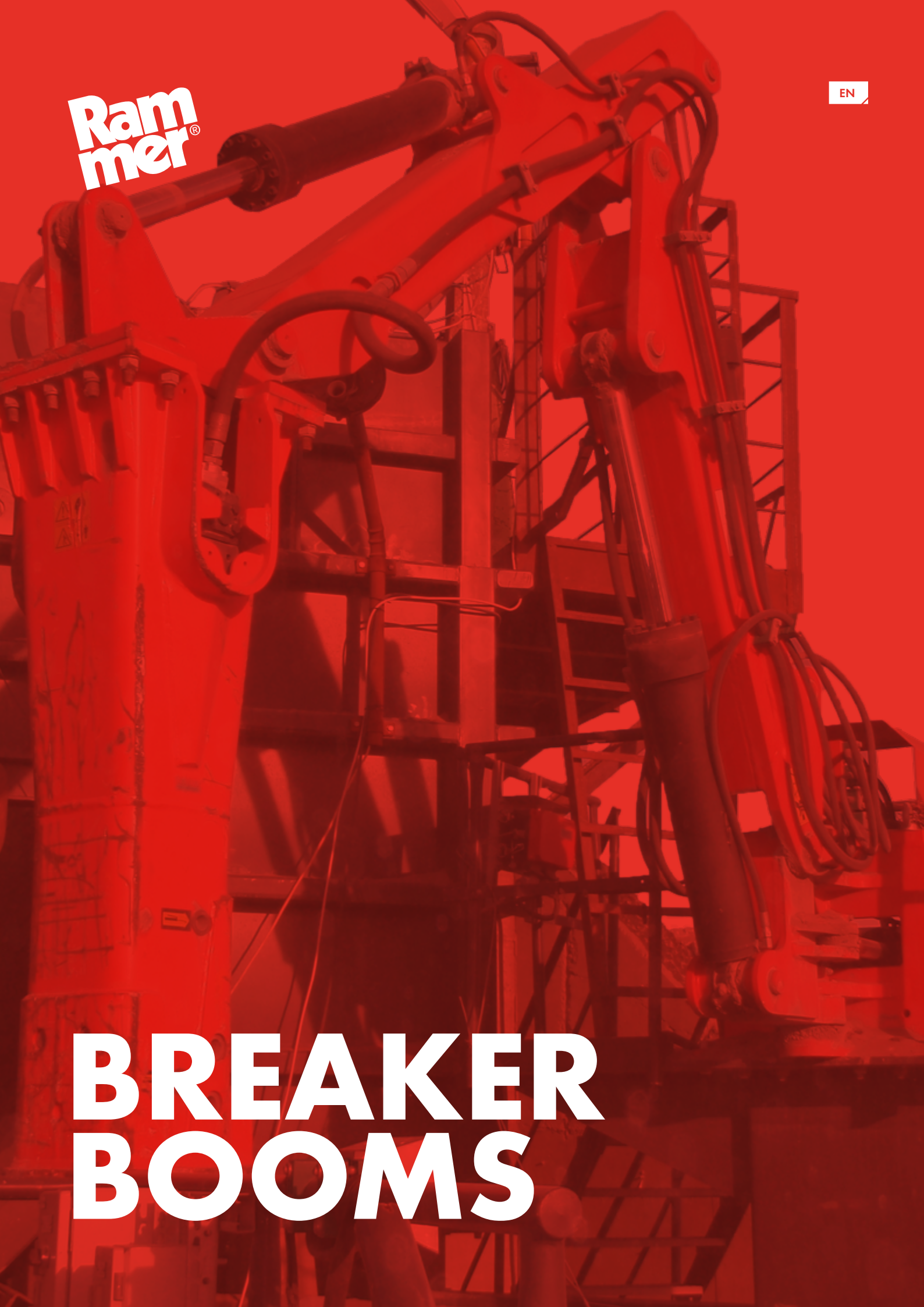




**Ram
mer®**

EN

BREAKER BOOMS



RAMMER – PUTTING SAFETY FIRST

Rammer, the world's best known and most-respected brand of hydraulic hammers, offers a comprehensive range of breaker booms to enhance the safety, productivity and profitability of crushing operations in mines and quarries around the world. Rammer*) is a unique boom supplier, delivering complete, bespoke equipment packages to meet specific customer needs.

