

Innovation of Motion Control

SG SERVO

Specialized in Hydropneumatic
and Electric Drive Products



THE MOST COMPETITIVE COMPANY

In Motion Control System

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We will strive to become the best 'small giants' company that can provide **Total Solutions** for motion control systems.

CEO Greetings



Innovation of Motion Control We are SG SERVO, the Leader in Motion Control!

Hello. We are Go-Do Kim and Hyen-Cheol Lee, the co-representatives of SG SERVO.

Since our founding in 2002, we have grown into a company specialized in the R&D and production of precision hydropneumatic and electric drive products. All employees are committed to making the company that grows together with customers and trusted by customers under the company motto of "Faith and Mutual Growth".

Through continuous R&D investment, we will strive to become the best 'small giants' company that can provide total solutions for motion control systems, and we will endeavor to become a so good(SG) company that fulfills its social responsibility.

We kindly ask for your continued interest and support.

Thank you.



Company Overview

Company Name	SG SERVO Co., Ltd.	Establishment	2002.01.19. (2017.04.04. Spin off)
CEO	Kim Go-Do Lee Hyen-Cheol	Address	17, Pyeongsan-ro 8beon-gil, Uichang-gu, Changwon-si, Gyeongsangnam-do, Republic of Korea
Website	www.sgservo.co.kr	E-Mail	buiiz@sgservo.co.kr



- SG**
 It is an abbreviation of 'So Good' intending to make the best products which satisfy customers with performances and qualities.
- SERVO**
 It symbolizes the goal of becoming the world's best 'servo technology company'
- Red oval**
 It expresses a fiery passion and vividness flapping with progressive spirit



2006~2011

- Obtained INNO-BIZ certifications **2006. 01**
- Selected as a military service exception company by the Military Manpower Administration **2007. 12**
- Received the Commissioner of Korean Intellectual Property Office Award **2010. 04**
- Received the Minister of Ministry of SMEs and Startups Award **2011. 03**

2002~2003

- 2002. 01** Established SG SERVO Co., Ltd.
- 2003. 05** Established R&D Center
- 2003. 09** Obtained ISO 9001 certifications



2012

- 09** Selected as an excellent job-creating company by Changwon City
- 12** Obtained ISO 14001 certifications



2013

- Obtained AS 9100 certifications **02**
- Received the Superintendent of Changwon Tax Office Commendation **03**
- Selected as an Advanced Technology Center(ATC) by Ministry of Trade, Industry and Energy **06**
- Selected as a company that wants to work by the INNO-BIZ Association **09**

2014

- 04** Received the Minister of Ministry of Trade, Industry and Energy Commendation
- 07** Selected as a company that wants to work by the Gyeongnam Regional SMEs and Startups office

2015

- Received the Best R&D Team Award by Changwon City **12**



2018

- Received the Minister of National Defense Commendation **05**



2022

- 03** Obtained MAIN-BIZ certifications

2023

- Factory Expansion Relocation **11**

Business Fields



Servo Hydraulic

- Servo Valves
- Proportional Valve
- Servo Actuator
- Spools / Sleeves



Electric Driving

- Actuator
- Reducer



General Hydraulic & Pneumatic

- Valves
- Pump / Motor
- Power Pack
- Quick Disconnect Coupling

Key Clients



?

 We will happily invite you as our next client.

Main Products

- 08** Servo Hydraulic
 - 08 Servo / Proportional Valve
 - 08 Servo Actuator
 - 08 Spools / Sleeves
- 09** Electric Drive
 - 09 Actuator
- 10** General Hydraulic & Pneumatic
 - 10 Valves
 - 11 Hydropneumatic Suspension Unit
 - 11 Pump/Motor
 - 12 Power Pack
 - 12 Other Hydropneumatic Products

Servo Hydraulic

SG SERVO designs and manufactures servo valve, proportional valve, servo actuator of which speed/force/direction can be precisely controlled according to user's demand. Also SG SERVO designs servo systems using these equipments.

Servo / Proportional Valve



Servo Valves

Max. Operating Pressure	350 bar
Rated Flow	4, 19, 38, 63 lpm

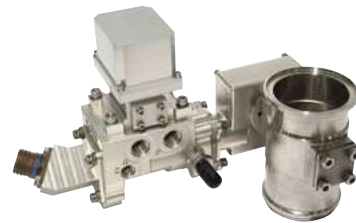
* 2 stage, Nozzle flapper type servo valves (4 kinds)

Proportional Valve

Max. Operating Pressure	350 bar
Rated Flow	32 lpm

Servo Actuator

Patent



Stroke	25~2,000 mm	Operating Pressure	35~315 bar	Force	280~3,500 kg
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Spools / Sleeves



Operating Pressure	70~350 bar	Rated Flow	25~756 lpm (@70 bar)
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* Spools / Sleeves for servo valves (13 kinds)

Electric Drive

SG SERVO designs and manufactures linear electric actuator, reducer for precise motion control.

