

SERVO VALVE

Servo valve can make accuracy pressure and flow control using the low current and are suitable for electro-hydraulic systems that require position, speed and acceleration control with high precision and response.

Applications



Military



Aerospace



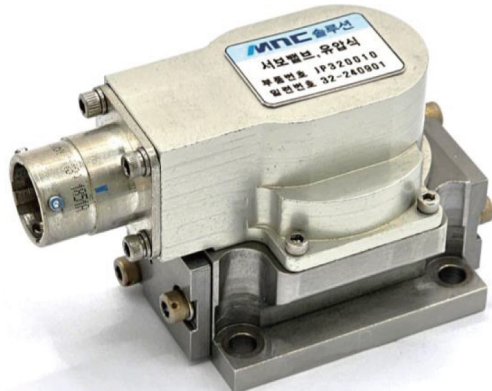
Steel/Power plant



Test equipment



Robot



서보밸브 보유 기술

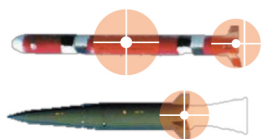
MNC Solution은 32년간 서보밸브 10종 30,000여 개 이상을 방산사업에 적용하여 성능과 신뢰성을 입증함.

서보밸브 개발 능력

유압식 정밀제어 서보시스템의 핵심 구성품으로
방산용, 민수용 서보밸브 총 18종을 국내 독자 개발하여
체계 적용 및 검증완료

구분	방산	민수
형상		
압력 기준	3,000 psi	1,000 psi
종류별 유량범위	3 ~ 44 gpm @ 3,000 psi	1 ~ 16.5 gpm @ 1,000 psi
사용 전류	10 mA	40 mA
내부 누유	0.2 ~ 0.5 gpm (종류별 상이)	0.45 gpm
가격	고가	저가
설계 변경	요구조건 대응 설계변경 가능	좌동
커넥터 사양	사용자의 요구조건에 따라 변경 가능	좌동

서보밸브 개발 및 적용 실적

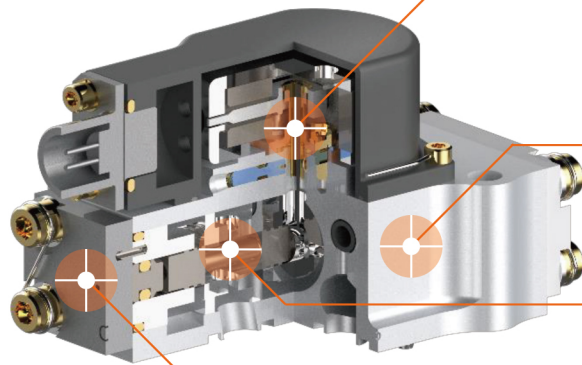
1993	1999	2003	2005	2008
K1전차용 서보밸브 CKD 생산 	서보밸브 국산화 개발 성공 	- 군 사용가 판정 획득 - K9 자주포 고각/선회용(2종) 	- 순항유도무기 구동장치용 - 순항유도무기 연료조절장치용 - 탄도유도무기 구동장치용 	- K2 전차 현수장치용 - 천무 발사대용 

30년 이상 축적된 기술력

“서보밸브” 개발 및 생산 능력 보유

서보밸브 생산 능력

30,000여개를 생산하여 유도무기/지상무기 체계에 적용하였으며,
연간 3,000개 이상 서보밸브 생산이 가능한 국내 유일 제조 인프라 보유



서보밸브 조립/시험 장비

환경시험 장비

정밀 호닝 장비

스풀 단가공 장비



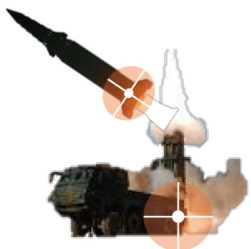
1 독자 설계 및
개발 역량 활용

2 자체보유 생산 및
시험 인프라 활용

3 개발 리스크 제거 및
개발 일정 충족

2019

- 탄도유도무기 구동장치용
- 탄도유도무기 날개용



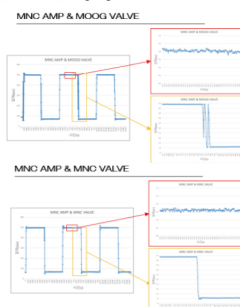
2023

- 민수용 서보밸브 개발 성공
(Moog社 G761 Series
OILGEAR社 VSC4-R03
호환가능)



2025

- 민수용 서보밸브 Track
record 획득



현재

방산 → 민수
사업영역 확장

- 민수용 서보밸브 적용
사업 발굴
- 민수용 3단밸브 개발진행
- 지속적인 투자/개발

민수용 서보밸브 개발성능 비교

범용적으로 사용하는 MOOG 社の 서보밸브와 호환 및 성능 비교를 위해 MOOG 社 서보밸브가 적용중인 장비에 자체 개발한 서보밸브 및 앰프를 장착하여

TRACK RECORD 획득

가. 적용 장비 및 작동원리

- 밸브, 호스 등 다양한 유압부품에 임펄스(충격파)를 인가하기 위한 장비
- 가압을 위한 BOOSTER UNIT과 이를 제어하기 위한 서보밸브로 구성
- 서보밸브 성능은 BOOSTER UNIT(선형작동기)의 위치 제어 성능에 영향을 미치며, 압력으로 최종 출력

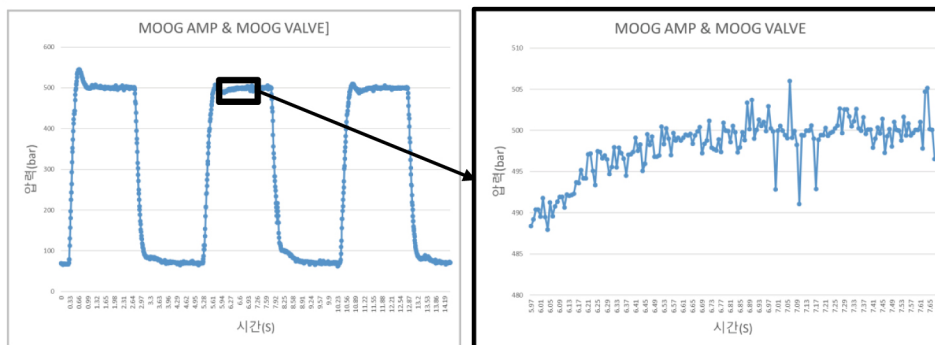


BOOSTER UNIT

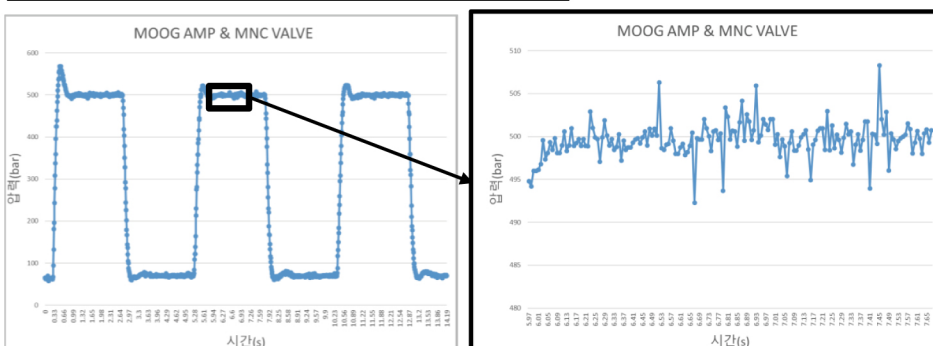
서보밸브

나. MOOG G761-3004 vs MNC NFC100(with MOOG AMP)

