SANDVIK

RAISE BORING TOOLS AND SYSTEMS
USER MANUAL

CONTENTS

GENERAL SAFETY INSTRUCTIONS

Safety is fundamental to us at Sandvik. Please make sure that you read and follow this information in order to stay within safety guidelines.

SAFE WORK PROCEDURES

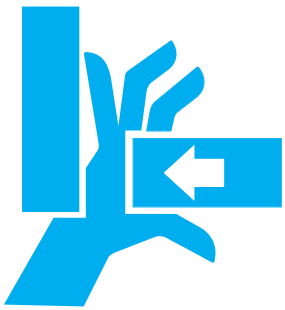
Appropriate personal protective equipment (PPE) should be worn when working with or around raise boring drilling. These include:

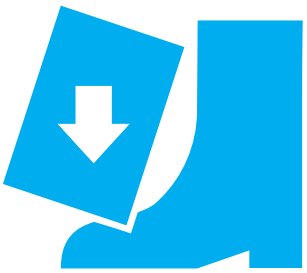
- Safety helmet
- Hearing protection
- Safety glasses
- Protective and high visibility clothing
- Safety boots
- And any site-specific PPE as required

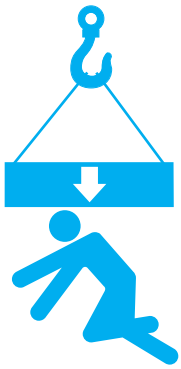
Consider safety when planning your schedule. Take five minutes before the start of a task to consider the possible hazards. Perform a quick risk assessment. Plan and apply the appropriate control measures. Ensure that you have the correct resources to perform the task.

Go to App store on your iOS device and search for: Sandvik Mining & Rock Technology Take Five then download the app for your own safe convenient use.

SAFETY HAZARDS







MOUNTING/DISMOUNTING OF SADDLES

- Make sure the saddle is handled with proper lifting equipment when lifted
- Make sure the saddle is properly secured and that lifting gear rated for the saddle weight is used
- Make sure the fitter is educated and trained to use any lifting gear or tools required to handle the saddle safely
- Make sure the proper tools are used to handle the saddle safely and correctly
- Use proper safety outfit for the activity

MOUNTING/DISMOUNTING OF CUTTERS

- Make sure the cutter is handled with proper lifting equipment when lifted
- Make sure the cutter is properly secured and that lifting gear rated for the cutter weight is used
- Make sure the fitter is educated and trained to use any lifting gear or tools required to handle the cutter safely
- Make sure the proper tools are used to handle the cutter safely and correctly
- Use proper safety outfit for the activity

MOUNTING/DISMOUNTING OF STEM

- Make sure the reaming head is supported and secured safely before the stem is mounted/dismounted
- Make sure the stem is properly secured and that proper lifting equipment rated for the stem weight is used
- Make sure the fitter is educated and trained to use any lifting gear or tools required to handle the stem safely
- Do not work within the area of danger around the reaming head before it is properly secured
- Make sure the proper tools are used to handle the stem safely and correctly
- Use proper safety outfit for the activity

MOUNTING/DISMOUNTING OF SEGMENT

- Make sure the reaming head is supported and secured safely before the segment is mounted/dismounted
- Make sure the segment is properly secured and that proper lifting equipment rated for the segment weight is used
- Make sure the fitter is educated and trained to use any lifting gear or tools required to handle the segment safely
- Do not work within the area of danger around the reaming head before it is properly secured
- Make sure the proper tools are used to handle the segment safely and correctly
- Use proper safety outfit for the activity

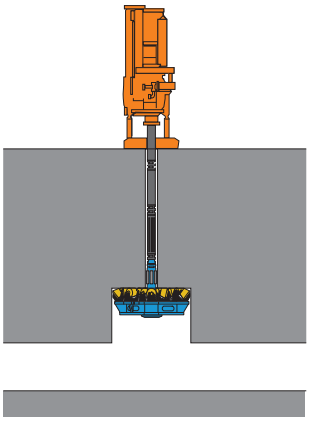
WEAR PAD REPLACEMENT

- Make sure the stem is properly secured and that proper lifting equipment rated for the stem weight is used
- Make sure the fitter is educated and trained to use any lifting equipment or tools required to handle the stem safely
- Make sure the proper tools are used to handle the stem safely and correctly
- Do not work within the area of danger around the stem before it is properly secured
- Use proper safety outfit for the activity

RE-GREASING OF CUTTERS & SEAL REPLACEMENT

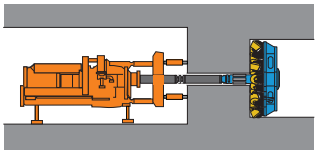
- Make sure the cutter is properly secured and that proper lifting equipment rated for the cutter weight is used
- Make sure the fitter is educated and trained to use any lifting equipment or tools required to handle the cutter safely
- Make sure the proper tools are used to handle the cutter safely and correctly
- Do not work within the area of danger around the cutter before it is properly secured
- Use proper safety outfit for the activity

DIFFERENT RAISE BORING METHODS



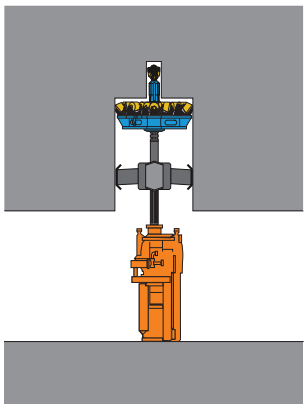
RAISE BORING

- Access on two rock faces.
- Ø 0.6 m and larger.
- Used for ore passes, ventilation raises, penstocks etc.
- Drill pipes under tension.



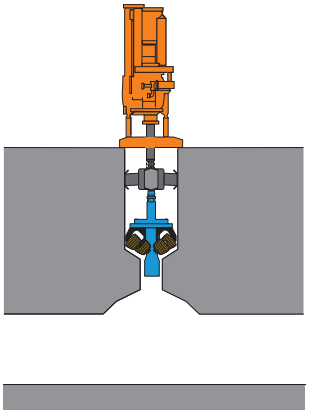
HORIZONTAL RAISE BORING

- Access on two rock faces.
- Ø 0.6 m and larger.
- Used in civil construction in urban areas ex. cable tunnel, escape tunnels, sewage tunnels etc.
- Rock stability important.
- Drill pipes under tension.



BLIND RAISE BORING

- Access on one rock face.
- Ø 0.6 m and larger.
- Used for slot raises, ore passes, manways.
- Drill pipes under compression.
- Needs drill pipe stabilisation.



DOWN RAISE BORING WITH PRE-D RILLED PILOT HOLE

- Access on one rock face and an opening below.
- Ø 0.6 m and larger.
- Used for drilling large fill holes.
- Drill pipes under compression.
- Needs drill pipe stabilisation.

GENERAL RECOMMENDED REAMING PARAMETERS

Max recommended operating cutter load 27 tonnes (60 000 Lbs). Max recommended reaming head speed see graph below.

The net operating cutter load is chosen depending on machine/ drill pipe capacity and rock characteristics. Increase the cutter load ≤ max cutter load and/or the machine/ drill pipe capacity limit as long as increased load results in increased rate of penetration.

The reaming head speed (RPM) is chosen depending on reaming head diameter and rock characteristics.

Utilise the optimum (fastest) RPM the rock formation allows ≤ max recommended reaming head speed together with optimum net cutter load.

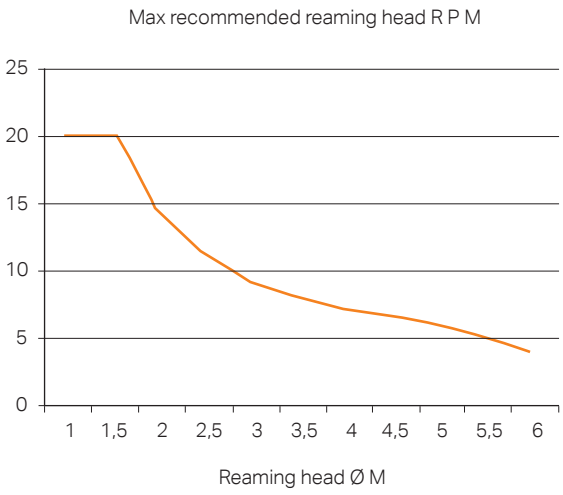
Reduce the RPM before reducing the cutter load.

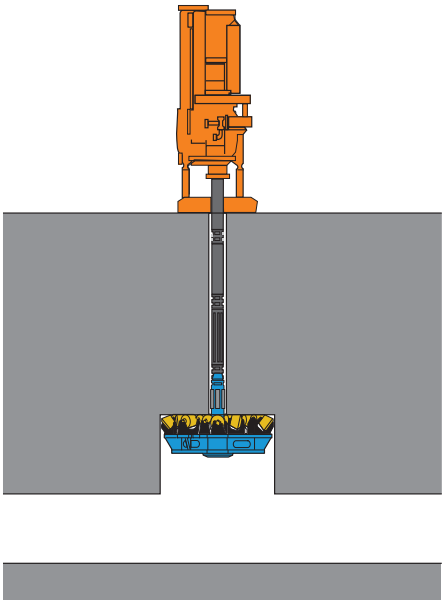
CUTTER MAINTENANCE

The raise boring cutter bearings are operating under extreme conditions, exposed to constant high operating loads, varying degree of uncontrolled shock loads in combination with high temperatures.

It is of vital importance to use the recommended type of lubricant suitable for these conditions and to relubricate the cutters on a regular basis in order to obtain an optimum cutter service life.

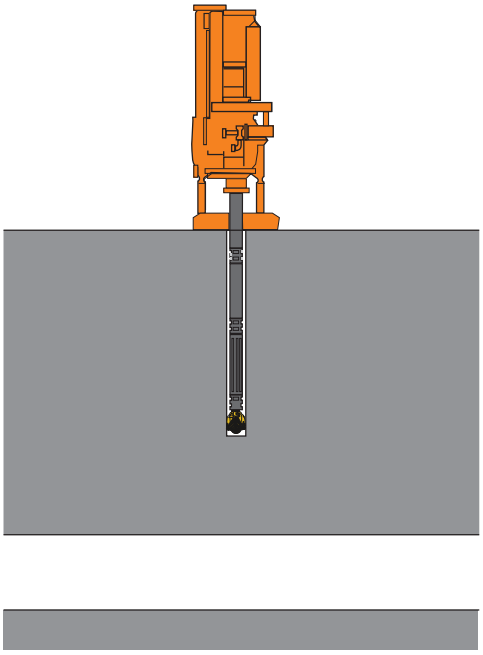
The interval between re-greasing needs to be more frequent with increased temperature as the lubricant properties are affected by increased operating temperatures. See page 33 for the re-greasing instruction.





GENERAL RECOMMENDED PILOT DRILLING PARAMETERS

Max recommended operating bit load 3 tonnes (6 600 Lbs) × bit diameter in inches.
Max recommended speed 60 RPM.



The net bit load and drilling speed (RPM) is chosen depending on rock characteristics ≤ max recommended bit load and RPM.

Utilise the highest RPM the rock formation and the machine allows ≤ max recommended bit RPM together with the correct bit load for optimum rate of penetration and bit service life.

Reduce the RPM before reducing the bit load.
For optimum performance use sufficient flushing to clean the hole and avoid regrinding of cuttings. Use min 800 litres/min of water for efficient flushing.

GENERAL INFORMATION FOR SANDVIK PILOT BITS

PART NO	BIT TYPE	DIAMETER		WEIGHT		PIN CONNECTION	MAX. REC. BIT LOAD		REC. DRILLING SPEED
		MM	INCH	KG	LBS	API REG	KG	LBS	RPM
0101097-0X	P70	229	9	45	100	Ø 4 1/2"	27000	59470	30–60
0101101-0X	P70	251	9 7/8	62	137	Ø 6 5/8"	29600	65200	30–60
0101070-0X	P70	279	11	75	165	Ø 6 5/8"	33000	72690	30–60
0101030-0X	P70	311	12 1/4	100	220	Ø 6 5/8"	36750	80950	30–60
0039727-0X	P70	349	13 3/4	120	164	Ø 6 5/8"	41250	90860	30–60
0101123-0X	P70	381	15	160	353	Ø 7 5/8"	45000	99120	30–60
0040009-0X	P70	406	16	205	450	Ø 7 5/8"	48000	105720	30–60
0101162-0X	P80	229	9	45	100	Ø 4 1/2"	27000	59470	30–60
0040005-0X	P80	251	9 7/8	62	137	Ø 6 5/8"	29600	65200	30–60
0101164-0X	P80	279	11	75	165	Ø 6 5/8"	33000	72690	30–60
0040007-0X	P80	311	12 1/4	100	220	Ø 6 5/8"	36750	80950	30–60
0040008-0X	P80	349	13 3/4	120	164	Ø 6 5/8"	41250	90860	30–60
0101167-0X	P80	381	15	160	353	Ø 7 5/8"	45000	99120	30–60
0040010-0X	P80	406	16	205	450	Ø 7 5/8"	48000	105720	30–60

SANDVIK REAMING HEADS

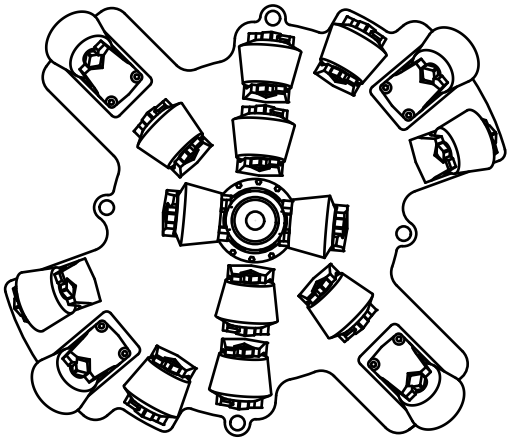
THE SANDVIK REAMING HEADS ARE AVAILABLE IN DIFFERENT TYPES:

Integral heads ex. CRH10D
Segmented heads ex. CRH10SD
Extendable heads ex. CRH10E

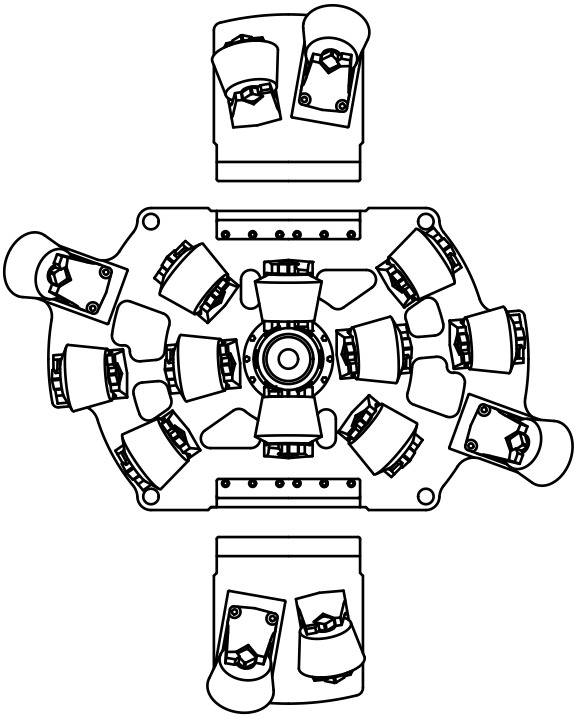
The figure in the name represents the reaming head diameter in feet (CRH10D=Ø 10'). Designs for other applications are available ex. blind boring up or down and for horizontal boring.

Segmented heads are used when reduced transport dimension and weight is required. Extendable heads are used for increased flexibility to drill different diameters using the same base head. All Sandvik reaming heads have bolted components for improved flexibility and ease of service and assembly.

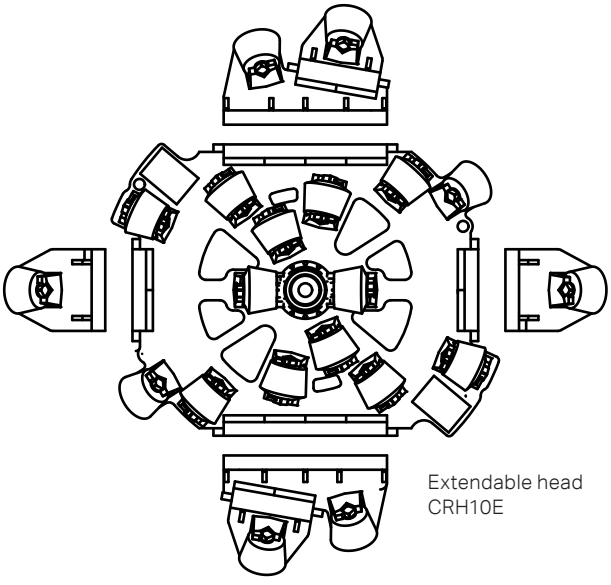
The reaming heads are designed with different size of centre hole in order to fit stems for different pilot hole sizes. Part- and serial numbers are welded on the side of the reamer as a reamer ID.



Integral head
CRH10D



Segmented head
CRH10SD



Extendable head
CRH10E

JOIN SANDVIK TO SHAPE A SUSTAINABLE FUTURE

Environmental considerations are crucial in all of our operations, and never more so than when it comes to the recycling of cemented carbide.

We recognize today's increasing environmental concerns, and we are the only mining company that recycles both steel and cemented carbide.

In fact, we have been collecting and recycling both scrap and discarded drilling consumables for conversion back into basic raw materials for more than 10 years. A large number of customers have joined our recycling program during this period. One major reason for this is that we make it easy for them to recycle, by collecting scrap from their own premises.

All of our customer service centres are now set up to receive used cemented carbide-enhanced products. Our recycling plant in Chiplun, India complies with the most stringent environmental standards, and is certified to the ISO 14001 and OHSAS 18001 (ISO 45001) international standard.

