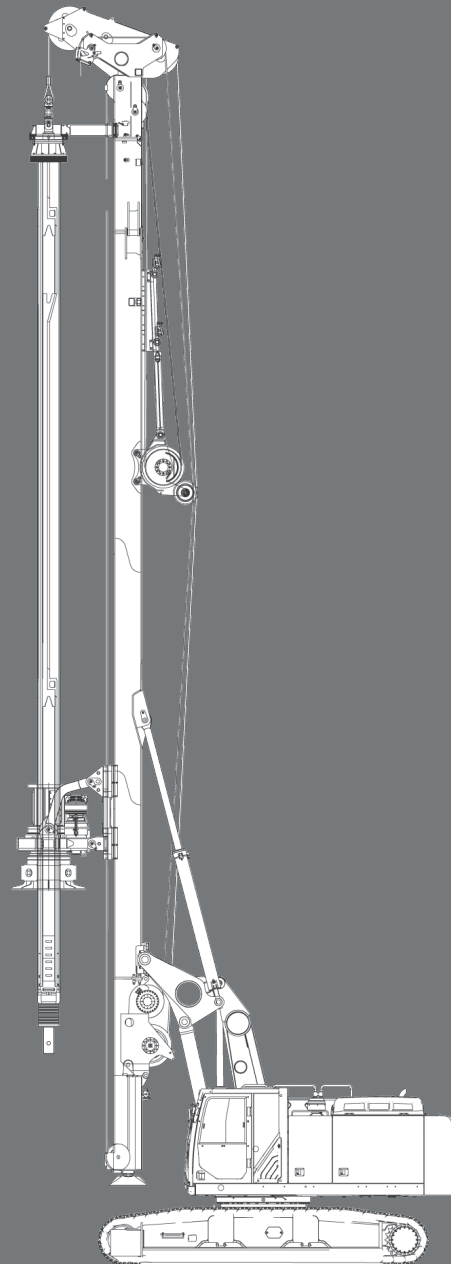


CH 650



High Tech Line

CH 650

The **Comacchio** self-erecting rigs are available in **CPD** (Cylinder Pull Down) and **WPD** (Winch Pull Down) versions and both are designed for easy transport as well as the best drilling performance.

- **CBP** (Cased Bored Piles) cased bored piles with casing driven directly by rotary head or optionally by casing oscillator powered by the base carrier;
- **BP** (Bored Piles) deep uncased bored piles stabilized by drilling fluid or dry hole;
- **LHR** (Low Head Room) special short mast arrangement suitable for large diameter bored piles;
- **CFA** (Continuous Flight Auger) piles by means of long auger string;
- **DP** (Displacement Piles);
- **MP** (Micropiles).

The **CH 650** is equipped with the **CCS** (Comacchio Controlling System) on 12' full touch screen for monitoring and control of the rig performances and operating parameters.

Technical Data

Undercarriage		
Type	Variable gauge	
Removable tracks	No	
Track shoe width	720 mm / 28" 1/2	
Track shoe type	Triple grouser	
Overall width (retracted side frames)	3000 mm / 9' 10"	
Overall width (extended side frames)	4270 mm / 14'	
Overall length	5858 mm / 19' 2" 3/4	
Centre idler to centre sprocket	5000 mm / 14' 4" 3/4	
Upperframe		
Width	3000 mm / 9' 10"	
Operators' cabin	TOPS & FOPS-1 certified, 1040 mm (3' 5") wide	
Control system type	CAN-BUS	
Control system interface	12" Touch Screen	
Tail swing radius	3500 mm / 15' 5" 3/4	
Diesel engine		
Make and model	CAT C9.3	CAT C9
Emission certification	EU stage IV / US EPA Tier 4f	EU stage IIIA / US EPA Tier 3
Aspiration	Turbocharged and charge air cooled	
Power rating	240 kW (321 HP) / 1550 rpm	261 kW (350 HP) / 1800 rpm
Displacement	9300 cc / 568 in ³	8800 cc / 537 in ³
Fuel consumption rate (100% power, rated speed)	202 g/kWh - 0.332 lb/hp-hr	222 g/kWh - 0.365 lb/hp-hr
Average fuel consumption approx.	31.5 l/hr / 8.3 gal/hr	34,5 l/hr / 9.1 gal/hr
Hydraulic system		
Main pumps flow	2 x 280 l/min / 2 x 74 gal/min	
Third pump flow	160 l/min / 42.3 gal/min	
Kelly bars		
Outer element diameter (three options available)	419 - 406 - 394 mm / 16" 1/2 - 16" - 15" 1/2	
Max length (self-mounting) CPD - WPD	13.5 - 15.0 m / 44' 3" - 49' 3"	

