
STEELWRIST
EARTHMOVING EFFICIENCY
Responsiveness
Simplicity
Speed

Steelwrist – the key to unlock your excavator

Enablers and Automation

The core of the Steelwrist product offering includes quick couplers, tilt couplers and tiltrotators that together with the control system make up the foundation for higher excavator efficiency.

Regardless if your need is a safe and robust quick coupler, a more advanced tilt coupler, or the most efficient tiltrotator, we have the solution for you.

We use the patented Front Pin Lock technology as standard which make our products fulfill the highest safety demands in all markets.
Our SQ technology will convert the quick couplers and tiltrotators to automatic quick coupler systems connecting both hydraulics and electrical signals in one movement. No need to get out of the cabin for any tool change.

Quick Couplers

Tilt Couplers

Tiltrotators

Enablers

efficiency!

Work Tools

A job needs a work tool and a work tool needs an excavator - not the other way around. That's the starting point when we think about how to increase your excavator efficiency.

Steelwrist work tools include buckets such as grading-, digging-, cable-, v-ditch-, sorting-, skeleton- and utility buckets as well as rippers, pallet forks, asphalt cutters and grading beams. Our powered work tools include a range of multi-, sorting- and finger grapples as well as sweepers and compactors.

Work Tools

Work Tools

Powered Work Tools

Automation

Control System & Synergy Features


Maths


Max


Michal


Susann


Toni


Peter


Stian

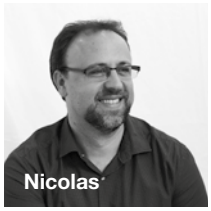

Peter


Henrik


Vincent


Richard


Jaakko


Nicolas


Anders


Sebastién


Jean


Daniel


Mattias


Christian


Alexander


Atle


Sofia


Stefan


Hiro


Rainer


Johann


Claire


Niklas


Tom


Robin


Simon


Brett


Peter


Markus


Fredrik


Joachim


Takahiro


Sami


Jonas


Christian


Heidi


Tony


Pat


Jacob


Hervé


Martin


Luis


Hugo


Jerry


Stefan


Junglae


Darryn


Piotr


Sissi


Roy


Victor


Tim


Alain


Andrew


Wonjo


Erik


Jens


Pierre


Christoffer


Henrik


Jonathan


Therése


Kai


Nicholas


DongHyun

The fastest growing manufacturer of tiltrotators, couplers and work tools in the world

NOW

Open-S – Alliance for fully automatic symmetrical quick couplers

2020

Fully Automatic Quick Couplers (SQ)
Powered Work Tools
Quantum and Tool Recognition

2017

Front Pin Lock

2012

Control System
Work Tools
First OEM agreement

2009

Steelwrist founded
Focus on Tiltrotators and Quick Couplers

2005

Steelwrist People and Values

Responsiveness, Simplicity and Speed

Steelwrist Quick Couplers with Front Pin Lock

With or without integrated oil couplings

Customers are increasingly demanding safer coupler solutions - all over the world. At the same time legislators are raising the bar for what is considered ”safe”. Despite this, work tools are dropped every day on job sites!

Luckily accidents are relatively rare but it is still a problem. When we launched the Front Pin Lock (FPL) technology in 2012 we wanted operator and ground personnel to feel safe during work tool changes. Today, with thousands of couplers in the field, the result has been a higher safety level and a robust solution cast in steel.

- Steel casted
- Locked front pin - maintains the bucket in a safe position
- Best in class hydraulic flow characteristics
- EN474, ISO13031 and SUVA compliant
- Expander pins

Front Pin Lock

With the Front Pin Lock technology it is possible for the operator to see when the work tool is in a safe position. Thanks to the mechanical FPL safety we are not sensor dependant and it works equally well with all types of excavators regardless if the excavator is small, large, new or used.

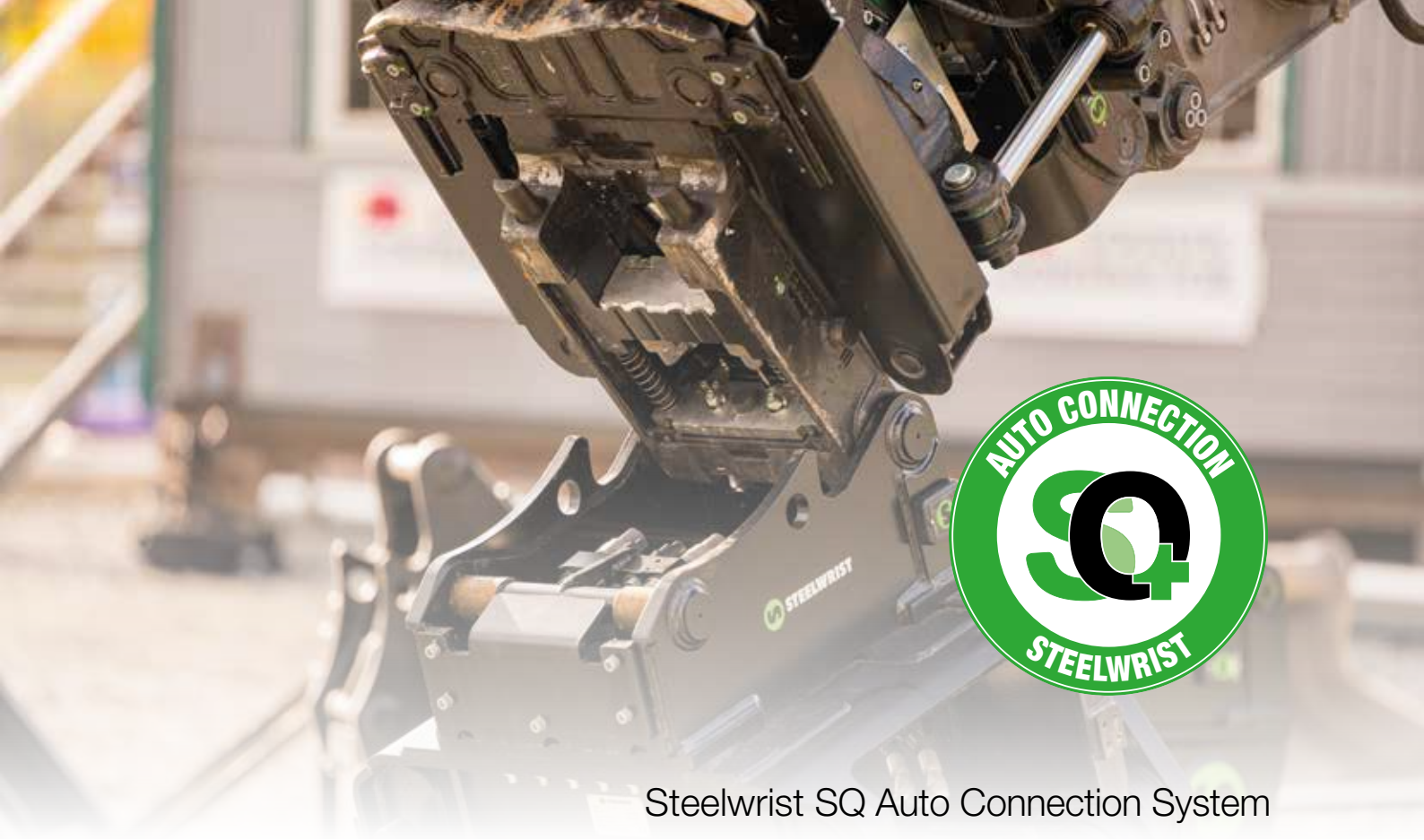
With Steelwrist entrance into the demolition segment the Front Pin Lock has been upgraded to a second generation in order to support the heavy demolition work tools.

SQ coupler

Machine Weight	Machine Quick Coupler	Building Height	Weight excl. pins	Max Oil Couplings
Symmetrical				
< 5500	**S30/180**	3,2"	33 lbs	–
4400-13200	**S40**	3,9"-4,7"	66/77 lbs	–
11000-26500	**S45**	4,7"	154 lbs	–
11000-26500	**S50**	4,7"	154 lbs	–
26500-44100	**S60**	5,3"-6,7"	265 lbs	–
39700-72700	**S70**	6,9"-7,9"	551 lbs	–
55100-94800	**S80**	9,1"	860 lbs	–
Symmetrical Fully Automatic				
26500-44100	**SQ60-4**	5,3"-6,7"	265 lbs	4
26500-44100	**SQ60-5**	5,3"-6,7"	265 lbs	5
30900-48500	**SQ65**	6,3"	551 lbs	5
39700-72700	**SQ70**	6,9"-7,9"	551 lbs	5
39700-72700	**SQ70/55**	6,9"-7,9"	551 lbs	6
55100-94800	**SQ80**	9,0”	926 lbs	6
88200-154300	**SQ90**	10,4”	1653 lbs	9

Positive lock indicator - green indication when the work tool is in a safe position

Negative lock indicator – the red indicates when the coupler is open



Steelwrist SQ Auto Connection System

Changing powered work tools in seconds

The demand for productivity is constantly rising and in some applications the need for quick tool changes is almost continuous.

