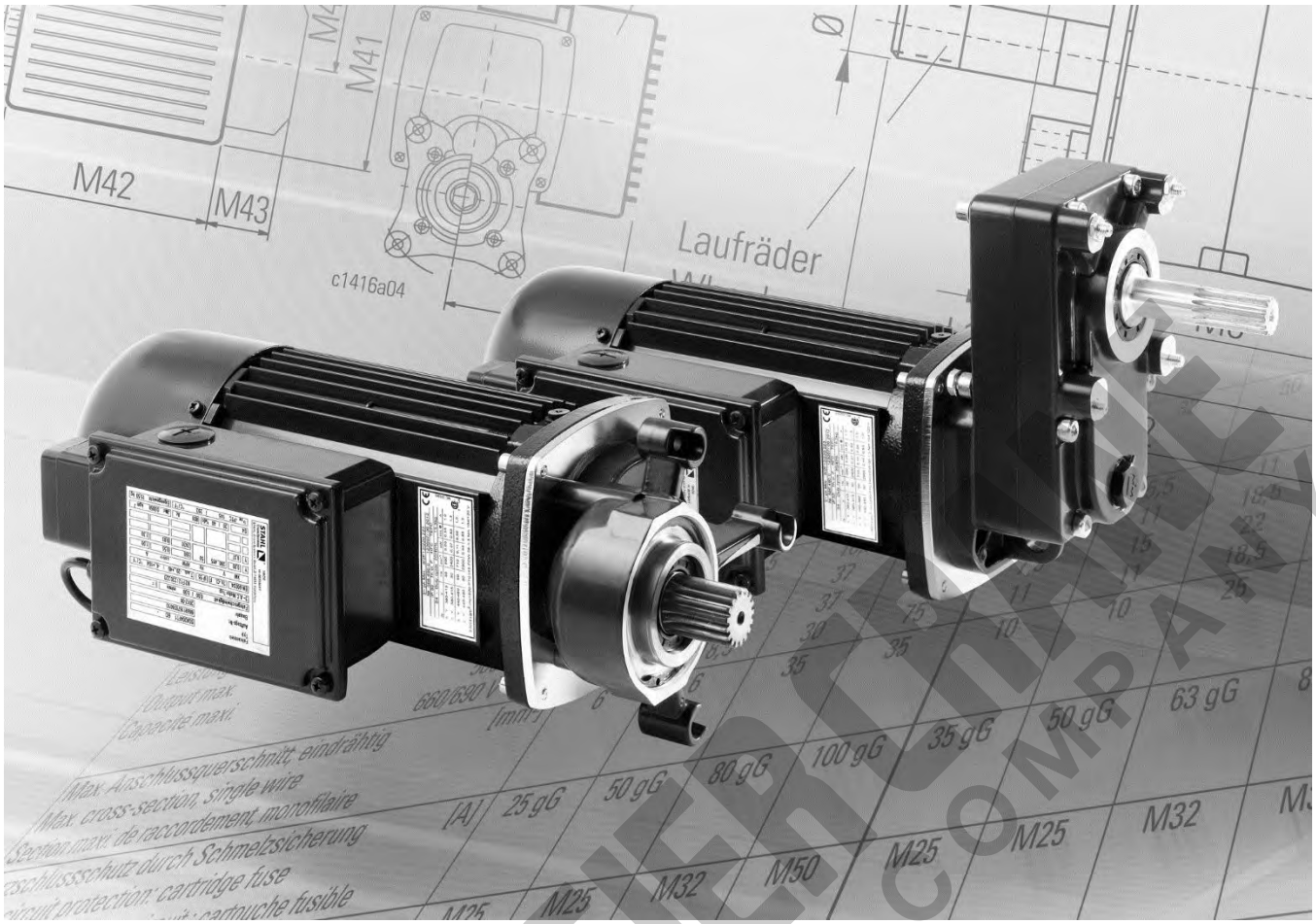

SU-A

SF

SA-C

Travel Drives
Operation & Service Manual

en-US

Before installing hoist, fill in the information below.
Refer to the Hoist and Motor data plates.

Model No. _____

Serial No. _____

Purchase Date _____

Voltage _____

Rated Load _____

Follow all instructions and warnings for inspecting, maintaining and operating this product.

The use of any hoist presents some risk of personal injury or property damage. That risk is greatly increased if proper instructions and warnings are not followed. Before using this hoist, each operator should become thoroughly familiar with all warnings, instructions and recommendations in this manual. Retain this manual for future reference and use.

Forward this manual to operator. Failure to operate equipment as directed in manual may cause injury.

Yale® HOISTS

SHAW-BOX®

ba-o.3.4.1-us-1.2-y | A11867601 Rev AB

YALE/SHAWBOX HOIST PARTS AND SERVICES ARE AVAILABLE IN THE UNITED STATES AND IN CANADA

As a Yale/Shawbox Hoist and Trolley user you are assured of reliable repair and parts services through a network of Master Parts Depots and Service Centers that are strategically located in the United States and Canada. These facilities have been selected on the basis of their demonstrated ability to handle all parts and repair requirements promptly and efficiently. To quickly obtain the name of the Master Parts Depot or Service Center located nearest you, call (800) 888-0985, Fax: (716) 689-5644, visit www.cmworks.com

LAS PIEZAS Y REPARACIONES DE LOS POLIPASTOS DE YALE/SHAWBOX ESTÁN ASEGURADAS EN ESTADOS UNIDOS Y CANADÁ

Como usuario de un polipasto y carro de Yale/Shawbox le aseguramos cualquier reparación o la disponibilidad de cualquier pieza de repuesto a través de una red de almacenes de piezas de repuesto y centros de servicio situados estratégicamente en Estados Unidos y Canadá. Estas instalaciones se han seleccionado en base a su capacidad demostrada en la reparación de equipos y suminstro de piezas de repuesto de forma rápida y eficaz. Para obtener la dirección del almacén de piezas de repuesto o del centro de servicio más cercano, llame al teléfono (800) 888-0985. Fax: (716) 689-5644, visite www.cmworks.com (sólo en Estados Unidos y Canadá).

LE SERVICE DE RÉPARATION ET DE PIÈCES POUR PALANS YALE/SHAWBOX EST DISPONIBLE AUX ÉTATS-UNIS ET AU CANADA

Soyez assurés qu'en temps d'utilisateur de palan et treuil Yale/Shawbox, d'un service de réparation et de pièces fiable par l'entremise d'un réseau de Centres de service et de Dépôts de pièces maîtresses qui sont stratégiquement situés aux États-Unis et au Canada. Ces établissements ont été sélectionnés sur une base de leur habileté démontrée à s'occuper promptement et efficacement des besoins de réparation de pièces. Appelez le (800) 888-0985, Fax: (716) 689-5644, visite www.cmworks.com pour obtenir rapidement le nom du dépôt de pièces maîtresses ou du centre de service situé le plus près.

Contents

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1 General information

You have purchased a Yale product.
This product was constructed in accordance with the applicable European standards and regulations.
Read carefully and observe the operating instructions. Store the operating instructions within easy reach at the place of operation.

1.1 Information about safety messages

1.1.1 Explanation of signal words and symbols

The following signal words are used in safety messages.

Signal word	Meaning
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates possible material or environmental damage.

1.1.2 Safety alert symbols

Symbol	Meaning
	General hazard
	Electric shock hazard

1.1.3 Additional symbol

Symbol	Meaning
	Important note

1.2 Spare parts

⚠ WARNING

Incorrect or defective spare parts may lead to damage, malfunctions or the complete failure of the machine.

➢ Use only original mounting accessories from the manufacturer.

1.3 Terminology

Owner
Whoever uses and employs the product or has it operated by suitable trained personnel is considered to be the owner (employer/company).

Trained personnel
Trained personnel are persons who have been instructed and trained in the duties with which they are entrusted and the risks which may arise from incorrect behavior, have been advised on the necessary protective devices, precautions, applicable regulations, accident prevention regulations and prevailing conditions and have proven their ability.

Qualified person
A qualified person is a person who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, successfully demonstrates the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Electrical qualified person
An electrical qualified person is defined as:
One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazard involved.

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1.4 Transport and storage

Transport

- The product is delivered on a special pallet. This enables it to be loaded and unloaded safely with a fork-lift truck.
- If the product is to be transported suspended. it must be attached by suitable sling equipment.
- Do not allow the product to drop. The product should always be set down on the ground correctly.

Storage

- Store the product and its accessories in a dry place
- Store it in a stable position, secure it against toppling or overturning
- Observe environmental protection laws for storage (do not allow oil etc. to leak)
- Ensure the load is evenly distributed, support the product at several points.

1.5 Weight

	SU-A	SF	SA-C
	[lb]		
min	21	51	132
max	23	690	337

1.6 Installation, commissioning, maintenance and repairs

- Installation, commissioning, maintenance and repairs must be carried out by qualified persons only.
- We recommend having installation carried out by qualified personnel engaged by the manufacturer.
- The component may only be commissioned if it has been determined that the system or equipment in which the component has been installed complies with the provisions of the EC machinery directive.
- Use only original spare parts for repairs.
- Additional fitments must not impair safety.
- Electrical connection and the test of electrical functions may only be performed by a skilled electrician (see chap. 1.3).

1.7 After-sales service

You have purchased a high-quality product. A contracted after sales service will give you advice on its maintenance and correct use.

In order to maintain the safety and constant availability of the product, we recommend concluding a maintenance agreement.

1.8 Periodic inspections

Travel drives must be inspected by a qualified person (see chapter 1.3) at least once a year, more frequently if so specified by national regulations.
The results of the test must be recorded and filed in the test logbook.
The periodic inspections must be adapted to the product's use. Intensive use or adverse environmental conditions entail shorter maintenance intervals.

All tests must always be initiated by the owner.

1.9 Environmental information

Environmental aspects have been taken into account when developing and manufacturing this equipment. Please note the instructions on safe lubrication and waste disposal to avoid pollution risks during use. Appropriate use and correct maintenance will improve the environmental performance of this product.

1.9.1 Life cycle assessment

The stages of the product service life are:

- Production of materials,
- components and energy,
- transport to factory,
- manufacture and assembly,
- transport to customer,
- on-site installation,
- operating phase including maintenance and modernization,
- dismantling and recycling of materials at end of service life.

1.9.2 Energy consumption

The energy consumption during the operating phase has the highest impact on the environment.

2 Safety instructions

2.1 Use for intended purpose

- The travel drives are intended for the construction of rail-bound vehicles, cranes and similar installations. They may only be used in accordance with their design principles.
- Do not carry out any alterations or modifications. Additional fitments must be authorized by the manufacturer. Non-compliance will invalidate the declaration of incorporation.

These sub-assemblies must be inspected and maintained carefully in accordance with these instructions to maintain lifelong safety.

2.2 Inappropriate use

- Use in potentially explosive atmospheres
- Installation in equipment or systems which exceed the specifications of the travel drive.
- Using a damaged travel drive
- If the product forms "part of a machine," the person placing it on the market must ensure that the product meets the specific regulations of the application.

2.3 Residual dangers

The machine has been subjected to a risk analysis. The design and construction based on this correspond to the state of the art. However, residual hazards remain during operation and maintenance and these could result in serious or even fatal injuries to personnel.

- Risk of crushing
- Risk of electric shock

Preventative measures:

- Use LOTO (Lockout/Tagout) procedure in accordance to national, state and local regulations and company policy.
- Switch the machine off and ensure it cannot be switched on again before carrying out maintenance, cleaning and repair work.
- Switch off the power supply before all work on the electrical system. Check that the components to be replaced are free of current and voltage.
- Do not remove any safety devices or override them by manipulating them.
- It is forbidden for anyone to stand in the danger area.

2.4 Organizational safety precautions

- The owner may only employ persons to operate a crane single-handedly (crane operator) or perform maintenance on a crane if they

1 are capable both physically and mentally,
2 have been instructed in operating and maintaining the crane and have shown him proof of their competence and
3 may be expected to perform the duties assigned them reliably.

- At regular intervals, check that work is being carried out in a safety-conscious manner.
- Observe the intervals specified for periodic inspections. File the test reports in the test logbook.

2.5 General regulations

- Safety and accident prevention regulations.
- All national, state and local regulations.

2.6 Recommended PPE

Fig. 1

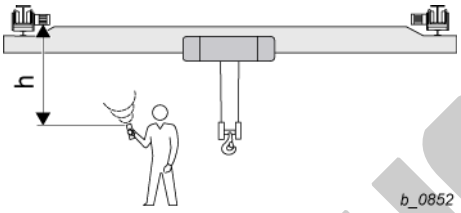
Personal protective equipment to be provided by the owner

- Safety shoes
- Gloves (only if there is no danger of them being drawn into equipment)
- Protective goggles
- Hart hat
- Hearing protection
- Closely fitting clothes (danger of clothing being drawn into equipment)
- When operating hoist, or standing close to hoist, wire rope or chain there is a danger of fingers, clothing, jewelry, etc. being drawn into equipment

2.7 Working above floor level

Personnel must be protected from falling. Observe the national, state, and local regulations, and company policies when working above the floor level.

2.8 Sound pressure level



The sound pressure level was measured at a distance of 3 ft from the wire rope hoist. The mean sound pressure level is calculated for one operating cycle (50% with maximum permissible load, 50% without load).

Instead of stating an emission value based on a workplace, the values from the Tables at measuring distance "h" can be used.

Indoors

Type	[db (A)] + / - 3				
	h [ft]				
	3 ft	7 ft	13 ft	26 ft	52 ft
SU-A..	78	75	72	69	66
SF .. 2..	72	69	66	66	63
SF .. 8..	78	75	72	69	66
SA-C..	72	69	66	66	63

Outdoors

Type	[db (A)] + / - 3				
	h [ft]				
	3 ft	7 ft	13 ft	26 ft	52 ft
SU-A..	78	72	66	60	54
SF .. 2..	72	66	60	54	48
SF .. 8..	78	72	66	60	54
SA-C..	72	66	60	54	48

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2.9 Fire safety

⚠ WARNING

Never use a powder extinguisher in the presence of high voltages
Only fight the fire if this is possible without subjecting yourself to risk.
Switch off the crane if this is possible.
Evacuate the area.
Advise other persons on potential danger and call for help.

2.10 Safety-conscious operation

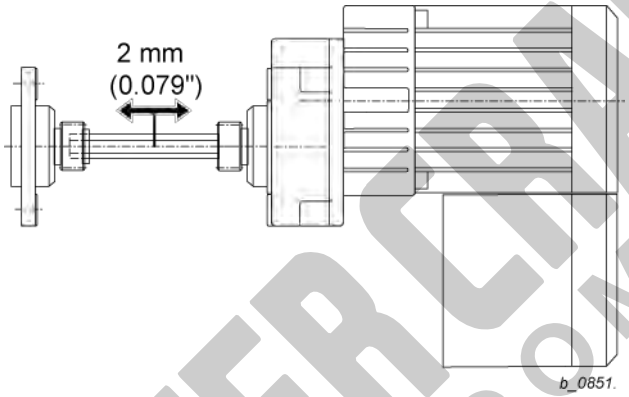
The travel drives are constructed according to the state of the art. In spite of this, dangers may arise from inappropriate use or use for an unintended purpose.

