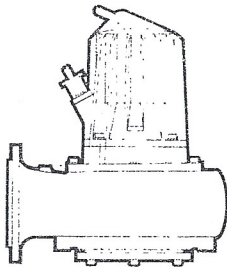
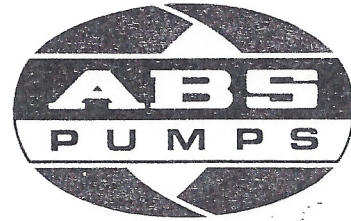


Art.-No. 1597107 (10/86)



AF 13 to 70

Submersible  
Sewage Pumps

## Installation and operating instructions

### Rating plate/technical data

ABS PUMPEN AG D-5204 LOHMAR 1 WEST GERMANY			
Typ			
Nr.			
UN	V	IN	A Hz
P <sub>1N</sub>	kW	P <sub>2N</sub>	kW n min <sup>-1</sup>
QN	m <sup>3</sup> /h	HN	m LR Ø
Q <sub>max</sub>	m <sup>3</sup> /h	H <sub>max</sub>	m DN
∇ <sub>max</sub>	m	IP 68	PA-I

Pump type  
Part No./Pump No.  
U, <sup>^</sup> E<sub>N</sub> Operating voltage V  
IN Rated current A  
Frequency Hz  
P<sub>1N</sub> Power input kW  
P<sub>2N</sub> Power output kW  
n Speed min<sup>-1</sup>  
QN Rated flow m<sup>3</sup>/h  
HN Rated head m  
LR Impeller dia. mm  
Q<sub>max</sub> Max. Flow m<sup>3</sup>/h  
H<sub>max</sub> Max. head m  
DN Nom. bore mm  
max Immersion depth m  
Watertight  
IP 68 Protection class  
PA-I number

The submersible sewage pumps AF 13 to 70 are high quality products for a wide range of applications:

Model "CB" for clear water, polluted water and sewage. Model "V" particularly for careful handling of sensitive material through solid size 100 or for handling liquids with gaseous contents.

Max. flow head 319 m<sup>3</sup>/h  
Max. head 34 m

Explosion-proof motors tested to CENELEC Standard

European Standard EN 50014/50018

Insulation Class: EEx d IIB T4

**Always state pump type and part number with enquiries.**

We recommend recording the pump data on the rating plate for subsequent use.

## Applications

Usable in industrial and municipal applications, in portable and stationary installations, vertically and horizontally mounted, for submersible and dry operation.

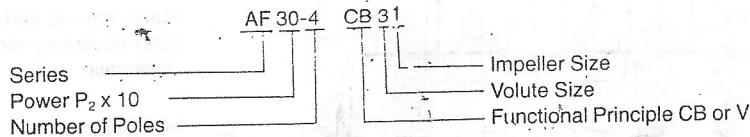
## Fluid Handled

Model "CB" for clear water, polluted water, and sewage.  
Model "V" particularly for careful handling of sensitive material through solid size 100 or for handling liquids with gaseous contents such as in the foodstuff or beverage industries.

## Type/Construction

Motor and connection chamber have pressure-proof encapsulation and are fully submersible, insulation class F = 155 °C, protection IP 68. Hydraulic section optionally with cb (contra-block) system (model "CB") or Vortex Impeller (model "V").  
Motor side: radial lip seal  
Fluid side: silicone carbide mechanical seal, independent of sense of rotation, temperature shock resistant with emergency running characteristics when operating dry  
Temperature sensor and seal monitor for all pump models.

## Identification Code



## Installation Options

### "stationary" vertical/wet

with (non-bolted) automatic ABS coupling, single-guide rail, elbow base section and discharge outlet bayonet/plug connection

### "portable" vertical/wet

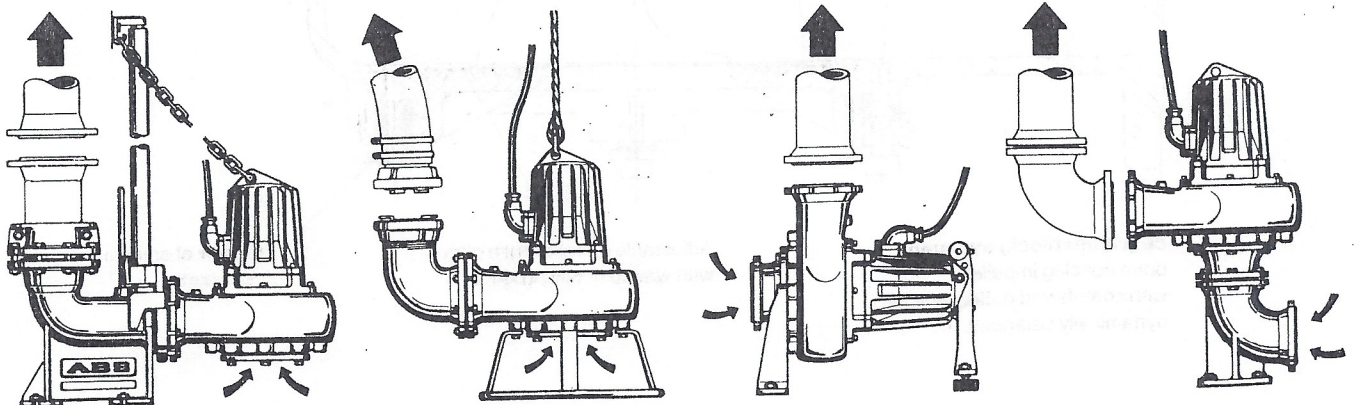
with ground support ring. Flange or discharge outlet with 4" male thread and quick-release coupling for hose connection

### "stationary" horizontal/dry

for tank connection and exceptional applications when special operating conditions prevail

