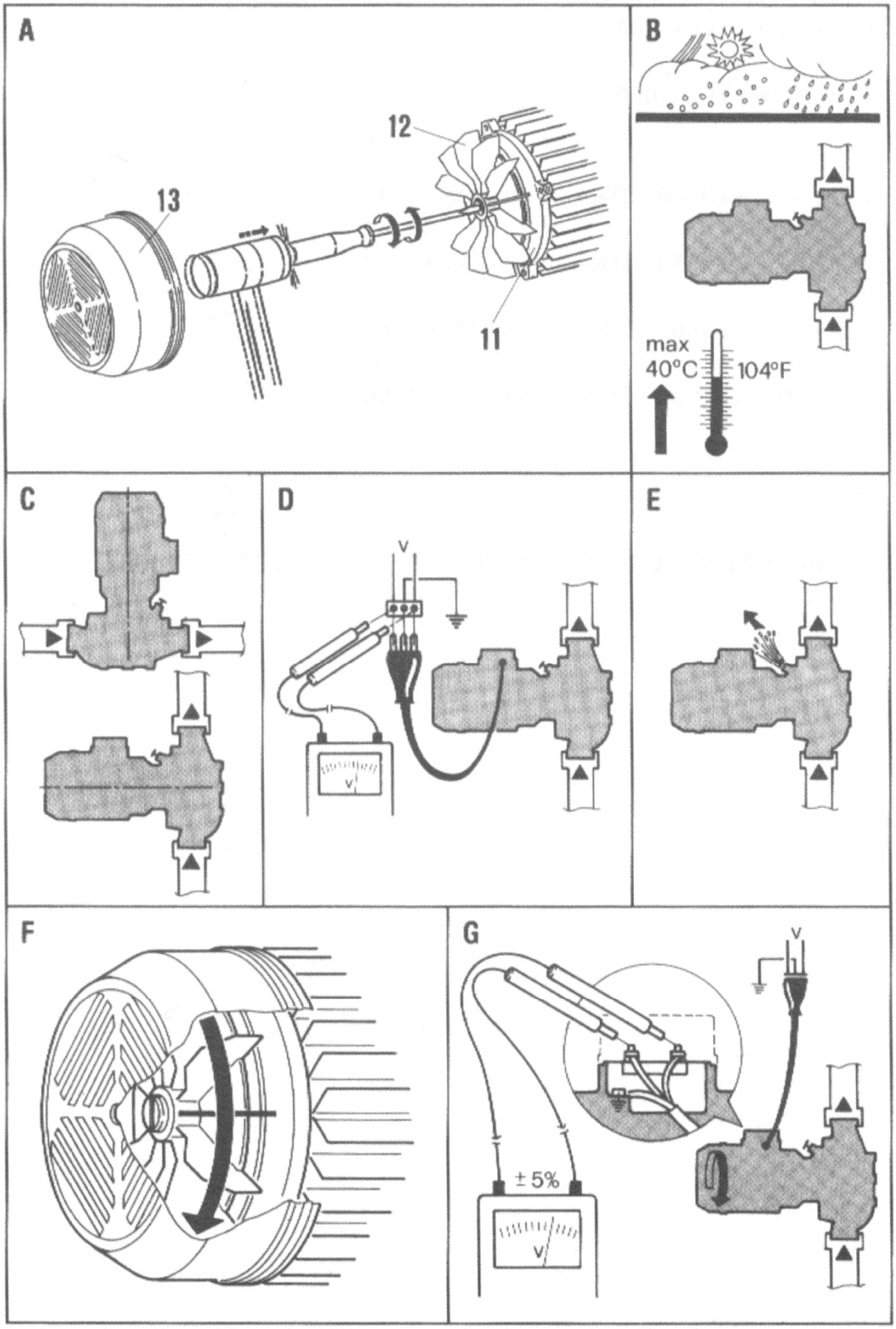
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE
INSTALLATIONS - OCH UNDERHÅLLSANVISNING

DAB
WATER•TECHNOLOGY


A
12
13
11
B
max
40°C
104°F
C
D
V
V
E
F
G
V
± 5%
V

ALM 200 – ALP 800 – ALM 500 – ALP 2000

KLM-DKLM 40/300 – KLP-DKLP 40/600 – KLP-DKLP 40/900 – KLP-DKLP 40/1200
KLM-DKLM 50/300 – KLM-DKLM 50/600 – KLP-DKLP 50/900 – KLP-DKLP 50/1200
KLM-DKLM 65/300 – KLM-DKLM 65/600 – KLP-DKLP 65/900 – KLP-DKLP 65/1200
KLM-DKLM 80/300 – KLM-DKLM 80/600 – KLP-DKLP 80/900 – KLP-DKLP 80/1200

CM 40/440 – CM 40/540 – CM 40/670 – CM 40/870 – CM 40/1300 – CM 40/1450
CM 50/510 – CM 50/630 – CM 50/780 – CM 50/1000 – CM 50/1270 – CM 50/1420

CP 40/1900 – CP 40/2300 – CP 40/2700 – CP 40/3500 – CP 40/3800 – CP 40/4700 – CP 40/5500
CP 40/6200
CP 50/2200 – CP 50/2600 – CP 50/3100 – CP 50/4100 – CP 50/4600 – CP 50/5100 – CP 50/5650

DCM 40/380 – DCM 40/460 – DCM 40/620
DCM 50/460 – DCM 50/630 – DCM 50/880
DCM 65/670 – DCM 65/820 – DCM 65/900
DCM 80/630 – DCM 80/730 – DCM 80/860 –DCM 80/1020
DCM 100/820 – DCM 100/1000 – DCM 100/1200 – DCM 100/1450

