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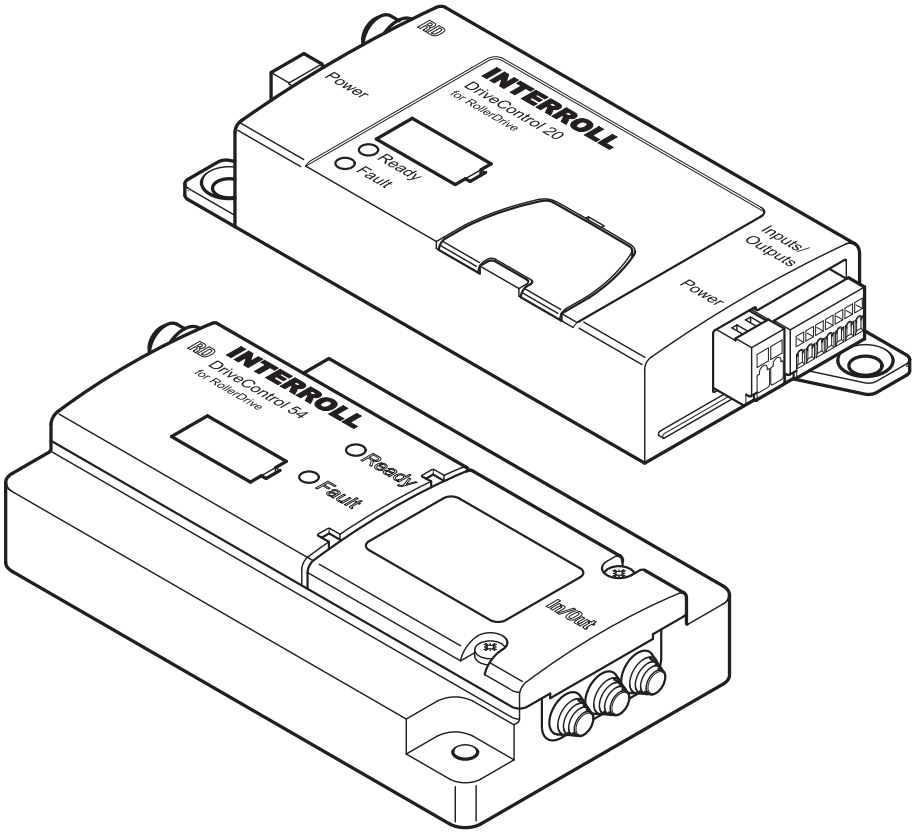

User manual

Interroll DriveControl

DriveControl 20

DriveControl 54

Version 2.0 (11/2013) en
Translation of the original instructions

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Table of contents

Introduction

Information about the operating instructions

Contents

This manual contains important advice, notes and information about the DriveControl 20/54 in all phases of its lifecycle:
- Transport, assembly and start-up
- Safe operation, maintenance and troubleshooting, disposal
- Accessories

Validity of the manual

The manual describes the DriveControl 20/54 as it is delivered by Interroll.

In addition to this manual, special contractual agreements and technical documents apply to special versions.

The manual is part of the product

- ➢ For trouble-free, safe operation and warranty claims, read the manual and follow the instructions before handling the DriveControl 20/54.
- ➢ Keep the manual near to the DriveControl 20/54.
- ➢ Pass the manual on to any subsequent operator or occupant of the DriveControl 20/54.
- ➢ Interroll does not accept any liability for faults or defects due to non-observance of this manual.
- ➢ If you have any questions after reading the operation manual, feel free to contact our customer service. See the last page for your local contact information.

Warnings in this manual

The warnings in this document refer to risks which may arise while using the DriveControl 20/54. For relevant warnings, *see "Safety", page 4* and the warnings at the beginning of each chapter.

There are three categories of danger. The following signal words are used in the document as required:
- Danger
- Warning
- Caution

Signal word	Meaning
Danger	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
Warning	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
Caution	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

Structure of warnings

⚠ DANGER

Nature and source of the hazard
Possible consequence of non-observance

➢ Information about how to avoid the hazard.

Further symbols

NOTICE

This symbol identifies possible material damage.
➢ Information about how to avoid damage.

This symbol displays safety instructions.

This symbol marks useful and important information.

➢ This symbol marks the steps that have to be carried out.

Safety

General safety instructions

The DriveControl 20/54 is designed according to the technical state of the art and is reliable in operation, once distributed. However, risks may still arise.

- Risks of physical injury to the user or bystanders.
- Adverse effects of the DriveControl and other material.

Disregarding the warnings in this manual may lead to serious injury.

- ➢ Always read the entire operating and safety instructions before starting to work with the DriveControl and follow the information contained herein in full.
- ➢ Only instructed and qualified persons may work with the DriveControl.
- ➢ Always keep this user manual at hand when working on the DriveControl so that you can consult it quickly if required.
- ➢ Always comply with relevant national safety regulations.
- ➢ If you have any questions after reading this user manual, feel free to contact our customer service. See the last page for contact information.

Intended use

The DriveControl 20/54 may only be used for industrial applications and in an industrial environment to control a RollerDrive EC310. It must be integrated in a conveyor module or a conveying system. Any other use is not permitted.

Any changes that affect the safety of the product are not allowed.

The DriveControl 20/54 may only be used within the given operation limits.

Unintended use

Applications not according to the intended use of the DriveControl 20/54 require approval from Interroll.

Qualified persons

Qualified persons are persons who read and understand the manual and, taking national regulations into account, can competently execute incidental work.

Only instructed and qualified persons may work with the DriveControl, taking the following into account:

- the relevant manuals and diagrams,
- the warning and safety instructions in this manual,
- the system specific regulations and requirements,
- national or local regulations and requirements for safety and accident prevention.

Dangers

The following list provides information about the various types of danger or damage that may occur while working with the DriveControl 20/54.

Bodily injury

- Maintenance or repair work must only be performed by authorized and qualified persons in accordance with the applicable regulations.
- Before using the DriveControl, ensure that no unauthorized persons are near the conveyor.

Electricity

- Only operate the DriveControl with control voltages that are in compliance with the requirements of EN 60401-1, PELV.
- Only perform installation and maintenance work after you have switched off the power.
- Ensure that the power cannot be turned on accidentally.

Working environment

- Do not use the DriveControl in areas where there is a hazard of explosion.
- Remove equipment or material which is not required from the workspace.

Faults during operation

- Regularly inspect the DriveControl for visible damage.
- If you notice smoke, switch off the power immediately and ensure that it cannot be switched on again accidentally.
- Contact qualified personnel immediately to find the source of the fault.

Maintenance

- Because the product does not require maintenance, you only need to inspect the DriveControl regularly for visible damage and that all cables and screws are firmly in place.

Accidental motor starts

- Exercise caution when installing or performing maintenance on the DriveControl 20/54 and when troubleshooting, as a start signal may accidentally be triggered, unintentionally starting one of the connected motors.

