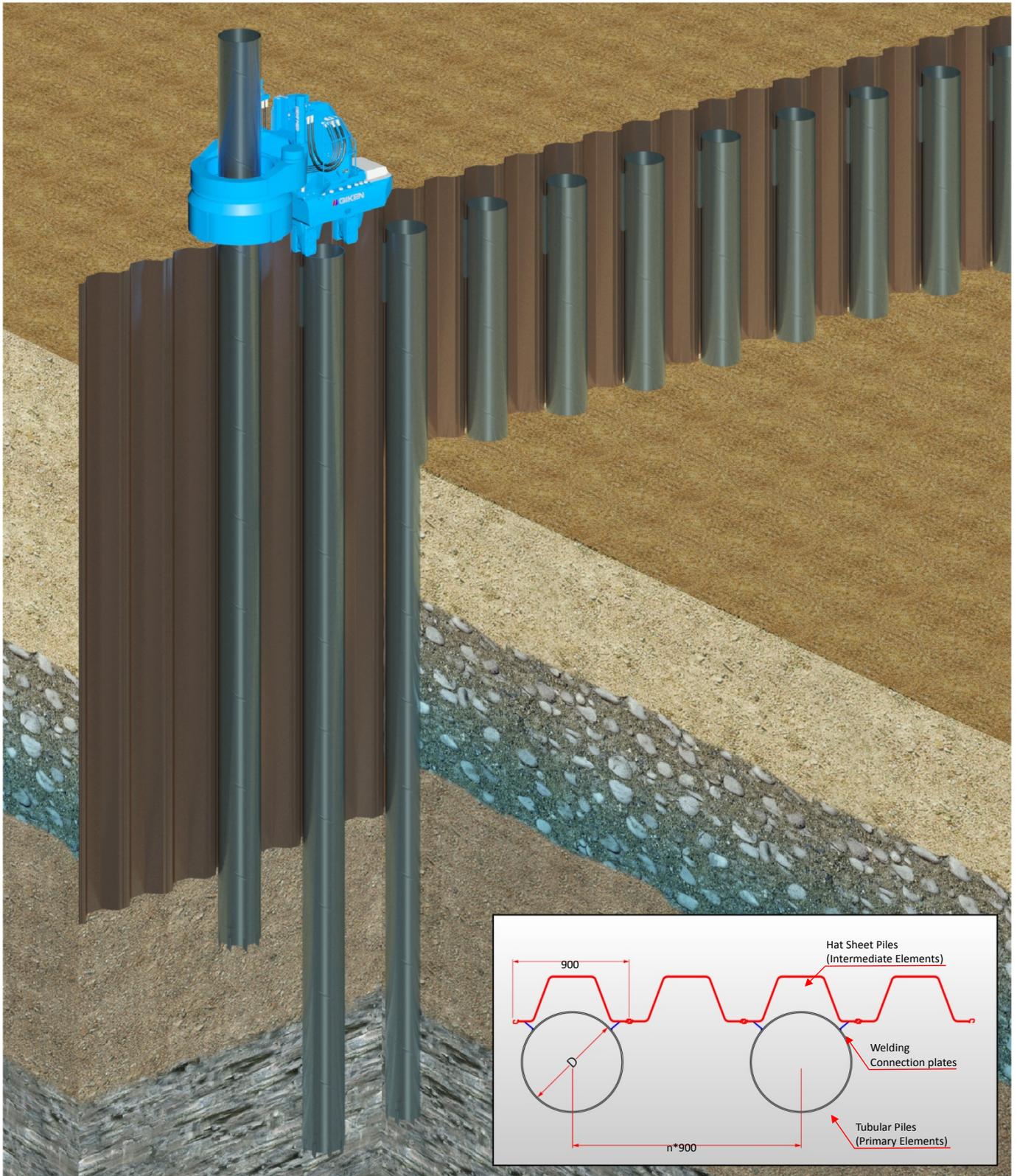


# COMBI-GYRO WALL SYSTEM

- High Modulus Steel Combined Wall -

Ver. Tube / Hat Wall Vol.2 Construction





## Table of Contents

Chapter 1	Introduction .....	1
Chapter2	Standard Procedure .....	2
	2-1 Overall Procedure .....	2
	2-2 Initial Piling (Sheet Pile) .....	3
	2-3 Installation Working Procedure (Sheet Pile) .....	4
	2-4 Installation Working Procedure (Tubular Pile) .....	5
	2-5 Extraction Working Procedure (Sheet Pile) .....	6
	2-6 Extraction Working Procedure (Tubular Pile) .....	7
Chapter3	Work Layout .....	8
	3-1 Standard Operation of Sheet Piling (Above Ground) .....	8
	3-2 Standard Operation of Tubular Piling (Above Ground) .....	9
	3-3 Standard Operation of Sheet Piling (Above Water) .....	10
	3-4 Standard Operation of Tubular Piling (Above Water) .....	11
	3-5 GRB Operation (Non-staging Method) .....	12
Chapter4	Machine Specification .....	13
	4-1 Machine Specification .....	13

## Chapter 1 Introduction

The purpose of this document is to provide practical guidelines for the construction of the Combi-Gyro Wall.

The intended audience for this document is engineers and construction specialists involved in the design, construction, and contracting of foundation elements for infrastructures.

The press-in piling method is commonly used worldwide because of its very quiet operation, ultra low vibration, and flexibility of sizes to suit different wall properties and subsoil conditions.

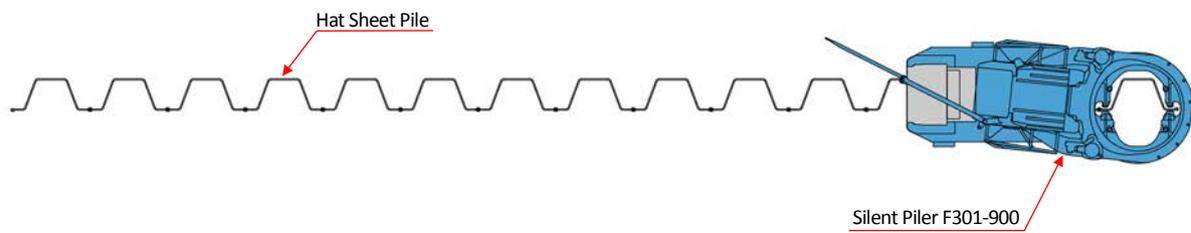
The main attributes of the Combi-Gyro Wall are efficiency of physical wall properties and reusability. The Combi-Gyro Wall comprises steel tubular piles as the primary element and steel sheet piles as the secondary element. The efficiencies of physical wall properties can be optimised in view of the flexibility of pile size and the spacing of tubular piles for the ground conditions and the form of the loading. The Combi-Gyro Wall is installed by the press-in method and pile penetration force is monitored and recorded throughout the piling operation. This thorough monitoring and recording system alleviates concerns of quality control, as well as providing a comprehensive quality control method for a performance-based contracting process.

This document provides a description of construction equipment and procedures of the Combi-Gyro Wall.

