

회 사 소 개 서

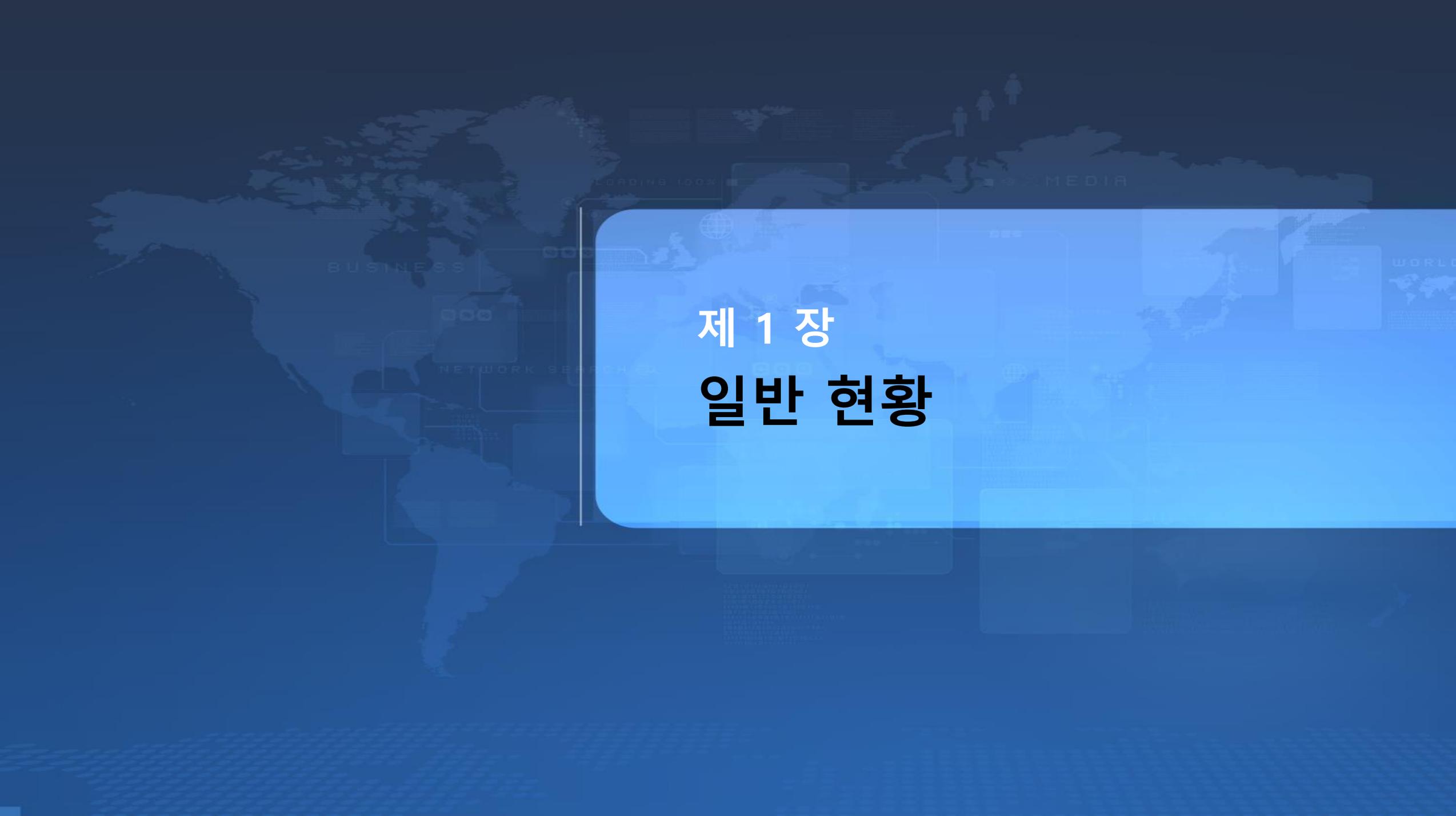
August 2019



목 차

Index

1. 일반 현황
2. 제품 현황
3. 금형 개발
4. 제품 설계 및 개발
5. 시험 및 신뢰성 확보
6. 신기술 개발



제 1 장 일반 현황

일반 현황

본사 & 제 1사업장(평택)



DI오토모티브(경주)



DIKI (Duck Il Korea Incorporated) (필리핀)



제 2사업장(평택)



R&D/시험센터(동탄)



사업장 기본 정보

본사 및 계열사		
위치 & 규모	본사 & 제 1 사업장	경기도 평택시 세교산단로 21-20 대지 9,268㎡ / 건물 17,195㎡
	제 2 사업장	경기도 평택시 세교산단로 22번길 대지 10,243㎡ / 건물 12,889㎡
	R&D / 시험센터	경기도 화성시 방교동 동탄산단7길 대지 2,600㎡ / 건물 10,891㎡
	DI AUTOMOTIE	경북 경주시 강동면 천강로 534-8 대지 16,679㎡ / 건물 9,454㎡
	DIKI	Lapu-Lapu, Cebu, Philippines Ground 11,368㎡ / Building 6,895㎡
주요 핵심 사업	<ul style="list-style-type: none"> ▪ 스위치 : Power seat switches , Seat Control Module, Control Modules ▪ 인테리어램프 : Overhead console, Room lamps, Interior lighting ▪ 전장 & 내장품 : HVAC unit, Cup holder ▪ 사출부품 : Fuse & Relay Box, Connectors, Channels, Band cables & Clips ▪ 사출금형 : Design and Fabrication ▪ 디자인 센터: Product Design, Development, Mold Development 	

1990s



- 1993. 08 회사설립 (대표 유기덕)
- 1999. 03 기술혁신 개발업체 선정(중소기업청)

2000s



- 2000. 09 대통령 표창 (우수자본재 개발)
- 2001. 12 SQ-Mark '사출부문' 획득 (현대기아자동차) - A등급
- 2002. 02 CLEAN 사업장 선정 (노동부)
- 2005. 06 INNO-BIZ 인증기업 (중소기업청)
- 2006. 02 SQ-Mark '전기/전자(솔더)부문' 획득 (현대기아자동차) - A등급
- 2009. 02 JVIS USA와 Business Partnership 체결 및 HVAC/Cup Holder/Flashlight 등

2010s



- 북미수출 개시
- 2011. 04 필리핀 Cebu 공장(DUCK-IL KOREA Incorporated) 설립 및 가동 개시
- 2013. 01 글로벌 강소기업 인증 (중소기업청)
- 2014. 01 NEW CI (Corporate Identify) 확정 및 선포
- 2015. 08 평택 본사(1사업장) 준공 및 가동
- 2017. 02 DI 오토모티브 (DIA) 가동
- 2018. 05 JVIS와 Zoon 및 GE 사업 시작
- 2018. 09 CMMI Level 3 구축
- 2018. 09 ISO/IATF 16949 인증 (BSI)
- 2019. 07 신뢰성 시험센터 ISO/IEC 17025:2006 인증 (KOLAS)
- 2019. 10 R&D 및 신뢰성 시험 센터 오픈 (예정)



1990s



1999. 10 회사설립

2000s



2001. 03 QS 9000 인증(AFAQ)

2002. 05 ISO 9002 인증(AFAQ)

2006. 03 SQ-Mark '사출부문' 획득 (현대기아자동차)

2006. 04 SQ-Mark '전기/전자(솔더)부문' 획득 (현대기아자동차)

2006. 10 TS 16949, ISO 9001(AFAQ)

2007. 07 현대모비스 거래 개시

2009. 09 R&D Center 설립

2010s



2010. 08 LS Automotive & Technology 거래 개시

2015. 05 SL ADAS 거래 개시

2017. 02 덕일산업 인수

2017. 05 사명 변경 "DI Automotive Co.,LTD"

