Operating manual

Interroll DriveControl

DriveControl 20

DriveControl 54

DriveControl 2048

Manufacturer details

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Content

We strive for the accuracy, timeliness and completeness of the information and have carefully prepared the contents in this document. Regardless of this, errors and changes are expressly reserved.

Online version - only suitable for color printing!

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1 About this document

1.1 Information about this operating manual

This operating manual covers the following Interroll DriveControl models

- DriveControl 20
- DriveControl 54
- DriveControl 2048

Throughout this manual, the term "control system" is used as an alternative for referring to these models.

The operating manual is a component of the product and contains important advice and information regarding the different operating phases of the DriveControl. It describes the DriveControl at the time of shipping from Interroll.

The currently applicable version of this operating manual can be found online at: www.interroll.com/support/

All the information and advice in this operating manual has been compiled with respect to applicable standards and regulations as well as the current state of the art.

➢ To ensure safe and faultless operation and to fulfil any warranty claims that may apply, read this operating manual first and observe its instructions.

➢ Keep this operating manual within close reach of the DriveControl.

➢ Pass this operating manual onto every subsequent owner or user.

The manufacturer assumes no liability for damage and malfunctions that occur as a result of non-compliance with this operating manual.

Should you still have any unanswered questions after reading this operating manual, please contact Interroll customer service. Contact details for your region can be found online at www.interroll.com/contact/

Please direct any comments and suggestions regarding our operating manuals to manuals@interroll.com

1.2 Warning notices in this document

Warning notices are provided in the context in which danger can occur and describe the nature of the danger in question. They are structured according to the following examples:

SIGNAL WORD

Type and source of hazard

Consequence(s) in the event of non-compliance

➢ Measure(s) for avoiding hazard

Signal words indicate the type and severity of the consequences if measures to avoid the hazard are not observed.

DANGER

Denotes an imminent hazard.

If measures to avoid the hazard are not observed, death or severe injury will occur.

➢ Preventive measures

WARNING

Denotes a potentially hazardous situation.

If measures to avoid the hazard are not observed, death or severe injury may occur.

➢ Preventive measures

CAUTION

Denotes the possibility of a hazardous situation.

If measures to avoid the hazard are not observed, minor or moderate injury may occur.

➢ Preventive measures

NOTE

Denotes a situation that can lead to material damage.

➢ Preventive measures

1.3 Symbols

This symbol indicates useful and important information.

✓ This symbol indicates a requirement that must be fulfilled before carrying out assembly or repair work.

This symbol indicates general information relating to safety.

➢ This symbol indicates an action that needs to be performed.

• This symbol indicates a listed item.

2 Safety-related information

2.1 State of the art

The Interroll DriveControl has been constructed with respect to applicable standards and the current state of the art and has been delivered in a condition that is safe to operate. Nevertheless, hazards can occur as a result of use.

Non-compliance with the instructions in this operating manual can result in life-threatening injuries.

In addition, the applicable local accident prevention regulations for the area of application and general safety regulations must be adhered to.

2.2 Proper use

The DriveControl may only be used in an industrial environment for industrial purposes within the stipulated performance limits that are given in the technical specifications.

It controls an Interroll RollerDrive and must be integrated into a conveyor unit or conveyor system before commissioning.

2.3 Improper use

Any use that goes beyond the proper use is considered improper, unless this has been authorised by Interroll Engineering GmbH where applicable.

The equipment must not be installed in areas in which substances could form explosive atmospheres/dust atmospheres or for application in the medical/pharmaceutical sector.

It is considered improper use to install the equipment in exposed spaces that are open to potentially adverse weather conditions, or areas in which the technology would suffer from the prevailing climactic conditions and could potentially malfunction as a result.

The DriveControl is not intended for use by private end users. The equipment must not be used in a residential environment without further examination and without the use of EMC protective measures that have been adapted accordingly.

It must not be used as a safety-relevant component or for performing safety-relevant functions.

2.4 Qualification of personnel

Non-qualified personnel are unable to identify risks and are therefore exposed to higher levels of danger.

- ➢ Only qualified personnel may be assigned with the tasks outlined in this operating manual.
- ➢ The operating company is responsible for ensuring that personal adhere to the locally valid rules and regulations for working in a safe and risk-aware manner.

This operating manual is intended for the following target audiences:

Operators

Operators are trained in how to operate and clean the Interroll DriveControl unit and follow the safety regulations.

Service engineers

The service engineers have a specialist technical education or have successfully completed a training course from the manufacturer. They carry out repair and maintenance work.

Qualified electricians

Qualified electricians have a specialist technical education. Moreover, due to their knowledge and experience as well as knowledge of applicable regulations, they are able to carry out work on electrical equipment in an appropriate manner. They are able to identify hazards independently and prevent electrical damage to persons and property.

All work on electrical equipment must generally only be performed by a qualified electrician.

2.5 Dangers

Here, you will find information about the different types of dangers or damage that can occur in connection with the operation of the DriveControl.

Injury to persons

- Maintenance, installation and repair work on the unit must only be carried out by authorised technical personnel in compliance with the applicable provisions.
- Before switching on the DriveControl, ensure that no unauthorised personnel are situated in the vicinity of the conveyor/conveying system.

Electricity

- Installation and repair work must only be carried out when the system has been disconnected from the power supply. Switch off the power to the DriveControl and ensure that it cannot be unintentionally switched on again.

Work environment

- Remove any materials and objects that are not required from the working area.

Faults in operation

- Regularly check the DriveControl for visible damage.
- If smoke develops, immediately switch off the power to the DriveControl and ensure that it cannot be unintentionally switched on again.
- Immediately contact specialist personnel to determine the cause of the malfunction.

Maintenance

- Since the product in question requires no maintenance, it is sufficient to simply examine the DriveControl for visible damage on a regular basis.
- Never open up the DriveControl.

Unintentional start-up

- Ensure that the connected RollerDrive/motors cannot start up unintentionally, particularly during assembly and maintenance work or in the event of a fault.

2.6 Interface to other devices

The integration of the DriveControl into a conveyor system can create additional potential hazards. Such potential hazards are not covered by this operating manual and must be analysed during the development, installation and commissioning of the conveyor system as a whole.

➢ Following the integration of the DriveControl into a conveyor system, the entire system must be checked for any new potential hazards that may be present before the conveyor is switched on.

2.7 Operating modes/operating phases

Standard operation

Operation in the installed condition at the end customer as a component in a conveyor in an overall system.

Special operation

Special operation encompasses all operating modes/operating phases that are necessary to guarantee and maintain safe standard operation.

Special operating mode	Comments
Transport/storage	-
Assembly/commissioning	In de-energised state
Cleaning	In de-energised state
Maintenance/repair	In de-energised state
Fault location	-
Troubleshooting	In de-energised state
Decommissioning	In de-energised state
Disposal	-

2.8 Applicable documentation

In order to ensure proper use of the DriveControl, additional operating manuals/documentation relating to the following must be consulted:

- Power supply unit
- RollerDrive
- Description of the conveyor system/unit

Also ensure that you adhere to the information given in the operating manuals of the connected devices.

3 Product information

3.1 Product description

The DriveControl is a control system for conveyor systems that regulates the speed and rotational direction of an Interroll RollerDrive.

Control system	RollerDrive to be used
DriveControl 20	EC 310, EC 5000 AI 24 V DC (20 W and 35 W)
DriveControl 54	EC 310, EC 5000 AI 24 V DC (20 W and 35 W)
DriveControl 2048	EC 5000 AI 24 V DC, EC 5000 AI 48 V DC (20 W, 35 W, 50 W)

Energy recovery/overvoltage protection

If the RollerDrive is stopped or the speed is abruptly reduced, the kinetic energy of the conveyed material in the RollerDrive is converted into electrical energy, akin to a generator. This energy is fed back into the system, where it can be used by other RollerDrive units.

