MESSRING

Safer Mobility.



MESSRING Products

Passive Safety

MESSRING GmbH
Safer Mobility

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MESSRING – THE GLOBAL LEADER IN CRASH TEST SOLUTIONS

In a world where every second counts and every life matters, MESSRING GmbH stands at the forefront of automotive safety innovation. With over 50 years of experience, we have revolutionized the way vehicles are tested, ensuring that millions of people worldwide drive safer cars.

From pioneering the first turnkey crash test facility in 1970 to delivering cutting-edge testing solutions for autonomous vehicles, MESSRING has built a legacy of trust, precision, and excellence. Our state-of-the-art crash test systems, data acquisition tools, and active safety testing solutions are the gold standard in the industry, used by leading automakers, research institutions, and regulatory agencies across the globe.

Why are we unique?

- **Unmatched Expertise:** With over 130+ crash test facilities installed worldwide, we lead the industry in design, engineering, and execution.
- **Future-Ready Solutions:** From ADAS and EV testing to pre-braking technology, we don't just follow trends – we set them.
- **Global Reach, Local Support:** With offices in Germany, USA, China and a tight network of partners worldwide, we provide dedicated maintenance and in-time service wherever you need us.

At MESSRING, we don't just manufacture crash test equipment – we redefine safety testing standards. With our unique pre-commissioning process, certified & proven technology, and plug-and-play engineering, we offer unparalleled efficiency, reliability, and ease of use.

Pre-Commissioning on our own Crash Facility: Unlike any other provider, we test and fine-tune every system in our own crash facility before delivery. This means:

- **Seamless Installation & Immediate Readiness:** No unexpected delays or troubleshooting on-site.
- **Validated Performance:** Equipment is fully tested under real-world crash conditions before deployment.
- **Reduced Downtime:** Clients receive a fully functional, pre-optimized system for instant use.

Certified & Proven Equipment: MESSRING technology meets the highest global safety and testing standards, ensuring:

- Compliance with the different NCAP protocols, IIHS, ISO standards, FMVSS, and more.
- Reliability backed by real-world testing and industry-leading expertise. Various MESSRING facilities have won the prestigious "Crash Facility of the Year" Award.
- Data integrity, repeatability, and precision at every test.

Engineered for Plug & Play Efficiency: All our systems are designed for effortless integration and reduce complexity for operators:

- Pre-calibrated & pre-configured components – no lengthy setup required. E.g. our mobile barriers are calibrated for directional stability and weight distribution.
- Intuitive software interfaces for smooth operation.
- Future-proof modularity, allowing for easy expansion as testing needs evolve.

User-friendliness and flexibility: All technological solutions from MESSRING are designed for maximum adaptability:

- **Multi-purpose test setups:** One system, multiple test applications.
- **Customization options:** Tailored to specific automotive crash testing needs and third-party equipments.
- **Scalable configurations:** From small test labs to full-scale crash facilities, our solutions grow with you.

TABLE OF CONTENTS

Crash Testing

Key Components

| Electric Propulsion System 13
| MicroTrack System 13
| Film Pit 14
| Crash Block 15

Specialized Test Equipment

| Flying Floor 17
| Static Rollover 18
| Universal Rollover Sled 19
| Embankment Rollover Test System 20
| Hydraulic Vehicle Brake System 22

Rigid Barriers

| Small Overlap Barrier 25
| Barrier 10° 25
| Underride Barrier 26
| Barrier 30° 26
| Bumper Barrier 27
| Pole Barrier 27
| Offset Barrier 28

Mobile Barriers

| ECE R95 Mobile Barrier 31
| AE-MDB Mobile Barrier 32
| MPDB Mobile Barrier 33
| ECE R34, ECE R153 and TRIAS15 Mobile Barrier 34
| RCAR Mobile Barrier 35
| FMVSS 214 and FMVSS 301R Mobile Barrier 36
| FMVSS 208 Mobile Barrier 37
| NHTSA OMDB Mobile Barrier 38
| IIHS 2.0 Mobile Barrier 39
| Restrainer for Mobile Barrier 40

LED Lighting System

| M=LIGHT EVO 43
| M=SYNC Base Unit 45

DAQ & Sensor Systems

| M=BUS Pro Analog Logger 49
| M=BUS Pro Digital Logger 51
| M=BUS Pro Fire Box 52
| M=BUS Pro Timer 53
| M=BUS Pro Active Terminator 55
| M=BUS Pro Ethernet Gateway 56

| M=BUS Pro Mounting Rail 57
| M=BUS UPS 5500 58
| M=BUS Wireless LAN Bridge 59
| M=BUS USB Gateway 60
| M=BUS InDummy Logger for Ratiometric Transducers 61
| M=BUS InDummy Logger for Voltage Ratiometric Transducers 62
| M=BUS InDummy Active Terminator 63
| Sensor Tester 65
| Seat Belt Load Cell 66
| Seat Belt Displacement Transducer 67
| Three Beam Laser Speed Trap 68
| M=WALL Load Cell 69

Child Presence Detection

| CPD Surrogates 71
| CPD 1-Year-Old Child Surrogate 72
| CPD 3-Year-Old Child Surrogate 73
| CPD 6-Year-Old Child Surrogate 74

Sled Testing

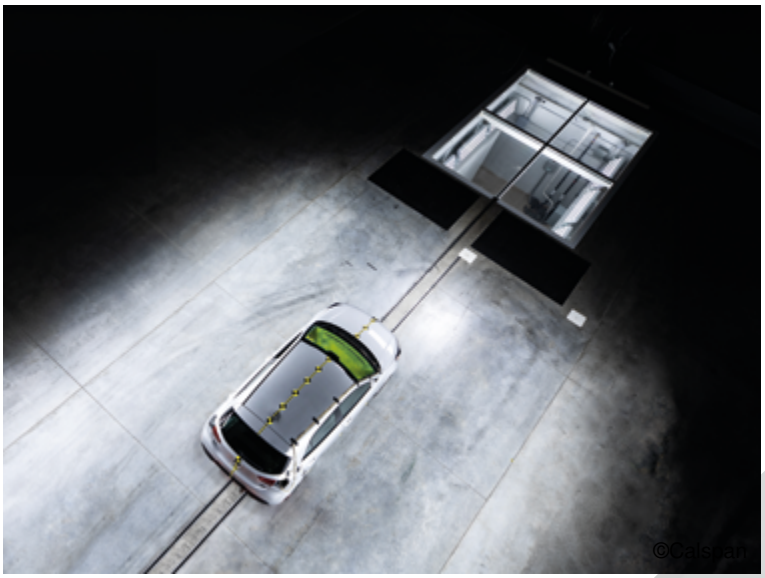
Deceleration Sled Testing

| HydroBrake 79
| M=SLED 81

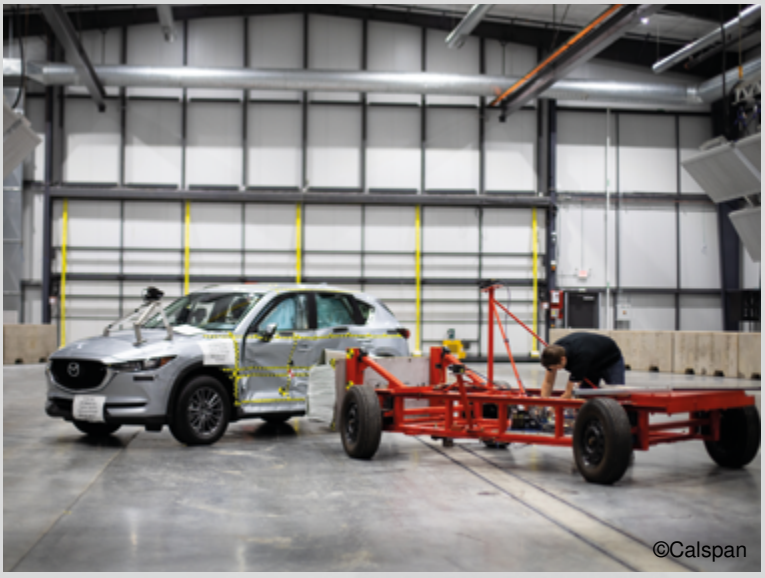
| M=SLED MODULAR 82
| M=BRAKE 83

Acceleration Sled Testing

| CIS Compact Impact Sled 87
| ECE R129 Sled Test Fixture 88
| ECE R16 Sled Test Fixture 89
| FMVSS 213a / 213b Sled Test Fixture 89
| ADAC Sled Test Fixture for frontal impact testing 90
| ADAC Sled Test Fixture for side impact testing 90


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CRASH TESTING

Facility project @MESSRING

From **concept to completion**, MESSRING takes full responsibility for the design, construction, and commissioning of world-class crash test facilities. Our proven project management approach ensures:

- **Custom-Tailored Planning**: Every project begins with a deep dive into your unique requirements, whether it‘s full-scale vehicle crash testing, sled test systems, or ADAS testing infrastructure.
- **Seamless Coordination**: We integrate architects, engineers, suppliers, and regulatory bodies, ensuring smooth collaboration and eliminating costly bottle-necks.
- **Turnkey Execution**: We design, build, and install every component, from impact barriers and lighting systems to data acquisition tools and safety equipment.
- **On-Time Delivery**: With our proven risk management strategies and lean construction principles, we keep projects on track without delays or cost overruns.
- **Post-Installation Support**: Our job doesn’t end when the facility is built. We provide training, maintenance, and ongoing technical support, ensuring long-term operational excellence along the full lifecycle of your facility.

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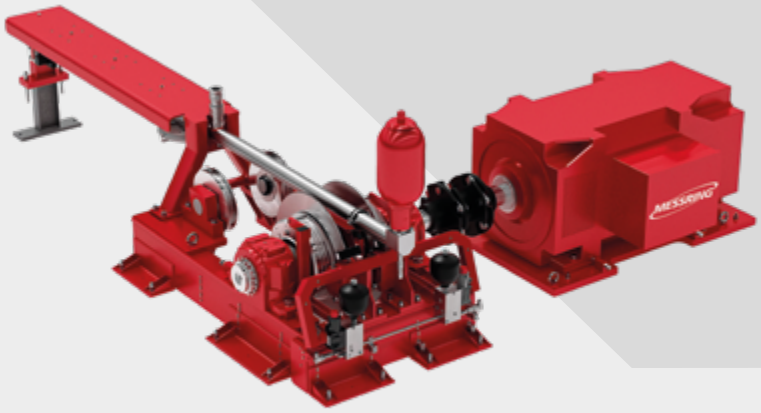
KEY COMPONENTS

- Electric Propulsion System 13
- MicroTrack System 13
- Film Pit 14
- Crash Block 15

Electric Propulsion System

KEY COMPONENTS

Electric motor propulsion system for crash test facilities. Suitable for the testing of vehicles or sled structures. Operation in both directions possible. Power and performance according to test system specifications. Scope of supply:

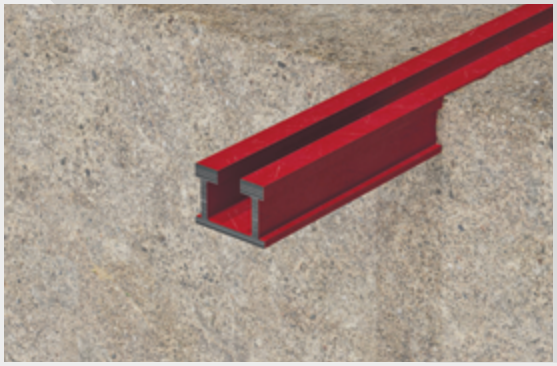


- Electric motor
- Drive frame with drive shaft
- Drive winch with friction insert and clutches
- High stiffness
- Hydraulic disc brake
- Brake winch with hydraulic disc brake
- Hydraulic cable pretensioner
- Second output for second cable possible
- Digital encoder

MicroTrack System

KEY COMPONENTS

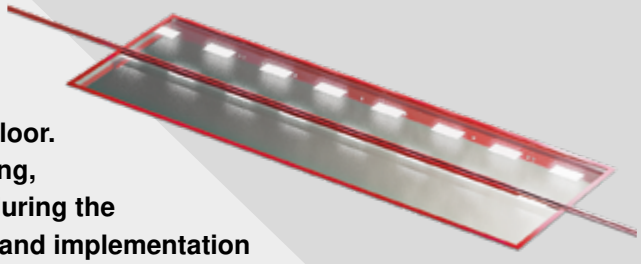
Enhanced track rail system for guiding passenger cars, trucks and sleds. Unparalleled small dimensions – gap only 30 mm! – and unique design, combine guiding ultimate capabilities and view from a film pit that is limited by a beam not wider than 70 mm only!



- Designed for outdoor installation
- Can be easily crossed with cars
- Used on concrete and transparent cover
- High stiffness
- Usable in standard crash test facilities and sled test facilities as well
- Very low height
- Corrosion protection
- Installation in existing rails possible
- Optional: Surface mounted track rails; easy to install at any angle to center line
- Rail system which combines perfect guiding of vehicles with almost unlimited view despite track rails

Film Pit

KEY COMPONENTS



MESSRING designs and constructs film pits to ensure optimal filming conditions beneath vehicles or the MESSRING Flying Floor. Using advanced computer simulations, all components—lighting, cameras, and transparent covers—are seamlessly integrated during the planning phase. MESSRING manages manufacturing, delivery and implementation for a hassle-free solution.

- Tailored planning and construction of film pits
- Optimized for filming beneath vehicles and the Flying Floor
- Computer-optimized coordination of lighting, cameras, and transparent covers
- Seamless integration with MESSRING's MicroTrack rail system (70 mm width)
- Enables crossing of two rails above the film pit for maximum flexibility
- Customizable size and shape for specific crash test requirements
- Additional concrete covers available to protect the plexiglass when not in use or during heavy-duty and rollover tests
- Rectangular film pits ideal for sled and linear crash tests
- Octagonal film pits optimized for car-to-car crash tests with varying impact angles

TECHNICAL SPECIFICATIONS

Standard film pit dimensions	2,6 x 2,6 m, 2,6 x 5,2 m, 2,6 x 7,8 m, 3 x 6 m, 4 x 6 m, 7,8 x 7,8 m Octagon
Standard transparent film pit cover sizes	2,6 x 2,6m, 2,6 x 5,2 m, 3 x 3 m, 3 x 4 m
Material transparent film pit covers	Concrete film pit cover sizes
Concrete film pit cover sizes	2,6 x 2,6 m, 2,6 x 5,2 m, 3 x 3 m, 3 x 4 m or customized depending on weight handling and lifting devices @ customer site

All film pit covers come with following features:

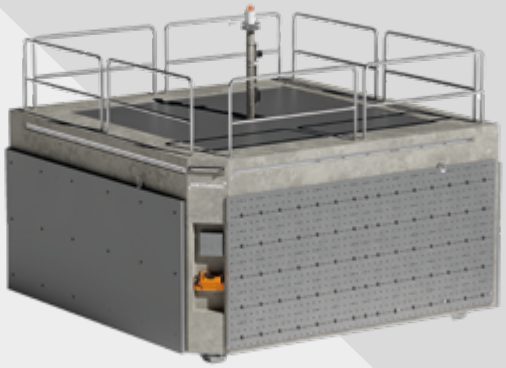
- Integrated hooks for lifting with common lifting devices
- Rest on frames only, no additional cross- or support beams necessary
- Levelling capability for exact alignment and planarity
- Manual or automated/motorized safety net for occupational safety during cover exchange

Crash Block

KEY COMPONENTS

The MESSRING crash block is a highly customizable system that serves as a fixed barrier for crash tests.