DCP 40/1250 – DCP 40/1650 – DCP 40/2050 – DCP 40/2450
DCP 50/1550 - DCP 50/1900 – DCP 50/2450 – DCP 50/3000 – DCP 50/3650
DCP 65/2300 – DCP 65/2650 – DCP 65/3250 – DCP 65/3700
DCP 80/2530 – DCP 80/3050 – DCP 80/3650 – DCP 80/4100
DCP 100/3300 – DCP 100/3750 – DCP 100/2450 – DCP 100/2750 – DCP 100/2800 – DCP 100/2900

ALME 500 – ALPE 2000

KLPE-DKLPE 40/600 – KLPE-DKLPE 40/1200
KLME-DKLME 50/600 – KLPE-DKLPE 50/1200
KLME-DKLME 65/600 – KLPE-DKLPE 65/1200
KLME-DKLME 80/600 – KLPE-DKLPE 80/1200

CME 40/870 - CME 40/1450
CME 50/1000 – CME 50/1420

CPE 40/2300 – CPE 40/3500 – CPE 40/4700 – CPE 40/5500 – CPE 40/6200
CPE 50/2600 – CPE 50/4100 – CPE 50/4600 – CPE 50/5650

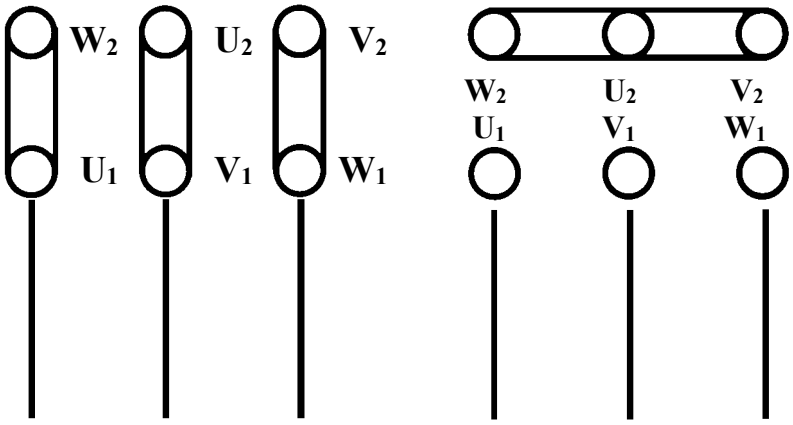
DCME 40/620
DCME 50/460 – DCME 50/880
DCME 65/670 – DCME 65/900
DCME 80/730 – DCME 80/1020
DCME 100/1000 – DCME 100/1200 – DCME 100/1450

DCPE 40/1650 – DCPE 40/2450
DCPE 50/1550 – DCPE 50/2450 – DCPE 50/3650
DCPE 65/2300 – DCPE 65/2650 – DCPE 65/3250 – DCPE 65/3700
DCPE 80/2530 – DCPE 80/3050 – DCPE 80/3650 – DCPE 80/4100
DCPE 100/2450 – DCPE 100/2750 – DCPE 100/2900 – DCPE 100/3300 – DCPE 100/3750

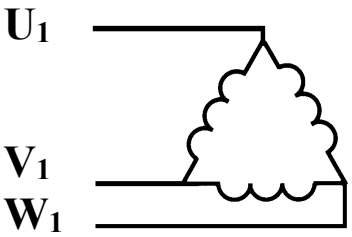
ENGLISH

Collegamento TRIFASE per motori / Branchement TRIPHASE pour moteurs THREE-PHASE motor connection / Aansluiting TRIPLEFASE voor motoren DREIPHASIGER Anschluß für Motoren / Conexión TRIFASICA para motores TREFAS elanslutning för motorer / ТРЕХФАЗНОЕ соединение двигателей Motorlar için ÜÇ FAZLI bağlantı / Conexiune TRIFAZICA motor / Trifazio Variklio Pajungimas / Ligação TRIFÁSICA para motores / Trifazna priključitev motorja / إيصال ثلاثي الطور للمحركات / A motorok háromfázisú bekötése / THREE-PHASE motor connection / Свързване на трифазен мотор / نحوه اتصال موتورهای سه فاز به شبکه برق

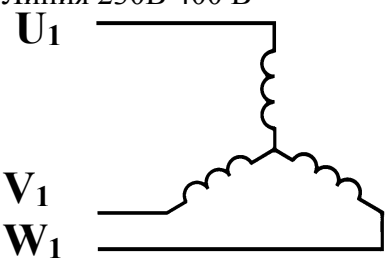
3 ~ 230/400 V



230V **Linea** - Ligne 400V
Line - Lijn
Linie - Línea - Ledning
Линия 230В 400 В - Hat
Linie - Linjia - Linha
linija - خط / Vonal / Линия 230В 400 В

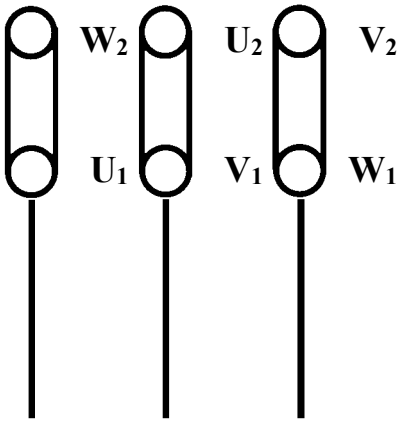


Collegamento a TRIANGOLO
Branchement TRIANGLE
DELTA starting
Driehoekaansluiting
DREIECK-Schaltung
Conexión de TRIÁNGULO
DELTA-anslutning
Соединение на ТРЕУГОЛНИК
Üçgen bağlantı
Conexiune TRIUNGHI
Trikampis jungimas
Ligação em TRIÂNGULO
Trikot priključitev
إيصال مثلثي
Delta kötésű indítás
Свързване триъгълник

