SHEET PILING (UK) LTD

PRESS-IN PILING TECHNICAL GUIDE

WE ARE MORE THAN JUST A SHEET PILING CONTRACTOR: WE ARE YOUR PARTNER OF CHOICE.

THE FIVE PRINCIPAL BENEFITS OF PILE PRESS-IN TECHNOLOGY

1. Safety

- No machine instability.
- Fully hydraulic clamping system.
- Remote control operation.
- Eliminates 'working at height'.

2. Environmental

- Vibration free.
- Noise free.
- Minimise influence on surrounding environment.
- Minimise temporary works.
- Effective for pile extraction allowing re-use.

3. Quality

- Accurate pile alignment and installation tolerances.
- Pre-formed quality controlled steel pile product.
- Various aesthetical finishes available.

4. Programme

- Self-walking system reduces construction programme.
- No limitation on working hours.
- 'One-Stop' construction method.

5. Cost

- Reduced temporary works (temporary platforms, earth works, road diversions).
- Minimal labour requirement.
- Maximise off-site design and fabrication.

"As one of the UK's leading driven steel piling contractors, Sheet Piling (UK) Ltd has built its reputation on solid foundations."

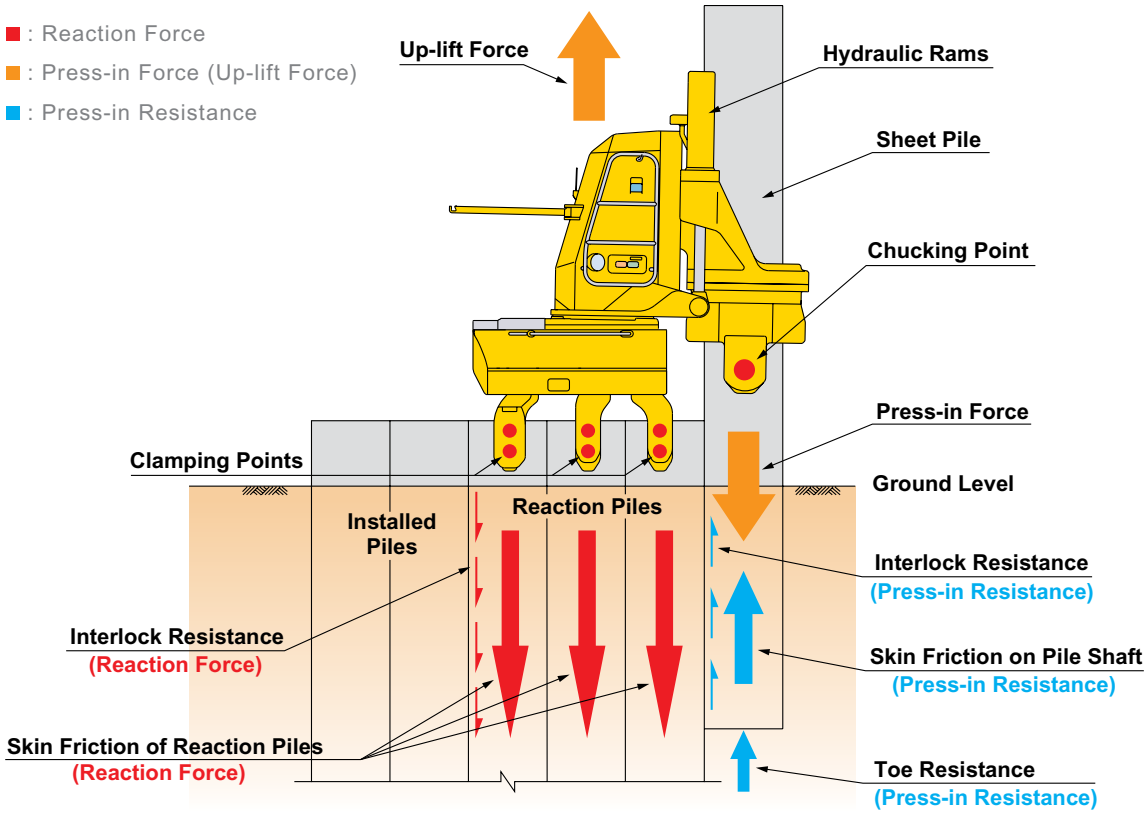
PRESS-IN METHOD

Press-in Method

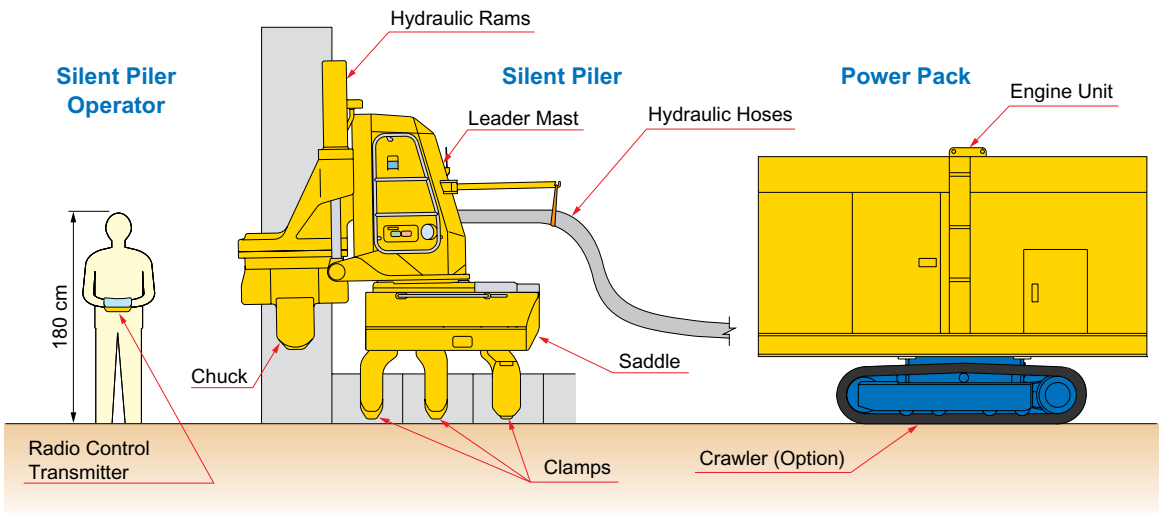
Conventionally prefabricated sheet piles have been hammered or vibrated into the ground. Such methods inevitably generate excessive noise and vibration because of their reliance on percussive or vibratory energy. Giken has developed the reaction-based press-in machine the 'Silent Piler' and established the "Press-in Method" based on the principle of silent, vibration free pile installation.

In practical terms, the Silent Piler clamps previously installed piles and generates a reaction force from the negative skin friction and interlock resistance of these reaction piles. This reaction force provides press-in force to hydraulically jack subsequent piles into the ground.

Since the piles are pressed-in, the Silent Piler minimises any damage to the environment including neighbouring structures and local residents through noise and vibration. The Press-in Method allows pile installation in areas where environmental disruption is strictly precluded.



Main Components of The Silent Piler

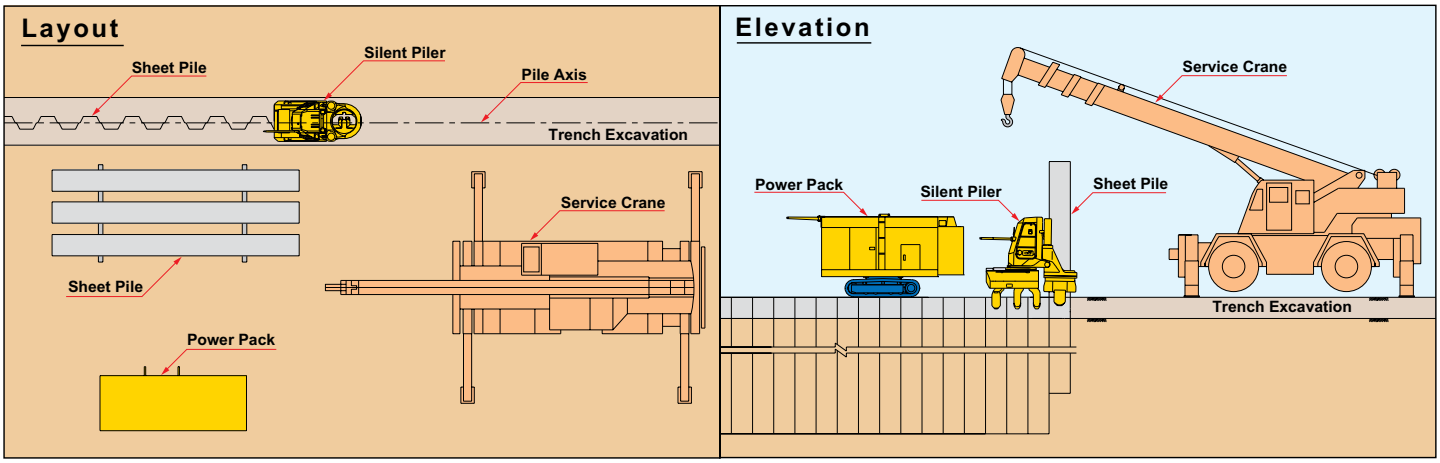


Note: Hydraulic hoses are omitted to show for simplifying Silent Piler pictures in all other pages.

