



BRISBANE CITY COUNCIL BRISBANE WATER

Australia Trade Coast Sewer Project

SP300

Serpentine Rd Pump Station

Operation & Maintenance Manual

Contract No. BW30137-02/03

Volume No. 2.2

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Brisbane Water
Serpentine Road P/S SP300 Australia Trade Coast Sewer Project

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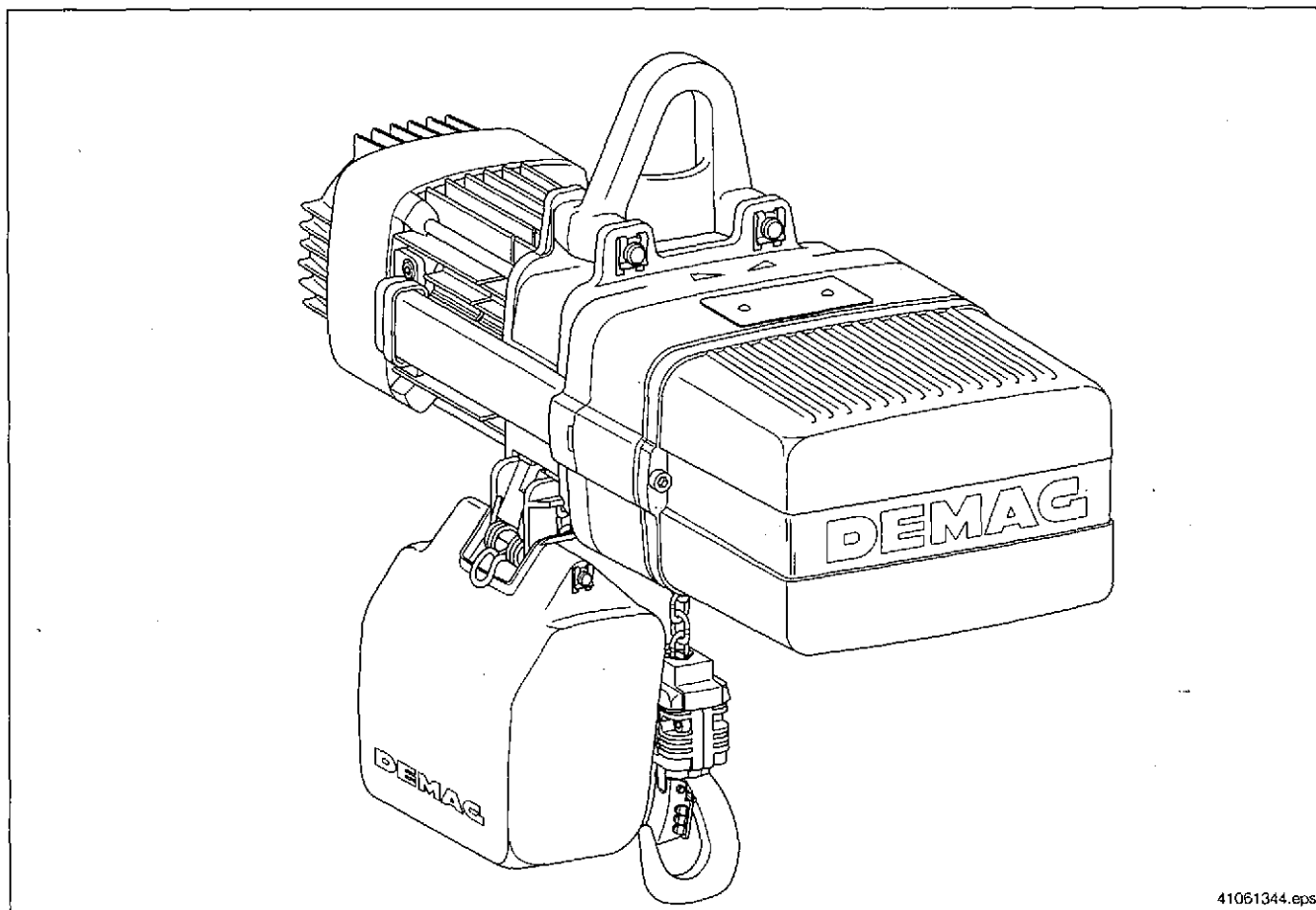
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2.4



Operating instructions

Demag chain hoist DKUN 2 - DKUN 5 - DKUN 10 - DKUN 16 - DKUN 20



41061344.eps

Manufacturer**Demag Cranes & Components GmbH**

P.O. Box 67 · D-58286 Wetter

Telephone (+49/2335) 92-0 · Telefax (+49/2335) 927676

www.demagcranes.com

Please fill in the following table before first putting the chain hoist into service.

This provides you with a definitive documentation of your Demag chain hoist and important information if you ever have to contact the manufacturer or his representative.

Owner	
Where in use	
Model	
Serial number	
Main/creep hoist motor number	
Main hoist motor number	
Travel drive unit number	
Operating voltage	
Control voltage	
Frequency	
Wiring diagram number	
Direct control	
Contact control	

Accompanying documents**Component parts list for Demag chain hoist**

DKUN 2	222 501 44	721 IS 817
DKUN 5	222 506 44	721 IS 817
DKUN 10	222 511 44	721 IS 817
DKUN 16	222 546 44	721 IS 817
DKUN 20	222 516 44	721 IS 817
DSK Assembly instructions	206 485 44	720 IS 951
Component parts list for DSK control pendant	222 381 44	721 IS 951
Assembly instructions DST	206 165 44	720 IS 951
Component parts list for DST control pendant	222 142 44	721 IS 951
DSE assembly instructions	214 214 44	720 IS 951
Technical data for DSE control pendant	203 119 44	714 IS 951
Test and inspection booklet for Demag chain hoist	214 260 44	720 IS 817
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Demag chain hoist DKUN 1 – 20	202 846 44	714 IS 817
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0 Foreword



You have purchased a Demag product.

This chain hoist was manufactured in accordance with German and European standards and regulations, e.g. EC Machinery Directive 98/37/EC, and state-of-the-art engineering principles.

Demag electric chain hoists are of modular design.

The main assemblies include:

- the gearbox
- the hoist motor
- the integrated electrics
- the chain drive mechanism
- the control pendant

These operating instructions are designed to provide the operator with appropriate instructions for safe and correct operation and to facilitate maintenance.

Every individual given the task of transporting, installing, commissioning, operating, maintaining and repairing our chain hoists and additional equipment must have read and understood

- the operating instructions
- the safety regulations and
- safety instructions in the individual chapters and sections.

The operating instructions must be available to the operating personnel at all times in order to prevent operating errors and to ensure smooth and trouble-free operation of our products.

0.1 Copyright

These operating instructions must be treated confidentially. They should only be used by authorized personnel. They may only be entrusted or made available to third parties with the prior written consent of Demag. All documents are protected within the sense of copyright law.

No part of this documentation may be reproduced, utilized or transmitted without specific prior consent. Infringements are an offence resulting in obligatory compensatory damages.

All industrial rights reserved.

0.2 After-sales service

Our after-sales service will provide you with all technical information on Demag products and their systematic application.

Should you have any questions regarding our products, please refer to one of our after-sales service stations, the relevant representative or to our main office.

Kindly quote the serial or order number (see test and inspection booklet, chain hoist data plate) in any correspondence or for spare part orders.

Specifying this data ensures that you receive the correct information or the required spare parts.

The relevant after-sales service station of Demag is specified for example on the back page of the test and inspection booklet.

0.3 Liability for defects

These operating instructions must be read carefully before installing and putting chain hoists into operation.

We assume no liability for damage and malfunctions resulting from failure to comply with the operating instructions.

Any liability claims for defects must be made by quoting the order number immediately on detecting the defect.

Liability claims for defects are void in the event of:

- inappropriate use,
- faulty devices or equipment connected or attached to the chain hoist which are not part of our scope of supplies and services,
- use of non-genuine spare parts and accessories,
- refurbishment or modification of the chain hoist unless approved in writing by Demag.

Wearing parts are not subject to liability for defects.

0.4 Limitations of liability

All technical information, data and instructions for operation contained in these operating instructions were up-to-date on going to print and are compiled on the basis of our experience and to the best of our knowledge.

We reserve the right to incorporate technical modifications within the scope of further development of the hoist units which are the subject of these operating instructions. The information, illustrations and descriptions contained in these operating instructions are therefore only intended for information purposes.

The descriptions and illustrations contained in this documentation do not necessarily correspond to the scope of delivery or any subsequent spare part delivery, either; the drawings and illustrations are not to scale.

Only documentation belonging to the actual order is valid.

We assume no liability for defects, damage and malfunctions caused as a result of operating errors, noncompliance with these operating instructions or omitted and/or inappropriate repairs and maintenance.

We expressly point out that only Demag spare parts and accessories approved by us may be used. Accordingly, this also applies to other manufacturers' parts supplied by us.

For safety reasons, the fitting and use of spare parts or accessories which have not been approved and unauthorized modification and conversion of the hoist unit are not permitted; we assume no liability for defects or damages resulting therefrom.

With the exclusion of any further claims, our liability for defects and other liability obligations for any defects pertaining to the products supplied or faults in the documentation delivered or any negligence on our part are exclusively based on the stipulations of the original contract. Any further claims, in particular any and all claims for damages, are excluded with the exception of legal claims in accordance with product liability legislation.

0.5 Definitions

Owner

Owners (employer, company) are defined as persons who own chain hoists and who use them appropriately or allow them to be operated by suitable and instructed persons.

Operating personnel

Operating personnel are defined as persons entrusted by the owner of the chain hoist with operation and/or transportation of the equipment.

Specialist personnel

Specialist personnel are defined as persons assigned by the owner to carry out special tasks such as installation, setting-up, maintenance and fault elimination.

Qualified electrician

Qualified electricians are defined as persons, who, owing to their technical training, knowledge and experience of electrical installations as well as knowledge of the relevant standards and regulations, are able to assess the tasks given to them and identify and eliminate potential hazards.

Trained person

Trained persons are defined as persons who have been instructed and trained for the tasks assigned to them and on the possible hazards resulting from incorrect handling and who have been informed about the required protective devices, protective measures, relevant regulations, codes of practice, accident prevention regulations and operating conditions and who have proven their qualifications.

Experienced technician

Experienced technicians are defined as persons, who, owing to their technical training and experience, have sufficient knowledge of chain hoists and are familiar with the relevant national industrial safety regulations, codes of practice, accident prevention regulations, directives and generally accepted engineering standards enabling them to judge the safe operating condition of chain hoists.

Qualified electricians are defined as persons who, owing to their technical training, knowledge and experience of electrical installations as well as knowledge of the relevant standards, codes of practice and regulations, are able to assess the tasks given to them and to identify and eliminate potential hazards.

Assigned expert engineer (in the Federal Republic of Germany according to BGV D8 § 23 (VBG 8), for determining the S.W.P.)

An assigned expert engineer is defined as an experienced technician specifically assigned by the manufacturer to determine the remaining duration of service (service life) of serial hoists and for carrying out general overhauls of chain hoists (S.W.P. = safe working period).

Authorized expert engineer (according to BGV D6 § 28 (VBG 9))

In addition to the expert engineers of the Technical Supervisory and Inspection Board, an authorized expert engineer for the inspection of chain hoists is defined as an expert engineer authorized by the Industrial Employers' Mutual Insurance Association.

Chain hoists

Chain hoists are systems used for lifting and moving loads, such as cranes, crabs and travelling hoist units, rail systems.

* VBG (BGV D8) = German Industrial Employers' Mutual Insurance Association responsible for the prevention of accidents

1 Safety instructions

1.1 Symbols

These symbols are used throughout the operating instructions in order to visually indicate hazard warnings.



Safety at work symbol

This symbol appears in the operating instructions next to all instructions relating to safety at work wherever a potential danger to life and limb exists.

Follow these instructions at all times and be particularly careful and cautious.

Pass on safety instructions to all persons entrusted with working on the chain hoist.

In addition to the safety instructions, observe all general safety regulations at all times.



Warning against electrical hazards

Contact with live parts can result in immediate death. Protective covers (e.g. covers and enclosures) marked with this sign may only be opened by qualified electricians. Before opening, all relevant operating, control, feed or other voltages must be disconnected.



Warning against suspended load

Any person remaining in this danger zone may suffer serious injury or death.

This applies in particular to non-positive locked load handling attachments e.g. magnet and vacuum systems. In each case the special safety and operating

instructions contained in the operating instructions for the load handling attachment in question must be complied with..



Operating hazard for the installation

This symbol in the operating instructions indicates all warnings which, if not complied with, may result in damage to the chain hoist or the load.

1.2 Appropriate use

Electric chain hoists are only intended for lifting and moving loads and may be used as stationary or travelling units.

Electric chain hoists may only be operated when in perfect working order by trained personnel in accordance with the relevant safety and accident prevention regulations. This also includes compliance with operating and maintenance conditions specified in the operating instructions.

Chain hoists are industrial equipment designed to be used with a rated voltage of up to 690 V for alternating current.



Power feed is via power supply lines (mobile cables, open or enclosed power conductor systems, cable drums). These systems are live up to the terminals of the isolating switch (mains connection switch, isolating switch). The relevant isolating switch must be switched off when performing maintenance/repair work.

During operation or when the main switch is not switched off, electrical components inside enclosures, motors, switchgear cabinets, terminal boxes, etc., carry dangerous voltages. This voltage may cause fatal injuries.

Serious personal injury or damage to property may occur in the event of:

- unauthorized removal of covers,
- inappropriate use of the chain hoist,
- incorrect operation,
- insufficient maintenance,
- exceeding the maximum permitted load
(The rated load capacity/S.W.L. is the maximum permitted load. Pay attention to the sum of the load to be lifted and the load handling attachment.),
- working on live parts.



Advise operators to avoid inching as far as possible. It might cause excessive wear and premature failure of the chain hoist. Inching means giving short pulses to the motor to obtain small movements, e.g. when lifting loads or moving the travelling hoist unit or the crane.

1.3 Prohibited practices



Certain work and practices are prohibited when using the chain hoist as they may involve danger to life and limb and result in lasting damage to the chain hoist, e.g.:

- Unsafe load handling (e.g. swinging the load).
- Do not handle suspended loads above persons.
- Do not pull or drag suspended loads at an angle.
- Do not pull free fixed or obstructed loads with the chain hoist.
- Do not exceed the maximum permitted load and permitted load dimensions.
- Do not leave suspended loads unsupervised.
- Do not allow the chain to run over edges.
- Do not use the chain as a load bearing sling.
- Always move the chain hoist with push travel trolley by pulling on the load, bottom block or load hook assembly – never pull on the control pendant.
- Do not allow loads to drop when the chain is in a slack condition.
- Do not subject the control pendant to inappropriate mechanical loads.
- Transporting persons, unless lifting devices are specifically approved for transporting persons, is not permitted.
- Do not tamper with or manipulate electrical equipment.
- Chain hoists must be suspended in such a way that they do not collide with stationary equipment and structures, e.g. when slewing jib cranes are slewed.

1.4 General safety information



Persons under the influence of drugs, alcohol or medicines which affect reactions must not install, operate, put into service, maintain, repair or disassemble chain hoists.

Any conversions and modifications to the installation require the written consent of Demag.

Work on electrical equipment of chain hoists may only be carried out by qualified electricians in accordance with electrical regulations. In the event of malfunctions, chain hoist operation must be stopped, the hoist switched off and the relevant main switches locked immediately. Defects must be rectified immediately.

National accident prevention regulations and codes of practice and general safety regulations must be observed when operating our products. Important information and instructions are marked by corresponding symbols. Follow these instructions and/or safety regulations in order to avoid accidents and damage. The operating instructions must be kept available at the place where the chain hoist is in use at all times. They include significant aspects and appropriate excerpts from the relevant guidelines, standards and regulations. The owner must instruct his personnel appropriately.



Any failure to comply with the safety instructions stated in these operating instructions can result in death or personal injury.

Observe general statutory and other obligatory regulations relating to accident prevention and environmental protection and basic health and safety requirements in addition to those included in these operating instructions. Such requirements may also relate, for example, to the handling of hazardous materials or the provision/wearing of personal protection equipment. Comply with these regulations and general accident prevention regulations relevant for the place at which the chain hoist is used and follow the instructions therein when working with the chain hoist. The chain hoist may still constitute a danger to life and limb if it is not installed, operated, maintained or used appropriately by personnel which have not been trained or specially instructed. The operating instructions must, if required, be supplemented by the owner with instructions and information (e.g. factory regulations) relating to organization of work, working procedures, operating personnel, etc. Supervising and reporting obligations as well as special operating conditions must also be taken into consideration.

Personnel assigned to working with the chain hoist must have read and understood the operating instructions and, in particular, the chapter on safety information.

All activities relating to chain hoists which are not described in these operating instructions may only be carried out by specialist personnel specifically trained for the particular chain hoist.

The owner must ensure that personnel work in a safety and hazard-conscious manner in compliance with the operating instructions.



The owner must ensure that the chain hoist is only operated when in proper working order and that all relevant safety requirements and regulations are complied with. Chain hoists must be taken out of service immediately if functional defects or irregularities are detected. In the event of a stoppage (e.g. if defects regarding safe and reliable operation are detected, in emergency situations, in the event of operating malfunctions, for repairs and maintenance purposes, if damage is detected or after finishing work), the operator/experienced technician must carry out all prescribed safety measures (e.g. for cranes operating outdoors, ensure wind drift safety catch is fitted) or observe that they are automatically carried out. Personal protective clothing must be worn as necessary or as required by regulations. Personnel must not wear loose clothing, jewellery including rings or long hair loose. Injury may occur, for example, by being caught or drawn into the mechanism. All safety and hazard information and recommendations on the chain hoist, at access points and mains connection switches must be maintained in complete and legible condition. Inching (i.e. giving short pulses to the motor) must always be avoided. Emergency limit stop devices (e.g. slipping clutch or emergency limit switch) must not be approached in normal operation.

Modifications, additions to and conversions of the chain hoist which may impair safety in any way must not be carried out without the consent of Demag. This also applies to the installation and adjustment of safety devices as well as for performing welds on load bearing parts. Safety devices must not be rendered inoperative. Only genuine Demag spare parts may be used.

Observe prescribed deadlines or those specified in the operating instructions for routine checks/inspections.

1.5 Selection and qualification of operating personnel



For independent operation or maintenance of the chain hoist, the owner may only employ persons

- who are at least 18 years of age,
- who are mentally and physically suitable,
- who have been instructed in the operation or maintenance of the chain hoist and have proven their qualification to the owner in this respect (in addition to theoretical training, instruction also includes sufficient practical operating experience as well as acquiring the ability to identify defects which are a hazard to safe operation),
- who can be expected to carry out the work assigned to them reliably.

The owner must assign operating and maintenance personnel to their relevant tasks.

1.6 Safety instructions for installation and disassembly



- Installation and disassembly work may only be performed by experienced technicians.
- Installation and disassembly work must be coordinated by the person carrying out the work and the owner within the scope of their responsibility.
- The working and danger zone must be made safe.
- The installation must be isolated in accordance with the relevant electrical regulations.
- Customer-specific regulations must be observed.
- Only appropriate, tested and calibrated tools and equipment may be used.
- The electrode holder and earth must be connected to the same assembly when welding work is carried out. If the current flow is returned via protective conductors, screening elements or anti-friction bearings, serious damage may be caused to these or other components.

1.7 Safety instructions when first putting the hoist into service after completing installation



- The working and danger area must be made safe.
- First check that the voltage and frequency specified on the data plates match the owner's mains power supply.
- All clearance dimensions and safety distances (see approval drawing) must be checked before putting the hoist into service.
- When putting the hoist unit into service, it may be necessary to perform work in the danger zone.
- In the course of putting the hoist unit into service, it may be necessary to temporarily render safety devices or features inoperative.
- It must be ensured that only trained personnel are employed for putting the hoist unit into service.

1.8 Safety instructions for operation



The operator must check the function of the brakes and emergency limit stop devices before starting work.

All instructions and measures described in the operating instructions with regard to safe operation and items concerning general safety and accident prevention which have to be observed before, during and after putting into service must be strictly complied with. Any failure to comply can lead to accidents resulting in fatalities. Chain hoists must be taken out of service immediately or not put into operation if any defects relating to operating safety and reliability are detected. Safety devices must not be rendered inoperative or modified in contradiction to their intended use. Only operate chain hoists when all protective devices and safety-relevant equipment, e.g. movable protective devices and emergency-stop devices, are fitted and fully functioning.

Anybody who identifies an immediate danger of personal injury must actuate the emergency-stop button without delay. This also applies in the case of damage occurring to parts of the installation and equipment which makes immediate stoppage necessary. After an "emergency-stop", the operator must not switch on and restart the chain hoist until an experienced technician is satisfied that the cause which led to actuation of this function has been rectified and that continued operation of the installation constitutes no further hazard.

Chain hoists must be switched off immediately in the event of the following faults:



- In the event of damage to electrical devices and cables as well as parts of the insulation.
- In the event of brake and safety device failure.
- The chain hoist is provided with a slipping clutch as overload protection.

In the event of overload, the following situations may occur:

1. The load is not lifted, the slipping clutch responds.
2. The load is lifted, however, after switching off the lifting motion, the load slowly moves downwards. In this case, the load must be immediately deposited by actuating the control switch.

Malfunction: The slipping clutch must be readjusted or overload has occurred.

Before switching on/putting into operation of the chain hoist it must be ensured that nobody is endangered by operation of the hoist.

If the operator notices persons who may be exposed to a risk to health or personal safety by operation of the chain hoist, he must suspend operation immediately and may not resume operation again until the persons are outside the danger zone.

Before putting the chain hoist into operation, the operator must be satisfied that the installation is in safe and correct operating condition.

Work on chain hoists may only be carried out when instructions to this effect have been issued, when operation and function of the chain hoist have been explained and when the working and danger zone has been made safe. Cooling devices, such as ventilation openings, may not be rendered permanently inoperative (e.g. covered or closed).

Special local conditions or special applications can lead to situations which were not known when this chapter was written. In such cases, special safety measures must be implemented by the owner.



1.9 Safety instructions for maintenance

Maintenance measures are defined as regular maintenance, inspection and repair work.

Mechanical and electrical repairs and maintenance work may only be carried out by appropriately trained personnel (experienced technicians).

Adjustment, maintenance and inspection activities and inspection deadlines including specifications concerning replacement of parts/assemblies prescribed in the operating instructions must be observed.

Ensure that all electrical components are de-energized before commencing work on electrical installations and devices. When all work on the chain hoist has been completed, operation of the chain hoist must not resume until the owner has given approval to this effect.

Unauthorized persons must be prohibited from carrying out work on machinery or parts of the chain hoist. Before starting all repair and maintenance work, the chain hoist must be switched off, taken out of operation and secured (switches must be locked) against accidental or unauthorized putting into operation (restarting).

It must be ensured that



- the chain hoist is switched off and checked that it is de-energized and, in special cases, isolated,
- moving parts are stationary and stopped,
- moving parts cannot start moving while maintenance work is being performed,
- the power supply cannot be accidentally restored as long as the hoist unit has been taken out of service for maintenance and repair purposes.
- Ensure that operating and auxiliary materials as well as spare parts are disposed of in a safe and environmentally sound way.

Instructions for repair work in the course of operation

The danger zone must be marked off with red/white safety chains or safety tape and indicated with warning signs.

In each individual case, the owner or the person specified by him must check whether the relevant work may be carried out in the course of operation without risk of personal injury owing to the particular local conditions.

To avoid injury, only use calibrated and appropriate tools and auxiliary materials for maintenance, inspection and repair purposes.

If there is a risk of objects falling, the danger zone must be made safe.

Maintain a sufficient safety distance to rotating parts to prevent clothing, parts of the body or hair becoming entangled.



Avoid naked flames, extreme heat and sparks in the vicinity of cleaning agents and flammable parts or parts liable to deformation (e.g. wood, plastic parts, oil, grease) as well as in electrical installations – noncompliance may result in fire hazard. Harmful gases may evolve or insulation may be damaged.

Additional instructions for repair work on electrical equipment

Only use genuine fuse links with specified amperage and tripping characteristics. Defective fuse links must not be repaired or bridged and must only be replaced by fuse links of the same type. Switch off the chain hoist immediately in the event of electrical power supply malfunctions. Work on the electronic and electrical components or equipment may only be carried out by qualified electricians. If inspection, maintenance and repair work is to be carried out on parts of chain hoists, these must – if prescribed by regulations – be isolated. First verify the safe isolation of the parts from the supply before commencing work. The electrical equipment of the chain hoist must be inspected and checked at regular intervals. Defects, such as loose connections, damaged cables and worn contactors must be rectified immediately.



Since it is possible that after a longer period of operation the switching points of relays (time, frequency, monitoring relays) change due to ageing of the components, the relay switching points in circuits relevant to safety must be checked at regular intervals.

Electrical equipment must be replaced as a preventive measure on reaching the limit of its theoretical duration of service (service life).

If work has to be carried out on live parts, a second person must be available in order to actuate the emergency-stop button or mains connection switch/isolating switch for voltage disconnection in an emergency.

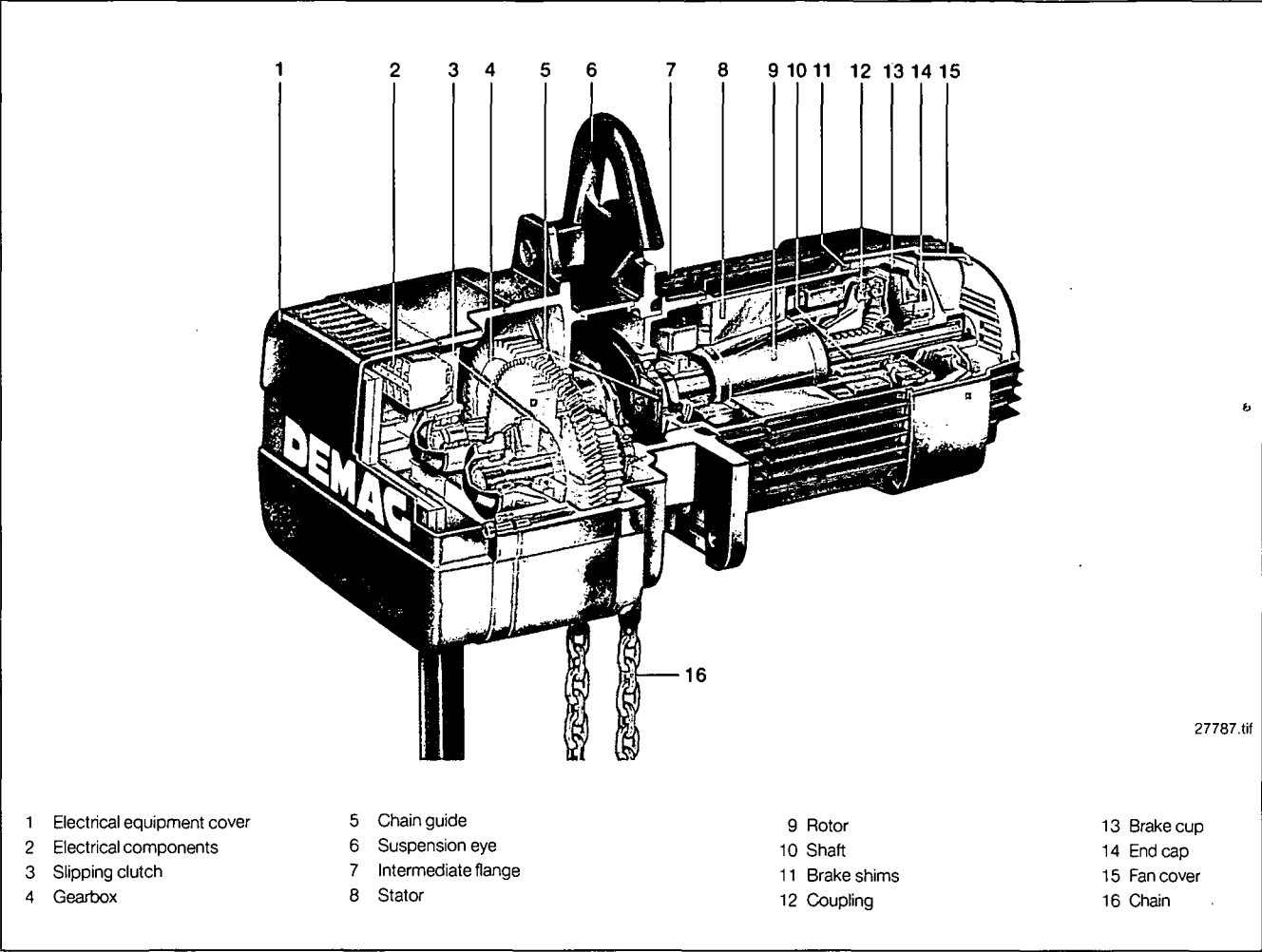
The second person must be familiar with resuscitation measures.

Only use insulated tools.

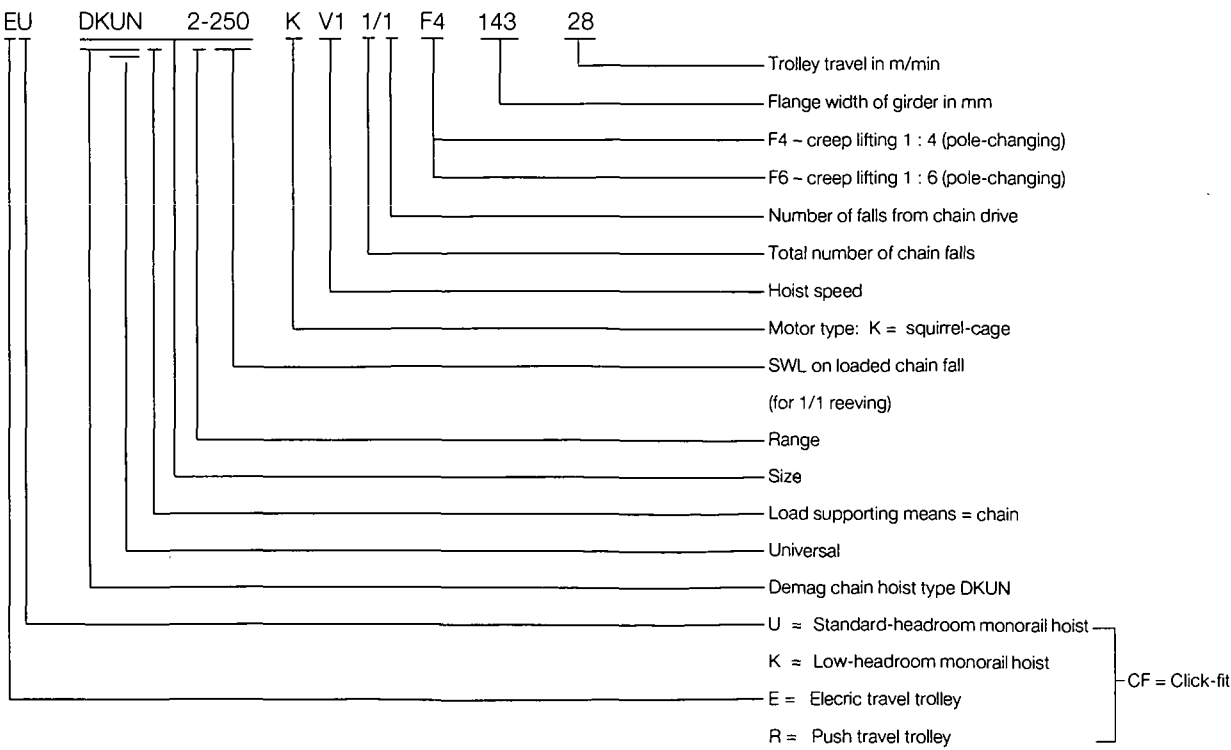
Before disconnecting and connecting electrical plug-and-socket connections, always disconnect them from the supply (this does not apply to mains connections, provided they do not represent a dangerous contact voltage in the sense of the safety regulations).

2 Technical data

2.1 Designation



2.2 Explanation of chain hoist designation



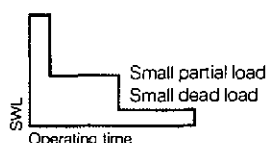
2.3 Selection criteria

The load spectrum

(in most cases estimated) can be evaluated in accordance with the following definitions:

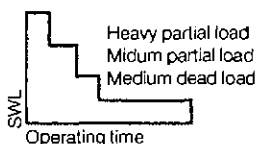
1 light

Hoist units which are usually subject to very small loads and in exceptional cases only to maximum loads.



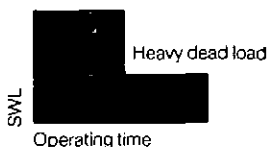
2 medium

Hoist units which are usually subject to small loads but rather often to maximum loads.



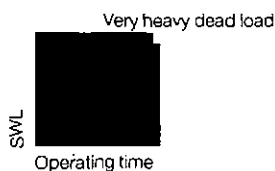
3 heavy

Hoist units which are usually subject to medium loads but frequently to maximum loads.



4 very heavy

Hoist units which are usually subject to maximum or almost maximum loads.



The size of the hoist is determined by the load spectrum, average operating time per working day, SWL and reeving.

1. What are the operating conditions?
2. What is the specified SWL?
3. To what height must be load be lifted?
4. What is the required lifting speed?
5. Do the loads need to be lifted and lowered with high precision?
6. Is horizontal load travel required?
7. How is control to be effected?

The group is determined from the operating time and load spectrum.

Load spectrum		Average operating time per day in working hours					
1	light	up to 1	up to 2	2-4	4-8	8-16	
2	medium	up to 0,5	up to 1	1-2	2-4	4-8	
3	heavy	up to 0,25	up to 0,5	0,5-1	1-2	2-4	
4	very heavy	up to 0,12	up to 0,25	0,25-0,5	0,5-1	1-2	
Group of mechanisms to FEM		1 Cm	1 Bm	1 Am	2m	3m	
Reeving		Range		Size			
1/1		2/1					
SWL kg							
160	315	-	-	-	-	-	160
200	400	-	-	-	-	-	200
250	500	-	-	-	-	250	250
315	630	-	-	-	315	-	315
400	800	DKUN 2	400	-	-	400	-
500	1000	-	-	-	500	-	500
630	1250	DKUN 5	630	-	-	-	630
800	1600	-	-	-	-	800	800
1000	2000	-	-	-	1000	1000	-
1250	2500	DKUN 10	1250	-	1250	-	1250
1600	3200	DKUN 16	1600	-	-	1600	-
2000	4000	-	-	-	2000	-	-
2500	5000	DKUN 20	-	2500	-	-	-

Example (see \Rightarrow —)

SWL	315 kg
Load spectrum	"medium" from table
Lifting speed	8 m/min
Reeving	1/1
Average hook path	2 m
Number of cycles/hour	20
Working time/day	8 hours

The average operating time per working day is estimated or calculated as follows:

$$\text{Op. time/day} = \frac{2 \times \text{average hook path} \times \text{no. of cycles/h} \times \text{working time/day}}{60 \times \text{lifting speed}} = \frac{2 \times 2 \times 20 \times 8}{60 \times 8} = 1,34 \text{ hours}$$

For the medium load spectrum and an average daily operating time of 1,34 hours the table shows FEM group 1 A m. For an SWL of 315 kg and 1/1 reeving, the table indicates a hoist size DKUN 2-315.

2.4 Selection table

SWL kg	Size	FEM	Hook path m	Hoist speed m/min			Motor size	P kW	n rpm	CDF %	Hook dimension C mm ¹⁾ ²⁾	max. weight kg ³⁾
				V1	V2	V3						
160	DKUN 2-160 KV3 1/1	3 m	3; 4; 6; 8	-	-	25	KMK 71 B 2	0,75	2680	60	355	25
	DKUN 2-160 KV3 1/1 F6			-	-	25/4	KMK 80 B 2/12	0,75/0,1	2720/380	40/20	355	31
200	DKUN 2-200 KV1 1/1	3 m	3; 4; 6; 8	8	-	-	KMP 71 B 2	0,4	2840	60	355	25
	DKUN 2-200 KV1 1/1 F4			8/2	-	-	KMK 80 Z 2/8	0,4/0,1	2770/675	40/20	355	29
	DKUN 2-200 KV2 1/1			-	14	-	KMK 71 B 2	0,75	2680	60	355	25
	DKUN 2-200 KV2 1/1 F4			-	14/3,5	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	355	31
250	DKUN 2-250 KV1 1/1	2 m	3; 4; 6; 8	8	-	-	KMP 71 B 2	0,4	2840	60	355	25
	DKUN 2-250 KV1 1/1 F4			8/2	-	-	KMK 80 Z 2/8	0,4/0,1	2770/675	40/20	355	29
	DKUN 2-250 KV2 1/1			-	14	-	KMK 71 B 2	0,75	2680	60	355	25
	DKUN 2-250 KV2 1/1 F4			-	14/3,5	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	355	31
	DKUN 5-250 KV3 1/1	3 m	3; 4; 6; 8	-	-	25	KMK 80 B 2	1,4	2720	60	395	38
	DKUN 5-250 KV3 1/1 F6			-	-	25/4	KMK 90 B 2/12	1,2/0,16	2840/430	40/20	395	45
315	DKUN 2-315 KV1 1/1	1 Am	3; 4; 6; 8	8	-	-	KMK 71 B 2	0,75	2680	60	355	25
	DKUN 2-315 KV1 1/1 F4			8/2	-	-	KMK 80 B2/8	0,75/0,17	2800/685	40/20	355	31
	DKUN 2-315 KV2 1/1			-	12,5	-	KMK 71 B 2	0,75	2680	60	355	25
	DKUN 2-315 KV2 1/1 F4			-	12,5/3,1	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	355	31
	DKUN 5-315 KV1 1/1	3 m	3; 4; 6; 8	8	-	-	KMK 71 B 2	0,75	2680	60	395	34
	DKUN 5-315 KV1 1/1 F4			8/2	-	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	395	38
	DKUN 5-315 KV2 1/1			-	15	-	KMK 80 B 2	1,4	2720	60	395	38
	DKUN 5-315 KV2 1/1 F4			-	12,5/3,1	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	395	38
	DKUN 2-160 KV3 2/1	3 m	3; 4	-	-	12,5	KMK 71 B 2	0,75	2680	60	415	26
	DKUN 2-160 KV3 2/1 F6			-	-	12,5/2	KMK 80 B 2/12	0,75/0,1	2720/380	40/20	415	32
400	DKUN 2-400 KV1 1/1	1 Cm	3; 4; 6; 8	8	-	-	KMK 71 B 2	0,75	2680	60	355	25
	DKUN 2-400 KV1 1/1 F4			8/2	-	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	355	31
	DKUN 5-400 KV1 1/1	2 m	3; 4; 6; 8	8	-	-	KMK 71 B 2	0,75	2680	60	395	34
	DKUN 5-400 KV1 1/1 F4			8/2	-	-	KMK 90 Z 2/8	0,85/0,2	2770/665	40/20	395	43
	DKUN 5-400 KV2 1/1			-	15	-	KMK 80 B 2	1,4	2720	60	395	38
	DKUN 5-400 KV2 1/1 F4			-	12,5/3,1	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	395	45
	DKUN 2-200 KV1 2/1	3 m	3; 4	4	-	-	KMP 71 B 2	0,4	2840	60	415	26
	DKUN 2-200 KV1 2/1 F4			4/1	-	-	KMK 80 Z 2/8	0,4/0,1	2770/675	40/20	415	30
	DKUN 2-200 KV2 2/1			-	7	-	KMK 71 B 2	0,75	2680	60	415	26
	DKUN 2-200 KV2 2/1 F4			-	7/1,7	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	415	32
500	DKUN 5-500 KV1 1/1	1 Am	3; 4; 6; 8	8	-	-	KMK 71 B 2	0,75	2680	60	395	34
	DKUN 5-500 KV1 1/1 F4			8/2	-	-	KMK 90 Z 2/8	0,85/0,2	2770/665	40/20	395	43
	DKUN 5-500 KV2 1/1			-	15	-	KMK 80 B 2	1,4	2720	60	395	38
	DKUN 5-500 KV2 1/1 F4			-	12,5/3,1	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	395	45
	DKUN 10-500 KV3 1/1	3 m	3; 4; 6; 8	-	-	20	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-500 KV3 1/1 F6			-	-	20/3,3	KMK 100 B 2/12	2/0,31	2800/400	40/20	480	73
	DKUN 2-250 KV1 2/1	2 m	3; 4	4	-	-	KMP 71 B 2	0,4	2840	60	415	26
	DKUN 2-250 KV1 2/1 F4			4/1	-	-	KMK 80 Z 2/8	0,4/0,1	2770/675	40/20	415	30
	DKUN 2-250 KV2 2/1			-	7	-	KMK 71 B 2	0,75	2680	60	415	26
	DKUN 2-250 KV2 2/1 F4			-	7/1,7	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	415	32
630	DKUN 5-250 KV3 2/1	3 m	3; 4	-	-	12,5	KMK 80 B 2	1,4	2720	60	465	40
	DKUN 5-250 KV3 2/1 F6			-	-	12,5/2	KMK 90 B 2/12	1,2/0,16	2840/430	40/20	465	47
	DKUN 5-630 KV1 1/1	1 Cm	3; 4; 6; 8	8	-	-	KMK 80 B 2	1,4	2720	60	395	38
	DKUN 5-630 KV1 1/1 F4			8/2	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	395	45
	DKUN 10-630 KV1 1/1	3 m	3; 4; 6; 8	9	-	-	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-630 KV1 1/1 F4			9/2,2	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	480	64

1) Hook dimension "C" with long suspension eye

2) For limit switch cut-off for the highest hook position, hook dimension C is increased by 80 mm

3) For 3 m hook path

SWL kg	Size	FEM	Hook path m	Hoist speed m/min			Motor size	P kW	n rpm	CDF %	Hook dimension C mm 1) 2)	max. weight kg 3)
				V1	V2	V3						
630	DKUN 10-630 KV2 1/1	3 m	3; 4; 6; 8	-	12,5	-	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-630 KV2 1/1 F4			-	12,5/3,1	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	480	64
	DKUN 2-315 KV1 2/1	1 Am	3; 4	4	-	-	KMK 71 B 2	0,75	2680	60	415	26
	DKUN 2-315 KV1 2/1 F4			4/1	-	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	415	32
	DKUN 2-315 KV2 2/1	3 m	3; 4	-	6,3	-	KMK 71 B 2	0,75	2680	60	415	26
	DKUN 2-315 KV2 2/1 F4			-	6,3/1,5	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	415	32
	DKUN 5-315 KV1 2/1			4	-	-	KMK 71 B 2	0,75	2680	60	465	36
	DKUN 5-315 KV1 2/1 F4			4/1	-	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	465	40
	DKUN 5-315 KV2 2/1			-	7,5	-	KMK 80 B 2	1,4	2720	60	465	40
	DKUN 5-315 KV2 2/1 F4			-	6,3/1,5	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	465	40
800	DKUN 10-800 KV1 1/1	2 m	3; 4; 6; 8	9	-	-	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-800 KV1 1/1 F4			9/2,2	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	480	64
	DKUN 10-800 KV2 1/1			-	12,5	-	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-800 KV2 1/1 F4			-	12,5/3,1	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	480	73
	DKUN 16-800 KV1 1/1	3 m	3; 4; 6; 8	8	-	-	KMK 90 B 2	2,1	2730	60	540	68
	DKUN 16-800 KV1 1/1 F4			8/2	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	540	68
	DKUN 16-800 KV2 1/1			-	12,5	-	KMK 90 B 2	2,1	2730	60	540	68
	DKUN 16-800 KV2 1/1 F4			-	12,5/3,1	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	540	77
	DKUN 2-400 KV1 2/1	1 Cm	3; 4	4	-	-	KMK 71 B 2	0,75	2680	60	415	26
	DKUN 2-400 KV1 2/1 F4			4/1	-	-	KMK 80 B 2/8	0,75/0,17	2800/685	40/20	415	32
	DKUN 5-400 KV1 2/1	2 m	3; 4	4	-	-	KMK 71 B 2	0,75	2680	60	465	36
	DKUN 5-400 KV1 2/1 F4			4/1	-	-	KMK 90 Z 2/8	0,85/0,2	2770/665	40/20	465	45
	DKUN 5-400 KV2 2/1			-	7,5	-	KMK 80 B 2	1,4	2720	60	465	40
	DKUN 5-400 KV2 2/1 F4			-	6,3/1,5	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	465	47
1000	DKUN 10-1000 KV1 1/1	1 Am	3; 4; 6; 8	9	-	-	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-1000 KV1 1/1 F4			9/2,2	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	480	64
	DKUN 10-1000 KV2 1/1			-	12,5	-	KMK 100 B 2	3	2780	60	480	73
	DKUN 10-1000 KV2 1/1 F4			-	12,5/3,1	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	480	73
	DKUN 16-1000 KV1 1/1	2 m	3; 4; 6; 8	8	-	-	KMK 90 B 2	2,1	2730	60	540	68
	DKUN 16-1000 KV1 1/1 F4			8/2	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	540	68
	DKUN 16-1000 KV2 1/1			-	12,5	-	KMK 100 B 2	3	2780	60	540	77
	DKUN 16-1000 KV2 1/1 F4			-	12,5/3,1	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	540	77
	DKUN 5-500 KV1 2/1	1 Am	3; 4	4	-	-	KMK 71 B 2	0,75	2680	60	465	36
	DKUN 5-500 KV1 2/1 F4			4/1	-	-	KMK 90 Z 2/8	0,85/0,2	2770/665	40/20	465	45
	DKUN 5-500 KV2 2/1			-	7,5	-	KMK 80 B 2	1,4	2720	60	465	40
	DKUN 5-500 KV2 2/1 F4			-	6,3/1,5	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	465	47
	DKUN 10-500 KV3 2/1	3 m	3; 4	-	-	10	KMK 90 B 2	2,1	2730	60	580	70
	DKUN 10-500 KV3 2/1 F6			-	-	10/1,6	KMK 100 B 2/12	2,0/0,31	2800/400	40/20	580	79
1250	DKUN 10-1250 KV1 1/1	1 Cm	3; 4; 6; 8	9	-	-	KMK 90 B 2	2,1	2730	60	480	64
	DKUN 10-1250 KV1 1/1 F4			9/2,2	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	480	73
	DKUN 16-1250 KV1 1/1	1 Am	3; 4; 6; 8	8	-	-	KMK 90 B 2	2,1	2730	60	540	73
	DKUN 16-1250 KV1 1/1 F4			8/2	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	540	82
	DKUN 20-1250 KV1 1/1 F4	3 m	3; 4; 6; 8	8/2	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	630	100
	DKUN 20-1250 KV2 1/1 F4			-	12,5/3,1	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	630	115
	DKUN 20-1250 KV3 1/1 F4			-	-	16/4	KMK 112 B 2/8	4/0,97	2770/670	40/20	630	115
	DKUN 5-630 KV1 2/1	1 Cm	3; 4	4	-	-	KMK 80 B 2	1,4	2720	60	465	40
	DKUN 5-630 KV1 2/1 F4			4/1	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	465	47

1) Hook dimension "C" with long suspension eye

2) For limit switch cut-off for the highest hook position, hook dimension C is increased by 80 mm

3) For 3 m hook path

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SWL kg	Size	FEM	Hook path m	Hoist speed m/min			Motor size	P kW	n rpm	CDF %	Hook dimension C mm 1) 2)	max. weight kg 3)
				V1	V2	V3						
1600	DKUN 16-1600 KV1 1/1	1 Bm	3; 4; 6; 8	8	-	-	KMK 100 B 2	3,0	2780	60	540	82
	DKUN 16-1600 KV1 1/1 F4			8/2	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	540	82
	DKUN 20-1600 KV1 1/1 F4	2 m	3; 4; 6; 8	8/2	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	630	100
	DKUN 20-1600 KV2 1/1 F4			-	12,5/3,1	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	630	115
	DKUN 10-800 KV1 2/1	2 m	3; 4	4,5	-	-	KMK 90 B 2	2,1	2730	60	580	70
	DKUN 10-800 KV1 2/1 F4			4,5/1,1	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	580	70
	DKUN 10-800 KV2 2/1			-	6,3	-	KMK 90 B 2	2,1	2730	60	580	70
	DKUN 10-800 KV2 2/1 F4			-	6,3/1,5	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	580	79
	DKUN 16-800 KV1 2/1	3 m	3; 4	4	-	-	KMK 90 B 2	2,1	2730	60	640	76
	DKUN 16-800 KV1 2/1 F4			4/1	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	640	76
	DKUN 16-800 KV2 2/1			-	6,3	-	KMK 90 B 2	2,1	2730	60	640	76
	DKUN 16-800 KV2 2/1 F4			-	6,3/1,5	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	640	82
2000	DKUN 20-2000 KV1 1/1 F4	1 Am	3; 4; 6; 8	8/2	-	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	630	115
	DKUN 10-1000 KV1 2/1	1 Am	3; 4	4,5	-	-	KMK 90 B 2	2,1	2730	60	580	70
	DKUN 10-1000 KV1 2/1 F4			4,5/1,1	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	580	70
	DKUN 10-1000 KV2 2/1			-	6,3	-	KMK 100 B 2	3,0	2780	60	580	79
	DKUN 10-1000 KV2 2/1 F4			-	6,3/1,5	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	580	79
	DKUN 16-1000 KV1 2/1	2 m	3; 4	4	-	-	KMK 90 B 2	2,1	2730	60	640	76
	DKUN 16-1000 KV1 2/1 F4			4/1	-	-	KMK 90 B 2/8	1,7/0,42	2800/640	40/20	640	76
	DKUN 16-1000 KV2 2/1			-	6,3	-	KMK 100 B 2	3,0	2780	60	640	85
	DKUN 16-1000 KV2 2/1 F4			-	6,3/1,5	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	640	85
2500	DKUN 20-2500 KV1 1/1 F4	1 Bm	3, 4, 6, 8	8/2	-	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	630	115
	DKUN 10-1250 KV1 2/1	1 Cm	3; 4	4,5	-	-	KMK 90 B 2	2,1	2730	60	580	70
	DKUN 10-1250 KV1 2/1 F4			4,5/1,1	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	580	79
	DKUN 16-1250 KV1 2/1	1 Am	3; 4	4	-	-	KMK 90 B 2	2,1	2730	60	640	76
	DKUN 16-1250 KV1 2/1 F4			4/1	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	640	85
	DKUN 20-1250 KV1 2/1 F4	3 m	3; 4	4/1	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	755	106
	DKUN 20-1250 KV2 2/1 F4			-	6,3/1,5	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	755	121
	DKUN 20-1250 KV3 2/1 F4			-	-	8/2	KMK 112 B 2/8	4/0,97	2770/670	40/20	755	121
3200	DKUN 16-1600 KV1 2/1	1 Bm	3; 4	4	-	-	KMK 100 B 2	3,0	2780	60	640	85
	DKUN 16-1600 KV1 2/1 F4			4/1	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	640	85
	DKUN 20-1600 KV1 2/1 F4	2 m	3; 4	4/1	-	-	KMK 100 B 2/8	2,5/0,62	2720/620	40/20	755	106
	DKUN 20-1600 KV2 2/1 F4			-	6,3/1,5	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	755	121
4000	DKUN 20-2000 KV1 2/1 F4	1 Am	3; 4	4/1	-	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	755	121
5000	DKUN 20-2500 KV1 2/1 F4	1 Bm	3; 4	4/1	-	-	KMK 112 B 2/8	4/0,97	2770/670	40/20	755	121

1) Hook dimension "C" with long suspension eye

2) For limit switch cut-off for the highest hook position, hook dimension C is increased by 80 mm

3) For 3 m hook path

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2.5 Hoist motor data

Main/creep lifting F4

Required supply cable conductor cross sections and fuse links

Size KMK	Group of mechanisms to FEM	P kW	CDF %	n rpm	Starts/h	Rated current I _N and starting current I _A for 50 Hz						cos	
						230 V		400V		500 V		φ _N	φ _A
						I _N (A)	I _A (A)	I _N (A)	I _A (A)	I _N (A)	I _A (A)		
80 Z 2/8	1 Cm 1 Bm 1 Am 2 m 3 m	0,4/ 0,1	40/ 20	2770/ 675	120/ 240	2,6 2,6	9,1 3,8	1,5 1,5	5,3 2,2	1,1 1,1	3,8 1,6	0,80 0,62	0,84 0,84
80 B 2/8		0,75/ 0,17	40/ 20	2800/ 685	120/ 240	3,8 3,8	15,5 5,5	2,2 2,2	9,0 3,2	1,6 1,6	6,5 2,3	0,80 0,57	0,90 0,86
90 Z 2/8		0,85/ 0,2	40/ 20	2770/ 665	120/ 240	4,6 2,7	20 5,1	2,6 1,6	11,6 3,0	1,9 1,1	8,4 2,1	0,81 0,59	0,79 0,77
90 B 2/8		1,7/ 0,42	40/ 20	2800/ 640	120/ 240	7,7 4,4	35 8,6	4,4 2,5	20 5,0	3,2 1,8	14,4 3,6	0,90 0,60	0,82 0,75
100 B 2/8		2,5/ 0,62	40/ 20	2720/ 620	120/ 240	11,9 5,8	49 11,9	6,9 3,4	29 6,9	4,9 2,4	21 4,9	0,86 0,65	0,79 0,72
112 B 2/8		4/ 0,97	40/ 20	2770/ 670	120/ 240	19,2 11,9	91 24	11,1 6,9	53 13,7	8 4,9	38 9,9	0,82 0,50	0,68 0,68

Size KMK	Group of mechanisms to FEM	Mains connection delay fuse for 50 Hz 1)			Supply lines for 5% voltage drop Δ U and starting current I _A for 50 Hz 2)					
		230 V	400 V	500 V	230 V (Δ U 11,5 V)		400 V (Δ U 20 V)		500 V (Δ U 25 V)	
		A	A	A	mm ²	m	mm ²	m	mm ²	m
80 Z 2/8	1 Cm 1 Bm 1 Am 2 m 3 m	6	6	6	1,5	73	1,5	100	1,5	100
80 B 2/8		6	6	6	1,5	42	1,5	100	1,5	100
90 Z 2/8		10	6	6	1,5	35	1,5	100	1,5	100
90 B 2/8		16	10	6	2,5	28	1,5	59	1,5	100
100 B 2/8		16	16	10	2,5	23	1,5	42	1,5	77
112 B 2/8		35	20	16	2,5	16	1,5	30	1,5	47

Main/creep lifting F6

Size KMK	Group of mechanisms to FEM	P kW	CDF %	n rpm	Starts/h	Rated current I _N and starting current I _A bei 50 Hz						cos	
						230 V		400V		500 V		φ _N	φ _A
						I _N (A)	I _A (A)	I _N (A)	I _A (A)	I _N (A)	I _A (A)		
80 B 2/12	3 m	0,75/ 0,1	40/ 20	2720/ 380	120/ 240	3,7 3,7	15,0 4,8	2,1 2,1	9,0 2,7	1,5 1,5	6,5 2,0	0,84 0,73	0,87 0,77
90 B 2/12		1,2/ 0,16	40/ 20	2840/ 430	120/ 240	6,4 5,7	35 6,9	3,7 3,3	20 4,0	2,7 2,4	14,4 2,9	0,75 0,59	0,85 0,79
100 B 2/12		2,0/ 0,31	40/ 20	2800/ 400	120/ 240	9,9 6,0	49 10	5,7 3,5	29 5,8	4,1 2,5	20 4,2	0,81 0,53	0,79 0,64

Size KMK	Group of mechanisms to FEM	Mains connection delay fuse for 50 Hz 1)			Supply lines for 5% voltage drop Δ U and starting current I _A for 50 Hz 2)					
		230 V	400 V	500 V	230 V (Δ U 11,5 V)		400 V (Δ U 20 V)		500 V (Δ U 25 V)	
		A	A	A	mm ²	m	mm ²	m	mm ²	m
80 B 2/12	3 m	6	6	6	1,5	41	1,5	100	1,5	100
90 B 2/12		16	10	6	2,5	31	1,5	57	1,5	99
100 B 2/12		16	16	10	2,5	24	1,5	42	1,5	77

1) Fuse links also apply in conjunction with a cross travel motor.

2) The lengths of the supply lines are calculated on the basis of an earth-loop impedance of 200 mΩ.

Main hoist

Size	Group of mechanisms to FEM	P kW	CDF %	n rpm	Starts/h	Rated current I N and starting current I A for 50 Hz						cos φ N	cos φ A
						230 V		400v		500 V			
						I N (A)	I A (A)	I N (A)	I A (A)	IN (A)	I A (A)		
KMP 71 B 2	1 Cm 1 Bm 1 Am 2 m 3 m	0,40	60	2840	360	3,7	16,4	2,1	9,5	1,5	6,8	0,52	0,74
KMK 71 B 2		0,75	60	2680	360	4,2	16,4	2,4	9,5	1,8	6,8	0,75	0,74
KMK 80 B 2		1,4	60	2720	360	7,3	33	4,2	19	3,0	13,7	0,80	0,82
KMK 90 B 2		2,1	60	2730	360	9,9	46	5,7	26	4,1	19	0,81	0,83
KMK 100 B 2		3,0	60	2780	360	14,6	77	8,4	44	6,1	32	0,78	0,78

Size	Group of mechanisms to FEM	Mains connection delay fuse for 50 Hz 1)			Supply lines for 5% voltage drop Δ U and starting current I _A for 50 Hz 2)					
		230 V	400 V	500 V	230 V (Δ U 11,5 V)		400 V (Δ U 20 V)		500 V (Δ U 25 V)	
		A	A	A	mm ²	m	mm ²	m	mm ²	m
KMP 71 B 2	1 Cm 1 Bm 1 Am 2 m 3 m	6	6	6	1,5	46	1,5	100	1,5	100
KMK 71 B 2		6	6	6	1,5	46	1,5	100	1,5	100
KMK 80 B 2		16	10	6	2,5	34	1,5	62	1,5	100
KMK 90 B 2		16	10	10	2,5	24	1,5	45	1,5	77
KMK 100 B 2		20	16	10	2,5	15	1,5	28	1,5	48

2.6 Travel motor data

EU standard-headroom monorail hoist

EK low-headroom monorail hoist

Size	P	CDF %	n	Rated current I _N and starting current I _A at 50 Hz						cos φ _N	cos φ _A
				230 V		400V		500 V			
				I _N (A)	I _A (A)	I _N (A)	I _A (A)	I _N (A)	I _A (A)		
13/3 PKF 2	0,2	40	2890	1,1	5,7	0,63	3,3	0,46	2,4	0,73	0,74
13/3 PKF 4	0,14	40	1390	0,77	2,6	0,44	1,5	0,32	1,1	0,76	0,74
13/3 PKF 8	0,05	40	710	0,95	2,2	0,55	1,3	0,4	0,91	0,48	0,7
13/6 PF 2	0,3	40	2840	1,5	8,8	0,85	5	0,68	4	0,78	0,8
13/6 PF 4	0,2	40	1320	1,1	3	0,62	1,7	0,49	1,4	0,86	0,88
13/6 PF 8	0,1	40	710	1,6	3,7	0,95	2,1	0,68	1,5	0,50	0,72
13/6 PKF 8/2	0,07/	40	680/	1,3/	2,6/	0,74/	1,5/	0,53/	1,1/	0,57/	0,86
13/6 PF 8/2	0,27		2900	1,8	8,6	1,1	5,0	0,76	3,6	0,71	0,86
13/6 PKF 12/4	0,05/	20/	450/	2,2/	2,8/	1,3/	1,6/	0,91/	1,2/	0,66/	0,82/
13/6 PF 12/4	0,17	40	1440	1,8	6,2	1,1	3,6	0,76	2,8	0,55	0,86
KMF 80 A 2	0,65	40	2570	3,0	9,6	1,7	5,5	1,4	4,4	0,93	0,84
KMF 80 A 4	0,32	40	1350	1,7	5,5	0,95	3,1	0,76	2,5	0,74	0,82
KMF 80 A 8/2	0,13/	40	630/	2,0/	3,3/	1,1/	1,9/	0,91/	1,5/	0,71/	0,84/
	0,5		2710	2,5	9,9	1,4	5,7	1,1	4,6	0,88	0,84

1) Fuse links also apply in conjunction with a cross travel motor.

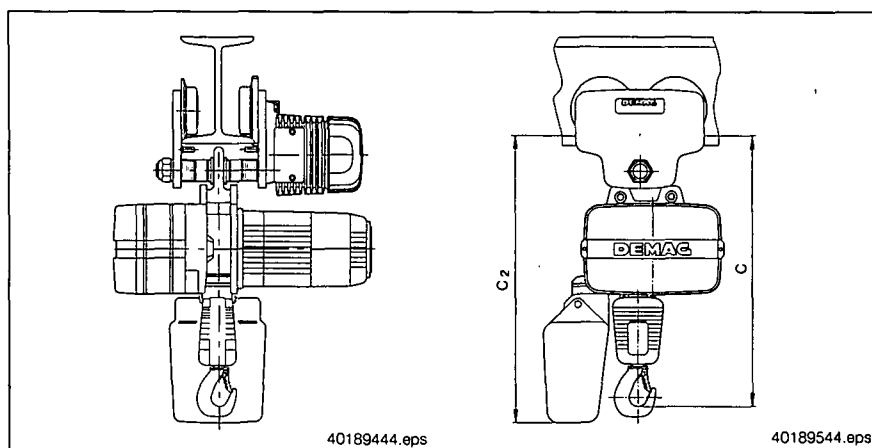
2) The lengths of the supply lines are calculated on the basis of an earth-loop impedance of 200 mΩ.

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2.7 Hook dimensions C

Standard-headroom monorail hoist

- 1) Pay attention to flange thickness
- 2) Trolley crossbar with adjusting rings



2.7.1 RUDK/HUDK/EUDK trolley

Hook dimension C from girder running surface

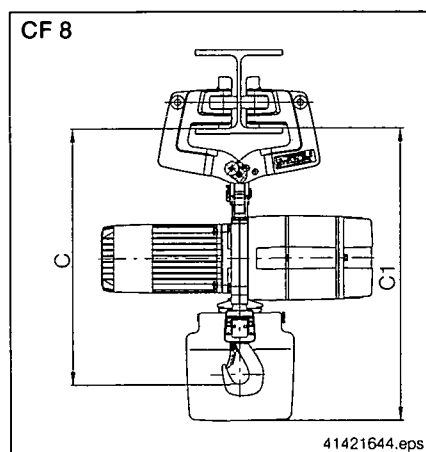
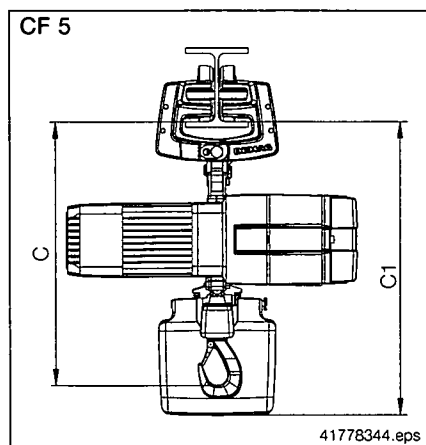
For trolley assembly instructions see sections 5.18.

Trolley size	max. SWL	Flange width	Size	Hook dim. C		C2					
				Reeving		Chain collector box size					
				1/1	2/1	1	2	3	4	5	6
RU 3 DK	450	50-90	DKUN 2 -160-200	410	470	445	505	555			
			DKUN 2 -250-315-400	410							
			DKUN5 -250-315	450		470	530	575			
RU 6 DK	700	58-300	DKUN 2 -250-315		460	460	520	565			
			DKUN 5 -250-315		510	485	545	590			
			DKUN 5 -400-500-630	440							
		58-300 1)	DKUN 10 -500	535					-	-	-
		RU 11 DK	850	58-300	DKUN 2 -400		460	460	520	565	
1350	58-143		DKUN 5 -400-500-630	510	485		545	590			
	144-300			505	480		540	585			
	58-143 1)			535	635				680	800	
	144-300 1)		530	675	795						
	58-143 1)		535	680	800						
	144-300 1)		530	675	795						
RU 22 DK	2600	82-300	DKUN 10 -500-630-800-1000-1250	545	645				690	810	
			DKUN 16 -800-1000-1250	595	695						
			DKUN 16 -1600	595							
			DKUN 20 -1250-1600-2000	685					785	905	985
RU 36-N 2)	3600	90-300	DKUN 16 -800-1000-1250-1600	610	710				705	825	-
			DKUN 20 -2500	700	-				800	920	1000
			DKUN 20 -1250-1600	-	825						
RU 55 DK	5500	106-186	DKUN 20 -1250-1600-2000-2500	705	830				805	925	1005
		187-300		700	825				800	920	1000
EU 11/HU 11 DK	850	58-300	DKUN 2 -160-200-250-315-400	400	460	460	520	565			
	1350	58-143	DKUN 5 -250-315-400-500-630	440	510	485	545	590			
		144-300		435	505	480	540	585			
		58-143 1)		535	635				680	800	
		144-300 1)	530	630	675				795		
		58-143 1)	535		680				800		
		144-300 1)	530		675				795		
EU 22/HU 22 DK	2600	82-300	DKUN 10 -500-630-800-1000-1250	545	645				690	810	
			DKUN 16 -800-1000-1250	595	695						
			DKUN 16 -1600	595							
			DKUN 20 -1250-1600-2000	685					785	905	985
EU 36-N 2)	3600	90-300	DKUN 16 -800-1000-1250-1600	610	710				705	825	-
			DKUN 20 -2500	700	-				800	920	1000
			DKUN 20 -1250-1600	-	825						
EU 55 DK	5500	106-186	DKUN 20 -1250-1600-2000-2500	705	830				805	925	1005
		187-300		700	825				800	920	1000

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2.7.2 Hook dimension C

Click-fit trolleys



CF 5 standard headroom monorail hoist (max. SWL 550 kg)

Hook dimension C from girder running surface

Mounting arrangement			Flange width 50 - 91 mm						
			At right angles to the track girder				Parallel to the track girder		
Range	Reeving	C	Chain collector box size			C	Chain collector box size		
			1	2	3		1	2	3
			C1				C1		
DKUN 2	1/1	370	435	495	540	390	455	515	560
	2/1	430				450			

For trolley assembly instructions see section 5.19.

CF 8 standard headroom monorail hoist (max. SWL 850 kg)

Hook dimension C from girder running surface

Track girders with parallel flanges									
Mounting arrangement		Flange width 55 - 143 mm							
		At right angles to the track girder					Parallel to the track girder		
		C	Chain collector box size			C	Chain collector box size		
1	2		3	1	2		3		
C1			C1						
DKUN 2	1/1	400	460	520	565	420	480	540	585
	2/1	460				480			
DKUN 5	1/1	445	490	550	595	465	510	570	615
	2/1	515				535			

Track girders with sloping flanges									
Mounting arrangement		Flange width 58 - 143 mm							
		At right angles to the track girder					Parallel to the track girder		
		C	Chain collector box size			C	Chain collector box size		
1	2		3	1	2		3		
C1			C1						
DKUN 2	1/1	390	450	510	555	410	470	530	575
	2/1	450				470			
DKUN 5	1/1	435	480	540	585	455	500	560	605
	2/1	505				525			

For trolley assembly instructions see section 5.20.

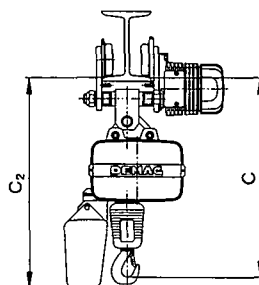
2.7.3 Curve radii for RU/HU/EUDK and CF 5/CF 8 trolleys

The specified curve radii apply for normal applications. Contact the manufacturer or his representative for frequent curve travel operation (e.g. automatic installations).

Curve radii in mm

Trolley size	Track girder			
	round-edged		square-edged	
	Flange width	Rmin	Flange width	Rmin
CF 5	50-91	800	50-91	800
CF 8	58-143	800	55-143	800
RU 3 DK	50 58-90	1200 900	50-90	900
RU 6 DK	58-300	1000	58-300	1200
RU 11 DK HU 11 DK EU 11 DK	58-300	1800	58-300	2000
RU 22 DK HU 22 DK EU 22 DK	82-143 144-200 201-300	2300 1900 1300	82-300 - -	2575 - -
RU 36-N EU 36-N	90-300	3000	90-300	3500
RU 55 DK EU 55 DK	106-186 187-300	3000	106-186 187-300	3500

2.7.4 Trolley with special crossbar Flange width 144-300 mm



Suitable for:

Chain hoist turned 90° and suspended
with standard suspension eye.
As RU, HU or EU trolley.
For flange widths 144 - 300 mm.

For assembling trolleys see 202 846 44

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Hook dimension C from girder running surface

Trolley size	Max. SWL	Flange width	Hoist size	Suspension eye							Suspension ring						
				Hook dim. C		C2					Hook dim. C		C2				
				Reeving		Chain collector box size					Reeving		Chain collector box size				
				1/1	2/1	1	2	3	4	5	1/1	2/1	1	2	3	4	5
RU 6 DK	700	144-300	DKUN1-100-125-160-200	435	495	485	545	-	-	-	-	-	-	-	-	-	-
			DKUN2-160-200-250-315	455	515	515	575	620	-	-	460	520	520	580	625	-	-
			DKUN5-250-315	495	565	-	-	-	-	-	505	575	-	-	-	-	-
			DKUN5-400-500-630	495	-	540	600	645	-	-	505	-	550	610	655	-	-
RU 11 DK	1350	144-300	DKUN2-400	-	520	520	580	625	-	-	-	525	525	585	630	-	-
			DKUN5-400-500-630	-	570	545	605	650	-	-	-	580	555	615	660	-	-
RU 22 DK	2600	144-300	DKUN10-500-630-800-1000-1250	625	725	-	-	-	770	890	650	750	-	-	-	805	925
			DKUN16-800-1000-1250	675	775	-	-	-	-	-	-	-	-	-	-	-	-
			DKUN16-1600	675	-	-	-	-	-	-	-	-	-	-	-	-	-
EU 11/ HU 11 DK	1350	144-300	DKUN2-160-200-250-315-400	465	520	520	580	625	-	-	465	525	525	585	630	-	-
			DKUN5-250-315-400-500-630	510	570	545	605	650	-	-	510	580	555	615	660	-	-
EU 22/ HU 22 DK	2600	144-300	DKUN10-500-530-800-1000-1250	625	725	-	-	-	770	890	650	750	-	-	-	805	925
			DKUN16-800-1000-1250	675	775	-	-	-	-	-	-	-	-	-	-	-	-
			DKUN16-1600	675	-	-	-	-	-	-	-	-	-	-	-	-	-

2.8 EU 11/EU 22 DK travel speeds with 13/3 PKF and 13/6 PKF motor

Travel drive			Possible travel speeds in approx. ... m/min				
			28	14	7	7/28	4,6/14
			13/3 PKF 2	13/3 PKF 4	13/3 PKF 8	13/6 PKF 8/2	13/6 PKF 12/4
Part no.	Voltage	230/400 V	563 062 44	563 064 44	563 067 44	-	-
		400 V	-	-	-	563 057 44	563 056 44

2.9 EU 36-N/EU 55 DK travel speeds with 13/6 PF motor up to 3600 kg

Travel drive			Possible travel speeds in approx. ... m/min				
			25	12,5	6,3	6,3/25	4,2/12,5
			13/6 PF 2	13/6 PF 4	13/6 PF 8	13/6 PF 8/2	13/6 PF 12/4
Part no.	Voltage	230/400 V	563 913 44	563 916 44	563 964 44	-	-
		400 V	-	-	-	563 968 44	563 982 44

2.10 EU 55 DK travel speeds with KMF 80 motor up to 5000 kg

Travel drive			Possible travel speeds in approx. ... m/min	
			12,5	6,3/25
			KMF 80 A 4	KMF 80 A 2/8
Part no.	Voltage	400 V	819 091 46	819 092 46

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3 General

3.1 Handling



Notes on inspections in accordance with

Relevant accident prevention regulations for winches, hoists and towing devices

BGV D8 (VBG 8)

Relevant accident prevention regulations for cranes

BGV D6 (VBG 9)

The EC machinery directive requirements are therefore also complied with.

Inspection when putting the hoist into operation for the first time

If hoist units are used as cranes, an inspection must be carried out by an expert engineer in accordance with relevant accident prevention regulations BGV D6 § 25 for cranes.

Chain hoists used in accordance with relevant accident prevention regulations for winches, hoists and towing devices BGV D8 must be inspected by an experienced technician.

The inspection in accordance with relevant accident prevention regulations for winches, hoists and towing devices BGV D8 mainly consists of a visual inspection and a function check. It is designed to ensure that the equipment is in a safe condition and that any defects and damage, e.g. caused by inappropriate handling during transport, are identified and repaired.

In addition, regulations specific to cranes must also be taken into consideration during acceptance and other inspections in accordance with relevant accident prevention regulations for cranes BGV D6



Routine inspections

Hoists and cranes must be inspected by an experienced technician at least once a year. Routine inspections mainly consist of a visual inspection and a function check which should include a check to determine the condition of components and equipment regarding damage, wear, corrosion or other alterations, and a check to determine the integrity and efficiency of safety devices and brakes. It may be necessary to dismantle the hoist in order to inspect wearing parts.

Load carrying means must be inspected along their entire length, including those parts which cannot normally be seen.



The owner must arrange for all inspections to be carried out and documented in the test and inspection booklet of the chain hoist.

3.2 Noise emission measurement according to DIN 45635

The noise emission levels (L_{pAF}) are:

DKUN 2	up to 14 m/min	71 ⁺² dB (A)
	above 14 m/min	73 ⁺² dB (A)
DKUN 5	up to 14 m/min	72 ⁺² dB (A)
	above 14 m/min	74 ⁺² dB (A)
DKUN 10	up to 14 m/min	75 ⁺² dB (A)
	above 14 m/min	77 ⁺² dB (A)
DKUN 16	up to 14 m/min	75 ⁺² dB (A)
	above 14 m/min	77 ⁺² dB (A)
DKUN 20		78 ⁺² dB (A)

at a distance of 1 m from the chain hoist.

These noise emission levels were measured under maximum load.

Structural influences such as

- transmission of noise via steel structures
- reflection of noise from walls, etc.

were not allowed for in the above measurements.

3.3 Chain hoists operating outdoors



Chain hoists operating outdoors should be provided with a cover for protection against the weather. Travelling hoists should be kept under shelter if they are not used for a considerable length of time.

3.4 Packing and storage

The chain hoist and accessories such as chain, hook with fittings, bottom block and control pendant as well as the chain collector box and trolley are shipped in cardboard packaging.

Store the chain hoist and accessories in a dry place.

3.5 Paint finish

The chain hoist is supplied in the following standard colours:

Chain hoist	RAL 5009	Azure blue
Bottom block/hook with fittings	RAL 1007	Chrome yellow
Hook	RAL 9005	Jet black
Trolley	RAL 5009	Azure blue

Other colours and special colours can also be ordered.

3.6 Operating conditions

The chain hoist can be operated at:

- -10° to +40°C
- air humidity up to 80%
- Air pressure up to 1000 m above sea level

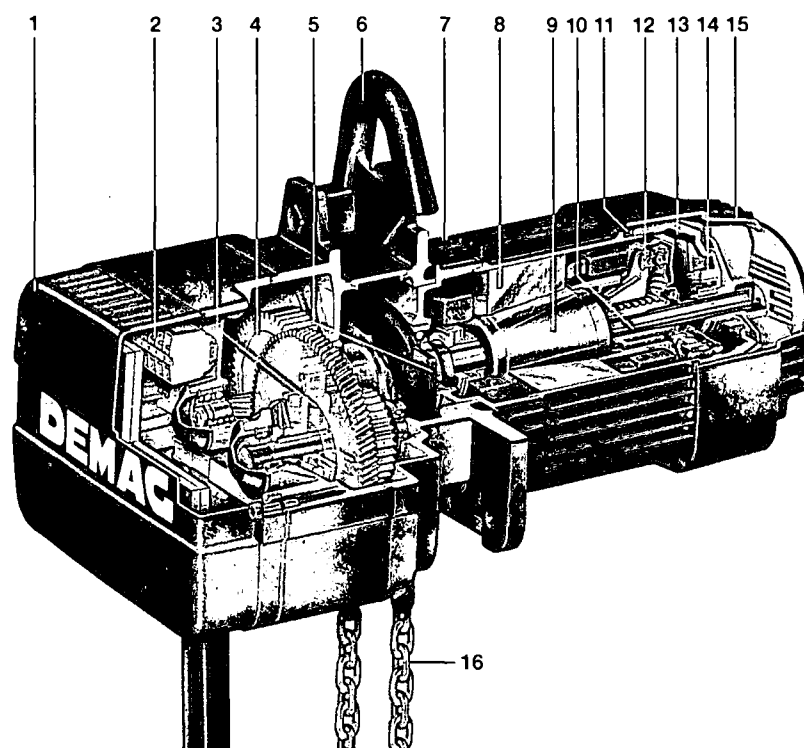
Other operating conditions are also possible.

Please refer to the manufacturer for information on any modifications that may be necessary.

See page 2 for the address.

4 Description

4.1 Design



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- | | | | |
|------------------------------|-----------------------|----------------|--------------|
| 1 Electrical equipment cover | 5 Chain guide | 9 Rotor | 13 Brake cup |
| 2 Electrical components | 6 Suspension eye | 10 Shaft | 14 End cap |
| 3 Slipping clutch | 7 Intermediate flange | 11 Brake shims | 15 Fan cover |
| 4 Gearbox | 8 Stator | 12 Coupling | 16 Chain |

4.2 Hoist motor

The hoist motor is the proven sliding rotor brake motor with a newly developed rotor-shaft connection, torsionally resistant, axially free fail-safe coupling and conical brake with asbestos-free brake lining. Type of enclosure IP 55.

4.3 Gearbox

The gearbox is of two-stage coaxial design.

The gearbox is lubricated by a mineral oil to DIN 51502 CLP 220.

The first stage of the reduction gear has helical gearing. The wheel of the first gear stage has an integrated slipping clutch. It performs the function of an emergency limit stop device for the highest and lowest hook position and protects the Demag chain hoist against extreme overloads. The slipping clutch also fulfils the EC guideline requirements regarding a load control device starting with an SWL of 1000 kg.

If the emergency limit stop device – in this case the slipping clutch – is approached in normal operation, operation must be limited according to relevant national regulations and those of Demag.

In this case, an additional operating limit switch is required.

4.4 Chain and sprocket drive

The special Demag chain is of highly wear-resistant material with a high degree of surface hardening, zinc-plated with additional surface treatment. Only chains marked with Demag may be used. The chain hoist has a six-pocket chain drive sprocket and a hardened chain guide.

4.5 Chain hoist

The housing is of strong die-cast aluminium and thus light-weight and robust.

The pivoting chain collector box is of tough, flexible, impact-resistant plastic.

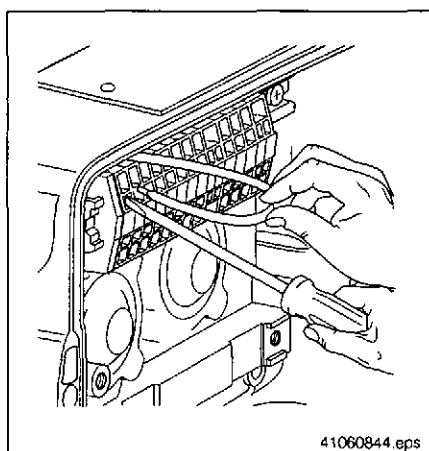
4.6 Electrical equipment

The standard chain hoist is designed for direct control:

The chain hoist can be supplied with contactor control as an option or if required by regulations.

Further electrical equipment includes:

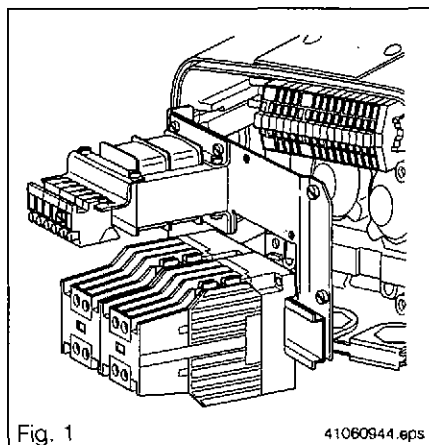
Limit switches for lifting and lowering, geared limit switches with up to eight switching points, pulse generator, single-phase design, plug-and-socket connections for power supply line and control pendant, electric overload cut-off.



4.6.1 Direct control

Direct control is effected in the main circuit by means of the DSK 3 D... and DST control pendant.

The control pendant is supplied with the control cable connected to it. Connect the separately supplied control pendant in accordance with the wiring diagram. Plastic-sheathed wire cords are used for strain relief of the DST control cable, the DSK 3 D... control cable is provided with strain relief by means of a flexible hose. For control cable strain relief, see sections 5.6 and 5.7 for DSK 3 D... and DST control pendant assembly instructions.



4.6.2 Contactor control

Contactor control is effected in the auxiliary circuit by means of the Demag control pendant. The control pendant required depends on the application.

Control pendant DSK 3 S... for Demag chain hoists without electric travel trolley, control pendant DST or DSE for Demag chain hoists with electric travel trolley. Connect the separately supplied control pendant in accordance with the wiring diagram.

Plastic-sheathed wire cords are used for strain relief of the DST and DSE control cable, the DSK 3 S... control cable is provided with strain relief by means of a flexible hose.

The hoist and travel drive contactors, as well as the main contactor and the control transformer are combined into one set of electrical equipment (see fig. 1).

The control circuit is fed from a transformer, the secondary of which is connected to earth.

4.7 Control pendant

The shock and impact-resistant housings are of high quality thermoplastic in the case of DSK and DSE units and of glass-fibre reinforced polyester in the case of DST units and are resistant to fuels, salt water, fats, oils and alkaline solutions.

Type of enclosure IP 55 (65) for DSK and IP 65 for DST/DSE.

Strong mineral (e.g. hydrochloric or sulphuric) acids may corrode pendant switch casings. Replace such pendant switches in good time.

4.8 Suspension fittings

Five types of suspension fitting provide a wide range of mounting possibilities.

Long suspension eye – standard design

For monorail and KBK trolleys

Short suspension eye

For optimum utilization of the available hook path (not suitable for KBK).

Suspension ring – turned 90°

For arrangement of the chain hoist parallel to the girder

Suspension hook

For quickly changing the position of the chain hoist and changing the mounting position by increments of 90° (not suitable for trolleys).

Special suspension eye

For fitting the carrier link with strain gauge or the electro-magnetic load link.

Additional bore holes in the housing of the chain hoist provide further mounting possibilities.

4.9 Trolley



The load capacity of the Demag chain hoist must not exceed the load capacity of the trolley.

4.9.1 Track

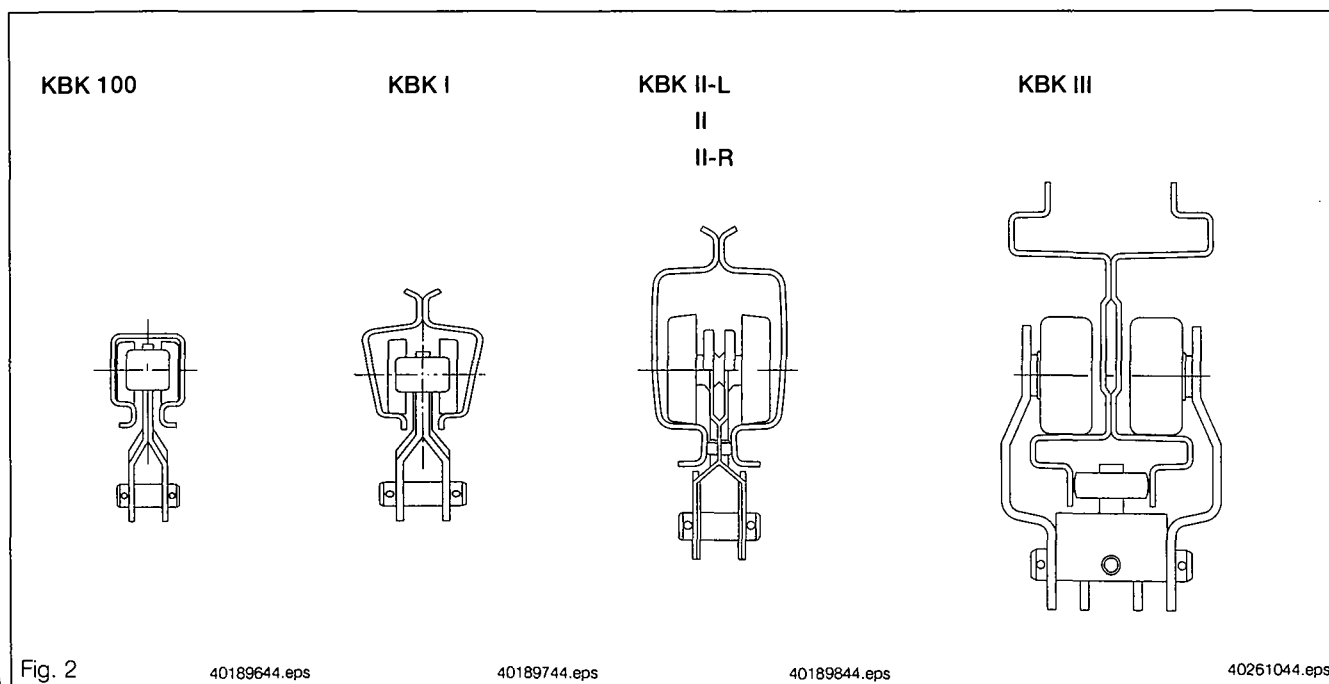
When selecting a track, we suggest you specify our KBK crane construction kit track section (fig. 2) of special design. The light-weight, cold-rolled track sections feature a smooth running surface and offer the advantage of simple power supply by means of trailing cables or integrated busbars. The use of I beams according to DIN 1025 as tracks is also possible.

The track radius on curved sections should always be as large as possible in order to ensure good travel characteristics.

I beam tracks should be bent with the utmost care in order to obtain a clean, regular curve. Ready-made curved sections are available for our special KBK track.

Hoist travel on I beam tracks must in no way be obstructed by protruding suspension bolts, screw heads, butt straps, clamping plates, etc. These types of obstruction can be avoided by using our special KBK track section.

Resilient buffers should be mounted at travel wheel axle level at the ends of tracks in order to prevent the hoist from derailing.



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5 Assembly instructions

5.1 Electrical equipment



Work on electrical equipment may only be carried out by qualified electricians or trained personnel, see also section 1 "Safety instructions".

Each Demag chain hoist is provided with a wiring diagram showing details of the controls.

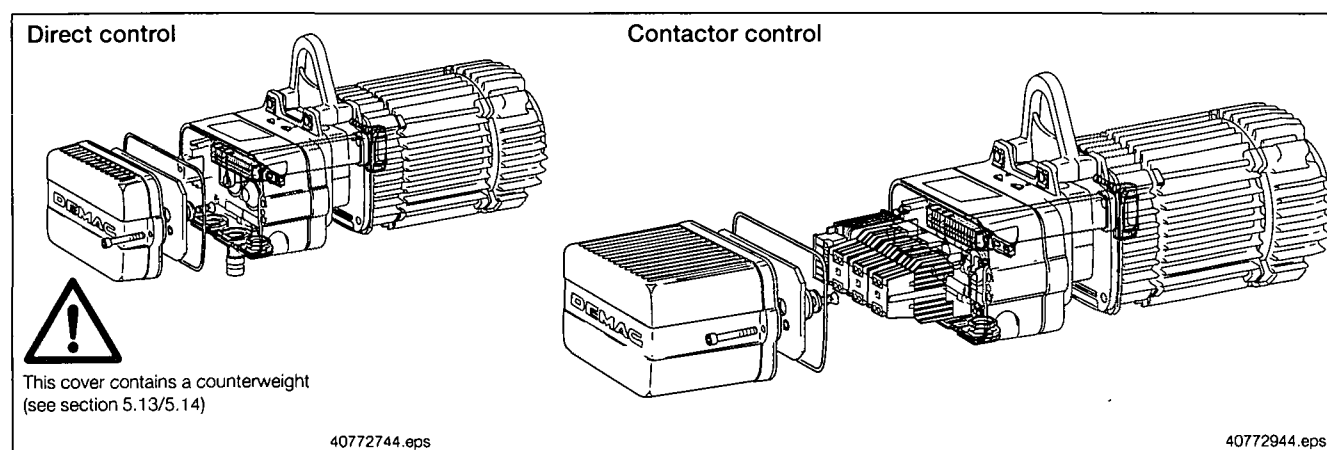
The wiring of the chain hoist complies in all respects with current DIN VDE- and accident prevention regulations. Unauthorized intervention and modifications may result in infringement of these regulations.

The switchgear is designed for extreme conditions. However, its life depends on usage.

