



**YH YoohanENS**

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*Excellent No. 1  
Solution provider*

YH ENS tries to challenge continuously to become the company to grow with customers together.  
We will be the best business partner with trust and expectation based on People, technique and value as our core value. We will provide a differentiated service with accumulated technology and know-how as your business partner for happy value creation.



## R&D With creativity and passion, YH ENS R&D tries to challenge for improving professional competency.

- Develop planetary reducer for shipbuilding, construction equipment and wind power generators
- Provide 3D solution as required specification
- Analyze the design verification and optimized design

### ▶ R&D development area

#### Reducer

- Reducer with the teeth of cycloid
- Minimized and lightened planetary reducer with high efficiency
- Planetary reducer to be adaptable on high torque
- Satisfy with various specifications for shipbuilding and wind power
- Many patents about planetary reducer and hydraulic brake

#### Design automation

- Gear teeth and parametric 3D modeling
  - Gear strength analysis
  - Drawings and Kinematic simulation
- Template and Automation
  - Assembly template
  - Part template



We build trust with customers through continuous passion and new value creation.

- People : Future management with person
- Technique : New technology through continuous human resource cultivation
- Value : Social value realization with person and technique

## ► Construction Equipment

### ■ Application

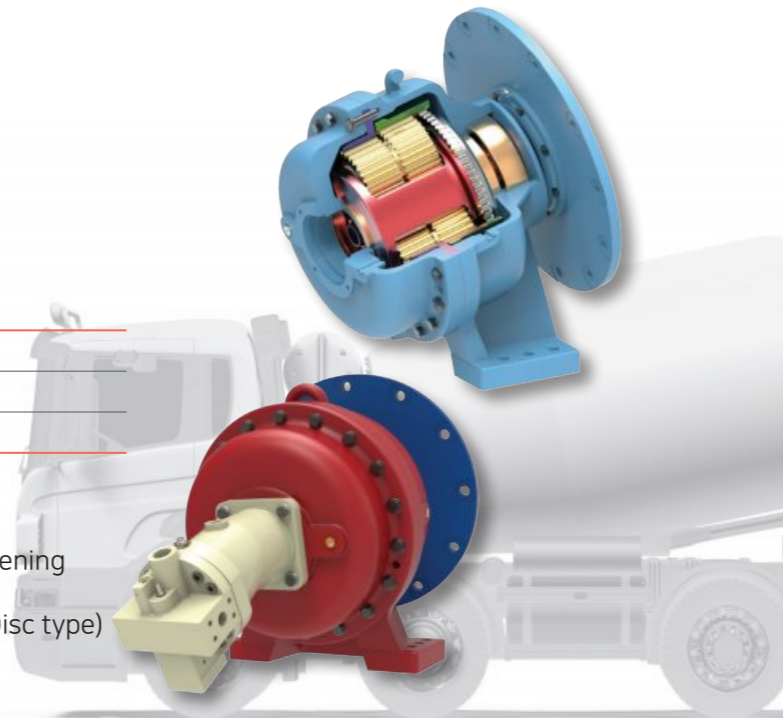
- Drum reducer module of mixer truck
- Drive reducer module of wheel hub
- Drive reducer module of driving

### ■ Specification

Gear Ratio	1/13~1/350
Stages	1,2,3,4
Break	Lining type, Disc type

### ■ Features

- High reducing ratio in minimizing and weight-lightening
- Outstanding endurance from shock and vibration
- Various oil brake system application(Lining type, Disc type)



## ► Shipbuilding & Marine

### ■ Application

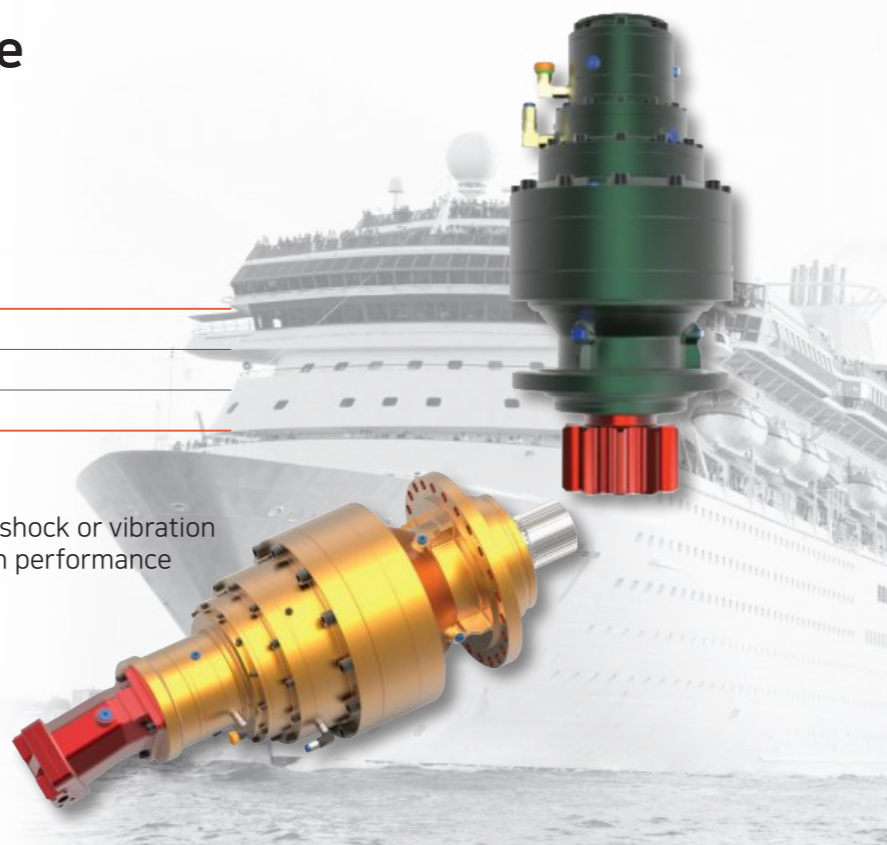
- Slewing reducer, Hoist reducer
- Reducer for winch