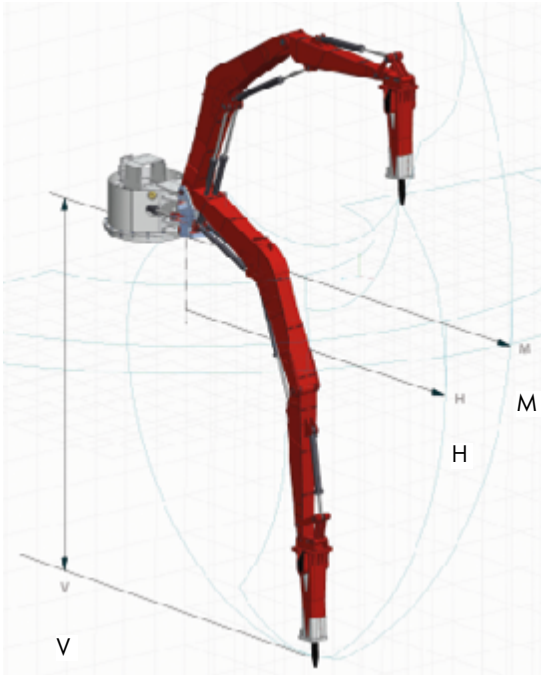
Rammer is ideally positioned to provide a safe turn-key package comprising hammer, boom, power pack and full electrification of the system. All elements are manufactured to stringent quality and exacting safety standards and are fully CE-compliant. The company's experienced engineering team not only ensure that customers receive the best solution for their needs, they also make sure that the right equipment is positioned in the right place for optimum safety, reliability, durability and productivity. Rammer's product selection is supported by a dedicated global dealer network with ready access to genuine Rammer parts and a wealth of operational knowledge and experience to ensure that your Rammer breaker boom package continues to contribute to your company's profitability for its entire working life.

*) The Rammer name and logo are registered trademarks of Sandvik Mining and Construction Oy.

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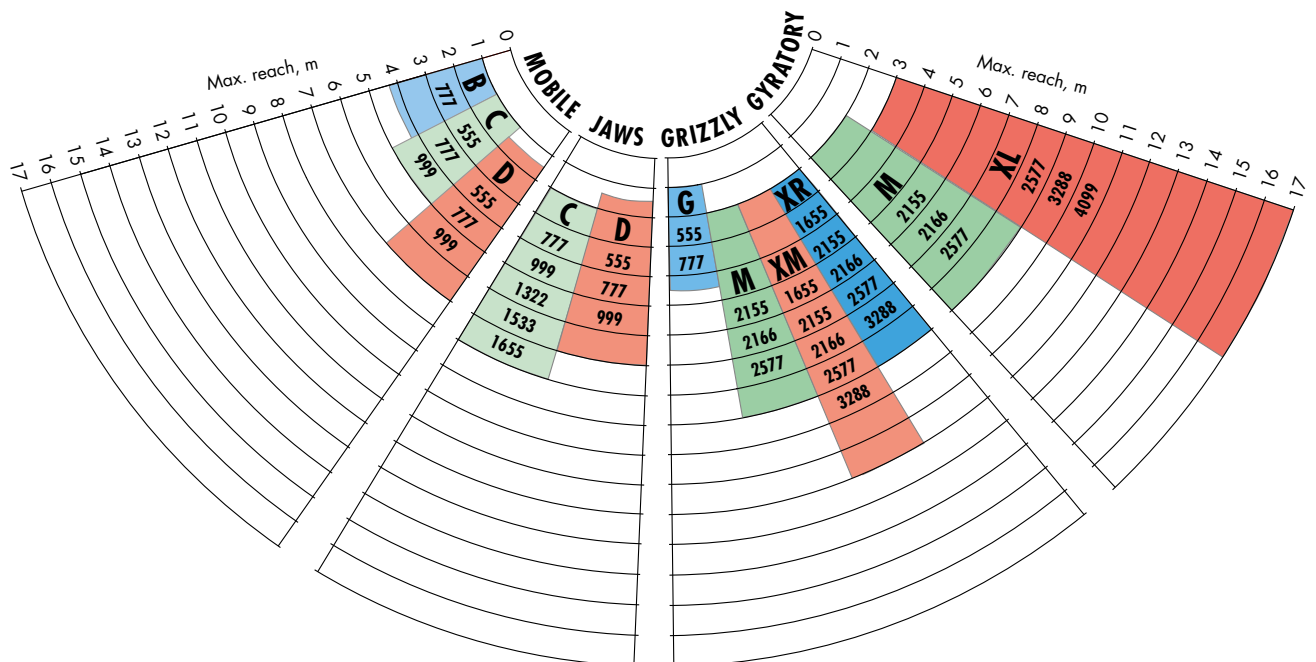
RIGHT BOOM FOR EVERY NEED



