FLYGT

Installation, Operation and Maintenance

Mixer 4650

Flygt

ITT Industries

FLYGT

Installation, Operation and Maintenance

Mixer 4650

Overview

Table of Contents

This publication contains the following topics:

Topic

Preface

Purpose

The purpose of this manual is to give the reader information about how to install the product and its accessories.

Recipient

The manual is principally intended for ITT Flygt
- service departments *and*
- customers.

Contact

Please contact ITT Flygt documentation department if any information in this publication is
- missing
- difficult to find *or*
- irrelevant.

Reference

More information about the product and how to handle it is available in the following documents:
- Parts List
- Service and Maintenance

Safety

Overview

Table of Contents

This chapter contains the following topics:

Safety Regulations

Introduction

It is extremely important that you read, understand and follow the warnings and safety regulations carefully before handling an ITT Flygt product. They are published to help prevent

- personal accidents and health problems
- damages to the unit
- product malfunction

Reference

For ex-approved products also see Safety Regulations for Ex-approved Products in this book.

Symbols

In the ITT Flygt documentation, admonitions are used together with the denomination.

The following items describes the safety levels of the admonition symbols in combination with the denomination.

DANGER!

Indicates a hazardous situation which, if not avoided, **will** result in death or serious injury.

WARNING!

Indicates a hazardous situation which, if not avoided, **could** result in death or serious injury

CAUTION!

Indicates a hazardous situation which, if not avoided, **could** result in minor or moderate injury

NOTE!

Indicates a potential situation which, if not avoided, **could** result in undesirable results or state. Indicates a practice not related to personal injury.

Presence of a dangerous voltage.

Environment

NOTE!

All dangers due to electricity must be avoided. Therefore, pay attention to the risks due to electric shock or arc flash hazard. Also pay attention to the chemical and physical characteristics of the gas and/or vapors present in hazardous areas.

Working areas

Observe these regulations and warnings for the working areas.

- The pump/mixer station must always be kept tidy and in good order.
- If the product is used together with automatic level control, there is a risk of sudden start.
- Warning signs for rotating propellers that start automatically must be positioned visibly.

Noise level

The noise level of the products is lower than 70 dB, but in some installations and at certain operating points on the performance curve the noise level of 70 dB may be exceeded.

Distance to wet areas

When pumping or mixing near a lake or similar (e.g. jetties, beaches, ponds, fountains) there must be a safety distance of at least 20 m (65 ft) between the person and the product if the person is in contact with the pumped or mixed media.

The pump or mixer must never be placed directly into a swimming pool. If the product is intended to be used in connection with swimming pools, special safety regulations apply.

Connections

Make sure that the

- product is isolated from the power supply and cannot be energized before starting work on it. This applies to the control circuit as well.
- thermal contacts are connected to a protection circuit intended for that purpose according to the products approval.
- cable and cable entry have not been damaged during the transportation before the unit is installed.

Intrinsically safe circuits are normally required for the automatic level control system by level regulator if mounted in zone 0.

Earth connection

Observe these regulations and warnings for earth connections.

- All electric equipment must be earthed.
  This applies to pumps and mixers as well as to monitoring equipment.
- Make sure that the earth conductor is correctly connected by testing it.
  Failure to heed this warning may cause fatal accident.
- If persons are likely to come into physical contact with the product or media, e.g. on construction sites and farms, the earthed socket must have an additional earth fault protection device connected to it.
- The earth conductor shall always be longer than the phase conductor. **Rationale:** If the motor cable is jerked loose by mistake, the earth conductor shall be the last conductor to be disconnected from its terminal. This applies to both ends of the cable.

Recycling

Laws and regulations regarding recycling must be followed. If there are no laws or regulations, or the product is not accepted by an authorized recycling company, the product or it's parts can be returned to the nearest Flygt sales company or service workshop.

Disposal of waste

All waste and emissions such as used coolant must be appropriately disposed of.

- Coolant spills must be cleaned up.
- Emissions to the environment must be reported.

Reference

For electrical installation requirements, consult your local electric utility.

User Health and Safety

NOTE!

In order to minimize the risk of accidents, the following safety rules and local regulations must be followed.

Precautions before working

Observe the following safety precautions before working with the product:

- Make sure that the product cannot roll or fall over and injure people or damage property.
- Use lifting harness, safety line and a respirator as required.
- Make sure that the lifting equipment is in good condition.
- Provide a suitable barrier around the work area, e.g a guard rail.
- Make sure you have a clear path of retreat.
- Make sure there are no poisonous gases within the work area.
- A first-aid kit must be close at hand.

Precautions when working

Observe the following safety precautions when working with the product:

- Never work alone.
- Use safety helmet, safety goggles and protective shoes and gloves.
- Make sure that the product has been thoroughly cleaned and rinse the components in water after dismantling.
- Stay clear of suspended loads.
- Always lift the product by its lifting device – never by the motor cable or the hose.
- Watch out for the starting jerk, which may be powerful.
- Check the explosion risk before welding or using electric hand tools.

Risks: Bear in mind the risk of:

- Drowning
- Electrical accidents
- Burn injuries

Health rules

The product 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 product:

- All personnel who work with sewage systems must be vaccinated against diseases to which they may be exposed.
- Observe strict cleanliness.
- Always wear goggles and protective gloves.
- Rinse the product thoroughly with clean water before starting work.

Emergency instruction: Chemicals in eyes

Follow these steps if hazardous chemicals have splashed into your eyes.

Step	Action
1	Hold your eyelids apart with your fingers and rinse your eyes immediately in running water for 15 minutes.
2	Contact an eye specialist.

Emergency instruction: Chemicals on body

Follow these steps if hazardous chemicals have splashed on your body.

Step	Action
1	Remove contaminated clothes.
2	Wash your skin with soap and water.
3	If required, seek medical attention.

Safety Regulations for Ex-Approved Products

Qualification of personnel

All work on an Ex-approved product must be carried out by certified electricians and by ITT Flygt authorized mechanics.

NOTE!

Special rules apply to installation in explosive atmosphere. ITT Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.

Working areas

WARNING!

Only Ex-approved products may be used in an explosive or flammable environment!

Observe these regulations and warnings for the working areas.

- FM approved products must not be installed in locations classified as hazardous in accordance with the national electric code, ANSI/NFPA 70–2005.
- ATEX approved equipment must be installed in conformity to international, national and local standards (IEC/EN 60079–14).
- Do not open the product while energized or in an explosive gas atmosphere.
- The user must know about the risks due to the existence of electric current and the chemical and physical characteristics of the gas and/or vapour present in hazardous areas.
- Before start working on the product, make sure that the product and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.

Minimum water level

See the dimensional drawing of the product for minimum permitted water level according to the ATEX approval.

The product must run fully submerged. Level sensing equipment should be installed if the product could be operated at less than the minimum submergence depth, see dimensional drawing.

Regulations concerning the equipment

Observe these regulations and warnings before working on the product or the equipment.

- ATEX approved equipment must be installed in conformity to international, national and local standards (IEC/EN 60079–14).
- The maintenance operation of ATEX approved equipment must be made in conformity to the international, national and local standards (IEC/EN 60070–17).
- According to the ATEX directive, the Ex-product must never run dry or snore during normal operation. Dry running during service and inspection is only permitted outside the Ex area.
- Thermal contacts must be connected to a protection circuit according to the approval of the product.
- The product may be used only in accordance with the approved motor data stated on the data plates.
- Intrinsically safe circuits are normally required for the automatic level control system by level regulator if mounted in zone 0.

- Yield stress of fasteners according to ATEX approval and approval drawing.

Legal Issues

Overview

NOTE!

The purpose of this chapter is to give the reader an overview of legal issues such as standards, approvals and warranty of a product in general. For individual product approval information, see approval plate on the product or Declaration of Conformity.

Table of Contents

This chapter contains the following topics:

Approvals

Standard design

All products are approved according to CSA standards in Canada and UL standards in USA.

The drive unit degree of protection follows IP68, see dataplate for max. submersion, according to standard IEC 60529.

All electrical ratings and performance of the motors comply with IEC 60034-1.

Explosion-proof design

All explosion-proof products for use in explosive environments are designed in accordance with one or more of the following approvals:

- EN, ATEX Directive 94/9/EC, or/and
- FM According to NEC
  Class 1 Div 1 Groups “C” and “D”
  Class 2 Div 1 Groups “E”, “F”, and “G”
  Class 3 Div 1 Hazardous Locations

Warranty

Qualification of personnel

All work on the product, standard or explosion-proof, must be carried out by certified electricians and ITT Flygt-authorized mechanics.

ITT Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.

Modification and spare parts

Modifications or changes to the product/installation should only be carried out after consulting with ITT Flygt.

Original spare parts and accessories authorized by ITT Flygt are essential for compliance. The use of other parts

- can invalidate any claims for warranty or compensation *or*
- jeopardize explosion proof approvals.

NOTE!

Only ex-approved spare parts and accessories authorized by ITT Flygt are allowed in ex-approved products.

Warranty claim

For warranty claim, contact your ITT Flygt representative.

Practical Information

Overview

Table of Contents

This chapter contains the following topics:

Data Plate Interpretation

Introduction

The ITT Flygt product is always provided with data plates:

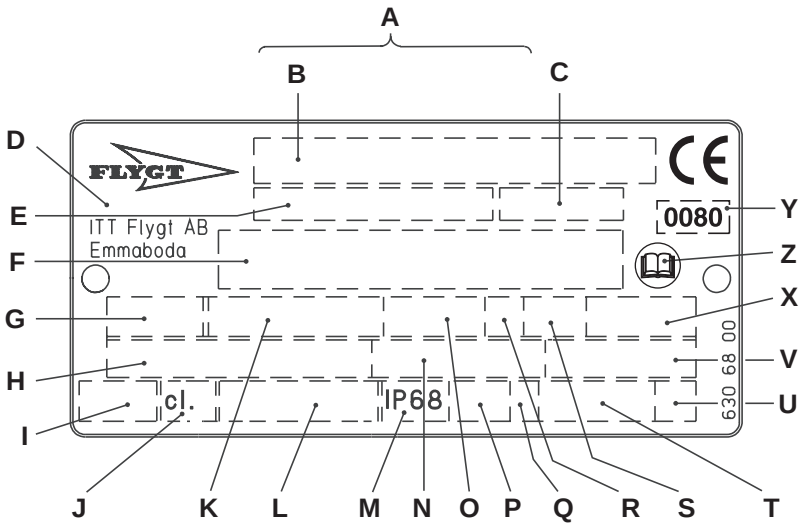
- The general data plate is used on all products.
- The approval plate is added to all explosion proof products.

Data Plate

The product may only be operated within the parameters stated on the data plate.

Illustration

This is an illustration of a general data plate.



Field description

This table shows the fields on the general data plate, and which information each field contains.

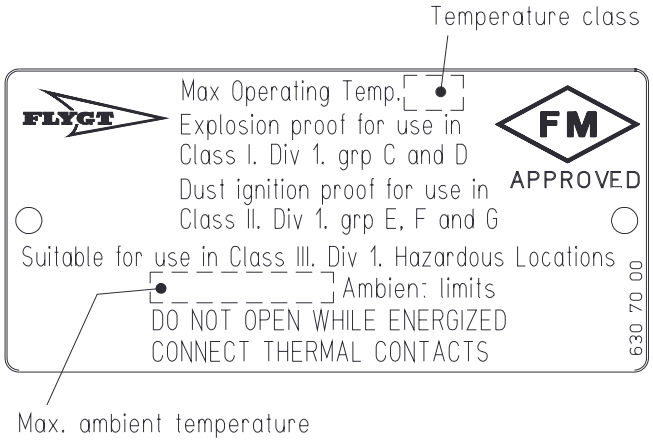
Field	Description	Field	Description
A	Serial number	N	Rated current
B	Product code	O	Rated speed
C	Curve code + number	P	Maximal submersion
D	Country of origin	Q	Direction of rotation: • L = Left • R = Right
E	Product number	R	Duty class
F	Additional information	S	Duty factor
G	Phase; type of current, frequency	T	Product weight
H	Rated voltage	U	Locked rotor code letter

Field	Description	Field	Description
I	Thermal protection	V	Power factor
J	Thermal class	X	Maximal ambient temperature
K	Rated shaft power	Y	Notified body (only for EN-approved Ex-products)
L	International standard	Z	Read Installation Manual
M	Degree of protection		

Approval Plate – FM approved version

Illustration

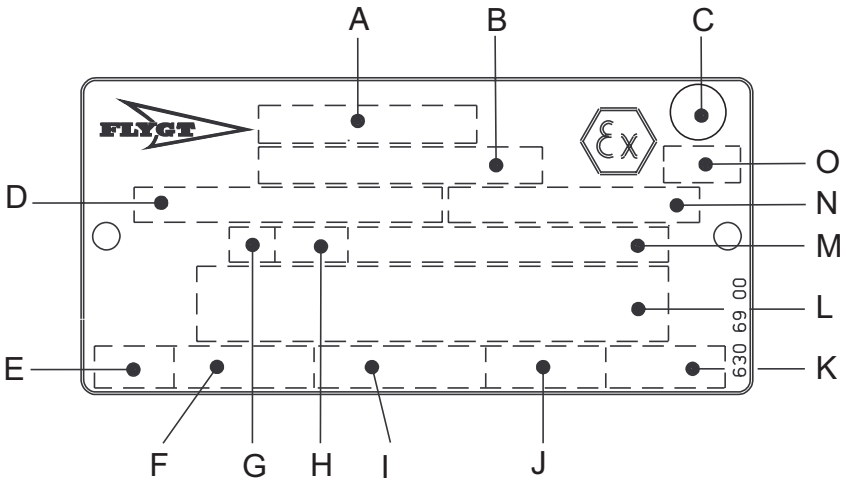
This is an illustration of an approval plate for the FM approved product version.



Approval Plate – EN approved version

Illustration

This is an illustration of an approval plate for the EN approved product version.



Field description

This table shows the fields on the approval plate.

Field	Description	Field	Description
A	Approval	I	Input power
B	Approval authority + Approval Number	J	Rated speed
C	Approval for Class 1	K	Controller
D	Approved drive unit	L	Additional information
E	Stall time	M	Max. ambient temperature
F	Starting current / Rated current	N	Serial number
G	Duty class	O	ATEX marking
H	Duty factor	—	—

Approval

The approval for the European version according to ATEX Directive 94/9/EC is shown on the Approval Plate with one of the following information:

Ex IM2 EEx de I

Ex IM2 EEx dI

Ex II2G EEx de IIB T3

Ex II2G EEx d IIB T3

Ex II2G EEx d IIB T4

Cable entry: The approval for the cable entry has the following certificate number:

INERIS 02ATEX 9008 U

Ex II 2 G or IM2 EEx dIIC or EEx dI

Product Identity

Sales denomination

The products identity is built up of the Sales Code (four digit) and two letters indicating hydraulic end and type of installation.

This is an example of a sales denomination.

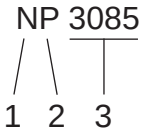


Table: This table explains what the letters and the numbers in the sales code stand for.

Code Position	Gives information about the...
1	hydraulic part
2	installation mode
3	sales code

Product code

In each range the product´s identity, Product Code, is made up of seven digits.

This is an example of a product code.

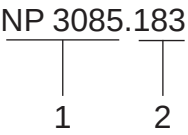


Table: This table explains what the product code is made up of:

Code position	Gives information about the ...
1	sales denomination
2	version

Serial number

The serial number is used for identification of an individual pump/mixer.

This is an example of a serial number

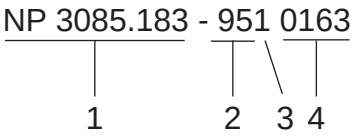


Table: This table explains what the serial number is made up of:

Product code position	Gives information about the ...
1	product code
2	production year
3	production cycle
4	running number

Order parts

Order

When order spare parts, state serial number of the product, spare part number and quantity.

