



RAISE BORING TOOLS AND SYSTEMS USER MANUAL



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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

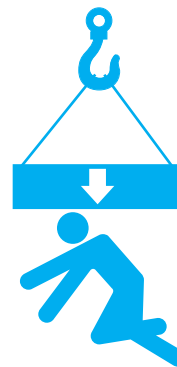
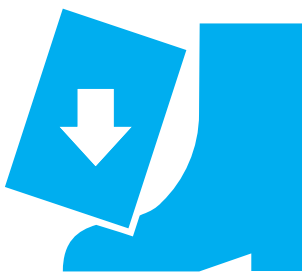
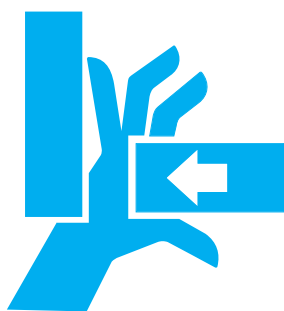
Appropriate personal protective equipment (PPE) should be worn when working with or around raise boring drilling. These include:

- 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

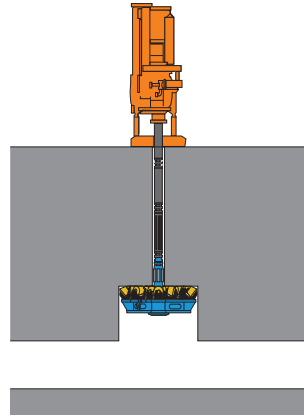
RE-GREASING OF CUTTERS & SEAL REPLACEMENT

- 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

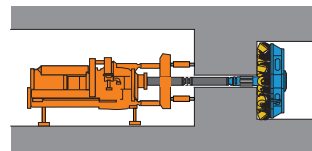
RAISE BORING

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



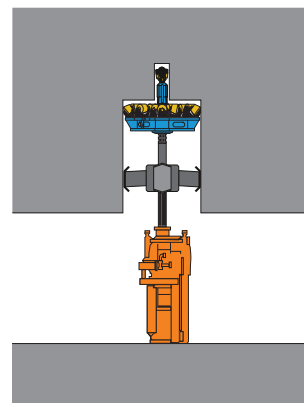
HORIZONTAL RAISE BORING

- 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.



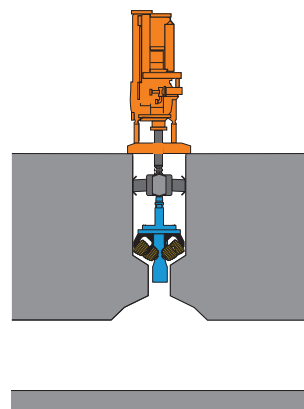
BLIND RAISE BORING

- 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 \leq 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 \leq max recommended reaming head speed together with optimum net cutter load.

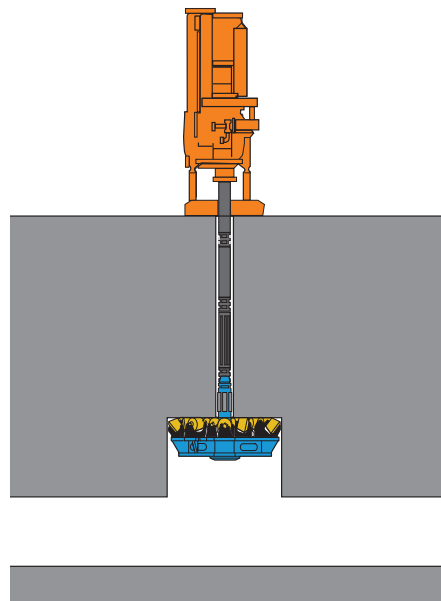
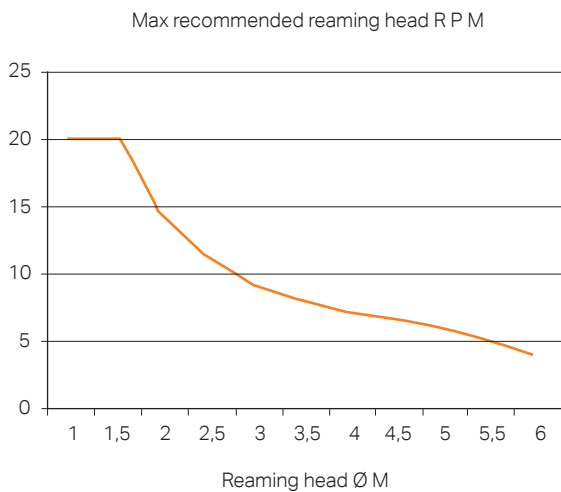
Reduce the RPM before reducing the cutter load.

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

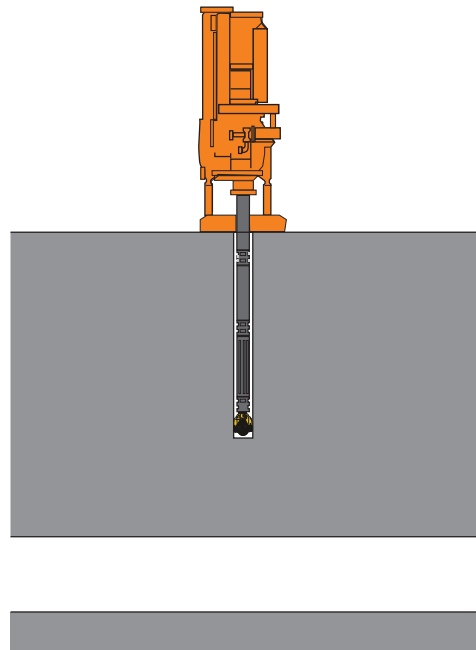
Max recommended operating bit load 3 tonnes (6 600 Lbs) × bit diameter in inches.

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 API REG | MAX. REC. BIT LOAD | | REC. DRILLING SPEED RPM |
|------------|----------|----------|--------|--------|-----|---------------------------|--------------------|--------|----------------------------|
| | | MM | INCH | KG | LBS | | KG | LBS | |
| 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

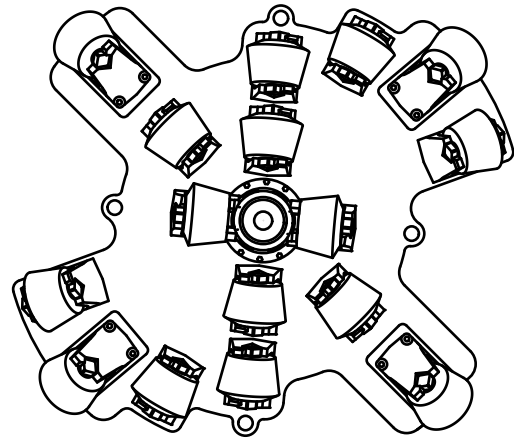
Segmented heads ex. CRH10SD

Extendable heads ex. CRH10E

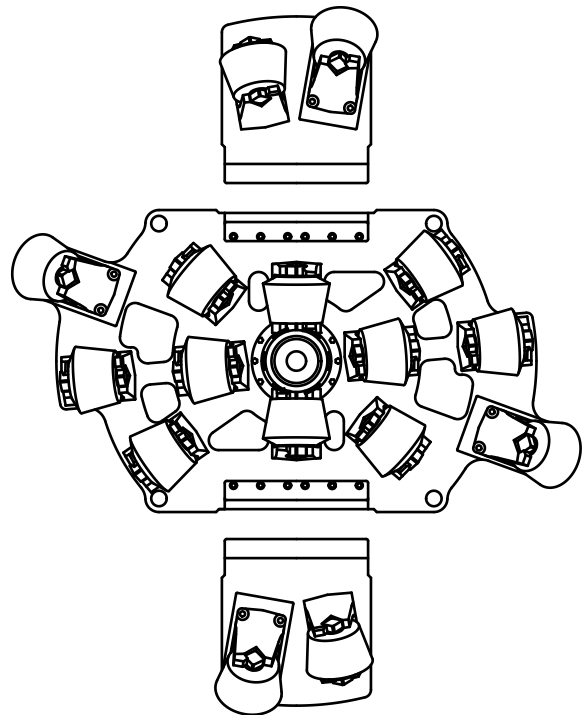
The figure in the name represents the reaming head diameter in feet (CRH10D=Ø 10'). Designs for other applications are available ex. blind boring up or down and for horizontal boring.

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.

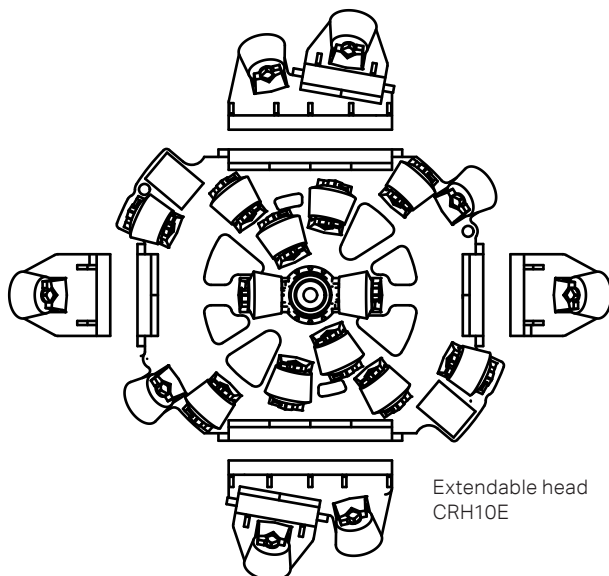
The reaming heads are designed with different size of centre hole in order to fit stems for different pilot hole sizes. Part- and serial numbers are welded on the side of the reamer as a reamer ID.



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.

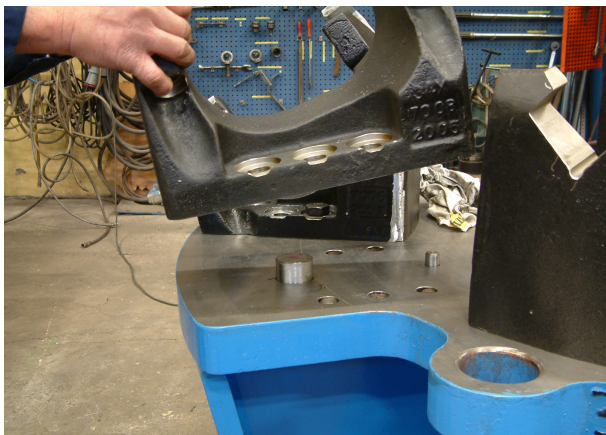
2. Tighten the bolts crosswise to 2/3 of full torque (≈ 800 Nm).

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

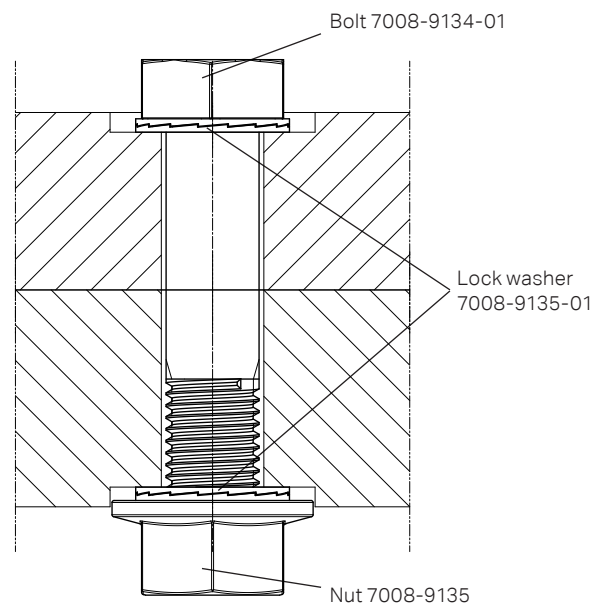
The Nord-lock washers are reusable.



Example of tool combination.



