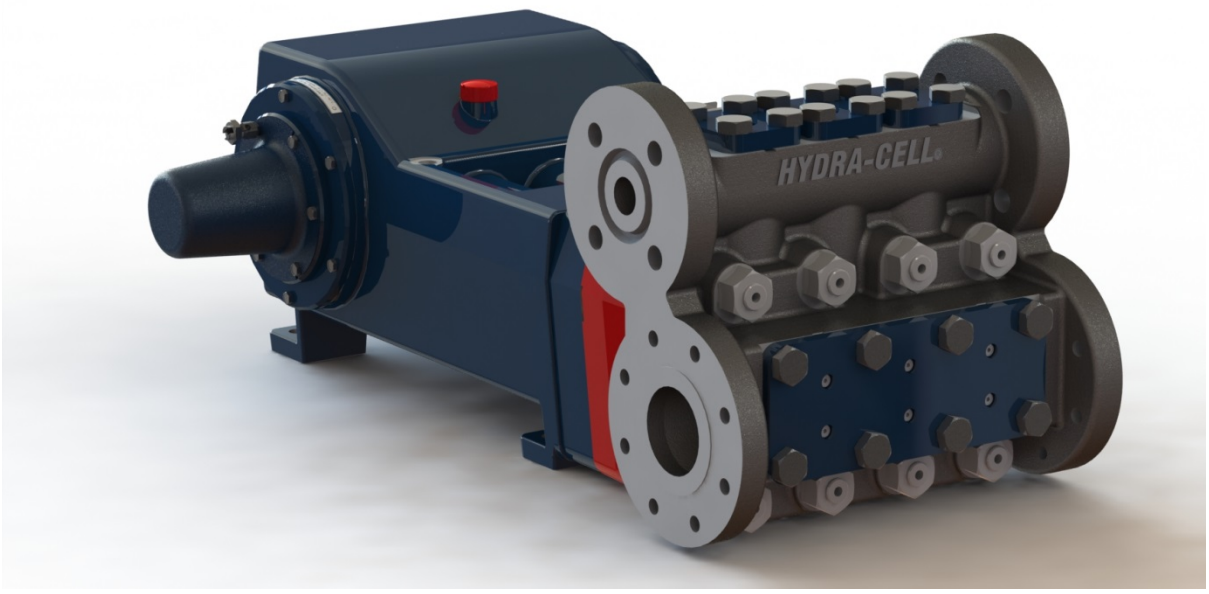
ATEX

T & Q-Series pumps

Directive 2014/34/EU

Covers – Category 2 Zone 1 requirements



Rev: A **Date of issue: 14/10/2019**

Contents

1. Wanner and the ATEX Directive 2014/34/EU

ATEX Directive 2014/34/EU is a directive adopted by the European Union (EU) to harmonise the technical and legal requirements in the Member States for products intended for use in potentially explosive atmospheres. The Directive covers electrical and non-electrical equipment and became mandatory in April 2016 when adopted by the EU.

The Directives are known as **ATEX** from the French title of the 2014/34/EU directive: *Appareils destinés à être utilisés en **AT**mosphères **EX**plosives*.

Wanner has worked with an outside specialist agency called **Intertek** in order to obtain **ATEX** Certification for the T&Q-Series Hydra-Cell pumps, carrying out a comprehensive risk assessment and compiling the Technical File. Intertek is accredited by UKAS (the UK Accreditation Service) and authorised to carry out product safety testing and Certification of equipment under European Directives such as ATEX as well as under the international IECEx scheme. See Apendix 1 “Type Examination Certificate.”

Certificate Number:

ITS14ATEX18067X

Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards:

EN 80079-36:2016

EN 80079-37:2016

T & Q-Series Hydra-Cell **ATEX** Certification covers the supply from Wanner of bare shaft pumps and not complete pump and electric motor sets.

2. Operating Conditions

The normal operating environment is an outdoor or indoor above ground industrial environment in which flammable dust or gas could be present.

The intended maximum external ambient operating temperature is +40°C. The minimum permitted temperatures (both ambient and operating) are defined by the below table:

Diaphragm Material	Minimum service temperature (°C)
Aflas	30
EPDM	-20
FKM	5
HNBR	-5

This is the maximum temperature range for T-Series Hydra-Cell pump with ATEX.

Wanner has obtained Type Certification, for conditions outside the pump as follows:-

II 2G Ex h IIC T5…T4 Gb X

Group II (Zone 1)
Category 2 G (gasses)
T5…T4 (auto ignition temperature dependent on process temperature)

Process Temperature	Resultant T-class TX
Less than or equal to 49°C	T5
Less than or equal to 82°C	T4

Note – Process liquid temperatures above 82°C are not permitted for this equipment.

Hydra-Cell pumps are not intended for pumping explosive atmospheres in normal operation. Where the liquid being pumped is flammable or where the supply tank is vented to an explosive atmosphere measures must be taken to ensure the pump head is fully flooded with liquid during normal operation.

3. Drive Motors

T & Q-Series Hydra-Cell **ATEX** Certification covers the supply of bare shaft pumps only and not complete pump and motor sets.

The supplier of the drive motor and motor control system must provide over current and short circuit protection that is capable of shutting down the pump before the motor produces more than 100% of the input power limit of the power-end.

The input power limit can be calculated using the Hydra-Cell standard power requirements formula (see product specification sheets on website) at maximum speed and pressure for any given pump .

4. Protection Concept

T & Q Series Hydra-Cell pumps are protected by constructional safety and control of ignition source.

Constructional safety is ensured by splash lubrication. Control of ignition source is used in the form of an oil level monitoring float switch which ensures the presence of the protective liquid (lubricant).

5. Specific Conditions of Use

Hydra-Cell pumps are not intended for pumping explosive atmospheres in normal operation. Where the liquid being pumped is flammable or where the supply tank is vented to an explosive atmosphere measures must be taken to ensure the pump head is fully flooded with liquid during normal operation.

