1. MATERIAL: NEOPRENE G-231-N 4.8mm THICK, WITH 2 SIDES OF NYLON (N-2-S). COLORS BLACK AND RED.
2. PATTERN IS SYMMETRIC ABOUT $\theta$.
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
4. CUT THIS PATTERN WITH THE RED COLOR SURFACE FACING UPWARDS.
5. MARK PART NUMBER WITH PERMANENT MARKER ON RED COLORED SIDE.

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OUTSIDE REAR PANEL PATTERN

NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. PATTERN IS SYMMETRIC ABOUT
3. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
4. MARK PART NUMBER WITH PERMANENT MARKER ON LAMINATED SIDE.

DIAMETERS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

CHECKED BY:

DATE:

REV.

ECO# REV.
DESCRIPTION DATE BY

RENUMBERED FROM T1JKF211 RB1 AND CONVERTED TO METRIC FOR THOR-M; ADD TOLERANCE AND SYMMETRY NOTE; CORRECT MATERIAL & DIMENSIONS

12/6/2011 BK

1.000

UNLESS OTHERWISE SPECIFIED

X.X

0.01

387

156

206

181

191

R138X

R138X

R77

R77

81

603

565

5°
NOTES:

1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

3. MARK PART NUMBER WITH PERMANENT MARKER, ON LAMINATED SIDE.

SEW 190mm X 16mm BLACK HOOK VELCRO
NOTES:
1. MATERIAL: CORDURA (1000 DENIER) NYLON, RED, LAMINATED ON ONE SIDE.
2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
3. CUT PATTERN WITH LAMINATED SURFACE FACING DOWN.
4. MARK PART NUMBER WITH PERMANENT MARKER, ON LAMINATED SIDE.

SEW 292mm X 16mm BLACK HOOK VELCRO
NOTES:
1. MATERIAL: #6 CHARCOAL POLYESTER FOAM.
2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
SCALE .500

NOTES:
1. MATERIAL: #6 CHARCOAL POLYESTER FOAM.
2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.

REVISION HISTORY

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1.000

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DO NOT SCALE DRAWING

TOLERANCES

DIMENSIONS ARE IN MILLIMETERS

UPPER BACK FOAM

ENGINEER: J. WANG

NEXT ASSEMBLY 472-3951

 TOTAL QTY IN DUMMY 1

A31 or 1

472-3956
NOTES:

1. MATERIAL: BLACK POLYPROPYLENE HOOK VELCRO, SHEAR STRENGTH 17 PSI.

2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:
1. MATERIAL: 16mm, BLACK POLYPROPYLENE HOOK VELCRO, SHEAR STRENGTH 17 PSI.
2. TOLERANCE ±3mm, UNLESS OTHERWISE NOTED.
NOTES:

1. THE VELCRO HOOK PIECES (472-2913) ARE GLUED TO THE OUTER FRONT EDGES OF THE FOAM SKIN USING A HIGH STRENGTH CONTACT CEMENT.

2. THE VELCRO LOOP (472-2914) IS USED TO SECURE THE NECK TOGETHER AFTER BEING PLACED AROUND THE NECK ASSEMBLY.

3. REVISION "B" SKIPPED.
SCALE 1.000

NOTES:
1. MATERIAL: 5 lb/cu ft POLYURETHANE FOAM.
2. REINFORCEMENT MESH IS CAST INTO URETHANE FOAM.
3. PART WEIGHT: 75g ±10g
4. FOAM TOLERANCE: ±2mm.
5. REVISION "B" SKIPPED.
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT $\xi$, UNLESS OTHERWISE NOTED.
2. TOLERANCE $\pm 2\text{mm}$. 
NOTES:

1. MAKE FROM BLACK HOOK VELCRO AND CUT AS SHOWN.
2. TOLERANCE ±2mm.
NOTES:

1. MAKE FROM BLACK LOOP VELCRO AND CUT AS SHOWN
2. TOLERANCE 2mm.
NOTES:

1. TRACE SEWING LINES, 3mm OUTSIDE THE PROFILE OF THE NEOPRENE PATTERN ON THE INSIDE FACE OF THE CORDURA SKINS.

2. LAYER THE CORDURA SHEETS SO THE INNER FACES ARE FACING OUTWARD.

3. USING KEVLAR THREAD, SEW THE LAYERS TOGETHER ALONG THE TRACED SEWING LINE WITH THE EXCEPTION OF EDGE A.

4. TRIM THE EXCESS CORDURA LEAVING 3mm MATERIAL ALONG THE STITCHED LINE.

5. TURN THE LAYERS INSIDE OUT, INSERT THE NEOPRENE (472-2923), AND FOLD THE INNER AND OUTER CORDURA LAYER INSIDE, THEN SEW ALONG EDGE A.

6. MARK PART NUMBER AND SERIAL NUMBER AS SHOWN. (THIS WILL BECOME THE INNER FACE)

7. SEW THE ZIPPERS AS SHOWN WITH THE INSIDE FACE (WITH PART MARK) FACING UP.

8. TOLERANCE: ±2mm.
NOTES:
1. MATERIAL: NEOPRENE, RUBATEX G-231-N 1/8" (3.2mm) THICK WITH 2 SIDES OF NYLON (N-2-S). COLORS RED AND BLACK.
2. TOLERANCE ±2mm.
3. PATTERN IS SYMMETRIC ABOUT \( \theta \), UNLESS OTHERWISE NOTED.
NOTES:

1. #5 BLACK OXIDE BRASS ZIPPER
   STANDARD AUTOLOCK SLIDER
   TOP AND BOTTOM SEPARATING
   COLOR: BLACK
   (LENZIP)

2. TOLERANCE +/- 2mm.

1. #5 BLACK OXIDE BRASS ZIPPER
   STANDARD AUTOLOCK SLIDER
   TOP AND BOTTOM SEPARATING
   COLOR: BLACK
   (LENZIP)

2. TOLERANCE +/- 2mm.

REVISION HISTORY

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<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>7/10/2012</td>
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THOR-M

NECK SKIN REAR ZIPPER

VEHICLE RESEARCH
and Test Center

APPROVALS | DATE
DRAWN | CHECKED
B. Kimes | 7/10/2012

MATERIAL
LEATHER

SEE NOTES

FINISH
LEATHER

THIRD ANGLE PROJECTION

SCALE: 7/10/2012

472-2921 Neck Skin Rear Zipper.iam
NOTES:
1. PATTERN IS SYMMETRIC ABOUT $\theta$, UNLESS OTHERWISE NOTED.
2. TOLERANCE: ±2mm.
NOTES:

1. #5 BLACK OXIDE BRASS ZIPPER
   STANDARD AUTOLOCK SLIDER
   TOP AND BOTTOM SEPARATING
   COLOR: BLACK
   (LENZIP)

2. TOLERANCE: ±2mm.
GROUNDING STRAPS
## Parts List

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<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<td>METRIC RING TERMINAL M4 NON-INSULATED</td>
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<td>6002979</td>
<td>METRIC RING TERMINAL M5 NON-INSULATED</td>
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## Revision History

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<th>ECO #</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td></td>
<td>RENUMBERED FROM T1NM011 R1 AND CONVERTED TO METRIC FOR THOR-M</td>
<td>2/7/2012</td>
<td>SKK</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>6002273 WAS 6002977</td>
<td>12/14/2012</td>
<td>BK</td>
</tr>
</tbody>
</table>

## Notes

- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION
- UNLESS OTHERWISE SPECIFIED

## Symbols

- **REV:** Drawing Revision
- **DRAWING NO.:** Document Number
- **SCALE:** Drawing Scale
- **SIZE:** Drawing Size
- **DESCRIPTION:** Part Description
- **TOLERANCES:** Dimensions and Tolerances
- **FINISH:** Surface Finish
- **HEAT TREAT:** Heat Treatment
- **MATERIAL:** Material Specification
- **PROJECT NO.:** Project Number
- **ENGINEER:** Project Engineer
- **CHECKED BY:** Document Reviewer
- **DRAWN BY:** Document Creator
- **DATE:** Document Date
- **NEXT ASSEMBLY:** Date of Next Assembly

## Drawing

- Instrument Ground Strap, Head/Neck
- **1.000**
- **INSTRUMENT GROUND STRAP, HEAD/NECK**
- **A31 of 1 472-8700**

