



***SEGER Sound of Safety<sup>®</sup> ...***

 **SEGER**  
[www.seger.com](http://www.seger.com)

**SEGER**

# Company Structure

# SEGER

- ESTABLISHMENT: 1981
- CORE BUSINESS : Designing, producing and selling Acoustic Devices  
(Electromechanical, Electronic and Air horn, Back-up Alarms, and AVAS)
- CAPITAL STRUCTURE: % 100 Turkish Company
- NUMBER OF EMPLOYEES : 300 (150 Turkish - 150 Chinese)
- PRODUCTION CAPACITY : 15.000.000 horns/year  
750.000 Avas/year
- PRODUCTION QUANTITY : 10.000.000 horns/year  
25.000 Avas/year



**SEGER A.Ş. (Bursa – TURKEY)**



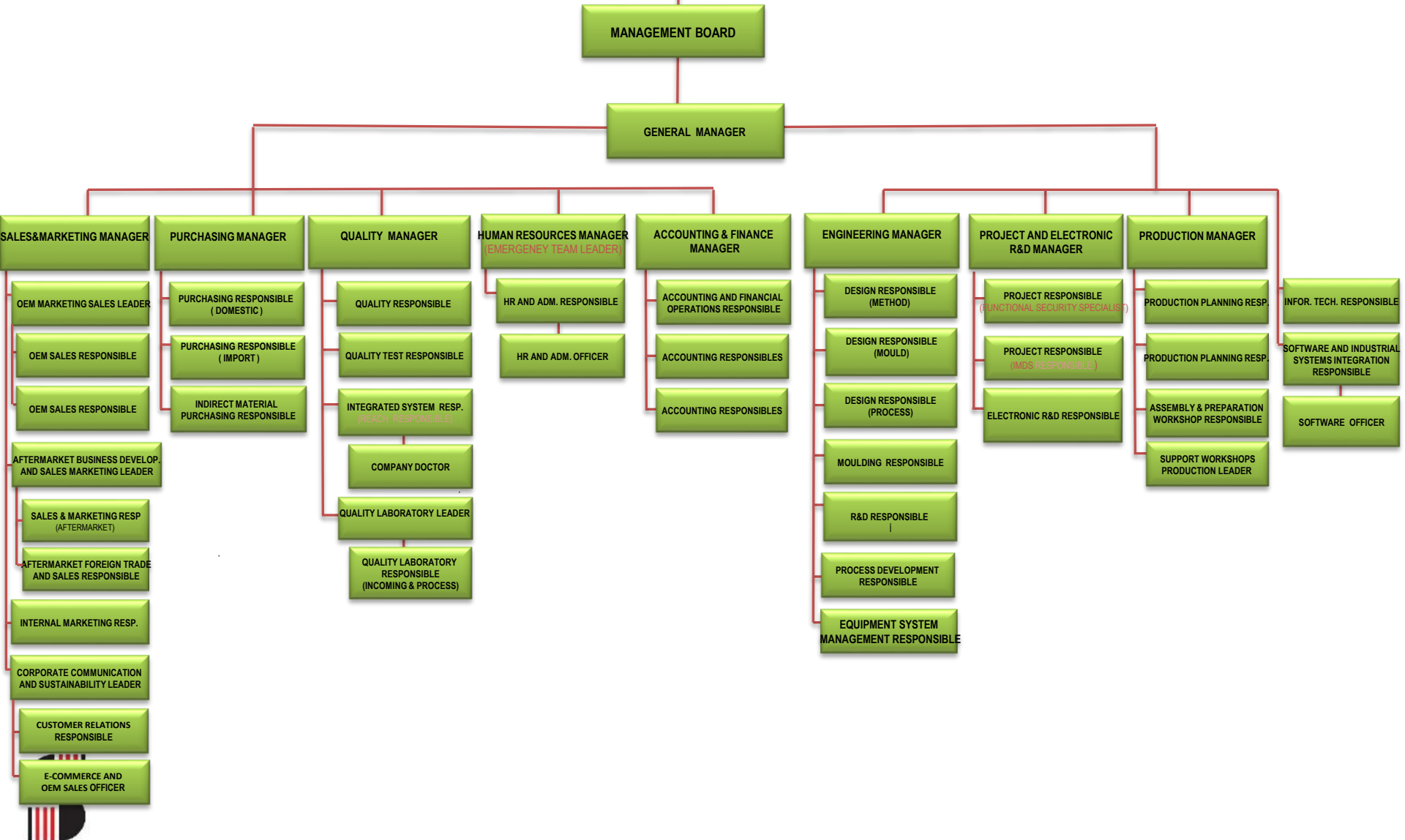
**DONGGUAN SEGER  
AUTO PARTS CO.LTD  
(Dongguan – CHINA)**



# TR Organization Chart

SEGER A.Ş.  
ORGANIZATION CHART

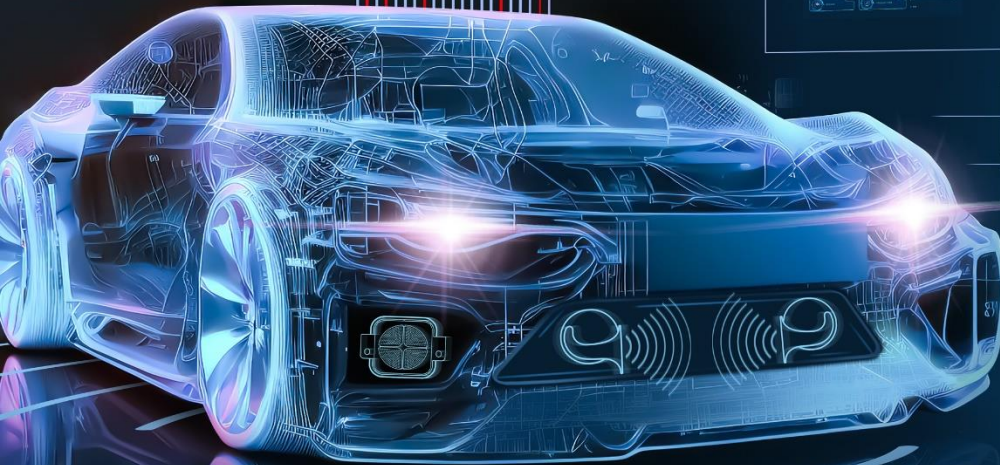
# SEGER



# Vision and Mission

# SEGER

# SEGER



## OUR VISION

To position SEGER as a technological product designer and manufacturer in the mobility ecosystem and to strengthen the SEGER brand by increasing product diversity in after-sales markets.

## OUR MISSION

To demonstrate continuous improvement with the contribution of our stakeholders in line with our ethical, sustainable and innovative business approach and strategic goals, and to fulfill our responsibilities towards society.





## OUR VALUES

### Trust Our Employees

We trust our people, our most valuable resource, and we believe that they will use the authority delegated to them as required by their responsibilities.

### Transparency

We are open and honest with each other.  
If we have an alternative idea, we are ready to explain and defend it.  
We accept different views and support change.  
We exchange information with each other throughout our organization.

### Professional Excellence

We do not see the current standards as sufficient and we pursue perfection.  
We enjoy what we do, constantly striving to improve and perfect existing standards.

### Team work

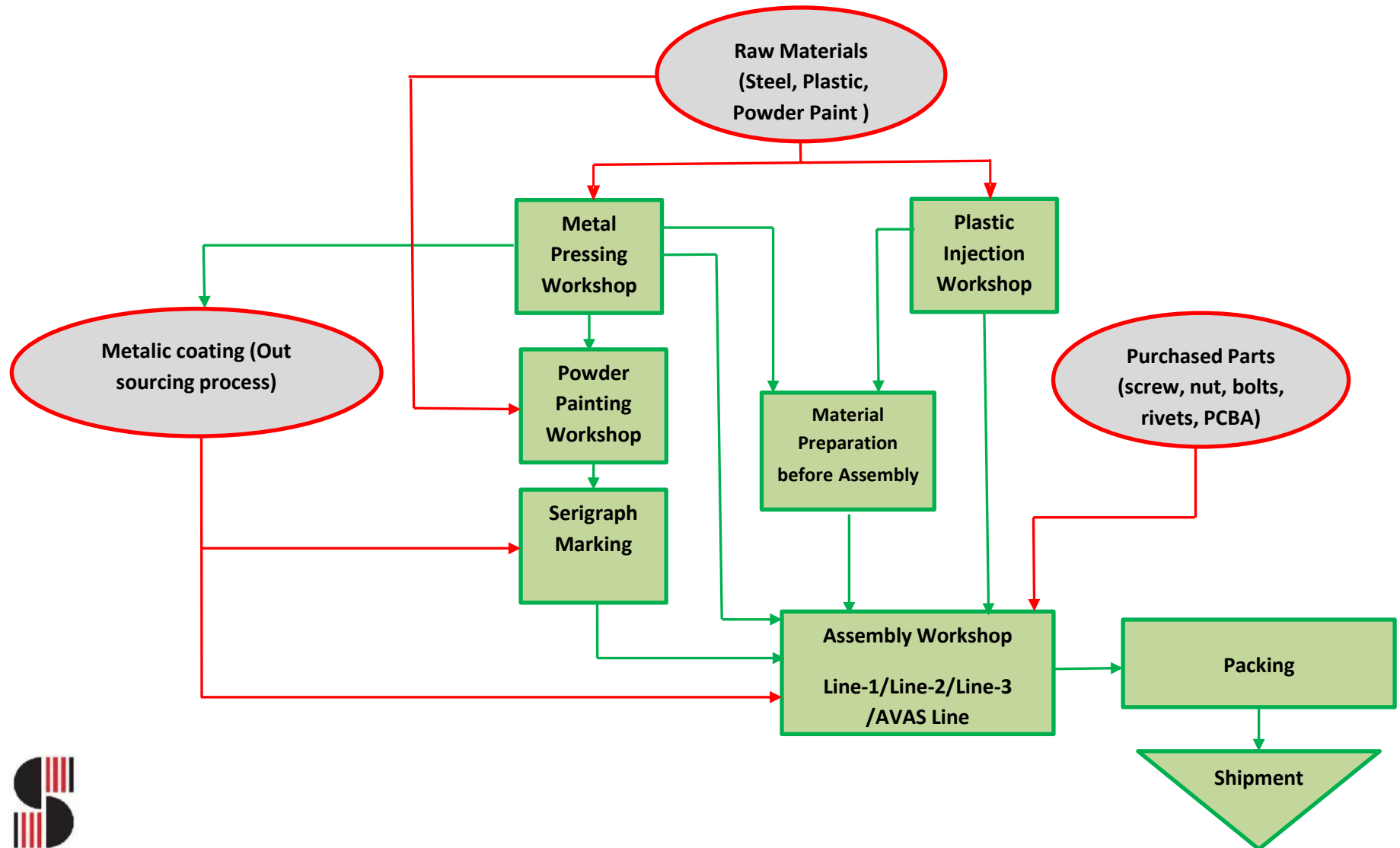
By combining the common interests and goals of our employees and the institution, we ensure that they work in harmony and with a team spirit.  
We ensure that the team spirit is strengthened by providing the necessary opportunities for our employees to reveal their creativity, own their work and improve themselves.

