Wilo-MultiVert-MVI 1../ 2../ 4../ 8../ 16.. -6

D Einbau- und Betriebsanleitung

GB Installation and operating instructions

F Notice de montage et de mise en service

NL Inbouw- en bedieningsvoorschriften

E Instrucciones de instalación y funcionamiento

I Istruzioni di montaggio, uso e manutenzione

FIN Huolto- ja käyttöohje

S Monterings- och skötselinstruktioner

H Beépítési és üzemeltetési utasítás

GR Οδηγίες εγκατάστασης και λειτουργίας

CZ Návod k montáži a obsluze

PL Instrukcja montażu i obsługi

RUS Инструкция по монтажу и эксплуатации

DK Monterings- og driftsvejledning

NO Monterings- og driftsveiledningen

2050778-Ed.3-04/10

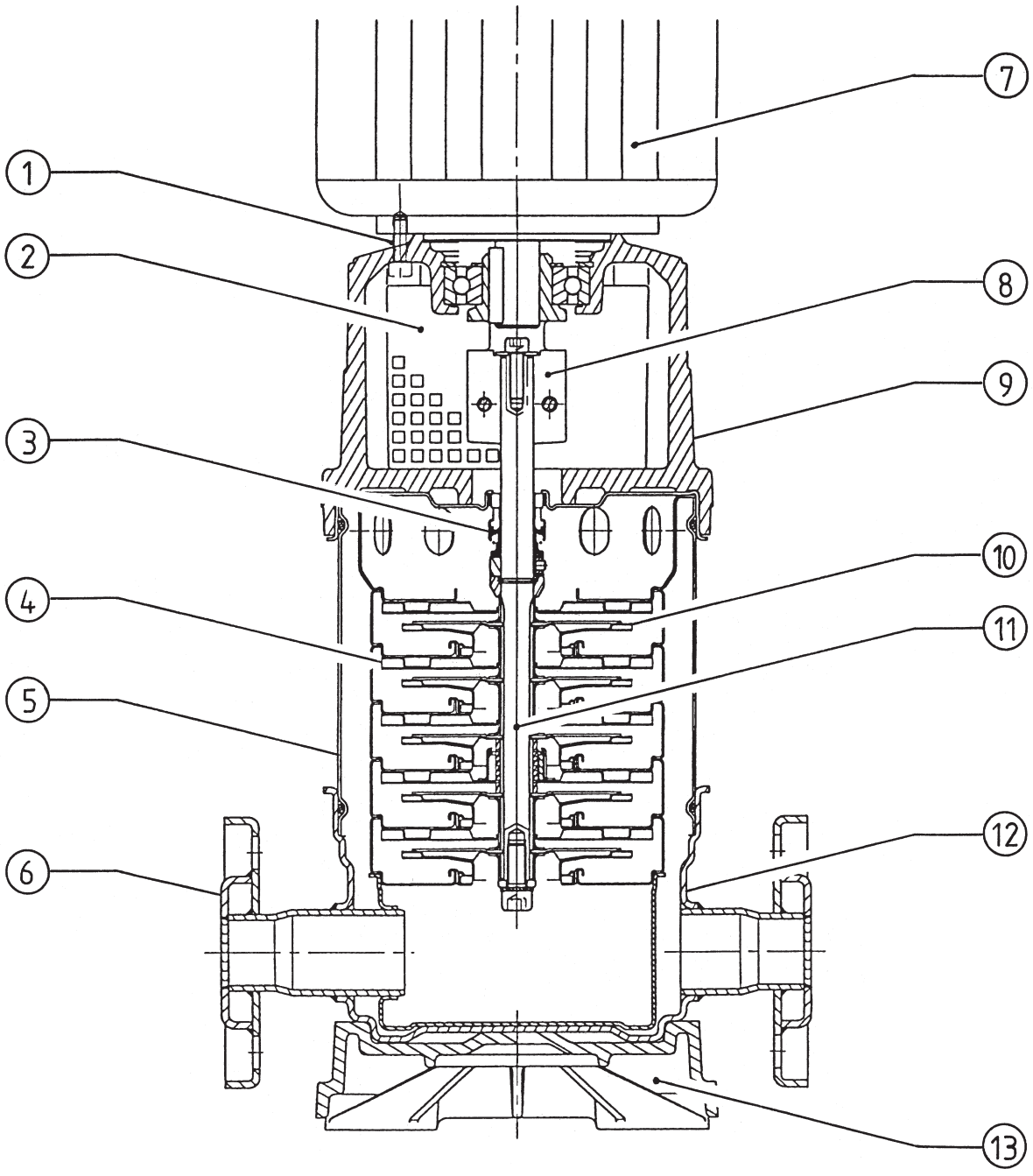
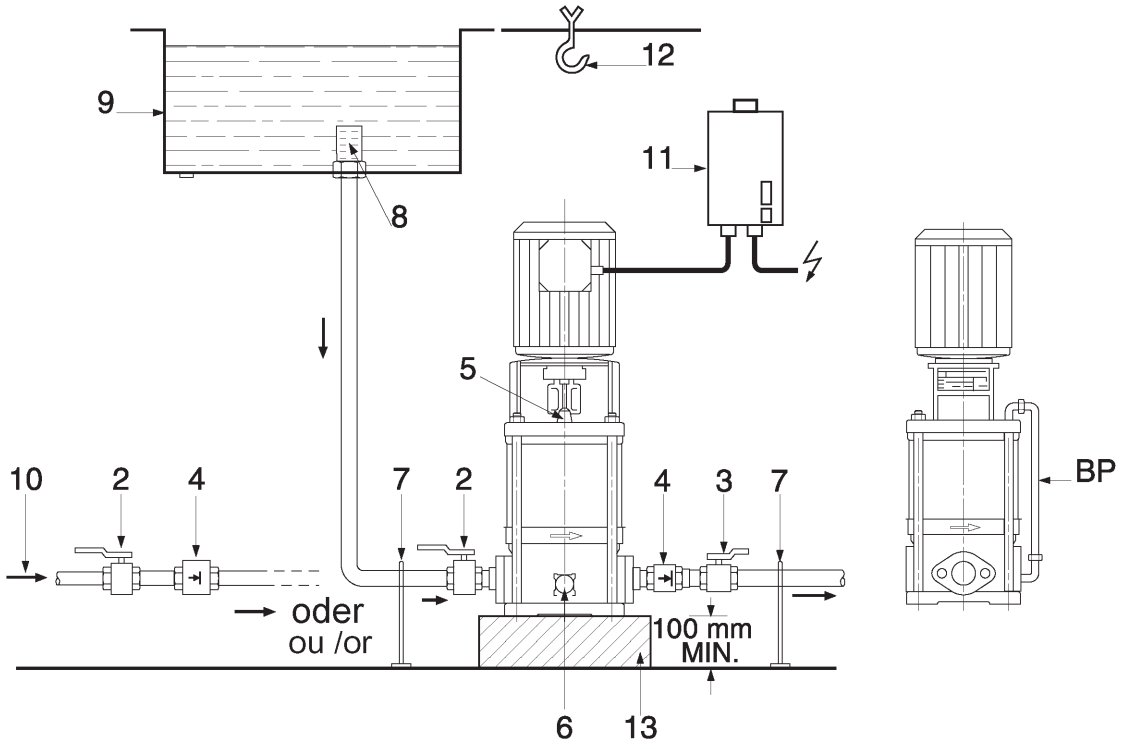


