ČZ MOTORCYCLE CHAINS

Technical information

CONTENT

1 ČZ motorcycle chains

1.1 Description and function of the chain

Each chain used for driving of the motorcycle rear wheel consists of five elementary components. They include pins, bushes, rollers, inner plates and outer plates. Variously shaped rubber sealing rings are used for the sealed chains in addition.

For the chain to torque transfer, which is the main function of the chain on the motorcycle, the chain links must be sufficiently strong and movable. Movability of the chain links is based on the rotary motion between the bushes and pin. They both form a friction bearing and we call it the chain joint.

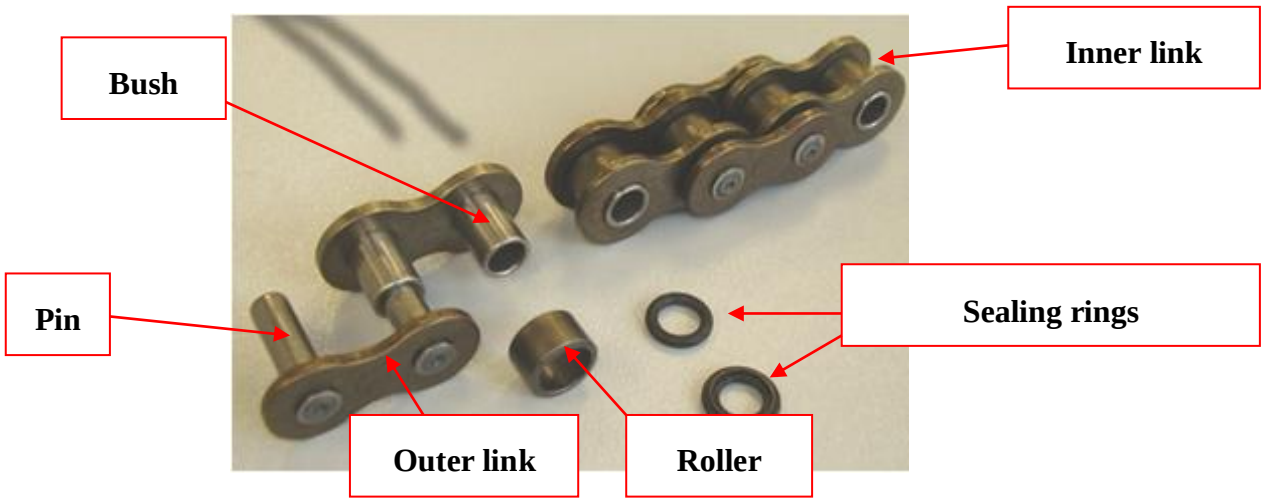
Another important component of the chain is the roller. It helps rolling the chain link away on the teeth of the sprocket wheel. Rolling the roller away on the teeth reduces frictional resistance and increases durability of the sprocket wheels.

The plates are the last ones of the five chain components. The outer plates form the outer link with the pressed pins. For improved strength of the pressed connection the pins are riveted within the plate. The inner plates are a part of the inner link with the pressed bushes. Friction inside the pressed connections holds the chain together. To achieve stable technical parameters of the chain the components must be manufactured in hundredth tolerances and high quality heat treatment must be provided.

The rubber sealing ring is used only for the sealed chains. The ring has a specific shape and always seals the gap between the inner and outer plate to avoid leaking of lubricant in the space between the bush and pin – in the chain joint. There is tiny amount of the lubricant inside the chain joint and therefore, sealing must be perfect. The sealing ring protects the joint against dirt. The lubricant is pumped carefully into the joint during the chain production cycle because it must operate across the chain lifetime. External lubrication of the inner joint through the sealing rings is impossible when in use. The lubricant does not only lubricate the contact points of the joint but friction surfaces of the sealing rings.

ČZ uses special lubricant developed in cooperation with a leading oil company for lubrication and anti-corrosion protection. The lubricant provides excellent lubrication properties and is one of the reasons for long lifecycle of the ČZ sealed chains.

