INSPIRED BY EFFICIENCY

CATALOG
ROLLERDRIVE CONTROLS POWER SUPPLIES

PRODUCT LOCATOR

Products

	Voltage		Interface		Power			Diameter		Protection rate	Suitable for deep freeze areas	page
	24 V	48 V	AI	BI	20 W	35 W	50 W	1.9"	2.36"			
RollerDrive EC5000												
For straight sections	●	●	●	●	●	●	●	●	–	IP54	–	10
	●	●	●	●	–	●	●	●	–	IP54	●	22
	●	●	●	●	–	●	●	1.97"	–	IP66	–	30
	●	●	●	●	–	–	●	–	●	IP54	–	26
For curves	●	●	●	●	●	●	●	●	–	IP54	–	16
Controls												
DriveControl 20	●	–	●	–	●	●	–			IP20	–	34
DriveControl 54	●	–	●	–	●	●	–			IP54	●	36
DriveControl 2048	●	●	●	–	●	●	●			IP20	–	38
ZoneControl	●	–	●	–	●	●	–			IP20	–	40
MultiControl AI	●	●	●	–	●	●	●			IP54	●	44
MultiControl BI	●	●	–	●	●	●	●			IP54	●	48
Switching power supplies												
HP5424	●	–	●	●	●	●	●			IP54	●	52
HP5448	–	●	●	●	●	●	●			IP54	●	56

● = suitable – = not suitable

Symbols

	Suitable for deep freeze area
24V	Voltage 24 V
48V	Voltage 48 V
20W	Power 20 W
35W	Power 35 W
50W	Power 50 W
AI	Analog interface
BI	Bus interface (CANopen)

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THE INTERROLL GROUP

The Interroll Group is a globally leading supplier of high-quality key products and services for internal logistics. The company, which is listed on the stock exchange and has its headquarters in Switzerland, employs some 2300 people in 32 companies around the globe.

The solutions for our customers' daily logistical challenges are based on Interroll key products that are built on a worldwide common platform.

Conveyor Rollers

Interroll is the worldwide leading provider of conveyor rollers that can be found in a multitude of applications in internal logistics. For the roller production, we merge quality, flexibility and speed. More than 13 million rollers in 60,000 variants leave our plants worldwide every year. Our production is always order-driven, even for the smallest order quantities and, if desired, even with a delivery time of 24 hours. Proven.

Drives and Controls

Interroll is a leading manufacturer in the segment of DC motor rollers and drum motors.
Interroll RollerDrive and their controls are used in automated conveyor technology. Energy-efficient DC drives are installed in decentralized conveyor systems and, as a result, optimize energy demand and material handling. The bus interface enables integrating the zero pressure accumulation conveyor technology into Industry 4.0 systems.
Interroll Drum Motors are designed for use in belt conveyors and conveyor systems. These robust, high-quality belt drives enable the construction of maintenance-free, energy-efficient conveyor belt systems for the majority of industrial applications as well as for food processing, baggage handling and supermarket checkouts.

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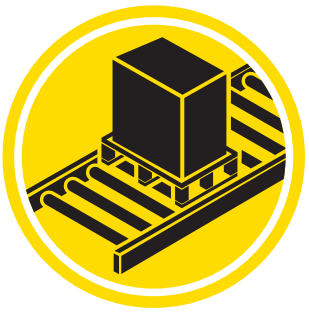
Conveyors & Sorters

The Modular Conveyor Platform (MCP) from Interroll offers highest flexibility: a broad spectrum of modules, consisting of roller conveyors, belt conveyors as well as key products such as transfer, high-performance diverts or spiral lifts, covers all requirements of the material handling.

The Interroll crossbelt sorters were developed with an eye on precision for fast and precise sorting of goods of all types from 2 oz to 77 lbs. More than 300 Interroll sorters are used every day by the largest CEP players and E-commerce enterprises worldwide.

The brand-new modular pallet conveyor platform (MPP) offers roller and chain conveyors as well as special conveyors such as transfers and turntables to create a fully integrated, robust, space-saving and energy-saving solution for high throughput handling of pallets.



Pallet & Carton Flow

Interroll Pallet Flow and Carton Flow are the first choice when it comes to rapid turnarounds and optimizing the storage and commissioning process. Thanks to its efficiency and robustness, Pallet Flow ensures long-term availability and more flexibility for peaks in orders. The compact design reduces space requirements by up to 50 percent compared to conventional solutions. The integrated TimePlus Separator as well as the Magnetic Speed Controller increase the safety of the work environment and significantly reduce the risk of damages to goods.

The Interroll Carton Flow solutions are efficient as well as ergonomic, and were developed to improve the commissioning output.

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INTERROLL DC PLATFORM

Smart solutions

With the market launch of its new DC platform, Interroll is once again setting standards in material handling technology. The range of perfectly matched RollerDrive, control systems and power supplies enables system integrators and machine builders to provide an even better fit for their customers' needs – from standard applications to equipment with Industry 4.0 functionality. The new DC platform has a solution to match every challenge.

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Technology at a glance

48-V technology
A 48-V voltage supply allows reducing the number of power supplies depending on the application. In addition, the risk of functional issues due to voltage drop on the line will be reduced significantly. It also means that longer cabling, or alternatively cables with a minimized cross section, can be used.

Bus interface
A large variety of operating data can be read out via the bus interface of the new RollerDrive EC5000. Not only can they be used for the analysis of the RollerDrive, but rather for optimizing the entire conveyor line as defined by Industry 4.0. The service life indication, for example, allows purposeful preventive maintenance. The cooperation of PLC and Interroll MultiControl also allows for ultra-precise positioning of conveying goods, e.g., for the support of robotics applications.

New switching power supplies
The new power supplies do not need to be installed in the control cabinet. Instead, the robust devices with protection rating IP54 can be mounted directly where the extra-low voltage is needed. This enables much shorter cable lengths. Automatic power limitation and selectable circuit protection are integrated, as is status evaluation via LED or signal lines to the PLC.

Simple detection
In addition to the nameplate, the different design variants of EC5000 can also be identified by a color ring on the connector. Color assignment:

- White - 24 V, analog interface
- Gray - 24 V, bus interface
- Black - 48 V, analog interface
- Yellow - 48 V, bus interface

Choice of three power levels
The RollerDrive EC5000 is available in 20, 35 and 50 watt versions. This enables zero pressure accumulation conveyors that are the perfect fit for both heavy and lightweight conveying goods.

Control systems for every application
Alongside DriveControl 2048 for standard applications with few RollerDrive, MultiControl – a four-zone control compatible with multiple protocols – offers the right solution for both simple and demanding applications, from autonomous conveyors with integrated logic to conveyors with customized PLC programming via fieldbus communication.

Everything from a single source
Control systems, power supplies, different cabling, and other accessory parts. For Interroll, it is extremely important that the products not only work together, but actually complement each other. The company always has the right experts on hand to answer any questions that arise.

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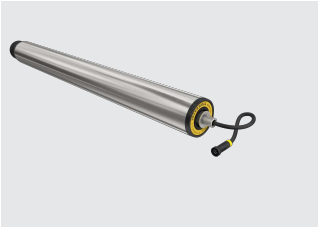
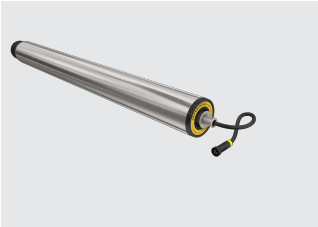
PRODUCT OVERVIEW

RollerDrive EC5000



ø 1.9", cylindrical, IP54,
for 32 to 104 °F
page 10

ø 1.9", tapered, IP54,
for 32 to 104 °F
page 16



ø 1.9", cylindrical, IP54,
for –22 to +32 °F
page 22

ø 2.36", cylindrical, IP54,
for 32 to 104 °F
page 26

ø 1.97", cylindrical, IP66,
for 32 to 104 °F
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Controls

DriveControl 20
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DriveControl 54
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DriveControl 2048
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ZoneControl
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MultiControl AI
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MultiControl BI
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Switching power supplies

HP5424
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HP5448
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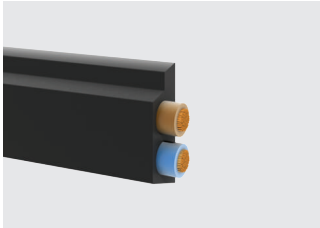
Accessories

PolyVee belt
page 60

RollerDrive fastening socket
page 61

RollerDrive counter wrench
page 62

RollerDrive EC5000 extension cable
page 62



Voltage supply flat cable
page 62

MultiControl communication cable
page 63

MultiControl Y-cable
page 63

Magnetic key
page 65

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ROLLERDRIVE
SERIES EC5000
ø 1.9", cylindrical, IP54, for 32 to 104 °F

24V
48V
20W
35W
50W
AI
BI

Application area
Drive for unit handling conveyor systems, such as transporting cardboard cartons, containers, platens or tires at normal ambient temperature. Suitable for straight conveyors, small belt conveyors and especially zero-pressure accumulation conveyors. Also usable in shuttle systems, aligning conveyor segments or transfers to other "conveyor system branches".

Compact design
The motor integrated in the tube allows a very compact design of the conveyor system.

Very energy-efficient
The brushless drive features energy recovery when braking. The conveyor system can operate without pneumatics or conventional drives, which must be operated continually.

Flexible possible applications
RollerDrive is available in many variations, allowing it to be used in all types of different conveyor systems. For the user, this translates into a single interface instead of many. Depending on the application area, PolyVee, round or toothed belts can be used for the transmission of force. Nine gear ratios allow selecting the perfect pairing between speed and torque. The electronic holding brake (Zero-Motion-Hold) holds conveying goods in position, even on gravity conveyors.

Low-noise
The use of decoupling elements achieves particularly low-noise running.

Maintenance-free and installation-friendly
The drive with internal commutation electronics does not require any maintenance. It features an overload protection that prevents damages due to overtemperature or blockage. It is connected securely without complex screw connection by using a motor cable with 5-pin snap-in plug.

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Technical data

Rated voltage	24 V	24 V	24 V	48 V	48 V	48 V
Power	20 W	35 W	50 W	20 W	35 W	50 W
Rated current	1.4 A	2.4 A	3.4 A	0.7 A	1.2 A	1.7 A
Starting current	3.0 A	5.5 A	7.5 A	1.5 A	2.8 A	3.8 A
Max. noise emission (installed)	55 dB(A), application-dependent					
Length of motor cable	19.6"					
Max. reference length	59"					
Ambient temperature in operation	32 to 104 °F					
Motor shaft	Stainless steel, 7/16" HEX, thread M12 x 1					
Anti-static version	Yes (< 10^6 Ω)					
Tube wall thickness	ø 1.9": 0.065"					
Tube material	Zinc-plated steel, stainless steel					
Tube sleeving	PVC sleeve 0.08" PU sleeve 0.063", 0.125"					

Maximum static load capacity
The maximum load capacity of the RollerDrive EC5000 depends on the drive head and the length of the RollerDrive.

Length of RollerDrive	≤ 39"	43"	47"	51"	55"	59"
Maximum load capacity per RollerDrive without drive head	242 lbs	203 lbs	165 lbs	143 lbs	121 lbs	104 lbs
Maximum load capacity per RollerDrive with drive head (PolyVee, round or toothed belt)	76 lbs					

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ROLLERDRIVE SERIES EC5000

ø 1.9", cylindrical, IP54, for 32 to 104 °F

Design versions

20 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	382	18	2.2	5.5	5.5
13:1	264	12	3.18	8.0	8.0
18:1	190	8	4.4	11.1	11.1
21:1	163	8	5.2	13.0	13.0
30:1	114	6	7.5	18.8	18.8
42:1	82	4	10.4	26.1	26.1
49:1	70	4	12.1	30.4	30.4
78:1	42	2	17.8	48.0	48.0
108:1	32	2	24.9	67.0	67.0

35 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	382	18	3.89	9.8	9.8
13:1	264	12	5.6	14.1	14.1
18:1	190	8	7.8	19.6	19.6
21:1	163	8	9.2	22.9	22.9
30:1	114	6	13.1	33.1	33.1
42:1	82	4	18.3	45.8	45.8
49:1	70	4	21.4	53.4	53.4
78:1	42	2	31.4	84.4	84.4
108:1	32	2	43.8	115.0	115.0

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50 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	382	18	5.5	13.98	13.98
13:1	264	12	8.0	20.2	20.2
18:1	190	8	11.2	28.0	28.0
21:1	163	8	13.0	32.7	32.7
30:1	114	6	18.8	47.2	47.2
42:1	82	4	26.1	65.4	65.4
49:1	70	4	30.5	76.3	76.3
78:1	42	2	44.8	115.0	115.0
108:1	32	2	62.5	115.0	115.0

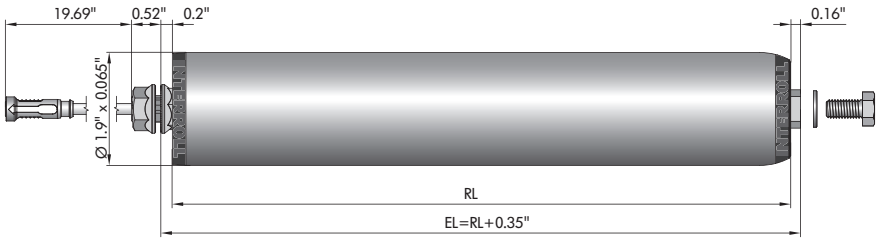
Before the run-in, the values may differ up to ±20 %. After a run-in phase, the values vary only in the range of ±10 % for 95 % of all RollerDrive used.

Dimensions

The minimum reference length depends on the gear box variant, the grooves in the tube and the drive or the bearing assembly. A sufficient axial play is already taken into account, so that the actual clear width between side profiles is required.
When using the tapered hexagon spring shaft, it must be ensured that the design of the axial play is not too high. If the RollerDrive selected is too short, the shaft may have play in the hexagon hole. A hexagon hole with a size of at least 0.44" is recommended. If the RollerDrive is installed obliquely, the fastening hole must be designed larger accordingly.

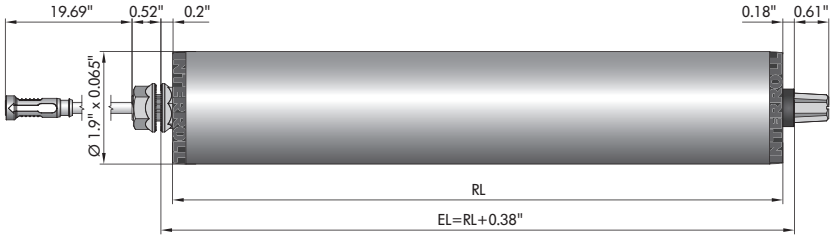
RL = Reference length/ordering length
EL = Installation length

5/16"-18 or M8 female thread, without grooves

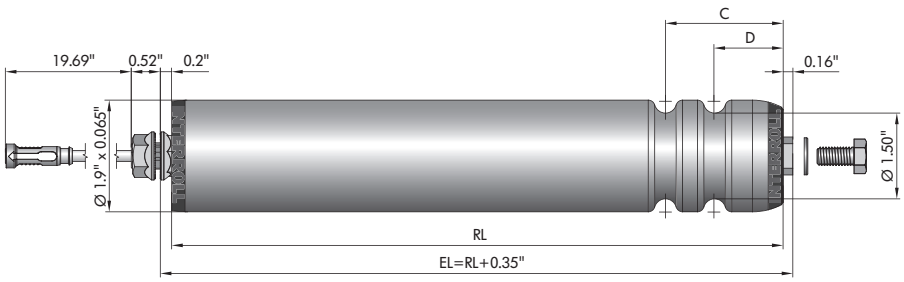


ROLLERDRIVE
SERIES EC5000
ø 1.9", cylindrical, IP54, for 32 to 104 °F

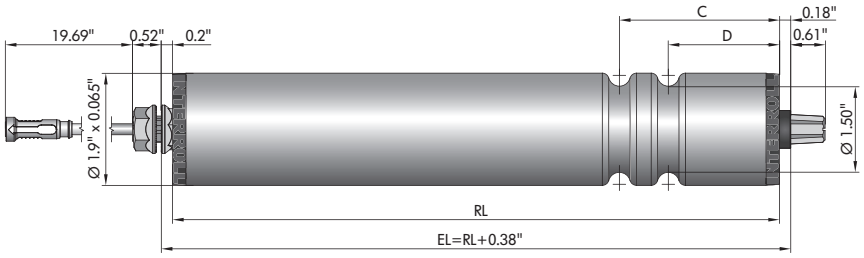
Hexagon spring shaft, without grooves



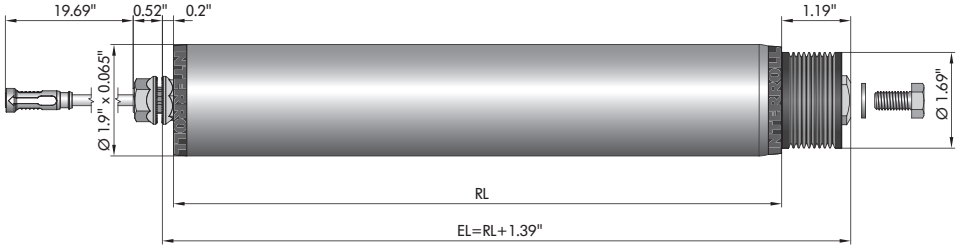
5/16"-18 or M8 female thread, with grooves



Hexagon spring shaft, with grooves



PolyVee drive head with M8 female thread



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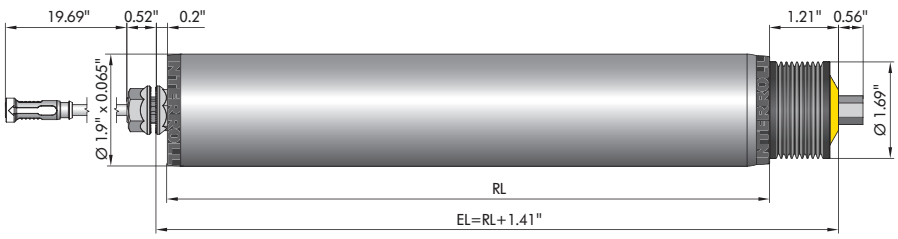
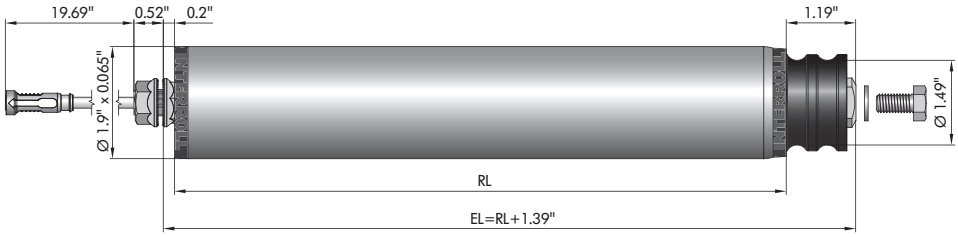
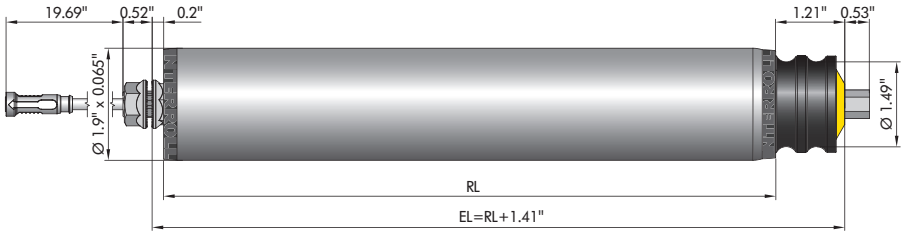
PolyVee drive head with 7/16" hexagon spring shaft



Round belt drive head with M8 female thread



Round belt drive head with 7/16" hexagon spring shaft



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ROLLERDRIVE
SERIES EC5000
Based on ø 1.9", tapered, IP54, for 32 to 104 °F

24V
48V
20W
35W
50W
AI
BI

Application area
Drive for unit handling conveyor systems, such as transporting cardboard cartons, containers, platens or tires at normal ambient temperature. Suitable for roller/ belt curves as well as constantly driven or zero pressure accumulation conveyor technology.