Standard Equipment

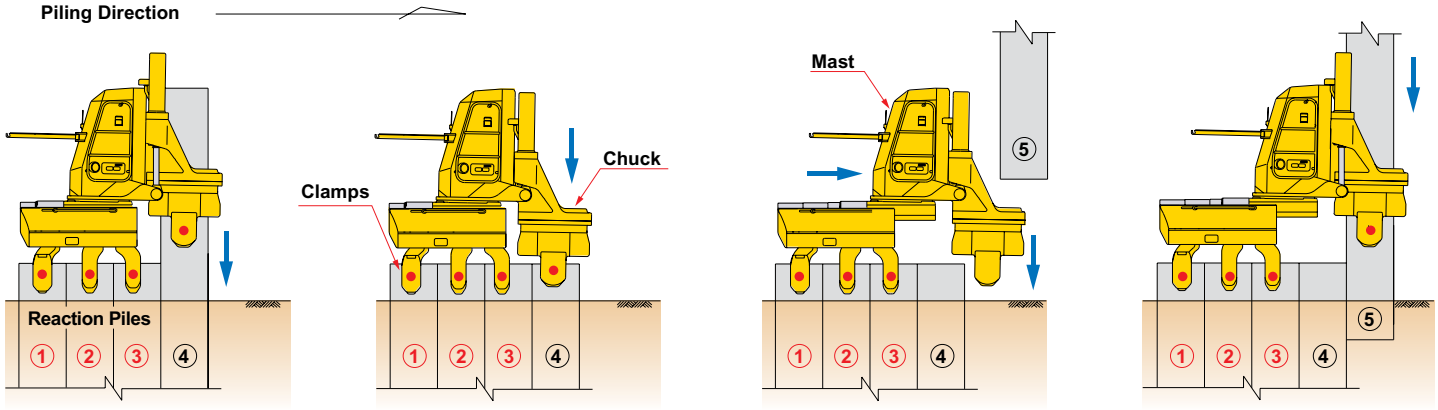
Under normal working conditions, the Silent Piler can operate with just one crane to pitch piles. When a pile being pressed-in is sufficiently stable, the Silent Piler releases its clamps from the reaction piles and use this pile to raise itself and travel forwards.

This "Self-moving" system eliminates the need for support by a crane during the piling operation. In other words, even where a site requires a large jib radius for pitching, a relatively light-weight crane can be used.



Press-in Procedure & Self-moving

● shows hydraulic jaws of Chuck and Clamps closed.

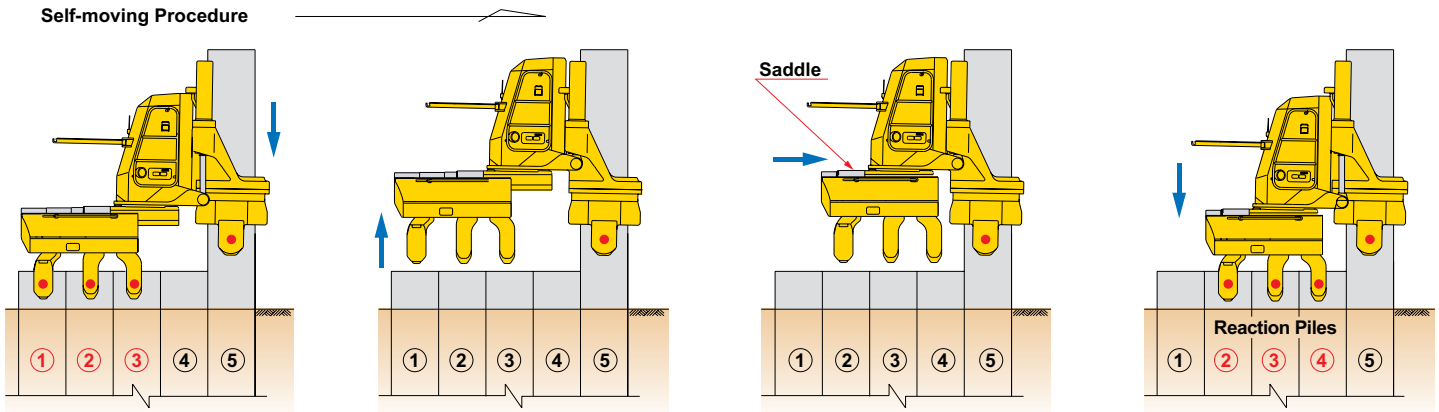


1. The Silent Piler clamps reaction piles No1-3 and presses-in pile No4.

2. Complete pressing-in pile No4 to the specified height and open Chuck.

3. Move Mast forward and lower Chuck turning it for pile No5.

4. Insert pile No5 into Chuck, align the pile and start pressing-in.



5. Press-in pile No5 until the pile is sufficiently stable.

6. Release Clamps from the reaction piles and raise the main body.

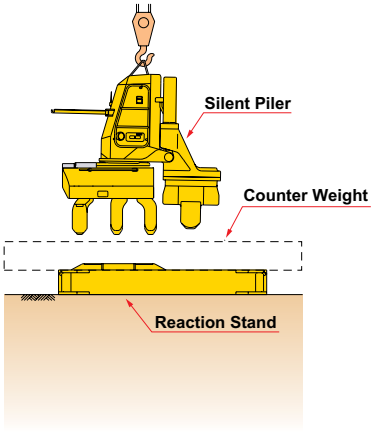
7. Move Saddle forward to the next position on the reaction piles.

8. Lower the main body onto reaction piles No2-4 and clamp them to complete pressing-in pile No5.

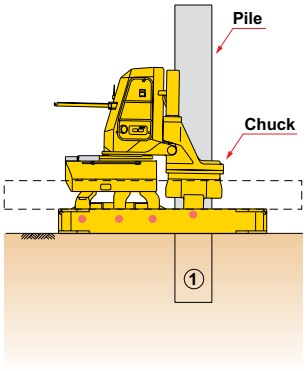
Initial Press-in

At the very beginning of press-in work, if there is no completed pile, "Reaction Stand" is usually used for initial piling work. Press-in Machine is horizontally set onto the Reaction Stand and then counter weights are loaded onto the Reaction Stand. It depends on soil conditions and pile length how heavy the counter weight should be. Then the first pile is pressed-in utilising all weights of machine and counter weight as reaction. After installing the first pile, the installed pile becomes the first reaction pile for installing second pile. Once Press-in Machine completely sits on reaction piles and Reaction Stand is removed as well as counter weight, the initial piling work is completed.

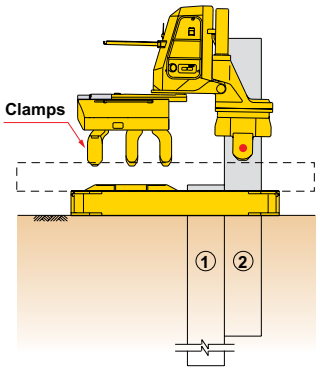
● shows hydraulic jaws of Chuck and Clamps closed.