Actuator



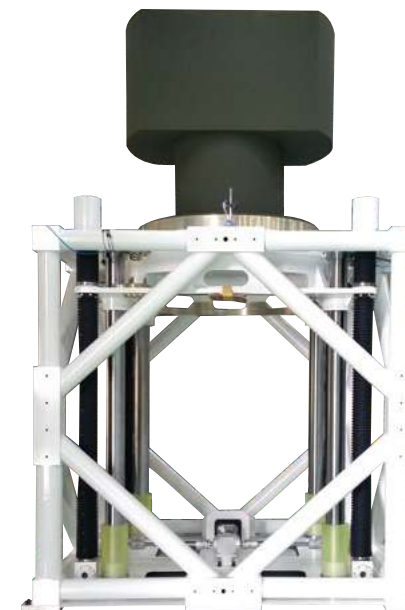
Actuators (3 items)

Reduction Ratio	5:1, 15:1	Driving Speed	7.5~20 mm/sec
Stroke	450 mm	Max. Force	10~20 kN



Reducer

Reduction Ratio	19.3:1	Output Torque	4,700 Nm
Max. Input Speed	1,500 rpm	Efficiency	97% ▲



Lift Assembly / Gimbal Assembly

Reduction Ratio	6:1	Driving Speed	138 mm/sec
Stroke	1,300 mm	Max. Force	11 kN



Auto Leveling System

Reduction Ratio	15:1	Driving Speed	9 mm/sec
Stroke	450 mm	Max. Force	52 kN

General Hydraulic & Pneumatic

SG SERVO manufactures general hydraulic pneumatic products such as valve, pump, manifold, quick disconnect coupling, hydraulic power supply & distribution device and has a technology to design hydraulic systems.

Valves



Module Valve Assembly

Max. Operating Pressure	320 bar
Max. Flow Rate	40 lpm



Valve Sensor Assembly

Max. Operating Pressure (Pneumatic Pressure)	1.3 bar
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Hydropneumatic Suspension Unit



Hydropneumatic Suspension Unit (KAAV II Amphibious Vehicle)

Static Load	3.0 ton
Operation Angle of Road Arm	63°
Wheel Displacement	436.9 mm
Feature	Retractable



Manifold / Wheel Valve Assembly

Max. Operating Pressure	9.5 bar
Working Fluid	Dry air (moisture content < 0.5%)



Solenoid Valve

Max. Operating Pressure (Pneumatic Pressure)	50 bar
Supply Voltage	28 VDC

Pump/Motor



Hydrostatic Steering Unit (K2 Main Battle Tank)

Max. Input Power	432 kW (@2,300 rpm)
Max. Operating Pressure	530 bar
Displacement	250 cc/rev



Hydrostatic Steering Unit (KAAV I Amphibious Vehicle)

Max. Input Power	285 kW (@3,800 rpm)
Max. Operating Pressure	482 bar
Displacement	108.6 cc/rev



Manifold Assembly (Track tension control)

Proof Pressure (Input Port)	294 bar	Rated Flow	7 lpm
Proof Pressure (Output Port)	441 bar	Accumulator Tank Capacity	200 cc



Manifold Assembly (Dozer Control)

Proof Pressure	343 bar
Rated Flow	15 lpm



Piston Pump **Patent**

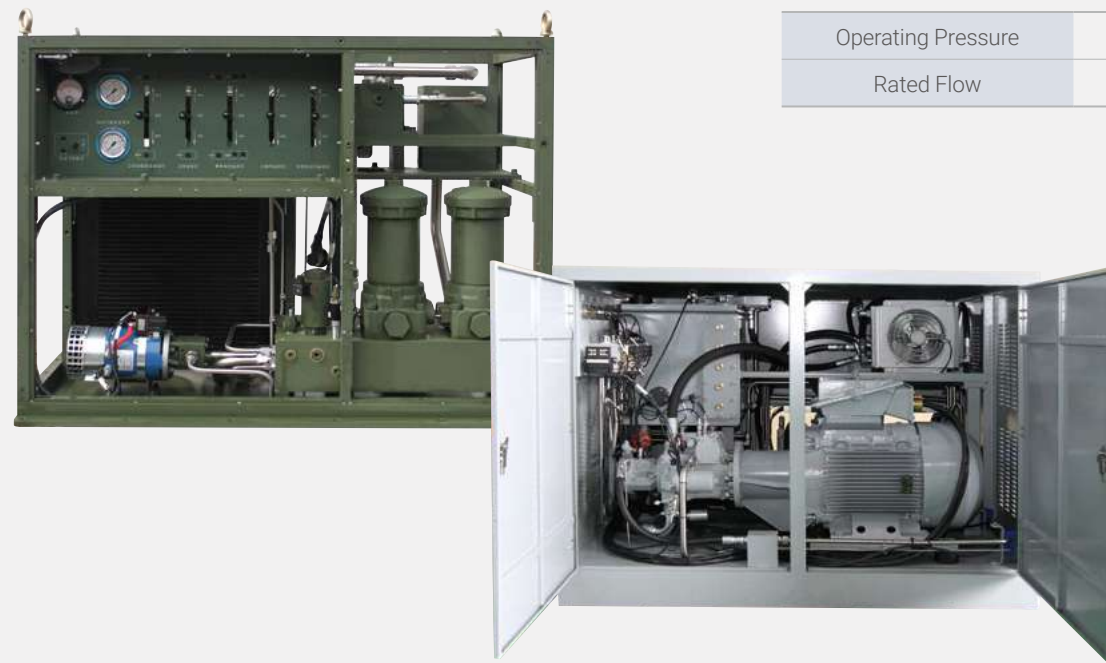
Rated Pressure	350 bar
Displacement	110 cc/rev
Feature	Variable Displacement, with Load Sensing Controller



External Gear Pump

Rated Flow	294 lpm
Driving Torque	67 Nm

Power Pack



Hydraulic Power Supply / Distribution Device

Operating Pressure	185~280 bar
Rated Flow	200, 230 lpm

Other Hydropneumatic Products



Quick Disconnect Coupling **Patent**

Operating Pressure	600 ~ 3,000 psi
Pressure Drop	3 ~ 8 psi
Tube Size	0.25 ~ 2 inch

* For aircraft hydraulic, Self sealing, ratchet lock (5 kinds)



Damper

Stroke	25 mm
Damping Force	2,170 kg (@0.25 m/sec)



Damper

* The time required to compress 50mm with a force of 3,300kg is between 1~2 seconds.