Compact design
The drive integrated in the tube allows a very compact design of the curve.

Very energy-efficient
The brushless drive features energy recovery when braking. The conveyor system can operate without pneumatics or conventional drives, which must be operated continually.

Robust design
In contrast to conventional designs, the tapered elements (gray and black) are secured against axial shifting. This safeguard prevents the tapered elements from shifting on the tube, similar to the matching conveyor rollers.

Flexible possible applications
RollerDrive is available in many variations, allowing it to be used in all types of different conveyor systems. For the user, this translates into a single interface instead of many. Depending on the application area, PolyVee or round belts can be used for the transmission of force. Nine gear ratios allow selecting the perfect pairing between speed and torque.

Low-noise
The use of decoupling elements achieves particularly low-noise running.

Maintenance-free and installation-friendly
The drive with internal commutation electronics does not require any maintenance. It features an overload protection that prevents damages due to overtemperature or blockage. It is connected securely without complex screw connection by using a motor cable with 5-pin snap-in plug.

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Technical data

Rated voltage	24 V	24 V	24 V	48 V	48 V	48 V
Power	20 W	35 W	50 W	20 W	35 W	50 W
Rated current	1.4 A	2.4 A	3.4 A	0.7 A	1.2 A	1.7 A
Starting current	3.0 A	5.5 A	7.5 A	1.5 A	2.8 A	3.8 A
Max. noise emission (installed)	55 dB(A), application-dependent					
Length of motor cable	19.6"					
Max. reference length	40"					
Ambient temperature in operation	32 to 104 °F					
Maximum load capacity per RollerDrive without drive head	104 lbs					
Max. load capacity per RollerDrive with drive head (PolyVee or round belt)	76 lbs					
Motor shaft	Stainless steel, 7/16" HEX, thread M12 x 1					
Anti-static version	No					
Tube wall thickness	0.065"					
Tube material	Zinc-plated steel, stainless steel					
Tapered cones	1.8° in black (not antistatic)					

Design versions

20 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	382	18	2.2	5.5	5.5
13:1	264	12	3.18	8.0	8.0
18:1	190	8	4.4	11.1	11.1
21:1	163	8	5.2	13.0	13.0
30:1	114	6	7.5	18.8	18.8
42:1	82	4	10.4	26.1	26.1
49:1	70	4	12.1	30.4	30.4
78:1	42	2	17.8	48.0	48.0
108:1	32	2	24.9	67.0	67.0

ROLLERDRIVE SERIES EC5000

Based on ø 1.9", tapered, IP54, for 32 to 104 °F

35 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	382	18	3.89	9.8	9.8
13:1	264	12	5.6	14.1	14.1
18:1	190	8	7.8	19.6	19.6
21:1	163	8	9.2	22.9	22.9
30:1	114	6	13.1	33.1	33.1
42:1	82	4	18.3	45.8	45.8
49:1	70	4	21.4	53.4	53.4
78:1	42	2	31.4	84.4	84.4
108:1	32	2	43.8	115.0	115.0

50 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	382	18	5.5	13.98	13.98
13:1	264	12	8.0	20.2	20.2
18:1	190	8	11.2	28.0	28.0
21:1	163	8	13.0	32.7	32.7
30:1	114	6	18.8	47.2	47.2
42:1	82	4	26.1	65.4	65.4
49:1	70	4	30.5	76.3	76.3
78:1	42	2	44.8	115.0	115.0
108:1	32	2	62.5	115.0	115.0

Before the run-in, the values may differ up to ±20 %. After a run-in phase, the values vary only in the range of ±10 % for 95 % of all RollerDrive used.

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Dimensions

The minimum reference length depends on the gear box variant, the grooves in the tube and the drive or the bearing assembly. A sufficient axial play is already taken into account, so that the actual clear width between side profiles is required.
When using the tapered hexagon spring shaft, it must be ensured that the design of the axial play is not too high. If the RollerDrive selected is too short, the shaft may have play in the hexagon hole. A hexagon hole with a size of at least 0.44" is recommended. If the RollerDrive is installed obliquely, the fastening hole must be designed larger accordingly.

RL = Reference length
EL = Installation length
U = Usable tube length: Length of tapered elements

Reference lengths with tapered elements

Conicity: 1.8°, color: black (not antistatic)		
Tapered rated length [inch]	**Min. Ø [inch]**	**Max. Ø [inch]**
11.85	2.30	3.05
13.62	2.19	3.05
15.61	2.07	3.05
15.80	2.30	3.30
17.57	2.19	3.30
19.56	2.07	3.30
19.75	2.30	3.56
21.53	2.19	3.56
23.51	2.07	3.56
23.70	2.30	3.81
25.48	2.19	3.81
27.46	2.07	3.81
27.66	2.30	4.06
29.43	2.19	4.06
31.41	2.07	4.06
31.61	2.30	4.32
33.38	2.19	4.32
35.36	2.07	4.32

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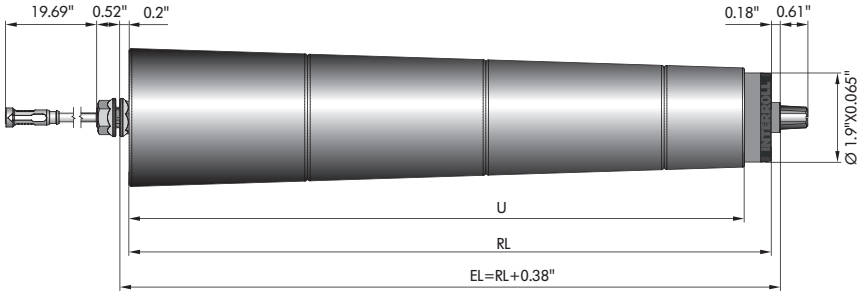
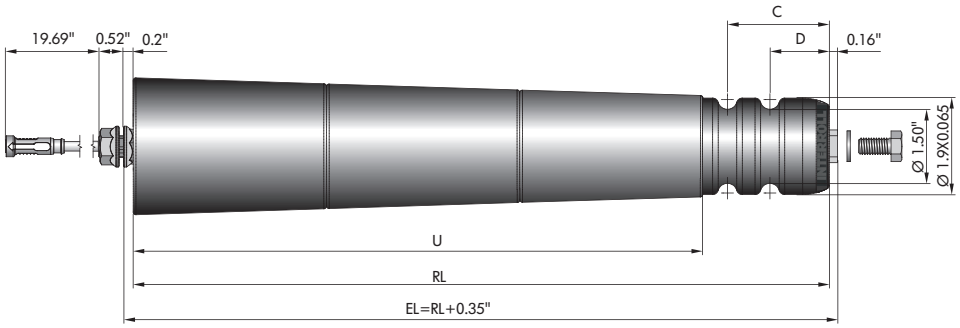
ROLLERDRIVE
SERIES EC5000
Based on ø 1.9", tapered, IP54, for 32 to 104 °F

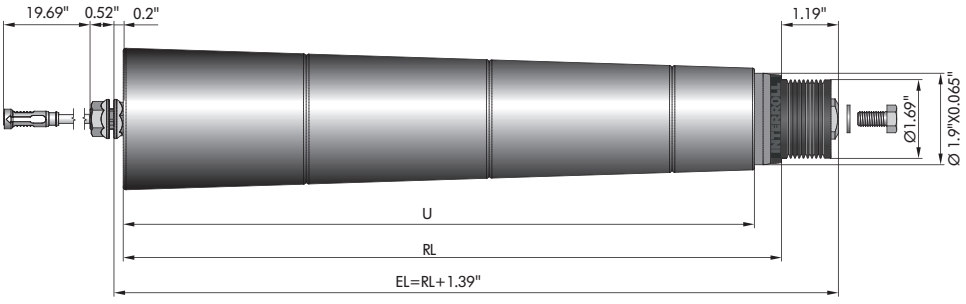
Hexagon spring shaft, without grooves



5/16"-18 or M8 female thread, with grooves



PolyVee drive head with M8 female thread



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ROLLERDRIVE SERIES EC5000

Based on ø 1.9", tapered, IP54, for 32 to 104 °F

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ROLLERDRIVE
SERIES EC5000
ø 1.9", cylindrical, IP54, for –22 to 32 °F

Application area
Drive for unit handling conveyor systems, such as transporting cardboard cartons, containers or platens in deep freeze conditions. Suitable for straight conveyors and especially zero-pressure accumulation conveyors. Also usable in shuttle systems, aligning conveyor segments or transfers to other "conveyor system branches".

Compact design
The motor integrated in the tube allows a very compact design of the conveyor system.

Very energy-efficient
The brushless drive features energy recovery when braking. The conveyor system can operate without pneumatics or conventional drives, which must be operated continually.

Flexible possible applications
RollerDrive is available in many variations, allowing it to be used in all types of different conveyor systems. For the user, this translates into a single interface instead of many. Depending on the application area, PolyVee, round or toothed belts can be used for the transmission of force. Nine gear ratios allow selecting the perfect pairing between speed and torque. The electronic holding brake (Zero-Motion-Hold) holds conveying goods in position, even on gravity conveyors.

Low-noise
The use of decoupling elements achieves particularly low-noise running.

Maintenance-free and installation-friendly
The drive with internal commutation electronics does not require any maintenance. It features an overload protection that prevents damages due to overtemperature or blockage. It is connected securely without complex screw connection by using a motor cable with 5-pin snap-in plug.

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Technical data

Rated voltage	24 V	24 V	48 V	48 V
Power	35 W	50 W	35 W	50 W
Rated current	2.2 A	3.4 A	1.1 A	1.7 A
Starting current	5.5 A	7.5 A	2.8 A	3.8 A
Max. noise emission (installed)	55 dB(A), application-dependent			
Length of motor cable	19.6"			
Max. reference length	59"			
Ambient temperature in operation	–22 to 32 °F			
Motor shaft	Stainless steel, 7/16" HEX, thread M12 x 1			
Anti-static version	Yes (< 10^6 Ω)			
Tube wall thickness	⌀ 1.9": 0.065"			
Tube material	Zinc-plated steel, stainless steel			
Tube sleeving	PVC sleeve 0.08" PU sleeve 0.063", 0.125"			

Maximum static load capacity
The maximum load capacity of the RollerDrive EC5000 depends on the drive head and the length of the RollerDrive.

Length of RollerDrive	≤ 39"	43"	47"	51"	55"	59"
Maximum load capacity per RollerDrive without drive head	242 lbs	203 lbs	165 lbs	143 lbs	121 lbs	104 lbs
Maximum load capacity per RollerDrive with drive head (PolyVee, round or toothed belt)	76 lbs					

Design versions

35 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
30:1	114	6	13.1	33.1	33.1
42:1	82	4	18.3	45.8	45.8
49:1	70	4	21.4	53.4	53.4

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ROLLERDRIVE
SERIES EC5000
ø 1.9", cylindrical, IP54, for –22 to 32 °F

50 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
13:1	264	12	8.0	20.2	20.2
18:1	190	8	11.2	28.0	28.0
21:1	163	8	13.0	32.7	32.7
30:1	114	6	18.8	47.2	47.2
42:1	82	4	26.1	65.4	65.4
49:1	70	4	30.5	76.3	76.3
78:1	42	2	44.8	115.0	115.0
108:1	32	2	62.5	115.0	115.0

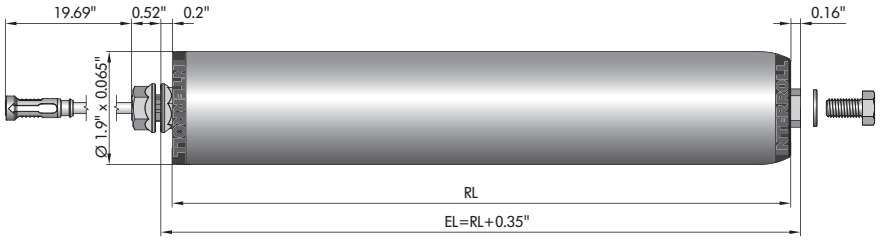
Before the run-in, the values may differ up to ±20 %. After a run-in phase, the values vary only in the range of ±10 % for 95 % of all RollerDrive used.

Dimensions

The minimum reference length depends on the gear box variant, the grooves in the tube and the drive or the bearing assembly. A sufficient axial play is already taken into account, so that the actual clear width between side profiles is required. A hexagon hole with a size of at least 0.44" is recommended. If the RollerDrive is installed obliquely, the fastening hole must be designed larger accordingly.

RL = Reference length/ordering length
EL = Installation length

M8 female thread, without grooves



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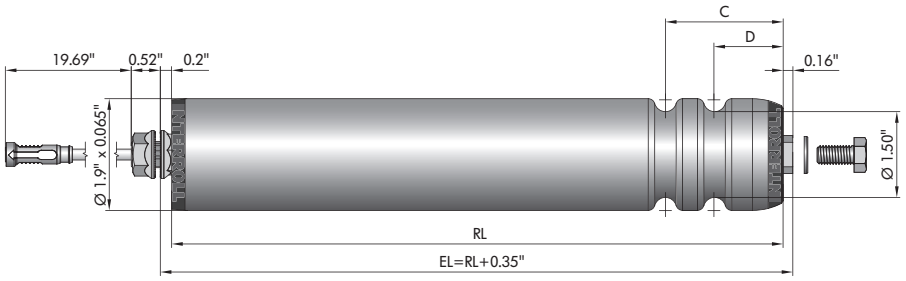
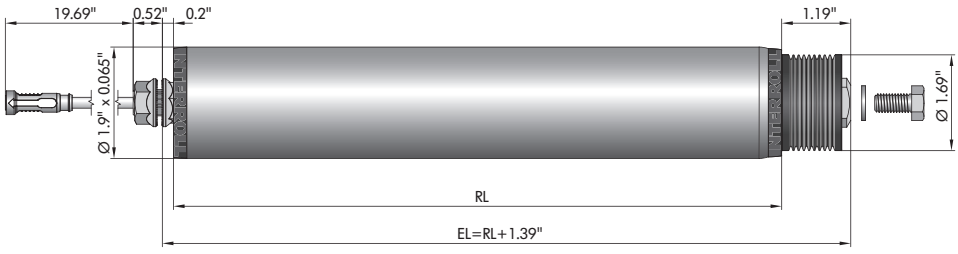
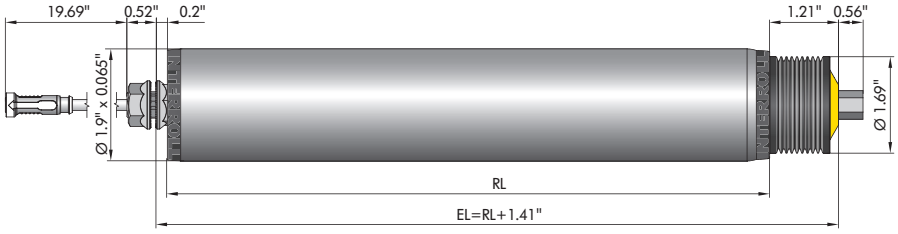
M8 female thread, with grooves



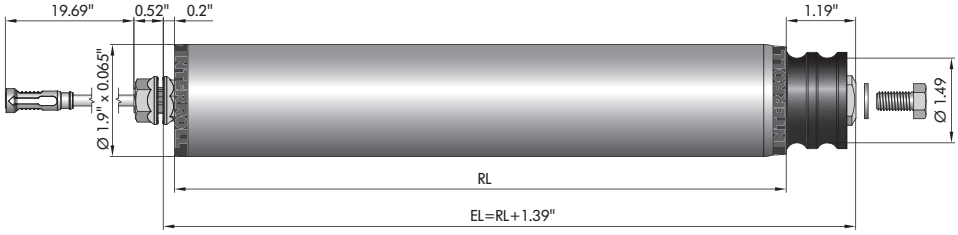
PolyVee drive head with M8 female thread



PolyVee drive head with 7/16" hexagon spring shaft



Round belt drive head with M8 female thread



ROLLERDRIVE
SERIES EC5000
ø 2.36", cylindrical, IP54, for 32 to 104 °F

24V
48V
20W
35W
50W
AI
BI

Application area
Drive for unit handling conveyor systems, such as transporting cardboard cartons, containers, platens, (truck) tires or lightweight pallets at normal ambient temperature. Suitable for straight conveyors, small belt conveyors and especially zero-pressure accumulation conveyors. Also usable in aligning conveyor segments or transfers or other "conveyor system branches".

Compact design
The motor integrated in the tube allows a very compact design of the conveyor system.

Very energy-efficient
The brushless drive features energy recovery when braking. The conveyor system can operate without pneumatics or conventional drives, which must be operated continually.

Flexible possible applications
RollerDrive is available in many variations, allowing it to be used in all types of different conveyor systems. For the user, this translates into a single interface instead of many. Nine gear ratios allow selecting the perfect pairing between speed and torque. The electronic holding brake (Zero-Motion-Hold) holds conveying goods in position, even on gravity conveyors.

Low-noise
The use of decoupling elements achieves particularly low-noise running.

Maintenance-free and installation-friendly
The drive with internal commutation electronics does not require any maintenance. It features an overload protection that prevents damages due to overtemperature or blockage. It is connected securely without complex screw connection by using a motor cable with 5-pin snap-in plug.