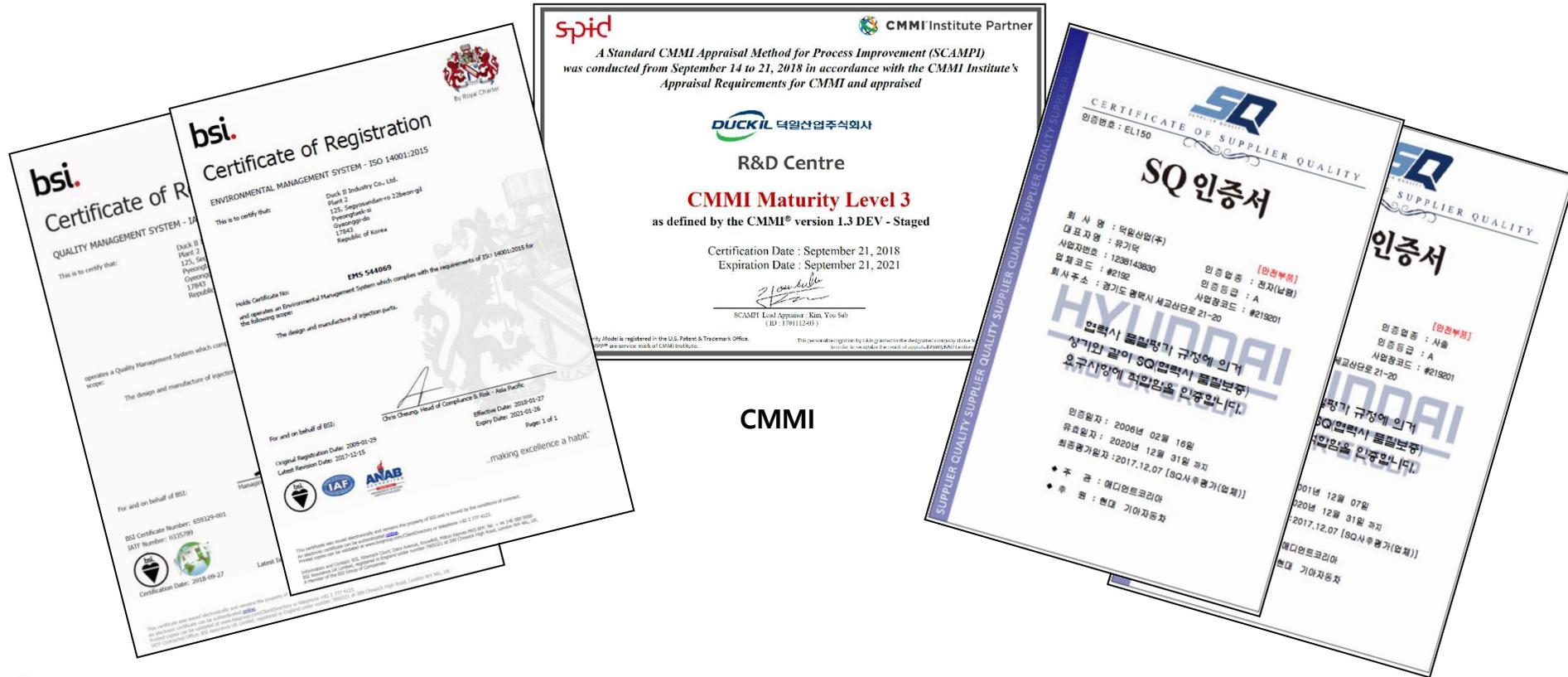
2018. 10 IATF 16949, ISO 9001 인증(TUV HESSEN)



2010s



- 2011. 04 세부공장 가동 개시 (MEPZ I, Lapu Lapu City, Cebu)
- 2011. 09 GM K2xx & Nissan CMF1 프로그램 수주 - LEAR
- 2012. 03 ISO/TS16949 by BSI (TUV) 획득
- 2012. 03 신규 공장 확장 (CLIP, Mactan Lapu-lapu City, Philippines)
- 2013. 04 신규 공장 가동 개시
- 2013. 06 X60A Nissan Protector 프로그램 수주
- 2014. 10 GMK2XX 및 P32R/CMF1 양산
- 2015. 06 P60A 및 J32U 프로그램 수주
- 2016. 03 P71A 프로그램 수주
- 2016. 04 완제품 창고 증축 - (반자동화)
- 2016. 12 J32U HEV 프로그램 수주
- 2017. 10 ISO/TS16949 재 인증 (TUV Rheinland)
- 2017. 11 STI-P 공급업체 인증 획득
- 2018. 07 ISO /IATF 16949 인증 (TUV Rheinland)
- 2018. 11 Autoliv 거래 개시