With Steelwrist SQ technology you change between hydraulic powered work tools as well as mechanical work tools in only seconds – all without leaving the cabin!

In 2017 we introduced our patented Qplus™ technology (Pat.Pend.) which radically changes the ”inside” of the hydraulic couplings.

Open standard

We believe in open standard interfaces, so the SQ system is designed to be able to connect to other brands using the same type of oil connection system.

Steelwrist Qplus™ is the label we have put on all the improvements we have developed compared to competitor solutions. Higher flow, more uptime and improved serviceability are the main benefits for the operator.

Qplus™ - Higher flow!

With Steelwrist Qplus™ the flow area measure up to 37 percent more compared to competitor products (depending on coupling size).

Qplus™ - More uptime!

Steelwrist Qplus™ sealing technology is completely new and significantly more durable compared to competitor products. This will give you more hours in operation before sealings have to be changed.

Qplus™ - Improved serviceability!

Changing seals in Steelwrist Qplus™ couplings is done fast and easy without need for proprietary and complicated tools.

Steelwrist Tiltrotator

The most compact and optimized tiltrotator on the market

Our core values are responsiveness, speed and simplicity. This coupled with a rigorous attention to detail has allowed us to take the leading technology role within the business.

SQ Technology

All our tiltrotators from X18 and upwards can be equipped with our SQ full automatic technology. Either on the top side (upper coupler) of the tiltrotator for rapid change between tiltrotator or other work tools.

SQ on the bottom side (attachment coupler) of the tiltrotator will allow for rapid change between hydraulic powered work tools, or why not sandwich with SQ on both top and bottom.

High Flow Hydraulics

Steelwrist high flow swivel is raising the bar for compact high flow hydraulics. This will allow you to use powered work tools like never before or just your tiltrotator in a more fuel efficient way. The high flow swivel can also include an electrical connection that can control valves on a work tool below the tilt-rotator. Central lubrication can also be automatically connected to a work tool below the tiltrotator.

The Gripper

An integrated gripper is an amazing tool that increases your productivity even further. The gripper opens widely, closes almost entirely, has robust cylinder covers and does not interfere with excavation. Of course, it can be retrofitted.

- High 45° tilt angle
- Direct fit or Sandwich
- Steel casted
- Vertical tilt cylinders that allow digging in narrow trenches
- Lowest building height in the market
- Robust gripper cylinder covers
- Four finger gripper (X12 and up)

- Grease lubrication for longer life time and connection to central lubrication
- Coupler with Front Pin Lock for safe tool changes
- High flow hydraulics
- Load holding valves

FRONT PIN LOCK
STEELWRIST

Machine Weight	Tiltrotator	Building Height (from)	Weight (from)	
0-4400 lbs	**X02**	10,2"	132 lbs	Q4 2020
4400-8800 lbs	**X04**	13,5"	254 lbs	
8800-13200 lbs	**X06**	13,1"	298 lbs	
11000-15400 lbs	**X07**	15,6"	430 lbs	
15400-26500 lbs	**X12**	16,7"	628 lbs	
22000-30900 lbs	**X14**	17,9"	838 lbs	
26500-39700 lbs	**X18**	18,0"	882 lbs	
35300-44100 lbs	**X20**	20,0"	981 lbs	
39700-57300 lbs	**X26**	21,1"	1257 lbs	
55100-72700 lbs	**X32**	24,6"	1852 lbs	

Steelwrist Tilt Couplers

When a robust tilt function is enough

Tilt Coupler

The Steelwrist tilt coupler is a combination between a robust tilt motor and the patented Front Pin Lock technology from Steelwrist.

With the Steelwrist tilt coupler you will get a safe quick coupler solution when you just need the tilt function and not the full blown tiltrotator functionality.

The Steelwrist tilt coupler is based on the steel casted coupler as well as the robust direct fit top with expander pins.

- Front Pin Lock coupler for safe work tool changes
- Hose free internal channels to locking cylinder
- Large contact surfaces to work tool thanks to steel casting

TCX

The TCX - a tilt function for the smallest excavators. Available as Direct mounted with S30/180 coupler, both manual snap-on or hydraulic.

- Expander pins
- Up to 2x90° tilt angle
- Overload protection with cross-over valves

Machine Weight	Tilt Coupler/ TCX	Tilt Angle	Building Height	Weight excl pins
0-6600 lbs	**TCXS30/180**	±30°	76,3"	62 lbs
4400-13200 lbs	**PT050/S40**	±90°	13,7"	210 lbs
11000-15400 lbs	**PT070/S40**	±90°	15,0"	320 lbs
11000-26500 lbs	**PT100/S45**	±90°	17,6"	463 lbs
11000-26500 lbs	**PT100/S50**	±90°	17,6"	463 lbs
26500-44100 lbs	**PT180/S60**	±60°	19,5"	794 lbs
26500-44100 lbs	**PT180/SQ60-5**	±60°	19,5"	838 lbs
39700-52900 lbs	**PT240/S70**	±60°	23,4"	1367 lbs
39700-52900 lbs	**TC240/SQ70**	±60°	23,46"	1433 lbs

Steelwrist GEOfit and SQ Adaptors

Connecting work tools efficiently

Connecting the tiltrotator or work tools in an efficient way is always a good idea. Regardless if you are looking to safeguard proper maintenance by connecting to a central lubrication system, or if you are chasing seconds when changing work tools we have the solution that you need.

SQ adaptors

The main reason to go for SQ couplers or a tiltrotator with SQ bottom is when the work requires many work tool changes. Regardless if you need an adaptor plate or a weld on bracket we have the cost effective brackets that you need.

All male couplings in the SQ adaptors includes the Qplus™ technology giving your work tool higher flow capabilities and more uptime. Our SQ adaptors build on the Symmetrical (S-type) standard with the addition of oil couplings. Steelwrist SQ adaptors therefore work perfectly with other manufacturers having the same dimensions and positions.

GEOfit

GEOfit (Grease, Electricity, Oil) connects the hydraulics, electrics and central lubrication to your excavator with a simple connection.

Weld on S-type adaptors

Pendulum Adaptors

Weld on SQ adaptors - low

Weld on SQ adaptors - high

SQ adaptor plate for internal hoses

SQ adaptor plate with manifold

GEOfit - Manual coupling

Product	Connection	Hydraulic	Electronics	Grease
GEOfit	Manual	2	Up to 10 pins	Yes
SQ60-4	Auto	4	Up to 14 pins	Option
SQ60-5	Auto	5	Up to 14 pins	Option
SQ65	Auto	5	Up to 14 pins	Option
SQ70	Auto	5	Up to 14 pins	Option
SQ70/55	Auto	6	Up to 14 pins	Option
SQ80	Auto	6	Up to 14 pins	Option
SQ90	Auto	9	Up to 14 pins	Option

Steelwrist Control Systems

Connected system for highest uptime

Steelwrist supply two types of control systems, both do the job, both comply with all regulations and both will increase your efficiency.

The four hose proportional machine control is the more basic system (see Hard facts page 24).

The Quantum platform

Multifunctional ergonomic joystick, simultaneous usage of all functions, remote support and individual profiles for all operators or work tools - all key features to unlock the true efficiency of your excavator. All these are obviously standard in our Quantum platform.

With the Quantum app on your smartphone or display in the cabin you will manage settings in a user friendly way.

Add on functionality like joystick steering, track steering, boom swing control or blade control when needed.

Positioning System

- Direct link to your Machine Control System
- Clinometer for tilt and rotation angle indication
- Autotilt

Remote Support

- One click away from online support
- Upgrades online

Tiltrotator Control

- Simultaneous use of all functions
- Based on technology and know-ledge from more than 55 000 tiltrotator installations

Steelwrist Tool Recognition

Automatic optimization and tracking

Data to your Machine Control System

The basic idea behind the Quantum based Tool Recognition (ToolRec) is a system that automatically detects the work tool which is connected to the excavator. This information can be used by any of our partner systems that you use in your everyday work - Machine Control System, Weighing System, Tiltrotator Control System etc.