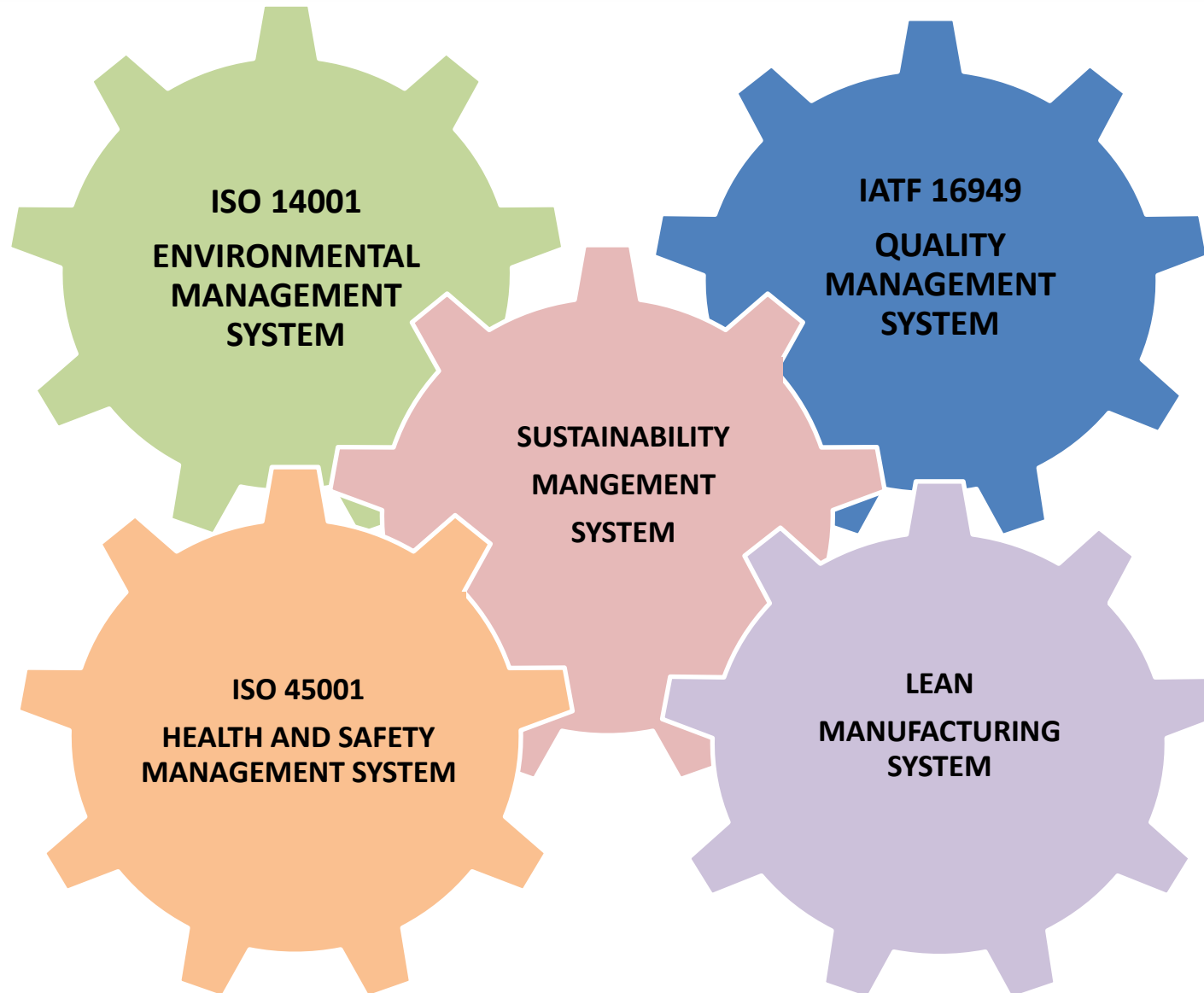
### Speed

We find the most suitable solutions by trying to offer solutions that will satisfy our customers before our competitors.  
We respond to improvement needs in the most effective way.

### Ethic

SEGER A.S. We are aware of the expectations of our customers and act in line with the basic values of business ethics and our social sustainability and ethical policy in all our activities.

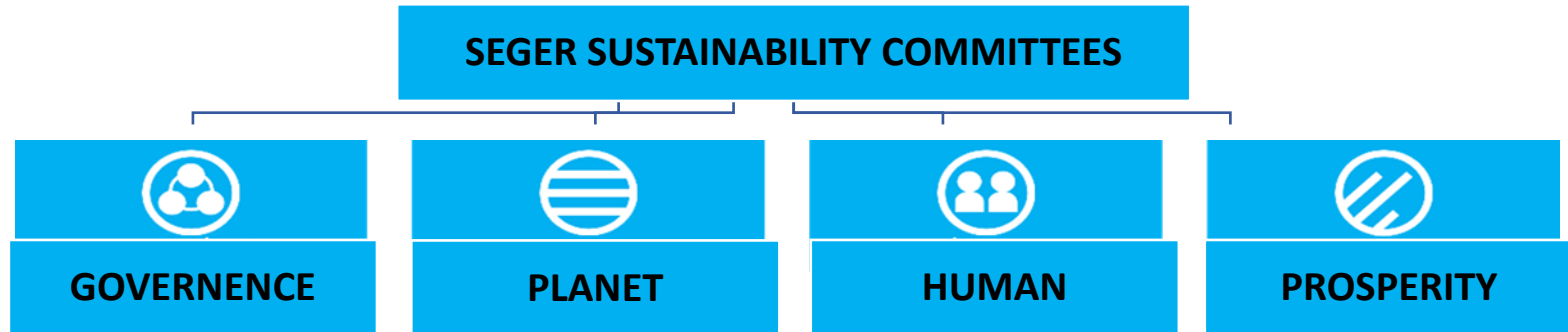




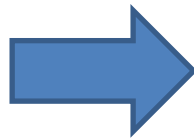


**OUR PRIORITY SUSTAINABLE DEVELOPMENT GOALS  
FOR TODAY AND THE FUTURE**





Started Sustainability studies  
February 2022

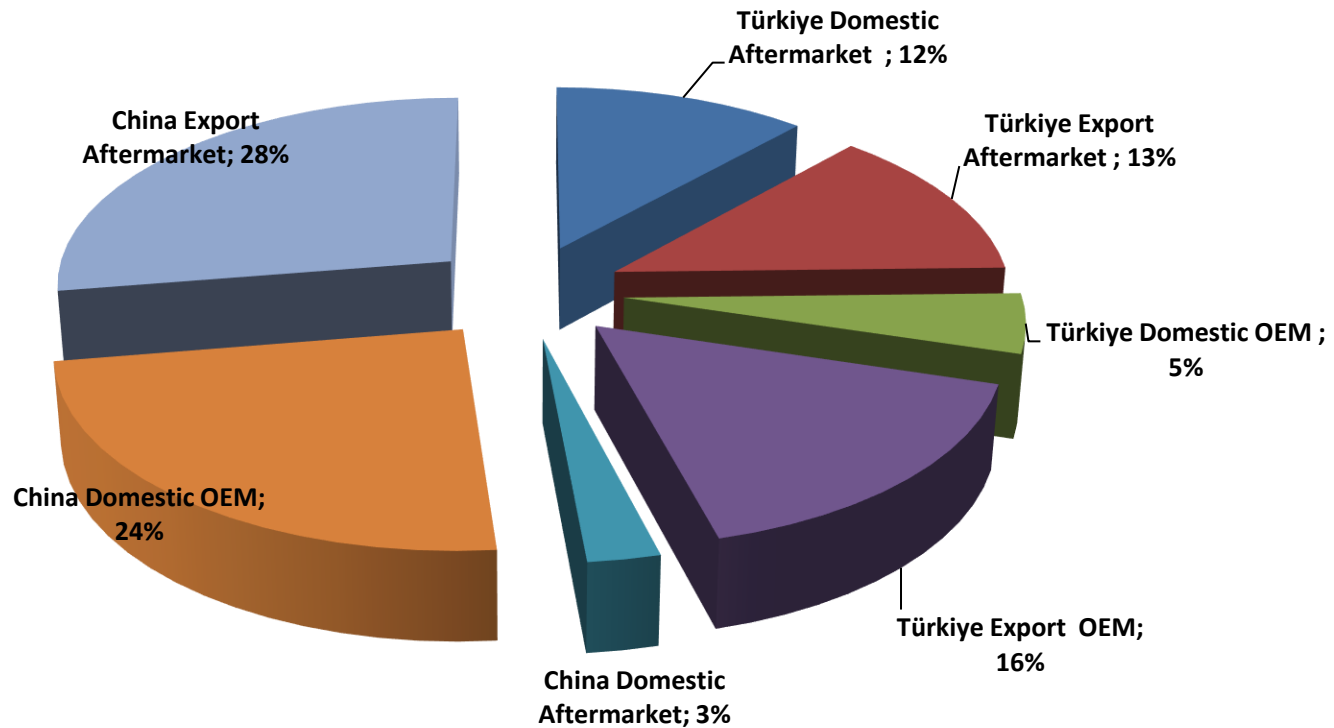


Set up Sustainability committees and defined our sustainability goals and actions  
December 2022



**Publish Seger Sustainability Report  
November 2024**





**2 registered brands in 50 countries**



# SEGER-TURKEY PLANT OEM CUSTOMERS

# SEGER



DACIA



DAIMLER



ISUZU



IVECO



HİDROMEK



# CHINA PLANT OEM CUSTOMERS

# SEGER





*Sejer horns are exported to more than 70 countries all over the world*



A world map with country names labeled in red text, indicating export destinations for Sejer horns. The labels are organized into columns across the map.

