



## PULSE ROLLER

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# PULSE ROLLER

— GLOBAL MOTOR ROLLER TECHNOLOGIES —



PRODUCT CATALOG

**DC24V**  
Powered

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# Drives Overview



# SENERGY

## SENERGY / SENERGY-Ai



Product type	Motor Roller
Rated voltage	DC24V
Output	50W (Max)
Conveyor speed	2.0 – 304.1 m/min (50.0 mm diameter)

## PGD / PGD-Ai



Product type	Geared Drive
Rated voltage	DC24V
Output	50W (Max)
Rotational speed	8.5 - 645.3 rpm (Output shaft)

## Pallet / Pallet-Ai



Product type	Motor Roller
Rated voltage	DC24V
Output	50W (Max)
Conveyor speed	3.1 – 34.6 m/min (76.3 mm diameter)

## Introduction



## SENERGY

The SENERGY unique gearbox design and powerful brushless DC motor provides an extremely efficient means of delivering an amazing amount of torque and speed with the smallest amount of energy. Typically used in conveyors for Zero Pressure Accumulation or roller transportation. SENERGY Roller gearbox selection contains only 11 gearbox combinations to make ordering and keeping an inventory much more manageable. SENERGY's range and performance characteristics are suitable for speeds between 2.0 to 304.1 m/min and starting torque up to an amazing 24.2 N·m.

Regardless of the project, type of conveyor, the weight or speed of the load you really only need one type of roller. SENERGY.

## SENERGY-Ai

SENERGY-Ai is the world's first motor roller using a robust M8-4pin connector which is then connected to an external control of your choice. The hall-effect signals are digitally coded by a micro controller inside the motor, which makes it possible to communicate through only one pin to an external controller. The micro controller also digitally provides through the same pin complete roller part number containing the diameter and gearbox information, serial number, motor temperature and other information. The external control can read and analyze all this data for multiple functions such as precise speed and positioning control, full diagnostics such as over-temp, over-current, over-voltage and much more to help with predictive maintenance.

Drives

# SENERGY / SENERGY-Ai



## Product information

### General information

- CE certified, RoHS compliant, IP54 rating
- ETL certified to UL standards
- Tube material: Mild steel, zinc plating / Stainless steel (SUS304)
- Roller diameter: 48.6 mm, 50.0 mm  
57.0 mm, 60.5 mm
- Min. roller length: Refer to the "Available minimum roller length table" below
- Max. roller length: 1000 mm \*Contact us for longer than 1000 mm.
- Cable length: 600 mm (SENERGY) / 1000 mm (SENERGY-Ai)  
\*Contact us for extension cables
- Motor connector: JST (SENERGY) / M8-4pin (SENERGY-Ai)
- Operation: 0.5 sec ON / 0.5 sec OFF duty cycle (Minimum)  
or continuous within rated load

Compatible Control Technologies



### Technical data

	ECO mode	BOOST mode	BOOST-8 mode
Voltage	DC24V		
Nominal output	40W	50W	50W
Rated current	2.5A	3.5A	3.5A
Starting current	3.0A	5.0A	8.0A
Ambient temperature	-10 ~ 40°C		
Ambient humidity	10 ~ 90% RH (No condensation)		

### Available minimum roller length

Roller diameter	Speed Code	Interlocking option		
		Plain straight	Micro V-pulley	Round Groove
SENERGY 48.6 / 50.0	15, 20, 25	325	318	357
	35, 45, 60, 75	301	294	333
	95, 125, 175, 215	274	267	306
SENERGY-Ai 48.6 / 50.0	15, 20, 25	331	324	363
	35, 45, 60, 75	307	300	339
	95, 125, 175, 215	280	273	312

Unit: mm

\*We support shorter length than those listed above using specially made components. Contact us for more details.

### Weight table

Diameter	Speed code	Roller length							
		300	400	500	600	700	800	900	1000
φ48.6	15, 20, 25	2.0	2.1	2.3	2.5	2.6	2.8	2.9	3.1
	35, 45, 60, 75	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9
	95, 125, 175, 215	1.7	1.8	2.0	2.1	2.3	2.5	2.6	2.8
φ50	15, 20, 25	2.0	2.2	2.4	2.5	2.7	2.9	3.0	3.2
	35, 45, 60, 75	1.8	2.0	2.2	2.4	2.5	2.7	2.9	3.0
	95, 125, 175, 215	1.7	1.9	2.0	2.2	2.4	2.6	2.7	2.9
φ57	15, 20, 25	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8
	35, 45, 60, 75	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6
	95, 125, 175, 215	2.1	2.3	2.5	2.7	2.8	3.0	3.2	3.4
φ60.5	15, 20, 25	3.1	3.6	4.0	4.5	4.9	5.3	5.8	6.2
	35, 45, 60, 75	2.9	3.4	3.8	4.3	4.7	5.2	5.6	6.1
	95, 125, 175, 215	2.8	3.2	3.7	4.1	4.6	5.0	5.5	5.9

\*Above values are only approximate. Contact us for more details. Unit: kg

### Wall thickness

Diameter	48.6	50.0	57.0	60.5
Thickness	1.4	1.5	1.5	3.25

Unit: mm

### Static load capacity

Diameter	Length	300	400	500	600	700	800	900	1000
		48.6	70	60	50	40	35	30	25
50.0	80	70	60	55	50	45	40	35	
57.0	100	100	80	80	60	60	50	50	
60.5	160	160	130	130	100	100	80	80	

Unit: kg

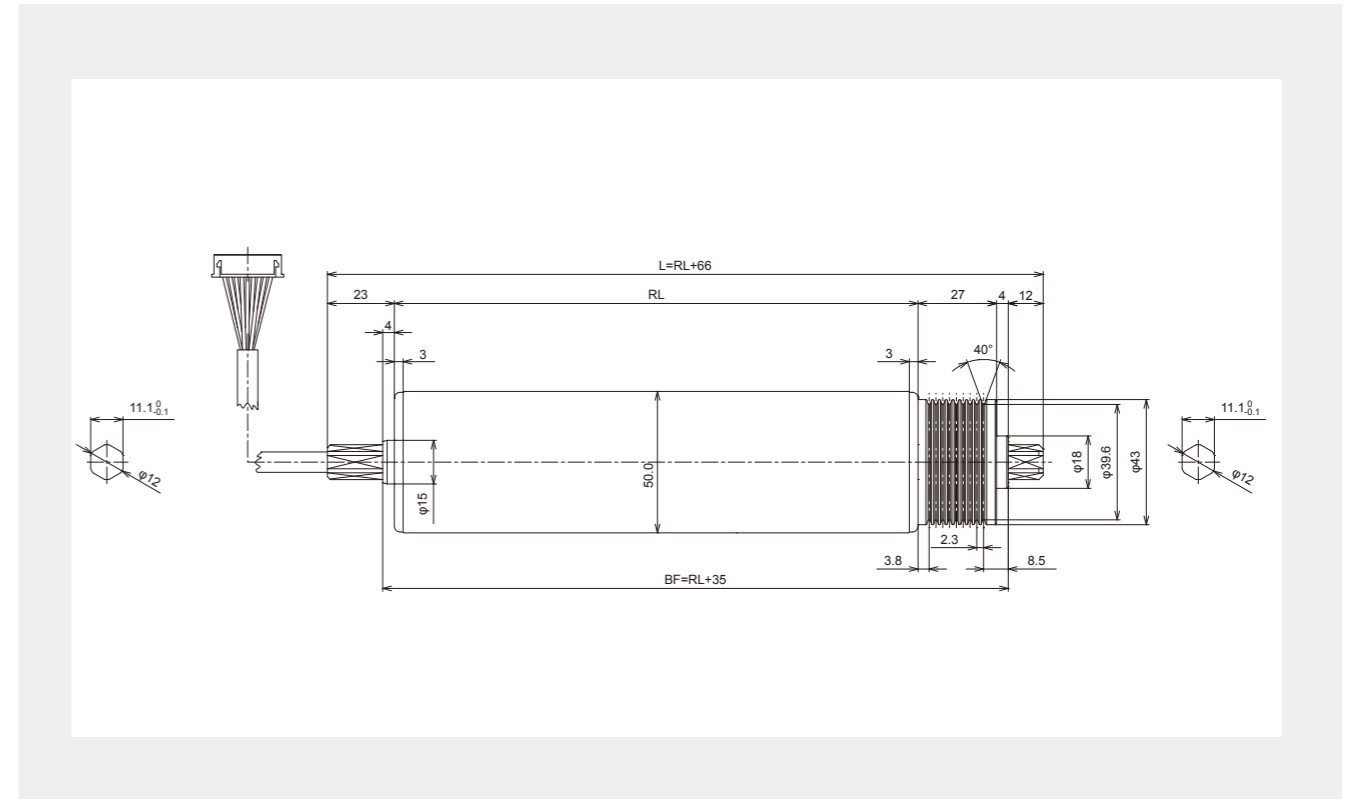
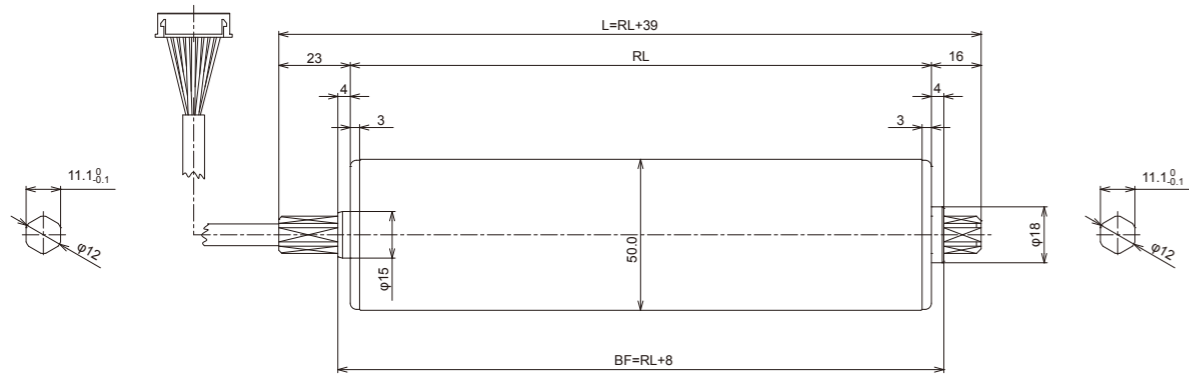
Drives

# SENERGY / SENERGY-Ai

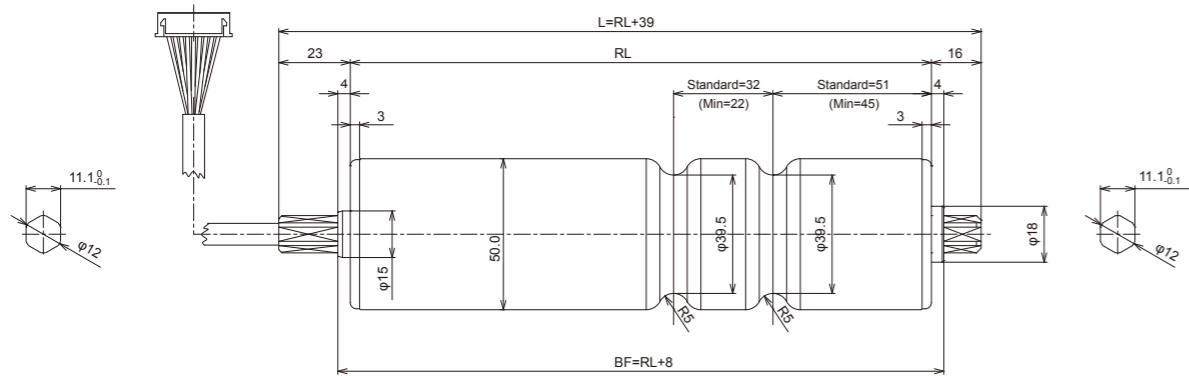


Dimensions (Metric)

Plain straight

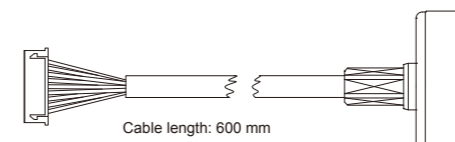


Round Groove

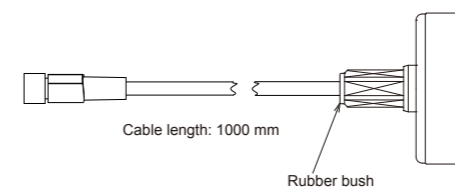


Connector versions

SENERGY JST



SENERGY-Ai M8-4pin





Drives

# SENERGY / SENERGY-Ai

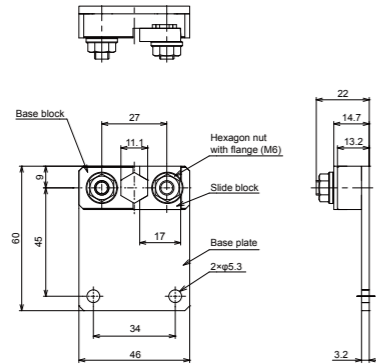


### Bracket

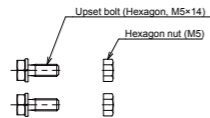
Standard accessory  
(Cable side)

PR-D-30H-PU-N  
(Point-up)

