

“TBM” SERIES

SUBMERSIBLE HORIZONTAL MIXERS

DIRECT:

TBM 1,5 / 6N
TBM 2,2 / 6N



WITH GEAR BOX:

ATEX	STANDARD
TBMex 2,2/4	TBM 2,2/4
TBMex 3/4	TBM 3/4
TBMex 4/4	TBM 4/4
TBMex 5,5/4	TBM 5,5/4
TBMex 7,5/4	TBM 7,5/4
TBMex 9/4	TBM 9/4
TBMex 11/4	TBM 11/4
TBMex 15/4	TBM 15/4
TBMex 18,5/4	TBM 18,5/4

TYPE	
SERIAL NUMBER	
POWER	
DATE	

CRI-MAN S.R.L.

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1. GENERAL INFORMATION



The instructions provided in this manual and regarding safety are marked with this symbol. Non complying with these warnings may expose the personnel to risks for their health.



The instructions marked with this symbol must be complied with as they mainly concern electricity-related hazards.

WARNING Instructions accompanied by this word concern the correct operation, storage or conditions of the equipment. This word indicates only the main precautions to be considered for safe, correct and reliable operation together with all the indication provided by the manual.

The descriptions and drawings contained in this publication are to be intended as non-binding. Subject to the essential features of the machine described, CRI-MAN reserves the right to make any change to components, machine parts, details and accessories, as it will deem it appropriate for product improvement purposes or for construction or commercial requirements, at any time and without any obligation to update this publication.

2. PRECAUTIONS

Keep this manual with care for future reference. Copies of the mixer nameplates showing specifications and technical operation details of the machine purchased are an integral part of this manual. The mixers described in this manual are for farming or industrial use; therefore, the equipment shall only be installed, operated, serviced and repaired by specifically trained and qualified personnel.

Reading this operation and maintenance manual is absolutely necessary before transporting, installing, commissioning, operating, adjusting, assembling, disassembling and servicing the mixer. This manual is an integral part of the product supplied. It is the Purchaser's responsibility to instruct all the operating personnel who will use, handle or service the equipment to carefully read and study this manual.

The mixers described in this manual are not intended for domestic use, or the like, and must never be left within children's reach or, in general, within reach of any person who has not been trained to their use, installation or maintenance.

The content of this manual applies to the serial version of the equipment; similar mixers supplied as "job orders" may not fully correspond to the aspects described in this manual.

The supplier of this product shall not be held liable for any damage caused to persons, animals or objects if the instructions contained in this manual have not been fully complied with.

Supplementary nameplates supplied with the mixer shall be kept together with this operation and maintenance manual and the electric control equipment for easy and prompt consultation.

For safety reasons and to ensure that guarantee conditions are fulfilled, do not use the equipment in case of failure or a sudden change in the product.

It is the Purchaser's liability to provide the mixer with appropriate alarm and protection systems, as well as to carry out the necessary checks and maintenance to prevent any accident or damage due to malfunction.

To request further information, please contact CRI-MAN directly or call its authorized Support Centers.

3. PRESCRIPTIONS AND GENERAL RECOMMENDATIONS

- The equipment or any of its parts must not be used or operated by personnel who has not been expressly authorised to do so.
- It is forbidden to carry out any maintenance, repair, modification operation that is not strictly necessary for the working cycle when the machine is on. First of all, disconnect all the power inputs of the machine.
- Do not remove any protection guards installed on the machine.
- Do not use the equipment for any purpose other than those for which it has been intended.
- When work is over, always disconnect the equipment from electrical power.
- Any maintenance operation regarding electric or non-electric parts shall be carried out in compliance with CEI 64-8 462.2 463.1 573.3 standards.

4. SAFETY PRECAUTIONS

Any operation shall be carried out on the mixer by specifically trained and qualified personnel with the appropriate tools and equipment in full compliance with the instructions given in this manual.

Both in the event of a new installation or for maintenance purposes, comply with all hygiene, accident prevention and safety standards and regulations, as well as with applicable local hazard prevention legislation. The Purchaser is liable for complying with these regulations and safety instructions.

In particular, strictly comply with the following recommendations:

System inspections

- 1) Considering the nature of the fluids to be processed, wear appropriate personal protection clothes and outwear to avoid any contact of the skin with equipment or contaminated fluids.
- 2) The operating personnel must receive all the vaccines against any possible disease which may be transmitted through wounds, contact or inhalation.
- 3) Before performing any action on the mixer, ensure that all the power cords that feed the equipment are disconnected from the main power supply.
- 4) Before displacing the equipment from its location, first disconnect the power cords from the contact boxes of the electric drive units and disconnect feed; displace the mixer with the appropriate equipment for the purpose.

Mixer inspections

- 1) The mixer or any accessory must be accurately and completely cleaned with water or specific products before any operation;
- 2) If the equipment is disassembled, handle the pieces with special protection gloves;
- 3) Check the degree of insulation of the electric motor and the efficiency of the earth connection before conducting any electrical power test.
- 4) The external surface of the motor can exceed 80°C. Use any necessary device to prevent burnings.

The mixer cannot be used:

- Before carefully reading Use and Maintenance instructions
- During mixer maintenance and repairing operations
- During tank maintenance and repairing
- During mixer placement operations
- When mixer is damaged or there is the suspicion of possible damage
- When liquid level is less than 0.5m above propeller diameter

The design of the mixer may not be altered without the permission of the manufacturer. If there is any change in the use to which the mixer is put or in the properties of the liquid to be agitated, please contact the manufacturer of the mixer.

4.1 Safety regulations for Atex version

TBMex mixers are designed for places in which it is possible to have specific potential explosive atmosphere: Cri-Man assumes no liability for installations or repairs performed by non-qualified personnel and without respecting standards regarding potentially explosive atmosphere.

Follow this indications when installing flame-proof explosion mixers:

- TBMex mixers are built in accordance with standards EN1127-1, EN13463-1, EN 13463-5, EN 13463-8, EN13980, EN60079-0, EN60079-1, in the way to be installed in presence of specific potential explosive atmosphere.
- The classification of potentially explosive atmosphere zone gives the indication of characteristic the equipment has to respect: verify, referring to the marking on mixer plate, directive and harmonized standards, that the characteristics of explosion-proof mixer meet the requirement of the classification. If not, do not install the machine.
- Install accessories in accordance with applicable standards (EN 60079-14).
- During installation and maintenance, check that the power supply is turned off and that it is not possible to reinsert it before starting to use the mixer.
- Do not perform any maintenance before shutting down power supply or in presence of potentially explosive atmosphere.
- Do not replace any component in the electric motor: this type of maintenance can be carried out by Cri-Man or authorized personnel.
- The user must be aware of the chemical and physical properties of gases and/or vapors present in explosion-protected zones, as well as the risks posed by the presence of electrical components.
- Maintenance work on electrical equipment must be carried out in accordance with applicable standards (EN 60079-17).
- Do not start a mixer if not totally immersed in liquid to be processed. Starting without load for maintenance or inspection have to be carried out in a zone not classified as potentially explosive.

Cri-Man mixers TBMex are marked as follows:

II 2 G Ex d IIB T5 (reference EN 60079-0, EN 60079-1)

II 2 G c k T5 (reference EN 13463-1, EN 13463-5, EN 13463-8)

Legenda:

Symbol	Description	Note
II	Group II equipment	Except from mines
2	Category 2	High level of protection
G	Presence of gas vapors or fogs	
Ex	Protection in accordance with harmonized standards	
d	Flame-proof explosion protection	Referred to electrical motor
IIB	For gas type B	All gas except from H ₂ , C ₂ H ₂ , CS ₂
T5	Temperature class	Maximum surface temperature 100°C
c	Protection by constructional safety	Non electrical components
k	Protection by liquid immersion	Non electrical components

Here below a table of correspondence between the dangerous areas for potentially explosive atmospheres (94/9/CE), the categories (94/9/CE) and the protection level of equipment EPL (EN 60079-0).

Before the installation of an Atex mixer, ensure that it is suitable for that zone.

Dangerous Zone	Atmosphere		Category (G= gas, D= dust)
Zone 0	Presence of gas, vapors potentially explosive	Continuous presence or for long periods	1G
Zone 1		Probable arising	1G or 2G
Zone 2		Non probable arising	1G, 2G or 3G
Zone 20	Presence of clouds of combustible dust in the air	Continuous presence or for long periods	1D
Zone 21		Probable arising	1D or 2D
Zone 22		Non probable arising	1D, 2D or 3D

In all areas in which potential explosive atmosphere can arise, must be installed equipment in compliance with categories identified from directive 94/9/CE (Atex).

5. PRODUCT DESCRIPTION AND USE

5.1. Sectors for use

Mixers manufactured by Cri-Man S.r.l. are ideally suited to applications involving the mixing, i.e. the homogenizing and suspending of liquids of low to medium viscosity.

Please contact Cri-Man S.r.l. for further information on other applications, such as the mixing of viscous media or explosive materials.

5.2. Reception and nameplate exemplification

In the event of damage, please contact the nearest service center or the manufacturer.

Check that the received material correspond to what indicated in transport document and that it is not damaged.

WARNING This machine may not be operated under conditions which exceed either the threshold values stated on the factory specification plate, or any other instructions contained in the operating regulations or the contractual documentation. All prescribed electrical connection figures, as well as all installation and servicing instructions, must be adhered to without exception. Any use of the machine which exceeds the conditions contained in the operating manual can result in the failure of the machine. Non-compliance with this warning can result in personal injury and material damage.

Note :

All descriptions and instructions in this guide are based on standard models. These operating regulations do not take into account all details and variations in design and construction nor any possible eventualities or events that may occur during erection, operation or servicing.




These operating regulations do not take any local safety regulations into account. The operator of this installation is responsible for ensuring that such regulations are adhered to and that they are followed by the installation personnel who install the mixer.

The type plate on the casing identifies the type of mixer, the most important operating data and the machine number or serial number respectively. These details must always be given when information is required, when reordering machines or spare parts.

In the event of damage, please contact the nearest service center or the manufacturer.

The factory plate on the casing identifies the type of mixer, the most important operating data and the machine number or serial number respectively. These details must always be given when information is required, when ordering machines or spare parts.

Mixer plate
TBM standard

	Via Costituzione, 50F 42015 Correggio (RE) Italy Tel. 0522/73.22.04		
Tipo <input type="text"/>	Matricola <input type="text"/>		
P _N [kW] <input type="text"/>	~ <input type="text"/>	Hz <input type="text"/>	cosØ <input type="text"/>
n° poli <input type="text"/>	avv. <input type="text"/>	Q [l/sec] <input type="text"/>	
V <input type="text"/>	H [m] <input type="text"/>		
I _N [A] <input type="text"/>	g/min <input type="text"/>		

	Via Costituzione, 50F 42015 Correggio (RE) Italy Tel. 0522/73.22.04	
	II 2 G Ex d IIB T5 Gb	ISseP 13 ATEX034
	II 2 G c k T5	Matricola / N° <input type="text"/>
non aprire se in tensione / do not open when energized		

TBMex

Tipo	: Complete electric mixer code
Atex	: Complete Atex code
Matricola	: Serial Number: first numbers indicate year of production
P _N [kW]	: Electrical motor Power
~	: Alternate current
Hz	: Frequency
Cos Ø	: Power factor
avv.	: Type of starting allowed
S1	: Continuous service
V	: Electrical motor voltage
IP68	: Motor protection level
I _N [A]	: Rated absorption
cl. F	: Insulation class
Q [l/se]	: Capacity
N° poli	: Numbers of poles
g/min	: RPM propeller



For safe and proper operation, must not be exceeded maximum performance characteristics described on mixer's plate.