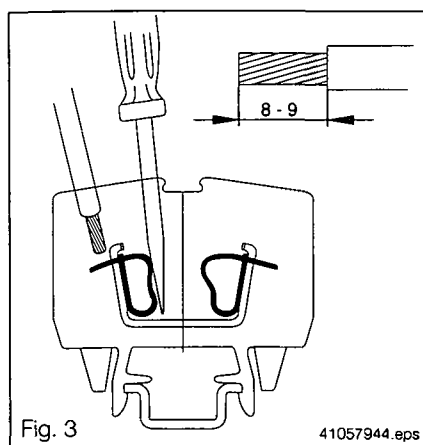


Advise operators to avoid inching (i.e. giving short pulses to the motor to obtain small movements) as far as possible, e.g. when lifting loads, to prevent excessive contact burning and thus premature destruction of the switchgear.

Inching operations can largely be eliminated by using two-speed hoist and travel motors.



5.2 Connection to the electrical supply



First check whether the voltage and frequency stamped on the data plate match your mains supply.

The terminals for mains connection are located on the rear wall of the electrical enclosure.

To connect the power supply cable, the electrical equipment cover must be removed and, in the case of hoists with contactor control, the switchgear set must be swung to the side.

A 4-lead cable with an earth lead (PE) is required for current supply.

The required supply cable conductor cross sections, the maximum permissible supply cable length and fuse links can be seen in the tables in sections 2.5 and 2.6.

Please note that the length of the supply line specified for a given cross section must not be exceeded in order to avoid excessive voltage drop, which might prevent the conical rotor of the motor from sliding into running position when the motor is switched on.

The wiring carried out in our factory includes an earth lead which is connected to all parts of the equipment which relevant regulations require to be included in the protective measures.

The protective conductor marked green/yellow in the supply line must be connected to the green/yellow earth terminal.

Connect leads L1, L2 and L3 in accordance with the wiring diagram. Open the cage clamp terminals with a 3,5 mm wide screwdriver as in fig. 3.

5.3 Connecting the control cable

Connect the control cable in accordance with the wiring diagram.

5.4 Checking the direction of movement

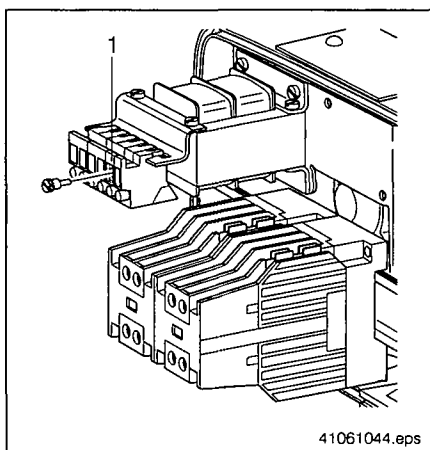
When the control pendant button for "lifting" is pressed, the load hook must move upwards.



If this is not the case, leads L2 and L3 of the supply cable should be changed over. (Switch off the mains supply before changing over the leads!)

5.5 Replacing the control fuse link

The control fuse link (1) is held in a fuse terminal on the control transformer. The required amperage of the fuse link can be seen on the transformer data plate.



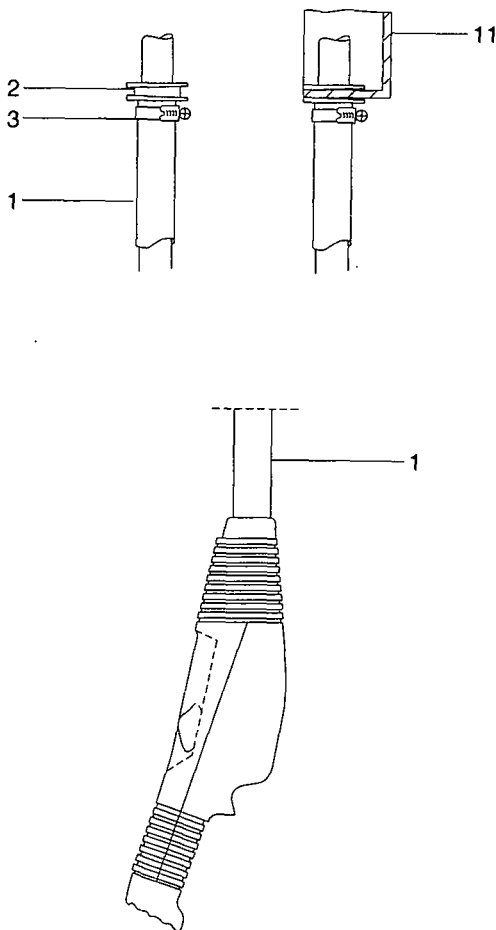
5.6 Assembly instructions for DSK control pendant



Electrical installation work must only be carried out by a qualified electrician, see also section 1 "Safety instructions".
Control pendant suspension height approx. 1000 mm above floor level.
For special strain relief solutions see operating instructions:
Ident no. 206 489 44 (720 IS 951)

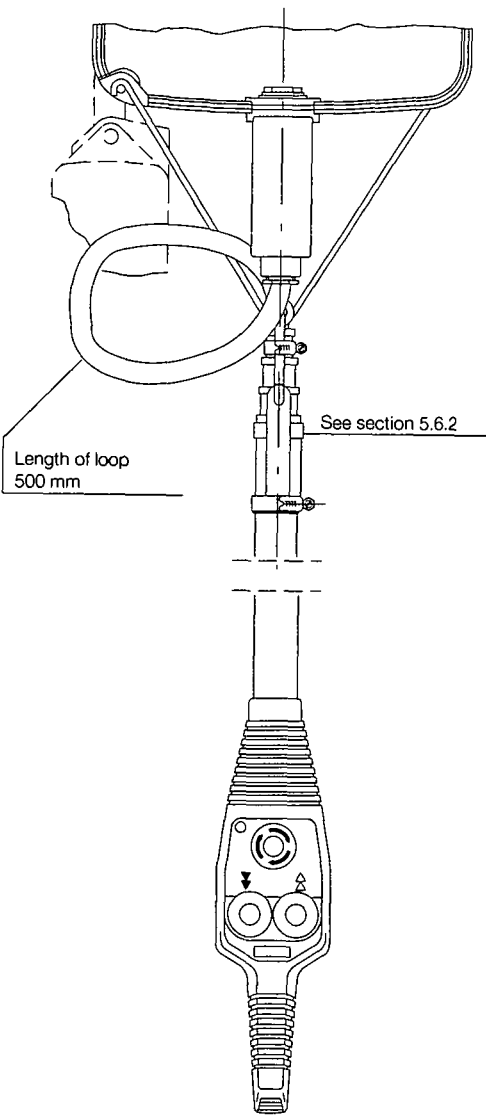
Strain relief with special flexible hose

Push special flexible hose 1 over slide bush 2 and secure with hose clip 3. Insert slide bush 2 in DK housing 11.

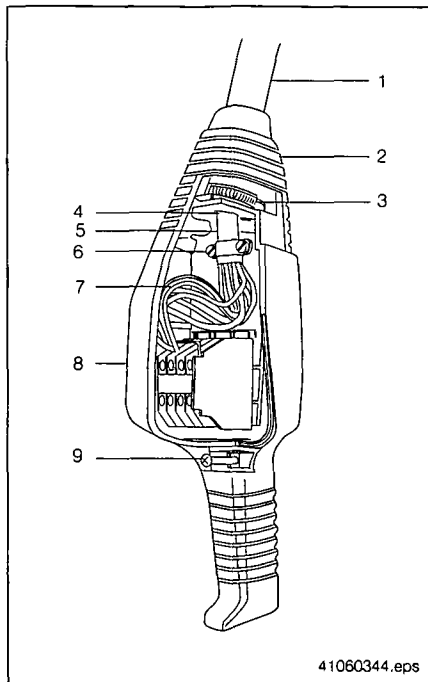


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Strain relief with special flexible hose and plug-and-socket connection



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5.6.1 Connection and strain relief of the DSK control pendant

Loosen the three housing screws 9. Remove lower part 8 of the housing. Pass flexible boot 2 over flexible hose 1. Slide flexible hose onto connecting socket 4 until it stops and secure it to the latter by tightening clip 3. Pass cable 5 through clamp 6 and clamp tight. Carefully lay conductors 7 and connect them to terminals.



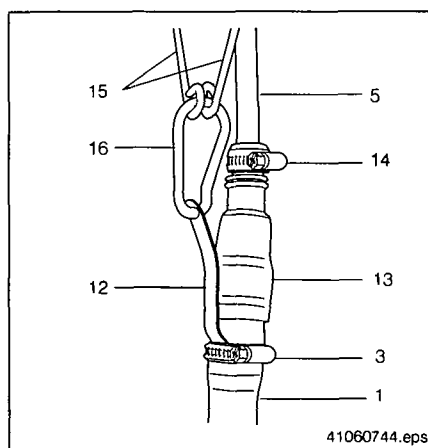
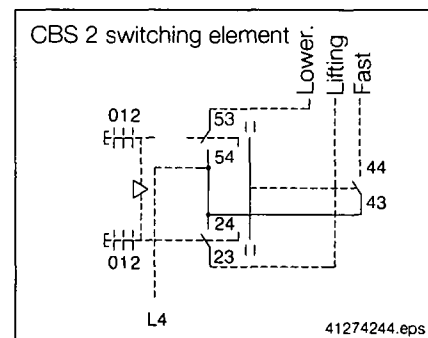
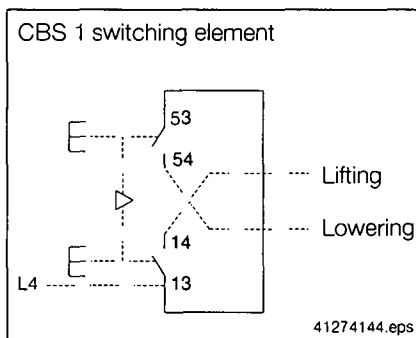
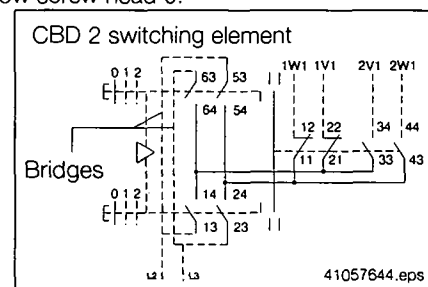
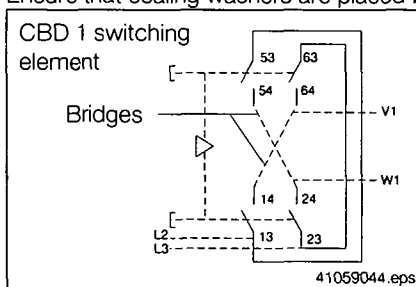
Connect only in compliance with the wiring diagram.

Switching elements CBD 1 / CBD 2:

Fit bridges 14-64, 24-54 for switching element CBD 1 and 13-53, 23-63 for CBD 2.

Switching elements CBD 1, CBS 1, CBD 2 and CBS 2 can only be fitted in one predetermined position defined by a rib.

Refit lower part 8 of the housing by tightening the screws provided for this purpose. Ensure that sealing washers are placed below screw head 9.



5.6.2 Strain relief with special flexible hose and plug-and-socket connection

Push special flexible hose 1 over threaded bush (not illustrated). Insert strain relief plate 12 under hose clip 3 and secure by tightening hose clip. Push sealing sleeve 13 over threaded bush until the latter is no longer visible (use grease or similar lubricant) and secure with hose clip 14.

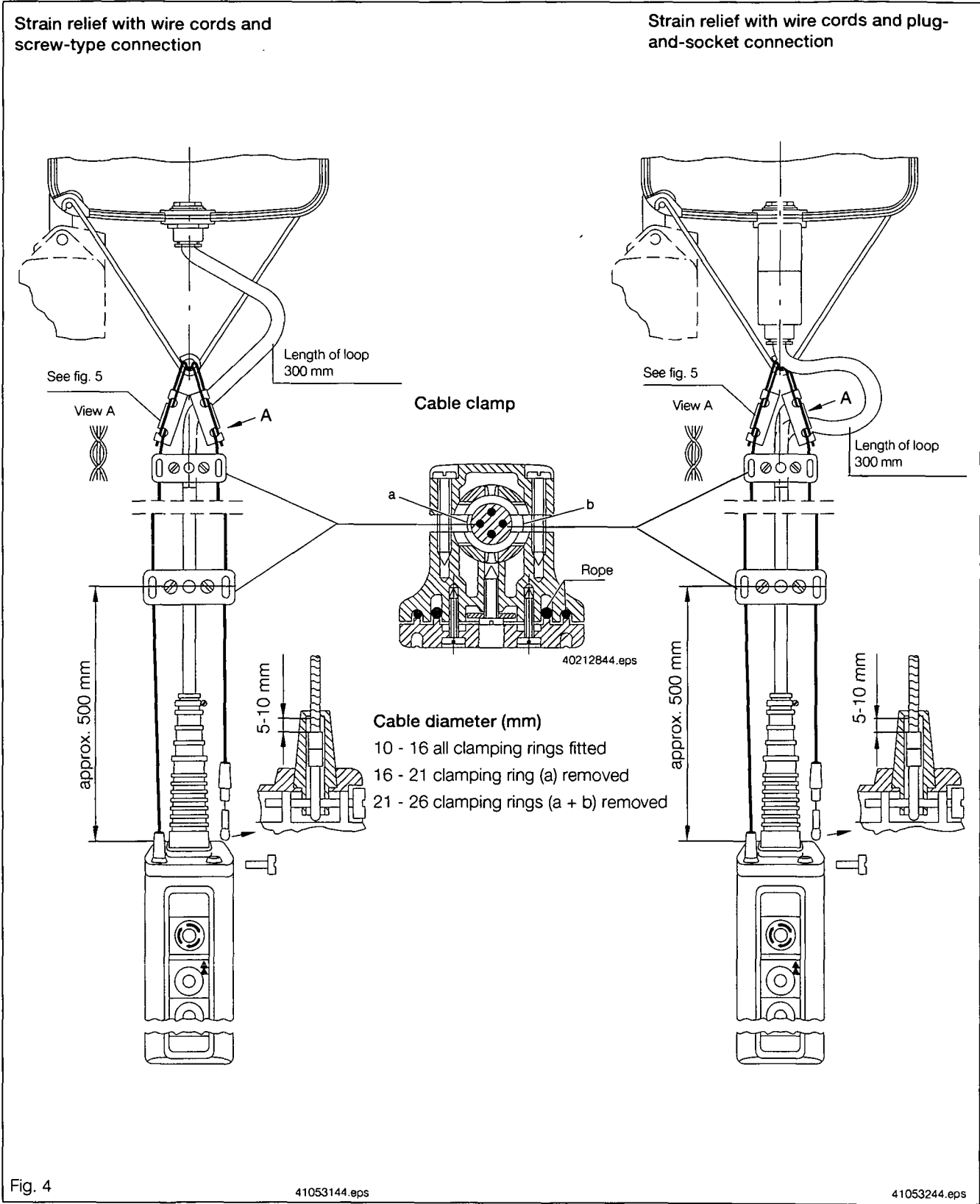
Hook strain relief rods 15 to Demag chain hoist DK and connect to strain relief plate 12 by means of snap hook 16.

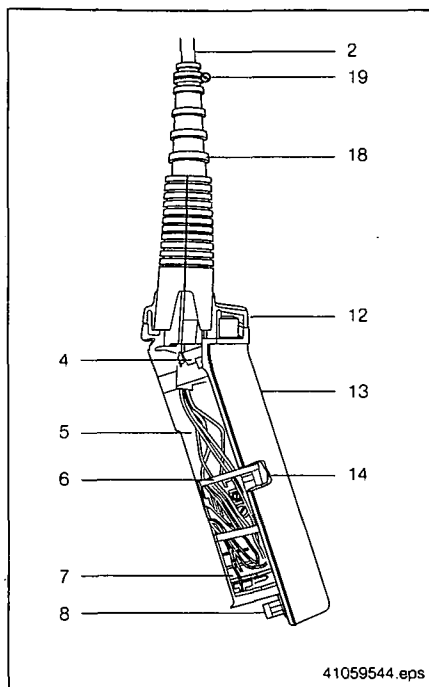
For further information see assembly instructions DSK control pendants
Ident. no. 206 485 44

5.7 Assembly instruction for DST control pendant



Electrical installation work must only be carried out by a qualified electrician, see also section 1 "Safety instructions".
Control pendant suspension height approx. 1000 mm above floor level.





Control pendant with sleeve protecting against kinking 18.

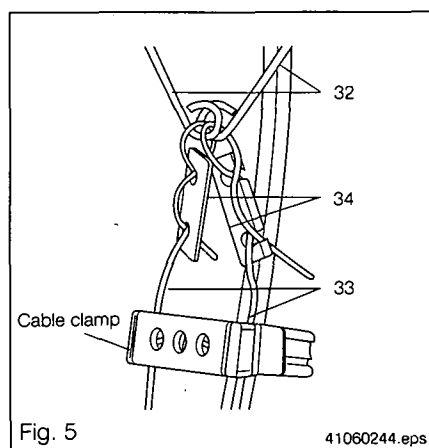
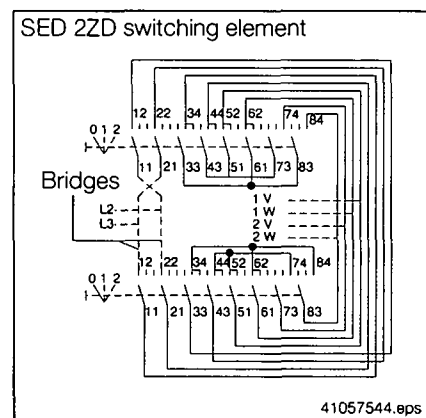
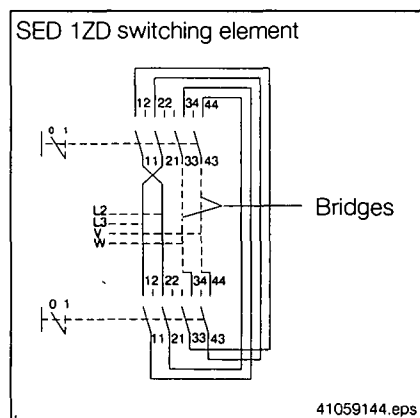
Strain relief by wire cords; see figs. 4 and 5.

Loosen the 4 or 6 housing screws 8. Remove lower part 7 of the housing. By tightening the two screws securing cap 12 to upper part 13 of the housing, press sleeve protecting against kinking 18 against the housing. Cut off sleeve protecting against kinking 18 as required for the relevant cable diameter (see markings on sleeve). Pass cable 2 through sleeve 18 and clamp 4 (small opening for cables of 10-20 mm diameter and wide opening for cables of 20-26 mm diameter) and clamp the cable by tightening the screws. Tighten clip 19 on sleeve 18. This ensures that the cable inlet is water-tight. Carefully bunch conductors 5 behind clip 6 and connect them to terminals as required.



Connect only in compliance with the wiring diagram.

Only use bridges 33-34, 43-44 for switching element SED 1ZD and 11-22, 21-12 for switching element SED 2ZD. Remove bridges 34-62 and 44-52 on switching element SED 2ZD for lifting/lowering. Double switching elements SED 1D and SED 2D can only be fitted in one predetermined position defined by pin 14. Fit lower part 7 of the housing by tightening screws 8. Ensure that sealing washers are placed below screw heads 8.



Strain relief by means of wire cords

Hook strain relief rods 32 to Demag chain hoist DK. Thread strain relief cords 33 through loops of strain relief rods 32 and insert in slots of retaining plates 34 (part no. 864 662 44) in the shape of an "S" (see fig. 5).

For further information see assembly instructions DST control pendants
Ident. no. 206 165 44

5.8 Assembly instructions for DSE control pendant



Electrical installation work must only be carried out by a qualified electrician, see also section 1 "Safety instructions".

Control pendant suspension height approx. 1000 mm above floor level.

Assembly of strain relief see section 5.8.3

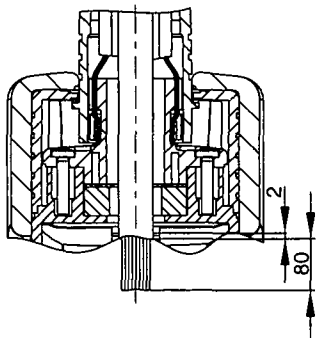
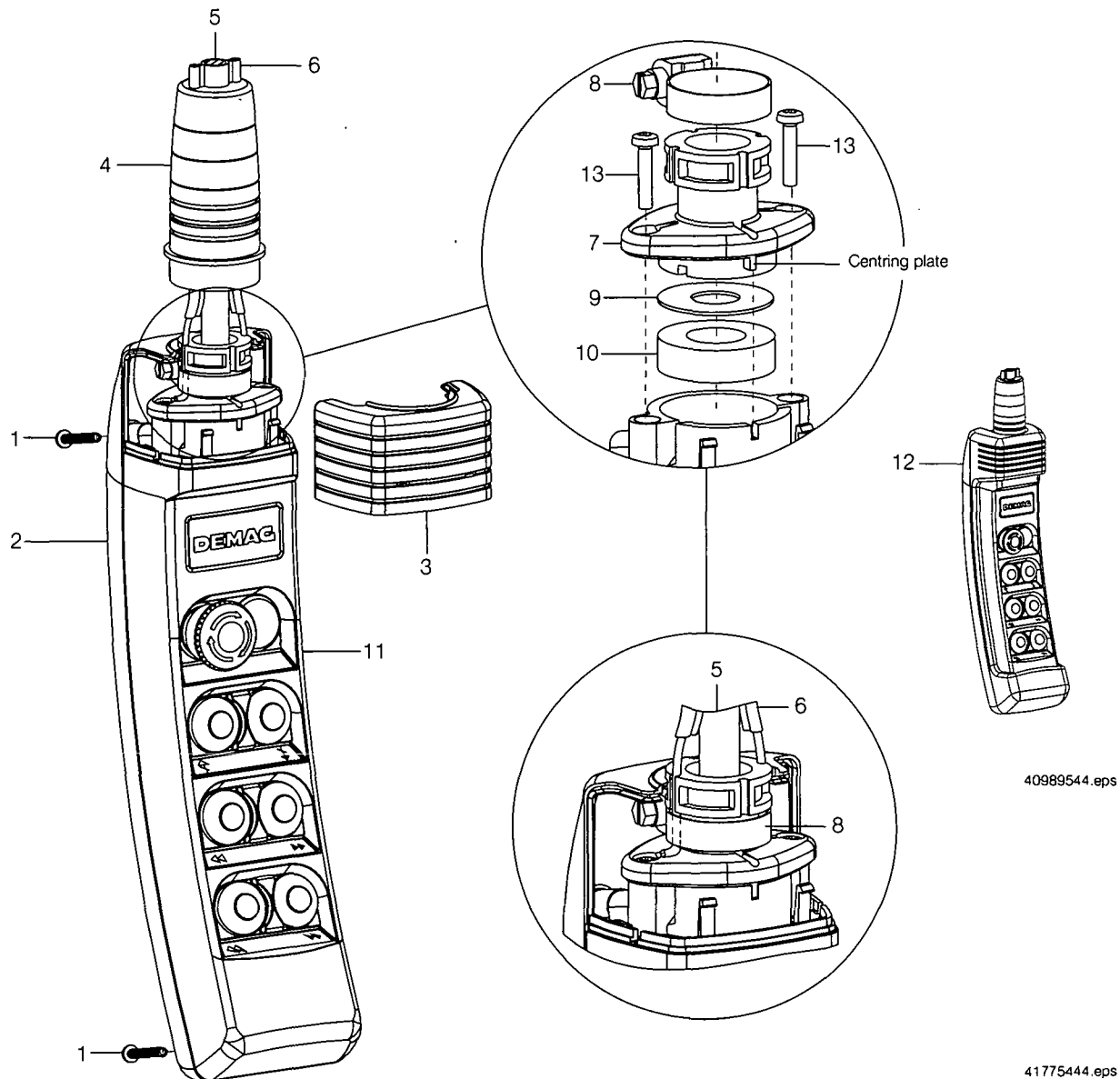
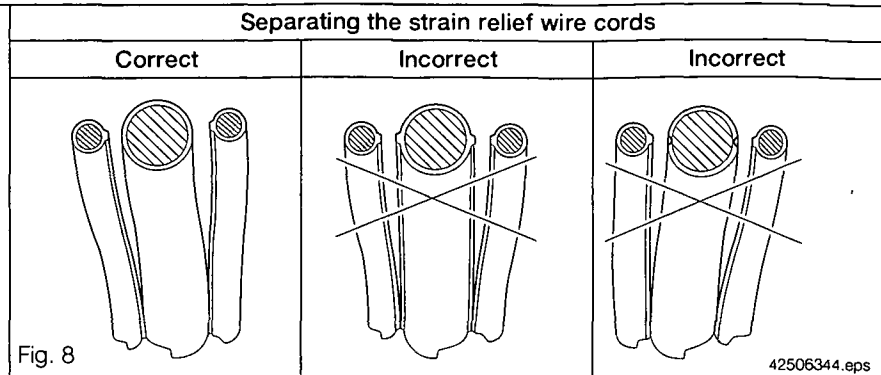


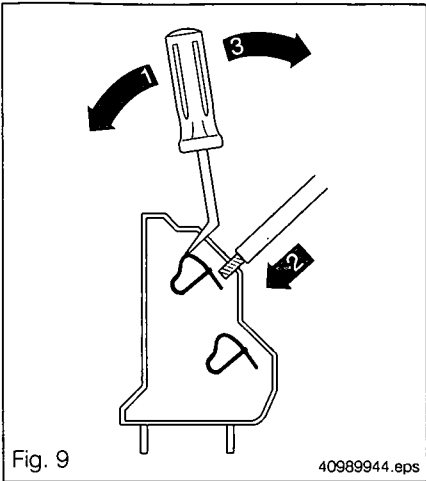
Fig. 7

41775244.eps



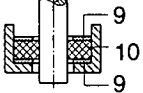
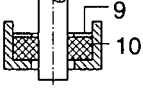
For further information see assembly instructions DSE control pendants, ident. no. 214 214 44

5.8.1 Connecting the control cable with vulcanised strain relief wire cords to the DSE control pendant



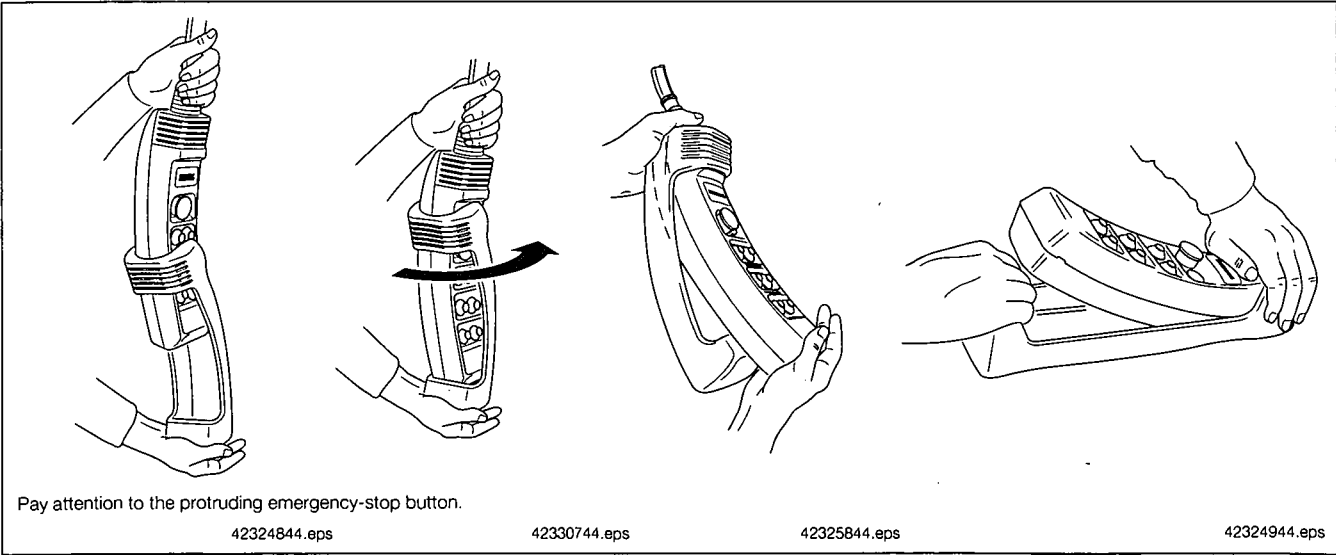
- For connecting the control cable with vulcanised strain relief wire cords, proceed as follows:
- Undo the four recessed head screws (1) and remove rear part (2) of the housing.
 - Remove housing cap (3).
 - Cut off protective sleeve (4) as required for the relevant control cable diameter.
 - Push protective sleeve (4) onto control cable (5). Use lubricant (e.g. washing-up liquid).
 - Separate vulcanised strain relief wire cords (6) from control cable (5) (fig. 8).
 - Push tube clip (8) up to strain relief wire cords (6) and control cable (5).
 - Undo the two recessed head screws (13) of pressure sleeve (7).
 - Push pressure sleeve (7) onto control cable (5) (fig. 6).
 - Slide control cable (5) through washer (9) and sealing ring (10).
- The sealing washers and the sealing rings are assigned to the corresponding control cable diameter in accordance with table 1.
- Strip insulation from the end of the control cable (fig. 7). Pay attention to the mounting dimensions!
 - Pull conductors into front part (11) of the housing.
 - Slide washer (10), sealing ring (9) and pressure sleeve (7) down to the front part (11) of the housing.
 - Tighten the two recessed head screws (13).
 - Strip sheathing of strain relief wire cords (6) (fig. 6).
 - Shorten strain relief wire cords (6) (fig. 6) and insert on the side in the groove of pressure sleeve (7)
 - Fix strain relief wire cords with tube clip (8) (fig. 6).
 - Connect conductors in accordance with wiring diagram and assignment diagram in rear part (2) of the housing.
 - Open the cage clamp terminals with a 3,5 mm wide screwdriver or an offset screwdriver as shown in fig. 9 (part no. 772 798 44).
 - Push protective sleeve (4) onto pressure sleeve (7). The protective sleeve is flush with the pressure sleeve flange.
 - Fit housing cap (3).
 - Screw rear part (2) of the housing back onto front part (11) of the housing.
 - Finally fit bumper (12) (see section 5.8.2).

Table 1

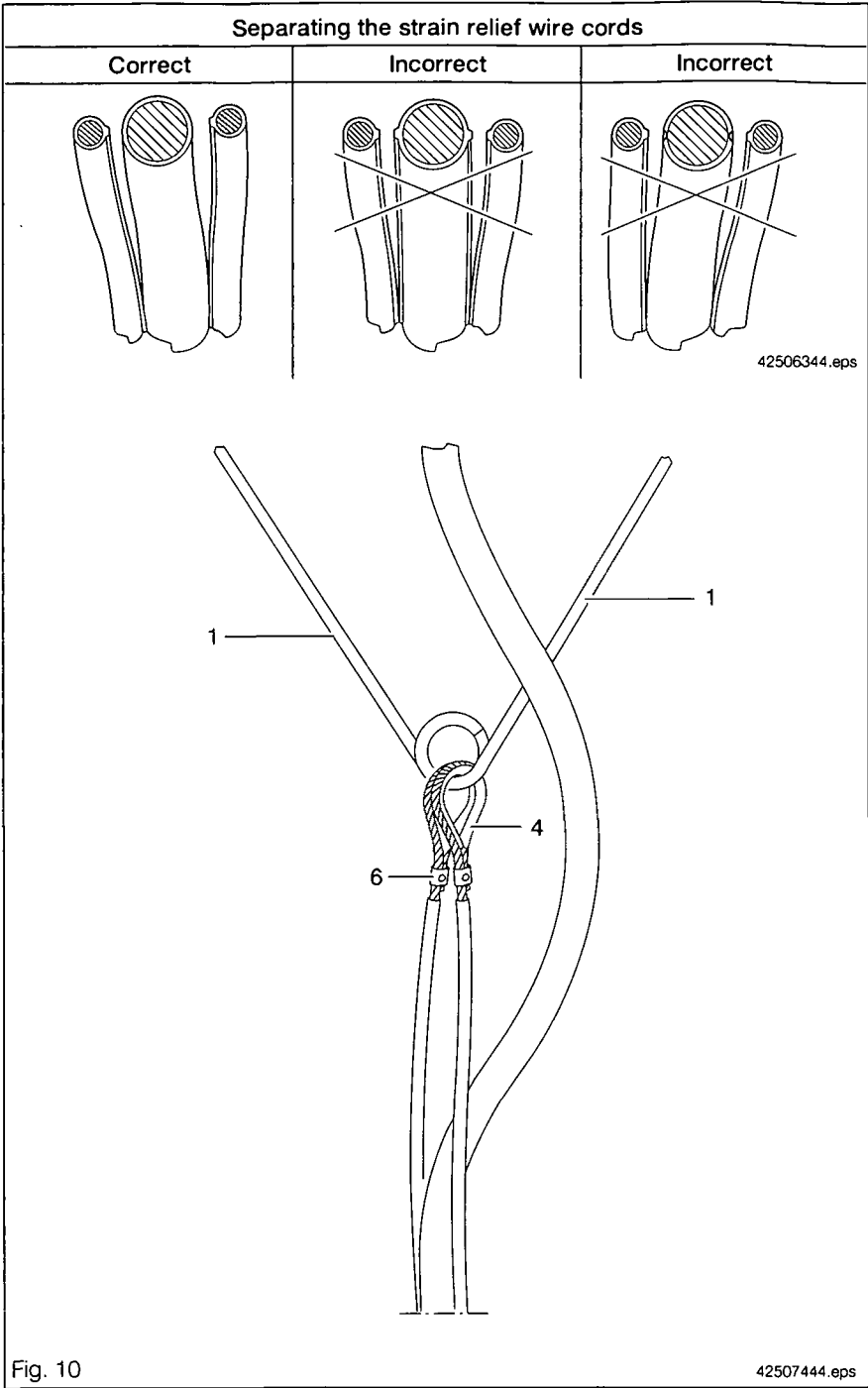
Control cable outside diameter	Pressure sleeve with seal		Control cable outside diameter	Pressure sleeve with seal	
10,5 - 14,5	Item 9 2 x 772 576 44 Sealing washer 10-15		15 - 20	Item 9 1 x 772 574 44 Sealing washer 15-20	
	Item 10 1 x 772 575 44 Sealing ring 10-15			Item 10. 1 x 772 546 44 Sealing ring 15-20	

5.8.2 Fitting the rubber bumper

Fit the bumper at room temperature.
We recommend that a lubricant (e.g. washing-up liquid) be used for further assembly.



5.8.3 Connecting the strain relief wire cord



- Connecting the control cable with vulcanised strain relief wire cords to the DK housing.
- Separate vulcanised strain relief wire cords from the control cable as shown in the table above (for dimensions see fig. 11).
 - Shorten strain relief wire cords by approx. 100 mm and strip sheathing in accordance with the thimble diameter + 30 mm for fitting Talurit clamp (6).
 - Slide one Talurit clamp (6), each, onto the strain relief wire cords.
 - Place strain relief wire cords around thimbles (4), insert into Talurit clamp (6) and secure using pliers while the rope is tensioned.
 - Hook strain relief rods (1) to DK housing (see page 11).
 - Hook strain relief rods (1) to thimbles (4) as shown in the fig. 10.

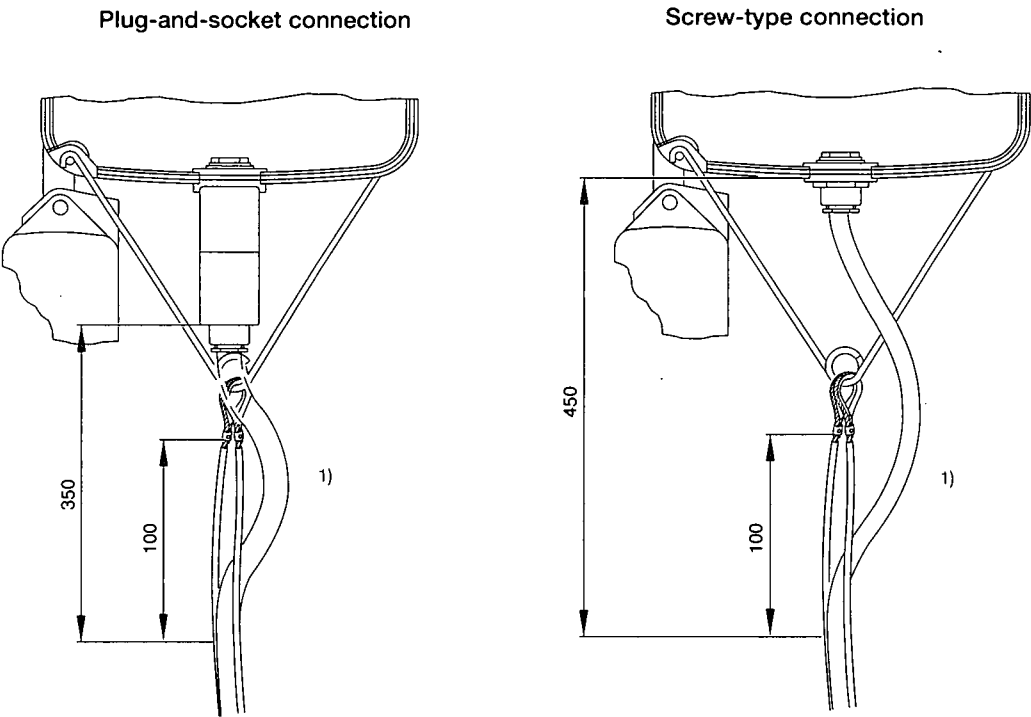


Fig. 11

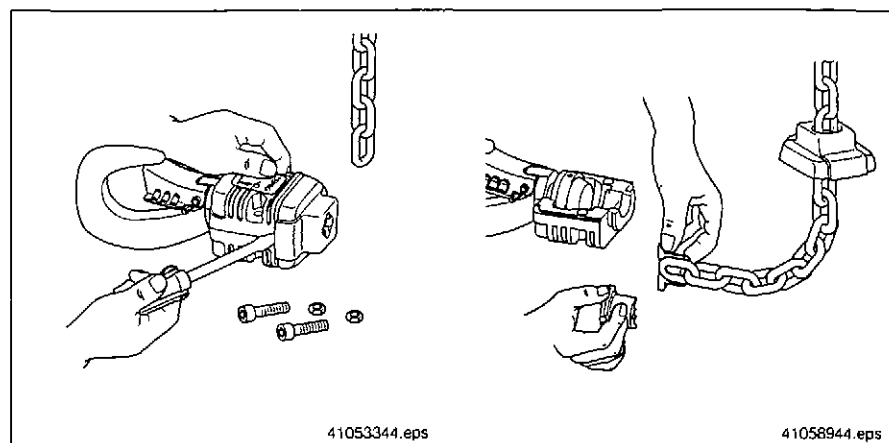
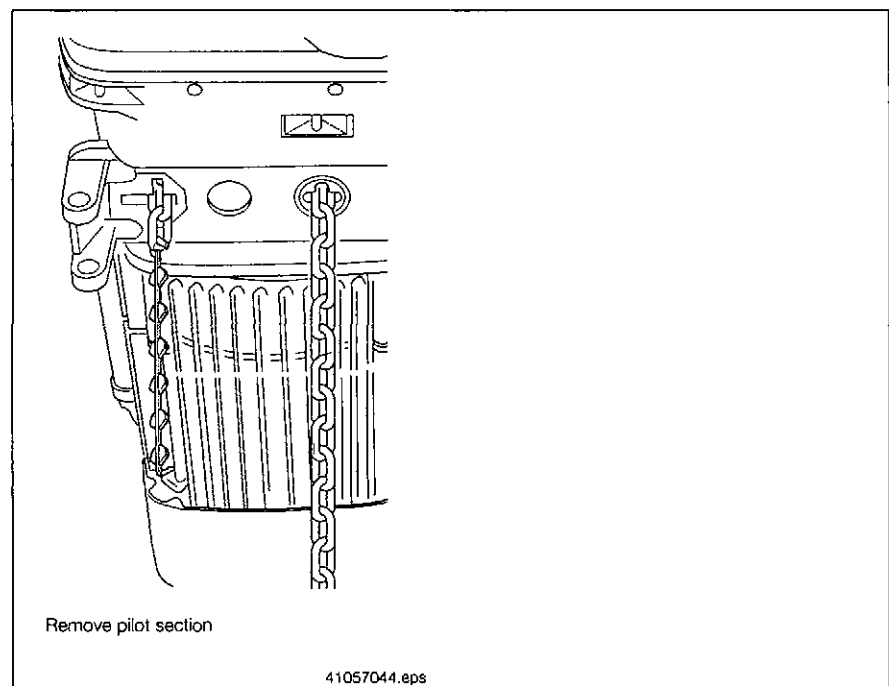
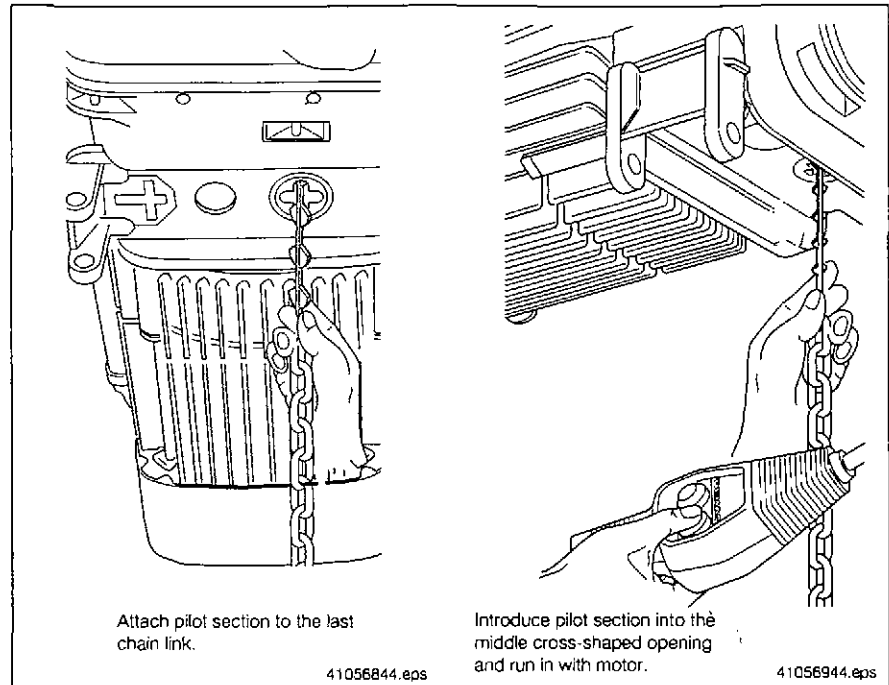
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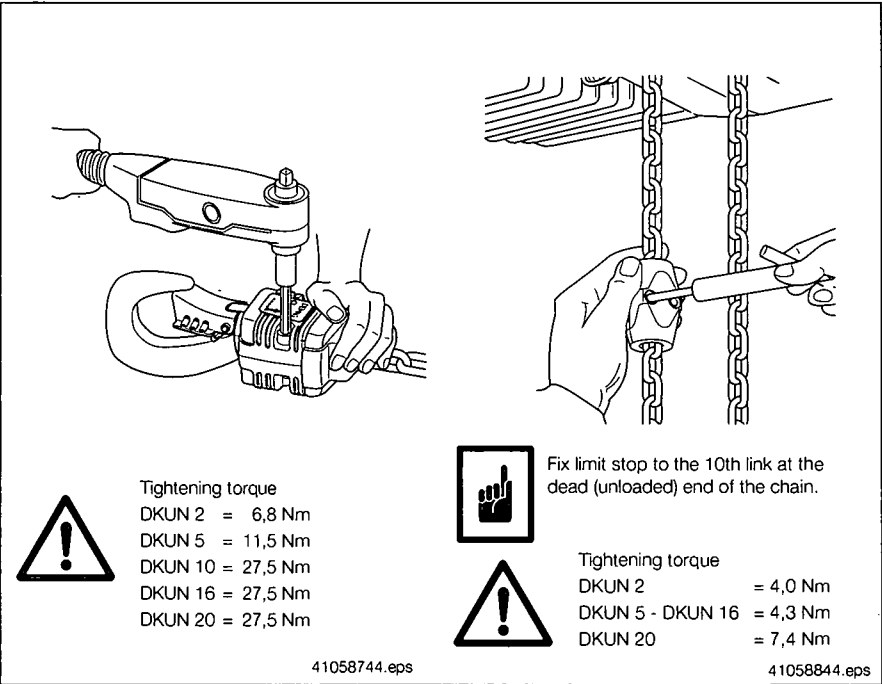
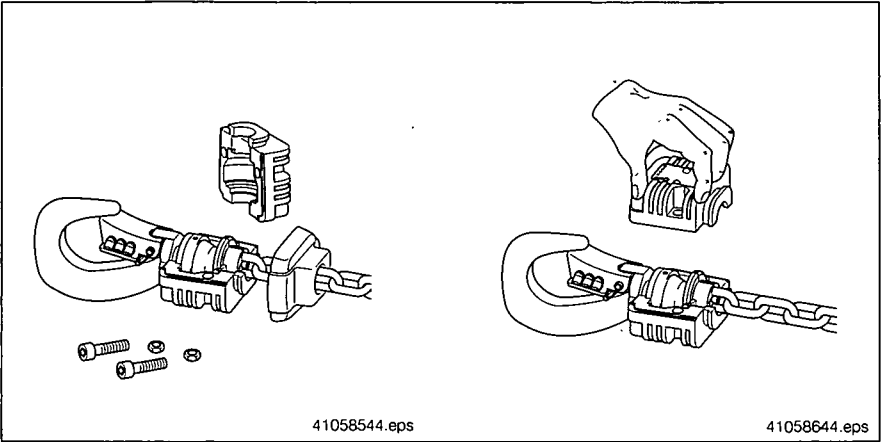
42325744.eps

1) To ensure strain relief of the control cable, the control cable must be approx. 100 mm longer than the required strain relief cords.

5.9 Fitting the chain for 1/1 reeving

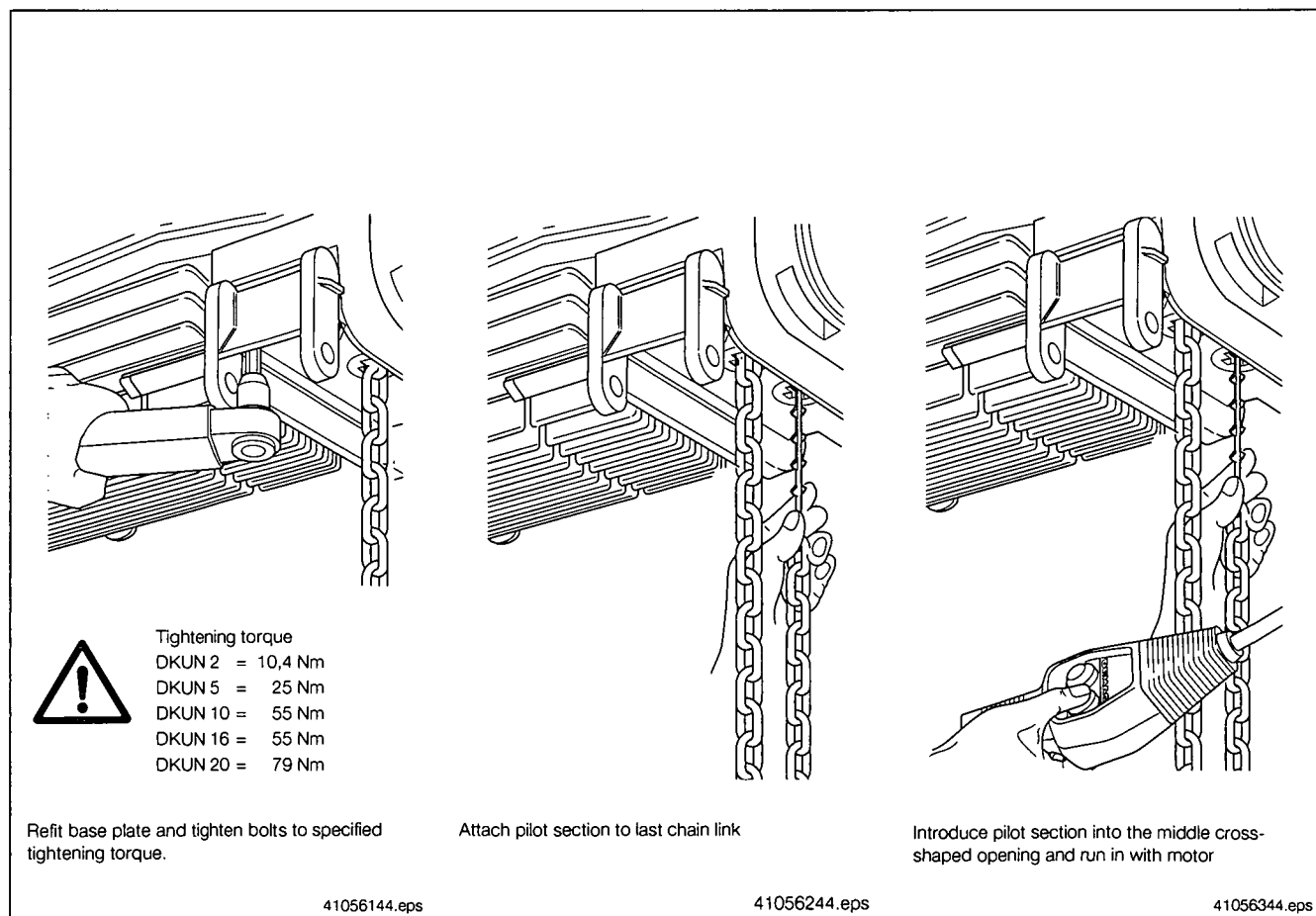
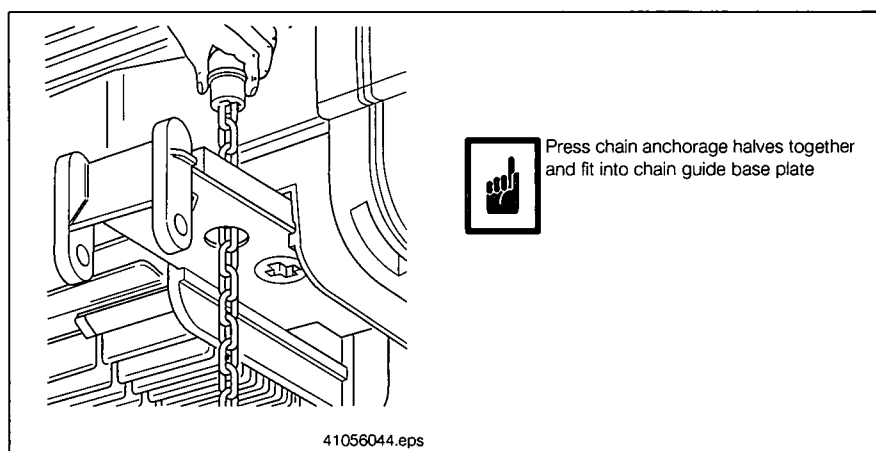
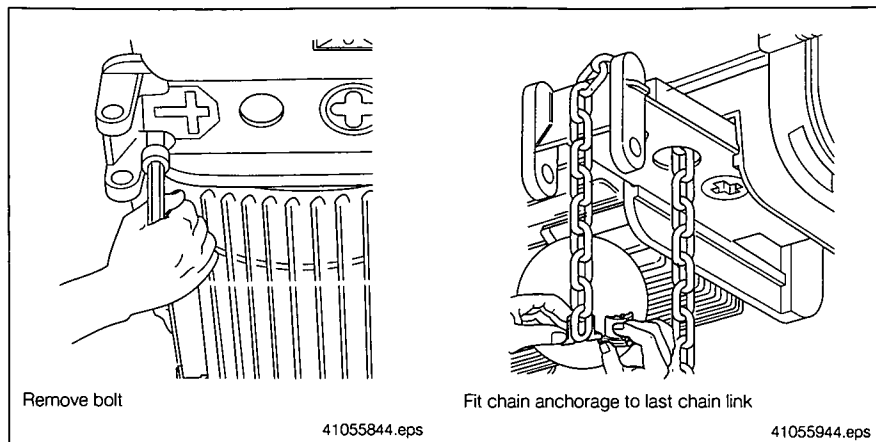
Fitting the load hook assembly and limit stop

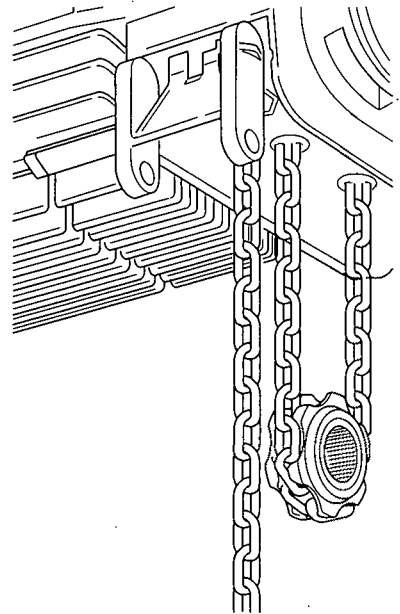
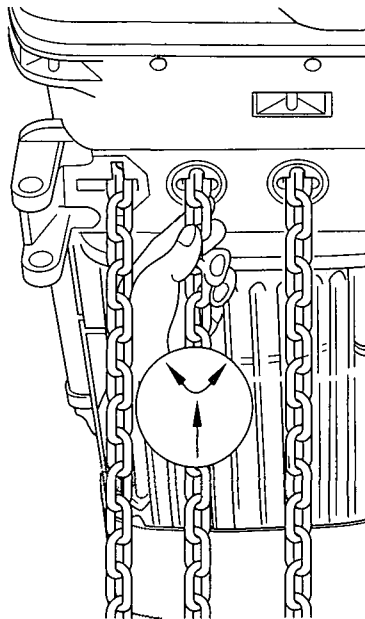
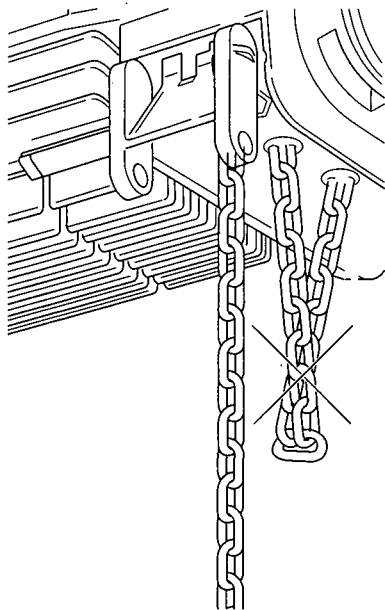




5.10 Fitting the chain for 2/1 reeving

Fitting the bottom block and limit stop



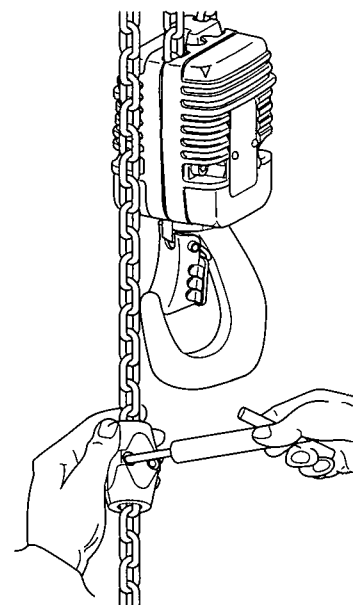
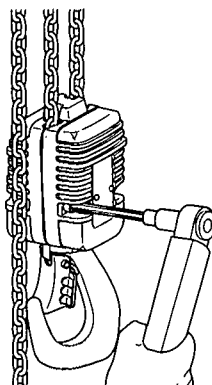
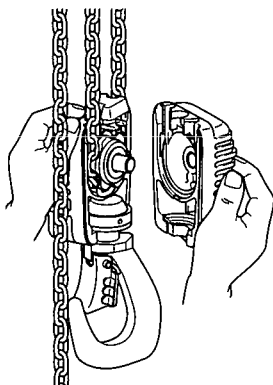


Align the chain by lifting and turning the chain anchorage.
The chain is correctly aligned when the chain links are not twisted.

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Tightening torque
DKUN 2 = 11,5 Nm
DKUN 5 = 27,5 Nm
DKUN 10 = 55 Nm
DKUN 16 = 55 Nm
DKUN 20 = 55 Nm



Fix limit stop to the 10th link at the dead (unloaded) end of the chain

Tightening torque
DKUN 2 = 4,0 Nm
DKUN 5 - DKUN 16 = 4,3 Nm
DKUN 20 = 7,4 Nm

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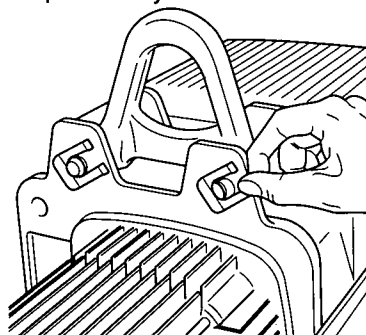
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41057444.eps

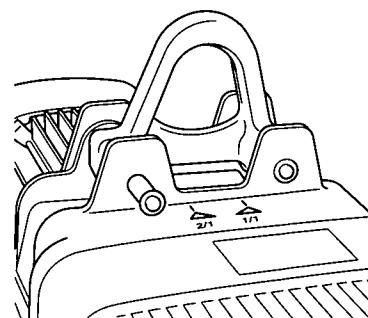
20650114.p65/020604

5.11 Converting suspension eye, suspension hook and suspension ring from 1/1 to 2/1 reeving

Suspension eye

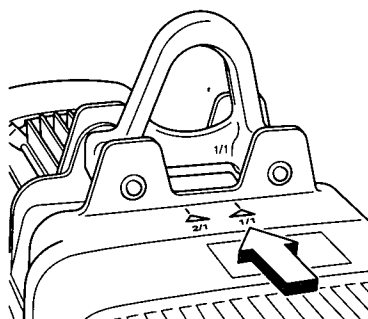


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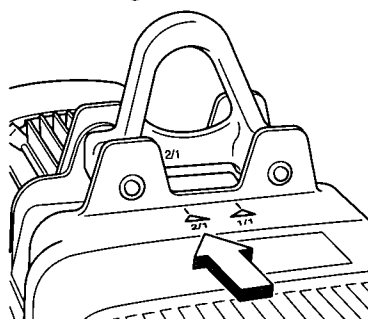
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1/1 reeving

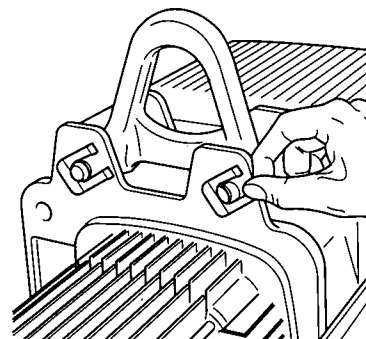


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2/1 reeving



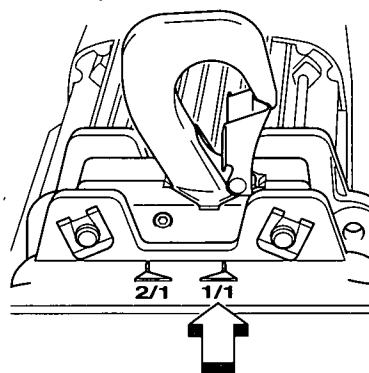
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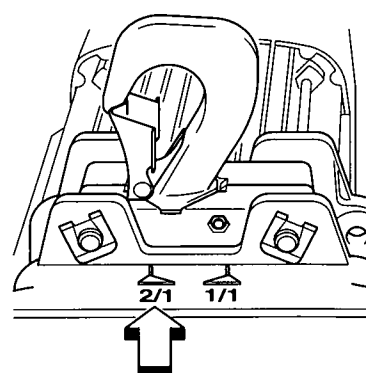
Suspension hook
DKUN 2 - DKUN 5 - DKUN 10

1/1 reeving



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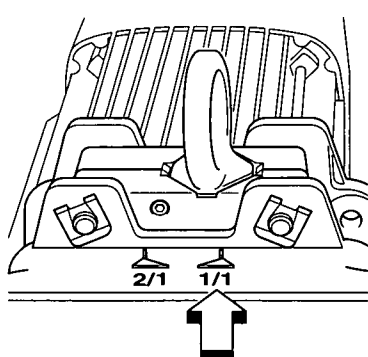
2/1 reeving



41043444.eps

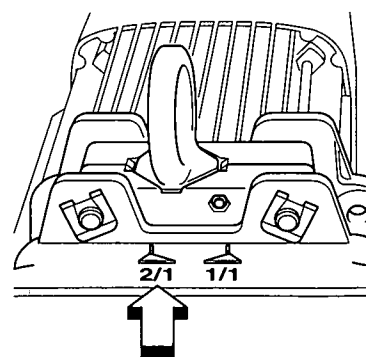
Suspension ring turned 90°
DKUN 2 - DKUN 5 - DKUN 10

1/1 reeving



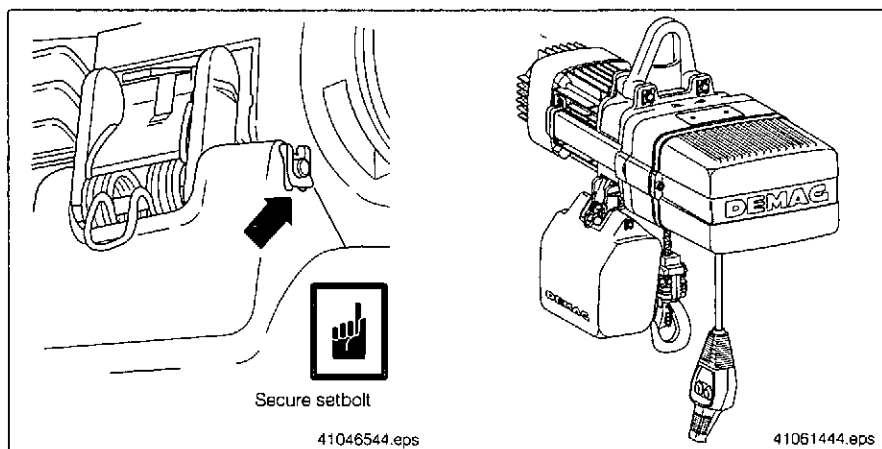
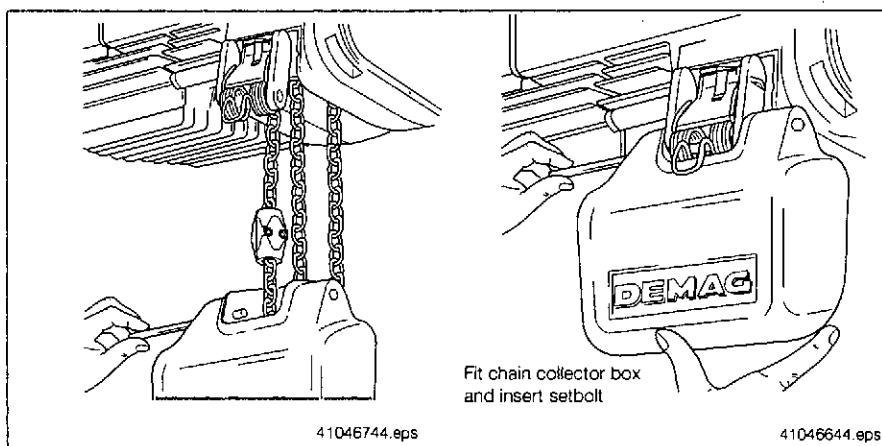
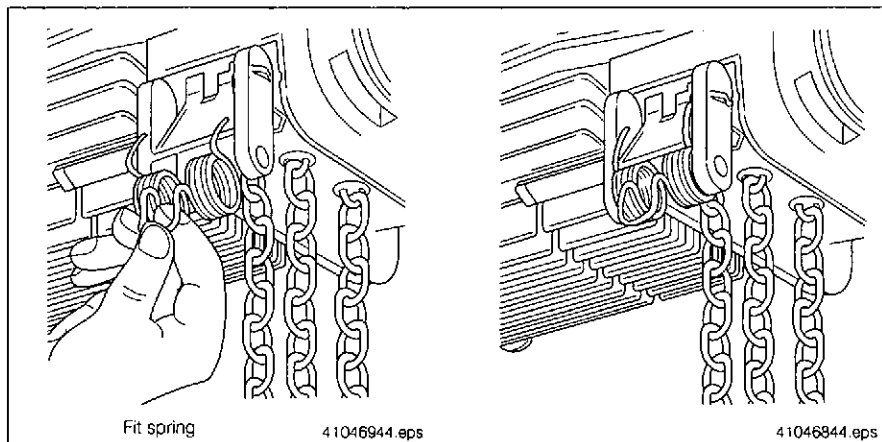
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2/1 reeving

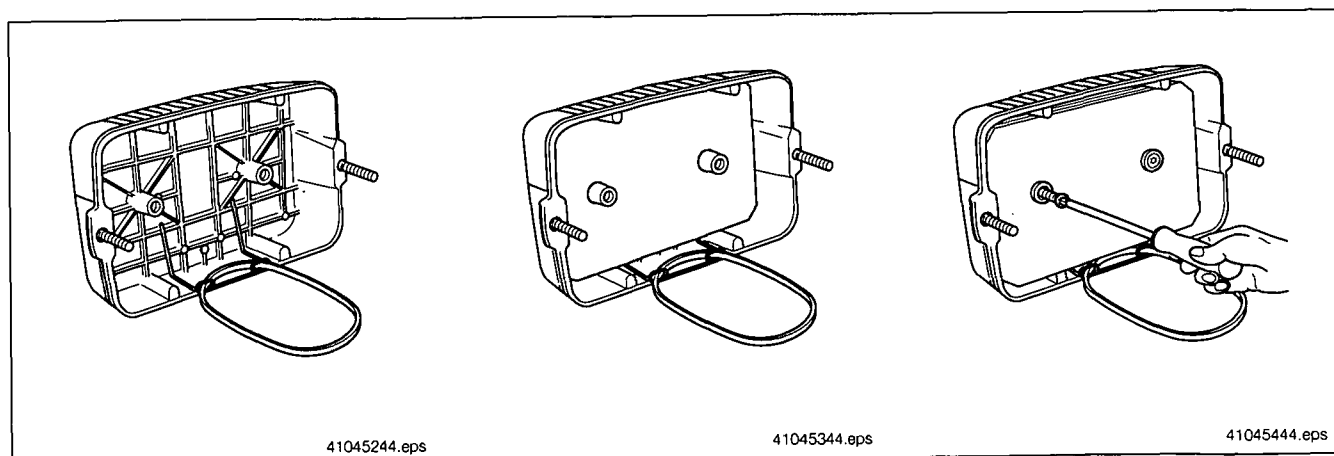
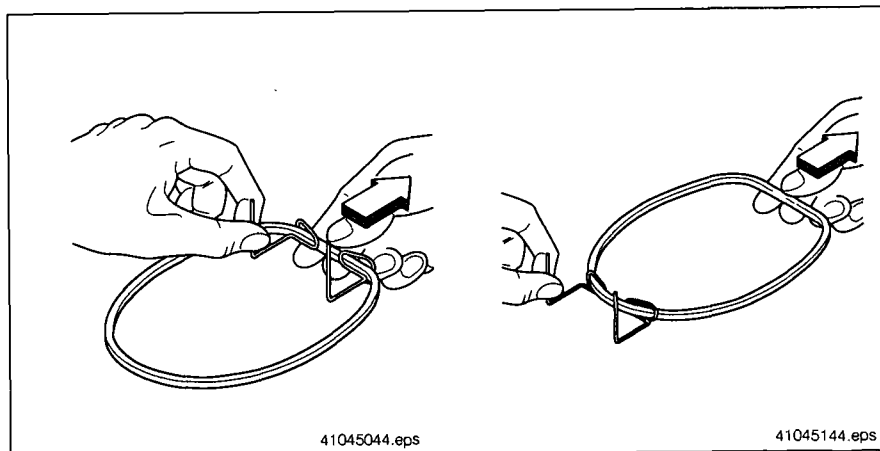
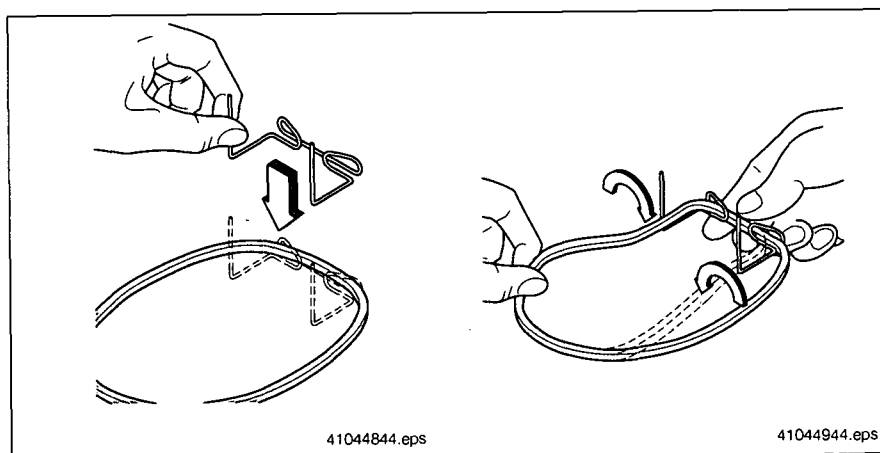
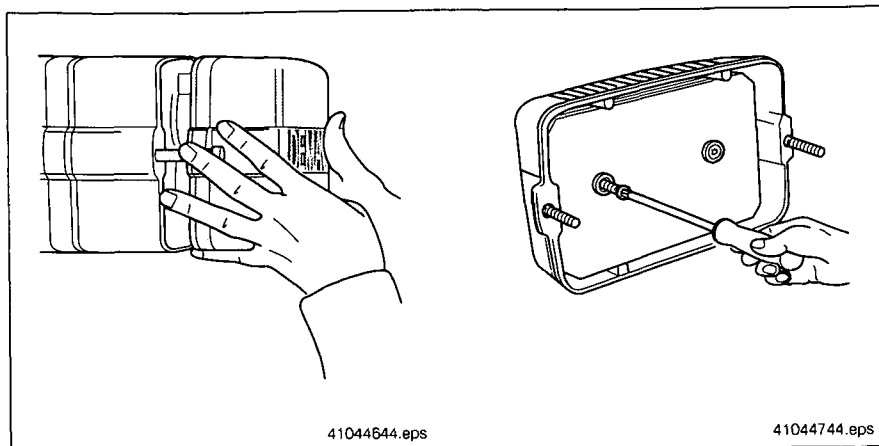


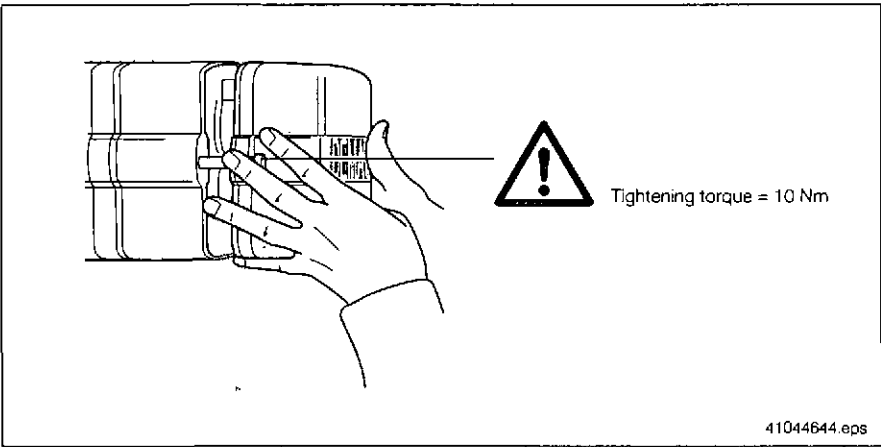
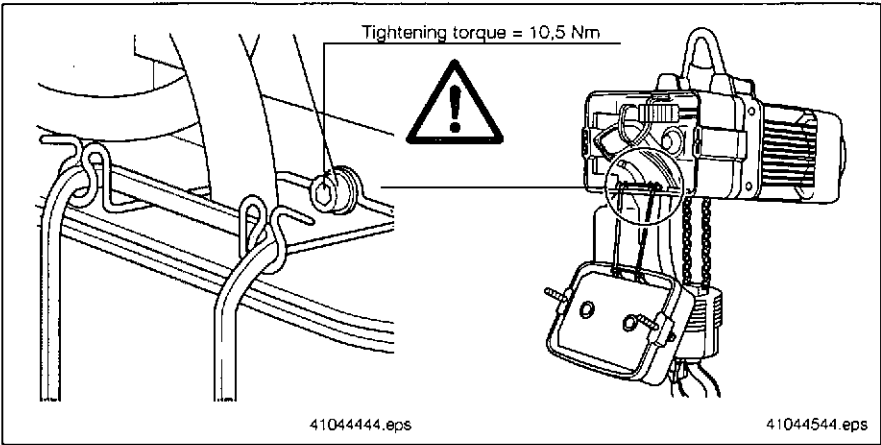
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5.12 Fitting the chain collector box



5.13 Fitting the counter-weights and cover retainer for DKUN 2/DKUN 5



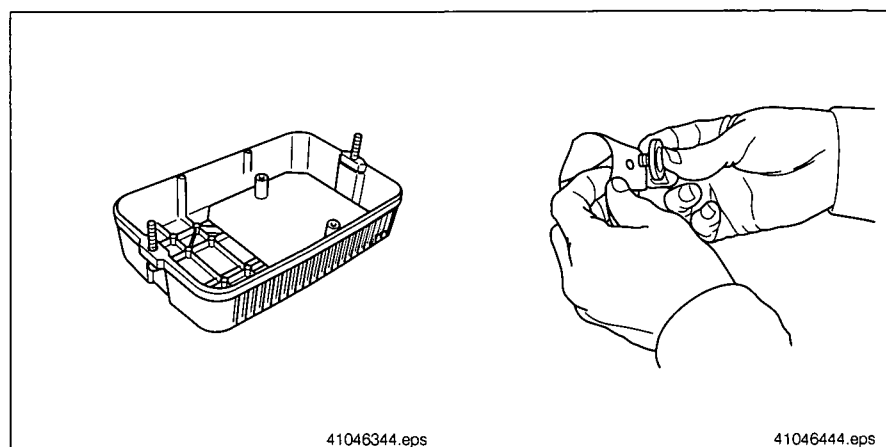
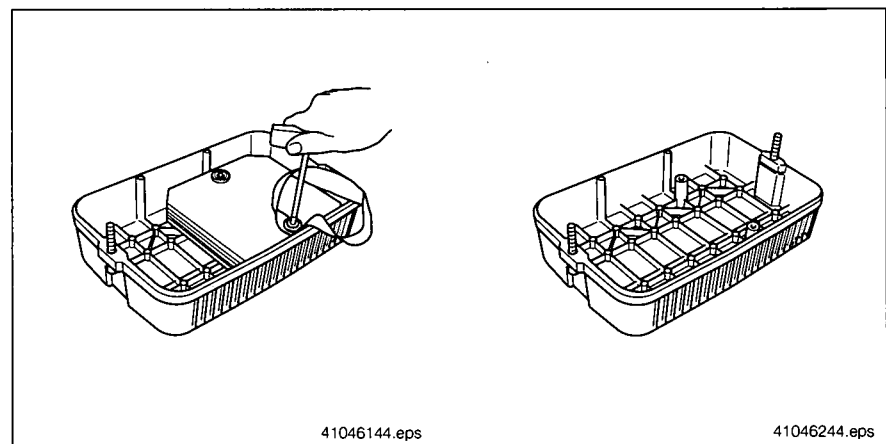
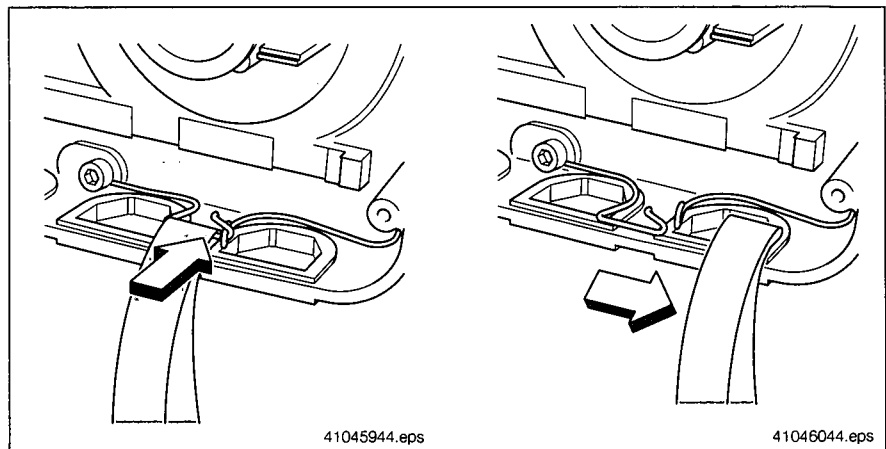
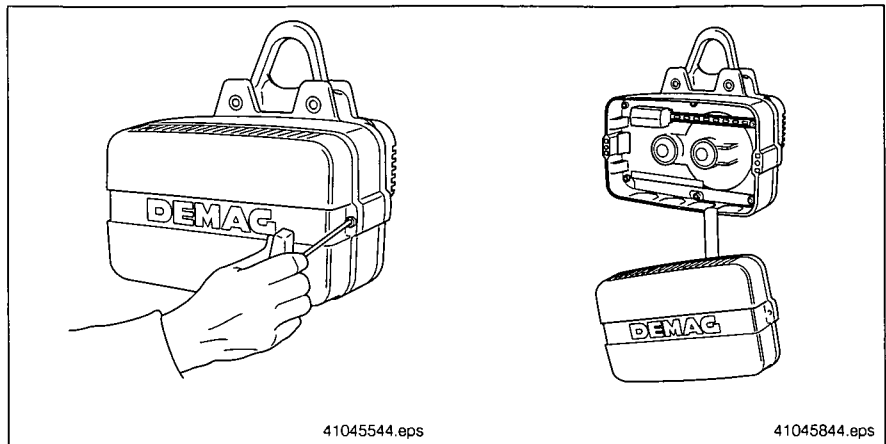


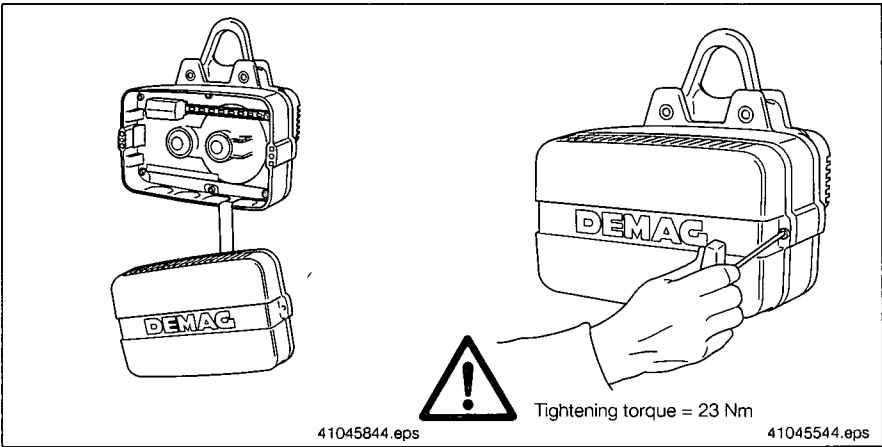
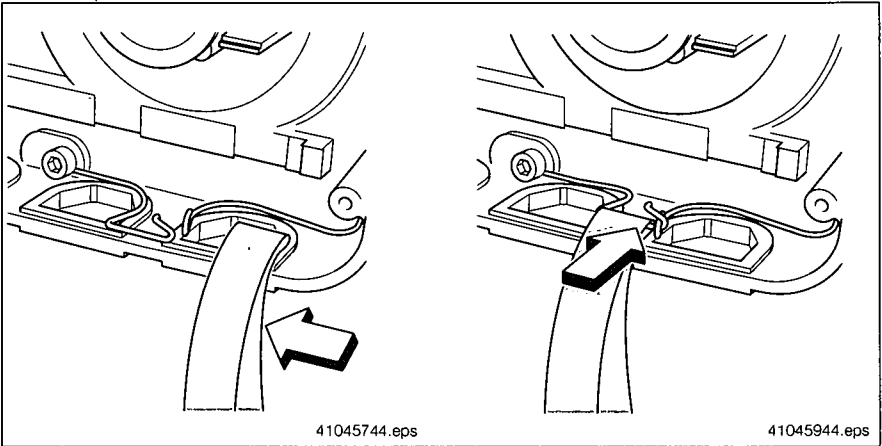
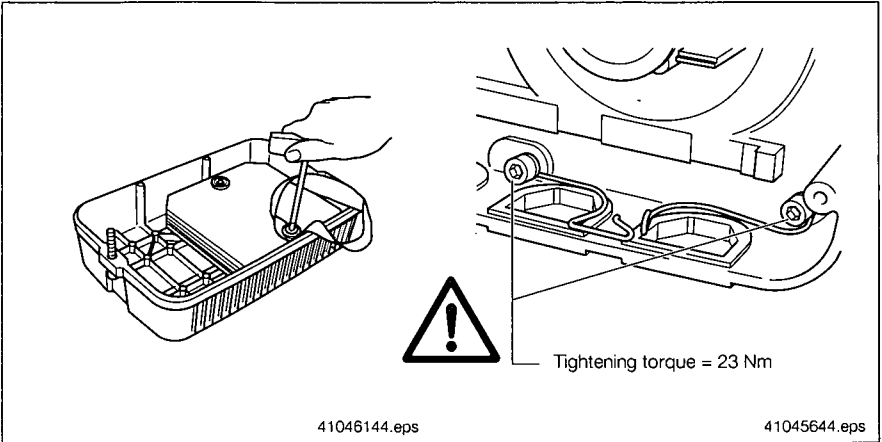
Allocation of counterweights

	DKUN 2				DKUN 5				DKUN 2				DKUN 5			
	Number of counterweights for contactor control with transformer								Number of counterweights for direct control							
	Part no.								Part no.							
	835 127 44				836 127 44				835 127 44				836 127 44			
	Motor				Motor				Motor				Motor			
	KMP	KMK			KMK			KMP	KMK			KMK				
	71 B	71 B	80 B	80 Z	71 B	80 B	90 B	90 Z	71 B	71 B	80 B	80 Z	71 B	80 B	90 B	90 Z
With short cover	-	-	-	-	-	-	-	-	4	4	8	7	3	6	-	8
With long cover	-	1	3	2	1	2	4	3	2	2	7	4	3	6	7	4

Cover retainer part no. 836 553 44

5.14 Fitting the counter-weights and cover retainer for DKUN 10 - 16 - 20



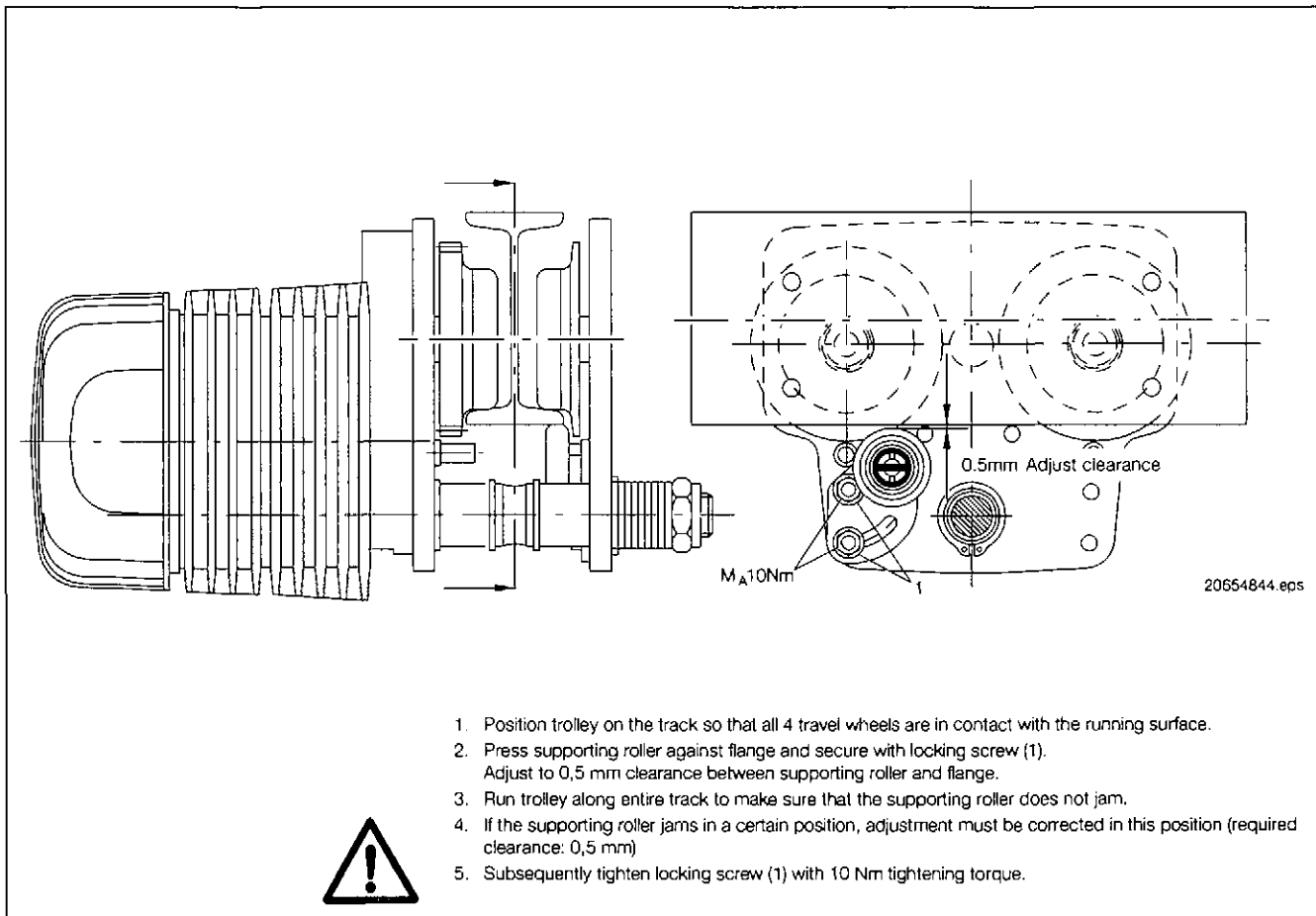


Allocation of counterweights

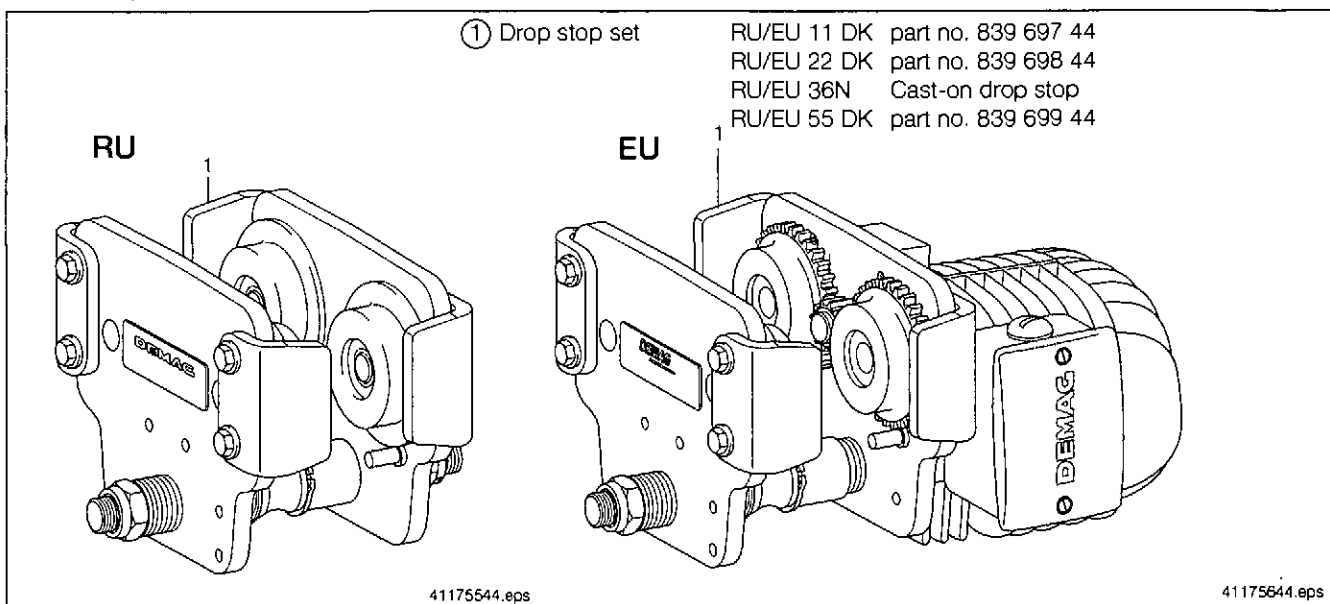
Part no.	DKUN 10/16		DKUN 20		DKUN 10/16				DKUN 20	
	Number of counterweights for contactor control with transformer				Number of counterweights for direct control					
	Motor				Motor					
	KMK 90 B	KMK 100 B	KMK 100 B 2/8	KMK 112 B 2/8	KMK 90 B with short cover	KMK 90 B with long cover	KMK 100 B with short cover	KMK 100 B with long cover	KMK 100 B with short/long cover	KMK 112 B with long cover
837 127 44	1	3	0	4	5	3	7	5	4/2	6

Cover retainer part no. 837 553 44

5.15 Fitting the supporting roller on EU 11 DK trolleys for flange widths 58 – 143 mm



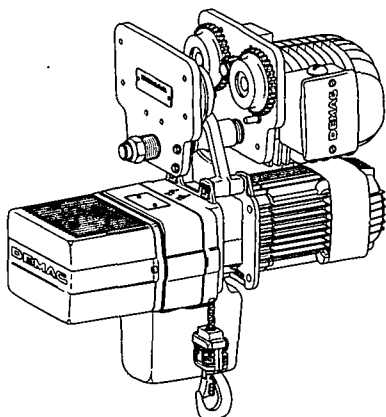
5.16 Fitting RU/EUDK drop stops



5.17 Example for mounting

EU 11 DK

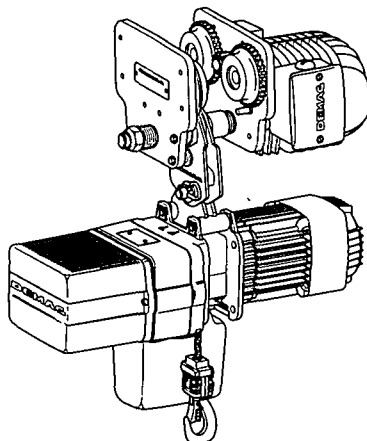
Supporting roller up to flange width
143 mm only



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EU 11 DK

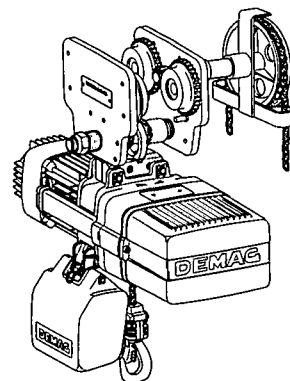
with ZMS strain gauge carrier link



40467844.eps

HU 11 DK

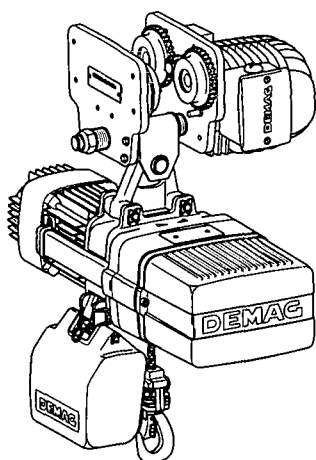
with suspension ring



40264844.eps

EU 11 DK

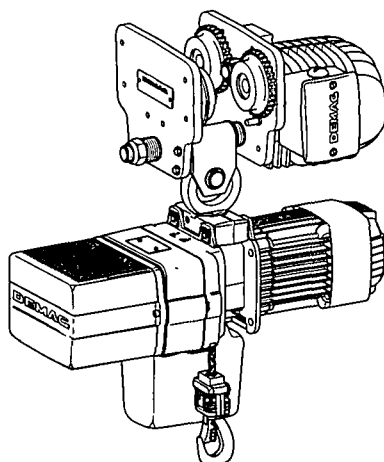
with suspension eye and crossbar yoke
from flange width 144 mm



40266344.eps

EU 11 DK

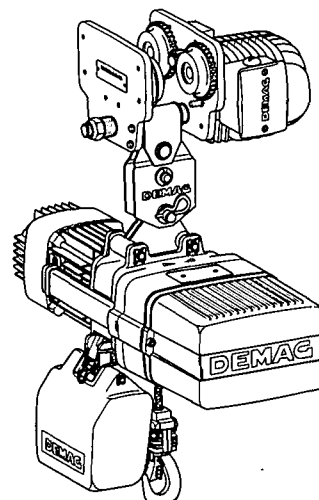
with suspension ring and trolley
crossbar yoke from flange width 144 mm



40465644.eps

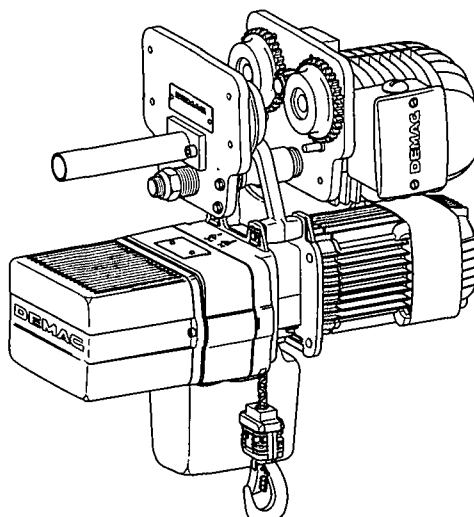
EU 11 DK

with ZMS strain gauge carrier link and
crossbar yoke from flange width 144 mm



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Current collector bracket
for RU/HU and EUDK trolleys
Part no. 839 737 44



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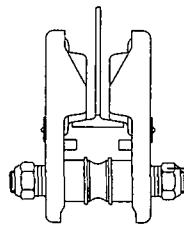
5.18 Assembling RU/HU/EUDK trolleys

Assembling RU / EU 36-N (with adjusting rings for infinitely variable track gauge), see assembly instructions 214 800 44

For further assembly and adjustment, refer to:

RU 3 DK trolleys	206 600 44	720 IS 845	EU 11 DK trolleys	206 604 44	720 IS 845
RU 6 DK trolleys	206 601 44	720 IS 845	EU 22 DK trolleys	206 605 44	720 IS 845
RU 11 DK trolleys	206 602 44	720 IS 845	RU 36-N trolleys	214 800 44	720 IS 845
RU 22 DK trolleys	206 603 44	720 IS 845	EU 36-N trolleys	214 800 44	720 IS 845
EU 11 DK trolleys	206 604 44	720 IS 845	RU 55 DK trolleys	206 580 44	720 IS 845
			EU 55 DK trolleys	206 581 44	720 IS 845

Trolley crossbars tightening torques RU 3/RU 6 DK



Tightening torque
RU 3 DK = 50 Nm
RU 6 DK = 80 Nm

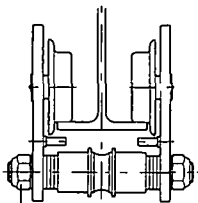


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RU 11/RU 22 DK

HU 11/HU 22 DK

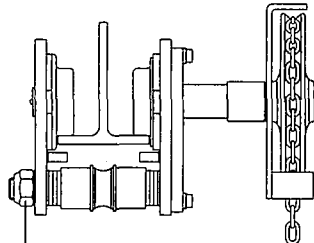
EU 11/EU 22 DK



Tightening torque
RU 11 DK = 120 Nm
RU 22 DK = 160 Nm



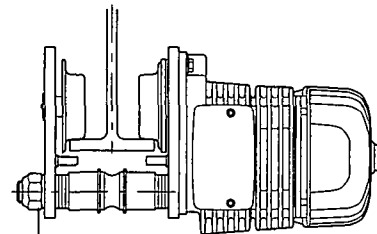
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Tightening torque
HU 11 DK = 120 Nm
HU 22 DK = 160 Nm



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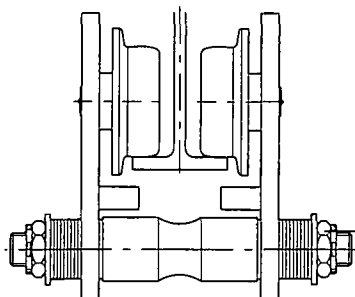
Tightening torque
EU 11 DK = 120 Nm
EU 22 DK = 160 Nm



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RU 55 DK

EU 55 DK



Tightening torque 160 Nm

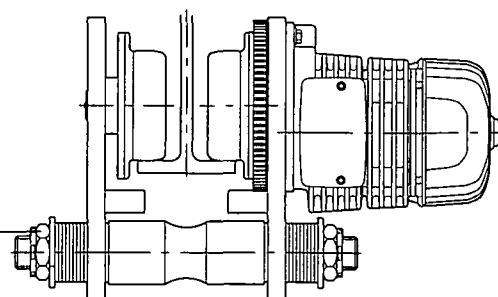
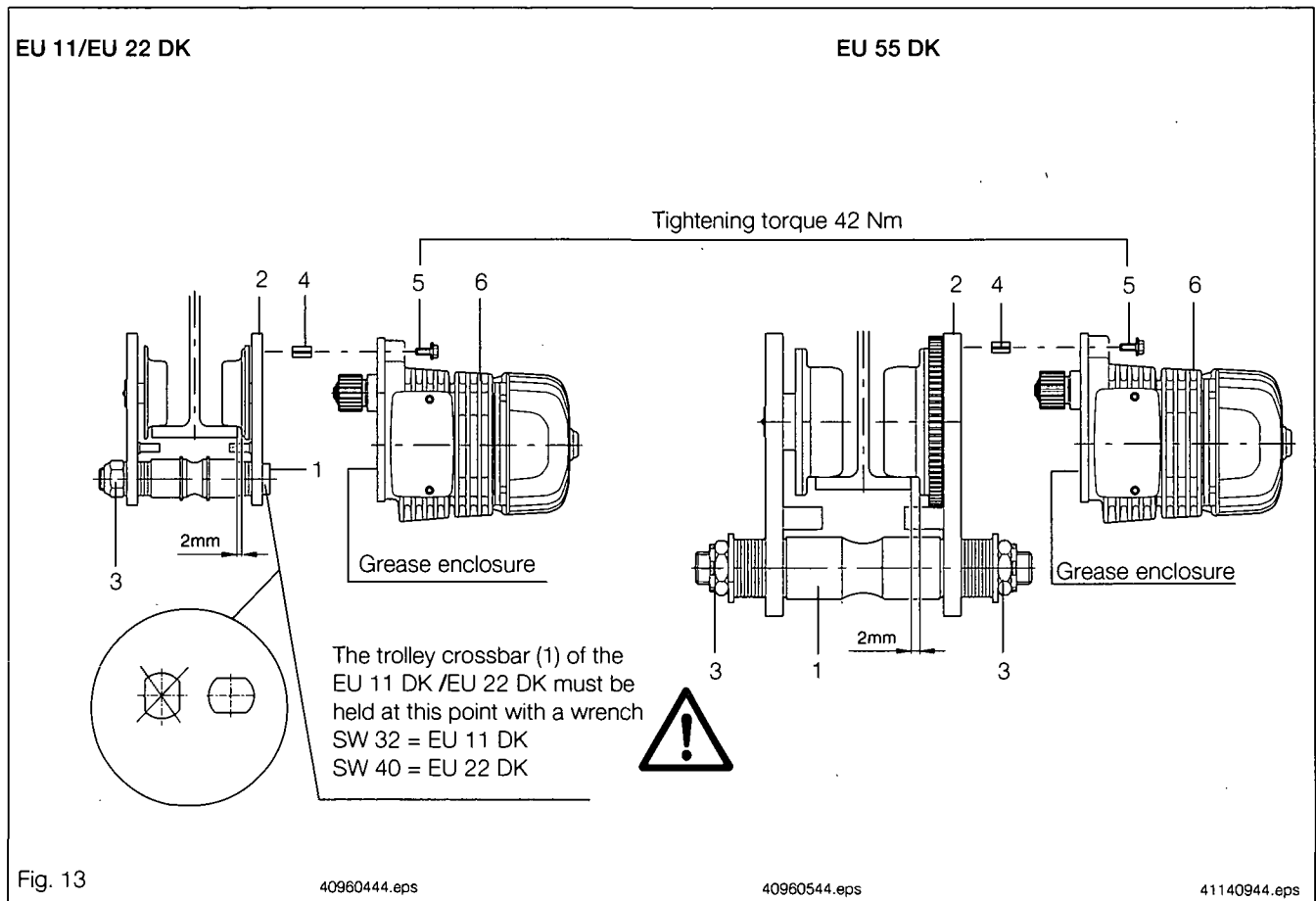


Fig. 12

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Assembling RU / EU 36-N (with adjusting rings for infinitely variable track gauge), see assembly instructions 214 800 44



Assembling the trolley

Insert trolley crossbar (1) into side cheek (2) (see fig. 13). Then adjust the trolley according to the girder flange width of the track by arranging the distance washers as specified on page 54. Assembling trolleys.

