



## Lagging for Standard Belts

Smooth or specially grooved lagging to increase friction between the shell and conveyor belt

### Product description

#### Characteristics

- High resistance to oil, fuel and other chemicals
- Increases friction between the shell of the Motorized Pulley and conveyor belt
- Prevents slip between the shell of the Motorized Pulley and conveyor belt
- Longitudinal grooved lagging reduces liquid build up between belt and shell
- Centered V-groove for belt tracking
- Multiple V-grooves for V-belt or round belt conveyors

#### Applications

- Wet applications
- For standard motorized pulleys
- Food and hygienic applications
- Flat belt, round belt or multi V-belt applications
- Hot vulcanisation for high-torque motorized pulleys

**Note:** The Lagging influences the outer diameter of the motorized pulley and increases its speed to that stated in the catalogue. The tangential force and the speed of the motorized pulley must be recalculated according to the increased diameter.

### Cold Vulcanization lagging (R)

Lagging profile	Colour	Characteristics	Shore Hardness	Thickness mm
Smooth (S)	Black (B)	Oil and Fat resistant	70 ± 5 Shore A	3, 5, 6, 8, 10, 12
	White (W)	FDA food approved	70 ± 5 Shore A	
Longitudinal grooves (Ri)	White (W)	FDA food approved	70 ± 5 Shore A	8
Diamond Patterned (DP)	Black (B)	Oil and Fat resistant	60 ± 5 Shore A	8

### Hot Vulcanization lagging (VR or XN)

Lagging profile	Colour	Characteristics	Shore Hardness	Thickness mm
Smooth (S)	Black (B)	Oil and Fat resistant	65 ± 5 Shore A	3, 5, 6, 8, 10, 12, 14
	White (W)	FDA food approved	70 ± 5 Shore A	
	Blue (BL)	FDA food approved	70 ± 5 Shore A	
Longitudinal grooves (Ri)	Black (B)	Oil and Fat resistant	65 ± 5 Shore A	6, 8, 10, 12, 14
	White (W)	FDA food approved	70 ± 5 Shore A	
	Blue (BL)	FDA food approved	70 ± 5 Shore A	
Diamond Patterned (DP)	Black (B)	Oil and Fat resistant	65 ± 5 Shore A	6, 8

For a short description of the type of lagging.

#### Example:

R3 / S - W

| | | White  
 | | | Smooth  
 | | | 3mm thickness  
 | | | Cold Vulcanisation

## Lagging for Standard Belts

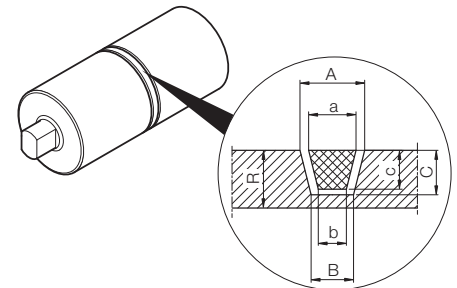
Smooth or specially grooved lagging to increase friction between the shell and conveyor belt

### V-groove

#### Hot Vulcanization

A machined centre groove in the hot vulcanized rubber coating, allows the use of conveyor belts manufactured with a tracking profile on the underside of the belt. Designed to help maintain tracking and to prevent belt wander. Conveyors using this type of belt should be designed in such a way that the slider bed or roller bed primarily tracks the belt and not the Motorized Pulley.

Fig.: V-grooved lagging



Groove	R Standard	R Stainless	Groove			Belt		
	mm	steel	A	B	C	a	b	c
K6	8	5	10	8	5	6	4	4
K8	8	6	12	8	6	8	5	5
K10	10	8	14	10	7/8*	10	6	6
K13	12	10	17	11	9/10*	13	7.5	8
K15	12	10	19	13	9/10*	15	9.5	8
K17	14	12	21	13	12	17	9.5	11

\* for shell in stainless steel.  
All dimensions are expressed in mm.

