

AUTOMOTIVE ***SUMMIT 2014***



System Solutions for Vehicle Safety

Vehicle Safety Systems and Solutions

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Kistler Southeast Asia



AUTOMOTIVE SUMMIT 2014

19-20
June 2014

BITEC • Bangkok
Thailand

KISTLER
measure. analyze. innovate.

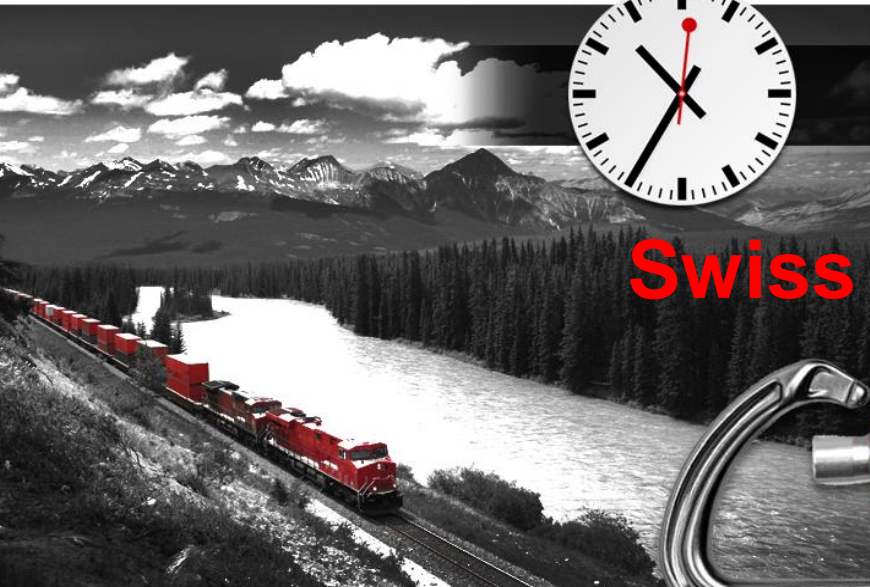


Swiss taste



Swiss quality

Let's make a short trip to Switzerland



Swiss reliability



Swiss precision

Kistler Group

Family enterprise in Switzerland

53 locations

1'263 employees worldwide

523 in Switzerland

392 in Germany

8 Production Centers

55 years of
technology experience

Global Presence

10 Competence Centers

24 Sales Centers

70 % of sales in
automotive industry

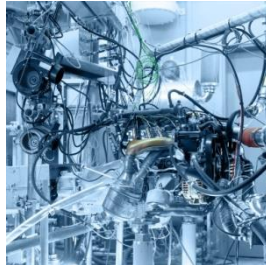
3 Tech Centers

6 Tech Offices



Kistler. One Group. Three divisions.

Automotive Research & Testing (ART)



Engines R&D



Engine M&S



Vehicle D&D



Vehicle Safety

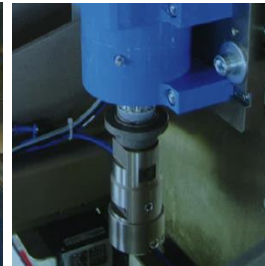
Industrial Process Control (IPC)



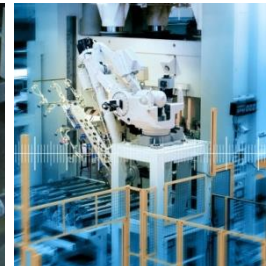
Plastics



Customer
Solutions



Joining System
Business

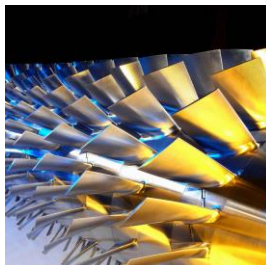


Production
Monitoring

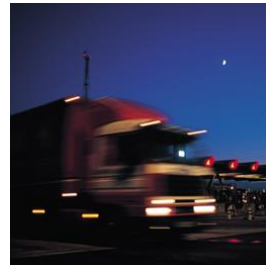


Test Stands

Sensor Technology (ST)