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Technical data

Rated voltage	24 V	48 V
Power	50 W	50 W
Rated current	3.4 A	1.7 A
Starting current	7.5 A	3.8 A
Max. noise emission (installed)	55 dB(A), application-dependent	
Length of motor cable	19.69"	
Max. reference length	59"	
Ambient temperature in operation	32 to 104 °F	
Max. load capacity per RollerDrive with PolyVee drive head	123 lbs	
Motor shaft	Stainless steel, 7/16" HEX, thread M12 x 1	
Anti-static version	Yes (< 10^6 Ω)	
Tube wall thickness	0.079"	
Tube material	Zinc-plated steel, stainless steel	
Tube sleeving	PVC sleeve 0.079" Lagging 0.079"	

Design versions

50 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
9:1	474	23	5.5	13.9	13.9
13:1	328	18	8.0	20.2	20.2
18:1	236	12	11.2	28.0	28.0
21:1	202	10	13.0	32.7	32.7
30:1	141	6	18.8	47.2	47.2
42:1	102	6	26.1	65.4	65.4
49:1	86	6	30.5	76.3	76.3
78:1	55	2	44.8	115.0	115.0
108:1	39	2	62.5	115.0	115.0

Before the run-in, the values may differ up to ±20 %. After a run-in phase, the values vary only in the range of ±10 % for 95 % of all RollerDrive used.

ROLLERDRIVE
SERIES EC5000
ø 2.36", cylindrical, IP54, for 32 to 104 °F

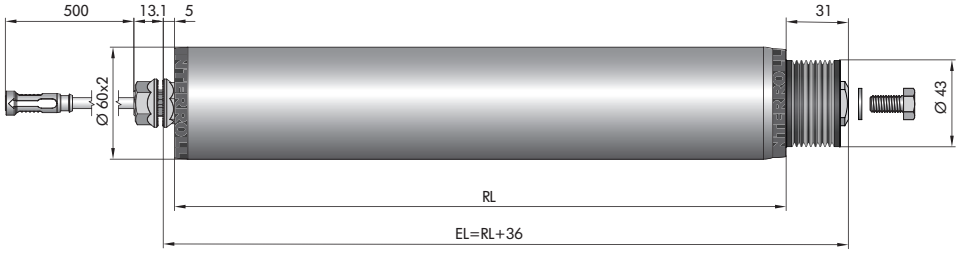
Dimensions

RL = Reference length/ordering length
EL = Installation length, clear width between side profiles

The minimum reference length depends on the gear box variant and the drive or the bearing assembly. A sufficient axial play is already taken into account, so that the actual clear width between side profiles is required. A hexagon hole with a size of at least 0.44" is recommended. If the RollerDrive is installed obliquely, the fastening hole must be designed larger accordingly.

Note: This model is available in metric sizes only (millimeters) as shown below.

PolyVee drive head with female thread



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ROLLERDRIVE SERIES EC5000

ø 2.36", cylindrical, IP54, for 32 to 104 °F

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ROLLERDRIVE
SERIES EC5000
ø 1.97", cylindrical, IP66, for 32 to 104 °F

24V
48V
20W
35W
50W
AI
BI

Application area
Drive for unit handling conveyor systems, such as transporting cardboard cartons, containers or platens at normal ambient temperature. Suitable for straight conveyors and especially zero-pressure accumulation conveyors. Often used at locations for cleaning with water jets due to the high protection rating.

Compact design
The motor integrated in the tube allows a very compact design of the conveyor system.

Very energy-efficient
The brushless drive features energy recovery when braking. The conveyor system can operate without pneumatics or conventional drives, which must be operated continually.

Flexible possible applications
RollerDrive is available in many variations, allowing it to be used in all types of different conveyor systems. For the user, this translates into a single interface instead of many. Depending on the application area, PolyVee or round belts can be used for the transmission of force. The many gear ratios allow selecting the perfect pairing between speed and torque.

Low-noise
The use of decoupling elements achieves particularly low-noise running.

Maintenance-free and installation-friendly
The drive with internal commutation electronics does not require any maintenance. It features an overload protection that prevents damages due to overtemperature or blockage. It is connected securely without complex screw connection by using a motor cable with 5-pin snap-in plug.

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Technical data

Rated voltage	24 V	24 V	48 V	48 V
Power	35 W	50 W	35 W	50 W
Rated current	2.4 A	3.4 A	1.2 A	1.7 A
Starting current	5.5 A	7.5 A	2.8 A	3.8 A
Max. noise emission (installed)	55 dB(A), application-dependent			
Length of motor cable	19.69"			
Max. reference length	59"			
Ambient temperature in operation	32 to 104 °F			
Motor shaft	Stainless steel, 7/16" HEX, thread M12 x 1			
Anti-static version	Yes (< 10^6 Ω)			
Tube wall thickness	ø 1.97": 0.059"			
Tube material	Stainless steel			
Tube sleeving	PVC sleeve 0.08", 0.19" PU sleeve 0.08" Lagging 0.08" to 0.19"			

Maximum static load capacity
The maximum load capacity of the RollerDrive EC5000 depends on the drive head and the length of the RollerDrive.

Length of RollerDrive	≤ 39"	43"	47"	51"	55"	59"
Maximum load capacity per RollerDrive without drive head	242 lbs	203 lbs	165 lbs	143 lbs	121 lbs	104 lbs
Maximum load capacity per RollerDrive with drive head (PolyVee, round or toothed belt)	76 lbs					

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ROLLERDRIVE SERIES EC5000

ø 1.97", cylindrical, IP66, for 32 to 104 °F

Design versions

35 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
18:1	196	8	7.8	19.6	19.6
21:1	169	8	9.2	22.9	22.9
30:1	118	6	13.1	33.1	33.1
42:1	84	4	18.3	45.8	45.8
49:1	72	4	21.4	53.4	53.4
78:1	45	2	31.4	84.4	84.4
108:1	33	2	43.8	115.0	115.0

50 W

Gear ratio	Max. conveying speed [fpm]	Min. conveying speed [fpm]	Rated torque [in-lbs]	Acceleration torque [in-lbs]	Continuous blocking torque [in-lbs]
18:1	196	8	11.2	28.0	28.0
21:1	169	8	13.0	32.7	32.7
30:1	118	6	18.8	47.2	47.2
42:1	84	4	26.1	65.4	65.4
49:1	72	4	30.5	76.3	76.3
78:1	45	2	44.8	115.0	115.0
108:1	33	2	62.5	115.0	115.0

Before the run-in, the values may differ up to ±20 %. After a run-in phase, the values vary only in the range of ±10 % for 95 % of all RollerDrive used.

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Dimensions

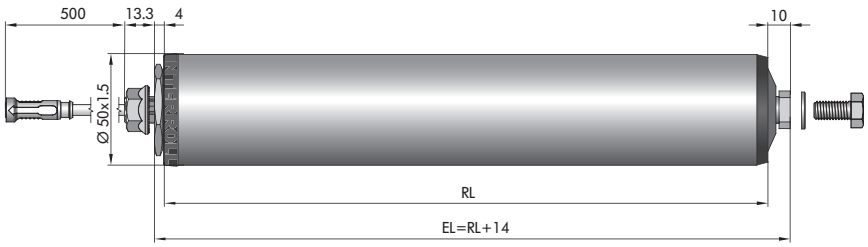
The minimum reference length depends on the gear box variant, the grooves in the tube and the drive or the bearing assembly. A sufficient axial play is already taken into account, so that the actual clear width between side profiles is required. A hexagon hole with a size of at least 0.44" is recommended. If the RollerDrive is installed obliquely, the fastening hole must be designed larger accordingly.

RL = Reference length/ordering length
EL = Installation length, clear width between side profiles

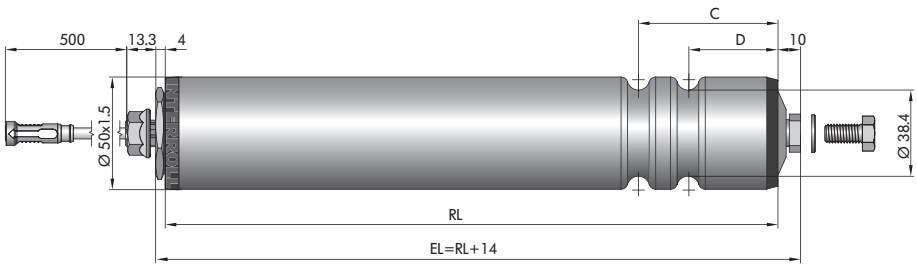
The female thread solution for the IP66 designs consists of a shaft bolt using a floating bearing. Ball bearings are not used.

Note: This model is available in metric sizes only (millimeters) as shown below.

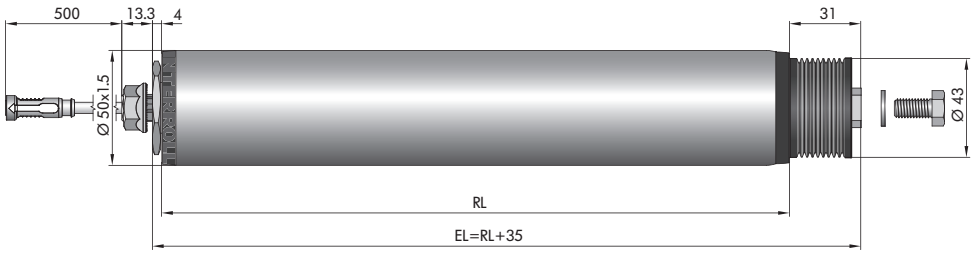
Female thread, without grooves



Female thread, with grooves



PolyVee drive head with female thread



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CONTROLS
DRIVECONTROL 20
For EC5000, 24 V
20 W, 35 W, with analog interface

Application area
Control of RollerDrive EC5000 in applications without start-stop operation, e.g. in roller curves. Mechanical engineering applications. Applications with PLC, but without fieldbus. Small applications with max. ten RollerDrive.

Product description
The DriveControl 20 is a simple control for the RollerDrive EC5000. It does not contain any logic (e.g. for zero-pressure accumulation conveying) and requires external signals.

DIP switches can be used to set the direction of rotation, a start and braking ramp and the speed in 15 increments. Digital inputs and outputs serve as interface to a higher-level control. Signals allow adjusting the direction of rotation and the speed in seven increments. The braking energy of the RollerDrive EC5000 is fed back into the DC supply system. The voltage fed back from the RollerDrive EC5000 is limited at 30 V by means of the integral brake chopper (voltage-dependently switched load resistance).

Functions
- Speed setting (DIP switches 15x, digital input 7x)
- Selection of direction of rotation (via DIP switches or digital input)
- Error signal output
- Status display with LEDs
- Voltage limitation via brake chopper

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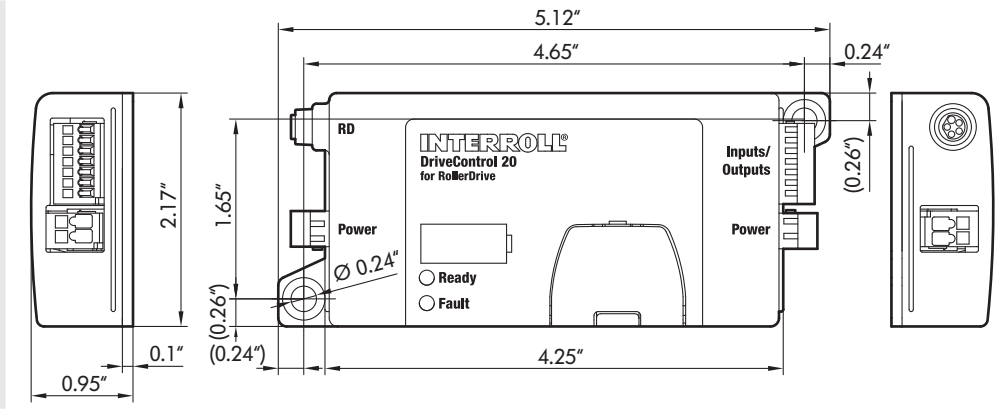
Technical data

Electrical data	
Rated voltage	24 V DC
Voltage range	19 to 26 V DC
Current consumption	DriveControl: approx. 0.5 A + current of RollerDrive EC5000*
Fuse	Present, non-replaceable
Protection rate	IP20
Ambient conditions	
Ambient temperature in operation	32 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft (at higher altitudes, a reduction of performance values is possible)
Cable cross-sections	
Power supply	Fine-wired, 1.5 mm² (AWG 16)
Inputs/outputs (I/O)	Fine-wired, 0.08 to 0.5 mm² (AWG 28 to 20)

* The power of EC5000 depends on the application, e.g., conveying good weight, conveying speed, acceleration ramp, and on the EC5000 used (refer to the corresponding chapter).

Dimensions



Accessories

- RollerDrive EC5000 extension cable, page 62
- Switching power supply HP5424, page 52

Ordering information

- Article number: S-1001415
- Scope of supply: 2 plugs for voltage supply, 1 plug for inputs and outputs, polymer tool for cabling

CONTROLS
DRIVECONTROL 54
For EC5000 24 V
20 W, 35 W, with analog interface

24V
48V
20W
35W
50W
AI
BI

Application area
Control of RollerDrive EC5000 in applications without start-stop operation, e.g. in roller curves. Mechanical engineering applications. Applications with PLC, but without fieldbus. Small applications with max. ten RollerDrive. Applications with splashing water (e.g. Sprinkler systems) or applications in deep freeze area.

Product description
The DriveControl 54 is a simple control for the RollerDrive EC5000. It does not contain any logic (e.g. for zero-pressure accumulation conveying) and requires external signals. The DriveControl 54 has a protection rating of IP54 and, as a result, is suitable for use in wet environments or deep freeze conditions.

DIP switches can be used to set the direction of rotation, a start and braking ramp and the speed in 15 increments. Digital inputs and outputs serve as interface to a higher-level control. Signals allow adjusting the direction of rotation and the speed in seven increments. The braking energy of the RollerDrive EC5000 is fed back into the DC supply system. The voltage fed back from the RollerDrive EC5000 is limited at 30 V by means of the integral brake chopper (voltage-dependently switched load resistance).

Functions
- Speed setting (DIP switches 15x, digital input 7x)
- Selection of direction of rotation (via DIP switches or digital input)
- Error signal output
- Status display with LEDs
- Voltage limitation via brake chopper

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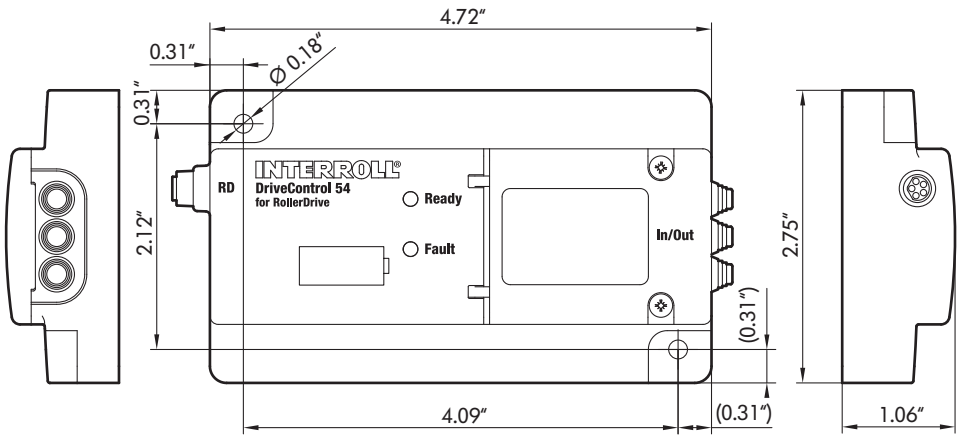
Technical data

Electrical data	
Rated voltage	24 V DC
Voltage range	19 to 26 V DC
Current consumption	DriveControl: approx. 0.5 A + current of RollerDrive EC5000*
Fuse	Present, non-replaceable
Protection rate	IP54
Ambient conditions	
Ambient temperature in operation	–18 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft (at higher altitudes, a reduction of performance values is possible)
Cable cross-sections	
Power supply	Fine-wired, 1.5 mm² (AWG 16)
Inputs/outputs (I/O)	Fine-wired, 0.08 to 0.5 mm² (AWG 28 to 20)

* The power of EC5000 depends on the application, e.g., conveying good weight, conveying speed, acceleration ramp, and on the EC5000 used (refer to the corresponding chapter).

Dimensions



Accessories

- RollerDrive EC5000 extension cable, page 62
- Switching power supply HP5424, page 52

Ordering information

Article number: S-1001416

CONTROLS
DRIVECONTROL 2048
For EC5000 24 V, 48 V
20 W, 35 W, 50 W, with analog interface

24V
48V
20W
35W
50W
AI
BI

Application area
Control of RollerDrive EC5000 in applications without start-stop operation, e.g. in roller curves. Mechanical engineering applications. Applications with PLC, but without fieldbus. Small applications with max. ten RollerDrive.

Product description
The DriveControl 2048 is a simple control for the RollerDrive EC5000. It does not contain any logic (e.g. for zero-pressure accumulation conveying) and requires external signals.

2 rotary coding switches can be used to set the direction of rotation, 8 different start and braking ramps and the speed in 15 increments. Digital inputs and outputs serve as interface to a higher-level control. Signals allow adjusting the direction of rotation and the speed in seven increments. The braking energy of the RollerDrive EC5000 is fed back into the DC supply system. The voltage fed back from the RollerDrive EC5000 is limited at 30 V by means of the integral brake chopper (voltage-dependently switched load resistance).

Functions
- Speed setting (rotary coding switch 15x, digital input 7x)
- Selection of direction of rotation (via rotary coding switch or digital input)
- Adjustment of acceleration and braking ramp (rotary coding switch 8x)
- Status display with LEDs
- Voltage limitation via brake chopper

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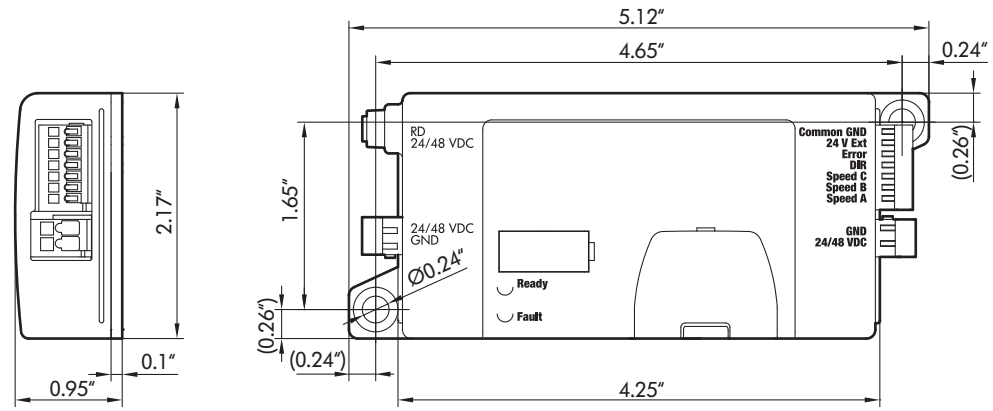
Technical data

Electrical data	
Rated voltage	24 or 48 V DC
Voltage range	24 V DC: 19 to 28 V DC 48 V DC: 38 to 56 V DC
Current consumption	DriveControl: approx. 0.5 A + current of RollerDrive EC5000*
Fuse	Present, non-replaceable
Protection rate	IP20
Ambient conditions	
Ambient temperature in operation	32 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft (at higher altitudes, a reduction of performance values is possible)
Cable cross-sections	
Power supply	Fine-wired, 1.5 mm^2 (AWG 16)
Inputs/outputs (I/O)	Fine-wired, 0.08 to 0.5 mm^2 (AWG 28 to 20)

* The power of EC5000 depends on the application, e.g., conveying good weight, conveying speed, acceleration ramp, and on the EC5000 used (refer to the corresponding chapter).