PR-D-30H-FU-N  
(Flat-up)



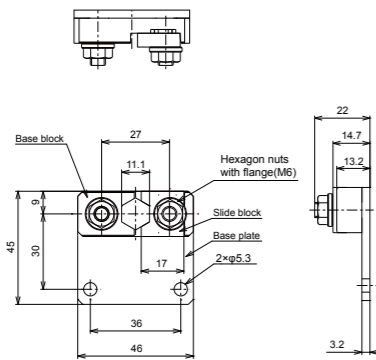
\*Drawing above depicts Point-up



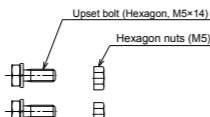
\*Note Tightening torque (M6) : 8 ~10 N-m  
Tightening torque (M5) : 2.3 ~3.5 N-m

PR-D-30H-PU-N-ST  
(Point-up)

PR-D-30H-FU-N-ST  
(Flat-up)



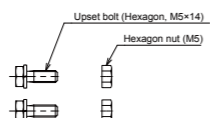
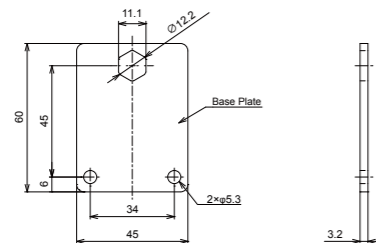
\*Drawing above depicts Point-up



\*Note Tightening torque (M6) : 8 ~10 N-m  
Tightening torque (M5) : 2.3 ~3.5 N-m

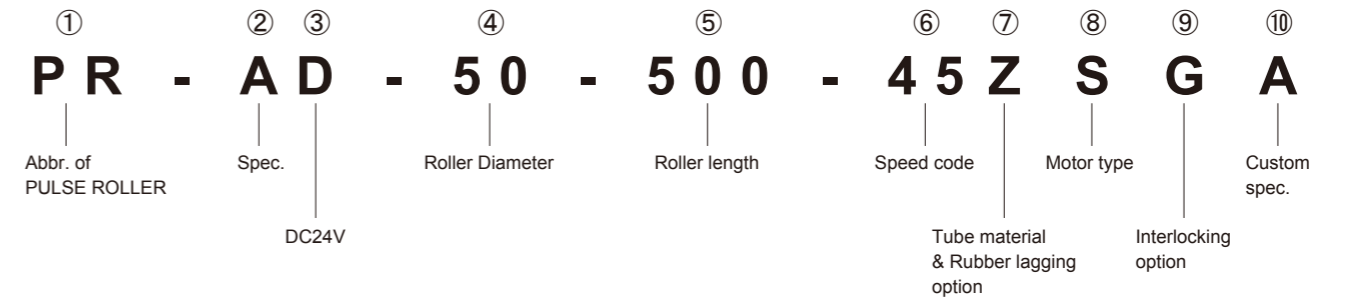
Optional accessory  
(Non-Cable side)

\*Flat up is not available



\*Note Tightening torque (M5) : 2.3 ~3.5 N-m

### Part number definition



② Spec.

- A** --- Standard
- B** --- Built-in brake
- W** --- Wash-down rated (IP-66)
- Z** --- Freezer spec. (-30°C)

④ Roller Diameter

- 48** ---φ48.6
- 50** ---φ50.0
- 57** ---φ57.0
- 60** ---φ60.5

⑤ Roller length

Dimension RL (Unit: mm) \*Available for every 1 mm unit

⑥ Speed code

Selection of speed range \*See Characteristics data table for available speed codes.

⑦ Tube material & Rubber lagging option

- Z** --- Steel, Zinc plating, No lagging \*Z is standard for Dia. 48.6 and 50.
- A** --- Steel, Unichrome plating, No lagging \*A is standard for Wash-down rated and Dia. 57 & 60.5.
- J** --- Stainless tube
- B** --- 3 mm Black rubber lagging
- W** --- 3 mm Urethane lagging
- Y** --- Special

⑧ Motor type

- S** ---SENERGY (JST connector)
- M** --- SENERGY-Ai (M8-4pin connector, ETL)

⑨ Interlocking option

- A** --- Plain straight, No interlocking
- G** --- Round groove
- H** --- Micro V-pulley (Poly vee)
- D** --- Dual sprockets
- Y** --- Special

\* Special interlocking options are also available. For more details, please contact us.

⑩ Custom spec.

- A** --- Standard
- Y** --- Special

# Drives

# SENERGY / SENERGY-Ai



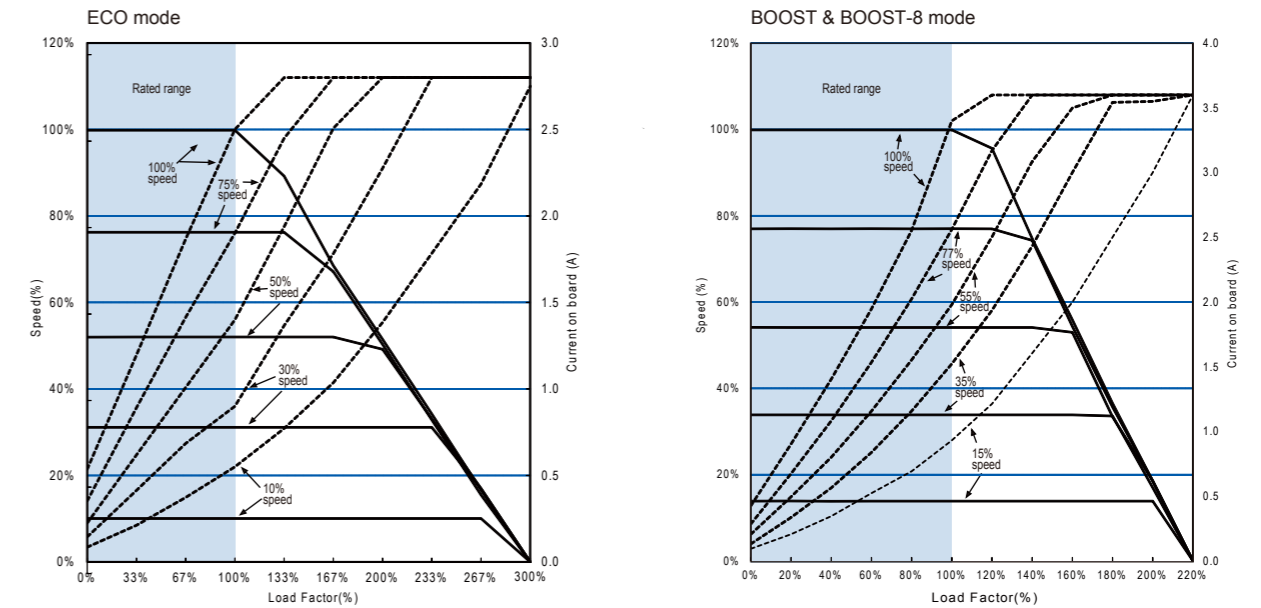
## Characteristics data

Roller Dia: 50.0

Speed Code	Gear box	Reduction Ratio	ECO-mode						BOOST & BOOST-8 mode										
			Speed (m/min)	Torque(N-m)		Tangential force(N)		Current (A)		Speed (M/min)	Torque(N-m)			Tangential force(N)			Current (A)		
				Rated	Starting	Rated	Starting	Rated (max)	Starting		Rated	BOOST Starting	BOOST-8 Starting	Rated	BOOST Starting	BOOST-8 Starting	Rated (max)	BOOST Starting	BOOST-8 Starting
15	3 stage	45.00	2.0 ~ 20.3	2.97	16.39	118.8	655.7	2.5	3.0	2.0 ~ 14.7	5.40	21.37	24.30	216.0	855.0	972.0	3.5	5.0	8.0
20		32.999...	2.7 ~ 22.7	2.17	12.00	86.9	480.0			2.7 ~ 20.0	3.95	15.64	17.78	158.1	625.8	711.5			
25		27.00	3.4 ~ 33.8	1.78	9.83	71.2	393.4			3.4 ~ 24.4	3.24	12.82	14.58	129.6	513.0	583.2			
35	2 stage	18.333...	4.9 ~ 49.9	1.20	6.66	48.3	266.6	4.9 ~ 36.1	2.19	8.69	9.88	87.8	347.7	395.2					
45		15.00	6.0 ~ 60.8	0.99	5.46	39.6	218.5	6.0 ~ 44.0	1.80	7.12	8.10	72.0	285.0	324.0					
60		10.999...	8.2 ~ 83.1	0.72	4.00	28.9	160.0	8.2 ~ 60.1	1.31	5.21	5.92	52.7	208.6	237.1					
75	1 stage	9.00	10.1 ~ 101.4	0.59	3.27	23.7	131.1	10.1 ~ 73.3	1.08	4.27	4.86	43.2	171.0	194.4					
95		6.8181...	13.3 ~ 133.8	0.44	2.48	17.9	99.3	13.3 ~ 96.8	0.81	3.23	3.68	32.7	129.5	147.2					
125		5.00	18.1 ~ 182.5	0.33	1.82	13.2	72.8	18.1 ~ 131.9	0.60	2.37	2.70	24.0	95.0	108.0					
175	1 stage	3.666...	24.7 ~ 249.3	0.24	1.33	9.6	53.3	24.7 ~ 180.3	0.43	1.73	1.97	17.5	69.5	79.0					
215		3.00	30.2 ~ 304.1	0.19	1.09	7.9	43.7	30.2 ~ 219.9	0.36	1.42	1.62	14.4	57.0	64.8					

\*Rated torque and rated tangential force of BOOST-8 are the same values as BOOST.  
 \*BOOST-8 performance is available with EZ-24HTB and ConveyLinX HTF card only.

## Characteristics chart





# Drives

## SENERGY / SENERGY-Ai

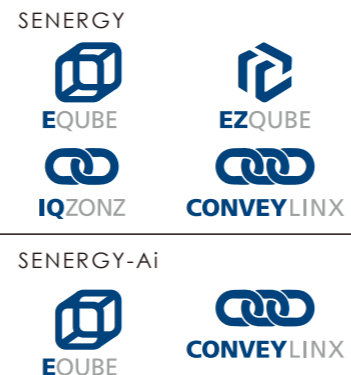


### Optional spec.

#### Wash-down rated

- IP rating: IP-66
- Material: All stainless made (Tube: SUS304, Side plate and shaft: SUS303)
- Roller diameter: 48.6 mm, 50.0 mm  
57.0 mm, 60.5 mm
- Min. roller length: Refer to the "Available minimum roller length table" below.
- Max. roller length: 1000 mm \*Contact us for longer than 1000 mm.
- Cable length: 600 mm (SENERGY) / 1000mm (SENERGY-Ai)  
\*Contact us for extension cables
- Motor connector: JST (SENERGY) / M8-4pin (SENERGY-Ai)
- Operation: 0.5 sec ON / 0.5 sec OFF duty cycle (Minimum)  
or continuous within rated load

#### Compatible Control Technologies



### Part number definition

PR - WD - 50 - 500 - 45 A S A A

Spec.  
W for Wash-down

Tube material & Rubber lagging option  
A is standard for Wash-down rated.

### Available minimum roller length

Motor type	Speed Code	Interlocking option		
		Plain straight	Micro V-pulley	Round Groove
SENERGY 48.6 / 50.0	15, 20, 25	368	352	382
	35, 45, 60, 75	344	328	358
	95, 125, 175, 215	317	301	331
SENERGY-Ai 48.6 / 50.0	15, 20, 25	348	332	362
	35, 45, 60, 75	324	308	338
	95, 125, 175, 215	297	281	311

Unit: mm

\*We support shorter length than those listed above using specially made components. Contact us for more details.

### Optional spec.

#### Built-in Brake

- Brake: Electromagnetic brake
- Roller diameter: 48.6 mm, 50.0 mm  
57.0 mm, 60.5 mm
- Min. roller length: Refer to the "Available minimum roller length" table below.
- Max. roller length: 1000 mm \*Contact us for longer than 1000 mm.
- Cable length: 600 mm \*Contact us for extension cables
- Operation: 0.5 sec ON / 0.5 sec OFF duty cycle (Minimum)  
or continuous within rated load

-Note: Not available with SENERGY-Ai

#### Compatible Control Technologies



\*1 Only EZ-24HTB and EZ-24HTBS are capable for brake control in EZ-24 series.

### Part number definition

PR - BD - 50 - 500 - 45 Z S A A

Spec.  
B for Built-in Brake

### Available minimum roller length

Motor type	Speed Code	Interlocking option				
		Plain straight	Micro V-pulley	V-pulley	Round Groove	Sprocket
SENERGY 48.6 / 50.0	15, 20, 25	394	387	394	426	399
	35, 45, 60, 75	371	364	371	403	376
	95, 125, 175, 215	343	336	343	376	348

Unit: mm

\*We support shorter length than those listed above using specially made components. Contact us for more details.