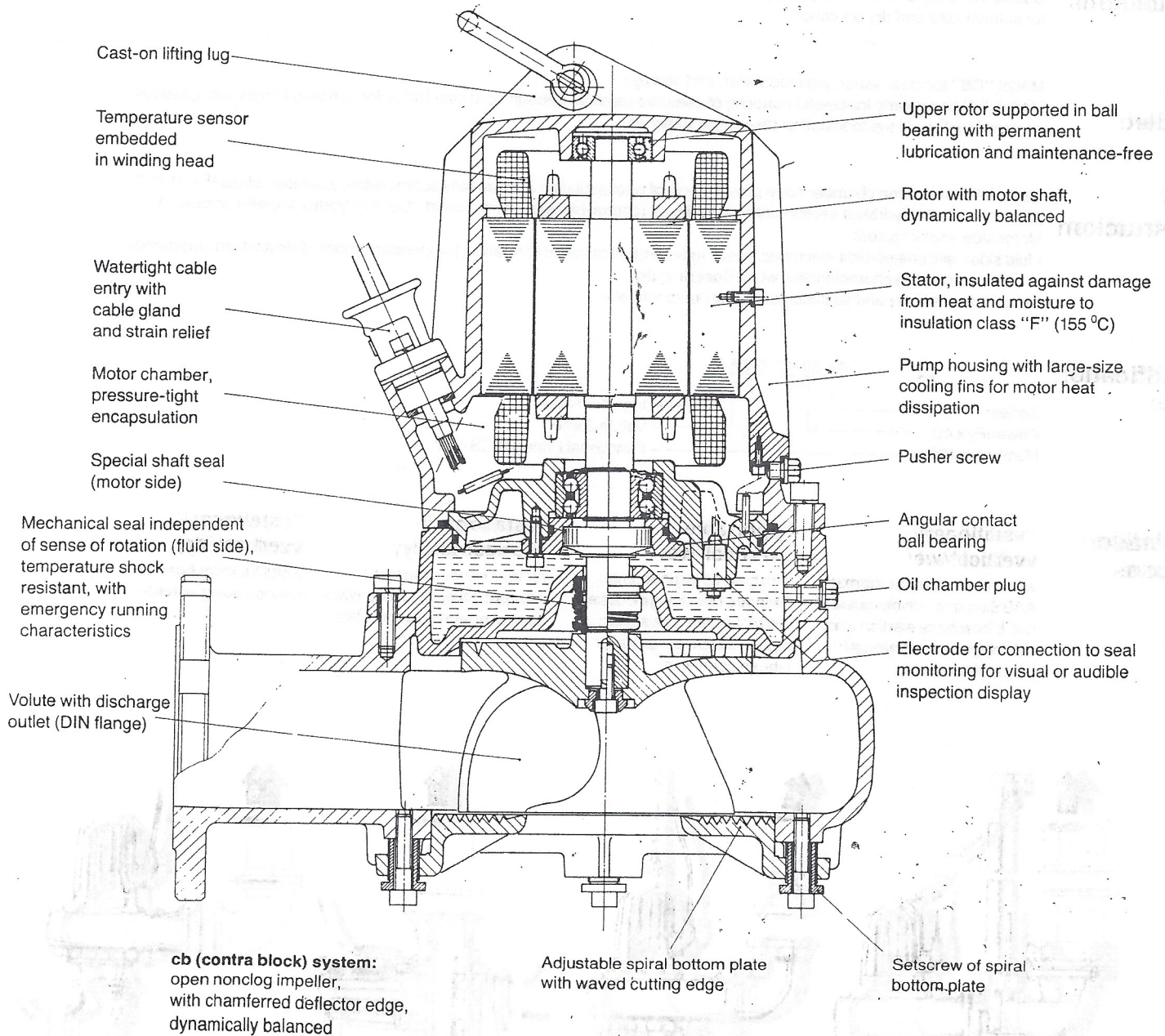
### "stationary" vertical/dry

with Duckfoot bend for space saving erection





## Construction of Submersible Pump



## Technical Data

Model		AF	AF	AF	AF	AF	AF	AF	AF
Designation - poles		15-4	22-4	30-4	40-4	60-4	13-6	30-6	70-2
Type *		CB or V	CB or V	CB or V	CB or V	CB or V	CB	CB	CB
Power P <sub>1</sub> /P <sub>2</sub> **	kW	2,11/1,5	2,85/2,2	3,95/2,9	5,15/4,0	7,45/6,0	2,06/1,3	3,95/2,9	8,3/7,0
Speed at 50 Hz.	rpm.	1400	1400	1400	1400	1400	950	950	2850
Speed at 60 Hz.	rpm.	1700	1700	1700	1700	1700	1150	1150	3460
Current type	A.C.	3-phase	3-phase	3-phase	3-phase	3-phase	3-phase	3-phase	3-phase
Operating Voltage	V	380 V 3~	380 V 3~	380 V 3~	380 V 3~	380 V 3~	380 V 3~	380 V 3~	380 V 3~
Rated current	A	3,8	5,1	7,5	9,4	12,8	3,9	7,15	14,1
Operating Voltage	V	415 V 3~	415 V 3~	415 V 3~	415 V 3~	415 V 3~	415 V 3~	415 V 3~	415 V 3~
Rated current	A	3,5	4,7	6,8	8,6	11,7	3,6	6,5	12,9
Operating Voltage	V	460 V 3~	460 V 3~	460 V 3~	460 V 3~	460 V 3~	460 V 3~	460 V 3~	460 V 3~
Rated current	A	3,2	4,2	6,2	7,8	10,6	3,25	5,9	11,6
Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/—
Required fusing	A slow	6	10	16	16	20	6	10	16
Starting	DOL	X	X	X	X	X	X	X	X
	A	—	—	—	—	—	—	—	—
Insulation class	(F = 155 °C)	F	F	F	F	F	F	F	F
Cable length ***	m	7	7	7	7	7	7	7	7
Cable	Type (stand.)	H07RN-F5G1,5	H07RN-F5G1,5	H07RN-F5G1,5	H07RN-F10G1,5	NSSHOU-J10 x 1,5	H07RN-F5G1,5	NSSHOU-J10 x 1,5	NSSHOU-J10 x 1,5
	Type (ex)	NSSHOU-J8 x 1,5	NSSHOU-J8 x 1,5	NSSHOU-J8 x 1,5	NSSHOU-J11 x 1,5	NSSHOU-J11 x 1,5	—	—	NSSHOU-J11 x 1,5
Connection type		free cable end	free cable end	free cable end	free cable end	free cable end	free cable end	free cable end	free cable end
Flange	DIN	2633	2633	2633	2633	2633	2633	2633	2633
Oil quantity	l	1,4	1,4	1,4	3,0	3,0	1,4	3,0	3,0

