Tango hp=1

Operating Instructions and Safety Instructions
mvt Rotary Nozzle, 3000 bar

Before using the equipment for the first time, read these operating instructions including the safety instructions. Act in accordance with all these instructions. Keep them for use later on and hand them over to subsequent owners of the equipment.

In addition to the operating instructions, the general statutory safety and accident prevention regulations must be observed.

Contents

1 Safety

1.1 Important information

If the equipment is used improperly, the high-pressure jet from the nozzle can be dangerous and result in serious injury and damage. **The water jet must never be aimed at people, animals, active electrical equipment or at the high-pressure cleaner itself.**
Before use, the high-pressure hoses, the high-pressure spray gun and the pump must all, without fail, be inspected for possible damage. Hose lines must not be pinched, fed over sharp edges, driven over by vehicles, tugged or bent. The rotary nozzle must not be operated if any of the components mentioned above are damaged.
Any person engaged in operating, servicing, inspecting or assembling the equipment must be appropriately qualified to carry out those tasks. The company operating the equipment must produce precise instructions covering areas of responsibility, competence and how employees are supervised.
Training and instruction must be given to any employees who do not have the necessary skills and knowledge. If necessary, the manufacturer or supplier can provide this training on behalf of the company operating the machine or pump. The company operating the equipment must also ensure that their employees fully understand the contents of these operating instructions.

In addition to the safety instructions mentioned in these operating instructions, the relevant statutory accident prevention and safety regulations must be observed and adhered to!

1.2 Significant risks

⇨ **Risk from the possible escape of liquid under high pressure**
The water jet from high-pressure water jet equipment nozzles poses a risk due to its cutting effect and its ability to penetrate objects, and because the high-pressure water jet nozzle and hose may change direction or wander. Serious or even fatal injuries may be caused. Hazardous substances may be released and it is also possible that parts of any object being cleaned by the water jet may become loose.

⇨ **Risk posed by handheld spray fixtures**
Handheld spray fixtures pose a particular mechanical risk due to the recoil forces from the water jet.

⇨ **Risk posed by noise**
Exposure to noise poses a risk. Exposure to noise can lead to loss of hearing, tinnitus or physiological problems.
Noise can increase the risk of accidents because it may not be possible to hear alarms or faults developing in the equipment.

⇨ **Risk posed by vibrations**
Pulsating vibrations from the pressure unit in handheld spray equipment poses a risk.

1.3 Danger from failure to follow the instructions

There are potential risks to individuals and the environment if the rules for using the equipment set out in these operating instructions and in the safety instructions in particular are not followed.
Please take note of Section 1.2, 'Significant Risks'.

1.4 Clothing and protective equipment

So as to operate the rotary nozzle safely, it is recommended that appropriate protective equipment is worn, e.g. shoes with soles which provide a good grip, protective helmets, hearing protection, goggles, visors, waterproof protection suits including protective gloves and boots, high-pressure protective gaiters and aprons; high-pressure hose burst protection should also be used.

1.5 Physical aptitude

Anyone working with the rotary nozzle must be well-rested, fit and in good health. Anyone who, for health reasons, may not carry out strenuous tasks, should consult their doctor about whether it is possible for them to work using the rotary nozzle.

No work should be carried out using the rotary nozzle after taking medication which has the effect of slowing reactions or after consuming alcohol or taking drugs.

1.6 Proper use

The rotary nozzle is designed for use on manually-controlled high-pressure spray guns.

Particular attention should be paid to the instructions about operating the equipment for the first time (Point 2) as regards the design of the nozzles (Point 3.2) and the permissible recoil forces (see Point 3.3 below).

In addition, the relevant accident prevention regulations and any work instructions, operating and safety instructions issued by the company owning the equipment should also be followed.

Possible applications for the equipment are listed below:
- Refurbishing concrete and removing material
- Cleaning surfaces
- Deburring and cleaning castings
- Removing layers of coating such as paint, etc.
- Cleaning oil and gas platforms
- Cleaning containers, metal gratings, construction machinery, etc.

- Cleaning and removing paint from a variety of metal surfaces, e.g. in the marine sector
- ... and many more applications

For hygiene reasons, the rotary nozzle is not suitable for cleaning surfaces and materials which come into contact with foodstuffs.