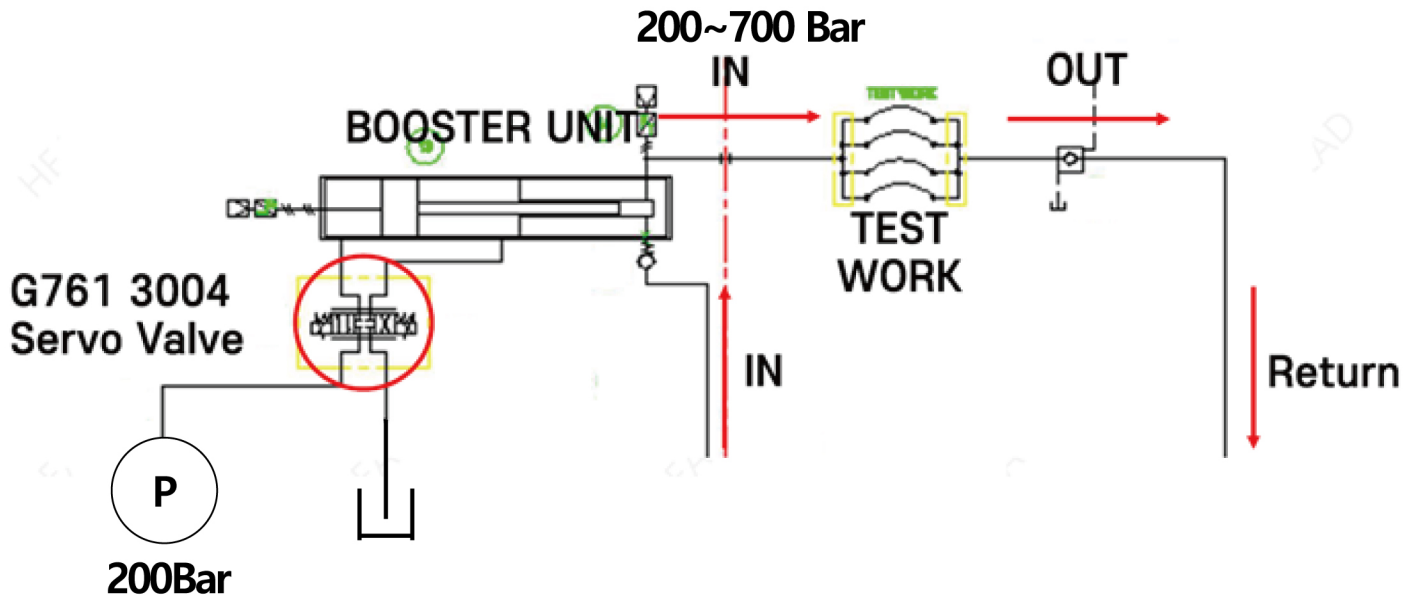
MOOG VALVE & MOOG AMP



MNC VALVE & MOOG AMP

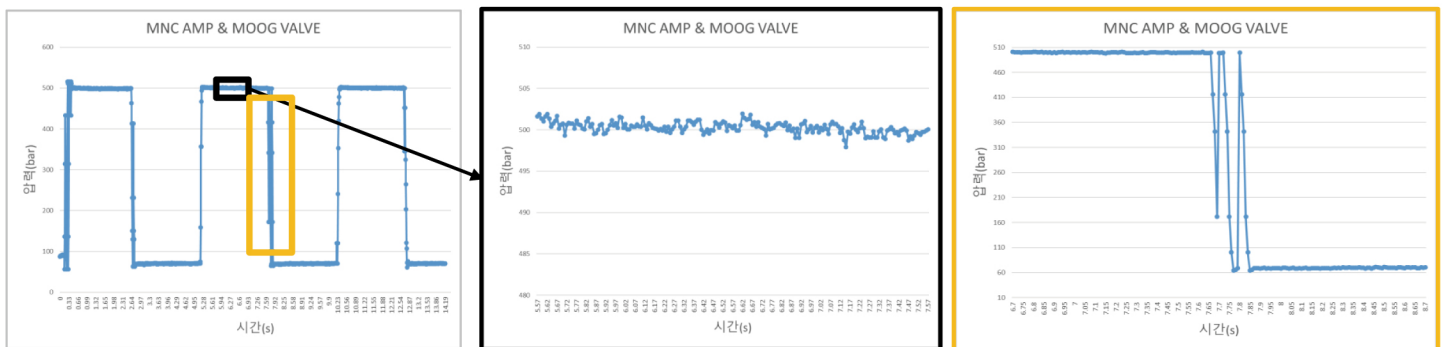


*상/하 그래프 간 X, Y축 SCALE 동일

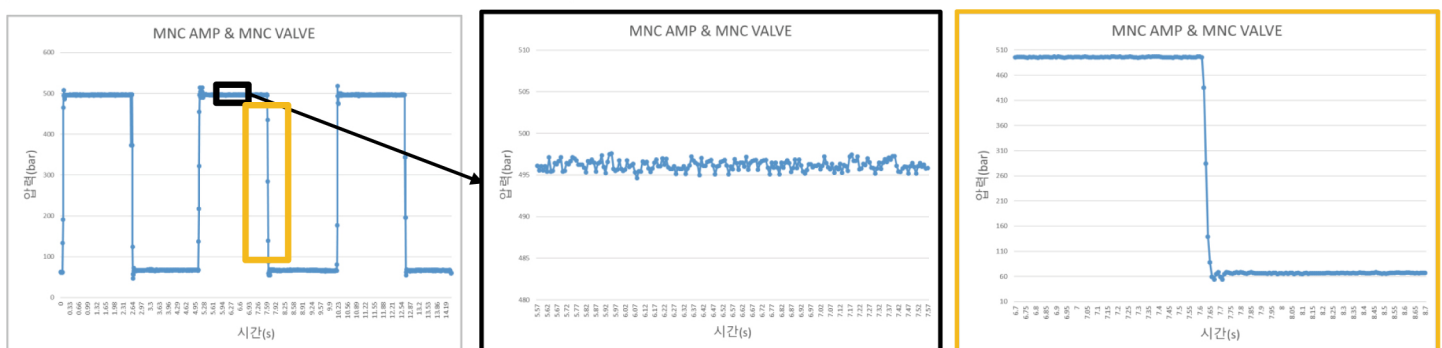


다. MOOG G761-3004 vs MNC NFC100(with MNC AMP)

