

Planning Section

86	Environmental conditions
89	Different power supply
90	Industrial solutions
91	Power calculation and selection of the Motorized Pulley for package transportation
93	Oil types and contents
95	Connection diagrams

Hygienic conditions

For food processing and other applications where hygiene is paramount we recommend the following materials, connectors and accessories:

- Stainless steel Shell,
- Stainless steel Shaft,
- Stainless steel End housing - TS8N/10N version.,
- IP66 Sealing with NBR or FPM with stainless steel labyrinth motorized pulleys
- Hot vulcanized Lagging, FDA approved, white nitrile rubber NBR or in polyurethane PU
- Oil, food-grade, synthetic
- Stainless steel Terminal box
- Straight or elbow connectors in stainless steel
- Diamond patterned lagging is not suitable for food processing as it can be difficult to clean and leave traces of bacteria

Conveyor frame

According to EHEDG design rules, it is highly recommended to incorporate rust-free open conveyor frames to facilitate easy cleaning, wash down and disinfection of the conveyor, motorized pulley and belt. The rubber material shall be USDA/FDA and EC1935/2004 compliant.

Wet and wash down applications

Wet and wash-down subject applications require rust-free or stainless steel materials for the motorized pulley shell and sealing system.

The following materials and accessories are available:

- Stainless steel or mild steel Shell with hot vulcanised lagging
- Stainless steel Shaft,
- End housing for saltwater resistant (80 LS-138LS) powder coating (165LS-320H) or with stainless steel shell (80LS-320M)- TS8N/10N version
- End housings for S-series, aluminium with stainless steel cover
- IP66 seal, nitrile rubber NBR or FPM, with stainless steel labyrinth
- Lagging, all types possible
- Diamond patterned lagging can be used for non-food wet applications
- Cable connectors, all types possible
- Max. 50 bar at a distance of 0.3 m
- Max. 60°C water temperature for nitrilic rubber NBR regreasable sealing
- Max. 80°C water temperature for nitrilic rubber NBR or FPM sealing

Dry and dusty applications

All Rulmeca Motorized Pulleys regardless of specification or material, are sealed to IP66 protection rating. For applications in hazardous areas requiring intrinsically safe or explosion proof motors, please contact Rulmeca.

High temperature

With Rulmeca Motorized Pulleys, the cooling is due to the contact of the shell with the conveyor belt. It is essential that every motorized pulley, has an adequate temperature difference between the internal motor and its ambient operating temperature.

All Motorized Pulleys in the catalogue are designed and tested, without lagging and with a belt for use in a maximum ambient temperature of +40 °C.

- The maximum ambient temperature for standard Rulmeca Motorised Pulleys is 40° C according to EN 60034
- Every execution is possible, stainless steel versions allow a lower heat dissipation
- Before installing, make sure that the type of oil, declared on the label of the motorized pulley, ensures a temperature range compatible with the temperature of the applications environment.
- The rubber coating for modular belts can cause overheating of the Motorized Pulley, therefore only use recommended specifications
- De-rated motors or standard motors with frequency converters, properly configured for reducing running temperatures (Reduced power and inrush current)
- The rubber lagging to increase the friction with the belts can cause overheating; comply with the limits allowed for the lagging and always connect the motors internal thermal protection.
- For motorized pulleys with motors 6, 8, 12 poles and lagging thicker than 8 mm, use standard motors with frequency converters or de-rated Motorized Pulleys
- For applications with ambient temperatures above +40 ° C, please contact Rulmeca



Environmental conditions

Low temperature

When a Motorized Pulley is operated in low temperatures (less than +5 °C), the viscosity of the oil and temperature of the motor when it is not running should be considered. Consider also that condensation inside the motorized pulley and terminal box may occur with varying wide ranging temperatures.