Main winch	
Type	Controlled descent
1 st layer line pull	250 kN / 56,200 lbs
1 st layer rope speed	76 m/min / 249 ft/min
Rope diameter	28 mm / 1" 1/8
Rope layers	2
Useful rope length with 1 / 2 / .. full layers	38 - 84 m / 124' 8" - 275' 7"
FEM classification	M5 - L2 - T5
Service winch	
Type	Controlled descent / Free fall
1 st layer line pull	133 kN / 16,200 lbs
1 st layer rope speed	64 m/min / 210' ft/min
Rope diameter	20 mm / 13/16"
Rope layers	3
Useful rope length with 1 / 2 / .. full layers	17 - 39 - 62 m / 56' - 128' - 203'
FEM classification	M5 - L2 - T5
Bored Piles (BP)	
Drilling radius min - max	3800 - 4500 mm / 12' 5" 1/2 - 14' 9" 1/4
Max pile diameter, CPD (Cylinder pull down)	2200 - 2500 mm / 7' 3" - 8' 2" ⁽¹⁾
Max pile diameter, WPD (Winch pull down)	2000 - 2500 mm / 6' 7" - 8' 2" ⁽²⁾
Max pile depth friction kelly CPD - WPD	62.0 - 69.0 m / 203' 5" - 226' 5"
Max pile depth locking kelly CPD - WPD	50.5 - 56.5 m / 165' 8" - 185' 4"
Operating weight w/o tool, CPD	65000 kg / 143,300 lbs
Operating weight w/o tool, WPD	67000 kg / 147,700 lbs
CFA (Continuous Flight Auger)	
	T4
Max pile diameter	1.000 mm / 3' 3"
Max length of augers	18.5 m / 60' 8"
Max length of auger extension	6,0 m / 19' 8"
Max pile depth	18 + 6 = 24 m / 59' 1" + 19' 8" = 78' 9"
Extraction force	650 kN / 146,000 lbs
Crowd force on auger (option)	100 kN / 22,500 lbs ⁽³⁾

Notes

(1) tool in front of mast - below mast

(2) with - without bottom mast element

(3) depth reduced by 1.0 m [3' 3 1/2"]

Options and Accessories

Standard equipment

Main winch with special grooving

Hoist limit switch on main rope and service rope

Swivel for main rope

Service rope parking point

Mast inclination measurement on X & Y axes (digital and analog display)

Automatic vertical mast alignment

Depth measuring device on main winch

Rpm measuring device on rotary

Crowd pressure setting

Oscillator attachment brackets

Air conditioning system

Emergency mode of operation for engine

Engine diagnostic panel

Diagnostic panel for hydraulic, electrical and electronic functions

Transport securing lugs on crawler unit

On board lighting set

Electric refuelling pump and hydraulic oil refilling

Front and top cabin protective grate

Radio and music player C/W bluetooth

Phone charger

CCS Comacchio Controlling System

Spinoff and Shaker tool dump systems

Rotary auto speed management & interactive multiple gear

Optional equipment

Biodegradable oil

Freefall auxiliary winch

Central lubrication system

Swivel for auxiliary rope

Main and aux winch load cell

Videocamera set

Vibrator device

Washing kit

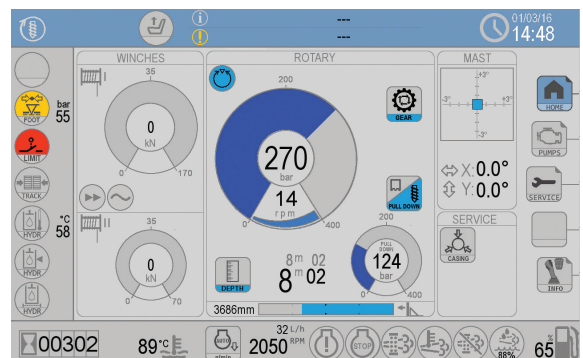
Kelly Bars

Comacchio developed an innovative kelly bar system. Three bar sizes are available with minor changes on the rotary head.

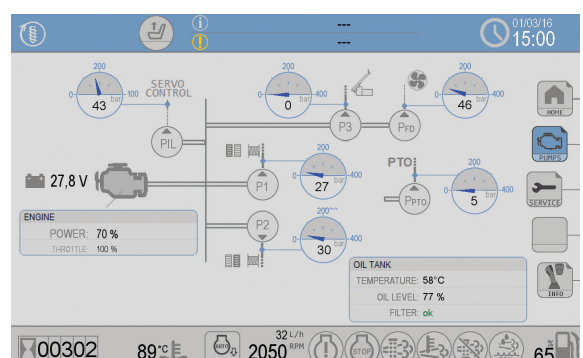


Kelly bar sizes	Outer diameter
L (light)	394 mm / 15 1/2"
HD (Heavy Duty)	406 mm / 16"
XHD (Extra Heavy Duty)	419 mm / 16 1/2"