### ■ Specification

Gear Ratio	1/12~1/350
Stages	2,3,4
Break	Lining type

### ■ Features

- Planetary reducer against high torque of shock or vibration
- Excellent endurance with good lubrication performance
- Adjustable torque of hydraulic brake



## ► Wind Turbines

### ■ Application

- Pitch drive reducer
- Yaw drive reducer

### ■ Features

- Planetary reducer with low noise and high endurance
- Make-to-order as required specification
- Reducer for special application



## ► Defense

### ■ Application

- Reducer / Increaser for equipment

### ■ Features

- Planetary reducer against high torque of shock of vibration
- Various specification and system
- Make-to-order as required specification



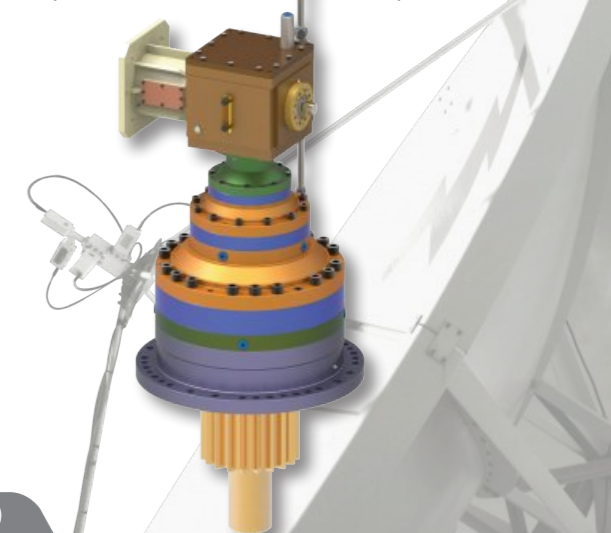
## ► Radio Telescope

### ■ Application

- Azimuth Speed Reducer
- Elevation Speed Reducer

### ■ Features

- Outstanding endurance from shock and vibration
- Make-to-order as required specification
- Special specification for radio telescope



## ► Industrial Machines

### ■ Application

- Reducer / Increaser for industry plant
- Reducer / Increaser for iron industry plant

### ■ Features

- Make-to-order as required specification
- 2-stage reducer system
- Reducer of special specification



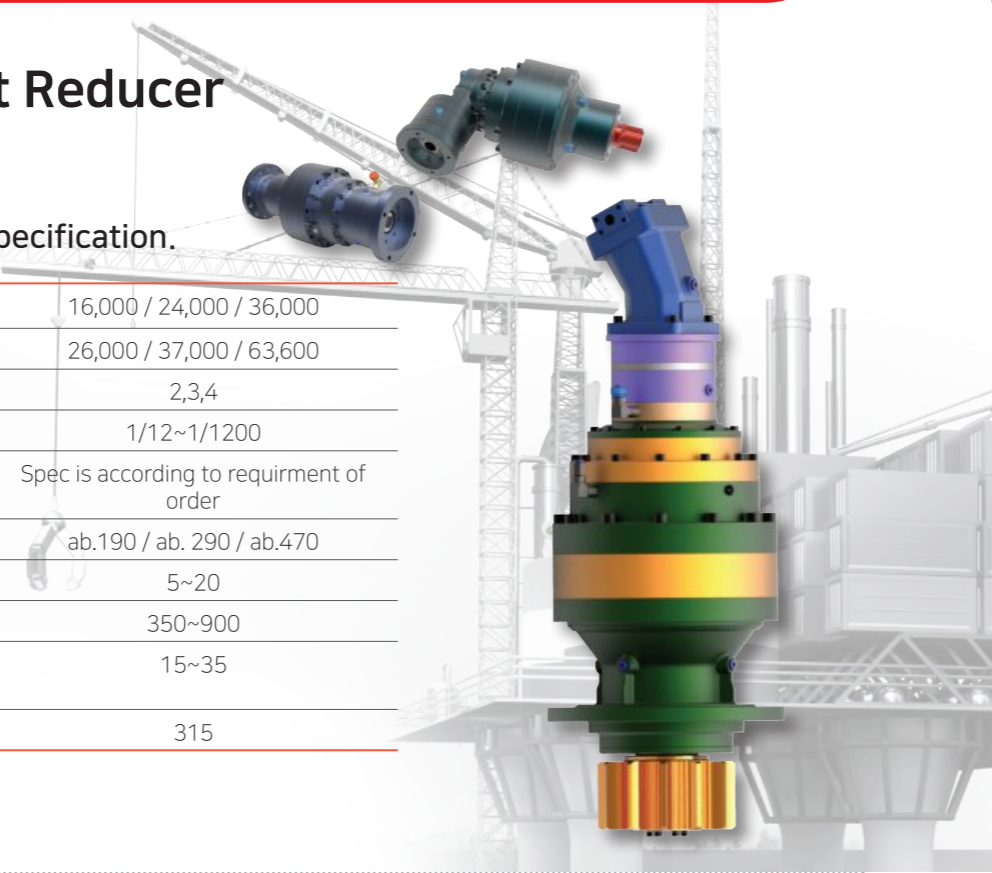
# Slewing and Hoist Reducer

## ► Slewing and Hoist Reducer

### ■ Specification

Make-to-order as required specification.