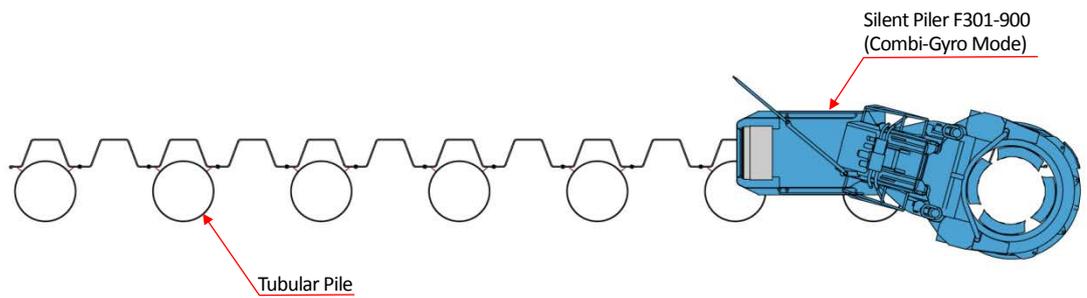
## Chapter 2 Standard Procedure

### 2-1 Overall Procedure

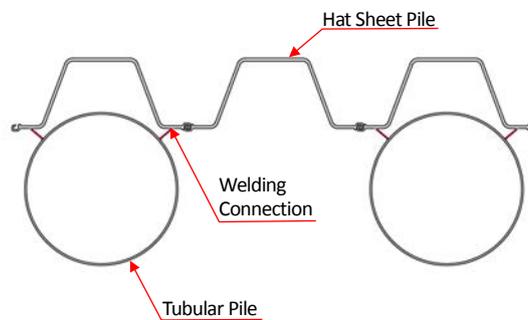
#### 2-1-1 Installation of Sheet Piles



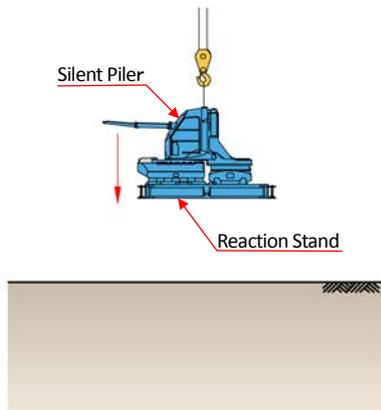
#### 2-1-2 Installation of Tubular Piles



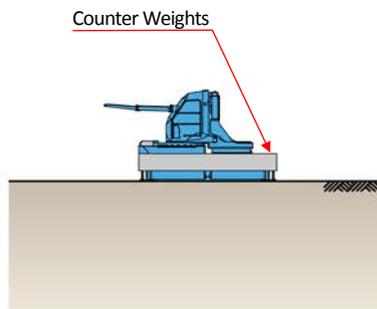
#### 2-1-3 Joining Tubular Piles and Sheet Piles by Welding



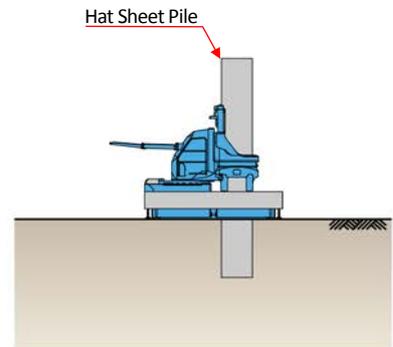
## 2-2 Initial Piling (Sheet Pile)



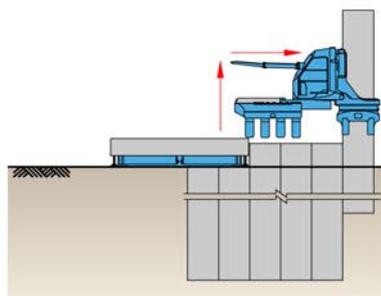
1. Setting of Silent Piler and Reaction Stand on level ground



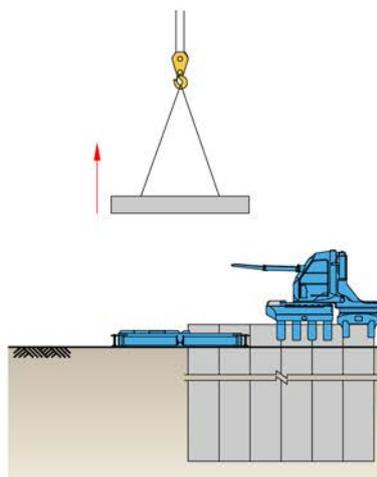
2. Loading of counter weights



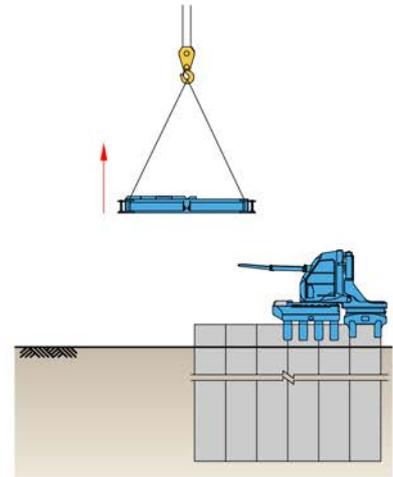
3. Pitching and installing of first pile



4. Installing of piles until Silent Piler can operate solely on reaction piles

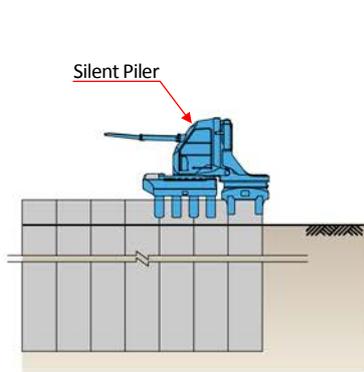


5. Removing of counter weights

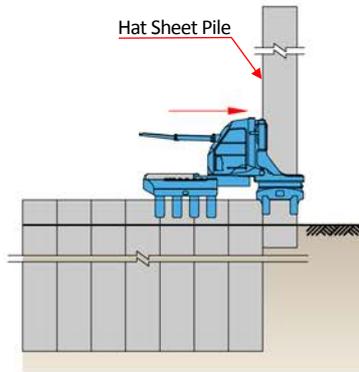


8. Removing of Reaction Stand and initial piling is completed

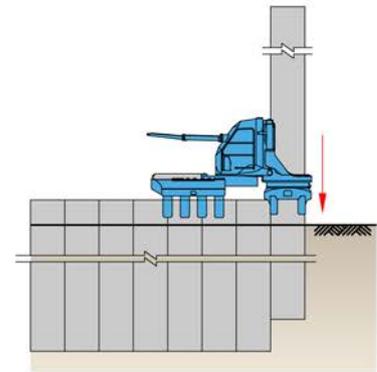
## 2-3 Installation Working Procedure (Sheet Pile)



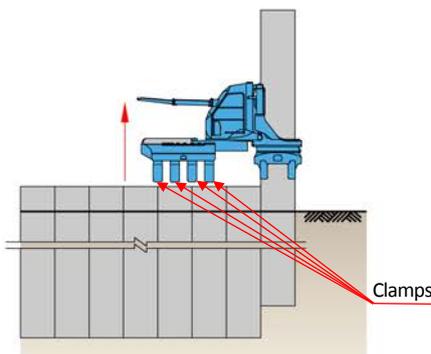
1. Installing of pile to prescribed depth



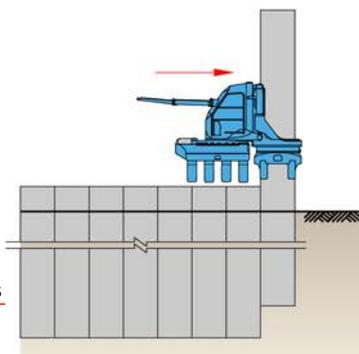
2. Pitching and installation of next pile



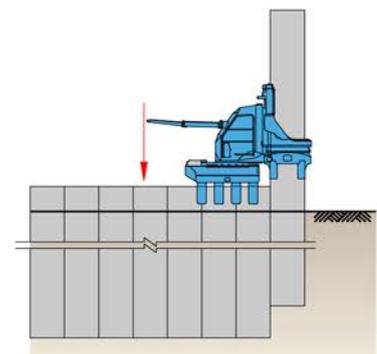
3. Installing of pile until the pile has sufficient bearing capacity



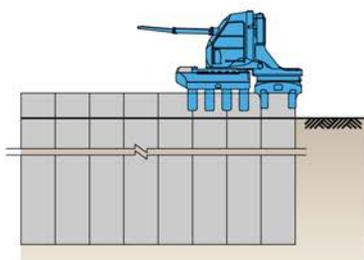
4. Releasing of clamps and raising machine body



