

# Electro submersible pumps

## SD, SDF, SDN, SDX, SDS

### ORIGINAL OPERATING INSTRUCTIONS

#### 1. Operating conditions

##### Standard construction

- For clean or slightly dirty water with maximum sand content: 150 g/m<sup>3</sup> (50 g/m<sup>3</sup> for SDX).
  - Water temperature up to 25 °C (35 °C for 4").
  - Max starts per hour at regular intervals: 20 for 4" motors, 15 for 6"-8" motors, 10 for 10" motors.
- The electric data marked on the label are referred to the nominal power of the motor.

#### 2. Installation

Along its entire length the well diameter must be wide enough to allow for passage of the pump with clearance all round.

Handle the pump carefully; don't drop it or let it fall.

**The safe movement of the equipment is on the user responsibility and any lifting operation must be carried out by a suitably trained and qualified personnel.**

When threaded connections are used, delivery pipes must be tightened to avoid any risk of the pump falling into the well owing to unscrews.

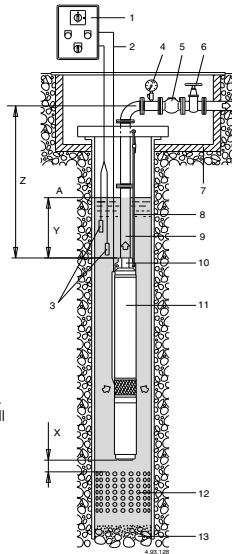
It is advisable to connect the **metal pipes** to the threaded joints with spot welding.

With **plastic pipes** use proper connections.

The **SD, 6SDX**-series pumps have two holes in the delivery casing for anchoring and for raising the pump.

- 1 control panel
- 2 power cable
- 3 level probes system
- 4 pressure gauge
- 5 non-return valve
- 6 delivery gate valve
- 7 inspection shaft
- 8 safety cable
- 9 delivery piping
- 10 built-in valve
- 11 pump
- 12 filter
- 13 well bottom

- A changeable dynamic level.
- Z total length of delivery piping;  
if >100 m install one or more non-return valves.
- Y depth of immersion, always >1 m.
- X distance between motor and well filter > 1 m.



**A safety rope or chain** of non-perishable material should always be used to secure the pump. Attach the power supply cables to the delivery pipe with cable clamps placed at intervals of approx 3 m. Lower the pump into the well, making sure the feed cables are not damaged in any way during the operation.



**Never use the electric power cable to suspend the pump.**

When the pump is operating, the delivery connection must be submersed at least 1 m below the deepest dynamic level of the well; for this purpose, it is advisable to install an automatic control system which will stop operating of the pump when the level of the water falls below this limit.

Position the pump at a distance from the bottom of the well which will be sufficient to avoid accumulation of sand or mud around the motor and to eliminate the risk of overheating.

The following components must be installed in the **delivery pipe**:

- a pressure gauge;
- a check valve at max. 7 m from the pump outlet and more lift-type **check valves** (5), depending on the type of installation (at least one every 50 m in the straight vertical pipe above the pump), to provide protection against water hammering;
- a **gate valve** to regulate delivery, head and absorbed power.

If the submersible pump is to be installed in the **horizontal position**, the following instructions must be followed:

- install the pump with its axis placed at least 0,5 m above the bottom of the sump, tank or container;
- install a supplementary check valve, as the pump valve does not ensure a perfect seal in the horizontal position;
- the plant must allow for easy evacuation of the air when starting.

#### 2.1. Motor cooling

If the well (or tank) has a diameter which is considerably greater than the pump width, it is necessary to install a **cooling flow shroud** (a flow inducer sleeve), that is an external jacket to ensure a sufficient flow and water velocity ( $v \geq 0,08$  m/s for 4", 0,16 m/s for 6" and 0,2 m/s for 8"-10") **to cool the motor**.

#### 3. Assembly of the pumps

The pumps are normally supplied with motor and pump disconnected (except 4SD already assembled).

Connect the coupling and pump-motor suction lantern. Clean the surface to be coupled. Put the suction lantern of the pump in correspondance of the motor studs. Couple the grooved joint of the pump to the motor shaft.

Screw in the nuts to the suction lantern, then fix them cross-wise starting from the one opposed to the cable as shown in the figure below. The torque



recommended is 10Nm (for 4" motors). Attach the cable to the pump with the cable guard and place the filter on the suction lantern. Follow separate operating instructions (if available) of the motor.

## 4. Electrical connection



Electrical connection must be carried out only by a qualified electrician in accordance with local regulations.

**Follow safety standards.**

**The unit must be properly earthed (grounded), also with a non-metallic delivery pipe.**

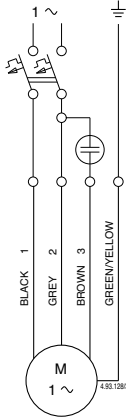
Make sure the frequency and mains voltage correspond with the name plate data.