Torque(dyn) [N.m]	16,000 / 24,000 / 36,000
Torque(max) [N.m]	26,000 / 37,000 / 63,600
Stages	2,3,4
Ratio	1/12~1/1200
Hydraulic Motor	Spec is according to requirment of order
Weight without motor (approx.) [kg]	ab.190 / ab. 290 / ab.470
Output speed [rpm]	5~20
Hydraulic Braking torque [N.m]	350~900
Hydraulic Brake releasing pressure [bar]	15~35
Hydraulic Brake max pressure [bar]	315

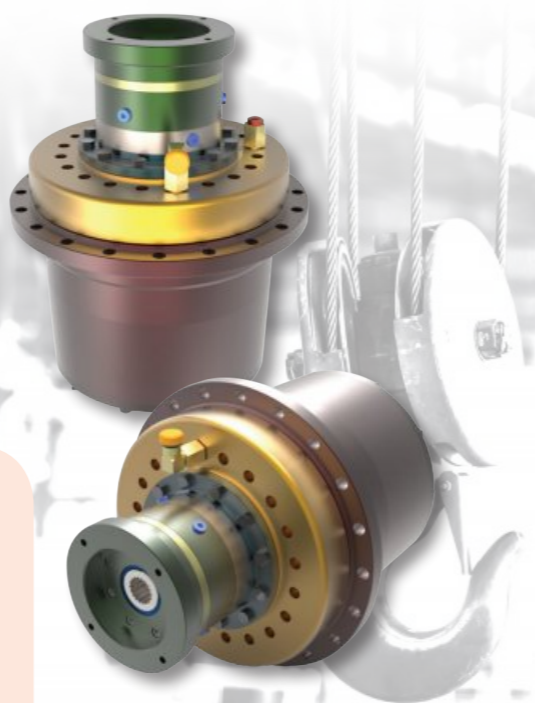


## ► Drive Reducer

Torque(dyn) [N.m]	12,800 / 18,500
Torque(max) [N.m]	25,000 / 36,000
Stages	2,3,4
Ratio	1/12~1/600
Hydraulic Motor	according to requirment of order
Weight without motor (approx.) [kg]	ab.200 / ab. 240
Output speed [rpm]	20
Hydraulic Braking torque [N.m]	350~900
Reverse rotation prevention with one-way bearing	T=1,050 [N.m]
Hydraulic Brake releasing pressure [bar]	15~35
Hydraulic Brake max pressure [bar]	315

### ■ Features

- Hydraulic brake : reverse rotation prevention system
- High reduction gear ratio in miniaturization and weight-lightening
- Specially guaranteed durability on impact and vibration
- Make-to-order as required specification
- Oil brake system : Lining type, Disc type.
- Adjustable torque of hydraulic brake with anti-backlash



# Transmission Planetary Reducer

## ► 3-Stage

### ■ Application

- Reducer for Auger Excavator.
- Marine ship-building and off-shore equipments
- Construction equipments
- Industrial equipments
- Conveyance(lifting, hoist) equipments
- Make to order according to customer's requirements

### ■ Specification

Specification						
Model	2AT-3S110		2AT-3S090		2AT-3S075	
Ratio	1/110		1/90		1/75	
Hyd' motor	107cc		130cc		160cc	
Pressure	350 bar					
Flow	300 l/min					
Speed change hyd' pressure	14 bar					
Total reducer ratio	1/24.9	1/112.2	1/24.9	1/88.4	1/24.9	1/74.7
Output speed	112 rpm	25 rpm	90 rpm	25 rpm	76 rpm	25 rpm
Output torque	15,000 N.m	66,000 N.m	18,000 N.m	64,000 N.m	22,000 N.m	66,000 N.m
Weight	570kg					



# Transmission Planetary Reducer

## ► 1-Stage

### ■Application

- Reducer for Auger Excavator.
- Marine ship-building and off-shore equipments
- Construction equipments
- Industrial equipments
- Conveyance(lifting, hoist) equipments
- Can be attached to an existing reducer and used as a shift reducer
- Make to order according to customer's requirements



### ■Specification

Model	2AT-80		2AT-107		2AT-160	
Hyd' Motor	80cc		107cc		160cc	
Max. Pressure	350 bar		350 bar		350 bar	
Max. Flow	240 ℓ		260 ℓ		320 ℓ	
Speed Change Pressure	13 bar		15 bar		13 bar	
Ratio	1/3	1/1	1/3	1/1	1/3	1/1
Max. Output Speed	1,000 rpm	3,000 rpm	830 rpm	2,500 rpm	660 rpm	2,000 rpm
Max. Output Torque	1,335 N.m	445 N.m	1,770 N.m	590 N.m	2,670 N.m	890 N.m
Weight	165 kg		195 kg		260 kg	

# Hydraulic Motor

## ► Hydraulic Axial Piston Motor

### ■Application

- Marine ship-building and off-shore equipments
- Construction equipments
- Industrial equipments
- Conveyance(lifting, hoist) equipments
- Agricultural machine equipments
- Mining equipments
- Airport and Railway equipments



### ■Specification

Motor Size	45cc	55cc	65cc	80cc	90cc	107cc	130cc	160cc
Displacement (cm <sup>3</sup> /rev)	44.2	54.6	65.0	80.3	90.4	106.6	129.5	160.1
Max. pressure [bar]	350	350	350	350	350	350	350	350
Peak pressure [bar]	420	420	420	420	420	420	420	420
Max. speed [rpm]	4,400	3,900	3,900	3,450	3,450	3,000	3,000	2,750
Max. flow [l/m]	194	213	253	276	312	320	388	440
Max. torque [N.m]	246	304	362	448	504	594	722	892
Peak. torque [N.m]	295	364	434	536	604	712	865	1,070
Max. power(kw)	111	121	145	158	178	183	226	256
Weight [kg]	21.0	21.0	28.8	28.8	40.5	40.5	56	56
Connection Port	A : SAE 3/4" (6000psi)		A : SAE 1" (6000psi)		A : SAE 1 1/4" (6000psi)		A : SAE 1 1/4" (6000psi)	
	B : SAE 3/4" (6000psi)		B : SAE 1" (6000psi)		B : SAE 1 1/4" (6000psi)		B : SAE 1 1/4" (6000psi)	