Automatic tiltrotator settings

As standard function in our Quantum system each work tool (ToolRec module) can be configured with custom tiltrotator settings. This helps the operator to always optimize tiltrotator performance.

Easy to add new work tools

Setting up a new work tool in Quantum ToolRec is very easy. Just mount the ToolRec Module on the work tool, open the Quantum app and tap the new work tool that appears automatically. Name the work tool to your liking and it is now available to any supporting system.

Keep track of your work tools

With Tool Recognition you will have the option to localize your work tools on the workplace as they are tracked. We monitor both the physical position as well as utilization. If you have regular service intervals on your work tools we can automatically call your attention to when the service is due.

Grapples for your everyday tasks

Steelwrist grapples are made to last and to make your day easy, although each model has its specialized purpose, all are still extremely useful for multipurpose use. You choose the grapple that fits your needs, but you will end up using it for many more tasks.

Multi Grapples

Application areas are general purpose and log handling such as heavy lifting, stone laying, sorting, loading of cut-to-length timber and waste wood handling.

By-passing jaws that close fully, so that also thin objects can be handled with ease. Hardox 500 in all wear plates and optimized roll in/roll out geometry for log handling.

	Machine Weight lbs	Grapple	Gripper Area inch²	Opening width inch	Max Load lbs	Weight lbs
Multi grapple	6600-13200 lbs	**MG20**	310 inch²	53,4"	6615 lbs	423 lbs
	13200-26500 lbs	**MG25**	388 inch²	59,6"	11025 lbs	688 lbs
	17700-35300 lbs	**MG32**	496 inch²	70,9"	13227 lbs	904 lbs
	26500-30900 lbs	**MG40**	620 inch²	76,3"	15432 lbs	1237 lbs
	41900-57300 lbs	**MG55**	852 inch²	95,8"	22045 lbs	1916 lbs
Sorting grapple	13200-26500 lbs	**SG20**	310 inch²	49,2"	6615 lbs	437 lbs
	17700-35300 lbs	**SG25**	388 inch²	67,2"	13227 lbs	831 lbs
	22000-44100 lbs	**SG32**	496 inch²	72,1"	15432 lbs	1190 lbs
	35300-57300 lbs	**SG40**	620 inch²	86,8"	17363 lbs	1581 lbs
	48500-70500 lbs	**SG55**	852 inch²	106,7"	26455 lbs	2795 lbs
Finger grapple	13200-26500 lbs	**FG20**	310 inch²	54,7"	6615 lbs	483 lbs
	17700-35300 lbs	**FG25**	388 inch²	61,1"	13227 lbs	897 lbs
	2000-44100 lbs	**FG32**	496 inch²	71,8"	15432 lbs	1389 lbs
	35300-57300 lbs	**FG40**	620 inch²	77,0"	17363 lbs	1596 lbs

- Tip-to-tip closing
- Mechanical end-stops
- Turnable and bolted cutting edges in HB500 steel

Sorting Grapples

Application areas are the tougher tasks as large rock handling, recycling, scrap, sorting and medium duty demolition work.
High clamp force and wide opening give you the flexibility that you need.

Finger Grapples

A heavy duty five or seven finger universal grapple where dedicated application areas are handling of stumps, debris, scrap and forest residue.

Common features between all models:

- Wide opening. Also available with SQ top, or other standards as S-type, CW-type and HS-type
- Expander pins
- Dual guide bars
- Integrated load holding valves
- 5° bracket angle to make grapple level with tiltrotator rotation plane
- High clamp force

- By-passing jaws
- Hardox 500 in all wear plates and hard face
- HB500 welding in jaws for long life time
- Wide opening and full closure

Steelwrist Powered Work Tools - Compactor

Compaction made easy

Steelwrist Compactors are designed for quiet, safe, comfortable and maintenance free compaction of soil, pipeline trenches, embankments, pits and shafts.

The low height and off-center bracket position increase the reach and you can use the compactor under obstacles and in other narrow positions.

The open design allows the compactor plate to self-clean and prevent backfill material to jam the compactor.

The angled housing design and rubber buffers provides optimum force distribution for the compaction work and makes it possible to use in rough terrain. The 15° angle also reduce stress on the rubber buffers resulting in less wear.

Additionally the job site safety level is improved as the need for personnel directly in the work area is reduced.

- 15° housing for best force distribution
- Pressure and flow rate control for overload protection
- Off centre bracket position allows for compaction under obstacles
- Bolt on top brackets available with S-, SQ-, CW- and HS-type standards
- Excenter motor permanently lubricated
- Low noise motor and rubber buffers reduce oscillation to the operator's cabin

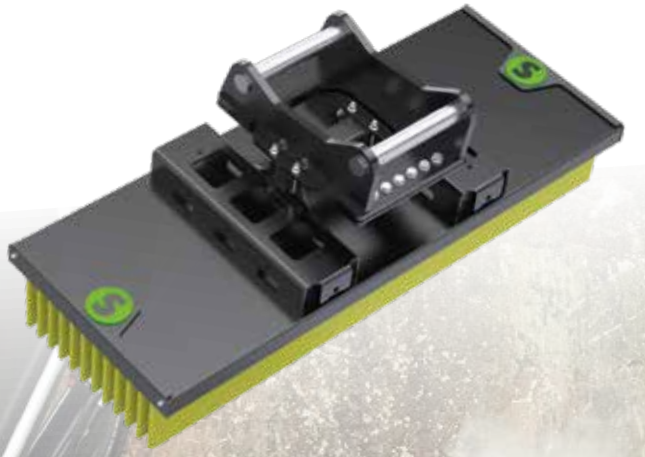
Machine Weight	Comp-actor	Force kN	Flow gpm	Weight lbs
4400-13200 lbs	**HC20**	20	6,8-11,4	551 lbs
11000-26500 lbs	**HC40**	40	13,6-18,2	853 lbs
22000-48500 lbs	**HC60**	60	20,4-27,2	1367lbs
35300-66100 lbs	**HC90**	90	27,2-31,8	2136 lbs

High performance excavator sweeper

Regardless if you have a need for cleaning pavements, cable trenches, railway switches, tram tracks, roofing, containers, flooding or other disaster areas from debris, material or snow, the Steelwrist sweeper range give you the tool to take on the job.

Instead of using manual shovels, snow plows or other similar work tools the Steelwrist sweeper range will give you access to the work area in a completely different and much more effective way.

Dual direct drive hydraulic motors safeguard the torque needed for efficient brushing and together with Beeline brushes, a long lifetime.



The mechanical fixed brush can easily be used under the tiltrotator.

- Works great with our SQ technology
- Dual direct drive hydraulic motors
- Bolt on top brackets available with S-, SQ-, CW- and HS-type standards
- Integrated parking stand
- Mudflap as standard

Model	Width	Weight	Motor	Option	Flow req.
SW1000	39 inch	375 lbs	Dual Motor Direct Drive	Twisted core cartridge brushes	11-34 gpm
SW1500	59 inch	441 lbs	Dual Motor Direct Drive	Twisted core cartridge brushes	11-34 gpm
SW2000	79 inch	551 lbs	Dual Motor Direct Drive	Twisted core cartridge brushes	11-34 gpm

Digging buckets

- Hardox 500 material in all wear plates
- 30° cutting edge angle
- CAT J-style tooth system

V-ditch buckets

- Hardox 500 material in all wear plates

Grading buckets

- Rounded back without corner for easy fill/empty cycle
- Conical shape for work with tiltrotator
- Hardox 500 material in all wear plates
- 20° cutting edge angle
- Cutting edge in HB 500 material

Steelwrist Buckets and Work Tools

Lighter, more durable, more affordable

Our buckets are constantly evolving based on customer feedback and we are now on our forth generation. The main benefits are even further optimized geometry and volumes.

High grade steel allows us to make a more wear resistant bucket without increasing the weight.

Thanks to the sharp growth of our bucket business we have acquired economies of scale in production - the benefit for you is that we can offer high quality buckets at a more affordable price.

Most work tools we have on stock for fast delivery.