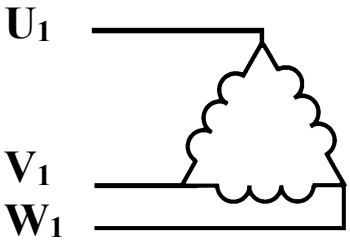


Collegamento a STELLA
Branchement ETOILE
STAR starting
Steraansluiting
STERN-Schaltung
Conexión de ESTRELLA
Y-anslutning
Соединение на ЗВЕЗДУ
Yıldız bağlantı
Conexiune STEA
Jungimas žvaigžde
Ligação em ESTRELA
Zvezda priključitev
إيصال نجمي
Csillag kötésű indítás
Свързване звезда

3 ~ 400 Δ V



Linea - Ligne
Line - Lijn
Linie - Línea – Ledning
Линия – Hat
Linie - Linjia - Linha
linija - خط / Vonal / Линия



Collegamento a TRIANGOLO
Branchement TRIANGLE
DELTA starting
Driehoekaansluiting
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Conexión de TRIÁNGULO
DELTA-anslutning
Соединение на ТРЕУГОЛНИК
Üçgen bağlantı
Conexiune TRIUNGHI
Trikampis jungimas
Ligação em TRIÂNGULO
Trikot priključitev
إيصال مثلثي
Delta kötésű indítás
Свързване триъгълник

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1. GENERAL

Read this documentation carefully before installation. It contains fundamental instructions to be followed during installation, operation and maintenance.

Installation and functioning must comply with the safety regulations in force in the country in which the product is installed. The entire operation must be carried out in a workmanlike manner, exclusively by skilled personnel (paragraph 6.1), in possession of the technical qualifications indicated by the standards in force. Failure to comply with the safety regulations not only causes risk to personal safety and damage to the equipment, but invalidates every right to assistance under guarantee.

The pump may be installed in either horizontal or vertical position, as long as the motor is always above the pump.

For ALM 200 and ALP 800 circulators, installation must be carried out ONLY in horizontal position.

2. APPLICATIONS

Pumps for circulating hot and cold water, with apertures in line for installations in series with plant pipes. Suitable for civil and industrial heating, conditioning and chilling plants and for domestic hot water systems.

3. PUMPED FLUIDS

The machine has been designed and built for pumping water, free from explosive substances and solid particles or fibres, with a density of 1000 kg/m³ and a kinematic viscosity of 1 mm²/s, and chemically non-aggressive liquids. Use with other fluids is allowed only with the manufacturer's authorization.

4. TECHNICAL DATA AND RANGE OF USE

– **Supply voltage:**	– 1 x 220-240 V 50 Hz – 1 x 110V 50 Hz – 1 x 115V 60 Hz – 3 x 230-400 V 50/60 Hz up to 4 KW inclusive – 3 x 400 V D 50/60 Hz over 4 KW	**See electric data plate**

– **Head up – Hmax (m):**	pag. 127
– **Maximum working pressure 10 Bar (1000 Kpa):**	ALM(E) , ALP(E), KLM(E), KLP(E), DKLM(E), DKLP(E)
– **Maximum working pressure 16 Bar (1600 Kpa):**	CM 40/440, CM 40/540, CM 40/670, CM 40/870 CM 50/510, CM 50/630, CM 50/780, CM 50/1000 CP 40/1900, CP 40/2300, CP 40/2700, CP 40/3500 CP 50/2200, CP 50/2600, CP 50/3100, CP 50/4100 CME 40/870, CME 50/1000 CPE 40/2300, CPE 40/3500, CPE 50/2600, CPE 50/4100
– **Maximum working pressure 10 Bar (1000 Kpa):**	CM 40/1300, CM 40/1450, CM 50/1270, CM 50/1420 CP 40/3800, CP 40/4700, CP 40/5500, CP 40/6200 CP 50/4600, CP 50/5100, CP 50/5650 CME 40/1450, CME 50/1420 CPE 40/4700, CPE 40/5500, CPE 40/6200 CPE 50/4600, CPE 50/5650 DCM 40/380, DCM 40/460, DCM 40/620 DCM 50/460, DCM 50/630, DCM 50/880 DCM 65/670, DCM 65/820, DCM 65/900 DCM 80/630, DCM 80/730, DCM 80/860, DCM 80/1020 DCM 100/820, DCM 100/1000, DCM 100/1200, DCM 100/1450 DCP 40/1250, DCP 40/1650, DCP 40/2050, DCP 40/2450 DCP 50/1550, DCP 50/1900, DCP 50/2450, DCP 50/3000, DCP 50/3650 DCP 65/2300, DCP 65/2650, DCP 65/3250, DCP 65/3700 DCP 80/2530, DCP 80/3050, DCP 80/3650, DCP 80/4100 DCP 100/2450, DCP 100/2750, DCP 100/2800, DCP 100/2900 DCP 100/3300, DCP 100/3750 DCME 40/620, DCME 50/460, DCME 50/880 DCME 65/670, DCME 65/900, DCME 80/730, DCME 80/1020 DCME 100/1000, DCME 100/1200, DCME 100/1450 DCPE 40/1650, DCPE 40/2450 DCPE 50/1550, DCPE 50/2450, DCPE 50/3650 DCPE 65/2300, DCPE 65/2650, DCPE 65/3250, DCPE 65/3700 DCPE 80/2530, DCPE 80/3050, DCPE 80/3650, DCPE 80/4100 DCPE 100/2450, DCPE 100/2750, DCPE 100/2900, DCPE 100/3300 DCPE 100/3750
– **Standard apertures:**	– ALM 200 - ALP 800: unflanged, 1½” M GAS; – ALM (E) 500 – ALP (E) 2000: unflanged, 2” M GAS; – KLM/P (E) 40 - DKLM/P (E) 40: flanged DN40 – PN 10 (takes also PN6); – KLM/P (E) 50 – DKLM/P (E) 50: flanged DN50 – PN 10 (takes also PN6); – KLM/P (E) 65 – DKLM/P (E) 65: flanged DN65 – PN 10 (takes also PN6); – KLM/P (E) 80 – DKLM/P (E) 80: flanged DN80 – PN 10 (takes also PN6) PN16 on request; – CP (E) - DCP (E): DN 40÷50 – PN 16 – CM (E) - DCM (E): DN 40÷150 – PN 16
– **Liquid temperature range from –15°C to +120°C:** – **Storage temperature from – 10°C to +40°C:**	ALM 200, ALP 800, ALM (E) 500, ALP (E) 2000 KLM 40, KLP 40, DKLM 40, DKLP 40 KLM 50, KLP 50, DKLM 50, DKLP 50 KLM 65, KLP 65, DKLM 65, DKLP 65 KLM 80, KLP 80, DKLM 80, DKLP 80 KLPE 40, DKLPE 40 KLME 50, KLPE 50, DKLME 50, DKLPE 50 KLME 65, KLPE 65, DKLME 65, DKLPE 65 KLME 80, KLPE 80, DKLME 80, DKLPE 80 CM 40/440, CM 40/540, CM 40/670, CM 40/870 CM 50/510, CM 50/630, CM 50/780, CM 50/1000 CP 40/1900, CP 40/2300, CP 40/2700, CP 40/3500

