

Operation and Maintenance VERDEGRO TMA-US (100K)



READ BEFORE USE!

**ONLY AUTHORIZED PERSONS MAY WORK WITH THE MACHINE
IMPROPER USE CAN CAUSE SERIOUS INJURIES!**

*All maintenance and repair should be done by the manufacturer or under
their supervision by an official distributor. Each TMA should be delivered
with 3 certificates to guarantee the right performance.*

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1 Data producer and specific machine:

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4879 NE Etten-Leur
The Netherlands
(T) +31(0)76-5017990
(F) +31(0)76-5019404
(W) www.verdegro.com
(E) info@verdegro.com

Date release : _____

Machine number : _____

Cushion number : _____

Company stamp:



Note: This document is only valid with an original company stamp of the producer.



2 Introduction:

A Truck Mounted Attenuator (TMA) is an energy absorbing device attached to the rear of a truck or utility vehicle. A TMA is designed to provide a controlled stop of a vehicle impacting the rear of the truck. TMAs have been used since the mid- 1970's to reduce the severity of impacts between errant motorists and slow moving or stopped shadow vehicles used to protect highway maintenance workers.

The National Cooperative Highway Research Program Report 350 (NCHRP 350) specifically addresses the performance requirements of TMAs. The recommended tests to evaluate TMA crash performance are defined for two different Test Levels. The basic Test Level, TL-2, is conducted at a nominal impact speed of 70 kph. TL-3 is the higher test level and is conducted at 100 kph. This report presents the manual for the Verdegro TMA, type US at the more demanding NCHRP 350 TL-3 test conditions.

The Verdegro TMA-US 100K, in this manual called TMA is a device with an optional framework for a sign, eventually with LED arrow or LED display. The TMA is fully hydraulic operated and must be placed behind a supporting truck with a minimum weight of 8.000 Kg and a maximum weight of 12.000kg¹² for best performance results. The crash cushion mounted on this TMA is 100K, which means test with the TMA were done according TL-3 of the Report NCHRP-350.

The TMA is amply equipped with features that promote safety. By inspect them, the quality, efficiency and safety of the TMA improved.

Check the condition of the TMA daily before starting work on the base of the instructions. It is strictly forbidden to use the TMA when it is damaged, not maintained or inspected.

The Manufacturer reserves the right to the machine construction, parts and maintenance instructions without notice.

This manual is only for the Verdegro TMA-US-100K. Some drawings or colors in this manual can be slightly different from the delivered model which should be recognized as a typical Verdegro TMA-US 100K.



Attention! Before maintenance or checks, disconnected the power!

¹ For some countries other specifications are mandatory. See chapter "supporting vehicle" for specifications.

² If you have a truck which is heavier, contact Verdegro or your distributor.