b (contra block) system V = vortex system (free-flow impeller)

P<sub>1</sub> = effective power taken from mains; P<sub>2</sub> = power at motor shaft

Explosion-proof pumps are available with cable lengths of 10, 20 or 30 m, if desired

## Technical Data

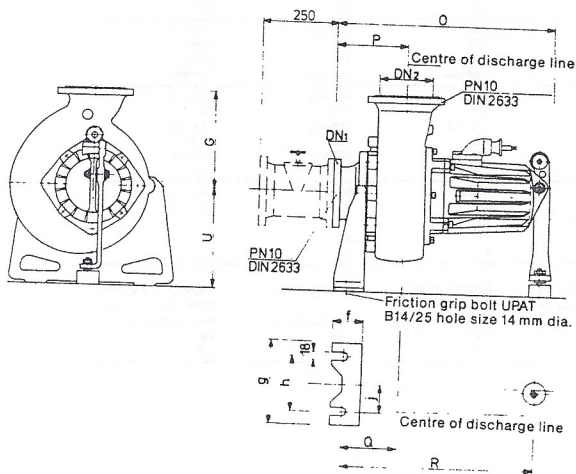
## Discharge Data

Pump model	Weight kg	dchg. suc. DN	sold. size mm	Head H in m													ηp (max.) <sup>*</sup> %	
				2	4	6	8	10	12	14	16	18	20	25	30			
15-4 CB 11	58	80 100	80	119 33,1	89 24,7	58 16,1	26 7,2											63,0
CB 12	58	80 100	80	85 23,6	54 15,0	23 6,4												60,9
CB 13	58	80 100	80	67 18,6	37 10,3													53,8
CB 21	58	100 100	100	109 30,3	69 19,2	28 7,8												59,9
CB 22	58	100 100	100	94 26,1	50 13,9	13 3,6												57,9
CB 34	58	100 100	100	118 32,8	81 22,5	42 11,7	7 1,9											62,8
22-4 CB 33	65	100 100	100	135 37,5	102 28,3	68 18,9	36 10,0	3 0,8										62,4
CB 42	65	150 100	100	165 45,8	122 33,9	70 19,4	28 7,8											62,0
30-4 CB 31	65	100 100	100	177 49,2	149 41,4	122 33,9	93 25,8	64 17,8	31 8,6	2 0,6								69,4
CB 32	65	100 100	100	167 46,4	137 38,1	105 29,2	73 20,3	41 11,4	10 2,8									69,3
CB 41	71	150 100	100	210 58,3	166 46,1	119 33,1	74 20,6	34 9,4										66,5
40-4 CB 53	97	150 100	100	232 64,4	190 52,8	149 41,4	112 31,1	75 20,8	42 11,7	11 3,1								66,9
CB 63	100	100 100	100	220 61,1	180 50,0	144 40,0	108 30,0	73 20,3	39 10,8	10 2,8								70,0
60-4 CB 51	100	150 100	100		273 75,8	234 65,0	193 53,6	152 42,2	120 33,3	78 21,7	48 13,3	22 6,1						74,1
CB 52	100	150 100	100	290 80,6	249 69,2	208 57,8	168 46,7	125 34,7	88 24,4	55 15,3	25 6,9							72,3
CB 61	100	100 100	100	319 88,6	270 75,0	227 63,0	187 51,9	151 41,9	116 32,2	83 23,0	49 13,6	16 4,4						70,0
CB 62	100	100 100	100	278 77,2	232 64,4	189 52,5	151 41,9	115 31,9	79 21,9	47 13,1	19 5,3							71,5
15-4 V 13	55	100 100	100	75 20,8	50 13,9	18 5,0												42,0
22-4 V 12	60	100 100	100	93 25,8	70 19,4	40 11,1												41,5
30-4 V 11	60	100 100	100	119 33,1	97 26,9	74 20,6	50 13,9	10 2,8										50,0
40-4 V 22	83	100 100	100	146 40,6	125 34,7	102 28,3	77 21,4	47 13,1	4 1,1									50,0
60-4 V 21	85	100 100	100	175 48,6	156 43,3	137 38,1	117 32,5	96 26,7	73 20,3	45 12,5								50,0
13-6 CB 21	58	100 100	90	44 12,2														64,0
CB 22	58	100 100	90	34 9,4														63,0
CB 23	58	100 100	90	26 7,2														61,0
CB 24	58	100 100	90	19 5,3														60,0
CB 31	58	100 100	90	92 25,5	53 14,7	8 2,2												68,8
CB 32	58	100 100	90	78 21,7	32 8,9													63,1
CB 33	58	100 100	90	67 18,6	17 4,7													63,2
CB 34	58	100 100	90	56 15,6														63,8
6 CB 61	100	100 100	100		120 33,3	70 19,4	18 5,0											74,1
CB 62	100	100 100	100	142 39,4	94 26,1	40 11,1												77,5
CB 63	100	100 100	100	120 33,3	70 19,4	17 4,7												75,1
70-2 CB 71	81	100 100	55					126 35,0	116 32,2	106 29,4	97 26,9	89 24,7	79 21,9	68 18,9	38 10,6	11 3,1		59,0