2 Operating for the first time

2.1 Inserting and removing nozzles

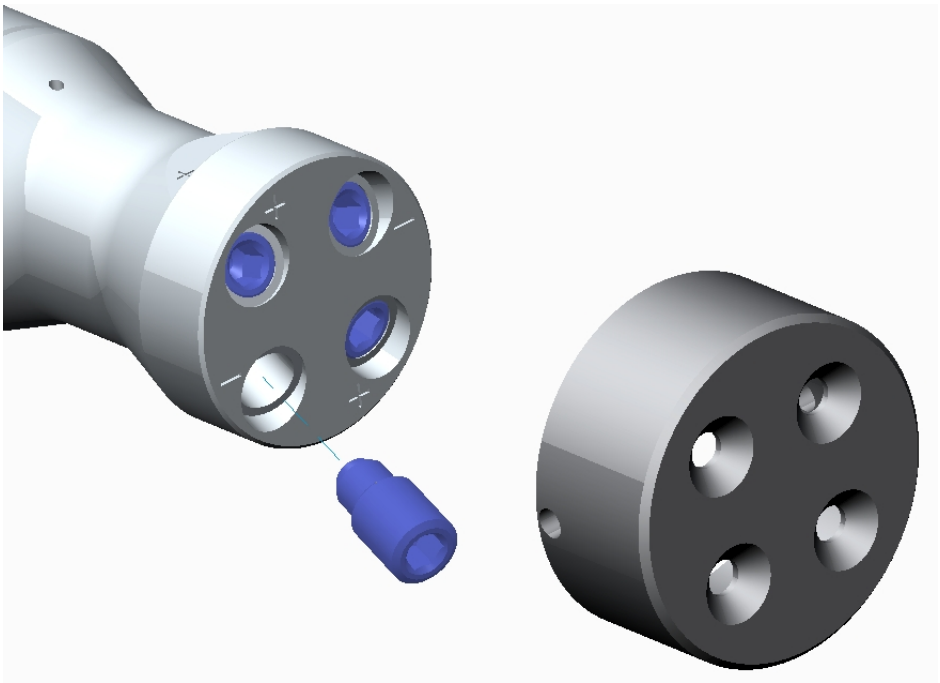
1. Before fitting the nozzles, the high-pressure water jet equipment must be switched off.

2. If the nozzles have protective caps, these must first be removed before the nozzles are fitted.

3. Apply metal lubricating paste to the screw connection threads on the nozzles.

4. Hold the nozzle head with an open-ended wrench (32mm wrench size) and screw the nozzles in with an Allen key (5mm wrench size).

