High Precision, High Power

Eastern Robot Gear

EASTERN GEAR Move On, Together

Gear in Industries

Long history

Core role

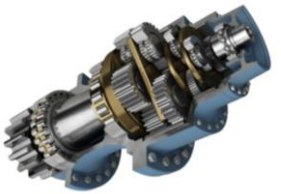
Low Awareness



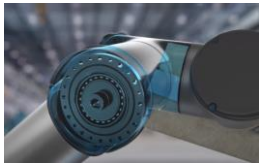






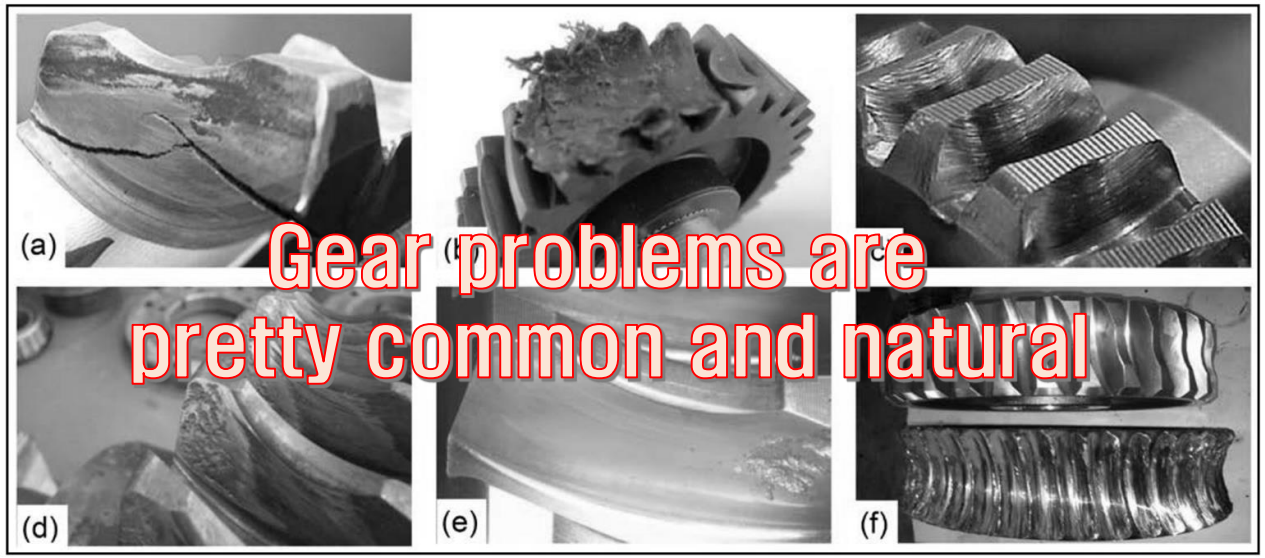




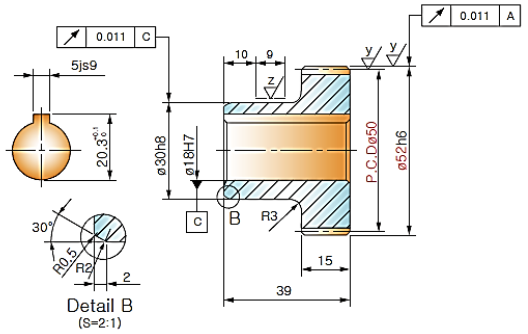




Recognized as replaceable parts

- ✓ Lack of design technologies
- ✓ Build without considering the use of machinery