The **control panel** must contain:

- a device for disconnection from the mains (switch) with a contact separation of at least 3 mm in all poles;
- an adequate motor protector for the current indicated on the nameplate;
- a capacitor for the **SDM** single-phase pumps, in accordance with the data indicated on the motors themselves.

For pumps with power rating above 11 kW, it is advisable to provide the control panel with Y/Δ or impedance starting.

Install electrodes to protect the pump against dry running.



Electrical diagram single-phase motors

### 4.1. Connection of cables

Feed cables have to be chosen on the basis of power, distance, voltage drop and temperature.

For connection of cables in the well, use thermo-shrinking insulation sheathes or other systems used for submerged cables.

Before lowering the motor into the well, use appropriate instruments to measure continuity between phases and perform an isolation test between each single phase and the earth conductor.

### 4.2. Operation with frequency converter

Adjust the frequency converter so that the limiting values of min. 30 Hz and max. 60 Hz will not be exceeded.

The maximum running up time from 0 to 30 Hz and running down time from 30 to 0 Hz for frequency-converter operation is 1 second.

## 5. Starting

**ATTENTION: never run the pump dry, not even for a short trial run.**

**Start the pump with the gate valve regulated to minimum aperture** and wait until the delivery pipe is completely free of air.

**With a three-phase motor make sure the direction of rotation is correct.**

For this purpose, with the gate valve at half-open aperture position, check the pressure (with the pressure gauge) or flow rate (sight check) after starting. Switch off power, reverse the connections of two phases on the control panel, re-start and check the pressure or flow rate capacity again.

The correct direction of rotation will provide a considerably greater and easily distinguishable pressure and delivery capacity.

Make sure the sand residue present in the water disappears or is minimal.

**Never start or run the pump when the gate valve has been opened too widely.**

**Make sure the pump operates within its rated limits of performance and that the rated absorbed current is not exceeded.**

Otherwise, regulate the delivery gate valve or the setting of any pressure switches.

**ATTENTION: avoid long periods of operation with closed discharge.**

### 5.1. Generator supply

The switching sequence is of utmost importance. If you do not apply this correctly, both motor and generator may be damaged.

Therefore:

- Always switch the generator on and off without load!

This means:

- Starting: always switch the generator ON first - and the motor afterwards!
- Stopping: always switch the motor OFF first - and the generator afterwards!

## 6. Maintenance

Under normal operating conditions with clean water the pump will not require maintenance. Absorbed current and head supplied by the pump must be checked at regular intervals.

This procedure should be carried out frequently when water contains considerable quantities of sand. In the case of emergency systems, it is advisable to operate the pumps once a month in order to avoid the risk of blocking and to maintain and verify perfect efficiency.



**Disconnect electrical power before any servicing operation.**

Changes reserved.

# 4SD 10,15

(1) Solo nei tipi  
 Only for types  
 Seulement pour les types  
 Soles en los tipos  
 Endast typ

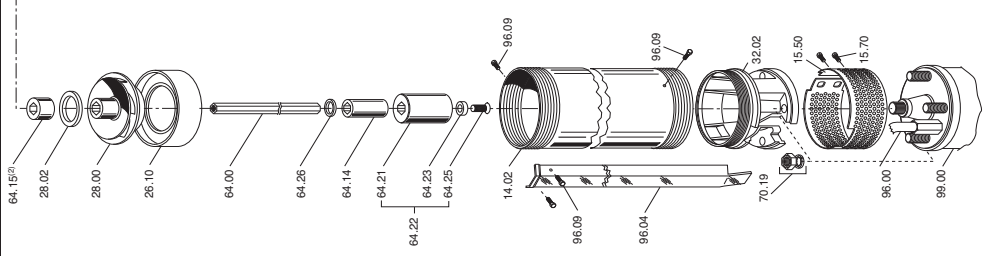
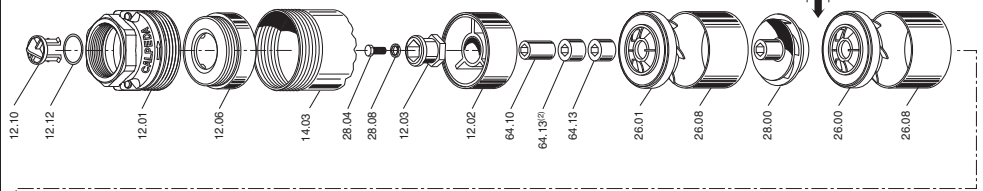
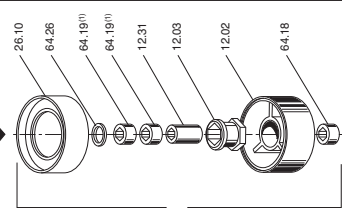
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 4SD 10/22  
 4SD 10/24  
 4SD 10/27  
 4SD 10/30  
 4SD 15/15  
 4SD 15/17  
 4SD 15/23 (n° 2)

