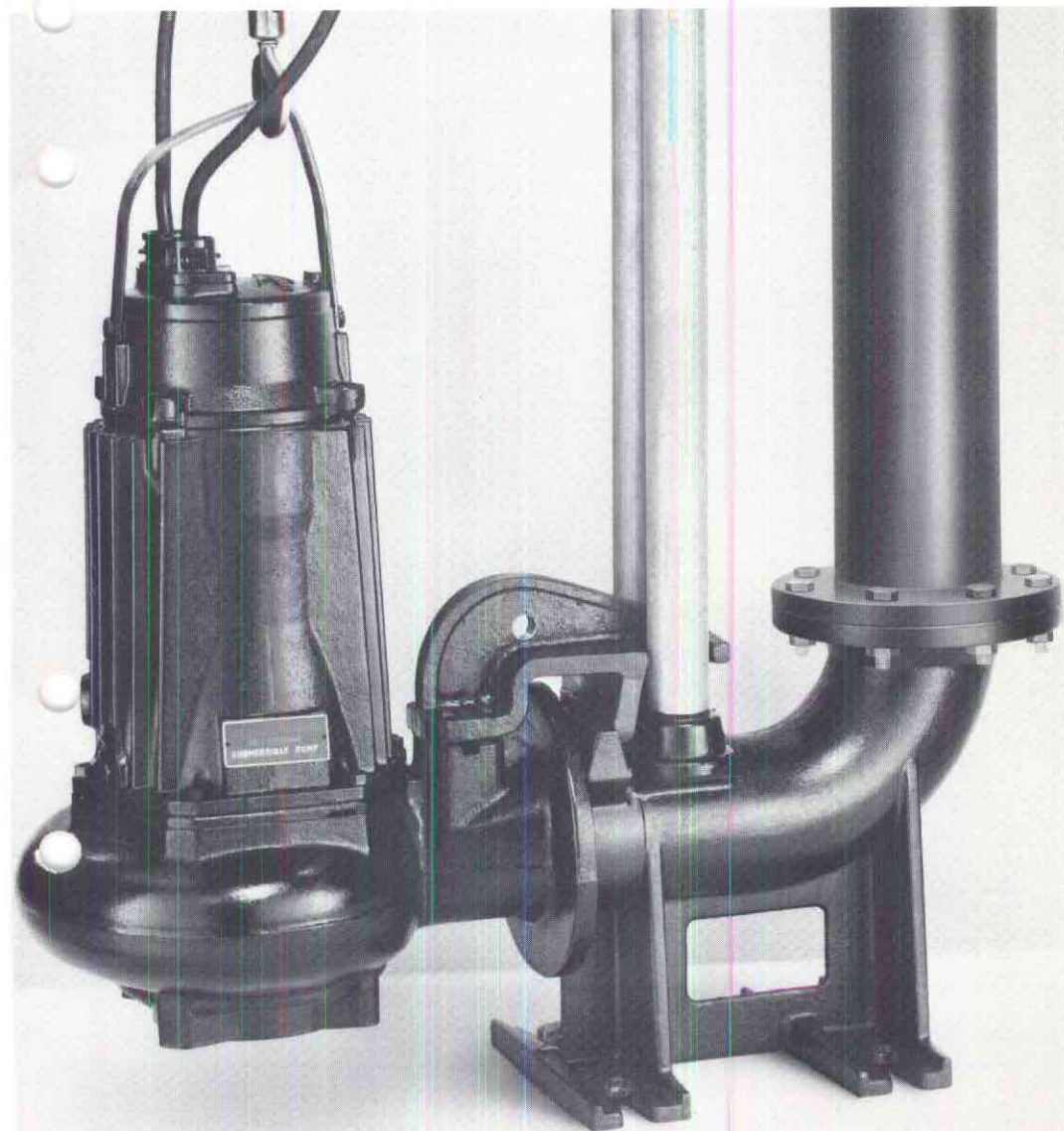


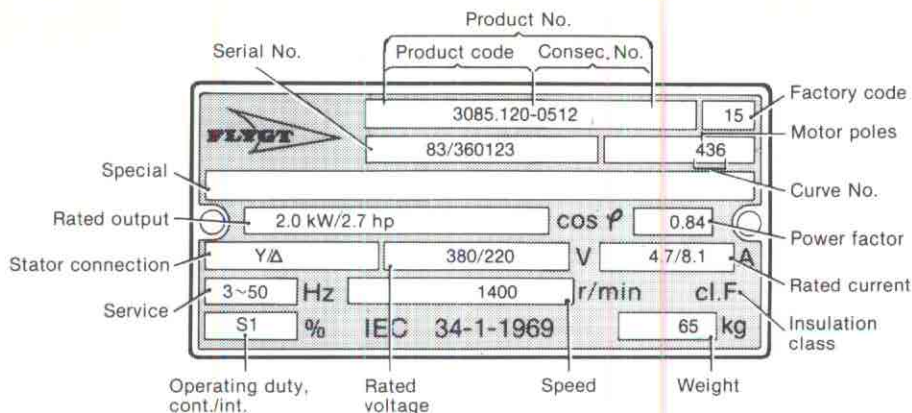
3101.180, 3126.181



INSTALLATION, CARE AND MAINTENANCE



DATA PLATE INTERPRETATION



Flygt undertakes to remedy faults in products sold by Flygt provided:

- that the fault is due to defects in design, materials or workmanship;
- that the fault is reported to Flygt or Flygt's representative during the guarantee period;
- that the product is used only under conditions described in the care and maintenance instructions and in applications for which it is intended;
- that all service and repair work is done by a workshop authorized by Flygt;
- that genuine Flygt parts are used.

Hence, the guarantee does not cover faults caused by deficient maintenance, improper installation, incorrectly executed repair work or normal wear and tear.

Flygt assumes no liability for either bodily injuries, material damages or economic losses beyond what is stated above.

Flygt guarantees that a spare parts stock will be kept for 15 years after the manufacture of this product has been discontinued.

The manufacturer reserves the right to alter performance, specification or design without notice.

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PRODUCT DESCRIPTION

Applications

3101 and 3126 are intended to be used for:

pumping of waste water

pumping of sludge

HS 3126 is intended to be used for pumping of water that contains abrasive particles.

Liquid temperature: max. 40°C (103°F)

Liquid density: Max. 1100 kg/m³ (9.2 lb per US gal.)

The pumped liquid may contain particles up to a size which corresponds to the throatlet of the pump.

The pH of the pumped liquid: 6—11.

Depth of immersion: max. 20 m (65 ft).

The following pumps with a swirl-type impeller may not be operated at a too low discharge head, since this causes overloading of the motor.

Pump	Curve no. (stated on the data plate)	Minimum discharge head
3101	472	6.5 m(21.3 ft)
	474	3.5 m(11.4 ft)
3126	470	3.6 m(11.8 ft)
	471	6 m(19.7 ft)
	472	6 m(19.7 ft)

If required contact your nearest Flygt representative for further information.

The pump shall not be used in explosive or flammable environments or with flammable liquids.

For other applications, contact your nearest Flygt representative for information.

Design

3101 and 3126 are submersible, electric motor-driven pumps.

Motor

Squirrel-cage 3-phase induction motor for 50 Hz or 60 Hz.

The motor is started by means of: direct on-line start or star-delta start.

The motor can be run:

continuously or intermittently with a maximum of 15 evenly spaced starts per hour.

The stator is insulated to IEC 85 class F (155°C). The motor is designed to supply its rated output at $\pm 5\%$ variation of the rated voltage. $\pm 10\%$ variation of the rated voltage can be permitted without overheating. The motor is designed to operate with a voltage imbalance of up to 2 % between the phases (according to IEC 34-1).

Monitoring equipment

The stator of 3126 incorporates three thermal protectors connected in series.