- Each of the four faces can be used for impact
- For 3,500 kg / 60 G
- Can be rotated on the spot by 360° in under ten minutes
- Automatic guidance
- Usable on uneven floors
- Climbing performance 1% at a total mass of > 90,000 kg
- Anchored to the foundation at crash position
- Four hydraulic undercarriages with two heavy-duty wheels each
- Rotation or moving time typ. < 10 min



Basically, three different versions can be configured:

- The **fixed crash block**, which can be constructed for either passenger car or truck crash tests. Depending on the space available, this block can be equipped with different rigid barriers on the impact face and hit with vehicles or test sleds.

- The **rotating crash block**, which can also be equipped with different fixed barriers at all four impact faces. The special feature compared to the fixed crash block is that it is fixed locally, but can be rotated remotely around its own vertical axis. In this way, one crash track is sufficient to generate up to four different impact scenarios. In addition, a great deal of time can be saved during the conversion between the most frequent tests.

- The **mobile crash block** is the most flexible version. Depending on the configuration, it can be moved linearly back and forth along a fixed line or, in the highest configuration level, can even be driven freely by remote control. In this way, various crash scenarios can be implemented in a very limited space with minimum time expenditure.

All crash blocks can be equipped with different rigid barriers to cover all common test types and regulations. The hydraulic chassis places considerably less demands on the ground than alternatives moved on air cushions and can therefore also be used on uneven floors.

SPECIALIZED TEST EQUIPMENT

| Flying Floor 17
| Static Rollover 18
| Universal Rollover Sled 19
| Embankment Rollover Test System 20
| Hydraulic Vehicle Brake System 22

Flying Floor

SPECIALIZED TEST EQUIPMENT



Explore a moveable platform by means of which you can accelerate passenger cars on your crash facility simulation pole impact scenarios. Best filming results are guaranteed by transparent window in the center of the sled. Test sled for lateral pole impact tests according to the following regulations:

- Euro NCAP, ANCAP, U.S. NCAP, Latin NCAP, KNCAP, FMVSS 201, FMVSS 214, ECE R135, GTR 14, ADR 85/00 (Australia)
- Excellent sliding of the test vehicle on the low friction sled surface
- No movement of the test vehicle during acceleration – wing-design of the sled compensates for uneven floor conditions
- Large transparent window free from stabilizer bars – optimum video results taken from below
- Restraint system for test vehicles – safely restrains the vehicle onboard the test sled during acceleration and an emergency stop
- Wear free braking with built-in hydraulic dampers

TECHNICAL SPECIFICATIONS

Max. payload	4,536 kg
Weight	2,354 kg
Dimensions, without shock absorbers (L x W x H)	4,934 mm x 6,128 mm x 308 mm
Dimensions of transparent window (L x W)	3,010 mm x 2,000 mm
Ground clearance	84 mm
Track width	2,526 mm (inner) 5,860 mm (outer)
Surface material	Low friction material (Teflon)
Max. stroke of shock absorbers	700 mm
Distance between hydraulic shock absorbers	3,260 mm
Max. test speed	50 km/h

Scope of Supply

- Flying Floor
- Safety restraint system

Required Additional Equipment

- Sled guide pieces
- Pole Barrier

Static Rollover

SPECIALIZED TEST EQUIPMENT

Test rig suitable for the measurement of liquid leakage before and after a vehicle crash test according to FMVSS 301, FMVSS 305, ECE R34.

- Automatic positioning mode in steps of 90°
- Emergency mode with test speeds of up to 6°/s for return to 0° position
- Programmable for individual test modes
- Additional test mode for ERA GLONASS (GOST 34003)
- Easy positioning of test rig through rollers



TECHNICAL SPECIFICATIONS

Weight	6,800 kg
Dimensions of test system (L x W x H)	8,000 mm x 3,520 mm x 4,000 mm
Max. payload	4,536 kg
Max. dimensions of test object (L x W x H)	6,000 mm x 2,300 mm x 2,200 mm Version for vehicles up to 7,500 mm on request
Min. track width of test object	1,200 mm
Max. track width of test object	2,200 mm
Power supply	20 kVA, 380…480 VAC, 50/60 Hz, CEE 32 A

Scope of Supply

- Static Rollover Test System
- Touch display for test setup and current angle status

Optional Equipment

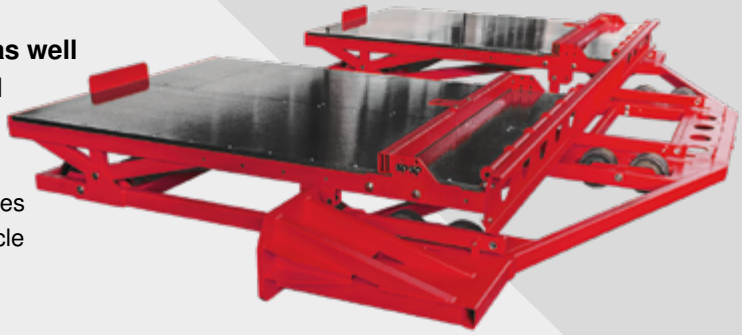
- Drip trays for collecting leaking fluids
- Remote display for test object (ERA GLONASS)
- Light barrier system to ensure safe operation
- Towing bar for positioning with object
- Heavy duty rollers for positioning with test object attached

Universal Rollover Sled

SPECIALIZED TEST EQUIPMENT

Sled platform designed for sand pit and curb tests as well as rollover tests in accordance with FMVSS 208 and SAE J2114.

- One sled enabling various rollover tests
- Only one brake system using a varying number of crush tubes
- Restraint system for test vehicles – safely restrains the vehicle onboard the test sled during an emergency stop
- Fits all common wheelbases



TECHNICAL SPECIFICATIONS

Universal Rollover Sled	
Max. payload	3,500 kg
Weight	2,870 kg
Dimensions (L x W x H) (Sand pit and curb test: lowered, 0°)	6,160 mm x 4,020 mm x 695 mm
Dimensions (L x W x H) (FMVSS 208: erected, 23°)	6,160 mm x 4,157 mm x 1,492 mm
Ground clearance	30 mm
Track width of sled	1,880 mm (inner) 4,740 mm (outer)
Max. speed	60 km/h (sand pit and floor anchor mounted curb tests) 48.3 km/h (FMVSS 208 and SAE J2114) 15 km/h (sled mounted curb tests)
Wheel base of test vehicle	1,845…4,455 mm
Max. track width of test vehicle	2,100 mm
Sled Mounted Curb Simulator (2 units)	
Weight per unit	44 kg
Dimensions (L x W x H)	560 mm x 45 mm x 270 mm
Height adjustment	101…140 mm
Crush Tube Brake System (2 units)	
Max. brake force per unit	500 kN
Weight per unit	272 kg
Max. number of crush tubes per unit	10
Dimensions (L x W x H)	1,300 mm x 456 mm x 350 mm

Scope of Supply

- Universal Rollover Sled
- Crush tube brake system (including one set of crush tubes)
- Sled mounted curb simulator
- Vehicle restraint system

Optional Equipment

- Floor anchors for installation of brake system
- Floor anchor mounted curb simulator
- Release hook
- Maintenance service

Embankment Rollover Test System

SPECIALIZED TEST EQUIPMENT

Designed to reproduce various types of embankment rollover crash tests with a customizable length of embankment ramp.

- Adjustable ramp angle from 30° to 50° in steps of 5°
- Height adjustable sled platform
- Precise guidance of sled and uncoupling of test vehicle
- Restraint system for test vehicles – safely keeps the vehicle onboard the test sled during an emergency stop





Embankment Rollover

1 Height adjustable sled
2 Crush tube brake system
3 Embankment Rollover Ramp

TECHNICAL SPECIFICATIONS

Test Vehicle	
Max. speed	50 km/h
Max. weight	3,500 kg
Max. center of gravity height	1,200 mm
Embankment Rollover Sled	
Weight	3,109 kg
Dimensions (L x W x H)	5,559 mm x 4,080 mm x 2,565 mm
Sled platform dimensions (L x W)	4,300 mm x 2,450 mm
Sled platform height	596…2,500 mm
Power supply	110/230 VAC (additional options on request)
Embankment Rollover Ramp	
Dimensions (L x W x H)	26,365 mm x 7,248 mm x 3,105 mm
Ramp angle	30…50° (in 5° steps)
Drive-up angle between ramp and sled (primary segment)	15°
Surface friction	μ>=1.2
Number of primary segments	1
Number of middle segments	9
Number of final segments	1
Dimensions primary segment (L x W x H)	1,204 mm x 2,758 mm x 2,505 mm
Dimensions middle segment (L x W x H)	2,235 mm x (7,299…7,550) mm x 3,105 mm
Dimensions final segment (L x W x H)	2,811 mm x (6,714…7,217) mm x 3,100 mm
Weight primary segment	550 kg

Weight middle segment	2,940 kg
Weight final segment	7,250 kg
Crush Tube Brake System	
Number of brake units	2 (1 per side)
Max. number of crush tubes per unit	8
Max. brake force per unit	500 kN
Weight per unit	244 kg (without tubes)
Dimensions per unit (L x W x H)	1,260 mm x 470 mm x 293 mm

Scope of Supply

- Embankment Rollover Sled
- Embankment Rollover Ramp
- Crush tube brake system (incl. one set of crush tubes)
- Vehicle restraint system

Optional Equipment

- Steering control
- Additional ramp segments
- Floor anchors for installation of ramp and brake system
- Maintenance service

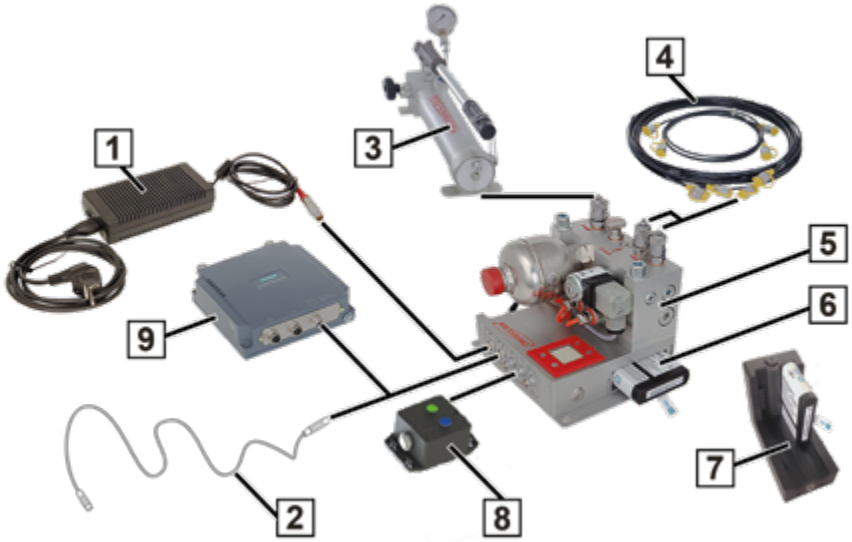
Hydraulic Vehicle Brake System

SPECIALIZED TEST EQUIPMENT



Remote-controlled test vehicle or moving barrier brake actuation system. Serves to prevent secondary impacts and for emergency braking situations.

- Compact, quick, and easy system to install
- Communication wireless or via trailing cable
- Powered via trailing cable and onboard battery
- High reliability – wireless realtime monitoring and controlling
- Triggering via the facility control system, smartphone or tapeswitch at a pre-determined point in time after t=0
- Test configuration and monitoring via facility control or web server
- Optional ID-modules enable control system to automatically identify the test vehicle or barrier
- OLED screen to monitor status and parameters included



1	Power supply	6	Battery
2	Trailing cable	7	Battery charger
3	Hydraulic hand pump	8	ID-module
4	Connection kit for brake line	9	Onboard wireless LAN client
5	Hydraulic vehicle brake		

TECHNICAL SPECIFICATIONS

Hydraulic Vehicle Brake System	
Brake system type	Hydraulic disc brake on each wheel
Brake pressure	130… 180 bar
Dimensions (L x W x H)	170 mm x 226 mm x 184 mm
Mounting grid	150 mm x 205 mm (M10)
Weight	7 kg
Shockproof	100 G
Power supply	18… 24 V @ 6 A
Switching capacity	12 W
Hydraulic connection	Minimess
Brake fluid	DOT 4, DOT 3
Operating temperature	-20…35°C

Battery dimensions (L x W x H)	88 mm x 80 mm x 22.5 mm
Battery weight	300 g
Charging voltage	16.8 V
Operating time	approx. 5h
Battery capacity	48 Wh
Charging battery time up to 80% (approx.)	1 h
Onboard wireless LAN client	
Dimensions (L x W x H)	160 mm x 140 mm x 45 mm
Mounting grid	130 mm x 120 mm (M4)
Weight	0.95 kg
Shockproof	100 G
Communication	Wireless LAN standard IEEE 802.11 a, b, e, g, h, i, n
Special function	iPCF

Scope of Supply

- Hydraulic Vehicle Brake System

Required Additional Equipment

- Power supply unit
- Battery
- Onboard wireless LAN client
- Trailing cable
- Hydraulic hand pump
- Adapter set hoses
- Profinet access point (required for real time operation)
- Profinet integration into facility control system (required for real time operation)

Optional Equipment

- Battery charger
- ID-module

RIGID BARRIERS

Small Overlap Barrier	25
Barrier 10°	25
Underride Barrier	26
Barrier 30°	26
Bumper Barrier	27
Pole Barrier	27
Offset Barrier	28

Small Overlap Barrier

RIGID BARRIERS

Rigid barrier for frontal crash tests with a 25% overlap according to IIHS and C-IASI test protocol, available for both left and right hand drive. Also available as Small Overlap Barrier with M=WALL Load Cells.



TECHNICAL SPECIFICATIONS

Weight	3,050 kg
Dimensions (L x W x H)	1,929 mm x 2,905 mm x 1,185 mm
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)

Barrier 10°

RIGID BARRIERS

Rigid barrier for frontal tests with a 40% overlap according to RCAR test protocol. Suitable for both left and right drive. Also available as instrumented barrier with M=WALL Load Cells.



TECHNICAL SPECIFICATIONS

Weight	1,665 kg
Dimensions (L x W x H)	796 mm x 1,250 mm x 1,340 mm
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)

Underride Barrier

RIGID BARRIERS

Rigid barrier for commercial vehical rear underride tests.



TECHNICAL SPECIFICATIONS

Weight	634 kg
Dimensions (L x W x H)	1,050 mm x 2,500 mm x 1,250 mm
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)

Barrier 30°

RIGID BARRIERS

Rigid barrier for full width frontal tests according to FMVSS 208 and FMVSS 305a test protocol. Suitable for both left and right hand drive.