5. Moving of machine body forward

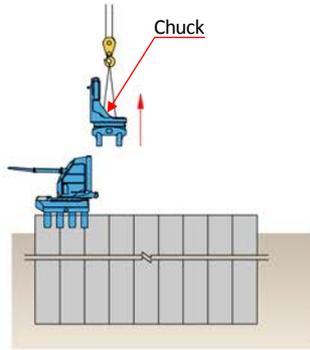


6. Lowering of machine body and gripping reaction piles

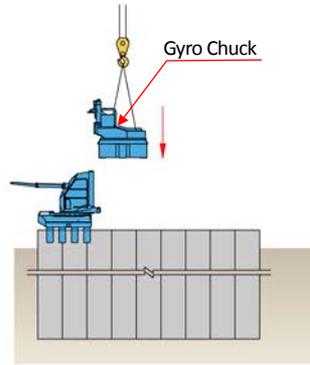


7. Completion of pile installation

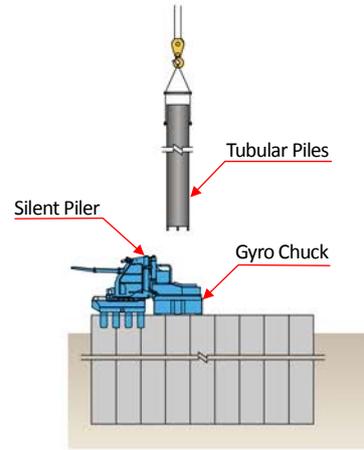
## 2-4 Installation Working Procedure (Tubular Pile)



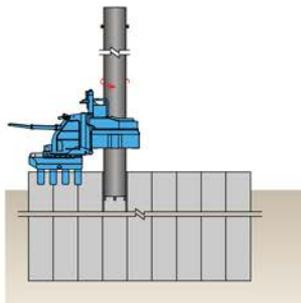
1. Dismantling of Chuck from Mast



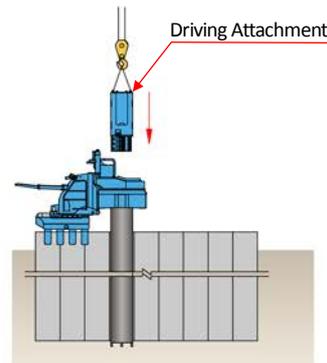
2. Fixing of Gyro Chuck to Mast



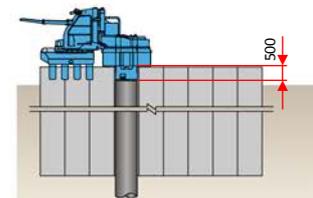
3. Pitching of tubular pile into Chuck



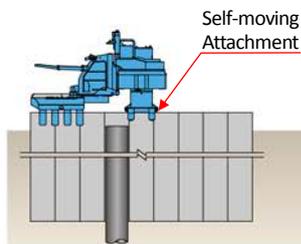
4. Installing of pile until top of pile reaches Chuck level



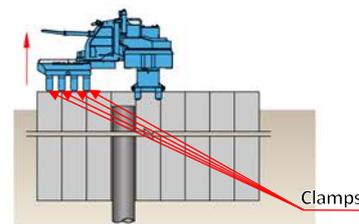
5. Pitching of Driving Attachment into top of pile and installing pile to prescribed depth



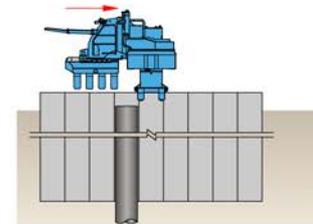
6. Pitching of Driving Attachment onto top of pile and installing pile to prescribed depth



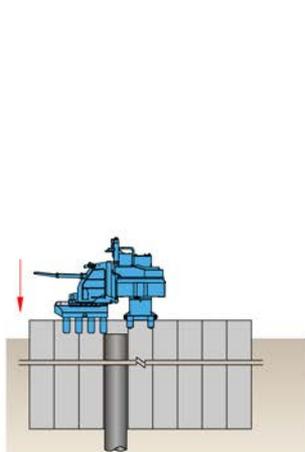
7. Pitching of Self-moving Attachment onto top of sheet pile located directly ahead of installed tubular pile



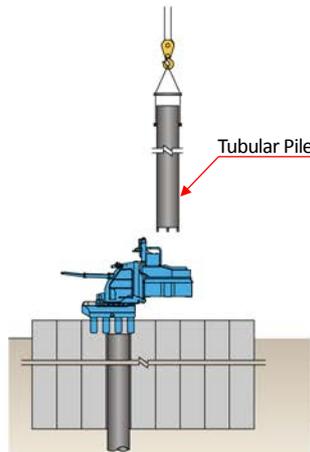
8. Fixing of Driving Attachment to Self-moving Attachment .  
Releasing of Clamps and raising machine body



9. Moving of machine body forward

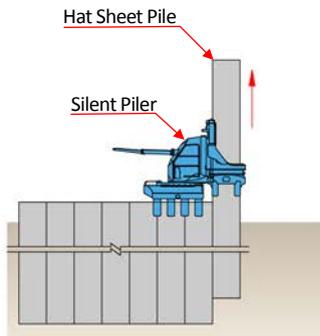


10. Lowering of machine body and gripping reaction piles  
Repeat self-moving until next desired tubular pile installation position

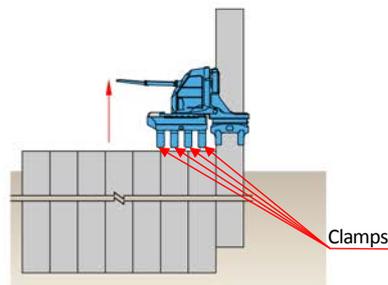


11. Repeat tubular pile installation and Self-moving until completion

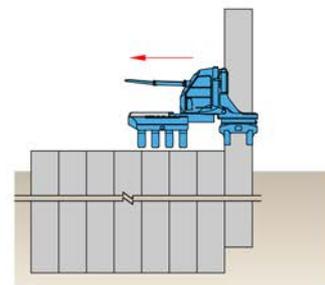
## 2-5 Extraction Working Procedure (Sheet Pile)



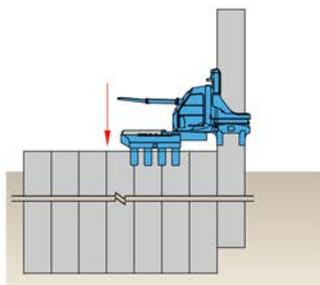
1. Partial extraction of sheet pile with Silent Piler



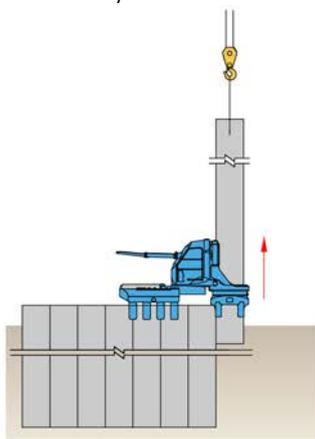
2. Releasing of Clamps and raising machine body