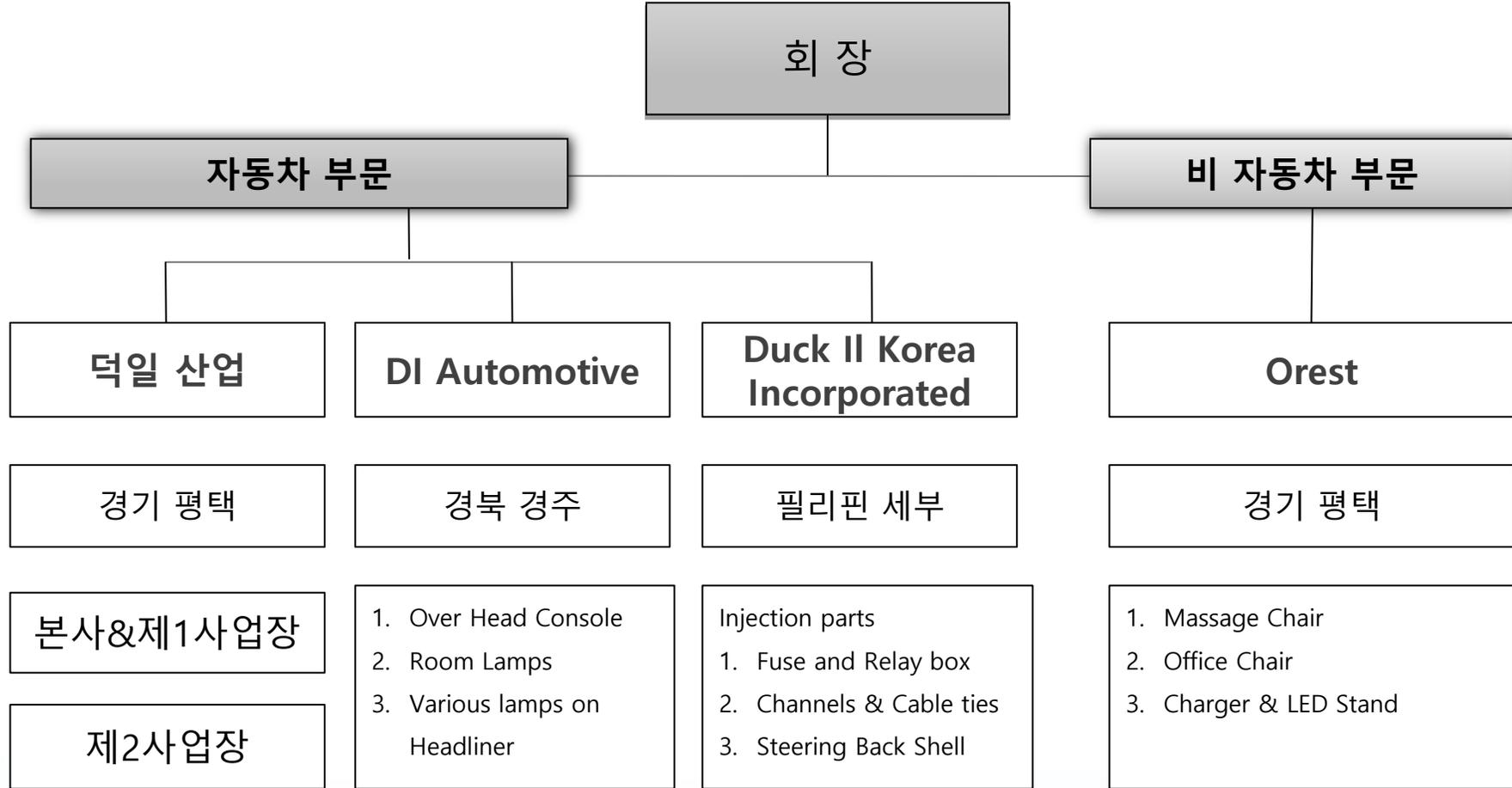
<ISO14001>

<IATF16949 : 2016>

Electrical/Electronics

Injection

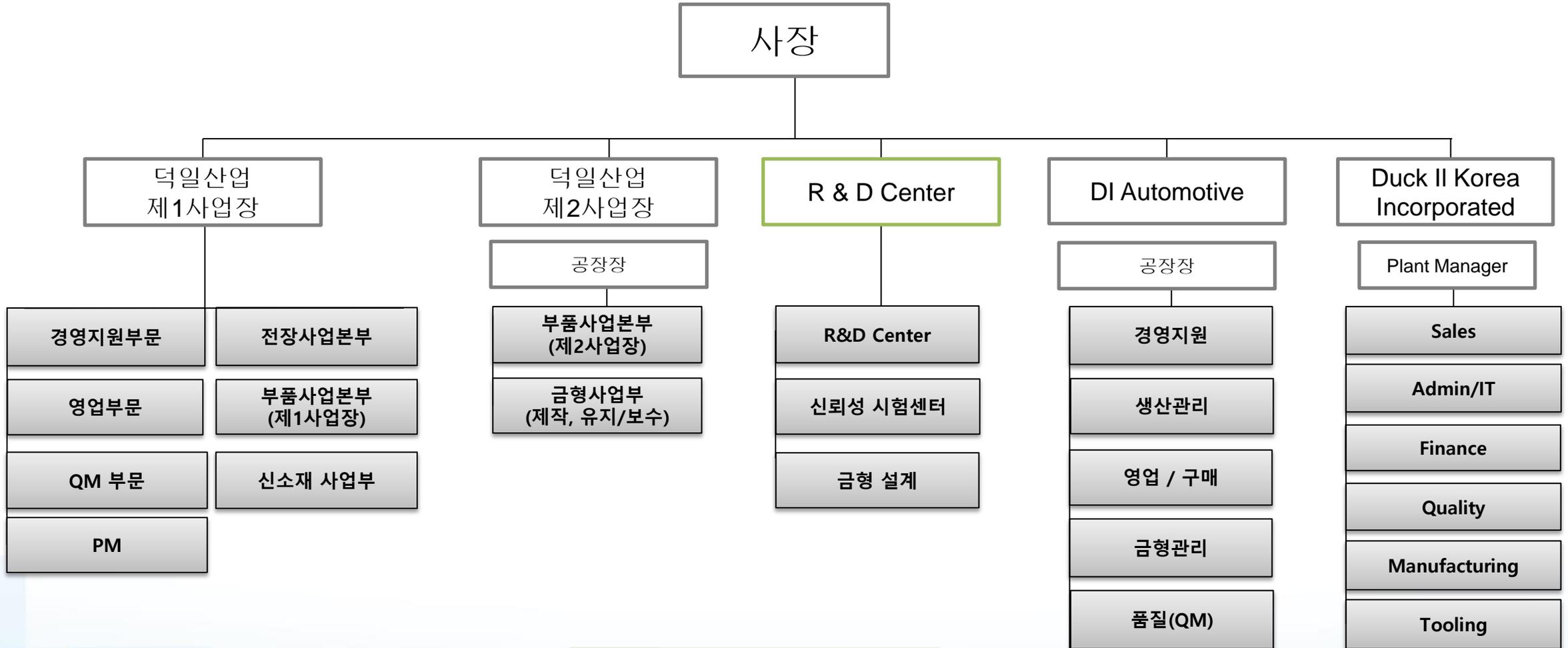
CMMI



회사명

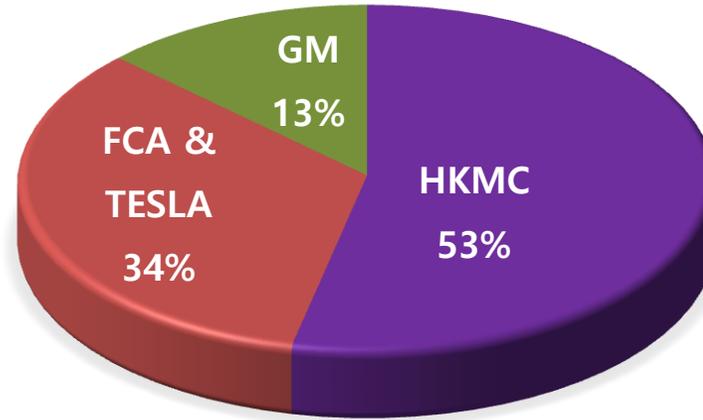
위치

주요 사업



R&D Center : Open, 2019년 10월
경기도 화성 동탄 위치

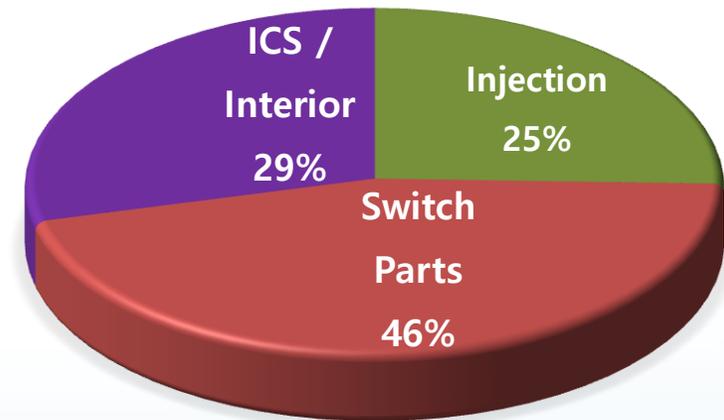
자동차 제조사 별 점유율



내수 vs 수출 비율



제품별 점유율



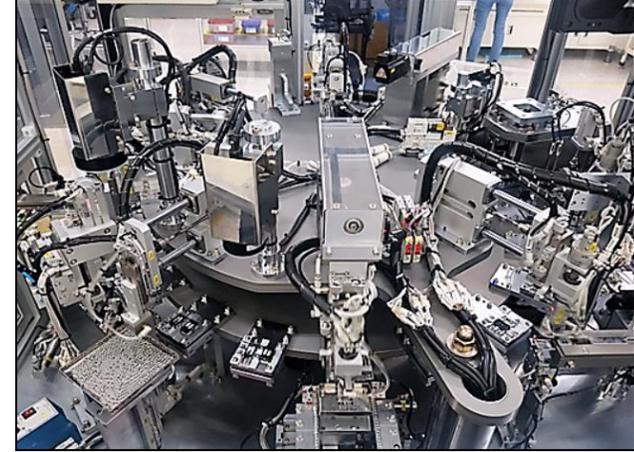
년도	품 목	고객사
1995 ~	Connectors, Fasteners , Covering of Wiring harness	GM, RSM, HKMC
1998 ~	HVAC switch / Manual Type	HMC
2000 ~	Switches on Steering Wheel , Horn Switch	HMC, KMC
2002 ~	Power Seat Switch, Lumbar , Recline & Slide limit switch	HMC, KMC, GM Korea
2005 ~	Fuse & Relay Boxes	GM, RSM, Honda, Mitsubishi
2010 ~	Integrated Center Stack , Flash light	FCA
2011 ~	Lumbar Switch	TESLA Model S
2012 ~	Wireless Charging Mat , Cup Holder	FCA, Ford
2014 ~	Power Seat Switch, Lift Gate S/W	TESLA Model X
2015 ~	Battery Charge Indicating System	FCA
2016 ~	Lift gate Switch & Hood Bump Stop	Model 3 for TESLA
2016 ~	Door open Switch, USB Port, Interior lighting	Karma K2
2017 ~	Interior Ambient lighting	FCA DT, DJ
2018 ~	Room Lamp - Touch Type Switch	Karma
2018 ~	Integrated Seat Switch Module / Walk-in and ECU	HMC
2018 ~	Wireless Charging Mat – Inductive Type, 15 W	HMC, Zoox

구 분	설비 & 기구	수 량
사출기 (제1 & 2 사업장)	총 보유 사출기	85
	▪ Single Injection Machines 30 Ton ~ 400 Ton	64
	▪ Double Injection Machines 140 Ton, 160 Ton	8
	▪ Insert Injection Machines 80 Ton, 100 Ton, 200 Ton, 250Ton	13
조립라인	<ul style="list-style-type: none"> ▪ Power Seat Switch Assembly Line ▪ HVAC Assembly Line ▪ Interior lighting Assembly 	19
자동 조립 라인	<ul style="list-style-type: none"> ▪ Micro Switch Auto Ass'y Machine ▪ Recline limit Switch Auto Ass'y Line ▪ Terminal Insert Machines for Header Connectors 	12
PCB 조립 라인	<ul style="list-style-type: none"> ▪ SMD Line ▪ Wave Solder Line / Selective Solder Machines 	4 4
도장 라인	▪ Paint Spray Chamber (By 4 Booth) – Dry line 48Meter	1
Laser Etching	▪ Laser Etching Line	5

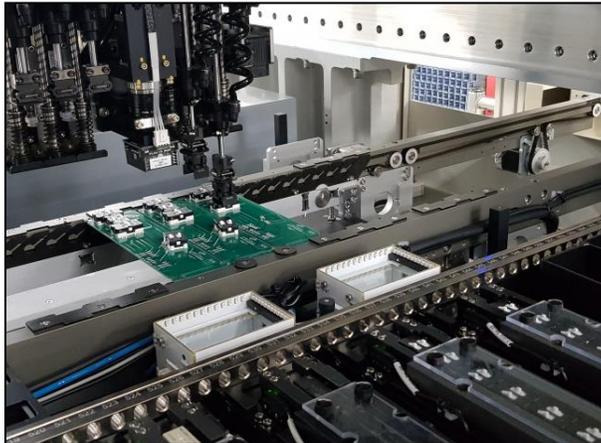
구 분	설비 & 기구	수 량
사출기	총 보유 사출기	42
	• Single Injection MCs 50Ton ~ 380 Ton	34
	• Vertical Injection MCs 150Ton ~ 250 Ton	7
	• Double Injection MCs 400ton	1
조립 라인	<ul style="list-style-type: none"> • O/H Console Lamp Line • Room Assembly Line 	38
자동화 라인	<ul style="list-style-type: none"> • Vanity Lamp Automatic Line • Room Lamp Automatic Line 	2