WHAT WE OFFER:

- Recycling of cemented carbide available worldwide
- Sustainable recycling process with low environmental impact
- Cost recovery and reduced waste disposal for you
- New tools made by using recycle carbide
- Consumables and tools from all manufacturers
- are accepted
- A win-win situation for all

Adopting sustainable business practices and handling them in the right way is a foundation that contributes across the entire business value chain.

The whole supply chain will be improved by incorporating recycling into the business process. For instance, our recycling process significantly reduces energy consumption and carbon dioxide emissions, thereby reducing environmental impact.

MOUNTING OF SADDLES

For Safety Instructions, see page 4-5.

1. The positions are marked on the side of the head frame. If there are two position marks, the upper one refers to the position nearest the head centre. Dowel pins locate the saddles in the correct position.

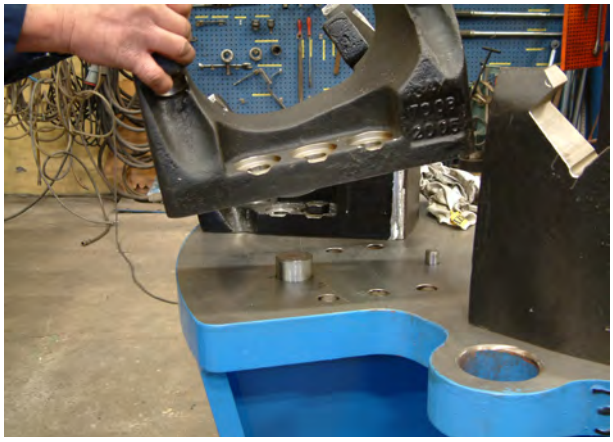
   Note. Do not attach the saddles for position 1 and 2 before the stem is mounted. All bolts, nuts and contact surfaces must be flat, cleaned and oiled before mounting.

2. Tighten the bolts crosswise to 2/3 of full torque (≈800 Nm).

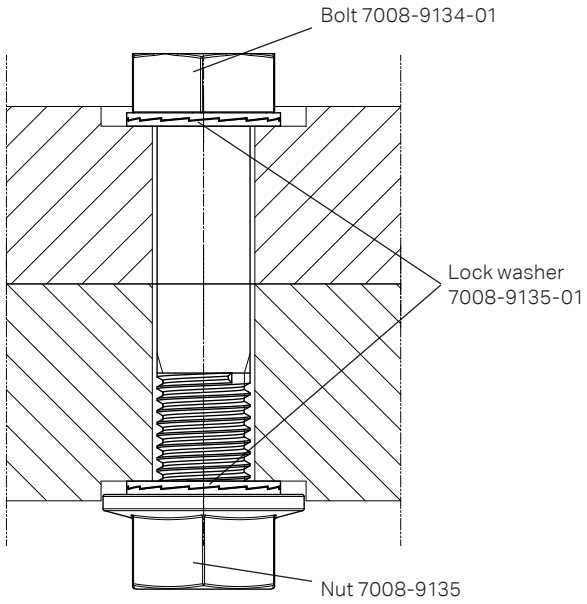
   Finish by tighten to full strength 1200 Nm. Always use new bolts and nuts, even when reassembling.

   The **Nord-lock** washers are reusable.

Example of tool combination.



Dowel pin Ø 50 mm 7008-2007-01
Dowel pin Ø 20 mm 7008-9145

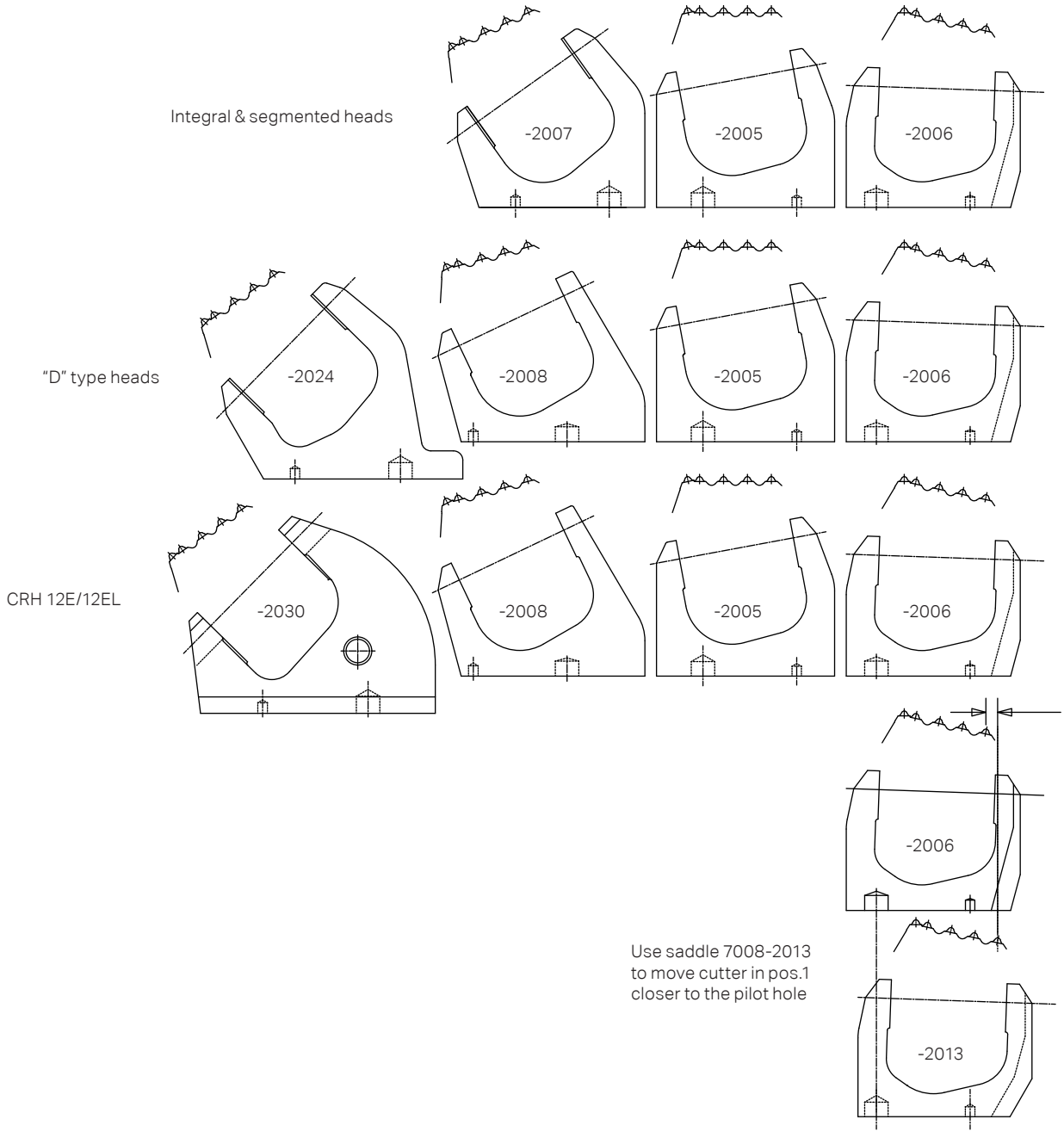


Different saddle types are used depending on positioning and the reaming head type. The most frequent dressings as per the illustration below. The part numbers are 7008-2XXX (some additional saddles modified for small diameters reaming heads are not shown below). The number of the different types varies with the reaming head diameter and type.

A new and improved gauge saddle system is implemented on all "D" type reaming heads to make it possible to reduce the reamer diameter by changing the gauge saddles only. See page 10 for more detailed information.

A special inner saddle, 7008-2013, is used to move cutter in position 1 closer to the pilot hole when required and is used to keep a maximum spacing to obtain efficient spalling into the pilot hole. (See illustration below).

Saddle 7008-2013 is required in position 1 when :
- Ø 9 / 9 7/8" stem is used in reaming heads with 340 mm stem fit,
- Ø 12 1/4" stem is used in reaming heads with Ø 360 mm stem fit (exception CRH10SE),
- Ø 13 3/4" stem is used in reaming heads with Ø 390 mm stem fit (exception CRH12E).



SADDLE POSITIONING

REAMING HEAD TYPE	HEAD DIA. MM	INNER SADDLE 7008-2015 POS.	INNER SADDLE 7008-2004 POS.	INNER SADDLE 7008-2006 POS.	INNER SADDLE 7008-2006-05 POS.	GAUGE SADDLE 7008-2003 POS.
CRH 2	660	1, 2				
CRH 3	950		1, 2			3, 4
CRH 3	1060			1, 2		3, 4
CRH 3	1084				1, 2	3, 4

REAMING HEAD TYPE	HEAD DIA. MM	INNER SADDLE 7008-2006 POS.	MIDDLE SADDLE 7008-2005 POS.	SEMI GAUGE SADDLE 7008-2008 POS.	GAUGE SADDLE 7008-2007 POS.	GAUGE SADDLE 7008-2024 POS.
CRH 4	1420	1, 2	3, 4,		5, 6	
CRH 5	1524	1, 2	3, 4		5, 6, 7, 8	
CRH 6/6S	1829	1, 2	3, 4, 5, 6		7, 8, 9, 10	
CRH 7/7S	2134	1, 2	3, 4, 5, 6, 7, 8		9, 10, 11, 12	
CRH 8/8S/8L	2440	1, 2	3, 4, 5, 6, 7, 8, 9, 10		11, 12, 13, 14	
CRH 8D	2447	1, 2	3, 4, 5, 6, 7, 8	9, 10		11, 12, 13, 14
CRH 9L	2743	1, 2	3, 4, 5, 6, 7, 8, 9, 10		11, 12, 13, 14	
CRH 10D/10SD	3094	1, 2	3, 4, 5, 6, 7, 8, 9, 10	11, 12		13, 14, 15, 16

REAMING HEAD TYPE	HEAD DIA. MM	INNER SADDLE 7008-2006 POS.	MIDDLE SADDLE 7008-2005 POS.	SEMI GAUGE SADDLE 7008-2008 POS.	GAUGE SADDLE 7008-2007 POS.	GAUGE SADDLE 7008-2024 POS.
CRH 6E	1829	1, 2	3, 4, 5, 6		7, 8, 9, 10	
CRH 6E	2236	1, 2	3, 4, 5, 6, 9, 10		11, 12, 13, 14	
CRH 6E	2429	1, 2	3, 4, 5, 6		7, 8, 9, 10, 11, 12, 13, 14	
CRH 8E	2441	1, 2	3, 4, 5, 6, 7, 8		9, 10, 11, 12	
CRH 8E	2765	1, 2	3, 4, 5, 6, 7, 8		9, 11, 13, 14, 15, 16	
CRH 8E	3154	1, 2	3, 4, 5, 6, 7, 8, 13, 14	15, 16		17, 18, 19, 20
CRH 8E	3510	1, 2	3, 4, 5, 6, 7, 8, 13, 14, 15, 16	17, 18		19, 20, 21, 22
CRH8SE	2442	1, 2	3,4,5,6,7,8,9,10		11,12,13,14	
CRH8SE	3052	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12	13,14		15,16,17,18
CRH 10SE	3047	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13, 14, 15, 16	
CRH 10SE	3372	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13, 14, 15, 16, 17, 18	
CRH 10SE	3696	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13, 14, 15, 16, 17, 18, 19, 20	

REAMING HEAD TYPE	HEAD DIA. MM	INNER SADDLE 7008-2006 POS.	MIDDLE SADDLE 7008-2005 POS.	SEMI GAUGE SADDLE 7008-2008 POS.	GAUGE SADDLE 7008-2007 POS.	GAUGE SADDLE 7008-2024 POS.
CRH 10E	3130	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13, 14, 15, 16	
CRH 10E	3500	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		14, 16, 17, 18, 19, 20	
CRH 10E	3824	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		14, 16, 17, 18, 19, 20, 21, 22	
CRH 10ED	3500	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13B, 14B, 15, 16, 17, 18	
CRH 10ED	3687	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	15, 16		17, 18, 19, 20
CRH 10ED	3824	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13B, 14B, 15, 16, 17, 18, 19, 20	
CRH 10ED	4042	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	17, 18		19, 20, 21, 22

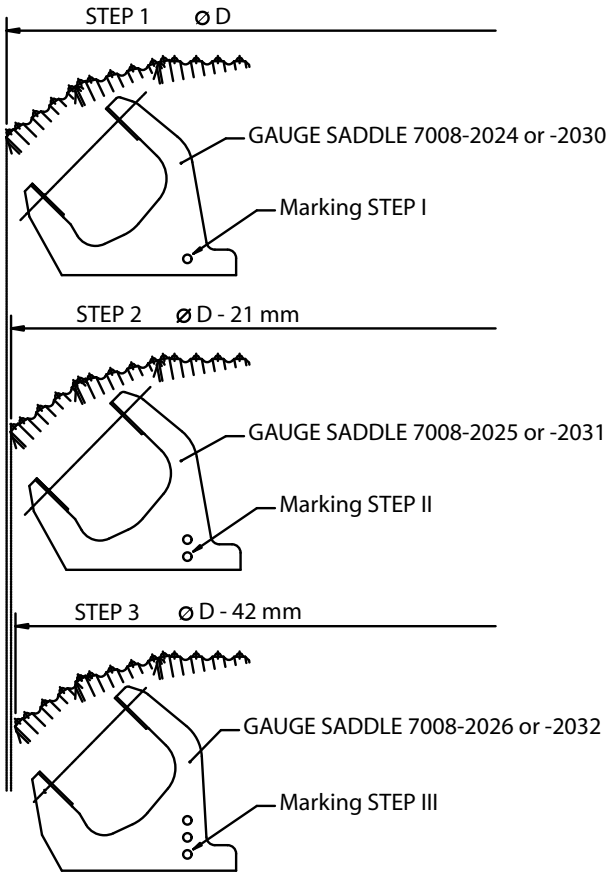
REAMING HEAD TYPE	HEAD DIA. MM	INNER SADDLE 7008-2006 POS.	MIDDLE SADDLE 7008-2005 POS.	MIDDLE SADDLE 7008-2035 POS.	SEMI GAUGE SADDLE 7008-2008 POS.	SEMI GAUGE SADDLE 7008-2038 POS.	GAUGE SADDLE 7008-2030 POS.
CRH 12E/12EL	3534	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12		13, 14		15, 16, 17, 18
CRH 12E/12EL	3840	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14		15, 16		17, 18, 19, 20
CRH 12E/12EL	4146	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16		17, 18		19, 20, 21, 22
CRH 12E/12EL	4500	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18		19, 20		21, 22, 23, 24
CRH 12E/12EL	5000	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20		21, 22		23, 24, 25, 26
CRH 12E	5520	1, 2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22		23, 24 25, 26		27, 28, 29, 30
CRH 12E	6028	1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26		27, 28, (29), (30)	(31),(32),33,34 35,36

Saddle positions in paranthesis (x), are for optional use when heavy gauge wear is expected.

GAUGE SADDLE SYSTEM WITH REDUCED REAMER DIAMETER OPTION

The gauge saddle system on "D"-type reaming heads makes it possible to reduce the reamer diameter in two steps by changing the gauge saddles only (see illustrations). This option is valid on all Sandvik reaming heads that takes gauge saddles type 7008-2024 or 7008-2030. This option can be used in a long raise with heavy gauge button wear and makes it easier to reach the rock face again after lowering the reaming head for any service. The "D"-type gauge saddles have different part numbers and markings (see table and illustrations) in order to reduce the risk of mixing different types on the same reamer.

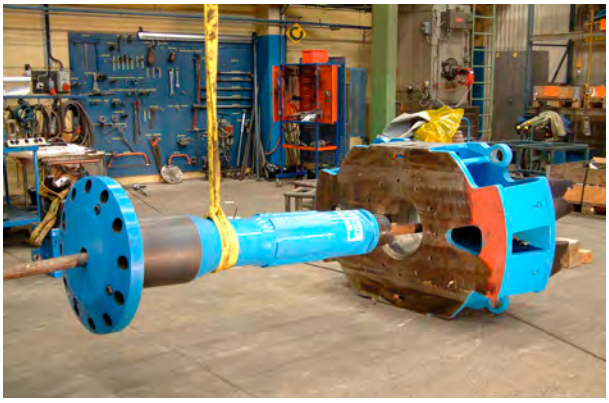
DIAMETER STEP NO	SADDLE PART NO	MARKING ON SADDLE SIDE
I	7008-2024	o – one hole drilled
II	7008-2025	o o – two holes drilled
III	7008-2026	o o o – three holes drilled
I	7008-2030	o – one hole drilled
II	7008-2031	o o – two holes drilled
III	7008-2032	o o o – three holes drilled



Important!
Make sure to use four gauge saddles of the same type (same part no and marking) together on the reamer at all times to keep the correct profile.

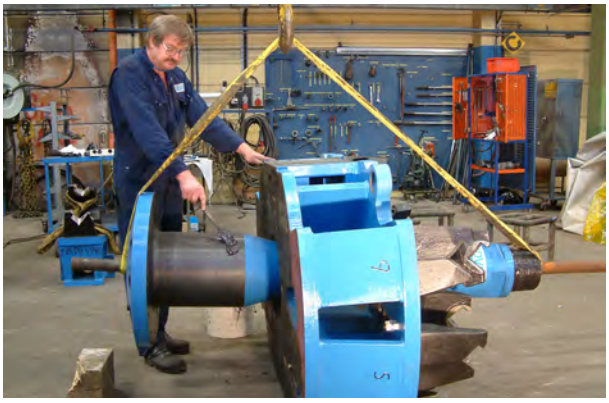
MOUNTING OF STEM

For Safety Instructions, see page 4-5.