Applications

- 14 K21 Recovery Vehicle
- 16 K55 Self Propelled Howitzer
- 17 K200 Infantry Fighting Vehicle
- 17 K808 Infantry Combat Vehicle
- 18 Submarine
- 20 Aviation
- 21 Aviation
- 22 Magnetic Levitation Train



K21 Recovery Vehicle

Design and Production of Hydraulic System

Manifold Assemblies and Driving Units	16 items
Pumps and Valves for Transmission	5 items

You can check working line diagram by scanning the QR code with your smartphone.



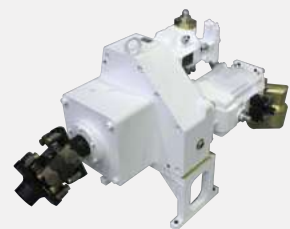
Driving Unit
for emergency power generation



Manifold Assy.
for emergency power control



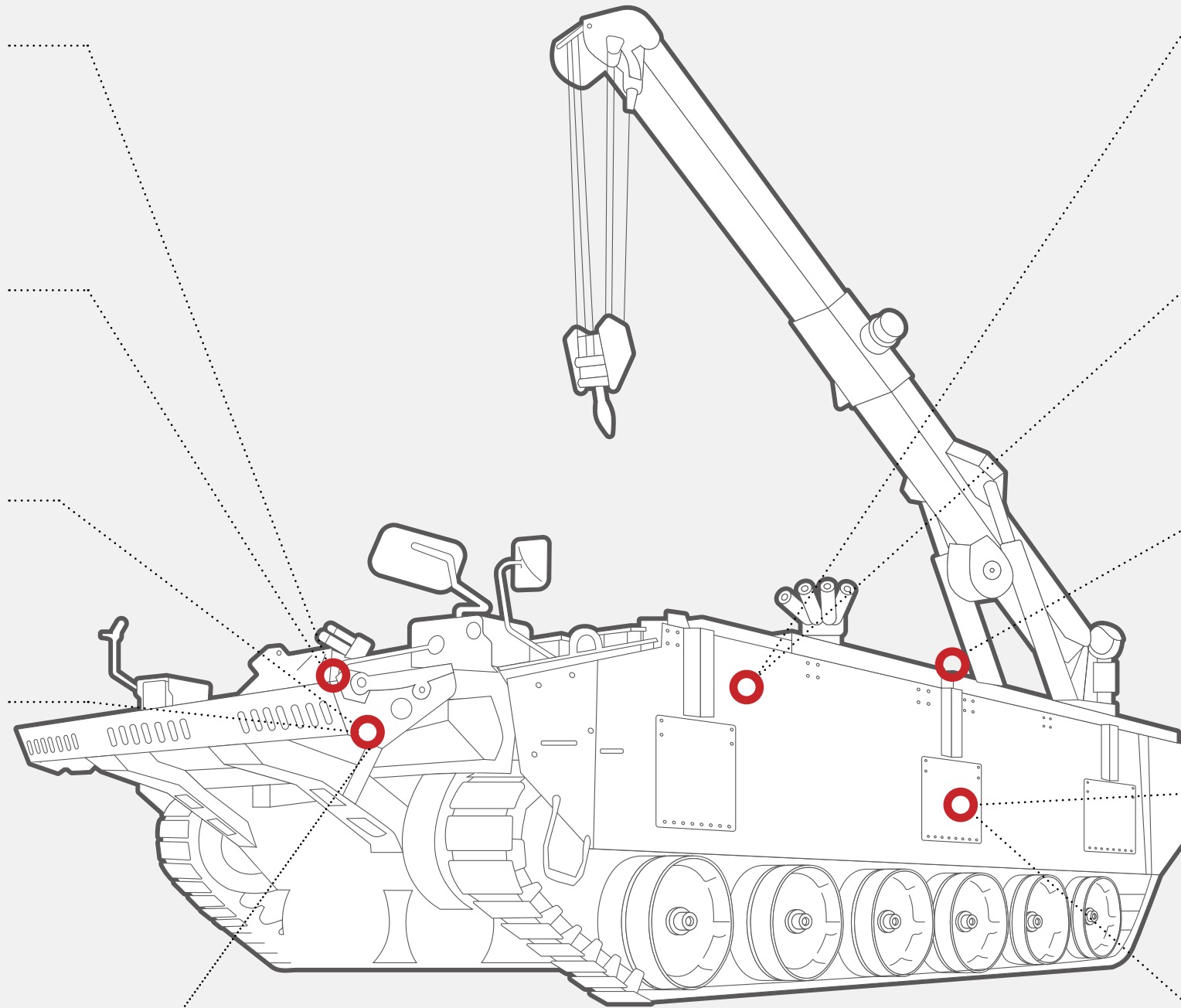
Manifold Assy.
for clutch control



Driving Unit
for power take off



Reservoir



Manifold Assy.
for track tension control



Manifold Assy.
for hydraulic pressure distribution



Manifold Assy.
for cooling fan control



Valve Sensor Assy.
for flotation device control



Manifold Assy.
for added armor control



K55 Self Propelled Howitzer

7 items for transmission (Model Type XTG 411-2A)