Dowel pin \varnothing 50 mm 7008-2007-01
Dowel pin \varnothing 20 mm 7008-9145



MOUNTING OF SADDLES

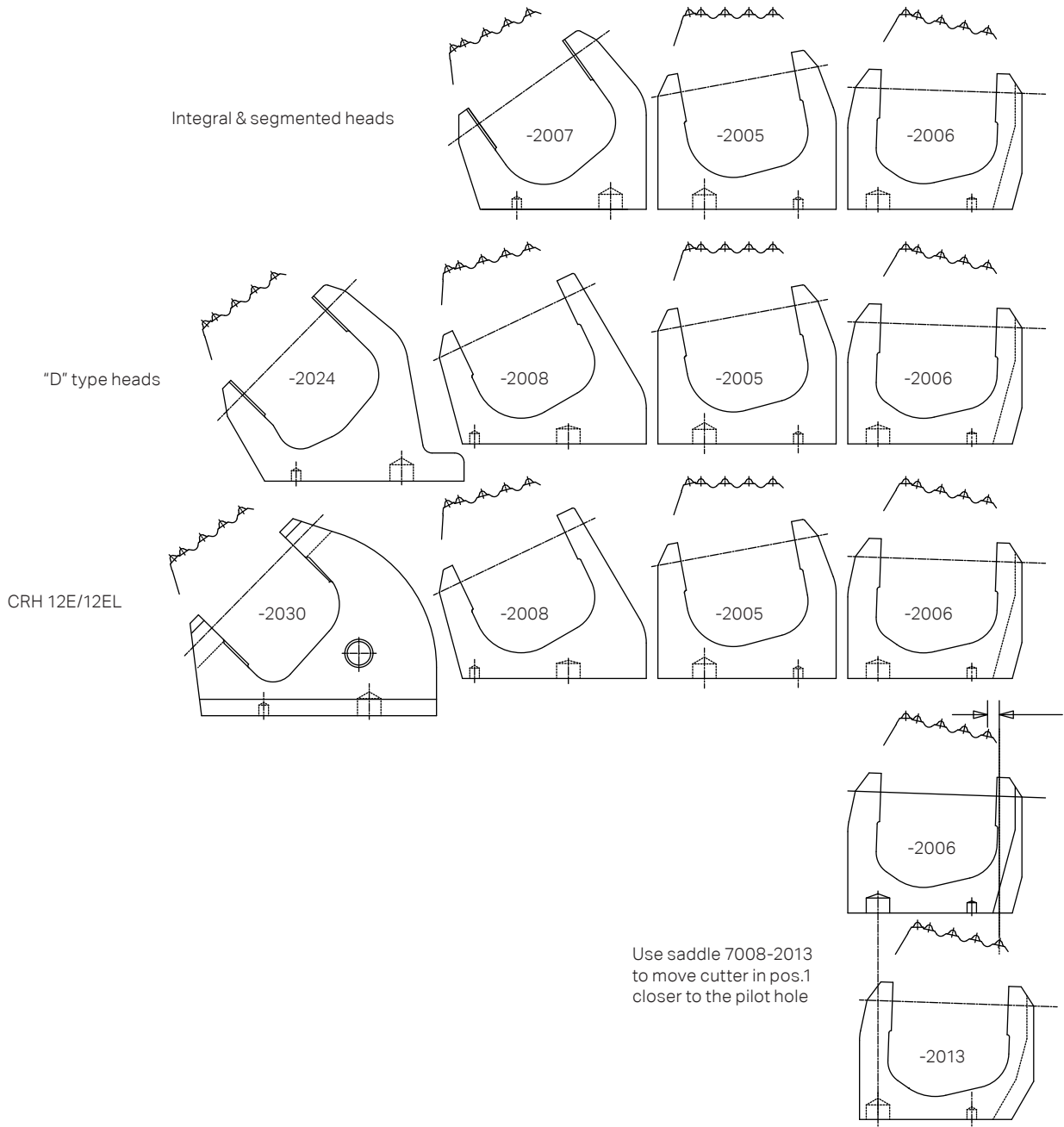
Different saddle types are used depending on positioning and the reaming head type. The most frequent dressings as per the illustration below. The part numbers are 7008-2XXX (some additional saddles modified for small diameters reaming heads are not shown below). The number of the different types varies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

SADDLE POSITIONING

| 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 |

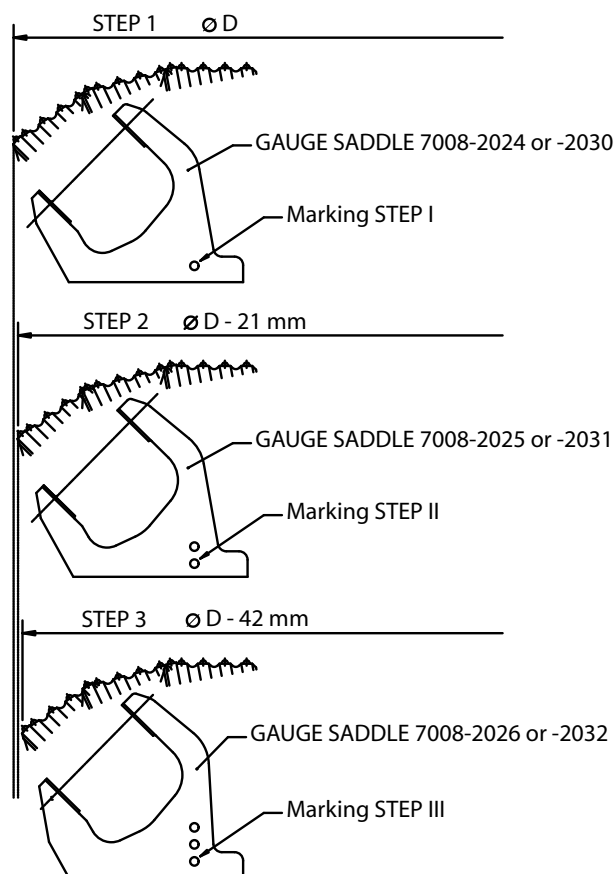
| REAMING HEAD TYPE | HEAD DIA. MM | INNER SADDLE 7008-2006 POS. | MIDDLE SADDLE 7008-2005 POS. | MIDDLE SADDLE 7008-2035 POS. | SEMI GAUGE SADDLE 7008-2008 POS. | SEMI GAUGE SADDLE 7008-2038 POS. | GAUGE SADDLE 7008-2030 POS. |
|-------------------|--------------|-----------------------------|---|---|----------------------------------|----------------------------------|-----------------------------|
| 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 |

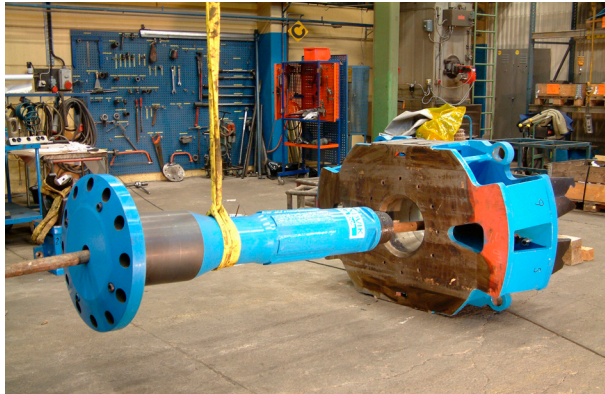


Important!

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

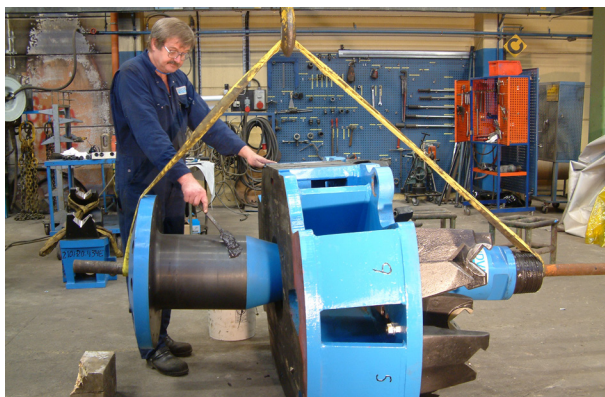
For Safety Instructions, see page 4-5.



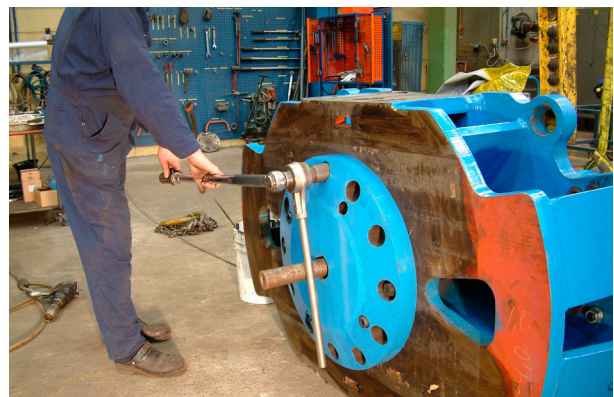
1. Place the head on its side.



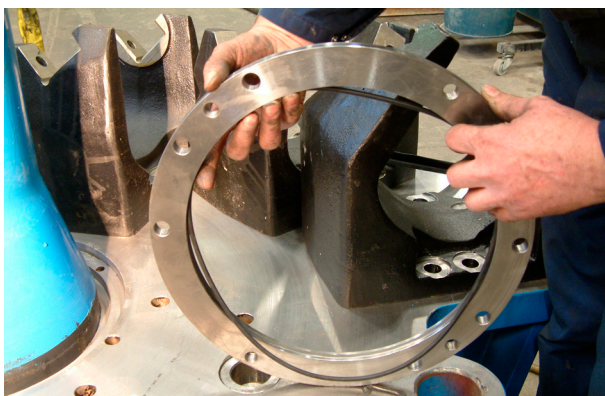
2. Clean the centre hole. Use a suitable solvent to remove the rust protection. Apply a lot of grease before fitting the stem.



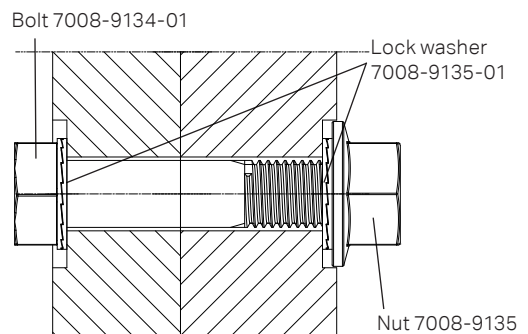
3. Insert the stem. Put a rod through the stem for easier handling. Clean and put a lot of grease on the inlet part of the stem. Use ordinary machine grease (0.5 kg).



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

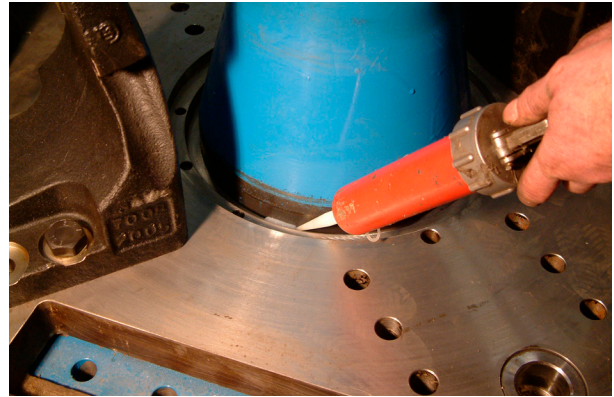


5. Clean the O-ring groove in the retainer ring and insert the O-ring.

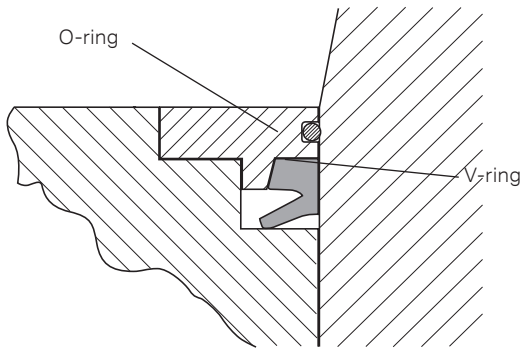




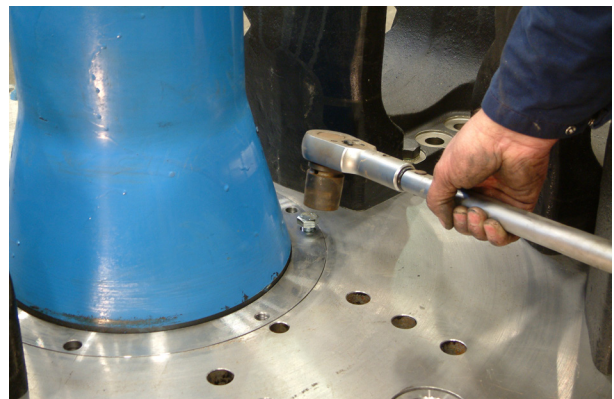
6. Clean the seal seat. Slide the V-ring over the top of the stem and push it into position. Note. Do not use the V-ring in reaming head CRH3 and CRH4.