(2) Solo nei tipi  
 Only for types  
 Nur für baugrößen  
 Seulement pour les types  
 Soe en los tipos  
 Endast typ

4SD 15

MODELLI CON INTERSTADIO  
 MODELS WITH INTERMEDIARY BUSH BRACKET  
 MODELES AVEC PALIER INTERMEDIAIRE  
 MODELOS CON SOPORTE INTERMEDIO

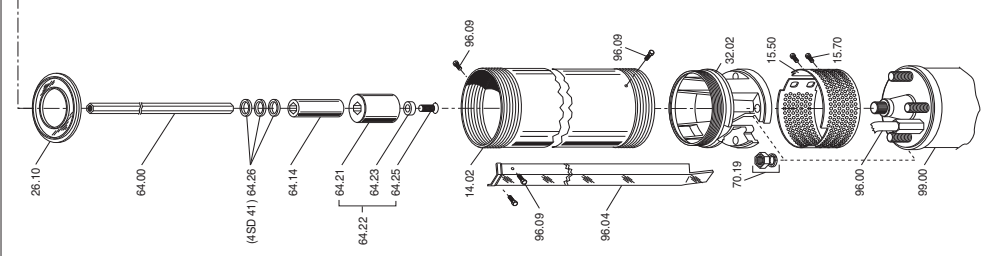
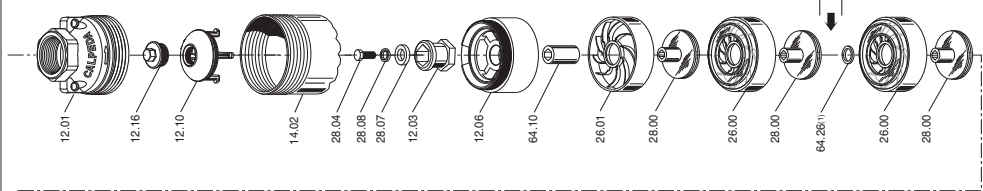
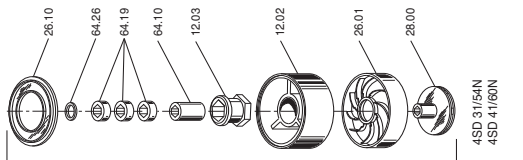
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 4SD 10/22  
 4SD 10/24  
 4SD 10/27  
 4SD 10/30  
 4SD 15/15  
 4SD 15/17  
 4SD 15/23 (n° 2)



# 4SD 31

(1) ogni 3 stadi  
 every 3 stages  
 tous les 3 stades  
 cada tres etambos

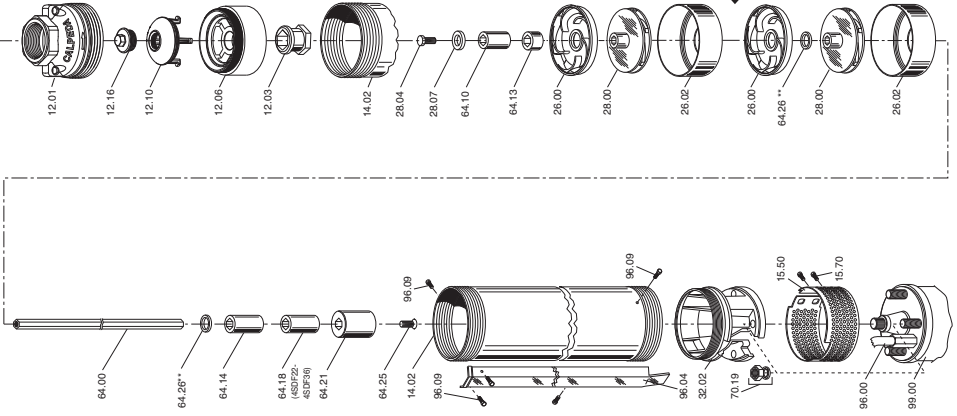
MODELLI CON INTERSTADIO  
 MODELS WITH INTERMEDIARY BUSH BRACKET  
 MODELES AVEC PALIER INTERMEDIAIRE  
 MODELOS CON SOPORTE INTERMEDIO