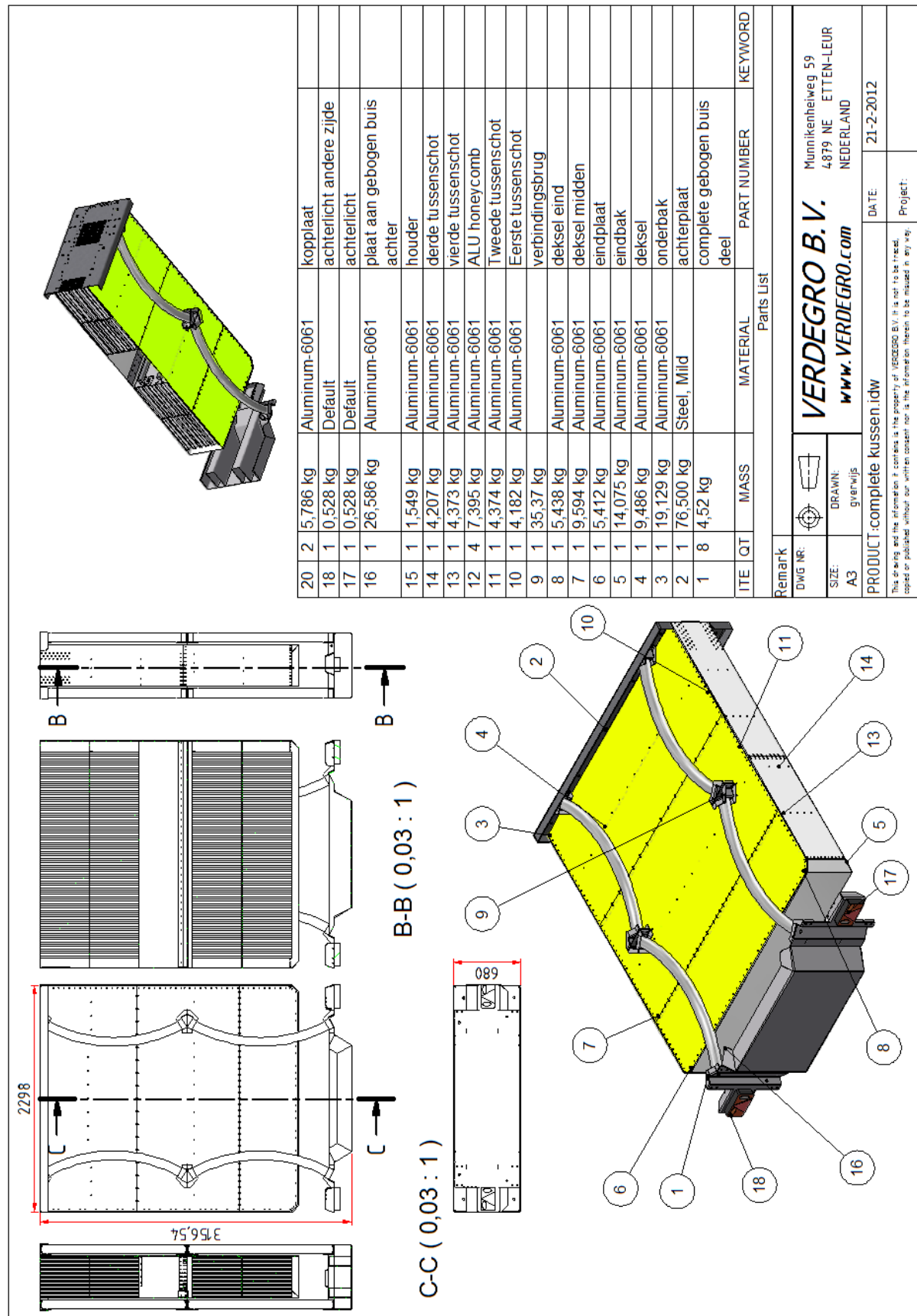
3 Recognition and dimensions

3.1 Photos of a typical TMA-US 100K



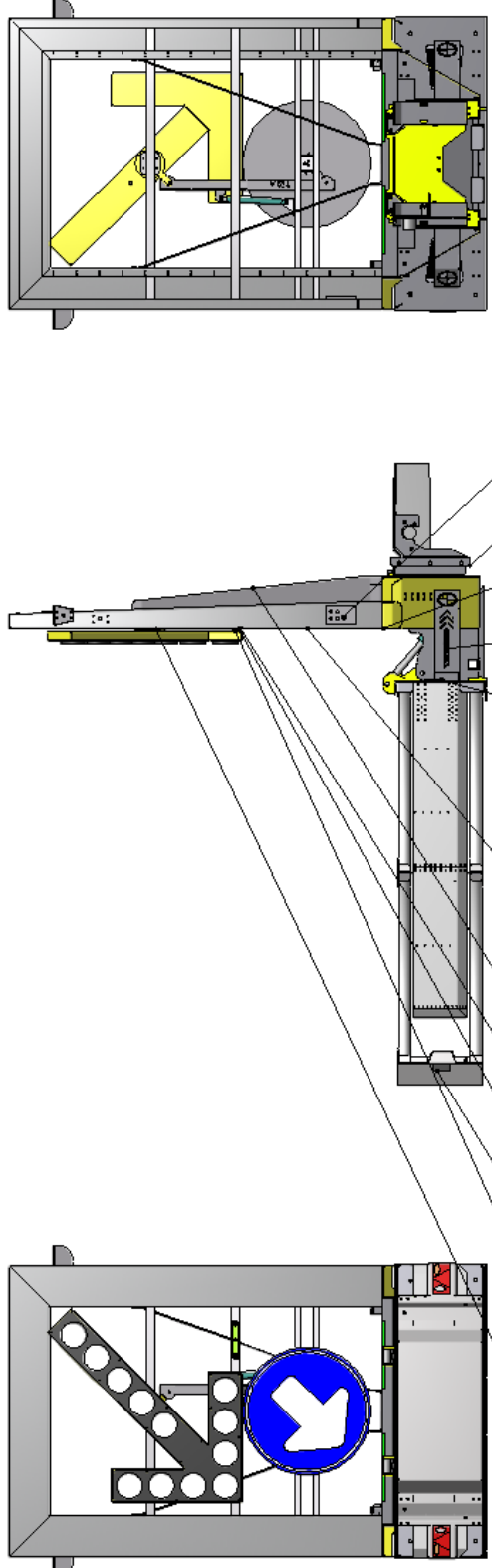


3.2 Cushion dimensions and details





3.3 Drawing TMA with optional frame for rotatable arrow:



ITE	QTY	MASS	MATERIAL	PART NUMBER	KEYWORD
24	1	677,23 kg	Default	complete kussen	
23	1	0,902 kg	Default	cilinderhuis kantelen d2	
22	1	0,129 kg	Default	zuigerstang cilinder kantelen d2	
21	2	0,638 kg	Aluminum-6061	zwaailamp plaatje	
20	1	0,223 kg	Aluminum-6061	plaat achter bord	
19	1	0,280 kg	Aluminum-6061	Bedieningsplaat	
18	1	0,060 kg	Default	rema 175A	
17	1	0,732 kg	Aluminum-6061	afdekplaatje	
16	1	0,944 kg	Steel	kogelbout met moer	
14	1	3,652 kg	Aluminum-6061	voordeksel	
13	2	1,919 kg	Aluminum-6061	hoofd deksel	
12	3	0,327 kg	Default	glijblok pijl	
11	1	8,140 kg	Default	pijl verrijf	
10	1	6,382 kg	Aluminum-6061	bord	
9	1	0,528 kg	Default	achterlicht	
8	1	0,528 kg	Default	achterlicht andere zijde	
7	2	1,759 kg	Steel, Mild	draaikrans	
6	1	22,996 kg		pijl compleet	
5	1	0,259 kg	Aluminum-6061	scharnier cilinder gelijkloop	
4	1	1,972 kg	Aluminum-6061	gelijkloopstang	
3	1	205,12 kg		ALU raam bouwbaar	
2	1	566,76 kg		Complete onderboks	
1	1	120,44 kg		Truck ophanging met pennen en DIN plaat	

Remark: **VERDEGRO B.V.** Munsterlaanweg 59 4879 NE ETTEREN-LEUR NEDERLAND www.VERDEGRO.com

SIZE: A2 **DRAWN:** gsm-vjs **DATE:** 22-2-2012

PRODUCT: Compleet met koopdelen.idw

This drawing and the information it contains is the property of VERDEGRO B.V. It is not to be re-used, copied or published without the written consent of VERDEGRO B.V. The information contained in this drawing is not intended for use.



3.4 Drawing TMA with optional frame for LED display or arrow panel:

ITE	QTY	MASS	MATERIAL	PART NUMBER	KEYWORD
125	1	3769,021 kg	Steel		
24	1	677,23 kg		complete kussen	
23	1	0,902 kg	Default	cilinderhuis kantelen d2	
22	1	0,129 kg	Default	zuigerstang cilinder kantelen d2	
21	2	0,638 kg	Aluminum-6061	zwaailamp plaatje	
20	1	0,223 kg	Aluminum-6061	plaat achter bord	
19	1	0,280 kg	Aluminum-6061	Bedieningsplaat	
18	1	0,060 kg	Default	rema 175A	
17	1	0,732 kg	Aluminum-6061	afdekplaatje	
16	1	0,944 kg	Steel	kogelbout met moer	
14	1	3,652 kg	Aluminum-6061	voordeskel	
13	2	1,919 kg	Aluminum-6061	hoofd desel	
12	3	0,327 kg	Default	glijblok pijl	
11	1	8,140 kg	Default	pijl verdrijf	
10	1	6,382 kg	Aluminum-6061	bord	
9	1	0,528 kg	Default	achterlicht	
8	1	0,528 kg	Default	achterlicht andere zijde	
7	2	1,759 kg	Steel, Mild	draaikrans	
6	1	22,986 kg		pijl compleet	
5	1	0,259 kg	Aluminum-6061	schamier cilinder gelijkloop	
4	1	1,972 kg	Aluminum-6061	geleijkloopstang	
3	1	20,512 kg		ALU raam boutbaar	
2	1	566,76 kg		Complete onderboks	
1	1	120,44 kg		Truck ophanging met pennen en DIN plaat	

Remark

DWG NR. VERDEGRO B.V.