RECOMMENDATION: Do never remove the lubricant applied from the production before the first use of a new chain. The product may either get damaged or its lifecycle substantially reduced. Do not re-lubricate the brand new chain with another lubricant.



Picture 1: Motorcycle chain parts

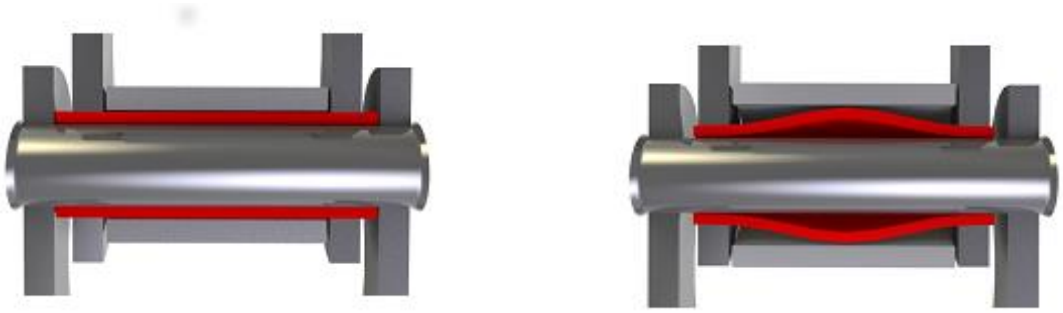
1.2 Description of the chain components and their specification

The plates transfer tension force and therefore, they must be hardened to high strength by thermal treatment. Precise and stable dimensions of a high quantity of the plates can be achieved by pressing from steel strip. In order to improve dynamic strength, the plate surface is shot-peened with steel beads after heat treatment. The chain must be not only strong but it must also look fine and be at least partially corrosion resistant, wherein the resistance is provided by various surface treatments. ČZ uses the following surface treatments: blackening, heat impregnating on blue or yellow colour and galvanic brass or nickel plating.

The bushes are produced by wire cold forming at ČZ. This method does not produce a seam as in case of the bushes coiled from a strip. The solid bushes are important for the sealed chains in order to avoid lubricant leak through the seam from the joint when in use. In order to provide slight extension of the chain during operation the ČZ bushes are produced not only

with pure cylindrical shape but with the defined hole shape as well, so that precise contact surface for the pin is achieved after pressing of the bush in the plate. ČZ called these patent - protected bushes as "KSJ". The surface of all ČZ bushes is saturated with carbon and heat treated in order to achieve high surface hardness.

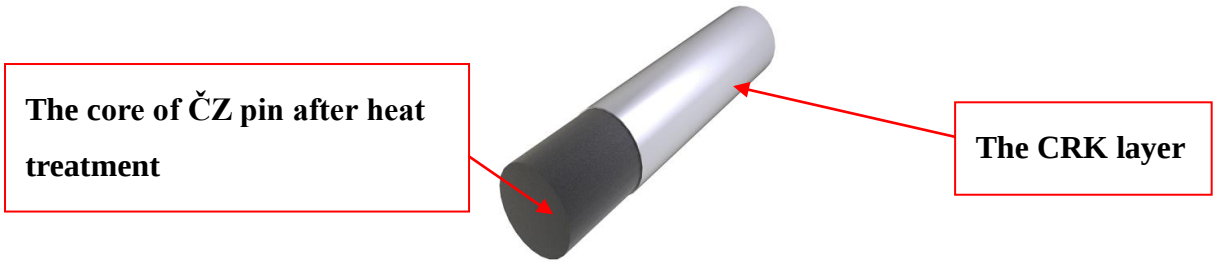
Special ČZ KSJ bush **Standard ČZ bush**



Picture 2: The difference between ČZ KSJ bushes and standard ČZ bushes

The rollers in operation roll away on the tooth side of the sprocket wheel. The force being transferred and speed of rotation of the sprocket wheel bring slight sprocket tooth impacts to the roller surface. For the rollers to operate correctly, the ČZ rollers are heat treated, and the surface is in addition shot peened with steel beads. The rollers are manufactured by the method of wire cold forming.