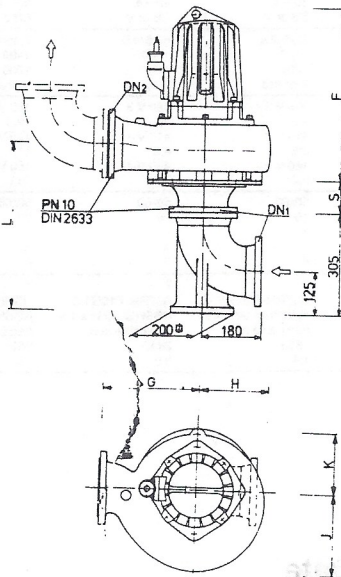
\* ηp max. = max. pump efficiency



Installation with ground support ring

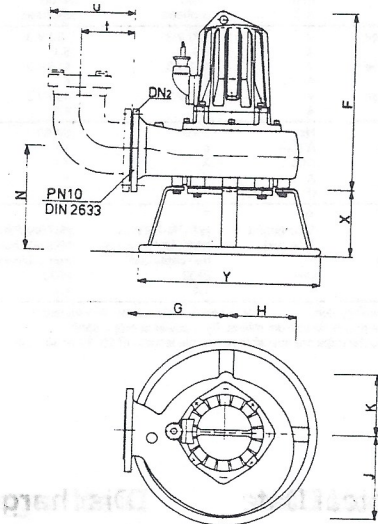


Dry Installation – vertical

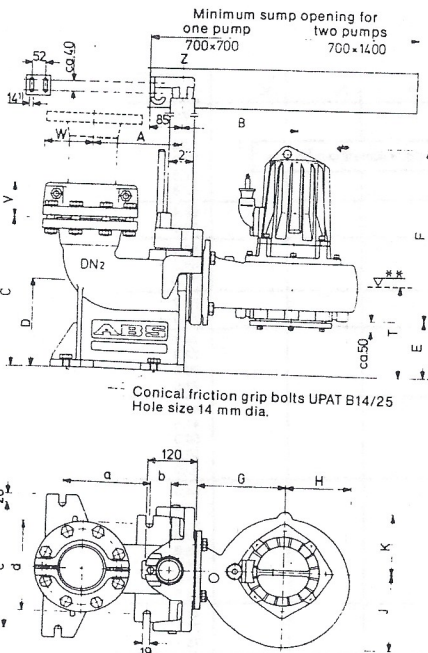


Dimensions in „mm“

Dry Installation – horizontal



Stationary Installation (WET)  
with ABS Automatic Coupling System



Motor	AF 13 15	AF 13 15	AF 15 22 30	AF 22 30	AF 40 60	AF 40 60	AF 70	AF 15 22 30 V 1	AF 40 60 V 2
Hydraulic	CB 1	CB 2	CB 3	CB 4	CB 5	CB 6	CB 7		
DN 1	100	100	100	100	100	100	100	100	100
DN 2	80	100	100	150	150	100	100	100	100
A	203	203	203	278	278	203	278	203	203
B	292	317	317	347	372	317	302	203	302
C	304	346	346	462	462	346	462	346	346
D	150	200	200	250	250	200	250	200	200
E	77	102	111	147	144	94	100	90	88
F	480	492	474	500	580	580	523	90	88
G	240	265	265	285	310	265	—	532	625
H	155	157	176	190	215	189	—	250	250
J	167	176	191	216	240	189	170	160	180
K	141	141	160	162	190	168	170	160	180
L	472	497	488	502	549	549	—	400	410
N	253	278	269	283	286	286	—	260	262
O	588	600	582	608	727	727	300	560	660
P	167	192	183	197	244	244	—	110	—
Q appr.	113	138	134	148	151	151	—	155	157
R appr.	503	515	502	528	600	600	—	560	645
S	94	94	94	94	138	138	—	—	—
T	150	200	200	250	250	200	250	200	200
U	200	200	235	235	235	235	—	—	—
V appr.	75	83	83	105	105	83	—	235	235
W	100	110	110	143	143	110	105	83	83
X	180	180	180	180	180	180	143	110	110
Y	425	425	480	480	480	480	180	150	150
a	205	205	205	290	290	205	425	348	348
b	48	48	48	50	50	48	205	205	205
c	300	300	300	365	365	300	50	48	48
d	215	215	215	285	285	215	365	300	300
e	70	70	75	75	75	215	—	215	215
f	365	365	450	450	450	285	—	75	75
g	250	250	300	300	300	—	—	450	450
h	—	—	—	—	—	—	—	—	—
i	125	125	150	150	150	300	—	300	300
j	125	135	135	170	170	150	—	150	150
k	190	225	225	275	275	135	170	225	225
l	—	—	—	—	—	225	275	135	135

1) For hexagon head wood screw m 10 x 70 and dowel size 12

\*\* Lowest switching off point for automatic control

## Control System

Control systems, wired ready for connection, with control elements, indicators, automatic level control and alarm device can be delivered for the AF series of ABS submersible motor pumps.

If the customer himself prepares the control system, the cores of the temperature sensors (F0, F1 versions), with explosion-proof pumps (F0, F1, F2) and the core of the seal monitoring system (Di) must be connected to the respective signalling devices (see page 7).

## Inspection

Seal monitoring system (Di) indicator light: yellow = inspection display (only for standard model).  
The illumination of an indicator light signals the necessity for maintenance of the shaft seal of the submersible pump motor. i.e. water in the oil chamber: Take a sample of oil from the oil drain plug. If water is found in the oil (milky emulsion), the rotary seal unit must be checked and replaced if necessary and the oil changed (see oil change).