---

_NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION_
REVISION HISTORY

<table>
<thead>
<tr>
<th>ECO#</th>
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<td>6002273 WAS 6002977</td>
<td>12/17/2012</td>
<td>BK</td>
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</table>

PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>6002273</td>
<td>Braid, tinned copper tubular 1/8&quot;</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>6002981</td>
<td>Metric ring terminal M8 non insulated</td>
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</tbody>
</table>

SCALE: 1/2" = 1'-0"

DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

J. WANG

DATE: 1/23/2012

INSTRUMENT GROUND STRAP, THORACIC SPINE

THORACIC SPINE

TOTAL QTY IN DUMMY:

NEXT ASSEMBLY:

TOTAL QTY IN DUMMY:

DATE:

472-0000

472-8702
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
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<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>600290V</td>
<td>STANDARD RING TERMINAL 3/8&quot; NON INSULATED</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>6002980</td>
<td>METRIC RING TERMINAL M6 NON INSULATED</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>6002272V</td>
<td>HIGH-FLEX GROUNDING WIRE, INSULATED, #10 AWG</td>
</tr>
</tbody>
</table>

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
INSTRUMENT GROUND STRAP, MAIN GROUND

A31 of 1

472-8706
INSTRUMENTATION
380MM LG. CABLE WITH 7 PIN CIRCULAR CONNECTOR

Ø .850 [21.6]

+.350 [8.9]

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

0 .850 SKULL SPRING LOAD CELL THOR (METRIC) SA572-S112

SPECIFICATIONS

<table>
<thead>
<tr>
<th>AXIS</th>
<th>CAPACITY (METRIC)</th>
<th>CAPACITY (ENGLISH)</th>
<th>OUTPUT</th>
<th>BRIDGE RESISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FZ</td>
<td>4.45 KN</td>
<td>1000 LBF.</td>
<td>±3 mV/V</td>
<td>1050 OHM</td>
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<tr>
<td>NON-LINEARITY</td>
<td>&lt; 1% OF FULL SCALE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>HYSERESIS</td>
<td>&lt; 1% OF FULL SCALE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXCITATION</td>
<td>10 VDC NOMINAL 15 VDC MAX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MASS</td>
<td>15 GRAMS ~ LESS CABLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLARITY</td>
<td>CONFORMS TO S.A.E. J-211</td>
<td></td>
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</tr>
</tbody>
</table>

380MM LG. CABLE WITH 7 PIN CIRCULAR CONNECTOR

.350 [8.9]

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

0 .850 SKULL SPRING LOAD CELL THOR (METRIC) SA572-S112

SPECIFICATIONS

<table>
<thead>
<tr>
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<th>CAPACITY (METRIC)</th>
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<th>OUTPUT</th>
<th>BRIDGE RESISTANCE</th>
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<tr>
<td>FZ</td>
<td>4.45 KN</td>
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<td></td>
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</tr>
<tr>
<td>MASS</td>
<td>15 GRAMS ~ LESS CABLE</td>
<td></td>
<td></td>
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<tr>
<td>POLARITY</td>
<td>CONFORMS TO S.A.E. J-211</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL QTY IN DUMMY 2
CBORE HOLE FOR M6x1 X 14 LG. SHCS (4) HOLES ON A Ø38.10 B.C.

Ø8.000 THRU HOLE FOR OCCIPITAL CONDYLE PIN

C'BORE HOLE FOR M6x1 X 14 LG. SHCS (4) HOLES ON A Ø38.10 B.C.

COVER FOR A 31 SOCKET MICRO-D CONNECTOR

Specifications:

<table>
<thead>
<tr>
<th>Axis</th>
<th>Capacity (Metric)</th>
<th>Capacity (English)</th>
<th>Output</th>
<th>Bridge Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX</td>
<td>8.9 kN</td>
<td>2000 LBF.</td>
<td>2.0 mV/V</td>
<td>350</td>
</tr>
<tr>
<td>FY</td>
<td>8.9 kN</td>
<td>2000 LBF.</td>
<td>2.0 mV/V</td>
<td>350</td>
</tr>
<tr>
<td>FZ</td>
<td>13.3 kN</td>
<td>3000 LBF.</td>
<td>1.2 mV/V</td>
<td>700</td>
</tr>
<tr>
<td>MX</td>
<td>282.4 Nm</td>
<td>2500 IN-LBF.</td>
<td>1.7 mV/V</td>
<td>350</td>
</tr>
<tr>
<td>MY</td>
<td>282.4 Nm</td>
<td>2500 IN-LBF.</td>
<td>1.7 mV/V</td>
<td>350</td>
</tr>
<tr>
<td>MZ</td>
<td>282.4 Nm</td>
<td>2500 IN-LBF.</td>
<td>2.7 mV/V</td>
<td>700</td>
</tr>
</tbody>
</table>

- Non-linearity < 1% of full scale
- Hysteresis < 1% of full scale
- Crosstalk < 5% of full scale
- Excitation 10 VDC nominal 15 VDC max.
- Polarity conforms to SAE J-211
- Mass 420 g (.94 LBS) less cable

Third Angle Projection

Engineer:

Engineer:

Next Assembly

QTY: 1

Total Qty in Dummy: 1

SA572-S110
A A
B B

REV:DRAWING NO.:SHEET
SCALE: SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING

FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY: DATE:
DATE:
OF1 1 B SA572-S111
LOWER NECK LOAD CELL THOR (METRIC)

CABLE:
MX, MY, MZ

CABLE:
FX, FY, FZ

69.9
62.0

(4) MOUNTING HOLES FOR M6 SHCS

(4) MOUNTING HOLES FOR M6 SHCS

(2) 16 COND. CABLE 380MM LG. WITH 31 PIN CONNECTOR

1 : 1

DIMENSIONS ARE IN MILLIMETERS

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ENGINEER:

REMOVE BURRS & BREAK SHARP EDGES

M.FINK 8/24/2011

DATE:
7/3/12

NEXT ASSEMBLY

QTY
TOTAL QTY IN DUMMY

69.9
62.0
50.8

6.0
12.7
25.40
50.8

CABLE:
FX, FY, FZ

CABLE:
MX, MY, MZ

(2) 16 COND. CABLE 380MM LG. WITH 31 PIN CONNECTOR

(4) MOUNTING HOLES FOR M6 SHCS

Ø12.7 THRU HOLE

AXIS | CAPACITY (METRIC) | CAPACITY (ENGLISH) | OUTPUT | BRIDGE RESISTANCE |
---|---|---|---|---|
FX | 13.3 kN | 3000 LBF. | 2.3 mV/V | 350 |
FY | 13.3 kN | 3000 LBF. | 2.3 mV/V | 350 |
FZ | 13.3 kN | 3000 LBF. | 1.0 mV/V | 700 |
MX | 452.0 Nm | 4000 IN-LBF. | 1.8 mV/V | 350 |
MY | 452.0 Nm | 4000 IN-LBF. | 1.8 mV/V | 350 |
MZ | 226.0 Nm | 2000 IN-LBF. | 1.5 mV/V | 700 |

NON-LINEARITY < 1% OF FULL SCALE
HYSTERESIS < 1% OF FULL SCALE
CROSSTALK < 5% OF FULL SCALE
EXCITATION 10 VDC NOMINAL 15 VDC MAX.
POLARITY CONFORMS TO S.A.E. J-211
MASS 800 GRAMS (1.76 LBS.)