Argentina	Belgium	Cyprus	England	France	Azerbaijan	Bangladesh
Chile	Germany	Greece	Holland	Hungary	China	India
Colombia	Italy	Kosovo	Malta	Portugal	Indonesia	Iraq
Ecuador	Romania	Russia	Serbia	Bulgaria	Israel	
Guadeloupe	Slovenia	Spain	Ukraine	Latvia	Jordan	Kazakhstan
Mexico	Macedonia	Poland			Lebanon	Malaysia
Peru			Algeria	Egypt	Pakistan	Philippines
U.S.A.			Kenya	Libya	S.Arabia	Singapore
Uruguay			Madagascar	Mauritius	S.Korea	Sri Lanka
Venezuela			Morocco	S.Africa	Syria	Taiwan
			Sudan	Tanzania	Thailand	Turkmenistan
			Tunis		U.A.E.	Uzbekistan
					Vietnam	Yemen
					Palestine	Japan

From SEGER to all over the World  
From SEGER to all over the World





# SEGER

# SEGER

## R&D ACTIVITIES



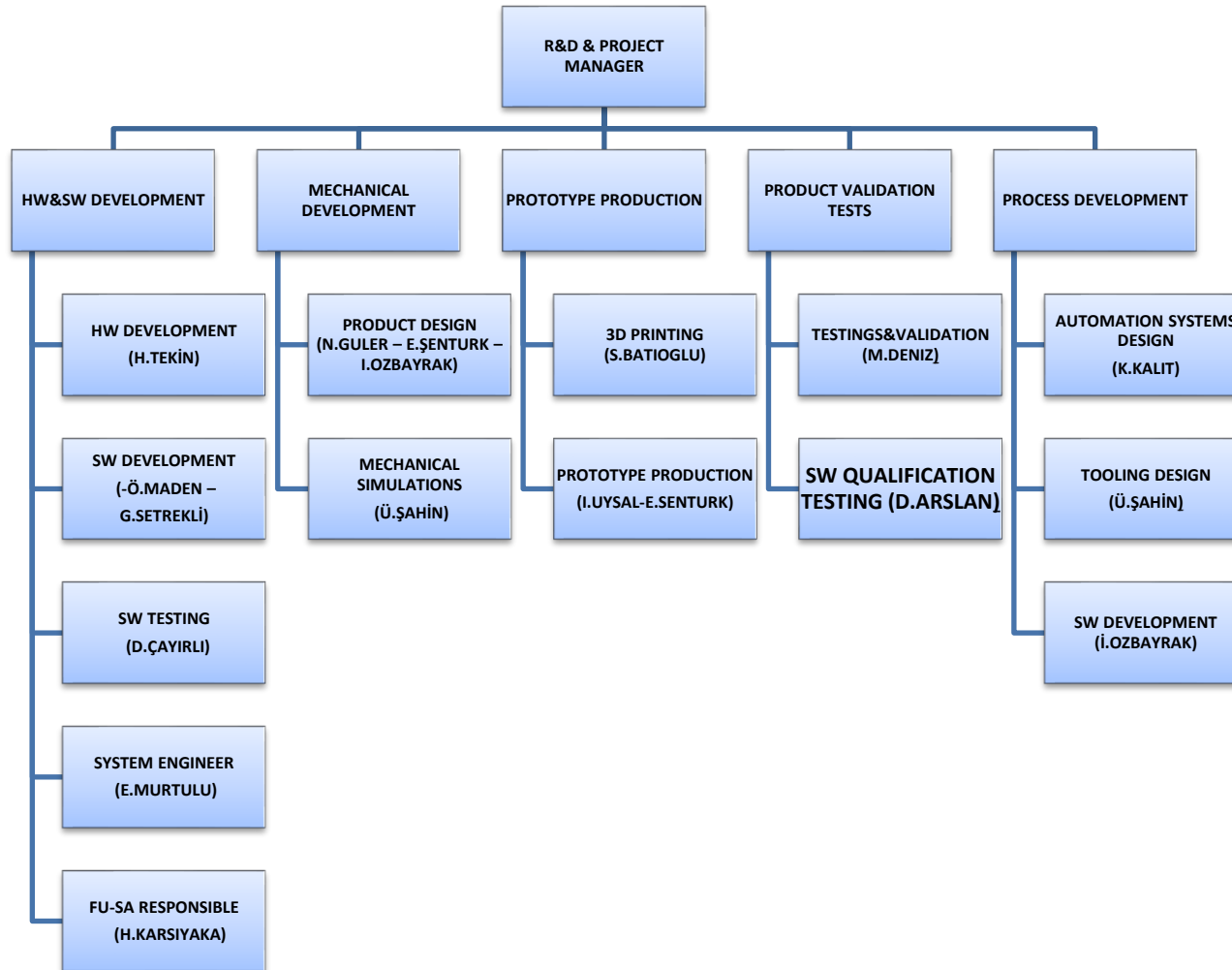
As of April 2023, the **Seger Design Center** has been approved by the Ministry of Industry and Technology under Law No. 5746.

Content	Approved	On Pending
Patents	8	7
Design Registration	4	0
Brand Registration	2	0



# Design Team Org. Chart

# SEGER

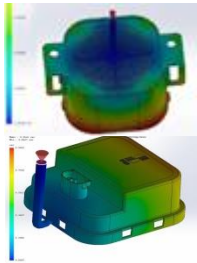




## Electronic Component Design

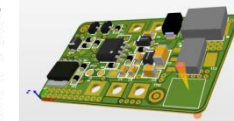
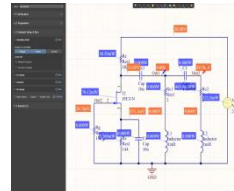
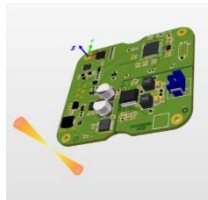
### Mechanical

- Cover Designs
- Connector Designs
- Mech. Simulations



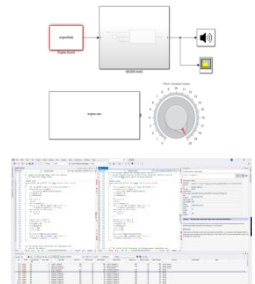
### Hardware

- PCB Design
- Component Selection
- Spice Simulations
- Thermal Analysis
- EMC tests



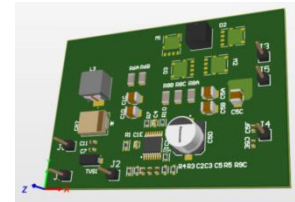
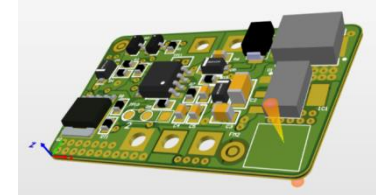
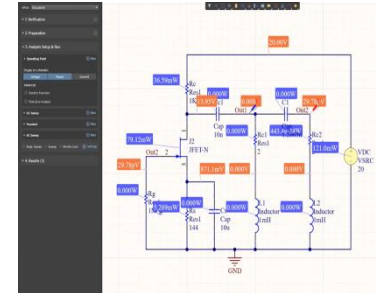
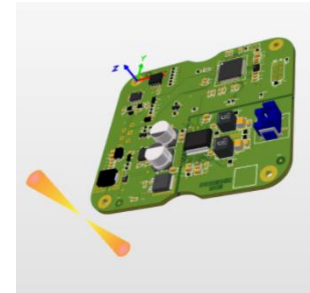
### Software