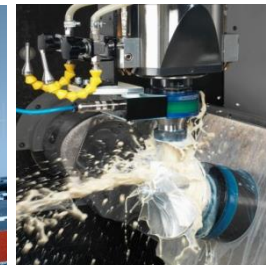
Business
Development



Road & Traffic



Biomechanics



Cutting Force



Test &
Measurement

Application – Vehicle Safety

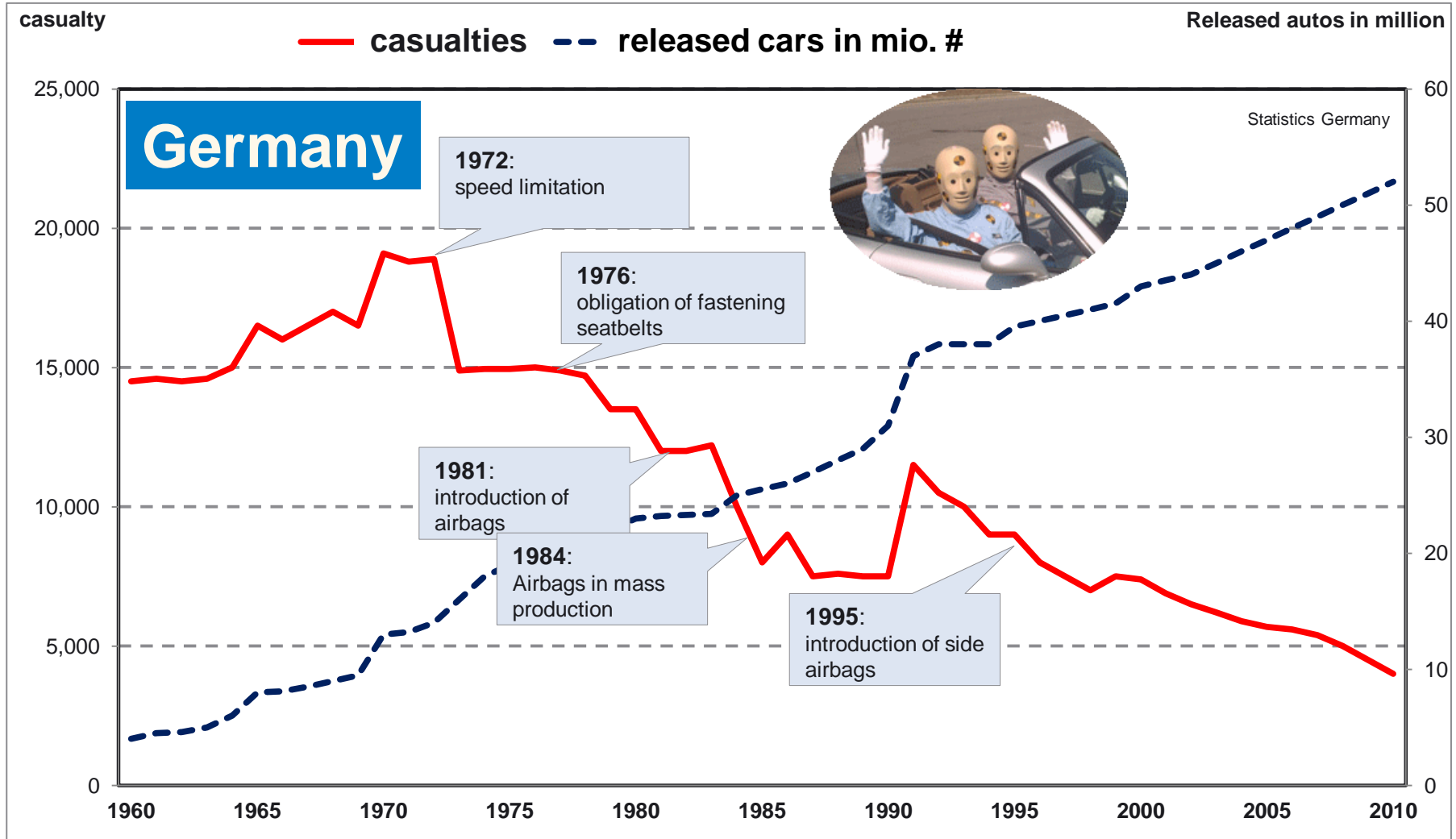


Kistler helps to optimize the vehicle safety

Technologies for:

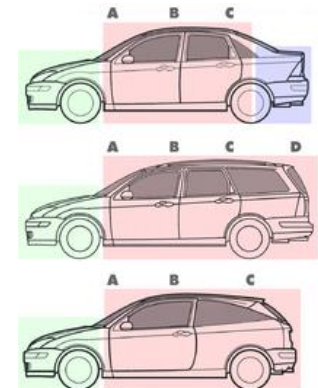
- Data Acquisition Systems
- Crash Test Instrumentation
- Crash walls
- Related services

Do you know ... since 1970 the number of cars increased by a factor of four. At the same time the number of casualties decreased by the same factor in Germany



Trends in Vehicle Safety

- Changing vehicle demographic:
 - Smaller and lighter vehicles
 - More vehicle variants
- Vehicle safety is increasingly important
 - Strong drive to increase number of restraint systems
- Vehicles become more connected
 - Additional electronic systems and in-vehicle communication
- Crash testing is becoming progressively complex
 - More stringent regulations & testing procedures (E-NCAP, ...)
 - Shorter vehicle development cycles
 - Use of computer aided engineering requires more test channels
 - More complex, biofidelic, Anthropomorphic Test Devices (i.e. Dummies)



Kistler Solutions

Data Acquisition

- Data Acquisition systems with minimal weight or a zero weight penalty
- Data Acquisition systems with smaller footprint or zero footprint
- Record vehicle system communications
 - CAN-bus recorder
- User benefits:
 - Have higher channel counts inside a vehicle (record more data)
 - Improve crash testing efficiency
 - Ultimately improve CAE modeling and reduce test costs

Kistler Solutions – Data Acquisition

- Complete family of smaller and lighter systems



MiniDAU
Advanced



MiniDAU



KiDAU
Advanced



KiDAU



nxt32



DTI

Kistler Solutions

Data Acquisition - Analog

■ MiniDAU®-Series

- Launched in 1995
- #1 in On-Board DAS market
- Worldwide market share >70%

■ Main features:

- Ethernet 10Base2
- 32 analog channels
- Sampling rate max. 20 kHz
- Programmable gain 1 ... 10000
- Bridge supply 2.5V, 5V, 10V
- Sense Line + ID chip
- Sampling time 52s @ 20 kHz
- Integrated battery for 20 minutes



