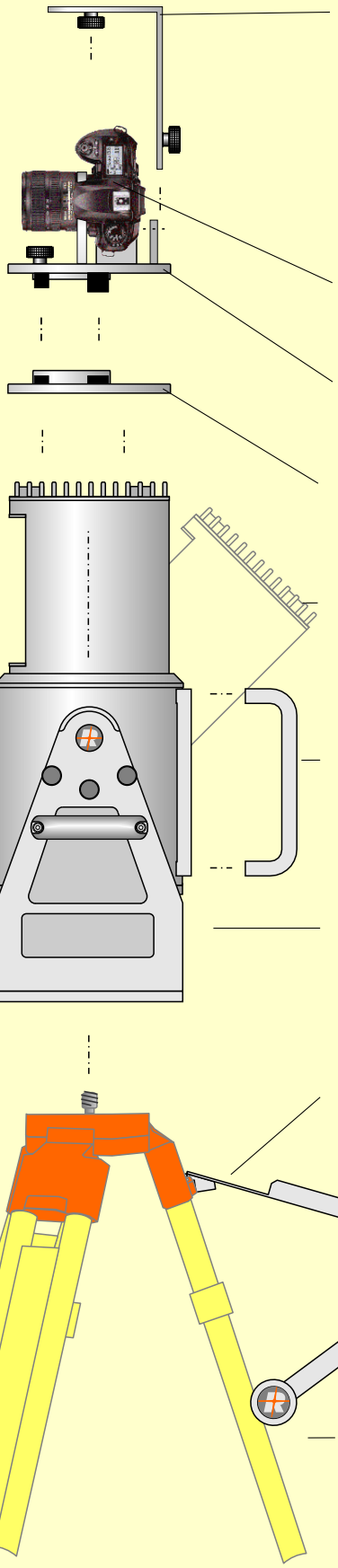
RIEGL SYSTEM CONFIGURATION 3D TERRESTRIAL SCANNER LMS-Z420i



Holder for GPS antenna, detachable,
for Nikon D70s / Nikon D100 / Nikon D200
camera mount
Part-No. 02RA09-00-009-00
or
for Canon EOS 1Ds Mark II camera mount
Part-No. 02RA09-00-011-00
or
for Canon EOS 20D camera mount
Part-No. 02RA09-00-013-00

High Resolution Digital Camera with accessories
(for details see camera configuration)

High-Precision Camera Mount detachable
(for details see camera mount configuration)

Base plate for mounting the high-precision camera mount (or the telescope)
Part-No. 02RA09-00-005-00

Scanner Basic Configuration LMS - Z420i
(for details see page 2)
Part-No. 12R09-00-100-01

Handgrip (detachable) in the price of the basic configuration included

Scanner mount for manual tilt, improved version, damped tilting mechanism, adjustable in steps of 5° up to ±90°
Part-No. 01RA09-00-002-01

Holding device for Laptop, adjustable, fitting onto tripod
Part-No. 07RA09-00-001-00

Stable, professional tripod
Part-No. 02Z01-03-001-00

Tripod star for smooth surfaces
Part-No. 02Z01-03-002-00

Scanner Basic Configuration: Part-No. 12R09-00-100-01

3D Terrestrial Scanner Hardware LMS-Z420i Part-No. 12R09-00-001-00

High performance 3D Laser Scanner,
specifications according to the latest **datasheet LMS-Z420i**

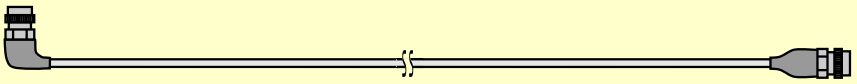
Vertical tripod mount Part-No. 04RA09-00-002-00

Interfaces, integrated

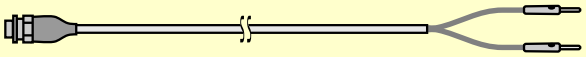
- TCP/IP Interface, providing smooth integration of the LMS-Z420i data into a 10/100 MBit/sec, twisted-pair (TP) Local Area Network (LAN). The interface acts as a server allowing remote configuration and data acquisition via a platform-independent TCP/IP (Ethernet) Interface.
- ECP parallel data Interface
- RS232, 19.2 kBd for scanner configuration via PC or laptop