We recommend the use of the following materials, cables and accessories:

- Mild steel with hot vulcanised lagging or stainless steel Shell
- Stainless steel Shaft,
- End housing in salt water resistant aluminium or solid stainless steel-TS version
- Sealing stainless steel with labyrinth
- Optional special oils for low temperatures
- Use special low temperature seals in temperatures below -25 °C
- System Activation of pre-heating, to prevent condensation
- Lagging, all types possible
- Very low temperatures reduce the effectiveness of the rubber to increase friction
- Cable connections: possible all kinds
- Use of anti rust materials

Anti Condensation heating

In ambient temperatures below +1 °C, consider heating the motor windings to keep the oil viscosity, seals and internal parts at a constant temperature.

If the motor current is switched off for some time and the ambient temperature is very low, then the motor oil becomes viscous. In these situations opt for the use of condensation heating systems, also in order to avoid the formation of ice crystals within the oil seals that would result in a premature damage.

Please refer to Rulmeca.

Altitude higher than 1000 m

The operation of a motorized pulley at an altitude above 1000 m above sea level may result in a loss of power and overheating due to low atmospheric pressure and the lower density of the air, which cools the motor. The altitude of the final application should be taken into consideration when calculating the required power. For more information please contact Rulmeca.

Different power supply



Connecting 3-phase motors to a single phase supply

3-phase motors combined with a frequency converter can be connected to a single phase supply providing that the supply voltage is the same as that of the motor. 3-phase motors generally have a much higher efficiency than single phase motors.



Industrial solutions

Rulmecca offers a wide range of industrial solutions for different applications and market sectors. This chapter will only give an overview of some the most important areas covered.

General logistics

Conveying in internal logistics, warehousing and storage handling covers a wide spectrum of applications, such as electronics, chemicals, food, automotive and general manufacturing. All Motorized Pulleys in this catalogue are suitable for general logistics applications.

Food application

Rulmecca motorized pulleys are ultra-hygienic and easy to clean. All motorized pulleys for food processing comply with EC 1935-2004 and FDA.

Airport logistics

Airport applications, such as check-in conveyors, X-Ray machines and scanning equipment, require low noise and frequent start / stops. Most applications use friction drive belts made of PU, PVC or rubber.

Suitable motorized pulleys:

- Standard motorized pulleys with 4 or 6 poles offer low noise levels that are typically below 56 dB.
- Motorized pulleys with Lower noise levels can be supplied on request
- Baggage handling systems (138LS-320M)
- X-Ray and check-in conveyors (113LS-138LS)
- Lagging for standard belts to increase friction
- Backstops for inclined conveyors
- Brakes for holding the belt stationary
- Halogen-free cables available

Power calculation and selection of the Motorized Pulley for unit handling

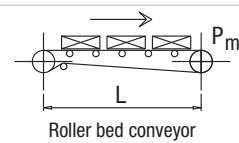
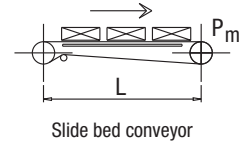
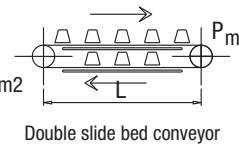
Calculation of the tangential force

- F = Tangential Force [N]. $F = F_0 + F_1 + F_2 + F_3$
 The tangential forces for motorized pulleys are given in the tables of the range of standard products
- 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]
- P_{m2} = Weight in Kg of the conveyed product on the return section, for each metre of length of the belt conveyor [kg/m]
- C_1 = Coefficient of friction between product and belt carrying side
- C_2 = Coefficient of friction between belt carrying side and slider bed
- C_3 = Coefficient of friction between return belt and product
- C_4 = Coefficient of friction between return belt side and slider bed
- L = Length of the conveyor in metres [m]
- H = Height difference in conveyor [m]
- F_0-F_3 = Force [N]

Coefficient of friction			
C_2 o C_4	Belt PE	Belt PP	Belt POM
Slide bed	0.30	0.15	0.10
Steel or stainless steel scroll plan slide bed	0.15	0.25	0.20

C_1 o C_3	Belt PE	Belt PP	Belt POM
Steel product	0.15	0.30	0.20
Glass product	0.15	0.15	0.15
Plastic product	0.10	0.15	0.15

