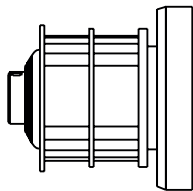
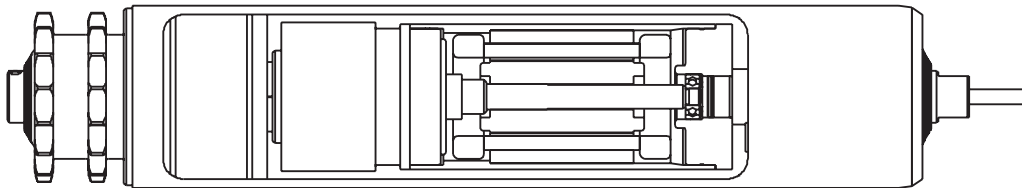


INSPIRED BY EFFICIENCY



User Manual

Interroll Pallet Drive

DP 0080

DP 0089

Manufacturer

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Contents

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Introduction

Information about the operating instructions

The following Pallet Drive types are described in these operating instructions:

- DP 0080
- DP 0089

Contents

This instruction manual contains important notes and information about the various operating phases of the Pallet Drive.

The instruction manual describes the Pallet Drive as it is delivered by Interroll.

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

The instruction manual is part of the product

- ▶ For trouble-free, safe operation and warranty claims, read the instruction manual first and follow the instructions.
- ▶ Keep the instruction manual close to the Pallet Drive.
- ▶ Pass the instruction manual on to any subsequent operator or occupant.
- ▶ **NOTICE! The manufacturer does not accept any liability for faults or defects due to non-observance of this instruction manual.**
- ▶ If you still have questions after reading the instruction manual, please contact Interroll customer service. Contact persons close to you can be found on the Internet under www.interroll.com/contact.

Warning notices in this manual

The warning notices refer to risks that may arise while using the Pallet Drive. They are available at four danger levels with the following signal words:

Signal word	Meaning
DANGER	Identifies a danger with high risk that will result in death or serious injury if it is not avoided.
WARNING	Identifies a danger with medium risk that could result in death or serious injury if it is not avoided.
CAUTION	Identifies a danger with low risk that could result in minor or medium injury if it is not avoided.
NOTICE	Identifies a danger that results in property damage.



Interroll Pallet Drive DP 0080/DP 0089

Introduction

Symbols



This symbol marks useful and important information.

Requirement:

- This symbol represents a prerequisite to be met prior to assembly and maintenance work.
- ▶ This symbol marks the steps to be carried out.

Safety

State of the art

The Pallet Drive is designed according to the state of the art and is reliable in operation, once distributed. However, risks may still arise:



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

- ▶ Carefully read the manual and follow its content.
- ▶ Observe local accident prevention regulations and general safety regulations that apply in the area of use.

Intended use

The Pallet Drive is intended for use in industrial environments, super markets and airports and is used for the transport of unit handling, such as pallets, cartons or crates. The Pallet Drive must be integrated into a conveyor module or conveyor system. Any other use is considered inappropriate.

Use of the Pallet Drive is only allowed in the areas described in the product information chapter.

Any modifications that affect the safety of the product are not permitted.

The Pallet Drive may only be operated within the defined operating limits.

Unintended use

The Pallet Drive must not be used for transporting people.

The Pallet Drive is not intended for use under impact or shock loads.

The Pallet Drive is not designed to be used under water. Such a use leads to personal or fatal injuries from electrocution as well as the penetration of water, resulting in a short circuit or motor damage.

The Pallet Drive may not be used as a drive for cranes or lifting devices or for the corresponding hoist ropes, cables or chains.

Applications not in accordance with the intended use of the Pallet Drive require approval from Interroll.

Unless otherwise stated in writing and/or specified in a quote, Interroll and its dealers shall assume no liability for product damage or failure which result from failure to observe these specifications and restrictions (see "*Electrical data*", page 14).

Interroll Pallet Drive DP 0080/DP 0089

Safety

Personnel qualification

Unqualified personnel cannot recognize risks and, as a result, is subject to greater dangers.

- ▶ Authorize only qualified personnel to perform the activities described in these instructions.
- ▶ The operating company must ensure that personnel follow locally applicable regulations and rules about safety and hazards while working.

The following target groups are addressed in these instructions:

Operators	Operators have been instructed in the operation and cleaning of the Pallet Drive, and follow the safety guidelines.
Service personnel	The service personnel features a technical training or has undergone training by the manufacturer and performs the maintenance and repair tasks.
Electricians	Persons working on electrical installations must have pertinent technical training.

Dangers



The following list informs you about the various types of danger or damage that may occur while operating the Pallet Drive.

Bodily injury	<ul style="list-style-type: none">▶ Maintenance or repair work on the Pallet Drive must only be performed by service personnel in accordance with applicable regulations.▶ Before turning on the Pallet Drive, ensure that no unauthorized persons are near the conveyor.
Electricity	<ul style="list-style-type: none">▶ Only perform installation and maintenance work after you have switched off the power. Ensure that the Pallet Drive cannot be turned on accidentally.
Rotating parts	<ul style="list-style-type: none">▶ Do not reach into areas between Pallet Drive and roller chains.▶ Tie long hair together.▶ Never wear loose clothing.▶ Never wear jewelry, such as necklaces or bracelets.
Hot motor parts	<ul style="list-style-type: none">▶ Do not touch the surface of the Pallet Drive. It can result in burns, even under regular operating temperature.
Working environment	<ul style="list-style-type: none">▶ Do not use the Pallet Drive in explosive atmospheres.▶ Remove equipment or material that is not required from the workspace.▶ Wear safety shoes.▶ Precisely specify and monitor the placement of the material.
Faults during operation	<ul style="list-style-type: none">▶ Regularly check the Pallet Drive for visible damage.▶ In case of fumes, unusual noise or blocked or damaged materials, stop the Pallet Drive at once and ensure that it cannot be started accidentally.▶ Contact qualified personnel immediately to find the source of the fault.▶ During operation, do not step on the Pallet Drive or the conveyor/the system in which it is installed.

Interroll Pallet Drive DP 0080/DP 0089

Safety

- Maintenance**
 - ▶ Check the product regularly for visible damages, unusual noise and firm seating of fittings, screws and nuts. An additional maintenance is not required.
 - ▶ Do not open the Pallet Drive.
- Accidental motor start**
 - ▶ Take care during installation and maintenance work or in the event of a Pallet Drive fault: The Pallet Drive could start inadvertently.

Interfaces to other devices

Hazardous positions may occur while integrating the Pallet Drive into a complete system. These zones are not part of this manual and have to be analyzed during the design, installation and startup of the complete system.

- ▶ After installing the Pallet Drive in a conveyor module, check the complete system for new potential hazard zones before switching on the conveyor.
- ▶ Additional construction measures may be required.

Product information

Product description

The Pallet Drive is a completely enclosed electrical drive roller. It replaces external components such as motors and gears, which require frequent maintenance.

The Pallet Drive can be operated in environments with heavy coarse and fine dust exposure.

The Pallet Drive is driven by an asynchronous three-phase induction motor. It is available in a single power stage only and for most of the international supply voltages.

The Pallet Drive does not contain any oil and is not intended for continuous operation.