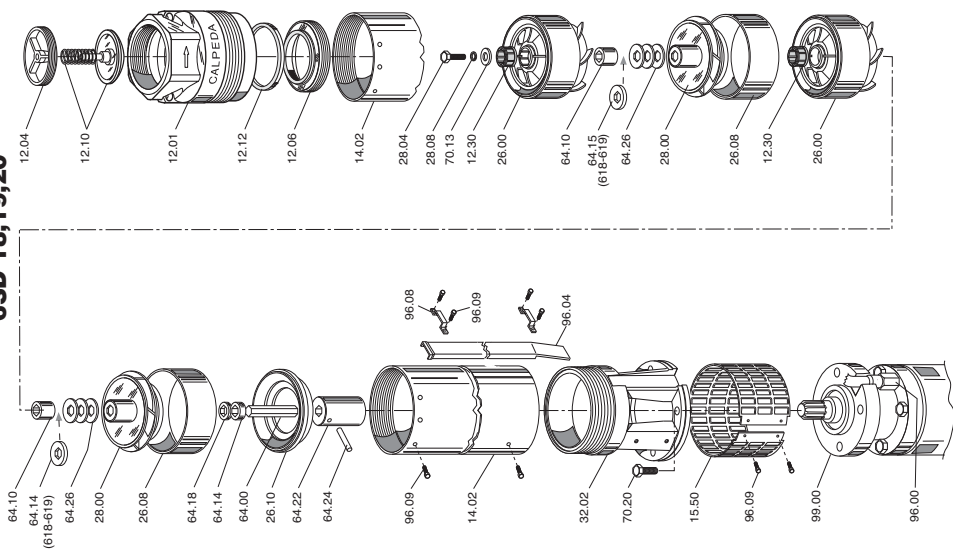
# 4SDF 16,22,36,46,54

MODELLI CON INTERSTADIO  
 MODELS WITH INTERMEDIARY BUSH BRACKET  
 MODELOS CON SOPORTE INTERMEDIO

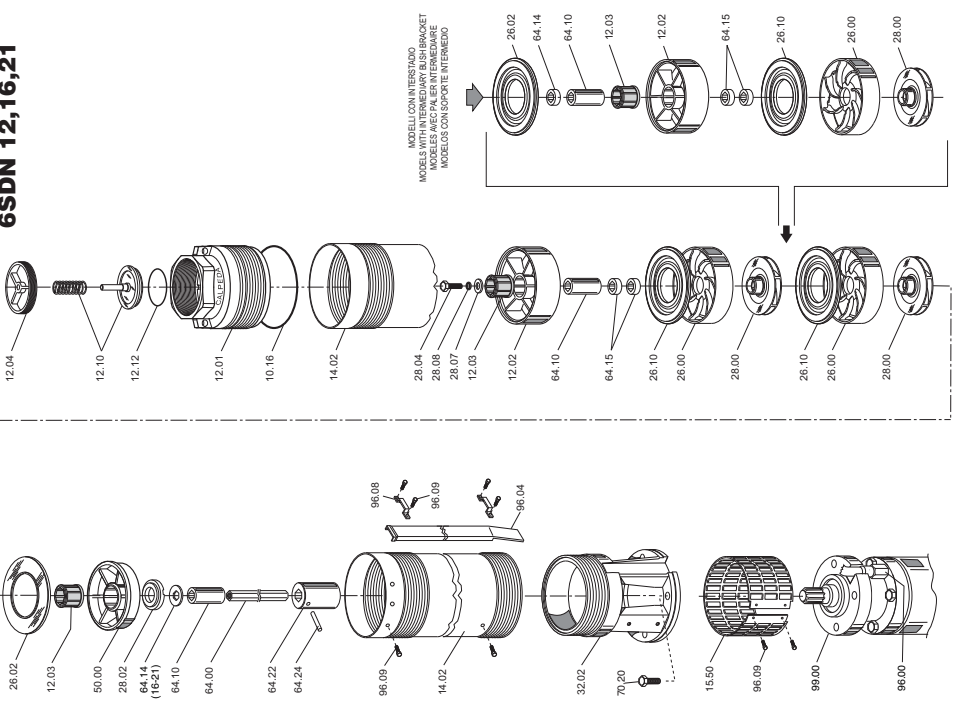
- 4SDF 16-55
- 4SDF 22-57
- 4SDF 36-49
- 4SDF 36-60
- 4SDF 46-42
- 4SDF 46-55
- 4SDF 54-40
- 4SDF 54-48
- 4SDF 54-55