5.3. Technical description

General information

Manufacturer:	Cri-Man S.r.l.
Type of mixer:	Submersible horizontal mixer direct and with gear box, standard and Atex version
Type designation:	(TBM .../6) (TBM .../4) (TBMex .../4)
Power cable:	10.0 meters (standard length, suitable for basins up to 7 meters depth)
Corrosion protection mixer:	Painted with two component epoxy resin with substrate with zinc phosphate

Motor

Manufacturer:	Cri-Man S.r.l.
Protective system:	IP 68 a 20 m
Insulation class:	F
Sealing:	Radial mechanical seal
Motor casing material:	Cast iron, EN GJL 250

Gearbox

Manufacturer:	Cri-Man S.r.l.
Type:	Planetary gearbox
Gears:	Hardened and ground
External sealing:	2 radial shaft sealig rings
Internal sealing:	Mechanical seal
Shaft bearings:	2 taper roller bearings
Gearbox casing:	Cast iron, EN GJL 250

Propeller

Number of blades:	2 - 3
Propeller diameter	290 - 780 mm
Material:	Stainless steel

Mixers type TBM .../6N

Type TBM.../6 mixers are available in following configurations:

Mixer type:	TBM 1.5/6N	TBM 2.2/6N
Motor:		
Motor size	100	100
Mech. nom. rating	1.5 [kW]	2.2 [kW]
Electr. actual power [kW]	1.97	2.90
Nominal speed [rpm]	925	940
Rated current ¹⁾ [A]	4.2	5.9
Power Factor [cos Ø]	0.75	0.73
Operating mode	S1, Y	S1, Y
Mains voltage [V]	3 x 400	3 x 400
Permissible motor voltage [V]	230/400	230/400
Mains frequency required [Hz]	50	50
Starting type	Y	Y
Propeller:		
Number of blades	3	3
Diameter [mm]	297	347
Capacity ¹⁾ [m ³ /h]	643	876
Propeller speed [rpm]	925	940
General data:		
Axial thrust force ¹⁾ [N]	230	313
Output torque ¹⁾ [Nm]	15.2	22.4
Weight with console [in kg]	54	57

¹⁾ in clean water. Values obtained in accordance with ISO 21630.

Mixers type TBM .../4, TBMex.../4

Type TBM .../4, TBMex.../4 mixers are available in the following configurations:

Mixer type:	TBM 2.2/4	TBM 3/4	TBM 4/4	TBM 5.5/4N	TBM 7.5/4N
	TBMex 2.2/4	TBMex 3/4	TBMex 4/4	TBMex 5.5/4	TBMex 7.5/4
Motor:					
Motor size	100	100	100	132	132
Mech. nom. rating	2.2 [kW]	3.0 [kW]	4.0 [kW]	5.5 [kW]	7.5 [kW]
Electr. actual power [kW]	2.80	3.60	4.85	6.50	8.80
Nominal speed [rpm]	1420	1420	1405	1430	1440
Rated current ¹⁾ [A]	5.3	6.8	9.1	12.5	15.8
Power Factor [cos Ø]	0.78	0.78	0.78	0.85	0.85
Operating mode	S1, Y	S1, Y	S1, Δ	S1, Δ	S1, Δ
Mains voltage [V]	3 x 400	3 x 400	3 x 400	3 x 400	3 x 400
Permissible motor voltage [V]	230/400	230/400	400/690	400/690	400/690
Mains frequency required [Hz]	50	50	50	50	50
Starting type	Y	Y	YΔ	YΔ	YΔ
Gearbox :					
Reduction	4.39	4.39	4.39	4.39	4.39
Output speed [g/min]	323	323	320	326	328
Propeller:					
Number of blades	2	2	2	2	2
Diameter [mm]	445	460	515	535	585
Capacity ¹⁾ [m ³ /h]	1333	1581	2146	2391	3254
General data:					
Axial thrust force ¹⁾ [N]	441	580	853	981	1520
Output torque ¹⁾ [Nm]	65	87	119	161	218
TBM weight [kg]	75	78	81	109	115
TBMex weight [kg]	77	80	83	112	118

¹⁾ in clean water. Values obtained in accordance with ISO 21630.

Mixers in Atex version (TBMex...) are manufactured in accordance with standards:
 EN60079-0 and EN 60079-1. Type: II 2G Ex d IIB T5 Gb
 EN13463-1, EN13463-5, EN13463-8. Type II 2G c k T5

Mixer type:	TBM 9/4N	TBM 11/4	TBM15/4N	TBM 18.5/4N
	TBMex 9/4	TBMex 11/4	TBMex 15/4	TBMex 18.5/4
Motor:				
Motor size	132	160	160	160
Mech. nom. rating	9 [kW]	11 [kW]	15 [kW]	18.5 [kW]
Electr. actual power [kW]	10.8	12.5	16.8	20.0
Nominal speed [rpm]	1440	1450	1450	1450
Rated current ¹⁾ [A]	19.0	23.5	30.0	36.0
Power Factor [cos φ]	0.83	0.81	0.83	0.83
Operating mode	S1, Δ	S1, Δ	S1, Δ	S1, Δ
Mains voltage [V]	3 x 400	3 x 400	3 x 400	3 x 400
Permissible motor voltage [V]	400/690	400/690	400/690	400/690
Mains frequency required [Hz]	50	50	50	50
Starting type	YΔ	YΔ	YΔ	YΔ
Gearbox :				
Reduction [-]	4.39	4.13	4.13	4.13
Output speed [g/min]	328	351	351	351
Propeller:				
Number of blades [-]	2	2	2	2
Diameter [mm]	595	600	720	780
Capacity ¹⁾ [m ³ /h]	3628	3977	5335	6884
General data:				
Axial thrust force ¹⁾ [N]	1826	2158	2697	3826
Output torque ¹⁾ [Nm]	261	299	408	503
TBM weight [kg]	123	183	193	203
TBMex weight [kg]	126	187	197	207

¹⁾ in clean water. Values obtained in accordance with ISO 21630.

Mixers in Atex version (TBMex...) are manufactured in accordance with standards:
 EN60079-0 and EN 60079-1. Type: II 2G Ex d IIB T5 Gb
 EN13463-1, EN13463-5, EN13463-8. Type II 2G c k T5

6. TRANSPORT AND STORAGE

The mixer may only be lifted using the suspension points provided. The winch or lifting tackle supplied incl. the chain or cable to raise and lower the mixer in the basin may not be used as a universal form of lifting equipment.



Never hang the motor cable to handle the mixer!

ATTENTION During transport and storage, keep the machine fixed on its base support; be sure that it is well fixed in order to avoid falls that could cause damage to things, people or to the machine.

Receipt of goods

The shipment must be inspected for damage immediately on arrival. If necessary, a damage claim form must be completed in the presence of the haulage operator/driver since remedying any damage free of charge is otherwise impossible.

Storage

If the mixer has to be stored, it is essential to select a storage area that is free from oscillations and vibration in order to prevent the roller bearings from being damaged. The machine must also be stored on dry premises in which the ambient temperature is not subject to major fluctuations.

If the mixer has had to be stored for more than one year, the gearbox oil must be replaced. This must also be done even if the machine has never been in use previously. (Natural aging of mineral oil lubricants).

7. INSTALLATION



All stainless steel threads must be greased in advance with a suitable paste.

Always ensure that installation and fitting tools (cutoff disks, open-ended wrenches, screwdrivers, files, etc.) are strictly separated for use with stainless steel parts and normal steel parts. If this is not done, microscopic rust particles on these tools can be pressed into the stainless steel parts where they will trigger off a corrosive reaction that can lead to their destruction in time.



Installation must be in accordance with all local safety regulations. CRI-MAN cannot accept any liability due to improper mounting of the machine.

The fully assembled machine must be positioned and rigidly fixed using its fixing holes. In case (recommended) use of Cri-Man equipment, refer to installation instructions.

8. ELECTRICAL CONNECTIONS

8.1. Connection of electrical motor to control panel



DANGER!

The voltage-carrying and rotating parts of electric machines can cause severe or fatal injuries. Installation, connection, commissioning as well as servicing and repair work may only be carried out by qualified technicians with due regard for:

- these instructions
- all other project documentation relating to the drive, commissioning instructions and electrical
- all currently valid national and local regulations relating to safety and accident prevention

As a principle all electrical connections must be carried out by a qualified electrician.

All electrical connection necessary to operate the mixer are responsibility of the installer, who also has the responsibility to ensure that the control panel is in accordance with National rules, and that it has an adequate degree of protection with respect to installation area. Install electrical equipment in dry area. Otherwise make use of special equipment.

Electrical motor characteristics are indicated on data plate.

The mixer is supplied complete of connection to mains. The core code numbers are indicated along the corresponding cores (s. connection diagram in 8.3.4).

Before connecting the motor, the actual operating voltage must be compared with the voltage data on the motor specification plate and with the motor windings. Please refer to Fig. 8.3.

WARNING After ensuring the electric connection, ensure that the direction of rotation is correct: watching the mixer from the back side of the motor, the propeller must rotate clockwise. In order to reverse the direction of rotation, exchange two phases.

Three phases conductor (L1, L2, L3) must not be confused with neutral conductor (N) or earth conductor (yellow-green).

Do not change the position of cables coming from the electrical motor to the terminal board (U1, V1, W1, or U2, V2, W2) to avoid errors in Y- Δ starting system.

WARNING Undersized or poor-quality electrical equipment may undergo rapid contact deterioration and consequently power the motor incorrectly, which may damage the equipment. In order to ensure safe operation, install good-quality electrical equipment.

WARNING The use of inverters or soft-starters, if not correctly planned and implemented, could damage the mixer, not only in its electrical components but also the mechanical elements.

If the associated problems are not fully understood, request assistance from the Cri-Man Technical Offices.

Operation with Inverters or Soft-starters:

The structure and motor insulation used are suitable for use with Inverters and Soft-starters but some essential operating conditions must be satisfied:

- Comply with the electromagnetic compatibility directives.
- The lower threshold frequency must be regulated so that the machine does not operate below 30 Hz.
- The upper frequency threshold must be regulated so that the nominal motor power is not exceeded (max frequency 50 Hz).

The most recent inverters operate at high repetition frequencies and with sharp increases in voltage ramp. This reduces power losses and motor noise but generates sharp voltage peaks in the motor coil. These voltage peaks negatively influence the duration of transmission, relative to the operating voltage and the cable length between the motor and inverter. The voltage ramp dU / dt , typical of a PWM inverters, must be lower than $1 \text{ kV} / \mu\text{s}$. In general this value does not affect traditional asynchronous motors, like those used in the TBM series mixers, if the cable has a length less than 40 to 50m. In any case it is good practice to fit at least three sinusoidal filters between the motor and inverter and if the cable is longer than stipulated above other types of filters are required.

Any starting equipment shall be provided with:

- 1) general disconnecting switch with minimum 3 mm contact opening and suitable block in the open position;
- 2) a suitable magnetic protection device to protect cables against short circuits;
- 3) a suitable device against earth-connected failures of the mixer;
- 4) a suitable protection device against phase failure;
- 5) a voltmeter and an amperometer;
- 6) a minimum current relay, if necessary.

