

Use and maintenance manual

Chain Drawing: W10441Z

Chain Description: Pitch 152.4mm, Inner Width 36mm, Roller Diameter 63.5mm, Top plate on every pitch with guide plate every 6 pitches (914.4mm), Wearpads every 6 pitches (914.4mm), Zinc Plated

Year of production: 2022



Z.M.C. ITALIA S.r.l.
Via Portoni, 290/D
21044 CAVARIA (VA)
Tel. +39 0331 217476
Fax: +39.0331 218204
http: www.zmcitaly.com

Index

1	Introduction.....	pag. 3
	1.1 Reference specifications.....	pag. 3
	1.2 Warning statement.....	pag. 4
2	Chain Installation.....	pag. 5
	2.1 Check of the conveyor before the installation of the chain.....	pag. 6
	2.2 Assembly scheme.....	pag. 7
	2.3 Tensioning of the chain.....	pag. 8
	2.4 Break in and adjusting of the chain.....	pag. 8
	2.5 Assembly and Disassembly of the chain.....	pag. 9
	2.5.1 Assembly of the chain.....	pag. 10
	2.5.2 Disassembly of the chain.....	pag. 14
3	Characteristics of the ZMC chain W10441Z and operating conditions.....	pag. 15
	3.1 Drawing.....	pag. 15
	3.2 Tensile Strength (Breaking load).....	pag. 17
	3.3 Working load.....	pag. 17
	3.4 Self lubricating parts.....	pag. 17
	3.5 Gear Motor.....	pag. 17
	3.6 Position of the load.....	pag. 17
	3.7 Operating Temperature.....	pag. 18
	3.8 Expected life.....	pag. 18
4	Preventive checks and Maintenance.....	pag. 18
	4.1 Pull, elongation of the chain and energy consumption.....	pag. 18
	4.2 Fitting of the chain on the sprockets.....	pag. 19
	4.3 State of the tracks and of the wearpads.....	pag. 19
	4.4 Cleaning of the chain.....	pag. 20
	4.5 Monitoring of the chain.....	pag. 20
	4.5.1 Visual check.....	pag. 20
	4.5.2 Dimensional checks on chain samples.....	pag. 21
	4.6 Maintenance checkpoints.....	pag. 22
5	Identification of the Maintenance and Use Manual.....	pag. 23

1 - Introduzione

- This manual is divided into parts to more easily point out to the section of interest.
- The scope of this manual is to serve for the installation and maintenance of the chain
- **Warning** : Reading this manual is meant for installers, operators, technicians responsible for maintenance, as well as to the purchaser who must inform the operators in order to prevent damage and accidents.

1.1 - References specifications

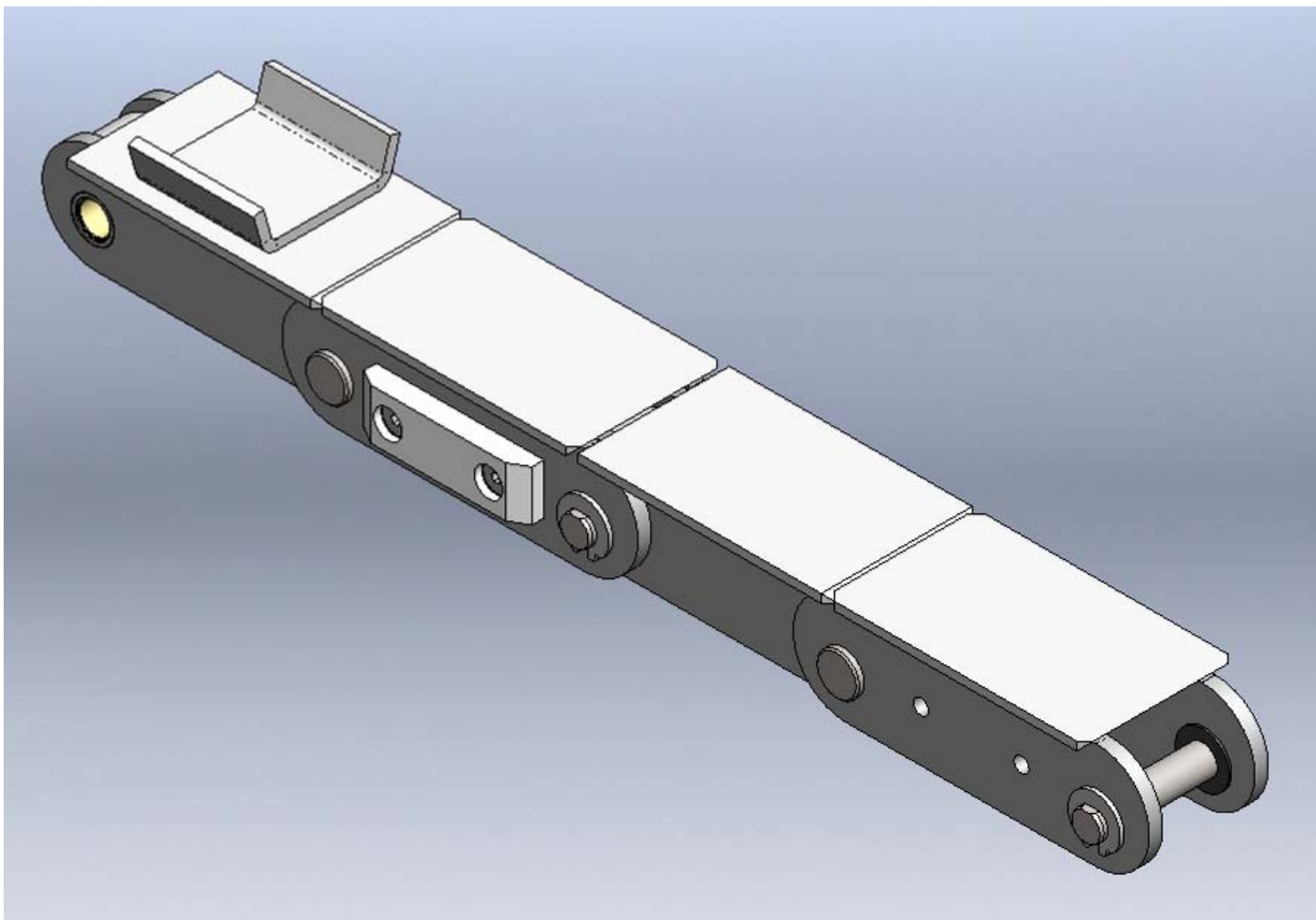
Issue	Title
European Parliament	<i>Machinery Directive 2006/42/EC</i>
BS 4116	<i>Conveyor chains, their attachments and associated chain wheels</i>
DIN 8165	<i>Solid Bearing pin type FV conveyor chain</i>
DIN 8167	<i>ISO-type M conveyor chains with solid pins</i>
DIN 8168	<i>ISO-type MC conveyor chains with hollow pins</i>
DIN 8169	<i>Rollers for types M, MT, MC, and MCT solid and hollow bearing pin conveyor chains</i>
ASME B29.10M	<i>Heavy duty offset sidebar power transmission roller chains and sprocket teeth</i>
ASME B29.12M	<i>Steel bushed rollerless chains, attachments, and sprocket teeth</i>
ASME B29.15M	<i>Steel roller type conveyor chains, attachments, and sprocket teeth</i>
UNI 10932	<i>Trattamenti termici dei materiali metallici Heat Treatment of Metallic materials</i>
ISO 1977	<i>Conveyor chains, attachments and sprockets</i>
ISO 15614-1	<i>Specificazione e qualificazione delle procedure di saldatura per materiali metallici Specification and qualification of the welding procedures for metallic materials</i>