Dimensions



Accessories

- RollerDrive EC5000 extension cable, page 62
- Switching power supply HP5424, page 52
- Switching power supply HP5448, page 56

Ordering information

- Article number: S-1113898
- Scope of supply: 2 plugs for voltage supply, 1 plug for inputs and outputs, polymer tool for cabling

CONTROLS
ZONECONTROL
For EC5000 24 V
20 W, 35 W, with analog interface

24V
48V
20W
35W
50W
AI
BI

Application area
Zero-pressure accumulation (ZPA) conveying for systems with medium to high number of conveyor zones. Applications with or without PLC, but without fieldbus.

Product description
The ZoneControl is a single-zone control for a RollerDrive EC5000 and a zone sensor. The ZoneControl can be used to create stand-alone, zero-pressure accumulation conveyors which require no higher-level control (PLC). Additional functions and communication to upstream and downstream conveyors can be implemented via digital inputs and outputs (I/Os).

The advantage is that the ZPA logic is contained in the ZoneControl and does not have to be programmed within a PLC. DIP switches can be used to set the RollerDrive speed and direction of rotation as well as the logic (single or train release). For all ZoneControl connected with each other, the speed can also be changed with an analog signal and a cumulative error signal can be read out.

The wiring of the voltage supply is done via switching wire and communication using commercial CAT5 patch cables (Ethernet cable). The ZoneControl is only partially suited when a tracking of conveying goods or the control of the RollerDrive with start and brake ramps is being planned or a large number of additional functions is to be used.

The ZoneControl shows its strength in the fact that it does not have to be addressed, which makes an exchange in case of a failure extremely easy, and it can easily be configured with DIP switches.

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Functions

- Logic for zero-pressure accumulation conveying incl. initialization
- Communication with upstream and downstream zones via peer-to-peer connection
- Speed setting in 8 increments via DIP switches or analog signal
- Direction of rotation setting via DIP switches or external digital signal
- Connection of a zone sensor
- Connection of a start sensor for the start of the conveyor line
- Determination of NPN or PNP switching logic
- Switching a second RollerDrive into the zone
- Additional functions: Running the conveyor empty, error signaling of all connected zones, external start or stop signal
- Voltage limitation via brake chopper

Technical data

Electrical data	
Rated voltage	24 V DC
Voltage range	19 to 26 V DC
Current consumption	ZoneControl with sensor: approx. 0.5 A + current of RollerDrive EC5000*
Fuse	Present, non-replaceable
Protection rate	IP20
Ambient conditions	
Ambient temperature in operation	32 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft (at higher altitudes, a reduction of performance values is possible)
Cable cross-sections	
Power supply	Fine-wired, 1.5 mm^2 (AWG 16)
Inputs/outputs (I/O)	Fine-wired, 0.08 to 0.5 mm^2 (AWG 28 to 20)

* The power of EC5000 depends on the application, e.g., conveying good weight, conveying speed, acceleration ramp, and on the EC5000 used (refer to the corresponding chapter).

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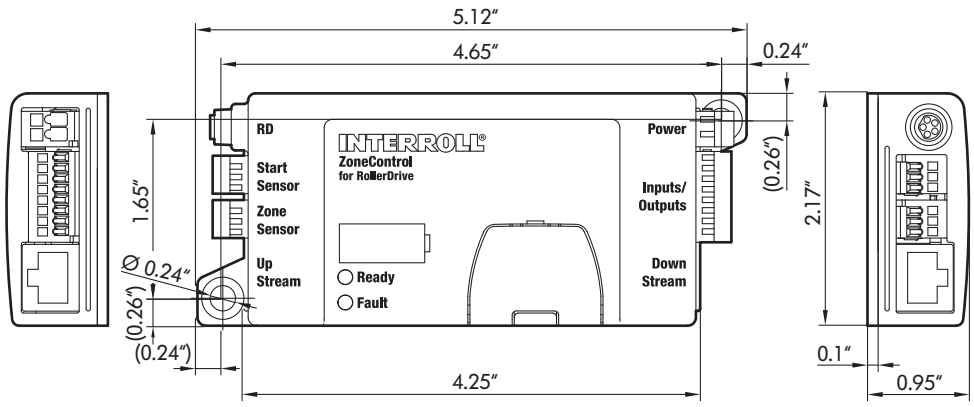
CONTROLS
ZONECONTROL
For EC5000 24 V
20 W, 35 W, with analog interface

Dimensions



Accessories

- RollerDrive EC5000 extension cable, page 62
- Switching power supply HP5424, page 52

Ordering information

- Article number: S-1101459
- Scope of supply: Plug for voltage supply, plug for inputs and outputs, one plug each for start and zone sensor, polymer tool for cabling

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CONTROLS
ZONECONTROL
For EC5000 24 V
20 W, 35 W, with analog interface

CONTROLS
MULTICONTROL AI
For EC5000 24 V, 48 V
20 W, 35 W, 50 W with analog interface

Application area
Zero-pressure accumulation conveying (ZPA) for systems with medium to high number of conveyor zones. Control of the Interroll Transfer and High Performance Divert as well as Interroll Pallet Drive (via Pallet Control).

Product description
The MultiControl is a four-zone control. This means that up to four RollerDrive EC5000 AI and four zone sensors can be connected. The use of Y-cables enables connecting four additional inputs or outputs. The connections can be configured individually.

MultiControl is multi-protocol-capable. PROFINET, EtherNet/IP and EtherCat can be used via simple switching.

With help of the MultiControl, sensors and RollerDrive are directly integrated into the field bus level. An additional sensor/actuator level and, as a result, additional communication lines or a gateway become redundant. A standard flat cable is used for power supply. They can simply be cut to the desired length and can be connected very quickly using the piercing technology of MultiControl.

The separate voltage supply allows a safe power-off of the RollerDrive while the bus communication and sensors can continue to be used.

Addressing and naming is done over PLC software, a web user interface, or with the Interroll teach-In method. With the Teach-In method, automatic addressing and configuration of all MultiControl is possible. In addition, the sequence of all MultiControls in the conveyor line can be determined. This saves time during the commissioning on site.

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Functions

- Easy handling – One control card for PROFINET, EtherNet/IP and EtherCat (simple toggling of bus protocols)
- Independent power supply for RollerDrive
- Plug & Play in case of replacements – no addressing or configuration required
- Status display with LEDs for all functions and I/Os
- Integrated logic for zero-pressure accumulation conveying incl. initialization
- Secure communication with the use of certificates: PROFINET Conformance Class B, EtherNet/IP ODVA Conformance, EtherCat Conformance
- Configuration via PLC, web browser menu and via teach-In method of:
  - Speed, direction of rotation, start and stop ramp of RollerDrive
  - Sensor properties
  - Timer
  - Error handling
  - Logic (single/train release)
- UL-listed
- Voltage limitation via brake chopper
- Variable process images for optimizing the data volumes transferred between MultiControl and PLC
- Functional ground connection for shield of communication line
- Polarity reversal protection of voltage supply
- Short circuit-proof design of voltage supply of inputs and outputs

Possible applications

Use of a PLC	Function of a PLC	Function of MultiControl
No	• None	• Implementation of ZPA logic
Yes	• Influencing the ZPA logic • Tracking of conveying goods • Error diagnostics	• Implementation of ZPA logic • Implementation of PLC specifications
Yes	• The PLC must be programmed and controls all connected RollerDrive via this program • Tracking of conveying goods and error diagnostics	• Function as input/output card • Transmits the status of all sensors, RollerDrive and, if necessary, error information to the PLC

CONTROLS
MULTICONTROL AI
For EC5000 24 V, 48 V
20 W, 35 W, 50 W with analog interface

Technical data

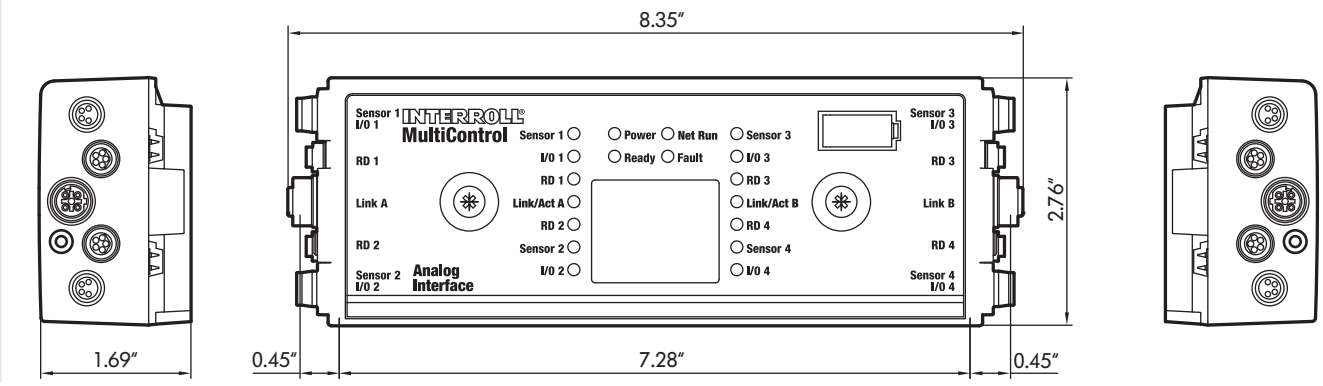
Electrical data	
Rated voltage	24 or 48 V DC
Voltage range	24 V DC: 22 to 28 V DC 48 V DC: 44 to 56 V DC (voltage supply of RollerDrive only)
Current consumption	Logic supply voltage: MultiControl: max. 0.2 A + connected sensors/actuators = max. 1.6 A + current of RollerDrive EC5000*
Fuses	– For logic – For RollerDrive – For sensors and I/Os, can be reset
Protection rate	IP54
Ambient conditions	
Ambient temperature in operation	–22 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft**

* The power of EC5000 depends on the application, e.g., conveying good weight, conveying speed, acceleration ramp, and on the EC5000 used (refer to the corresponding chapter).

** The installation in systems at an altitude above 3280 ft is possible. However, this can lead to a reduction of the performance values.

Dimensions

MultiControl



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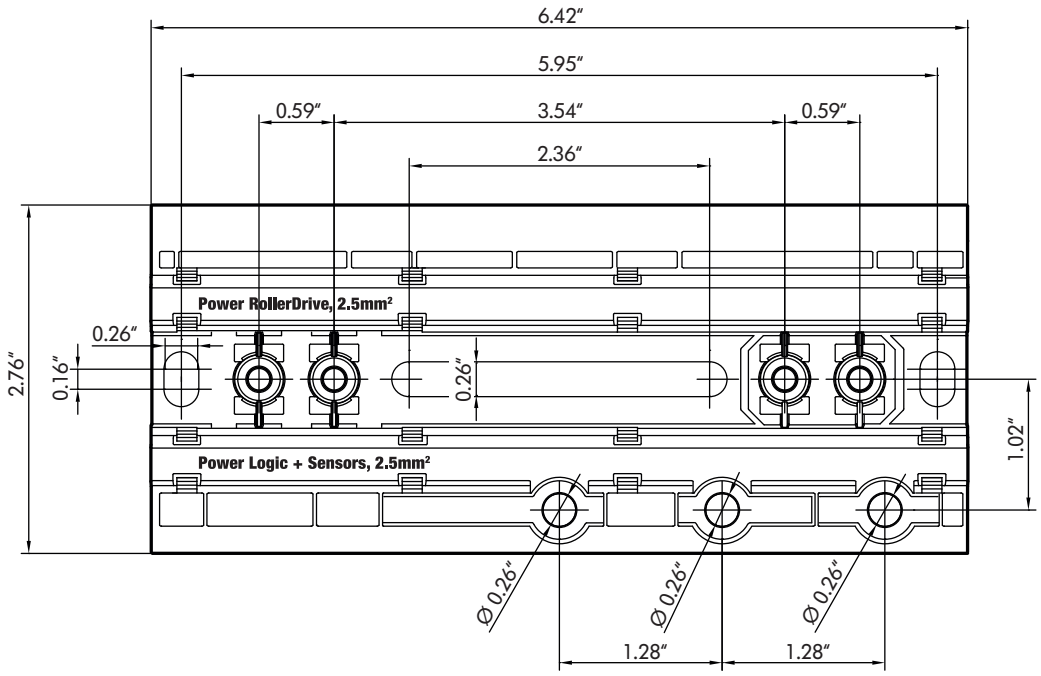
Base plate



To be able to position the magnetic key, the distance from the top edge of MultiControl to adjacent components must be at least 0.4".

Accessories

- Flat cable for voltage supply, page 62
- Magnetic key, page 65
- MultiControl dummy plug, page 64
- RollerDrive EC5000 extension cable, page 62
- MultiControl communication cable, page 63
- MultiControl Y-cable, page 63
- Switching power supply HP5424, page 52
- Switching power supply HP5448, page 56
- Cable distribution, page 63
- Shield connection cable, page 64

Ordering information

- Article number: S-1103563
- Scope of supply: Base plate

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CONTROLS
MULTICONTROL BI
For EC5000 24 V, 48 V
20 W, 35 W, 50 W, with bus interface (CANopen)

Application area
Zero-pressure accumulation conveying (ZPA) for systems with medium to high number of conveyor zones. Control of the Interroll Transfer and High Performance Divert as well as Interroll Pallet Drive (via Pallet Control). Control of RollerDrive EC5000 BI in applications with positioning demand.

Product description
The MultiControl is a four-zone control. This means that up to four RollerDrive EC5000 BI and four zone sensors can be connected. The use of Y-cables enables connecting four additional inputs or outputs. The connections can be configured individually.

MultiControl is multi-protocol-capable. PROFINET, EtherNet/IP and EtherCat can be used via simple switching.

With help of the MultiControl, sensors and RollerDrive are directly integrated into the field bus level. An additional sensor/actuator level and, as a result, additional communication lines or a gateway become redundant. A standard flat cable is used for power supply. They can simply be cut to the desired length and can be connected very quickly using the piercing technology of MultiControl.

The separate voltage supply allows a safe power-off of the RollerDrive while the bus communication and sensors can continue to be used.

Addressing and naming is done over PLC software, a web user interface, or with the Interroll teach-In method. With the Teach-In method, automatic addressing and configuration of all MultiControl is possible. In addition, the sequence of all MultiControls in the conveyor line can be determined. This saves time during the commissioning on site.

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Functions

- Easy handling – One control card for PROFINET, EtherNet/IP and EtherCat (simple toggling of bus protocols)
- Independent power supply for RollerDrive
- Plug & Play in case of replacements – no addressing or configuration required
- Status display with LEDs for all functions and I/Os
- Integrated logic for zero-pressure accumulation conveying incl. initialization
- Secure communication with the use of certificates: PROFINET Conformance Class B, EtherNet/IP ODVA Conformance, EtherCat Conformance
- Configuration via PLC, web browser menu and via teach-In method of:
  - Speed, direction of rotation, start and stop ramp of RollerDrive
  - Sensor properties
  - Timer
  - Error handling
  - Logic (single/train release)
- UL-listed
- Voltage limitation via brake chopper
- Variable process images for optimizing the data volumes transferred between MultiControl and PLC
- Functional ground connection for shield of communication line
- Polarity reversal protection of voltage supply
- Short circuit-proof design of voltage supply of inputs and outputs
- Precise error diagnostics of EC5000 – Analysis via web browser menu and PLC
- Automatic addressing of all connected EC5000s
- Test operation without previous configuration or connection of a PLC
- Positioning the connected EC5000 together with a PLC
- Analysis of various RollerDrive data via web browser menu and PLC:
  - Operating hours
  - Throughput
  - Temperature of EC5000
  - System status indicators
  - Life cycle indicator (allows preventive maintenance, resulting in increased availability)

Possible applications

Use of a PLC	Function of a PLC	Function of MultiControl
No	• None	• Implementation of ZPA logic • Visualization of EC5000 data
Yes	• Influencing the ZPA logic • Tracking of conveying goods • Error diagnostics	• Implementation of ZPA logic • Implementation of PLC specifications
Yes	• The PLC must be programmed and controls all connected RollerDrive via this program • Tracking of conveying goods and error diagnostics • Specification of target position in positioning mode	• Function as input/output card • Transmits the status of all sensors, RollerDrive and, if necessary, error information to the PLC

CONTROLS
MULTICONTROL BI
For EC5000 24 V, 48 V
20 W, 35 W, 50 W, with bus interface (CANopen)

Technical data

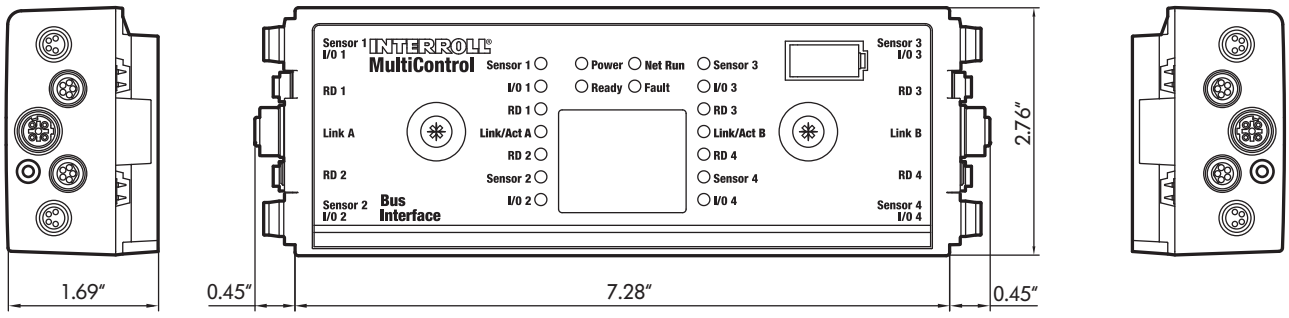
Electrical data	
Rated voltage	24 or 48 V DC
Voltage range	24 V DC: 22 to 28 V DC 48 V DC: 44 to 56 V DC (voltage supply of RollerDrive only)
Current consumption	Logic supply voltage: MultiControl: max. 0.2 A + connected sensors/actuators = max. 1.6 A + current of RollerDrive EC5000*
Fuses	– For logic – For RollerDrive – For sensors and I/Os, can be reset
Protection rate	IP54
Ambient conditions	
Ambient temperature in operation	–22 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft**

* The power of EC5000 depends on the application, e.g., conveying good weight, conveying speed, acceleration ramp, and on the EC5000 used (refer to the corresponding chapter).