Control Valve
for gear range control



Relay Valve
for supply of hydraulic fluid according to gear shifting condition



Steering Valve
for controlling of steering pressure



Main Control Valve
for maintaining main hydraulic pressure



External Gear Pump
for circulation of cooling oil



External Gear Pump
for circulation of hydraulic oil



Pump Assembly
for supply of valve's main pressure

K200 Infantry Fighting Vehicle

2 items for transmission (Model Type X200-5K)



External Gear Pump
for oil input

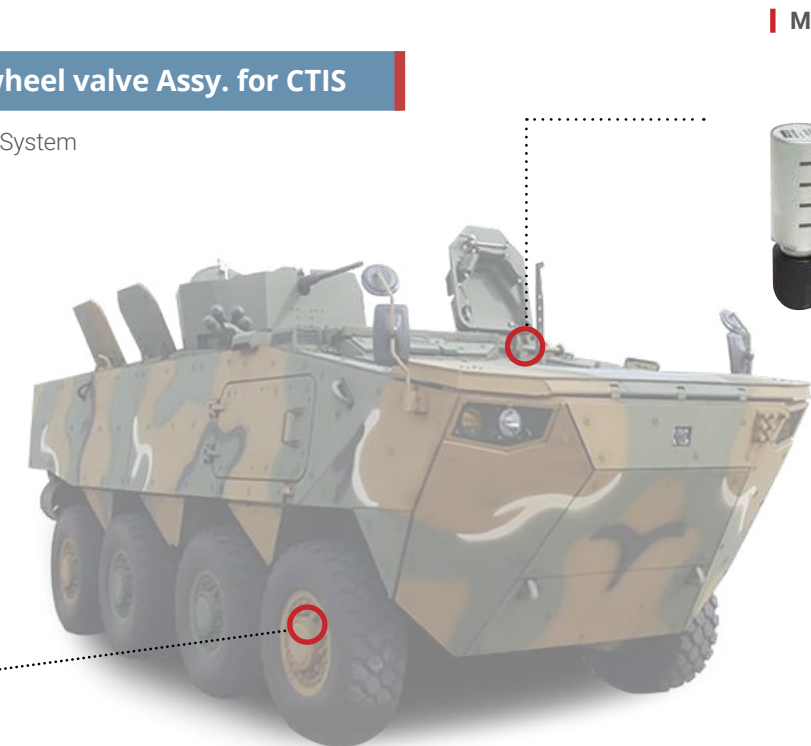


External Gear Pump
for oil output

K808 Infantry Combat Vehicle

Manifold / wheel valve Assy. for CTIS

* Central Tire Inflation System



Manifold

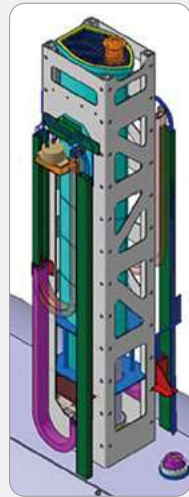


Wheel Valve

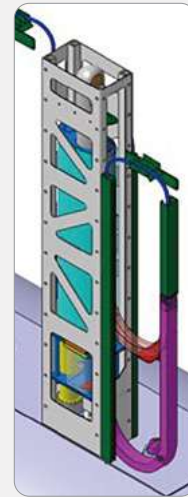
Submarine

Mast Raising Equipment

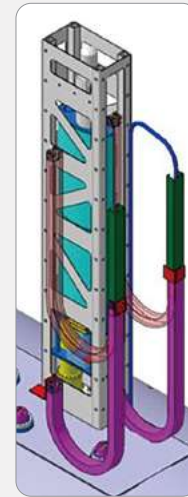
Driving Type	Electric Driving
Input Power	5~7 kW
Max. Speed	300 mm/sec
Stroke	2,400~3,600 mm