MOOG VALVE & MNC AMP



MNC VALVE & MNC AMP

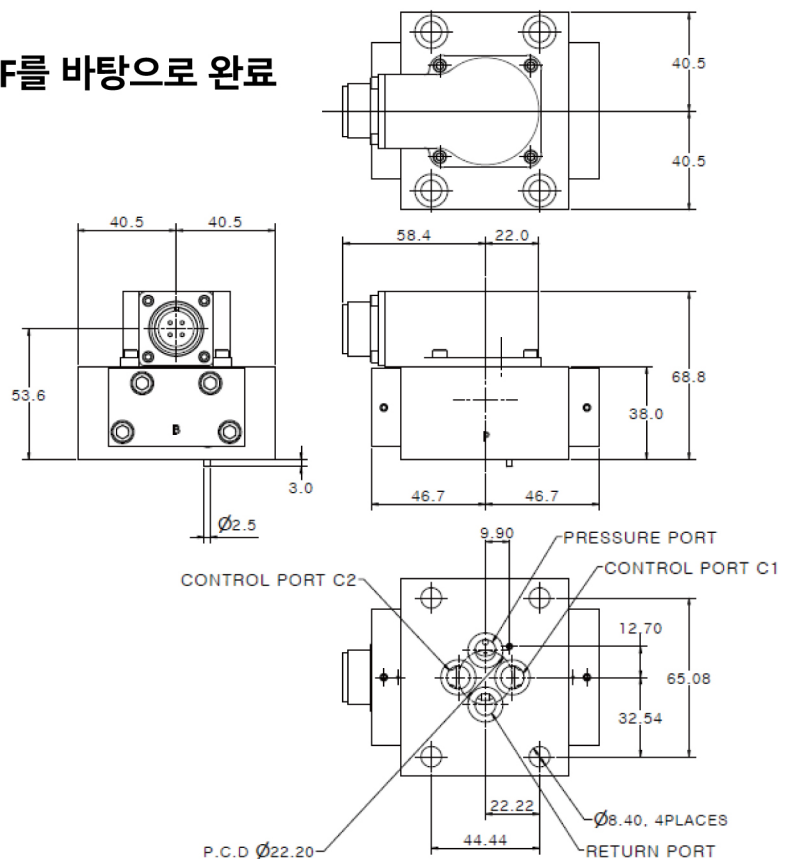


민수용 서보밸브

NFC Series

✓ MOOG社 G761 모델과 호환 가능한 NFC Series 개발 완료

- 작동압력 : 500 ~ 3000 psi
- 정격전류 : 40mA
- 코일저항 : 80 Ω(Individual)
- 구조 : 2단, 노즐 - 플래퍼
- 커넥터 : MS3106F14S-2S
- 환경시험 및 내구성시험은 ARP 490F를 바탕으로 완료

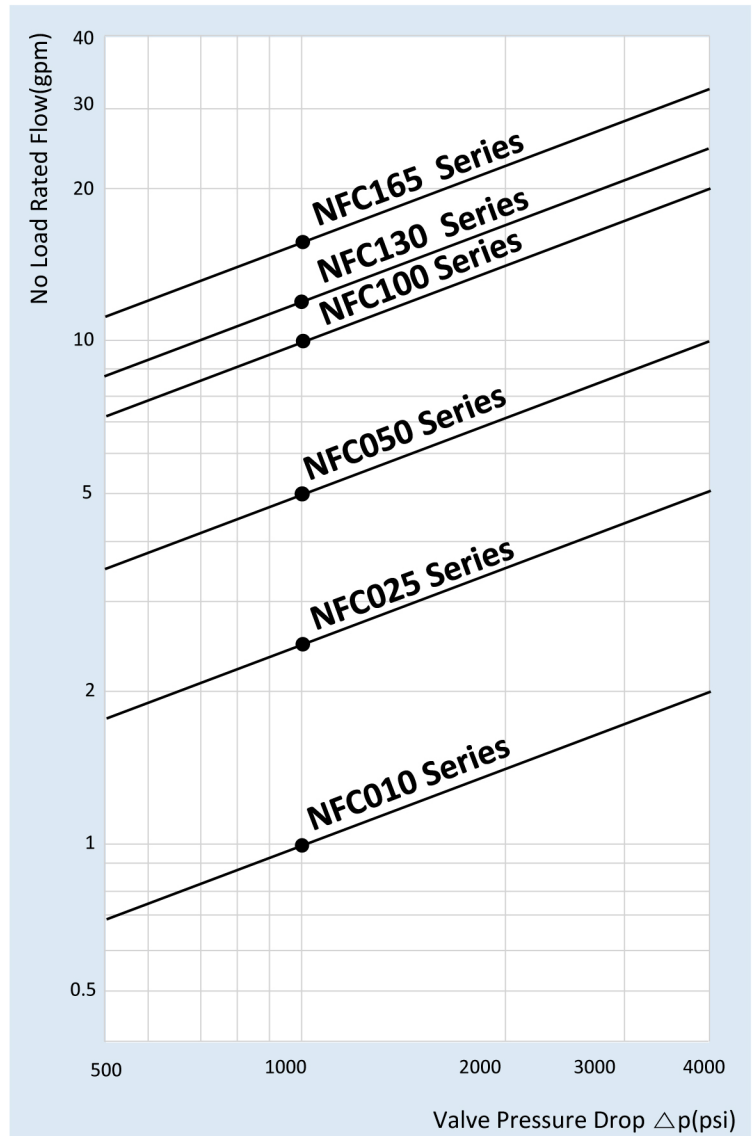


Model	Rated Flow (@1000 psi, gpm)	Maximum Leakage (@1000 psi,gpm)	Frequency of Phase Phint (Hz)	Maximum Amplitude Ratio(dB)	Interchangeable with	Comment
NFC010	1.0	< 0.45	> 130	< 2	Moog G761 3001	
NFC025	2.5	< 0.45	> 130	< 2	Moog G761 3002	
NFC050	5.0	< 0.45	> 130	< 2	Moog G761 3003	
NFC075	7.5	< 0.45	> 320	< 2	Moog G761 4907	High Response Type
NFC100	10.0	< 0.45	> 100	< 2	Moog G761 3004	
NFC165	16.5	< 0.45	> 60	< 2	Moog G761 3005	

Servo Valves(Commercial)

Base on our military servo valve technology, we have completed the development of a commercial servo valve. This valves are interchangeable with MOOG's G761 series. Features of commercial servo valve are outlined below.