If more energy is fed back than can be used, the excess energy is converted into heat via a brake chopper in the DriveControl. The brake chopper becomes active when the voltage increases to over 26.5 V (with the 24 V RollerDrive) or 56 V (with the 48 V RollerDrive). This prevents excessively high voltages within the system.

Overload protection

The brake chopper resistance is monitored in terms of temperature. If the brake chopper resistance is frequently activated due to certain application properties (e.g. high weight of material to be conveyed or high conveyor speed), the DriveControl will be switched off whenever it gets too hot (an internal temperature of approx. 90 °C). Whenever the temperature protection is active, this will be indicated via the LEDs and a start signal will no longer be sent to the RollerDrive. Once the DriveControl has cooled down, the RollerDrive will automatically switch on again whenever a start signal is issued.

The DriveControl will cool down faster if it is mounted on a level surface, ideally one made of metal.

NOTE

Irreparable damage to the DriveControl through overheating

➢ Do not carry out a power reset while the overload protection is active, as this causes faults to reoccur.

Blocking time for signal changes

The following signals are protected by the firmware to guarantee their functionality in the event of bouncing and instability. This means that once a signal has been changed, the next signal change will only be processed after 20 ms.

DriveControl 20/DriveControl 54

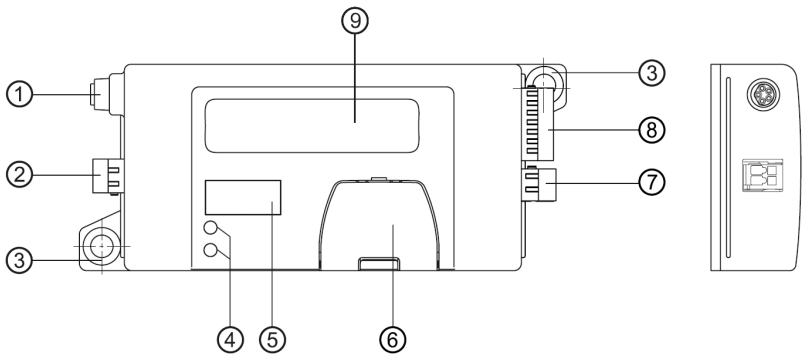
- DIP switch SPEED A, SPEED B, SPEED C, SPEED D, DIR, RAMP
- Inputs for RollerDrive ERROR, SPEED A, SPEED B, SPEED C, DIR

DriveControl 2048

- Rotary coding switch SPEED, rotary coding switch RAMP/DIR
- Inputs for RollerDrive ERROR, SPEED A, SPEED B, SPEED C, DIR

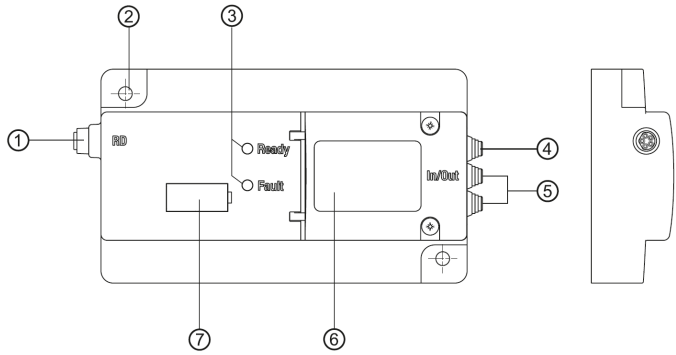
3.2 Setup

DriveControl 20/DriveControl 2048



1 RollerDrive connection
2 Power supply connection
3 Fastening clip with hole for countersunk screw
4 Red and green LEDs
5 Identification plate
6 Cover for DIP switch/rotary coding switch
7 Power supply connection
8 Connection for inputs/outputs
9 Nameplate

DriveControl 54



1 RollerDrive connection

2 Mount holes

3 Red and green LEDs

4 Feedthroughs to the connection for the inputs/outputs

5 Feedthrough to the power supply connection

6 Cover for DIP switch and the connection terminals for the power supply and the inputs/outputs*; rating plate

7 Identification plate

* For a detailed description of the connections, see „Inputs and outputs“ on page 28.

3.3 Scope of delivery

DriveControl 20/DriveControl 2048

- DriveControl
- Connector for power supply (WAGO 724-102/xxx-xxx)
- Connector for inputs/outputs (WAGO 733-107/xxx-xxx)
- Auxiliary tool for connector for power supply (black)
- Auxiliary tool for connector for inputs/outputs (yellow)

DriveControl 54

- DriveControl

3.4 Technical specifications for DriveControl 20/DriveControl 54

	DriveControl 20	DriveControl 54
Rated voltage	24 V DC, protected extra-low voltage (PELV)	
Voltage range	19 to 26 V DC	
Current consumption	With RollerDrive: Up to 5 A Without RollerDrive: 0.1 A	
Protection rate	IP20	IP54
Cooling system	Convection	
Weight	500 g (incl. base plate)	
Ambient temperature in operation	0 °C to +40 °C	-30 °C to +40 °C
Ambient temperature during transport and storage	-40 °C to +85 °C	
Relative humidity	5–95%, condensation not permitted	
Altitude of installation site	Max. 1000 m In principle, it is possible to install the equipment at altitudes higher than 1000 m. However, this may reduce the performance values.	

3.5 Technical specifications for DriveControl 2048

Rated voltage	24 V DC, protected extra-low voltage (PELV)	48 V DC, protected extra-low voltage (PELV)
Voltage range	19 to 26 V DC	38 to 55 V DC
Current consumption	With RollerDrive: Up to 8 A Without RollerDrive: 0.1 A	
Protection rate	IP20	
Cooling system	Convection	
Weight	500 g (incl. base plate)	
Ambient temperature in operation	0 °C to +40 °C	
Ambient temperature during transport and storage	-40 °C to +85 °C	
Relative humidity	5–95%, condensation not permitted	
Altitude of installation site	Max. 1000 m In principle, it is possible to install the equipment at altitudes higher than 1000 m. However, this may reduce the performance values.	

3.6 DIP switches/rotary coding switches

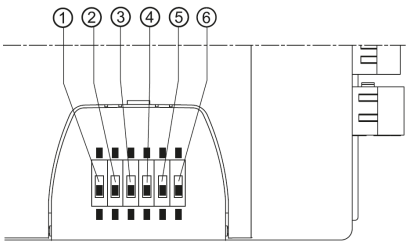
The DIP switches/rotary coding switches can be used to select the speed and the direction of the conveyor.

In the as-delivered condition, the DIP switches DIR and RAMP are set to OFF and the DIP switches SPEED A, B, C, and D are set to ON.

DIP switch	ON	OFF
DIR	RollerDrive will rotate clockwise (as seen from the cable side)*	RollerDrive will rotate anti-clockwise (as seen from the cable side)*
SPEED A, B, C, D	For speed settings, see „Speed preselection via DIP switch for DriveControl 20, DriveControl 54“ on page 37	
RAMP	Acceleration and deceleration ramp active	

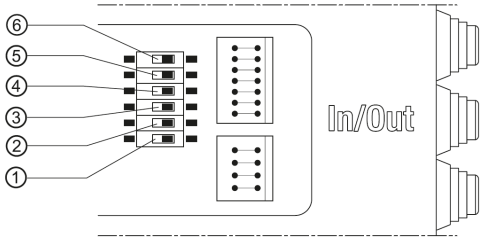
*The rotational direction is reversed if the input DIR is connected.