- Modelling
- Embedded Coding
- Interface Coding
- SW Testings



## HW Design

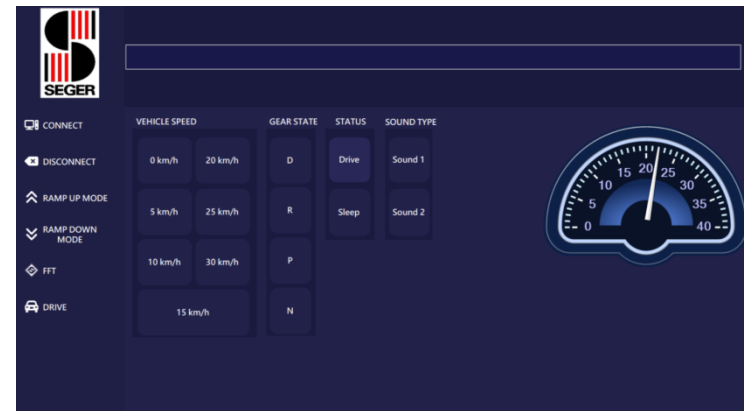
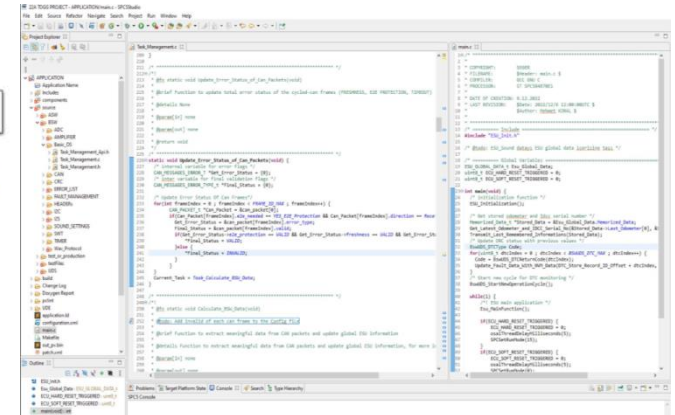
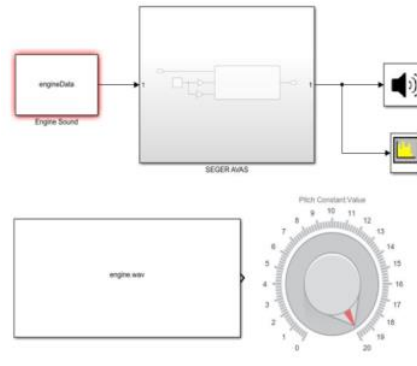
- PCB Design
- Component Selection
- Spice Simulations
- Thermal Analysis
- EMC tests



All HW Requirements are managed in Stakeholder document acc.to Customer Specification and All versioning is done with Sourcetree.



- Modelling
- Embedded Coding
- GUI Coding(Interface)
- SW Testings

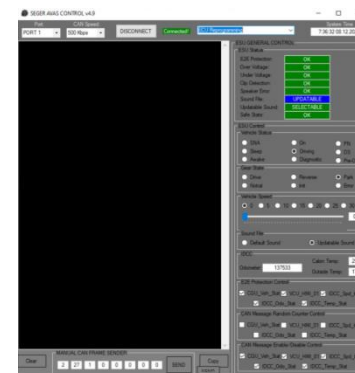
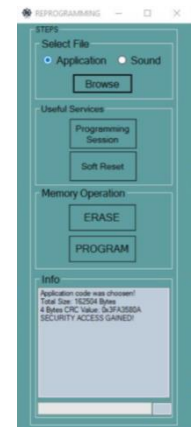
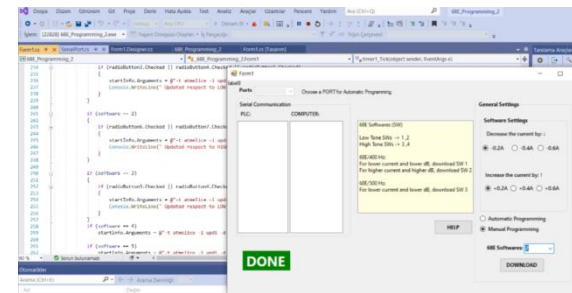
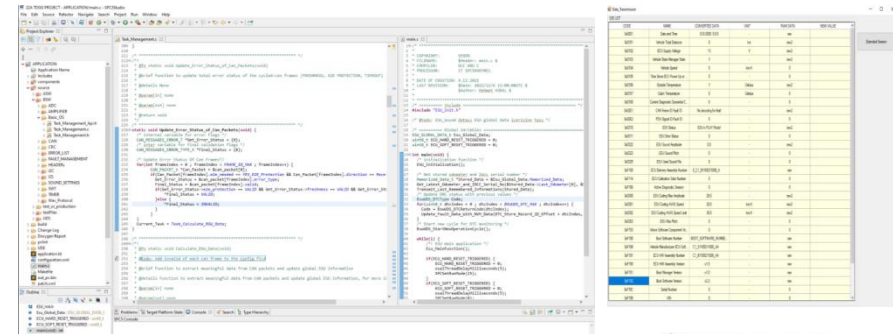


All SW Requirements are managed in Stakeholder document acc.to Customer Specification and All versioning is done with Sourcetree.



## Software Design Capabilities

- Software Development
  - ASW
  - BSW
  - Auto-code Generation
  - UDS acc.to ISO 14229-1
  - Bootloader
  - Verification, Integration, Testing
- Cybersecurity Development
  - Software Signing & Verification
  - Service 27
  - HSM
  - Secureboot
  - Jtag Protection
- GUI Developments
  - Vehicle Simulations
  - Diagnostic Testing





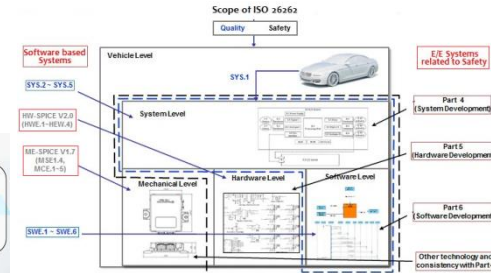
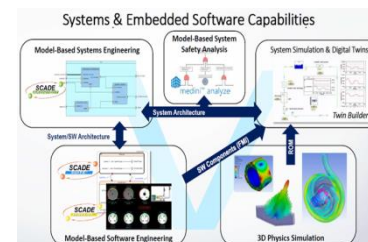
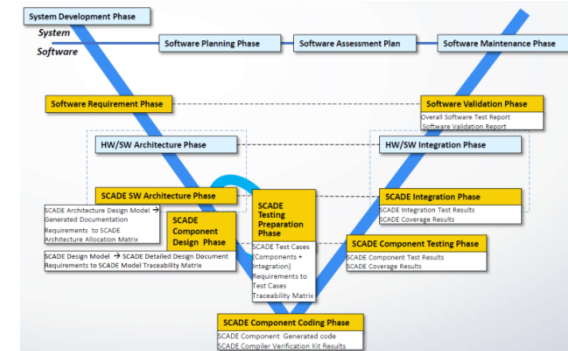
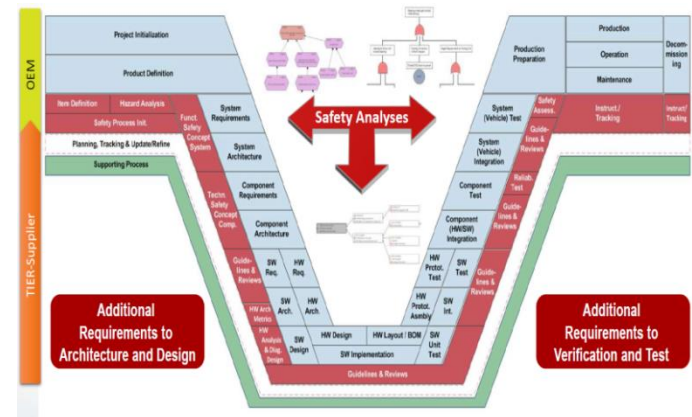
# SEGER

## Seeger uses Ansys

- # Versioning SourceTree

- Scade Medini Analyze Premium

- Scade Medini Analyze Expertise



# Product Development Phase

# SEGER

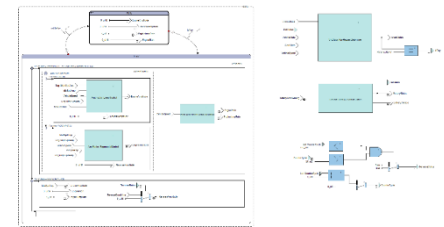
## Creating the Requirements

## HW&SW Design (Design acc.to Requirements)

Anslys Architect Tool :

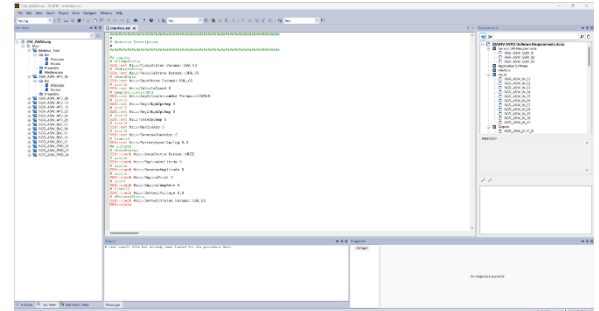
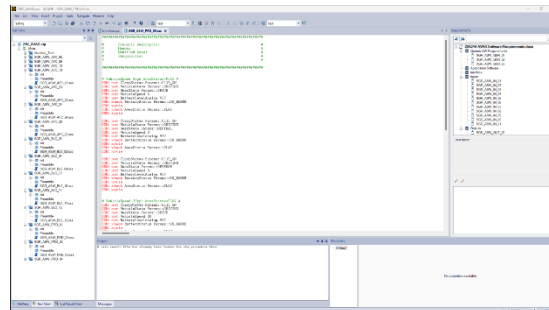


Anslys Scade Suite :

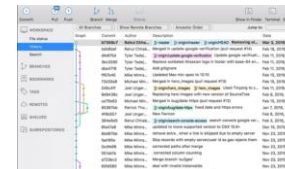
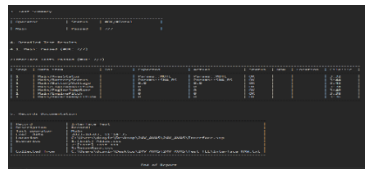