Sorting buckets

- Hardox 500 material in all wear plates
- 500 Brinnell steel rods

Skeleton buckets

- Hardox 500 material in all wear plates

Cable/Trench buckets

- Hardox 500 material in all wear plates
- Cutting edge in HB 500 material
- 30° cutting edge angle

Utility buckets

- Hardox 500 material in all wear plates
- Cutting edge in HB 500 material
- Dimensions for working in water and sewage applictions
- 30° cutting edge angle

Ripper S40 to S70
6600-66100 pounds excvators

Pallet forks for
6600-66100 pounds excvators

Asphalt cutter for
6600-66100 pounds excvators

Grading beam
6600-66100 pounds excvators

Steelwrist Buckets and Work Tools – Custom Build

Design your own buckets!

If I only had that specific bucket shape then I would be able to do this job much faster...
Ever had that feeling?

We know that many experienced operators may have specific needs! As a technology leading work tool supplier we have the tools available so that you can design your own custom built bucket online. Super easy!

Visit our homepage at steelwrist.com/custombuild and design your own bucket.

You can shape the bucket to your own desire, add teeth and determine material specifications. Price will adjust automatically depending on your choices. Once you have fixed the design and paid we will manufacture the bucket and ship it to the address of your choice.

steelwrist.com/custombuild

Steelwrist support

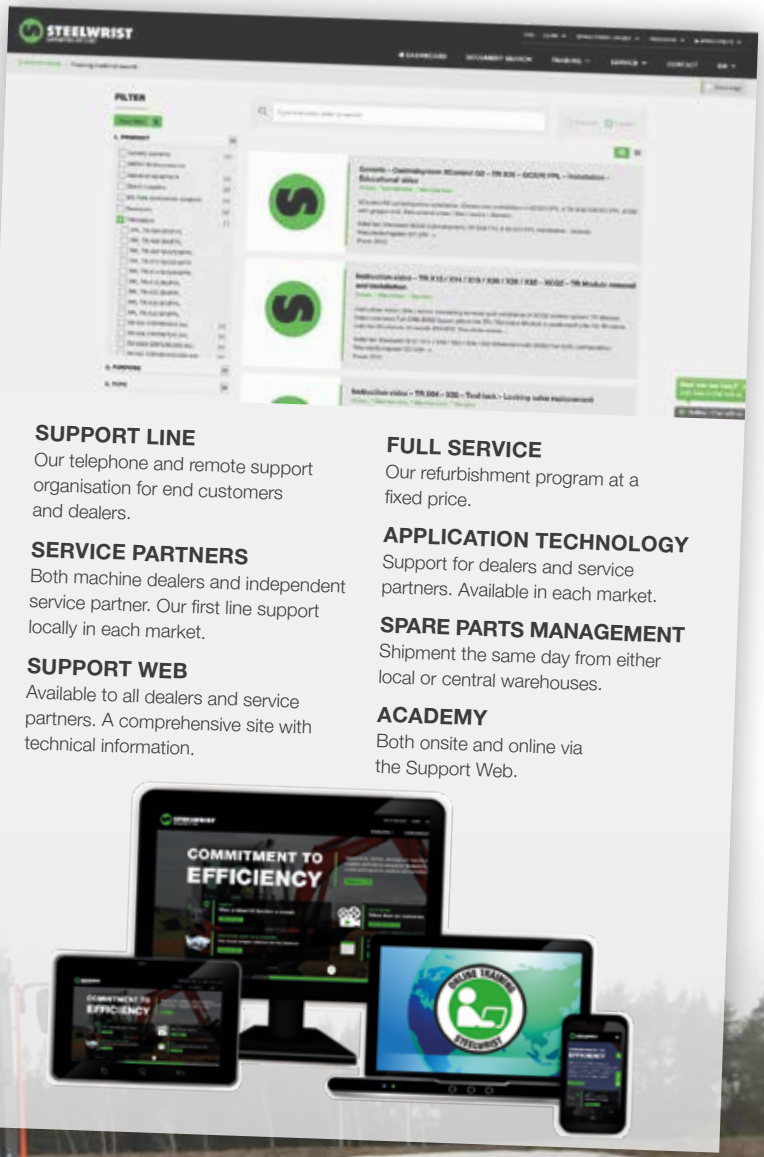
Fast service wherever you are

What do you do when the unexpected happens and something is broken?

We train and support our dealers for the best service. This means that you get help as soon as something happens. If your dealer does not have the part in stock, we can dispatch from one of our regional warehouses.

With the Quantum platform we can also connect to your system directly from our support line. Steelwrist support is built around a number of core concepts in order to give both end customers and Steelwrist dealers the best possible support, 24/7.

With product registration you get two year warranty.



SUPPORT LINE
Our telephone and remote support organisation for end customers and dealers.

SERVICE PARTNERS
Both machine dealers and independent service partner. Our first line support locally in each market.

SUPPORT WEB
Available to all dealers and service partners. A comprehensive site with technical information.

FULL SERVICE
Our refurbishment program at a fixed price.

APPLICATION TECHNOLOGY
Support for dealers and service partners. Available in each market.

SPARE PARTS MANAGEMENT
Shipment the same day from either local or central warehouses.

ACADEMY
Both onsite and online via the Support Web.

About tiltrotators

Although the tiltrotator was first invented in the late 1980's the technical development pace is today extremely high. The market penetration varies a lot between the most advanced markets where above 90% of all excavators have a tiltrotator, to start-up markets where only the true first movers looking for increased efficiency are active.

If you are an experienced user then you probably know what you want, but if you are in the process of investing in your first tiltrotator then here are some basic "good to know" facts that we hope will give you guidance to the best solution for you. Also check out "Ten tips when choosing a tiltrotator" on our homepage.

About quick coupler standards

The overall regulation for how quick couplers should be designed and controlled can be found in the standard ISO13031:2016, although local regulations may exist. ISO13031 divides quick couplers into three allowed types being Form-locked, Force-locked and Wedge-locked. Each type has it's specific safety requirements.

Quick couplers can also be divided into Universal (force-locked) and Dedicated (may be form- or wedge-locked). The idea behind the Universal couplers is that they are supposed to pick up the excavator's original bucket. However since all excavator manufacturers have different linkage dimension (width, pin c-c distance and pin diameter) the universal couplers can often pick up buckets from several different manufacturers.

The advantage with universal quick couplers is that they are easy to start with. However, they normally have a high building height, are heavy with a relatively limited surface area to the bucket pin which normally increase wear, increase fuel consumption and reduce break out force at the tooth point.

Several different types of Dedicated systems exist. They have in common that they are not trying to pick up the excavator's original bucket but instead all have a dedicated and standardized bucket interface. The advantage with dedicated couplers is that they are normally compact and lighter in design, however the bracket of the original bucket needs to be changed.

In more advanced markets where a dedicated standard is well established normally all buckets with new machines are delivered with standard coupler and a set of buckets with the corresponding bracket.

All Steelwrist products are available with interfaces following the symmetrical standard. However we also deliver products with Universal couplers as well as the Dedicated Lehnhoff (HS), Verachtert (CW) and Bofors. All SQ products follow the symmertical standard.


Symmetrical


Universal


Verachtert


Lehnhoff

Quick Coupler	Market area	Origin	Type	Standard	Function	Direct fit tiltrotator	Sandwich tiltrotator	Oil Couplings
Symmetrical	International	Scandinavia	Dedicated/ Wedgel locked	Open standard	Compact, light weight, growing internationally	Yes	Yes	Option
Universal	International	UK, Australia, New Zeeland	Universal/ Force-locked	N/A	Entry level coupler, high, heavy, important in Anglo-saxon markets	Yes	N/A	N/A
Verachtert CW	Mainly Holland and Belgium	Holland	Dedicated/ Wedge-locked	Verachtert/ Caterpillar	Heavy, safe	Yes	N/A	N/A
Bofors NTP	Finland	Sweden	Dedicated/ Wedge-locked	Open standard	Compact, need manual shiming, developed in 60's	Yes	Yes	N/A
Lehnhoff HS	Germany	Gemany	Dedicated/ Wedge-locked	Lehnhoff/ Komatsu	Relatively compact, light weight - strong in Germany	Yes	Yes	Option

About Direct fit vs. Sandwich

Direct fit
In a direct fit configuration the tiltrotator is permanently mounted to the dipper arm of the excavator. Direct fit is common on compact excavators, and on couplers with high building height like CW and Universal.

Sandwich configuration
In a sandwich configuration the machine's quick coupler is first mounted on the dipper arm of the excavator. The top of the tiltrotator then has the same type of bracket as a bucket which means that it can be picked up with the machine's quick coupler. This is often used for excavators of 30 900 pounds and above and where work tools like hydraulic breaker is used frequently.