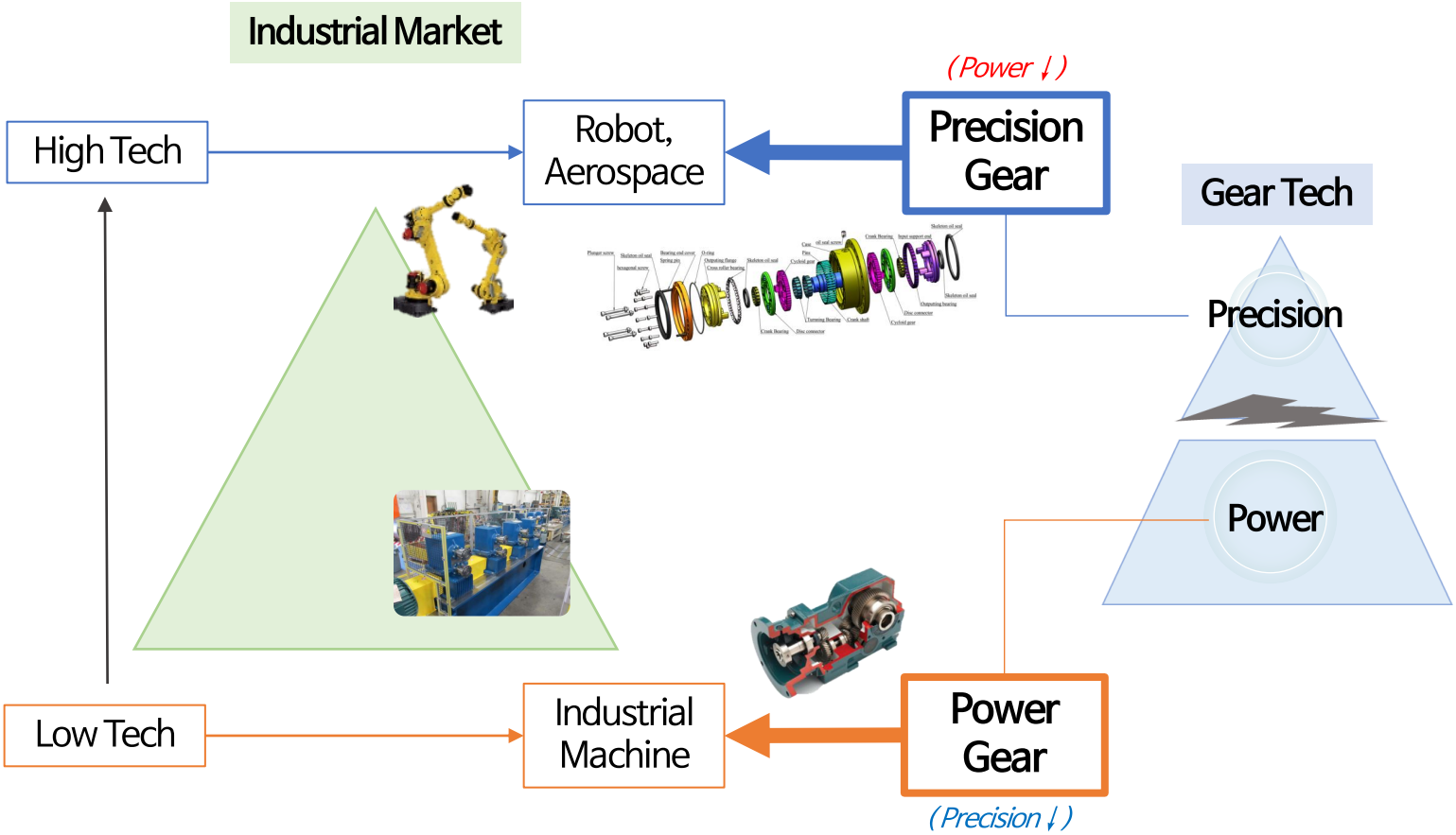
Performing Core Roles but still designed with old way



스퍼기어 요목표		
기어 치형		표준
공 구	모듈	2
	치형	보통이
	압력각	20°
전체 이 높이		4.5
피치원 지름		50
잇 수		25
다듬질 방법		호브절삭
정밀도		KS B ISO 1328-1, 4급

스퍼기어 기호 및 계산공식	계산 예
모듈 : m, 잇수 : Z, 피치원 지름 : PCD	
1. 전체 이높이 h=2.25×모듈 h=2.25m 2. 피치원 지름 PCD=모듈×잇수 PCD=m×Z 3. 이끝원 지름 외접기어 : D=PCD+2m 내접기어 : D_2=PCD-2m 4. 모듈 $m=\frac{D}{Z}$	모듈(m) 2, 잇수(Z) 25인 경우 1. 전체 이높이 h=2.25m=2.25×2=4.5 2. 피치원 지름 PCD=2×25=50 3. 이끝원 지름 D=50+(2×2)=54 4. 모듈 $m=\frac{D}{Z}=\frac{50}{25}=2$

Limitations of gear usages



Clear separation of Gear technology

Using a completely Different level of gears

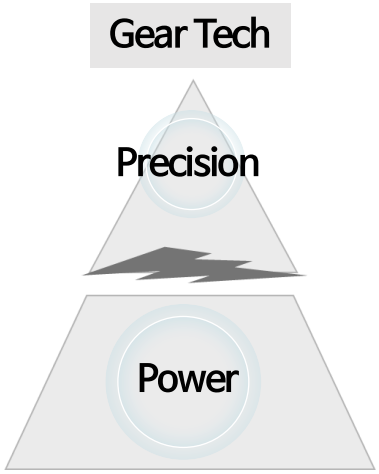
Reason for Higher Gear Technology

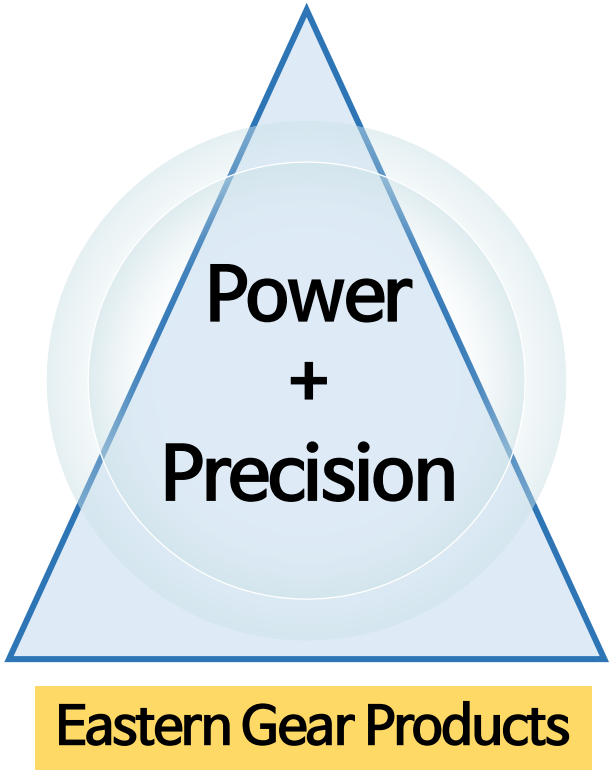
Industrial technology development
= Gear technology development