REVISION HISTORY

ECO# REV DESCRIPTION DATE BY
A RELEASE FOR PRODUCTION 9/9/2011 TORCH
REV: DRAWING NO.: SHEET 1

SCALE: SIZE:
DESCRIPTION:
TOLERANCES
DO NOT SCALE DRAWING
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY: DATE:

MODEL 9780
CABLE ASSEMBLY

FORCE CABLE
MOMENT CABLE

20.57 [.81] NEUTRAL AXIS

M6x1 - 6H PLCS 2 ENDS

KEYING SLOT
A 3 MM ROLL PIN
PRESSED INTO THE MATING PART AND PROTRUDING 1-2 MM SHOULD BE AT THE LOCATION INDICATED

KEYING SLOT
A 4 MM ROLL PIN
PRESSED INTO THE MATING PART AND PROTRUDING 1-2 MM SHOULD BE AT THE LOCATION INDICATED

ø51.00 [2.01] TO CLEAR SCREW HEADS

ø47.63 [1.88 in]
79.25 [3.12 in]
41.15 [1.620 in]
19.1 [.75 in]
27.9 [1.10]

ø51.00 [2.01] TO CLEAR SCREW HEADS

ø5.00 [2.01]
31.2 [1.23 in]
33.7 [1.33 in]

DECIMALS ANGLES FINISH
X \[\theta\] 0.5 \[\theta\]
X.X \[\theta\] 0.2 \[\theta\]
X.XX \[\theta\] 0.1 \[\theta\]

moconnor 7/12/2011

ECO# REV DESCRIPTION DATE BY
A REDRAWN TO INVENTOR 7/12/2011 MCO

SPECIFICATIONS

<table>
<thead>
<tr>
<th>AXES</th>
<th>CAPACITY (METRIC)</th>
<th>CAPACITY (ENGLISH)</th>
<th>OUTPUT</th>
<th>BRIDGE RESISTANCE</th>
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<tbody>
<tr>
<td>FX</td>
<td>15 KN</td>
<td>3400 LBF.</td>
<td>2.1 mV/V</td>
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<tr>
<td>FY</td>
<td>15 KN</td>
<td>3400 LBF.</td>
<td>1.0 mV/V</td>
<td>700</td>
</tr>
<tr>
<td>FZ</td>
<td>15 KN</td>
<td>3400 LBF.</td>
<td>2.3 mV/V</td>
<td>350</td>
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<tr>
<td>MX</td>
<td>350 NM</td>
<td>3100 IN-LBF.</td>
<td>2.3 mV/V</td>
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<tr>
<td>MY</td>
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<td>3100 IN-LBF.</td>
<td>2.3 mV/V</td>
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<tr>
<td>MZ</td>
<td>300 NM</td>
<td>2700 IN-LBF.</td>
<td>2.7 mV/V</td>
<td>700</td>
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NON-LINEARITY < 1% OF FULL SCALE
HYSTERESIS < 1% OF FULL SCALE
CROSSTALK < 5% OF FULL SCALE
EXCITATION 10 VDC NOMINAL 15 VDC MAX.
POLARITY CONFORMS TO S.A.E. J-211
MASS 470g
NEUTRAL AXIS 20.57 [.81]

THOR FEMUR LOAD CELL

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SA572-S120
POTENTIOMETER TYPE 1-TURN, PRECISION, CONDUCTIVE PLASTIC
RESISTANCE: 5K ohms ±10%
OUTPUT SIGNAL: ANALOG SIGNAL FROM 0 TO SUPPLY VOLTAGE (VOLTAGE DIVIDER CIRCUIT)
INDEPENDENT LINEARITY ERROR: ±1.0% MAX PER VPH-P-100A
OUTPUT SMOOTHNESS: 0.1% MAX.
NORMAL MASS: 0.5 oz. (15.0g)
CABLE TRAVEL: 1.5" (38mm) MAXIMUM TRAVEL
ELECTRICAL CONNECTION:
BLACK: INPUT, V-
WHITE: OUTPUT SIGNAL, S+
RED: GROUND, COMMON, V-3-

2X 2-56 MOUNTING HOLES

0.38 [9.7mm]
0.20 [5.1mm]

ELECTRICAL CABLE
3-CONDUCT FLYING LEAD
30 GAUGE MIN
18" (457mm) MIN. LENGTH

LEFT-HAND PULL DISPLACEMENT CABLE

0.75 [19.1mm]

ITEM | QTY | PART NO. | DESCRIPTION | MATERIAL
--- | ---- | -------- | ------------ |-------

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

STRING POT, MINI (LEFT)

SA572-S90-L
POTENTIOMETER TYPE 1-TURN, PRECISION, CONDUCTIVE PLASTIC
RESISTANCE: 5K ohms ±10%
OUTPUT SIGNAL: ANALOG SIGNAL FROM 0 TO SUPPLY VOLTAGE (VOLTAGE DIVIDER CIRCUIT)
INDEPENDENT LINEARITY ERROR: ±1.0% MAX.
OUTPUT SMOOTHNESS: 0.1% MAX.
NORMAL MASS: 0.5 oz. (15.9g)
CABLE TRAVEL: 1.5" (38mm) MAXIMUM TRAVEL
ELECTRICAL CONNECTION:
BLACK: INPUT, V+
WHITE: OUTPUT, SIGNAL S+
RED: GROUND, COMMON, V-5-

2X 2-56 MOUNTING HOLES

0.38 [9.7mm]
0.20 [5.1mm]

LEFT-HAND PULL DISPLACEMENT CABLE

0.75 [19.1mm]

ELECTRICAL CABLE
3-CONDUCT FLYING LEAD
30 GAUGE MIN
18" (457MM) MIN. LENGTH

<table>
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<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>STRING POT, MINI (RIGHT)</td>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS

DATE

S. Walker
12/14/2019

PRINT

DRAWN

SA572-S90-R

SCALE 2:1
SPECIFICATIONS

AXIS | CAPACITY
---|---
X  | 2000 | 1112.02
Y  | 2000 | 1112.02
Z  | 2000 | 1112.02
MAX | 2000 | 1956.3
MIN | 1000 | 390.1

Output at capacity: 100%滿量程  
Nonlinearity < 1% of full scale  
Drift < 1% of full scale  
Weight < 1.5 lbs/0.67 kg (cases not included)  
Signal output must be compatible with and  
recordable in a data channel as defined by  
SHE 111.  
Resonant frequency: 5000 Hz  
Operating temperature: 0 to 220°F  
Thermal sensitivity: (90 to 210°F) ±0.03% of reading /F  
Material: The load bearing structure of the load cell  
including provisions for the load cell mounting, are  
of metal or metal alloys. Non-load bearing parts  
of the load cell, internally and/or externally,  
including pipes and their attachments, may be made  
of any material provided they do not interfere with  
the performance of the load cell or the  
transmission of the load cell signals.

AXIS SHOW ILLUSTRATE THEIR ORIENTATION WITH RESPECT TO THE INSTRUMENTATION; THEY ARE  
NOT MEANT TO INDICATE DIRECTION OF POSITIVE POLARITY.

AXIS | QTY | PART NO. | DESCRIPTION | MATERIAL
---|---|---|---|---
A  | 1  |  |  |  

PARTS LIST

NATIONAL HIGHWAY TRAFFIC  
SAFETY ADMINISTRATION  
FIVE CHANNEL UPPER TIBIA LOAD CELL  
THOR-M

APPROVALS | DATE
---|---
D. Walker | 1/10/2002

H. Fry

SA572-S32
M3-0.5 \( \n Right \) 5

45°
30°

0.750 [19.05] [60.20] MAX.

2.370

CABLE

1/2" HOLE

1/4-28 UNF TAP THRU (4) PLACES 90° APART.

0.800 [20.32]

0.375 [9.53]

1.009 [25.62]

1.008 [25.60]

1.008 [25.60]

1.750 [44.45]

[0.375 [9.53]]

AXIS SHOW ILLUSTRATE THEIR ORIENTATION WITH RESPECT TO THE INSTRUMENTATION; THEY ARE NOT MEANT TO INDICATE DIRECTION OF POSITIVE POLARITY.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>AXIS</th>
<th>MIN</th>
<th>MAX</th>
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<tbody>
<tr>
<td>R1</td>
<td>1100</td>
<td>1100</td>
</tr>
<tr>
<td>R2</td>
<td>1100</td>
<td>1100</td>
</tr>
<tr>
<td>R3</td>
<td>1100</td>
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</tr>
<tr>
<td>H1</td>
<td>365</td>
<td>365</td>
</tr>
<tr>
<td>H2</td>
<td>365</td>
<td>365</td>
</tr>
</tbody>
</table>

OUTPUT AT CAPACITY: D c h
NOMINAL D c h NORMALLY NOT MORE THAN 0.1% OF FULL SCALE
NOMINAL D c h NORMALLY NOT MORE THAN 5% OF FULL SCALE
WEIGHT < 1.150 / unit

SIGNAL OUTPUT MUST BE CONSIDERED MIN AND MAX RECOMMENDED IN A DATA CHANNEL AS RECOMMENDED BY SAE J221.

FREE AIR RESONANT FREQUENCY: 5000 Hz FORCED MIN.
3000 Hz FORCED MAX.