### Holding torque

Speed code	15	20	25	35	45	60	75	95	125	175	215
Holding torque	11.2	8.2	6.7	4.5	3.7	2.7	2.2	1.7	1.2	0.9	0.7

Unit: N-m

# Drives

# SENERGY / SENERGY-Ai



## Optional spec.

### Freezer rated

- Applicable Temp: From 0°C down to -30°C (No condensation)
- Tube material: Mild steel, zinc plating / Stainless steel (SUS304)
- Side plate material: Aluminium
- Roller diameter: 48.6 mm, 50.0 mm  
57.0 mm, 60.5 mm
- Min. roller length: Refer to the "Available minimum roller length table" below
- Max. roller length: 1000 mm \*Contact us for longer than 1000 mm.
- Cable length: 600 mm \*Contact us for extension cables
- Operation: 0.5 sec ON / 0.5 sec OFF duty cycle (Minimum)  
or continuous within rated load

**-Note:** Not available with SENERGY-Ai

### Compatible Control Technologies



\*1 Only ConveyLinXHTF is capable for freezer application in ConveyLinX series.

## Part number definition

**PR - ZD - 50 - 500 - 45 Z S A A**

|  
Spec.  
Z for Freezer rated.

## Available minimum roller length

Roller diameter	Speed Code	Interlocking option		
		Plain straight	Micro V-pulley	Round Groove
SENERGY 48.6 / 50.0	15, 20, 25	326	311	357
	35, 45, 60, 75	302	287	333
	95, 125, 175, 215	275	260	306

Unit: mm

\*We support shorter length than those listed above using specially made components. Contact us for more details.

# Drives

## PGD / PGD-Ai -Pulse Geared Drive-



### Product information

#### General information

- CE certified, RoHS compliant, IP54 rating
- ETL certified to UL standards
- Mounting: M5 x 7 mm
- Shaft diameter: 16 mm
- Key: 5 x 5 x 25 mm
- Cable length: 600 mm (SENERGY motor) / 1000 mm (SENERGY-Ai motor)  
\*Contact us for extension cables
- Motor connector: JST (SENERGY motor) / M8-4pin (SENERGY-Ai motor)
- Operation: 0.5 sec ON / 0.5 sec OFF duty cycle (Minimum)  
or continuous within rated load

#### Compatible Control Technologies

SENERGY motor



SENERGY-Ai motor



### Characteristics data

Nominal Gear ratio	Actual Gear ratio	Gear box	ECO mode				BOOST & BOOST-8 mode							
			Output shaft Speed (rpm)	Torque(N-m)		Current (A)		Output shaft Speed (rpm)	Torque(N-m)			Current (A)		
				Rated	Starting	Rated (max)	Starting		Rated	BOOST Starting	BOOST-8 Starting	Rated (max)	BOOST Starting	BOOST-8 Starting
67	67.222...	3 stage	8.5 ~ 86.7	4.4	24.4	2.5	3.0	8.5 ~ 62.7	8.03	31.81	36.1	3.5	5.0	8.0
45	45.00		12.8 ~ 129.0	2.97	16.39			12.8 ~ 93.3	5.40	21.37	24.3			
33	32.999...		17.4 ~ 176.3	2.17	12.00			17.4 ~ 127.5	3.95	15.64	17.7			
27	27.00		21.3 ~ 215.1	1.78	9.83			21.3 ~ 155.5	3.24	12.82	14.5			
18	18.333...	2 stage	31.4 ~ 317.3	1.20	6.66	2.5	3.0	31.4 ~ 229.5	2.19	8.69	9.8	3.5	5.0	8.0
15	15.00		38.4 ~ 387.2	0.99	5.46			38.4 ~ 280.0	1.80	7.12	8.1			
11	10.999...		52.4 ~ 528.9	0.72	4.00			52.4 ~ 382.5	1.31	5.21	5.9			
9	9.00		64.0 ~ 645.3	0.59	3.27			64.0 ~ 466.6	1.08	4.27	3.6			

\*Rated torque of BOOST-8 is the same values as BOOST.

\*BOOST-8 mode is available only with the "High torque" series of EZ24 (EZ24HTB) and ConveyLinX (ConveyLinX HTF).

### Technical data

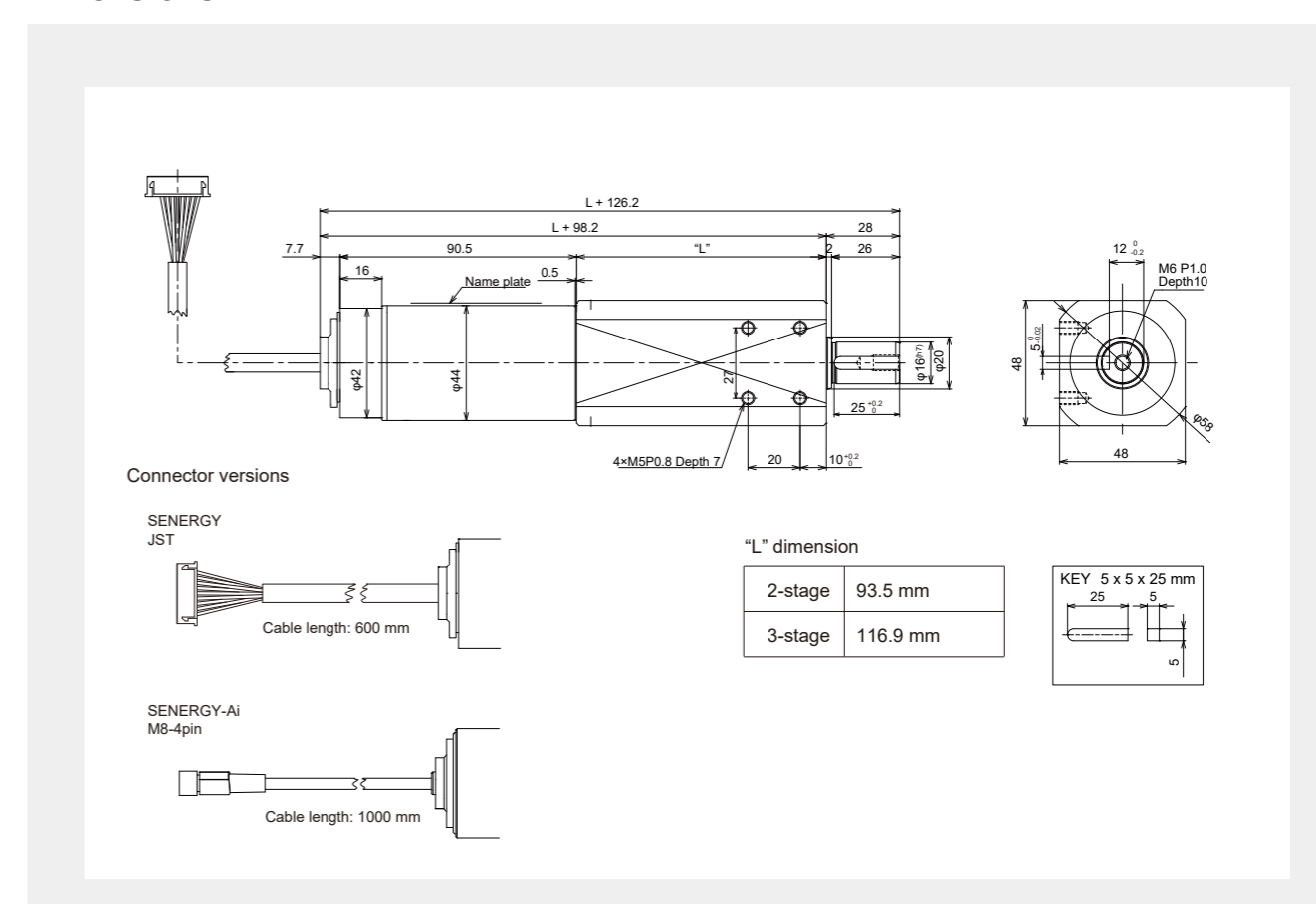
	ECO mode	BOOST mode	BOOST-8 mode
Voltage	DC24V		
Nominal output	40W	50W	50W
Rated current	2.5A	3.5A	3.5A
Starting current	3.0A	5.0A	8.0A
Ambient temperature	-10 ~ 40°C (No condensation)		
Ambient humidity	10 ~ 90% RH (No condensation)		

### Weight table

Gear box	Reduction ratio	Weight
3 stage	67, 45, 33, 27	1.5
2 stage	18, 15, 11, 9	1.2

Unit: kg

### Dimensions (Metric)

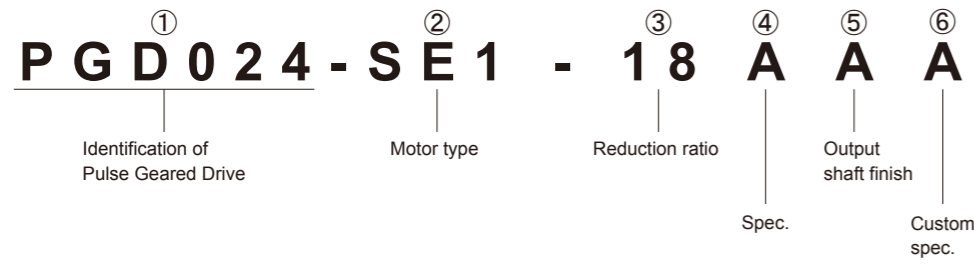


# Drives

## PGD / PGD-Ai -Pulse Geared Drive-



### Part number definition



② Motor type

**SE1** --- PGD (JST connector)

**SE2** --- PGD-Ai (M8-4pin connector, ETL)

③ Reduction ratio

Selection of gear ratio \*See Characteristics data table for available gear ratios.

④ Spec.

**A** --- Standard

⑤ Output shaft finish

**A** --- Standard key-way shaft (No attachment)

**H** --- With Micro V-pulley (Poly vee) Hub

⑥ Custom spec.

**A** --- Standard

**Y** --- Special

# Drives

# Pallet / Pallet-Ai



## Product information

### General information

- CE certified, RoHS compliant, IP54 rating
- ETL certified to UL standards
- Tube material: Mild steel, zinc plating / Stainless steel (SUS304)
- Roller diameter: 60.5 mm, 76.3 mm
- Min. tube length: 450 mm
- Max. tube length: 1800 mm
- Cable length: 500 mm (Pallet) / 900 mm (Pallet-Ai)  
\*Contact us for extension cables
- Motor connector: JST (Pallet) / M8-4pin (Pallet-Ai)
- Operation: 1.0 sec ON / 1.0 sec OFF duty cycle (Minimum)  
or continuous within rated load

#### Compatible Control Technologies

SENERGY



\*1 \*2 Use high torque version of respective cards, EZ-24HTB or ConveyLinXHTF for pallet handling application.

SENERGY-Ai



### Wall thickness

Diameter	60.5	63.5
Thickness	3.25	3.00

Unit: mm

### Static load capacity

Diameter (mm)	Roller length (mm)										
	500	600	700	800	900	1000	1100	1200	1300	1400	1500
60.5	300	280	250	220	190	150	120	90	60	50	40
76.3	300	300	300	280	250	220	190	160	130	100	70

\* Unit: kg

### Technical data

Voltage	DC24V
Nominal output	50W
Rated current	3.5A
Starting current	8.0A (Boost 8 mode with EZ-24HTB card)
Ambient temperature	-10 ~ 40°C
Ambient humidity	10~90% RH (No condensation)

### Weight table

Diameter (mm)	Roller length (mm)										
	500	600	700	800	900	1000	1100	1200	1300	1400	1500
60.5	8.1	8.6	9.0	9.5	9.9	10.4	10.8	11.2	11.7	12.1	12.6
76.3	9.0	9.5	10.1	10.6	11.2	11.8	12.3	12.9	13.4	14.0	14.6

\*Weight indicates plain straight roller only. Sprockets, cams, etc. must be added Unit: kg



# Drives

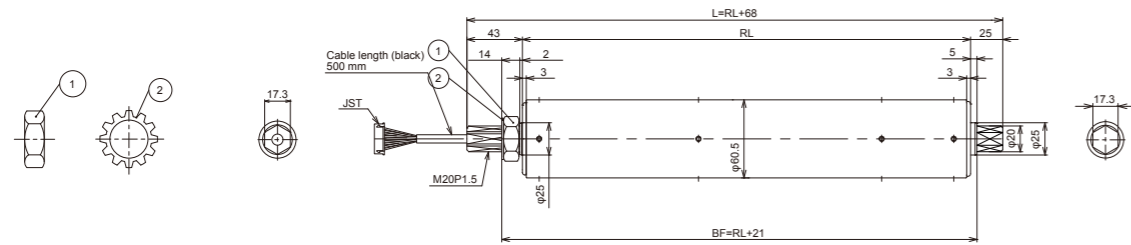
## Pallet / Pallet-Ai



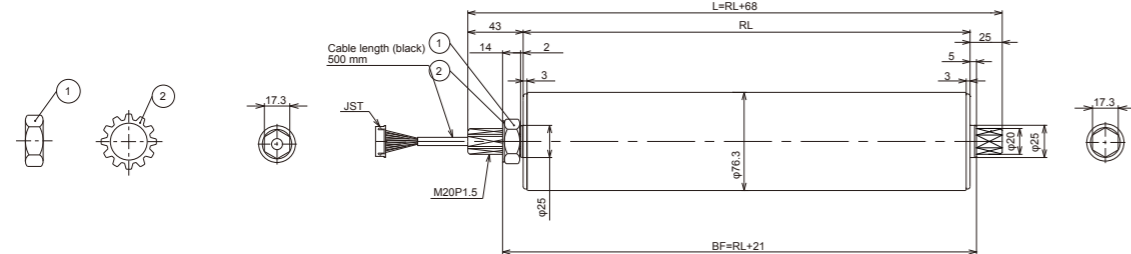
### Dimensions (Metric)