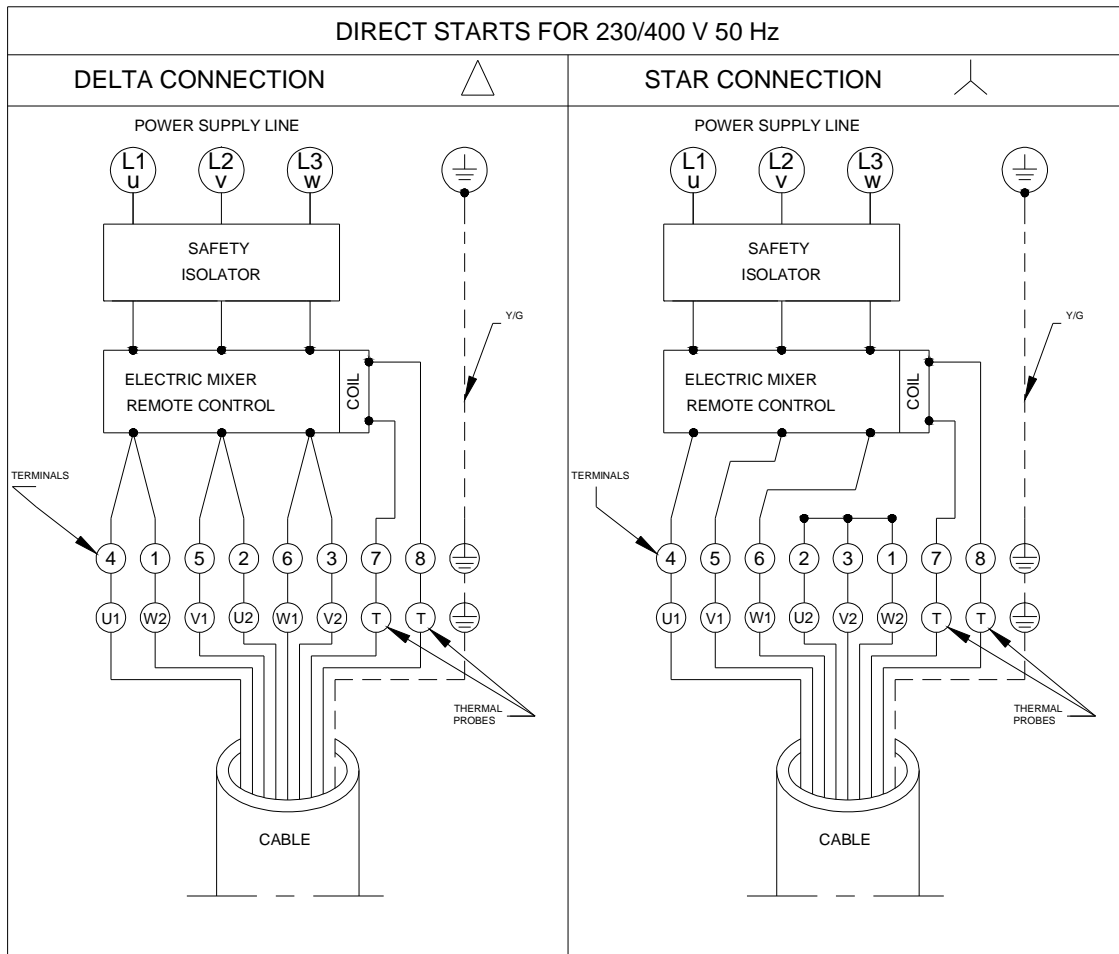
Engineers must ensure that the power system is protected against inadvertent start-up due to any failure and subsequent resetting of power supply.



Electrical connections shall be established by specifically qualified personnel in strict compliance with all applicable accident prevention regulations (CEI 64-8) and with the wiring diagrams attached to the switchboards. Ensure that the frequency and voltage values shown on the motor nameplates do correspond to those of the power supply line.

WARNING If the cables have been disconnected and reconnected, check the direction of rotation again: the phases may have been inverted. Check absorption on each phase; any unbalance must not exceed 5%. In the event that greater values are reached, which may be caused by the motor but also by the supply line, check absorption values in the other two motor-mains combinations, operating with double inversions to maintain the same direction of rotation. The best connection will be obtained when the absorption difference per phase is lower. Note that if the higher absorption is always found on the same phase of the line, the main cause for the unbalance is due to the mains power.

Connection diagram:



For Y – Δ starting, use electrical motor cables following the instructions of control panel electrical scheme.

TRIPHASE MOTOR				
MAIN VOLTAGE	MOTOR WINDINGS	• CONNECTIONS AND STARTINGS AVAILABLE		
VOLTS	VOLTS	STAR CONNECTION Y	DELTA CONNECTION Δ	Y Δ STARTING
230	230/400		•	•
	400/690			
400	230/400	•		
	400/690		•	•

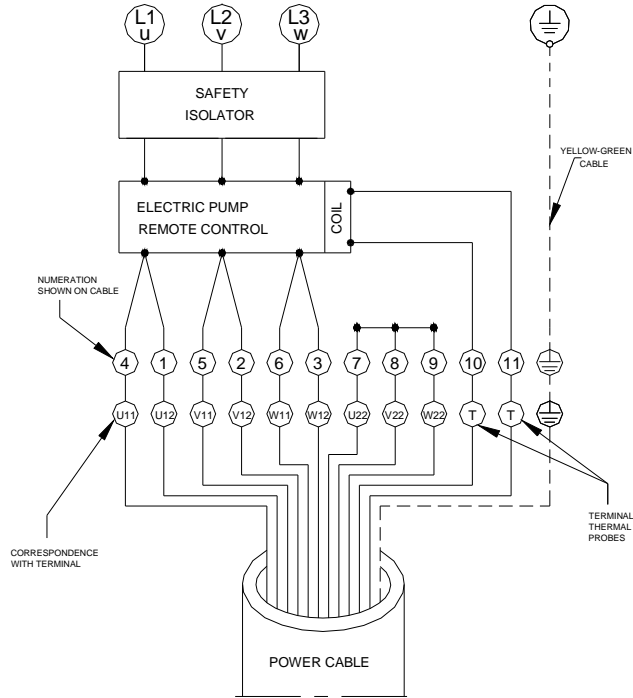
POSSIBLE DIRECT STARTS IN ELECTRIC THREE-PHASE MOTORS DUAL VOLTAGE WINDING WIRES TO 9

ELECTRIC STATOR WINDING DUAL VOLTAGE: 230/460V 60Hz

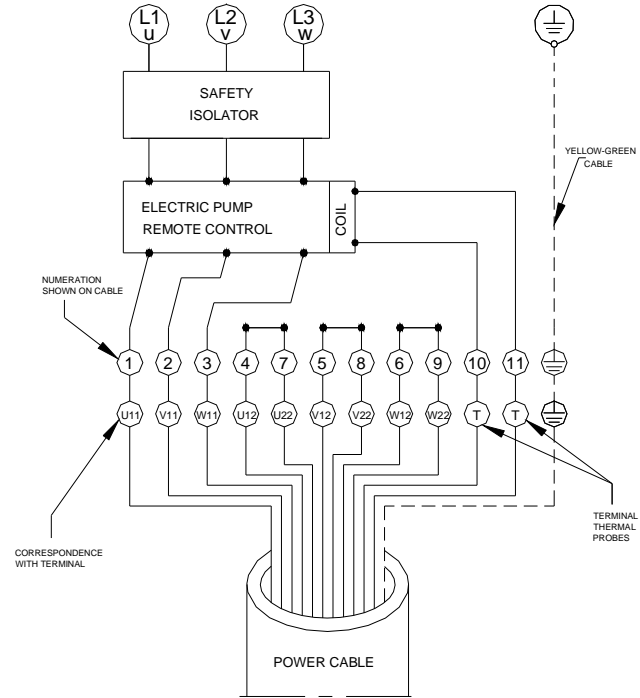
DOUBLE STAR CONNECTION 




STAR CONNECTION 

POWER SUPPLY LINE 230V 60Hz




POWER SUPPLY LINE 460V 60Hz



THREE-PHASE MOTORS WITH 9 LEADS- CONNECTIONS AND POSSIBLE STARTING					
POWER SUPPLY VOLTS	VOLTAGE ELECTRIC MOTOR WINDING VOLTS	POSSIBLE CONNECTIONS AND STARTINGS			
		DOUBLE STAR CONN. 	STAR CONNECT. 	DIRECT STARTING	START. DOUBLE ST.- ST. 
230	230/460	●		●	●
460			●	●	

A partire di luglio 2014, l'impresario visita, riproduce e comunica ai terzi il contenuto del presente disegno.

N° Mod.	Descrizione della modifica	Data	Firma	Controllo
OGGETTO	EL.CONNECT.IN THE FRAMEWORK OF POWER	DIS.	L.S.	Peso 0
SOTTOGRUPPO	00	Data	30.04.14	Quantità 0
COMPLESSO	PTS TBM 5.5-7.5-9 kW 9 MOTORS LEADS	Scala	1:1	N° Fogli 0
	MATERIALE	STATO FORNIT.	TRATT. TERMICI	
	00	00	00	
RIF. UNI	DIMENSIONI	TOLL. GENERALI		DISSEGNO
00	00	UNI-ISO 8015 UNI-EN 22769-2-nk UNI-ISO 8062-CT10		0.06567

8.2. Earth conductors connection



Yellow/Green earth terminals found in all power supply cables shall be connected to the earth circuit of the system before connecting the other terminals; for disconnection, they must be the last clamps to be disconnected.

8.3. Engine protection connections

Description

Electrical motors are equipped with thermal probes to avoid overheating. Thermal probes are normally closed bimetallic switches installed in the motor windings. It is obligatory to connect them to a suitable power source cut-out device

Once a temperature of 150°C (302°F) has been exceeded, the switches open and interrupt the power supply to the remote control coil, thus stopping the electric motor. When windings are cooled, the contacts of bimetallic switches reclose, allowing the motor to be started again. It is necessary that it should be given a new start command in case of operation of the probes: provide adequate predisposition in control panel.

The probes can be connected at a max. voltage value of 250V and have a max. capacity of 1.6A a $\cos\phi = 0.6$.

Overload protection

The motor is to be protected against overload through a thermal delay relay according to NIN. This is to be adjusted to the rated current indicated on the machine plate.

In case of star-delta starting the adjustable value is to be $I_N \times 0.58$. In both motor cables (U1, V1, W1 and U2, V2, W2) electro-thermal all-pole triggers are to be incorporated.

9. COMMISSIONING AND OPERATION

When all the checks described in paragraph 8 have been scrupulously carried out, go on to the setting up and then the running stage of the mixer. Before starting the machine, ensure that no solid parts are in the tank. Mixer cannot be started if the propeller is not immersed at least with 0.5m liquid over the higher part of the propeller. Additional requirements for mixer Atex are given in §4.

During the use of the mixer it is important to observe a series of checks and/or warnings in order to preserve mixer integrity.

These checks are detailed in §10 .

WARNING The machine is not equipped with a lighting device: it has to be installed in well-lit area.

9.1. Atex version

Once started the mixer ensure, during first hours of work, that the surface temperature of electrical motor and gear box doesn't exceed 93°C. Perform this control stopping electrical feeding of the motor and, with mixer stopped, keep it away from the liquid and put it in an area far away from the dangerous zone. In case of rising up of the temperature over the 93°C, stop immediately the machine and contact CRI-MAN.

Additional requirements for mixer Atex are given in §4.

10. PREVENTION MAINTENANCE CHECKS

To ensure a regular work of the mixer for a long while, the operator must perform regular checks and periodical maintenance and, eventually replace worn parts. The mixer comes ready for the use, complete with grease and oil like in table of §14.

	Service operation	Lubrification	Inspection
Electric motor	Keep the motor casing clean (otherwise cooling is affected). Motor casing only to be opened by the manufacturer. Check the wearing of electrical motor body: it must not be damaged, to ensure correct mechanical resistance	The roller bearings are sealed for life. (To be replaced only if they develop noise.)	Neither servicing is required.
Power cable	-	-	The power cable must be checked twice a year for surface damage, strain and kinks, etc. Immediate replacement by the manufacturer in case of damage.
Planetary gears	The gearbox must be checked for leaks twice a year .	First oil change after 500 operating hours. Then every 5,000 operating hours, or after a maximum of one year.	<u>Oil level inspection:</u> The oil level must be checked twice a year . (see page 19) If necessary top up with ISO VG 150.
Propeller	-	-	Check the mixer blades periodically. Remove any materials wound round the blades, such as ropes, threads, etc. They may cause uneven running and oscillation of the installation.