- Can be used in a variety of rated flow ranges(1.0 ~ 16.5 gpm)
- Low price
- Externally adjustable null
- Interchangeable with Moog G761 series



Applications



Test Equipment



Robot



Metal Forming

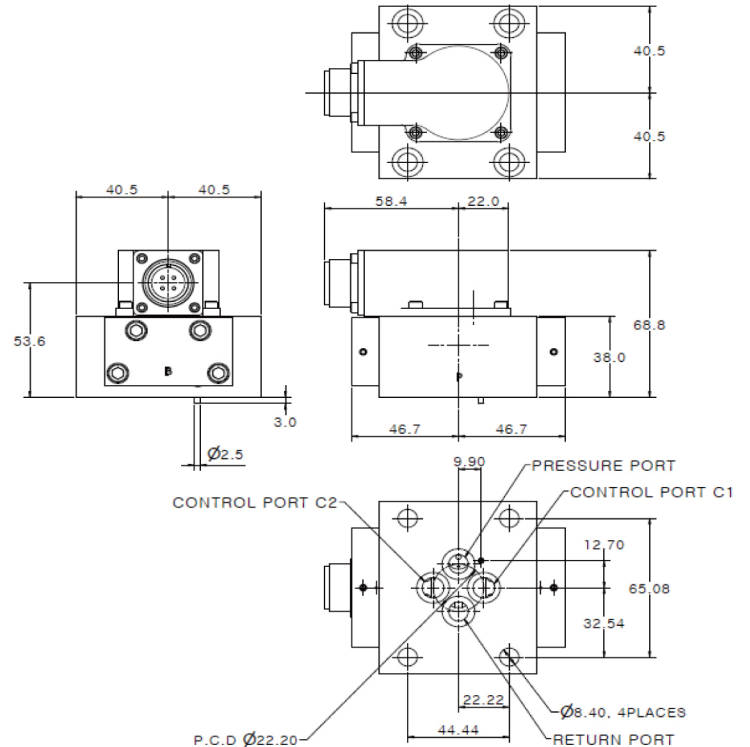


Rolling Mill

SERVO VALVE

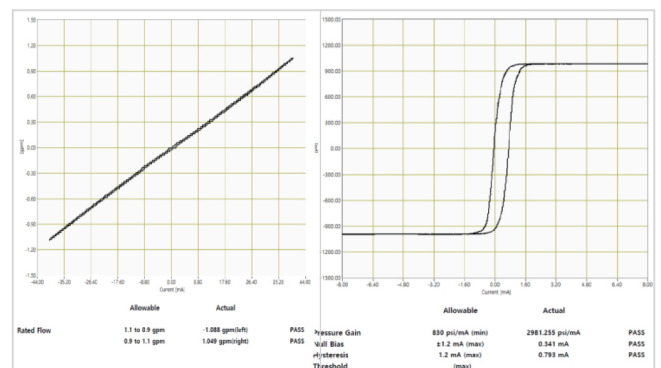
NFC010

Product Specification

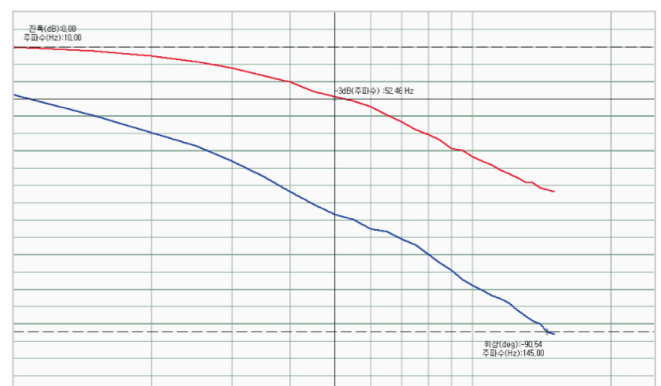


- Operating Pressure : 500 ~ 3000psi
- Rated Current : 40mA, Coil resistance : 80Ω (Individual)
- Structure : Two-Stage, Nozzle Flapper
- Connector mates with MS3106F14S-2S
- Completed environmental and durability tests based on ARP 490F
- Interchangeable with Moog G761 3001
- Turning the null adjustment pin clockwise increases the flow rate of port C1

Installation Drawing



Static Characteristic



Dynamic Characteristic

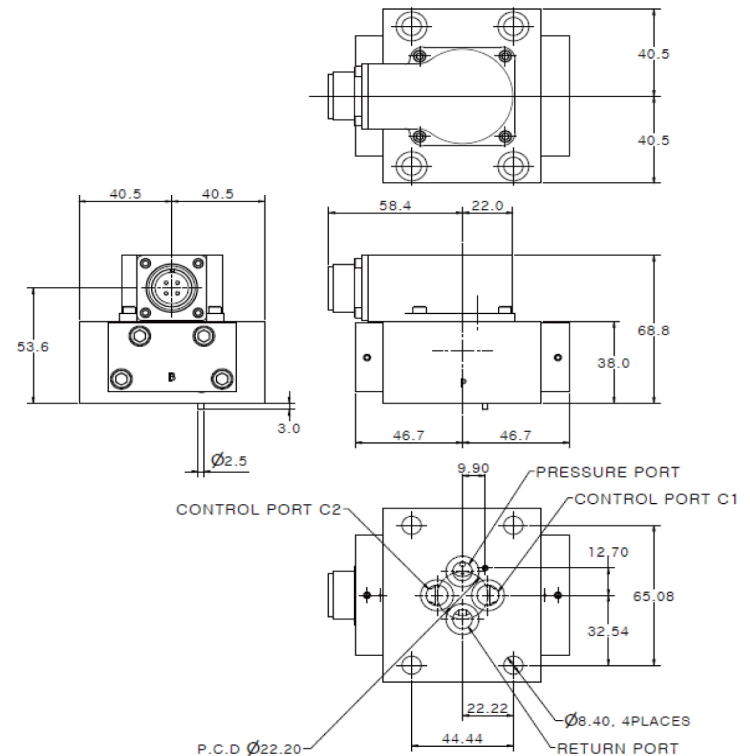
Performance Specifications

Flow Rates	1 ± 0.1gpm (at 1000psi)
Leakage	Max 0.45gpm (at 1000psi)
Null Bias	Max 1.2mA(Rated Current)
Pressure Gain	Min 830 psi/mA(at 1000psi)
Hysteresis	Max 1.2mA(Rated Current)
Threshold	Max 0.2mA(Rated Current)
Frequency Response (90° Phase Lag)	Min 130Hz(25% iR)

SERVO VALVE

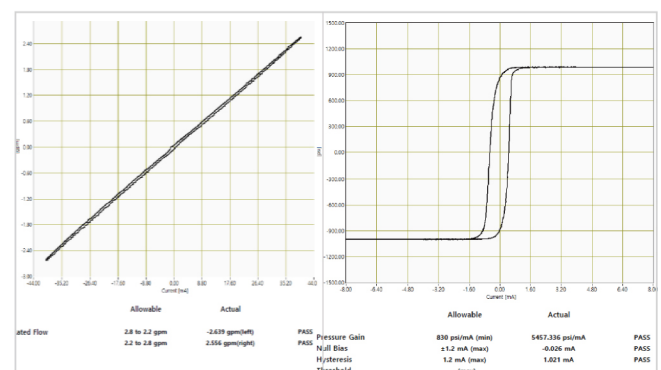
NFC025

Product Specification

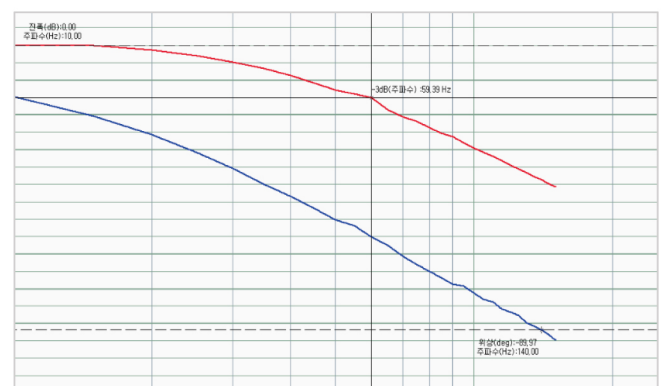


- Operating Pressure : 500 ~ 3000psi
- Rated Current : 40mA, Coil resistance : 80 Ω (Individual)
- Structure : Two-Stage, Nozzle Flapper
- Connector mates with MS3106F14S-2S
- Completed environmental and durability tests based on ARP 490F
- Interchangeable with Moog G761 3002
- Turning the null adjustment pin clockwise increases the flow rate of port C1

