



Manual Vertical Agitators

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Please read this manual carefully before installing, commissioning or operating the vertical agitators



1. INTENDED USE

Vertical agitators are exclusively designed to circulate ice water or brines in refrigeration systems.

2. SAFETY REQUIREMENTS

Any work with refrigeration systems must be carried out by trained personnel. All safety regulations concerning prevention of accidents or use of refrigerants/brines must be adhered to.

Any electrical work must be executed by professional electricians that follow the relevant safety regulations and codes of practice to avoid accidents.

Under no circumstances are the indicated limitations on the data plate and drawings to be exceeded!

3. TERMS OF WARRANTY

To prevent accidents and for the safe operation of the refrigerant plant no modifications or alterations may be carried out to the vertical agitators without written approval by TH. WITT Kältemaschinenfabrik GmbH.

Our liability or warranty is excluded, if:

- The instructions in this manual are not adhered to
- The vertical agitators and its equipment was operated incorrectly or the handling was not in accordance with the mentioned procedures
- The vertical agitator is used for purposes other than that for which it was intended to
- Safety devices were not used or disconnected
- There have been modifications made without written approval
- During installation or operation the safety requirements were not adhered to

Vertical agitators are not intended for end users, but for use in a refrigeration system. Start up is not permitted until a safety analysis for the entire system has been carried out that follows the regulations of the machinery directive 98/37/EG.

The provided information for the vertical agitators is based on our extensive experience. Translations have been made to the best of our knowledge. We are unable to accept any liability for errors in translation.

4. SCOPE OF DELIVERY

The vertical agitators are assembled with an electrical motor mounted onto a base plate.

Bulkhead with channel frame, dividing plates or vortex breaker are excluded from our scope of the supply. These items should be provided by others on site.

5. TECHN. DATA

Materials

Agitator propeller:	Bronze
Shaft:	Stainless steel
Housing:	Galvanized steel*
Bearing:	Plastic material
Coupling:	Steel
Base frame:	Steel

* Upon request, at an additional price, an additional 2-K – Epoxy finish (W 9.2) with a nominal thickness of 100µm can be applied.



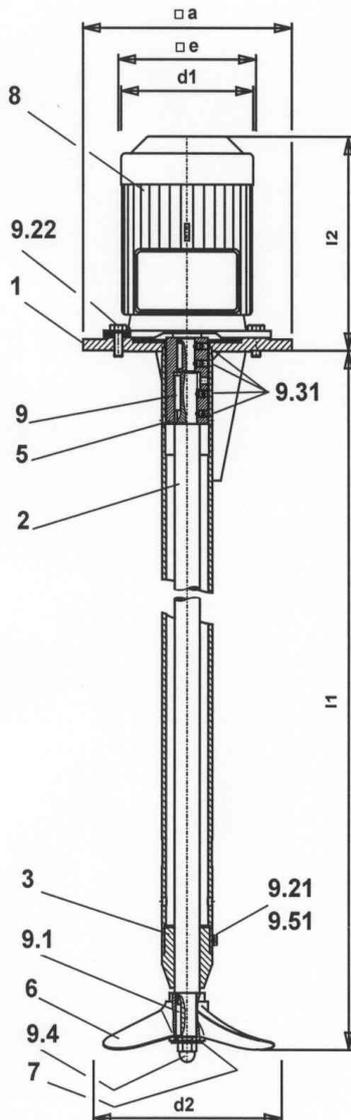
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Dimensions

		30L	30	50	75	75S	150L	150
Length	l1	665		685			913	
Length of extended shaft	l1 ^①	965		985			1213	
Ca. at 50 Hz	l2	270		320	340	-	420	
Ca. at 60 Hz	l2	270	300	340	-	420		
Base plate	a	250			325			
Bolt circle	e	210			285			
Motor ø	d1	160	180	210	230	270		
Propeller ø	d2	225		300	325	380		

Weights

		30L	30	50	75	75S	150 L	150
ca at 50 Hz	[kg]	26	29	44	51	-	95	100
ca at 60 Hz	[kg]	28	32	52	-	108	107	108

Parts list

Part	Pcs	Description
1	1	Housing
2	1	Shaft
3	1	Bearingr
4		n.a.
5	1	Coupling
6	1	Agitator Propeller
7	1	End disc
8	1	Electrical Motor
9	1	key
9.1	1	key
9.21	1	Hexagon head screw
9.22	4	Hexagon screw with nut
9.31	4	Threaded stud
9.4	1	Nut
9.51	1	Spring ring

Capacity/Motor data

			30L	30	50	75	75S	150L	150
Motor 50 Hz (V1/B5/IP55)	Volume flow ca.	m ³ /h	200	300	500	750	-	1100	1500
	Nominal capacity	kW	0,37	1,1	1,5	2,2	-	2,2	4
	Voltage	V ^②	Δ/Y 240/400: 220-240V Δ, 380-420V Y					Δ/Y 240/400	Δ/Y 400/690 ^③
	Rotations	RPM	1000	1500	1000	1000	-	750	1000
	Motor size		80	90S	100L	112M	-	132S	132M
	Currency at 415 V ca.	A	1,35	2,9	4,2	5,7	-	6,3	10
Motor 60 Hz (V1/B5/IP55)	Volume flow ca.	m ³ /h	240	360	600	-	900	1300	1800
	Nominal capacity	kW	0,66	1,8	2,6	-	3,6	3,6	6,6
	Voltage	V	Δ/Y 265/460: 254-280V Δ, 440-480V Y					Δ460: 440-480V Δ,	
	Rotations	RPM	1200	1800	1200	-	1200	900	1200
	Motor size		80	90L	112M	-	132S	132M	132M
	Currency at 440 V ca.	A	1,75	3,7	5,8	-	7,8	7,5	14