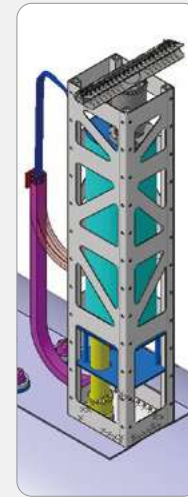
Snorkel Mast



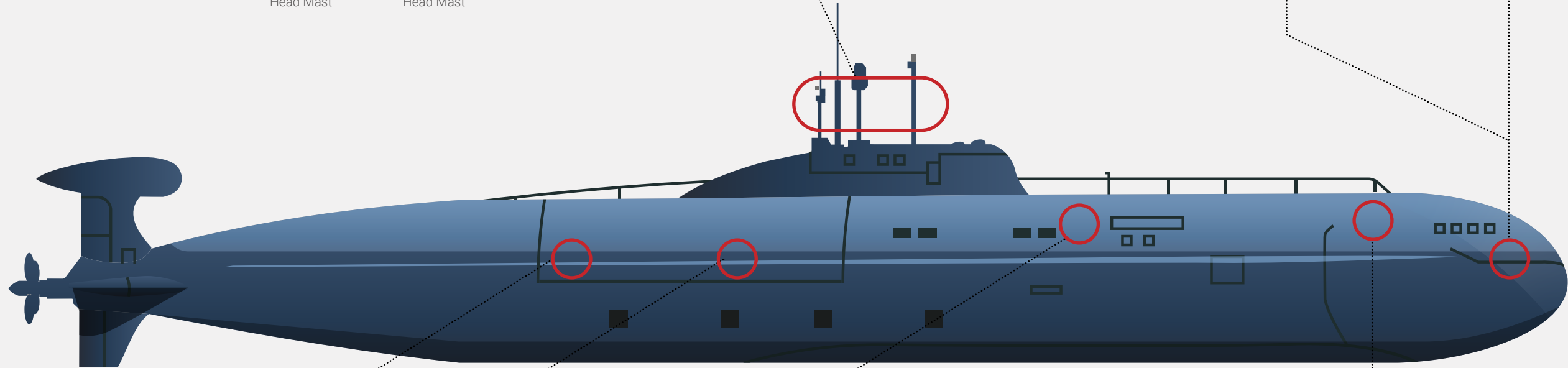
Attack Optronic Head Mast



Search Optronic Head Mast



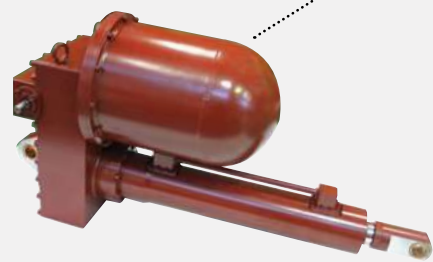
Rader Mast



Actuator for fastening of weapon



Actuator for containment unit drive



Actuator for torpedo launcher drive



Actuator for torpedo launcher drive



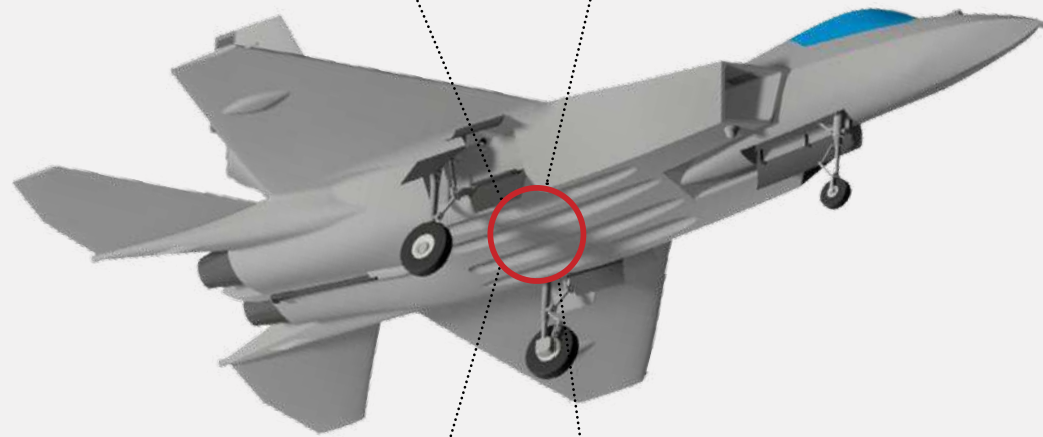
Aviation

Pneumatic Ejection System for Fighter

Air Compressors Assembly-Dry Type



Water - Oil Separator



Isolation Valve(4way)



Air Filter



Aviation

Ground Support Equipment for Aircraft

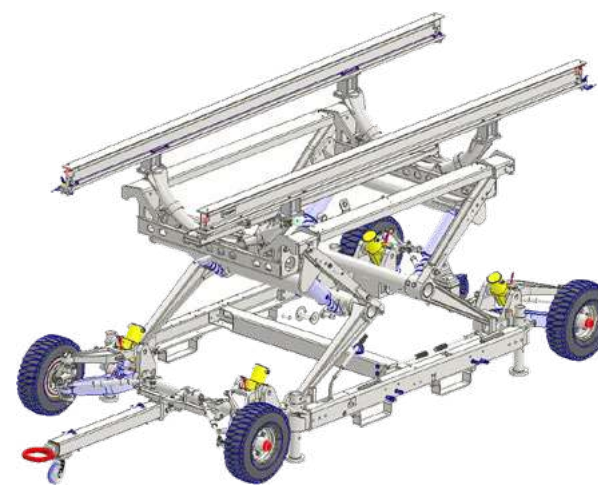
Nitrogen Generator
PSA(Pressure Swing Adsorption) Type
High Purity Nitrogen Generator(above 99.5%)



Nitrogen Charging Trailer
Supplying high-pressure nitrogen to aircraft



Trailer for Engine Installation
Trailer assembly for installation and removal of KF-21 Fighter engine

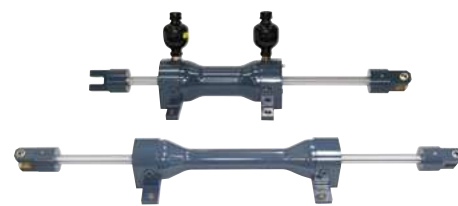


Magnetic Levitation Train



Emergency Driving Assembly | **Power Pack**

Function	Roller driving system for emergency
Max. Force	17.8 kN
Operating Pressure	166 bar
Supply Voltage	24 VDC