Installation Drawing



Static Characteristic



Dynamic Characteristic

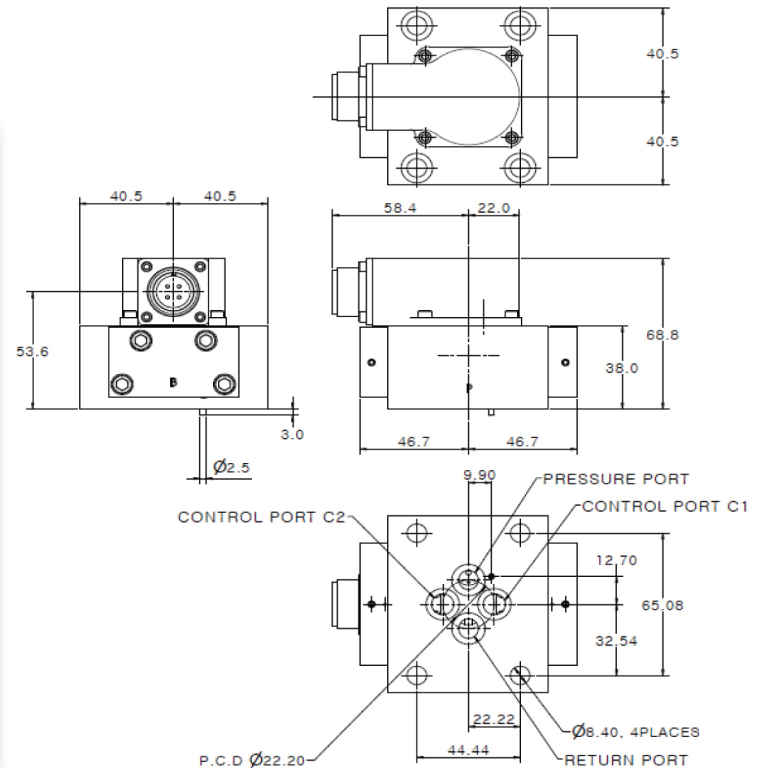
Performance Specifications

Flow Rates	2.5 $\pm$ 0.25gpm (at 1000psi)
Leakage	Max 0.45gpm (at 1000psi)
Null Bias	Max 1.2mA(Rated Current)
Pressure Gain	Min 830 psi/mA(at 1000psi)
Hysteresis	Max 1.2mA(Rated Current)
Threshold	Max 0.2mA(Rated Current)
Frequency Response	Min 130Hz(25% iR)
(90° Phase Lag)	

SERVO VALVE

NFC050

Product Specification

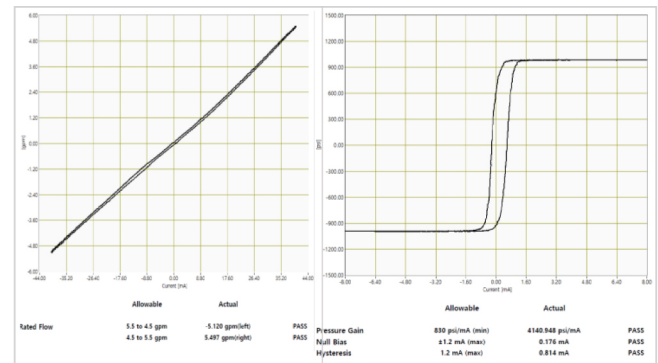


Installation Drawing

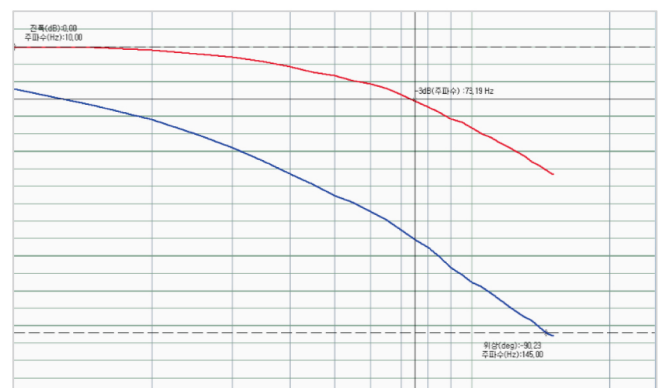
- Operating Pressure : 500 ~ 3000psi
- Rated Current : 40mA, Coil resistance : 80 Ω (Individual)
- Structure : Two-Stage, Nozzle Flapper
- Connector mates with MS3106F14S-2S
- Completed environmental and durability tests based on ARP 490F
- Interchangeable with Moog G761 3003
- Turning the null adjustment pin clockwise increases the flow rate of port C1

Performance Specifications

Flow Rates	5 ± 0.5 gpm (at 1000psi)
Leakage	Max 0.45gpm (at 1000psi)
Null Bias	Max 1.2mA(Rated Current)
Pressure Gain	Min 830 psi/mA(at 1000psi)
Hysteresis	Max 1.2mA(Rated Current)
Threshold	Max 0.2mA(Rated Current)
Frequency Response	Min 130Hz(25% iR)
(90° Phase Lag)	



