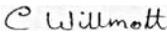


Varitank 1-2 pump cold Water Booster Sets TKS/GTKS Variable speed

Operating, Installation and Maintenance Instructions

EC Declaration of conformity

Xylem Water Solutions UK Ltd declare that the Varitank Booster set conforms to the requirements of the Machinery Safety Directive 2006/42/EC.
Electromagnetic compatibility (EMC) Directive 2014/30/EU
Conforming to the UK Health & Safety Requirements 2008 No. 1597
Water supply (Water fittings) regulations 1999

Signed: 

Clive Willmott

Position: Engineering manager

Date: 20-04-2016 Revision A

Introduction

This leaflet contains information to enable the safe installation and operation of the products mentioned. The following instructions must be read and understood by all persons responsible for the installation, operation and maintenance of this product.

Warning Symbols



Safety instructions where noncompliance would affect safety.



Safety instructions where electrical hazard is involved.



Safety instructions where noncompliance could cause damage to the equipment.

Instruction for safe use



This product has been designed for boosting cold water in potable water installations to the operating conditions shown.

This product should not be installed until this leaflet has been studied carefully and understood.

Handling, transportation and installation of this equipment should only take place with the proper use of lifting equipment. This product must be stored in a frost-free dry environment.

Noise Emissions

This equipment operates at a noise level lower than 70dBA.

Operating limits

Fluid temperature	0°C to 40°C
Ambient temperature	0°C to 40°C
Operating pressure	10 - 16bar
Protection class	Teknospeed & Electrical panel when fitted. IP55

Installation

The cold Water booster set is despatched mounted on a wooden pallet and covered in a protective film, it is



recommended that the unit be retained in the protective packaging until the product is to be installed. The unit will arrive pre-packaged and wired ready for installation. This product has been fully run tested at our works under simulated site conditions. The unit should be thoroughly checked for physical damage that may have been caused during transit. If the unit is found to have damage it must be reported immediately and should not be installed. The unit

should be sited in a ventilated, dry frost free position also ensuring adequate room for general maintenance and service. The set should be fixed in position directly to the floor, if vibration separation is required then cork mats should be used supplied by others.

Generally the water tank is constructed to have a weir slot (Cat 5) as required by the water bylaws to prevent back flow contamination, if the inlet ball valve suffered a catastrophic failure the overflow may not be able to keep up with the inflow in which case excess water will be ejected through the weir slot and onto the plant room floor, if this is not acceptable then consideration should be given to fitting the break tank set onto a tray with overflow to drain.

Never run pumps dry

Ensure the pumps are filled with water before switching the power on.

Electrical connections

The electrical connections must be carried out by a competent electrician in accordance with local regulations.



The cable used for the incoming supply must be of adequate size to carry the motor full load current of all pumps as they are able to operate at the same time. Motor ratings are shown on the set duty plate. All non power cable should be limited to 1.5mm².

All connections must be made using the appropriate wiring drawings for the equipment being installed; with particular attention being paid to the supply voltages. The supply voltage is shown

on the set duty plate.

Never operate this product with isolation panels removed or the control panel door in the open position.

These Sets are fitted with variable speed drives which include large capacitors, wait at least 8 minutes after the supply has been removed before opening or removing covers.

It is essential that this equipment is earthed to the building earth system.

All metal parts must be earth bonded directly to the building earth system.

Electrical data TKS/GTKS

Note: Whilst the input to the invert is Single phase, the output to the motor is Three phase

Nominal power (KW) 1 pump	TKS10 single phase Absorbed current(A) 1 x 230V	GTKS20 single phase Absorbed current(A) 1 x 230V
0.55	3.5	7
0.75	4.9	9.8
1.1	6.8	13.6

Water supply connection

Connect the incoming water supply to the break tank ball valve. The outlet of the tank will already be connected to the booster set suction manifold. The tank will normally include a class AB air gap (Category 5 protection) the tank will also include a low level float switch connected to the booster set to protect against dry running. Connect the 22mm warning pipe (where fitted) to a position where a discharge will cause a nuisance and be remedied. Connect the overflow pipe to drain. When the tank has been filled check the water level and adjust ball valve as necessary.



Ensure the tank is thoroughly flushed through before the set is put on line.

It is the responsibility of the installer to ensure that the overflow is able to keep up with the incoming water volume; if this is not the case then a pressure reducing valve should be fitted to reduce the incoming mains water volume.