## Trouble

### Explosion-proof version:

Red indicator light = temperature sensor F1 (limiter, must be reset) cuts off the pump in the event of a dangerous overtemperature. Trouble must be acknowledged manually in the control system.

Temperature sensor F2 (regulator)

"without indicator light" cuts off the pump upon increased temperature and switches it back on automatically after the pump has cooled off.

### Standard version:

Temperature sensor F1 only on AF 40/60 (limiter, does not require reset) "without indicator light" cuts off the pump upon overtemperature and switches it back on after it has cooled off.

## Oil Change

The oil chambers of the ABS submersible pumps were factory-filled with lubricating oil (Chevron Oil EP-46, part number 1103021). Regular oil change (without illumination of the inspection display) is not required. If an oil change becomes necessary (see Inspection), the submersible pump must be removed and the oil completely drained after having unscrewed the plug in the oil drain or oil filler opening resp. (also refer to Construction of Pump on page 3). In this case, it is also necessary to replace the rotary seal unit (request after-sales service). Then add the required oil quantity (see Specifications on page 4), but do not overfill or underfill. Reclose the opening properly, replacing the gasket ring as necessary.

Oils of other brands which are equivalent to Chevron Oil EP-46:

- |            |                |        |           |                     |
|------------|----------------|--------|-----------|---------------------|
| 1. Castrol | Deusol CRI     | SAE 10 | 4. Texaco | Ultra Motoroil 10 W |
| 2. BP      | Vanellus T Oil | SAE 10 | 5. Mobil  | Deval 1210          |
| 3. Esso    | Essolub HDX    | SAE 10 | 6. Voltol | Lube Oil 46         |

**Additional hints for the operation of explosion-proof submersible sewage pumps** (also refer to wiring diagrams on page 7):

Repairs to explosion-proof motors may be accomplished only in the manufacturer's plant or in specially authorized Service Stations.

In the case of repairs, only manufacturer's original parts may be used.

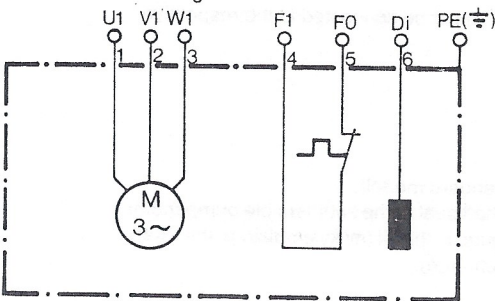


## Wiring Diagrams

### Standard Version

AF 15/22/30-4/13-6

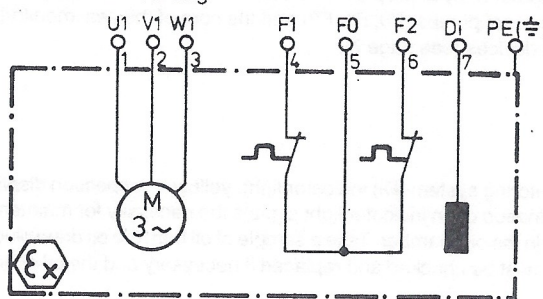
with temperature sensor and seal control  
Direct on-line starting



### Explosion-Proof Version

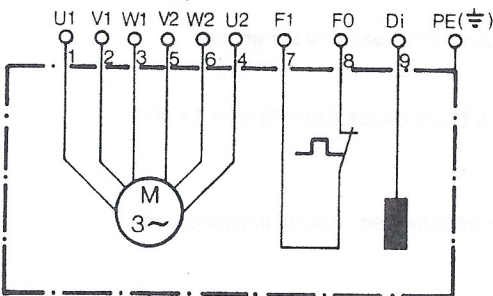
AF 15/22/30-4/13-6

with temperature sensor and seal control  
Direct on-line starting



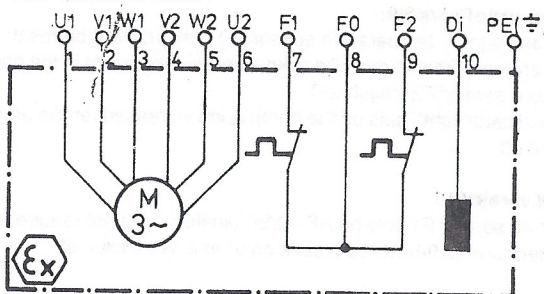
### AF 40/60-4/30-6/70-2

with temperature sensor and seal control  
Star-delta connection



### AF 40/60-4/30-6/70-2

with temperature sensor and seal control  
Star-delta connection



**Caution!** Explosion-proof pumps may be operated in explosion-hazardous areas only with connected temperature monitoring system (leads F0, F1, F2)

or in intermittent operation and with the following data, only leads F0 and F1 need be connected.

Cycle time (CT) to VDE 0530 = 10 minutes.

	CT* (%)	PTB-No.:		CT* (%)	PTB-No.:
AF 13-6 Ex	25	Ex - 83/3549 x	AF 30-6 Ex	35	Ex - 83/3550 x
AF 15-4 Ex	40	Ex - 82/3330 x	AF 40-4 Ex	35	EX - 82/3347 x
AF 22-4 Ex	35	Ex - 82/3339 x	AF 60-4 Ex	25	Ex - 82/3348 x
AF 30-4 Ex	35	Ex - 82/3346 x	AF 70-2 Ex	30	Ex - 83/3551 x

Mode of operation by dry installation is S3. Mode of operation with submerged motor S1.

Upon request, ABS will furnish a complete monitoring unit for installation into Control Panel.