5. Tighten the nozzles to a maximum of 25 Nm.

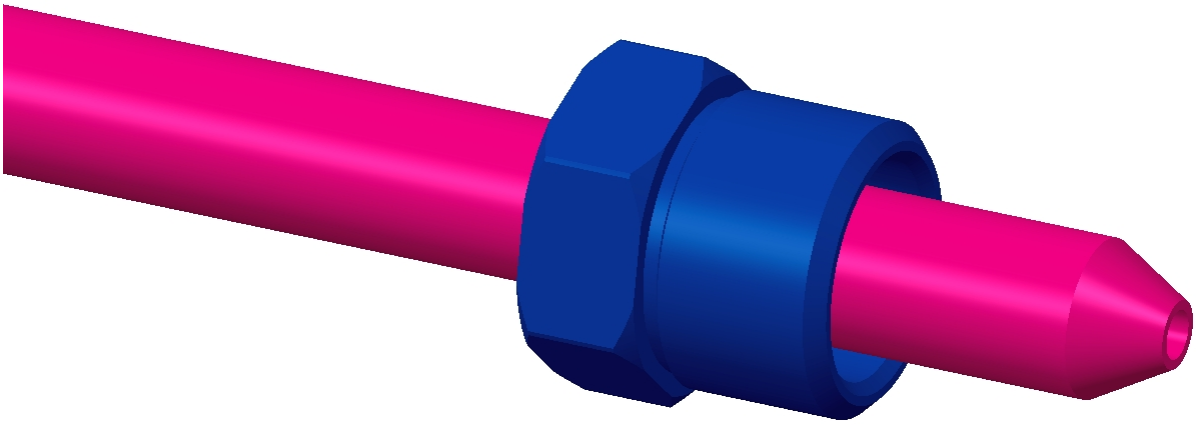


2.2 Fastening to the high-pressure lance

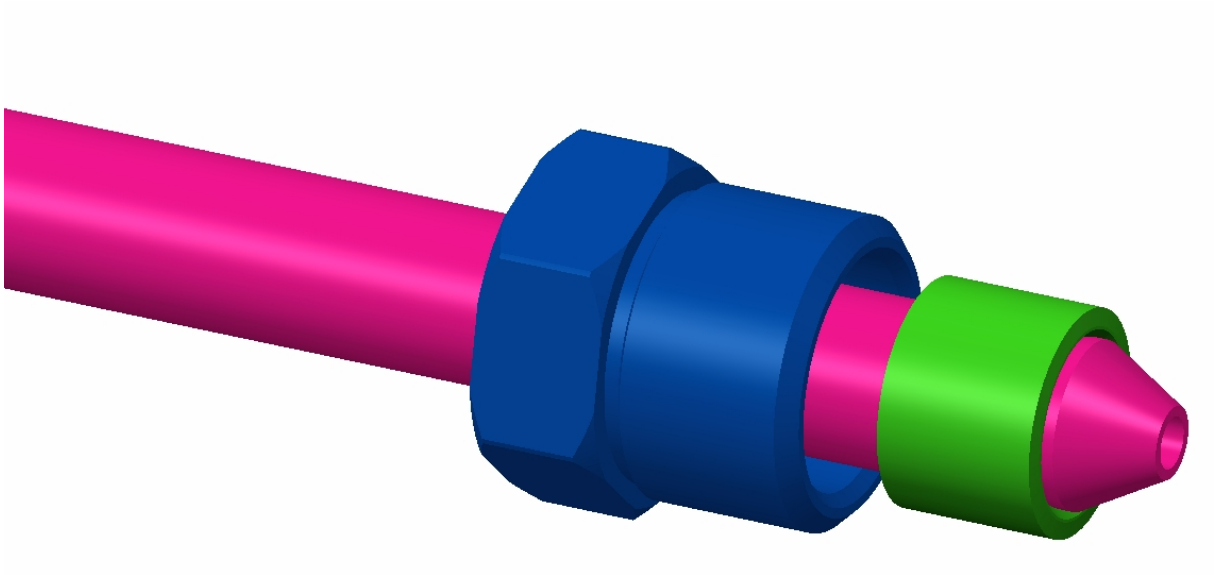
It is recommended that a torque wrench be used when fitting a nozzle onto a lance. The required tightening torque is 70 Nm.
Rotary nozzles must always be unscrewed from the lance before servicing them.

Check the high-pressure threaded screw connections for cleanliness and apply metal lubricating paste to them before fitting.