Interfaces to other devices

By assembling the DriveControl in a conveyor module, further hazards may occur. These hazards are not part of this manual and have to be analyzed during the design, installation and startup of the conveyor module.

- After assembling the DriveControl in a conveyor module, check the whole system for a new potential dangerous spot before switching on the conveyor.

Operating modes

Normal mode Operation of the installed device at the end customer's as a component in a conveyor in a complete system.

Special mode All operating modes which are required to guarantee and maintain safe and normal operation.

Special operating mode	Explanation	Comment
Transport/Storage	Loading and unloading, transport and storage	-
Assembly/Initial start-up	Installation at the end customer's and performing the test run	When de-energized
Cleaning	External cleaning	When de-energized
Maintenance/Repairs	Maintenance and inspection tasks	When de-energized
Troubleshooting	Troubleshooting in the event of a fault	When de-energized
Fault elimination	Eliminating the fault	When de-energized
Shut-down	Dismantling from the conveyor	When de-energized
Disposal	Disposal of DriveControl and packaging	-

Product information

Product description

The DriveControl 20/54 is intended to control the speed and rotation direction of the RollerDrive EC310.

Functions

- **Regenerative braking**: When the RollerDrive motor brakes, it acts as a generator and feeds energy back into the power supply. The DriveControl has a built in brake chopper (load resistor) to limit the DC voltage on the connection to a stable level.
- **Diagnostics**: LEDs indicate the operating condition of the DriveControl and the RollerDrive as well as the operating voltage (*see "Meaning of the LEDs", page 11*). An error signal can also be output.

Energy feedback

When the speed of a rotating RollerDrive is abruptly reduced (e. g. by removing or reducing the start signal at the DriveControl), the RollerDrive continues to rotate briefly (depending on the weight of the conveyed goods being stopped) and thus functions as a generator. The voltage generated in this way increases the supply voltage of the RollerDrive. This increased voltage is partly fed to the DC supply (to max. 30 V) and partly converted to heat via a brake chopper resistance on the DriveControl. The regenerated power is then available for other consumers. The more precisely 24 V are complied to in the voltage supply the greater the voltage range in which the DC network can be fed back to.

Temperature protection

The brake chopper resistor is temperature-controlled. If, due to specific application properties (e. g. high conveying weight or high conveying speed), the brake chopper resistance is frequently switched, the DriveControl switches off when it becomes too hot (approx. 90 °C/194 °F inner temperature). If temperature protection is activated, this state is indicated by the LEDs and no start signal will be transmitted to the RollerDrive. When the DriveControl has cooled down, the RollerDrive restarts automatically when a signal is pending. The DriveControl cools down quicker if it is mounted on a flat surface, ideally metal.

NOTICE

DriveControl failure from overheating

➢ Do not perform a voltage reset when temperature protection is active.

Lock period for signal modifications

The following signals are protected by the firmware to ensure functionality with flank-instable or bouncing levels. This means that after a signal status change, there is a time gap of 20 ms in which no additional status change is accepted.

- DIP switchesSPEED A, SPEED B, SPEED C, SPEED D, DIR
- Inputs RollerDrive error, SPEED A, SPEED B, SPEED C, DIR

Speed settings

The speed of the RollerDrive can be set with the DriveControl in two ways:

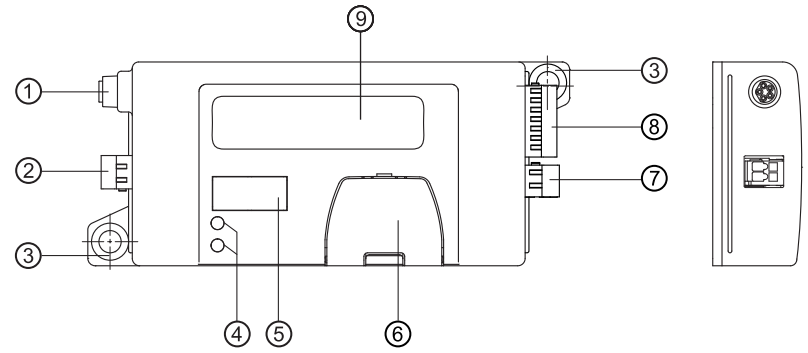
- internally via four DIP switches with 15 levels (is handled with priority and enables finer setting levels)
- externally via three digital inputs with eight levels (speed modifications are also possible in running operation, whereby a form of ramp function can be implemented with corresponding switching of a PLC)

This speed setting is converted to an analogue control voltage by the DriveControl and output by the RollerDrive as a reference setting. This reference setting is independent of the RollerDrive gears and their diameter.

Speed setting of the *see "Operation", page 24*.

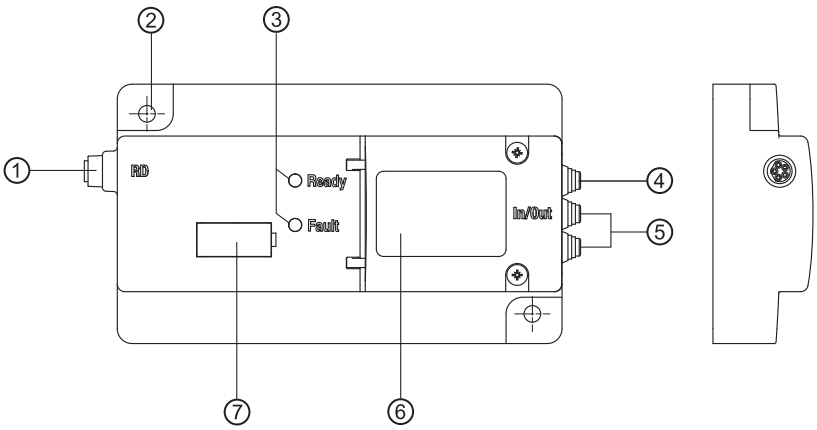
The acceleration and braking behaviour of the RollerDrive is defined by its own moment of inertia, the gears used, the conveying speed, the moment of inertia of the connected roller drives, the selected torque transmission and the goods transported.

Components



DriveControl 20

① RollerDrive connector
② Power supply connection
③ Mounting link with hole for countersunk screw
④ LED red and green
⑤ Marker (changeable)
⑥ Cover for DIP switches
⑦ Power supply connection
⑧ Connection of inputs/outputs
⑨ Label



DriveControl 54

① RollerDrive connector
② Mounting holes
③ LED red and green
④ Lead-in for connection of inputs/outputs
⑤ Lead-in for power supply connection
⑥ Cover for DIP switches and for power supply terminals and input/output terminals; label
⑦ Marker (changeable)

For detailed description of connections *see "Inputs and outputs", page 18*.