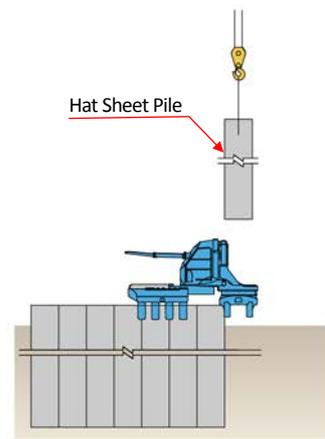
3. Moving of machine body rearward



4. Lowering of machine body and gripping reaction piles

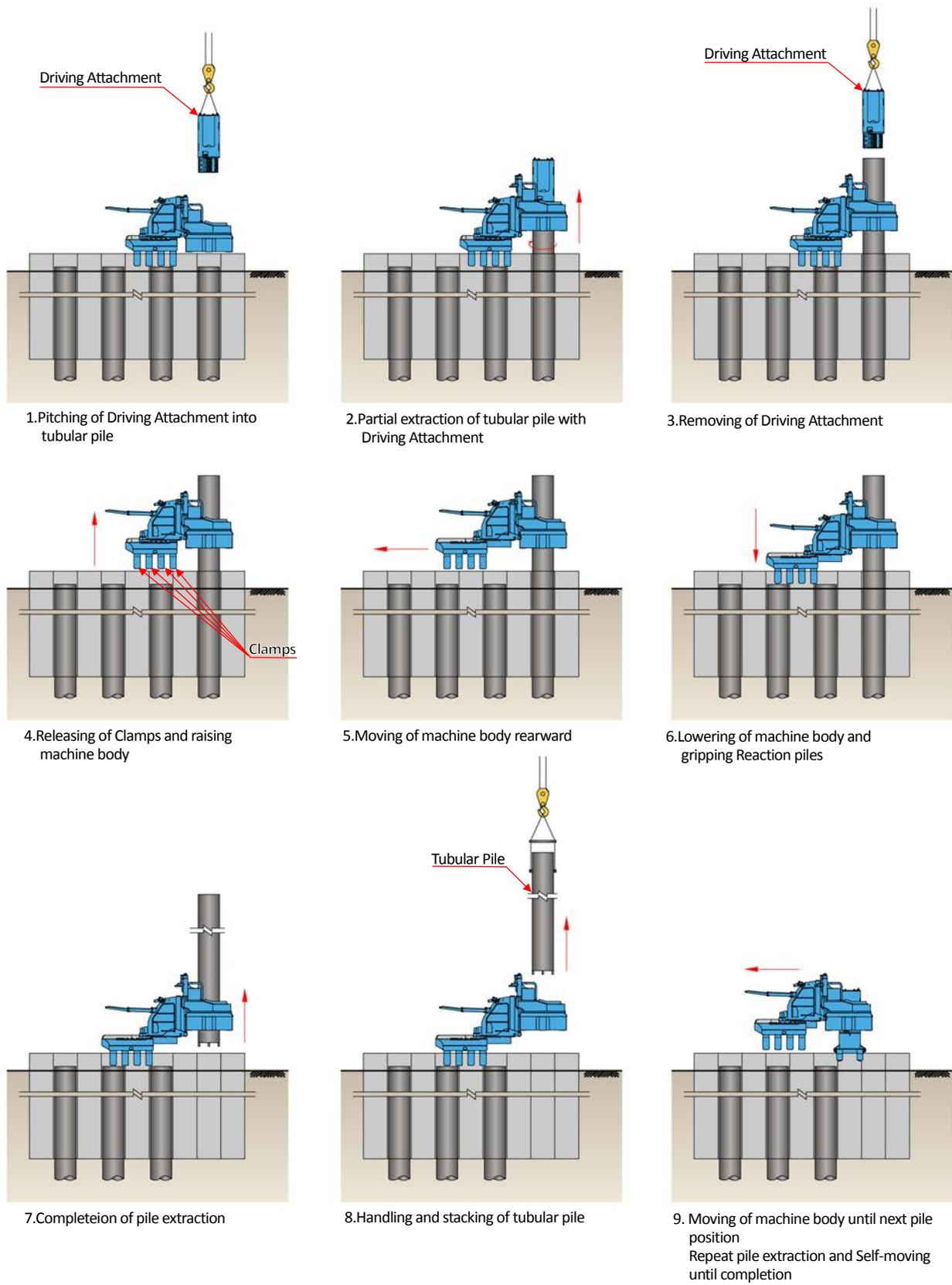


5. Completion of pile extraction



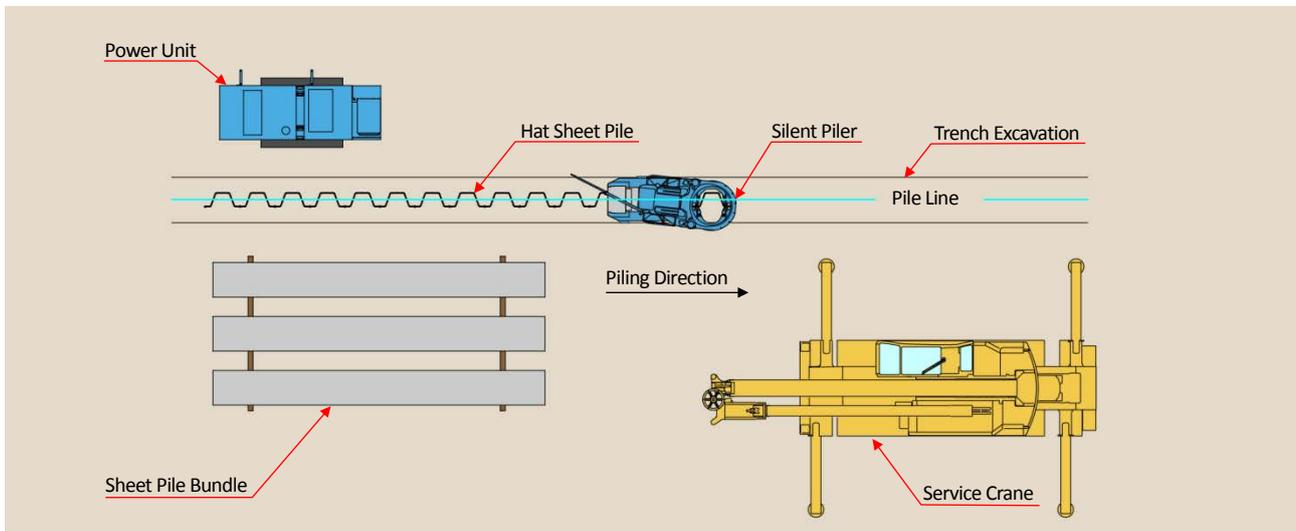
6. Handling and stacking of sheet pile  
Repeat 1 to 6 until completion