Static Characteristic

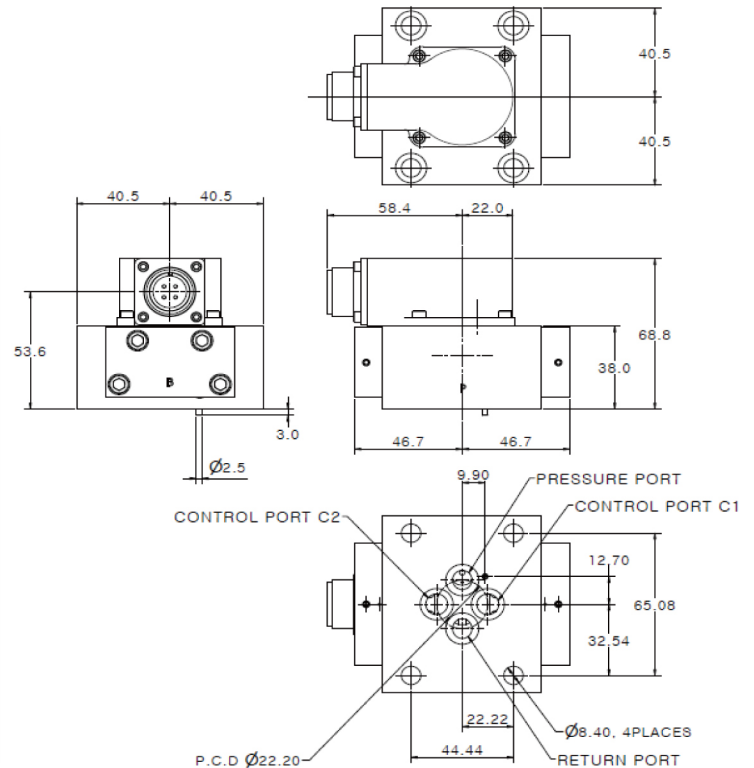


Dynamic Characteristic

SERVO VALVE

NFC100

Product Specification

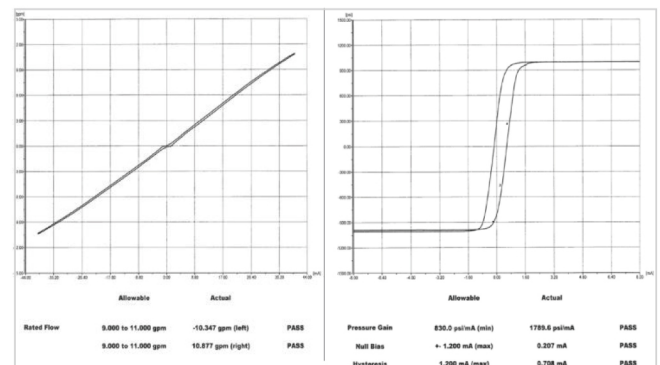


Installation Drawing

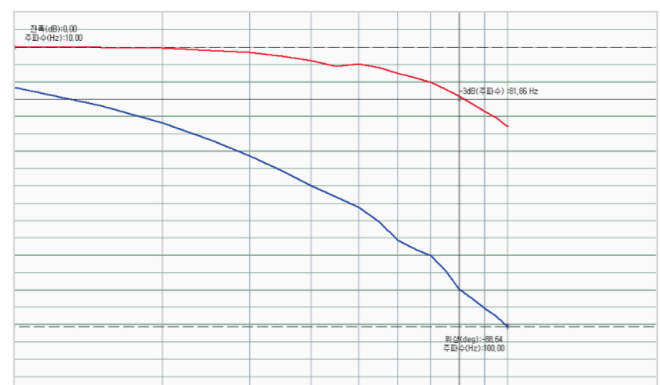
- Operating Pressure : 500 ~ 3000psi
- Rated Current : 40mA, Coil resistance : 80 Ω (Individual)
- Structure : Two-Stage, Nozzle Flapper
- Connector mates with MS3106F14S-2S
- Completed environmental and durability tests based on ARP 490F
- Interchangeable with Moog G761 3004
- Turning the null adjustment pin clockwise increases the flow rate of port C1

Performance Specifications

Flow Rates	10 $\pm$ 1gpm (at 1000psi)
Leakage	Max 0.45gpm (at 1000psi)
Null Bias	Max 1.2mA(Rated Current)
Pressure Gain	Min 830 psi/mA(at 1000psi)
Hysteresis	Max 1.2mA(Rated Current)
Threshold	Max 0.2mA(Rated Current)
Frequency Response	Min 100Hz(25% iR)
(90° Phase Lag)	



Static Characteristic

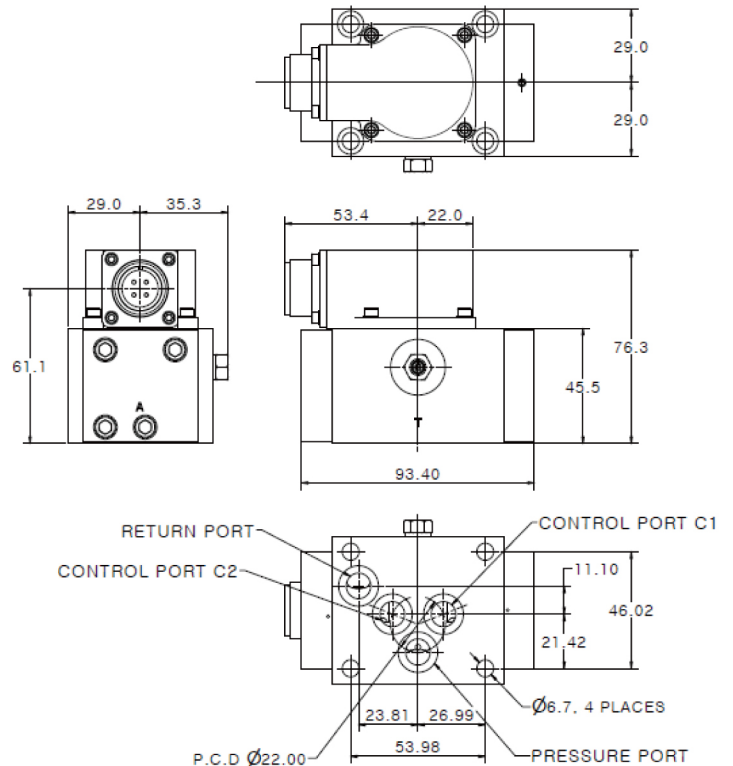


Dynamic Characteristic

SERVO VALVE

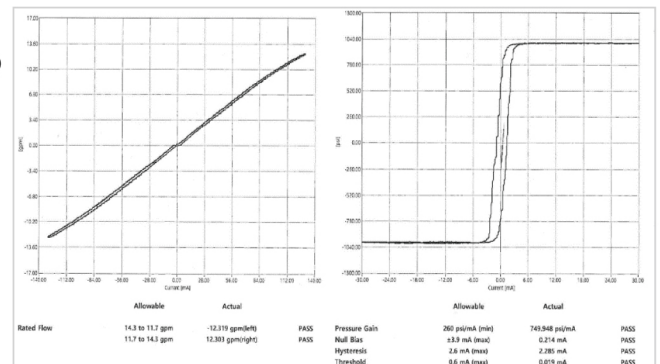
NFC130

Product Specification



Installation Drawing

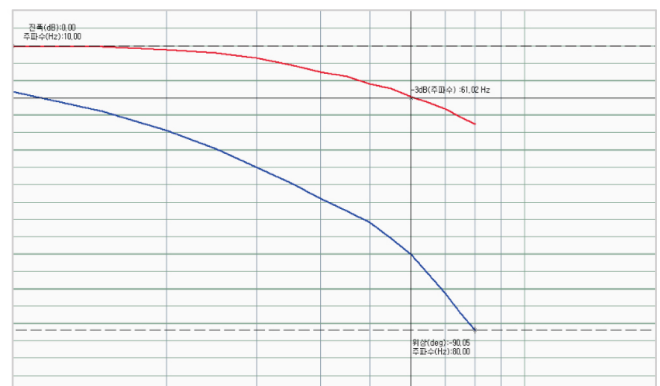
- Operating Pressure : 500 ~ 3000psi
- Rated Current : 130mA, Coil resistance : 11.5Ω (Individual)
- Structure : Two-Stage, Nozzle Flapper
- Connector mates with MS3106F14S-2S
- Completed environmental and durability tests based on ARP 490F
- Mounting surface is a ISO-D05 valve mounding pattern
- Turning the null adjustment pin clockwise increases the flow rate of port C1