The pump must be operated in conjunction with an external safety relief valve which must be set at or below the maximum operating pressure of the pump.

The liquid and ambient temperature limits in the table in section 2 must be respected.

An NPSHa calculation taking into account acceleration head losses must be performed by the operator and compared with the NPSH requirement of the pump before installation to guard against operating the pump in conditions of cavitation.

The operator is responsible for checking the selected materials of construction for resistance to the liquids to be pumped.

The lubricating oil in the pump should be changed in accordance with the guidelines stated in the pump Installation, Operation and Maintenance manual. The type of oil recommended and the frequency of the oil change can vary in accordance with the pump materials of construction, the duty, shaft speed, discharge pressure and the process liquid temperature.

Only officially sanctioned genuine lubricants must be used. The below lubricants are permitted for use in ATEX T & Q series pumps:

Oil code (digit 13 of pump model code)	Description	Suitable for use with diaphragm materials	Re-ordering part numbers
A	10w30 standard duty	All except EPDM	A01-114-3430 A01-114-3431 A01-114-3432 A01-114-3433
B	40wt	All except EPDM	A01-114-3440 A01-114-3441 A01-114-3442 A01-114-3443
D	EPDM compatible	All	A01-114-3402 A01-114-3403
E	Food contact	All except EPDM	A01-114-3410 A01-114-3411
H	15w50 high-temp severe-duty synthetic oil	All except EPDM	A01-114-3416 A01-114-3421

T&Q Series Hydra-Cell pumps are not suitable for total immersion in liquid.

Only genuine replacement parts and mechanical components must be used. The chemical and mechanical characteristics of genuine parts only have been considered as part of the risk assessment to ensure explosion safety within the parameter of the ATEX classification herein.

Alteration or modification of the pump is only permitted with the express permission of Wanner International.

6. Markings of Conformity – Category 2 Zone 1

The **pump nameplate** is Stainless steel and text clearly marked as below in figure 1.

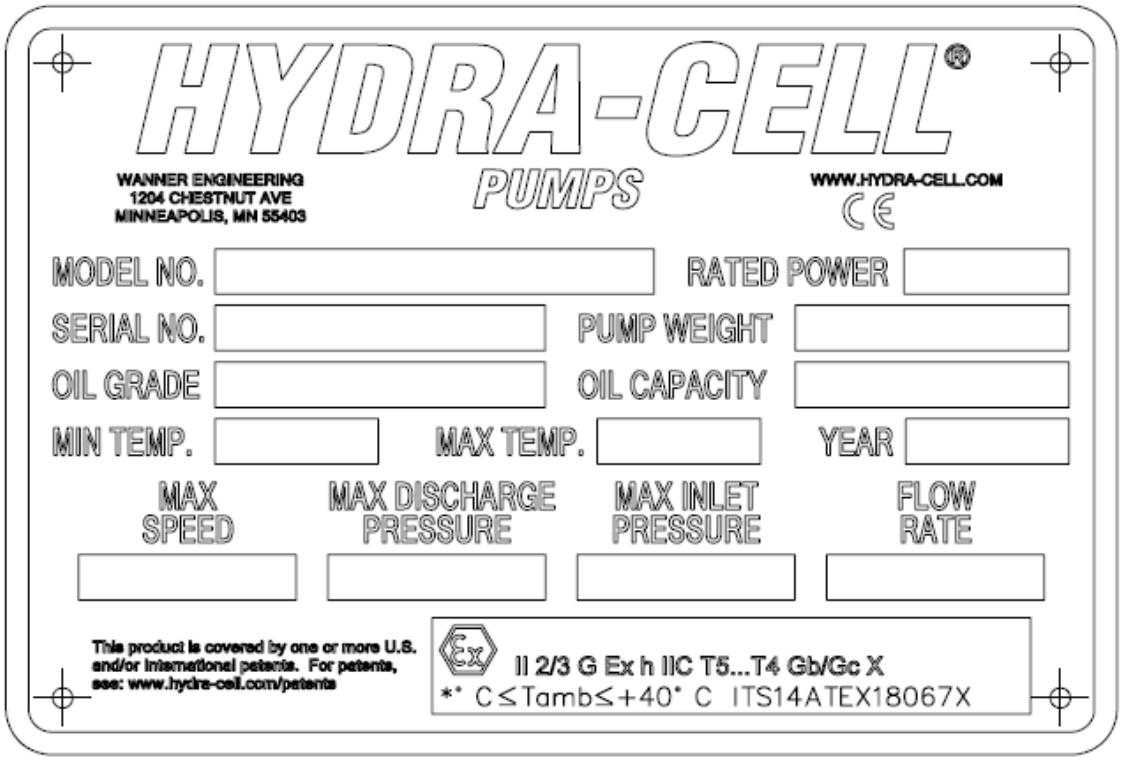


Figure 1 - ATEX nameplate markings

The nameplate will be positioned on the top of the crankcase. It is fixed with pop rivets to the main crankcase illustrated on the next page in figure 2.