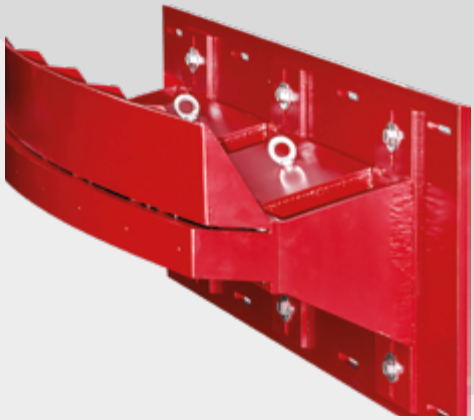
TECHNICAL SPECIFICATIONS

Weight	3,050 kg
Dimensions (L x W x H)	1,929 mm x 2,905 mm x 1,185 mm
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)

Bumper Barrier

RIGID BARRIERS

Rigid barrier for low-speed bumper tests according to RCAR test protocol.



TECHNICAL SPECIFICATIONS

Weight	702 kg
Dimensions (L x W x H)	558 mm x 1,900 mm x 650 mm
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)

Scope of Supply

- Bumper Barrier

Optional Equipment

- Bumper cover
- Energy absorber

Pole Barrier

RIGID BARRIERS

Rigid Barrier for pole impact tests according to the following regulations:

- EURO NCAP, ANCAP, US NCAP, KNCAP, Latin NCAP, C-NCAP
- FMVSS 214
- ECE R135
- GB/T 37337-2019 (China)
- Art 18 (Japan)
- KMVSS 102-4 (S. Korea)
- ADR 85/00 (Australia)

Also available as instrumented Pole Barrier with M=WALL Load Cells.

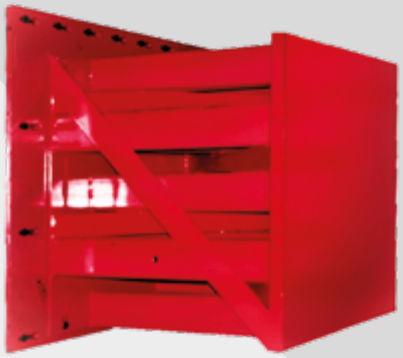


TECHNICAL SPECIFICATIONS

Weight (without concrete)	1,610 kg
Weight (with concrete)	1,824 kg
Dimensions (L x W x H)	2,007 mm x1,650 mm x 2,300 mm (custom sizes available)
Pole diameter	254 mm (custom sizes available)
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)

Offset Barrier

RIGID BARRIERS



Rigid Barrier for frontal offset tests according to the following regulations:

- EURO NCAP, ANCAP, C-NCAP, KNCAP, Latin NCAP, JNCAP, ASEAN NCAP
- IIHS
- ECE R94
- FMVSS 208
- EEVC WG 11
- GB/T 20913-2007 (China)
- Art 18 (Japan)
- AIS-098 (India)
- ADR 73/00 (Australia)

Also available as Offset Barrier with M=WALL Load Cells.

TECHNICAL SPECIFICATIONS

Weight	917 kg
Dimensions (L x W x H)	1,200 mm x 1,140 mm x 800 mm
Impact plate compatibility	Threaded holes / T-grooves with grid pattern 100 mm x 100 mm (M16) (custom sizes available)



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MOBILE BARRIERS

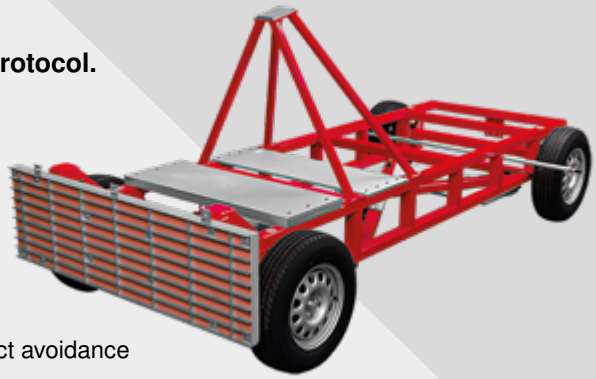
| ECE R95 Mobile Barrier 31
| AE-MDB Mobile Barrier 32
| MPDB Mobile Barrier 33
| ECE R34, ECE R153 and TRIAS15 Mobile Barrier 34
| RCAR Mobile Barrier 35
| FMVSS 214 and FMVSS 301R Mobile Barrier 36
| FMVSS 208 Mobile Barrier 37
| NHTSA OMDB Mobile Barrier 38
| IIHS 2.0 Mobile Barrier 39
| Restrainer for Mobile Barrier 40

ECE R95 Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for side impact tests according to ECE R95 test protocol.

- Convertible to AE-MDB, RCAR, ECE R34, ECE R153 and TRIAS15 Mobile Barrier and Chinese safety standard GB 20072-2024
- Height-adjustable shield for easy test setup adjustment – flexibility beyond standard specifications
- Camera stand always included
- Individually calibrated center of gravity
- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight (with deformation element)	950 ± 20 kg
Dimensions (L x W x H) (without deformation element and camera stand)	3,885 mm x 1,800 mm x 831 mm
Height (with camera stand)	1,632 mm
Dimensions front shield (W x H)	1,500 mm x 500 mm
Front shield clearance height	300 mm
Center of gravity	X-axis: 1,000 ± 30 mm behind front axle Y-axis: 0 ± 10 mm left of centerline Z-axis: 500 ± 30 mm above ground
Max. test speed	50 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- ECE R95 Mobile Barrier
- Camera stand
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system
- AE-MDB, RCAR, ECE R34; ECE R153 and TRIAS15 Mobile Barrier conversion kits
- Deformation elements

AE-MDB Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for side impact tests according to AE-MDB test protocol.

- Convertible to MPDB, ECE R95, RCAR, ECE R34, ECE R153 and TRIAS 15 Mobile Barrier
- Height-adjustable shield for easy test setup adjustment – flexibility beyond standard specifications
- Camera stand always included
- Individually calibrated center of gravity
- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight (with deformation element and camera stand)	1,400 ± 20 kg
Dimensions (L x W x H) (without deformation element and camera stand)	3,885 mm x 1,800 mm x 831 mm
Height (with camera stand)	1,631 mm
Dimensions front plate (W x H)	1,700 mm x 500 mm
Front shield clearance height	225 mm
Center of gravity	X-axis: 1,000 ± 30 mm behind front axle Y-axis: 0 ± 10 mm left of centerline Z-axis: 500 ± 30 mm above ground level
Max. test speed	50 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- AE-MDB Mobile Barrier
- Camera stand
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system
- MPDB, ECE R95, RCAR, ECE R34, ECE R153 and TRIAS 15 Mobile Barrier conversion kits
- Deformation elements

MPDB Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for car to car impact tests according to the Euro NCAP 2020 test protocol.



- Convertible to AE-MDB, ECE R95, RCAR, ECE R34, ECE R153 and TRIAS 15 Mobile Barrier and Chinese safety standard GB 20072-2024
- Height-adjustable shield for easy test setup adjustment – flexibility beyond standard specifications
- Camera stand always included
- Individually calibrated center of gravity
- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance

TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight (with deformation element and camera stand)	1,400 ± 20 kg
Dimensions (L x W x H) (without deformation element and camera stand)	3,884 mm x 1,800 mm x 831 mm
Height (with camera stand)	1,602 mm
Dimensions front plate (W x H)	1,700 mm x 650 mm
Front shield clearance height	150 mm
Center of gravity	X-axis: 1,000 ± 30 mm behind front axle Y-axis: 0 ± 10 mm left of centerline Z-axis: 500 ± 30 mm above ground level
Max. test speed	50 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- MPDB Mobile Barrier
- Camera stand
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system
- AE-MDB, ECE R95, RCAR, ECE R34, ECE R153, TRIAS 15 Mobile Barrier and Chinese safety standard GB 20072-2024 conversion kits
- Deformation elements

ECE R34, ECE R153 and TRIAS15 Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for rear impact tests according to ECE R34, ECE R153 and TRIAS15 test protocols.

- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight	1,100 ± 20 kg
Dimensions (L x W x H)	3,814 mm x 2,589 mm x 1,015 mm
Dimensions front shield (W x H)	2,589 mm x 889 mm
Front plate clearance height	178 mm
Front plate thickness	19 mm
Max. test speed	38 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- ECE R34, ECE R153 and TRIAS15 Mobile Barrier
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system

RCAR Mobile Barrier

MOBILE BARRIERS

Moving Barrier for rear impact tests according to RCAR test protocol.

- Convertible to MPDB, AE-MDB, ECE R95, ECE R34, ECE R153 and TRIAS 15 Mobile Barrier
- Height-adjustable shield for easy test setup adjustment – flexibility beyond standard specifications
- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight	1,400 kg
Dimensions (L x W x H)	4,010 mm x 1,800 mm x 832 mm
Dimensions front shield (W x H)	1,572 mm x 500 mm
Front shield clearance height	200 mm
Max. test speed	15 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- RCAR Mobile Barrier
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system

FMVSS 214 and FMVSS 301R Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for side impact tests according to FMVSS 214 test protocol and rear impact tests according to FMVSS 301R test protocol.

- Height-adjustable shield for easy test setup adjustment – flexibility beyond standard specifications
- Camera stand always included
- Individually calibrated center of gravity and moment of interia
- Easily adjusted wheel angle
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight (with deformation element and camera stand)	1,361 ± 4.5 kg
Dimensions (L x W x H) (without deformation element and camera stand)	3,632 mm x 2,095 mm x 888 mm
Height (with camera stand)	1,613 mm
Dimensions front shield (W x H)	1,677 mm x 660 mm
Front shield clearance height	228 mm
Center of gravity	X-axis: 1,123 ± 25 mm behind front axle Y-axis: 7.6 ± 25 mm left of centerline Z-axis: 500 ± 25 mm above ground
Moment of inertia	Around X / roll: 508 ± 25 kgm^2 Around Y / pitch: 2,263 ± 113 kgm2 Around Z / yaw: 2,572 ± 129 kgm^2
Max. test speed	80 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- FMVSS 214 and FMVSS 301R Mobile Barrier
- Camera stand
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system
- Deformation elements

FMVSS 208 Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for rear impact tests according to FMVSS 208 test protocol.

- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight	1814 kg
Dimensions (L x W x H)	3,910 mm x 1,982 mm x 1,651 mm
Dimensions front shield (W x H)	1,982 mm x 1,524 mm
Front shield clearance height	127 mm
Max. test speed	48 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- FMVSS 208 Mobile Barrier
- Wooden cover for front plate
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System or Hydropneumatic Vehicle Brake System
- Trailing cable system

NHTSA OMDB Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for frontal oblique impact tests with a 35 % overlap according to NHTSA test protocol.

- Camera stand always included
- Individually calibrated center of gravity and moments of interia
- Excellent directional stability
- Optional integrated brake system for emergency braking and second impact avoidance



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight (with deformation element and camera stand)	2490 ± 30 kg
Dimensions (L x W x H) (without deformation element and camera stand)	3,986 mm x 2,305 mm x 1,211 mm
Height (with camera stand)	1,786 mm
Dimensions front shield (W x H)	2,200 mm x 1,100 mm
Front shield clearance height	82,5 ± 2,5 mm
Center of gravity	X-axis: 915 ± 30 mm behind front axle Y-axis: 0 ± 10 mm left of centerline
Max. test speed	90 km/h
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- NHTSA OMDB Mobile Barrier
- Camera stand
- Cable support tube for trailing cable

Optional Equipment

- Hydraulic Vehicle Brake System
- Trailing cable system
- Barrier Restrainer
- Deformation elements

IIHS 2.0 Mobile Barrier

MOBILE BARRIERS

Mobile Barrier for side impact tests according to IIHS side impact crashworthiness evaluation 2.0 crash test protocol.

- Height-adjustable shield for easy test setup adjustment – flexibility beyond standard specifications
- Individually calibrated center of gravity and moment of inertia
- Mounting plates for sensors and data acquisition system
- Optional integrated hydropneumatic brake for emergency braking and second impact avoidance with optional wireless operation



TECHNICAL SPECIFICATIONS

Mobile Barrier	
Weight (with deformation elements and camera stand)	1,900 ± 5 kg
Dimensions (L x W x H) (without honeycomb and camera stand)	3,920 mm x 1,929 mm x 1,060mm
Height (with camera stand)	1,760 mm
Dimensions front shield (W x H)	1,700 mm x 700 mm
Height-adjustable front shield	± 30 mm
Deformations element clearance height	350 mm
Center of gravity	X-axis: 1,236 ± 10 mm rearward of the front axle Y-axis: 0 ± 10 mm from the lateral centerline Z-axis: 651 ± 10 mm above ground level
Moment of inertia	Around X / roll: 581 kgm² ± 5 % Around Y / pitch: 3,688 kgm² ± 5 % Around Z / yaw: 4,049 kgm² ± 5 %
Max. test speed	60 ± 1 km/h
Mounting grid for data acquisition equipment	50 mm x 50 mm (M6)
Brake system type	Hydraulic operated disc brake on each wheel
Hydraulic connection for vehicle brake system	Minimess
Brake fluid	DOT 3 and DOT 4

Scope of Supply

- IIHS 2.0 Mobile Barrier
- Camera stand
- Cable support tube for trailing cable
- Compensation weight for onboard equipment

Optional Equipment

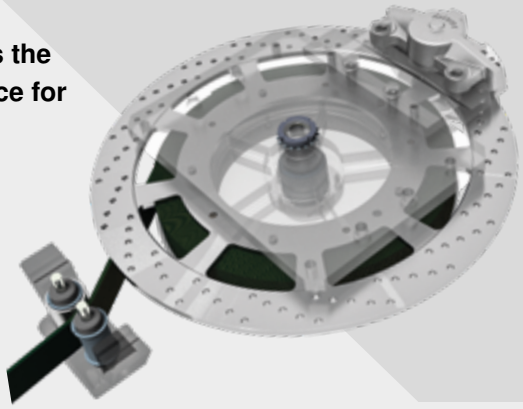
- Hydraulic Vehicle Brake System
- Trailing cable system
- Deformation elements

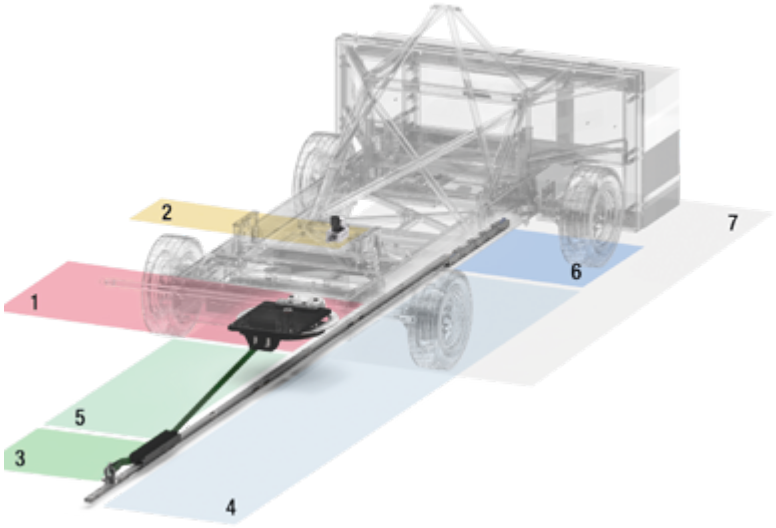
Restrainer for Mobile Barrier

MOBILE BARRIERS

Designed to prevent secondary impacts at high test speeds, such as the NHTSA OMDB. Can be mounted on the ground as a standalone device for other test scenarios.