11. DECOMMISSIONING AND DISPOSAL

Before disposal, the user shall perform the necessary decommissioning and destruction operations by carefully complying with all the laws and regulations locally in force and the instructions given in this manual concerning equipment disposal.

Notice:



The symbol reported above means that the product complies with the 2011/65/UE directive (referred to as RoHS), which prohibits the introduction on the market of electric equipment containing dangerous substances to prevent possible negative consequences for the environment and human health.

Disposing of the product:



When a product bears the crossed dustbin on wheels, it means that the product is envisaged by the 2002/96/EC European directive and following 2003/108/EC directive (referred to as WEEE).

For a correct disposal of the equipment at the end of its life cycle (applicable in all the European Union member states and in other European countries envisaging a selective collection of household waste), users shall hand in the product at an appropriate collection point to recycle electric and electronic equipment.

Dismissed equipment is not waste without value; moreover, recycling helps preserving natural resources. For detailed information on the collection and recycling of this product, you can contact your municipal authorities, the local waste disposal service or the shop where it was bought.

Disposing of the package:



Waste deriving from packages must be handed in to the relevant disposal organisation.

Particular attention must be given to the decommissioning of the gearbox: the oil must be drained out and its disposing must be done complying with all the laws and regulations locally in force

12. GUARANTEE

One of the prerequisites in order to achieve the eventual recognition of the guarantee is the respect of all the individual items shown in the accompanying documentation and the best standard hydraulic, mechanical and electrical engineering, a basic condition for a smooth operation of the product. A malfunction caused by wear and/or corrosion is not covered by warranty.

In addition, in order to have warranty recognition. It is necessary that the product is preliminarily examined by our engineers or technicians of authorized service centers. The non respect of the content in the product documentation will invalidate all warranties and responsibilities.

13. TROUBLESHOOTING

13.1. Indications of problems

Problem	Cause del problema (vedi par. 13.2)
Mixer does not start up	1, 2, 3, 4, 5, 6, 7, 8
Mixer starts but switches off immediately	5, 7, 8
No or inadequate circulation produced despite the motor running	9, 10, 11, 12
Mixer runs unevenly and noisily	11, 12, 13, 14
Heavy current and power consumption	1, 2, 3, 4, 5, 10, 11, 13

13.2. Possible reasons for the problems

1. Operating voltage is not available or is inadequate
 - Check the electrical installation
 - Call in the electrician
2. Motor cable is faulty (*)
3. Faulty control system (*)
4. Mixer blades cannot rotate (**)
 - Clean the blades and manually check rotation
5. The electrical windings are faulty (*)
6. Faulty automatic system equipment (*)
7. Different phase voltages (*)
8. Motor contactor is set too low or is faulty
 - Check the thermal relay; adjust the motor contactor to rated current (§ 5)
9. Mixer blades rotate in the wrong direction
 - Transpose two phases of the mains supply
10. Mixer runs on two phases
 - Replace faulty fuses
 - Check the supply connections
11. Internal parts are excessively worn (*)
12. Propeller blades are dirty or damaged (**)
 - Clean the blades and inspect for any wear (*)
13. Faulty motor or gearbox roller bearings (*)
14. Oscillations caused by the installation (resonance) (*)

(*) : Manufacturer must be contacted

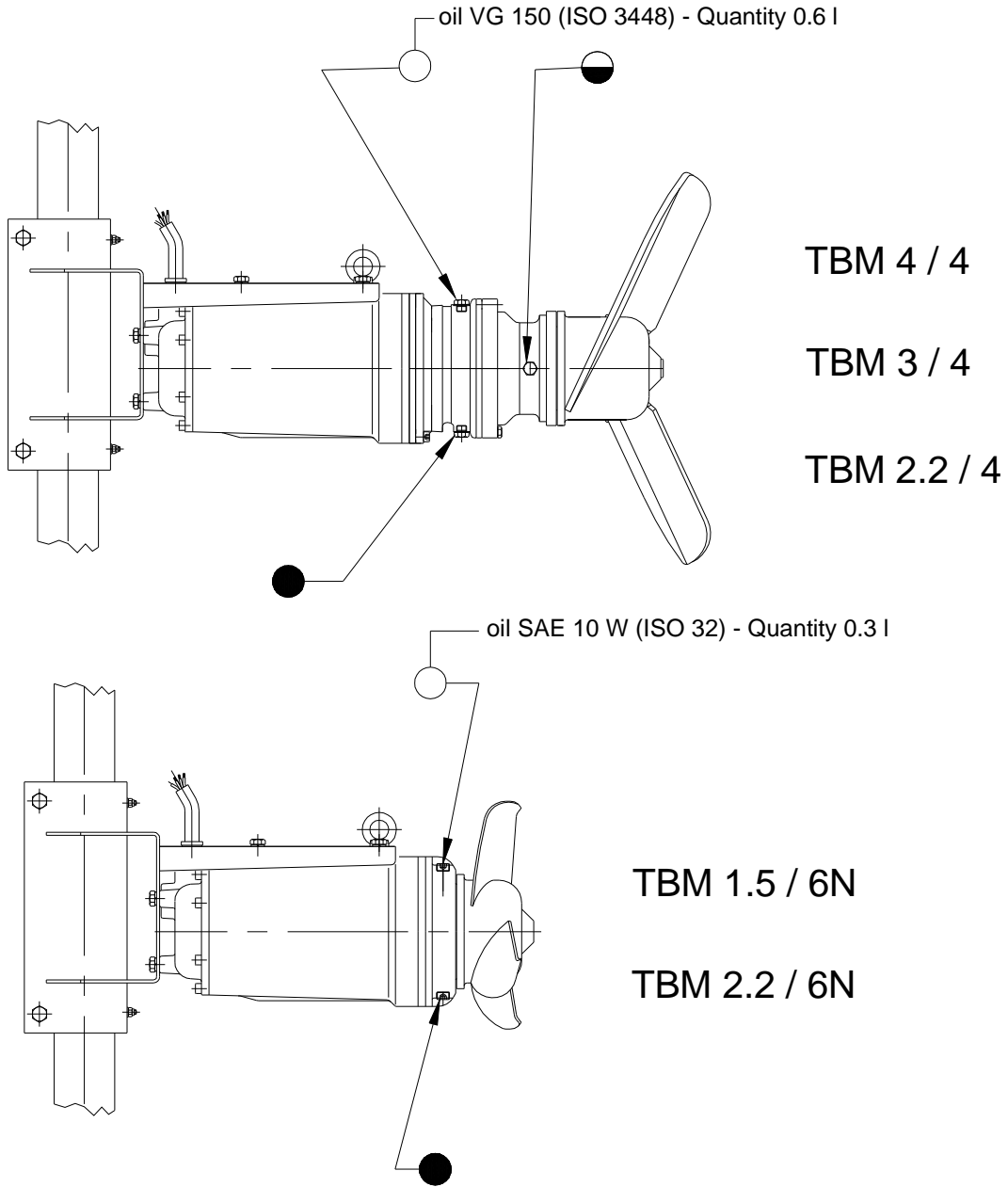
(**) : The mixer must be switched off and secured against further use

14. ANNEXES

- Lubrication diagram
- Overall dimensions
- Installation diagram
- Bill of materials
- CE declaration of conformity

CRI-MAN

LUBRICATION DIAGRAM

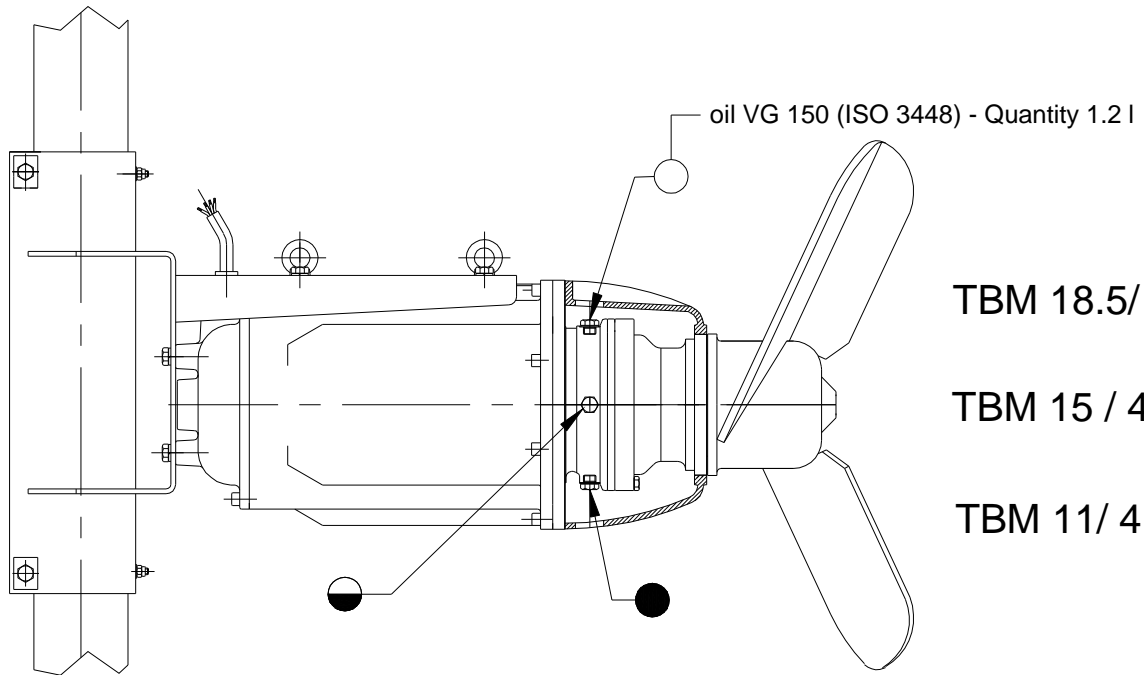


- OIL PLUG
- ◐ OIL LEVEL PLUG
- OIL DRAIN PLUG

The oil must be changed every 5000 - 7000 hours.