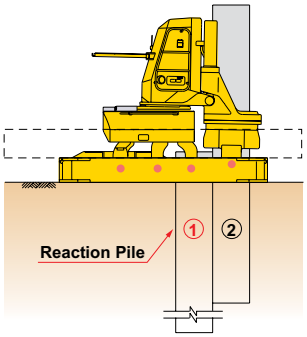
1. The Silent Piler is set up on the reaction stand with an appropriate amount of counter weight.



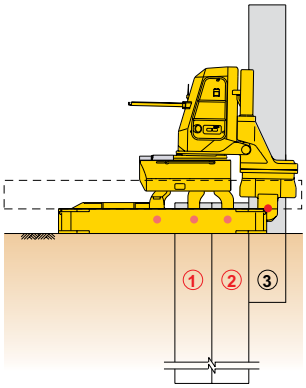
2. Pitch pile No1 into Chuck, align the pile and start pressing-in.



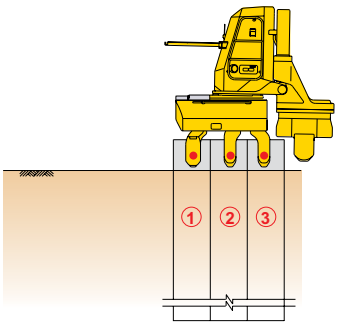
3. Prior to completion of pile No2 pressing-in, the Silent Piler self-moves (with crane support).



4. Clamp pile No1 with the reaction stand increasing available reaction force and continue pressing-in.



5. Repeat the previous procedure until pile No3 is fully installed to the specified height.



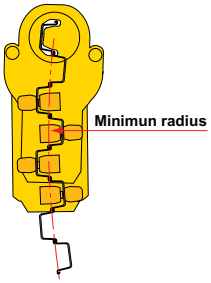
6. When initial reaction piles are installed, the Silent Piler moves off the reaction stand.

Initial Press-in (setting up and removal of the counter weight)

PRESS-IN METHOD

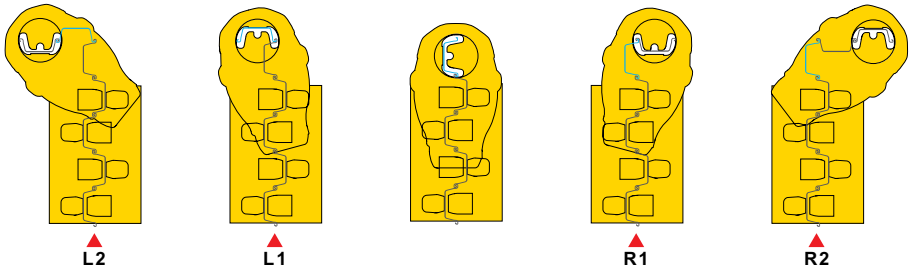
Curve Installation

Chuck rotation, mast revolution and clamp right-left mechanisms are equipped on the press-in machine main body. These functions enable to install piles on curved or complicated alignments. The minimal piling radius differs from the pile sections and press-in machine models.



Corner Installation

The press-in machine (U-Piler) has "Corner Four (C4)" function which can install 2 piles for both sides on perpendicular alignment from a machine position. The 2 piles are installed on the pile alignment and the other 2 piles are installed as dummy piles for reaction piles. This Corner 4 function make piling work at narrow site condition safe and efficient for cofferdam works.



WATCH SHEET PILING VIDEOS

For videos, visit our website: https://www.sheetpilinguk.com/about/useful-videos/
Or scan this QR Code using the camera on your iOS or Android smartphone.

Vibration Free Piling (HD)

Vibration Free Piling Press

Initial Setup

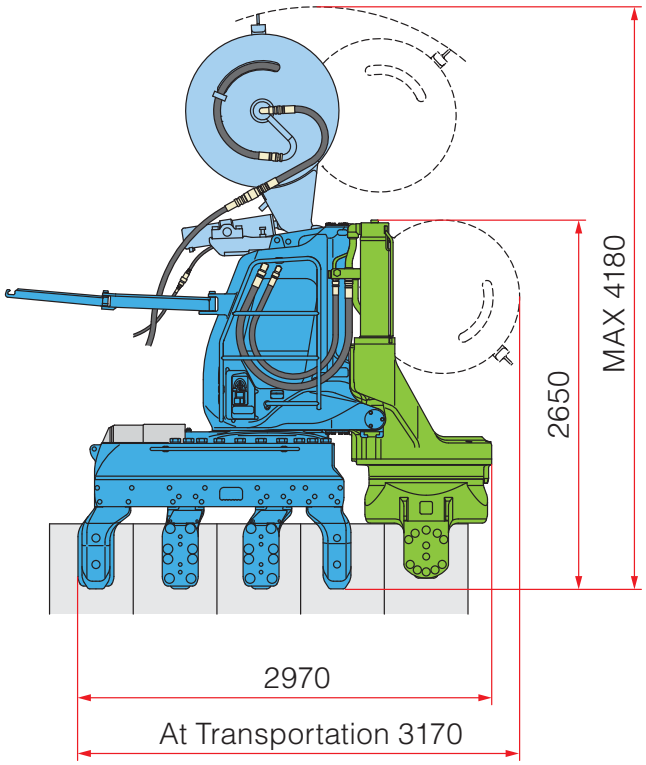
Corner Sheet Piling

Initial Set Up - Reaction Stand

Water Jetting Sheet Piles

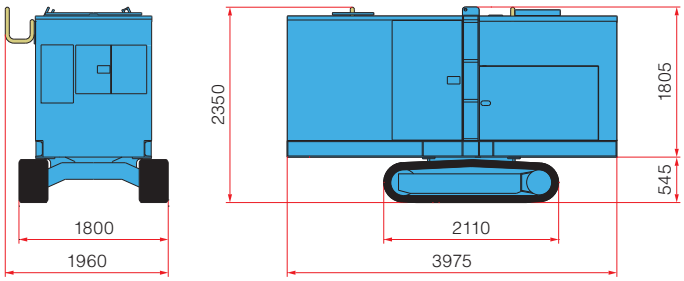
F201 SILENT PILER

Silent Piler



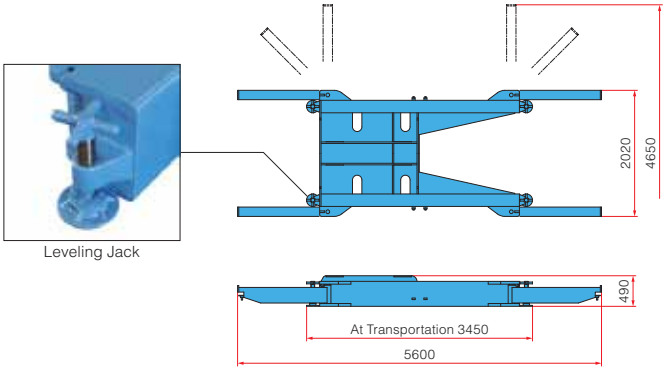
F201 Silent Piler	
Silent Pile Range	U Profile 600 mm
Max. Installation Force	1,500 kN
Max Extraction Force	1,600 kN
Stroke	850 mm
Pressing-in Speed	1.4 - 30.0 m/min
Drawing-out Speed	1.1 - 23.2 m/min
Operation	Radio Control
Movement	Self-moving
Power Unit Type	EU 300 Crawler Unit
Silent Piler Weight	11,120 kg
Super Jet Reel Weight	820 kg
Total Machine Weight	11,940 kg

Power Pack



Power Pack	
Engine Unit Type	EU 300
Power Source	Diesel Engine (Tier 111B)
Rated Output	230 kW (313 PS)
Fuel Tank	500 L
Hydraulic Oil	490 L
Noise Level at 7m	69 dB (A)
Weight	6,400 kg