① There are also special extended shafts available (l1 + 1 ... 300 mm) upon request

② Voltages between 125 ... 600 V upon request

③ Δ/Y 400/690: 380-420V Δ, 380-420V Y, also at 50 Hz 220-240V Δ, 380-420V Y can be supplied without additional cost



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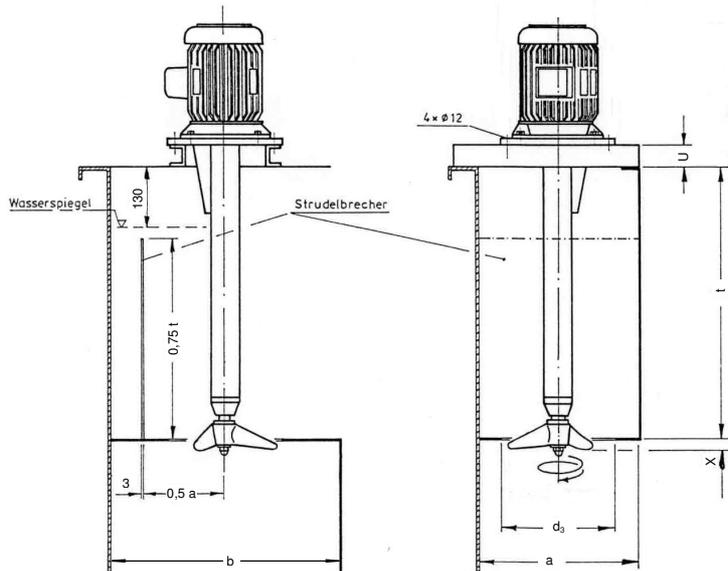
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6. SELECTION



The following table lists recommendations for the dimensions of the bulkhead design depending on the vertical agitator size.

		VR	30L	30	50	75	75S	150L	150
Bulkhead	Length	a	350	500			600		
	Width	b	<500	500	750	1000			
	Opening-Ø,	d3	250	325	350		400		
	Support frame	u	50					65	

Tank height H	Dimension of t with vertical agitator VR					
	30 L	30	50	75/75S	150 L	150
750	600	600	--	--	--	--
870	600	600	--	--	--	--
950	600	600	--	--	--	--
1000	--	600	600	--	--	--
1140	--	600	600	--	--	--
1250	--	600	600	--	--	--
1340	--	600	600	600	--	--
1370	--	600	600	600	--	--
1500	--	--	600	600	--	--
1600	--	--	--	750	800	800
1650	--	--	--	750	800	800
1700	--	--	--	750	800	800
1750	--	--	--	750	800	800
1830	--	--	--	750	800	800
2000	--	--	--	900	800	800
2100	--	--	--	900	1100	1100
2200	--	--	--	900	1100	1100
2250	--	--	--	900	1100	1100



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7. DESCRIPTION OF OPERATION

WITT vertical agitators operate like propellers of ships. They are designed to circulate water or brine for optimum turbulence within a tank.

Models that are marked with "L" have a lower frequency (capacity). Model 30L is particularly designed for smaller tank (< ca. 1,0 m height) and model 150L for short tank, to avoid excessive turbulence (see selection)

The flow circulated is dependant on the resistances (geometry within the water or brine tank) and the density of the fluid used. With fluids of high density ($> 1000 \text{ kg/m}^3$) it is recommended to use a higher-powered motor of the same frame size.

When circulating ice water within the tank special attention should be paid to provide sufficient space for the re-circulating return water when freezing ice around the pipe serpentines. Care has to be taken to avoid pressure increasing to an unacceptable high value, preventing the vertical agitator from operating properly.



When using brines with temperatures below -15°C a larger kW motor of the next higher capacity step should be selected.

8. SHIPPING AND STORAGE

The vertical agitator is supplied in a special packing case to protect it against damages.

Upon receipt please unpack the agitator and check for possible damage during shipping and the correct scope of equipment supplied. In case of any damage or missing parts inform your supplier immediately.

9. Installation

The bulkhead design should be optimised for the fluid circulation. Photos/sketches in chapter 6 shows a possible bulkhead design.

The vertical agitators should be mounted with its base plate on channel supports (excluded from WITT scope of supply) and be fixed to the tank. Use care to align the vertical agitator in the centre of the bulkhead so it cannot touch the bulkhead sidewalls.

The vertical distance between fluid level and tank top should be approximately 130 mm.



Additional consideration should be made for sufficient space for service and maintenance of the agitator.

After installation of the vertical agitator the electrical connections should be carried out from a professional electrician according to the motor connection specification.

10. COMMISSIONING

Commissioning and start up of the vertical agitators is not permitted until a safety analysis of the entire refrigeration installation has been carried out.

The entire system has to undergo a documented functioning check.

Please check in particular that

- The vertical agitator is installed according to the drawings
- Electrical connections are made in accordance with the local regulations and safety standards
- Free and easy rotation of the propeller
- Proper rotation is provided (clockwise)
- The vertical agitator is securely mounted to the base plate
- The electrical motor is protected from splashing fluids (water or brine)



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11. OPERATION

During start (ice water pumps switched on) or during the freeze on period the vertical agitators will provide a good circulation, resulting in an even ice layer around the pipe serpentines.

Please pay attention to the following

- Foreign elements, such as ice floes are not permitted in the bulkhead to avoid the danger of breaking the propellers or damaging the bearings.
- Dry running of the vertical agitators must be avoided, because the slide bearings will always require sufficient cooling by the re-circulating fluid.

12. SERVICE AND MAINTENANCE

The long-life bearing is maintenance free when covered with fluid (water or brine).

When repairing the vertical agitators use only genuine spare parts. When ordering parts indicate model and year of manufacture.