## 2-6 Extraction Working Procedure (Tubular Pile)

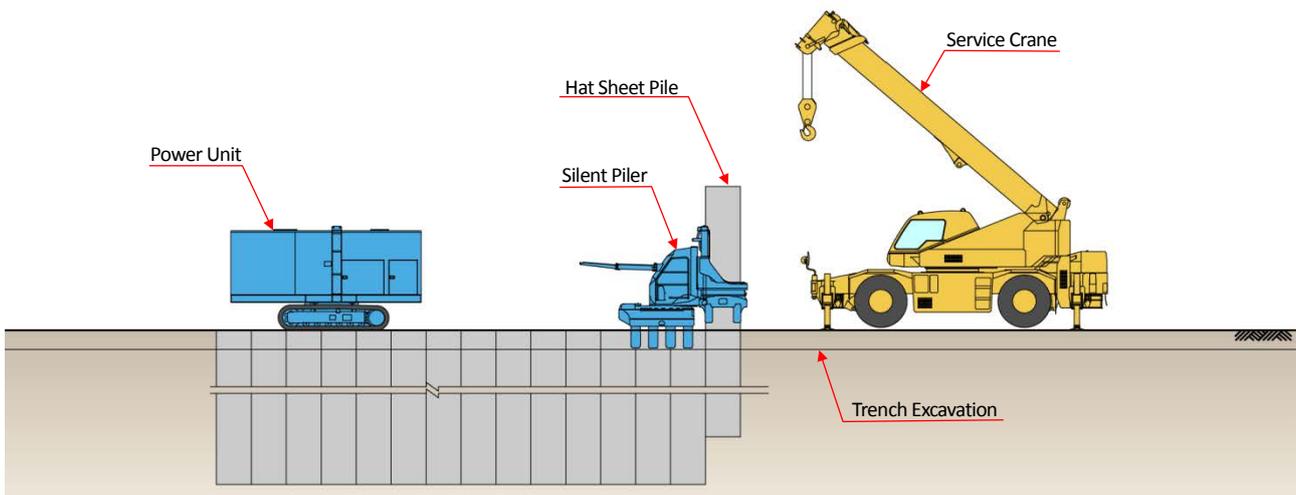


# Chapter 3 Work Layout

## 3-1 Standard Operation of Sheet Piling (Above Ground)

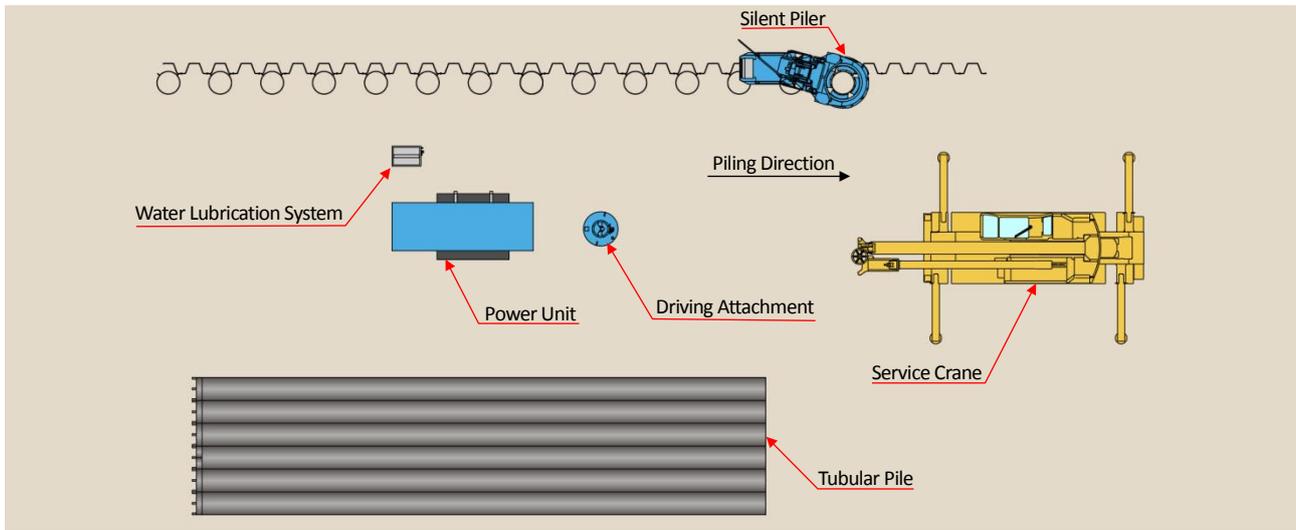


Plan View

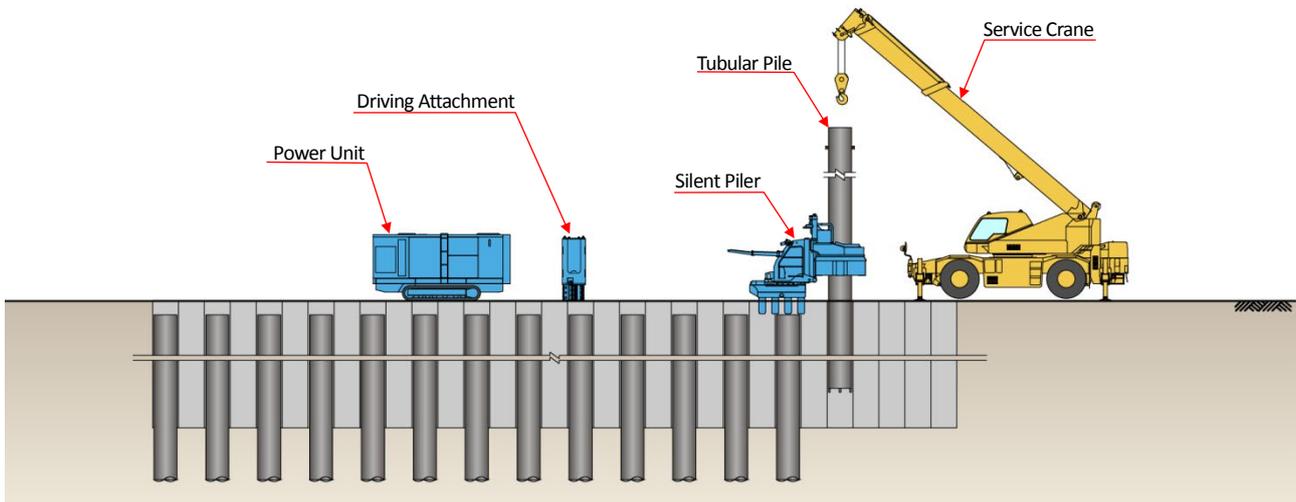


Sectional View