[Solution]

Gear role : “Power” or “Precision”

EASTERN GEAR Products : “ Power + Precision ”



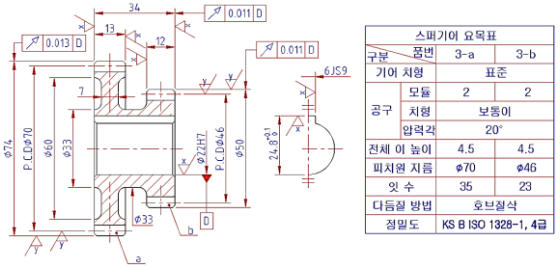


- ✓High efficiency
- ✓Low NVH
- ✓Down Sizing
- ✓Durability
- ✓Long Life

[Advantages]

Design/ Manufacturing/ Analysis

Traditional Way

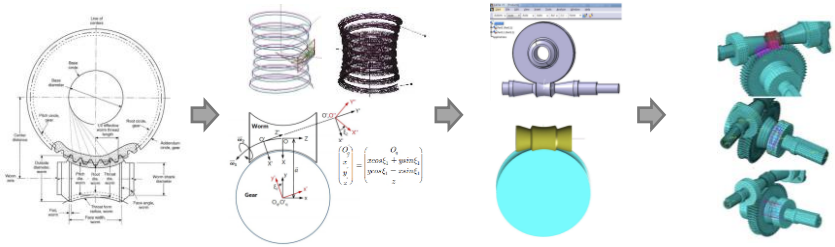


스퍼기어 요목표			
구분	품번	3-a	3-b
기어 치형		표준	
공구	모듈	2	2
	치형	보통이	
	압력각	20°	
전체 이 높이		4.5	4.5
피치원 지름		ø70	ø46
잇 수		35	23
다듬질 방법		호브절삭	
정밀도		KS B ISO 1328-1, 4급	