- Maximum operating safety – minimized risk of injury and damage
- Second impact avoidance and controlled emergency stops
- Mechanical operating principle – no complex programming or facility integration necessary
- Easy handling – compact onboard system
- Adjustable braking force of up to 35 kN





Barrier Restrainer

1 Hydraulic disc brake
2 Brake control unit
3 Rear trolley
4 Push rod
5 Synthetic belt

Facility requirements

6 MicroTrack main trolley
7 Mobile barrier

TECHNICAL SPECIFICATIONS

Barrier Restrainer	
Max. braking force	35 kN
Typical free-run time post impact	300 ms
Weight (hydraulic disc brake and brake control unit)	131 kg
Dimensions hydraulic disc brake (L x W x H)	731 mm x 690 mm x 209 mm
Dimensions brake control unit (L x W x H)	167 mm x 60 mm x 96 mm
Length (push rod and rear trolley)	6,200 mm
Max. test speed	90 km/h
Max. weight of barrier	2,500 kg
Facility Requirements	
Track and propulsion system	MESSRING MicroTrack rail system and MESSRING propulsion system (others on request)

Scope of Supply

- Barrier Restrainer

Optional Equipment

- NHTSA OMDB Mobile Barrier
- Synthetic belts



LED LIGHTING SYSTEM

| M=LIGHT EVO 43

| M=SYNC Base Unit 45

M=LIGHT EVO

LED LIGHTING SYSTEM



LED lamp for optimized illumination during high-speed image capturing. Next evolutionary step in the development of M=LIGHT technology with significantly higher luminous flux and full compatibility with the established MESSRING LED lamp.

- Doubled light output at constant connection power compared to our previous M=LIGHT technology
- Synchronized operation with cameras allows for high-intensity flash mode
- No warm-up or cool-down period – immediate maximum luminous power
- Test object not exposed to thermal radiation
- LED service life > 50,000 hours
- Compact design for various applications
- Available with three different beam angles

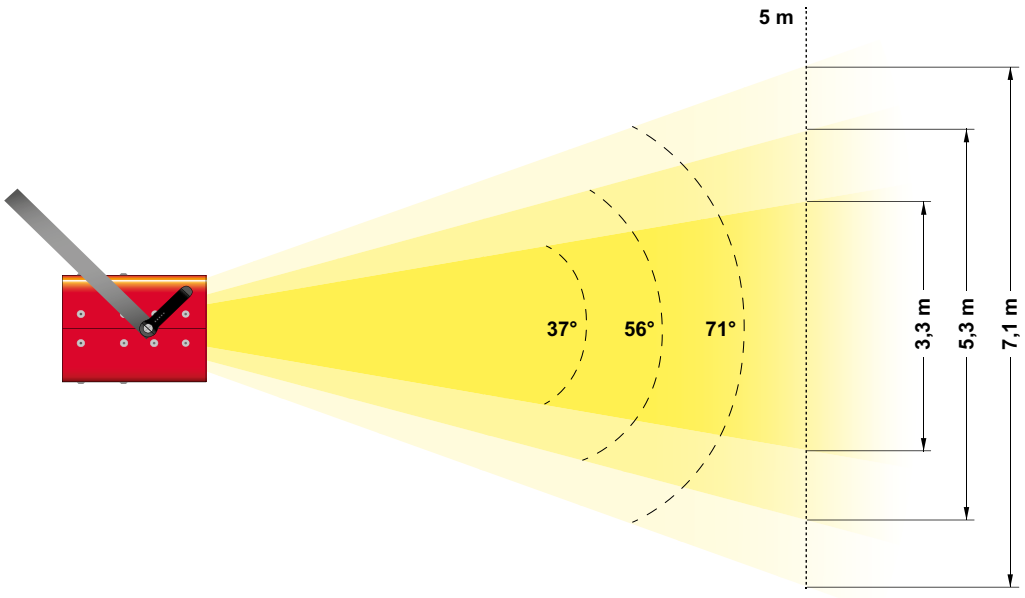


Figure 1: Available beam angles

Lens angle	Distance 1m	Distance 2m	Distance 3m	Distance 4m	Distance 5m
37°	232,400	58,900	26,300	14,800	9,500
56°	122,100	31,400	14,000	7,900	5,100
71°	82,500	20,100	8,900	5,000	3,300

Figure 2: Illuminance (lux) examples

Please note: The above mentioned illuminance values are based on 100 % steady light operation mode. With synchronized mode the maximum reachable illuminance values can be more than doubled.

TECHNICAL SPECIFICATIONS

Beam angles	37°, 56°, 71°
Color temperature	5,000 K (daylight)
Nominal input power	1,150 W
Power supply	100…230 VAC, 50/60 Hz
Luminous flux (steady light mode)	120,000 lumen
Luminous flux (synchronized mode)	260,000 lumen
Adjustable light output (steady light mode)	0…100 %
Adjustable light output (synchronized mode)	Up to 200 %
Max. frame rate (steady light mode)	No limitation (flicker-free)
Max. frame rate (synchronized mode)	Up to 25,000 fps

Adjustable flash duration	20…500 µs
Dimensions (L x W x H)	324 mm x 208 mm x 172 mm
Weight	7,5 kg
Operating temperature	0…50°C
Communication interface	Serial bus (differential signal with integrated bus termination)
Cooling system	Temperature controlled fans
Eye safety classification	DIN EN 62471 RG2

Scope of Supply

- M=LIGHT Evo
- Power cord (2 m)
- Cat. 6 Ethernet cable (5 m)

Optional Equipment

- M=LIGHT connection set (further information on request)
  - M=LIGHT bus-splitter (separates communication and synchronization signals)
  - Can 2 USB/Ethernet PC-interface
- M=LIGHT control software
- Consultation and design of customer-specific turn-key lighting systems

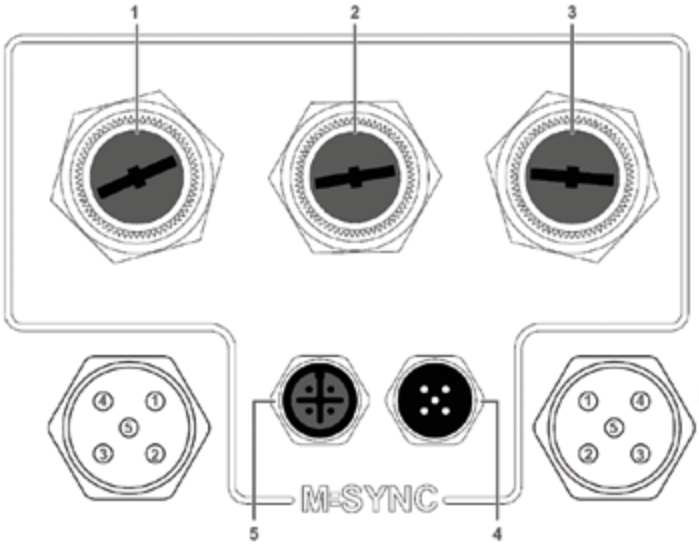
M=SYNC Base Unit

LED LIGHTING SYSTEM



Closed-loop synchronization backbone for decentralized distribution of sync signals for high-speed cameras, LED lighting and DAS systems. Integrated, native M=LIGHT LED control. Programmable, selective distribution of trigger (T0) signals for flexible assignment of independent trigger groups for parallel tests and setups.

- Flexible Configuration of Features with up to 3 M=SYNC Interface Cards
- High-Speed Communication and Closed-Loop Synchronization between Multiple Units
- Allows External Synchronization via IRIG-B or Clock Signal
- Fibre-Link for Long Distance Runs possible
- Profibus/Profinet Communication with Facility PLC
- General purpose 24V Digital IO, bidirectional (function can be configured)



1	M12 LWL Transceiver (only Controller Card+)
2	M12 LWL Transceiver (only Controller Card+)
3	M12 LWL Transceiver (only Controller Card+)
4	M12-A Plug (When synchronizing multiple systems: Terminate the first system with a terminating resistor: MESSRING P0002575)
5	M12-A Buchse (When synchronizing multiple systems: Terminate the last system with a terminating resistor: MESSRING P0002575)

Figure 1: Triggerbus V2 LWL und Triggerbus V2 CU

TECHNICAL SPECIFICATIONS

General	
Weight	8.1 kg
Dimensions	320 x 225 x 220 mm
Power Supply	22 V, 44 W
Built-In Backup Battery:	5,200 mAh
Controller Interface Card	
Uplink Port (female)	M=SYNC Bus Line, max. cable length 90 m (M12-A connector, 5 Pins)
Downlink Port (male)	M=SYNC Bus Line, max. cable length 90 m (M12-A connector, 5 Pins)
Global-Clock Port	2 x BNC Connector, bidirectional 5 V TTL (only switchable for both connectors)
DIO-Port	General Purpose 24 V Digital IO, bidirectional (function can be configured)
Profibus	Profibus Uplink/Downlink, connection to a PLC with Profibus interface (2 x M12-B connector, 5 Pins)
Ethernet	IEEE 802.3 i/u Ethernet 10 Mbit/s / 100 Mbit/s and Profinet Uplink/Downlink.

Additionally available on Controller+ Interface Card	
Fibre Optical Ports	M=SYNC Bus Line (Optical), max. cable length 500 m (3 x M12 OW transceiver)
IRIG-B Input	External Synchronization input for IRIG-B122 (BNC connector)

Scope of Supply

- M=SYNC Base Unit
- M=SYNC Controller Interface Card or Controller+ Interface Card

Optional Equipment

- Power Supply 110-220 VAC 50/60Hz. 22VDC@44W
- M=SYNC Trigger Interface Card
- M=LIGHT Interface Card
- Termination Resistor for M=SYNC Bus Line
- Prefabricated M=SYNC communication cables [copper or fibre], are available upon request.



DAQ AND SENSOR SYSTEMS

| M=BUS Pro Analog Logger 49
| M=BUS Pro Digital Logger 51
| M=BUS Pro Fire Box 52
| M=BUS Pro Timer 53
| M=BUS Pro Active Terminator 55
| M=BUS Pro Ethernet Gateway 56
| M=BUS Pro Mounting Rail 57
| M=BUS UPS 5500 58
| M=BUS Wireless LAN Bridge 59
| M=BUS USB Gateway 60
| M=BUS InDummy Logger for Ratiometric Transducers 61
| M=BUS InDummy Logger for Voltage Ratiometric Transducers 62
| M=BUS InDummy Active Terminator 63
| Sensor Tester 64
| Seat Belt Load Cell 66
| Seat Belt Displacement Transducer 67
| Three Beam Laser Speed Trap 68
| M=WALL Load Cell 69

M=BUS Pro Analog Logger

DAQ & SENSOR SYSTEMS

Shockproof data logger for signal conditioning, processing and data storage of analog signals.

- Data logger for 8 analog channels
- Automatically activated built-in backup system
- 16 bit resolution
- Max. 500 kHz sampling rate
- Internal shunt resistor and bridge completion



TECHNICAL SPECIFICATIONS

Supported channels	8
Power consumption (unloaded)	2.7 W
Supported instrumentation	Resistive sensors / active sensors
Sensor excitation voltage	5 VDC
Accuracy of sensor excitation voltage	0.1 %
Max. output current per channel	30 mA
Sensor input voltage	± 1.25 mV…± 2.5 V (over voltage protection up to ±48 V)
High voltage measurement	± 50 V (over voltage protection up to ± 150 V)
Trigger	M=BUS system trigger via gateway Autotrigger at cable disconnect
Conformity	SAE J211 / ISO 6487
Analog bandwidth (-3 dB)	>60 kHz @ gain 2,000
Resolution	16 bit
Sampling rate	20 kHz / 100 kHz / 500 kHz
Max. recording time	3.2 h per channel @ 20 kHz (233.963.520 samples per channel) 15 min per channel @ autotrigger
Internal shunt	Yes (20 kΩ 0.1%)
Internal bridge completion	Half bridge
Offset adjustment	Full range sensor input voltage, 16 bit
Sensor-ID per socket	1-Wire® compatible (Dallas)
Battery capacity	1,000 mAh, 3.7 VDC (Lithium-Polymer) Yearly maintenance mandatory
Data storage	4 GB flash
Data storage time	Non-volatile
Dimensions (L x W x H)	80 mm x 34 mm x 48 mm
Weight	241 g
M=BUS connectors	MMCX female
Operating temperature	0…50 °C
Shockproof	200 G @ 10 ms 1000 G @ 1 ms
Humidity range	10...70 % RH

Scope of Supply

- M=BUS Pro Analog Logger
- M=BUS cable (45 mm)
- Calibration certificate

Required Additional Equipment

- M=BUS Pro Ethernet Gateway or
  M=BUS USB Gateway
- M=BUS Pro Active Terminator (per Line)

Optional Equipment

- M=BUS Pro Mounting Plate
- M=BUS Pro Mounting Rail

M=BUS Pro Digital Logger

DAQ & SENSOR SYSTEMS

Shockproof data logger for signal conditioning, processing and data storage of digital events such as triggers or contact switches.

- Data logger for 16 digital channels
- Space saving and lightweight
- Automatically activated built-in backup system
- Max. 1 MHz sampling rate @ 1 bit
- Max. 100 kHz sampling rate @ 12 bit



TECHNICAL SPECIFICATIONS

Supported channels	16 (2 inputs per LEMO connector)
Power consumption (unloaded)	2.7 W
Supported instrumentation	Digital sensors / voltage sensors
Sensor excitation voltage	Socket 1 = 12 VDC / Socket 2 - 8 = 5 VDC
Output voltage accuracy (unloaded)	1 %
Max. output current per channel	Socket 1 = 120 mA / Socket 2 - 8 = 25 mA
Sensor input voltage	Input A: 0 …5 V (over voltage protection up to ± 48 V) Input B: 0…15 V (over voltage protection up to ± 100 V)
Trigger	M=BUS system trigger via gateway Autotrigger at cable disconnect
Conformity	SAE J211 / ISO 6487
Analog bandwidth (-3 dB)	> 700 kHz
Resolution	12 bit
Sampling rate	20 kHz @ 12 bit / 100 kHz @ 12 bit / 1 MHz @ 1 bit
Max. recording time per channel	2.1 h @ 20 kHz (155,975,680 samples per channel) 15 min @ autotrigger
Sensor-ID per socket	1-Wire® compatible (Dallas)
Battery capacity	1,000 mAh, 3.7 VDC (Li-Polymer) Yearly maintenance mandatory
Data storage	4 GB flash
Data storage time	Non-volatile
Dimensions (L x W x H)	80 mm x 34 mm x 48 mm
Weight	238 g
M=BUS connectors	MMCX female
Operating temperature	0…50 °C
Shockproof	200 G @ 10 ms / 1,000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS Pro Digital Logger
- M=BUS cable (45 mm)
- Calibration certificate

Required Additional Equipment

- M=BUS Pro Ethernet Gateway or
  M=BUS USB Gateway
- M=BUS Pro Active Terminator (per Line)

Optional Equipment

- M=BUS Pro Mounting Plate
- M=BUS Pro Mounting Rail

M=BUS Pro Fire Box

DAQ & SENSOR SYSTEMS

Ignites pyrotechnical devices such as airbags or seat belt pretensioners.