Options

Integrated thermal overload protection: A thermal circuit breaker integrated in the winding head protects against overheating. The switch trips if the motor overheats. However, it has to be connected to a suitable external control device that interrupts the current supply to the motor in case of overheating (see "*Thermal protection*", page 10).

Integrated electromagnetic brake: The integrated electromagnetic brake can hold loads. It acts directly on the rotor shaft of the Pallet Drive and is driven by a rectifier. The holding force of each Pallet Drive with brake corresponds to the belt pull of the motor. The electromagnetic brake is available for all Pallet Drive (see "*Electromagnetic brake for the Pallet Drive*", page 16).

Thermal protection

Under normal operating conditions, the thermal circuit breaker integrated in the stator winding is closed. When the motor limit temperature is reached (overheating), the switch opens at a preset temperature to prevent damage to the motor.

WARNING

The thermal circuit breaker is automatically reset after the motor has cooled off.

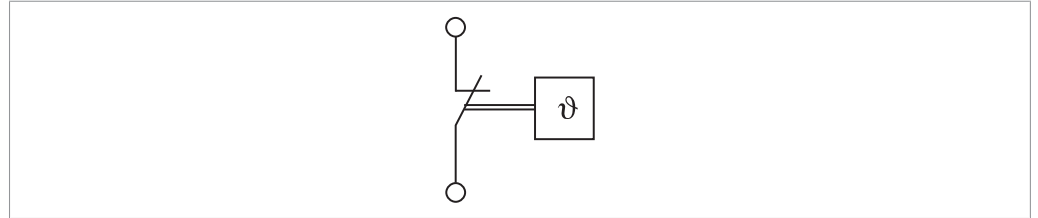
Inadvertent start-up of the motor

- ▶ Connect the thermal circuit breaker in series with a suitable relay or contactor so that the current supply to the motor is safely interrupted when the switch trips.
 - ▶ Ensure that the motor can be switched on again after overheating only with a confirmation button.
 - ▶ After the switch has tripped, wait until the motor has cooled off, and ensure prior to switch-on that there is no danger to persons.
-

Interroll Pallet Drive DP 0080/DP 0089

Product information

**Standard design:
Temperature limiter,
automatically switching
back**



Service life: 10,000 cycles

AC	$\cos \varphi = 1$	2.5 A	250 V AC
	$\cos \varphi = 0.6$	1.6 A	250 V AC
DC		1.6 A	24 V DC
		1.25 A	48 V DC

Service life: 2000 cycles

AC	$\cos \varphi = 1$	6.3 A	250 V AC
Switch-back temperature		40 K \pm 15 K	
Resistance		< 50 m Ω	
Contact bounce time		< 1 ms	

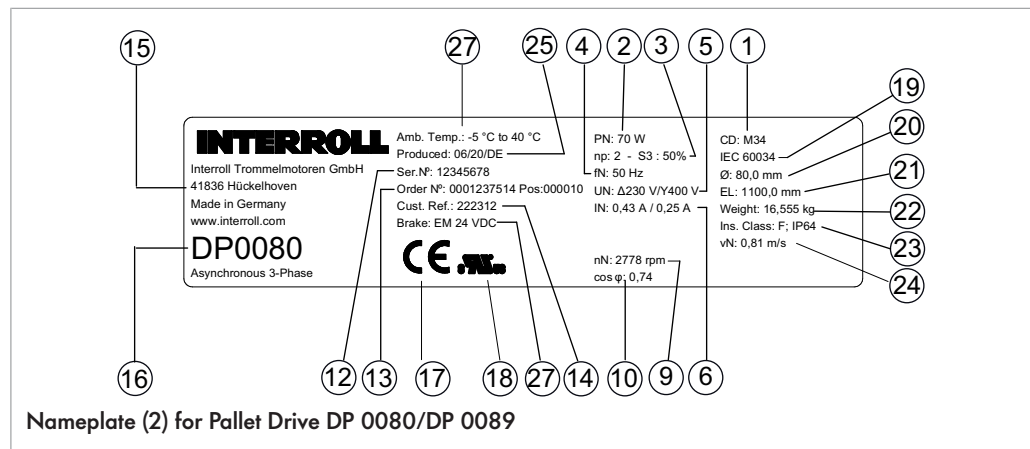
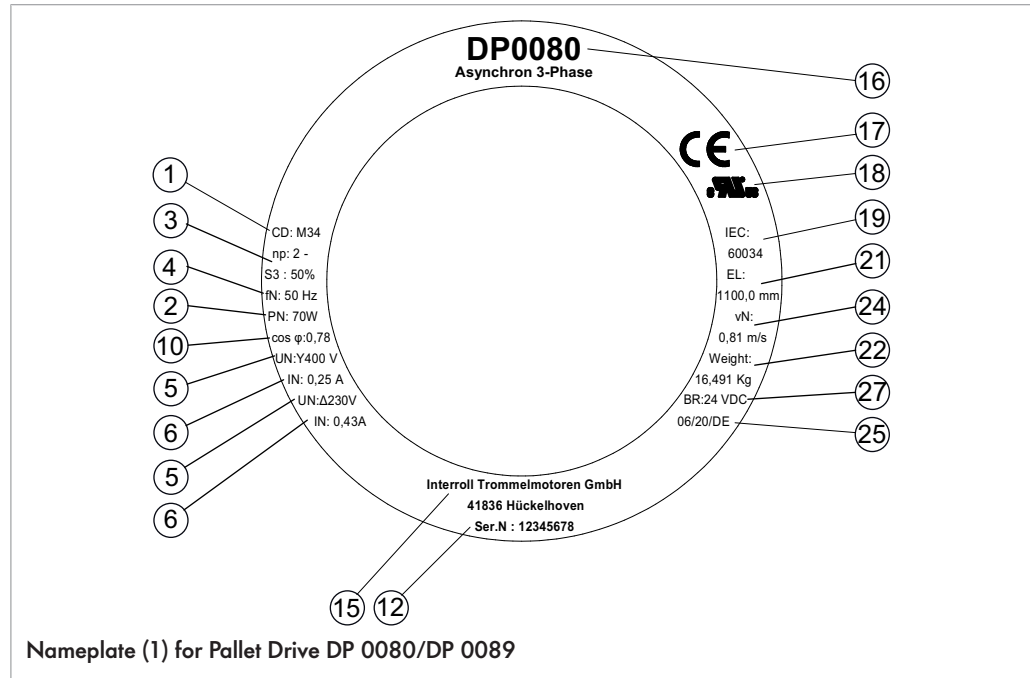
Interroll Pallet Drive DP 0080/DP 0089

Product information

Type plate of Pallet Drive

The information on the nameplate of the Pallet Drive is intended for its identification. This is the only way for the Pallet Drive to be used properly.

A laser-cut nameplate is located on the cover of the Pallet Drive. In addition, the Pallet Drive includes a label that can be used for documentation.