Fig. 1


12
9
11
8
5
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7
2
4
3
7
BP
oder
ou /or
100 mm
MIN.
6
13

Fig. 2

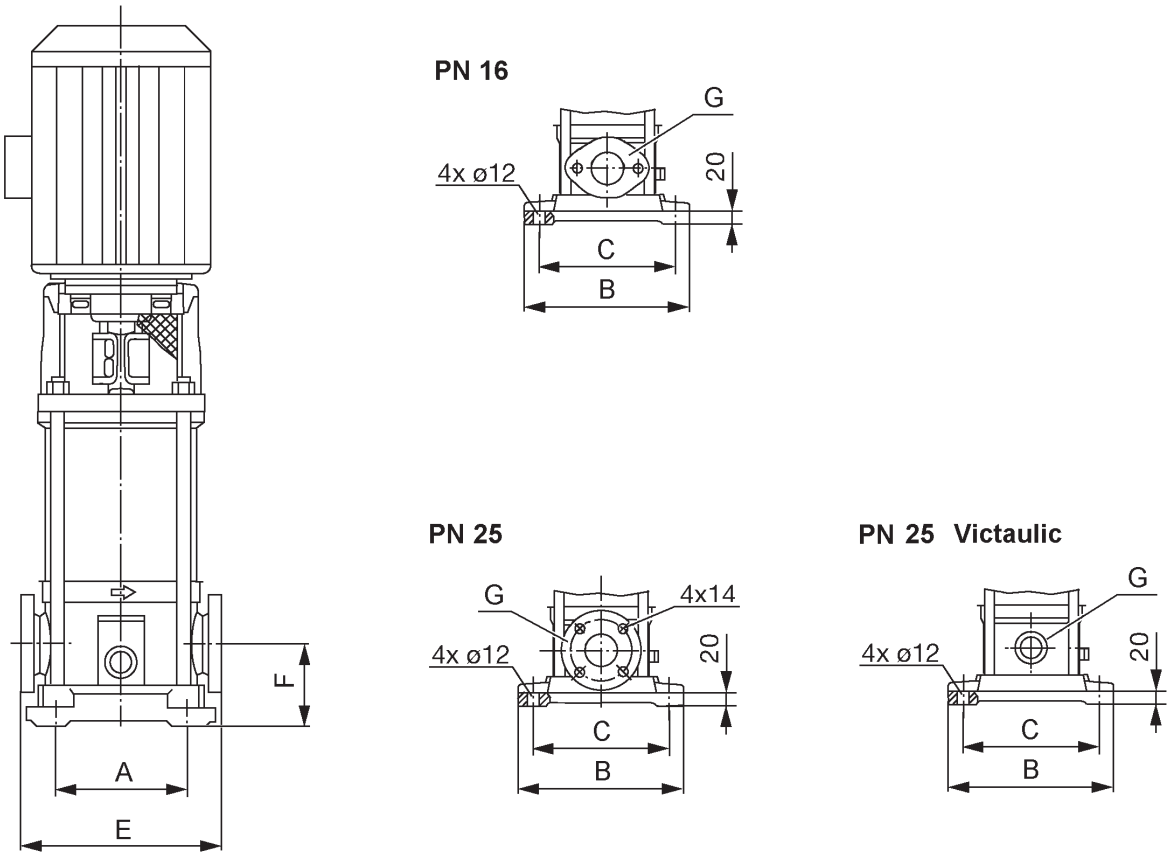
PN 16
G
4x ø12
20
C
B
PN 25
G
4x14
4x ø12
20
C
B
PN 25 Victaulic
G
4x ø12
20
C
B
F
A
E