# Hydraulic Pump

## ► Hydraulic Axial Piston Pump

### ■ Application

- Marine ship-building and off-shore equipments
- Construction equipments
- Industrial equipments
- Conveyance(lifting, hoist) equipments
- Agricultural machine equipments
- Mining equipments
- Airport and Railway equipments

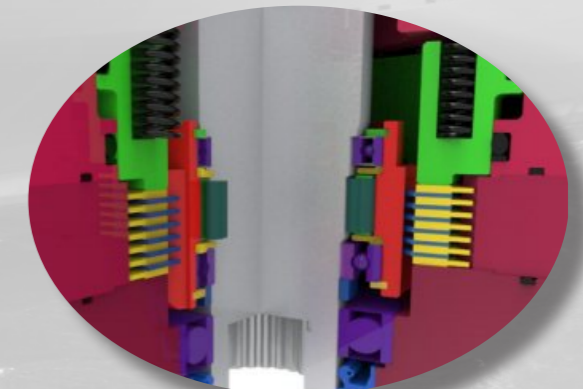
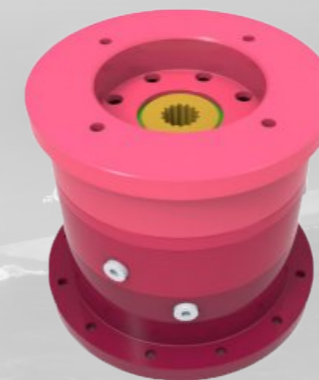
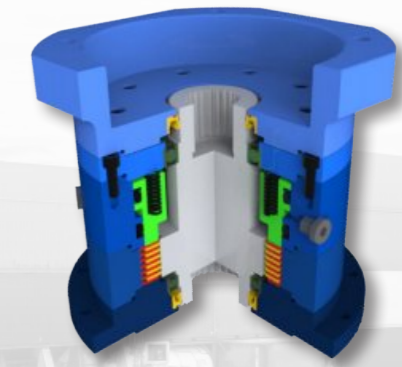
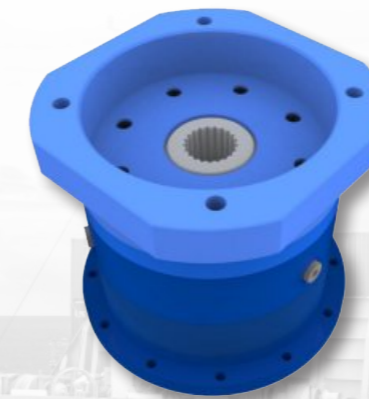


### ■ Specification

Pump Size	45cc	55cc	65cc	80cc	90cc	107cc	130cc	160cc
Displacement (cm <sup>3</sup> /rev)	44.2	54.6	65.0	80.3	90.4	106.6	129.5	160.1
Max. pressure [bar]	350	350	350	350	350	350	350	350
Peak pressure [bar]	420	420	420	420	420	420	420	420
Max. speed [rpm]	2,200	2,000	2,000	1,800	1,800	1,600	1,600	1450
Pump rotation speed (Increasing the suction pressure) [rpm]	3,600	3,500	3,500	3,250	3,250	3,000	3,000	2,750
Max. flow [l/m]	97	108	130	144	162	170	207	232
Max. torque [N.m]	246	303	362	447	504	593	722	892
Peak. Torque [N.m]	295	364	434	536	604	712	865	1,070
Max. power (kw)	55	62	74	82	93	97	120	135
Weight [kg]	21.0	21.0	28.8	28.8	40.5	40.5	56	56
Connection Port	S : SAE 1" (3000psi)		S : SAE 1 1/4" (3000psi)		S : SAE 1 1/2" (3000psi)		S : SAE 1 1/2" (3000psi)	
	A(B) : SAE 3/4" (6000psi)		A(B) : SAE 1" (6000psi)		A(B) : SAE 1 1/4" (6000psi)		A(B) : SAE 1 1/4" (6000psi)	

# Hydraulic Brake

## ► Hydraulic Brake



### ■ Features

- Various oil brake system application (Lining type, Disc type)
- Adjustable torque of hydraulic brake
- Hydraulic brake with anti-backlash
- It is applied in various fields with low noise and long life.

### ■ Specification

MODEL	YHB40	YHB60	YHB80	YHB130
Brake Torque	400 N.m	600 N.m	800 N.m	1,300 N.m
Max. Pressure	350 bar	350 bar	350 bar	350 bar
Opening Pressure	20 bar	20 bar	25 bar	25 bar
Port	PF 1/4	PF 1/4	PF 1/4	PF 1/4
Weight	18 kg	27 kg	36 kg	55 kg

## ► Hydraulic Winch

### ■ Application

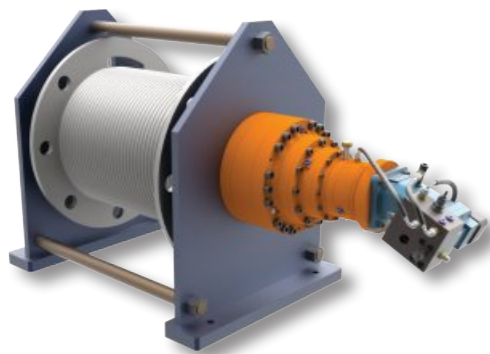
- Mooring arrangements
- Cargo gear arrangement for marine shipbuilding
- Construction equipment
- Distribution industry