80000+ MINIDAU® series channels
sold by Kistler



Kistler Solutions

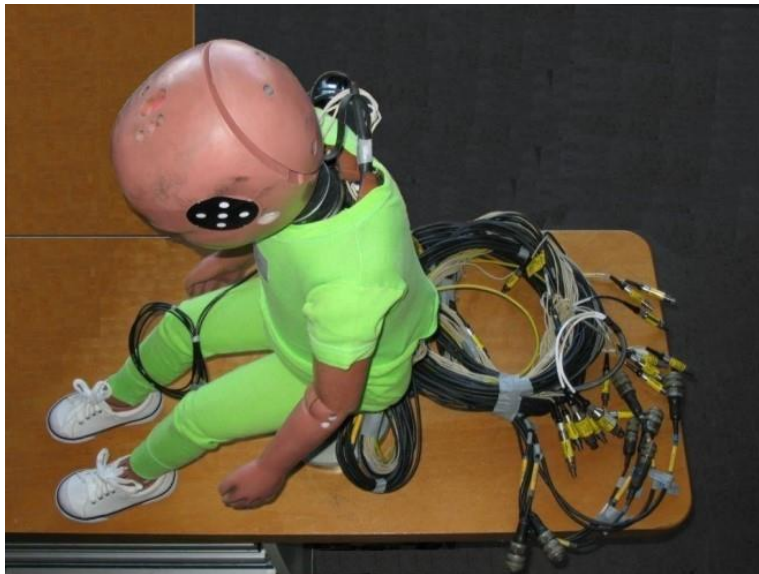
Data Acquisition - Analog

- KiDAU Series
- 63% less volume than Minidau
- 51% footprint than Minidau
- 50% less mass than Minidau
- More functionality
 - CAN-bus
 - Wireless
 - Constant current
 - Board excitation range



Kistler Solutions Data Acquisition - Digital

■ In-Dummy DAS



18000+ In-dummy channels
sold by Kistler



Kistler Solutions

Dummy Instrumentation

- Extensive experience in vehicle safety instrumentation since 1998
- Dummy instrumentation is balanced on the measuring point and matches the biomechanics requirements in weight, center of mass and moment of inertia
- Load cells and accelerometers for dummy and vehicle application in range of products/services
- Most instrumentation is equipped with special cable with very low microphonic effect to improve of overall sensor performance

Kistler Solutions

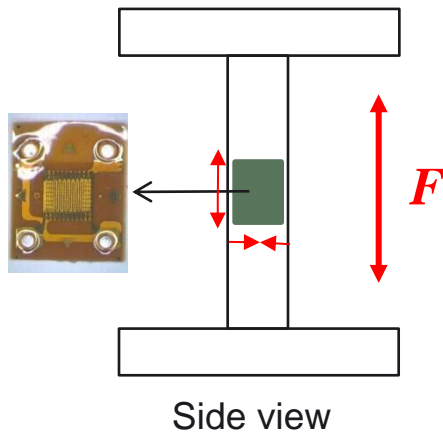
Load Cells, Accelerometers, Dummy Sensors

Portfolio	# of axes	H3-05	H3-50	H3-95	Thor	H3-10YO	H3-6YO	H3-3YO	CRABI	ES-2	ES2(RE)	SID-2s	WS-50	WS-05	Q-series	Q-10	P-series	BioRid
Upper Neck	6	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	
Lower Neck	3/6		x	x				x		x	x	x	x	x	x	x		
Lower Neck, adjustable	6		x	x														
Shoulder	3									x	x	x	x	x				
Arm	6												x					
T1	3																	x
Back Plate	4									x	x							
Thoracic spine	5		x															
T12	4									x	x							
Abdomen	1									x	x							
Lumbar spine	3/5/6	x	x	x			x	x		x	x	x	x	x	x	x		
Sacro-Iliac	12												x	x				
ASIS	2	x					x	x										
Acetabulum	1											x						
Iliac Wing	1											x						
Pubic	1									x	x	x	x	x				
Femoral Neck	3												x	x				
Femur	1/6	x	x	x		x	x			x	x	x	x	x				
Knee	1												x	x				
Clevis	2	x	x	x														
Upper Tibia	4/5	x	x	x	x							x	x	x				
Lower Tibia	4/5	x	x	x	x							x	x	x				

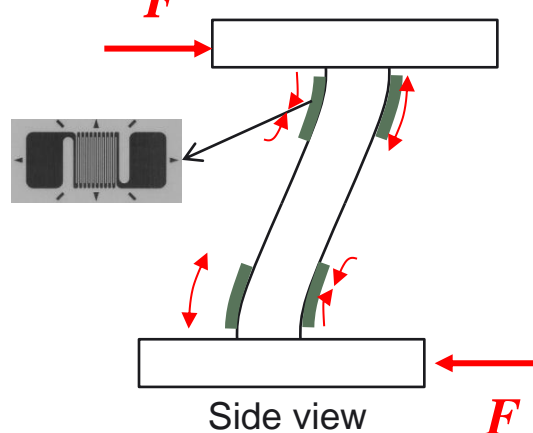
Kistler Solutions Load Cells

Forces :