- The owner is responsible for ensuring that work is carried out with safety in mind and avoiding risks.
- Read the instructions before starting to work with the product.
- Do not put your hand between edges which might crush or cut.
- Before starting work, find out where the emergency stop button is (usually in the control pendant).
- Report damage and defects to the product (impaired braking function, deformations, ...) to the person responsible immediately.
- Do not use the product until the faults have been eliminated.
- Do not remove information plates from the product. Replace illegible or damaged plates.
- Have travel drive inspected by the relevant authority before commissioning.

3 SU-A travel drive

3.1 Introduction

The travel drives are high-quality drives with smooth starting and braking characteristics as is required in particular for material handling.
The drives can be operated indoors, or outdoors with short term operation. Additional measures are necessary for continuous use outdoors.
The drive shaft is equipped with a pinion or a cylindrical shaft with groove for a feather key as desired.
It can be further extended with a flange bearing with pinion and a drive shaft.



3.2 Mounting and installation

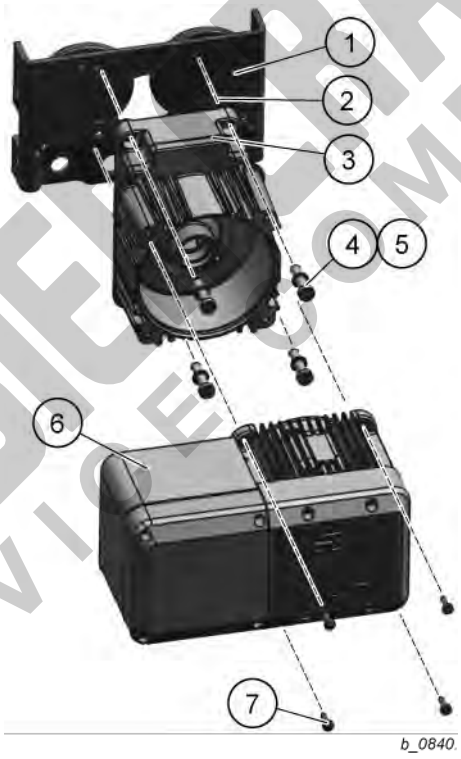
3.2.1 Travel drive mounting

⚠ WARNING

Danger of bodily injury
Unsuitable installation material and incorrect tightening torques may lead to damage and accidents.

- ➢ Before starting the work, de-energize the system and protect it against unintentional restart.
- ➢ Secure the danger zone.
- ➢ Observe a sufficient safety distance from the product.
- ➢ Use only original mounting accessories from the manufacturer.
- ➢ Tighten bolted connections with the specified tightening torque.

(1) Trolley side cheek
(2) Spacer (optional)
(3) Gear
(4) Screw
(5) Washer
(6) Trolley travel motor
(7) Screw



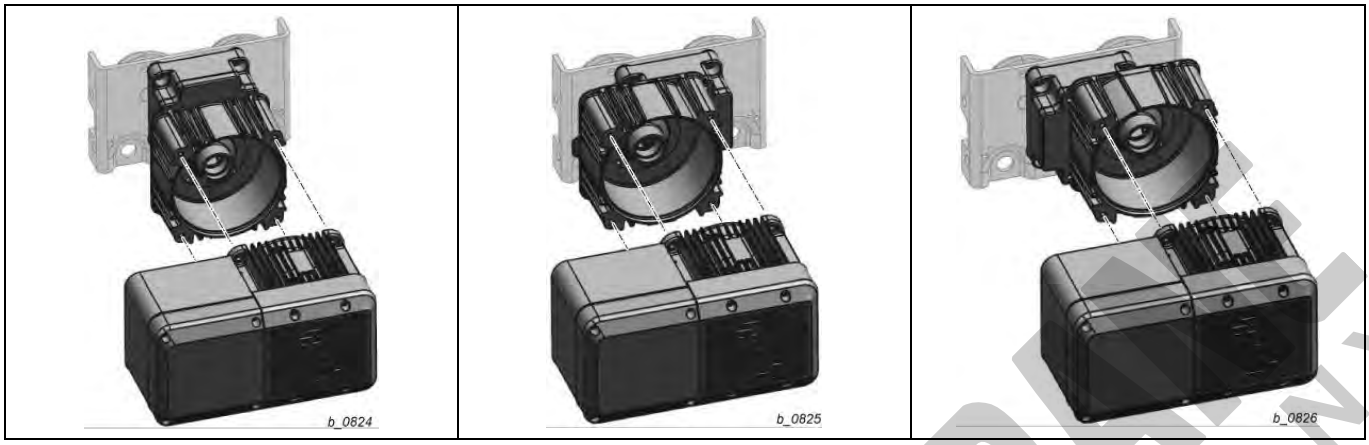
Tightening torques for bolted connection

Position	Thread size	Property class	
		08.8	DIN 7500
		[lbf ft]	[lbf ft]
6	M5		3
3	M8	15	

1 Before mounting, remove from contact surfaces dirt, rust, or grease.
- Make sure that the paint layer is no thicker than 3.1 mil.

2 Grease gearing of drive shaft (gear) lightly before installing.
3 Align the travel drive on the counter-gearing and push it on as far as it will go.
4 Tighten bolted connections with the specified tightening torque

3.2.2 Permissible installation positions



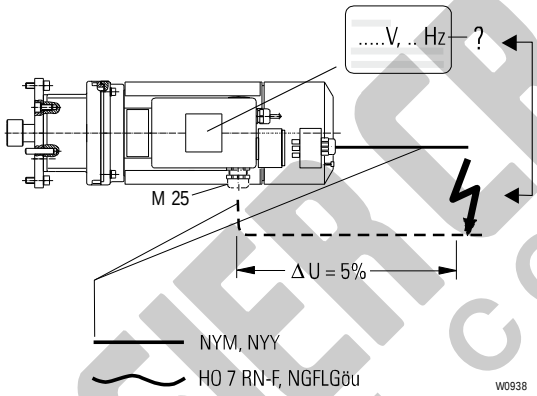
3.2.3 Electrical connection

⚠ DANGER

Electric shock hazard

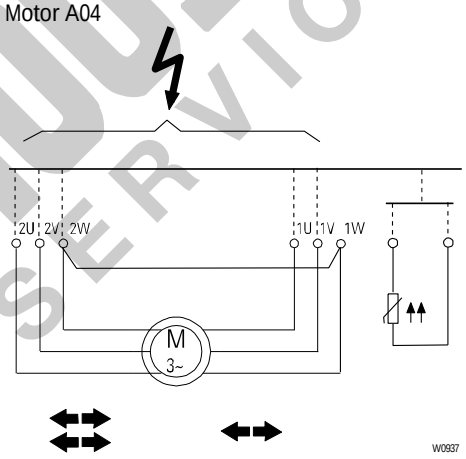
- ➢ Make sure an electrical qualified person performs the work.
- ➢ Observe the relevant safety and accident prevention regulations.
- ➢ Make sure that the mains voltage corresponds to the voltage specified on the rating plate.
- ➢ Make sure the main power supply cable meet the specifications given in the technical data.

- Electrical connection with plug connection or cable gland.
- Connect travel drive through cable gland as per connection diagram.



Block connection diagram

Motor A04



Standard settings for frequency inverter

Speed	[fpm]	31	39	49	63	79	98	126	157	197	248	315	394
Max. frequency	[Hz]	80	100	50	63	80	100	80	100	80	100	100	100
Motor connection		Δ	Δ	Y	Y	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Run-up time	[s]	2.1	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.0	6.7	8.4
Braking time	[s]	1.7	2.0	2.3	2.7	3.0	3.4	3.8	4.2	4.5	4.8	5.4	6.7

3.3 Inspection and maintenance

This section deals with the operational reliability, availability, and maintaining the value of your travel drives.
Although they are practically maintenance-free, the components subject to wear must be inspected regularly. This is required by the accident prevention regulations. Inspection and maintenance must be performed by qualified persons only, see chapter 1.3

⚠ WARNING

Safety hazard

- ➢ Maintenance and repair work may only be carried out when the travel drive is not under load.
- ➢ Switch off and padlock main isolator.
- ➢ Follow the accident prevention regulations.

Please also note the "Safety instructions" on page 8.
Wearing parts, see page 18.

3.3.1 Inspection and maintenance intervals

Inspection on commissioning *1	Daily inspection on starting work *2	For the first time after 3 months *1	Periodic inspections every 12 months *3	Periodic maintenance every 12 months *1	Maintenance after 10 years or at general overhaul *4		Inspection and maintenance table (classification: H2)	See page
●		●	●				Attachment of travel drive	13
●	●		●				Check braking effect of travel drive	17
			●				Test the air gap of the brakes (displacement path X)	17
					●		Change lubricant of gear	18

*1 By a qualified person
*2 By the operator
*3 Periodic maintenance at least every 12 months, possibly earlier if so prescribed by national regulations, to be performed by a qualified person.
*4 In manufacturer's factory

Heavy-duty applications and adverse conditions (dirt, solvents, multi-shift operation etc.) necessitate shortening this inspection and maintenance interval.

⚠ WARNING

If work needs to be carried out on live parts, a second person must be present who can stop dangerous movements in an emergency by means of the emergency stop button or disconnect the power supply by means of the main isolator / disconnect switch.

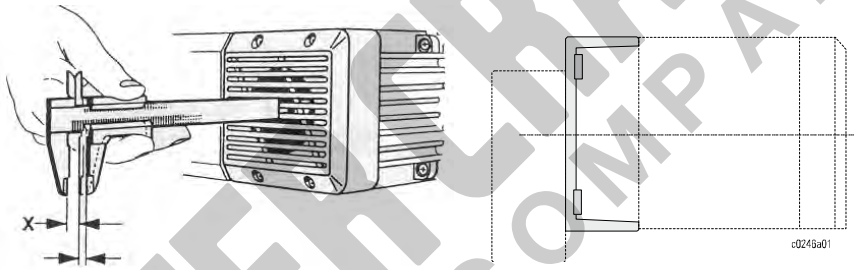
3.3.2 Travel motor brake

NOTICE

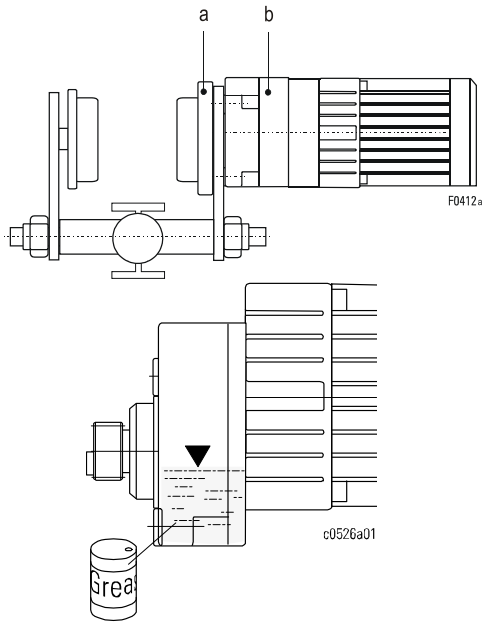
Danger of material damage
Have replacement and repairs performed by trained skilled personnel only.

Check brake at regular intervals. The intervals must be adapted in accordance with the application.

- Move carriage into a safe position.
- Jack up the trolley in the area of the fall protection, so that the wheels can turn freely. If this is not possible, the trolley will move during measurement.
- At the slowest speed, measure displacement path X of the motor shaft of the drive.
- If X ≥ 0.1 in, replace brake disc (gear housing).



0,5-2,5 mm
(0.02-0.1")



3.3.3 Gear

The gear has a long service life. All bearing points have roller bearings. The gearing is hardened, hard-machined and has high safety factors.

- Note any gear noises from the crane when under load and without load. Rough, noisy running, knocking sounds indicate possible faults.
- If any faults are detected, repairs must be scheduled.
- If there is any uncertainty, a fresh diagnosis can be made after consulting experts. e.g. from the manufacturer.

3.3.4 Changing lubricant of travel drive

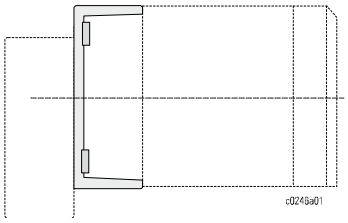
The SU-A travel drives have a gear with grease lubrication.
The toothed boss (a) is lubricated with grease (see table).

The type and quantity of oil or grease can be seen from the table.

Pos.	Position of lubrication point	Type of lubricant	Lubricant - Product name		Quantity
			Factory filling	Alternative	
a	Travel wheel (Gearing) Return sheave	Grease	Mobilux EP 3	Shell Gadus S2 V100 3	1.8 oz
				STABYL L120	
				Klüberplex BEM 41-132	
				Spheerol AP 3	
			Mobilgrease 28 [1)]	FUCHS RENOLIT RHF1 [1)]	
b	Tolley travel gear	Grease	FUCHS RENOLIT FLM 0	Shell Gadus S2 V220 0	SU-A 1.4.1 4.6 oz SU-A 1.4.2 7.1 oz
				Aralub LFZ 0	
				Klüberplex AG 11-461	
			FUCHS RENOLIT RHF 1 [1)]		

[1)] Synthetic lubricant for operating temperatures -40 °F…+104 °F

3.4 Wearing parts



NOTICE

Danger of material damage
Replacement and repairs may be carried out by trained personnel only.

Brake disc (gear housing)

Order no.
A5125079370 (SU-A 1.4.1)
A5125078370 (SU-A 1.4.2)

3.5 Decommissioning

3.5.1 Dismantling

⚠ WARNING

Falling parts hazard.
➢ Secure the product when dismantling.

Dismantle product correctly. First of all drain off lubricants.

3.5.2 Scrap disposal

NOTICE

Electronic components, electric scrap, lubricants and other auxiliary substances are hazardous waste and may only be disposed of by approved recycling companies.

Dismantled components must be recycled after correct dismantling.
It is imperative to observe national regulations on environmentally compatible disposal.
Local authorities will provide relevant information.

3.6 Technical data

3.6.1 Conditions of use

The product is designed for use in industry and for the ambient conditions usual in industry.

Special measures are necessary for particular applications such as e.g. high degree of chemical pollution, outdoor use, offshore application, etc.

The manufacturer will be pleased to advise you.

Protection against dust and moisture to EN 60529 / IEC
Standard: IP55
Option: IP66

Permissible ambient temperatures
Standard: -4 °F…+104 °F
Option: -40 °F…+140 °F
Frequency inverters can be used from -4 °F…+122 °F (non-dewing).