#### Straight

Dia 60.5

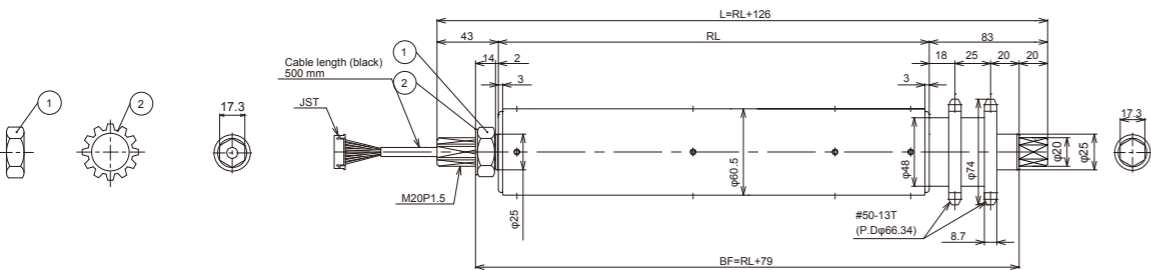


Dia 76.3

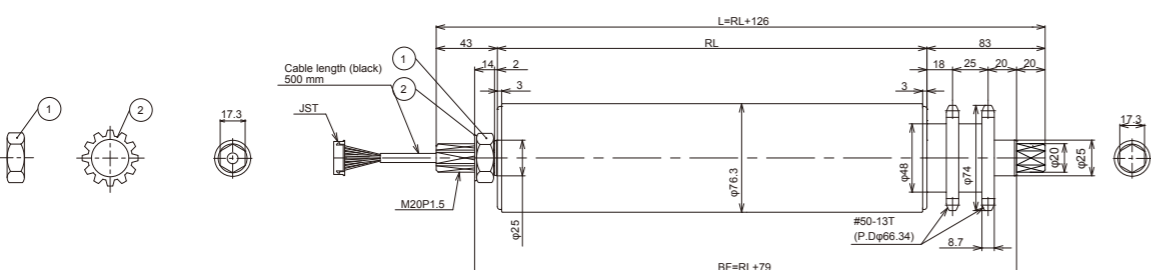


#### Sprocket

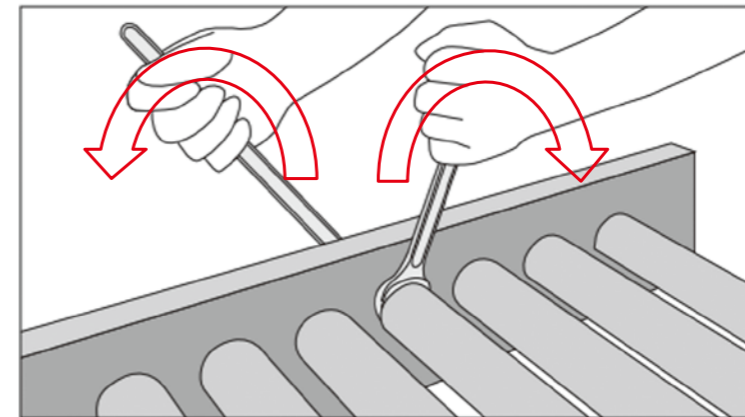
Dia 60.5



Dia 76.3



### Installation caution of Pallet Handling



\*Tighten both inside and outside nut with a spanner at the torque of between 75 - 80 N-m

#### Warning

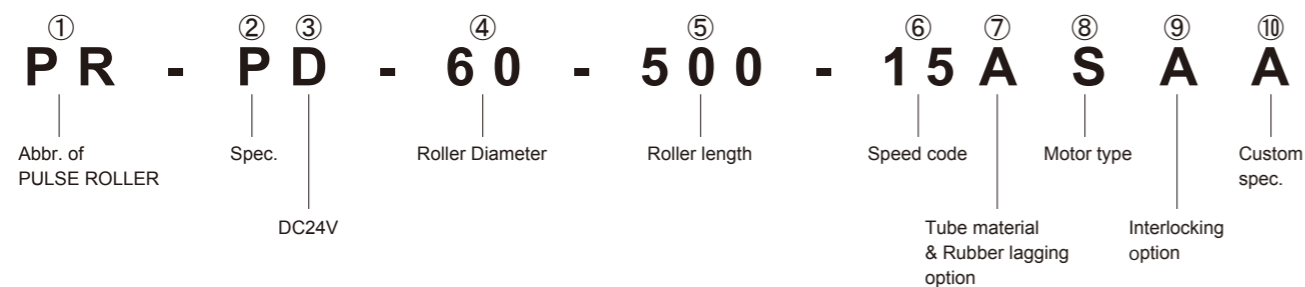
Tightening only one nut cannot fix the shaft properly.  
Loosened shaft may spin in the frame hole which may cause the cable to break.

# Drives

## Pallet / Pallet-Ai



### Part number definition



- ② Spec.
  - P** --- Pallet Handling      **M** --- Pallet Handling + Wash down rated (IP-66) \*Dia 60.5 only

---

- ④ Roller Diameter
  - 60** ---  $\phi$  60.5      **76** ---  $\phi$  76.3

---

- ⑤ Roller length
  - Dimension RL (Unit: mm) \*Available for every 1 mm unit

---

- ⑥ Speed code
  - Selection of speed range \*See Characteristics data table for available speed codes.

---

- ⑦ Tube material & Rubber lagging option
  - A** --- Standard, Mild steel, zinc plating
  - J** --- Stainless tube \*Dia 60.5 only
  - B** --- 3 mm Black rubber lagging
  - W** --- 3 mm Urethane lagging

---

- ⑧ Motor type
  - S** --- Pallet (JST connector)
  - M** --- Pallet-Ai (M8-4pin connector)

---

- ⑨ Interlocking option
  - A** --- Plain straight, No interlocking
  - D** --- Dual sprockets

---

- ⑩ Custom spec.
  - A** --- Standard
  - Y** --- Special

### Characteristics data

#### Roller Dia: 60.5

Speed Code	Gearbox	Gear ratio	Speed (m/min)	Torque (N-m)		Tangential force (N)		Current (A)	
				Rated	Starting	Rated	Starting	Rated (max)	Starting
8	Reinforced 3 stage	91.666***	1.2 ~ 8.7	10.9	49.3	362.3	1630.3	3.5	8.0
10		67.222***	1.6 ~ 11.9	8.0	36.1	265.6	1195.6		
15		45.00	2.4 ~ 17.7	5.4	24.3	178.5	803.3		
20		32.999***	3.3 ~ 24.2	3.9	17.7	130.6	588.0		

\*Control: EZ-24HTB or ConveyLinXHTF

#### Roller Dia: 76.3

Speed Code	Gearbox	Gear ratio	Speed (m/min)	Torque (N-m)		Tangential force (N)		Current (A)	
				Rated	Starting	Rated	Starting	Rated (max)	Starting
8	Reinforced 3 stage	91.666***	1.5 ~ 8.7	10.9	49.3	287.2	1292.7	3.5	8.0
10		67.222***	2.1 ~ 11.9	8.0	36.1	210.6	948.0		
15		45.00	3.1 ~ 17.7	5.4	24.3	141.5	636.9		
20		32.999***	4.2 ~ 24.2	3.9	17.7	103.6	466.2		

\*Control: EZ-24HTB or ConveyLinXHTF

# Drives

## PMD-Ai -Pulse Motion Drive-



### Product information

#### General information

- CE certified, RoHS compliant, IP54 rating
- ETL certified to UL standards
- Mounting: M4 x 4 pcs
- Shaft diameter: 8 mm
- Cable length: 1000 mm

#### Compatible Control Technologies



#### Characteristics data

Nominal Gear ratio	Actual Gear ratio	Gear box	BOOST-mode				
			Rotational speed - Output shaft - (rpm)	Torque(N-m)		Current (A)	
				Rated	Starting	Rated (max)	Starting
3	3.00	1 stage	192.0 ~ 1,400.0	0.3	1.4	3.5	5.0

NOTE : The amount of gear backlash is 3.5 degrees.

#### Technical data

	Boost-mode
Voltage	DC24V
Nominal output	50W
Rated current	3.5A
Starting current	5.0A
Ambient temperature	-10 ~ 40°C
Ambient humidity	10 ~ 90% RH (No condensation)

#### Weight table

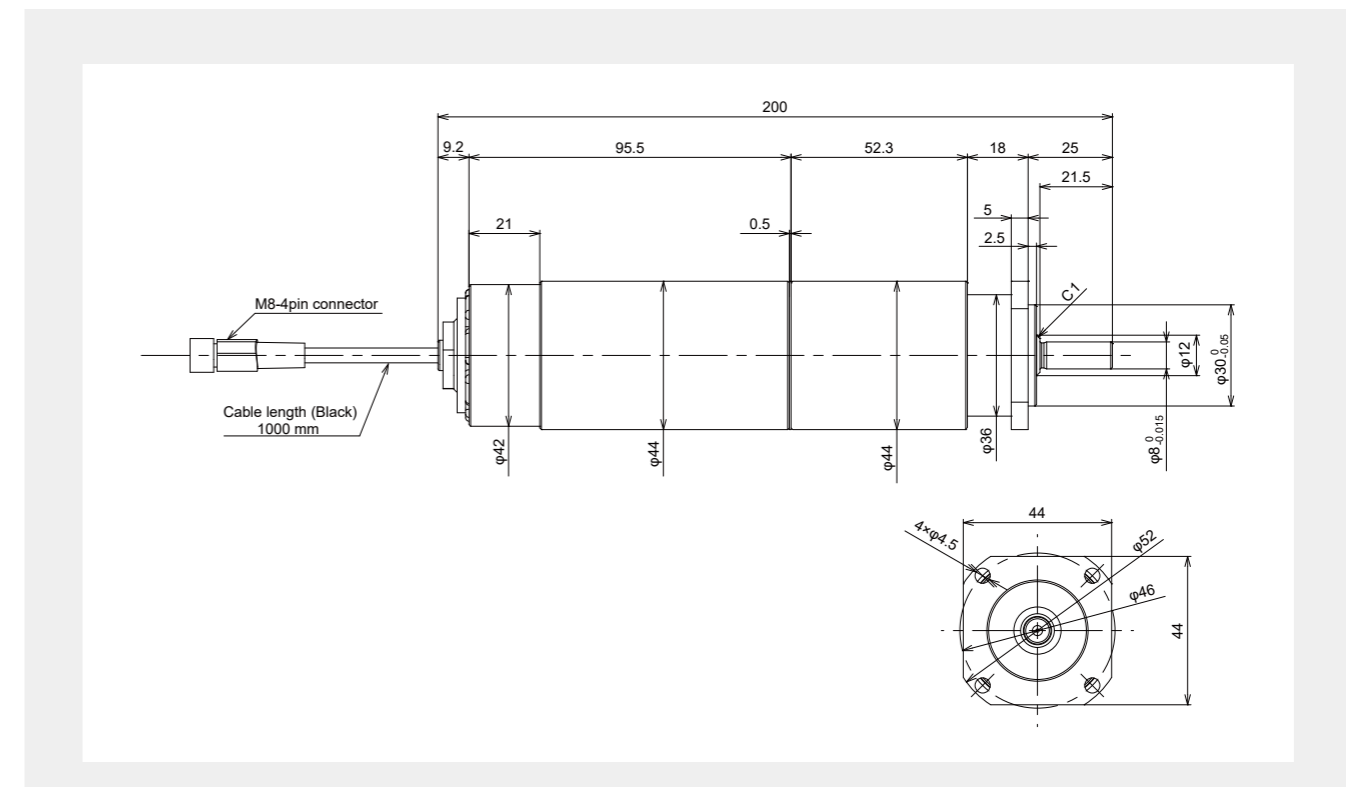
Gear box	Reduction ratio	Weight
1 stage	3	0.9

Unit: kg

#### Part number definition



#### Dimensions (Metric)



# Assemblies

## PDU-90 -Pulse Divert Unit 90 degrees-



### Product information

#### Features

- CE certified, RoHS compliant
- Low profile design
- Easy installation by mounting directly underneath conveyor frame
- Easy maintenance
- 2 SENERGY rollers for belt drive and lift up & down (No pneumatics)
- Customizable (W, L dimensions and number of belt units)
- Strong and oversized mechanical design