H = Horizontal
V = Vertical
M = Max reach

Rammer breaker booms are typically installed above crusher inlets or hoppers and grizzly screens to minimise downtime and avoid damage caused by oversize product blocking chutes or crusher inlets. A correctly sized hydraulic breaker and suitably positioned boom system is a well-recognised, safe and reliable solution which can maximise the productivity of any crushing circuit. The Rammer breaker boom range is wide, from 1 up to 18 tons heavy duty applications, reach from 1 meter up to 17 meter.

Boulder size (m³)	Boulders per hour	Hard rock (basalt, gabbro, granite, gneiss)	Medium hard rock (hard limestone, andesite, sandstone)	Soft rock (coal, shale, soft limestone)
0 – 1	0 – 10	1533 - 2155	999 - 1533	777 - 999
	10 – ...	2155 - 2577	1533	1533
1 – 2	0 – 10	2155 - 2577	1533	999 - 1533
	10 – ...	2577	1533 - 2155	1533
2 – 4	0 – 10	3288	2155 - 2577	1533 - 2155
	10 – ...	3288 - 4099	3288	2577





D425

COMPACT MULTIPURPOSE BOOM

easy transportation and installation, light weight.

CONICAL EXPANDER® PINS

in B and D-series, increased service life.

360° ROTATION

minimized pedestal footprint.

LOW PROFILE

in G330, suitable for small grizzlies with limited headroom.

INTERNAL HOSES

minimized the risk of damages.

SERIES B, D AND G

B and D-series Rammer booms are light weight, multipurpose booms which have been designed to be mounted on a mobile crushing plants and impact crushers to clear blockages and bridging.

G330 boom is a low profile compact underground grizzly boom with long horizontal reach.

	B300	D300	D425	G330
Weight, kg	1150	1450	1700	1310
Maximum reach, m	4.2	4.6	5.9	4.4
Nominal horizontal reach (H), m	2.9	2.9	4.2	3.4
Nominal vertical reach (V), m	1.8	2.6	3.8	1.7
Swing, °	360	360	360	270
Base dimensions, m	0.65	0.8	0.8	0.8
Recommended hammer types	777	555 - 999	555 - 999	555 - 999
Recommended power packs	HU 18	HU 18	HU 18	HU 18



G330



CONICAL EXPANDER® PINS

increased service life.

INTERNAL HOSES

minimizes the risk of damaging.

LIGHT WEIGHT

multipurpose boom.

COMPACT DESIGN

easy transportation.

SERIES C

C Series booms are multi-purpose booms ideal for use in stationary crushing plants next to a primary crusher to clear blockages and bridging.

C285N

C320N

Weight, kg	1355	1400
Maximum reach, m	4.7	5.2
Nominal horizontal reach (H), m	3.2	3.5
Nominal vertical reach (V), m	3.3	3.8
Swing, °	170	170
Base dimensions, m	0.69 x 0.93	0.69 x 0.93
Recommended hammer types	555 - 999	555 - 999
Recommended power packs	HU 18	HU 18





HEAT TREATED PINS

increased service life.

MULTIPURPOSE BOOM

6 models for various applications.

ROBUST AND RELIABLE

easy maintenance.

COMPACT DESIGN

easily built foundation.

SERIES C

C Series booms are multi-purpose booms ideal for use in stationary crushing plants next to a primary crusher to clear blockages and bridging.