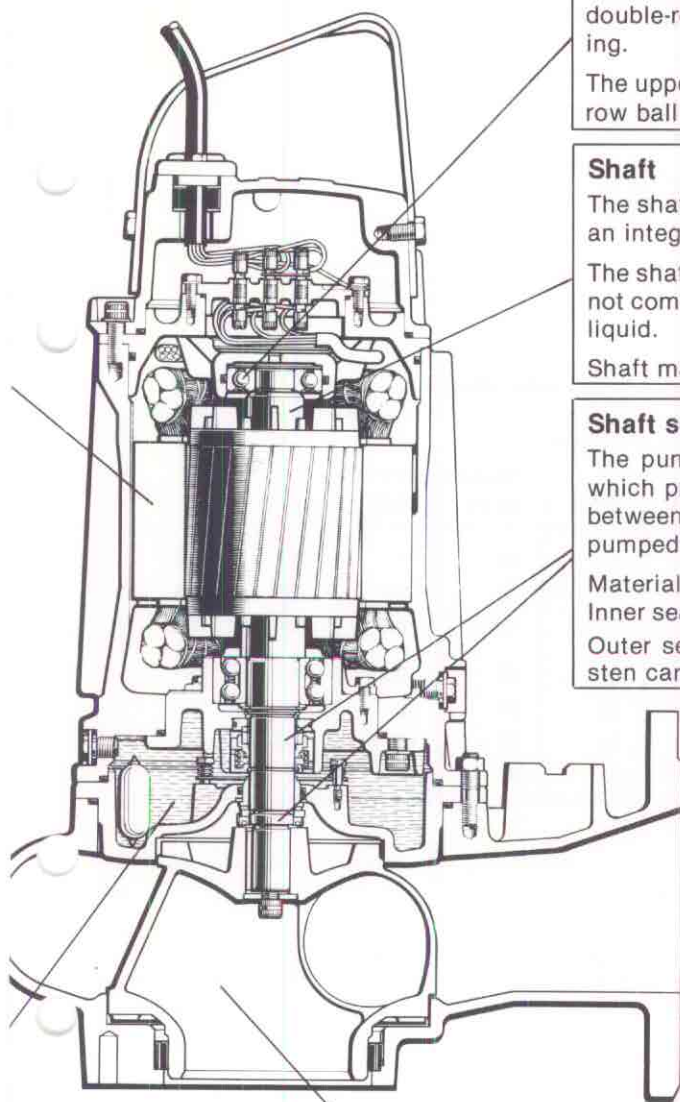
The thermal protectors:
open at 125°C (260°F)
close at 70°C (160°F)

See also "Electrical connections" and separate instructions for starters.

Oil casing

The oil lubricates and cools the seals and acts as a buffer between the pump casing and the electric motor.

Pressure build-up within the oil casing is reduced by means of a built-in air volume.



Bearings

The pump bearings are designed for at least 17 000 hours of operation.

The lower bearing consists of a double-row angular contact ball bearing.

The upper bearing consists of a single-row ball bearing.

Shaft

The shaft is delivered with the rotor as an integral part.

The shaft is completely sealed and will not come into contact with the pumped liquid.

Shaft material: stainless steel.

Shaft seals

The pump has two mechanical seals which provide the isolation necessary between the electric motor and the pumped liquid.

Materials:

Inner seal: tungsten carbide — carbon.

Outer seal: tungsten carbide — tungsten carbide.

Impellers

The pump is available with the following types of impellers:

single-vane impeller of cast iron.

two-vane impeller of cast iron.

heavy-duty impeller, designed especially for abrasive particles (only HS 3126).

swirl-type impeller of cast iron.

Technical data

3101 and 3126 are available in the following versions:

low-head version	— LT
medium-head version	— MT
high-head version	— HT
swirl-type impeller version	— D

All versions have different impellers for different head and flow rate.

For information regarding capacity of the pump consult your nearest Flygt representative.

For other abbreviations see "Installation alternatives".

Pump	Electrical motor, 3 ~ 50 Hz						
	kW	r/min	Rated current A				
			200 V	220 V	380 V	415 V	550 V
3101	3.1	1440	13	12	7	6.4	4.8
3101	4.4	2850	18	16	9.3	8.5	6.4
3101	2.35	1450	11	9.5	5.5	5.0	3.8
3126	4.0	1445	17	15	8.9	8.1	6.1
3126	5.9	1450	23	21	12	11	8.3
3126	4.7	1450	20	18	11	9.6	7.3
3126	7.4	2900	28	25	15	13	10

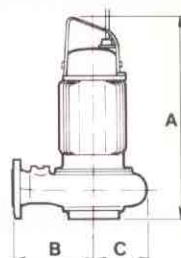
Pump	Electrical motor, 3 ~ 60 Hz						
	Rated output	r/min	Rated current A				
			200 V	230 V	440 V	460 V	575 V
3101	2.5 kW(3.4 hp)	1750	11	10	5.2	5.0	4.0
3101	3.7 kW(5 hp)	1700	15	13	7	6.7	5.4
3101	4.5 kW(6 hp)	3450	18	15	8	7.7	6.2
3126	4.5 kW(6 hp)	1750	20	18	9	8.7	7
3126	4.8 kW(6.4 hp)	1750	21	18	9.4	9	7.2
3126	5.5 kW(7.5 hp)	1750	23	20	11	10	8.1
3126	7 kW(9.4 hp)	1750	29	26	13	13	10
3126	6.5 kW(8.7 hp)	3490	—	21	11	10	—
3126	8.3 kW(11 hp)	3475	—	26	14	13	—

Pump	Electrical motor, 1 ~ 60 Hz		
	Rated output	r/min	Rated current 230 V
3101	2.9 kW(3.9 hp)	1730	16 A
3126	5.5 kW(7.4 hp)	1730	30 A

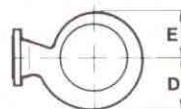
Dimensions and weights

All dimensions are in mm (in)

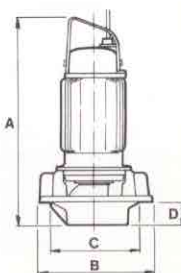
3101	A	B	C	D	E
LT	738(28.8)	290(11.3)	184(7.2)	210(8.2)	155(6.0)
MT	724(28.2)	285(11.1)	178(6.9)	193(7.5)	159(6.2)
HT	719(28.0)	285(11.1)	142(5.5)	142(5.5)	140(5.5)
D	724(28.2)	285(11.1)	178(6.9)	193(7.5)	159(6.2)



3126	A	B	C	D	E
LT	863(33.7)	350(13.7)	217(8.5)	251(9.8)	177(6.9)
MT	848(33.1)	310(12.1)	214(8.3)	242(9.4)	190(7.4)
HT (curve 461-467)	821(32.0)	310(12.1)	202(7.9)	182(7.1)	155(6.0)
HT (curve 250-259)	804(31.4)	310(12.1)	168(6.6)	182(7.1)	155(6.0)
D	909(35.5)	310(12.1)	214(8.3)	242(9.4)	190(7.4)



LL	A	B diam.	C diam.	D
LL 3101	750(29.3)	380(14.8)	282(11.0)	72(2.8)
LL 3126	865(33.7)	480(18.7)	384(15.0)	92(3.6)



Weight in kg (lb) without motor cable and discharge connection:

3101		LT	MT	HT	D
CP	Pump	123(271)	114(251)	102(225)	114(251)
	Discharge connection	46(101)	35(77)	30 ¹⁾ ; 35 ²⁾ (66 ; 77)	35(77)
CS	Pump with base stand	125(276)	116(256)	104(229)	116(256)
CT	Pump	111(245)	102(225)	—	102(225)
	Base stand	53(117)	28(62)	—	28(62)
LL	Pump	120(265)	—	—	—

3126		LT	MT	HT (Curve 461-467)	HT (Curve 250-259)	HS	D
CP	Pump	169(373)	164(361)	164(361)	138(304)	—	164(361)
	Discharge connection	62(137)	46(101)	35(77)	30(66)	—	46(101)
CS	Pump with base stand	194(428)	176(388)	167(368)	142(313)	175(386)	176(388)
CT	Pump	161(355)	156(344)	156(344)	—	—	156(344)
	Base stand	72(159)	53(117)	28(62)	—	—	53(117)
LL	Pump	150(331)	—	—	—	—	—

¹⁾ Discharge connection diam.. 80

²⁾ Discharge connection diam. 100

Transportation and storage

The pump may be transported and stored in a vertical or horizontal position. Make sure that it cannot roll or fall over.

The impeller shall be locked during transport.

Always lift the pump by its carrying handle, **never** by the motor cable or the hose.

The pump is frostproof as long as it is operating or is immersed in the liquid. If the pump is taken up when the temperature is below freezing, the impeller may freeze. The pump shall be operated for a short period after being taken up in order to expel all remaining water.

A frozen impeller can be thawed by allowing the pump to stand immersed in the liquid for a short period before it is started. Never use an open flame to thaw the pump.

For longer periods of storage, the pump must be protected against moisture and heat. The impeller should be rotated by hand occasionally (for example every other month) to prevent the seals from sticking together. If the pump is stored for more than 6 months, this rotation is mandatory.

After a long period of storage, the pump should be inspected before it is put into operation. Pay special attention to the seals and the cable entry.

Follow the instructions under the heading "Before starting", page 14.