- Support of 4 or 8 fire channels
- Individually programmable timers
- Operation independent from other M=BUS devices possible
- Squib recognition
- Mechanical and electrical safety interlock



TECHNICAL SPECIFICATIONS

Supported channels	4 or 8
Supply voltage	18…22 VDC
Power consumption	13 W
Trigger	Trigger-Bus (RS 485), 5V-TTL compatible; insulated 300 V
DC-Ignition	12 V, adjustable current: 0.1…8 A in steps of 0.1 A @ 1 Ω
Ignition energy	280 mJ
Ignition delay (set per software)	Min. 0.01 ms in steps of 0.01 ms
Ignition pulse duration (set per software)	Min. 0.1 ms in steps of 0.01 ms
Communication	IEEE 802.3 i/u Ethernet 10 Mbit/s / 100 Mbit/s
Battery capacity	2,200 mAh, 3.7 VDC (Lithium-Polymer) Yearly maintenance mandatory
Dimensions (L x W x H)	80 mm x 136 mm x 40 mm
Weight	4 channel: 522 g; 8 channel: 622 g
Operating temperature	0…50 °C
Shockproof	200 G @ 10 ms 1000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS Pro Fire Box
- Connecting cable for M=BUS Pro Ethernet Gateway (0.3 m)
- Connecting cable for power, network and trigger (0.3 m)
- Network cable, Western/Lemo (3 m)
- Power supply with cable (3 m)
- Safety connector
- Trigger switch

Required Additional Equipment

- CrashSoft control software

Optional Equipment

- M=BUS Pro Mounting Rail
- M=BUS Pro UPS
- M=BUS Pro Mounting Plate

M=BUS Pro Timer

DAQ & SENSOR SYSTEMS

Ignites pyrotechnical devices such as airbags or seat belt pretensioners and records ignition current and voltage.

- Support of 4 or 8 times output fire channels (ignition digital switch)
- Individually programmable timers
- Squib- and ignition-line recognition
- Resistance monitoring during recording
- Sync- and status-output for better system integration
- Mechanical and electrical safety interlock
- Automatically activated built-in backup system



TECHNICAL SPECIFICATIONS

Supported channels	4 or 8
Supply voltage	18…22 VDC
Power consumption	Max. 22 W
Trigger	• Trigger-Bus (RS 485), bidirectional, 5V-TTL compatible, 300V insulated (System Connector Socket) • 24V; Trigger-Input, insulated (TRG Socket)
Application	Vehicle crash testing, static deployment (OOP, COP), restraint system development (all-fire-rating), timed switching of actuators
Resolution	16 bit
Sampling Rate	20 kHz, 100 kHz, 400 kHz, 500 kHz, 800 kHz
Max. recording time	262 ksamples per channel 327 ms @ 800 kHz 13 s @ 20 kHz
Ignition current	Adjustable current: 0.1…6 A (0.01 A steps)
Ignition voltage (capacitor charging voltage)	24 V
Current rise time	< 10 µs
Max. ignition energy	633 mJ
Ignition delay	< 3 µs to max. 10 s in steps of 0.01 ms @ 800 kHz
Ignition pulse duration	< 0.1 ms to 10 s in steps of 0.01 ms
Communication	IEEE 802.3 i/u Ethernet 10 Mbit/s / 100 Mbit/s
Battery capacity	1,000 mAh, 7.4 VDC (Lithium-Polymer) Yearly maintenance mandatory
Capacitor charging time	~ 5 s
Resistance measurement	Squib (2-wire) / Squib + Ignition line (4-wire)
Squib resistance range	0.5 Ohm – 12 Ohm
Resistance check current	< 10 mA
Resistance measurement range	0.5 Ohm – 12 Ohm
Resistance measurement accuracy	< 0.1 mOhm
Data storage	SRAM 8 MB
Data storage time	2 weeks (battery buffered)
Digital Switch	Solid-state-relay (with same timing capabilities)
Dimensions (L x W x H)	80 mm x 170 mm x 51 mm
Weight	4 channels: 680 g 8 channels: 780 g
Operating temperature	0…50 °C

Shockproof	200 G @ 10 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS Pro Timer
- Connecting cable for M=BUS Pro Ethernet Gateway (0.35 m, with angular connector)
- Connecting cable for power, network and trigger (0.3 m, with angular connector)
- Network cable, Western/Lemo (3 m)
- Power supply with cable (3 m)
- Safety connector
- Squip simulator

Optional Equipment

- CrashSoft3 DAS Control Software
- M=BUS Pro Mounting Rail
- M=BUS UPS 5500
- M=BUS Pro Mounting Plate
- Safety interlink cable (0.35 m)
- Sync interlink cable (0.35m)
- Trigger switch

Required Additional Equipment

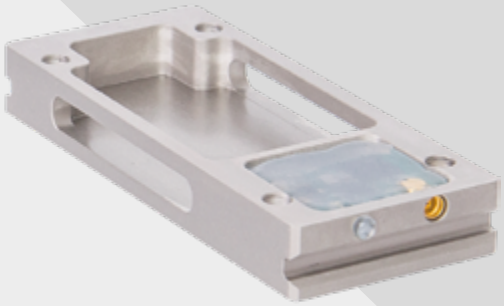
- M=BUS Test Wizard Software

M=BUS Pro Active Terminator

DAQ & SENSOR SYSTEMS

Last participant of the M=BUS line that monitors the signal quality and integrity of the entire bus.

- Active termination of one M=BUS line
- Space saving installation underneath the M=BUS Pro Logger



TECHNICAL SPECIFICATIONS

Dimensions (L x W x H)	80 mm x 34 mm x 11 mm
Weight	39 g
Signal termination	Active
M=BUS connectors	MMCX female
Operating temperature	0…50 °C
Shockproof	200 G @ 10 ms 1,000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS Pro Active Terminator
- M=BUS standard coaxial cable
- Mounting screws

Required Additional Equipment

- M=BUS Ethernet Gateway or M=BUS USB Gateway
- CrashSoft control software

Optional Equipment

- M=BUS Pro Analog Logger
- M=BUS Pro Digital Logger
- M=BUS Pro Mounting Plate

M=BUS Pro Ethernet Gateway

DAQ & SENSOR SYSTEMS

Shockproof interface between M=BUS data loggers and PC with Ethernet standard that supplies power, trigger and network signal.

- Support of 3 or 6 bus lines
- Display for status monitoring
- High level of data security – automatically activated built-in backup system



TECHNICAL SPECIFICATIONS

Max. number of M=BUS lines / Max. number of analog channels	6 / 1,152 (M=BUS Indummy), 288 (M=BUS Pro) or 3 / 576 (M=BUS Indummy), 144 (M=BUS Pro)
Supply voltage	18…22 VDC
Static power consumption	2.65 W
Max. power consumption with full sensor load	6 M=BUS lines: 135 W 3 M=BUS lines: 70 W
Trigger	Trigger-bus (RS 485), 5V-TTL compatible, insulated 300 V Autotrigger at cable disconnect
Communication	IEEE 802.3 i/u Ethernet 10 Mbit/s / 100 Mbit/s
Battery capacity	500 mAh, 3.7 VDC (Lithium-Polymer) Yearly maintenance mandatory
Data storage	Flash non-volatile
Dimensions (L x W x H)	80 mm x 84 mm x 40 mm
Weight	6 M=BUS lines: 359g (MMCX) 3 M=BUS lines: 353g (MMCX), 384g (SMA)
M=BUS connectors	MMCX female or SMA
Operating temperature	0…50 °C
Shockproof	200 G @ 10 ms 1000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS Pro Ethernet Gateway
- Connector protection M=BUS Pro Ethernet Gateway
- Connecting cable for power, network and trigger (0.3 m)
- Network cable, Western/Lemo (3 m)
- Trigger switch
- Power supply with cable (3 m)

Required Additional Equipment

- CrashSoft control software

Optional Equipment

- M=BUS Indummy Logger
- M=BUS Indummy Active Terminator
- M=BUS Pro Analog Logger
- M=BUS Pro Digital Logger
- M=BUS Pro Active Terminator
- M=BUS Pro Mounting Rail
- M=BUS UPS
- M=BUS Pro Mounting Plate

M=BUS Pro Mounting Rail

DAQ & SENSOR SYSTEMS

Mounting rail for the installation of all M=BUS Pro modules.

- Fixation of up to 14 modules in any order
- Module fastening with a single screw
- Removal of individual modules without affecting others



TECHNICAL SPECIFICATIONS

Max. number of modules	14
Rail fixation	Countersunk head cap screw (M12)
Module fixation	Open top hat rail, screwed clamps
Dimensions (L x W x H)	500 mm x 100 mm x 13.5 mm Mounting grid 50 mm x 100 mm (M12)
Weight	1,160 g

Scope of Supply

- M=BUS Pro Mounting Rail
- Screws and clamps

Optional Equipment

- M=BUS Pro Analog Logger
- M=BUS Pro Digital Logger
- M=BUS Pro Active Terminator
- M=BUS Pro Ethernet Gateway
- M=BUS Pro Fire Box
- M=BUS Pro FAM Box

M=BUS UPS 5500

DAQ & SENSOR SYSTEMS

Uninterruptible Power Supply (UPS)

Shockproof rechargeable battery for the M=BUS data acquisition system.

- Battery and loop-through operation
- LEDs for power level and status
- Parallel charging and DAS operation
- Space saving installation of M=BUS Pro devices on top of the UPS
- Battery can be replaced by user



TECHNICAL SPECIFICATIONS

Input voltage	12 V DC
Output voltage	22 V DC
Max. output power consumption	154 W
Short circuit protection	Yes
Weight	2,4 kg (without battery and mounting plate)
Dimensions (L x W x H)	170 mm x 140 mm x 120 mm
Operating temperature	0…50 °C
Runtime	> 15 min.
Shockproof	Up to 100 G @ 20 ms
Certified	CE according to 2014/30/EU Harmonized standards: EN 61326-1:2013
External charger	
Input Voltage	220 V – 240 V AC / 50 Hz – 60 Hz
Max. input power consumption	230 W
Max. output power consumption	12 V DC / max. 15 A DC
Battery	Lithium Powerbloc 5,5 AH - S
Capacity	5.5 Ah, 12 V Lightweight LiFePo-Technology
Weight	1,0 kg
Dimensions (L x W x H)	95 mm x 99 mm x 82 mm
Certified	UN 38.3
Mounting plate	
Dimensions (L x W x H)	170 mm x 220 mm x 12 mm
Weight	0,70 kg

Scope of Supply

- M=BUS UPS 5500
- Mounting plate and screws
- Connection cable UPS to M=BUS device (0.3 m)
- Quick Start Guide

Optional Equipment

- M=BUS Pro Ethernet Gateway
- M=BUS Pro Fire Box
- M=BUS Pro Timer
- Yearly maintenance service

Required Additional Equipment

- UPS 5500 Battery LPB 5,5 AH-S
- UPS 5500 Charger

M=BUS Wireless LAN Bridge

DAQ & SENSOR SYSTEMS

Wireless communication between shockproof mobile transmitter unit and local wireless LAN.

- Suitable for battery powered tests without trailing cable
- Operation as stand-alone M=BUS System or as system setup with the MESSRING Trailing Cable Box
- Ability to wirelessly transmit data from any kind of data acquisition system equipped with Ethernet





Figure 1: Example system setup

TECHNICAL SPECIFICATIONS

Supply voltage	18…22 VDC
Power consumption	18 W
Max. overvoltage protection	36 VDC
Communication (wireless)	Standard IEEE 802.11g
Transmission range (wireless)	60 m (within building) and 300 m (outdoor area)
Communication (Ethernet)	IEEE 802.3 i/u Ethernet 10Mbit/s / 100Mbit/s
Configuration interface	per WEB-Interface
Operating temperature	0…45°C
Shockproof	1,000 G
Dimensions (L x W x H)	113 mm x 80 mm x 46 mm Uses 4 slots on M=BUS Pro Mounting Rail (optional)
Dimensions mounting plate (L x W x H)	113 mm x 104 mm x 6 mm Mounting grid: 50 mm x 100 mm (M)
Weight	0.3 kg
Weight mounting plate	0.3 kg

Scope of Supply

- M=BUS Wireless LAN Bridge
- Connection kit
- Mounting plate

Optional Equipment

- WLAN Access Point for Wireless Data Transfer
- M=BUS Data Acquisition System
- Trailing cable system
- M=BUS UPS

M=BUS USB Gateway

DAQ & SENSOR SYSTEMS

Stationary interface between M=BUS data loggers and PC with USB 1.1 standard that supplies power, trigger and network signal.

- Support of one bus line
- Plug and play USB connectivity
- USB full speed



TECHNICAL SPECIFICATIONS

Max. number of M=BUS lines / Max. number of channels	1 / 6 (M=BUS Indummy) with USB power 1 / 192 (M=BUS Indummy), 48 (M=BUS Pro) with external power
Supply voltage	18…22 VDC
Static power consumption (unloaded)	47 mW
Max. power consumption with full sensor load	22 W
Trigger	Trigger-Bus (RS 485), 5V-TTL compatible, insulated 300 V
Communication	USB 1.1
Dimensions (L x W x H)	95 mm x 80 mm x 32 mm
Weight	218 g
M=BUS connectors	MMCX female
Operating temperature	0…50 °C
Humidity range	10…70 % RH

Scope of Supply

- M=BUS USB Gateway
- Power supply and cable (3 m)
- USB cable for M=BUS USB Gateway (3 m)
- Trigger switch

Required Additional Equipment

- CrashSoft control software

Optional Equipment

- M=BUS Indummy Logger
- M=BUS Indummy Active Terminator
- M=BUS Pro Analog Logger
- M=BUS Pro Digital Logger
- M=BUS Pro Active Terminator

M=BUS InDummy Logger for Ratiometric Transducers

DAQ & SENSOR SYSTEMS

Miniaturized shockproof data logger for signal conditioning, processing and data storage that can be integrated in any common crash dummy or pedestrian safety impactor.