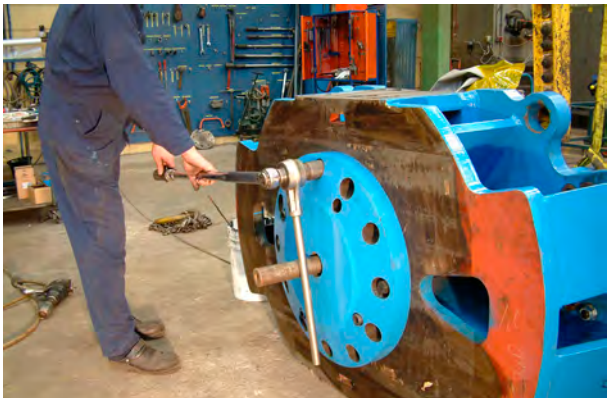


1. Place the head on its side.

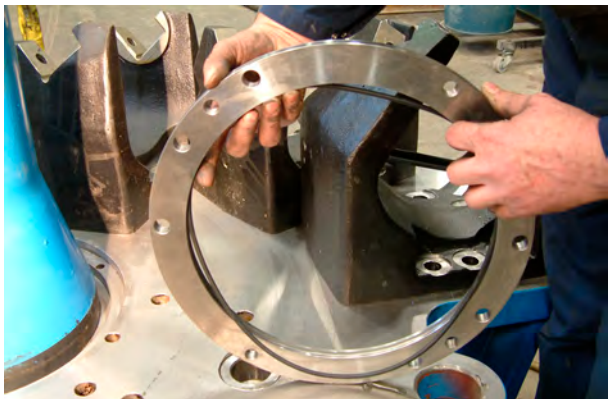
2. Clean the centre hole. Use a suitable solvent to remove the rust protection. Apply a lot of grease before fitting the stem.



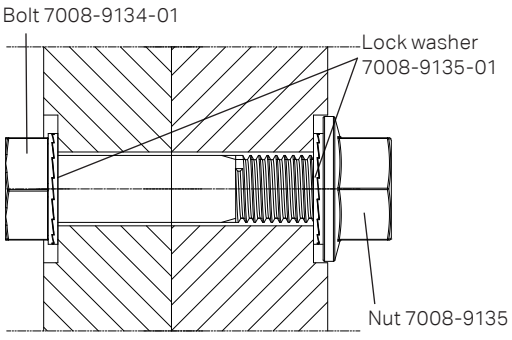
3. Insert the stem. Put a rod through the stem for easier handling. Clean and put a lot of grease on the inlet part of the stem. Use ordinary machine grease (0.5 kg).



4. Push the stem into position. Oil the bolts. Pre-tighten the bolt crosswise to 800 Nm. Tighten to full torque 1200 Nm.

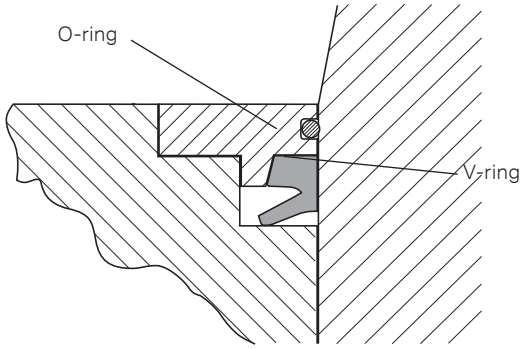


5. Clean the O-ring groove in the retainer ring and insert the O-ring.

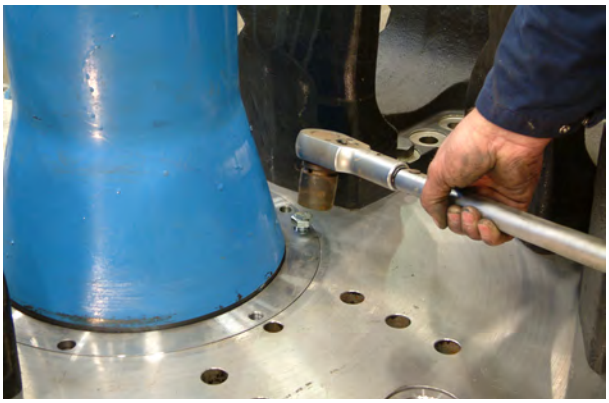


6. Clean the seal seat. Slide the V-ring over the top of the stem and push it into position. Note. Do not use the V-ring in reaming head CRH3 and CRH4.

7. Apply silicone sealant on top of the V-ring around the stem. Lower the retainer ring over the stem into position. Make sure both seals are properly seated.



8.



9. Tighten the bolts cross-wise until the retainer ring is seated. Make-up torque 220 Nm.

10. Mount the saddles in position 1 and 2 (see picture on page 8). The head assembly is now complete.

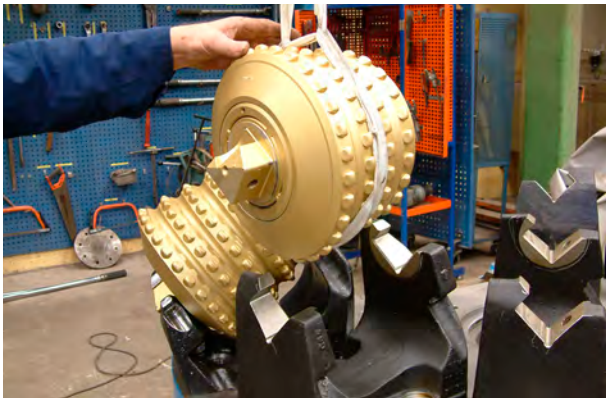
SEAL RETAINER

PART NO.	STEM FIT Ø, MM
7008-9380	340
7008-9381	360
7008-9398	390
7008-9625	451

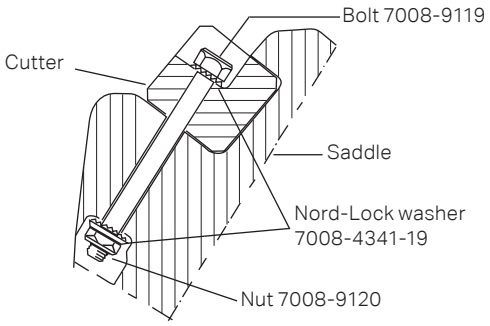
MOUNTING OF CUTTERS

For Safety Instructions, see page 4-5.

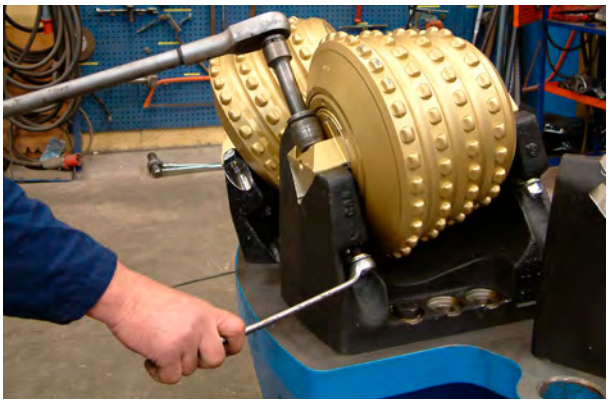
1. The positions are marked on the side of the head frame. If there are two position marks, the upper one refers to the position nearest the head centre.



2. Lift the cutters into position. See table on page 14-16 for correct positioning.



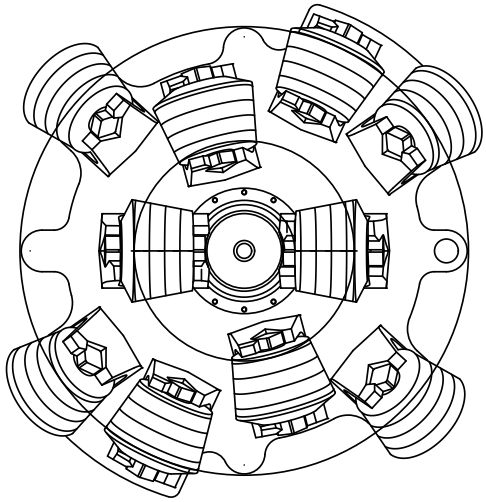
3. Put some oil on the bolt before tightening.



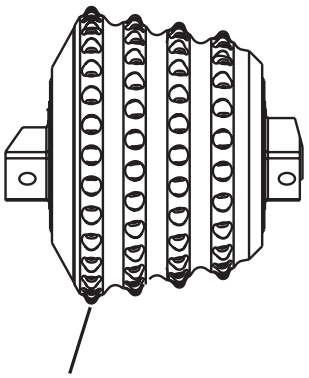
4. Tighten to 300 Nm.

BUTTON ROW OVERLAPPING

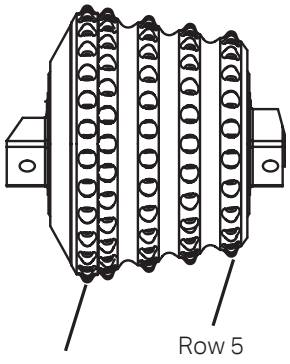
On all Sandvik reaming heads there are button rows that are tracking (overlapping).



This feature (overlapping) can be used if there is a CMR41 cutter with button row No. 1 damaged or a CMR52 cutter with button row No. 1 or 5 damaged. Mount them in overlapping positions to let the cutter next to it (outside or inside) without damaged button rows cut the rock in this track.



CMR 41



CMR 52

CUTTER POSITIONING

The cutters are to be placed in different positions, depending on which spacing is required. 25,5 mm spacing is recommended for medium to hard rock, 51 mm spacing is recommended for soft rock.

INTEGRAL- AND SEGMENTED HEADS

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 2	660	2	CMR 41 CMR 52	1 2	 1, 2
CRH 3*	950	4	CMR 41 CMR 52	1, 3 2, 4	1, 2 3, 4
CRH 3	1060	4	CMR 41 CMR 52	1, 3 2, 4	1, 2 3, 4
CRH 3**	1084*	4	CMR 41-27 CMR 52-27	1, 3 2, 4	1, 2 3, 4
CRH 4	1420	6	CMR 41 CMR 52	1, 3, 5 2, 4, 6	1, 2 3, 4, 5, 6
CRH 5	1524	8	CMR 41 CMR 52	1, 5, 7 2, 3, 4, 6, 8	4 1, 2, 3, 5, 6, 7, 8
CRH 6/6S	1829	10	CMR 41 CMR 52	1, 3, 5, 7, 9 2, 4, 6, 8, 10	3, 4, 5, 6 1, 2, 7, 8, 9, 10
CRH 7/7S	2134	12	CMR 41 CMR 52	1, 3, 5, 7, 9, 11 2, 4, 6, 8, 10, 12	3, 4, 5, 6, 7, 8 1, 2, 9, 10, 11, 12
CRH 8/8S/8D/8L	2440	14	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13 2, 4, 6, 8, 10, 12, 14	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13, 14
CRH 9L	2743	14	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13 2, 4, 6, 8, 10, 12, 14	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13, 14
CRH 10D/10SD	3094	16	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15 2, 4, 6, 8, 10, 12, 14, 16	5, 6, 7, 8, 9, 10, 11, 12 1, 2, 3, 4, 13, 14, 15, 16

Note! Cutter positioning when saddle 7008-2013 is used in position 1 (when a Ø 9", 9 7/8" stem is used in a reaming head with Ø 340 mm stem fit or when a Ø 12 1/4" stem is used in a reaming head with Ø 360 mm stem fit): 25,5 mm spacing: pos. 1, CMR 52; pos. 2, CMR 52. 51 mm spacing: pos. 1, CMR 52; pos. 2, CMR 41.

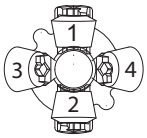
For cutter mounting of other Sandvik cutter types, consult your local Sandvik representative.

* CRH 3 Ø 950 mm, part number 7008-1009-30, is designed for 7 7/8" stem only!

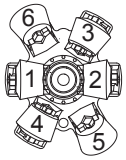
** CRH 3 Ø 1084 mm, part number 7008-1311-30, is designed for 9" or 9 7/8" stems and CMR 41-27 / CMR 52-27 cutters only!

CRH 2
Ø 660/26"

CRH 3
Ø 950/37"
Ø 1060/42"
Ø 1084/43"

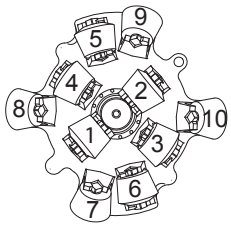


CRH 4
Ø 1420/56"

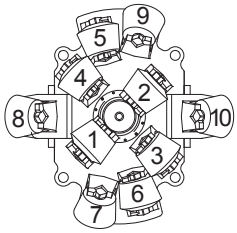


CRH 5
Ø 1524/60"

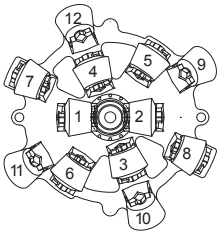
CRH 6
Ø 1829/72"



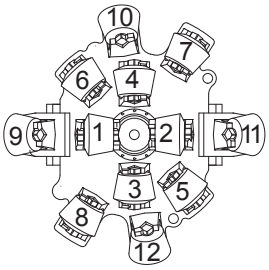
CRH 6S
Ø 1829/72"



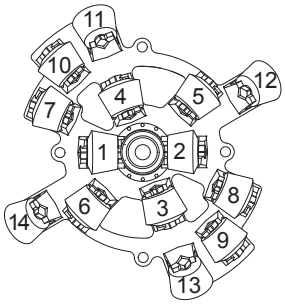
CRH 7
Ø 2134/84"



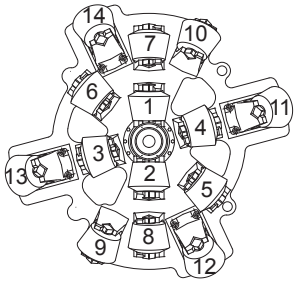
CRH 7S
Ø 2134/84"



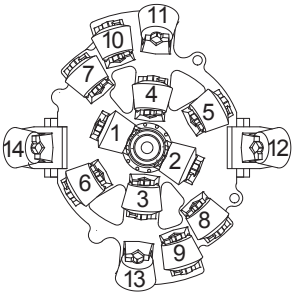
CRH 8/8L
Ø 2440/96"



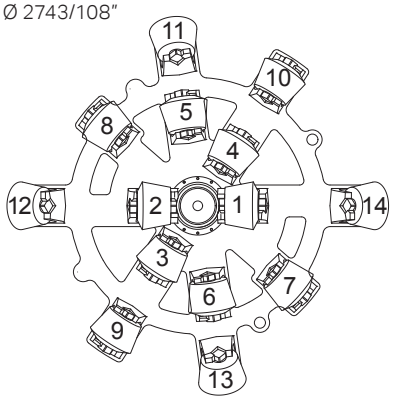
CRH 8D
Ø 2447/96"



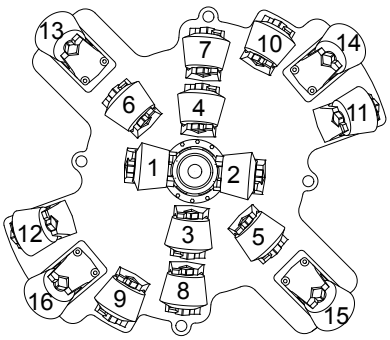
CRH 8S
Ø 2440/96"



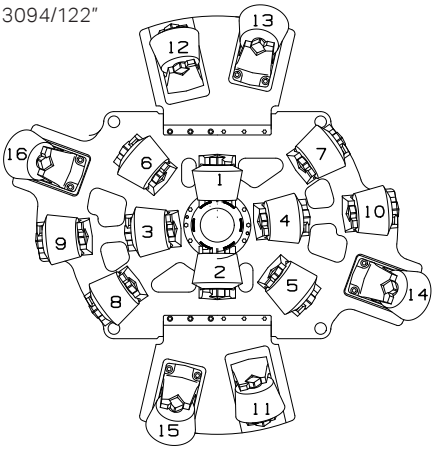
CRH 9L
Ø 2743/108"



CRH 10D
Ø 3094/122"



CRH 10SD
Ø 3094/122"



CUTTER POSITIONING

The cutters are to be placed in different positions, depending on which spacing is required. 25,5 mm spacing is recommended for medium to hard rock, 51 mm spacing is recommended for soft rock.