INSTALLATION

Safety precautions

In order to minimize the risk of accidents in connection with the service and installation work, the following rules should be followed:

1. Never work alone. Use a lifting harness (part No. 84 33 02), safety line (part No. 84 33 03) and a respirator (part No. 84 33 01), as required. Do not ignore the risk of drowning!
2. Make sure that there is sufficient oxygen and that there are no poisonous gases present.
3. Check the explosion risk before welding or using electric hand tools.
4. Do not ignore health hazards. Observe strict cleanliness.
5. Bear in mind the risk of electrical accidents.
6. Make sure that the lifting equipment is in good condition.
7. Provide a suitable barrier around the work area, for example a guard rail.
8. Make sure you have a clear path of retreat!
9. Use safety helmet, safety goggles and protective shoes.
10. All personnel who work with sewage systems shall be vaccinated against diseases that can occur.

Follow all other health and safety rules and local codes and ordinances.

Handling equipment

Lifting equipment is required for handling the pump.

The lifting equipment shall be able to hoist the pump straight up and down in the sump, preferably without necessitating resetting the lifting hook.

Oversize lifting equipment could cause damage if pump gets stuck when being lifted.

Make sure that the lifting equipment is securely anchored.

WARNING! Keep out from under suspended loads.

Installation alternatives

CP version

In the CP version, the pump is installed on a stationary discharge connection and operates completely or partially submerged in the pumped liquid.

In addition to the pump, the following items are required:

Guide bars consisting of two hot-dip galvanized pipes (2").

Upper guide bar bracket for attaching the guide bars to the access cover or top of the station.

Level sensors or other control equipment for start, stop and alarm.

Cable holder for holding the cable and regulating the height of the level sensors.

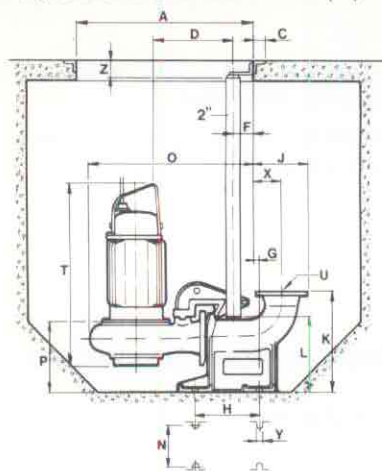
Access frame (with covers) to which the upper guide bar bracket and cable holder can be attached.

Discharge connection for connecting the pump to the discharge line. The discharge connection has a flange which fits the flange on the station piping. The pump casing mates with the discharge connection, which also has bosses for holding the guide bars.

Bushings for vibration damping between the guide bars and the discharge connection.

Discharge connection frame with anchor bolts for anchoring the discharge connection.

CP All dimensions are in mm (in)



	A	B	C	D	E	F	G	H
3101 LT	780(30.4)	570(22.2)	50(2.0)	352(13.7)	262(10.2)	85(3.3)	109(4.3)	280(10.9)
3101 MT	780(30.4)	570(22.2)	50(2.0)	347(13.5)	262(10.2)	85(3.3)	69(2.7)	250(9.7)
3101 HT	780(30.4)	570(22.2)	50(2.0)	347(13.5)	262(10.2)	85(3.3)	59(2.3)	250(9.7)
3101 D	780(30.4)	570(22.2)	50(2.0)	347(13.5)	262(10.2)	85(3.3)	69(2.7)	250(9.7)
3126 LT	780(30.4)	570(22.2)	50(2.0)	436(17.0)	262(10.2)	85(3.3)	139(5.4)	280(10.9)
3126 MT	780(30.4)	570(22.2)	50(2.0)	396(15.4)	262(10.2)	85(3.3)	109(4.3)	280(10.9)
3126 HT								
(curve 461-467)	780(30.4)	570(22.2)	50(2.0)	396(15.4)	262(10.2)	85(3.3)	69(2.7)	250(9.7)
3126 HT								
(curve 250-259)	780(30.4)	570(22.2)	50(2.0)	396(15.4)	262(10.2)	85(3.3)	59(2.3)	250(9.7)
3126 D	780(30.4)	570(22.2)	50(2.0)	396(15.4)	262(10.2)	85(3.3)	109(4.3)	280(10.9)
	J	K	L	M	N	O	P	
3101 LT	236.5(9.2)	450(17.5)	367(14.3)	670(26.1)	250(9.8)	675(26.3)	323(12.6)	
3101 MT	279(11.0)	400(15.6)	258(10.0)	670(26.1)	200(7.8)	664(25.9)	250(9.8)	
3101 HT	254(10.0)	400(15.6)	258(10.0)	670(26.1)	200(7.8)	628(24.5)	255(9.9)	
3101 D	279(11.0)	400(15.6)	258(10.0)	670(26.1)	200(7.8)	664(25.9)	250(9.8)	
3126 LT	396.5(15.5)	450(17.5)	381(14.9)	670(26.1)	250(9.8)	768(30.0)	335(13.1)	
3126 MT	337.5(13.2)	450(17.5)	367(14.3)	670(26.1)	250(9.8)	725(28.3)	321(12.5)	
3126 HT								
(curve 461-467)	280(10.9)	400(15.6)	258(10.0)	670(26.1)	200(7.8)	713(27.8)	256(10.0)	
3126 HT								
(curve 250-259)	255(9.9)	400(15.6)	258(10.0)	670(26.1)	200(7.8)	679(26.5)	256(10.0)	
3126 D	337.5(13.2)	450(17.5)	367(14.3)	670(26.1)	250(9.8)	725(28.3)	321(12.5)	
	R	S	T	U diam.	X	Y	Z	
3101 LT	210(8.2)	155(6.0)	738(28.8)	150(5.9)*	194(7.6)	23(0.9)	70(2.7)	
3101 MT	193(7.5)	159(6.2)	724(28.2)	100(3.9)*	164(6.4)	23(0.9)	70(2.7)	
3101 HT	142(5.5)	140(5.5)	719(28.0)	80(3.1)*	154(6.0)	23(0.9)	70(2.7)	
3101 D	193(7.5)	159(6.2)	724(28.2)	100(3.9)*	164(6.4)	23(0.9)	70(2.7)	
3126 LT	251(9.9)	177(6.9)	863(33.7)	200(7.8)**	225(8.8)	23(0.9)	70(2.7)	
3126 MT	242(9.4)	190(7.4)	848(33.1)	150(5.9)*	195(7.6)	23(0.9)	70(2.7)	
3126 HT								
(curve 461-467)	182(7.1)	155(6.0)	821(32.0)	100(3.9)*	165(6.4)	23(0.9)	70(2.7)	
3126 HT								
(curve 250-259)	182(7.1)	155(6.0)	804(31.4)	80(3.2)*	155(6.2)	23(0.9)	70(2.7)	
3126 D	242(9.4)	190(7.4)	909(35.5)	150(5.9)*	195(7.6)	23(0.9)	70(2.7)	

* Flange as per SMS 342, DIN 2533 or BS 4622:1970 table 11

** Flange as per SMS 342, DIN 2532 or BS 4622:1970 table 11

CP installation

Provide a barrier around the pump pit, for example a guard rail.

Arrange for a cable between the sump and the electric control box. Make sure that the cables are not sharply bent or pinched.

NOTE! The end of the cable must not be submerged. Leads have to be above flood level, as water may penetrate through the cable into the junction box or the motor.

Place the access frame in position. Align the frame so that it is horizontal and then grout it in place. Check that the guide bars will be vertical using a level or plumb line.

Install the anchor bolts in place. Be careful when aligning and positioning the discharge connection in relation to the access frame. See dimension drawing.

Place the discharge connection in position and tighten it. Secure the guide bars in the brackets and discharge bosses. Connect the discharge pipe to the discharge connection.

Bolt the cable holder to the access frame. Thread the level regulator cables through the holes in the cable holder and adjust the height of the sensors.

It is recommended that the level regulators be used with low voltage. The data sheet delivered with the regulators gives the permissible voltage. Local rules may specify otherwise.

Protect bolts and nuts with corrosion-preventive compound.

Lower the pump along the guide bars. On reaching its bottom position, the pump will automatically connect to the discharge connection. Fasten the lifting chain on the access frame eyebolt provided and the cables on the cable holder. Cable supports are required for deep installations. Run the cables up to the electric control box.

Clean out debris from the sump before starting up the station.

The pump can be hoisted up along the guide bars for inspection without any connections having to be undone.

CS version

In the CS version, the pump is transportable and intended to operate completely or partially submerged in the pumped liquid.

The pump is equipped with a connection for hose or pipe, see "Parts list".

The pump stands on a base stand.

CS installation

Run the cables so that they have no sharp bends, are not pinched and cannot be sucked into the pump inlet. Connect the discharge line and the motor cable. See "Electrical connections".

Lower the pump into the sump.

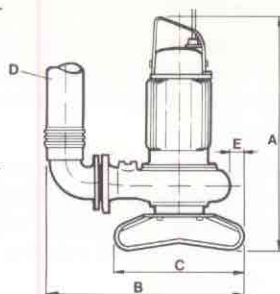
Place the pump on a base which prevents it from sinking into a soft sump bottom.