Fig. 3

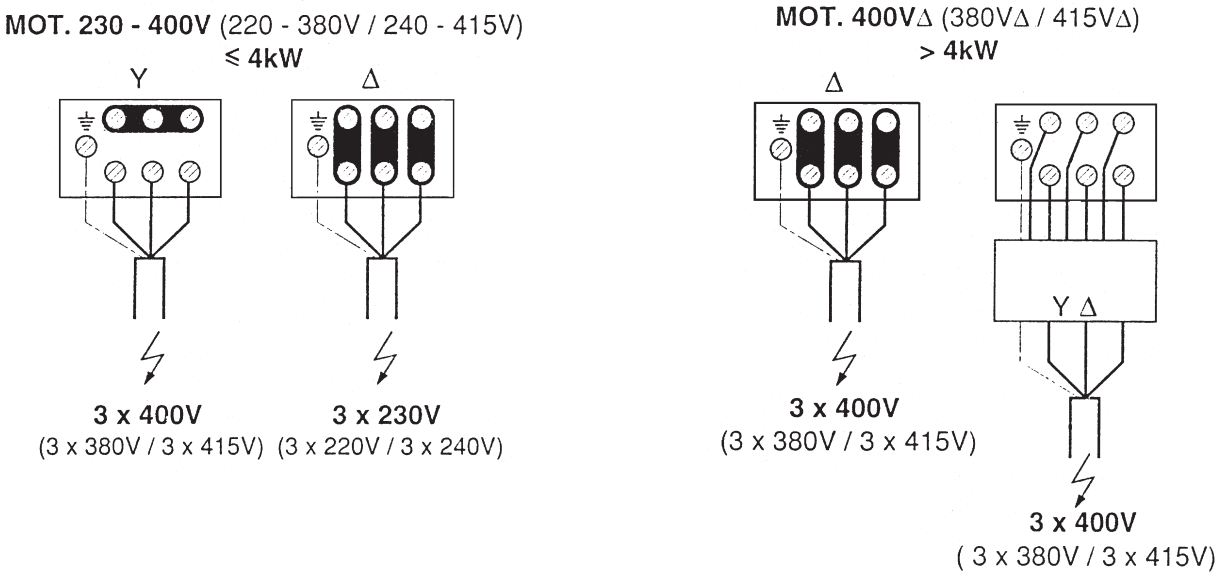
MOT. 230 - 400V (220 - 380V / 240 - 415V)
≤ 4kW
Y
Δ
3 x 400V
(3 x 380V / 3 x 415V)
3 x 230V
(3 x 220V / 3 x 240V)
MOT. 400VΔ (380VΔ / 415VΔ)
> 4kW
Δ
Y Δ
3 x 400V
(3 x 380V / 3 x 415V)
3 x 400V
(3 x 380V / 3 x 415V)

Fig. 4

D

GB

F

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I

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S

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PL

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DK

N

D EG – Konformitätserklärung
GB EC – Declaration of conformity
F Déclaration de conformité CE

(gemäß Anhang/according annex/ conforme appendice 1A, 2006/42/EG)

Hiermit erklären wir, dass die Bauart der Baureihe : **MVI**
Herewith, we declare that the product type of the series:
Par le présent, nous déclarons que l'agrégat de la série :

in der gelieferten Ausführung folgenden einschlägigen Bestimmungen entspricht:
in its delivered state complies with the following relevant provisions:
est conforme aux dispositions suivantes dont il relève:

EG-Maschinenrichtlinie
EC-Machinery directive
Directives CE relatives aux machines
98/37/EG
(gültig bis /valid up to / valide jusqu'à 28.12.2009)

Niederspannungsrichtlinie
Low Voltage directive
Directive basse-tension
2006/95/EG
(gültig bis / valid up to / valide jusqu'à 28.12.2009)

EG-Maschinenrichtlinie
EC-Machinery directive
Directives CE relatives aux machines
2006/42/EG
(gültig ab / valid from / valide de 29.12.2009)

Die Schutzziele der Niederspannungsrichtlinie werden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie 2006/42/EG eingehalten.
The protection objectives of the low-voltage directive are realized according annex I, No. 1.5.1 of the EC-Machinery directive 2006/42/EC.
Les objectifs protection de la directive basse-tension sont respectées conformément à appendice I, n° 1.5.1 de la directive CE relatives aux machines 2006/42/CE.

Elektromagnetische Verträglichkeit - Richtlinie
Electromagnetic compatibility - directive
Compatibilité électromagnétique- directive
2004/108/EG

Angewendete harmonisierte Normen, insbesondere:
Applied harmonized standards, in particular:
Normes harmonisées, notamment:
EN 809
EN 60034-1
EN 60204-1

Bei einer mit uns nicht abgestimmten technischen Änderung der oben genannten Bauarten, verliert diese Erklärung ihre Gültigkeit.
If the above mentioned series are technically modified without our approval, this declaration shall no longer be applicable.
Si les gammes mentionnées ci-dessus sont modifiées sans notre approbation, cette déclaration perdra sa validité.

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen ist:
Authorized representative for the completion of the technical documentation:
Mandataire pour le complément de la documentation technique est :

Cyrille Cornilleau
Pompes Salmson S.A. - Laval
80 Bd de l'Industrie
BP 0527
F-53005 Laval Cédex

Dortmund, 23.11.2009

i.V.
Erwin Prieß
Quality Manager

WILO SE
Nortkirchenstraße 100
44263 Dortmund
Germany

Document: 2105106.1

NL

EG-verklaring van overeenstemming

Hiermede verklaren wij dat dit aggregaat in de geleverde uitvoering voldoet aan de volgende bepalingen:

EG-richtlijnen betreffende machines 2006/42/EG

De veiligheidsdoelstellingen van de laagspanningsrichtlijn worden overeenkomstig bijlage I, nr. 1.5.1 van de machinerichtlijn 2006/42/EG aangehouden.