구 분	설비 & 기구	수 량
사출기	<p>총 보유 사출기</p> <ul style="list-style-type: none"> ▪ Single Injection MCs <ul style="list-style-type: none"> • 120 ~ 170 Ton • 200 ~ 250 Ton • 300 ~ 450 Ton ▪ Double Injection MCs <ul style="list-style-type: none"> • 400 Ton Double Injection - 2 	34
측정기	<ul style="list-style-type: none"> ▪ Co-ordinate Measurement Machine ▪ Vision Measuring Machine ▪ Melt Flow Index Analyzer ▪ Moisture Analyzer 	6
금형 부문	<ul style="list-style-type: none"> ▪ Wire Cut MC ▪ Electrical Discharge Machine ▪ Grinding Machine ▪ Machining Center ▪ Milling Machine ▪ Power Drill / Drill ▪ Lathe Machine ▪ Horizontal Band Saw 	12



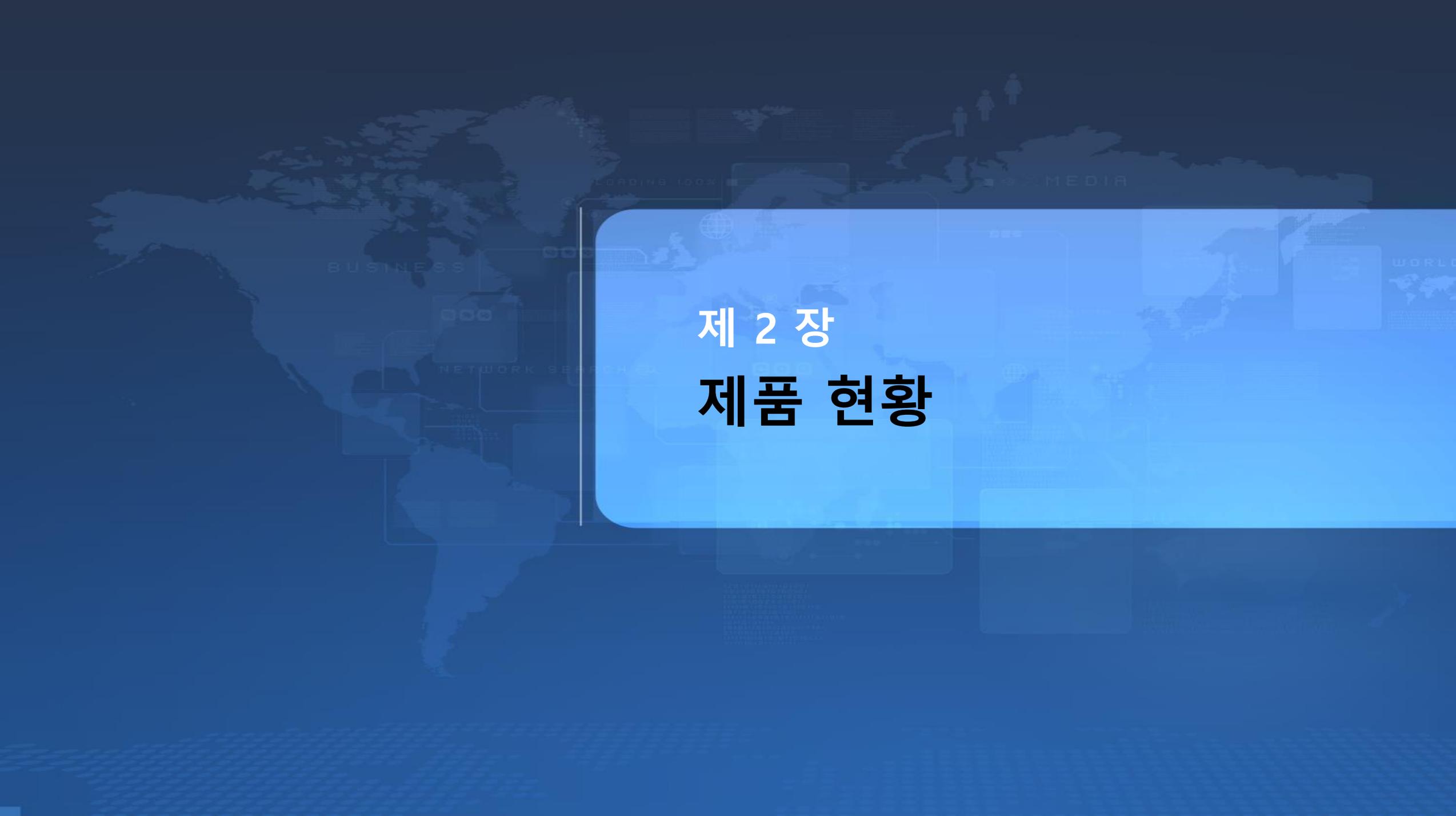




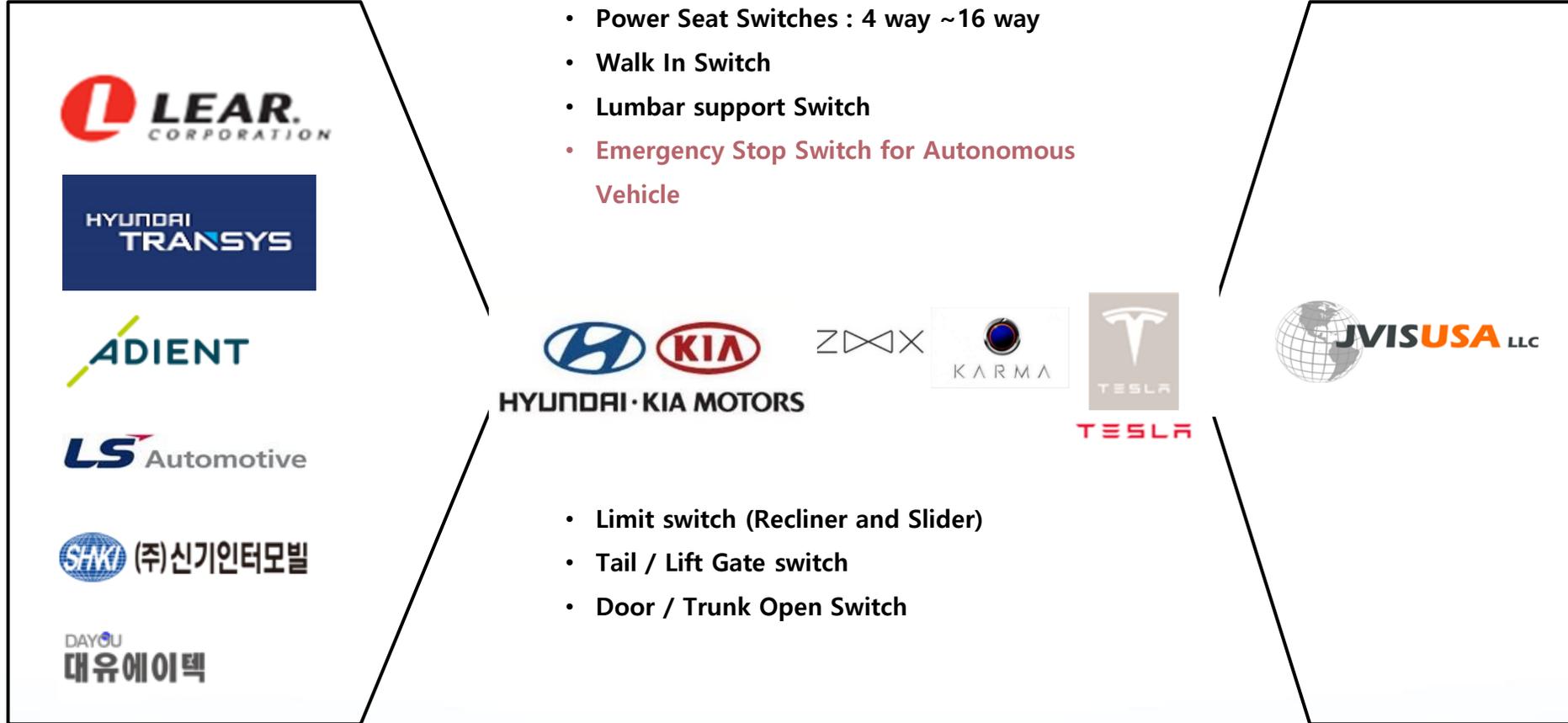








제 2 장 제품 현황



Project

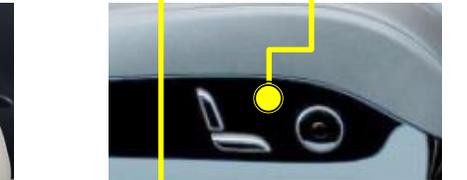
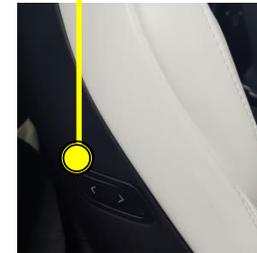
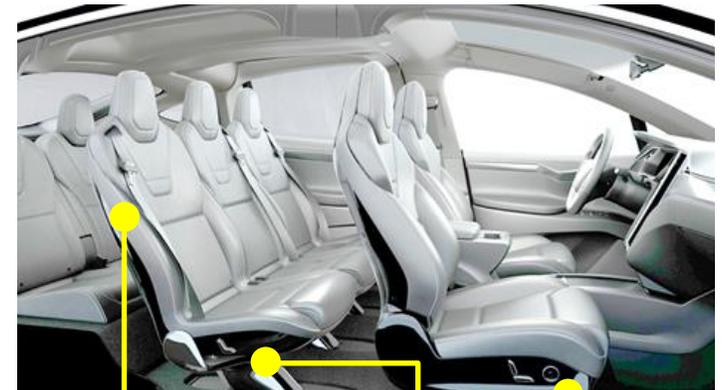
Variant Global Car Maker's