Calculation of the tangential force

Conveying system	Force without load	Force to convey materials horizontally	Force to convey materials on incline	Accumulation
 Roller bed conveyor	$F_0 = 0.4 \cdot L \cdot (2P_n + P_{pr})$	$F_1 = 0.4 \cdot L \cdot P_{m1}$	$F_2 = 10 \cdot H \cdot P_{m1}$	$F_3 = 10 \cdot L \cdot P_{m1} \cdot C_1$
 Slide bed conveyor	$F_0 = 11 \cdot L \cdot P_n \cdot C_2$	$F_1 = 11 \cdot L \cdot P_{m1} \cdot C_2$	$F_2 = 10 \cdot H \cdot P_{m1}$	$F_3 = 10 \cdot L \cdot P_{m1} \cdot C_1$
 Double slide bed conveyor	$F_0 = 10 \cdot L \cdot P_n \cdot (C_2 + C_4)$	$F_1 = 10 \cdot L \cdot (P_{m1} \cdot C_2 + P_{m2} \cdot C_4)$	$F_2 = 10 \cdot H \cdot (P_{m1} - P_{m2})$	$F_3 = 10 \cdot L \cdot (P_{m1} \cdot C_1 + P_{m2} \cdot C_3)$



Required data for power calculation

Section A - Order detail

Motorized Pulley (TM)	Q.ty	Ø [mm]	Type	[kW]	Phase	Voltage [V]	[Hz]	[m/s]	RL [mm]	EL [mm]	AGL [mm]
Idler Pulley (UT)	Q.ty	Ø [mm]	Type						RL [mm]	EL [mm]	AGL [mm]
TM	UT	Note: please mark the required options with a cross					New EDP code:			Additional comments:	
		Terminal box stainless steel:				Terminal box aluminium:					
		Elbow connector stainless steel:				Elbow connector polyamide:					
		Straight connector stainless steel:				Straight connector brass:					
		Cable length [m]:				Cable type (screened/halogen free):					
		Insulation class:									
		Special certification:				CSA:		FDA:			
		Backstop:				Motor turning direction (at connection side):					
		Elektromagn. brake:				AC voltage to rectifier [V]:					
		Ø 80 - 220 RLmin + 50 mm				Fail safe unit:		Starts/Stops:			
		Special thermal controller:				(PTC):					
		Encoder option:		SKF:		RLS:		Special:			
		VFD-operation:				delivered with VFD:					
		Reversible operation:				Starts/Stops per hour:					
		Stainless steel option:									
		TS8N/TS10N:				TS7N/TS9N (with regreasable labyrinths):					
		Oil:		FDA:		Synthetic:					
		Special environmental condition - kind of aggressivity:									
		Temperature of material to be conveyed if higher than 70°C:									
		Ambient temperature if higher than 40°C or lower than - 25°C:									
		Special mounting vertical:				or with an angle of:		degrees			
		Cylindric shell:				Diameter (if special) [mm]:					
		Additional motor data plate required:									
		Special shell: (customer drawing has to be included)									
		Special shaft design: (customer drawing has to be included)				H [mm]:					
		F (key width) [mm]:		D [mm]:		K or C (flat length) [mm]:					
		Special end housings: (customer drawing has to be included)									
		Low noise requirements [dBA]:		dBA							
		Rubber lagging black/white/blue:				hot/cold vulcan.		Special:			
		Thickness of the lagging [mm]:									
		Special groove measurements: (customer drawing has to be included)									
		Groove type:		Groove dimens. [mm]:		Top:		Bottom:		Depth:	

Section B - Necessary details for power calculation

Type of conveyor:	Slider bed:	Roller bed:	Special:	Inclining/Declining:
Conveyor length [m]:		Load [kg/m]:	Belt width [mm]:	Belt material:
Belt type:		Belt thickness [mm]:	Belt manufacturer:	
Additional comments:				
Environmental conditions:				
Accessories:				