CCS Comacchio Controlling System



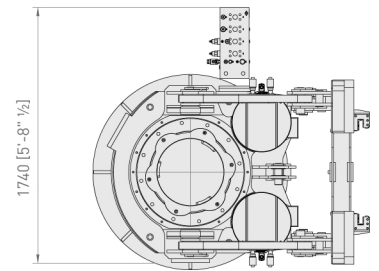
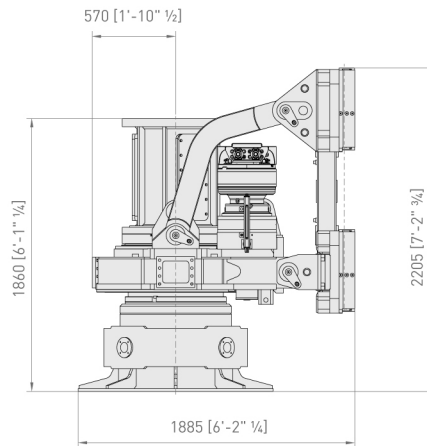
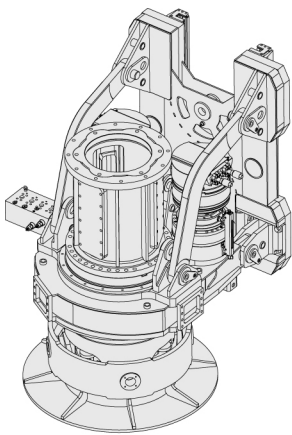
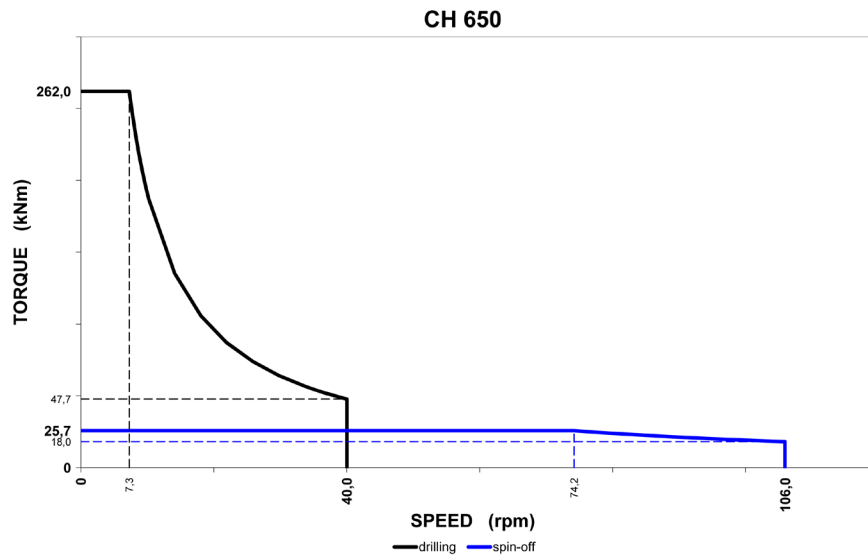
CCS: Home page