Discharge pipe work

On two pump sets the discharge pipe work can be connected to either end of the booster set, ensure the blanking cap is fitted to the end not used. A flexible connector fitted between the booster discharge manifold and the system connection pipe will help prevent the transmission of noise/vibration. An isolation valve should be provided between the booster discharge line and the system to aid maintenance. The discharge pipe work should be sized to achieve a maximum velocity of approximately 2.5m/s.

Pressure vessels

Variable speed booster sets can operate with relatively small pressure vessels; each set is supplied with 1 x 8 or 24lt vessel for each pump depending on pump type which is more than adequate for the set to function correctly. Larger vessel can be added if required. If stand alone vessels are added they should have an isolation valve and drain cock fitted to allow the vessel to be isolated from the system and drained to check the pre-charge pressure.

The vessel pre-charge should be set to approximately 0.2 bar below the pump starting pressure.

Teknospeed basic setting details

The Teknospeed has only one adjustable parameter which is the system set point, to adjust see item 14 below under commissioning.

Commissioning

With the main power isolated check:

1. The break tank feeding the set is filled with water and the ball valve is set to the correct height.
2. The set/system vessels have been charged with Nitrogen to the correct pressure (set point -0.2 bar).
3. Open suction line isolation valve.
 4. Open suction and discharge pump isolation valves.
 5. Close main discharge isolation valve.
 6. Open the pump vents at the top of each pump.
 7. Allow all air to escape until water flows freely.
 8. Close pump vent valves.
9. Open discharge valve.
10. Ensure all vessel valves are open.
11. Switch the main power supply on.
12. Allow water to flow and clear air through the system
13. Close discharge valve and check pressure reading on pressure gauge
14. To raise or lower the system set point use the screwdriver provided and turn the adjusting screw in the inverter housing clockwise to increase pressure, anti-clockwise to decrease pressure. When decreasing pressure it may be necessary to open a discharge outlet to release pressure after adjusting, close discharge and pump should stop after approximately 60 seconds. Do not set the system set point higher than the pump can produce as the pump will not stop. See Fig. 1 below for adjusting screw position.



See Teknospeed O&M for more in depth operating details

For specific pump details refer to the O&Ms for the pump type fitted

Operation

The booster set is designed to maintain a constant system pressure with varying flows.

Each inverter head has its own 4-20ma transducer which monitors the system pressure at all times.

If one inverter or transducer fails the next inverter will continue to function independently. All inverters talk to each other through a RS485 serial coms link. Each inverter head is fitted with an adjusting screw to adjust the set point. See figure 1.

When a demand is placed on the system, water will be supplied from any vessels that are fitted to the system, once this supply is depleted the system pressure will start to fall, when the pressure falls to the system set point the first Teknospeed pump will start to ramp up to maintain the set point, if demand increases and the first Teknospeed reaches maximum speed and again the system pressure continues to fall the second Teknospeed (When fitted) will be called in to ramp up and assist the first pump.

When demand reduces the last Teknospeed to be called in will start to ramp down and eventually stop, if demand continues to decrease the next Teknospeed will start to ramp down and stop. The next time the pressure falls the pumps will have been rotated so the opposite pump will be the first to operate.

If a low level in the break tank occurs all pumps will be stopped until the water supply has been reinstated, the pumps will then be automatically released to resume normal operation.

The remote inhibit if fitted will operate in the same way and stop all pumps if inhibited.

Volt Free Contacts

Each Teknospeed head is fitted with a common fault volt free contact which is a normally closed contact that is held open under healthy conditions, if a fault occurs or the power supply fails the contact will close.

See electrical drawing for connection details.

Remote inhibit

A remote inhibit can be achieved by utilising the low water terminals, a N/C external Stop/Start circuit can be connected in series with the low water terminals. (open to inhibit) See electrical drawing for connection details.

Alarm indicators

LEDs are provided to indicate:

Power-Run-Alarm

The number of times a Red LED flashes indicates

The type of alarm (see Figure 2)

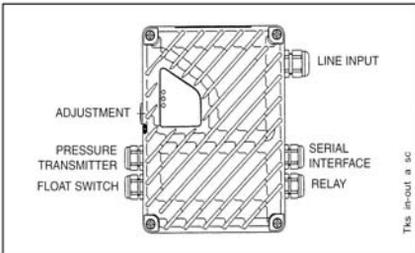
An attempt is made to reset the alarm every 20 seconds after 3 unsuccessful attempts the inverter stops

If at least 10 minutes elapse after an alarm without any further faults occurring the reset attempts counter is reset

Figure 2



Figure 1



LED No OF FLASHES	TYPE OF ALARM
2	Converter overcurrent
3	Converter overtemperature
4	Motor overtemperature
5	No water (LOW1/LOW2)
6	No signal from pressure transmitter
7	Undervoltage
8	Serial interrupted (timeout)

Caution



This booster set is an automatic machine; the pumps may start up automatically without prior warning.