Oil types and contents



Motorized Pulley Oil type	IEC34 Insulation Class	Ambient Temp.	ISO 3498 DIN51519	DIN 51517	Castrol	BP	ESSO Mobil	Shell	Texaco	Fuchs
80LS Standard mineral	F	-5°C +40°C	CC ISOVG 68	CLP ISOVG 68	ALPHA SP 68	ENERGOL GR-XP 68	MOBILGEAR 600 XP 68	OMALA 68	MEROPA 68	
80LS Synthetic option	F & H	-25°C +40°C	CC ISOVG 68	CLP ISOVG 68	ALPHA SYN T 68		SHC 626 68			
80LS Synthetic food grade	F & H	-40°C +40°C	CC ISOVG 68	CLP ISOVG 68						CASSIDA FLUID HFS 68
113LS Standard mineral	F	-5°C +40°C	CC ISOVG 150	CLP ISOVG 150	ALPHA SP 150	ENERGOL GR-XP 150	MOBILGEAR 600 XP 150	OMALA 150	MEROPA 150	
113LS Synthetic option	F & H	-25°C +40°C	CC ISOVG 150	CLP ISOVG 150	ALPHA SYN T 150		SHC 629 150			
113LS Synthetic food grade	F & H	-30°C +40°C	CC ISOVG 150	CLP ISOVG 150						CASSIDA GL150
138LS - 320H Standard mineral	F	-5°C +40°C	CC ISOVG 150	CLP ISOVG 150	ALPHA SP 150	ENERGOL GR-XP 150	MOBILGEAR 600 XP 150	OMALA 150	MEROPA 150	
138LS - 320H Synthetic option	F & H	-25°C +40°C	CC ISOVG 220	CLP ISOVG 220	ALPHA SYN T 220		SHC 630 220			
138LS - 320H Synthetic food grade	F & H	-30°C +40°C	CC ISOVG 220	CLP ISOVG 220						CASSIDA GL220

Oil contents in litres for vertical mounting regardless of drum width		
	Litres	Special construction
Ø 80	0.2	} Electrical connection to be located at the top
Ø 113	0.6	
Ø 138	1,4	
Ø 165	3.0	
Ø 220	10	
Ø 320	25	

Note: The given oil contents are valid for standard unlagged drum motors only.
For special options the oil quantity can deviate. Therefore always use the given oil quantity shown on the data plate.



Oil types and contents

RL	80LS	113LS	138LS	165LS	220M & 220H		320L 0.75 - 4.0kW	320M & 320H		
					0.37 - 0.55kW 1.1-1.5kW	0.75kW 2.2-5.5kW		0.75 - 3.0kW	4.0 - 5.5kW	7.5 - 11.0kW
200	0,10									
250	0,14	0,32								
300	0,18	0,43	0,7							
350	0,22	0,54	0,9	1,2						
400	0,26	0,65	1,1	1,4	3,00		6,5			
450	0,30	0,76	1,3	1,6	3,50	4,00	7,0			
500	0,34	0,87	1,5	1,8	4,00	5,00	7,5	3,50	8,0	10,0
550	0,38	0,98	1,8	2,0	4,25	5,25	8,0	3,75	8,5	10,5
600	0,42	1,09	2,0	2,3	4,50	5,50	9,0	4,00	9,0	11,0
650	0,46	1,20	2,2	2,5	4,75	5,75	9,5	4,25	9,5	12,0
700	0,50	1,31	2,4	2,7	5,00	6,00	10,0	4,50	10,0	13,0
750	0,54	1,42	2,6	2,9	5,25	6,25	10,5	5,00	10,5	13,5
800	0,58	1,53	2,8	3,1	5,50	6,50	11,0	5,50	11,0	14,0
850	0,62	1,64	3,0	3,3	5,75	6,75	11,5	5,75	11,5	15,0
900	0,66	1,75	3,2	3,5	6,00	7,00	12,5	6,00	12,0	16,0
950	0,70	1,86	3,4	3,7	6,25	7,25	13,0	6,25	13,0	17,0
1000	0,74	1,97	3,7	3,9	6,50	7,50	14,0	6,50	14,0	18,0
1050		2,08	3,8	4,1	6,75	7,75	14,5	6,75	14,5	18,5
1100		2,19	4,0	4,4	7,00	8,00	15,0	7,00	15,0	19,0
1150		2,30	4,2	4,6	7,25	8,25	16,5	7,50	16,5	20,5
1200		2,41	4,4	4,8	7,50	8,50	18,0	8,00	18,0	23,0
1250			4,6	5,0	7,75	8,75	19,0	8,50	19,0	24,0
1300			4,8	5,2	8,00	9,00	20,0	9,00	20,0	25,0
1350			5,0	5,4	8,25	9,25	21,0	9,50	21,0	26,5
1400			5,1	5,6	8,50	9,50	22,0	10,00	22,0	28,0
1450			5,3	5,8	8,75	9,75	23,0	10,50	23,0	29,0
1500			4,8	6,0	9,00	10,00	24,0	11,00	24,0	30,0
1550			5,0	5,8	9,25	10,25	25,0	12,00	25,0	31,5
1600			5,1	6,0	9,50	10,50	26,0	13,00	26,0	33,0
1650			5,3	6,2	10,00	11,00	27,0	14,00	27,0	34,0
1700			5,5	6,4	11,50	11,50	28,0	15,00	28,0	35,0
1750			5,6	6,6	12,00	12,00	29,0	16,00	29,0	36,0
1800			5,8	6,8	13,00	13,00	30,0	17,00	30,0	37,0
1850			5,9	7,0	13,50	13,50	30,5	18,00	30,5	38,5
1900				7,1	14,00	14,00	31,0	19,00	31,0	40,0
1950				7,3	15,50	14,50	31,5	20,00	31,5	40,5
2000				7,5	15,00	15,00	32,0	21,00	32,0	41,0