End Customers

- Hyundai Motor
- KIA Motor
- TESLA

Products

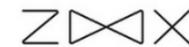
- Power seat switch
- Walk-in switch
- Lumbar switch
- Recline limit switch
- Slide limit switch
- Lift gate switch





TESLA

- Integrated Center Stack
- Cup Holder
- Ambient Lights
- Door Map Pocket
- Sill Plate



- Dome Lamp
- IP Mood Lighting
- Headliner Lighting Module
- Room Lamp for Autonomous Vehicle
- Door Handle & Light of GE Refrigerator

Project

Variant Global Car Maker's

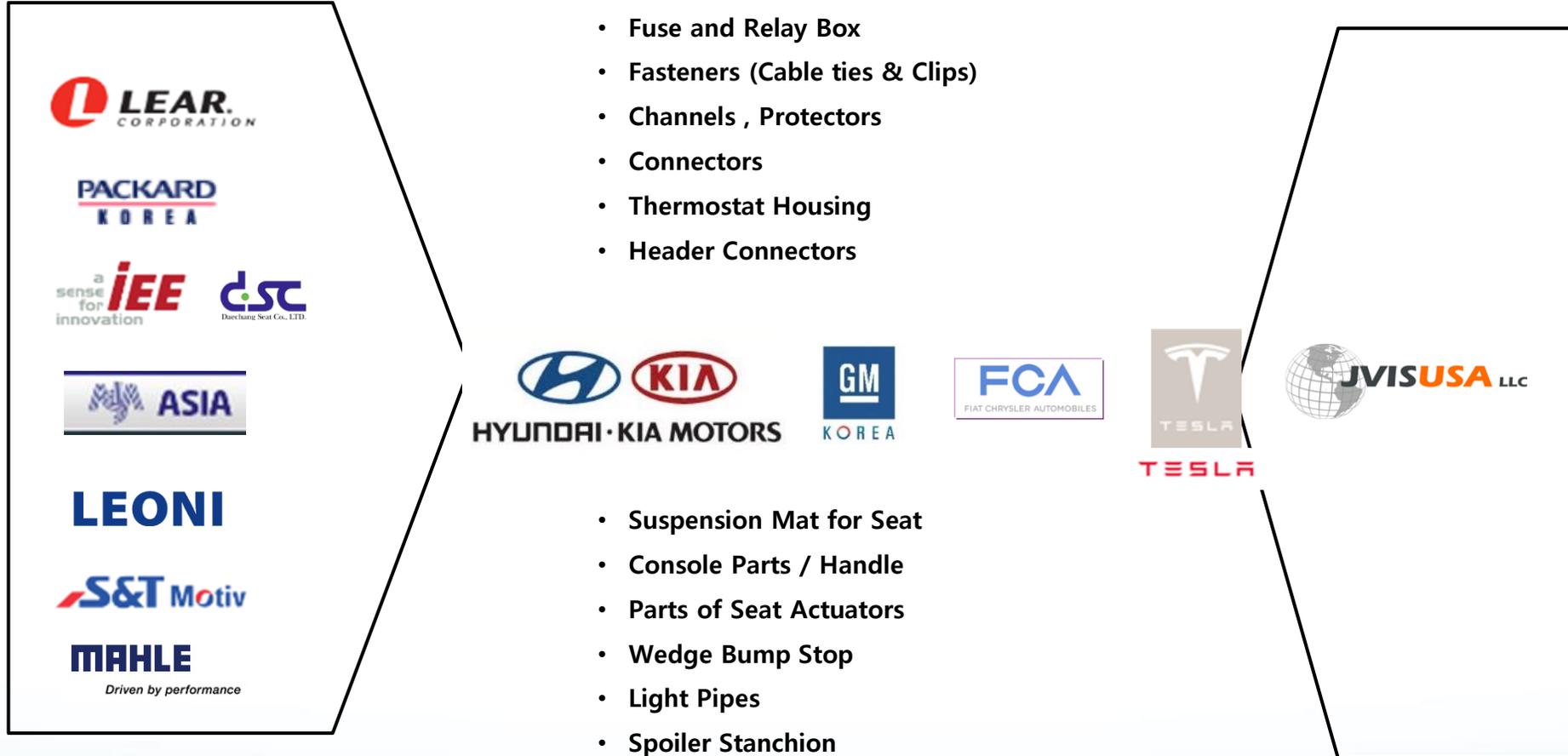
End Customers

- FCA
- KARMA
- ZooX
- GE

Products

- Integrated Center Stack
- Lighted Cup Holder
- Interior lamp
- Ambient lighting
- Foot well lamp





Project

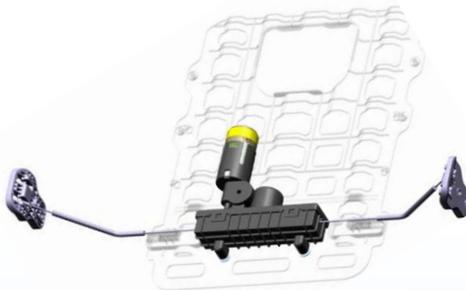
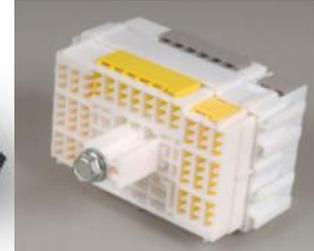
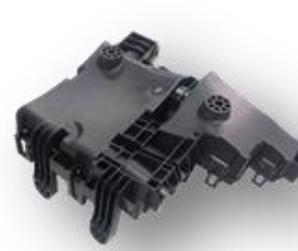
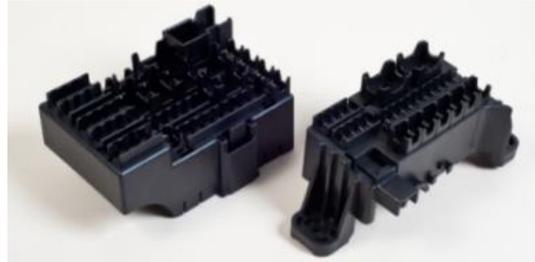
Various Global Car Maker

End Customers

- GM
- FCA
- Tesla
- Renault
- HKMC

Products

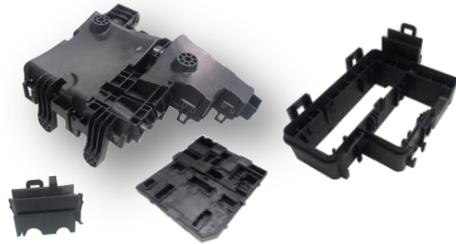
- Fuse & Relay Boxes
- Connectors
- Covering for Wiring Harness
- Fasteners
- Seat Components



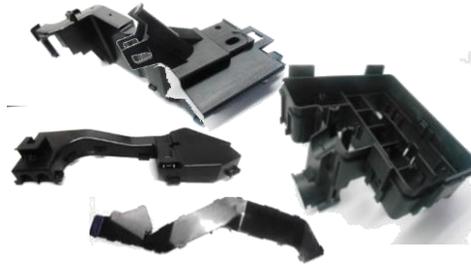


- Fuse and Relay Box
- Fasteners (Cable tie & Clips)
- Channels , Protectors
- Conduit outlet
- Back Shell of Steering wheel
- Rim Bezel

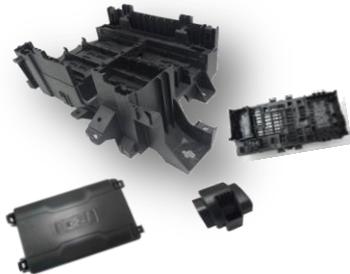




NISSAN
(P32R/CMF1/ RENAULT)



NISSAN
(J32U Protectors / Covers)



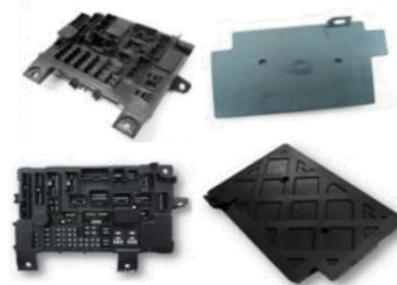
GM
(K2XX)



Autoliv
Back shell & Rim Bezel



NISSAN
(P60A)