Alternatively, the pump can be suspended from above by its handle just above the bottom of the sump.

CS All dimensions are in mm (in)

3101	A	B	C	D diam.	E
LT	880(34.3)	673(29.8)	476(18.6)	150(5.9)	54(2.1)
MT, D	865(33.7)	686(26.8)	476(18.6)	100(3.9)	60(2.3)
HT	860(33.5)	682(26.6)	476(18.6)	80(3.1)	96(3.7)

3126	A	B	C	D diam.	E
LT	993(38.7)	873(34.0)	476(18.6)	200(7.8)	21(0.8)
MT, D	981(38.3)	783(30.5)	476(18.6)	150(5.9)	23(0.9)
HT (curve 461-467)	936(36.5)	700(27.3)	476(18.6)	100(3.9)	33(1.3)
HT (curve 250-259)	936(36.5)	700(27.3)	476(18.6)	80(3.1)	68(2.7)
HS	967(37.7)	573(22.3)	476(18.6)	100(3.9)	38(1.5)



LL version

In the LL version, the pump is installed in a stationary discharge arrangement.

The pump operates completely under water and requires no extra connections.

In addition to the pump, the following items are required:

Discharge pipe with bottom plate in which the pump is installed.

Cable holder for holding the cable and regulating the height of the level sensors.

Screen at intake.

Level sensors or other control equipment for start, stop or alarm.

LL installation

The pump is lowered into position in the finished station.

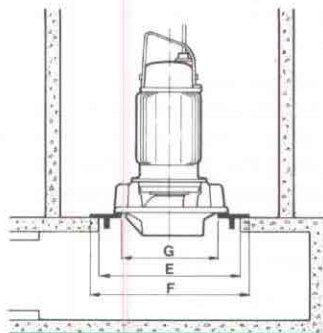
No additional anchoring of the pump is required.

Fasten the motor cables on the cable holder and run them to the electric control box.

NOTE! The end of the cable must not be submerged. Leads have to be above flood level, as water may penetrate through the cable into the junction box or the motor.

The pump can easily be hoisted for inspection without any connections having to be undone.

LL



All dimensions are in mm (in)

	E diam.	F diam.	G diam.
LL 3101	600(23.4)	800(31.2)	290(11.3)
LL 3126	600(23.4)	800(31.2)	393(15.3)

CT version

In the CT version, the pump is installed in a stationary position in a dry well next to the wet sump.

The pump has a watertight motor and will therefore not be damaged in the event of flooding in the pump room.

The pump is air-cooled and the temperature of the motor casing can be as high as 100°C (212°F). The pump room shall be ventilated.

In certain cases, the CT version can only be operated intermittently. Contact Flygt for exact information.

In addition to the pump, the following items are required:

Base stand and anchor bolts for setting up the pump.

Inlet elbow for connecting the suction line.

Shut-off valves to permit the pump to be removed for repair.

Air vent on discharge side between the pump and the check valve.

Level sensors or other control equipment for start, stop and alarm.

CT installation

The pump should be positioned low in the dry pit for effective drainage.

Bolt the base stand to the concrete base by means of four grouted-in anchor bolts.

Bolt the pump to the stand.

Check that the pump is vertical.

Connect the motor cable, suction line and discharge line.

Make sure that the weight of the pump does not bear on the system piping.

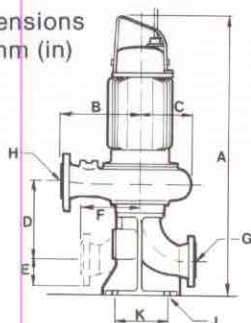
NOTE! The risk of freezing is particularly great with this installation.

Consult your nearest Flygt representative regarding:

- sizing of sump, pumping station and access frame.
- choice of peripheral equipment.
- other problems in connection with installation.

CT

All dimensions are in mm (in)



	A	B	C	D	E	F	G diam.	H diam.	J diam.	K
3101 LT	1137 (44.3)	290 (11.3)	184 (7.2)	348 (13.6)	142.5 (5.6)	250 (9.8)	150 (5.9)*	150 (5.9)*	23 (0.9)	300 (11.7)
3101 MT	1022 (39.9)	285 (11.1)	178 (6.9)	280 (10.9)	115 (4.5)	200 (7.8)	100 (3.9)*	100 (3.9)*	23 (0.9)	220 (8.6)
3101 D	1022 (39.9)	285 (11.1)	178 (6.9)	280 (10.9)	115 (4.5)	200 (7.8)	100 (3.9)*	100 (3.9)	23 (0.9)	220 (8.6)
3126 LT	1368 (53.4)	350 (13.7)	217 (8.5)	450 (17.6)	171.5 (6.7)	300 (11.7)	200 (7.8)**	150 (5.9)*	23 (0.9)	360 (14.0)
3126 MT	1251 (48.9)	310 (12.0)	214 (8.3)	372 (14.5)	142.5 (5.6)	250 (9.8)	150 (5.9)*	150 (5.9)*	23 (0.9)	300 (11.7)
3126 HT	1100 (42.9)	310 (12.0)	202 (7.9)	264 (10.3)	115 (4.5)	200 (7.8)	100 (3.9)*	100 (3.9)*	23 (0.9)	220 (8.6)
3126 D (curve 461-467)	1309 (51.0)	310 (12.0)	214 (8.3)	377 (14.7)	142.5 (5.6)	250 (9.8)	150 (5.9)*	150 (5.9)*	23 (0.9)	300 (11.7)

* Flange as per SMS 342, DIN 2533 or BS 4622:1970 table 11

** Flange as per SMS 342, DIN 2532 or BS 4622:1970 table 11

Electrical connections

All electrical work shall be carried out under the supervision of an authorized electrician. Local codes and regulations shall be complied with.

Check that the main (line) voltage and frequency agree with the specifications on the pump data plate.

The motor can be connected for different voltages as shown on the data plate.

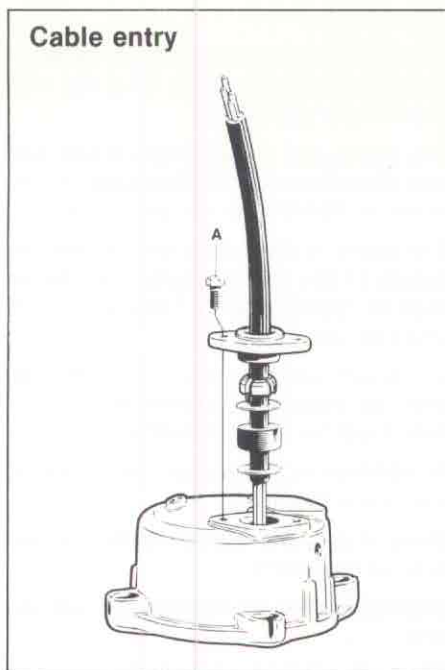
Under no circumstances may starter equipment be installed in the pump pit.

Install the motor cable and the control cable as illustrated in the figure.

To avoid leakage into the pump, check:

- that the cable entry seal sleeve and washers conform to the outside diameter of the cable. See the parts list.
- that the outer jacket on the cable is not damaged. When refitting a cable which has been used before, **always** cut off a short piece of the cable so that the cable entry seal sleeve does not close around the cable at the same point again.

Cable entry



If star-delta start is used, both motor cables are connected as illustrated. Closing links are not used with star-delta start.

Connect the control leads from the motor control circuit if any to T1 and T2.

Make sure that the pump is correctly earthed (grounded).

Tighten the screws (A) so that the cable entry unit bottoms out.

Remember that the starting surge with the direct-on line start can be up to six times higher than the rated current. Make sure that the fuses or circuit breakers are of the proper amperage.

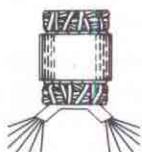
The overload protection (motor protection breaker) shall always be set to the motor's rated current as given on the data plate.

Connect the motor cable to the terminal board connections U1, V1, W1 and earth. Mount the closing links as illustrated. Check the direction of rotation, see "Before starting" (page 13). Transpose two phase leads if the impeller rotates in the wrong direction.