SIZE www.VERDEGRO.com

A2 Nieuwenhuisweg 59

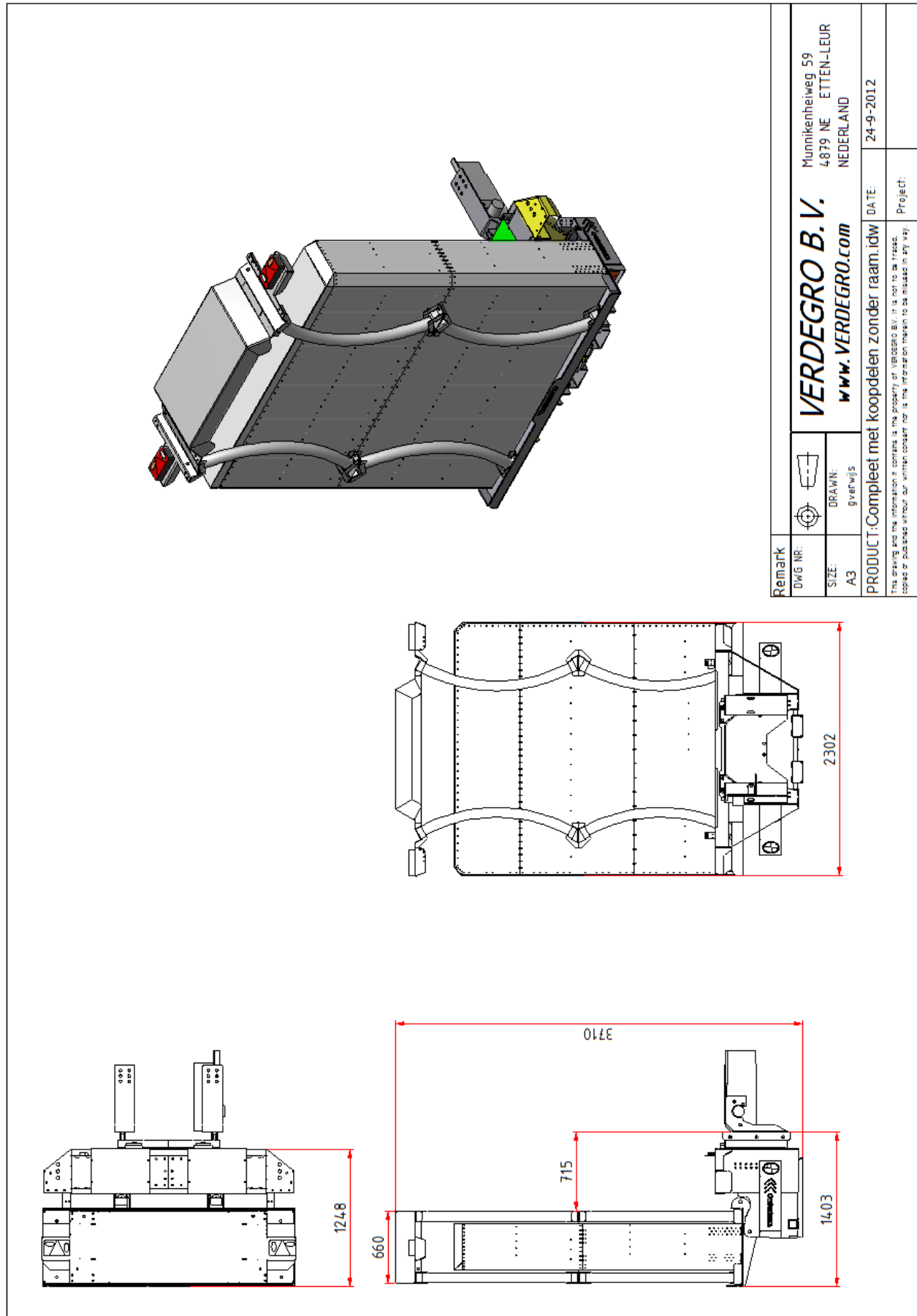
4879 NE ETTEN-LEUR

NEDERLAND

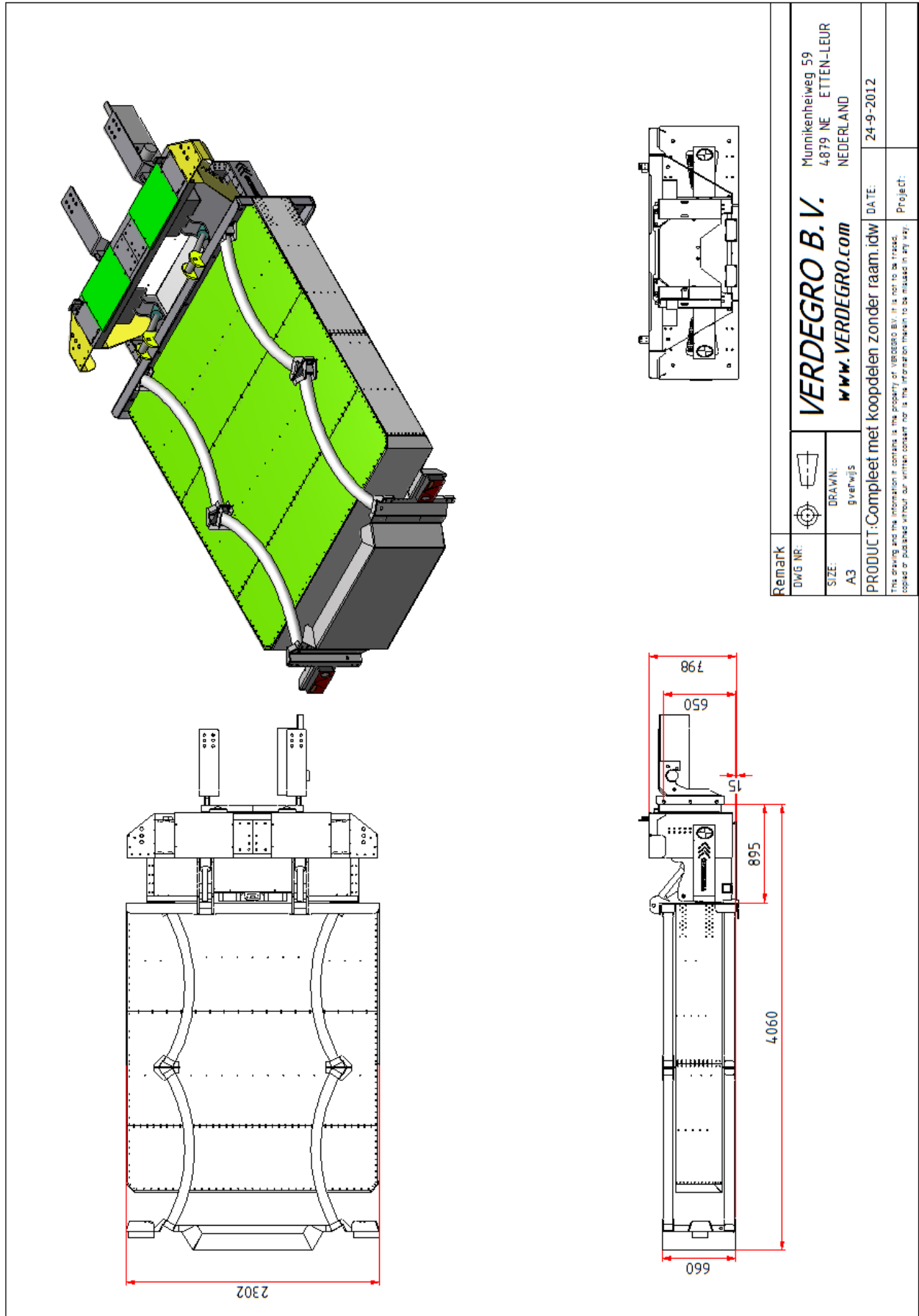
PRODUCT Compleet met kooldelen.idw DATE: 22-2-2012

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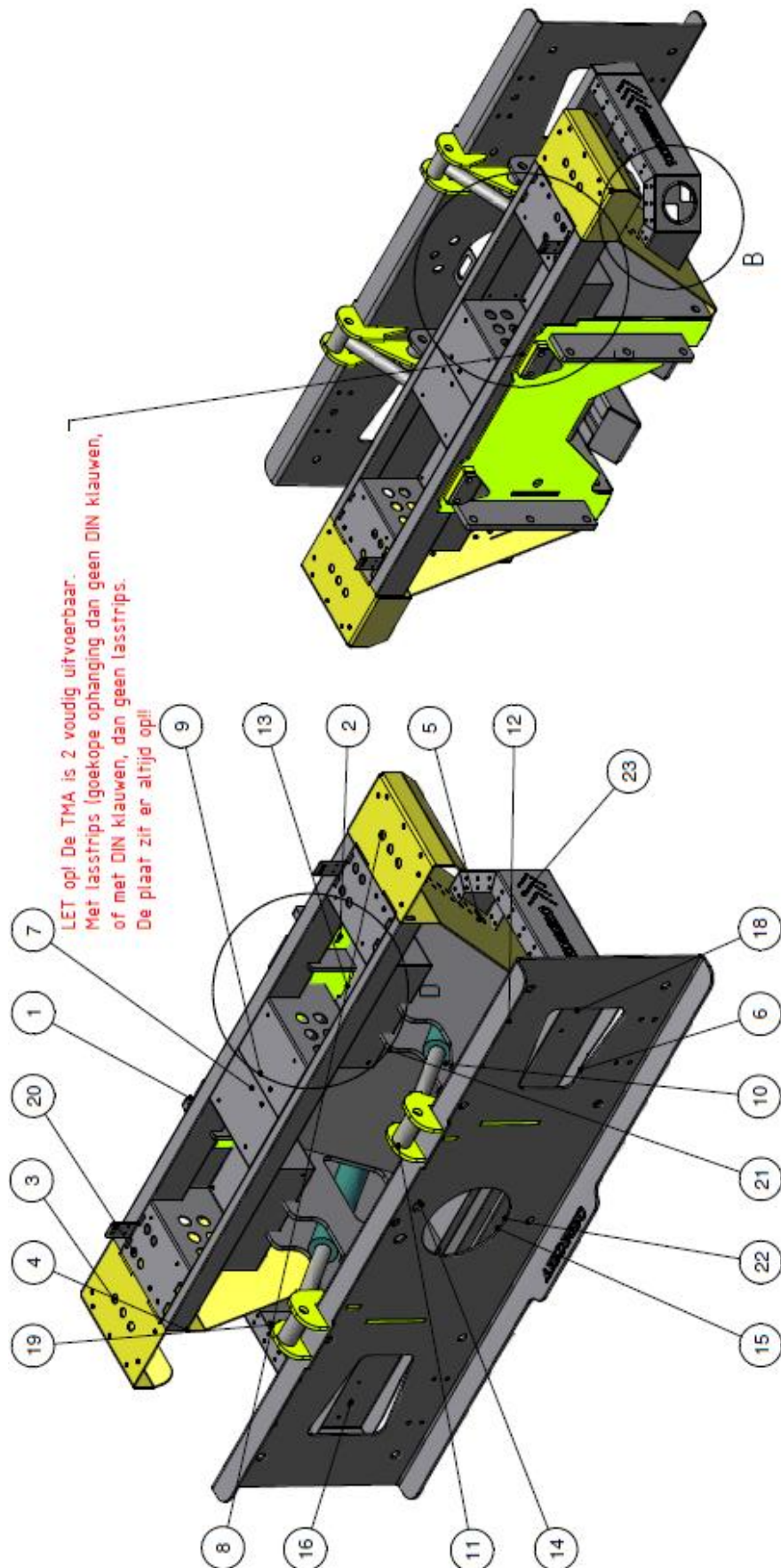
3.5 Transport dimensions