#### Rule:

- 1)  $R-C \geq 2$  for shell in steel
- 2)  $R=C$  for shell in stainless steel

#### Example for the groove description:

Central Groove K6

or for non standard measures:

Groove 11/8 x 5 Central

A/B x C



# Profiled Lagging for Plastic Modular Belts

Specially produced lagging, profiled to suit the belt manufacturers series of plastic modular belt.

## Product description

### Characteristics

- Resistance to abrasion
- Low noise during operation
- Reduced wear of the belt
- Easy to clean
- High resistance to oil, grease and chemicals applications

### Applications

- Applications for food environments
- Profiles to suit most manufacturer's standard plastic modular belts
- Motorized Pulleys with de-rated motors
- For standard Motorized Pulleys with frequency converters. The frequency converter must be prepared to reduce the power by 18%

**Note:** The Lagging influences the outer diameter of the motorized pulley and increases its speed to that stated in the catalogue. The tangential force and the speed of the motorized pulley must be recalculated according to the increased diameter.

## Technical data

<b>Material</b>	Hot Vulcanized nitrile rubber NBR
<b>Lagging temperature</b>	40 /+120 °C (consider the temperature allowed for the motorized pulley)
<b>Shore Hardness</b>	From 65 to 70 ± 5 Shore A

Plastic modular belts manufacturer	Series	Lagging			
		80LS Z	113LS Z	138LS Z	165LS Z
Intralox	800		9	10	12
	1600	13	16	20	23
	1100 FT PE/AC		27		
	1100 FT PP	20	27	32	38
Siegling	LM50 Series 3		9	10	
Uni Chains / Ammeraal	CNB		16	20	
	MPB		9	10	
	S-MPB	12	16	20	

Z Number of teeth



# Sprockets for Plastic Modular Belts

Special laser cut sprockets based on the specification of modular belt manufacturers

## Product description

### Characteristics

- Laser cut for excellent fitting accuracy
- Stainless steel sprockets to avoid rust
- Low friction

### Applications

- For the control of plastic modular belts
- For standard Motorized Pulleys with frequency converters . The frequency converter should be prepared to reduce the power by 18%
- For Motorized Pulleys with de-rated motor
- For Motorized Pulleys with cylindrical shell and locking key
- For food processing applications

**Note:** The Sprockets influence the outer diameter of the motorized pulley and increases its speed to that stated in the catalogue. The tangential force and the speed of the motorized pulley must be recalculated according to the increased diameter. Please refer to the velocity factor (VF) in the table below.

## Order Information

Different belt variants and materials may affect the operational characteristics. Rulmeca try to show the most popular basic profile options in this catalogue. If you are unable to find the required profiled lagging or sprocket you need, or if you have some doubts, please answer the following questions and send them to Rulmeca with your enquiry:

- Lagging or sprockets preferred?
- Thermoplastic non-modular belt or plastic modular belt?
- Motorized Pulley diameter?
- Required belt speed?
- Belt manufacturer?
- Belt series?
- Belt type and variant?
- Belt material?
- Number of teeth?
- Tooth Pitch?
- Reversible, yes or no?
- Outside diameter (D) in mm?
- Pitch circle diameter (PCD) in mm?
- Sprocket thickness (B) in mm?

Modular belt manufacturer	Series	Sprocket 80LS				Sprocket 113LS				Sprocket 138LS				Sprocket 165LS			
		Z	PCD mm	Vf	B mm	Z	PCD mm	Vf	B mm	Z	PCD mm	Vf	B mm	Z	PCD mm	Vf	B mm
Intralox	800	8	133.00	1.63	6.00	10	164.00	1.45	6.00								
	1100	24	116.00	1.42	18.00												
		24	116.00	1.42	6.00												
	1600	14	114.00	1.40	8.00												
	2400	15	122.00	1.49	6.00	19	154.00	1.36	6.00	24	195.00	1.42	6.00	26	211.00	1.30	6.00
HabasitLINK	M1220	25	101.00	1.24	3.00												
	M2520 & M2530	15	122.00	1.49	12.00												
		15	122.00	1.49	4.00	20	164.00	1.45	4.00								
Uni Chains / Ammeraal	Flex SNB	14	114.00	1.40	3.00	18	146.00	1.29	3.00	21	170.00	1.24	3.00	24	195.00	1.20	3.00
	M-SNB & M-QNB	24	97.00	1.19	5.00												