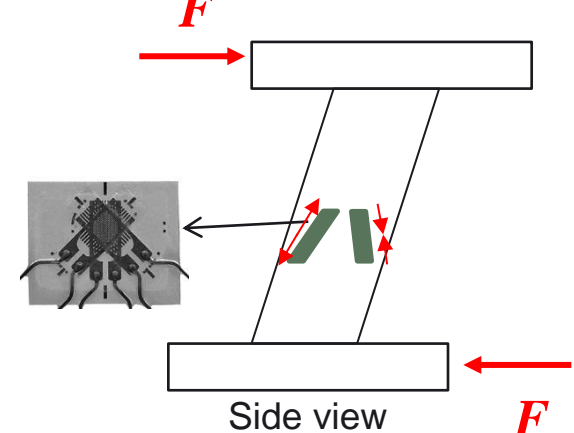
Elongation/Compression



S-bending beam

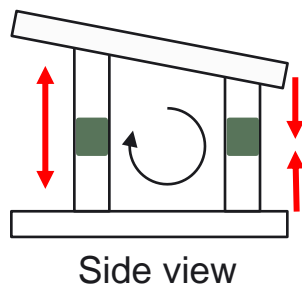


Shear force

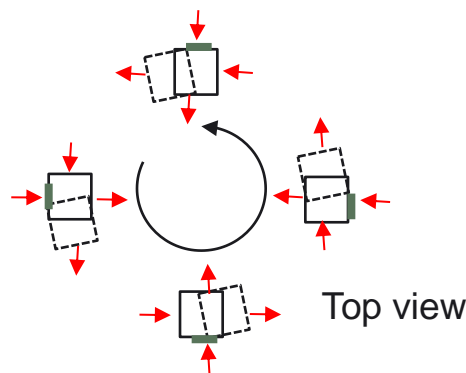


Moments:

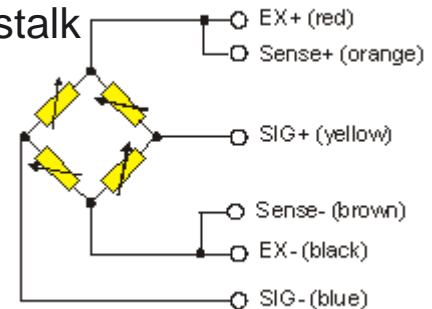
M_x and M_y



M_z



Each channel has own
bridge wiring to compensate
crosstalk



Kistler Solutions Accelerometers

■ Types

- Low-cost



- ATD



- Damped



- Vehicle



- Number of sensor types include Kistler proprietary low-noise cable

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FIAT S.p.A. (Italy)
August 2007**

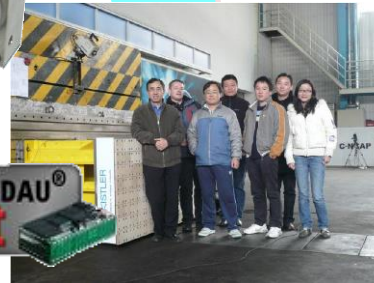
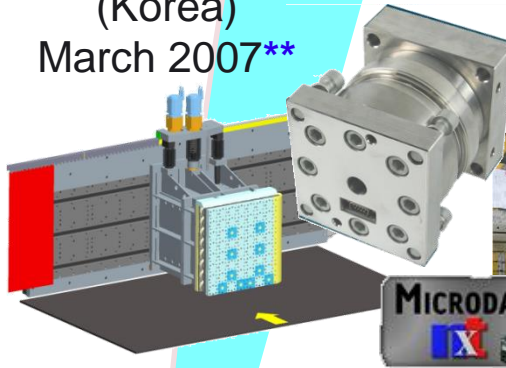