3.6 Operational dimensions



3.7 Rotating mechanism

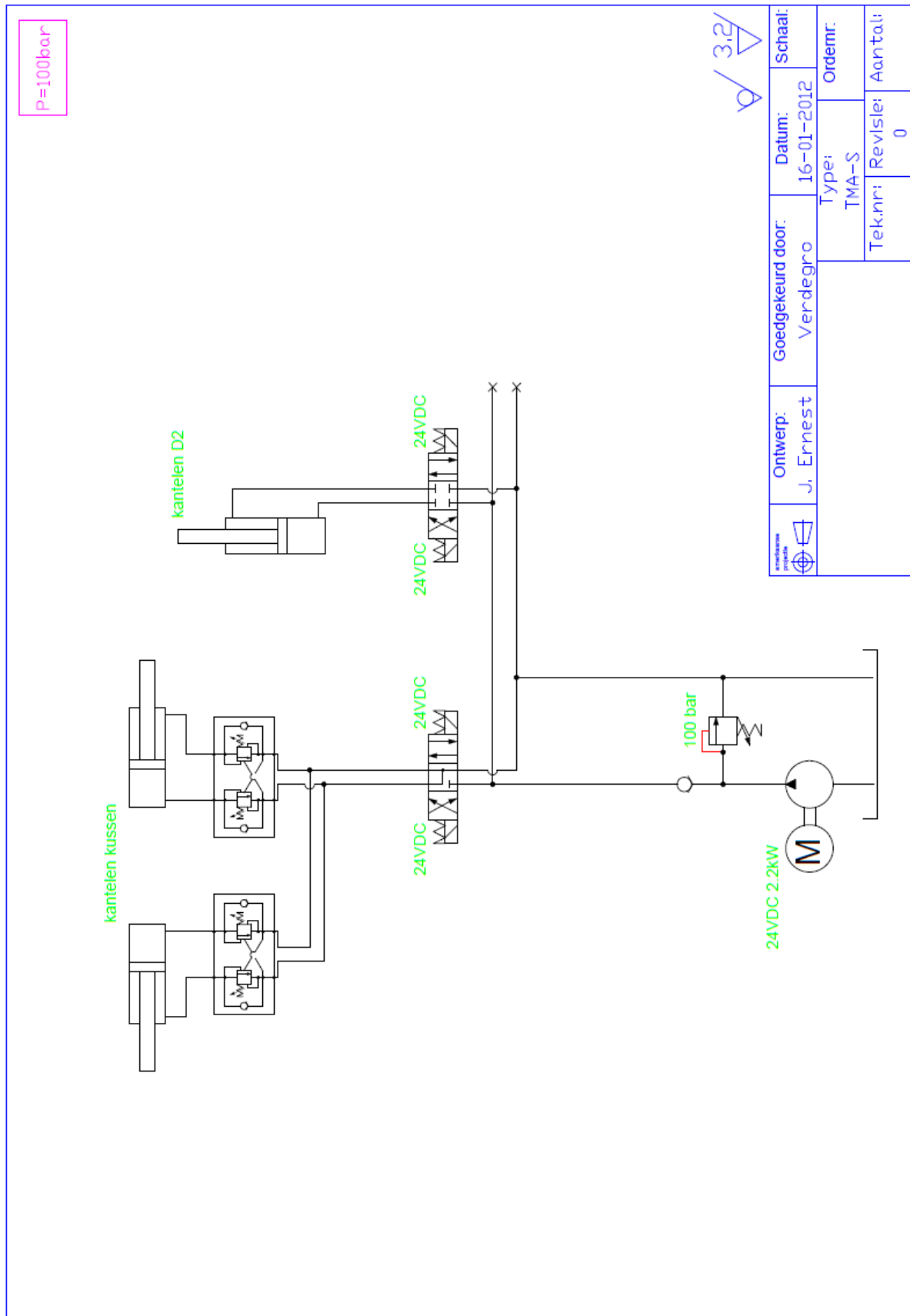


4 Technical data

4.1 Table

<i>Description</i>	<i>Dimension</i>
Min. height Cushion from the ground	200 mm
Max. height Cushion from the ground	280 mm
Max. height behind truck	4,0 m
Transport width	2,3 m
Transport height	3,7 m
Total weight	Approx.950 kgs
Hydraulic pressure	100 bar
Hydraulic gear pump (thermal secure !)	12cc
Contents of hydraulic tank	10 L
Power hydraulic pump	2,2 Kw
Equipped with thermo switch	Yes
Hydraulic rotating cylinders	2
Standard Hydraulic pump motor voltage	24 V
Standard driving lights	24 V
Battery Bank	Optional
Safety fuse	200A
Cable from truck to TMA	25 mm ²

4.2 Hydraulic schedule with optional cylinder for rotatable arrow





5 General specifications and instructions

- A. Always make sure the system is delivered with the right certificates, stickers and documentation!. **Do not remove the sticker(s)!!**
- B. Make sure the validation time of the certificates is never exceeded!
- C. Never remove safety instructions of the TMA!
- D. All Verdegro Truck Mounted Attenuators (Verdegro TMA) shall be designed and manufactured by the Verdegro Group, in accordance with the specifications.
- E. The Verdegro TMA is an attenuator system designed for installation at the back of trucks with gross vehicle weight (GVW) ranges between 8000 kg and 12 000 kg³ (Contact your country for other specifications!).

Note: Any added ballast must be adequately anchored to the truck so that it will not move during impacts. Because the back end of the truck supports the weight of the rearward protruding TMA, care must be taken not to exceed the manufacturer's published maximum axle loads. To ensure that the driving characteristics of the vehicle are maintained, the manufacturer's recommended center-of-gravity zone should also be adhered to.

- F. A truck equipped with a Verdegro TMA shall have a forward skid distance of less than 10 m during an impact by either an 820 kg or 2000 kg vehicle traveling at a design speed of 100 kph. The minimum forward skid distance is dependent on the truck's transmission being in second gear, and the parking brake set with the truck situated on clean, dry pavement.

5.1.1 Description of system

- A. The Verdegro TMA shall consist of the following basic components: An aluminum foldex box with 4 aluminum *Cartridges*, a steel *Support Structure* and a *Support Frame with 2 mounting options* for attaching the system to the truck.
A hydraulic system shall also be included in the system to raise the structure and cartridges to a vertical position. When the system is in a horizontal position, the frame assembly shall be capable of collapsing when impacted by an errant vehicle. No portion of the system shall protrude forward under the truck during an impact. The total mass of the system shall be approximately 980 kg. The complete Verdegro TMA is designed to make attachment or detachment from the truck simple and fast.
- B. The Verdegro TMA shall have a standard trailer lighting system. This system shall include brake lights, taillights and turn signals. The wiring for the rear lights shall be routed and secured on the articulating frame. This system also has additional lights on the cartridge so that the lighting system meets the standards, whether the system is in its horizontal or vertical orientation.
- C. Under the support frame are two tubes to lift the complete system with a forklift, for example to mount on the truck.

³ If you have a truck which is heavier, contact Verdegro or your distributor.



- D. The rear impact surface of the articulated frame assembly, when in the horizontal position, shall display a red / white or yellow / black striping (Preferred reflective).
- E. All welding is done by, or under the direction of, a certified welder. Metal work shall be made at the Verdegro Group.
- F. All exposed steel surfaces on the TMA shall be primed and painted and or galvanized.
- G. The TMA shall be assembled with Commercial Quality bolts, nuts, and washers conforming to European Standards.
- H. The hydraulic system shall consist of a pump with a 12 or 24 (standard) volt DC motor, cylinders, hoses, switches, wiring, and necessary subcomponents to tilt the frame assembly to a 90° position from horizontal. The complete hydraulic system, including the pump and hoses, shall be factory assembled and mounted to the TMA by the Verdegro Group.
- I. The complete hydraulic system shall be factory assembled and mounted to the TMA. Once assembled, each system shall be operated through ten (10) complete cycles (horizontal, tilted to 90 position and lowered back to horizontal is one cycle) to ensure proper operation of the pump and tilting mechanism. The hydraulic system shall be shipped assembled.