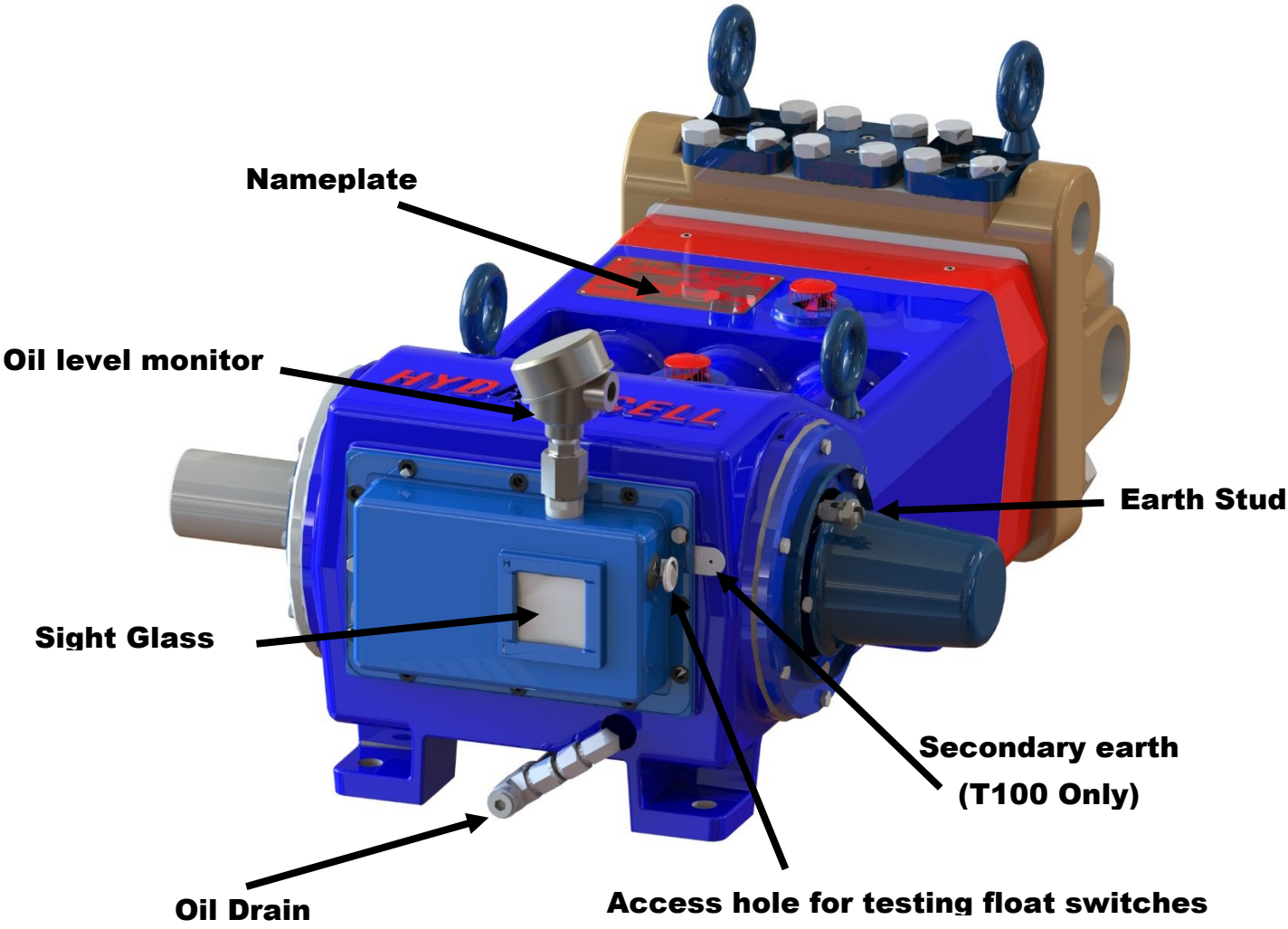


Figure 2 – Component positions

An earth stud is fitted to every T and Q-Series Hydra-Cell **ATEX** certified pump and must be connected to ground during installation.

For some T100 models there is also a secondary earthing point on an ‘ear’ projecting from the back cover gasket. This should also be connected to electrical ground.

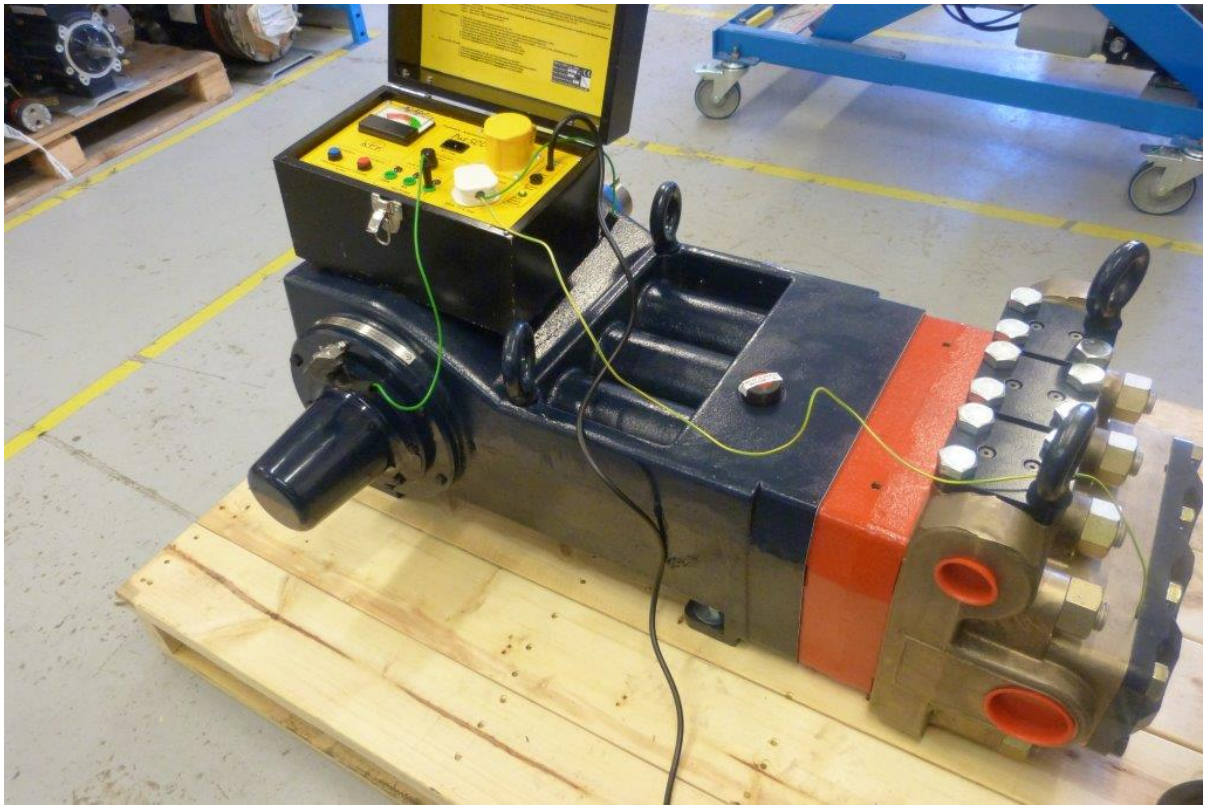
7. Earth Continuity Checks & Procedure.