Interroll Pallet Drive DP 0080/DP 0089

Product information

1	Connection diagram number	16	Type + design
2	Rated power	17	CE mark
3	Number of poles + operating mode	18	UL mark
4	Rated frequency	19	International Electrotechnical Commission: Standard for drum motors
5	Rated voltage at rated frequency	20	Drum tube diameter
6	Rated current at rated frequency	21	Installation length
9	Rated speed of rotor ¹⁾	22	Weight
10	Power factor	23	Insulation class and protection rate
12	Serial number	24	Circumferential speed of drum tube
13	Order number + item	25	Manufactured (week/year/country)
14	Customer item number	27	Technical data of option
15	Manufacturer's address	28	Operating temperature

¹⁾ The value depends on the voltage used.

Product identification

The information given below is required in order to identify a Pallet Drive. The values for a specific Pallet Drive can be entered in the last column.

Information	Possible value	Own value
Type plate of Pallet Drive	Motor type Speed in m/s Serial number Between frames (BF) in mm Number of poles Power in kW	
Drum diameter (tube diameter)	e.g. 80 mm	



Interroll Pallet Drive DP 0080/DP 0089

Product information

Technical data

Protection rate	IP54
Ambient temperature range for standard applications	-5 °C to +40 °C
Cycle times (duty cycle DC50)	120 pallets per hour
Ramp times	Pallet Drive: ≥ 0.5 s
Installation altitude above sea level	max. 1000 m

Electrical data

Abbreviations see "List of abbreviations", page 34

DP 0080 3-phase and DP
0089 3-phase

P_N	n_p	n_N	f_N	U_N	I_N	$\cos\varphi$	η	J_R	I_s/I_N	M_s/M_N	M_B/M_N	M_P/M_N	M_N	R_M
kW		min^{-1}	Hz	V	A			kgcm^2					Nm	Ω
0.07	2	2889	50	400	0.33	0.56	0.54	1.25	4.2	4	4.5	4	0.23	72.7
0.07	2	2889	50	230	0.57	0.56	0.54	1.25	4.2	4	4.5	4	0.23	72.7

Interroll Pallet Drive DP 0080/DP 0089

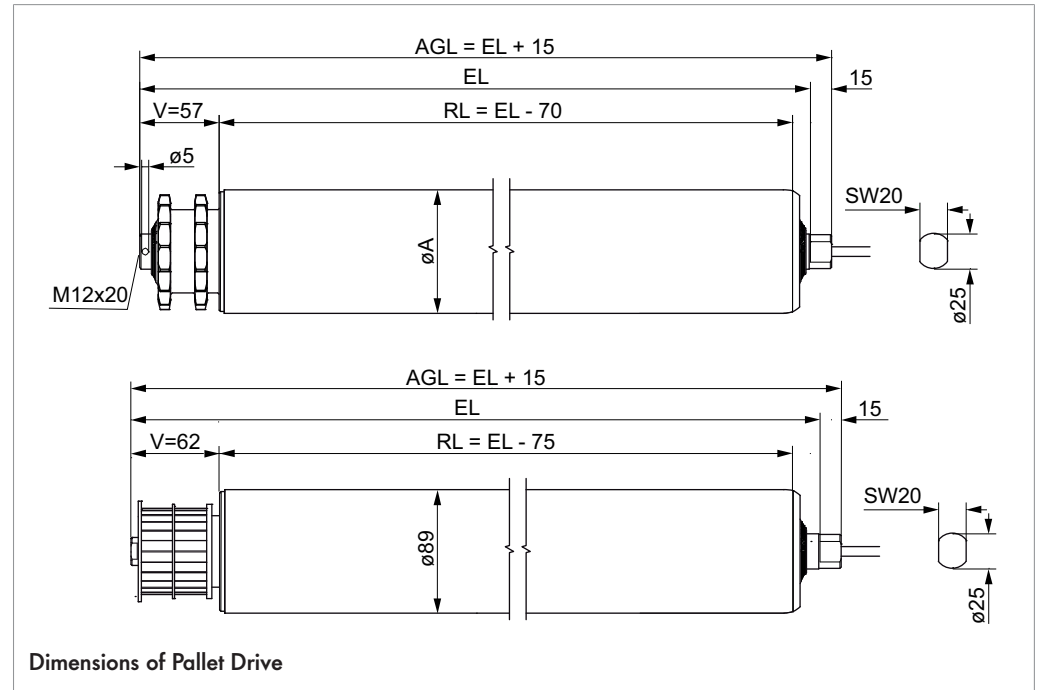
Product information

Dimensions

All length-related dimensions in the catalog and in these operating instructions comply with the requirements of DIN/ISO 2768 (medium quality).



The recommended distance between the mounting brackets (EL) while taking into account the maximum thermal expansion and internal tolerances is $EL + 2$ mm.



Type	A mm	EL mm	AGL mm
DP 0080	80	$RL+V+13$	$RL+V+28$
DP 0089	89	$RL+V+13$	$RL+V+28$

Options and accessories

Electromagnetic brake for the Pallet Drive

The electromagnetic brake, which is available as an option, acts directly on the rotor shaft. If the power supply is interrupted, the brake is applied and holds the Pallet Drive in position until the power supply is re-established. The load held by the brake corresponds to the maximum transport weight specified for the Pallet Drive.

Features:

- Applied directly to the rotor shaft of the Pallet Drive.
- Holds a load equal to the specified transport weight.
- Operation via an external rectifier.
- Operating temperature from -10 °C to +120 °C.



The rated braking torque is heavily influenced by the operating conditions inside of the Pallet Drive as well as the ambient temperature. For safety reasons, the specified braking torque should be reduced by 50% for load calculations.

Brake type	Rated braking torque Nm	Rated output W	Rated supply voltage V DC	Rated current mA
24	2	11	24	500

The installed brake disk is a wear part and has a limited service life in relation to the operating conditions. In case of premature wear, the operating conditions must be checked and evaluated. The wear parts of the brake are not included in the product warranty.



The braking torque at the Pallet Drive tube corresponds to the gear ratio of the motor times the braking torque listed in the table above. For safety purposes, 25% reserve have to be figured into the dimensioning of the brake. The brake is not a safety holding brake.

All brakes are dimensioned for start/stop operation.

The rise and fall delays of the brakes can vary significantly depending on the following factors:

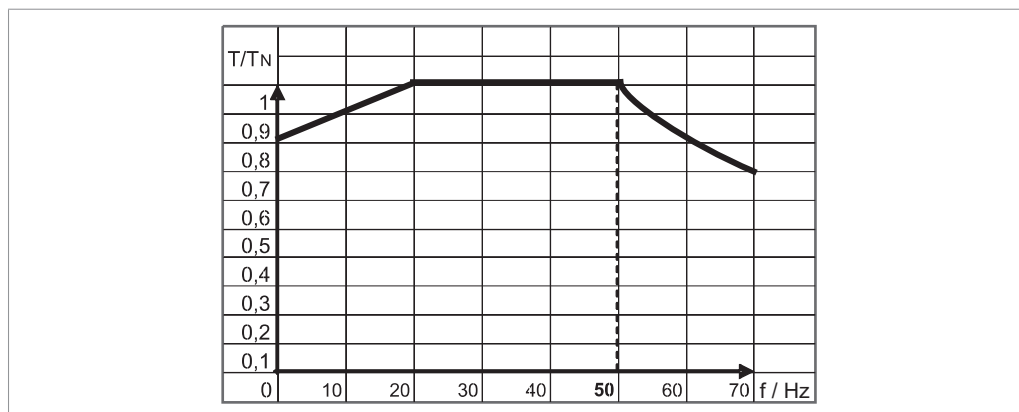
- Ambient temperature
- Internal operating temperature of Pallet Drive

Interroll Pallet Drive DP 0080/DP 0089

Options and accessories

Asynchronous Pallet Drive with frequency inverters

Torque dependent on input frequency



Operating frequency [Hz]	5	10	15	20	25	30-50
Available motor torque in % of rated motor frequency 50 Hz	80	85	90	95	100	100

The torque dependency depicted in the figure above is expressed as $P = T \times \omega$. With a reduced operating frequency of below 20/24 Hz, the motor torque is reduced by changing heat dissipation conditions.