EXTENDABLE HEADS

CRH 6E

Reamer base 7008-1318-22 with Ø340 mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 6E	1829	10	CMR 41 CMR 52	1, 3, 5, 7, 9 2, 4, 6, 8, 10	3, 4, 5, 6 1, 2, 7, 8, 9, 10
CRH 6E	2236	12	CMR 41 CMR 52	1, 3, 5, 9, 11, 13 2, 4, 6, 10, 12, 14	3, 4, 5, 6, 9, 10 1, 2, 11, 12, 13, 14
CRH 6E	2429	14	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13 2, 4, 6, 8, 10, 12, 14	3, 4, 5, 6, 9, 10 1, 2, 7, 8, 11, 12, 13, 14

CRH 8E

Reamer base 7008-1625-20 with Ø390 mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 8E	2441	12	CMR 41 CMR 52	1, 3, 5, 7, 9, 11 2, 4, 6, 8, 10, 12	3, 4, 5, 6, 7, 8 1, 2, 9, 10, 11, 12
CRH 8E	2765	14	CMR 41 CMR 52	1, 3, 5, 7, 9, 13, 15 2, 4, 6, 8, 11, 14, 16	3, 4, 5, 6, 7, 8 1, 2, 9, 11, 13, 14, 15, 16
CRH 8E	3154	16	CMR 41 CMR 52	1, 3, 5, 7, 13, 15, 17, 19 2, 4, 6, 8, 14, 16, 18, 20	3, 4, 5, 6, 7, 8, 13, 14 1, 2, 15, 16, 17, 18, 19, 20
CRH 8E	3510	18	CMR 41 CMR 52	1, 3, 5, 7, 13, 15, 17, 19, 21 2, 4, 6, 8, 14, 16, 18, 20, 22	3, 4, 5, 6, 7, 8, 13, 14 1, 2, 15, 16, 17, 18, 19, 20, 21, 22

CRH 8SE

Reamer base 7008-1524-20 with Ø340mm stem fit and 7008-1624-20 with Ø390mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH8SE	2442	14	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13 2, 4, 6, 8, 10, 12, 14	3, 4, 5, 6, 7, 8 1, 2, 9, 10, 11, 12, 13, 14
CRH8SE	3052	18	CMR 41 CMR 52	1, 3, 5, 7, 9, 12, 13, 15, 17 2, 4, 6, 8, 10, 11, 14, 16, 18	3, 4, 5, 6, 7, 8, 9, 10, 13, 14 1, 2, 11, 12, 15, 16, 17, 18

CRH 10E

Reamer base 7008-1031-20, Ø360 mm stem fit and 7008-1331-20, Ø390 mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 10E	3130	16	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15 2, 4, 6, 8, 10, 12, 14, 16	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13, 14, 15, 16
CRH 10E	3500	18	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 14, 17, 19 2, 4, 6, 8, 10, 12, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 14, 16, 17, 18, 19, 20
CRH 10E	3824	20	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 14, 17, 19, 21 2, 4, 6, 8, 10, 12, 16, 18, 20, 22	3, 4, 5, 6, 7, 8, 9, 10, 11, 12 1, 2, 14, 16, 17, 18, 19, 20, 21, 22

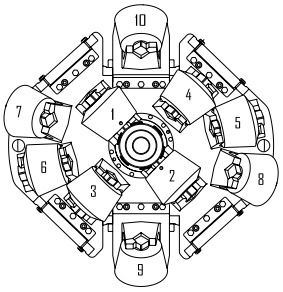
CRH 10SE

Reamer base 7008-1630-20, Ø360 mm stem fit

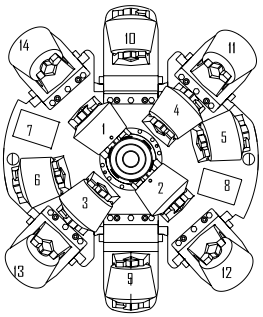
REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 10SE	3047	16	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15 2, 4, 6, 8, 10, 12, 14, 16	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13, 14, 15, 16
CRH 10SE	3372	18	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17 2, 4, 6, 8, 10, 12, 14, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13, 14, 15, 16, 17, 18
CRH 10SE	3696	20	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19 2, 4, 6, 8, 10, 12, 14, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10, 11, 12 1, 2, 13, 14, 15, 16, 17, 18, 19, 20

CRH 6E

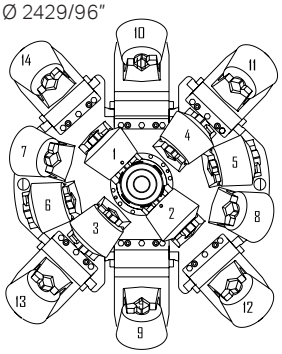
Ø 1829/72"



Ø 2236/88"

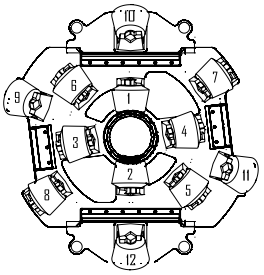


Ø 2429/96"

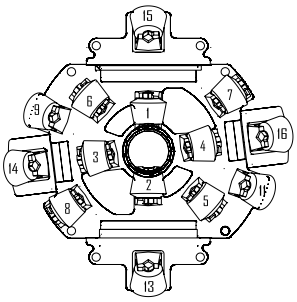


CRH 8E

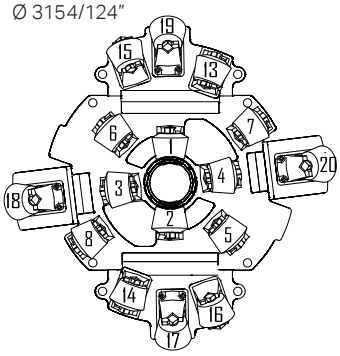
Ø 2441/96"



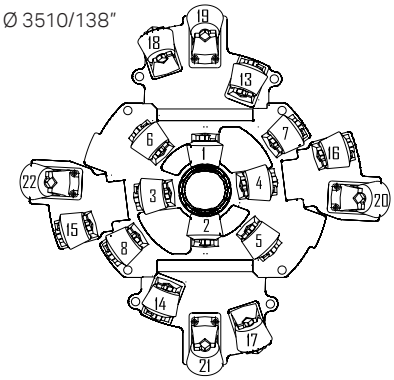
Ø 2765/109"



Ø 3154/124"

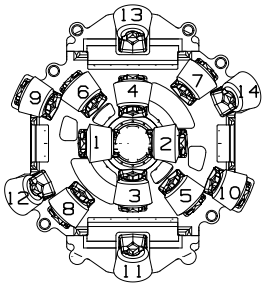


Ø 3510/138"

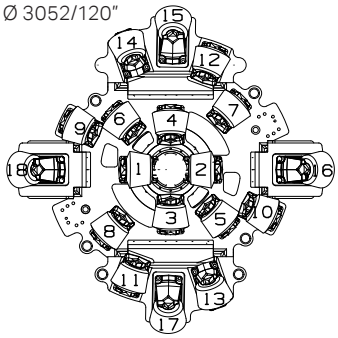


CRH 8SE

Ø 2442/96"

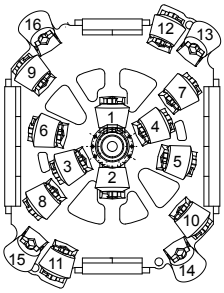


Ø 3052/120"

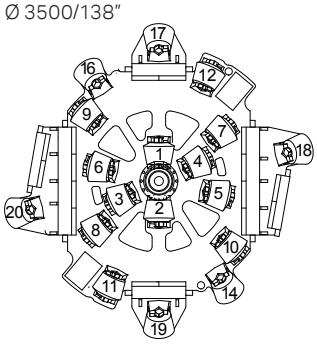


CRH 10E

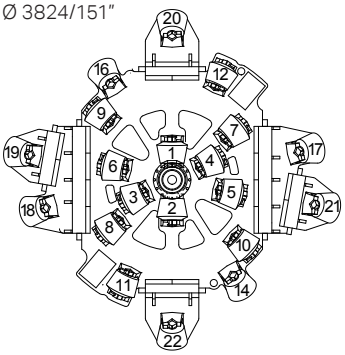
Ø 3130/123"



Ø 3500/138"

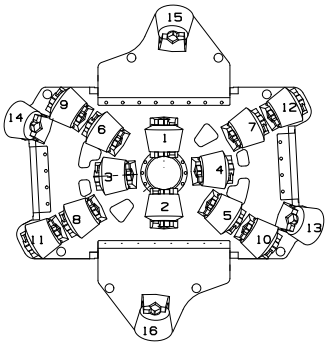


Ø 3824/151"

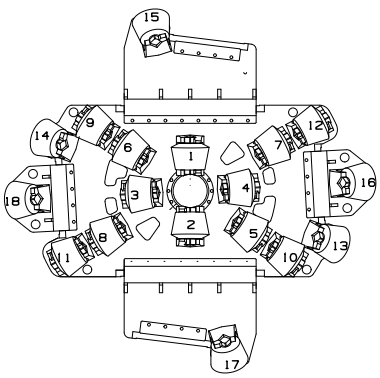


CRH 10SE

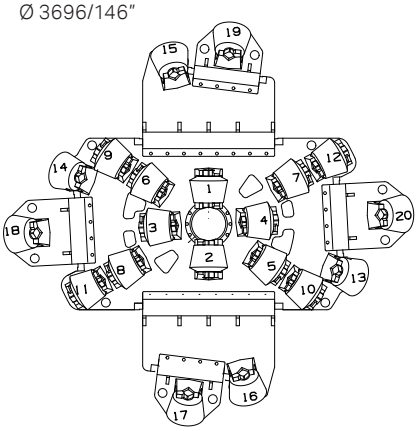
Ø 3047/120"



Ø 3372/133"



Ø 3696/146"



The cutters are to be placed in different positions, depending on which spacing is required. 25,5 mm spacing is recommended for medium to hard rock, 51 mm spacing is recommended for soft rock.

EXTENDABLE HEADS

CRH 10ED

Reamer base 7008-1440-20, Ø360 mm stem fit and 7008-1340-20, Ø390 mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 10ED	3500	18	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13B, 15,17 2, 4, 6, 8, 10, 12, 14B, 16,18	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13B, 14B, 15, 16, 17, 18
CRH 10ED	3687	20	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19 2, 4, 6, 8, 10, 12, 14, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10,11,12 1, 2, 13, 14, 15, 16, 17, 18, 19, 20
CRH 10ED	3824	20	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13B, 15, 17, 19 2, 4, 6, 8, 10, 12, 14B, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10, 11, 12 1, 2, 13B, 14B, 15, 16, 17, 18, 19, 20
CRH 10ED	4042	22	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22	3, 4, 5, 6, 7, 8, 9, 10, 11, 12 1, 2,13, 14, 15, 16, 17, 18, 19, 20, 21, 22

CRH 12E/CRH 12EL

Reamer base Ø 390 mm stem fit: CRH12E 7008-1338-2X , CRH12EL 7008-1335-2X
Reamer base Ø 451 mm stem fit: CRH12E 7008-1138-2X

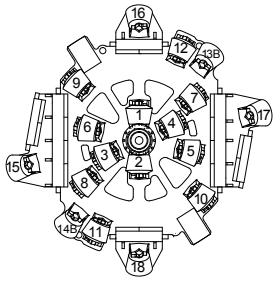
REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	TYPE OF CUTTER	POSITION 25.5 MM SPACING	POSITION 51 MM SPACING
CRH 12E/12EL	3534	18	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17 2, 4, 6, 8, 10, 12, 14, 16, 18	3, 4, 5, 6, 7, 8, 9, 10 1, 2, 11, 12, 13, 14, 15, 16, 17, 18
CRH 12E/12EL	3840	20	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19 2, 4, 6, 8, 10, 12, 14, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10, 11, 12 1, 2, 13, 14, 15, 16, 17, 18, 19, 20
CRH 12E/12EL	4146	22	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22	3, 4, 5, 6, 7, 8, 9, 10, 11, 12 1, 2, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
CRH 12E/12EL	4500	24	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 1, 2, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
CRH 12E/12EL	5000	26	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 1, 2, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26
CRH 12E	5520	30	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 1, 2, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
CRH 12E	6028	32 (36)	CMR 41 CMR 52	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, (29), (31), 33, 35 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, (30), (32), 34, 36	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 1, 2, 21, 22, 23, 24, 25, 26, 27, 28, (29), (30), 31, (32), 33, 34, (35), 36

Note!
Cutter positioning when saddle 7008-2013 is used in position 1 (when a Ø 12 1/4" stem is used in a reaming head with Ø 360 mm stem fit with exception for CRH10SE or when a Ø 13 3/4" stem is used in a reaming head with Ø 390 mm stem fit with exception for CRH12SE):
25,5 mm spacing: pos. 1, CMR 52; pos. 2, CMR 52.
51 mm spacing: pos. 1, CMR 52; pos. 2, CMR 41.
For cutter mounting of other Sandvik cutter types, consult your local Sandvik representative.

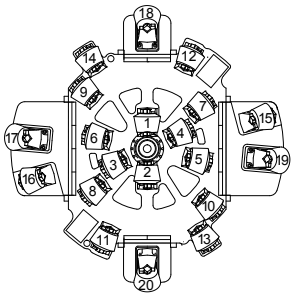
Cutter positions in parantheses (X), are for optional use, when heavy gauge wear is expected.

CRH 10ED

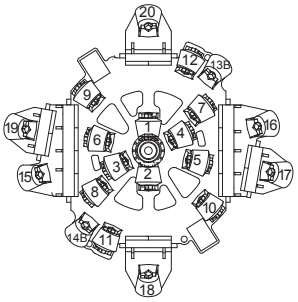
Ø 3500/138"



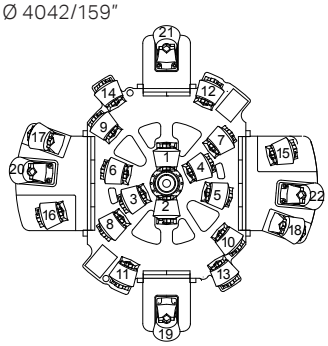
Ø 3687/145"



Ø 3824/151"

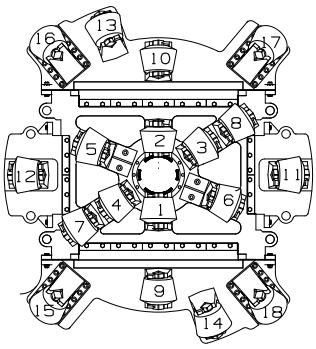


Ø 4042/159"

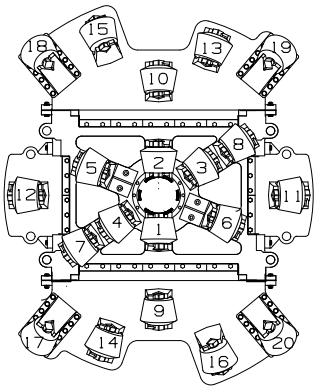


CRH 12E/CRH 12EL

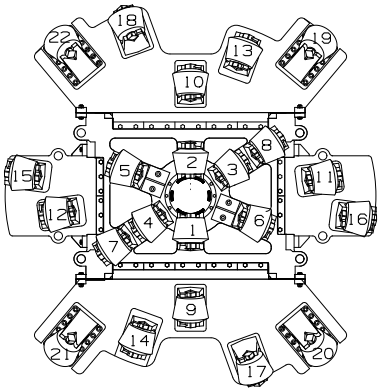
Ø 3534/139"



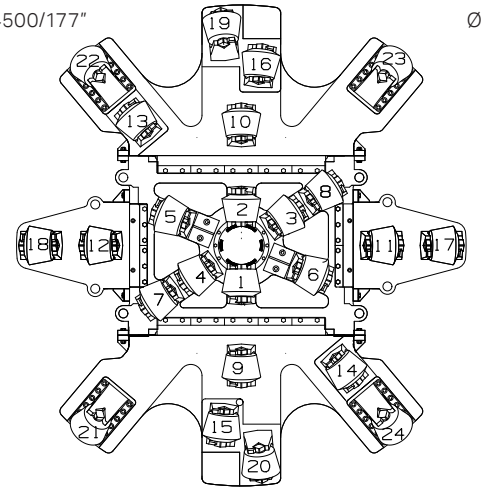
Ø 3840/151"



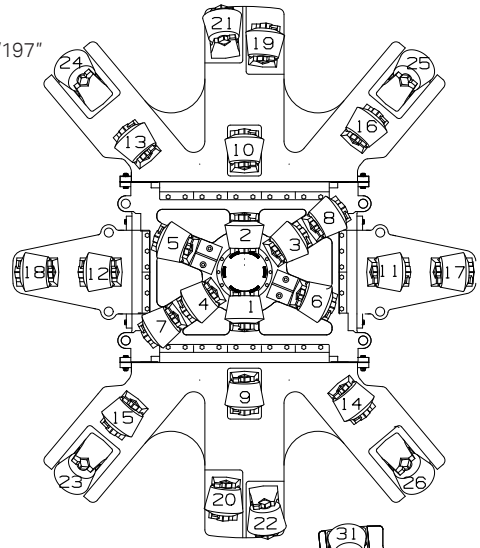
Ø 4146/163"



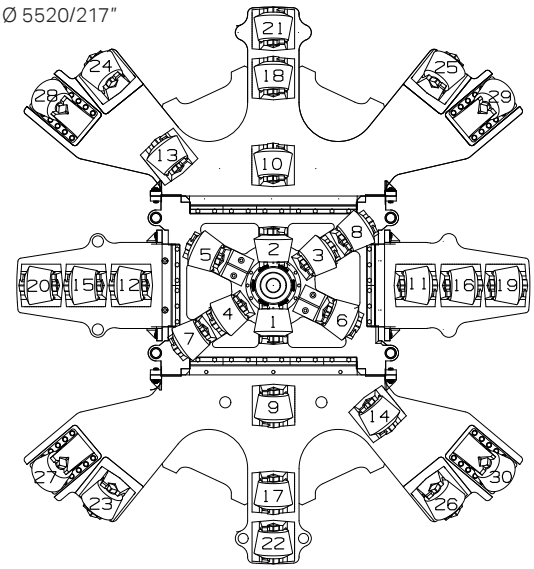
Ø 4500/177"



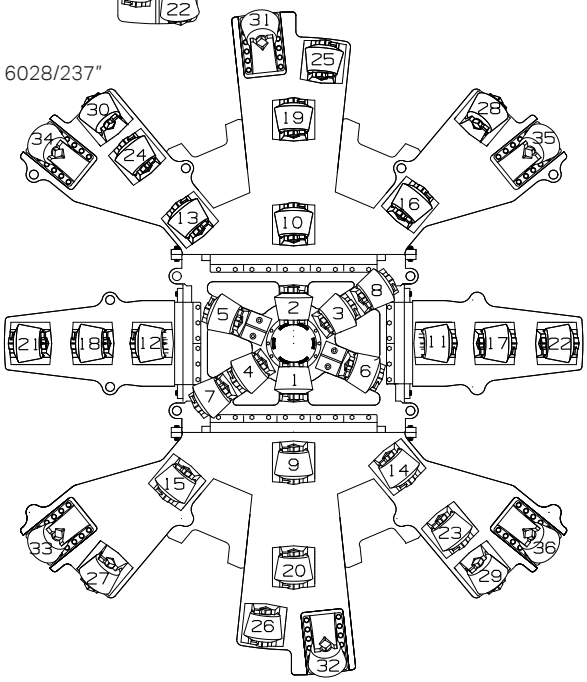
Ø 5000/197"



Ø 5520/217"

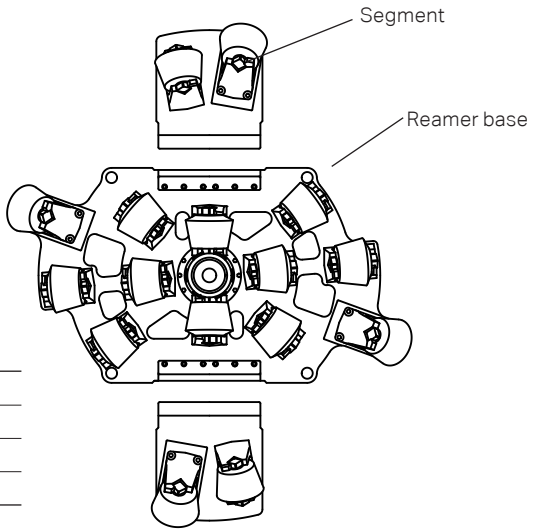


Ø 6028/237"



MOUNTING OF SEGMENTS

For Safety Instructions, see page 4-5.