	CP 50/2200, CP 50/2600, CP 50/3100, CP 50/4100 CME 40/870, CME 50/1000 CPE 40/2300, CPE 40/3500, CPE 50/2600, CPE 50/4100
– **Liquid temperature range from –10°C to +130°C:**	CM 40/1300, CM 40/1450, CM 50/1270, CM 50/1420 CP 40/3800, CP 40/4700, CP 40/5500, CP 40/6200 CP 50/4600, CP 50/5100, CP 50/5650
– **Storage temperature from +5°C to +40°C:**	CME 40/1450, CME 50/1420 CPE 40/4700, CPE 40/5500, CPE 40/6200, CPE 50/4600, CPE 50/5650 DCM 40/380, DCM 40/460, DCM 40/620 DCM 50/460, DCM 50/630, DCM 50/880 DCM 65/670, DCM 65/820, DCM 65/900 DCM 80/630, DCM 80/730, DCM 80/860, DCM 80/1020 DCM 100/820, DCM 100/1000, DCM 100/1200, DCM 100/1450 DCP 40/1250, DCP 40/1650, DCP 40/2050, DCP 40/2450 DCP 50/1550, DCP 50/1900, DCP 50/2450, DCP 50/3000, DCP 50/3650 DCP 65/2300, DCP 65/2650, DCP 65/3250, DCP 65/3700 DCP 80/2530, DCP 80/3050, DCP 80/3650, DCP 80/4100 DCP 100/2450, DCP 100/2750, DCP 100/2800, DCP 100/2900 DCP 100/3300, DCP 100/3750 DCME 40/620, DCME 50/460, DCME 50/880 DCME 65/670, DCME 65/900, DCME 80/730, DCME 80/1020 DCME 100/1000, DCME 100/1200, DCME 100/1450 DCPE 40/1650, DCPE 40/2450 DCPE 50/1550, DCPE 50/2450, DCPE 50/3650 DCPE 65/2300, DCPE 65/2650, DCPE 65/3250, DCPE 65/3700 DCPE 80/2530, DCPE 80/3050, DCPE 80/3650, DCPE 80/4100 DCPE 100/2450, DCPE 100/2750, DCPE 100/2900, DCPE 100/3300 DCPE 100/3750

– **Maximum environment temperature:**	+40°C
– **Relative humidity of the air:**	max. 95%
– **Degree of motor protection:**	see plate on package
– **Thermal class:**	F
– **Absorbed power:**	see electric data plate

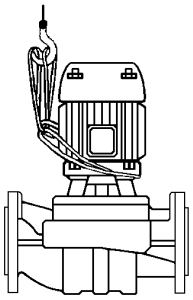
5. MANAGEMENT

5.1 Storage

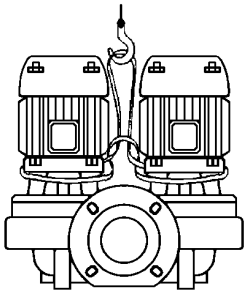
All the pumps must be stored indoors, in a dry, vibration-free and dust-free environment, possibly with constant air humidity. They are supplied in their original packaging and must remain there until the time of installation. If this is not possible, the intake and delivery aperture must be accurately closed.

5.2 Transport

Avoid subjecting the electropumps to needless jolts or collisions. The figures below indicate respectively how to lift single electropumps (KLM – KLP – CM – CP) – Fig. 1 – and twin versions (DKLM – DKLP – DCM – DCP) – Fig. 2 – during installation, after they have been removed from the packaging.



(Fig. 1)



(Fig. 2)

5.3 Weights

The adhesive label on the package indicates the total weight of the electropump.

6. WARNINGS

6.1 Skilled technical personnel

It is advisable that installation be carried out by skilled personnel in possession of the technical qualifications required by the specific legislation in force.

The term **skilled personnel** means persons whose training, experience and instruction, as well as their knowledge of the respective standards and requirements for accident prevention and working conditions, have been approved by the person in charge of plant safety, authorizing them to perform all the necessary activities, during which they are able to recognize and avoid all dangers (Definition for technical personnel IEC 364).
The appliance is not intendend for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsable for their safety. Children should be supervised to ensure that they do not play with the appliance.

6.2 Safety

Use is allowed only if the electric system is in possession of safety precautions in accordance with the regulations in force in the country where the product is installed (for Italy, CEI 64/2).