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

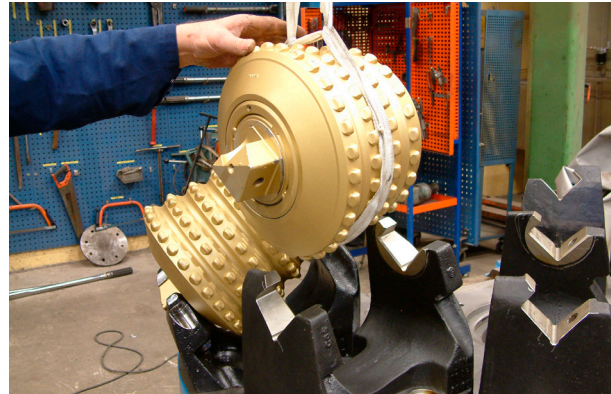
| PART NO. | STEM FIT Ø, MM |
|-----------|----------------|
| 7008-9380 | 340 |
| 7008-9381 | 360 |
| 7008-9398 | 390 |
| 7008-9625 | 451 |

MOUNTING OF CUTTERS

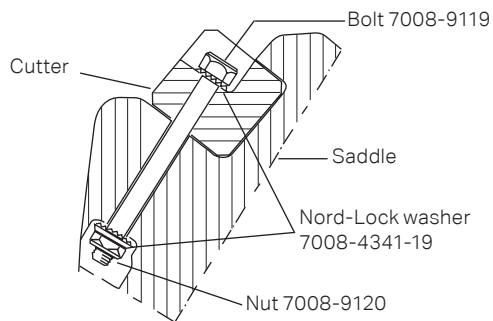
For Safety Instructions, see page 4-5.



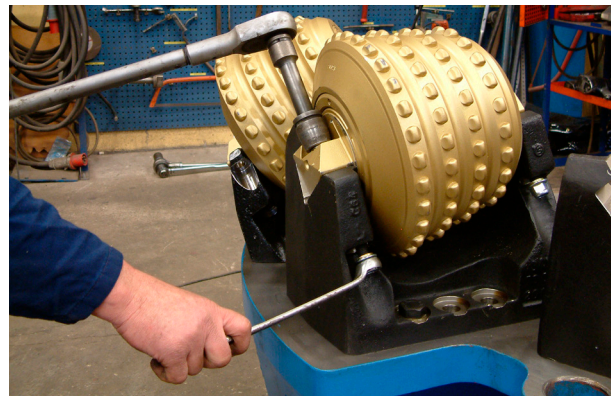
1. The positions are marked on the side of the head frame. If there are two position marks, the upper one refers to the position nearest the head centre.



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



3. Put some oil on the bolt before tightening.

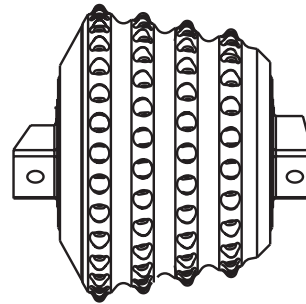
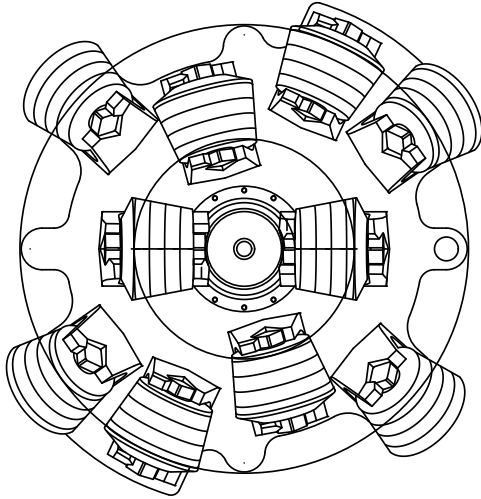


4. Tighten to 300 Nm.

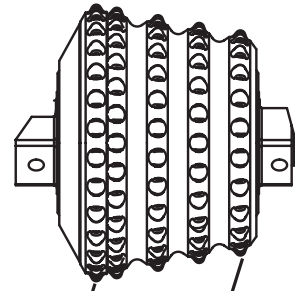
BUTTON ROW OVERLAPPING

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.



Row 1
CMR 41



Row 1
Row 5
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 | 1 | |
| | | | CMR 52 | 2 | 1, 2 |
| CRH 3* | 950 | 4 | CMR 41 | 1, 3 | 1, 2 |
| | | | CMR 52 | 2, 4 | 3, 4 |
| CRH 3 | 1060 | 4 | CMR 41 | 1, 3 | 1, 2 |
| | | | CMR 52 | 2, 4 | 3, 4 |
| CRH 3** | 1084* | 4 | CMR 41-27 | 1, 3 | 1, 2 |
| | | | CMR 52-27 | 2, 4 | 3, 4 |
| CRH 4 | 1420 | 6 | CMR 41 | 1, 3, 5 | 1, 2 |
| | | | CMR 52 | 2, 4, 6 | 3, 4, 5, 6 |
| CRH 5 | 1524 | 8 | CMR 41 | 1, 5, 7 | 4 |
| | | | CMR 52 | 2, 3, 4, 6, 8 | 1, 2, 3, 5, 6, 7, 8 |
| CRH 6/6S | 1829 | 10 | CMR 41 | 1, 3, 5, 7, 9 | 3, 4, 5, 6 |
| | | | CMR 52 | 2, 4, 6, 8, 10 | 1, 2, 7, 8, 9, 10 |
| CRH 7/7S | 2134 | 12 | CMR 41 | 1, 3, 5, 7, 9, 11 | 3, 4, 5, 6, 7, 8 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12 | 1, 2, 9, 10, 11, 12 |
| CRH 8/8S/8D/8L | 2440 | 14 | CMR 41 | 1, 3, 5, 7, 9, 11, 13 | 3, 4, 5, 6, 7, 8, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14 | 1, 2, 11, 12, 13, 14 |
| CRH 9L | 2743 | 14 | CMR 41 | 1, 3, 5, 7, 9, 11, 13 | 3, 4, 5, 6, 7, 8, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14 | 1, 2, 11, 12, 13, 14 |
| CRH 10D/10SD | 3094 | 16 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15 | 5, 6, 7, 8, 9, 10, 11, 12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16 | 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.

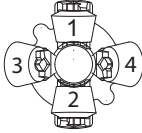
* CRH 3 Ø 950 mm, part number 7008-1009-30, is designed for 7 7/8" stem only!

** 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"



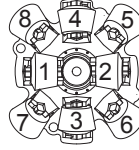
CRH 3
Ø 950/37"
Ø 1060/42"
Ø 1084/43"



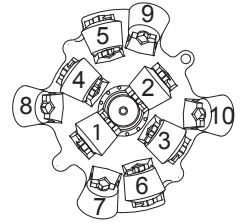
CRH 4
Ø 1420/56"



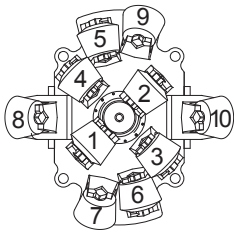
CRH 5
Ø 1524/60"



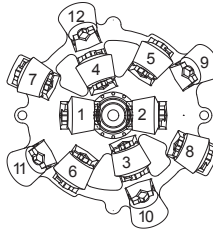
CRH 6
Ø 1829/72"



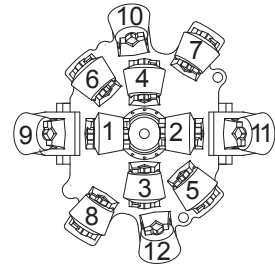
CRH 6S
Ø 1829/72"



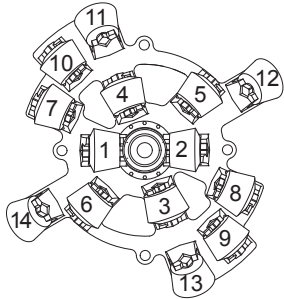
CRH 7
Ø 2134/84"



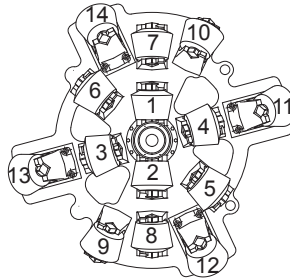
CRH 7S
Ø 2134/84"



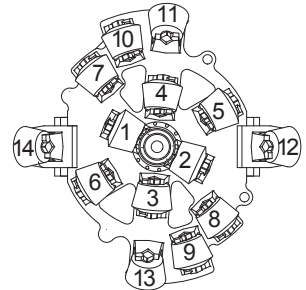
CRH 8/8L
Ø 2440/96"



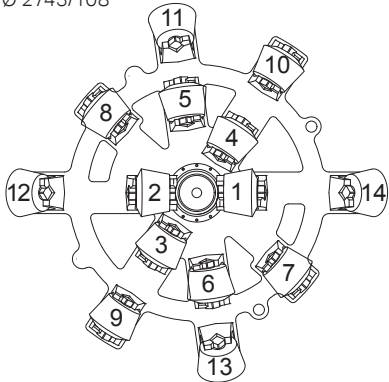
CRH 8D
Ø 2447/96"



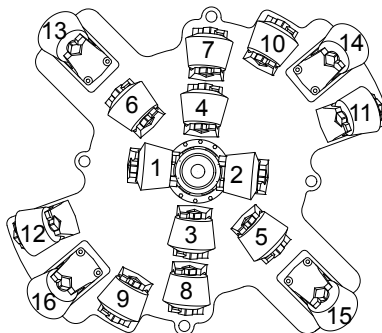
CRH 8S
Ø 2440/96"



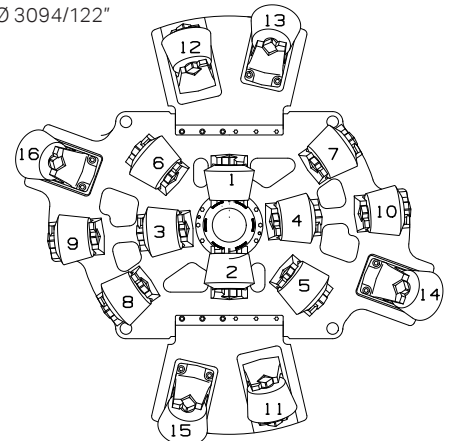
CRH 9L
Ø 2743/108"