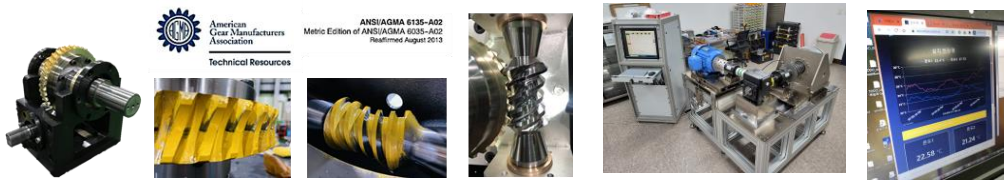
VS

Eastern Gear Way

System understanding/ Analysis



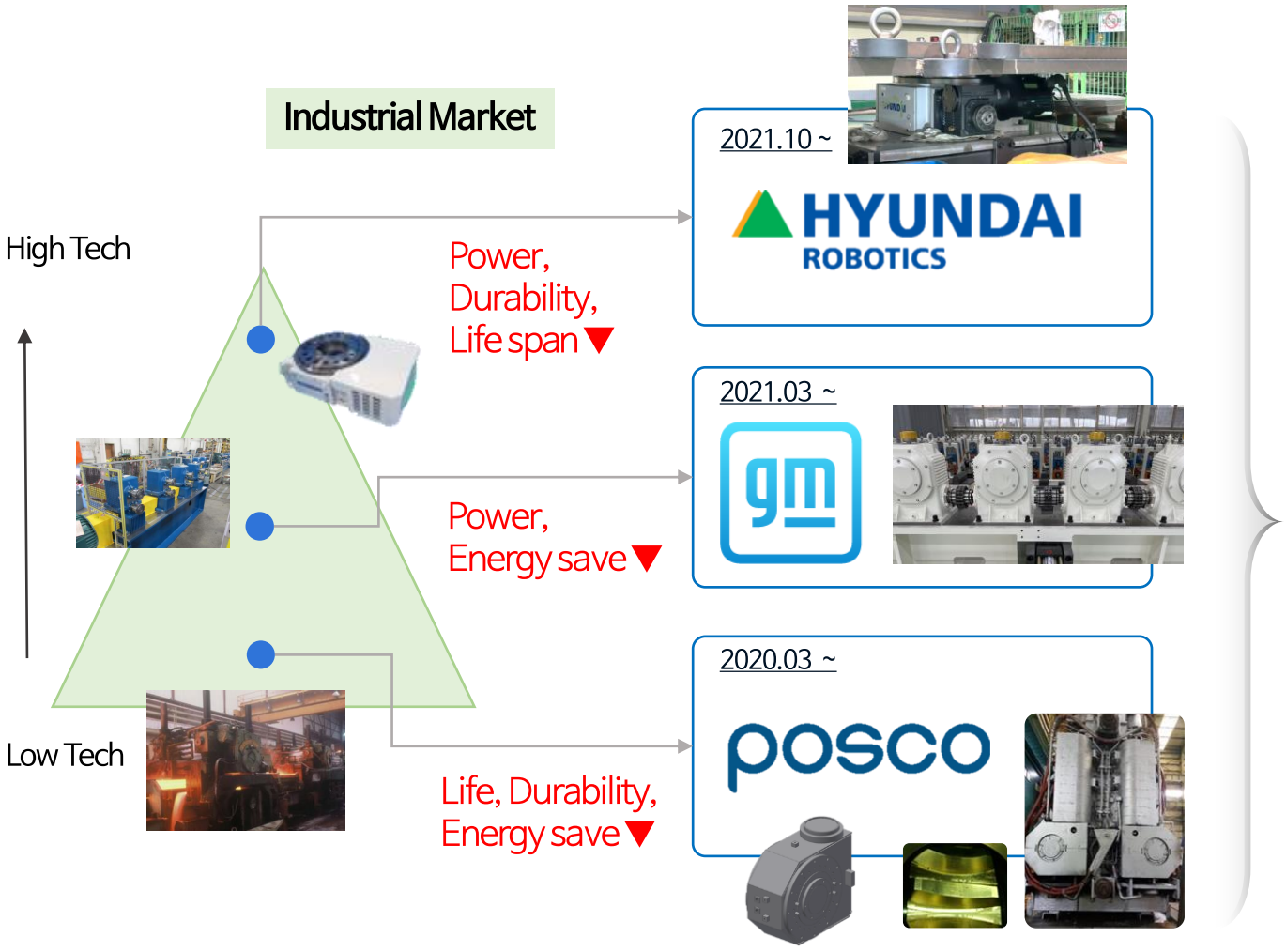
Optimization Design



Best Results

[Advantages]

Field Proven Experiences



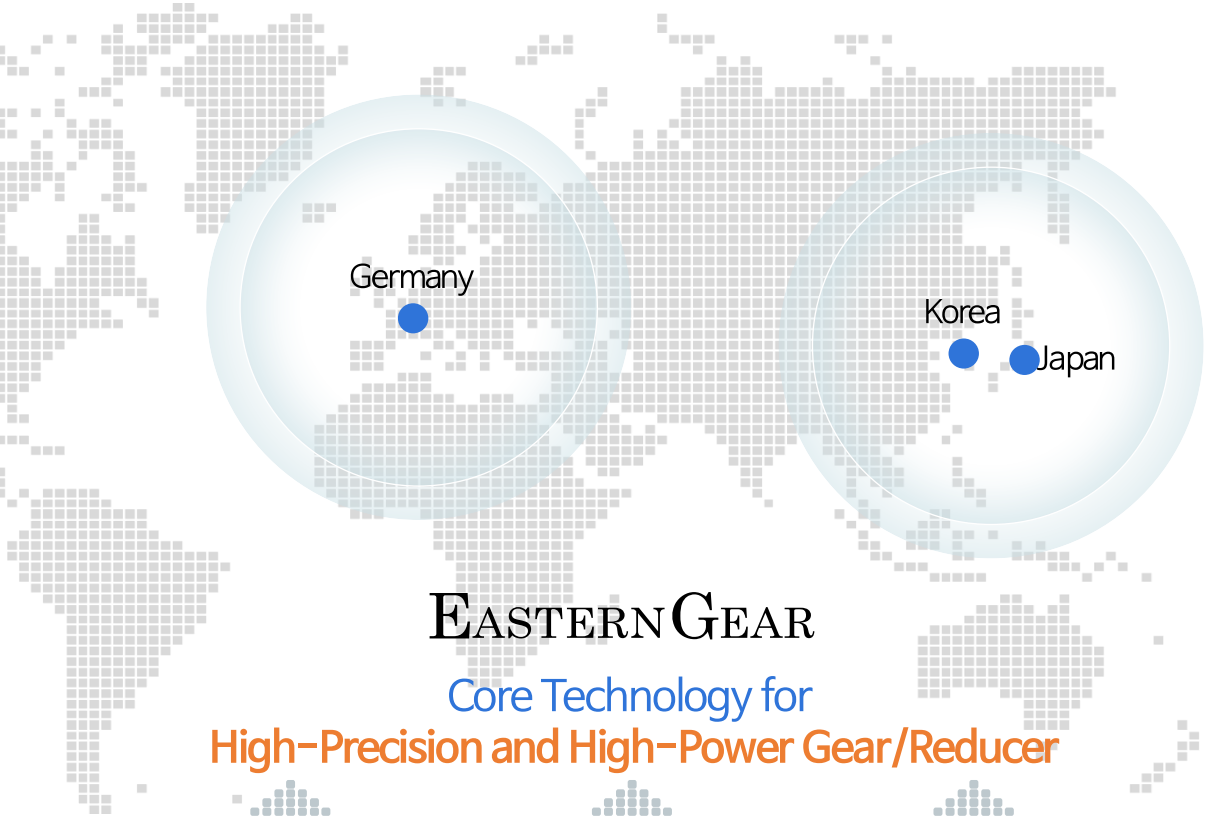
"Advantages"