1.2 – Warning statement

Pay attention. Respect the following indications to avoid serious damage to things and people:

1. Guards must be provided on all chain and sprocket installations in accordance with provisions of “Machinery Directive 2006/42/EC” or other applicable safety standards. When revisions of these standards are published, the updated edition shall apply.
2. Always lock out the power switch before installing, removing, manually lubricating or servicing a chain system.
3. When connecting or disconnecting chain:
 - a Eye protection is required. Wear safety glasses, protective clothing, gloves and safety shoes.
 - b Support the chain to prevent uncontrolled movement of the chain and its parts.
 - c The use of hydraulic equipment (cylinders, pumps) is suggested. Tools must be in good condition and properly used.
 - d Do not attempt to connect or disconnect the chain without first reading and understanding the instructions, including the proper placement of pins and bushings, and the procedures for removal or insertion.
 - e Do not attempt to reuse a damaged chain by replacing only the parts that show the fault. The entire chain may be compromised through damage occurred and thus may need to be replaced
4. Other cautions:
 - a **Alterations and Repairs** of the chains should be made only by qualified personnel with parts and components authorized by ZMC Italia S.r.l.
 - b **Inspect Chains** for shipment damage before installation. During operation, all chain systems should be inspected on a regular schedule. Visually check for worn, damaged and broken parts caused by improper installation or maintenance, abnormal stress, temperature, humidity, abrasion or corrosion, possible interference with other system components and improper lubrication.
 - c **Heating Chain** with a cutting torch is not suggested unless absolutely necessary for removal. The heating caused by the cutting can damage the chain.
 - d **Welding** should not be performed on any chain or component.
 - e **Breaking Load** of a chain means the average load at which it will break when subjected to a destructive tensile test. *It does not mean working load.* For complete information, contact ZMC Italia S.r.l.

2 - Chain Installation



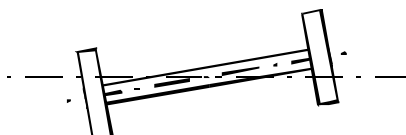
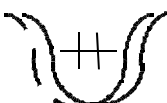
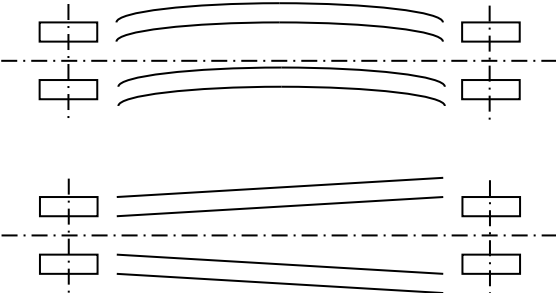
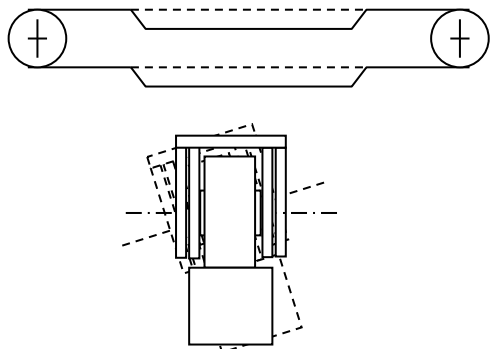
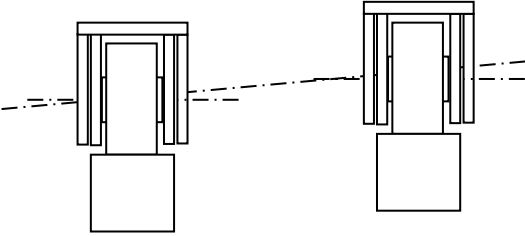
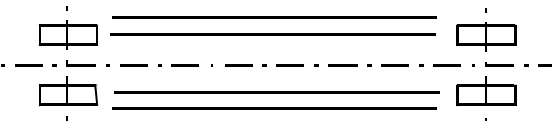
Img_1

CHAIN W10441Z

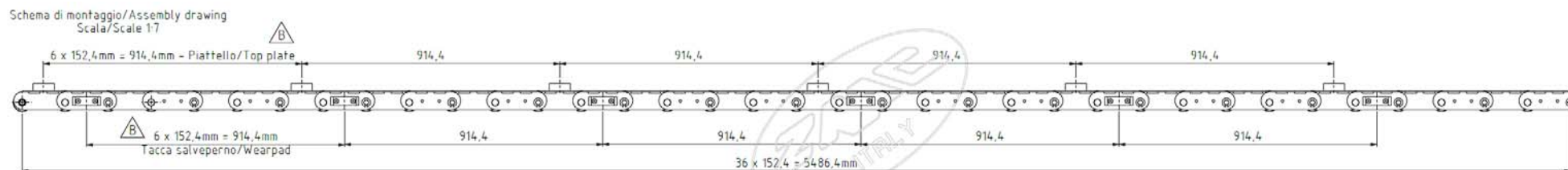
2.1 – Check of the Conveyor before the Installation of the chain

Checks to be executed on the conveyor before assembling the chain are reported in order to obtain a correct running of the chain. The failure to respect one or more of the geometric requirements may affect the function of the chain; the presence of misalignments or inclinations force the chain to operate with an uncorrect distribution of the load, from which an excessive elongation of the chain or damage of chain components could result.

In the following, the list of checkpoints is illustrated.

	Check
	Inclination of the shafts To be checked both in the vertical and horizontal plane.
	Tooth gap alignment
	Flatness of tracks
	Straightness of tracks
	Coplanarity of tracks for the two chains
	Alignment between chains and sprockets

2.2 – Assembly Scheme



Img_2

ASSEMBLY SCHEME CHAIN W10441Z

2.3 – Tensioning of the Chain

The method of applying tension to the chains can vary from installation to installation, the most correct and reliable system remains that of the counterweight which allows to precisely control the load actually applied to the chains.

