TT305/ TT505/ TT510

Submersible Sewage Pumps

User Information Manual

ttpumps.com

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EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer

We the manufacturer: TT Pumps Ltd
of
Onnelley Works,Newcastle Road, **Woore, Cheshire**
CW3 9RU
England

Object of the declaration:
Equipment: **Pump**
Model name/number: **TT305, TT505, TT505C, TT510, TT1008 & TT1409**

The object of the declaration described above is in conformity with the following Community harmonization legislation:

Directive 2006/42/EC **of** Machinery Safety Directive
Directive 2014/30/EU **of** Electromagnetic Compatibility Directive

and has been designed and manufactured to the relevant parts of the following harmonized standard:

EN60034	**Rotating Electrical machines**
ENISO12100	**Safety of Machinery, Safety of machinery. General principles for design. Risk assessment and risk reduction**

Signed for and on behalf of: TT Pumps LTD

Name: Ben Nash **Function:** Sales Director

Place of issue: **UK** **Date:** 21st July 2020

Contents:

Introduction and contact information

This manual is intended to give an outline to the operation and maintenance data of your equipment. You are advised to read this manual before attempting any installation, adjustments or repairs.

When maintained correctly, your pumping system should provide reliable operation over a long period. However, it is essential that regular maintenance and if necessary prompt repairs are carried out to ensure satisfactory and reliable operation. Therefore we urge you to use the T-T Service or an approved service partner, for continued attention to your installation by trained and experienced service engineers.

Our products are manufactured to high standards at economic prices, and are complemented by our warranty which covers all items for 12 months from the date of purchase (or to individual contract requirement). Warranty claims should be made to T-T and will be dealt with promptly and efficiently.

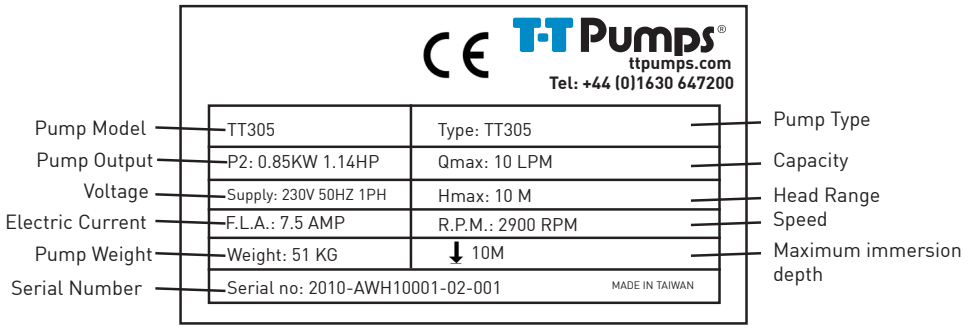
Any enquiry made to T-T Pumps in connection with the equipment should include details of:

- T-T Pumps contract reference number
- Equipment type and serial number
- Scheme and site name
- Original purchaser name

You can contact T-T on the below details:

T-T Pumps Ltd, Onneley Works, Newcastle Road, Woore, Cheshire, CW39RU
Tel: +44 (0) 1630 647200
Fax: +44 (0) 1630 642100
Web: www.ttpumps.com
Email: response@ttpumps.com

Nameplate Format (example only)



Please note: This name plate is for example purposes only.

Health and Safety

Sewage pumping systems, because of the media they handle, can be hazardous and dangerous if not treated with care and knowledge.

Hygiene

Always ensure that before working on a live pumping system, sensible precautions are undertaken for hygiene.

Always wear overalls and protective gloves where desirable. After finished work on a pumping system remove soiled clothing for laundering or disposal, and always wash thoroughly.

Safety

Sewage pumping systems are safe in operation, however there are a number of precautions needed when working on these.

Gases such as methane and hydrogen sulphide can accumulate because of the media being pumped in a sewage pumping system, it is therefore important that sensible precautions are taken.

If you do not have the qualification or certification to work on pumping systems you should call a specialist to do the work for you.

The following check list should help, and if there are any doubts or questions please contact T-T:

1. Never work or maintain a sewage pumping system on your own
2. Isolate electrical supply before working on, or maintaining a pumping station
3. Never enter the pump chamber under any circumstances, as this is a specialised job which requires specialised training and equipment
4. Keep naked flames away from pumping system
5. Never leave the pump chamber open or unattended when open
6. Always secure the access cover when leaving the pumping system
7. Never use a wander light in or around then pump chamber unless it is intrinsically safe.