### ■ Features

- 2~20ton
- Equipped hydraulic brake with anti-backlash
- Applied the secondary reducer system
- Free fall capability, winch is an emergency safety device



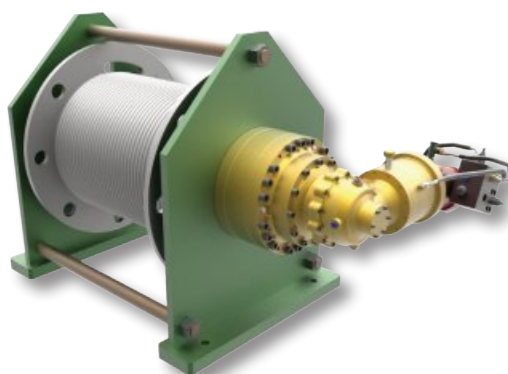
## » Horizontal Winch



### ■ Specification

Stages	1,2,3
Ratio	1/3 ~ 1/350
Capacity[ton]	2~20(4,409~44,092lb)
Drum diameter[mm]	Ø250~Ø700
Drum width[mm]	350 ~ 1000
Hydraulic Motor	55cc / 80cc / 107cc
Working pressure [bar]	200 ~ 250
Output speed [rpm]	20~40
Hydraulic Braking torque [N.m]	350 ~ 900
Hyd' Brake releasing pressure[bar]	15 ~ 35
Hydraulic Brake max pressure [bar]	315
Reverse rotation prevention with one way bearing (option)	T=1,050 [N.m]

## » Right-Angle Winch



### ■ Specification

Stages	2,3
Ratio	1/20 ~ 1/140
Capacity[ton]	2~20(4,409~44,092lb)
Drum diameter[mm]	Ø250~Ø700
Drum width[mm]	350 ~ 1000
Hydraulic Motor	55cc / 80cc / 107cc
Working pressure [bar]	200 ~ 250
Output speed [rpm]	20~40
Hydraulic Braking torque [N.m]	350 ~ 900
Hyd' Brake releasing pressure[bar]	15 ~ 35
Hydraulic Brake max pressure [bar]	315
Reverse rotation prevention with one way bearing (option)	T=1,050 [N.m]

- Possible for make-to-order according to customer's specification(special-purpose or specific design)
- Supply brake valve block
- Hydraulic motor (Standard : 55cc/80cc/107cc/106cc or other specification)

## » Hoisting Winch

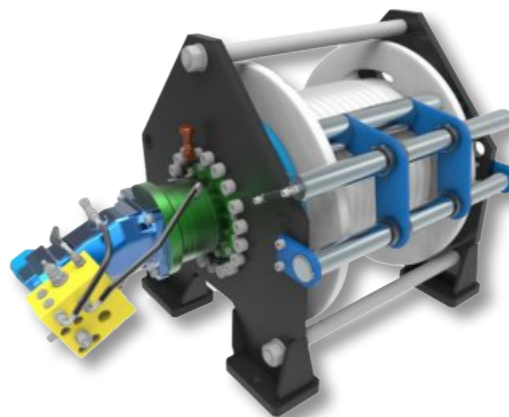


### ■ Specification

Stages	2,3
Ratio	1/20 ~ 1/140
Capacity[ton]	2~10(4,409~44,092lb)
Drum diameter[mm]	Ø200~Ø500
Drum width[mm]	200 ~ 600
Hydraulic Motor	55cc / 80cc / 107cc
Working pressure [bar]	200 ~ 250
Output speed [rpm]	20~40
Hydraulic Braking torque [N.m]	200 ~ 500
Hyd' Brake releasing pressure[bar]	15 ~ 30
Hydraulic Brake max pressure [bar]	315
Reverse rotation prevention with one way bearing (option)	T=570 [N.m]



## » Drive Winch



### ■ Specification

Stages	2,3
Ratio	1/20 ~ 1/140
Capacity[ton]	2~20(4,409~44,092lb)
Drum diameter[mm]	Ø250~Ø700
Drum width[mm]	350 ~ 1000
Hydraulic Motor	55cc / 80cc / 107cc
Working pressure [bar]	200 ~ 250
Output speed [rpm]	20~40
Hydraulic Braking torque [N.m]	350 ~ 900
Hyd' Brake releasing pressure[bar]	15 ~ 35
Hydraulic Brake max pressure [bar]	315
Reverse rotation prevention with one way bearing (option)	T=1,050 [N.m]



# Winch Equipment

## ► Manual Hand Winch

### ■Application

- Vehicle, Shipbuilding
- Construction, Industrial machines

### ■Features

- Reverse rotation prevention type (Worm gear)
- Ease of installation and portableness
- High capacity with efficient reduction gear ratio



### ■Specification

Max.Load Tension [kgf]	3,000 (=6,600 lb)	2,500 (=5,512 lb)
Working Load Tension	2,500 (=5,512 lb)	2,000 (=4,409 lb)
Weight [kg]	23	21
Drum Diameter [mm]	ø48.6	ø65
Drum Width [mm]	86	80
Handle Operation Power [kg]	ab.14	ab.12
Handle Length [mm]	350	
Gear Ratio	1/61.7	



# Performance Test and Processing Equipment

## ► Decelerator performance test equipment



Measurement of deceleration ratio, RPM, hydraulic brake release pressure and leakage

### ■Features

- UNIT Capacity: 40 L
- Operating force: 40 to 50 bar
- Single acting solenoid type
- Electric motor rotation speed control function

## ► Winch Test Equipment



Winch tension, operating pressure, rotational speed (rpm)