The stator leads are colour coded as follows:

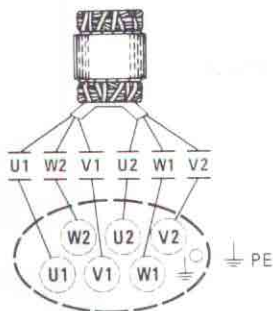
6 – 9 – 12

U1 = Red
V1 = Brown
W1 = Yellow
U2 = Green
V2 = Blue
W2 = Black
U5 = Red
V5 = Brown
W5 = Yellow
U6 = Green
V6 = Blue
W6 = Black

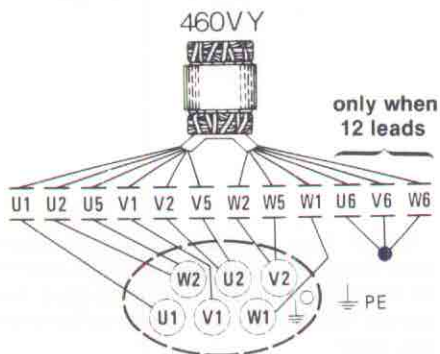


The stator leads are connected to the terminal board as follows:

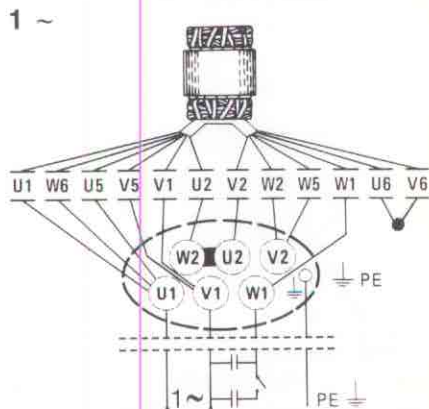
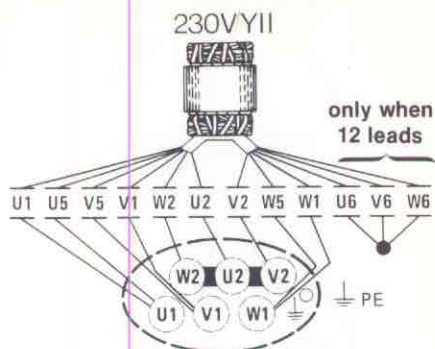
6-lead stators



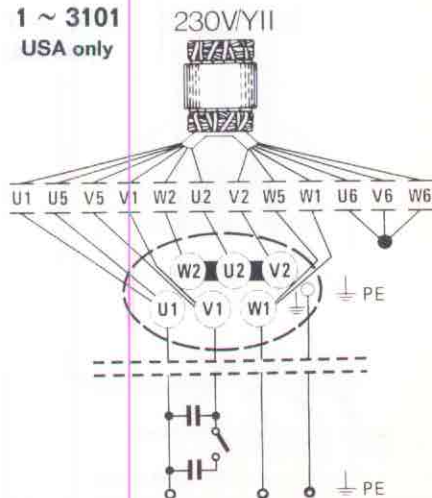
9- and 12-lead stator for:



9- and 12-lead stator for:

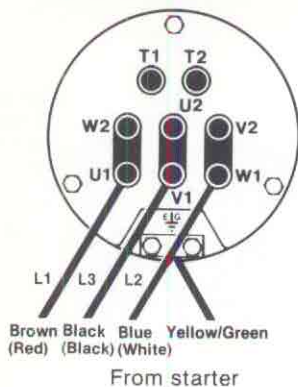


1 ~ 3101 USA only

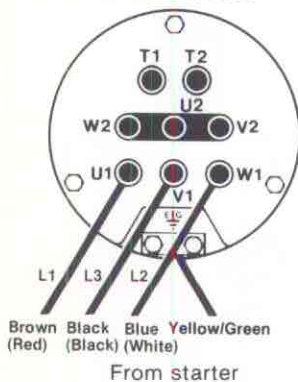


Terminal board

△ Delta connected

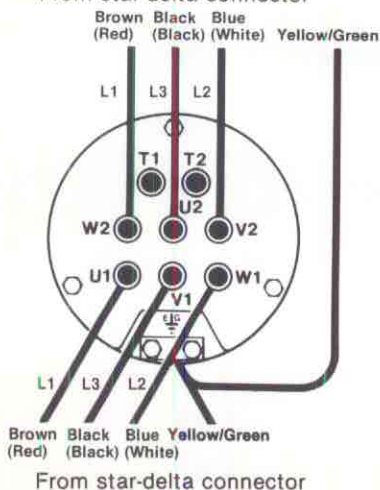


Y Star connected*



Y/△ Star-delta connection

From star-delta connector



Before starting

Check the oil level in the oil casing.

Remove the fuses or open the circuit breaker and check that the impeller can be rotated by hand.

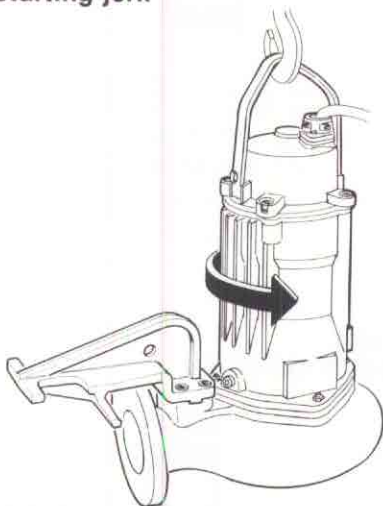
Check that the monitoring equipment (if any) works.

Check the direction of rotation. See the figure. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. **Beware! The starting jerk on large pumps can be powerful!**

In the case of CT installation, the direction of rotation is checked through the inlet elbow access cover.

The above measures are described under "Inspection".

Starting jerk



* NOTE! When connecting pumps which have a 9 or 12 lead stator for 440—460 VY, 60 Hz, no closing links should be used. For correct connection, see inside of junction box cover.

CARE AND MAINTENANCE

The letters in parentheses refer to the cutaway figure on page 22.

Safety precautions

Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.

NOTE! This applies to the control circuit as well.

The following points are important in connection with work on the pump:

- make sure that the pump has been thoroughly cleaned.
- observe good personal hygiene.
- beware the risk of infection.
- follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after disassembly.
- Hold a rag over the oil casing screw (OIL) and the inspection screw (INSP) when removing them. Otherwise, pressure that may have built up in the pump due to the leakage of pumped liquid into the pump may cause splatter into the eyes or onto skin.

Proceed as follows if you get hazardous chemicals

in your eyes:

- rinse immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- contact an eye doctor.

on your skin:

- remove contaminated clothes.
- wash skin with soap and water.
- seek medical attention if required.

Inspection

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least once a year, more frequently under severe operating conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop every three years.

This requires special tools and should be done by an authorized service shop.

When the pump is new or when the seals have been replaced, inspection is recommended after one week of operation.

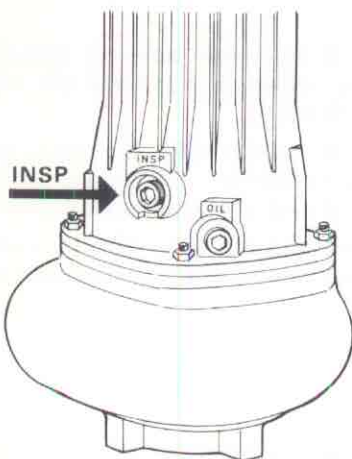
Recommended inspections

Inspection of	Action
Visible parts on pump and installation	<p>Replace or fix worn and damaged parts.</p> <p>Make sure that all screws, bolts and nuts are tight.</p> <p>Check the condition of carrying handle, chains and wire ropes.</p> <p>Check that the guide bars are vertical.</p>
Pump casing and impeller	<p>Replace worn parts if they impair function.</p> <p>If the clearance between the impeller skirt and the pump casing exceeds 2 mm (0.08 in), see "Replacing the wear ring".</p> <p>Wear on the outlet flange on the pump casing usually causes corresponding wear on the discharge connection.</p>
Oil quantity	<p>WARNING. If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil casing screw in order to prevent splatter. See "Safety precautions" for additional information.</p> <p>Check that the oil reaches up to the oil hole when the pump is lying down with the oil hole up.</p> <p>Add oil as needed. See "Changing the oil".</p>
Condition of the oil	<p>A check of the condition of the oil can show whether there has been any leakage. Maximum permissible leakage is 0.05 ml/h (0.0017 oz/h). (Note! Air/oil mixture can be confused with water/oil mixture).</p> <p>Insert a tube (or hose) into the oil hole. Cover the top end of the tube and take up a little oil from the bottom.</p> <p>Change the oil if it contains too much water, i.e., is heavily emulsified (cream-like), or if the water has settled out. See "Changing the oil". Check again one week after changing the oil.</p> <p>If the oil contains too much water again, the fault may be:</p> <ul style="list-style-type: none">— that an oil screw (OIL) is not sufficiently tight.— that an oil screw O-ring or its sealing surface is damaged.— that an O-ring (I) or its sealing surface is damaged.— that the lower seal (H) is damaged. Contact a Flygt service shop.