MMC
(3x45 / 4B00)



EDS
Outlet

개발 중인 신제품

- 8 Cable ties for Wiring Harness for Lear
- Back Shell of Steering Wheel for Autoliv
 - Suzuki (SA 700)
 - Toyota (TN 170)
 - Mitsubishi (MQ 150)



- Over head Console Lamps
- Room Lamps
- Personal Lamps
- Vanity Lamps
- Cargo Lamp



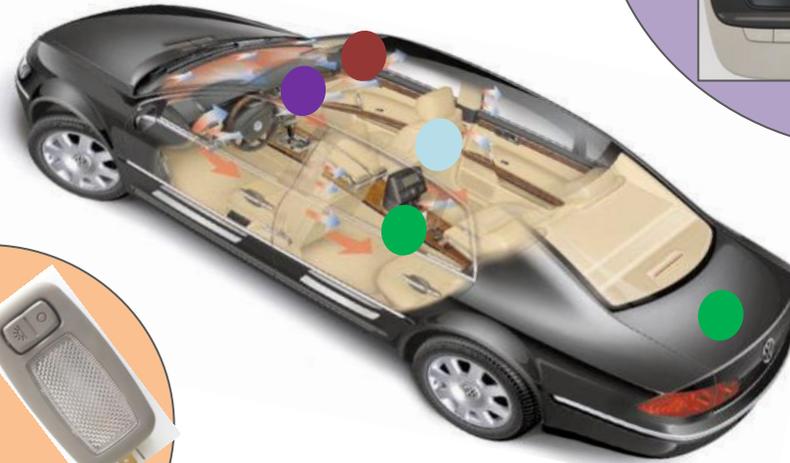
ROOM & MAP LAMP



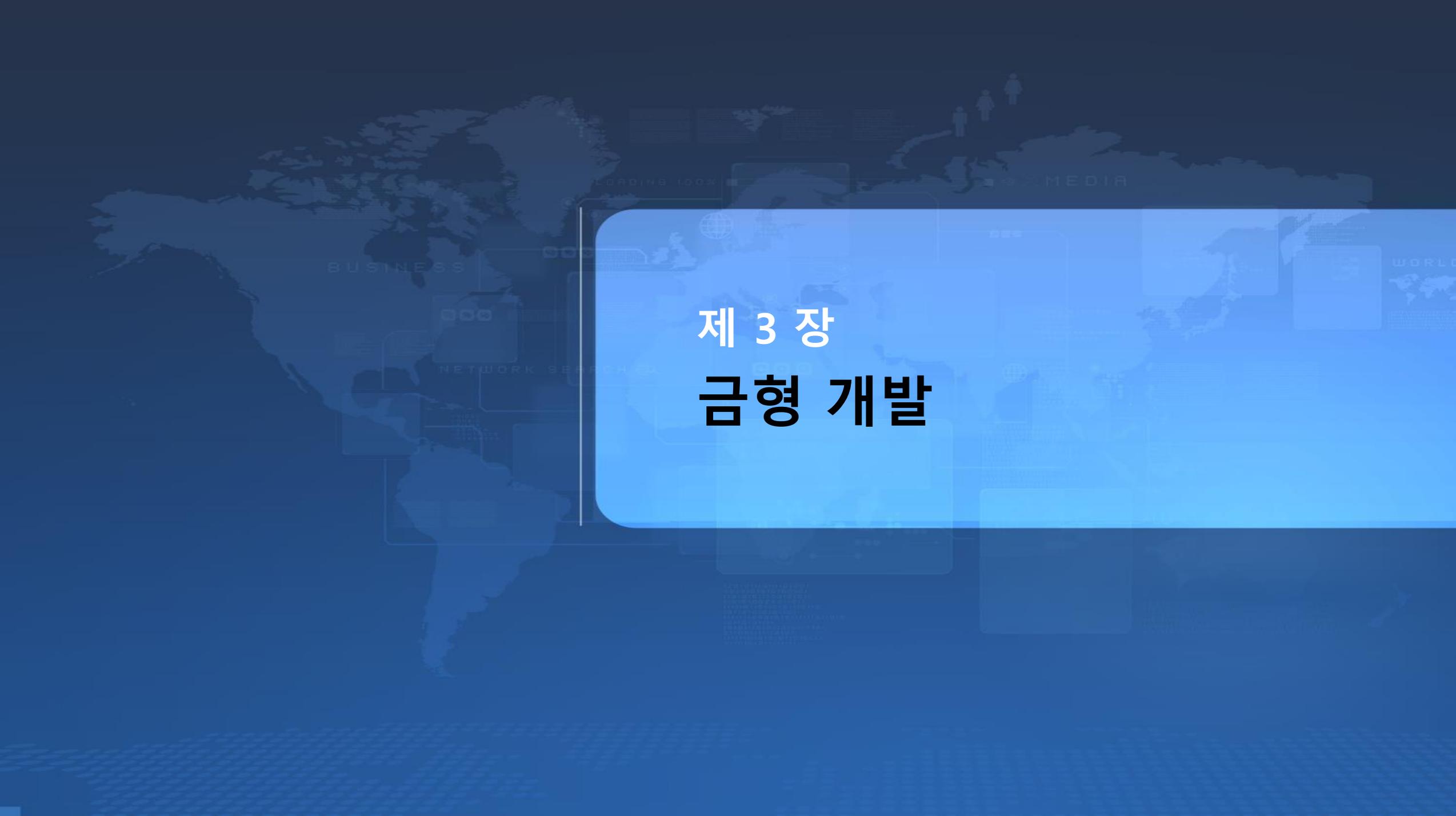
OVER HEAD CONSOLE LAMP



VANITY LAMP

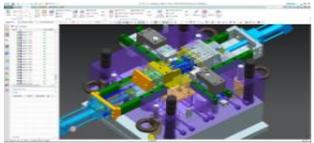
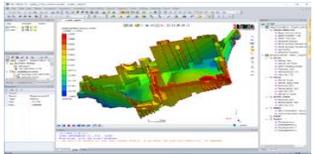


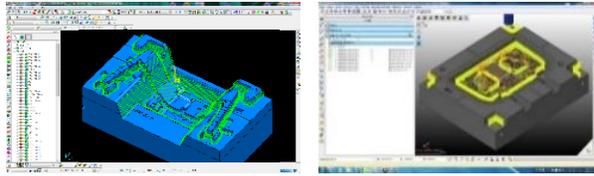
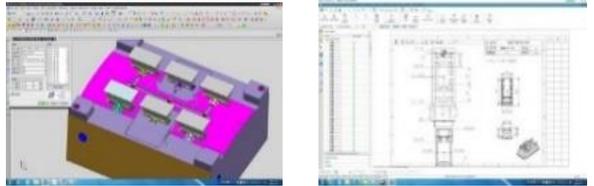
PERSONAL & CARGO LAMP

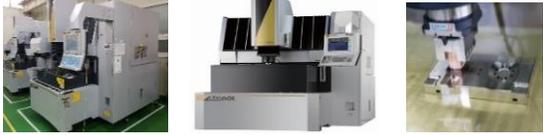


제 3 장 금형 개발

금형 개발 담당자는 제품의 설계 컨셉과 양산시 잠재되어 있는 문제점들을 확인하고 조치할 목적으로 프로그램 개발의 시작 단계부터 참여하고 있으며, 이후 제품 디자인 리뷰, DFM, 제품 분석 등 모든 APQP 활동에 참여하고 있습니다. 모든 검토 결과는 금형 설계 및 제작, 검증에 반영되며, 총 28명의 엔지니어는 한 해 500벌 이상의 금형을 제작하고 있습니다.

Description	Tool	Function	
설계 프로그램	AUTO CAD	<ul style="list-style-type: none"> • 2D Design • Define the detailed dimension and tolerances. 	
	UG NX 11	<ul style="list-style-type: none"> • 3D Mold design • Parts review in mold assembly 	
	3D TIMON	<ul style="list-style-type: none"> • Mold flow analysis • Simulation to foresee any possibility of mechanical stress, deformation , shrinkage and quality issues 	

Description	Tool	Function	
<p>CAE & 금형 개발 프로그램</p>	<ul style="list-style-type: none"> • WORK NC • POWER MILL & POWER SHAPE 	<ul style="list-style-type: none"> • NC Tool design & Modeling • Efficient CAM design 	
	<ul style="list-style-type: none"> • NC BRAIN 	<ul style="list-style-type: none"> • Optimization of NC machining • Pre - simulation of CAM 	
	<ul style="list-style-type: none"> • T - EDM 	<ul style="list-style-type: none"> • Electrode design • Electrode sheet creation • Reduced design errors • Easy and Convenient programing for machining 	