Daimler AG (Germany)
November 2008**



HYUNDAI KIA
(Korea)
March 2007**

TÜV Süd Auto CZ
(Czech Republic)
February 2009**



PSA Peugeot-Citroën
(France)
Oct. 2006**

CATARC (China)
March 2010**



BMW Group (Germany)
March 2005**

APIC (Korea)
June 2011**



AUDI AG (Germany)
August 2004**



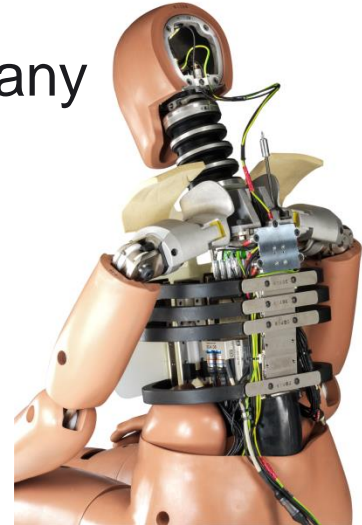
SmartCrash® Technique

** date of commissioning

Kistler Services

- The experts within Kistler are able to provide the many services in the field of Vehicle Safety:
 - Calibration services
 - Repair services
 - (ATD) Integration services

- Through product range and knowledge, Kistler is able to provide, in cooperation with industry partners, turn-key solutions for complete crash facilities



**Competence Center
Heidelberg**

**Tech Center Tokyo
Tech Center Shanghai**

Kistler Customers

North & Central America

- n PMG
- n Applied Research
- n Autoliv
- n Breed
- n Carr Engineering
- n Calspan
- n Chrysler
- n Delphi
- n Denton
- n Ford
- n General Dynamics
- n GESAC
- n Key Safety
- n MGA Research
- n Humanetics
- n Takata
- n Toyota Technical
- n TRC
- n Wayne State Uni.
- n VW Mexico

Brazil

- n VW do Brasil

United Kingdom

- n DERA
- n Ford
- n Jaguar
- n Lotus
- n MIRA
- n Millbrook
- n Thatcham
- n TRL
- n Britax

France

- n Autoliv
- n Faurecia
- n PSA
- n Renault
- n UTAC
- n LIER
- n Valutec
- n TeamTex
- n CESVI

Spain

- n CTAG
- n IDIADA
- n INTA

Germany

- n ACTS
- n Allianz
- n Audi
- n Autoliv
- n BAST
- n BMW
- n Brose
- n Britax Römer
- n Continental
- n Daimler
- n DEKRA
- n Delphi
- n Ford
- n ika Aachen
- n JCI
- n Keiper
- n Key Safety
- n Lear
- n Opel
- n Porsche
- n TRW
- n TU Berlin
- n Uni Heidelberg
- n Volkswagen
- n WTD91

Netherlands

- n TASS

Sweden

- n Autoliv
- n SP
- n Volvo

Austria

- n Magna Steyr
- n Uni Graz
- n Concept
- n DSD

Romania

- n DACIA
- n Takata

Turkey

- n METU

Czech Rep.

- n Skoda/TÜV
- n VTUO Brno
- n AZOS

Poland

- n WitPis

Russia

- n Autovaz

Japan

- n Autoliv
- n Honda
- n JARI
- n JCI
- n JMOT
- n Nissan
- n NTSL
- n Toyota

Korea

- n GM-DAT
- n Hyundai
- n KATRI
- n RSM
- n APIC

Malaysia

- n Proton

Singapore

- n ST Kinetics

India

- n ARAI
- n TATA
- n NATRIP

Australia

- n GM-Holden
- n RTA

China

- n Autoliv
- n Brilliance
- n CATARC
- n CATC/CAERI
- n ChangAn Auto
- n Dong Feng
- n East Joylong
- n FAW
- n FAWAY-JCI
- n FAW-VW
- n GATC
- n GM PATAC
- n I610
- n I623
- n I702
- n JAC
- n JCI
- n Jinheng
- n Luckybaby
- n Key Safety
- n Protech
- n NAST
- n SAIC
- n SMVIC
- n SVW



THANK YOU