Checking Procedure.

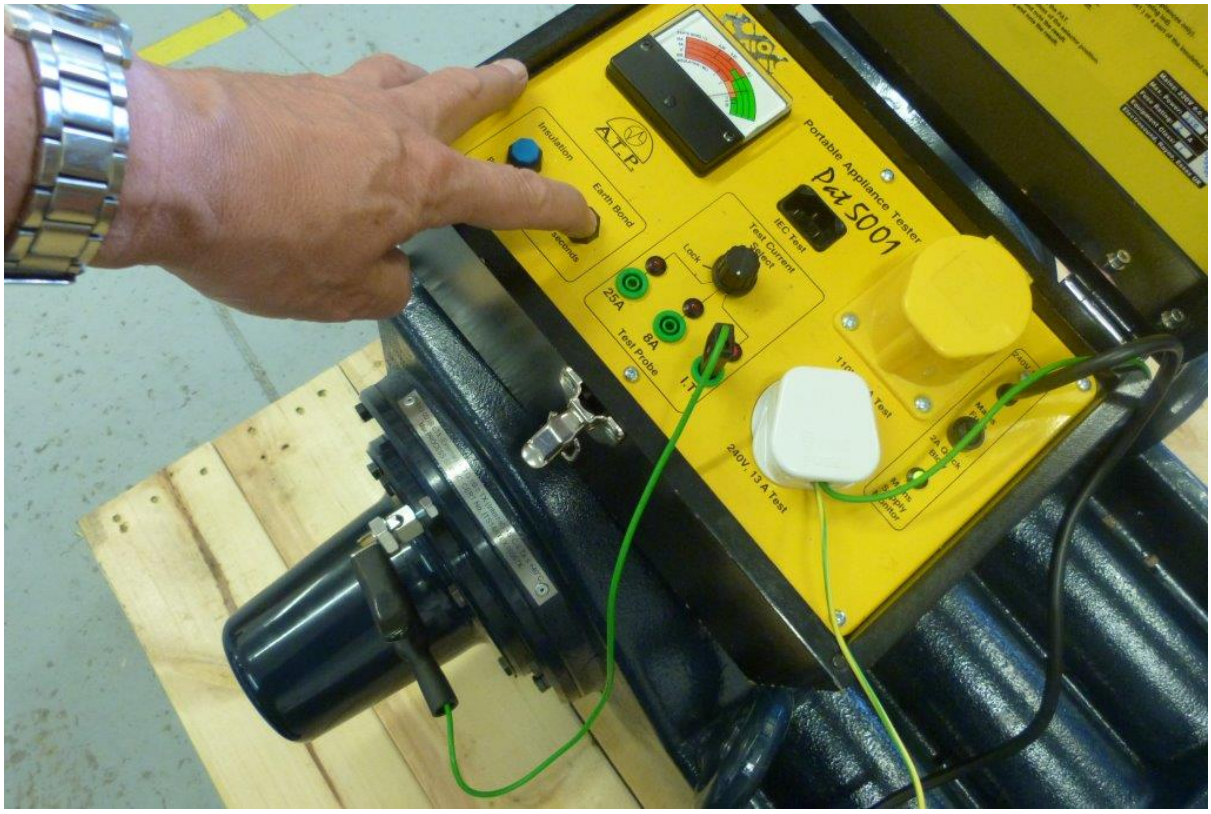
The 2 cables connected to the PAT tester are connected, one to the manifold of the pump and the other to the earth stud, as described in the pictures below.

The ‘earth bond’ is then measured on the deflection meter, when the red earth button is pressed on the PAT tester.

Values of below 0.1 ohms can be expected and as such are acceptable. The actual value is recorded against the pump serial number in the ATEX register.



PAT tester connected to pump 1



PAT tester in operation 1

8. Oil level monitoring device installation.

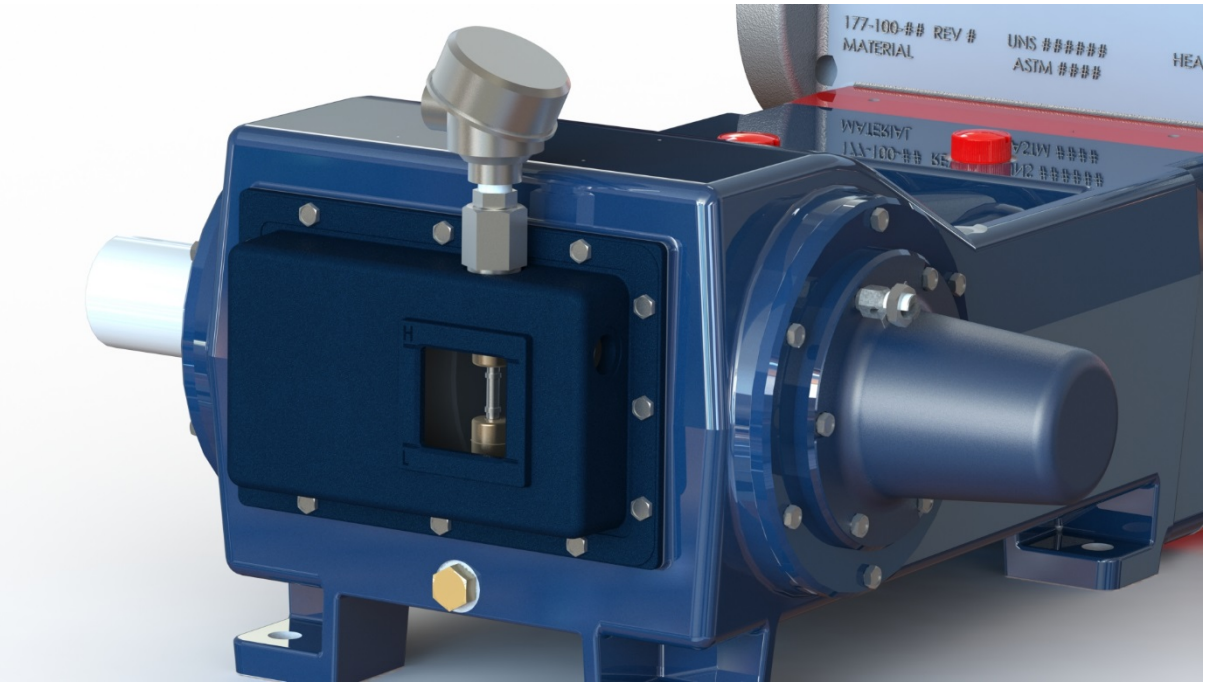
ATEX T and Q series pumps are supplied with an Ex d flameproof level sensor which is used to monitor the level of oil in the pump and detect a change in level caused by diaphragm rupture. This should be connected to an approved motor shutdown system.