Description	Tool	Function	
<p style="text-align: center;">금형 제작 전용 보유 설비</p>	<ul style="list-style-type: none"> • CNC (SIRIUS UL+) 	<ul style="list-style-type: none"> • 3d machining tool 	
	<ul style="list-style-type: none"> • CNC (SIRIUS 650) 	<ul style="list-style-type: none"> • 3d machining tool 	
	<ul style="list-style-type: none"> • CNC EDM (SODICK AG60L) 	<ul style="list-style-type: none"> • Precise EDM processing 	
	<ul style="list-style-type: none"> • Surface Grinding (CGM 250A) 	<ul style="list-style-type: none"> • Precision Grinding machining 	
	<ul style="list-style-type: none"> • Welding machine • Supersonic waves cleaning machine 	<ul style="list-style-type: none"> • Maintenance Equipment 	

제 4 장

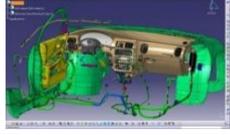
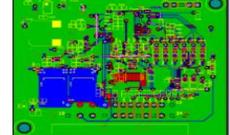
제품 설계 및 개발

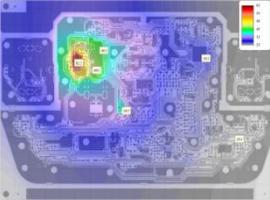
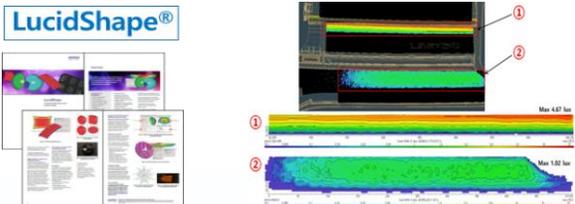
제품 설계 & CAE

1. 기구 설계
 - 플라스틱 및 금속 제품 설계
 - 제품 조립 설계
 - 역학적 설계 / 인체공학적 설계
 - 광학 설계 및 광학 시뮬레이션
 - 기계적 분석 및 열 변형방지를 위한 검토
 - 고객에 게스트 엔지니어 파견을 통한 업무지원
2. 시스템 설계
3. 하드웨어 개발
4. 소프트웨어 개발

Program Management

1. 프로그램 개발팀은 각 부서 주요 인원으로 구성
2. 제품 개발일정 준수를 위한 PM의 프로그램 관리
3. 각 부문 성과 검토 및 경영진 보고
4. 모든 프로그램 개발 기간 중 준비/진행사항 점검
5. 프로그램 별 다음 단계로 가기 위한 Gate Review 실시
6. 각 단계별 품질, 생산성, 경쟁력 있는 가격 유지를 위한 Tear Down Audits 실시
7. 필요 시, PM은 각 부문에 요청하여 프로그램 점검회의를 실시하여 문제가 없도록 운용

구분	도구	기능	
기구설계 / CAE	UG - NX7.5 (3D)	<ul style="list-style-type: none"> Package & Lay-out Check 3D Part & Assembly Design & 2D Drawing Kinematics & Simulation 	
	ANSYS	<ul style="list-style-type: none"> Simulation and analyzing stress and thermal for mechanical parts 	
	CATIA V5 - R20 (3D) CATIA V5 - 6R2012 (3D) CATIA V5 - 6R2014 (3D)	<ul style="list-style-type: none"> Package & Lay-out Check 3D Part & Assembly Design & 2D Drawing Kinematic & Simulation 	
회로 설계	PADS, ORCAD	<ul style="list-style-type: none"> PCB Pattern Drawing, Design Rule Check, H/W Circuit Design 	
	Altium	<ul style="list-style-type: none"> Schematic Capture, PCB Layout, CAM 3D Verification(interference) SPICE Circuit simulation(With PSpice compatibility) 	
소프트웨어 설계	CodeWarrior IDE Cyclone Pro / CAN-Oe MLX Emulator / MLXIDE Pickit3 Microchip debugger MPLAB XIDE	<ul style="list-style-type: none"> CodeWarrior Development Studio for Freescale S12(X) Multiple Freescale architecture support LIN Protocol Controller according to LIN 	

구분	도구	기능
<p>PCB 열 시뮬레이션</p>	<p>TRM (Thermal Risk Management)</p>	<ul style="list-style-type: none"> ▪ High resolution virtual thermographs of boards and assemblies ▪ DC Voltage drop and current-carrying capacity in all traces (Joule heating) ▪ Steady state and transient. Also PWM power pulses ▪ All traces and components included ▪ Coupling to environment conditions ▪ Coupling material properties to temperature ▪ Precision by physics and geometry 
<p>광학 시뮬레이션</p>	<p>LucidShape</p>	<p>Optical Pattern Analysis Simulation Optimization</p> <p>LucidShape is a powerful 3D system for computer aided design of automotive exterior lighting, with interactive tools for design, simulation, analysis, and documentation of automotive lighting products.</p> <ul style="list-style-type: none"> ▪ Monte Carlo ray trace ▪ Light Mapping ▪ Fast simulation for reflector design ▪ Interactive ray path bundle ▪ Ray Trace Analysis 

제 5 장

시험 및 신뢰성 확보

당사의 신뢰성 시험센터는 고객의 요구 사항에 따라 테스트 및 신뢰성 시험 진행을 하고 있으며, 2019년 7월 30일 KS Q ISO/IEC 17025:2006에 의거하여 국제공인시험기관으로 인정을 받았습니다.

구 분	장 비
측정 장비	<ul style="list-style-type: none"> ▪ CMM / VMMs ▪ X-ray Scan / Measuring equipment ▪ Electrostatic discharge simulator ▪ Electrostatic Field meter ▪ Color test , Harmony Booth ▪ Illumination photometer ▪ Ultrasonic coating thickness Indication ▪ Surface roughness measuring instrument
시험 장비	<ul style="list-style-type: none"> ▪ Switch and Device system durability tester ▪ Environmental test Chambers / 2 & 3 axis ▪ Thermal shock chamber ▪ Haptic tester ▪ Water Splash chamber ▪ Salt spray chamber ▪ Universal Testing Machine

Korea Laboratory Accreditation Scheme

국제공인시험기관 인정서

덕일산업(주) 신뢰성 시험센터

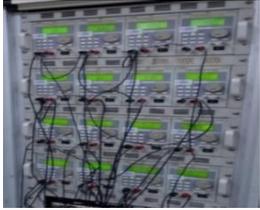
인 정 번 호 : KT860
 법 인 등 록 번 호 (또는 고유번호) : 134111-0055554
 사 업 장 소 재 지 : 경기도 평택시 세교산단로 21-20
 최 초 인 정 일 자 : 2019년 7월 30일
 인 정 유효 기 간 : 2019년 7월 30일 ~ 2023년 7월 29일
 인정분야 및 범위 : 별첨
 발 행 일 : 2019년 7월 30일

상기 기관을 국가표준기본법 제 23 조 및 KS Q ISO/IEC 17025:2006 에 의거하여 국제공인시험기관으로 인정합니다. 또한 ISO-ILAC-IAF 공동성명에 언급된 비와 같이 인정된 분야 및 범위에 대한 기술적 능력과 시험기관의 품질 경영시스템이 적절함을 인정합니다.

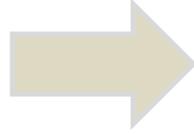




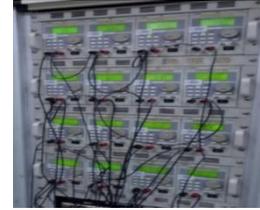
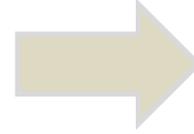
한국인정기구(KOLAS)는 국제시험기관인정협력체(ILAC)의 상호인정협정(MRA) 서명기구입니다.