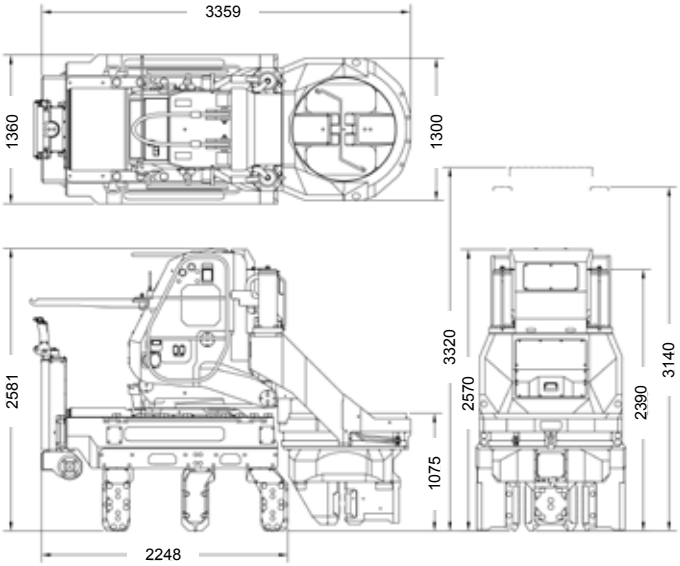
Reaction Stand



Reaction Stand	
Weight	1,900 kg

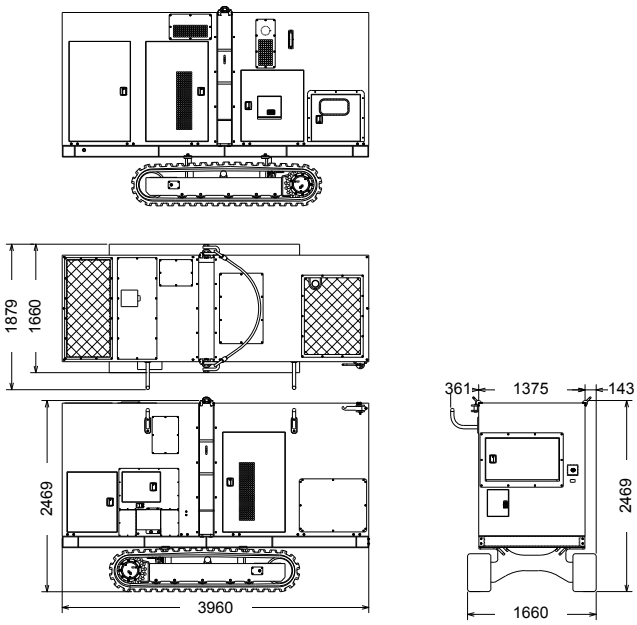
ZU100 SILENT PILER

Silent Piler



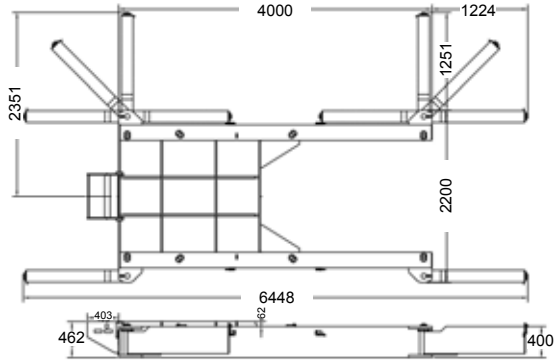
ZU100 Silent Piler	
Silent Pile Range	U Profile 600 - 750 mm Z Profile 585 - 700 mm
Max. Installation Force	1,000 kN
Max Extraction Force	1,100 kN
Stroke	750 mm
Pressing-in Speed	3.0 - 36.0 m/min
Drawing-out Speed	2.4 - 28.0 m/min
Operation	Radio Control
Movement	Self-moving
Power Unit Type	TE - 200C
Silent Piler Weight	12,200 kg

Power Pack



Power Pack	
Engine Unit Type	CAT C7
Power Source	Diesel Engine (Tier IV)
Rated Output	168 kW
Fuel Tank	350 L
Hydraulic Oil	500 L
Noise Level at 7m	69 dB (A)
Weight	5,500 kg

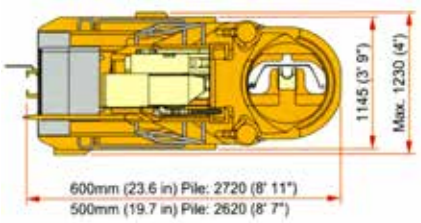
Reaction Stand

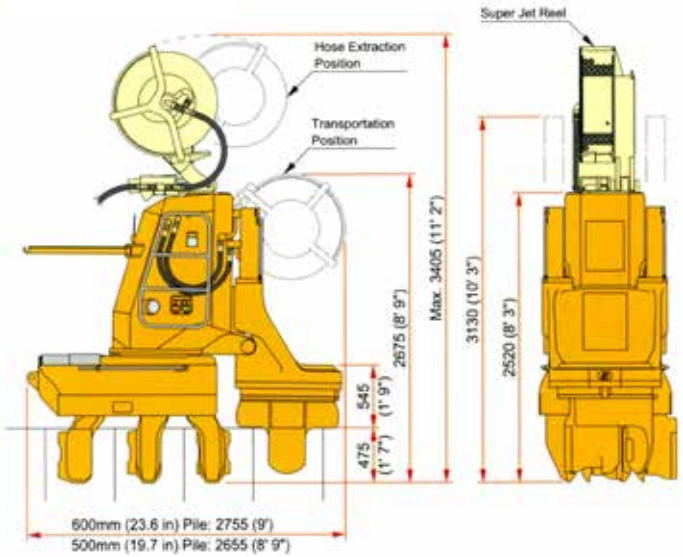


Reaction Stand	
Weight	2,400 kg

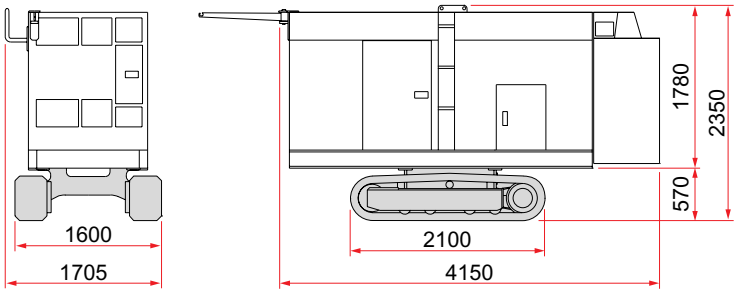
SW100 SILENT PILER

Silent Piler

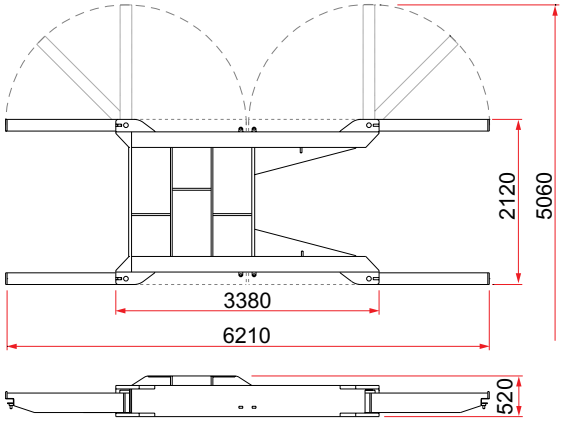




Power Pack



Reaction Stand



SW100 Silent Piler	
Silent Pile Range	U Profile 500, 525, 600 mm
Max. Installation Force	1,000 kN
Max Extraction Force	1,100 kN
Stroke	750 mm
Pressing-in Speed	1.5 - 35.2 m/min
Drawing-out Speed	3.2 - 27.5 m/min
Operation	Radio Control
Movement	Self-moving
Power Unit Type	EU200 / 200A Crawler Unit
Silent Piler Weight	8,200 kg
Super Jet Reel Weight	550 kg
Total Machine Weight	8,750 kg

Power Pack	
Engine Unit Type	EU 200
Power Source	Diesel Engine
Rated Output	147 kW (200 PS)
Fuel Tank	350 L
Hydraulic Oil	550 L
Noise Level at 7m	69 dB (A)
Weight	4,900 kg
Crawler Type	GT1 (optional)
Crawler Operation	Remote Control
Power Source	2 Pumps x 2 Motors
Moving Speed	1.4 km/h
Weight	1,000 kg
Total Weight	5,900 kg

Reaction Stand	
Weight	2,000 kg

AUXILIARY SHEET PILING TECHNIQUES

Water Jetting

Water Jetting is primarily used to enable sheet piles to be pressed into difficult ground conditions which might otherwise be deemed unsuitable.