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 | 1, 3, 5, 7, 9 | 3, 4, 5, 6 |
| | | | CMR 52 | 2, 4, 6, 8, 10 | 1, 2, 7, 8, 9, 10 |
| CRH 6E | 2236 | 12 | CMR 41 | 1, 3, 5, 9, 11, 13 | 3, 4, 5, 6, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 10, 12, 14 | 1, 2, 11, 12, 13, 14 |
| CRH 6E | 2429 | 14 | CMR 41 | 1, 3, 5, 7, 9, 11, 13 | 3, 4, 5, 6, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14 | 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 | 1, 3, 5, 7, 9, 11 | 3, 4, 5, 6, 7, 8 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12 | 1, 2, 9, 10, 11, 12 |
| CRH 8E | 2765 | 14 | CMR 41 | 1, 3, 5, 7, 9, 13, 15 | 3, 4, 5, 6, 7, 8 |
| | | | CMR 52 | 2, 4, 6, 8, 11, 14, 16 | 1, 2, 9, 11, 13, 14, 15, 16 |
| CRH 8E | 3154 | 16 | CMR 41 | 1, 3, 5, 7, 13, 15, 17, 19 | 3, 4, 5, 6, 7, 8, 13, 14 |
| | | | CMR 52 | 2, 4, 6, 8, 14, 16, 18, 20 | 1, 2, 15, 16, 17, 18, 19, 20 |
| CRH 8E | 3510 | 18 | CMR 41 | 1, 3, 5, 7, 13, 15, 17, 19, 21 | 3, 4, 5, 6, 7, 8, 13, 14 |
| | | | CMR 52 | 2, 4, 6, 8, 14, 16, 18, 20, 22 | 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 | 1, 3, 5, 7, 9, 11, 13 | 3, 4, 5, 6, 7, 8 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14 | 1, 2, 9, 10, 11, 12, 13, 14 |
| CRH8SE | 3052 | 18 | CMR 41 | 1, 3, 5, 7, 9, 12, 13, 15, 17 | 3, 4, 5, 6, 7, 8, 9, 10, 13, 14 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 11, 14, 16, 18 | 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 | 1, 3, 5, 7, 9, 11, 13, 15 | 3, 4, 5, 6, 7, 8, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16 | 1, 2, 11, 12, 13, 14, 15, 16 |
| CRH 10E | 3500 | 18 | CMR 41 | 1, 3, 5, 7, 9, 11, 14, 17, 19 | 3, 4, 5, 6, 7, 8, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 16, 18, 20 | 1, 2, 11, 12, 14, 16, 17, 18, 19, 20 |
| CRH 10E | 3824 | 20 | CMR 41 | 1, 3, 5, 7, 9, 11, 14, 17, 19, 21 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 16, 18, 20, 22 | 1, 2, 14, 16, 17, 18, 19, 20, 21, 22 |

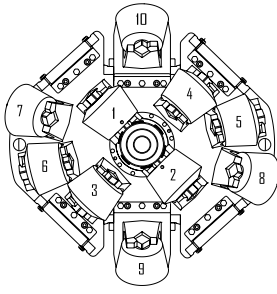
CRH 10SE

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

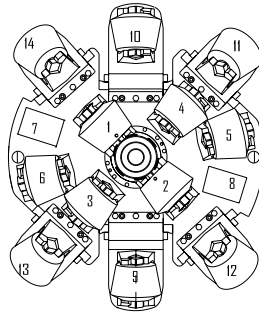
| REAMING HEAD TYPE | HEAD DIA. MM | NO. OF CUTTERS | TYPE OF CUTTER | POSITION 25.5 MM SPACING | POSITION 51 MM SPACING |
|-------------------|--------------|----------------|----------------|------------------------------------|--------------------------------------|
| CRH 10SE | 3047 | 16 | CMR 41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

CRH 6E

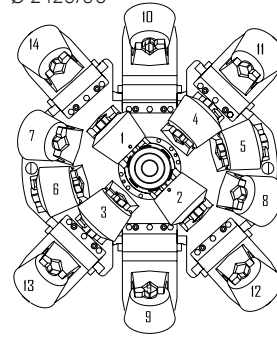
Ø 1829/72"



Ø 2236/88"

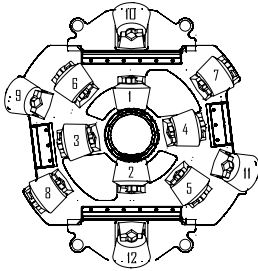


Ø 2429/96"

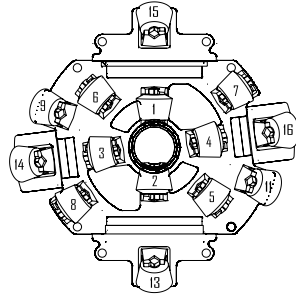


CRH 8E

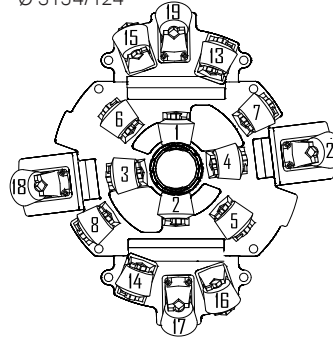
Ø 2441/96"



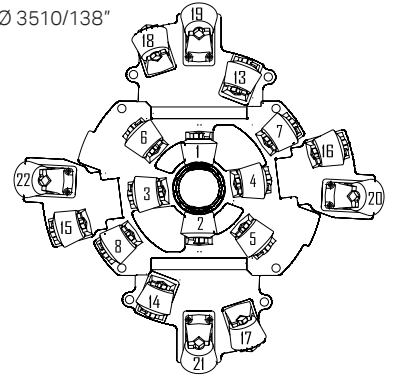
Ø 2765/109"



Ø 3154/124"

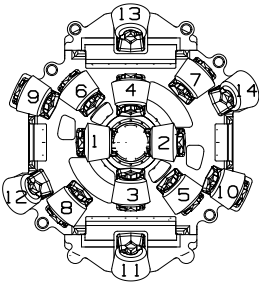


Ø 3510/138"

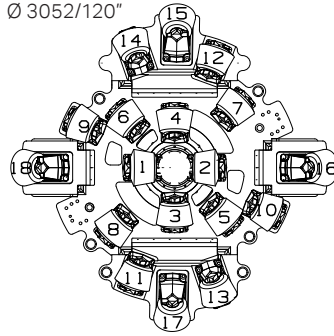


CRH 8SE

Ø 2442/96"

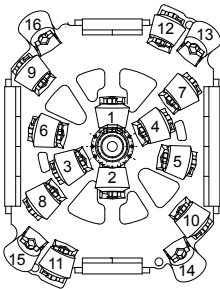


Ø 3052/120"

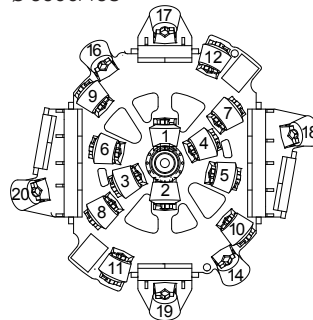


CRH 10E

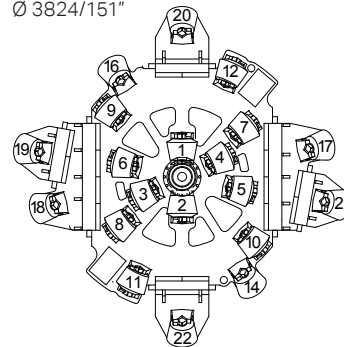
Ø 3130/123"



Ø 3500/138"

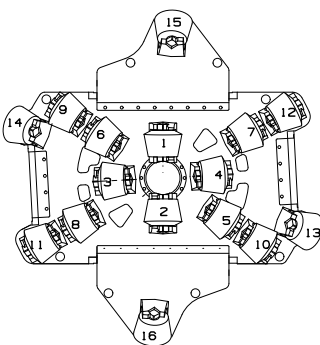


Ø 3824/151"

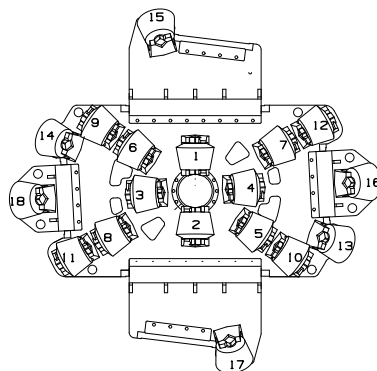


CRH 10SE

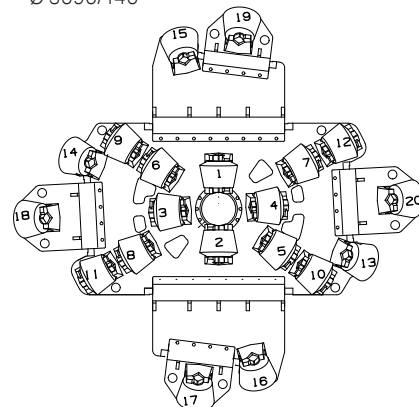
Ø 3047/120"



Ø 3372/133"



Ø 3696/146"



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 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 | 1, 3, 5, 7, 9, 11, 13B, 15,17 | 3, 4, 5, 6, 7, 8, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14B, 16,18 | 1, 2, 11, 12, 13B, 14B, 15, 16, 17, 18 |
| CRH 10ED | 3687 | 20 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19 | 3, 4, 5, 6, 7, 8, 9, 10,11,12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 | 1, 2, 13, 14, 15, 16, 17, 18, 19, 20 |
| CRH 10ED | 3824 | 20 | CMR 41 | 1, 3, 5, 7, 9, 11, 13B, 15, 17, 19 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14B, 16, 18, 20 | 1, 2, 13B, 14B, 15, 16, 17, 18, 19, 20 |
| CRH 10ED | 4042 | 22 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 | 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 | 1, 3, 5, 7, 9, 11, 13, 15, 17 | 3, 4, 5, 6, 7, 8, 9, 10 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18 | 1, 2, 11, 12, 13, 14, 15, 16, 17, 18 |
| CRH 12E/12EL | 3840 | 20 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 | 1, 2, 13, 14, 15, 16, 17, 18, 19, 20 |
| CRH 12E/12EL | 4146 | 22 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 | 1, 2, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 |
| CRH 12E/12EL | 4500 | 24 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 | 1, 2, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 |
| CRH 12E/12EL | 5000 | 26 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26 | 1, 2, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 |
| CRH 12E | 5520 | 30 | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 | 1, 2, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 |
| CRH 12E | 6028 | 32 (36) | CMR 41 | 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, (29), (31), 33, 35 | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 |
| | | | CMR 52 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, (30), (32), 34, 36 | 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.

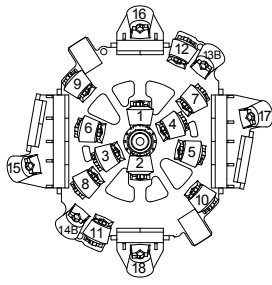
51 mm spacing: pos. 1, CMR 52; pos. 2, CMR 41.

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

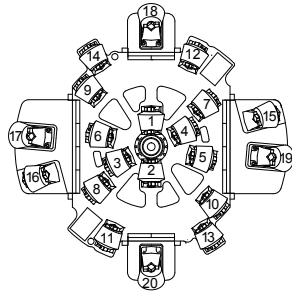
Cutter positions in parantheses (X), are for optional use, when heavy gauge wear is expected.