5.1.2 Performance criteria

- A. The Verdegro TMA, when mounted to a truck weighing up to 9,000 kg situated on clean dry pavement with the transmission in second gear and the brakes locked shall perform as follows:
- 1) Vehicles with a mass of 820 kg impacting straight into the rear of the TMA at 100 kph shall remain upright with the theoretical occupant impact velocity of 12 m/s or less and the occupant ride down acceleration of 20 g's or less per NCHRP 350, Test 3-50 evaluation criteria. The truck shall be placed against a non-moving wall, also called a rigid barrier, during this test.
 - 2) Vehicles with a mass of 2000 kg impacting straight into the rear of the TMA at 100 kph shall remain upright with the theoretical occupant impact velocity of 12 m/s or less, and the occupant ride down acceleration of 20 g's or less per NCHRP 350, Test 3-51 evaluation criteria.
 - 3) Vehicles with a mass of 2000 kg impacting straight into the rear of the TMA at 100 kph, and an offset of W/3 with respect to the TMA centerline, shall remain upright with no significant roll pitch or yaw per NCHRP 350 optional Test 3-52 evaluation criteria.
 - 4) Vehicles with a mass of 2000 kg impacting at 10 degrees into the rear of the TMA at 100 kph (62 mph) and an offset of W/4 at an angle of 10 degrees with respect to the TMA centerline, shall remain upright with the theoretical occupant impact velocity of 12 m/s or less and the occupant ride down acceleration of 20 g's or less per NCHRP 350, optional Test 3-53 evaluation criteria.
 - 5) To minimize potential damage to the truck, no portion of the TMA's structure or energy absorbing elements shall protrude forward of the underride during an impact. Certified test results and associated test reports and films produced in the guideline with NCHRP 350 procedures shall be submitted showing that the TMA system conforms with all test and performance criteria in this specification.
- B. The Verdegro TMA cartridges shall successfully perform to accelerated vibration, moisture and corrosion.



6 Safety

1. Read these instructions carefully before using the "TMA"
2. The TMA should not be used without knowledge of the operating instructions and safety precautions. Keep the operating instructions, always within easy reach of the machine, the operator's manual should ALWAYS be at or near the machine.
3. The operator of the TMA must be at least 18 years old and experienced in serving Truck Mounted Attenuators.
4. The owner/holder of the TMA must ensure that all users are trained in the use of the machine.
5. Be careful when the machine is used near live power lines.
6. Transport the TMA only if it is properly secured to vehicle.
7. On the platform are no persons during storage and adjustment of the machine or in transit.
8. Make use at all times during the adverse influences of wind, rain, temperature, brine, thunderstorms, snow, hail and ice.
9. Use the TMA purely as Truck Mounted Attenuator, and not as a lifting mechanism or other device.
10. The wind load of the TMA does not increase with additional signs or other objects that could catch wind.
11. Set the whole machine back together in a smooth continuous motion so as to avoid shock effects of road users.
12. Inspect the entire machine for loose materials such as bird nests, twigs, leaves, but also tools, bolts, nuts, etc. which may end up on the lanes during mobilization or transport.
13. Do not hoist the TMA!
14. The safety devices are not deactivated. Defective safety devices or by a qualified repair service company to recover before the TMA is used again.
15. Before and during operation of the machine always look at / near the machine, no persons are present, guiding also takes into account the rotation range of the machine!
16. For safe and trouble-free operation, the TMA clean snow and ice held.
17. Be careful with fuels, lubricants, hydraulic oils and greases of the TMA. Avoid skin contact with these substances. Exposure Danger !
18. The TMA regular inspection and maintenance of service - repair outsourcing to an expert in this field service company.



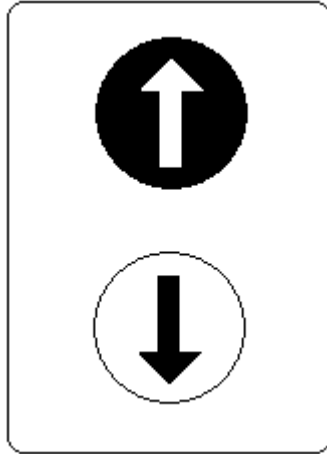
19. The construction of the TMA may not be altered without permission and the manufacturer's instructions.
20. Inspect the TMA every day before work or during use and pass through the machine.
21. Axles control all bolts / nuts: Before each use the principal axes, bolts and nuts.
22. Let the TMA annual inspect by the manufacturer. The inspection must take place more frequently if welding is done in supporting parts, or other special reasons exist for the device to be debating. For modification and repair, always contact the manufacturer!. After repair or replacement of parts, the TMA should always be served a full test facility. **The Verdegro Group can only guarantee the working when repair and service is done by the Verdegro Group or under their supervision by an official distributor.**
23. If you leave the TMA, put it somewhere where it does not preclude others. Keep the whole machine in transport position. Close all hatches well for unauthorized persons. Take your keys with you.
24. The operator of the machine may not be under the influence of alcohol or narcotic drugs.

7 Operation

The operation of the machine depends on the chosen type. It can be wireless, with buttons on the TMA or buttons in the truck. Ask the manufacturer or distributor for the optional equipment guidance on your TMA.

Standard:

To rotate the cushion you use the black and white buttons on the framework.




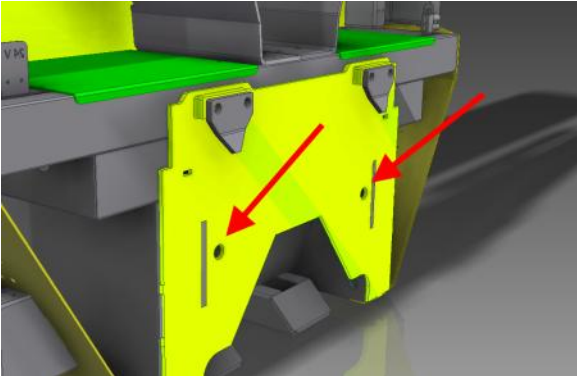


8 Supporting vehicle and adjustment

It is important that the TMA is mounted correctly behind the supporting vehicle. Mounting the TMA behind the vehicle can be done with a DIN construction and or with 6 hitch pins. Make sure the connection with the truck is done or checked by Verdegro or a distributor, and that a certificate is given.

It is allowed that a country overrules the specifications of the supporting vehicle, for example (valid for the Verdegro TMA):

- Sweden: Lower limit weight of the truck 9.000 kgs, upper limit by manufacturer⁴
- Belgium: Lower limit weight of the truck 8.000 kgs, upper limit 9.440 kgs

	<p>Make sure the hitch pins (if present) are correctly installed. Only use pins delivered from Verdegro</p> 
	<p>Make sure the TMA is bolted correctly when using DIN plate. Only use bolts that are delivered by the TMA.</p> 

⁴ If you have a truck which is heavier, contact Verdegro or your distributor.