80LP-113LP Connection diagrams



Connection diagrams for Motorized Pulley cable connection 80LP - 113LP

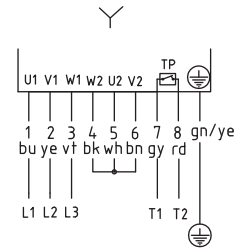
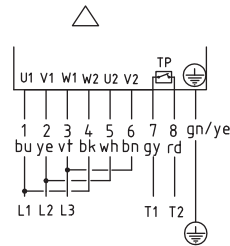
Colors or lead numbers for standard turning direction clockwise.
(lead numbers for screened cable)

TP - Thermal protector T1 & T2

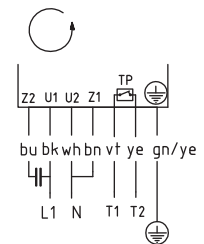
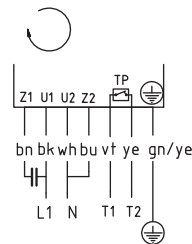
Color code

- gn - green
- ye - yellow
- bu - blue
- bn - brown
- vt - violette
- bk - black
- wh - white
- rd - red
- gy - grey

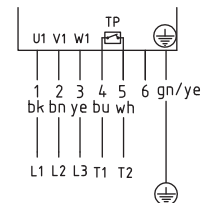
3-Ph motor
dual voltage
with TP



1-Ph motor
with TP



3-Ph motor
single voltage
with TP &
6 leads



Lead 6 not used



80LS-165LS Connection diagrams

Connection diagrams for Motorized Pulley cable connection 80LS - 165LS ELB - only single voltage