There are two different versions available: A 2-point magnetic float reed switch and a continuous level sensor.

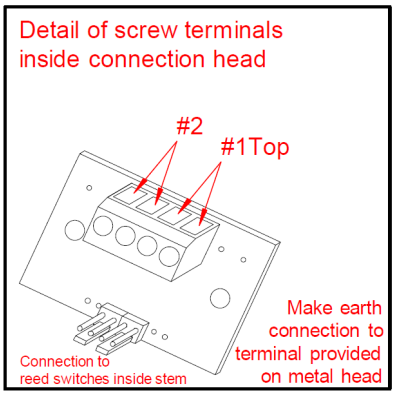
2 point float switch, P/N 177-453-01

The float switch is fitted with 2 floats and 4 normally closed reed switches. When the oil level is nominal, all switches will be closed circuit. If the oil level becomes too high the upper float switches will create an open circuit condition. If the oil level becomes too low the lower float switches will create an open circuit condition. The switches should be installed as part of a control loop which ensures that any switch creating an open circuit condition will result in a shutdown of the pump within less than 1 minute. Configuring the control loop so that there is a small delay of less than 1 minute will enable testing of the switch during pump operation without inadvertently shutting down the pump.

Both switch points are pre-set and will trigger at the correct limiting oil levels if the switch is installed at the factory.



8.1 Electrical installation



The connecting wires to the printed circuit board must be between 16 to 22AWG (Metric capacity 1.5mm2) with 6mm stripped ends. The earth wire should be connected to the screw point in the head using the crimp terminal provided. EXd flameproof cable gland for enclosures with internal volume ≥ 0.5 litres and suitable for gas, zone, temperature and cable type being used. IP6x glands must be used in dust environments.

When using conduit a stopping box must be fitted no more than 50mm from the sensor head. The stopping box and conduit must be installed in accordance with clause 13.2.2 EN60079-1.
A cable strain relief can be made by passing the cable through the nylon washer and fixing a cable tie tight to the cable, leaving a minimum of 70mm after the cable tie.

The electrical supply to all the switches must be connected through a protection device to limit excess current should a fault occur. A fast blow 1A fuse can be used to limit the total current drawn by all the switches together. If each switch point is fused individually the sum of all the fuse links must not exceed 1Amp. The fuse must be placed in a position where it protects the cable and the sensor should a fault occur.

After connecting the earth, supply and output wires, screw the lid down hand-tight, keep applying torque by hand until the lid cannot be turned any further. Tighten the lidlocking screw so the lid cannot be accidentally removed.

9. Installation and Putting into Service.

Inlet Piping (Suction Feed)

If there is a possibility of freezing conditions, install drain cocks at any low points of the suction line, to permit draining in freezing conditions.

Provide for permanent or temporary installation of a vacuum gauge to monitor the inlet suction. To maintain maximum flow, NPSHA must exceed NPSHR (See chart in Specifications Section). **Do not supply more than one pump from the same inlet line if possible.** Where this is unavoidable, give due consideration to the use of suction stabilisers.

Hose and Routing

Size the suction line so that the velocity will be no more than 0.9 m/s:

For pipe in mm: Velocity (m/sec) = 21.2 x LPM/Pipe ID_2

Keep the suction line as short and direct as possible.

Where possible, use flexible hose and/or expansion joints to absorb vibration, expansion, or contraction.

If possible, keep suction line level. If possible, avoid any high points collecting vapor unless high points are vented.

To reduce turbulence and resistance, avoid the use of 90° elbows where possible. If turns are necessary in the suction line, use 45° elbows or arrange sweeping curves in the flexible inlet hose.

If a block valve is used, be sure it is fully opened so that the flow to the pump is not restricted. The opening should be at least the same diameter as the inlet plumbing ID.

Do not use a line strainer or filter in the suction line unless regular maintenance is assured. If used, choose a top loading basket. It should have a free-flow area of at least three times the free-flow area of the inlet.

Install piping supports where necessary to relieve strain on the inlet line and to minimize vibration.

Inlet Piping (Pressure Feed)

Provide for permanent or temporary installation of a vacuum/ pressure gauge to monitor the inlet vacuum or pressure. Pressure at the pump inlet should not exceed 500 psi (34.5 bar); if it could get higher, install an inlet pressure reducing regulator. Where possible, avoid supplying more than one pump from the same inlet line. Where multiple pumps must be installed from the same line give due consideration to ensuring the fluid velocity does not exceed 0.9m/s at any point in the suction line and install suction stabilisers to minimise suction line pulsation.

Inlet Calculations

Acceleration Head

Calculating the Acceleration Head

Use the following formula to calculate acceleration head losses. Subtract this figure from the NPSHa, and compare the result to the NPSHr of the Hydra-Cell pump.