Frequency inverter parameters

- **Clock frequency:** A high clock frequency leads to a better utilization factor of the motor. Optimum frequencies are 8 or 16 kHz. Parameters such as smooth running test quality (motor is running smoothly) and noise development are also affected positively by high frequencies.
- **Voltage increase:** Interroll motor windings are dimensioned for a rated voltage increase rate of 1 kV/ μ s. If a frequency inverter generates a steeper voltage increase, motor chokes must be installed between frequency inverter and motor. Contact your local Interroll dealer about the need for motor chokes.
- **Voltage:** If a frequency inverter with single-phase supply is installed at the Pallet Drive, it must be ensured that the specified motor is dimensioned for the frequency inverter output voltage and is connected accordingly.
- **Frequency inverter parameters:** Frequency inverters are usually delivered with factory settings. Given these settings, the inverter is generally not immediately ready for operation. The parameters have to be adjusted to the respective motor. For frequency inverters sold by Interroll, startup instructions specifically created for Pallet Drive for the respective frequency inverters can be supplied upon request.
- **Maximum frequency:** The Pallet Drive may be operated only in a frequency range from 10 - 50 Hz.

Transport and storage

Transport

CAUTION

Improper transport poses a risk of injury

- ▶ Only qualified and authorized persons may perform transport work.
 - ▶ Do not stack pallets on top of each other.
 - ▶ Before the transport, ensure that the Pallet Drive is sufficiently fastened.
-

NOTICE

Risk of damages to the Pallet Drive due to improper transport

- ▶ Avoid heavy impacts during transport.
 - ▶ Do not lift the Pallet Drive using the cable.
 - ▶ Do not transport Pallet Drive between warm and cold environments. This can lead to the formation of condensate.
 - ▶ For the transport in shipping containers, ensure that the temperature in the container is not permanently above 70 °C (158 °F).
-

- ▶ Check each Pallet Drive for damage after transport.
- ▶ In the event of damage, take photos of the damaged parts.
- ▶ In case of a transport damage, immediately notify the carrier and Interroll to avoid losing any claims for compensation.

Storage

CAUTION

Risk of injury due to improper storage

- ▶ Do not stack pallets.
 - ▶ Do not stack more than four cardboard boxes on top of each other.
 - ▶ Ensure that proper fastening is in place.
-

- ▶ Store the Pallet Drive in a clean, dry and enclosed location at +15 to +30 °C; protect it from moisture and humidity.
- ▶ Check each Pallet Drive for damage after storage.

Assembly and installation

Warning notices concerning the installation

CAUTION



Rotating parts and inadvertent startup of the Pallet Drive

Crushing hazard for fingers

- ▶ Do not reach into areas between Pallet Drive and roller chains.
 - ▶ Attach a protective device (e.g. protective cover) to prevent fingers from being jammed into chain belts or roller chains.
 - ▶ Attach a suitable warning sign on the conveyor.
-

NOTICE

Risk of damage leading to failure or shortened service life of the Pallet Drive

- ▶ Observe the following safety information.
 - ▶ Do not drop or mishandle the Pallet Drive to avoid internal damages.
 - ▶ Check each Pallet Drive for damage before the installation.
 - ▶ Do not hold, carry, or support the Pallet Drive by the wires extending out of the mounting shaft to avoid damage to the internal parts and seals.
 - ▶ Do not twist the motor cable.
-

Positioning of Pallet Drive

- ▶ Ensure that the data on the type plate are correct and match the ordered and confirmed product.



The installation of a Pallet Drive is permissible only in horizontal applications. In case of doubt, contact Interroll.



The Pallet Drive must be mounted horizontally with a clearance of $\pm 2^\circ$.

The Pallet Drive can be installed in any orientation.

Interroll Pallet Drive DP 0080/DP 0089

Assembly and installation

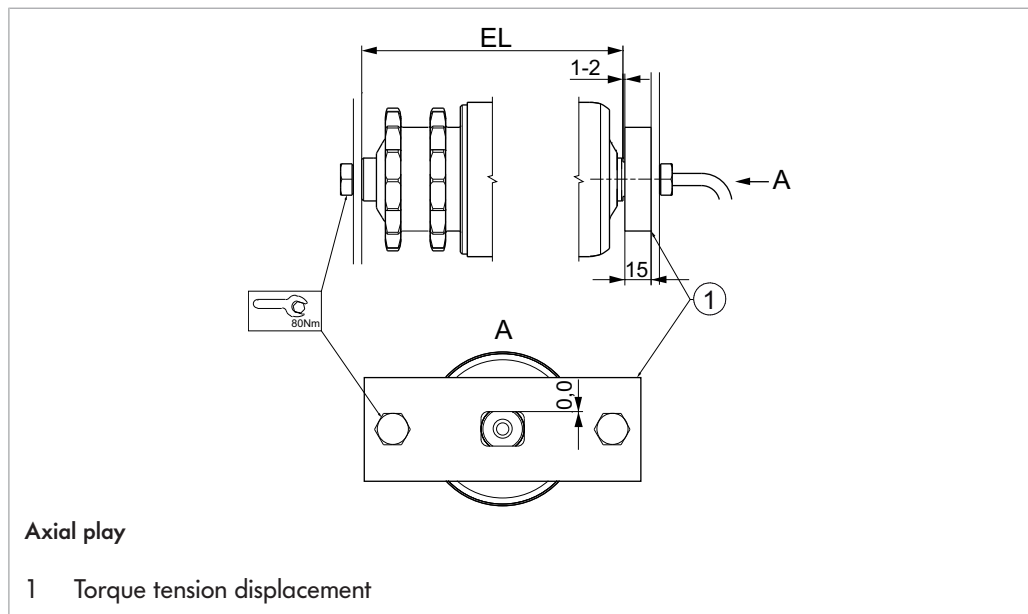
Installation of Pallet Drive in mounting brackets

The mounting brackets must be sufficiently robust to withstand the motor torque.

- ▶ Install the brackets at the conveyor or machine frame. Ensure that the Pallet Drive is installed parallel to the transport rollers and at a right angle to the conveyor belt frame.
- ▶ Ensure that at least 80% of the key surfaces of the Pallet Drive are held by the mounting brackets (cable side).
- ▶ Ensure that the distance between the key surfaces and the bracket is free from play.
- ▶ On the side without cable, use a screw M12; 8.8 and tighten with a tightening torque of 80 Nm.



The Pallet Drive can also be installed without mounting brackets. In this case, the shaft end of the cable side must be installed in a corresponding recess in the conveyor belt frame; this recess must be designed in such a way that the aforementioned requirements are met.