DriveControl 20



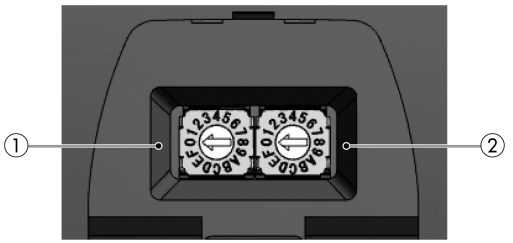
1 DIR
2 SPEED A
3 SPEED B
4 SPEED C
5 SPEED D
6 RAMP

DriveControl 54



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

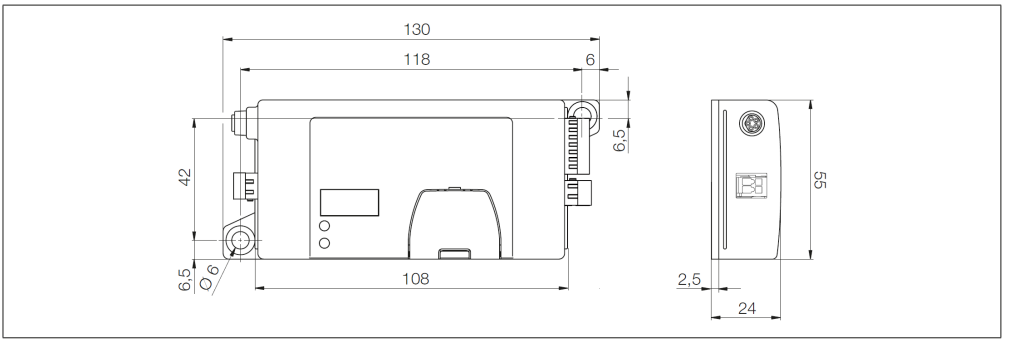
DriveControl 2048



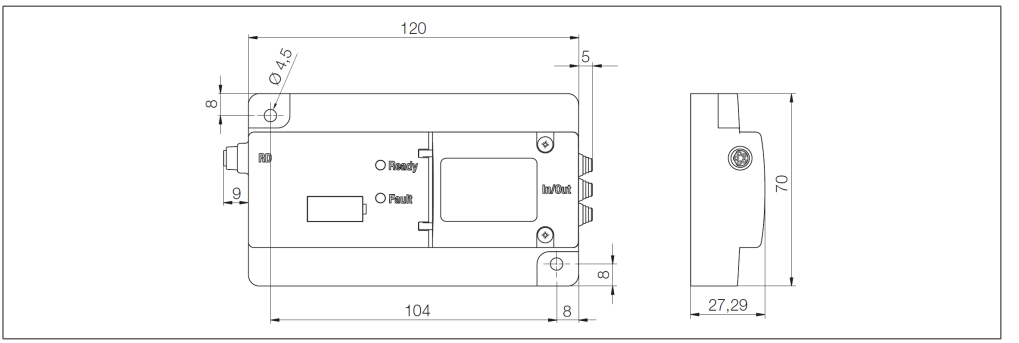
1 Rotary coding switch SPEED
2 Rotary coding switch RAMP/DIR

3.7 Dimensions

DriveControl 20/DriveControl 2048



DriveControl 54



4 Transport and storage

4.1 Transport

CAUTION

Risk of injury from improper transport.

➢ Transport operations must only be carried out by authorised, qualified personnel.

Please note the following:

➢ Do not stack pallets on top of one another.

➢ Prior to transport, check whether the DriveControl is correctly attached.

➢ Avoid heavy impacts during transport.

➢ Check each DriveControl after transport for any visible damage.

➢ If any damage has been identified, photograph the damaged parts.

➢ In the event that damage has been incurred during transport, inform the shipping agent or Interroll immediately to ensure that you do not lose any potential damage claims.

➢ Do not expose the DriveControl to any strong fluctuations in temperature, since this can lead to condensation forming.

4.2 Storage

CAUTION

Risk of injury due to improper storage.

➢ Ensure that the DriveControl is stored safely.

Please note the following:

➢ Do not stack pallets on top of one another.

➢ Check each DriveControl after storage for any visible damage.

5 Assembly and installation

5.1 Warning notices for installation

NOTE

An improper approach to installing the DriveControl can lead to material damage or reduce the service life of the DriveControl.

- To preserve the interior of the DriveControl, do not allow the DriveControl to fall or for it to be used in an improper fashion.
- Check each DriveControl before assembly for any visible damage.
- Ensure that the DriveControl is not tensioned during the assembly process (no bending or torsional load).
- Do not drill any additional mount holes into the housing and do not enlarge any existing holes.
- Ensure that the permitted operating temperature is under no circumstances exceeded as a result of external heat sources.

5.2 Assembling the DriveControl

- Look for level surfaces that are suitable for mounting the DriveControl on.
- Use the DriveControl as a template and mark the middle of the two installation holes. For the distance between the installation holes, see „Dimensions“ on page 22.
- Drill two installation holes with diameters of 5.6–6 mm on the markings.
- Screw on the DriveControl.
- Make sure the housing has not been distorted.

5.3 Warning notices for electrical installation

CAUTION

Risk of injury when working on electrical equipment.

- Electrical installation work must only be carried out by a qualified electrician.
- Before installing, removing or connecting the DriveControl, switch off the power to the conveyor system and ensure that it cannot be unintentionally switched on again.
- Set all the power supplies used to the same ground potential in order to avoid compensating currents via the DriveControl.
- Ensure all components are earthed correctly. Improper earthing can lead to a build-up of static charge, which can result in a fault or premature failure of the DriveControl.
- Ensure that suitable switching devices and protective systems are in place that will allow the equipment to be operated safely.
- Only switch on the operating voltages when all cables are connected.

NOTE

Improper electrical installation can result in damage to the DriveControl.

- Observe national regulations for electrical installation.
- Only operate the DriveControl with a protective extra-low voltage (PELV) of 24 V or 48 V.
- Never operate the DriveControl with an alternating voltage.
- Ensure that the polarity of the power supply is correct.
- Ensure that the existing electrical installation has no disruptive influence on the DriveControl.
- Only use cables that are adequately dimensioned for the specific operating conditions.
- Ensure that the calculations for the drop in voltage in the cables are taken into account.
- Observe regulations for laying cables.
- Do not expose the connectors to excessively high tensile or pressure loads. If the connector cable is bent, this can damage the cable insulation and cause the DriveControl to fail.

5.4 Electrical installation

Connecting the power supply

The DriveControl is fitted with an internal, non-replaceable fuse that serves exclusively to protect the device. The protection of the supply cables must be guaranteed by the operator.

DriveControl 20/DriveControl 2048

Required cables:

Connection	Conductor cross-section
Inputs/outputs	Flexible wire: 0.08 to 0.5 mm^2
	Flexible wire with ferrule terminal: 0.25 to 0.34 mm^2
	Stripping length: 5 to 6 mm
Power supply	Flexible wire: H05 (07) V-K 1.5 mm^2
	Ferrule terminal optional
	Stripping length: 6 to 7 mm

- ➢ Prepare wire ends in accordance with the recommendations of the contact manufacturer.
- ➢ Insert the cables for the inputs/outputs into the connector using the yellow auxiliary tool (see „Inputs and outputs“ on page 28).
- ➢ Insert the power supply cables into the connector using the black auxiliary tool.
- ➢ Insert the connector into the DriveControl.
- ➢ If necessary, adjust the DIP switch / rotary coding switch in accordance with the requirements (see „Configuration options“ on page 36).
- ➢ Insert the RollerDrive connector so that the "RD" label on the DriveControl is visible and the label on the connector faces the rear (and is therefore not visible).