- Smallest and lightest
- Data loggers for 3 or 6 analog channels
- One-wire bus system
- Lowest heat dissipation
- Automatically activated built-in backup system
- Compliant to SAE J211 / ISO 6487



TECHNICAL SPECIFICATIONS

Supported channels	3 or 6
Power consumption (unloaded)	0.65 W
Supported instrumentation	Ratiometric sensor
Sensor excitation voltage	3.3 VDC
Signal accuracy	0.1 %
Max. output current per channel	All sensors max. 66 mA
Sensor input voltage	± 825 µV…± 38 mV
Trigger	M=BUS system trigger via gateway Autotrigger at cable disconnect
Conformity	SAE J211 / ISO 6487
Analog bandwidth (-3 dB)	2.4 kHz, Bessel 6-pole
Resolution	16 bit
Sampling rate	20 kHz
Max. recording time	17 s per channel (349.520 samples per channel)
Internal shunt	Yes (100 kΩ)
Offset adjustment	Full range sensor input voltage, 8 bit
Sensor-ID	1-Wire® compatible (Dallas)
Battery capacity	50 mAh, 3.7 VDC (Lithium-Polymer) Yearly maintenance mandatory
Data storage	SRAM 4 MB
Battery data storage time	2 weeks (battery buffered)
Dimensions (L x W x H)	40 mm x 25 mm x 14 mm
Weight	16 g
M=BUS connectors	MMCX female
Sensor connectors	Adapter-PCB
Operating temperature	0...50°C
Shockproof	200 G @ 10 ms 1000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS InDummy Logger for Ratiometric Transducers
- Adapter-PCB
- Calibration certificate

Optional Equipment

- M=BUS Toolset

Required Additional Equipment

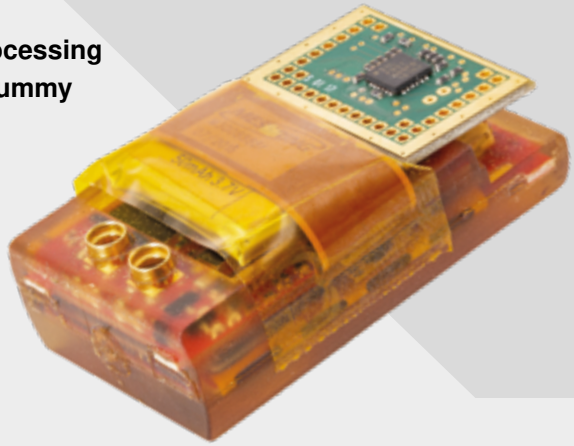
- M=BUS Pro Ethernet Gateway or M=BUS USB Gateway
- M=BUS InDummy Active Terminator (per Line)
- M=BUS system cable

M=BUS InDummy Logger for Voltage Ratiometric Transducers

DAQ & SENSOR SYSTEMS

Miniaturized shockproof data logger for signal conditioning, processing and data storage that can be integrated in any common crash dummy or pedestrian safety impactor.

- Smallest and lightest
- Data loggers for 3 or 6 analog channels
- One-wire bus system
- Lowest heat dissipation
- Automatically activated built-in backup system
- Compliant to SAE J211 / ISO 6487



TECHNICAL SPECIFICATIONS

Supported channels	3 or 6
Power consumption (unloaded)	0.65 W
Supported instrumentation	Active sensors / Potentiometer (channel 1…3) Ratiometric sensors (channel 4…6)
Sensor excitation voltage	3.3 VDC
Signal accuracy	0.1 %
Max. output current per channel	All sensors max. 66 mA
Sensor input voltage	± 1.65 V (channel 1…3) ± 825 µV…± 38 mV (channel 4…6)
Trigger	M=BUS system trigger via gateway Autotrigger at cable disconnect
Conformity	SAE J211 / ISO 6487
Analog bandwidth (-3 dB)	2.4 kHz, Bessel 4-pole (channel 1…3) 2.4 kHz, Bessel 6-pole (channel 4…6)
Resolution	16 bit
Sampling rate	20 kHz
Max. recording time	17 s per channel (349.520 samples per channel)
Internal shunt	Yes (100 kΩ)
Offset adjustment	Full range sensor input voltage, 12 bit (channel 1…3) Full range sensor input voltage, 8 bit (channel 4…6)
Sensor-ID	1-Wire® compatible (Dallas)
Battery capacity	50 mAh, 3.7 VDC (Lithium-Polymer) Yearly maintenance mandatory
Data storage	SRAM 4 MB
Battery data storage time	2 weeks (battery buffered)
Dimensions (L x W x H)	40 mm x 25 mm x 14 mm
Weight	16 g
M=BUS connectors	MMCX female
Sensor connectors	Adapter-PCB
Operating temperature	0...50°C
Shockproof	200 G @ 10 ms 1000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS InDummy Logger for Ratiometric Transducers
- Adapter-PCB
- Calibration certificate

Optional Equipment

- M=BUS Toolset

Required Additional Equipment

- M=BUS Pro Ethernet Gateway or M=BUS USB Gateway
- M=BUS InDummy Active Terminator (per Line)
- M=BUS system cable

M=BUS InDummy Active Terminator

DAQ & SENSOR SYSTEMS

Last participant of the M=BUS line that monitors the signal quality and integrity of the entire bus.

- Active termination of one M=BUS line



TECHNICAL SPECIFICATIONS

Dimensions (L x W x H)	39 mm x 23.5 mm x 10.7 mm
Weight	16 g
Signal termination	Active
M=BUS connectors	MMCX female
Operating temperature	0…50 °C
Shockproof	200 G @ 10 ms 1,000 G @ 1 ms
Humidity range	10…70 % RH

Scope of Supply

- M=BUS InDummy Active Terminator
- Mounting screws

Required Additional Equipment

- M=BUS Pro Ethernet Gateway or M=BUS USB Gateway
- CrashSoft control software

Optional Equipment

- M=BUS InDummy Logger

Sensor Tester

DAQ & SENSOR SYSTEMS

Handheld Sensor Tester

Allows quick and easy functionality check of full- or half-bridge (with bridge completion) transducers including ID-module verification.

- Mobile handheld device
- Single button operation
- Easy check verification with multi-color LEDs
- Powered by rechargeable batteries
- Pin assignment can be customized according to requirements



TECHNICAL SPECIFICATIONS

Supported channels	1
Power Supply	Battery powered (2x 3.7V 800mAh)
Dimensions	86 mm x 135 mm x 32 mm
Operating Temperature	0..60°C
Operating Humidity	10..70% Rh
Resistance Measuring Range	150R..10kR
Supply Voltage DuT	4.55 VDC
Test	Test each bridge wire, including the shield, for short circuits.

Scope of Supply

- Handheld Sensor Tester

Optional Equipment

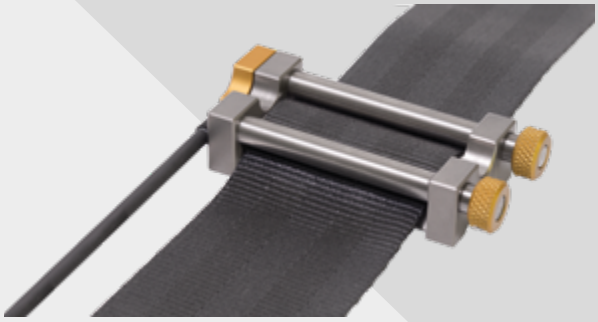
- Rechargeable Batteries (2pcs.) (4TCA)
- Battery Charger (4TCA1)

Seat Belt Load Cell

DAQ & SENSOR SYSTEMS

Load cell that measures the face on the seat belt webbing.

- Multiple calibration ranges available
- Lightweight and durable design
- High accurancy and low linearity error
- Quick change cable
- Integrated Dallas-ID module



TECHNICAL SPECIFICATIONS

Body material	Titanium	Aluminum
Use Case	Dynamic force measurements	Static force measurements
Measuring range (calibrated)	0…6 kN or 0…16 kN	0… 500 N
Overload without damage	1.25 x 16 kN	4.0 x 500 N
Typical sensitivity	0.16 mV / 1 kN / 1 V	0.4 mV / 1 kN / 1 V
Working principle	Strain gauge, full bridge	
Bridge resistance	1,000 Ω	
Linearization electronics	Yes, integrated	
Excitation voltage	5…10 VDC (with linearization electronics)	
Max. power consumption	100 mW	
Conformity	SAE J211/ISO 6487	
Non-linearity	≤ 2%	
Shunt	Optional, positive or negative shunt between positive signal and positive/negative excitation	
Sensor-ID	1-Wire® (Dallas), type DS2401	
Max. seat belt width	50.8 mm (2“)	
Max. seat belt thickness	2.0 mm	
Dimensions (L x W x H)	73 mm x 38 mm x 18 mm	
Mass, excluding cable	83 g	69 g
Compensated temperature range	10…70°C	
Cable length	Standard 6 m	
Standard cable connector	LEMO 1B, 7-pin (pin assignment according to customer specifications)	
Cable-core colors	White: Positive excitation Brown: Negative excitation Green: Positive signal Yellow: Negative signal Grey: ID-Module Shield: According to customer requirements	

Scope of Supply

- Seat Belt Load Cell
- Quick change cable (Standard 6m)
- Calibration certificate in accordance to ISO/TS 17242

Optional Equipment

- Quick change cable (other lengths on request)
- Yearly maintenance and calibration service (recommended)

Seat Belt Displacement Transducer

DAQ & SENSOR SYSTEMS

Transducer that measures the linear movement of the seat belt by means of two light barriers and special adhesive tapes.

- Lightweight and durable design
- High accuracy
- Large measuring range
- Easy attachment of seat belt



TECHNICAL SPECIFICATIONS

Measuring range	± 2,048 mm
Excitation voltage	5...10 VDC
Max. power consumption	120 mW
Typical sensitivity (see calibration certificate)	0.16 mV/mm
Resolution	1 mm
Accuracy	< 0.05 %
Sensor-ID	1-Wire® (Dallas), type DS2401
Seat belt width	48…51 mm
Max. seat belt thickness	2 mm
Max. seat belt speed	50 m/s
Dimensions (L x W x H)	70 mm x 70 mm x 17 mm
Weight, including cable	138 g
Compensated temperature range	10…70°C
Cable length	6 m
Standard cable connector	LEMO 1B, 7-pin (pin assignment according to customer specifications)
Cable-core colors	White/pink: + Excitation Brown/blue: - Excitation Green: + Signal Yellow: - Signal Grey: ID-Module Shield: According to customer requirements

Scope of Supply

- Seat Belt Displacement Transducer
- Connecting cable (6 m)
- Adhesive tapes with bar pattern (10 units, 500 mm)
- Mounting plate
- Cover plates for 51 mm, 50 mm, 48 mm
- Calibration certificate

Optional Equipment

- Adhesive tapes with bar pattern (500 mm and 1,000 mm)
- Maintenance and calibration service

Three Beam Laser Speed Trap

DAQ & SENSOR SYSTEMS



Non-contact speed measurement system with three laser beams, consisting of transmitter and receiver for indoor applications.

- Easy system setup – visual indication for correct alignment of laser beams
- Alignment aid using integrated line laser
- No interference from lighting or heat sources
- Speed measurement using two independent time bases
- Redundant speed measurement through a third laser sensor
- Configuration and monitoring via web interface over Ethernet or WLAN
- Real-time speed display on integrated display
- Increased measurement reliability through redundant sensor architecture
- Network-based access for parameterization and diagnostics

TECHNICAL SPECIFICATIONS

Speed measurement range	Up to 150 km/h
Accuracy	0.1 km/h (up 50 km/h) 0.15 km/h (50…80 km/h) 0.25 km/h (80…150 km/h)
Maximum transmitter-receiver separation	20 m
Separation of laser beams	250 mm
Supply voltage	110…240 VAC, 50/60 Hz
Interface	Ethernet / cable (Gigabit Ethernet)/ wireless (WLAN (IEEE 802.11ax)
Laser class	1
Height of laser beams	250…950 mm
Dimensions (L x W x H)	540 mm x 650 mm x 1,113 mm (transmitter) 540 mm x 650 mm x 1,113 mm (receiver)
Weight	72 kg (without transportation box)
Operating temperature	0…40°C

Scope of Supply

- Three Beam Laser Speed Trap
- Transportation box
- Calibration certificate (standard calibration speeds 10 km/h, 50 km/h, 80 km/h, others on request)
- Power supply cable
- Ethernet cable

Options

- Integration into the MESSRING facility control system
- Calibration service

Optional Equipment

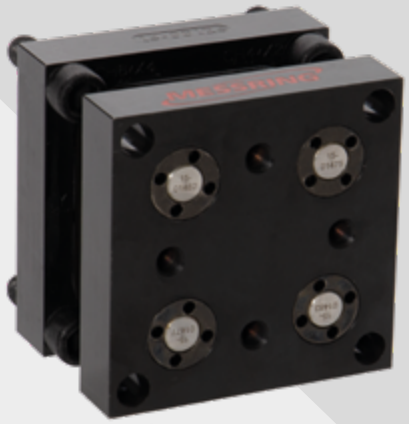
- Cross-line laser

M=WALL Load Cell

DAQ & SENSOR SYSTEMS

M=Wall load cells can be arranged in nearly any way to provide the desired area for standard tests and specific test setups enabling the measurement of multiaxial forces and moments during impact.

- Measurement across five axes – F_X, F_Y, F_Z, M_Y, M_Z
- Wide measuring range – eligible 400 kN or 550 kN
- System integrated data acquisition
- Excellent linearity over total measuring range
- Flexibility - various crash barriers can be instrumented with M=WALL load cells



TECHNICAL SPECIFICATIONS

M=WALL load cell	**400 kN**	**550 kN**
Coordinate System	According to SAE J1733	
Working principle	Strain gauge, full bridge	
Measuring range	F_X: 0…-400 kN F_Y, F_Z: -150…+150 kN M_Y, M_Z: -12.5…+12.5 kNm	F_X: 0…-550 kN F_Y, F_Z: -150…+150 kN M_Y, M_Z: -17…+17 kNm
Non-linearity	1 %	
Maximum Noise Floor	< 0.1 kN	
Channel crosstalk X → Y, Z [typical value]	3.0 % [1.7 %]	
Channel crosstalk Y, Z → X [typical value]	1,5 % [0.7 %]	
Channel crosstalk Y ↔ Z [typical value]	2.0 % [1.0 %]	
Hysteresis X [typical value]	1.0 % [0.5 %]	
Hysteresis Y, Z [typical value]	1.0 % [0.5 %]	
Overload without damage (F_X, F_Y, F_Z, centric load)	1.25 x F.S.	FX: 2.0 x F.S. FY, FZ: 1.5 x F.S.
Dimensions (L x W x H)	125 mm x 125 mm x 92 mm	
Weight	7.5 kg	8.5 kg
Operating Temperature	0…50 °C	
Protection (IEC)	IP54	
Conformity	SAE J211 / ISO 6487	
M=WALL load cell integrated data acquisition system		
Offset adjustment	Full range sensor input voltage, 8 bit	
Trigger	M=BUS system trigger via gateway	
Antialiasing filter	2.4 kHz, Bessel 6-pole	
Sample rate	20 kHz	
Resolution	16 bit	
Max. recording time	17 s per channel	
Shunt check	Yes	
Battery	Lithium-Polymer	
Data storage time	2 weeks	

Scope of Supply

- M=WALL Load Cell
- Integrated data acquisition system
- Calibration certificate for load cell and system integrated M=BUS data acquisition system

Required Additional Equipment

- M=BUS Pro Ethernet Gateway
- Customized Back Plate
- CrashSoft M=WALL

Optional Equipment

- Control cabinet
- Wooden cover plates
- CrashSoft DAS Control

CHILD PRESENCE DETECTION

| CPD Newborn Surrogate 71

| CPD 1-Year-Old Child Surrogate 72

| CPD 3-Year-Old Child Surrogate 73

| CPD 6-Year-Old Child Surrogate 74

CPD Newborn Surrogates

CHILD PRESENCE DETECTION

The CPD Newborn Surrogate is used for validating child presence detection systems by reproducing realistic newborn breathing motion and radar-representative signatures in line with Euro NCAP requirements.