Scope of delivery

DriveControl 20

The scope of delivery of the DriveControl 20 contains the following parts:

- DriveControl
- Mating plug for power supply (WAGO 734-102/xxx-xxx)
- Mating plug for inputs/outputs (WAGO 733-107/xxx-xxx)
- Spare tool for power supply mating plug (black)
- Spare tool for inputs/outputs mating plug (yellow)

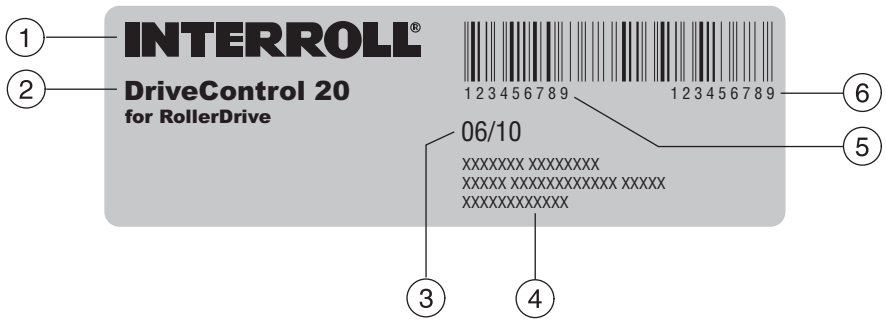
DriveControl 54

The scope of delivery of the DriveControl 54 contains the following parts:

- DriveControl

Label

The specifications on the label are used to identify the DriveControl.



DriveControl 20

① Manufacturer
② Product name
③ Week and year of production
④ Manufacturer's address
⑤ Article number
⑥ Serial number

DriveControl 54

① Article number
② Week and year of production
③ Manufacturer's address
④ Serial number

Technical Data

Rated voltage	24 V DC
Voltage range	19 to 26 V DC (reverse-polarity protection to 30 V)
Current consumption	with RollerDrive: to 5 A without RollerDrive: 0.5 A
Protection classification	DriveControl 20: IP20 DriveControl 54: IP54
Cooling	Convection
Permissible ambient temperature in operation	DriveControl 20: 0 °C to 40 °C (32 °F to 104 °F) DriveControl 54: -28 °C to 40 °C (-18 °F to 104 °F)
Permissible ambient humidity	5 to 95 %, condensation not permissible
Installation height above sea level	max. 1000 m (max. 3300 ft)

Meaning of the LEDs

The LEDs indicate the operating condition of the DriveControl and the RollerDrive and the operating voltage.

LED green	LED red	Meaning	Operating voltage
on	off	DriveControl ready for operation	19 to 26 V
flashing	off	RollerDrive rotates / is controlled	19 to 26 V
off	on	fuse in DriveControl defective	
off	flashing slowly [1)]	Operating voltage too low	below 18 V
on	flashing slowly [1)]	RollerDrive-ERROR is active or RollerDrive is not connected	19 to 26 V
on	flashing quickly [2)]	Shutdown due to excessive temperature in chopper resistance	

[1)] LED flashing slowly = 0.5 s on - 1.5 s off

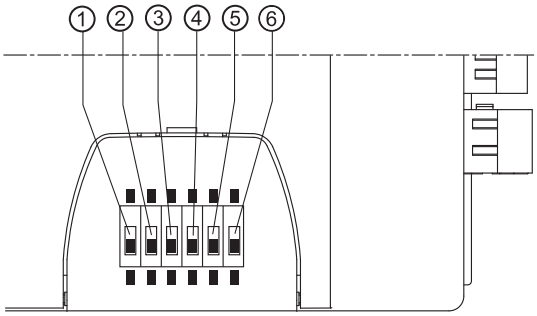
[2)] LED flashing quickly = 0.5 s on - 0.5 s off

DIP switches

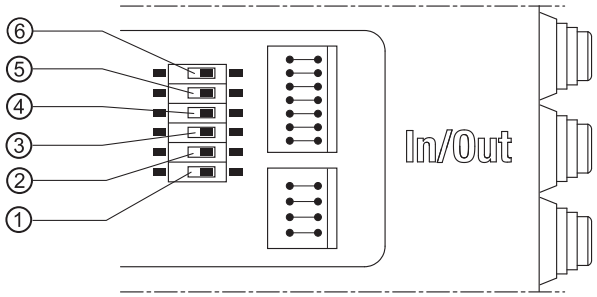
The DIP switches enable selection of the speed and direction of transport. In state of delivery the DIP switches DIR and Reserve are OFF and the DIP switches SPEED A, B, C, D are switched to ON.

DIP switches	ON	OFF
DIR	Rotation direction of RollerDrive in clockwise direction (seen from the connection cable side) *	Rotation direction of RollerDrive in anticlockwise direction (seen from the connection cable side) *
SPEED A, B, C, D	Speed setting (*see "Operation", page 24*)	
Reserve	not occupied	

* The rotation direction is reversed when the input DIR is switched.