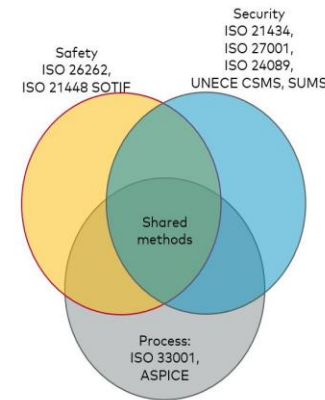
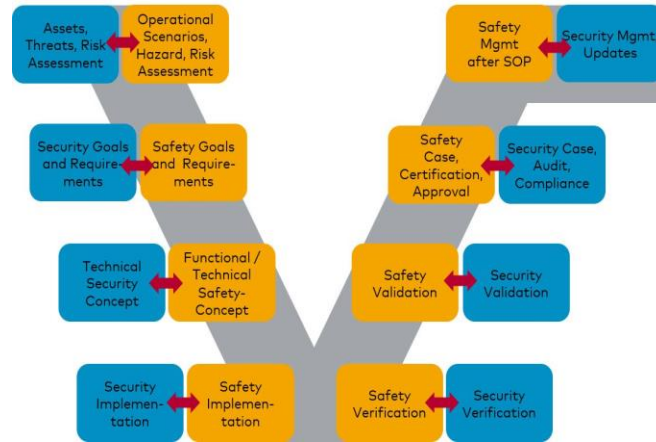
## Integration & Verification (Host Tests are carried out)

Anslys Scade Test Environment for Host  
Anslys Test Model Coverage



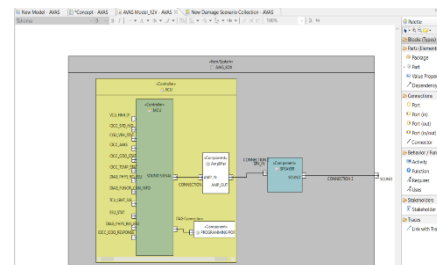
## Model Validation & Versioning





## ISO 26262:2018

- Item Definition
- HARA
- Safety Goals
- FTA (Fault Tree Analysis)
- Safety Requirements
- Safety Concept
- Functional Safety Test Schemes
- Hardware/Software Integration Concepts



## ISO 21434:2021

- Item Block Diagram
- Asset identification
- Threat scenario identification
- Impact rating
- Attack path analysis
- Attack feasibility rating
- Risk value determination
- Risk treatment decision
- Cybersecurity Goals
- Cybersecurity Concept
- Vulnerability Collection

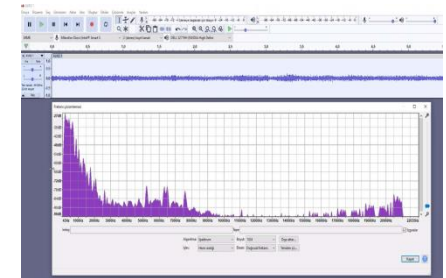
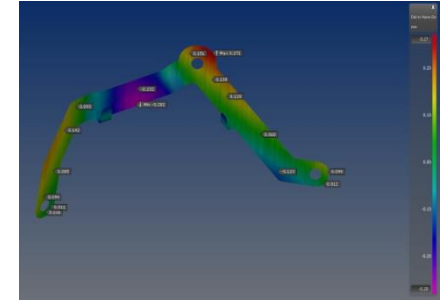
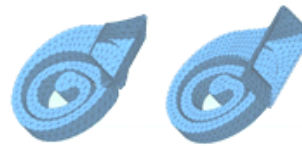
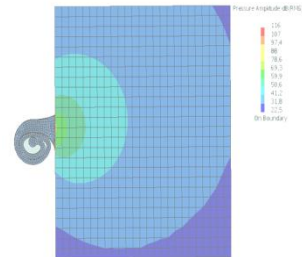


## Mechanical Design

- 2D & 3D Modelling
- CAD/CAM
- Acoustical Simulations
- FEA Simulations
- Fast 3D Prototyping

**SIEMENS**  
**NX**

**SOLIDWORKS**  
**PLASTICS**





## Hardware & Acoustics



## Software



## Mechanical



## Testing





# SEGER

## SEGER

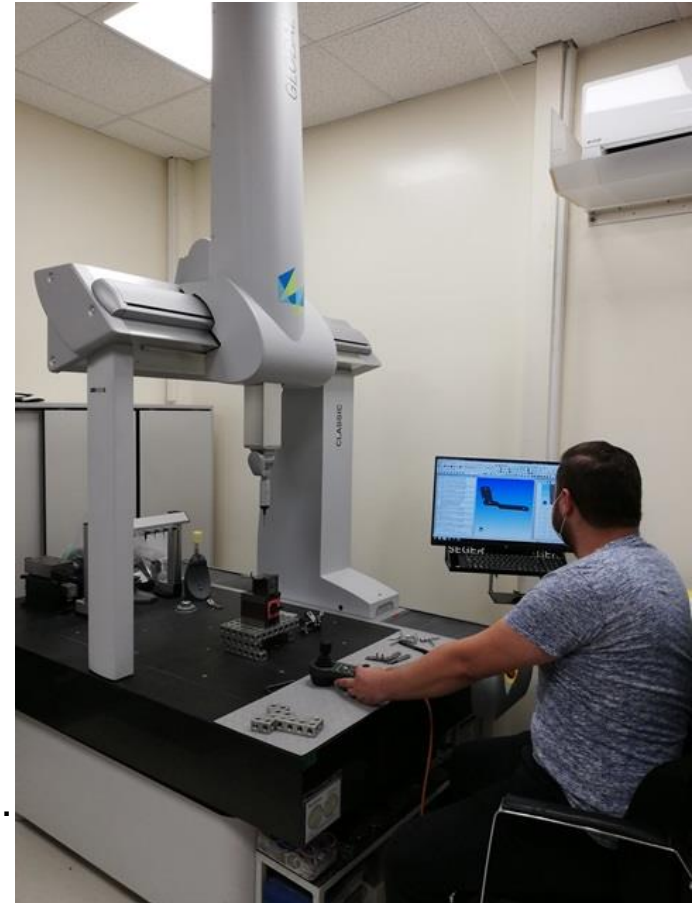
# QUALITY AND TESTING LABORATORY



At our quality laboratory we apply;

- Incoming Inspections and production approvals
- Final product controls
- Process controls
- Process capability studies
- MSA studies
- Performance tests of products and parts
- Lay out inspections
- Calibration facilities
- Failure Analyses of internal & external rejects

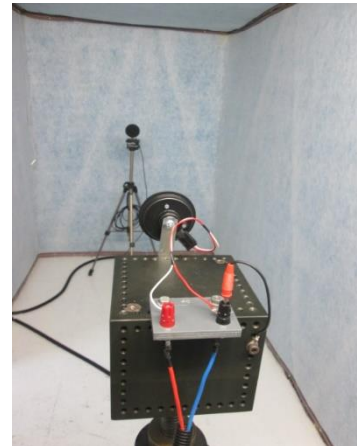
During these facilities we always use calibrated equipments.



- There is a yearly performance test plan and we apply verification tests to verify whether the parts are still met the customer requirements in serial life.

The following Performance Tests carry out in own Quality Laboratories;

- Acoustical Tests
- Conditioning Tests
- Mechanical Shock Tests
- Vibration Tests
- Life Endurance Tests
- Rain Simulation Tests
- Dust Tests
- Low Pressure Compensation Tests
- Heat-Moisture Tests
- Electrical Tests
- Liquid Tightness Tests
- Engine Cleaning Tests
- Splash Water Tests
- Drop Tests
- Salt Spray Tests
- Multi-stage Temperature Tests
- Chemical Tests
- Corroison Tests
- Plug Connection Tests
- Stone Impact Tests
- Software Qualification Tests





# SEGER

# SEGER PRODUCT RANGE








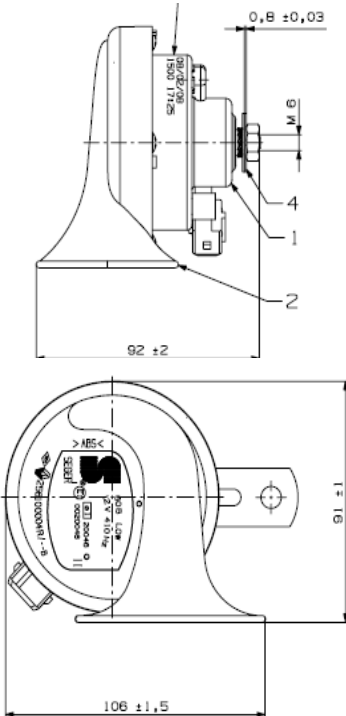
**SEGER**

# Electromechanical Horns



60B – Midi Trumpet Horn


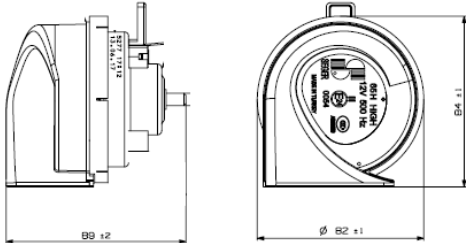

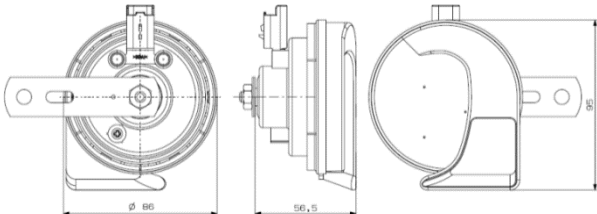
SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger Car Manufacturers & Independent After Sales Markets	<div>60B</div> <div>HORIZONTAL TRUMPET TYPE</div> <div></div>	<div>Nominal Voltage : 12V, 24V Current Consumption: max. 6A., max.3A. Nominal Frequency; 410&amp;510 ±20 Hz Sound Pressure Level; 108-118 dB(A) Life Endurance; 100,000 cycles acc.to ECE R28</div> <div></div>