Pump model	Number of cables	Lead designation/lead colour										Temperature sensor			Lead cross number x section
		PE	U1	V1	W1	V2	W2	U2	Di	F0	F1	F2			
AF 15/22/30-4/13-6	1	gn/ge	1	2	3	-	-	-	6	5	4	-	7 x 1,5		
40/60-4/30-6/70-2	1	gn/ge	1	2	3	5	6	4	9	8	7	-	10 x 1,5		
AF 15/22/30-4/13-6 Ex	1	gn/ge	1	2	3	-	-	-	7	5	4	6	8 x 1,5		
40/60-4/30-6/70-2 Ex	1	gn/ge	1	2	3	5	6	4	10	8	7	9	11 x 1,5		

Di = seal control

\* Cycle time related to 10 minutes. 40% for example means: 4' running, 6' cooling and so on.

## Cable Chart Lead Usages

## Electrical Connection

### WARNING (For your safety)

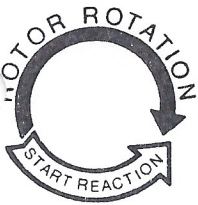
Before you put your ABS submersible pump to use, have a specialist check that one of the prescribed electrical safety features is available. Earthing, neutral, fault current safety device, etc. must meet the local authority regulations and operate properly. Cross-section and voltage of the mains supply (feed-in) must comply with the local authority rules. Check whether the voltage indicated on the pump nameplate agrees with the mains voltage.

Connection of the supply and pump cable to the terminal strip of the control system should be made by the specialist in agreement with the identification of the individual leads (see lead usage and motor wiring diagram).

The system should be protected with a sufficiently strong slow-blow fuse (appropriate to the pump rating).

Please note that the electrical control devices should be protected from moisture and must be installed in an area which is safe against flooding. The pump supply cable must be run so that it cannot be caught by the pump suction.

## Checking Direction of Rotation



Direction of Rotation: Only necessary for Three Phase pumps!

The direction of rotation should be carefully checked when the pump is first put into use (and also if the location is changed). An incorrect direction of rotation will result in considerably reduced discharge quantities and damage the pump.

After completing the electrical installation, check the direction of rotation. Unless the control panel is designed to indicate the correct or wrong direction of rotation, this can also be determined as follows: Raise the pump from the pit. Tilt it and start the motor. When starting, the pump should kick in the direction of the arrow on the pump lid (= ANTICLOCKWISE). The impeller of course will rotate in the opposite direction.

The electrical connection of the pump is correct, i.e. the rotor rotation (direction of rotation of the impeller) if the pump (when starting and looking from above) makes an anti-clockwise start reaction (in direction of arrow "Start-Reaction"). See direction of rotation symbol.

Are several pumps connected to a control panel, each pump has to be checked separately.

## Changing Direction of Rotation

Should the pump kick in the opposite direction reverse two phases.

The pump may then be lowered back into the sump and is now ready for operation.

## Level Control

The pump is automatically controlled through float switches responsive to the liquid level which are installed in the wet well so that the pump, upon reaching the desired liquid level maximum (under the inlet line), is switched on or, before dropping below the minimum liquid level (volute centre) is switched off.

### Ball-Type Float Switch (KS)

The KS level control uses a single-contact float switches (on and off) and is suitable for extremely small or large level with a bracket for wall mounting and with an adjustment weight and is available with fastening clamp and plug if the pump version is portable.

The KS level control in agreement with the freely movable control cable length can be used where the level differences are from 20 cm to approx. 2 m.

### Ball-Type Float Switch (2KS)

The 2KS level control uses two single-contact float switches (on and off) and is suitable for extremely small or large level differences or where, for lack of space, the KS system cannot be employed. The shift heights can be modified by shifting (extending or shortening) the free control cable in the clamping lug or by placing the control cable mounting higher or lower.

It is a presupposition for the proper operation of the automatic control that the float switches can always move freely up and down, never rest on the bottom nor be located directly in the water inlet flow.

Additionally, another float switch (installed approx. 10 cm above the highest cut-in point) can activate an alarm device (horn or bell).

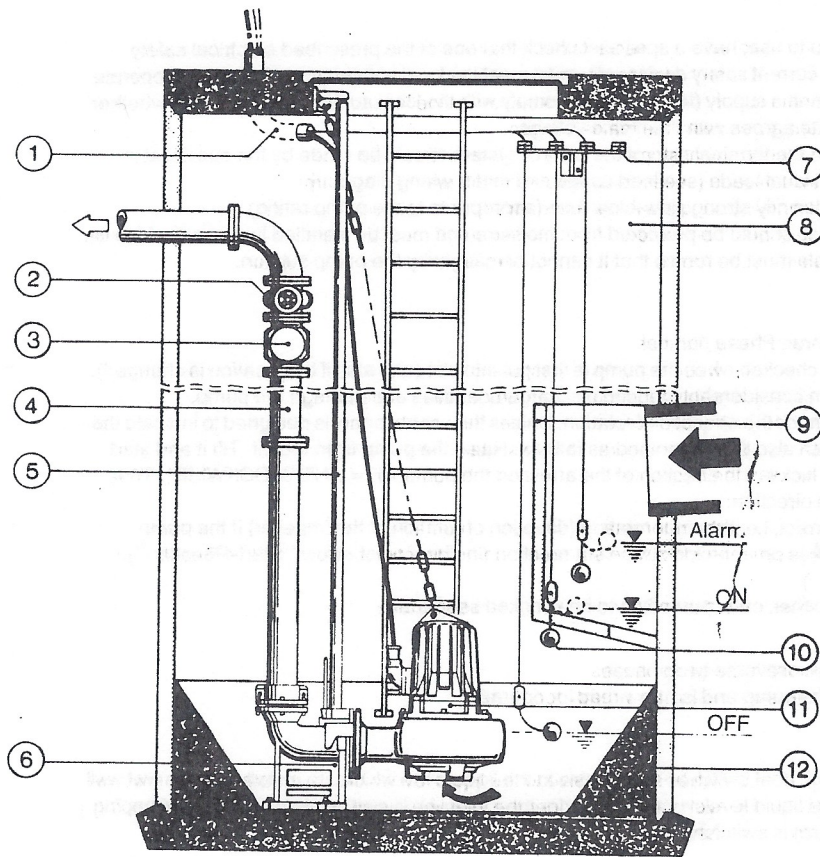
**Warning!** If installed in an explosion-hazardous area, ball type float switches must be laid in an intrinsically safe circuit "protection Ex (i)".