Requirements

Genuine ITT Flygt parts must always be used for repairs if the product is to fulfill requirements and obtain official approval.

Qualification of personnel

Only ITT Flygt or Flygt-authorized service personnel may undertake repair work on Ex-approved products.

Dimensional drawings

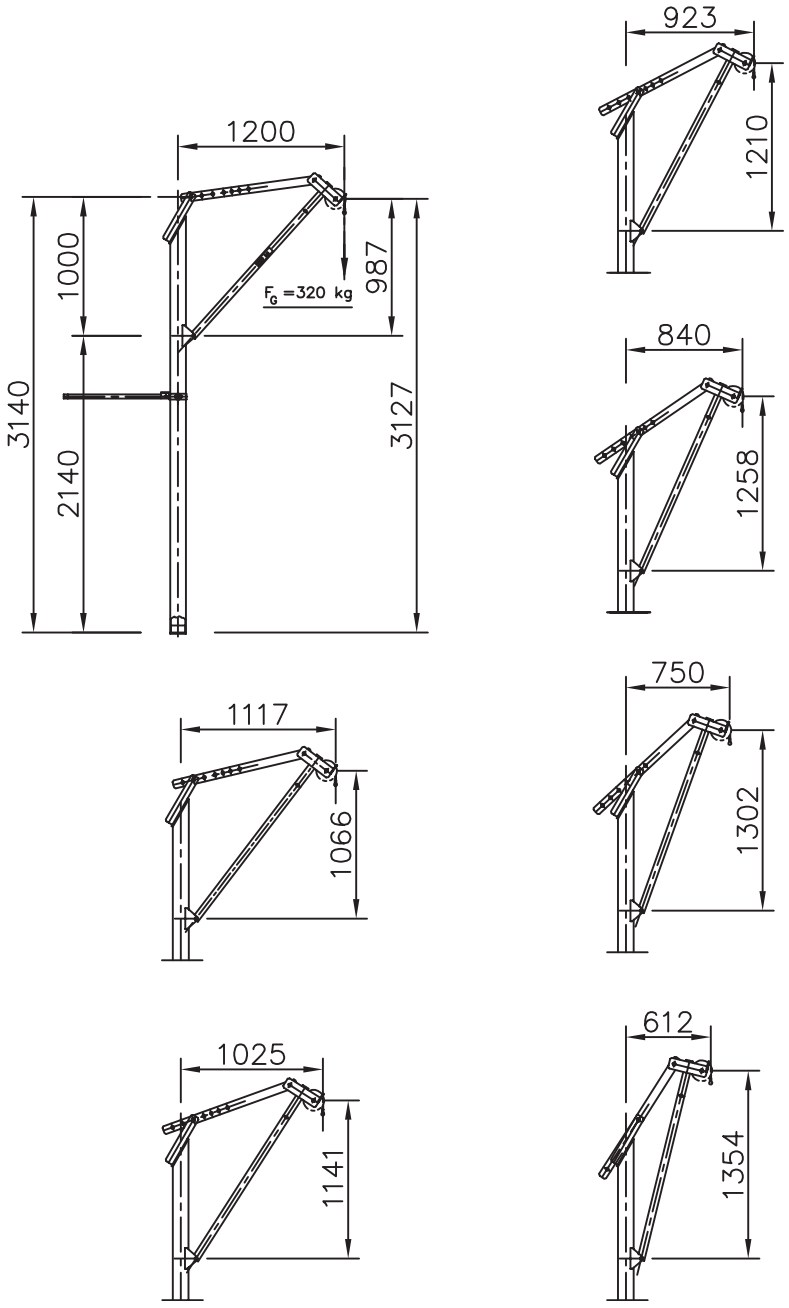
Overview

Table of Contents

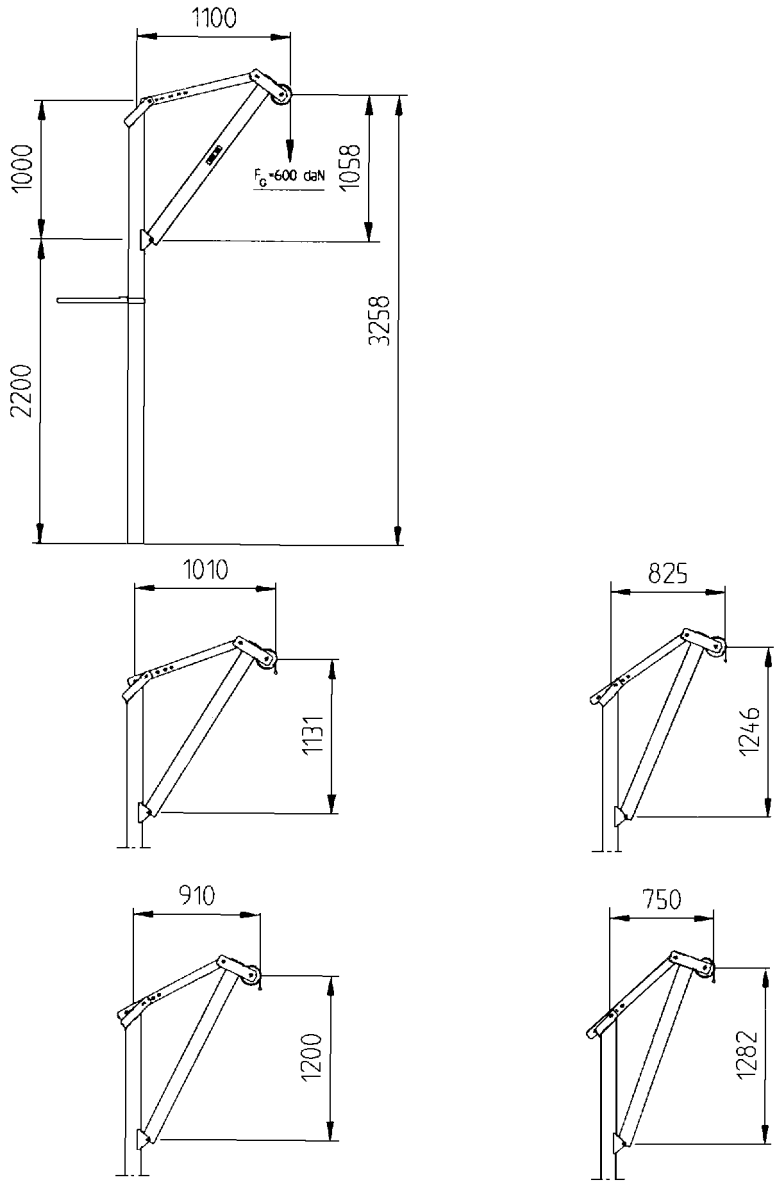
This chapter contains the following topics:

Lifting Davit

Davit 320



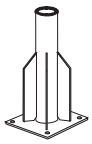
Davit 600

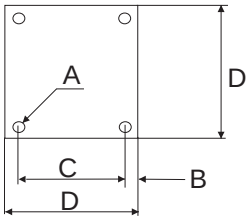

1100
1000
1058
F_G =600 daN
3258
2200
1010
1131
825
1246
910
1200
750
1282

Measurements for Brackets

Single Guide Bar System

Davit holder — floor mounted

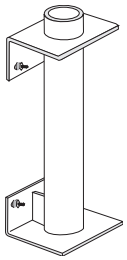


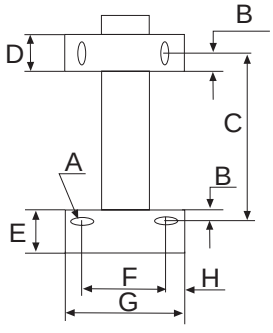


This table shows how to position the floor mounted davit holder.

Position	A	B	C	D
Guide bar system	**Dimension** (mm)			
50x50 100x50	Ø14	15	150	180
100x100 150x100	Ø18	20	300	340

Davit holder — wall mounted

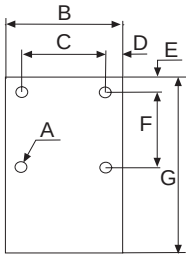




This table shows how to position the wall mounted davit holder.

Posi-tion	A	B	C	D	E	F	G	H
Guide bar sys-tem	**Dimension** (mm)							
50x50 100x50	Ø14	27	300	70	60	155	210	27,5
100x100 150x100	Ø18	50	600	100	110	190	260	35

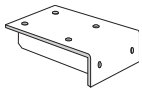
Upper bracket

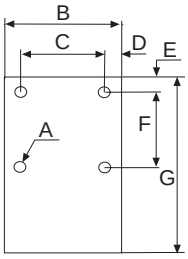


This table shows how to position the upper bracket.

Position	A	B	C	D	E	F
Guide bar system	**Dimension** (mm)					
50x50 100x50	Ø14	43	70	155	210	27,5
100x100 150x100	Ø18	50	100	190	260	35

Upper bracket — under floor alternative

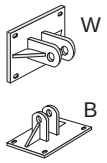


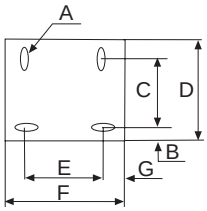


This table shows how to position the upper bracket when mounted under floor.

Position	A	B	C	D	E	F	G
Guide bar system	**Dimension** (mm)						
50x50 100x50	Ø15	190	150	20	15	150	275
100x100 150x100	Ø19	230	190	20	20	190	335

Lower bracket





W = bracket fixed to the wall.

B = Bracket fixed to the bottom.

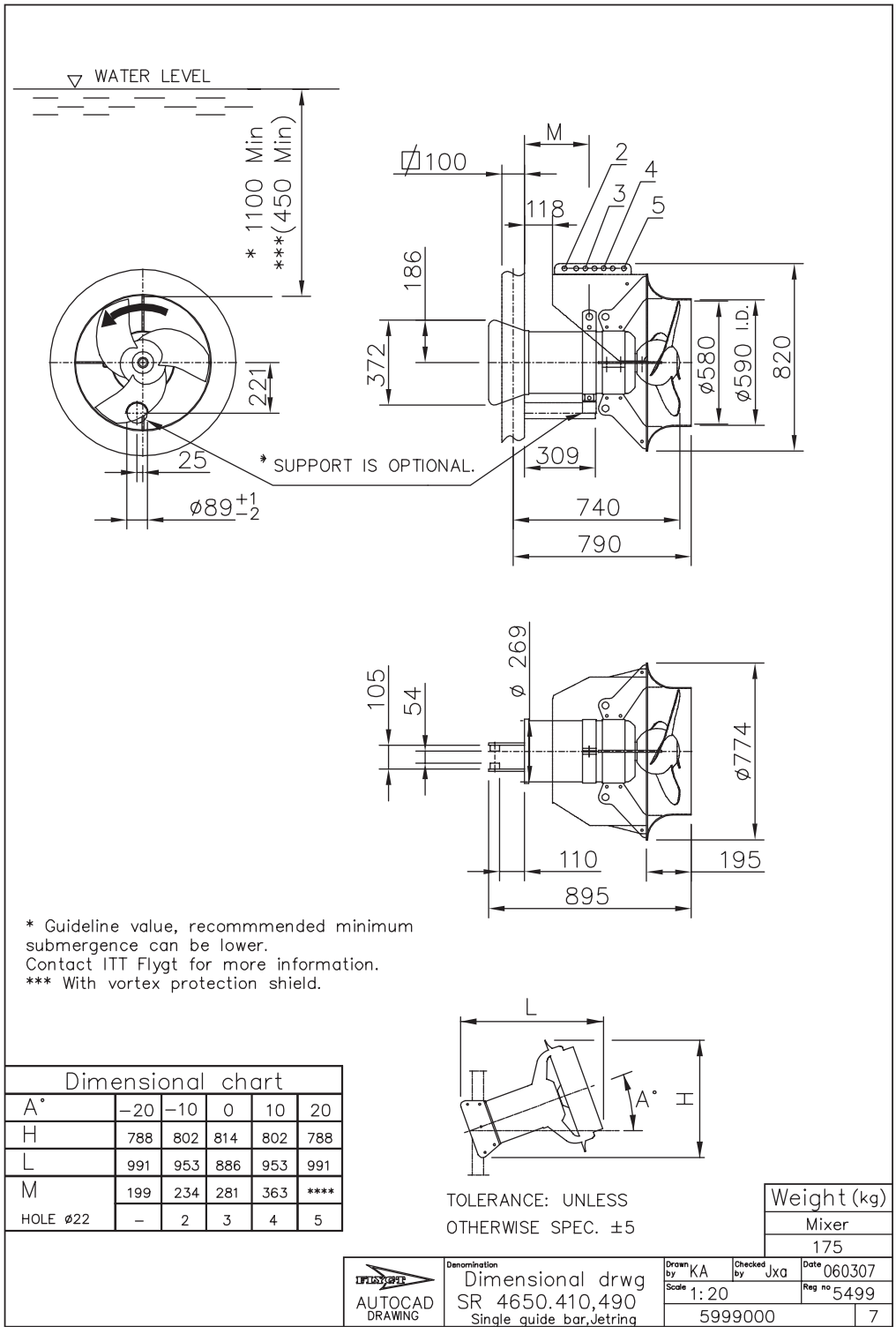
This table shows how to position the lower bracket.

Position	A	B	C	D	E	F	G
Guide bar system	**Dimension** (mm)						
50x50 100x50	Ø14	15	147,5	190	160	215	27,5