OPEATING TEMPERATURE: 0°C TO 200°F.

THERMAL DEVIATION: (0°C TO 20°F) 0.05% OF READING /°F

MATERIAL: THE LOAD BEARING STRUCTURE OF THE LOAD CELL INCLUDING PROVIDES FOR THE LOAD CELL MOUNTING ARE OF STEEL OR METAL ALLOYS. NON-LOAD BEARING PARTS OF THE LOAD CELL EXTERNALLY AND/OR EXTERNALLY. INCLUDING AXLES AND THEIR ATTACHMENTS, MAY BE MADE OF ANY MATERIAL PROVIDING THEY DO NOT INTERFERE WITH THE PERFORMANCE OF THE LOAD CELL OR THE TRANSMISSION OF THE ENCODER SIGNALS.

AXIS SHOW ILLUSTRATE THEIR ORIENTATION WITH RESPECT TO THE INSTRUMENTATION; THEY ARE NOT MEANT TO INDICATE DIRECTION OF POSITIVE POLARITY.
Test Procedure:
1) Mount the ARS unit to the shock anvil such that the axis of rotation of ARS is parallel to the axis of the imparted shock pulse.

2) Subject ARS to linear acceleration haversine pulse with peak between 500g and 550g and a pulse width less than 3.5ms, measured at 10% of peak acceleration, when filtered at SAE Class 1000.

3) Record ARS output and filter at SAE Class 180.

Performance requirements:
ARS output should be within ±100deg/second.

SPECIFICATIONS:
- MASS: 3g
- RANGE: ±1500 DEG/SEC
- BANDWIDTH: 0-1000 Hz (DC RESPONSE)
- NOISE: <0.15% (RMS FULL SCALE)
- EXCITATION: 4.9-14.0 VDC
- CURRENT: 6mA NOMINAL
- ZERO OUTPUT: ±200mV
- FULL SCALE OUTPUT: ±2V NOMINAL
Test Procedure:
1) Mount the ARS unit to the shock anvil such that the axis of rotation of ARS is parallel to the axis of the imparted shock pulse.

2) Subject ARS to linear acceleration haversine pulse with peak between 500g an 550g and a pulse width less than 3.5ms, measured at 10% of peak acceleration, when filtered at SAE Class 1000.

3) Record ARS output and filter at SAE Class 180.

Performance requirements:
ARS output should be within ±100deg/second.

SPECIFICATIONS:
- MASS: 3g
- RANGE: ±8000 DEG/SEC
- BANDWIDTH: 0-300 Hz OR 0-600 Hz (DC RESPONSE)
- NOISE: <0.15% (RMS FULL SCALE)
- EXCITATION: 4.9-14.0 VDC
- CURRENT: 6mA NOMINAL
- ZERO OUTPUT: ±200mV
- FULL SCALE OUTPUT: ±2V NOMINAL
Test Procedure:
1) Mount the ARS unit to the shock anvil such that the axis of rotation of ARS is parallel to the axis of the imparted shock pulse.

2) Subject ARS to linear acceleration haversine pulse with peak between 500g an 550g and a pulse width less than 3.5ms, measured at 10% of peak acceleration, when filtered at SAE Class 1000.

3) Record ARS output and filter at SAE Class 180.

Performance requirements:
ARS output should be within ±100deg/second.

SPECIFICATIONS:
MASS: 3g
RANGE: ±12000 DEG/SEC
BANDWIDTH: 0-1650 Hz (DC RESPONSE)
NOISE: <0.25% (RMS FULL SCALE)
EXCITATION: 4.9-14.0 VDC
CURRENT: 6mA NOMINAL
ZERO OUTPUT: ±200mV
FULL SCALE OUTPUT: ±2V NOMINAL
Test Procedure:

1) Mount the ARS unit to the shock anvil such that the axis of rotation of ARS is parallel to the axis of the imparted shock pulse.

2) Subject ARS to linear acceleration haversine pulse with peak between 500g and 550g and a pulse width less than 3.5ms, measured at 10% of peak acceleration, when filtered at SAE Class 1000.

3) Record ARS output and filter at SAE Class 180.

Performance requirements:

ARS output should be within ±100deg/second.

SPECIFICATIONS:

MASS: 3g
RANGE: ±18000 DEG/SEC
BANDWIDTH: 0-300 Hz OR 0-2000 Hz (DC RESPONSE)
NOISE: <1.5% DEG/SEC/√Hz
EXCITATION: 4.9-14.0 VDC
CURRENT: 6mA NOMINAL
ZERO OUTPUT: ±200mV
FULL SCALE OUTPUT: ±2V NOMINAL
NOTES:
THE NUMBERS TO BE USED TO PROCESS THE UPPER NECK ARE THE HIS DIMENSIONS

**UPPER NECK INSTRUMENTATION SETUP DIMENSIONS**

<table>
<thead>
<tr>
<th>DIM.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>38.1mm FRONT SPRING TOP X</td>
</tr>
<tr>
<td>B</td>
<td>-9.3mm FRONT SPRING TOP Z</td>
</tr>
<tr>
<td>C</td>
<td>38.0mm FRONT SPRING BOTTOM X</td>
</tr>
<tr>
<td>D</td>
<td>16.3mm FRONT SPRING BOTTOM Z</td>
</tr>
<tr>
<td>E</td>
<td>-56.9mm REAR SPRING TOP X</td>
</tr>
<tr>
<td>F</td>
<td>7.5mm REAR SPRING TOP Z</td>
</tr>
<tr>
<td>G</td>
<td>-33.1mm REAR SPRING BOTTOM X</td>
</tr>
<tr>
<td>H</td>
<td>42.4mm REAR SPRING BOTTOM Z</td>
</tr>
</tbody>
</table>
POSTURE FOAMS
NOTES:
1. MATERIAL: 6 LB. CHARCOAL ESTER FOAM.
2. MARK PART NUMBER AND "ERECT" WHERE SHOWN.
3. FOAM TOLERANCE: ±1mm, UNLESS OTHERWISE NOTED.

472-0011 SLIDES INTO LOWER ABDOMEN POCKET (BETWEEN UPPER AND LOWER ABDOMEN) FOR DUMMY AT ERECT POSITION.
NOTES:
2. MARK PART NUMBER AND "NEUTRAL" WHERE SHOWN.
3. FOAM TOLERANCE: ±1mm, UNLESS OTHERWISE NOTED.
NOTES:

1. WELD ITEMS 1, 2, # 3 TOGETHER FIRST. GRIND WELDS FLUSH.

2. WELD ITEMS 4 & 5 SECOND.

3. WELDS ARE "ALL AROUND" WITH EXCEPTION TO THE LOCATIONS NOTED.

4. FINISH: ELECTROLESS NICKEL PLATE .008 mm MAXIMUM PER SIDE.
SCALE .250

10 TYP

30  40  40  40  40  40  40

63.5°

(290)

300

7X Ø10.5 THRU
✓ Ø13.0 X 90°
CSINK BOTH SIDES
REV: DRAWING NO.: SHEET
SCALE:
SIZE:
DESCRIPTION:
TOLERANCES
FINISH:
HEAT TREAT:
MATERIAL:
PROJECT NO.:
CHECKED BY:
DRAWN BY:
DATE:
DATE:
DATE:
OF

A A
B B
C C
D D

1.5 : 1

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

1.6

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

ENGINEER:
REMOVE BURRS & BREAK SHARP EDGES

ECO# REV DESCRIPTION DATE BY
A RELEASE TO PRODUCTION 11/2/2011 DW

REL1

QTY TOTAL QTY IN DUMMY
472-8101 2 1018 STEEL dwashenko 11/2/2011
NEXT ASSEMBLY QTY BJS 11/2/2011
TOTAL QTY IN DUMMY 2 D. WASHENKO 11/2/2011

LOWER ROD

472-8105

A31 of 1

130.0

150.0

8.0

Ø20.0

Ø9.00 THRU

SCALE .750

(12)
1. REMOVE BURRS AND BREAK SHARP EDGES.
1. REMOVE BURRS AND BREAK SHARP EDGES.
Screw, SHCS M4-0.7 x 12
Screw, BHCS M4x0.7 x 6mm
Washer, 4.3mm x 12mm x 1mm
Sill Adaptor H-Point Gage
Plate, H-Point Gage
Pin Ass'y., H-Point Gage

PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>6</td>
<td>2</td>
<td>5000152</td>
<td>Screw, SHCS M4-0.7 x 12</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5001075</td>
<td>Screw, BHCS M4x0.7 x 6mm</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>5000155V</td>
<td>Washer, 4.3mm x 12mm x 1mm</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>472-8220</td>
<td>Sill Adaptor H-Point Gage</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-8215</td>
<td>Plate, H-Point Gage</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-8210</td>
<td>Pin Ass'y., H-Point Gage</td>
</tr>
</tbody>
</table>

FINISH

MATER.