DriveControl 54

Required cables:

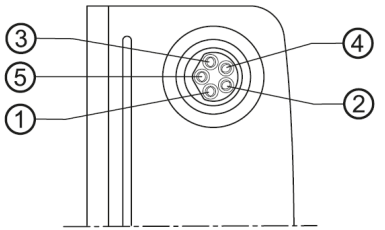
Connection	Conductor cross-section
Inputs/outputs	Flexible wire: 0.08 to 0.5 mm^2
	Flexible wire with ferrule terminal: 0.25 mm^2
	Stripping length: 5 to 6 mm
Power supply	Flexible wire: H05 (07) V-K 1.5 mm^2
	Ferrule terminal optional
	Stripping length: 8 mm

- ➢ Prepare wire ends in accordance with the recommendations of the contact manufacturer.
- ➢ Loosen the two screws on the yellow cover of the connection area.
- ➢ Open the cable feedthroughs to the connection area according to the cables used.
- ➢ Feed the cables through.
- ➢ Connect the input/output cables (see „DriveControl 54“ on page 27). To do this, push the white slider to the right (towards the feedthroughs), insert the cable and then push the slider back again.
- ➢ Connect the power supply cables (see „DriveControl 54“ on page 27). To do this, push the white button down and insert the cable.
- ➢ Establish strain relief.
- ➢ If necessary, adjust the DIP switch in accordance with the requirements (see „Speed preselection via DIP switch for DriveControl 20, DriveControl 54“ on page 37).
- ➢ Close the cover and tighten both screws.
- ➢ Carry out a visual inspection of the connection area to ensure that an IP54 protection rating can be guaranteed.
- ➢ Insert the RollerDrive connector so that the "RD" label on the DriveControl is visible and the label on the connector faces the rear (and is therefore not visible).

5.5 Inputs and outputs

DriveControl 20/DriveControl 2048

RollerDrive connection – 8 mm snap-in, five-pin, contact assignment as per DIN EN 61076-2



1 V_B

2 Output: Rotational direction

3 Ground

4 Input: Error

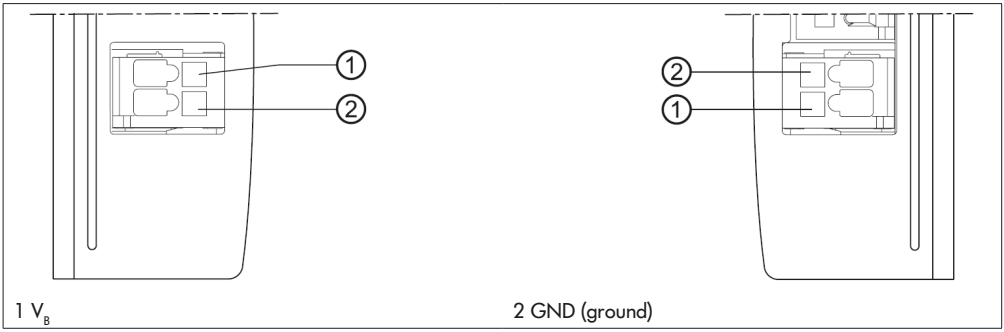
5 Output: Speed

NOTE

DriveControl 2048 - Destruction of the RollerDrive with incorrect connection values

➢ Do not attempt to operate a RollerDrive EC 5000 24V DC with 48 V DC. This leads to the destruction of the engine electronics.

Power supply connection

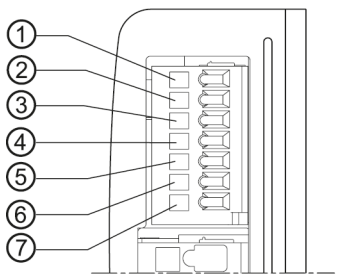


1 V_B 2 GND (ground)

The power supply connection features a double-sided design, meaning the most favourable side (in terms of installation) can be used to connect the power supply. Both connections are directly internally linked with one another. The power supply can be fed through a DriveControl, allowing a maximum of two DriveControl units to be connected in succession.

	DriveControl 20	DriveControl 2048
V_B	+24 V DC	+24 V or +48 V DC

Connection for inputs/outputs

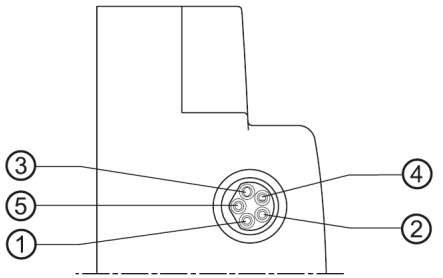


1 COMMON GND – common signal ground
2 V_{EXT} – power supply for ERROR signal
3 ERROR – error output
4 DIR – rotational direction
5 SPEED C – input for speed preselection
6 SPEED B – input for speed preselection
7 SPEED A – input for speed preselection

V_{EXT} typically corresponds to +24 V DC.

DriveControl 54

RollerDrive connection – 8 mm snap-in, five-pin, contact assignment as per DIN EN 61076-2



1 +24 V DC

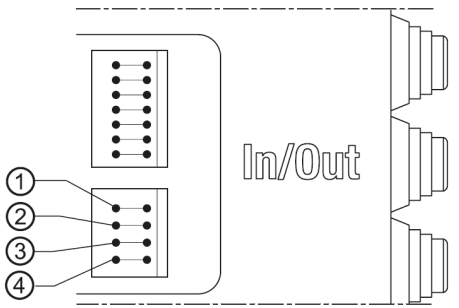
2 Output: Rotational direction

3 Ground

4 Input: Error

5 Output: Speed

Power supply connection



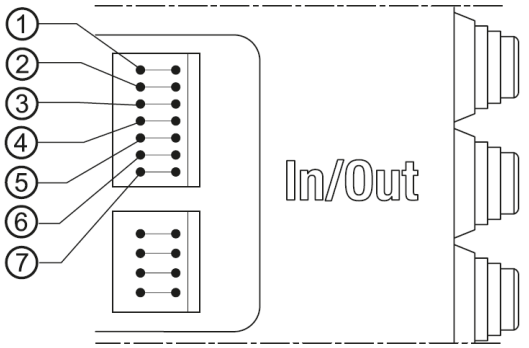
1 GND (ground)

2 +24 V DC

3 GND (ground)

4 +24 V DC

Connection for inputs/outputs



1 COMMON GND – common signal ground

2 24 V EXT – power supply for ERROR signal

3 ERROR – error output

4 DIR – rotational direction

5 SPEED C – input for speed preselection

6 SPEED B – input for speed preselection

7 SPEED A – input for speed preselection

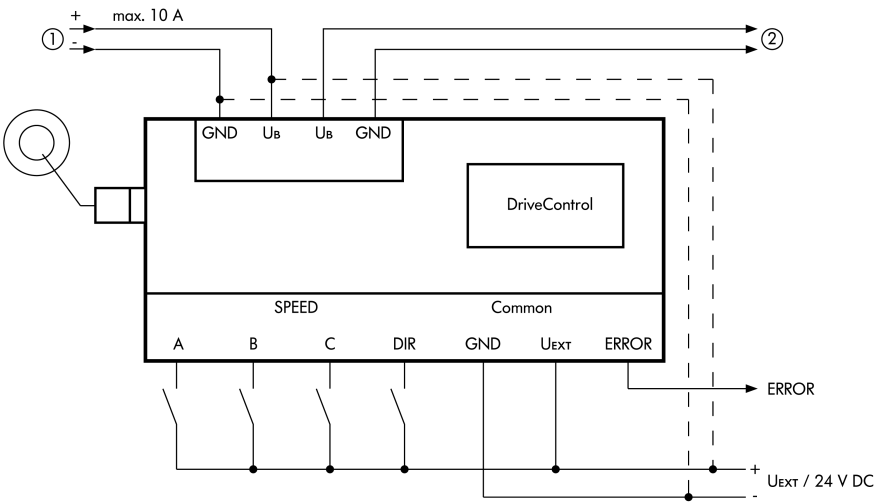
The power supply connection features a double-sided design. Both connections are directly internally linked with one another. The power supply can be fed through a DriveControl, allowing a maximum of two DriveControl units to be connected in succession.