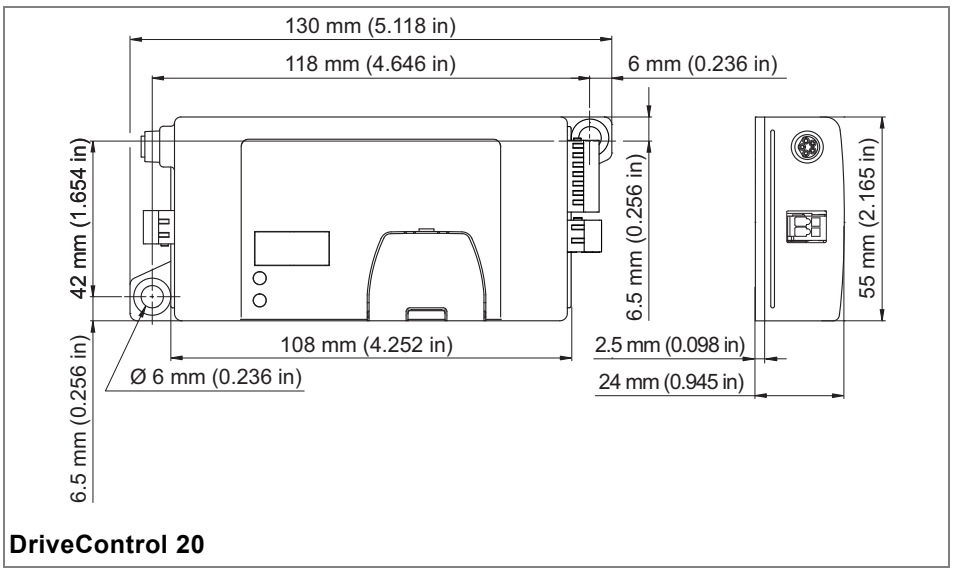
DIP switches on DriveControl 20



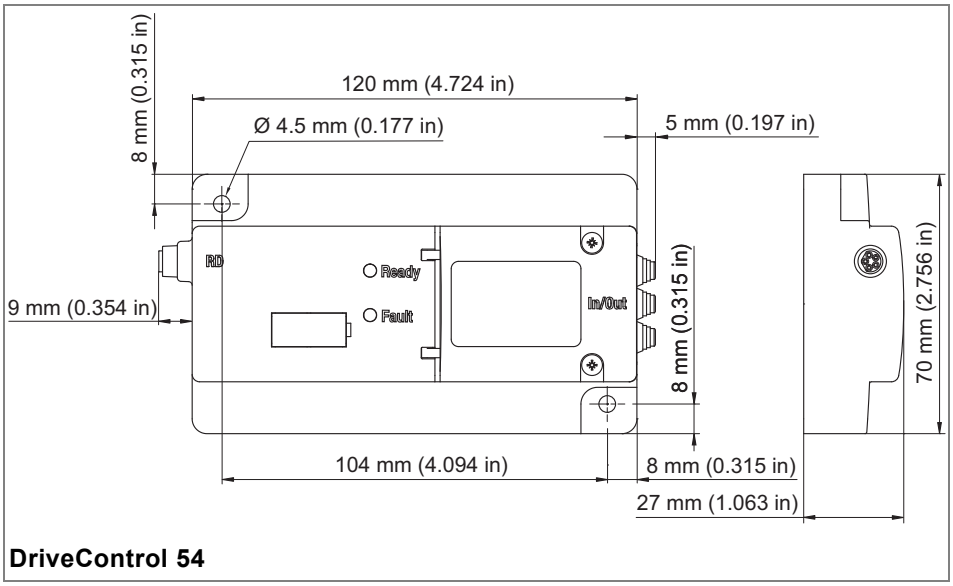
DIP switches on DriveControl 54

① DIR
② SPEED A
③ SPEED B
④ SPEED C
⑤ SPEED D
⑥ Reserve

Dimensions



DriveControl 20



DriveControl 54

Transport and storage

Ambient conditions for transport and storage

Permissible ambient temperature	-40 °C to 85 °C (-40 °F to 185 °F)
Permissible relative humidity	5 to 95 % Condensation not permissible.

Transport

- Every DriveControl is packaged in its own cardboard box.

⚠ CAUTION

There is a risk of injury if transported incorrectly.

- ➢ Only qualified and authorized persons should transport the product.
- ➢ Follow the instructions below.

- ➢ Do not stack more than four cardboard boxes on top of each other.
- ➢ Check that the DriveControls are correctly fixed prior to transport.
- ➢ Avoid serious impacts during transport.
- ➢ Inspect every DriveControl for visible damage and completeness (mating plugs and spare tools) following transport (*see "Scope of delivery", page 10*).
- ➢ In the event of damage, take photos of the damaged parts.
- ➢ Report any damage caused by transport immediately to the transport company and Interroll to retain the right to claim for compensation.
- ➢ Do not expose the DriveControls to serious fluctuations in temperature as this could lead to condensation.

Storage

⚠ CAUTION

Risk of injury due to improper storage

- ➢ Do not stack more than four cardboard boxes on top of each other.

- ➢ Inspect each DriveControl for damage after storage.

Assembly

Warning notices concerning assembly

NOTICE

Risk of damage leading to failure or shortened life expectancy of the DriveControl

➢ Follow the instructions below.

- ➢ Do not drop or mishandle the DriveControl to avoid internal damage.
- ➢ Check each DriveControl visually for damage before assembly.

Warning notices concerning the electrical installation

NOTICE

Risk of damage to the DriveControl

➢ Observe the following safety information.

- ➢ Electrical work should only be performed by qualified and authorized persons.
- ➢ Disconnect the power supply before installing, removing or rewiring the DriveControl.
- ➢ Ensure that no hazardous voltage can come into contact with the connections or the housing, not even in the event of a malfunction or fault.
- ➢ Do not connect AC current to the RollerDrive or the DriveControl at any time, as this will cause irreparable damage to the device.
- ➢ Do not use earth connections or earth wires as a protective conductor (PE).
- ➢ Do not apply too much tension or load to the motor plug. The cable insulation can become damaged if the cable is bent at the plug and the DriveControl or the RollerDrive could fail.
- ➢ Ensure that existing electrical installations do not interfere with the DriveControl or the RollerDrive.
- ➢ Only use cables that are dimensioned sufficiently for the application.
- ➢ Ensure that current load at each terminal or terminal block does not exceed 10 A.
- ➢ Ensure that the switching power supply unit supplying the DriveControl supplies a nominal DC voltage of 24 V with a maximum deviation of ±8 %.
- ➢ Ensure that the RollerDrive, the DriveControl and the voltage source are connected to the conveyor frame or supporting structure in such a way that they are properly earthed. Incorrect earthing can result in the build-up of static charge, causing the motor or DriveControl to malfunction or fail prematurely.
- ➢ Only use the specified mating plug (*see "Inputs and outputs", page 18*) and the spare tool supplied.
- ➢ Only apply operating voltage when all of the cables have been connected.

Installing the DriveControl 20/54 in a conveyor system

- Locate a flat surface for mounting the DriveControl.
- Use the DriveControl as a template and mark the centre of both mounting holes. For the distance between the holes, *see "Dimensions", page 13*.
- Drill two ø 5.6 - 6 mm (0.22 - 0.24 in) mounting holes at the marked spots.
- Fasten the DriveControl.
- Ensure that the housing is not distorted.

Electrical installation

The DriveControl is equipped with an internal, non-replaceable fuse intended exclusively for device protection. Protection of the supply cables must be ensured by the operator.

DriveControl 20

Required conductors:

Connection	Conductor cross-section
Inputs/Outputs	fine-strand: 0.08 to 0.5 mm^2 (AWG 28 to 21) fine-strand with end-splice: 0.25 to 0.34 mm^2 (AWG 24 to 22) Stripped length: 5 to 6 mm (0.2 to 0.24 in)
Power supply	fine-strand, H05(07) V-K: 1.5 mm^2 (AWG 16) (optionally with end-splice according to DIN 46228/1) Stripped length: 6 to 7 mm (0.24 to 0.27 in)

- Prepare wire ends according to the recommendations of the contact manufacturer.
- Insert the input/output wires into the mating plug with the yellow spare tool (*see "Inputs and outputs", page 18*).
- Insert the power supply wires into the mating plug with the black spare tool.
- Insert the mating plug into the DriveControl.
- If necessary, set the DIP switches according to requirements (*see "Operation", page 24*).
- Insert the plug of the RollerDrive so that with the DriveControl the "RD" labeling can be read and the "EC310" labeling is to the rear, i.e. cannot be read.