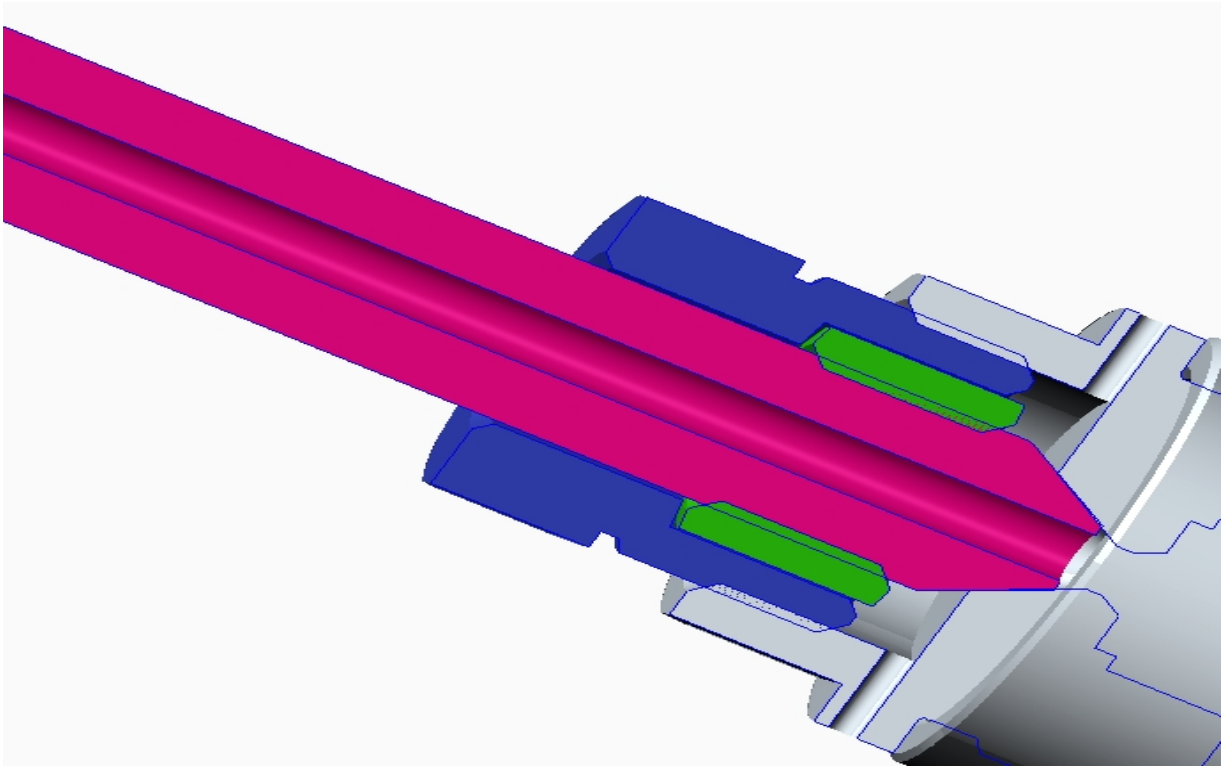
1. Slide the M26 pressure screw onto the lance.



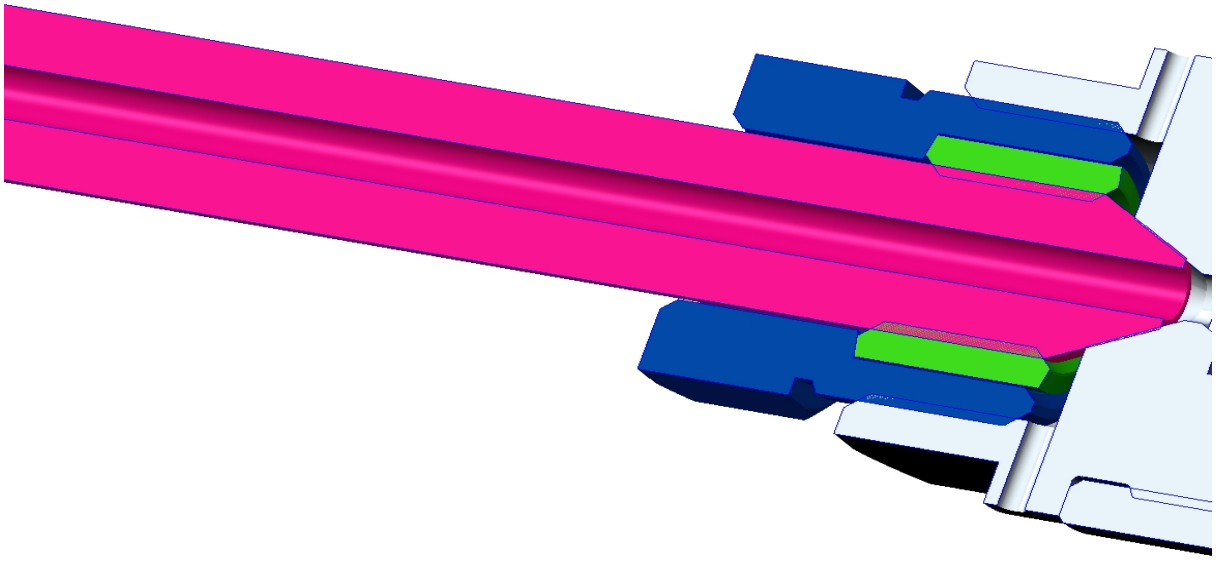
2. Screw the thrust ring onto the lance (left-hand thread). Screw the thrust ring onto the lance to the full extent of its threaded area.