5.6 Circuit diagrams

The control inputs SPEED A, SPEED B, SPEED C, DIR and the output signal ERROR are completely galvanically separated from the power supply V_B by means of optical couplers.

The control inputs and the output signal are supplied via the external voltage V_{EXT}. The common ground connection for the signals SPEED A, SPEED B, SPEED C, DIR and ERROR is COMMON GND.

Basic circuitry of DriveControl 20, DriveControl 54



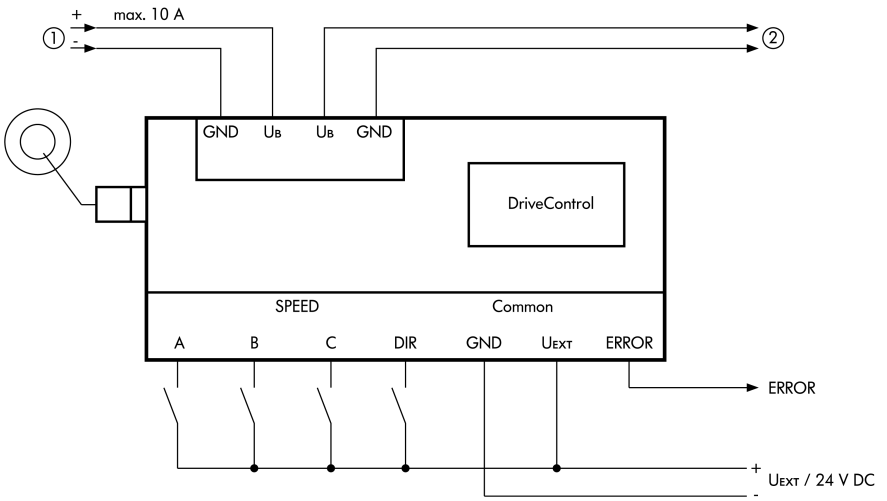
1 Supply voltage V_B = 24 V DC from the power supply unit (cable 1.5 mm²)

2 Additional DriveControl (cable 1.5 mm²)

The dashed lines are only used when no galvanic separation is required between the control signals and the supply voltage.

In this case, the power for the control signals is supplied by the supply voltage V_B.

Basic circuitry of DriveControl 2048

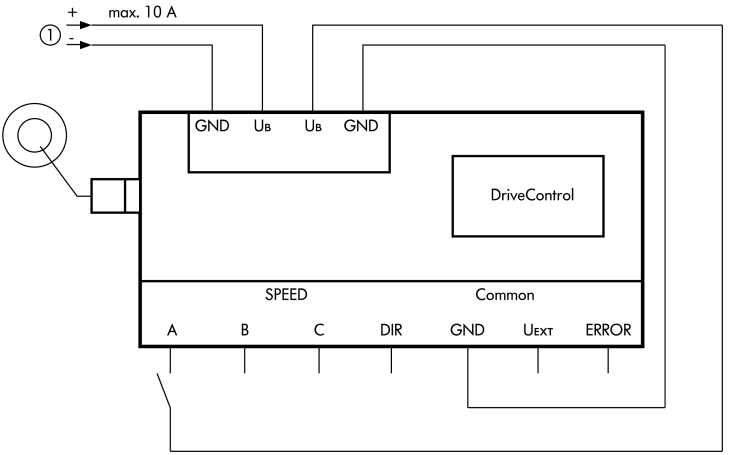


1 Supply voltage V_B = 24 V DC/48 V DC from the power supply unit (cable 1.5 mm²)

2 Additional DriveControl (cable 1.5 mm²)

For issue-free connection to a PLC, we recommend a separately conducted control voltage V_{EXT} of 24 V DC.

Minimum circuitry for DriveControl 20, DriveControl 54, DriveControl 2048



1 Supply voltage V_B = 24 V DC (DC 20 / DC 54), 24/48 V DC (DC2048) from the power supply unit (cable 1.5 mm²)

This circuitry enables the specification of the target values for rotational speed and rotational direction via the internal DIP switch (DC20/DC54) respectively rotary coding switch (DC2048).

The error signal is not used; errors are only indicated via the red LED.

Starting and stopping can be controlled by changing the level on the SPEED A connection.

NOTE

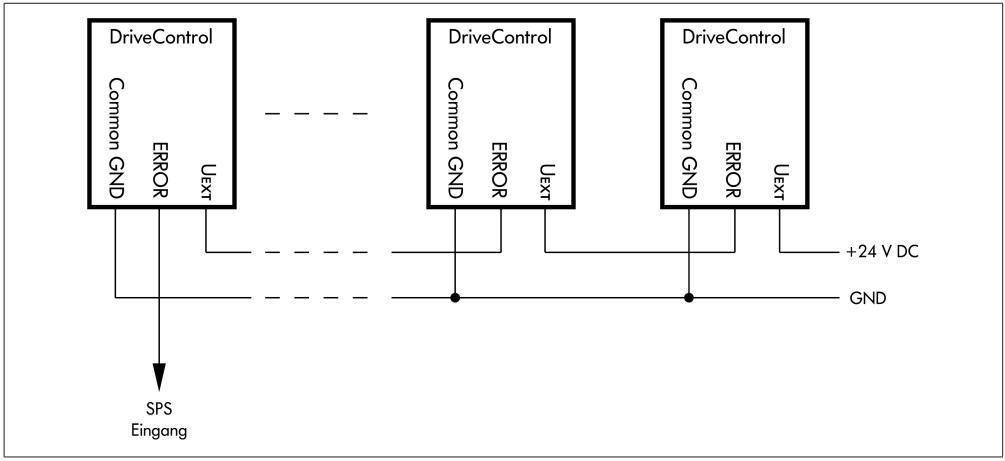
The DriveControl and RollerDrive must not be controlled by switching the power supply on or off. They must only be controlled via the start signal (SPEED A, B, C).

Connecting multiple error signals to one PLC

In order to be able to interpret the error signal, the input V_{EXT} must be supplied with a voltage of 24 V DC.

The error signal from a maximum of six DriveControl units can be connected in series. For every DriveControl unit, the logic level "no error" is reduced by 1.1 V.

➢ Connect the ERROR output of the preceding DriveControl with the input V_{EXT} of the subsequent DriveControl.



When the operating voltage is switched off, the ERROR output will switch to the "error" state. This guarantees a correct error message even when the error signal has been linked from multiple DriveControl units and the operating voltage of a DriveControl unit is switched off, or a cable error has occurred (detached contact, cable break).

When the operating voltage is switched on, the error signal is issued until the internal microcontroller has assumed control. If no error is present, the error signal is terminated approx. 400 ms after the operating voltage has been switched on.