Ha = (L x V x N x C) ÷ (K x G)
where:
Ha = Acceleration head (ft of liquid)
L = Actual length of suction line (m) — not equivalent length
V = Velocity of liquid in suction line (m/sec) [V = LPM x (21.2 ÷ pipe ID^2)]
N = rpm of crank shaft
C = Constant determined by type of pump — use 0.066 for the T100 Hydra-Cell pumps, use 0.04 for the Q155 Hydra-Cell pumps.
K = Constant to compensate for compressibility of the fluid — use: 1.4 for de-aerated or hot water; 1.5 for most liquids; 2.5 for hydrocarbons with high compressibility
G = Gravitational constant ($9.81 m/s^2$)

Friction Losses

Calculating Friction Losses in Suction Piping

When following the above recommendations (under “Inlet Piping”) for minimum hose/pipe I. D. and maximum length, frictional losses in the suction piping are negligible (i.e., Hf = 0) if you are pumping a water-like fluid.

When pumping more-viscous fluids such as lubricating oils, sealants, adhesives, syrups, varnishes, etc.; frictional losses in the suction piping may become significant. As Hf increases, the available NPSH (NPSHa) will decrease, and cavitation will occur.

In general, frictional losses increase with increasing viscosity, increasing suction-line length, increasing pump flow rate, and decreasing suction-line diameter. Changes in suction-line diameter have the greatest impact on frictional

losses: a 25% increase in suction-line diameter cuts losses by more than two times, and a 50% increase cuts losses by a factor of five times.

Consult the factory before pumping viscous fluids.

Minimizing Acceleration Head and Frictional Losses

To minimize the acceleration head and frictional losses, where possible:

- Keep inlet lines less than 6 ft (1.8 m) or as short as possible
- Use at least 4 in. (102 mm) I.D. inlet hose
- Use **suction** hose (low-pressure hose, non collapsing) for the inlet lines
- Minimize fittings (elbows, valves, tees, etc.)
- **Use a suction stabilizer on the inlet.**

Net Positive Suction Head

NPSHa must be equal to or greater than NPSHr. If not, the pressure in the pump inlet will be lower than the vapor pressure of the fluid — and cavitation will occur.

Calculating the NPSHa

Use the following formula to calculate the NPSHa:

NPSHa = Pt + Hz - Hf - Ha - Pvp

where:

Pt = Atmospheric pressure

Hz = Vertical distance from liquid surface to pump center line (if liquid is below pump center line, the Hz is negative)

Hf = Friction losses in suction piping

Ha = Acceleration head at pump suction

Pvp = Absolute vapor pressure of liquid at pumping temperature

Notes:

NPSHa must be at least 1m greater than NPSHr
All values must be expressed in metres of liquid

Discharge Piping

Hose and Routing

Use the shortest, most-direct route for the discharge line.

Select pipe or hose with a **working pressure** rating of at least 1.5 times the maximum system pressure.

Where possible, use flexible hose between the pump and rigid piping to absorb vibration, expansion or contraction.

Support the pump and piping independently. Where possible, size the discharge line so that the velocity of the fluid will be 1-3 m/sec

Pressure Relief

Install a pressure relief valve in the discharge line. Bypass pressure must not exceed the pressure limit of the pump.

Size the relief valve so that, when fully open, it will be large enough to relieve the full capacity of the pump without over pressurizing the pump.

Locate the valve as close to the pump as possible and ahead of any other valves.

Adjust the pressure relief valve to no more than 10% over the maximum working pressure of the pump.

Do not route the bypass line directly back to the pump suction port.

If the pump may be run for a long time with the discharge closed and fluid bypassing, install a thermal protector in the bypass line (to prevent severe temperature buildup in the bypassed fluid).

CAUTION: *Never* install shutoff valves in the bypass line or between the pump and pressure relief valve.

Install a pressure gauge in the discharge line.

Vacuum at Outlet. Do not allow a vacuum at the pump outlet during shutdown. A vacuum can damage the diaphragm at start-up. If there is a vacuum at the pump outlet, allow atmospheric pressure at the outlet for 30 minutes before starting. Wanner Engineering recommends installing an outlet check valve with a 4.5 bar cracking pressure where necessary to prevent a vacuum condition during shutdown.

Oil Level Monitoring. Oil level is sensed by the back cover float switch and can be used to control the pump system operation.

Before Initial Start-Up

Before you start the pump, be sure that:

- Pump is stored at a temperature above the minimum service temperature for a minimum of 24 hours before start up.
- All shutoff valves are open, and the pump has an adequate supply of fluid.
- All connections are tight.
- The oil level is correct. Add oil as needed. The oil level can also be viewed through the sight glass (42) on the back cover (12). The oil level is OK when the float (48) is in the middle of the sight glass.
- Connect the float switch. See Float Switch Section.
- Test the float switch by removing the side port plug (50) and manipulating the float up and down using a suitable tool (screwdriver). Reinstall side port plug (50).

CAUTION: Take care not to drop tool inside pump.

- The relief valve on the pump outlet is adjusted so the pump starts under minimum pressure.

• All shaft couplings or drive pulleys have adequate safety guards.

Initial Start-Up

1. Pump must be at or above minimum temperature specified in diaphragm temperature limits table for 24 hours prior to starting.
2. Open the bypass line start-up and capacity-control valve (if required) so the pump may be started against negligible discharge pressure.
3. Turn on power to the pump motor.
4. Check the inlet pressure or vacuum. To maintain maximum flow, inlet vacuum must not exceed 0.24 bar at 21° C. Inlet pressure must not exceed 500 psi (34 bar).
5. Listen for any erratic noise, and look for unsteady flow.
6. If the system has an air lock and the pump fails to prime:
   a. Turn off the power.
   b. Remove the pressure gauge from the tee fitting at the pump outlet (if installed), or remove the plug / blanking flange from the unused side of the pump discharge.