### 3-2 Standard Operation of Tubular Piling (Above Ground)

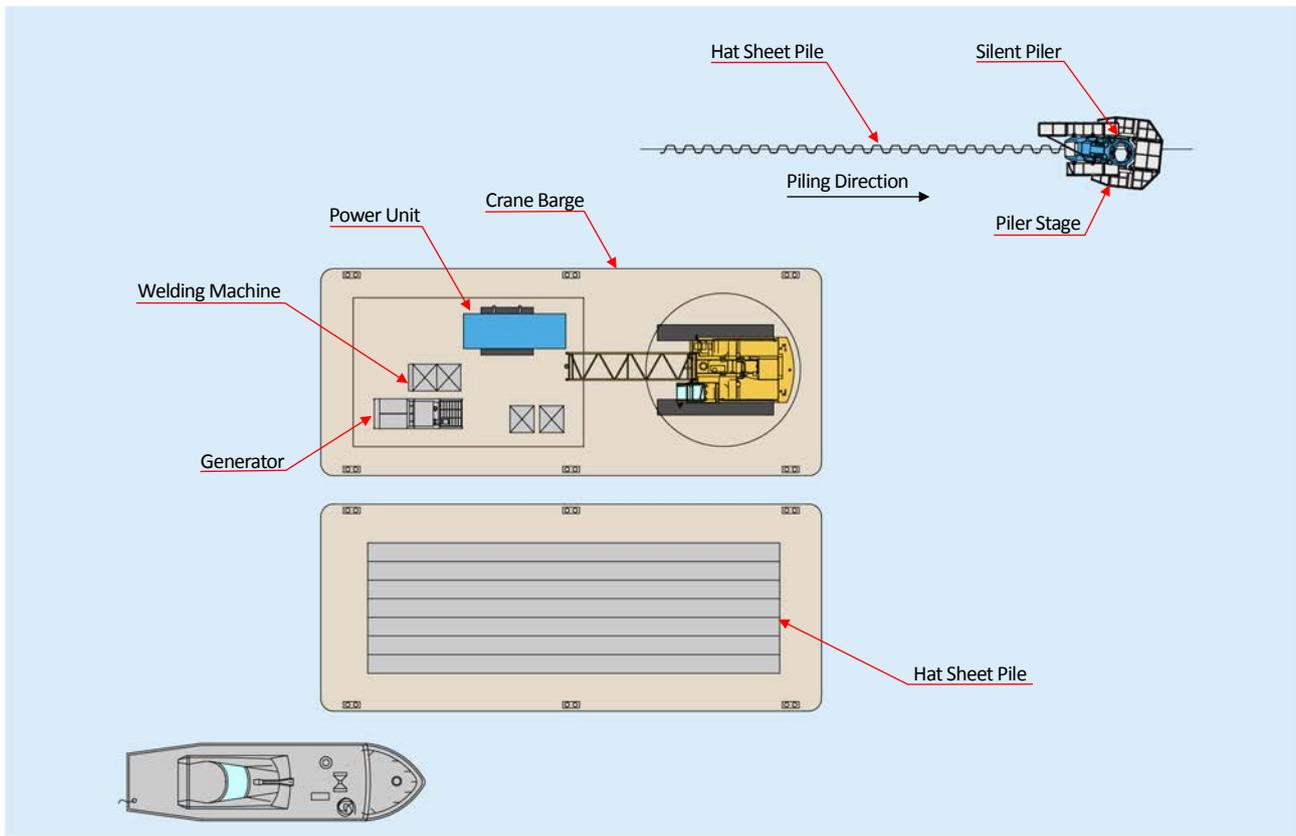


Plan View

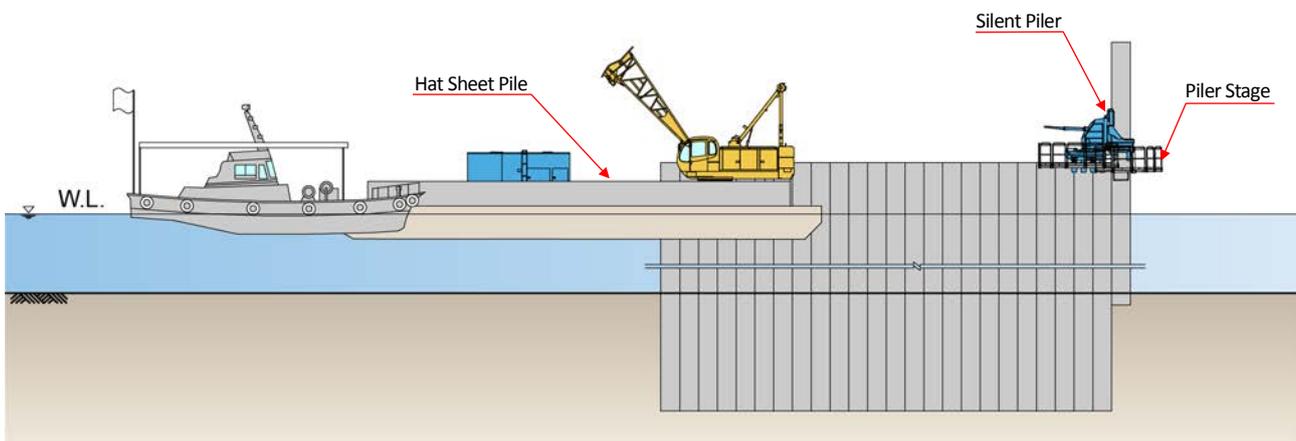


Sectional View

### 3-3 Standard Operation of Sheet Piling (Above Water)

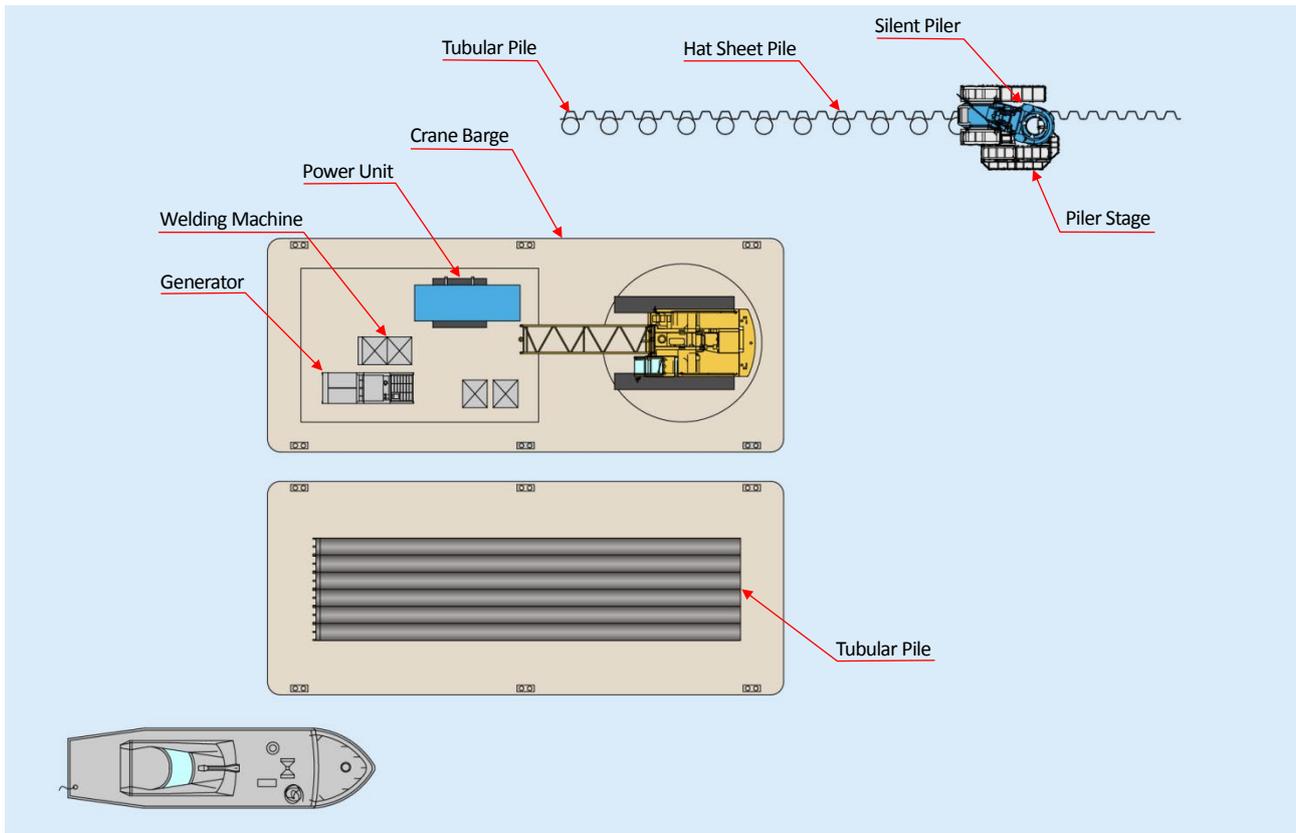


Plan View

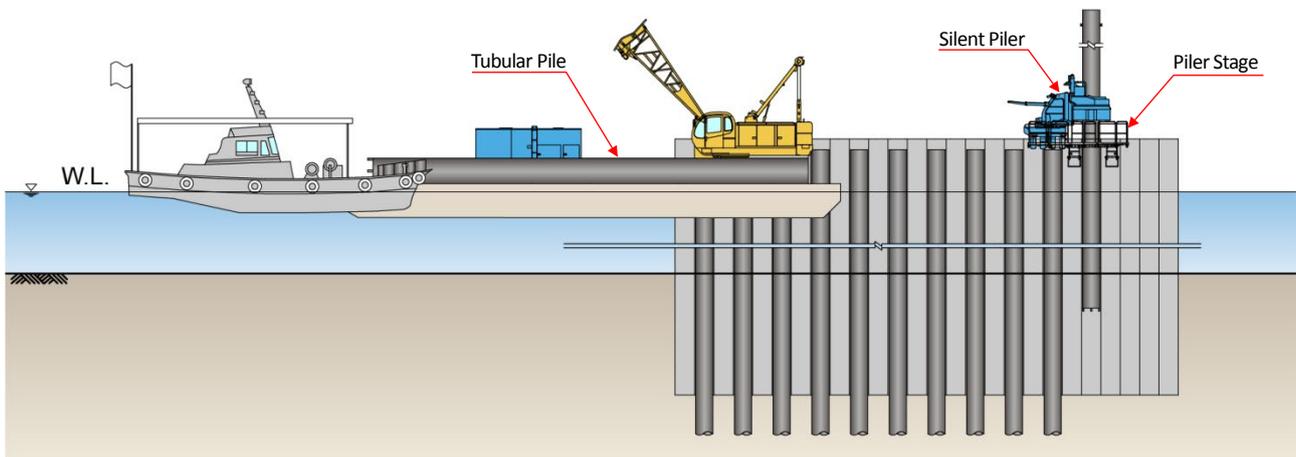


Sectional View