NOTE

Incorrect polarity will irreparably damage the DriveControl.

Ensure that the polarity of the supply voltage V_{EXT} is correct.

6 Start-up and operation

6.1 Start-up

Check before the initial start-up

- ➢ Ensure that the base plate of the DriveControl has been correctly attached to the profile and that all screws have been properly tightened.
- ➢ Ensure that no additional hazards are formed through the interfaces to other components.
- ➢ Ensure that the wiring conforms to the specifications and legal provisions.
- ➢ Check all protective equipment.
- ➢ Ensure that no persons are in the hazardous areas by the conveyor system.

6.2 Configuration options

Setting the speed

The speed of the RollerDrive can be adjusted via the DriveControl in two ways:

- Internally, via a DIP switch (DC20/DC54) or in 15 levels using a rotary coding switch (DC2048). This method is given priority and allows for finer increments.
- Externally, via three digital inputs in eight levels (speed changes are also possible during operation, whereby a quasi ramp function can be implemented via corresponding circuitry of a PLC).

This speed setting is converted into an analogue control voltage by the DriveControl, which is then interpreted by the RollerDrive as a target value setting. This target value setting is independent of the RollerDrive gears and their diameters.

The acceleration and deceleration characteristics of the RollerDrive are determined by their own moment of inertia, the gears used, the conveyor speed, the moment of inertia of the connected conveyor rollers, the selected operating medium and the transported mass.

The varying rated speeds and gear stages of the RollerDrive units used will result in different speeds.

- RollerDrive EC310 = rated speed 6000 rpm
- RollerDrive EC5000 AI = rated speed 6900 rpm

Speed preselection via DIP switch for DriveControl 20, DriveControl 54

Position of the DIP switch SPEED on the DriveControl				Speed of the gear ratio for RollerDrive EC310 [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	0,79	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	0,63	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	0,20	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 on the inputs SPEED A, B, C								

Nominal values at an ambient temperature of 20 °C

Position of the DIP switch SPEED on the DriveControl				Speed of the gear ratio for RollerDrive EC5000 AI [m/s]								
A	B	C	D	9:1	13:1	18:1	21:1	30:1	42:1	49:1	78:1	108:1
on	on	on	on	2,01	1,39	1,00	0,86	0,60	0,43	0,37	0,23	0,17
on	on	on	off	1,87	1,29	0,93	0,80	0,56	0,40	0,34	0,22	0,16
on	on	off	on	1,73	1,20	0,87	0,74	0,52	0,37	0,32	0,20	0,14
on	on	off	off	1,60	1,10	0,80	0,68	0,48	0,34	0,29	0,18	0,13
on	off	on	on	1,46	1,01	0,73	0,63	0,44	0,31	0,27	0,17	0,12
on	off	on	off	1,32	0,91	0,66	0,57	0,40	0,28	0,24	0,15	0,11
on	off	off	on	1,18	0,82	0,59	0,51	0,36	0,25	0,22	0,14	0,10
on	off	off	off	1,05	0,72	0,52	0,45	0,31	0,22	0,19	0,12	0,09
off	on	on	on	0,91	0,63	0,46	0,39	0,27	0,20	0,17	0,11	0,08
off	on	on	off	0,77	0,54	0,39	0,33	0,23	0,17	0,14	0,09	0,06
off	on	off	on	0,64	0,44	0,32	0,27	0,19	0,14	0,12	0,07	0,05
off	on	off	off	0,50	0,35	0,25	0,21	0,15	0,11	0,09	0,06	0,04
off	off	on	on	0,36	0,25	0,18	0,15	0,11	0,08	0,07	0,04	0,03
off	off	on	off	0,22	0,16	0,11	0,10	0,07	0,05	0,04	0,03	0,02
off	off	off	on	0,09	0,06	0,04	0,04	0,03	0,02	0,02	0,01	0,01
off	off	off	off	Corresponding to the signals on the inputs SPEED A, B, C								

Nominal values at an ambient temperature of 20 °C

Speed preselection via digital inputs for DriveControl 20, DriveControl 54

Requirement: All DIP switches must be set to OFF.

- ➢ Set the external inputs for SPEED A, B, C to a logic level of (H)igh or (L)ow in accordance with the table below, in order to start the RollerDrive at the desired speed.
- ➢ To adjust the speed, change the signals on the inputs SPEED A, B, C accordingly.
- ➢ To stop the RollerDrive, switch all the inputs SPEED A, B, C to a logic level of (L)ow.

The internal speed setting is given priority. If one or more of the internal DIP switches SPEED A, B, C, D are set to ON while the speed is specified externally, the RollerDrive will rotate at this internally set speed, independent of the signals from the external inputs. If all internal DIP switches SPEED A, B, C, D are set to OFF, the RollerDrive will once again rotate at the speed that is set through the external inputs.

Inputs SPEED on the DriveControl			Speed of the gear ratio for RollerDrive EC310 [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	0,79	0,65	0,44	0,33	0,25	0,16
H	H	L	1,47	1,10	0,82	0,66	0,55	0,37	0,27	0,21	0,14
H	L	H	1,19	0,89	0,67	0,53	0,44	0,30	0,22	0,17	0,11
H	L	L	0,91	0,68	0,51	0,41	0,34	0,23	0,17	0,13	0,08
L	H	H	0,65	0,49	0,36	0,29	0,24	0,16	0,12	0,09	0,06
L	H	L	0,37	0,28	0,21	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

Nominal values at an ambient temperature of 20 °C

Inputs SPEED on the DriveControl			Speed of the gear ratio for RollerDrive EC5000 AI [m/s]								
A	B	C	9:1	13:1	18:1	21:1	30:1	42:1	49:1	78:1	108:1
H	H	H	2,01	1,39	1,00	0,86	0,60	0,43	0,37	0,23	0,17
H	H	L	1,68	1,17	0,84	0,72	0,50	0,36	0,31	0,19	0,14
H	L	H	1,36	0,94	0,68	0,58	0,41	0,29	0,25	0,16	0,11
H	L	L	1,03	0,72	0,52	0,44	0,31	0,22	0,19	0,12	0,09
L	H	H	0,74	0,51	0,37	0,32	0,22	0,16	0,14	0,08	0,06
L	H	L	0,41	0,28	0,21	0,18	0,12	0,09	0,08	0,05	0,03
L	L	H	0,09	0,06	0,04	0,04	0,03	0,02	0,02	0,01	0,01
L	L	L	0	0	0	0	0	0	0	0	0

Nominal values at an ambient temperature of 20 °C

Accelerating when using the DIP switch RAMP for the acceleration and deceleration ramp of the DriveControl 20, DriveControl 54

Position of the RAMP DIP switch	
ON	OFF
Acceleration and deceleration ramp of t = 0.39 seconds switched on. The time relates to the maximum speed. For lower speed preselection, the ramps diminish proportionally.	RollerDrive accelerates and decelerates as quickly as possible depending on the application.