Note: Fluid may come out of this port when the plug is removed. Provide an adequate catch basin for fluid spillage, if required. Fluid will come out of this port when the pump is started, so we recommend that you attach adequate plumbing from this port so fluid will not be sprayed or lost. Use high-pressure-rated hose and fittings from this port. Take all safety precautions to assure safe handling of the fluid being pumped.

c. Jog the system on and off until the fluid coming from this port is air-free.
d. Turn off the power.
e. Remove the plumbing that was temporarily installed, and reinstall the pressure gauge or plug.

7. Adjust the bypass line valve to the desired operating pressure. Do not exceed the maximum pressure rating of the pump.
8. After the system pressure is adjusted, verify the safety relief valve setting by closing the bypass line valve until the relief valve opens.

Note: Fluid may come out of the safety relief valve. Provide an adequate catch basin for fluid spillage. Take all safety precautions to assure safe handling of the spillage.

9. Reset the bypass line valve to obtain the desired system pressure.
10. Provide a return line from the relief valve to the supply tank, similar to the bypass line.

10. Maintenance and Testing

Hydra-Cell pumps should only be maintained by competent engineers authorised to perform the procedures being carried out.

As part of the regular maintenance procedure for the pump, the following routine checks must be made.

1. Check the pressure relief / bypass valve is functioning as intended.
2. All head and casing bolts are secured (refer to torque values).
3. Check for electrical conductivity for the pump frame to ground.
4. Check the integrity of the external shaft seals and pump head O rings.

Please refer to the T-Series Hydra-Cell Installation / Service manual and supplements for more detailed instructions on maintenance and checking methods.

The pump casing must have cooled down to ambient temperature before disassembling the pump.

The bearings in the pump have a limited lifetime. Each T-Series pump datasheet has curves showing pressure and speed limits corresponding to rated L10 bearing life of 16,000 and 25,000 hours. The bearings should be replaced according to the instructions in the Installation, Operation and Maintenance manual after the L10 bearing life has expired. **Failure to replace the bearings after the lifetime has expired can result in bearing failure, leading to excessive heat generation and the pump temperature exceeding the certified temperature class.**

The oil level float switches are a critical part of the explosion protection of the pump and they should be tested for correct operation at regular intervals. The pump is provided with an access hole on the back cover which enables the floats to be exercised without disassembly of the pump. A flat bladed screwdriver or similar blunt tool can be inserted through the access hole. This should be done while the pump is running. Push the lower float downwards with the screwdriver until it hits the mechanical stop and hold the float down until the control system initiates a pump shutdown. The pump should then be re-started and the upper float should be lifted and held upwards against the stop until the control system initiates a pump shutdown. If either float fails to initiate a shutdown then the pump should be manually stopped and not used again until the control system loop is confirmed as working correctly. This proof test of the shutdown system should take place at least once every 18 months and records of the testing should be maintained by the operator.

Appendix 1: Type Certificate

intertek
Total Quality. Assured.

TYPE EXAMINATION
CERTIFICATE

Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

1. **Type Examination Certificate Number: ITS14ATEX18067X Issue 01**
2. **Product:** Hydra-Cell Industrial Pumps T100 and Q155 Series
3. **Manufacturer:** Wanner Engineering
4. **Address:** 1204 Chestnut Avenue, Minneapolis, MN 55403, USA
5. This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
6. Intertek Testing and Certification Limited, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of the products intended for use in potentially explosive atmospheres given in Annex II of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014.
7. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 80079-36:2016 and EN 80079-37:2016 except in respect of those requirements referred to within item 14 of the Schedule
8. If the sign "X" is placed after the certificate number, it indicates that the product is subject to the special conditions of use specified in the Schedule to this certificate.
9. This Type Examination Certificate relates only to the design of the specified product and not to specific items subsequently manufactured.
10. The marking of the product shall include the following:

    II 2/3 G Ex Ex h IIC T5...T4 Gb/Gc

    *°C ≤ Ta ≤ +40°C

    * See schedule for lower ambient

Certification Officer: P Moss **Date:** 14 October 2019

SCHEDULE:

TYPE EXAMINATION CERTIFICATE NUMBER ITS14ATEX18067X Issue 01

11. Description of Equipment or Protective System

T100 High Pressure

The T100 High Pressure is a reciprocating positive displacement hydraulically balanced triplex diaphragm pump intended for pumping hard to handle liquids and abrasive slurries. Maximum external dimensions are 1017x739x473mm. Inlet ports are 3 ½" ANSI RF Flanges or 2 ½" NPT, discharge ports are either 1 ½" ANSI RF flanges or 1 ½" NPT. Flow rate is variable from 43.6 to 98 litres per minute depending upon shaft RPM. Maximum power input is 75kW. Maximum discharge pressure is 345 bar and maximum inlet pressure is 34.5 bar. The pump housing is constructed from ductile cast iron and the pump head is constructed from either Nickel Aluminium Bronze, Stainless Steel or Hastelloy C. Diaphragm material can be FKM, EPDM, or Nitrile rubber.

T100 Medium Pressure

The T100 Medium Pressure is a reciprocating positive displacement hydraulically balanced triplex diaphragm pump intended for pumping hard to handle liquids and abrasive slurries. Maximum external dimensions are 1038x739x441mm. Inlet ports are either 3 ½" ANSI RF Flanges or 2 ½" NPT, discharge ports are either 1 ½" ANSI RF flanges or 1 ½" NPT. Flow rate is variable depending upon shaft RPM and plunger choice. Maximum power input is 75kW. Maximum RPM for all variants is 450 RPM. Maximum discharge pressure is up to 241 bar depending on plunger choice and maximum inlet pressure is 34.5 bar. The pump housing is constructed from ductile cast iron and the pump head can be constructed from Nickel Aluminium Bronze, Stainless Steel or Hastelloy C. Diaphragm material can be FKM, EPDM, or Nitrile rubber.