Inspection of	Action
Liquid in the stator casing	<p>WARNING. If there has been leakage, the stator casing may be under pressure. Hold a rag over the inspection screw to prevent splatter. See "Safety precautions" for additional information.</p> <p>Remove the inspection screw (INSP) and its O-ring.</p> <p>Tilt the pump so that any liquid in the stator casing can run out through the hole.</p> <p>If there is water in the stator casing, the cause may be:</p> <ul style="list-style-type: none"> — that the inspection screw is not sufficiently tight. — that the inspection screw O-ring or its sealing surface is damaged. — that an O-ring (D, E) is damaged. — that the cable entry is leaking. <p>If there is oil in the stator casing, the cause may be:</p> <ul style="list-style-type: none"> — that the inner seal (G) is damaged. Contact a Flygt service shop. — that an O-ring (F) is damaged.
Cable entry	<p>If the cable entry leaks:</p> <ul style="list-style-type: none"> — check that the entry is tightened so it bottoms out. — cut a piece of the cable off so that the seal sleeve (C) closes around a new position on the cable. — replace the seal sleeve (C). — check that the seal sleeve (C) and the washers (B) conform to the outside diameter of the cables.
Cables	<p>Replace the cable if the outer jacket is damaged. Make sure that the cables do not have any sharp bends and are not pinched.</p>
Level sensors or other level equipment	<p>Check function. Clean, adjust, replace or repair damaged level sensing equipment. Follow the instructions for the level sensing equipment in question.</p> <p>Note! The level sensor contains a mercury switch. Damaged sensors should therefore be disposed of in a proper manner.</p>
Starter equipment	<p>If faulty, contact an electrician.</p>
Monitoring equipment (should be checked often)	<p>Follow the instructions for monitoring equipment. Check:</p> <ul style="list-style-type: none"> — signals and tripping function. — that relays, lamps, fuses and connections are intact.

Inspection of	Action
Rotation direction of pump (requires voltage)	Transpose two phase leads if the impeller does not rotate clockwise as viewed from above. Rotation in the wrong direction reduces the capacity of the pump and the motor may be overloaded. Check the direction of rotation every time the pump is reconnected.
Pipes, valves and other peripheral equipment	Repair faults and notify supervisor of any faults or defects.
Insulation resistance in the stator	Use insulation tester. With a 1000 V-DC megger the insulation between the phases and between any phase and earth (ground) should be $> 1 \text{ M}\Omega$.

Inspection screw



Changing the oil

WARNING. If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil plug to prevent splatter.

Lay the pump on its side on a bench or over two supports.

Remove the screw (OIL) and its O-ring from one of the oil holes.

Turn the pump so that the oil hole faces downwards.

It is easier to drain the oil if the other oil hole screw is also removed.

Fill with 1.0 litre (1.1 US quarts) of new oil in 3101 and 2.3 litres (2.4 US quarts) in 3126. Always replace the gaskets under the oil casing screws. Place the screws back in. Tightening torque 10—20 Nm (7.5—15 ft lb).

Use the following oil or their equivalent:

BP, Energol TOU 10W-30

Castrol, Castrolite 10W-30

Esso Extra Motor Oil 10W-30

Gulf Multi G 10W-30

Mobil Delvac Oil 1210

Delvac special 10W-30

Shell, Tractor Oil Universal 10W-30

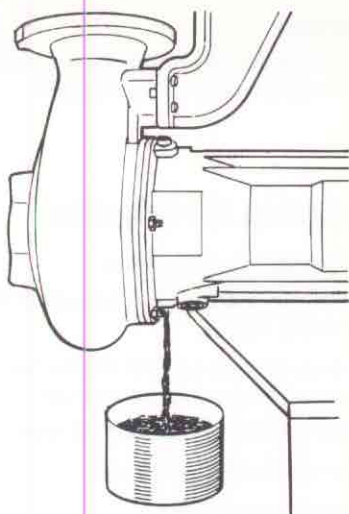
Tellus T Oil 27

Shell Clavus Oil 27

Texaco Havoline Motor Oil 10W-40

Mobil Whiterex 309 or an equivalent paraffin oil is recommended for raw or clean water pumping.

Draining the oil



Replacing the wear ring

When the clearance between the impeller skirt and the pump casing exceeds 2 mm (0.08 in), one or more of the following replacements must be made.

Replacing the wear ring in the pump casing (Q).

Disconnect and lift off the motor section from the pump casing.

Knock out the wear ring using a chisel.

Drive in the new wear ring. Use a rubber mallet or wooden block to prevent deformation.

The work will proceed more easily if the pump casing is first heated and/or the wear ring cooled.

Replacing the impeller

See below.

Assembly

Before assembling the pump, check the O-ring (K) and fit it in place.

Replacing the impeller

Removing the impeller

WARNING! Worn impellers often have very sharp edges.

Remove nuts (R) and lift the motor section off of the pump casing (O).

Lay the motor section on its side.

Remove impeller screw (N).

Remove washer (M).

Pull off the impeller.

Use impeller puller according to table below.

Do **not** pry off the impeller, since it can easily be damaged.

Installing the impeller

Make sure that the end of the shaft is clean and free of burrs. Polish off any flaws.

Clean and oil all sealing surfaces and O-rings.

Check:

— that the key (L) is seated in the key-way on the shaft.

Grease end of shaft and impeller hub.

Place washer (M) on the impeller screw.

Press the impeller onto the shaft with the impeller screw.

Tightening torque for 3101 50 Nm (37 ft lb), for 3126 80—100 Nm (60—74 ft lb).

Check that the impeller is firmly seated.

Check that the impeller can be rotated by hand.

Fit the motor section to the pump casing (O). Make sure that the pump casing has the right orientation.

Don't forget the O-ring (K).

Impeller pullers

Pump	Curve no. (stated on the data plate)	Puller no.
3101 LT	410—412	295 72 02
	440—442	249 92 02
	MT	303 60 00
	HT	344 13 00
	D	84 13 62
3126 LL	410—412	249 92 01
	LT	249 92 01
	MT	249 92 01
	HT	250, 461, 465, 467
		262, 263
		254—259
		309 39 00
		303 60 00
		84 13 62
	HS	303 58 00
	D	84 13 62

Replacing the impeller of HS 3126

Removing the impeller (HS 3126)

WARNING! Worn impellers often have very sharp edges.

Lay the pump on its side.

Remove nuts (3).

Remove lower diffuser (10).

Remove impeller screw.

Pull off the impeller by tightening screw (5) into the threaded washer (12).

Installing the impeller (HS 3126)

Make sure that the end of the shaft is clean and free of burrs. Polish off any flaws.

Grease end of shaft and impeller hub.

Press the impeller onto the shaft with the impeller screw.

Tighten the impeller screw.

Tightening torque 75 Nm (55 ft lb).

Adjusting the impeller (HS 3126)

Screw the adjusting nuts (3) down toward the bottom of the studs (4).

Press the lower diffuser (10) against the impeller.

Screw the adjusting nuts (3) so that they lie flush against the lower diffuser.

Back off all adjusting nuts another half-turn (counter-clockwise).

Place the lower nuts (3) on the studs.

Tighten the lower nuts (3) evenly all around.

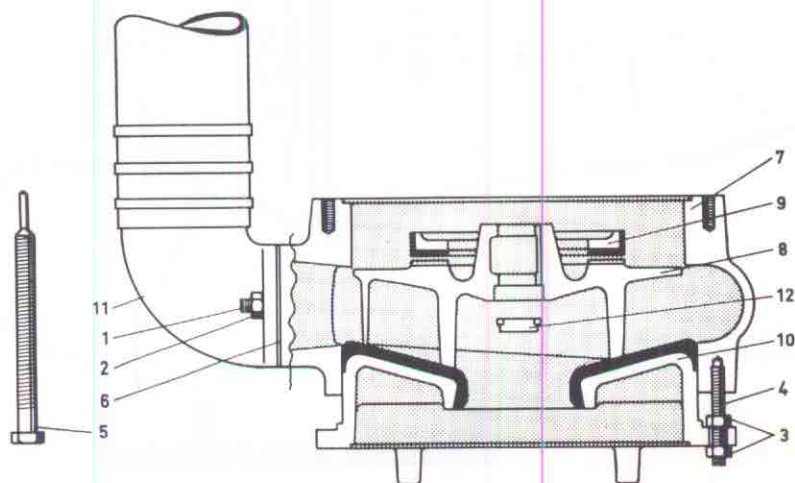
The clearance between the impeller and the lower diffuser shall be as little as possible.