EU11/EU22 DK: The locknut (3) must be tightened to the specified tightening torque (see fig. 12).

EU 55 DK: The castle nut (3) must be tightened to the specific tightening torque (see fig. 12) and secured with a split pin.

Since girder flange width tolerances are relatively high, the gap between the travel wheel flange and the girder flange must be checked on both sides to ensure that the play does not exceed 2 mm.

Fitting the travel drive

Knock the split sleeve into the hole in the side cheek (2). Then fill the travel drive with grease – approx. 60 g, part no. 472 915 44 – see fig. 13. Screw travel drive (6) to side cheek (2) with screw (5). Fit the travel drive in such a way that the play between the teeth of the drive pinion and the two travel wheels is the same.

Removing/fitting the trolley crossbar locknut EU 11/EU 22 DK



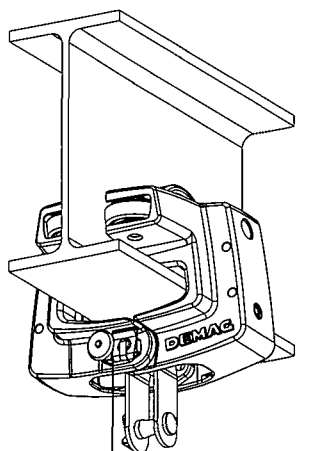
If the locknut is completely removed from the crossbar, a new locknut acc. to DIN 985 must be used.

The locknut can be screwed onto the trolley crossbar for pre-assembly without being pre-tensioned.

For final assembly, only unscrew the locknut until the trolley can be placed on the girder.

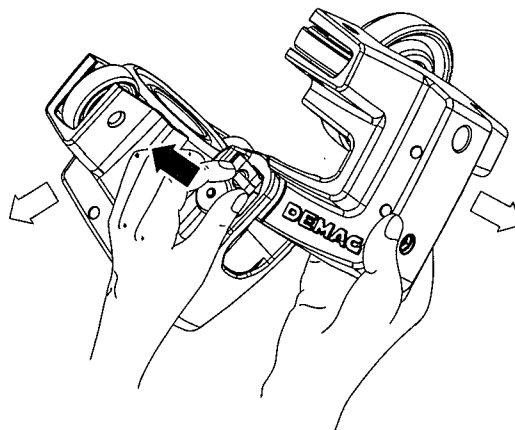
Then tighten the locknut with the specified tightening torque (see fig. 12).

5.19 Fitting the CF 5 trolleys



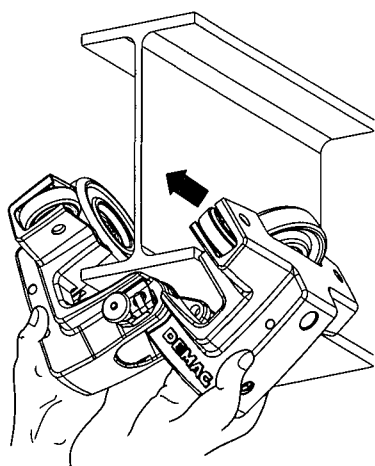
Locking element

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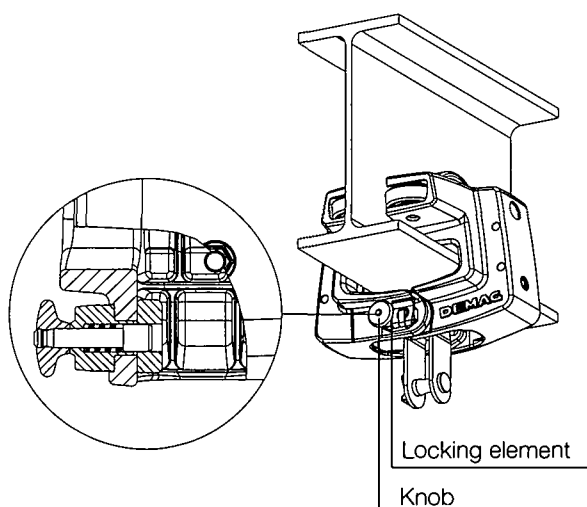
1. Unlock locking element (see figure).
2. Open trolley.

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1. Place trolley travel roller on girder flange.
2. Close trolley.

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Locking element

Knob

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When the trolley is fitted, the locking element must be clearly heard to lock into place. The knob used to unlock the trolley must be fully pushed into the locking element.

The trolley guide rollers come into contact with the girder when a load is suspended.

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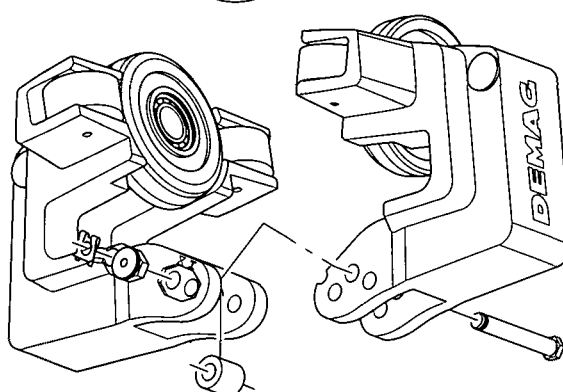
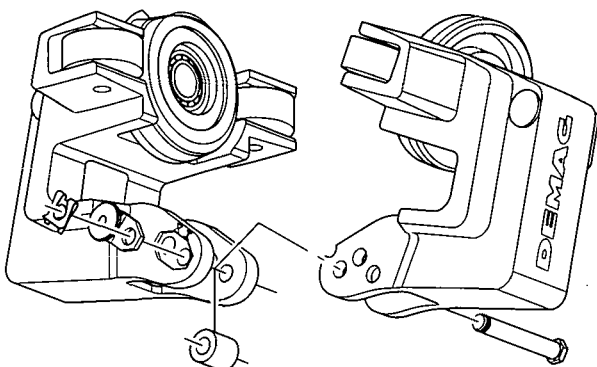
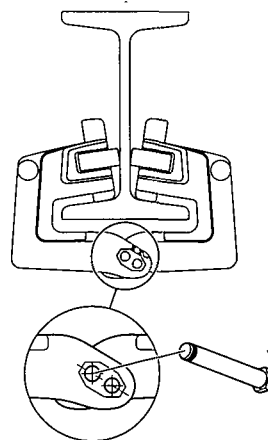
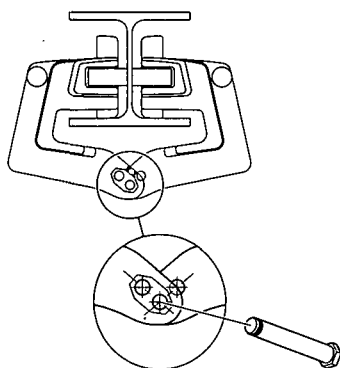
5.20 Fitting the CF 8 trolleys



Pay attention to girder type!

Girder to DIN 1025, parts 2, 3 and 5

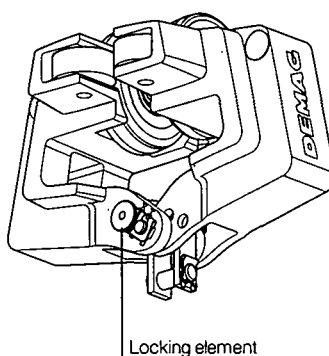
Girder to DIN 1025, part 1



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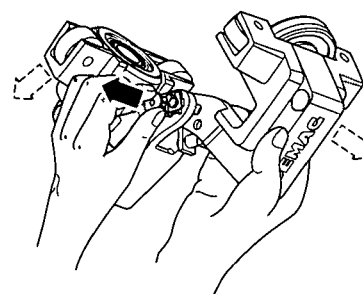
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Fitting the trolleys



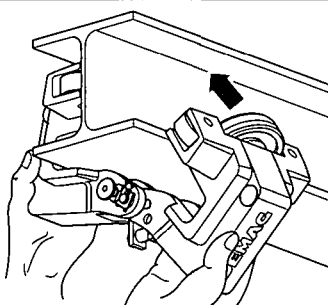
Locking element

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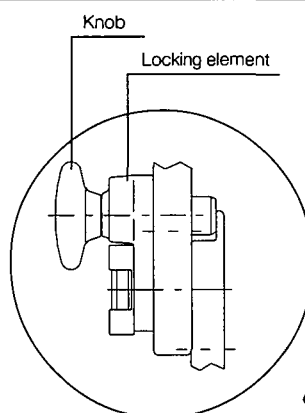
1. Unlock locking element (see figure).
2. Open trolley.

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1. Place trolley travel roller on girder flange.
2. Close trolley.

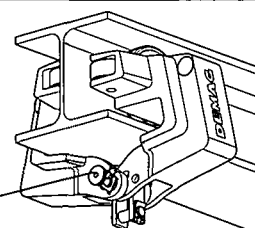
41415044.eps



Knob

Locking element

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When the trolley is fitted, the locking element must be clearly heard to lock into place. The knob used to unlock the trolley must be fully pushed into the locking element. The trolley guide rollers come into contact with the girder when a load is suspended.

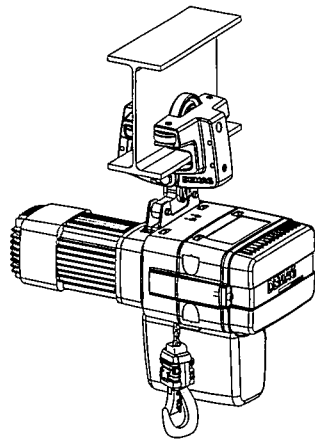


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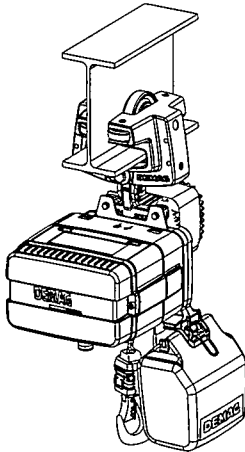
Examples for mounting CF 5 trolleys

DK – at right angles to track girder



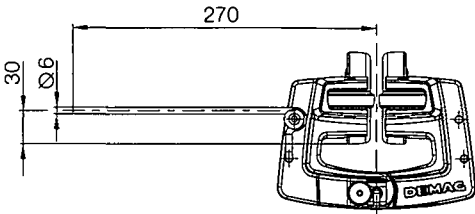
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DK – parallel to track girder



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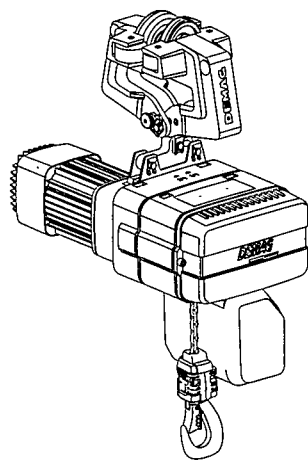
Current collector bracket
Part no. 840 085 44



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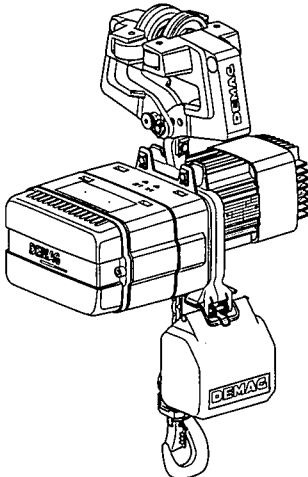
Examples for mounting CF 8 trolleys

DK – at right angles to track girder



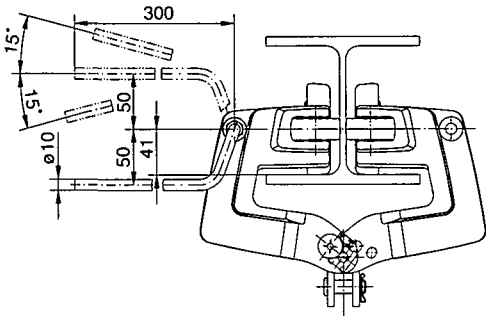
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DK – parallel to track girder



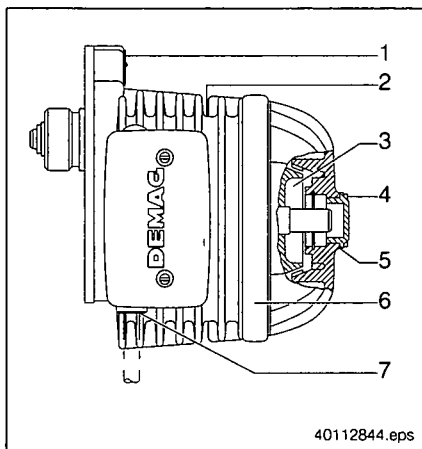
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Current collector bracket
Part no. 840 055 44



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5.21 Converting the travel drive for arduous operating conditions



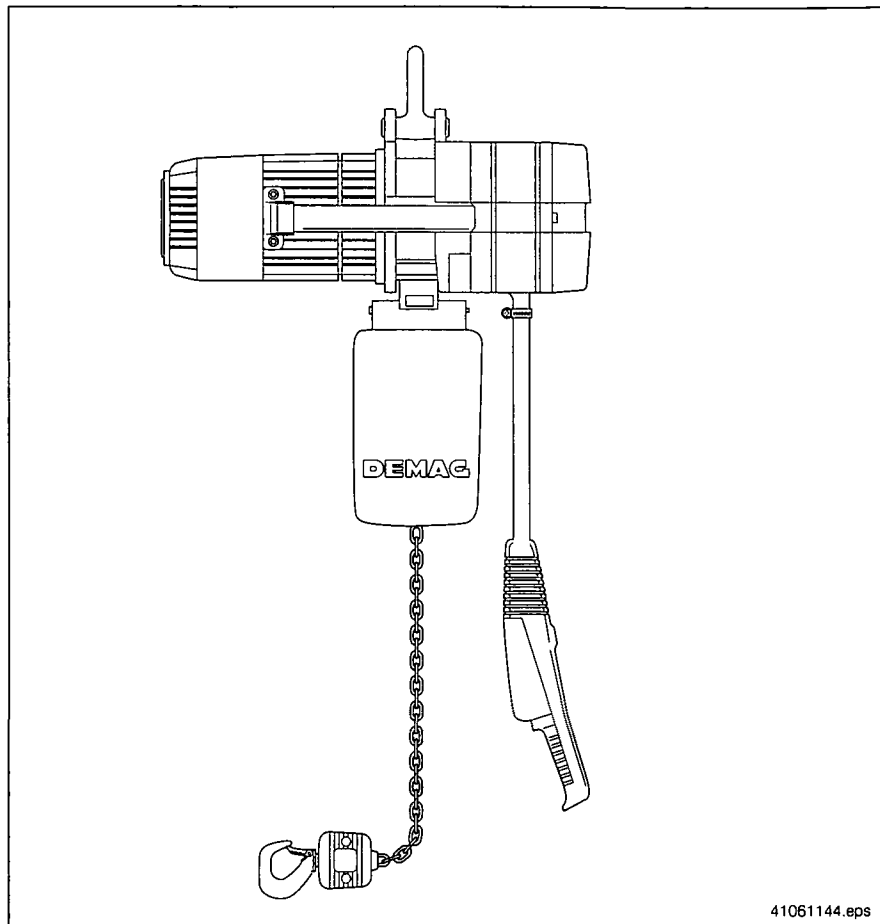
Conversion to IP 55

To convert, proceed as follows:

1. Seal centring collar (2) using Loctite 573.
2. Replace standard rotor assembly (3) with a new one with weather-proof braking surface.
3. Fit motor seal (6) between motor end cap and stator.
4. Place sealing ring (5) under cover (4).
5. Replace twist-type cable entry glands and plugs by cable entry bushes with gland nuts and screw plugs with sealing rings (7).
6. Stamp IP 55 and all other relevant data on blank rating plate (1) and fit this plate instead of the existing one. Replace all twist-type cable entry glands and plugs of the electrical equipment casing by cable entry bushes with gland nuts and screw plugs with sealing rings.

6 Putting the Demag chain hoist into service

When determining the hook path/lifting height, make sure that when in the lowest hook position, the load hook or bottom block is lying on the floor (limit stop at the dead end of the chain should not touch the chain guide base plate).



6.1 Inspection when putting the hoist into operation

When putting the hoist into operation for the first time, the inspections in accordance with section 8.3, table 2 must be carried out.

6.2 Safety instructions



All fitting and assembly work must be completed in accordance with the operating instructions and the hoist chain must be greased.

Operation with defective or damaged chains results in a high risk of accident for persons and the chain hoist and is therefore prohibited.

Any change or modification which prejudices safety must be reported to the nearest person responsible immediately. Unauthorized repairs are not permitted.

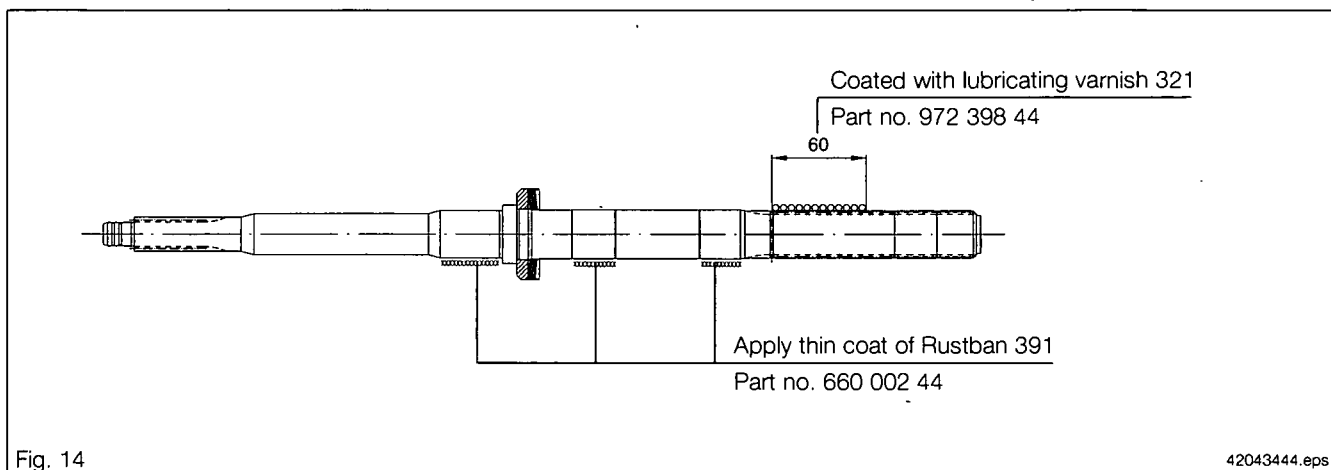
6.3 Starting operation

See section 8.1

6.4 Notes regarding the motor

The surfaces marked on the motor shaft shown in fig. 14 are preserved with Rustban 391. The involute spline is coated with lubricating varnish 321.

The preservative and the lubricating varnish must not be removed when dismantling the motor. When maintenance is carried out, the surfaces marked below must be checked and a new coat must be applied, if, required.

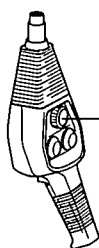


The red paste which can be seen in the area of the braking surface is used for preservation until putting into operation and running in the braking surface of the motor.

This preservative must not be removed, however, it is not necessary to apply it again during maintenance.

7 Taking the Demag chain hoist out of service

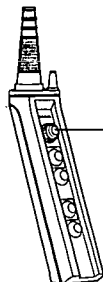
DSK



Emergency-stop button

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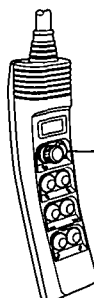
DST



Emergency-stop button

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DSE



Emergency-stop button

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7.1 Emergency-stop button

Every chain hoist features an emergency-stop device with which all motions can be stopped in the event of a hazard.

The emergency-stop button is arranged on the control pendant.

To actuate the emergency-stop button, press the button until it reaches the end stop and automatically latches.

To unlock the actuated emergency-stop button, turn the push button in the direction of the arrows and release.

The emergency-stop device must only be reset after the hazard and its cause have been eliminated.

7.2 Taking the hoist out of service at the end of the shift

When the work has been completed, raise the hook assembly or bottom block outside the travel area. Switch off the power supply at the mains connection or isolating switch.

7.3 Taking the hoist out of service for maintenance purposes

Maintenance work on the Demag chain hoist must not commence before the load has been removed and the mains switch/isolator switched off.

The relevant accident prevention regulations and statutory regulations must be observed for operation and maintenance.

Tests and inspections required in addition to those specified in the maintenance schedule (see table 2) must be carried out, see also section 1 "Safety instructions".

8 Inspections/maintenance/general overhaul GO

8.1 Inspection before starting work and during operation

The operator must carry out inspections in accordance with table 2 before starting work. Chain hoists must be taken out of service immediately or not put into operation if any defects relating to operating safety and reliability are detected.

Such defects are e.g.:

- brake and safety device failure,
- damage to the chain,
- unusual noise in the gearbox, etc.

8.2 Inspection and maintenance schedule



The specified inspection and maintenance intervals (table 2) apply to normal chain hoist service conditions.

If routine maintenance reveals that the intervals are too long or too short, they should be adapted to the specific operating conditions.

For repairs, only use genuine Demag parts (see component parts list).

The use of spare parts not approved by Demag renders any liability and guarantee claims void.

8.3 General overhaul GO



The theoretical duration of service D (hours at full load h) depends on the Group of Mechanisms classification of the chain hoist (see section 9, table 4).

Upon expiration of 90 % of the theoretical duration of service – if the chain hoists are correctly classified after 8 to 10 years – the owner must arrange for a general overhaul GO to be carried out. A general overhaul must be carried out on reaching the theoretical duration of service at the latest.

During the general overhaul the following parts must be replaced in addition to the checks and work specified in the inspection and maintenance schedule (see table 2).

- Gearing
- Gearbox bearings
- Motor shaft
- Motor bearings
- Connection elements
- Gear oil

The small parts (screws, washers ...) to be replaced during maintenance and assembly work are not listed separately.

The general overhaul carried out by the manufacturer or an authorized specialist company fulfills the condition for continued operation of the chain hoist. Thus the relevant accident prevention regulations and the UvV/BGV D8 (VBG 8) are complied with.

Further utilization is approved when an expert engineer has entered the conditions for further utilization into the test and inspection booklet. The completion of the general overhaul must be confirmed in the test and inspection booklet and a further period of utilization in accordance with FEM 9.755 must be entered.

The general overhaul may be carried out by expert engineers of Demag or an authorized specialist company.

Table 2
Inspection and maintenance schedule

Check when putting into operation, when starting operation and during operation	See section	Before putting into operation	When starting operation	Every 6 months	Once per year
Lubricate chain (under heavy-duty conditions the chain must be lubricated more frequently)	8.5	X	X		X
Check electrical switchgear and wiring	5.1	X		X	
Check operation of emergency limit switch, if fitted		X	X		X
Check strain relieving elements, control cables and control pendant housing for damage		X	X		X
Check operation of the slipping clutch	8.9	X			X
Check operation of the brake	8.6	X	X		X
Check hook and hook safety catch		X	X		X

Check during operation

Check and apply further grease to bearing points of suspension eyes, suspension hook assembly and suspension eye turned 90°, as required	5.11-5.12-5.18-5.19-5.20				X
Check brake stroke, adjust brake or replace brake cup, as required	8.6				X
Check trolley crossbar connection	5.18				X
Check suspension eye, locking elements, bracket for suspension eye and securing elements (clips, etc.)	5.11				X
Check suspension eye/suspension hook assembly and ensure suspension eye turned 90° is properly secured	5.11				X
Check tight fit of securing bolts on load hook assembly	5.9				X
Check hooks for cracks, deformation and wear	8.4				X
Check hook safety catch for deformation					X
Check hook bearing for wear					X
Bottom block: lubricate chain sprocket bearing and check tight fit of securing bolts	5.10				X
Check chain sprocket, return sprocket and chain guide					X
Check chain and chain collector box are properly secured	5.12				X
Check chain for deformation, cracks, pitting, reduction in the thickness of the links or increase in pitch due to wear, elongation caused by deformation	8.5				X
Check securing elements (clips, bolts, etc.) for tight fit and corrosion	5.11-5.12-5.18-5.19-5.20				X
Check and apply or supplement corrosion protection, as required					X
Check electrical enclosure seals					X
Check trolley, crossbar and condition of buffers	5.18-5.19-5.20				X
Check lubrication of geared travel rollers of monorail hoist	8.8				X
Check oil level					X
Change oil	8.7	every 4 - 5 years			
Check bearing points of rotor for corrosion	6.4	every 5 years			

General overhaul

The general overhaul should coincide with the annual inspection		On reaching the theoretical duration of service
Fit chain-hoist specific Demag GO set	8.3	X

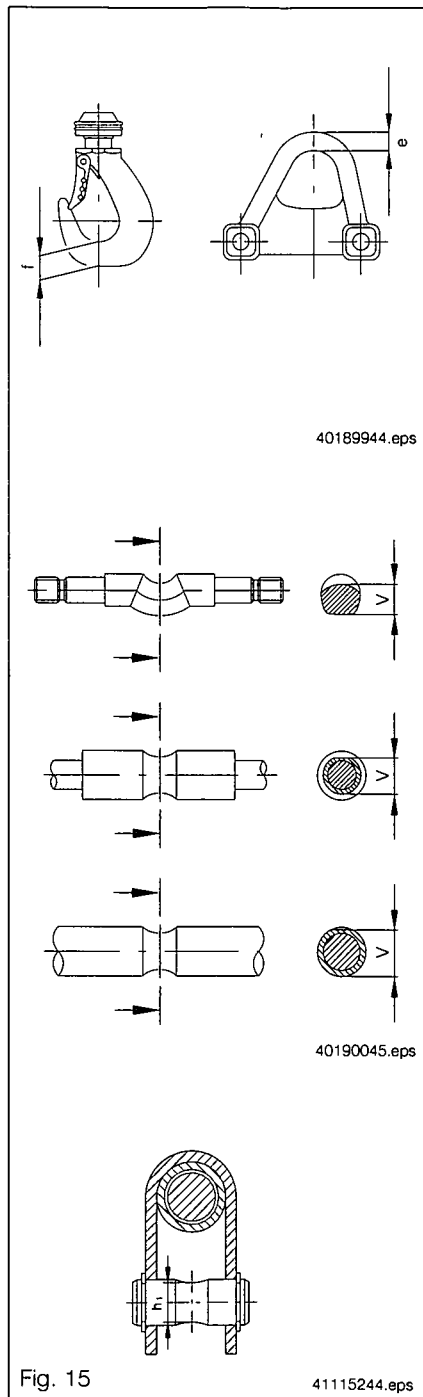
The small parts (screws, washers ...) to be replaced during maintenance and assembly work are not listed separately. The tasks specified in the inspection and maintenance schedule must be carried out during a GO.



The specified maintenance intervals apply to normal chain hoist service conditions. If the annual calculation of the actual duration of service S indicates that the theoretical duration of service D will be reached before a period of 8 – 10 years, regular maintenance work must be adapted to the operating conditions and maintenance must be carried out at shorter intervals. For repairs, only use genuine Demag parts (see component parts list).

8.4 Suspension eye, hook, trolley crossbar

If a check or inspection reveals that these components are worn beyond the dimensions shown in fig. 15 and the tables, or if cracks can be seen in these parts, they must be replaced at once. See pages 42 – 45 for replacing the hook in the load hook assembly or in the bottom block.



Chain hoist DK		DKUN 2	DKUN 5	DKUN 10	DKUN 16	DKUN 20
Range						
Suspension eye min. dimension e		13	17	24,5	24,5	30
Load hook min. dimension f for reeving	1/1	16,2	19,35	23,6	31	31
	2/1	19,35	23,6	30,95	35	44

Trolley for DKUN 2

Range	RU 3	RU 6		RU11/EU11	
Flange width mm	58-90	58-143	144-300	58-143	144-300
Trolley crossbar min. dimension v	16	24	30	30	
Trolley crossbar min. dimension h1	-	-	14,5	-	17,5

Trolley for DKUN 5

Range	RU 3	RU 6		RU11/EU11	
Flange width mm	58-90	58-143	144-300	58-143	144-300
Trolley crossbar min. dimension v	16	24	32	30	38,5
Trolley crossbar min. dimension h1	-	-	14,5	-	17,5

Trolley for DKUN 10

Range	RU 6		RU 11/EU 11		RU 22/EU 22	
Flange width mm	58-143		58-143	144-300	82-143	144-300
Trolley crossbar min. dimension v	24	32	30	38,5	45,5	
Trolley crossbar min. dimension h1	-	14,5	-	17,5	-	26,5

Trolley for DKUN 16

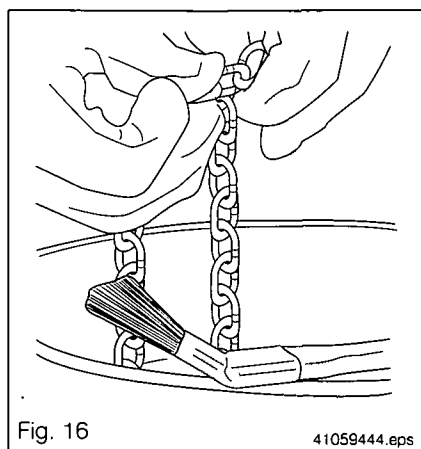
Range	RU 22/EU 22		RU 36-N/EU 36-N	
Flange width mm	82-143	144-300	90-180	181-300
Trolley crossbar min. dimension v	45,5		44	43
Trolley crossbar min. dimension h1	-	26,5	-	

Trolley for DKUN 20

Range	RU 22/EU 22		RU 36-N/EU 36-N		RU 55/EU 55	
Flange width mm	82-143	144-300	90-180	181-300	106-186	187-300
Trolley crossbar min. dimension v	45,5		44	43	57	67

8.5 Hoist chain

The original Demag chain is a tested round section steel chain which is subject to the directives for round section steel chains in hoisting operation of the Main Association of Industrial Employers' Mutual Insurance Societies, Central Department for Accident Prevention and to the test criteria for round section steel chains in hoisting operation and to the inspection regulations according to DIN 685 part 5 Nov. 1981 as well as accident prevention regulations BGV D8 (VBG 8) and BGV D6 (VBG 9).



8.5.1 Lubricating the chain when putting the hoist into operation and during subsequent operation



Before fitting, before lifting a test load and commissioning and during normal operation, the contact surfaces of the chain must be lubricated with a gear grease, part no. 472 918 44, along the entire length of the chain, which must be free of load.

The contact surfaces of chains must be relubricated – after being cleaned – at intervals depending on service and load conditions. The lubricant should preferably be applied with a brush (see fig. 16).

A dry film lubricant should be used in environments where abrasives occur (emery, sand, etc.).



8.5.2 Checking wear or deformation of the original Demag chain

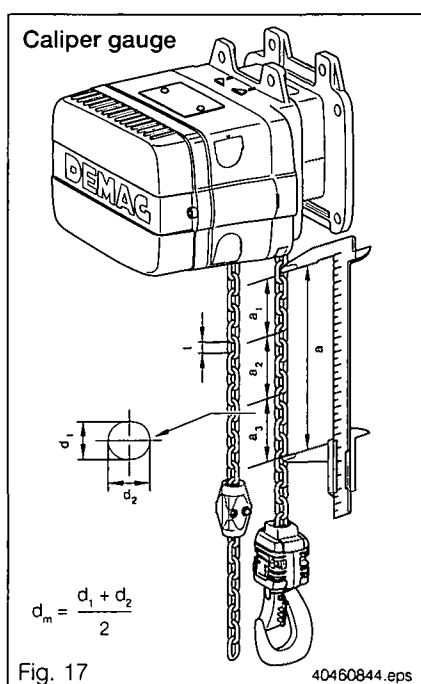
In addition to selecting the correct hoist unit, owners of electric chain hoists are obliged by relevant accident prevention regulations to constantly check the round section steel chain in order to ensure optimum operating safety and, therefore, to avoid serious accidents.

Where normal duty conditions prevail, the chain should be checked once a year (see section 8.2, table 2).

If routine maintenance reveals that the intervals are too long, they should be adapted to the specific operating conditions.

A partial load must be suspended from the load hook when measuring the chain for wear or deformation. This measurement can be taken in two different ways.

1. As in fig. 17 with a caliper gauge
2. As in fig. 18 with a chain gauge



Measuring with the caliper gauge

Measurements on 11 chain links may be taken in steps of 2 x 3 and 1 x 5 chain links (see table 3 and fig. 17).

The sum total of the 3 readings taken, i.e. $a_1 + a_2 + a_3$, must not exceed limit a in table 3. Otherwise, the chain must be replaced.

Since this is a chain of special manufacture with the name Demag stamped on every 12th link for chain size 4,2 x 12,2 and 5,3 as well as every 10th link for chain sizes 7,4 x 21,2 – 8,7 x 24,2 and 10,5 x 28,2 replacements must not be procured from any source other than Demag.

Do you find that, on fitting a new chain, it does not run smoothly over the sprocket? Please contact our after-sales service centre.



The use of chains other than those supplied by Demag is not permitted.

Chains and chain sprockets are designed to fit each other precisely. Your using a chain of a make other than Demag renders any liability and guarantee claims null and void.

Table 3

Demag chain hoist	DKUN 2	DKUN 5	DKUN 10	DKUN 16	DKUN 20
Chain designation d x t	4,2 x 12,2	5,3 x 15,2	7,4 x 21,2	8,7 x 24,2	10,5 x 28,2
Limit dimensions according to DIN 685 part 5					
Overall length of 11 links, maximum dimension $a = a_1 + a_2 + a_3$	144,7 mm	180,3 mm	253 mm	289,2 mm	337,4 mm
Inside length of 1 link, maximum dimension t	12,8 mm	15,9 mm	22,4 mm	25,5 mm	29,8 mm
Measuring the chain link diameter, (see fig. 17) Minimum dimension $d_m = 0,9 \times d$	3,8 mm	4,8 mm	6,7 mm	7,8 mm	9,45 mm

Refer to sections 5.9 and 5.10 for replacing the chain when required.



When the chain hoist is operated with a dry-running chain, the chain guide, chain sprocket and return sprocket of the bottom block must also be replaced when the chain is replaced.

Chain gauge

Part no. 836 025 44

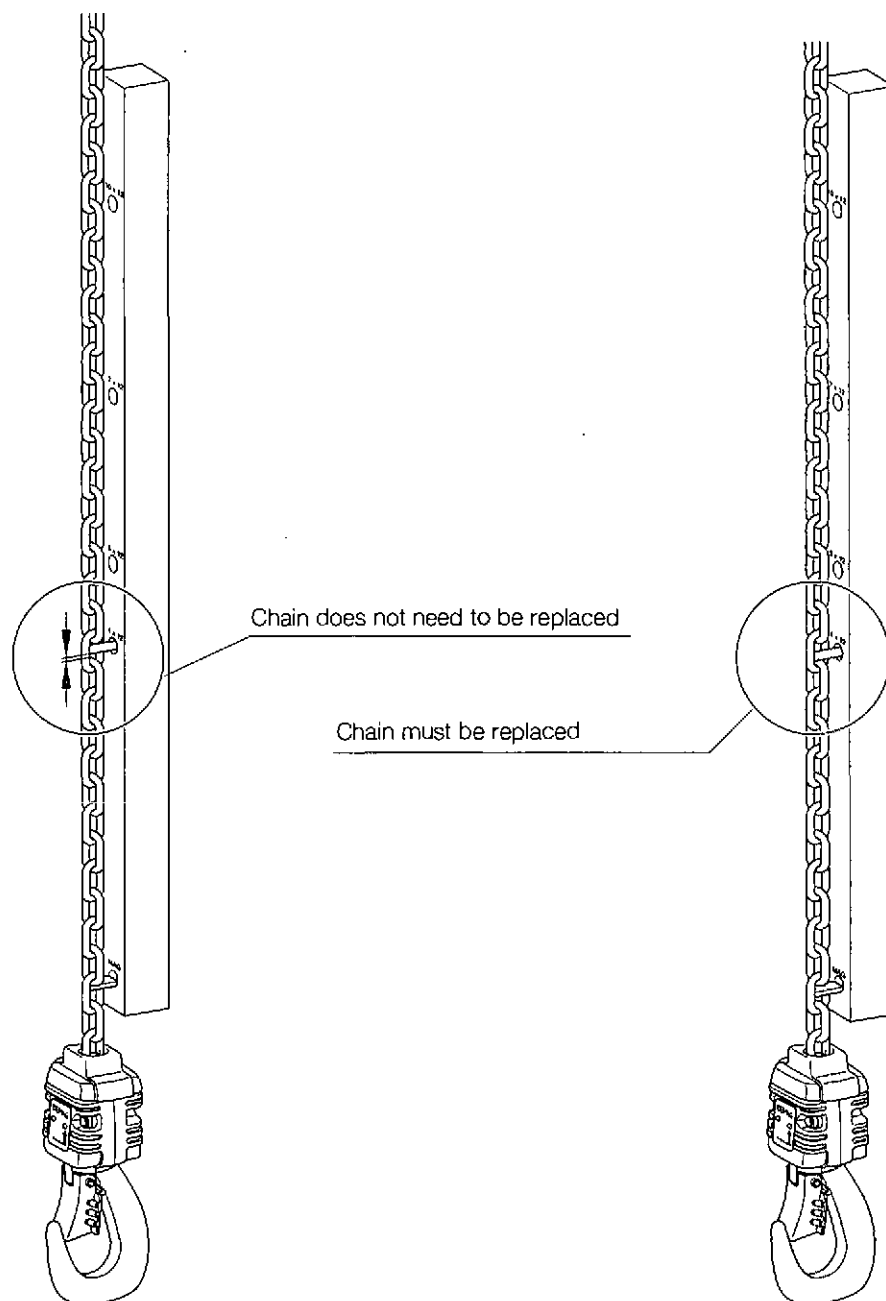


Fig. 18

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8.6 Brake

8.6.1 KMK main hoist motor brake and KMF travel motor brake 80



Demag chain hoists are supplied with the brake adjusted for the minimum rotor displacement path of approx.

1,5-2,0 mm for 71, 80, 90 motors and

1,8-2,3 mm for 100, 112 motors.

Number of shims

Motor	Quantity	Shim thickness
71/80	2 x 5	0,8 mm
90	2 x 6	0,8 mm
100	2 x 9	1 mm
112	2 x 10	1 mm

As the brake lining wears down, the path of rotor displacement increases.

The brake must be adjusted before the path of displacement has reached a maximum of 3,0 mm for 71, 80, 90 motors and 3,5 mm for 100, 112 motors.

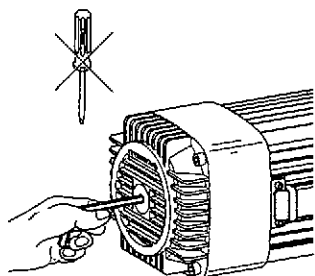
It is therefore imperative to ensure, by regular maintenance, that the brake is adjusted before the maximum rotor displacement is reached.

For brake adjustment the load must be removed from the chain hoist.

Adjustment can be repeated several times.

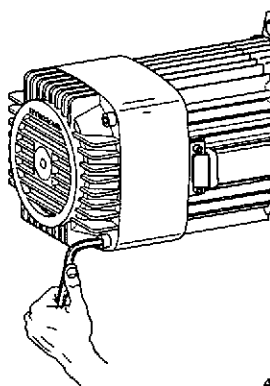
It is advisable to have a spare brake cup in stock.

8.6.2 Adjusting the brake with shims

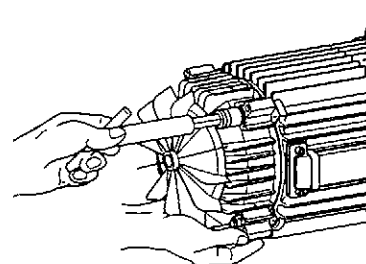


Measure the path of rotor displacement of the KMK 100/112 motor in braking and running positions.

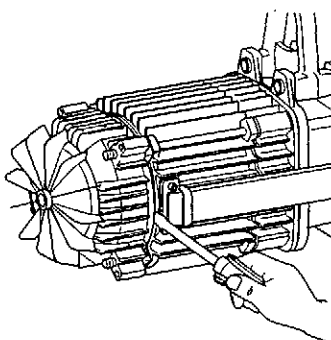
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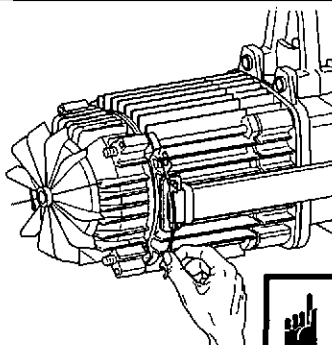


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Loosen brake shield

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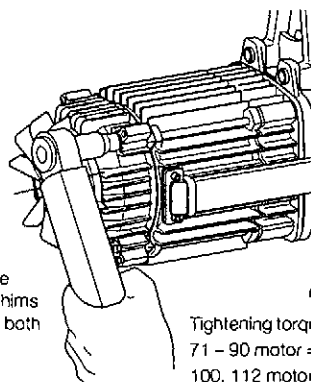


Remove shims to adjust the rotor displacement.

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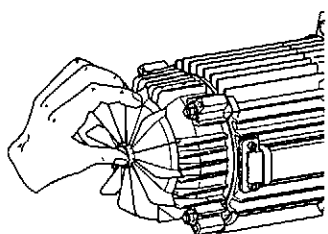


Ensure same number of shims are fitted on both sides



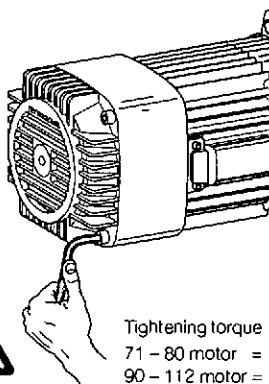
Tightening torque
71 - 90 motor = 10,5 Nm
100, 112 motor = 25 Nm

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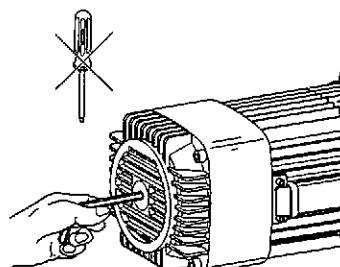
Measure the path of rotor displacement 71 - 90 motor
Check rotor displacement (approx. 1,5 - 2 mm displacement)

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Tightening torque
71 - 80 motor = 3 Nm
90 - 112 motor = 5 Nm

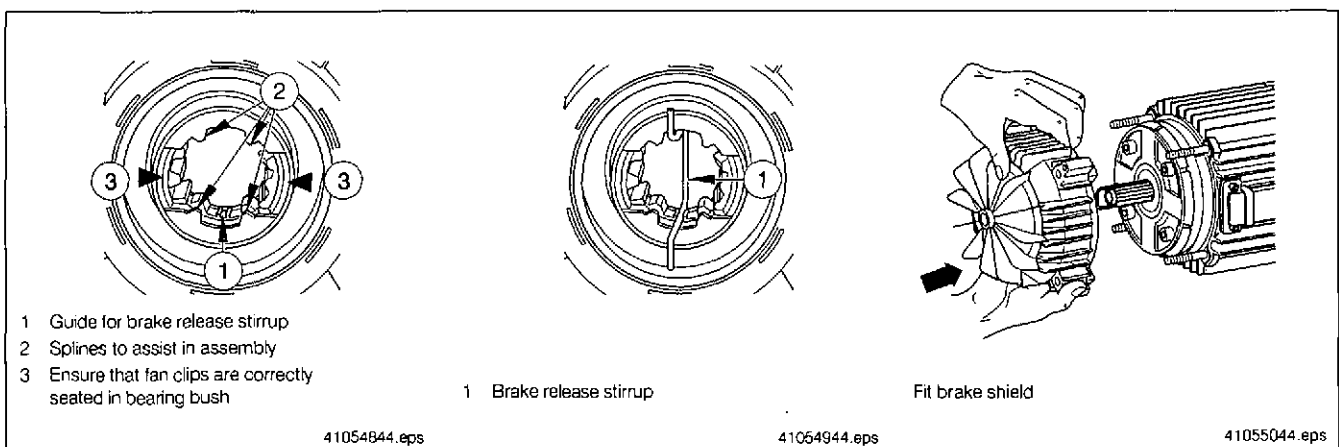
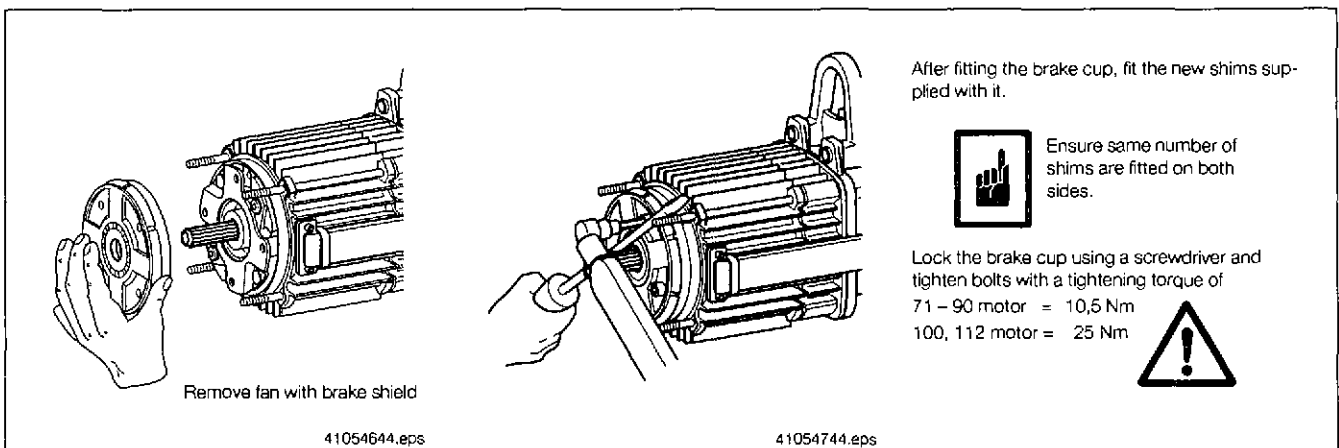
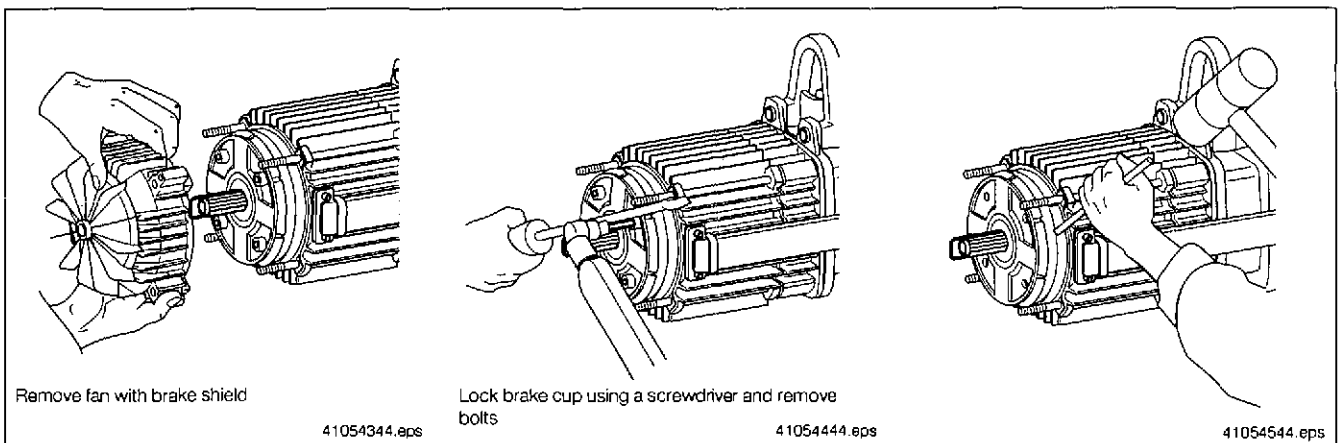
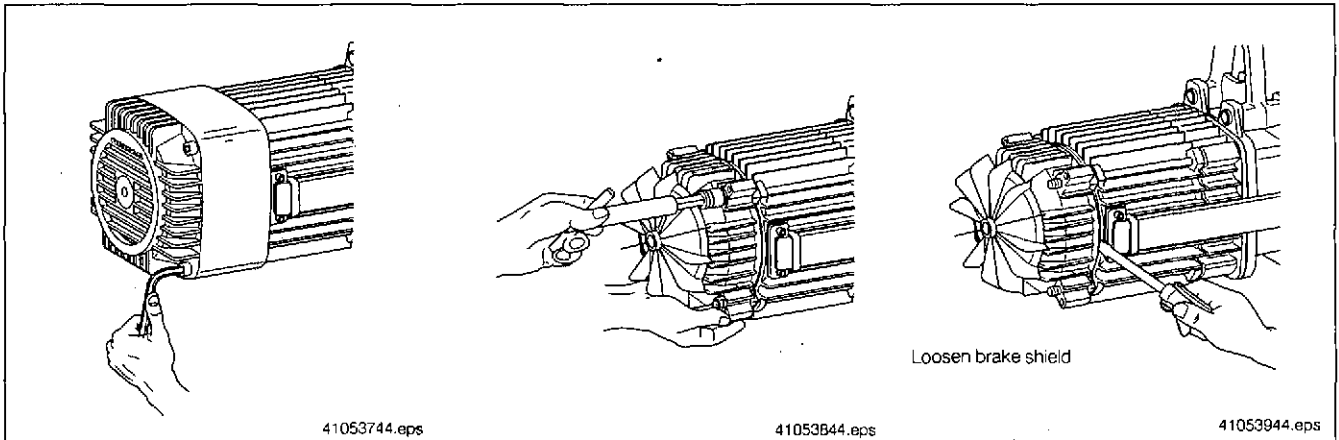
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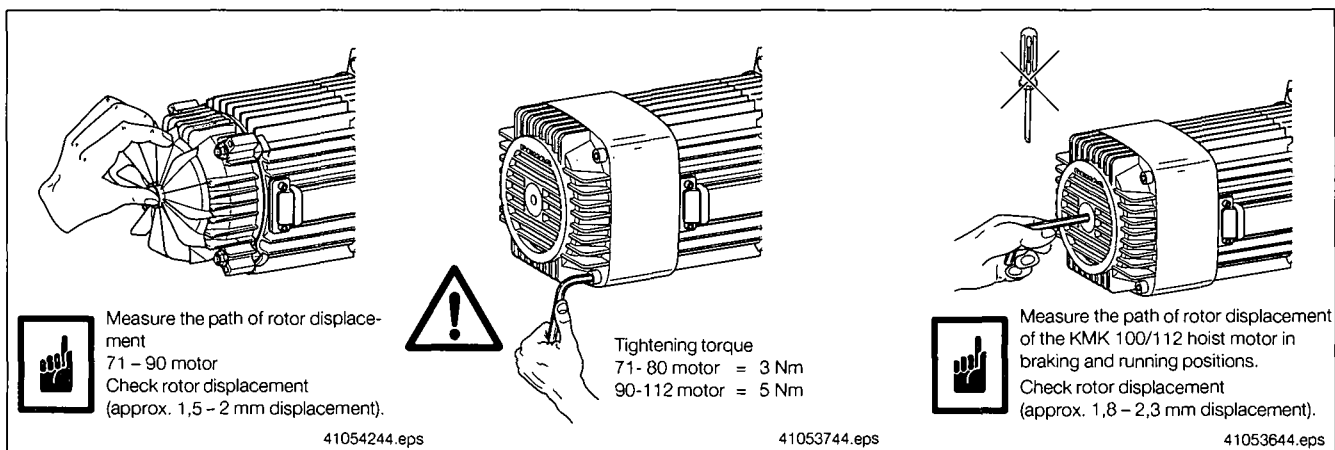
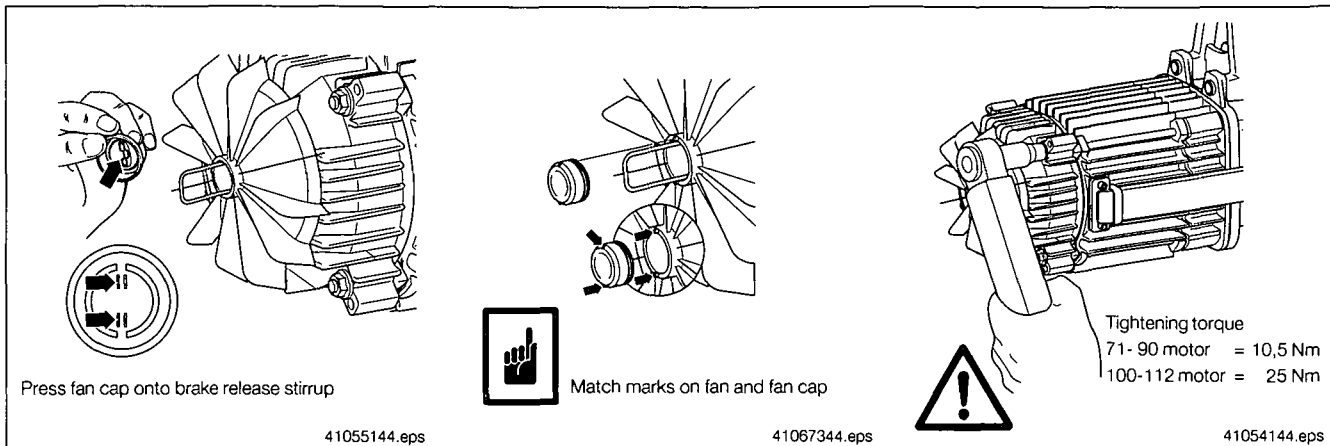
Measure the path of rotor displacement of the KMK 100/112 hoist motor in braking and running positions.
Check rotor displacement (approx. 1,8 - 2,3 mm displacement).

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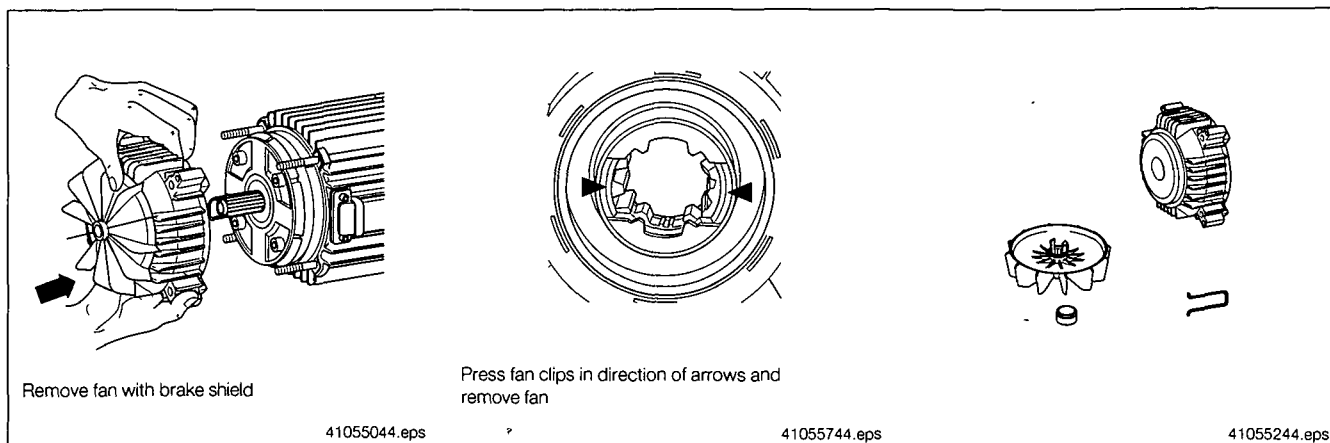
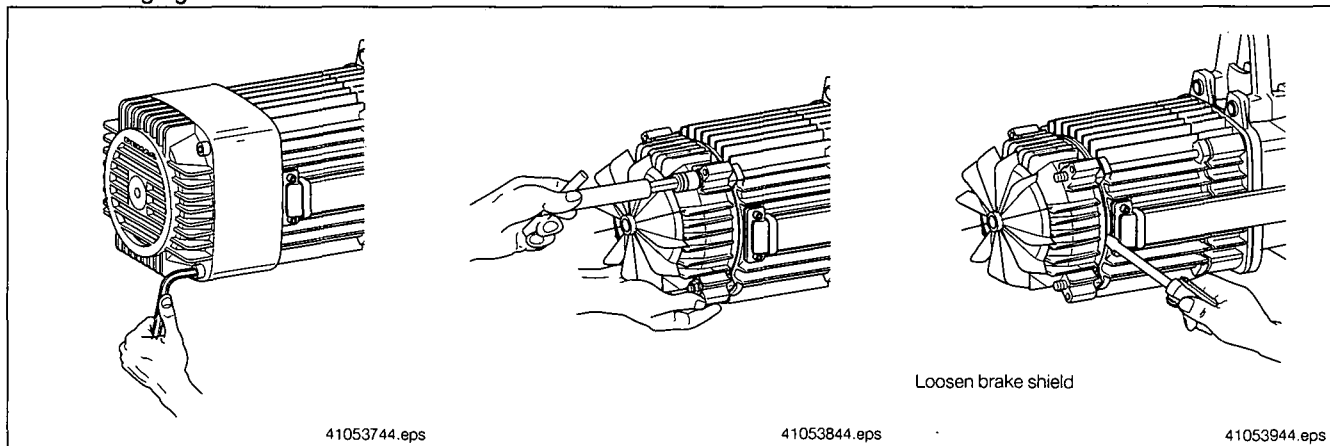
8.6.3 Changing the brake cup

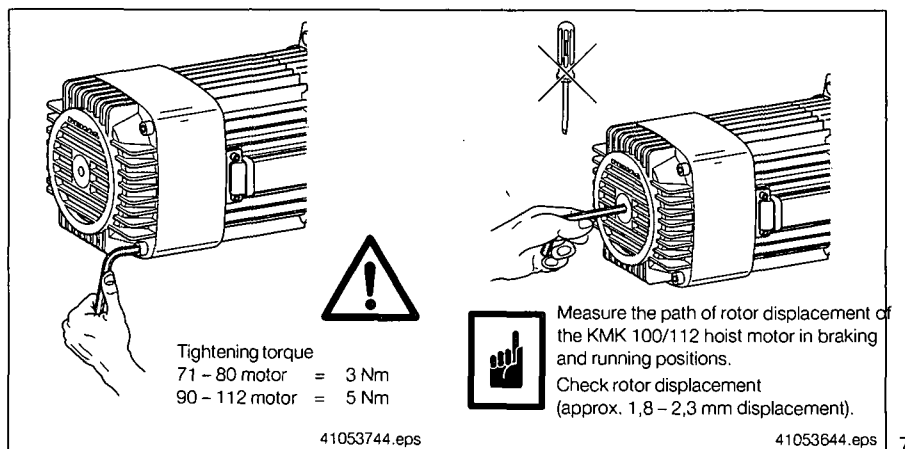
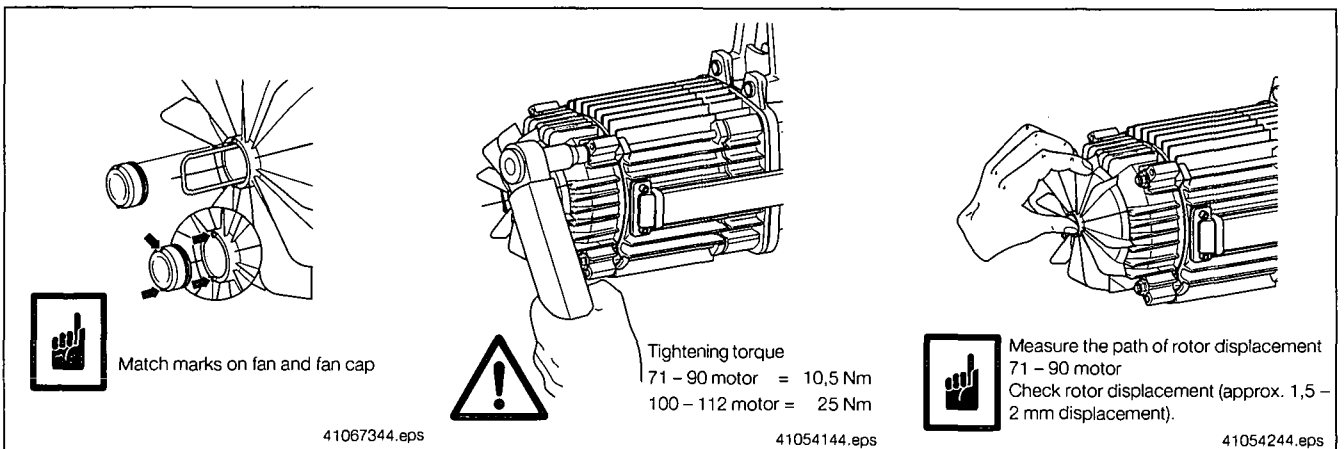
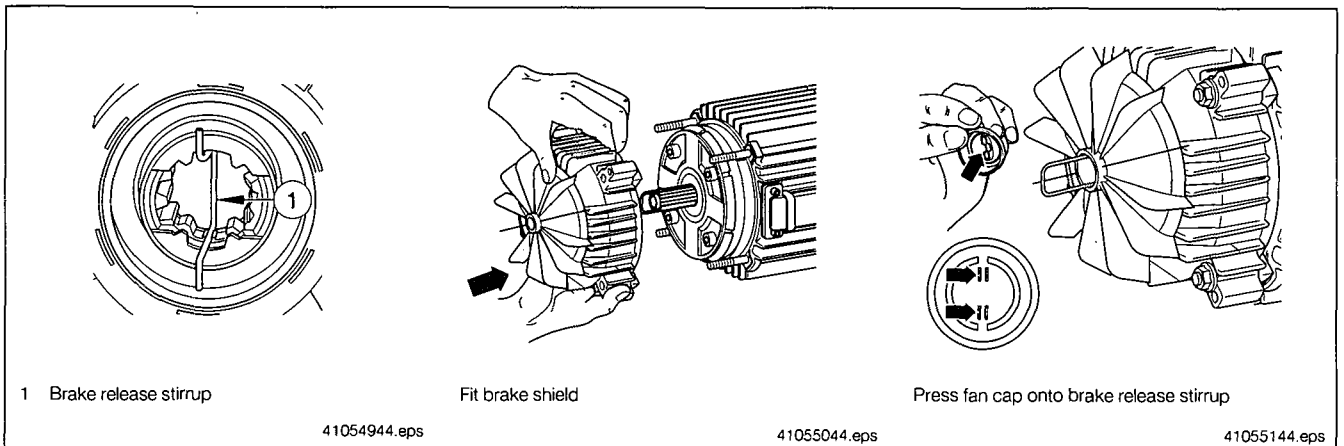
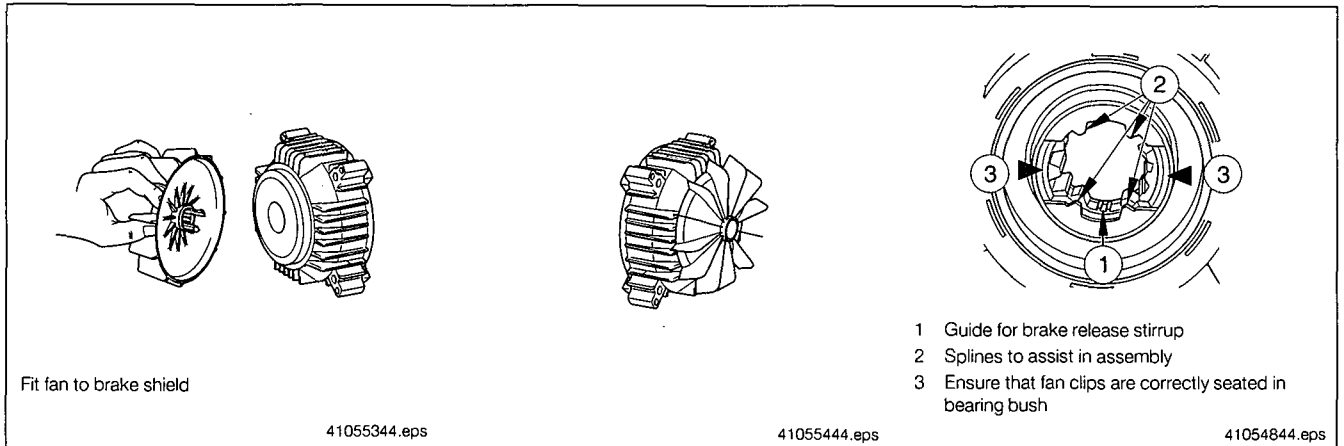


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8.6.4 Changing the fan





8.6.5 KMP main hoist motor brake



Demag chain hoists are supplied with the brake adjusted for the minimum rotor displacement path of approx. 1,5 – 2 mm for the KMP 71 motor.

As the brake lining wears down, the path of rotor displacement increases.

The brake must be adjusted before the path of displacement has reached a maximum of 3,0 mm for the KMP 71 motor.

It is therefore imperative to ensure, by regular maintenance, that the brake is adjusted before the maximum rotor displacement is reached.

For brake adjustment the load must be removed from the Demag chain hoist.

Adjustment can be repeated several times.

It is advisable to have a spare brake cup in stock.

Number of shims

Motor	Quantity	Shim thickness
71	2 x 5	0,8 mm

8.6.6 Adjusting the brake with shims

1. Measure the path of rotor displacement:

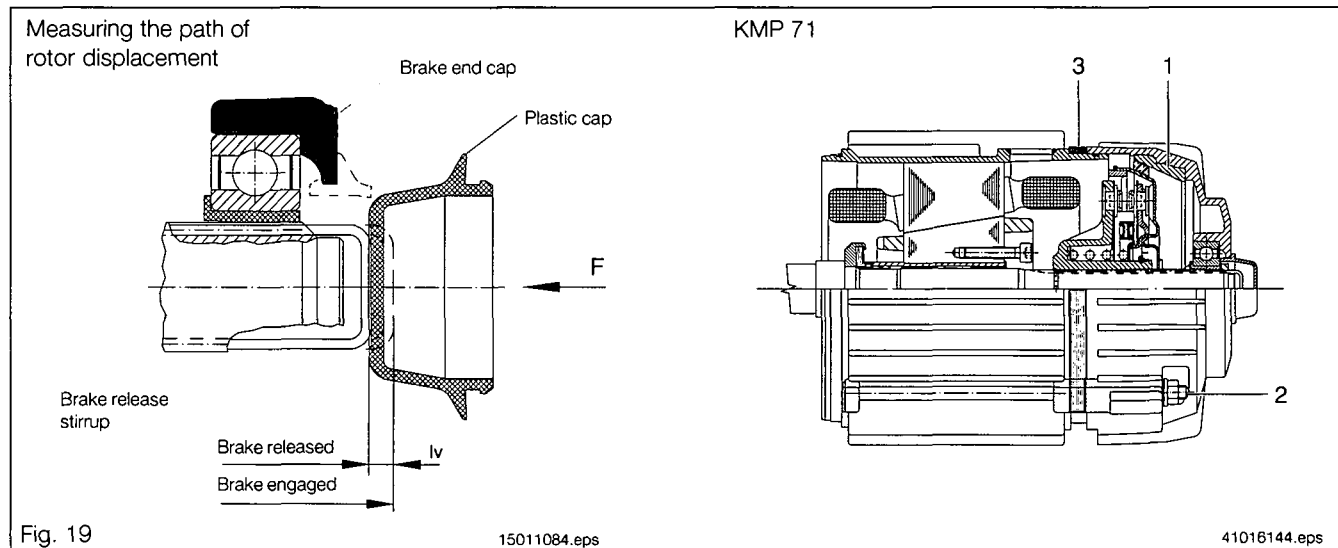
For KMP motors which are not fitted with a fan, remove the black plastic cap from the brake end cap, turn it and determine difference dimension lv by pressing on the brake release stirrup (see fig. 19).

2. Loosen the four nuts (2) and remove brake end cap (1).

3. Remove the necessary number of shims (3) in order to obtain a path of displacement of 1 – 1,5 mm (shim thickness 0,8 mm); it is absolutely essential that the number of shims at the top is the same as at the bottom.

4. Screw on brake end cap (1) evenly with the four hexagon socket nuts (2) with a tightening torque of 10,5 Nm. Any paint or dirt must be removed from the centering faces.

5. Check path of rotor displacement (should be 1 – 1,5 mm).



8.6.7 Travel motor brake 13/3 PKF, 13/6 PKF and 13/6 PF



Demag travel drives are supplied with the brake adjusted for the minimum rotor displacement of approx. 1 – 1,5 mm.

As the brake lining wears down, the path of rotor displacement increases.

It is therefore imperative to ensure, by regular maintenance, that the brake is adjusted before the maximum rotor displacement is reached.

Adjustment can be repeated several times.

It is advisable to have a spare brake lining or a complete brake end cap available.

8.6.8 Adjusting the brake with shims

Measure the path of rotor displacement:

This is done by measuring the distance between the motor shaft end and the brake end cap, first with the brake engaged (fig. 20) and then with the brake released (fig. 21). If the path of displacement is approx. 3 mm, the brake must be adjusted.

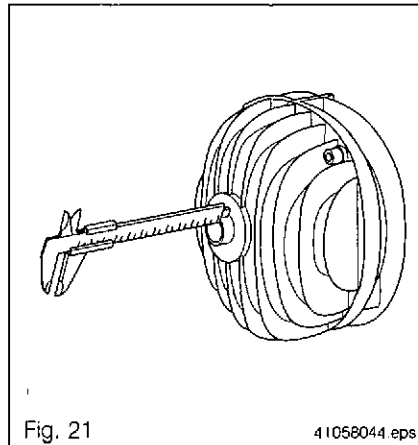


Fig. 21

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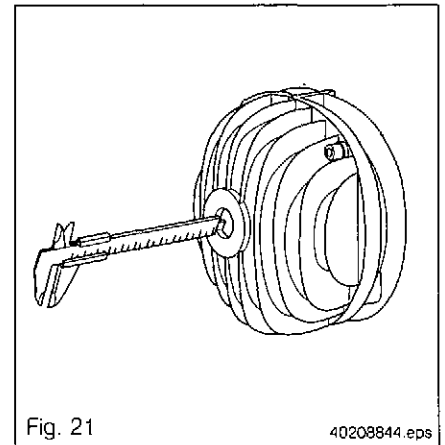


Fig. 21

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Loosen the four nuts (2) and remove brake end cap (1).

Remove the necessary number of shims (3) in order to obtain a path of displacement of 1 – 1,5 mm (shim thickness 0,8 mm); it is absolutely essential that the number of shims at the top is the same as at the bottom.

Screw on brake end cap (1) evenly with the four hexagon socket nuts (2) (for tightening torque see fig. 22). Any paint or dirt must be removed from the centering faces.

Check path of rotor displacement (should be 1 – 1,5 mm).

Loosen the four hexagon socket nuts (2) and remove brake end cap (1) with its worn lining.



8.6.9 Fitting new brake lining to travel motor

Remove old brake lining from brake end cap.

Glue new brake lining into brake end cap (see section 8.6.10).

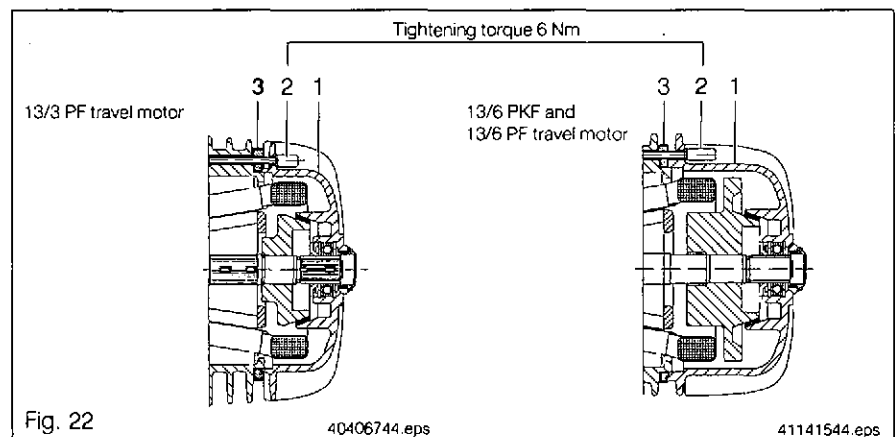
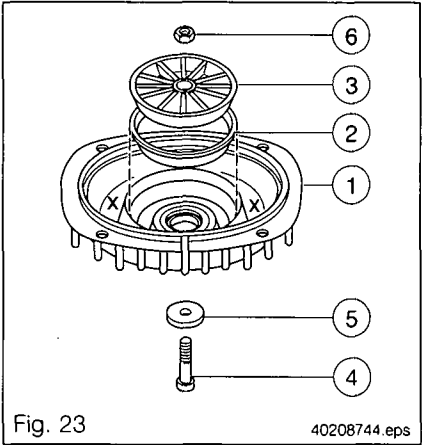


Fig. 22

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8.6.10 Gluing on brake linings



A two-component glue is supplied with every replacement brake lining. The lining must be held in position by a clamping device.

Remove end cap (brake end shield) (1), heat to 100 – 150° C and remove worn brake lining. (To do this, put the end cap on a heating plate and pour some water into recess “X” of the end cap. The required temperature has been reached when the water boils. Remove the remains of the old lining with a screwdriver or similar tool).

Surfaces to be glued together must be free from grease, oil, paint, rust, dirt and moisture. They should be emery-papered and wiped with acetone or any other good solvent.

Squeeze adhesive out of the two tubes supplied and mix the two components thoroughly in a ratio of 1:1. Apply a thin layer to both surfaces with a brush or paint scraper.

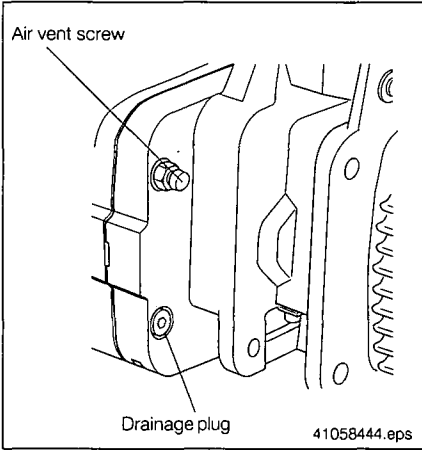
Locate annular brake lining (2) in its proper position and apply pressure by fitting pressure disc (3), bolt (4), washer (5) and nut (6) as illustrated in fig. 23.

Allow the glue to solidify under pressure for 20 hours at room temperature.

Remove the gluing jig (components 3 to 6).

Fit adjusting shims and end cap (see section 8.6.8).

8.7 Gearbox



Oil lubrication

Under normal operating conditions, the oil must be changed at least every 4 years.

Under exceptional conditions, e.g. increased ambient temperatures, we recommend that oil changes be adapted to suit these conditions.

Oil change

Drain the old oil at operating temperature. To do this, first remove the air vent screw at the top of the gearbox and then the plug at the bottom, and the oil will run out. The flushing oil should have a viscosity of 46 – 68 mm²/s at 40° C.

The quantity of flushing oil used should be approximately twice that specified for lubrication. Then flush the gears by switching the hoist on and allowing the hook to run several times over the entire length of its path. Then drain the flushing oil and refill the gearbox with oil as specified for lubrication. The required quantity and grade of oil can be seen from the table below.

Oil grades

For ambient temperatures of approx. –10° C to +50° C, a gear oil of 220 mm²/s at 40° C with mild high-pressure additives should be used, DIN 51502 CLP 220, e.g. BP ENERGOL GR-XP 220, Esso Spartan EP 220, SHELL Omala oil 220, Mobilgear 630 or Aral Degol BG 220.

At higher or lower ambient temperatures, the type of oil used should be adapted to the specific conditions.



Dispose of waste oil in accordance with environmental protection requirements.

Quantity of oil in litres

Range	DKUN 2	DKUN 5	DKUN 10	DKUN 16	DKUN 20
Litre	0,15	0,25	0,4	0,4	0,7

Part no. 472 902 44, 1litre

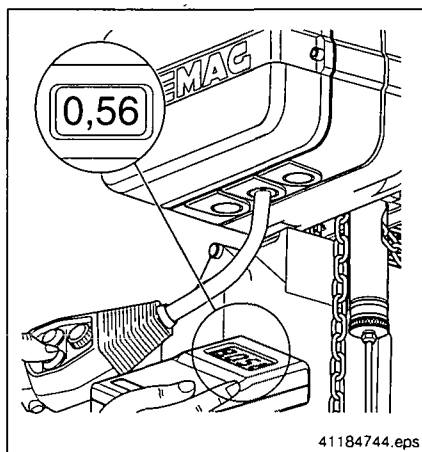
8.8 EU 11 DK/EU 22 DK/ EU 36-N/EU 55 DK electric trolley gearbox

The gearbox is lubricated with grease (approx. 60 g).