Output
x15 increased

Precision
x 5 increased

Life
300+ %

Cost
$100,000+ saved



EASTERN GEAR

Core Technology for
High-Precision and High-Power Gear/Reducer

Power Drive
(High Power/Industrial)

Robot Drive
(Robot/Precision)

Globoid Worm Gear
(High Power, Precision gear)

Korea

HYUNDAI ROBOTICS | POSCO | 성우하이텍
SAMSUNG | POONGSAN CORPORATION | SMEC
MOTTROL | 대동테크 DAEDONGTECH

Japan

Sumitomo Drive Technologies 住友重機械工業株式会社 | YASKAWA | Hitachi Metals Materials Magic
MAKISHINKO

Germany

igus

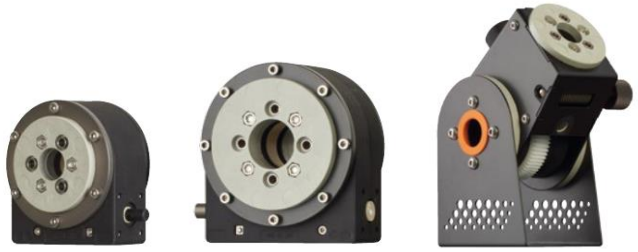
[Current status of High performance gear/reducer (2022.03)]

Country	Part			Company	STAGE				Current Status
	Robot Precision	Smart Mobility	Industrial Use		Request	Collabo	Develop	Production	
KOREA	✓			HYUNDAI ROBOTICS	Development completed in 2021 with sales of 100 million ▶ Expected to exceed 1 billion per year				Applied HSP1 Series, discussing additional models for mass production
		✓	✓	성우하이텍	Development completed in 2021 with sales of 300 million ▶ expected to exceed 1 billion per year				Applied to the U.S. GM electric vehicle bumper line (Additional orders scheduled for 2022)
	Non-disclosure			POONGSAN CORPORATION	First delivery in February 2022 and further development planned				Non-disclosure
	Non-disclosure			SAMSUNG					Ultra-compact precision reducer Development is under consideration
	✓			SMEC					Index, Robot reducer Development is under discussion
			✓	MOTTROL					High power reducer for heavy equipment Development is under discussion
			✓	대동테크 DAEDONGTECH	Developing in March 2022, expected to exceed 500 million to 1 billion won per year				Reducers for agricultural machinery, more than 100 units a year,
JAPAN	✓			YASKAWA					Non-disclosure
	✓		✓	Sumitomo Drive Technologies 住友重機械工業株式会社	4 development requests in 2021 - more than 10 billion won is expected when developing robot reducer				Sumitomo Gearbox / Established in 1916, sales of 2 trillion, 2nd in the world for medium and large reducers, 4 cases of development received
			✓	MAKISHINKO	3rd sample was delivered in February 2022, and expected to exceed 3 billion won per year after the official order				Established in 1940, annual sales of 500 billion, 3rd development sample in progress
GERMANY	✓			igus	When the robot reducer development is completed, it is expected to generate more than 20 billion won in annual sales by expanding related robot companies				German Bearing Company, Launches Smart Factory Robot Business, Talks on Joint Project

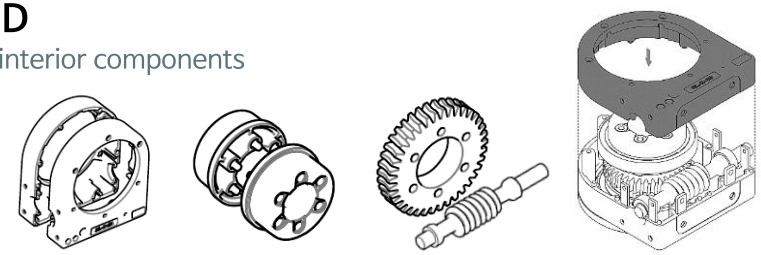
Collaboration

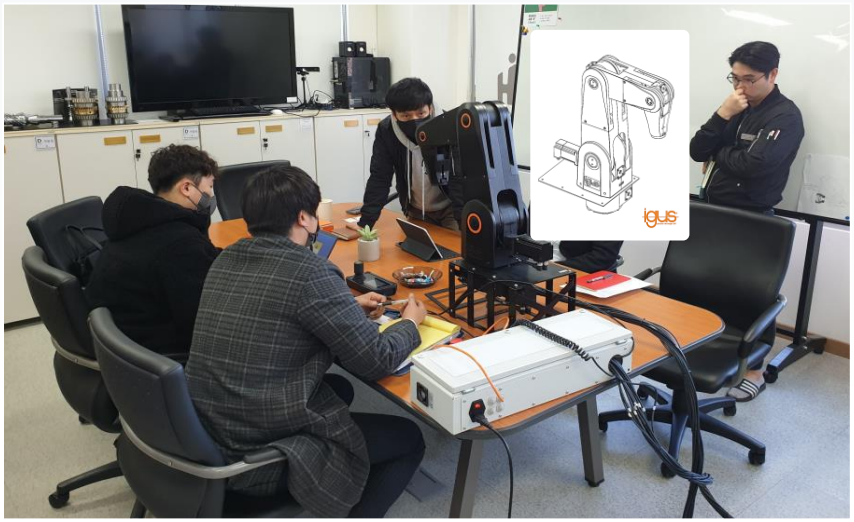
German robot brand

Igus robolink D
Robot joint model



Igus robolink D
Robot joint model interior components





[Photo] Igus Korean branch visit to EASTERN GEAR (2022.01.12)