CCS: Pumps page

Rotary Head

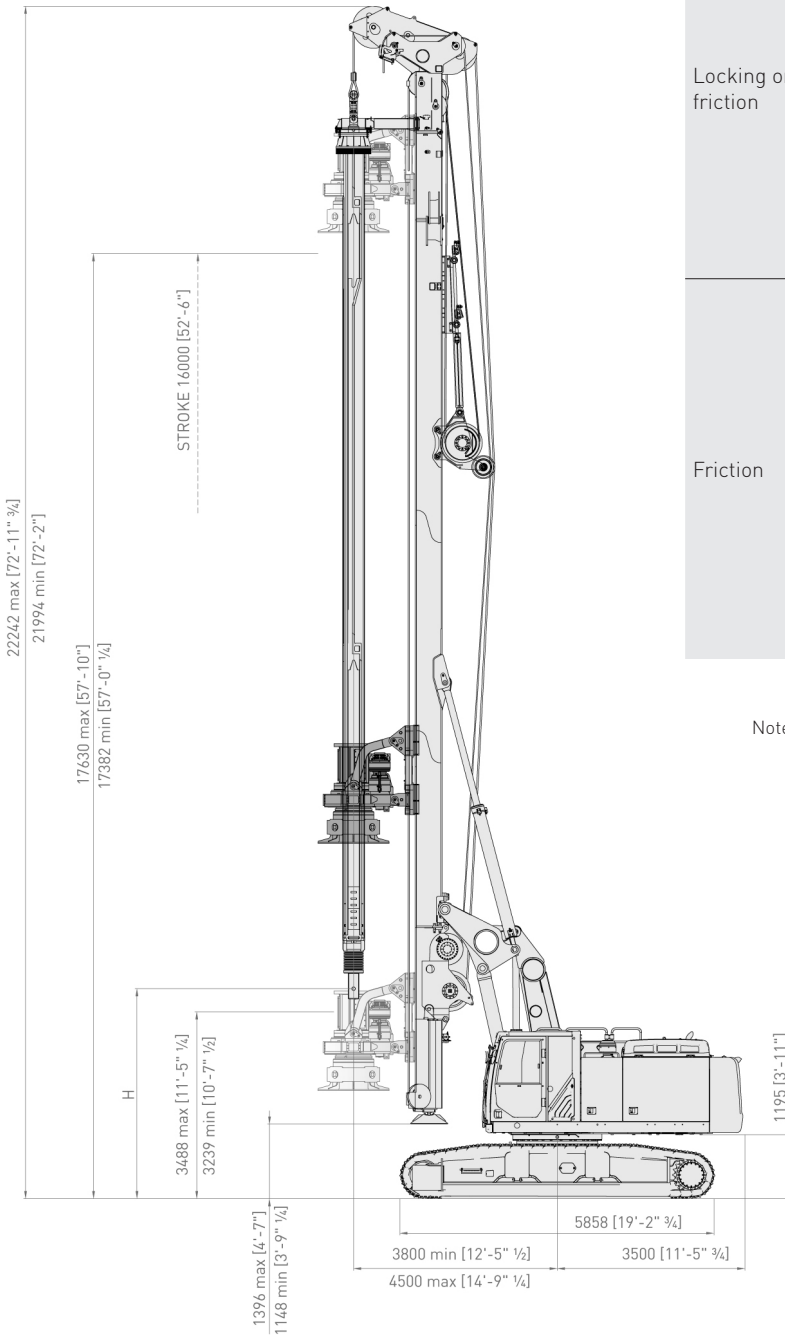
Overall dimensions



Rotary table	
Max torque	225 kNm / 166,000 lbf-ft at 30 MPa / 4350 psi
Nominal max torque	262 kNm / 193,240 lbf-ft at 35 MPa / 5080 psi
Max drilling speed	40 rpm
Hydraulic power	200 kW / 268 HP
Spin-off speed	106 rpm
Replaceable drive sleeve	Yes
Replaceable drive keys	Yes

CH 650 - BP / WPD

Overall dimensions

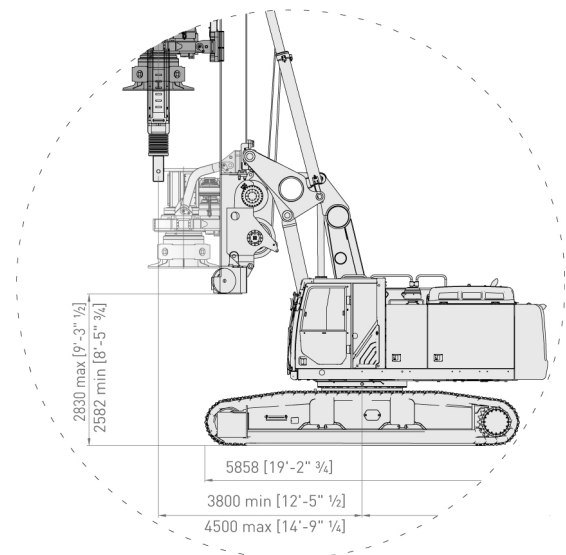


Kelly Bars	Depth (m)	H (m)	Depth (ft-in)	H (ft-in)	
Locking or friction	4 x 8	28,40	10,69	93' 2"	35' 0"
	4 x 9	32,40	9,69	106' 3"	31' 9"
	4 x 10,5	38,40	8,19	125' 11"	26' 10"
	4 x 12	44,40	6,69	145' 8"	21' 11"
	4 x 13	48,40	5,69	158' 9"	18' 7"
	4 x 13,5	50,40	5,19	165' 4"	17' 0"
	4 x 14 *	52,40	4,69	171' 10"	15' 4"
	4 x 14,5 *	54,40	4,19	178' 5"	13' 8"
Friction	4 x 15 *	56,40	3,69	185' 0"	12' 1"
	5 x 8	35,20	10,69	115' 5"	35' 0"
	5 x 9	40,20	9,69	131' 10"	31' 9"
	5 x 10,5	47,70	8,19	156' 5"	26' 10"
	5 x 12	55,20	6,69	181' 1"	21' 11"
	5 x 13	60,20	5,69	197' 6"	18' 7"
	5 x 13,5	62,20	5,19	204' 0"	17' 0"
	5 x 14 *	64,20	4,69	210' 7"	15' 4"
5 x 14,5 *	66,70	4,19	218' 9"	13' 8"	
5 x 15 *	69,20	3,69	227' 0"	12' 1"	

(* self-mounting only if mast foot is installed)