Steering Cylinder

Function	Improve driving safety in curve sections
Type	Double rod, Double acting
Max. Operating Pressure	210 bar
Stroke	± 210 mm (inner), ± 76 mm (outer)



Manifold

Function	Steering cylinder control
Operating Pressure	140 bar
Feature	Built-in sevo valve



Steering Cylinder

Function	Improve driving safety in curve sections
Type	Single rod, Double acting
Stroke	± 159 mm (Articulation), ± 13 mm (Bogie)
Feature	Built-in LVDT

Certificates and Patents

Certificates



- 01 AS 9100
- 02 ISO 9001
- 03 ISO 14001
- 04 Defense Quality Management System (DQMS)

Recognitions and Awards



- 01 R&D Center certificate
- 02 INNO-BIZ certificate
- 03 MAIN-BIZ certificate
- 04 Commendation for Secretary of Defense
- 05 The Best R&D Team Award of the Changwon city
- 06 Commendation for Prime Minister

Patents



- 01 Piston Pump
- 02 Piston Pump
- 03 Quick Disconnect Coupling
- 04 Hydraulic Rotary Actuator
- 05 Hydraulic Rotary Actuator
- 06 Servo Valve Driving Apparatus

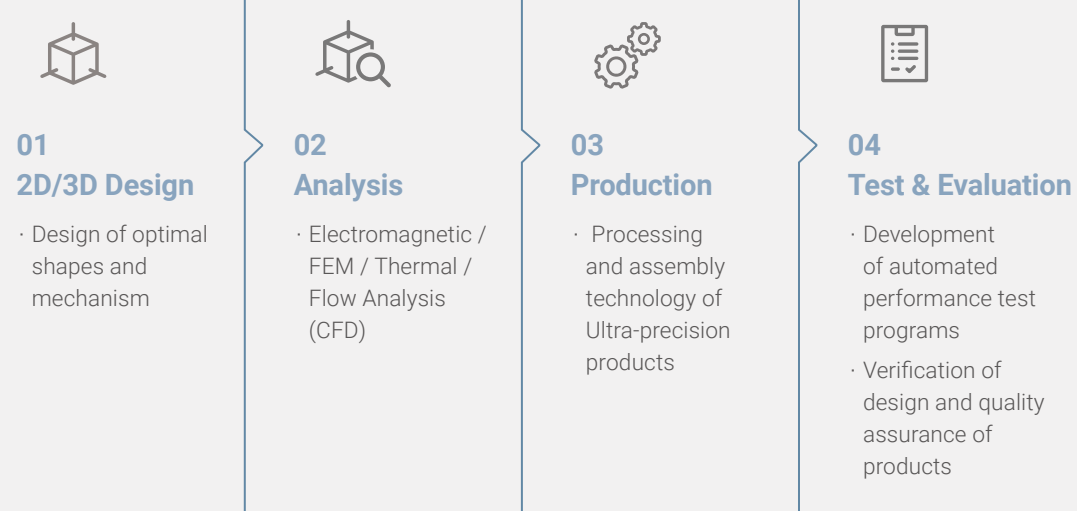
Research and Development



Overview

Established in 2003, the SG SERVO R&D Center has secured advanced technologies in the fields of servo hydraulic, electric drive, and hydropneumatic. As well as continuous investment in research and development, we are maximizing our research capability through a collaborative research system with various research institutes and academia. We will continue to make further efforts to become a research institute that can provide total solutions for motion control system by preparing for future technologies in advance.

Research Capability



R&D Cooperative Organization

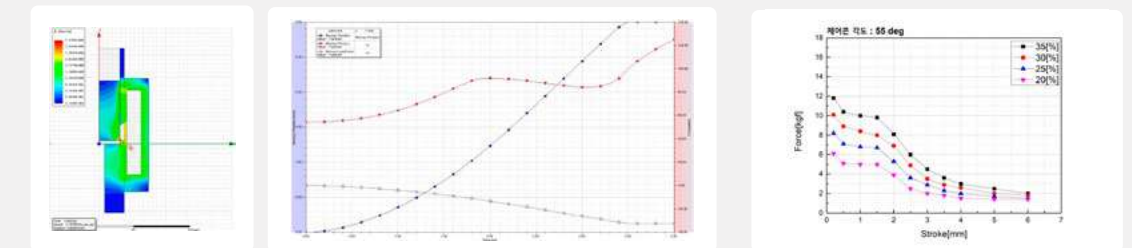
SG SERVO R&D Center is dedicated to R&D as best as possible to satisfy customer requirements through research cooperation with various institutions.



Engineering Analysis

Electromagnetic Analysis

- Optimal design of torque motor of servo valves
- Analysis of magnetic field of proportional valve, and analysis of electromagnetic field according to actuator cone angles and materials

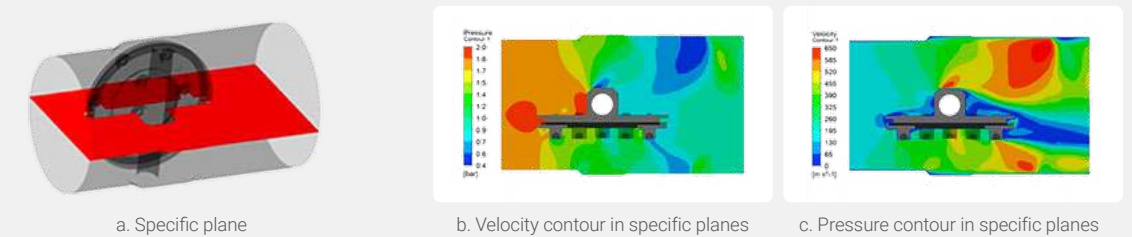


< Analysis of electromagnetic field according to materials and shapes of control cone >