The concepts that are always valid for horizontal conveyors apply to the calculation of the tension load. The purpose of the tensioning load is only to keep the chain unloaded along the return branch of the system by applying a traction force sufficient to ensure that the chain itself remains in a straight position in the unsupported sections.

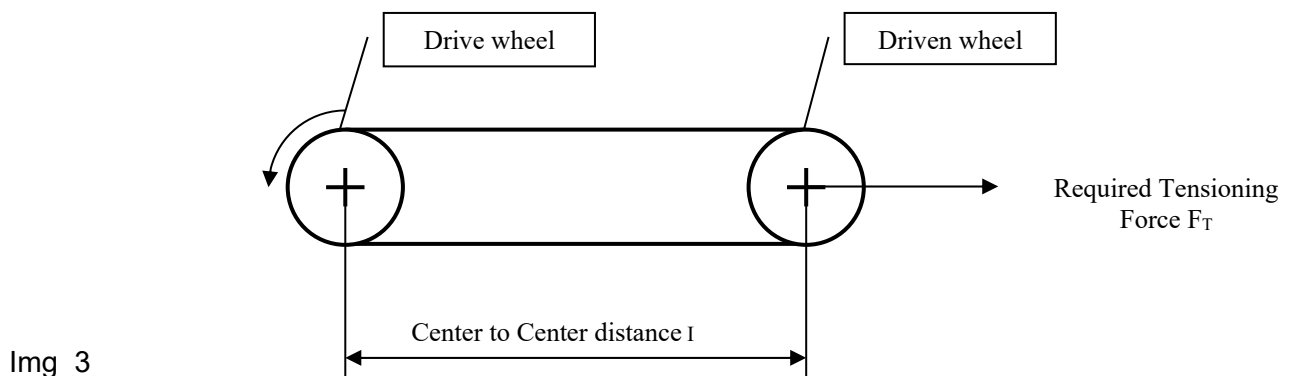
The extent of this force is a function of:

- the weight of the chain plus any elements supported by it also in the return branch
- the friction coefficient of the chain along the return path
- the length and geometry of the aforementioned path.

It is important to remember that the use of tension forces higher than strictly necessary induces unexpected stresses on the elements of the chain and can cause accelerated wear.

In any case, it is essential that the chain tensioning system allows to accurately check the load actually applied and that safety devices (position sensors or other systems) are present to ensure **the absence of overloads, even momentary ones**.

The calculation method that can be used for a horizontal conveyor is shown here below.



The required force F_T referred to a single strand of the conveyor can be estimated as follows:

$$F_T = 2 \cdot P_C \cdot I \cdot f \cdot 1,1$$

where:

P_C = chain weight $\left[\frac{kg}{m} \right]$. In this case $P_C = 20.6 \left[\frac{kg}{m} \right]$.

I = Center to Center distance of the conveyor $[m]$

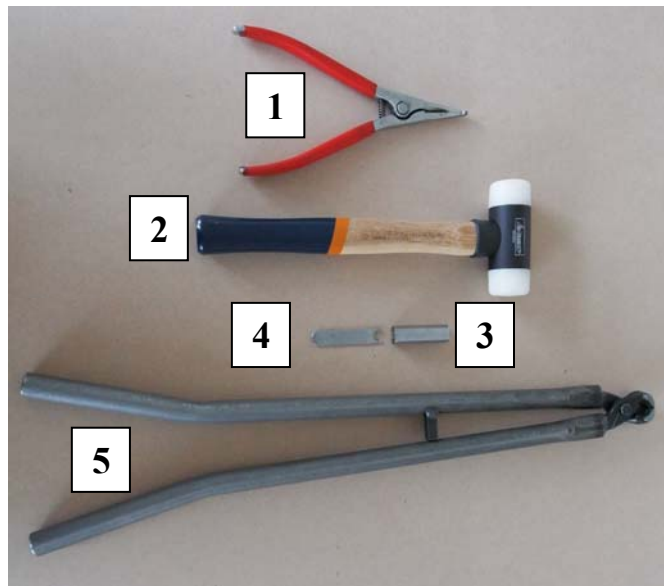
$f = 0.25$ coefficient of friction (first guess estimation) for the chain supported in the return branch; NB depending on the actual support mode of the chain this coefficient may need to be corrected.

2.4 – Break in and adjustment of the chain

A break-in of the chain on the empty conveyor for at least 24 hours in operating conditions (temperature and environment) is recommended in order to ensure a first adjustment of the chain.

2.5 – Assembly and Disassembly of the chain

Img_4 shows the tools needed for the assembly and disassembly of the chain manufactured according to drawing nr W10441Z, in particular for the connecting links of the mentioned chain.

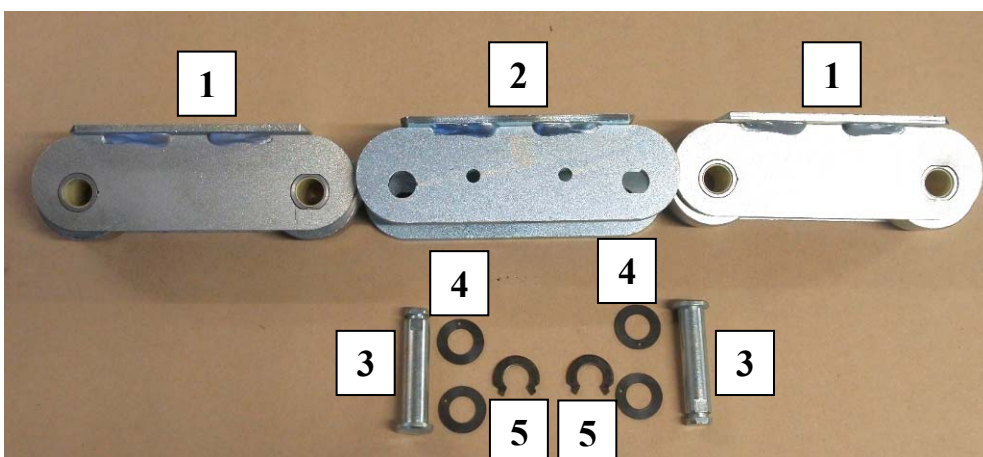


Img_4

1. Special pliers for outer rings (opening tool)
2. Rubber hammer (optional)
3. Idle pin (supplied by ZMC)
4. Key for idle pin (supplied by ZMC)
5. Pincer for outer rings (closing tool)

Chain components

Img_5 shows the different components of the chain.

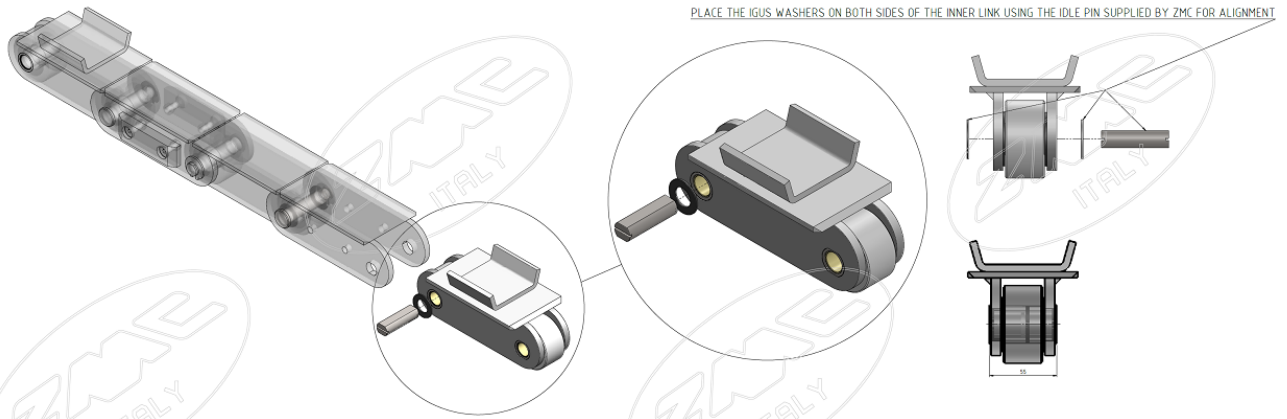


Img_5

1. Inner link
2. Outer link
3. Pin
4. Washer
5. Special closing ring

2.5.1 Assembly of the chain

1° STEP



Img_6

Take the inner link to be connected, the washers and the idle pin. Insert the idle pin in the bush and make it protrude equally on both sides of the inner link (Img_7 and 8). Then place a washer on each end of the idle pin. Note the following:

- the idle pin has one end with a magnet (Img_8) and one without it (Img_9)
- the outer link has a hole with flats and a round hole (Img_10)



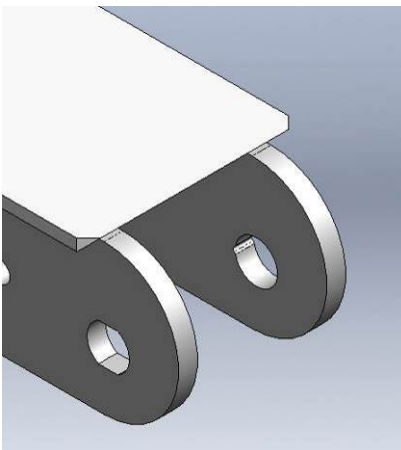
Img_7



Img_8



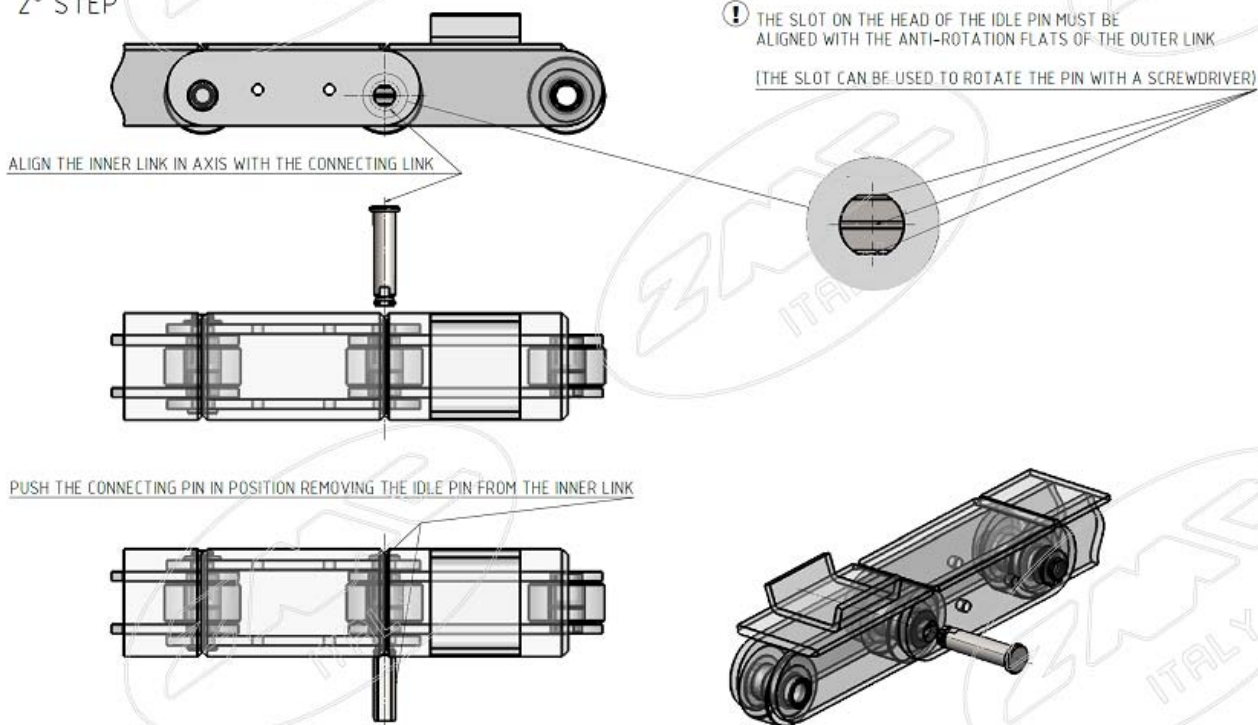
Img_9



Img_10

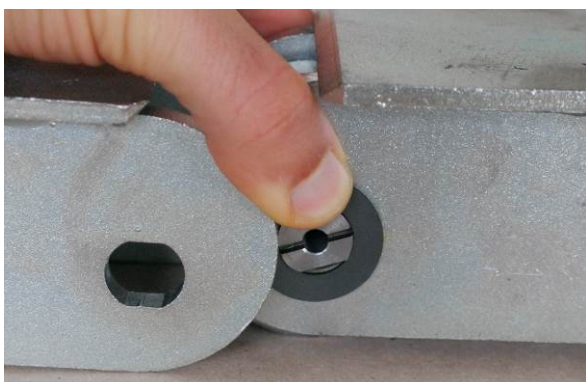
IMPORTANT: Keep the end of the idle pin with the magnet on the side of the outer link where the round hole is.

2° STEP



Img_11

While keeping in position the two washers insert the Inner link in the Outer link (Img_12 e 13).



Img_12



Img_13

Using the supplied key (or a suitable screwdriver) rotate the idle pin until the flats of the pin correspond to the ones of the outer link, see Img_14; the following Img_15 and 16 show the two sides of the chain after the idle pin has been oriented.



Img_14



Img_15

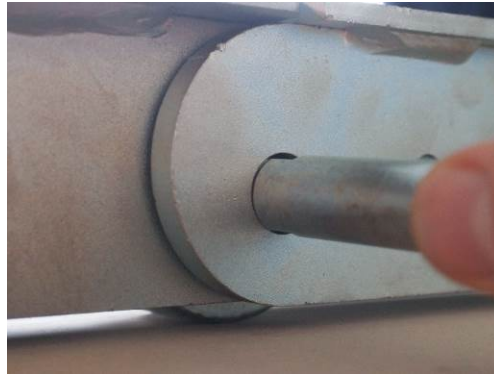


Img_16

Insert the chain pin in the Outer link from the side where the round hole is, match and lock the chain pin to the idle pin by means of the magnet (Img_17 e 18).



Img_17



Img_18

Fully insert the chain pin into the outer link, possibly with the aid of a rubber hammer. At the same time the false pin will exit from the opposite side. See from Img_19 to 24.



Img_19



Img_20



Img_21



Img_22



Img_23

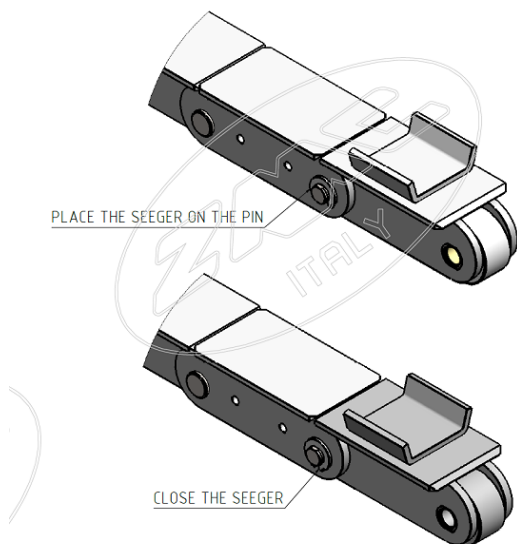


Img_24

ATTENTION During the extraction of the idle pin make sure that the washers do not move or fall from their position.

ATTENTION Check the alignment of the flats of the chain pin with the ones of the Outer link.

3° STEP



Img_25

Place the special locking ring in the groove of the pin (Img_26). Close the ring with the pliers (Img_27-28).



Img_26



Img_27



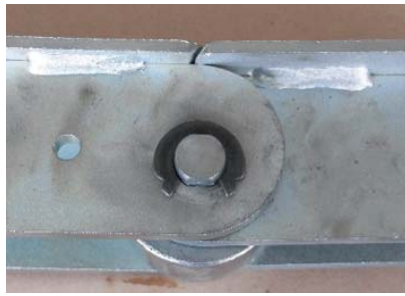
Img_28

2.5.2 Disassembly of the chain

Using the special pliers open the closing ring and remove it (from Img_29 to Img_31).



Img_29



Img_30

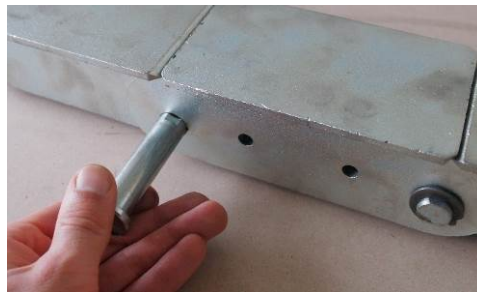


Img_31

With the help of the rubber hammer, remove the pin from the link (Img_32 and Img_33)

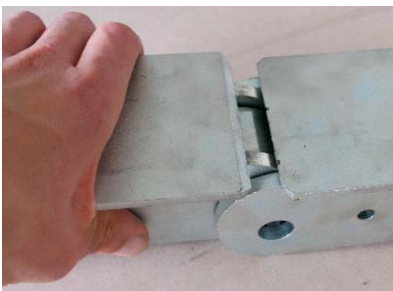


Img_32

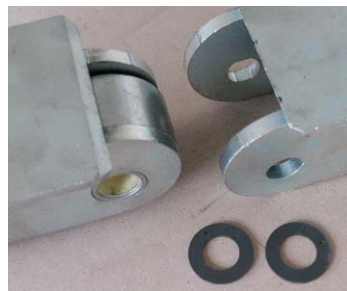


Img_33

Remove the inner link from the outer link (Img_34 and 35)



Img_34



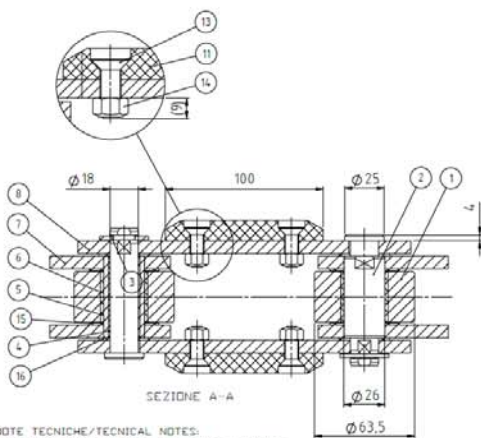
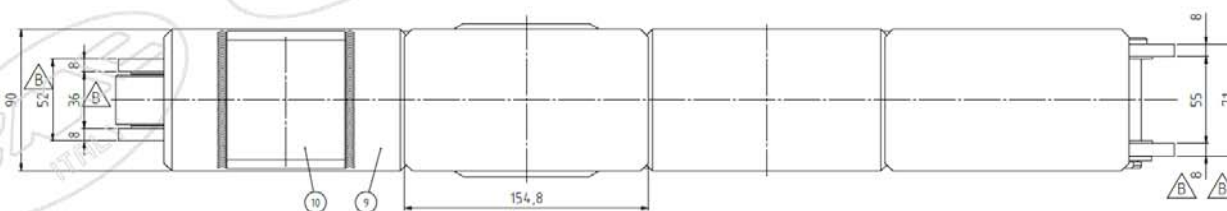
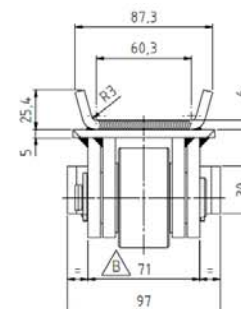
Img_35

During all these operations, be careful not to lose the washers placed between the inner link and the outer link.

3 - Characteristics of the ZMC chain W10441Z and operating conditions

3.1 – Drawing

W10441Z

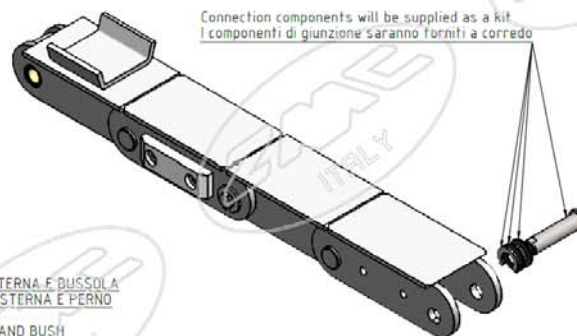


- NOTE TECNICHE/TECHNICAL NOTES:
 - CARICO DI ROTTURA/BREAKING LOAD: 234.000 N
 - CARICO DI LAVORO/WORKING LOAD: 17.150 N
 - PESO AL METRO/WEIGHT PER METER: 20,6 kg
 - SETTORE DI IMPIEGHO/SECTOR OF APPLICATION: AUTOMOBILE/AUTOMOTIVE
 - CATENA ZINCATO/ZINC PLATED CHAIN

ACCOPPIAMENTO LIBERO TRA PIASTRA INTERNA E BUSSOLA
ACCOPPIAMENTO LIBERO TRA PIASTRA ESTERNA E PERNO

FREE FIT BETWEEN INNER PLATE AND BUSH
FREE FIT BETWEEN OUTER PLATE AND PIN

Connection components will be supplied as a kit.
I componenti di giunzione saranno forniti a corredo



14	SOUS TRUSS WASHER 18X36L15	10 LIGULUM GTM		QTH-1020-012
15	BALLA RECOPPIANTE 1026 18X36L15	10 LIGULUM GTM		QTH-1044-015
16	CEP. LOCKING ALCOA RUP 1H8	50 580-V		DW87
17	2400 AUTODIAGNOSTICO NALCO	580-V		
18	GRUP. M&L5 - UN 5533	5533		VT50A82
19	TESTE TESTA SVARIES H 8X25	UN 5533		
20	KEY LOCKING RING	1011 304		DCSP156
21	SECCO SPECIALE INOX	1011 304		
22	WEARPAD	PE 1000		TL104-49F
23	TACCA SUSA PERINO	PE 1000		
24	TOP PLATE	10038 / ZINC PLATED		TP102441
25	PISTELLO SUPERDURE	PE 360 / ZINC PLATED		
26	PISTELLO	PE 360 / ZINC PLATED		TP102441
27	PISTELLO	PE 360 / ZINC PLATED		
28	PIASTRA ESTERNA ECCENTRICA	GT2005 / ZINC PLATED		TP1044110G
29	DEEP ZINER PLATE	GT2005 / ZINC PLATED		TP1044110G
30	PIASTRA INTERNA ECCENTRICA	GT2005 / ZINC PLATED		TP1044110G
31	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
32	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
33	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
34	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
35	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
36	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
37	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
38	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
39	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
40	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
41	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
42	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
43	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
44	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
45	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
46	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
47	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
48	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
49	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
50	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
51	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
52	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
53	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
54	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
55	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
56	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
57	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
58	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
59	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
60	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
61	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
62	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
63	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
64	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
65	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
66	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
67	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
68	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
69	SOUS BUSH 86-3020 - 10 LIGULUM	86-3020-80		J2H-2630-80
70	SOUS BUSH 86-3020 - 10 LIGULUM			

16	IGUS THRUST WASHER 18x32x1,5 IGLIDUR GTM RALLA REGGISPINTA IGUS 18x32x1,5 IGLIDUR GTM		GTM-1832-015
15	IGUS THRUST WASHER 26x44x1,5 IGLIDUR GTM RALLA REGGISPINTA IGUS 26x44x1,5 IGLIDUR GTM		GTM-2644-015
14	SELF LOCKING KLOCK NUT M8 - DIN 980-V DADO AUTOBLOCCANTE KLOCK M8 - DIN 980-V		DM8T
13	SCREW M8x25 - UNI 5933 (DIN 7991) VITE TESTA SVAS.E.I. M 8X25 UNI 5933		VTS8X25
12	INOX LOCKING RING SEEGER SPECIALE INOX	1.4301 AISI 304	SESP18I2
11	WEARPAD TACCA SALVA PERNO	P.E.H.D. 1000 P.E.H.D. 1000	TS10441P7
10	TOP PLATE PIATTELLO SUPERIORE	1.0038 / ZINC PLATED Fe 360 / ZINCATURA	TPS10441
9	PLATE PIATTELLO	1.0038 / ZINC PLATED Fe 360 / ZINCATURA	TP10441
8	DEEP OUTER PLATE PIASTRA ESTERNA ECCENTRICA	1.8974 / ZINC PLATED S700MC / ZINCATURA	PHE10441AS
7	DEEP INNER PLATE PIASTRA INTERNA ECCENTRICA	1.8974 / ZINC PLATED S700MC / ZINCATURA	PIE10441AS
6	IGUS BUSH $\varnothing$ 26x30x20 - IGLIDUR JSM-2630-20 BOCCOLA IGUS 26X30X20 IGLIDUR J		JSM-2630-20
5	IGUS BUSH $\varnothing$ 26x30x12 - IGLIDUR JSM-2630-12M BOCCOLA IGUS 26X30X12 IGLIDUR J		JSM-2630-12M
4	IGUS BUSH $\varnothing$ 18x20x25 - IGLIDUR GSM-1820-25 BOCCOLA IGUS $\varnothing$ 18x20x25 - IGLIDUR GSM-1820-25		P210SM-1820-25
3	PIN PERNO	1.7131 / CASE HARDENED + ZINC PLATED 16MnCr5 / CMT-TMP + ZINCATURA	P10441L950
2	BUSH BUSSOLA	1.7131 / CASE HARDENED + ZINC PLATED 16MnCr5 / CMT-TMP + ZINCATURA	B10441L950
1	ROLLER RULLO	1.0715 / CASE HARDENED + ZINC PLATED 11SMn30 / CMT-TMP + ZINCATURA	R10441AV03
POS	DESCRIZIONE	MATERIALE/TRATTAMENTO TERMICO	CODICE ZMC
CHAIN P.152,4x36x63,5 $\varnothing$ ROLLER DENOMINAZIONE CATENA P.152,4x36x63,5 $\varnothing$ RULLO			
DISEGNATO TARTAGLIONE	DATA 14/04/22	RIC. DA DIS. ×	DISEGNO N. W10441Z
VISTO	SCALE 1:1.5	DIS. CLIENTE ×	REV. N. B
 CATENE DI TRASPORTO INDUSTRIALI ED AGRICOLE		A1	VIETATA LA RIPRODUZIONE O LA COMUNICAZIONE A TERZI SENZA AUTORIZZAZIONE SCRITTA DELLA ZMC 

DISEGNO ESEGUITO CON CAD NON MODIFICARE A MANO

img_37

3.2 - Tensile strength (Breaking load)

The ZMC chain W10441Z has a nominal tensile strength (breaking load KR) of **234 kN**.

3.3 - Working load

The maximum suggested working load constantly applied in operating conditions is **17,2 kN**.

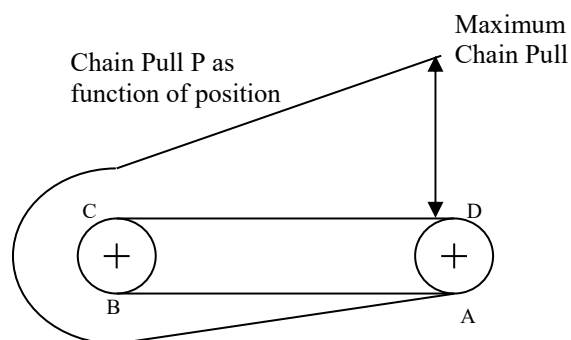
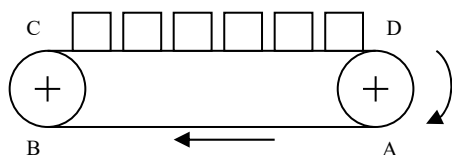
Il carico di lavoro è da intendere come il massimo tiro (forza di trazione) che si consiglia di applicare alla catena durante le condizioni operative.

The maximum working load is the greatest chain pull allowed during the operation of the conveyor.

We recall that the chain pull is a function of the following parameters:

- the load conveyed (including the weight of the chains and of all the additional parts assembled to the chain)
- the global friction factor of the chain and the position of the chain.

As a matter of fact the chain pull is not the same on the whole path of the conveyor and the maximum value occurs immediately before the driving wheel (see the pictures showing the progress of the chain pull T as it develops along the path of an horizontal conveyor).



Img_38

3.4 - Self lubricating parts

The chain is originally equipped with self-lubricating bushings and washers in all the main points of friction (pin / bush; bush / roller; inner link / outer link).

NO original lubrication is performed.

During the handling and assembly operations of chains with bushings and washers in plastic material all necessary precautions must be taken to prevent the chain from being exposed to impacts, twisting, temperatures above 80 ° C or other situations that can damage the plastic parts.

The chain is designed to work without lubrication thanks to the presence of plastic bushings and washers.

It is however allowed to lubricate the chain in operation as long as the used products are compatible with the plastic material of the bushing and washers.

In case of lubrication, the presence of lubricant on the guides and / or on the outer diameter of the rollers should be avoided as much as possible, this could cause the rollers to slide in place of correctly rolling, leading to damage of the guides and of the external surface of the rollers.

3.5 - Gear Motor

The engine of the carrier must be equipped with a control device to avoid starts with tears or excessive accelerations. Furthermore, to prevent overload on the chain, the presence of a torque limiter is strongly advised.

3.6 - Position of the load

When the conveyor is in operation, the load must be evenly distributed between the two sides of the system (left and right). The chain should be aligned with the guide.

3.7 - Operating temperature

The operating temperature prescribed for this chain is between -0°C e 70°C.

3.8 - Expected life

When used properly, that is in accordance with the requirements given in this handbook, it can be assumed for the chain a life expectancy of not less than 5 years of operation (frequency of two shifts of 8 hours per working day).

4 – Preventive checks and maintenance

4.1 - Pull, elongation of the chain and energy consumption

- 4.1.a** After a break-in period, it is important to record the actual length of the chain in both rings, for example with an indelible mark on the mobile part of the tensioning system of the chains or on the conveyor frame. Only in this way it will be possible to control the elongation of the chain over time compared to an initial reference.
- 4.1.b** Check regularly, at least every three months, the tension in the chain. Apply to the chain only the load necessary to maintain the condition of straightness of the specific chain in the specific conveyor. Avoid applying a value in excess of the required tension because it would increase the risk of wear. See also par. 2.3.
- 4.1.c** While checking point 4.1.b also check the chain elongation compared with the original length.
- 4.1.d** Usually, a chain properly sized for the required operation, with a correct maintenance program, without having been subjected to overloads or particular failures, does not show significant elongation after running in. Since, however, the nominal conditions are not always respected, it must be verified that during the life of the chain the elongation does not exceed the limit value of 0.5% compared to the initial size of the chain (i.e. 5 mm per 1m of chain). This elongation will be determined mainly by the wear of the plastic bushings interposed between the pin and the bush. This limit is deliberately conservative to prevent a chain failure resulting from wear or permanent deformations above the limit described, causing damage to the system and to the operators. The clearance between roller and bush must not exceed 1.5mm (NB the initial clearance is 0.2-0.3mm); the increase in play will be determined mainly by the wear of the plastic bushings interposed between the bush and the roller.
- 4.1.e** If possible, check the energy consumption of the conveyor to have an initial evaluation of the chain behavior during running-in. This value must serve as a comparison for subsequent surveys. A significant increase in energy absorption would indicate a running problem in the conveyor (ie the friction coefficient has increased due to wear / problems in the joints (pin/bush) and / or rollers, or due to damage to the guides).

4.2 - Fitting of chain on the sprockets

Every 6 months verify the correct fitting between chain and sprockets. Any sign of contact and/or wear on the links of the chain caused by the teeth of the sprockets must be carefully analyzed. The sprocket must not, for any reason, guide the chain but only pull it and accompany it from one track to the next. The repeated contact between chain and sprocket may cause a significant reduction of the thickness of the teeth and generates an axial overstressing between plate and bush and between bush and pin.

4.3 - State of the Tracks and of the Wearpads

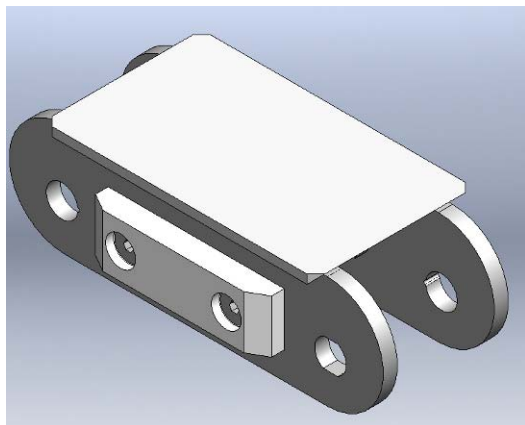
Every six months the area of contact between tracks and chains must be checked. Each roller must be allowed to turn freely in any part of the tracks, as a consequence the wear of the rails should be kept under control.

The chain must not meet any obstacle or have any interference with the fixed parts of the conveyor.