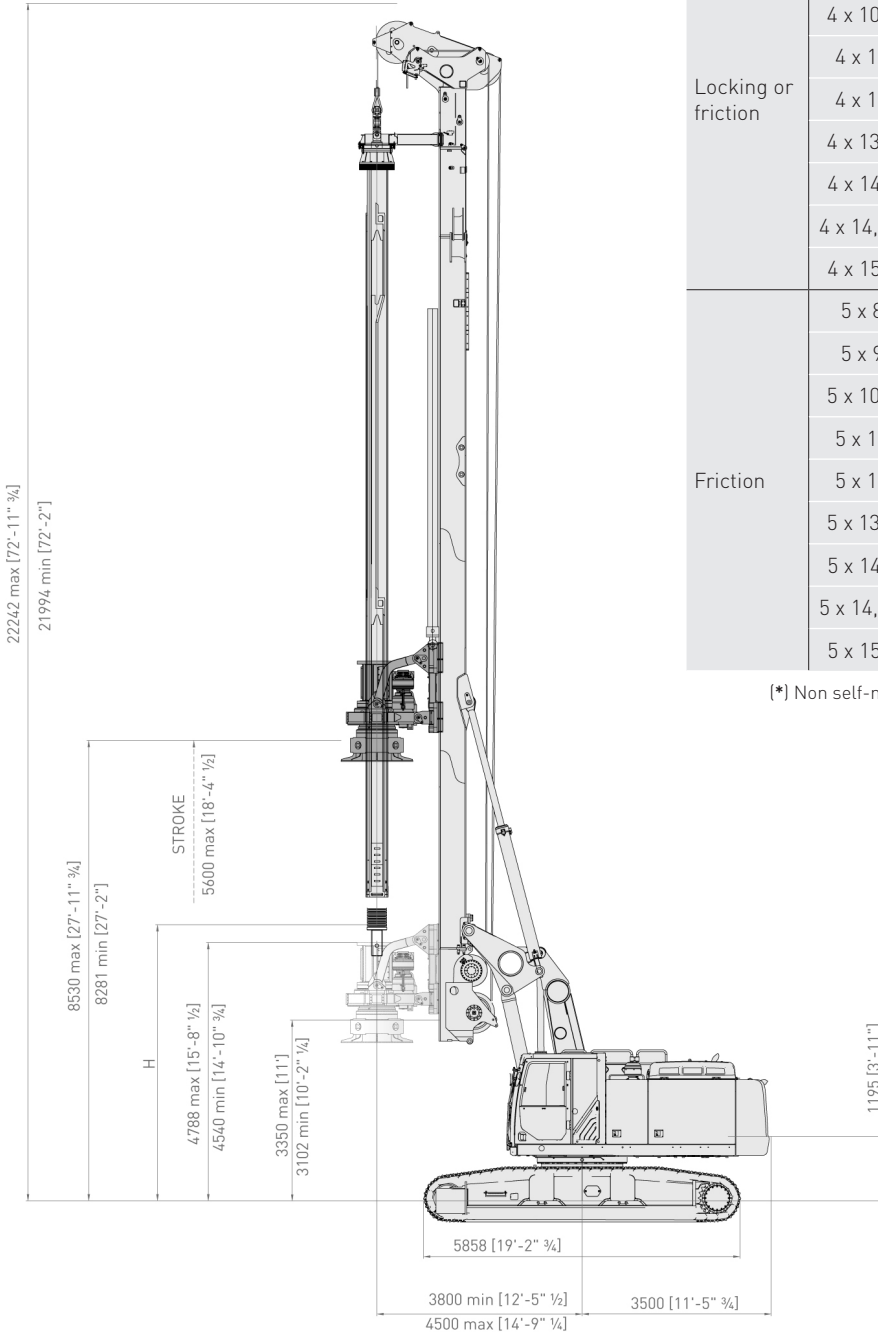
(H) Max height of bottom kelly pin above ground

Note. Depth to be reduced by 1.3 m / 4' 3" in case mast foot is not installed



WPD (Winch Pull Down)	
Stroke c/w mast foot	16000 mm / 52' 6"
Stroke c/w lower reeving box	14700 mm / 48' 3"
Max pull up force	330 kN / 74,200 lbs
Max pull down force	330 kN / 74,200 lbs
Max pull down force on kelly	140 kN / 31,470 lbs
Speed up	36 m/min / 118 ft/min
Speed down	36 m/min / 118 ft/min