### ■Features

- Maximum tensile force: 10 tons
- Stroke: 1000mm
- Maximum pressure: 210 bar
- Maximum motor rotation: 1,200 rpm

## ► Torsional torque equipment



Torsional torque, rotational RPM

### ■Features

- Maximum torque: 42,000 N.m
- Hydraulic pressure Motor: 80cc
- Planetary gear reducer: 1/112.2

## ► 300L Power Pack



Flow, pressure, speed

### ■Features

- Maximum operating pressure: 300 bar
- Maximum flow rate: 200L
- Maximum motor RPM: 2,500 rpm

## ► Vertical machining center



### ■Features

- Equipment Size: 3000×2030×2830 (H)
- Transfer distance: 800(X)\*460(Y)\*520(Z)
- Table size: 1,000(L)\*460(W)
- Main shaft output: 15×11 kw
- Load weight: 600 kg

## ► Plane Molding Grinder

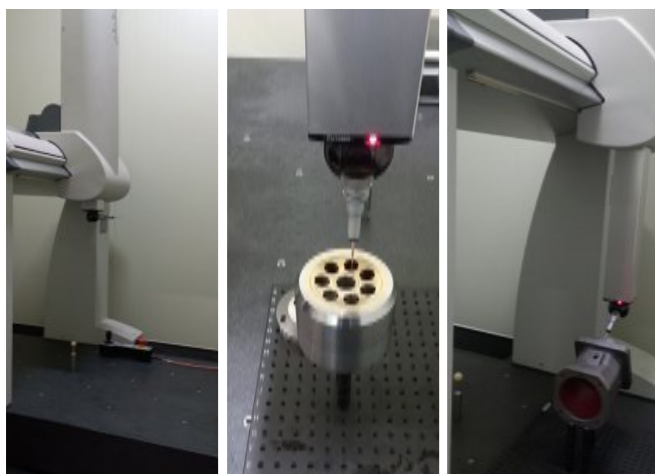


### ■Features

- Size: 3200×2700×2600 (H)
- Grinding range: 600×315 mm
- Maximum load: 130 kg
- Spindle Speed: 800~4200
- Drive power: 10kw
- Voltage: 400 V AC/50 Hz

# Measuring Equipment

## ► 3D measuring machine



### ■Specification

Model name	Global Image 7107
Measurement range (mm)	X=700, Y=1000, Z=660
Device index (mm)	X=1250, Y=1910, Z=2696
Scale resolution (mm)	0.000039
P (Proving precision)	1.9 (ISO-10360-2)
E (Space accuracy)	1.7 + L / 333 (ISO-10360-2)
Compressed air and air consumption	5 bar - 150 NL/min
Total weight	1235 kg
Weight of measurements	Less than 900 kg

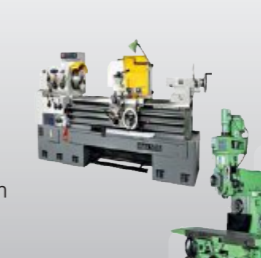
## ► CNC Shelf



### ■Features

- Size: 3970×1894×1900 (H)
- Ittransmission distance: 220/1000 mm
- Maximum processing length: 1070 mm
- Main shaft output: 33×25 kw
- Product Weight: 8,000 kg

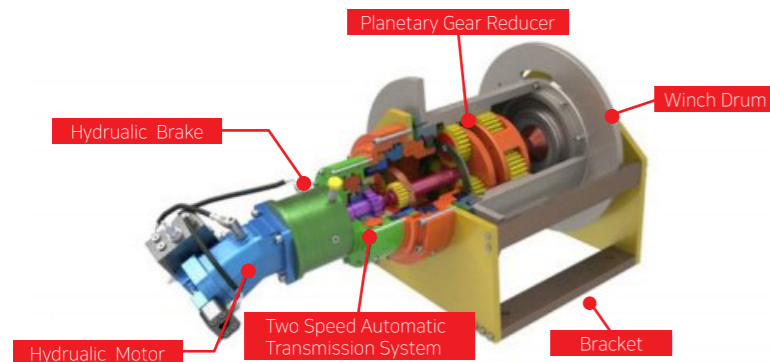
## ► Universal Shelf and Milling



### ■Features

- Main Composition: Main spindle, reciprocating belt, pericardium, electronic travel distance measuring instrument
- Main spindle motor: 5.5 kW
- Main components: left and right/backward transfer handles, automatic transfer levers, etc
- Spindle motor: 3.7 kW vertical, 2.2 kW horizontal

## ► Hydraulic Hoisting Winch

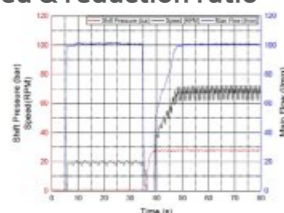


### ■ Specification

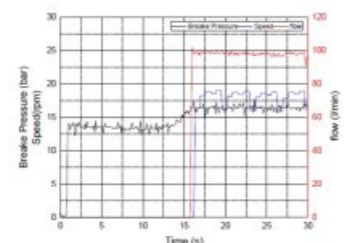
Winch Pull	2 Ton	6.5 Ton
Line Speed	70 m/min	20m/min
Rope Diameter	ø 21mm	
Drum Capacity	100 mm	
Drum Rpm	58 rpm	17 rpm
Drum Torque	3,833 N.m	11,500 N.m
Total Reducer Ratio	1/26.56	1/94.15
Hyrd. Riston Motor	55 cc	
Hyrd. Motor Flow	90 L/min	
Working Pressure	195 bar	185 bar
Hyrd. Brake Torque	560 N.m	
Hyrd. Brake Releasing Pressure	20 bar	
Low Ratio Change Hyd. Pressure	25 bar	
Weight	530 kg	