100x100 150x100	Ø18	25	185	250	200	290	45

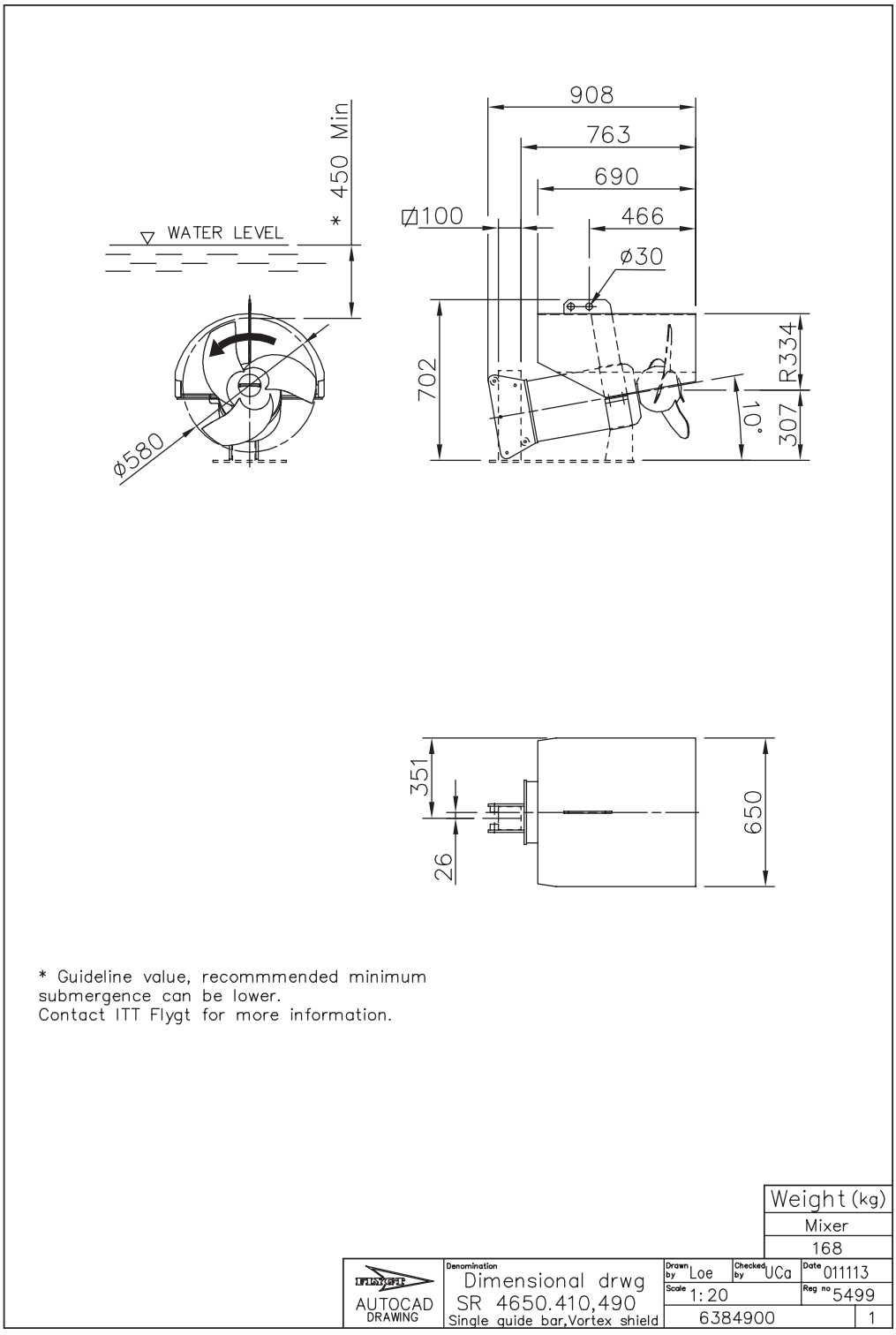
Mixer

Single Guide Bar With Jet Ring

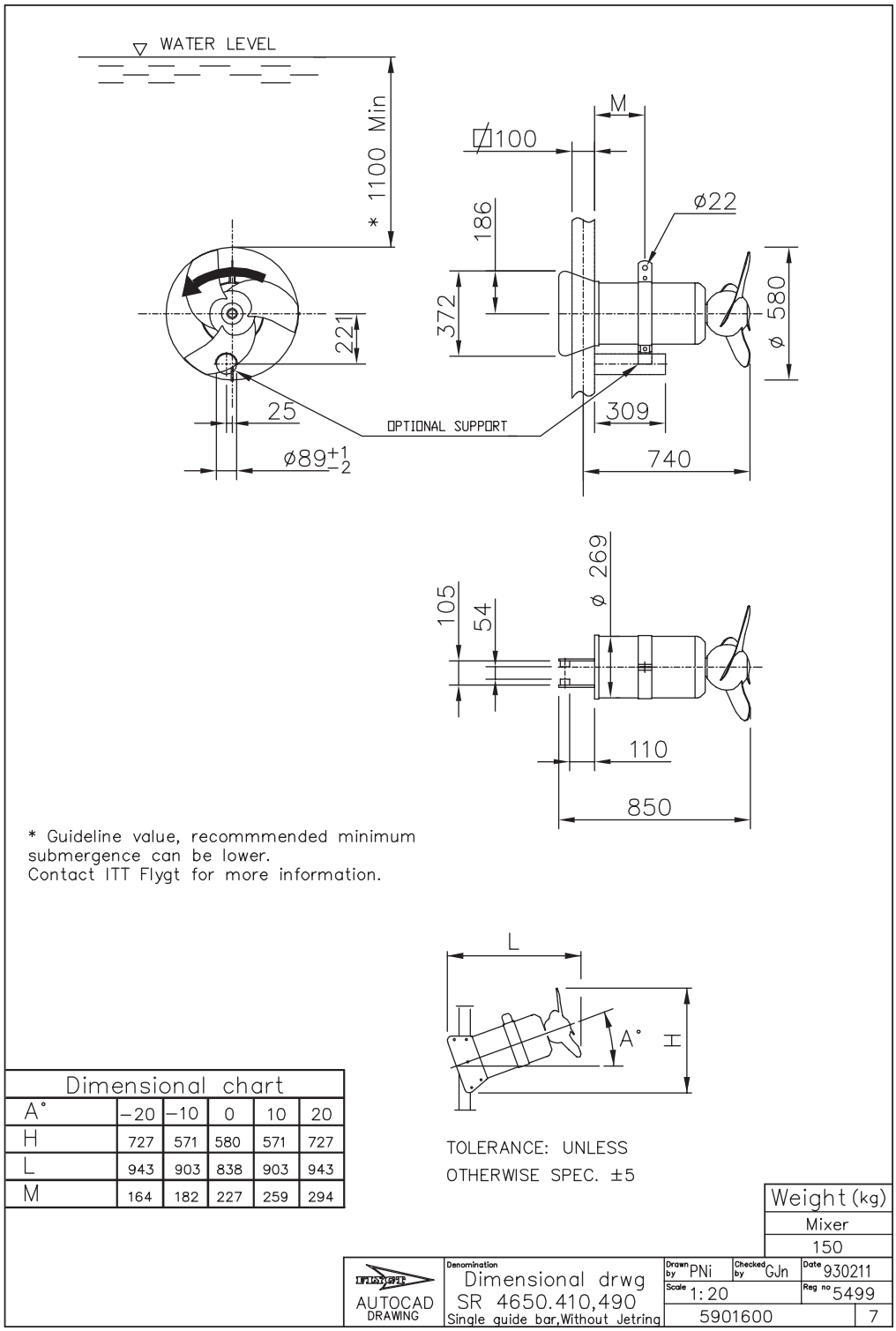


Dimensional chart					
A°	−20	−10	0	10	20
H	788	802	814	802	788
L	991	953	886	953	991
M	199	234	281	363	****
HOLE ø22	–	2	3	4	5

Single Guide Bar With Vortex Shield

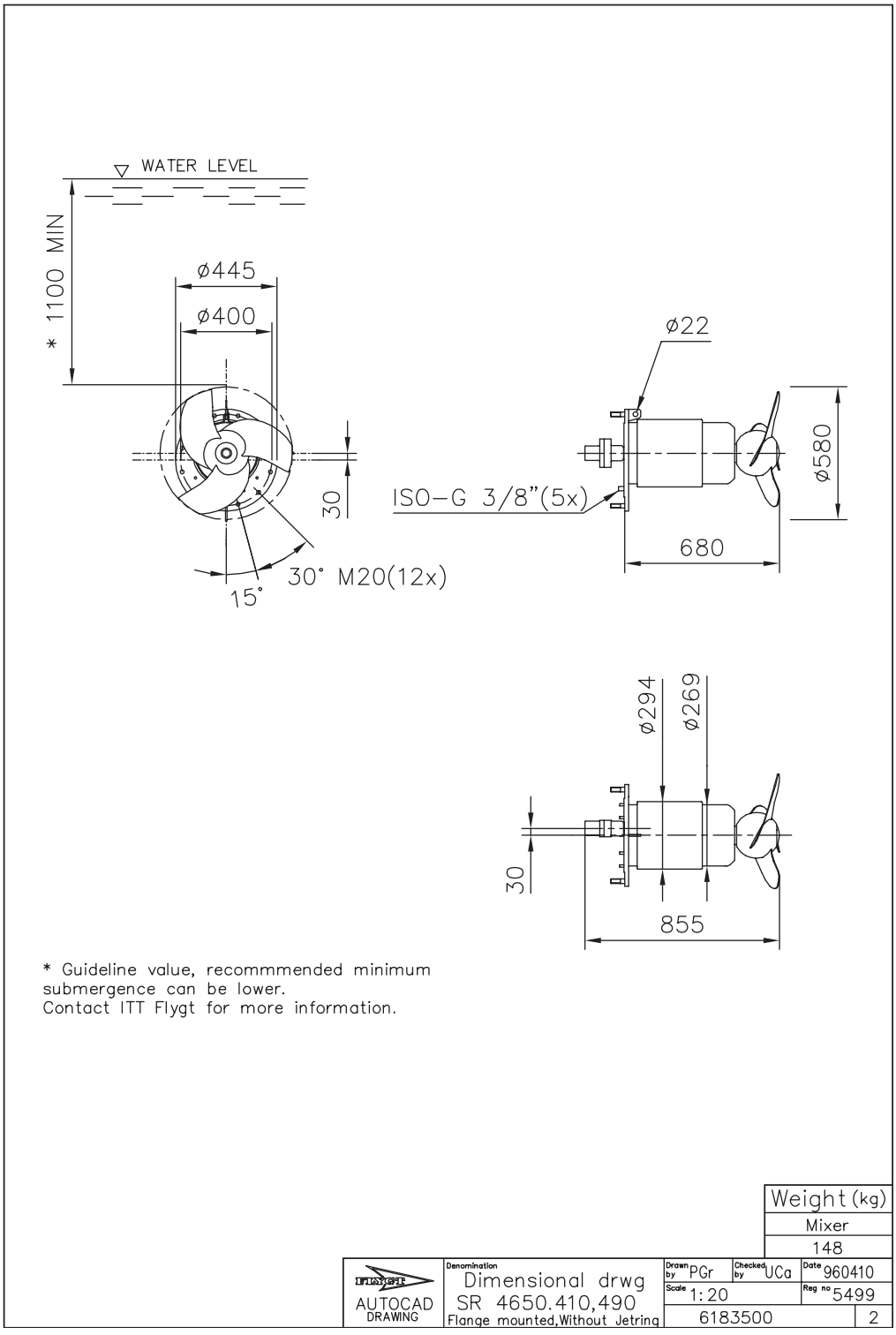


Single Guide Bar Without Jet Ring

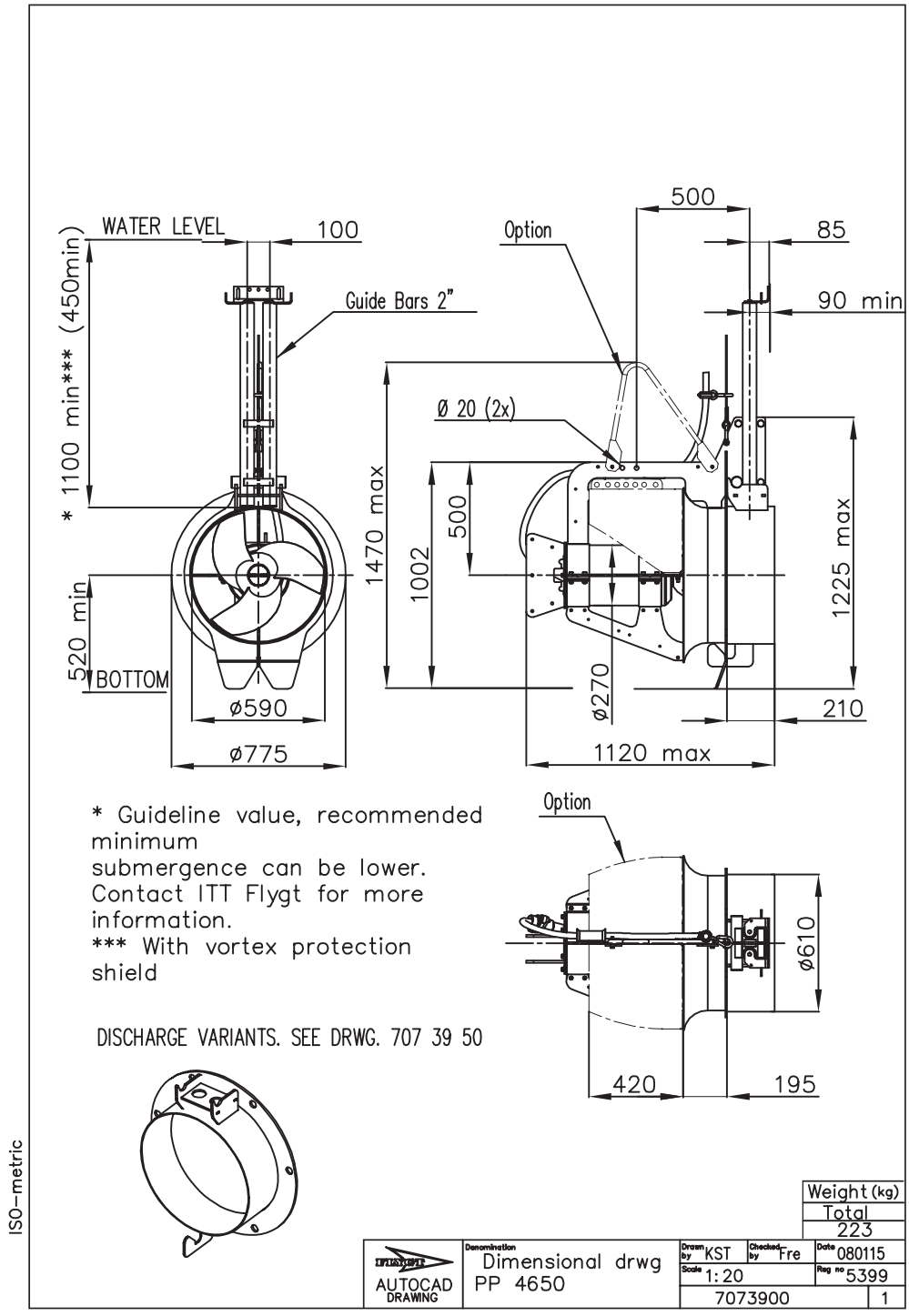


Dimensional chart					
A°	−20	−10	0	10	20
H	727	571	580	571	727
L	943	903	838	903	943
M	164	182	227	259	294

Flange Mounting



PP Installation



Install Lifting System

Overview

Introduction

This chapter describes how to mount the lifting system.

Table of Contents

This chapter contains the following topics:

EU Declaration of Conformity

Lifting system

This is a EU declaration of conformity valid for lifting davits.

FLYGT
An ITT Industries company

EU declaration of conformity

Manufacturer: Company name: **ITT Flygt AB**
Address: **S-361 80 EMMABODA** Telephone: **+46 471 24 70 00**
SWEDEN

Hereby certify that:

Davit:

Type:	Part number:
150 kg	623 11 00/01 + 622 98 00/01 / 623 04 00/01
300 kg	624 27 00/01 + 623 55 00/03 / 623 59 00/01
320 kg	624 26 00/01 + 623 55 00/03 / 623 59 00/01
600 kg	624 28 00/01 + 623 55 00/03 / 623 59 00/01

- has been manufactured in accordance with the COUNCIL'S DIRECTIVE concerning convergence of the legislation of Member States with regard to Machinery (98/37/EC (89/392/EEC) + 91/368/EEC + 93/44/EEC + 93/68/EEC), EMC (89/336/EEC).
- has been manufactured in accordance with the following harmonized standards and technical spec. EN 292/1, EN 292/2.
- National standard DIN 15018 Teil 1, DIN 15020 Blatt 1+2, DIN 15021, VBG 8, VBG 9, VGB 9a (Davit 300, 320, 600 kg).
- National standard NF E 52110 (Davit 150 kg).

Title: Technical Manager Name: Peter Uvemo

Company name: **ITT Flygt AB** Signature: Peter Uvemo Date: 2003-09-15

Reference

The EU declaration of conformity valid for machines is attached separately together with the machine.

Mount Lifting Davit

Introduction

This section describes how to mount the lifting davit.

The instruction is a general description which includes lifting davit 300, 320 and 600 and illustrations shall bee seen as examples of the davits.

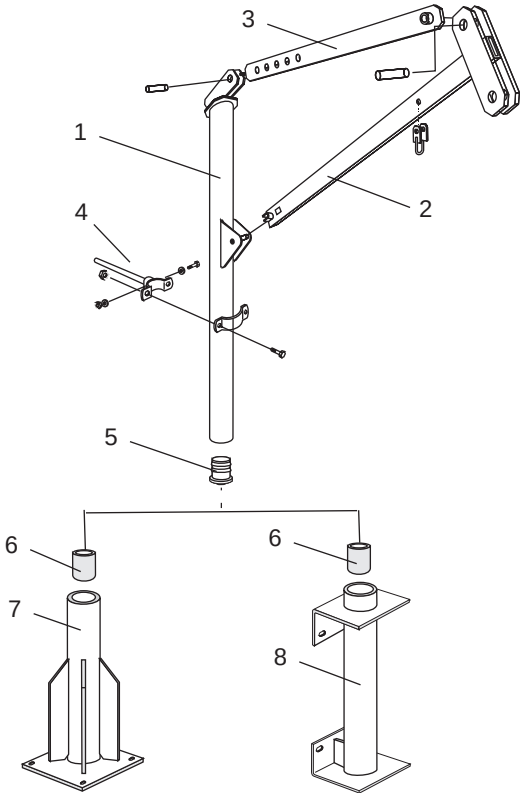
For measurements, see Dimensional Drawings.