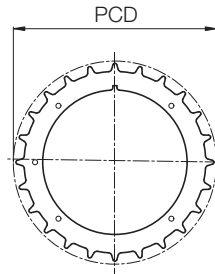


## Sprockets for Plastic Modular Belts

Special laser cut sprockets based on the specification of modular belt manufacturers

### Product Range

Motorized pulleys that require sprockets, must be ordered with a cylindrical shell.



<b>Z</b>	Number of teeth
<b>PCD</b>	Pitch circle diameter in mm
<b>Vf</b>	Velocity factor
<b>B</b>	Width of sprocket in mm
<b>Rev.</b>	Reversible sprocket
<b>Ref. no.</b>	Reference number

# Backstop / Anti run-back bearing



## Product Description

Backstops prevent the roll-back of the belt and carried load in case of shutdown or lack of power supply.

## Characteristics

- The backstop runs only in one direction
- Mounted on the rotor shaft, except for the 80LS
- Mounted in the end housing on the 80LS
- No need for an electrical connection
- Higher holding torque than an electromagnetic brake

## Application

- Single direction inclined belt conveyors
- For preventing run-back of the belt and load when the power supply is off

The rotational direction of the motorized pulley with backstop is indicated by an arrow on the end housing at the electrical connection side.

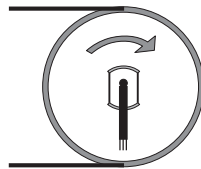


Fig.: Rotation arrow.

## Product range

Rotation direction from the electrical connector side	Clockwise Anti-Clockwise
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## Product description

The Electromagnetic brake stops and holds the load in position according to the stated holding torque.

## Characteristics

- Low noise
- Wear contained
- Powered by a separate external rectifier
- Applied directly on the rotor of the motorized pulley
- When the power to the motor is lost or stopped the brake will close (mechanically engage)

## Applications

- For reversible inclined and declined conveyors
- For reduced stopping times\*
- For stopping and holding loads
- For approximate positioning

(\* ) For faster stopping times and accurate positioning, please use a frequency converter with braking function and if necessary an encoder with feedback control.

## Response time

The response time for opening of the brake (motorized pulley start) and closing (stop motorized pulley), may vary substantially according to:

- Type and viscosity of the oil
- Level of oil in the drum motor
- Ambient temperature
- Internal motor working temperature
- Switching at input (AC-switching) or at output (DC-switching)
- Control contact of the coil brake into the alternating current supply of the rectifier (long response times), or on the output DC of the rectifier (fast response)
- Type and output voltage of the rectifier control of the brake coil

The difference between the control in alternating current and direct current is shown in the following table:

	AC Switching	DC Switching
Intervention time	Slow	Fast
Braking voltage	Nearly 1Volt	Nearly 500volt

**Note:** For the brake coil command in DC, the contacts must be protected against surges.

## Reduction of braking torque

The declared braking torque M, is strongly influenced by the operating conditions of the motorized pulley (with oil at high temperatures) and the ambient temperature. For the calculation of the load that can be braked in safety, the braking torque provided in the tables should be reduced by 50%.

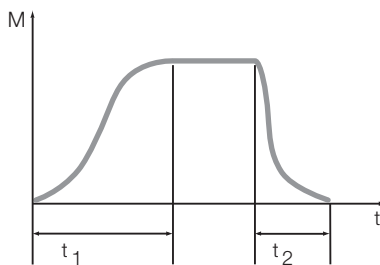


Fig.: Time t/Torque M brake closure

- $t_1$  Closing response time (de-excitation coil): Stop
- $t_2$  Opening response time (excitation coil): start