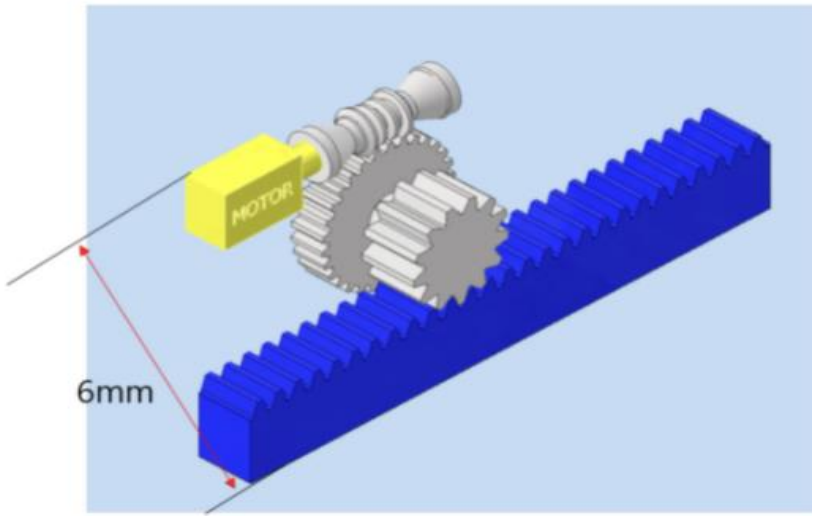
Collaboration

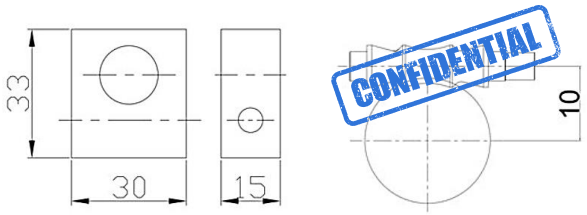
precision machinery

SAMSUNG

Samsung Electronics / Next Generation Product Group: Request for development of micro worm gear

2022.01~





※ Non-disclosure

Invited and announced at the 2021 Samsung Electronics Element Technology Exhibition Seminar

2021.09.01

Had a presentation of technical seminars for executives of Samsung Electronics and Samsung affiliates

Continued discussion with Samsung Electronics, SMEC on robot gear/decelerator development

2021.11.20

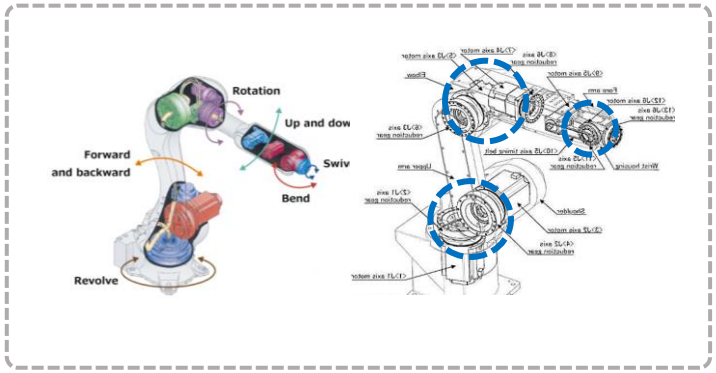
Had a meeting about robot reducer development with Samsung Electronics, SMEC (21.04.16)

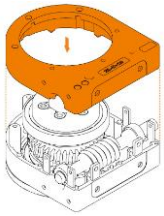
SMEC SMEC CO.,LTD.