# 65 – Mega Trumpet Horn


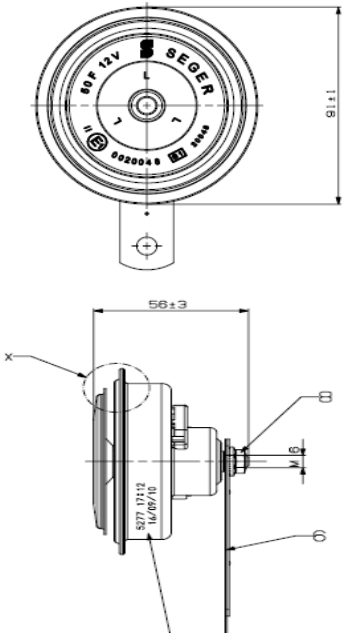
# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger Car Manufacturers & Commercial Vehicle Manufacturers	<b>65H/G – HORIZONTAL TRUMPET TYPE</b> 	<p>                         Nominal Voltages; 12V, 24V                          Current Consumption; max.6A, max.3A                          Nominal Frequency; 400&amp;500 <math>\pm</math>20 Hz                          Sound Pressure Level; 108-118 dB(A)                          Life Endurance; 100,000 cycles acc.to ECE R28                     </p> 
	<b>65V – VERTICAL TRUMPET TYPE</b> 	<p>                         Nominal Voltages; 12V                          Current Consumption; max.6A,                          Nominal Frequency; 410&amp;500 <math>\pm</math>20 Hz                          Sound Pressure Level; 108-118 dB(A)                          Life Endurance; 100,000 cycles acc.to ECE R28                     </p> 



# 50F – Midi Disc Horn


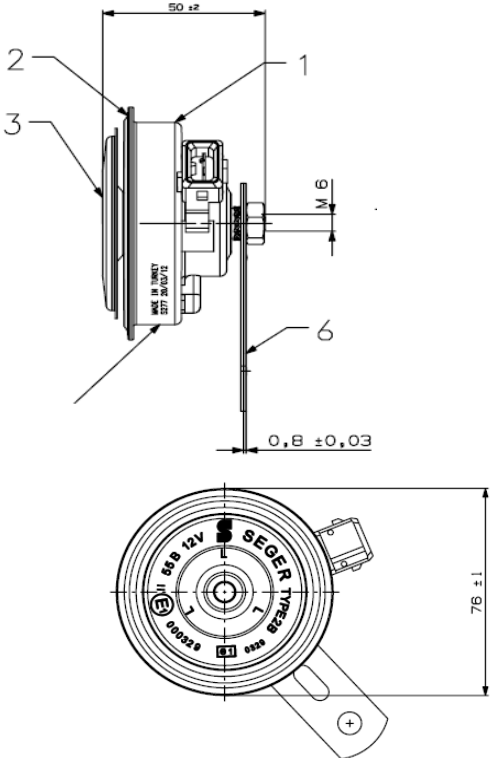
# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger Car Manufacturers & Light Commercial Vehicle Manufacturers & Heavy Duty Vehicle Manufacturers & Construction Vehicle Manufacturers & Agriculture Vehicle Manufacturers & Independent After Sales Markets		<p>Nominal Voltages; 12V, 24V Current Consumption; max.6A, max.3A Nominal Frequency; 335&amp;435 ±30 Hz Sound Pressure Level; 108-118 dB(A) Life Endurance; 100,000 cycles acc.to ECE R28</p> 



# 55B – Mini Disc Horn

# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger Car Manufacturers & Light Commercial Vehicle Manufacturers & Motorcycle Manufacturers	<div>55B DISC TYPE</div> 	<p>Nominal Voltages; 12V, Current Consumption; max.6A Nominal Frequency; 350&amp;420 ±20 Hz Sound Pressure Level; 108-118 dB(A) Life Endurance; 50,000 cycles acc.to ECE R28</p> 








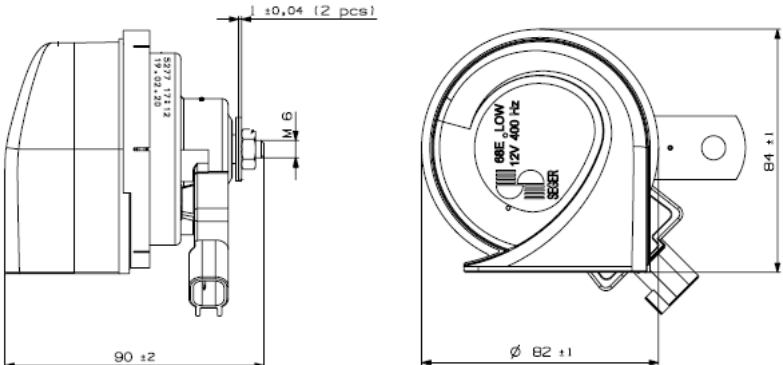
**SEGER**

# Electronical Horns



# 68E – Electronic Trumpet Horn


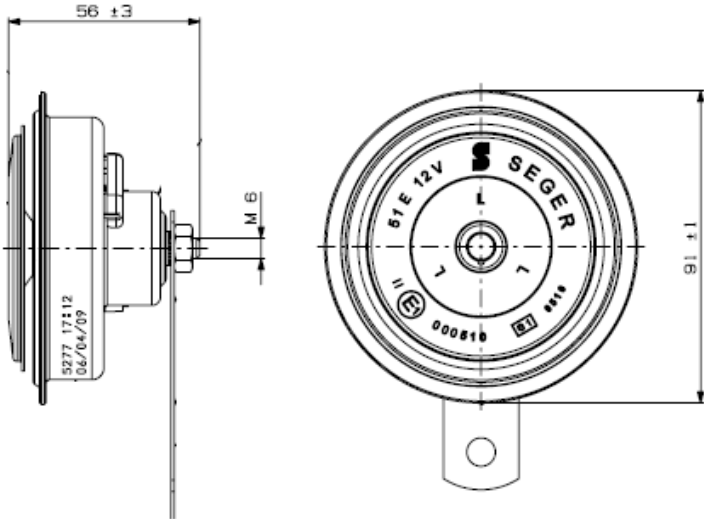
# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger Car Manufacturers & EV Car Manufacturers & Light Commercial Vehicle Manufacturers	<div>68E</div> <div>ELECTRONIC HORIZONTAL TRUMPET TYPE</div> <div></div>	<div>Nominal Voltage : 12V, Current Consumption: max. 6A., Nominal Frequency; 400&amp;500 ±20 Hz Sound Pressure Level; 107-118 dB(A) Life Endurance; 2,000,000 cycles acc.to ECE R28</div> <div></div>



# 51E – Electronic Disc Horn

# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger Car Manufacturers & Light Commercial Vehicle Manufacturers & Heavy Duty Vehicle Manufacturers & Construction Vehicle Manufacturers & Agriculture Vehicle Manufacturers & Independent After Sales Markets	<div>51E ELECTRONIC DISC TYPE</div> 	<div>Nominal Voltages; 12V, 24V Current Consumption; max.6A,max.3A Nominal Frequency; 300&amp;400 ±30 Hz Sound Pressure Level; 105-118 dB(A) Life Endurance; 500,000 cycles acc.to ECE R28</div> <div></div>






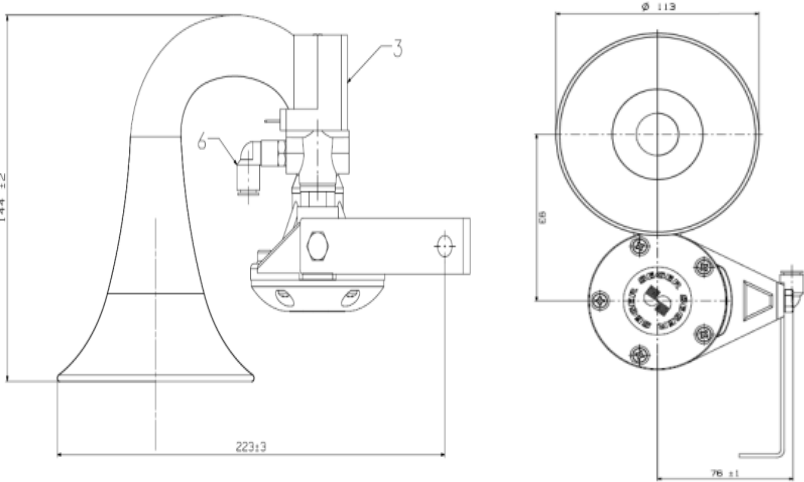
**SEGER**

# Air Horns



# 80JH – AIR HORN

# SEGER


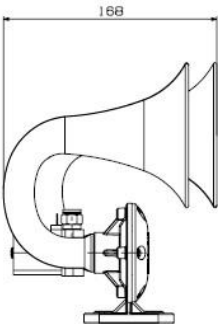
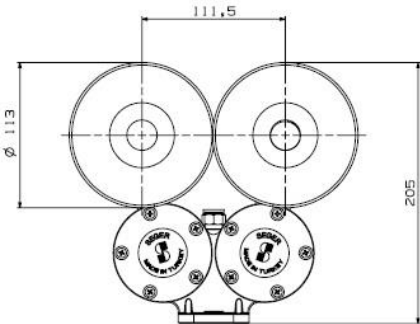
CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Heavy Duty Vehicles ( Buses, Coaches, Trucks ) & Construction Vehicles & Independent After Sales Markets	<div>80JH UNICORN</div> 	<div>Nominal Voltages; 24V, Current Consumption; max.3A Nominal Frequency; 380&amp;420 ±20 Hz Sound Pressure Level; 110-118 dB(A)</div> <div><p>Technical drawing of the 80JH Unicorn air horn. The side view shows a height of 144 ±2 and a base width of 223 ±3. The front view shows a diameter of 113 and a base width of 76 ±1. Callouts 3 and 6 point to specific components.</p></div>