CRI-MAN

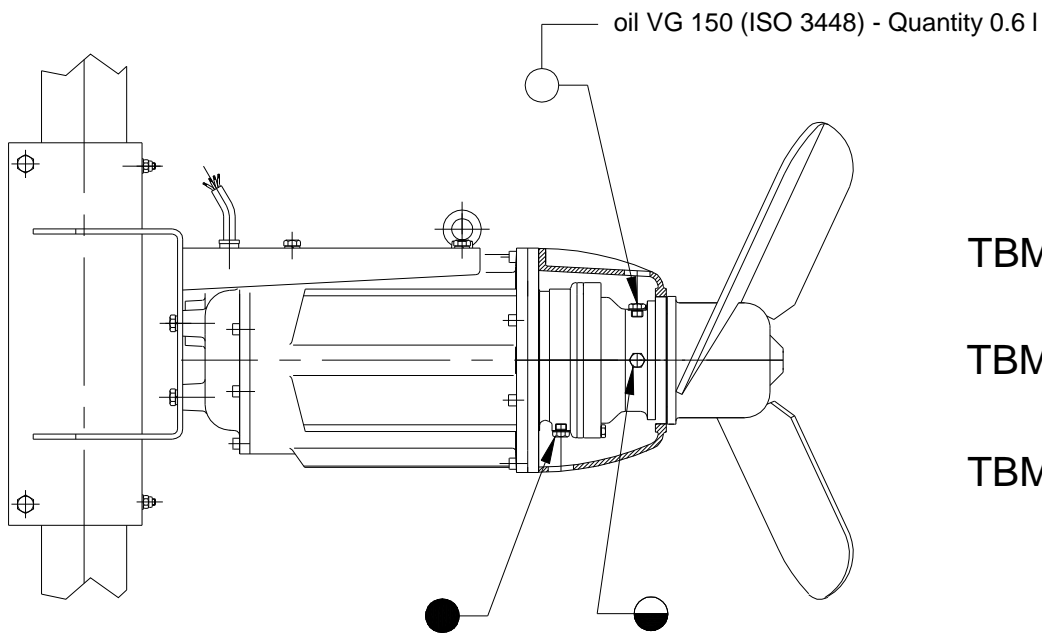
LUBRICATION DIAGRAM



TBM 18.5/ 4N

TBM 15 / 4N




TBM 11/ 4



TBM 9/ 4N

TBM 7.5 / 4N

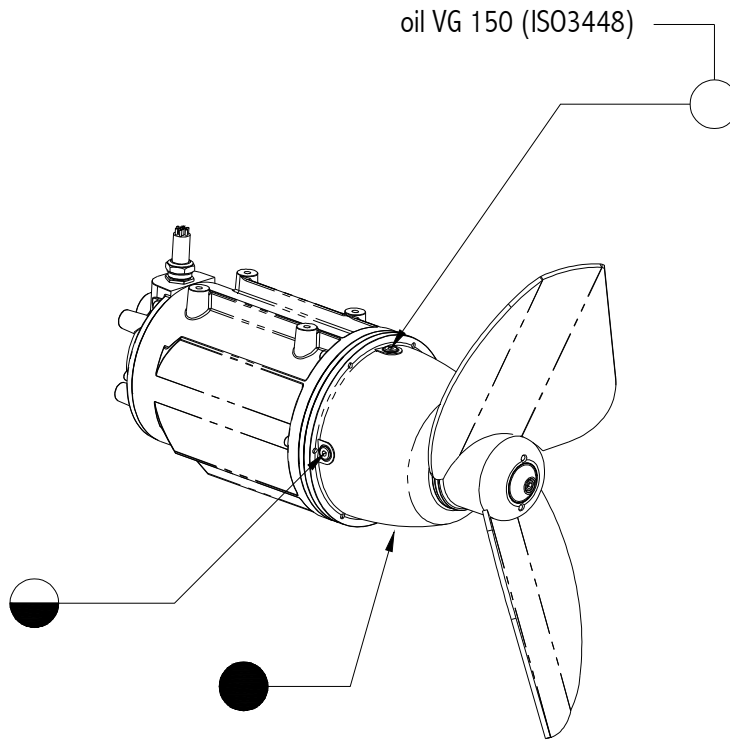
TBM 5.5/ 4N




-  OIL PLUG
-  OIL LEVEL PLUG
-  OIL DRAIN PLUG

The oil must be changed every 5000 - 7000 hours.

CRI-MAN

LUBRICATION DIAGRAM



-  OIL PLUG
-  OIL LEVEL PLUG
-  OIL DRAIN PLUG

The oil must be changed every 5000 - 7000 hours

TYPE	OIL QUANTITY
TBMex 2,2 / 4	1.5 l
TBMex 3 / 4	1.5 l
TBMex 4 / 4	1.5 l

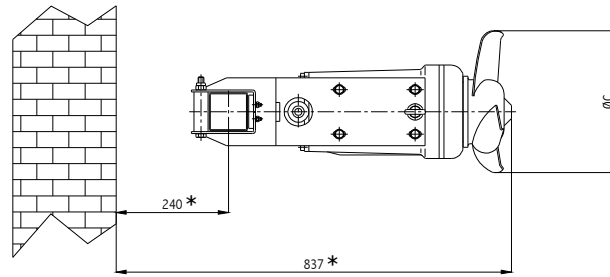
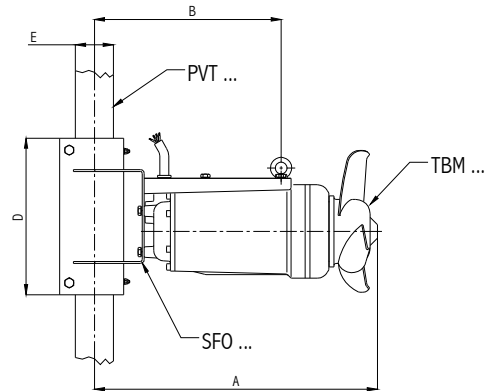
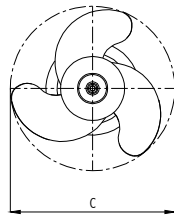
TYPE	OIL QUANTITY
TBMex 5,5 / 4	1.5 l
TBMex 7,5 / 4	1.5 l
TBMex 9 / 4	1.5 l

TYPE	OIL QUANTITY
TBMex 11 / 4	3 l
TBMex 15 / 4	3 l
TBMex 18,5 / 4	3 l

DIMENSIONI DI INGOMBRO / OVERALL DIMENSIONS

TBM 1,5 / 6N

TBM 2,2 / 6N

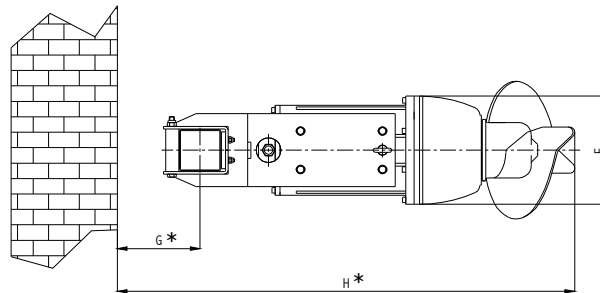
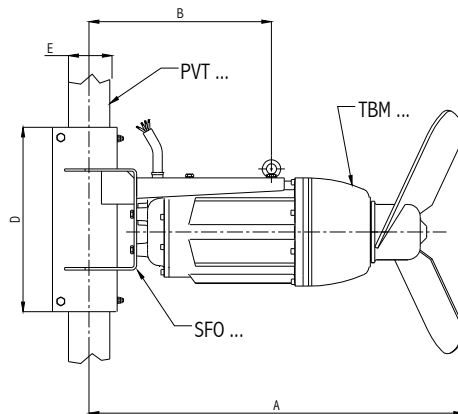
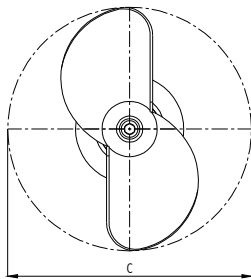


TIPO TYPE TYPE	Motore Motor Moteur	DIMENSIONI INGOMBRO OVERALL DIMENSIONS DIMENSIONS D'ENCOMBREMENT [mm]					Peso Weight Poids
	[kW]	A	B	C	D	∇ E	[kg]
TBM 1,5 / 6N	1,5	595	395	297	330	80x80	54
TBM 2,2 / 6N	2,2			347			57

* TBM + PVT/GVT + SFO

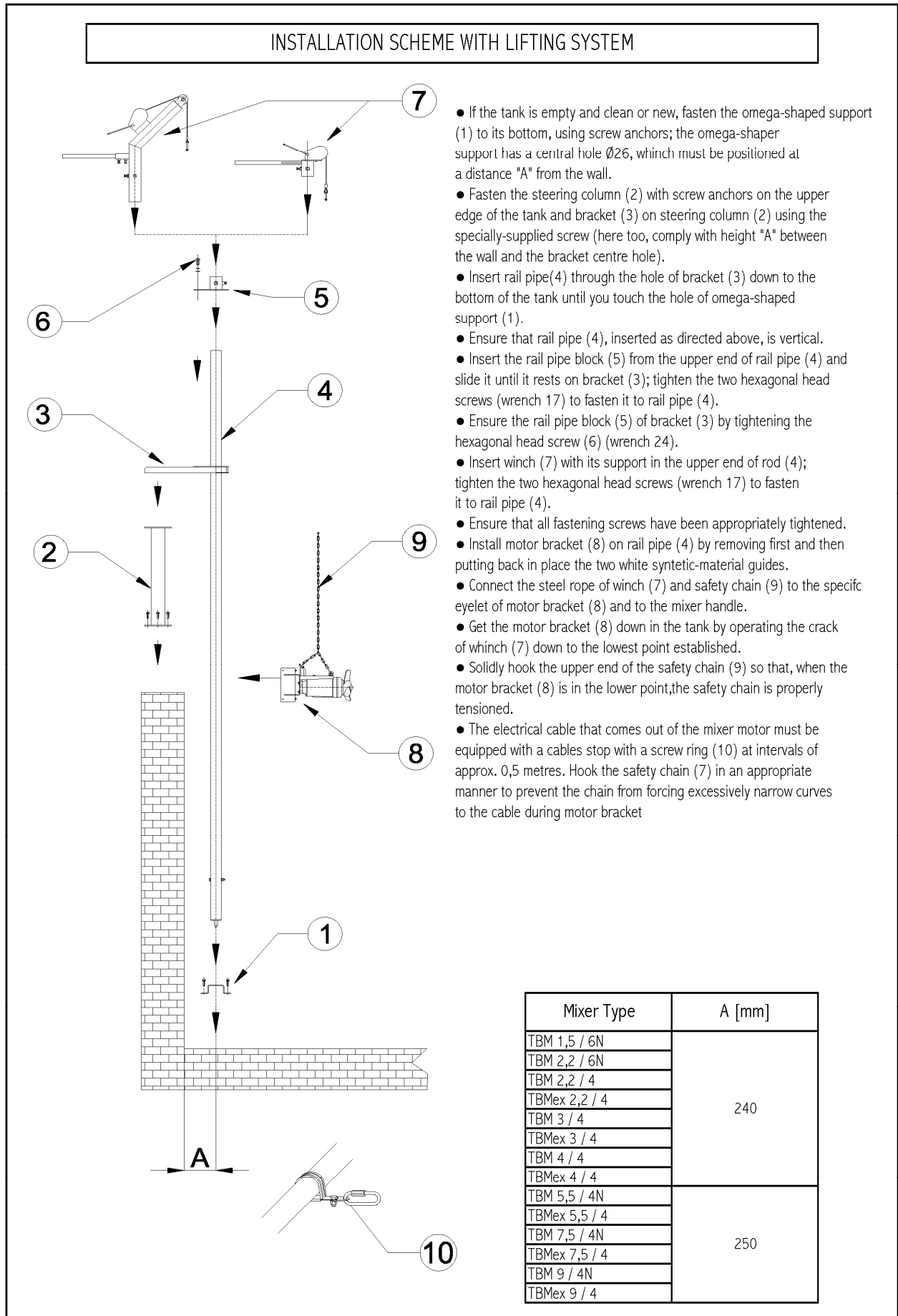
DIMENSIONI DI INGOMBRO / OVERALL DIMENSIONS

TBM 2,2 / 4	TBM 5,5 / 4N	TBM 11 / 4
TBMex 2,2 / 4	TBMex 5,5 / 4	TBMex 11 / 4
TBM 3 / 4	TBM 7,5 / 4N	TBM 15 / 4N
TBMex 3 / 4	TBMex 7,5 / 4N	TBMex 15 / 4N
TBM 4 / 4	TBM 9 / 4	TBM 18,5 / 4N
TBMex 4 / 4	TBMex 9 / 4	TBMex 18,5 / 4N



TIPO TYPE TYPE	Motore Motor Moteur	DIMENSIONI INGOMBRO OVERALL DIMENSIONS DIMENSIONS D'ENCOMBREMENT								Peso Weight Poids
	[kW]	A	B	C	D	∇ E	F	G *	H *	[kg]
TBM 2,2 / 4	2,2	820		445					1060	75
TBMex 2,2 / 4				77						
TBM 3 / 4	3	830	395	460	330	80x80	197	240	1070	78
TBMex 3 / 4				80						
TBM 4 / 4	4	840		515					1080	81
TBMex 4 / 4				83						
TBM 5,5 / 4N	5,5	889		535					1139	109
TBMex 5,5 / 4				112						
TBM 7,5 / 4N	7,5	903	445	585	450		264		1153	115
TBMex 7,5 / 4				118						
TBM 9 / 4N	9	914		595				250	1164	123
TBMex 9 / 4				126						
TBM 11 / 4	11	1035		600		100x100			1285	183
TBMex 11 / 4				187						
TBM 15 / 4N	15	1030	505	720	550		310		1280	193
TBMex 15 / 4				197						
TBM 18,5 / 4N	18,5	1045		780					1295	203
TBMex 18,5 / 4				207						

* TBM + PVT/GVT + SFO



INSTALLATION SCHEME WITH LIFTING SYSTEM

- At the end of assembly, rail pipe and motor bracket must look as illustrated in the figure shown here on the left.
- Loosen the screws (6) and check that the mixer can be freely directed both leftward and rightward by operating the lever of the support of winch (7).