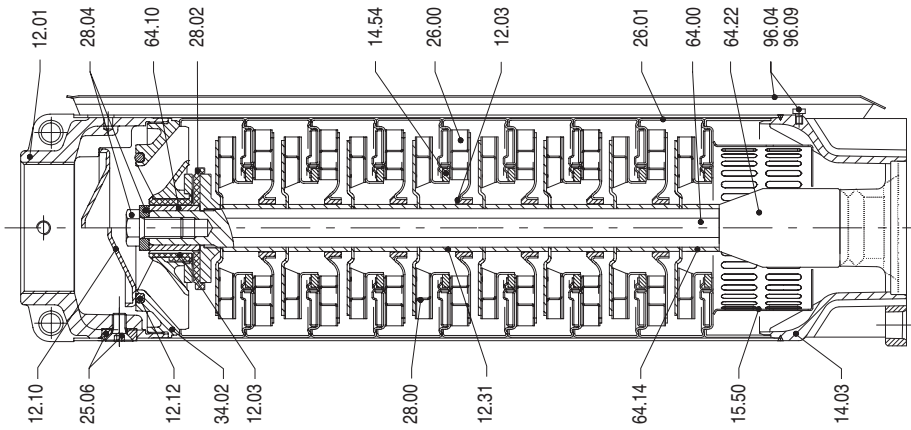
# 6SD 18,19,20



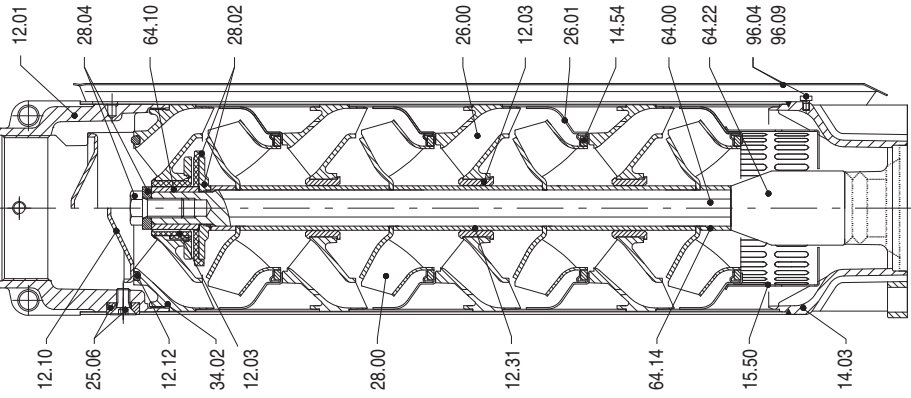
# 6SDN 12,16,21



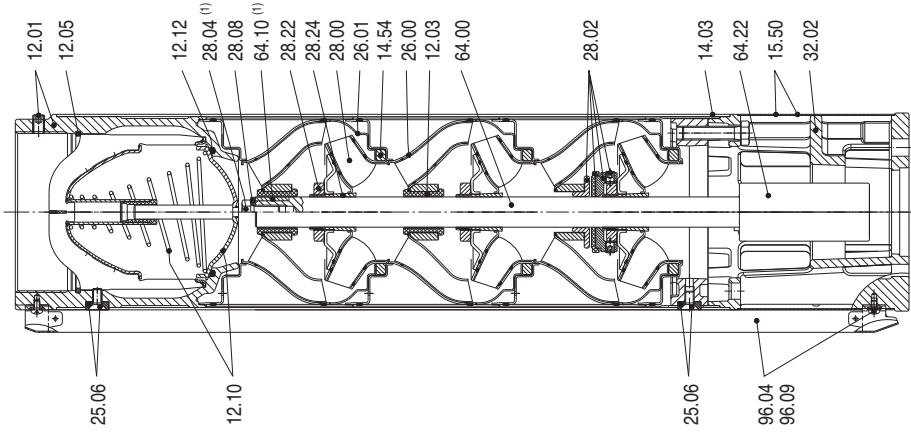
### 6SDX 13,18,27



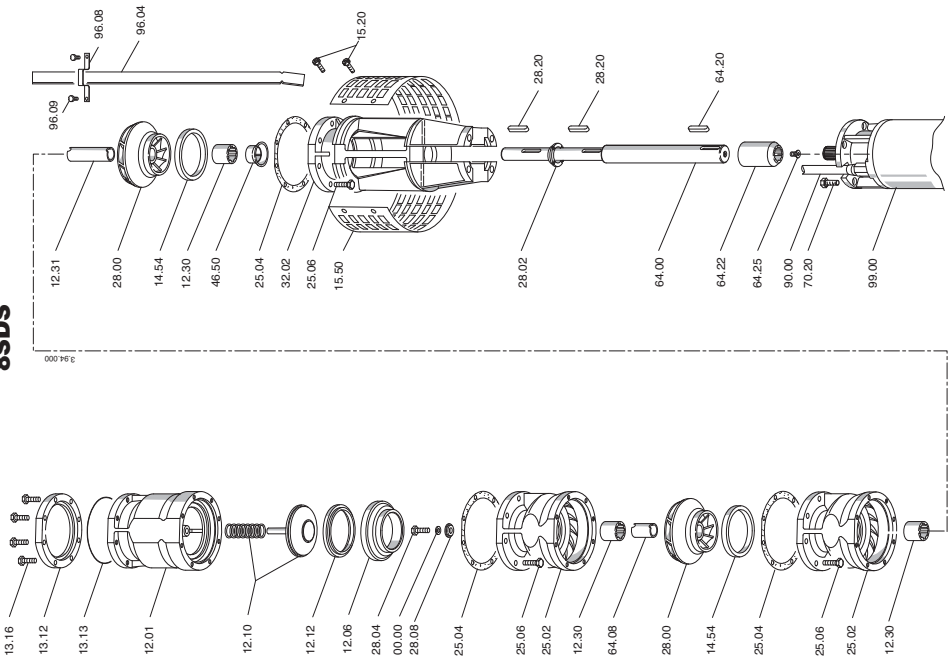
### 6SDX 45,60



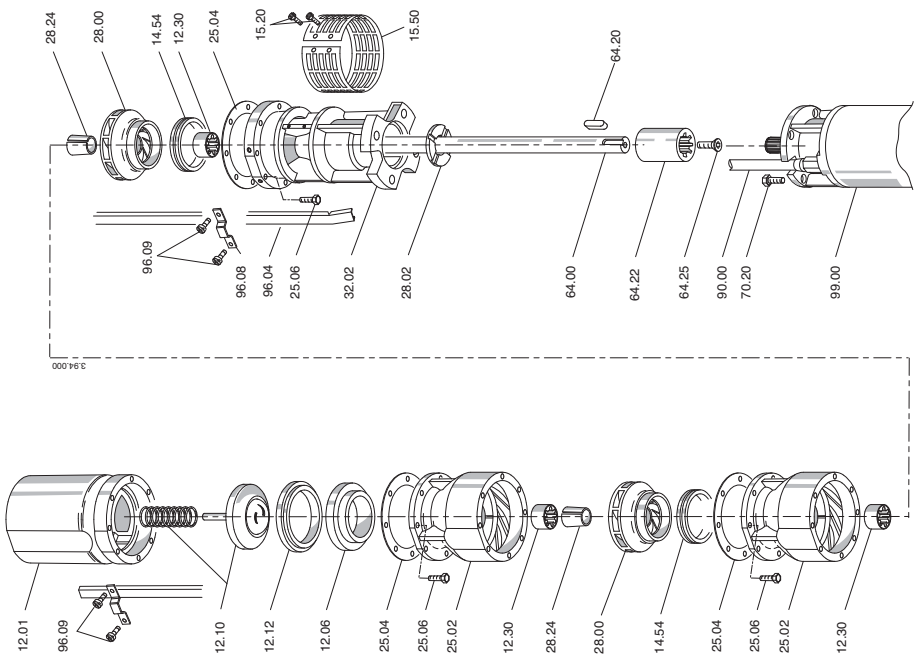
### 8SDX 78,97



# 8SDS



# 6SDS







**Italiano****Nr. Denominazione**

10.16 Guarnizione  
 12.01 Corpo di mandata  
 12.02 Supporto boccola  
 12.03 Cuscinetto a boccola (parte fissa)  
 12.04 Guida valvola  
 12.05 Anello di sicurezza  
 12.06 Sede valvola  
 12.10 Valvola completa  
 12.12 Guarnizione valvola  
 12.16 Tappo  
 12.30 Cuscinetto a boccola stadio  
 12.31 Bussola del cuscinetto (rotante)  
 13.12 Controflangia premente  
 13.13 Guarnizione flangia premente  
 13.16 Vite  
 14.02 Camicia esterna  
 14.54 Anello di tenuta  
 15.20 Vite  
 15.50 Filtro  
 25.02 Corpo stadio  
 25.04 Guarnizione piana  
 25.06 Vite  
 26.00 Diffusore (pompa)  