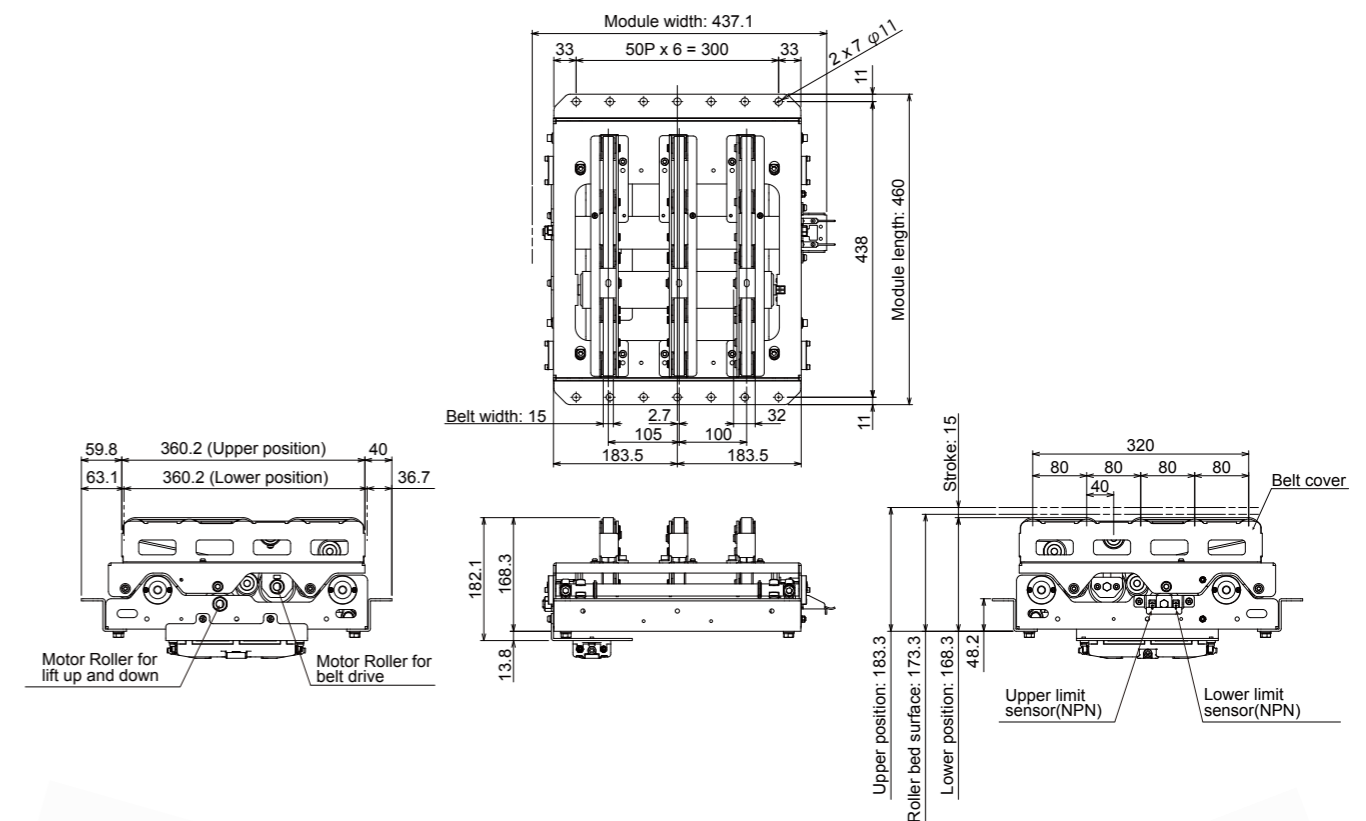
Compatible Control Technologies



#### Technical data

Voltage	DC24V
Roller pitch (where belts fit in)	100 mm
Max load	50 kg
Belt speed	60 m/min
Lift-up stroke	15 mm
Through-put	1500 / h *It varies depending on product size
Minimum dimensions	W360 x L380 (For BF 380 mm)
Maximum dimensions	W960 x L800 (For BF 820 mm)
Ambient temperature	-10 ~ 40°C (No condensation)
Ambient humidity	10 ~ 90% RH (No condensation)

#### Dimensions ( Reference drawing for BF 400 mm conveyor)









#### Installation image








# Controls

## Controls Overview

### Drive Control

		 EQUBE	 EZQUBE	 IQZONZ
Category	Description	 E-Qube-N, E-Qube-P, E-Qube-Ai-P	 EZQUBE-N, EZQUBE-P	 IQ-ZONZ
Conformity	ETL certified to UL standards	-	-	-
Motor connection	Number of connectable motors	1	1	2
Sensor connection	Number of connectable sensors	0	0	2
Configuration setting	Speed, Braking, accel / decel, etc	DIP SW	DIP SW	Configuration software
Motor profile	ECO mode	●	●	●
	BOOST mode	-	●	-
	BOOST-8 mode	-	-	-
Speed control	Speed setting	32 steps by DIP SW	31 steps by DIP SW	10 - 100% with software
	Accel timer setting	16 steps by DIP SW	16 steps by DIP SW	0.3 - 10 sec with software
	Decel timer setting	16 steps by DIP SW	16 steps by DIP SW	0 - 10 sec with software
	Individual accel / decel setting	-	-	●
	Analog input speed control	-	●	-
	Signal input speed change	●	●	-
Electrical braking	Standard (Dynamic brake)	●	●	●
	Servo lock	-	●	-
	Free spin	-	●	-
Error	Motor protection	●	●	●
	Jam error detection	-	-	●
	Error signal output	●	●	●*using IQ-MAP (Globally only)
Conveyor logic	ZPA (Zero Pressure Accumulation)	-	-	●
	Marge control	-	-	-

### Networked Control

		 CONVEY LINX	 MOTION LINX
Category	Description	 ConveyLinx, ConveyLinx-HTF	 ConveyLinx-Ai  MotionLinx
Conformity	ETL certified to UL standards	●*Optional	●
Motor connection	Number of connectable motors	2	2
Sensor connection	Number of connectable sensors	4	2
Configuration setting	Speed, Braking, accel / decel, etc	Software	Software
Motor profile	ECO mode	●	●
	BOOST mode	●	●
	BOOST-8 mode	●*with ConveyLinx HTF	●
Speed control	Speed setting	●	●
	Accel timer setting	●	●
	Decel timer setting	●	●
	Individual accel / decel setting	●	●
	Analog input speed control	●	●
	Signal input speed change	●	●
Electrical braking	Standard (Dynamic brake)	●	●
	Servo lock	●	●
	Free spin	●	●
Error	Motor protection	●	●
	Jam error detection	●	●
	Error signal output	●	●
Conveyor logic	ZPA (Zero Pressure Accumulation)	●	●
	Marge control	●	●
Network	EtherNet/IP	●	-
	Modbus TCP	●	-
	PROFINET	●	-
	CC-LINK IE Feild Basic	●	-
	EtherCAT	-	●



# Controls

## EQUBE -Simple Drive Control-



### Features

- Part number: E-Qube-N, E-Qube-P, E-Qube-Ai-P (For SENERGY-Ai motor only)
- CE certified, RoHS compliant
- ECO mode performance only
- LED Indicator for Power, Run, Reverse and Error
- 32 fixed speed setting by DIP Switch setting
- 3 stage speed selection via signal input
- Run motor forward or reverse
- Dynamic brake
- PI regulator (stable speed control)
- 16 stage Accel / Decel timer for 0 - 2.5 sec by DIP Switch setting

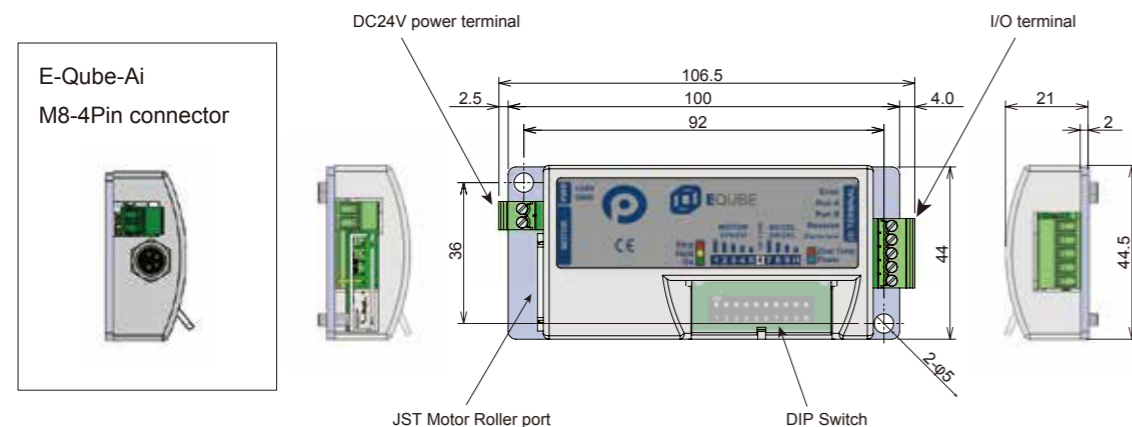
### Technical data

Voltage	DC24V
Voltage range	18 ~ 28V
Rated current	2.5A
Starting current	3.0A
Fuse	Present

### Applicable environment

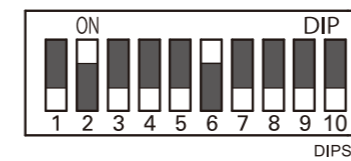
Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 - 90% RH (No condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 - 90% RH (No condensation)
Vibration	1G or less

### Dimensions and parts



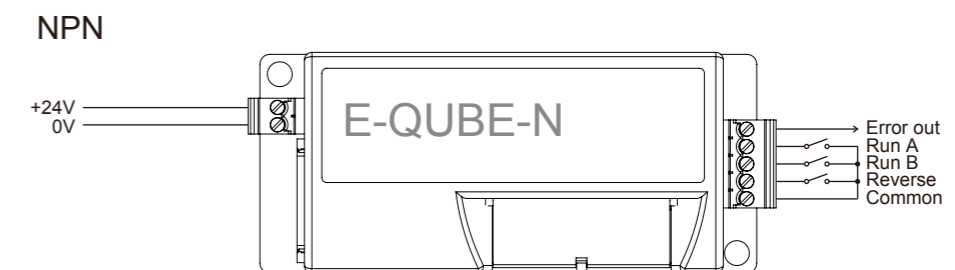
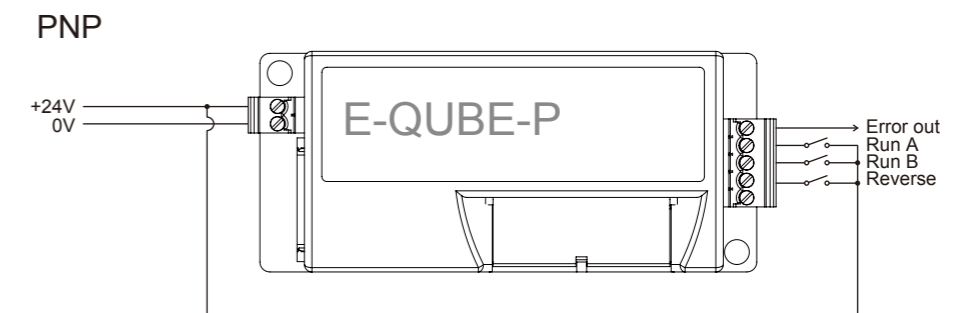
### DIP Switch setting

No.	Function	Description
1	Speed setting	32 fixed stages available with DIP switch combinations
2		
3		
4		
5		
6	Direction of rotation	ON = CCW, OFF = CW
7	Acceleration / Deceleration timer setting	16 fixed timers (0 ~ 2.5 sec) available with DIP switch combinations
8		
9		
10		



\*Above setting is for illustrative purpose only

### Wiring



\*NPN version is not available with E-Qube-Ai

### Speed setting via signal input

Run A	100% of set speed by DIP switch
Run A + B	75% of set speed by DIP switch
Run B	50% of set speed by DIP switch

# Controls

## EZQUBE -Multi Drive Control-



### Features

- Part number: EZQUBE-N, EZQUBE-P
- CE certified, RoHS compliant
- 2 different performance modes, ECO and BOOST
- LED Error Indicators
- 31 fixed speed setting with DIP Switch (High/ Low)
- 3 stage speed selection via signal input
- 0 - 10V analog input for speed setting
- Run motor forward or reverse
- Selectable braking methods -Dynamic brake, Free spin (Non braking), Servo Lock brake
- PID regulator (stable speed control)
- 16 stage Accel / Decel timer setting for 0.05 - 2.5 sec

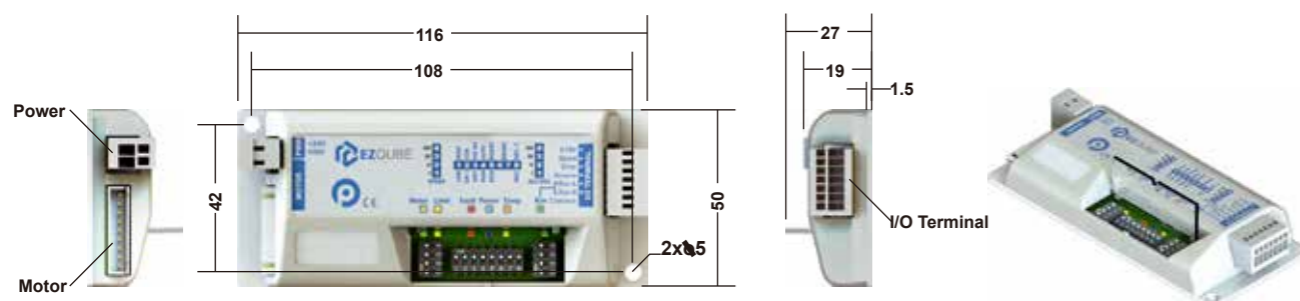
### Technical data

Voltage	DC24V
Voltage range	18 - 28V
Rated current	2.5A (ECO), 3.5A (BOOST)
Starting current	3.0A (ECO), 5.0A (BOOST)
Fuse	Present