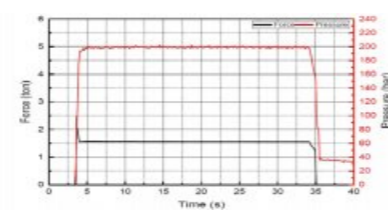
### ■ Shift pressure, rotation speed & reduction ratio



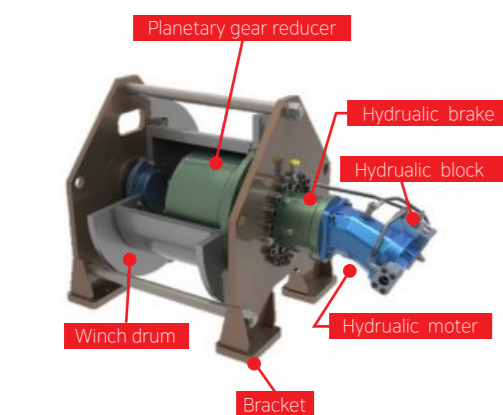
### ■ Hyd' Brake Releasing Pressure



### ■ Winch Pull



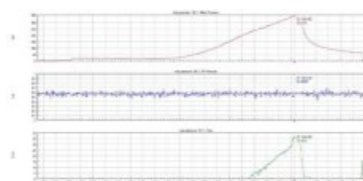
## ► Hydraulic Drive Winch



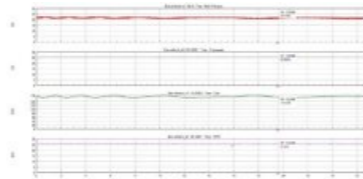
### ■ Specification

Winch Pull	8.0 Ton
Line Speed	20 m/min
Rope Diameter	ø 24 mm
Drum Capacity	80m (On 3 Layers)
Drum Rpm	13.3 rpm
Drum Torque	18,882 N.m
Total Reducer Ratio	1/79.7
Hyrd. Riston Motor	80 cc
Hyrd. Motor Flow	85 L/min
Working Pressure	223 bar
Hyrd. Brake Torque	563 N.m
Hyrd. Brake Releasing Pressure	18 bar
Weight	660 kg

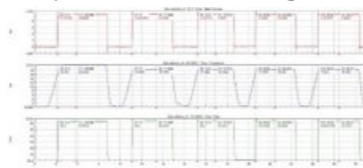
### ■ Max. Pressure



### ■ Reducer Ratio & RPM



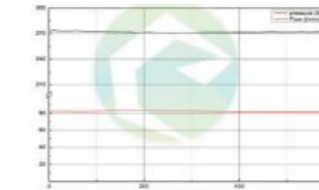
### ■ Hyd' Brake Releasing Pressure



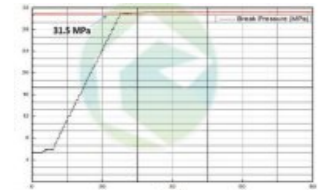
## ► Planetary Gear Reducer



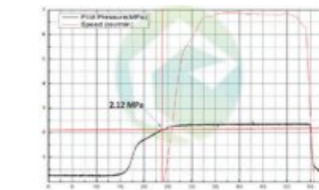
### ■ Durability test



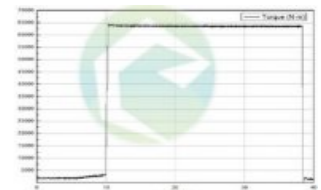
### ■ H-brake leakage flow



### ■ H-brake release pressure



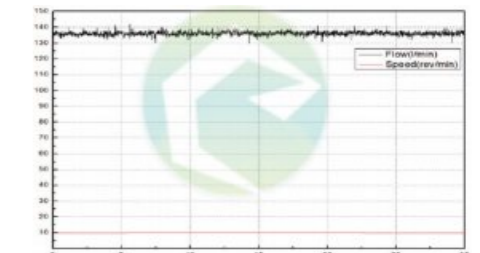
### ■ Maximum torque



### ■ Test condition

Product	Item	Target
Planetary Gear Reducer	Max.torque	63,600 N.m
	Brake release pressure	(2.5±0.5) Mpa
	Reducer ratio	1 / (247±0.5)
	Max. brake pressure	31.5 Mpa
	Brake torque	700 N.m

### ■ Reduction ratio



## ► Planetary Gear Reducer With Hydraulic Brake

### ■ Test condition

Product	Item	Target	Notes
Reducer for shipbuilding	Opening pressure of oil brake	40±5 bar	Horizontal length of jig to work on rotary system : 0.8m
	Leakage	0 cc	
	Max. pressure of oil brake	300over bar	
	Torque of oil brake	650over N.m	
	Max. torque	60,000over N.m	

### • Opening pressure of hydraulic pressure

Test product	Test picture
SPL#1	
SPL#2	
No issue with (40±5) bar	



## ► Hydraulic Axial Piston Motor/Pump

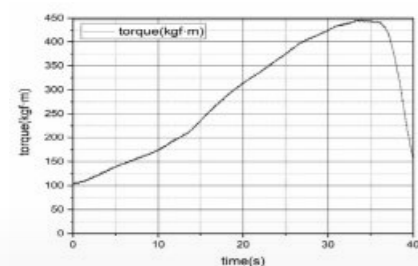
### ■ Test result



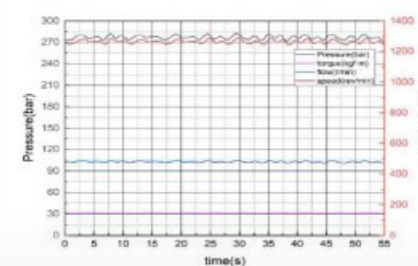
### ■ Test condition

Product	Item	Target
Hydraulic Axial Piston Motor	Displacement	80 cc/rev
	Max.torque	447 N.m
	Max.pressure	350 bar
	Max.RPM	3,450 rev/min
	Volumetric efficiency	97%
	Mechanical efficiency	92%