Static Characteristic

Performance Specifications

Flow Rates	13±1.3gpm (at 1000psi)
Leakage	Max 0.39gpm (at 1000psi)
Null Bias	Max 3.9mA(Rated Current)
Pressure Gain	Min 260 psi/mA(at 1000psi)
Hysteresis	Max 2.6mA(Rated Current)
Threshold	Max 0.6mA(Rated Current)
Frequency Response (90° Phase Lag)	Min 70Hz(25% iR)

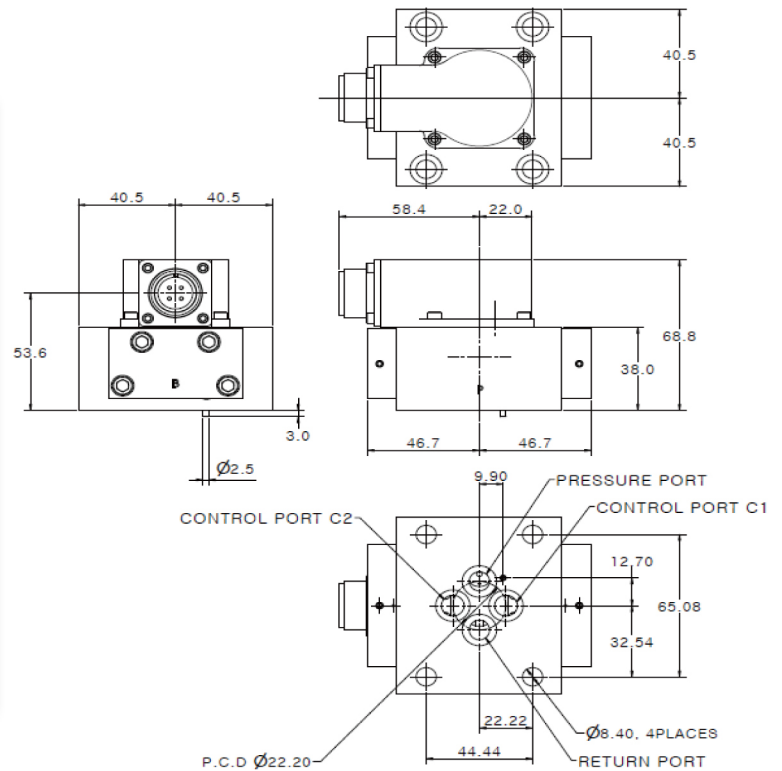


Dynamic Characteristic

SERVO VALVE

NFC165

Product Specification

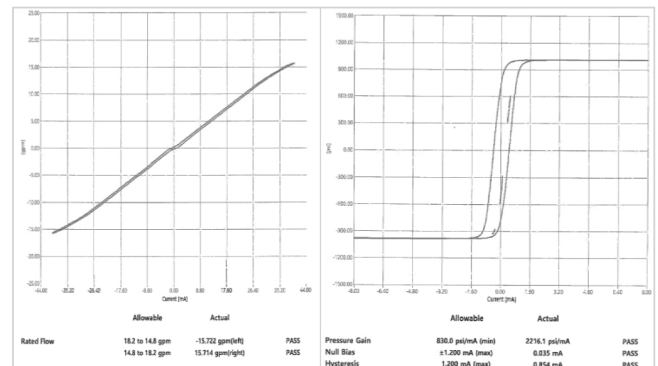


Installation Drawing

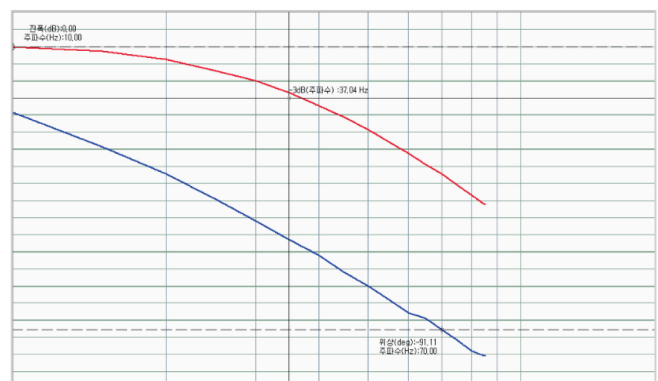
- Operating Pressure : 500 ~ 3000psi
- Rated Current : 40mA, Coil resistance : 80Ω (Individual)
- Structure : Two-Stage, Nozzle Flapper
- Connector mates with MS3106F14S-2S
- Completed environmental and durability tests based on ARP 490F
- Interchangeable with Moog G761 3005
- Turning the null adjustment pin clockwise increases the flow rate of port C1

Performance Specifications

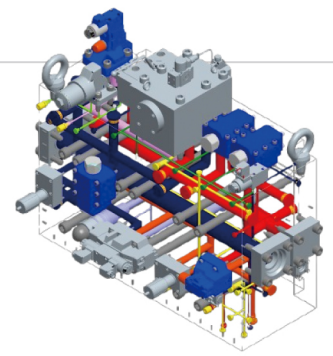
Flow Rates	±1.7gpm (at 1000psi)
Leakage	Max 0.45gpm (at 1000psi)
Null Bias	Max 1.2mA(Rated Current)
Pressure Gain	Min 830 psi/mA(at 1000psi)
Hysteresis	Max 1.2mA(Rated Current)
Threshold	Max 0.2mA(Rated Current)
Frequency Response	Min 60Hz(25% iR)
(90° Phase Lag)	



Static Characteristic

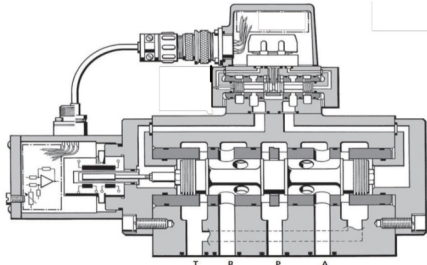
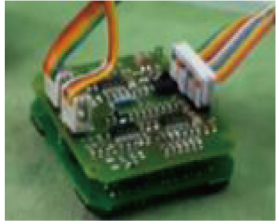


Dynamic Characteristic



3단 서보밸브 개발진행

방산 및 민수용 서보밸브 개발 및 양산을 바탕으로 기 개발 완료(G761 Series 호환모델)되어 있는 서보밸브를 적용하여 제철소(POSCO, 현대제철) 등에 적용되는 3단 서보밸브를 Customize화 개발

순	모델 및 사양			형상 및 단면도	비 고
1	모델	J079-100	J079-200	 	 (제어기 AMP)
2	사양	55gpm	100gpm		
3	전압	$\pm 10V$	$\pm 10V$		
4	전류	4~20 mA	4~20 mA		