Elektromagnetische compatibiliteit 2004/108/EG

gebruikte geharmoniseerde normen, in het bijzonder:

zie vorige pagina

I

Dichiarazione di conformità CE

Con la presente si dichiara che i presenti prodotti sono conformi alle seguenti disposizioni e direttive rilevanti:

Direttiva macchine 2006/42/EG

Gli obiettivi di protezione della direttiva macchine vengono rispettati secondo allegato I, n. 1.5.1 dalla direttiva macchine 2006/42/CE.

Compatibilità elettromagnetica 2004/108/EG

norme armonizzate applicate, in particolare:

vedi pagina precedente

E

Declaración de conformidad CE

Por la presente declaramos la conformidad del producto en su estado de suministro con las disposiciones pertinentes siguientes:

Directiva sobre máquinas 2006/42/EG

Se cumplen los objetivos en materia de seguridad establecidos en la Directiva de Baja tensión según lo especificado en el Anexo I, punto 1.5.1 de la Directiva de Máquinas 2006/42/CE.

Directiva sobre compatibilidad electromagnética 2004/108/EG

normas armonizadas adoptadas, especialmente:

véase página anterior

P

Declaração de Conformidade CE

Pela presente, declaramos que esta unidade no seu estado original, está conforme os seguintes requisitos:

Directivas CEE relativas a máquinas 2006/42/EG

Os objectivos de protecção da directiva de baixa tensão são cumpridos de acordo com o anexo I, nº 1.5.1 da directiva de máquinas 2006/42/CE.

Compatibilidade electromagnética 2004/108/EG

normas harmonizadas aplicadas, especialmente:

ver página anterior

S

CE- försäkran

Härmed förklarar vi att denna maskin i levererat utförande motsvarar följande tillämpliga bestämmelser:

EG–Maskindirektiv 2006/42/EG

Produkten uppfyller säkerhetsmålen i lågspänningsdirektivet enligt bilaga I, nr 1.5.1 i maskindirektiv 2006/42/EG.

EG–Elektromagnetisk kompatibilitet – riktlinje 2004/108/EG

tillämpade harmoniserade normer, i synnerhet:

se föregående sida

N

EU-Overensstemmelseserklæring

Vi erklærer hermed at denne enheten i utførelse som levert er i overensstemmelse med følgende relevante bestemmelser:

EG–Maskindirektiv 2006/42/EG

Lavspenningsdirektivets vernemål overholdes i samsvar med vedlegg I, nr. 1.5.1 i maskindirektivet 2006/42/EF.

EG–EMV–Elektromagnetisk kompatibilitet 2004/108/EG

anvendte harmoniserte standarder, særlig:

se forrige side

FIN

CE-standardinmukaisuusseloste

Ilmoitamme täten, että tämä laite vastaa seuraavia asiaankuuluvia määräyksiä:

EU–konedirektiivit: 2006/42/EG

Pienjännitedirektiivin suojatavoitteita noudatetaan konedirektiivin 2006/42/EY liitteen I, nro 1.5.1 mukaisesti.

Sähkömagneettinen soveltuvuus 2004/108/EG

käytetyt yhteensovitetut standardit, erityisesti:

katso edellinen sivu.

DK

EF-overensstemmelseserklæring

Vi erklærer hermed, at denne enhed ved levering overholder følgende relevante bestemmelser:

EU–maskindirektiver 2006/42/EG

Lavspændingsdirektivets mål om beskyttelse overholdes i henhold til bilag I, nr. 1.5.1 i maskindirektivet 2006/42/EF.

Elektromagnetisk kompatibilitet: 2004/108/EG

anvendte harmoniserede standarder, særligt:

se forrige side

H

EK-megfelelőségi nyilatkozat

Ezennel kijelentjük, hogy az berendezés megfelel az alábbi irányelveknek:

Gépek irányelv: 2006/42/EK

A kisfeszültségű irányelv védelmi előírásait a 2006/42/EK gépekre vonatkozó irányelv I. függelékének 1.5.1. sz. pontja szerint teljesíti.

Elektromágneses összeférhetőség irányelv: 2004/108/EK

alkalmazott harmonizált szabványoknak, különösen:

lásd az előző oldalt

CZ

Prohlášení o shodě ES

Prohlašujeme tímto, že tento agregát v dodaném provedení odpovídá následujícím příslušným ustanovením:

Směrnice ES pro strojní zařízení 2006/42/ES

Cíle týkající se bezpečnosti stanovené ve směrnici o elektrických zařízeních nízkého napětí jsou dodrženy podle přílohy I, č. 1.5.1 směrnice o strojních zařízeních 2006/42/ES.