The entire axial clearance of the Pallet Drive should measure 1 mm minimum and 2 mm maximum.

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Assembly and installation

Warning notices concerning the electrical installation

⚠ WARNING

Electrocution due to improper installation

- ▶ All electrical work must only be performed by electricians.
 - ▶ Disconnect the power supply before installing, removing, or rewiring the Pallet Drive.
 - ▶ Always observe the connection instructions and ensure that the power and control circuits of the Pallet Drive are correctly connected.
 - ▶ Ensure that metal transport roller frames are sufficiently grounded.
-

NOTICE

Damage of the Pallet Drive due to incorrect power supply

- ▶ Do not connect an AC Pallet Drive to an excessive DC voltage supply – it will lead to permanent damages.
-

Connection of the Pallet Drive - with cable

Electrical connection of the Pallet Drive

- ▶ Ensure that the motor is connected to the correct supply voltage according to the motor type plate.
 - ▶ Ensure that the Pallet Drive is correctly grounded with the yellow-green cable.
-

NOTICE

Damage of the Pallet Drive due to incorrect polarity

In case of incorrect polarity, the brake cannot lift properly which leads to overloads.

- ▶ Ensure that the correct polarity of the brake is observed.
-

- ▶ Connect the Pallet Drive according to the connection diagrams (see "Connection diagrams", page 22). Observe the correct polarity of the brake.

Interroll Pallet Drive DP 0080/DP 0089

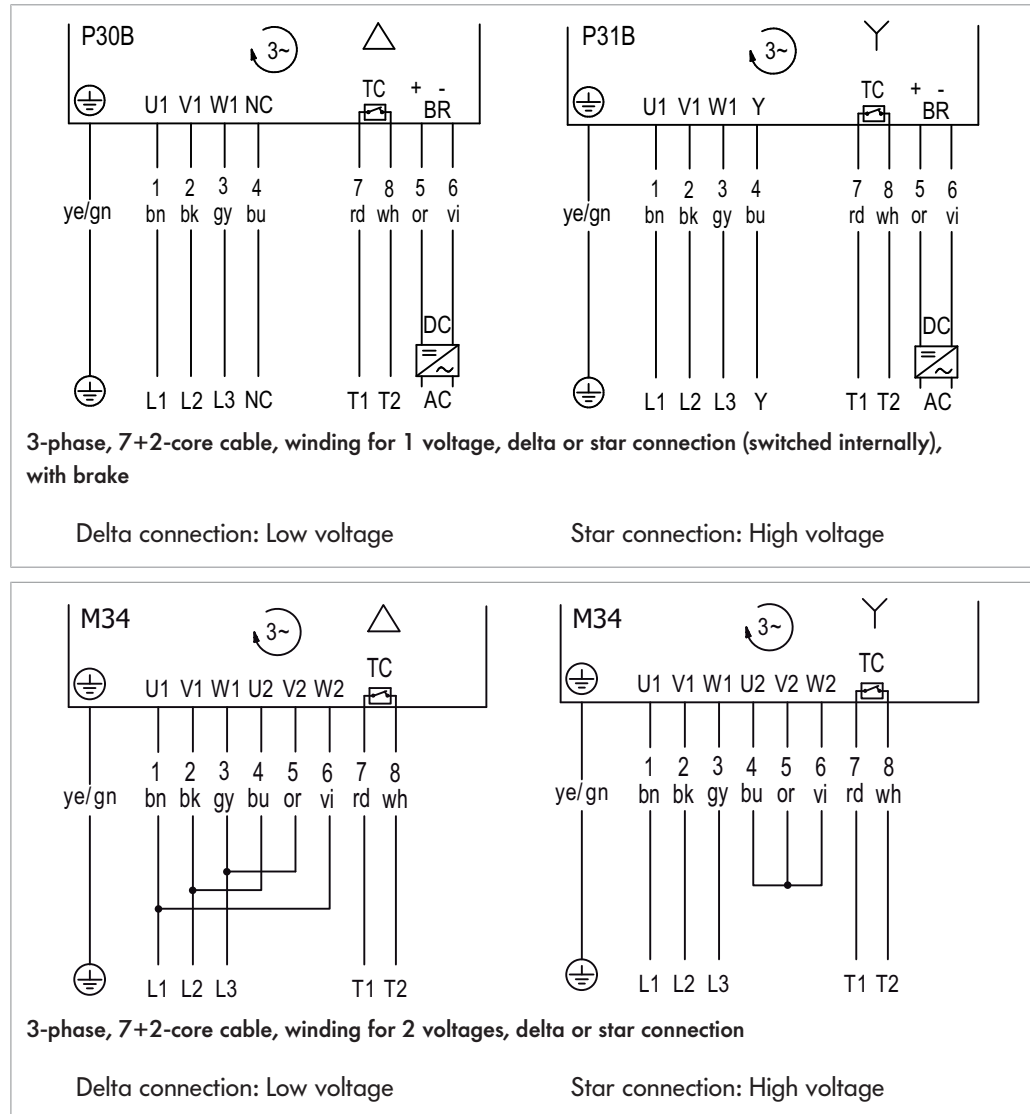
Assembly and installation

Connection diagrams

These operating instructions list only standard connection diagrams. For other connection types, the connection diagram is supplied separately with the Pallet Drive.

Abbreviations see "List of abbreviations", page 34

Cable connections



External motor protection

The motor must always be installed together with suitable external motor protection, e.g., a motor circuit breaker or frequency inverter with protection against excessive current. The protective device must be adjusted to the rated current of the corresponding motor (see type plate).

Interroll Pallet Drive DP 0080/DP 0089

Assembly and installation

Interroll synchronous motors may be operated only with frequency inverters that feature a control suitable for permanent magnet synchronous motors (PMSM).

The rated current must not be exceeded during continuous operation.

Basic thermal motor protection is provided by the integrated thermal circuit breaker, which must be analyzed by the inverter or the control.

For dynamic applications that cause the rated current to be briefly exceeded, additional protective functions, such as I²t motor protection and minimum speed monitoring, must be enabled. However, maximum values for current and torque must not be exceeded at any time. Complete overload protection of the motor only exists if the aforementioned protective functions in the frequency inverter or control are enabled in addition to analysis of the thermal circuit breaker. For correct parameterization, Interroll recommends contacting the manufacturer of the frequency inverter or control.

The following parameters apply to the synchronous motor installed in Interroll applications (BM8465, BM8460, BM8461):

- Thermal circuit breaker: Enabled
- Blocking protection: Enabled via minimum speed monitoring
- I²t: 25 A²s (400 V)
- I²t: 75 A²s (230 V)

P _N	U _N	I _N	I ₀	I _{max}	η	J _R	M _N	M ₀	M _{max}	R _M	L _{sd}	L _{sq}	K _e	T _e	k _{TN}	U _{SH}
W	V	A	A	A		kgcm ²	Nm	Nm	Nm	Ω	mH	mH	V/krpm	ms	Nm/A	V
425	400	1.32	1.32	3.96	0.86	0.42	1.35	1.35	4.05	17.60	49.80	59.00	80.80	6.70	1.02	33
425	230	2.30	2.30	6.90	0.87	0.42	1.35	1.35	4.05	5.66	16.26	19.42	45.81	6.86	0.59	19

Integrated thermal protection

CAUTION

Accidental motor start

Crushing hazard for fingers

- ▶ Connect the integrated thermal circuit breaker to an external control device that interrupts the current supply to the motor at all poles in case of overheating.
- ▶ After the thermal circuit breaker has tripped, examine and remove the cause for overheating before the current supply is reactivated.