CRH 10ED

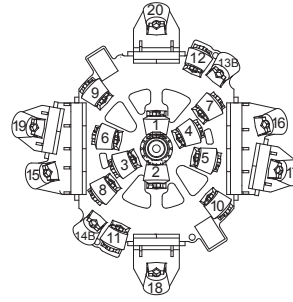
Ø 3500/138"



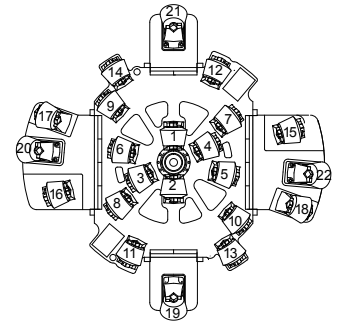
Ø 3687/145"



Ø 3824/151"

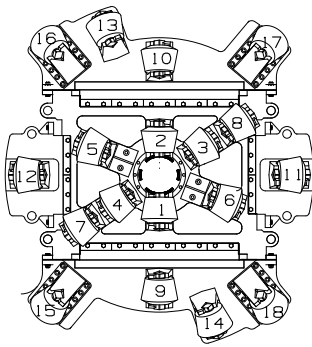


Ø 4042/159"

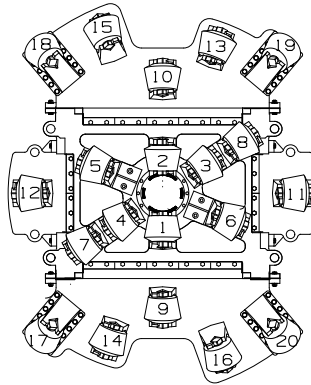


CRH 12E/CRH 12EL

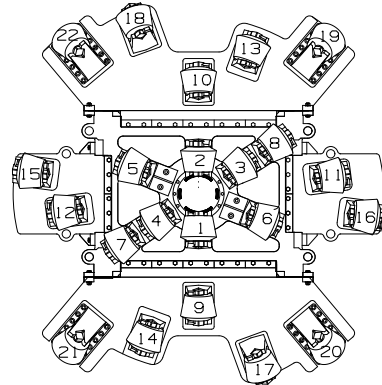
Ø 3534/139"



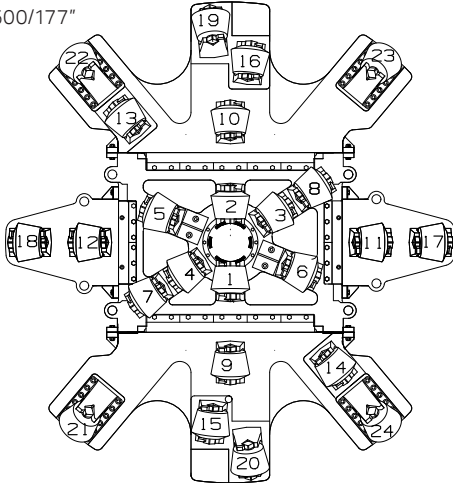
Ø 3840/151"



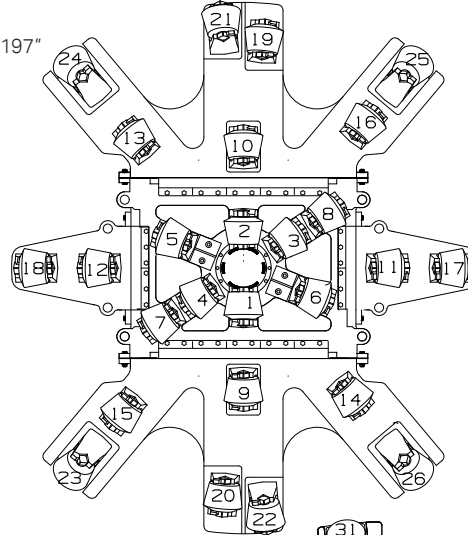
Ø 4146/163"



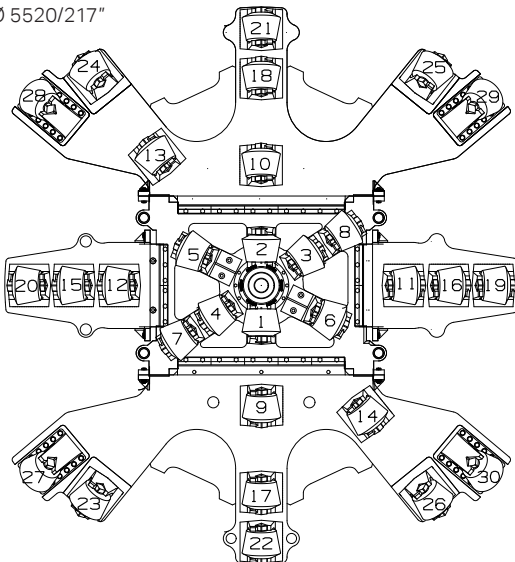
Ø 4500/177"



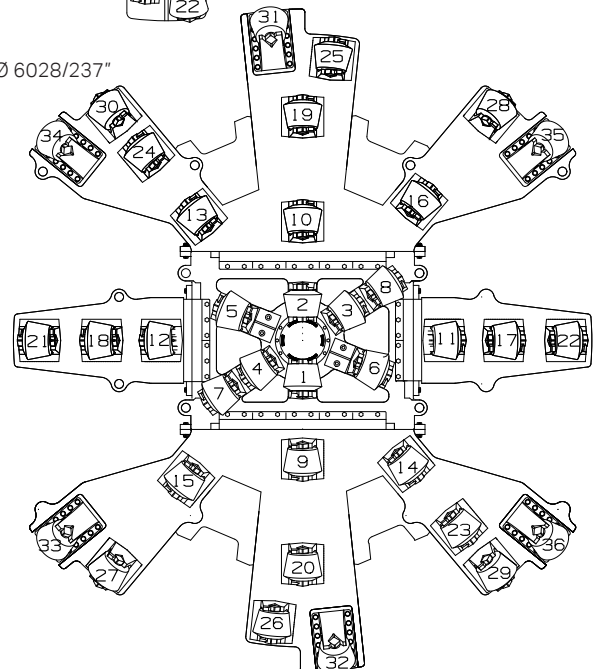
Ø 5000/197"



Ø 5520/217"



Ø 6028/237"

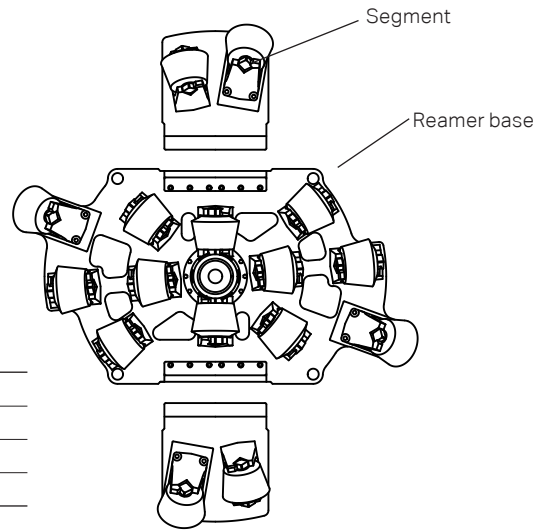


MOUNTING OF SEGMENTS

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 dismantled until the collaring site is reached.

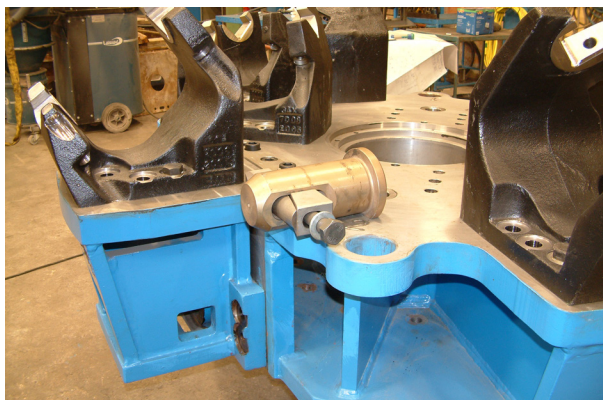
| REAMING HEAD TYPE | BASE HEAD PART NO. | SEGMENT PART NO. | NO. OF SEGMENT | NO. OF CUTTER |
|-------------------|--------------------|------------------|----------------|---------------|
| CRH 6S | 7008-1418-21 | 7008-2101-20 | 2 | 10 |
| CRH 7S | 7008-1421-21 | 7008-2101-20 | 2 | 12 |
| CRH 8S |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



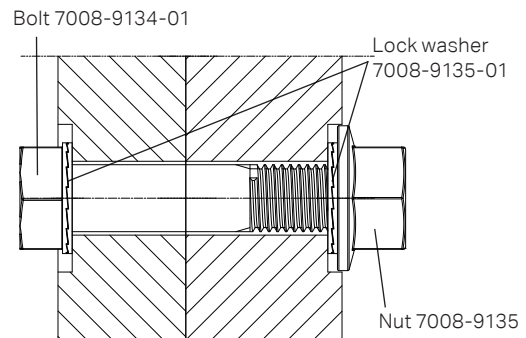
1. Clean all contact surfaces. Oil bolts, nuts, wedge and slotwedge. Hook the segment on to the head as shown.



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.



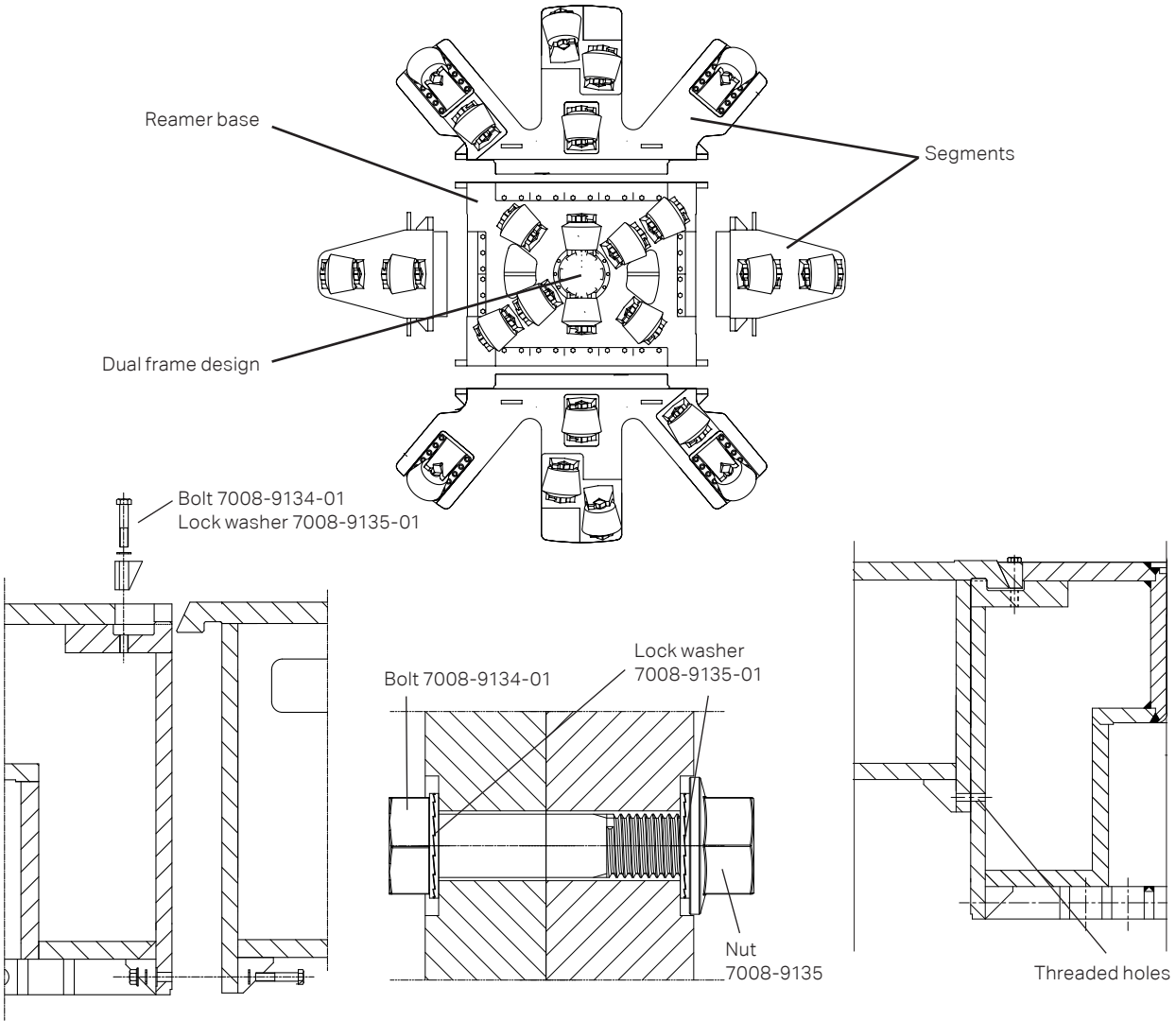
4. Complete the segment assembly by tightening the bolt/nut joints. Start with 2/3 torque (≈800 Nm). Tighten to full torque 1200 Nm. Example of tool combination see page 8.

Segment part number: 7008-XXXX-YY

ex: 7008-2109-2X (without saddles)
 7008-2109-3X (with saddles)

CRH 12E/CRH 12EL

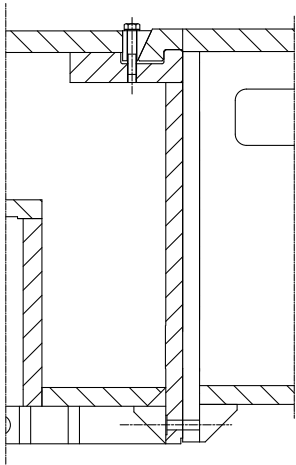
The CRH 12E system is a user friendly design which facilitates transportation through narrow openings and substantially reduces the time for assembly. The reamer base is transported with the segments dismantled until the collaring site is reached.