Under normal conditions this grease suffices for approx. 2 years after which the gears need relubricating. The geared travel wheels must be lubricated regularly with the same grease.

Part no. 011 058 44, 60 g.

8.9 Adjusting the slipping clutch



Under normal operating conditions, the slipping clutch does not need to be adjusted. The clutch runs in the oil bath and the linings are virtually wear-free. The slipping clutch is initially set in the factory. Adjustment of the slipping clutch may only be carried out by authorized specialists. An increase of the tripping torque which exceeds the factory setting is not permitted.

Adjust the slipping clutch with the friction force checking device.

Part no. 836 708 44

For further information see Adjusting the slipping clutch 206 974 44.



A new safety nut must be fitted each time the clutch lining is replaced.

9 Measures necessary for achieving safe working periods

The safety and health provisions of EC directive 98/37/EC make it a legal requirement to eliminate special hazards which may be caused by, for example, fatigue and ageing. This requirement is also reflected in relevant accident prevention regulations and codes of practice, such as the 3rd supplement to UVV/BGV D8 (VBG 8) of 1.4.1996 in Germany. This requirement obliges the owner of serial hoist units to determine the actual duration of service of the hoist unit on the basis of the operating hours, load spectra and/or recording factors. This is based on FEM 9.755/06.1993 "Measures for achieving safe working periods for powered serial hoist units (S.W.P.)". The objective of this rule is to determine measures for achieving safe working periods over the entire duration of service, although, according to the state-of-the-art, the hoist units are designed for specific periods of operation. Premature failure cannot, however, be ruled out.

The following items have been taken from FEM rule 9.755 with reference to the electric chain hoist:

1. The actual duration of service determined on the basis of operating time and load must be documented at least once per year.
2. The operating time T_i (number of operating hours) can be estimated or read on an elapsed time indicator.
3. The load k_m (load spectrum) must be estimated.
4. The value determined for operating time T_i using an elapsed time indicator must be multiplied by the type of recording factor $f = 1, 1$.
5. The value determined for the estimated operating hours and load spectrum must be multiplied by the type of recording factor $f = 1, 2$.
6. The actual duration of service S is calculated as: $S = k_m \times T_i \times f$
7. A general overhaul must be carried out on reaching the theoretical duration of service.
8. All checks and inspections and the general overhaul must be arranged by the owner of the hoist unit.

A general overhaul is defined as:

Inspection of the machinery for the purpose of detecting all defective components and/or components and parts close to failure and the replacement of all such components and parts. Following a general overhaul, the machinery is in a condition similar to that of the same machinery in new condition as far as the principle of operation and performance values are concerned.

For electric chain hoists classified according to FEM 9.511, the following theoretical durations of service apply (converted into full load hours):

Table 4:

	1Cm	1Bm	1Am	2m	3m
[h]	200	400	800	1600	3200

The actual duration of service is considerably increased if the hoist unit is only operated with partial load. For a chain hoist operated on average with half load, for example, this results in an 8-fold increase in the actual duration of service, with operation at one quarter of the full load, a 64-fold increase.

9.1 Calculating the actual duration of service S

The actual duration of service S of the electric chain hoist can be determined as follows:

$$S = k_m \times T_i \times f$$

k_m : Actual load spectrum factor

T_i : Number of operating hours

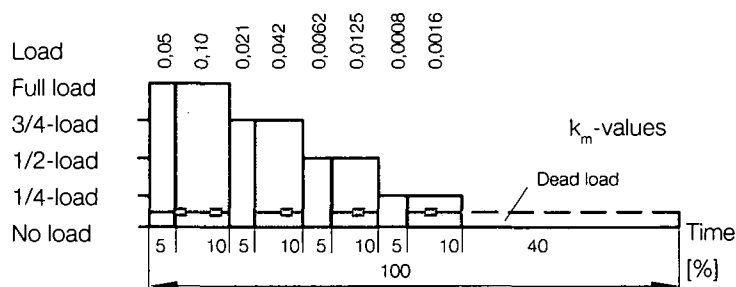
f : Factor depending on the type of recording

9.1.1 Estimating the load spectrum factor k_m (by the owner)

To simplify estimation, each type of load can be grouped into k_m load spectrum modules. The types of load are simplified and quoted as 1/4, 1/2, 3/4 load and full load. Dead loads are added to the loads. Loads up to 20% of the rated load capacity are not taken into consideration.

The operating time for each type of load is divided up within the inspection interval (e.g. 1 year) in terms of percentage.

The following bar diagram shows the k_m load spectrum modules for the load conditions without load up to full load in time increments of 5 and 10%. Larger shares of the time period must be correspondingly added together.



The load spectrum factor k_m can be obtained by adding together the individual k_m load spectrum modules.

9.1.2 Calculating the number of hours of operation (operating time) T_i (by the owner)

The operating time can be calculated by means of an elapsed time indicator or according to the following method:

Operating time per inspection interval:

$$T_i = \frac{(\text{Lifting+lowering}) \times \text{cycles/h} \times \text{working time/day} \times \text{days/inspection interval}}{60 \times \text{hoist speed}}$$

Only lifting and lowering movements are counted, long and cross travel times are not taken into consideration.

9.1.3 Factor depending on type of recording f

$f = 1,1$ for calculating the operating hours using an elapsed time indicator

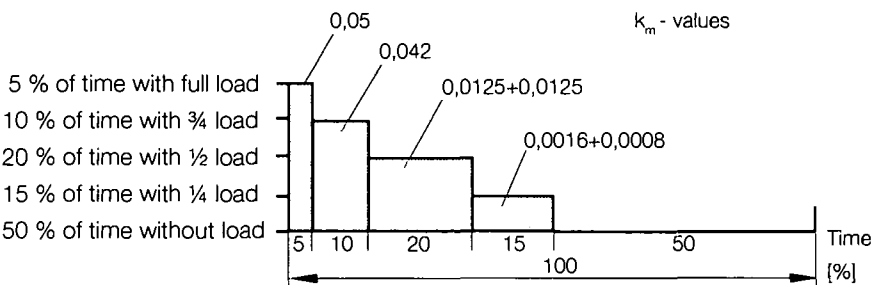
$f = 1,2$ for estimating the operating hours and the load spectrum

9.2 Example:
DKUN 10-1000 KV1
in 1Am

Hoist speed : 9 m/min
No. of cycles per hour : 10 cycles/h
Lifting and lowering : (2+2) m/cycle = 4 m/cyle
Operating time per day : 8 h/day
Days per inspection interval : 250 days/inspection interval

$$T_i = \frac{4 \times 10 \times 8 \times 250}{60 \times 9} = 148,1 \text{ h/inspection interval}$$

In the operating time as calculated above, the chain hoist has transported the following loads:



Adding the load spectrum modules k_m together results in the load spectrum factor:

$$k_{mi} = 0,119$$

Thus, the actual duration of service amounts to:

$$S = k_{mi} \times T_i \times f = 0,119 \times 148,1 \times 1,2 = 21,2 \text{ hours}$$

For classification in FEM group of mechanisms 1Am (see DKUN data plate) with 800 hours of theoretical duration of service (see table 5) the hoist has a theoretical remaining duration of service of 778,8 hours.

Documentation

Enter these values in your test and inspection booklet or crane installation test and inspection booklet. This entry may appear as follows:

Table 5

Date		Operating hours T _i value [h]	Load [%] k _m factor					Load factor k _{mi}		Actual duration of service S [h]	Theoretical duration of service D [h] group of mechanisms	Remaining duration of service D-S [h]
from	until		full	3/4	1/2	1/4	none					
3.1.--	30.12.--	148,1	5	10	20	15	50	0,119	1,2	21,2	800 / 1Am	778,8
			0,05	0,042	0,025	0,002	-					

DEMAG Cranes & Components	EC conformity declaration Demag chain hoist DKUN, DKES, DKST in accordance with EC Directives 89/336/EEC, Annex I, 98/37/EEC, Annex II A and 73/23/EEC, Annex III		1 page(s)	Page 1
			Ident. no. 204 405 44	
			Issue	0799 EN

Hereby we,

Demag Cranes & Components GmbH
Komponententechnik,



declare that the product

Demag chain hoist DKUN, DKES, DKST

of serial design ready for use¹⁾ with or without the relevant serial trolleys has been declared in conformity with the provisions of the following relevant regulations:

EC EMV Directive	89/336/EEC
amended by	92/31/EEC and 93/68/EEC
EC Machinery Directive	98/37/EEC
EC Low Voltage Directive	73/23/EEC
amended by	93/68/EEC

Applied harmonised standards:

EN 292-1, 292-2	Safety of Machinery	
EN 50081-2	Electromagnetic compatibility	
EN 50082-2	Electromagnetic compatibility	
EN 60034-1	Rating and performance for rotating electrical machines	
EN 60034-5	Types of enclosure for rotating electrical machines	
EN 60204-32	Electrical equipment, requirements for hoists	#
EN 60529	Types of enclosure (IP code)	
EN 60947-1	Low voltage switchgear	

Applied standards and technical specifications:

DIN VDE 0160	Electronic equipment for use in electrical power installations and their assembly into electrical power installations	
FEM 9.511	Classification of mechanisms	
FEM 9.671	Chains for hoist units	
FEM 9.683	Travel and hoist motor selection	
FEM 9.755	Measures for achieving safe working periods	
FEM 9.811	Specifications for rope and chain hoists	

Wetter, den 19. 7. 1999

Place and date of issue

ppa. Dr. Neupert
Technik
Hebezeuge und Komponenten

ppa. Weihmann
Vertrieb
Hebe- und Komponententechnik

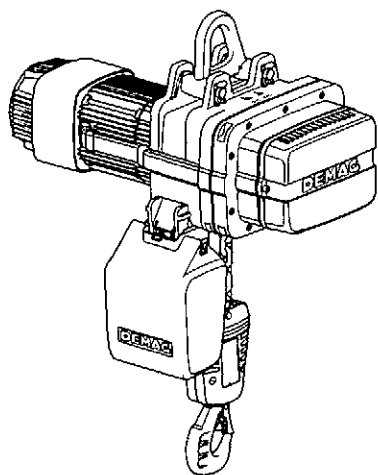
1) Design ready for use requires a scope of parts as specified in Works Standard 012 313 99.

# = Modifications compared to previous issue	7550 Normung	Class. no. 715 IS 817
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Component parts

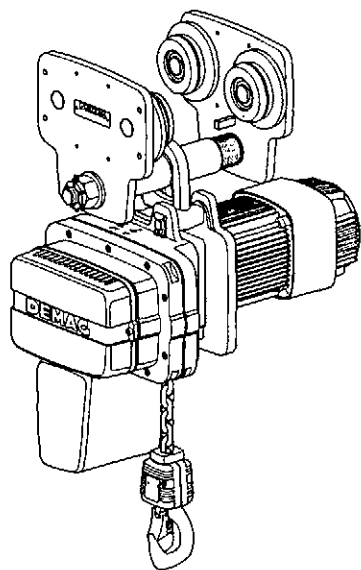
Demag chain hoist DKUN 20

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Standard headroom monorail hoist

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# Flange width 106 - 300 mm	20
RU 55 DK trolley	
Flange width 106 - 300 mm	22

= Alterations compared with previous issue

Example

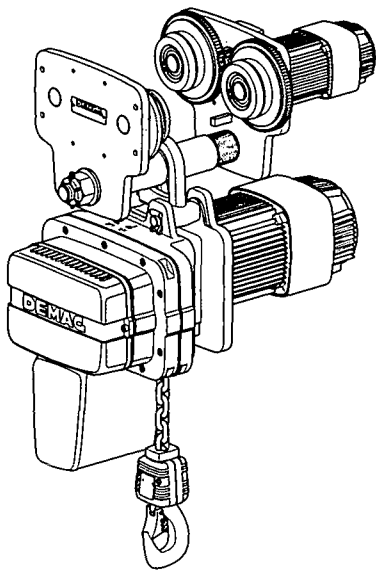
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FEDST

DIN 471

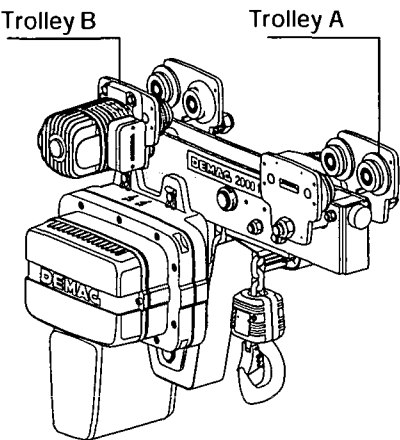
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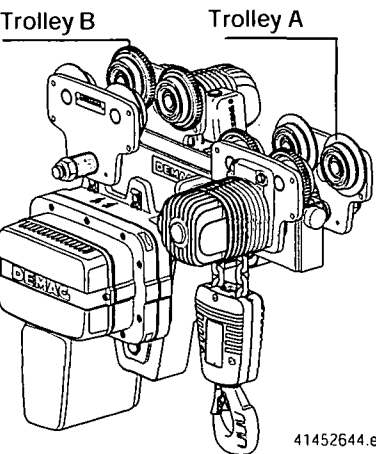
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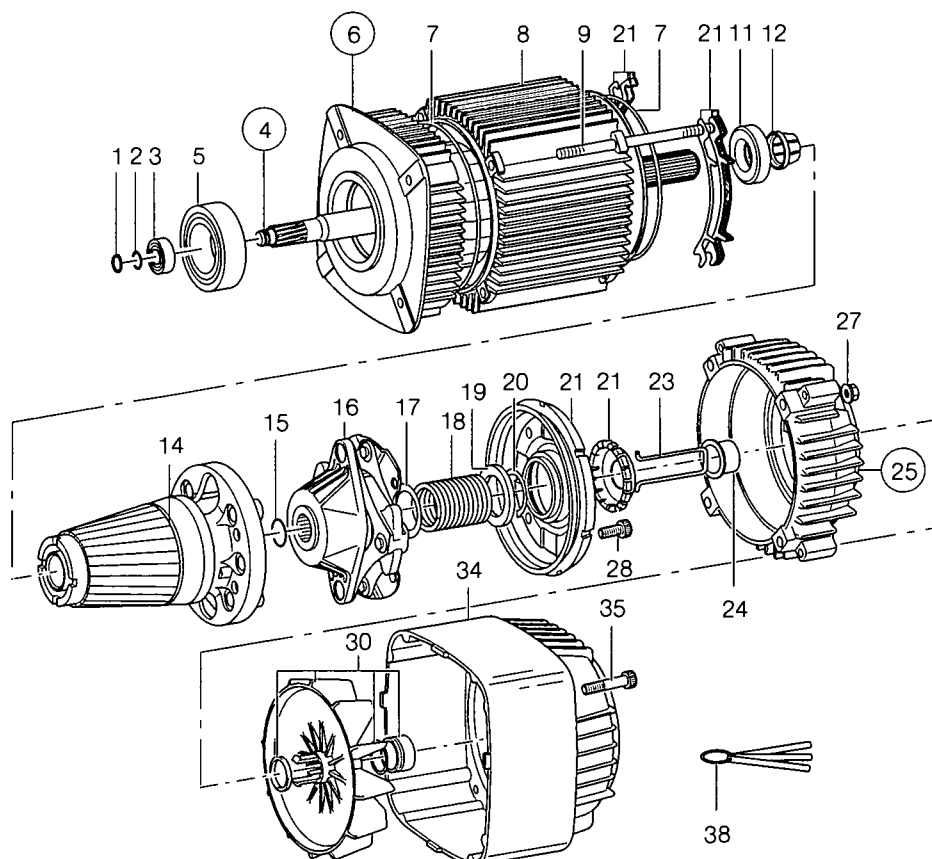


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Main/creep hoist motor KMK 100 B2/8



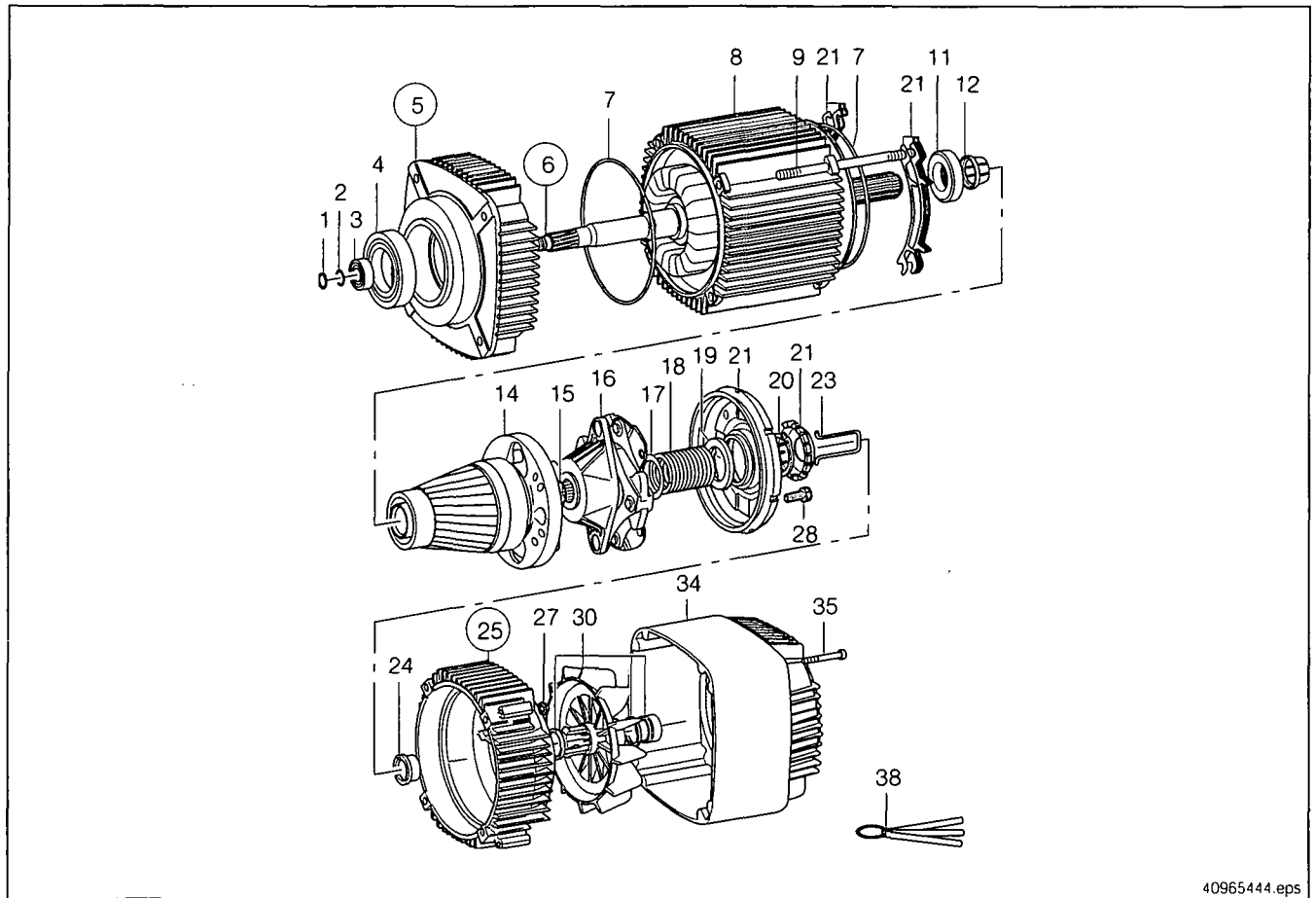
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Item no.	Part no.	Quantity	Designation	Material	Standard
1	34252199	1	Retaining ring 15X1,5	FEDST	DIN 471
2	36720099	1	O-ring 12 X 1,5 N	NBR 70	DIN- 3771
3	36060299	1	Grooved ball bearing 6302	WLZ-ST IL	DIN 625
4	14335484	1	Shaft coupling DK20	c/w items 2, 11, 15	
5	36827099	1	Grooved ball bearing 6210 2RS	WLZ-ST IL	DIN 625
6	83831244	1	Intermediate flange KM100B-DK20	c/w item 5	
7	36719199	2	O-ring 150 X 2 N	NBR 70	DIN- 3771
8	14101484	1	Stator KMK100B 2/8 AB	1)	
9	30242999	4	Stud M 8 X265	8.8 A2F	DIN- 835
11	14386284	1	Damper KM 100 Gedreht	1)	
12	14385284	1	Thrust ring set KM100	1)	
14	14345484	1	Rotor KMK100B 2/12	1)	
15	34191199	1	Spring ring A 28	FEDST	DIN 7993
16	14376084	1	Engaging element KMK100		
17	34144999	1	Shim 42X 52X0,5	ST2K50	DIN 988
18	14374784	1	Spring 4,75X42 X77 RTBL		
19	14876684	1	Quill gear KM 100-112		
20	34246999	1	Retaining ring 40X2,5	FEDST IL	DIN 471
21	14389584	1	Brake lining support KM 100		
23	14377084	1	Brake release bracket KM100		
24	14381384	1	Bearing bush KM 100		
25	14361384	1	End shield BS KM 100	c/w item 24	
27	15108599	4	Hexagonal nut M 8	8 A2F	DIN 6923
28	32012599	4	Hex.socket cylind.screw M 8 X 30	8.8 A2F	DIN 6912
30	14389684	1	Fan set KM 100		
34	14382084	1	Fan cover KM100		
35	32151699	4	Hex.socket cylind.screw M 6 X 60	10.9 A2F	DIN 912
38	10041084	3	Feeler gauge set	1)	

22251501.tbl

1) When ordering a rotor or stator, a set of thrust rings (item no. 12) must also be ordered for adjusting the air gap (adjust with feeler gauge no. 2, item no.38)

Main/creep hoist motor KMK 112 B2/8



40965444.eps

Item no.	Part no.	Quantity	Designation	Material	Standard
1	34252199	1	Retaining ring 15X1.5	FEDST	DIN 471
2	36720099	1	O-ring 12 X 1,5 N	NBR 70	DIN- 3771
3	36060299	1	Grooved ball bearing 6302	WLZ-ST IL	DIN 625
4	36827099	1	Grooved ball bearing 6210 2RS	WLZ-ST IL	DIN 625
5	83831644	1	Intermediate flange KM112B-DK20		
6	14834784	1	Shaft gearbox DK20		
7	36719399	2	O-ring 170 X 2 N	NBR 70	DIN- 3771
8	14603084	1	Stator KMK112B 2/8 AB		
9	15055299	4	Stud M 8 X285	8.8 A2F	DIN- 835
11	14886284	1	Damper KM 112 Vorser.		
12	14885284	1	Thrust ring set KM112		
14	14845484	1	Rotor KMH112B21/2		
15	34191299	1	Spring ring A 30	FEDST	DIN 7993
16	14876084	1	Engaging element KMK112		
17	34144999	1	Shim 42X 52X0,5	ST2K50	DIN 988
18	14874284	1	Spring 4,25X42 X135 GE		
19	14876684	1	Quill gear KM 100-112		
20	34246999	1	Retaining ring 40X2,5	FEDST IL	DIN 471
21	14889584	1	Brake lining support KM 112		
23	14877084	1	Brake release bracket KM112		
24	14881384	1	Bearing bush KM 112		
25	14861384	1	End shield BS KM 112		
27	15108599	4	Hexagonal nut M 8	8 A2F	DIN 6923
28	32012599	4	Hex.socket cylind.screw M 8 X 30	8.8 A2F	DIN 6912
30	14889684	1	Fan set KM 112		
34	14882084	1	Fan cover KM112		
35	31923499	4	Hex.socket cylind.screw M 6 X 75	10.9	DIN- 912
38	10041184	3	Feeler gauge set		

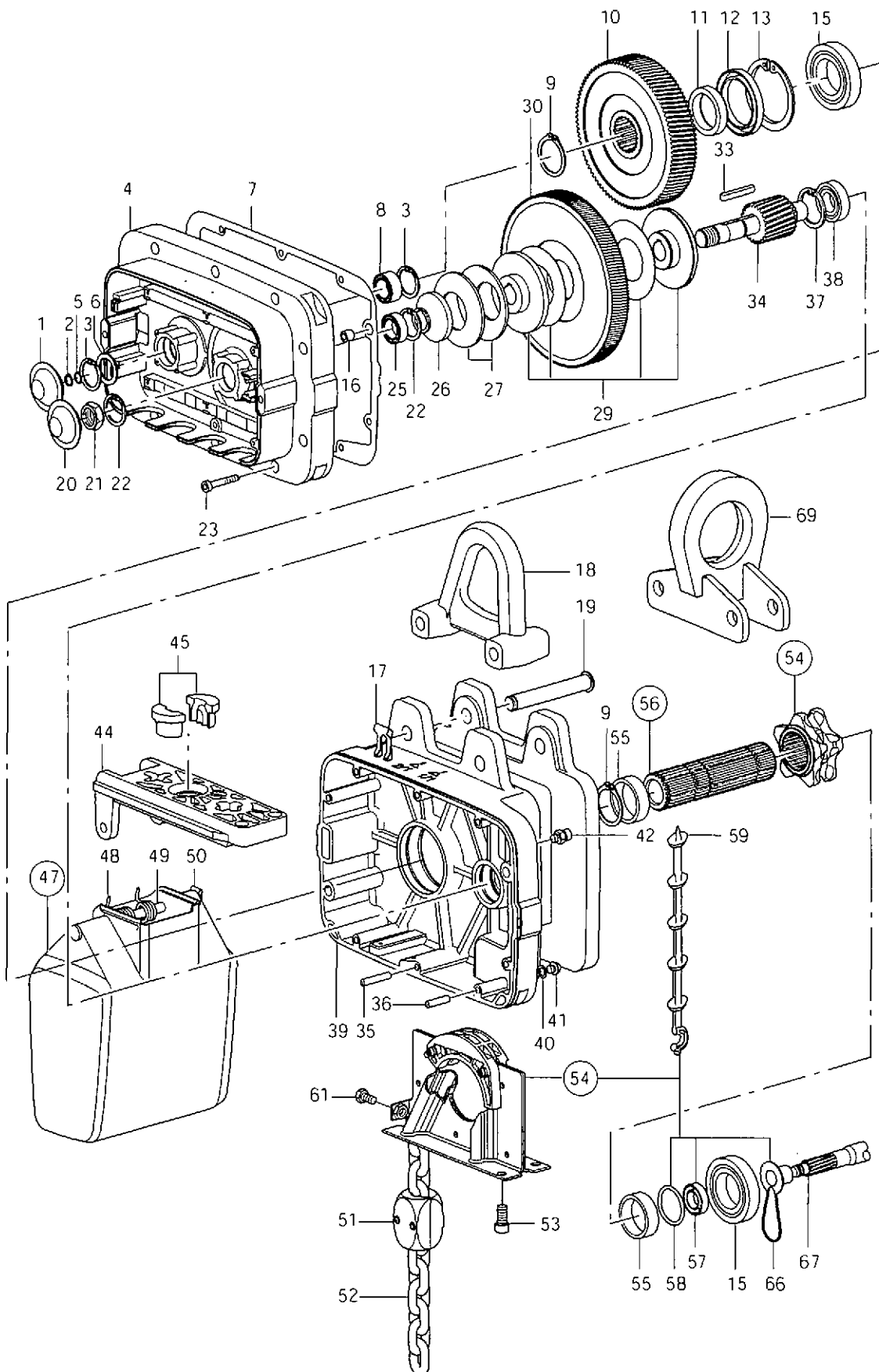
22251502.tbl

1) When ordering a rotor or stator, a set of thrust rings (item no. 12) must also be ordered for adjusting the air gap (adjust with feeler gauge no. 2, item no.38)

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Helical gearbox, 2-stages

Helical gearbox, combination with corresponding motor for two hoist speeds



Helical gearbox, 2-stages

Helical gearbox, combination with corresponding motor for two hoist speeds

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83725844	1	Plug with O-ring		
2	34252199	1	Retaining ring 15X1.5	FEDST	DIN 471
3	34276299	2	Retaining ring 42X2	FEDST	DIN 472
4	83810444	1	Gearbox housing DK20 T.2		
5	36720099	1	O-ring 12 X 1.5 N	NBR 70	DIN- 3771
6	34349599	1	Supporting plate 30X 42X2.5	FEDST	DIN 988
7	83813944	1	Gearbox seal DK20		
8	36060299	1	Grooved ball bearing 6302	WLZ-ST IL	DIN 625
9	34255099	2	Retaining ring 50X2	FEDST	DIN 471
10			Stage 2 for two hoist speeds		
10	83814644	1	Gearwheel Z109 M 2 B 40		Mot. KMK 100 B 2/8 1600, V 1, i = 98,4
10	83814644	1	Gearwheel Z109 M 2 B 40		1250, V 1, i = 98,4
10			Stage 2 for two hoist speeds		
10	83814644	1	Gearwheel Z109 M 2 B 40		Mot. KMK 112 B 2/8 2500, V 1, i = 98,4
10	83814644	1	Gearwheel Z109 M 2 B 40		2000, V 1, i = 98,4
10	83814444	1	Gearwheel Z102 M 2 B 40		1600, V 2, i = 64,5
10	83814444	1	Gearwheel Z102 M 2 B 40		1250, V 2, i = 64,5
10	83814244	1	Gearwheel Z 97 M 2 B 40		1250, V 3, i = 51,1
11	83812844	1	Bush 50 X 65 X15		
12	36679499	1	Oil seal A 65X 90X10	NBR	DIN 3760
13	34266899	1	Retaining ring 90X3	FEDST	DIN 472
15	36827099	2	Grooved ball bearing 6210 2RS	WLZ-ST IL	DIN 625
16	71631144	2	Bush 8,5X 14 X12		
17	34287744	2	Securing clip SL 16 SXN08		
18	83870444	1	Supporting eye long DK20		
19	83861644	2	Setbolt 20H11X135 Nut		
20	83825844	1	Plug with O-ring		
21	83813744	1	Lock nut M25 DK20		
22	15052599	2	Retaining ring 47X2	FEDST	DIN 472
23	32158399	10	Hex.socket cylind.screw M 8 X 50	8.8 A2F	DIN 912
25	36091599	1	Grooved ball bearing 6005	WLZ-ST IL	DIN 625
26	83813844	1	Pressure ring DK20		
27	15052699	2	Dished washer 100 X51 X4 GR2	50CRV4	DIN- 2093
29	83826044	1	Coupling set DK20 XX		
30			Stage 1 for two hoist speeds		
30	83823044	1	Gearwheel Z177 M 1.25B 22		c/w item 21 Mot. KMK 100 B 2/8 1600, V 1, i = 98,4
30	83823044	1	Gearwheel Z177 M 1.25B 22		1250, V 1, i = 98,4
30			Stage 1 for two hoist speeds		
30	83823044	1	Gearwheel Z177 M 1.25B 22		Mot. KMK 112 B 2/8 2500, V 1, i = 98,4
30	83823044	1	Gearwheel Z177 M 1.25B 22		2000, V 1, i = 98,4
30	83823044	1	Gearwheel Z177 M 1.25B 22		1600, V 2, i = 64,5
30	83823044	1	Gearwheel Z177 M 1.25B 22		1250, V 2, i = 64,5
30	83823044	1	Gearwheel Z177 M 1.25B 22		1250, V 3, i = 51,1
33	35428099	1	Key A 8X 7X 56	C 45 K	DIN 6885
34			Stage 2 for two hoist speeds		
34	83815544	1	Pinion shaft Z 14 M2 B 51		Mot. KMK 100 B 2/8 1600, V 1, i = 98,4
34	83815544	1	Pinion shaft Z 14 M2 B 51		1250, V 1, i = 98,4
34			Stage 2 for two hoist speeds		
34	83815544	1	Pinion shaft Z 14 M2 B 51		Mot. KMK 112 B 2/8 2500, V 1, i = 98,4
34	83815544	1	Pinion shaft Z 14 M2 B 51		2000, V 1, i = 98,4
34	83815344	1	Pinion shaft Z 20 M2 B 51		1600, V 2, i = 64,5
34	83815344	1	Pinion shaft Z 20 M2 B 51		1250, V 2, i = 64,5
34	83815244	1	Pinion shaft Z 24 M2 B 51		1250, V 3, i = 51,1
35	34638899	1	Cylinder pin 5 H11X 45	ST A2F	DIN 7
36	34638999	2	Cylinder pin 5 H11X 28	ST A2F	DIN 7
37	34265199	1	Retaining ring 52X2	FEDST	DIN 472
38	36091899	1	Grooved ball bearing 6205	WLZ-ST IL	DIN 625
39	83810244	1	Gearbox housing DK20 T.1		
40	33987499	1	Sealing ring A10 X16 X1		
41	31339499	1	Screw plug M10X1	CU	DIN 7603
42	34264844	1	Bleeding valve AM10X1	5.8	DIN 908
44	83816044	1	Base plate chain guide DK20		
45	83817844	2	Spring clip fastener 10,5X28,2		
47	83806344	1	Chain collector box DK10-20 GR. 4		max. 3 m, c/w items 48 - 50
47	83806544	1	Chain collector box DK10-20 GR. 5		max. 8 m, c/w items 48 - 50
47	83806744	1	Chain collector box DK20 GR. 6		max. 16 m, c/w items 48 - 50
48	83807044	1	Double spring washer DK10/20		
49	83806944	1	Setbolt 12H11X205 Nut		
50	34287644	1	Securing clip SL 12 SXN08		
51	83808344	1	Stop piece DK20		2)
52	83869944	1	Chain 10,5X 28,2		3)

22251503.tbl

222516x1 p05030403

- 1) Quantity 0,7 litre, part no. 472 902 44 (1,0 kg).
- 2) Fix limit stop (item 51) to the 10th chain link.
- 3) Supplied per metre, state length required when ordering.

Helical gearbox, 2-stages

Helical gearbox, combination with corresponding motor for two hoist speeds

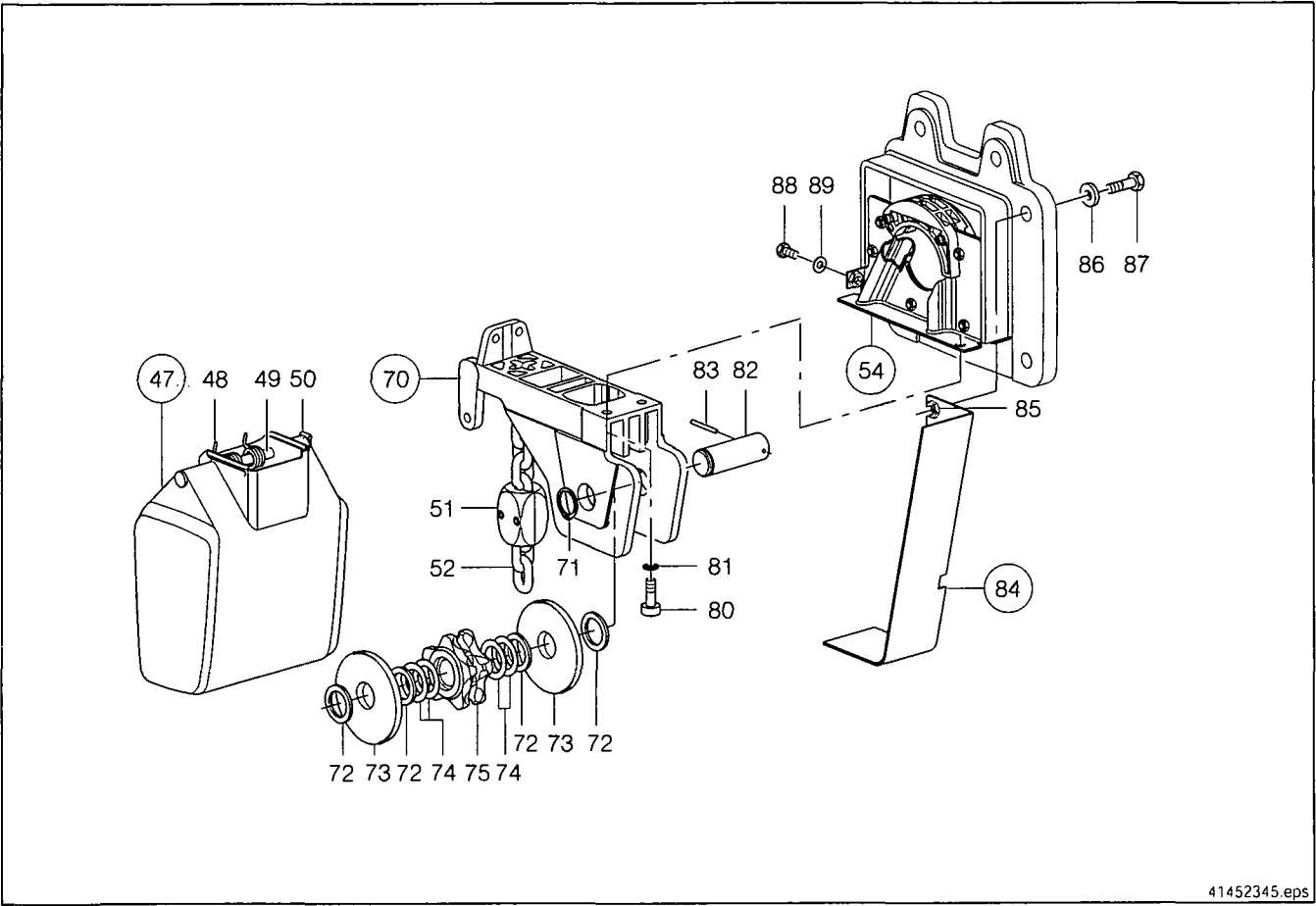
Item no.	Part no.	Quantity	Designation	Material	Standard
53	15052399	2	Hex.socket cylind.screw M12 X 25	8.8 A2F	DIN 912
54	83837744	1	Chain guide set DK20	c/w items 57 - 59, 66	
55	83816344	2	Bush 50,5X 60 X17,8		
56	83836244	1	Output shaft DK20	c/w item 57	
57	36681099	1	Oil seal A 30X 42X 7	NBR-CFWIL	DIN 3760
58	15052499	1	O-ring 43,7 X 3,55	NBR 70	DIN 3771
59	83807844	1	Pilot section DK20 10,5X28,2		
61	30046044	2	Lock screw M10X20 VB.RIPP		
66	83703544	1	Protective sleeve DK10/16		
67			Stage 1 for two hoist speeds	Mot. KMK 100 B 2/8	
67	14335484	1	Shaft coupling DK20	1600, V 1, i = 98,4	
67	14335484	1	Shaft coupling DK20	1250, V 1, i = 98,4	
67			Stage 1 for two hoist speeds	Mot. KMK 112 B 2/8	
67	14834784	1	Shaft gearbox DK20	2500, V 1, i = 98,4	
67	14834784	1	Shaft gearbox DK20	2000, V 1, i = 98,4	
67	14834784	1	Shaft gearbox DK20	1600, V 2, i = 64,5	
67	14834784	1	Shaft gearbox DK20	1250, V 2, i = 64,5	
67	14834784	1	Shaft gearbox DK20	1250, V 3, i = 51,1	
69	83864544	1	Eye ring transverse DK20		

22251503.tbl

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Helical gearbox, 2-stages

Fittings for EKDK low-headroom monorail hoist



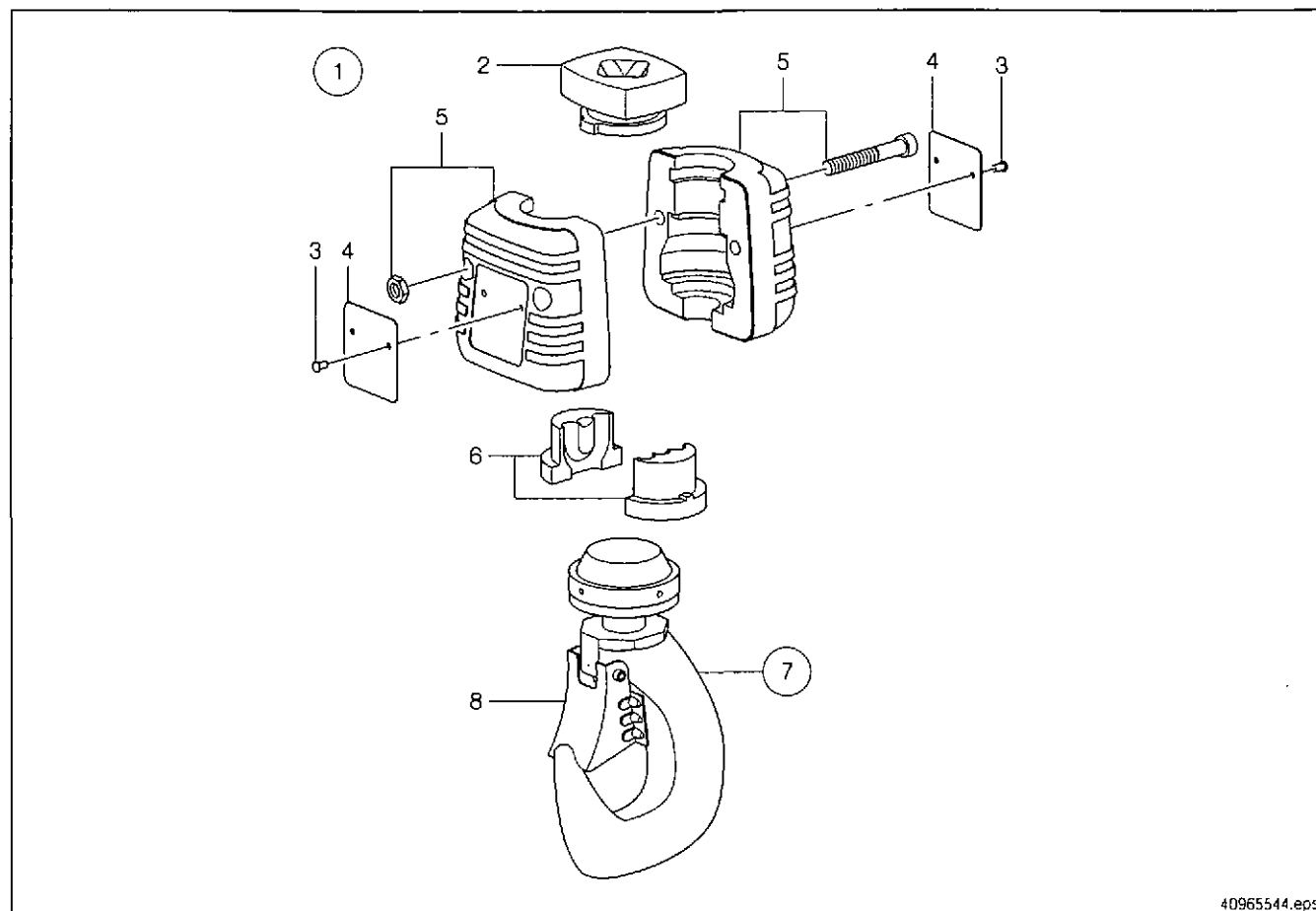
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Item no.	Part no.	Quantity	Designation		Material	Standard
70	83995944	1	Return sheave support KDK20	c/w items 71 - 74, 82, 83		
71	34243599	1	Retaining ring 35X2,5		FEDST IL	DIN 471
72	50222044	4	Washer 35.5X 50 X 4			
73	83987244	2	Washer KDK20			
74	34231244	4	Axial bearing disk 35X 52X1			
75	83888044	1	Return sheave 10.5X28,2 Z5	Needle-roller assembly, z = 5		
80	15072499	4	Hex.socket cylind.screw M12 X 35		10.9 A2F	DIN 912
81	34042499	4	Washer 13 X 20 X2		140HV A2F	DIN 433
82	83999244	1	Pin 35 H 5X 102 NUT			
83	34503999	1	Split sleeve 5 X 50		ST	ISO 8752
84	83999344	1	Protective plate KDK20	c/w item 85		
85	00460998	2	Set nut M12			
86	34069699	2	Washer 13 X 30 X 6		ST A2F	DIN 7349
87	15047899	2	Hexagonal screw M12 X 40		8.8 A2F	ISO 4017
88	30046344	1	Lock screw M10X35 VB.RIPP			
89	34065599	1	Washer A10.5X 20 X2		140HV A2F	DIN 125

22251504.tbl

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Hook with fittings, 1/1 reeving



40965544.eps

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83874044	1	Hook fittings DK20/2.5T		
2	83875344	1	Buffer cover 2.5 T		
3	35091099	4	Round head dowel pin 3 X 5	St A2F	DIN 1476
4	83594344	2	Capacity plate 1.25T AL		DKUN 20, 1250
4	83591244	2	Capacity plate 1.6 T AL		DKUN 20, 1600
4	83594144	2	Capacity plate 2 T AL		DKUN 20, 2000
4	83599544	2	Capacity plate 2.5 T AL		DKUN 20, 2500
5	83875244	1	Hook fittings half DK20		
6	83817844	2	Spring clip fastener 10,5X28,2		
7	83865044	1	Load hook number 5 2.5 T		
8	83865944	1	Hook safety catch GR.5		

c/w items 2, 5 - 7

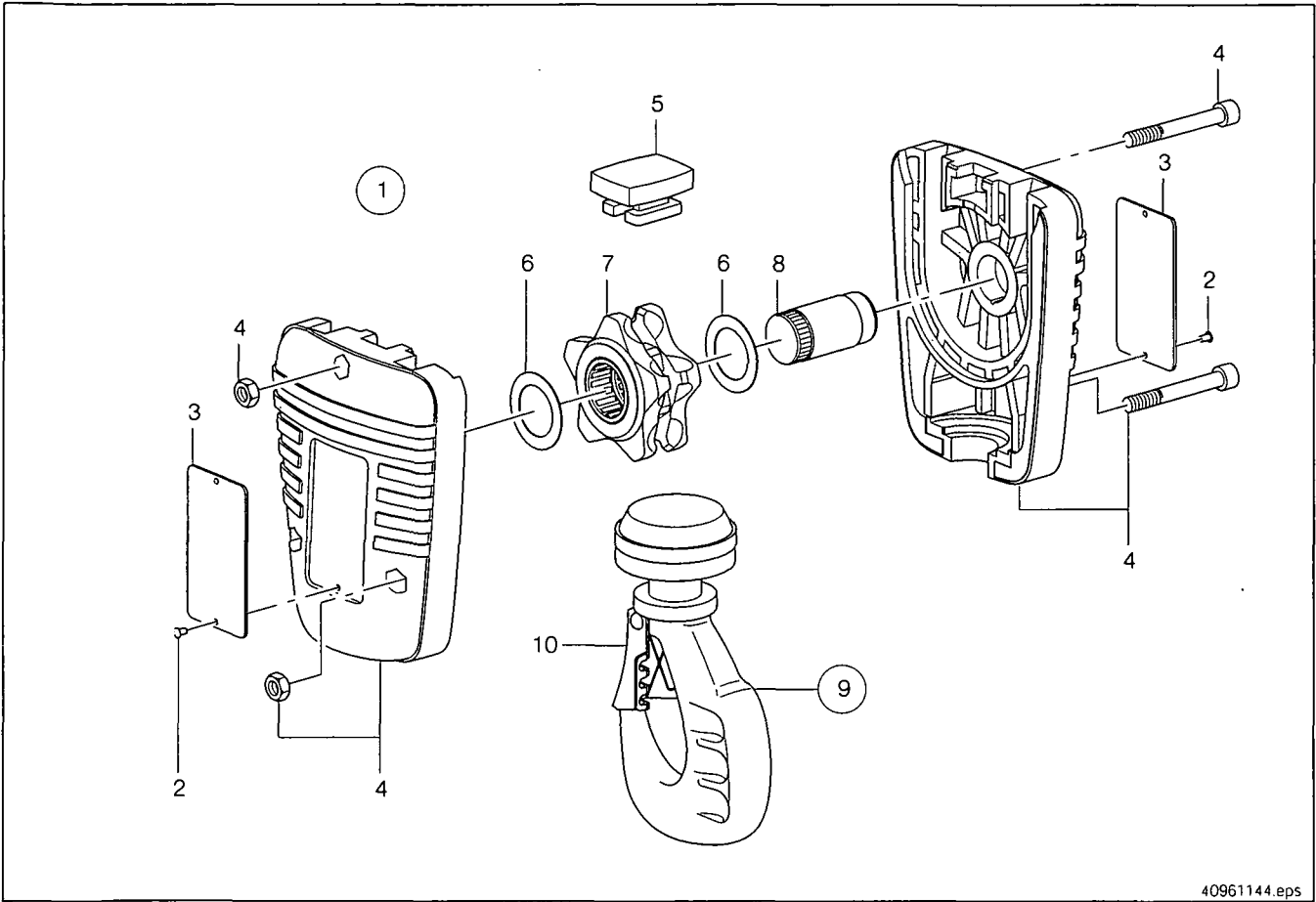
DKUN 20, 1250
 DKUN 20, 1600
 DKUN 20, 2000
 DKUN 20, 2500

c/w item 8

22251506.tbl

22251506.tbl

Bottom block, 2/1 reeving



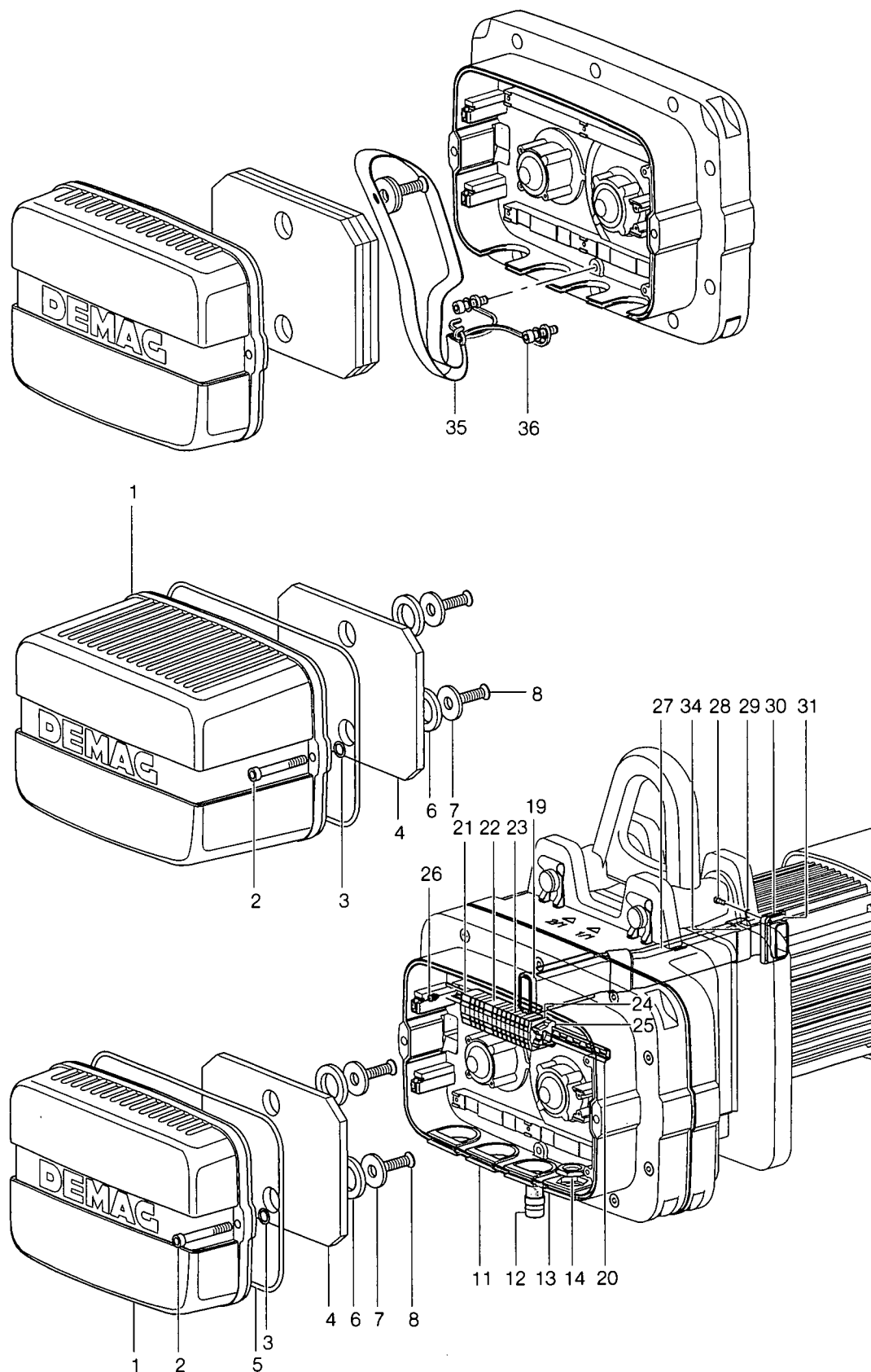
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Item no.	Part no.	Quantity	Designation		Material	Standard
1	83884044	1	Bottom block DK20 1BM 5T	c/w items 4 - 9		
2	35091099	4	Round head dowel pin 3 X 5		St A2F	DIN 1476
3	83595244	2	Capacity plate 2.5 T AL	DKUN 20, 1250		
3	83593244	2	Capacity plate 3.2 T AL	DKUN 20, 1600		
3	83595144	2	Capacity plate 4 T AL	DKUN 20, 2000		
3	83599644	2	Capacity plate 5 T AL	DKUN 20, 2500		
4	83884844	1	Bottom block half DK20			
5	83886144	1	Buffer plug bottom block 5,0T			
6	34231244	2	Axial bearing disk 35X 52X1			
7	83888444	1	Return sheave 10,5X28,2 Z5			
8	83885844	1	Bolt return sprocket 10,5X28,2			
9	83884244	1	Load hook size 7 1BM	c/w item 10		
10	82917644	1	Hook safety catch Gr.7			

22251506.tbl

Electrical components

Direct control



Electrical components

Direct control

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83712044	1	Hood short DK10-20		
1	83712344	1	Hood long DK10-20		
2	32158399	2	Hex.socket cylind.screw M 8 X 50	8.8 A2F	DIN 912
3	73917544	2	O-ring 7,3 X 2,4 B	NB 70/769	DIN- 3770
4	83712744	4	Counterweight DK10/16	Mot. 100 B 2/8, cover shorts	
4	83712744	2	Counterweight DK10/16	Mot. 100 B 2/8, cover long	
4	83712744	6	Counterweight DK10/16	Mot. 112 B 2/8, cover long	
5	83722144	1	Seal DK10 3 X 980		
6	34054299	8	Washer A17 X 30 X3	Mot. 100 B 2/8, cover shorts	140HV A2F DIN 125
6	34054299	12	Washer A17 X 30 X3	Mot. 100 B 2/8, cover long	140HV A2F DIN 125
6	34054299	2	Washer A17 X 30 X3	Mot. 112 B 2/8, cover long	140HV A2F DIN 125
7	34059199	2	Washer A13 X 24 X2,5	140HV A2F	DIN 125
8	15072099	2	Countersunk screw M 8 X 25	8.8A2F/TX	DIN- 7991
8	83620244	1	Plug-in unit M20		
12	83605144	1	Slide-in connection piece 20/3		
13	83620144	3	Plug-in unit, dummy M25		
14	53746184	2	Counter nut M25 EMV M		
19	83605044	1	Seal cable guide	Gearbox side	
20	89541744	1	Supporting rail 15 / 5,5X 160M		
21	89539544	1	Modular terminal 2,5X4X1DRDR	4 conductors	
22	89528444	1	Modular terminal 2,5X4X1DRDR	4 conductors, 1)	
23	89528344	1	Modular terminal 2,5X2X1DRDR	2 conductors, 1)	
24	89528544	1	End plate 264-368		
25	89541944	1	End angle TS15		
26	32475099	3	Thread rolling screw CE M 4X 12	ST-TX A2F	DIN- 7500
27	83804644	1	Cable guide KM100 B-DK20		
27	83804744	1	Cable guide KM112 B-DK20		
28	32147999	2	Hex.socket cylind.screw M 6 X 16	10.9 A2F	DIN 912
29	34387444	2	Screw locking device M 6		
30	83704944	1	Elbow piece cable tray Gr.2		
31	06980684	1	O-ring 58 X 2,5+-0,08	Perbunan	DIN- 3771
34	83615044	1	Seal cable guide	Motor side	
35	83755344	1	Cover securing set		
36	31881799	2	Hex.socket cylind.screw M 8 X 16	10.9 A2F	DIN- 912

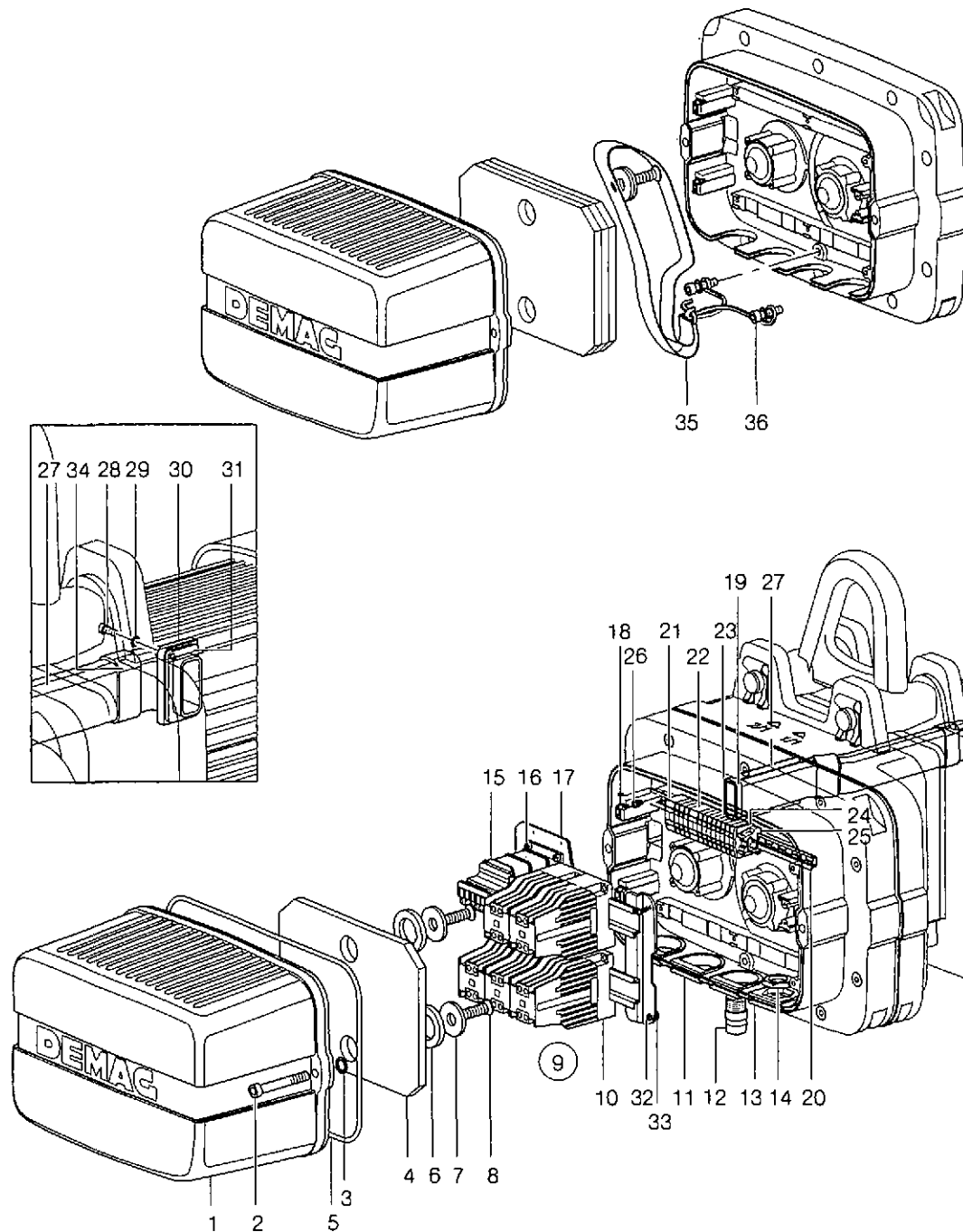
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1) Quantity depends on the version.

Electrical components

Contactor control



Electrical components

Contactor control

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83712344	1	Hood long DK10-20		
2	32158399	2	Hex.socket cylind.screw M 8 X 50	8.8 A2F	DIN 912
3	73917544	2	O-ring 7,3 X 2,4 B	NB 70/769	DIN- 3770
4	83712744	4	Counterweight DK10/16		
5	83722144	1	Seal DK10 3 X 980		
6	34054299	6	Washer A17 X 30 X3		
7	34059199	2	Washer A13 X 24 X2,5		
8	15072099	2	Countersunk screw M 8 X 25		
9			Switchgear set 3-Phase Design		
9	19801946	1	Switchgear set 230V 50HZ VDE		
9	19800746	1	Switchgear set 400/230V50HZ VDE		
9	19883846	1	Switchgear set 400/230V50HZ VDE		
9	19801346	1	Switchgear set 400/230V50HZ VDE		
9	19884146	1	Switchgear set 400/230V50HZ VDE		
9	19802146	1	Switchgear set 230V 50HZ VDE		
9	19800946	1	Switchgear set 400/230V50HZ VDE		
9	19883946	1	Switchgear set 400/230V50HZ VDE		
9	19801546	1	Switchgear set 400/230V50HZ VDE		
9	19884246	1	Switchgear set 400/230V50HZ VDE		
9	19802346	1	Switchgear set 230V 50HZ VDE		
9	19884646	1	Switchgear set 230V 50HZ VDE		
9	19800546	1	Switchgear set 400-500V50HZ VDE		
9	19883746	1	Switchgear set 400-500V50HZ VDE		
9	19801146	1	Switchgear set 400/230V50HZ VDE		
9	19884046	1	Switchgear set 400/230V50HZ VDE		
9	19801746	1	Switchgear set 400/230V50HZ VDE		
9	19884346	1	Switchgear set 400/230V50HZ VDE		
10	87535244	1	Contactor DSW 3TF8133 42V50HZ		
10	87535044	2	Contactor DSW 3TF8133 230/220V50HZ		
10	87536244	1	Contactor DSUB 111 42V50HZ		
10	87536044	1	Contactor DSUB 111 230/220V50HZ		
10	87548744	1	Contactor DSKR 110 42V50HZ		
10	87545544	1	Contactor DSKR 110 230/220V50HZ		
10	89510544	1	Compact rev.contactor 42V50HZ		
10	89563444	1	Compact rev.contactor 230V50HZ		
10	57524444	1	AC power contactor 25C 42V56 11E		
10	57524844	1	AC power contactor 25C230V56 11E		
10	57525344	1	AC power contactor 32C 42V56 11E		
10	57525744	1	AC power contactor 32C230V56 11E		
10	87559244	1	Contactor DSW 3TF8633 42V50HZ		
10	87559044	1	Contactor DSW 3TF8633 230/220V50HZ		
10	87560244	1	Contactor DSUB 311 42V50HZ		
10	87560044	1	Contactor DSUB 311 230/220V50HZ		
11	83620244	1	Plug-in unit M20		
12	83605144	1	Slide-in connection piece 20/3		
13	83620144	3	Plug-in unit, dummy M25		
14	53746184	2	Counter nut M25 EMV M		
15	89553944	1	Control transformer 36VA400/ 42V		
15	89569944	1	Control transformer 36VA400/230V		
15	89595044	1	Control transformer 63VA400/ 42V		
15	89597144	1	Control transformer 63VA400/230V		
16	31892599	4	Cylinder screw M 4X 8Z +SHB	4.8 A2F	DIN 6900
17	83712244	1	Mounting plate DK10-20		
18	34280444	1	Clamping plate 4X1.5X11.2		
19	83605044	1	Seal cable guide		
20	89541744	1	Supporting rail 15 / 5,5X 160M		
21	89539544	1	Modular terminal 2,5X4X1DRDR		
22	89528444	1	Modular terminal 2,5X4X1DRDR		
23	89528344	1	Modular terminal 2,5X2X1DRDR		
24	89528544	1	End plate 264-368		
25	89541944	1	End angle TS15		
26	32475099	3	Thread rolling screw CE M 4X 12	ST-TX A2F	DIN- 7500
27	83804644	1	Cable guide KM100 B-DK20		
27	83804744	1	Cable guide KM112 B-DK20		
28	32147999	2	Hex.socket cylind.screw M 6 X 16		
29	34387444	2	Screw locking device M 6		
30	83704944	1	Elbow piece cable tray Gr.2		
31	06980684	1	O-ring 58 X 2,5+-0,08		
32	31819799	2	Cylinder screw M 5 X 12		
33	34085499	2	Washer 4,3X 8 X0,5		
34	83615044	1	Seal cable guide		
35	83755344	1	Cover securing set		
36	31881799	2	Hex.socket cylind.screw M 8 X 16	10.9 A2F	DIN- 912

22251508.tbl

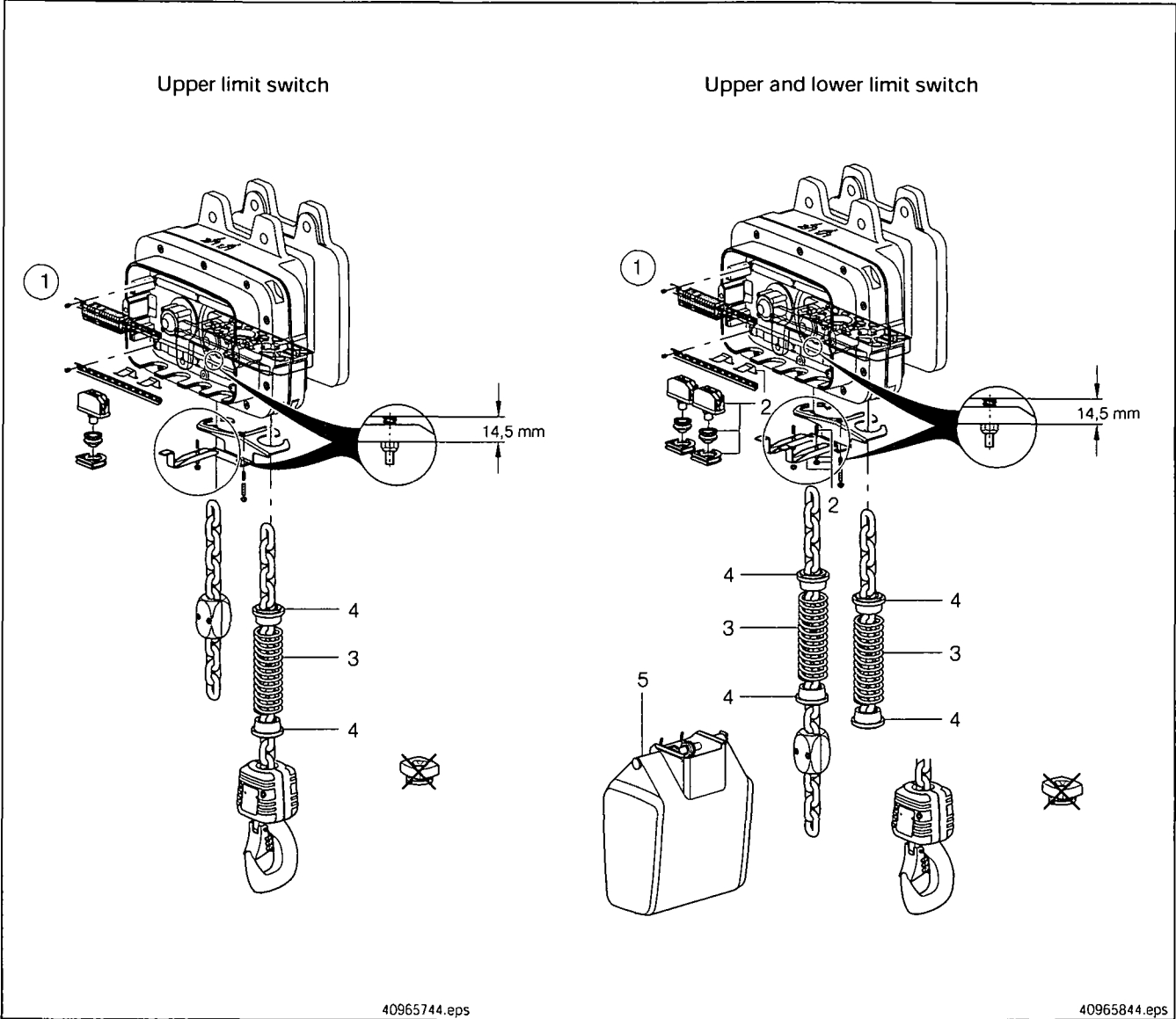
222516k1.p65/030403

- 1) State operating and control voltage when ordering.
 2) Without control transformer.
 3) Electrical equipment set for motor size KMK 100.

- # 4) Electrical equipment set for motor size KMK 112 B 2/8.
 5) With crane switch.
 6) Quantity depends on the version.

Limit switch for the upper and lower hook position

1/1 reeving



Limit switch for the upper hook position

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83878144	1	Limit switching set DK20		
3	15053499	1	Pressure spring 4,5 X50,5X145	8 m/min, 12,5 m/min, 16 m/min	
4	83828644	2	Cut-out sleeve DK20		

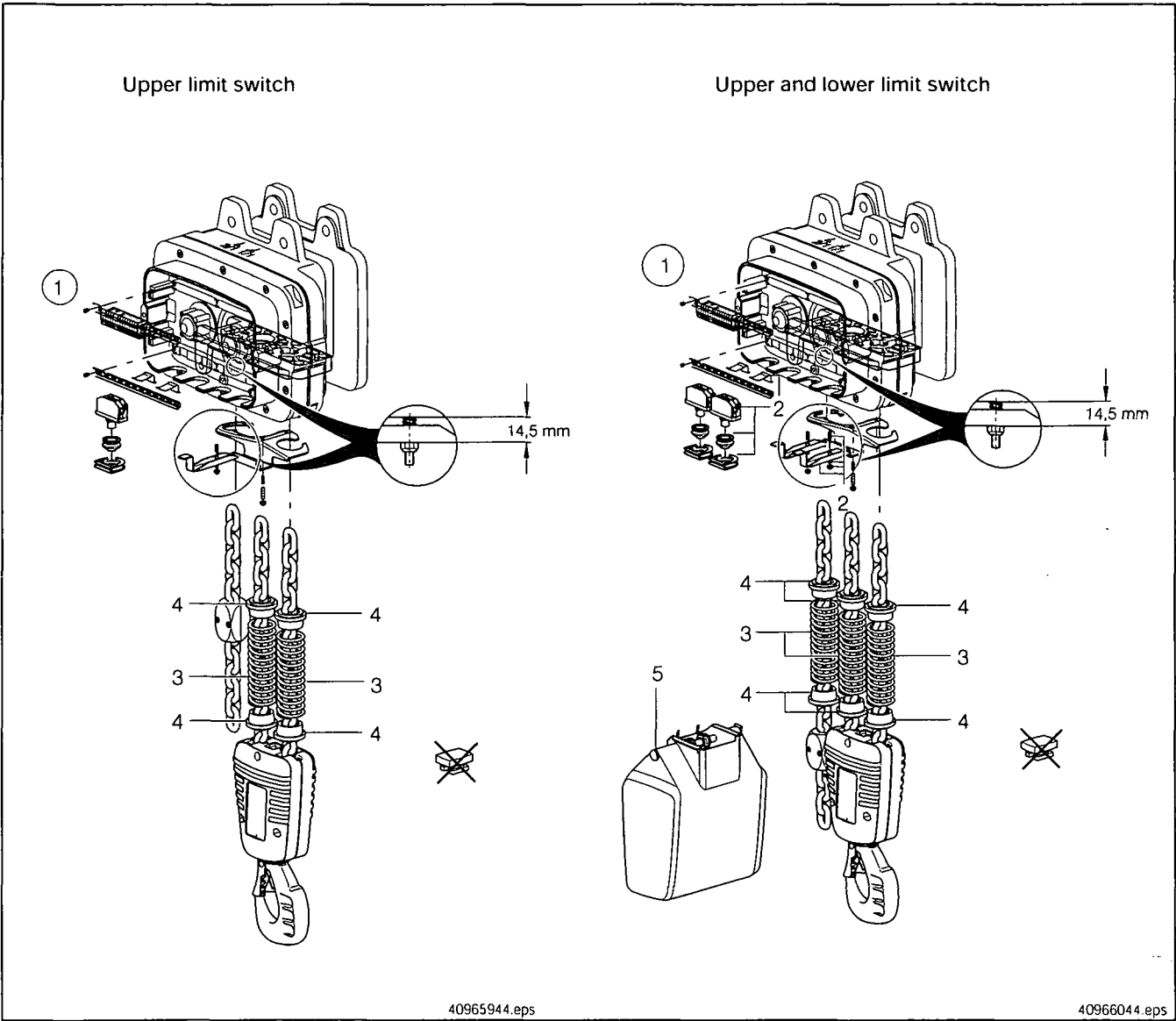
22251509.tbl

Limit switch for the upper and lower hook position

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83878144	1	Limit switching set DK20	Basic set	
2	83878244	1	Limit switching set DK20	Supp. set	
3	15053499	2	Pressure spring 4,5 X50,5X145	8 m/min, 12,5 m/min, 16 m/min	
4	83828644	4	Cut-out sleeve DK20		
5	83806744	1	Chain collector box DK20 GR. 6	max. chain length 13 m	

22251510.tbl

Limit switch for the upper and lower hook position
2/1 reeving



Limit switch for the upper hook position

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83878144	1	Limit switching set DK20		
3	15053499	2	Pressure spring 4.5 X50.5X145	8 m/min, 12.5 m/min, 16 m/min	
4	83828644	4	Cut-out sleeve DK20		

22251511.tbl

Limit switch for the upper and lower hook position

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83878144	1	Limit switching set DK20	Basic set	
2	83878244	1	Limit switching set DK20	Supp. set	
3	15053499	3	Pressure spring 4.5 X50.5X145	8 m/min, 12.5 m/min, 16 m/min	
4	83828644	6	Cut-out sleeve DK20		
5	83806744	1	Chain collector box DK20 GR. 6	max. chain length 13 m	

22251512.tbl

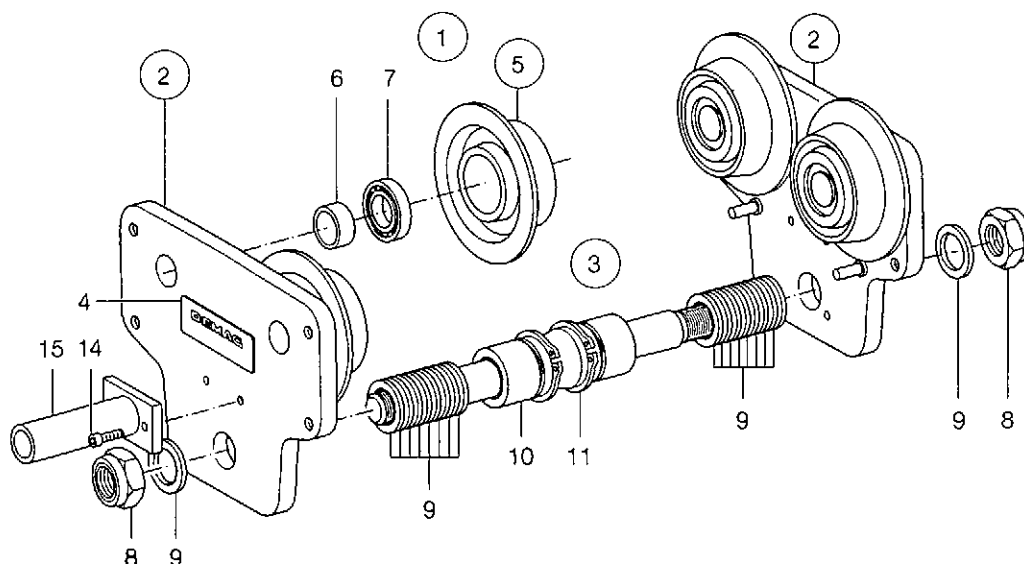
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Standard headroom monorail hoist**Trolley RU 22 DK****SWL 2600 kg****Flange width 82 - 300 mm**

Suitable for Demag chain hoist

DKUN 20 - 1250/1600/2000,

1/1 reeving



41176744.eps

Item no.	Part no.	Quantity	Designation	Material	Standard
1	84011344	1	Tr.un.tr.whl.univ.w/o crossb. RU22	c/w item 2	
2	84011644	2	Side plate tr.v.whl.univ.w/o g.rim	c/w items 4, 5	
3	83955644	1	Crossbeam RU22 Flb. 82-143	c/w items 8 - 11	
3	83955744	1	Crossbeam RU22 Flb. 144-200	c/w items 8 - 11	
3	83955844	1	Crossbeam RU22 Flb. 201-300	c/w items 8 - 11	
4	83964744	1	Capacity plate 2600KG		
5	84016044	2	Universal travel wheel 112 1 SPK.OZ	c/w items 6, 7	
6	84017244	1	Bush 30.2X 38 X17.4		
7	36822699	1	Grooved ball bearing 6206 2Z	WLZ-ST	DIN 625
8	33468799	2	Hexagonal nut M30 X2	8 A2F	DIN 985
9	50222044	19	Washer 35,5X 50 X 4	Fl. W. 82 - 143	
9	50222044	16	Washer 35,5X 50 X 4	Fl. W. 144 - 200	
9	50222044	27	Washer 35,5X 50 X 4	Fl. W. 201 - 300	
10	83955044	1	Tube 51 X 7,1 X 109	Fl. W. 82 - 143	
10	83955144	1	Tube 51 X 7,1 X 174	Fl. W. 144 - 200	
10	83955244	1	Tube 51 X 7,1 X 230	Fl. W. 201 - 300	
11	34244299	2	Retaining ring 52X3	FEOST	DIN 471
14	32141099	2	Hex.socket cylind.screw M 8 X 20	10.9 A2F	DIN 912
15	83973744	1	Current collector tube 400		

22251513.tbl

Standard headroom monorail hoist

Trolley EU 22 DK

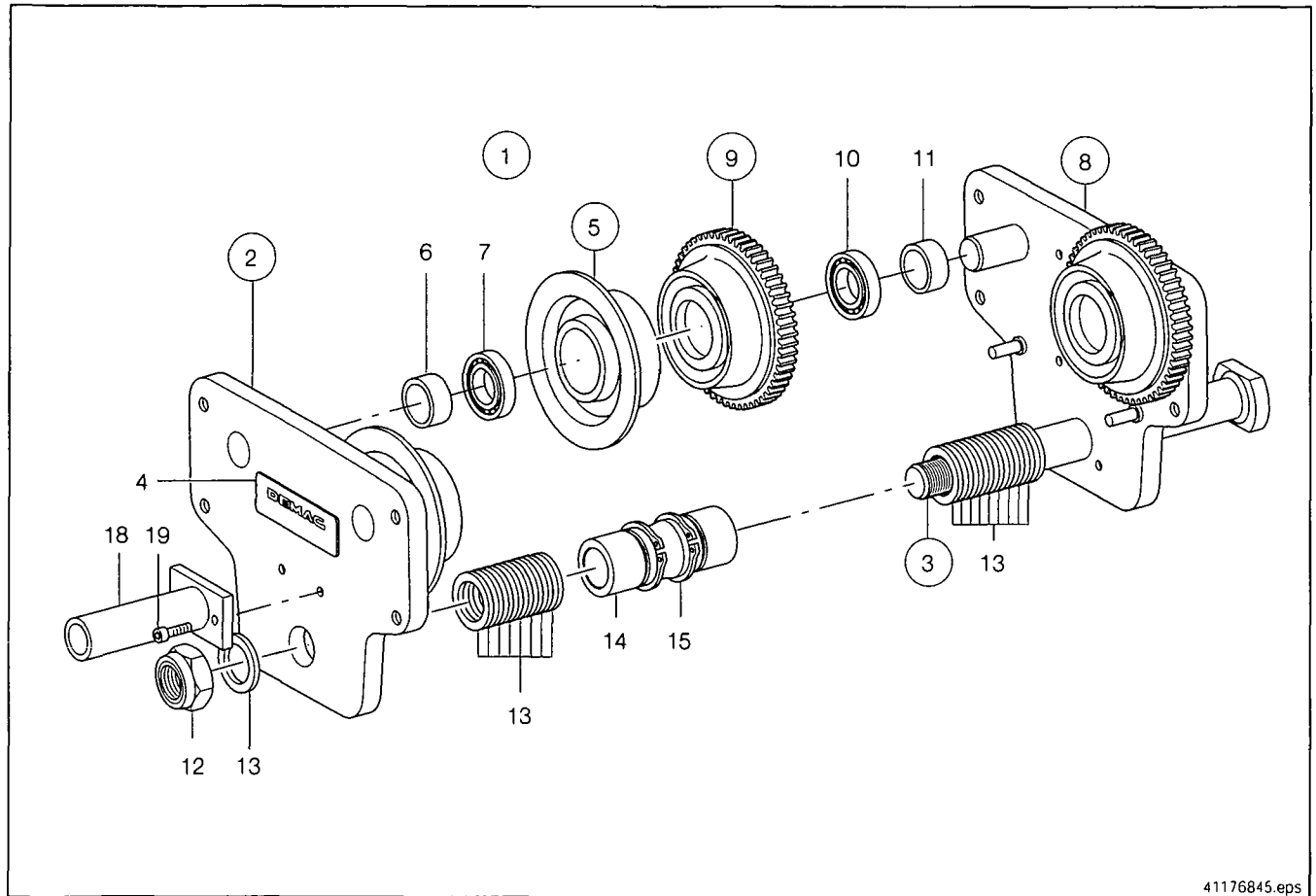
SWL 2600 kg

Flange width 82 - 300 mm

Suitable for Demag chain hoist

DKUN 20 - 1250/1600/2000,

1/1 reeving



Item no.	Part no.	Quantity	Designation	Material	Standard
1	84011444	1	Tr.un.tr.wht.univ.w/o crossb. EU22		
2	84011644	1	Side plate trv.wht.univ.w/o g.rim		
3	83956344	1	Crossbeam EU22 Flb. 82-143		
3	83956444	1	Crossbeam EU22 Flb.144-200		
3	83956544	1	Crossbeam EU22 Flb.201-300		
4	83964744	1	Capacity plate 2600KG		
5	84016044	2	Universal travel wheel 112 1 SPK.OZ		
6	84017244	1	Bush 30.2X 38 X17,4		
7	36822699	1	Grooved ball bearing 6206 2Z	WLZ-ST	DIN 625
8	84011744	1	Side plate trv.wht.univ.w.gear rim		
9	84017044	2	Universal travel wheel 112 1 SPK.MZ		
10	36822699	1	Grooved ball bearing 6206 2Z	WLZ-ST	DIN 625
11	84017344	1	Bush 30.2X 38 X23,2		
12	33468799	1	Hexagonal nut M30 X2	8 A2F	DIN 985
13	50222044	19	Washer 35,5X 50 X 4		
13	50222044	17	Washer 35,5X 50 X 4		
13	50222044	28	Washer 35,5X 50 X 4		
14	83955044	1	Tube 51 X 7,1 X 109		
14	83955144	1	Tube 51 X 7,1 X 174		
14	83955244	1	Tube 51 X 7,1 X 230		
15	34244299	2	Retaining ring 52X3	FEDST	DIN 471
18	83973744	1	Current collector tube 400		
19	32141099	2	Hex.socket cylind.screw M 8 X 20	10.9 A2F	DIN 912

22251515.tbl

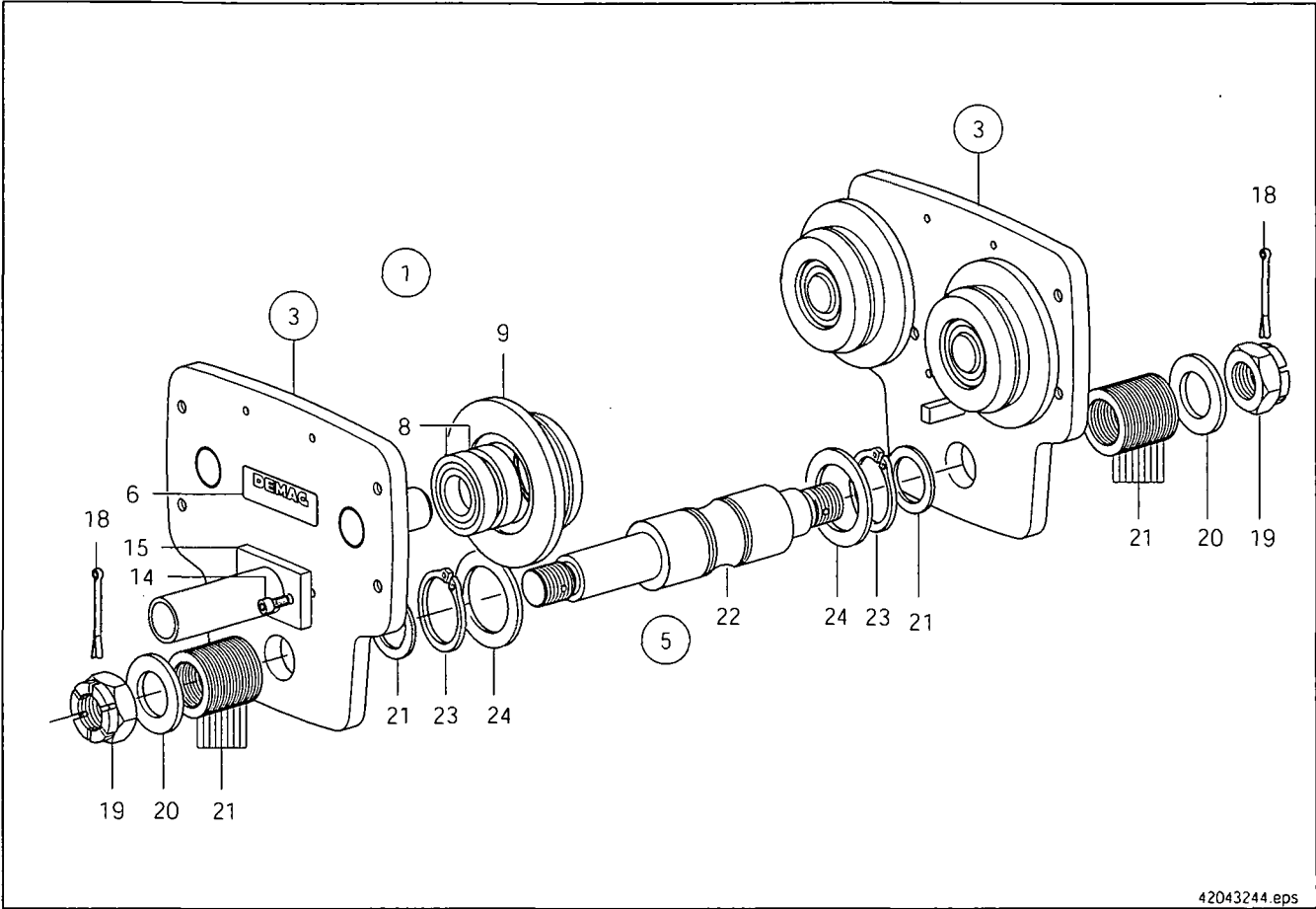
Standard headroom monorail hoist

Trolley RU 36 DK

SWL 3600 kg

Flange width 106 - 300 mm

Suitable for Demag chain hoist
DKUN 20 - 2500, 1/1 reeving
DKUN 20 - 1250, 1600, 2/1 reeving



Item no.	Part no.	Quantity	Designation	Material	Standard
1	84029244	1	Tr.un.tr.whl.univ.w/o crossb. RU36	c/w item 3	
3	84029044	2	Side plate RU36DK-UNI	c/w items 6, 9	
5	83959144	1	Crossbeam RUEU36 Flb.106-186	c/w itwms 18 - 24	
5	83959944	1	Crossbeam RUEU36 Flb.187-300	c/w itwms 18 - 24	
6	83969144	1	Capacity plate 3600KG		
8	36820899	2	Grooved ball bearing 6208 Z	WLZ-ST	DIN 625
9	83057844	2	Universal travel wheel 125 1 SPK.OZ	c/w item 8	
14	32141099	2	Hex.socket cylind.screw M 8 X 20	10.9 A2F	DIN 912
15	83973744	1	Current collector tube 400		
18	34210599	2	Split pin 6.3X 63	ST	DIN 94
19	33573899	2	Castellated nut M36	04 A2F	DIN 979
20	34002899	2	Washer 45 X 78 X7	ST	DIN 126
21	52222044	22	Washer 45,5X 65 X 4	Fl. W. 106 - 186	
21	52222044	30	Washer 45,5X 65 X 4	Fl. W. 187 - 300	
22	83958544	1	Tube 57 X 5,6 X 158	Fl. W. 106 - 186	
22	83958644	1	Tube 57 X 5,6 X 240	Fl. W. 187 - 300	
23	34255499	2	Retaining ring 58X2	FEDST	DIN 471
24	83968244	2	Washer 58 X 76,1X 7		

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Standard headroom monorail hoist