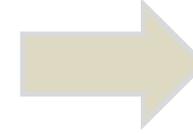
Feeding actual load to the switches



Turn on/off Switches by programed cycle for durability test @ -40 ~120 C

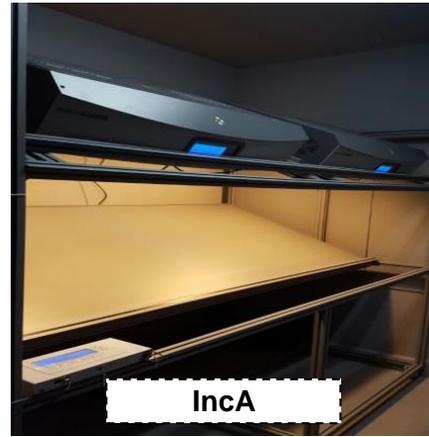
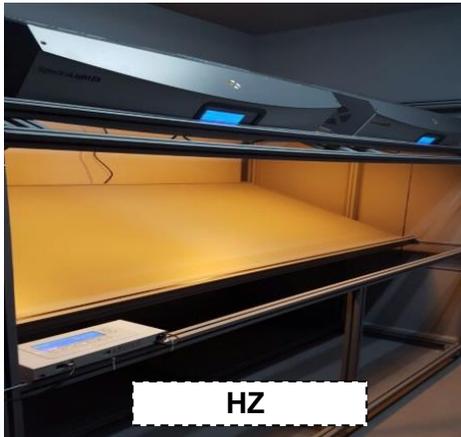
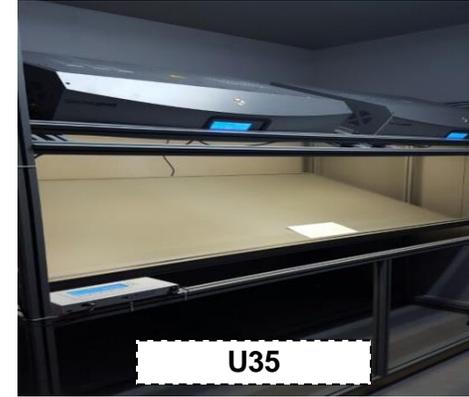
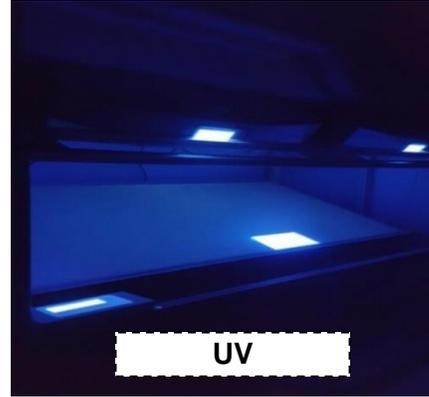
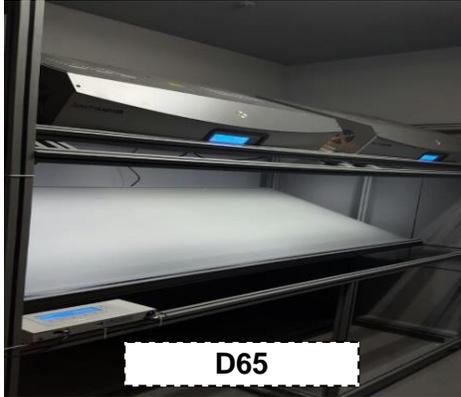


Feeding actual load to seats



Seats are operated in the chamber @ - 40 ~ 120C to test switches

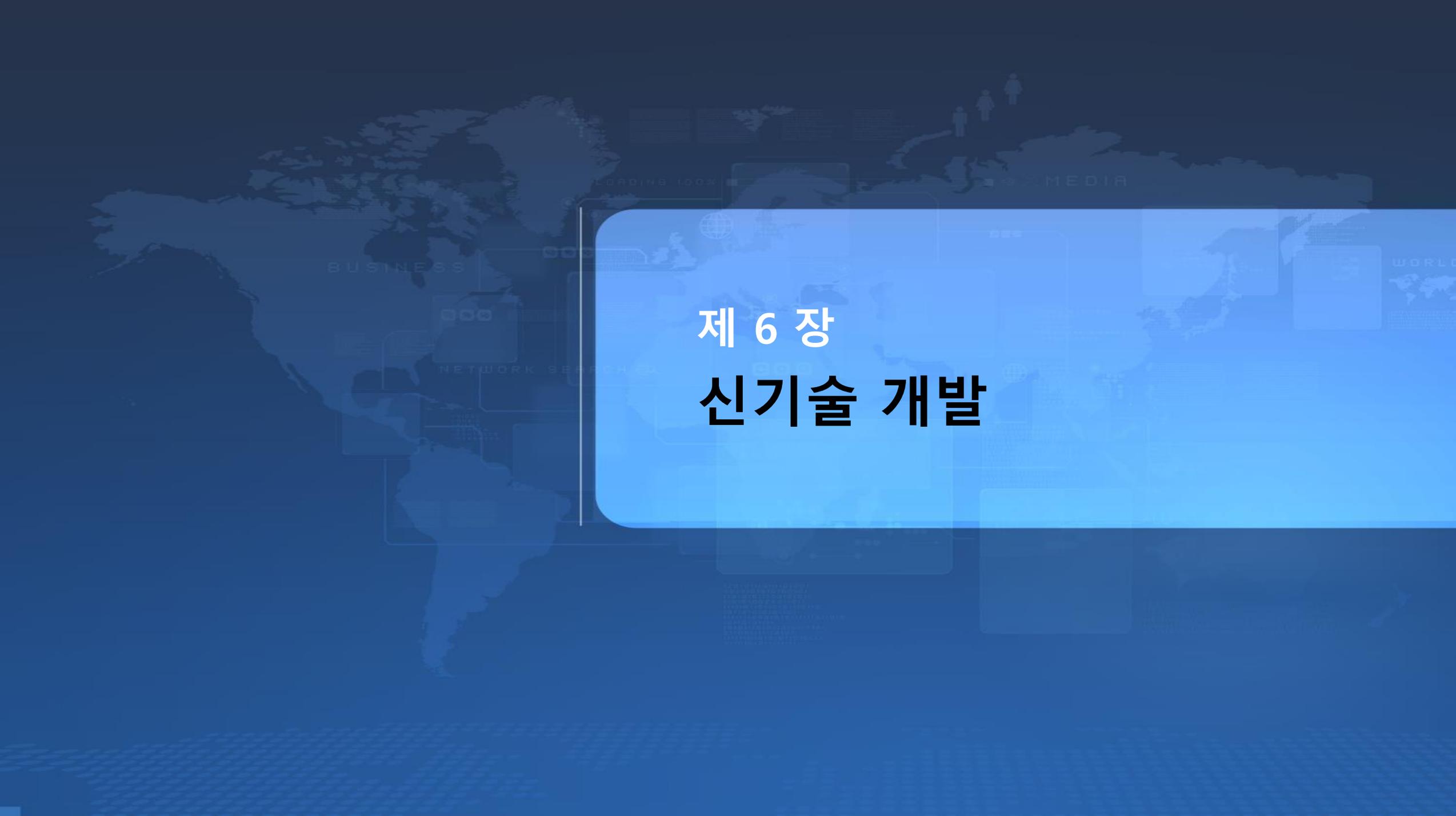




Light Source for Appearance Color

Standard : SAEJ361

- Daylight : D65
- Fluorescent : TL84 / U35 / CWF
- Horizon : HZ
- Incandescent A : IncA
- Ultraviolet : UV



제 6 장 신기술 개발

1. Switches

- Micro switch for power window switch
- Power window switch
- Touch switch
- Gesture switch

2. Seat Control unit

- Integrated Seat Switch Module : 5 in 1 module
 - **Walk-in (Easy Access) +**
 - **Seat position memory +**
 - **Seat Switch (4~14 way) +**
 - **Seat temperature control module (Heating + cooling for driver and passenger)**
- Seat folding control unit

3. Wireless charger

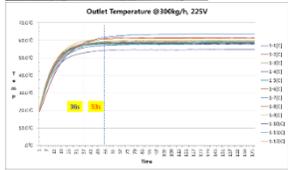


4. Seat Component

- 2 way lumbar Actuator : Smaller size & more efficient



Heater Core - Controller Integrated



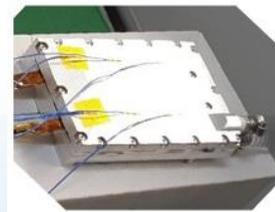
Seat Warmer & Controller



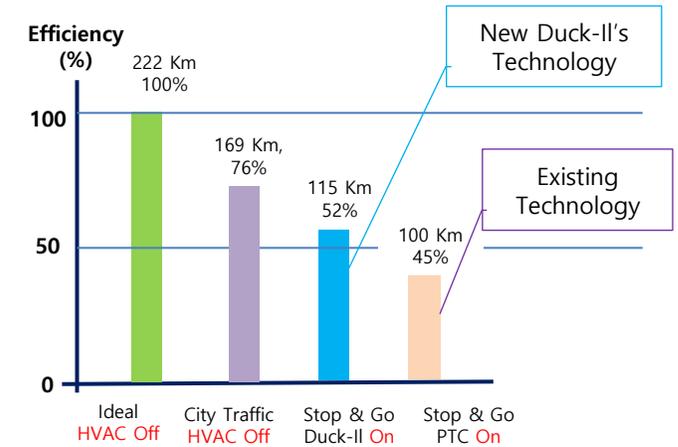
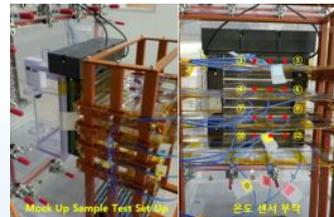
Driving Condition	Speed (Km/h)	O/Temp. (C)	Drive Duration	Cruising (Km)	HVAC	Remark
City Traffic	39	25	4hr 23min	169 Km	Off	
Stop & Go	24	-10	4hr 08min	Max 100	Heater on	PTC
Stop & Go	24	-10	4hr 45min	Min 115	Heater on	Duck-II
Ideal Condition	61	20	3hr 38min	222	Off	

Battery Warmer

Liquid Heating Type



Air Heating Type



Comparison of Cruising Efficiency
@ Room Heater On, Off
(Seat Warmer Off)

감사합니다.