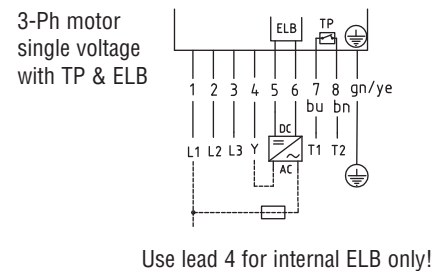
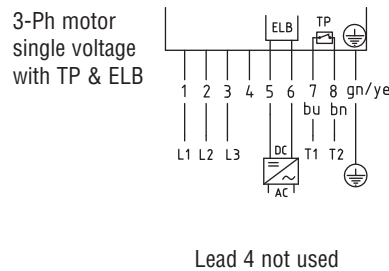
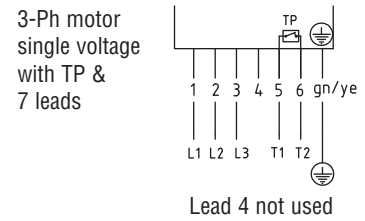
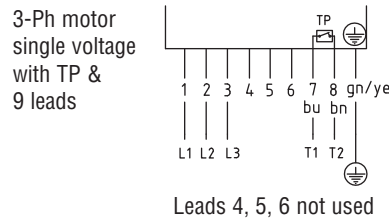
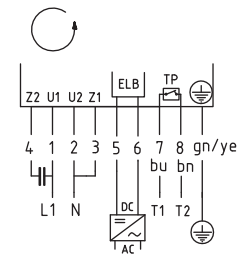
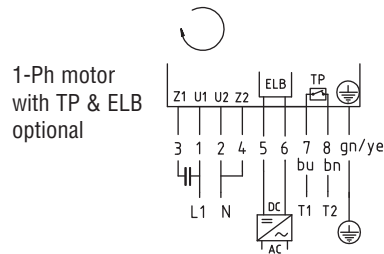
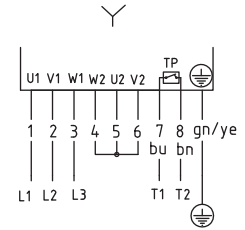
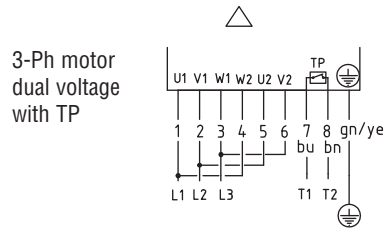
Lead numbers for standard turning direction clockwise.

TP - Thermal protector T1 & T2

ELB - Electromagnetic brake B1 & B2

Color code

- gn - green
- ye - yellow
- bu - blue
- bn - brown



113LS Connection diagrams



Connection diagrams for Motorized Pulley Terminal box with WAGO clamp 113LS (ELB only single voltage)

Characters in brackets for 2 stage gearbox
turning direction clockwise.

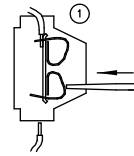
TP - Thermal protector T1 & T2

ELB - Electromagnetic brake B1 & B2

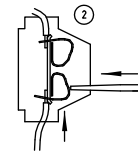
Color code

- RD - Red
- BN - Brown
- BK - Black
- GY - Grey
- BU - Blue
- VT - Violet
- WH - White

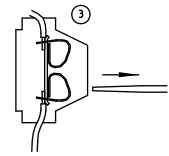
Assembly instruction



Push down clamp

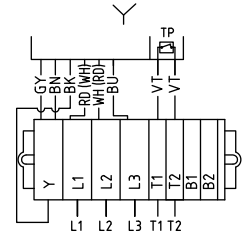
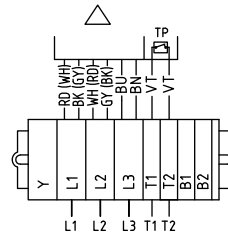


Push in cable

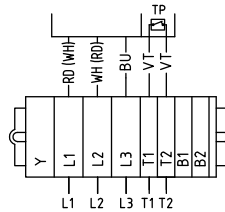


Release clamp

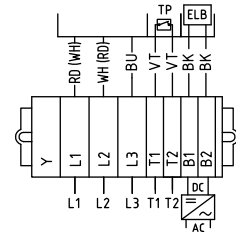
3-Ph motor
dual voltage
with TP



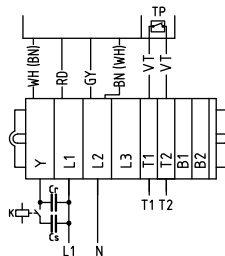
3-Ph motor
single voltage
with TP



3-Ph motor
single voltage
with TP & ELB

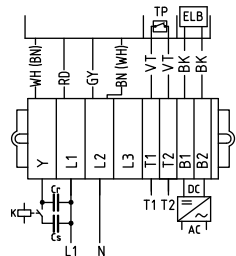


1-Ph motor
with TP



Cr - Run capacitor
Cs - Start capacitor

1-Ph motor
with TP & ELB



Cr - Run capacitor
Cs - Start capacitor

Connection diagrams for Motorized Pulley Terminal box with WAGO clamp 138LS - 400L (138LS - ELB only single voltage)

Characters in brackets for 2 stage gearbox turning direction clockwise.