### Applicable environment

Operating ambient temp	-10 - 40°C
Operating ambient humidity	10 - 90% RH (No condensation)
Storage ambient temp	-40 - 85°C
Storage ambient humidity	10 - 90% RH (No condensation)
Vibration	1G or less

### Dimensions (Metric)

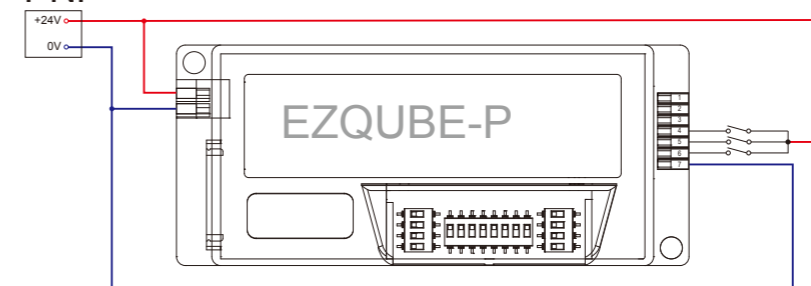


### DIP Switch Setting

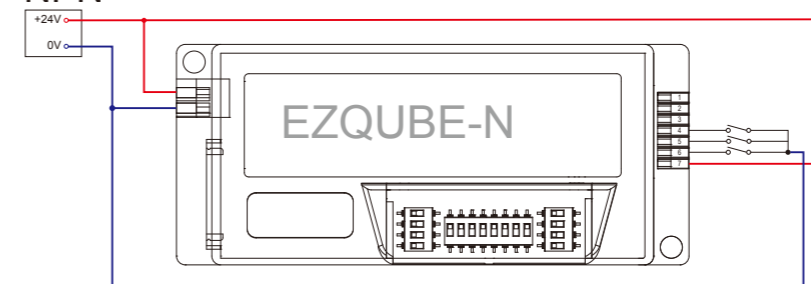
SWITCH SPEED	Function	OFF	ON	
1	Speed setting	32 fixed stages available with DIP switch combinations		
2				
3				
4				
SWITCH ACC/DCC	Function	OFF	ON	
1	Accel / Decel Setting	16 fixed timers (0.05 ~ 2.5 sec) available with DIP switch combinations		
2				
3				
4				
SWITCH CONFIG	Function	OFF	ON	
1	Speed range setting	Low range	High Range	
2	Direction of Rotation	CCW	CW	
3	Open/Close loop	Open Loop	Close Loop (PID)	
4	Auto/Manual Error Reset	Manual Reset	Automatic Reset	
5	Motor Setting	Eco mode	Boost mode	
6	Electrical Brake Method Setting	Brake method	SW 6	SW 10
		Dynamic brake	OFF	OFF
		Free spin	ON	OFF
7	Servo Lock	OFF	ON	
8	Deceleration Time	Decel time = Accel	Decel time = 2 * Accel	

### Wiring

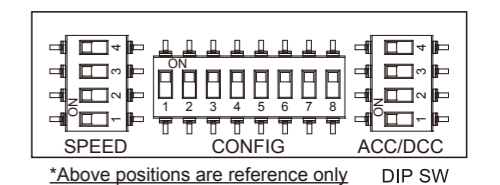
#### PNP



#### NPN



### DIP SW setting



### Removable I/O Terminal Block

- 1 ← 0-10V
- 2 → Speed
- 3 → Error
- 4 ← Reverse
- 5 ← Run A
- 6 ← Run B
- 7 ← Common

### Speed setting via signal input

Run A	100% of set speed by DIP switch
Run A + B	75% of set speed by DIP switch
Run B	50% of set speed by DIP switch

# Controls

## IQZONZ -ZPA Drive Control-



### Features

- Part number: IQ-Zonz
- CE certified, RoHS compliant
- Dual zone ZPA (Zero Pressure Accumulation) out of box
- Singulation and Train modes
- Configuration not required for typical ZPA
- IQ-Tool Software for parameter changes such as speed, accel / decel timer, direction and/or ZPA mode
- Motor error detection

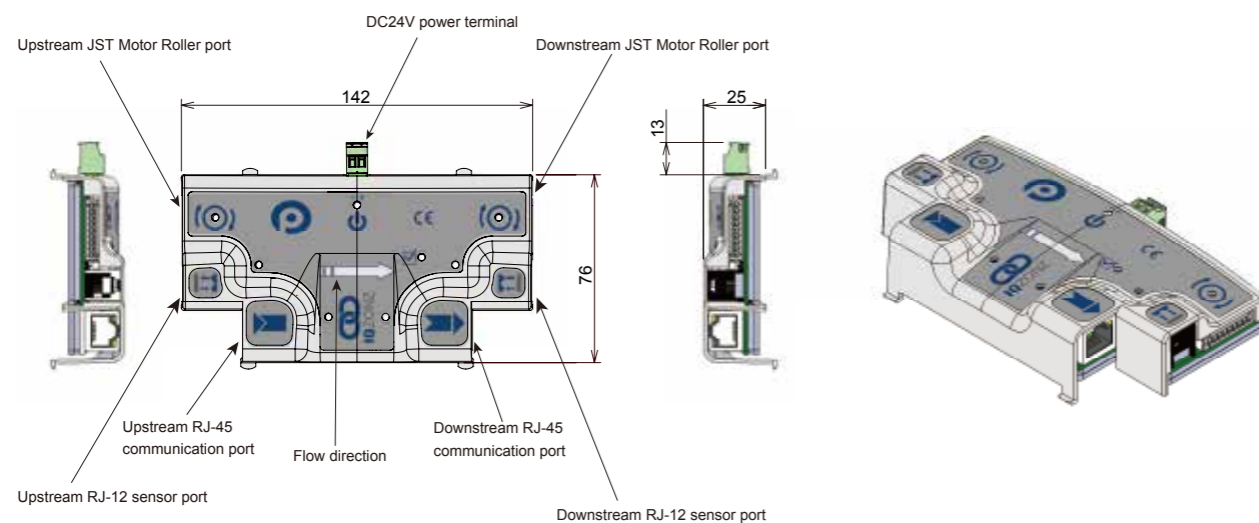
### Technical data

Voltage range	24V ± 10%
Rated current	5.2A (Two Motors)
Starting current	6.0A (Two Motors)
Fuse	Present

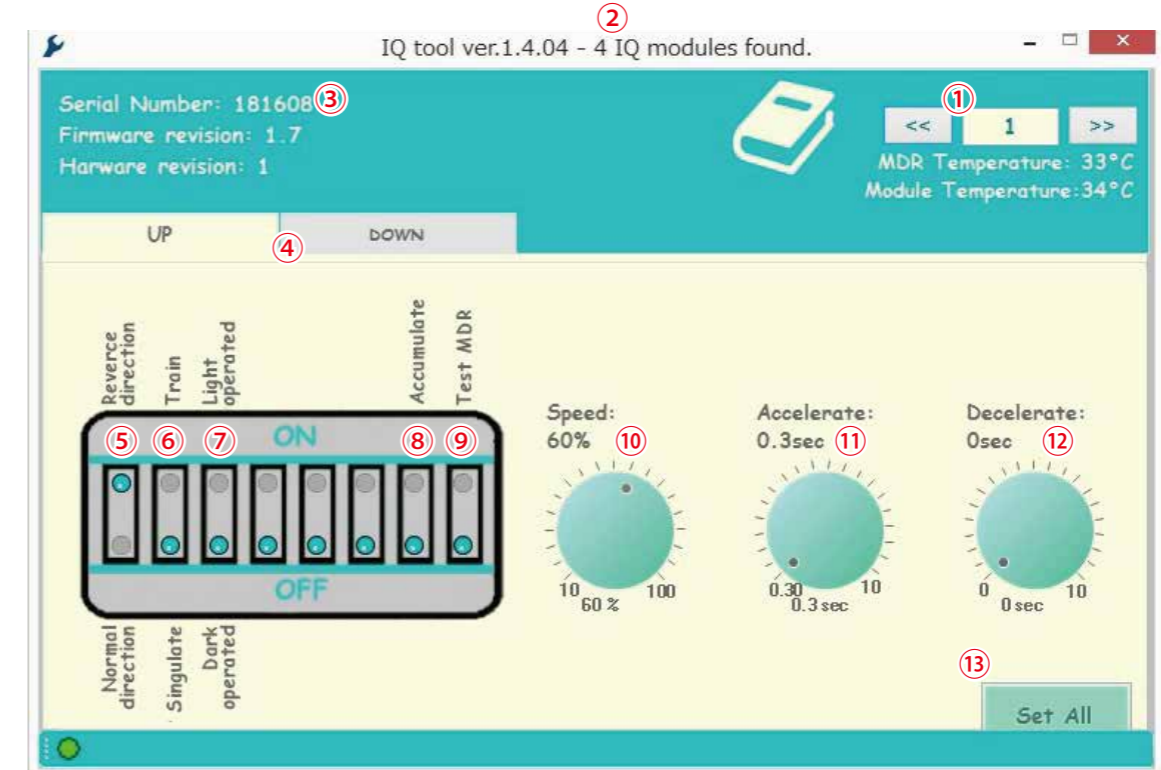
### Applicable environment

Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 - 90% RH (Non condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 - 90% RH (Non condensation)
Vibration	1G or less

### Dimensions (Metric)



### IQ Tool Software



### Parameter setting

- |   |   |
|---|---|
| 1. Selected node number                   | 10. Speed setting                               |
| 2. Qty of modules found                   | 11. Acceleration timer setting                  |
| 3. Data for selected module               | 12. Deceleration timer setting                  |
| 4. Upstream and Downstream zone selection | 13. Set All (Set all zone's parameters at once) |
| 5. Motor rotational direction             |   |
| 6. ZPA mode (Singulation / Train)         |   |
| 7. Sensor Dark / Light operated selection |   |
| 8. Accumulate last zone                   |   |
| 9. Test MDR                               |   |

# Controls

## IQZONZ -ZPA Drive Control-



### IQ-Map I/O & Speed control Hardware

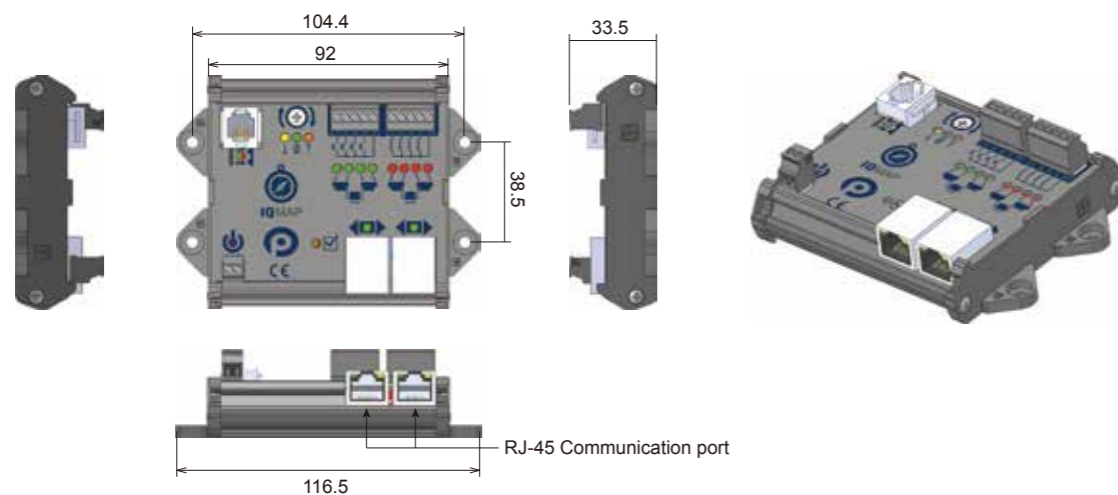
#### Features

- Part number: IQ-Zonz-FM
- CE certified, RoHS compliant
- 4 Digital I/O (Input for Local zone accumulate, change of sensor polarity, Wake up and Lane full function, Output for Sensor status, Motor and Jam error status)
- Global speed adjustment
- Sensor connector for Wake up and Lane full function
- Communication via standard Ethernet cable

#### Applicable environment

Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 - 90% RH (Non condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 - 90% RH (Non condensation)
Vibration	1G or less

#### Dimensions (Metric)





# Controls



-Ethernet Drive Control-



## Features

- Part number: ConveyLinx, ConveyLinx-HTF
- CE certified, RoHS compliant
- ETL certified to UL standards (Optional)
- Ethernet I/P, Modbus/TCP, PROFINET, CC-LINK IE Field basic Connectivity
- Baud rate: 10Mbps / 100Mbps
- 2 Zones control (Up to 4 sensors and 2 motors connections)
- Both NPN/PNP photo-eye sensor applicable
- Auto-Configuration for ZPA (Zero Pressure Accumulation) conveyor set-up
- ZPA logic: Singulation, Train and Gap Train
- EasyRoll Software for changing default configuration and customizing functionality of each module
- Motor error detection (Overload, Over-current, motor not connected)
- Jam error detection (Sensor Jam, Arrival Jam)
- Mechanical brake control
- Use card as motor drive card, PLC, or remote I/O