	C350	C400	C450
Weight, kg	2500	2550	2600
Maximum reach, m	5.4	5.8	6.3
Nominal horizontal reach (H), m	3.9	4.3	4.6
Nominal vertical reach (V), m	3.8	4.3	4.6
Swing, °	170	170	170
Base dimensions, m	0.81 x 0.96	0.81 x 0.96	0.81 x 0.96
Recommended hammer types	777 - 1655	777 - 1655	777 - 1655
Recommended power packs	HU 18 - HU 30	HU 18 - HU 30	HU 18 - HU 30

	C500	C550	C600
Weight, kg	2650	2700	2750
Maximum reach, m	7.0	7.3	7.7
Nominal horizontal reach (H), m	5.6	5.8	6.2
Nominal vertical reach (V), m	5.0	5.2	5.7
Swing, °	170	170	170
Base dimensions, m	0.81 x 0.96	0.81 x 0.96	0.81 x 0.96
Recommended hammer types	777 - 1655	777 - 1655	777 - 1655
Recommended power packs	HU 18 - HU 30	HU 18 - HU 30	HU 18 - HU 30



ROUND PEDESTAL

even foundation stress distribution, pedestal angle can be adjusted.

SHOCK ABSORBING PEDESTAL MOUNTING

longer foundation lifetime.

CONICAL EXPANDER® PINS

heat treated pins have an increased service life.

ROBUST DESIGN

optimized weight combined with high capacity.

SERIES M

M-series booms have been built to take heavy loads in quarry and mining applications. Medium series are installed to enhance the productivity of stationary crushers by feeding material to the crushers and raking the hopper area.

	M440	M550	M630
Weight, kg	6300	6830	7130
Maximum reach, m	7.2	8.2	8.9
Nominal horizontal reach (H), m	4.8	5.9	6.7
Nominal vertical reach (V), m	3.4	5.0	5.8
Swing, °	170	170	170
Base dimensions, m	1.68	1.68	1.68
Recommended hammer types	2155 - 2577	2155 - 2577	2155 - 2577
Recommended power packs	HU 37 - HU 45	HU 37 - HU 45	HU 37 - HU 45





MODULAR DESIGN

interchangeable parts.

SHOCK ABSORBING PEDESTAL MOUNTING

longer foundation lifetime.

CONICAL EXPANDER® PINS

increased service life.

PARTS STANDARDIZATION

sparepart inventory can be reduced.

SERIES XM

XM series booms have been especially designed for mining markets. Their proven design combined to over dimensioning makes this a convenient and safe choice.

	XM500HD	XM600HD	XM750HD
Weight, kg	8545	8760	9100
Maximum reach, m	8.0	9.0	10.4
Nominal horizontal reach (H), m	5.5	6.4	7.9
Nominal vertical reach (V), m	5.1	5.8	6.8
Swing, °	170	170	170
Base dimensions, m	1.52 x 1.22	1.52 x 1.22	1.52 x 1.22
Recommended hammer types	2155 - 3288	2155 - 3288	2155 - 3288
Recommended power packs	HU 37 - HU 55	HU 37 - HU 55	HU 37 - HU 55





HEAT TREATED MULTI ALLOY PINS

reduced wear and tear.

PROTECTED CYLINDER POSITIONING

minimizes the risk of damaging.

FLEXIBASE

reduced vibration in foundation and rotating base.

360° ROTATION

wider coverage and service access.

SERIES XR

XR-series booms are designed for extreme duty grizzly applications.

	XR600R	XR700R
Weight, kg	9350	9700
Maximum reach, m	7.0	8.7
Nominal horizontal reach (H), m	5.4	6.5
Nominal vertical reach (V), m	3.7	4.3
Swing, °	360	360
Base dimensions, m	1.8	1.8
Recommended hammer types	1655 - 3288	1655 - 3288
Recommended power packs	HU 30 - HU 55	HU 30 - HU 55



HEAVY DUTY DESIGN

lower running costs.

LONG REACH

full coverage – up to 17 m.

ROUND PEDESTAL

even stress distribution. Pedestal angle can be adjusted.

HEAT TREATED PINS

increased service life.

SERIES XL

Applications demanding long reach and high breaking power require an XL series boom. These applications include gyratory crushers in mines and quarries and grizzlies in mines.