# 81JH – AIR HORN


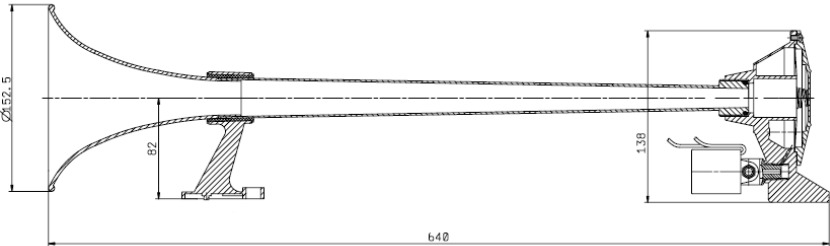
# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Heavy Duty Vehicles ( Buses, Coaches, Trucks ) & Construction Vehicles & Independent After Sales Markets	<div>81JH AIR HORN</div> 	<p>Nominal Voltages; 12V, 24V Current Consumption; max.6A max.3A Nominal Frequency; 440 ±20 Hz Sound Pressure Level; 110-118 dB(A)</p> <div></div>



# 82MH – AIR HORN



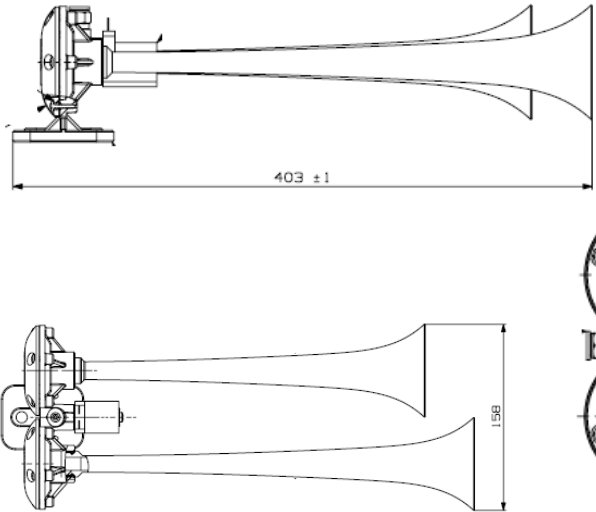
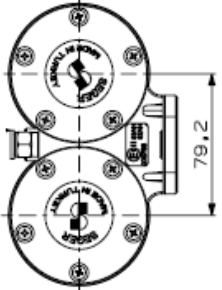
# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Heavy Duty Vehicles ( Trucks ) & Marine Vehicles ( Boats, Ships, Yachts ) & Independent After Sales Markets	<div>82MH (MARINE) AIR HORN</div> 	<div>Nominal Voltages; 12V, 24V Current Consumption; max.6A Nominal Frequency; 600 ±20 Hz Sound Pressure Level; 105-118 dB(A)</div>  <p>Technical drawing showing dimensions of the 82MH Marine Air Horn:</p> <ul style="list-style-type: none"><li>Overall length: 640</li><li>Flare diameter: 52.5</li><li>Mounting bracket height: 82</li><li>Actuator diameter: 138</li></ul>



# 80AH/82AH – AIR HORN

# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Heavy Duty Vehicles ( Buses, Coaches, Trucks ) & Independent After Sales Markets	<b>80AH/82AH AIR HORN</b>  80AH (Plastic PA Pipes)  82AH (Chrome coated aluminium pipes)	<p>Nominal Voltages; 12V, 24V Current Consumption; max.6, max.4A Nominal Frequency; 600 ±20 Hz Sound Pressure Level; 105-118 dB(A)</p>  






**SEGER**

# Back-up Alarm



# 20GK- BACK-UP ALARM

# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger & Light & Heavy & Commercial Vehicle Customers	<div>20GK0948 – BACKUP HORN</div> 	Operating Voltages; 09V-48V. Current Consumption; 0,1A.-0,6A. Sound Pressure Level; 110 dB(A)

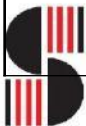




# 21GK- BACK-UP ALARM

# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
Passenger & Light & Heavy & Commercial & Construction Vehicle Customers	<div>21GK1248 – BACKUP HORN</div> <div></div>	Operating Voltages; 12V-48V. Current Consumption; 1A.-1,5A. Sound Pressure Level; 115 dB(A)





# SEGER

## **Acoustical Vehicle Alerting System (AVAS)**



A red banner at the top of the slide features stylized white graphics of a fire flame, a fire truck wheel, and fire truck horns.




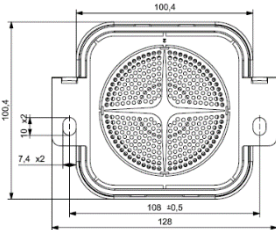
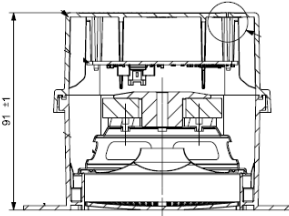
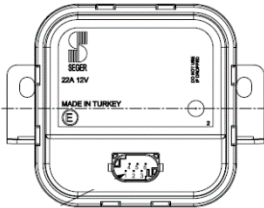
# SEGER

## ACTIVE AVAS (WITH ECU)



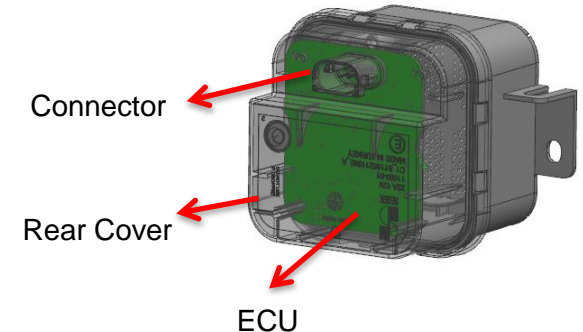
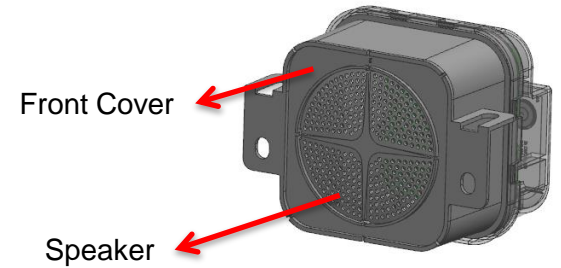
# 22A - Acoustic Vehicle Alerting System(AVAS)

# SEGER

CUSTOMER	SEGER HORN TYPE	SPECIFICATIONS
BEV, PHEV & HEV VEHICLES	<p><b>AVAS</b></p>  <p><b>Forward</b> <b>Reverse</b></p>  	<p>Operating Voltages; 12V-24V.  Current Consumption; max 0,5 A  Frequency; 160-5000 Hz  Sound Pressure Level; 75±3 dB(A)  Communication: CAN 2.0, up to 1 Mbps  Functional Safety ASIL A(ISO 26262)  UDS ISO 14229-1  Cybersecurity Service 27 protection &amp; more  Autosar can be adopted  Operating Vehicle Speed; 0 to 20 &amp; 32 Km/h  Sound Seger Sound Available</p>   



- **POWERFUL SOUND**  
meets Regulation ECE-R138
- **MORE DURABLE**  
at High Temperature Tests
- **STABLE**  
Sound Pattern for Frequency & Acoustical
- **ECU CONTROLLED**  
HW & SW & Sound are placed in the product  
and driven by Product Side



## MAIN TECHNICAL SPECIFICATIONS (Product Type : 22A)

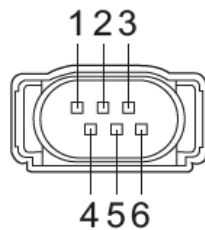
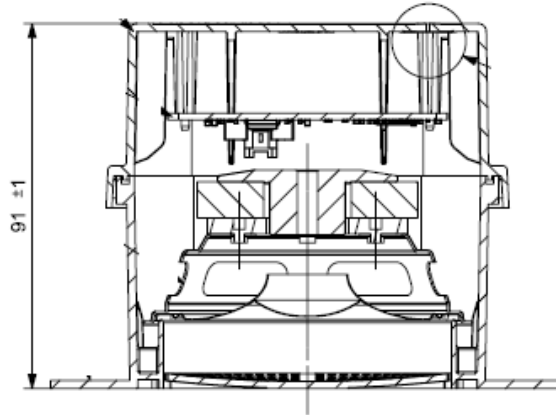
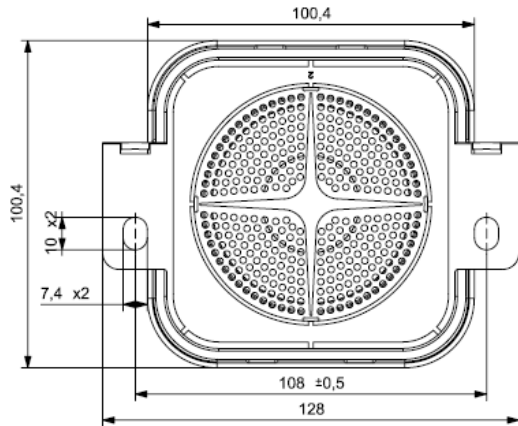
Nominal Voltage	12, 24V	Vdc
Operating Voltage Range	9 – 16, 9-32	Vdc
Current Consumption	Max.0,5	A
Sound Pressure Level (Overall)	75±3 dB(A)	-
Frequency	160 - 5000	Hz
Operating & Storage Temperature	-40° to 85°	°C
Operating relative humidity	30 to 95	%
Speaker Durability (Pink Noise)	> 400	hours
Thermal Overload Protection	Available	
AEC Q Standards	Available	
Communication	CAN 2.0, SAE J1939	Max.1 Mbps
Operating Vehicle Speed	0 to 20 & 32	Km/h
Full Digital Amp	8/16	Bits resolution
Speaker	4	Ω
Speaker Power	5	Watt
Vibration ( 8 h, 3 axis)	3	G
Water Protection	IP67, IP68	15 min.15 cm
UDS & Bootloader Implementation	can be developed	-
Functional Safety ( ISO 26262:2018 )	can be implemented for ASIL A	-
Cybersecurity	can be developed	-
Weight	420	Gr