# Electromagnetic brakes



Product range							
Motorized pulley	Rated torque M (Nm)	Rated power (W)	Rated voltage (V CC)	Rated current (A)	DC switching t1 (ms)	AC switching t1 (ms)	Opening delay time t2 (start) (ms)
80LS	1.1	12	24	0.5	13	80	20
			104	0.12	13	80	20
113LS 138LS	6	24	24	1.00	26	200	30
			104	0.23	26	200	30
			207	0.12	26	200	30
165LS	12	33	24	1.38	46	260	40
			104	0.32	46	260	40
			207	0.16	46	260	40





# Rectifiers

The rectifier operates the electromagnetic brake

## Product description

### Characteristics

- The Rectifier for the electromagnetic brake (external component), must be installed in a protective box as close as possible to the Motorized Pulley

### Applications

- Motorized pulleys with electromagnetic brake
- Frequent start and stop applications
- Positioning applications
- Half-wave rectifier for standard applications
- Fast acting and multiswitch rectifier for applications in which short opening delay times are necessary

## Product range

Input Voltage V AC	Brake voltage V DC	Starting voltage V DC	Holding voltage V DC	Rectifier type	Application
115	104	104	52	Fast acting rectifier	C L
230	207	207	104	Fast acting rectifier	C L
230	104	207	104	Fast acting rectifier	CS
230	104	190	52	Phase rectifier	CSL
230	104	104	104	Half wave rectifier	C
400	104	180	104	Multiswitch rectifier	C S
460	104	180	104	Multiswitch rectifier	C
460	207	207	207	Half wave rectifier	C

- C** Continuous running application  
**S** Frequent start/stop application  
**L** Less heat\*

\*Using a fast acting rectifier or a phase rectifier will save energy and the brake coil heats up less. These types of rectifiers generate a holding voltage lower than the starting voltage of the brake coil itself.

### General rules for voltages of rectifiers

#### One way / Half wave rectifier:

- Output DC voltage = 0.45 x input AC voltage

#### Fast acting rectifier:

- 1. Bridge rectifier: output DC voltage = 0.9 x input AC voltage for 0.004- 2 s (overexitation time influenced by external resistance)
- 2. One way rectifier: output DC voltage = 0.45 x input AC voltage

#### Phase rectifier: - input 230 VAC (only for 104 VDC brakes)

- 1. Overexitation voltage 190 VDC for 0.15 sec fixed
- 2. Holding brake voltage 52 VDC (50% of the brake voltage is enough to keep the brake open)

## Product description

### Characteristics

- Supplies low resolution signals to an external control unit
- Embedded in the rotor bearing
- Cannot be combined with the electromagnetic brake option

### Application

- For applications which require the continuous control of the speed, direction, and position of the Motorized Pulley belt or load

Technical data	
Rated voltage	From 5 to 24 V Cc
Max. operated current	From 8 to 10 mA
Max. output current	20 mA
High level Voltage	> 3.5 V
Low level voltage	<0.1 V

### INC resolution

The INC resolution (n° of pulses per pulley revolution) depends on encoder type and can be calculated as follows:

$$INC = Z \times i$$

i Gear ratio of the motorized pulley

Z Number of encoder pulses per rotor revolution

Product range		
Motorized pulley	Bearing type	Pulses for rotor revolution
from 80LS to 138LS	6202	32
165LS	6205	48

**Nota:** The Motorized Pulley 80LS with encoder has 2 cables-one exiting through each shaft at either end.

### Control interface

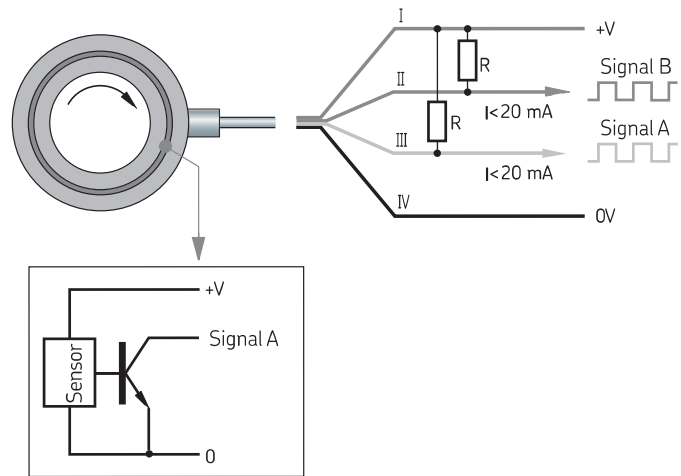
The encoder has open collector NPN transistor outputs. When connected to the input of a control interface the required load resistances (R) have to be used. The load resistances are stated in the table overleaf. When using different interfaces or, should you have any doubts, please refer to Rulmeca or to a local electronic specialist.