DriveControl 54

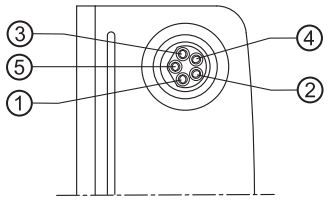
Required conductors:

Connection	Conductor
Inputs/Outputs	fine-strand: 0.08 to 0.5 mm^2 (AWG 28 to 21) fine-strand with end-splice: 0.25 mm^2 (AWG 24) Stripped length: 5 to 6 mm (0.2 to 0.24 in)
Power supply	fine-strand, H05(07) V-K: 1.5 mm^2 (AWG 16) (optionally with end-splice according to DIN 46228/1) AWG: 16 Stripped length: 8 mm (0.31 in)

- Prepare wire ends according to the recommendations of the contact manufacturer.
- Unscrew the two yellow cover screws of the connection area.
- Open the cable bushings to the connection area according to the cables used.
- Route the cable through.
- Connect the conductors for inputs and outputs (for inputs and outputs *see "DriveControl 54", page 19*). For this purpose push the white slide to the right (in the direction of the cable bushes), insert the conductor and push the slide back.
- Connect the conductors for operating voltage (for connections *see "DriveControl 54", page 19*). For this purpose push the white button downwards and insert the conductor.
- Enable cable strain relief.
- If necessary, set the DIP switches according to requirements (*see "Operation", page 24*).
- Close the cover and fasten both screws.
- Visually inspect the connection area to ensure that IP54 protection exists.
- Insert the plug of the RollerDrive so that with the DriveControl the "RD" labeling can be read and the "EC310" labeling is to the rear, i.e. cannot be read.

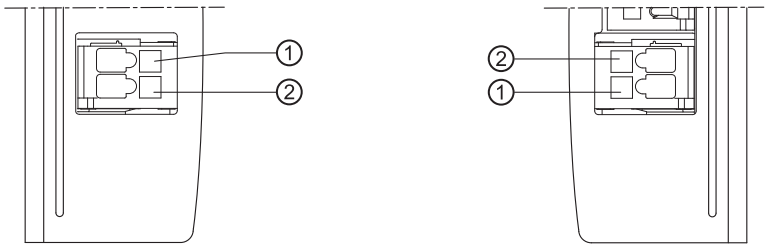
Inputs and outputs

DriveControl 20



Connection RollerDrive: 8 mm snap-in, 5 poles, contact configuration according to DIN EN 61076-2

① +24 V DC
② Output for rotation direction
③ Earth
④ Input for fault
⑤ Output for speed

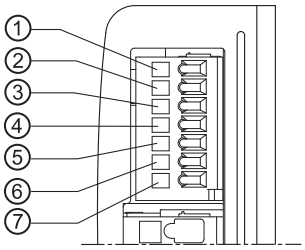


Power supply connection

Mating plug: WAGO 734-102/xxx-xxx

① +24 V DC
② GND (Earth)

The power supply connection is double in order to connect the power supply from the most convenient side during installation. Both connections are directly interconnected internally. The power supply can be implemented with a DriveControl so that a maximum of two DriveControls can be connected in sequence.

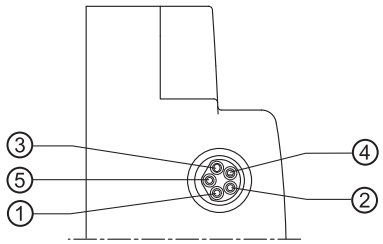


Connection of inputs/outputs

Mating plug: WAGO 733-107/xxx-xxx

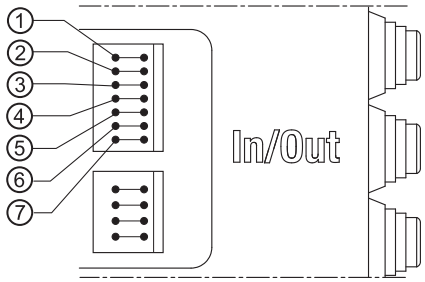
① COMMON GND (Common signal earth)
② 24 V EXT (Power supply for signal ERROR)
③ ERROR (Output for fault)
④ DIR (Rotation direction)
⑤ SPEED C (Input for speed setting)
⑥ SPEED B (Input for speed setting)
⑦ SPEED A (Input for speed setting)

DriveControl 54



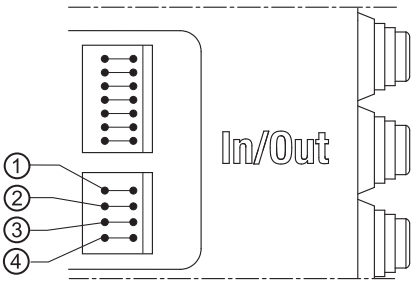
Connection RollerDrive: 8 mm snap-in, 5 poles, contact configuration according to DIN EN 61076-2

① +24 V DC
② Output for rotation direction
③ Earth
④ Input for fault
⑤ Output for speed



Connection of inputs/outputs

① COMMON GND (common signal earth)
② 24 V EXT (Power supply for signal ERROR)
③ ERROR (Output for fault)
④ DIR (Rotation direction)
⑤ SPEED C (Input for speed setting)
⑥ SPEED B (Input for speed setting)
⑦ SPEED A (Input for speed setting)



Power supply connection

① GND (Earth)
② +24 V DC
③ GND (Earth)
④ +24 V DC

The power supply connection is double. Both connections are directly interconnected internally. The power supply can be implemented with a DriveControl so that a maximum of two DriveControls can be connected in sequence.

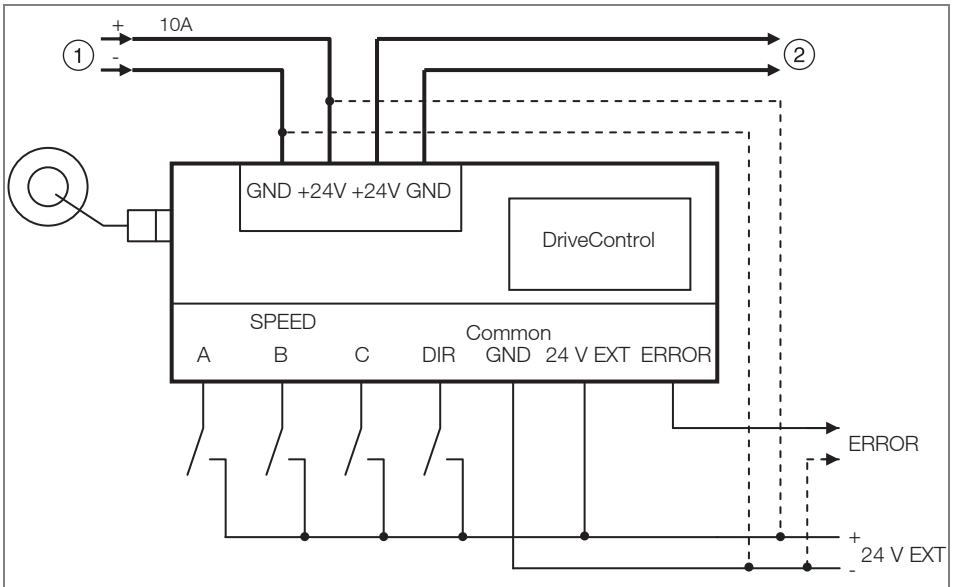
The electrical data of each connection are specified in the appendix (*see "Electrical data of connectors", page 30*).