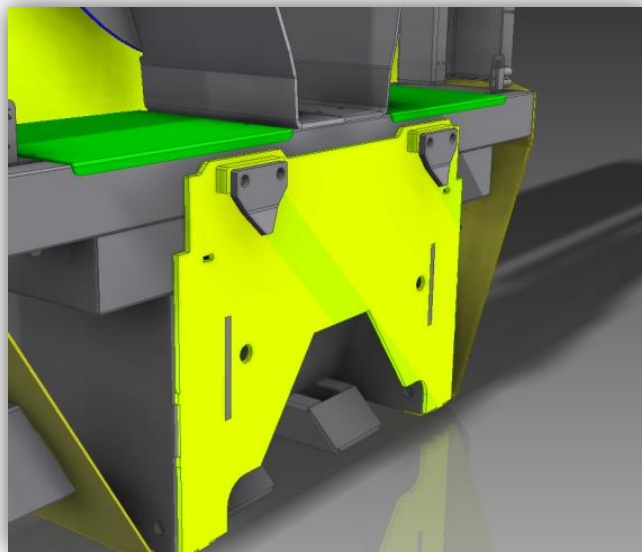
8.1 Specifications for mounting

The TMA can be mounted behind the truck in two ways. Both of these ways were available during the full scale crash tests and therefore acceptable. The following paragraphs clarify the possibilities

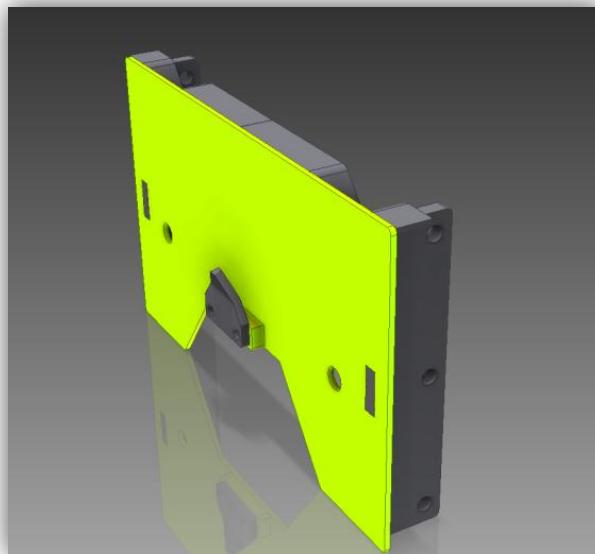
8.1.1 DIN mounting system

Please note that the DIN plate on the truck can also be mounted with 6 hitch pins for adjustment, or bolted to the chassis. The DIN plate must be mounted to the supporting vehicle by Verdegro or an official distributor.

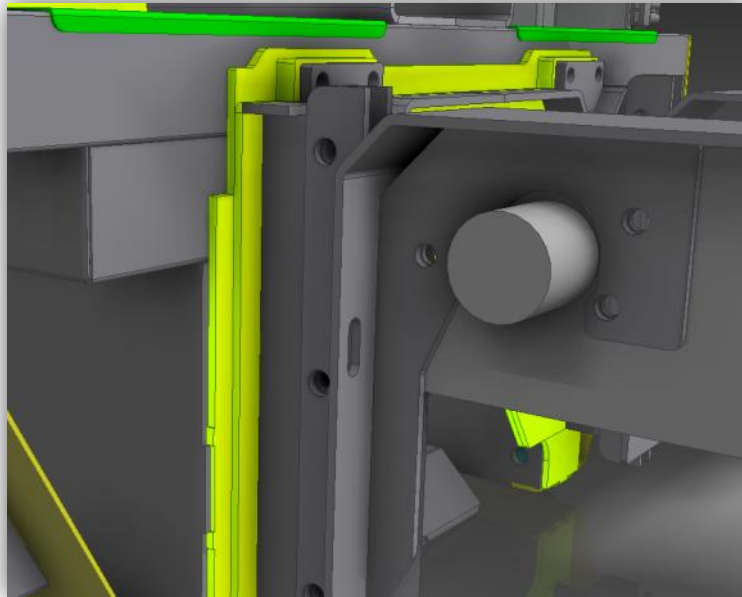
Picture of the DIN mounting system on the TMA:



Typical DIN plate with the optional 6 pins for mounting on the truck:



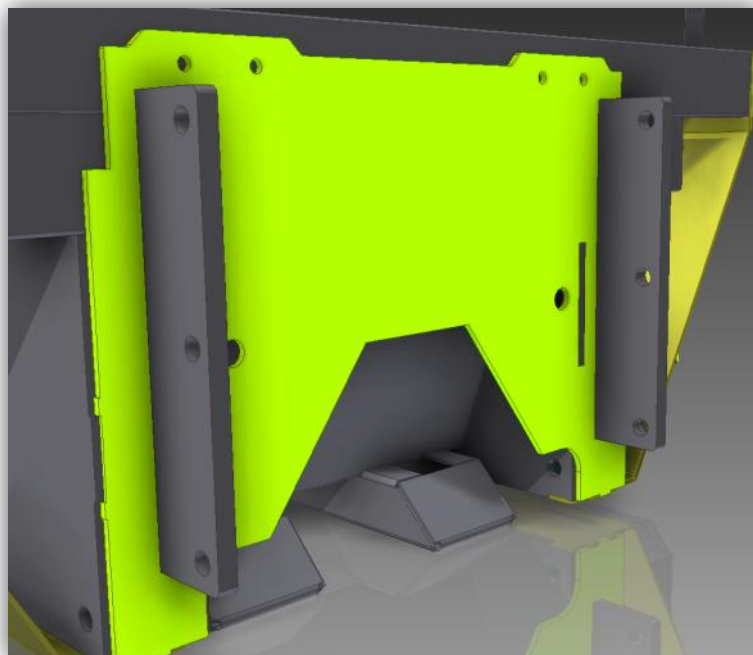
Typical DIN plate TMA mounted on the truck with the optional six pin system:



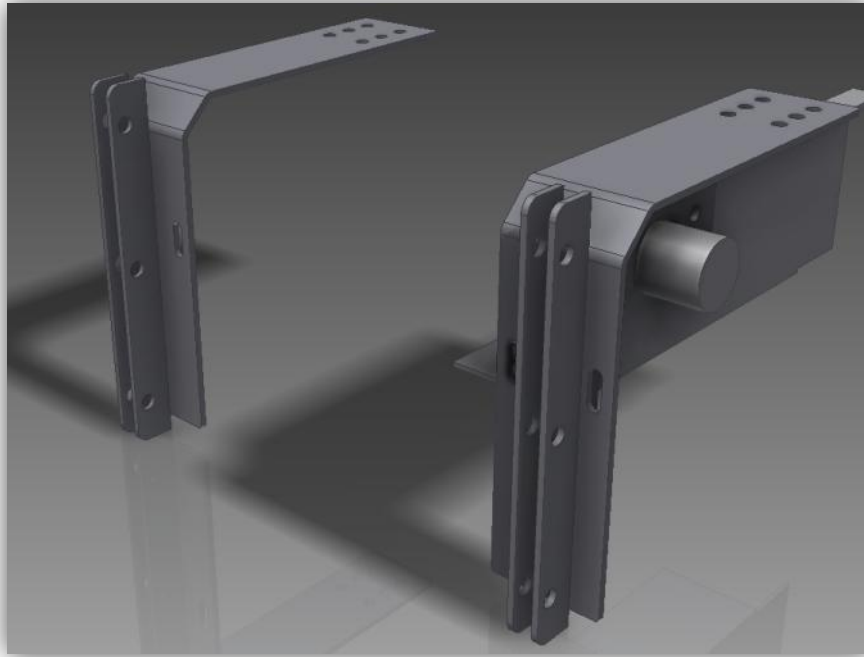
8.1.2 Six pin mounting system

Make sure all the six pins are correctly installed and that the strips are correctly attached to the supporting vehicle. This can be done by Verdegro or an official distributor.

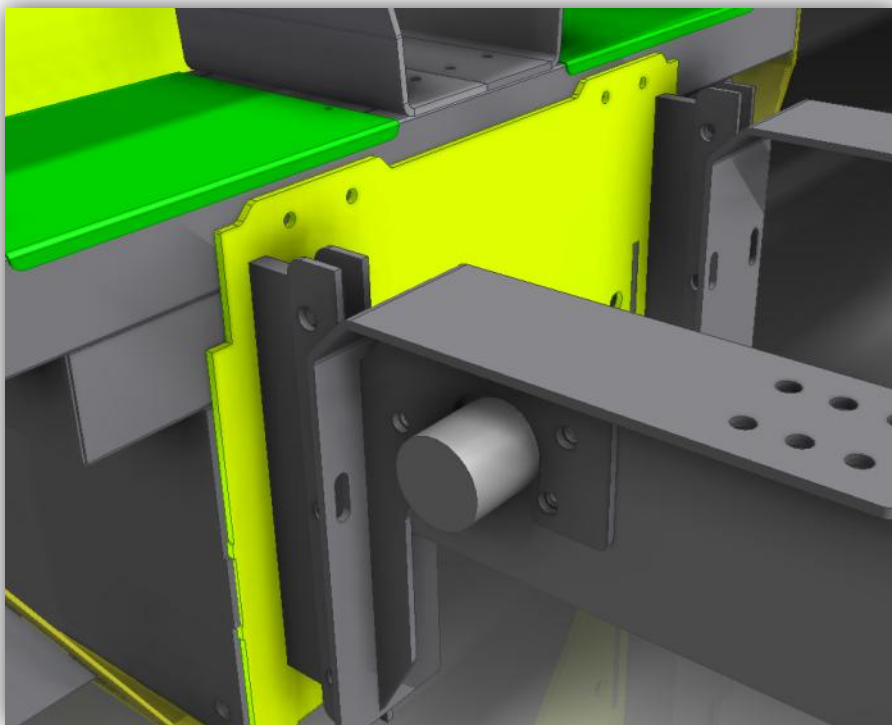
Picture of the 6 pin mounting system on the TMA:



Typical 6 pin mounting on supporting vehicle:



Typical six pin TMA mounted on the truck:



9 Inspection

9.1 Inspection table

<i>General inspection points (If they are in bad condition, use of the TMA is forbidden)</i>	<i>Every application</i>	<i>Weekly</i>	<i>Monthly</i>
<i>Level hydraulic oil</i>		X	
<i>Condition hydraulic cylinders</i>	X		
<i>Leakage hydraulic</i>	X		
<i>Condition of the hydraulic hoses</i>	X		
<i>Visual inspection of shafts, bolts and structural bearings</i>		X	
<i>Operation-end position defectors</i>	X		
<i>Inspection LED display control (errors) / arrow configuration(s)</i>	X		
<i>Visual inspection loose machine parts</i>	X		
<i>Cracks</i>			X
<i>Damage on the cushion</i>	X		

9.2 Control position Crash Cushion

Verify proper operation / adjustment of the cushion on a right road surface where no height difference is present. After unfolding the cushion, the machine / pillow should be horizontal.



If the machine is not leveled horizontal, directly contact the manufacturer; use prohibited!

9.3 Use of the machine in cold

- Take into account delays in cold (-5° or colder)
- Ensure that there is no snow, ice or dirt on the safety switch.
- Ensure that there is no snow, ice or dirt on the frame and cushion.
- Protect the machine from the snow and ice when not in use.

9.4 High voltage

Not use this machine within:

- 50 Meters at power Lines on steel towers
- 25 Meters at low voltage lines on wooden poles
- 5 Meters in contact Lines of railway and tramway etc.

10 Maintenance

Scheduled maintenance keeps the TMA in safe and reliable condition. From the maintenance schedule and checklist for the annual inspection shows what measures are required. Read for the maintenance of the TMA the entire manual carefully!. If in doubt about the maintenance work it is better that it is carried out by the manufacturer. If not, than it must be done under supervision of the manufacturer, for example by an official distributor. Distributors can be found on the website www.verdegro.com

10.1 Check hydraulic oil

The TMA has an oil level in the tank.

- Open the hydraulic compartment
- Make sure the machine is reasonably flat
- Before opening the cap or around the filling is clean, clean it if necessary.
- Add the oil with a special pump with filter. The use of the oil directly from the can to pour.

Term	Actions
Daily or before any start up	Check level Hydraulic oil
	Check bearings parts
	Check hydraulic hoses and cylinders, pipes and fitting
	Check operation of emergency and safety devices
	Piston rods outrigger daily check for debris, leaks or damage. If severely polluted or clean brine is presents.
	Try all in normal position
Each 500 h	Lubricate all bearings and sliding surfaces
	Turntable bolts tightened
	Check condition of cylinders and outrigger
Each 1000 h of latest 6 months	Check of total TMA
Every 12 months	Annual inspection. + Full service preventive replacement valves and seals.
Cushion	Check daily for damages

HYDRAULIC

Oil volume 10,0 liter
 Oil quantity (applications of -10° to + 50°) UNIVIS 32

GUIDED BEARINGS

-Multy duty grease EP2(example Shell alvania EP2/ Esso beacom EP2)

SLIDEWAYS arrow

-Only clean and lightly spray with WD40

TURNTABLE

- Multy duty grease EP2 (example Shell alvania EP2/ Esso beacom EP2)

10.2 Torque index Tension

Dimensions thread	Of torque for bolt with thread in hermetically ISO Nm		
	Hex bolt Class 8.8	Hex bolt Class 10.9	Hex bolt Class 12.9
M4	2,8	4,0	4,9
M5	5,7	7,9	9,5
M6	9,7	13,7	16,2
M8	23,5	33,3	39,2
M10	47,1	65,7	79,4
M12	81,4	114,7	137
M14	130	181	216
M16	196	280	333
M18	270	382	461
M20	382	539	647
M22	519	730	873
M24	662	932	1118
M30	1324	1863	2236

11 General control points of TMA

- Chassis:
 - Corrosion
 - Welds (no cracks visible)
 - Permanent deformation
- Turn table:
 - Bolts / nuts wreath
 - Welds
 - Sufficient fat is present in wreath
 - Corrosion
- Turn section:
 - Assessment of hinge shafts and cylinders
 - Welds / corrosion
 - Cracks and other damage
 - Cable and pipe installation
 - Cylinders
- Hydraulic system:
 - Condition hoses (replaced by the least damage or leaks)
 - Piston rods for damage
 - Control for leaks or damage
 - Bolt connection outriggers control
- Elektrical system:
 - Condition and suspension of cables
 - Condition of connectors
 - Operation of end position detectors
- Crash Cushion:
 - Control of cracks and dents or cracks
- Emergency stop:
 - The control for the emergency stop should be red, along with a plate with the inscription "STOP"
 - The emergency must immediately stop the movement, the machine may not start immediately when the emergency stop is released or put back, but keep in mind the time required for a fully running engine to stop.
 - The emergency must be clearly distinguishable from other button.
 - The emergency must not be used to machine just freeze it only with the power button.
 - The emergency stop is not out of service / bridged
- Test running
 - Set up the entire machine as defined
 - Try all labor movements, which may not be expired as shocking
 - After the test it must be properly monitored or stressed parts do not exhibit cracks or permanent deformation.

12 Repairs (by manufacturer or official distributor)

12.1 Welding

If parts of the TMA are repaired with welding, it should be noted in the report under "Remarks"

- Welded points
- Date of welding
- Make sure when welding the manufacturer's instructions are followed

12.2 Other welding

If other repairs are made to supporting parts (example cylinders), make a note under "Remarks"

- Maintenance points
- Date
- Contractor
- Ensure that the repair to the manufacturer's instructions are followed

13 Warranty

Verdegro strives by various internal and external inspections and final inspections that the delivered TMA system is free from error into operation. We provide the following warranty for any defects in materials or workmanship.

The guarantee is effective up to 12 months from the date of delivery of the machine to the buyer. The guarantee applies only to a new TMA sold in possession of the first owner, and officially delivered by Verdegro or an official distributor.

Verdegro is based on an obligation to guarantee the absence of TMA occurred in accordance with this warranty for free repair. The warranty repair is performed only during normal working hours by a technician authorized by Verdegro BV.

Verdegro decides whether parts and labor are under warranty or not.


The warranty does not cover defects caused by neglect of the use - and safety instructions in the operations manual, or mainly due to improper or inadequate use, installation or maintenance unauthorized persons, or resulting from normal wear or deterioration quality or caused by an accident.

Verdegro does not reimburse any damage to property or persons / companies due to a defective TMA, neither revenue, driving costs to the repair company etc.

The guarantee will terminate immediately in full if the TMA is repaired or serviced by another company / person than the Verdegro Group or an official distributor, when strange or inappropriate components are mounted on the TMA, or when the settings of the TMA are changed by unauthorized persons.

14 Document delivered by each TMA

14.1 Crash cushion certificate, signed by the Verdegro Group



Official declaration

VERDEGRO Crash systems BV, Etten-Leur The Netherlands

Declares that the crash-cushion with number:

.....


Construction year 20.....

Has been exactly build as the model used at the tests of the Verdegro TMA.
Full scale tests were according the NCHRP-350 TL3, 100K.
The weight of the truck was about 9000 kgs during the tests, conform standards of the NCHRP-350. The weight of the TMA without cushion is about 700 kgs.
The weight of the crash cushion is about 280 kg.