On Installation

- Check that all equipment is correct for the application; this must include a check to en sure that the power supply is correct for the pump.
- Check that there is no damage to the pump or to its attached cable.
- Do not allow the cable end to become submerged, as water could penetrate the cable.
- Ensure that adequate lifting equipment is available; **never** use the pump cable for lifting.
- Ensure that the pump is properly and securely located in its operating position, and that all discharge pipework, hoses, and joints are fully assembled to avoid leaks.
- Ensure that all electrical connections are correctly made, by a suitably qualified engineer.

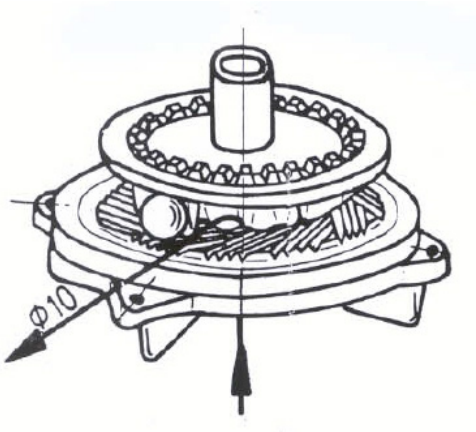
General Pump Description

Types TT305/TT505/TT510

This pump type is a combined submersible pump/motor unit for application on sewage and wastewater, in either free standing or auto-coupling arrangement.

The pump is fitted with a twin-vane open impeller which acts against a special suction cover, producing a shearing action on materials entering the pump, to reduce destructible solids to approximately 10mm diameter before being pumped away.

Fig 1: Impeller and suction cover

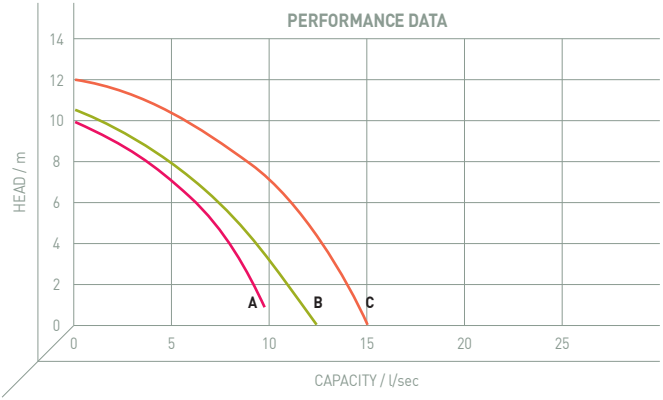


Shaft sealing is by a mechanical seal, with lip seals below the motor. There is an oil chamber between the pump section and the motor.

Pump casing, impeller and motor casing are cast-iron.

Direction of the impeller rotation is anti-clockwise as viewed on the suction port, ie: from below. Dry running for a few seconds for checking purposes is permissible.

Fig 2: Pump performance



Motors

Motors are all 2-pole, providing a rotation speed of 2850rpm. Protection against motor overheating is provided by thermostats in the motor windings, cabled out of the motor for connection to starter control gear.

Motor cables - length 8 metres
Direct-on-line starting -
1 x 7 core x 1.5mm^2 - 3 x power, 2 x thermostat, 1 x earth
(1 core not used)
Star-Delta starting - 6 x power, 2 x thermostat, 1 x earth
(3 cores not used)
Motor winding insulation - Class F
Thermostat cut-out - 100°C
Maximum liquid temperature - 40°C