### Pneumostat

For the automatic control of explosion-proof pumps we also furnish the ABS level control Pneumostat (air-bubble feed-in process).



## Example of a Wet Type Installation



- 1 Cable duct to control panel
- 2 Gate valve
- 3 Check valve
- 4 Rising main
- 5 Guide rail
- 6 Elbow type base with automatic coupling
- 7 Cable holder for float switch
- 8 Sump
- 9 Inlet with baffle
- 10 KS float switch
- 11 Submersible sewage pump
- 12 Bring in benching after installation

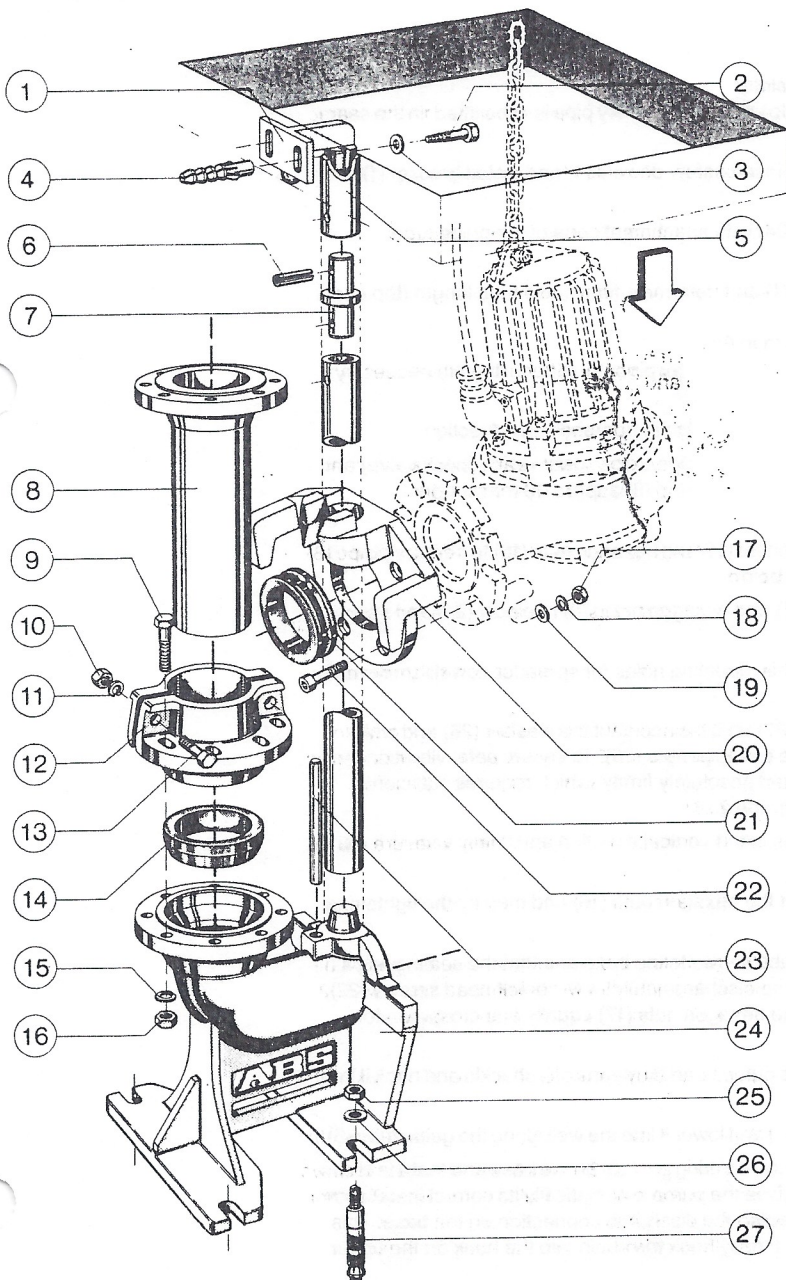
Upon completion of the sump assemble the automatic coupling with single guide rail (see pages 10 and 11). Then install the delivery line (4) with gate valve (2) and check valve (3). Thereafter, install the cable holder (7) for the float switches (10) easily accessible on the upper edge of the pump well (8). Suspend the float switches (10) so that their operation is not adversely affected by inflow turbulence of the waste water. To avoid control trouble by deposits, the float switches whenever possible should be fitted close to the pump (for adjustment and shift heights see level control on page 8). Guide the control and motor cables through the cable duct (1) and connect them to the control unit. After the assembly work is complete, bring in benching (12). Adjust the profile of the benching (12) to the sump conditions (dimensions).

Approximation: Ratio between base and sump wall equal to 1 : 2.

Then lower the submersible sewage pump (11) by means of a chain shackle and a sufficiently sized hoist into the sump along the guide rail (5). The pump will automatically couple to the pedestal (6) and through its dead weight ensures an absolutely tight connection with the delivery line.

## Installation

## Stationary Installation

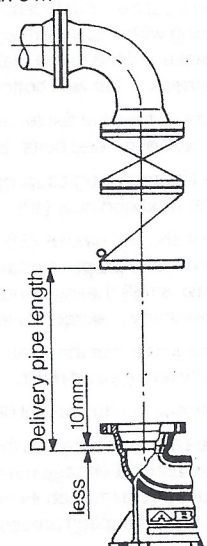


## Automatic coupling with single guide rail and delivery pipe bayonet/plug connection

The automatic ABS coupling ensures rapid and economical installation. When installing the pumping station, the special pedestal is securely mounted with the delivery pipe on the bottom of the well. A guide tube connects the pedestal with the rail support at the sump head. The submersible sewage pump is lowered along the guide rail, automatically reaches its proper operating position and seals off the discharge outlet on the pedestal automatically by its dead weight.

