

# THOR-50<sup>th</sup> Percentile Male

Type TH-472-0000

## THOR-50M

THOR is an ATD (Anthropomorphic Test Device = Dummy) whose anthropomorphic data correspond to those of a 50-percentile adult male. THOR stands for Test device for Human Occupant Restraint.

- DTI ready, up to 288 channels
- Standard instrumentation included
- Optional instrumentation according to customer requirements
- Configuration according to NHTSA or EuroNCAP possible

### Description

This dummy was developed with funding from the NHTSA and is currently the most advanced dummy model for frontal impact testing. Compared to the previous standard frontal impact dummy (Hybrid III 50%-man), the THOR dummy has improved biofidelity – a representation of human behaviour – and extended instrumentation to better determine the relevant parameters with regard to injuries and injury mechanisms.

The Kistler THOR-50M Dummy fulfills the requirements in accordance with TB026 (EuroNCAP specifications and criteria for THOR-50M) and since May 2020, Kistler is officially listed as supplier for this dummy for EuroNCAP testing.

The test response requirements and parameter corridor specifications correspond to the demanded qualification procedure.

### Qualification test matrix \*

Component tests		Full body tests
Neck Torsion L & R	Ankle Inversion L & R	Face
Neck Flexion	Ankle Eversion L & R	Head
Neck Extension	Ball of the Foot L & R	Upper Thorax
Neck Lateral L & R	Heel L & R	Lower Thorax L & R
	Heel with shoe L & R	
Knee L & R		Abdomen
		Upper Leg L & R

\* Depending on the required specifications



### Technical data

#### Data recorder Type DTI375.TH

DTI ports		24
Measuring channels		288
Recording time	s	200
Trigger		T-Start Recording (SR)
Max. trigger input voltage (with respect to GND)	V	8 ... 13
Synchronization input frequency	Hz	1 000
Communication		
RS-485	Mbit/s	6
Ethernet	Mbit/s	100
Memory (Flash)	GByte	4
Supply voltage	V	36 ... 60
Weight	kg	71.4
Dimensions (LxWxH)	mm	97x63x134
Operation temperature range	°C	0 ... 40
Storage temperature range		
Long term	°C	-20 ... 25
Short term (<1 )	°C	-20 ... 50
Humidity, max. (non-cond.)	%	80
Shock resistance, peak, half sine wave for 6 ms in all axes	g	100

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**Technical data (continuation)****UPS Power supply (integrated)**

Power consumption (max.)	W	70
Buffer time	min	>5
Accumulator		
Type		Lithium-Polymer
Voltage	V	7.4
Capacity	mAh	1 100
Power supply (nom., max.)	W	60

**Ordering key**Type TH-472-0000- 

THOR-LX	– Lower Legs (NHTSA)	1
Hybrid III 50 %	– Lower Legs (EuroNCAP)	2

**Instrumentation (standard)**

Position	Sensor numbers	Channels numbers	Type	Description
<b>Head &amp; Neck</b>				
Neck Rotation	1	1	W01289 (THOR)	Neck Rotational Potentiometer, Y-Axis
<b>Spine &amp; Thorax</b>				
Thorax IR-TRACC (upper & lower: left/right)	4	12	IR-TRACC 3D or S-TRACC 3D	Assessment of Chest Compression (1 x distance, 2 x angle)
<b>Abdomen</b>				
Abdomen IR-TRACC (lower: left/right)	2	6	IR-TRACC 3D or S-TRACC 3D	Assessment of Chest Compression (1 x distance, 2 x angle)
<b>Lower Extremity Left</b>				
Knee SD Path	1	1	Knee Pot.	Knee Slider String Potentiometer (SA572-S90)
Ankle Rotation (three on each leg)	3	3	W01289 (THOR)	Ankle Rotational Potentiometer (SA572-114)
<b>Lower Extremity Right</b>				
Knee SD Path	1	1	Knee Pot.	Knee Slider String Potentiometer (SA572-S90)
Ankle Rotation (three on each leg)	3	3	W01289 (THOR)	Ankle Rotational Potentiometer (SA572-114)