3. Insert the lance cone into the Tango nozzle's counter-cone.



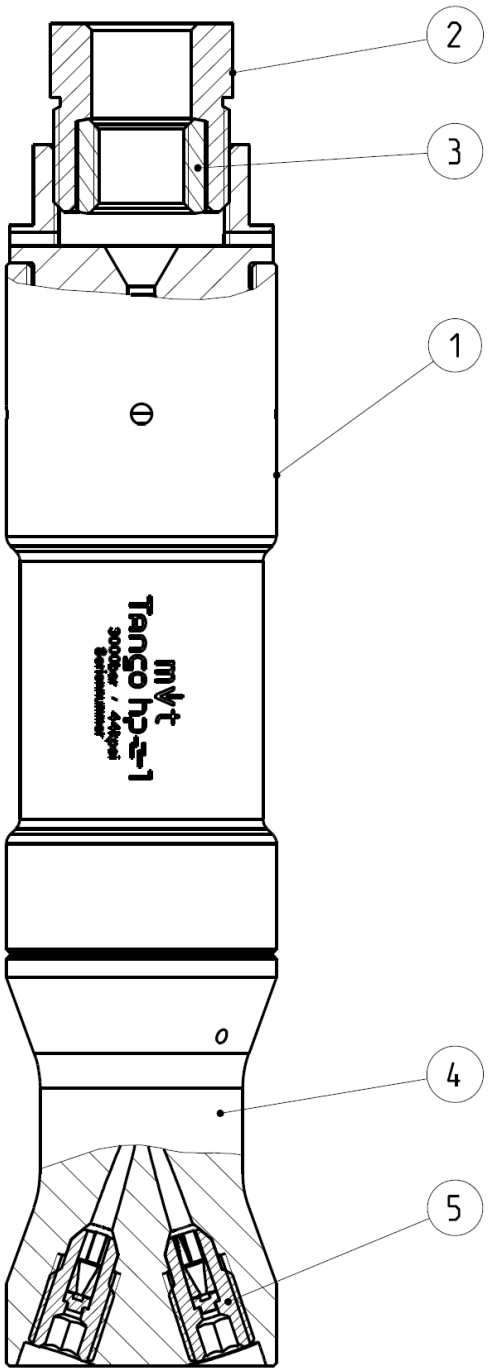
4. Screw in the M26 pressure screw and tighten it (tightening torque 70 Nm).



3 Technical data

3.1 Features of the TANGO hp-1

- Unique seal (patent applied for); this does away with the usual need to change sealing systems.
- Rotating shaft supported radially and axially by bearings on both sides makes for maximum robustness – perfect for operating in a harsh environment.
- So that material removal is achieved as effectively as possible, two nozzles are aligned clockwise (Drive +) and two counter-clockwise (Brake -).
- The maximum volume flow at 3000 is 75 litres/minute. Beware of the recoil force!



- **Important: identical-size nozzles must always be inserted diagonally opposite each other in order to prevent any imbalance occurring during rotation (risk of injury).**

Technical data

- Operating pressure: 1,500 – 3,000 bar
- Volume flow: max. 75 L/Min. in accordance with nozzle selection table 3.2
- Rotational speed: approx. 500 – 4000 rpm.
- Dimensions: Ø40 x 180 mm
- Weight: approx. 1.2 Kg
- Nozzle type: mvt 964 / 965 (Saphir) with or without jet smoothing insert
- Brake: eddy current brake
- Operating temperature: max. 100°C in continuous operation
- Max. rotational speed: 8500 rpm.
- Connection thread: M14x1.5 LH or 9/16"-18 UNF

Structure of the rotary nozzle

1. Housing
2. M26 pressure screw
3. Pressure ring M14x1.5 LH or 9/16“-18 UNF
4. Nozzle head
5. Nozzles

3.2 Nozzle arrangement

So that material removal is achieved as effectively as possible, two nozzles on the 4-jet nozzle head are set as Drive + and two nozzles as Brake –.

It is important that identical-size nozzles are always inserted diagonally opposite each other in order to prevent any imbalance occurring during rotation (risk of injury). In other words, the two Drive Nozzles + must always be the same size and the two Brake Nozzles – must always be the same size.