	XL940	XL1020	XL1200	XL1400
Weight, kg	15100	15500	16500	17500
Maximum reach, m	12.7	13.4	14.6	17.0
Nominal horizontal reach (H), m	9.8	10.5	12.2	14.1
Nominal vertical reach (V), m	9.2	10.0	10.6	13.0
Swing, °	170	170	170	170
Base dimensions, m	2.29	2.29	2.29	2.29
Recommended hammer types	2577 - 4099	2577 - 4099	2577 - 4099	2577 - 4099
Recommended power packs	HU 45 - HU 55	HU 45 - HU 55	HU 45 - HU 55	HU 45 - HU 55





ROTATION 360 °

high twist capacity design.

HEAT TREATED PINS

less maintenance needs & lower running costs.

LONG REACH

full coverage – up to 17 m.

HIGH TWIST CAPACITY DESIGN

less maintenance needs and lower running costs.

SERIES XL

Applications demanding long reach and high breaking power require an XL series boom. These applications include gyratory crushers in mines and quarries and grizzlies in mines.

	XL940R	XL1020R	XL1200R	XL1400R
Weight, kg	11100	11500	12500	13500
Maximum reach, m	12.7	13.4	14.6	17.0
Nominal horizontal reach (H), m	9.8	10.5	12.2	14.1
Nominal vertical reach (V), m	9.0	9.8	10.4	13.0
Swing, °	360	360	360	360
Base dimensions, m	1.40	1.40	1.40	1.40
Recommended hammer types	2577 - 4099	2577 - 4099	2577 - 4099	2577 - 4099
Recommended power packs	HU 45 - HU 55	HU 45 - HU 55	HU 45 - HU 55	HU 45 - HU 55



POWER PACKS

Power packs are designed specially to work alongside hydraulic hammers and booms. The power packs are sized to match the chosen hammer.

- Squirrel cage motor in vertical position
- Submerged fixed displacement gear pump
- Pressure and return filter
- Oil cooler
- Optional oil heater
- Complete with electrification
- Standard voltage 400 V / 50 Hz or 480 V / 60 Hz, others available
- IP class 55



	HU18	HU30	HU37
Oilflow, l/min, 1500 rpm (50 Hz)	65	90	125
Oilflow, l/min, 1800 rpm (60 Hz)	78	108	150
Motor power, kW (50 Hz)	18	30	37
Motor power, kW (60 Hz)	22	36	44
Motor framesize (IEC)	180M	200L	225S
Working weight without oil, kg	800	900	950
Oil tank volume, l	250	250	250

	HU45	HU55
Oilflow, l/min, 1500 rpm (50 Hz)	180	220
Oilflow, l/min, 1800 rpm (60 Hz)	215	265
Motor power, kW (50 Hz)	45	55
Motor power, kW (60 Hz)	54	66
Motor framesize (IEC)	250M	280S
Working weight without oil, kg	1200	1310
Oil tank volume, l	400	400

REMOTE CONTROLS

All booms should be fitted with remote controls for safe and effective operation.

	RC Standard	RC Heavy	Operator chair
Radio	•	•	
Cable mode	•	•	•
Proportional joysticks, pc	2	2	2
Hammer fire button, pc	2	2	2
Lever switch	4	4	4



The Standard RC-control system can be upgraded to long distance optical fibre control system by adding the tele-operation package (BTO). The maximum distance is 2.5 km when multi-mode optical fibre cables are used and 15 km when single mode cables are used. Optical fibre cables are not included in the package.

TELE REMOTE

Teleoperation-systems can be integrated into a large mining automation control systems. Tele remote allows the operation of multiple booms up to 15 km with HD quality picture and sound feedback. The tele remote system heightens operators' awareness, operator is removed from any potential localised safety hazards, improves operator comfort and productivity. Having a tele remote system installed will limit travel time to site creating a more efficient outcome for your business.

Please contact your local dealer for further information.



FOUR THINGS TO CONSIDER BUYING A BREAKER BOOM SYSTEM

Firstly, ensure the hydraulic hammer is correctly sized for the application.

When sizing the hydraulic hammer, you must consider the following:

- Rock hardness
- Rock size
- Expected Duty (number of rocks per hour)
- The physical size of the chute or crusher inlet

Put simply- 'the bigger the hammer, the greater the impact energy'.