** The installation in systems at an altitude above 3280 ft is possible. However, this can lead to a reduction of the performance values.

Dimensions

MultiControl



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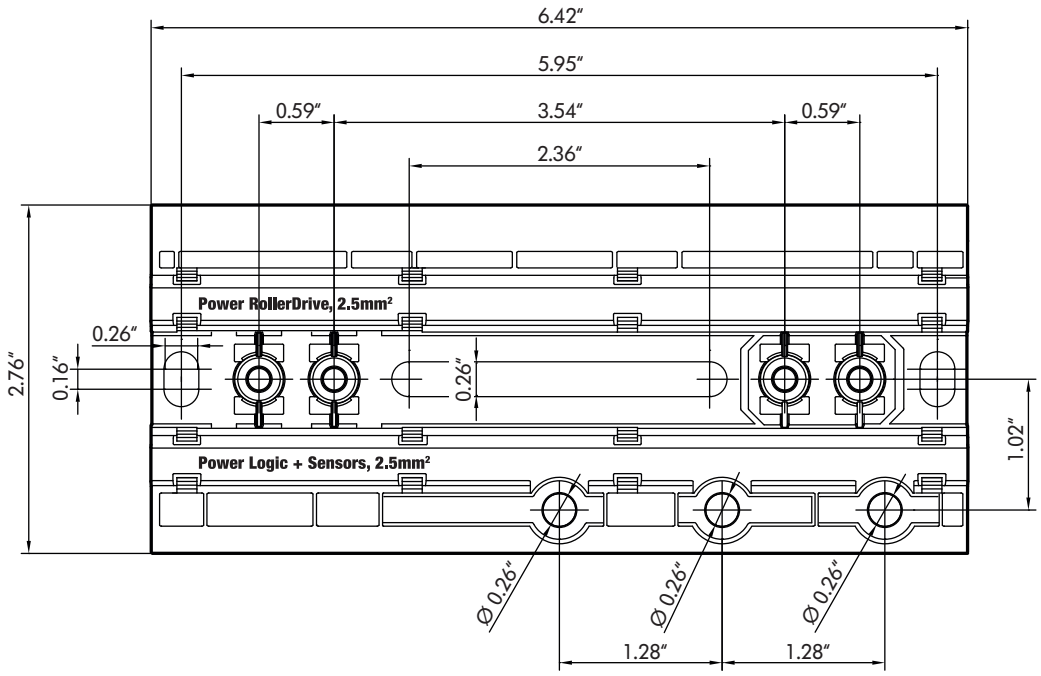
Base plate



To be able to position the magnetic key, the distance from the top edge of MultiControl to adjacent components must be at least 0.4".

Accessories

- Flat cable for voltage supply, page 62
- Magnetic key, page 65
- MultiControl dummy plug, page 64
- RollerDrive EC5000 extension cable, page 62
- MultiControl communication cable, page 63
- MultiControl Y-cable, page 63
- Switching power supply HP5424, page 52
- Switching power supply HP5448, page 56
- Cable distribution, page 63
- Shield connection cable, page 64

Ordering information

- Article number: S-1103564
- Scope of supply: Base plate

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SWITCHING POWER SUPPLIES
SWITCHING POWER SUPPLY HP5424

Application area
Voltage supply of MultiControl or ConveyorControl system via flat cable. Voltage supply of DriveControl or ZoneControl via round cable. Basic voltage supply of 24-V DC products.

Product description
The Interroll switching power supply HP5424 is a three-phase power supply for providing 24-V DC voltage. The robust housing achieves a protection rating of IP54. This allows placement in the immediate vicinity of the products to be supplied with 24 V DC, such as Interroll MultiControl. The central voltage supply saves costs for control cabinets and allows very short lines which, in turn, lead to cost savings and error reduction with respect to voltage drops on the line.

The HP5424 is immediately operational, all required functions, such as circuit protection or maintenance switches, are already present. Given its high level of overload capability, the power supply is perfectly adjusted to the current requirements of the RollerDrive EC5000. This ensures the power supply of several RollerDrive starting at the same time.

Properties
- No installation in switch cabinet required
- Compact design using heat dissipation element
- Very high peak output (150 %)
- Adjustable circuit protection (jumper)
- Overcurrent protection with resettable fuse
- Status signal
- LED status display
- 400 V AC can be looped through
- 4 24-V DC outputs are available
- Multiple terminal points, no special and expensive connectors required
- Brake chopper for limiting feedback voltage – resulting in feedback capability
- Lockable maintenance switch against reactivation
- Screw for connecting/disconnecting ground potential of primary side with ground of secondary side
- Maintenance-free
- No power reduction (derating) over the entire operating temperature range

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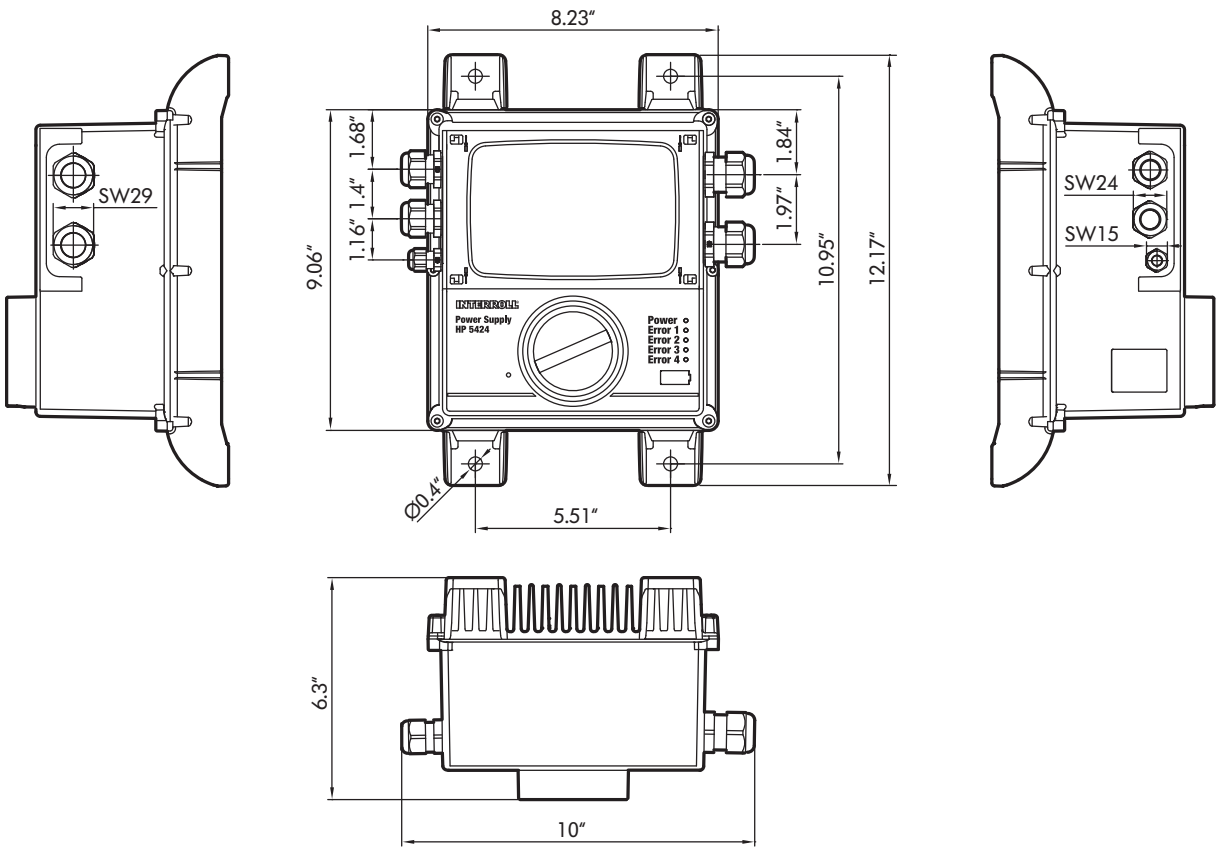
Technical data

Electrical data	
Rated supply voltage	400 V AC, 3 phases
Supply system voltage range	380 to 480 V AC ± 10 %
Supply system frequency	50 to 60 Hz ± 6 %
Supply system power consumption	Typically 1.6 A per phase at 3 x 400 V AC
Rated output voltage	24 V DC
Rated output power	960 W
Rated peak power	Max. 1440 W at 24 V DC for 4 s, repetition rate depends on duration and actual peak load
Maximum output current	60 A at 24 V DC for 4 s
Current limitation for each output	10, 16, 25 A
Efficiency	Min. 92 %
Feedback resistance	≤ 35 V DC
Brake chopper	30 W (briefly 200 W)
Ambient conditions	
Protection rate	IP54
Ambient temperature in operation	–22 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft*
Miscellaneous data	
Weight	9 lbs
Color	RAL9005 (black)

* The installation in systems at an altitude above 3280 ft is possible. However, this can lead to a reduction of the performance values.

SWITCHING POWER SUPPLIES
SWITCHING POWER SUPPLY HP5424

Dimensions



Accessories

Set of rubber seals for all cable screw connections

- 24-V DC output for one flat cable, article number: S-1115406
- 24-V DC output for two flat cables, article number: S-1115407
- 24-V DC output for a round cable (ø 0.19" up to 0.51″), article number: S-1115405

Scope of delivery

- Fit all cable screw connections (in the screwed-on condition) with dummy plugs. Jumper for current limitation of all cables.

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SWITCHING POWER SUPPLIES
SWITCHING POWER SUPPLY HP5424

SWITCHING POWER SUPPLIES
SWITCHING POWER SUPPLY HP5448

Application area
Voltage supply of MultiControl via flat cable. Voltage supply of DriveControl via round cable. Basic voltage supply of 48-V DC products.

Product description
The Interroll switching power supply HP5448 is a three-phase power supply for providing 48-V DC voltage. The robust housing achieves a protection rating of IP54. This allows placement in the immediate vicinity of the products to be supplied with 48 V DC, such as Interroll MultiControl. The central voltage supply saves costs for control cabinets and allows very short lines which, in turn, lead to cost savings and error reduction with respect to voltage drops on the line.

The HP5448 is immediately operational, all required functions, such as circuit protection or maintenance switches, are already present. Given its high level of overload capability, the power supply is perfectly adjusted to the current requirements of the RollerDrive EC5000. This ensures the power supply of several RollerDrive starting at the same time.

Properties
- No installation in switch cabinet required
- Compact design using heat dissipation element
- Very high peak output (150 %)
- Adjustable circuit protection (jumper)
- Overcurrent protection with resettable fuse
- Status signal
- LED status display
- 400 V AC can be looped through
- 2 48-V DC outputs are available
- Multiple terminal points, no special and expensive connectors required
- Brake chopper for limiting feedback voltage – resulting in feedback capability
- Lockable maintenance switch against reactivation
- Screw for connecting/disconnecting ground potential of primary side with ground of secondary side
- Maintenance-free
- No power reduction (derating) over the entire operating temperature range

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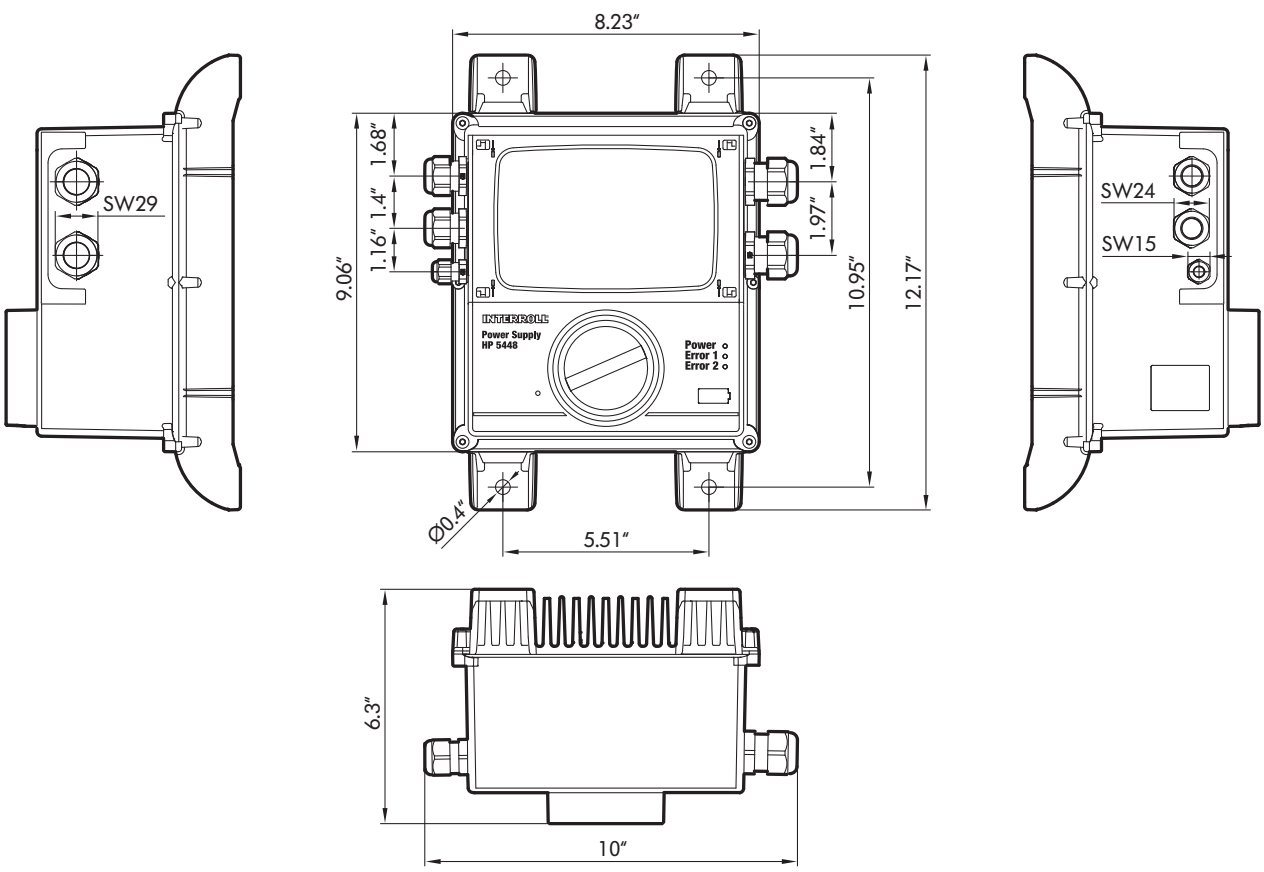
Technical data

Electrical data	
Rated supply voltage	400 V AC, 3 phases
Supply system voltage range	380 to 480 V AC ± 10 %
Supply system frequency	50 to 60 Hz ± 6 %
Supply system power consumption	Typically 1.6 A per phase at 3 x 400 V AC
Rated output voltage	48 V DC
Rated output power	960 W
Rated peak power	Max. 1440 W at 48 V DC for 4 s, repetition rate depends on duration and actual peak load
Maximum output current	30 A at 48 V DC for 4 s
Current limitation for each output	10, 16, 20 A
Efficiency	Min. 92 %
Feedback resistance	≤ 60 V DC
Brake chopper	30 W (briefly 200 W)
Ambient conditions	
Protection rate	IP54
Ambient temperature in operation	–22 to 104 °F
Ambient temperature during transport and storage	–40 to 176 °F
Max. installation height above sea level	3280 ft*
Miscellaneous data	
Weight	9 lbs
Color	RAL9005 (black)

* The installation in systems at an altitude above 3280 ft is possible. However, this can lead to a reduction of the performance values.

Dimensions



Accessories

- Set of rubber seals for all cable screw connections
  - 48-V DC output for one flat cable, article number: S-1115406
  - 48-V DC output for two flat cables, article number: S-1115407
  - 48-V DC output for a round cable (ø 0.19" up to 0.51"), article number: S-1115405

Scope of delivery

- Fit all cable screw connections (in the screwed-on condition) with dummy plugs. Jumper for current limitation of all cables.

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SWITCHING POWER SUPPLIES
SWITCHING POWER SUPPLY HP5448

PolyVee belt

A PolyVee belt is used for the drive from roller to roller or RollerDrive for straight sections and for curves.

Product description

- Elastic standard belt, 1 to 3 % pretension, for fixed shaft distances
- Significantly longer service life than round belts
- Up to 300 % higher torque transmission than with comparable round belts
- Much better efficiency compared to toothed belts since much less flexing work is required
- Curve application: Use of 2-rib or 3-rib belts
- Suitable for normal and freezer temperatures
- Belts are antistatic

Technical data

- Temperature range: –22 to 104 °F (in operation)
- Color: Black
- Belt acc. to Type PJ; ISO 9982; DIN 7867

Design versions

Number of ribs	Roller pitches ±0.04"	Max. weight of conveying good [lbs]	Article number
2	3"	110	S-1001109
3	3"	660	S-1001113

Material specification

Standards	ISO 9982 (DIN 7867) PJ profile for 2-rib and 3-rib V-ribbed belts (PolyVee)
Material	Complies with the Directive 2011/65/EC (RoHS) Contains only materials, which have been tested and registered to comply with the REACH Directive (EC No. 1907/2006) Halogen-free, silicon-free, PVC-free, flame-resistant
Certification	UL-certified
Hardness	Ribs 70 Shore A
Electrical conductivity	< 7 MΩ (antistatic)
Temperature range	–22 to 176 °F (transport and storage)
Dimensions	In accordance with ISO 9982 (DIN 7867), profile PJ

Please contact the relevant manufacturer for information on other drives.

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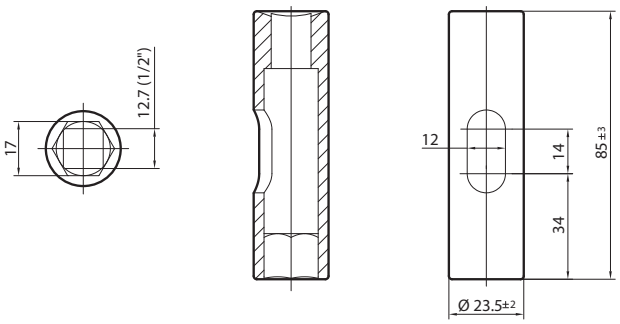
Fastening socket

The fastening socket is used for tightening according to the torque of the RollerDrive fastening nut using a torque wrench. The socket features a lateral opening through which the RollerDrive connecting cable can be fed to the outside.

Article number: S-1101248

Dimensions



Note: Measurements in mm.

ACCESSORIES

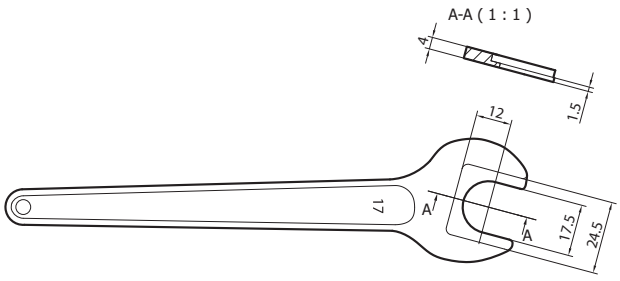
Counter wrench

The RollerDrive has a glued-on ribbed nut that is located at the bearing housing. An additional nut is used to screw the RollerDrive in the side profile. Depending on the condition of the side profile, the glued-on nut must be secured with a counter wrench while tightening the outside nut.