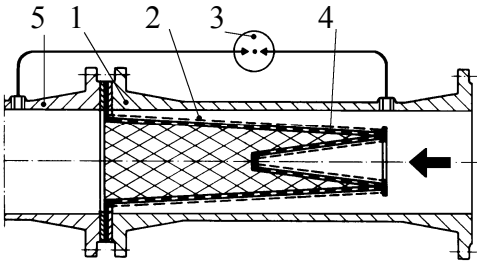
6.3 Checking motor shaft rotation

Before installing the pump you must check that the rotating parts turn freely. For this purpose, proceed as follows on the pump concerned:
ALM – ALP – KL – DKL: remove the fan cover from its seat in the motor end cover. Insert a screwdriver in the notch on the motor shaft from the ventilation side. **If there is a blockage**, turn the screwdriver, tapping it gently with a hammer **(Fig. A)**.
CM: remove the fan cover from its seat in the motor end cover, loosening the nuts. Move the fan by hand to turn the motor shaft a few times. If this is not possible, dismantle the pump body, slackening the screws to check whether there are any foreign bodies inside it. To disassemble, proceed in the inverse order to assembly.

Do not force the fan with pliers or other tools to try to free the pump as this could cause deformation or breakage of the pump.

6.4 New systems

Before running new systems the valves, pipes, tanks and couplings must be cleaned accurately. Often welding waste, flakes of oxide or other impurities fall off after only a certain period of time. To prevent them from getting into the pump they must be caught by suitable filters. The free surface of the filter must have a section at least 3 times larger than the section of the pipe on which the filter is fitted, so as not to create excessive load losses. We recommend the use of TRUNCATED CONICAL filters made of corrosion-resistant materials (SEE DIN 4181).



(Filter for intake pipe)
1) Filter body
2) Narrow mesh filter
3) Differential pressure gauge
4) Perforated sheet
5) Pump intake aperture

6.5 Responsibility

The Manufacturer does not vouch for correct operation of the pumps if they are tampered with or modified, run outside the recommended work range or in contrast with the other instructions given in this manual.

The Manufacturer declines all responsibility for possible errors in this instructions manual, if due to misprints or errors in copying. The company reserves the right to make any modifications to products that it may consider necessary or useful, without affecting the essential characteristics.

6.6 Protections

6.6.1 Moving parts

In accordance with accident-prevention regulations, all moving parts (fans, couplings, etc.) must be accurately protected with special devices (fan covers,ecc.) before operating the pump.

During pump operation, keep well away from the moving parts (shaft, fan, etc.) unless it is absolutely necessary, and only then wearing suitable clothing as required by law, to avoid being caught.

6.6.2 Noise level

The noise levels of pumps with standard supply motors are indicated in table 6.6.2 on page 126.
Remember that, in cases where the LpA noise levels exceed 85 Db(A), suitable HEARING PROTECTION must be used in the place of installation, as required by the regulations in force.

6.6.3 Hot and cold parts

As well as being at high temperature and high pressure, the fluid in the system may also be in the form of steam!
DANGER OF BURNING!
It may be dangerous even to touch the pump or parts of the system.
If the hot or cold parts are a source of danger, they must be accurately protected to avoid contact with them.

7. INSTALLATION

7.1 To protect the pump against deposits, it is advisable to install it in the lowest point of the system. Fit the pump in the plant only after having completed the welding works and checked that the plant is quite clean.

7.2 The electropump must be fitted in a well ventilated place, protected from unfavourable weather conditions and with an environment temperature not exceeding 40°C. **Fig. B**
Electropumps with degree of protection IP55 may be installed in dusty and damp environments. If installed in the open, generally it is not necessary to take any particular steps to protect them against unfavourable weather conditions.

7.3 The pump may be fitted either on the delivery or on the return pipe, with the motor axis in horizontal or vertical position, as long as the terminal board box is never facing downwards **(FIG.C)** so as to avoid dangerous water infiltrations in the case of leaks For ALM – ALP pumps the motor axis must only be horizontal.

7.4 To facilitate checking and replacement operations, install the pump in a position with easy access.

7.5 The arrows on the pump body indicate the direction of flow. It is recommended to use interception gate valves on the intake and delivery pipes, to prevent drainage of the system when it is to be repaired. Fit also a by-pass circuit between delivery and intake to guarantee minimum recycling if electrovalves are used in the pipes, so as to avoid the creation of dangerous temperature rises.

7.6 Ensure that the plant is provided with an air bleeding system and that the expansion chamber (if provided) is installed before the intake aperture. If the pump is installed on the delivery of an open vessel circuit, ensure that the safety pipe is connected before the pump.

7.7 When fitting the pump on the system, ensure that the metal pipes do not weigh down on the pump body, transmitting excess forces or stress that could cause cracks or breakages

7.8 To avoid transmitting noise and vibrations, fit **vibration-damping couplings** on the intake and delivery apertures.

8. ELECTRICAL CONNECTION

Caution! Always follow the safety regulations.

Scrupulously follow the wiring diagrams inside the terminal board box and those on page 5 of this manual.

8.1 **The electrical connections must be made exclusively by skilled personnel (see point 6.1) as required by the safety regulations in force.**
The requirements of the electric energy supply company must be scrupulously complied with.
In the case of three-phase motors with star-delta start, ensure that the switch-over time from star to delta is as short as possible and that it falls within table 8.1 on page 106.

8.2 Before opening the terminal board and working on the pump, ensure that the **power has been switched off**

8.3 Check the mains voltage before making any connection. If it is the same as the voltage on the data plate, proceed to connect the wires to the terminal board, **giving priority to the earth lead. (Fig. D).**

8.4 **ENSURE THAT THE EARTH SYSTEM IS EFFICIENT AND THAT THERE IS THE POSSIBILITY OF MAKING A GOOD CONNECTION.**

8.5 The pumps must always be connected to an external switch.

8.6 Single-phase motors are provided with thermal overload protection and may be connected directly to the mains.

8.7 Three-phase motors must be protected with special remote-control motor-protectors calibrated for the current shown on the plate.