Speed preselection via rotary coding switch for DriveControl 2048

Position of the rotary coding switch on the RollerDrive	Speed of the gear ratio for RollerDrive EC5000 AI [m/s] at roller diameter of 50 mm								
	9:1	13:1	18:1	21:1	30:1	42:1	49:1	78:1	108:1
F	2,01	1,39	1,00	0,86	0,60	0,43	0,37	0,23	0,17
E	1,87	1,29	0,93	0,80	0,56	0,40	0,34	0,22	0,16
D	1,73	1,20	0,87	0,74	0,52	0,37	0,32	0,20	0,14
C	1,60	1,10	0,80	0,68	0,48	0,34	0,29	0,18	0,13
B	1,46	1,01	0,73	0,63	0,44	0,31	0,27	0,17	0,12
A	1,32	0,91	0,66	0,57	0,40	0,28	0,24	0,15	0,11
9	1,18	0,82	0,59	0,51	0,36	0,25	0,22	0,14	0,10
8	1,05	0,72	0,52	0,45	0,31	0,22	0,19	0,12	0,09
7	0,91	0,63	0,46	0,39	0,27	0,20	0,17	0,11	0,08
6	0,77	0,54	0,39	0,33	0,23	0,17	0,14	0,09	0,06
5	0,64	0,44	0,32	0,27	0,19	0,14	0,12	0,07	0,05
4	0,50	0,35	0,25	0,21	0,15	0,11	0,09	0,06	0,04
3	0,36	0,25	0,18	0,15	0,11	0,08	0,07	0,04	0,03
2	0,22	0,16	0,11	0,10	0,07	0,05	0,04	0,03	0,02
1	0,09	0,06	0,04	0,04	0,03	0,02	0,02	0,01	0,01
0	Corresponding to the signals on the inputs SPEED A, B, C								

Nominal values at an ambient temperature of 20 °C

Speed preselection via digital inputs for DriveControl 2048

Requirement: All DIP switches must be set to OFF.

- ➢ Set the external inputs for SPEED A, B, C to a logic level of (H)igh or (L)ow in accordance with the table below, in order to start the RollerDrive at the desired speed.
- ➢ To adjust the speed, change the signals on the inputs SPEED A, B, C accordingly.
- ➢ To stop the RollerDrive, switch all the inputs SPEED A, B, C to a logic level of (L)ow.

The internal speed setting is given priority. If the rotary coding switch SPEED is adjusted while the speed is specified externally, the RollerDrive rotates at the internally set speed, independent of the signals of the external inputs. If the rotary coding switch SPEED is rotated back to position "0", the RollerDrive will once again rotate at the speed that is set through the external inputs.

Inputs SPEED on the DriveControl			Speed of the gear ratio for RollerDrive EC5000 AI [m/s]								
A	B	C	9:1	13:1	18:1	21:1	30:1	42:1	49:1	78:1	108:1
H	H	H	2,01	1,39	1,00	0,86	0,60	0,43	0,37	0,23	0,17
H	H	L	1,68	1,17	0,84	0,72	0,50	0,36	0,31	0,19	0,14
H	L	H	1,36	0,94	0,68	0,58	0,41	0,29	0,25	0,16	0,11
H	L	L	1,03	0,72	0,52	0,44	0,31	0,22	0,19	0,12	0,09
L	H	H	0,74	0,51	0,37	0,32	0,22	0,16	0,14	0,08	0,06
L	H	L	0,41	0,28	0,21	0,18	0,12	0,09	0,08	0,05	0,03
L	L	H	0,09	0,06	0,04	0,04	0,03	0,02	0,02	0,01	0,01
L	L	L	0	0	0	0	0	0	0	0	0

Nominal values at an ambient temperature of 20 °C

Rotary coding switch DIR/RAMP for DriveControl 2048

Position of the rotary coding switch DIR/RAMP on the DriveControl	Rotational direction of the RollerDrive as seen from the cable side	Ramp duration [s]
0	Counter clockwise	0
1		0.2
2		0.3
3		0.45
4		0.675
5		1
6		1.5
7		2
8	Clockwise	0
9		0.2
A		0.3
B		0.45
C		0.675
D		1
E		1.5
F		2

7 Maintenance and cleaning

CAUTION

Risk of injury from following incorrect procedure.

- ➢ Maintenance and repair work must only be carried out by authorised and trained (specialist) personnel.
- ➢ Maintenance and repair work must only be carried out when the system has been disconnected from the power supply. Switch off the power to the DriveControl and ensure that it cannot be unintentionally switched on again.
- ➢ Put up signs to indicate that maintenance or cleaning work is being carried out.

7.1 Maintenance

Checking the DriveControl

The DriveControl itself requires no maintenance. However, in order to prevent faults from occurring, the connections and fixings must be examined on a regular basis.

- ➢ In the course of regular inspection and maintenance work on the conveyor, ensure that the screws of the DriveControl are still tight, that the cables are still arranged correctly and that the corresponding connections are correctly attached.

Replacing the DriveControl

If a DriveControl is damaged or defective, it must be replaced.

Do not attempt to open the DriveControl.

- ➢ Install a new DriveControl (see „Decommissioning“ on page 49 and „Assembling the DriveControl“ on page 24).

7.2 Cleaning

Under humid conditions, dust and dirt can cause a short circuit. Therefore, ensure dirty environments are cleaned regularly to prevent short circuits that could damage the DriveControl.

NOTE

The DriveControl can be damaged if it is cleaned improperly.

- ➢ Never immerse the DriveControl in fluids.

- ➢ If necessary, vacuum any dust or dust that is present.
- ➢ To clean the DriveControl more thoroughly, disconnect it from the power supply, detach it and wipe it with a damp cloth.

8 Assistance in the event of faults

8.1 Troubleshooting

Fault	Possible cause	Remedy
DriveControl is not working or not working properly	No power supply	➢ Ensure that the output voltage of the power supply is within the specified voltage range. ➢ Check the connections and correct them if necessary.
	Incorrect position of the DIP switch/ rotary coding switch	➢ Check the position of the DIP switch and correct this if necessary (see „DIP switches/ rotary coding switches“ on page 20).
DriveControl is defective or damaged	Internal fuse has been triggered or is defective	➢ Replacing the DriveControl

The error signal is activated in the event of the following faults:

- Error on the RollerDrive
- RollerDrive not connected
- Voltage is outside the specified range (above or below)
- Chopper resistor overheated
- Initialisation phase

8.2 Understanding the LEDs

The LEDs provide information about the operating state of the DriveControl and the RollerDrive.

Description	Parameter	LED ready	LED fault	RD speed	Error	Comments
Fuse faulty		Off	On	= 0		Repair not possible
RD ERROR high		On / F	FS	Unchanged	High	Determine whether the RollerDrive is faulty or needs to be replaced
RD not connected	Corresponds to RD ERROR high	On / F	FS	Unchanged	High	Connect the RollerDrive
Voltage is outside the specified range VBmin24, VBmax24, VBmin48, VBmax48*	24 V/48 V mode*	Off	FS	= 0	High	Self-terminating, once VB returns to the permitted range
Excessive temperature of chopper	$T \geq T_{Chmax}$	On	F	= 0	High	Chopper inactive, cooling of chopper to $T_{Ch} < T_{Chmax}$
Chopper overload	Chopper was active	Off	F	= 0	High	Self-terminating
RD rotates	No error	F	Off	≠ 0	Low	-
RD does not rotate	No error	On	Off	= 0	Low	No "start signal"
Initialisation phase		Off	On	= 0	High	

*48 V only for DriveControl 2048

FS= LED flashes slowly (0.5 s on, 1.5 s off)

F = LED flashes fast (0.5 s on, 0.5 s off)

9 Decommissioning and disposal

CAUTION

Risk of injury from following incorrect procedure.

- Decommissioning must only be carried out by authorised, qualified personnel.
- Only decommission the DriveControl when the system has been disconnected from the power supply.
- Switch off the power to the DriveControl and ensure that it cannot be unintentionally switched on again.

9.1 Decommissioning

- Remove all cables from the DriveControl.
- Loosen the screws that have been used to attach the DriveControl to the conveyor frame.
- Remove the DriveControl from the conveyor frame.