3.6.2 Motor data

3.6.2.1 Pole-changing travel motors

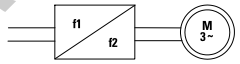
Index no.	Type	50 Hz											
		P	n1	TN	TA	TH	TB	J	cos φ N	cos φ K	DC	Ac	PB
		[HP]	[1/min]	[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]			[%]	[(1/h)s]	[HP]
43	2/8A04/507	0.09 0.43	595 2670	0.841	1.844 1.918	1.328 1.549	0.959	0.0831	0.67 0.74	0.84 0.89	20 40	450	-

Index no.	Type	50 Hz					
		I_N			I_K		
		220...240 V	380...415 V	480...525 V	220...240 V	380...415 V	480...525 V
		[A]	[A]	[A]	[A]	[A]	[A]
43	2/8A04/507	1.9 2.1	1.1 1.2	0.9 1.0	2.1 5.6	1.2 3.2	1.0 2.6

Index no.	Type	60 Hz											
		P	n1	TN	TA	TH	TB	J	cos φ N	cos φ K	DC	Ac	PB
		[HP]	[1/min]	[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]			[%]	[(1/h)s]	[HP]
43	2/8A04/507	0.12 0.51	710 3200	0.841	1.844 1.918	1.328 1.549	0.959	0.0831	0.67 0.74	0.84 0.89	20 40	450	-

Index no.	Type	60 Hz					
		I_N			I_K		
		380...415 V	440...480 V	550…600 V	380...415 V	440...480 V	550…600 V
		[A]	[A]	[A]	[A]	[A]	[A]
43	2/8A04/507	1.3 1.4	1.1 1.2	0.9 1.0	1.4 3.7	1.2 3.2	1.0 2.6

3.6.2.2 Frequency-controlled travel motors

Index no.	Type	f_N		P		n1		TN	TA	TH	TB	Jrot	I_N		I_K	cos φ N	cos φ K	DC	x
		Y	Δ	Y	Δ	Y	Δ						Y	Δ					
		[Hz]		[HP]		[1/min]		[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]	[A]		[A]			[%]	[Ω]
50/60 Hz		380...480 V. 50/60 Hz  380...415 V. 100 Hz																	
44	4A04/507	50	100	0.27	0.54	1220	2440	1.158	2.286	1.844	0.959	0.0285	0.8	1.6	1.7	0.67	0.80	60	34.1

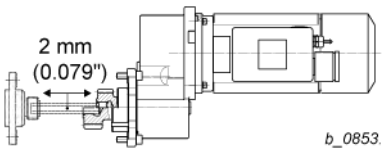
Ac	[(1/h)s]	Switching frequency factor
cos φ K		Power factor (short circuit)
cos φ N		Power factor (nominal)
DC	[%]	Duty cycle
fN	[Hz]	Rated frequency
IK	[A]	Short-circuit current
IN	[A]	Rated current
J	[lbft²]	Moment of inertia
Jrot	[lbft²]	Moment of inertia. rotor
n1	[1/min]	Motor r.p.m.
P	[HP]	Motor output
PB	[HP]	Coil output (brake)
TA	[lbf ft]	Motor starting torque
TB	[lbf ft]	Braking torque (motor shaft)
TH	[lbf ft]	Run-up torque (motor shaft)
TN	[lbf ft]	Rated motor torque
x =		Terminal resistance

4 SF travel drive

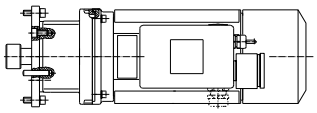
4.1 Introduction

The travel drives are high-quality drives with smooth starting and braking characteristics as is required in particular for material handling. The pole-changing motor must be activated in a certain way to achieve this (see block circuit diagram, chapter "Electrical connection").
The drives can be operated indoors, or outdoors with short term operation. Additional measures are necessary for continuous use outdoors.
The SF11 and SF18 can be further extended with a flange bearing with pinion and a drive shaft.

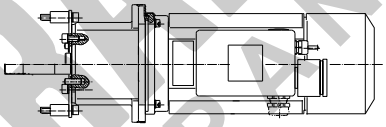
SF11/18



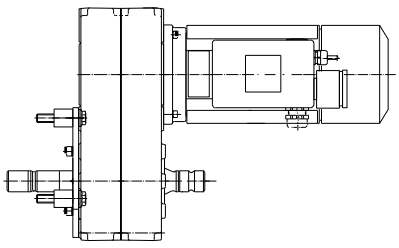
SF 14

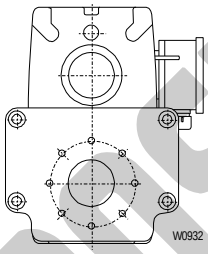


SF 15/17

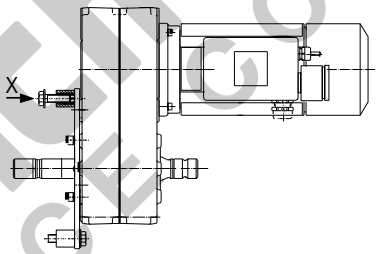


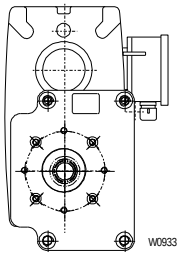
SF 25/35





SF 25/35





4.2 Mounting and installation

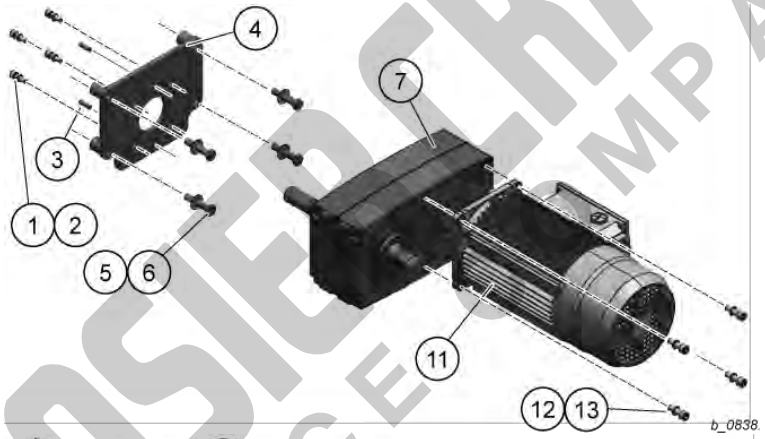
4.2.1 Travel drive mounting

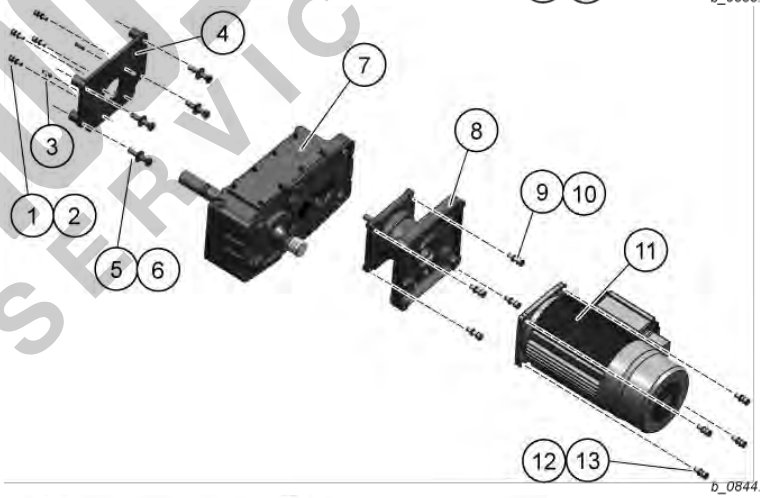
⚠ WARNING

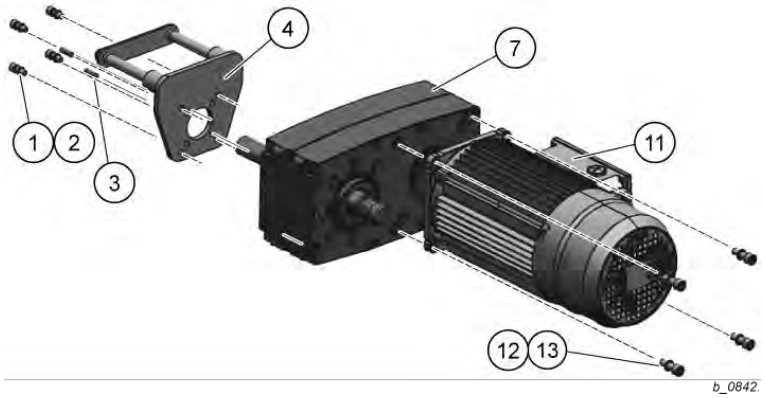
Danger of bodily injury
Unsuitable installation material and incorrect tightening torques may lead to damage and accidents.

- ➢ Before starting the work, de-energies the system and protect it against unintentional restart.
- ➢ Secure the danger zone.
- ➢ Keep a sufficient safety distance from the product.
- ➢ Use only original mounting accessories from the manufacturer.
- ➢ Tighten bolted connections with the specified tightening torque.

(1) Screw
(2) Washer
(3) Pin
(4) Torque arm
(5) Screw
(6) Washer
(7) Gear
(8) Intermediate gear
(9) Screw
(10) Washer
(11) Trolley travel motor
(12) Screw
(13) Washer







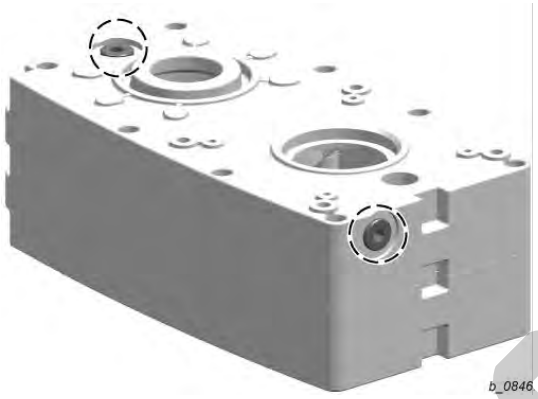
For assembly of the travel drive on the wheel block, see the wheel block operating instructions

Tightening torques for bolted connection

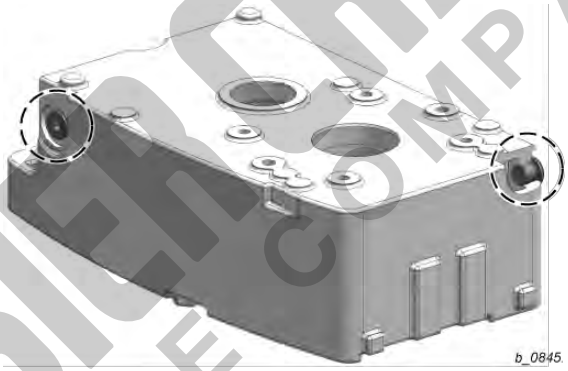
Position	Thread size	Property class
		8.8
		[lbf ft]
12	M6	8
1, 5	M8	18
1, 5, 9, 12	M10	36
5	M12	63

1 Before mounting, remove from contact surfaces dirt, rust, or grease.
- Make sure that the paint layer is no thicker than 3.1 mil.
2 Grease gearing of drive shaft (gear) lightly before installing.
3 Align the travel drive on the counter-gearing and push it on as far as it will go.
4 Tighten bolted connections with the specified tightening torque.

SF2….



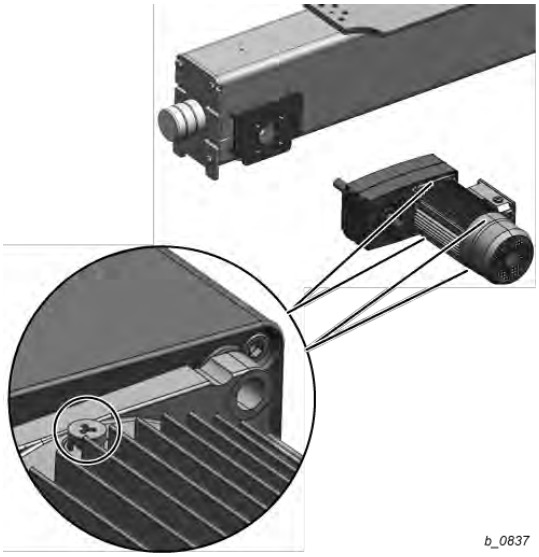
SF3….



5 Install the bleeder screw before commissioning.
– Before commissioning, the separately supplied bleeder screw must be replaced with the screw plug in the highest location.
– Depending on the installation situation, this is one of the screw positions marked on the sketch.

Small quantities of oil may leak out of the bleeder screw.

6 Check the lubricant level before commissioning.



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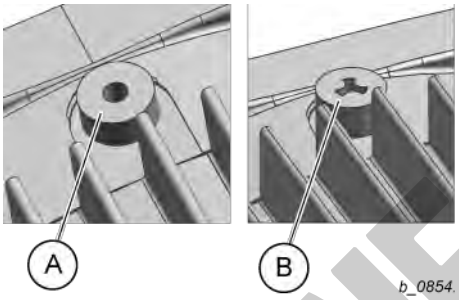

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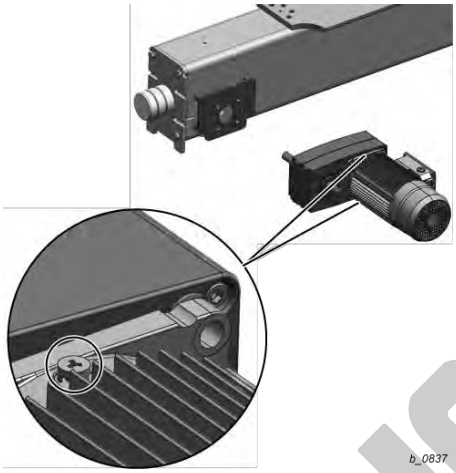
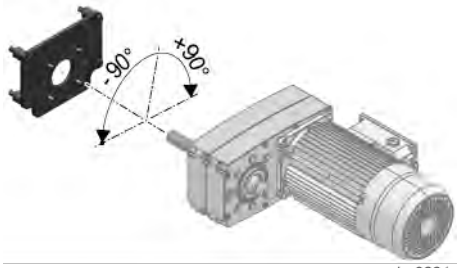


b_0837

7 Check the stopping plug (A) and drainage plug (B) before commissioning.
- The stopping plugs (A) on the motor flange and motor cover must always be assembled at the top and the opposing drainage plugs (B) (see detailed image) always at the bottom.
  The stopping plug (A) and drainage plug (B) on the motor cover are located beneath the fan cover.
- In order to replace the stopping plug (A) and drainage plug (B) it is possible to use a SPAX screw.

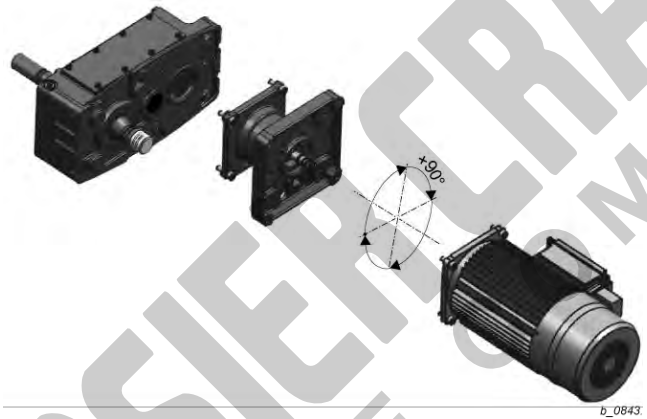
4.2.2 Permissible installation positions

- Torque arm



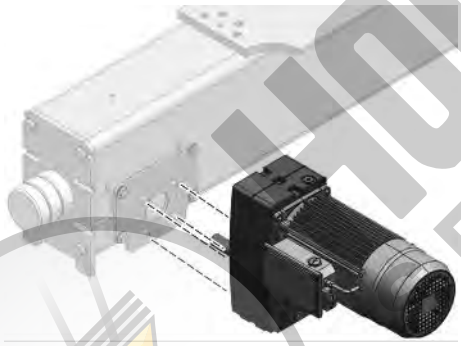
b_0831.