CAUTION: DURING MIXER OPERATION, RAIL PIPE BLOCKER SCREWS MUST BE TIGHTENED.

- Using the crank located on winch (7), ensure that motor bracket (8) slide along the rail pipe without hard points and without finding obstacles.
- The lowest level of motor bracket (8) must be established respecting the values "B" and "C" listed in the table.

CAUTION: DURING MIXER OPERATION, THE SAFETY CHAIN (9) MUST ALWAYS BE TENSIONED, INCLUDING WHEN OPERATION IS CARRIED OUT AT DIFFERENT HEIGHT FROM THE LOWEST POSITION.

- Ensure, from time to time, that all screws are properly tightened, that the safety chain works correctly, that the motor bracket slides freely along the rail pipe and that the electrical cable is not damaged or excessively curved.
- It is important to ensure that the cable gland on the mixer motor is not damaged, to ensure its sealing.

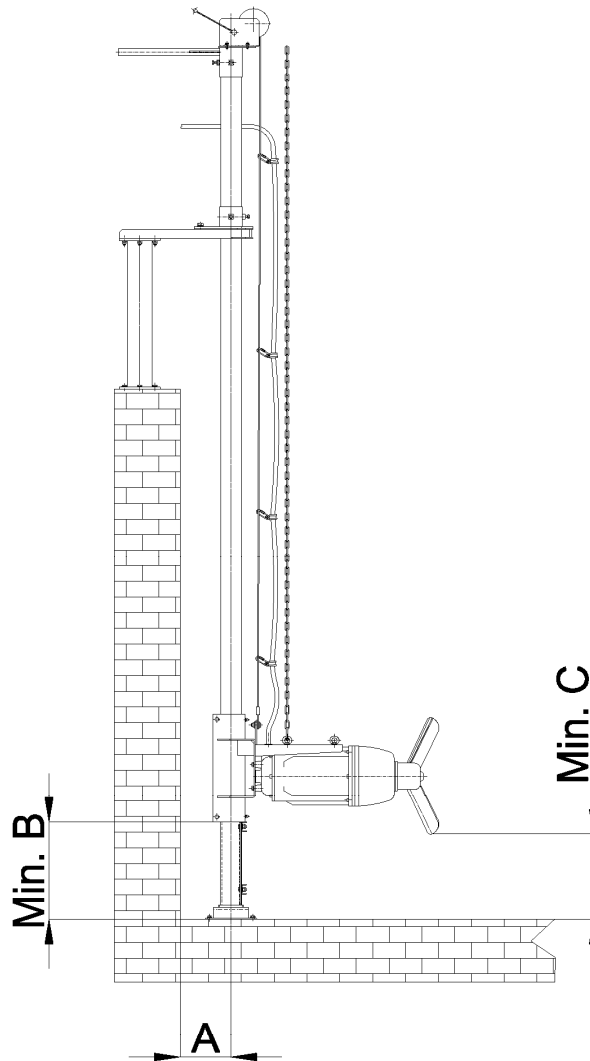
Mixer Type	Rail Pipe [mm]	Motor Bracket	A [mm]	B [mm]	C [mm]			
TBM 1,5 / 6N	PVT 80 □ 80	SFO 80	240	390	350			
TBM 2,2 / 6N				420				
TBM 2,2 / 4				520	400			
TBMex 2,2 / 4				530				
TBM 3 / 4				560				
TBMex 3 / 4				490				
TBM 4 / 4				PVT 100 □ 100		SFO 100	250	520
TBMex 4 / 4								
TBM 5,5 / 4N								
TBMex 5,5 / 4								
TBM 7,5 / 4N								
TBMex 7,5 / 4								
TBM 9 / 4N								
TBMex 9 / 4								

INSTALLATION SCHEME WITH LIFTING SYSTEM

- If the tank is empty and clean or new, fix the omega shaped support (1) to the floor of the tank using resin bolts. The centre of the pipe must be at distance "A" from the sidewall.
- Fit the cover (2) on the rail pipe (5) and insert it over the omega shaped support (1).
- Fit the column (2) to the upper edge of the tank using expansion bolts, and the bracket (3) onto the column (2) with the relevant screws (again maintaining distance "A" between the sidewall and the centre of the bracket hole).
- Check that the rail pipe (5) is vertical.
- Cut the rail pipe taking into account the projecting height required for fitting the hoist.
- Insert the rail pipe clamp (6) onto the upper end of the rail pipe (5) sliding it down until it is supported on the bracket (4), and tighten the two hexagonal head screws (hex key 17) to fix it to the rail pipe (5).
- Fix the rail pipe clamp (6) to the bracket (4) using the hexagonal head screws (7) (hex key 24).
- Slide the winch (8) onto the upper end of the rail pipe (5) with its support or hoist and tighten the two hexagonal head screws (hex key 17) to fix it to the rail pipe (5).
- Check that all the fixing screws are well tightened.
- Fit the slider (9) on the rail pipe (5), first removing and then replacing the two guides in green synthetic material.
- Connect the steel cable of the winch (8) and the safety chain (10) to the relative eyelets on the slider (9).
- Lower the slider (9) into the tank using the winch (8) crank, to the defined lowest slider position.
- Solidly fix the upper end of the safety chain (10) so that when the slider (9) is at its lowest position the chain is taut.
- The electrical cable from the mixer motor must be restrained with screw ring cable clamps (11) every 0.5 metres approximately. Fix the rings to the winch (8) cable so that when the slider moves up the rail pipe the cable is not pulled into excessively tight bends.

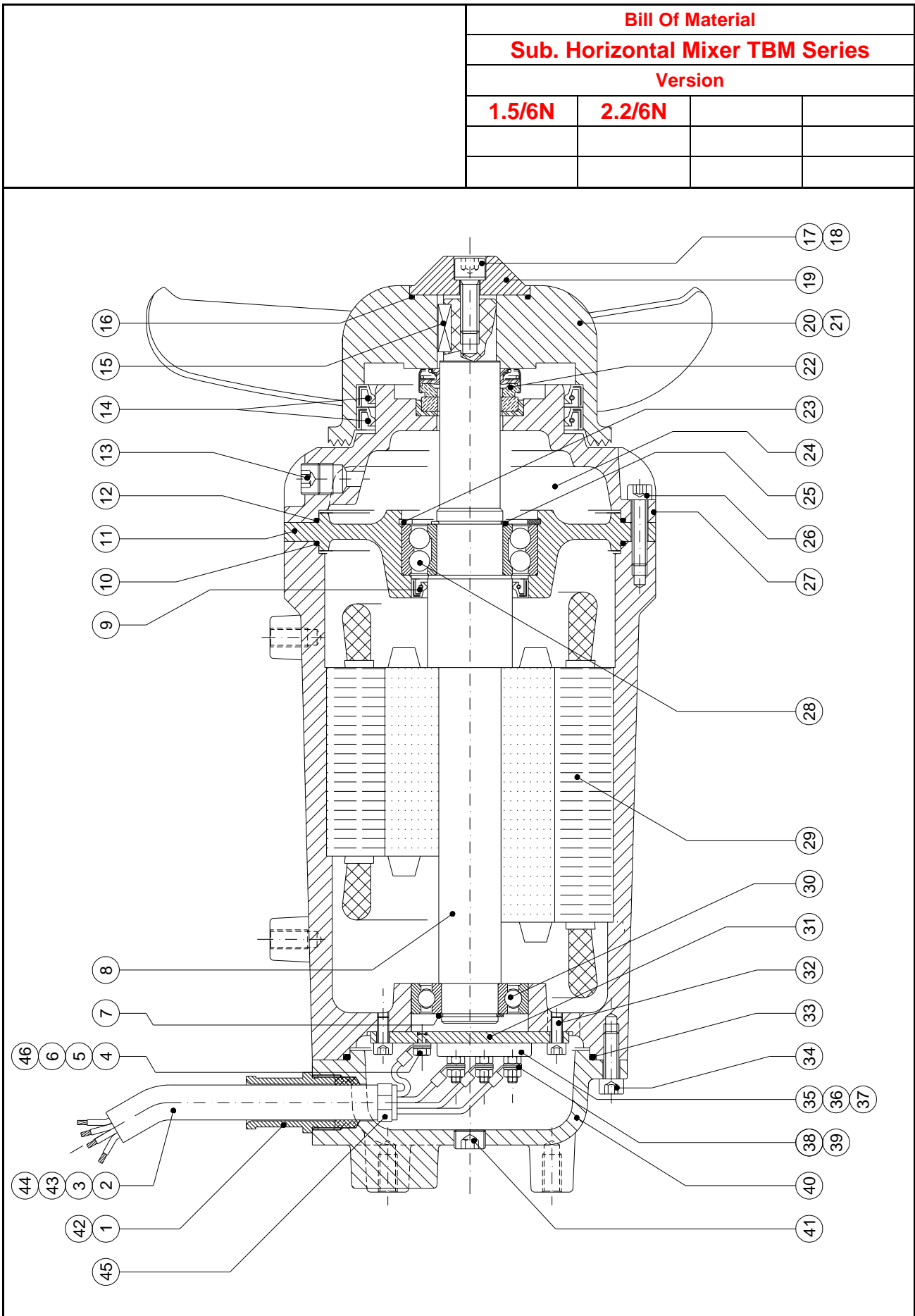
Mixer Type	A [mm]
TBM 11 / 4	250
TBMex 11 / 4	
TBM 15 / 4N	
TBMex 15 / 4	
TBM 18,5 / 4N	
TBMex 18,5 / 4	