9.2 Disposal

The operating company is responsible for disposing of the DriveControl according to correct procedure. In doing so, the industry-specific and local provisions for disposing of the DriveControl and its packaging must be observed.

10 Appendix

10.1 Electrical data of the connections for DriveControl 20, DriveControl 54

Connection for inputs/outputs

Input 24 V (pin 2)

Properties	Galvanically separated	
Voltage range	19 to 26 V DC	
Insulation strength	Max. 500 V_{eff}	1 min, 50 Hz
Reverse polarity protection	Max. 30 V DC	
Current consumption	Max. 100 mA	Must be guaranteed through external circuitry

Output ERROR (pin 3)

Properties	Galvanically separated, not permissible to feed in an external voltage	
Insulation strength	Max. 500 V_{eff}	1 min, 50 Hz
Logic level for fault	Max. 1 V DC	External load resistance to GND required
Output current for fault	Max. 1 mA	
Logic level for no fault	10 to 26 V DC	
Output current for no fault	Max. 50 mA	Not short-circuit proof

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

Properties	Debounced, galvanically separated	
Reverse polarity protection	Max. 30 V DC	
Overvoltage protection	Max. 30 V DC	Permanent, free of harmonic waves
Insulation strength	Max. 500 V_{eff}	1 min, 50 Hz
Logic level, low	0 to 1 V DC	Logic level 0 = L = inactive
Input current, low	Max. 0.1 mA	
Logic level, high	19 to 26 V DC	Logic level 1 = H = active
Input current, high	2.5 to 4.5 mA	

Appendix

RollerDrive connection

Power supply (pin 1, 3)

Rated value	24 V DC	
Voltage range	19 to 26 V DC	
Residual ripple	Max. 600 mV_{PP}	
Rated current	2.3 A	
Starting current	Max. 5 A	Max. 250 ms > 2.3 A, Time-dependent current course, triangular-shaped, duty ratio ≤ 19%
Voltage feedback stability	Max. 35 V DC	Free of harmonic waves Max. 500 ms; after 500 ms, the reserve voltage must be ≤ 27 V, duty ratio max. 27%

Output: Rotational direction

Properties	Not galvanically separated, short-circuit proof, not permissible to feed in an external voltage	
Overvoltage protection	Max. 30 V DC	
Anti-clockwise rotation	Max. 4 V	Logic level 0
Output current, low	Max. 1 mA	Load resistance = 57 kΩ
Clockwise rotation	Min. 7 V	Logic level 1
Output current, high	Max. 0.2 mA	For short circuit

Input: Error (pin 4)

Properties	Not galvanically separated	
Reverse polarity protection	Max. 30 V DC	
Max. voltage	30 V DC	
Logic level, low	Max. 8.5 V DC	@ 1.5 mA Logic level 0 = L = no error
Residual current, low	1.5 mA Max. 5 mA	
Logic level, high	12 to 30 V DC	Logic level 1 = H = error
Residual current, high	Max. 0.01 mA	

Output: Speed (pin 5)

Properties	Not galvanically separated	
Speed setting range for motor control voltage	2.3 to 10 V DC	RollerDrive rotates
Stop range	0 to 2 V DC	RollerDrive does not rotate
Accuracy of motor control voltage	5%	Motor control voltage between 2.3 and 10 V DC at 21 °C
Ripple of motor control voltage	250 mV_{PP}	50 Ω
Max. load for motor control current	0.16 to 2 mA	Input resistance for RollerDrive: 66 kΩ
Rate of change	4.5 to 5 V/ms	0–100% motor control voltage

Appendix

10.2 Electrical data of the connections for DriveControl 2048

Connection for inputs/outputs

Input 24 V (pin 2)

Properties	Galvanically separated	
Voltage range	19 to 26 V DC	
Insulation strength	Max. 1000 V_{eff}	1 min, 50 Hz
Reverse polarity protection	Max. 60 V DC	
Current consumption	Max. 50 mA	Must be guaranteed through external circuitry

Output ERROR (pin 3)

Properties	Galvanically separated, not permissible to feed in an external voltage	
Insulation strength	Max. 1000 V_{eff}	1 min, 50 Hz
Logic level for fault	Max. 1 V DC	External load resistance to GND required
Output current for fault	Max. 0.1 mA	
Logic level for no fault	10 to 26 V DC	
Output current for no fault	Max. 50 mA	Not short-circuit proof

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

Properties	Debounced, galvanically separated	
Reverse polarity protection	Max. 60 V DC	
Overvoltage protection	Max. 58 V DC	Permanent, free of harmonic waves
Insulation strength	Max. 1000 V_{eff}	1 min, 50 Hz
Logic level, low	0 to 1.5 V DC	Logic level 0 = L = inactive
Input current, low	Max. 0.1 mA	
Logic level, high	19 to 55 V DC	Logic level 1 = H = active
Input current, high	2.5 to 4.5 mA	

Appendix

RollerDrive connection

Power supply (pin 1, 3)

Rated value	24 V/48 V DC	
Voltage range	19 to 55 V DC	
Residual ripple	Max. 800 mV_{PP}	
Rated current	2.3 A	
Starting current	Max. 8 A	Max. 1 s > 10 A, Time-dependent current course
Voltage feedback stability	Max. 58 V DC	Free of harmonic waves, max. 500 ms

Output: Rotational direction

Properties	Not galvanically separated, short-circuit proof, not permissible to feed in an external voltage	
Overvoltage protection	Max. 30 V DC	
Clockwise rotation	Max. 4 V	Logic level 0
Output current, low	Max. 1 mA	Load resistance = 57 kΩ
Counter clockwise rotation	Min. 7 V	Logic level 1
Output current, high	Max. 0.2 mA	For short circuit

Input: Error (pin 4)

Properties	Not galvanically separated	
Reverse polarity protection	Max. 30 V DC	
Max. voltage	30 V DC	
Logic level, low	Max. 8.5 V DC	@ 1.5 mA Logic level 0 = L = no error
Residual current, low	1.5 mA Max. 5 mA	
Logic level, high	12 to 30 V DC	Logic level 1 = H = error
Residual current, high	Max. 0.01 mA	

Output: Speed (pin 5)

Properties	Not galvanically separated	
Speed setting range for motor control voltage	2.3 to 10 V DC	RollerDrive rotates
Stop range	0 to 2 V DC	RollerDrive does not rotate
Accuracy of motor control voltage	5%	Motor control voltage between 2.3 and 10 V DC at 21 °C
Ripple of motor control voltage	250 mV_{PP}	50 Ω
Max. load for motor control current	0.16 to 2 mA	Input resistance for RollerDrive: 66 kΩ
Rate of change	4.5 to 5 V/ms	0–100% motor control voltage

10.3 Translation of the original Declaration of Conformity

EU Declaration of conformity

EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU

The manufacturer

Interroll Engineering GmbH
Höferhof 16
42929 Wermelskirchen
Germany

hereby declares that the

- **Interroll DriveControl 20**
- **Interroll DriveControl 54**
- **Interroll DriveControl 2048**

conforms to the applicable provisions and the associated CE marking in accordance with the aforementioned Directives.

List of the coordinated standards that have been applied:
EN 60947-5-3:1999/A1:2005
EN 61000-6-2:2005/AC:2005
EN 61000-6-3:2007/A1:2011/AC:2012
EN 60204-1:2006/AC:2010

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i. V.

Jörg Schiffler
Product Compliance Officer, Interroll Engineering GmbH
Wermelskirchen, 1st February 2019

Notes

INSPIRED BY EFFICIENCY

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