Trolley EU 36 DK

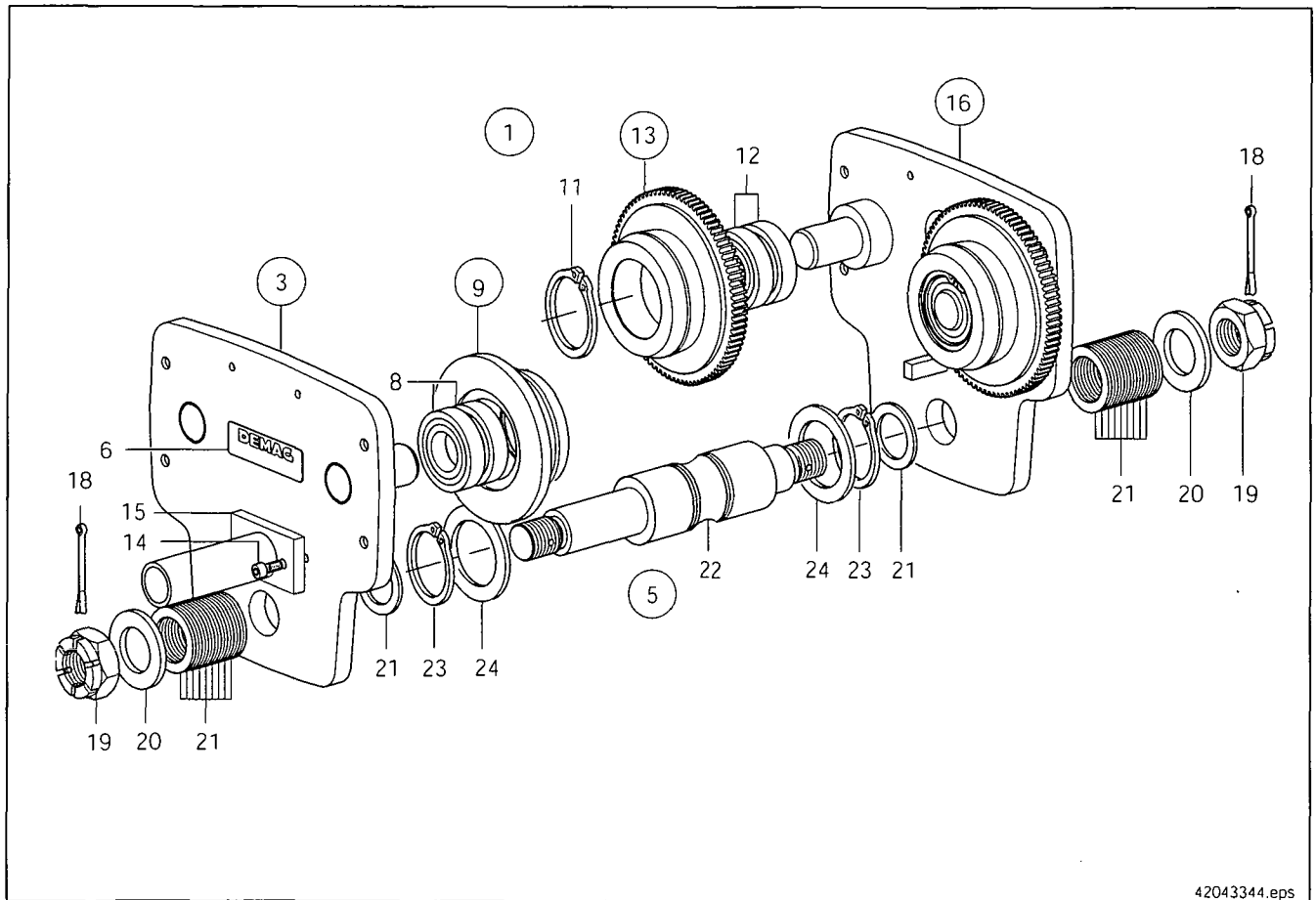
SWL 3600 kg

Flange width 106 - 300 mm

Suitable for Demag chain hoist

DKUN 20 - 2500, 1/1 reeving

DKUN 20 - 1250, 1600, 2/1 reeving



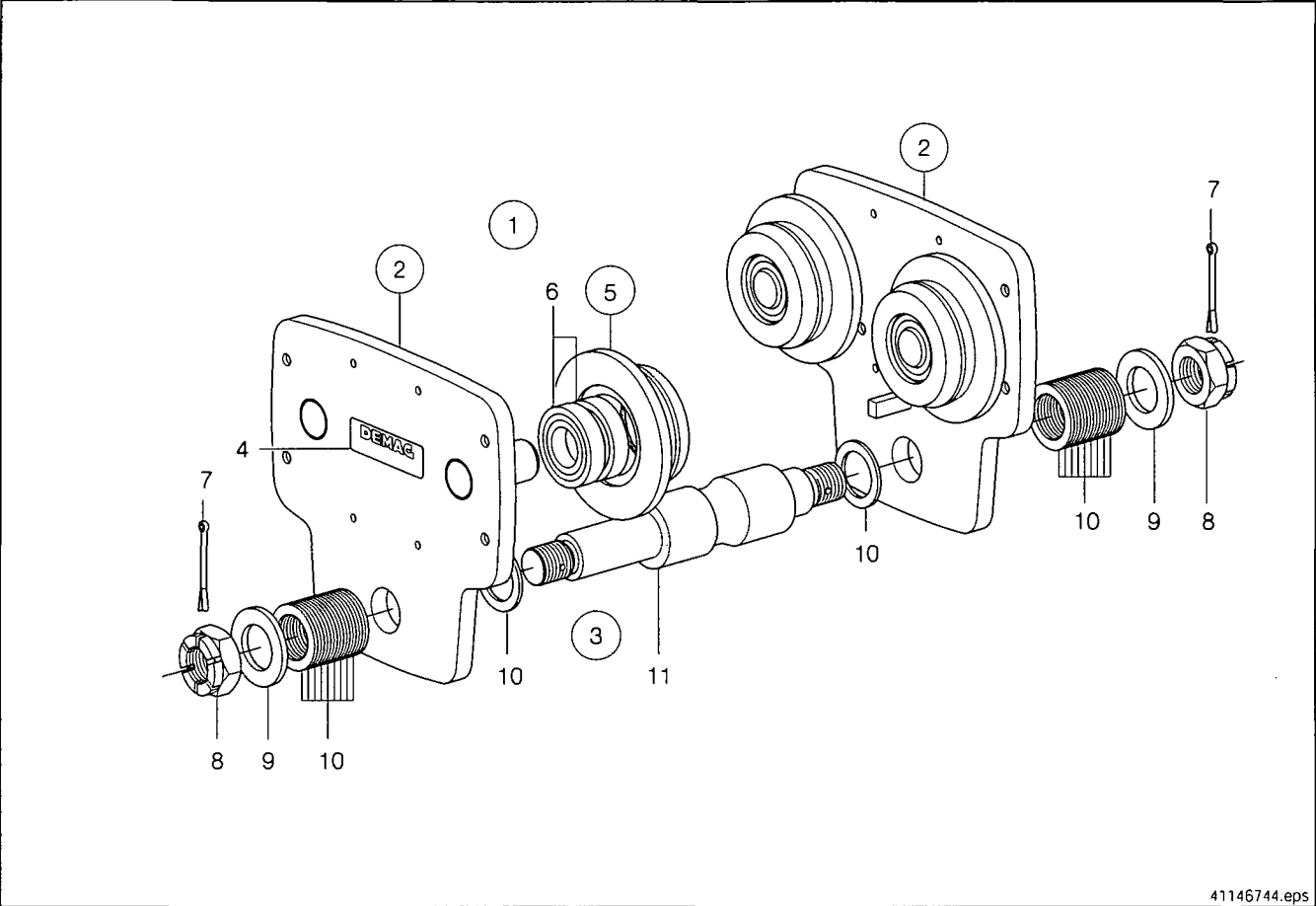
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Item no.	Part no.	Quantity	Designation		Material	Standard
1	84039244	1	Tr.un.tr.whl.univ.w/o crossb. EU36	c/w items 3, 16		
3	84029044	1	Side plate RU36DK-UNI	c/w items 6, 9		
5	83959144	1	Crossbeam RUEU36 Flb.106-186	c/w itwms 18 - 24		
5	83959944	1	Crossbeam RUEU36 Flb.187-300	c/w itwms 18 - 24		
6	83969144	1	Capacity plate 3600KG			
8	36820899	2	Grooved ball bearing 6208 Z		WLZ-ST	DIN 625
9	83057844	2	Universal travel wheel 125 1 SPK.OZ	c/w item 8		
11	34266599	1	Retaining ring 80X2,5		FEDST	DIN 472
12	36820899	2	Grooved ball bearing 6208 Z		WLZ-ST	DIN 625
13	83055344	2	Universal travel wheel 125 1 SPK.MZ	c/w items 11, 12		
14	32141099	2	Hex.socket cylind.screw M 8 X 20		10.9 A2F	DIN 912
15	83973744	1	Current collector tube 400			
16	83979144	1	Side plate EU55-13/6	c/w item 13		
18	34210599	2	Split pin 6,3X 63		ST	DIN 94
19	33573899	2	Castellated nut M36		04 A2F	DIN 979
20	34002899	2	Washer 45 X 78 X7		ST	DIN 126
21	52222044	22	Washer 45,5X 65 X 4	Fl. W. 106 - 186		
21	52222044	30	Washer 45,5X 65 X 4	Fl. W. 187 - 300		
22	83958544	1	Tube 57 X 5,6 X 158	Fl. W. 106 - 186		
22	83958644	1	Tube 57 X 5,6 X 240	Fl. W. 187 - 300		
23	34255499	2	Retaining ring 58X2		FEDST	DIN 471
24	83968244	2	Washer 58 X 76,1X 7			

22254513.tbl

Standard headroom monorail hoist
Trolley RU 55 DK
SWL 5500 kg
Flange width 106 - 300 mm

Suitable for Demag chain hoist
DKUN 20 - 1250/1600/2000/2500,
1/1 and 2/1 reeving

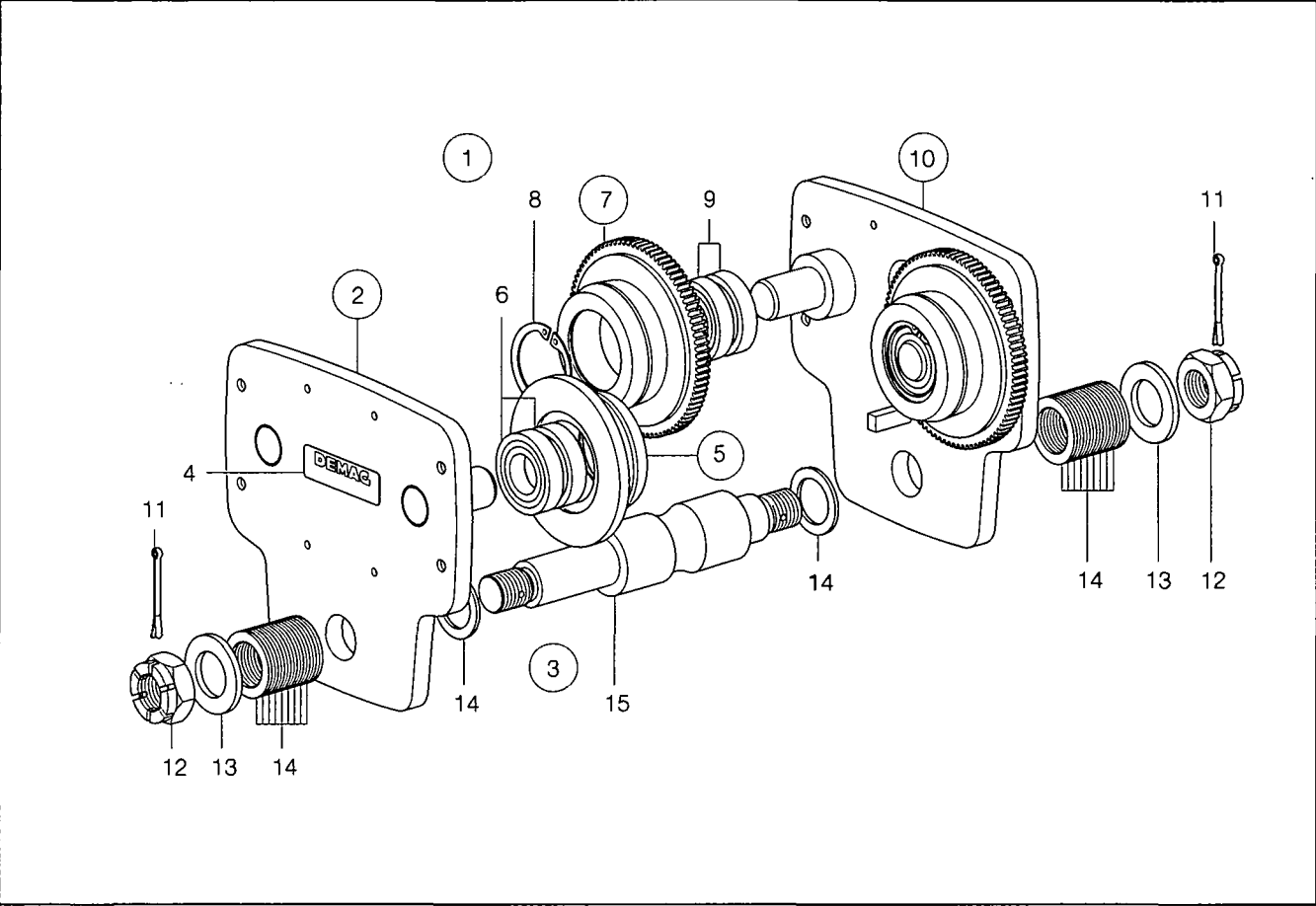


Item no.	Part no.	Quantity	Designation	Material	Standard
1	83969244	1	Tr.un.tr.whl.univ.w/o crossb. RU55	c/w item 2	
2	83969044	2	Side plate RU55DK-UNI	c/w items 4, 5	
3	83957644	1	Crossbeam RUEU55 Flb.106-186	c/w items 7 - 11	
3	83957744	1	Crossbeam RUEU55 Flb.187-300	c/w items 7 - 11	
4	83968944	1	Capacity plate 5500KG		
5	83057844	2	Universal travel wheel 125 1 SPK.OZ	c/w item 6	
6	36820899	2	Grooved ball bearing 6208 Z	WLZ-ST	DIN 625
7	34210599	2	Split pin 6.3X 63	ST	DIN 94
8	33573899	2	Castellated nut M36	04 A2F	DIN 979
9	34002899	2	Washer 45 X 78 X7	ST	DIN 126
10	52222044	22	Washer 45,5X 65 X 4	Fl. W. 106 - 186	
10	52222044	30	Washer 45,5X 65 X 4	Fl. W. 187 - 300	
11	83957044	1	Tube 70 X12 X 158	Fl. W. 106 - 186	
11	83957144	1	Tube 82,5X18,25X 240	Fl. W. 187 - 300	

22251514.tbl

Standard headroom monorail hoist
Trolley EU 55 DK
SWL 5500 kg
Flange width 106 - 300 mm

Suitable for Demag chain hoist
DKUN 20 - 1250/1600/2000/2500,
1/1 and 2/1 reeving



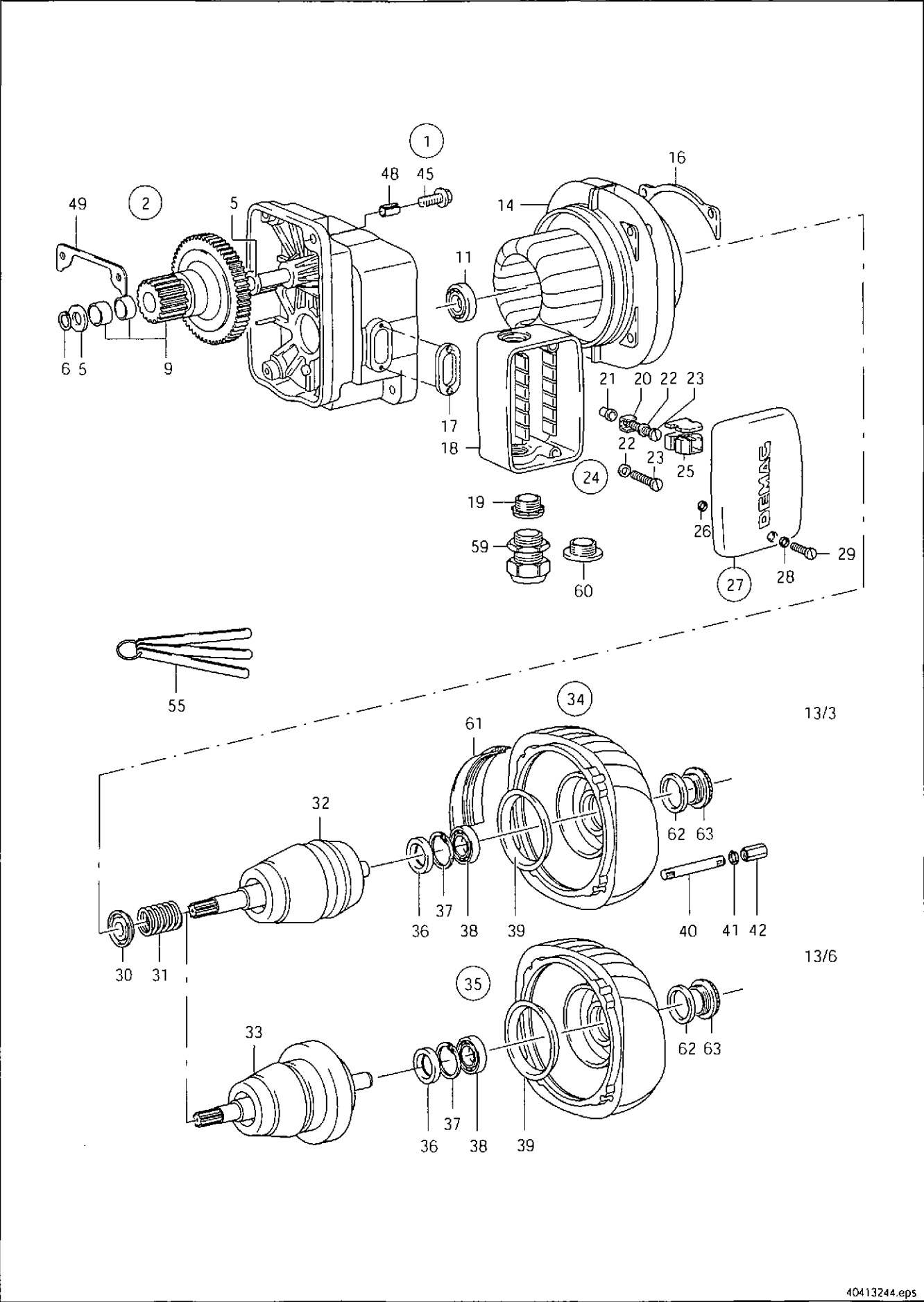
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Item no.	Part no.	Quantity	Designation		Material	Standard
1	83979444	1	Tr.un.tr.whl.univ.w/o crossb. EU55	c/w items. KMF 80		
1	83979244	1	Tr.un.tr.whl.univ.w/o crossb. EU55	c/w items. 13/6 PKF		
2	83969044	1	Side plate RU55DK-UNI	c/w items 4, 5		
3	83957644	1	Crossbeam RUEU55 Fib.106-186	c/w items 11 - 15		
3	83957744	1	Crossbeam RUEU55 Fib.187-300	c/w items 11 - 15		
4	83968944	1	Capacity plate 5500KG			
5	83057844	2	Universal travel wheel 125 1 SPK.OZ	c/w item 6		
6	36820899	2	Grooved ball bearing 6208 Z		WLZ-ST	DIN 625
7	83055344	2	Universal travel wheel 125 1 SPK.MZ	c/w items 8, 9		
8	34266599	1	Retaining ring 80X2,5		FEDST	DIN 472
9	36820899	2	Grooved ball bearing 6208 Z		WLZ-ST	DIN 625
10	83979044	1	Side plate EU55-KMF80	c/w item 7		
10	83979144	1	Side plate EU55-13/6	c/w item 7		
11	34210599	2	Split pin 6.3X 63		ST	DIN 94
12	33573899	2	Castellated nut M36		04 A2F	DIN 979
13	34002899	2	Washer 45 X 78 X7		ST	DIN 126
14	52222044	22	Washer 45,5X 65 X 4	Fl. W. 106 - 186		
14	52222044	30	Washer 45,5X 65 X 4	Fl. W. 187 - 300		
15	83957044	1	Tube 70 X12 X 158	Fl. W. 106 - 186		
15	83957144	1	Tube 82,5X18,25X 240	Fl. W. 187 - 300		

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Travel drive PKF 13/3 and PKF 13/6 for EU 22 DK



Travel drive PKF 13/3 and PKF 13/6 for EU 22 DK

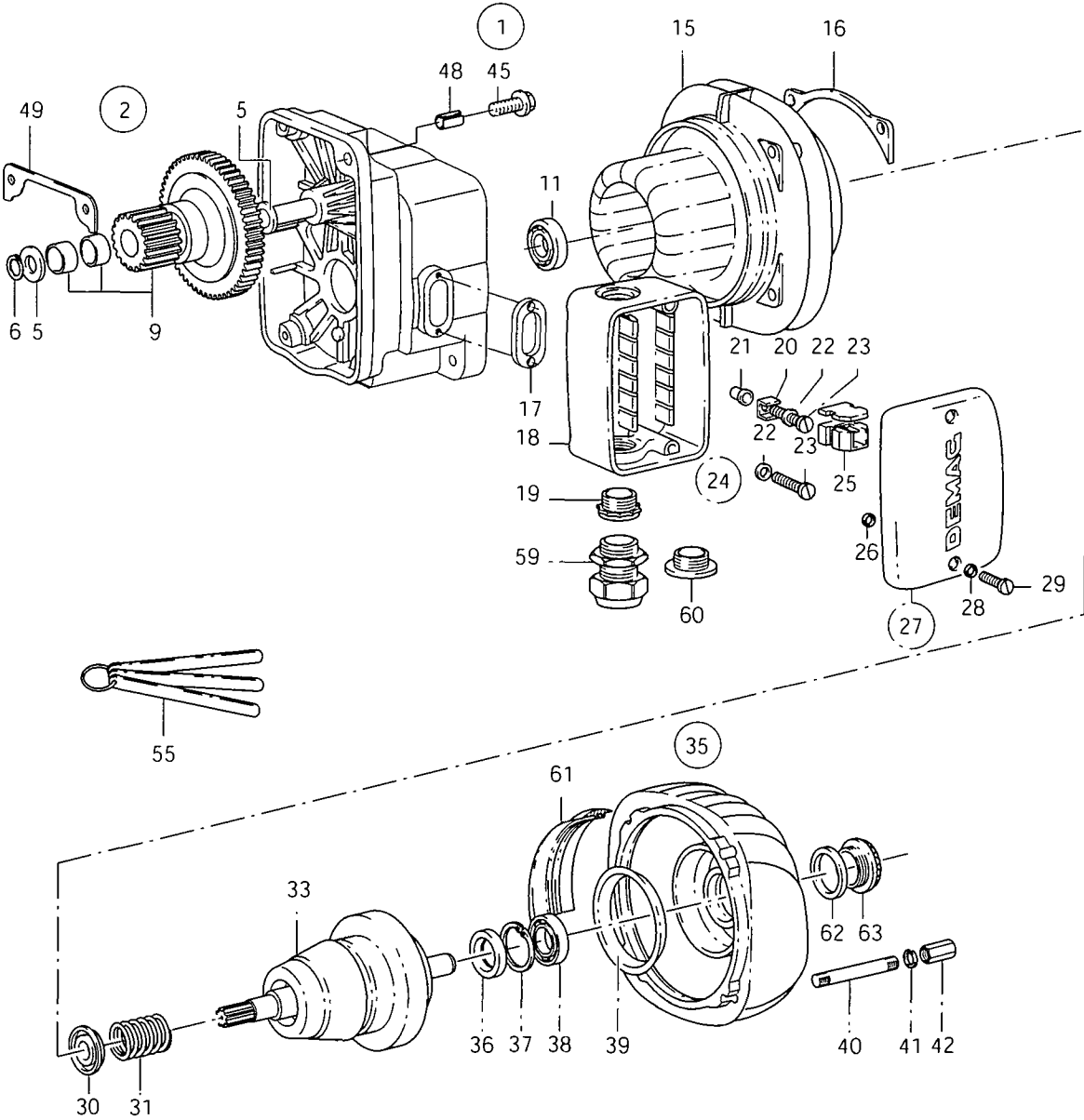
Item no.	Part no.	Quantity	Designation	Material	Standard
1	56306744	1	Motor 7M 13/3PKF8 AB	c/w items 2,12-14,16,24,25,30-32,34,40-42, 220-400 V, 50 ID	
1	56306444	1	Motor 14M 13/3PKF4 AB	c/w items 2,12-14,16,24,25,30-32,34,40-42, 220-400 V, 50 ID	
1	56306244	1	Motor 28M 13/3PKF2 AB	c/w items 2,12-14,16,24,25,30-32,34,40-42, 220-400 V, 50 ID	
1	56305644	1	Motor 4,6/14M 13/6PKF AB	c/w items 2,12-14,16,24,25,30,31,33,35,40-42, 380-400 V, 50 ID	
1	56305744	1	Motor 7/28M 13/6PKF8-2AB	c/w items 2,12-14,16,24,25,30,31,33,35,40-42, 380-400 V, 50 ID	
2	56307144	1	End shield PKF-M5 Bo.Kurz	c/w items 5, 6, 9, 11	
5	56377844	2	Washer 15D12X 26 X 2		
6	34251599	1	Retaining ring 15X1	FEDST	DIN 471
9	56307344	1	Cluster gear Z103M1 Z18M2		
11	36050399	1	Grooved ball bearing 6003	FE.-30+110	DIN- 625
14	56010644	1	Stator F 13/ 3P2K AB	220/380 V, 50 ID, 230/400 V, 50 ID, 1)	
14	56371444	1	Stator F 13/ 3PF4 AB	220/380 V, 50 ID, 230/400 V, 50 ID, 1)	
14	56371744	1	Stator F 13/ 3PF8 AB	220/380 V, 50 ID, 230/400 V, 50 ID, 1)	
14	56372544	1	Stator F 13/ 6PF8/2AB	380/400 V, 50 ID, 1)	
14	56370144	1	Stator F 13/6PF12/4AB	380/400 V, 50 ID, 1)	
16	56025444	14	Segment 13/3P	13/6 P	
17	56368944	1	Seal terminal box lower part		
18	56369044	1	Terminal box lower part M25X1,5		
19	79494644	1	Twist.cab.entrgland M25 ZU/ 9-16 K		
20	44016499	1	Flat plug 6.3-0,8/2X		
21	37437999	1	Tubular rivet A6 X0,4 X10	1.4301	DIN- 7340
22	34360599	2	Serrated lock washer A 5,3	FEDST A2F	DIN 6798
23	31817999	2	Cylinder screw M 5 X 20	4.8 A2F	DIN 84
24	56368544	1	Terminal board 13 KF-PKF	c/w items 17 - 23, 27	
25	50577344	1	Terminal strip 4X 4,8 STST	1 speed	
25	50577444	1	Terminal strip 6X 4,8 STST	2 speeds	
26	34043599	2	Washer 3,7X 7 X1,0	VULKANFIBE	DIN- 433
27	56368744	1	Terminal box cover EU	c/w items 26, 28, 29	
28	34387244	2	Screw locking device M 4		
29	31816699	2	Cylinder screw M 4 X 16	4.8 A2F	DIN 84
30	56022544	1	Pressure ring 7,3 13/3P	13/6 P 1)	
30	56022644	1	Pressure ring 7,6 13/3P	13/6 P 1)	
30	56022744	1	Pressure ring 7,9 13/3P	13/6 P 1)	
30	56022844	1	Pressure ring 8,2 13/3P	13/6 P 1)	
31	56379344	1	Pressure spring 1,8 X25,8X 84	30 N	
32	56379144	1	Rotor 13/ 3PKF	1), 3)	
32	56379244	1	Rotor 13/ 3PKF+B.Sch.	1)	
33	56304744	1	Rotor 13/ 6PF 8-2	1), 3)	
33	56304844	1	Rotor 13/ 6PF8-2B.Sch	1)	
34	56024044	1	End shield B 13/ 3P	c/w items 36 - 39, 63	
35	56305544	1	End shield B13/ 6PF8-2	c/w items 36 - 39, 63	
36	56024544	1	Oil seal 17 X 35X 5		
37	34263599	1	Retaining ring 35X1,5	FEDST	DIN 472
38	36050399	1	Grooved ball bearing 6003	FE.-30+110	DIN- 625
39	56029044	1	Brake lining PK 1 ASBFR	2)	
40	60063544	4	Stud M 5 X 54X 62	13/3 P	
40	60063844	4	Stud M 5 X 79X 87	13/6 P	
41	34380599	4	Lock washer 5 A	FEDST A2F	DIN 127
42	60065444	4	Nut with hexagon socket M 5		
45	30021944	4	Lock screw M 8X25 VB.RIPP		
48	34575899	1	Split sleeve 11 X 12	ST	ISO-13337
49	58136944	1	Seal travel drive PK		
55	10092644	1	Feeler gauge 0,30X3X250	1)	
55	10092744	1	Feeler gauge 0,35X3X300	1)	
59	79495944	2	Screw conn. compl. M25 RD K	3)	
60	79499144	1	Screw plug M25X1,5	3)	
61	60077444	1	Profiled joint 13P	3)	
62	60087599	1	Sealing ring thr.con. PG21 K	3)	
63	60070644	1	Screw plug PG21 K	PE	DIN 46320
	01105844	1	Grease KPF2K-30 DG67B		

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1) When ordering a rotor or stator, a set of thrust rings (item no. 30) must also be ordered for adjusting the air gap (adjust with feeler gauge no. 2, item no. 55)
2) With gluing device.
3) For service in arduous conditions.

Travel drive PKF 13/6 for EU 55 DK up to 3200 kg



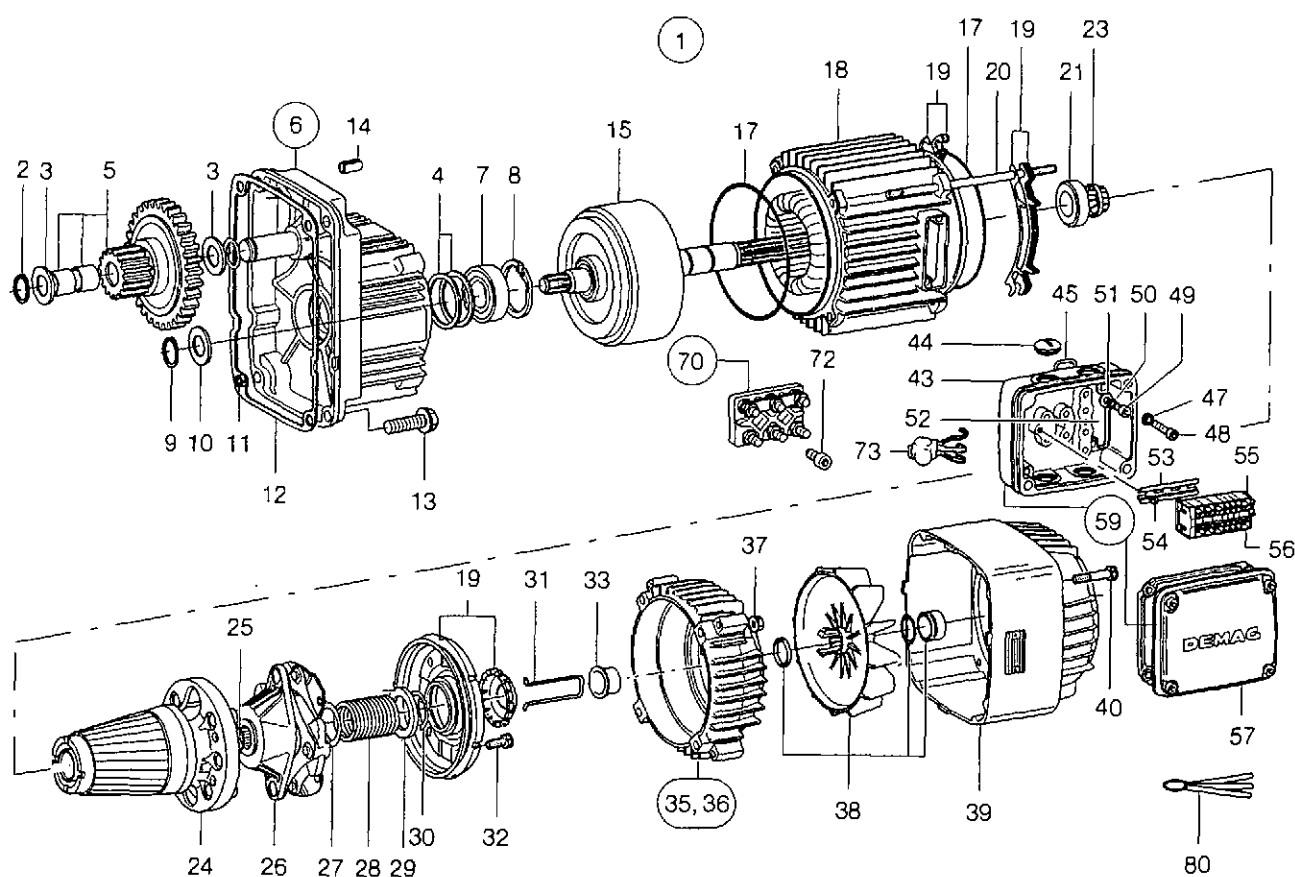
Travel drive PKF 13/6 for EU 55 DK up to 3200 kg

Item no.	Part no.	Quantity	Designation	Material	Standard
1	56391344	1	Motor 28M 220/380V50AB	c/w items 2,12-16,24,25,31,33,35,40-42	
1	56391644	1	Motor 14M 13/ 6PF4 AB	c/w items 2,12-16,24,25,31,33,35,40-42	
1	56396444	1	Motor 7M 230/400V	c/w items 2,12-16,24,25,31,33,35,40-42	
1	56396844	1	Motor 7/28M 13/ 6PF8-2AB	c/w items 2,12-16,24,25,31,33,35,40-42	
1	56398244	1	Motor 4,2/12M13/6PF12-4	c/w items 2,12-16,24,25,31,33,35,40-42	
2	56378944	1	End shield PKF-M5 Bo.Lang	c/w items 5, 6, 9, 11	
5	56377844	2	Washer 15D12X 26 X 2		
6	34251599	1	Retaining ring 15X1	FEDST	DIN 471
9	56377344	1	Cluster gear Z103M1 Z18M2		
11	36050399	1	Grooved ball bearing 6003	FE.-30+110	DIN- 625
12	60005144	1	Rating plate 13/3-13/6		
12	56308944	1	Rating plate motor 13/6PF12/4	220/230V, 50ID, 380/400V, 50ID	
12	56309044	1	Rating plate motor 13/6PF 8/2	380/400V, 50ID	
13	35041399	2	Countersunk head grooved pin A 2,6X 6	ST A2F	ISO- 8747
15	56372244	1	Stator F 13/ 6PF2	220/380V, 50ID, 230/400V, 50ID, 1)	
15	56382244	1	Stator F 13/ 6PF4 AB	220/380V, 50ID, 230/400V, 50ID, 1)	
15	56381744	1	Stator F 13/ 6PF8 AB	220/380V, 50ID, 230/400V, 50ID, 1)	
15	56372544	1	Stator F 13/ 6PF8/2AB	380/400V, 50ID, 1)	
15	56370144	1	Stator F 13/6PF12/4AB	380/400V, 50ID, 1)	
16	56025444	14	Segment 13/3P	13/6P	
17	56368944	1	Seal terminal box lower part		
18	56369044	1	Terminal box lower part M25X1,5		
19	79494644	1	Twist.cab.entrgland M25 ZU/ 9-16 K		
20	44016499	1	Flat plug 6,3-0,8/2X		
21	37437999	1	Tubular rivet A6 X0,4 X10	1.4301	DIN- 7340
22	34360599	2	Serrated lock washer A 5,3	FEDST A2F	DIN 6798
23	31817999	2	Cylinder screw M 5 X 20	4.8 A2F	DIN 84
24	56368544	1	Terminal board 13 KF-PKF	c/w items 17 - 23, 27	
25	50577344	1	Terminal strip 4X 4,8 STST	1 speed	
25	50577444	1	Terminal strip 6X 4,8 STST	2 speeds	
26	34043599	2	Washer 3,7X 7 X1,0	VULKANFIBE	DIN- 433
27	56368744	1	Terminal box cover EU	c/w items 26, 28, 29	
28	34387244	2	Screw locking device M 4		
29	31816699	2	Cylinder screw M 4 X 16	4.8 A2F	DIN 84
30	56022544	1	Pressure ring 7,3 13/3P	13/6P 1)	
30	56022644	1	Pressure ring 7,6 13/3P	13/6P 1)	
30	56022744	1	Pressure ring 7,9 13/3P	13/6P 1)	
30	56022844	1	Pressure ring 8,2 13/3P	13/6P 1)	
31	56379344	1	Pressure spring 1,8 X25,8X 84	30N	
33	56304844	1	Rotor 13/ 6PF8-2B.Sch	1)	
33	56304744	1	Rotor 13/ 6PF 8-2	1), 3)	
35	56305544	1	End shield B13/ 6PF8-2	c/w items 36 - 39, 63	
36	56024544	1	Oil seal 17 X 35X 5		
37	34263599	1	Retaining ring 35X1,5	FEDST	DIN 472
38	36050399	1	Grooved ball bearing 6003	FE.-30+110	DIN- 625
39	56029044	1	Brake lining PK 1 ASBFR	2)	
40	60063844	4	Stud M 5 X 79X 87		
41	34380599	4	Lock washer 5 A	FEDST A2F	DIN 127
42	60065444	4	Nut with hexagon socket M 5		
45	30021944	1	Lock screw M 8X25 VB.RIPP		
46	30022044	3	Lock screw M 8X30 VB.RIPP		
48	34575899	1	Split sleeve 11 X 12	ST	ISO-13337
49	58136944	1	Seal travel drive PK		
55	10015084	1	Feeler gauge set	1)	
59	79495944	2	Screw conn. compl. M25 RD K	3)	
60	79499144	1	Screw plug M25X1,5	3)	
61	60077444	1	Profiled joint 13P	3)	
62	60087599	1	Sealing ring thr.con. PG21 K	3)	
63	60070644	1	Screw plug PG21 K	PE	DIN 46320
	01105844	1	Grease KPF2K-30 DG67B		

22251517.tbl

1) When ordering a rotor or stator, a set of thrust rings (item no. 30) must also be ordered for adjusting the air gap (adjust with feeler gauge no. 2, item no. 55)
2) With gluing device.
3) For service in arduous conditions.

Travel drive KMF 80 for EU 55 DK up to 5000 kg



Travel drive KMF 80 for EU 55 DK up to 5000 kg

Item no.	Part no.	Quantity	Designation	Material	Standard
1			Travel speed 12,5 m/min		
1	13010084	1	Motor KMF 80A 4 KDHGR4	c/w items 6.18.21.24.26.28.29.31.35.38.39.44.45.47-56.59.70.73	1)
			Travel speed 6,3/25 m/min		
1	13010184	1	Motor KMF 80A8/2 KDHGR4	c/w items 6.18.21.24.26.28.29.31.35.38.39.44.45.47-56.59.70.73	1)
2	34251899	1	Retaining ring 18X1,2	FEDST	DIN 471
3	82010944	2	Axial bearing disk 18X 32X1		
4	34139899	2	Shim 37X 47X1	ST2K50	DIN 988
5	83912244	1	Cluster gear Z117M1 Z18M2		
6	83916644	1	End shield KMF 80 28M	c/w items 2 - 5, 7, 8	
7	36826499	1	Grooved ball bearing 6204 2RS	WLZ-ST	DIN 625
8	34264799	1	Retaining ring 47X1,75	FEDST	DIN 472
9	34247099	1	Retaining ring 20X1,75	FEDST IL	DIN 471
10	34140699	1	Shim 25X 35X0,5	ST2K50	DIN 988
10	34140499		Shim 25X 35X0,1	as required	DIN 988
10	34149599		Shim 25X 35X0,2	as required	DIN 988
11	34575899	1	Split sleeve 11 X 12	ST	ISO-13337
12	83910944	1	Seal end cap GR.4		
13	30022044	4	Lock screw M 8X30 VB.RIPP		
14	34586899	1	Split sleeve 11 X 18	ST	ISO-13337
15	13331984	1	Shaft gearbox KMF 80A-Z14	c/w item 25, z = 14	
17	36720399	2	O-ring 120,37X 1,78 N	NBR 70	DIN- 3771
18	13104484	1	Stator KMF 80A 4 AB	400 V, 50 HZ 2)	
18	13104784	1	Stator KMF 80A 8/2 AB	400 V, 50 HZ 2)	
19	13389584	1	Brake lining support KM 80		
20	30243699	4	Stud M 6 X175	8.8 A2F	DIN- 835
21	13386584	1	Damper ring KM 80		
23	13385284	1	Thrust ring set KM 80	2)	
24	13345584	1	Rotor KMF 80A 8/2	KMF 80 A4 2)	
25	34190699	1	Spring ring A 20	FEDST	DIN 7993
26	13376084	1	Engaging element KMK 80		
27	34144599	1	Shim 30X 42X0,5	ST2K50	DIN 988
28	13374184	1	Spring 3 X30 X56 RTWS	56 N, KMF 80 AB/2	
28	13374884	1	Spring 3 X30 X61 RTBL	69 N, KMF 80 A4	
29	13376684	1	Quill gear KM 80		
30	34245099	1	Retaining ring 28X2	FEDST	DIN 471
31	13377084	1	Brake release bracket KM 80		
32	32011399	4	Hex.socket cylind.screw M 6 X 20	8.8 A2F	DIN 6912
33	13381384	1	Bearing bush KM 80		
35	13361384	1	End shield BS KM 80	c/w item 33	
36	13363184	1	End shield BS KM 80	c/w item 33 3)	
37	15108499	4	Hexagonal nut M 6	8 A2F	DIN 6923
38	13389684	1	Fan set KM 80		
39	13382084	1	Fan cover KM 80		
40	31922199	4	Hex.socket cylind.screw M 5 X 50	10.9 A2F	DIN 912
43	05495484	1	Terminal box lower part KB 71- 90		
44	79499144	4	Screw plug M25X1,5		
45	05480684	1	O-ring 46 X 2,5+-0,08	KB71,80,90	DIN- 3771
47	00465498	2	Lock washer S 5		
48	31921899	2	Hex.socket cylind.screw M 5 X 30	10.9 A2F	DIN 912
49	31921499	1	Hex.socket cylind.screw M 5 X 12	> = 15 A	
50	00465498	1	Lock washer S 5	> = 15 A	DIN 912
51	34050599	1	Washer A 5,3X 10 X1	> = 15 A	
52	05490984	1	Pass through cable	140HV A2F	DIN 125
53	14986284	1	Supporting rail 15 / 5,5X 90M	< = 15 A	
54	32052899	2	Hex.socket cylind.screw M 4 X 8	< = 15 A	DIN 912
55	89541944	2	End angle TS15	< = 15 A	
56	03495684	1	Terminal block module KM	< = 15 A, 6 Terminals, 2 speeds	
56	03495784	1	Terminal block module KM	< = 15 A, 3 Terminals, 1 speed	
57	05494684	1	Terminal box cover KB 71- 90		
59	03612884	1	Terminal board KB 71- 90	c/w items 43, 57)	
70	05492284	1	Terminal plate KB 71- 90	> = 15 A, 6 Terminals, c/w item 72	
72	31921499	1	Hex.socket cylind.screw M 5 X 12	< = 15 A	DIN 912
73	13387084	1	VDR resistor <= 400V	only for 8/2-pole	
80	10040984	3	Feeler gauge set	2)	

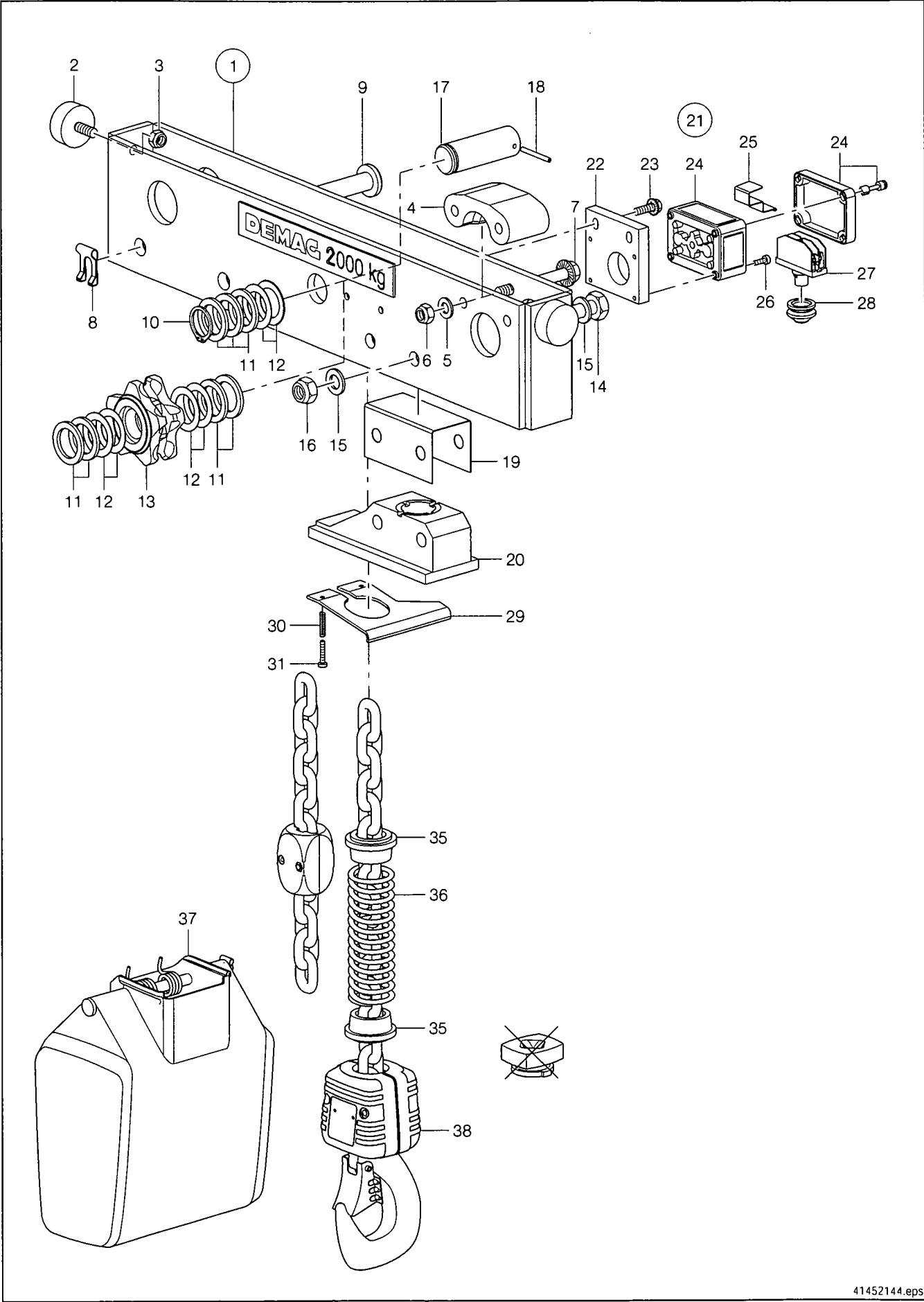
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- 1) The gearbox is lubricated with grease (approx. 60 g DG 67 B). Part no. 011 058 44 (60 g). This lubrication is sufficient for approx. Two years at normal operation and must be repeated after this time.
- 2) When ordering a rotor or stator, a set of thrust rings (item no. 23) must also be ordered for adjusting the air gap (adjust with feeler gauge no. 2, item no. 80)
- 3) For service in arduous conditions, chromium-plated brake surface.

222516x2.p65/030403

Bridge size 11
Low-headroom monorail hoist

Suitable for Demag chain hoist
DKUN 20-1250/1600/2000,
1/1 reeving



Bridge size 11
Low-headroom monorail hoist

Suitable for Demag chain hoist
DKUN 20-1250/1600/2000,
1/1 reeving

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83996644	1	Longitudinal girder KDK20Gr11	c/w items 11 - 21	
2	97820644	2	Buffer 50X 20 M10 SHR	10	DIN 985
3	33468199	2	Hexagonal nut M10		
4	83997644	1	Self-aligning bearing KDK20	140HV A2F	DIN 125
5	34059199	2	Washer A13 X 24 X2,5		
6	33461244	2	Lock nut V M12	8.8 A2F	DIN 980
7	15049499	2	Hexagonal screw M12 X100		
8	34287744	2	Securing clip SL 16 SXN08	FEDST IL	DIN 471
9	83861644	2	Setbolt 20H11X135 Nut		
10	34243599	1	Retaining ring 35X2,5	8.8 A2F	ISO 4014
11	50222044	7	Washer 35,5X 50 X 4		
12	34231244	6	Axial bearing disk 35X 52X1	140HV A2F	DIN 125
13	83888044	1	Return sheave 10,5X28,2 Z5		
14	30805399	2	Hexagonal screw M16 X110	8 A2F	DIN 980
15	34054299	4	Washer A17 X 30 X3		
16	33461444	2	Lock nut V M16	ST	ISO 8752
17	83999244	1	Pin 35 H 5X 102 NUT		
18	34503999	1	Split sleeve 5 X 50	4.8 A2F	DIN 84
19	83999044	1	Retaining plate KDK20		
20	83998944	1	End bracket 10,5X28,2	FEDST	DIN 2098
21	83993544	1	Limit switching device KDK20 Mech.		
22	83999744	1	Plate fixture cut-off switch	ST-TX A2R	DIN- 7500
23	30021644	2	Lock screw M 8X25 VB.RIPP		
24	79238944	1	Housing 94X 65X 58K	max. 3 m	max. 8 m
25	83999844	1	Clamping spring KDK20		
26	31815599	2	Cylinder screw M 5 X 16	max. 16 m	see page 10
27	87461044	1	Switching element SED SPRG		
28	87404544	1	Cap Gummi	max. 3 m	max. 8 m
29	83999544	1	Operating rocker KDK20		
30	34086299	2	Pressure spring 0,63X 5 X 38,5	max. 16 m	see page 10
31	32473599	2	Thread rolling screw CE M 5X 25		
35	83828644	2	Cut-out sleeve DK20	max. 3 m	max. 8 m
36	15053499	1	Pressure spring 4,5 X50,5X145		
37	83806344	1	Chain collector box DK10-20 GR. 4	max. 16 m	see page 10
37	83806544	1	Chain collector box DK10-20 GR. 5		
37	83806744	1	Chain collector box DK20 GR. 6	max. 3 m	max. 8 m
38	83874044	1	Hook fittings DK20/2,5T		

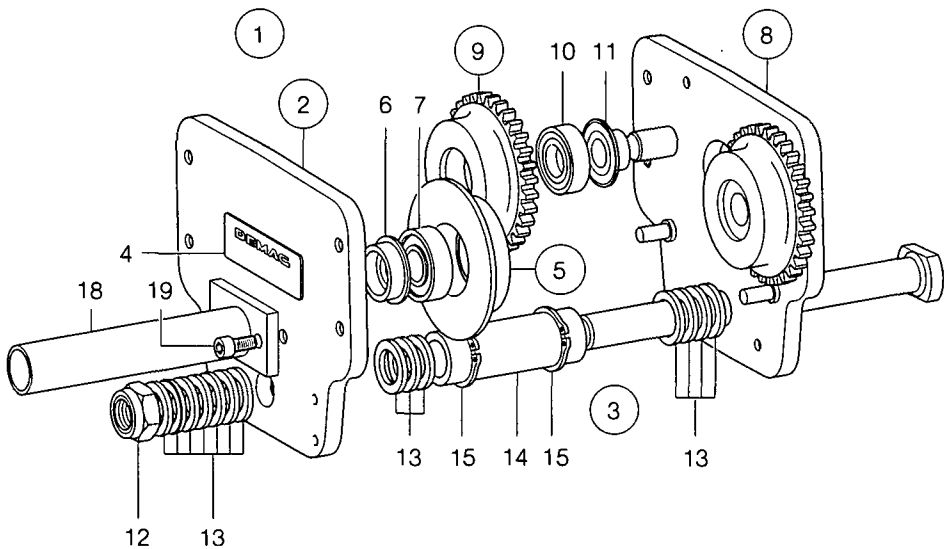
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222518x2,565/030403

Low-headroom monorail hoist
Trolley size 11 EKDK
Flange width 90 - 300 mm

Suitable for Demag chain hoist
DKUN 20-1250/1600/2000,
1/1 reeving

Trolley B



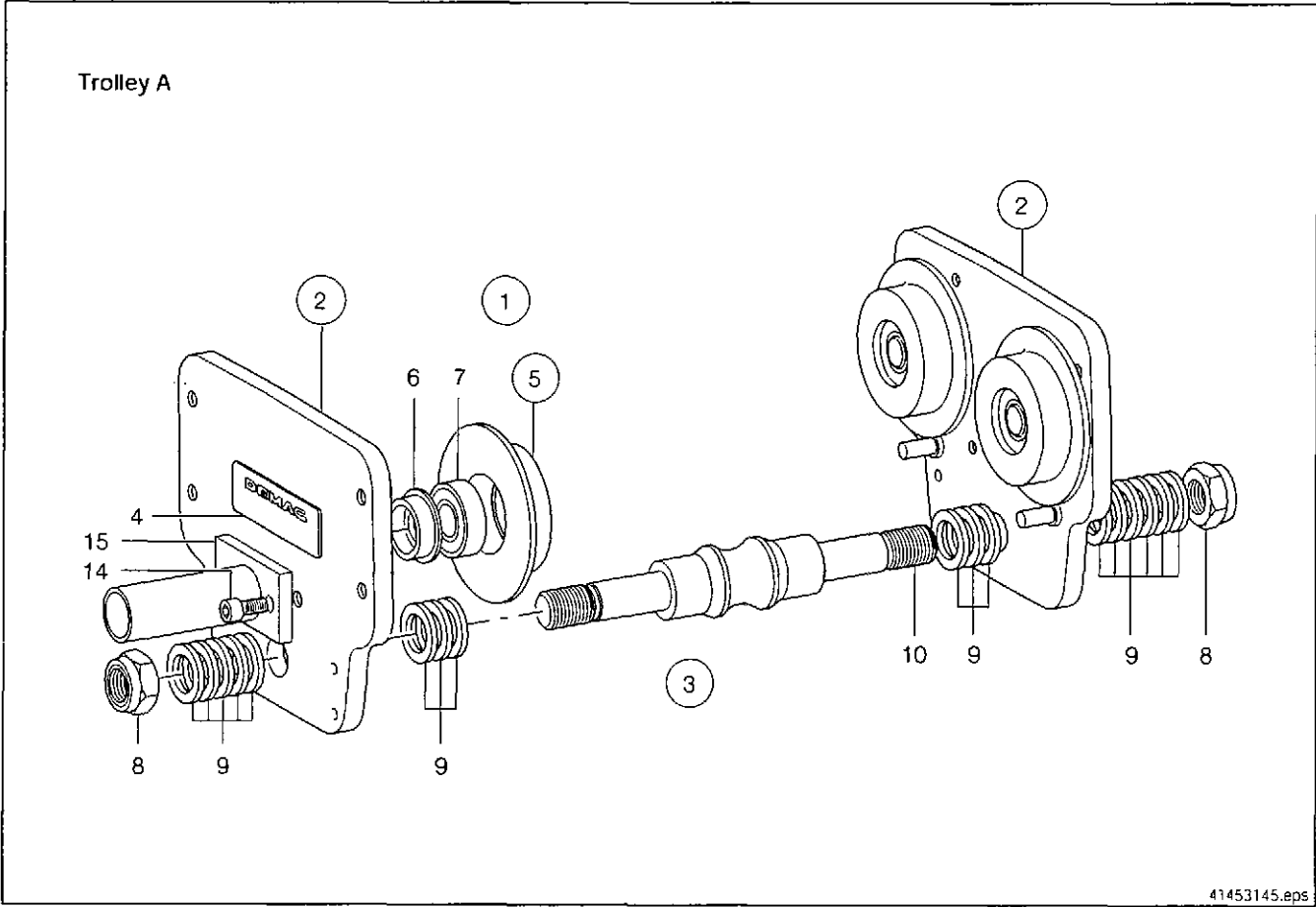
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Item no.	Part no.	Quantity	Designation		Material	Standard
1	84010444	1	Tr.un.tr.whl.univ.w/o crossb. EU11	c/w items 2, 8		
2	84010844	1	Side plate trv.whl.univ.w/o g.rim	c/w items 4, 5		
3	84050244	1	Crossbeam EKDK20 FLB. 90-143	c/w items 12 - 15		
3	84050344	1	Crossbeam EKDK20 Flb.144-200	c/w items 12 - 15		
3	84050444	1	Crossbeam EKDK20 Flb.201-300	c/w items 12 - 15		
4	83962744	1	Capacity plate 1350KG			
5	84014044	2	Universal travel wheel 80 1 SPK.OZ	c/w items 6, 7		
6	83970944	1	Collar packing sleeve			
7	36820499	1	Grooved ball bearing 6204 Z		WLZ-ST	DIN 625
8	84010744	1	Side plate trv.whl.univ.w.gear rim	c/w item 9		
9	84015044	2	Universal travel wheel 80 1 SPK.MZ	c/w items 10, 11		
10	36820499	1	Grooved ball bearing 6204 Z		WLZ-ST	DIN 625
11	83975944	1	Collar packing sleeve EU11			
12	33460299	1	Hexagonal nut M24 X2		8 A2F	DIN 985
13	56322444	19	Washer 24,5X 36,5X 4	Fl. W. 90 - 143		
13	56322444	18	Washer 24,5X 36,5X 4	Fl. W. 144 - 200		
13	56322444	29	Washer 24,5X 36,5X 4	Fl. W. 201 - 300		
14	83998444	1	Tube 45 X10 X 105	Fl. W. 90 - 143		
14	83998544	1	Tube 45 X10 X 166	Fl. W. 144 - 200		
14	83998644	1	Tube 45 X10 X 223	Fl. W. 201 - 300		
15	34253299	2	Retaining ring 32X1,5		FEDST	DIN 471
18	83973744	1	Current collector tube 400			
19	32141099	2	Hex.socket cylind.screw M 8 X 20		10.9 A2F	DIN 912

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Low-headroom monorail hoist
Trolley size 11 RKDK
Flange width 90 - 300 mm

Only to be used with trolley B



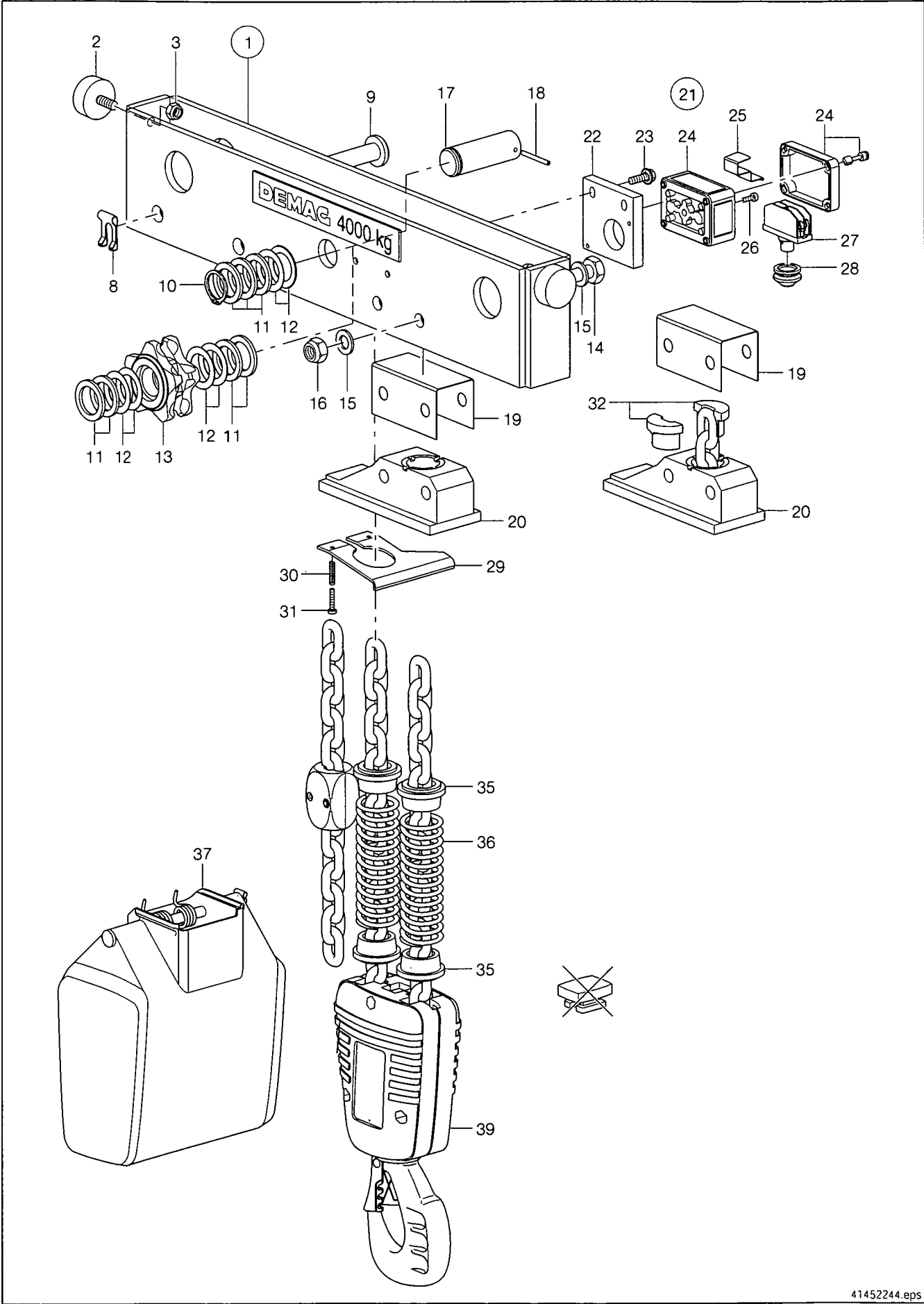
Item no.	Part no.	Quantity	Designation	Material	Standard
1	84010344	1	Tr.un.tr.whl.univ.w/o crossb. RU11		
2	84010844	2	Side plate trv.whl.univ.w/o g.rim		
3	84050844	1	Crossbeam KDK20 FLB. 90-143		
3	84050944	1	Crossbeam KDK20 Flb.144-200		
3	84051044	1	Crossbeam KDK20 Flb.201-300		
4	83962744	1	Capacity plate 1350KG		
5	84014044	2	Universal travel wheel 80 1 SPK.OZ		
6	83970944	1	Collar packing sleeve		
7	36020499	1	Grooved ball bearing 6204 Z		
8	33460299	2	Hexagonal nut M24 X2	WLZ-ST 8 A2F	DIN 625 DIN 985
9	56322444	20	Washer 24,5X 36,5X 4		
9	56322444	18	Washer 24,5X 36,5X 4		
9	56322444	30	Washer 24,5X 36,5X 4		
10	83986444	1	Pin cross beam FLB. 90-143		
10	83986844	1	Pin cross beam FLB.144-200		
10	83987044	1	Pin cross beam FLB.201-300		
14	32141099	2	Hex.socket cylind.screw M 8 X 20	10.9 A2F	DIN 912
15	83973744	1	Current collector tube 400		

22251519.tbl

222516k2.p65/030403

Bridge size 22
Low-headroom monorail hoist

Suitable for Demag chain hoist
DKUN 20-1250/1600/2000,
2/1 reeving



Bridge size 22
Low-headroom monorail hoist

Suitable for Demag chain hoist
DKUN 20-1250/1600/2000,
2/1 reeving

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83999944	1	Longitudinal girder KDK20GR22		
2	97820644	2	Buffer 50X 20 M10 SHR		
3	33468199	2	Hexagonal nut M10	10	DIN 985
8	34287744	2	Securing clip SL 16 SXN08		
9	83861644	2	Setbolt 20H11X135 Nut		
10	34243599	1	Retaining ring 35X2,5	FEDST !L	DIN 471
11	50222044	7	Washer 35,5X 50 X 4		
12	34231244	6	Axial bearing disk 35X 52X1		
13	83888044	1	Return sheave 10,5X28,2 Z5		
14	30805399	2	Hexagonal screw M16 X110	8.8 A2F	ISO 4014
15	34054299	2	Washer A17 X 30 X3	140HV A2F	DIN 125
16	33461444	2	Lock nut V M16	8 A2F	DIN 980
17	83999244	1	Pin 35 H 5X 102 NUT		
18	34503999	1	Split sleeve 5 X 50	ST	ISO 8752
19	83999044	1	Retaining plate KDK20		
20	83998944	1	End bracket 10,5X28,2		
21	83993544	1	Limit switching device KDK20 Mech.		
22	83999744	1	Plate fixture cut-off switch		
23	30021644	2	Lock screw M 8X25 VB.RIPP		
24	79238944	1	Housing 94X 65X 58K		
25	83999844	1	Clamping spring KDK20		
26	31815599	2	Cylinder screw M 5 X 16	4.8 A2F	DIN 84
27	87461044	1	Switching element SED SPRG		
28	87404544	1	Cap Gummi		
29	83999544	1	Operating rocker KDK20		
30	34086299	2	Pressure spring 0.63X 5 X 38,5	FEDST	DIN 2098
31	32473599	2	Thread rolling screw CE M 5X 25	ST-TX A2R	DIN- 7500
32	83817844	2	Spring clip fastener 10,5X28,2		
35	83828644	4	Cut-out sleeve DK20		
36	15053499	2	Pressure spring 4,5 X50,5X145		
37	83806344	1	Chain collector box DK10-20 GR. 4		
37	83806544	1	Chain collector box DK10-20 GR. 5		
37	83806744	1	Chain collector box DK20 GR. 6		
39	83884044	1	Bottom block DK20 1BM 5T		

c/w items 11 - 21

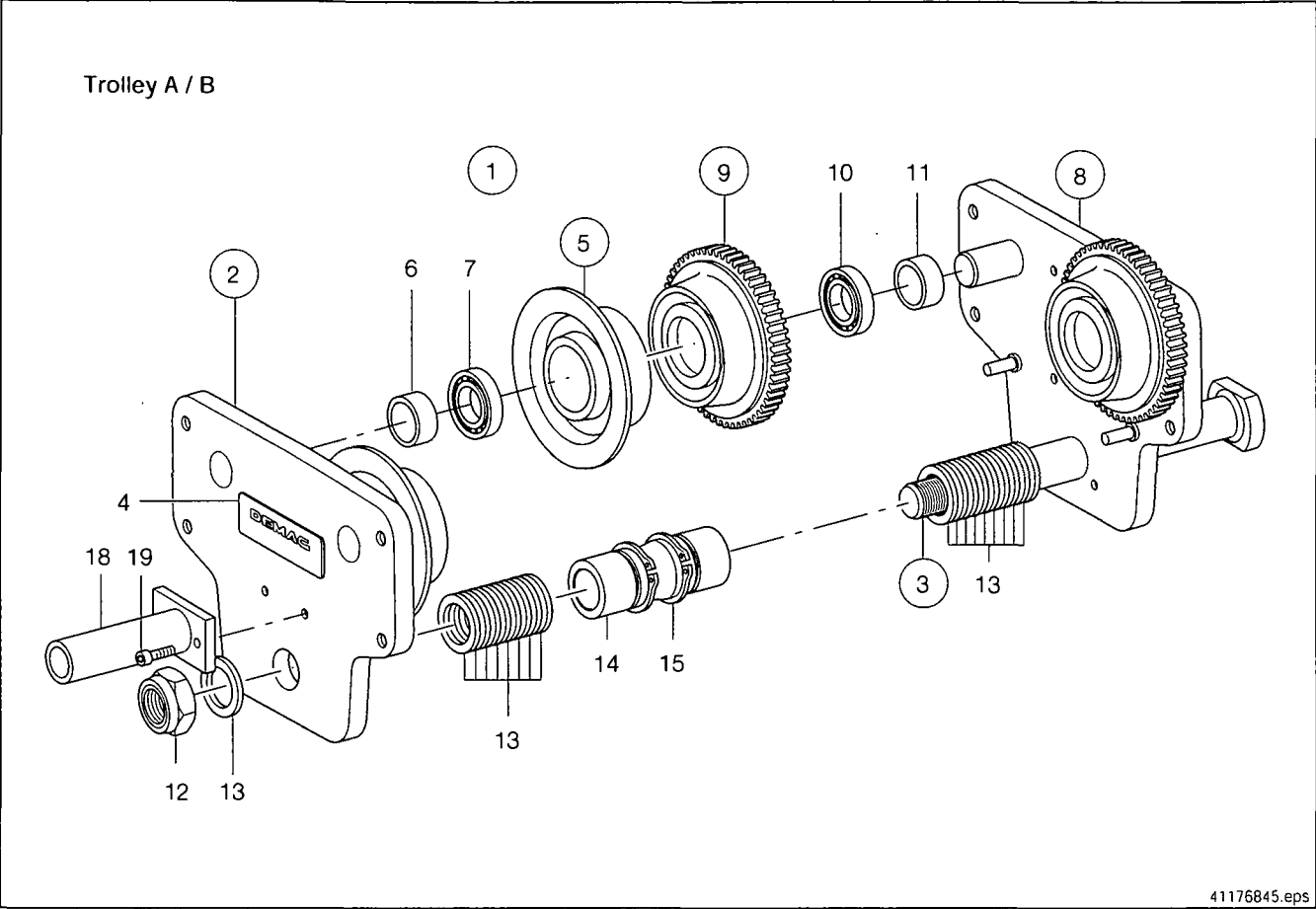
c/w items 22 - 31

max. 3 m
max. 8 m
max. 16 m
see page 11

22251521.tbl

Low-headroom monorail hoist
Trolley size 22 EKDK
Flange width 98 - 300 mm

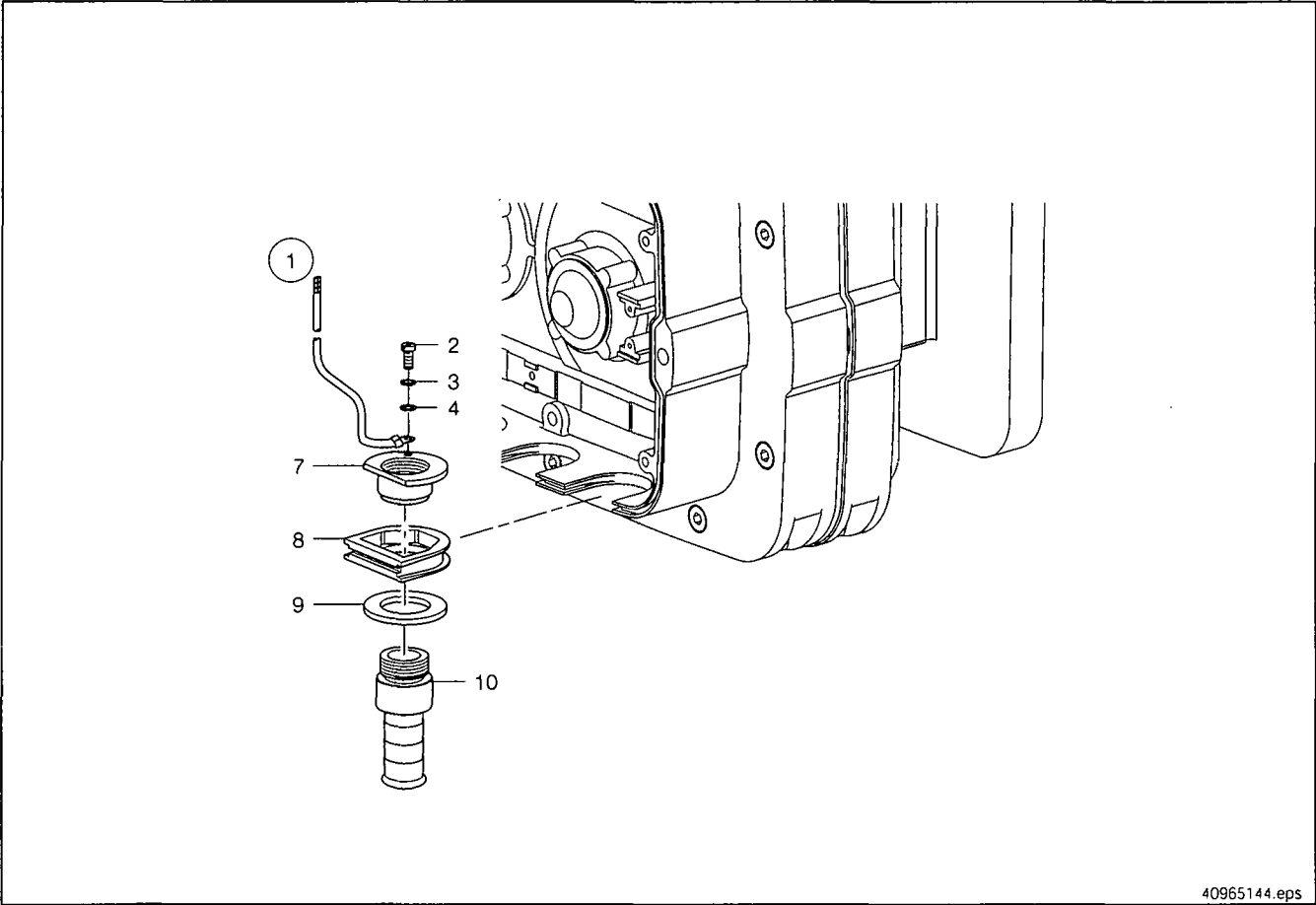
Suitable for Demag chain hoist
DKUN 20-1250/1600/2000,
2/1 reeving



Item no.	Part no.	Quantity	Designation	Material	Standard
1	84011444	1	Tr.un.tr.whl.univ.w/o crossb. EU22	c/w items 2, 8	
2	84011644	1	Side plate trv.whl.univ.w/o g.rim	c/w items 4, 5	
3	84050544	1	Crossbeam EKDK20 Flb. 98-143	c/w items 12 - 15	
3	84050644	1	Crossbeam EKDK20 Flb.144-200	c/w items 12 - 15	
3	84050744	1	Crossbeam EKDK20 Flb.201-300	c/w items 12 - 15	
4	83964744	1	Capacity plate 2600KG		
5	84016044	2	Universal travel wheel 112 1 SPK.OZ	c/w items 6, 7	
6	84017244	1	Bush 30.2X 38 X17.4		
7	36822699	1	Grooved ball bearing 6206 2Z	WLZ-ST	DIN 625
8	84011744	1	Side plate trv.whl.univ.w.gear rim	c/w item 9	
9	84017044	2	Universal travel wheel 112 1 SPK.MZ	c/w items 10, 11	
10	36822699	1	Grooved ball bearing 6206 2Z	WLZ-ST	DIN 625
11	84017344	1	Bush 30.2X 38 X23.2		
12	33468799	1	Hexagonal nut M30 X2	8 A2F	DIN 985
13	50222044	16	Washer 35.5X 50 X 4	Fl. W. 98 - 143	
13	50222044	19	Washer 35.5X 50 X 4	Fl. W. 144 - 200	
13	50222044	30	Washer 35.5X 50 X 4	Fl. W. 201 - 300	
14	83998744	2	Tube 51 X 7.1 X 121	Fl. W. 98 - 143	
14	83998844	2	Tube 51 X 7.1 X 166	Fl. W. 144 - 200	
14	83998344	2	Tube 51 X 7.1 X 223	Fl. W. 201 - 300	
15	34244299	2	Retaining ring 52X3	FEDST	DIN 471
18	83973744	1	Current collector tube 400		
19	32141099	2	Hex.socket cylind.screw M 8 X 20	10.9 A2F	DIN 912

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Reinforced M24 X 1,5 cable sleeve insert



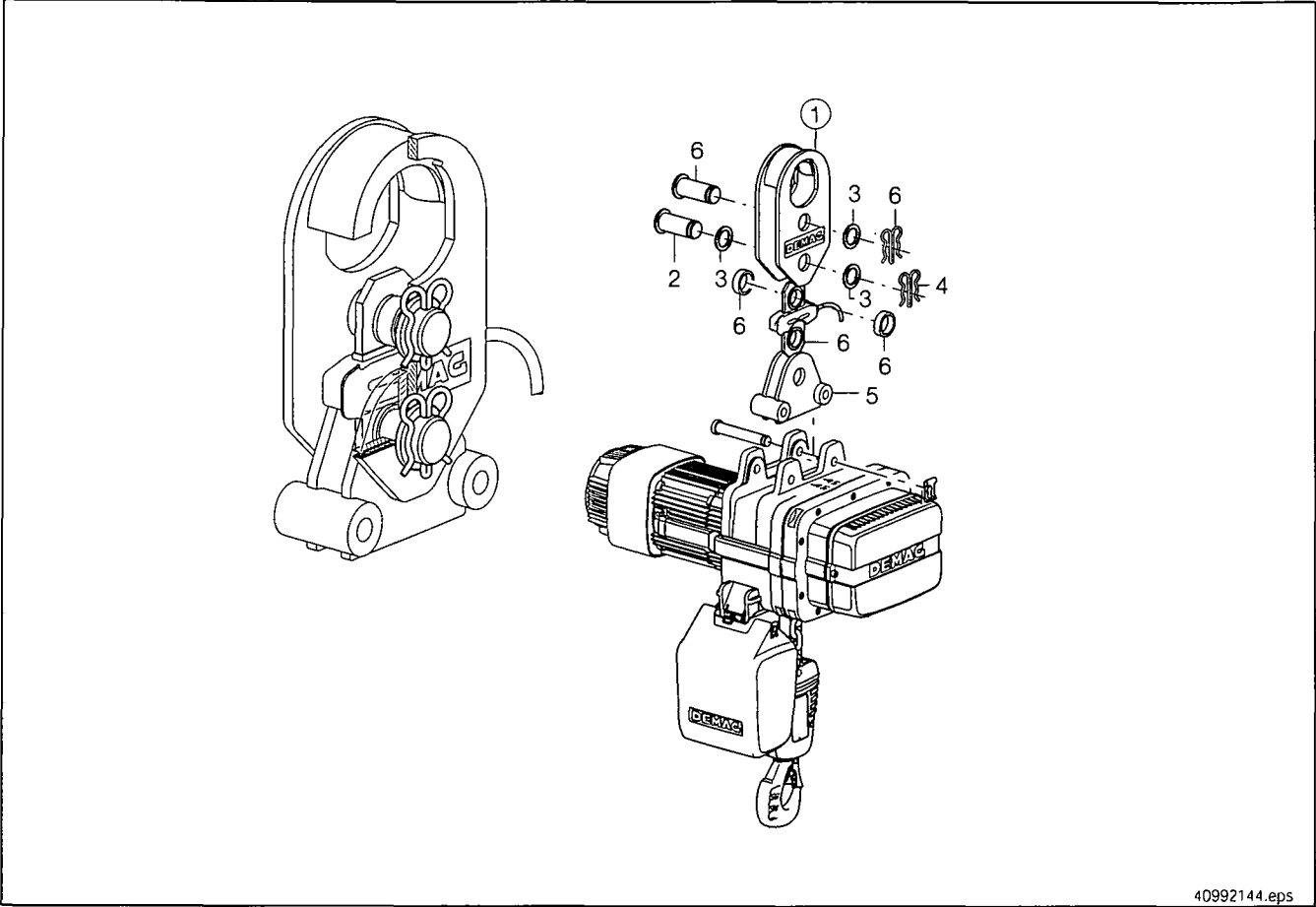
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Item no.	Part no.	Quantity	Designation		Material	Standard
1	83654044	1	Plug-in unit M24X1,5DK 1-20	c/w items 2 - 4, 7 - 10		
2	31813699	1	Cylinder screw M 4 X 10		4.8 A2F	DIN 84
3	34398199	1	Serrated lock washer A 4,3		FEDST A2F	DIN 6798
4	34040399	1	Washer 4,3X 8 X0,5		140HV A2F	DIN 433
7	83654144	1	Bush M24X1,5			
8	83620144	1	Plug-in unit, dummy M25			
9	34034199	1	Washer 26 X 44 X4		100HV A2F	DIN 126
10	83654244	1	Screw socket M24X1,5			

22249506.tbl

Strain gauge carrier link ZMS 2500 - 1/1

Strain gauge carrier link ZMS 5000 - 2/1



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Strain gauge carrier link ZMS 2500 - 1/1

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83861444	1	Strain gauge carr. link 2,5 T	FEDST	DIN 988
2	82873844	1	Setbolt 25H 9X 65 Boh		
3	34349899	3	Supporting plate 25X 35X2		
4	34306944	1	Double spring plug 3 X 51		
5	83860544	1	Eye DK20-ZMS 2500 1/1		
6	49160144	1	Strain gauge carr. link 3,15 T		

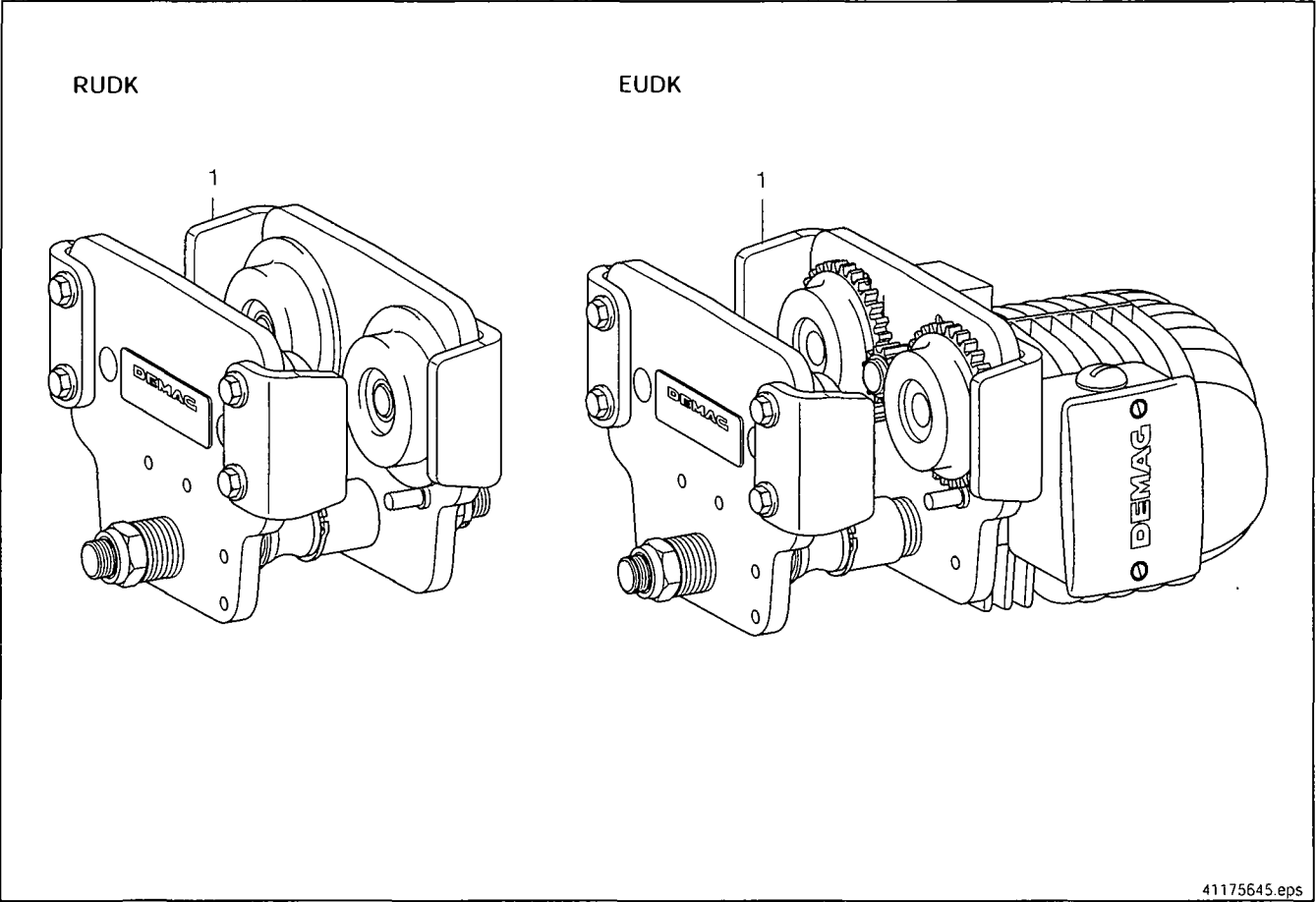
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Strain gauge carrier link ZMS 5000 - 2/1

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83861844	1	Strain gauge carr. link 5,0 T	FEDST	DIN 988
2	82883844	1	Setbolt 40H 9X 94 Boh		
3	34349799	3	Supporting plate 40X 50X2,5		
4	34307044	1	Double spring plug 4 X 83		
5	83861044	1	Eye DK20-ZMS 5000 2/1		
6	49160244	1	Strain gauge carr. link 6,25 T		

22251525.tbl

Drop stop fittings RUDK/EUDK



41175645.eps

Item no.	Part no.	Quantity	Designation	Material	Standard
1	83969744	1	Drop stop set GR.11		
1	83969844	1	Drop stop set GR.22		
1	83969944	1	Drop stop set GR.55		

22251523.tbl

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DEMAG

Cranes & Components

QUALITY ASSURANCE **LOAD TEST REPORT FOR BRIDGE, GANTRY,** **PORTAL, MONORAIL & JIB CRANES**

DOC. No. DCO-IT-410/29
ISSUE 3 - 1/7/2000

CUSTOMER:

LEIGHTON

JOB No.

5400398

LOCATION (Address):

SERPENTINE ROAD PINKENBA

DESCRIPTION (Crane/Installation Type):

MONORAIL CHAIN HOIST

CRANE SN:

N/A

MAKE & MODEL OF HOIST:

EUKUN 20-2500 V1 2/1 A4

CLASS:

M4

HOIST SN:

61578275

STATUTORY BODY: (IF APPLICABLE)

APPROVAL No. (IF APPLICABLE)

- NOTE: 1/ If load testing is required by contract or is a statutory requirement, testing is to be carried out in accordance with AS1418.3, Section 12 - Inspection & Commissioning.
 2/ All hoists are pretested at 25% overload (Test certificates available).
 3/ Commissioning checks are to be carried out in accordance with Doc. No. MDA-IT-6/5 "Installation & Commissioning Checklist"

LOAD TESTING

WITH MAXIMUM S.W.L. OF

3295 kg

CHECK AT POINT OF MAXIMUM DEFLECTION:

Calculated:

mm

Actual:

0.11 mm

DEFLECTION AFTER REMOVAL OF LOAD:

0 mm

ACCEPTABLE (✓)

NOT ACCEPTABLE (✓)

CHECK CRANE TRAVEL AND TRAVERSE AT FULL SPEED WITH MAXIMUM RATED CAPACITY.

✓

REMARKS:

TEST CARRIED OUT BY:

WITNESSED By (Crane Owner, Authorised Officer)

Name: Greg Windsor (print)

Name: (print)

Sign: JAM

Sign:

Title: Service

Title:

Date: 03/06/2005

Date: / /

DEMAG

Cranes & Components

QUALITY ASSURANCE
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PORTAL, MONORAIL & JIB CRANES

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Calculated:

mm

Actual:

0.11 mm

DEFLECTION AFTER REMOVAL OF LOAD:

0 mm

ACCEPTABLE (✓)

NOT ACCEPTABLE (✓)

CHECK CRANE TRAVEL AND TRAVERSE AT FULL SPEED WITH MAXIMUM RATED CAPACITY.