## Additional instrumentation according to customer request\*

Position	Sensor numbers	Channels numbers	Type	Description
<b>Head &amp; Neck</b>				
Head Acceleration/ Angular Rate	1	6	DTI5002A06	DTI Inertial Measurement Unit (3 x acceleration, 3 x angular rate)
Left Eye Force	1	1	M55991	Uniaxial Face Load Cell ( $F_x$ )
Right Eye Force	1	1	M55991	Uniaxial Face Load Cell ( $F_x$ )
Left Cheek Force	1	1	M55991	Uniaxial Face Load Cell ( $F_x$ )
Right Cheek Force	1	1	M55991	Uniaxial Face Load Cell ( $F_x$ )
Chin Force	1	1	M55991	Uniaxial Face Load Cell ( $F_x$ )
Upper Neck Force & Moment	1	6	M55596	Six-axial Upper Neck Load Cell ( $F_x, F_y, F_z, M_x, M_y, M_z$ )
Lower Neck Force & Moment	1	6	M55696	Six-axial Lower Neck Load Cell ( $F_x, F_y, F_z, M_x, M_y, M_z$ )
Skull Spring (front) Force	1	1	M55191	Uniaxial Skull Spring Load Cell ( $F_x$ )
Skull Spring (rear) Force	1	1	M55191	Uniaxial Skull Spring Load Cell ( $F_x$ )
<b>Spine &amp; Thorax</b>				
T1 Acceleration	3	3	M0064C00	Uniaxial, Piezoresistive Accelerometer
T1 Angular Rate	3	3	IES 3101	Uniaxial, Gyro Sensor
Mid Sternum Acceleration	1	1	M0064C00	Uniaxial, Piezoresistive Accelerometer
T4 Acceleration/ Angular Rate	1	6	DTI5002A06	DTI Inertial Measurement Unit (3 x acceleration, 3 x angular rate)
Clavicle (left), Force	1	4	M53894	Four-axial Clavicle Load Cell (2 x $F_x, F_z$ )
Clavicle (right), Force	1	4	M53894	Four-axial Clavicle Load Cell (2 x $F_x, F_z$ )
T12 Acceleration	1	3	DTI-M60-3K	DTI Acceleration Measurement Unit (3 x acceleration)
T12 Force & Moment	1	5	M56495	Five-axial Thoracic Spine Load Cell ( $F_x, F_y, F_z, M_x, M_y$ )
Arm (left) Force & Moment	1	6	M56516	Six-axial Arm Load Cell ( $F_x, F_y, F_z, M_x, M_y, M_z$ )
Arm (right) Force & Moment	1	6	M56516	Six-axial Arm Load Cell ( $F_x, F_y, F_z, M_x, M_y, M_z$ )
<b>Abdomen</b>				
Upper Abdomen Acceleration	1	1	M0064C00	Uniaxial, Piezoresistive Accelerometer
<b>Pelvis</b>				
Pelvis Acceleration/Angular Rate	1	6	DTI5002A06	DTI Inertial Measurement Unit (3 x acceleration, 3 x angular rate)
Acetabulum (left) Force	1	3	M52893	Triaxial Acetabulum Load Cell ( $F_x, F_y, F_z$ )
Acetabulum (right) Force	1	3	M52993	Triaxial Acetabulum Load Cell ( $F_x, F_y, F_z$ )
ASIS (left) Force	1	2	M52292	Biaxial Iliac Wing (ASIS Load Cell ( $F_z, M_y$ ))
ASIS (right) Force	1	2	M52292	Biaxial Iliac Wing (ASIS Load Cell ( $F_z, M_y$ ))

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## Continuation - Additional instrumentation according to customer request\*

Position	Sensor numbers	Channels numbers	Type	Description
<b>Femur</b>				
Femur (left) Force & Moment	1	6	M56506	Six-axial Universal Femur Load Cell ( $F_x, F_y, F_z, M_x, M_y, M_z$ )
Femur (right) Force & Moment	1	6	M56506	Six-axial Universal Femur Load Cell ( $F_x, F_y, F_z, M_x, M_y, M_z$ )
<b>Lower Extremity Left</b>				
Upper Tibia Force	1	5	M55295	Five-axial Upper Tibia Load Cell ( $F_x, F_y, F_z, M_x, M_y$ )
Lower Tibia Force	1	5	M55395	Five-axial Lower Tibia Load Cell ( $F_x, F_y, F_z, M_x, M_y$ )
Tibia Acceleration	1	1	M0064C00	Uniaxial, Piezoresistive Accelerometer
Achilles Spring Force	1	1	M55491	Uniaxial Skull Spring Load Cell ( $F_y$ )
Foot Acceleration	1	3	DTI-M60-3K	DTI Acceleration Measurement Unit (3 x acceleration)
<b>Lower Extremity Right</b>				
Upper Tibia Force	1	5	M55295	Five-axial Upper Tibia Load Cell ( $F_x, F_y, F_z, M_x, M_y$ )
Lower Tibia Force	1	5	M55395	Five-axial Lower Tibia Load Cell ( $F_x, F_y, F_z, M_x, M_y$ )
Tibia Acceleration	1	1	M0064C00	Uniaxial, Piezoresistive Accelerometer
Achilles Spring Force	1	1	M55491	Uniaxial Skull Spring Load Cell ( $F_y$ )
Foot Acceleration	1	3	DTI-M60-3K	DTI Acceleration Measurement Unit (3 x acceleration)

\* Additional instrumentation to be ordered separately from Kistler