The counter wrench size 17 WAF fits perfectly between the flange of the ribbed nut and the bearing housing of the RollerDrive.

Article number: S-1101270

Dimensions



Note: Measurements in mm.

RollerDrive EC5000 extension cable

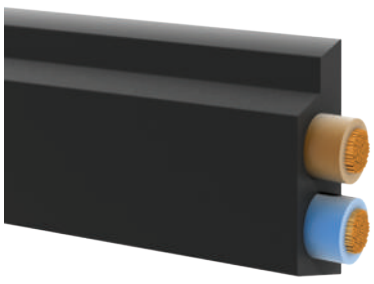
The connecting cable of the EC5000 can be extended easily with a plug connection by using the RollerDrive extension cable.

Article number: S-1113897

Technical data

- Temperature range: –22 to 104 °F
- Color: Black
- Length: 78.7"
- Outside diameter: 0.2"
- Plug connection: M8 snap-in plug and socket
- Protection rate: IP67 in connected state
- Cross sections: 3 x 0.14 mm^2 and 2 x 0.5 mm^2
- Type designation of the cable: Li9Y11Y
- Bending radius with fixed laying: > 5 * diameter of the cable
- Bending radius with flexible application: > 10 * diameter of the cable
- Properties: Halogen-free, UL-certified cable
- Suitable for drag chains: Yes

Voltage supply flat cable



The flat cable is used for the voltage supply of ConveyorControl and MultiControl. The outer contour of the line corresponds to the standard of AS interface. The shell of the line covers holes that were created by piercing contacts. This means that the cable maintains the protection rating even after disconnecting a control.

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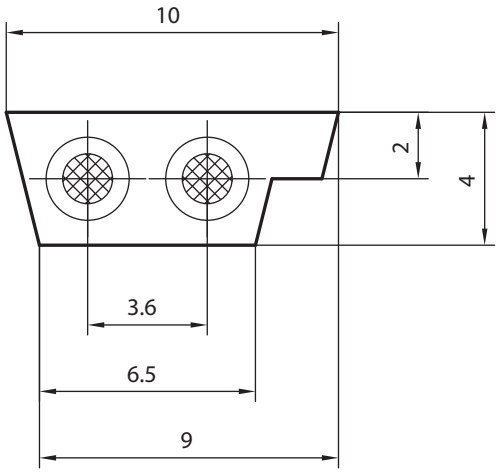
Article number: S-1106644

Technical data

- Temperature range: –18 to 104 °F
- Strand insulation: Brown for voltage, blue for ground
- Length: 164 ft
- Cross section of braids: 2.5 mm^2
- Maximum voltage: 60 V DC
- Protection rate: IP54 in contacted state
- UL CL2
- Halogen-free

Dimensions



Note: Measurements in mm.

MultiControl communication cable

The prefabricated Ethernet cable is used for communication with MultiControl. The cable allows connecting one MultiControl with another MultiControl, another bus node, a switch or a PLC.

Article number: S-1104438

Technical data

- Temperature range: –22 to 104 °F
- Color: Green
- Length: 118"
- Outside diameter: 0.26"
- Plug connection: M12, straight on M12, straight
- Protection rate: IP67 in contacted state
- Line: Cat5, shielded
- UL1581

MultiControl Y-cable

The Y-cable with M8 plugs enables the use of an additional input or output at the MultiControl.

Article number: S-1104460

Technical data

- Temperature range: –22 to 104 °F
- Color: Black
- Length: 11.81" (+ plug)
- Outside diameter: 0.2"
- Plug connection with single connector: M8, straight, screwed, 4-pin, for connecting to a MultiControl
- Plug connection with dual connector: A) M8, straight, screwed, 4-pin, for connecting to a zone sensor
  B) M8, straight, screwed, 4-pin, for connecting to an input or output
- Protection rate: IP67 in contacted state

Cable distribution

The cable distribution allows splitting a flat cable. MultiControl in its initial design (article number S-1101834) allowed connecting a second flat cable as an option for the voltage supply of connected RollerDrive. MultiControl in its new design (article number S-1103563) requires two voltage supplies in principle. If the new design of MultiControl is to be used as spare part in a system that features only flat cables for voltage supply, the cable distribution can be used.

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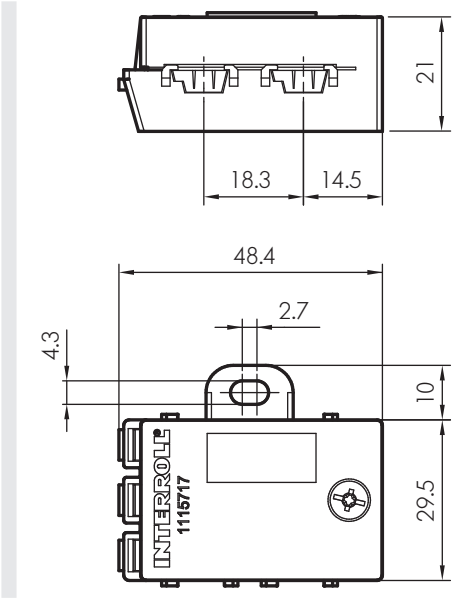
The cable distribution includes two end caps for left and right design to protect the cable ends and to maintain the system protection rating of IP54.

Article number: S-1115717

Dimensions



Note: Measurements in mm.

Shield connection cable

To reduce the risk of interference effects on the communication line of MultiControl, the shield of the cable can be grounded. Both sides of the MultiControl feature a contact that is connected with the shield of the respective communication cable. The shield connection cable can be used to connect the contact with functional ground or to connect the two contacts of MultiControl with each other. The shield connection cable is 13" long and features a cable lug at each end. The cable lugs allow connecting the cable to one or both contacts of the MultiControl. The required screws and toothed washers are part of the scope of delivery.

Article number: S-1113876

MultiControl dummy plug

The MultiControl features 4 RollerDrive, 2 communication and 4 sensor or I/O connections. If all connections are occupied, then the MultiControl has a protection rating of IP54. Based on the application, it is also possible that not all connections are occupied. If the protection rating of IP54 is to be maintained in such cases, then it is necessary to close the open connections. The dummy plug package contains as many plugs as needed if the MultiControl has only the minimum connections.

Article number: S-1104466

Dummy plug package			
MultiControl connection	**Dummy plug size**	**Use**	**Dummy plugs included**
RollerDrive	M8	Insert	3
Sensor or I/O	M8	Screws	3
Communication	M12	Screws	1

The dummy plugs are delivered prefabricated for the required connections.

Technical data

- Temperature range: –22 to 104 °F
- Color: Black

Sealing insert for switching power supplies

The Interroll switching power supplies feature different cable grommets sealed with dummy plugs. Three different sets of sealing inserts are available for the line connection. For line connection, they ensure maintaining protection rating IP54 and providing cable relief.

Design versions

Three different sets of sealing inserts are available:

	Set 1	**Set 2**	**Set 3**
400-VAC connections	2 pieces M25 sealing inserts for round cable ø0.31" to 0.67"		
Error connection	1 piece M12 sealing insert for round cable ø0.08" to 0.2"		
24/48-VDC connections	2 pieces M20 sealing inserts for round cable ø0.2" to 0.51"	2 pieces M20 sealing inserts for a flat cable	2 pieces M20 sealing inserts for two flat cables
Article number	S-1115405	S-1115406	S-1115407

Every power supply is delivered with a matching set. The sets can also be ordered individually.

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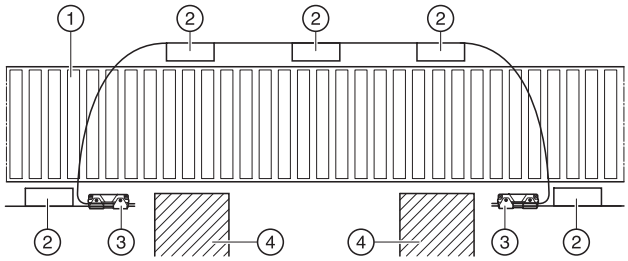
Cable bridge for flat cable

The cable bridge allows electrically combining two flat cables and changing the position of one flat cable. The ends of both flat cables have to point in the same direction.

Article number: S-1004028



1 Conveyor
2 SegmentControl or ComControl
3 Cable bridge
4 Obstacle (wall, column or similar)

Technical data

- Temperature range: –22 to 104 °F
- Protection rate: IP54
- Suitable for the communication cable of the ConveyorControl system
- Suitable for the voltage line of the ConveyorControl system or the MultiControl: can be loaded up to 6 A

Magnetic key

The magnetic key with a high-quality neodyme magnet offers many functions. For the MultiControl, it enables switching the bus protocol or the use of the Teach-In method. For the ConveyorControl, it enables addressing or, for example, performing a self-test.

Article number: S-64100210

Conveying good

This chapter is intended to provide support in the planning of conveyor systems and the selection of matching products.

The properties of the conveying good, the requirements with regards the conveyor system and the ambient conditions are the basis for the planning of the system.

Length and width of conveying good

The length and width of the conveying good have an effect on several factors:

Straight running: The higher the ratio of length to width, the more stable will be the straight running of your items. With smaller length to width ratios, it may be necessary to put in place additional measures to stabilize the straight running of the conveying goods.

Reference length: As a rule, the reference length corresponds to the conveyor width +1.97" or for large conveying goods, such as pallets, +3.94". In curves, Interroll recommends the use of tapered conveyor rollers and RollerDrive whose length must be calculated separately (see Curve dimensioning).

Roller pitch: To transport the conveying good without problems, the roller pitch must be selected so that the conveying good is carried by three conveyor rollers at any given time.

Surface pressure: The different Interroll conveyor rollers and RollerDrive can be loaded with different forces. The static load capacity can be taken from the respective chapter. The values are based on the assumption that a conveying good rests on the complete usable tube length and not just on a part of it. If a conveying good has contact with less than approx. 50 % of the usable tube length, please have the application checked by Interroll beforehand.

Very long conveying goods generally do not rest on all conveyor rollers and RollerDrive that are located under them. If, for example, 20 conveyor rollers are under a piece of conveying good, but the conveying good contacts only 15 conveyor rollers, then the load capacity of a roller must be greater than one-fifteenth of the conveying good weight. For very long conveying goods, the tolerance of the roller fastening height for conveyor rollers and RollerDrive should be kept as low as possible so that as many conveyor rollers as possible can carry the conveying good.

Height of conveying good

The greater the height of the conveying good in relation to its bottom area, the higher is the risk of it tipping over when traveling on the conveyor. The following must be taken into consideration:

- Minimize the roller pitch as much as possible to ensure that the products are conveyed smoothly with as large a base surface as possible.
- Avoid rapid acceleration and harsh braking. Use MultiControl or ConveyorControl as far as possible for controlling EC5000. These control systems allow for purposeful matching of acceleration and deceleration of the RollerDrive.
- With inclined conveyor tracks, determine the center of gravity of the conveying good and check whether there is a risk of it tipping.

Weight and weight distribution of the conveying good

The weight of the conveying good must be distributed on a number of conveyor rollers so that the maximum load capacity of the individual conveyor roller and RollerDrive is not exceeded. This may mean that more than three conveyor rollers must support the conveying good.

In principle the weight of the conveying good should be distributed as evenly as possible. The more uneven the weight distribution is, the more difficult a reliable conveyance is.

If the weight of the goods is mostly at the front, then it is very likely that the rollers at the end of the load carrier support only very little weight. In the worst case scenario, the rollers at the start of the load carrier could be overloaded.

The load capacity increases with larger tube diameter. For heavy conveying goods, RollerDrive with a diameter of 2.36" should be used instead. The load capacity is increased by rollers with threaded shafts. In addition, the shafts reinforce the conveyor and act as a cross tie.

Drive elements, such as round belts or toothed belts, must also be selected while taking the conveying good weight into consideration. Interroll recommends PolyVee belts for conveying containers and cardboard cartons. Their service life and torque transmission is significantly higher compared to round belts.

Material of conveying good

The material, and especially the condition of the base, has an effect on the rolling and starting resistance.

Hard materials, such as polymer containers, feature lower rolling and starting resistances than soft materials, such as cardboard cartons. This has a direct impact on the required drive output and must be included in its calculation. The softer the underside of the conveying good, the higher is the drive output required for a product with the same weight but with a hard underside. In principle, the softer the conveying good, the smaller the roller pitch needs to be.

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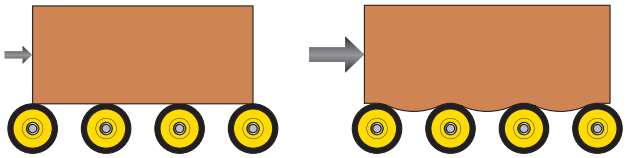

Ribs, keyways, strips or grooves in the bottom of conveying goods that run parallel to the direction of conveyance, do not pose a problem concerning transportability. The required drive output increases depending on their shape. Cross ribs can negatively impact the transporting. It may be necessary to determine the roller pitch empirically.

When checking whether a roller has sufficient load capacity for an application, it is important to take the condition of the conveying good into consideration. Conveying goods with an uneven bottom generally do not rest on all rollers that are located under them. With pallets, it must be ensured that only the rollers under the bulk of the pallet are actually bearing the load. The following diagram shows which runner load distribution occurs for an evenly loaded euro-pallet.

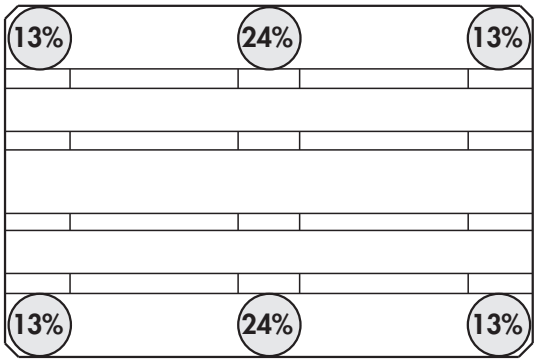

Fig.: Support of 2 runners

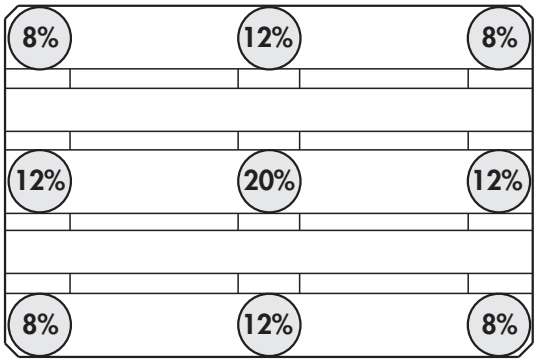

Fig.: Support of 3 runners

Conveyor requirements

The following fundamental parameters determine the configuration of the conveyor:

- Maximum throughput per time unit
- Geometry of conveying good
- Weight and weight distribution of the conveying good
- Control requirements
- Environmental conditions

The topic of environmental conditions is discussed below.

Static charging

In principle, conveyance via rollers creates electrostatic charging which, among other things, depends on the properties of the conveying good and the tube material.

To prevent electrostatic charging from occurring or dissipate it immediately and without creating sparks, Interroll offers antistatic versions for rollers with steel tube. RollerDrive feature an antistatic design in principle. Sleeves, lagging and gray tapered elements do not feature an antistatic design. For this reason, Interroll recommends the use of black tapered elements for curves.

Antistatic conveyor rollers and RollerDrive require the proper manufacturing and check of the conducting connection between shaft and side profile and the grounding of the side profile by the system manufacturer .

Noise level

Noise is created by different components of a conveyor and the conveying good itself.

Every drive creates noise. The RollerDrive is designed with decoupling elements which reduce the noise of the gear box. In most cases, the noise level of the RollerDrive is below 50 dBA. More and more zero-pressure accumulation conveyor systems are converted from pneumatic solutions with a centrally arranged drive to a RollerDrive solution. The significantly lower noise level is a deciding factor here.

The following applies to the noises of drive elements: A chain drive causes more noise than a belt drive. At high accelerations and decelerations, slipping round belts can cause squealing noises. Interroll recommends reducing the acceleration and deceleration of RollerDrive or using PolyVee belts. In this case, the risk of squealing noises is greatly minimized.

Very quiet rollers, RollerDrive and drive elements are of little use if the conveying good on the conveyor creates noise. Various measures can counteract it. The following should be observed in this case:

- A small roller pitch generally causes less noise than a large roller pitch.
- Keep height tolerances at transitions from conveyors and at the fastening of rollers/RollerDrive as small as possible.
- Fitting the rollers/RollerDrive with noise-reducing materials, e.g. with a PVC or PU sleeve
- Use of noise reduction inside of rollers for rollers with a diameter of 1.97".

Humidity

Humidity can occur in different forms as a result of the following:

- moist conveying goods, e.g. bottle crates stored in the rain
- moist environment, e.g. sculleries
- applications that become moist, e.g. because of cleaning or tripped sprinkler systems

If humidity can be expected in a system, then all components should be checked for corresponding resistance.

Interroll offers a series of products that are suitable for applications with humidity, water exposure, or water jets:

Tube material: Rollers and RollerDrive can be manufactured from rust-free material, such as stainless steel. In addition, materials can be protected with different finishing processes, such as zinc-plating.

Shaft material: Shafts for conveyor rollers can be manufactured from rust-free material, such as stainless steel.

Drive elements: Some drive elements are better suited for moist applications. PolyVee belts are much better suited than round belts which are guided via grooves in the tube. The round belts could slip in the groove that is slippery due to moisture.

Drives: The RollerDrive already has a high degree of protection with protection rating of IP54. If water jets can be expected in the application, Interroll recommends the design with protection rating IP66.

Bearing: All rollers with precision ball bearings are well protected against moisture and dust. For systems with constant humidity or moisture, Interroll offers designs with stainless steel ball bearings.

Applications in deep freeze area

Applications with an ambient temperature of approx. –18 °F are particularly prevalent in the food processing sector. Many items must be taken into account in the so-called deep freeze area:

- Changed starting torque of conveyor rollers and drives.
- Increased viscosity of greases, e.g. in ball bearings or gear boxes.
- Possibly frozen and, therefore, less flexible components, such as drive elements.
- Functional safety of all components through different contraction of various materials.

The solutions from Interroll

Materials: For various products, Interroll offers variants that are particularly suited for deep freeze applications. The tapered elements for conveyor rollers and RollerDrive are manufactured impact-resistant. Conventional materials used are often brittle and break easily. The bearing housings of series 1700 are designed as high impact-resistant for deep freeze applications.