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 sequence 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 |

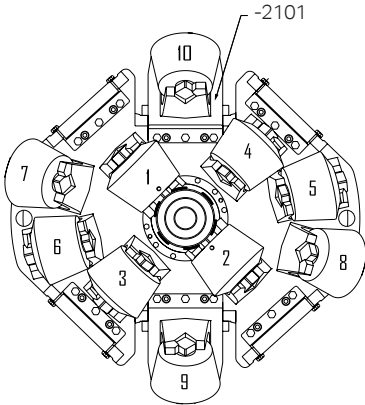
CRH 8SE

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

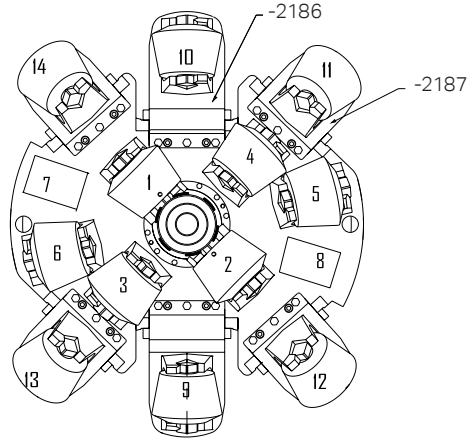
| REAMING HEAD TYPE | HEAD DIA. MM | NO. OF CUTTERS | NO. OF SEGMENTS | SEGMENT PART NUMBER | SEGMENT PART NUMBER |
|-------------------|--------------|----------------|-----------------|---------------------|---------------------|
| CRH 8SE | 2442 | 14 | 2 | 7008-2172-20 | |
| CRH 8SE | 3052 | 18 |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

CRH 6E

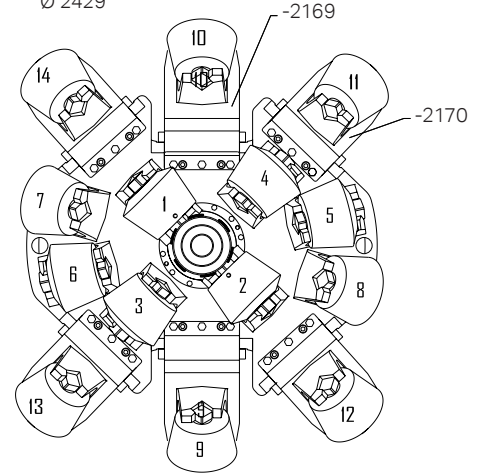
Ø 1829



Ø 2236

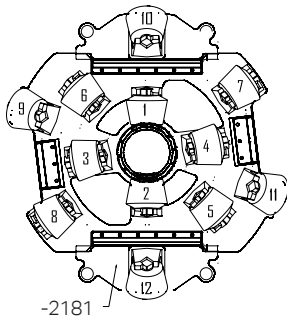


Ø 2429

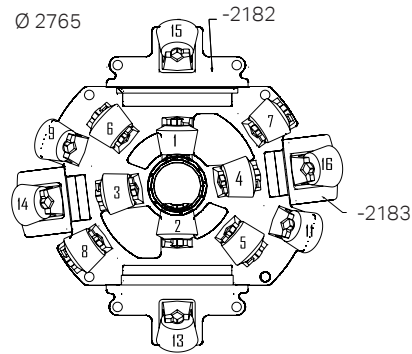


CRH 8E

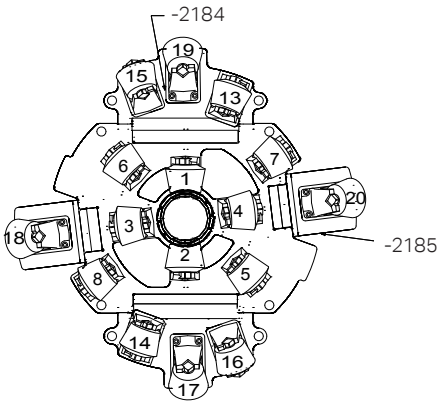
Ø 2441



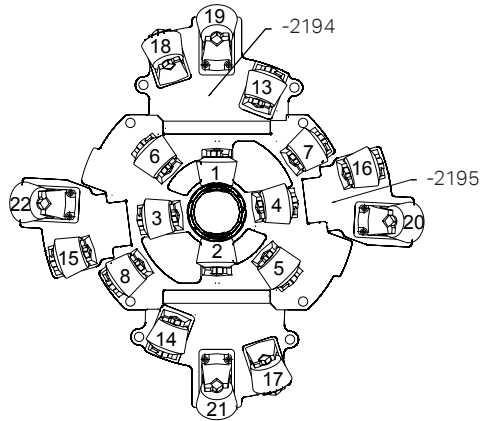
Ø 2765



Ø 3154

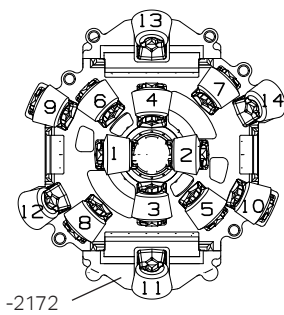


Ø 3510

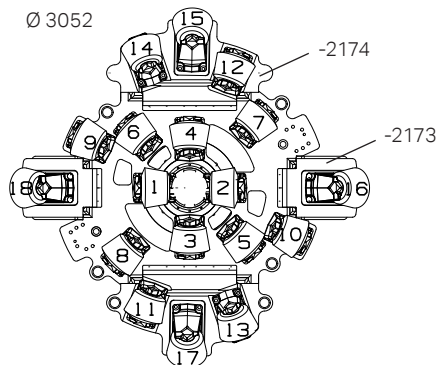


CRH 8SE

Ø 2442



Ø 3052



SEGMENT POSITIONING

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 | |

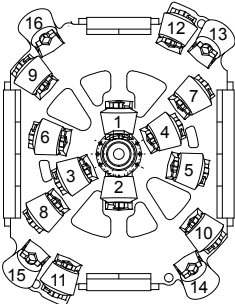
CRH 10SE

Reamer base 7008-1630-20, Ø360 stem fit

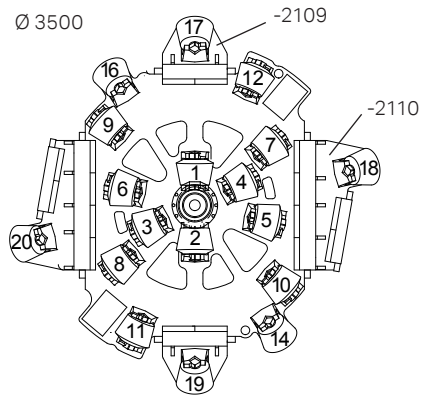
| REAMING HEAD TYPE | HEAD DIA. MM | NO. OF CUTTERS | NO. OF SEGMENTS | SEGMENT PART NUMBER | SEGMENT PART NUMBER | SEGMENT PART NUMBER |
|-------------------|--------------|----------------|-----------------|---------------------|---------------------|---------------------|
| CRH 10SE | 3047 | 16 | 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

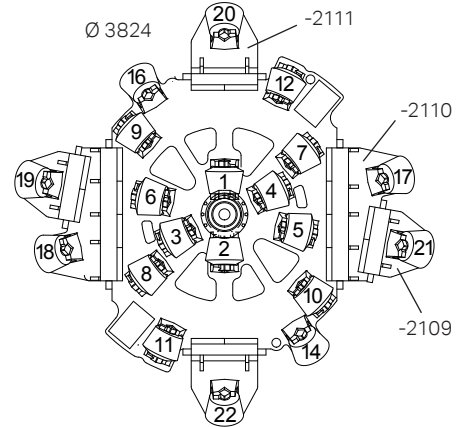
Ø 3130



Ø 3500

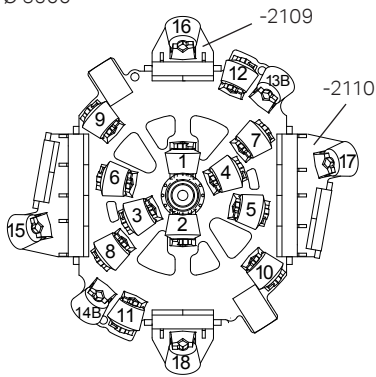


Ø 3824

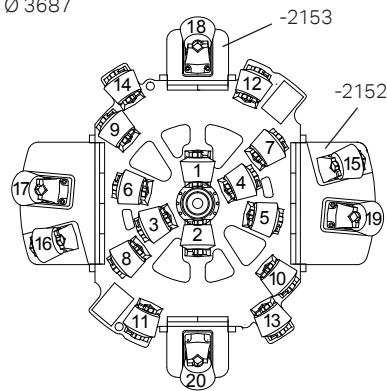


CRH 10ED

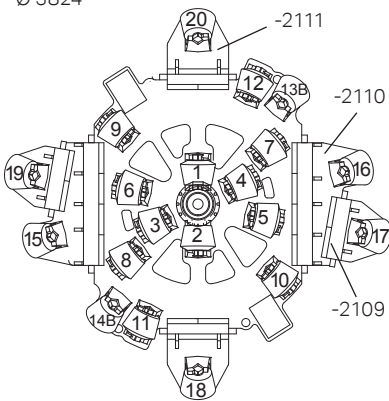
Ø 3500



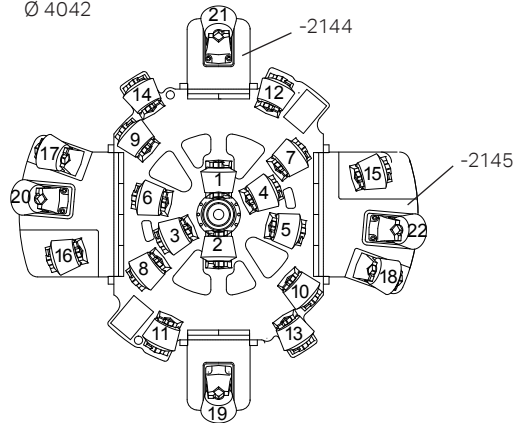
Ø 3687



Ø 3824

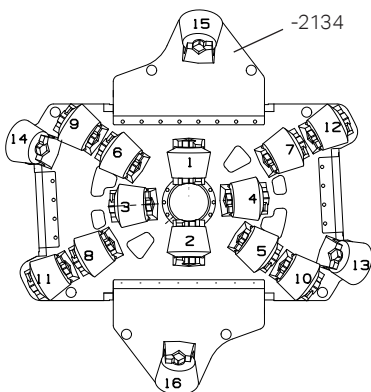


Ø 4042

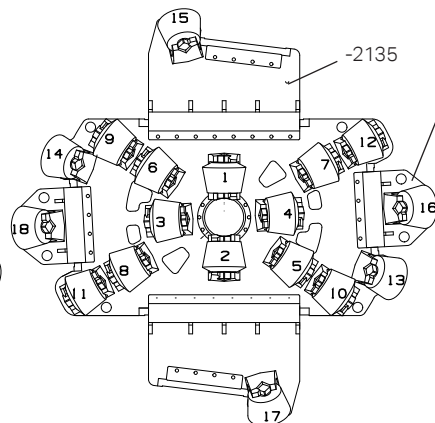


CRH 10SE

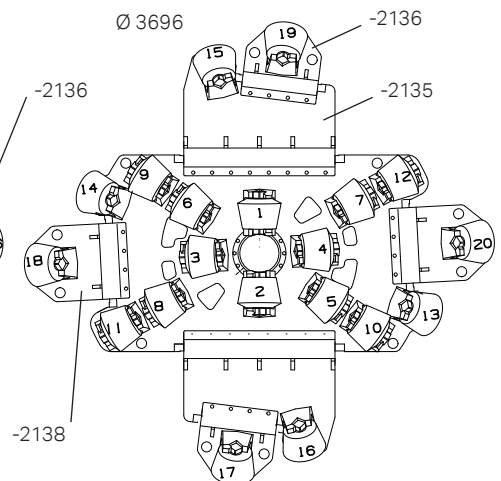
Ø 3047



Ø 3372



Ø 3696



MOUNTING OF SEGMENTS

CRH 12E/CRH 12EL

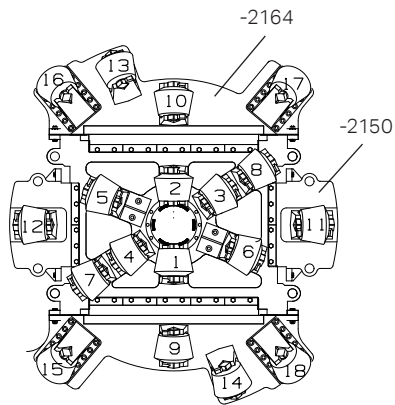
Reamer base Ø 390 mm stem fit: CRH12E 7008-1338-2X , CRH12EL 7008-1335-2X