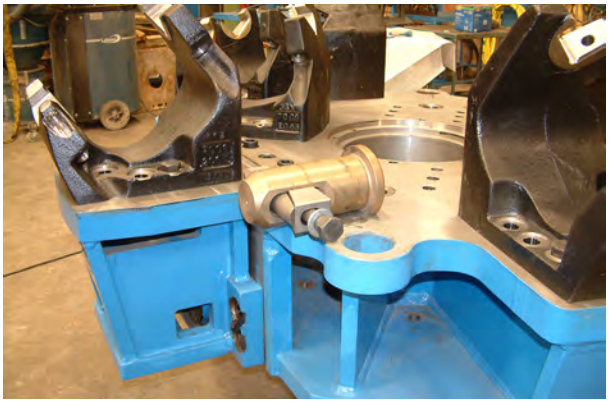
CRH 6S, 7S, 8S, 10SD CRH 6E, 8E, 8SE, 10SE, 10E, 10ED

Segmented heads are designed in order to facilitate transportation through narrow openings. The reamer base is transported with the segments dismounted until the collaring site is reached.

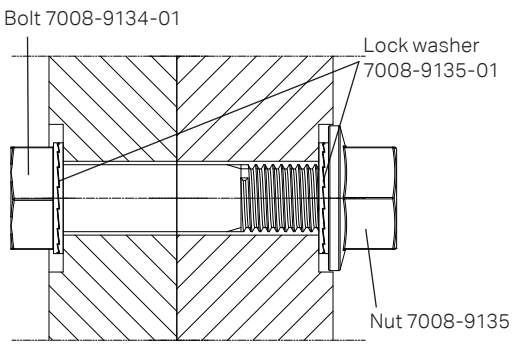
REAMING HEAD TYPE	BASE HEAD PART NO.	SEGMENT PART NO.	NO. OF SEGMENT	NO. OF CUTTER
CRH 6S	7008-1418-21	7008-2101-20	2	10
CRH 7S	7008-1421-21	7008-2101-20	2	12
CRH 8S	7008-1424-21	7008-2101-20	2	14
CRH 10SD	7008-1831-21	7008-2142-20	2	16

1. Clean all contact surfaces. Oil bolts, nuts, wedge and slotwedge. Hook the segment on to the head as shown.

2. Fit the upper wedge.



3. Fit the slot wedge. Tighten all bolt joints to 2/3 torque (≈800 Nm). Tighten to full torque 1200 Nm. Begin with upper wedge. Repeat on slot-wedge.



4. Complete the segment assembly by tightening the bolt/nut joints. Start with 2/3 torque (≈800 Nm). Tighten to full torque 1200 Nm. Example of tool combination see page 8.

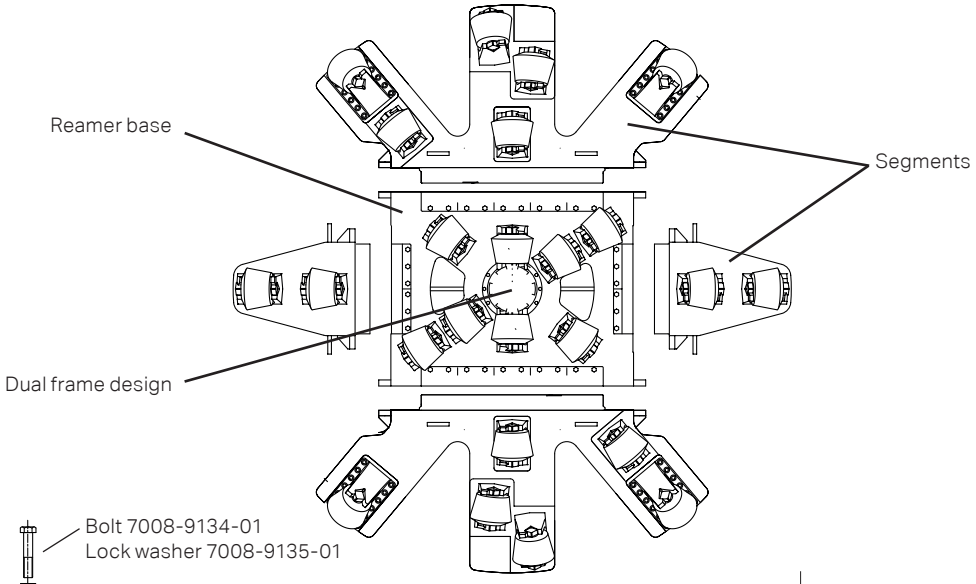
Segment part number: 7008-XXXX-YY

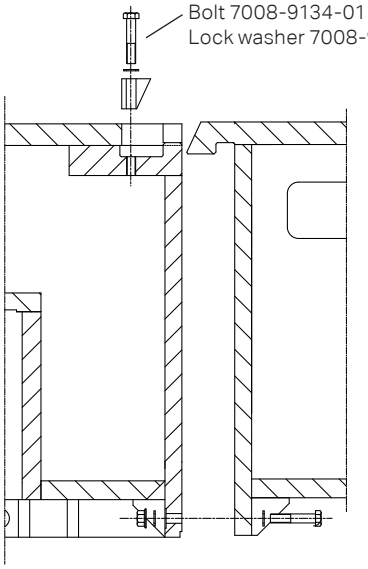
ex: 7008-2109-2X (without saddles)

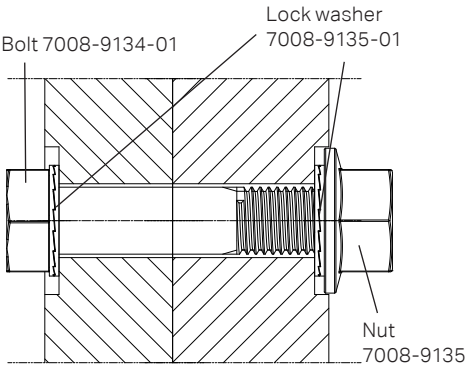
7008-2109-3X (with saddles)

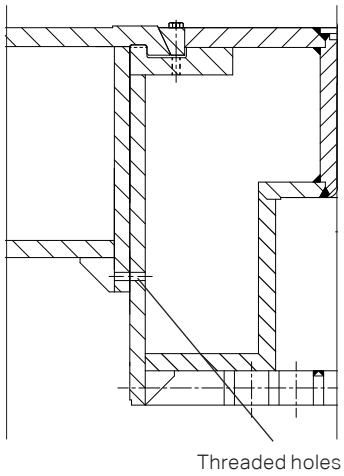
CRH 12E/CRH 12EL

The CRH 12E system is a user friendly design which facilitates transportation through narrow openings and substancially reduces the time for assembly. The reamer base is transported with the segments dismounted until the collaring site is reached.

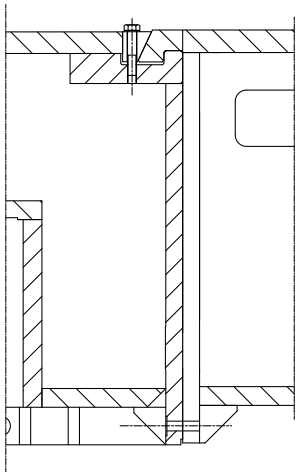








Clean all contact surfaces, oil bolts, nuts and wedges. Hook the segments on to the head as shown. Start to tighten the upper wedge joints.



Begin with the wedge in the middle and work your way outwards. Tighten the bolts to 2/3 torque (800 Nm). Continue with the bolt joints on the sides and at the bottom of the segments. Tighten to 2/3 torque(800 Nm). Tighten to full torque (1200 Nm). Use the same sequense as when tightening to 2/3 torque.

When using CRH12E Light segments on the heavy CRH12E reamer base make sure that the reamer base have the additional threaded holes, shown on the illustration above, otherwise the reamer base needs to be modified by Sandvik. Bolts M6S 24x80-10.9 7008-9134-03 should be used in the threaded holes.

SEGMENT POSITIONING

CRH 6E

Reamer base 7008-1318-22 with Ø 340 mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT PART NUMBER	SEGMENT PART NUMBER
CRH 6E	1829	10	2	7008-2101-20	
CRH 6E	2236	12	2 + 4	7008-2186-25	7008-2187-20
CRH 6E	2429	14	2 + 4	7008-2169-25	7008-2170-20

CRH 8E

Reamer base 7008-1625-20 with Ø 390 mm stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT PART NUMBER	SEGMENT PART NUMBER
CRH 8E	2441	12	2	7008-2181-20	
CRH 8E	2765	14	2 + 2	7008-2182-20	7008-2183-20
CRH 8E	3154	16	2 + 2	7008-2184-20	7008-2185-20
CRH 8E	3510	18	2 + 2	7008-2194-20	7008-2195-20

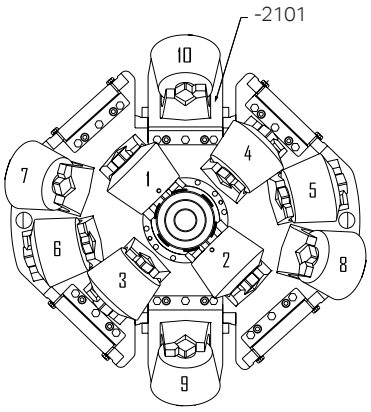
CRH 8SE

Reamer base 7008-1524-20 with Ø340mm stem fit and 7008-1624-20 with Ø390mm stem fit

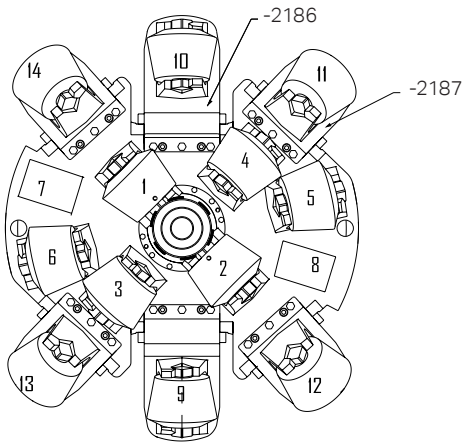
REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT PART NUMBER	SEGMENT PART NUMBER
CRH 8SE	2442	14	2	7008-2172-20	
CRH 8SE	3052	18	2 + 2	7008-2174-20	7008-2173-20

CRH 6E

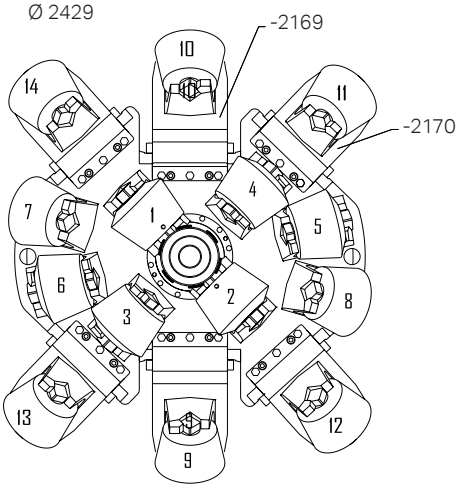
Ø 1829



Ø 2236

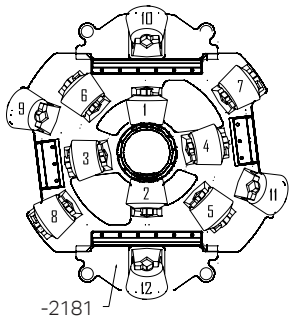


Ø 2429

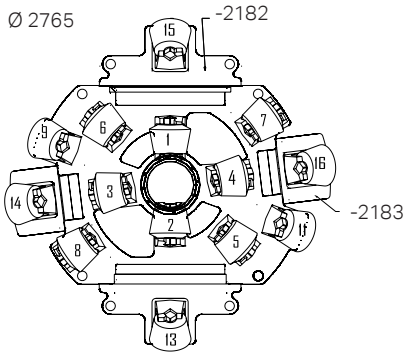


CRH 8E

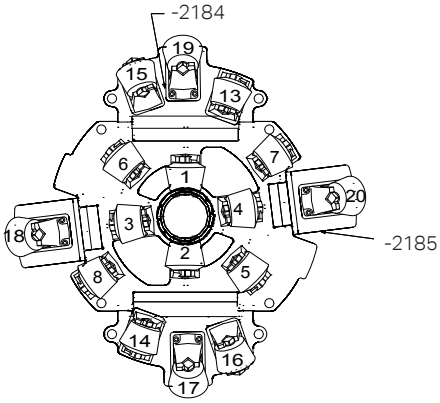
Ø 2441



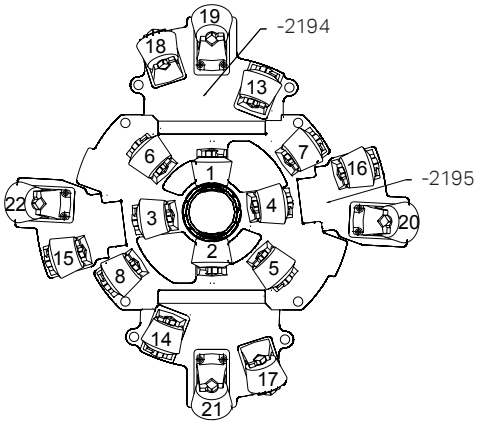
Ø 2765



Ø 3154

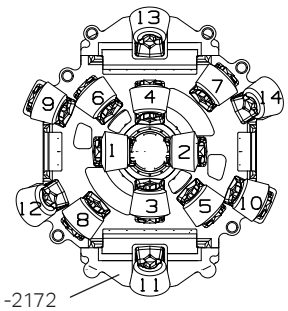


Ø 3510

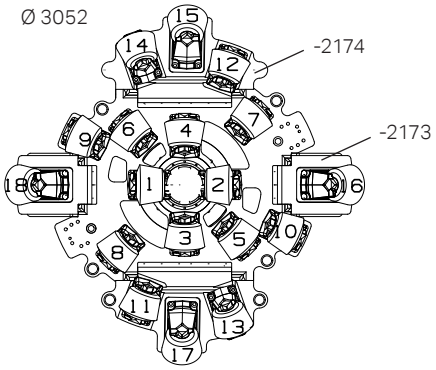


CRH 8SE

Ø 2442



Ø 3052



CRH 10E

Reamer base 7008-1031-20, Ø360 stem fit and 7008-1331-20, Ø390 stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT PART NUMBER	SEGMENT PART NUMBER	SEGMENT PART NUMBER
CRH 10E	3130	16	Reamer base only			
CRH 10E	3500	18	2 + 2	7008-2109-20	7008-2110-20	
CRH 10E	3824	20	2 + 2 + 2	7008-2109-20	7008-2110-20	7008-2111-20

CRH 10ED

Reamer base 7008-1440-20, Ø360 stem fit and 7008-1340-20, Ø390 stem fit

REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT PART NUMBER	SEGMENT PART NUMBER	SEGMENT PART NUMBER
CRH 10ED	3500	18	2 + 2	7008-2109-20	7008-2110-20	
CRH 10ED	3687	20	2 + 2	7008-2152-20	7008-2153-20	
CRH 10ED	3824	20	2 + 2 + 2	7008-2109-20	7008-2110-20	7008-2111-20
CRH 10ED	4042	22	2 + 2	7008-2144-20	7008-2145-20	

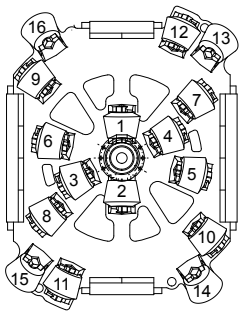
CRH 10SE

Reamer base 7008-1630-20, Ø360 stem fit

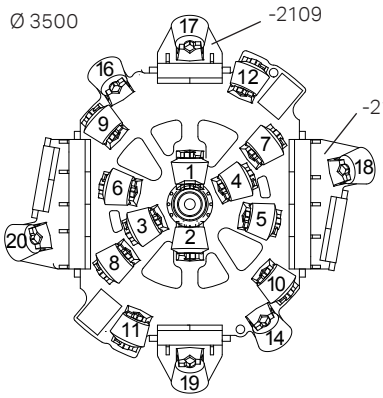
REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT PART NUMBER	SEGMENT PART NUMBER	SEGMENT PART NUMBER
CRH 10SE	3047	16	2	7008-2134-20		
CRH 10SE	3372	18	2 + 2	7008-2135-20	7008-2136-20	
CRH 10SE	3696	20	2 + 2 + 2	7008-2135-20	7008-2136-20	7008-2138-20