8.8 In systems where twin pumps are fitted, provide separate wiring and switches for each pump so as to ensure continuous service.

9. STARTING UP

9.1 **As well as being at high temperature and high pressure, the fluid in the system may also be in the form of steam.**
DANGER OF BURNING.
It may be dangerous even to touch the pump or parts of the system.

Before starting up you must fill the system with water and bleed the air. Bleed the residual air from the pump body through the bleeding cock provided (not present on version ALM 200 – ALP 800) until only water comes out **(Fig. E)**. This ensures that the mechanical seal is well lubricated and that the pump immediately starts to work regularly. **Dry operation, even for brief periods, causes irreparable damage to the mechanical seal.**

9.2 Switch on the power and, on three-phase versions, check that the motor is turning in the right direction, that is clockwise when viewed from the fan side, **Fig. F**. Otherwise invert any two phase leads, after having disconnected the pump from the mains.

9.3 With the pump running, check the supply voltage at the motor terminals, which must not differ from the rated value by +/- 5% **(Fig. G)**.

9.4 With the unit at regular running speed, check that the current absorbed by the motor does not exceed the value on the data plate.

10. PRECAUTIONS

10.1 The electropump should not be started an excessive number of times in one hour. The maximum admissible value is as follows:

	MAXIMUM NUMBER OF STARTS PER HOUR
SINGLE-PHASE MOTORS	30
THREE-PHASE MOTORS UP TO 5.5 HP	20 ÷ 30
THREE-PHASE MOTORS FROM 7.5 TO 60 HP	5 ÷ 10

10.2 **DANGER OF FROST:** When the pump remains inactive for a long time at temperatures of less than 0°C, the pump body must be completely emptied to prevent possible cracking of the hydraulic components. This operation is advisable even in the event of prolonged inactivity at normal temperature.

Check that the leakage of liquid does not damage persons or things, especially in plants that use hot water. The system must be drained only once the fluid temperature has reached environment temperature.

Do not close the drainage cap until the pump is to be used again.
When restarting after long periods of inactivity it is necessary to repeat the operations described above in the paragraphs **"WARNINGS"** and **"STARTING UP"**.

11. MAINTENANCE AND CLEANING

11.1 **As well as being at high temperature and high pressure, the fluid in the system may also be in the form of steam.**
DANGER OF BURNING.
It may be dangerous even to touch the pump or parts of the system.

11.2 **The electropump can only be dismantled by competent skilled personnel, in possession of the qualifications required by the legislation in force.** In any case, all repair and maintenance jobs must be carried out only after having disconnected the pump from the power mains. Ensure that it cannot be switched on accidentally.
If possible, keep to a maintenance schedule: expensive repairs or machine down times can be avoided with a minimum expense. During maintenance schedule discharge the condensate, if necessary present into the motor, through the hole, removing the exhaust port plug no (electropumps with IP55 Degree of motor protection only)

11.3 **If the liquid has to be drained out maintenance, ensure that the liquid coming out cannot harm persons or things, especially in using hot water.**
The legal requirements on the disposal of any harmful fluids must also be complied with.

11.4 In normal operation, the pump does not require any kind of maintenance. However, from time to time it is advisable to check the plate data, which will enable you to have advance warning of any faults or wear.

11.5 On some models which are provided with a grease nipple, the motor ball bearings must be greased every 3000 working hours; this interval may be reduced in the case of heavy duty applications. So top up with grease for high temperatures through the grease nipples provided.

11.6 **After any operation involving the removal of the motor head from the pump body, it is advisable to change the O-ring between the pump body and the support.**

12. MODIFICATIONS AND SPARE PARTS

Any modification not authorized beforehand relieves the manufacturer of all responsibility. All the spare parts used in repairs must be original ones and the accessories must be approved by the manufacturer so as to be able to guarantee maximum safety of persons and operators, and of the machines and systems in which they may be fitted.

13. TROUBLESHOOTING

FAULT	CHECK (possible cause)	REMEDY
1. The motor does not start and makes no noise.	A. Check the protection fuses. B. Check the electric connections. C. Check that the motor is live.	A. If they are burnt-out, change them. ⇒ If the fault is repeated immediately this means that the motor is short circuiting.
2. The motor does not start but makes noise.	A. Ensure that the mains voltage corresponds to the voltage on the data plate. B. Check that the connections have been made correctly. C. Check that all the phases are present on the terminal board. D. The shaft is blocked. Look for possible obstructions in the pump or motor. E. Capacitor short-circuiting or broken.	B. Correct any errors. C. If not, restore the missing phase. D. Remove any obstructions. E. Change the capacitor.
3. The motor turns with difficulty.	A. Check the supply voltage which may be insufficient. B. Check whether any moving parts are scraping against fixed parts. C. Check the state of the bearings.	B. Eliminate the cause of the scraping. C. Change any worn bearings.
4. The (external) motor protection trips immediately after starting.	A. Check that all the phases are present on the terminal board (on three-phase models). B. Look for possible open or dirty contacts in the protection. C. Look for possible faulty insulation of the motor, checking the phase resistance and insulation to earth.	A. If not, restore the missing phase. B. Change or clean the component concerned. C. Change the motor casing with the stator or reset any cables discharging to earth.
5. The motor protection trips too frequently.	A. Ensure that the environment temperature is not too high. B. Check the calibration of the protection. C. Check the motor rotation speed. D. Check the state of the bearings.	A. Provide suitable ventilation in the environment where the pump is installed. B. Calibrate at a current value suitable for the motor absorption at full load. C. Consult the motor data plate. D. Change any worn bearings.
6. The pump supplies insufficient flow.	A. The impeller is worn or blocked. B. Check that the direction of rotation on three-phase versions is correct.	A. Change the impeller or remove the obstruction. B. Invert the connection of two supply wires.
7. The pump vibrates and operates noisily.	A. Check that the pump and/or the pipes are firmly anchored. B. There is cavitation in the pump. C. The pump is running above its plate characteristics. D. Ensure that the mains voltage corresponds to the voltage on the data plate.	A. Fasten any loose parts. B. Increase the system pressure, keeping within the allowed limits. C. Reduce the flow rate.
8. The absorbed current is too high.	A. Check that the fluid density or viscosity is not too high. B. Check whether any moving parts are scraping against fixed parts. C. The feeding voltage is not the same as the voltage on the data plate. D. The pump is running above its plate characteristics.	A. Analyse the fluid to be pumped. B. Eliminate the cause of the scraping. C. Feed the motor with the correct voltage. D. Reduce the flow rate.