Water Jetting is effected by means of a High Strength Jetting Pipe (lance) attached to the inner face of the sheet pile.

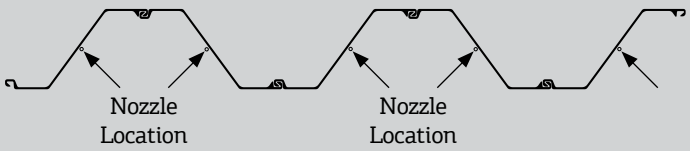
The jet pressure is kept to the minimum required that allows the pile to continue to penetrate the ground and prevent the lance needle from becoming blocked during installation.

In "Coarse Granular" soils, the main action of the water jet is to oscillate the particles reducing the resistance to pile penetration.

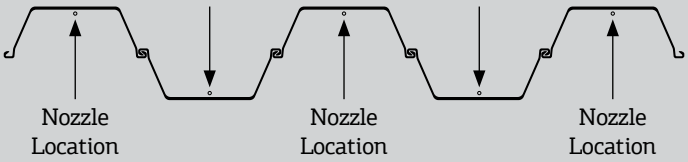
When sheet piles are installed into cohesive soils, the lubricating actions of the water reduces the amount of adhesion contributing to the pressing resistance whilst at the toe the water reduces the end resistance to ease the penetration of the piles.

The volume and pressure of water can be adjusted according to the ground conditions; thus, water is only applied where needed and large voids are not produced. Soils parameters quickly return to their normal state as is evidenced by the adequacy of the reaction force available for pressing the subsequent pile.

As an additional benefit, water jetting can significantly improve installation production as well as optimise the sheet pile section required.



Water Jetting for 'Z' Piles



Water Jetting for 'U' Piles

THE PROBLEM

HEAVY GROUND
Dense/Cohesive Soils

=

HEAVY PILE SECTION

+

LARGE PRESS-IN FORCE

THE SOLUTION

MODIFIED GROUND
by Water Jetting

=

OPTIMISED PILE SECTION

+

REDUCED PRESS-IN FORCE

THE BENEFITS

✓ Improved Productivity

✓ Improved Quality

✓ Optimal Pile Section

✓ Reduced Costs

Pre-Augering

If dense soils are anticipated, then pre-augering of the sheet pile line in advance of sheet pile installation, to reduce the in-situ ground density, can enable piles to be driven into ground conditions that might otherwise be deemed unsuitable.

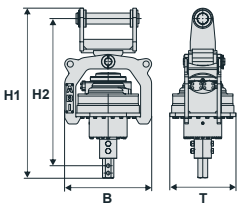
Selective Sheet Piling (UK) Ltd Telescopic Leader Rigs can be fitted with the MDBA 3000/MDBA 7000 auger motor. A 450mm or 600mm diameter auger flight is attached to the auger motor and the ground is then augered through the dense soils. The auger flights are rotated into the ground in one direction and counter-rotated out of the ground leaving the soil in place without flighting the material. Only a small amount of spoil is generated to displace the volume of the auger flight itself.

Use of pre-augering reduces the in-situ density of the soils and prevents a large pressure bulb from forming during driving. The depth of pre-augering is dependant on both method of installation and ground conditions anticipated. Pre-augering can also help identify underground obstructions in advance of pile installation and the system minimises disturbance to the surrounding subsoil.

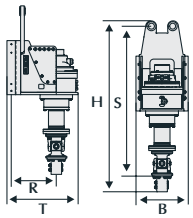
Technical Data	Unit	BA2200	3000	4200	7000
Torque	daNm	2200	3000	4200	6600
Revolutions (max.)	min^{-1}	50	70	60	40
Hydraulic flow rate	l/min	220	450	540	540
Required oil quantity per rotation	l	4,4	6,3	7,5	13,2
Required hydraulic power at auger drive	kW	60	225	290	280
Static extraction force (max.)	kN	200	200	200	300
Nominal oil pressure	MPa	32	30	30	33
Total weight (incl. cardanic joint)	kg	600	1350	1400	1900
Transport weight	kg	700	1580	1630	2100
Hexagon connection (SW - M Socket/Female)	mm	80	80	100	120

Dimensions (mm)	BA2200	3000	4200	7000
H - Height/with swivel	1180	2260/2015	2225/2050	3120/2470
B - Width/with swivel	710	690/910	690/910	835/1010
T - Depth	510	950	970	925
R - Guide to drilling axle	N/A	600	600	600
S - Locking to bottom	1050	1970	1970	2635
Transport dimensions (without swivel) height (h)/width (b)/depth (t)	N/A	2470/1020/1120	2470/1020/1120	3405/970/1060