TREAT.TREAT

ANGLE

472-8200

THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

VEHICLE RESEARCH and TEST CENTER

APPROVALS

DATE

8/28/2015

THIRD ANGLE PROJECTION

SCALE: 0.75:1
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<tr>
<td>4</td>
<td>1</td>
<td>5000189V</td>
<td>ROLL PIN M3 x 22 SS</td>
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<tr>
<td>3</td>
<td>1</td>
<td>5000405V</td>
<td>PIN, DOWEL M4 x 20</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-8212</td>
<td>DISK, H-POINT GAGE</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>472-8211</td>
<td>PIN, TAPPERED, H-POINT GAGE</td>
</tr>
</tbody>
</table>

**PARTS LIST**

**UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS**

**TOLERANCES ARE:**

- **DECIMAL:** ±.5
- **MACHINED:** ±.2
- **ANGLES:** ±.1

**DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED**

**Vehicles Research and Test Center**

**APPROVALS**

**DRAWN:** Dave Walker

**CHECKED:**

**DATE:** 8/27/2015

**DEPARTMENT OF TRANSPORTATION**

**UNITED STATES OF AMERICA**

**THIRD ANGLE PROJECTION**

**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

**PIN ASS'Y., H-POINT GAGE**

**THOR-M**

**SCALE:** A3

**DRAWING NUMBER:** 472-8210

**REV:** 1 OF 1
SECTION A-A

M4x0.7 - 6H \( \pm 8.00 \) [M4x0.7 - 6H \( \pm 0.315 \)]

\[ \varnothing11.00 \pm 0.01 \] [\( \varnothing0.433 \pm 0.0004 \)]

\[ 9.57 \] [0.377]

\[ 160.0 \] [6.30]

\[ 4.00^\circ \pm 10^\circ \]

\[ 9.80 \pm 0.05 \] [0.386 \pm 0.0020]

\[ 8.00^\circ \pm 10^\circ \]

PIN, TAPPED, H-POINT GAGE

THOR-M

M4x0.7 - 6H

304 Stainless Steel

MACHINED

M4x0.7 - 6H

FINISH

APPROVED

8/27/2015

Dave Walker

THIRD ANGLE PROJECTION

National Highway Traffic Safety Administration

Vehicle Research and Test Center
<table>
<thead>
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<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>472-8221</td>
<td>BASE, H-POINT SILL ADAPTOR</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>472-8222</td>
<td>PIN, H-POINT SILL ADAPTOR</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>5000224</td>
<td>PIN, DOWEL M1.5 x 5</td>
</tr>
</tbody>
</table>

**Description:**
- DIMENSIONS ARE IN MILLIMETERS
- TOLERANCES ARE:
  - \( \pm 1.6 \) Decimals
  - \( \pm 0.5 \) X.X
  - \( \pm 0.2 \) X.XX
  - \( \pm 0.1 \) X.XXX

**Notes:**
- DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED

**Section A-A**

**Details:**
- P.F ØM6.35 H-POINT SILL ADAPTOR PIN TO BOTTOM OF HOLE
- (79.4 [3.13])
- (1.8 [0.07])
SECTION A-A

VEHICLE RESEARCH and TEST CENTER

APPROVALS

DATE

THOR-M

BASE, H-POINT SILL ADAPTOR

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

MATERIAL: 304 Stainless Steel

FINISH: APPROVED

THIRD ANGLE PROJECTION

SCALE: 2:1

SHEET 1 OF 1

472-8221
TEST FIXTURES
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tr>
<td>1</td>
<td>NECK TWIST FIXTURE MOUNTING PLATE</td>
<td>DL472-1170</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>NECK TWIST TEST FIXTURE MOUNTING PLATE</td>
<td>DL472-109118</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>SCREW, SHCS M1.4-0.3 x 105000376V2</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SCREW, PENDULUM SPACER</td>
<td>DL472-11802</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>ANGULAR RATE SENSOR</td>
<td>A572-S551</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>SCREW, FHCS M6-1 x 255000135414</td>
<td>13</td>
<td></td>
</tr>
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<td>7</td>
<td>SCREW, SHCS M6-1 x 1650006044</td>
<td>13</td>
<td></td>
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<tr>
<td>8</td>
<td>SCREW, FHCS M4-0.7 x 255000292V6</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>SCREW, SHCS M5-08 x 255000373V611</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>PIN, ROLL M5 x 405000200V1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>NECK TWIST FIXTURE SHAFT ASSEMBLY</td>
<td>DL472-11501</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>NECK TWIST FIXTURE PENDULUM ROD ASS.</td>
<td>DL472-11600</td>
<td>8</td>
</tr>
<tr>
<td>13</td>
<td>SHAFT COUPLING, FLEXIBLE BELLOWS FOR ½&quot; (6.4 MM) SHAFT, 1.09&quot; (27.7 MM) LG., ½&quot; (12.7 MM) O.D.</td>
<td>3000030V</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>BALL BEARING, 5/8&quot; (15.9) BORE, 1 3/8&quot; (35.0) O.D., 11/32&quot; (8.7) THK., S.S.</td>
<td>3000150V</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>ROTARY POTENTIOMETER</td>
<td>A572-S511</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>NECK TWIST FIXTURE END PLATE ASSEMBLY</td>
<td>DL472-1120</td>
<td>4</td>
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<tr>
<td>17</td>
<td>NECK TWIST FIXTURE PENDULUM SUPPORT PLATE</td>
<td>DL472-11400</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>NECK TWIST FIXTURE END PLATE ASSY., LATERAL IMPACT</td>
<td>DL472-1130</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>NECK TWIST FIXTURE TOP PLATE</td>
<td>DL472-1110</td>
<td>1</td>
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</table>
### Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>MATERIAL</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>DL472-1131</td>
<td>NECK TWIST FIXTURE END PLATE, LATERAL IMPACT</td>
<td>Steel</td>
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<tr>
<td>2</td>
<td>1</td>
<td>5000332V</td>
<td>PIN, DOWEL M5 x 20</td>
<td>Steel</td>
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### Revision History

<table>
<thead>
<tr>
<th>ECO</th>
<th>REV</th>
<th>DESCRIPTION</th>
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<tr>
<td>A</td>
<td></td>
<td>CONVERTED TO METRIC</td>
<td>9/8/2015</td>
<td>DW</td>
</tr>
</tbody>
</table>

### Notes

- Dimensions are in millimeters.
- Tolerances are:
  - DECIMAL: X ±0.2
  - X.X ±0.2
  - X.XX ±0.2

- Do not scale drawing unless otherwise specified.