### 3-4 Standard Operation of Tubular Piling (Above Water)

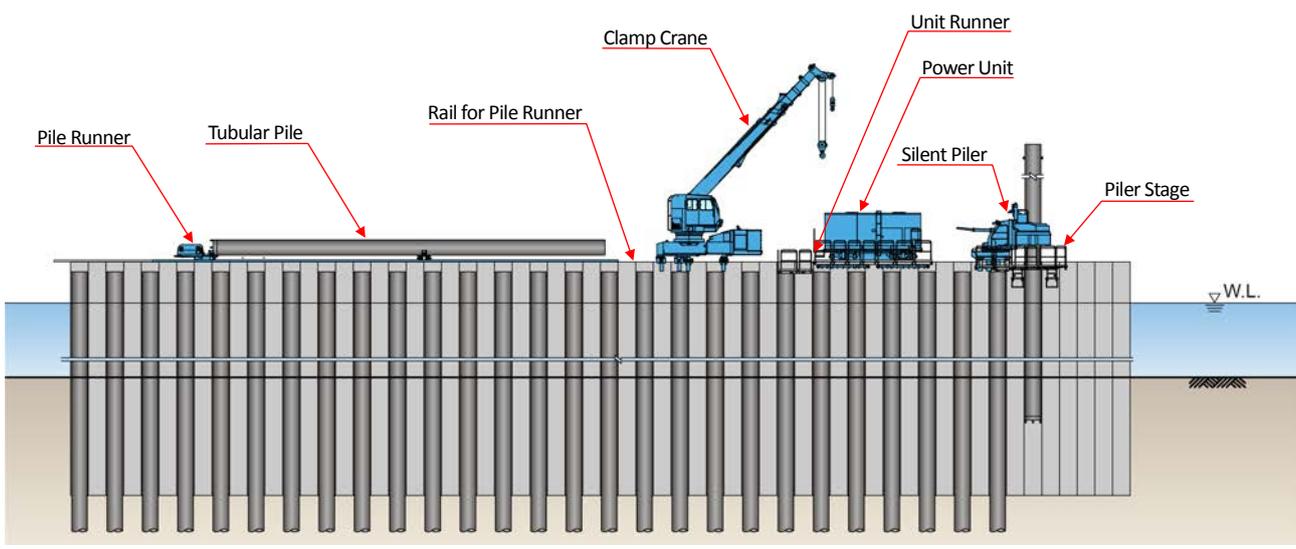
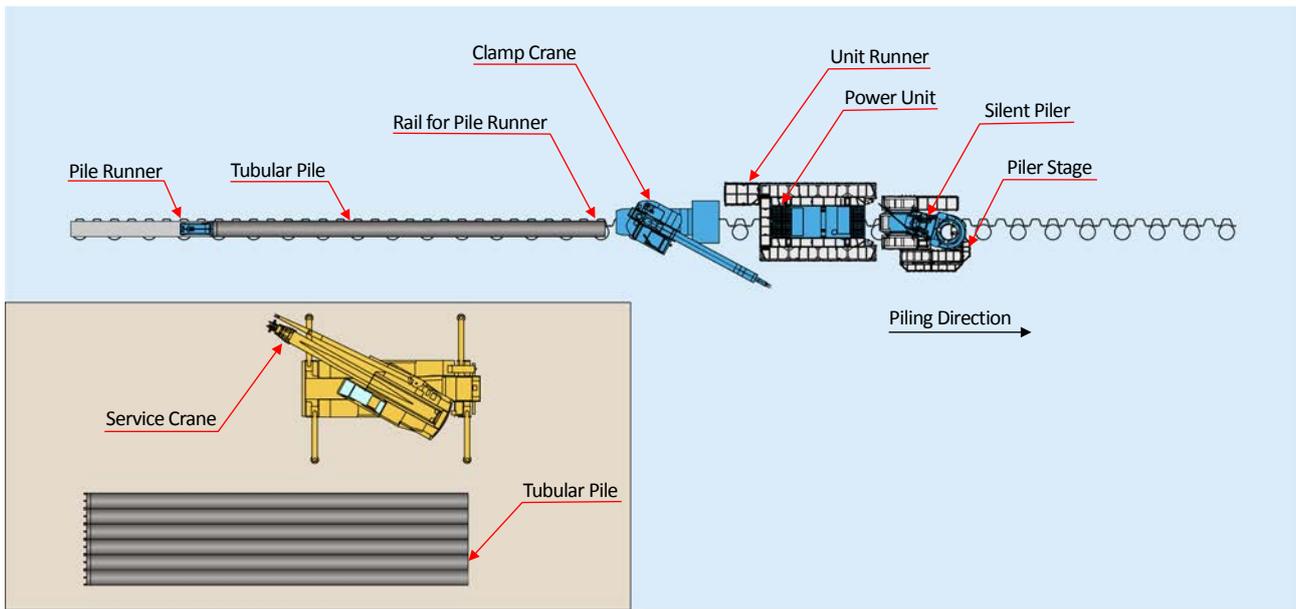


Plan View



Sectional View

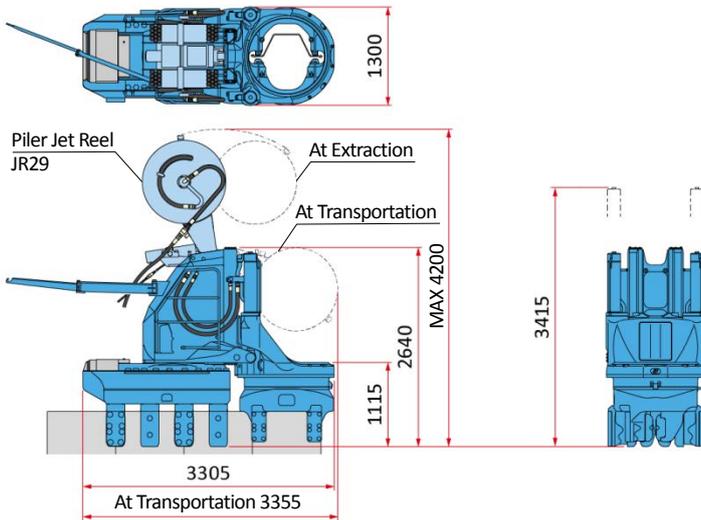
### 3-5 GRB Operation (Non-staging Method)



# Chapter 4 Machine Specification

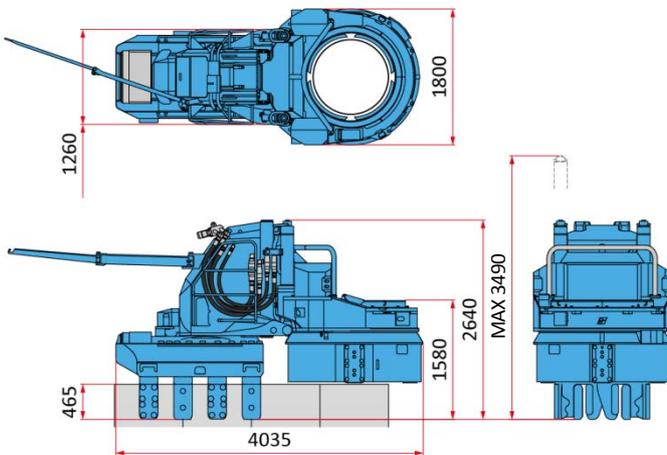
## 4-1 Machine Specification (for Sheet Piling)