< Analysis of attractive force according to angle change of control cone >

Flow Analysis

- Optimal design of components through flow analysis



a. Specific plane

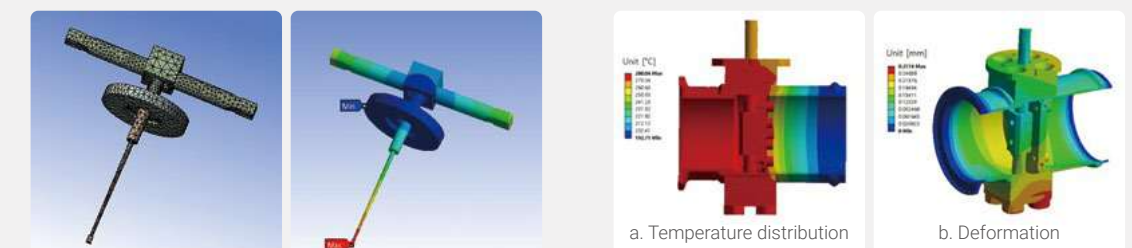
b. Velocity contour in specific planes

c. Pressure contour in specific planes

< Analysis of flow field in the valve plane >

Structural and Thermal Analysis

- Analysis of structural strength and fatigue life according to applied load and thermal stress



< Analysis of structural strength of servo valve flappers >

< Temperature distribution and deformation of butterfly valve >

Test and Evaluation

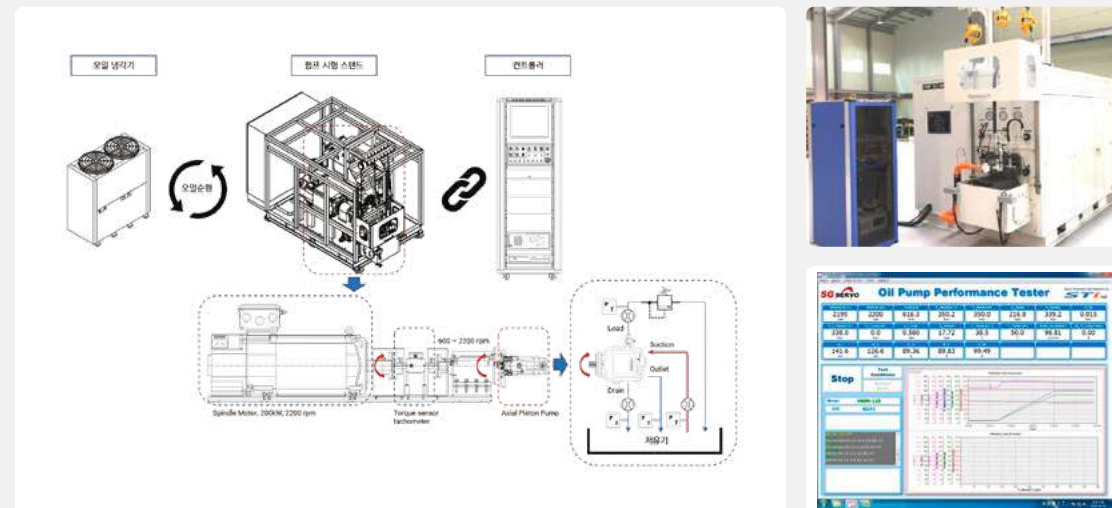
Data Acquisition and Control Technology

- Design of data acquisition system using commercial program (Lab VIEW)
- Design of control system using Micro Processor Unit (MPU)
- Design of automated performance test system