The pins must be again heat treated to high strength in order to resist to wear and tension impacts in use. The ČZ chains for demanding applications like motocross and karting are characterized by high resistance to elongation in dusty and muddy operation. For the chains, ČZ uses in-house CRK technology that consists in application of very hard chromium carbides on the surface of the pins. Hardness of the carbides is twice higher compared to hardened steel.



Picture 3: The heat treatment of pins used in ČZ chains

The sealing rings – ČZ uses two types of the sealing rings for sealing of the chains. Round-profiled ring "**O-ring**" is used for standard chains modification. The round profile imparts a certain chain durability limit. The second ring type used in the ČZ chains is the special profile ring. The ring with this profile has been developed at ČZ and it is called "**Active-ring**" for its excellent permanent elasticity property in the chain. It is used for the superior class chains and guarantees long sealing ability thanks to the elasticity. Another great advantage of the Active-ring special profile is application of less force to bend the joints in use in order to achieve less loss performance.

Active-ring **O-ring**

Picture 4: The Active-ring and O-ring sealing ring used in ČZ chains

2 Options for linking of the ČZ chains

2.1 Types of the connection links for the ČZ motorcycle chains

ČZ offers three types of the connecting links to its customers. Each version differs in the design and assembly procedure in the chain.

Type V & Type P

Type RIVET

Picture 5: Connecting links usable for CZ chains

TYPE CLIP V	TYPE CLIP P	TYPE RIVET
415 S	428 OR	520 DZO
415 HT	428 MX	520 DZX
086	520 MX	520 SDZZ
420 S	520 EC	525 DZO
420 MX	520 ORM	525 DZX
428 S	520 RDO	525 SDZZ
520 M	520 ORH	530 DZO
	520 ORMX	530 DZX
		530 SDZZ

Table 1: Connecting links and their usage with associated motorcycle chain models

2.2 Chain closing with the Clip V type connection link

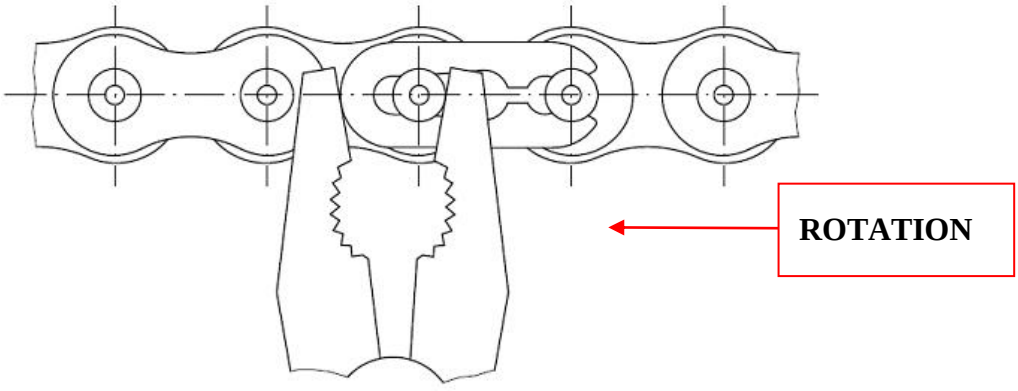
The Clip V type connecting link has been designed by ČZ only for the chains of unsealed basic version as shown in the table. The main feature of the connection link is the closing plate with the holes that permit putting the plate on the pins freely without any force.

Assembly procedure: Slide in the connecting link into the holes of both free ends of the chain. The best way is sliding in from the wheel towards you. Spring assembly is then freely accessible and in use the connection can be then visually checked during common chain maintenance. Proceed with care when sliding the pins in the holes to avoid removal of the lubricant located in the bushes of the free ends of the chain. Over spraying with a spray lubricant is possible. The less lubricant remains in the joint the shorter lifecycle would be.