T100 Low Pressure

The T100 Low Pressure is a reciprocating positive displacement hydraulically balanced triplex diaphragm pump intended for pumping hard to handle liquids and abrasive slurries. Maximum external dimensions are 1038x739x494mm. Inlet ports are 3 ½" ANSI RF Flanges, discharge ports are 2" ANSI RF flanges. Flow rate is variable depending upon shaft RPM and plunger choice. Maximum RPM for all variants is 450 RPM. Maximum power input is 75kW. Maximum discharge pressure is up to 145 bar depending on plunger choice and maximum inlet pressure is 34.5 bar. The pump housing is constructed from ductile cast iron and the pump head can be constructed from Nickel Aluminium Bronze, Stainless Steel or Hastelloy C. Diaphragm material can be FKM, EPDM, or Nitrile rubber.

SCHEDULE:

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Q155 Low Pressure

The Q155 Low Pressure is a reciprocating positive displacement hydraulically balanced triplex diaphragm pump intended for pumping hard to handle liquids and abrasive slurries. Maximum external dimensions are 1038x739x494mm. Inlet ports are 4" proprietary flanges with a range of flange and weld neck adapters available, discharge ports are 3" proprietary flanges with a range of flange and weld neck adapters available. Flow rate is variable depending upon shaft RPM and plunger choice with an absolute maximum flow rate of 595L/min. Maximum RPM for all variants is 450 RPM. Maximum power input is 120kW. Maximum discharge pressure is up to 145 bar depending on plunger choice and maximum inlet pressure is 34.5 bar. The pump housing is constructed from ductile cast iron and the pump head can be constructed from Nickel Aluminium Bronze, Stainless Steel or Hastelloy C. Diaphragm material can be FKM, EPDM, or Nitrile rubber.

Q155 Medium Pressure

The Q155 Medium Pressure is a reciprocating positive displacement hydraulically balanced triplex diaphragm pump intended for pumping hard to handle liquids and abrasive slurries. Maximum external dimensions are 1038x739x494mm. Inlet ports are 4" proprietary flanges with a range of flange and weld neck adapters available, discharge ports are 2" proprietary flanges with a range of flange and weld neck adapters available. Flow rate is variable depending upon shaft RPM and plunger choice with an absolute maximum flow rate of 295L/min. Maximum RPM for all variants is 450 RPM. Maximum power input is 120kW. Maximum discharge pressure is up to 241 bar depending on plunger choice and maximum inlet pressure is 34.5 bar. The pump housing is constructed from ductile cast iron and the pump head can be constructed from Nickel Aluminium Bronze, Stainless Steel or Hastelloy C. Diaphragm material can be FKM, EPDM, or Nitrile rubber.

Lower ambient temperature (**°C) is based on the below table.

Diaphragm Material	Minimum Service temperature (°C)
Aflas	30
EPDM	-20
FKM	5
HNBR	-5

SCHEDULE:

TYPE EXAMINATION CERTIFICATE NUMBER ITS14ATEX18067X Issue 01

12. **Report Number**

Intertek Report: 103250047CHE-001 Dated: 14 October 2019.

13. **Conditions of Certification**

(a). Special Conditions of Use

- Hydrotatic/hydrokinetic equipment shall comply with the requirements of EN ISO 4413;
- All lubricants and/or coolants must be suitable for +5°C to +103°C temperature range and have an ignition temperature of at least 153°C;
- To avoid electrostatic charging steps must be taken to ensure the equipotential bonding is maintained;
- The end user must monitor and control the temperature of the internal process fluid. An additional temperature rise above the ambient or process temperature (whichever is the higher) of 21K must be accounted for, hence the following resulting temperature classes (T-classes) apply:-

Process Temperature	Resultant T-class
Less than or equal to 49ºC	T5
Less than or equal to 82 ºC Note. Process temperatures above 82 ºC are not permitted for this equipment.	T4

(b). Conditions of Manufacture

- No Conditions of Manufacture

14. **Essential Health and Safety Requirements (EHSRs)**

The relevant Essential Health and Safety Requirements (EHSRs) affected by this variation have been identified and assessed in Intertek Report: 103250047CHE-001 Dated: 14 October 2019.

SCHEDULE:

TYPE EXAMINATION CERTIFICATE NUMBER ITS14ATEX18067X Issue 01

15. Drawings and Documents

Title:	Drawing No.:	Rev. Level:	Date:
T100 pump with Earthstud and baffle.	ATEX T-100	D	22/08/2019
Q155 ATEX pump with Earthstud	Q155-MP-ATX	D	22/08/2019
Q100 Medium Pressure – ATEX	Q155-MP-ATX	A	06/08/2018
T100 High Pressure – ATEX	T100 HP ATX	A	03/08/2018
Q155 Low Pressure – ATEX	Q155-LP-ATX	A	06/08/2018
Assy, Q155 Pump, Low Pressure	Q155-L	B	11/29/2016
Assy, Q155 Pump, Medium Pressure	Q155-M	B	5/16/2016
Assy, T100 Pump, High Pressure	T100-HR	N	11/16/2016
Assy, T100 Pump, Low Pressure	T100-LR	G	11/14/2016
Assy, T100 Pump, Medium Pressure, NPT	T100-MA	L	11/14/2016
Assy, T100 Pump, Medium Pressure, Flange	T100-MR	L	11/16/2016
ATEX T & Q Series Pumps Directive 2014/34/EU Covers – Category 2 Zone 1 requirements	-	A	14/10/2019
High Horse Power Data Plate (T100, Q155)	177-198 REV 14 W ENTRY	C	05/09/2019

16. Details of Certificate changes

ITS14ATEX18067X – Original Issue.

ITS14ATEX18067X issue 1 – This Issue – Change of model numbering, addition of Q155 range of pumps, updating to the latest standards.

Appendix 2: Maximum Pressure Values of all Models

Model	Discharge Pressure	Inlet Pressure
T100E / Q155E	103 bar	34 bar
T100F / Q155F	127 bar	34 bar
T100H / Q155H	144 bar	34 bar
T100K / Q155K	207 bar	34 bar
T100M / Q155M	241 bar	34 bar
T100S	345 bar	34 bar