Cables

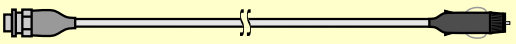
- Part-No. 02Z03-01-025-00 TCP/IP Cable M12-M12, 0.3 m
- Part-No. 02Z03-02-003-00 TCP/IP Cable M12-M12, 3 m
- Part-No. 02Z03-01-001-00 TCP/IP Cable M12-RJ45, 0.3 m
- Part-No. 02Z03-01-002-00 TCP/IP Cable M12-RJ45 cross over, 0.3 m
- Part-No. 02Z03-02-001-00 Serial Data Cable, RS232, 3 m
- Part-No. 02Z03-02-002-00 Parallel Data Cable, ECP, 3 m
- Part-No. 16R09-06-008-00 Power Supply Cable, 7 pole connector, 3 m



- Part-No. 16R09-06-002-00 Adapter Cable, 1 m, from power supply cable to banana plugs



- Part-No. 16R09-06-004-00 Adapter Cable, 1 m, from power supply cable to cigarette



Retroreflectors

- 100 pcs. of flat circular retroreflectors, white, diameter 50 mm Part-No. 08R04-07-010-00
- 5 pcs. of flat circular retroreflectors, white, diameter 100 mm Part-No. 08R04-07-016-00

Scanner Basic Configuration continued next page

License RiSCAN PRO Operating Software Part-No. 02Z06-02-001-00

- The companion software package to the *RIEGL* LMS-Z series
- Allows the operator to perform a large number of tasks:
  - Sensor configuration:
    - Panorama scan
    - Detail scan with reduced field of view & high resolution
    - Reflector scan in oscillating mode
    - First/Last target selection
  - Scan data acquisition via TCP/IP or RiPORT driver
  - Data archiving
  - Registration of the scan data into global coordinate system
  - Pointcloud data visualization in 2D or 3D, true color or color coded
  - Object View/Inspector for data viewing and feature extraction
  - Calculation of volumes and surface areas
  - Calculation of user defined animations within object view
  - Semi automatic triangulation of unified pointclouds
  - Smooth and decimate meshes
  - Automatic high resolution texturing of global meshes
  - Support of global aligned aerial images
  - Automatic calculation of high resolution panorama images
- Using a well-documented tree structure for comfortable access and clarity
- Project oriented, XML file format
- For operating systems WINDOWS XP (recommended), NT SP4, 2000 SP2 or above

License RiScanLib OFFLINE Scan Library Part-No. 02Z06-02-002-00

- The basic version of the RiScanLib allows the software developer the offline scan data decoding from a 3dd file. This library will assist the software developer in writing an own software application. Since the RiScanLib is based on COM technology it can be used in many programming languages. It consists of several DLL's for scan data decoding.
- "Visual C++" example and full documentation is included
- For operating systems WINDOWS XP (recommended), NT SP4, 2000 SP2 or above

License RiPORT Driver (included within RiSCAN PRO) Part-No. 02Z06-02-003-00

- Low-level data acquisition via ECP on PC platform
- Code examples for C++
- For operating systems WINDOWS XP (recommended), NT SP4, 2000 SP2 or above

Firmware maintenance for 12 months Part-No. 02Z06-05-007-00

- Free software updates

RiSCAN PRO Software maintenance for 12 months Part-No. 02Z06-05-001-00

- Free software updates
- E-mail and telephone support

User's Manual (in English language)

"Technical Documentation & User's Instructions"
including, between other things, instructions for: Safety, Installation, Operation, etc.

Scanner Basic Configuration Package Part-No. 12R09-00-100-01

Services:

Two-day training Part-No. 02Z06-03-001-00

Regarding the hardware as well as the operating software RiSCAN PRO. The training will be held either at our site in Horn, Austria, or at your site (travelling and accommodation expenses to be added).

Intensified additional training Part-No. 02Z06-03-003-00

Covers advanced working with the scanner hardware as well as processing of the acquired data with RiSCAN PRO.
Price per 8 hours working day (travelling expenses to be added).

Digital Camera Calibration Service for up to three camera lenses

Part-No. 02Z01-01-016-00

Provides complete set of camera calibration parameters for use in RiSCAN PRO including internal calibration, lens distortion parameters and mounting calibration parameters. Parameters are delivered within a RiSCAN PRO project. Calibration statistics included (available for camera-lens combinations as recommended by *RIEGL* LMS).