TAB. 6.6.2:

Rumore aereo prodotto dalle pompe dotate con motore di serie / Bruit aérien produit par les pompes équipées de moteur de série/ Airborne noise produced by the pumps with standard motor / Lärmpegel der Pumpen mit serienmäßigem Motor / Luchtlawaai geproduceerd door standaardmotoren / Ruido aéreo producido por las bombas dotadas de motor en serie / Luftburen bullernivå för pumpar med standardmotorer / Шум, производимый насосами, оснащенными серийными двигателями / Seri motor ile donatılan pompaların gürültü seviyesi / Zgomot aerian produs de pompele dotate cu moyor de serie / Siurblių, su atitinkamu varikliu, keliamas triukšmas / Ruído aéreo produzido pelas bombas equipadas com motor de série / Zračni hrup črpalk, opremljenih s standardnim motorjem / ضجيج هوائي ناتج عن المضخات المزودة بمحرك نموذجي

Szériagyártású motorokkal működő szivattyúk zajszintje / Ниво на шум на помпи със стандартен мотор / ميزان توليد صدا توسط پمپ های دارای موتور استاندارد

Grandezza motore Grandeur moteur Motor size Motorgröße Motorgrootte Tamaño del motor Motorns storlek Величина двигателя Motor Marime motor Variklis Tamanho do motor Velikost motorja كبر المحرك A motor mérete Мотор سایز موتور	n° poli n.de pôles no. poles Polzahl aantal polen n° polos antal poler Число полюсов Kutup sayısı n. poli Polių sk. n° de pólos Število polov عدد الأقطاب Póluszszám Брой полюси تعداد قطب ها	Potenza max Puissance max Power max Leistung max Vermogen max Potencia max Effekt max Макс. Мощность Güç Putere Maksimali Galia Potência máx. Maksimalna moč القوة الأقصى Max.telj. Макс. Мощност حداكثر توان		Pressione sonora Lpa Pression sonore Lpa Sound pressure Lpa Schalldruck Lpa Geluidsdruk Lpa Presión sonora Lpa Ljudtryck Lpa Звуковое давление Lpa Ses basıncı (Lpa) Presiune fonica Lpa Garso slėgis Lpa Pressão acústica Lpa Zvočni tlak Lpa الضغط الصوتي Lpa Zajnyomás Lpa Налягане на звука Lpa فشار توليد صدا	Potenza sonora Lwa Puissance sonore Lwa Sound power Lwa Schalleistung Lwa Geluidsvermogen Lwa Potencia sonora Lwa Ljudeffekt Lwa Акустическая мощность Lwa Ses gücü (Lwa) Putere fonica Lwa Garso galia Lwa Potência acústica Lwa Zvočna moč Lwa القوة الصوتية Lwa Zajteljesítmény Lwa Акустична моюност Lwa قدرت صدا
		KW	Hp	Lpa [dB(A)]	Lwa [dB(A)]
MEC 63	4	0.06	0.08	40	- -
MEC 71	4	0.75	1	54	- -
MEC 80	4	1.1	1.5	55	- -
MEC 100	4	3.7	5	67	- -
MEC 132	4	7.5	10	70	- -
MEC 160	4	15	20	79	- -
MEC 180	4	18.5	25	73	- -
MEC 63	2	0.37	0.5	52	- -
MEC 71	2	0.75	1	61	- -
MEC 80	2	2.2	3	65	- -
MEC 100	2	4	5.5	71	- -

TAB. 8.1:

Tempi commutazione stella-triangolo /Temps de commutation étoile-triangle / Star-delta switch-over times / Umschaltzeiten Stern-Dreieck / Overgangstijden ster-driehoek / Tiempos de conmutación estrella-triángulo Omkopplingstid stjärna – triangel / Время переключения со звезды на треугольник / Yıldızdan üçgene geçiş süreleri / Timpi comutare stea-trunghi / „Delta“ – „Žvaigždė“ perjungimo laikas / Tempos de comutação estrela-triângulo / Zvezda-trikot preklopni časi / زمن التحويل نجمة - مثلث / Csillag-delta átkapcsolási idő / Време на превключване звезда-триъгълник / مدت زمان تغییر سویچ ستاره – دلتا

Potenza / Puissance / Power / Leistung Vermogen / Potencia /Effekt / Мощность Güç / Putere / Galia / Potência Moč motorja / القوة / Teljesítmény / Мощност / توان		Tempi di commutazione / Temps de commutation / Switch-over times Umschaltzeiten / Overgangstijden / Tiempos de conmutación Omkopplingstid / Время переключения / Geçiş süreleri Timpi de comutare / Laikas / Tempos de comutação Preklopni časi / زمن التحويل / Átkapcsolási idő / Време на превключване / زمان تغییر سویچ
KW	Hp	
≤ 30	≤ 40	< 3 sec.
> 30	> 40	< 5 sec.