Drives: The RollerDrive EC5000 is available in a deep freeze design (starting with Series EC5000). The special design with oiled ball bearing offers a restart for many gear stages, even after extended downtime.

Drive elements: Before using a drive element, its suitability for deep freeze applications should be checked. It should also be ensured that the friction at temperatures below zero is sufficient and the drive elements cannot freeze since frozen drive elements could pose unplanned torque requirements for the drive. The PolyVee belts offered by Interroll are suitable for deep freeze application (see page 60).

Bearing: The precision ball bearings used also work in deep freeze conditions. However, the startup of the roller is higher in this case than at an ambient temperature of 68 °F. RollerDrive are either designed for this higher startup, or oiled ball bearings are being used. The oiled bearings run significantly smoother at temperatures below zero.

Under deep freeze conditions, materials such as steel and polymer contract in different ways. For functional reliability, a PolyVee drive head for a RollerDrive is not only pressed into the steel tube, but it is also flanged. Additional security is provided by a metal star. This star, which is being produced with laser cutting, is engaged in the drive head and channels itself into the inside wall of the tube. This innovative solution inside the tube allows avoiding interfering edges on the outside contour of the tube. This solution is available as an option for various designs series 3500 and 3500KXO.

Drive concepts

With respect to drives, Interroll distinguishes between drives (such as round belts, PolyVee belts, chains, etc.) and the actual drive. Different drives are used in conveyor systems, such as drum motors, gear motors, motor rollers, etc. Furthermore, the potential energy of conveying good, e.g. on gravity conveyors, is also being utilized.

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Gravity conveyors

A gravity conveyor differs significantly from the other concepts. It is not horizontally aligned, but always mounted at an incline. There are driven and non-driven gravity conveyors. Driven gravity conveyors can be driven with RollerDrive. If the RollerDrive and, as such, the conveyor is stopped, the conveying goods remain in place and do not slide downward. The EC5000 holds its position with a certain torque which prevents any downward sliding. The different gear boxes and powers offer different continuous blocking torques. It must be ensured that conveying goods do not slide over standing rollers; if necessary, friction must be increased, e.g. with PVC sleeve on rollers and RD. Gravity conveyors use the potential energy of conveying goods. This means that other technology must first move the conveying good to a corresponding spatial height.

The conveying good rolls without additional drive as a result of the potential energy up to the end of the conveyor or up to the preceding conveying good. The speed and the restart capability of conveying goods is heavily influenced by:

- The incline of the conveyor
- The already existing speed of a conveying good when placed upon the gravity conveyor
- The ease of movement of the rollers
- The conveyor length
- The condition of the underside of a conveying good
- The weight of the conveying good
- Other properties

On the one hand, the conveying good must reach the end of the conveyor. It must not stop because its weight is too low to start moving rollers at rest. If many conveying goods are already on a gravity conveyor and, as a result, a piece of conveying good stops in the last section of the conveyor, then it must be ensured that the last item will start again and reach the end of the gravity conveyor after the first conveying goods have been conveyed.

On the other hand, the speed of the conveying goods must not be or get too high. There is the risk that a conveying good hits another jammed conveying good or the end stop at the end of the conveyor. This creates an injury risk for employees who may want to remove the conveying good by hand, as well as the risk of damaging the conveying good.

Establishing the matching properties of a gravity conveyor becomes a challenge if different conveying goods have to be moved. Generally, the conveying goods on a gravity conveyor differ by at least one of the following properties: Weight, size, material and base condition. A mixture of different conveying goods can also be transported by a gravity conveyor with respect to personnel and conveying good safety as well as process reliability. Interroll offers different products for this purpose. The rollers of series 1100 are designed for use in gravity conveyors.

The magnetic speed controller MSC 50 enables the restart of conveying goods starting at 1.1 lbs and reliably decelerates conveying goods up to 77 lbs depending on the properties of the conveyor. If conveying goods are lighter than 1.1 lbs or heavier than 77 lbs, it is also possible to use the RollerDrive series EC5000.

The driven RollerDrive ensures that every lightweight conveying good, regardless of its weight, can be moved or moved again. When decelerating heavy conveying goods, the energy recovered by the RollerDrive must not be too high. If one or several RollerDrive are used within a gravity conveyor, it also provides the advantage of accumulation pressure reduction. If a RollerDrive, which may be connected with additional rollers via drive elements, is stopped, then the conveying goods stop. This allows reducing the pressure on conveying goods that are already on the conveyor or on the stop at the end of the conveyor. On long gravity conveyors, it may be advisable to use several RollerDrive in order to reduce the accumulation pressure even further. If the incline is so high that conveying goods slide over the steel tube of stopped RollerDrive or rollers, then the friction may be increased with a PVC sleeve on the tube.

In principle, it is recommended to test every gravity conveyor design under original conditions.

Fixed drive conveyor

If a conveying good moves in harmony with the drive, then it is generally a fixed or constantly driven conveyor. The drive head of the rollers used is permanently connected with the tube. If the fixed drive heads are replaced with friction drive heads, they create a friction conveyor. Many different types of fixed drive conveyors are possible. They generally differ with respect to the selected drive element, such as chains, PolyVee belts, round belts, etc., and the drives used.

For all current fixed drive conveyors, Interroll offers matching conveyor rollers, with the RollerDrive EC5000, the Pallet Drive and PolyVee belt even drives and drive elements. When using a RollerDrive as drive, it is recommended to place it in the middle of the driven conveyor rollers (for information about the Pallet Drive, see the separate product documents). If many rollers have to be driven, then PolyVee belts offer advantages over round belts. The use of PolyVee belts reduces the number of roller revolutions with increasing distance to the RollerDrive.

Zero pressure accumulation conveyor

The zero pressure accumulation conveying is often abbreviated as ZPA. A ZPA conveyor is generally divided into zones. The zone length is based on the length of the conveying good or the longest conveying good. Each zone features an option of identifying conveying goods, e.g. via a photo cell. In addition, every zone can be switched on and off. The zones are driven in different ways, see the examples below.

One option consists of a central drive, often a gear motor, that drives a flat belt. The flat belt is pressed onto the rollers using a switchable unit or guided past them. In the case of bypassing, the rollers are also often decelerated. It is feasible that the flat belt is pressed onto only a few rollers of a zone and the remaining rollers are connected with them by means of other drive elements. In many cases, this switching unit consists of pneumatic valves. They frequently cause an undesired noise level. A high level of energy can be expected for this ZPA solution since the powerful gear motor must also be powered if, for example, only one conveying good has to be moved on a 40-zone section.

Another option always presses the flat belt against a section of a roller in every zone. The remaining portion of the roller is switched in or out via a coupling. The remaining rollers of every zone are connected with the driven roller via other drive elements.

Another concept is the use of decentral drives. Motor rollers are often used for this purpose. In this case, drives which are directly driving the respective rollers, are installed in one or several rollers of a zone. A drive element connecting the entire conveyor is redundant. The remaining rollers of a zone are generally connected with the motor roller(s) using PolyVee or round belts. The zones can be activated or deactivated by purposefully switching the motor rollers on or off.

Depending on the length of the conveyor, the design with central drive usually falls below the investment costs of a solution with motor rollers. However, the operating costs tend to be higher due to the constant turning of the drive, even when nothing may be conveyed at the time. For most solutions with motor rollers, higher investment costs are possibly amortized after a short time.

Not only the lower energy consumption speaks in favor of a solution with motor rollers, but also the compact design. The motor is installed in a roller and does not have to be placed next to or below the conveyor.

Compared to gear motors, motor rollers are maintenance-free, they do not have to be greased and generally offer a higher safety level with a protected extra-low voltage.

But solutions with motor rollers can also have disadvantages. For solutions with many motor rollers per zone, the availability decreases – the more motors are being used, the higher the probability that a motor roller fails.

For this reason, Interroll recommends the use of the RollerDrive EC5000. In this case, one RollerDrive per zone is generally sufficient, and flexible control concepts are available. Furthermore, the controls offer many other options, such as change of direction of rotation or start and stop ramps which are not being offered by conventional ZPA conveyors.

Drive elements

With respect to drives, Interroll distinguishes between the actual drive, such as RollerDrive, drum motor, Pallet Drive, gear motor, etc. and the drive elements. Drive elements refers to different types of the torque transmission. Only the following drive elements are considered in this chapter:

- Toothed belt
- PolyVee belt
- Round belt

Toothed belt

The share of toothed belts as drive element in roller conveyor systems is declining. Toothed belts are generally used from roller to roller and are unable to negotiate curves. Compared to round or PolyVee belts, the power requirement of a toothed belt is significantly higher because of its design. This must be taken into account in the selection of the drive. Toothed belts pose a high demand on the tolerance of the roller pitch since the tooth engagement is form-fit with the profile of the drive head. Interroll recommends obtaining the tolerances to be followed from the manufacturer of the selected toothed belt.

One advantage of the toothed belt compared to round and PolyVee belts, is the fact that it passes movements without slipping when used properly. On top of that, toothed belts are low-noise and maintenance-free, lubricating or retensioning is not required.

The drive length of a conveyor with toothed belt drive should be dimensioned so that the overall load of 2697 lbs conveying good being conveyed at the same time is not being exceeded.

For the roller series 3500 and the RollerDrive EC5000, a maximum toothed belt width of 0.47" and a Poly-Chain GT gearing is recommended.

PolyVee belt

PolyVee belts are ribbed V-belts that are generally used for the torque transmission from roller to roller in roller conveyor systems. The belts must feature a flexible tension member which renders them significantly less flexible than most round belts. Nevertheless, they can accept tolerances within the roller pitch because of their flexibility and used as drive elements in curves. For the installation of PolyVee belts, Interroll recommends the use of a PolyVee tensioning device.

Compared to round belts, PolyVee belts can transfer a higher torque of up to 300 %, the service life is longer and, when used properly, a PolyVee belt does not slip over the drive head. In start-stop operation, the rollers can be stopped more precisely and, compared to round belts, a higher number of conveyor rollers can be driven because of the high torque transmission.

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Due to the design of the PolyVee drive head and the small width of the belts, they can be placed very close to the side profile. This leads to an optimal tube utilization for conveying goods. With the small diameter of the PolyVee drive head, any contact of PolyVee belt and conveying good is generally ruled out.

In container conveyor systems, 2-rib and 3-rib PolyVee belts are generally used. Interroll offers PolyVee belts for these designs for the most common roller pitches, see PolyVee belt. The 9-rib drive head also allows using 4-rib belts. The ability of high torque transmission also carries with it a high demand on safety. Injuries, such as jammed fingers between PolyVee belt and drive head, must be avoided. Interroll offers a finger guard for the most common roller pitches. It does not have to be fastened to the side profile and, for this reason, can be used for almost all side profiles.

Round belt

Round belts, also referred to as O-rings, are available in different materials, colors and diameters. They are often used for the torque transmission from roller to roller. Round belts are cost-effective with respect to their purchase, are very flexible and can be installed with ease. The disadvantage is a relatively poor power transmission and relatively short service life. For this reason, the use of PolyVee belts predominates in conveyor systems.

The round belt guides with the RollerDrive EC5000 can be carried out via grooves in the tube or a round belt drive head. The drive head made from polyamide offers the advantage that the round belts can be guided closer at the end of the RollerDrive or at the side profile of the conveyor. In this case, it is more likely to separate torque transmission and running surface of conveying goods. Furthermore, the concentric precision is increased since no mechanical change of the tube occurs compared to grooves in the tube.

The round belt drive head offers a higher conveyance for most belts because of its material. This significant advantage must be taken into account if acceleration and deceleration for start-stop operation are so high that the belt briefly slips and wears out because of it. The better the conveyance from the guide, the higher the wear in this case. Groove solutions in tubes and also the round belt drive head offer 0.39" wide grooves. This allows using round belts with a maximum diameter of 0.23". In case of higher round belt diameters, there is the risk of two contact points of the round belt – at the bottom and at the side of the groove. In this case, the belt is subjected to two different speeds and experiences above average wear.

Roller curves

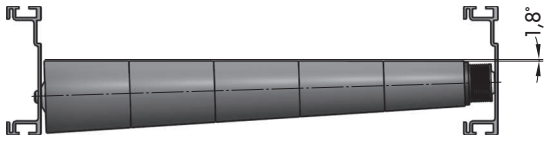
How to build a curve?

It is possible to build roller curves with cylindrical rollers. With such a design, conveying goods are not conveyed in the center of the curve, but alongside a required side guide. This requires more energy and it poses the risk of damage to the side guide or conveying good. For this reason, the design with tapered conveyor rollers is recommended.

The diameter of the tapered rollers increases towards the direction of the outside curve diameter. With the increasing diameter, the circumferential speed increases. This allows conveying goods to be transported through the curve without losing their orientation. With the usual speeds (max. 157 fpm) and ideal curve design, a side guide is not required.

Interroll offers different curve-capable rollers that feature the designation KXO. These are rollers with cylindrical steel tube onto which tapered elements are pressed. Compared to conventional curve rollers/curve motor rollers, the Interroll products are additionally secured against shifting on the steel tube by means of a form fit. This safety mechanism is not visible from the outside so that no interfering edges are being created.

Installing the rollers/RollerDrive



For the curve construction, it must be taken into account that the top side of the curve RollerDrive is level. Hence, the fastening shaft is not horizontal. As a result, vertically arranged side profiles do not have a 90° angle. For this reason, Interroll recommends an angle compensation so that the fastening shaft does not experience any warping. The EC3500 with protection rating IP54 is exclusively available for installation in the curve.

The installation length of curved sections must be longer than that of straight sections to ensure that the conveying good does not touch the side guide in the curve. Please select the next larger installation length grid.

Drive

The RollerDrive has established itself as the drive for powered roller curves. It allows implementing a cost-efficient, compact and quiet curve. RollerDrive in conjunction with PolyVee belts as drive element are the simplest solution for torque transmission in

curves. Such curves can be constructed and set up in an easy way – for constantly rotating as well as for curves for start-stop operation.

Drive element

Round belts and PolyVee belts are suitable as drive element.

Round belts can be guided via grooves which are located in the area of a tube projection. As an alternative, round belts can also be guided via a drive head at the inside radius.

PolyVee belts are exclusively guided via a drive head, also at the inside radius.

The most frequent solution is the PolyVee belt. For use in curves, 2-rib and 3-rib flexible belts are suitable. The belts must occupy the first grooves from the direction of the inner curve radius. A distance of one groove is required between the two belts.

Length of tapered elements

1.8° elements: The first tapered element has a length of 1.77" or 3.74". All additional elements have a length of 3.94". The total length of the tapered elements can be selected in increments of 1.97". The different lengths of the first tapered elements result in 2 different inside curve radii.

2.2° elements: The length of the first tapered is always 5.51". Hence, the inner curve radius does not vary.

Radii

Different inside curve radii can be created with the different tapered elements. A conveying good will be conveyed perfectly through a curve only if the radii are being maintained.

Inside curve radii for RollerDrive with PolyVee or round belt drive head

Inner curve radius	Conicity	Reference lengths
25.98"	2.2°	7.48", 9.44", 11.41", 13.38", 17.32", 21.25", 25.19", 29.13"
32.28"	1.8°	5.9", 9.84", 13.77", 17.71", 21.65", 25.59", 29.52", 33.46", 37.4"
30.31"	1.8°	7.87", 11.81", 15.75", 19.68", 23.62", 27.55", 31.5", 35.43", 39.36"

Roller pitch

The roller pitch depends on the selected drive element.

PolyVee belt: For example, if a PolyVee belt is used in the curve for a roller pitch of 2.95", then a hole pitch of 2.9" must be planned at the inside radius. The roller pitch at the outside radius can be calculated using the following formula:

$$P_o = P_i \cdot \frac{R_o}{P_i}$$

P_o = Roller pitch on the outside diameter
P_i = Roller pitch on the inside diameter
R_o = Outside radius of the curve

Interroll recommends an angle of 5° between two rollers. The angle must not be greater than 5.5°.

Round belts: Any length can be used here. To ensure a sufficient distance of the rollers,Interroll recommends not to plan more than 22 rollers in a 90° curve. This also applies to non-driven curves.

Number of rollers

The calculation or determination of the roller pitch and the angle of the roller curve result in the number of rollers to be used, which is not always an even number. In this case, the value must be rounded up or down.
If a PolyVee belt is used in the curve for a roller pitch of 2.87" (based on a straight conveyor line), it results in an even roller count for the following curve angles:

Angle	Number of rollers
30°	6
45°	9
90°	18
180°	36

Speed

For a conveying good to be conveyed perfectly through the curve, the speed of the curve and the adjacent straight conveyor lines must be identical. The curve speed refers to the average speed, see the following sample calculation. If the speeds of straight and curve are different, the conveying good can loose its orientation and, as a result, reach the side guide.

Sample calculation of average diameter

First, the average diameter of the tapered rollers is to be calculated. When tapered elements with an angle of 1.8° and a length of 17.71" are used, the starting diameter is 2.19" and the ending diameter 3.3", see page 19.

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$$Ø_{Ø} = \frac{(Ø_{min} + Ø_{max})}{2} = \frac{2.18" + 3.3"}{2} = 2.74"$$

$Ø_{Ø}$ = Average diameter of tapered elements
$Ø_{min.}$ = Starting diameter
$Ø_{max.}$ = Ending diameter

Sample calculation of same speed

Let us assume that the straight section before and after the curve is equipped with 1.97" diameter rollers and runs at a speed of 157 fpm. The speed in the curve is to be of the same value and must be converted to the average diameter of 2.74".

$$S_{RD} = \frac{S_{Strai.}}{Ø_{Ø}} \cdot Ø_{Strai.} = \frac{157\ FPM}{2.74"} \cdot 1.97" = 112\ FPM$$

S_{RD} = Speed to be set of the RollerDrive
$S_{Strai.}$ = Required speed on the straight line
$Ø_{Ø}$ = Average diameter of tapered elements
$Ø_{Strai.}$ = Diameter of rollers on the straight line

Interroll recommends using different gear stages for the straight line sections and curves. A gear stage of 30:1 would be ideal for the calculated curve example. Based on a diameter of 1.97", a maximum speed of 118 fpm can be calculated. Based on an average diameter of 2.74", a RollerDrive with this gear box could also be set to 157 fpm. For sections with cylindrical rollers and RollerDrive before and after the curve, a gear stage of 21:1 would present itself. In general, the gear stage 21:1 could also be used in both parts of the system. The recommendation of the gear stage 30:1 for the curve is based on the fact that it has a higher torque and a higher torque is often required in curves. In principle, we recommend using the powerful 50-W version for use in curves.

Different forces occur in a curve. If the centrifugal force is greater than the static friction force, conveying goods will almost always loose their orientation. This occurs at speeds over approx. 157 fpm. At that point, conveying goods will no longer be conveyed through the center of the curve and come into contact with the side guide at the outside radius. Besides the conveying speed, this also depends on, e.g. material and condition of the underside of the conveying good. Corresponding factors must also be taken into consideration when planning the curves.