The standard maximum switching current of the thermal circuit breaker is 2.5 A. For other options, please contact Interroll.

For operational safety, the motor must be safeguarded against overload with an external motor protection, as well as an integrated thermal protection; otherwise, there is no warranty if the motor fails.

Interroll Pallet Drive DP 0080/DP 0089

Assembly and installation

Frequency inverter

Asynchronous Pallet Drive can be operated with frequency inverters. Frequency inverters have to be parameterized for the respective Pallet Drive. For this purpose, Interroll can supply parameterization instructions. In this case, please contact your local Interroll partner.

- ▶ If no frequency inverter from Interroll is used, the frequency inverter must be correctly parameterized according to the specified motor data. Interroll can provide only very limited support for frequency inverters that are not being sold by Interroll.
- ▶ Resonance frequencies in the power supply line must be prevented since they create voltage spikes in the motor.
If the cable is too long, frequency inverters generate resonance frequencies in the line between frequency inverter and motor.
- ▶ Use a completely shielded cable to connect the frequency inverter to the motor.
- ▶ Install a sine-wave filter or a motor choke if the cable is longer than 10 meter or if a frequency inverter controls several motors.
- ▶ Ensure that the cable shield is connected to a grounded part according to the electrotechnical guidelines and local EMC recommendations.
- ▶ Always observe the installation guidelines of the frequency inverter manufacturer.

Electromagnetic brake

The Pallet Drive can be delivered with a installed electromagnetic brake as an option. The rectifier is an accessory part and must be ordered separate from the motor.

- ▶ Connect the rectifier and the brake according to the connection diagrams (see "Connection diagrams", page 22).



The rectifier has an AC input and a DC output to the brake winding.

DANGER

Risk of injuries when used as safety brake

When large loads are being held, the motor can unexpectedly rotate in the opposite direction. As a result, loads may fall down and hit or fatally injure persons.

- ▶ Do not use the electromagnetic brake as safety brake.
 - ▶ If a safety brake is required, install a suitable additional safety brake system.
-

Interroll Pallet Drive DP 0080/DP 0089

Assembly and installation

NOTICE

Damage of the Pallet Drive and the brake if both are operated simultaneously

- ▶ Route the control circuits in such a way that motor and brake do not work against each other.
 - ▶ Consider the response time for applying and releasing the brake (depending on temperature, it can amount to 0.4 to 0.6 seconds).
 - ▶ Apply the brake only after the current supply to the motor has been switched off.
 - ▶ Start the motor only after the brake has been released.
-

The cable should be as short as possible, and the cable cross section should correspond to the national/international regulations so that the voltage supply at the rectifier does not deviate from the rated voltage by more than $\pm 2\%$.

The electromagnetic brake is a pure holding brake and should not be used for positioning or braking the motor. Braking applications should be implemented with a frequency inverter.

Initial startup and operation

Initial startup

The Pallet Drive may be put into operation only if it is correctly installed and connected to the power supply and all rotating parts have been fitted with the corresponding protective devices and guards.

Checks before the initial startup

Prior to the initial startup of the Pallet Drive, the following steps have to be performed:

- ▶ Ensure that the motor type plate matches the version ordered.
- ▶ Ensure that no contact points exist between objects, conveyor belt frame and rotating or moving parts.
- ▶ Ensure that all bolts are tightened according to the specifications.
- ▶ Ensure that no additional dangerous areas arise due to interfaces to other components.
- ▶ Ensure that the Pallet Drive is correctly wired and connected to the voltage supply with the correct voltage.
- ▶ Check all safety devices.
- ▶ Ensure that no bystanders are in dangerous areas around the conveyor.
- ▶ Ensure that the external motor protection is correctly adjusted to the rated motor current and a corresponding switching device can switch off the motor voltage at all poles if the integrated thermal circuit breaker trips.

Interroll Pallet Drive DP 0080/DP 0089

Initial startup and operation

Operation

CAUTION

Rotating parts and accidental starting



Crushing hazard for fingers

- ▶ Do not reach between Pallet Drive and chains/toothed belts.
 - ▶ Do not remove protective device.
 - ▶ Keep fingers, hair and loose-fitting clothes away from Pallet Drive and chains/toothed belts.
 - ▶ Keep watches, rings, chains, piercings and comparable jewelry away from the Pallet Drive and chains/toothed belts.
-

NOTICE

Damage to the Pallet Drive in reversing mode

- ▶ Ensure that a time delay is in place between forward and reversing movement. Before reversing, the motor must come to a complete standstill.
-



If exact speeds are required, a frequency inverter may have to be used.

The specified rated speeds of the motor can deviate by $\pm 10\%$. The belt speed indicated on the type plate is the calculated speed at the drum diameter under full load, rated voltage and rated frequency.

Checks before every startup

- ▶ Check the Pallet Drive for visible damage.
- ▶ Ensure that no contact points exist between objects, conveyor belt frame and rotating or moving parts.
- ▶ Ensure that the Pallet Drive and the sprockets can move freely.
- ▶ Check all safety devices.
- ▶ Ensure that no bystanders are in dangerous areas around the conveyor.
- ▶ Precisely specify and monitor the placement of the material.

Procedure in case of accident or fault

- ▶ Stop the Pallet Drive immediately and ensure that it cannot be started inadvertently.
- ▶ In case of an accident: Provide first aid and make an emergency call.
- ▶ Inform the responsible person.
- ▶ Have the malfunction repaired by qualified persons.
- ▶ Restart the Pallet Drive only after approval by qualified persons.

Maintenance and cleaning

Warning notices concerning maintenance and cleaning

⚠ CAUTION

Risk of injury due to improper handling or accidental motor starts

- ▶ Maintenance work and cleaning must only be performed by qualified and authorized persons.
 - ▶ Perform maintenance work only when the system is powered down. Secure the Pallet Drive against inadvertent powering up.
 - ▶ Set up signs indicating that maintenance work is in progress.
-

Preparation for maintenance and cleaning by hand

- ▶ Switch off the power supply to the Pallet Drive.
- ▶ Switch off the main power switch to switch off the Pallet Drive.
- ▶ Open terminal box or distribution box and disconnect the cables.
- ▶ Attach a sign to the control station that maintenance work is in progress.

Maintenance

Generally, Interroll Pallet Drive does not have to be maintained and require no special care during their regular service life. Nevertheless, certain checks have to be performed at regular intervals:

Check the Pallet Drive

- ▶ Verify daily that the Pallet Drive can turn freely.
- ▶ Check the Pallet Drive daily for visible damage.
- ▶ Ensure weekly that motor shaft and brackets are firmly fastened to the conveyor frame.
- ▶ Ensure weekly that cables, lines and connections are in good condition and securely fastened.

Cleaning

- ▶ Remove foreign material from the drum shell.
- ▶ Do not use sharp-edged tools to clean the drum shell.