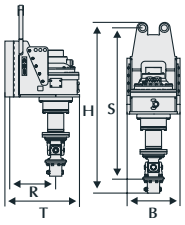
BA2200



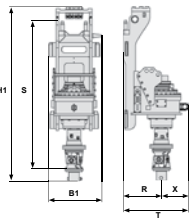
MDBA 3000

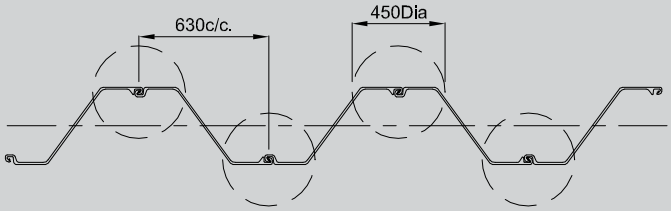


MDBA 4200

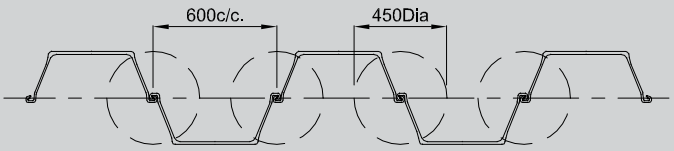


7000

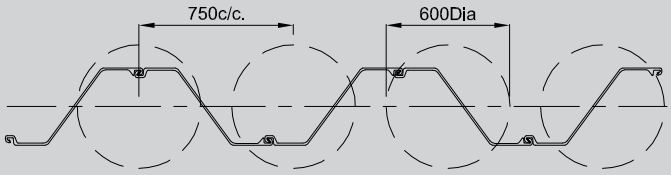




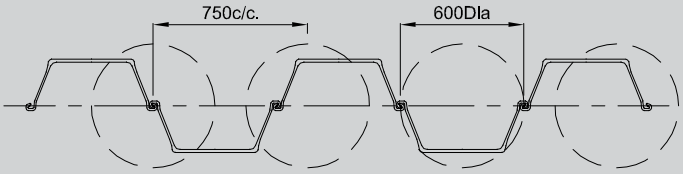
Pre-Augering for 'Z' Piles - 450dia



Pre-Augering for 'U' Piles - 450dia



Pre-Augering for 'Z' Piles - 600dia



Pre-Augering for 'U' Piles - 600dia

THE PROBLEM

HEAVY GROUND
Dense/Cohesive Soils or Boulders/Rock

=

HEAVY PILE SECTION

+

LARGE INSTALLATION FORCE

THE SOLUTION

MODIFIED GROUND
by Pre-Augering

=

OPTIMISED PILE SECTION

+

REDUCED INSTALLATION FORCE

THE BENEFITS

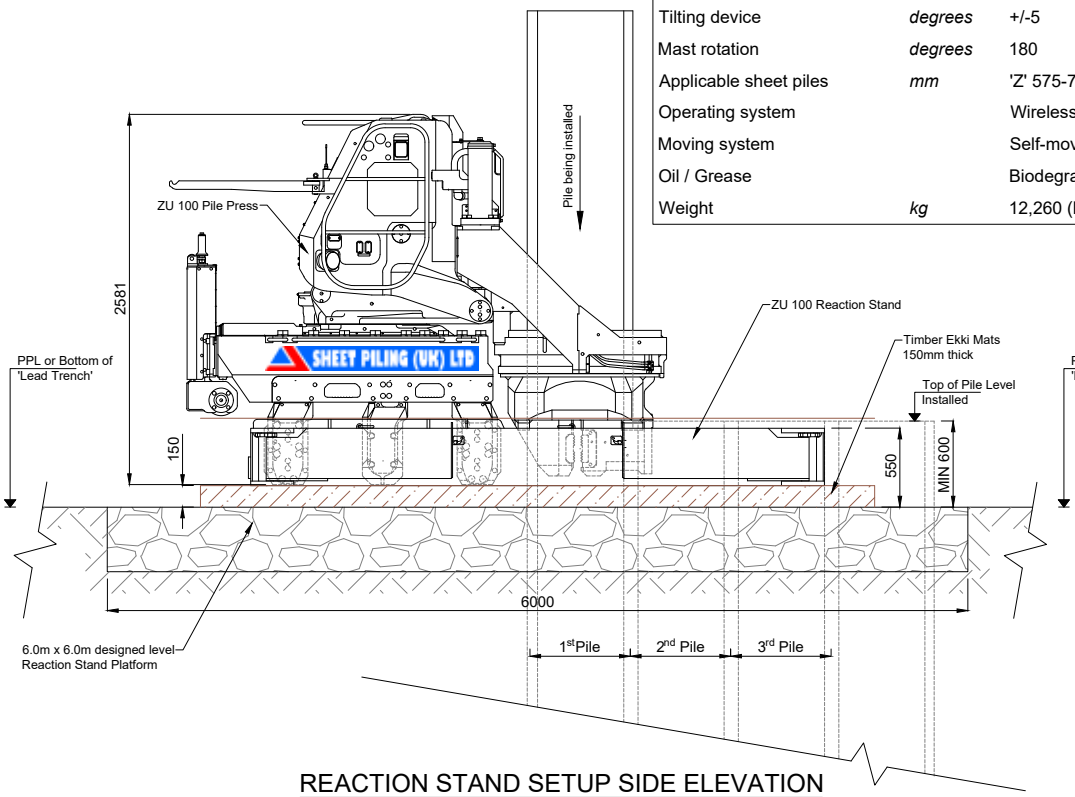
- ✓ Improved Productivity
- ✓ Improved Quality
- ✓ Optimal Pile Section
- ✓ Reduced Noise and Ground-bourne vibration

Kowan Still Worker ZU100 Reaction Stand Setup

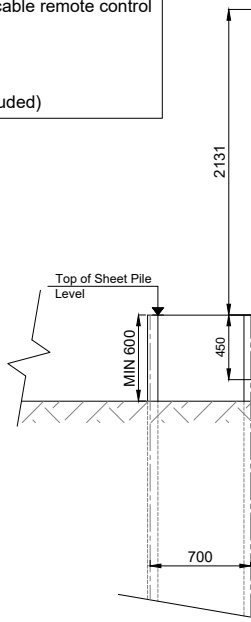
NOTES

1. All dimensions are in millimetres uno.
2. See also project specific Method Statement.
3. Jet Reel not shown

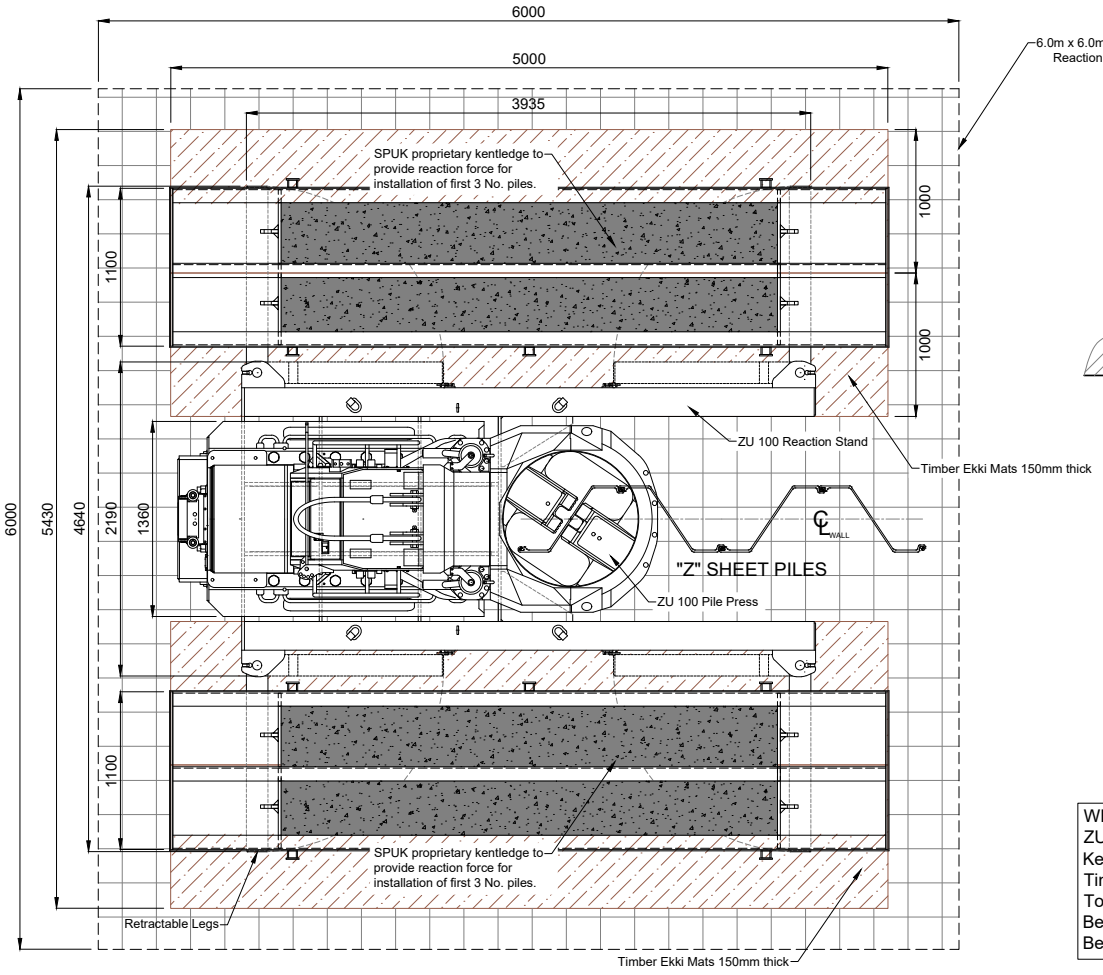
KOWAN ZU100 SPECIFICATIONS		
Max pressing in force	*kN*	1000
Max drawing out force	*kN*	1100
Stroke	*mm*	750
Tilting device	*degrees*	+/-5
Mast rotation	*degrees*	180
Applicable sheet piles	*mm*	'Z' 575-708 & 'U' 600 - 750
Operating system		Wireless radio control & cable remote control
Moving system		Self-moving
Oil / Grease		Biodegradable
Weight	*kg*	12,260 (NB. Reel not included)



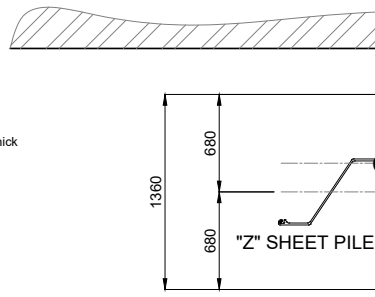
REACTION STAND SETUP SIDE ELEVATION
Scale 1:25