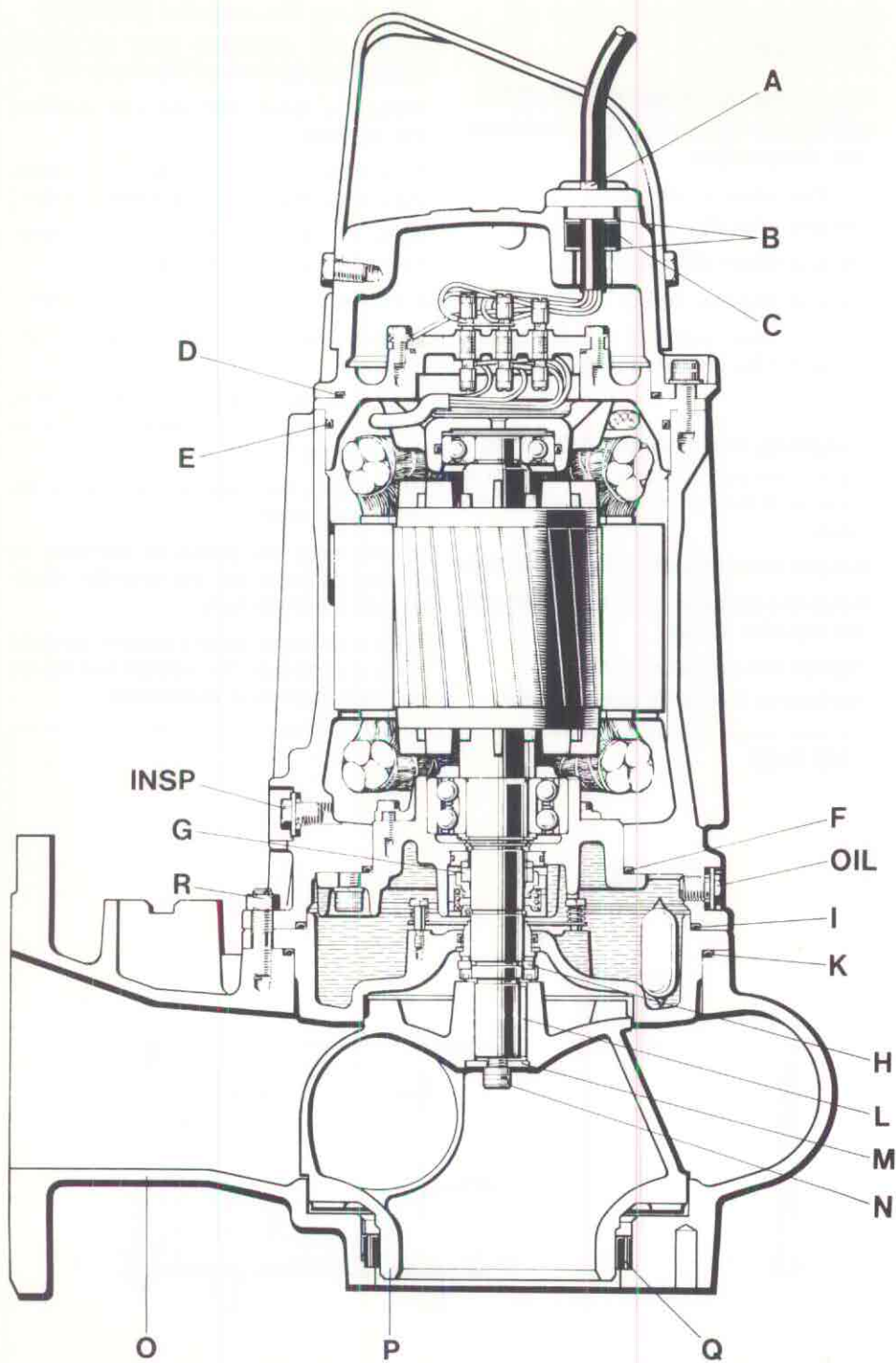
Check that the impeller can easily be rotated by hand.

In order for the pump to perform at maximum capacity, the impeller must be adjusted regularly.

More extensive repairs require special tools and should be carried out by an authorized service technician.

HS 3126





ACCESSORIES AND TOOLS

Level sensor

Flygt supplies level sensors suited for different liquid densities and with different cable lengths. See separate brochure.

Start and control equipment

Flygt has suitable start and control equipment for the pump. Contact Flygt for further information.

TOOLS

The following tools are required in order to perform the necessary care and maintenance of the pump:

Order No.	Description
84 13 87	Socket, n = 13 mm
84 13 90	Socket, n = 17 mm
84 13 92	Socket, n = 19 mm
84 14 28	Adjustable wrench
84 15 55	Extension bar
84 15 61	Swivel handle 1/2" □
84 15 66	Torque wrench, 0—137 Nm
84 16 73	Screwdriver
303 53 00	Allen key for impeller screw (3101), n = 8 mm
309 32 00	Allen key for impeller screw (3126), n = 10 mm

For impeller pullers see table page 19.

For further information on tools, see Flygt's Tool Catalogue.

FAULT TRACING (TROUBLESHOOTING)

A universal instrument (VOM), a test lamp (continuity tester) and a wiring diagram are required in order to carry out fault tracing on the electrical equipment.

Fault tracing shall be done with the power supply disconnected and locked off, except for those checks which cannot be performed without voltage.

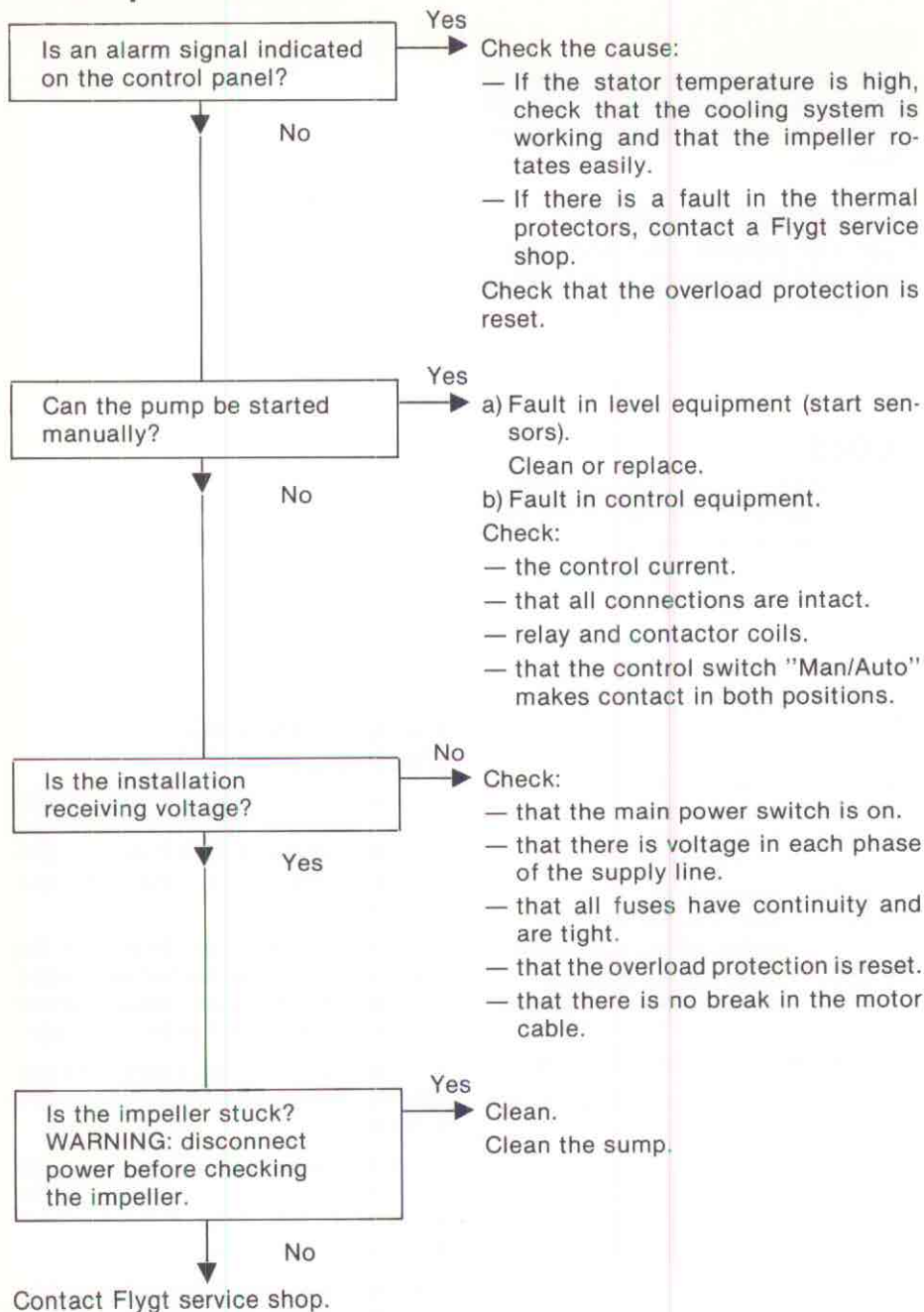
Always make sure that there is no one near the pump when the power supply is turned on.

Use the following checklist as an aid to fault tracing. It is assumed that the pump and installation have formerly functioned satisfactorily.