- Intermediate gear (optional)

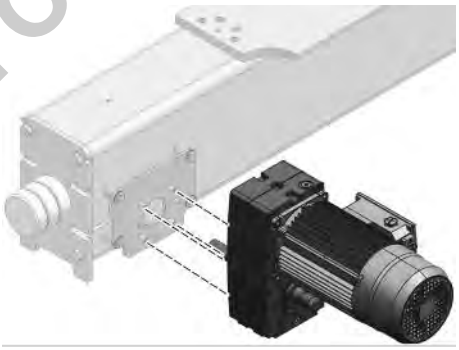


b_0843.

- Travel drive



b_0827.



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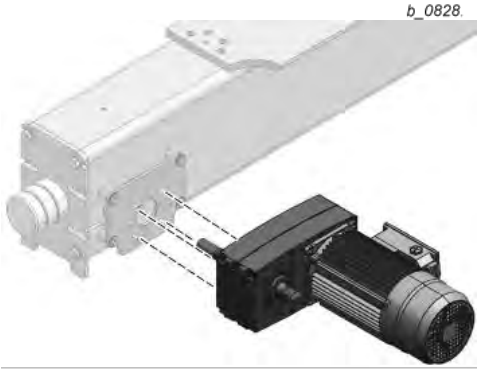
b_0829.



b_0830.

4.2.3 Electrical connection

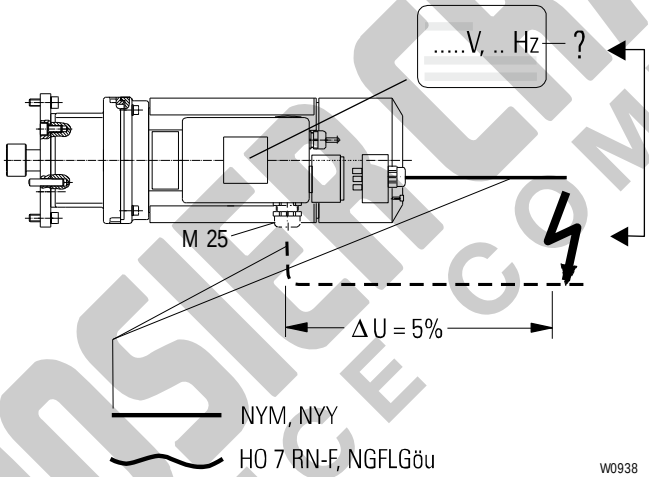
⚠ DANGER

Electric shock hazard

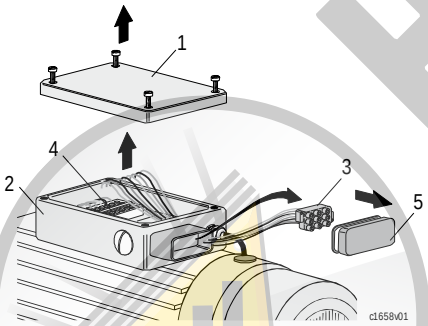
- Make sure an electrical qualified person performs the work.
- Observe the relevant safety and accident prevention regulations.
- Make sure that the mains voltage corresponds to the voltage specified on the rating plate.
- Make sure the main power supply cable meet the specifications given in the technical data.

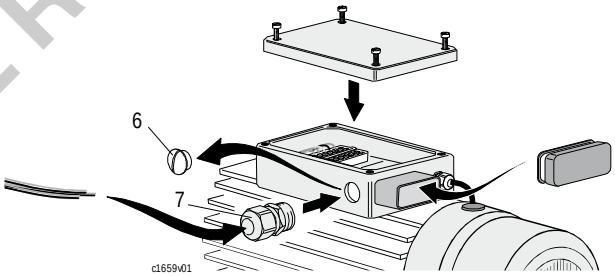
- Electrical connection with plug connection or cable gland.

Plug connection



Cable gland

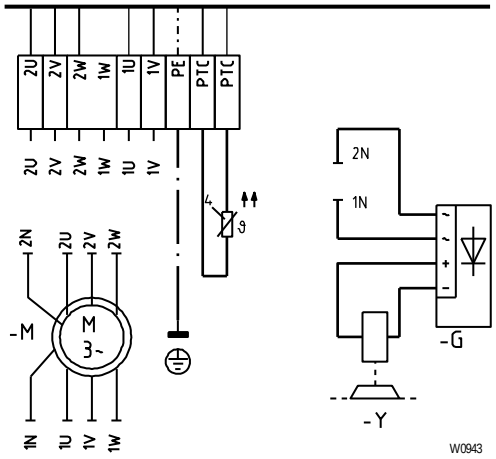




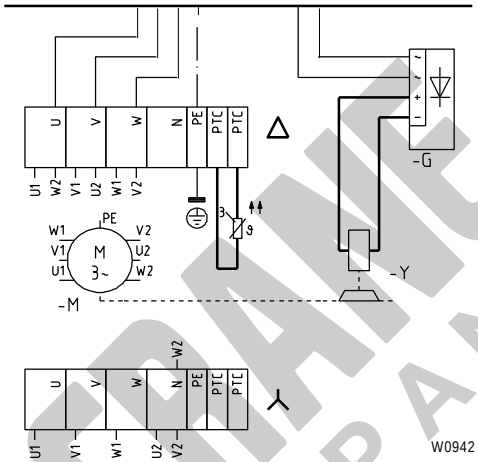
- Open cover (1) of terminal box (2).
- Remove wires (3) from plug at terminal strip (4).
- Remove cap (5) of plug, pull out wires and replace cap including seal.
- Remove sealing plug (6) from terminal box, mount cable gland (7).
- Connect travel drive through cable gland as per connection diagram.
- Close cover of terminal box.

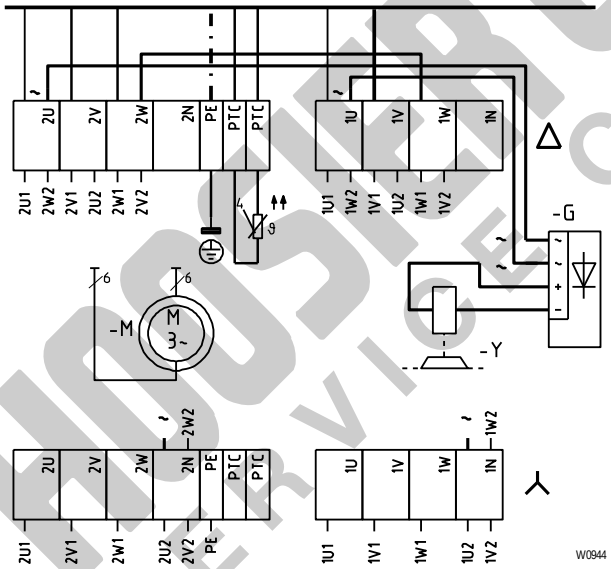
Block connection diagram

Motor 8/2 F..



Motor 4 F..

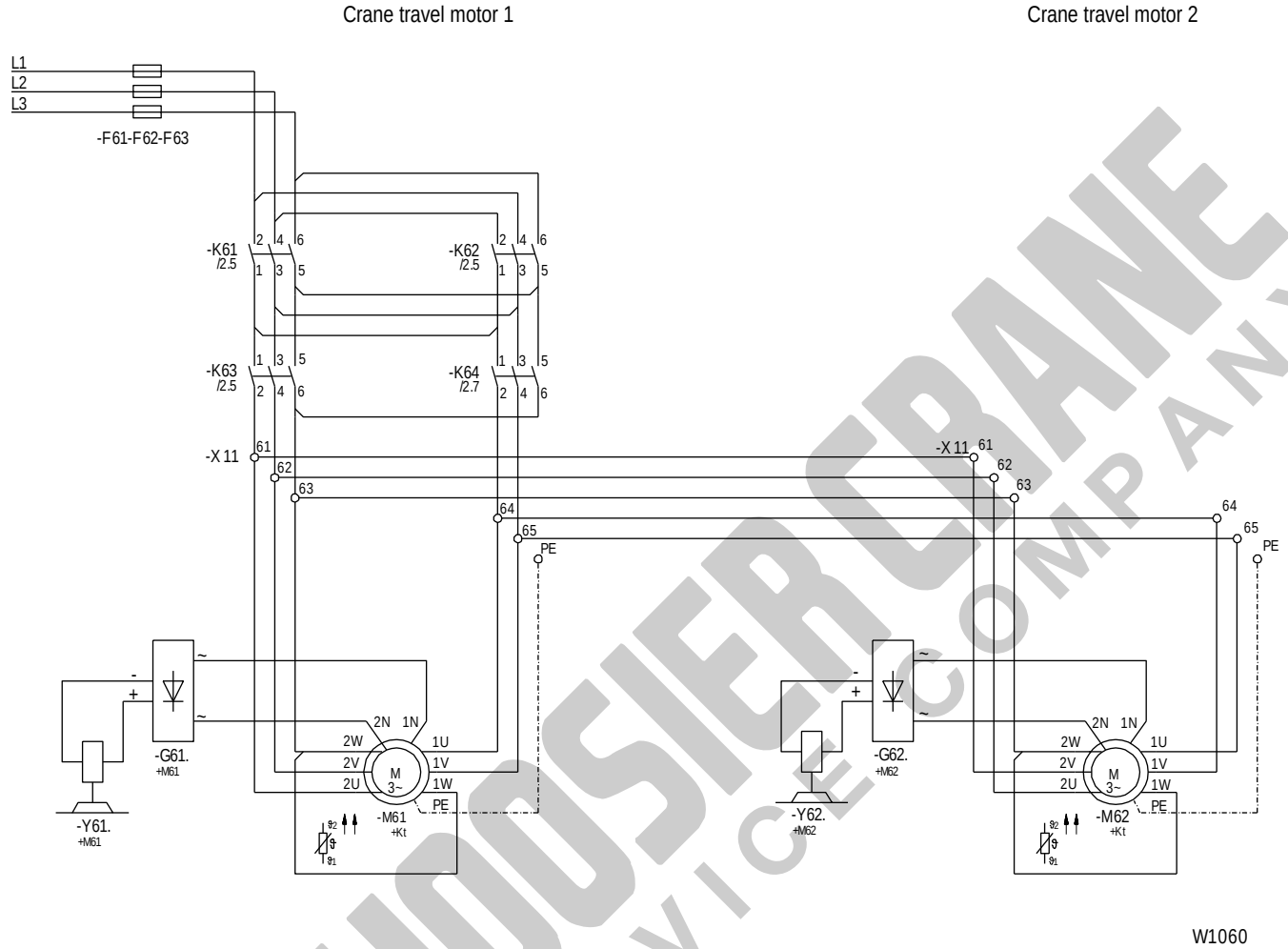




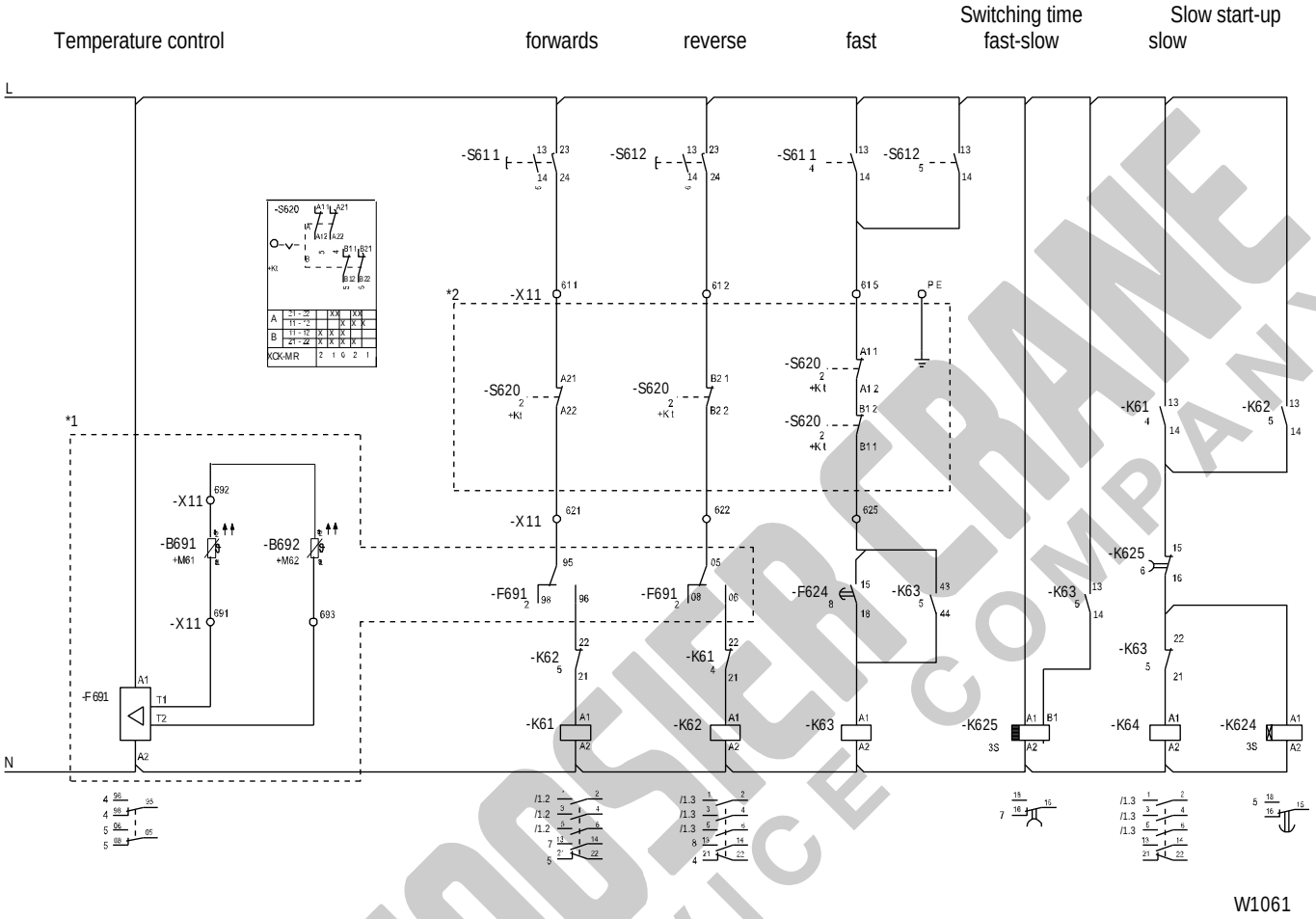
Standard settings for frequency inverter

Speed	[fpm]	31	39	49	63	79	98	126	157	197	248	315	394
Max. frequency	[Hz]	80	100	50	63	80	100	80	100	80	100	100	100
Motor connection		Δ	Δ	Y	Y	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Run-up time	[s]	2.1	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.0	6.7	8.4
Braking time	[s]	1.7	2.0	2.3	2.7	3.0	3.4	3.8	4.2	4.5	4.8	5.4	6.7

Block circuit diagram



Block circuit diagram



*1 Option: temperature control
*2 Option: travel limit switch

The time-lag relays -K624 and -K625 shown in the circuit diagram are pre-set (approx. 3 sec.). The time-lag relay -K625 should be reset on commissioning depending on load and travel speed. The switching time should be set in such a way that no sudden increase in speed occurs in the drive when the slow speed is activated.