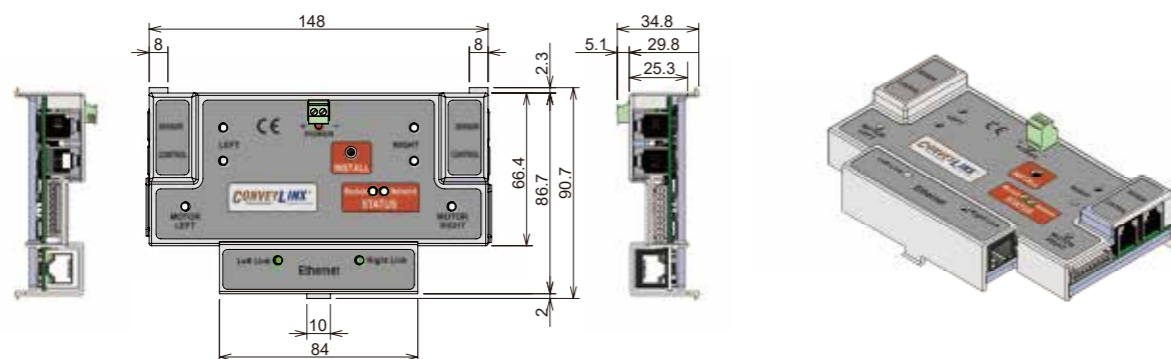
## Technical data

Voltage	DC24V
Voltage range	18 - 28V
Rated current	5.2A (ECO), 7.2A (BOOST) *Two Motors
Starting current	6.0A (ECO), 10.0A (BOOST) *Two Motors
Fuse	Present

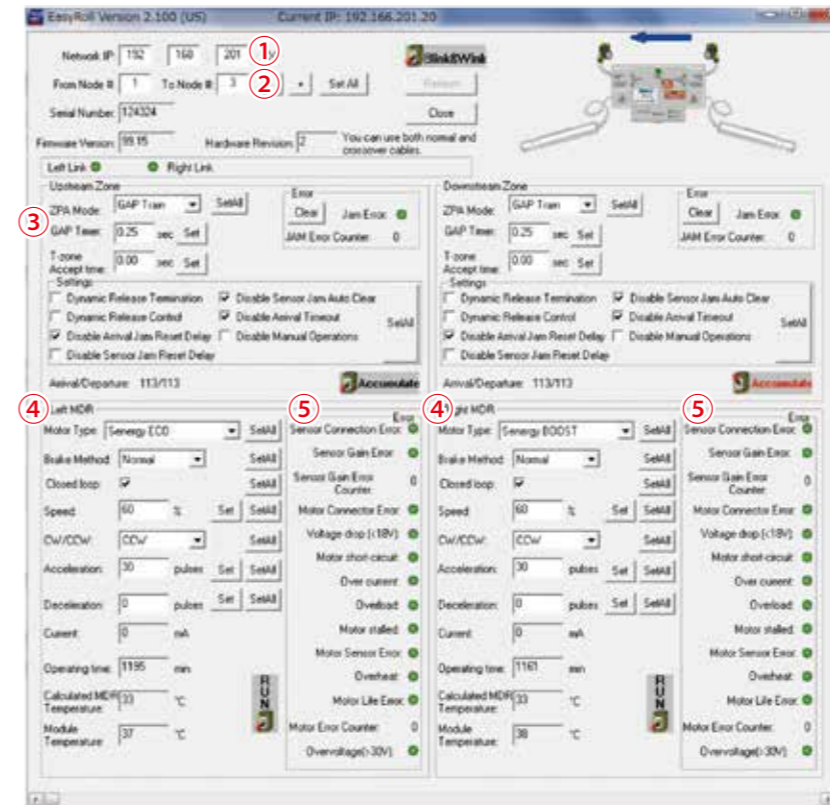
## Applicable environment

Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 - 90% RH (Non condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 - 90% RH (Non condensation)
Vibration	1G or less

## Dimensions (Metric)

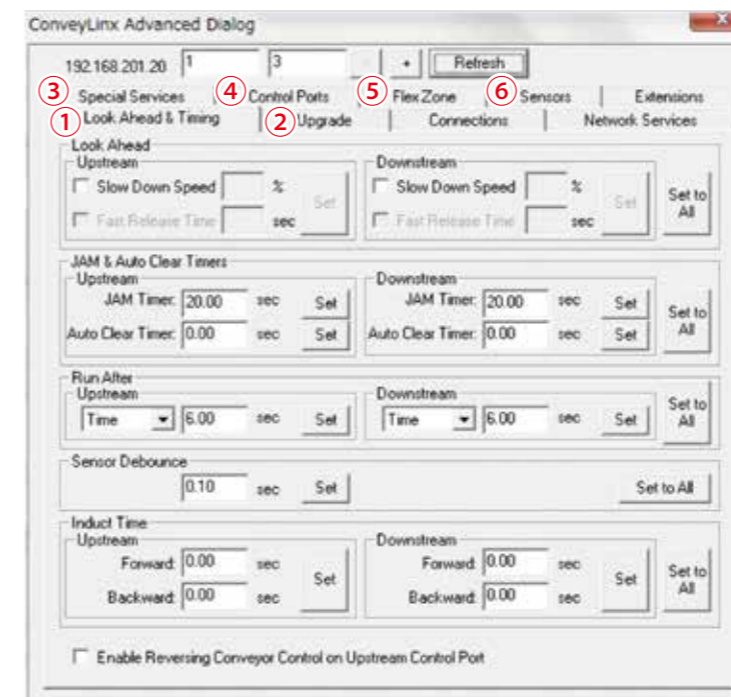


## EasyRoll Configuration Software



Main screen

1. Network IP – The Subnet of the particular ConveyLinx network to be connected.
2. Node No. – A range of Nodes in which to be connected.
3. Upstream Zone / Downstream Zone – Selection of ZPA mode, GAP timer and T-bone accept timer settings, etc.
4. Left / Right MDR (Motor Roller) -Selections for changing Motor Roller type, braking method, Accel/Decel timer setting, etc as well as showing values of the current Module status.
5. Error – Error indicators for Sensor connection, Motor connection, Over current, Overload, etc.



Advanced dialog

\* Press F2 key to invoke the Advanced Dialog

1. Setting of Look Ahead feature, JAM timer, Run After timer, etc.
2. Upgrade - Upgrade of firmware version
3. Special Service - Reset operating time, Clear Motor-short circuit error
4. Control Ports - Control ports' configuration
5. Flex Zone - Flex Zone feature setting
6. Sensors - Sensor ports configuration

\*ConveyLinx provides many more functions and is the most advanced motor drive control in the market today. Visit [www.pulseroller.com](http://www.pulseroller.com) for more details.



# Controls

## CONVEYLINX -Ethernet Drive Control-



### Features

- Part number : ConveyLinx-Ai2 (For SENERGY-Ai motor)
- CE certified, RoHS compliant, IP54 rated
- ETL certified to UL standards
- M8 - 4 pin connector for Motors and Sensors
- Ethernet I/P, Modbus/TCP, PROFINET, CC-LINK IE Feild Basic Connectivity
- Baud rate: 10Mbps / 100Mbps
- 2 Zones control (Up to 2 sensors and 2 motors connections)
- Both NPN/PNP photo-eye sensor applicable
- Auto configuration for ZPA (Zero Pressure Accumulation) conveyor set-up (from EasyRoll software)
- ZPA logic; Singulation, Train and Gap Train
- EasyRoll Software for changing default configuration and customizing functionality of each module
- Motor error detection (Overload, Over-current, motor not connected)
- Jam error detection (Sensor Jam, Arrival Jam)
- Separate power for Motor and Logic

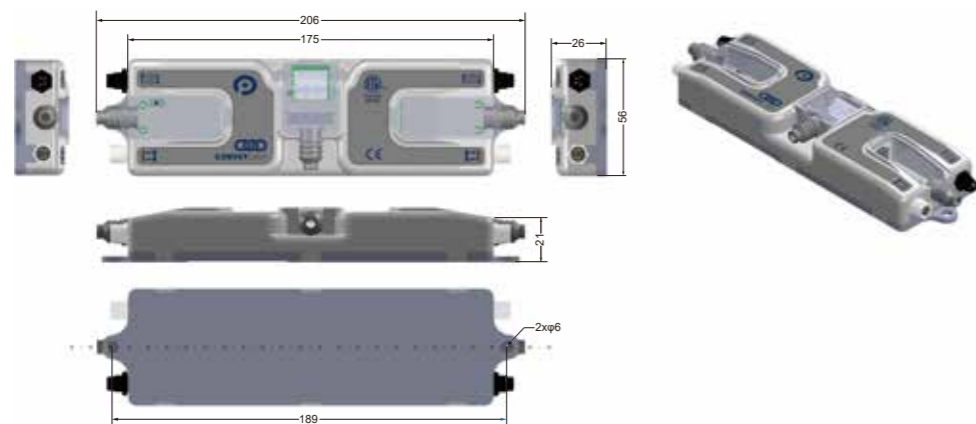
### Technical data

Voltage	DC24V
Voltage range	18 ~ 28V
Rated current	5.2A (ECO), 7.2A (BOOST) *Two Motors
Starting current	6.0A (ECO), 10.0A (BOOST) *Two Motors
Fuse	Present

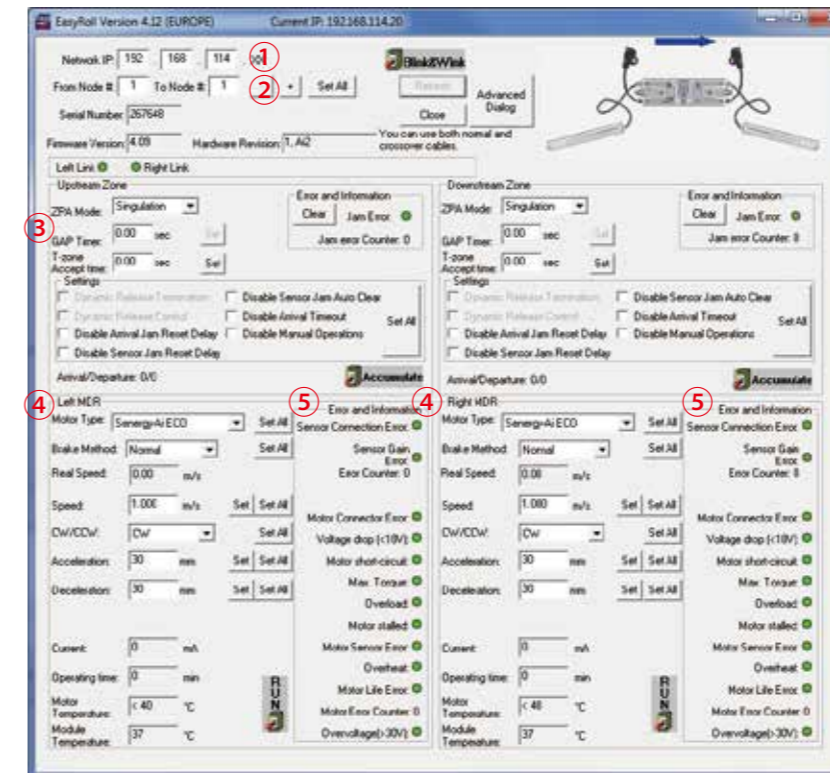
### Applicable environment

Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 - 90% RH (Non condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 - 90% RH (Non condensation)
Vibration	1G or less

### Dimensions

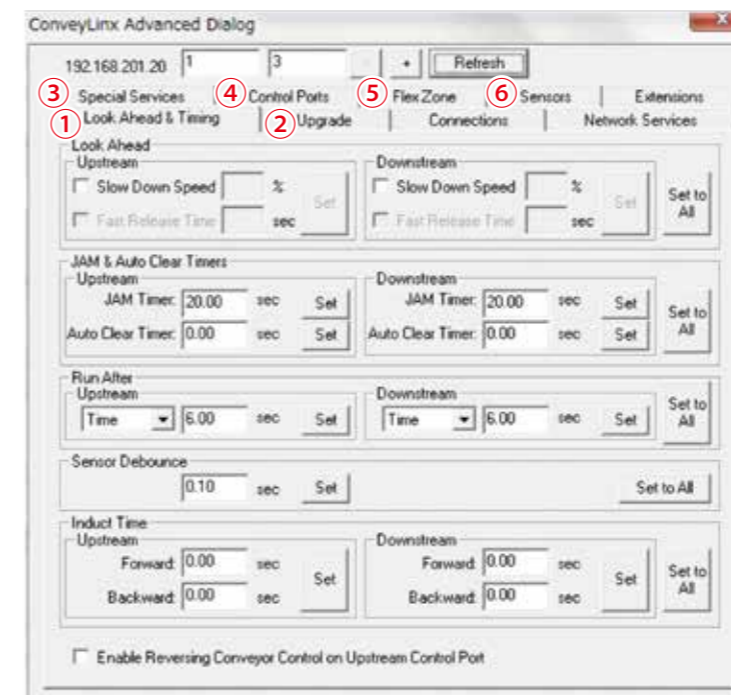


### EasyRoll Configuration Software



Main screen

1. Network IP – The Subnet of the particular ConveyLinx network to be connected.
2. Node No. – A range of Nodes in which to be connected.
3. Upstream Zone / Downstream Zone – Selection of ZPA mode, GAP timer and T-bone accept timer settings, etc.
4. Left / Right MDR (Motor Roller) -Selections for changing performance mode, speed, braking method, Accel/Decel distance setting, etc as well as showing values of operation status.
5. Error – Error indicators for Sensor connection, Motor connection, Over current, Overload, etc.