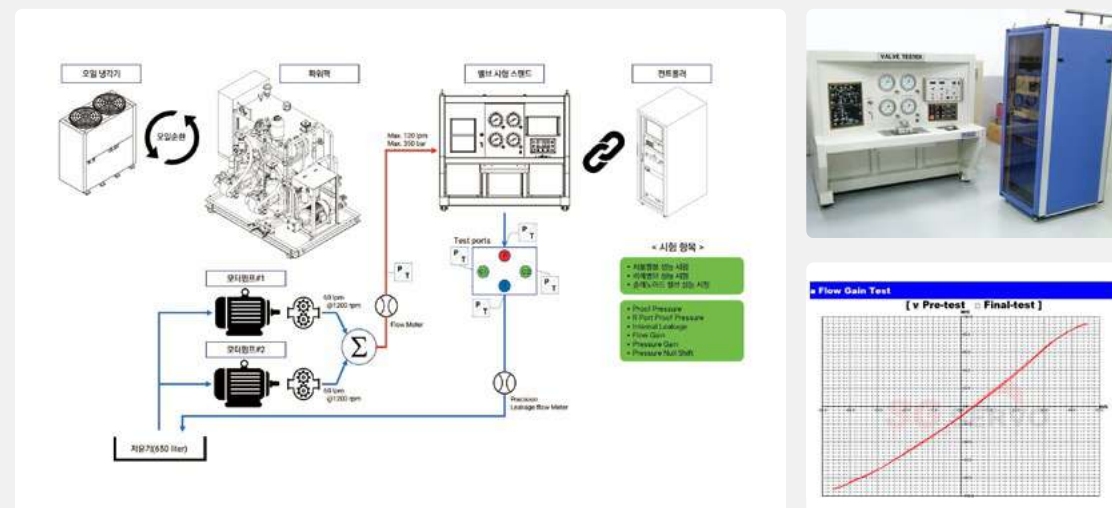


Performance Test and Evaluation

- Performance test of pumps



- Performance test of valves



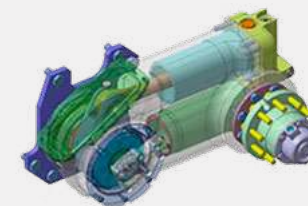
R&D Performance and Vision

R&D Performance 2002 ~ 2018

- Pumps, valves for transmissions of military tracked vehicles (K55 SPH, K21 IFV, K21 IFV)
- Design of hydraulic system and production of hydraulic components for K21 recovery vehicle
- Hydrostatic steering unit for transmission of K2 main battle tank
- Manifold and wheel valve for CTIS of K808 infantry combat wheeled vehicle
- Electric auto leveling system for ground vehicle
- Mast raising equipment and electric actuators for submarine
- Actuator and surge valve for APU of Korean Fighter
- Servo and proportional valves
- General hydraulic products (Piston Pumps, Quick Disconnect Couplings, Cylinder, Damper, etc)

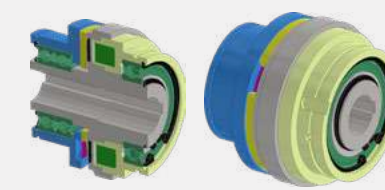
Development Project in Progress 2019 ~ Present

- Hydrostatic steering unit for transmission of old Korean amphibious assault vehicle (KAAV I)
- Hydropneumatic suspension unit for Korean amphibious assault vehicle (KAAV II)
- Electromagnetic clutch
- Multiple drone launcher
- Exhaust valves for submarine
- Ground support equipment for aviation
- Pneumatic ejection system for fighter



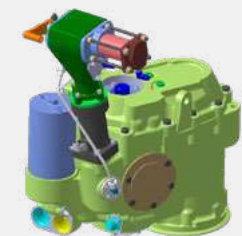
Retractable Hydropneumatic Suspension Unit (KAAV II)

Static Load	3.0 ton
Stroke	-108~328 mm



Electromagnetic Clutch

Rate Torque	40 Nm
Max. Speed	5,000 rpm
Driving Voltage	24 V



Hydrostatic Steering Unit (KAAV I)

Operating Pressure	41.4 Mpa
Displacement	106.5 cc/rev

Facilities

We have the latest facilities and skilled professionals to process, assemble, test and evaluate the precision hydraulic and electric drive devices, and we require our clients with best products through thorough quality assurance.



Test Facilities



Production / Inspection Facilities

No.	Facility	Spec.	Qty
1	Hydrostatic Steering Unit Test Equipment	700 bar / 51 lpm	1
		210 bar / 60 lpm	
		50 bar / 100 lpm	
2	Dynamometer	300 kw / 5,000 rpm	1
3	Hydropneumatic Suspension Unit Test Equipment	25 ton / 500 mm (stroke)	1
4	Transmission Pump Test Equipment	200 bar / 400 lpm	1
5	Hydraulic Pump Test Equipment	400 bar / 250 lpm	1
6	Quick Disconnect Coupling Test Equipment	70 bar / 70 lpm	1
		15 bar / 800 lpm	

No.	Facility	Spec.	Qty
7	Servo Valve Test Equipment	350 bar / 120 lpm	1
8	Valve Test Equipment	345 bar / 130 lpm	1
9	Manifold / Wheel Valve Test Equipment	10 bar	1
10	Motor Test Equipment	1,300 Nm / 600 rpm	1
11	PTO Test Equipment	1,180 rpm / 360 rpm	1
12	Pneumatic Distributor Test Equipment	0~4 bar	1
13	Climatic Testing Chambers	-50 °C ~150 °C / 30~98% (RH)	1

No.	Facility	Model	Manufacturer	Qty
1	H-MCT	KH80G	WIA, Etc.	5
2	V-MCT	MYNX6500/50 II DN solutions, Etc.		5
3	CNC	PUMA GT2600 DN solutions, Etc.		4
4	Honing Machine	CVH-03S	Cleantec, Etc.	2
5	Lapping Machine	KE-610	Ibche Corporation, Etc.	2
6	Ultrasonic Washer	UIL-40040H	UIL Ultrasonic	2
7	Laser Marking Machine	AT-F20-L	TAECHU, Etc.	2
8	Gage	395-271-30	MITUTOYO, Etc.	250

No.	Facility	Model	Manufacturer	Qty
9	3D Measuring Machine	CONTURA G2	ZEISS	1
10	2D Measuring Machine	V7-700	TRIMOS	2
11	Surface Tester	CD 120	Mahr	1
12	Fluid Control Unit	FCU 2110-4	HYDAC	1
13	Illuminometer	SJ310	MITUTOYO	1
14	Hardness Tester	DTR-200N	Daekyung Tech, Etc.	2
15	Roundness Measuring Machine	EC1550	Kosaka	1
16	Tension and Compression Tester	SY10800-50	SHIN YOUNG	1



www.sgserve.co.kr

Scan the QR code with
your smartphone.



DQMS, AS9100,
ISO14001, ISO9001
Certified Company

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