- Realistic breathing pattern
- Metal-free design – no radar interferences
- Adjustable breathing rate
- Real-world representing static radar signature
- Easy operation via a mobile device using a web app
- Portable, fast and simple set-up
- All electronics, processors and control components outside of the dummy
- Cost effective solution – all dummies can be operated with the same control and supply box



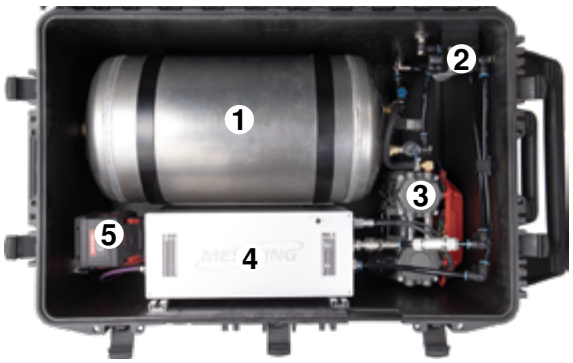


Figure 1: Control and Supply Unit opend

1 Pressure tank
2 Condensate separators
3 Compressor
4 Control unit
5 Battery connection

TECHNICAL SPECIFICATIONS

Weight	4.0 kg
Body height	550 ± 10 mm
Shoulder width	150 ± 10 mm
Head circumference	370 ± 10 mm
Chest circumference	340 ± 10 mm
Material	Plastic, soft-touch surface, metal-free
Movement pattern	**Chest and abdominal breathing:** lifting and lowering, parameters preset or userdefined
Control and Supply Unit	
Weight	32 kg
Dimensions (L x W x H)	816 mm x 540 mm x 426 mm
Power supply	Battery 18 V
Wireless communication	WLAN

Scope of Supply

- CPD Newborn Surrogate
- Child seat and restraint system (CRS)
- Control and Supply Unit (to be purchased seperately)
- Radar absorber for different radar frequencies
- Euro NCAP blanket

CPD 1-Year-Old Child Surrogate

CHILD PRESENCE DETECTION

Supports the validation of child presence detection in toddler seating configurations, enabling reliable assessment across different breathing rates, limb articulation in line with Euro NCAP requirements.

- Realistic breathing pattern matching the child's age
- Articulated limbs and head
- Metal-free design – no radar interferences
- Adjustable breathing rate
- Real-world representing static radar signature
- Easy operation via a mobile device using a web app
- Portable, fast and simple set-up
- All electronics, processors and control components outside of the dummy
- Cost effective solution – all dummies can be operated with the same control and supply box



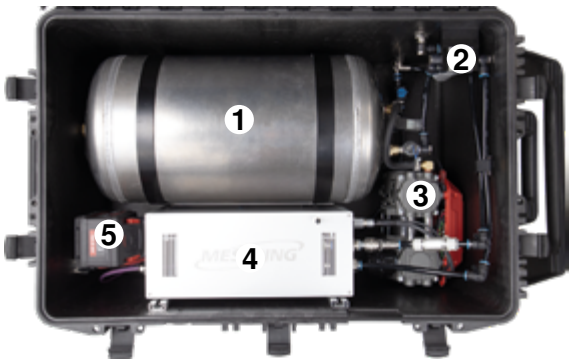


Figure 1: Control and Supply Unit opend

1	Pressure tank
2	Condensate separators
3	Compressor
4	Control unit
5	Battery connection

TECHNICAL SPECIFICATIONS

Weight	4.07 kg
Body height	727 ± 10 mm
Shoulder width	202 ± 10 mm
Head circumference	460 ± 10 mm
Chest circumference	448 ± 10 mm
Material	**Head**: plastic, smooth lacquered, metal-free **Body**: plastic, metal-free **Arms and legs**: foam, closed-pore
Movement pattern	**Chest and abdominal breathing**: lifting and lowering, parameters preset or userdefined **Head**: rotation with defined end-stop **Arms (shoulders) and legs (hips)**: up and down movement with defined end-stop
Control and Supply Unit	
Weight	32 kg
Dimensions (L x W x H)	816 mm x 540 mm x 426 mm
Power supply	Battery 18 V
Wireless communication	WLAN

Scope of Supply

- CPD 1-Year-Old Child Surrogate
- Child seat and restraint system (CRS)
- Control and Supply Unit (to be purchased seperately)
- Radar absorber for different radar frequencies
- Euro NCAP blanket

CPD 3-Year-Old Child Surrogate

CHILD PRESENCE DETECTION

Supports the validation of child presence detection in toddler seating configurations, enabling reliable assessment across different breathing rates, limb articulation in line with Euro NCAP requirements.

- Realistic breathing pattern matching the child's age
- Articulated limbs and head
- Metal-free design – no radar interferences
- Adjustable breathing rate
- Real-world representing static radar signature
- Easy operation via a mobile device using a web app
- Portable, fast and simple set-up
- All electronics, processors and control components outside of the dummy
- Cost effective solution – all dummies can be operated with the same control and supply box



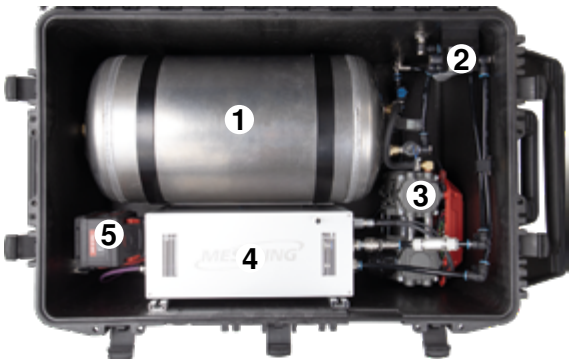


Figure 1: Control and Supply Unit opend

1	Pressure tank
2	Condensate separators
3	Compressor
4	Control unit
5	Battery connection

TECHNICAL SPECIFICATIONS

Weight	6.6 kg
Body height	990 ± 10 mm
Shoulder width	275 ± 10 mm
Head circumference	500 ± 10 mm
Chest circumference	533 ± 10 mm
Material	**Head**: plastic, smooth lacquered, metal-free **Body**: plastic, metal-free **Arms and legs**: foam, closed-pore
Movement pattern	**Chest and abdominal breathing**: lifting and lowering, parameters preset or userdefined **Head**: rotation with defined end-stop **Arms (shoulders) and legs (hips)**: up and down movement with defined end-stop
Control and Supply Unit	
Weight	32 kg
Dimensions (L x W x H)	816 mm x 540 mm x 426 mm
Power supply	Battery 18 V
Wireless communication	WLAN

Scope of Supply

- CPD 3-Year-Old Child Surrogate
- Child seat and restraint system (CRS)
- Control and Supply Unit (to be purchased seperately)
- Radar absorber for different radar frequencies
- Euro NCAP blanket

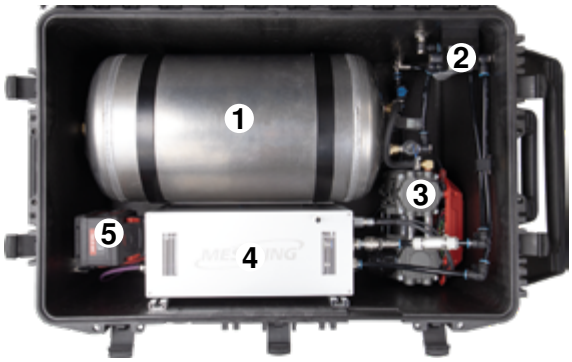
CPD 6-Year-Old Child Surrogates

CHILD PRESENCE DETECTION

Designed for advanced validation of child presence detection testing in child and booster seats, combining articulated body parts with realistic breathing motion for robust, Euro NCAP–compliant testing.

- Realistic breathing pattern matching the child's age
- Articulated limbs and head
- Metal-free design – no radar interferences
- Adjustable breathing rate
- Real-world representing static radar signature
- Easy operation via a mobile device using a web app
- Portable, fast and simple set-up
- All electronics, processors and control components outside of the dummy
- Cost effective solution – all dummies can be operated with the same control and supply box





1 Pressure tank
2 Condensate separators
3 Compressor
4 Control unit
5 Battery connection

Figure 1: Control and Supply Unit opend

TECHNICAL SPECIFICATIONS

Weight	8.3 kg
Body height	1250 ± 10 mm
Shoulder width	330 ± 10 mm
Head circumference	530 ± 10 mm
Chest circumference	635 ± 10 mm
Material	**Head**: plastic, smooth lacquered, metal-free **Body**: plastic, metal-free **Arms and legs**: foam, closed-pore
Movement pattern	**Chest and abdominal breathing**: lifting and lowering, parameters preset or userdefined **Head**: rotation with defined end-stop **Arms (shoulders) and legs (hips)**: up and down movement with defined end-stop
Control and Supply Unit	
Weight	32 kg
Dimensions (L x W x H)	816 mm x 540 mm x 426 mm
Power supply	Battery 18 V
Wireless communication	WLAN

Scope of Supply

- CPD 6-Year-Old Child Surrogate
- Child seat and restraint system (CRS)
- Control and Supply Unit (to be purchased seperately)
- Radar absorber for different radar frequencies
- Euro NCAP blanket


MAXI·COSI
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CabrioFix
MESSRING


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MESSRING

SLED TESTING

MESSRING crash facilities are prepared to conduct **Deceleration Sled Testing**. Our sled equipment offers the **full flexibility** and can be used on our proprietary equipment as well as third party sled systems. MESSRING even provides the required pulse information to successfully conduct testing. In the field of **Acceleration Sled Testing** we are especially proud of our CIS (Compact Impact Sled) system:

- **Quick and cost-optimized installation:** The CIS only requires industry-standard flooring and is screwed to the floor. No need for costly and time intensive heavy load foundations
- **Compact in Size:** The CIS has an average need of a 6 x 18 m space. No need of extra room for energy provision.
- **Highest potential test rate in the market:** Ready in just 15 minutes – the CIS delivers uninterrupted 24/7 performance with no downtime. No need for extra lengthy recharging.

MESSRING

Safer Mobility.

DECELERATION SLED TESTING

| HydroBrake 79

| M=SLED 81

| M=SLED MODULAR 82

| M=BRAKE 83

HydroBrake

DECELERATION SLED TESTING

Hydraulic programmable sled deceleration system for non-destructive reproduction of complex crash pulses

- Performs all standard component tests as well as complex crash pulses
- Initial peak prevention
- Excellent reproduction of both the deceleration pulse and velocity curve
- High accuracy
- Can be integrated into existing crash test facility



Child Seat Tests	Seat Belt Tests	Battery Tests
• ECE R44 • ECE R129 • FMVSS 213 • ADAC frontal and side impact	• ECE R16 • AK-LV106 • FMVSS 208	• ECE R100 • GB/T 31467.3-2015
Seat Tests	**Rear Impact Tests**	**Other Applications**
• ECE R80 • ECE R17 • FAR 25.562 (aircraft seat tests)	• FMVSS 202a • IIHS RCAR-IIWPG	• DIN ISO 27955 (securing of cargo)

Table 1: HydroBrake pulses, application examples (individual vehicle pulses on request)

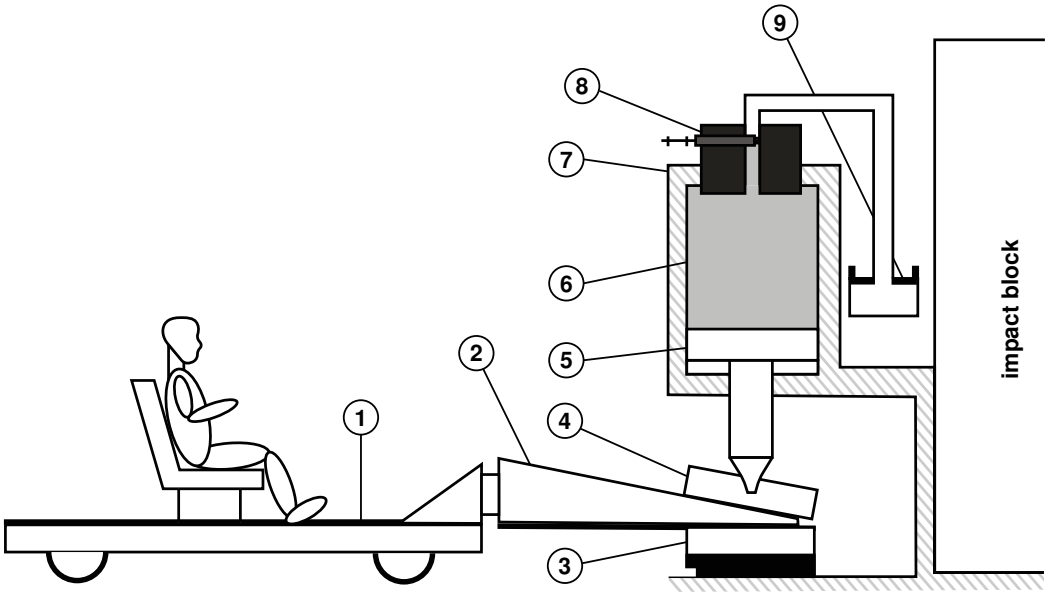


Figure 1: Functional principle of theHydrobrake

1	Sled	6	Primary volume
2	Brake wedge	7	Hydraulic cylinder
3	Bottom brake shoe	8	Servo-hydraulic valve
4	Top brake shoe	9	Expansion chamber
5	Piston		

TECHNICAL SPECIFICATIONS

Max. braking force	**2 MN**	**3.2 MN**
Deceleration examples 45 g 80 g 100 g Specifications depend on the height of the center of gravity of the sled payload and pulse length	Max. sled + payload weight 4,500 kg 2,500 kg 2,000 kg	Max. sled + payload weight 7,000 kg 4,000 kg 3,200 kg
Max. speed	80 km/h	
Pulse control	Servo valve	
Power supply	11 kVA, 380…480 VAC, 50/60 Hz, CEE 32 A	15 kVA, 380…480 VAC, 50/60 Hz, CEE 32 A
Max. jerk	15 G/ms	
Max. braking distance	1,800 mm	
Typical speed deviation for Hydrobrake pulses (see table 1)	± 0.5 km/h	
Typical acceleration deviation for Hydrobrake pulses (see table 1)	± 1 G RMS (CFC60, 0…30 G)	
Time span between two tests	< 10 min	
Dimensions (L x W x H)	1,173 mm x 2,250 mm x 1,902 mm	1,160 mm x 2,500 mm x 2,053 mm
Weight	3,943 kg	5,541 kg

Scope of Supply

- HydroBrake
- Safety guard
- Crashsoft control software

Optional Equipment

- Impact wedge
- Universal test sled
- Maintenance services

M=SLED

DECELERATION SLED TESTING

Test sled for non-destructive deceleration testing.