The set contains pressurised water; reduce the pressure to zero before servicing.

Maintenance

Routine check (6 monthly intervals)

1. Check all pumps produces the correct pressure.
2. Check that the pump operates without undue noise or vibration.
3. Check the break tank is clean and that the correct water level has been maintained.
4. Check that all screws are tight on electrical components.
5. Check that the earth connections are tight and making good contact.
6. Check that the gas pre charge is at the correct pressure, this should be done by isolating the vessel from the system and draining water out of the vessel via the isolation valve drain point.

Once the water has been discharged, a tyre gauge can be connected to the pre charge valve to display the vessel pre charge pressure. Recharge as necessary with Nitrogen or dry air.

Any other expansion vessels connected to the system can be checked in the same manner.

Clean any filters that may be connected to suction/discharge lines and ensure the mesh is in good condition.

Yearly intervals

Drain the break tank and using clean water only, clean all internal surfaces using non-metallic equipment and tools.

Remove any debris found in the tank. Check and clean filters in overflow/warning pipe (If accessible)

Refill the tank with clean fresh water, disinfect and leave to stand for 60minutes. Test water for correct PPM levels.

General fault finding guide

Fault	Possible Cause	Remedy
Pump fails to start	Power supply failure Control panel fuse blown, MCB tripped Remote inhibit active Low water level	Reinstate incoming power supply Replace power supply fuse Reset MCB Turn remote inhibit off Reinstate water supply
Pump fails to stop	Set point set too high Manual operation selected System pressure low due to large leak	Lower set point Select Auto operation Switch unit off until leak is repaired
Pump switches on and off quickly	Air in system Vessel pre-charge incorrect	Purge air from pumps and pipework Check vessel pre-charge and charge as necessary with Nitrogen or dry air
Pump runs but will not make pressure	Pump air locked Non-return valve jammed Incorrect rotation Passing too much water	Open pump bleed screw and vent pump Clean/ replace valve Check pump internal connections Check system for leaks
Pump overheating	Pump partially seized	Remove pump and check for foreign objects
Pump set frequently starting. (pressure falls to cut in point)	Newly installed system with large amount of air in pipe work Leaks in system pipe work Vessel pre-charge incorrect	Bleed system to remove air Repair leaks Isolate vessel and pre-charge with Nitrogen as appropriate
Break tank overflowing	Leaking ball valve Non-return valve letting by	Replace ball valve seal Replace/clean non-return valve
Pump leaks water	Defective mechanical seal Undue mechanical stress on pump	Replace seal Support the pipe work

Disposal

Disposal of this product should be carried out in accordance of local codes and regulation pertaining to the disposal of waste, including packaging materials.

Booster set details

Model type	
Order Code	
Pump type	
Serial number	
Installation date	
System set point	
Booster set notes	

Flexible connectors

Working dimensions and tolerances for stainless steel range.

Part No	N.B. (mm)	Installed length (mm)	Movement +/- (mm)	Maximum working pressure (bar) @ 120 C	Test pressure (bar)
JP23VS-32	32	3	2	16	24
JP23VS-40	40	3	2	16	24
JP23VS-50	50	3	2	16	24
JP23VS-65	65	3	2	16	24
JP23VS-80	80	3	2	16	24
JP23VS-100	100	3	2	16	24
JP23VS-125	125	3	2	16	24
JP23VS-150	150	3	2	16	24
JP23VS-200	200	5	2	16	24
JP23VS-250	250	5	2	16	24
JP23VS-300	300	5	2	16	24
Screwed					
JP20-15	15	220	2	16	24
JP20-20	20	220	2	16	24
JP20-25	25	250	2	16	24
JP20-32	32	300	2	16	24
JP20-40	40	300	2	16	24
JP20-50	50	350	2	16	24

Optional flange kits for use on sets with screwed manifolds

Flange size	Pt No	DN	C	A	B	D	H	F	No	PN
1"1/2	109398022	40	1"1/2	110	16	150	24	18	4	25
2"	109398032	50	2"	125	16	165	24	18	4	25
2"1/2	109392750	65	2"1/2	145	16	185	23	18	4	16
3"	109392760	80	3"	160	17	200	27	18	8	16