Modello / Modèle / Model *Modell / Model* *Modelo / Modell / Model* **Модель / Model / نموذج / *Modell /*** ***Модел / مدل***	**Prevalenza / Hauteur d'élévation / Head up** **Förderhöhe / Overwicht / Prevalencia** **Maximal pumphöjd / Manometrik yükseklik** **Напор / Tlačna višina /التفوق / Emelési magasság / Напор / حداكثر ارتفاع**			
	Hmax (m) 2 poles 50 Hz	***Hmax (m) 2 poles 60 Hz***	***Hmax (m) 4 poles 50 Hz***	***Hmax (m) 4 poles 60 Hz***
ALM 200			1.9	1.9
ALP 800	7.7	7.6		
ALM 500			5.5	5.9
ALP 2000	21	21.5		
KLM – DKLM 40/300			3.4	3.4
KLP – DKLP 40/600	8.2	8		
KLP – DKLP 40/900	9.9	10.1		
KLP – DKLP 40/1200	13.5	13.5		
KLM – DKLM 50/300			2.9	3
KLM – DKLM 50/600			5.5	5.85
KLP – DKLP 50/900	8.9	9		
KLP – DKLP 50/1200	11.5	13		
KLM – DKLM 65/300			3.1	3.2
KLM – DKLM 65/600			5.4	5.45
KLP – DKLP 65/900	8.8	9		
KLP – DKLP 65/1200	11.7	12.2		
KLM – DKLM 80/300			3.2	3.5
KLM – DKLM 80/600			5.8	6
KLP – DKLP 80/900	8.8	9.75		
KLP – DKLP 80/1200	11.8	12.6		
CM 40/440			4.4	4.5
CM 40/540			5.4	5.6
CM 40/670			6.7	6.8
CM 40/870			8.7	8.8
CM 40/1300			12.9	12.9
CM 40/1450			14.4	14.4
CM 50/510			5.5	5.4
CM 50/630			6.2	6.4
CM 50/780			7.7	8.1
CM 50/1000			10.1	10.6
CM 50/1270			12.7	12.7
CM 50/1420			14.2	14.2
CP 40/1900	17.6	17.6		
CP 40/2300	21.8	21.9		
CP 40/2700	26.9	26.9		
CP 40/3500	34.8	35		
CP 40/3800	38	38		
CP 40/4700	47	47		
CP 40/5500	55	55		
CP 40/6200	62	62		
CP 50/2200	20	20		
CP 50/2600	25	27		
CP 50/3100	31	31.5		
CP 50/4100	40.7	41		
CP 50/4600	46	46		

Modello / Modèle / Model Modell / Model Modelo / Modell / Model Модель / Model / نموذج / *Modell / Модел /* مدل	Prevalenza / Hauteur d'élévation / Head up Förderhöhe / Overwicht / Prevalencia Maximal pumphöjd / Manometrik yükseklik Напор / Tlačna višina /التفوق / Emelési magasság / Напор / حداكثر ارتفاع			
	Hmax (m) 2 poles 50 Hz	*Hmax (m) 2 poles 60 Hz*	*Hmax (m) 4 poles 50 Hz*	*Hmax (m) 4 poles 60 Hz*
ALME 500			5.5	5.9
ALPE 2000	21	21.5		
KLPE – DKLPE 40/600	8.2	8		
KLPE – DKLPE 40/1200	13.5	13.5		
KLME – DKLME 50/600			5.5	5.85
KLPE – DKLPE 50/1200	11.5	13		
KLME – DKLME 65/600			5.4	5.45
KLPE – DKLPE 65/1200	11.7	12.2		
KLME – DKLME 80/600			5.8	6
KLPE – DKLPE 80/1200	11.8	12.6		
CME 40/870			8.7	8.8
CME 40/1450			14.4	14.4
CME 50/1000			10.1	10.6
CME 50/1420			14.2	14.2
CPE 40/2300	21.8	21.9		
CPE 40/3500	34.8	35		
CPE 40/4700	47	47		
CPE 40/5500	55	55		
CPE 40/6200	62	62		
CPE 50/2600	25	27		
CPE 50/4100	40.7	41		
CPE 50/4600	46	46		
CPE 50/5650	56.5	56.5		
DCME 40/620			5.8	5.8
DCME 50/460			4.6	4.6
DCME 50/880			8.8	8.8
DCME 65/670			6.7	6.7
DCME 65/900			9	9
DCME 80/730			7.3	7.3
DCME 80/1020			10.2	10.2
DCME 100/1000			10	10
DCME 100/1200			12	12
DCME 100/1450			14.5	14.5
DCPE 40/1650	16.5	16.5		
DCPE 40/2450	24.5	24.5		
DCPE 50/1550	15.5	15.5		
DCPE 50/2450	24.5	24.5		
DCPE 50/3650	36.5	36.5		
DCPE 65/2300	23	23		
DCPE 65/2650	26.5	26.5		
DCPE 65/3250	32.5	32.5		
DCPE 65/3700	37	37		
DCPE 80/2530	25.3	25.3		
DCPE 80/3050	30.5	30.5		
DCPE 80/3650	36.5	36.5		

Modello / Modèle / Model Modell / Model Modelo / Modell / Model **Модель / Model /** نموذج / ***Modell / Модел /*** مدل	**Prevalenza / Hauteur d'élévation / Head up Förderhöhe / Overwicht / Prevalencia Maximal pumphöjd / Manometrik yükseklik Напор / Tlačna višina** /التفوق / **Emelési magasság / Напор /** حداكثر ارتفاع			
	Hmax (m) 2 poles 50 Hz	***Hmax (m) 2 poles 60 Hz***	***Hmax (m) 4 poles 50 Hz***	***Hmax (m) 4 poles 60 Hz***
DCPE 80/4100	41	41		
DCPE 100/2450	24.5	24.5		
DCPE 100/2750	27.5	27.5		
DCPE 100/2900	29	29		
DCPE 100/3300	33	33		
DCPE 100/3750	37.5	37.5		

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