NOTE!

All mounting to the floor shall be made with **chemical anchor bolts** from ITT Flygt.

Lifting Davit 300, 320 & 600

This is an illustration of a Lifting Davit.

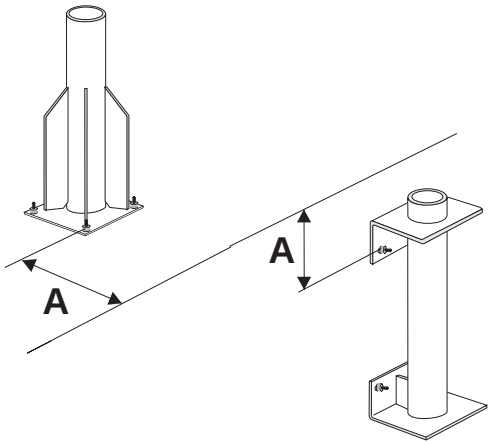
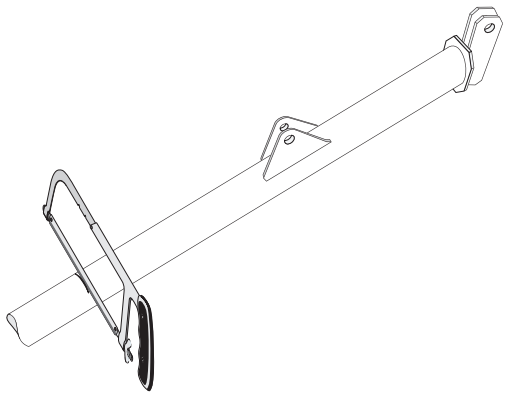


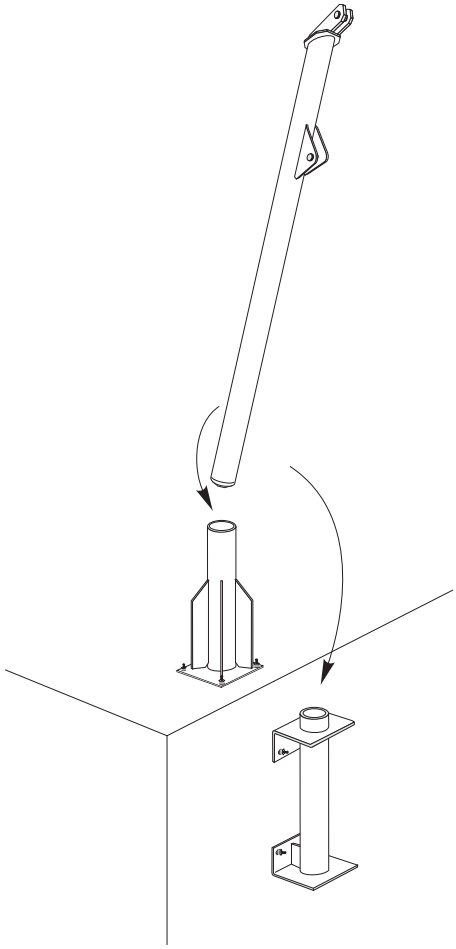
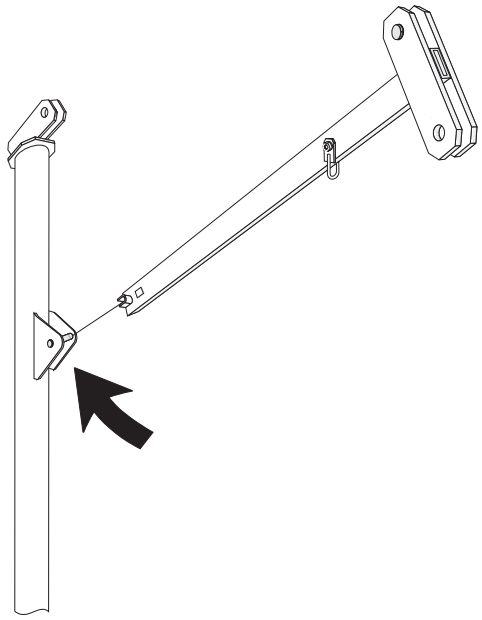
List: This is a list of the parts of the lifting davit:

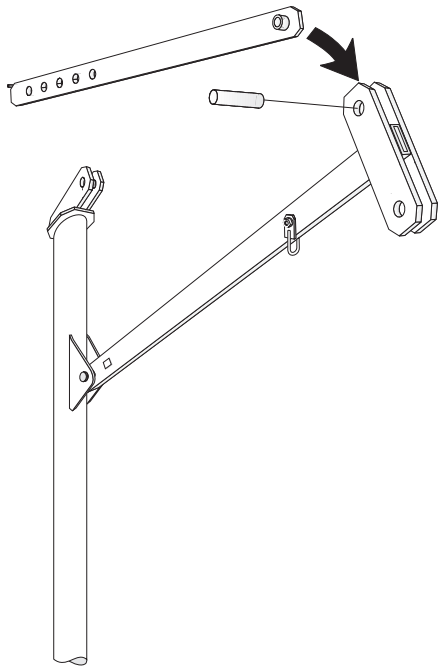
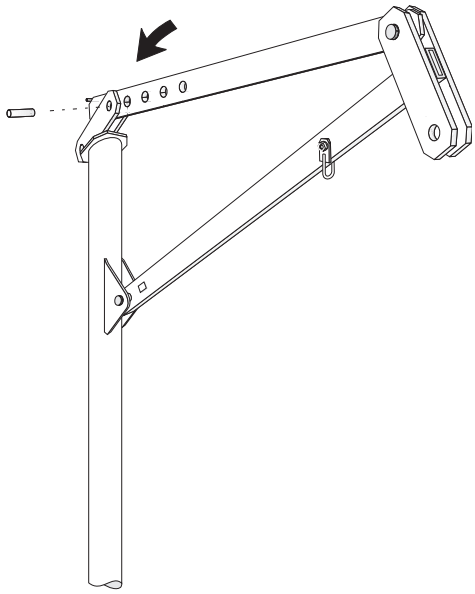
1. Lifting davit pipe
2. Lifting davit unit
3. Lock plate unit
4. Operating bar
5. Sleeve
6. Sleeve
7. Davit holder, floor mounted
8. Davit holder, wall mounted

Instruction

Follow these steps to mount the Lifting Davit; 300, 320 or 600.

Step	Action	Illustration
1	• Position the davit holder. A = Minimum distance 65 mm, recommended 125 mm. • Fasten the davit holder with chemical anchors. Maximum torque = 60 Nm.	
2	**If required:** Adjust the pipe to proper length. Remove the sleeve and cut the pipe. Reassemble the sleeve.	

Step	Action	Illustration
3	• Check that the sleeves are positioned at the pipe end and at the top of the davit holder • Fit the lifting davit pipe unit in the davit holder.	
4	Fit the lifting davit unit onto the bracket. Secure the unit with a pin.	

Step	Action	Illustration
5	Fix the lifting davit unit and the lock plate unit together with a pin and secure it.	
6	Choose a suitable hole in the lock plate unit and fit it with the davit pipe. Secure the unit with a pin.	

Mount Lifting Equipment

Introduction

This section describes how to mount the lifting equipment such as winch, chain, block and tackle to the lifting davit.

NOTE!

All mounting to the floor shall be made with **chemical anchor bolts** from ITT Flygt.

The winch may be mounted to the

- davit pipe *or*
- davit unit

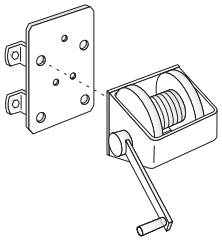
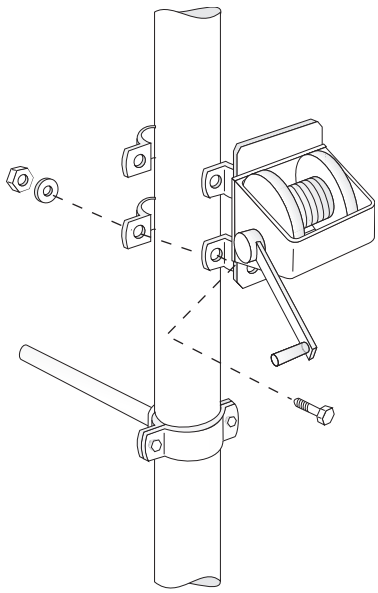
Maximum load — winch

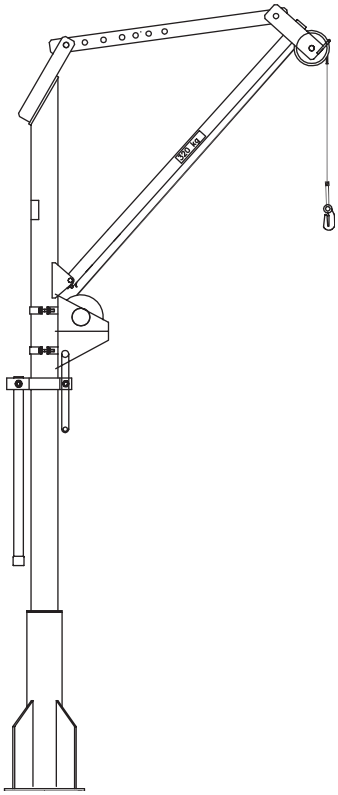
The winch have a maximum load of 320 kg.

For each winch there is a purpose–made winch bracket.

Instruction

Follow these steps to mount the lifting equipment to the davit.

Step	Action	Illustration
1	Fit the winch to the bracket by using the provided bolts. **Check** that the “top” and “bottom” marks are correctly positioned.	
2	Fit the winch to the davit pipe or the davit unit in a suitable position where the height setting is easily adjustable. **Check** • that the center of the drum is in line with the center line of the davit arm. Lock it in position on the davit pipe by using the clamping nuts. • that the winding handle is on the right side.	

Step	Action	Illustration
3	Place the cord pulley or block and tackle in position. **Check** that the handling chain or wire is vertical.	

Chain, Block and Tackle

This table shows the available lengths and maximum loads.

Lifting equipment	**Maximum load** **Kg**	**Available lengths** **m**
Calibrated lifting chain	500	5, 9 or 20
Chain links with hook and shackle	500	0.75
Corner block	400	
Block and tackle	500	

Install Guide Bar System

Overview

Introduction

This chapter describes how to install the guide bar systems.

NOTE!

All mounting to the floor shall be made with **chemical anchor bolts** from ITT Flygt.

Table of Contents

This chapter contains the following topics:

Mount Single Guide Bar system

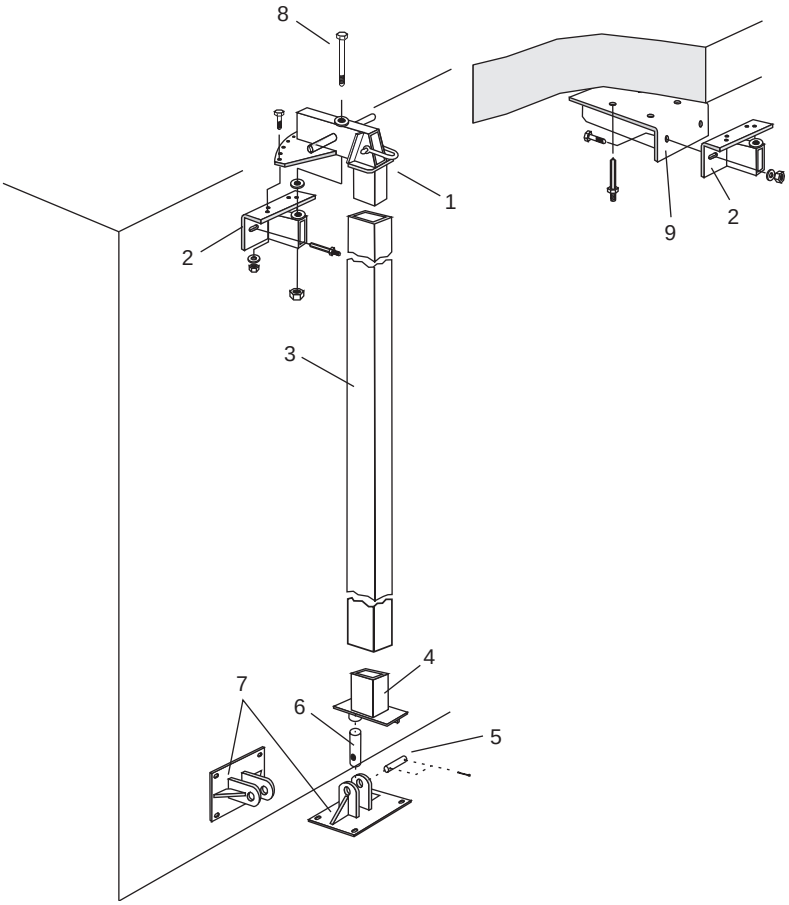
Introduction

This chapter describes how to install a single guide bar system with or without intermediate support.

Mount without intermediate support

Illustration

This is an illustration of a single guide bar system up to 6 m, without intermediate support.



List: This is a list of the general parts of the single guide bar system without intermediate support:

1. Upper guide
2. Upper bracket
3. Guide bar
4. Lower guide
5. Lower bracket pin
6. Lower guide pin

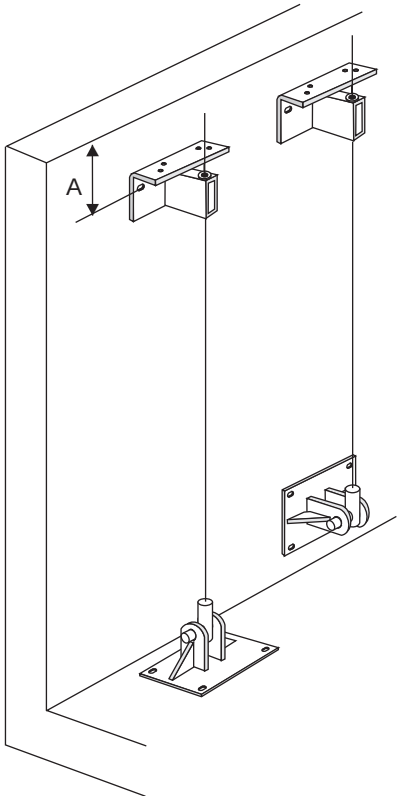
7. Lower bracket
8. Upper guide retaining bolt
9. Upper bracket, under floor

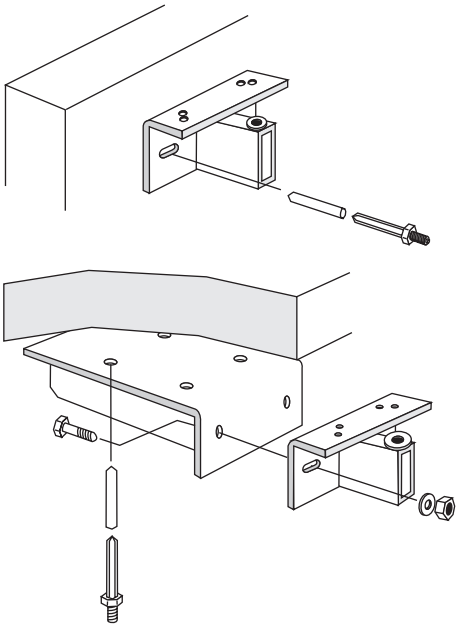
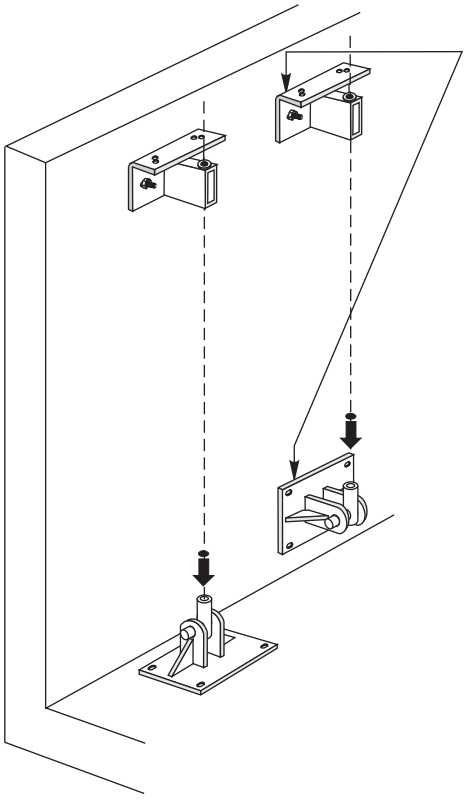
NOTE!