Advanced dialog screen

\* Press F2 key to invoke the Advanced Dialog.

1. Setting of Look Ahead feature, JAM timer, Run After timer, etc.
2. Upgrade - Upgrade of firmware version
3. Special Service - Reset operating time, Clear Motor-short circuit error
4. Control Ports - Control ports' configuration
5. Flex Zone - Flex Zone feature setting
6. Sensors - Sensor ports configuration

\*ConveyLinx provides many more functions and is the most advanced motor drive control in the market today. Visit [www.pulseroller.com](http://www.pulseroller.com) for more details.

# Controls



## MOTION LINX -EtherCAT Drive Control-



### Features

- Part number: MotionLinX-Ai (For SENERGY-Ai motor)
- CE certified, RoHS compliant, IP54 rated
- ETL certified to UL standards
- Baud rate: 100Mbps
- 2 Zones control (Up to 2 sensors and 2 motors connections)
- Both NPN/PNP photo-eye sensor applicable
- Motor error detection (Overload, Over-current, motor not connected)
- Precision repeatable motion

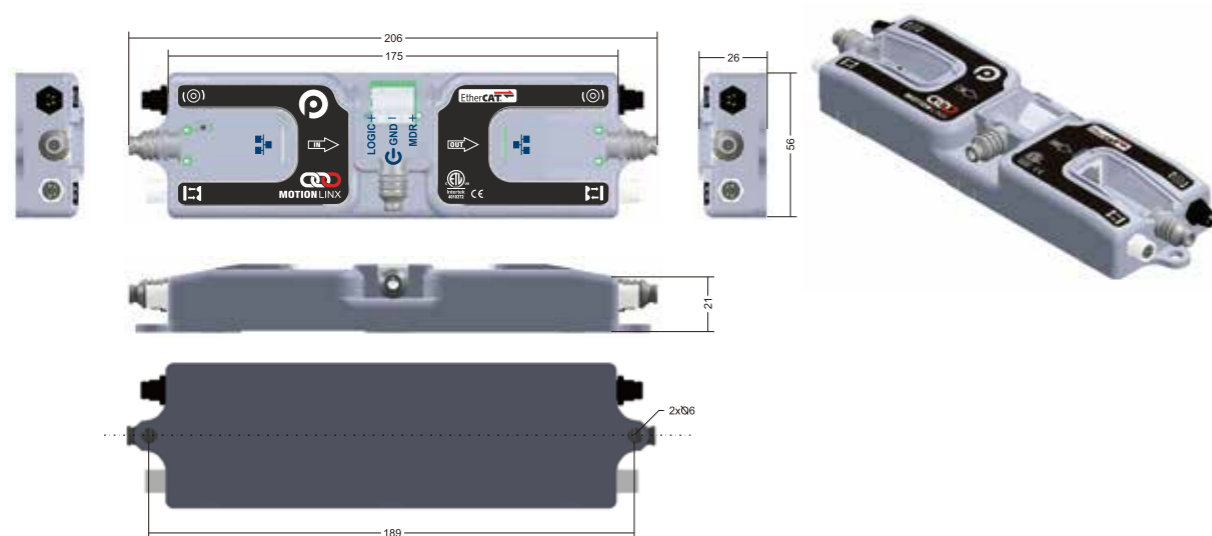
### Technical data

Voltage	DC24V
Voltage range	18 - 28V
Rated current	5.2A (Eco), 7.2A (Boost) *Two Motors
Starting current	6.0A (Eco), 10.0A (Boost) *Two Motors
Fuse	Present

### Applicable environment

Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 ~ 90% RH (Non condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 ~ 90% RH (Non condensation)
Vibration	1G or less

### Dimensions (Metric)



### Introduction

MotionLinX-Ai provides integrated control solution for conveyor and motor control applications with industrial protocol EtherCAT. The module is on EtherCAT slave and exchanges information with the master, concerning motor control, servo commands, sensors and diagnostics. The benefits of such a conveyor system includes:

- Real time communication with cycle times < 100 μs
- Easy way to configure the EtherCAT slaves
- Simple system maintenance

EtherCAT is a highly flexible Ethernet network protocol, a unique principle called "processing on the fly" gives EtherCAT a handful of unique advantages. Because EtherCAT messages are passed before being processed in each node, EtherCAT operates at a high speed and efficiency. The process also creates flexibility in topology and incredible synchronization.

### Connectors

Sensor connectors

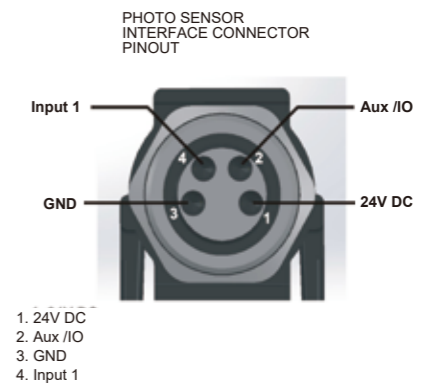
- Number of inputs:
- 2 M8 female connectors - 4 inputs
- PNP/NPN/Push-Pull Sensors

### Motor connectors - 2 M8 male connectors

- Number of motors :
- 2 SENERGY-Ai motors - ECO or BOOST mode
- Overload, overheat, overvoltage, short-circuit protection
- Extended Motor Diagnostics/Maintenance Data

### Network connectors - 2 RJ45

- Number of ports :
- Port A and Port B



### Hardware overview



# Controls

## I/O control



### Features

- Part number : ConveyLinx-IO
- CE certified, RoHS compliant, IP54 rated
- ETL certified to UL standards
- Ethernet I/P, Modbus/TCP, PROFINET, CC-LINK IE Feild Basic Connectivity
- M8 - 4 pin connectors x 4
- Configurable 2 I/O points per M8 connector
- Baud rate: 10Mbps / 100Mbps

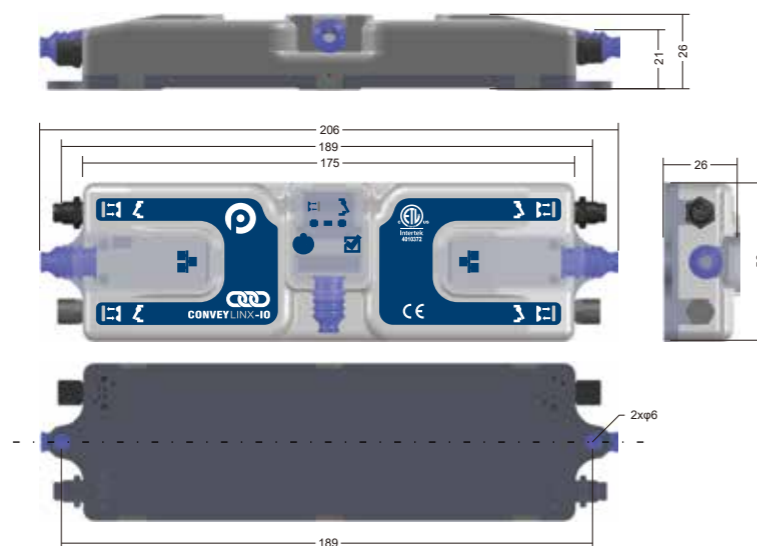
### Technical data

Voltage	DC24V
Voltage range	21 ~ 30V
Input current	0.4mA is Maximum OFF current. 1.5mA is Minimum ON current.
Output current	Maximum current per Output is 300mA
Fuse	Present

### Applicable environment

Operating ambient temp	-10 ~ 40°C
Operating ambient humidity	10 - 90% RH (Non condensation)
Storage ambient temp	-10 ~ 75°C
Storage ambient humidity	10 - 90% RH (Non condensation)
Vibration	1G or less

### Dimensions



### Features

- Part number : MotionLinx-IO
- CE certified, RoHS compliant, IP54 rated
- ETL certified to UL standards
- EtherCAT Connectivity
- M8 - 4 pin connectors x 4
- Configurable 2 I/O points per M8 connector
- Baud rate: 10Mbps / 100Mbps

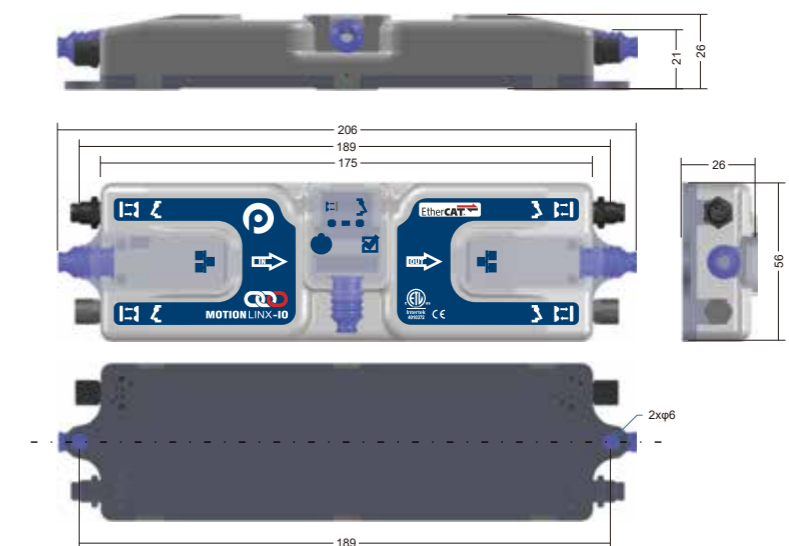
### Technical data

Voltage	DC24V
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Storage ambient temp	-10 - 75°C
Storage ambient humidity	10 ~ 90% RH (Non condensation)
Vibration	1G or less

### Dimensions



# Calculation of Motor Roller capability

## Required tangential force

$$F(N) = m \cdot g \cdot \mu$$

- F = Required tangential force
- m = Mass (kg)
- g = Gravitational acceleration 9.8 m/s<sup>2</sup>
- μ = Coefficient of friction

### Coefficient of friction

Material	Wood	Steel	Cardboard	Plastic	Rubber
μ	0.02 ~ 0.05	0.01 ~ 0.02	0.05 ~ 0.1	0.02 ~ 0.04	0.1

---Example---

Weight of the product --- 50 kg

Material of the product --- Cardboard (μ=0.1, maximum)

Conveyor speed --- 40m/min

$$F = 50 \times 9.8 \times 0.1 = 49N$$

The model which can operate at 40m/min is;

PR-AD-50-500-35ZSAA (SENERGY, Diameter: 50mm, Speed code35 - Eco mode)

Starting tangential force: 274.3N

Since its tangential force exceeds the required tangential force (274.3 > 49), the selected model is considered to be capable to handle 50 kg cardboard.

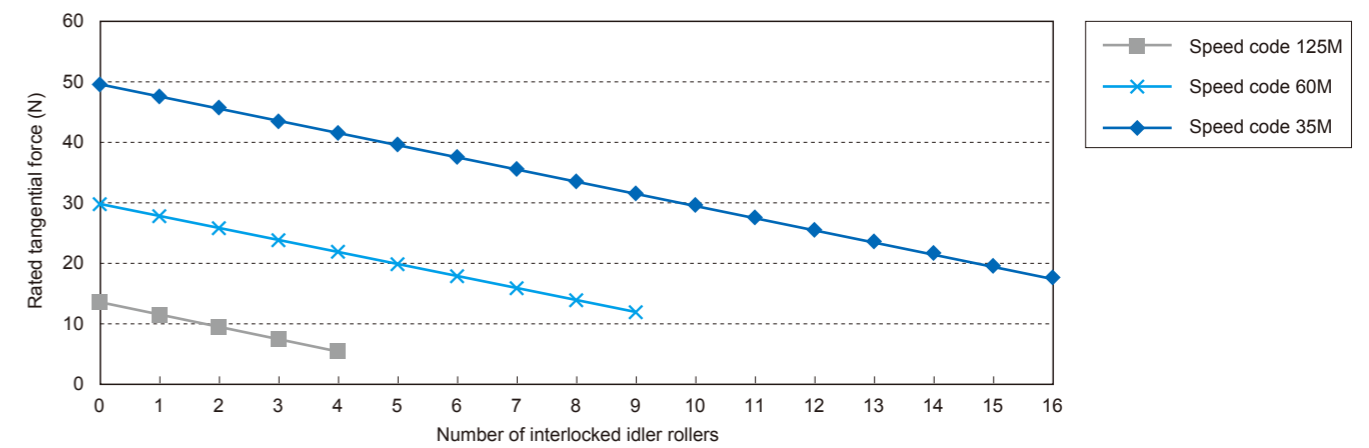
**\*Note: please include adequate value of safety factor for the actual calculation of required tangential force. The required tangential force varies depending on various conditions.**

## Power loss in general when interlocking with idlers

This is a very important factor when selecting a model for applications.

As the table below shows that the capability (Tangential force) of PULSE ROLLER decreases when interlocking with idler rollers using rubber belts.

SENERGY – ECO mode



SENERGY – BOOST mode