About Control Systems

In general two types of control systems exist for controlling the tiltrotator on an excavator.
Four hose systems (or variants thereof) where the tiltrotator has on/off valves and the flow is controlled solely from the excavator. Four hose systems are often used for compact excavators as it is less costly and often good enough for the average compact excavator.

However the more demanding customers on mid size excavators often choose two hose systems because of the possibility to use all functions simultaneously, a more fine tuned solution. In two hoose systems the tiltrotator control systems takes care of it all.

Both four hose and two hose systems can be connected to Machine Control Systems like Leica, Topcon, Trimble and Novatron. The two hose systems are often further enhanced by adding joystick steering for both wheeled and tracked excavators, as well as boom swing control and blade control etc.

Four hose system

Excavator hydraulics	Tiltrotator (TR)			Comment
	Control System	Function	Valves in TR	
Circuit 1, dual direction, proportionally controlled from the excavator, original joysticks must have rollers or similar.	–	Rotation	On/Off (non directional)	Rotation controlled directly from the machine. Flow control depending on excavator hydraulics.
Circuit 2, dual direction, proportionally controlled from the excavator, original joystick must have rollers or similar.	On/Off control	Tilt	On/Off (non directional)	Tilt, extra functions and lock share the same circuit, and only one function can be used at the same time. Flow control depending on excavator hydraulics.
		Extra 1 (gripper option)	On/Off (non directional)	
		Extra 2 (work tools)	On/Off (non directional)	
		Coupler lock	On/Off (non directional)	

Two hose system

Excavator hydraulics	Tiltrotator		Comment
	Control System	Function	Valve type	
One circuit, single direction. Original joysticks will be replaced with Steelwrist joysticks with rollers.	Proportional control with compensation if several functions run simultaneously.	Rotation	Proportional (directional)	All functions can be used simultaneously.
		Tilt	Proportional (directional)	
		Extra 1 (gripper option)	Proportional (directional)	
		Extra 2 (work tools)	Proportional (directional)	
		Coupler lock	On/Off (non directional)	

About oil flow vs pressure drops

We often get questions like:
- I have a work tool that needs 120 liters of oil, can I run it below the tiltrotator?

This is a more complicated question than it may seem at first glance. Let us walk you through the facts.

All hydraulic systems have internal resistance, which is correctly called pressure drop. Hydraulic systems with over-dimensioned hoses, large valves and straight channels have low internal resistance whereas hydraulic systems with under-dimensioned hoses, small valves and many sharp angles have higher internal resistance. The internal resistance in the system will define how much flow you can get through the system at any given pressure. So far quite straight forward and intuitive.

The relationship between pressure and flow is however exponential. If you want to increase flow you will need to increase the pressure exponentially. At very low flow, the additional pressure needed to get "X" liter in addition is not that much. However, in the same hydraulic system already at high flow, the pressure needs to be increased a lot in order to get the same amount of "X" in increased flow.

As a result it is possible to plot the relationship between pressure and flow. This will show how many liters per minute you can get through the system at a certain pressure level. For the sake of argument let's call this the Operating Limit Curve. We also need to add a second line describing the hydraulic pressure limit the machine can be used at. In most cases this pressure is always the same, independent of the flow. Let's call this one the Maximum Pressure Curve. The defined area in between the Operating Limit Curve and the Maximum Pressure Curve, is where the machine will work. Let's call this the Working area.

An example - let's say you have a maximum pressure of 200 bar and you rotate an hydraulic sweeper in the air as fast as you can. You would get 80 liters per minute through the system at point A. Now you engage the sweeper with the ground and start working.

Depending on how much you lower the boom and push the sweeper to the ground, the torque needed to the driver shaft of the sweeper increases. Let's say you push it so the motor needs 130 bar for the torque. The pressure needed for the work to be done, is only possible to reach at a flow of 40 liters per minute, at point B.

Since we started the sweeper in the air at full speed with maximum system pressure, workpoint A, the only way the hydraulic system can handle an increasing load is to reduce the flow. In this case, you have to control the boom lift so the sweeper does not stall and the flow in the system decreases to zero, workpoint C.

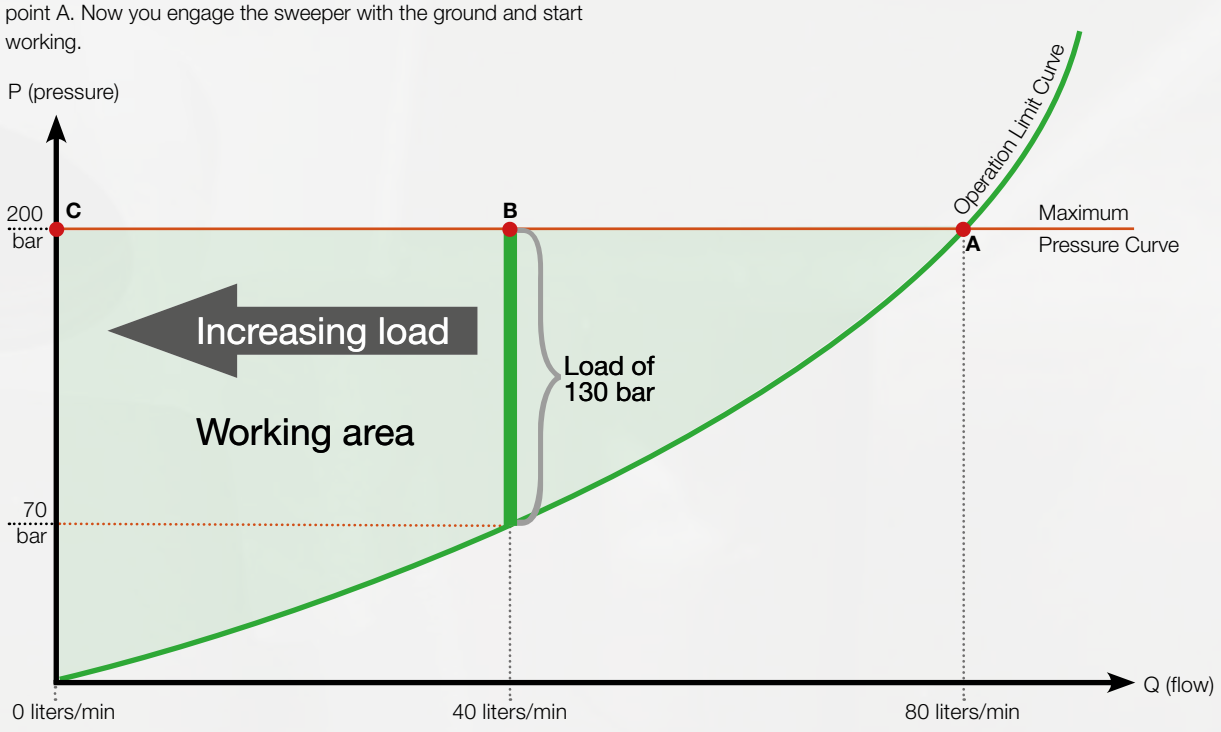
This is also applicable to a cylinder application and for example a gripper. If we are closing the gripper in the air with no load, with full speed, we will reach a flow of 80 liters per minute at point A. However, with increasing load to the gripper jaws the cylinder needs higher pressure to deliver a greater force. In most cases the point of using a gripper is to hold material as steady as possible which is achieved with maximum pressure in the cylinder - which is when the flow is down to zero.

It has to be mentioned that in practise using proportional valves and variable flow, you will end up with different workpoints, although limited by the defined working area.

So back to the original question. Is it possible to use the 120 liter tool below the tiltrotator? The answer is: '-It depends...'

Of course all work tools will move, but the question is how well the tool is matched against the capabilities of the machine as well as the match to the flow requirements of the work tool."