 26.02 Parete del diffusore  
 26.08 Camicia del diffusore  
 26.10 Anello convogliatore  
 28.00 Girante  
 28.02 Anello di contropinta  
 28.04 Dado bloccaggio girante (o vite)  
 28.05 Anello di sicurezza  
 28.07 Rondella  
 28.08 Rosetta  
 28.20 Linguetta girante  
 28.24 Bussola conica  
 32.02 Lanterna aspirante  
 34.02 Coperchio superiore  
 46.50 Parasabbia  
 64.00 Albero pompa  
 64.08 Camicia di protezione  
 64.10 Bussola cuscinetto  
 64.13 Bussola distanziatrice superiore  
 64.14 Bussola distanziatrice inferiore  
 64.15 Bussola distanziatrice  
 64.18 Bussola distanziatrice  
 64.19 Bussola distanziatrice  
 64.20 Linguetta per estremità d'albero  
 64.21 Giunto  
 64.22 Giunto completo  
 64.23 Rondella  
 64.24 Spina elastica  
 64.25 Vite  
 64.26 Spessore di aggiustaggio  
 70.13 Rondella  
 70.19 Dado  
 70.20 Vite  
 96.00 Cavo  
 96.04 Copricavo  
 96.08 Staffa  
 96.09 Vite  
 99.00 Motore completo