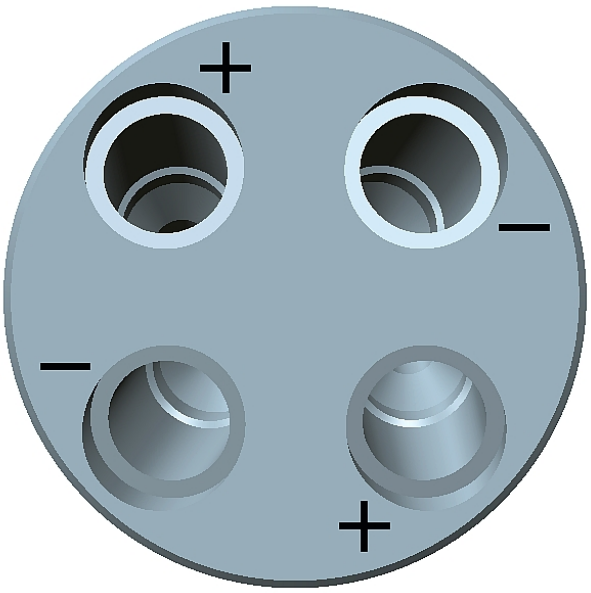
The Drive Nozzles + must always be bigger than the Brake Nozzles –.

The available pump capacity should be split in the ratio of approx. 70% as Drive + and 30% as Brake –.

The nozzle head must always rotate clockwise (looking from the lance towards the nozzle head). If the head does not rotate, the material being cleaned could possibly be damaged since the pressure against a single point will be too high. In order to start the nozzle head rotating, it is important that the nozzles are paired as described above. If the head still does not rotate, there might be a mechanical blockage or the bearing could be defective. Look at the instructions in Section 4 'Malfunction / Rectification' below.

Example of nozzles fitted for a pump operating at 2500 bar and 21.58 l/min:

Ratio 70/30 =16.1 l/min for the Drive + and 5.48 l/min for the Brake –
Drive Nozzles +=8.05 l/min per nozzle = nozzle Ø 0.60
Brake Nozzles –=2.74 l/min per nozzle = nozzle Ø 0.25



3.3 Nozzle selection table when using 4 nozzles (Keep to the ratio!)

Pressure/bar	Drive +	Brake -	Flow rate/L	Recoil force/N
3000	2x x 0.55mm	2x x 0.20mm	17.6	225
2500	2x x 0.60mm	2x x 0.30mm	21.1	246
2000	2x x 0.65mm	2x x 0.35mm	22.8	238
1500	2x x 0.75mm	2x x 0.35mm	24.8	225

When using handheld high-pressure spray guns and lances, the recoil force which has to be absorbed in the longitudinal axis of the **spray equipment must not exceed 250N**!
If the recoil force exceeds 150N, body support must be worn by equipment operators!

3.4 Water quality

Filter unit	1.0 µm
Solids content	max. 50 mg/l (20)
Hardness (CaCO3)	max. 25 mg/l (50-175)
Iron content (Fe)	max. 0.1 mg/l
Manganese content (Mn)	max. 0.1 mg/l
Chloride content (Cl)	max. 100 mg/l
Turbidity	max. 5 NTU
Free chlorine	max. 1.0 mg/l
pH	between 6.5 and 8.5