- Compatible with various brake systems, such as MESSRING's Hydrobrake, bending bar, PU-tube brake systems
- Guided in a track rail for smooth operation
- Individual height adjustment of each wheel to ensure smooth operation
- Lateral flange faces e. g. for camera mountings
- Mounting surfaces for measurement equipment at the rear



TECHNICAL SPECIFICATIONS

Max. force applied from brake system	3.2 MN
Max. payload	5000 kg @ 45 g 2200 kg @ 80 g 1400 kg @ 100 g Specifications depend on the height of the center of gravity
Dimensions without impact wedge / thorn (L x W)	3,200 mm x 2,000 mm
Dimensions of mounting surface (L x W)	2,800 mm x 1,800 mm Mounting grid 50 mm x 100 mm (M12)
Dimensions of mounting surface for measurement equipment (2 units) (L x W)	675 mm x 295 mm (each) Mounting grid 50 mm x 50 mm (M12)
Ground clearance (height adjustable)	88…94 mm
Track width	1,890 mm
Weight (Sled only)	1,200 kg

Scope of Supply

- M=SLED

Required Additional Equipment

- Sled guide pieces
- Release hook
- Impact wedge/thorn (depending on the brake system)
- Impact wedge/thorn adapter

Optional Equipment

- Trailing cable system with cable routing
- Sled test fixtures, e.g. according to ECE R16, R129, ADAC frontal or side impact
- M=BUS Pro data acquisition system

M=SLED MODULAR

DECELERATION SLED TESTING

Test sled for non-destructive deceleration testing with inter-changeable sled platforms.

- Modular design allows for flexible adaption to a wide range of applications and scenarios
- Compatible with various brake systems, such as MESSRING's Hydrobrake, bending bar, PU-tube brake systems
- Guided in a track rail for smooth operation
- Sled platform rotatable in 90°-steps – easy change of the test body orientation and platforms
- Mounting surfaces for measurement equipment at the rear
- Optional floodable tank for safe battery testing



TECHNICAL SPECIFICATIONS

Max. force applied from brake system	3.2 MN
Max. payload	5000 kg @ 45 g 2200 kg @ 80 g 1000 kg @ 100 g Specifications depend on the height of the center of gravity
Overall dimensions without impact wedge / thorn (L x W)	4,100 mm x 2,000 mm
Dimensions of mounting surface (L x W) standard sled platform battery sled platform	 2,800 mm x 1,800 mm 2,700 mm x 1,800 mm
Dimensions of mounting surface for measurement equipment (L x W)	1160 mm x 280 mm
Mounting grid Platform Measurement Equipment area	 100 mm x 100 mm (M12) 50 mm x 50 mm (M12)
Ground clearance (height adjustable)	82…88 mm
Track width	1,890 mm
Weight without impact wedge / thorn standard sled platform battery sled platform	 1,550 kg 1,700 kg

Scope of Supply

- Individually ordered M=SLED Modular configuration consisting of sled platform and undercarriages

Required Additional Equipment

- Sled guide pieces
- Release hook
- Impact wedge/thorn (depending on the brake system)
- Impact wedge/thorn adapter

Optional Equipment

- Customizable sled platforms
- Sled test fixtures e.g., according to ECE R16, R129, ADAC frontal or side impact
- Trailing cable system with cable routing
- M=BUS Pro data acquisition system

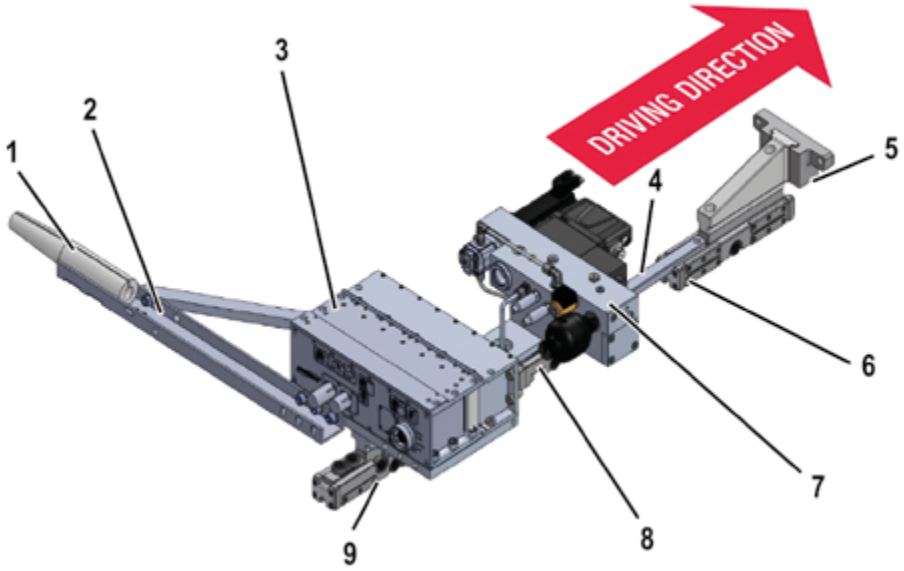
M=BRAKE

DECELERATION SLED TESTING

MicroTrack rail guided pre-crash deceleration system for realistic occupant and vehicle data analysis. Supports drive system brakes. Mounted behind vehicle or sled to provide exact braking maneuvers.

- Programmable brake profiles for realistic and gradual deceleration
- On-board control unit connected via trailing cable
- Servo-controlled
- Shockproof





1	Kink protection for trailing cables	7	Hydraulic unit
2	Trailing cable holder	8	Front end
3	M=DRIVE, battery unit optional	9	Brake cable cars
4,5,6	Coupling unit		

TECHNICAL SPECIFICATIONS

Max. braking force	45 kN
Max. braking pressure	150 bar
Brake pistons	16
Max. speed	100 km/h
Min. recommended track length	150 m, MicroTrack
Payload example	5,200 kg @ 0.8 G
Deceleration example 1	0.6 G from 100 km/h to 64 km/h
Deceleration example 2 Step 1 Step 2 Step 3	 0.1 G from 100 km/h to 95 km/h 0.3 G from 95 km/h to 80 km/h 0.6 G from 80 km/h to 64 km/h
Power supply for trailing cable cabinet	10 kVA, 380…480 VAC, 50/60 Hz
Trigger	PLC via trailing cable
Mass	85 kg

Dimensions above rail (L x W x H)	1,220 mm x 1,230 mm x 175 mm
Total length (Figure 2)	1,260 mm
Example operation with 2 extension rods:	
Approximate distance to test object	2,320 mm (depending on film pit dimension)
Total length (in rail)	3,420 mm

Scope of Supply

- M=BRAKE trolley
- Trailing cable including cabinet
- Installation and training

Required Additional Equipment

- Sled coupler or vehicle coupler

Optional Equipment

- Extension rods
- Onboard UPS
- Universal test sled
- MESSRING maintenance service
- Battery unit for M=DRIVE



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ACCELERATION SLED TESTING

| CIS Compact Impact Sled 87
| ECE R129 Sled Test Fixture 88
| ECE R16 Sled Test Fixture 89
| FMVSS 213a / 213b Sled Test Fixture 89
| ADAC Sled Test Fixture for frontal impact testing 90
| ADAC Sled Test Fixture for side impact testing 90

CIS Compact Impact Sled

ACCELERATION SLED TESTING

Servo-hydraulic accelerator sled system for non- destructive testing of vehicle components such as safety belts, seats, child seats, batteries or airbags.



- No special foundation required
- Installation on common industrial floor
- Minimal footprint – only 18 m x 2.2 m
- Complete integration of data acquisition system, lighting and many other components
- Fully factory pre-commissioned system
- Extremely fast installation – typically 3 weeks
- High test frequency – less than 10 min between tests
- Minimal maintenance costs – wear free brake system

Child Seat Tests	Seat Belt Tests	Battery Tests
• ECE R44 • ECE R129 • FMVSS 213 • ADAC frontal and side impact	• ECE R16 • AK-LV106 • FMVSS 208	• ECE R100 • GB/T 31467.3-2015
Seat Tests	**Rear Impact Tests**	**Other Applications**
• ECE R80 • ECE R17 • FAR 25.562 (aircraft seat tests)	• Whiplash (Euro NCAP, ANCAP, KNCAP, CNCAP, JNCAP) • FMVSS 202a • IIHS RCAR-IIWPG	• DIN ISO 27955 (securing of cargo) • ECE R144 (eCall systems)

Table 1: CIS pulses, application examples (individual vehicle pulses on request)

TECHNICAL SPECIFICATIONS

Max. force	0.8 MN
Max. speed	80 km/h
Max. payload	1,500 kg
Max. stroke	1,200 mm
Max. acceleration	80 G
Max. jerk	15 G/ms
Pulse control	Servo valve
Power supply	45 kVA, 380…480 VAC, 50/60 Hz
Footprint (L x W)	18 m x 2.2 m
Sled platform dimensions (L x W)	2.20 m x 1.4 m Mounting grid 50 mm x 100 mm (M12)
Installation height (options)	1.97 m (on grade) 1.5 m (below grade)
Number of trigger outputs	7
Time span between two tests	< 10 min
Typical speed deviation for CIS pulses (see table 1)	± 0.5 km/h
Typical acceleration deviation for CIS pulses (see table 1)	± 1 G (CFC60)

(Due to the inter-related nature of sled performance specifications, it may not be possible to simultaneously achieve each maximum. MESSRING technical experts can help you determine the feasibility of each pulse individually.)

Scope of Supply

- CIS (Compact Impact Sled)
- M=BUS Pro Data Acquisition System for 8 analog channels
- Accelerometer (2000 G)
- Control-PC and software

Optional Equipment

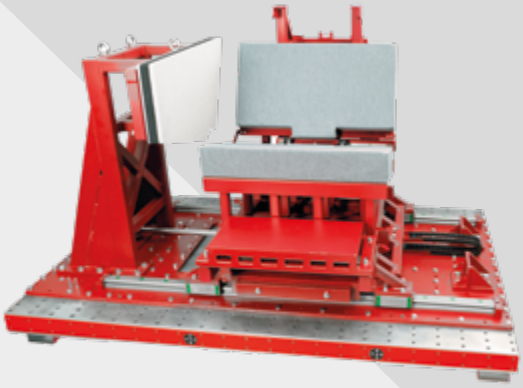
- M=LIGHT LED lighting system
- M=CAM high-speed cameras (on-/offboard)
- M=BUS data acquisition system
- Sled Test Fixtures, e.g. according to ECE R16, R129, R44, ADAC frontal or side impact
- Low-G module for Whiplash test
- Maintenance and calibration services

ECE R129 Sled Test Fixture

ACCELERATION SLED TESTING

First sled on sled system to perform child seat sled tests according to the ECE R129 test protocol from 2018 with an accelerator sled system.

- Designed for accelerator sled systems
- Integrated hydraulic damper simulates the required relative speed between door panel and seat itself
- Short changeover times between side, front and rear test
- Height of footrest adjustable in 3 steps



TECHNICAL SPECIFICATIONS

Weight	986 kg – 1,008 kg*
Fixation points for child seat	ISOFIX, top-tether, safety belt
Mounting grid	50 mm x 100 mm (M12)
Dimensions (L x W x H)	2,230 mm x 1,350 mm x 1,239 mm

* Dimensions and weight deviate slightly according to side-, front- and rear-test

Facility Requirements

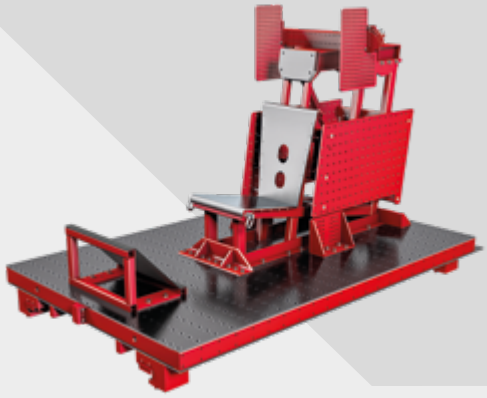
Sled system	Accelerator sled system (for compatibility with decelerator sled systems please contact our sales department)

ECE R16 Sled Test Fixture

ACCELERATION SLED TESTING

Sled test fixture for testing seat belts according to the ECE R16 test protocol.

- Designed for accelerator or decelerator sled systems
- Comfortable attachment of seat belt
- Compatible with all MESSRING sled platforms



TECHNICAL SPECIFICATIONS

Weight	232 kg
Dimensions with mounted foot rest (L x W x H)	2,143 mm x 855 mm x 1,268 mm
Mounting grid seat belt buckle	50 mm x 100 mm (M12)
Mounting grid redirection point	50 mm x 100 mm (M12)

FMVSS 213a / 213b Sled Test Fixture

ACCELERATION SLED TESTING

Sled Test Fixture for testing lateral impacts on child seats according to the FMVSS 213a and 213b impact test protocol.

- Comfortable attachment of child seats
- Test of ISOFIX/LATCH child restraint systems
- Compatible with all MESSRING sled platforms
- Usable on accelerator systems



*Image shows **FMVSS 213a**

TECHNICAL SPECIFICATIONS

	FMVSS 213a	FMVSS 213b
Weight	450 kg	142 kg
Dimensions (L x W x H)	720 mm x 931 mm x 926 mm	720 mm x 930 mm x 930 mm
Mounting grid	50 mm x 100 mm (M12)	50 mm x 100 mm (M12)

ADAC Sled Test Fixture for frontal impact testing

ACCELERATION SLED TESTING

Sled fixture for testing frontal impacts on child seats according to the ADAC test protocol.

- Designed for accelerator or decelerator sled systems
- Comfortable attachment of child seats
- Compatible with all MESSRING sled platforms



TECHNICAL SPECIFICATIONS

Weight	411 kg
Dimensions of car body (L x W x H)	2,280 mm x 1,700 mm x 1,130 mm
Dimensions of mounting platform (L x W)	2,236 mm x 1,395 mm
Mounting grid	50 mm x 100 mm (M12)
Car body type	According to the current specifications from ADAC

ADAC Sled Test Fixture for side impact testing

ACCELERATION SLED TESTING

Sled fixture for testing lateral impacts on child seats according to the ADAC 10°side impact test protocol.

- Designed for accelerator sled systems
- Comfortable attachment of child seats
- Test of ISOFIX child-restraint systems
- Integrated hydraulic damper simulates the required relative speed between door panel and seat itself



TECHNICAL SPECIFICATIONS

Weight	833 kg
Dimensions with mounted foot rest (L x W x H)	2,230 mm x 1,323 mm x 1,212 mm
Mounting grid	50 mm x 100 mm (M12)


MAXI-COSI
MESSRING
276 kg


LIGHTING SYSTEM
TEST COMPONENTS
FACILITY


SOFTWARE
DAS/SENSORS
CAMERA
SLED SYSTEMS


MESSRING



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Safer Mobility.

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