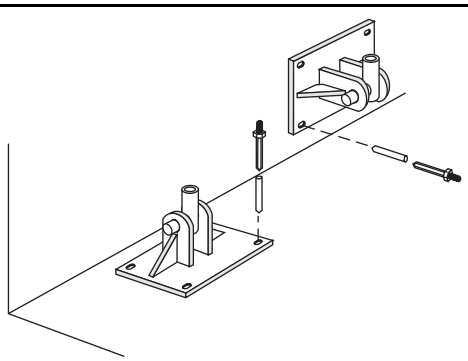
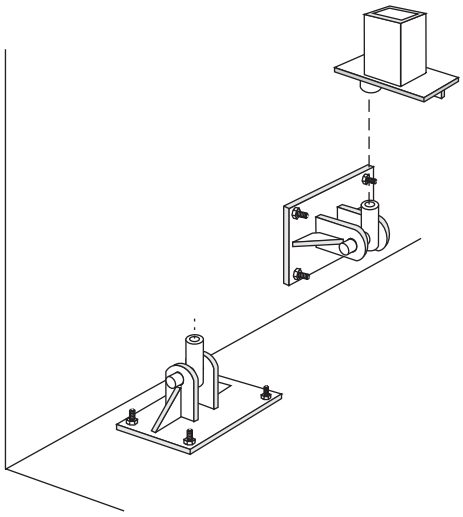
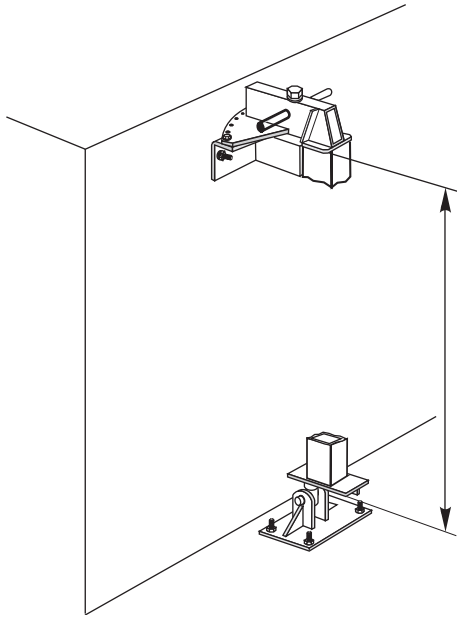
The lower bracket may be fixed to the bottom or the wall of the tank.

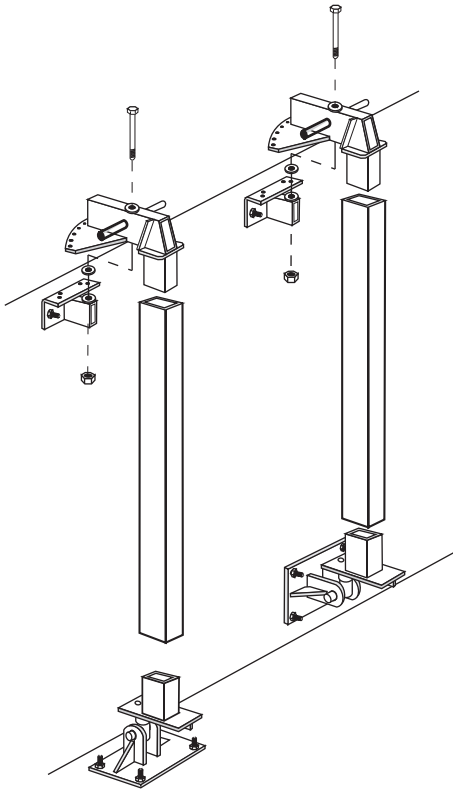
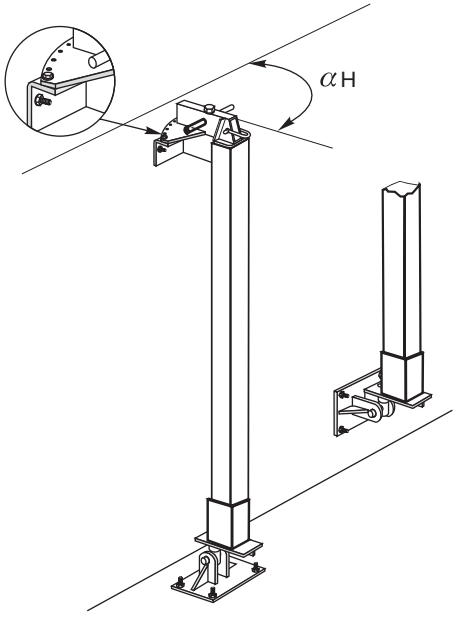
Instruction

Follow these steps to install single guide bar system without intermediate support:

Step	Action	Illustration
1	Position the guide brackets. A = minimum 65 mm, recommended 125 mm.	

Step	Action	Illustration
2	Fix the upper bracket.	
3	Check • the position of the lower bracket. • that the pin in the lower bracket is in line with the center line of the upper bracket. Use a plumb line. **Wall mounted bracket:** It may be necessary to put metal shims under one of the brackets to achieve a vertical axis of rotation.	

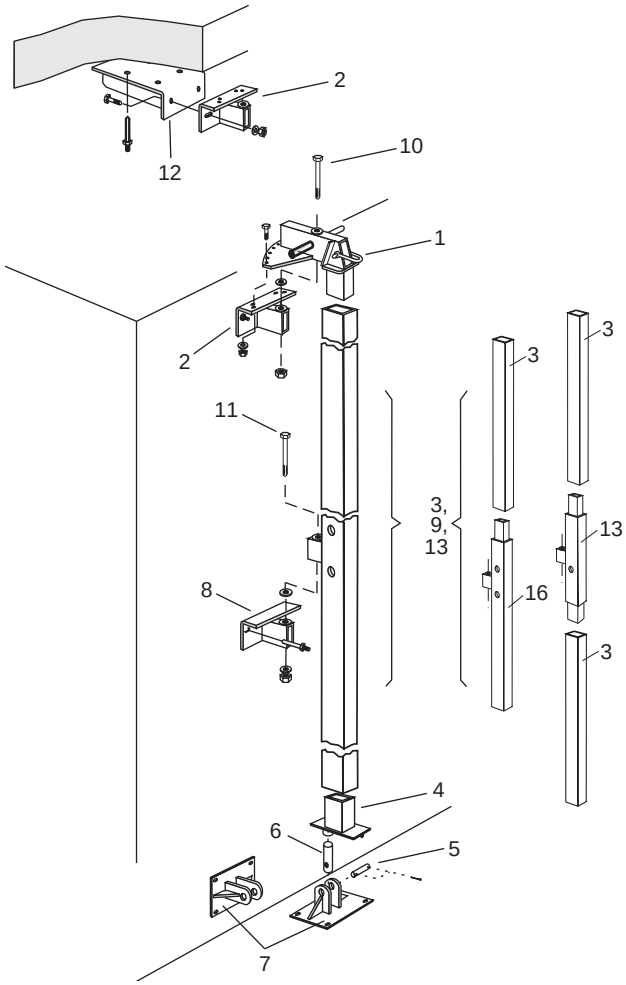
Step	Action	Illustration
4	Fix the lower bracket.	
5	Fit the lower guide to the lower bracket by positioning it on the pin.	
6	• Measure the distance between the lower and the upper guides. • Subtract 10 mm from the measurement and cut the guide bar there **Note!** Make sure that the cut end of the guide bar points downwards.	

Step	Action	Illustration
7	• Insert the bar to the lower guide. • Insert the upper guide to the bar. • Fit the bolt, but do not tighten.	
8	• Turn the guide bar unit to required angle. • Fix the angle H with the indexing screw. • Mount the shackle to the upper bracket. See, Positioning the mixer, for correct angle setting.	
9	Install the mixer on the single guide bar system.	

Mount with intermediate support

Illustration

This is an illustration of a single guide bar system over 6 m with intermediate support.



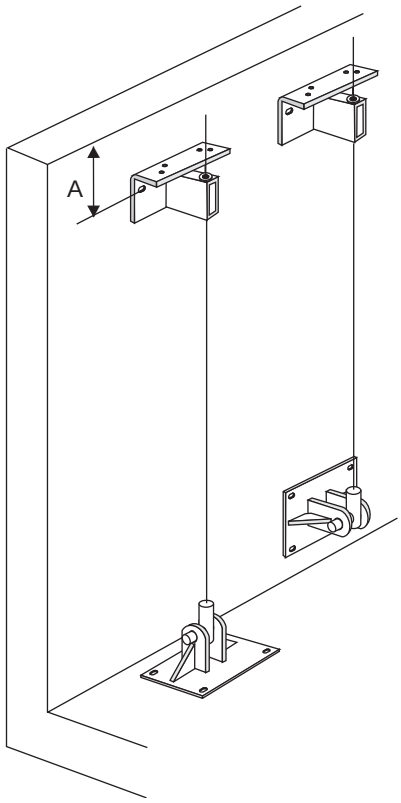
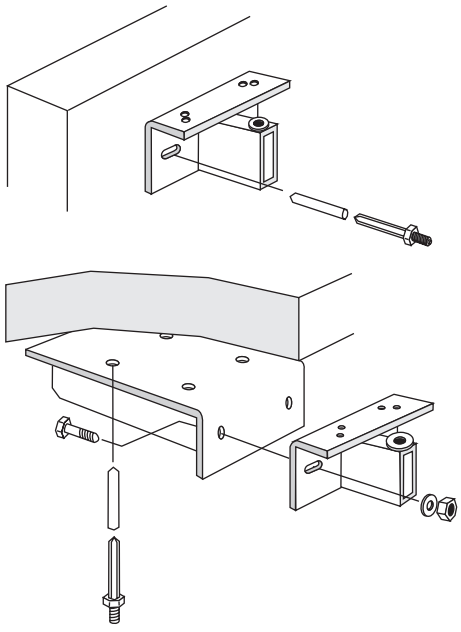
List: This is a list of the general parts of the single guide bar system with intermediate support:

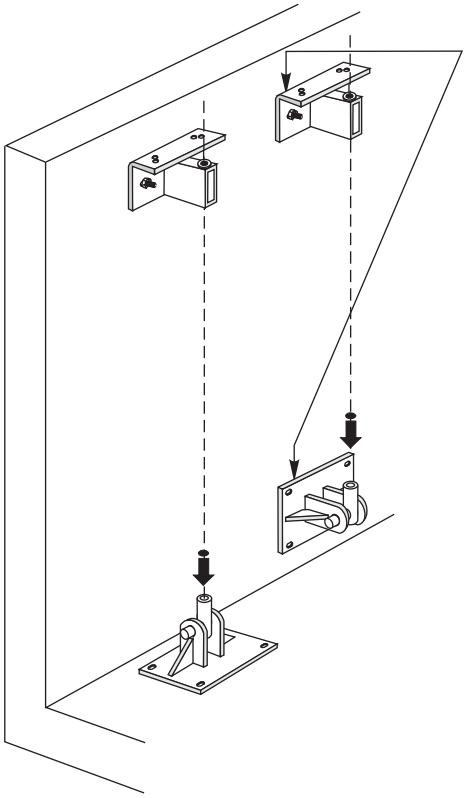
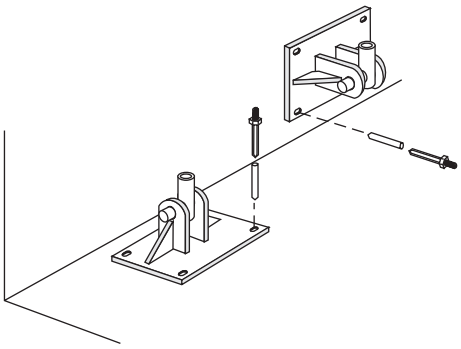
1. Upper guide
2. Upper bracket
3. Guide bar
4. Lower guide
5. Lower bracket pin
6. Lower guide pin
7. Lower bracket
8. Intermediate bracket
9. Extension bar
10. Upper guide retaining bolt
11. Intermediate guide retaining bolt
12. Upper bracket, under floor — alternative
13. Extension bar — alternative

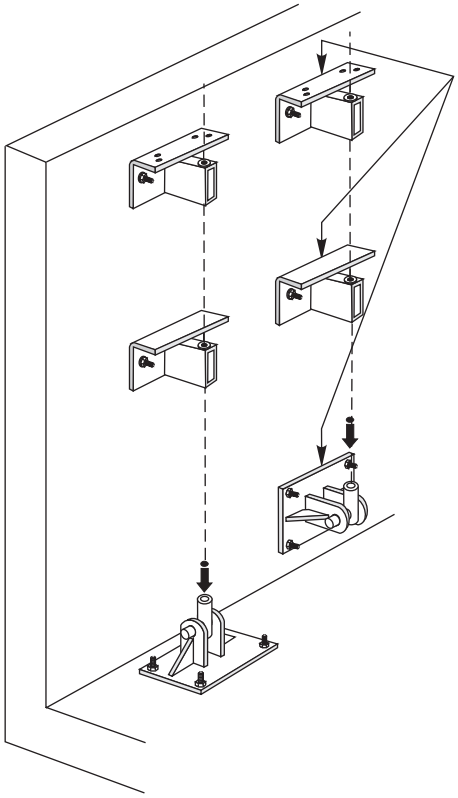
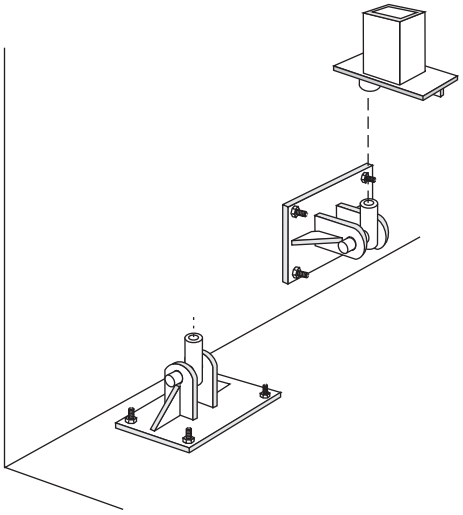
NOTE! The lower bracket may be fixed to the tank bottom or to the wall.