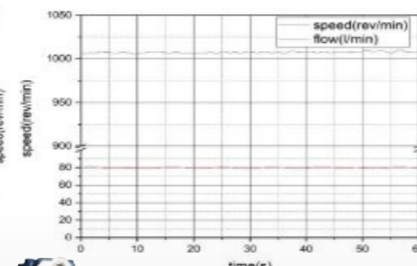
### ■ Max.torque test



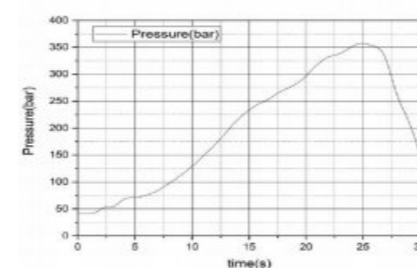
### ■ Efficiency test



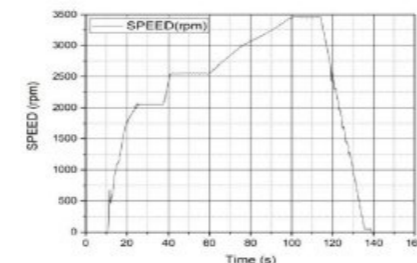
### ■ Displacement test



### ■ Max.pressure test

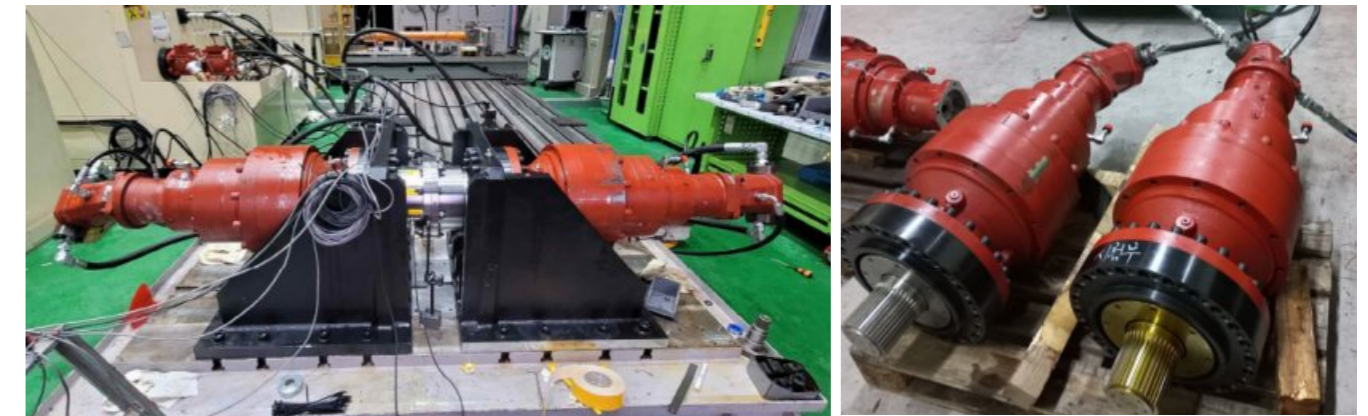


### ■ Max.rpm test



## ► Transmission planetary Reducer

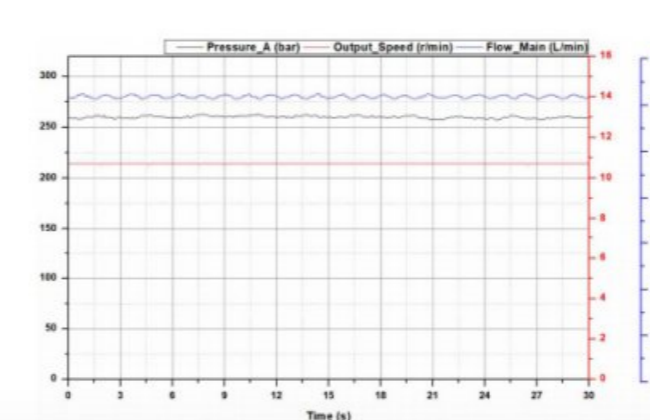
### ■ Test result



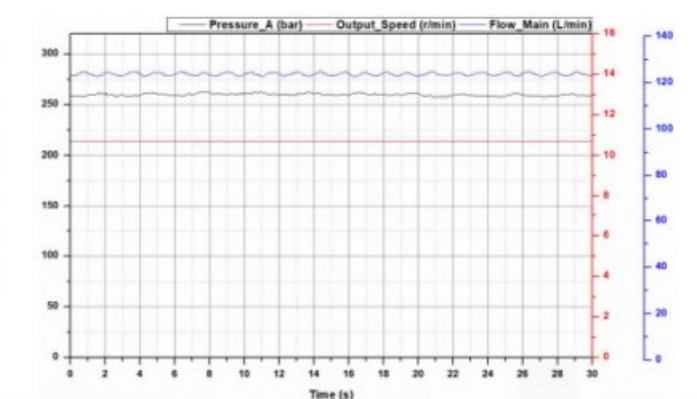
### ■ Test condition

Product	Item	Target
Transmission planetary Reducer	High-temperature operation test	Clear
	Low-temperature operation test	Clear
	Noise test (260bar)	90dB
	Durability test (260bar, 400h)	Clear

### ■ High-temperature operation test



### ■ Low-temperature operation test



### ■ Noise test



### ■ Durability test