The Steelwrist High Flow Swivel will make the following available:
- 200 liters available at a pressure of 250 bar
- 150 liters available with a pressure drop of 40 bar



Quick Coupler										
Machine Weight [lbs]	0-4400	4400-13200	4400-13200	11000-26500	11000-26500	26500-44100	26500-44100	39700-70500	55100-72700	55100-94800
Model	**S30/180**	**S40**	**S40w**	**S45**	**S50**	**S60**	**S60w**	**S70**	**S70w**	**S80**
Mechanical/Hydraulic	M/H	H	H	H	H	H	H	H	H	H
Building Height [inch]	3,2	3,9	4,7	4,7	4,7	5,3	6,7	6,9	7,9	9,6
Weight [lbs]	33	66	77	154	154	265	287	551	573	772
Width [inch]	7,9	7,9	7,9	11,4	10,6	13,4	13,4	17,7/21,6*	17,7	23,2
Length [inch]	9,0	11,8	11,8	16,9	16,9	18,9	18,9	23,6	23,6	26,4
Lifting hook [lbs]	No	2200	2200	6600	6600	11000	11000	17700	17700	22000
Front Pin Lock/Hook	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Body	Welded	Casted	Casted	Casted	Casted	Casted	Casted	Casted	Casted	Casted
Shaft dia. dipper [inch]	1,0-1,4	1,4-1,8	1,4-2,0	1,8-2,4	1,8-2,4	2,4-3,1	2,4-3,1	2,4-3,1	2,7-3,5	3,5-4,3
Width dipper arm [inch]	4,9	4,7-6,3	6,3-7,8	5,9-8,9	5,9-9,0	9,9-12,0	11,8-13,0	11,0-15,7	13,8-17,0	Max 18,9
Pin distance [cc] [inch]	3,3-5,9	6,3-10,6	9,2-13,6	8,6-14,4	8,6-14,4	13,0-18,1	15,7-18,1	10,6-19,0	18,5-22,2	15,2-23,3

* SQ70/55

SQ Coupler							
Machine Weight [lbs]	26500-41000	26500-41000	30900-48500	39700-72700	39700-72700	55100-94800	88200-154300
Model	**SQ60-4**	**SQ60-5**	**SQ65**	**SQ70**	**SQ70/55**	**SQ80**	**SQ90**
Dimensions [same as]	S60	S60	S65	S70	S70	S80	S90
Weight [lbs]	265	265	507	551	617	948	1653
Couplings	4	5	5	5	6	6	9
3/8”	-	2	-	-	-	-	1
1/2”	2	1	2	2	2	2	3
3/4”	2	2	3	1	2	2	1
1”	-	-	-	2	2	2	4
Electrical Connector	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Tilt Coupler / TCX									
Max Machine Weight [lbs]	0-6600	4400-13200	11000-15400	11000-26500	11000-26500	26500-44100	26500-44100	39700-52900	39700-52900
Model	**TCX S30**	**TC050/ S40**	**TC070/ S40**	**TC100/ S45**	**TC100/ S50**	**TC180/ S60**	**TC180/ SQ60-5**	**TC240/ S70**	**TC240/ SQ70**
Weight [lbs]	62	209	320	463	463	794	838	1367	1433
Max tilt angle [degree]	±30°	±90°	±90°	±90°	±90°	±60°	±60°	±60°	±60°
Driving Torque [kNm]	–	2,6	4,3	6,6	6,6	13,3	13,3	17,8	17,8
Holding Torque [kNm]	–	9,4	14,8	20,4	20,4	40,7	40,7	53,1	53,1
Required Oil Flow [gpm]	1,3-2,6	2,4-7,4	4,0-7,9	5,0-15,3	5,0-15,3	6,9-20,6	6,9-20,6	9,3-27,7	9,3-27,7
Max Circuit Pressure [psi]	2538	3900	3900	3900	3900	3900	3900	3900	3900
Coupler	S30	S40	S40	S45	S50	S60	SQ60-5	S70	SQ70

Multi Grapple					
Machine Weight [lbs]	6600-13200	13200-26500	17700-35300	26500-30900	41900-57300
Model	**MG20**	**MG25**	**MG32**	**MG40**	**MG55**
Gripper area [inch²]	310	388	496	620	852
Gripper reach [inch]	53,4	59,6	70,9	76,3	95,8
Gripper reach, smallest object [inch]	2,2	3,7		4,3	6,1
Max Load [lbs]	6 615	11 025	13 227	15 432	22 045
Weight [lbs]	423	688	904	1237	1916
Gripper force [tip against tip] [kN]	12,5	17	21	25	38
Height [tip against tip] [inch]	33,2	36,2	43,4	44,4	51,4
Height [max open] [inch]	29,4	30,7	37,4	37,1	41,8
Width [inch]	19,8	23,4	26,0	27,2	31,3
Bracket	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S50, S60, S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, CW30, HS10	S60, S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, CW30, HS10	S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, SQ80, CW40, HS21

Stone and Sorting Grapple					
Machine Weight [lbs]	13200-26500	17700-35300	22000-44100	35300-57300	48500-70500
Model	**SG20**	**SG25**	**SG32**	**SG40**	**SG55**
Gripper area [inch²]	310	388	496	620	852
Gripper reach [inch]	49,2	67,2	72,1	86,8	106,7
Max Load [lbs]	6615	13227	15432	17363	26455
Weight [lbs]	437	831	1191	1581	2795
Gripper force [tip against tip] [kN]	10	15	20	25	40
Height [tip against tip] [inch]	25,8	33,4	39,8	44,3	51,2
Height [max open] [inch]	19,7	24,0	34,0	32,5	35,9
Width [inch]	20,4	23,6	25,8	27,6	39,4
Bracket	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S50, S60, S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, CW40, HS21	S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, SQ80, CW40, HS21	S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, SQ80, CW40, HS21

Finger Grapple				
Machine Weight [lbs]	13200-26500	17700-35300	22000-44100	35300-57300
Model	**FG20-5/ FG20-7**	**FG25-5/ FG25-7**	**FG32-5/ FG32-7**	**FG40-5/ FG40-7**
Gripper area [inch²]	310	388	496	620
Gripper reach [inch]	54,7	61,1	71,8	77,0
Max Load [lbs]	6615	13227	15432	17363
Weight [lbs]	483/534	897/968	1389/1499	1596/1731
Gripper force [tip against tip] [kN]	10	15	20	25
Height [tip against tip] [inch]	32,2	34,5	40,7	42,8
Height [max open] [inch]	27,0	27,6	34,0	34,1
Width [inch]	19,8	26,5	27,5	29,7
Bracket	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S50, S60, S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, CW40, HS21	S60, S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, CW30, HS10

Grapples = Max operating pressure [psi] **3600**

Compactor/Vibro				
Machine Weight [lbs]	4400-13200	11000-26500	22000-48500	35300-66100
Model	**HC20**	**HC40**	**HC60**	**HC90**
Vibration Force [kN]	20	40	60	90
Vibration Frequency [Hz]	38	38	38	38
Weight [lbs]	551	853	1367	2136
Length [inch]	27,6	33,5	37,8	41,3
Width [inch]	16,1	24,0	27,6	31,5
Height [inch]	19,4	21,3	23,4	25,3
Load Area [inch^2]	418,5	806	1038,5	1519
Pressure [rec/max] [psi]	2200/3600	2200/3600	2200/3600	2200/3600
Flow [gpm]	7,9-13,2	15,9-21,1	23,8-31,8	31,8-37,0
Bracket	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S40, S45, S50, S60, SQ60-4, SQ60-5, CW05, CW10, HS03, HS08	S60, S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, CW30, HS10	S70, SQ60-4, SQ60-5, SQ65, SQ70, SQ70/55, SQ80, CW40, HS21

Sweeper			
Model	**SW1000**	**SW1500**	**SW2000**
Width [inch]	39	59	79
Motor	Dual Motor Direct Drive	Dual Motor Direct Drive	Dual Motor Direct Drive
Mudflap	Standard	Standard	Standard
Flow req [gpm]	10,6-34,3	10,6-34,3	10,6-34,3
Integrated parking stand	Yes	Yes	Yes
Brush / Option	Bee-Line / Twisted core cartridge brushes		
Bracket	S45, S50, S60, SQ60, SQ70, HS08, HS10, CW10, CW20		

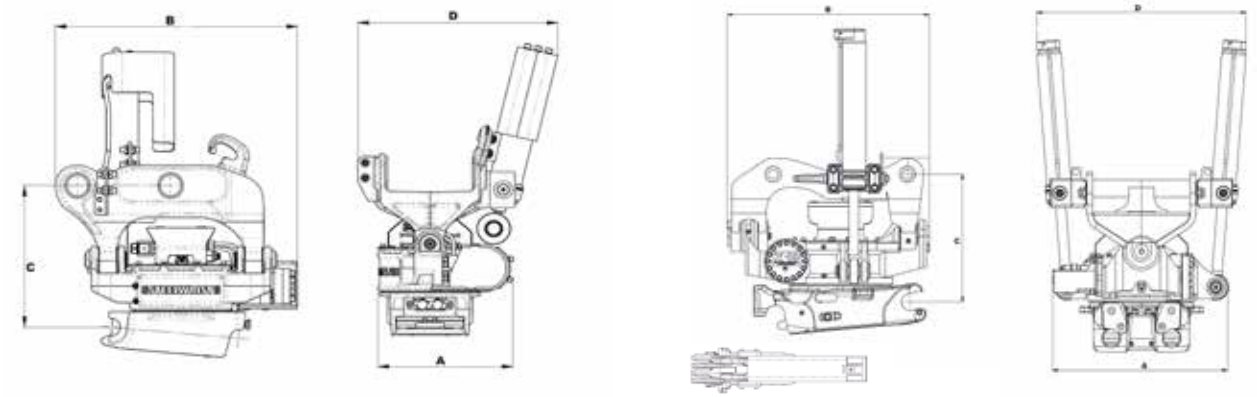
Brush		
Model	**FB1800**	**FB2500**
Width [inch]	71	98
Bracket	S40, S45, S50, S60	