Wiring diagrams

The signals SPEED A, SPEED B, SPEED C, DIR and ERROR are completely electrically isolated from the operating voltage via optocouplers. The output signal ERROR additionally requires the external voltage 24 V EXT. The common earth connection of signals SPEED A, SPEED B, SPEED C, DIR and ERROR is COMMON GND.

If electrical isolation is not required, the 24 V connections (power supply) can be connected with 24 V EXT (inputs/outputs) and GND (power supply) can be connected with COMMON GND (inputs/outputs).

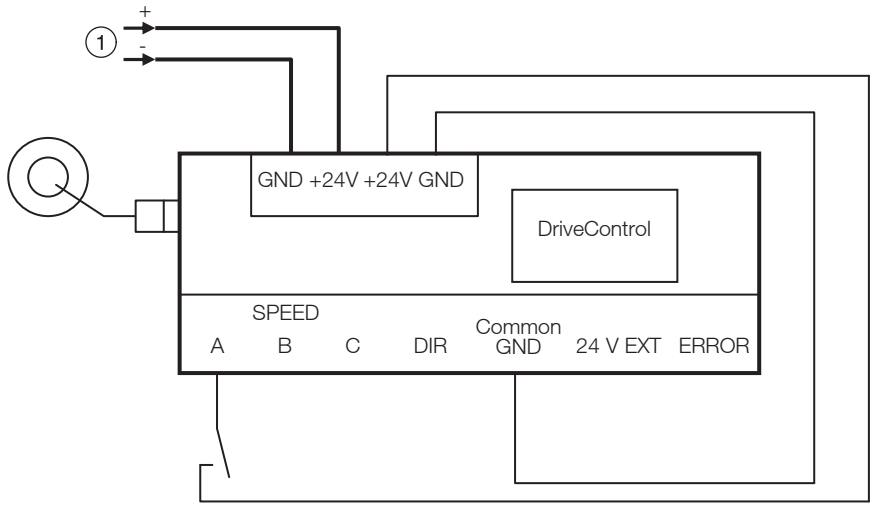
Basic circuit



① Operating voltage of power supply unit (conductor 1.5 mm^2, AWG 16)
② Additional DriveControl (conductor 1.5 mm^2, AWG 16)

The dotted conductors are only used if electrical isolation is not required between the inputs/outputs and the operating voltage.

Minimum circuit



① Operating voltage of power supply unit (conductor 1.5 mm^2, AWG 16)

- This switching enables the specification of the nominal values for speed and rotation direction via the internal DIP switches.
- The error signal is not used, faults are only displayed via the red LED.
- Start and stop can be controlled by changing the level at the SPEED A connection.
- The DriveControl or RollerDrive must not be switched on or off via the activation or deactivation of the DriveControl power supply; this may only be implemented via the start signal (SPEED A, B, C).

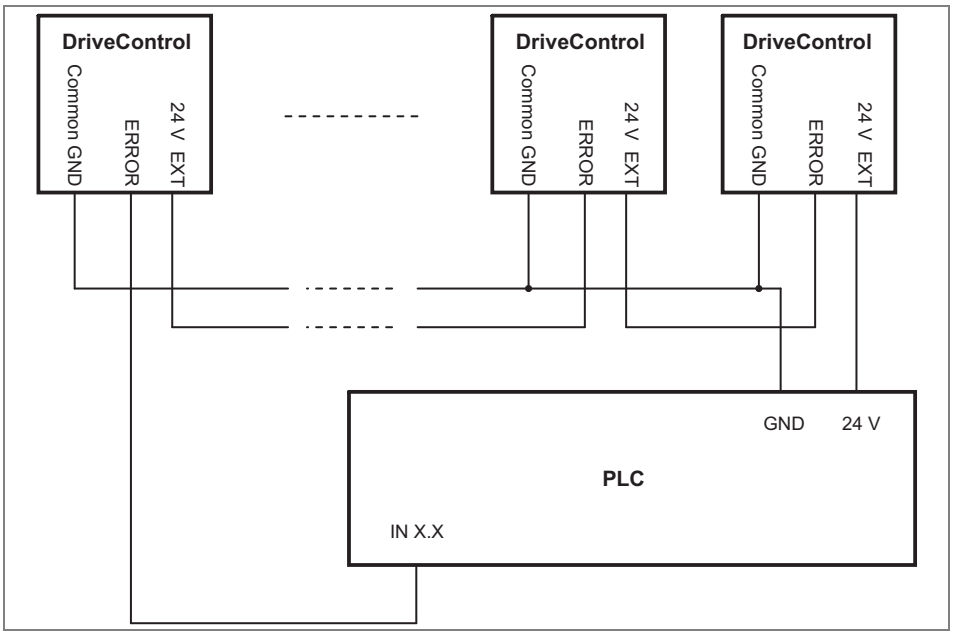
Error signal connection

To evaluate the error signal, the input 24 V EXT must be supplied with a voltage of 24 V DC.

➢ Connect input 24 V EXT with the operating voltage.

The error signal of a maximum of six DriveControls can be linked via series switching. The logic level "no error" is hereby reduced by 1.1 V per DriveControl.

➢ Connect output ERROR of the previous DriveControl with the input 24 V EXT of the following DriveControl.



When operating voltage is disconnected, the ERROR output switches to the error condition. This ensures correct display of faults when the error signal of several DriveControl has been linked and the operating voltage of a DriveControl is switched off or if a cable defect (e.g. loosened contact, cable rupture) occurs.

When operating voltage is switched on, the error signal is active until the internal microcontroller assumes control. If no error exists, the error signal is canceled approx. 400 ms after activating the operating voltage.

Initial startup and operation

Commissioning

Pre-commissioning checks

- Ensure that the DriveControl has been correctly fastened to the profile and that all screws have been correctly tightened.
- Ensure that there are no additional areas of danger caused by interfaces to other components.
- Ensure that the wiring is in accordance with the specification and legal directives.
- Check all protection devices.
- Ensure that no personnel stand in hazardous areas near the conveyor.

Pre-commissioning checks

- Check the DriveControl for visible damage.
- Check the DIP switch settings (*see "DIP switches", page 12*).
- Check all protection devices.
- Clearly specify and monitor the way goods are placed on the conveyor.
- Ensure that the RollerDrive is not blocked.
- Ensure that no personnel stand in hazardous areas near the conveyor.

Operation

⚠ CAUTION

Accidental start-up of the RollerDrive
Danger of crushing of limbs and damage to goods

- Ensure that no unauthorized persons are near the conveyor before switching on the operating voltage.

Ambient conditions during operation *see "Technical Data", page 11*

Internal speed setting on the DriveControl

Requirement: The external inputs SPEED A, B, C are logically inactive.