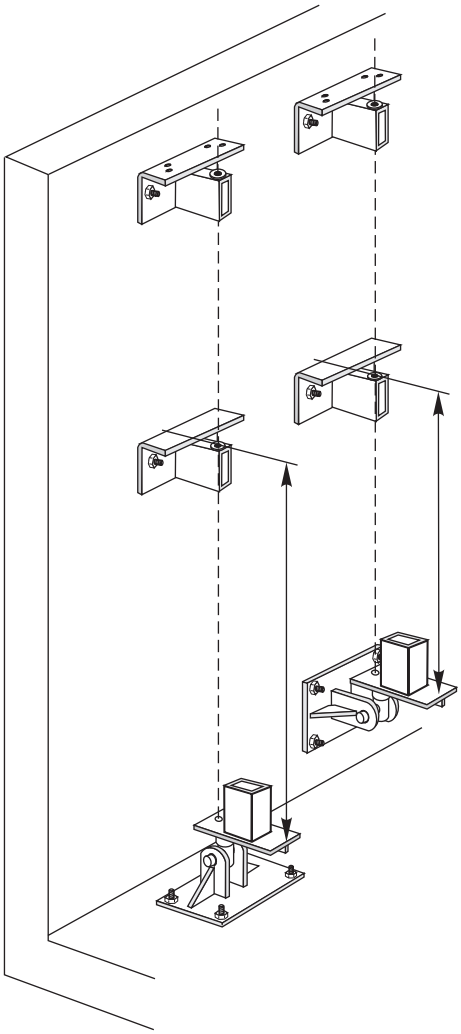
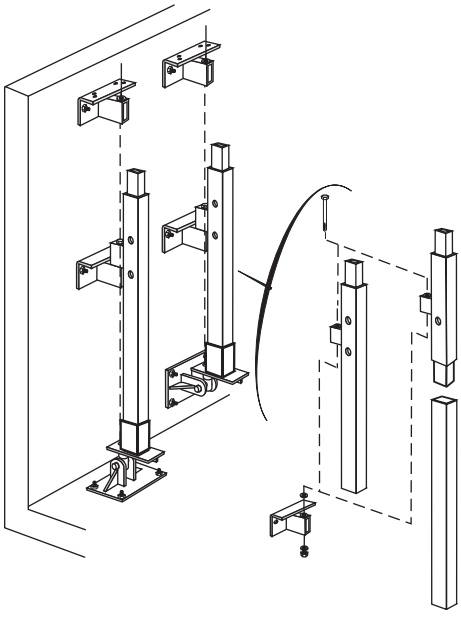
Instruction

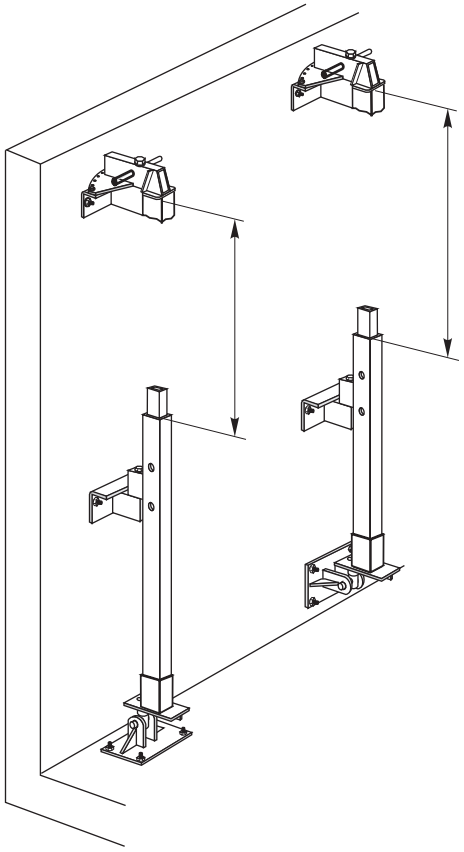
Follow these steps to install single guide bar system with intermediate support:

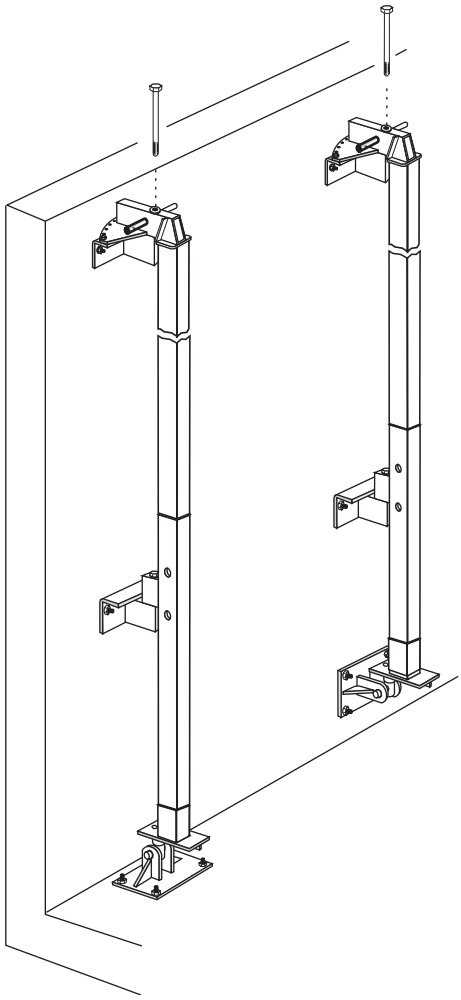
Step	Action	Illustration
1	Position the guide brackets. A = minimum 65 mm, recommended 125 mm.	
2	Fix the upper bracket.	

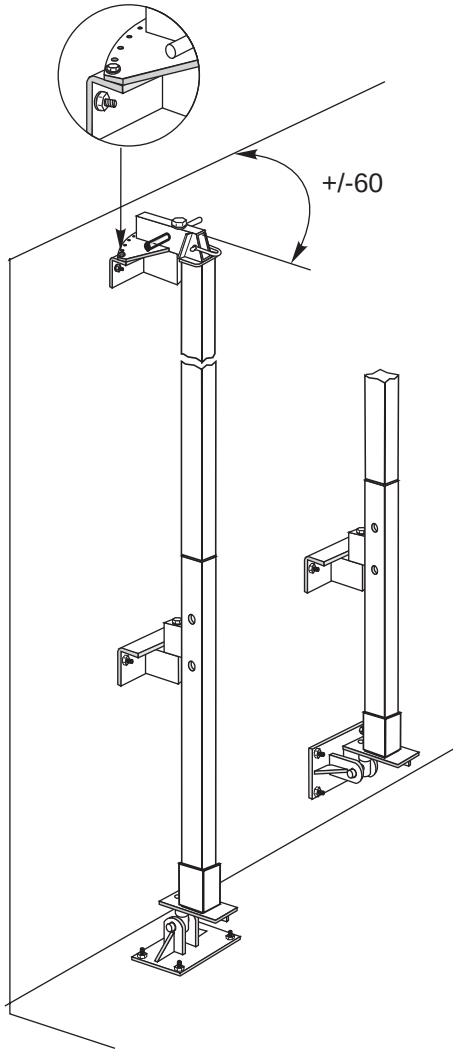
Step	Action	Illustration
3	Check • the position of the lower bracket. • that the pin in the lower bracket is in line with the center line of the upper bracket. Use a plumb line. **Wall mounted bracket:** It may be necessary to put metal shims under one of the brackets to achieve a vertical axis of rotation.	
4	Fix the lower bracket.	

Step	Action	Illustration
5	• Position the intermediate bracket. • Check that it is in line with the lower and upper brackets by using a plumb line. • If, necessary, add shims under the brackets to align the brackets. • Fix the intermediate bracket.	
6	Fit the lower guide to the lower bracket by positioning it to the pin.	

Step	Action	Illustration
7	• Measure the distance between the intermediate bracket and the lower guide. • If necessary, cut the bar.	
8	• Insert the lower extension bar to the lower guide. • Fit the bolt, but do not tighten.	

Step	Action	Illustration
9	• Measure the distance between the edge of the lower extension bar and the upper guide. • Subtract 10 mm from the measurement and cut the guide bar there. **Note!** Make sure that the cut end of the guide bar points downwards.	

Step	Action	Illustration
10	• Insert the guide bar to the lower guide. • Insert the upper guide to the bar. • Fit the bolt, but do not tighten.	

Step	Action	Illustration
11	• Turn the guide bar unit to required angle. • Fix the angle H with the indexing screw. • Mount the shackle to the upper bracket. See chapter Positioning the mixer, for correct angle setting.	
12	Install the mixer on the single guide bar system.	

Install the Mixer

Overview

Introduction

This chapter describes how to install the mixer.

NOTE!

All mounting to the floor shall be made with **chemical anchor bolts** from ITT Flygt.

Table of Contents

This chapter contains the following topics:

Install on a Single Guide Bar System

Introduction

This section describes how to install the mixer on a single guide bar system.

When positioning the mixer there are three parameters to be observed:

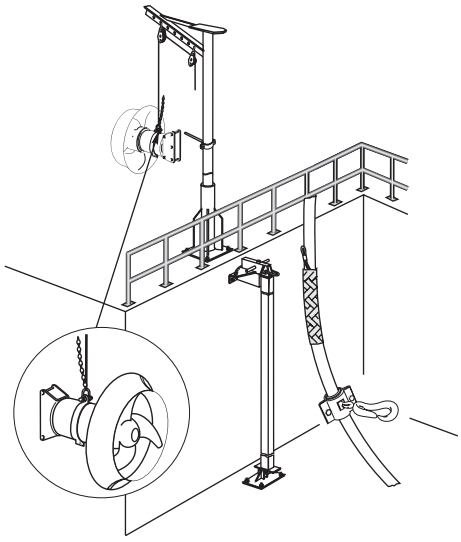
- H = Height from tank bottom
- α H = Horizontal angle
- α V = Vertical angle

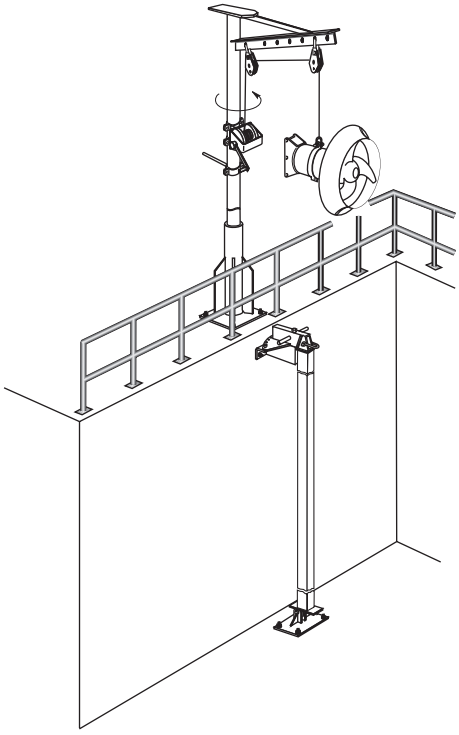
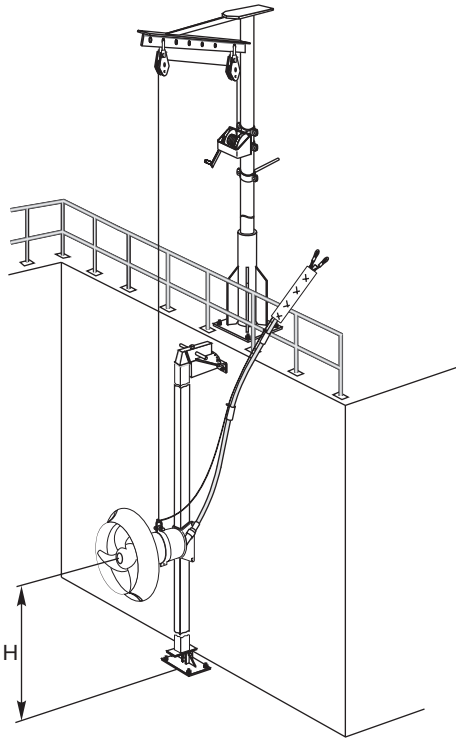
H and α H are set at the stage of placing the unit on the guide bar system.

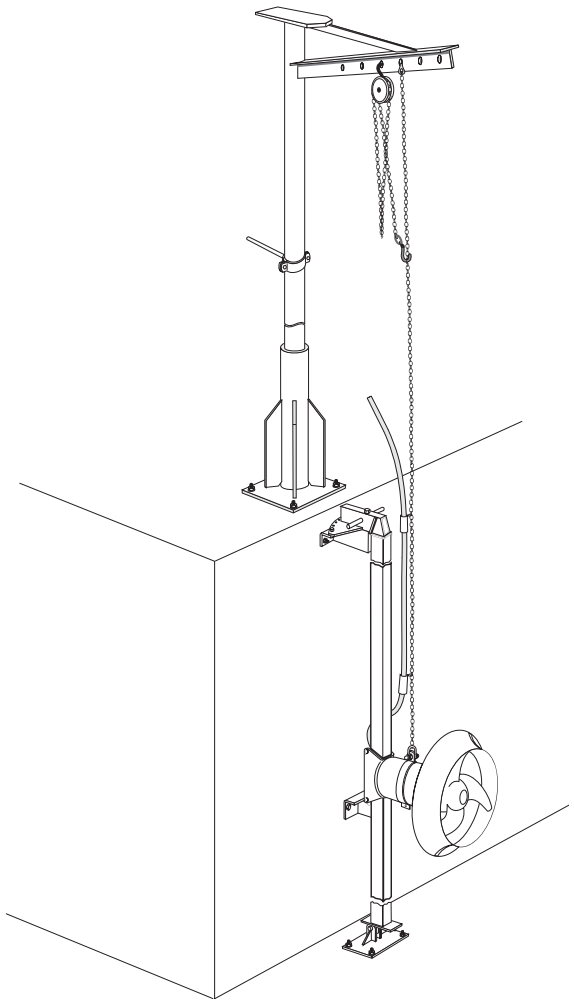
For angle position data and instructions, see Positioning the Mixer.

Instruction

Follow these steps to install the mixer on the guide bar system.

Step	Action	Illustration
1	• Attach the retaining chain or wire to the mixer by means of the shackle. • Attach the lifting chain or wire to the unit. • Fit a support grip on the power cable. • Place cable holders on the power cables at every 1.5 m.	

Step	Action	Illustration
2	• Raise the mixer and rotate it by using the davit handle. • Lower the mixer.	
3	Position the mixer on the guide bar to the given height “H” from the tank bottom or to the support. See, Positioning the mixer, for correct angle setting.	

Step	Action	Illustration
4	Lower the retaining chain or wire and the power cable. **Note!** The power cable must not carry the weight of the mixer.	
5	The mixer is now ready to be connected to the power supply. See, Electrical Installation	

Install on a Sloping Bottom

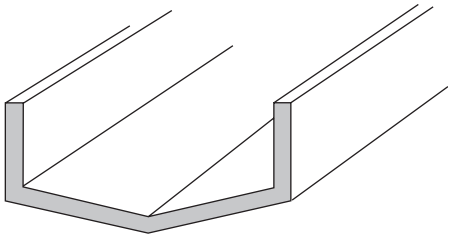
Introduction

This chapter describes how to install the mixer on a sloping bottom.

For measurements, see Dimensional Drawings.

Illustration

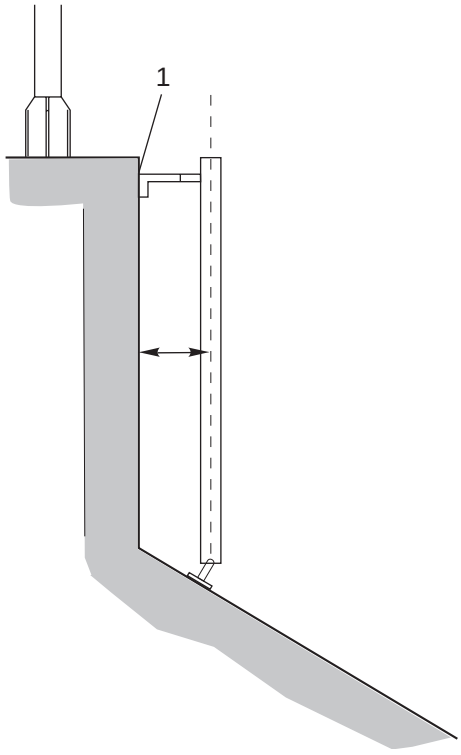
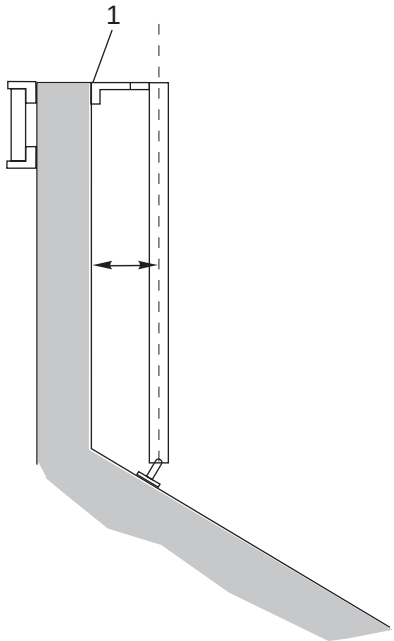
This illustration shows a tank with sloping bottom.