This automatic coupling process can be repeated as often as necessary and facilitates, in particular, the inspection and maintenance: the pump (also with the system flooded) is simply pulled out of the well with the chain, checked or maintained, and lowered again.

- 1 Rail support
- 2 Hexagon head bolt
- 3 Washer
- 4 Safety dowel
- 5 Guide rail
- 6 Dowel pin
- 7 Pipe connector for more than 6 m guide tube length
- 8 Delivery pipe
- 9 Hexagon head bolt
- 10 Hexagon nut
- 11 Spring washer
- 12 Tightening segment
- 13 Hexagon head bolt
- 14 Tapered sealing ring
- 15 Spring washer
- 16 Hexagon nut
- 17 Hexagon nut
- 18 Spring washer
- 19 Washer
- 20 Bracket
- 21 Shaped gasket
- 22 Socket head screw
- 23 Centring pin
- 24 Elbow type pedestal
- 25 Hexagon nut
- 26 Washer
- 27 Spreader dowel





Assembly of the automatic ABS coupling with single guide rail and delivery pipe bayonet/plug coupling in connection with the submersible pump is performed in accordance with the instructions below:

## Assembly

1. Determine position of the upper bracket (1) and mark the mounting slots:
  - 1.1 On the inside of the well access openings, in the centre of the side where the delivery pipe is to be fitted, in the same axis with the delivery connection flange
2. Drill two holes (centrically in relation to the marked mounting slots), insert safety dowels (4) and install bracket (1) with hexagon head bolts (2) and washers (3), but do not tighten.
3. Drive centring pin (23) into elbow base (24) and place elbow base (24) with attachment cone of the guide tube perpendicular under the upper bracket (1) on the bottom of the well.
4. Position guide rail (5) next to attachment cone on the elbow base (24) and determine final guide tube length (top edge to cone of the pipe tightener).
  - 4.1 Shorten guide tube (5) accordingly where the well depth is less than 6 m
  - 4.2 Assemble guide tube from various tubes with tube connectors and pins (6) after drilling the necessary holes where the well depth is greater (more than 6 m).
5. Insert guide tube between cone on pedestal (24) and upper bracket (1) in perpendicular direction.
6. Determine length of delivery pipe (8) between prepared delivery pipe elbow, gate valve, check valve) and shoulder on the smallest elbow I.D. of the base adapter (24) and pipe (8) approx. 10 mm shorter (see illustration on page 10).
7. Fit tightening segments (12) with hexagon head bolts (13), spring washers (11) and hexagon nuts (10) to delivery pipe (8) (tighten hand tight) and push tapered sealing ring (14) in place from below.
8. Fit delivery pipe (8) with hexagon head bolts (9), spring washers (15) and hexagon nuts (16) to elbow (24) and secure to the flange of the upper delivery pipe branch.
9. Align delivery pipe (8) and guide tube (5) once more vertically and drill mounting holes for spreader dowels (minimum diameter 14 mm) on the positioned elbow.
10. Blow dust out of drilled holes, insert untightened spreader dowels (27) until they contact the washer (26) and while holding with a screwdriver secure the base elbow (24) finally with the hexagon nuts (25). To ensure safe, vibration-free operation of the pump make sure that the spreader dowels are located absolutely firmly, which requires sufficient thickness of the well bottom and proper concrete quality (minimum grade 25)!
11. Press upper pipe tightener (1) into guide tube so that no play remains in the vertical direction and finally secure it with the hexagon head bolts (2).
12. The bayonet/plug coupling is initially sealed by the final tightening of the hexagon nuts (16) and then by the tightening of the hexagon nuts (10).
13. Insert shaped gasket (21) into the retainer (20) so that the tapered face shows to the base and that the sealing lips all round make proper contact on both sides. Secure retainer to the pump discharge outlet with socket head screws (22), washers (19), hexagon nuts (17) and spring washers (18). Tighten the hexagon nuts (17) equally and crosswise to prevent any leakage of the seal.
14. Secure chain for the lowering the pump to the cast-on lifting lug on the pump head by means of a shackle and hook it into a sufficiently sized hoist.
15. Allow pump with bracket (20) to slide above the upper pipe tightener (1) and lower it into the well along the guide tube (5).
16. Take care to ensure that the guide slot on the bracket (20) slides over the centring pin (23) on the base and that the claws of the bracket engage over the side cast-on cams of the base. This gives the pump automatically its correct installation position, and through its dead weight, the pump has automatically sealed the discharge connection on the base. This automatic coupling process can be repeated as often as necessary. Finally hook the chain into the hook on the upper bracket.

## Maintenance Hints

All ABS pumps are reliable and proven quality products and undergo a thorough final inspection. Permanently lubricated ball bearings and an inspection display independent of the hours of operation (see oil change) provide for optimal readiness of the pump for use. Regular inspection and servicing, however, are recommended for long life and uninterrupted operational safety. A maintenance agreement with our company after-sales service ensures in any case the best specific and expert service for your product.

## Cleaning

If used as a portable pump, it should be cleaned after every use by the discharge of clear water to avoid deposits of dirt and incrustations. If used as a stationary pump, it should be cleaned in certain intervals. Actuation of the selector switch (position "WASCH" or "WASH") reveals deposited dirt on the float switch and some control intervals checked in the manual. If any trouble should occur when you operate the pump – which would be against our expectations – and this mainly upon repeated response of the excess current release, then do not improvise, but request expert assistance from one of our service stations or a franchised repair shop.

Regular inspections will maintain the durable operational safety of our quality products. The ABS Service Organisation is your reliable partner.