

Central SEQ Distributor – Retailer

Authority – trading as Queensland Urban Utilities

Operation & Instruction Manual

Supply and Install Replacement Pumps at
SP7, 16, 18, 25 and 174

Contract No. C1011-045 QUU052

SP25 Scott Street Norman Park

SP7 Ferol Street Coorparoo
SP16 Gordon Street Hawthorne
SP18 Carnelian Street Holland Park
SP174 Jesmond Road Fig Tree Pocket



RE-PUMP Australia PTY LTD A.B.N. 20 109 927 844

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SP25 Scott Street Norman Park

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1. Operating Instructions

Pump 1 Code:

F06G-EMN3R + FE0304X4-XVEK1 + NC1B4V-15 + B0-200X250F6KH (Duty 76l/s @ 27m)

Serial No. 217057

Pump 2 Code:

F06G-EMN3R + FE0304X4-XVEK1 + NC1B4V-15 + B0-200X250F6KH (Duty 76l/s @ 27m)

Serial No. 217058

Supplier: Weir Minerals Australia Ltd

2. Hydrostatic Test Certificate

3. Flow Test Results

4. Electrical Test Results

5. Mechanical Commissioning Sheet

6. Electrical Commissioning Sheet

7. Mechanical Drawings (PDF & CAD)

486/5/7-0387-030 A

486/5/7-0387-031 A

486/5/7-0387-032 A

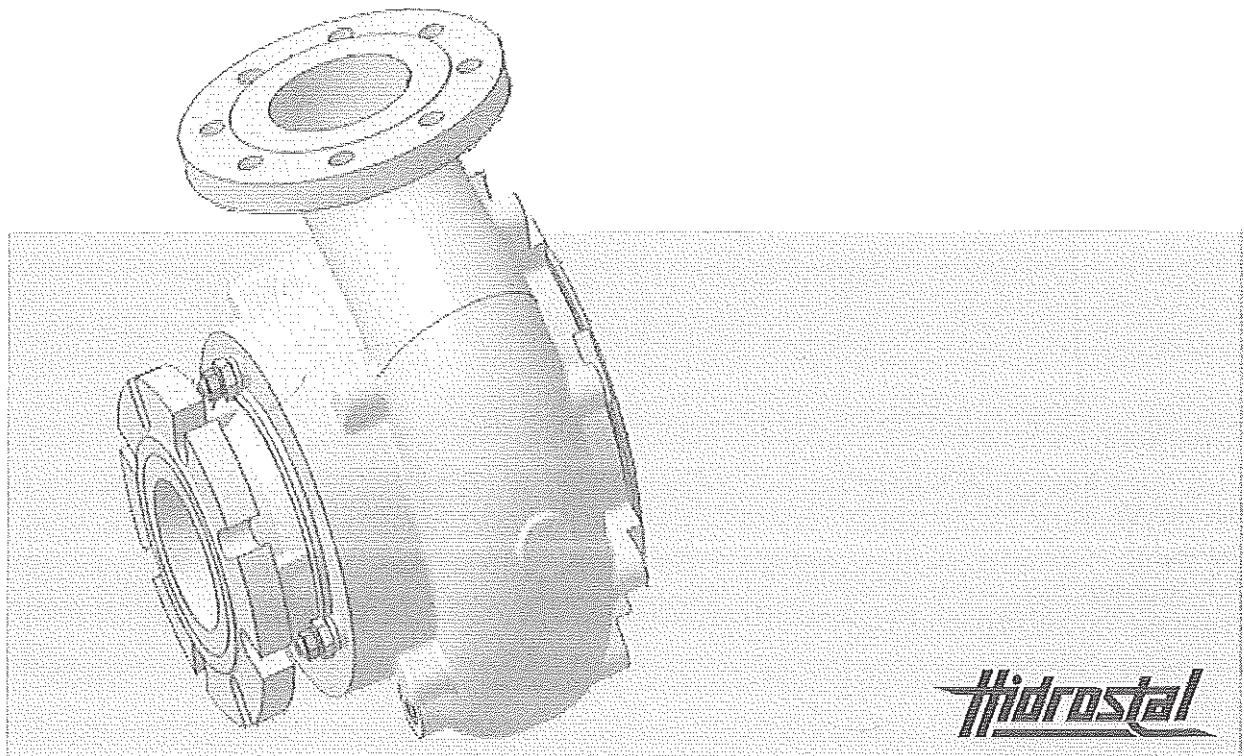
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8. Electrical Drawings (PDF & CAD)

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Operating instructions

Submersible and immersible screw-centrifugal pumps



Hydraulic B-N
Motor size 002-300 and B-Z



Read the instructions prior to performing any task!