**English****Nr. Part designation**

10.16 Gasket  
 12.01 Delivery casing  
 12.02 Bush casing  
 12.03 Bearing sleeve (stationary part)  
 12.04 Valve guide  
 12.05 Circlip  
 12.06 Valve seat  
 12.10 Valve set  
 12.12 Valve joint  
 12.16 Plug  
 12.30 Stage bearing sleeve  
 12.31 Bearing sleeve (rotating part)  
 13.12 Counterflange, delivery side  
 13.13 Flange gasket, delivery side  
 13.16 Screw  
 14.02 External jacket  
 14.54 Wear ring  
 15.20 Screw  
 15.50 Strainer  
 25.02 Stage casing  
 25.04 Gasket  
 25.06 Screw  
 26.00 Diffuser (pump)  
 26.02 Diffuser plate  
 26.08 Diffuser sleeve  
 26.10 Conveyor ring  
 28.00 Impeller  
 28.02 Counter thrust bearing ring  
 28.04 Impeller nut (or screw)  
 28.05 Circlip  
 28.07 Washer  
 28.08 Washer  
 28.20 Impeller key  
 28.24 Locking sleeve  
 32.02 Suction lantern  
 34.02 Upper cover  
 46.50 Sand guard  
 64.00 Pump shaft  
 64.08 Shaft sleeve  
 64.10 Bearing sleeve  
 64.13 Upper spacer sleeve  
 64.14 Lower spacer sleeve  
 64.15 Intermediate spacer sleeve  
 64.18 Spacer sleeve  
 64.19 Spacer sleeve  
 64.20 Key for shaft end  
 64.21 Coupling  
 64.22 Coupling, set  
 64.23 Washer  
 64.24 Shear pin  
 64.25 Screw  
 64.26 Adapter thickness  
 70.13 Washer  
 70.19 Nut  
 70.20 Screw  
 96.00 Cable  
 96.04 Cable guard  
 96.08 Clamp  
 96.09 Screw  
 99.00 Complete motor

**Deutsch****Nr. Teile-Benennung**

10.16 Flachdichtung  
 12.01 Druckgehäuse  
 12.02 Buchsegehäuse  
 12.03 Lagerbuchse  
 12.04 Tellerführung  
 12.05 Sicherungsring  
 12.06 Ventil Sitz  
 12.10 Ventil, komplett  
 12.12 Ventilsitzdichtung  
 12.16 Verschlußschraube  
 12.30 Stufenbüchse  
 12.31 Lagerhülse  
 13.12 Gegenflansch, druckseitig  
 13.13 Flachdichtung, druckseitig  
 13.16 Schraube  
 14.02 Pumpenmantel  
 14.54 Spaltring, saugseitig  
 15.20 Schraube  
 15.50 Saugsieb  
 25.02 Stufengehäuse  
 25.04 Flachdichtung  
 25.06 Schraube  
 26.00 Leitrad  
 26.02 Leitradwand  
 26.08 Stufenmantel  
 26.10 Förderring  
 28.00 Laufrad  
 28.02 Gegenaxiallagering  
 28.04 Laufradmutter (oder Schraube)  
 28.05 Sicherungsring  
 28.07 Scheibe  
 28.08 Scheibe  
 28.20 Paßfeder für Laufrad  
 28.24 Spannhülse  
 32.02 Sauggehäuse  
 34.02 Oberer Deckel  
 46.50 Sandschutzring  
 64.00 Pumpenwelle  
 64.08 Wellenschutzhülse  
 64.10 Lagerhülse  
 64.13 Abstandshülse, oben  
 64.14 Abstandshülse, unten  
 64.15 Zwischenabstandshülse  
 64.18 Abstandshülse  
 64.19 Abstandshülse  
 64.20 Paßfeder für Wellenende  
 64.21 Kupplung  
 64.22 Kupplung, komplett  
 64.23 Scheibe  
 64.24 Paßstift  
 64.25 Schraube  
 64.26 Zwischenlage  
 70.13 Scheibe  
 70.19 Mutter  
 70.20 Schraube  
 96.00 Kabel  
 96.04 Kabelschutzleiste  
 96.08 Schelle  
 96.09 Schraube  
 99.00 Motor, komplett

## **I** DICHIARAZIONE DI CONFORMITÀ

Noi CALPEDA S.p.A. dichiariamo sotto la nostra esclusiva responsabilità che le Pompe SD, SDM, SDN, SDX, SDS, B-SDS, tipo e numero di serie riportati in targa, sono conformi a quanto prescritto dalle Direttive 2004/108/CE, 2006/42/CE, 2006/95/CE e dalle relative norme armonizzate.

## **GB** DECLARATION OF CONFORMITY

We CALPEDA S.p.A. declare that our Pumps SD, SDM, SDN, SDX, SDS, B-SDS, with pump type and serial number as shown on the name plate, are constructed in accordance with Directives 2004/108/EC, 2006/42/EC, 2006/95/EC and assume full responsibility for conformity with the standards laid down therein.