INSTALLATION SCHEME WITH LIFTING SYSTEM

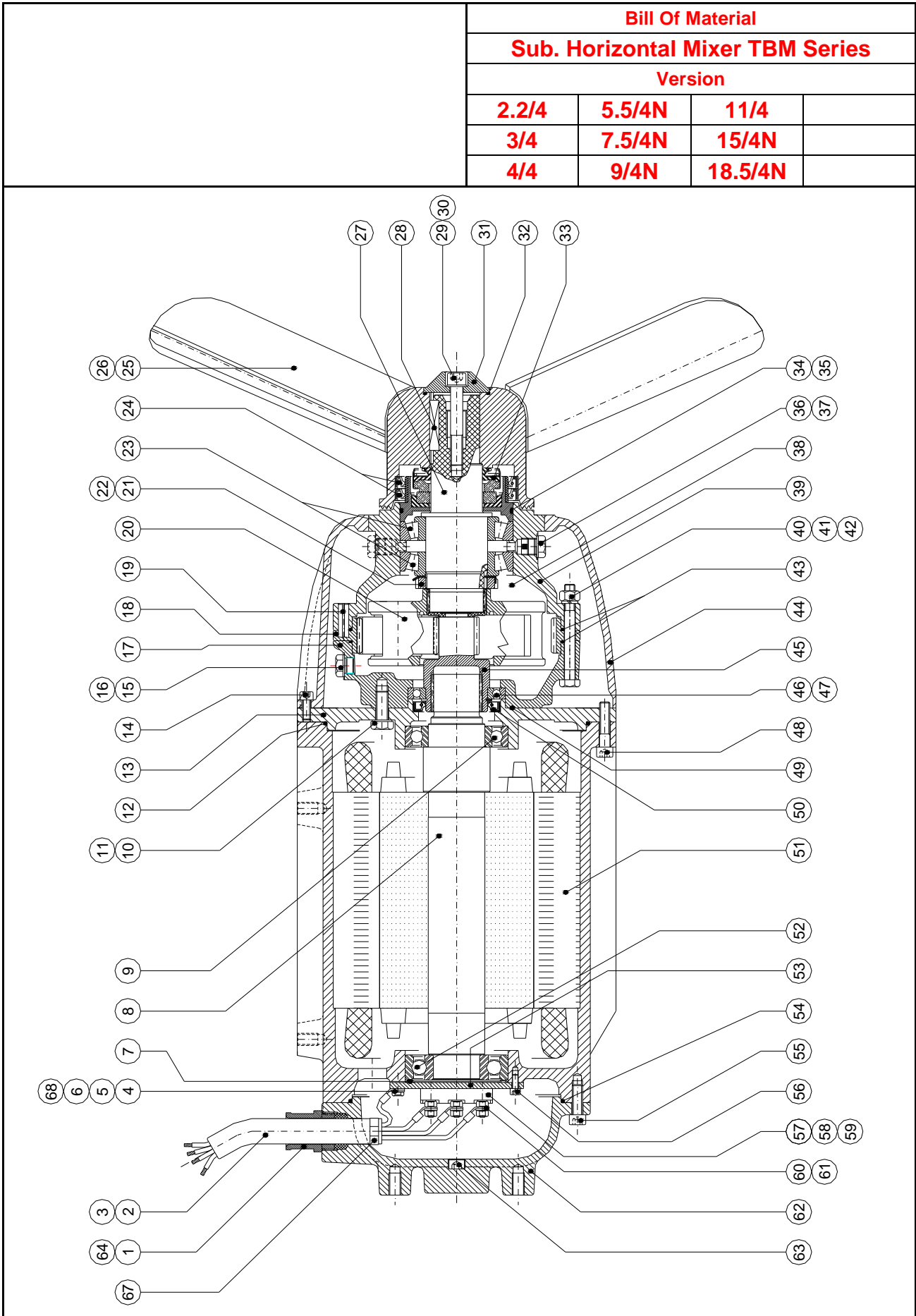


- At the end of assembly, rail pipe and motor bracket must look as illustrated in the figure shown above.
- Loosen the screws (7) and check that the mixer can be freely directed both leftward and rightward by operating the lever of the support of winch (8).
CAUTION: DURING MIXER OPERATION, RAIL PIPE BLOCKER SCREWS MUST BE TIGHTENED.
- Using the crank located on winch (8), ensure that motor bracket (9) slide along the rail pipe without hard points and without finding obstacles.
- The lowest level of motor bracket (9) must be established respecting the values "B" and "C" listed in the table.
CAUTION: DURING MIXER OPERATION, THE SAFETY CHAIN (10) MUST ALWAYS BE TENSIONED, INCLUDING WHEN OPERATION IS CARRIED OUT AT DIFFERENT HEIGHT FROM THE LOWEST POSITION.
- Ensure, from time to time, that all screws are properly tightened, that the safety chain works correctly, that the motor bracket slides freely along the rail pipe and that the electrical cable is not damaged or excessively curved.
- It is important to ensure that the cable gland on the mixer motor is not damaged, to ensure its sealing.

Mixer Type	Rail Pipe [mm]	Motor Bracket	A [mm]	B [mm]	C [mm]
TBM 11 / 4	PVT 150 ∅ 100	SFO 150	250	500	400
TBMex 11 / 4				560	
TBM 15 / 4N					
TBMex 15 / 4				590	
TBM 18,5 / 4N					
TBMex 18,5 / 4					



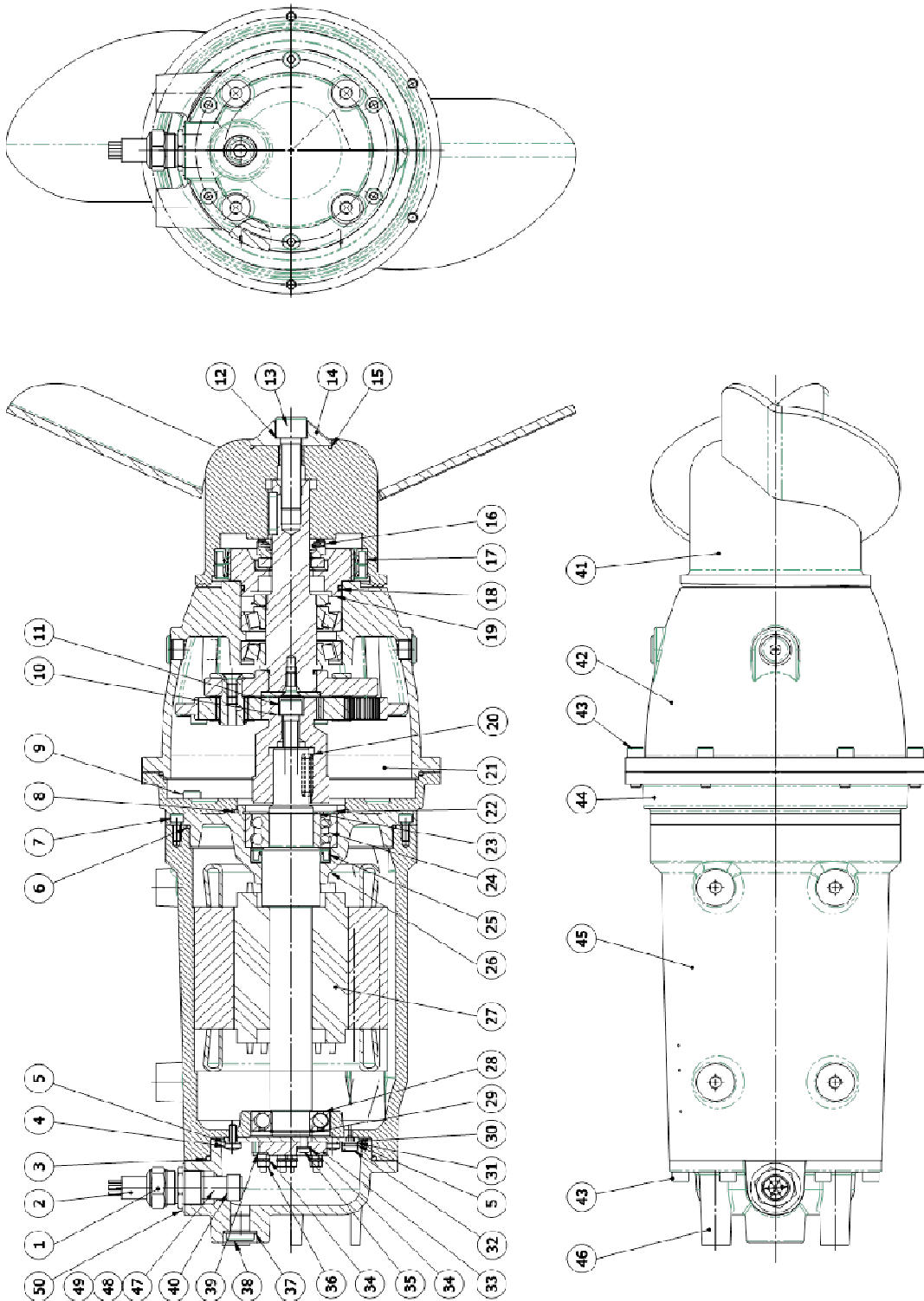
		Bill Of Material			
		Sub. Horizontal Mixer TBM Series			
		Version			
		1.5/6N	2.2/6N		
Pos.	Description				
1	Cable gland				
2	Cable				
3	Eyelet terminal				
4	Screw				
5	Washer				
6	Terminal strip				
7	Snap ring				
8	Shaft with rotor				
9	Lip seal				
10	OR ring				
11	Bearing housing				
12	OR ring				
13	Plug				
14	Lip seal				
15	Key				
16	OR ring				
17	Screw				
18	Washer				
19	Washer				
20	Propeller				
21	Screw				
22	Mechanical seal				
23	Snap ring				
24	Oil				
25	Snap ring				
26	Screw				
27	Flange for mech. Seal				
28	Bearing				
29	Motor casing+Stator				
30	Bearing				
31	Terminal strip plate				
32	Screw				
33	OR ring				
34	Screw				
35	Terminal strip				
36	Screw				
37	Washer				
38	Nut				
39	Washer				
40	Head cover				
41	Plug				
42	Gasket				
43	Sheath				
44	Seal				
45	Cable ties				
46	Tipped terminal				



		Bill Of Material			
		Sub. Horizontal Mixer TBM Series			
		Version			
		2.2/4	5.5/4N	11/4	
		3/4	7.5/4N	15/4N	
	4/4	9/4N	18.5/4N		
Pos.	Description				
1	Cable gland				
2	Cable				
3	Eyelet terminal				
4	Screw				
5	Washer				
6	Terminal strip				
7	Ring				
8	Shaft with rotor				
9	Bearing				
10	Screw				
11	Washer				
12	OR ring				
13	Bearing housing				
14	Screw	----			
15	Plug				
16					
17	Flange				
18	Crown gear				
19	Pin				
20	Reduction				
21	Ring nut				
22	Washer				
23	Bearing				
24	Lip seal				
25	Propeller				
26	Screw				
27	Propeller shaft				
28	Key				
29	Screw				
30	Washer				
31	Washer				
32	OR ring				
33	Mechanical seal				
34	Bushing				
34	Chrome plated bush				
35	OR ring				
36	Plug				
37					
38	Oil				
39	Casing				
40	Screw				
41	Nut	----	-----		
42	Washer				
43	OR ring				
44	Cover	----			

		Bill Of Material			
		Sub. Horizontal Mixer TBM Series			
		Version			
		2.2/4	5.5/4N	11/4	
		3/4	7.5/4N	15/4N	
	4/4	9/4N	18.5/4N		
Pos.	Description				
45	Pinion				
46	Bearing				
47	Snap ring				
48	Screw				
49	Gasket				
50	Lip seal				
51	Motor casing+Stator				
52	Bearing				
53	Terminal strip plate				
54	OR ring				
55	Screw				
56	Screw				
57	Terminal strip				
58	Screw				
59	Washer				
60	Nut				
61	Washer				
62	Head cover				
63	Plug				
64	Gasket				
65	Sheath				
66	Seal				
67	Cable ties				
68	Tipped terminal				

Bill of Material			
TBMex Submersible Horizontal Mixer Series			
ATEX Version			
TBMex 2,2/4	TBMex 3/4	TBMex 4/4	