If the hydraulic hammer is too small, it will take longer to break rock and clear blockages, resulting in unnecessary and costly downtime.

However, if the hydraulic hammer is too big it may be too large to fit into the crusher throat or chute where blockages are likely to occur. Importantly, if the rock hardness is too low for the selected hammer, it can actually cause damage to the rockbreaker. Instead of the tool impacting and imparting energy into the rock, the tool easily passes through the rock and is captured by the tool retaining pin, effectively causing the energy to be 'absorbed' by the hammer itself rather than delivered to the rock.

By considering all aspects of the application, including rock

hardness, rock size, expected duty and the space available, an experienced dealer can recommend the most suitable hydraulic hammer for the application ensuring the best possible return on investment.

Additionally, careful attention should be given to the hammer design and location of hoses, particularly if working within the tight constraints of a chute or within a dump hopper. Top entry hoses and a hydraulic hammer design which eliminates exposed hose swivels is always preferred. Side swivels can be easily damaged by impact with chute walls and designs with long hoses hanging from the side can easily get caught on rocks and chute work and should be avoided.

Secondly, the boom size and reach must be correct.

Once the optimum hydraulic hammer is selected, the boom system itself needs to be selected to carry the weight of the chosen hammer and meet the reach requirements for the application. Additionally, consideration should be given to the expected operating duty and whether there is a need for raking rocks in larger chutes or

dump pockets. If it is expected that regular raking of rocks and material will be necessary, a heavier duty boom system may need to be considered.

Selecting a boom system that is too light for the application will lead to higher maintenance costs which accelerate over time, due to excessive pivot pin and bush wear and possible fatigue failures in structural components. The end result will be a reduced effective life of the boom.

Conversely, over-sizing the hammer and / or the boom system will increase the initial capital cost and have a flow on effect on the cost of support structures and foundations.

Correctly sized booms which are operated and maintained correctly can achieve an operating life of up to 20 years or more.

Thirdly, the position, elevation and working slew angle of the boom system need to be assessed.

Having selected the most suitable hammer and boom system, correct positioning of the boom can make a big difference to the usability and maintainability of the system. Ideally, the normal working area of the hammer should be well within



the maximum and minimum limits of the boom reach. This allows the boom to work with its hydraulic cylinders near mid-stroke, allowing for hydraulic cushioning of the hydraulic cylinders and proper operation of hydraulic relief valves, which are used to limit undue stresses on the boom.

Not only is it essential to ensure that the boom system is capable of positioning the hydraulic hammer in the locations where blockages are expected to occur, if raking or re-positioning of material is anticipated, the boom system should be orientated such that the hammer can be used to 'rake' material in line with the boom rather than attempt to 'slew' material sideways. There is far greater force available for raking when in line with the boom (i.e. pushing or pulling the material) when compared to trying to slew material sideways.

Ensuring that the boom can reach down far enough into the chute and then lift out sufficiently to clear chute walls, hand railing and other structures to move to park and maintenance positions is also very important. The expected normal working angle and the nominated 'park' position and maintenance location (for tool changes) will determine the required slew angle.

Typical king-pin type slew designs have a slew range of 170 degrees and a recommended working angle of 140 degrees. For greater slewing capability, a 360 degree slew base may be required.

Finally, the position of the boom system must also consider the location of the operator control cabin or operator platform. Visibility and operator safety while operating the boom system is extremely important and careful selection of an appropriate 'line-of-site' location for the operator should be determined.

Fourthly, the availability of advanced safety systems, remote operation options and of course, maintenance and spare parts should be considered.

All booms should be fitted with remote controls for safe and effective operation. The standard control system can be upgraded to long distance optical fibre control system.

The Teleoperation-system can be integrated into a large mining automation control systems. Options such as centralised or fully automatic greasing systems should also be considered to

maximise the life of all pivot pins and bushes. Finally, the availability and prompt delivery of spare parts is an important factor to minimise downtime. Using standard, proven boom system models which are manufactured regularly ensures that your boom system supplier will always have common parts in stock and available when required.

GLOBAL DEALER NETWORK

Sandvik sells and supports its Rammer-branded products through a global dealer network that operates in 130 countries around the world.

YOUR LOCAL RAMMER DEALER



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