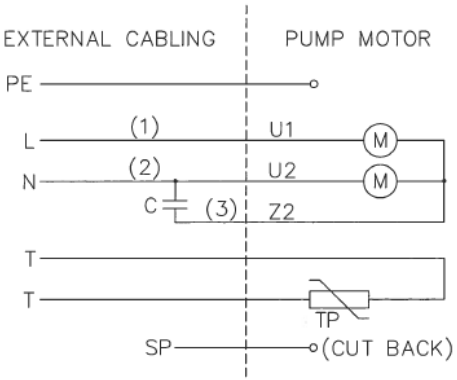
	TT305	TT305	TT505	TT505	TT510
Power Supply	230V/1Ph/50Hz	400V/1Ph/50Hz	230V/1Ph/50Hz	400V/3Ph/50Hz	400V/3Ph/50Hz
Starting Method	DOL	DOL	DOL	DOL	DOL or ASD
Power Absorbed P1	1.25kW	1.25kW	1.70kW	1.70kW	2.20kW
Rated Power at Shaft P2	0.85kW	0.85kW	1.25kW	1.25kW	1.85kW
Full Load Current	7.5A	2.0A	9.6A	2.6A	3.5A
Rotation Speed	2850rpm	2850rpm	2900rpm	2900rpm	2900rpm

Pumps should always be wired through starter/control panel with overload protection.

Wiring Diagrams

TT305/TT505 1PH 230V Pump Schematic, 7-core 1.5mm cable

KEY:
PE = PROTECTIVE EARTH
CABLE No. (1) = U1
CABLE No. (2) = U2
CABLE No. (3) = Z2
L = LIVE
N = NEUTRAL
C = CAPACITOR
T = THERMAL
SP = SPARE CABLE (NOT NEEDED)

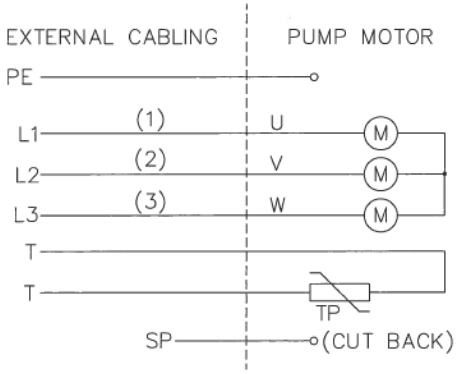


IMPORTANT INFORMATION:
THERMALS (WHERE PROVIDED) MUST BE WIRED INTO A PROTECTIVE CIRCUIT WITHIN THE CONTROL PANEL.
FAILURE TO DO SO MAY INVALIDATE WARRANTY.

CAPACITOR REQUIRED:
100–125uF 320V START CAPACITOR

TT305/TT505 3PH 400V Pump Schematic, 7-core 1.5mm cable

KEY:
PE = PROTECTIVE EARTH
CABLE No. (1) = U
CABLE No. (2) = V
CABLE No. (3) = W
L1 = LIVE
L2 = LIVE
L3 = LIVE
T = THERMAL
SP = SPARE CABLE (NOT NEEDED)



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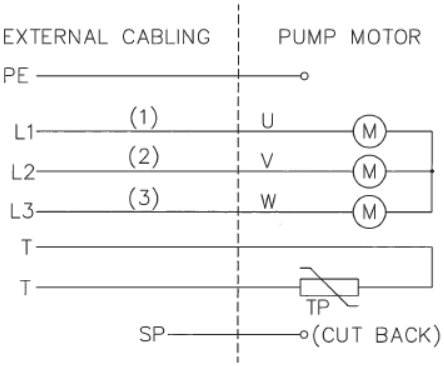
TT510 3PH 400V Pump Schematic, 7-core 1.5mm cable

KEY:
PE = PROTECTIVE EARTH
CABLE No. (1) = U
CABLE No. (2) = V
CABLE No. (3) = W
L1 = LIVE
L2 = LIVE
L3 = LIVE
T = THERMAL
SP = SPARE CABLE (NOT NEEDED)



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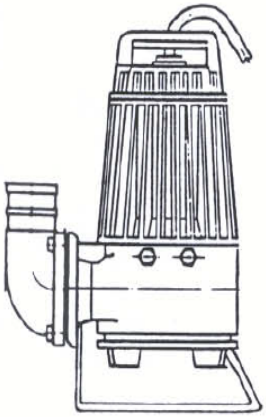
FAILURE TO DO SO MAY INVALIDATE WARRANTY.