ZU100 INSTALLING
Scale 1:25

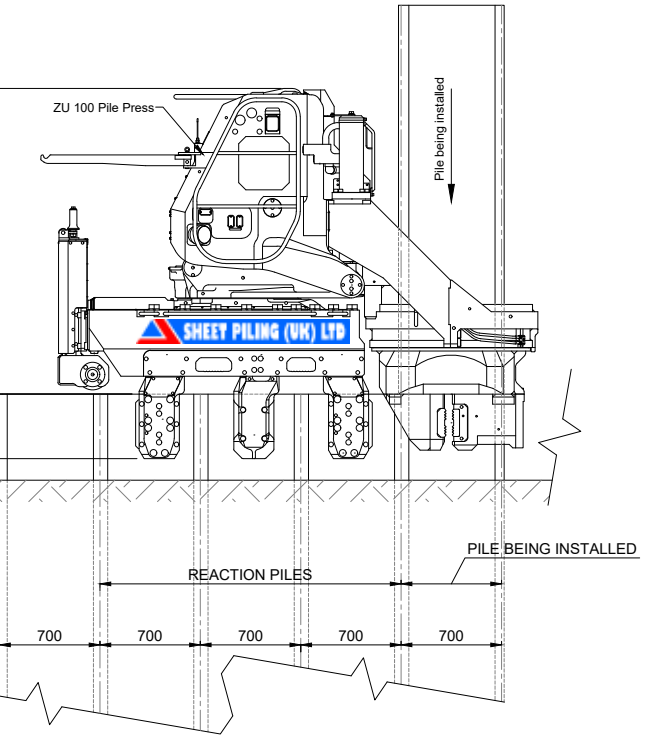


REACTION STAND SETUP PLAN
Scale 1:25

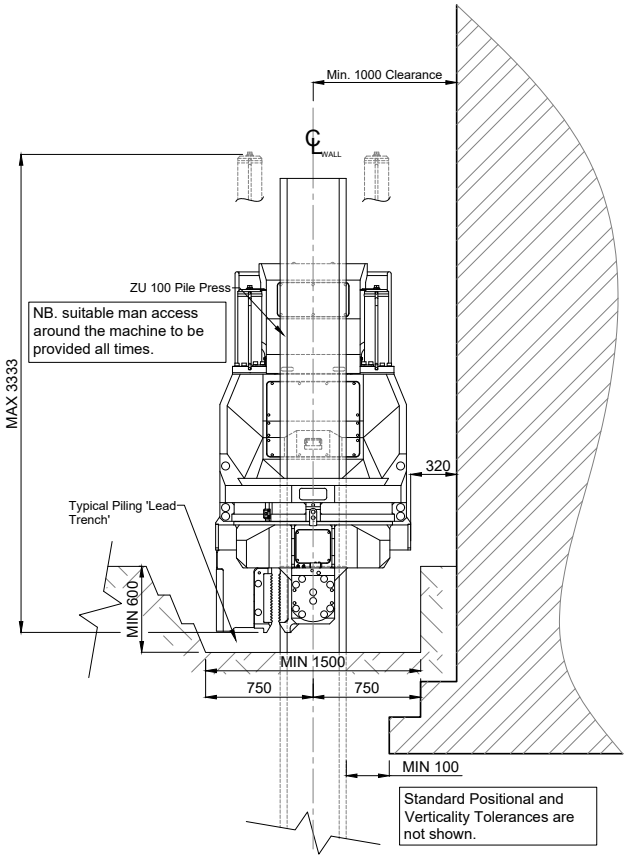


INSTALLATION CLE
Scale 1:25

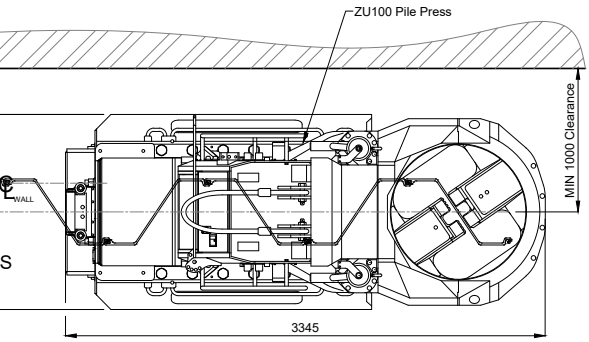
WEIGHTS	
ZU100 and Stand:	14.7t
Kentledge:	28.0t (Max)
Timber Mats:	2.4t
Total Weight:	45.1t
Bearing Area:	20m²
Bearing Pressure:	2.3t/m²



"Z" PILES SIDE ELEVATION



ZU100 CLEARANCES FRONT ELEVATION
Scale 1:25



EARANCES PLAN

FOR INFORMATION

P1	05/07/2022	ISSUED FOR INFORMATION	BH

Client :

KOWAN

Project :

KOWAN STILL WORKER
ZU 100 HYDRAULIC PILE PRESS

Drawing Title :

ZU 100 REACTION STAND SETUP, CLEARANCES & GENERAL DETAILS.

5th July 2022	Scale @ A1 : Shown	Drawn by : B. Hasan	Checked : AJC
Original Size A1	Drawing No. SPUK-PILE PRESS-ZU100		Revision : P1

Oakfield House, Rough Hey Road,
Grimsargh, Preston. PR2 5AR
Telephone: 01772 794141
Facsimile: 01772 795151
E-Mail: enquires@sheetpilinguk.com
Web: www.sheetpilinguk.com