☒
☐

REMARKS:

TEST CARRIED OUT BY:

Name: **Eug. Windsor** (print)

Sign: **SAM**

Title: **Service**

Date: **03/06/2005**

WITNESSED By (Crane Owner, Authorised Officer)

Name: (print)

Sign:

Title:

Date:

07 32715303

DEMAG Cranes & Components		QUALITY ASSURANCE LOAD TEST REPORT FOR BRIDGE, GANTRY, PORTAL, MONORAIL & JIB CRANES		DOC. No. DCC-IT-410/29 ISSUE 3 - 1/7/2000	
CUSTOMER: LEIGHTON			JOB No. 5400398		
LOCATION (Address): SERPENTINE ROAD PINKENBA					
DESCRIPTION (Crane/Installation Type): MONORAIL CHAIN HOIST				CRANE SN: N/A	
MAKE & MODEL OF HOIST: EWDHUN20-2500 V1 2/1 A		CLASS: M4		HOIST SN: 61578275	
STATUTORY BODY: (IF APPLICABLE)			APPROVAL No. (IF APPLICABLE)		
<p>NOTE: 1/ If load testing is required by contract or is a statutory requirement, testing is to be carried out in accordance with AS1418.3, Section 12 - Inspection & Commissioning.</p> <p>2/ All hoists are pretested at 25% overload (Test certificates available).</p> <p>3/ Commissioning checks are to be carried out in accordance with Doc. No. MDA-IT-6/5 "Installation & Commissioning Checklist"</p>					
LOAD TESTING					
WITH MAXIMUM S.W.L. OF		3295 kg			
CHECK AT POINT OF MAXIMUM DEFLECTION:		Calculated:	<input type="text"/>	mm	Actual: 0.11 mm
DEFLECTION AFTER REMOVAL OF LOAD:		<input type="text"/> mm			
		ACCEPTABLE (✓)		NOT ACCEPTABLE (✓)	
CHECK CRANE TRAVEL AND TRAVERSE AT FULL SPEED WITH MAXIMUM RATED CAPACITY.		<input checked="" type="checkbox"/>		<input type="checkbox"/>	
REMARKS:					
TEST CARRIED OUT BY:			WITNESSED By (Crane Owner, Authorised Officer)		
Name: Eric Windsor (print)			Name: (print)		
Sign: [Signature]			Sign: 		
Title: Service			Title: 		
Date: 03/06/2005			Date: 		

DEMAG Cranes & Components		QUALITY ASSURANCE LOAD TEST REPORT FOR BRIDGE, GANTRY, PORTAL, MONORAIL & JIB CRANES		DOC. No. DCO-IT-410/29 ISSUE 3 - 1/7/2000	
CUSTOMER: LEIGHTON			JOB No. 5400398		
LOCATION (Address): SERPENTINE ROAD PINKENBA					
DESCRIPTION (Crane/Installation Type): MONORAIL CHAIN HOIST				CRANE SN: N/A	
MAKE & MODEL OF HOIST: EUDKUN20-2500 V1 2/1 A			CLASS: M4	HOIST SN: 61578275	
STATUTORY BODY: (IF APPLICABLE)				APPROVAL No. (IF APPLICABLE)	
NOTE: 1/ If load testing is required by contract or is a statutory requirement, testing is to be carried out in accordance with AS1418.3, Section 12 - Inspection & Commissioning. 2/ All hoists are pretested at 25% overload (Test certificates available). 3/ Commissioning checks are to be carried out in accordance with Doc. No. MDA-IT-6/5 "Installation & Commissioning Checklist"					
LOAD TESTING WITH MAXIMUM S.W.L. OF 3295 kg					
CHECK AT POINT OF MAXIMUM DEFLECTION:		Calculated: mm	Actual: 0.71 mm		
DEFLECTION AFTER REMOVAL OF LOAD:		0 mm			
		ACCEPTABLE (✓)		NOT ACCEPTABLE (✓)	
CHECK CRANE TRAVEL AND TRAVERSE AT FULL SPEED WITH MAXIMUM RATED CAPACITY.		✓			
REMARKS:					
TEST CARRIED OUT BY: Name: Greg Windsor (print) Sign: GAW Title: Service Date: 03/06/2005			WITNESSED By (Crane Owner, Authorized Officer) Name: _____ (print) Sign: _____ Title: _____ Date: 1 / 1		

Australia Trade Coast Sewer Project

Serpentine Road Odour Control System

OPERATIONS AND MAINTENANCE MANUAL

Revision A, April 2005



Client:
Leighton Contractors Pty Ltd.

Designer:
AIREPURE Aust. Pty. Ltd.
P.O BOX 747
Mulgrave VIC. 3170



Leighton Contractors Pty Ltd
Australia Trade Coast Sewer Project

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Document Register						
Rev	Status/Comments	Author	Reviewed	Approval		
				Name	Signature	Date
A	Final Draft	J McIntosh	J McIntosh	J McIntosh		4/05
++ Denotes original document signed.						
Client Acceptance						
Leighton Contractors Pty Ltd.						/ /04

1.0 System Overview

This document provides a general description of the operational and maintenance activities associated with the odour control system installed at Serpentine Road, Pinkenba site comprising the Australia Trade Coast Sewer Project. Drawings and relevant manufacturer's manuals have also been provided in the appendices providing more detailed information in relation to this installation.

The odour control unit at this site is an active type odour control system. This system is designed to clean odorous air using a Purafil ® DS-1000 drum scrubber coupled with a particulate filter, that has an inlet and outlet pipe, mechanical blower (exhaust fan), a media bed housed in a HDPE drum, and diffuser. This drum scrubber is designed to exhaust recycled air. The drum scrubber is supplied with Purafil ® Odoroxidant, Odorcarb II and Odormix media's. A blower (exhaust fan) fitted to the lid, draws the air from the odour control drum. The air is then discharged, to atmosphere, via an outlet duct section fitted to the blower section. The speed of the blower is controlled via a VSD (Variable Speed Drive), which has been supplied for this site.

2.0 Components of Odour Control Systems

The following sections provide an overview of the main components that make up the odour control system.

2.1.1 Odour Control Vessel (Drum)

The main component of the odour control system is the DS-1000 Drum Canister (or Scrubber). Each drum scrubber consists of a polyethylene drum measuring 1,524 mm in height and 1,321 mm in diameter. The drum is fitted with a 254 mm inlet flexible connection. Connection to the inlet is via a 254 mm slip on "FERNCO" connector. The drum is also fitted with two sample ports to allow media samples to be taken and a drain valve is fitted at the base of each drum for maintenance purposed.



Figure 2.1.1 Odour control system canister.

The vessel is filled with 183 kg's PURAFIL ODOROXIDANT, 431's kg of PURAFIL ODORCARB II ® and 183 kg of PURAFIL ODORMIX SELECT 1/16 ® as well as other various poly-media filters, which are used to contain any media dust that may be generated.

Details of the media are provided in Appendix D in the form of Materials Safety Data Sheets.

The vessel is finished in black Polyethylene.

2.1.2 Odour Control Blower

A mechanical centrifugal blower, fabricated from strong high density polypropylene, is used to draw sewer gases through the media bed of the drum scrubber. The details of the blower for this site are provided in the table below.

Table 2.1.2 - Blower Details

Item	Detail
Impeller type	Centrifugal
Fan type	Niche CAV200, Centrifugal SWSI, Laminar impeller fan
Volume (l/s)	Max. 480 l/sec
Static Pressure (pa)	750
Fan speed (rpm)	2880
Sound Pressure (dBA)	64 @ 3m
Motor Power (kW)	2 Pole, 2.2
Electrical supply	415V, 3 phase, 50Hz

Blower control (speed) is maintained at the required airflow via a Variable Speed Drive, which is installed in a cabinet close to the unit on site.

2.1.3 Odour Control System Pipe work

Interconnecting SWJ (Solvent Weld Joint) ABS pipe work and fittings are used to connect the various components of the proposed odour control system.

A single 250mm ABS run exists from the wet well directly to the odour control unit located above ground level. An isolation damper is fitted within this duct run for purposes of servicing and a method of shut-off to the wet well if required.

3.0 Control & Operation

The following sections provide an overview of the control employed at this site.

3.1 System Control

The odour control system employed at this site is an active (force ventilated) type odour control system comprising a centrifugal blower and VSD drive. Following is the set control system requirements

- The VF Drive will operate continuously.

- The Drive is to receive a 4-20 mA signal from the RTU to control the speed of the blower.
- The VF Drive will provide a digital output to the RTU to indicate drive fault.
- The Drive is to run at a set minimum speed under normal operating conditions. This set speed to be adjustable in software and set during commissioning to achieve the required negative pressure in the wet well. Normal operating conditions are when the wet well level is either constant, falling or rising at a rate less than that specified below.
- The drive will run at an increased speed during periods when the wet well level is rising. The increased speed set point to be adjustable in software and set during commissioning to maintain the required negative pressure in the wet well.
- Sewage Maintenance is to specify the required rate of rise in the wet well to trigger the increased speed operation. In specifying the rate of rise, need to consider the time period between sampling of the wet well level and the required change for each sample. This needs to be averaged to filter out transient changes. NOTE: Such filtering will increase the response time before speed changed will be effected.
- There is to be no instrumentation required to monitor the negative pressure within the system.

4.0 System Maintenance

The following sections provide a guide to the minimum maintenance requirements for this system. Procedures describing the replacement of the media contained within the drum scrubber have also been provided in this section.

Please be aware of the following precautions when handling, or when being exposed to the media contained within the drum.

A well-ventilated work area is recommended for any work that is being performed on this odour control system. Dust occurs in fresh media due to handling abrasion. Workers should avoid direct inhalation of considerable Purafil® dust, as it induces sneezing. In closed, poorly ventilated areas, the wearing of dust masks, such as a 3M No.8500, is strongly recommended.

Avoid exposing the Purafil® media to water or precipitation, as this dissolves permanganate content. Storage of the media should be in a dry place with less than 95% relative humidity. Exposure of permanganate solution to the skin causes brown staining, which is temporary but not harmful. This staining can be removed by washing in a diluted solution of water and sodium bisulfite.

If dust is exposed to the eyes or delicate membrane, flush thoroughly with water and seek treatment by a physician. Follow normal procedures for exposure to abrasive dust. The wearing of suitable eye protection is also recommended

4.1 Media Sampling & Replacement

Purafil® media has a finite life which is a function of the available potassium permanganate (KmnO_4) expressed as a percentage.

Following start-up and during the operating life of the system, routine sampling of the media contained in the drum scrubber should be undertaken to ensure the working efficiency of the system is kept. Please note that a change in colour does not necessarily represent any change in the effectiveness of the media.

Since every site is different, due to the type and quantity level of the contaminant, operators must develop a sample schedule best suited to their system. It is however recommended that a sample be taken not long after the system has been commissioned so that the rate of decay can be established, and hence a replacement date can be projected, as well as, a recommended sample schedule.

4.1.1 Media Sampling

To take a media sample, simply utilise the media sampling ports located on the outside of the drum and insert the sampling probe into the media bed.

Open the entry port of the sampling probe, pulling up until the port cover slides open.

Close the sampling probe by pushing down and pour the contents into a plastic sample bag, which can be provided by your Airepure representative.

Seal this bag tightly and label the bag appropriately, so that it can be clearly determine from where this sample had been taken. Include the date the sample was taken.

Please note that the local Airepure representative can assist you in the undertaking of lab analysis of this media.

4.1.2 Media Replacement

Following media analysis, in determination of the condition of the media. If then, it has been determined that the media is in need of replacement then the following procedure should be followed:

PLEASE NOTE: The use of eye and dust protection (PPE) should be worn before opening the drum scrubber. It is recommended that overalls and gloves also be worn as some of the materials contained within the drum scrubber canister can leave stains that cannot be removed from clothing.

REMOVAL OF DRUM SCRUBBER CONTENTS

1. Electrical isolate the blower motor and tag "DO NOT OPERATE"
2. Remove drum vessel lid and blower.
3. Remove Polymedia (blue) filter.
4. Remove layer of Odormix media
5. Remove layer of Odorcarb II media.
6. Remove layer of Odoroxidant media.
7. Remove layer of Polymedia (blue) filter.

REPLACEMENT OF DRUM SCRUBBER CONTENTS

1. Install Polymedia (blue) filter
2. Install new Odoroxidant media (2 boxes)
3. Install new Odorcarb media (5 boxes)
4. Install new Odormix media (3 boxes)
5. Install top Polymedia (blue) filter
6. Replace drum vessel lid and blower
7. Return blower motor to service and remove tag.

Please refer to section 4.2 for instructions concerning the proper disposal of the old media.

4.2 Media Disposal

Purafil ® media is a non-toxic, non-flammable substance. Filtration of contaminants through Purafil ® media causes molecular changes to occur, and the resulting product is usually not harmful to the environment. Although special precautions are generally not required when disposing of spent media, government regulations may require specific disposal procedures if the resulting product could be harmful to the environment. Large quantities of Purafil media should not be disposed of in a dumper like equipment because the weight of the media cause difficulties in the handling of the dumpster.

Independent laboratory analysis for the Environmental Protection agency (EPA) toxicity characteristics may be required if the contaminants eliminated from your environment (system) include heavy metals and pesticides.

4.3 Exhaust Fan Maintenance

Routine maintenance procedures, typical of those carried out for electrical motors should be undertaken for the motor of this system. A qualified electrical trades person should only undertake this type of work.

It is recommended that the electrical motor and fan be inspected every 6 months and that routine maintenance procedures be undertaken on a 12 monthly basis.

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IMPORTANT: The exhaust fan should be electrically isolated before attempting any routine inspection of maintenance procedures.

The exhaust fan and its associated drive components, should be inspected to ensure continually reliable and safe operation.

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Appendix A: Purafil literature DS-1000

<i>No. if applicable</i>	<i>Description</i>
	Purafil ESD Drum Scrubber – 1000
	Suggested Specifications – DS-1000
	Purafil ESD's Odorcarb II Media and Specification
	Purafil ESD's Odoroxidant Media and Specification
	Purafil ESD's Odormix Media and Specification
	Service Guide Purafil Drum Scrubber

Purafil ESD Drum Scrubber - 1000



Manufactured by Purafil Environmental Systems Division (ESD), the Drum Scrubber-1000 (DS-1000) is ideal for removal of odorous gases found at pump stations, lift stations, wet wells, force mains, and even at the wastewater treatment plant. Recommended for moderate-load applications, the DS-1000 is sized for airflows up to 1000 cfm.

Construction: The DS-1000's polyethylene canister measures 52 inches (132.1 cm) in diameter, 79.5 inches (201.9 cm) in height (including blower), and 1/4-inch (6.4 mm) in thickness. The unit is mounted on a 60-inch square aluminum skid.

Media: At the core of ESD's high-efficiency odor control systems are dry-chemical air filtration medias. The DS-1000 is bulk filled with multiple layers of Odoroxidant™, Odorcarb™ II, and Odormix™ media for broad-spectrum removal of sewage odors at 99.5+% efficiencies.

Applications

- Pump Stations
- Lift Stations
- Wet Wells
- Force Mains
- Head Works
- Aerobic Digesters
- Clarifiers
- Sludge Dewatering

Targeted Odors/Gases

- Hydrogen sulfide
- Ammonia
- Aldehydes
- Sulfur dioxide
- Mercaptans
- Organic compound

System Advantages

Corrosion-Resistant Housing: The DS-1000 is constructed of corrosion-resistant materials and requires essentially no maintenance, making it ideal for remote, outdoor applications or areas where high levels of acid gases are present.

Low Maintenance: The DS-1000 has only one moving part—a blower. Other than routine service checks, no maintenance is required to ensure maximum scrubber performance. The expected service life of the DS-1000 is nine months to one year, depending on the contaminant level.

Complete Gas Removal: Purafil ESD's Odoroxidant, Odorcarb II, and Odormix media offer broad-spectrum

removal of sewage odors. By using these media in combination, users are assured of complete odor control.

Media Sampling Ports: Three media sampling ports, located on the side of the DS-1000, allow for easy access to the media beds. Upon receiving the samples, Purafil ESD's laboratory performs a complimentary Media Life Analysis to project remaining service life. Timely replacement of spent media is critical in preventing odor breakthrough.

Local Service: Purafil ESD's network of local representatives offers convenient and timely service. These factory-trained representatives work in conjunction with ESD's in-house laboratory to provide comprehensive technical service.

Standard Features:

- Linear, low-density, polyethylene canister (1/4-inch in thickness)
- Odoroxidant, Odorcarb II, and Odormix media (39 ft³)
- Integrated motor housing
- Totally Enclosed Fan Cooled (TEFC) motor
- High-density, rotomolded, polypropylene motor/blower assembly
- Adjustable damper (PVC)
- Stainless steel and rubber latches
- Stainless steel fasteners
- Thermoplastic packing and FRP lid
- Polypropylene impellers and motor shaft bushings
- Integrated rainhood
- Fernco flexible coupling at inlet
- Polyethylene inlet (10-inch pipe diameter)
- Airflows up to 1000 cfm

Optional Features

- Other Purafil ESD media

Other System Advantages

- System media are UL Classified Class 1 and 2.
- Spent media is landfill disposable.
- Maintains superior performance in climates with fluctuating temperature and relative humidity.



2654 Weaver Way • Doraville, Georgia 30340 • Phone: (770) 662-8545 • Fax: (770) 263-6922 • www.purafil.com

SUGGESTED SPECIFICATIONS - DS-1000

DRUM SCRUBBER – 1,000 CFM

For use with drawing AW-121703 Rev. B



1. GENERAL

1.01 Intent

- A. It is the intent of these Suggested Specifications to give the Contractor/Engineer the descriptions of the equipment, instructions for delivery, and installation of the Purafil Drum Scrubber-1,000cfm (DS-1000) as manufactured by Purafil, Inc. Doraville, Georgia or equal.
- B. The Contractor/Engineer is advised that all drawings shall be for general reference.
- C. The Contractor/Engineer shall provide all equipment and work indicated below unless otherwise noted and any additional work to produce a completely finished job as required by the Engineer.

2. PRODUCTS

2.01 General

- A. This specification defines the requirements for a Drum Scrubber-1,000cfm (DS-1000) as manufactured by Purafil, Inc. Doraville, Georgia or equal.
- B. The DS-1000 consists of dry scrubbing media contained in a 550-gallon, linear, low density, polyethylene drum with a blower mounted on top of a FRP lid.
- C. The DS-1000 shall contain 39 ft³ (0.96 m³) of Odoroxidant™, Odorcarb™ II, and Odormix™ media. The DS-1000 shall contain 400 pounds (183 kg) of impregnated activated alumina, Odoroxidant media, 945 pounds (431 kg) of impregnated activated carbon, Odorcarb II Media, followed by 400 pounds (183 kg) of a 50/50 volume blend of activated carbon and active-oxidant impregnated alumina, Odormix Media, as manufactured by Purafil, Inc.
- D. The DS-1000 shall be designed to operate at 99.5+% gas removal efficiencies.
- E. The airflow capacity shall range from 800 cfm (1,360 m³/hr) to 1,100 cfm (1,870 m³/hr)
- F. The configuration shall be arranged so that the contaminated air shall flow into the bottom inlet plenum and be drawn upwards through the media bed. Treated air shall discharge out the top of the vessel through a centrifugal air ventilator.
- G. All components of the DS-1000 shall include:
 - 1. 550-gallon, linear, low density, polyethylene drum and FRP lid
 - 2. 1,745 pounds (796 kg) of dry scrubbing media
 - 3. Polypropylene blower section with damper

2.02 Drum

- A. The drum material shall be linear, low density, polyethylene, 1/4" (6.4mm) in thickness.
- B. The drum shall have a capacity of 550 gallons and measure 52" (132.1 cm) in diameter and 60" (152.4 cm) in height.
- C. Latches shall be stainless steel and rubber.
- D. Fasteners shall be stainless steel.
- E. The drum shall contain 39 ft³ (1.10 m³) of Odoroxidant, Odorcarb II and Odormix medias as manufactured by Purafil, Inc.
- F. The drum shall be provided with two media sampling ports, each measuring one inch in diameter.
- G. The media shall be supported by an FRP air diffuser and surrounded by thermoplastic packing and will contain a mist eliminator to remove moisture.
- H. Polymedia filters shall be used to separate the thermoplastic packing from the Odorcarb II media, the blower from the Odormix media, and to separate the layers of media.
- I. The inlet shall have a 8" (203.2 mm) FERNCO flexible coupling.
- J. The drum shall have a 0.75" (19 mm) dia. drain pipe.

2.03 Blower Section

- A. The blower shall be sized to deliver 1,000 cfm (1,700 m³/hr)
- B. The blower/motor shall be covered with an FRP rainhood.
- C. The blower shall consist of a direct drive motor-fan assembly.
- D. The motor shall be a 3.0 hp, 3450 RPM, 115/230 volt / 1 phase/ 60 Hz TEFC motor.
- E. The unit comes ready to be field wired.

2.04 Chemical Media

- A. The DS-1000 shall contain 8 ft³ (0.22 m³) of Odoroxidant media, 21 ft³ (0.58 m³) of Odorcarb II Media, and 10 ft³ (0.28 m³) Odormix Media as manufactured by Purafil, Inc.

- B. The Odoroxidant™ Media shall consist of manufactured, generally spherical, porous pellets. Pellets shall be formed from a combination of activated alumina and other binders, suitably impregnated with potassium permanganate to provide optimum adsorption, absorption, and oxidation of a wide variety of gaseous contaminants. The potassium permanganate shall be applied during pellet formation, such that the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction.
- C. Odoroxidant Media shall have the following physical properties:
1. Moisture content: 35% maximum
 2. Average crush strength: 35% minimum - 70% maximum
 3. Average abrasion: 4.5% maximum
 4. Bulk density: 50 lbs/ft³ (800 kg/m³)
 5. Nominal pellet diameter: 1/8" (3.2 mm)
 6. Potassium permanganate content: 8% minimum
- D. Odoroxidant Media shall be UL Classified Class 1.
- E. Odoroxidant Media shall be capable of absorbing and removing odorous gases throughout the entire pellet.
- F. The Odorcarb™ II Media shall consist of manufactured, generally spherical porous pellets. The pellets shall be formed from a combination of powdered activated carbon, alumina, and other binders suitably impregnated with chemicals to enhance the capacity for removal of odorous gases. The pellets shall also chemically react to produce solid reaction products within the media. Impregnants shall be applied during pellet formation such that the impregnant is uniformly distributed throughout the pellet volume.
- G. Odorcarb II Media shall have the following physical properties:
1. Moisture content: 35% maximum
 2. Average crush strength: 35% minimum - 70% maximum
 3. Average abrasion: 4.5 maximum
 4. Bulk density: 45 lbs/ft³ (721 kg/m³)
 5. Nominal pellet diameter: 1/16" – 1/8" (1.587mm)
- H. Odorcarb II Media shall be UL Classified Class 2.
- I. Odorcarb II Media shall be capable of absorbing and removing odorous gases throughout the entire pellet.
- J. The Odormix™ Media shall consist of an equal mix (by volume) of Odoroxidant Media and Odorkol Media. Odoroxidant Media shall be manufactured of generally spherical, porous pellets formed from a combination of powdered activated alumina and other binders, suitably impregnated with potassium permanganate to provide optimum adsorption, absorption, and oxidation of a wide variety of gaseous contaminants. The potassium permanganate shall be applied during pellet formation, such as the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction. Odorkol Media shall be a premium grade, activated carbon with a high surface area available for adsorption.
- K. Odormix Media shall have the following physical properties:
1. Odoroxidant Media
 - Moisture content: 35% maximum
 - Average crush strength: 35% minimum - 70% maximum
 - Average abrasion: 4.5% maximum
 - Bulk density: 50 lbs/ft³ (800 kg/m³)
 - Nominal pellet diameter: 1/16" (1.587mm)
 - Potassium permanganate content: 8% minimum
 2. Odorkol Media
 - Moisture content: 5.0% maximum
 - CTC: 55 minimum
 - Base material: activated carbon
 - Bulk density: 30-32 lbs/ft³ (480-512 kg/m³)
 - Odormix Media shall be UL Classified Class 1.

L. ANALYTICAL SERVICES

- a. Media Sampling and Analysis
 - i. The manufacturer shall, after start up, shall analyze media samples to predict the remaining service life of system media. Such service will be provided as needed at the manufacturer's expense.

M. MANUFACTURER

a. Purafil, Inc.

- i. The manufacturer shall have a minimum of ten (10) years experience in the design, fabrication, and testing of systems that are 99.5+% efficient at removing gaseous contaminants.
- ii. The manufacturer shall be a single source provider of equipment, media, and testing services and be certified to ISO-9001 standards.
- iii. The manufacturer shall have local, factory-trained representatives.
- iv. The manufacturer shall be Purafil, Inc. of Doraville, Georgia.

Purafil ESD's Odorcarb™ II Media



Proven Performance

Odorcarb™ II Media is highly effective at removing odorous hydrogen sulfide gas (H_2S) and is the primary media in Purafil ESD's odor control systems for wastewater treatment applications.

Characteristics

- Landfill disposable
- New and spent media is non-toxic
- UL Classified Class 2

Media

Odorcarb™ II, an activated alumina-based media shall consist of manufactured, generally spherical porous pellets measuring 1/16" to 1/8" in diameter. Pellets shall be formed from a combination of powdered activated carbon, alumina and other binders, suitably impregnated with caustic chemicals to enhance the capacity for removal of hydrogen sulfide.

Impregnants shall be applied during pellet formation, such that the impregnant is uniformly distributed throughout the volume of the pellet.

Disposal Requirements

Spent Odorcarb™ II Media should be disposed of according to local, state and federal guidelines.

The Chemisorptive Process

The chemisorptive process shall remove contaminant gases by means of adsorption, absorption, and chemical reaction. Gases shall be trapped within the pellet where an irreversible chemical reaction changes the gases into harmless solids, eliminating the possibility of desorption.

Removal Capacity

Odorcarb™ II Media shall meet the following removal capacity for hydrogen sulfide: 35.0% minimum by weight.

100 lbs (45.36 kg) of Odorcarb™ II Media shall remove a minimum of 35 lbs (15.88 kg) of hydrogen sulfide.

Physical Properties

Odorcarb™ II Media shall have the following physical properties:

- **Moisture Content:** 35% Max
- **Crush Strength:** 35% - 70% Max
- **Abrasion:** 4.5% Max
- **Bulk Density:** 45 lbs/ft³ (721 kgs/m³)
- **Pellet Diameter:** 1/16" - 1/8" (1.5 mm - 6.5mm)

Applications

Purafil ESD's Odorcarb™ II Media is ideal for use in environments requiring control of hydrogen sulfide gas, such as wastewater treatment plants, pumping stations, wet wells, lift stations and sludge holding tanks.

Application Guidelines

Odorcarb™ II Media shall perform effectively under the following conditions and guidelines:

- **Temperature:** -4°F to 125°F (-20°C to 51°C)
- **Humidity:** 10 - 95% RH
- **Airflow:** Odorcarb™ II Media shall be effective in Purafil ESD systems, including

the Drum Scrubber with airflows from 100 to 1,000 CFM (170 to 1699 m³/hr), Tub Scrubber with airflows from 500 to 6,000 CFM (850 to 10,194 m³/hr) and Deep Bed Scrubber with airflows from 600 to 8,000 CFM (1,020 to 13,592 m³/hr). Odorcarb™ II Media shall also be effective in Vessel Scrubbers with airflows from 8,000 to 20,000 cfm (13,592 to 33,980 m³/hr).

Other Media

Purafil ESD's Odorcarb™ II Media can be used with other media manufactured by Purafil, Inc. Specific media are available for selection based upon the composition of the contaminants present, gaseous concentration levels, airflow requirements and environmental concerns. These media include Odoroxidant™, for the removal of sulfur dioxide, hydrogen sulfide, aldehydes and many organic compounds; Odormix™ for broad-spectrum removal of sewerage odors; Odorkol™ for the removal of hydrocarbons; Odorkol™ AM for the removal of ammonia; Chlorosorb® II for the specific gas removal of chlorine; CSO™ for emergency removal of chlorine and sulfur dioxide.

Purafil ESD, Your Single Source For...

- Media Manufacturing
- Equipment Design & Manufacturing
- Complimentary Media Life Analysis
- Monitoring Instruments & Programs



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Specification: Odorcarb™ II Media

Target Contaminants

- Hydrogen sulfide
- Sulfur dioxide
- Volatile organic compounds

Media Specification

Odorcarb™ II media is manufactured specifically for corrosive environments and consists of generally spherical, porous pellets. Composed of carbon, alumina and other binders, Odorcarb™ II pellets are impregnated during pellet formation such that the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction.

Chemisorptive Process

The Purafil chemisorptive process shall remove contaminant gases by means of adsorption, absorption, and chemical reaction. Gases shall be trapped within the pellet, where oxidation changes the gases into harmless solids, thus eliminating the possibility of desorption.

Removal Capacity

Odorcarb™ II media shall meet the following removal capacities:

- Hydrogen sulfide: 35% by weight

For example, 100 lbs (45.36 kg) of Odorcarb™ II media will remove a minimum of 35 lbs (15.88 kg) of hydrogen sulfide.

Physical Properties

Odorcarb™ II media shall have the following physical properties:

- Moisture content: 35% maximum
- Crush strength: 35% - 70% maximum
- Abrasion: 4.5% maximum
- Bulk density: 45 lbs/ft³ (721 kg/m³)
- Nominal pellet diameter: 1/16" - 1/8" (1.59 mm - 3.175 mm)
- Odorcarb™ II media is UL Classified Class 2

Specification: OdorcarbTM II Media**Page 2 of 2****Application Guidelines**

OdorcarbTM II media shall perform effectively under the following conditions and guidelines:

- Temperature: -4° F - 125° F (-20° C - 51° C)
- Humidity: 10% - 95% RH
- Airflow: OdorcarbTM II media shall be effective in commercial and industrial systems with airflows ranging from less than 25 cfm to over 100,000 cfm (42.5 m³/hr - 169,920 m³/hr) and with velocities from 60 to 500 fpm (0.30 to 2.54 m/s).
- Media performance: OdorcarbTM II media shall be designed for 99.5% minimum removal efficiency in Purafil systems.
- Media life: Regular media samples of OdorcarbTM II media shall be taken for projecting remaining media life, providing scheduled maintenance, and ensuring performance.

Installation and Disposal Requirements

- Installation: Installers shall use dust masks, safety goggles, and rubber gloves.
- Disposal: Spent OdorcarbTM II media shall be disposed of according to local, state and, federal guidelines.

Purafil ESD's Odoroxidant™ Media



Proven Performance

Odoroxidant™ Media demonstrates a high removal capacity for sewerage gases, including hydrogen sulfide, aldehydes, sulfur dioxide and many organic compounds.

Characteristics

- Landfill disposable
- UL Classified Class 1
- New and spent media is non-toxic
- Will not support bacterial or fungal growth

Media

Purafil ESD's Odoroxidant™ Media shall consist of manufactured, generally spherical, porous pellets. Pellets shall be formed from a combination of activated alumina and other binders, suitably impregnated with potassium permanganate to provide optimum adsorption, absorption and oxidation of a wide variety of gaseous contaminants. The potassium permanganate shall be applied during pellet formation, such that the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction.

Disposal Requirements

Spent Odoroxidant™ Media should be disposed of according to local, state and federal guidelines.

The Chemisorptive Process

The chemisorptive process shall remove contaminant gases by means of adsorption, absorption, and chemical reaction. Gases shall be trapped within the pellet where an irreversible chemical reaction changes the gases into harmless solids, eliminating the possibility of desorption.

Removal Capacity

Purafil ESD's Odoroxidant™ Media shall meet the following removal capacities:

- **Hydrogen Sulfide:** 18.0% min. by weight
- **Sulfur Dioxide:** 7.0% min. by weight

For example, 100 pounds (45.36 kg) of Purafil ESD's Odoroxidant™ Media will remove a minimum of 18 pounds (8.16 kg) of hydrogen sulfide.

Physical Properties

Purafil ESD's Odoroxidant™ Media shall have the following physical properties:

- **Moisture Content:** 35% Maximum
- **Crush Strength:** 35% - 70%
- **Abrasion:** 4.5% Maximum
- **Bulk Density:** 50 lbs/ft³ (800 kg/m³)
- **Pellet Diameter:** 1/16" - 1/8" (1.5 mm - 3.2 mm)
- **Potassium Permanganate Content:** 8% Minimum

Applications

Odoroxidant™ Media is designed for the removal of odorous gases pervasive in wastewater operations. The media is used in conjunction with other Purafil ESD media and serves to polish remaining odorous gases before discharge to the atmosphere.

Application Guidelines

Odoroxidant™ Media shall perform effectively under the following conditions and guidelines:

- **Temperature:** -4°F to 125°F (-20°C to 51°C)

- **Humidity:** 10 - 95% RH

- **Airflow:** Odoroxidant™ Media shall be effective in Purafil ESD systems, including the Drum Scrubber with airflows from 100 to 1,000 CFM (170 to 1699 m³/hr), Tub Scrubber with airflows from 500 to 6,000 CFM (850 to 10,194 m³/hr) and Deep Bed Scrubber with airflows from 600 to 8,000 CFM (1,020 to 13,592 m³/hr). Odoroxidant™ Media shall also be effective in Vessel Scrubbers with airflows from 8,000 to 20,000 cfm (13,592 to 33,980 m³/hr).

Other Media

Purafil manufactures specific media for selection based upon the composition of the contaminant gases present, concentration levels, airflow requirements, environmental concerns, and room design considerations. These media include Odormix™ for broad-spectrum removal of sewerage odors; Odorcarb™ II for removal of hydrogen sulfide, sulfur dioxide and chlorine; Odorkol™ for removal of hydrocarbons; Odorkol™ AM for removal of ammonia; CSO™ for emergency removal of sulfur dioxide and chlorine gas; Chlorosorb® II for removal of chlorine gas.

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Specification: Odoroxidant™ Media

Target Contaminants

- Aldehydes
- Amines
- Oxides
- Sulfur compounds

Media Specification

Purafil ESD's Odoroxidant™ media shall consist of manufactured, generally spherical, porous pellets. Pellets shall be formed from a combination of activated alumina and other binders suitably impregnated with potassium permanganate to provide optimum adsorption, absorption, and oxidation of a wide variety of gaseous contaminants. The potassium permanganate shall be applied during pellet formation such that the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction.

Chemisorptive Process

The Purafil ESD chemisorptive process shall remove contaminant gases by means of adsorption, absorption, and chemical reaction. Gases shall be trapped within the pellet, where an irreversible chemical reaction changes these gases into harmless solids, thus eliminating the possibility of desorption.

Removal Capacity

Purafil ESD's Odoroxidant™ media shall meet the following removal capacities:

- Hydrogen sulfide: 14.0% minimum by weight
- Sulfur dioxide: 7.0% min. by weight

For example, 100 lbs (45.36 kg) of Purafil ESD's Odoroxidant™ media will remove a minimum of 14 lbs (6.34 kg) of hydrogen sulfide.

Physical Properties

Purafil ESD's Odoroxidant™ media shall have the following physical properties:

- Moisture content: 35% maximum
- Crush strength: 35% - 70% maximum
- Abrasion: 4.5% maximum
- Bulk density: 50 lbs/ft³ (800 kg/m³)
- Pellet diameter: 1/16" - 1/4" (1.5 mm - 6.5 mm)
- Potassium permanganate content: 8% minimum

Specification: Odoroxidant™ Media**Page 2 of 2****Applications**

Odoroxidant™ media is designed for the removal of odorous gases pervasive in wastewater operations. The media is used in conjunction with other Purafil ESD medias and serves to polish remaining odorous gases before discharge to the atmosphere.

Application Guidelines

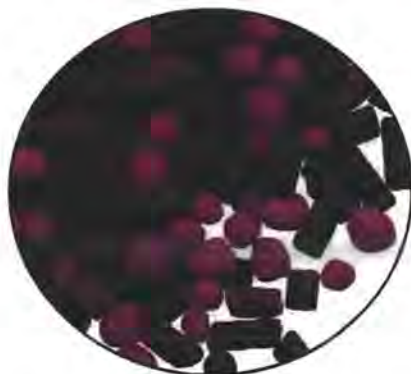
Odoroxidant™ media shall perform effectively under the following conditions and guidelines:

- Temperature: -4° F - 125° F (-20° C - 51° C)
- Humidity: 10% - 95% RH
- Airflow: Odoroxidant™ media shall be effective in Purafil ESD systems, including the Drum Scrubber with airflows from 100 - 500 cfm (170 - 850 m³/hr), Tub Scrubber with airflows from 1,000 - 4,000 cfm (1,700 - 6,800 m³/hr), and Deep Bed Scrubber with airflows from 600 - 6,000 cfm (1,020 - 10,200 m³/hr). Odoroxidant™ media shall also be effective in Purafil ESD systems with velocities from 60 - 100 fpm (0.3 - 0.5 m/s).

Installation and Disposal Requirements

- Installation: Installers shall use dust masks, safety goggles, and rubber gloves.
- Disposal: Spent Odoroxidant™ media shall be disposed of according to local, state, and federal guidelines.

Purafil ESD's Odormix™ Media



Proven Performance

Purafil ESD's Odormix™ Media offers broad spectrum removal of odorous gases related to sewerage treatment operations.

Characteristics

- Landfill disposable
- UL Classified Class 1
- Medias are pre-mixed at Purafil's factory
- Substitutes for a two-pass media system
- New and spent media is non-toxic

Media

Purafil ESD's Odormix™ Media shall consist of an equal mix (by volume) of Purafil ESD's Odoroxidant™ Media and Odorkol™ Media.

Odoroxidant™ Media shall be manufactured of generally spherical, porous pellets formed from a combination of powdered activated alumina and other binders, suitably impregnated with potassium permanganate to provide optimum adsorption, absorption and oxidation of a wide variety of gaseous contaminants. The potassium permanganate shall be applied during pellet formation, such that the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction. The Odorkol™ Media shall be a premium grade, activated carbon with a high surface area available for adsorption.

Disposal Requirements

Spent Odormix™ Media should be disposed of according to local, state and federal guidelines.

Physical Properties

Odormix™ Media bulk density is 40 lbs/ft³ (640 kg/m³).

Odoroxidant™ Media shall have the following physical properties:

- **Moisture Content:** 35% Maximum
- **Crush Strength:** 35% - 70%
- **Abrasion:** 4.5% Maximum
- **Bulk Density:** 50 lbs/ft³ (800 kg/m³)
- **Nominal Pellet Diameter:** 1/16" - 1/8" (1.5 mm - 3.2 mm)
- **Potassium Permanganate Content:** 8% Min.
- **Percentage of Pellet Remaining:** 80-85% after screening

Odorkol™ Media shall have the following physical properties:

- **Moisture Content:** >3%
- **CTC:** 55 Minimum
- **Base Material:** Activated Carbon
- **Bulk Density:** 30 lbs/ft³ (480 kg/m³)
- **Pellet Diameter:** 1/16" - 1/8" (1.5 mm - 3.2 mm)

Applications

Purafil ESD's Odormix™ Media is designed for broad spectrum removal of odorous gases, including mercaptans, hydrocarbons, hydrogen sulfide and sulfur dioxide. Odormix™ Media is recommended when space within Purafil ESD's multi-stage scrubber is limited; in this application, Odormix™ substitutes for two media passes. Odormix™ is also recommended as a polishing media.

Application Guidelines

Odormix™ Media shall perform effectively under the following conditions and guidelines:

• **Temperature:** -4°F to 125°F (-20°C to 51°C)

• **Humidity:** 10 - 95% RH

• **Airflow:** Odormix™ Media shall be effective in Purafil ESD systems, including the Drum Scrubber with airflows from 100 to 1,000 CFM (170 to 1699 m³/hr), Tub Scrubber with airflows from 500 to 6,000 CFM (850 to 10,194 m³/hr) and Deep Bed Scrubber with airflows from 600 to 8,000 CFM (1,020 to 13,592 m³/hr). Odormix™ Media shall also be effective in Vessel Scrubbers with airflows from 8,000 to 20,000 cfm (13,592 to 33,980 m³/hr).

Other Media

Purafil ESD's Odormix™ Media can be used with other media manufactured by Purafil, Inc. Specific media are available for selection based upon the composition of the contaminants present, gaseous concentration levels, airflow requirements and environmental concerns. These media include Odoroxidant™ for the removal of sulfur dioxide, hydrogen sulfide, aldehydes and many organic compounds; Odorcarb™ II for the removal of hydrogen sulfide, sulfur dioxide and chlorine; Odorkol™ for the removal of hydrocarbons; Odorkol™ AM for the removal of ammonia; and Chlorosorb® II for the specific gas removal of chlorine.

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Specification: Odormix[™] Media

Target Contaminants

- Mercaptans
- Hydrocarbons
- Hydrogen sulfide
- Sulfur dioxide

Media Specification

Purafil ESD's Odormix[™] media shall consist of an equal mix by volume of Purafil ESD's Odoroxidant[™] media and Odorkol[™] media.

Odoroxidant[™] media shall be manufactured of generally spherical, porous pellets formed from a combination of powdered activated alumina and other binders suitably impregnated with potassium permanganate to provide optimum adsorption, absorption, and oxidation of a wide variety of gaseous contaminants. The potassium permanganate shall be applied during pellet formation such that the impregnant is uniformly distributed throughout the pellet volume and is totally available for reaction.

Odorkol[™] Media shall be a premium grade activated carbon with a high surface area available for adsorption.

Physical Properties

Odormix[™] media shall have the following physical properties:

- Bulk density: 40 lbs/ft³ (640 kg/m³)

Odoroxidant[™] media

- Moisture content: 35% maximum
- Crush strength: 35% - 70% maximum
- Abrasion: 4.5% maximum
- Bulk density: 50 lbs/ft³ (800 kg/m³)
- Nominal pellet diameter: 1/16" - 1/4" (1.5 mm - 6.5 mm)
- Potassium permanganate content: 8% minimum
- Percentage of pellet remaining: 80 - 85% after screening

Specification: Odormix™ Media**Page 2 of 2****Odorkol™ media**

- Moisture content: >3%
- CTC: 55 minimum
- Base material: Activated carbon
- Bulk density: 30 lbs/ft³ (480 kg/m³)
- Pellet diameter: 1/16" - 1/4" (1.5 mm - 6.5 mm)

Applications

Odormix™ media is recommended when space within Purafil ESD's multi-stage scrubber is limited; in this application, Odormix™ substitutes for two media passes. Odormix™ is also recommended as a polishing media.

Application Guidelines

Purafil ESD's Odormix™ media shall perform effectively under the following conditions and guidelines:

- Temperature: -4° F - 125° F (-20° C - 51° C)
- Humidity: 10% - 95% RH
- Airflow: Odormix™ media shall be effective in Purafil ESD systems, including the Drum Scrubber with airflows from 100 - 500 cfm (170 - 850 m³/hr), Tub Scrubber with airflows from 1,000 - 4,000 cfm (1,700 - 6,800 m³/hr), and Deep Bed Scrubber with airflows from 600 - 6,000 cfm (1,020 - 10,200 m³/hr). Odormix™ media shall also be effective in Purafil ESD systems with velocities from 60 - 100 fpm (0.3 - 0.5 m/s).

Installation and Disposal Requirements

- Installation: Installers shall use dust masks, safety goggles, and rubber gloves.
- Disposal: Spent Odormix™ media shall be disposed of according to local, state, and federal guidelines.

SERVICE GUIDE #122

Installation, Operation & Maintenance Instructions

Drum Scrubbers

DS-100 (170 m³/hr) , DS-300 (510 m³/hr), DS-500 (850 m³/hr), & DS-1000 (1700 m³/hr) Models

Manufactured by:

Purafil, Inc.

2654 Weaver Way
Doraville, GA, U.S.A. 30340
Telephone: (770) 662-8545
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TITLE

BASIC DESIGN

1.0 PRE-INSTALLATION INSTRUCTIONS

Service Guide #122 – Rev. 05/00

1.1 SAFETY CONSIDERATIONS

- Read this Service Manual carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
- This manual should be retained with the unit because it contains the information necessary for proper maintenance.
- Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.

CAUTION:

- Installer should be a trained, experienced service person.
- Check the assembly and component weights to be sure that the rigging equipment can handle them safely.
- Be sure that the unit is balanced well in the transporting device.
- Always conduct a thorough check when the installation is complete.
- Never enter an enclosed blower cabinet or reach into a chousing while fan is running.
- The motors in PURAFIL® equipment get very hot. This is normal and should not be regarded as a problem with the motor. However, take special care to avoid touching the hot areas.

1.2 RECEIVING INSTRUCTIONS

Systems are normally shipped assembled and with motors mounted. All units are attached securely to skids. It is recommended that units be left on their skids for protection and ease of handling while transporting. Straps, rigging, slings, or hooks attached to the skids may be

used, with proper care. The units are well protected with triple wall board and are secured with metal bands. Forklifts may be used under the skids, but exercise caution to prevent damage.

Upon receiving systems from Purafil, Inc., note any shipping damage, obvious or hidden, to your carrier and on your Bill of Lading. All problems should be handled between the customer and carrier except for U.P.S. shipments, which require the customer to contact Purafil, Inc. for action.

- If the unit is to be stored before use, see Section 1.4 in this manual.
- If the unit is to be installed immediately, be sure to check Section 3.0 in this manual.
- To uncrate unit, cut metal bands and remove packaging.
- For positioning and special handling, see Section 3.1 in this manual.

1.3 INSPECTION

The condition of the unit upon its arrival is critical to its proper operation. Prior to start-up, inspect the unit carefully, according to the checklist below. Correct any inadequacies before start-up to prevent possible damage or inefficiency. Note, should there be any questions concerning the unit, refer to the numbers found on the unit identification plate, when contacting the PURAFIL® representative.

PRE-OPERATION CHECK LIST

YES NO CONDITION

- | | | |
|-------|-------|--|
| _____ | _____ | 1. Configuration and material are as specified on the sales order form |
| _____ | _____ | 2. Measurements fit submittal requirements |

- _____ 3. Parts are all present
- _____ 4. Latches hold securely and gaskets seal properly
- _____ 5. Labels and serial numbers are present
- _____ 6. Airflow direction is consistent with installation requirements (check labels attached to unit)

Note: Checking specific points is also imperative after the unit is started up. See section 3.4 in this manual for checklist.

1.4 STORAGE

The unit should be protected from the elements during storage, especially when storage time is extensive. While indoor storage is considered best, outdoor storage can be adequate when precautions are taken.

OUTDOOR STORAGE PRECAUTIONS

- Cover the equipment with a tarp. Intake and discharge openings must be well covered. (Use of black plastic as a cover may cause excessive condensation and rusting.)
- If there is the possibility of moisture collection, allow for proper drainage.
- Do not place heavy equipment on top of the unit.
- Store Purafil® media in a dry place with less than 95% relative humidity.

1.5 FOUNDATION AND CLEARANCES

FOUNDATIONS

Some units may require new or reinforced foundations, due to their weight. Always be sure to check that the existing foundation is adequate for the unit to be installed. Units to be used indoors require particular attention to strength of foundation. In some instances, a concrete base is best suited to the system. Concrete lessens the chance for vibration than if metal structures are used.

CLEARANCE

All units should be easily accessible for the required periodic maintenance. Do not block return and discharge grilles. Sufficient minimum clearances can be recommended by the local PURAFIL® representative.

2.0 BASIC DESIGN OF THE DRUM FILTER

Designed to clean odorous air, the drum filter, coupled with the final particulate filter, contains an inlet pipe, blower, a media bed housed in a LDPE drum, and diffuser. Pre-engineered in a single unit, the drum filter is designed to exhaust recycled air. The drum filter is supplied with Odoroxidant™, Odorcarb™ II and Odormix™ media. The drum filter has a quiet, low horsepower motor and low pressure drop.

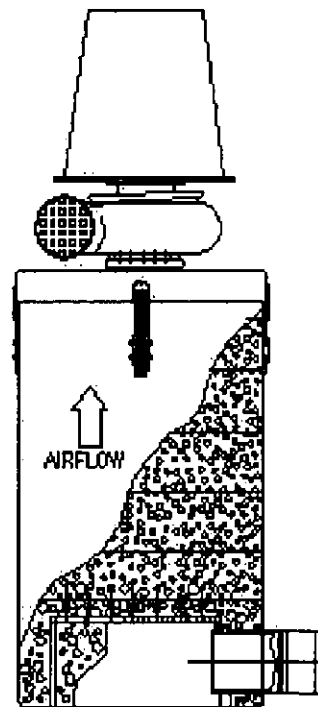
The drum filter includes the following components:

1. INLET PIPING/DIFFUSER – Air enters through a 100 mm (4"), (DS-100, 170 m³/hr, 100 cfm model), 200mm (8"), (DS-300, 510 m³/hr & DS-500, 850 m³/hr, 300 & 500 cfm models) and 254 mm (10"), (DS-1000, 1700 m³/hr, 1,000 cfm model) Fernco fitting prior to entering the drum.
2. MEDIA BED –
 - DS-100 (170 m³/hr, 100 cfm model) consists of 0.028m³ (1 ft³), 22.7 kg of Odoroxidant media, 0.056m³ (2 ft³), 41 kg

of Odorcarb II media and, 0.056m^3 (2 ft³), 36 kg of Odormix. Each cubic foot of media is contained in a MediaSak for easy handling and disposal.

- DS-300 (510 m³/hr, 300 cfm model) comes complete with 0.056m^3 (2 ft³), of Odoroxidant™ media (45 kg's), 0.14m^3 (5 ft³) of Odorcarb™ II media (102 kg's) and 0.084m^3 (3 ft³) of Odormix™ media (55 kg's).
 - DS-500 (850 m³/hr, 500 cfm model) comes complete with 0.084m^3 (3 ft³) of Odoroxiant media (68 kg's), 0.28m^3 (10 ft³) of Odorcarb II media (205 kg's) and 0.112m^3 (4 ft³) of Odormix media (73 kg's).
 - DS-1000 (1,700 m³/hr, 1,000 cfm model) comes complete with 0.224m^3 (8 ft³) of Odoroxiant media (183 kg's), 0.588m^3 (21 ft³) of Odorcarb II media (431 kg's) and 0.28m^3 (10 ft³) of Odormix media (183 kg's).
3. **BLOWER** – the air is then propelled further by the blower assembly which includes a mill and chemical duty motor and direct drive blower, assuring even, quiet airflow.
 4. **FINAL FILTER** (DS-300, DS-500 & DS-1000) – any remaining contaminants, such as media dust and airborne contaminants are removed in this final stage by a polymedia filter.

FIGURE 1: BASIC DESIGN



3.0 INSTALLATION

After the entire pre-operative inspection is finished (Section 1.3), complete the following sequence for installation:

- (1) Remove the unit from the skid and position it in the designated operation location.
- (2) Plug in the electrical connections.
- (3) Start the unit.
- (4) Perform post-start inspection check. (See Section 3.5)

3.1 POSITIONING THE UNIT

The standard unit can simply be transported by lift to its pre-designed operation location (if in

close proximity to the skid), according to facility safety requirements.

3.2 MEDIA FILLING INSTRUCTIONS (FOR INITIAL START-UP)

Proper filling, installation, and maintenance of the chemical filtration media is critical to the unit's efficient operation. The drums are designed specifically for media manufactured by Purafil, Inc. and allows the system to perform at maximum efficiency, through proper shape and bed depth. Drum filters are pre-filled with media at the factory.

3.4 MEDIA FILLING INSTRUCTIONS (FOR MEDIA REPLACEMENT)

Once media analysis (DS-300, DS-500 & DS-1000 models only) has determined that it is time for a replacement supply of media, replace the media according to the instructions below. Please note that after each media type or MediaSak is installed it is imperative that it is leveled out across the drum. This is to eliminate bypass and channeling effects.

For DS-100 Model:

- Media replacement is accomplished by removing the motor/blower lid assembly. Disconnect power supply.
- Remove MediaSaks (5).
- Install new MediaSaks (5).
- Install motor/blower lid assembly.
- See Section 4.3 for disposal precaution.

For DS-300, DS-500 & DS-1000 Models:

- Remove motor/blower lid assembly. Disconnect power supply.
- Remove Polymedia (blue) filter.
- Remove layer of Odormix™ media.
- Remove layer of Odorcarb™ II media.
- Remove layer of Odoroxidant™ media.
- Remove Polymedia (blue) filter.
- Install bottom Polymedia (blue) filter.
- Install new Odoroxidant media.

- Install new Odorcarb II media.
- Install new Odormix media.
- Install top Polymedia (blue) filter.
- Install motor/blower lid assembly.
- Connect power supply.
- See Section 4.3 for disposal precaution.

3.4 POST-START INSPECTION/CHECK

Before initial start-up of system, contact your local PURAFIL® representative. Their name and phone number is attached to your system. *Operate all DS models at the lowest air flow required to maintain a negative pressure and maximize media life.*

YES	NO	CONDITION
_____	_____	1. Joints, seals, and gaskets do not leak.
_____	_____	2. Particulate filters have been installed.

4.0 MAINTENANCE

4.1 REPLACEMENT PARTS AND MATERIALS

While Purafil, Inc. products are built for durability, some parts of the PURAFIL® unit will require replacement during the normal lifetime of the equipment. Replacement items may be ordered from your local PURAFIL® representative or from Purafil, Inc.

Consumables: In order to maintain proper performance levels, particulate filters and PURAFIL® media must be replaced periodically, as they have a finite life (See Sampling Procedure Service Guide).

Moving Parts: Bearings, motors, etc. are all subject to gradual deterioration and/or sudden breakdown.

4.2 MEDIA REPLACEMENT

Need for Sampling (DS-300, DS-500 & DS-1000 models only)

1. PURAFIL® media has a finite life which is a function of the available potassium permanganate (KMnO_4) expressed as a percentage.
2. After start-up, your local Purafil representative will work with the owner to periodically secure media samples. Purafil, Inc. will provide regular laboratory analysis of such samples to establish life cycles. Note, color change of media does not indicate level of remaining life.
3. Since every installation varies due to the type and quantity level of the contaminant, each operator must develop a sample schedule best suited to their system. However, until a schedule can be established, we recommend that a sample is taken and sent for analysis, so that a replacement date can be projected with a recommended sampling schedule.
4. To take a sample from the media, utilize the media sampling ports located on the outside of the drum and insert the sampling probe into the media bed.

Open the entry port of the sampling probe, pulling up until the port cover slides open.

Close the sampling probe by pushing down and pour the contents into the plastic sample bag provided by your PURAFIL® representative.

Seal tightly and label the laboratory bag. Use the same label name on the Transmittal Sheet.

Place a label on the media bed to show that a sample was taken from it.

Fill out the PURAFIL® Sample Transmittal and send it with the samples to the local representative or to the Purafil, Inc. laboratory. A replacement sampling kit will be mailed to you.

A sampling record sheet is included with this manual. Record the following data, and file all related reports with the record sheet:

- Date sample taken and mailed
- Results of life analysis as reported by the Purafil Laboratory.

After the Purafil® laboratory has analyzed the sample, a Certificate of Analysis will be sent to you detailing the approximate percentage of total life consumed, and if installation and sampling dates are provided, a projected replacement date will be given for each unit.

The projected replacement dates may be used in updating budget requirements, and as a guide in ordering replacement material; however, since contaminant load is rarely constant, avoid relying too heavily on projected replacement dates.

By maintaining up-to-date records showing the life expenditures of each filter bank, media banks with the greatest percentage of life expended can be replaced before other banks, which have less life expended.

4.3 SPECIAL PRECAUTIONS

Disposal

PURAFIL® media is a non-toxic, non-flammable substance. Filtration of contaminants through PURAFIL® media causes molecular changes to occur, and the resulting product is usually not harmful to the environment. Although special precautions are generally not required when disposing of spent media, government regulations

may require specific disposal procedures if the resulting product could be harmful to the environment. Large quantities of PURAFIL® media should not be disposed of in dumpster-like equipment because the weight of the media could cause difficulties in handling the dumpster.

Independent laboratory analysis for Environmental Protection Agency toxicity characteristics may be required if the contaminants eliminated from your environment include heavy metals and pesticides.

Inhalation

A well-ventilated work area is suggested for changing the PURAFIL® media, as dusting occurs in fresh media due to handling abrasion. Workers should avoid direct inhalation of considerable PURAFIL® dust, as it induces sneezing. In closed, unventilated spaces, dust masks such as the 3-M No. 8500 are suggested.

Water

Avoid exposing the PURAFIL® media to water or precipitation, as this dissolves permanganate content. Storage of media should be in a dry place with less than 95% relative humidity. Exposure of permanganate solution to the skin causes brown staining which is temporary and not harmful. This staining can be removed by washing in a diluted solution of water and sodium bisulfite.

Eye Contact

If dust is exposed to the eyes or delicate membrane, flush thoroughly with water and seek treatment by a physician. Follow normal procedures for exposure to abrasive dust.

4.4 PURAFIL® STAIN REMOVAL

The following stain removal procedure is stated here as information only, and neither Purafil, Inc., any of its subsidiaries, nor any agent or employee of Purafil, Inc. make any warranty or other representation regarding the efficacy or safety of this procedure. The stain removal could cause further damage to the garment or to the item from which one may attempt to remove the stain.

If the dust from PURAFIL® media comes in contact with organic material, there are two possible stain problems:

1. Manganese dioxide (MnO_2) which is insoluble, characterized by a medium brown color, and is found in expended PURAFIL media, can usually be removed by normal washing.
2. New (unused) PURAFIL® media contains potassium permanganate (KMnO_4), which is a strong oxidant and will react with and discolor any organic material with which it comes in contact. These stains, which will be brownish black in color, may be removed using a solution of sodium bisulfite in water, after the garment has been removed from the person.

However, if the fiber has been damaged by the permanganate, removal of the stain may make the damage more apparent.

CAUTION: This procedure should start with a very weak solution, gradually increasing the strength until the stain is removed. Use of too strong a solution could conceivably cause additional fabric damage.

NOTE: Sodium bisulfite gives off sulfur dioxide (SO_2) gas; therefore, it must be used in a well-ventilated area.

5.0 WARRANTY

PURAFIL warrants hardware equipment manufactured by PURAFIL to be free from defects in material and workmanship under normal use and service for one (1) year from shipment date. PURAFIL's obligation under this warranty shall be limited to replacing any parts thereof which shall be demonstrated to have been defective. THIS WARRANTY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

PURAFIL MAKES NO WARRANTIES AS TO MERCHANTABILITY OR AS TO THE FITNESS OF THE MERCHANDISE FOR ANY PARTICULAR USE AND SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECTLY OR INDIRECTLY, ARISING FROM THE USE OF SUCH MERCHANDISE OR FOR CONSEQUENTIAL DAMAGES. No person, firm or corporation is authorized to assume for PURAFIL any other liability in connection with the sale of these goods. Equipment, parts, and material manufactured by others and incorporated in PURAFIL equipment are warranted by PURAFIL ONLY TO THE EXTENT OF THE ORIGINAL MANUFACTURERS LIABILITY TO PURAFIL.

6.0 TROUBLESHOOTING

	SYMPTOM	PROBLEM	CHECKS/REMEDY
Media Bank	Airflow too low	Filters loaded	Replace filters

7.0 SAMPLE RECORD

[illegible]

Represented By

Important Notice

The information contained in this Bulletin reflects the results of various testing and analytical procedures believed by PURAFIL, INC. (a U.S.A. corporation) to be useful indicators of the relative performance of air filtration systems and media. It is intended for use by persons having appropriate scientific and technical knowledge and experience at their own risk. This bulletin does not in any way constitute a representation, warranty, promise, or guarantee by PURAFIL, INC. of the installed performance of PURAFIL® media.

Leighton Contractors Pty Ltd
Australia Trade Coast Sewer Project

Appendix B: Mechanical Drawing

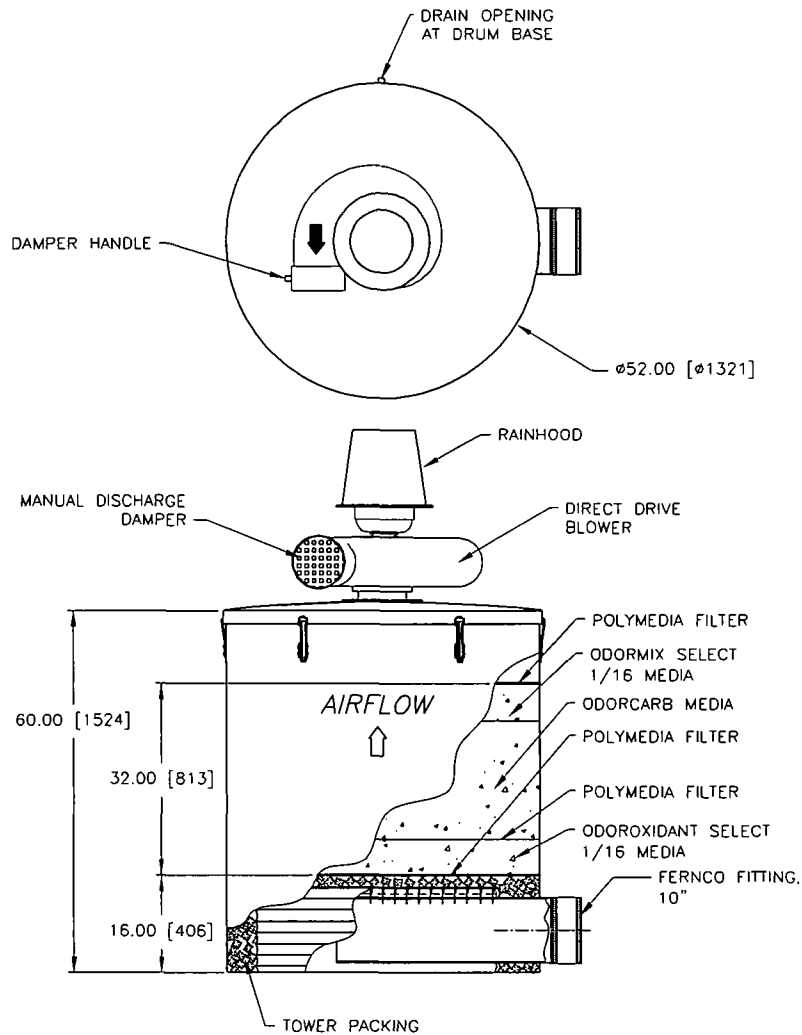
<i>Drawing No.</i>	<i>Description</i>
CC-070104	DS-1000 Drum Scrubber with Blower & Rainhood



Environmental Systems
A Division of Purafil, Inc.
2654 WEAVER WAY
DORAVILLE, GA 30340
(770)662-8545

1000 CFM DRUM SCRUBBER WITH BLOWER & RAINHOOD

JOB/UNIT IDENTIFICATION:



MODEL #:

DS-1000

MATERIAL:

DRUM -
LOW DENSITY POLYETHYLENE

FINISH:

DRUM -
BLACK

ELECTRICAL:

VOLTS	PH	HZ	HP	TYPE
<input type="checkbox"/> (STD) 115/230	<input type="checkbox"/> 1	<input type="checkbox"/> 60	<input type="checkbox"/> 3.0	<input type="checkbox"/> TEFC
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

MAX RECOMMENDED AIRFLOW:

1500 CFM W/2.25 IWG ESP AVAILABLE

MIST ELIMINATOR:

TYPE	QTY	SIZE
<input type="checkbox"/> NONE	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PURAFIL® AIR PURIFICATION MEDIA(S) IN DIRECTION OF AIRFLOW:

MEDIA TYPE	TOTAL MEDIA
<input checked="" type="checkbox"/> ODOROXIDANT SELECT 1/16	400 LB [181 KG]
<input checked="" type="checkbox"/> ODORCARB	945 LB [429 KG]
<input checked="" type="checkbox"/> ODORMIX SELECT 1/16	400 LB [181 KG]

INLET CONNECTION:

☐ 10.0" [254mm] INLET

☐ FOR APPROVAL

☐ FOR INFORMATION

☐ FOR CONSTRUCTION

☐ AS BUILT

DATE:

07/01/04

REV DATE:

APPROXIMATE OPERATING WEIGHT:

1938 LB [879 KG]

APPROVED BY:

AAY/BLG

DRAWING NUMBER:

CC-070104

REVISION:

—

DIMENSIONS ARE IN INCHES. METRIC EQUIVALENTS IN BRACKETS [] ARE IN MILLIMETERS.
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PURAFIL®, PURAFIL II®, PURASORB®, CHLOROSORB®, AND THE SCOOTER® SKUNK EMBLEM (REG. U.S.PAT. & TM OFFICE), PURASTAT®, HEBA-LOCK®,
CORROSIVE-AIRE™, E.S.,™, PURACARB™, PM™ SERIES AND THE DISTINCTIVE SHAPE OF PM™ MODULES ARE TRADEMARKS OF PURAFIL, INC., A U.S.A. CORPORATION.

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Leighton Contractors Pty Ltd
Australia Trade Coast Sewer Project

Appendix C: Material Safety Data Sheets.

<i>No.if applicable</i>	<i>Description</i>
	MSDS Purafil Odorcarb II Media
	MSDS Purafil Odoroxidant Media
	MSDS Purafil Odormix Media

Odorcarb™ II Media MSDS Page 1 of 7
Revision Date: 7/20/2004



MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name (as used on the label): Odorcarb™ II Media

Product Synonyms:

Puracarb II WW, Odorcarb™ II

Supplier Name and Address:

Airepure Australia P/L
64 Geddes Street
MULGRAVE VIC 3170

Contact: 1300 886 353

2. COMPOSITION / INFORMATION ON INGREDIENTS

Preparation Chemical Nature:

The preparation is a combination of both solid base substances as well as liquid impregnants. The combined properties of the preparation are less reactive than the most reactive individual substances listed below.

COMPONENTS

Common Chemical Name	Synonyms	CAS Number	Wt %
Water	dihydrogen oxide	7732-18-5	≤35
aluminum oxide (non-fibrous)	activated aluminas; activated and amorphous aluminas	1333-84-2*	≤32
proprietary ingredient	—	—	≤32
activated carbon	carbon; carbon, activated	7440-44-0	≤32
potassium hydroxide	caustic potash, liquid	1310-58-3	>5

*For TSCA inventory reporting purposes, CAS No. 1344-28-1 was assigned for all forms of aluminum oxide instead of the CAS No. 1333-84-2 as indicated above.

3. HAZARDS IDENTIFICATION

Most Important Hazards:

- If crushed or handled extensively, dust may evolve and can be irritating to the eyes, skin, and respiratory tract.
- Wet activated carbon removes oxygen from the air causing severe hazards for workers in enclosed spaces. The product is by no means one hundred percent activated carbon, but it may have the potential to act as described above. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal regulations.
- Solutions of this product may be caustic due to high pH.

Adverse Human Health Effects:

- The following medical conditions may be aggravated by exposure to the product: asthma, chronic lung disease, and skin rashes.
- In solution, this product may produce a basic (caustic) solution and similar precautions should be taken as those for basic (caustic) solutions when such a solution is produced.

Environmental Effects:

If contacted by water, the active ingredients may produce a basic solution depending on amounts of media and water. If such a solution is produced, the pH should be checked and kept within local regulations by buffering with suitable neutral or acidic agent.

Emergency Overview:

Inhalation: Move to fresh air. If breathing difficulty occurs or persists, seek medical attention.

Skin Contact: Wash area with soap and water.

Eye Contact: Flush with large quantities of water for 15 minutes. Seek medical attention.

Ingestion: Seek medical attention.

4. FIRST-AID MEASURES

First aid measures should be taken as indicated below for the following routes of exposure.

Inhalation:

Move to fresh air. If breathing difficulty occurs or persists, seek medical attention.

Skin Contact: Wash area with soap and water.

Eye Contact: Flush with large quantities of water for 15 minutes. Seek medical attention.

Ingestion: Seek medical attention.

Notes to Physician:

Treatment is recommended to be symptomatic and supportive. If patient has been exposed to this product in solution, the solution may be basic (caustic), treat the affected person appropriately.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

If involved in a fire, flood with plenty of water.

Specific Hazards:

When involved in a fire, the dilute potassium hydroxide may liberate hydrogen and the solid base materials may liberate carbon monoxide.

Protection of Firefighters:

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Protective clothing appropriate for the environment should be worn. Goggles or safety glasses with side shields, NIOSH approved dust masks, rubber or plastic gloves, and full cover clothing covering arms and legs are recommended.

Environmental Precautions:

See section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

Methods for Cleaning Up:

Clean up using dry procedures (broom, shovel, etc.); avoid dusting.

Recovery:

Product may be recovered for use if it has not come in contact with liquid, changed color, or been exposed to significant amounts of gaseous contaminants.

Neutralization:

See section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

Disposal: See section 13. **DISPOSAL CONSIDERATIONS.**

7. HANDLING AND STORAGE

Handling:

Use air conveying (vacuum) for bulk removal. If manual handling is used for transfer (from vessel, slingbags, boxes, or pails), use mechanical ventilation or other measures to remove airborne dust.

Technical Measures:

The following precautions should be taken when handling the product.

Prevention of User Exposure:

Goggles or safety glasses with side shields are recommended.

NIOSH approved dust masks are recommended.

Rubber or plastic gloves are recommended.

Full cover clothing covering arms and legs is recommended.

Precautions for Safe Handling:

- Wet activated carbon removes oxygen from the air causing severe hazards for workers in enclosed spaces. The product is by no means one hundred percent activated carbon, but it may have the potential to act as described above. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal regulations.
- Avoid crushing the product to keep dusting to a minimum. As described under **Handling** above, mechanical ventilation or other measures may be needed to remove airborne dust.
- Protect from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Storage:

General good storage practices should be followed.

Storage Conditions:

The following storage conditions should be maintained.

Suitable Conditions:

Store in a cool, dry area and keep in original, closed containers.

Incompatible Products:

Product should be kept protected from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Packaging Materials:

The following materials are used and should be used for packaging of the product. These are intended to keep contaminants away from the product.

Recommended Materials:

- Corrugated boxes of 350 lb, double wall quality, with 4 mm plastic liners.
- Injection molded, polystyrene pails and lids including a neoprene seal.

Not Suitable Materials:

Porous materials allowing contact with water, air, and the contaminants contained therein.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures:

Minimize eye and skin contact by using appropriate protective equipment. Use local or general room ventilation to control airborne dust that may be generated.

Personal Protective Equipment:

The following recommendations are made for appropriate personal protective equipment for the following.

Respiratory Protection: NIOSH approved dust mask

Hand Protection: Rubber or plastic gloves

Eye Protection: Goggles or safety glasses with side shields

Skin and Body Protection: Full cover clothing covering arms and legs.

Hygiene Measures: Do not inhale dust and avoid contact with eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid

Form: Spherical pellets approximately 1.5 – 6.4 mm (1/16 – 1/4 in.) in diameter

Color: Black

Odor: No significant odor

PH: Not relevant

Temperature of Physical State Change: Not relevant

Flashpoint: Not relevant

Ignition Temperature: >300°C (572°F)⁽¹⁾

Bulk Density: 0.721 g/cc (45 lb/ft³)

Solubility: Insoluble

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions.

Hazardous Reactions: none known

Materials to Avoid:

Protect from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Hazardous Decomposition Products:

When involved in a fire, the dilute potassium hydroxide may liberate hydrogen and the solid base materials may liberate carbon monoxide.

Intended Use and Foreseeable Misuse:

Intended use is for air purification from gaseous contaminants. The product is not intended to remove dangerous particulates or biological contaminants. Other media/systems would be required for those. The product is not intended to purify water.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: Expected to be low^[2], not tested

Local Effects:

See section 3. **HAZARDS IDENTIFICATION, Adverse Human Health Effects.**

Sensitization:

Primary skin irritation and corrosivity (rabbits): expected to be low^[2], not tested

Eye irritation (rabbits): expected to be an irritant^[2], not tested

Primary Route of Entry: Inhalation, ingestion, skin contact, eye contact

12. ECOLOGICAL INFORMATION

Not determined. See Section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

13. DISPOSAL CONSIDERATIONS

Waste From Residues:

New product (media) can generally be disposed of in a landfill. Spent media that has removed toxic chemicals should be examined for specific hazards. Local regulations should always be consulted and followed.

Contaminated Packaging: Not relevant

14. TRANSPORT INFORMATION

International Regulations:

Odorcarb II media contains approximately 30% (by weight) activated carbon, which is produced by a steam activation process. Because of this Odorcarb II is not subject to the provisions of the International Dangerous Goods Code (IMDG) or the labeling and packaging requirements of International Maritime Organization (IMO) Class 4.2.

Proper Shipping Name: Not Applicable

15. REGULATORY INFORMATION

Regulations:

This section contains information specifically applicable to the chemical product relative to the following regulations. Local regulations should always be consulted and followed.

SARA Title III (Superfund Amendments and Reauthorization Act)

Section 302 Extremely Hazardous Substances (40CFR355): Not Listed

Section 312 Hazard Categories (40CFR370.2):

Only expected as Acute (eye irritant), see section 11 **TOXICOLOGICAL INFORMATION**

Section 313 Reportable Ingredients (40CFR372): None listed.

16. OTHER INFORMATION

Disclaimer:

The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones, which exist. Purafil, Inc. makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. The user has sole responsibility to determine the suitability of the material for any use and the manner of use contemplated.

^[1] According to ASTM D 3466-76 - Standard Test Method for Ignition Temperature of Granular Activated Carbon.

^[2] According to methods described in US Government Document 29CFR1910.1200.

Odoroxidant™ Media MSDS Page 1 of 7
Revision Date: 4/9/2004



MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name (as used on the label): Odoroxidant™ Media

Product Synonyms:

Odoroxidant™ Select Media

Supplier Name and Address:

Airepure Australia P/L
64 Geddes Street
MULGRAVE VIC 3170

Contact: 1300 886 353

2. COMPOSITION / INFORMATION ON INGREDIENTS

Preparation Chemical Nature:

The preparation is a combination of both solid base substances as well as liquid impregnants. The combined properties of the preparation are less reactive than the most reactive individual substances listed below.

COMPONENTS

Common Chemical Name	Synonyms	CAS Number	Wt %
aluminum oxide (non-fibrous)	activated aluminas; activated and amorphous aluminas	1333-84-2*	≤64
Water	dihydrogen oxide	7732-18-5	≤35
proprietary ingredient	--	--	≤24
potassium permanganate	permanganate of potash; chameleon mineral; permanganic acid, potassium salt	7722-64-7	≥8

*For TSCA inventory reporting purposes, CAS No. 1344-28-1 was assigned for all forms of aluminum oxide instead of the CAS No. 1333-84-2 as indicated above.

3. HAZARDS IDENTIFICATION

Most Important Hazards:

If crushed or handled extensively, dust may evolve and can be irritating to the eyes or respiratory tract.

Adverse Human Health Effects:

- The following medical conditions may be aggravated by exposure to the product: asthma, chronic lung disease, and skin rashes.
- If the product contacts the skin with water, it may leave a stain of insoluble products on the skin. This stain will be washed away/rubbed off over a period of time (hours to days).

Environmental Effects:

If the product is contacted by water, some of the potassium permanganate may leach out and the water may turn pink to purple in color. Sodium bisulfite will clarify the water (by chemical reduction), but will give off sulfur dioxide and should only be used in well ventilated areas. Local regulations should always be consulted and followed.

Emergency Overview:

Inhalation: Move to fresh air. If breathing difficulty occurs or persists, seek medical attention.

Skin Contact: Wash area with large quantities of water.

Eye Contact: Flush with large quantities of water. Seek medical attention.

Ingestion: Seek medical attention.

4. FIRST-AID MEASURES

First aid measures should be taken as indicated below for the following routes of exposure.

Inhalation:

Move to fresh air. If breathing difficulty occurs or persists, seek medical attention.

Skin Contact: Wash area with large quantities of water.

Eye Contact: Flush with large quantities of water. Seek medical attention.

Ingestion: Seek medical attention.

Notes to Physician:

Product is expected to be non-toxic and is classified as an eye irritant in the powder form.

Treatment is recommended to be symptomatic and supportive.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

The product is UL Classified Class 1 (when clean does not contribute fuel when attacked by flame and emits only negligible amounts of smoke). Use fire fighting measures that suit the environment.

Specific Hazards:

When involved in a fire, the dilute potassium permanganate may liberate corrosive fumes.

Protection of Firefighters:

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Protective clothing appropriate for the environment should be worn. Goggles or safety glasses with side shields, NIOSH approved dust masks, rubber or plastic gloves, and full cover clothing covering arms and legs are recommended.

Environmental Precautions:

See section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

Methods for Cleaning Up:

Clean up using dry procedures (broom, shovel, etc.); avoid dusting.

Recovery:

Product may be recovered for use if it has not come in contact with liquid, changed color, or been exposed to significant amounts of gaseous contaminants.

Neutralization:

See section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

Disposal: See section 13. **DISPOSAL CONSIDERATIONS.**

7. HANDLING AND STORAGE

Handling:

Use air conveying (vacuum) for bulk removal. If manual handling is used for transfer (from vessel, slingbags, boxes, or pails), use mechanical ventilation or other measures to remove airborne dust.

Technical Measures:

The following precautions should be taken when handling the product.

Prevention of User Exposure:

Goggles or safety glasses with side shields are recommended.

NIOSH approved dust masks are recommended.

Rubber or plastic gloves are recommended.

Full cover clothing covering arms and legs is recommended.

Precautions for Safe Handling:

- Avoid crushing the product to keep dusting to a minimum. As described under **Handling** above, mechanical ventilation or other measures may be needed to remove airborne dust.
- Protect from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Storage:

General good storage practices should be followed.

Storage Conditions:

The following storage conditions should be maintained.

Suitable Conditions:

Store in a cool, dry area and keep in original, closed containers.

Incompatible Products:

Product should be kept protected from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Packaging Materials:

The following materials are used and should be used for packaging of the product. These are intended to keep contaminants away from the product.

Recommended Materials:

- Corrugated boxes of 350 lb, double wall quality, with 4 mm plastic liners.
- Injection molded, polystyrene pails and lids including a neoprene seal.

Not Suitable Materials:

Porous materials allowing contact with water, air, and the contaminants contained therein.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures:

Minimize eye and skin contact by using appropriate protective equipment. Use local or general room ventilation to control airborne dust that may be generated.

Personal Protective Equipment:

The following recommendations are made for appropriate personal protective equipment for the following.

Respiratory Protection: NIOSH approved dust mask

Hand Protection: Rubber or plastic gloves

Eye Protection: Goggles or safety glasses with side shields

Skin and Body Protection: Full cover clothing covering arms and legs.

Hygiene Measures: Do not inhale dust and avoid contact with eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid

Form: Spherical pellets approximately 1.5 – 6.4 mm (1/16 – 1/4 in.) in diameter

Color: Purple

Odor: No significant odor

Ph: Not relevant

Temperature of Physical State Change: Not relevant

Flashpoint: Not relevant

Bulk Density: 0.800 g/cc (50 lb/ft³)

Solubility: Partially soluble in water. Will dissolve in concentrated acids and alkalis.

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions

Hazardous Reactions:

Reactions with gaseous hydrogen chloride or vinyl chloride may produce chlorine. For these applications, the media should be combined with other media for the removal of chlorine gas.

Materials to Avoid:

Protect from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Hazardous Decomposition Products:

When involved in a fire, the dilute potassium permanganate may liberate corrosive fumes.

Intended Use and Foreseeable Misuse:

Intended use is for air purification from gaseous contaminants. The product is not intended to remove dangerous particulates or biological contaminants. Other media/systems would be required for those. The product is not intended to purify water.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: Expected to be non-toxic^[1], not tested

Local Effects:

See section 3. **HAZARDS IDENTIFICATION, Adverse Human Health Effects.**

Sensitization:

Primary skin irritation and corrosivity (rabbits): expected to be non-irritant^[1], not tested

Eye irritation (rabbits): irritant^[1]

Primary Route of Entry: Inhalation, ingestion, skin contact, eye contact

12. ECOLOGICAL INFORMATION

Not determined. See Section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

13. DISPOSAL CONSIDERATIONS

Waste From Residues:

New product (media) can generally be disposed of in a landfill. Spent media that has removed toxic chemicals should be examined for specific hazards. Local regulations should always be consulted and followed.

Contaminated Packaging: Not relevant

14. TRANSPORT INFORMATION

International Regulations: Not Applicable

Proper Shipping Name: Not Applicable

15. REGULATORY INFORMATION

Regulations:

This section contains information specifically applicable to the chemical product relative to the following regulations. Local regulations should always be consulted and followed.

SARA Title III (Superfund Amendments and Reauthorization Act)

Section 302 Extremely Hazardous Substances (40CFR355): Not listed

Section 312 Hazard Categories (40CFR370.2):

Only expected as Acute (eye irritant), see section 11 **TOXICOLOGICAL INFORMATION.**

Section 313 Reportable Ingredients (40CFR372):

The potassium permanganate portion of the media contains a high percentage (~97%) Manganese Compound as a part of the chemical structure (manganese compounds CAS Reg. No. N/A) and is subject to the reporting requirements of Section 313 of Title III, Superfund Amendments and Reauthorization Act of 1986 and 40CFR372.

16. OTHER INFORMATION

Disclaimer:

The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones, which exist. Purafil, Inc. makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. The user has sole responsibility to determine the suitability of the material for any use and the manner of use contemplated.

^[1] According to methods described in US Government Document 29CFR1910.1200.

**MATERIAL SAFETY DATA SHEET****1. PRODUCT AND COMPANY IDENTIFICATION****Product Name (as used on the label): Odormix™ Media****Supplier Name and Address:**

Airepure Australia P/L
64 Geddes Street
MULGRAVE VIC 3170

Contact: 1300 886 353**2. COMPOSITION / INFORMATION ON INGREDIENTS****Preparation Chemical Nature:**

The preparation is a combination of both solid base substances as well as liquid impregnants. The combined properties of the preparation are less reactive than the most reactive individual substances listed below.

COMPONENTS

Common Chemical Name	Synonyms	CAS Number	Wt %
aluminum oxide (non-fibrous)	activated aluminas; activated and amorphous aluminas	1333-84-2*	≤40
activated carbon	carbon; carbon, activated	7440-44-0	≥32
Water	dihydrogen oxide	7732-18-5	≤24
proprietary ingredient	--	--	≤15
potassium permanganate	permanganate of potash; chameleon mineral; permanganic acid, potassium salt	7722-64-7	≥5
Ash	--	--	≥5

*For TSCA inventory reporting purposes, CAS No. 1344-28-1 was assigned for all forms of aluminum oxide instead of the CAS No. 1333-84-2 as indicated above.

3. HAZARDS IDENTIFICATION

Most Important Hazards:

- If crushed or handled extensively, dust may evolve and can be irritating to the eyes or respiratory tract.
- Wet activated carbon removes oxygen from the air causing severe hazards for workers in enclosed spaces. The product is by no means 100% activated carbon, but it may have the potential to act as described above. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal regulations.

Adverse Human Health Effects:

- The following medical conditions may be aggravated by exposure to the product: asthma, chronic lung disease, and skin rashes.
- If the product contacts the skin with water, it may leave a stain of insoluble products on the skin. This stain will be washed away/rubbed off over a period of time (hours to days).

Environmental Effects:

If the product is contacted by water, some of the potassium permanganate may leach out and the water may turn pink to purple in color. Sodium bisulfite will clarify the water (by chemical reduction), but will give off sulfur dioxide and should only be used in well ventilated areas. Local regulations should always be consulted and followed.

Emergency Overview:

Inhalation: Move to fresh air. If breathing difficulty occurs or persists, seek medical attention.

Skin Contact: Wash area with soap and water.

Eye Contact: Flush with large quantities of water for 15 minutes. Seek medical attention.

Ingestion: Seek medical attention.

4. FIRST-AID MEASURES

First aid measures should be taken as indicated below for the following routes of exposure.

Inhalation:

Move to fresh air. If breathing difficulty occurs or persists, seek medical attention.

Skin Contact: Wash area with soap and water.

Eye Contact: Flush with large quantities of water for 15 minutes. Seek medical attention.

Ingestion: Seek medical attention.

Notes to Physician:

Product is expected to be non-toxic and only an eye irritant in the powder form. Treatment is recommended to be symptomatic and supportive.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

The product is UL Classified Class 1 (when clean does not contribute fuel when attacked by flame and emits only negligible amounts of smoke). Use fire fighting measures that suit the environment.

Specific Hazards:

When involved in a fire, the dilute potassium permanganate may liberate corrosive fumes and the solid base materials may liberate carbon monoxide.

Protection of Firefighters:

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Protective clothing appropriate for the environment should be worn. Goggles or safety glasses with side shields, NIOSH approved dust masks, rubber or plastic gloves, and full cover clothing covering arms and legs are recommended.

Environmental Precautions:

See section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

Methods for Cleaning Up:

Clean up using dry procedures (broom, shovel, etc.); avoid dusting.

Recovery:

Product may be recovered for use if it has not come in contact with liquid, changed color, or been exposed to significant amounts of gaseous contaminants.

Neutralization:

See section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

Disposal: See section 13. **DISPOSAL CONSIDERATIONS.**

7. HANDLING AND STORAGE

Handling:

Use air conveying (vacuum) for bulk removal. If manual handling is used for transfer (from vessel, slingbags, boxes, or pails), use mechanical ventilation or other measures to remove airborne dust.

Technical Measures:

The following precautions should be taken when handling the product.

Prevention of User Exposure:

Goggles or safety glasses with side shields are recommended.

NIOSH approved dust masks are recommended.

Rubber or plastic gloves are recommended.

Full cover clothing covering arms and legs is recommended.

Precautions for Safe Handling:

- Wet activated carbon removes oxygen from the air causing severe hazards for workers in enclosed spaces. The product is by no means 100% activated carbon, but it may have the potential to act as described above. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal regulations.
- Avoid crushing the product to keep dusting to a minimum. As described under **Handling** above, mechanical ventilation or other measures may be needed to remove airborne dust.
- Protect from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.

Safe Handling Advice:

Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, permanganates, peroxides, etc. may result in generation of heat.

Storage:

General good storage practices should be followed.

Storage Conditions:

The following storage conditions should be maintained.

Suitable Conditions:

Store in a cool, dry area and keep in original, closed containers.

Incompatible Products:

- Product should be kept protected from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.
- Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, permanganates, peroxides, etc. may result in generation of heat.

Packaging Materials:

The following materials are used and should be used for packaging of the product. These are intended to keep contaminants away from the product.

Recommended Materials:

- Corrugated boxes of 350 lb, double wall quality, with 4 mm plastic liners.
- Injection molded, polystyrene pails and lids including a neoprene seal.

Not Suitable Materials:

Porous materials allowing contact with water, air, and the contaminants contained therein.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures:

Minimize eye and skin contact by using appropriate protective equipment. Use local or general room ventilation to control airborne dust that may be generated.

Personal Protective Equipment:

The following recommendations are made for appropriate personal protective equipment for the following.

Respiratory Protection: NIOSH approved dust mask
Hand Protection: Rubber or plastic gloves
Eye Protection: Goggles or safety glasses with side shields
Skin and Body Protection: Full cover clothing covering arms and legs.

Hygiene Measures: Do not inhale dust and avoid contact with eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid

Form:

Spherical and cylindrical pellets approximately 1.5 – 6.4 mm (1/16 – 1/4 in.) in diameter

Color: Purple and black

Odor: No significant odor

PH: Not relevant

Temperature of Physical State Change: Not relevant

Flashpoint: Not relevant

Bulk Density: 0.640 g/cc (40 lb/ft³)

Solubility: Partially soluble in water and more soluble in concentrated acids and alkalies

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions

Hazardous Reactions: None known

Materials to Avoid:

- Protect from water and exposure to contaminated air (gaseous, particulate, and aerosol contaminated), otherwise the product may be rendered useless.
- Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, permanganates, peroxides, etc. may result in generation of heat.

Hazardous Decomposition Products:

When involved in a fire, the dilute potassium permanganate may liberate corrosive fumes and the solid base materials may liberate carbon monoxide.

Intended Use and Foreseeable Misuse:

Intended use is for air purification from gaseous contaminants. The product is not intended to remove dangerous particulates or biological contaminants. Other media/systems would be required for those. The product is not intended to purify water.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: Expected to be non-toxic^[1], not tested

Local Effects:

See section 3. **HAZARDS IDENTIFICATION, Adverse Human Health Effects.**

Sensitization:

Primary skin irritation and corrosivity (rabbits): expected to be non-irritant^[1], not tested
Eye irritation (rabbits): irritant^[1]

Primary Route of Entry: Inhalation, ingestion, skin contact, eye contact

12. ECOLOGICAL INFORMATION

Not determined. See Section 3. **HAZARDS IDENTIFICATION, Environmental Effects.**

13. DISPOSAL CONSIDERATIONS

Waste From Residues:

New product (media) can generally be disposed of in a landfill. Spent media that has removed toxic chemicals should be examined for specific hazards. Local regulations should always be consulted and followed.

Contaminated Packaging: Not relevant

14. TRANSPORT INFORMATION

International Regulations: Not Applicable

Proper Shipping Name: Not applicable

15. REGULATORY INFORMATION

Regulations:

This section contains information specifically applicable to the chemical product relative to the following regulations. Local regulations should always be consulted and followed.

SARA Title III (Superfund Amendments and Reauthorization Act)

Section 302 Extremely Hazardous Substances (40CFR355): Not listed

Section 312 Hazard Categories (40CFR370.2):

Only expected as Acute (eye irritant), see section 11 TOXICOLOGICAL INFORMATION

Section 313 Reportable Ingredients (40CFR372):

The potassium permanganate portion of the media contains a high percentage (~97%) Manganese Compound as a part of the chemical structure (manganese compounds CAS Reg. No. N/A) and is subject to the reporting requirements of Section 313 of Title III, Superfund Amendments and Reauthorization Act of 1986 and 40CFR372.

16. OTHER INFORMATION

Disclaimer:

The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones, which exist. Purafil, Inc. makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. The user has sole responsibility to determine the suitability of the material for any use and the manner of use contemplated.