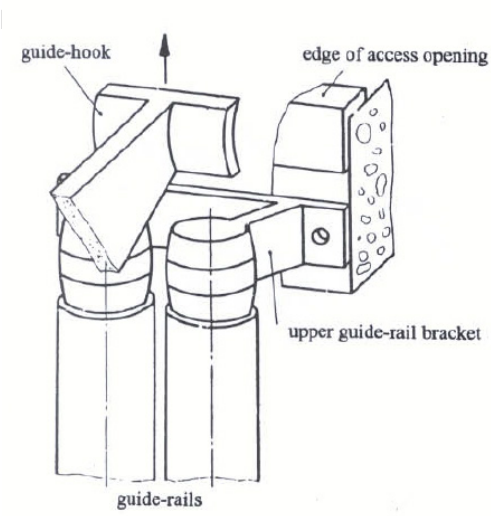
Mounting Arrangements

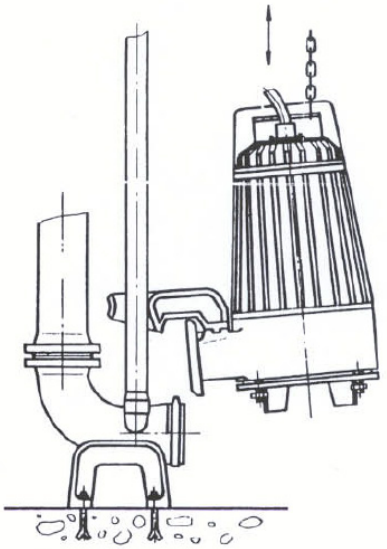
1. Free-standing, in which the pump is supported by a base-stand, and discharge connection is normally by a discharge bend and flexible hose.

2. Auto-coupling, in which rigid discharge pipework is connected to a foot-bend fixed to the base of the pump chamber. Twin guide-rails are fixed between the foot-bend and an upper bracket located at high-level in the pump chamber. By means of a special connection piece, or guide-hook, fixed to the pump volute, the pump engages with the guide-rails and is lowered into the chamber, where the pump automatically couples to the foot-bend. When the pump is lifted, for maintenance, it automatically de-couples from the foot-bend. Guide rails, lifting chain, and discharge pipework are not included as standard, but can be supplied to customer requirement.

Fig 3: Free-standing pump







Routine Maintenance

You are advised to refer to T-T Service for all maintenance and repairs to your pump.

Routine checks should be carried out at 6 month or 1000 operating hours intervals:

1. Oil check and motor contamination check
2. Wear parts check
3. General condition check

1. Oil check (Oil capacity is 0.5litre of 10W40 type)

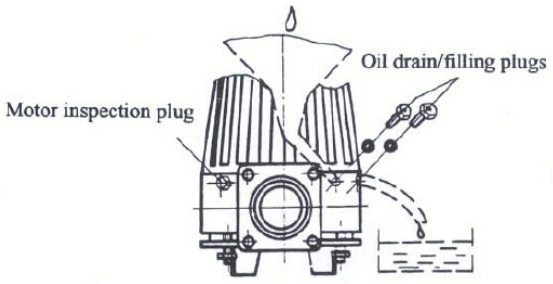
Shaft main sealing is by mechanical seal in an oil chamber. The oil level and condition should be inspected at the indicated intervals.

Oil contamination indicated wear of the mechanical seal, and if serious, the seal should be renewed; any degree of oil contamination requires an oil change.

Oil inspection/filling plugs are located externally on the oil chamber housing as follows:

Two plugs close together - Oil level check/draining/filling
Single plug on opposite side of housing - Motor inspection - no oil or water should be present.

Fig 5: Oil inspection/drain/filling plugs



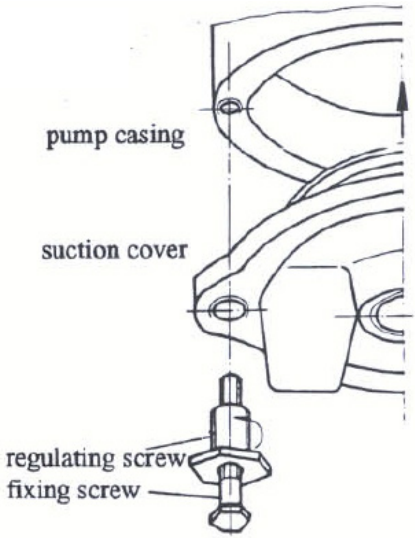
2. Wear Check

At the routine check intervals, the condition of the impeller and suction cover should be checked.