- Set the required speed using the DIP switches (see table).
- Switch one of the inputs SPEED A, B, C to logical active to start the RollerDrive.
  The RollerDrive rotates with the set speed.
- To stop the RollerDrive, switch all inputs SPEED A, B, C to logical inactive.

Setting of the SPEED DIP switches on the DriveControl				Speed at gear ratio								
				m/s								
A	**B**	**C**	**D**	**9:1**	**12:1**	**16:1**	**20:1**	**24:1**	**36:1**	**48:1**	**64:1**	**96:1**
on	on	on	on	1.75	1.31	0.98	0.78	0.65	0.44	0.33	0.25	0.16
on	on	on	off	1.63	1.22	0.92	0.73	0.61	0.41	0.31	0.23	0.15
on	on	off	on	1.51	1.13	0.85	0.68	0.57	0.38	0.28	0.21	0.14
on	on	off	off	1.39	1.04	0.78	0.62	0.52	0.35	0.26	0.20	0.13
on	off	on	on	1.27	0.95	0.72	0.57	0.48	0.32	0.24	0.18	0.12
on	off	on	off	1.15	0.86	0.65	0.52	0.43	0.29	0.22	0.16	0.11
on	off	off	on	1.03	0.78	0.58	0.47	0.39	0.26	0.19	0.15	0.10
on	off	off	off	0.92	0.69	0.52	0.41	0.34	0.23	0.17	0.13	0.09
off	on	on	on	0.80	0.60	0.45	0.36	0.30	0.20	0.15	0.11	0.07
off	on	on	off	0.68	0.51	0.38	0.31	0.25	0.17	0.13	0.10	0.06
off	on	off	on	0.56	0.42	0.32	0.25	0.21	0.14	0.11	0.08	0.05
off	on	off	off	0.44	0.33	0.25	0.19	0.17	0.11	0.08	0.06	0.04
off	off	on	on	0.32	0.24	0.18	0.15	0.12	0.08	0.06	0.05	0.03
off	off	on	off	0.21	0.15	0.12	0.09	0.08	0.05	0.04	0.03	0.02
off	off	off	on	0.09	0.07	0.05	0.04	0.03	0.02	0.02	0.01	0.01
off	off	off	off	Corresponding to the signals at the inputs SPEED A, B, C								

Setting of the SPEED DIP switches on the DriveControl				Speed at gear ratio								
				ft/min								
A	**B**	**C**	**D**	**9:1**	**12:1**	**16:1**	**20:1**	**24:1**	**36:1**	**48:1**	**64:1**	**96:1**
on	on	on	on	344	258	193	154	128	87	65	49	31
on	on	on	off	321	240	181	144	120	81	61	45	30
on	on	off	on	297	222	167	134	112	75	55	41	28
on	on	off	off	274	205	154	122	102	69	21	39	26
on	off	on	on	250	187	142	112	94	63	47	35	24
on	off	on	off	226	169	128	102	85	57	43	31	22
on	off	off	on	203	154	114	93	77	51	37	30	20
on	off	off	off	181	136	102	81	67	45	33	26	18
off	on	on	on	157	118	89	71	59	39	30	22	14
off	on	on	off	134	100	75	61	49	33	26	20	12
off	on	off	on	110	83	63	49	41	28	22	16	10
off	on	off	off	87	65	49	37	33	22	16	12	8
off	off	on	on	63	47	35	30	24	16	12	10	6
off	off	on	off	41	30	24	18	16	10	8	6	4
off	off	off	on	18	14	10	8	6	4	4	2	2
off	off	off	off	Corresponding to the signals at the inputs SPEED A, B, C								

External speed setting via digital inputs

Requirement: All DIP switches SPEED A, B, C, D are switched to OFF.

- Switch the external inputs SPEED A, B, C to logically active or inactive according to the table below to start the RollerDrive with the required speed.
- To modify the speed, correspondingly modify the signals at the inputs SPEED A, B, C.
- To stop the RollerDrive, switch all inputs SPEED A, B, C to logical inactive.

The internal speed setting has priority. If during external speed setting one or several internal DIP switches are switched from SPEED A, B, C, D to ON, the RollerDrive rotates with this internally set speed, independent of signals from the external inputs. When all internal DIP switches SPEED A, B, C, D are set to OFF, the RollerDrive rotates again with the speed set via the external inputs.

inputs SPEED at the DriveControl *			Speed at gear ratio								
			m/s								
A	**B**	**C**	**9:1**	**12:1**	**16:1**	**20:1**	**24:1**	**36:1**	**48:1**	**64:1**	**96:1**
H	H	H	1.75	1.31	0.98	0.78	0.65	0.44	0.33	0.25	0.16
H	H	L	1.47	1.10	0.83	0.66	0.55	0.37	0.28	0.21	0.14
H	L	H	1.19	0.89	0.67	0.53	0.45	0.30	0.22	0.17	0.11
H	L	L	0.92	0.69	0.52	0.41	0.34	0.23	0.17	0.13	0.09
L	H	H	0.64	0.48	0.36	0.29	0.24	0.16	0.12	0.09	0.06
L	H	L	0.36	0.27	0.20	0.17	0.14	0.09	0.07	0.05	0.03
L	L	H	0.09	0.07	0.05	0.04	0.03	0.02	0.02	0.01	0.01
L	L	L	0	0	0	0	0	0	0	0	0

inputs SPEED at the DriveControl *			Speed at gear ratio								
			ft/min								
A	**B**	**C**	**9:1**	**12:1**	**16:1**	**20:1**	**24:1**	**36:1**	**48:1**	**64:1**	**96:1**
H	H	H	344	258	193	154	128	87	65	49	31
H	H	L	289	217	163	130	108	73	55	41	28
H	L	H	234	175	132	104	89	59	43	33	22
H	L	L	181	136	102	81	67	45	33	26	18
L	H	H	126	94	71	57	47	31	24	18	12
L	H	L	71	53	39	33	28	18	14	10	6
L	L	H	18	14	10	8	6	4	4	2	2
L	L	L	0	0	0	0	0	0	0	0	0

* H = logically active; L = logically inactive

Maintenance and cleaning

Warning notices concerning maintenance and cleaning

⚠ CAUTION

Risk of injuries due to incorrect handling

- ➢ Maintenance work and cleaning must only be performed by qualified and authorized persons.
- ➢ Perform maintenance work only after switching off the power. Ensure that the system cannot be switched on accidentally.
- ➢ Set up signs indicating that maintenance work is in progress.

Maintenance

Inspecting the DriveControl

The DriveControl itself is maintenance-free. For avoidance of faults however, regular inspection of the connections and fixings is required.

- ➢ As part of the regular control and maintenance work on the conveyor, ensure that the screws of the DriveControl are still tight and that the cables are still laid properly and connected to the terminals.