Overall dimensions



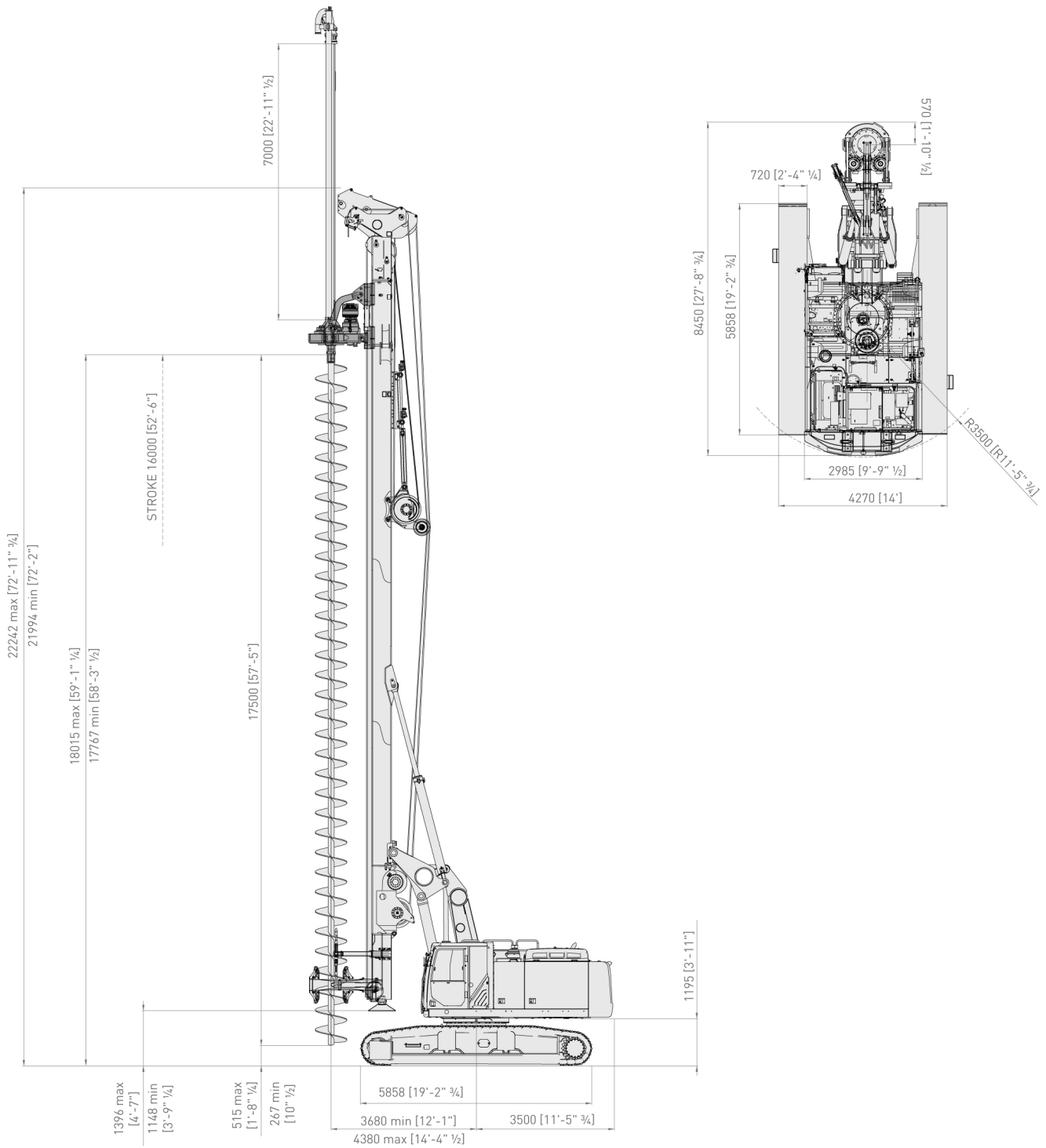
	Kelly Bars	Depth (m)	H (m)	Depth (ft-in)	H (ft-in)
Locking or friction	4 x 8	27,10	10,69	88' 10"	35' 0"
	4 x 9	31,10	9,69	102' 0"	31' 9"
	4 x 10,5	37,10	8,19	121' 8"	26' 10"
	4 x 12	43,10	6,69	141' 4"	21' 11"
	4 x 13	47,10	5,69	154' 6"	18' 7"
	4 x 13,5	49,10	5,19	161' 1"	17' 0"
	4 x 14 *	51,10	4,69	167' 7"	15' 4"
	4 x 14,5 *	53,10	4,19	174' 2"	13' 8"
Friction	4 x 15 *	55,10	3,69	180' 9"	12' 1"
	5 x 8	33,90	10,69	111' 2"	35' 0"
	5 x 9	38,90	9,69	127' 7"	31' 9"
	5 x 10,5	46,40	8,19	152' 2"	26' 10"
	5 x 12	53,90	6,69	176' 10"	21' 11"
	5 x 13	58,90	5,69	193' 2"	18' 7"
	5 x 13,5	60,90	5,19	199' 9"	17' 0"
	5 x 14 *	62,90	4,69	206' 4"	15' 4"
5 x 14,5 *	65,40	4,19	214' 6"	13' 8"	
5 x 15 *	67,90	3,69	222' 9"	12' 1"	

(* Non self-mounting / (H) Max height of bottom kelly pin above ground.