CRH 10E

Ø 3130



Ø 3500



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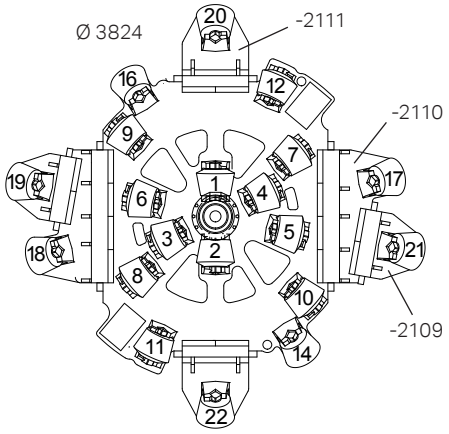
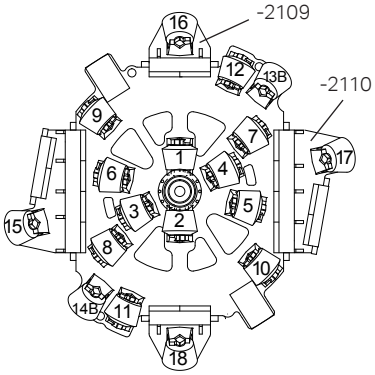
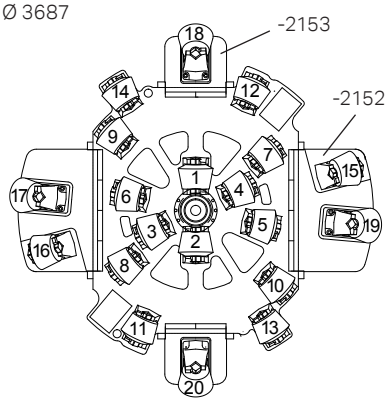


CRH 10ED

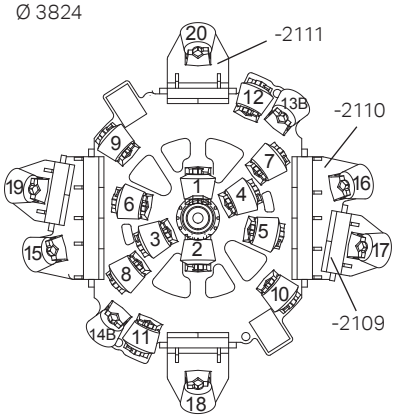
Ø 3500



Ø 3687



Ø 3824



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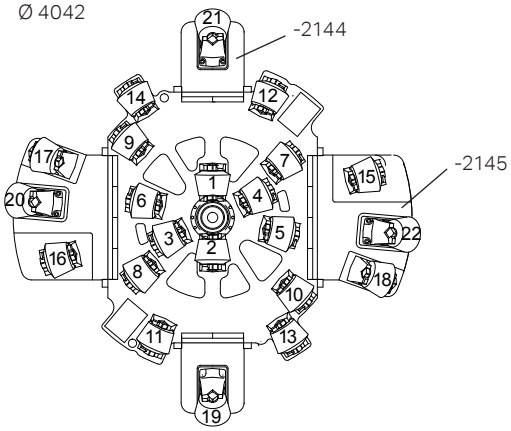
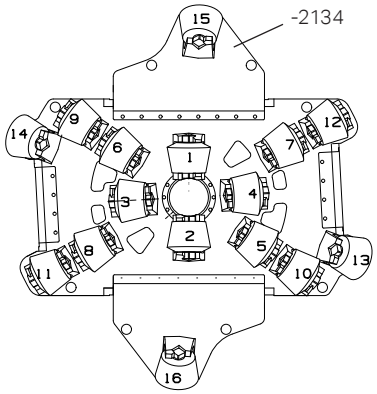


CRH 10SE

Ø 3047



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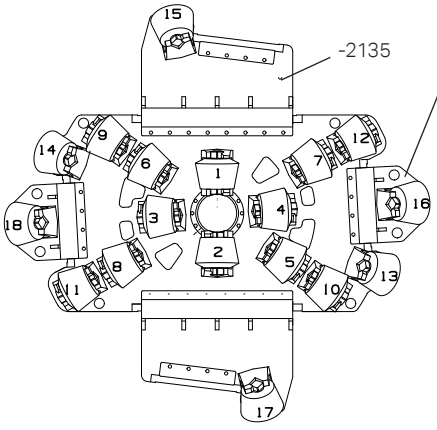
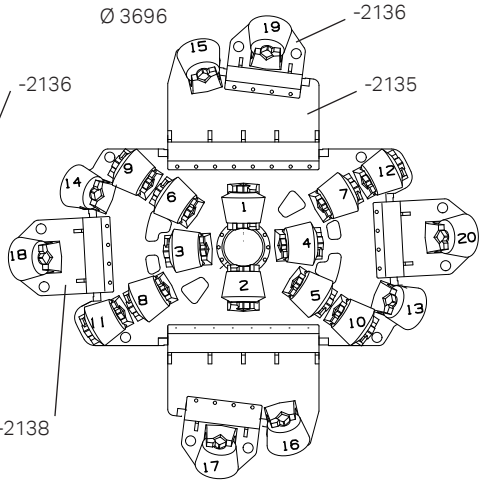


Ø 3696



CRH 12E/CRH 12EL

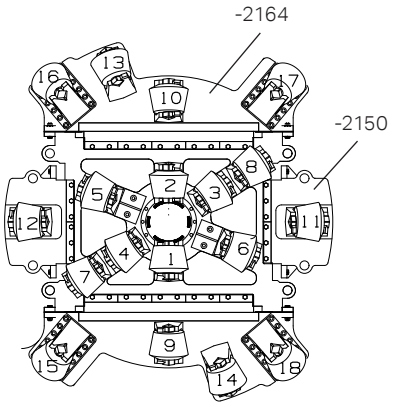
Reamer base Ø 390 mm stem fit: CRH12E 7008-1338-2X , CRH12EL 7008-1335-2X

Reamer base Ø 451 mm stem fit: CRH12E 7008-1138-2X

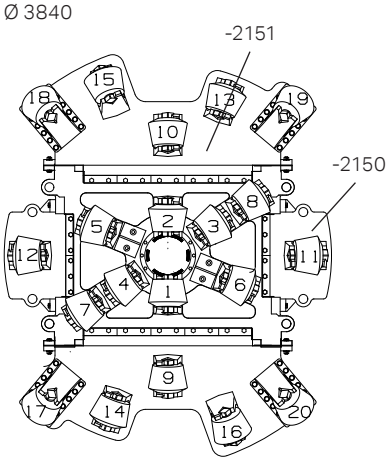
REAMING HEAD TYPE	HEAD DIA. MM	NO. OF CUTTERS	NO. OF SEGMENTS	SEGMENT (SMALL) PART NUMBER	SEGMENT (LARGE) PART NUMBER
CRH 12E CRH 12EL	3534	18	2 + 2	7008-2150-20 7008-2150-25	7008-2164-20 7008-2164-25
CRH 12E CRH 12EL	3840	20	2 + 2	7008-2150-20 7008-2150-25	7008-2151-20 7008-2151-25
CRH 12E CRH 12EL	4146	22	2 + 2	7008-2161-20 7008-2161-25	7008-2162-20 7008-2162-25
CRH 12E CRH 12EL	4500	24	2 + 2	7008-2149-20 7008-2149-25	7008-2148-20 7008-2148-25
CRH 12E CRH 12EL	5000	26	2 + 2	7008-2147-20 7008-2147-25	7008-2146-20 7008-2146-25
CRH 12E	5520	30	2 + 2	7008-2226-20	7008-2225-20
CRH 12E	6028	32 (36)	2 + 2	7008-2220-20	7008-2219-20

CRH 12E/CRH 12EL

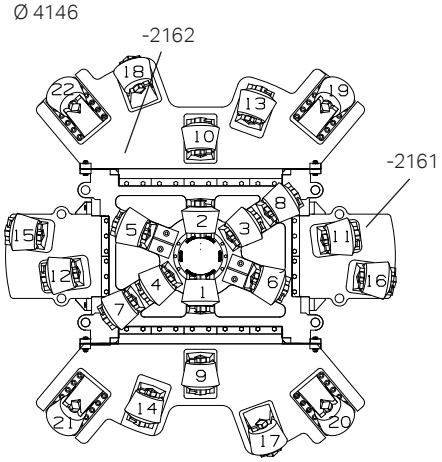
Ø 3534



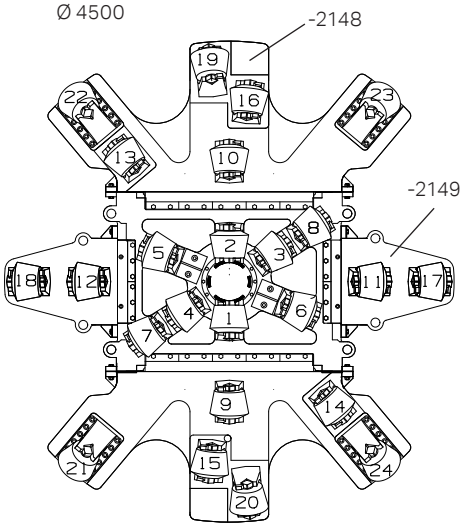
Ø 3840



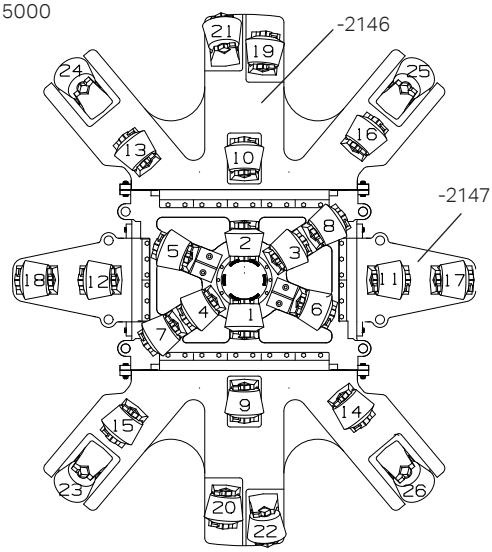
Ø 4146



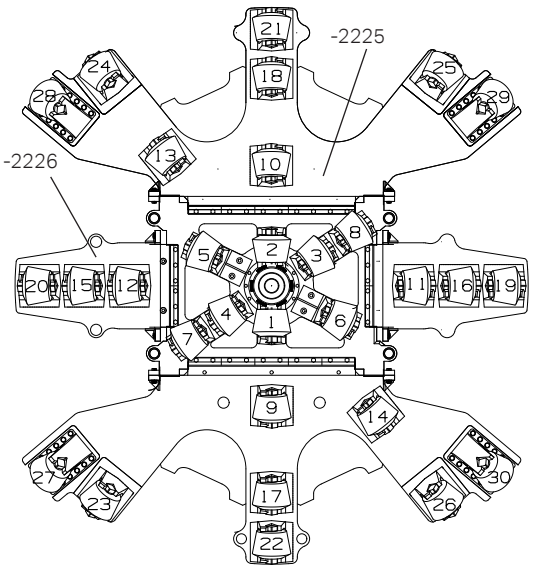
Ø 4500



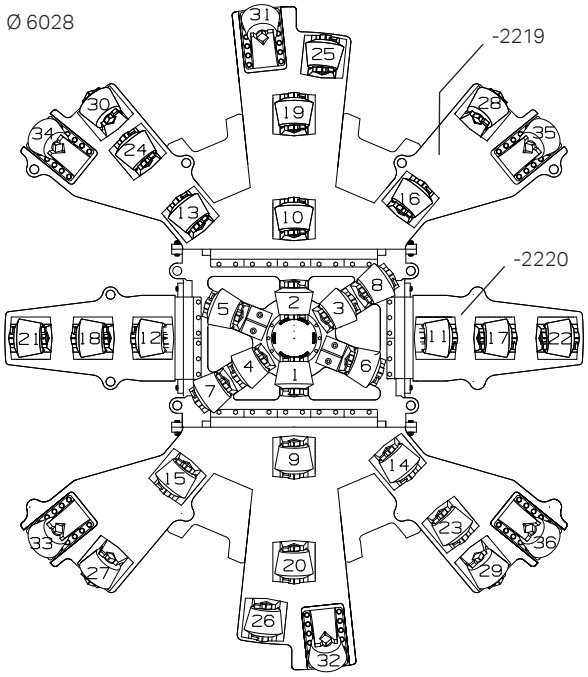
Ø 5000



Ø 5520



Ø 6028



INSPECTION

For Safety Instructions, see page 4-5.

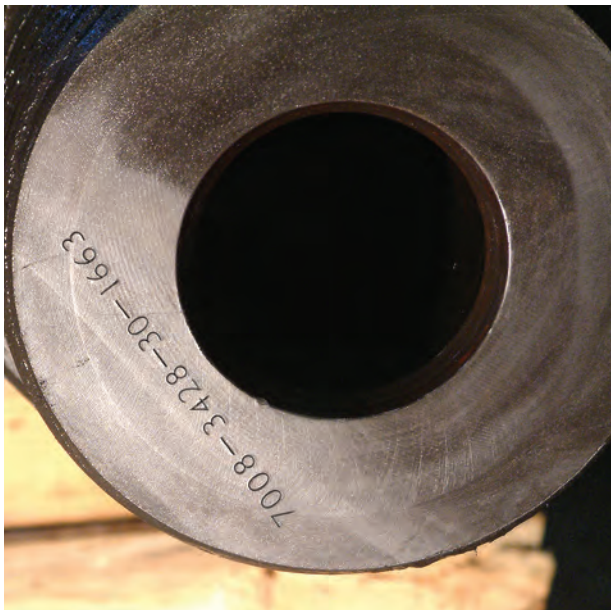
In order to keeep your reaming head in good working conditioning we recommend an inspection after each raise.

Check the following:
- Wear pad diameter on stem
- For cracks in the wrench flats and in the thread of the stem
- Stem/reamer base bolt joints
- Saddle bolts
- Conditioning of the journal seats in the saddles
- Contact surface between saddle/reamer base

Check the following on the cutters:
- Button condition, use cutter gauge 7008-9445
- Seal/bearing. If the cutter is easy to rotate it needs re-greasing, follow the instructions on page 33.

Serial number location on the different components see below.

Cutter serial number is found on the shaft end of the narrow part of the cutter and on the ball plug retainer.



The stem is marked at the bottom flange and on the thread top.

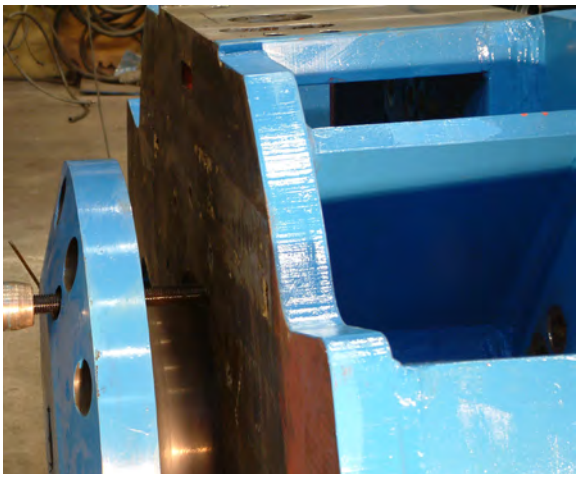
Use measuring gauge 7008-9631 to measure the button wear on any individual button. The gauge measures the percentage of the protrusion left on each button.

DISMOUNTING OF STEM

For Safety Instructions, see page 4-5.

1. Remove the inner saddles from position 1 and 2. Use the tool combination on page 8

2. Dismount the seal retainer ring. Use the two releasing holes and tighten cross-wise until the retainer ring comes loose



3. Dismount the twelve clamping bolts. Remove the protection bolts from the jacking holes in the stem flange. Insert four of the loose bolts and tighten cross-wise until the stem is released

4. Put a rod through the stem and attach the lifting equipment. Pull the stem out

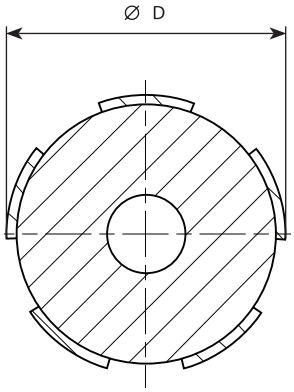
Important!
When the stem and the saddles are reassembled, new bolts and nuts must be used.

WEAR PAD REPLACEMENT

For Safety Instructions, see page 4-5.

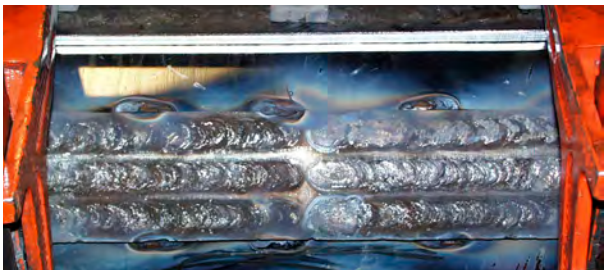
Replace the wear pads when the diameter D is less than shown in the table below.

PILOT HOLE DIAMETER	Ø D MM	WEAR PADS QUANTITY	WEAR PADS THIN TYPE PART NO.
7 7/8"	192	4	7008-9020
9"	220	5	7008-9023
9 7/8"	242	5	7008-9025-05
11"	271	5	7008-9028-05
12 1/4"	303	5	7008-9031-05
13 3/4"	341	10	7008-9034-05
15"	373	15	7008-9038-05
16"	398	15	7008-9040-05
17 1/2"	436	20	7008-9044-05



1. Remove the worn out wear pads by grinding away the welding joint. Pre-heat the area where the wear pads are to be welded to 370-450° C. Should the temperature drop to below 370°. Reheat before continuing.

2. Fix the wear pads in position with clamps. Important! Make sure the ID of the wear pad corresponds with the OD of the stem.



3. Insert the stem. Put a rod through the stem for easier handling. Clean and put a lot of grease on the inlet part of the stem. Use ordinary machine grease (0.5 kg).

4. Fill the welding points properly using our recommended welding wire. After welding, the diameter over the wear pads must be checked. If some peeks exceed D-max, grind with a silicon carbide grinding wheel.

5. Make the welding joints 10 mm longer than the wear pad and end with a smooth finish

RECOMMENDED DIAMETER OVER WEAR PADS;

PILOT HOLE	D-MAX, MM
7 7/8"	200
9"	228
9 7/8"	251
11"	279
12 1/4"	311
13 3/4"	349
15"	381
16"	406
17 1/2"	444

RE-GREASING OF CUTTERS

For Safety Instructions, see page 4-5.