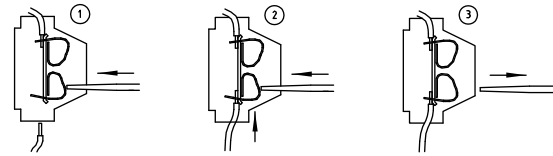
TP - Thermal protector T1 & T2

ELB - Electromagnetic brake B1 & B2

Color code

RD - Red
YE - Yellow
BK - Black
GY - Grey
BU - Blue
GN - Green
WH - White
BN - Brown

Assembly instruction

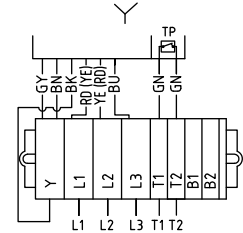
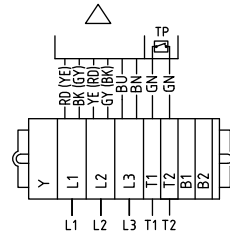


Push down clamp

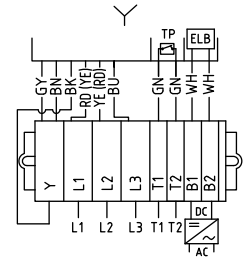
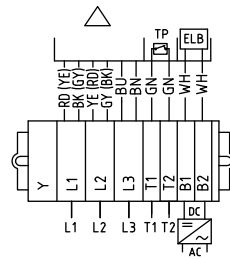
Push in cable

Release clamp

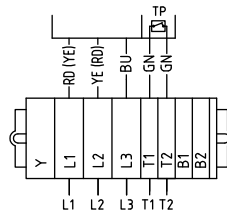
3-Ph motor
dual voltage
with TP



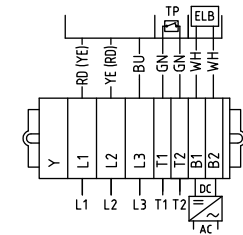
3-Ph motor
dual voltage
with TP & ELB



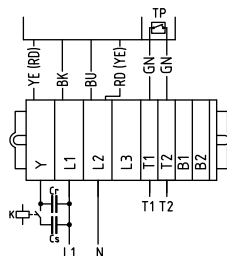
3-Ph motor
single voltage
with TP



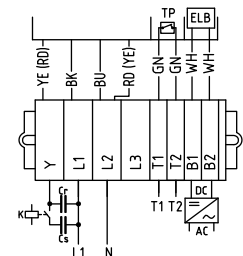
3-Ph motor
single voltage
with TP & ELB



1-Ph motor
with TP



1-Ph motor
with TP & ELB



Cr - Run capacitor
Cs - Start capacitor

Cr - Run capacitor
Cs - Start capacitor

220M - 400L Connection diagrams



Connection diagrams for Motorized Pulley Cable connection 220M - 400L

Lead numbers for turning direction clockwise.

TP - Thermal protector T1 & T2

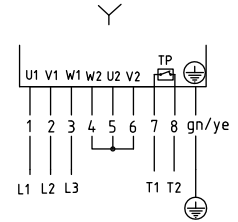
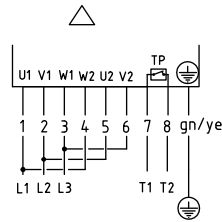
ELB - Electromagnetic brake

Color code

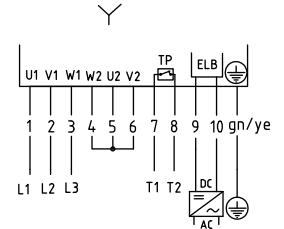
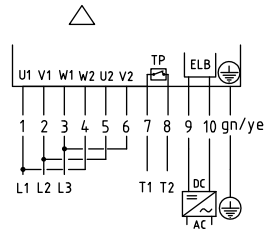
GN - Green