Replacing the DriveControl

If a DriveControl is damaged, it has to be replaced.

- ➢ Install a new DriveControl (*see "Abandonment", page 29* and *see "Installing the DriveControl 20/54 in a conveyor system", page 16*).

Cleaning

Dust and dirt in combination with humidity may bridge the electric circuit. Therefore, in a dirty environment, periodic cleaning will help to avoid short-circuits which could damage the DriveControl.

⚠ CAUTION

Risk of damage to the DriveControl due to incorrect cleaning

- ➢ Do not immerse the DriveControl in liquids.
- ➢ Do not use cleaning agents.

- ➢ Clean away dust and soiling if necessary.
- ➢ For more thorough cleaning, disconnect the DriveControl from the power supply, remove (*see "Abandonment", page 29*), and wipe over with a damp cloth.

Troubleshooting

Troubleshooting

Symptom	Possible cause	Help
DriveControl is not working or is working incorrectly	No power supply	➢ Check whether the output voltage of the power supply is within the specified voltage range. ➢ Check the connections and correct if necessary.
	Wrong position of the DIP switches	➢ Check and if necessary correct the position of the DIP switches (*see "DIP switches", page 12*).
DriveControl faulty or damaged	Internal fuse triggered or faulty.	➢ Replace the DriveControl.

The error signal is active in the event of the following faults:
- RollerDrive error
- RollerDrive is not connected
- Fuse faulty
- Permitted operating voltage range exceeded
- Operating voltage has reverse polarity
- Chopper resistor overheating

Abandonment and disposal

Abandonment

⚠ CAUTION

Risk of injury due to improper handling

- ➢ Abandonment may only be executed by qualified and authorized persons.
- ➢ Only abandon the DriveControl after switching off the power. Ensure that the DriveControl cannot be turned on accidentally.

- ➢ Disconnect all cables from the DriveControl.
- ➢ Unscrew the screws attaching the DriveControl to the conveyor frame.
- ➢ Extract the DriveControl from the conveyor frame.

Disposal

The operator is responsible for the proper disposal of the DriveControl. In doing so, industry-specific and local provisions must be observed for the disposal of the DriveControl and its packaging.

Appendix

Electrical data of connectors

Inputs/outputs connectors

Input 24 V (pin 2)

Properties	electrically isolated	
Dielectric strength	max. 500 V_{eff}	1 min, 50 Hz
Reverse polarity protection	max. 30 V DC	
Current consumption	max. 50 mA	must be ensured via external circuit

Output ERROR (pin 3)

Properties	electrically isolated, infeed of external voltage not permitted	
Dielectric strength	max. 500 V_{eff}	1 min, 50 Hz
Logic level with error	max. 1 V DC	external load resistance required to GND
Output current with error	max. 0.1 mA	
Logic level with no error	10 to 25 V DC	
Output current with no error	max. 50 mA	not short circuit-proof
Impedance related toCOMMON GND	4.7kΩ	

The error signal can be linked by connecting the output error of a previous DriveControl with the 24 V input of a subsequent DriveControl. The logic level with "no error" is hereby reduced by 1.1 V per DriveControl.

Inputs SPEED A, SPEED B, SPEED C and DIR (pin 4 - 7)

Properties	debounced, electrically isolated	
Reverse polarity protection	max. 30 V DC	
Overvoltage protection	max. 30 V DC	permanent, absence of harmonic waves
Dielectric strength	max. 500 V_{eff}	1 min, 50 Hz
Logic level low	0 to 1 V DC	logical 0 = L = inactive
Input current low	max. 0.1 mA	
Logic level high	18 to 26 V DC	logical 1 = H = active
Input current high	2.5 to4.5 mA	

RollerDrive connector

Power supply (pin 1, 3)

Nominal value	24 V DC	
Voltage range	18 to 26 V DC	
Remaining ripple	max. 600 mV_{pp}	
Rated current	0 to 2.3 A	
Peak current	max. 5 A	max. 250 ms > 2.3 A, time-dependent current flow triangular, duty factor ≤ 19 %
Return electric strength	max. 35 V DC	Without harmonic waves max. 500 ms; after 500 ms the reserve voltage must be ≤ 27 V, duty factor max. 27 %

Direction of rotation output (pin 2)

Properties	not electrically isolated, short circuit-proof, infeed of external voltage not permitted	
Overvoltage protection	max. 30 V DC	
Anticlockwise direction of rotation	max. 4 V	logical 0
Output current low	max. 1 mA	load resistance = 57kΩ
Clockwise direction of rotation	min. 7 V	logical 1
Output current high	max. 0.2 mA	with short circuit

Input error (pin 4)

Properties	not electrically isolated	
Reverse polarity protection	max. 30 V DC	
Max. voltage	30 V DC	
Logic level low	max. 8.5 V DC	@ 1.5 mA logical 0 = inactive = no error
Fault current low	1.5 mA max. 5 mA	
Logic level high	12 to 30 V DC	logical 1 = active = error
Fault current high	max. 0.01 mA	

Speed output (pin 5)

Properties	not electrically isolated	
Speed operating range of motor control voltage	2.3 up to 10 V DC	RollerDrive rotates
Stop range	0 to 2 V DC	RollerDrive does not rotate
Precision of motor control voltage	5 %	Motor control voltage between2.3 and 10 V DC at 21 °C
Motor control voltage ripple	250 mV_{pp}	50 Ω
Max. load of motor control current	0.16 to 2 mA	Input resistance of RollerDrive: 66kΩ
Modification speed	4.5 to 5 V/ms	0 - 100 % motor control voltage

Installation declaration

in accordance with the EC Machinery Directive 2006/42/EC, Appendix II B,

the manufacturer:

Interroll Engineering GmbH
Hoeferhof 16
D - 42929 Wermelskirchen
Germany

hereby declares with sole responsibility that the product range

- DriveControl 20
- DriveControl 54

is not a ready-to-use machine as defined by the EC Machinery Directive and, therefore, does not fully comply with the requirements of this directive. The commissioning of these modules is not permitted until conformity of the entire machine/system in which they are installed has been declared in compliance with the EC Machinery Directive and the EMC directive.

The health and safety requirements as stated in Appendix I have been applied. The special technical documents mentioned in Appendix VII B have been prepared and will be sent to the responsible authority if necessary.

Person authorized to prepare the technical documents:
Interroll Engineering GmbH, Hoeferhof 16, D - 42929 Wermelskirchen

Applicable EC directives:
- Machinery Directive 2006/42/EC
- RoHS Directive 2002/95/EC

Applied harmonized standards:
- EN ISO 12100-03 "Safety of machinery - Basic concepts - risk assessment and reduction"

Wermelskirchen, 31st March 2010

Armin Lindholm

(Managing Director)

(This declaration can be obtained at www.interroll.com, if needed.)

Version 2.0 (11/2013) en
Translation of the original instructions

For your local contacts please visit
interroll.com/contacts