## **D** KONFORMITÄTSEKLRÄRUNG

Wir, das Unternehmen CALPEDA S.p.A., erklären hiermit verbindlich, daß die Pumpen SD, SDM, SDN, SDX, SDS, B-SDS, Typbezeichnung und Fabrik-Nr. nach Leistungsschild den EG-Vorschriften 2004/108/EG, 2006/42/EG, 2006/95/EG entsprechen.

## **F** DECLARATION DE CONFORMITE

Nous, CALPEDA S.p.A., déclarons que les Pompes SD, SDM, SDN, SDX, SDS, B-SDS, modèle et numero de série marqués sur la plaque signalétique sont conformes aux Directives 2004/108/CE, 2006/42/CE, 2006/95/CE.

## **E** DECLARACION DE CONFORMIDAD

En CALPEDA S.p.A. declaramos bajo nuestra exclusiva responsabilidad que las Bombas SD, SDM, SDN, SDX, SDS, B-SDS, modelo y numero de serie marcados en la placa de características son conformes a las disposiciones de las Directivas 2004/108/CE, 2006/42/CE, 2006/95/CE.

## **DK** OVERENSSTEMMELSESERKLÆRING

Vi CALPEDA S.p.A. erklærer hermed at vore pumper SD, SDM, SDN, SDX, SDS, B-SDS, pumpe type og serie nummer vist på typeskiltet er fremstillet i overensstemmelse med bestemmelserne i Direktiv 2004/108/EC, 2006/42/EC, 2006/95/EC og er i overensstemmelse med de heri indeholdte standarder.

## **P** DECLARAÇÃO DE CONFORMIDADE

Nós, CALPEDA S.p.A., declaramos que as nossas Bombas SD, SDM, SDN, SDX, SDS, B-SDS, modelo e número de série indicado na placa identificadora são construídas de acordo com as Directivas 2004/108/CE, 2006/42/CE, 2006/95/CE e somos inteiramente responsáveis pela conformidade das respectivas normas.

## **NL** CONFORMITEITSVERKLARING

Wij CALPEDA S.p.A. verklaren hiermede dat onze pompen SD, SDM, SDN, SDX, SDS, B-SDS, pomptype en serienummer zoals vermeld op de typeplaat aan de EG-voorschriften 2004/108/EU, 2006/42/EU, 2006/95/EU voldoen.

## **SF** VAKUUTUS

Me CALPEDA S.p.A. vakuutamme että pumppumme SD, SDM, SDN, SDX, SDS, B-SDS, malli ja valmistusnumero tyypikkivästä, ovat valmistettu 2004/108/EU, 2006/42/EU, 2006/95/EU direktiivien mukaisesti ja CALPEDA ottaa täyden vastuun siitä, että tuotteet vastaavat näitä standardeja.

## **S** EU NORM CERTIFIKAT

CALPEDA S.p.A. intygat att pumpar SD, SDM, SDN, SDX, SDS, B-SDS, pumptyp och serienummer, visade på namnplåten är konstruerade enligt direktiv 2004/108/EC, 2006/42/EC, 2006/95/EC. Calpeda åtar sig fullt ansvar för överensstämmelse med standard som fastställts i dessa avtal.

## **GR** ΔΗΛΩΣΗ ΣΥΜΦΩΝΙΑΣ

Εμείς ως CALPEDA S.p.A. δηλώνουμε ότι οι αντλίες μας αυτές SD, SDM, SDN, SDX, SDS, B-SDS, με τύπο και αριθμό σειράς κατασκευής όπου αναγράφεται στην πινακίδα της αντλίας, κατασκευάζονται σύμφωνα με τις οδηγίες 2004/108/ΕΟΚ, 2006/42/ΕΟΚ, 2006/95/ΕΟΚ, και αναλαμβάνουμε πλήρη υπευθυνότητα για συμφωνία (συμμόρφωση), με τα στάνταρς των προδιαγραφών αυτών.

## **TR** UYGUNLUK BEYANI

Bizler CALPEDA S.p.A. firması olarak SD, SDM, SDN, SDX, SDS, B-SDS, Pompalarımızın, 2004/108/EC, 2006/42/EC, 2006/95/EC, direktiflerine uygun olarak imal edildiklerini beyan eder ve bu standartlara uygunluğuna dair tüm sorumluluğu üstleniriz.

## **RU** Декларация соответствия

Компания "Calpeda S.p.A." заявляет с полной ответственностью, что насосы серий SD, SDM, SDN, SDX, SDS, B-SDS, тип и серийный номер которых указывается на заводской табличке соответствуют требованиям нормативов 2004/108/CE, 2006/42/CE, 2006/95/CE.

## **中文** 声明

我们科沛达泵业公司声明我们制造的 SD, SDM, SDF, SDFM, SDN, SDX, SDS, B-SDS, 系列水泵 (在铭牌上标示水泵的型号和序列号) 均符合以下标准的相应目录要求: 2004/108/CE, 2006/42/CE, 2006/95/CE. 本公司遵循其中的标准并承担相应的责任