Company stamp

Verdegro Crash Systems BV Etten-Leur

DATE: ____ - ____ - 20____



This Certificate is valid for one year, the equipment needs a control the first month, after 6 months and one year after above mentioned release date (Done by Verdegro). These control turns (appointment required) are mandatory and free of charge for the first year. The certificate of conformity can be renewed every year.

14.2 TMA certificate, signed by the Verdegro Group



Official declaration

VERDEGRO Crash systems BV, Etten-Leur The Netherlands

Declares that the Truck Mounted Attenuator with number:

.....

Construction year 20.....

Has the same hydraulic mechanism and mounting construction as the model used at the tests of the Verdegro TMA.

Full scale tests were according the NCHRP-350 testlevel TL3, 100K.

The weight of the truck was about 9000 kgs during the tests, conform standards of the NCHRP-350.

DATE: ____ - ____ -20 ____

Company stamp
Verdegro Crash Systems BV Etten-Leur




VERDEGRO

This Certificate is valid for one year, the equipment needs a control the first month, after 6 months and one year after above mentioned release date (Done by Verdegro). These control turns (appointment required) are mandatory and free of charge for the first year. The certificate of conformity can be renewed every year.

14.3 Overall and mounting certificate

Note: This certificate can be signed by the distributor and than will be the their responsibility



Official declaration

VERDEGRO Crash Systems BV, Etten-Leur The Netherlands
Declares that the following equipment meets the specifications and standards of full scale tests.

Truck Mounted Attenuator:

Producer: Verdegro BV

Number TMA: P

Number Cushion: O

Delivered with signalization on TMA: YES / NO

Voltage: 12V / 24V / other: V

Remote control: O

Wireless / Cable / Other: _____

Truck:

Producer: _____

Type: _____

License plate: _____

Chassis number: _____

Construction year: _____


Color: _____

Company stamp
 Verdegro Crash systems BV Etten-Leur

DATE: ____ - ____ - 20__

The TMA is mounted on a truck according to the specifications of the manufacturer with the following characteristics:


- The mass as close to 9 000kg with a minimum limit of 8 000 kg and an upper limit of 12 000 kg. (Weight report and mass is the responsibility of the buying company)
- When extra load is added this must be done in a way that the load will not move and certainly not fall of the truck when it is hit.
- The fixing installation is the same as during the full scale tests (DIN Plate AND / OR minimal 4 hitch pins)
- Verdegro BV has build, mounted and checked the fixing installation which is on the truck



This Certificate is valid for one year, the equipment needs a control the first month, after 6 months and one year after above mentioned release date (Done by Verdegro). These control turns (appointment required) are mandatory and free of charge for the first year. The certificate of conformity can be renewed every year.

14.4 Sticker on chassis of TMA

Note: without this sticker, the TMA is unusable!



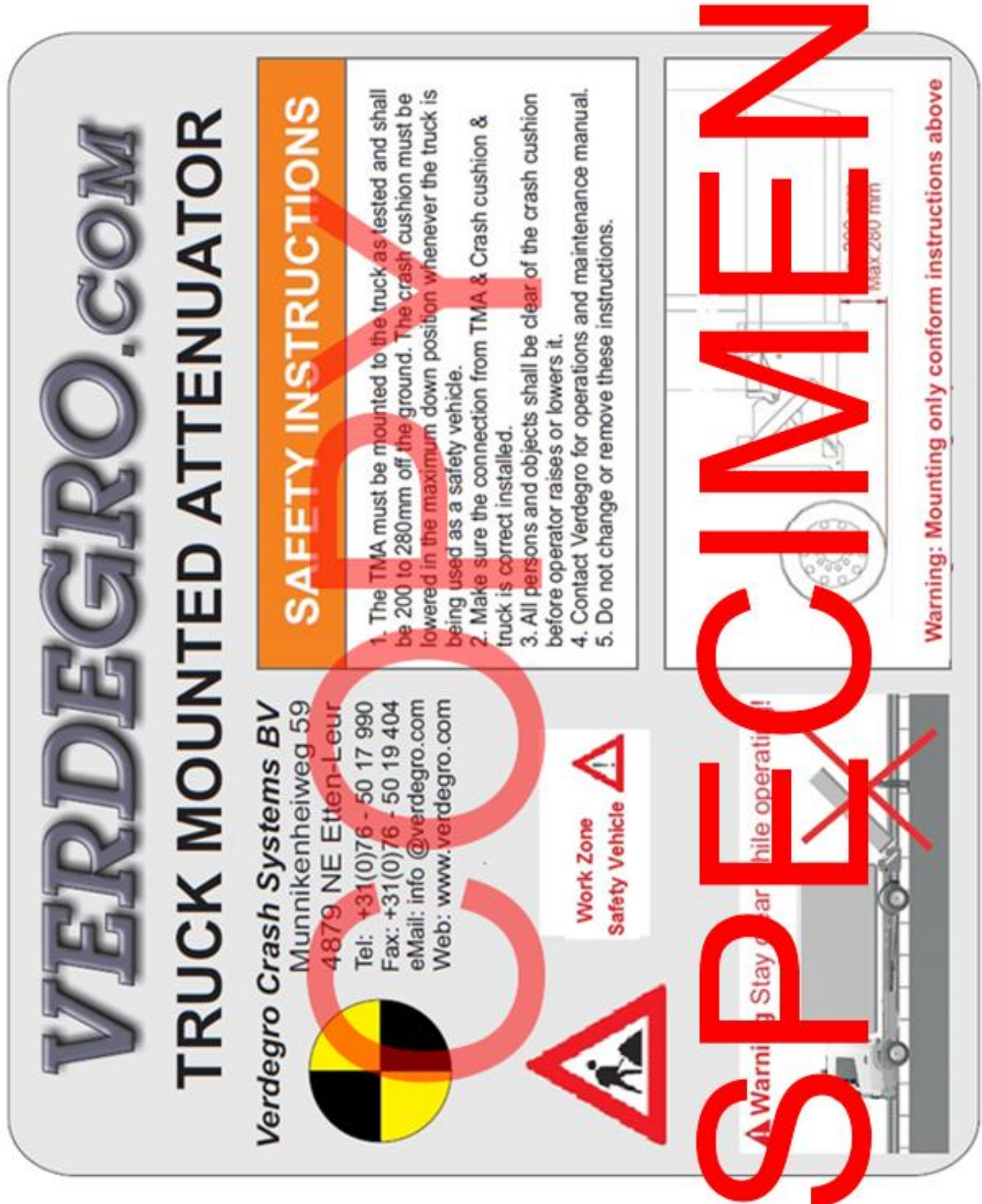
Bouwjaar	: 20
Type	: TMA-US
Chassis nr.	: 20

VERDEGRO

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Fax: +31(0)76 - 50 19 404
email: info@verdegro.com
Web: www.verdegro.com

14.5 Sticker on the cushion of the TMA

Note: without this sticker, the TMA is unusable!



15 CE certification



CE Verklaring van conformiteit
CE Declaration of conformity
CE Konformitätserklärung
Déclaration CE de conformité

The Verdegro Group

verklaart hiermee, dat het produkt
hereby declare, that the product
erklären hiermit, daß das Produkt
déclare par la présente, que l'outil

TMA-US (100K)

NL

Is geproduceerd conform de normen en normatieve documenten overeenkomstig de bepalingen van de EG-richtlijnen 2006/42/EG en de NCHRP report 350-TL3.

GB

Is manufactured in conformity with the EG 2006/42/EG and the NCHRP report 350-TL3.

Other applied standards	
Machinerichtlijnen / CE- markering 2006/42/EG	NEN-EN-IEC 60068-2
NEN-EN 12966-1/2/3	2002/49/EG
IEC-EN 60529	NEN-12899-1
IEC-60950-1:2006 (2006/95/EG)	CROW 96a/96b
NEN 60068-2-47	RDW
NEN 72/245/EEG (EMC)	ISO 2813
NEN-3381	NEN-EN-ISO 3506-1/2
NEN-1010	Arbo-wet
NEN-EN 1050	ARAB/CODEX/AREI

16 Maintenance history

Date:..... Hours:..... Stamp:	Date:..... Hours:..... Stamp:
Date:..... Hours:..... Stamp:	Date:..... Hours:..... Stamp:
Date:..... Hours:..... Stamp:	Date:..... Hours:..... Stamp:
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