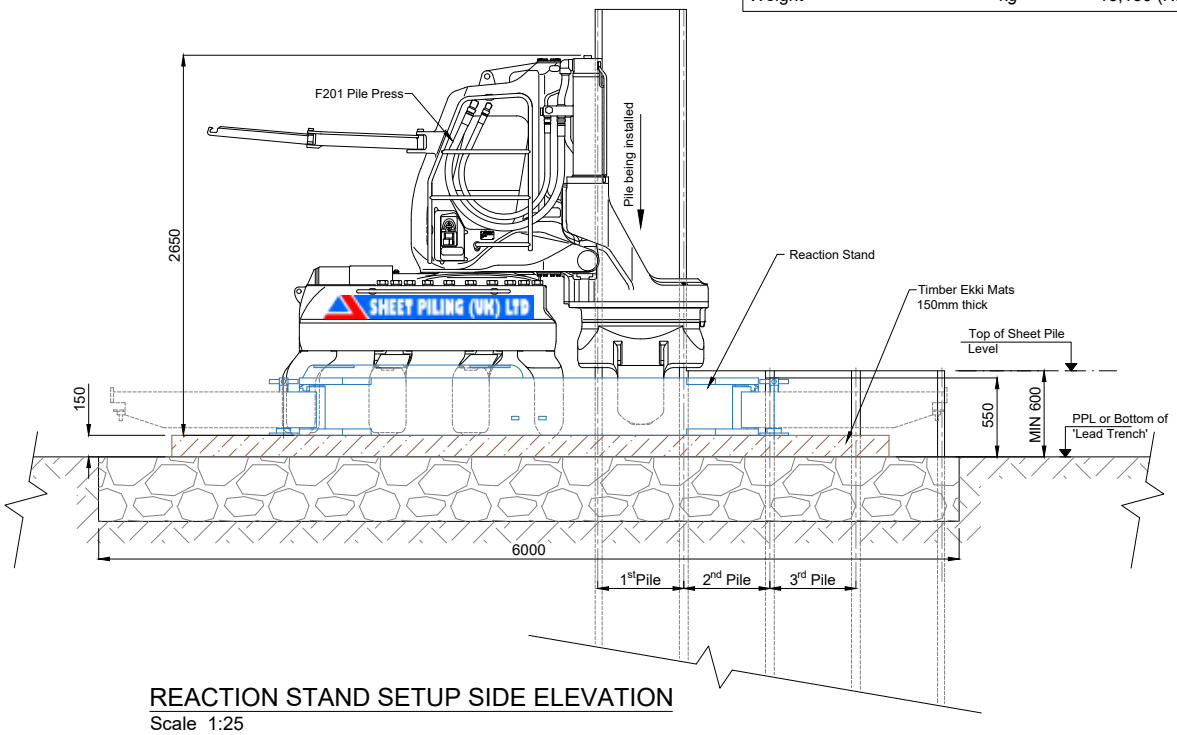
SHEET PILING (UK) LTD

Giken Silent Piler F201A-C600 Reaction Stand Setup

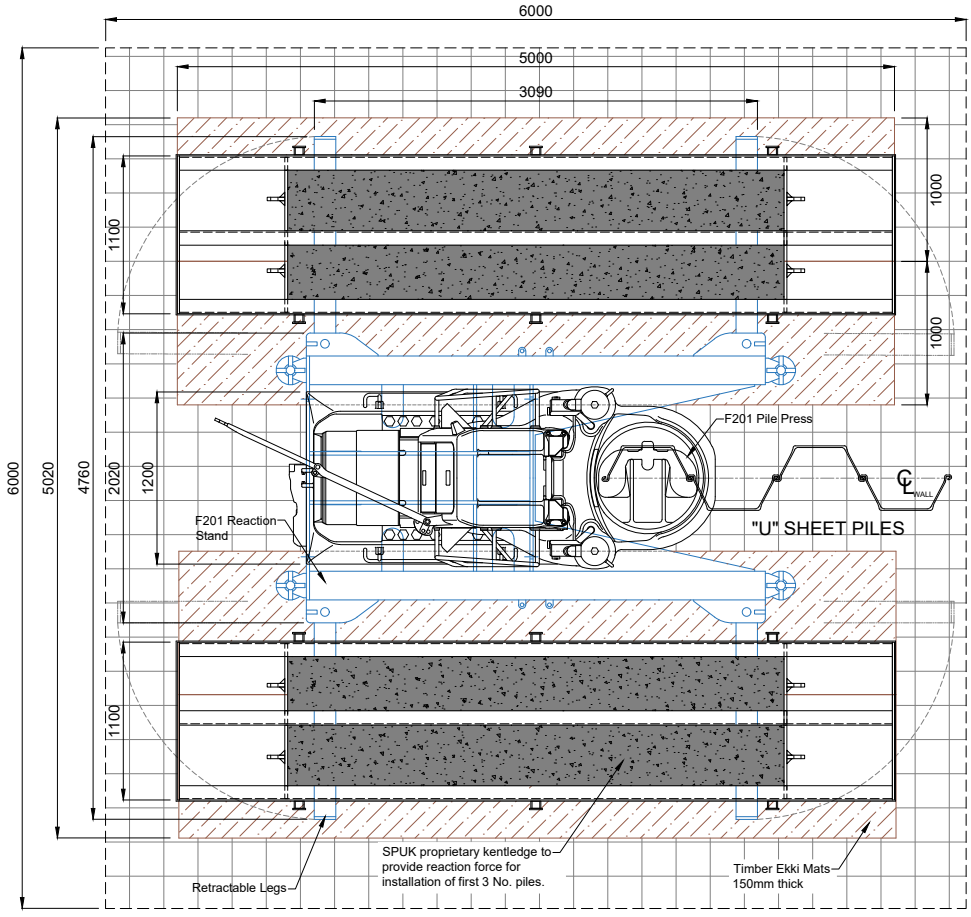
NOTES

1. All dimensions are in millimetres.
2. See also project specific Method Statement.
3. Jet Reel not shown

F201A Standard Mode SPECIFICATIONS		
Max pressing in force	*kN*	1500
Max drawing out force	*kN*	1600
Stroke	*mm*	850
Applicable sheet piles	*mm*	'U' 500mm & 600mm
Control system		Radio Control
Weight	*kg*	13,150 (NB. Reel not included)

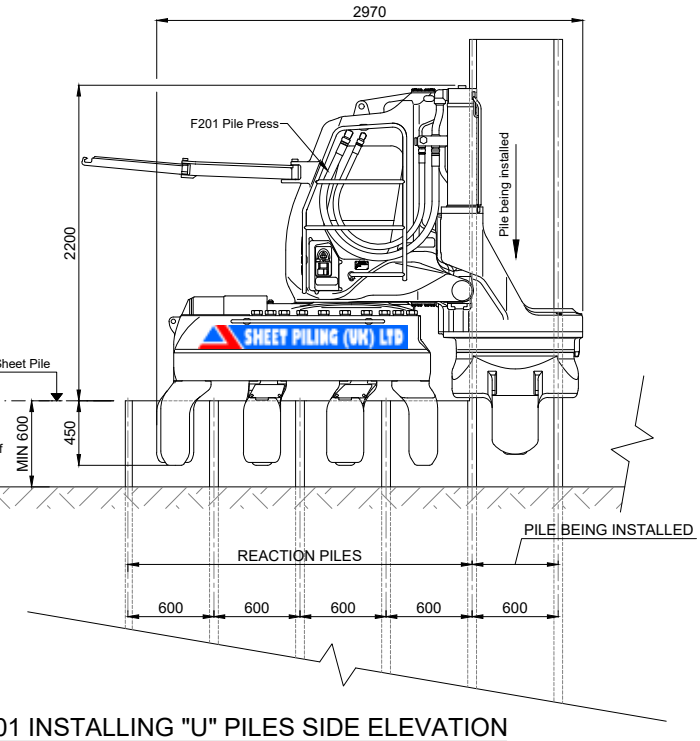


REACTION STAND SETUP SIDE ELEVATION
Scale 1:25

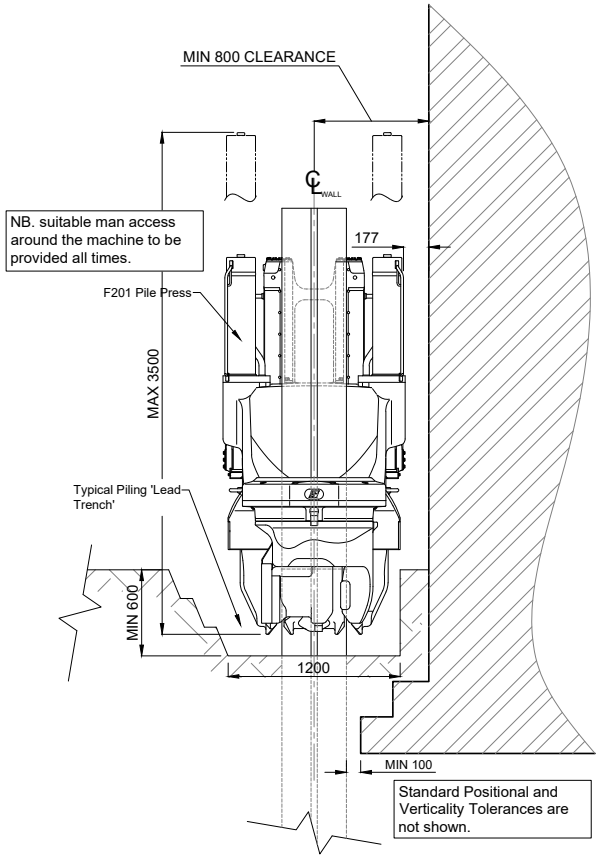


REACTION STAND SETUP PLAN
Scale 1:25

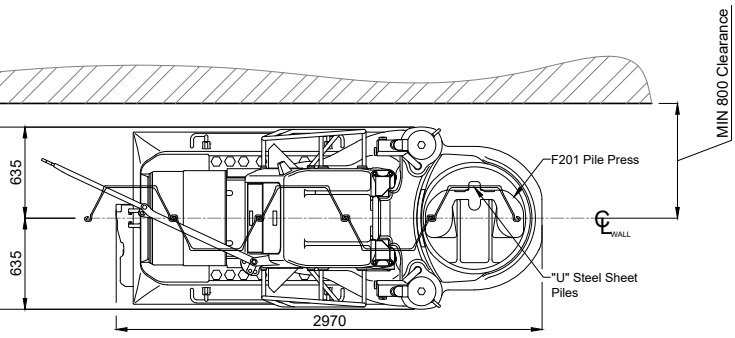
WEIGHTS	
F201-600 and Stand:	15.05t
Kentledge:	28.0t (Max)
Timber Mats:	2.4t
Total Weight:	45.45t
Bearing Area:	20m²
Bearing Pressure:	2.3t/m²



01 INSTALLING "U" PILES SIDE ELEVATION
le 1:25



F201 CLEARANCES FRONT ELEVATION
Scale 1:25



STALLATION CLEARANCES PLAN
le 1:25

P1	04/07/2022	ISSUED FOR INFORMATION	BH

Client :

GIKEN

Project :

GIKEN SILENT PILER F201A-C600 HYDRAULIC PILE PRESS

Drawing Title :

F201-600 REACTION STAND SETUP, CLEARANCES & GENERAL DETAILS.

4th July 2022	Scale @ A1 : Shown	Drawn by : B. Hasan	Checked : AJC
Original Size A1	Drawing No. SPUK-PILE PRESS-F201		Revision : P1

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