Směrnice o elektromagnetické kompatibilitě 2004/108/ES

použité harmonizační normy, zejména:

viz předchozí strana

PL

Deklaracja Zgodności WE

Niniejszym deklarujemy z pełną odpowiedzialnością, że dostarczony wyrób jest zgodny z następującymi dokumentami:

dyrektywą maszynową WE 2006/42/WE

Przestrzegane są cele ochrony dyrektywy niskonapięciowej zgodnie z załącznikiem I, nr 1.5.1 dyrektywy maszynowej 2006/42/WE.

dyrektywą dot. kompatybilności elektromagnetycznej 2004/108/WE

stosowanymi normami zharmonizowanymi, a w szczególności:

patrz poprzednia strona

RUS

Декларация о соответствии Европейским нормам

Настоящим документом заявляем, что данный агрегат в его объеме поставки соответствует следующим нормативным документам:

Директивы ЕС в отношении машин 2006/42/EG

Требования по безопасности, изложенные в директиве по низковольтному напряжению, соблюдаются согласно приложению I, № 1.5.1 директивы в отношении машин 2006/42/EG.

Электромагнитная устойчивость 2004/108/EG

Используемые согласованные стандарты и нормы, в частности:

см. предыдущую страницу

GR

Δήλωση συμμόρφωσης της ΕΕ

Δηλώνουμε ότι το προϊόν αυτό σ' αυτή την κατάσταση παράδοσης ικανοποιεί τις ακόλουθες διατάξεις :

Οδηγίες ΕΚ για μηχανήματα 2006/42/ΕΚ

Οι απαιτήσεις προστασίας της οδηγίας χαμηλής τάσης τηρούνται σύμφωνα με το παράρτημα I, αρ. 1.5.1 της οδηγίας σχετικά με τα μηχανήματα 2006/42/ΕG.

Ηλεκτρομαγνητική συμβατότητα ΕΚ-2004/108/ΕΚ

Εναρμονισμένα χρησιμοποιούμενα πρότυπα, ιδιαίτερα:

Βλέπε προηγούμενη σελίδα

TR

CE Uygunluk Teyid Belgesi

Bu cihazın teslim edildiği şekliyle aşağıdaki standartlara uygun olduğunu teyid ederiz:

AB-Makina Standartları 2006/42/EG

Alçak gerilim yönergesinin koruma hedefleri, 2006/42/AT makine yönergesi Ek I, no. 1.5.1'e uygundur.

Elektromanyetik Uyumluluk 2004/108/EG

kısmen kullanılan standartlar için:

bkz. bir önceki sayfa

RO

EC-Declarație de conformitate

Prin prezenta declarăm că acest produs aşa cum este livrat, corespunde cu următoarele prevederi aplicabile:

Directiva CE pentru maşini 2006/42/EG

Sunt respectate obiectivele de protecție din directiva privind joasa tensiune conform Anexei I, Nr. 1.5.1 din directiva privind maşinile 2006/42/CE.

Compatibilitatea electromagnetică – directiva 2004/108/EG

standarde armonizate aplicate, îndeosebi:

vezi pagina precedentă

EST

EÜ vastavusdeklaratsioon

Käesolevaga tõendame, et see toode vastab järgmistele asjakohastele direktiividele:

Masinadirektiiv 2006/42/EÜ

Madalpingedirektiivi kaitse-eesmärgid on täidetud vastavalt masinate direktiivi 2006/42/EÜ I lisa punktile 1.5.1.

Elektromagnetilise ühilduvuse direktiiv 2004/108/EÜ

kohaldatud harmoneeritud standardid, eriti:

vt eelmist lk

LV

EC – atbilstības deklarācija

Ar šo mēs apliecinām, ka šis izstrādājums atbilst sekojošiem noteikumiem:

Mašīnu direktīva 2006/42/EK

Zemsprieguma direktīvas drošības mērķi tiek ievēroti atbilstoši Mašīnu direktīvas 2006/42/EK pielikumam I, Nr. 1.5.1.

Elektromagnētiskās savietojamības direktīva 2004/108/EK

piemēroti harmonizēti standarti, tai skaitā:

skatīt iepriekšējo lappusi

LT

EB atitikties deklaracija

Šiuo pažymima, kad šis gaminys atitinka šias normas ir direktyvas:

Mašinų direktyvą 2006/42/EB

Laikomasi Žemos įtampos direktyvos keliamų saugos reikalavimų pagal Mašinų direktyvos 2006/42/EB I priedo 1.5.1 punktą.

Elektromagnetinio suderinamumo direktyvą 2004/108/EB

pritaikytus vieningus standartus, o būtent:

žr. ankstesniame puslapyje

SK

ES vyhlásenie o zhode

Týmto vyhlasujeme, že konštrukcie tejto konštrukčnej série v dodanom vyhotovení vyhovujú nasledujúcim príslušným ustanoveniam:

Stroje – smernica 2006/42/ES

Bezpečnostné ciele smernice o nízkom napätí sú dodržiavané v zmysle prílohy I, č. 1.5.1 smernice o strojových zariadeniach 2006/42/ES.

Elektromagnetická zhoda – smernica 2004/108/ES

používané harmonizované normy, najmä:

pozri predchádzajúcu stranu

SLO

ES – izjava o skladnosti

Izjavljamo, da dobavljene vrste izvedbe te serije ustrezajo sledečim zadevnim določilom:

Direktiva o strojih 2006/42/ES

Cilji Direktive o nizkonapetostni opremi so v skladu s prilogo I, št. 1.5.1 Direktive o strojih 2006/42/EG doseženi.

Direktiva o elektromagnetni združljivosti 2004/108/ES

uporabljeni harmonizirani standardi, predvsem:

glejte prejšnjo stran

BG

ЕО-Декларация за съответствие

Декларираме, че продуктът отговаря на следните изисквания:

Машинна директива 2006/42/ЕО

Целите за защита на разпоредбата за ниско напрежение са съставени съгласно. Приложение I, № 1.5.1 от Директивата за машини 2006/42/ЕС.