Method of functioning:
On start-up, -K624 activates start-up with 8 poles for the time set.
On braking, -K625 activates brake action for the time set, thus avoiding dynamic braking and high torque forces on the drive.

We recommend start-up control from motor size 8/2 F42...
Brake control is required for all drives.

4.3 Inspection and maintenance

This section deals with the operational reliability, availability, and maintaining the value of your travel drives.
Although they are practically maintenance-free, the components subject to wear must be inspected regularly. This is required by the accident prevention regulations. Inspection and maintenance must be performed by qualified persons only, see chapter 1.3.

⚠ WARNING

Safety hazard
- ➢ Maintenance and repair work may only be carried out when the travel drive is not under load.
- ➢ Switch off and padlock main isolator.
- ➢ Follow the accident prevention regulations.

Please also note the "Safety instructions" on page 8.
Wearing parts, see page 33.

4.3.1 Inspection and maintenance intervals

Inspection on commissioning *1	Daily inspection on starting work *2	For the first time after 3 months *1	Periodic inspections every 12 months *3	Periodic maintenance every 12 months *1	Maintenance after 10 years or at general overhaul *4		Inspection and maintenance table (classification: H2)	See page
		●	●				Attachment of travel drive	23
●	●		●				Check braking effect of travel drive	32
			●				Test the brake air gap	32
●							Filling of lubricant	33
					●		Change lubricant of gear	33

*1 By a qualified person
*2 By the operator
*3 Periodic maintenance at least every 12 months, possibly earlier if so prescribed by national regulations, to be performed by a qualified person.
*4 In manufacturer's factory

NOTICE

Heavy-duty applications and adverse conditions (dirt, solvents, multi-shift operation etc.) necessitate shortening this inspection and maintenance interval.

⚠ WARNING

If work needs to be carried out on live parts, a second person must be present who can stop dangerous movements in an emergency by means of the emergency stop button or disconnect the power supply by means of the main isolator / disconnect switch.

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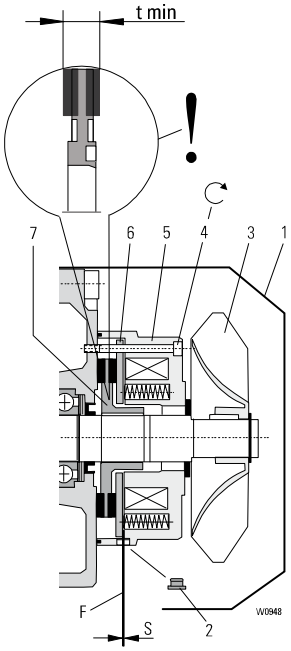

4.3.2 Travel motor brake

NOTICE

Danger of material damage
Have replacement and repairs performed by trained qualified personnel only.

Check brake at regular intervals. The intervals must be adapted in accordance with the application.

- Move carriage into a safe position

- Remove fan cover (1)
- Remove plug (2)
- Measure air gap (S) with feeler gauge (F). See table for max. permissible air gap (S).
- The travel motor brake does not need to be adjusted.
- If the max. permissible air gap (S) has been reached, the brake disc (brake rotor) must be replaced.

4.3.3 Replacing brake disc (brake rotor)

- Remove fan cover (1)
- Pull off fanwheel (3), remove feather key
- Disconnect brake
- Unscrew fixing screws (4)
- Remove magnet piece (5) together with armature disc (6)
- Remove brake disc (brake rotor) (7)
- Clean brake (wear a dust protection mask)

Replace in reverse order. Ensure that the check hole for measuring the air gap is underneath.
Observe tightening torques.

Travel drive	Motor type	Brake	Braking torque	S min	S max.	t min	(4)	↻
			[lbf ft]	[in]	[in]	[in]		[lbf ft]
SF xx xxx 123	8/2F12/2xx.223	FDW 08	0.96	0.008	0.079	0.224	3xM4	2
SF xx xxx 133	8/2F13/2xx.233	FDW 08	1.84	0.008	0.063	0.24	3xM4	2
SF xx xxx 184	4F18/2xx.243	FDW 08	3.69	0.008	0.028	0.276	3xM4	2
SF xx xxx 313	8/2F31/2xx.423	FDW 13	3.69	0.012	0.079	0.346	3xM6	7
SF xx xxx 384	4F38/2xx.443	FDW 13	9.59	0.012	0.079	0.346	3xM6	7
SF xx xxx 423	8/2F42/2xx.433	FDW 13	5.9	0.012	0.079	0.346	3xM6	7
SF xx xxx 484	4F48/2xx.453	FDW 13	14.75	0.012	0.039	0.386	3xM6	7
SF xx xxx 523	8/2F52/2xx.523	FDW 15	9.59	0.012	0.079	0.425	3xM6	7

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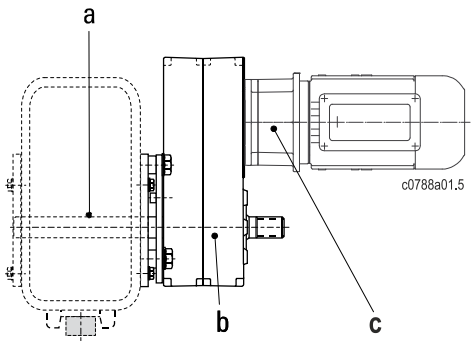


4.3.4 Gear

The gear has a long service life. All bearing points have roller bearings.
The gearing is hardened, hard-machined and has high safety factors.

- During annual maintenance, check whether any lubricant has leaked. If any loss of lubricant is ascertained, the lubricant must be changed and repairs scheduled if necessary.
- Note any gear noises from the crane when under load and without load. Rough, noisy running, knocking sounds indicate possible faults.
- If any faults are detected, repairs must be scheduled.
- If there is any uncertainty, a fresh diagnosis can be made after consulting experts, e.g. from the manufacturer.

4.3.5 Changing lubricant of travel drive

SF 1. .. travel drives have a gear with grease lubrication, SF 25.., SF 35.. with oil lubrication.
The toothed boss (a) is lubricated with grease (see table).

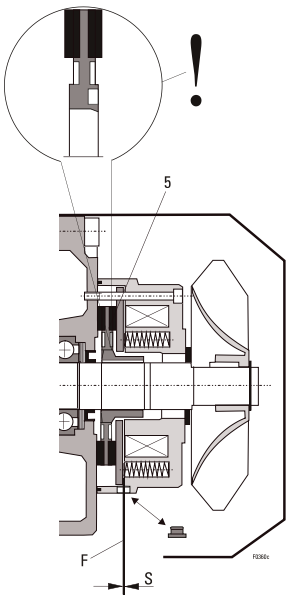
Run lubricant off while warm.

The type and quantity of lubricant can be seen from the table.

Pos.	Position of lubrication point	Type of lubricant	Lubricant - Product name		Quantity
			Factory filling	Alternative	
a	Travel wheel (Gearing) Return sheave	Grease	Mobilux EP 3 K3K	Shell Gadus S2 V100 3	1.8 oz
				Fuchs Renolit Duraplex EP3	
				BP Energrease LS-EP3	
			Fuchs Renolit RHF1 [1]	Klüberplex BEM 41-132	
b	Tolley travel gear	Grease	Fuchs Renolit FLM 0 KPF OK	Shell Gadus S2 V220 0	SF 1.1.. 3.5 oz SF 1.2.. 7.1 oz SF 1.2.. 1.3 lb [2]
				Castrol Viscogen 0	
				Klüberplex AG 11-461	
			Fuchs Renolit RHF1 [1]		
		Oil	Fuchs Renolin CLP 460	Aral Degol BG 460 Plus	SF 25….2 lb SF 35 2 lb
				Castrol Alpha SP 460	
			Fuchs Renolin Unisyn CLP PG 220 [1]		
c	Intermediate gear	Grease	FUCHS RENOLIT FLM 0	Shell Gadus S2 V220 0	3.5 oz
			FUCHS RENOLIT RHF 1 [1]		

[1] Synthetic lubricant for operating temperatures -40 °F… +104 °F
[2] Installation position "motor below"

4.4 Wearing parts



NOTICE

Material damage hazard
Replacement and repairs may be carried out by trained qualified personnel only.

Brake disc (brake rotor)

Travel drive	Motor	Order no., brake disc (5)
SF xx xxx 123	8/2F12/2xx.223	A2127023650
SF xx xxx 133	8/2F13/2xx.233	A2127023650
SF xx xxx 184	4F18/2xx.243	A2127023650
SF xx xxx 313	8/2F31/2xx.423	A2127036650
SF xx xxx 384	4F38/2xx.443	A2127036650
SF xx xxx 423	8/2F42/2xx.433	A2127036650
SF xx xxx 484	4F48/2xx.453	A2127036650
SF xx xxx 523	8/2F52/2xx.523	A2127042650

4.5 Decommissioning

4.5.1 Dismantling

⚠ WARNING

Falling parts hazard.
➢ Secure product during dismantling.

Dismantle product correctly. First of all drain off lubricants.

4.5.2 Scrap disposal

NOTICE

Electronic components, electric scrap, lubricants and other auxiliary substances are hazardous waste and may only be disposed of by approved recycling companies.

Dismantled components must be recycled after correct dismantling.
It is imperative to observe national regulations on environmentally compatible disposal.
Local authorities will provide relevant information.

4.6 Technical data

4.6.1 Conditions of use

The product is designed for use in industry and for the ambient conditions usual in industry.

Special measures are necessary for particular applications such as e.g. high degree of chemical pollution, outdoor use, offshore application, etc.

The manufacturer will be pleased to advise you.

Protection against dust and moisture to EN 60529 / IEC
Standard: IP55
Option: IP66

Permissible ambient temperatures
Standard: -4 °F…+104 °F
Option: -40 °F…+140 °F
Frequency inverters can be used from -4 °F…+122 °F (non-dewing).

4.6.2 Motor data

4.6.2.1 Pole-changing travel motors

Index no.	Type	50 Hz											
		P	n1	TN	TA	TH	TB	J	cos φ N	cos φ K	DC	Ac	PB
		[HP]	[1/min]	[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]			[%]	[(1/h)s]	[HP]
123	8/2F12/220.223	0.12 0.50	590 2420	1.077	2.876 2.655	1.696 1.696	0.959	0.1376	0.55 0.83	0.77 0.93	20 40	800	0.07
133	8/2F13/220.233	0.17 0.74	600 2540	1.527	3.762 3.762	2.581 2.581	1.844	0.2017	0.55 0.82	0.72 0.92	20 40	500	0.07
313	8/2F31/210.423	0.43 1.68	660 2550	3.452	5.605 7.744	4.72 5.015	3.688	0.3916	0.69 0.88	0.89 0.90	20 40	600	0.11
423	8/2F42/210.433	0.67 2.68	665 2680	5.259	8.851 12.834	6.786 7.671	5.9	0.6811	0.74 0.95	0.87 0.90	20 40	360	0.11
523	8/2F52/210.523	1.07 4.29	610 2550	8.836	15.489 17.701	11.801 13.276	9.588	0.9682	0.74 0.96	0.83 0.82	20 40	300	0.13

Index no.	Type	50 Hz					
		I_N			I_K		
		220...240 V	380...415 V	480...525 V	220...240 V	380...415 V	480...525 V
		[A]	[A]	[A]	[A]	[A]	[A]
123	8/2F12/220.223	1.7 2.3	1.0 1.3	0.8 1.0	2.4 5.6	1.4 3.2	1.1 2.6
133	8/2F13/220.233	2.1 2.8	1.2 1.6	1.0 1.3	2.8 7.6	1.6 4.5	1.3 3.6
313	8/2F31/210.423	2.4 5.2	1.4 3.0	1.1 2.4	5.0 16.0	2.9 9.2	2.3 7.4
423	8/2F42/210.433	3.1 7.0	1.8 4.0	1.4 3.2	7.7 28.0	4.4 16.0	3.5 13.0
523	8/2F52/210.523	4.7 12.7	2.7 7.3	2.2 5.8	10.6 43.0	6.1 25.0	4.9 20.0

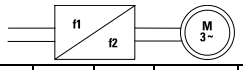
Index no	Type	50 Hz					
		I_N			I_K		
		575...630 V	660...720 V		575...630 V	660...720 V	
		[A]	[A]		[A]	[A]	
123	8/2F12/220.223	0.7 0.9	0.6 0.8		0.9 2.1	0.8 1.9	
133	8/2F13/220.233	0.8 1.1	0.7 0.9		1.1 3.0	0.9 2.6	
313	8/2F31/210.423	0.9 2.0	0.8 1.7		1.9 6.1	1.7 5.3	
423	8/2F42/210.433	1.2 2.7	1.0 2.3		2.9 1.9	2.6 9.4	
523	8/2F52/210.523	1.8 4.9	1.6 4.2		4.1 16.7	3.5 14.5	

Index no.	Type	60 Hz											
		P	n1	TN	TA	TH	TB	J	cos φ N	cos φ K	DC	Ac	PB
		[HP]	[1/min]	[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]			[%]	[(1/h)s]	[HP]
123	8/2F12/220.223	0.15 0.59	710 2900	1.077	2.876 2.655	1.696 1.696	0.959	0.1376	0.55 0.83	0.77 0.93	20 40	800	0.07
133	8/2F13/220.233	0.21 0.89	720 3050	1.527	3.762 3.762	2.581 2.581	1.844	0.2017	0.55 0.82	0.72 0.92	20 40	500	0.07
313	8/2F31/210.423	0.48 2.01	790 3060	3.452	5.605 7.744	4.72 5.015	3.688	0.3916	0.69 0.88	0.89 0.90	20 40	600	0.11
423	8/2F42/210.433	0.8 3.22	800 3220	5.259	8.851 12.834	6.786 7.671	5.9	0.6811	0.74 0.95	0.87 0.90	20 40	360	0.11
523	8/2F52/210.523	1.21 5.1	730 3060	8.836	15.489 17.701	11.801 13.276	9.588	0.9682	0.74 0.96	0.83 0.82	20 40	300	0.13

Code	Type	60 Hz					
		I_N			I_K		
		220...240 V	380...415 V	440...480 V	220...240 V	380...415 V	440...480 V
		[A]	[A]	[A]	[A]	[A]	[A]
123	8/2F12/220.223	2.0 2.6	1.2 1.5	1.0 1.3	2.8 6.4	1.6 3.7	1.4 3.2
133	8/2F13/220.233	2.4 3.2	1.4 1.8	1.2 1.6	3.2 9.0	1.8 5.2	1.6 4.5
313	8/2F31/210.423	2.8 6.0	1.6 3.5	1.4 3.0	5.8 18.4	3.3 10.6	2.9 9.2
423	8/2F42/210.433	3.6 8.0	2.1 4.6	1.8 4.0	8.8 33.0	5.1 19.0	4.4 16.0
523	8/2F52/210.523	5.4 14.6	3.1 8.4	2.7 7.3	12.2 50.0	7.0 29.0	6.1 25.0