After extended use, and depending on the abrasion characteristics of the pumped media, the impeller and specially-grooved suction cover may be subject to wear. Adjustment of clearance is carried out by means of the three regulation/fixing screws which secure the suction cover to the pump casing. Correct adjustment allows the impeller to turn against the suction cover with slight resistance.

Severe wear of impeller and/or suction cover will require replacement.

Fig 6: Suction cover clearance adjustment



3. General Condition Check

The complete unit should be inspected externally for any signs of damage to pump, motor housing or cable/cable gland entry. This check would also include an electrical test.

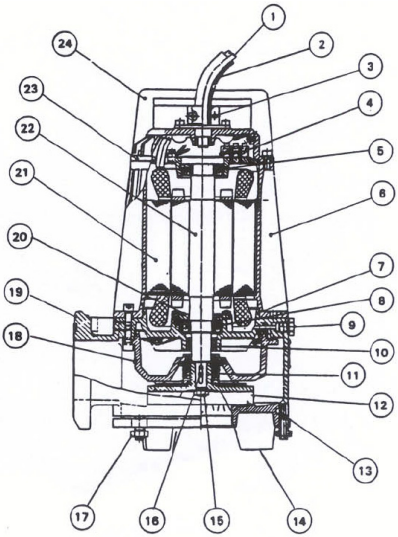
Pumping Station Cleaning

It is important that the pumping system condition is checked regularly, at least every two months, to ensure that everything is in order and that there is not an excessive build-up of fats and other materials.

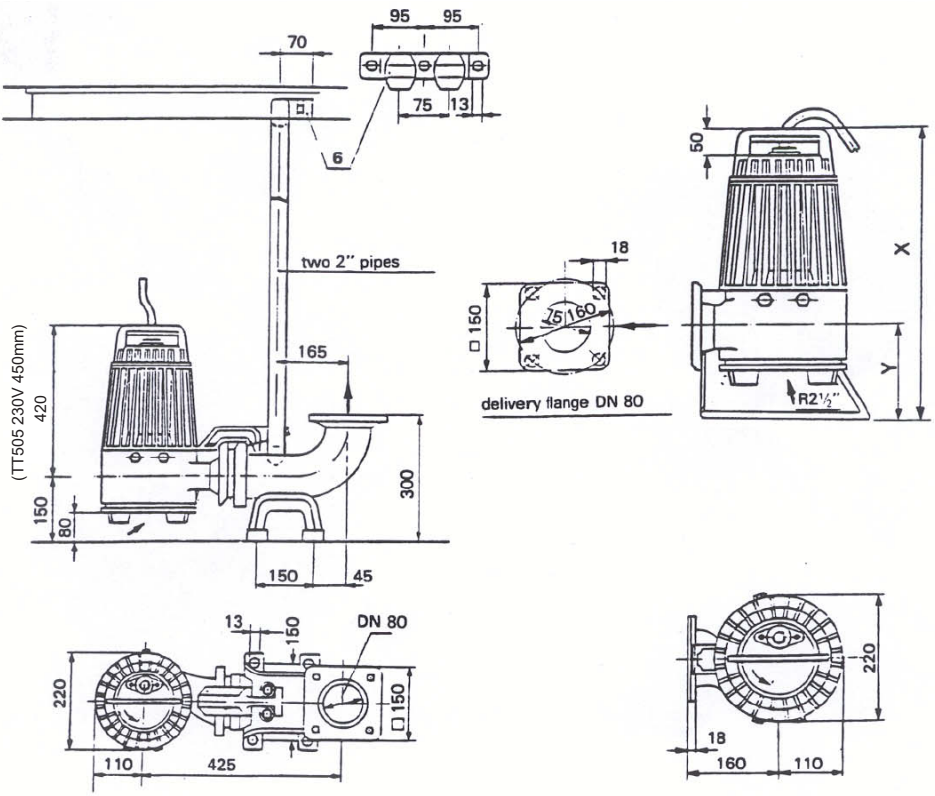
If necessary, use a detergent on the affected area and hose down; in severe cases of solids build-up, a professional cleaning contractor may need to be engaged.