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

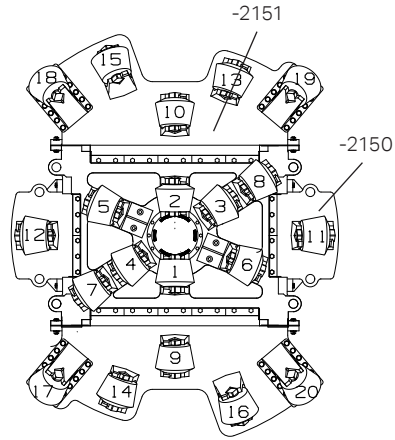
| REAMING HEAD TYPE | HEAD DIA. MM | NO. OF CUTTERS | NO. OF SEGMENTS | SEGMENT (SMALL) PART NUMBER | SEGMENT (LARGE) PART NUMBER |
|-------------------|--------------|----------------|-----------------|-----------------------------|-----------------------------|
| CRH 12E | 3534 | 18 | 2 + 2 | 7008-2150-20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

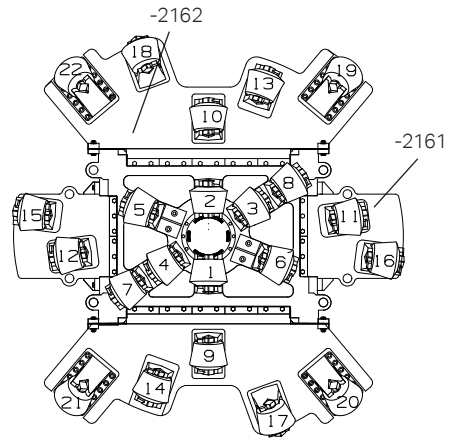
Ø 3534



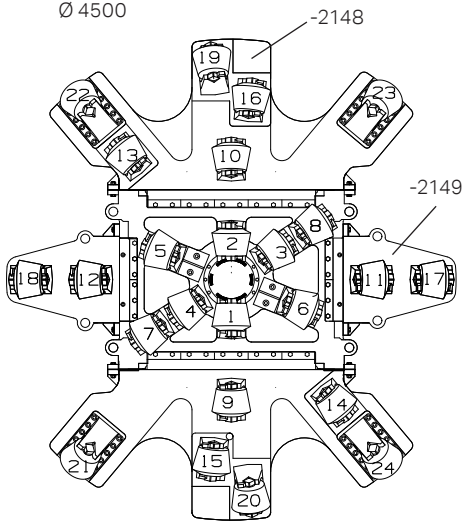
Ø 3840



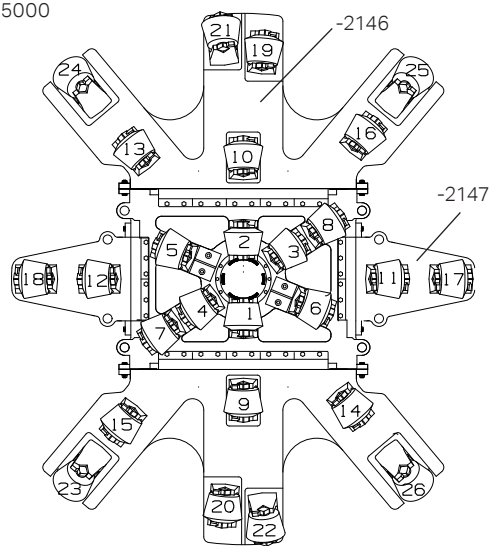
Ø 4146



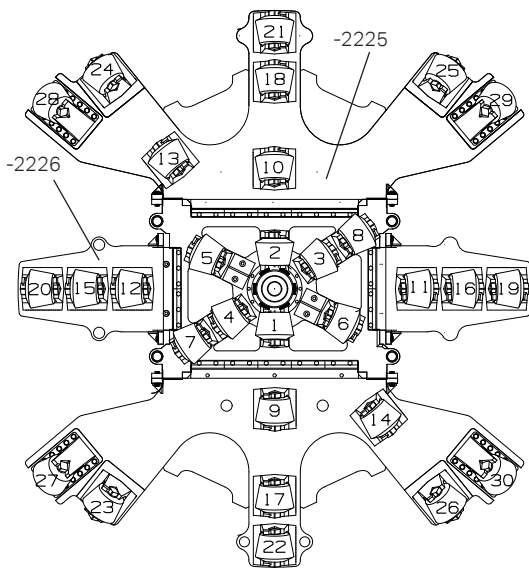
Ø 4500



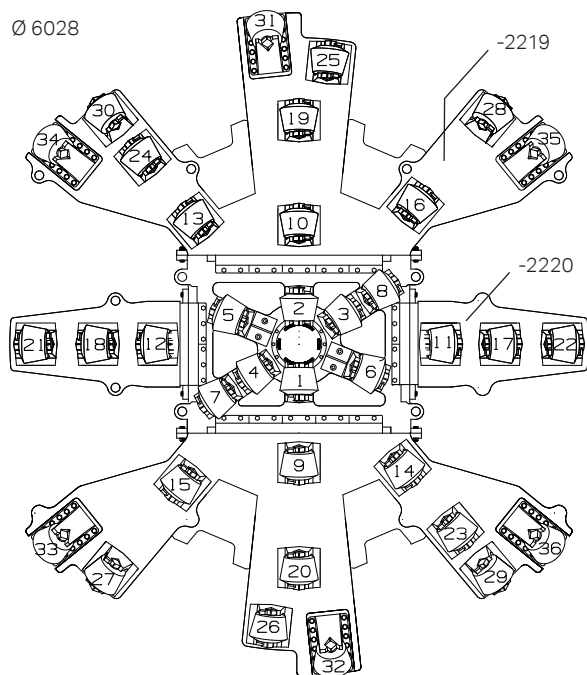
Ø 5000



Ø 5520



Ø 6028



INSPECTION

For Safety Instructions, see page 4-5.

In order to keep 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.



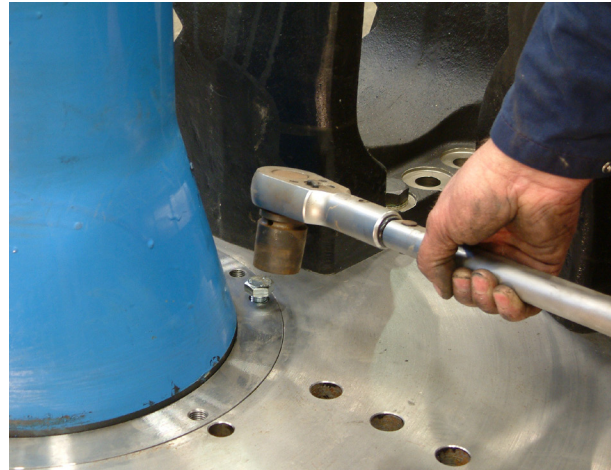
Use measuring gauge 7008-9631 to measure the button wear on any individual button. The gauge measures the percentage of the protrusion left on each button.

DISMOUNTING OF STEM

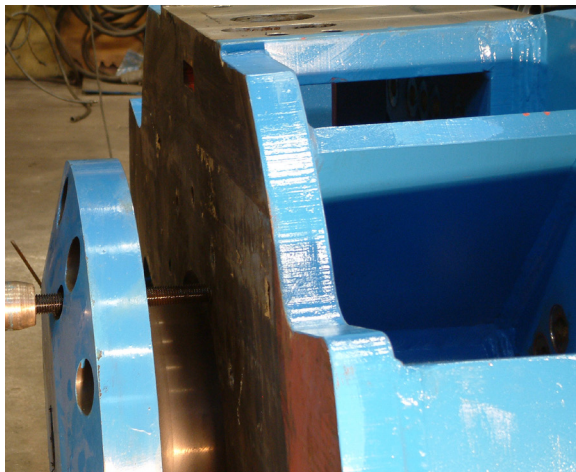
For Safety Instructions, see page 4-5.



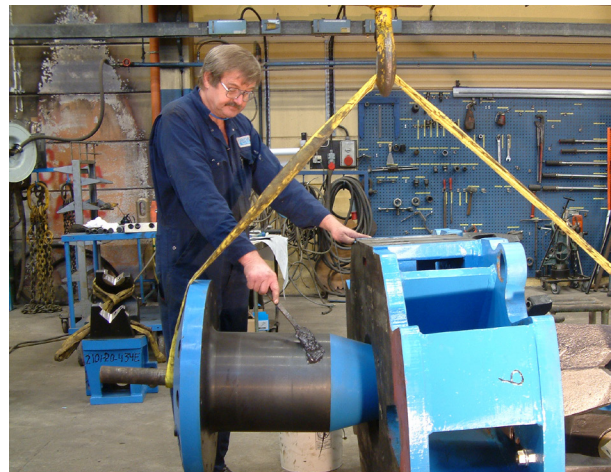
1. Remove the inner saddles from position 1 and 2. Use the tool combination on page 8



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!

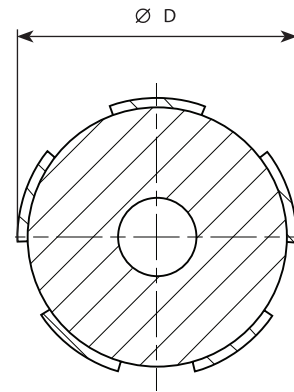
When the stem and the saddles are reassembled, new bolts and nuts must be used.

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.

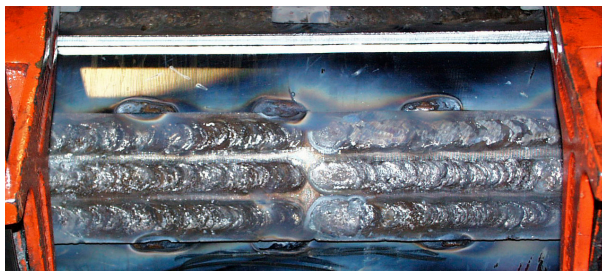
| PILOT HOLE DIAMETER | Ø D MM | WEAR PADS QUANTITY | WEAR PADS THIN TYPE PART NO. |
|---------------------|--------|--------------------|------------------------------|
| 7 7/8" | 192 | 4 | 7008-9020 |
| 9" | 220 | 5 | 7008-9023 |
| 9 7/8" | 242 | 5 | 7008-9025-05 |
| 11" | 271 | 5 | 7008-9028-05 |
| 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 until grease comes out through the other relief hole. Mount a conical plug in this hole in the same way.