Troubleshooting

Troubleshooting

Fault	Possible cause	Remedy
Motor does not start or stops during operation	No voltage supply	Check the voltage supply.
	Incorrect connection or loose/defective cable connection	Check connection according to connection diagram. Check whether cables are defective or connections are loose.
	Motor overheating	See the fault "Motor heats up in regular operation".
	Motor overload	Disconnect main power supply, determine and remove cause of overload.
	Internal thermal circuit breaker tripped/failure	Check whether there is overload or overheating. After cooling off, check continuity of internal thermal protection. See the fault "Motor heats up in regular operation".
	External thermal circuit breaker tripped/failure	Check whether there is overload or overheating. Check continuity and function of external overload protection. Check whether the correct motor current is set in the external overload protection.
	Motor winding phase error	Replace Pallet Drive or contact local Interroll dealer.
	Motor winding short circuit (insulation fault)	Replace Pallet Drive or contact local Interroll dealer.
Motor does not start or stops during operation	Brake is not triggered	Check whether the brake works during start-up. During the brake release, one can generally hear the clicking noise of the brake in the motor. The drum tube must then turn by hand. Depending on the gear ratio, the motors can be turned more easily or harder. Check connections and continuity of the brake winding. If connections and brake winding are OK, check the rectifiers.
	Drum or chain blocked	Ensure that the Pallet Drive is not being blocked and all rollers and drums can turn freely. If the Pallet Drive cannot turn freely, the gear box or the bearing may be blocked. In this case, contact the local Interroll dealer.
	Gear box or bearing blocked	Check by hand if the drum shell can be turned freely. If not, replace Pallet Drive or contact local Interroll dealer.
Motor is running, drum shell does not turn	Incorrect assembly	Ensure that the motor is not rubbing against the conveyor belt frame.
	Transfer loss	Contact local Interroll dealer.

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Troubleshooting

Fault	Possible cause	Remedy
Motor heats up in regular operation	Overload of Pallet Drive	Check rated current for overload. Ensure that the motor is not rubbing against the conveyor belt frame.
	Ambient temperature above 40 °C	Check ambient temperature. If the ambient temperature is too high, install a cooling unit. Contact local Interroll dealer.
	Excessive or frequent stops/starts	Check whether the number of stops/starts and the weight of the pallets corresponds to the specifications of the Pallet Drive and reduce this number if necessary. Install a frequency inverter to optimize the motor output. For Pallet Drive, the start-and-stop ramps may not be less than 0.5 seconds. Ramps can be set with a frequency inverter. Contact local Interroll dealer.
	Motor is not suitable for the application	Check whether the application meets the specifications of the Pallet Drive.
	Wrong voltage supply	Check the voltage supply. For 3-phase motors, ensure that no phase has failed.
	Wrong settings at frequency inverter	Check whether the frequency inverter settings meet the specifications of the Pallet Drive and change them if necessary.
Loud noise of Pallet Drive in regular operation	Wrong settings at frequency inverter	Check whether the frequency inverter settings meet the specifications of the Pallet Drive and change them if necessary.
	Loose motor mount	Check motor mount, shaft tolerances and fastening screws.
	An outer conductor failed	Check connection, check supply system.
Pallet Drive vibrates heavily	Wrong settings at frequency inverter	Check whether the frequency inverter settings meet the specifications of the Pallet Drive and change them if necessary.
	Loose motor mount	Check motor mount, shaft tolerances and fastening screws.
Pallet Drive runs with interruptions	Pallet Drive/chain/toothed belt is partially or intermittently blocked	Ensure that chain and Pallet Drive are not being blocked and all rollers and drums can turn freely.
	Wrong or loose power cable connection	Check connections.
	Gear box is damaged	Check by hand if the drum shell can be turned freely. If not, replace Pallet Drive or contact local Interroll dealer.
	Wrong or faulty voltage supply	Check the voltage supply.

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Troubleshooting

Fault	Possible cause	Remedy
Pallet Drive/chain runs more slowly than specified	Wrong motor speed ordered/delivered	Check Pallet Drive specifications and tolerances. Replace Pallet Drive or contact local Interroll dealer.
	Pallet Drive/chain is partially or intermittently blocked	Ensure that chain and Pallet Drive are not being blocked and all rollers and drums can turn freely.
	Wrong settings at frequency inverter	Check whether the frequency inverter settings meet the specifications of the Pallet Drive and change them if necessary.
Pallet Drive runs faster than specified	Wrong motor speed ordered/delivered	Check Pallet Drive specifications and tolerances. Replace Pallet Drive or contact local Interroll dealer.
	Wrong settings at frequency inverter	Check whether the frequency inverter settings meet the specifications of the Pallet Drive and change them if necessary.
Motor winding: one phase failed	Failure/overload of winding insulation	Check continuity, current and resistance of each phase winding. Replace Pallet Drive or contact local Interroll dealer.
Motor winding: two phases failed	Power failure at one phase which leads to overload at the other two phases/separating failure	Check power supply to all phases. Check continuity, current and resistance of each phase winding. Replace Pallet Drive or contact local Interroll dealer.
Motor winding: all three phases failed	Motor overload/wrong power connection	Check whether the correct supply voltage is present. Check continuity, current and resistance of each phase winding. Replace Pallet Drive or contact local Interroll dealer.
Cable defective or damaged	Wrong operation by the customer or damage during installation	Check type of damage and possible cause. Replace Pallet Drive or contact local Interroll dealer.
	Damage during transport	Check type of damage and possible cause. Replace Pallet Drive or contact local Interroll dealer.
Cap bearing failed	Overload	Check whether the load of the application meets the specifications of the Pallet Drive.
	Impact load	Check whether the load of the application meets the specifications of the Pallet Drive.
	Load or incorrect adjustment of shaft	Check whether screws have been overtightened and whether frame or motor mount are incorrectly adjusted.
	Loose or fixed seating of bearing on the shaft	Contact local Interroll dealer.
Gear box failure	Overload/impact load or regular wear	Check whether the load of the application meets the specifications of the Pallet Drive. Check service life.
Rotor bearing worn/failed	Poor lubrication	Lifetime lubricated bearings: Check service life.

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Troubleshooting

Fault	Possible cause	Remedy
Rotor drive worn or teeth broken off	Excessive or frequent stops/starts, very high starting torque	<p>Check whether the load of the application meets the specifications of the Pallet Drive.</p> <p>Check maximum number of stops/starts and permissible starting torque.</p> <p>Use frequency inverter with start-and-stop ramps (0.5 s or more).</p>
Tooth sleeves worn or teeth/bolts broken off	Start-up under overload and/or impact load or blocking	<p>Check whether the application and load meet the specifications of the Pallet Drive.</p> <p>Check whether a blockage is present.</p> <p>Use frequency inverter with start-and-stop ramps (0.5 s or more).</p>
Complete or temporary failure of brake and rectifier	Wrong operating voltage applied	Ensure that the correct rectifier was installed and that the correct input voltage (V/ph/Hz) is present.
	Wrong connection	<p>Never connect the rectifier to the frequency inverter.</p> <p>Ensure that the brake was connected according to connection diagram.</p>
	Insufficient shielding against external voltage spikes from cables and external devices	Ensure that all cables between brake, rectifier and voltage supply are shielded and grounded according to IEC recommendations.
Complete or temporary failure of brake and rectifier	Voltage drop due to cable with excessive length	Check whether a voltage drop occurs in long cables and ensure that the cable cross section meets the IEC specifications.
	Excessive stops/starts	Ensure that the specifications for brake and rectifier meet the requirements of the application.
	Wrong rectifier connected	Contact Interroll. We will give you the name of the correct rectifier for the corresponding brake and application.
	Short circuit of brake winding	Check continuity of winding and rectifier.
Slow switching of brake and rectifier	Wrong brake/wrong rectifier selected or specified	Ensure that the specifications for brake and rectifier meet the requirements of the application.