〈 GOAL 2023 〉

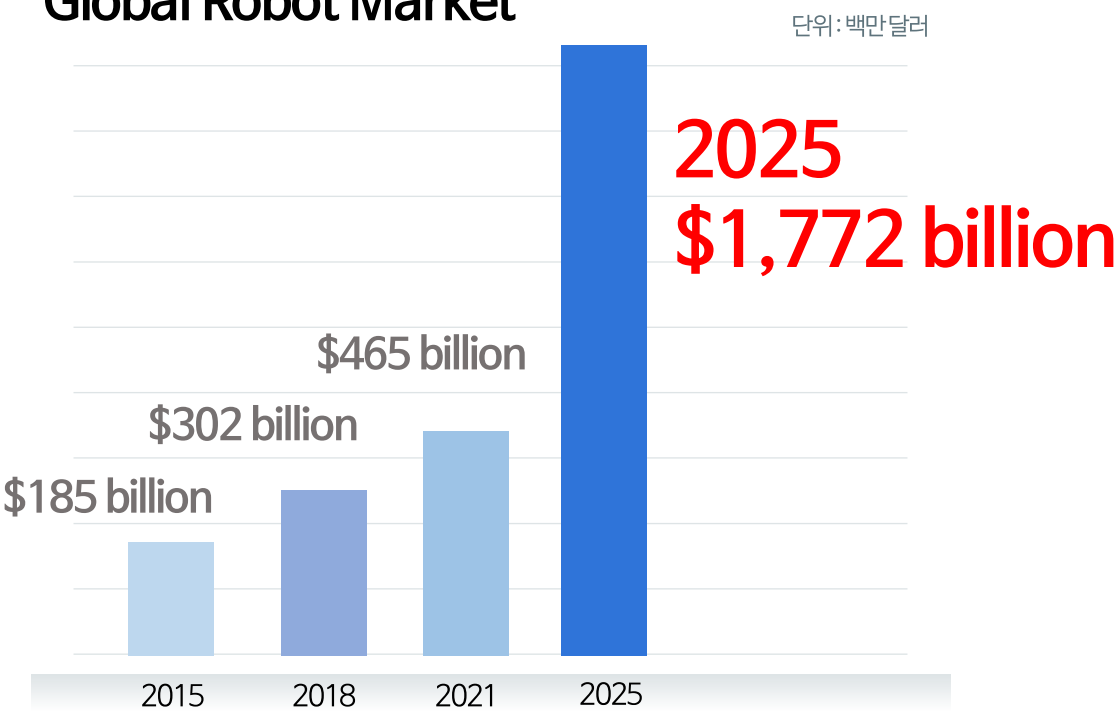
Robot Gear, General Problem : Lack of Power

→ Focusing on Output Increasing





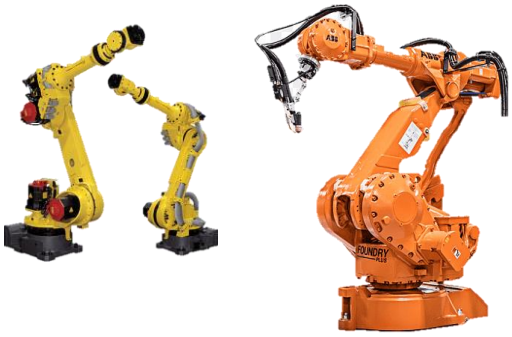
- High Precision + High Power
- Durability + Long life



[Reference] International Federation of Robotics (IFR), Hyundai Motor Group

Investment Plan

~ 2025	~ 2030	~ 2040
Small Robot Purpose Equipment (MCT, testing utility)	Mid-Large Purpose Equipment (MCT, handling, testing utility)	Agricultural, Industrial Purpose Equipment expansion



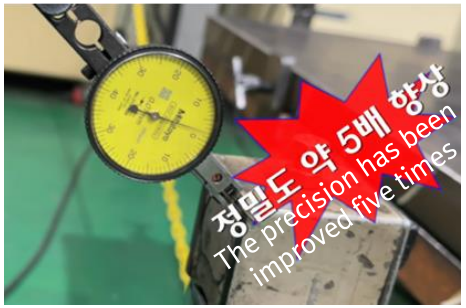
www.epglab.com

Move on, Together

EasternGear

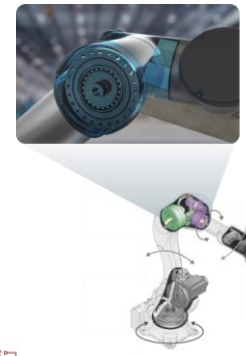
Performance Test Comparison

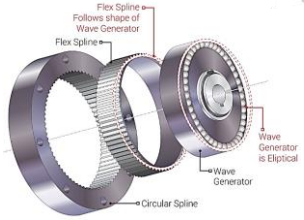
5ton Steel Rotation-Sudden Stop-Rotation (Maintain precision (0.1 mm) during sudden stop)

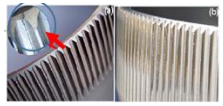


Company	Test Time	Test Results	Gear Status
EASTERN GEAR	250 hours	SUCCESS ▪ No abnormality in reducer heat and noise ▪ Gear teeth normal (stabilize) ▪ *Improve precision (0.1->0.02mm)	 Stabilization of Gear teeth
KOREA COMPANY A	1 hour	▪ Gear was broken when the 5-ton steel comes to a sudden stop after 360 degree rotation	 FAILED
OVERSEAS COMPANY D	24 hours	▪ Increased heat and noise due to damage to the teeth of the gears ▪ The test was stopped as the precision deviated significantly from the reference value due to an increase in shaking (backlash).	 FAILED