Code	Type	60 Hz					
		I_N			I_K		
		550…600 V	660…720 V		550…600 V	660…720 V	
		[A]	[A]		[A]	[A]	
123	8/2F12/220.223	0.8 1.0	0.7 0.9		1.1 2.6	0.9 2.1	
133	8/2F13/220.233	1.0 1.3	0.8 1.1		1.3 3.6	1.1 3.0	
313	8/2F31/210.423	1.1 2.4	0.9 2.0		2.3 7.4	1.9 6.1	
423	8/2F42/210.433	1.4 3.2	1.2 2.7		3.5 13.0	2.9 10.9	
523	8/2F52/210.523	2.2 5.8	1.8 4.9		4.9 20.0	4.1 16.7	

4.6.2.2 Frequency-controlled travel motors

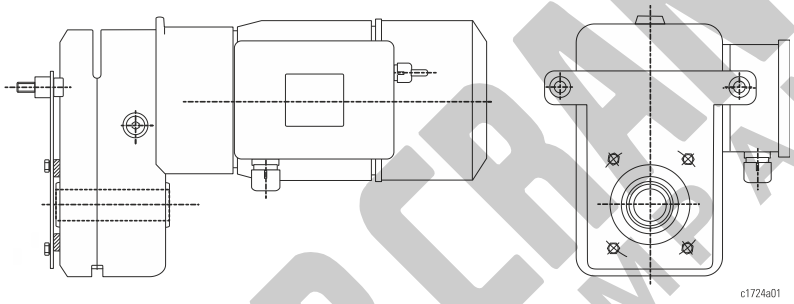
Index no.	Type	f_N		P		n1		TN	TA	TH	TB	Jrot	I_N		I_K	cos φ N	cos φ K	DC	x
		Y	Δ	Y	Δ	Y	Δ						Y	Δ					
		[Hz]		[HP]		[1/min]		[lb_f ft]	[lb_f ft]	[lb_f ft]	[lb_f ft]	[lbft²]	[A]		[A]			[%]	[Ω]
50/60 Hz		380...480 V. 50/60 Hz  380...415 V. 100 Hz																	
184	4F18/220.243 4F18/231.243	50	100	0.51	1.01	1220	2440	2.168	3.762	2.803	3.688	0.0119	1.1	2.2	2.7	0.73	0.82	60	18.8
384	4F38/210.443 4F38/221.443	50	100	1.48	2.95	1370	2740	5.679	12.54	9.588	9.588	0.0759	2.6	5.2	9.5	0.80	0.87	60	5.6
484	4F48/210.453 4F48/220.453	50	100	2.15	4.29	1425	2850	7.892	22.86	25.08	14.75	0.1353	4.3	8.6	23	0.71	0.83	60	2.6

Ac	[(1/h)s]	Switching frequency factor
cos φ K		Power factor (short circuit)
cos φ N		Power factor (nominal)
DC	[%]	Duty cycle
fN	[Hz]	Rated frequency
IK	[A]	Short-circuit current
IN	[A]	Rated current
J	[lbft²]	Moment of inertia
Jrot	[lbft²]	Moment of inertia. rotor
n1	[1/min]	Motor r.p.m.
P	[HP]	Motor output
PB	[HP]	Coil output (brake)
TA	[lb_f ft]	Motor starting torque
TB	[lb_f ft]	Braking torque (motor shaft)
TH	[lb_f ft]	Run-up torque (motor shaft)
TN	[lb_f ft]	Rated motor torque
x =		Terminal resistance

5 SA-C travel drive

5.1 Introduction

The travel drive is a high-quality drive with smooth starting and braking characteristics such as is required in particular for material handling. The pole-changing motor must be activated in a certain way to achieve this (see block circuit diagram, chapter "Electrical connection").
The drives can be operated indoors, or outdoors with short term operation. Additional measures are necessary for continuous use outdoors.



5.2 Mounting and installation

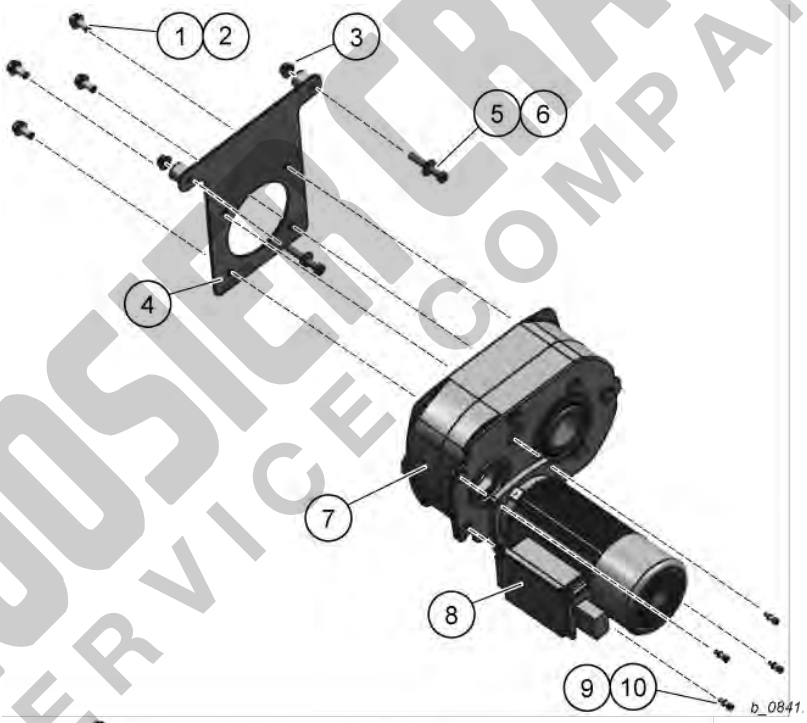
5.2.1 Permissible installation position

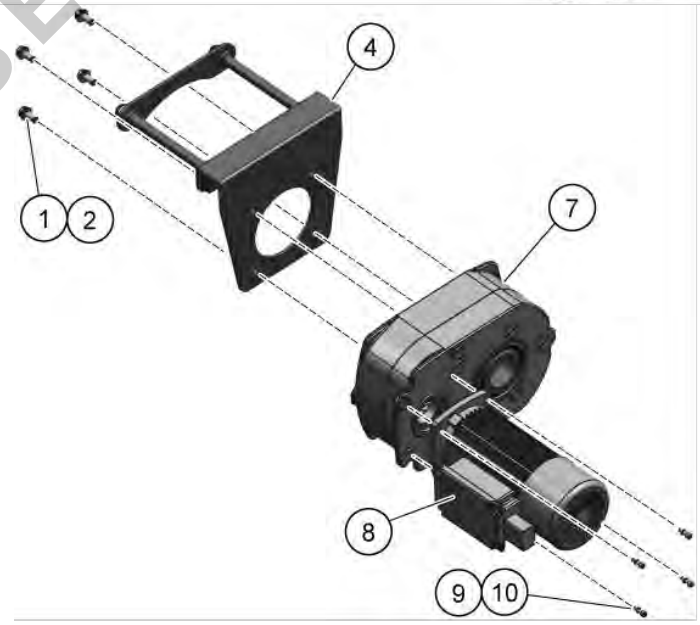
⚠ WARNING

Danger of bodily injury
Unsuitable installation material and incorrect tightening torques may lead to damage and accidents.

- ➢ Before starting the work, de-energize the system and protect it against unintentional restart.
- ➢ Secure the danger zone.
- ➢ Keep a sufficient safety distance from the product.
- ➢ Use only original mounting accessories from the manufacturer.
- ➢ Tighten bolted connections with the specified tightening torque.

(1) Screw
(2) Washer (Optional)
(3) Nut
(4) Torque arm
(5) Screw
(6) Washer (Optional)
(7) Gear
(8) Travel drive
(9) Screw
(10) Washer





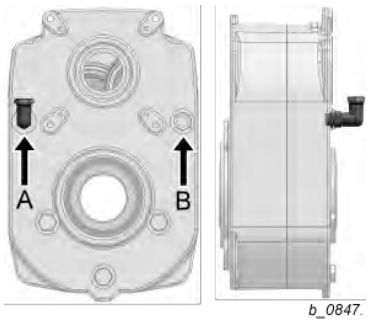
For assembly of the travel drive on the wheel block, see the wheel block operating instructions.

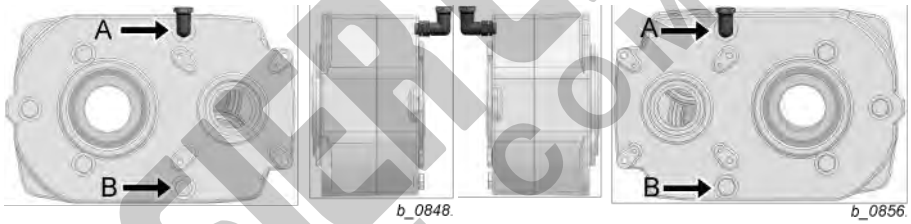
Tightening torques for bolted connection

Position	Thread size	Property class	
		8.8	VERBUS RIPP® 100
		[lbf ft]	[lbf ft]
9	M6	8	
9	M10	36	
1, 5	M12	63	96
1, 5	M16	155	

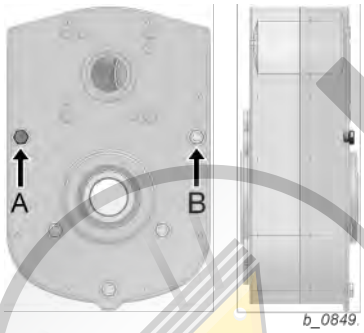
1 Before mounting, remove from contact surfaces dirt, rust, or grease.
- Make sure that the paint layer is no thicker than 3.1 mil.
2 Grease gearing of drive shaft (gear) lightly before installing.
3 Align the travel drive on the counter-gearing and push it on as far as it will go.
4 Tighten bolted connections with the specified tightening torque

SA-C5…





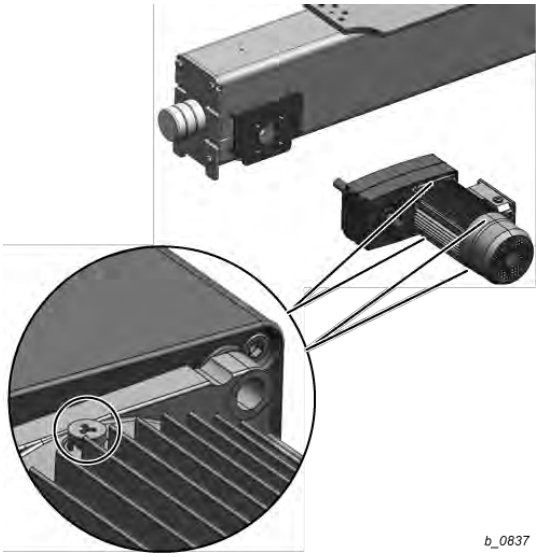
SA-C6…



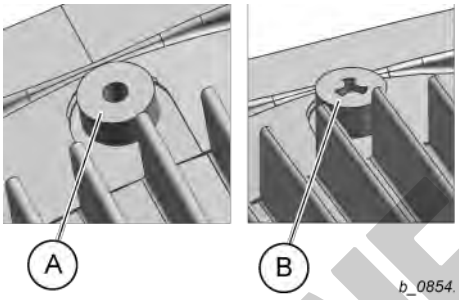
5 Check the bleeder screw (A) before commissioning.
– The bleeder screw (A) must always be located at the highest point of the gear.
– Depending on the installation position, the bleeder screw (A) must be replaced with the screw plug (B).

Small quantities of oil may leak out of the bleeder screw.

6 Check that there is sufficient lubricant before commissioning.
7 Remove the sticker from the bleeder screw.



b_0837

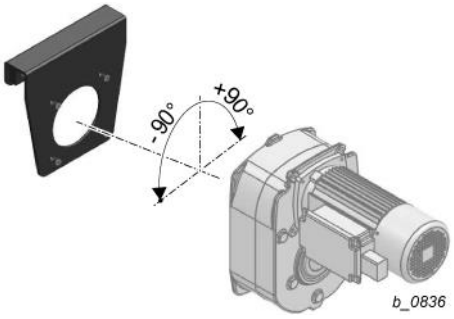


b_0854.

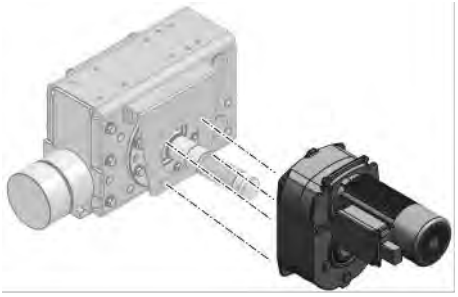
8 Check the stopping plug (A) and drainage plug (B) before commissioning.
- The stopping plugs (A) on the motor flange and motor cover must always be assembled at the top and the opposing drainage plugs (B) (see detailed image) always at the bottom.
  The stopping plug (A) and drainage plug (B) on the motor cover are located beneath the fan cover.
- In order to replace the stopping plug (A) and drainage plug (B) it is possible to use a SPAX screw.

5.2.2 Permissible installation position

- Torque arm



- Travel drive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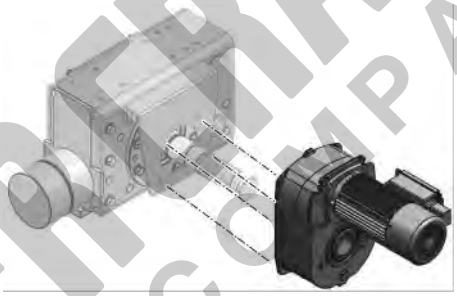
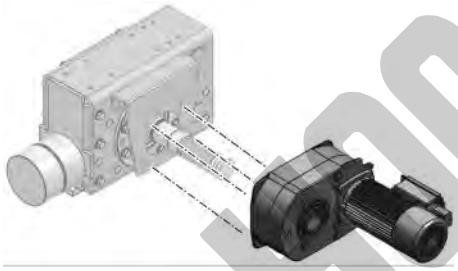
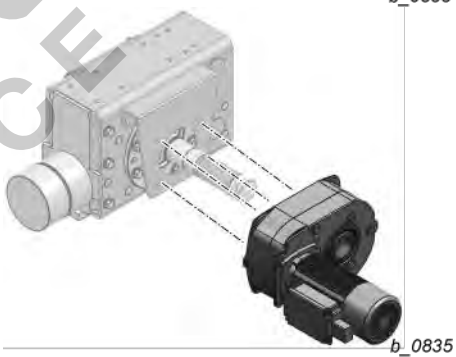

b_0833


b_0834


b_0835

5.2.3 Electrical connection

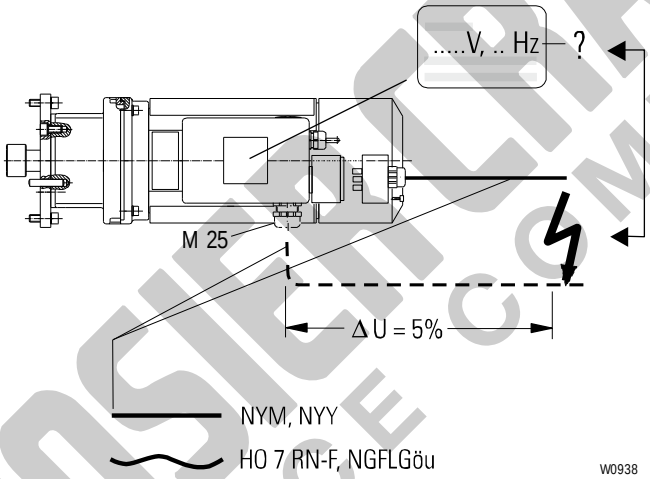
⚠ DANGER

Electric shock hazard

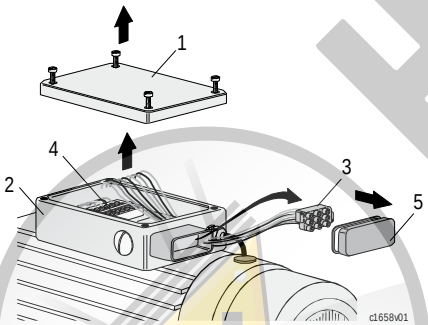
- Make sure an electrical qualified person performs the work.
- Observe the relevant safety and accident prevention regulations.
- Make sure that the mains voltage corresponds to the voltage specified on the rating plate.
- Make sure the main power supply cable meet the specifications given in the technical data.