3.5 Flow rate table for the mvt 964 nozzle

ART. NR.	DÜSEN GRÖSSE in US Gal/min bei 40 psi	DÜSEN Ød mm	DRUCK in psi / bar							
			psi 2900	psi 7250	psi 10875	psi 14500	psi 21750	psi 29000	psi 36250	psi 43500
			bar 200	bar 500	bar 750	bar 1000	bar 1500	bar 2000	bar 2500	bar 3000
			DURCHFLUSSMENGE in l/min							
31226.0100	0002	0.10	0.064	0.100	0.122	0.141	0.171	0.196	0.217	0.237
31226.0125	0003	0.125	0.100	0.157	0.191	0.220	0.267	0.306	0.340	0.370
31226.0150	0004	0.15	0.143	0.226	0.275	0.316	0.385	0.441	0.489	0.532
31226.0175	0006	0.175	0.195	0.307	0.375	0.431	0.523	0.600	0.666	0.725
31226.0200	0008	0.20	0.255	0.401	0.489	0.563	0.684	0.784	0.870	0.946
31226.0250	0012	0.25	0.404	0.636	0.776	0.892	1.084	1.242	1.379	1.501
31226.0300	0018	0.30	0.582	0.916	1.117	1.285	1.561	1.789	1.986	2.161
31226.0350	0024	0.35	0.793	1.247	1.520	1.748	2.124	2.435	2.703	2.941
31226.0400	0032	0.40	1.035	1.628	1.986	2.284	2.775	3.180	3.530	3.842
31226.0450	0040	0.45	1.310	2.061	2.513	2.890	3.512	4.025	4.468	4.862
31226.0500	0050	0.50	1.618	2.544	3.103	3.568	4.336	4.969	5.516	6.003
31226.0550	0060	0.55	1.957	3.079	3.755	4.318	5.246	6.013	6.675	7.263
31226.0600	0072	0.60	2.329	3.664	4.468	5.138	6.243	7.155	7.944	8.644
31226.0650	0084	0.65	2.734	4.300	5.244	6.030	7.327	8.398	9.323	10.144
31226.0700	0098	0.70	3.171	4.987	6.082	6.994	8.498	9.739	10.812	11.765
31226.0750	0112	0.75	3.640	5.725	6.982	8.029	9.755	11.180	12.412	13.506
31226.0800	0127	0.80	4.141	6.513	7.944	9.135	11.099	12.721	14.122	15.367
31226.0850	0145	0.85	4.709	7.406	9.033	10.387	12.621	14.465	16.058	17.473
31226.0900	0162	0.90	5.279	8.303	10.126	11.645	14.149	16.216	18.003	19.589
31226.0950	0182	0.95	5.916	9.305	11.348	13.049	15.856	18.172	20.174	21.952
31226.1000	0202	1.00	6.555	10.310	12.574	14.459	17.569	20.136	22.353	24.323

4 Malfunction / rectification

4.1 General

In order not to run any risks when rectifying malfunctions, it is important to take account of everything contained in the operating instructions – especially the "Safety Instructions" (Section 2), the relevant accident prevention regulations, generally applicable legislation and directives, and internal company rules.

All the rotary nozzle's component parts may only be replaced by original component parts supplied by mvt AG.

4.2 Rectifying malfunctions

Malfunction	Reason	Rectification
Operating pressure is not reached	Threaded connections on the nozzles / lance not fully tightened The nozzles chosen do not comply with the flow rate table	Check that the threaded connections are clean and firmly seated. Replace nozzle in accordance with the flow rate table
Water loss at the rotary nozzle	Threaded connections on the nozzles / lance not fully tightened	Check that the threaded connections are clean and firmly seated.
	Defective shaft seal	Contact service partner
Mechanical noises	Bearings worn	Contact service partner
Rotary nozzle does not rotate	Mechanical blockage, defective bearing Drive nozzle too small; brake nozzle too big	Contact service partner Adjust nozzle ratio; increase drive nozzle size; reduce brake nozzle size.
Material removal performance worsens	Check the nozzle's jetting pattern	Replace nozzles

Maintenance / servicing

5.1 General

The mvt Tango rotary nozzle is maintenance-free.

If a malfunction or a defect should occur while using the equipment, contact the local mvt agent in your country or contact mvt AG directly.

mvt service number: Tel.+41 32 332 97 60 / info@mvt.ch

5.2 Wearing parts

Wearing parts are mvt Type 964 / 965 nozzles plus the protection cap.

The degree of any wear depends on the level of soiling in the water used, on the application and on the operating pressure.

When replacing nozzles, it is recommended that all 4 nozzles be replaced at the same time.

6 Warranty

Essentially, mvt AG's General Sales and Delivery Conditions shall apply. These conditions can be found on our website www.mvt.ch.

Warranty and liability claims are excluded if they are attributable to one or more of the following causes:

- ⇨ Improper use of the nozzle
- ⇨ Incorrect assembly, start-up, operation and maintenance of the rotary nozzle
- ⇨ Operating without using safety equipment or with defective safety equipment
- ⇨ Wrongly fitted or non-functioning safety equipment and protective equipment
- ⇨ Operating without wearing protective clothing
- ⇨ Operating with damaged high-pressure hose lines, connectors and adapters
- ⇨ Inadequate monitoring of those component parts which are subject to wear
- ⇨ Operating after making one's own structural modifications to the rotary nozzle
- ⇨ Operating with non-original mvt spare parts
- ⇨ Repairs and servicing carried out improperly
- ⇨ Disastrous damage due to foreign objects, and force majeure

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