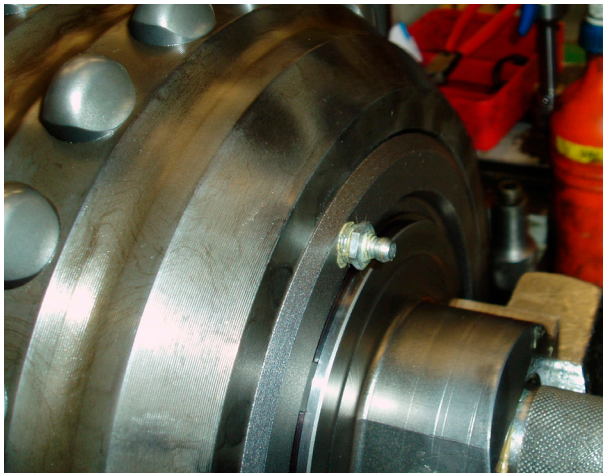


8. Re-install the ball plug retainer. Mount a new snap ring and a plastic protection cap together with new o-rings.

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

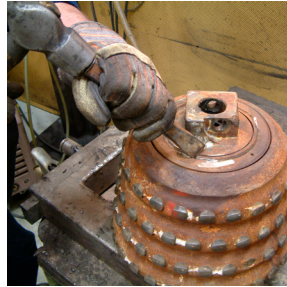
| PCS | PART NO. | ITEM |
|-----|-----------|---------------|
| 2 | 7008-9110 | Seal |
| 2 | 7008-9571 | Seal retainer |
| 2 | 7008-9111 | Snap ring |
| 2 | 7008-9604 | O-ring |
| 2 | 7008-9113 | Lock ring |

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.



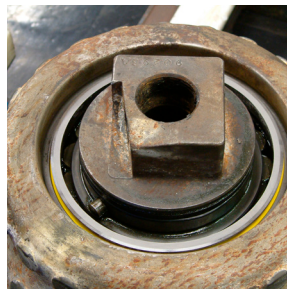
3. Make a puller tool by using two bolts, nuts and a small U-beam. Tack weld the two bolts to the retainer ring. Remove the retainer ring by tightening the nuts and tapping the retainer ring with a hammer. The retainer ring can be reused if it is not damaged.



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.

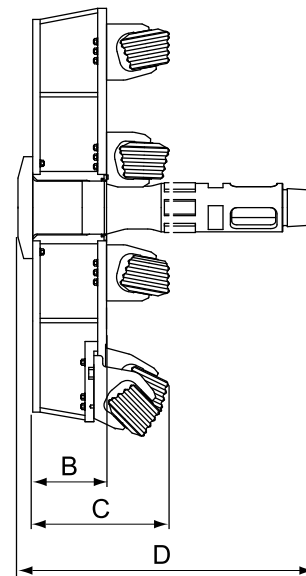
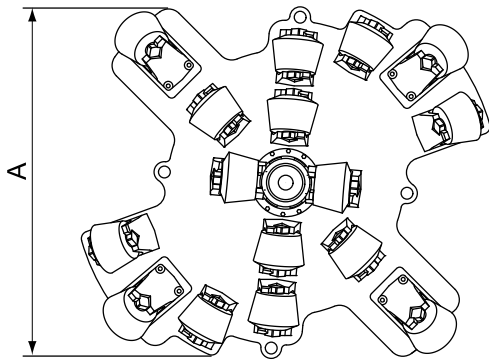
Spares for re-sealing kit see page 36.

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 | |

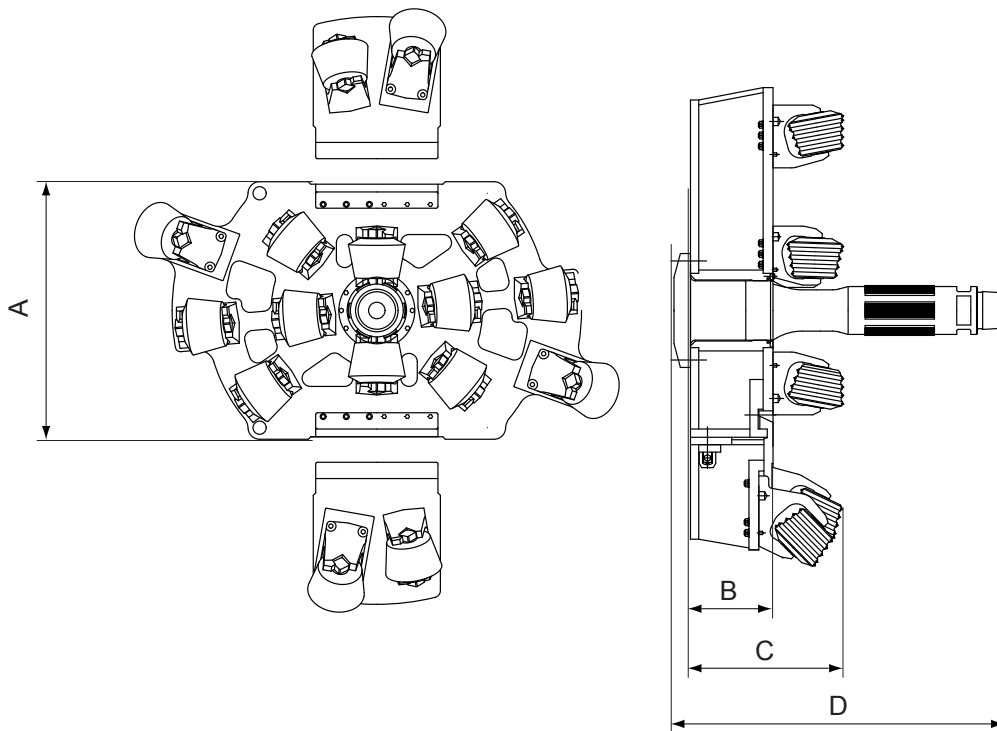


TRANSPORT DIMENSIONS AND WEIGHTS

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 | |



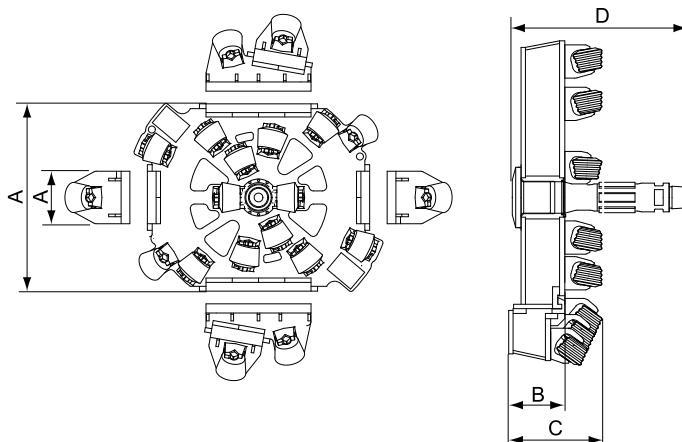
EXTENDABLE REAMING HEADS

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 |



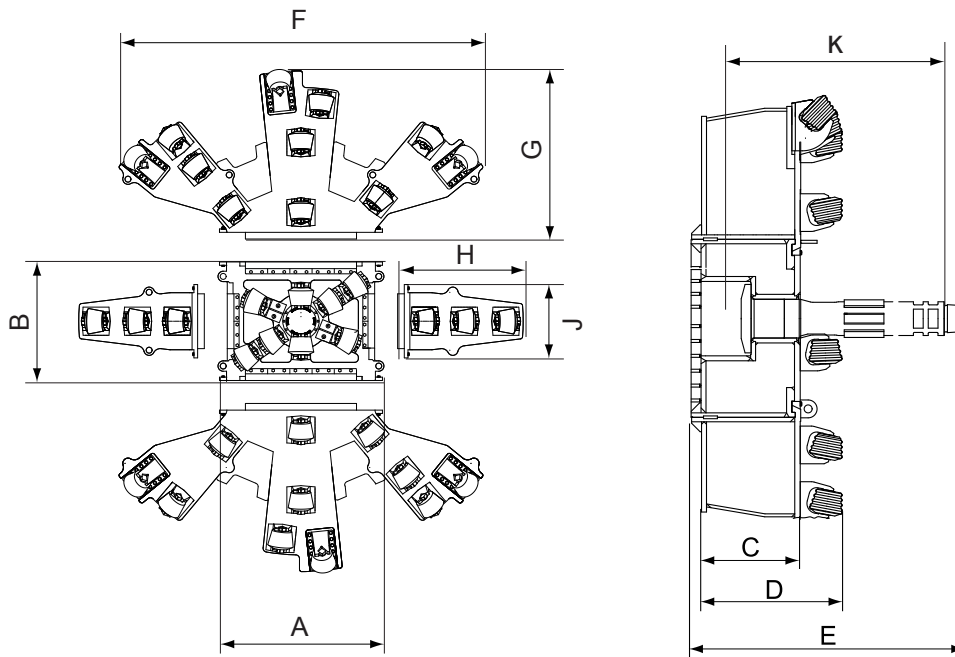
TRANSPORT DIMENSIONS AND WEIGHTS

CRH 12E/CRH 12EL

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

| REAMING HEAD CRH 12E/12EL | TRANSPORT DIMENSIONS, MM | | | | | | | | | |
|------------------------------|--------------------------|------|----------|-----------|-----------|------|------|------|-----|------|
| | 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 | STEM 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 3/4" 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 3/4" DI22 | Bolt | 12 | 7008-9134-01 |
| 9 7/8" | 251 | 7008-3325-30 | 7008-9025-05 | 5 | 6 3/4" DI22 | Nut | 12 | 7008-9135 |
| 11" | 279 | 7008-3428-30 | 7008-9028-05 | 5 | 8 1/4" DI22 | Lock washer | 24 | 7008-9135-01 |
| 12 1/4" | 311 | 7008-3431-30 | 7008-9031-05 | 5 | 8 1/4" DI22 | O-ring | 1 | 7008-9136 |
| 12 1/4" | 311 | 7008-3531-30 | 7008-9031-05 | 5 | 9 1/4" DI22 | V-ring | 1 | 7008-9395 |
| Stems with Ø 360 mm reamer fit | | | | | | | | |
| 12 1/4" | 311 | 7008-3531-40 | 7008-9031-05 | 5 | 9 1/4" 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 1/4" | 311 | 7008-3531-50 | 7008-9031-05 | 5 | 9 1/4" 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 |

SPARE PART LIST

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, D-type reaming heads | Bolt | 8 | 7008-9134-01 |
| | | 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 retainer) | 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

SPARE PART LIST

ASSEMBLY TOOLS

| ITEM | PART NO. |
|-------------------|-----------|
| Complete tool box | 7008-9420 |

| ITEMS INCLUDED IN TOOL BOX | PART NO. | ITEMS INCLUDED IN TOOL BOX | PART NO. |
|------------------------------------|-----------|---|-----------|
| Torque wrench, L=1050 mm | 7008-9421 | Wrench, hex= 24 mm | 7008-9429 |
| Torque wrench, L=800 mm | 7008-9427 | Wrench, hex= 36 mm | 7008-9430 |
| Torque multiplier (X 4) | 7008-9422 | Hexagon spanner, hex= 3/16" | 7008-9447 |
| Extension bar, L= 102 mm | 7008-9431 | Hexagon spanner, hex= 14 mm | 7008-9446 |
| Extension bar, L= 152 mm | 7008-9432 | Hexagon spanner, hex= 19 mm | 7008-9426 |
| Extension bar, L= 228 mm | 7008-9433 | Sealant (tube 0,4 kg) | 7008-9434 |
| Power socket hex bit, 19 mm | 7008-9449 | Applier for sealant | 7008-9435 |
| Power socket, 24 mm | 7008-9428 | File | 7008-9440 |
| Power socket, 36 mm | 7008-9425 | Wire brush | 7008-9441 |
| Power socket, 36 mm long | 7008-9439 | Grease Note! Not for re-greasing cutters! | 7008-9443 |
| Adaptor socket, 1" box to 3/4" pin | 7008-9438 | Steel scraper | 7008-9444 |
| Adaptor socket, 3/4" box to 1" pin | 7008-9442 | 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 | | SEAL CHANGE | | BUTTON LIFE % | TOTAL METERS | OTHERS |
|------|-------------------|------|-----------|----|-------------|----|---------------|--------------|--------|
| | | | YES | NO | YES | NO | | | |
| 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 SERIAL NO. | TYPE OF CUTTER SERVICE | | BUTTON LIFE % | NUMBER OF METRES/HOURS | MISC. |
|---------------------------|------------------------|-----------|---------------|------------------------|-------|
| | OK | RE-GREASE | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |

NOTES:

