EURONORM

DRIVE SYSTEMS

Drive Roller

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Euronorm

As an internationally operating supplychain partner, Euronorm is serving the European market with transmission components that present a more than convincing balance between price and quality.

Products

Euronorm distinguishes itself in the market by means of its extensive programme of electrical and mechanical transmission components. Thanks to an excellent interchangeability, high quality and competitive price level Euronorm transmissions are the first choice for both new constructions and the replacement market.

Service

Euronorm means direct contact with experienced technical specialists, good advice and no quibble agreements. The compact organisation makes it possible to give customers dedicated attention, which due to the personal nature of the firm relationships with a more than usual involvement during consultation, supply and support.Thanks to the Euronorm workshop, modification of transmissions to suit customer demands can be executed swiftly and reliably, be it a longer shaft for a motor or an alternative paint system or paint colour. Also a solid product support by means of good documentation, 3D drawings or the professional development and testing of prototypes is in capable and committed hands with Euronorm, and gives Euronorm its notable position in the transmission market.

Reliability of supply

In all respects Euronorm is a reliable partner, also when it comes to reliability of supply.
Thanks to a generous and ambitious stock management and the in-house assembly of motors and reductors it is possible to realise short delivery times under the motto “to measure and to schedule”.

EURONORM DRIVE SYSTEMS

Index

Page	Title
5	**Introduction to the Drive Roller**
6	**Design criteria of the roller conveyor system**
8	**Design criteria of small belt conveyors**
9	**Round belt transmission**
10	**Poly-V transmission**
12	**Euronorm Drive Roller (RDR)**
13	**RDR BL2 Drive Roller**
16	**Electrical connection**
17	**Euronorm Motion Control (RMC) Electronic Board**
20	**Conveyor roller series 117**
21	**Conveyor roller series 135**
22	**Tapered RDR and roller series KRO**
25	**Coatings and options**
26	**Tension rollers for use with light duty belt conveyors**
29	**Conveyor profile**

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Introduction to the Drive Roller

Euronorm Drive Rollers (RDR) are considered to play a key role in progressive manufacturing and distribution environments. Today's conveyor handling systems require higher throughputs, greater flexibility, accuracy, traceability and reliability.

The Euronorm Drive Roller products described in this document have been designed to provide optimum handling and control functions, which have been established with our customers over many years.

Depending on the features of handled items, the overall configuration of the installation, as well as environmental conditions, you can select the optimum RDR Drive Roller specification to best suit the application, to provide maximum efficiency and reliability.

A high-level of technology, such as incorporated in the RDR range, is required to guarantee a smooth flow of products. This technology enables the RDR Drive Roller to be applied in a wide range of applications, from handling light weight fragile items to medium or heavy loads, at variable and accurate speeds.

If driven by Drive Rollers, handling systems require no additional drive unit, drive chain or expensive guarding to enable the conveyor to work safely and quietly.

Besides being classified as a safe system due to a 24VDC supply, the Drive Roller represents an extremely silent, compact, efficient and durable solution.

Euronorm Drive Rollers are highly tested components, technologically advanced, perfectly suitable for engineering automated systems with higher performance and reliability. The Drive Roller consists of a brushless motor cartridge, which includes the electric motor (24V dc low voltage) and the relative reduction gear housed in a 50 mm diameter tube, configured to suit each application. The variable speed motor with integral drive control is coupled to a planetary gear box with steel gears, available in 5 different ratios. To choose the Drive Roller model correctly, please consider the weight and size of the load to conveyed and the transfer speed required. Transmission can be passed from the RDR Drive Roller to matching idler rollers via drive bands or belts. If required, please contact Euronorm for further information regarding the selection of the correct configuration of RDR Drive Roller and associated products.

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Drive Roller RDR = Total Flexibility

- Installation made easy by the absence of external components.
- Ideal for replacing traditional systems.
- Direct interface with PLC.
- Possibility of changing speed.
- Ramp regulation by means of the 0-10VDC analogue system (with PLC).
- Easy control of the handled item.
- High efficiency, low energy consumption.
- Low noise level of the plant.
- Wide range of speeds and torque available.
- Configuration of tubes and lengths as required.

Design criteria of a roller conveyor system

Design criteria

The elements that determine a first design approach of an idle roller conveyor system are: The weight and dimensions of the load to be handled, the type of material in contact with the rollers and the condition of the contact surface area.

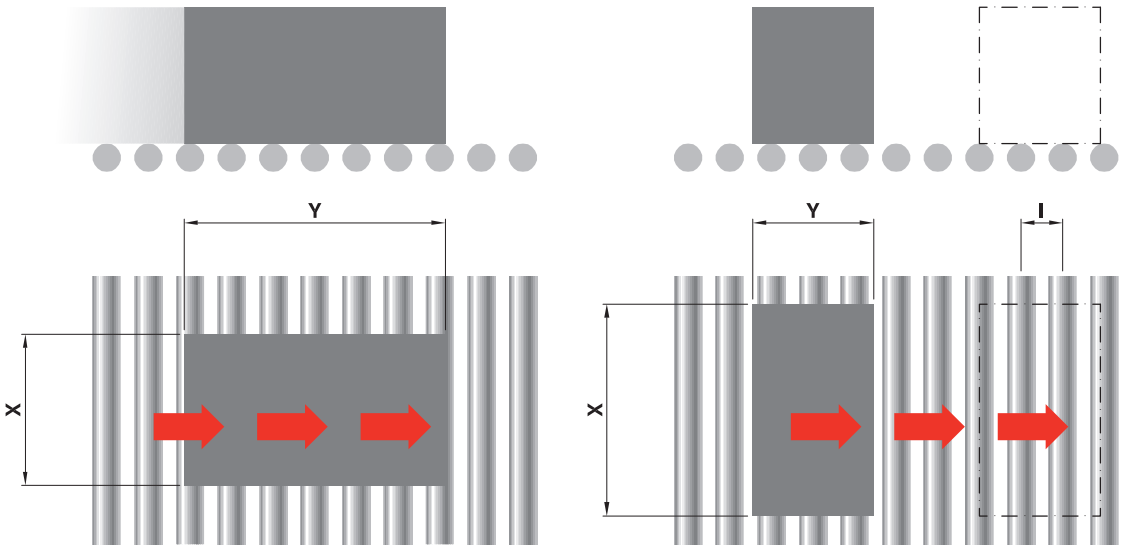
Roller pitch

Packages can be handled by a roller conveyor system providing that contact surfaces are sufficiently rigid, flat and smooth, laying on at least 3 rollers.

n = 3 minimum

However, a greater number of rollers should be normally foreseen, reducing the pitch in order to obtain better movement, especially if the package surface is rigid but deformable and not flat. Also, reducing the pitch helps avoid stumbling effects if the load is not equally distributed inside the package, or if the running surface is not perfectly level. Furthermore, it can sometimes be more economical to employ a higher number of light rollers rather than fewer heavy or medium ones.
It must be ensured that the maximum load per Roller and Drive Roller is never exceeded. Maximum loads are stated in the product catalogue.

$$l = \frac{Y}{n} \quad \text{where} \quad n \geq 3$$



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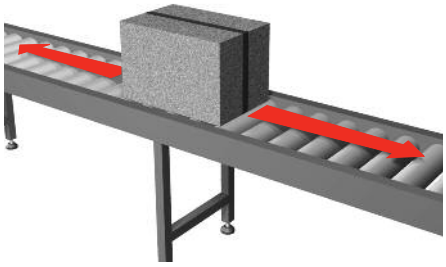
Engineering criteria of roller tracks

Definition of the number of rollers of the conveyor

The number of rollers necessary to manufacture a conveyor is calculated by the total length of the transport section, divided by the pitch, +1.

The "roller pitch" means the distance between the axes of two adjacent rollers. The pitch is determined by the length, the type of materials to be transported and the load capacity of the rollers you wish to use.
In principle, the number of rollers beneath the item must always be higher than or equal to 3 (preferably 4) so as to guarantee a smooth transport without “sticking”. The roller pitch must be max. one third of the length of the smallest transported item.

The engineer of the plant must make sure that the maximum load the items may exert on every roller and Driver Roller is lower than their load capacity declared in the catalogue.



Definition of the type of Drive Roller and reduction ratio

The transported material moves perpendicularly to the roller axis. This means that the calculation of necessary forces is affected by the rolling friction of the roller with the surface of the base of the transported item.

Apply the following formula to define the tangential force necessary to handle the item:

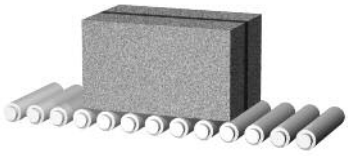
$F_t = P \times G \times U$

where:
F_t) Tangential Force required (N).
P) Weight of the item (Kg).
G) Force of gravity (9.81 m/s^2).
U) Friction coefficient.

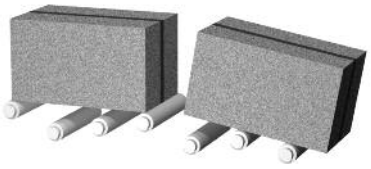
The friction coefficient of the item varies according to the material in contact with the rollers. Refer to the following values for calculation:

Steel	→ 0.03
Smooth PVC	→ 0.04
Polymer profile	→ 0.05
Wood	→ 0.05
Stiff cardboard	→ 0.06
Soft cardboard	→ 0.08

Stiff materials (the weight being the same) require a lower tangential force for handling.



Soft items will tend to sink between rollers, thus requiring more tangential force (the weight being the same) for handling.



To prevent items from sinking, a closer roller pitch must be used.

Example of Drive Roller selection

Providing the transport speed required for the conveyed load is known and after defining the tangential force necessary to handle the item, refer to the specification tables for each Drive Roller to determine the most suitable reduction ratio.

Example:
Weight of the transported material: 30 Kg.
PVC item.
Transport speed: 0.5 m/s.
F_t = 30 Kg x 9.81 m/s^2 x 0.04 = 11.7 N.

If you also wish to know the necessary torque, consider the Drive roller radius (equal to 25 mm = 0.025 m). The torque (force x radius) is equal to 11.7 N x 0.025 m = 0.3 Nm.

The necessary mechanical power (W) (tangential force x speed) will be 11.7 N x 0.5 m/s = 5.9 W.

Note that calculations done this way fail to consider any force absorption due to the drive belts or systems for towing driven rollers.

Oversize by applying a safety factor to the calculation.

To choose the Drive Roller, consider not only the data obtained before, but also the type of use (intermittent or continuous), the average life required and the electronic functions necessary to manage the plant.

In case of doubt, contact Euronorm to confirm the specification of Drive Roller required.

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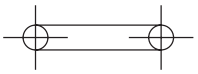
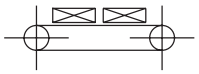
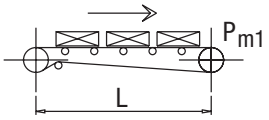
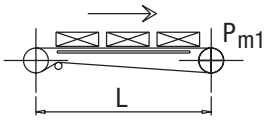
Design criteria of small belt conveyors

General Logistics

The RDR Drive roller can also be easily used in small belt conveyors for the transfer of light weights. Typical applications are those requiring small or low profiles having a minimal design, such as in the electronic, chemical, automotive or manufacturing industry, in general. It is recommended to use the Drive Roller with a crowned shell for tracking the belt, in combination with elastic or single ply conveyor belts. Refer to page 26 for the types of tension rollers available.

Calculation of the tangential force

Conveying system	 Force without load	 Force to convey materials horizontally
 Roller bed conveyor	$F_0 = 0.4 \cdot L \cdot (2P_n + P_{pr})$	$F_1 = 0.4 \cdot L \cdot P_{m1}$
 Slide bed conveyor	$F_0 = 11 \cdot L \cdot P_n \cdot C_2$	$F_1 = 11 \cdot L \cdot P_{m1} \cdot C_2$

Coefficient of fiction			
C_2	Belt PE	Belt PP	Belt POM
Slide bed	0.30	0.15	0.10
Steel or stainless steel scroll planin slider bed	0.15	0.25	0.20

Calculation of the tangential force

F = Tangential Force [N]. $F = F_0 + F_1 + F_2 + F_3$.
The tangential forces are given in the tables of the performance.

P_n = Belt weight per linear metre [kg/m].

P_{pr} = Weight of rotating parts of the belt conveyor per metre length (carrying and return section) [kg/m].

P_{m1} = Weight in Kg of the conveyed product on the load section, for each metre of length of the belt conveyor [kg/m].

C_2 = Coefficient of friction between belt carrying side and slider bed

L = Length of the conveyor in metres [m].

F_0–F_1 = Force [N].

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Round belt transmission

A controlled roller conveyor can be realised by using Drive Rollers with grooves, connected to matching idle rollers.

Round belt transmission

To connect the grooved Drive Roller and idle rollers, use round belt made of high friction Polyurethane (not supplied by Euronorm). The development and pretension thereof depend upon the transported load and the roller pitch established at the time of engineering design. The pretension recommended by the manufacturers of round belt shall not be lower than 8%. However, this value must be requested and confirmed by the supplier of the round belt. Attention: each idle roller handled by round belt involves a decrease in tangential force by approx. 1 N. On calculating the load that can be transported by every single Drive Roller, this force must be subtracted from the tangential force, supplied by the Drive Roller and specified by the performance tables on page 14.

Never exceed the number of 5 + 5 idle rollers driven via round belt per single Drive Roller (to be placed in a central position).

The motion transmission to the rollers driven by round belt is recommended for max. 0.6 m/s speed rates and for items weighing less than 40 daN.

If necessary and possible, the item must be stopped when it is still partially positioned on the Drive Roller and not only on the rollers driven by the round belts.

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RDR Drive Roller with Poly-V belts

The best method to link together the driven rollers adjacent to the Drive Roller

The drive system with Poly-V belts is the most effective method to transmit torque to the driven rollers adjacent to the Drive Roller.

The belts supplied by Euronorm are so flexible, that the same technology can be applied not only to straight-line sections, but also - in combination with the KRO versions of Drive Rollers and rollers - to conveyors with curves, even when used in zero pressure applications.
The drive system with Poly-V belts is so highly efficient that it can transmit up to 300% more torque than systems using round belts, thus optimising the number of rollers that can be linked with each Drive Roller.

The Poly-V drive head is so highly precise that conveyors can be engineered with frequent and immediate start-stops, with no danger of slipping on a large production scale.

The torque of Drive Rollers for inclined conveyors can be maintained by using belts with a maximum of 4 ribs for medium-heavy loads.

The Poly-V drive head has been designed to accept up to a maximum of two, 4-rib belts, leaving a single groove gap between each belt. Even so, most applications can be realised with 2-rib belts (max 50 daN).

The drive heads are very compact, gaining more available surface on the roller and allowing shorter roller lengths to be achieved. The compact Poly-V drive head where necessary, can also be easily enclosed, maximising safety, keeping the conveyed load and working area unexposed to the drive belts.

Features of the Poly-V belt.
- Poly-V belt ISO9982 (DIN7867) with 2-4 rib PJ profile.
- In compliance with the 2002/95/EC directive (RoHS).
- All the materials in use have been tested and registered according to the REACH (EC) directive no. 1907/2006.
- The belt contains no halogen, no silicone compound, no PVC and it is flame-resistant.
- UL-certified.
- Surface hardness 82 Shore A, hardness of ribs 55 Shore A.
- Pretension of use 1-3%.
- Electric conductivity <7 M Ω.
- Temperature range from -20 to +90°C.
- Roller pitch possible with Poly-V belts from market: 60, 75, 78, 100, 120 mm.

Load capacity
The direct load capacity for each Drive roller is 35 daN. It is recommended to use 3-rib belts for loads above 50 daN.
Poly-V belts for most common pitches are available for prompt delivery.
The optimal pretension of belts is obtained by observing the roller pitch and tolerance required for the various belt specifications in the table below. The drive calculation depends upon the performance guaranteed by the belt manufacturer. For further technical information contact Euronorm.

Ordering code	Description	Ribs N°	Rollers pitch l mm +/-1
BELT - 2PJ - 60	POLY-V belt, pitch 60, 2 ribs	2	60
BELT - 2PJ - 68	POLY-V belt, pitch 68, 2 ribs		68
BELT - 2PJ - 75	POLY-V belt, pitch 75, 2 ribs		75
BELT - 2PJ - 78	POLY-V belt, pitch 78, 2 ribs		78
BELT - 2PJ - 80	POLY-V belt, pitch 80, 2 ribs		80
BELT - 2PJ - 90	POLY-V belt, pitch 90, 2 ribs		90
BELT - 2PJ - 94	POLY-V belt, pitch 94, 2 ribs		94
BELT - 2PJ - 100	POLY-V belt, pitch 100, 2 ribs		100
BELT - 2PJ - 105	POLY-V belt, pitch 105, 2 ribs		105
BELT - 2PJ - 120	POLY-V belt, pitch 120, 2 ribs		120
BELT - 2PJ - 133	POLY-V belt, pitch 133, 2 ribs		133
BELT - 2PJ - 160	POLY-V belt, pitch 160, 2 ribs		160
BELT - 3PJ - 60	POLY-V belt, pitch 60, 3 ribs	3	60
BELT - 3PJ - 68	POLY-V belt, pitch 68, 3 ribs		68
BELT - 3PJ - 75	POLY-V belt, pitch 75, 3 ribs		75
BELT - 3PJ - 78	POLY-V belt, pitch 78, 3 ribs		78
BELT - 3PJ - 80	POLY-V belt, pitch 80, 3 ribs		80
BELT - 3PJ - 90	POLY-V belt, pitch 90, 3 ribs		90
BELT - 3PJ - 94	POLY-V belt, pitch 94, 3 ribs		94
BELT - 3PJ - 100	POLY-V belt, pitch 100, 3 ribs		100
BELT - 3PJ - 105	POLY-V belt, pitch 105, 3 ribs		105
BELT - 3PJ - 120	POLY-V belt, pitch 120, 3 ribs		120
BELT - 3PJ - 133	POLY-V belt, pitch 133, 3 ribs		133
BELT - 3PJ - 160	POLY-V belt, pitch 160, 3 ribs		160

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The RDR Drive Roller

Transportable loads
The Drive Roller can manage load directly acting upon it (static load resting on the drive roller and/or load due to conveyor belt tension), and the distributed load to be transported on the conveyor. The maximum static load, available torque and tangential force for each gear ratio are stated in the technical data. Please consider both types of load prior to selection.
To select the reduction ratio, refer to the speed/tangential force tables supplied in this catalogue.

To increase the motors lifetime, decrease system noise level and to optimise energy consumption, it is very important to operate the Drive Rollers only when product is present to be conveyed. (through photocells, timers, relays or PLC).

Electric protection
Drive Rollers connected to the power supply must be individually protected by a delayed fuse, the value of which is adequate for the nominal current of the Drive roller. When using Drive Rollers in conveyors with a high frequency of start-stops, with multiple Drive Rollers connected to the same power supply, we recommend using a braking device fed by BUS DC. Please contact Euronorm for information.

Fastening holes in the structure
Drive Rollers have no through shaft; stub axles support the bearings on the motor and idle side and need to be rigidly fastened to vertical, sturdy side frames, that will not flex due to load.
Closed support holes and not open slots or horizontal slots are recommended to guarantee a good perpendicular fixing of the axles to the support. To tighten the fastening screws or nuts, it is recommended to use a torque wrench. Torque values are supplied in the assembly instructions.
If it is necessary to use open slots, add two sturdy flat washers, one to the internal and external side of the slot. Please consider their thickness at the time of determining the C dimension (space between the frames) required at the time of ordering the Drive roller.

Accident prevention
The Customer must fulfill all safety requirements and electrical protections required by the regulations in force in the Country where the conveyor will be installed.

Assembly dimensions
While engineering and installing the Drive Rollers, ensure that the distance between the roller-mounting positions between side frames is correct (dimension C of the Drive roller), ensuring the axle pins are not compressed or extracted, preventing any damage. To avoid this, the Roller Drive bearing housing (Idle side) is complete with an extractable M8 pin for assembly. Allowing a 1 to 1.5 mm extraction, for assembly and to compensate for any tolerance difference to the inside frame width.

ATTENTION! *No Drive Roller may be used in conjunction with mechanical retainers, intended to forcibly stop the conveyed item whilst the Drive Roller is still operating (to align the item to the retainer). Never move units on the roller conveyor by hand forcing the movement of the stationary Drive Roller.*
This will cause damage to the gear box leading to break down.

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RDR BL2 Drive Roller

The powerful and versatile Drive Roller

The brand new RDR BL2 model, a new Drive Roller concept, is originated by the high reliability and performance of the Brushless motor with internal drive and control, along with the versatility and wide range of speeds and torque that can be obtained from the gear box. The favourable quality/price ratio and very low energy consumption make the RDR BL2 Drive Roller perfectly suitable for the most demanding Customers.
High performance and configuration flexibility make the RDR BL2 Drive Roller fit for use for a wide range of conditions and workloads:

- Conveyors, requiring a constant speed rate as load varies
- Suitable for frequent start/stop cycles.
- Handling requiring high torques thanks to optimal heat management.
- Handling requiring the possibility of varying the speed rate as well as creating acceleration or deceleration ramps (by means of the PLC).

RDR BL2:
Technical features and advantages

- Optimised and high performance torque transmission system from the motor to the shell (international application for patent filed).
- Controlling and operating electronics built into the motor cartridge.
- Fully safe operation even without the external electronic board thanks to the electronics protected against polarity reversal, overcurrent and over temperature.
- In-built diagnostic functions with fault signal output.
- Controlled dynamic braking system.
- Speed rates from 0.05 to 0.65 m/s in the various reduction ratios (and value torque).
- Speed rate change through analogue regulation 0-10V (10V supplied from the roller).
- Protection against accidental polarity reversal.
- Smart heat protection against overheating.
- Protection against overcurrent due to overload.
- Maximum safety thanks to the low supply voltage (24 VDC).

Shell

- Std. Tube: ø 50x1.5 Sendzimir zinc-plated (Z), with 1 or 2 grooves upon request (Standard a=35 b=20).

Options

- Tube 50x1.5 electrically zinc-plated (J).
- Tube 50x1.5 Stainless Steel AISI 304 (I).
- Coated by soft PVC sleeve(P).
- Coated by vulcanised rubber (R) or Adiprene.
- Heavy gauge tube, parallel or crowned, machined or heat-treated on the surface. Contact Euronorm.
- Extra-short version: to shorten the shell below the standard minimum size. The noise level of the extra-short version is slightly higher. Contact Euronorm

Housing assembly on the motor side (cable exit)

- M12 male threaded shaft, bevelled 11mm hexagon made of zinc-plated (Standard) or stainless steel, supplied with a pair of self-locking washers and M12 nut, made of zinc-plated (Standard) or stainless steel.
- Antistatic polymer housing, with 6203 bearing.

Motor

Brushless motor with feedback electronic rotation control, to keep speed constant with assisted acceleration and deceleration ramps. Direct power supply with in-built protection against polarity reversal.

Gear box

Planetary gear box complete with sintered gears, available in the following reduction ratios: 16:1, 24:1, 36:1, 49:1 and 64:1.

Connection cable

- 8-wire connection damage resistant cable, halogen free insulation and marked Euronorm, 450 mm in length, with exposed and pre-tinned wires, i.e. ready for connecting.

Drive head assembly

- Standard idle housing, with 6002 bearing, M8 floating drilled and threaded shaft made of zinc-plated or stainless steel Ch 19 supplied with an M8 hexagonal-head bolt and washer for fastening.
- Alternative: pulley for Poly-V flexible belts, PJ shape ISO 9981 DIN 7867, with 6002 bearing, M8 floating drilled and threaded shaft made of zinc-plated (standard) or stainless steel Ch 19 supplied with an M8 hexagonal-head bolt and washer for fastening. The floating shaft is equipped with an extraction-proof system.

Functions built into the RDR BL2 Drive Roller

- Overload protection: as soon as the maximum current is reached, the Drive Roller stops without pre-warning and attempts to restart for 3 times before giving the Fault signal and permanently stopping the motor.
  To reset the Fault signal and restore operation, remove the cause of the malfunction, then power off and on the Drive Roller.
- Overheat protection: as soon as the safety heat threshold of the motor is reached, electronics activate the Fault function whilst keeping the motor active for another 60 seconds before forcing the power off.
  Re-activation is automatic after resetting temperature to non-dangerous levels;
- Protection against accidental reversal of polarity: The Drive roller is protected against any error of connection of the power supply polarity.
- Direct connection with the PLC.
- TTL signal output for the Customer's use (for any feedback control) 12 pulses/motor rev.
- Acceleration and deceleration ramps with electronic braking control (Dynamic Brake Assist).
- Static braking system when the item is not moving (braking torque value depending on reduction ratio).
- Analogue adjustable speed rates with 0-10V signal (10V level supplied by the Drive roller or - as an alternative - by the PLC).
  To decrease the speed rate (compared to the maximum value and within the given range), apply adequate resistance or a potentiometer.
- The Drive Roller is intended to manage part of the current produced by the motor (by inertia) during the slowdown of items and to avoid generating current that may cause damage to power supply units in the network.

Installation details
Refer to the technical manual for the correct installation and operation of the Drive Roller.

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RDR BL2 DriveRoller

Technical features

General technical data	
Noise level (mounted)	55 dB(A)
Theoretical average life at nominal conditions	15'000 h
Maximum load for C up to 1000 mm	1100 N
Maximum load for C from 1010 to 1500 mm	500 N

Electric data	
Nominal voltage	**24 VDc**
Voltage range	18 ÷ 25 VDc
Max direct current	**2.5 A**
No Load current	0.34 A
Peak current (max.)	**3.0 A**

Dimensional data	
Standard tube diameter	50 mm
Standard tube thickness	1.5 mm
Maximum length	2000 mm

Environmental conditions	
Ambient / operational conditions	-10 ÷ +35 °C
Ambient storage temperature	-30 ÷ +75 °C
Maximum humidity	90% non-condensed

Minimum sizes C (mm)

Reduction ratio	Extra-short* execution	Extra short* execution with Poly-V	Standard execution	Standard execution with grooves	Standard execution with Poly-V pulley
	mm	mm	mm	mm	mm
16:1	**241**	282	282	312	323
24:1	**241**	282	282	312	323
36:1	**241**	282	282	312	323
49:1	**251**	292	292	322	333
64:1	**251**	292	292	322	333

RDR BL-2 performance

Reduction ratio	Red. Min/Max speed	Nom. torque	Start torque	Nom. Tangential Force
	m/s	Nm	Nm	N
16:1	0.08 ÷ 0.65	1.2	3.0	48
24:1	0.08 ÷ 0.40	1.8	4.5	72
36:1	0.08 ÷ 0.30	2.7	6.0	108
49:1	0.05 ÷ 0.20	4.0	8.0	160
64:1	0.05 ÷ 0.16	4.5	8.5	180

(*) The C length of the Drive Roller in extra-short execution is a fixed value and is intended without grooves.
- The weight of a standard roller with C=500 mm is 2.8 Kg.

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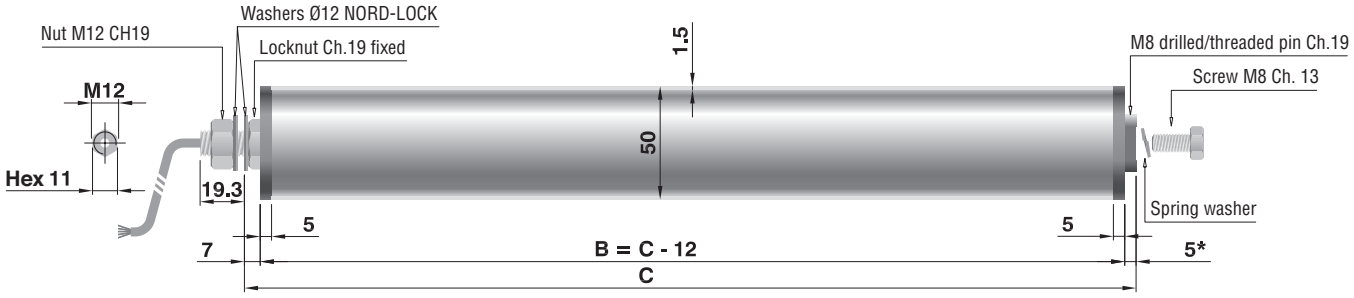
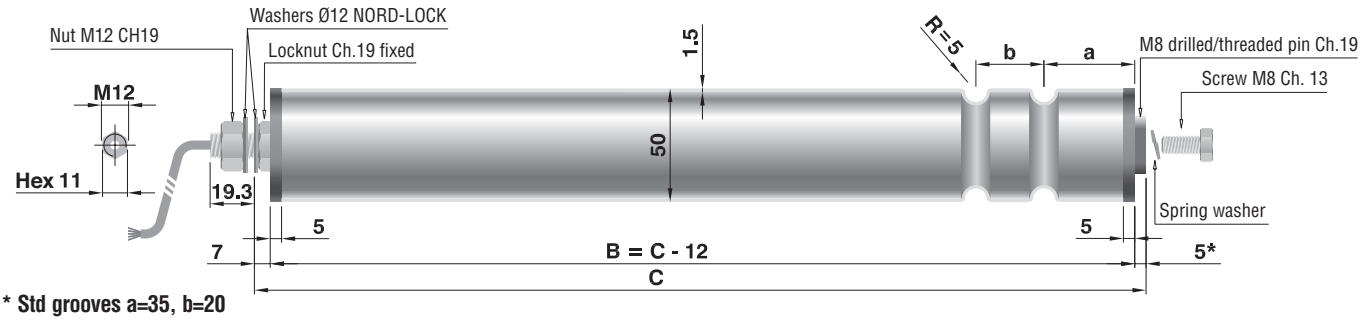
TYPE RDR BL2 – STANDARD

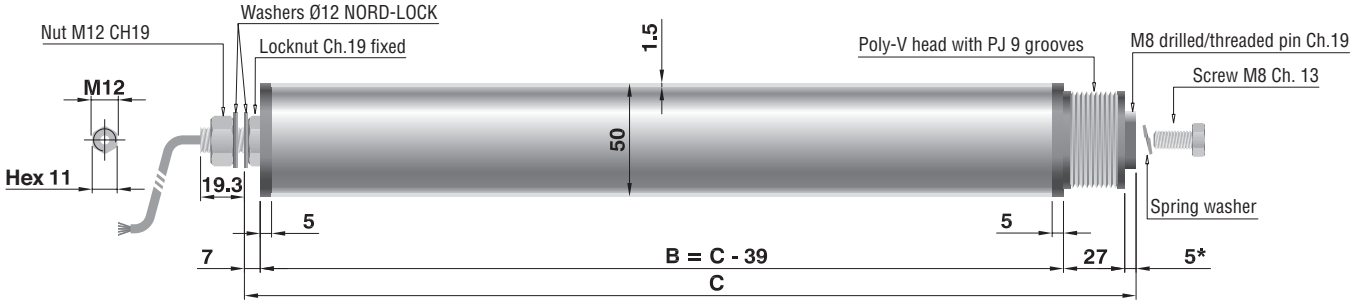


TYPE RDR BL2 - WITH GROOVES **

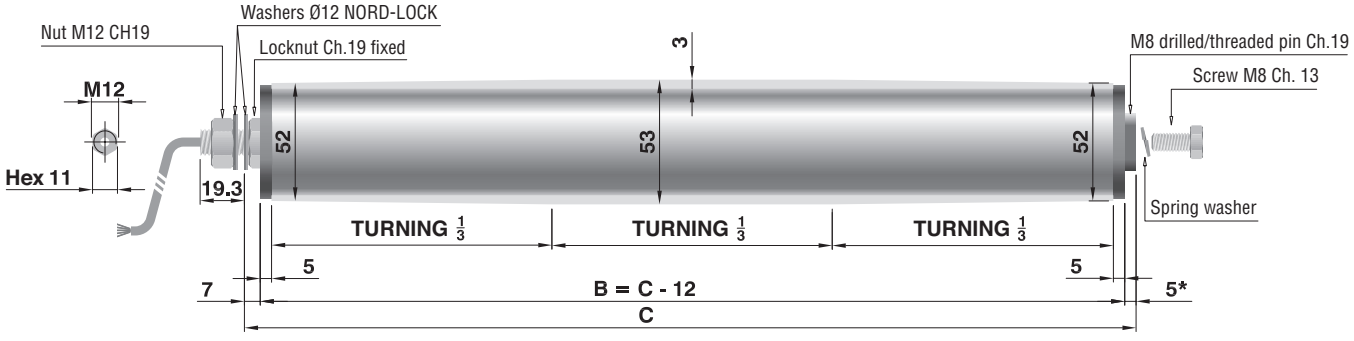


** Std grooves a=35, b=20

TYPE RDR BL2 - WITH POLY-V PULLEY



TYPE RDR BL2 - TURNED FOR BELTS



* Dimension C is obtained from a pin extracted by abt. 1÷1.5 mm

The RDR BL2 brand new model can be directly connected to control systems, such as PLC's or simple switches and potentiometers since no external electronics are required for operation. The Drive Roller is supplied - as standard - with a multipolar connection cable with exposed pre-tinned wires. The Customer is free to connect the wires as necessary to use the Drive Roller, saving time and material cost whilst wiring the system.
Since it is equipped with the electronics necessary for correct operation, the Drive Roller is also adequately protected against any damage due to:
- Over current.
- Over temperature.
- 24VDC power supply wrong polarity connection.

The functions made available by direct connection are listed below:
- Motor power supply.
- Motor start/stop.
- Speed rate change.
- Reversal of direction.
- Fault signal output.
- TTL signal output.

The cable consists of 8 wires (white is reserved), each one having a different colour and a specific function.

Table cable function/colour

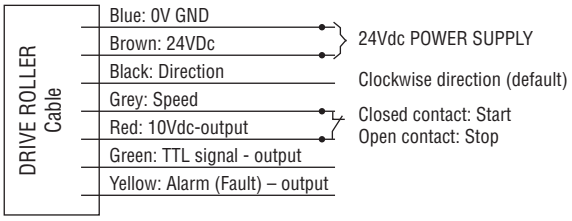
0V GND (power supply)	Blue
+24 VDc (power supply)	Brown
Direction	Black
Operation-Speed rate adjustment	Grey
+10 Vdc output	Red
TTL signal output (5V)	Green
Fault output (Max. 20mA)	Yellow

Power supply: connect the power supply wires with the line from a 24VDc switching transformer power supply unit that can supply adequate current.
Operation: to start the Drive Roller at max. speed, connect the 24VDc power supply and apply a 10 - 24VDc voltage to the GREY wire or connect (short) the RED and GREY wires together.
To set an intermediate speed rate between the min. and max. value, connect a 10KOhm potentiometer (or adequate resistance) across the red and grey wires according to the diagram.
To adjust the speed rate or set an acceleration and/or deceleration ramp, connect a PLC or an analogue voltage regulation system to the GREY wire to apply a voltage between 0 and 10 VDC.
Direction of rotation: the Drive Roller turns clockwise by default (seen from the side of the cable exit). To reverse the direction of rotation, connect the positive power supply pole (+24VDC) with the black wire.
Attention: before reversing the direction, make sure that the Drive Roller and the load are stationary to avoid any damage to the gear box.
Fault output (Alarm): if the motor is working within the correct temperature and current range, the output voltage on the YELLOW cable is +24VDc, in case of internal overtemperature (>85°C), overcurrent or malfunction alarm, the voltage value decreases to 0V (alarm logic). The Fault signal can supply a max. 20 mA current.

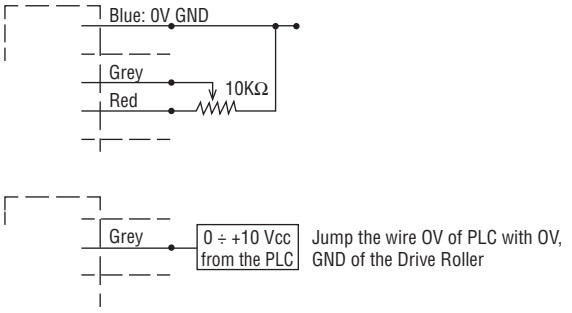
Connection systems via bus

The RDR BL-2 Drive Roller can be connected with BUS systems, such as ASi BUS. Refer to the signals that can be supplied to the BUS system, select and connect to the correct plug type, compatible with the colour / function table. In case of connection of more than one Drive Roller to just one feeding line, submitted to frequent start/stop cycles, the use of a braking adjusting device for motors with BUS DC can be required.

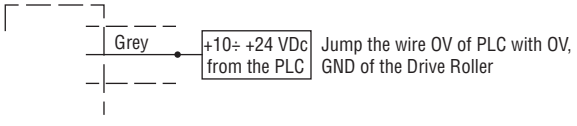
RAPID START - STOP (Recommended connection)



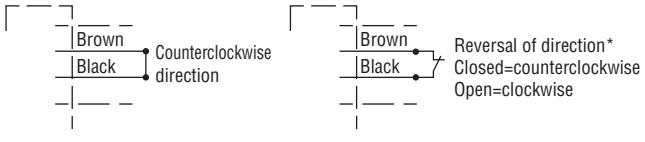
SPEED CHANGE



START - STOP from the PLC



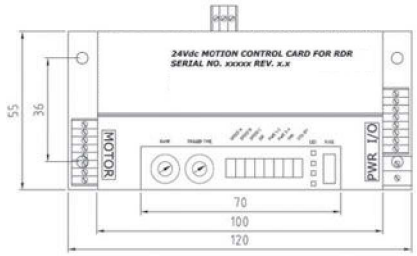
REVERSAL OF DIRECTION



* Stop the Drive Roller before any reversal of direction

EURONORM
DRIVE SYSTEMS

RMC Electronic Board Euronorm Motion Control (RMC)



RMC-1310 board, features

Although Drive Roller BL-2 can be directly controlled with no need for an electronic board in fully safe conditions, Euronorm suggests a system that can extend the basic features of the Drive Roller while making the interface simple, advantageous, highly performing and with small dimensions (55x120x30).

The features of the RMC Motion Control board:

- Small compact size.
- Removable terminal boards.
- Microprocessor electronics.
- Dip-Switch for rapid configuration of functions.
- Potentiometers for rapid setup.
- Display lights for immediate and intuitive evidence of functions.
- Replaceable components that can be easily found on the market.

The functions of the RMC Motion Control

- Dboard:rive Roller supply.
- Change the direction of rotation.
- Digital speed variation.
- Regulation of acceleration and deceleration ramps.
- Timer Function (Trigger) using a photocell, sensor or a simple signal from the PLC.
- Overload Protection via dip switch
- Smart Fault control.
- Motor energy saving system.
- Protection of RDR/RMC via replaceable fuse system of an automotive type.
- Possibility of remote-controlling the speed setup, direction of rotation, Trimmer function and Fault signal.
- Possibility of remote-piloting with voltage values other than 24V DC.

Electrical connection

Motion Control boards are equipped with removable terminal boards to make wiring easier. Terminal boards are equipped with a wire fastening system with no need for tools. All signal contacts are opto-insulated to directly connect the Motion Control board with any PLC. For wiring refer to the technical manual. It is not necessary to protect the Drive Roller with fuses since its electronics are already serving this purpose. This does not exonerate the Customer from properly protecting the supply line against overcurrent by means of delayed fuses properly dimensioned according to the electric Drive Roller data supplied in previous pages.

Drive Roller setting

The front slot gives access to the:

Potentiometers that enable the operator to set up:

- Acceleration and deceleration ramp.
- Activation and setting of the Trimmer function.

Dip-Switches that enable the operator to set up:

- Speed (3 Dip-Switch).
- Direction of rotation (1Dip-Switch).
- Selection of the delivered power (2 Dip-Switch).
- Trigger Function Multiplier (1 Dip-Switch).
- Energy saving system activation (1 Dip-Switch).

Status LED's that enables the operator to monitor:

- The correct board supply (fixed Green LED), the motor activation (slowly blinking Green LED), the acquisition of settings (quickly blinking Green LED).
- Drive Roller malfunction due to over temperature (yellow LED).
- Electronics malfunction (red LED)
- Trigger function activation (fixed blue LED), motor activation for Trigger function (blinking blue LED), where blinking indicates the seconds setup.

It is recommended to reset the electronic board after any setup change. As soon as it is powered on again, the electronic board will perform a self-test (which can be recognised by the pilot lamps turning on in sequence).

Energy saving function

The Dip-Switches are intended to optimise the power delivery of the Motion Control board to the Drive Roller so as to refine the actual energy need. The installation consumption can be further reduced by setting up Dip-Switch 8 for the total motor deactivation as soon as the start signal is removed.

Motor protection

The Drive Roller is protected by the electronics built in the motor, which prevents incorrect wiring from damaging the motor. The Motion Control electronic board can extend safety limits.
Moreover, it can protect the Drive Roller with a timed system against stall, overcurrent and slowdown, compared to Dip-Switch or remote settings.

Installation details

Refer to the technical manual for proper installation and operation of the RMCelectronic board.

EURONORM DRIVE SYSTEMS

RMC Electronic Board Euronorm Motion Control (RMC)

RMC-1310 BOARD

Electric data	
Nominal Voltage	**24 VDc**
Voltage range	18 ÷ 26 Vcc
Nominal direct current	**3.0 A**
No load current	0,1 A
Maximum current	5.0 A
Protection fuse	Replaceable
Supply ripple	Max 5%
Protection rate	IP00

Environmental conditions	
Ambient / operational conditions	-10 ÷ +45 °C
Ambient storage temperature	-20 ÷ +75 °C
Maximum non-condensed humidity	90%

Electric connections	
Power supply cable cross-section	1 mm^2
I/O signal cable cross-section	From 0.08 to 0.5 mm^2

Settings of Dip-Switches

Speed
Dip-Switch 1 – 2 – 3 are intended to vary the rotation speed of the Drive roller. With reference to the maximum speed rate in the catalogue, the speed rate can be varied according to the following percentages: 55% - 60% - 70% - 80% - 90% - 100%.
To vary the speed rate remotely, set all Dip-Switches on board to OFF and remote-control the contacts from the terminal board.

Direction
Dip-Switch 4 is intended to change the direction of rotation of the Drive Roller from clockwise to counterclockwise (compared to the connection cable side).

Delivered power
Dip-Switch 5 and 6 are intended to control the power that can be delivered by the Motion Control board in order to optimise energy consumption within the following range: 1.0A - 1.5A – 2.0A - 3.0A (Turbo Mode).

Trigger Multiplier (TMR)
Dip-Switch 7 is intended to activate the time multiplier of the TRIGGER function by multiplying the timer set from the potentiometer by 2.5 so as to prolong the motor activation.

Stand-by
Dip-Switch 8 is intended to activate the stand-by function. This function is intended to brake more rapidly to the disadvantage of the system energy consumption.

Setting of potentiometers

Ramp
Potentiometer 1 is intended to adjust the acceleration and deceleration ramps of the Drive Roller from min. 100 milliseconds to max. 10 seconds. The setup ramp is valid for acceleration and deceleration.

Trigger
Potentiometer 2 is intended to activate and set up the Trigger function. As soon as it is activated, the blue pilot lamp will turn on to indicate it is active. As soon as the maximum rotation is achieved by the potentiometer, the trigger function will keep the motor on for 10 seconds (25 seconds if Dip-Switch 7 is active) upon arrival of the signal from the photocell or sensor. If fixed, the blue pilot lamp confirms that the function is activated; if blinking, it signals that the Drive Roller is running with flashing for every operation second.

Pilot lamps
Pilot lamps indicate a self-test as soon as the board is powered on.
Led 1: green, if it is on and the light is fixed, the board is working, but the motor is off; when blinking slowly, the motor is moving.
When blinking quickly, user's settings are being acquired.
Led 2: red, if on, it means that there is an electronic problem.
Led 3: blue, if on, it means that the trigger function is active, if blinking, it means that the motor is moving.
Led 4: yellow, if on, it means that there is a heat problem in the motor.

Protections

Fuse
The supply of the electronic board, the Drive Roller and the photocell is protected by an interchangeable 5A minifuse of an automotive type.

Polarity reversal
The electronic board is protected against accidental false wiring of the supply polarity.

Opto-insulation
All I/O contacts are opto-insulated for direct connection with the PLC.

Overcurrent
The electronic board constantly monitors the current level absorbed by the Drive Roller. If it should fail to comply with Dip-Switch (5 and 6) settings, the Drive Roller supply is interrupted, the Fault signal activated and the corresponding pilot lamp turned on (red).

Speed
The electronic board constantly monitors the Drive Roller rotation speed. If it should fail to comply with the speed set up by Dip-Switch (1, 2 and 3), the Drive Roller supply is interrupted, the Fault signal activated and the corresponding pilot lamp turned on (red).

Drive Roller Temperature
The electronic board constantly monitors the internal temperature of the Drive Roller by activating the Fault in case of over temperature and by turning on the corresponding pilot lamp (yellow).

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EURONORM
DRIVE SYSTEMS

EURONORM DRIVE SYSTEMS

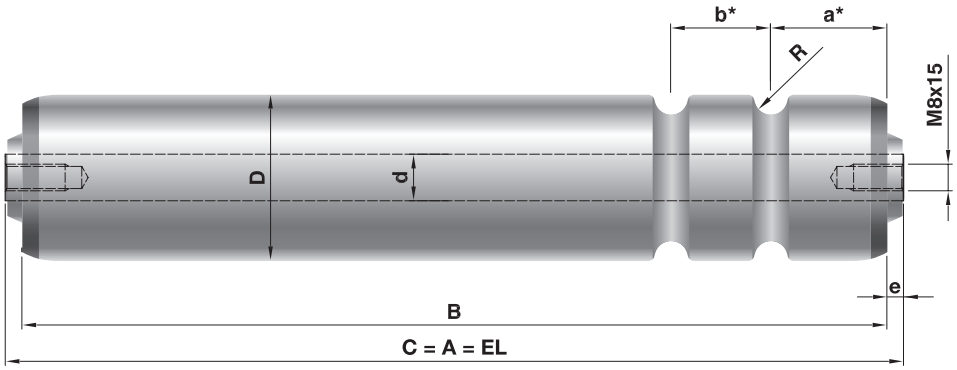
Roller series 117

Idle rollers for light and medium weight unit handling conveyors in internal, normal, humid, and corrosive environments

A very versatile roller, having various application possibilities, with low noise and particularly smooth running. The bearings are housed in black Polyamide end-caps; with radial precision ball bearings permanently lubricated, 6002-2RZ std. type or in stainless steel, for shafts up to d.14, protected by a RAL 1023 yellow labyrinth shaped Polypropylene cap.
The tube can be in zinc-plated steel (Z exec.) or in stainless steel (I), thickness 1.5 mm.
A drilled and threaded shaft (R) for screw fastening, makes a more rigid and stronger assembly.

The specific shape of the end-caps, the accuracy of the assembly and the type of bearing used make the rollers particularly strong and allow them to reliably function even in driven and belt applications.
Application temperatures range from –5° C to +80° C for steel tube; working conditions must be verified for applications in lower temperatures.
We suggest conforming to the standard executions and lengths.
The belts must have a section of min. ø 5 max. ø 8 mm.

Ordering code							e	Weight		Rotating parts weight		Options		a	b	R
Type	Shaft		Tube		Length C			C=200 daN	al cm daN	C=200 daN	al cm daN	Shaft exec.	Tube exec.			
	d(ø)	exec.	D(ø)	exec.	min	max										
117/12	12	D	50	Z	70	1600	4.5	0.630	0.027	0.432	0.018	S-M-R-F-J-I	N-J-P-I	35	20	5
117/14	14	R	50	Z/I	70	1600	5	0.630	0.030	0.432	0.018	J-I	J-P-I	35	20	5



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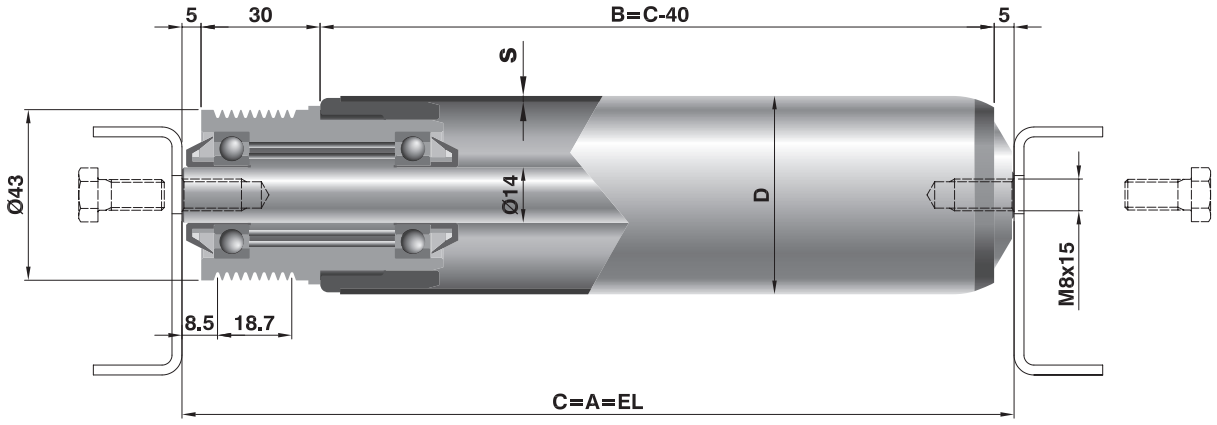
Roller series 135

Driven rollers with Poly-V belt head

Series 135 rollers have the same features as the series 117.
The drive head is made of Polyamide in black, stabilized and very resistant to wear, pressed and fixed into position within the housing element at the tube end. Tube is sendzimir zinc-plated (exec. Z). Or an option of tube execution in stainless steel AISI 304.
Application temperatures range from –5° C to +80° C.
The rollers have precision 6002-2RZ ball bearings.

On request rollers can be supplied with stainless steel bearings and in an antistatic version.
The drive head has 9 grooves, V profile pitch 2,34 mm form PJ, ISO 9981 DIN 7867.
Standard Poly-V belts have 2 ribs but it is also possible to use belts with 3 or 4 ribs.
The standard 2-rib belt allows up to 20 rollers to be looped together with a central drive (estimated and subject to application requirements).

Type	Shaft		Tube		Length. *C*		s	Options		Weight		Rotating parts weight	
	d(ø)	exec.	D (ø)	exec.	min.	max.		Shaft exec.	Tube exec.	C=200 daN	al cm daN	C=200 daN	al cm daN
135/V1	14	R	50	Z	130	1600	1.5	J-I	J-N-I-P	0.721	0.030	0.452	0.018



Roller selection for curves

In selecting a roller the following should be considered:

$$Pc \geq P$$

The load capacity of the roller is equal to or greater than the maximum actual load

Furthermore, the suitability to the environmental conditions should be verified (dust, humidity, corrosion, hygiene, etc.), as well as the tube thickness in relation to the concentrated load shocks, considering that the use of rollers with bigger diameters, with equal bearings, reduces the thrust force or the inclination in gravity conveyors.

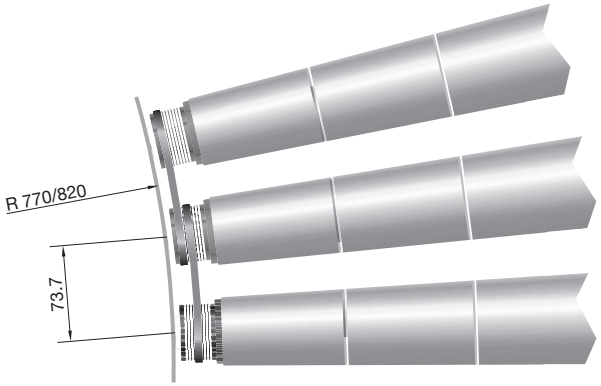
Roller length

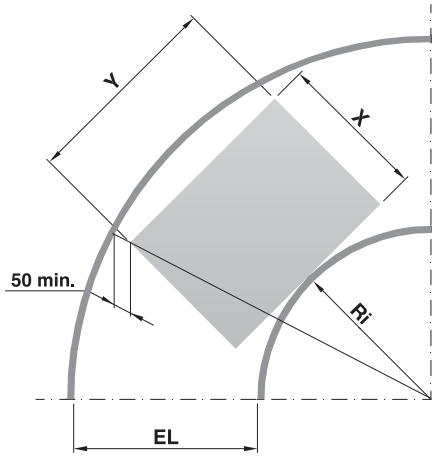
The roller length and therefore the width of the conveyor is determined by the maximum dimensions of the packages to be handled:

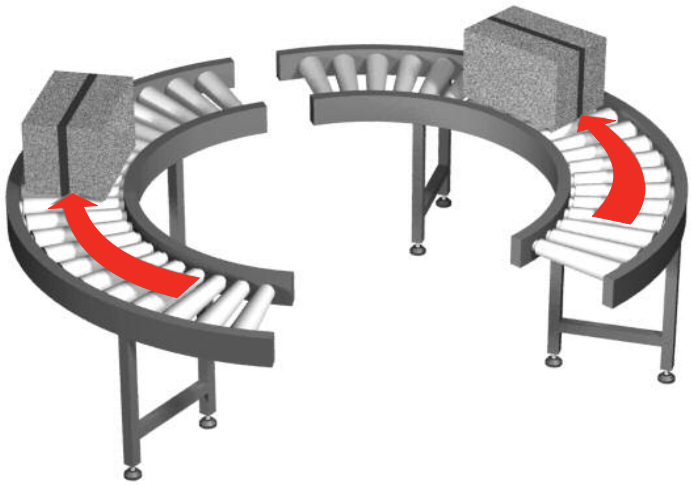
C (EL) = X + 100 min.
EL = C with fixed shaft ends.

Curves can be of tapered rollers, cylindrical double rollers, simple cylindrical differentiated in 2 or 3 rows, simple cylindrical as with straight sections (although not advisable).

$$EL = \sqrt{(Ri + X)^2 + (Y/2)^2} - Ri + 100 \text{ min.}$$







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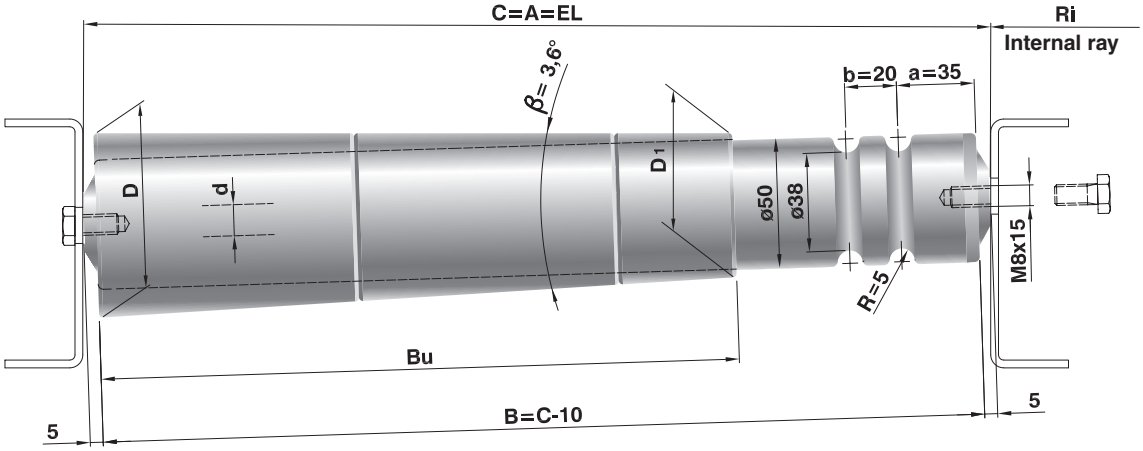
Tapered RDR and rollers with grooves for round belt transmission

These rollers are supplied on request and are obtained by assembling Polypropylene conical sleeves onto a Ø 50 base roller.
On the protruding part of the Ø 50 parallel base roller there are 2 grooves formed into the tube for Ø4-5 mm round belt.
The rollers have precision radial 6002 bearings.



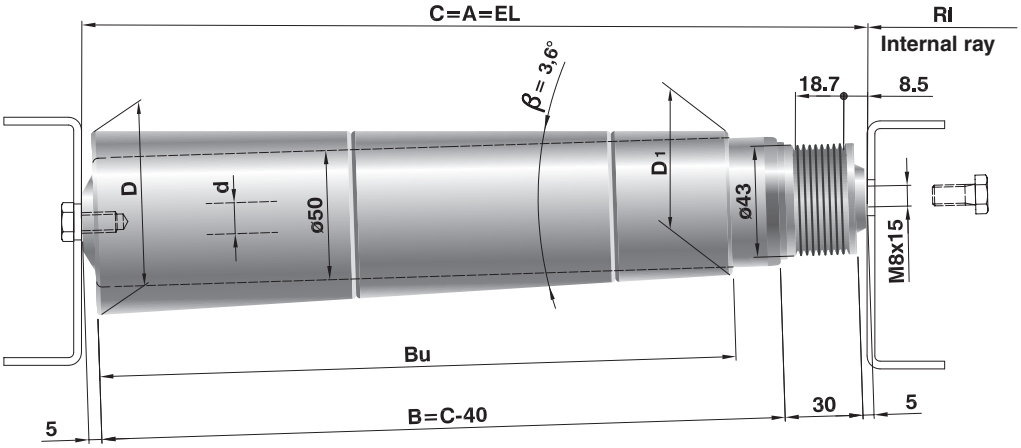
Type	Ordering code Shaft d(ø)	Shaft exec.	Tube cod.	Tube exec.	Length C	Base roller	Length Bu	D (ø)	D_1 (ø)	Ri	Total weight daN
KRO/F2	12	R	65	ZFK	300	KRO-117	195	65.6	53.4	720	0.98
			71		350		245	72.0	56.4	770	1.16
			72		400		295	72.0	53.4	720	1.32
			77		450		345	78.5	56.4	770	1.53
			78		500		395	78.5	53.4	720	1.69
			84		550		445	85.0	56.4	770	1.91
			85		600		495	85.0	53.4	720	2.07
			90		650		545	91.3	56.4	770	2.31
			91		700		595	91.3	53.4	720	2.47
			96		750		645	97.6	56.4	770	2.72
			97		800		695	97.6	53.4	720	2.89
			103		850		745	104.0	56.4	770	3.16
			104		900		795	104.0	53.4	720	3.33
			109		950		845	110.3	56.4	770	3.62
			110		1000		895	110.3	53.4	720	3.78

RDR and Roller series KRO Poly-V

Driven tapered RDR and rollers with flexible Poly-v belt head

These rollers are ideal to build curves for light and medium duty, they are obtained by assembling Polypropylene conical sleeves onto a Ø 50 base roller. The Poly-V drive head is positioned at the protruding end of the base roller, with 9 grooves for V-rib pitch 2,34 mm J profile, ISO 9982 DIN 7867, directly inserted with tight interference on the end of the tube Ø50x1,5, without an intermediate coupling, thus avoiding deformations as in case of grooves on the tube.
The transmission can be easily covered, thus limiting space consumption, maximizing safety and preventing damage to the Poly-V belts.

We foresee just a very flexible two-rib Poly-V belt, for a roller pitch on inner frame of I=73,7.
A 90° curve is typically powered by a driving unit midway along the curve. The sprocket is made in black Polyamide, while the general features are the same as for the driven sprocket tapered KRO series (base roller 135 series). The rollers are equipped precision radial bearings 6002-2RZ.



Type	Ordering code Shaft d(ø)	Shaft exec.	Tube cod.	Tube exec.	Length C	Base roller	Length Bu	D (ø)	D_1 (ø)	Ri	Total weight daN
KRO/VM	14	R	72	ZK	350	KRO-135	295	72.0	53.4	770	1.42
			77		400		345	78.5	56.4	820	1.54
			78		450		395	78.5	53.4	770	1.69
			84		500		445	85.0	56.4	820	1.81
			85		550		495	85.0	53.4	770	1.97
			90		600		545	91.3	56.4	820	2.04
			91		650		595	91.3	53.4	770	2.26
			96		700		645	97.6	56.4	820	2.38
			97		750		695	97.6	53.4	770	2.58
			103		800		745	104.0	56.4	820	2.70
			104		850		795	104.0	53.4	770	2.97
			109		900		845	110.3	56.4	820	3.03
			110		950		895	110.3	53.4	770	3.26

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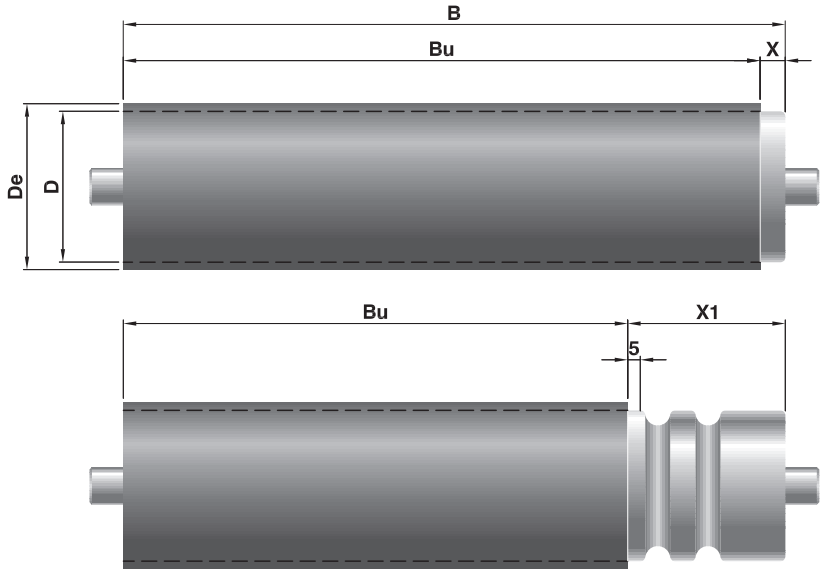
Coatings and Options

PVC covered rollers
Although not special, information on this design is given.
The self colour or zinc plated steel tube "**N**" or "**Z**" and "**J**" rollers with "D" values as per table, can be covered with a soft, elastic and smooth surface PVC (Polyvinylchloride) sleeve, particularly resistant to chemical agents (hardness 73 ShA) grey colour (RAL 9006).

It is normally used to protect the roller surface and mostly to avoid scratching painted, enamelled, smooth, loads and in some cases to increase friction.
The PVC sleeving is simply fitted onto the tube with excellent coupling thanks to elastic tightening.
Application temperatures ranging from -10°C to +50°C.

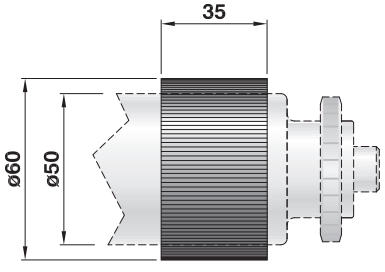


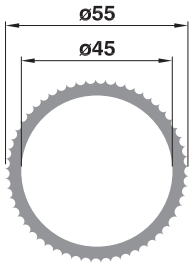
Rollers with hot vulcanized rubber lagging
Lagging with 70 ± 5 Sh.A hardness, with surface turned to 3 mm minimum thickness.
On request the lagging can be with different hardnesses or thicknesses or with cold bonded rubber, Adiprene, Neoprene and Silicone compatibly with the number of rollers requested.

Ordering code
The "R" code should be added to the tube design.

High friction sleeves K698
Where it is necessary to increase friction between the rollers and the handled unit loads the employment of these sleeves is particularly effective. They are made with transparent Polyurethane 75 Sh.A with longitudinal grooves and are supplied separately only for rollers with tube Ø 50.

Code: SVGN_00050
Description: Sleeves D.45/55 L=35 K698





EURONORM DRIVE SYSTEMS

Tension Rollers

For use with light belt conveyors

General characteristics

Application: For use with Drive Rollers.

Note: when required smaller roller diameters are available for limited space or weight applications.

Standard execution: self colour steel or zinc plated steel tube, steel shaft, shaft executions milled or drilled and threaded, labyrinth seals or external bearings 2RS.

Roller type:

RSP: With 2RS bearings seated in counter bored tube.

MPS: With 2RS bearings seated in counter bored tube and labyrinth seals with semi-hermetic outer trim in galvanized steel.

117: with polymer PA6 bearing seats and dual screen 2Z bearings lubricated for life.

Options: Electrolytic zinc plated or stainless steel shaft, zinc plated or stainless steel tube for food and / or wet applications.

Roller type	Dimensions mm								Standard execution		
	Ø D	s	d	e	Ch x g	M	C max	Bearing	Shaft	Tube	Sealings
RSP/6H	32 J	3	12	4		M8 x 15	700	6001 2RS	steel	Zinc plated steel	2RS Bearings
MPS/3	38 J	2.6	15	6.5	17 x 9		700	6202	steel	Zinc plated steel	Labyrinth
MPS/3	38 J	2.6	15	6.5		M10 x 18	700	6202	steel	Zinc plated steel	
117/15	51 J	2	15	4	12 x 9		700	6202 2Z	steel	Zinc plated steel	Metal screen
117/15	51 J	2	15	4		M10 x 18	700	6202 2Z	steel	Zinc plated steel	2Z Bearings

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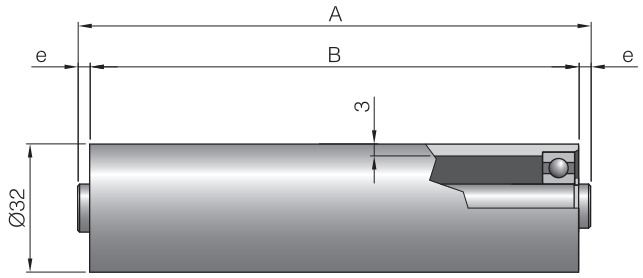
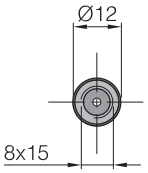
Tension Rollers

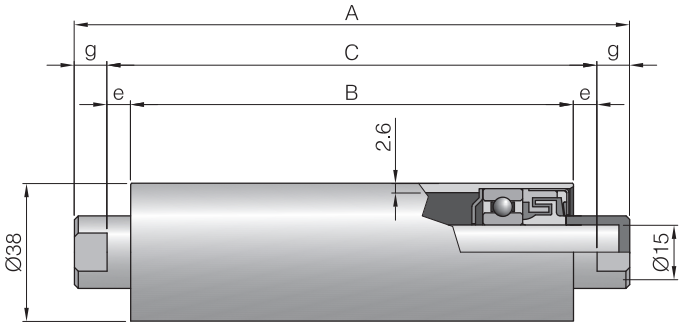
For use with light belt conveyors





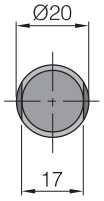
RSP/6H

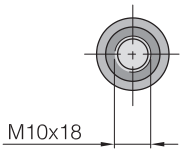
Drilled and threaded shaft execution



MPS/3

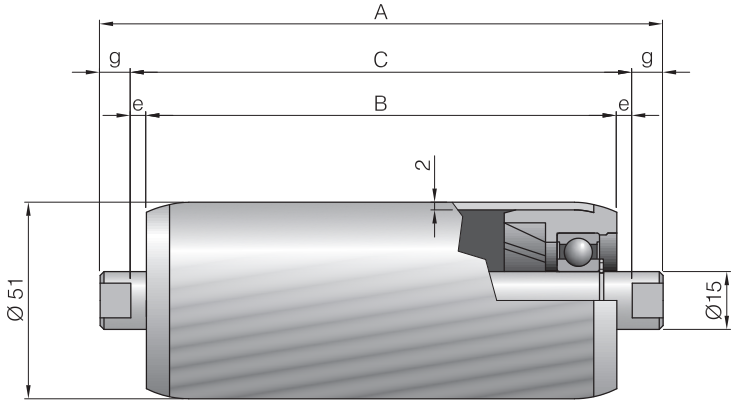
Shaft execution with key obtained with metal sleeve





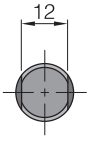
MPS/3

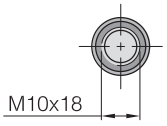
Drilled and threaded shaft execution



117/15

Flats shaft execution





117/15

Drilled and threaded shaft execution

EURONORM DRIVE SYSTEMS

Tension Rollers

For use with light belt conveyors

Technical data and options on request									
Roller type	Ø D	s [mm]	d [mm]	Shaft	Max Speed rev/min	Max Speed m/s	Max Capacity DaN	Options Shaft	Options Tube
RSP/6H	32 J	3	12	M: M8 x 15	600	1	100	J, I	J-I
MPS/3	38 J	2.6	15	Ch x g: 17 x 9	600	1.2	110	J, I	J, I
MPS/3	38 J	2.6	15	M: M10 x 18	600	1.2	150	J, I	J, I
117/15	51 J	2	15	Ch x g: 12 x 9	600	1.3	120	J, I	J
117/15	51 J	2	15	M: M10 x 18	600	1.3	150	J, I	J

Calculated flow rate at full load and maximum speed for a theoretical bearing life of 10,000 hours.

Contact Euronorm for limit loads or other technical details.

The roller capacity must be greater than the belt tension T1 plus the carried load to avoid over deflection of the shaft and bearings.

Key options

Tube:
J = Zinc plated.
I = stainless steel AISI 304.

Shaft:
J= Zinc plated.
I = stainless steel AISI 304.

For higher flow rates and for special rollers Please contact Euronorm.

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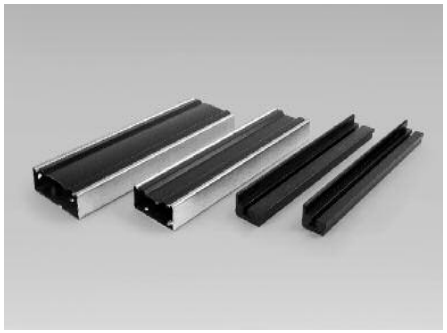
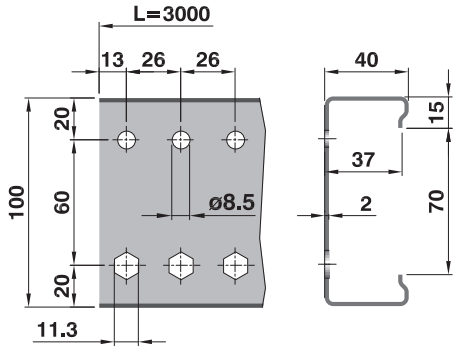
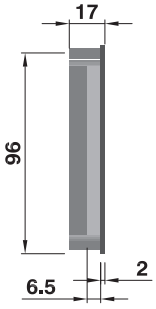


Profiles for Conveyors

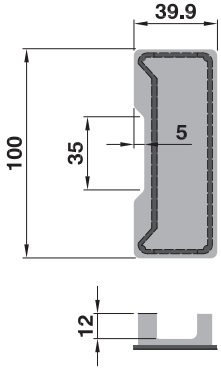
The CP1 and CP2 profiles can be supplied in self colour or in a galvanized version. Combined with the P5 and P6, grey PVC cover strip and black Polyethylene end caps. They are particularly suited to build conveyors with motorized and friction rollers series 135 and 138, with tangential chain or belt transmission.
All the profiles are cut to obtain the first hole with a 13 mm pitch from the end, consequently "L" length values are merely nominal.

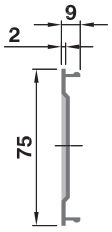


Profile
PR CP1 3000 (-Rough)
PR CP1J 3000 (Galvanized)
Weight = 9.50 daN

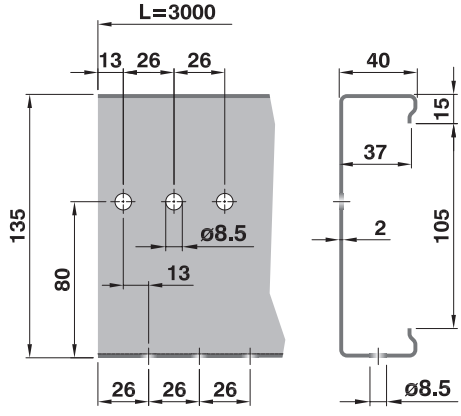


End cap KR32
Code RMSP-00138
Weight = 0.012 daN

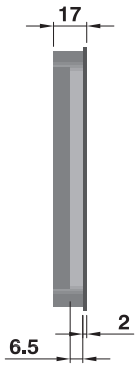




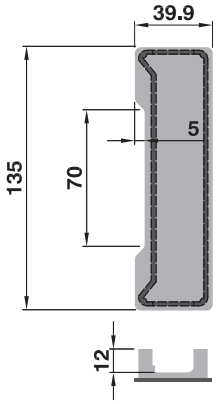
Cover strip L3000
PR P5 3000
Weight = 0.75 daN

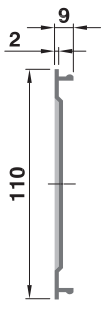


Profile
PR CP2 3000 (Rough)
PR CP2J 3000 (Galvanized)
Weight = 11.00 daN



End cap KR31
Code RMSP-00137
Weight = 0.017 daN





Cover strip L3000
PR P6 3000
Weight = 0.75 daN