- Third Angle Projection.
THOR M NTF Middle Support Plate
### Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
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<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>DL472-1121</td>
<td>NECK TWIST FIXTURE END PLATE, RIGHT</td>
<td>Steel</td>
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<tr>
<td>2</td>
<td>2</td>
<td>500002</td>
<td>PIN, DOWEL M5 x 12</td>
<td>Steel</td>
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<tr>
<td>3</td>
<td>1</td>
<td>5000224</td>
<td>PIN, DOWEL M1.5 x 5</td>
<td>Steel</td>
</tr>
</tbody>
</table>

### Drawing Details

- **Drawing Number:** DL472-1120
- **Sheet:** 1
- **Scale:** 1:1
- **Third Angle Projection:**
- **Date:** 2/24/2015
- **Reviewer:** JIM CLEVENGER
- **Description:** PRESS FIT PIN IN PLATE

---

**Revision History**

<table>
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<th>DESCRIPTION</th>
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<td>CONVERTED TO METRIC, ADDED PART #5000224 - PIN, DOWEL M1.5 x 5</td>
<td>9/8/2015</td>
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</tbody>
</table>
THOR M NTF End Plate Right.ipt

3X Ø5.3 THRU
2X Ø4.987 +.003 -.000 THRU
PRESS FIT FOR M5 DOWEL PIN
Ø1.5 THRU
PRESS FIT FOR M1.5 DOWEL PIN
Ø9.5 THRU
R12.0
2 PLACES

4.8
(3/16" STOCK)

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS.
TOLERANCES ARE:
DECIMAL:
± .5
X .5
X.X
X.XX
X.XX
X.XXX

MACHINED:
± .3
X .2
X.X
X.XX
X.XX
X.XXX

ANGLES
± .5
X .2
X.X
X.XX
X.XX
X.XXX
MACHINED ANGLES

THOR-M
NECK TWIST FIXTURE END PLATE, RIGHT

DATE: 2/24/2015

APPROVALS
JOE DAVISON
JIM CLEVENGER

DATE
2/24/2015

ECO
REV
DESCRIPTION
DATE
BY
A
CONVERTED TO METRIC
9/8/2015
DW

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

VEHICLE RESEARCH
and TEST CENTER

APPROVALS
DATE

MATERIAL
Aluminum-6061

FINISH
APPROVED

THIRD ANGLE PROJECTION

THOR M NTF End Plate Right.ipt
REVISION HISTORY

ECO  REV  DESCRIPTION  DATE  BY
A    CONVERTED TO METRIC  9/8/2015  DW

VEHICLE RESEARCH and TEST CENTER

APPROVALS  DATE

DRAWN  CHECKED

MACHINED  ANGLES ±.2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMALS ±.5
X.X ±.2
X.XX ±.1

DO NOT SCALE DRAWING

STEEL

FINISH

MATERIAL

THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NECK TWIST FIXTURE
PENDULUM COLLAR

REV

DATE  COUNTERING NUMBER

A3  DL472-1161 A

SCALE  THIRD ANGLE PROJECTION

1:1  1 1
STOCK: Ø1/2" CR ROUND BAR

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: ±.1
MACHINED: ±.2
ANGLES: ±.3°

MATERIL: Steel
FINISH: ENGG.

THOR M NTF Pendulum Shaft.ipt

THOR MNTF Pendulum Shaft.ipt
ϕ50.8

M5x0.8 THRU TO CENTER HOLE
INLINE WITH CTBORE HOLE

REAM ϕ12.7 THRU

ϕ5.5 THRU TO CENTER HOLE
□ ϕ10.0 x 12.0 DEEP

THOR M NTF Pendulum Weight
### Parts List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<td>5000198V</td>
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<td>S.S.</td>
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<td>NECK TWIST FIXTURE ROTATION SHAFT</td>
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<td>DL472-1151</td>
<td>NECK TWIST FIXTURE NECK ATTACHMENT PLATE</td>
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### Notes
- Dimensions are in inches.
- Tolerances are:
  - 1.6
  - 0.001
  - 1/64
  - .001
  - .005
- Approval and checking information.
- Metric conversion:
  - 9/8/2015
- Decimal: 0.01
- Angle: 30°
- Heat treatment:
  - Quench
- Finish:
  - Polished

### Revision History

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<td>9/8/2015</td>
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THOR M NTM Shaft Assembly.iam

THOR M NTM Shaft Assembly
STEELPIN, DOWEL M6 x 20

Aluminum 6061

NECK TWIST FIXTURE NECK ADAPTER PLATE

PARTS LIST

<table>
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<th>PART NUMBER</th>
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<td>NECK TWIST FIXTURE NECK ADAPTER PLATE</td>
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<td>2</td>
<td>4</td>
<td>5000445</td>
<td>PIN, DOWEL M6 x 20</td>
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MATERIAL

<table>
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<td>4</td>
<td>5000445</td>
<td>PIN, DOWEL M6 x 20</td>
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MATERIAL

1. Steel
2. Aluminum 6061

REVOLUTION HISTORY

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<td>9/4/2015</td>
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</table>

THOR M NTF Neck Mounting Bracket Assy.iam

THOR M NTF Neck Mounting Bracket Assy.iam
NOTE:

THE M6 AND THE 6mm DOWEL HOLES LINE UP

4X Ø6.0 x 12.0 DEEP PRESS FOR 6mm DOWEL

2X M1.4x0.3 x 4.0

8.0

69.9

53.9

4.7

69.9

53.9

8.0

45° TYP

R3.0 TYP

6.0 X 45° CHAMFER TYP

Ø30.00

25.4 STOCK

3.2

40.61

40.0

54.0

53.9

13.03

4XM6x1 x 12.7

12.70 +.76 DEEP RECESS

4XM6x1 x 12.7

9.6

53.9

53.9

34.5

1.3

3.2

40.61

40.0

54.0

53.9

13.03

4XM6x1 x 12.7

9.6

53.9

53.9

34.5

1.3

3.2

40.61

40.0

54.0

53.9

13.03
### Parts List

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<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
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<td>5000117</td>
<td>SCREW, FHCS M8-1.25 x 5</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>9000079</td>
<td>SCREW, SHCS 3/8-16 x 1&quot;</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>DL472-3010</td>
<td>LOWER ABDOMEN PROBE FACE FRONT PLATE</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>DL472-3020</td>
<td>LOWER ABDOMEN PROBE FACE CONNECTOR PLATE</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>DL472-3030</td>
<td>LOWER ABDOMEN PROBE FACE MOUNTING PLATE</td>
</tr>
</tbody>
</table>

### Description

- **Parts List**

  - **5000117**: SCREW, FHCS M8-1.25 x 5
  - **9000079**: SCREW, SHCS 3/8-16 x 1"
  - **DL472-3010**: LOWER ABDOMEN PROBE FACE FRONT PLATE
  - **DL472-3020**: LOWER ABDOMEN PROBE FACE CONNECTOR PLATE
  - **DL472-3030**: LOWER ABDOMEN PROBE FACE MOUNTING PLATE

---

**Revision History**

<table>
<thead>
<tr>
<th>ECO</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>BY</th>
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<td>CONVERTED TO METRIC</td>
<td>9/9/2015</td>
<td>DW</td>
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</table>

**Vehicle Research and Test Center**

- **APPROVALS**: JIM CLEVENGER
- **DATE**: 6/10/2015

**National Highway Traffic Safety Administration**

- **Department of Transportation**
- **United States of America**

**Lower Abdomen Probe Face Assembly**

- **THOR-M**

---

**Material**: ASME Y14.5M - 1994

**Scale**: 1:1

**Drawing Number**: DL472-3000 A

**Third Angle Projection**: A3

**Revision**: A

---

**Note**: Do not scale drawing unless otherwise specified. Dimensions are in millimeters. Tolerances are:

- Decimal: ±0.1
- MACHINED: ±0.5
- ANGLES: ±0.25°
- X.X: ±0.2
- X.XX: ±0.1

**Third Angle Projection**: Lower Abdomen Probe Face.iam
UNLESS OTHERWISE SPECIFIED Dimensions are in MILLIMETERS TOLERANCES ARE:

DECIMAL
±.5

MACHINED
±.2

ANGLES
±.5°

MATERIAL
Steel, Mild

FINISH
ENG.

APPROVALS
ossed

CHECKED
JIM CLEVENGER 6/10/2015

REVISION HISTORY

ECO
REV
DESCRIPTION
DATE
BY

A
CONVERTED TO METRIC
9/9/2015
DW

LOWER ABDOMEN PROBE FACE MOUNTING PLATE THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

VEHICLE RESEARCH and TEST CENTER

APPROVALS
DATE

JOE
6/10/2015

REV
A
CONVERTED TO METRIC
9/9/2015

A3
DL472-3030

DRAWING NUMBER
SIZE

SHEET
1 OF 1

THIRD ANGLE PROJECTION

SCALE: 1:1
THOR-M

Lower Abdomen Probe Face Connector Plate

Material: Steel, Mild

Machined Angles: ±.5°

Connectors:
- 4x M8x1.25 x 20.0

Dimensions are in millimeters.