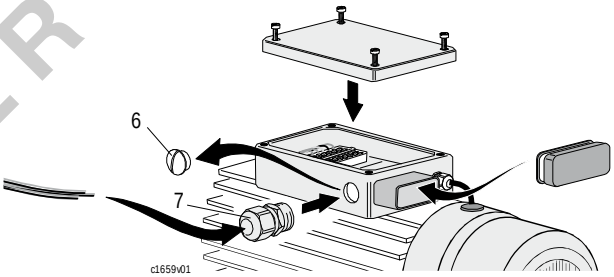
- Electrical connection with plug connection or cable gland.

Plug connection



Cable gland

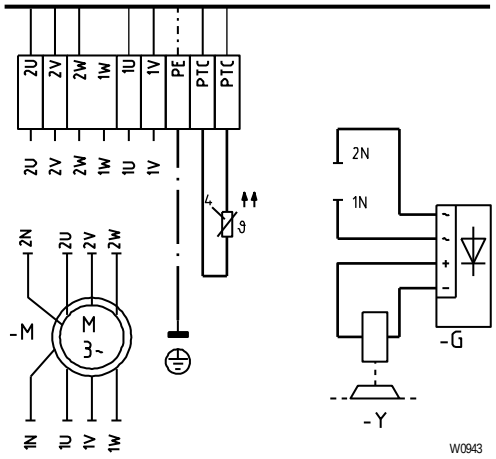




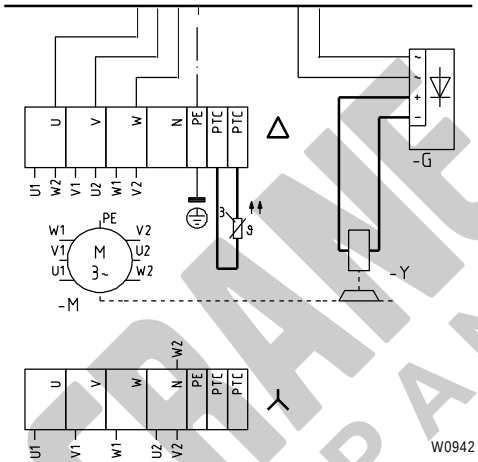
- Open cover (1) of terminal box (2).
- Remove wires (3) from plug at terminal strip (4).
- Remove cap (5) of plug, pull out wires and replace cap including seal.
- Remove sealing plug (6) from terminal box, mount cable gland (7).
- Connect travel drive through cable gland as per connection diagram.
- Close cover of terminal box.

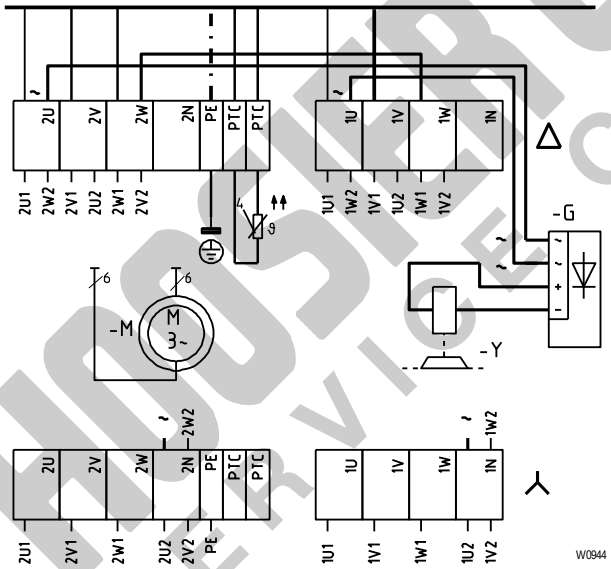
Block connection diagram

Motor 8/2 F..



Motor 4 F..

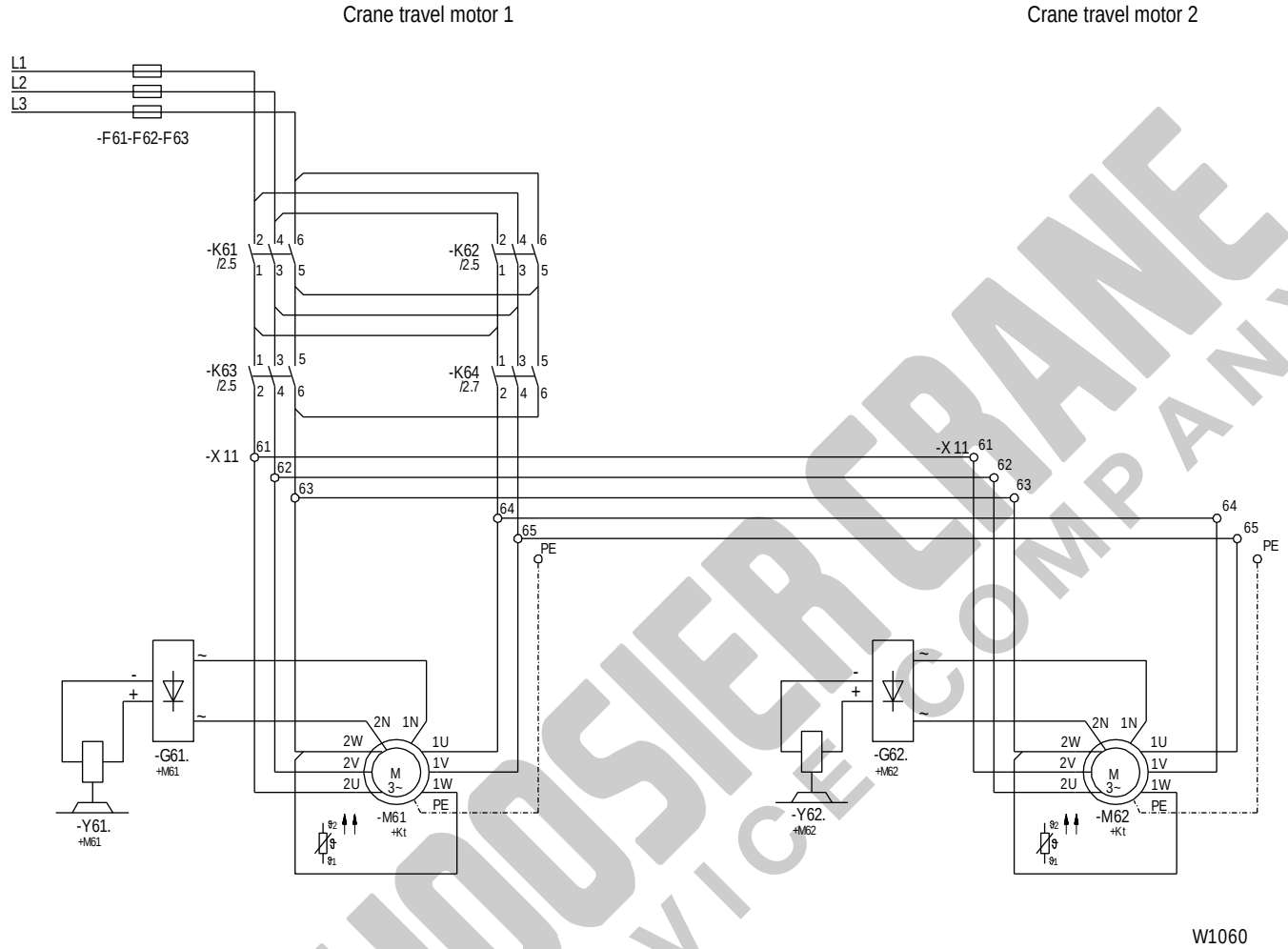




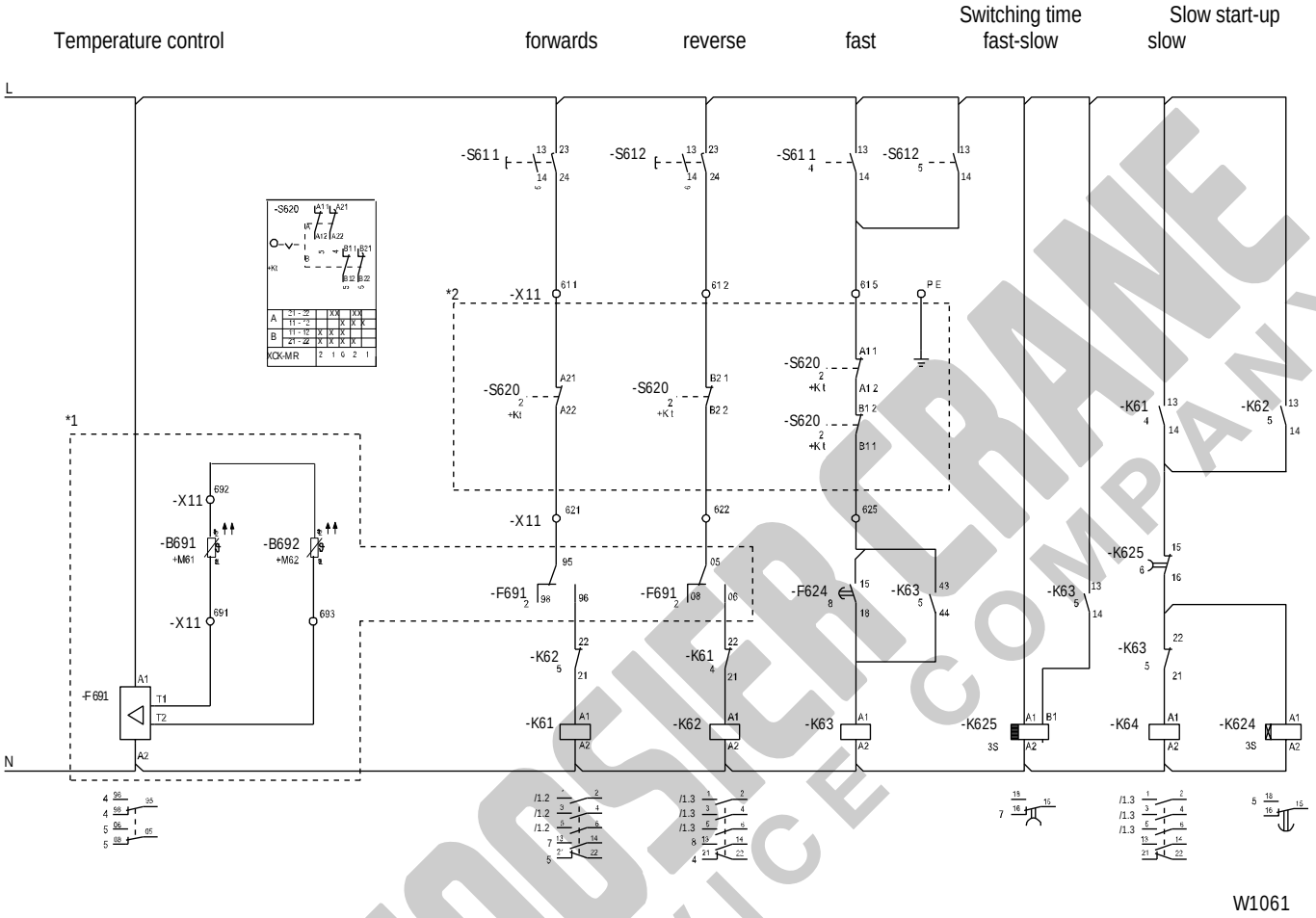
Standard settings for frequency inverter

Speed	[fpm]	31	39	49	63	79	98	126	157	197	248	315	394
Max. frequency	[Hz]	80	100	50	63	80	100	80	100	80	100	100	100
Motor connection		Δ	Δ	Y	Y	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Run-up time	[s]	2.1	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.0	6.7	8.4
Braking time	[s]	1.7	2.0	2.3	2.7	3.0	3.4	3.8	4.2	4.5	4.8	5.4	6.7

Block circuit diagram



Block circuit diagram



*1 Option: temperature control
*2 Option: travel limit switch

The time-lag relays -K624 and -K625 shown in the circuit diagram are pre-set (approx. 3 sec.). The time-lag relay -K625 should be reset on commissioning depending on load and travel speed. The switching time should be set in such a way that no sudden increase in speed occurs in the drive when the slow speed is activated.

Method of functioning:
On start-up, -K624 activates start-up with 8 poles for the time set.
On braking, -K625 activates brake action for the time set, thus avoiding dynamic braking and high torque forces on the drive.

We recommend start-up control from motor size 8/2 F42...
Brake control is required for all drives.

5.3 Inspection and maintenance

This section deals with the operational reliability, availability, and maintaining the value of your travel drives.
Although they are practically maintenance-free, the components subject to wear must be inspected regularly. This is required by the accident prevention regulations. Inspection and maintenance must be performed by qualified persons only, see chapter 1.3.

⚠ WARNING

Safety hazard

- ➢ Maintenance and repair work may only be carried out when the travel drive is not under load.
- ➢ Switch off and padlock main isolator.
- ➢ Follow the accident prevention regulations.

Please also note the "Safety instructions" on page 8.
Wearing parts, see page 50.

5.3.1 Inspection and maintenance intervals

Inspection on commissioning *1	Daily inspection on starting work *2	For the first time after 3 months *1	Periodic inspections every 12 months *3	Periodic maintenance every 12 months *1	Maintenance after 10 years or at general overhaul *4		Inspection and maintenance table (classification: H2)	See page
		●	●				Attachment of travel drive	40
●	●		●				Check braking effect of travel drive	49
			●				Test the brake air gap	49
●							Filling of lubricant	50
					●		Change lubricant of gear	50

*1 By a qualified person
*2 By the operator
*3 Periodic maintenance at least every 12 months, possibly earlier if so prescribed by national regulations, to be performed by a qualified person.
*4 In manufacturer's factory

NOTICE

Heavy-duty applications and adverse conditions (dirt, solvents, multi-shift operation etc.) necessitate shortening this inspection and maintenance interval.

⚠ WARNING

If work needs to be carried out on live parts, a second person must be present who can stop dangerous movements in an emergency by means of the emergency stop button or disconnect the power supply by means of the main isolator / disconnect switch.

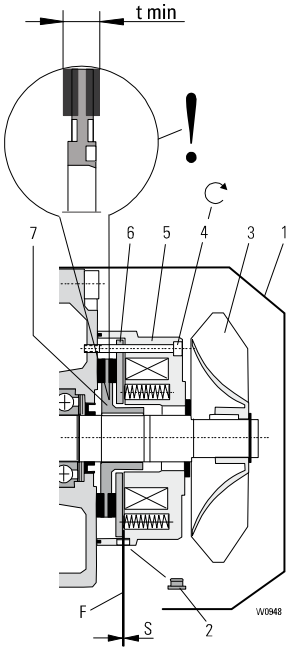
5.3.2 Travel motor brake

NOTICE

Material damage hazard
Have replacement and repairs performed by trained qualified personnel only.