Decommissioning and disposal

- ▶ When disposing the motor oil, observe the disposal documents of the motor manufacturer.
- ▶ The packaging must be recycled to provide environmental relief.

Shutdown

CAUTION

Risk of injuries due to incorrect handling

- ▶ Decommissioning may only be performed by qualified and authorized persons.
 - ▶ Decommission the Pallet Drive only when it is de-energized. Ensure that the Pallet Drive cannot be turned on accidentally.
-
- ▶ Disconnect the motor cable from the power supply and motor control.
 - ▶ Remove holding plate from the motor mount.
 - ▶ Remove the Pallet Drive out of the conveyor belt frame.

Disposal

The operator is responsible for the proper disposal of the Pallet Drive.

- ▶ In doing so, industry-specific and local provisions must be observed for the disposal of the Pallet Drive and its packaging.

Appendix

List of abbreviations

Electrical data

P_N in kW	Rated output in kilowatt
np	Number of poles
n_N in 1/min.	Rated speed of rotor in revolutions per minute
f_N in Hz	Rated frequency in Hz
U_N in V	Rated voltage in volt
I_N in A	Rated current in ampere
I_0 in A	Rated open-circuit current in ampere
I_{max} in A	Maximum current in ampere
cos φ	Power factor
η	Efficiency
J_R in kgcm ²	Rotor moment of inertia
I_S/I_N	Ratio of startup current to rated current
M_S/M_N	Ratio of starting torque to rated torque
M_p/M_N	Ratio of pull-up torque to rated torque
M_B/M_N	Ratio of pull-out torque to rated torque
M_N in Nm	Rated torque of rotor in Newton meter
M_0 in Nm	Stalled torque in Newton meter
M_{max} in Nm	Maximum torque in Newton meter
R_M in Ω	Phase resistance in ohm
R_A in Ω	Phase resistance of auxiliary winding in ohm
L_{sd} in mH	Inductance of d-axes in millihenry
L_{sq} in mH	Inductance of q-axes in millihenry
L_{sm} in mH	Averaged inductance in millihenry
k_e in V/krpm	Induced motor voltage
T_e in ms	Electrical time constant in milliseconds
k_{TN} in Nm/A	Torque constant in Newton meter per ampere
C_r in μ F	Run capacitor (1~) / Steinmetz capacitor (3~) in microfarad

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Appendix

Connection diagrams

3~	Three-phase motor
B1	Input of electromagnetic brake:
B2	Output of electromagnetic brake:
BR	Brake (optional)
Cos -	Cosine signal 0
Cos +	Cosine signal +
FI	Frequency inverter
L1	Phase 1
L2	Phase 2
L3	Phase 3
N	Neutral conductor
NC	Not connected
Ref -	Reference signal 0
Ref +	Reference signal +
Sin -	Sine signal 0
Sin +	Sine signal +
T1	Input thermistor
T2	Output thermistor
TC	Thermal protection
U1	Input winding phase 1
U2	Output winding phase 1
V1	Input winding phase 2
V2	Output winding phase 2
W1	Input winding phase 3
W2	Output winding phase 3
Z1	Input auxiliary winding single-phase motor
Z2	Output auxiliary winding single-phase motor

Color coding

Color coding of cables in the connection diagrams:

bk: black	gn: green	pk: pink	wh: white
bn: brown	gy: gray	rd: red	ye: yellow
bu: blue	or: orange	vi/vt: violet	ye/gn: yellow/green
(): alternate color			

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Appendix

Installation declaration

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

The manufacturer:
Interroll Trommelmotoren GmbH
Opelstr. 3
D - 41836 Hueckelhoven/Baal
Germany

hereby declares with sole responsibility that the product range

- Pallet Drive DP 0080
- Pallet Drive DP 0089

is an incomplete machine as defined by the EC Machinery Directive, but complies with the following requirements according to Appendix I of that directive:

1.1.2, 1.1.3, 1.1.5, 1.5.1, 1.5.2, 1.5.4, 1.5.8, 1.5.9, 1.6.4, 1.7.2, 1.7.3, 1.7.4.

The special technical documents mentioned in Appendix VII B have been prepared and will be sent to the responsible authority if required.

Applied EU Directives:

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

Applied harmonized standards:

- EN ISO 12100:2010
- EN 60204-1:2018
- EN 63000:2018

Additional standards applied:

- EN IEC 60034-1:2010/AC:2010
- EN IEC 60034-11:2004
- EN IEC 60034-14:2018
- EN IEC 60034-5:2020
- EN IEC 60034-6:1993
- EN 61984:2009
- EN IEC 61800-3:2018

Cannot be applied to standalone drum motors. Can be applied only within the complete machine.

- EN 61800-5-1:2007 + A1:2017

Cannot be applied to standalone drum motors. Can be applied only within the complete drive system.

- EN 60664-1:2007

Interroll Pallet Drive DP 0080/DP 0089

Appendix

Person authorized to prepare the technical documents:

Holger Hoefler, Interroll Trommelmotoren GmbH, Opelstr. 3, D - 41836 Hueckelhoven, Germany

Important Note! The incomplete machine may only be put into operation if it has been determined that the overall machine/system, which the incomplete machine is to be installed, meets the requirements of this directive.

Hueckelhoven - January 31, 2020



Dr. Hauke Tiedemann
(Managing Director)

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

Interroll Pallet Drive DP 0080/DP 0089

Appendix

Declaration of incorporation

UK Supply of Machinery (Safety) Regulations 2008

The manufacturer

Interroll Trommelmotoren GmbH
Opelstr. 3
D - 41836 Hueckelhoven/Baal
Germany

represented in the UK by

Interroll Limited
Unit 1a, Orion Way Kettering, Northants
NN15 6NL
England

hereby declares that the product range

- Pallet Drive DP 0080; DP 0089

are partly completed machines in the sense of the mentioned directive.

The health and safety requirements have been applied in accordance with the EC Machinery Directive 2006/42/EC as listed in the EC Declaration of incorporation. The relevant technical documentation has been compiled in accordance with Annex VII B and has been passed on to the relevant authorities where applicable.

The commissioning of the incomplete machine is prohibited until the conformity of the overall machine/system in which it is installed with the UK Supply of Machinery (Safety) Regulations 2008 has been declared.

Further applied guidelines and resulting UKCA marking:

- UK Electromagnetic Compatibility Regulations 2016
- UK Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Authorised for compiling technical documentation:

Hueckelhoven, 4th November 2021



Dr. Hauke Tiedemann
(Managing Director)



Interroll Pallet Drive DP 0080/DP 0089