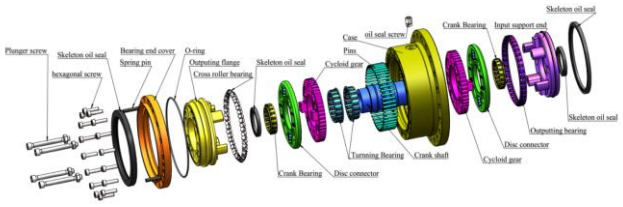
Compare to existing robot gear





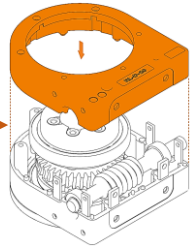


Harmonic Driver



RV Driver / Cycloid

Photo) igus robot



Advantages 01
Manufacturing period is reduced by 80%

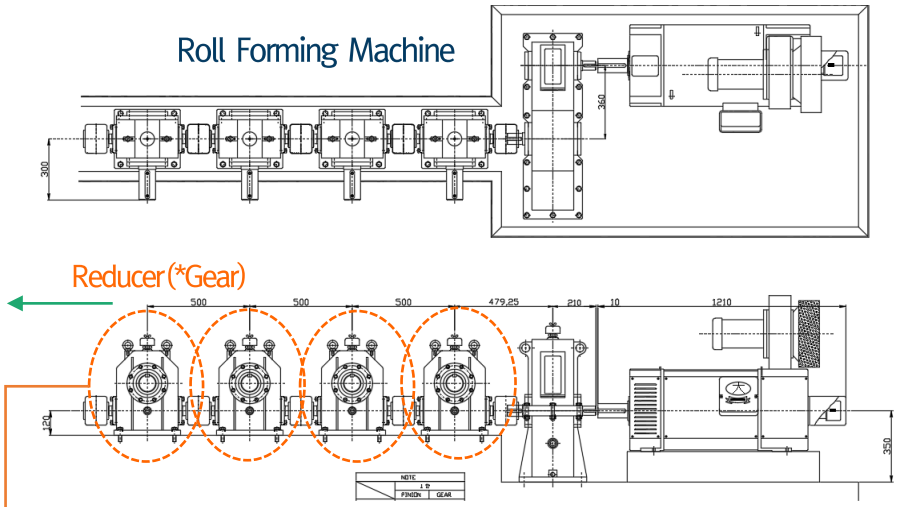
Advantages 02
manufacturing cost is less than 1/3

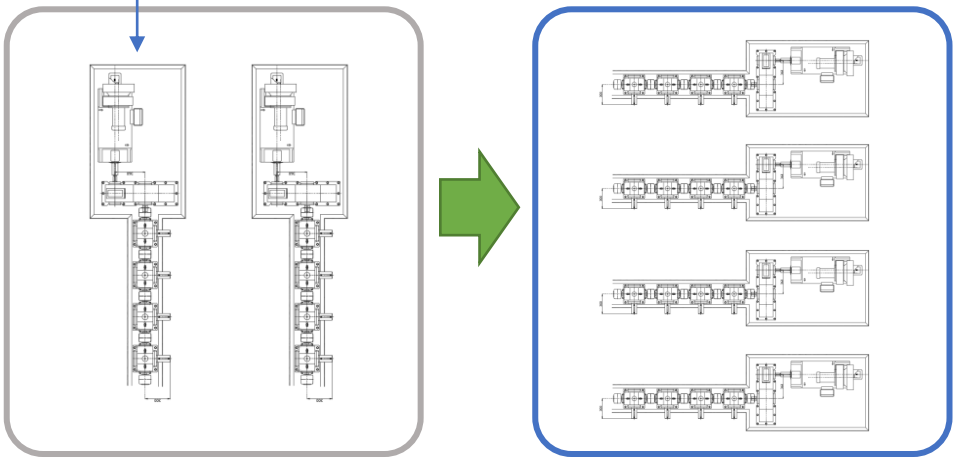
Advantages 03
Implementation of a reduction ratio of 100:1 or less

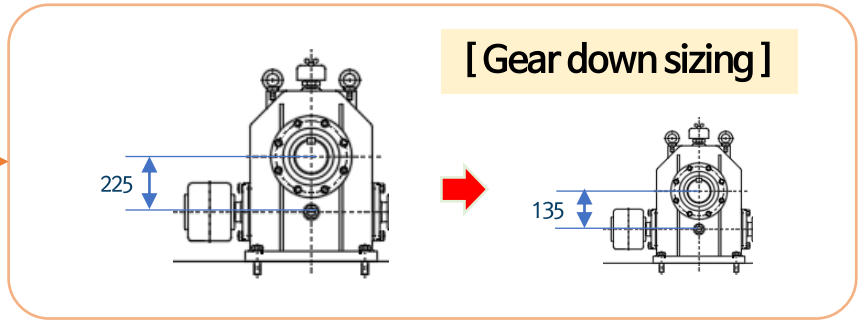
Effect of gear improvement

생산설비 구축비용 절감, 공간/에너지 절약

Reduced cost of building production facilities, saved Space / Energy







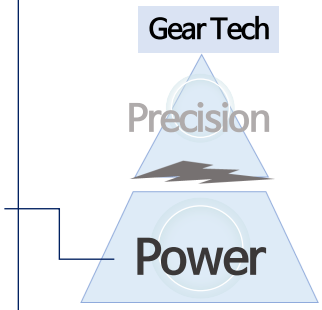
it is possible to reduce facility manufacturing costs and installation space by about 40% compared to the previous one

with reducer down-sized(42%) for forming bumpers for electric vehicles.

Effect of gear improvement

에너지 절약, 탄소저감, 효율향상

Saving energy, Reducing carbon, Improving efficiency



Large gears
For steel and ships : POWER

▼

Improved precision

▼

[Effect of improvement]

- Transmit Power Up
- Energy Save
- Efficiency Up