Електромагнитна съвместимост – директива 2004/108/ЕО

Хармонизирани стандарти:

вж. предната страница

M

Dikjarazzjoni ta' konformità KE

B'dan il-mezz, niddikjaraw li l-prodotti tas-serje jissodisfaw id-dispożizzjonijiet relevanti li ġejjin:

Makkinarju – Direttiva 2006/42/KE

L-objettivi tas-sigurta tad-Direttiva dwar il-Vultaġġ Baxx huma konformi mal-Anness I, Nru 1.5.1 tad-Direttiva dwar il-Makkinarju 2006/42/KE.

Kompatibbiltà elettromanjetika – Direttiva 2004/108/KE

kif ukoll standards armonizzati b'mod partikolari:

ara l-paġna ta' qabel

WILO SE
Nortkirchenstraße 100
44263 Dortmund
Germany

ENGLISH

1. General

Installation and service by qualified personnel only

1.1 Applications

The pump is suitable for hot and cold water and other fluids free from mineral oil and without abrasives or long-fibred substances.
The main areas of use are in water supply installations, as a booster pump, as a boiler feed pump, in industrial circulation systems, in process technology, in cooling water systems, in fire extinguishers and in washing and sprinkler installations.
Approval from the manufacturer must be obtained beforehand if corrosive chemicals are to be pumped.

1.2 Technical description

1.2.1 Performance and electrical data (Table 1)

Permissible temperature range for version designed for use with drinking water KTW/WRAS sans KTW/WRAS, eau		–15 °C to +120 °C –15 °C to +90 °C	
Maximum ambient temperature		+40 °C	
Maximum permissible working pressure:	at the inlet (inlet pressure see paragraph 5.1) at the outlet, for a 2 pole motor at the outlet, for a 4 pole motor	10 bar 16/25 bar 16 bar	
Mains voltages:		50 Hz (±10%)	60 Hz (±6%)
	EM: for $P_2 \leq 1{,}5$ kW DM: for $P_2 \leq 4$ kW for $P_2 \geq 5{,}5$ kW	1 ~ 230 V 3 ~ 230/400 V 3 ~ 400 V	1 ~ 230 V 3 ~ 230/400 V 3 ~ 400 V
Standard motor	for $P_2 \leq 5{,}5$ kW for $P_2 \geq 7{,}5$ kW	Standard motor V18 Standard motor V1	
Speed		50 Hz	60 Hz
	2 pole version 4 pole version	2900 t/min 1450 t/min	3500 t/min 1750 t/min
Mains fuse protection		see motor rating plate	
Protective system		IP 55 better protective systems available	
Sound level		50 Hz	60 Hz
		< 73dB(A)	< 77dB(A)

Principal dimensions and connection dimensions (Table 2, see also Fig. 3):

Models				PN 16 version			PN 25 version					
				Oval flange			Circular flange			VICTAULIC		
	A	B	C	E	F	G	E	F	G	E	F	G
MVI	mm			mm			mm			mm		
102 ▷ 124	100	212	180	204	50	Rp1	250	75	DN 25	-	-	-
202 ▷ 220	100	212	180	204	50	Rp1	250	75	DN 25	210	50	Rp1¼
402 ▷ 420	100	212	180	204	50	Rp1¼	250	75	DN 32	210	50	Rp1¼
802 ▷ 819	130	252	215	250	80	Rp1½	280	80	DN 40	261	90	Rp2
1602/6 ▷ 1612/6	130	252	215	250	90	Rp2	300	90	DN 50	-	-	-

When ordering spare parts, please give all the information on the pump/motor rating plate.

1.2.2 Series specifications

MVI 4 08 1 / 16 / E / 3 ~ 400 - 50 - 2/XX/X

- MVI (Multistage Vertical stainless steel (Inox) centrifugal pump) design
- Flow rate [m^3/h] (2-pole/ 50 Hz)
- Number of impellers in row
- Steel grade: 1 -> 1.4301 (AISI 304) 2 -> 1.4404 (AISI 316L)
- maximum permissible working pressure [bar] (P) VICTAULIC
- gaskets – EPDM (KTW/WRAS) gaskets – VITON
- Mains voltage 3 ~ 400 V 1 ~ 230 V
- 50Hz or 60Hz frequency
- 2- or 4- pole motor
- Manufacturer's key

2. Safety precautions

These instructions contain important information which must be followed when installing and operating the pump. It is therefore imperative that they be read by both the installer and the operator before the pump is installed or started up.
Both the general safety instructions in the 'Safety precautions' section and those in subsequent sections indicated by danger symbols should be carefully observed.

2.1 Danger symbols used in these operating instructions
Safety precautions in these operating instructions which, if not followed, could cause personal injury are indicated by the symbol:

Safety precautions warning of danger due to electricity are indicated by the symbol:

Safety precautions which, if not followed, could damage the pump or installation and cause it to malfunction are indicated by the word:

WARNING!

2.2 Qualified Personnel
The personnel installing the pump must have the appropriate qualifications for this work.

2.3 Risks incurred by failure to comply with the safety precautions
Failure to comply with the safety precautions could result in personal injury or damage to the pump or installation. Failure to comply with the safety precautions could also invalidate any claim for damages.
In particular, failure to comply with these safety precautions could give rise, for example, to the following risks:
– the failure of important parts of the pump or installation,
– personal injury due to electrical, mechanical and bacteriological causes.
– material damage.

2.4 Safety precautions for the operator
Existing regulations for the prevention of accidents must be followed.
To prevent the risk of electric shock or electrocution VDE regulations and those of the local supply company must be followed.