Pallet Fork					
Model	**GR1250**	**GR1500**	**GR2000**	**GR2500**	**GR3000**
Width [inch]	49,2	59,1	78,4	98,4	118,1
Weight [lbs]	463	882	1058	1235	1411
Bracket	S40, HS03, CW05	S40, HS03, CW05	S45, S50, S60, HS08, CW10, CW20	S45, S50, S60, S70, HS08, HS10, HS21, CW10, CW20, CW30-40	S60, S70, HS08, HS10, CW10, CW20, CW30-40

Tiltrotator (value with gripper)										
Machine Weight [lbs]	2200-4400	4400-8800	8800-13200	11000-15400	15400-26500	22000-30900	26500-39700	35300-44100	39700-57300	55100-72700
Model	**X02**	**X04**	**X06**	**X07**	**X12**	**X14**	**X18**	**X20**	**X26**	**X32**
Upper coupler	**DF S30/180**	**DF S40 HS03**	**DF S40 HS03**	**DF S40 S45 S50 HS08**	**DF S45 S50 HS08**	**DF S45 S50**	**DF S60 SQ60-5 HS10**	**DF S60 SQ65 SQ60-5 HS10**	**DF S60 SQ65 SQ70 SQ70/55 HS21**	**DF S70 SQ70 SQ70/55 HS21 S80 SQ80**
Attachment coupler Dedicated	**S30/180**	**S40 HS03 CW05**	**S40 HS03 CW05**	**S40 S45 S50 HS08 CW10**	**S45 S50 HS08 CW10**	**S45 S50**	**S60 SQ60-5 HS10 CW20**	**S60 SQ65 SQ60-5 HS10 CW20**	**S70 SQ65 SQ70 S70/55 SQ70/55 HS21 CW30**	**S70 SQ70 S70/55 SQ70/55 HS21 CW40 S80 SQ80**
Max tilt angle [degrees]	± 45	± 45	± 45	± 45	± 45	± 45	± 45	± 45	± 45	± 45
Req hydraulic oil flow [gpm]	4-	6–11	6–11	8–13	18–24	21–26	21–26	26–32	26–32	32–37
Max pressure [psi]	2538	3050	3050	3050	3050	3050	3050	3050	3050	3050
Hydraulic extra functions	1	1(0)	1(0)	1(0)	2(1)	2(1)	2(1)	2(1)	2(1)	2(1)
A. Width [inch]	16,9	12,4 (18,1)	12,4 (18,1)	14,4 (22,4)	22,3 (22,7)	24,3 (25,0)	24,3 (28,2)	27,2 (28,2)	27,2 (31,8)	28,7 (31,8)
B. Length [inch]	10,2	20,7 (25,3)	20,8 (25,3)	24,3 (31,1)	24,6 (30,1)	28,5 (32,0)	28,6 (37,5)	32,1 (39,5)	32,6 (43,9)	34,3 (45,9)
C. Build height [inch]		13,5	13,1	15,6	16,7	17,9	18,0	20	21,1	24,6
D. Width cylinders [inch]	12,8	19,6	19,6	20,1	26,6	27,0	29,0	28,9	32,5	36,9
Weight from [lbs]	132	254 (333)	298 (377)	430 (553)	628 (767)	838 (977)	882 (1130)	981 (1228)	1257 (1515)	1852 (2110)
Gripper reach [inch]	–	(16,7)	(16,7)	(20,2)	(20,0)	(20,0)	(32,3)	(32,3)	(37,8)	(37,8)
Tilt force [kNm]	5,9	10,6	11,0	13,8	29,0	41,0	41,0	47,0	61,0	73,0
Rotation force [kNm]	1,9	3,9	4,9	5,2	5,4	7,8	7,8	8,8	8,8	9,8
Central Lubrication	–	Option	Option	Option	Option	Option	Option	Option	Option	Option
DATATAG	–	Option	Option	Option	Option	Option	Option	Option	Option	Option

All dimensions are depending on configuration.