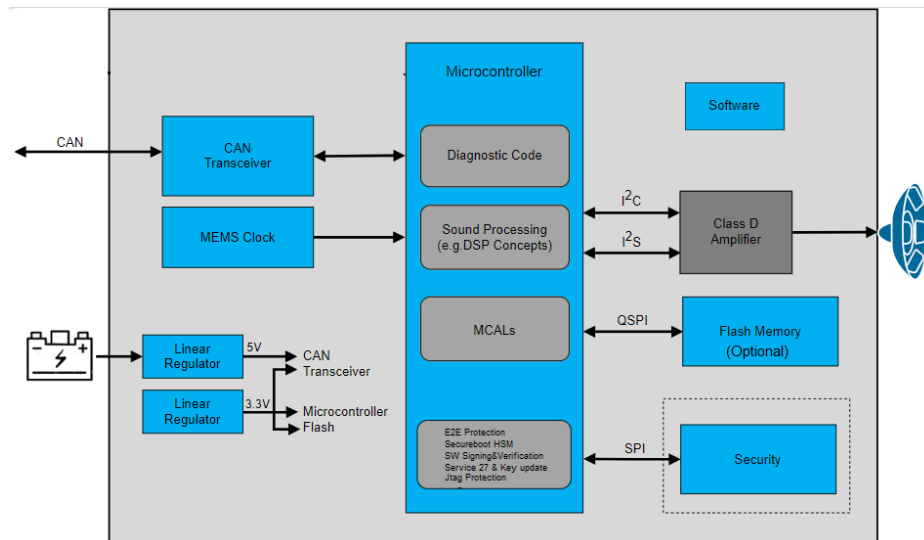
# 22A – AVAS

# SEGER



- 1 V\_BAT
- 2 IGN (Optional)
- 3 CAN\_bus\_L
- 4 N.A
- 5 GND
- 6 CAN\_bus\_H

Harness Connector Number: TE 1-967616-1





# SEGER

## HORN + AVAS (WITH ECU)



## MULTIPLE PRODUCT

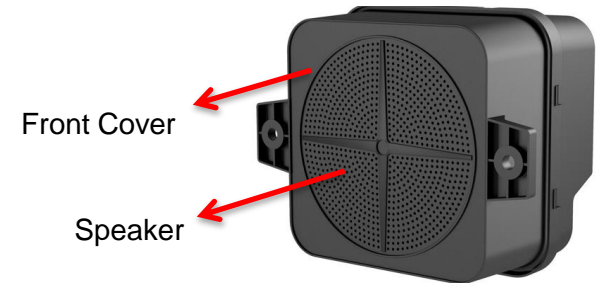
using one Product which covers  
Horns, Buzzer Alarm, Avas, Back up Alarm  
Cost savings on the vehicle reducing many cablings  
Weight reduction



more Additional Sounds can be added;  
Door Locking, Charging Beep Sound, Turning warn and etc.



- **POWERFUL SOUND**  
meets Regulation ECE-R138 & ECE-R28
- **MORE DURABLE**  
at High Temperature Tests
- **COMPACT DESIGN**  
smaller size & Weight
- **STABLE**  
Sound Pattern for Frequency & Acoustical
- **ECU CONTROLLED**  
HW & SW & Sound are placed in the product and driven by Product Side

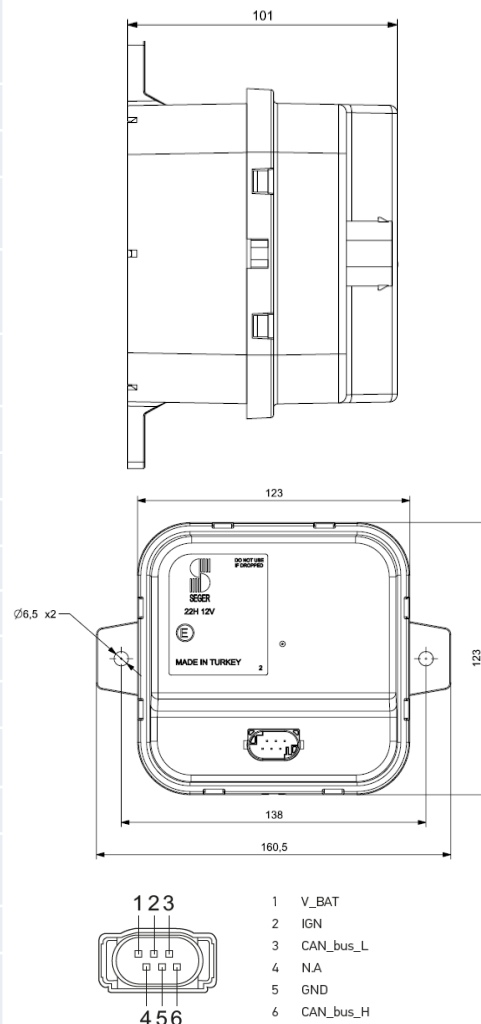


# 22H – MULTIPLE AVAS

# SEGER

## MAIN TECHNICAL SPECIFICATIONS (Product Type : 22H)

Nominal Voltage	12	Vdc
Operating Voltage Range	9 – 16	Vdc
Current Consumption	Avas: Max.0,3 Horn: max.3	A
Sound Pressure Level (Overall)	75±3 dB(A) @ 1 meter 105-118 dB(A) @ 2 meters	dB(A)
Frequency	350 – 5000 1800-3550	Hz
Operating & Storage Temperature	-40° to 85°	°C
Operating relative humidity	30 to 95	%
Speaker Durability (Pink Noise)	> 400	hours
Thermal Overload Protection	Available	
AEC Q Standards	Available	
Communication	CAN 2.0, SAE J1939	Max.1 Mbps
Operating Vehicle Speed	0 to 20 & 32	Km/h
Full Digital Amp	8/16	Bits resolution
Vibration ( 8 h, 3 axis)	3	G
Water Protection	IP67, IP68 IP69K	15 min.15 cm
UDS & Bootloader Implementation	can be developed	-
Functional Safety ( ISO 26262:2018 )	can be implemented for ASIL A	-
Cybersecurity	can be developed	-
Weight	450	Gr



**Harness Connector  
Number: TE 1-967616-**





# SEGER

## PASSIVE AVAS (WITHOUT ECU)





- **POWERFUL SOUND**

Meets Regulation ECE-R138

- **MORE DURABLE**

at High Temperature Tests

- **COMPACT DESIGN**

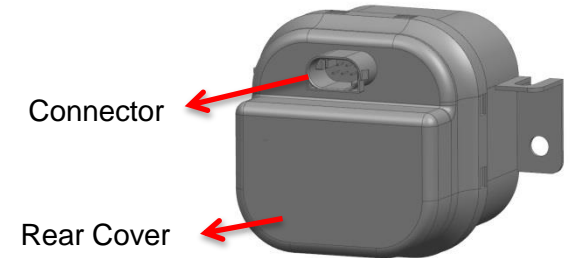
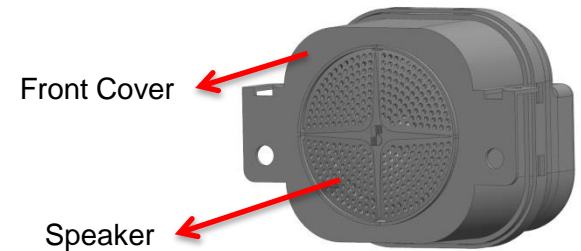
smaller size & Weight

- **STABLE**

Sound Pattern for Frequency & Acoustical

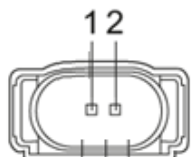
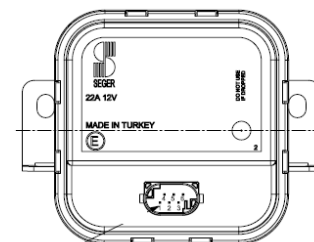
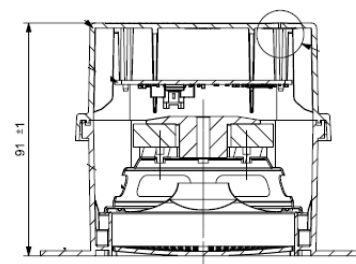
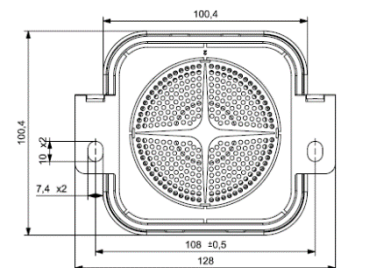
- **CONTROLLED BY CUSTOMER**

HW & SW & Sound are supplied and  
drived by Customer Vehicle Side

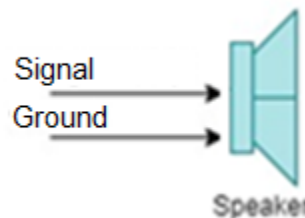


## MAIN TECHNICAL SPECIFICATIONS (Product Type : 22P)

Nominal Voltage	Any Vehicle voltage	Vdc
Current Consumption	Max.0,5	A
Sound Pressure Level (Overall)	75±3 dB(A)	-
Frequency	160 - 5000	Hz
Operating & Storage Temperature	-40° to 85°	°C
Operating relative humidity	30 to 95	%
Speaker Durability (Pink Noise)	> 400	hours
Operating Vehicle Speed	0 to 20 & 32	Km/h
Speaker	4	Ω
Speaker Power	5	Watt
Vibration ( 8 h, 3 axis)	3	G
Water Protection	IP67, IP68	15 min.15 cm
Weight	400	Gr



1 SIGNAL  
2 GND



# SEGER

*Thank you very  
much*