If the tank bottom slopes the installation procedure of the guide system needs to be modified:

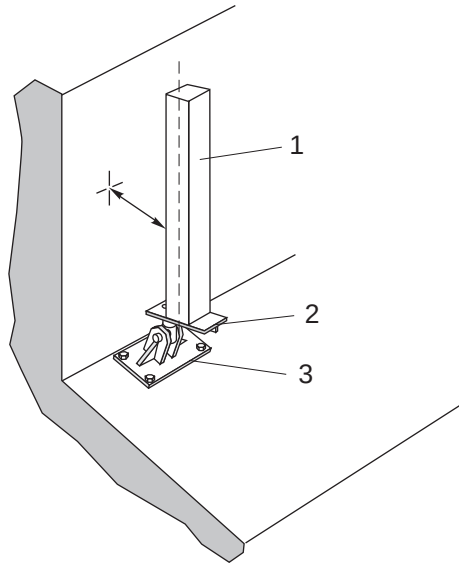
- A larger distance is needed between the guide bar and the wall in order to allow turning of the lower bracket.
- An intermediate wall spacer is needed to keep the guide bar's distance from the wall.

This table shows examples of how to place the intermediate wall spacer (1).

Horizontal floor mounted davit holder	Davit holder placed outside the tank
	

General parts

This table shows the general parts of a guide bar installation in a tank with sloping bottom.

Pos.	Description	Illustration
1	Guide bar	
2	Lower guide	
3	Lower bracket	

Install with Flange

Introduction

Flange mounted mixer is a unique method for installing mixers in tanks where guide bar or bottom stand is not applicable.

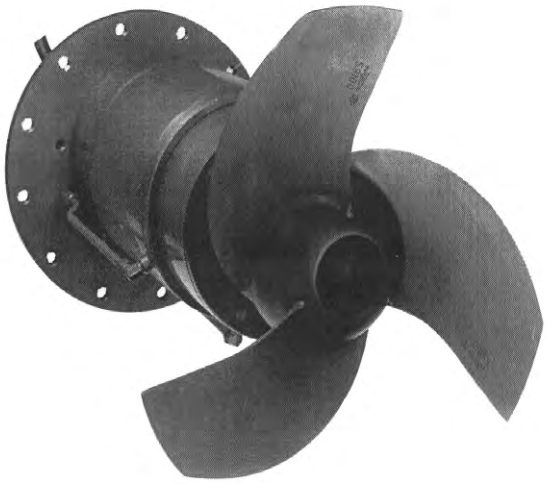
The flange mounted mixer consists of

- a mixer with fixing plate *and*
- a flange cover, manufactured locally.

Contact your nearest ITT Flygt representative for information.

Illustration

This illustration shows a mixer with a fixing plate.



Positioning the Mixer

Overview

Table of Contents

This chapter contains the following topics:

Reference

For more information, see Mixer Positioning Principles (part.nr: 892731).

General description

Parameters

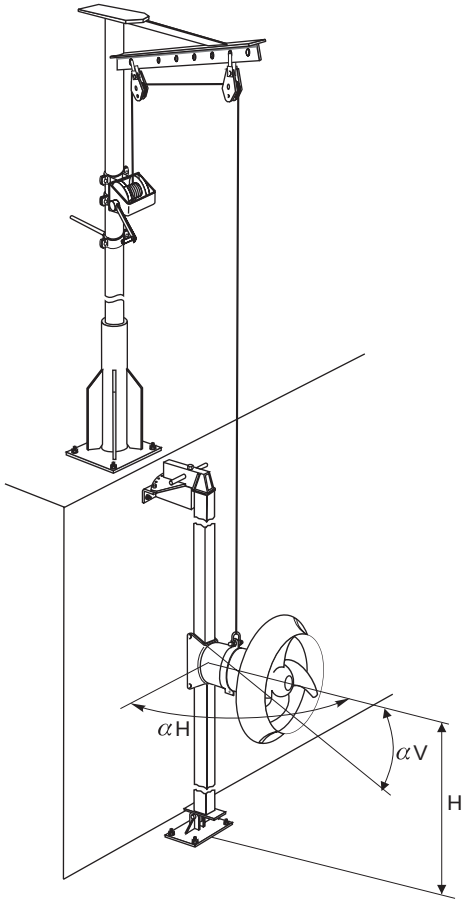
When positioning the mixer there are three parameters to be observed:

- H = Height from tank bottom
- α H = Horizontal angle
- α V = Vertical angle

H and α H are set at the stage of placing the unit on the guide bar system.

Illustration

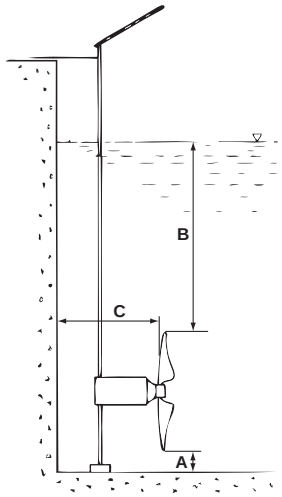
This illustration shows the three parameters to be observed.



Clearance

Propeller clearance

This table shows the minimum propeller clearance in connection with the installation work that should be observed.

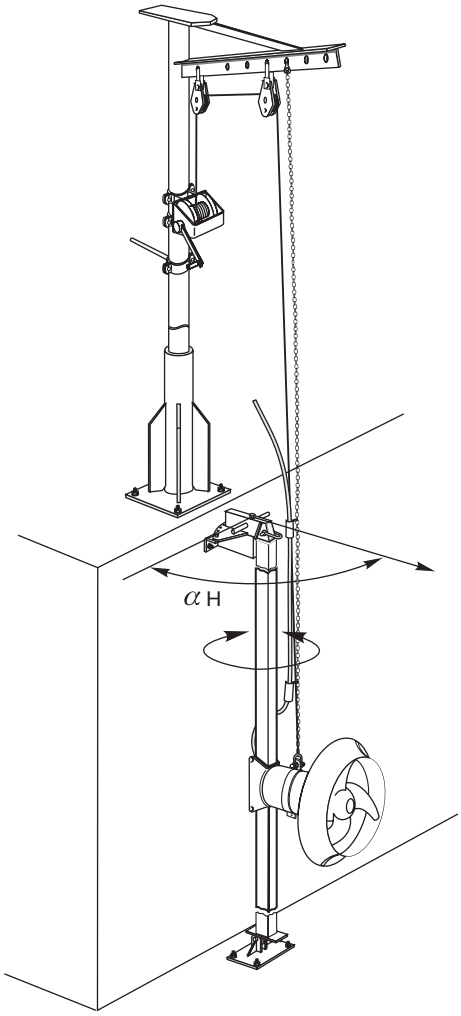
	Distance between the...	**should not be less than...**	**Illustration**
A	peak position of the propeller blade and • the bottom of the tank *and/or* • the side wall	300 mm	
B	peak position of the propeller blade and • the liquid level	**Exception:** In thick media and very good flow condition or lower motor load the distance can be 300 mm.	
C	propeller blade and the background wall	the dimension of the propeller diameter.	

Distance between the propeller and the...	**should not be less than...**
side wall	0.5 times the propeller diameter.
bottom	1 propeller diameter.
background wall	1.5 times the propeller diameter.

Obstacles and walls downstream of mixer: The clear distance downstream of the mixer should be at least 10 times the propeller diameter.

Horizontal angle

Instruction Follow these steps to set the horizontal angle.

Step	Action	Illustration
1	Set the angle by rotating the guide bar. See table for α H angle identification.	

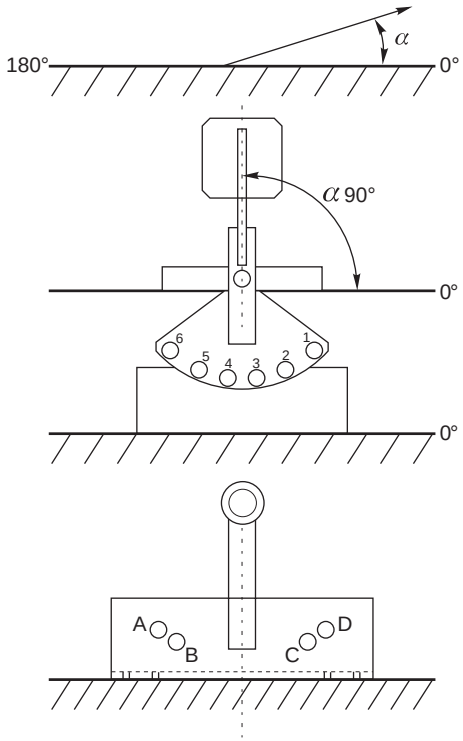
Step	Action	Illustration
2	Place the indexing screw in the corresponding hole.	
3	Place the support grip in position on the power cable and attach it to the shackle. **NOTE!** The support grip is imperative when the mixer is held in position by wire and not by chain.	
4	The mixer is now ready to be connected to the power supply. See, Electrical Installation	

Table 1: α H 0–90

This table gives an angle identification of mixer orientation α H from 0–90 degree.

α H	Letter	Numeral	Other possible combinations	
0	A	1	Letter	Numeral
10	B	1	–	–
20	A	2	–	–
30	B	2	–	–
40	A	3	–	–
50	B	3	–	–
60	A	4	–	–
70	B	4	C	1
80	A	5	D	1
90	B	5	C	2

Table 1: α H 100–180

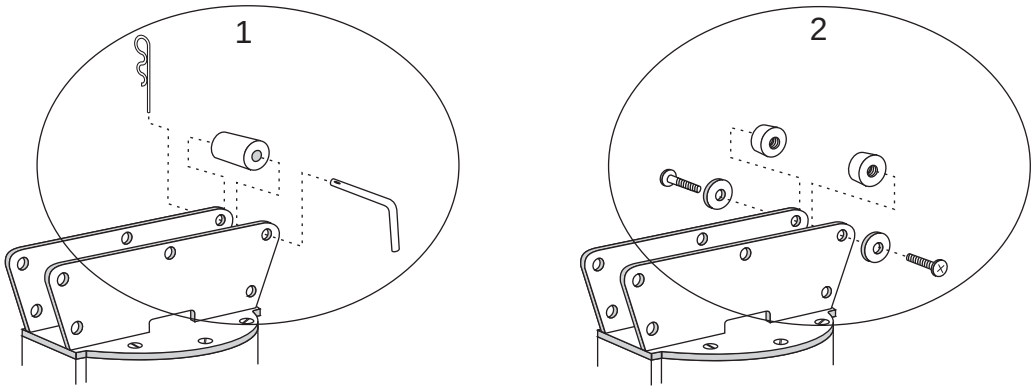
This table gives an angle identification of mixer orientation α H from 100–180 degree.

α H	Letter	Numeral	Other possible combinations	
			Letter	Numeral
100	A	6	D	2
110	B	6	C	3
120	D	3	–	–
130	C	4	–	–
140	D	4	–	–
150	C	5	–	–
160	D	5	–	–
170	C	6	–	–
180	D	6	–	–

Vertical angle

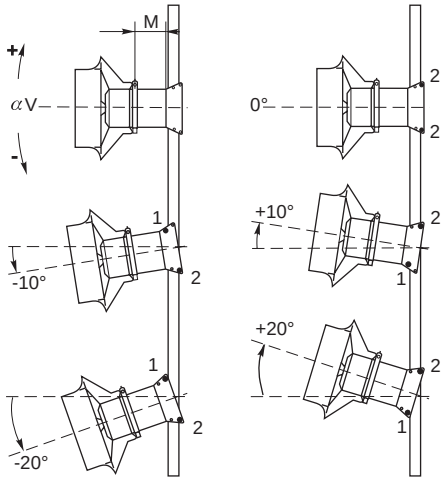
General

Orientation is by means of a set of rollers situated on the rear guide of the mixer.



Instruction

Follow these steps to set the vertical angle.

Step	Action	Illustration
1	Set the desired α V angle, by placing the rollers according to the illustration. The roller 1 is always used in front of the guide bar. For correct lifting equipment position see Dimensional Drawings to obtain the M measurement. Note that different measurements apply for mixer with or without jet ring.	
2	The mixer is now ready to be connected to the power supply. See, Electrical Installation	

Electrical Installation

Overview

Table of Contents

This chapter contains the following topics:

Power Supply

NOTE!

Fused rating and cable shall be selected in accordance with local rules and regulations.

Cables

Always check that the cables are in perfect condition before using them.

- Make sure that the cable does not have any sharp bends and is not pinched.
- If the outer sheath is damaged, contact a Flygt service shop to replace the cable.
- Make sure that the conductors not in use are isolated
- If a variable-frequency-drive (VFD) is used, make sure that the shielded cable (type Screened Subcab) is used according to the European CE requirements. **Reference:** For more information contact your Flygt representative VFD-supplier.

Information on current

See the product's data plate.

NOTE!

Pay attention to the voltage drop in long cables! The motor's rated voltage is the voltage measured at the terminal board in the product.

Overload protection

The Starting current in direct-on-line starting can be up to six to ten times higher than the rated current. Therefore, make sure that

- the fuses or circuit breakers are of proper rating.
- the overload protection (motor protection breaker) for direct-on-line starting are set to the motor rated current stated on the data plate.

Possible Disturbances

When the mixer is connected to the public mains it may cause flicker of incandescent lamps when starting. In this case the supply authority should be notified before installing the mixer.

Connection

Earthing

Make sure that the product is correctly earthed.

The earth conductor shall always be longer than the phase conductors. **Rationale:** If the motor cable is jerked loose by mistake, the earth conductor shall be the last conductor to be disconnected from its terminal. This applies to both ends of the cable.

Cable Connection Diagrams

SUBCAB 4GX / SUBCAB AWG Y and D Connection

This is an illustration of how to connect the cable leads and the stator leads.