Tolerances are:
- Decimal: ±.5
- X.X ±.2
- X.XX ±.1

Third Angle Projection

Scale: 1:1

Revision History

ECO | REV | DESCRIPTION | DATE | BY
--- | --- | --- | --- | ---
A | | Converted to Metric | 9/9/2015 | DW

DO NOT SCALE DRAWING

Steel, Mild
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DESKTOP: ±.5
X.X ±.2
X.XX ±.1

DO NOT SCALE DRAWING

Vehicle Research and Test Center

Approval:
- 6/10/2015
- DW

CHECKED:
- JIM CLEVENGER

FINISHED:
- APPROVED

DATE:
- 6/10/2015

Drawing Number:
- DL472-3020

Drawing Sheet:
- A3

Page Numbers:
- 1 of 1

Third Angle Projection

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL:
X ±.5
X.X ±.2
X.XX ±.1

MACHINED:
X ±.5
X.X ±.2
X.XX ±.1

ANGLES:
X ±.5°

DO NOT SCALE DRAWING

MATERIAL:
Steel, Mild

FINISH:
ENG.

APPROVALS

REVISION HISTORY

ECO | REV | DESCRIPTION | DATE | BY
--- | --- | --- | --- | ---
A | CONVERTED TO METRIC | 9/9/2015 | DW

LOWER ABDOMEN PROBE FACE
FRONT PLATE

THOR-M

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

SCALE: 1:1
DATE: 6/10/2015
DRAWING NUMBER: A3
COUNTING NUMBER: DL472-3010
REV: A

THIRD ANGLE
PROJECTION

90°
A SCREW, SHCS M6-1 x 90

PENDULUM ARM ASSEMBLY (TLX-9000-007)

1250.0

IMPACTOR FACE (TLX-9000-006)

SCREW, SHCS M6-1 x 45

IMPACTOR BALLAST (TLX-9000-001)

REVISION HISTORY

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<th>DESCRIPTION</th>
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<td>A</td>
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<td>SCREW, SHCS M6-1 x 45 WAS SHCS 1/4&quot;Ø – 20 x 1 3/4&quot;; AND SCREW, SHCS M6-1 x 90 WAS SHCS 1/4&quot;Ø – 20 x 3 1/2&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9/28/2000 DW</td>
</tr>
</tbody>
</table>

THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DYNAMIC IMPACTOR

VEHICLE RESEARCH and TEST CENTER

APPROVALS

DATE

DRAWN
Dave Walker
9/28/2000

CHECKED

MATERIAL

HEAT TREAT

FINISH

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

DECIMAL: ± .5 X .5
X . X ± .2 X . X
X . X X ± .1 X . X X
X . X X X ± .05

WORK VOLUMETRIC

THIRD ANGLE PROJECTION

SCALE: 1:1

DRAWING NUMBER

REV

A3 TLX-9000-013 A
REVISION HISTORY

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<td>ADDED DECIMAL EQUIVALENT TO DRILL SIZE</td>
<td>5/23/2002</td>
<td>DW</td>
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<tr>
<td>B</td>
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<td>REMOVED &quot;#7&quot; FROM HOLE NOTE</td>
<td>9/19/2003</td>
<td>DW</td>
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<tr>
<td>C</td>
<td></td>
<td>DIMENSION 2X M6-1 - 6H ± 25.0 WAS DRILL 5.105/0.201 X 25.4/1.0 DEEP TAP ¼-20 (2 PLC’S.)</td>
<td>9/9/2015</td>
<td>DW</td>
</tr>
</tbody>
</table>

1.5 X 45° CHAMFER TYP. BOTH ENDS

2X M6x1 - 6H ± 25.0

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

<table>
<thead>
<tr>
<th>DECIMAL</th>
<th>MACHINED</th>
<th>ANGLES</th>
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</thead>
<tbody>
<tr>
<td>±0.5</td>
<td>±0.2</td>
<td>±0.1</td>
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</tbody>
</table>

MACHINED ANGLES ± 0.5°

DO NOT SCALE DRAWING

MATERIAL: PTFE, Teflon

FINISH: ENGRAVED

THOR-M

TEST FIXTURE - IMPACTOR FACE

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS

DATE

OWNER

CHECKED

DRAWN

APPROVED

9/9/2015

Dave Walker

9/9/2015

DW

9/9/2015

DW

9/9/2015

DW
 WEIGHT: 3.94 kg./(8.68 lbs.)

UNITS ARE mm./in

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

TEST FIXTURE – IMPACTOR BALLAST

THOR-LX LOWER EXTREMITY

SCALE 1:1
ADDITIONS DATE
DRAWN WALKER 3/25/00
CHECKED ENG

A

TLX-9000-001 A
<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
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<tr>
<td>3</td>
<td>2</td>
<td>DL472-4103</td>
<td>Gusset</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>DL472-4102</td>
<td>Leg Mounting Bar</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>DL472-4101</td>
<td>Lower Leg Mounting Bracket</td>
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</tbody>
</table>

**Dimensions:**

- 152.40 [6.000]
- 203.20 [8.000]
- ø25.70 ± 22.23
  [ø1.01 ± 0.88]
- 76.20 [3.000]

**Notes:**

- This surface mounts to a rigid surface.

**Material:**

- 1018 Welded Steel Mild

**Tolerances:**

- 1.6 decimal:
  - ± .5
  - ± .2
  - ± .1

**Heat Treat:**

- None

**Drawing Information:**

- DRAWN: Jim Clevenger
- CHECKED: Jim Clevenger
- ENG: Thor-M
- THOR-M
- NUMBE ROF  A2
- DATE: 8/13/2015
- SCALE: 1:1
- DRAWING NUMBER: A2
- SHEET: 1
- REV: 1

**Department:**

- DEPARTMENT OF TRANSPORTATION
- UNITED STATES OF AMERICA

**Scales:**

- ASME Y14.5M - 1994
- DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- TOLERANCES ARE:
  - ± .5
  - ± .2
  - ± .1

**Third Angle Projection:**

- MACHINED ANGLES
  - ± .5
<table>
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<th>ITEM</th>
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<th>DESCRIPTION</th>
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<tr>
<td>8</td>
<td>1</td>
<td>DL472-4204</td>
<td>EYE BOLT - MODIFIED</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>5001500V</td>
<td>LOAD CELL, 25# CAP, LCR-25</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>5000685V</td>
<td>THRUST BEARING, 1/4&quot; ID</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>DL472-4203</td>
<td>PULL WIRE ASSEMBLY</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>9000101V</td>
<td>HEX NUT, FLANGED, 1/4-28</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>9000110</td>
<td>HEX NUT 1/4-28</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>DL472-4202</td>
<td>DRAW SCREW</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>DL472-4210</td>
<td>MOUNTING BRACKET ASSEMBLY</td>
</tr>
</tbody>
</table>
NOTE:

1. THESE HOLES ARE LOCATING DOWEL HOLES AND MUST MATCH UP WITH CORRESPONDING HOLES IN THE LEG MOUNTING BRACKET.
UNLESS OTHERWISE SPECIFIED.
DIMENSIONS ARE IN MILLIMETERS.
TOLERANCES ARE:
DECIMAL: ±0.5
MACHINED: ±0.2
ANGLES: ±0.1°
DO NOT SCALE DRAWING
HEAT TREAT
MATERIAL
Steel
FINISH
ENG

113.5 [4.47]

55.0°

35.0°

3.2 [0.13]

19.1 [0.75]

VEHICLE RESEARCH and Test Center

APPROVALS

DATE

10/26/2009

GUSSSET
THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SCALE: 1:1

DRAWING NUMBER

A3

DL472-4213

THIRD ANGLE PROJECTION

REV

DATE

DRAWING NUMBER

SHEET

OF
UNLESS OTHERWISE SPECIFIED

Dimensions are in millimeters.
Tolerances are:

DECIMAL: ±.5
MACHINED: ±.2
ANGLES: ±.1°

DO NOT SCALE DRAWING

Steel, Mild

Machined

ANGLES
±.5°

MATERIAL
Steel, Mild

FINISH
Approved

DATE
10/26/2008

THOR-M

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PULLEY SUPPORT ANGLE

THIRD ANGLE PROJECTION

SCALE: 1:1

DATE: 10/26/2008

MACHINED ANGLES ±.5°

FINISH APPROVED

APPROVALS
Jim Clevenger

THOR-M

DL472-4214

A3

PAGE 1 OF 1

152.4 [6.00]

25.4 [1.00]

22.2 [0.88]