		Bill of Material			
		TBMex Submersible Horizontal Mixer Series			
		ATEX Version			
		TBMex 2,2/4	TBMex 3/4	TBMex 4/4	
Pos.	Description				
1	Cable gland				
2	Cable				
3	OR Ring				
4	Screw				
5	Washer				
6	OR Ring				
7	Screw				
8	OR Ring				
9	Screw				
10	Washer				
11	Screw				
12	Washer				
13	Screw				
14	Washer				
15	OR Ring				
16	Mechanical seal				
17	Lip seal				
18	OR Ring				
19	Bush + Ceramic coated bush				
20	Key				
21	Oil				
22	Snap ring				
23	Snap ring				
24	Bearing				
25	Lip seal				
26	Bearing housing				
27	Shaft with rotor				
28	Bearing				
29	Snap ring				
30	Terminal strip plate				
31	Washer				
32	Screw				
33	Terminal strip				
34	Washer				
35	Screw				
36	Nut				
37	Gasket				
38	Plug				
39	Washer				
40	Cable ties				
41	Propeller				
42	Planetary gear box				

		Bill of Material			
		TBMex Submersible Horizontal Mixer Series			
		ATEX Version			
		TBMex 2,2/4	TBMex 3/4	TBMex 4/4	
Pos.	Description				
43	Screw				
44	Gear box support				
45	Motor casing+Stator				
46	Head cover				
47	Eyelet terminal				
48	Flying terminal				
49	Tipped terminal				
50	Gasket				

	Bill of Material		
	TBMex Submersible Horizontal Mixer Series		
	ATEX Version		
	TBMex 5,5/4	TBMex 7,5/4	TBMex 9,2/4

		Bill of Material			
		TBMex Submersible Horizontal Mixer Series			
		ATEX Version			
		TBMex 5,5/4	TBMex 7,5/4	TBMex 9,2/4	
Pos.	Description				
1	Cable gland				
2	Cable				
3	OR Ring				
4	Screw				
5	Grower washer				
6	Plain washer				
7	OR Ring				
8	Plain washer				
9	Screw				
10	Key				
11	Plain washer				
12	Screw				
13	Plain washer				
14	Screw				
15	Washer				
16	OR Ring				
17	Mechanical seal				
18	Lip seal				
19	OR Ring				
20	Bush + Ceramic coated bush				
21	Oil				
22	Lip seal				
23	Snap ring				
24	Bearing				
25	Coupling				
26	Shaft with rotor				
27	Bearing				
28	Snap ring				
29	Terminal strip plate				
30	Screw				
31	Terminal strip				
32	Nut				
33	Cable ties				
34	Gasket				
35	Plug				
36	Propeller 5,5 kW				
37	Planetary gear box				
38	Bearing housing				
39	Screw				
40	Motor casing+Stator kW				

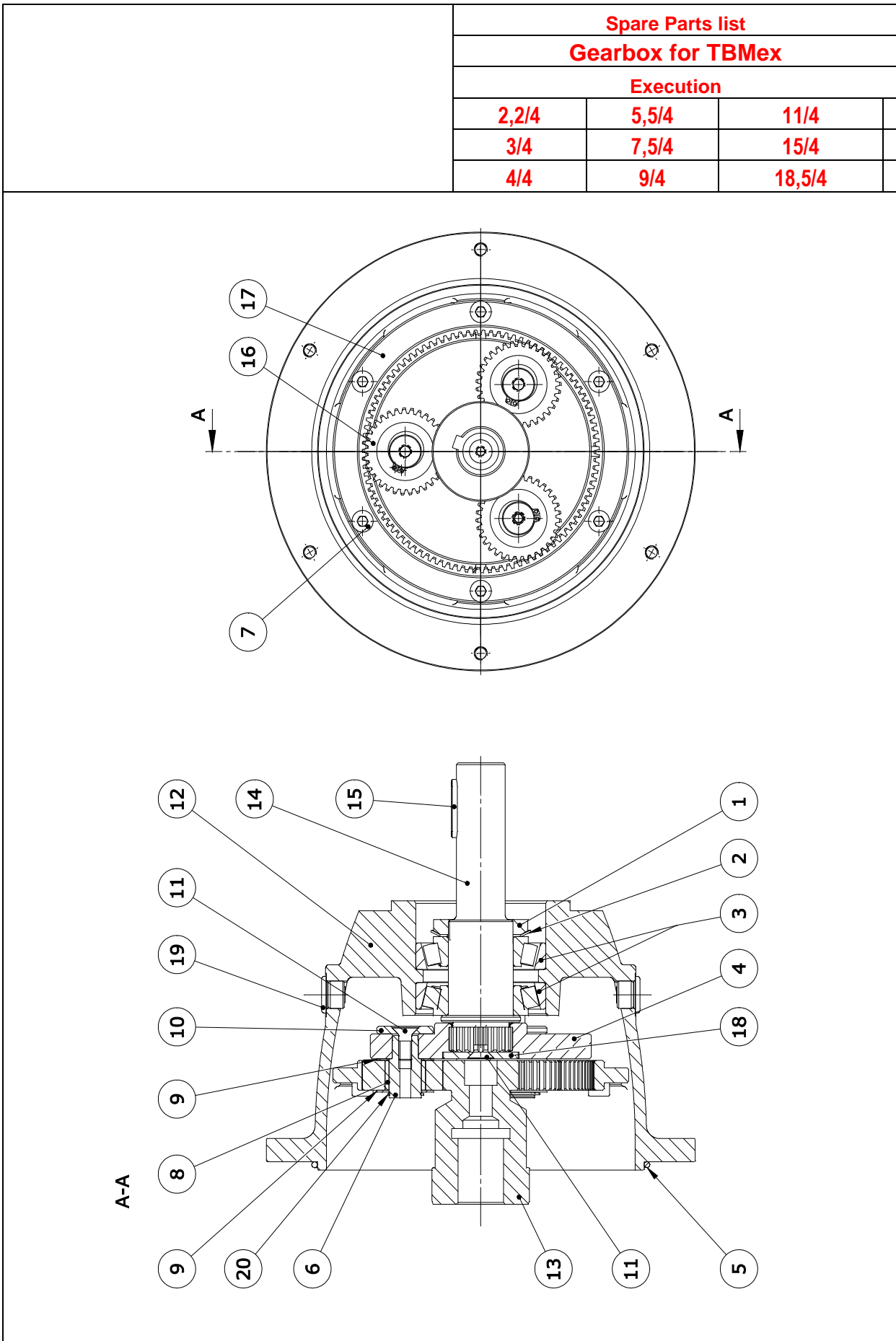
		Bill of Material			
		TBMex Submersible Horizontal Mixer Series			
		ATEX Version			
		TBMex 5,5/4	TBMex 7,5/4	TBMex 9,2/4	
Pos.	Description				
41	Screw				
42	Head cover				
43	Eyelet terminal				
44	Flying terminal				
45	Tipped terminal				
46	Gasket				
47	Spacer Ring				
48	Thrust Ring				

Bill of Material			
TBMex Submersible Horizontal Mixer Series			
ATEX Version			
TBMex 11/4	TBMex 15/4	TBMex 18,5/4	

The technical drawings illustrate the components of the TBMex Submersible Horizontal Mixer Series. The top view shows the circular mixer head with two mixing blades and callouts 22 and 23. The cross-section view (middle) details the internal shaft, bearings, seals, and mixing blades, with callouts 1 through 47. The side view (bottom) shows the mixer head and shaft assembly with callouts 37 through 43.

		Bill of Material			
		TBMex Submersible Horizontal Mixer Series			
		ATEX Version			
		TBMex 11/4	TBMex 15/4	TBMex 18,5/4	
Pos.	Description				
1	Cable gland				
2	Cable				
3	OR Ring				
4	Screw				
5	Washer				
6	Washer				
7	OR Ring				
8	Washer				
9	Screw				
10	Key				
11	Screw				
12	Washer				
13	Screw				
14	Washer				
15	OR Ring				
16	Mechanical seal				
17	Lip seal				
18	OR Ring				
19	Bush + Ceramic coated bush				
20	Oil				
21	Lip seal				
22	Plug				
23	Gasket				
24	Bearing				
25	Coupling				
26	Shaft with rotor				
27	Bearing				
28	Ring				
29	Terminal strip plate				
30	Screw				
31	Terminal strip				
32	Washer				
33	Washer				
34	Nut				
35	Screw				
36	Cable ties				
37	Propeller				
38	Planetary gear box				
39	Bearing housing				
40	Screw				
41	Motor casing+Stator				
42	Screw				

		Bill of Material			
		TBMex Submersible Horizontal Mixer Series			
		ATEX Version			
		TBMex 11/4	TBMex 15/4	TBMex 18,5/4	
Pos.	Description				
43	Head cover				
44	Eyelet terminal				
45	Flying terminal				
46	Tipped terminal				
47	Gasket				



		Spare Part list			
		Gearbox for TBMex			
		Execution			
		2,2/4	5,5/4	11/4	
		3/4	7,5/4	15/4	
		4/4	9/4	18,5/4	
Pos.	Description				
1	Ring nut				
2	Ring nut washer				
3	Bearing				
4	Planetary gear disk			---	
5	Gasket				
6	Planetary gear shaft				
7	Screw				
8	Pin				
9	Fifth weel				
10	Washer				
11	Screw				
12	Casing				
13	Toothed shaft				
14	Output shaft				
15	Key				
16	Planetary gear				
17	Crown gear				
18	Washer				
19	Nut				
20	Seeger				



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http://www.cri-man.com

**CHOPPER PUMPS
MIXER
SEPARATORS**

CONFORMITY DECLARATION

The undersigned manufacturing Company as depositary of documentation

CRI-MAN s.r.l.
Via Costituzione, 50/F
42015 Correggio (RE)

Declare that the machine

Type: Submersible Horizontal Mixer.

Operation: To mix and homogenize deep liquids with a max 12% of solid content and a max 40°C temperature.

Model: TBM series.

Serial Number:(¹)

is in compliance with the Community enforceable rules 2006/42/CE, 2004/108/CE, 2006/95/CE, 2002/95/CE.

Community enforced rules: EN ISO 12100:21010.

Correggio (RE),(¹)

CRI-MAN s.r.l.
(Oreste Massari, President)

(¹) If this space is not drawn up, please see on the front page of the present manual or on the CE plate of the machine.



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**CHOPPER PUMPS
 MIXER
 SEPARATORS**

ATEX CONFORMITY DECLARATION

The producer

CRI-MAN s.r.l.
 Via costituzione, 50/F
 42015 Correggio (RE)

Declares that following machine:

Type: Submersible Horizontal Mixer.

Model: TBMex series

Serial number:(¹)

classified in Group II, Category 2 as per Art.1, Paragraph 3 and per Annex I of Directive,
 is in compliance with Directive Atex (94/9/CE and following modifies) disposal and with National
 actuating disposal.

Due to machine classification, here declares that it can be utilized in potentially explosive
 atmospheres classified in Directive 94/9/CE in following:

Zone1,

Zone2

The total composition is:

Component	Classification	Assessment procedure
Electrical motor	II 2G Ex d IIB T5 Gb	CE Type exam – Annex III Production quality – annex IV
Gear box + propeller	II 2G ck T5	Internal production – annex VIII

Declares that the specified machine is in compliance with the prototype which passed the CE type
 certification N. ISSeP13ATEX034, from the notified body:

INSTITUT SCIENTIFIQUE DE SERVICE PUBLIC,
 Zoning A, Schweitzer, rue da la Platinerie B-7340 COLFONTAINE (Wasmès)

Declares that the notified body that periodically checks the quality system is

TÜV ITALIA S.R.L.

TÜV SÜD Group

Via Giosuè Carducci, 125 20099 Sesto San Giovanni (MI)

Number of notification of quality assurance of production: TÜV IT 13 ATEX 078 Q

CRI-MAN s.r.l.
 (Oreste Massari, Presidente)

(¹) If this space is not drawn up, please see on the front page of the present manual or on the CE
 plate of the machine.