1. Remove the plastic protection cup and the snap ring.

2. Pull out the ball plug retainer.

3. Pressure test to make sure the cutter seals are not leaking.

4. Remove the conical plugs (7008-9257) from the seal retainers. Use proper allen key wrench (7008-9447).

5. Clean the centre hole carefully. Install the re-greasing plug and attach the grease gun.

6. Start pumping until grease comes out through one of the relief holes. Clean the thread and mount the plug. Put some Loctite222 on the thread before tightening. Use the allen key wrench.

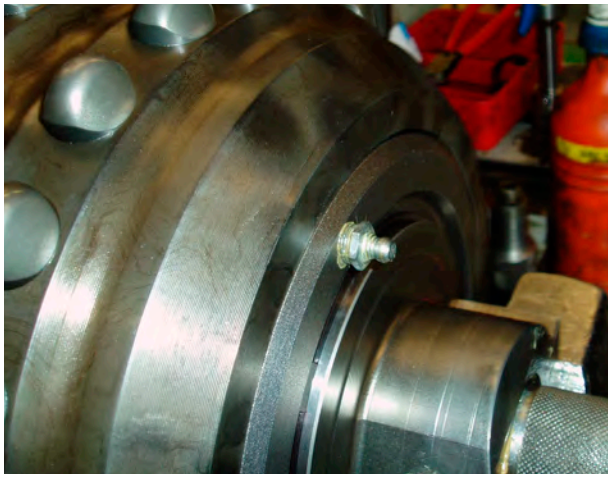
7. Rotate the cutter 20 revolutions. Continue to pump u ntil grease comes out through the other relief hole. Mount a conical plug in this hole in the same way.

8. Re-install the ball plug retainer. Mount a new snap ring and a plastic protection cap together with new o-rings.

RE-GREASING OPTION

For Safety Instructions, see page 4-5.

If it is not possible to re-grease the cutter through the centre hole as described on page 33, we recommend to re-grease the cutter through the seal retainer.



1. Disconnect the two conical plugs in the seal retainers. Mount a grease nipple in one of the holes.

2. Attach a grease pump and start pumping.

3. Continue to pump until grease comes out through the relief hole in the opposite seal retainer. Rotate the cutters ± 20 revolutions. Mount two new conical plugs in each seal retainer.

SPARES FOR RE-GREASING/ CUTTER

PCS	PART NO.	ITEM
3	7008-9115	O-ring
2	7008-9257	Conical plug
1	7008-9114	Snap ring
1	7008-9482	Protection plug
1	7008-9132-01	Cutter grease 0,4 kg tube

SPARES TO RE-SEAL/CUTTER

PCS	PART NO.	ITEM
2	7008-9110	Seal
2	7008-9571	Seal retainer
2	7008-9111	Snap ring
2	7008-9604	O-ring
2	7008-9113	Lock ring

SEAL REPLACEMENT

For Safety Instructions, see page 4-5.

1. Cut the four welding joints on the sea retainer. Use a small cutting disc. Remove protection ring 7008-9113.

2. Remove the snap ring 7008-9111. Use a hammer and a small chisel. Fill the cutter with grease before dismantling the seals to avoid dirt coming into the bearing system.

3. Make a puller tool by using two bolts, nuts and a small U-beam. Tack weld the two bolts to the retainer ring. Remove the retainer ring by tightening the nuts and tapping the retainer ring with a hammer. The retainer ring can be reused if it is not damaged.

4. Remove the two seal halves from both the seal retainer and the cutter shell. Remove the O-ring 7008-9604 (under the seal retainer).

5. Clean the snap ring groove, the O-ring groove and the seal seat carefully. Ensure that the seal seat is in good condition. If not, file the marks and nicks. Make sure no muck or dirt comes in to the bearing system.

6. Inspect the retainer pin 7008-9568. Replace if showing excessive wear.

7. Install the two seal halves (7008-9110) in both the retainer ring and the cutter shell. Important! Follow the mounting instructions from the seal manufacturer carefully. Instructions can be obtained from your local Sandvik representative.

8. Mount the O-rings 7008-9604 (on the journal). Note. Lubricate the O-ring carefully with oil before installation. Mount the retainer ring carefully. E.g use a hammer and clamp for smooth mounting. Mount the snap ring 7008-9111. Note! Always use new O-rings and snap ring.

9. Pressure test to make sure the cutter seals are not leaking.

10. Mount the protection ring 7008-9113 and weld four joints 90° apart. Use MIG welding. Recommended welding wire Ø 1,2 mm OK AUT-ROD 12,51 or similar.

11. Re-grease the cutter according to the regreasing instruction. This completes the seal change.

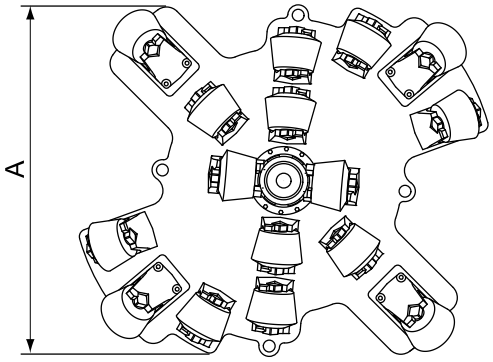
Spares for re-sealing kit see page 36.

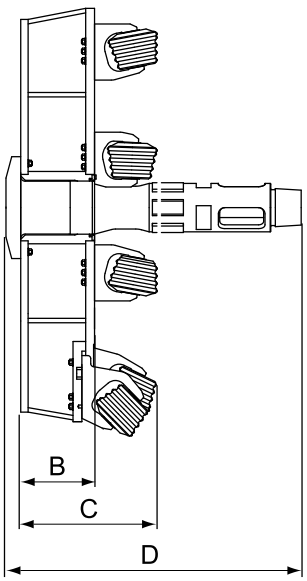
TRANSPORT DIMENSIONS AND WEIGHTS

INTEGRAL REAMING HEADS

Note. Weights as noted in tables are only to be used as a guide.

REAMING HEAD TYPE	TRANSPORT DIMENSIONS, MM				WEIGHT INCL. SADDLES KG	WEIGHT COMPLETE INCL. SADDLES & STEM KG
	A	B	C	D		
CRH 2	655			1500		800
CRH 3	850	400	826	1900	1000	2200*
CRH 4	1010	400	826	1900	1450	2650*
CRH 5	1220	400	826	1900	2050	3250*
CRH 6	1510	400	826	1900	2650	3850*
CRH 7	1720	400	826	1900	3200	4400*
CRH 8	1930	400	826	1900	3900	5100*
CRH 8D	2040	400	826	1900	4150	5350*
CRH 8L	1930	500	926	2100	4250	5550**
CRH 9	2200	500	926	2100	5100	6400**
CRH 10D	2280	500	926	2600	6750	8550***
Stem 12 1/4" – 30*				1900	1200	
Stem 12 1/4" – 40**				2100	1300	
Stem 13 3/4" – 40***				2700	1800	

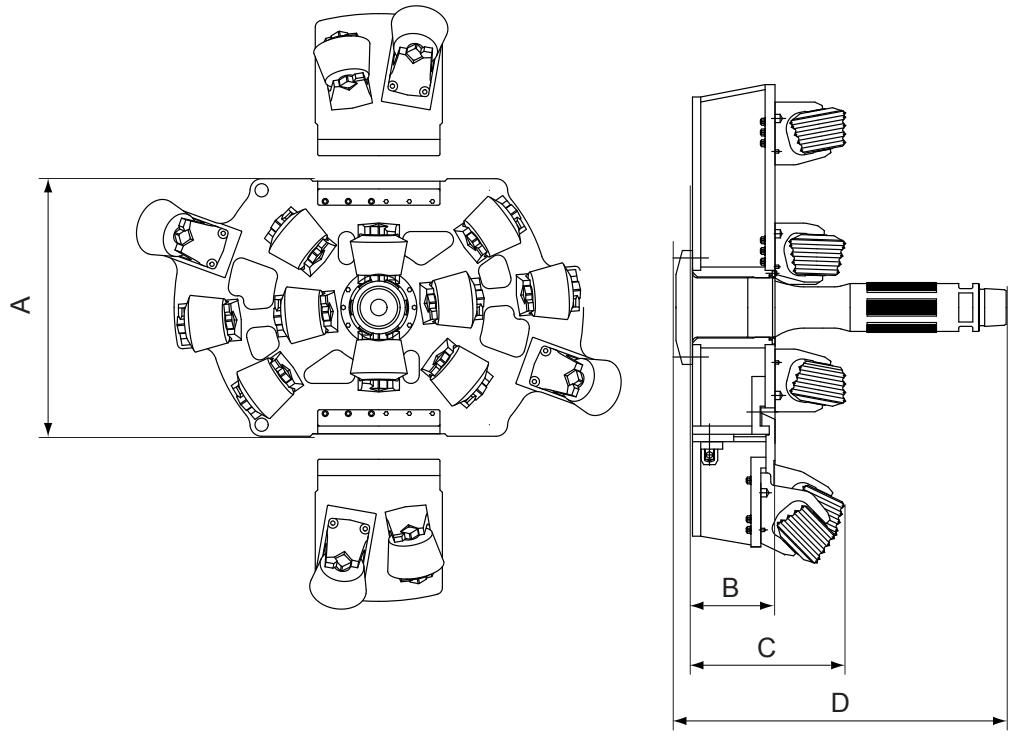




SEGMENTED REAMING HEADS

Note. Weights as noted in tables are only to be used as a guide.

ITEM	TRANSPORT DIMENSIONS, MM				WEIGHT/PIECE INCL. SADDLES KG	WEIGHT COMPLETE INCL. SADDLES, SEGMENTS & STEM KG
	A	B	C	D		
Reamer base CRH 6S	1050	400	826	1900	2300	3950*
Reamer base CRH 7S	1325	400	826	1900	2950	4600*
Reamer base CRH 8S	1631	400	826	1900	3950	5600*
Reamer base CRH 10SD	1560	500	926	2700	4950	8750***
Segment to CRH 6S, 7S, 8S	430	400	826		225	
Segment to CRH 10SD	770	500	926		1000	
Stem 12 1/4" – 30*				1900	1200	
Stem 12 1/4" – 40				2100	1300	
Stem 13 3/4" – 40***				2700	1800	



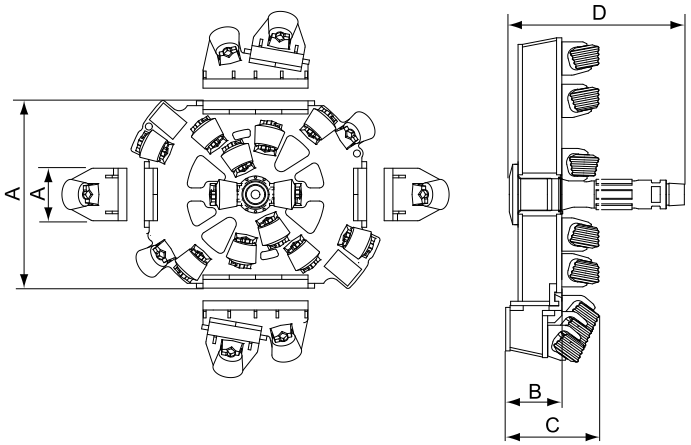
EXTENDABLE REAMING HEADS

Note. Weights as noted in tables are only to be used as a guide.

ITEM	REAMER	TRANSPORT DIMENSIONS, MM				WEIGHT / PIECE INCL. SADDLES KG
		A	B	C	D	
Reamer base CRH6E		1469	400	826		2800
Segment - 2101	1829	430	400	826		225
Segment - 2186	2236	430	400	826		250
Segment - 2187	2236	430	400	826		225
Segment - 2169	2429	430	400	826		300
Segment - 2170	2429	430	400	826		375
Reamer base CRH8E		1650	595	1023		4350
Segment - 2181	2441	475				625
Segment - 2182	2765	645				750
Segment - 2183	2765	545				500
Segment - 2184	3154	785				1250
Segment - 2185	3154	545				625
Segment - 2194	3510	965				1425
Segment - 2195	3510	880				800
Reamer base CRH8SE		1640	595	1023		4490
Segment - 2172		1176				640
Segment - 2173		500				580
Segment - 2174		1416				2140
Reamer base CRH 10SE		1560	590	1015		6725
Segment – 2134	3047	815				700
Segment – 2135	3372 and 3696	950				1250
Segment – 2136	3372 and 3696	610				400
Segment – 2138	3696	610				500
Reamer base CRH 10E	3130	2140	590	1015		7700
Segment – 2109	3500 and 3824	610				375
Segment – 2110	3500 and 3824	720				825
Segment – 2111	3824	610				500
Reamer base CRH 10ED		2140	590	1015		7550
Segment – 2144	4042	610				750
Segment – 2145	4042	965				1625
Segment – 2152	3687	785				1050
Segment – 2153	3687	610				550
Stem Ø 12 1/4" – 30					1900	1200
Stem Ø 12 1/4" – 40					2600	1600
Stem Ø 13 3/4" – 40					2600	1800
Stem Ø 15" – 50					3100	2500

COMPLETE REAMER INCL. BASE, SEGMENTS AND Ø 13 3/4" STEM WEIGHT / DIAMETER, KG

REAMING HEAD TYPE	Ø 3130	Ø 3500	Ø 3824	Ø 3687	Ø 4042	Ø 3047	Ø 3372	Ø 3696
CRH 10E	9500	11750	12750					
CRH 10ED		11750	12750	12550	14100			
CRH 10SE						9925	11825	12825

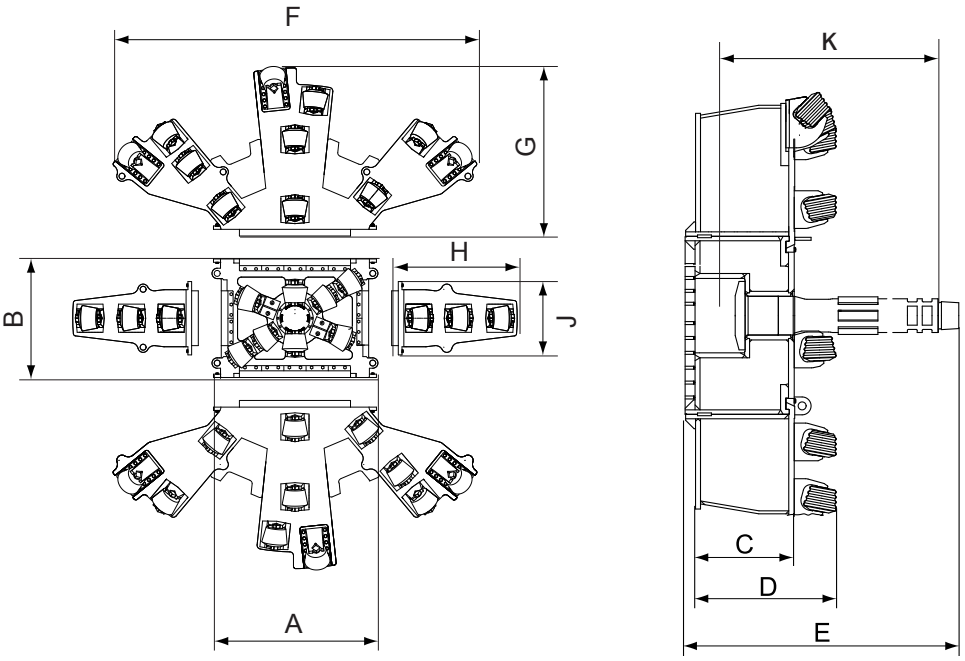


CRH 12E/CRH 12EL

Note. Weights as noted in tables are only to be used as a guide.