Check brake at regular intervals. The intervals must be adapted in accordance with the application.

- Move carriage into a safe position



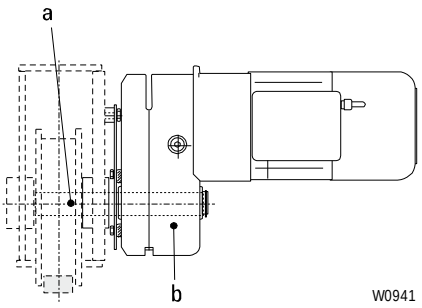
- Remove fan cover (1)
- Remove plug (2)
- Measure air gap (S) with feeler gauge (F). See table for max. permissible air gap (S).
- The travel motor brake does not need to be adjusted.
- If the max. permissible air gap (S) has been reached, the brake disc (brake rotor) must be replaced.

5.3.3 Replacing brake disc (brake rotor)

- Remove fan cover (1)
- Pull off fanwheel (3), remove feather key
- Disconnect brake
- Unscrew fixing screws (4)
- Remove magnet piece (5) together with armature disc (6)
- Remove brake disc (brake rotor) (7)
- Clean brake (wear a dust protection mask)

Replace in reverse order. Ensure that the check hole for measuring the air gap is underneath.
Observe tightening torques.

Travel drive	Motor type	Brake	Braking torquet	S min	S max.	t min	(4)	↻
			[lbf ft]	[in]	[in]	[in]		[lbf ft]
SA-C ... 133	8/2F13/2xx.233	FDW 08	1.84	0.008	0.063	0.24	3xM4	2
SA-C ... 184	4F18/2xx.243	FDW 08	3.69	0.008	0.028	0.276	3xM4	2
SA-C ... 313	8/2F31/2xx.423	FDW 13	3.69	0.012	0.079	0.346	3xM6	7
SA-C ... 384	4F38/2xx.443	FDW 13	9.59	0.012	0.079	0.346	3xM6	7
SA-C ... 423	8/2F42/2xx.433	FDW 13	5.9	0.012	0.079	0.346	3xM6	7
SA-C ... 484	4F48/2xx.453	FDW 13	14.75	0.012	0.039	0.386	3xM6	7
SA-C ... 523	8/2F52/2xx.523	FDW 15	9.59	0.012	0.079	0.425	3xM6	7



5.3.4 Gear

The gear has a long service life. All bearing points have roller bearings.
The gearing is hardened, hard-machined and has high safety factors.

- During annual maintenance, check whether any lubricant has leaked. If any loss of lubricant is ascertained, the lubricant must be changed and repairs scheduled if necessary.
- Note any gear noises from the crane when under load and without load. Rough, noisy running, knocking sounds indicate possible faults.
- If any faults are detected, repairs must be scheduled.
- If there is any uncertainty, a fresh diagnosis can be made after consulting experts, e.g. from the manufacturer.

5.3.5 Changing lubricant of travel drive

SA-C travel drives have a gear with oil lubrication.
The toothed boss (a) is lubricated with grease (see table).

Run gear lubricant off while warm.

The type and quantity of lubricant can be seen from the table.

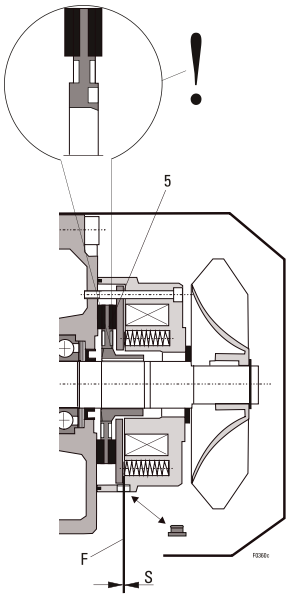
Pos.	Position of lubrication point	Type of lubricant	Lubricant - Product name		Quantity
			Factory filling	Alternative	
a	Travel wheel (Gearing) Return sheave	Grease	Mobilux EP 3	Shell Gadus S2 V100 3	1.8 oz
				FUCHS RENOLIT DURAPLEX EP 3	
				BP Energrease LS-EP3	
			FUCHS RENOLIT RHF1 [1)]	Klüberplex BEM 41-132	
b	Tolley travel gear	Oil	FUCHS RENOLIN CLP 460	Aral Degol BG 460 Plus	SA-.5.. 0.9 qt SA-.6.. 2.7 qt
				Castrol Alpha SP 460	
			FUCHS RENOLIN UNISYN CLP PG 220 [1)]		

[1)] Synthetic lubricant for operating temperatures -40 °F…+104 °F

5.4 Wearing parts

NOTICE

Material damage hazard
Replacement and repairs may be carried out by trained qualified personnel only.



Brake disc (brake rotor)

Travel drive	Motor	Order no., brake disc (5)
SA-C ... 133	8/2F13/2xx.233	A2127023650
SA-C ... 184	4F18/2xx.243	A2127023650
SA-C ... 313	8/2F31/2xx.423	A2127036650
SA-C ... 384	4F38/2xx.443	A2127036650
SA-C ... 423	8/2F42/2xx.433	A2127036650
SA-C ... 484	4F48/2xx.453	A2127036650
SA-C ... 523	8/2F52/2xx.523	A2127042650

5.5 Decommissioning

5.5.1 Dismantling

⚠ WARNING

Falling parts hazard.
➢ Secure the product when dismantling.

Dismantle product correctly. First of all drain off lubricants.

5.5.2 Scrap disposal

NOTICE

Electronic components, electric scrap, lubricants and other auxiliary substances are hazardous waste and may only be disposed of by approved recycling companies.

Dismantled components must be recycled after correct dismantling.
It is imperative to observe national regulations on environmentally compatible disposal.
Local authorities will provide relevant information.

5.6 Technical data

5.6.1 Conditions of use

The product is designed for use in industry and for the ambient conditions usual in industry.

Special measures are necessary for particular applications such as e.g. high degree of chemical pollution, outdoor use, offshore application, etc.

The manufacturer will be pleased to advise you.

Protection against dust and moisture to EN 60529 / IEC
Standard: IP55
Option: IP66

Permissible ambient temperatures
Standard: -4 °F…+104 °F
Option: -40 °F…+140 °F
Frequency inverters can be used from -4 °F…+122 °F (non-dewing).

5.6.2 Motor data

5.6.2.1 Pole-changing travel motors

Index no.	Type	50 Hz											
		P	n1	TN	TA	TH	TB	J	cos φ N	cos φ K	DC	Ac	PB
		[HP]	[1/min]	[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]			[%]	[(1/h)s]	[HP]
123	8/2F12/220.223	0.12 0.5	590 2420	1.077	2.876 2.655	1.696 1.696	0.959	0.1376	0.55 0.83	0.77 0.93	20 40	800	0.07
133	8/2F13/220.233	0.17 0.74	600 2540	1.527	3.762 3.762	2.581 2.581	1.844	0.2017	0.55 0.82	0.72 0.92	20 40	500	0.07
313	8/2F31/210.423	0.43 1.68	660 2550	3.452	5.605 7.744	4.72 5.015	3.688	0.3916	0.69 0.88	0.89 0.90	20 40	600	0.11
423	8/2F42/210.433	0.67 2.68	665 2680	5.259	8.851 12.834	6.786 7.671	5.9	0.6811	0.74 0.95	0.87 0.90	20 40	360	0.11
523	8/2F52/210.523	1.07 4.29	610 2550	8.836	15.489 17.701	11.801 13.276	9.588	0.9682	0.74 0.96	0.83 0.82	20 40	300	0.13

Index no.	Type	50 Hz					
		I_N			I_K		
		220...240 V	380...415 V	480...525 V	220...240 V	380...415 V	480...525 V
		[A]	[A]	[A]	[A]	[A]	[A]
123	8/2F12/220.223	1.7 2.3	1.0 1.3	0.8 1.0	2.4 5.6	1.4 3.2	1.1 2.6
133	8/2F13/220.233	2.1 2.8	1.2 1.6	1.0 1.3	2.8 7.6	1.6 4.5	1.3 3.6
313	8/2F31/210.423	2.4 5.2	1.4 3.0	1.1 2.4	5.0 16.0	2.9 9.2	2.3 7.4
423	8/2F42/210.433	3.1 7.0	1.8 4.0	1.4 3.2	7.7 28.0	4.4 16.0	3.5 13.0
523	8/2F52/210.523	4.7 12.7	2.7 7.3	2.2 5.8	10.6 43.0	6.1 25.0	4.9 20.0

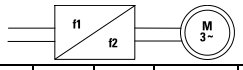
Index no.	Type	50 Hz					
		I_N			I_K		
		575...630 V	660...720 V		575...630 V	660...720 V	
		[A]	[A]		[A]	[A]	
123	8/2F12/220.223	0.7 0.9	0.6 0.8		0.9 2.1	0.8 1.9	
133	8/2F13/220.233	0.8 1.1	0.7 0.9		1.1 3.0	0.9 2.6	
313	8/2F31/210.423	0.9 2.0	0.8 1.7		1.9 6.1	1.7 5.3	
423	8/2F42/210.433	1.2 2.7	1.0 2.3		2.9 10.9	2.6 9.4	
523	8/2F52/210.523	1.8 4.9	1.6 4.2		4.1 16.7	3.5 14.5	

Index no.	Type	60 Hz											
		P	n1	TN	TA	TH	TB	J	cos φ N	cos φ K	DC	Ac	PB
		[HP]	[1/min]	[lbf ft]	[lbf ft]	[lbf ft]	[lbf ft]	[lbft²]			[%]	[(1/h)s]	[HP]
123	8/2F12/220.223	0.15 0.59	710 2900	1.077	2.876 2.655	1.696 1.696	0.959	0.1376	0.55 0.83	0.77 0.93	20 40	800	0.07
133	8/2F13/220.233	0.21 0.89	720 3050	1.527	3.762 3.762	2.581 2.581	1.844	0.2017	0.55 0.82	0.72 0.92	20 40	500	0.07
313	8/2F31/210.423	0.48 2.01	790 3060	3.452	5.65 7.744	4.72 5.015	3.688	0.3916	0.69 0.88	0.89 0.90	20 40	600	0.11
423	8/2F42/210.433	0.8 3.22	800 3220	5.259	8.851 12.834	6.786 7.671	5.9	0.6811	0.74 0.95	0.87 0.90	20 40	360	0.11
523	8/2F52/210.523	1.21 5.1	730 3060	8.836	15.489 17.701	11.801 13.276	9.588	0.9682	0.74 0.96	0.83 0.82	20 40	300	0.13

Code	Type	60 Hz					
		I_N			I_K		
		220...240 V	380...415 V	440...480 V	220...240 V	380...415 V	440...480 V
		[A]	[A]	[A]	[A]	[A]	[A]
123	8/2F12/220.223	2.0 2.6	1.2 1.5	1.0 1.3	2.8 6.4	1.6 3.7	1.4 3.2
133	8/2F13/220.233	2.4 3.2	1.4 1.8	1.2 1.6	3.2 9.0	1.8 5.2	1.6 4.5
313	8/2F31/210.423	2.8 6.0	1.6 3.5	1.4 3.0	5.8 18.4	3.3 10.6	2.9 9.2
423	8/2F42/210.433	3.6 8.0	2.1 4.6	1.8 4.0	8.8 33.0	5.1 19.0	4.4 16.0
523	8/2F52/210.523	5.4 14.6	3.1 8.4	2.7 7.3	12.2 50.0	7.0 29.0	6.1 25.0

Code	Type	60 Hz					
		I_N			I_K		
		550…600 V	660…720 V		550…600 V	660…720 V	
		[A]	[A]		[A]	[A]	
123	8/2F12/220.223	0.8 1.0	0.7 0.9		1.1 2.6	0.9 2.1	
133	8/2F13/220.233	1.0 1.3	0.8 1.1		1.3 3.6	1.1 3.0	
313	8/2F31/210.423	1.1 2.4	0.9 2.0		2.3 7.4	1.9 6.1	
423	8/2F42/210.433	1.4 3.2	1.2 2.7		3.5 13.0	2.9 10.9	
523	8/2F52/210.523	2.2 5.8	1.8 4.9		4.9 20.0	4.1 16.7	

5.6.2.2 Frequency-controlled travel motors

Index no.	Type	f_N		P		n1		TN	TA	TH	TB	Jrot	I_N		I_K	cos φ N	cos φ K	DC	x
		Y	Δ	Y	Δ	Y	Δ						Y	Δ					
		[Hz]		[HP]		[1/min]		[lb_f ft]	[lb_f ft]	[lb_f ft]	[lb_f ft]	[lbft²]	[A]		[A]			[%]	[Ω]
50/60 Hz		380...480 V. 50/60 Hz  380...415 V. 100 Hz																	
184	4F18/220.243 4F18/231.243	50	100	0.51	1.01	1220	2440	2.168	3.762	2.803	3.688	0.0119	1.1	2.2	2.7	0.73	0.82	60	18.8
384	4F38/210.443 4F38/221.443	50	100	1.48	2.95	1370	2740	5.679	12.54	9.588	9.588	0.0759	2.6	5.2	9.5	0.80	0.87	60	5.6
484	4F48/210.453 4F48/220.453	50	100	2.15	4.29	1425	2850	7.892	22.86	25.08	14.75	0.1353	4.3	8.6	23	0.71	0.83	60	2.6

Ac	[(1/h)s]	Switching frequency factor
cos φ K		Power factor (short circuit)
cos φ N		Power factor (nominal)
DC	[%]	Duty cycle
fN	[Hz]	Rated frequency
IK	[A]	Short-circuit current
IN	[A]	Rated current
J	[lbft²]	Moment of inertia
Jrot	[lbft²]	Moment of inertia. rotor
n1	[1/min]	Motor r.p.m.
P	[HP]	Motor output
PB	[HP]	Coil output (brake)
TA	[lb_f ft]	Motor starting torque
TB	[lb_f ft]	Braking torque (motor shaft)
TH	[lb_f ft]	Run-up torque (motor shaft)
TN	[lb_f ft]	Rated motor torque
x =		Terminal resistance

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F. Any action against Seller for breach of warranty, negligence or otherwise in connection with the electrical components of any Good must be commenced by Buyer within one (1) year after (a) the date any alleged claim accrues; or (b) the date of delivery of the Goods to Buyer, whichever is earlier. Any action against Seller for breach of warranty, negligence or otherwise in connection with the mechanical components of any Good must be commenced by Buyer within one (1) year after the date any alleged claim accrues.

G. This warranty is contingent upon Buyer's proper maintenance and care of the Goods, and does not extend to normal wear and tear. Seller reserves the right, at its option, to void this warranty in the event of Buyer's use with the Goods of parts, accessories or other than those supplied by Seller.

⚠ WARNING

Alterations or modifications of equipment and use of non-factory repair parts can lead to dangerous operation and injury.

TO AVOID INJURY:
- Do not alter or modify equipment.
- Do use only factory replacement parts.

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