CPD (Cylinder Pull Down)	
Stroke	5600 mm / 18' 4" ft
Max pull up force	280 kN / 63,000 lbs
Max pull down force	200 kN / 45,000 lbs
Max pull down force on kelly	140 kN / 31,500 lbs
Speed up	21 m/min / 68' 11" ft/min
Speed down	20 m/min / 65' 7" ft/min

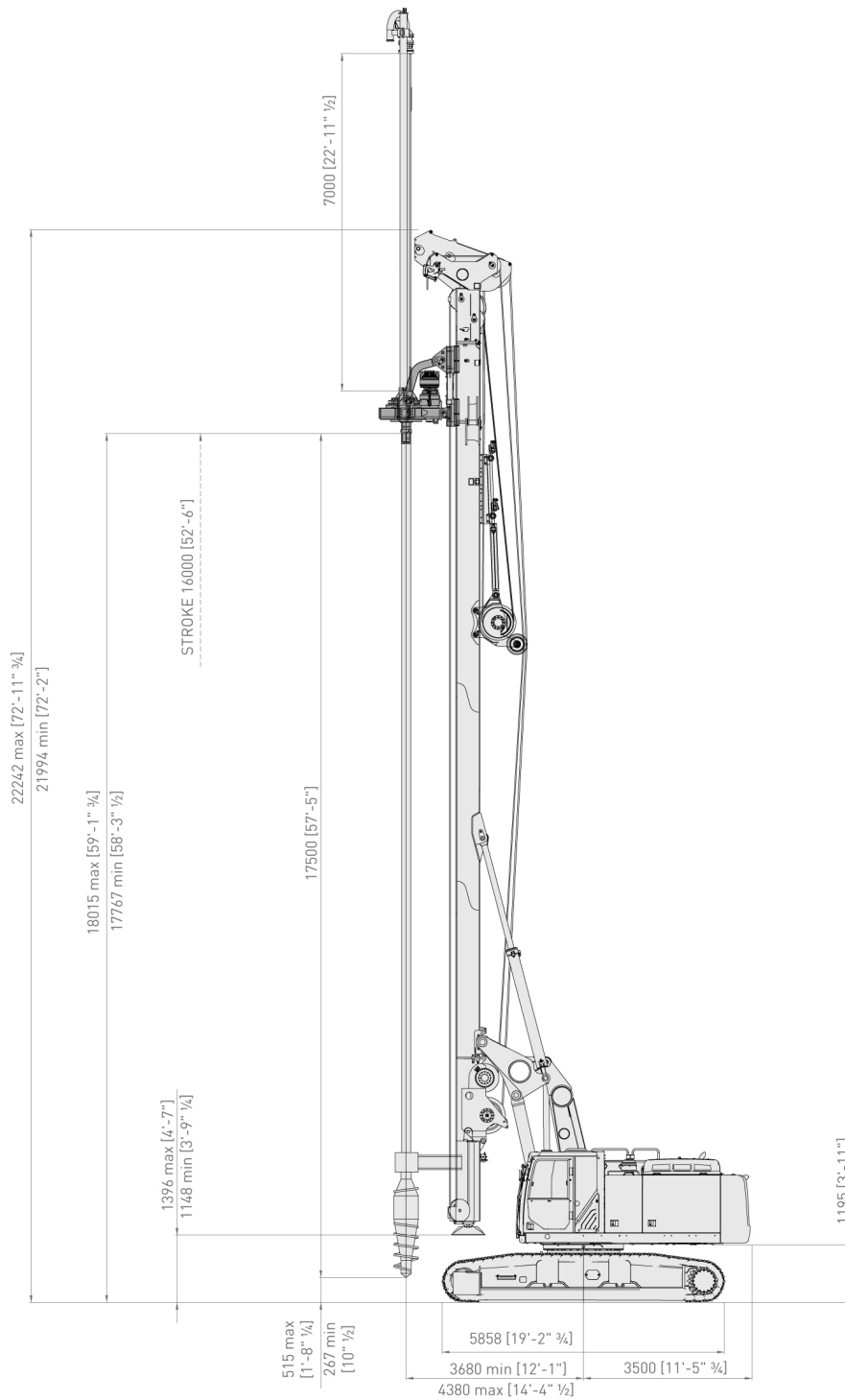
CH 650 - QUICK CFA

Overall dimensions



CFA/WPD (Quick Conversion CFA)

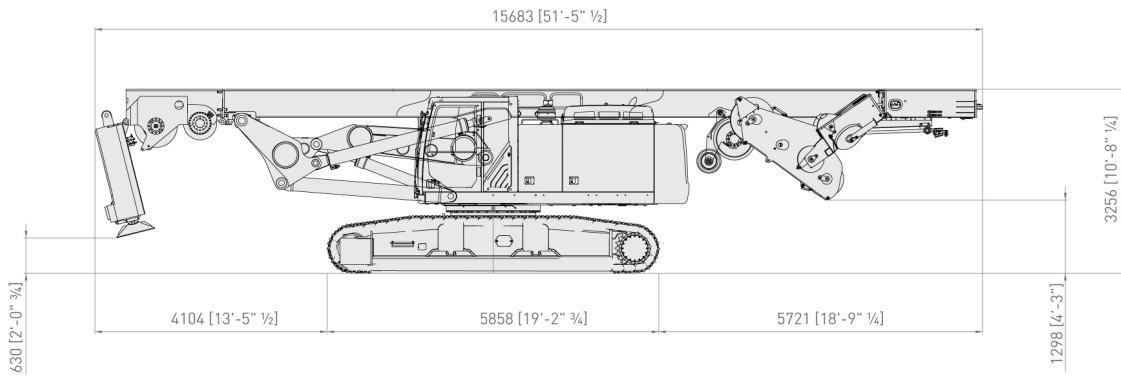
Max pile diameter	1000 mm / 3' 3"
Max length of augers	17.5 m / 57' 5"
Max length of auger extension	7 m / 23'
Max pile depth	15.5 + 7 = 22.5 m / 50' 10" + 23' = 73' 10"
Extraction force	580 kN / 130,400 lbs
Crowd force on auger	140 kN / 31,500 lbs



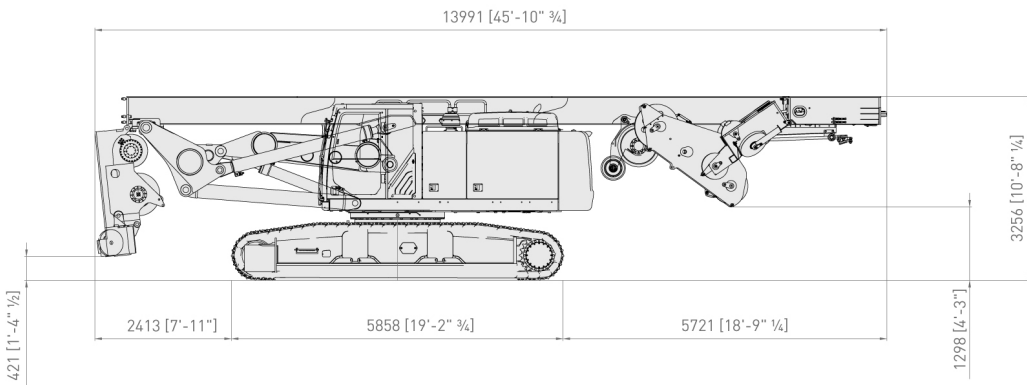
DP [Displacement Piles]	
Max diameter	600 mm / 24'
Max drill string length	17.5 m / 57' 5"
Max length of string extension	7 m / 23'
Max depth	15,5 + 7 = 22,5 m / 50' 10" + 23' = 73' 10"
Max pull down force	140 kN / 31,500 lb

CH 650

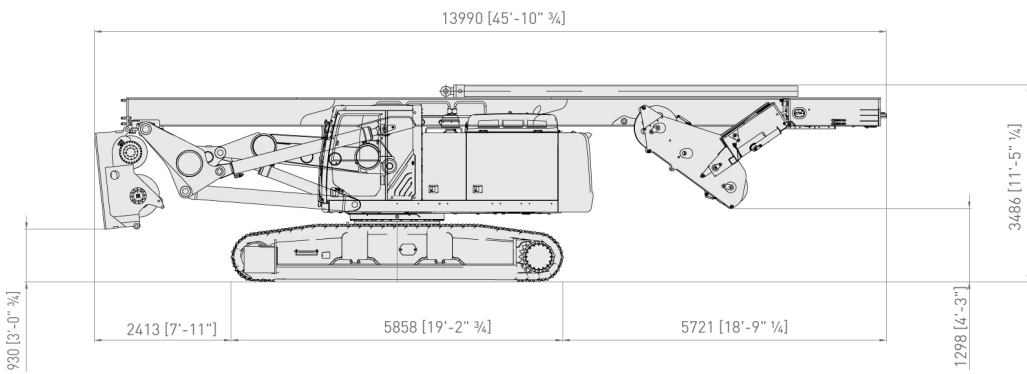
Overall dimensions



WPD



WPD
w/o mast foot



CPD

Weights and dimensions	
Transport width	3000 mm / 9' 10"
Transport height BP - CPD/WPD	3490 - 3260 mm / 11' 5" - 10' 8"
Transport length BP	See drawings above
Transport weight BP - CPD/WPD	5100 - 2300 kg / 112,500 - 116,800 lbs ⁽⁴⁾

Notes CPD and WPD
(4) without rotary, without kelly bar, with counterweight



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