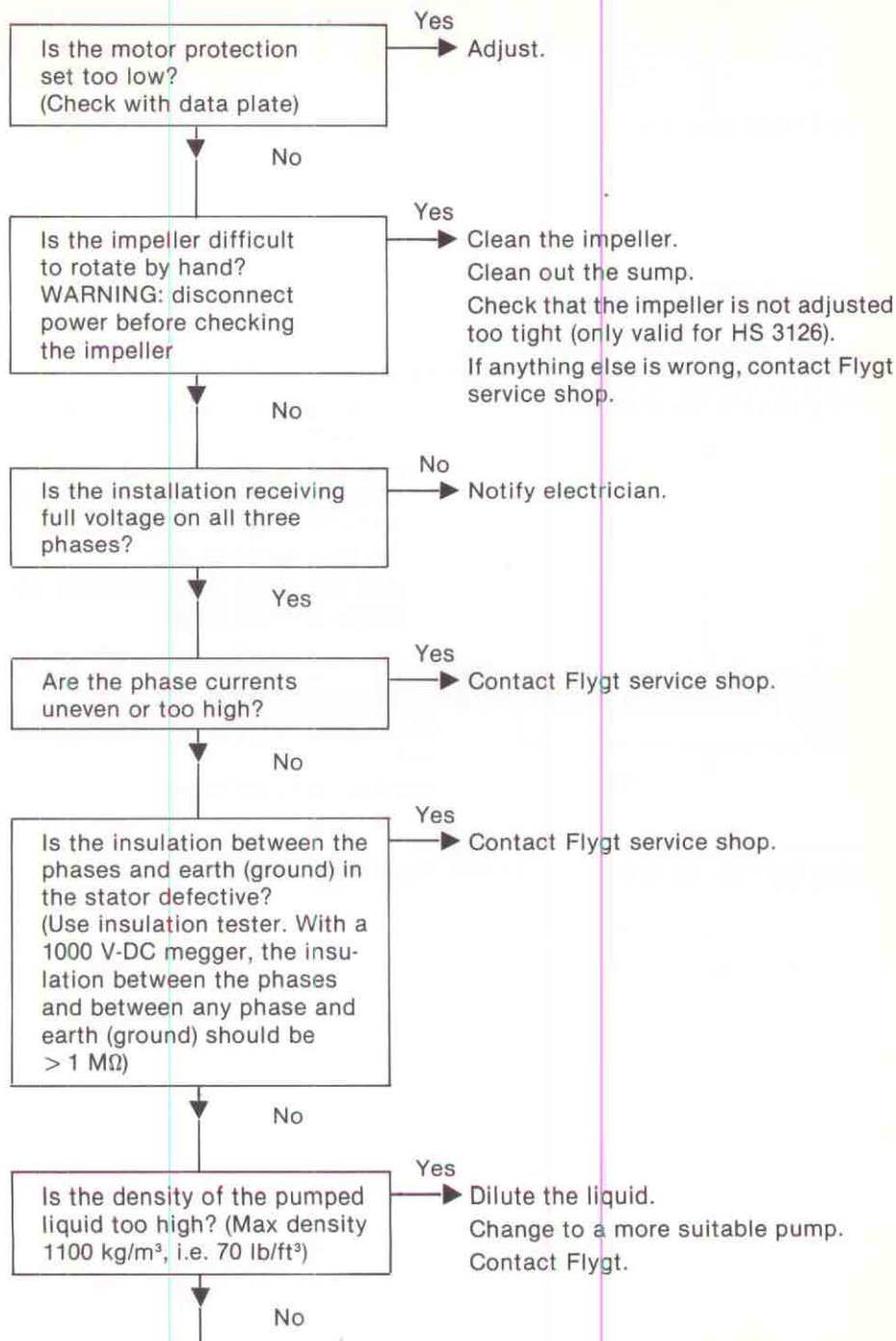
Electrical work shall be performed by an authorized electrician.

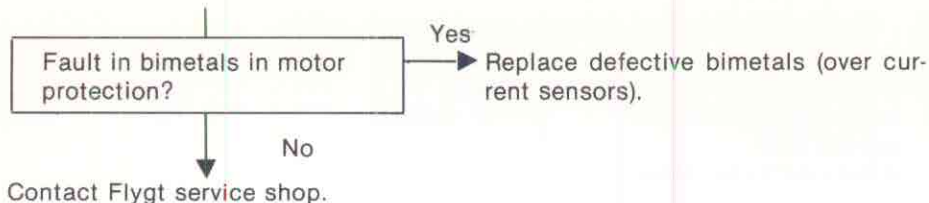
Follow local safety regulations and observe recommended safety precautions page 15.

1. Pump fails to start

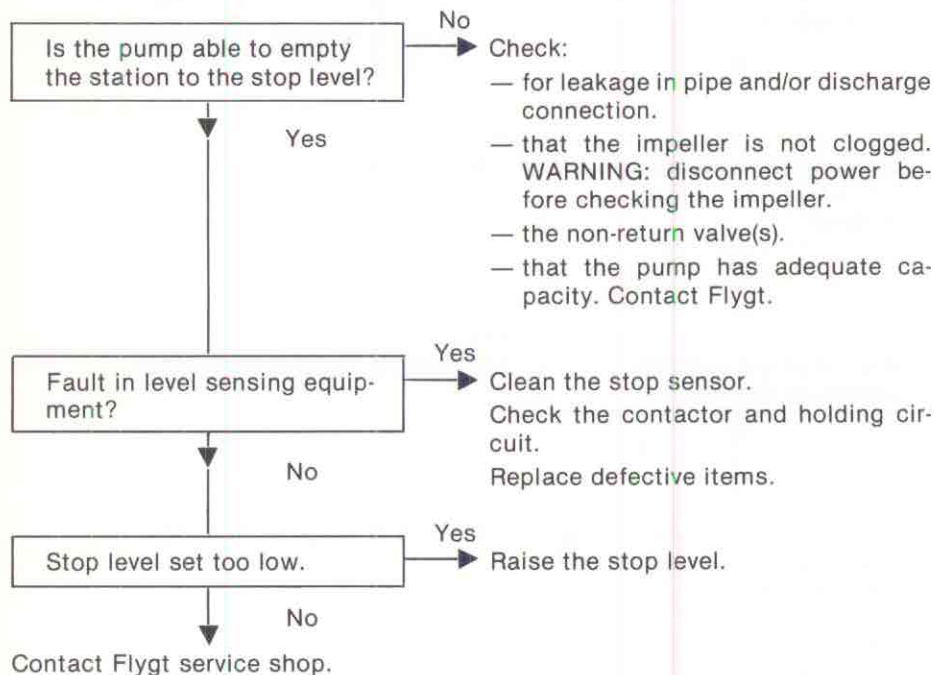


2. Pump starts but motor protection trips

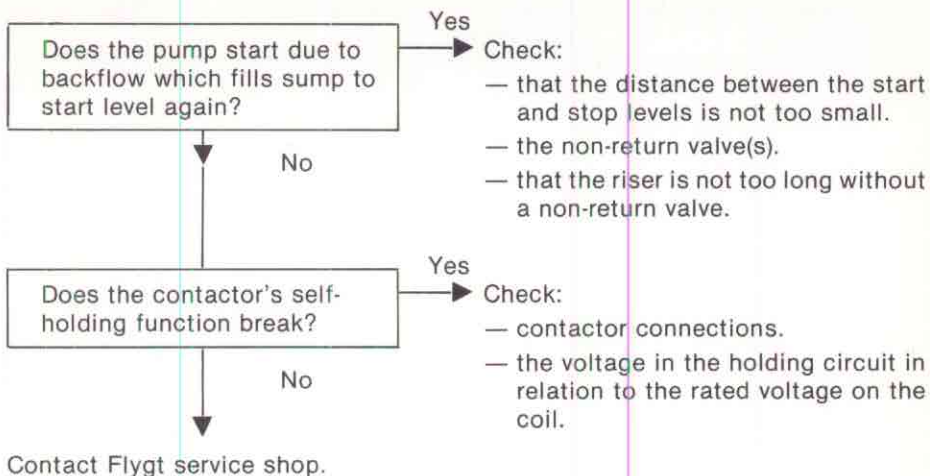




3. The pump does not stop



4. The pump starts-stops-starts in rapid sequence



5. Pump runs but delivers too little or no water

Check:

- direction of rotation of pump, see "Before starting".
- that valves are open and intact.
- that pipes, impeller and strainer are not clogged.
- that the impeller rotates easily.
- that the suction lift has not been altered.
- for leakage in the pump installation.
- for wear on wear ring, impeller, pump casing/flange, suction bottom.

See also under "Inspection".

Do not override the motor protection repeatedly if it has tripped.

Service log

Most recent service date	Pump No.	Hours of operation	Remarks	Sign.