### 4-1-1 Silent Piler F301-900



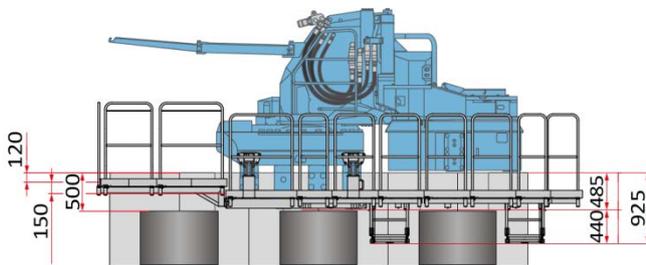
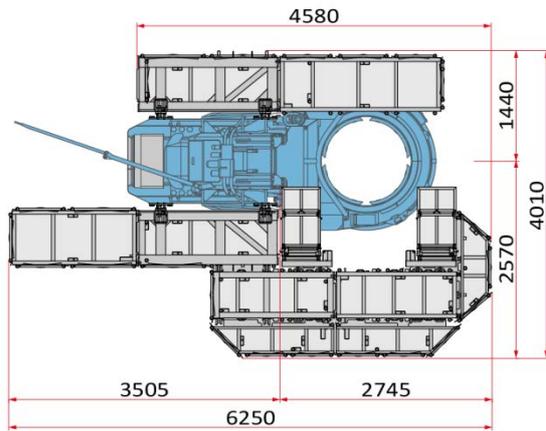
SILENT PILER	F301-900	
Applicable Sheet Piles	Hat Sheet Pile (900mm wide) (10H,25H,45H,50H)	
Max. Press-in Force	800kN(Super Crush Mode)	
	1000kN(Standard / WJ Mode)	
Max. Extraction Force	900kN(Super Crush Mode)	
	1200kN(Standard / WJ Mode)	
Stroke	850 mm	
Press-in Speed	2.0 ~ 43.5 m/min	
Extraction Speed	1.5 ~ 32.3 m/min	
Control System	Radio Control	
Mass	Super Crush Mode (Main Body & Hose Reel)	14880 kg
	Water Jetting Mode (Main Body & Piler Jet Reel)	12250 kg
	Standard Mode (Main Body)	11000 kg

### 4-1-2 Silent Piler F301-900 (Combi-Gyro Mode)



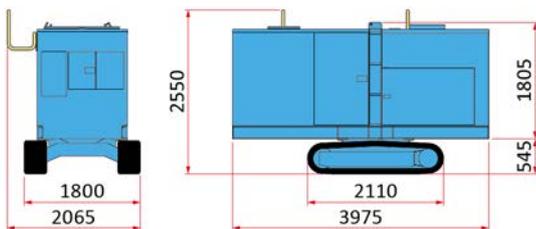
SILENT PILER	F301-900 (Combi -Gyro Mode)
Applicable Sheet Piles	Chuck Tubular Pile $\phi$ 600,800,1000mm
	Clamp Hat Sheet Pile (900mm wide) (10H,25H,45H,50H)
Max. Press-in Force	800kN
Max. Extraction Force	850kN
Chuck Rotation Torque	600kN·m
Chuck Rotation Velocity	10min <sup>-1</sup>
Stroke	850mm
Control System	Radio Control
Mass	15700kg

### 4-1-3 Piler Stage ST51



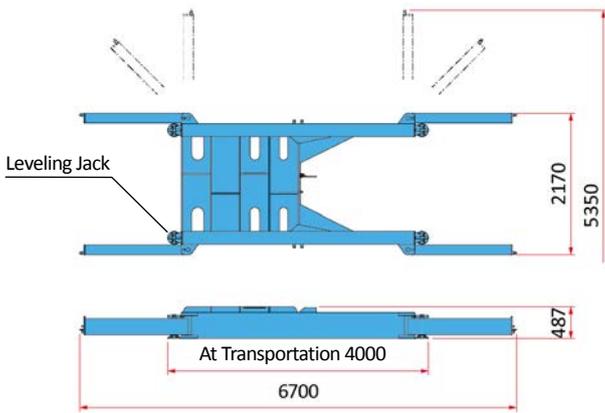
Piler Stage	ST51
Load Capacity	300kg (When set both sides)
	200kg (When set one side only)
Mass	1270kg

### 4-1-4 Power Unit EU300I3



Power Unit	EU300I3
Power Source	Diesel Engine
Rated Output	Power Mode 230 kW (313 ps) / 1800 min <sup>-1</sup>
	Eco Mode 204 kW (278 ps) / 1600 min <sup>-1</sup>
	Super Eco Mode 179 kW (243 ps) / 1400 min <sup>-1</sup>
Fuel Tank Capacity	500 L
Hydraulic Reservoir	Piler ECO Oil 490 L
Moving Speed	1.4 km / h
Mass	6800 kg (with 30m Hose)

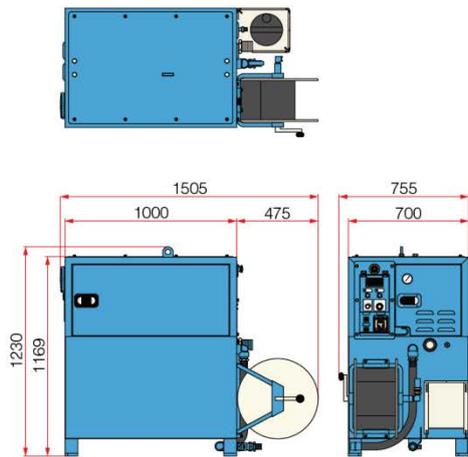
### 4-1-5 Reaction Stand



Reaction Stand(with Leveling Jack)

Mass	2000kg
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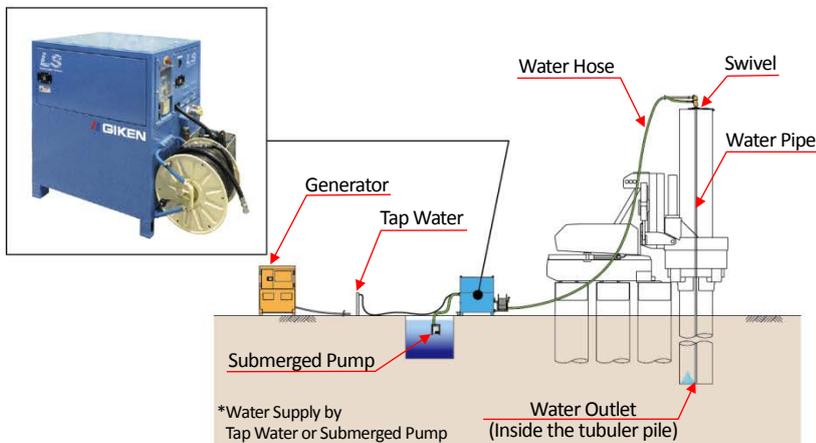
### 4-1-6 Water Lubrication System OP114A



Lubrication System

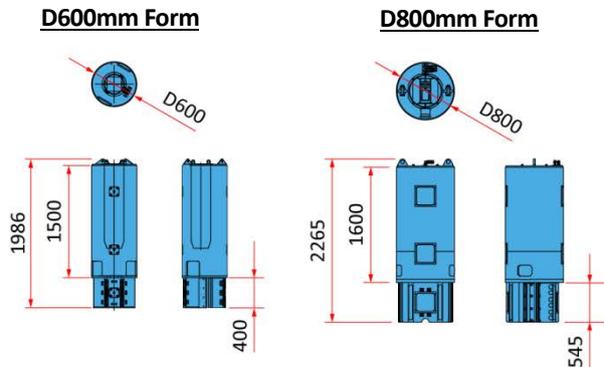
OP114A

Input Voltage (3 phases)	AC200V, 50 / 60 Hz, 24 KVA or more
Water Pump Discharge Rate	Max.60L / min
Water Pump Discharge Pressure	Max.6MPa
Outer Tank Capacity (W×D×H)	1505 × 755 × 1230
Water Tank Capacity	300 L
Mass (without water)	410 kg



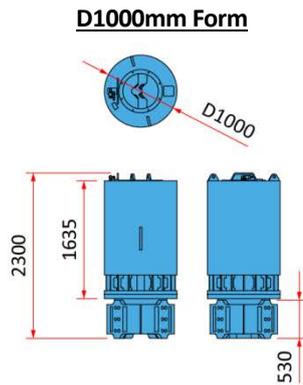
## 4-1-7 Driving Attachment

### Driving Attachment AM69A



Driving Attachment	AM69A
Applicable Closure Pile (Equal Angle Section)	200 × 200 × t20 - 25 250 × 250 × t20 - 25
Mass	1100 kg (D600mm Form) 2000 kg (D800mm Form)

### Driving Attachment AM105



Driving Attachment	AM105
Applicable Closure Pile (Equal Angle Section)	200 × 200 × t20 - 25 250 × 250 × t20 - 25
Mass	3300 kg (D1000mm Form)

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