REAMING HEAD	TRANSPORT DIMENSIONS, MM									
CRH 12E/12EL	A	B	C	D	E	F	G	H	J	K
Ø 3534	2200	1600	1105/780	1530/1205	3600/3280	2470	910	645	990	
Ø 3840	2200	1600	1105/780	1530/1205	3600/3280	2800	1145	645	990	
Ø 4146	2200	1600	1105/780	1530/1205	3600/3280	3000	1155	925	990	
Ø 4500	2200	1600	1105/780	1530/1205	3600/3280	3230	1470	1140	990	
Ø 5000	2200	1600	1105/780	1530/1205	3600/3280	3550	1700	1190	990	
Ø 5520	2200	1600	1105	1530	3600	4460	1810	1420	990	
Ø 6028	2200	1600	1105	1530	3600	5020	2250	2100	990	
STEM Ø 13 3/4" – 50										3100
STEM Ø 15" – 50										3100

REAMING HEAD CRH 12E CRH 12EL	WEIGHT REAMER BASE KG/PCE INCL. SADDLES	LARGE SEGMENT KG/PCE INCL. SADDLES	SMALL SEGMENT KG/ PCE INCL. SADDLES	Ø 15" STEM, KG	COMPLETE INCL. BASE, SEGMENTS AND STEM, KG
Ø 3534	8200/6700	3580/2650	1250/850	2500	20260/17100
Ø 3840	8200/6700	4775/3150	1250/850	2500	22650/18200
Ø 4146	8200/6700	5360	1300	2500	23920
Ø 4500	8200/6700	5655/4600	1550/1300	2500	25010/23425
Ø 5000	8200/6700	6650/5100	1700	2500	27300
Ø 5520	8200	8400	2100	2500	31700
Ø 6028	8200	10280	2250	2500	35760



SPARE PART LIST

STEMS

PILOT HOLE Ø IN	MM	STEM PART NO.	WEAR PAD PART NO.	PCS	THREAD DIMENSION	MOUNTING KIT INCL. PER STEM ITEM	PCS	PART NUMBER PART NO.
Stem with Ø 220 mm reamer fit								
7 7/8"	200	7008-3220-10	7008-9020	4	5 ¾" DI22	Bolt	8	7008-9134-01
						Nut	8	7008-9135
						Lock washer	16	7008-9135-01
						O-ring	1	7008–9170
Stems with Ø 340 mm reamer fit								
9"	229	7008-3323-30	7008-9023	5	6 ¾" DI22	Bolt	12	7008-9134-01
9 7/8"	251	7008-3325-30	7008-9025-05	5	6 ¾" DI22	Nut	12	7008-9135
11"	279	7008-3428-30	7008-9028-05	5	8 ¼" DI22	Lock washer	24	7008-9135-01
12 ¼"	311	7008-3431-30	7008-9031-05	5	8 ¼" DI22	O-ring	1	7008–9136
12 ¼"	311	7008-3531-30	7008-9031-05	5	9 ¼" DI22	V-ring	1	7008-9395
Stems with Ø 360 mm reamer fit								
12 ¼"	311	7008-3531-40	7008-9031-05	5	9 ¼" DI22	Bolt	12	7008-9134-01
13 3/4"	349	7008-3634-40	7008-9034-05	10	10 1/2" DI22	Nut	12	7008-9135
13 3/4"	349	7008-3634-41	7008-9034-05	10	10 1/2" DI22	Lock washer	24	7008-9135-01
13 3/4"	349	7008-3634-42	7008-9034-05	10	10 1/2" DI22	O-ring	1	7008–9316
13 3/4"	349	7008-3634-43	7008-9034-05	10	10 1/2" DI22	V-ring	1	7008-9395
Stems with Ø 390 mm reamer fit								
12 ¼"	311	7008-3531-50	7008-9031-05	5	9 ¼" DI22	Bolt	12	7008-9134-01
13 3/4"	349	7008-3634-53	7008-9034-05	10	10 1/2" DI22	Nut	12	7008-9135
15"	381	7008-3638-53	7008-9038-05	15	10 1/2" DI22	Lock washer	24	7008-9135-01
						O-ring	1	7008–9399
						V-ring	1	7008–9128
Stems with Ø 451 mm reamer fit								
16"	406	7008-3X40-7403	7008-9040-05	15	T B A	Bolt	12	7008-9134-01
17 1/2"	443	7008-3744-7403	7008-9044-05	20	12" DI 22 HT	Nut	12	7008-9135
						Lock washer	24	7008-9135-01
						O-ring	1	7008-9626
						Quad ring	1	7008-9627

SADDLES

SADDLE PART NO.	FOR POSITION	MOUNTING KIT INCL. PER SADDLE PART NUMBER ITEM	PCS	PART NO
7008-2015	Inner CRH 2	Bolt	6	7008-9134-01
7008-2004	Inner CRH 3 Ø 950 mm	*Bolt	6	7008-9560
7008-2006-05	Inner CRH 3 Ø 1084 mm	Nut	6	7008-9135
7008-2006	Inner	Lock washer	12	7008-9135-01
7008-2003	Gauge all CRH 3	Dowel pin Ø 20 mm	1	7008–9145
7008-2005	Middle	Dowel pin Ø 50 mm	1	7008-2007-01
7008-2007	Gauge			
7008-2024	Gauge Step 1			
7008-2025*	Gauge Step 2			
7008-2026*	Gauge Step 3			
7008-2008	Semi gauge,	Bolt	8	7008-9134-01
	D-type reaming heads	Nut	8	7008-9135
		Lock washer	16	7008-9135-01
		Dowel pin Ø 20 mm	1	7008–9145
		Dowel pin Ø 50 mm	1	7008-2007-01
7008-2030	Gauge Step 1, CRH 12E/12EL	Bolt	12	7008-9134-01
7008-2031*	Gauge Step 2, CRH 12E/12EL	*Bolt	12	7008-9560
7008-2032*	Gauge Step 3, CRH 12E/12EL	Nut	12	7008-9135
		Lock washer	24	7008-9135-01
		Dowel pin Ø 20 mm	1	7008–9145
		Dowel pin Ø 50 mm	1	7008-2007-01
7008-2035	Middle HD CRH12E/12EL	Bolt	10	7008-9134-01
7008-2038	Semi gauge HD CRH12E/12EL	Nut	10	7008-9135
		Lock washer	20	7008-9135-01
		Dowel pin Ø 20 mm	1	7008–9145
		Dowel pin Ø 50 mm	1	7008-2007-01

CUTTERS

CUTTER PART NO.	TYPE	MOUNTING KIT INCL. PER CUTTER PART NUMBER ITEM	PCS	PART NO
7008-5141-77	CMR 41	Bolt	2	7008-9119
7008-5152-77	CMR 52	Nut	2	7008-9120
7008-5551-77	CMR 501	Lock washer	4	7008-4341-19

CRH 2 REAMING HEADS

REAMING HEAD EXCLUDING SADDLES PART NO	TYPE	SPARES INCL. PER REAMING HEAD PART NUMBER ITEM	PCS	PART NO
7008-0306-2520	CRH 2 / Ø 9 7/8" stem	Bolt (to fit cutter in the stem)	2	7008-9133
7008-0406-2820	CRH 2 / Ø 11" stem			
7008-0506-3120	CRH 2 / Ø 12 ¼" stem			

INTEGRAL REAMING HEADS

REAMING HEAD EXCLUDING SADDLES PART NO	TYPE	SPARES INCL. PER REAMING HEAD PART NUMBER ITEM	PCS	PART NO
Reaming head with Ø 230 mm stem fit				
7008-1009-20	CRH 3 (Ø 950 mm)	None		
Reaming head with Ø 340 mm stem fit				
7008-1310-20	CRH 3 (Ø 1060 mm)	None		
7008-1311-20	CRH 3 (Ø 1084 mm)	None		
Reaming heads with Ø 340 mm stem fit				
7008-1314-20	CRH 4	Bolt (for seal reatiner)	6	7008-9137
7008-1315-20	CRH 5	Seal retainer	1	7008-9380
7008-1018-20	CRH 6			
7008-1021-20	CRH 7			
7008-1024-20	CRH 8			
7008-1924-20	CRH 8D			
Reaming heads with Ø 360 mm stem fit				
7008-1324-20	CRH 8L	Bolt (for seal reatiner)	6	7008-9137
7008-1027-20	CRH 9L	Seal retainer	1	7008-9381
7008-1931-20	CRH 10D			
Reaming heads with Ø 390 mm stem fit				
7008-1324-25	CRH8L	Bolt for seal retainer	6	7008-9137
7008-1731-20	CRH10D	Seal retainer	1	7008-9398

SEGMENTED REAMING HEADS

REAMING HEAD EXCLUDING SADDLES PART NO	TYPE	SPARES INCL. PER REAMING HEAD PART NUMBER ITEM	PCS	PART NO
Reaming head with Ø 340 mm stem fit				
7008-1418-21	CRH 6S	Bolt (for seal reatiner)	6	7008-9137
7008-1421-21	CRH 7S	Seal retainer	1	7008-9380
7008-1424-21	CRH 8S	Wedge (to fit segment)	2	7008-9274
		Cover plate (segment seat)	2	7008-9279
		Slot wedge unit	2	7008-9378
Reaming heads with Ø 360 mm stem fit				
7008-1831-21	CRH 10SD	Bolt (for seal reatiner)	6	7008-9137
		Seal retainer	1	7008-9381
		Wedge (to fit segment)	4	7008-9274
		Cover plate (segment seat)	2	7008-1431-01
		Slot wedge unit	4	7008-9378

SPARE PART LIST

EXTENDABLE REAMING HEADS

REAMING HEAD EXCLUDING SADDLES		SPARES INCL. PER REAMING HEAD PART NUMBER		
PART NO	TYPE	ITEM	PCS	PART NO
Reaming heads with Ø340 mm stem fit				
7008-1318-22	CRH 6E	Bolt (to be used in threaded holes)	48	7008-9134-03
		Bolt (for seal retainer)	6	7008-9137
		Seal retainer	1	7008-9380
		Wedge (to fit segments)	6	7008-9609
		Cover plate (segment seat)	6	7008-9279
		Slot wedge unit	4	7008-9378
Reaming heads with Ø360 or Ø390 mm stem fit				
7008-1525-20	CRH 8E (Ø 360 mm)	Bolt (for seal retainer)	6	7008-9137
7008-1625-20	CRH 8E (Ø 390 mm)	Seal retainer (Ø 360 mm stem fit)	1	7008-9381
		Seal retainer (Ø 390 mm stem fit)	1	7008-9398
		Wedge (to fit “small” segments)	2	7008-9483
		Wedge (to fit “large” segments)	6	7008-9484
		Cover plate (“small” segment seat)	2	7008-1625-01
		Cover plate (“large” segment seat)	2	7008-1625-02
		Cover plate (-2007 saddle)	2	7008-9352
Reaming heads with Ø340mm or Ø390mm stem fit				
7008-1524-20	CRH8SE (Ø340 mm)	Bolt (for seal retainer)	6	7008-9137
7008-1624-20	CRH8SE (Ø390 mm)	Seal retainer (Ø340 mm stem fit)	1	7008-9380
		Seal retainer (Ø390 mm stem fit)	1	7008-9398
		Wedge (to fit “small” segments)	2	7008-9601
		Wedge (to fit “large” segments)	4	7008-9600
Reaming heads with Ø360 mm stem fit				
7008-1631-21	CRH 10SE	Wedge (to fit segment)	12	7008-9348
7008-1031-20	CRH 10E	Cover plate (segment seat on CRH 10E, 10ED)	6	7008-9349
7008-1440-20	CRH 10ED	Cover plate (-2007 saddle on CRH 10E, 10ED)	2	7008-9352
		Cover plate (-2005 saddle on CRH 10ED)	2	7008-9453
		Bolt (for seal reatiner)	6	7008-9137
		Seal retainer	1	7008-9381
Reaming heads with Ø390 mm stem fit				
7008-1331-20	CRH 10E	Bolt (for seal retainer)	6	7008-9137
7008-1340-20	CRH 10ED	Seal retainer	1	7008-9398
		Wedge (to fit segment)	12	7008-9348
		Cover plate (segment seat on CRH 10E, 10ED)	6	7008-9349
		Cover plate (-2007 saddle on CRH 10E, 10ED)	2	7008-9352
		Cover plate (-2005 saddle on CRH 10ED)	2	7008-9453
Reaming heads with Ø390 mm stem fit				
7008-1335-20/ 7008-1335-25*	CRH 12EL	Bolt (for seal retainer)	6	7008-9137
7008-1338-20/ 7008-1338-25*	CRH 12E	Seal retainer	1	7008-9398
		Wedge (to fit “small” segments)	4	7008-9483
		Wedge (to fit “large” segments)	10	7008-9484
		Saddle bolt (to be used in threaded holes)	48	7008-9134-03
		Stem bolt (to be used in threaded holes)*	12	7008-9134-03
		Slot wedge (optional)	(8)	7008-9378
		Cover plate (“small segment“ seat)	2	7008-1338-01
		Cover plate (“large segment“ seat)	2	7008-1338-02
Reaming heads with Ø451 mm stem fit				
7008-1138-20/ 7008-1138-25*	CRH12E	Bolt (for seal retainer)	6	7008-9137
		Seal retainer	1	7008-9625
		Wedge (to fit “small” segments)	4	7008-9483
		Wedge (to fit “large” segments)	10	7008-9484
		Saddle bolt (to be used in threaded holes)	48	7008-9134-03
		Stem bolt (to be used in threaded holes)*	12	7008-9134-03
		Slot wedge (optional)	(8)	7008-9378
		Cover plate (“small segment“ seat)	2	7008-1338-01
		Cover plate (“large segment“ seat)	2	7008-1338-02

* Dual frame design

SEGMENTS

SEGMENT EXCLUDING SADDLES PART NO	FOR REAMING HEAD TYPE	SPARES INCL. PER SEGMENT PART NUMBER ITEM	PCS	PART NO
7008-2101-20	CRH 6S	Bolt	6	7008-9134-01
7008-2169-25	CRH 6E	Nut	6	7008-9135
7008-2186-25	CRH 6E	Lock Washe	12	7008-9135-01
		Bolt	1	7008-9335
		Wedge (lower key)	1	7008-9334
7008-2170-20	CRH 6E (gauge)	Bolt	4	7008-9134-01
7008-2187-20	CRH 6E (gauge)	Nut	4	7008-9135
		Lock Washer	8	7008-9135-01
		Bolt	1	7008-9335
		Wedge (lower key)	1	7008-9334
7008-2181-20	CRH8E (large)	Bolt	17	7008-9134-01
7008-2182-20	CRH8E (large)	Nut	17	7008-9135
7008-2184-20	CRH8E (large)	Lock Washer	34	7008-9135-01
7008-2194-20	CRH8E (large)			
7008-2183-20	CRH8E (small)	Bolt	5	7008-9134-01
7008-2185-20	CRH8E (small)	Nut	5	7008-9135
7008-2195-20	CRH8E (small)	Lock Washer	10	7008-9135-01
7008-2172	CRH8SE (large)	Bolt	16	7008-9134-01
7008-2174	CRH8SE (large)	Nut	16	7008-9135
		Lock Washer	32	7008-9135-01
7008-2173	CRH8SE (small)	Bolt	5	7008-9134-01
		Nut	5	7008-9135
		Lock Washer	10	7008-9135-01
7008-2142-20	CRH 10SD	Wedge (lower key)	1	7008-9334
		Bolt	1	7008-9335
7008-2109-20	CRH 10E (small)	Bolt	6	7008-9134-01
7008-2111-20	CRH 10E (small)	Nut	6	7008-9135
7008-2136-20	CRH 10SE (small)	Lock washer	12	7008-9135-01
7008-2138-20	CRH 10SE (small)			
7008-2144-20	CRH 10ED (small)			
7008-2153-20	CRH 10ED (small)			
7008-2110-20	CRH 10E (large)	Bolt	11	7008-9134-01
7008-2134-20	CRH 10SE (large)	Nut 11 7008-9135	11	7008-9135
7008-2135-20	CRH 10SE (large)	Lock washer	22	7008-9135-01
7008-2145-20	CRH 10ED (large)	Wedge (to fit segment on 10E+ED)	2	7008-9348
7008-2152-20	CRH 10ED (large)	Cover plate (to fit segm. on 10E+ED)	1	7008-9349
7008-2147-20/-25	CRH 12E/12EL (small)	Bolt	17	7008-9134-01
7008-2149-20/-25	CRH 12E/12EL (small)	Nut	17	7008-9135
7008-2150-20/-25	CRH 12E/12EL (small)	Lock washer	34	7008-9135-01
7008-2161-20/-25	CRH 12E/12EL (small)			
7008-2220-20	CRH 12E (small)			
7008-2226-20	CRH 12E (small)	Bolt**	5	7008-9134-03
7008-2146-20/-25	CRH 12E/12EL (large)	Bolt	29	7008-9134-01
7008-2148-20/-25	CRH 12E/12EL (large)	Nut	29	7008-9135
7008-2151-20/-25	CRH 12E/12EL (large)	Lock washer	58	7008-9135-01
7008-2162-20/-25	CRH 12E/12EL (large)			
7008-2164-20/-25	CRH 12E/12EL (large)			
7008-2219-20	CRH 12E (large)			
7008-2225-20	CRH 12E (large)	Bolt**	13	7008-9134-03

** Used with light segments on heavy reamer base

ASSEMBLY TOOLS

ITEM	PART NO.
Complete tool box	7008-9420

ITEMS INCLUDED IN TOOL BOX	PART NO.
Torque wrench, L=1050 mm	7008-9421
Torque wrench, L=800 mm	7008-9427
Torque multiplier (X 4)	7008-9422
Extension bar, L= 102 mm	7008-9431
Extension bar, L= 152 mm	7008-9432
Extension bar, L= 228 mm	7008-9433
Power socket hex bit, 19 mm	7008-9449
Power socket, 24 mm	7008-9428
Power socket, 36 mm	7008-9425
Power socket, 36 mm long	7008-9439
Adaptor socket, 1" box to ¾" pin	7008-9438
Adaptor socket, ¾" box to 1" pin	7008-9442

ITEMS INCLUDED IN TOOL BOX	PART NO.
Wrench, hex= 24 mm	7008-9429
Wrench, hex= 36 mm	7008-9430
Hexagon spanner, hex= 3/16"	7008-9447
Hexagon spanner, hex= 14 mm	7008-9446
Hexagon spanner, hex= 19 mm	7008-9426
Sealant (tube 0,4 kg)	7008-9434
Applyer for sealant	7008-9435
File	7008-9440
Wire brush	7008-9441
Grease Note! Not for re-greasing cutters!	7008-9443
Steel scraper	7008-9444
Button measuring gauge	7008-9631
Bolt (to jack out stems)	7008-9448

INSPECTION REPORT

Raise No.:		Date:	
Reaming head: CRH		Dia.:	mm
Reaming head No:			
Stem dia.:		mm	
Stem No.:			

STEM CHECK LIST

Wear pad dia.:		mm
Wear pad OK:	Yes	No
Wrench flats OK:	Yes	No
Thread OK:	Yes	No
Bolt joints OK:	Yes	No
Stem OK for use in next raise:	Yes	No
Other		

SADDLE CHECK LIST

Bolt joints OK:	Yes	No
OK for use in next raise:	Yes	No
Others:		
Sign:		

CUTTER CHECK LIST

POS.	CUTTER SERIAL NO.	TYPE	RE-GREASE YES	RE-GREASE NO	SEAL CHANGE YES	SEAL CHANGE NO	BUTTON LIFE %	TOTAL METERS	OTHERS
11									
12									
13									
14									
15									
16									
17									
18									
19									
10									
11									
12									
13									
14									
15									
16									

VISUAL INSPECTION – CUTTER

REF NO: ..... LOCATION: ..... DATE: ..... SIGN:.....

POS.	CUTTER		TYPE OF CUTTER SERVICE				BUTTON LIFE %	NUMBER OF METRES/HOURS	MISC.
	SERIAL NO.	TYPE	OK	RE-GREASE	SEAL CHANGE	OPEN			
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

NOTES:

VISUAL INSPECTION – FULL AREA BORING EQUIPMENT

REF NO: ..... LOCATION: ..... DATE: ..... SIGN:.....

PART NO.	SERIAL NO.	RECOMMENDED SERVICE

NOTES:

NOTES

SANDVIK