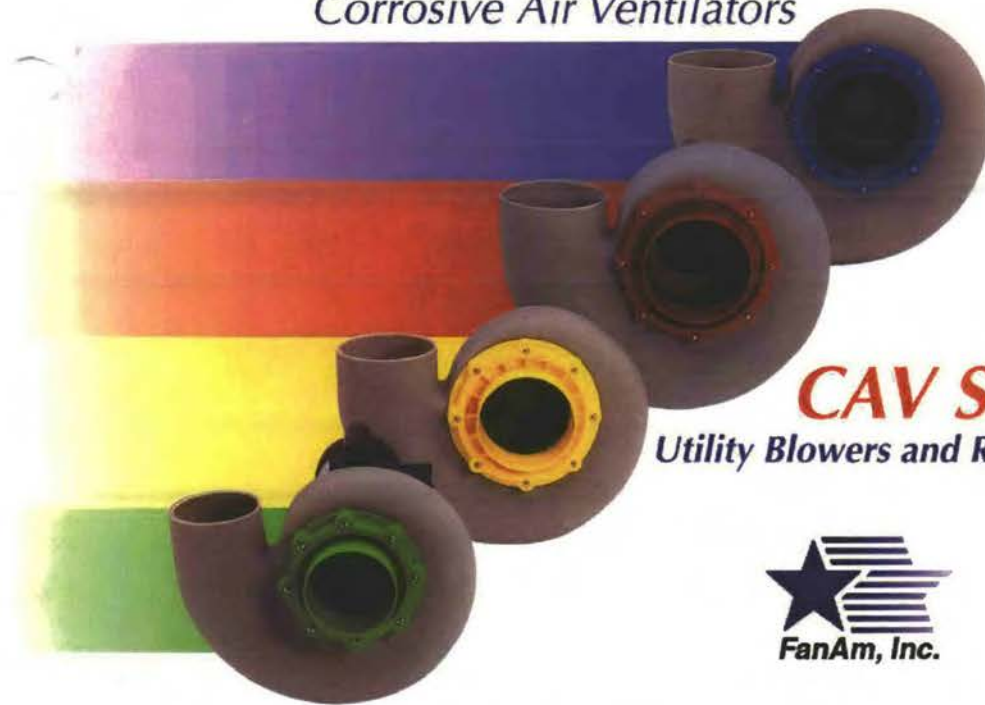
^[1] According to methods described in US Government Document 29CFR1910.1200.

Leighton Contractors Pty Ltd
Australia Trade Coast Sewer Project

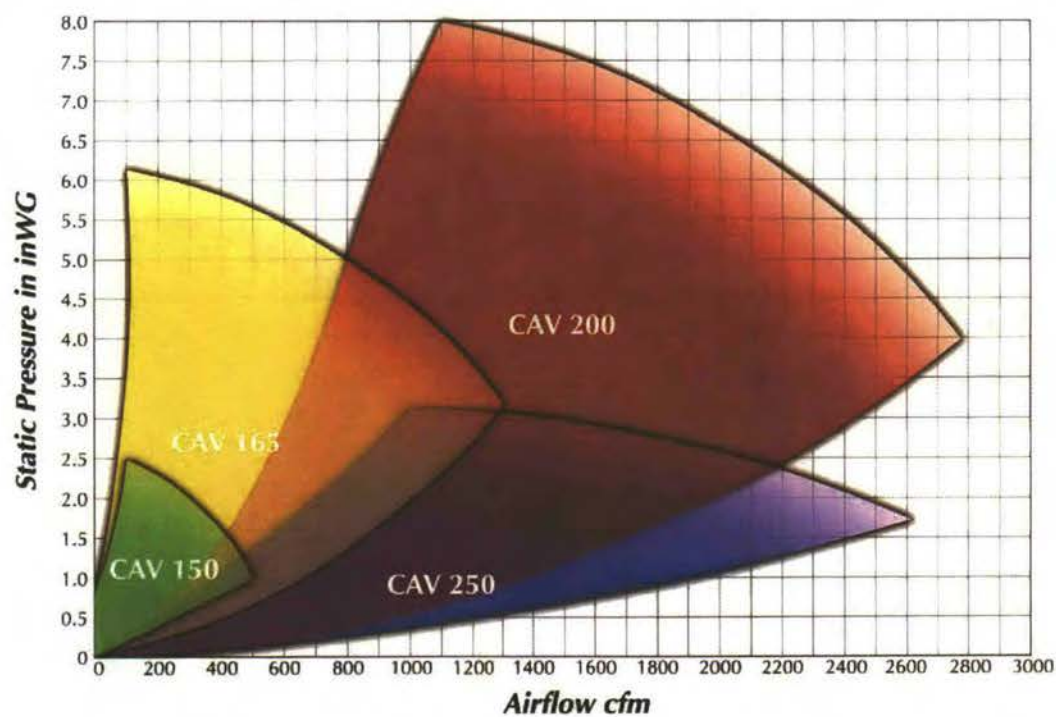
Appendix D: Manufacturers Information.

<i>No.if applicable</i>	<i>Description</i>
	Blower – CAV Series
	VSD Drive – Danfoss model VLT - 6004
	Rittal Enclosure Model No. 1057600

Corrosive Air Ventilators



CAV Series Utility Blowers and Roof Units



CORROSIVE AIR VENTILATOR

CAV Series Fans

The CAV Series is designed to work in corrosive air applications and is built with a combination of features to provide optimum protection for all exposed parts in the air stream. The CAV is shipped fully assembled for ease of installation. The Housings are fabricated from strong high density rotomolded polypropylene for complete corrosion protection. The inlet and outlet are designed for easy duct installation. The Impellers and Motor Shaft Bushings are constructed of injection molded polypropylene. Impellers are both electronically and dynamically balanced for best performance. The Shaft Hub Cap provides minimal exposure to the motor shaft portion extended into the air stream.

Motors

The motors are mounted outside the air stream for maximum protection from dirty air. Ball bearings are sealed and permanently lubricated, providing for a long life and maintenance free operation. Stainless steel shafts are standard on some models with 115/208-240VAC/1/60Hz. Other motor options are available in 3 phase and optional Explosion-Proof motors. For other special requirements, contact Fan America, Inc. (See performance charts).

Environmental

Environmental operation, for polypropylene casing recommended up to 165°F (70°C).

Motor Support Stand

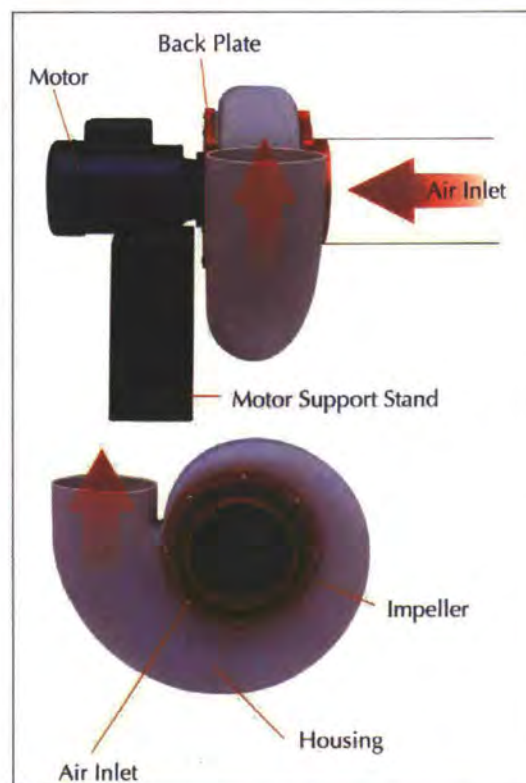
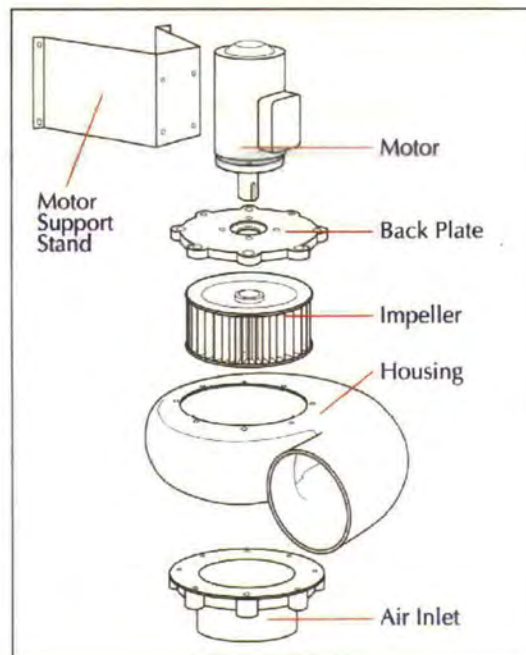
The Motor Support Stand provides rigid support for the motor and fan housing assembly. The stand is made of galvanized sheet steel and painted for extra protection. See accessories for optional polypropylene motor protection Pedestal Stand.

Accessories

Accessories are fabricated from corrosive resistant materials and include a variety of dampers, guards, connectors and etc.

Suitable for many applications...

- Plating
- Anodizing
- Fume Handling
- Lab Hood Exhaust
- Commercial Dishwasher Exhaust
- Equipment Room Exhaust or Supply
- Equipment Ventilation or Cooling



SUBMITTAL DATA – CAV SERIES

Description

Centrifugal type ventilators suitable for operation in corrosive applications including plating, anodizing, fume handling, lab hood exhaust, commercial washer/scrubber exhaust, etc. All structural parts are made of polypropylene and mounting hardware is stainless steel. CAV units are shipped assembled and may be adjusted to any of 8 standard discharge positions. CAV units can be supplied with optional equipment including explosion proof motors for Class 1 Group D atmospheres, corrosive resistant accessories, single and 3 phase power, as well as various RPM motors.

Specifications

Supply, exhaust or return air fans shall be of the direct drive utility fan type, AMCA arrangement 4 with single width, single inlet housing in CCW rotation as specified. CW rotation may be available in some models.

Construction

Housing shall be constructed of strong high density polypropylene with no air leakage and shall be field rotatable to any of the 8 standard discharge positions. Motor support stand shall be constructed of 14 gauge galvanized steel with painted finish and added foot support to prevent vibration and rigidly support motor and wheel operation. All fan mounting hardware shall be stainless steel. Optional motor support stand constructed of polypropylene shall be provided as specified. Fan wheel shall be forward curved type and constructed of polypropylene with uniformly molded blades. Fan wheel shall be suitable for RPM of up to 3450, on models CAV 150, 165, and 200, and up to 1725 on model CAV 250. The fan wheel shall be supplied with a motor shaft bushing and hub cap constructed of polypropylene. Wheels shall be electronically and dynamically balanced. Wheel inlet and housing inlet cone shall be carefully matched for maximum performance and operating efficiency.

The motor shall be of heavy duty ball bearing type rated for continuous duty with voltage as specified. Models may be specified with stainless steel shaft. Motors are to be totally enclosed fan cooled (TEFC) with auto Thermal Overload Protection (TOP) unless otherwise specified. Motor horsepower shall be matched to the fan load. Motor shall be UL or CSA listed for safety. Motor supplied shall be of the high efficiency explosion proof type when specified.

Performance

Fan performance shall be based on tests conducted in accordance with AMCA standard 210-85.

Niche CAV Series Fans shall be manufactured under the authority of Fan America, Inc., Sarasota, Florida.

PROJECT								ARCHITECT			
CONTRACTOR			DATE		SUBMITTED BY			ENGINEER			
SPECIFICATION											
FAN POS.	MODEL NO.	CFM	IN. WG.	RPM	WATTS HP	AMPS	DB(A)	SONES	QTY.	OPTIONAL EQUIPMENT	

WARNING! DO NOT use in **HAZARDOUS ENVIRONMENTS** where fan's electrical system could provide ignition to combustible or flammable materials unless it is specifically built for hazardous environments. FAN AMERICA, INC. reserves the right to substitute material or change product specification.



CAV 150



CAV 165



CAV 200



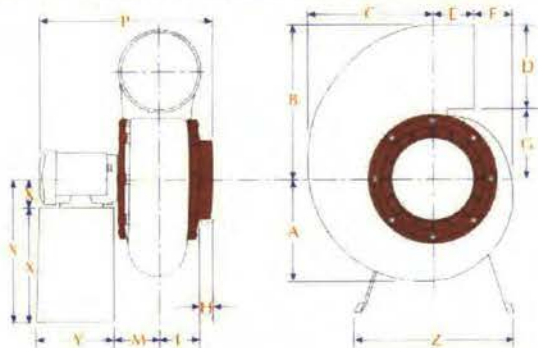
CAV 250

Performance & Dimensions

Niche CAV200 Utility Blower



Dimensional Data



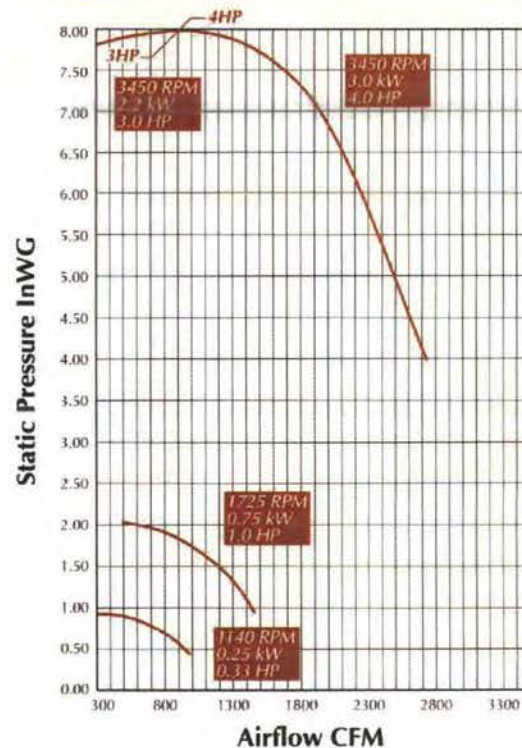
A	9.92	F	3.68	P	16.25	
B	14.6	G	6.6	Y	6.0	
C	12.4	H	1.4	Z	11.5	
D	8.0	L	3.8	X	14.75	
E	4.12	M	4.2	X ₁	3.25	
All dimensions in inches					X ₂	20.75

Notes

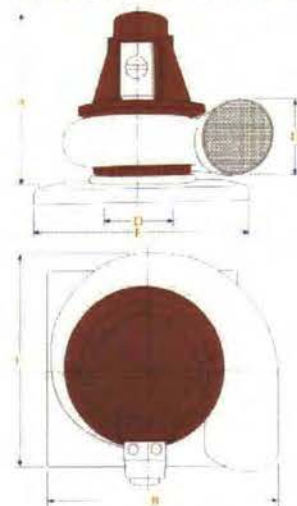
- Dimensions for P, X, and X₂ will vary depending upon motor selection.
- For **Weather Protection** see accessory "Enclosed Pedestal", pictured at right



2235 6th Street
Sarasota, FL 34237
Tel. (941) 865-9788
Toll Free. (800) 838-4074
Fax. (941) 865-9733
Email: info@fanam.com
Web: www.fanam.com



Dimensional Data Roof Unit



A	20.0
B	25.6
C	23.6
D	8.0
E	21.9 x 21.9 <small>unbracketed</small>
All dimensions in inches	

BRISBANE CITY COUNCIL
Brisbane Water
SP300 - Serpentine Road

Q1112-WC-001

Leighton Contractors Pty Ltd.

Installation, Operation and Maintenance Manual

SP300 Serpentine Road Pump Station

Prepared By Style Industries

Contract No. Q1112-WC-001

Job Reference: 9835C

Draft

19 May 2005

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BRISBANE CITY COUNCIL
Brisbane Water
SP300 - Serpentine Road

Q1112-WC-001

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Brisbane Water
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Part 1 Introduction and Background Information

1 Introduction

These instructions contain information for the installation, operation and maintenance of your mechanical equipment supplied by Style Industries.

When properly installed and maintained, this equipment will provide trouble free operation for a long period of time. These instructions are issued as a guide to correct procedures to be followed, and must be carried out to maximise the effectiveness and life of the equipment.

For replacement equipment, spare parts or service, please contact our office and quote the equipment details and Style Industries Job No 9835C.

Telephone: 07 37105200
Fax: 07 32791828
Email: pumps@styleindustries.com.au

Delivery Address: 7 Forge Close
Sumner Park QLD 4074

Postal Address: PO Box 3081
Darra QLD 4076

Works under this contract comprise of supply and installation and pressure testing of a submersible pump station and rising main.

Scope of Works includes:

- Installation of two (2) dry-well submersible pumps.
- Supply and installation of new discharge pipework, valves and fittings
- Supply and installation of one (1) submersible sump pump
- Supply and installation of two (2) davit lifting arms
- Supply and installation of one (1) ventilation fan

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Brisbane Water
SP300 - Serpentine Road

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2 Description of Equipment and Process

Major equipment supplied under this contract includes:

- Metal seated sluice valves
- Knifegate valve
- Check valves
- Discharge pipework and fittings
- Sump pumps and associated pipework
- Ventilation fan
- Davit lifting arms

Part 2 Installation and Commissioning

3 Installation and Pre-commissioning Procedure

3.1 Installation Process

The two through-wall pipes (Item 9) were installed prior to the commencement of Style Industries' works, and thus became the starting point for the assembly of pipework. Starting at the flanges of the through-wall pipe within the dry well and working towards the pumps, each item of pipework on the discharge side of the pumps can be progressively assembled in succession, ensuring that all pipework remains level and all flange faces are correctly aligned.

The suction pipework assemblies can be pre-assembled, with the exception of the non-thrust dismantling joints (Item 32) and the special mild steel tapers (Item 3). The assembly can be lowered into the dry well and steadily shifted through the dry-well/ wet-well dividing wall allowing enough space between the flange of the metal seated sluice valve and the pump suction flange, to insert the special mild steel taper and non-thrust dismantling joint. Once Items 3 and 32 have been installed, the suction pipework assembly can be adjusted to the correct positioning for the non-thrust dismantling joint to be bolted to the flange of the metal seated sluice valve.

Rubber insertion gaskets are to be inserted between all mating flanges and nuts and bolts tightened in the star pattern to the specified torque setting, according to the Water Services Specification (Table 2, Section 5 of WS-SPEC : 2000).

3.2 Pre-Commissioning Test Procedures

All torque settings on the nuts and bolts are to be confirmed prior to the pressure testing of the pipework, as per Table 2, Section 5 of WS-SPEC : 2000.

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Brisbane Water
SP300 - Serpentine Road

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4 Commissioning Procedure

The pipework is to be filled with water, allowing the venting of any trapped air. The water pressure will be allowed to steadily rise to between 600kPa and 650kPa and be held for 15 minutes. The pressure is to be monitored throughout the holding time and any pressure drop noted. If any leaks are discovered, the pressure test is to discontinue, and the cause of the leak determined and rectified, prior to any further re-tests.

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Part 3 Appropriate Records

5 Inspection and Test Plans

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BRISBANE CITY COUNCIL
Brisbane Water
SP300 - Serpentine RoadAUSTRALIAN TRADE COAST PROJECT
STYLE INDUSTRIES - ITP
LEIGHTON J/N Q1112

DOCUMENT NUMBER: 9835c - ITP		INSPECTION AND TEST PLAN		B.W C/N : 30137-02/03 LEIGHTON J/N : Q1112			BRISBANE WATER AUSTRALIA TRADE COAST SEWERAGE PROJECT					
SEQ NO	ITEM / DESCRIPTION	INSPECTION ACTIVITY	ACCEPTANCE CRITERIA	LOCATION	ACTION BY			COMPLETED			REPORT DOC REF	
					STL	LCPL	BW	STL	LCPL	BW		
	SERPENTINE ROAD											
1	CONCRETE WORKS	DIMENSION CHECK	CONTRACT DWGS	SITE	W/H CB	W/S JR		7/03 CB			CONTRACT DWGS	
2	PIPE & VALVES	GOODS INSPECTION & DIMENSION CHECK	PIPE & VALVE SCHEDULE (FROM CONTRACT DWGS)	SITE	W/H CB	W/S JR		19/02 CB			CONTRACT DWGS	
3	PUMPS	DIMENSION CHECK	WEIR IOM & 9835-PSCL	SITE	W/H CB	W/S JR		28/02 CB			WEIR IOM & 9835-PSCL	
4	PIPE & VALVES	INSPECTION OF INSTALLATION	CONTRACT DWGS & 9835- PSCL	SITE	W/H CB	W/H JR	W/H	21/03 CB			CONTRACT DWGS	
5	PUMPS	INSPECTION OF INSTALLATION	WEIR IOM & 9835-PSCL	SITE	W/H CB	W/H JR	W/H	10/03 CB			WEIR IOM & 9835-PSCL	
6	TEST PIPEWORK FOR LEAKS	PRESSURE TEST	SPECIFICATION & 9825-HSTC	SITE	W/H CB	W/H JR	W/H	5/04 CB			SPECIFICATION & 9835-HSTC	
8	PRIOR TO EPOXY GROUT POUR	INSPECTION	SPECIFICATION	SITE	W/H CB	W/H JR	W/H	5/04 CB			Reg M.G.	
9	SUMP PUMP & PIPEWORK	INSPECTION OF INSTALLATION	CONTRACT DWGS	SITE	W/H CB	W/S JR		5/04 CB			CONTRACT DWGS	
					ACTION CODES :			REVISION STATUS	DATE	DRAWN	CHECKED	REASON FOR REVISION
					W/H WITNESS - MANDATORY HOLD POINT							
					W/S WITNESS - INSPECT AT RANDOM							
					W/H WITNESS INITIAL THEN AT RANDOM							
					R/A REVIEW AND SIGN DOCUMENTATION							
					R REVIEW DOCUMENTATION ONLY							
					STL STYLE ROUTINE INSPECTION ONLY							
					G GENERAL INSPECTION BY CUSTOMER DURING ACTIVITY							
								1	14/1/05	MC	MC	LEIGHTONS REQUEST
								0		MR	MR	FIRST ISSUE
STYLE INDUSTRIES DENK INVESTMENTS PTY. LTD. A.C.N. 010 418 014 T/A				CUSTOMER / SITE : SERPENTINE ROAD		BRISBANE WATER AUSTRALIA TRADE COAST SEWER PROJECT				PAGE 1 OF 1		

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BRISBANE CITY COUNCIL
Brisbane Water
SP300 - Serpentine RoadAUSTRALIAN TRADE COAST PROJECT
STYLE INDUSTRIES – ITP
LEIGHTON J/N Q1112**PUMP STATION CHECKLIST****REF NO. – 9835/PSCL****PAGE 1 OF 2**

<u>CONCRETE WORKS – CHECK</u>	CHECKED BY	DATE	COMMENTS
Check Dimensions of pump well to Leightons Drawings	CB	22/02	Complete
Ensure all core holes are correct in size and position	CB	22/02	"
Check to ensure all surfaces are smooth and level where required	CB	22/02	"
<u>PIPE & VALVES – GOODS INSPECTION & DIMENSION CHECK</u>			
Check dimensions of all items ordered against those received	CB	18/02	Complete
Check correct quantity has been supplied of each item	CB	18/02	"
Ensure goods are in as new condition (e.g. no cracks, scratches, or other damage)	CB	18/02	"
Check all sockets are correct	CB	18/02	"
<u>PUMPS – DIMENSIONAL CHECK</u>			
Ensure pump is correct model and type	CB	28/02	Complete
Check dimensions of pump to that of the Weir drawing	CB	28/02	"
Visually inspect pump for damage before installation	CB	28/02	"
Check pump can rotate easily by hand	CB	28/02	"
Check electrical cable is undamaged and correct length	CB	28/02	"
<u>PIPE & VALVES – INSPECTION OF INSTALLATION</u>			
Ensure all gasket materials are clean and free from grit before install	CB	21/02	Complete
Install all pipework and valves as per the drawings	CB	21/03	"
Check that pipework is level and that faces are mating correctly aligned	CB	15/03	"
Ensure all valves are closed after installation	CB	16/03	"
Make sure bolts are of correct size, material, and tightness	CB	21/02	"
Tighten bolts in star pattern (tighten opposites)	CB	21/02	"

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STYLE INDUSTRIES – ITP
LEIGHTON J/N Q1112

Install support structures for pipework	CB	21/03	Complete
Tighten bolts after installation as per Table 2 Sect 5 of WS-Spec	CB	17/03	"
Ensure pipes are clean once installed	CB	21/03	"

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PUMP STATION CHECKLIST

REF NO. – 9835/PSCL

PAGE 2 OF 2

<u>PUMPS – INSPECTION OF INSTALLATION</u>	CHECKED BY	DATE	COMMENTS
Ensure suction and discharge are free from any foreign matter	CB	28/02	Complete
Check pump can rotate easily by hand	CB	28/02	"
Ensure pumps are mounted level and the discharge is aligned correctly	CB	28/02	"
Grout under pump pedestal	CB	7/04	"
<u>PRESSURE TESTING PIPEWORK – HYDROSTATIC TESTING</u>			
Pipework will be isolated by closing the isolation valves on the suction sides of the pumps. Discharge pipework will be isolated by closing valves (by others) further down the discharge pipework, beyond the battery limits of Style Industries.	CB	5/04	Complete
Pipework will be filled with water allowing venting of air. Water to be supplied by others.	CB	5/04	"
Pressure will be pumped up to 600kPa	CB	5/04	"
No drop in pressure allowed over 15min	CB	5/04	"
Check visually for leaks and or pipe deformations	CB	5/04	"

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ON COMPLETION OF CHECKLIST SIGN OFF BELOW

NAME:	CLIVE BLORE
SIGNED:	
DATE:	7/04/05

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PIPEWORK HYDROSTATIC TEST CERTIFICATE

REF NO: 9835-Serpentine-HSTC

PAGE 1 OF 1

TEST PRESSURE:	630kPa
DESCRIPTION OF WORKS:	Pressure test pipework to 600kPa or more and hold at the achieved pressure for 15 minutes. Check for leaks, deformations and substantial pressure drop
TIME PRESSURE HELD:	15 minutes
JOB NO:	9835C
CERTIFIED BY:	Clive Blore
WITNESSED BY:	Gary Mole
CERTIFICATE NO:	9835-Serpentine Road-HSTC
DATE:	5 April 2005
COMMENTS:	No leaks or deformations. 1kPa pressure drop over 15 minutes.

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Part 4 Operation and Maintenance

7 Maintenance

7.1 Corrective Maintenance

Fastener Torque Settings, Loadings (Table 2, Section 3, WS-SPEC : 2000)

TABLE 2

PIPE DIA	BOLT SIZE	NO. OF BOLTS	FULL FACE, CLASS 14		RAISED FACE, CLASS 16	
			BOLT TENSION (kN)**	ESTIMATED TIGHTENING TORQUE* (N.m)	BOLT TENSION (kN)**	ESTIMATED TIGHTENING TORQUE* (N.m)
100	M16	4	32	102	18	58
150	M16	8	27	86	15	48
200	M16	8	37	118	22	70
225	M16	8	45	144	23	74
250	M20	8	53	212	34	136
300	M20	12	43	172	28	112
375	M24	12	62	298	42	202
450	M24	12	83	398	52	250
500	M24	16	75	360	52	250
600	M27	16	101	545	67	362
750	M30	20	116	696	80	480

* Torques shown are calculated to achieve sealing and to limit risk of stress corrosion. Flat, smooth, well-lubricated surfaces such as would be achieved with anti-seize compounds for a torque coeff. of 0.2, and fibre reinforced natural rubber gaskets, have been assumed. Bolt tensions may vary considerably with different applications. Check with manufacturer for application of torques inconsistent with the above.

** Using a torque wrench, the resultant bolt tension may vary as much as $\pm 25\%$.

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Part 5 Appendices

Appendix 1 Pressure Gauge Certificate

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NATA CERTIFICATE
NO. 4313N

Ross Brown Sales Pty Limited
A.B.N. 28 000 890 382
21 Brookhollow Avenue
Baulkham Hills NSW 2153
Tel: (02) 9899 2744
Fax: (02) 9899 4233

To: Style Industries
7 Forge Close
Summer Park Qld. 4074

Date of Test: 12th October 2004

Instrument Tested: 160mm Wise Pressure Gauge **Serial No:** 4313

Range: 0/160 metres head **Graduation Interval:** 2 metres head

Instrument Orientation: Vertical **Temperature During Test:** 20°C

Reference Instrument: Mansfield & Green Pneumatic Dead Weight Tester
Model No. RK-2000N-SS **Serial No.** 82838 **Certificate No.** APL 036882

TEST RESULTS

<u>Applied Pressure</u> <u>Metres head</u>	<u>Mean Instrument Reading (metres head)</u>		<u>Corrections (metres head)</u>	
	<u>Ascending</u>	<u>Descending</u>	<u>Ascending</u>	<u>Descending</u>
0	0	0	0	0
20	20	20	0	0
40	40	40	0	0
60	60	60	0	0
80	80	80	0	0
100	100	100	0	0
120	120	120	0	0
140	140	140	0	0
160	160	-	0	-

Note: All corrections (+ or -) should be added to the instrument reading.
Conversion Factor: 1 metre head = 9.8064 kPa at 4°C

Uncertainty of Measurement: The reported corrections have an expanded uncertainty of +/- 0.6 metres head, with a coverage factor k = 1.96, and an estimated level of confidence of 95%.

Test Method: Ross Brown Sales Laboratory Test Method A, based upon AS 1349-1986

Performance Criteria: The manufacturer's specification being +/- 1% of full scale

Conclusion: The instrument described above complies with the performance criteria

NATA Signatory: *D.W. Brown* **Date:** *13th October 2004*
D.W. Brown

NATA Endorsed Document
The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements which include requirements of ISO/IEC 17025 and are traceable to Australian national standards of measurement. This document shall not be reproduced, except in full.

NATA Accredited Laboratory
No. 1808

QSP021-1 Issue 11 OCTOBER 2003

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Appendix 2

Rilsan® Nylon 11 Polymeric Coatings

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Rilsan® Nylon 11 Polymeric Coating

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Flow Control

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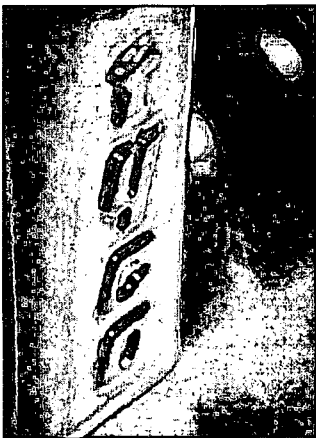
Features

- Excellent corrosion resistance to
 - water
 - wastewater
 - sea water and mist
- Chemical resistance to
 - hydrocarbons
 - solvents
 - acids
 - salts
 - alkalis and many others
- Outstanding
 - abrasion resistance
 - impact resistance
 - flexibility
 - thermal resistance
 - weathering and chalking resistance
- Low
 - water absorption
 - friction coefficient
- Wide range of working temperatures
- Long service life
- Produced from renewable raw materials of plant origin, environmentally friendly.

Rilsan® Nylon 11 polymeric coatings provide corrosion protection for fittings, valves and hydrants. Coating system and application complies with AS/NZS 4158.

Typical Type Test Results		
Test	AS/NZS 4158 Requirement	Rilsan® Nylon 11 Result
Hol Water Immersion	<= 1	<1
Water Absorption	<= 4.0%	2.2%
Flexibility	no crack @ 1.0%	no crack
Impact Resistance	>= 2.0 J	2.6 J
Penetration Resistance	<= 10%	1.4%
Abrasion Resistance	<= 40mg	18.6mg
Cathodic Disbondment	<= 15mm	4.2mm
Thermal Stability	<= 35% change to melt flow rate after 100 days @100°C	viscosity change <28%
Ultraviolet Radiation	<= 35% change to melt flow rate after 100 days @100°C	viscosity change <20%
Water Contact	No effect when used to convey drinking water	AS 4020 certified

Production Batch Release Requirements	
Test	Requirement
Thickness	>250µm - <600µm
Continuity	no holidays
Adhesion	<= 1



Rilsan® is a registered trademark of ATOPINA S.A.
A.B.N. 75 087 415 745

General Application

Rilsan® Nylon 11 coating provides excellent corrosion resistance in both potable and wastewater applications.

Technical Data

Coating Thickness:
250µm(minimum)
Application Method:
Fluidised Bed
Maximum Temperature : 50°C
Colour: Blue
Standards:
AS/NZS 4158 - Thermal-bonded polymeric coatings on valves and fittings for water industry purposes
Approvals:
AS 4020 - suitable for contact with drinking water.

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MANUFACTURING SPECIFICATION NO. MS02

APPLICATION OF THERMAL-BONDED POLYMERIC COATINGS TO DUCTILE IRON FITTINGS AND VALVES

1. **Material**
The coating shall be Rilsan (Nylon II) 7411 MAC, a thermoplastic polyamide powder or Jotac Corrocoat EP9188A50041R, a thermosetting epoxy powder (FBE).
2. **Colour**
Blue
3. **Surface Preparation**
 - i) Remove grease or oil, if present, with a volatile solvent.
 - ii) Abrasive grit blast to AS1627-9 Class 2 1/2 to a white metal blast using clean, dry, angular grit to achieve a surface profile between 40 & 90 µm. NB: Wet blasting is not permitted.
 - iii) Remove any remaining grit or metallic dust contamination.
4. **Primer**
(for Nylon II only)
 - i) PRIMOREEN (AT 12035 shall be applied as soon as practicable, but no later than 5 hrs after grit blasting.
5. **Powder Application**
 - i) Components shall be preheated in accordance with the manufacturer's recommendations.
 - ii) The powder coating shall be applied before the surface temperature falls below the figure recommended by the powder manufacturer.
 - iii) The coating shall be applied by the fluidised bed process.
6. **Coating Repairs**
 - i) Repair to coating defects shall be carried out using Jotacote 605 Epoxy colour Blue.
7. **Certification**
 - i) The powder coating material shall conform to the requirements of AS/NZS4158 and type test results shall be provided in accordance with Section 2.
 - ii) Production tests shall be carried out in accordance with 8. below

300 Production Test Requirements

Requirement	Test Method	Requirement			*Frequency
		Surface	Nylon II	FBE	
Thickness	AS 3894.3 Method B	Wetted	250 - 600	350 - 650	One product per batch
		External	200 - 600	300 - 650	
Continuity	AS 3894.1/Visual	As shown in table below.			When detected visually
Adhesion	AS 1580 Method 408.2	≤ 1.			One product per 8 hours
Cure (for FBE only)	AS3894.4 Method C: MEK rub test	Pass			One product per 8 hours

* Frequencies are based on prior demonstration of process control.

CMF Manufacturing Manual Ref. 9.13.003

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9. Acceptance Limits for Continuity Testing

Region	End Result	Repair Limitations	Test Requirements
Internal wetted surface	No holidays	Maximum holiday area 25mm ² per holiday, with a maximum of 3 repairs per coated product or 3 repairs per 100,000 mm ² of coated surface, whichever is the greater	High voltage spark test at 5V per μ m of the specified minimum thickness.
External surface	No visual defects	Maximum holiday area 1000mm ² per holiday, with a maximum of 6 repairs per coated product or 6 repairs per 100,000 mm ² of coated surface whichever is the greater.	Visual

Discontinuities at bolt holes, other external edges, hook holes and scuff marks shall not be considered as coating defects.

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Appendix 3 Metal Seated Sluice Valves

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Metal Seated Gate Valves - Figure 400 DN80 - DN900

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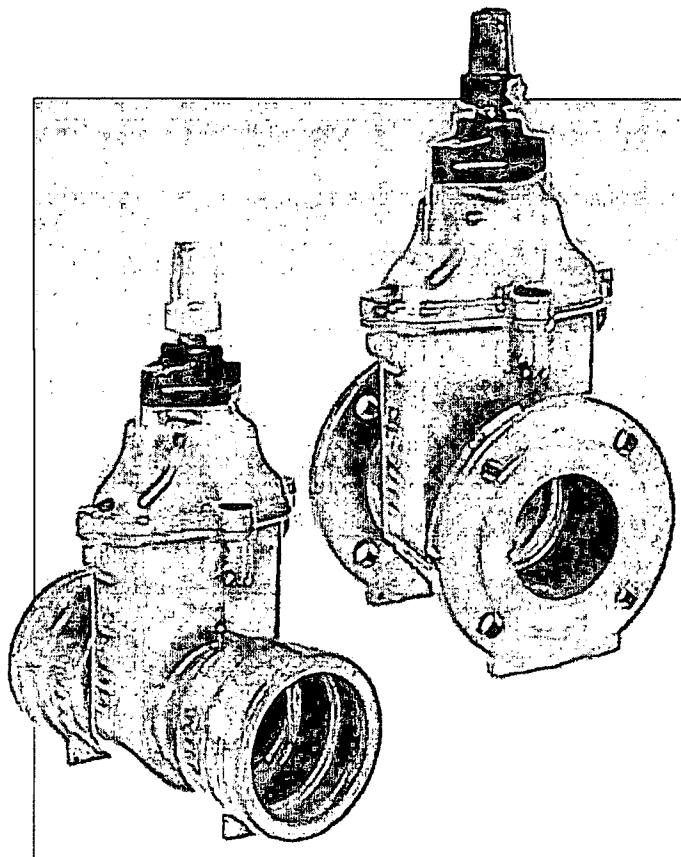
Flow Control

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Figure 400 metal seated gate valves are designed and manufactured to AS 2638.1.

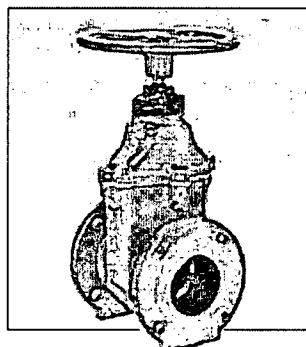
Features

- Ductile Iron body and bonnet for high strength and impact resistance.
- Solid gunmetal gate for DN80-DN200, ductile iron fusion coated gate with gunmetal rings for larger sizes.
- Grade 431 Stainless Steel spindle for high strength and corrosion resistance.
- Gunmetal dezincification resistant top casting incorporating dual O-ring seals and wiper ring for long life operation.
- Back seal facility to allow for replacement of seals under full operating pressure.
- Rilsan® Nylon 11 coating for long life corrosion protection.
- Isolated fasteners for corrosion protection.
- Anti-friction thrust washer for low operating torques.
- Integral cast in feet for safe and easy storage.
- Integral lifting lugs for installation convenience.
- Anticlockwise closing or clockwise closing available.
- Key, handwheel or gearbox operation available.



General Application

Figure 400 metal seated gate valves are suitable for use with drinking water and waste water, in below or above ground applications. Used for the isolation of sections and branches in pipelines.



Technical Data

Size Range: DN80-DN900
Allowable Operating Pressure:
1600 kPa or 3500 kPa
Maximum Temperature: 40°C
End Connections:
Flanged to AS 4087 Fig B5 or B6
TYTON® Socket
Approvals:
WSAA Appraisal No. 98/21
ISC AS 2638 Product Mark
Registration No. PRD/R61/0412/2
[DN80 - DN600]
Certified to AS 4020 -suitable for
contact with drinking water.

A.B.N. 75 087 415 745

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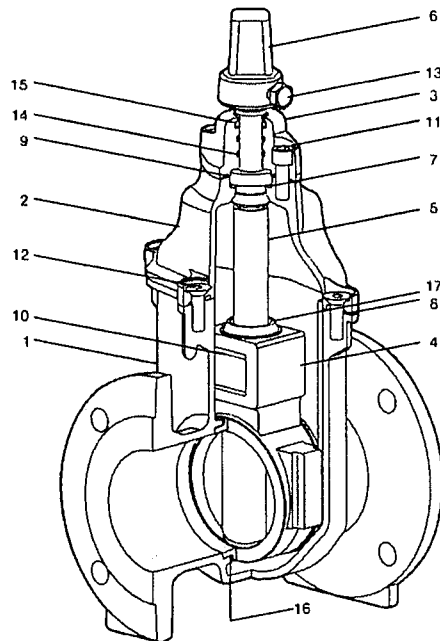
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Metal Seated Gate Valves - Figure 400
DN80-DN900



Parts List

No	Description	Material	Standard
1	Body	Ductile Iron	AS 1831 400-12
2	Bonnet	Ductile Iron	AS 1831 400-12
3	Seal Retainer	Gunmetal	AS 1565 C83600
4	Gate	DN80-DN200 Gunmetal DN255-DN900 Ductile Iron	AS 1565 C83600 AS 1831 400-12
5	Spindle	Stainless Steel	ASTM A 276 431
6	Spindle Cap	Ductile Iron	AS 1831 400-12
7	Thrust Washer	Acetyl	-
8	Body Gasket	EPDM	AS 1646
9	Bonnet Gasket	EPDM	AS 1646
10	Gate Nut	Gunmetal	AS 1565 C83600
11	Socket Head Screws	High Tensile Alloy Steel	-
12	Countersunk Screws	High Tensile Alloy Steel	-
13	Hex Head Screw	Stainless Steel	ASTM A276 316
14	O-Rings	Nitrile Rubber	AS 1646
15	Wiper Ring	Nitrile Rubber	AS 1646
16	Seat Rings	Gunmetal	AS 1565 C83600
17	Backseal Grommet	Nitrile Rubber	AS 1646
18	Fusion Coating	Rilsan® Nylon II	AS/NZS 4156

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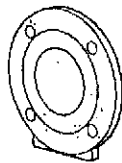
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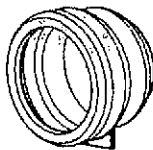
Metal Seated Gate Valves - Figure 400

DN80 - DN800

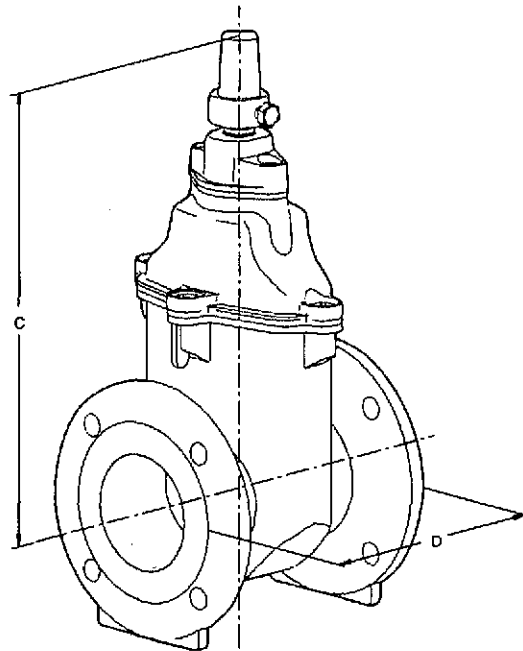
End Connections



Flange



Socket



Dimensions (mm)

Valve Size	C	D			Turns to Close	Approx. Mass kg
		Class 18 TYTON Socket	Class 18 Flange AS4087 Fig B5	Class 35 Flange AS4087 Fig B6		
80	367	-	203	280	20	18
100	402	150	229	305	23	24
150	502	170	267	330	26	43
200	610	195	292	380	34	75
225	649	205	305	405	38	85
250	723	235	330	420	42	110
300	810	245	356	430	50	160
375	960	-	381	610	62	340
450	1145	-	432	660	76	560
500	1290	-	457	710	82	710
800	1467	-	508	785	98	940

Note: DN750 and DN900 Gate Valves are also available.

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Metal Seated Gate Valves - Figure 400

DN80-DN900

Available Range

DN	Metal Seated Gate Valves			
	Inside Screw			Handwheel Operated Class 16 FI-FI
	Key Operated		Class 35 FI-FI	
	Class 16 FI-FI	Sc-Sc		
80				
100				
150				
200				
225				
250				
300				
375				
450				
500				
600				
750				
900				
Fig No.	400	400	400	600
Coating				
Rilsan Nylon 11				
Options				
Anticlockwise Closing				
Clockwise Closing				
Gear Actuator				
Flange Drilling Fig B5 (TC)				
Flange Drilling Fig B6 (HP)				

Recommended Specification

- Gate valves shall be metal seated conforming to AS2638.1.
- The allowable operating pressure shall be 1600 kPa/3500 kPa.
- Operation shall be by means of a key/hand wheel.
- The direction of closing shall be anticlockwise/clockwise.
- The valve body and bonnet shall be cast in Ductile Iron and coated with a thermally applied polymeric coating to AS/NZS 4158.
- The gate shall be cast in Ductile Iron and coated with a thermally bonded polymeric coating. Gate sealing rings shall be dezincification resistant copper alloy mechanically fixed to the body and gate. Solid gunmetal gates are also acceptable.
- The spindle shall be Grade 431 Stainless Steel incorporating a failsafe thrust collar.
- The spindle seal retainer shall be manufactured from a dezincification resistant copper alloy to AS1565.
- The spindle seal shall be affected by a minimum of two O-rings, which can be replaced under full operating pressure.
- Fasteners shall be completely isolated from the external environment.
- Valves shall be manufactured under a product certification scheme and each valve marked in accordance with the certification body's requirements.

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REPORT NUMBER: Q1112-WC-001
PROJECT: SP300 Serpentine Rd
ISSUE: 1
DATE: 01/06/2005
PAGE: 09

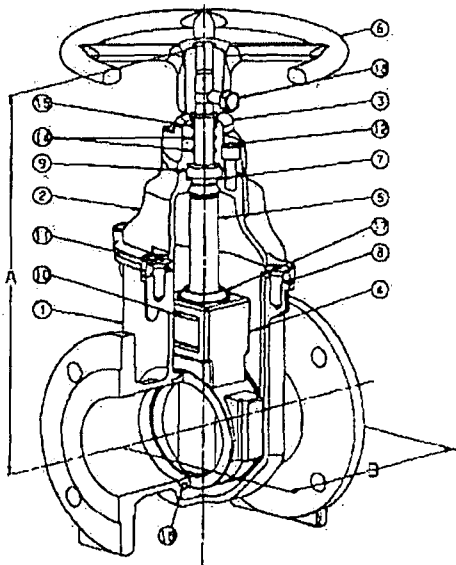
1.02.00 MAINTENANCE INSTRUCTIONS

- 1.02.01 This type of valve does NOT require any lubrication.
- 1.02.02 In the unlikely event of any of the long life Spindle Sealing Rings (items 14 & 15) requiring replacement, ensure valve is fully OPEN and remove spindle cap/handwheel and Seal Retainer (items 6 & 3) by removing concealed Socket Head Screws (Item 12). This will permit the Seal Retainer (item 3) to be removed from the Spindle (item 5) for replacement of the appropriate rings.
- 1.02.03 Re-assemble in the reverse sequence using any commercially available water pump grease applied to the upper end of the Spindle to aid assembly. Reseal Screws with silicon sealant.

2.00.00 SPARE PARTS LIST

- 2.00.01 Spare parts are NOT normally required for this type of valve.
- 2.00.02 In the unlikely event of a sealing ring failure the appropriate ring may be selected from items 14 & 15 in the attached general assembly drawing.

3.00.00 DETAIL DRAWING



No	Description	Material
1	Body	Ductile Iron
2	Bonnet	Ductile Iron
3	Seal Retainer	Gunmetal
4	Gate	ON 225-ON 200 Gunmetal
5	Spindle	Stainless Steel
6	Spindle Cap/Handwheel	Ductile Iron
7	Thrust Washer	Acetyl
8	Body Gasket	EPDM
9	Bonnet Gasket	EPDM
10	Gate Nut	Gunmetal
11	Countersunk Screws	High Tensile Alloy Steel
12	Socket Head Screws	High Tensile Alloy Steel
13	Socket Head Cap Screw	Stainless Steel
14	O-Rings	Nitrile Rubber
15	Water Ring	Nitrile Rubber
16	Seal Rings	Gunmetal
17	Backseal Grommet	Nitrile Rubber
18	Key Head screw	Stainless Steel

Operation & Maintenance Manual - Class 16 MSV

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Appendix 4 Knifegate Valve

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Knifegate Valves – Figure 952

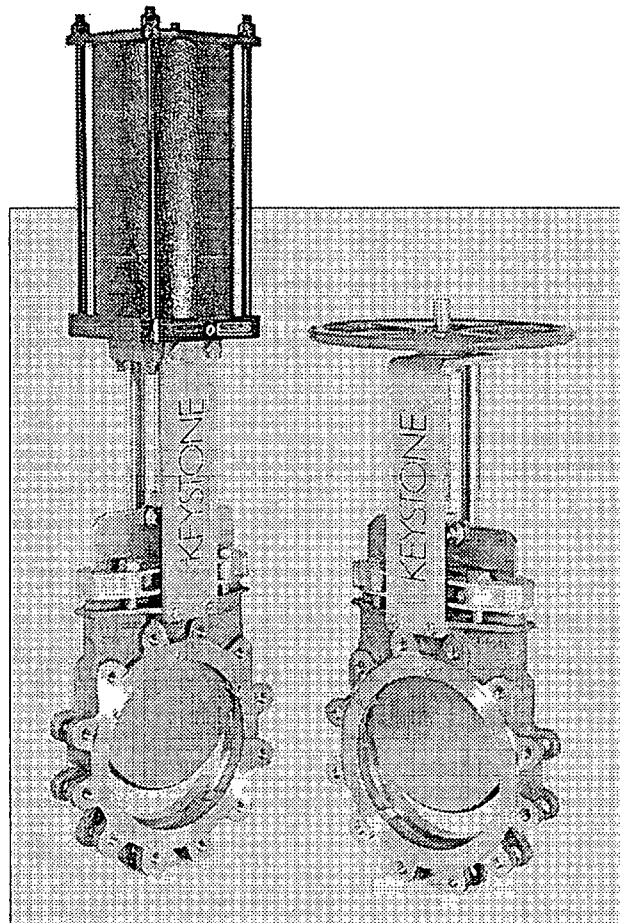
250 - 500mm

KEYSTONE
tyco FLOW CONTROL

Lugged style, uni-directional Knifegate valves.

Features

- Compact design.
- Self-aligning gland box.
- Both S.G. Iron and 316 S/S valves available.
- One piece Integral cast body, chest and lugs.
- Integral cast in gate wedges minimize flow obstructions.
- High quality gate finish for optimum sealing.
- High flow rates with low pressure drops.
- Full bore design.
- Integral RTFE gate scraper.
- Gate guides to support gate.
- A range of seat options available.
- Complies with MSS SP-81 face to face dimensions.
- All valves are pressure tested to MSS SP-81.
- Maintenance friendly.



General Applications

The Keystone K-Nife is designed for a wide range of applications such as:

- Pulp & paper
- Mining
- Effluent handling plants
- Chemical plants
- Food & beverage
- Fly ash handling plants
- Bulk conveying
- Corrosive environments



Technical Data

Pressure Rating:
1000 kPa (10 bar) @ Cold Working
Pressure (Non-shock)
Temperature Rating:
150°C RTFE seated
150°C Viton seated
230°C 316 S/S seated
230°C S.G. Iron seated

A division of **tyco** Flow Control Pacific Pty Ltd
A.C.N. 000922890

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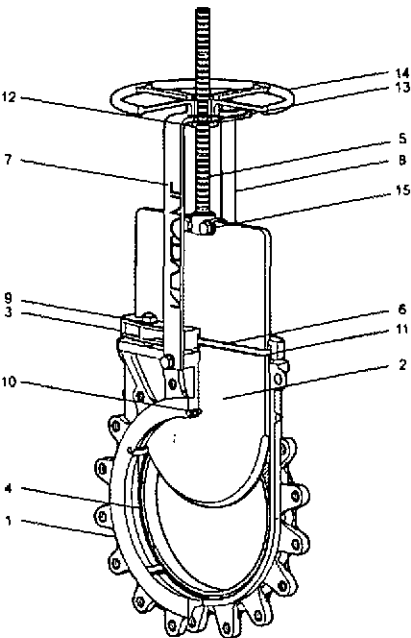
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Knifegate Valves - Figure 952
250 - 400mm



Parts List		
No.	Description	Material
1	Body	316 S/S or S.G. Iron
2	Gate	316 S/S, SAF 2205 or 304 S/S #
3	Gland Box	304 S/S or S.G. Iron
4	Seal	RTFE, Metal or Viton
5	Spindle	303 S/S
6	Gland Packing	K-LON
7	Upstand	304 S/S
8	Pillar	304 S/S
9	Glandbox Washer	Nylon
10	Gate Guide	S/S RTFE tipped
11	Gate Scraper	RTFE
12	Handwheel Nut	Lead or Gunmetal
13	Thrust Washer	Nylon
14	Handwheel	S/S or S.G. Iron
15	Clevis	304 S/S
16	All Fasteners	304 S/S

Note:
* 304 S/S gate is standard with S.G. Iron bodied valves.
Gate is PTFE coated when used with Viton seat.
• Other packing materials available on request.

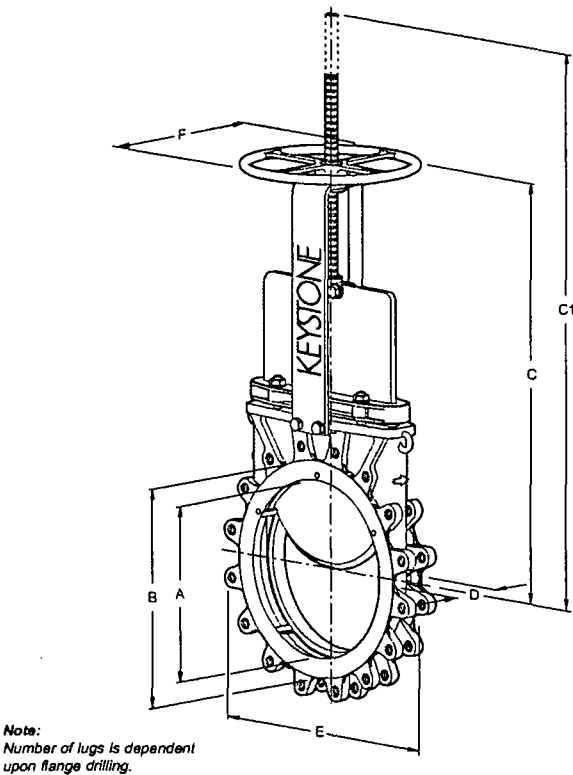
- | Options |
|---|
| • F459 Manual handwheel or quick acting levers |
| • F738 Pneumatic actuators |
| • F77C Electric actuators |
| • Bevel gear operators |
| • chainwheels |
| • F791 Solenoid valves |
| • Limit switches |
| • F793 Positioners |
| • F493 Pneumatic failsafe |
| • Deflection cones, both 28% Chrome Iron and Polyurethane |
| • Safety guards and shrouds |

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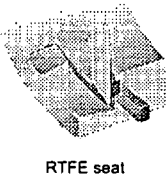
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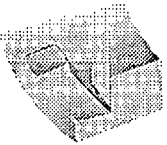
Knifegate Valves – Figure 952
250 – 600mm



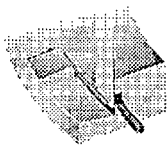
Standard seat details



RTFE seat



Metal seat



Viton seat

Dimensions (mm)										
Valve size	A Bore (downstream)	B	Rising spindle C C1 (closed) (open)		Non-rising C	D	E	F	Norm. mass manual (kg)	Kv @ full open*
250	250	326	651	908	693	71	406	400	47	6850
300	300	380	750	1057	793	76	474	400	74	9863
350	330	452	806	1144	848	76	520	400	93	11858
400	378	480	893	1281	935	89	584	400	121	15590
450	425	540	1020	1450	1084	89	628	600	170	20185
500	475	585	1117	1598	1181	114	696	600	212	25117
600	571	692	1305	1881	1369	114	822	600	312	36896

Notes:
Dimension D = The face to face dimension
Dimension E = The maximum valve or upstand clearance dimension for installation.
*Kv = The flow rate of water in m³/hr that will pass through a valve with a differential pressure of 1 bar (100 kPa) @ 20°C
Cv = 1.155 Kv
Dimensions are nominal.
Larger sizes are available upon request.

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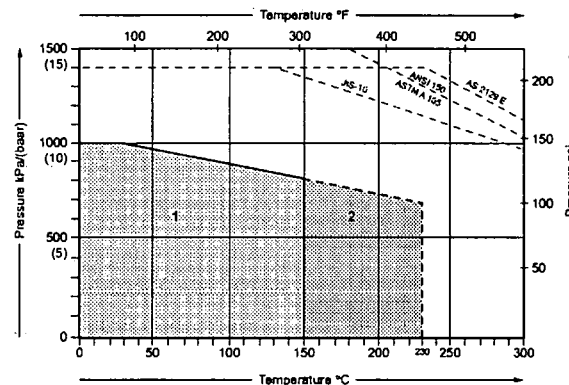
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Knifegate Valves - Figure 952

250 - 600mm

Pressure/temperature graph



Pressure/temperature ratings

RTFE seated

1000 kPa/(10 bar) @ 20°C
770 kPa/(7.7 bar) @ 150°C

Viton seated

1000 kPa/(10 bar) @ 20°C
770 kPa/(7 bar) @ 150°C

Metal seated

1000 kPa/(10 bar) @ 20°C
700 kPa/(7 bar) @ 230°C

- 1 RTFE seated valve trim code numbers are 176, 177 & 182
Viton seated valve trim code number is 180
- 2 Metal -S.G. Iron seated valve trim code number is 170, 172.
-316 S/S seated valve trim code numbers are 170, 171.
-304 S/S seated valve trim code number is 185.

Typical specifying sequence

250	F952	170	AS 2129 E
Valve size	Figure number	Trim code	End connections

Size range: 250-600mm

Figure No: F952 - Lugged style rising spindle uni-directional valve.

Trim No.	Body	Gate	Seat	Gland box	Bridge	Spindle	Packing
172*	S.G. Iron	304 S/S#	S.G. Iron	S.G. Iron	S.G. Iron	303 S/S	K-LON
182*	S.G. Iron	304 S/S#	RTFE	S.G. Iron	S.G. Iron	303 S/S	K-LON
170	316 S/S	316 S/S	316 S/S	304 S/S	304 S/S	303 S/S	K-LON
171	316 S/S	316 S/S	316 S/S	S.G. Iron	S.G. Iron	303 S/S	K-LON
176	316 S/S	316 S/S	RTFE	304 S/S	304 S/S	303 S/S	K-LON
177	316 S/S	316 S/S	RTFE	S.G. Iron	S.G. Iron	303 S/S	K-LON
180	316 S/S	316 S/S/PTFE*	Viton	304 S/S	304 S/S	303 S/S	K-LON

Note:

* Gates are 316 S/S, coated with PTFE.

Subject to material availability and delivery obligations, Keystone reserves the right to supply higher grade materials for any component, (eg) supply 316 S/S in lieu of 304 S/S.

* Available in sizes 350 - 600mm only.

Non-rising spindle design available upon request.

End connections (to suit):	• AS 2129	Table C,D,E metric threads	• JIS B2210	Table 5, 10
	• ANSI B16.5	Class 125 & 150 UNC threads	• DIN 2501	Table 10, 16
	• BS 4504	PN 10 and 16	• ANSI B16.5	Class 125 and 150 metric threads (for N.Z.)

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Knifegate Valves - Figure 951/952

Gland packing instructions for 250 - 600mm valves

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Gland packing replacement instructions for 250 - 600mm Knifegate valves.

Packing replacement

For optimum performance, the packing material should be replaced whenever the valve has been disassembled for routine maintenance. This is a very simple procedure which can be done leaving the valve in the pipeline.

Correct packing is essential for leak-free operation. Use Keystone's preformed and pre-cut Packing Replacement Kits for best results.

Packing Replacement kits are available in the following types:-

K-LON - Standard packing material.

D-LON - Food Grade packing.

G-LON - High Cyclic packing.

H-LON - Abrasive Service packing.

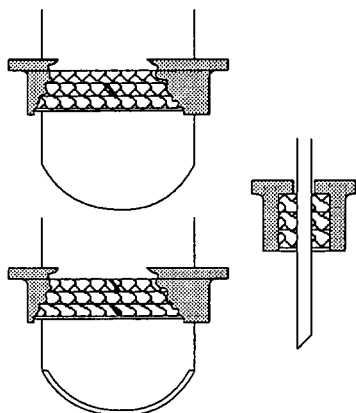
Ensure packing material selected is suitable for the service.

Disassembly procedure:

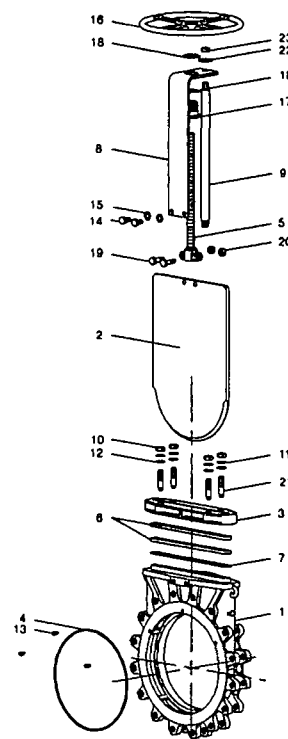
1. Ensure the pipeline is not pressurised and any hazardous medium is drained away.
2. Close valve.
3. Remove gland box nuts (10) and washers (11, 12). A 32mm - 11/4" AF spanner suits all valve sizes.
4. Remove clevis bolts (19) and nuts (20).
5. Remove pillar nut (23) and washer (22).
6. Remove upright mounting bolts (14) and washers (15) at valve body (1).
7. Remove handwheel (16) upright (8) and spindle (5) as an assembly.
8. Remove gland box (3) from gate (2) leaving the gate in the valve body.
9. Remove scraper (7) (Not fitted on polyurethane trim valves) and packing segments (6) from gland box, noting number of layers.
10. Clean gland box (3).

Note:

Although not essential, valve gate can also be removed for inspection at this stage. For optimum leak-free service, gate faces and edges must be smooth, and free of galling or burring. Repair or replace if excessively worn or damaged. When re-fitting gate, ensure bevelled edge of knifegate is upstream and away from seating face.



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Note: 250 - 600mm F952 valve illustrated

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Knifegate Valves - Figure 951/952

Gland packing instructions for 250 - 600mm valves

Packing procedure:

Note:

Care should be taken to stagger the mitred joints in each layer of packing to the opposite side of the gland box, e.g.:

- 1st packing layer joint to the front of the valve
 - 2nd packing layer joint to the rear of the valve
 - 3rd packing layer joint to the front of the valve.
11. Press first layer of gland packing (6) into gland box (3) cavity by hand, then repeat the process with the second layer ensuring the joints of the two layers are on opposing sides of the cavity
 12. Fit the RTFE scraper blade (7) (Not fitted on polyurethane trim valves) in bottom of gland box.

Assembly procedure:

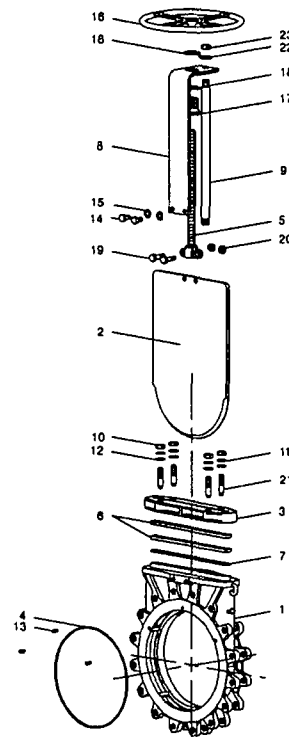
1. Using masking tape, hold packing in place temporarily by passing tape through gland box slot around packing onto edge of gland box (one piece per side minimum recommended).
2. Coat gland box studs (21) with nickel based anti-seize compound.
3. Place the gland box (3) over gate (2), sliding the gland box down to make contact with the body and remove temporary holding tape.
4. Tighten gland box nuts equally (10) ensuring nylon washer (12) is positioned between metal washer (11) and gland box (3).
5. Replace handwheel (16), upright (8) and spindle (5) assembly.
6. Replace pillar bolts (14) and washers (15) at valve body (1).
7. Replace pillar nut (23) and washer (22) ensuring thread is coated with nickel based anti-seize compound.
8. Lower the spindle clevis (5) onto the gate (2) and replace clevis mounting bolts (19) and nuts (20).
9. Check the alignment of spindle, upright and pillar and tighten fasteners (14, and 23).
10. Assembly is complete, actuate to check all is functioning as desired and gate reseats itself into the wedges at bottom of the valve body.

Note:

At commissioning or plant start-up, open and close valve to check it is operating correctly - gland nuts (8) may require adjustment. Please ensure to tighten equally.

Caution:

Do NOT over tighten gland packing as it will cause excessive resistance to gate movement.



Note: 250 - 600mm F952 valve illustrated

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Knifegate Valves - Figure 951/952 Disassembly instructions

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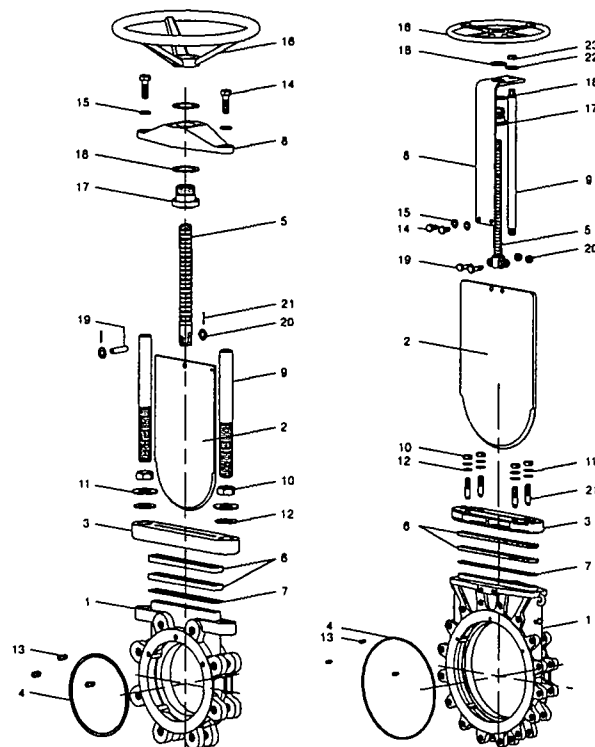
**Removal, disassembly and inspection instructions for
50 - 600mm rising spindle Knifegate valves.**

Removal & disassembly

1. Ensure pipeline is not pressurised and that any hazardous medium is drained away.
 2. Large valves need a chain block or crane to assist.
If large, heavy cylinders are fitted, they can be removed first if felt necessary:
 - i) Disconnect actuator air lines and power supplies etc.
 - ii) Support Actuator, disconnect actuator rod from valve gate, undo bridge bolts or hold down bolts, remove actuator from valve.
 3. Support valve body and remove all flange bolts.
 4. Remove valve and gaskets from the pipeline.
- For 50-200mm valves**
- i) Loosen gland box nuts (10) to end of pillar (9) threads. Remove clevis fastener (19, 20 and 21). Remove both bridge nuts (14)
 - ii) Remove Handwheel (or actuator) assembly. Unscrew both pillars (9) and remove.
- For 250-600mm valves**
- i) Remove gland box nuts (10) and washers (11, 12). Remove clevis fasteners (19 and 20).
 - ii) Remove upright bolts (14) and washers (15) at valve body (1). Remove pillar nut (23) and washer (22).
5. Withdraw gland box (3) and gate (2) assembly.
 6. Remove gate guides (13) from valve body (1).

Valve inspection

- Ensure all parts are clean and free of foreign material, particularly the chest area between the gland and valve bore.
- For optimum leak-free service, gate faces and edges must be smooth, and free of galling or burring. Repair or replace if excessively worn or damaged.
- Seating faces in valve bore must be smooth and undamaged otherwise leakage is likely to occur. Replace if necessary.
- Check gland sealing faces on top of valve body. They should be smooth and undamaged. Repair if necessary.
- Check threads on spindles and bolts - repair/replace.
- Replace Nyloc nuts if threads are stripped or weakened. These are used as protection against vibration.
- Check and replace gate guides (13) as necessary.



Note: 50 - 200mm F952 valve illustrated

Note: 250 - 600mm F952 valve illustrated

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Knifegate Valves - Figure 951/952 Disassembly instructions

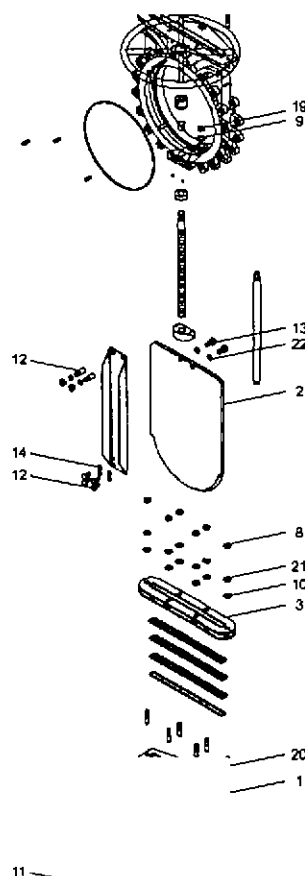
Removal, disassembly and inspection instructions for 250 - 600mm non-rising spindle Knifegate valves.

Removal & disassembly

1. Ensure pipeline is not pressurised and that any hazardous medium is drained away.
2. Large valves need a chain block or crane to assist. If large, heavy cylinders are fitted, they can be removed first if felt necessary:
 - i) Disconnect actuator air lines and power supplies etc.
 - ii) Support actuator, disconnect actuator rod from valve gate, undo bridge bolts or hold down bolts, remove actuator from valve.
3. Support valve body and remove all flange bolts.
4. Remove valve and gaskets from the pipeline.
 - i) Remove gland box nuts (8) and washers (21, 10). Remove clavis fasteners (13) and washers (22).
 - ii) Remove upright mounting bolts (12) and washers (14) at valve body (1). Remove pillar nut (19) and washer (9).
5. Withdraw gland box (3) and gate (2) assembly.
6. Remove gate guides (11) from valve body (1).

Valve inspection

- Ensure all parts are clean and free of foreign material, particularly the chest area between the gland and valve bore.
- For optimum leak-free service, gate faces and edges must be smooth, and free of galling or burring. Repair or replace if excessively worn or damaged.
- Sealing faces in valve bore must be smooth and undamaged otherwise leakage is likely to occur. Replace if necessary.
- Check gland sealing faces on top of valve body. They should be smooth and undamaged. Repair if necessary.
- Check threads on spindles and bolts - repair/replace.
- Replace Nyloc nuts if threads are stripped or weakened. These are used as protection against vibration.
- Check and replace gate guides (11) as necessary.



Note:
250 - 600mm F952 non-rising
spindle valve illustrated.

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Knifegate Valves
Storage and bolting instructions



Storage and installation instructions for 50 - 600mm Knifegate valves.

Storage

Important: Do not remove any identification or instruction tags. For optimum protection, undercover storage is desirable.

Valves:

Flange faces should be protected at all times with wooden or heavy cardboard shields. On iron bodied valves, lubricate threaded flange bolt holes to prevent rusting. Apply protective coating to seating faces of metal to metal seated valves.

Valves should be stored flat with the flow arrow pointing downwards and in the closed position, (but not jammed tight) to protect seating faces and gate from damage.

Handwheel spindle threads should NOT be lubricated otherwise dirt will accumulate in threads.

Actuators:

All air line and electrical cable entries should be plugged. If cylinders are not fitted to a valve, they should be stored with the piston rod fully retracted. Cylinders are assembled with a light coating of grease on internal components.

Spare parts:

Seats and packings should be carefully stored and protected from sharp or heavy objects which will damage sealing faces.

Handwheel operation

On standard valves, turn handwheel anti-clockwise to open valves, and clockwise to close valves.

Flange bolts

Caution:

It is critical that flange bolts do not bottom out in valve body otherwise valve damage will occur.

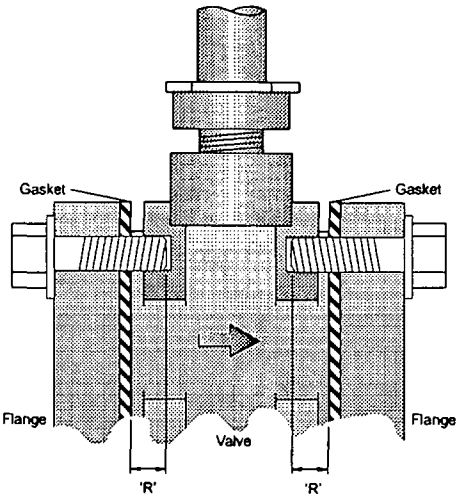
To determine bolt length for the blind holes in the upper chest area of the valve, add dimension 'R' + gasket + flange thickness + any washers etc. (plus deflection cone and gasket when used).

1. Stud bolts can be used in the blind holes in the chest area of the valve body to alleviate the risk of flange bolts bottoming out.
2. Coating of flange bolt threads with an anti-seize compound (Loctite 729 etc.) is recommended to prevent bolt seizure, particularly when using S/S bolts with S/S valves, or when using steel bolts in iron valves.

Thread Depths

Valve size (mm)	Thread depth 'R' (mm)	Thread depth 'R' (Inches)
50	10	3/8
65	10	3/8
80	11	7/16
100	11	7/16
125	14	9/16
150	14	9/16
200	18	5/8
250	18	5/8
300	18	5/8
350	18	5/8
400	19	3/4
450	24	15/16
500	19	3/4
600	19	3/4

Note:
Refer to relevant flange bolting literature sheet for detailed information.



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Knifegate Valves

Storage and bolting instructions

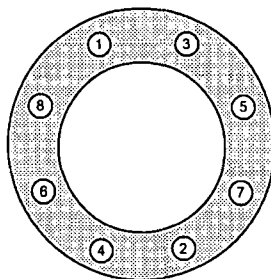
Installation instructions

Note:

Heavy valves will require a chain block or crane to assist. In difficult locations, large cylinder actuators can be removed from valve and re-fitted after installation if necessary, but check cylinder to gate alignment carefully and that valve seats correctly. (Refer cylinder fitting instructions).

1. Close valve.
2. Check valve size is correct and that there is adequate clearance to install valve.
3. Check flange faces are clean and smooth and that bolt hole patterns on pipe flanges are the same as the valve, and are in line.
4. Check bolt sizes and threads are clean and compatible with the valve.
(Separate technical data is available).
5. Check gaskets match flanges and are suitable for the service.
6. Check that the pipeline, upstream and downstream, is correctly aligned.
7. If a Deflector cone is being used, fit it to upstream side of valve with the cone nozzle pointing downstream, prior to installation. Metal (Chrome Iron) cones must have gaskets fitted between the cone and valve, and between cone and flange. Resilient urethane cones do not require these gaskets.
8. Spread flanges to clear valve, check flow arrow on side of valve is in the right direction. (Valve seating face and gate are downstream). Lower valve into position. Insert gaskets, 1 each side.
9. Insert flange bolts. On wafer valves, insert bolts into the threaded bolt holes in the chest of the valve first but do not tighten until all bolts are fitted. Tighten bolts in a diagonal sequence (refer Fig 1).

Figure 1



10. Ensure bolts in the chest area of the valve are not bottoming out in the blind holes.
11. Open and close valve to check it is operating correctly.
12. After pipe line is pressurised, check for flange leaks and for gland leaks, adjust as necessary.

Purge ports (where fitted)

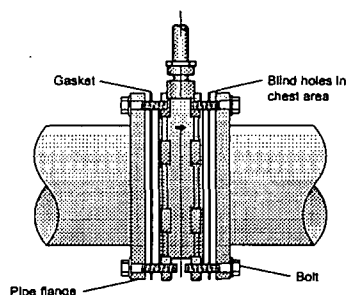
Optional stainless steel purge nozzles can be fitted in lower part of body. If sedimentation occurs preventing gate from closing fully, purge with compressed air or water. Alternatively, connect permanent installation to purge ports and purge periodically. Purge port hole is 1/8" BSPP.

Gland adjustment

The gland on new and repaired valves may require final adjustment after installation and pressurisation of the valve.

If packing leaks, tighten gland nuts (8) equally until leaking ceases. A 32mm (1 1/4" AF) spanner fits

Figure 2



50 - 600mm valve size. If gland leakage persists, check that pipeline is not pressurised above rating of valve. Alternatively, packing may be damaged, wrongly installed or have foreign matter caught between gate (2) and packing (5). Disassemble, inspect and repair or replace as necessary.

Caution:
Do NOT over tighten gland packing as it will cause excessive resistance to gate movement.

Safety

Actuated valves are generally operated from a remote location, caution should be exercised if working in close proximity to any moving parts. Keystone recommend the use of our purpose built Guards or Shrouds as safety devices.

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Appendix 5 Dismantling Joints

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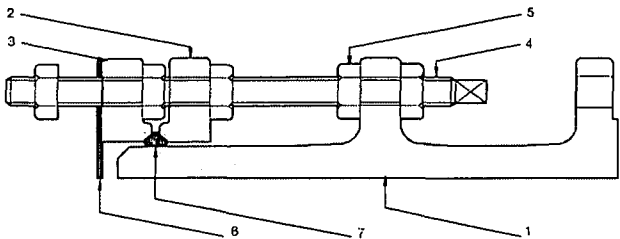
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Dismantling Joints
DN100-DN750



Parts List			
No.	Description	Material	Standard
1	Body (Thrust type only)	Ductile Iron	AS 1831-400/15
2	Thrust Ring Inner	Ductile Iron	AS 1831-400/15
3	Thrust Ring Outer	Ductile Iron	AS 1831-400/15
4	Stud	Stainless steel	ASTM A276 316
5	Nut	Stainless steel	ASTM A276 316
6	Gasket	EPDM Rubber (Class 16)	AS 1646
7	Rubber Ring	Teadit NA1000 (Class 35)	-
		EPDM Rubber	AS 1646

Specifying Sequence

Specifying a non-thrust type DN300 Class 16 dismantling joint.

Example	300	DIS JNT	N-THRUST	S/S	TC	FC
Nominal Size	100 - 750					
Name						
Type						
Thrust						
Non thrust						
Fastener Type						
SS - Stainless Steel						
End Type						
TC - Flanged AS 4087 Figure B5						
HP - Flanged AS 4087 Figure B6						
Extra Information						
FC - Fusion Coated						
DI - Ductile Iron						
DICL - Ductile Iron Cement Lined						

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Dismantling Joints DN100-DN750

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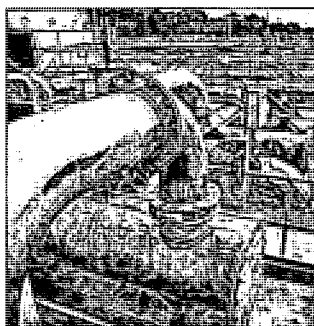
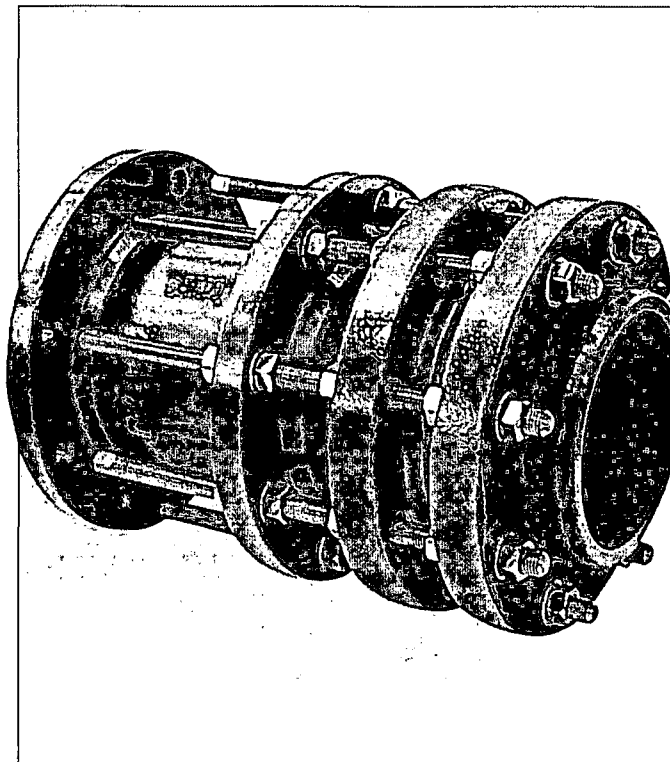
Flow Control

Tyco Water

Dismantling joints are designed to facilitate the removal of flanged valves from pipelines.

Features

- Ductile iron components for high strength and impact resistance.
- Fasteners are grade 316 Stainless Steel for long life operation.
- Thrust type available to provide longitudinal restraint.
- Non-Thrust type available where restraint is separately provided.
- Cement lined and bitumen coated or fusion coated with Rilsan Nylon 11 for long life corrosion protection.
- Studs are fully threaded.



A.B.N. 75 087 415 745

General Application

Dismantling Joints are used in pipelines where valves may need to be removed for future maintenance or replacement.

Technical Data

Size Range:
DN100-DN750
Allowable Operating Pressure:
1600 kPa or 3500 kPa
End Connections:
Flanged to AS 4087 Figure B5
Flanged to AS 4087 Figure B6

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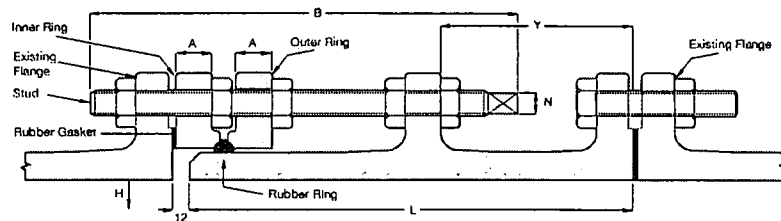
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Dismantling Joints

DN100-DN750

Thrust Type



Class 16 - Thrust Type Dismantling Joint Dimensions

Nominal Size DN	Joint Dimensions				Rubber ID x d	No. of Studs	Stud Details			No. of Nuts
	A	H	L	Y			Stud Size	B	Z	
100	30	126	400	175	104 x 16	4	M16	340	10	5
150	30	181	400	175	155 x 16	8	M16	340	10	5
200	30	236	400	175	206 x 16	8	M16	340	10	5
225	30	263	400	175	232 x 19	8	M16	340	10	5
250	30	290	400	175	268 x 19	8	M20	340	13	5
300	30	349	400	175	298 x 13	12	M20	340	13	5
375	35	430	600	260	410 x 13	12	M24	495	16	5
450	35	511	600	260	500 x 20	12	M24	495	16	5
500	40	564	600	260	555 x 20	16	M24	495	16	5
600	45	671	600	260	660 x 20	16	M27	495	16	5
750	47	831	600	260	780 x 25	20	M30	495	16	5

Class 35 - Thrust Type Dismantling Joint Dimensions

Nominal Size DN	Joint Dimensions				Rubber ID x d	No. of Studs	Stud Details			No. of Nuts
	A	H	L	Y			Stud Size	B	Z	
100	30	126	400	175	104 x 16	6	M16	340	10	5
150	30	181	400	175	155 x 16	12	M20	340	13	5
200	31	236	400	175	206 x 16	12	M20	340	13	5
225	34	263	500	220	232 x 19	12	M24	425	16	5
250	34	290	500	220	268 x 19	12	M24	425	16	5
300	38	349	500	220	298 x 19	16	M24	425	16	5
375	42	430	600	260	410 x 24	16	M27	495	16	5
450	46	511	600	260	500 x 20	20	M30	495	16	5
500	49	564	600	260	555 x 20	24	M30	495	18	5
600	54	671	700	300	660 x 20	24	M33	595	20	5
750	59	831	700	300	780 x 25	28	M33	595	20	5

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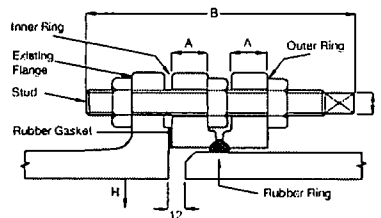
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Brisbane Water
SP300 - Serpentine Road

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Dismantling Joints DN100-DN750

Non-thrust type



Class 16 - Non-Thrust Type Dismantling Joint Dimensions

Nominal Size DN	Joint Dimensions		Rubber ID x d	No. of Studs	Stud Details			No. of Nuts
	A	H			Stud Size	C	Z	
100	30	126	104 x 16	4	M16	195	10	3
150	30	181	155 x 18	8	M16	195	10	3
200	30	236	206 x 16	8	M16	195	10	3
225	30	263	232 x 19	8	M16	195	10	3
250	30	290	268 x 19	8	M20	195	13	3
300	30	349	298 x 13	12	M20	195	13	3
375	35	430	410 x 13	12	M24	275	16	3
450	35	511	500 x 20	12	M24	275	16	3
500	40	564	555 x 20	16	M24	275	16	3
600	45	671	660 x 20	16	M27	275	16	3
750	47	831	760 x 25	20	M30	275	18	3

Class 35 - Non-Thrust Type Dismantling Joint Dimensions

Nominal Size DN	Joint Dimensions		Rubber ID x d	No. of Studs	Stud Details			No. of Nuts
	A	H			Stud Size	C	Z	
100	30	126	104 x 16	8	M16	195	10	3
150	30	181	155 x 16	12	M20	195	13	3
200	31	236	206 x 16	12	M20	195	13	3
225	34	263	232 x 19	12	M24	275	16	3
250	34	290	268 x 19	12	M24	275	16	3
300	38	349	298 x 19	16	M24	275	16	3
375	42	430	410 x 24	16	M27	275	16	3
450	46	511	500 x 20	20	M30	275	18	3
500	49	564	555 x 20	24	M30	275	18	3
600	54	671	660 x 20	24	M33	330	20	3
750	59	831	780 x 25	28	M33	330	20	3

Note: When non-thrust dismantling joints are used on non machined DI pipe spigots, the allowable operating pressure is 2100kPa

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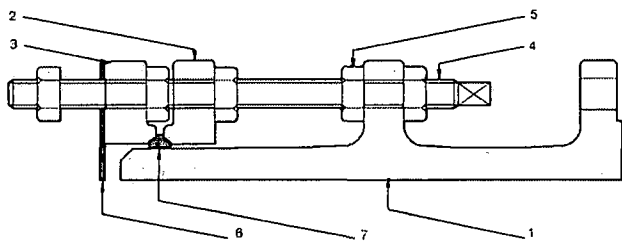
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Dismantling Joints
DN100-DN750



Parts List			
No.	Description	Material	Standard
1	Body (Thrust type only)	Ductile Iron	AS 1831-400/15
2	Thrust Ring Inner	Ductile Iron	AS 1831-400/15
3	Thrust Ring Outer	Ductile Iron	AS 1831-400/15
4	Stud	Stainless steel	ASTM A276 316
5	Nut	Stainless steel	ASTM A276 316
6	Gasket	EPDM Rubber (Class 16)	AS 1646
		Teadit NA1000 (Class 35)	-
7	Rubber Ring	EPDM Rubber	AS 1646

Specifying Sequence

Specifying a non-thrust type DN300 Class 16 dismantling joint.

Example	300	DIS JNT	N-THRUST	S/S	TC	FC
Nominal Size						
100 - 750						
Name						
Type						
Thrust						
Non thrust						
Fastener Type						
SS - Stainless Steel						
End Type						
TC - Flanged AS 4087 Figure B5						
HP - Flanged AS 4087 Figure B6						
Extra Information						
FC - Fusion Coated						
DI - Ductile Iron						
DI CL - Ductile Iron Cement Lined						

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Dismantling Joints for pressure pipe

Installation Instructions

1. Remove nut (1) and washer.
2. Place dismantling joint into position and attach fixed end of dismantling joint to pipeline.
3. Wind nut (5) back to 15mm from end of stud.
4. Slide whole assembly along by tightening nut (4) against thrust flange. Wind nut (3) back towards nut (4) about 20-30mm. Keep tightening nut (4) against thrust flange until enough thread is protruding from existing flange for nut (1) to go on.
5. Screw nut (1) and washer on.
6. Tighten nuts (4) & (5) together so that the stud is locked in position.
7. Tighten nut (1).
8. Tighten nut (2) so that flange "Y" is tight against existing flange.
9. Tighten nut (3) so that rubber ring gives appropriate seal.
10. Check to make sure joint is secure.

REMOVAL

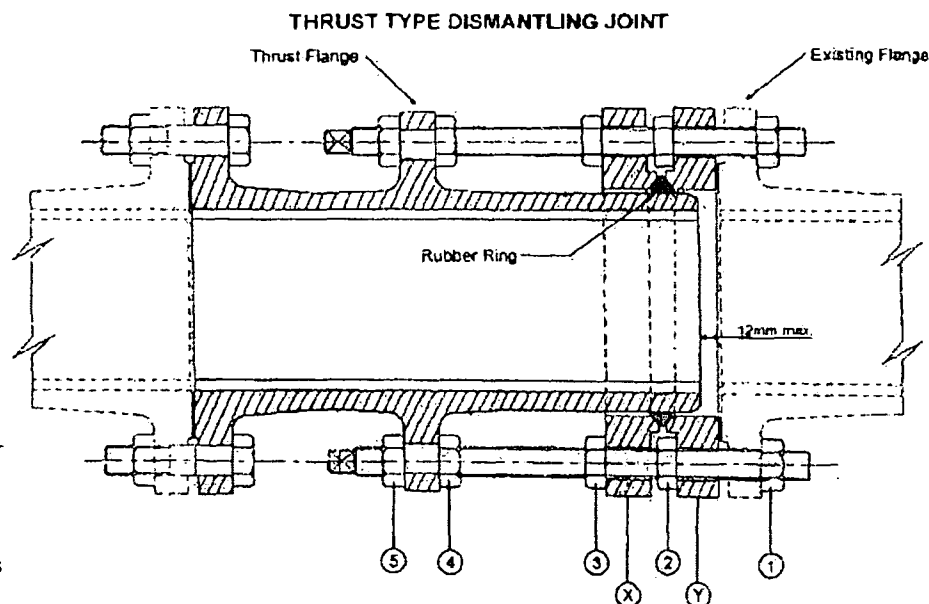
1. Remove nut (1) and washer.
2. Loosen nut (4) until it meets up with nut (3).
3. Slide flange "X" back towards thrust flange, which in turn will pull studs back as well.
4. There is no need to move nuts (2), (3) and (5).