2.5 Safety precautions for inspection and installation
The operator must ensure that all inspection and installation work is carried out by authorized and qualified specialists who have carefully studied these instructions. In principle, work should not be carried out on a running pump or installation.

2.6 Unauthorized alterations and manufacture of spare parts
Alterations to the pump or installation may only be carried out with the manufacturer's consent. The use of original spare parts and accessories authorized by the manufacturer will ensure safety. The use of any other parts may invalidate claims invoking the liability of the manufacturer for any consequences.

2.7 Improper use
The operational safety of the pump or installation supplied can only be guaranteed if it is used in accordance with paragraph 1 of the operating instructions. The limits given in the catalogue or data sheet must under no circumstances be exceeded.

3. Transport and Storage

WARNING! During transport and in storage the pump must be protected against moisture, frost and mechanical damage.
The pump unit is to be transported with the shaft horizontal. When storing, ensure that the pump unit cannot overturn as a result of top-heaviness.

4. Description of product and accessories

4.1 Pump description
The pump is a multistage (2-24 stages) normal suction vertical high pressure centrifugal pump with an in-line design, i.e. the inlet and outlet pressure glands are in a line. The pump is supplied in one of two outlet designs:
PN 16: with welded oval flanges,
PN 25: with welded circular flanges or VICTAULIC connection.
The pump (Fig. 1) stands on a grey cast iron pump footplate which serves as a fixing base (13). The stage casings (4) are in a multiple modular construction. The impellers (10) are fitted on a single shaft (11). The pressure casing (5) guarantees a fail-safe seal. All parts in contact with the fluid, such as stage casings, impellers, pressure casing and pump base (12) with flanges (6) are made of chromium nickel steel. The shaft hole through the pump casing is sealed with an axial face seal (3). The pump and motor shafts are linked together by a clutch (8). All parts of the drinking water version (version E) which are in contact with the fluid have been cleared by KTW and WRAS and are therefore suitable for use with drinking water.
The speed of the pump can be controlled when connected to a frequency converter (see paragraph 5.3).

4.2 Components supplied
– high pressure centrifugal pump
– for PN 16: 2 oval flanges (mating flanges) with internal threads, gaskets and screws,
– Installation and Operating Instructions.

4.3 Accessories
See catalogue or data sheet

5. Assembly and Installation

– See the rating plate of the pump and the rating plate of the motor

5.1 Installation

WARNING! Before installing the pump, make sure that all welding and soldering on the pipe system has been completed and that the pipe system has been flushed out if necessary. Dirt will damage the pump.

– Assemble the pump in a dry place free of frost.
– Assemble in a horizontal and flat position. If the pump is positioned on an incline the bearing will wear more quickly. Vertical operation only.
– Install the pump in an easily accessible place to facilitate inspection and disassembly. Always install the pump exactly perpendicular on a sufficiently heavy concrete base (Fig. 2, 3). Fit a vibration absorber between the base and the floor.
– Dimensions for installation and connections are given in Paragraph 1.2.1, Table 2 and in Fig. 3.
– For heavy pumps, attach a hook (Fig. 2, 12) or an eye with adequate load-bearing capacity vertically above the pump (for total weight of the pump see catalogue or data sheet), so that the pump can be attached to a crane or other lifting gear for maintenance or repairs.
– Only use the screws provided when fitting an oval flange on the PN 16 version as longer screws could damage the pump base.
– The arrow on the pump casing indicates the direction of flow.
– Fit the inlet and outlet pipes without stress. Install bellow expansion joints of restricted length to absorb vibrations. The pipes must be attached (Fig. 2, 7) in such a way that the pump does not bear the weight of the pipes.
– Isolation mechanisms (Fig. 2., 2&3) must in principle be installed in front of and behind the pump to avoid having to empty and refill the whole installation when inspecting or changing the pump.
– It is advisable to choose an inlet pipe with a nominal width one unit higher than that of the pump connector.
– To avoid pressure losses, the inlet pipe should be as short as possible and should not be restricted by bends or valves.
– A backflow preventer (Fig. 2., 4) should be fitted in the outlet pipe.
– The axial face seal should be protected against dry running. An inlet pressure gauge or level gauge should be installed by the customer.
– If the pump is to be connected directly to the public drinking water mains, a backflow preventer (Fig. 2., 4) and isolating valve (Fig. 2., 2) must also be installed in the inlet pipe.
– If the pump is to be connected indirectly via a reservoir, a suction strainer (Fig. 2, 8) must be provided in the inlet pipe by the customer to prevent coarse impurities entering the pump.
– With limited nominal pressure PN, ensure that this pressure is produced from the inlet pressure and the zero flow level:
$PN \leq P_{inlet} + P_{Q=0}$
– To prevent the formation of air pockets and hence high temperatures in the upper section of the pump at low flow rates (which would damage the axial face seal), a bypass pipe can be fitted to the pump (Fig. 2, BP, accessories).

5.2 Electrical installation

Electrical work must be carried out by a qualified and licensed electrician in strict compliance with local regulations.

– Check that the mains current and voltage comply with the data on the rating plate.
– Pump/installation must be earthed in compliance with regulations.
– All motors must be fitted with a motor safety switch by the customer to prevent the motor from overheating.