Scanner Hardware Options:

Inclination Sensors Part-No. 02Z07-03-001-00

For straightforward and efficient registration of large data projects, *RIEGL* Terrestrial Laser Scanners can be optionally equipped with integrated inclination sensors.
RiSCAN PRO makes complete use of the additional sensor data within its backsighting functions.

- smoothly integrated into the *RIEGL* TLS hardware
- utilization of inclination data by RiSCAN PRO's backsighting functions
- angular correction applicable for vertical and horizontal scanner setup position
- angular working range ± 5 deg
- accuracy typ. ± 0.1 deg

Internal Sync Timer for External GPS/INS Synchronization

Internal Sync Timer Part-No. 02Z07-04-001-00

The scanner optionally offers a time-stamping mechanism to add real-time-clock information to each laser range measurement. Taking full advantage of this feature needs

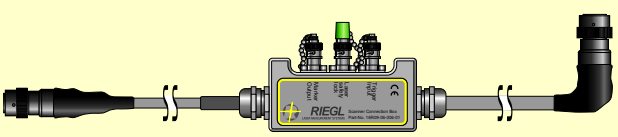
- a GPS synchronization output line, sending SYNC pulses in periods of 1 second (1 PPS), permanently connected to a scanner input line (Trigger input).
- the GPS serial RS232 port connected to a PC controlling the scanner for time synchronization purposes prior to scan data acquisition or for synchronization checks.

Both SYNC pulse as well as RS232 interface are standard for GPS receivers.

Technical implementation:
The scanner provides a counter value (SYNC-Counter) and a timer value (SYNC-Timer) supplied with the scan data.
The SYNC-Counter is incremented with each TTL pulse detected on a scanner input line.
This pulse is typically supplied by a GPS receiver, occuring each second and indicating the change of the second (SYNC pulse). The SYNC-Timer has a resolution of 10 microseconds. As designed, the TTL pulse on the input line also clears the SYNC-Timer. Therefore, when connected to a GPS, the SYNC-Timer always counts the number of 10 microseconds since the last GPS second pulse on the input.
The SYNC-Counter can be preset to a value via a software command. A synchronization procedure, executed once before scans are started, can therefore read GPS data strings via the RS232 port, interpret it, and preset the counter to the appropriate second value of the next GPS SYNC pulse.
Once synchronized, the SYNC-Counter provides the current real time second and the SYNC-Timer represents part of the following second with a resolution of 10 microseconds.

Special Power Supply Cable Part-No. 16R09-06-006-01

Special power supply cable for external connection and reset of the internal sync timer.



Further Software Modules:

Free software updates and e-mail/telephone support for 12 months included.

License RiSCAN PRO Plugin Camera Module Part-No. 02Z06-02-005-00

Calibrated and orientated image acquisition via USB or IEEE 1394 "firewire".
Provides the access to the features of RiSCAN PRO related to the use of high-resolution digital images such as:

- Calibrating a specific camera body and lens combination
- Texturing decimated meshes with high-resolution images

License RiSCAN PRO Plugin Multi Station Adjustment Module Part-No. 02Z06-02-022-00

- Advanced registration based on overlapping pointclouds
- Advanced registration and adjustment based on tiepoints, controlpoints
- Advanced registration and adjustment based on additional plane information

License RiSCAN PRO Plugin Orthophoto Module Part-No. 02Z06-02-006-00

This plugin enables the user to create True-Orthophotos from scan data and image data. (including depth information and orientation within project).
The RiSCAN PRO Plugin Camera Module is required.

License AUTOCAD Plugin ScanDig3D PRO Part-No. 02Z06-02-008-00

ScanDig3D is the choice whenever 3D scanner derived True-Orthophotos, created by RiSCAN PRO plugin Orthophoto, are to be processed with AUTOCAD 2004, 2005, 2006. Administrates True-Orthophotos and digitized data within a clearly arranged XML treeview.
Software updates and support will be provided directly by Christe Stejskal KEG Geoinformatics Consultant (www.scandig3d.com, support@scandig3d.com).