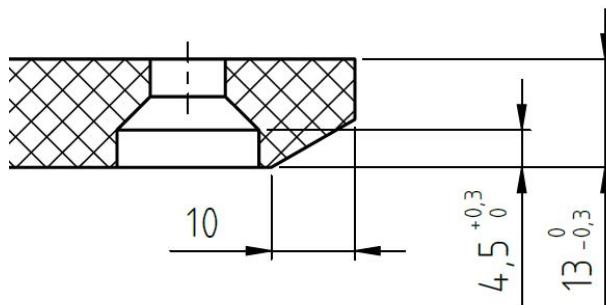
Attention must be paid to the wear of the tracks, an excess of wear could lead to a fast deterioration of the chain. If sliding of the rollers and/or wear of the tracks occurs, it is strongly recommended to restore the original operating condition.

Attention must also be paid to the state of the side guides and the plastic wearpads screwed to the two sides of the chain, on the external links, every 6 steps. A rapid wear of the wearpads is an indication of an anomalous behavior of the chain, if this situation occurs, the parameters that can influence the correct running of the chain must be checked and corrected, the main ones are: the alignment of the chain with the sprockets, the flatness and integrity of the guides, the positioning of the load.

In any case, the wearpads must not get worn out to the point that the heads of the screws are exposed, this means that their thickness must not be reduced by more than 4.5mm and their possible replacement must be foreseen before this value is reached. See Img_39 and Img_40



Img_39



Img_40

4.4 - Cleaning of the chain

Cleaning the chain is not a mandatory operation, it must only be carried out when necessary, that is when the dirt adhering to the chain compromises its functionality and / or duration over time (e.g. it blocks the rollers, significantly increases the wear of chain components). Other factors also contribute to the decision to clean the chain and the choice of the method to be used, including: the consistency of the layer of dirt to be removed, the difficulty in removing the dirt, the need to avoid pollution and deterioration of the chain components. For the chain in question, it is advisable first of all to consider the jet of pressurized water as a cleaning method, should it become necessary to perform it.

4.5 - Monitoring of the chain

These controls must be carried out directly on the chain to evaluate its conditions and detect any sign of damage.

4.5.1 - Visual control

In a part of the conveyor where free access to the chain is available it is possible to check the following:

Roller

(part. 1 of drawing W10441Z, see table at pag. 16):

- 4.5.1.a** Outside diameter, the nominal outside diameter is 63.5mm, the maximum acceptable wear is 0.6mm;
- 4.5.1.b** Presence of facets on the external diameter (roller / wheel blockage marks or difficulty in rotation);
- 4.5.1.c** Wear of the side surfaces;
- 4.5.1.d** Freedom to rotate, all rollers must rotate freely;

Bush

(part. 2 of drawing W10441Z, see table at pag. 16):

- 4.5.1.e** Outer diameter, the nominal outer diameter is 26mm, the maximum acceptable wear is 0,5mm;
- 4.5.1.f** Gap between pin and bush, originally this is about 0.2mm. A first evaluation can be done manually on the assembled chain, trying to move an inner link respect to an outer link, if the gap seems to be significantly increased it is advised to disassemble a few links (at least one inner and one outer) and carry out the checks mentioned in paragraph 4.5.2. Remember that the wear of a chain articulation (pin/bush) can be indirectly evaluated through the total elongation of the chain, see par. 4.1.c;

Pin

(part. 3 of drawing W10441Z, see table at pag. 16):

- 4.5.1.g** Integrity of the heads of the pin and of the locking ring (scratches and other signs of wear must not be present);
- 4.5.1.h** Stability of the pins in the holes of the plates, undesired gaps between pins and holes must not be present, the pins must not be allowed to rotate in the correspondent holes of the plates;

Chain in general

4.5.1.i Corrosion of each chain component;

4.5.1.j Scratches or signs of wear in each component; for example: marks on the internal part of the links identify a bad alignment between chain and sprockets; abnormal wear of the lateral wear pads, especially if always located on the same side of the chain, indicate incorrect running (heeling or curving) of the chain;

4.5.1.k Rettilineità della catena;

4.5.2 - Dimensional control of chain samples

After the first 6 months of use, and afterwards every year, it is recommended to replace one inner and one outer link of each chain (left and right) in order to carry out, with suitable instruments, the following checks:

4.5.2.a inner and outer diameter of rollers (Please Note: the inner diameter of the rollers will actually be that of the self-lubricating bushings);

4.5.2.b inner and outer diameter of bushes (Please Note: the inner diameter of the bushes will actually be that of the self-lubricating bushings);

4.5.2.c outer diameter of pins;

We also recommend to send the disassembled parts to ZMC for detailed laboratory analysis.

4.6 - Maintenance checkpoints

Maintenance Checkpoints		
Checks / Maintenance operations	Paragraph of Reference	Frequency and Specifications / Responsibility
Check of the conveyor	2.1	Before installing the chain in the conveyor Resp.: Manufacturer of the conveyor or Maintenance staff
Handling and installation	da 2.2 a 2.5	During the installation of the chain in the conveyor Resp.: Manufacturer of the conveyor or Maintenance staff.
Characteristics and limitations of use	da 3.2 a 3.7	Always During the whole lifetime of the chain all the specified limitations of use must be respected, particularly: - Working load (par. 3.3) Cautions for self lubricating parts - Features of the gearmotor (par. 3.5) - Position of the load (par. 3.6) - Temperature (par.3.7) Resp: End user of conveyor
Chain Pull and Elongation	da 4.1.a a 4.1.d	3 months Remember that applying unnecessary pull via the tensioning system will lead to faster wear of pins and bushes Resp: End user of conveyor
Energy Consumption	4.1.e	3 months The reference value of the energy consumption should be evaluated during the break in period. Resp.: Maintenance staff.
Fitting of chains on the sprockets	4.2	6 months Check the presence of wear signs on the inner surface of the links and/or the outer surface of the teeth; if necessary re-align chain and sprockets. Resp.: Maintenance staff.
State of tracks	4.3	6 months Check the wear of the guides and the correct alignment between chains and tracks Resp.: Maintenance staff.
Cleaning of the chain	4.4	Only when it is necessary in order to restore the chain function.
Visual check of the chain	4.5.1	1° check after 6 months. 2° check after 12 months. Following checks: every year. The maintenance staff carries out the visual control (4.5.1) and removes chain samples for dimensional control (4.5.2) and the eventual shipment to ZMC for detailed inspections.
Bearing wheels, Bushes and Pins	4.5.1	
Dimensional control of chain samples	4.5.2	



5 - Identificazione Manuale d'Uso e Manutenzione

Disegno catena: W10441Z

Anno di costruzione: 2022

Versione del manuale: UM W10441Z RevA

Costruttore: **Z.M.C. ITALIA S.r.l.**
Via Portoni, 290/D
21044 CAVARIA (VA)
Tel. +39 0331 217476
Fax:+39.0331 218204
http: www.zmcitaly.com

Servizio post vendita: **Z.M.C. ITALIA S.r.l.**
Via Portoni, 290/D
21044 CAVARIA (VA)
Tel. +39 0331 217476
Fax:+39.0331 218204
http: www.zmcitaly.com