Adjusting the motor safety switch:
Direct starting current: Adjust to nominal current of the motor in accordance with the data on the motor rating plate.
Star or triangular circuit starting current: If the motor safety switch is connected as a star or triangular safety circuit combination at the supply line it can be adjusted in the same way units operating on direct starting current. If the motor safety switch is connected to the motor supply line in phase (U1/V1/W1 or U2/V2/W2), then the motor safety switch should be adjusted to the value of 0.58 of the nominal motor current.

– The mains cable can be inserted to the left or the right of the terminal box. Open the appropriate hole by removing the moulded cover, unscrew the PG connector and push the cable through the PG connector.
– The supply cable must be protected against the effects of heat and vibrations which may come from the motor or the pump.
– Heat-resistant cable must be used if the pump is fitted in installations in which the temperature of the fluid pumped exceeds 90 °C.
– Connection to the mains must be carried out in accordance with the plan of terminal connections for rotary or alternating current in the terminal box of the pump (Fig. 4).
– The terminal box can be better positioned by rotating the motor through steps of 90°. To do this, remove the clutch guard (Fig. 1, 2) and loosen the connecting screws (Fig. 1, 1) of the light and the motor flange. When assembling the clutch guard, do not forget to tighten the safety screw.

5.3 Operation with frequency converter

The speed of the pump can be controlled when connected to a frequency converter. Speed control limits: $40\%n_{nom} \leq n \leq 100\%n_{nom}$.
See Installation and Operating Instructions of the frequency converter for connection and operation.
To avoid overloading the motor coil to the extent that it is damaged and to avoid increased noise levels, the frequency converter must not produce speeds due to increased voltage of over 2500 V/µs and spikes of $\hat{u} > 850$ V. If such speeds due to increased voltage are possible, an LC filter (motor filter) should be installed between the frequency converter and the motor. The filter must be designed by the manufacturer of the frequency converter or filter.
In control devices with frequency converters supplied by WILO, the filter is already installed.

6. Commissioning

WARNING! In order to protect the axial face seal, the pump must not run dry.

– Close both isolating valves and open the vent screw (Fig. 2, 5) by one and a half or two turns.
– Slowly open the isolating valve (Fig. 2, 2) at the inlet until the air has escaped from the vent screw and the fluid to be pumped comes out. The escaping air will be clearly heard hissing.
Tighten the vent screw.
– Slowly open the isolating valve at the outlet (Fig. 2, 3). The manometer installed at the outlet should be checked for any possible pressure instabilities, indicated by a flickering manometer pointer. If the pressure is unstable, allow more air to escape.

When the temperature of the liquid being pumped is high and the system is pressurised, any flow escaping from the vent screw can cause scalding and injuries. The vent screw should therefore be loosen only slightly.

– When used for the first time, if it is to be used to pump drinking water the system must be flushed through, so that any dirty water present will not contaminate the drinking water supply.
– Checking direction of rotation (only for rotary current motors): Check that the pump rotates in the direction indicated by the arrow on the pump latern by switching on for a short time. If this is not the case, interchange 2 phases in the terminal box.
– For pumps with a star or triangular circuit starting current, the connections of two coils must be interchanged, e.g. U1 with V1 and U2 with V2.
It is not necessary to check the direction of rotation with AC motors.
– If the fluid temperature is too high, steam may form which may damage the pump. The pump must therefore not run with the valve closed for longer than 10 minutes when pumping cold water or for longer than five minutes when pumping fluid where $\vartheta > 60$ °C.
We recommend that the flow rate does not drop to below 10 % of the nominal flow rate so as to avoid a build up of steam in the pump.

– If there is a build up of steam, this should be allowed to escape by carefully opening the vent screw.

The pump, including the motor, may reach operating temperatures of ϑ>100 °C, so care should be taken when touching the pump.

7. Maintenance

Before carrying out any maintenance work, switch off the unit and ensure that it cannot be switched on again by unauthorized people. Never carry out work on a running pump.

– During the running-in period, there may be some dripping from the axial face seal. Should a more significant leak occur as a result of substantial wear, have the axial face seal replaced by a specialist.
– Increased bearing noise and unusual vibrations indicate a worn bearing. In this case, have the bearing replaced by a specialist.
– If the pump is exposed to frost, the pump and pipework must be emptied in the cold season. Close the isolating valve and open the drain valve (Fig. 2, 6) and the vent screw (Fig. 2, 5) of the pump.

The isolating valve **must** be closed before the drain valve is opened.

– If placed in a frost-free location, the pump does not have to be emptied, even if it is out of service for a long period.

Figures:
1. Cross-section of the pump
2. Whole assembly in inlet phase with reference numbers
3. Drawing showing principal dimensions
4. Terminal connection plans

8. Fault finding, causes and remedies

Fault	Cause	Remedy
Pump does not run	no power	check fuses, cables and connections
	motor safety switch activated	eliminate motor overload
Pump runs but does not pump	wrong direction of rotation	check direction of rotation and correct if necessary
	pipe or pump components blocked by foreign body	check and clean pipe and pump
	air in inlet pipe	seal inlet pipe
	inlet pipe too narrow	fit a larger inlet pipe
	valve not sufficiently open	open valve
Pump does not pump evenly	air in the pump	bleed the pump
Pump vibrates and is noisy	foreign body in the pump	remove foreign body
	pump not properly fixed to the base	tighten anchor bolts
	bearing damaged	consult customer services
Motor overheats, motor cut-out activates	one phase interrupted	check fuses, cables and connections
	pump sluggish: foreign body bearing damaged	 clean pump have pump repaired by customer services
	ambient temperature too high	provide cooling

If the fault cannot be remedied, please contact your plumbing and heating specialist or WILO customer services.

Subject to technical alterations.

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