License RiSCAN PRO Plugin Hybrid Multi-Station Adjustment Module

Part-No. 02Z06-02-007-00

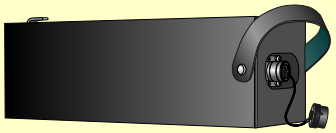
Based on ORIENT (Institute of Photogrammetry and Remote Sensing, Technical University Vienna). Minimizes the overall error by simultaneous adjustment of all Scan Positions in RiSCAN PRO combining various observations as reflective signals in laser data, arbitrary signals in high-resolution images (only available with Plugin Camera Module), control points from external measurements (e.g. total station or DGPS). Especially advantageous in registration tasks of long linear acquisition areas and/or chained acquisition sequences or arbitrary combinations of both.

License RiScanLib ONLINE Scan Library Part-No. 02Z06-02-004-00

The online version of the RiScanLib library assists the software developer in writing an own software application for an LMS-Zxxx scanner, i.e. to control the scanner and to acquire scan data online via TCP/IP or parallel port.
Since the RiScanLib is based on COM technology it can be used in many programming languages. It consists of separate DLL's for scanner configuration, reflector extraction, and scan data decoding.
“Visual C++" example and full documentation is included.
For operating systems WINDOWS XP (recommended), NT SP4, 2000 SP2 or above.

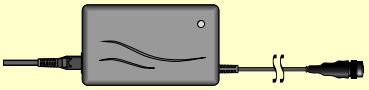
Power Supply Modules:

Rechargeable NiMH Battery
13.2 V, 18 Ah, with fuse, weight 3.55 kg



Part-No. 02Z05-02-004-00

Automatic Charger
100 - 240 V AC, short circuit proof,
weight 0.4 kg



Part-No. 02Z05-03-005-00

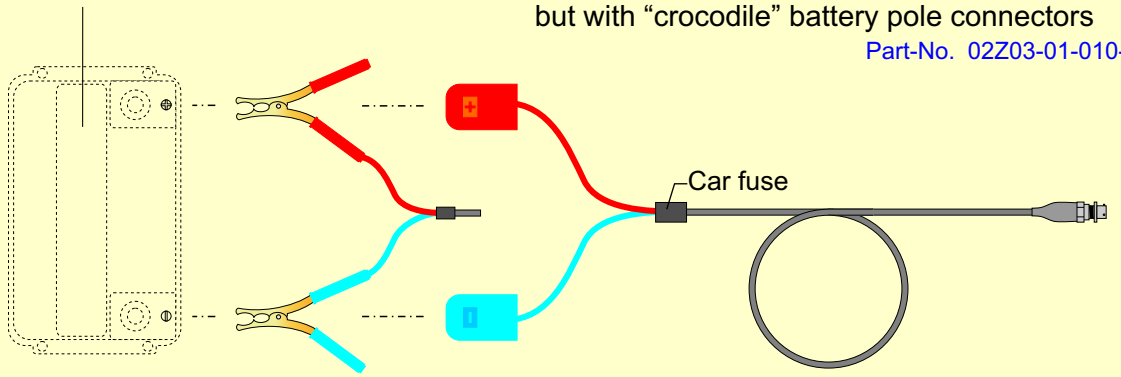
Adapter Cable, 1 m, from 7 pole power supply cable to 12 V PbGel battery
with “quick action” battery pole connectors

Part-No. 02Z03-01-009-00

12 V PbGel Battery

Adapter Cable as above,
but with “crocodile” battery pole connectors

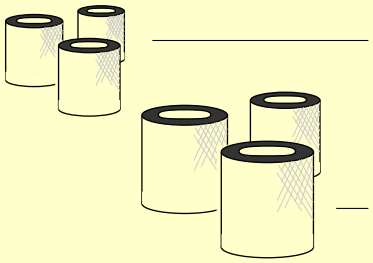
Part-No. 02Z03-01-010-00



AC Power Supply Unit
Input 100 - 240 V AC, 50 - 60 Hz, output 15 V DC, 7.5 A, weight 1.4 kg

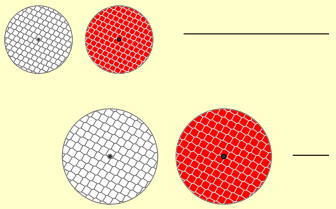
Part-No. 02Z05-03-003-00

Reflectors:



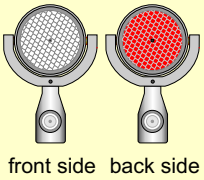
Cylindrical Retroreflectors, [1]
height 50 mm x diameter 50 mm each, hole diameter 24.3 mm
Part-No. 08R04-07-006-00

Cylindrical Retroreflectors, [1]
height 100 mm x diameter 100 mm each, hole diameter 24.3 mm
Part-No. 08R04-07-009-00

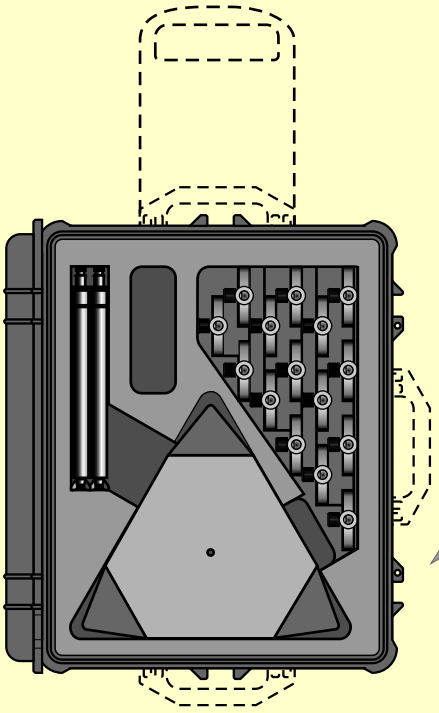


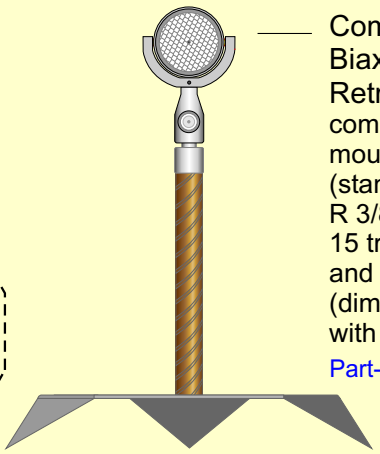
Flat Circular Retroreflectors, [2]
centre hole diameter 3 mm, self-adhesive

diameter 50 mm, white
Part-No. 08R04-07-010-00
diameter 50 mm. red
Part-No. 08R04-07-014-00
diameter 100 mm, white
Part-No. 08R04-07-016-00
diameter 100 mm, red
Part-No. 08R04-07-029-00



Biaxial Bireflex Flat Circular Retroreflectors, [2]
plastic reflector support, mounted on universal joints,
with foil coating on both sides
(diameter 50 mm, centre hole diameter 3 mm)
Part-No. 02Z01-04-001-00





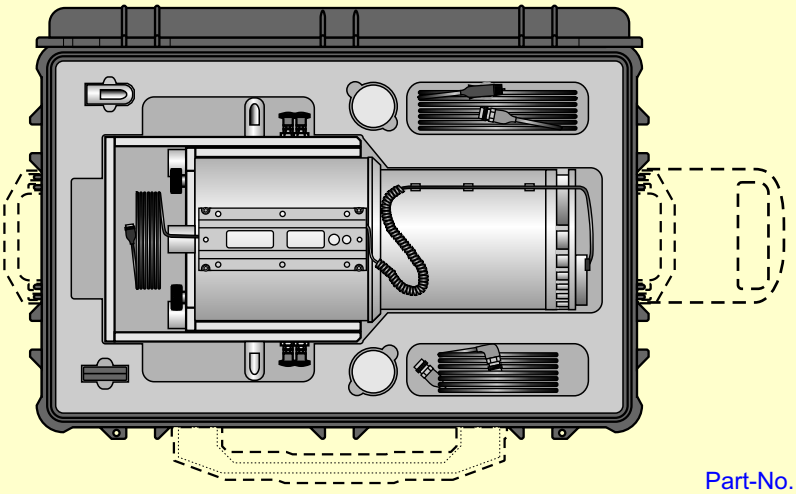
Complete Set of
Biaxial Bireflex Flat Circular
Retroreflectors, [2]
comprising 15 retroreflectors
mounted on convergence bolts
(standard length 250 mm,
R 3/8” threads),
15 triangle support feet,
and a stable carrying case
(dimensions: 624 x 490 x 303 mm)
with 4 hinged handgrips and wheels.
Part-No. 02Z01-04-100-00

Notes:
1. High transportation costs because of the high weight.
2. Can be delivered within EUROPE only.