Deep freezing

Roller curves can also be operated in the deep freeze area. An ideal drive is the RollerDrive EC5000 in deep freeze design. Driven rollers should feature oiled ball bearings so that the required drive power is not increased unnecessarily. Interroll recommends PolyVee belts as drive element. They have to be watched for suitability for deep freezing and that the belt tension is not too high.

RollerDrive variant selection

Mechanical output power

The RollerDrive EC5000 is available in three power designs: 20, 35 and 50 W. It can be identified via the label imprint.

20W
Interroll recommends the cost-effective 20-W power stage for conveying empty containers or conveying good weights of no more than 33 lbs.

35W
The allrounder of the power stages is the EC5000 with 35 W. It is recommended to use this power stage for conveying good weights of up to 110 lbs. This classic for zero pressure accumulation conveyor systems is the perfect solution between acceleration and cost effectiveness.

50W
The 50-W version should be used for conveying good weights of up to 550 lbs. This highest-torque design is suitable for the container conveyor system (ø 1.97") as well as for light pallet conveyor system (ø 2.36"). With the enormous acceleration, conveying goods reach their target speeds the fastest, which has a very positive effect on the demands of the throughput.

Interface

The RollerDrive EC5000 is available with two different interfaces – analog and bus. Its identification is possible via label imprint and a color ring at the connector.

Analog interface

The analog interface (AI) is a very cost-effective solution. With an analog voltage, it allows the speed setting within the range specified by the gear box. It also allows influencing start and/or braking ramps. The direction of rotation can be predefined and the error status can be read. The motor commutation technology integrated in the tube allows for a flexible control of the RollerDrive. If not start signal (at the same time speed specification) is active, the RollerDrive holds its position. Hence, it is also suitable for incline and decline conveyors. The AI is available with voltages of 24 and 48 V, with power stages of 20, 35 and 50 W, as well as tube diameters of 1.97" and 2.36".

Bus interface

The bus interface (BI) enables the data exchange between RollerDrive and a control system via CANopen. It allows for the following specifications:

- Speed specification within the range specified by the gear box
- Exact specification of start and/or braking ramps
- Specification of direction of rotation
- Toggling between "Hold position" and "Free-running"
- Exact positioning (when switching to the speed mode)
- Specification of the motor temperature warning threshold
- Activating a derating mode

Many data can be read out – including:

- Error cause (e.g. temperature, blocking or overvoltage)
- System status indicators (high temperature of RollerDrive, high torque demand and an above-average high number of error messages)
- Service life indicator (information about statistical end of service life)
- Operating data – for example:
  - Operating hours
  - Stand-by hours
  - Number of start cycles
  - Current motor temperature
  - Maximum motor temperature reached
  - Current torque
  - Current speed
  - Serial number
  - Date of manufacture

Compared to the AI, the BI enables an exact error analysis and, as a result, an easier cause analysis or avoidance of error causes. When the three system status indicators are evaluated, the causes analyzed and remedied, it allows for reaching the optimal service life. The service life indicator enables a preventive maintenance of conveyor lines with a very high availability requirement. Last, but not least, the operating data with the use of the BI enable the implementation of an Industry 4.0 conveyor system. Not only do they reading out the operating state of every RollerDrive, but also exact conclusions on the conveyor system. Regardless of whether the RollerDrive was manufactured in Chine, Germany or the United States, it features a unique serial number. It can be read on the label or read out electronically. If a RollerDrive was damaged, the transmission of the serial number is sufficient to manufacture an identical spare part.

The EC5000 with BI can be controlled with MultiControl. In this case, an automatic addressing of up to four connectible EC5000 takes place. MultiControl is capable of reading out RollerDrive data, such as the diameter.

The BI is available with voltages of 24 and 48 V, with power stages of 20, 35 and 50 W, as well as tube diameters of 1.97" and 2.36".

Voltage

The RollerDrive EC5000 is available in two operating voltage designs: 24 V DC and 48 V DC. It can be identified via the label imprint, a color ring at the connector or electronically when using an EC5000 BI.

24 V DC voltage supply

RollerDrive with a voltage supply of 24 V DC have established themselves worldwide for many decades now. The extra-low voltage allows a high flexibility for installation and cabling as well as a high level of safety during operation. The RollerDrive is frequently found adjacent to sensors, PLCs and other electronic products that are operated with a voltage of 24 V DC. The uniform voltage enables the exclusive use of 24-V DC switching power supplies. The 24 V DC EC5000 is available for both interfaces with power stages of 20, 35 and 50 W as well as diameters of 1.97" and 2.36".

48 V DC voltage supply

Interroll introduced the 48-V DC voltage supply for RollerDrive in 2019 – motivated by customer requests, the automotive industry and many 48-V DC motors that were already in use in other areas of conveyor technology. The extra-low voltage allows a high flexibility for installation and cabling as well as a high level of safety during operation. Sensors and other electronic products adjacent to the RollerDrive continue to be supplied with 24 V DC and the comparatively more power-intensive RollerDrive with 48 V DC. The 48-V DC voltage is a very cost-effective supply option. In most cases, fewer switching power supplies are needed. This translates in cost savings as a result of fewer units, more cost-effective power supplies and less planning, installation and cabling. Not least, the flexibility in cabling due to longer line lengths, cost savings by using smaller line cross sections or lower error risk from voltage drop on lines speak in favor of a supply with 48 V DC. The 48-V DC design is available for both interfaces with power stages of 20, 35 and 50 W as well as diameters of 1.97" and 2.36".

Tube material

Various aspects must be taken into account when selecting the correct tube material.

If the conveying good or the environment is moist, if water is used for cleaning, or if there is a risk that a sprinkler system could be activated, then a tube with a high corrosion protection should be selected. A tube made of stainless steel is recommended. Furthermore, it must be checked whether protection rating IP54 is sufficient or whether the design should be used in IP66.

The RollerDrive and also adjacent rollers must be capable of reliably moving the conveying good. In many cases, this also includes stopping and starting the conveying good without letting it slide on the tubes. This is particularly important for conveyors with an incline. For many conveying goods, the friction to the metal tube of the RollerDrive is sufficient, e.g. tires. For other conveying goods, a suitable sleeve or a lagging of the tube is required. It is recommended to fit the tube with a PU sleeve. It is more robust than a PVC sleeve and more cost-effective than a lagging. However, it is indispensable to adjust the friction of the RollerDrive to the application properties.

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Fastener

On the conducting side, the RollerDrive is fastened via a hexagon shaft in the side profile. The hexagon features an M12 male thread, an M12 fastening nut is supplied as standard. This nut features ribs on the contact surface to the side profile which prevents a loosening of the nut in almost all side profiles due to vibration. The ribs are also intended to enable electrical contact between RollerDrive shaft and powder-coated side profiles. The electrical connection and, as a result, the possibility of static discharge must be checked in principle. This very simple fastening solution prevents the shaft from turning inside the fastening hole and damaging the connecting cable. The nut must be tightened with a torque of 51.6 ft-lbs. A fastening socket for a torque wrench with opening for the RollerDrive connecting cable is suitable for this purpose, see page 61.

On the opposite side, the RollerDrive can be fastened in different ways. An M8 screw can be screwed into a shaft pin with female thread. For the IP66 variant, the shaft bolt sits in a slide bearing. For the conventional variant with protection rating IP54, it sits in a ball bearing. The fastening is also possible for a spring-loaded shaft solution. In combination with a drive head, e.g. a PolyVee drive head, the spring-loaded shaft is designed as hexagon. Without drive head, e.g. if round belts are guided via grooves, the spring-loaded shaft is designed as tapered hexagon. With this solution, the hexagon slides so far into the fastening hole until it is backlash-free. This solution reduces the noise level and possible wear.

RollerDrive with tapered elements require an angle compensation during fastening.

Protection rate

The RollerDrive has a protection rating of IP54. If this should not be sufficient due to moisture or dirt, a design with protection rating of IP66 is available.

Temperature range

The RollerDrive is designed for a temperature range from 32 to 104 °F. For deep freeze applications up to –22 °F, Interroll recommends the use of a corresponding deep freeze variant, see starting from page 22.

Drive element

Several drive heads are available, and grooves can also be fitted in the tube. Interroll recommends the use of PolyVee belts since they are suitable for almost all applications (straight, curve, gravity, etc.).

Speed/torque

The RollerDrive EC5000 covers all common speeds for ZPA conveyors. 9 gear stages are available to meet the requirements of different applications. The gear stage should be selected with respect to the required speed and the required torque. For this purpose, the RollerDrive can be varied with respect to speed. For example, the gear ratio 18 : 1 can turn with a maximum speed of 196 fpm, but also with every lower speed up to 8 fpm.

Compared with some drive solutions without gear box, the RollerDrive allows implementing a broad spectrum of applications with different torque requirements. It is sufficient to use the same drive with the same interface and control at all times, but employ different gear stages.

RollerDrive planning

For safe and reliable conveyance, at least one RollerDrive and two conveyor rollers have to be located under the conveying good. It is recommended to place the RollerDrive in the center of the conveyor zone that it is driving.

If the conveying good is to be moved on a conveyor perpendicular to the direction of the roller shaft, that is free of transverse force, then the static friction and rolling friction have to be overcome.

The following equation applies to conveying goods, which are moved at a constant speed along a conveyor track:

$$F = m \cdot g \cdot \mu$$

F = Required tangential force in N
m = Mass in kg
g = Max. gravitational acceleration 9.81 m/s
μ = Coefficient of friction

Sample calculation

If the weight of the conveying good is 30 kg and the coefficient of friction is 0.04, the resulting required tangential force is 11.8 N.

With a roller radius of 25 mm, the required torque (force × distance) is 0.3 Nm. The required mechanical power at a speed of 0.5 m/s (force × speed) measures 5.9 W.

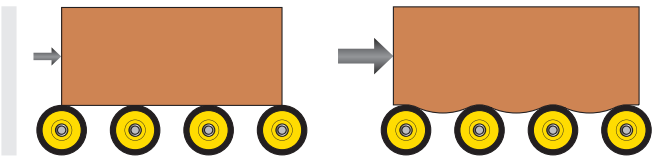
Coefficients of friction for different container materials when using rollers with steel tubes:

Material	Coefficient of friction μ
Steel	0.03
Polymer, smooth	0.04
Polymer, profiled	0.05
Wood	0.05
Cardboard carton	0.06

During zero-pressure accumulation conveying, the RollerDrive is started and stopped many times. The RollerDrive is designed for a high number of cycles. The previously described calculations are used for checking to what extent a RollerDrive is capable of conveying certain conveying goods. On top of that, the cycle count, i.e. how often the RollerDrive switches off and on per time unit, also plays a decisive role. The higher the cycle count, the higher the motor temperature. The motor temperature is also affected by the turning time per time unit. The less the standstill time of the motor, the less cooling time for the motor. With cycle times that are too high and standstill times that are too low, the RollerDrive switches to a temperature protection function and can no longer be operated until is has cooled off. This must be taken into account for the planning.

The required drive force to convey an item at a constant speed along a roller conveyor depends on the condition of the underside of the conveying good. A minimal force has to be exerted for a rigid, difficult to deform underside, such as a steel container.

However, a steel container tends to slide on the tube material during acceleration and deceleration. Approx. 3 % of the conveying good weight must be applied as propelling force during constant travel. μ is approx. 8 % with a cardboard container. This can be explained by the soft and malleable underside. With a cardboard container, the differential figure is applied to the steel container for the deformation of the underside of the container and is therefore no longer available for the forward motion.



As a conveyor cycle consists of acceleration, constant travel and braking, acceleration is critical for assessing the output.

In the acceleration phase, the static friction is overcome and a transition to significantly lower roller friction takes place. For this reason, a power surge can be measured at the start of every conveyor cycle.

For zero-pressure accumulation conveying, the conveyor should be divided into zones. As a rule, every zone is driven by a RollerDrive. The zone length must orient itself at the conveying good length or the longest conveying good. The zone length must be longer than the longest conveying good so that a gap prevents the conveying goods from contacting each other. In most cases, light barriers are used to detect conveying good in every zone. The run-on depends on various factors, such as speed or conveying good weight, but also the selected drive element. The run-on describes the distance from the sensor to the front edge of the stopped conveying good. In an ideal case, the run-on is very small, although the conveying good comes to a standstill later in most cases. The programming of the logic of the zero-pressure accumulation conveying does not have to be complex, it is already contained in most Interroll controls. A power surge can be measured at the switch-on time of the RollerDrive. This application-dependent current peak must be taken into account for the power supply dimensioning.

Power supply dimensioning

Introduction

The Interroll RollerDrive is supplied with a voltage of 24 or 48 V DC. Interroll offers the matching switching power supply for every voltage. The power supplies are exactly dimensioned for the requirements of the RollerDrive and its controls. The following must be observed if conventional power supplies are used:

- The rated and startup current of the RollerDrive must be taken into account when dimensioning the power supply.
- The RollerDrive, and also its controls, feed back voltage, i.e. the power supply must be feedback-capable.
- The Interroll RollerDrive controls each contain one brake chopper. This safety function is activated when the voltage exceeds a certain value (see the chapter of the respective control). This voltage may be elevated due to feedback of the RollerDrive or a supply voltage that has been set too high. If the voltage is elevated over a period of a few seconds, the control system will switch off for cooling purposes because of a high brake chopper temperature. For this reason, it is recommended not to set the voltage of the power supply to the switch-on threshold of the brake chopper.
- Long line lengths (particularly for 24 V) should be avoided since they could be accompanied by a high voltage drop.

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Basic information

The RollerDrive EC5000 can be connected to the following controls:

EC5000 24 V	EC5000 48 V
DriveControl 20	
DriveControl 54	
DriveControl 2048	DriveControl 2048
ZoneControl	
ConveyorControl	
MultiControl AI	MultiControl AI
MultiControl BI	MultiControl BI

Each control (without connected RollerDrive or connected sensor) allows a current flow of approx. 0.5 A (generally significantly lower). This current is not taken into account for the power supply dimensioning in the following example. The same applies to the sensors. As a rule, they can be assumed to have a current flow of 50 mA. If additional current-relevant inputs or outputs are switched, they should be included in the dimensioning, but they have been omitted in the example.

Depending on the power and voltage version, the RollerDrive EC5000 has a different rated and startup current:

	24 V DC			48 V DC		
	20 W	35 W	50 W	20 W	35 W	50 W
Rated current	1.4 A	2.4 A	3.4 A	0.7 A	1.2 A	1.7 A
Starting current	3.0 A	5.5 A	7.5 A	1.5 A	2.8 A	3.8 A

The currents depend on different factors, e.g. The acceleration of the RollerDrive, the number of rollers connected with the RollerDrive, the weight of the conveying good, the speed of the RollerDrive, etc. In many applications, the currents are below the values listed here.

In general, several RollerDrive are supplied by one power supply. The RollerDrive are mostly used for zero-pressure accumulation conveying. In this case, not all RollerDrive are started simultaneously in the so-called single release. For this reason, a simultaneity factor must be taken into account for the power supply dimensioning. If it is not clear how many RollerDrive could start simultaneously, it is recommended to dimension the power supply with the assumption that all RollerDrive will start simultaneously.

Sample calculation/dimensioning

The calculation refers to the HP5448 switching power supply with 20 A rated and 30 A peak current.

It must be checked with a calculation whether one power supply is sufficient for 24 units of EC5000 48 V 20 W. Since no application currents were determined, the catalog current values are used for the calculation:

Rated current 0.7 A
Startup current 1.5 A

Total rated current:

It is assumed that up to 80 % of the RollerDrive can start simultaneously.

$$I_{Nges} = n \cdot I_N$$

Example: $I_{Rtot} = 24 \cdot 0.7\ A = 16.8\ A$

Total startup current:

$$I_{Ages} = n \cdot I_A$$

Example: $I_{Stot} = 24 \cdot 1.5\ A = 36\ A$

Total startup current$_{80\ \%}$:

$$I_{A80\%} = n \cdot 80\% \cdot I_A$$

Example: $I_{S\ 80\%} = 24 \cdot 80\ \% \cdot 1.5\ A = 28.8\ A$

I_R = rated current in A
I_{Rtot} = total rated current in A
I_S = startup current in A
I_{Stot} = total startup current in A
$I_{S80\%}$ = total startup current $_{80\%}$ in A
n = number of RollerDrive

Explanations

If only the total rated current would be taken into account, all 24 RollerDrive could be supplied with one power supply and start simultaneously, since the power supply offers a current of up to 20 A.

However, the startup must also be taken into account. With 36 A, it is significantly higher than the maximum current of the power supply (30 A). As such, a second power supply would have to be used or it must be avoided to switch on all RollerDrive at the same time.

If it can be ensured that no more than 80 % of the RollerDrive will start at the same time, the total startup current $_{80\,\%}$ can be taken into account. In the example, this current is 28.8 A. Hence, all 24 RollerDrive could be supplied with one power supply.

If calculations are made with current values below the catalog values and/or with a simultaneity factor (like the 80% in the example), these values should be validated through field tests.

In principle, it is recommended to position the power supply in the middle of the RollerDrive or control systems to be supplied so that a cable can be routed to the left and to the right. This reduces the total cable length and, as a result, the risk of excessive line voltage drop.

If train release is used instead of single release, it must be assumed for conventional logic programs that all RollerDrive start simultaneously. The Interroll controls avoid a cumulative high startup current of all RollerDrive:

- ZoneControl: The control has a permanently set delay time of 125 ms in the train release program. After an enabling signal, the first RollerDrive starts. The next RollerDrive starts 125 ms later, etc.
- ConveyorControl: The delay time is adjustable, function identical to ZoneControl.
- MultiControl: The delay time is adjustable, function identical to ZoneControl.

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The Interroll Center of Excellence in Wermelskirchen (near Cologne, Germany) concentrates on conveyor rollers, RollerDrive and controls, used as key products in roller conveyors for container transport and other internal logistics systems.
In this product sector, the company certified in compliance with ISO 9001 is responsible within the global Interroll Group for all technical concerns ranging from development and application engineering to production and support for local Interroll companies. With an annual production volume of several million units, Interroll is currently seen in the logistics sector as the world's largest specialist manufacturer of conveyor rollers.

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About Interroll

The Interroll Group is a globally leading provider of solutions for material handling. The company was founded in 1959 and has been listed on the SIX Swiss Exchange since 1997. Interroll supplies system integrators and machine builders with a broad product range of platform-based products and services in the categories "Rollers" (conveyor rollers), "Drives" (motors and drives for conveyor systems), "Conveyors & Sorters" as well as "Pallet & Carton Flow" (flow storage systems). Solutions from Interroll are used by express and postal services, in e-commerce, in airports and in the areas of food & beverage, fashion, automotive and other industries. The company counts leading brands, such as Amazon, Bosch, Coca-Cola, DHL, Nestlé, Procter & Gamble, Siemens, Walmart, or Zalando, among its users. Interroll, with its headquarters in Switzerland, features a global network of 34 companies with annual revenues of roughly 559.7 million francs and 2,400 employees (2019).

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