Rulmeca recommends the use of an Opto-coupler for the following reasons:

- To protect the encoder
- To enable connection to other levels such as PNP
- To get the maximum potential between high and low signal



# Encoder SKF



Voltage +V DC	Load Resistances R Ω
5	270
9	470
12	680
24	1500

# Encoder RLS



## Product description

### Characteristics

- Supplies high resolution signals to an external decoder and control unit
- Embedded in the rotor bearing
- Cannot be combined with an electromagnetic brake

### Applications

- For applications which require control of speed, direction, and position of the Motorized Pulley belt or load

### The INC resolution

The INC resolution (n° of pulses per pulley revolution) depends on encoder type and can be calculated as follows:

$$INC = Z \times i$$

i Gear ratio of the motorized pulley

Z Number of encoder pulses per rotor revolution

Product range						
Motorized pulley	Encoder type	Rated voltage V DC	Max. operating current mA	Pulses per rotor revolution p	Max. cable length m	Precision °
80LS - 320H	RS422A 5V	5	50	1024	50	0.5

**Note:** Other resolutions are available on request.



# Encoder RLS



## Data sheet

RM44D01\_04

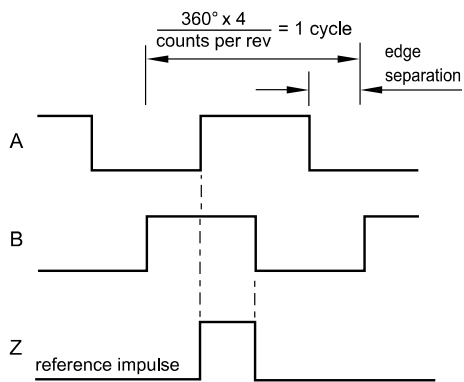
RM44IC - Incremental, RS422A, 5V

Alternative for optical encoders

Power supply	$V_{dd} = 5\text{ V} \pm 5\%$
Power consumption	35 mA
Output signals	A, B, Z, A-, B-, Z- (RS422A)
Max cable length	50 m
Operating temperature	-25 °C to +85 °C
Ext. operat. temp.	-40 °C to +125 °C (IP64)
Edge separation	1 $\mu\text{s}$ minimum

## Timing diagram

(complementary signals not shown)

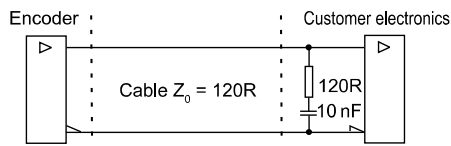


B leads A for clockwise rotation of magnetic actuator.

Resolution options (counts per rev)	Maximum speed (rpm)	Accuracy	Hysteresis
320, 400, 500, 512	30000	$\pm 0.7^\circ$	0.18°
800, 1000, 1024	20000	$\pm 0.5^\circ$	0.18°
1600, 2000, 2048	10000	$\pm 0.5^\circ$	0.18°
4096	5000	$\pm 0.5^\circ$	0.18°
8192	2500	$\pm 0.5^\circ$	0.18°

\* Worst case within operational parameters including magnet position and temperature.

## Recommended signal termination



## Connections

Pin Nr.	Function	Wire colour
1	Shield	-
2	Z	White
3	B	Green
4	A	Grey
5	$V_{dd}$	Red
6	Z-	Brown
7	B-	Yellow
8	A-	Pink
9	GND	Blue