[1] Intended for prior surveying by DGPS. Cylindrical retroreflectors to be mounted in vertical orientation only.
[2] Intended to be used with totalstation (theodolite) as control points in RiSCAN PRO and RiPROFILE projects!

Carrying Cases:

Heavy-duty **Scanner Carrying Case CC-Z420i** with 4 hinged handgrips and wheels, splash-water proof, foam-lined to fit shape of LMS-Z420i, mount for manual tilt and cables.
Dimensions: 820 x 520 x 290 mm

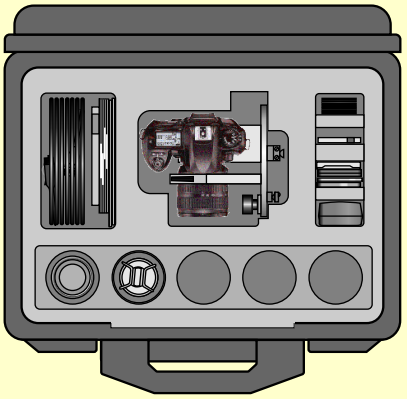


Part-No. 02Z05-01-006-00

3 pcs. additional foam-inserts for the scanner carrying case, to be used if the scanner is not equipped with the manual tilt mount.

Part-No. 02Z05-01-009-00
in the Scanner Carrying Case's price included

Heavy-duty **Camera Carrying Case**, splash-water proof, foam-lined to fit shape of camera, lenses, camera mount, and camera accessories.
Dimensions: 400 x 340 x 155 mm



for Nikon D70s / Nikon D100 / Nikon D200:
Part-No. 02Z05-01-002-00

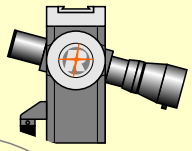
or

for Canon EOS 1Ds Mark II:
Part-No. 02Z05-01-007-00

or

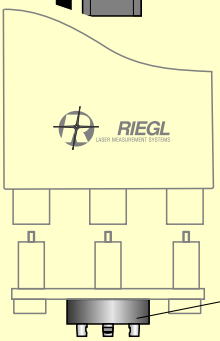
for Canon EOS 20D:
Part-No. 02Z05-01-002-00

Further Accessories:



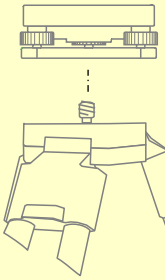
Telescope 3 x 20, on tilt mount, detachable
(fitting for the base plate)

Part-No. 02RA09-00-003-00



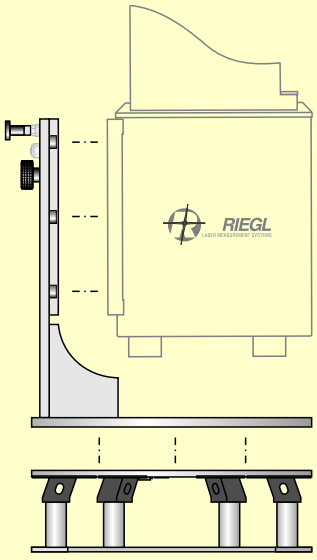
Adapter for tribrach

Part-No. 04RA09-01-001-00



Adjustable tribrach for mounting the
LMS-Z420i on a professional tripod

Note:
Scanner mounted on a tribrach to be
used only in vertical position!

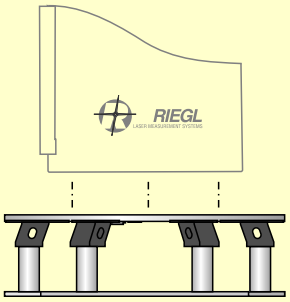


Tilt mount for vehicles

Part-No. 05RA09-00-001-00

Shock-absorbing mount SPM-Zxxx,
made of stainless steel mounting plates and
optimized shock-absorbing rubber elements

Part-No. 09RA09-00-001-00



Shock-absorbing mount SPM-Zxxx,
made of stainless steel mounting plates and
optimized shock-absorbing rubber elements

Part-No. 09RA09-00-001-00