When the connecting link is slid, put the closing plate to the free ends of the chain and hand press as furthest as possible until the grooves in the pins for safety spring are seen. Then assemble the elastic safety spring into the pin grooves.

IMPORTANT: Following the assembly always check carefully perfect condition of the link, whether the spring sunk completely into the grooves, and whether the link is connected in correct direction of the chain movement. Then when in use, the best during regular chain lubrication check the connecting link.

The spring must always be perfectly snapped into the grooves of the pins, and the closed part of the spring must face in the direction of the chain movement.



Picture 6: The assembly of Type V/P connection links

2.3 Chain closing with the Clip P type connection link

The use of Clip P type connection link provides demountable but strong connection that is important for the sealed chains. This connection link prevents from the lubricant leak from the link in use. Another positive property of the Clip P type connection link is improved dynamic strength. For this reason is used for racing version of the non-sealed chains. The described properties are brought by the closing plate where the pins must be pressed slightly but not by hand as with the Clip V type. This closing requires manual skills and tools need to be used.

Assembly procedure: Lubricate properly the holes of the chain end bushes before assembly. Use a part of the grease in the attached sachet to lubricate (if available for the chain type) and apply the lubricant to the bushes holes using a thin object. Alternatively, quality commercial Vaseline for high pressures may be used.

During assembly of the sealed chain, put one of the sealing rings to each pin of the connecting link and lubricate well with the attached lubricant (or Vaseline). Only thereafter, slide in the connecting link into the holes of both free ends of the chain. The best way is sliding in from the wheel towards you. The assembly is simplified and the connection may be checked visually during common chain maintenance when in use. When sliding the pins to the holes proceed with care not to remove the lubricant in the holes. When the connection link is slid, put the sealing rings in the free chain ends, and lubricate properly again. The next step is putting the closing plate on the edges of the pins. Use VZR 6 tool to push the plate to the proper position (flush with the bottom groove edge in the pin).

In emergency, the plate may be pushed to the pins with pliers, but this is not recommended in order to avoid excessive squeezing of the sealing ring for difficulty of keeping the exact plate position. When the method is used despite the problems described above, check distance of pushing in the plate using a gauge so that dimensions are equal to the link beside. The last assembly step is sliding on the connecting link spring clip into the pin grooves using the pliers in the manner identical to the Clip V type connecting link.

IMPORTANT: Following the assembly always check carefully perfect condition of the link, whether the spring sunk completely into the grooves, and whether the link is connected in

correct direction of the chain movement. Then when in use, the best during regular chain lubrication, check the connecting link.

2.4 Chain closing with the Rivet type connecting link

The Rivet type connecting link is used for the sealed chains for demanding operation, and it produces **permanent** connection. The connection is manually the most difficult compared to the other types of the connecting links, and special mounting tool ČZ – VZR 6 must be used here.

Assembly procedure: Lubricate properly the holes of the chain end bushes before assembly. Use a part of the grease in the attached sachet to lubricate and apply the lubricant to the holes using a thin object. Do not use lubricant for the connecting links other than delivered with the chain.

Put one of the sealing rings to each pin of the connecting link and lubricate well with the attached lubricant. Only thereafter, slide in the connecting link into the holes of both free ends of the chain. For simpler manipulation, the best way is sliding in from the wheel towards you. When sliding the pins to the holes proceed with care not to remove the lubricant in the holes. When the connecting link is slid, put the sealing rings in the free chain ends, and lubricate properly again.

Picture 7: Proper lubrication of pins, bushes and sealing rings guarantees long term reliability of the product. With regards on perfect connection we recommend to remove unnecessary amount of lube from the connection link before riveting.

The next task is putting of the closing plate on the chain ends. The plate can be put behind the edge of the pins only. The mounting tool VZR 6 must be used to finish the chain closing procedure using the Rivet type link. For details about the steps, see the work procedure in the tool manual.

Picture 8: For proper installation of Rivet connecting links use assembly tool CZ VZR 6 and included measurement tool.