Technical specifications

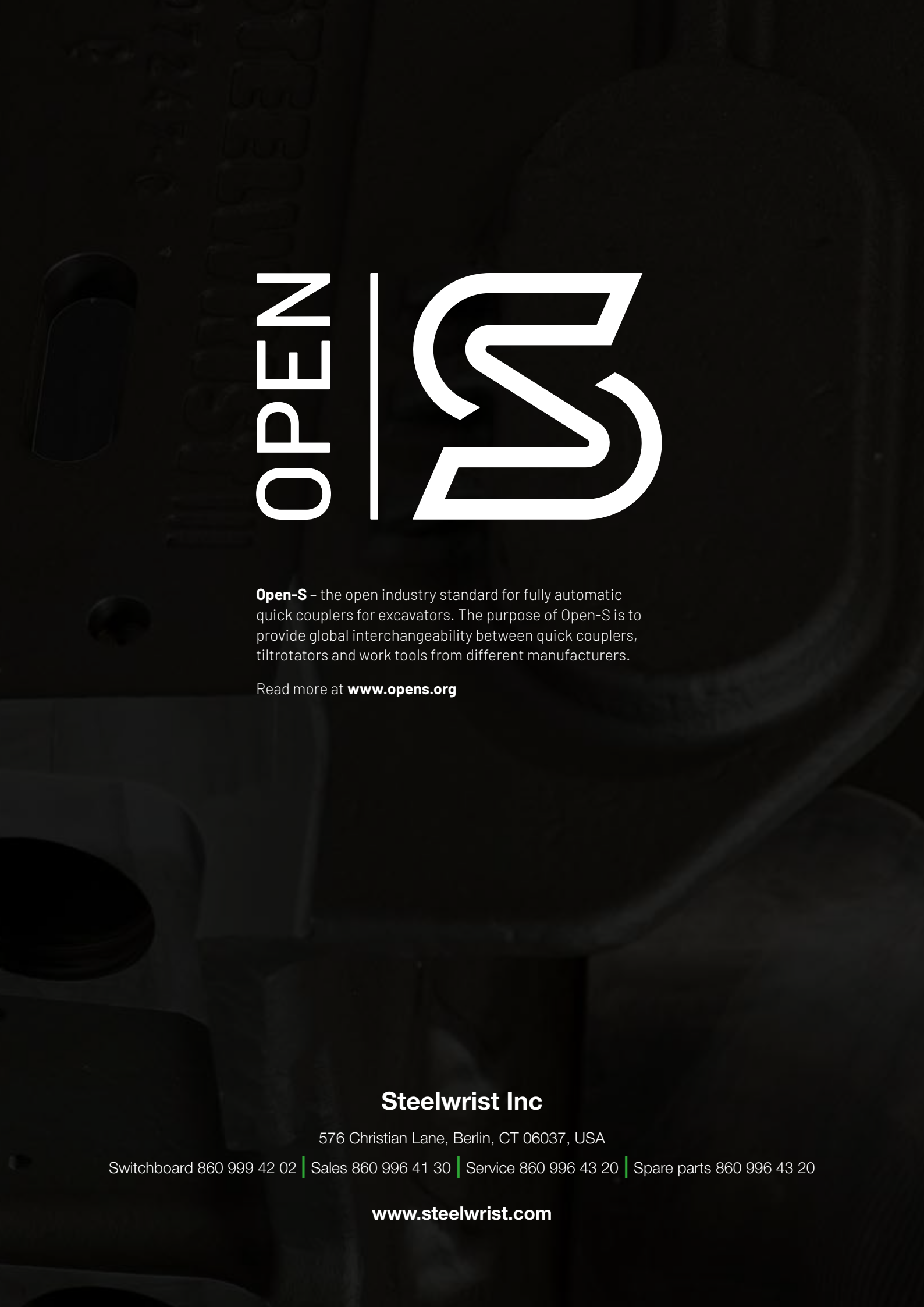


Buckets and Work Tools

Machine Weight [lbs]	0- 4400	0- 4400	2200- 6600	4400- 8800	6600- 11000	8800- 13200	11000- 13200	13200- 17700
Grading bucket Volym [yd³] Width [inch] Weight [lbs]	**GB08** 0,05 27,6 88	**GB1** 0,07 31,5 110	**GB2** 0,12 35,4 176	**GB3** 0,16 43,3 220	**GB4** 0,24 43,3 287	**GB5** 0,31 47,2 308	**GB6** 0,39 47,2 352	**GB6** 0,39 47,2 441
Digging bucket with teeth Volym [yd³] Width [inch] Weight [lbs]	–	**DB1T** 0,07 15,7 110	**DB2T** 0,09 17,7 132	**DB3T** 0,13 19,7 176	**DB4T** 0,20 23,6 242	**DB5T** 0,33 27,6 330	**DB6T** 0,37 27,6 419	**DB6T** 0,37 27,6 419
Digging bucket without teeth Volym [yd³] Width [inch] Weight [lbs]	**DB08** 0,05 15,7 66	**DB1** 0,07 15,7 88,2	**DB2** 0,09 17,7 110	**DB3** 0,13 19,7 176	**DB4** 0,20 23,6 220	**DB5** 0,33 27,6 287	**DB6** 0,37 27,6 375	**DB6** 0,37 27,6 397
Cable/Trench bucket Volym [yd³] Width [inch] Weight [lbs]	–	**CB1** 0,05 9,5 66	**CB2** 0,08 11,4 88	**CB3/CB3C** 0,10 / 0,13 11,8 / 7,9 76,4 / 176	**CB3/CB3C** 0,10 / 0,13 11,8 / 7,9 76,4 / 176	**CB05** 0,16 15,8 198	**CB6** 0,21 15,8 222	**CB6** 0,21 15,8 264
Utility bucket Volym [yd³] Width [inch] Weight [lbs]	–	–	–	–	–	–	–	–
V-ditch bucket Volym [yd³] Width [inch] Weight [lbs]	–	–	**VB2** 0,12 35,4 / 7,9 154	**VB3** 0,18 43,3 / 7,9 265	**VB4** 0,26 47,2 / 7,9 440	**VB4** 0,26 47,2 / 7,9 440	**VB6** 0,31 55,1 / 11,8 463	**VB8** 0,52 66,9 / 11,8 639
Sorting bucket Volym [yd³] Width [inch] Weight [lbs]	–	–	–	**SOB3** 0,17 35,4 198	**SOB4** 0,26 39.4 309	**SOB4** 0,26 39.4 309	**SOB6** 0,39 47,2 375	**SOB8** 0,48 51,2 639
Skeleton bucket Volym [yd³] Width [inch] Weight [lbs]	–	–	–	–	–	–	–	**SKB8** 0,48 39,4 661
Asphalt cutter Diameter [inch] Thickness [inch] Weight [lbs]	–	–	–	**AC5** 15,8 0,3 209	**AC5** 15,8 0,3 209	**AC5** 15,8 0,3 209	**AC5** 15,8 0,3 209	**AC10** 18,5 0,4 313
Pallet fork Lifting capacity [lbs] Width [inch]	–	–	–	**PF2000** 4400 47,24	**PF2000** 4400 47,24	**PF2000** 4400 47,24	**PF2000** 4400 47,24	**PF2500** 5500 47,24
Ripper Length [inch] Weight [lbs]	–	–	–	**RP40** 28,0 220	**RP40** 28,0 220	**RP40** 28,0 220	**RP40** 28,0 220	**RP45** **RP50** 33,9 419
Bracket	S30/150 S30/180	S30/150 S30/180	S30/150 S30/180	S40, HS03	S40, HS03	S40, HS03	S40, HS03	S45, S50, HS08

17700-26500	24300-28600	28600-30900	30900-33000	33000-35300	35300-39700	39700-48500	48500-57300	55100-72700	61800-88200	61800-94800
GB9 0,59 55,1 573	**GB12** 0,72 59,0 705	**GB14** 0,92 59,0 1234	**GB14** 0,92 59,0 1234	**GB15** 0,98 62,0 1300	**GB17** 1,18 66,9 1410	**GB20** 1,37 70,9 1896	**GB25** 1,63 74,8 2249	**GB30** 1,83 78,8 2425	**GB30/GB35** 1,83 / 2,35 78,8 / 86,6 2535 / 3197	**GB40** 2,62 94,5 3858
DB9T 0,46 27,6 507	**DB12T** 0,65 31,5 728	**DB13T** 0,78 35,4 1102	**DB14T** 0,85 37,4 1146	**DB15T** 0,92 39,4 1190	**DB17T** 1,11 39,4 1323	**DB20T** 1,37 41,3 2160	**DB25T** 1,63 49,2 2380	**DB30T** 2,03 51,2 2623	**DB30T** 2,03 51,2 2734	–
DB9 0,46 27,6 463	**DB12** 0,65 31,5 639	**DB13** 0,78 35,4 992	**DB14** 0,85 37,4 1036	**DB15** 0,92 39,4 1080	**DB17** 1,11 39,4 1190	–	–	–	–	–
CB9 0,26 15,8 308	**CB12** 0,33 15,8 463	**CB15/CB15C** 0,43 / 0,33 19,7 / 11,8 705 / 794	**CB15/CB15C** 0,43 / 0,33 19,7 / 11,8 705 / 794	**CB15/CB15C** 0,43 / 0,33 19,7 / 11,8 705 / 794	**CB17** 0,47 21,6 727	**CB20** 0,52 23,2 860	**CB25** 0,72 25,6 1080	**CB30** 0,92 34,5 1124	**CB30** 0,92 34,5 1233	–
–	–	**UB15** 0,65 27,6 926	**UB15** 0,65 27,6 926	**UB15** 0,65 27,6 926	**UB17** 0,78 31,5 1102	**UB20** 0,92 35,4 1213	**UB25** 1,18 35,4 1455	**UB30** 1,31 39,3 1675	–	–
VB8 0,52 66,9 / 11,8 639	**VB8** 0,52 66,9 / 11,8 639	**VB15** 0,65 68,9 / 11,8 860	**VB15** 0,65 68,9 / 11,8 860	**VB15** 0,65 68,9 / 11,8 860	**VB15** 0,65 68,9 / 11,8 860	**VB20** 0,78 78,7 / 13,8 1257	**VB20** 0,78 78,7 / 13,8 1257	**VB20** 0,78 78,7 / 13,8 1257	–	–
SOB8 0,48 51,2 639	**SOB8** 0,48 51,2 639	**SOB14** 0,85 63,0 970	**SOB15** 0,98 63,0 1389	**SOB15** 0,98 63,0 1389	**SOB17** 1,18 66,9 1543	**SOB20** 1,44 66,9 2028	**SOB25** 1,83 78,7 2315	**SOB25** 1,83 78,7 2315	–	–
SKB8 0,48 39,4 661	**SKB8** 0,48 39,4 661	**SKB14** 0,81 51,2 1168	–	–	–	–	–	–	–	–
AC10 18,5 0,4 313	**AC10** 18,5 0,4 313	**AC15** 18,5 0,4 330	**AC15** 18,5 0,4 330	**AC15** 18,5 0,4 330	**AC15** 18,5 0,4 330	**AC20** 18,5 0,4 375	**AC20** 18,5 0,4 375	**AC20** 18,5 0,4 375	–	–
PF2500 5500 47,24	**PF2500** 5500 47,24	**PF5000** 11000 47,24	**PF5000** 11000 47,24	**PF5000** 11000 47,24	**PF5000** 11000 47,24	**PF5000** 11000 47,24	**PF5000** 11000 47,24	**PF5000** 11000 47,24	–	–
RP45 **RP50** 33,9 419	**RP45** **RP50** 33,9 419	**RP60** 41,3 750	**RP60** 41,3 750	**RP60** 41,3 750	**RP60** 41,3 750	**RP70** 50,2 1311	**RP70** 50,2 1410	**RP70** 50,2 1410	–	–
S45, S50, HS08	S45, S50, HS08	S60, HS10	S60, HS10	S60, HS10	S60, HS10	S70, HS21	S70, HS21	S70, HS21	S80	S80

Not all products are available in all markets. Under our policy of continuous improvement, we reserve the right to change specifications and design without prior notice. The illustrations do not necessarily show the standard version of the machine.



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