45.0°

3.2 [0.13]
A \begin{align*}
\text{Ø3.2 THRU TO SLOT} \\
\text{Ø7.1 CTBORE x .8 DP} \\
\begin{bmatrix}
\text{Ø0.13 THRU TO SLOT} \\
\text{Ø0.28 CTBORE x 0.03 DP}
\end{bmatrix} \\
4-40 UNC THRU OPPOSITE SIDE
\end{align*}

\begin{align*}
\text{48.6 [1.91]} & \quad \text{43.8 [1.73]} \\
\text{35.6 [1.40]} & \quad \text{12.7 [0.50]}
\end{align*}

\text{R4.8 [0.19]}
1/4-28 UNF - 2A

101.6 [4.00]

Draw Screw

MATERIAL: Steel, Mild
FINISH: APPROVED

THOR-M

NOT TO SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL
 X ± 0.5
X.X ± 0.2
X.XX ± 0.1

MACHINED ANGLES
± 0.5°

DO NOT SCALE DRAWING

101.6

FINISH APPROVED

APPROVALS

DRAW SCREW

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

DRAWN

CHECKED

DATE

THIRD ANGLE

PROJECTION

SCALE: 2:1

A3

REV

1 OF 1

THOR-M

DL472-4202

191/2015

2:1

A3

1 1

REV

1 OF 1
## Parts List

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<th>Description</th>
<th>Material</th>
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<td>9003725V</td>
<td>WASHER, OVERSIZE FLAT, ID 0.094&quot; X OD 0.312&quot; X THK. 0.05&quot;</td>
<td>Steel, Mild</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td></td>
<td>WIRE ROPE STOP COMPRESSION SLEEVE FOR 3/64&quot;Ø WIRE ROPE</td>
<td>Zinc-Plated Copper</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
<td>WIRE ROPE OVAL COMPRESSION SLEEVE FOR 3/64&quot;Ø WIRE ROPE</td>
<td>Zinc-Plated Copper</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td>WIRE ROPE, 7 x 7, Ø0.047&quot;</td>
<td>Steel, Galvanized</td>
</tr>
</tbody>
</table>

---

### Dimensions

- **139.7** [5.50]
- **Ø6.4** MIN. [Ø0.25]
MAKE FROM EYEBOLT, 1/4-20 x 2.75" x 0.5" x 1.25"

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

DECIMAL: ± 0.5
MACHINED: ± 0.2
ANGLES: ± 0.1

MATERI AL: Steel, Mild
FINISH: MACHINED

THOR-M

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

VEHICLE RESEARCH
and Test Center

APPROVALS DATE

DRAWN: Dave Walker 12/21/2009
CHECKED: 
APPROVED:

THIRD ANGLE PROJECTION

SCALE: A3
DRAWING NUMBER: DL472-4204

DO NOT SCALE DRAWING

Steel, Mild

DIMENSIONS ARE IN MILLIMETERS

TOLERANCES ARE:

DECIMAL: ± 0.5
MACHINED: ± 0.2
ANGLES: ± 0.1

MATERIAL: Steel, Mild
FINISH: MACHINED

THOR-M

NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION
NOTES:
1. ATTACH FOAM ITEM #3 WITH 3M DP-110 EPOXY ADHESIVE OR EQUIVALENT.

PARTS LIST

<table>
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<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>MATERIAL</th>
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<tr>
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<td>INVERSION/EVERSION BRACKET, FOAM IMPACT PAD</td>
<td>ENSOLITE AHC</td>
</tr>
<tr>
<td>TLX-9000-026</td>
<td>INVERSION/EVERSION BRACKET, IMPACT TUBE</td>
<td>Aluminum 6061</td>
</tr>
<tr>
<td>TLS-9000-025</td>
<td>INVERSION/EVERSION BRACKET, ATTACHMENT BAR</td>
<td>Aluminum 6061</td>
</tr>
</tbody>
</table>

ECO REV DESCRIPTION DATE BY
A A ADDED ENSOLITE FOAM 9/22/2003 DW
B B ADDED PARTS NUMBERS AND DETAIL DRAWINGS; ADDED "OR EQUIVALENT" TO NOTE #1 9/11/2015 DW
4X Ø6.8 THRU [Ø0.27 THRU]

25.9 [1.02]
6.4 [0.25]
44.5 [1.75]
38.1 [1.50]
70.9 [2.79]
45.0 [1.77]
31.8 [1.25]

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS.

TOLERANCES ARE:

DECIMAL:
X ±.2
XX ±.1

MACHINED ANGLES:
±.5
±.2

MACHINED TOLERANCES ARE:

±.030

DO NOT SCALE DRAWING.

Aluminum 6061

THIRD ANGLE PROJECTION

DATE: 9/11/2015

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THOR-M

INVERSION/EVERSION BRACKET, ATTACHMENT BAR

MATERIAL: Aluminum 6061

FINISH: Approved

THIRD ANGLE PROJECTION

SCALE: 1:1

REV

SHEET 1 OF 1

DRAWING NUMBER: TLX-9000-025
MATERIAL: T.S. 1" x 1" x 1/8" x 4.125"[104.8mm]

UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL
X ± .5
X.X ± .2
X.XX ± .1

MACHINED
ANGLES
± .05°

DO NOT SCALE DRAWING

Aluminum 6061

THOR-M

INVERSION/EVERSION BRACKET, IMPACT TUBE

THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

THOR-M

TS 1 x 1 x 1_8 - 4.125.ipt
SPOT DRILL TO 0.25/(6.35)Ø
2 PLACES ON OPPOSITE SIDES

CHAMFER
45° x 1.57
(0.062)

END VIEW

SIDE VIEW

RIGID MOUNTING SURFACE

UNITs ARE mm/in

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

TEST FIXTURE - LEG MOUNT

THOR - LX LOWER EXTREMITY

TLX-9000-004
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

BTLX-9000-016
SIZE SHEET DRAWING NUMBER REV
1 of 1

THOR-LX LOWER EXTREMITY EXTERNAL POSITIONING BRACKET

MATERIAL: ALUMINUM

SCALE: FULL

APPROVALS: DATE

STAN: Jim Clevenger 8/5/2009

CHECKED:

ENG:

UNITS ARE in/mm

TOLERANCES ARE: *

DECIMALS ANGLES
X ± 0.1/2.5 ± 0.5
XX ± 0.01/25
XXX ± 0.005/127
FRACTIONS ± 1/64

* unless otherwise noted

ANGLES TOLERANCES ARE: *

± 0.5

∠

UNITS ARE in/mm

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<td>25.40</td>
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<td>1.02</td>
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<td>2.95</td>
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<tr>
<td>19.05</td>
<td>0.75</td>
</tr>
<tr>
<td>15.88</td>
<td>0.63</td>
</tr>
</tbody>
</table>

38.10 [1.50]
2.95 [0.12]
15.88 [0.63]
19.05 [0.75]
15.88 [0.63]
### Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>QTY</th>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>5000001</td>
<td>Screw, SHCS M6-1.0 x 20mm</td>
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<td>Knee Slider Test Distribution Bracket - Weldment</td>
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### Diagram

- 4x Ø6.6 THRU
- Ø12.6 x 90.0° ON 25.4 B.C.
- Ø0.5 THRU
- 1/4 x 1/2 FL BAR x 2

### Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
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<td>12.7</td>
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<td>44.5</td>
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<td>29.2</td>
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<td>7.6</td>
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<td>43.8</td>
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</table>

### Notes

- ASME Y14.5M - 1994
- DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- TOLERANCES ARE:
  - ±0.5
  - ±0.2
  - ±0.1
- HEAT TREAT
- SCALE: 8/27/2015 0.5:1
**Parts List**

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<th>ITEM</th>
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<th>DESCRIPTION</th>
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<td>DL472-5012</td>
<td>KNEE SLIDER TEST DISTRIBUTION BRACKET, SIDE PLATE - RIGHT</td>
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<td>KNEE SLIDER TEST DISTRIBUTION BRACKET - IMPACT PLATE</td>
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</table>

**Dimensions and Tolerances**

- Dimensions are in millimeters.
- Tolerances are:
  - ±.5
  - ±.2
  - ±.1

**Drawing Details**

- Scale: 10/2/2015
- Sheet: 1
- Department of Transportation, United States of America
- Third Angle Projection
- Machined Angles ±.5°
- Heat Treat:

**Drawing Number**

DL472-5010

**Notes**

- Do not scale drawing unless otherwise specified.
- ASME Y14.5M - 1994 - Do not use in conjunction with dimensions in printed text.