Parts List

Item No.	Part	Material	Item No.	Part	Material
1	Cable	NBR	13	'O' Ring	NBR
2	Cable Sheath	NBR	14	Wear Plate	Cast Iron
3	Cable Gland	NBR	15	Impeller Nut	Stainless Steel
4	Terminal Block	Plastic	16	Impeller Key	Stainless Steel
5	Top Bearing	Stainless steel	17	Adjuster	Stainless Steel
6	Motor Housing	Cast Iron	18	Oil Cham-ber	Cast Iron
7	'O' Ring	NBR	19	Pump Body	Cast Iron
8	Bottom Bearing	Stainless steel	20	Bearing Clamp	Cast Iron
9	Bottom Support	Cast Iron	21	Motor Stator	Class F
10	Lip seals x 2	NBR	22	Rotor & Shaft	Stainless Steel
11	Mechanical Seal	Tungsten Carbide	23	Top Support	Cast Iron
12	Impeller	Cast Iron	24	Top Cover	Cast Iron



Dimensions and Weights



Type	X mm	Y mm	Weight Pump & 10m cable	Weight free standing base	Weight auto-coupling bend	Weight guide hook
TT305 1Ph 230V	580	160	51kg	5kg	16kg	2kg
TT305 1Ph 400V	580	160	51kg	5kg	16kg	2kg
TT505 1Ph	610	160	55kg	5kg	16kg	2kg
TT505 3Ph	580	160	51kg	5kg	16kg	2kg
TT510 3Ph	580	160	55kg	5kg	16kg	2kg

Troubleshooting

Symptom	Possible Cause	Corrective Action
Pump does not start	Power supply failure or low voltage at motor	Check and rectify power supply including check for excessive cable length or incorrect cable size causing voltage drop
	Power not switched on at all points, or connections not secure	Check all switches and cable connections
	Fuse failed or circuit breaker operated	Check fuses/C.B. - Replace or reset Check & rectify cause.
	Control panel overload tripped	Check setting/condition of overload unit - reset/replace. If satisfactory investigate cause; do not reset continually.
	Control panel fault	Investigate and rectify
	Motor fault	Investigate and rectify
	Cable damaged	Replace
	Pump impeller obstructed	Clear
	Level control switches	Check manual switching satisfactory (except on pumps with integral level switches) Ensure level switches are correctly set and free to operate.
Pump does not stop	Level switches obstructed	Ensure switches are free to operate
	Control panel fault	Investigate and rectify
Pump starts and stops repeatedly	Level switches obstructed or at incorrect level	Clear or reset
	Power supply faulty	Investigate and rectify, including check for voltage drop on starting
	Pump impeller obstructed	Clear
	Non-return valve(s) obstructed or faulty allowing back flow when pump stops	Clear, or repair/replace
Pump starts but overload protection trips	Overload setting incorrect	Check setting/condition - reset/replace. If satisfactory investigate cause - do not reset continually
	Power supply fault	Investigate and rectify, including check for availability of 3 phases (for 3 phase motor)
	Connections faulty	Investigate and rectify
	Pump impeller obstructed	Clear
Pump runs but gives no output or reduced output	Discharge obstructed	Clear pipework
	Valve(s) partly or fully closed, or obstructed	Open or clear valves
	Discharge leak in pump chamber	Secure discharge connections
	Pump impeller obstructed	Clear
	Pump impeller worn	Replace
	Pump air locked	Release air
	Pump wrong rotation	Rectify electrical connections (3 phase motor only)
	Incorrect pump selection	Re-assess system
Pump runs, but noisy or vibrates	Pump impeller obstructed	Clear
	Pump/impeller air-locked	Release air
	Pump impeller worn or damaged, or pump shaft damaged	Investigate and replace as necessary

Service That Makes Sense

T-T Service boasts fully equipped workshops with test facilities and specialist equipment designed for repair and maintenance of ours and other manufacturers' pumps.

With a wide stock of spares and experienced Electro Mechanical Engineers, T-T will ensure works are carried out with minimal delays.

It is also possible for repairs to be carried out on site to reduce the downtime of your equipment. Our skilled service engineers are able to deal with most electrical/mechanical repairs and breakdowns, supported by fully equipped service vehicles.

For more information contact our team today on 01630 647200

Notes

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T-T Pumps® T-T Controls® & Automation T-T Flow® Valves T-T Pumping Stations® T-T Environmental® & Agricultural T-T Service®

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