YE - Yellow

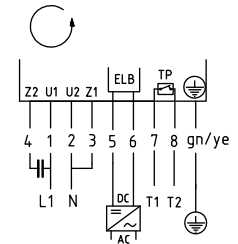
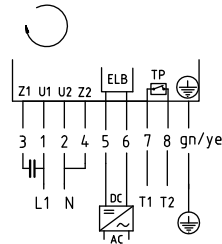
3-Ph motor
dual voltage
with TP



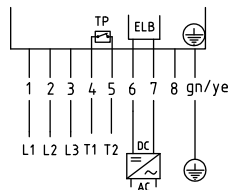
3-Ph motor
dual voltage
with TP & ELB



1-Ph motor
with TP & ELB
optional

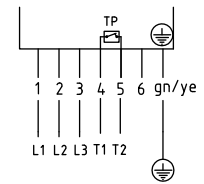


3-Ph motor
single voltage
with TP & ELB



Lead 8 not used

3-Ph motor
single voltage
with TP

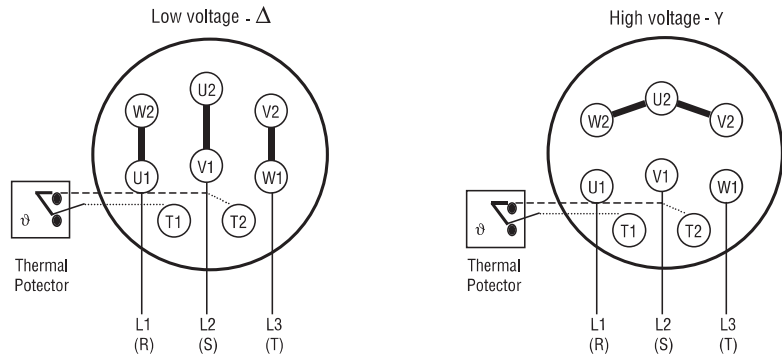


Lead 6 not used

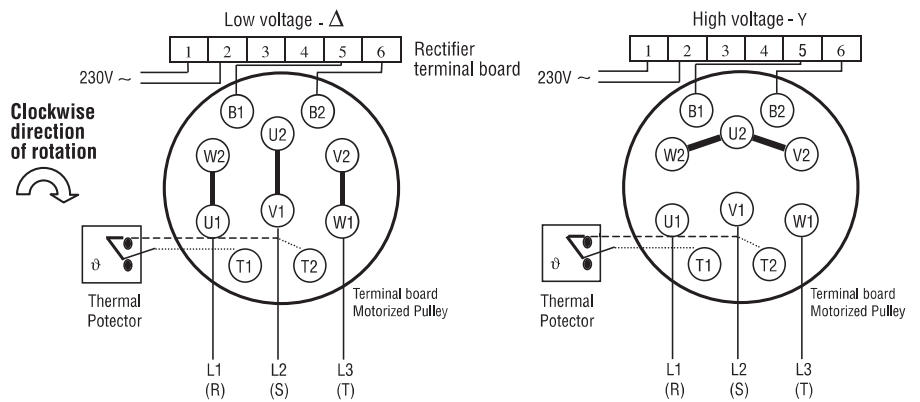


External Connection Diagrams for Motorized Pulleys 5.5 kW - 7.5 kW

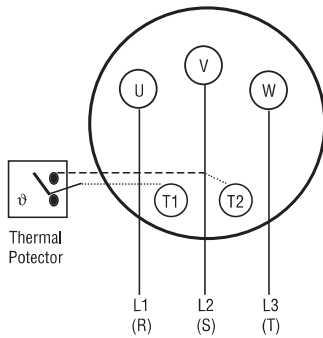
**Terminal Box
5.5 kW - 7.5 kW**



Electromagnetic Brake Configuration



**3-phase single voltage
5.5 kW - 7.5 kW**



USA - Configuration