NOTES:

Always tighten nuts progressively in a star pattern as per normal for flanged joints.

For reinstallation after removal, reverse the removal procedure.

Maximum Operating Pressure is 3500 kPa



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Appendix 6

Reflux Valves

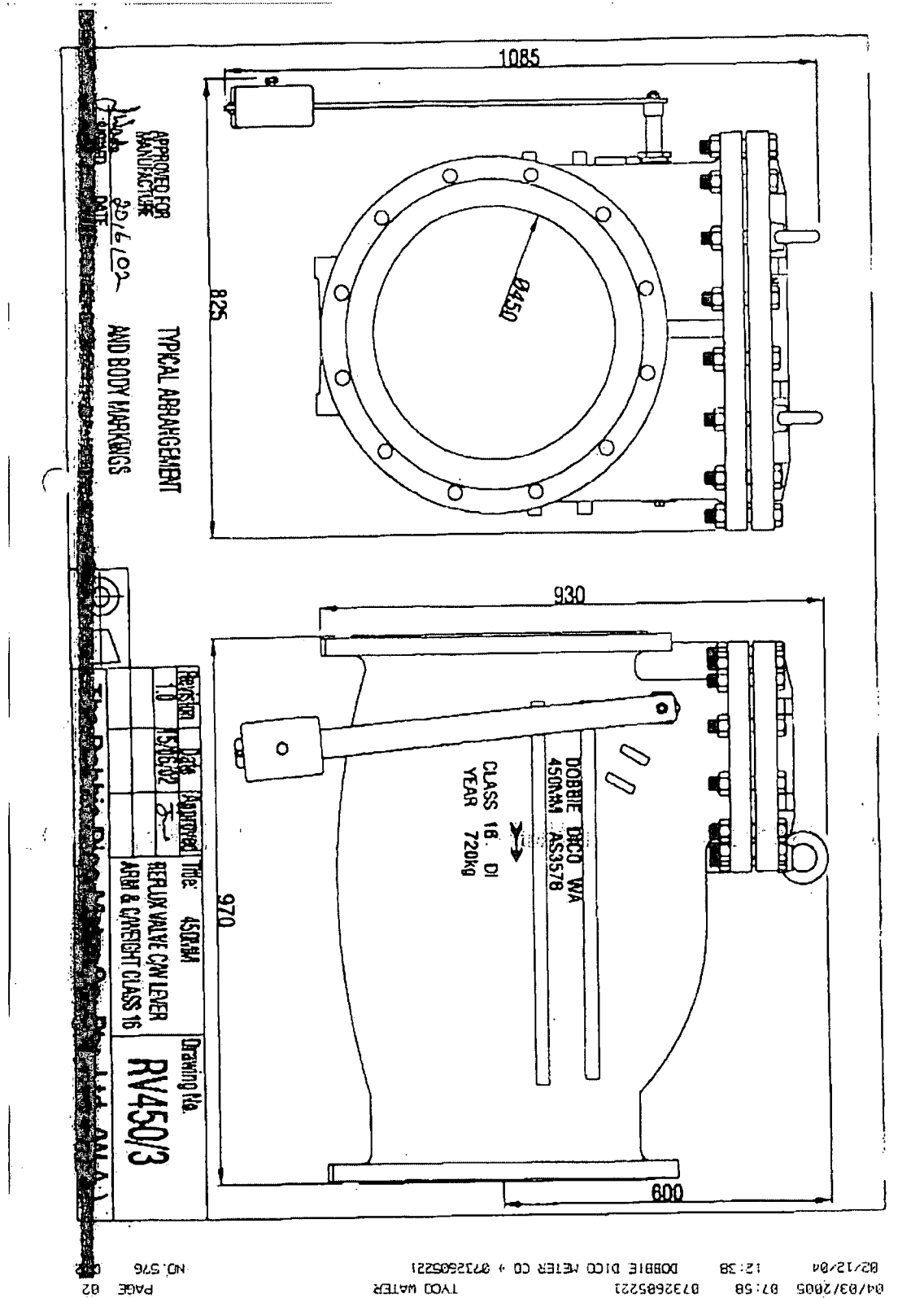
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PAGE 03
NO. 576

METRIC TOLERANCES	
mm	
25	± 0.5
25.0	± 0.2
25.00	± 0.1

APPROVED FOR
MANUFACTURE

SIGNED DATE

450mm REFLUX VALVE SPECIFICATIONS

No	PART	MATERIAL	STANDARD	GRADE
1	BODY	DUCTILE IRON	AS1831	AS 500-7
2	COVER	DUCTILE IRON	AS1831	AS 500-7
3	BOLTS	GALV. CARBON STEEL	AS1252	HIGH STRENGTH STRUCTURAL
3	BOLT ALTERNATIVE	STAINLESS STEEL	AS2837	304 OR 316
4	BLANKING PLUG	DR BRASS	BS1256	
5	FLAP SPINDLE	STAINLESS STEEL	AS2837	316 OR 304
6	SEATING RING	GUNMETAL	AS1565	(83600)
7	FLAP	GUNMETAL	AS1565	(83600)
8	HINGE	GUNMETAL	AS1565	(83600)
9	HINGE SPINDLE	STAINLESS STEEL	AS2837	316 OR 304
10	GASKET	NON ASBESTOS JOINTING	BS5292	
11	SPINDLE BUSH	GUNMETAL OR DR BRASS	AS1565	(83600)
12	WASHER	STAINLESS STEEL	AS2837	316 OR 304
13	SPLIT PIN	STAINLESS STEEL	AS2837	316 OR 304
14	GLAND NUT	GUNMETAL	AS1565	(83600)
15	BLEED PLUG	GALV. MALLEABLE IRON	BS1256	
16	LEVER ARM (IF REQ'D)	STRUCTURAL STEEL	AS3679	250
17	COUNTERWEIGHT (IF REQ'D)	GREY CAST IRON	AS1830	F220
18	LIMIT SWITCH (IF REQ'D)	AS SPECIFIED		
19	CAM (IF REQ'D)	STAINLESS STEEL	AS2837	316 OR 304

A.S. FLANGE SPECIFICATIONS

VALVE CLASS	FLANGE DIAM.	FLANGE THICKNESS	FACE/FACE LENGTH	LENGTH TOL. +/-	MIN WALL THICKNESS	No. BOLT HOLES	BOLT HOLE DIAM.	BOLT HOLE P.C.D.
450C	640	35	970	3	X	12	26	584
450E	640	35	970	3	X	16	26	584
450F	675	38	970	3	X	20	33	610
450H	675	51	970	3	X	20	33	610

REV	DATE	APPO	TITLE	DRAWING No.
0.0	26/10/06		450MM REFLUX VALVE SPECIFICATIONS	RV450/1
0.1	14/05/07			

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Appendix 7 Sump Pumps

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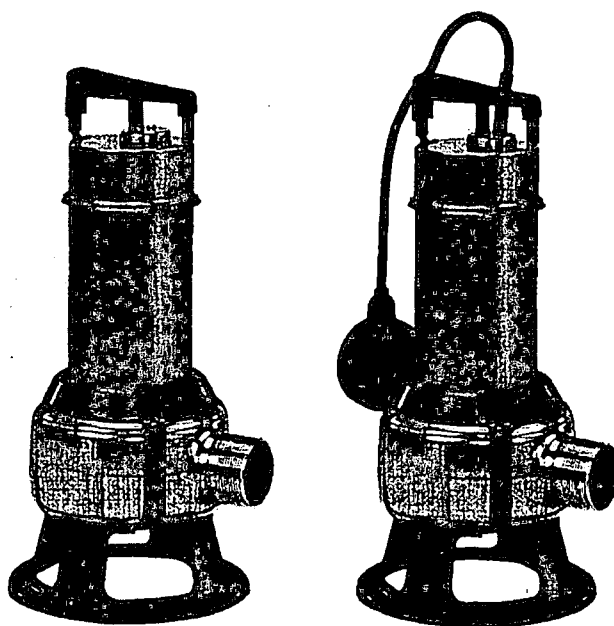
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GRUNDFOS INSTRUCTIONS

AP35B, AP50B

- (GB) Installation and operating instructions
- (D) Montage- und Betriebsanleitung
- (F) Notice d'installation et d'entretien
- (I) Istruzioni di installazione e funzionamento
- (E) Instrucciones de instalación y funcionamiento
- (P) Instruções de instalação e funcionamento
- (GR) Οδηγίες εγκατάστασης και λειτουργίας
- (NL) Installatie- en bedieningsinstructies
- (S) Monterings- och driftsinstruktion
- (SF) Asennus- ja käyttöohjeet
- (DK) Monterings- og driftsinstruktion



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GRUNDFOS 

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Declaration of Conformity

We GRUNDFOS declare under our sole responsibility that the products AP35B and AP50B to which this declaration relates, are in conformity with the Council Directives on the approximation of the laws of the EEC Member States relating to

- Machinery (98/37/EEC).
Standard used: EN 292.
- Electrical equipment designed for use within certain voltage limits (73/23/EEC).
Standards used: EN 60 335-1 and EN 60 335-2-41.

Konformitätserklärung

Wir GRUNDFOS erklären in alleiniger Verantwortung, daß die Produkte AP35B und AP50B, auf die sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-Mitgliedstaaten übereinstimmen:

- Maschinen (98/37/EEG).
Norm, die verwendet wurde: EN 292.
- Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (73/23/EEG).
Normen, die verwendet wurden: EN 60 335-1 und EN 60 335-2-41.

Déclaration de Conformité

Nous GRUNDFOS déclarons sous notre seule responsabilité que les produits AP35B et AP50B auxquels se réfère cette déclaration sont conformes aux Directives du Conseil concernant l'approchement des législations des Etats membres CEE relatives à

- Machines (98/37/CEE).
Standard utilisé: EN 292.
- Matériel électrique destiné à employer dans certaines limites de tension (73/23/CEE).
Standards utilisés: EN 60 335-1 et EN 60 335-2-41.

Dichiarazione di Conformità

Noi GRUNDFOS dichiariamo sotto la nostra esclusiva responsabilità che i prodotti AP35B e AP50B ai quali questa dichiarazione si riferisce sono conformi alle Direttive del Consiglio concernenti il ravvicinamento delle legislazioni degli Stati membri CEE relative a

- Macchine (98/37/CEE).
Standard usato: EN 292.
- Materiale elettrico destinato ad essere utilizzato entro certi limiti di tensione (73/23/CEE).
Standard usati: EN 60 335-1 e EN 60 335-2-41.

Declaración de Conformidad

Nosotros GRUNDFOS declaramos bajo nuestra única responsabilidad que los productos AP35B y AP50B a los cuales se refiere esta declaración son conformes con las Directivas del Consejo relativas a la aproximación de las legislaciones de los Estados Miembros de la CEE sobre

- Máquinas (98/37/CEE).
Norma aplicada: EN 292.
- Material eléctrico destinado a utilizarse con determinadas límites de tensión (73/23/CEE).
Normas aplicadas: EN 60 335-1 y EN 60 335-2-41.

Declaração de Conformidade

Nós GRUNDFOS declaramos sob nossa única responsabilidade que os produtos AP35B e AP50B aos quais se refere esta declaração estão em conformidade com as Directivas do Conselho das Comunidades Europeias relativas à aproximação das legislações dos Estados Membros respeitantes à

- Máquinas (98/37/CEE).
Norma utilizada: EN 292.
- Material eléctrico destinado a ser utilizado dentro de certos limites de tensão (73/23/CEE).
Normas utilizadas: EN 60 335-1 e EN 60 335-2-41.

Δήλωση Συμμόρφωσης

Εμείς η GRUNDFOS δηλώνουμε με αποκλειστικό δική μας ευθύνη ότι τα προϊόντα AP35B και AP50B συμμορφώνονται με την Οδηγία του Συμβουλίου επί της σύγκλισης των νόμων των Κρατών Μελών της Ευρωπαϊκής Ένωσης σε σχέση με τα

- Μηχανήματα (98/37/ΕΕΕ).
Πρότυπα που χρησιμοποιήθηκαν: EN 292.
- Ηλεκτρικές συσκευές σχεδιασμένες για χρήση εντός ορισμένων ορίων ηλεκτρικής τάσης (73/23/ΕΕΕ).
Πρότυπα που χρησιμοποιήθηκαν: EN 60 335-1 και EN 60 335-2-41.

Overeenkomstigheidsverklaring

Wij GRUNDFOS verklaren geheel onder eigen verantwoordelijkheid dat de producten AP35B en AP50B waarop deze verklaring betrekking heeft in overeenstemming zijn met de Richtlijnen van de Raad inzake de onderlinge aanpassing van de wetgevingen van de Lid-Staten betreffende

- Machines (98/37/EEG).
Norm: EN 292.
- Elektrisch materiaal bestemd voor gebruik binnen bepaalde spanningsgrenzen (73/23/EEG).
Normen: EN 60 335-1 en EN 60 335-2-41.

Försäkran om överensstämmelse

Vi GRUNDFOS försäkrar under ansvar, att produkterna AP35B och AP50B, som omfattas av denna försäkran, är i överensstämmelse med Rådets Direktiv om inbördes närmande till EU-medlemsstaternas lagstiftning, avseende

- Maskinell utrustning (98/37/EC).
Använd standard: EN 292.
- Elektrisk material avsedd för användning inom vissa spänningsgränser (73/23/EC).
Använda standarder: EN 60 335-1 och EN 60 335-2-41.

Vastaavuusvakuutus

Me GRUNDFOS vakuutamme yksin vastuullisesti, että tuotteet AP35B ja AP50B, joihin tämä vakuutus koskee, noudattavat direktiivijä joihin käsittelevät EY:n jäsenvaltioiden koneellista laitteita koskevien lakien yhdenmukaistusta seura:

- Koneet (98/37/EY).
Käytetty standardi: EN 292.
- Määrättyjen jännitearvojen puitteissa käytettävät sähköiset laitteet (73/23/EY).
Käytetyt standardit: EN 60 335-1 ja EN 60 335-2-41.

Overensstemmelseerklæring

Vi GRUNDFOS erklærer under ansvar, at produktene AP35B og AP50B, som denne erklæring omhandler, er i overensstemmelse med Rådets direktiv om indbyrdes tilnærming af EF medlemsstaternes lovgivning om

- Maskiner (98/37/EF).
Anvendt standard: EN 292.
- Elektrisk materiel bestemt til anvendelse inden for visse spændingsgrænser (73/23/EF).
Anvendte standarder: EN 60 335-1 og EN 60 335-2-41.

Bjerringbro, 1st April 2000



Kenneth Hvid Nielsen
Technical Manager

BRISBANE CITY COUNCIL
Brisbane Water
SP300 - Serpentine Road

Q1112-WC-001

AP35B, AP50B

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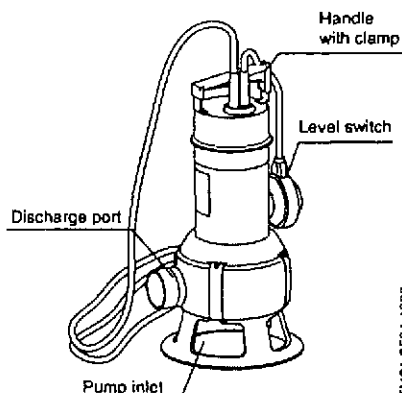
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Before beginning installation procedures, these installation and operating instructions should be studied carefully. The installation and operation should also be in accordance with local regulations and accepted codes of good practice.

1. General description

Fig. 1



TMO1 3504 4898

1.1 Applications

The GRUNDFOS AP35B and AP50B pumps are single-stage submersible pumps designed for the pumping of waste water.

The pump is capable of pumping water which contains a limited quantity of solids, however not stones and similar materials, without being blocked or damaged.

The pump is available for automatic as well as manual operation and can be installed in a permanent installation (on auto-coupling or as a free-standing pump) or used as a portable pump.

The pump is suitable for:

Applications	AP35B	AP50B
Groundwater lowering	●	●
Pumping in drainage pits	●	●
Pumping in surface water pits with inflow from roof gutters, shafts, tunnels, etc.	●	●
Emptying of ponds, tanks, etc.	●	●
Pumping of fibre-containing waste water from laundries and industries	●	●
Pumping of domestic waste water from septic tanks and sludge treating systems	●	●
Pumping of domestic waste water without discharge from water closets	●	●
Pumping of domestic waste water with discharge from water closets		●
Maximum particle size (mm)	35	50



The pump must not be used in or at swimming pools, garden ponds, etc. when there are persons in the water.

Incorrect application of the pump (e.g. resulting in blocking of the pump) and wear are not covered by the warranty.

1.2 Storage and operating conditions

Storage temperature: Down to -30°C.

Minimum liquid temperature: 0°C.

Maximum liquid temperature: +40°C.

Installation depth: Maximum 7 metres below liquid level.

pH value: Between 4 and 10.

Density: Maximum 1100 kg/m³.

Viscosity: Maximum 10 mm²/s.

Technical data: See pump nameplate.

1.3 Sound pressure level

The sound pressure level of the pump is lower than the limiting values stated in the EC Council Directive 90/37/EEC relating to machinery.

2. Safety



Pump installation in wells must be carried out by specially trained persons.

3. Electrical connection

Note: Depending on local regulations, a pump with 10 metres of mains cable must be used if the pump is used as a portable pump for different applications. The electrical connection should be carried out in accordance with local regulations.

The operating voltage and frequency are marked on the pump nameplate. Please make sure that the motor is suitable for the electricity supply on which it will be used.



As a precaution, the pump must be connected to a socket with earth connection. The installation must be fitted with an earth leakage circuit breaker (ELCB) with a tripping current < 30 mA.

The pump must be connected to an external mains switch with a minimum contact gap of 3 mm in all poles. If the pump is not installed close to the switch, this must be of a lockable type.

Three-phase pumps must be connected to an external motor starter with differential release. The nominal current of the motor starter must correspond to the electrical data marked on the pump nameplate.

If a level switch is connected to a three-phase pump, the motor starter must be magnetically operated.

Single-phase pumps incorporate thermal overload protection and require no additional motor protection.

Note: If the motor is overloaded, it will stop automatically. When it has cooled to normal temperature, it will restart automatically.

3.1 Checking of direction of rotation

(Three-phase pumps only)

The direction of rotation should be checked every time the pump is connected to a new installation.

Check the direction of rotation as follows:

1. Position the pump so that the impeller can be observed.
2. Start the pump for a short period.
3. Observe the rotation of the impeller. The correct direction of rotation is indicated by an arrow on the top of the motor (clockwise when seen from the bottom). If the impeller rotates in the wrong direction, reverse the direction of rotation by interchanging two of the phases to the motor.

If the pump is connected to a piping system, the direction of rotation can be checked as follows:

1. Start the pump and check the quantity of water or the discharge pressure.
2. Stop the pump and interchange two of the phases to the motor.

3. Start the pump and check the quantity of water or the discharge pressure.
4. Stop the pump.
5. Compare the results taken under points 1 and 3. The connection which gives the larger quantity of water or the higher pressure is the correct direction of rotation.



4. Installation



The installation of the pump must be carried out by specially trained persons. Care must be taken to ensure that persons cannot come into contact with the pump impeller.

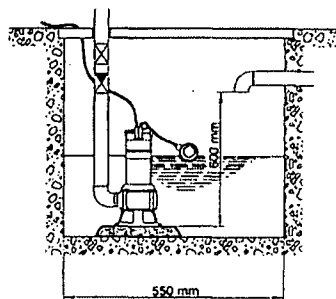
4.1 Connection

For permanent installation, it is recommended to fit a union, a non-return valve and an isolating valve in the discharge pipe.

If the pump is installed in a pit with a minimum free cable length of 100 mm, see fig. 5, the minimum pit dimensions must be as shown in fig. 2.

Furthermore, the pit should be dimensioned according to the relation between the water flow to the pit and the pump performance.

Fig. 2



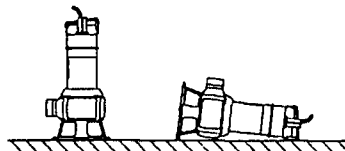
TM01 3595 4998

4.2 Pump location

The pump can be used in vertical or horizontal position, see fig. 3.

During continuous operation, the motor and the pump inlet must always be completely covered by the pumped liquid.

Fig. 3



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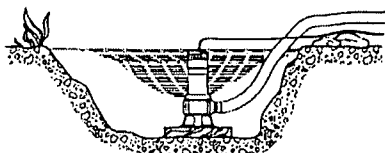
When the pipe/hose has been connected, place the pump in its operating position.

Note: Do not lift or lower the pump by means of the electric cable.

Position the pump so that the pump inlet will not be blocked or partly blocked by sludge, mud or similar materials.

It is recommended to place the pump on a solid base, see fig. 4.

Fig. 4



TMO1 3597 4998

In the case of permanent installation, the pit must be cleared of sludge, pebbles, etc. before the pump is installed.

4.3 Installation on auto-coupling

See figs. A and B, pages 62 and 63.

Pumps for permanent installation can be installed on a stationary auto-coupling and operated completely or partially submerged in the pumped liquid.

1. Drill mounting holes for guide rail bracket on the inside of the pit and fasten the guide rail bracket provisionally with two screws.
2. Place the auto-coupling base unit on the bottom of the pit. Use a plumb line to establish the correct positioning. Fasten with heavy-duty expansion bolts. If the bottom of the pit is uneven, the auto-coupling base unit must be supported so that it is level when being fastened.
3. Assemble the discharge line in accordance with the generally accepted procedures and without exposing the line to distortion or tension.
4. Insert the guide rails in the rings of the auto-coupling base unit and adjust the length of the rails accurately to the guide rail bracket.
5. Unscrew the provisionally fastened guide rail bracket, fit it on top of the guide rails and finally fasten it firmly to the pit wall.

Note: The guide rails must not have any axial play as this would cause noise during pump operation.

6. Clean out debris from the pit before lowering the pump into the pit.
7. Fit the auto-coupling half on to the discharge port of the pump. Then slide the guide bar of this coupling half between the guide rails and lower the pump into the pit by means of a chain. When the pump reaches the auto-coupling base unit, the pump will automatically connect tightly.
8. Hang up the end of the chain on a suitable hook at the top of the pit.

9. Adjust the length of the motor cable by coiling it up on a relief fitting, so the cable is not damaged during operation. Fasten the relief fitting to a suitable bracket at the top of the pit. Make sure that the cables are not sharply bent or pinched.

Note: The end of the cable must not be submerged, as water may penetrate through the cable into the motor.

4.4 Free-standing installation

See fig. C, page 64.

For free-standing installation of the pumps, fit a 90° elbow to the discharge port. The pump can be installed with a hose or rigid pipe and valves.

In order to facilitate service of the pump, fit a flexible union or coupling to the discharge line for easy separation.

If a hose is used, make sure that the hose does not buckle and that the inside diameter of the hose matches that of the discharge port.

If a rigid pipe is used, the union or coupling, non-return valve and isolating valve should be fitted in the sequence mentioned, as seen from the pump side.

Lower the pump into the liquid.

If the pump is installed in muddy conditions or on uneven ground, it is recommended to support the pump on bricks.

4.5 Setting of level switch

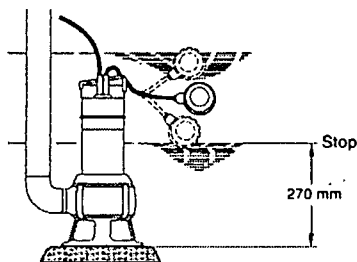
Intermittent operation:

For pumps supplied with a level switch, the difference in level between start and stop can be set by adjusting the free cable between the level switch and the pump handle.

The longer the length of free cable, the larger the difference in level between start and stop.

The pump is allowed to run for maximum 5 minutes per 30 minutes without the motor being submerged in the liquid.

Fig. 5



TMO1 3599 1899

Continuous operation:

During continuous operation, the pump must always be completely covered by the pumped liquid.

5. Start-up

Before start-up, the pump inlet must be submerged in the pumped liquid.

Open the isolating valve, if fitted, and check the level switch setting.

Note: The pump may be run briefly to check the direction of rotation without being submerged in the pumped liquid.

6. Maintenance and service



Before starting work on the pump, make sure that the electricity supply to the pump has been switched off and that it cannot be accidentally switched on.

Before carrying out maintenance and service, it must be ensured that the pump has been thoroughly flushed with clean water. Rinse the pump parts in water after dismantling.

Check the pump and replace the oil once a year. If the pump is used for pumping liquids containing abrasive particles or it is operating continuously, the pump must be checked at shorter intervals.

Out of consideration for the personal safety and health, this work must be carried out by specially trained persons. Furthermore, all rules and regulations covering safety, health and environment must be observed.



During dismantling, caution should be exercised as there will be access to sharp edges, etc. which may cut.

A possible replacement of the cable or the level switch must be carried out by an authorised GRUNDFOS service workshop.

6.1 Oil

The pump contains approx. 60 ml non-poisonous oil. Used oil must be disposed of in accordance with local regulations.

If the drained oil contains water or other impurities, the shaft seal should be replaced.

6.2 Pump construction

The construction of the pump will appear from the table below and fig. D, page 65.

Pos.	Description
50	Pump housing
37a	O-ring
49	Impeller
150	Motor with flange
66	Washer
84	Base
67	Lock nut
6	Inlet part
105a	Shaft seal
182	Level switch



6.3 Service kits

Service kit	Part number
Shaft seal, standard	96 42 93 07
Shaft seal, FKM	96 42 93 08
Oil	96 01 06 46

6.4 Contaminated pumps

Note: If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

If GRUNDFOS is requested to service the pump, GRUNDFOS must be contacted with details about the pumped liquid, etc. *before* the pump is returned for service. Otherwise GRUNDFOS can refuse to accept the pump for service.

Possible costs of returning the pump are paid by the customer.

However, any application for service (no matter to whom it may be made) must include details about the pumped liquid if the pump has been used for liquids which are injurious to health or toxic.

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7. Fault finding chart



Fault	Cause	Remedy
1. Motor does not start.	a) No electricity supply.	Connect the electricity supply.
	b) Motor switched off by level switch.	Adjust/replace the level switch.
	c) Fuses are blown.	Replace fuses.
	d) Motor protection/thermal relay has tripped out.	Wait until the motor protection trips in again/reset the relay.
	e) Impeller blocked by impurities.	Clean the impeller.
	f) Short-circuit in cable or motor.	Replace the defective part.
2. Motor protection/thermal relay trips out after short time of operation.	a) Temperature of pumped liquid too high.	Use another pump type.
	b) Impeller blocked or partly blocked by impurities.	Clean the pump.
	c) Phase failure.	Call an electrician.
	d) Voltage too low.	Call an electrician.
	e) Overload setting of the motor starter too low.	Adjust the setting.
	f) Incorrect direction of rotation. See section 3.1 <i>Checking of direction of rotation</i> .	Reverse the direction of rotation.
3. Pump runs constantly or gives insufficient water.	a) Pump partly blocked by impurities.	Clean the pump.
	b) Discharge pipe or valve partly blocked by impurities.	Clean the discharge pipe.
	c) Impeller not properly fixed to the shaft.	Tighten the impeller.
	d) Incorrect direction of rotation. See section 3.1 <i>Checking of direction of rotation</i> .	Reverse the direction of rotation.
	e) Incorrect setting of level switch.	Adjust the level switch.
	f) Pump too small for the application.	Replace the pump.
	g) Impeller worn.	Replace the impeller.
4. Pump runs but gives no water.	a) Pump blocked by impurities.	Clean the pump.
	b) Discharge pipe or non-return valve blocked by impurities.	Clean the discharge pipe.
	c) Impeller not properly fixed to the shaft.	Tighten the impeller.
	d) Air in pump.	Vent the pump and the discharge pipe.
	e) Liquid level too low. The pump inlet is not completely submerged in the pumped liquid.	Submerge the pump in the liquid or adjust the level switch.
	f) Level switch does not move freely.	Make the level switch move freely.

8. Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:

1. Use the local public or private waste collection service.
2. In case such waste collection service does not exist or cannot handle the materials used in the product, please deliver the product or any hazardous materials from it to your nearest GRUND-FOS company or service workshop.

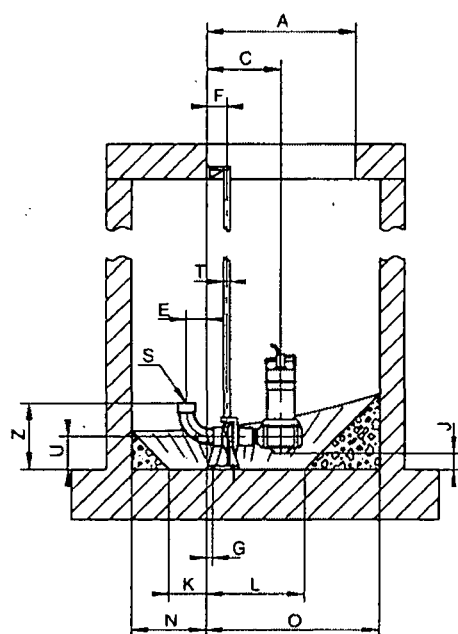
Subject to alterations

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GB: 1-pump installation on auto-coupling
D: Eine Pumpe mit Autokupplung
F: Une pompe avec système d'accouplement automatique
I: Una pompa con accoppiamento rapido
E: Una bomba con autoacoplamiento
P: Uma bomba com acoplamento automático
GR: Εγκατάσταση μίας αντλίας με αυτόματη ζεύξη
NL: Eén pomp met voetbochtsnelkoppeling
S: En pump installerad med kopplingsfot
SF: Yhden pumpun asennus jalustallittimellä
DK: En pumpe med autokobling

Fig. A



TM01 3593 0399

A	B	C	D	E	F	G	I	J	K
ø600	ø600	304	135	82	85	65	100	63	150

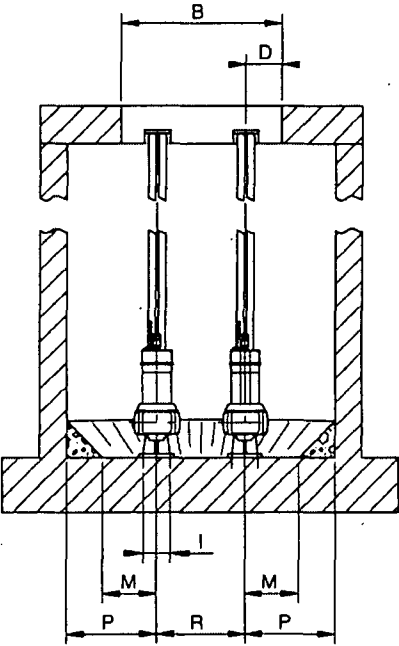
L	M	N	O	P	R	S	T	U	Z
400	200	300	700	500	-	R 2	¾"	130	261

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- GB: 2-pump installation on auto-coupling
D: Zwei Pumpen mit Autokupplung
F: Deux pompes avec système d'accouplement automatique
I: Due pompe con accoppiamento rapido
E: Dos bombas con autoacoplamiento
P: Duas bombas com acoplamento automático
GR: Εγκατάσταση δύο αντλιών με αυτόματη ζεύξη
NL: Twee pompen met voetbochtanekoppeling
S: Två pumpar installerade med kopplingsfot
SF: Kahden pumpun asennus jalustallittimellä
DK: To pumper med autokobling

Fig. B



TM01 3592 0399

A	B	C	D	E	F	G	I	J	K
600	600	304	135	82	85	26	100	63	150

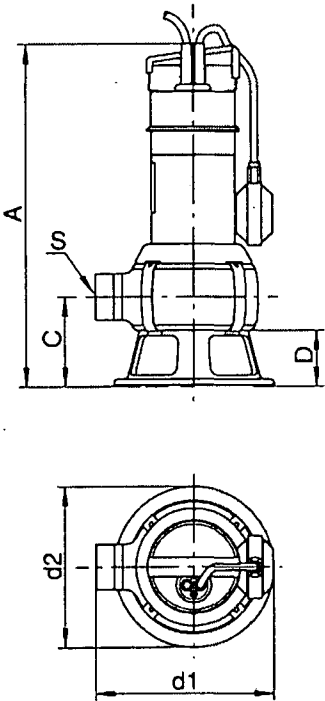
L	M	N	O	P	R	S	T	U	Z
400	200	300	700	335	330	R 2	¾"	130	261

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- GB: Free-standing Installation
- D: Freistehender Einbau
- F: Installation fixe sur socle
- I: Installazione su piede d'appoggio
- E: Instalación portátil
- P: Instalação autónoma
- GR: Ανεξάρτητη εγκατάσταση
- NL: Vrijstaande opstelling
- S: Fristående installation
- SF: Vapaasti seisova asennus
- DK: Fristående installation

Fig. C

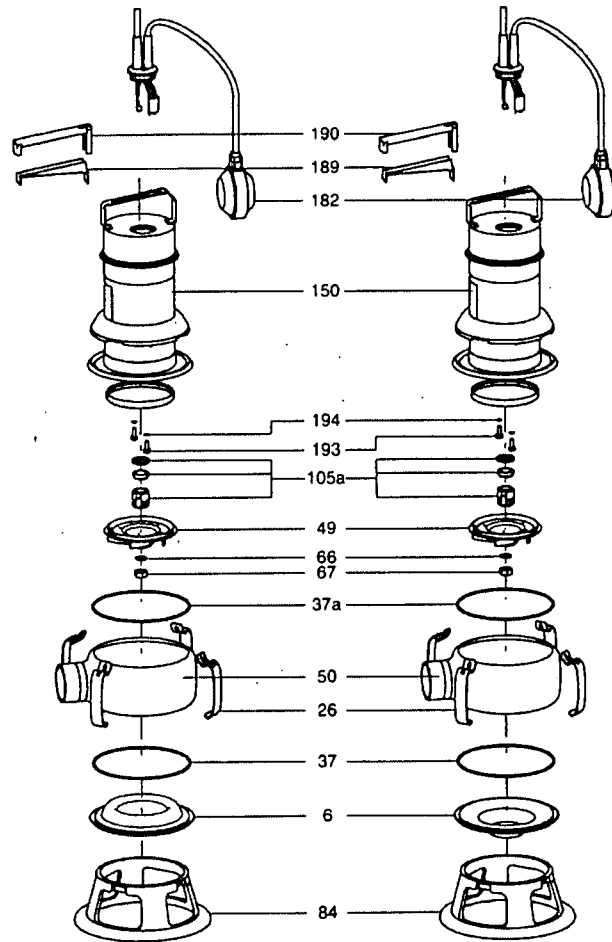


A	C	D	S	d1	d2
443	116	73	R 2	234	210

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Fig. D



TM01 3709 4998

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Appendix 8 Stainless Steel Ball Valves



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Appendix 9 Ventilation Fan

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TD-MIXVENT



Ventiladores para conductos circulares
In-line duct fans
Ventilateurs pour conduits circulaires
Zwischen-Rohr-Radialventilatoren
In-lijn ventilatoren
Ventiladores para condutas circulares
Ventilatori in linea per condotti circolari
Kanalläktar
Ventilatorer til montering i ventilationskanaler
Wentylatorów kanałowych



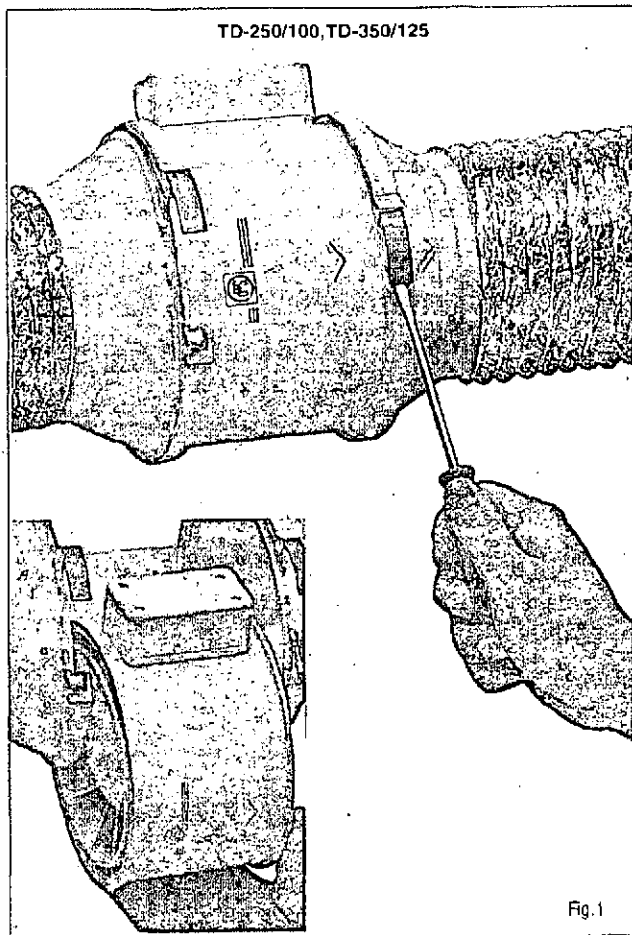
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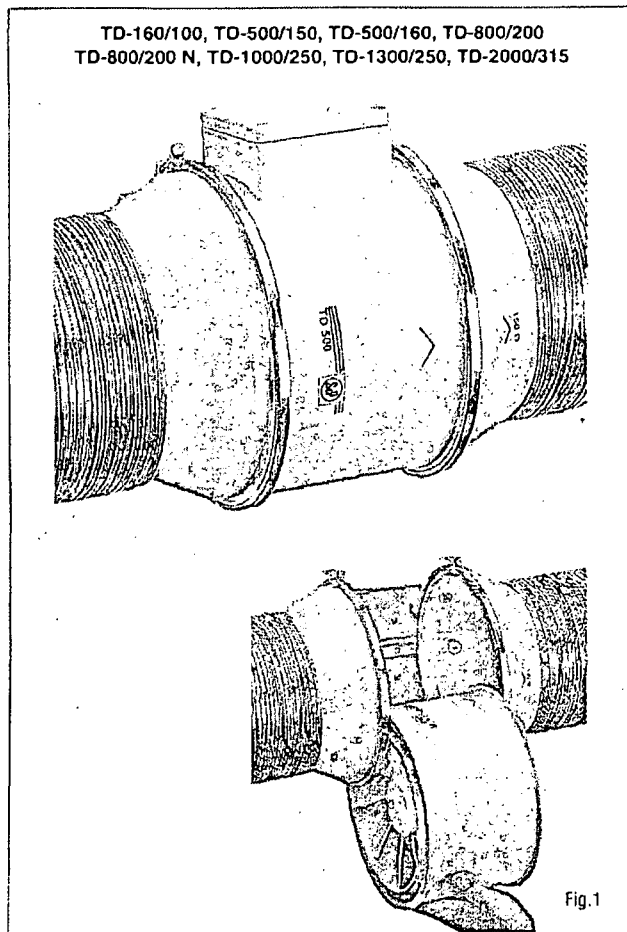
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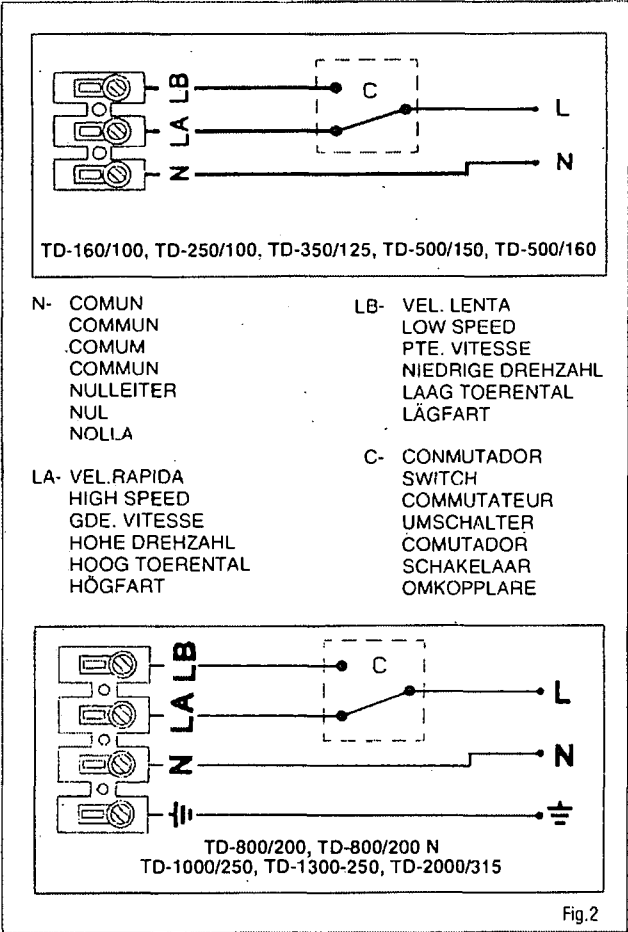
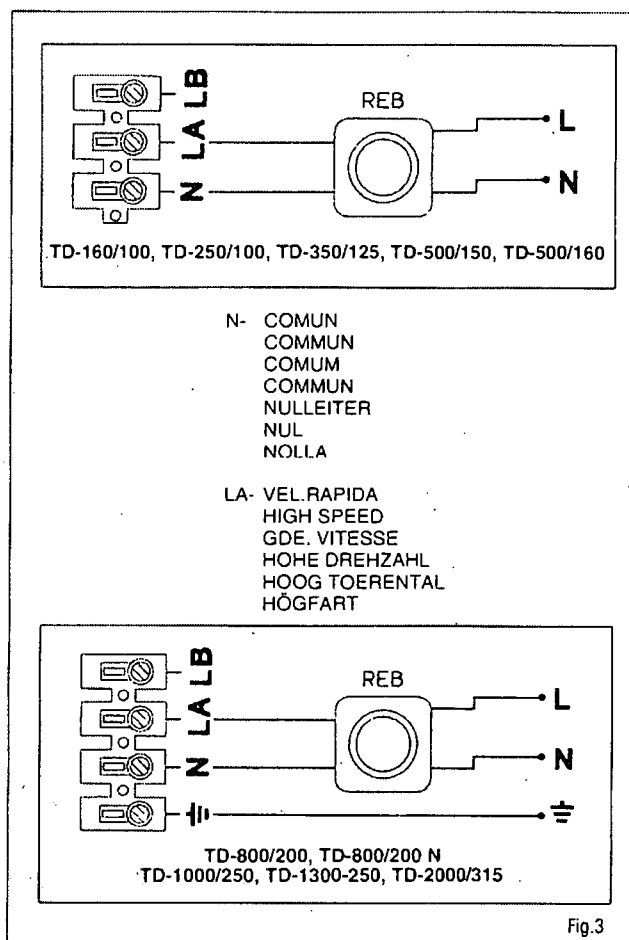


Fig.2

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ENGLISH**TD-MIXVENT****Installation and wiring instructions for in-line duct fans.**

The TD-MIXVENT range of in-line duct extractor fans have been manufactured in accordance with the rigorous standards of production and quality control laid down by the international Quality Standard ISO 9001. All components have been checked and each of the finished products has been tested at the end of the manufacturing process. We recommend that you check the following when receiving this product:

- That it is the correct size and model.
- That the details on the rating label are those you require; voltage, frequency, performance...

IMPORTANT SAFETY INFORMATION

- The installation should always be carried out in accordance with all current applicable Standards to the country in which the product is installed.
- The installation should always be carried out by a suitably qualified and competent person(s).
- These fans are not for stand-alone use. They are designed to be incorporated into ducted systems, machines or where safe operation has been ensured by providing applicable protection to moving parts.

- Do not use this product in, or to extract from, potentially hazardous or explosive atmospheres.
- If the extractor operates in a room with a boiler or any other type of appliance requiring air for combustion, check that air replacement inlets are sufficiently sized.
- The extractor outlet must not be connected to a duct used to exhaust smoke or fumes from any appliance that uses gas or any other type of fuel.

INSTALLATION

- This unit must not be installed outside, unless covered by a suitable weatherproof enclosure.
- For installation a support bracket is provided with the extractor which allows the motor and impeller assembly to be fitted or removed without dismantling the adjacent ducting.
- For installation, remove the motor and impeller assembly from its support bracket fig.1.
- Fix the support bracket in position where the extractor is to be located.
- Connect the inlet and outlet ducting. In order to avoid losses in performance we do not recommend that the fan is used in conjunction with ducting of a lesser diameter than the fan connection spigots. If the extractor is connected to flexible ducting, then the ducting must be expanded as much as possible.
- The fan should be installed to ensure minimum vibration and

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noise transmission to surrounding ductwork and building frames. Antivibration mountings and sound attenuating accessories are available. Please contact your local distributor. The fan should always be installed so that safe operation and maintenance can be ensured.

- Before installing the unit ensure the impeller is running freely and there are no obstructions to the airflow.

ELECTRICAL CONNECTION

- Before Installation and Wiring **ENSURE THE MAINS ELECTRICAL SUPPLY IS DISCONNECTED!**
- The electrical installation must include a double pole switch with a contact clearance of at least 3 mm, correctly sized and in accordance with the electrical standards of the country of installation.
- Ensure that the voltage and frequency of the electrical supply match the information stated on the Data Plate of the unit (maximum recommended tolerance of Voltage (V) and Frequency (Hz) $\pm 5\%$).
- The standard (non-Timer) fans are fitted with single-phase 2-speed motor. For connection using the two speed selection switches REGUL-2 or COM-2, follow wiring diagrams fig. 2. All motors are also 100% speed controllable via electronic voltage regulating speed controllers.
- For connection using a REB single phase speed controller,

- follow wiring diagrams fig. 3.
- Before operation, check all connections are correct and there are no obstructions to the airflow.
- On connecting the electrical supply ensure the direction of rotation and airflow correspond with the direction of airflow / rotation arrows (sited on unit).

MAINTENANCE

- Before inspection or repair, ensure that the unit is disconnected from the mains electrical supply.
- The fan impeller should be cleaned at least once (1) a year to ensure trouble free operation.
- Do not clean the unit with strong detergents or cleaning fluids. Use a damp (not wet) cloth only for cleaning.

(Soler & Palau, S.A. reserve the right to alter specifications without prior notice)

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Appendix 10 Davit Lifting Arms

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BOMAC ENGINEERING PTY LTD

ACN 005 339 097 ABN 49 005 152 032

Unit 1 153 Wedgewood Road Hallam Victoria Australia 3803
Int Tel: +61 (03) 9796 5300 Int Fax: +61 (03) 9796 4683

BOMAC WALL MOUNTED JIB CRANE

INSTALLATION SAFE USE AND MAINTENANCE MANUAL

28/06/2005/duz

20 MAY 2005

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➤SECTION 2

Installation

➤SECTION 3

Safe Use

➤SECTION 2

Maintenance

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►SECTION 1

General Arrangement and Parts List

Drawings attached model no ATJ-10, ATJ-12, AND ATJ-13

Standard wall mount installation drawing also attached ATJ-16

Parts list are shown on packing slip

For spare parts please contact your supplier and quote Crane No as found on serial plate and date of manufacture

J:\crane\atj.poc

25 MAY 2005


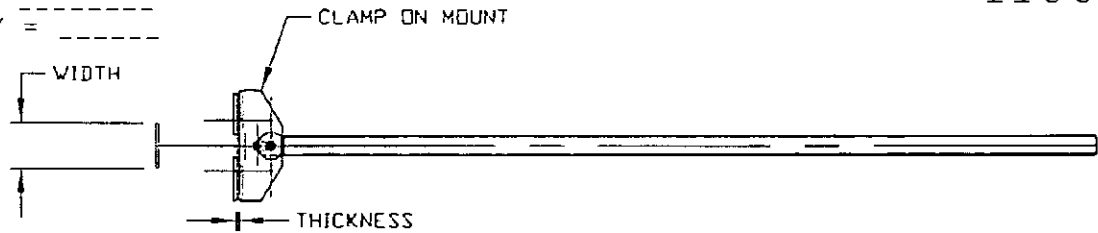
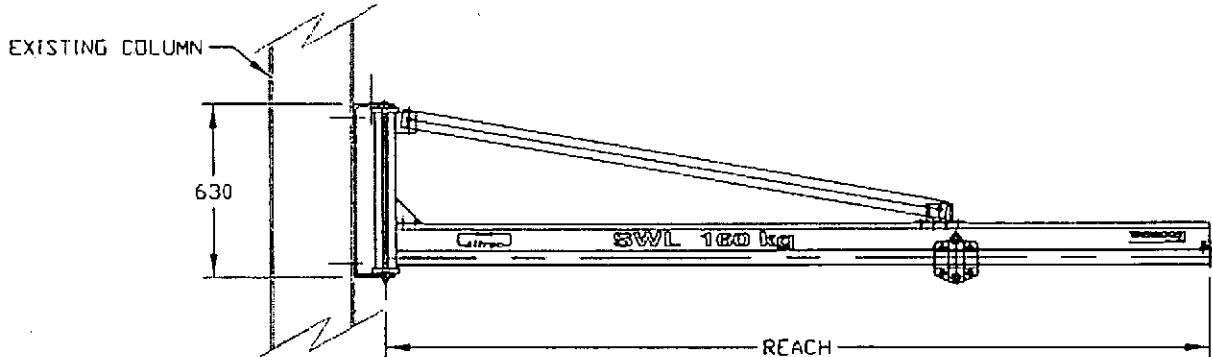
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COLUMN MOUNTED ALTRAC JIB SWL = _____ REACH = _____ HOIST = _____ TROLLEY = _____			
			
			
NOTE: SUITABILITY OF BUILDING COLUMN TO BE APPROVED BY OTHERS			
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BOMAC ENGINEERING PTY. LTD		Unit 1 153 Wedgewood Road Hallam VIC 3804 Telephone 03 9796 5300 Facsimile 03 9796 4683	
CLIENT		DRAWN PM	SHEET A2
SCALE NTS			
DRG NO. ATJ-13	DESCRIPTION ALTRAC 50/160/320KG JIB CRANE	DATE 7-10-03	JOB NO.

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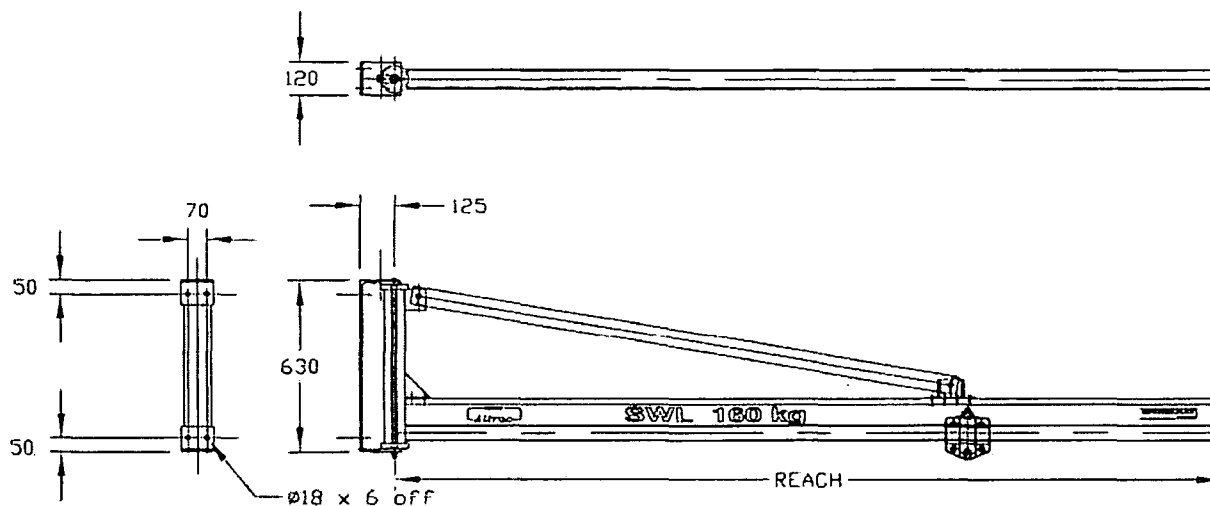
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WALL MOUNTED ALTRAC JIB

SWL = _____
REACH = _____
HOIST = _____
TROLLEY = _____BOMAC
Altrac

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Paint : HAMMERTONE BLUE

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Telephone 03 9796 5300 Facsimile 03 9796 4683

CLIENT		DRAWN: PM	SHEET: A2	SCALE: NTS
DRG NO. ATJ-12	DESCRIPTION ALTRAC 50/160/320KG JIB CRANE	DATE: 7-10-03	JOB. NO.	

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WALL MOUNTED ALTRAC JIB

SWL = -----
 REACH = -----
 HOIST = -----
 TROLLEY = -----

BOMAC
Altrac

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 Telephone 03 9796 5300 Facsimile 03 9796 4683

CLIENT	DRAWN PM	SHEET A2	SCALE NTS
DRG NO. ATJ-10	DESCRIPTION ALTRAC 500KG JIB CRANE	DATE 7-10-03	JOB NO.

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➤SECTION 2

Installation

WARNING : THE SUITABILITY OF EXISTING BUILDING COLUMN TO CARRY THE LOADS APPLIED BY A WALL MOUNTED JIB CRANE MUST BE CHECKED AND APPROVED BY A QUALIFIED ENGINEER. FAILURE OF THE BUILDING COLUMN OR DEFLECTION EXCEEDING CRANE CODE REQUIREMENTS ARE BEYOND THE MANUFACTURES CONTROL

Follow installation sheet provided with the crane using all bolts provided

Typical installation sheet attached for general reference only. Special requirements for each crane are noted on their installation sheet.

Installation should only be carried out by competent personnel and under the qualified supervision

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➤ SECTION 3

Safe Use

For full details on safe use of Cranes see Australian Standards AS2550.1

Specific requirements are as follows

1. The crane should only be used by qualified crane operators as per the relevant regulatory authorities for that State or Country
2. Care must be taken to avoid hitting end stops and slew stops
3. Loads should not be hoisted from outside the crane working range or off vertical
4. Loads exceeding the SWL rating on the crane must not be hoisted
5. Hoists with capacity exceeding the SWL rating of crane must not be used
6. Trolleys of capacity less than the SWL must not be used
7. Prior to using the crane the operator must check the crane is in safe working condition, be familiar with the location of isolating switch.
8. The crane should not be left unattended with a load suspended
9. The operator is responsible to take the crane out of service if any abnormal noise or movement occurs and to report to Management
10. The crane should not be placed back into service until checked by a qualified person

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➤ SECTION 2

Maintenance

Regular maintenance of all cranes is of great importance to provide the crane safe and trouble free for the full life span of the crane

Management must provide a logbook to record installation checks, and program planned maintenance and regular inspections

The inspection intervals should not exceed 12 months, and should be checked more regularly if subject to a high duty of use (see appendix table D1 of AS2550.1 to determine appropriate check intervals)

Regular inspections are to be provided by a competent person qualified to ensure the crane will continue to be safe to use. Inspection shall include but is not limited to the following

1. Remove crane from service
2. Structure - check for corrosion, damage, cracks, wear, all bolts tight
3. Function - check for movement, function of stops and limits
4. Lubrication - check pivots, bearings and chain
5. Electricals - check for function, wear, damage, catenary condition
6. Test - return to service and test with load to SWL

Note any parts found damaged or worn need to be replaced, please contact your crane supplier with crane No and date of manufacture to assist in sourcing appropriate parts

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	<p align="center">BOMAC <i>Altrac</i></p> <p>MODEL ATJ-12 BOLT/WELD ON 50 TO 320KG CAPACITY</p>
	<p>MODEL ATJ-13 CLAMP ON 50 TO 320 KG CAPACITY</p>
	<p>MODEL ATJ-10 BOLT/WELD ON 500/1000KG CAPACITY</p>
<p>WARNING - EQUIPMENT SHOULD BE INSPECTED REGULARLY INJURY OR DEATH MAY OCCUR AS A RESULT OF THE FOLLOWING USING THE INCORRECT TRAC TROLLEY EXCEEDING THE SAFE WORKING LOAD OF THE CRANE FAILURE TO INSTALL THE CRANE CORRECTLY TAMPERING WITH OR MODIFYING THE CRANE</p>	
<p>INSTALLATION INSTRUCTIONS</p> <ol style="list-style-type: none"> 1. GET APPROVAL BY QUALIFIED ENGINEER TO ATTACH TO BUILDING COLUMN 1. FIT MOUNT TO COLUMN -KEEP PIVOT VERTICAL PACK AS NEEDED TO KEEP PLUMB 3. FOR CLAMP ON MOUNT THROUGH DRILL Ø8 AND FIT M8 GR 8.8 BOLTS 4. CHECK PIVOT IN POSITION AND ROTATING FREELY 5. FIT BRACE MOUNT AND BRACE TO ALTRAC 6. TIGHTEN BRACE MOUNT BOLTS TO INSTALLATION TORQUE 7. FIT ALTRAC AND BRACE TO PIVOT AND TIGHTEN 8. FIT TROLLEY PROVIDED 9. FIT END STOP AND TIGHTEN 10. FIT HOIST 11. CHECK MOVEMENT AND SLEW WITHOUT LOAD 12. HOIST SWL AT MAXIMUM REACH AND CHECK DEFLECTION 13. CHECK SIGNAGE AND SERIAL PLATE NOT DAMAGED 	<p>INSTALLATION TORQUE</p> <p>M8 GR8.8 22NM M12 GR4.6 30 NM M12 GR8.8 77NM M16 GR4.6 73NM M16 GR8.8 190NM M20 GR4.6 143NM M20 GR8.8 372NM HILTI HSL T2 M8 25NM HILTI HSL T2 M10 50NM HILTI HSL T2 M12 80NM HILTI HSL T2 M16 120NM</p>
<p>THIS DESIGN OR DRAWING IS NOT SOLD BUT LOANED. IT REMAINS THE SOLE PROPERTY OF BOMAC ENGINEERING PTY LTD AND IS SUBJECT TO RECALL. IT MUST NOT BE COPIED, LENT OR REPRODUCED IN PART OR WHOLE WITHOUT THE WRITTEN APPROVAL OF BOMAC ENGINEERING PTY LTD.</p> <p>Copyright BOMAC Engineering Pty Ltd 2003 (C)</p>	
<p>BOMAC ENGINEERING PTY. LTD</p> <p>Unit 1 153 Wedgewood Road Hallam VIC 3804 Telephone 03 9796 5300 Facsimile 03 9796 4683</p>	
<p>CLASS: _____</p>	<p>DRAWN: PM</p>
<p>ORD. NO. ATJ16</p>	<p>DESCRIPTION: ALTRAC JIB CRANE INSTALLATION INSTRUCTIONS</p>
<p>DATE: 10/2/04</p>	<p>SHEET: A2</p>
<p>SCALE: NTS</p>	<p>JOIN NO. _____</p>

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Appendix 11 Non-Shrink Epoxy Grout

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Conbextra EP



Epoxy resin free flow grout

Uses

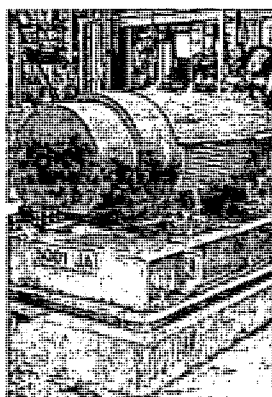
A range of free flow grouts for use in situations where heavy dynamic or mobile loads are encountered. The gap between a base plate and substrate will need to be filled and the structural load be uniformly distributed in such applications as reciprocating machinery, testing equipment, heavy crane and transporter rails, high speed turbines and centrifuges and drop forges.

Also for use in conditions where chemical spillage may be encountered. Typical situations could be met in steelworks, refineries, electroplating works and chemical plants.

Conbextra EP120 is especially suitable where long working time and/or low exotherm properties are required e.g. for large pours, large gaps or high ambient temperatures.

Advantages

- High compressive, tensile and flexural strengths
- Resistant to repetitive dynamic loads
- Fast, convenient installation with early strength gain
- Withstands a wide range of chemicals
- Non-shrink and hence ensures complete surface contact and bond
- Low creep characteristics under sustained loading



Grouting of motor baseplate with Conbextra EP products

Description

Conbextra EP is a range of epoxy resin based products designed for free-flow grouting of gaps from approximately 0.25 mm to 120 mm. Four grades of product are available.

Conbextra EP10 for grouting gaps ranging from 0.25 mm to 10 mm. It is an all liquid system consisting of a base and hardener.

Conbextra EP40 for grouting gaps ranging from 10 mm to 40 mm.

Conbextra EP65 for grouting gaps ranging from 35 mm to 65 mm.

Conbextra EP120 is a low exotherm material which is particularly suitable where long working time is needed; for large gaps (up to 120 mm) or for grouting at high ambient temperatures (up to 55°C).

Technical support

Parchem offers a comprehensive range of high performance, high quality construction products. In addition, Parchem offers a technical support package to specifiers and contractors as well as technical advice from staff experienced in the construction industry.

Properties

The following results are typical for the hardened grout at 20°C.

Test method for	Typical result			
	EP10	EP40	EP65	EP120
Density (kg/m³):	1060	1950	2050	1950
Compressive strength (MPa)				
BS 6319 part 2 1983				
1 day:	57	79	77	5
3 days:	66	86	89	90
7 days:	83	91	90	100
Typical site results @ 23°C				
Compressive Strength (MPa)				
	EP40	EP65		
3 Hours	30	20		
4 Hours	45	35		
5 Hours	55	50		
Tensile strength (MPa)				
BS 6319 part 7 1985				
7 days:	29	19	15	18
Flexural strength (MPa)				
BS 6319 part 3 1990				
7 days:	91	40	29	34
Secant modulus (GPa)				
BS 6319 part 6 1984 :		13.3	13.3	12.7

Conbextra EP : 5/2003

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Chemical resistance

All Conbextra EP products are resistant to oil, grease, fats, most chemicals, mild acids and alkalis, fresh and sea water. Consult Parchem Technical Services when exposure to solvents or concentrated chemicals is anticipated.

Pot life

Ambient temperature affects the time for which bulk material will remain fluid.

Typical values in minutes are:

	10°C	20°C	30°C	40°C
EP10	40	20	10	-
EP40	60	30	15	-
EP65	60	30	15	-
EP120	-	120	90	50

Exotherm

All epoxy systems will develop a temperature rise on mixing. Its extent will be a function of the volume to surface ratio, the ambient temperature, as well as the mass and thermal conductivity of the surrounding materials. Contact Parchem for specific data on each product.

Specification clauses

Supplier specification

All epoxy resin grouting where shown on the drawings, must be carried out using the suitable grade of Conbextra EP product manufactured by Parchem and used in accordance with the manufacturer's data sheet.

Performance specification

All epoxy resin grouting where shown on the drawings must be carried out with a factory packed product. The hardened grout must have a compressive strength which exceeds 80 MPa at 7 days, a tensile strength which exceeds 15 MPa at 7 days and a flexural strength which exceeds 28 MPa at 7 days.

The storage handling and placement of the grout must be in strict accordance with the manufacturer's instructions.

Instructions for use

Preparation

Foundation surface

All contact surfaces must be free from oil, grease, free standing water or any loosely adherent material. Concrete surfaces should be cut back to a sound base. All dust must be removed and bolt holes or fixing pockets blown clean of any dirt or debris.

Steel surfaces

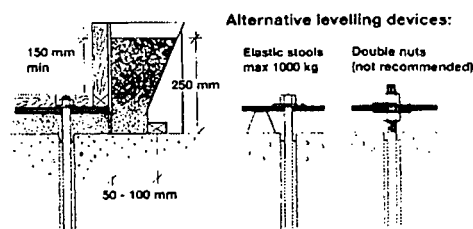
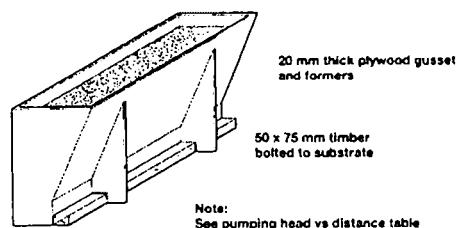
All steel surfaces should be shot blasted free of rust, paint and flaky mill scale.

Formwork

The formwork should be constructed to be leakproof as Conbextra EP products are free flowing grouts. Loss of grout once the material is placed, but not hardened, will result in incomplete filling of the gap.

For free flow grout conditions it is essential to provide a hydrostatic head of grout. To achieve this a feeding hopper system should be used.

Typical on-plate shutter system





Mixing

Pour all the contents of the hardener pack into the base container. Mix using a slow speed power mixer until homogeneous.

In the case of EP120, pour all the resultant liquid into a container with a capacity of 20 - 25 litres then add all the filler.

For all products, mix using a slow speed power mixer for two minutes or until a uniform colour is achieved in the grout.

Placing

The mixed grout should be poured steadily from one side only to eliminate the entrapment of air.

Continuous grout flow is essential.

Sufficient grout must be available prior to starting.

The time taken to pour a batch should be regulated to the time taken to prepare the next batch.

Flow characteristics

The maximum distance of flow is governed by the gap thickness, the head of grout applied and the ambient temperature. The following table gives typical data for flow design.

	°C	Gap thickness (mm)	Hydrostatic head (mm)	Maximum flow (mm)
EP10:	Flow determined by gap thickness and pressure applied.			
EP40:	5	12	100	450
	20	12	100	900
EP65:	5	35	100	900
	20	35	100	2000
EP120:	Similar to Conbextra EP65			

Cleaning

All tools and equipment should be cleaned immediately after use with Solvent 10. Spillages should be absorbed with sand or sawdust and disposed in accordance with local regulations.

Limitations

Temperature

During application

For all products except EP120, grouting may be carried out without special precautions at ambient temperatures from 5° to 25°C.

For EP120, grouting should not be carried out at temperatures below 20°C.

In service

The cured grouts, which are completely resistant to frost and sub-zero temperatures, are suitable for use up to 45°C. EP120 is most suited for temperatures in the range 20° to 55°C.

Estimating

Supply

EP10:	300 ml and 1.5 litre	2 component packs
EP40:	3 and 15 litre	2 component packs
EP65:	3.5 and 14 litre	2 component packs
EP120:	14 litre	3 component packs

(3 component packs contain base resin, hardener and fillers.)

Storage

All Conbextra EP products have a shelf life of 12 months if kept in dry conditions at 20°C.

Precautions

Health and safety

Conbextra EP10, EP40, EP65, EP120 and Solvent 10 are classed hazardous under WorkSafe Australia guidelines.

Conbextra EP: Contains resins which may cause sensitisation by skin contact. Avoid contact with skin and eyes and inhalation of vapour. Wear suitable protective clothing, gloves and eye/face protection. Barrier creams provide additional skin protection. Should accidental skin contact occur, remove immediately with a resin removing cream, followed by soap and water. Do not use solvent. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed seek medical attention immediately - **do not** induce vomiting.

If poisoning occurs, contact a Doctor or Poisons Information Centre - phone 13 11 26

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Fire

Solvent 10 is flammable. In the event of fire extinguish with CO₂ or foam. Solvent 10 is flammable. Keep away from sources of ignition - no smoking. Wear suitable protective clothing, gloves and eye/face protection. Use only in well ventilated areas.

Flash point - Solvent 10: 27°C.

A product Material Safety Data Sheet is available from your local Parchem sales office. Read MSDS and product data sheet carefully before first use. In emergency, contact any Poisons Information Centre.

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Melbourne (03) 9326 3100

Email: technical@parchem.com.au
Internet: www.parchem.com.au

7 days a week
Technical Support Hotline : 1800 812 884

Important note

Parchem Construction Products Pty Ltd products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst the company endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.

AUS/13004/03/A

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Material Safety Data Sheet

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Infosafe No.	LPT9B	Issue Date : August 2004	ISSUED by PARCHEMC
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Product Name :	FOSROC CONBEXTRA EP65 BASE
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Classified as hazardous according to criteria of NOHSC

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product Name	FOSROC CONBEXTRA EP65 BASE
Product Use	Base component of epoxy grout.
Company Name	Parchem Construction Products Pty Ltd (ABN 80 069 961 968)
Address	7 Lucca Road Wyong NSW 2259 Australia
Emergency Tel	1800 638 556
Telephone Number/Fax	Tel: 02 4350 5000 Fax: 02 4351 2024
Other Information	This MSDS summaries at the date of issue our best knowledge of the health and safety hazard information of the product, and in particular how to safely handle and use the product in the workplace. Since Parchem Construction Products Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, review this MSDS in the context of how the user intends to handle and use the product in the workplace. If clarification or further information is needed to ensure that an appropriate assessment can be made, the user should contact this company. Our responsibility for product as sold is subject to our standard term and conditions, a copy of which is sent to our customers and is also available upon request.

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Name	CAS	Proportion
	Silica (crystalline-quartz)	14808-60-7	60-100 %
	Bisphenol-A Epoxy Resin	25068-38-6	10-30 %
	Bisphenol F epoxy resin	55492-52-9	1-10 %
	C12-C14 Glycidyl ether	68609-97-2	1-10 %
	Other ingredients determined not to be hazardous		Balance

3. HAZARDS IDENTIFICATION

Classified as Hazardous according to the criteria of NOHSC.
Classified as Dangerous Goods according to the ADG Code.

RISK PHRASES:
Irritating to eyes, respiratory system and skin.
May cause sensitization by skin contact.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES:
Do not breathe vapour.
Avoid contact with skin and eyes.
Wear suitable protective clothing, gloves and eye/face protection.
Avoid release to the environment. Refer to special instructions/safety data sheet.

Other Information

4. FIRST AID MEASURES

Inhalation	Remove victim from exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. In event of cardiac arrest, apply external cardiac massage. Seek immediate medical advice.
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Product Name : **FOSROC CONBEXTRA EP65 BASE**

Classified as hazardous according to criteria of NOHSC

Ingestion	Do NOT induce vomiting. Wash out mouth with water. Do not give anything by mouth to an unconscious person. Seek immediate medical attention.
Skin	If skin or hair contact occurs remove contaminated clothing and wash contaminated skin and hair with plenty of soap and running water. Wash contaminated clothing before re-use. If irritation occurs seek medical advice.
Eye	If in eyes, hold eyelids apart and flush the eye continuously with running water. Take care not to rinse contaminated water into the non-affected eye. Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. In all cases of eye contamination it is a sensible precaution to seek medical advice.
First Aid Facilities	Eyewash and normal washroom facilities.
Advice to Doctor	Treat symptomatically. For advice, contact a Poisons Information Centre (Phone eg Australia 131 126) or a doctor (at once).

5. FIRE FIGHTING MEASURES

Extinguishing Media	Water fog (or if unavailable fine water spray), foam, dry agent (carbon dioxide or dry chemical powder).
Specific Methods	Keep uninvolved containers cool with water spray. Contain run-off water for later collection and controlled disposal.
Specific Hazards	Combustible material. This product will burn if exposed to fire. This product contains crystalline silica and when the wet product dries out, a proportion of this may become airborne as respirable dust.
Hazardous Combustion Products	Combustion products include oxides of carbon and nitrogen. Under fire conditions this product may produce hazardous dusts (crystalline silica).
Protective Equipment	Fire-fighters should wear full protective clothing and self contained breathing apparatus (SCBA).

6. ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Increase ventilation. Evacuate all unnecessary personnel. Slippery when spilt. Wear Self-Contained Breathing Apparatus (S.C.B.A) and full protective clothing to minimise skin and eye exposure, and inhalation of vapours. If possible contain the spill. Place inert absorbent such as vermiculite, sand or dirt onto material. Prevent run off into drains and waterways. Use clean non-sparking tools to collect the material and place into a suitable labelled container. Do not dilute material but contain. Mop up the remaining material and place into the same container. If large quantities of this material enter the waterways contact the Environmental Protection Authority, or your local Waste Management Authority.

7. HANDLING AND STORAGE

Handling	Use approved combustible liquid storage containers in the work area. Keep material away from sparks, flames and other ignition sources. Prevent release of vapours into workplace air. Use smallest possible amounts in designated areas with adequate ventilation. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Label containers. Keep containers closed when not in use. Empty containers may contain residues which are hazardous. Ensure a high level of personal hygiene is maintained when using this product. That is; always wash hands before eating, drinking, smoking or using the toilet.
Storage	Store in a cool, dry, well ventilated area away from sources of heat or ignition. This product should be stored away from foodstuffs and strong oxidising agents. Keep containers closed at all times - check regularly for leaks. For information on the design of the storeroom reference should be made to Australian Standard AS1940, The storage and handling of flammable and combustible liquids. Reference should also be made to any relevant Commonwealth, State or Territory regulations.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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Infosafe No.	LPT9B	Issue Date : August 2004	ISSUED by PARCHEMC
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Product Name : FOSROC CONBEXTRA EP65 BASE

Classified as hazardous according to criteria of NOHSC

Exposure Limits	No exposure standards have been established for this material by the National Occupational Health & Safety Commission (NOHSC). However, air concentrations of components should be controlled as low as possible. The following are applicable when the wet product dries out, and a proportion of it may become airborne as respirable dust:					
	Substance	TWA		STEL		NOTICE
		ppm	mg/m ³	ppm	mg/m ³	
	Crystalline Silica	-	0.2	-	-	Cat 1 Carcinogen
Other Exposure Information	TWA - the Time-Weighted Average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life. STEL (Short Term Exposure Limit) - the average airborne concentration over a 15 minute period which should not be exceeded at any time during a normal eight-hour workday. According to current knowledge these concentrations should neither impair the health of, nor cause undue discomfort to, nearly all workers. These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. Exposure Standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity. This product contain crystalline silica and when using the dry product, or when the wet product dries out, a proportion of this may become airborne as respirable dust. Silica may be released by grinding or machining of coated materials. Use approved dust respirator when grinding or machining coating or coated items. Crystalline silica is classified as a Class 1 Human Carcinogen according to IARC (International Agency for Research on Cancer), however the NATIONAL OCCUPATIONAL HEALTH & SAFETY COMMISSION NOHSC has yet to classify crystalline silica as a human carcinogen. Repeated exposure to respirable crystalline silica dust may lead to silicosis, or other serious delayed lung injury. The onset of silicosis is usually slow and lung damage may occur even when no symptoms or signs of ill-health have occurred. Silicosis can develop to a more serious degree even after exposure has ceased, and may also lead to other diseases including heart disease and scleroderma.					
Respiratory Protection	If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable organic vapour filter should be used. Reference should be made to Australian Standards AS/NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.					
Eye Protection	Safety glasses with side shields or goggles should be worn as described in Australian Standard AS/NZS 1337 - Eye Protectors for Industrial Applications. Final choice of appropriate eye/face protection will vary according to individual circumstances. This can include methods of handling, and engineering controls as determined by appropriate risk assessments.					
Hand Protection	Wear gloves of impervious material conforming to AS/NZS 2161: Occupational protective gloves - Selection, use and maintenance. Final choice of appropriate glove type will vary according to individual circumstances. This can include methods of handling, and engineering controls as determined by appropriate risk assessments. Advice should be sought from appropriate glove manufacturers in order to ensure gloves are correct for application.					
Body Protection	Suitable workwear should be worn to protect personal clothing, eg cotton overalls buttoned at neck and wrist. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust of dried product when removing or laundering clothes.					
Eng. Controls	Use in well ventilated areas. In confined spaces the use of local exhaust ventilation system is recommended. Air concentrations of components should be controlled as low as possible. Keep containers closed when not in use.					
Hygiene Measures	Ensure a high level of personal hygiene is maintained when using this product. Always wash hands before eating, drinking, smoking or using the toilet.					

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance High viscosity grey paste.

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Infosafe No.	LPT9B	Issue Date : August 2004	ISSUED by PARCHEMC
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Product Name :	FOSROC CONBEXTRA EP65 BASE
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Classified as hazardous according to criteria of NOHSC

Odour	Slight epoxy-like odour.
Melting Point	Not applicable
Solubility in Water	Insoluble.
Vapour Pressure	Not applicable
Volatile Component	Not determined.
Flammability	Combustible substance.

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions.
Hazardous Polymerization	Will not occur.
Materials to Avoid	Strong acids, alkalis, oxidisers and amines.
Hazardous Decomposition Products	Under fire conditions this product may produce hazardous dusts (crystalline silica) and could produce oxides of carbon and nitrogen.
Hazardous Reaction	

11. TOXICOLOGICAL INFORMATION

Toxicology Information	No toxicity data is available for this specific product.
Inhalation	Inhalation of product vapours may cause irritation of the nose, throat and respiratory system.
Ingestion	Ingestion of this product may irritate the gastric tract, causing nausea and vomiting. Ingestion of large quantities may depress the central nervous system.
Skin	May cause irritation resulting in redness, itching and dermatitis. Prolonged or repeated skin contact may lead to allergic contact dermatitis and sensitisation in some individuals.
Eye	Irritating to eyes. On eye contact this product will cause tearing, stinging, blurred vision, and redness.

12. ECOLOGICAL INFORMATION

	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Environ. Protection	Prevent this material entering waterways, drains, sewers.
Mobility	Not available.
Persistence / Degradability	Not available.
Bioaccumulation	Not available.
Ecotoxicity	Not available.

13. DISPOSAL CONSIDERATIONS

	Disposal should be in accordance with the relevant local, state and federal government regulations.
--	---

14. TRANSPORT INFORMATION

	This material is a Class 9 - Miscellaneous Dangerous Good according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. Class 9 - Miscellaneous Dangerous Goods are incompatible in a placard load with dangerous goods of Class 1, Explosives.
ADG U.N. Number	3082
ADG Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.*
ADG DG Class	9
ADG Hazchem Code	2X
ADG Packaging	5.9.9
Method	
ADG Packing Group	III

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Infosafe No.	LPT9B	Issue Date : August 2004	ISSUED by PARCHEMC
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Product Name : FOSROC CONBEXTRA EP65 BASE

Classified as hazardous according to criteria of NOHSC

Storage and Transport Keep in dry, cool and well ventilated area.

ADG EPG Number 9C1

ADG IERG Number 47

15. REGULATORY INFORMATION

Risk Phrase. R36/37/38 Irritating to eyes, respiratory system and skin.
R43 May cause sensitization by skin contact.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrase S23(2) Do not breathe vapour.
S24/25 Avoid contact with skin and eyes.
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S61 Avoid release to the environment. Refer to special instructions/safety data sheet.

Poisons Schedule S5

Hazard Category Irritant, Dangerous for the environment

AICS (Australia) All components in this product are listed on AICS (Australian Inventory of Chemical Substances).

16. OTHER INFORMATION

Contact Person/Point Technical Support: 1800 812 864

SDS History MSDS Creation: August 2004

...End Of MSDS...

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Infosafe No. LPT8R Issue Date : August 2004 ISSUED by PARCHEMC

Product Name : FOSROC CONBEXTRA EP65 HARDENER

Classified as hazardous according to criteria of NOHSC

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product Name FOSROC CONBEXTRA EP65 HARDENER
Product Use Hardener component of epoxy grout.
Company Name Parchem Construction Products Pty Ltd (ABN 80 069 961 968)
Address 7 Lucca Road Wyong
 NSW 2259 Australia
Emergency Tel 1800 638 556
Telephone Tel: 02 4350 5000 Fax: 02 4351 2024
Number/Fax
Other Information This MSDS summaries at the date of issue our best knowledge of the health and safety hazard information of the product, and in particular how to safely handle and use the product in the workplace. Since Parchem Construction Products Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, review this MSDS in the context of how the user intends to handle and use the product in the workplace.
 If clarification or further information is needed to ensure that an appropriate assessment can be made, the user should contact this company. Our responsibility for product as sold is subject to our standard term and conditions, a copy of which is sent to our customers and is also available upon request.

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Name	CAS	Proportion
	Benzyl alcohol	100-51-6	30-60 %
	Isophoronediamine	2855-13-2	30-60 %
	2,4,6-Tri(dimethylamino methyl) Phenol	90-72-2	10-30 %
	Salicylic acid	69-72-7	1-10 %
	Other ingredients determined not to be hazardous		Balance

3. HAZARDS IDENTIFICATION

Classified as Hazardous according to the criteria of NOHSC.

Classified as Dangerous Goods according to the ADG Code.

RISK PHRASES:

Harmful by inhalation, in contact with skin and if swallowed.

Causes burns.

May cause sensitization by skin contact.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES:

Do not breathe gas/fumes/vapour/spray.

Avoid contact with skin and eyes.

Wear suitable protective clothing, gloves and eye/face protection.

In case of accident or if you feel unwell seek medical advice immediately.

Medical Conditions Those suffering pre-existing pulmonary disorders should avoid inhaling vapours in confined spaces.

Generally

Aggravated by

Exposure.

4. FIRST AID MEASURES

Inhalation Remove the source of contamination or move the victim to fresh air. Ensure airways are clear and have qualified person give oxygen through a face mask if breathing is difficult. If symptoms develop seek medical attention.

Ingestion Do NOT induce vomiting. Wash out mouth with water. Do not give anything by mouth to an unconscious person. Seek immediate medical attention.

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Brisbane Water
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Material Safety Data Sheet

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Infosafe No.	LPT8R	Issue Date : August 2004	ISSUED by PARCHEMC
Product Name :	FOSROC CONBEXTRA EP65 HARDENER		

Classified as hazardous according to criteria of NOHSC

Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Ensure contaminated clothing is washed before re-use or discard. If irritation develops, seek medical attention.
Eye	If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. Remove clothing if contaminated and wash skin. Seek immediate medical assistance.
First Aid Facilities	Eye wash and normal washroom facilities.
Advice to Doctor	Treat symptomatically.
Other Information	For advice, contact a Poisons Information Centre (Phone eg Australia 131 126 or a doctor (at once).

5. FIRE FIGHTING MEASURES

Extinguishing Media	Dry chemical, CO2 or foam. Do not use water jets.
Specific Methods	Keep uninvolved containers cool with water spray. Contain run-off for later collection and controlled disposal.
Specific Hazards	Combustible liquid. This product will burn if exposed to fire.
Hazardous Combustion Products	Combustion products include oxides of carbon, oxides of nitrogen and ammonia gas.
Protective Equipment	Fire fighters to wear Self-Contained Breathing Apparatus (S.C.B.A) and full protective clothing if risk of exposure to vapour or products of combustion to minimise skin exposure.

6. ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Increase ventilation. Evacuate all unnecessary personnel. Slippery when spilt. Wear Self-Contained Breathing Apparatus (S.C.B.A) and full protective clothing to minimise skin and eye exposure, and inhalation of vapours. If possible contain the spill. Place inert absorbent such as vermiculite, sand or dirt onto material. Prevent run off into drains and waterways. Do not dilute material but contain. Mop up the remaining material and place into the same container. If large quantities of this material enter the waterways contact the Environmental Protection Authority, or your local Waste Management Authority.

7. HANDLING AND STORAGE

Handling	Use approved combustible liquid storage containers in the work area. Keep material away from sparks, flames and other ignition sources. Prevent release of vapours and mists into workplace air. Use smallest possible amounts in designated areas with adequate ventilation. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Label containers. Keep containers closed when not in use. Empty containers may contain residues which are hazardous. Ensure a high level of personal hygiene is maintained when using this product i.e. always wash hands before eating, drinking, smoking or using the toilet.
Storage	Store in a cool, dry, well ventilated area away from sources of heat or ignition. This product should be stored away from foodstuffs and strong oxidising agents. Keep containers closed at all times - check regularly for leaks. For information on the design of the storeroom reference should be made to Australian Standard AS1940, The storage and handling of flammable and combustible liquids. Reference should also be made to any relevant Commonwealth, State or Territory regulations.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits	No exposure standards have been established for this material by the National Occupational Health & Safety Commission (NOHSC). However, air concentrations of components should be controlled as low as possible.
Respiratory Protection	If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable organic vapour filter should be used. Reference should be made to Australian Standards AS/NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

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Infosafe No.	LPT8R	Issue Date : August 2004	ISSUED by PARCHEMC
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Product Name : FOSROC CONBEXTRA EP65 HARDENER

Classified as hazardous according to criteria of NOHSC

Eye Protection	Safety glasses with side shields or goggles should be worn as described in Australian Standard AS/NZS 1337 - Eye Protectors for Industrial Applications. Final choice of appropriate eye/face protection will vary according to individual circumstances. This can include methods of handling, and engineering controls as determined by appropriate risk assessments.
Hand Protection	Wear gloves of impervious material conforming to AS/NZS 2161: Occupational protective gloves - Selection, use and maintenance. Final choice of appropriate glove type will vary according to individual circumstances. This can include methods of handling, and engineering controls as determined by appropriate risk assessments. Advice should be sought from appropriate glove manufacturers in order to ensure gloves are correct for application.
Body Protection	Suitable workwear should be worn to protect personal clothing, eg cotton overalls buttoned at neck and wrist. When large quantities are handled the use of plastic aprons and rubber boots is recommended.
Eng. Controls	Use in well ventilated areas. In confined spaces the use of local exhaust ventilation system is recommended. Air concentrations of components should be controlled as low as possible. Keep containers closed when not in use.
Hygiene Measures	Ensure a high level of personal hygiene is maintained when using this product. Always wash hands before eating, drinking, smoking or using the toilet.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Low viscosity, light brown liquid.
Odour	Characteristic amine odour.
Solubility in Water	Insoluble.
Vapour Pressure	0.15 mmHg (benzyl alcohol)
Vapour Density (Air=1)	Not available
Flash Point	>100°C
Flammability	C1 Combustible liquid for the purpose of storage and handling- according to AS1940 - Storage and Handling of Flammable and Combustible Liquids.

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions.
Hazardous	Will not occur.
Polymerization	
Materials to Avoid	Incompatible with acids, bases and strong oxidising substances.

11. TOXICOLOGICAL INFORMATION

Toxicology Information	No toxicity data is available for this specific product, however toxicity data found for constituents are stated below: Benzyl alcohol: LD50 (oral, rat) 1,230 mg/kg LD50 (dermal, rabbit) 2000mg/kg (Standard Draize Test:100mg/24H moderate reaction) Salicylic acid: LD50 (oral, rat) 891mg/kg LD50 (dermal, rabbit) >10g/kg 2,4,6-tris(dimethylaminomethyl)phenol: LD50 (oral, rat) 1200mg/kg
Inhalation	Harmful by inhalation. Inhalation of mists or vapours will result in respiratory irritation and possible harmful corrosive effects including lesions of the nasal septum, pulmonary edema, pneumonitis and emphysema.
Ingestion	Harmful if swallowed. Ingestion of this product may cause nausea, vomiting, abdominal pain and chemical burns to the mouth, throat and stomach.
Skin	Harmful in contact with skin. This product may cause sensitisation in some individuals. Skin contact will cause redness, itching, irritation, severe pain and chemical burns with resultant tissue destruction.
Eye	Causes burns. Eye contact will cause stinging, blurring, tearing, severe pain and possible permanent corneal damage.

12. ECOLOGICAL INFORMATION

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Product Name :	FOSROC CONBEXTRA EP65 HARDENER
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Classified as hazardous according to criteria of NOHSC

Environ. Protection	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Prevent this material entering waterways, drains and sewers.
Mobility	Not available.
Persistence / Degradability	Not available.
Bioaccumulation	Not available.
Ecotoxicity	Not available.

13. DISPOSAL CONSIDERATIONS

Disposal should be in accordance with the relevant local, state and federal government regulations.

14. TRANSPORT INFORMATION

	This material is a Class 8 Corrosive Substance according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. Class 8 - Corrosive Substances are incompatible in a placard load with any of the following: - Class 1, Explosives - Class 4.3, Dangerous When Wet Substances - Class 5.1, Oxidising Agents & Class 5.2 - Organic Peroxides - Class 6, Toxic Substances (where the Toxic substances are cyanides and the corrosives are acids), - Class 7, Radioactive Substances and are incompatible with food and food packaging in any quantity.
ADG U.N. Number	2735
ADG Proper Shipping Name	AMINES, LIQUID, CORROSIVE, N.O.S. - (Contains: isophoronediamine)
ADG DG Class	8
ADG Hazchem Code	3X
ADG Packaging Method	5.9.8
ADG Packing Group	III
ADG EPG Number	8A1
ADG IERG Number	36

15. REGULATORY INFORMATION

Risk Phrase	R20/21/22 Harmful by inhalation, in contact with skin and if swallowed. R34 Causes burns. R43 May cause sensitization by skin contact. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrase	S23 Do not breathe gas/fumes/vapour/spray. S24/25 Avoid contact with skin and eyes. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S45 In case of accident or if you feel unwell seek medical advice immediately.
Poisons Schedule	S5
Hazard Category	Harmful, Corrosive, Dangerous for the environment
AICS (Australia)	All components in this product are listed on AICS (Australian Inventory of Chemical Substances).

16. OTHER INFORMATION

Contact Person/Point	Technical Support: 1800 812 864
SDS History	MSDS Creation: August 2004. ...End Of MSDS...

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