소요기술

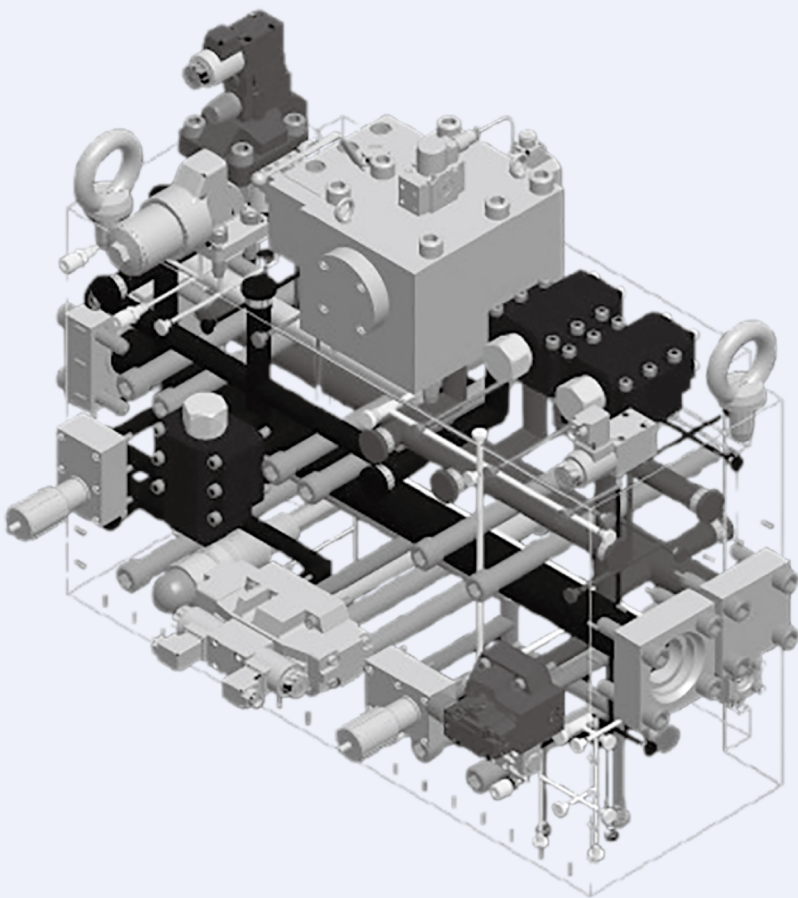
순	소요 기술	방안	비 고
1	2단 Pilot 서보밸브	기 개발 완료된 NFC Series 서보밸브 적용	개발완료 및 보유
2	제어기 AMP	유사사양 양산 및 기술보유	
3	3단밸브 설계 및 제작	유사사양 양산 및 기술보유	가공라인 보유
4	LVDT 설계	유사사양 양산 및 기술보유	
5	시험장비	유사사양 보유	유사장비 활용 중

- 사용자의 환경/요구에 따른 옵션 선택 가능(커넥터사양, 사용전류, 유량 및 압력등)
- Moog J079 Series와 Interchange 가능한 설계 및 제작
- 개발 완료 시 짧은 리드타임으로 고객납기 대응 가능

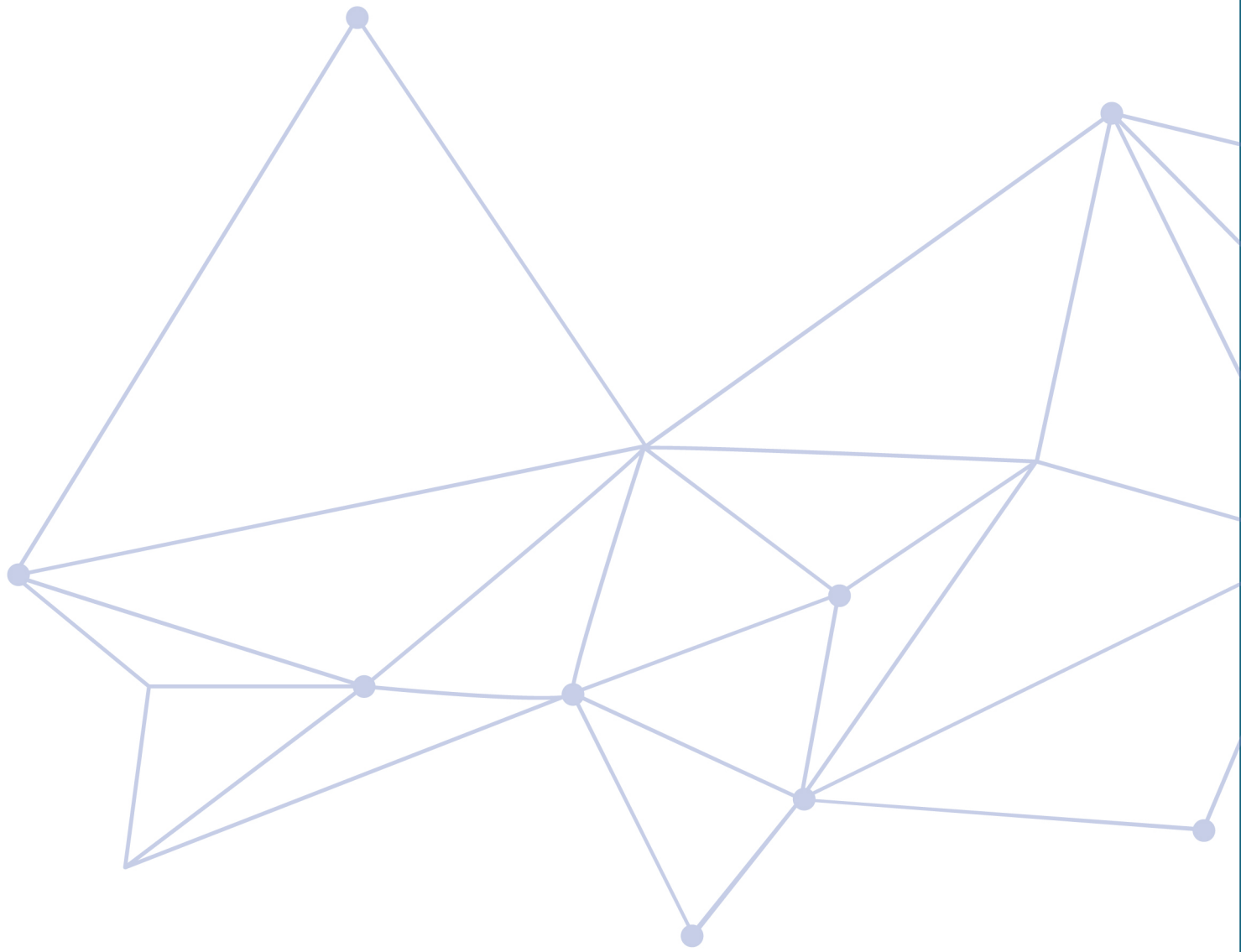


The Best Solution Provider in Motion & Control

MNC Solution strives to continue into a company that **contributes** to the society and **offers values** to our clients via constant **quality improvement** and **innovations**.



- 
- Innovation
 - Value
 - Contribution



MNC SOLUTION

Commersal Servo Valve Division

한국총판매원 (주)세임코리아

본 사 : 경북 포항시 남구 연일읍 중단길 7

서울사무소 : 서울 송파구 문정동 파크하비오오피스텔 202C동 801호

Contact : 010-3626-8611