Y Connection

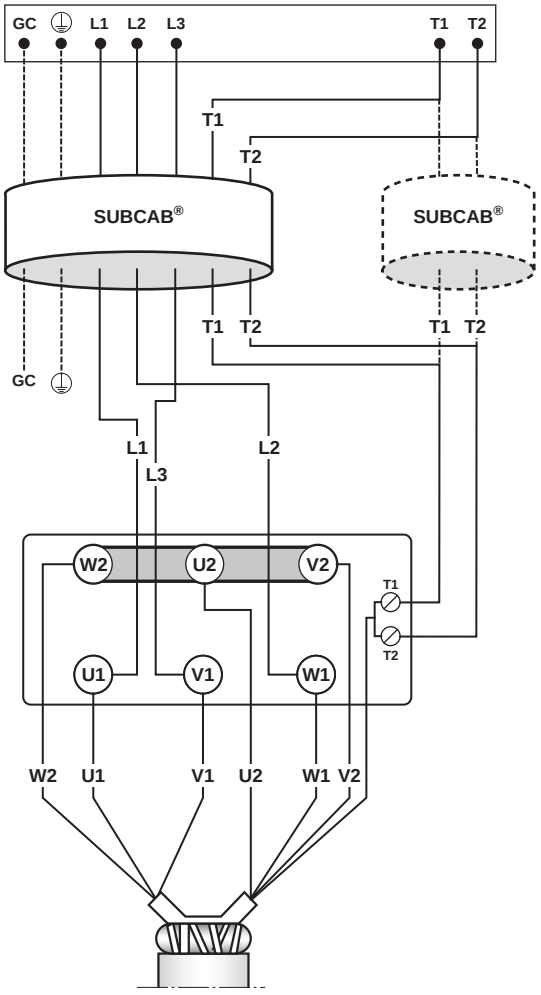


Bild 47

D Connection

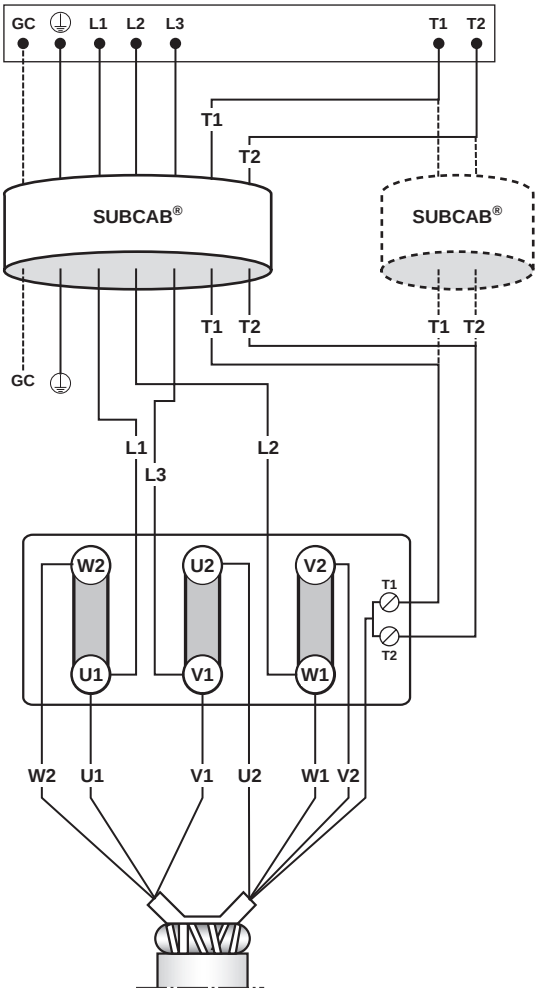


Bild 43

This table explains the colors of the leads.

Mains	SUBCAB Cable lead	SUBCAB AWG Cable lead	Terminal board
L1	Brown	Red	U1
L2	Black	Black	W1
L3	Grey	White	V1
⏚	Yellow/Green	Yellow/Green	⏚
Groundcheck GC		Yellow	
Control			

T1	T1	Orange	T1
T2	T2	Blue	T2
Stator leads connection: **Stator lead**		**Terminal board**	
U1, red		U1	
W2, black		W2	
V1, brown		V1	
U2, green		U2	
W1, yellow		W1	
V2, blue		V2	

Screened SUBCAB 6–Leads Y and D Connection

This is an illustration of how to connect the cable leads and the stator leads.

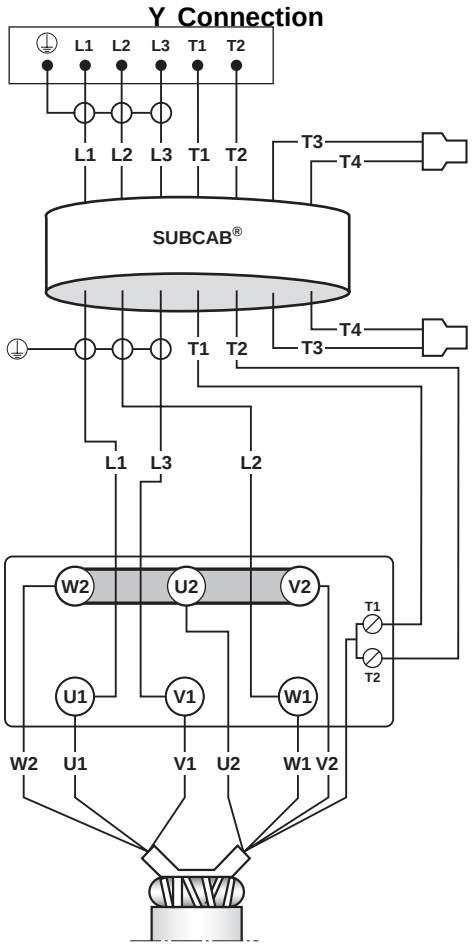


Bild 47a

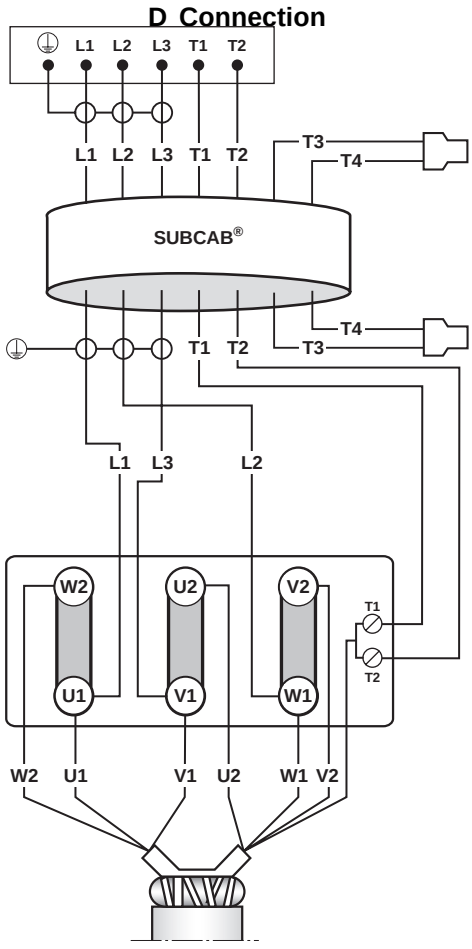


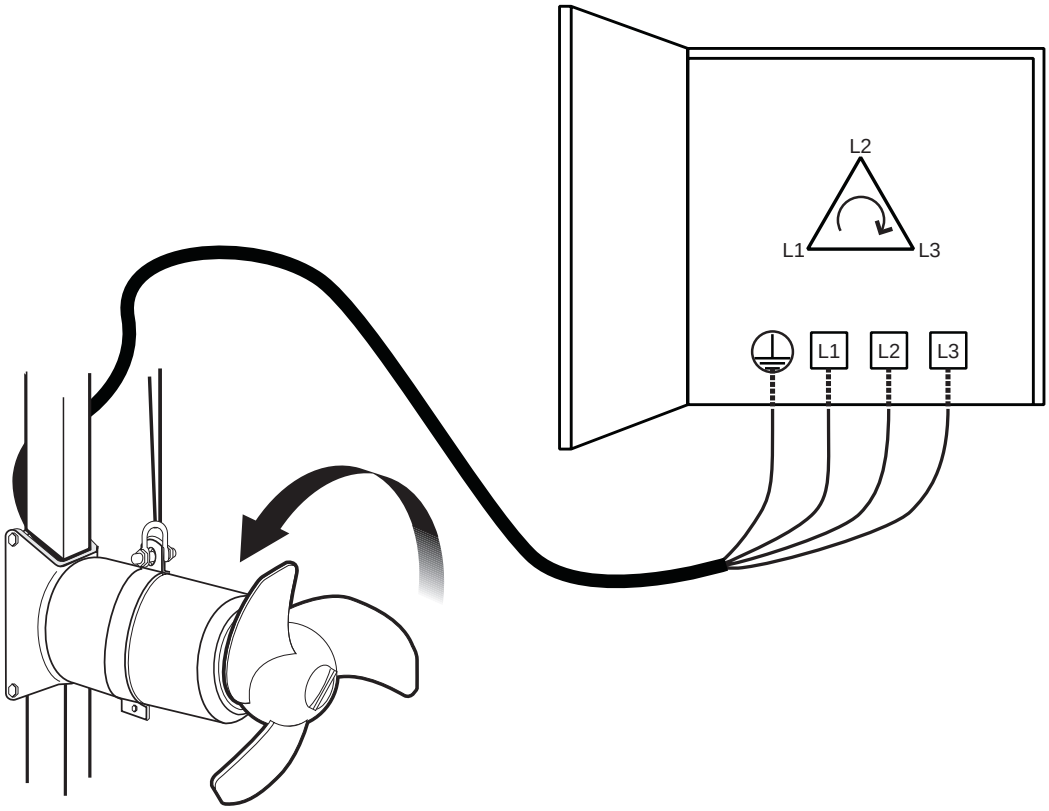
Bild 47b

This table explains the colors of the leads.

Mains	**SUBCAB Cable lead**	**Terminal board**
L1	Brown	U1
L2	Black	W1
L3	Grey	V1
⏚	Screen twisted together	⏚
Groundcheck GC		
Control		
T1	T1	T1
T2	T2	T2
T3 Not in use	T3 Not in use	End sleeve
T4 Not in use	T4 Not in use	End sleeve
Stator leads connection: **Stator lead**		
U1, red		
W2, black		
V1, brown		
U2, green		
W1, yellow		
V2, blue		

Cable Connection to Controller

This illustrates how to connect the product's power cable to the controller.



Main leads	Type of cable	
	SUBCAB Silicon HCR	SUBCAB AWG
⏚	Green/Yellow	Green/Yellow
L1	Brown	Red
L2	Black	Black
L3	Grey	White

Set up the Controller

Thermal Switches

The terminal switches are incorporated in the stator and shall be connected according to the cable chart. Flygt recommends that they are connected to 24 V over the separate fuses to protect the automatic equipment.

Additional sensors

The terminal A plate in the junction box shows if the product is equipped with other sensors than thermal contacts.

This table gives an overview of possible additional sensors for this product.

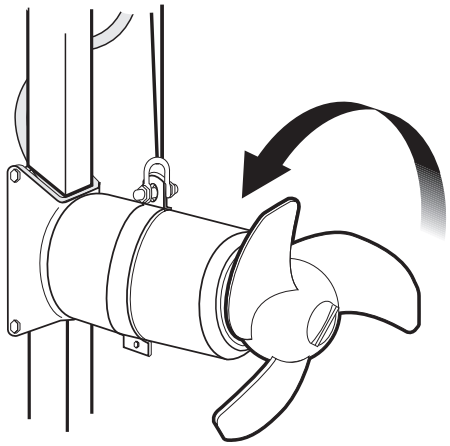
Sensor	Description
CLS-30	A leakage sensor that • senses water in the oil housing, *and* • initiates an alarm when the oil contains 30% water. Not applicable to Ex-approved pumps.  **WARNING!** Sensor body is made of glass! Handle with care!
FLS	A small float switch for sensing water in the stator housing. Design suitable for products in vertical installations.

Monitoring relay

If intermittent operation is prescribed (see data plate), the product shall be provided with control equipment that provides it. The Mini-CAS II is a monitoring relay to which the CLS and/or FLS are connected.

First Start-Up

Before starting Follow these steps when test-running the mixer.

Step	Action	Illustration
1	Check: • that there is oil in the oil casing • that the propeller can be rotated by hand • that the cable entry is securely tightened • that the machine is fixed to the guide bar **NOTE!** Maximum starts and stops are 30 times.	
2	Check the direction of rotation. The propeller shall rotate clockwise as viewed from the motor side. **WARNING!** Watch out for the propeller and for the starting jerk, which can be powerful.	

Trouble Shooting

Overview

Trouble shooting 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 mixer when the power supply is turned on.

When trouble shooting on the electrical equipment use:
- a universal instrument multimeter (VOM)
- a test lamp (continuity tester) *and*
- wiring diagram.

NOTE!

Electrical work shall be performed by an authorized electrician.

Follow local safety regulations and observe recommended safety precautions.

Table of Contents

This chapter contains the following topics:

Use the following checklists as an aid at trouble shooting. It is assumed that the mixer and installation have formerly functioned satisfactorily.

If the Mixer Fails to Start

Follow these steps to troubleshoot the mixer when it fails to start.

No	Question	No	Yes
1	Is an alarm signal indicated on the control panel?	Check question No 2.	• Check that the overload protection is reset. • Check the thermal switches. If the thermal switches are out of order, contact an ITT Flygt service shop.
2	Can the mixer be started manually?	Check question No 3.	• Check that all connections are intact. • Check relay and contactor coils. • Check that the control switch (Man/Auto) makes contact in both positions.
3	Is the installation receiving voltage?	Check that • the main power switch is on. • there is control voltage to the start equipment and its fuses are intact. • there is voltage in each phase of the supply line. • all fuses have continuity and are tight. • the overload protection is reset. • the motor cable is not damaged.	Check question No 4
4	Is the propeller stuck? **WARNING!** Disconnect power before checking the propeller.	Check question No 5	• Check that the propeller rotates easily by hand. • Clean the propeller.
5	Does the fault still exist?		Contact an ITT Flygt service shop.

If the Mixer Starts but Motor Protection Trips

Follow these steps to trouble shoot the mixer when the mixer starts but the motor protection trips.

No	Question	No	Yes
1	Is the motor protection set too low?	Check question No 2.	Set the motor protection according to the data plate.
2	Is the propeller difficult to rotate by hand? **WARNING:** disconnect power before checking the propeller!	Check question No 3	• Clean the propeller. • Check that the propeller size is correct. If none of these actions helps, contact an ITT Flygt service shop.
3	Is the installation receiving full voltage on all three phases?	• Check the motor fuses. • Notify an authorized electrician.	Check question No 4.
4	Have all the phase currents the same value or are they too high?	Check question No 5.	Contact an ITT Flygt service shop.
5	Is the rated speed in accordance with the data plate?	Check question No 6.	Contact an ITT Flygt service shop.
6	Is the density of the liquid too high?	Check question No 7.	• Dilute the liquid. • Change the propeller blades or to a more suitable mixer. • Contact an ITT Flygt service shop.
7	Fault on the overload protection?	Check question No 8.	Replace the overload protection.
8	Does the fault still exist?	-	Contact an ITT Flygt service shop.

If the Mixer Starts, Stops and Starts in a Rapid Sequence

If the contactor's selfholding function break, check

- the contactor connections.
- the voltage in the control circuit in relation to the rated voltage on the coil.

If the contactor's selfholding function is ok and the fault still exist, contact an ITT Flygt service shop.

WARNING!

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

Preventive Maintenance

Topics in this section

Topic in this section is:

- Intermediate Service

Maintenance Program

ITT Flygt recommends a preventive maintenance program based on *Intermediate* and *Major Service* at regular intervals. For Major Service instructions, refer to the Service and Repair Manual.

For applications other than sewage water or for specific operating conditions, other service intervals may be recommended.

Intermediate Service

For standard sewage applications, where the temperature of the pumped liquid is 40°C or less, an Intermediate Service should be performed every 2 years.

Mixer

This table shows what to inspect at intermediate service concerning the mixer.

Item	Action
Junction box	Check that it is clean and dry.
Terminal board	Check that the connections are properly tightened
Insulation check	• Check that the resistance between earth (ground) and phase lead is more than 5 M Ω. • Conduct phase-to-phase resistance check.
Cable	Check that the rubber seating (jacket) is undamaged.
Seal housing	• Check oil level. Fill up with new oil if necessary.
O-rings	• Replace the O-rings of the filling plugs and at the junction cover *and* • Grease new O-rings.
Thermal contacts	Check the resistance. Normally closed circuit; interval 0–1 Ω.
Thermistor	Check the resistance 20–250 Ω. Measuring voltage max. 2 V DC.
Rotation direction	Check the rotation of the mixer.
Lifting equipment	Check the screws and the condition of the lifting equipment.
Lifting device	Check that local safety regulations are followed.
Voltage and amperage	Check running values.

Mixer site

This table shows what to inspect at intermediate service concerning the mixer site.

Item	Action
Electrical cabinets/panels	Check that they are clean and dry.
Connection to power	Check that the connections are properly tightened.
Overload and other protections	Check correct settings.
Personnel safety	Check guard rails and other protective devices.

www.flygt.com

Mixer 4650

896508/6.0 - 20080328