10-BA7597en

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Translation of the original operating instructions

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General

Explanation of symbols



1 General

1.1 Information on these instructions

This manual enables safe and efficient handling of the system. This manual is an integral part of the system, and must be kept in close proximity to the system where it is permanently accessible to the personnel.

Before starting any work, the personnel must have read the manual thoroughly and understood its contents. Compliance with all specified safety instructions and operating instructions is vital to ensure safe operation.

In addition, local accident prevention regulations and general safety instructions must be observed for the operational area of the system.

Illustrations in this manual are intended to facilitate basic understanding, and may differ from the actual design.

1.2 Explanation of symbols

Safety instructions

The safety instructions provided in this manual are marked by symbols. The safety instructions are introduced by keywords used to express the extent of the danger.

Strictly adhere to all safety instructions and use caution to prevent accidents, personal injury and material damage.



DANGER!

This combination of symbol and keyword points to a situation of immediate danger which may lead to serious injury or death unless avoided.



WARNING!

This combination of symbol and keyword points to a situation of possible danger which may lead to serious injury or death unless avoided.



CAUTION!

This combination of symbol and keyword points to a possibly dangerous situation which may lead to slight or minor injury unless avoided.



NOTICE!

This combination of symbol and keyword points to a possibly dangerous situation which may lead to material and environmental damage unless avoided.



General

Limitation of liability

Tips and recommendations



This symbol highlights useful tips and recommendations as well as information designed to ensure efficient and smooth operation.

Special safety instructions

The following symbols are used in the safety instructions to draw attention to specific dangers:



DANGER!

This combination of symbol and signal word indicates dangers posed by electric power. If the safety instructions are not observed, there is a danger of serious or fatal injuries.

Symbols used in this manual

To indicate guidelines, descriptions of results, lists, references and other elements, the following symbols and markings are used in this manual:



Indicates step-by-step guidelines.



Indicates a condition or automatic sequence as result of action taken.



Indicates lists or list entries without a certain sequence.



„Symbols used in this manual“ on page 7 Indicates references to chapters in this manual.

1.3 Limitation of liability

All information and notes in this manual were compiled under consideration of the applicable standards and regulations, the present state of technology, as well as our many years of knowledge and experience.

The manufacturer assumes no liability for damages caused by:

- Non-observance of this manual
- Any use other than intended
- Assignment of untrained personnel
- Unauthorised conversions
- Technical modifications
- Use of unapproved spare parts
- Disassembly and repair of pump by unauthorised service centre & Chapter 1.6 „Customer Service“ on page 9.

General

Warranty terms



In case of customised versions, utilisation of additional order options, or latest technical modifications, the actual scope of delivery can vary from the explanations and interpretations described herein.

The commitments set out in the delivery contract, the general terms and conditions, as well as the delivery conditions of the manufacturer and the regulations applicable at the time of contract conclusion are in force.

1.4 Spare parts

Procure spare parts from authorised dealer or directly from manufacturer. For contact information refer to Internet address on page 2.



WARNING!

Risk of injury when using incorrect spare parts!

The use of incorrect or defective spare parts can create hazards for the personnel and cause damages, malfunctions or total failure.

- Use only genuine parts from manufacturer or parts approved by manufacturer.
- In case of any questions, please always contact manufacturer.



When using unapproved spare parts, all claims concerning warranty, service, damage and/or liability against manufacturer or his agents, dealers and representatives will be forfeited.

When making spare parts enquiries or placing spare parts orders, complete information must be provided & *Type designation in contract.*

Spare parts list can be found in appendix.

1.5 Warranty terms

The warranty terms are included in the manufacturer's Terms and Conditions.



1.6 Customer Service

Contact our Customer Service for technical information. For contact information refer to Internet address on page 2.

In addition, our employees are always interested in new information and experiences that result from application and may be beneficial for improving our products.

1.7 Copyright

This manual is protected by copyright and intended solely for internal use.

This manual must not be made available to third parties, duplicated in any manner or form – whether in whole or in part – and the content must not be used and/or communicated, except for internal purposes, without the written consent of the manufacturer.

Violation of the copyright will result in legal action for damages. We reserve the right to assert further claims.

Safety

Responsibility of operating company



2 Safety

This section provides an overview of all the main safety aspects involved in ensuring optimal personnel protection and safe and smooth operation.

Non-compliance with the action guidelines and safety instructions contained in this manual may result in serious hazards.

2.1 Responsibility of operating company

Customer

The term 'customer' refers to the person who himself operates the system for trade or commercial purposes, or who surrenders the system to a third party for use/application, and who bears the legal product liability for protecting the user, the personnel or third parties during the operation.

Owner's obligations

The system is used in the industrial sector. The owner of the system must therefore comply with statutory occupational safety requirements.

In addition to the safety instructions in this manual, the safety, accident prevention and environmental protection regulations governing the operating area of the system must be observed.

In this regard, the following requirements should be particularly observed:

- The owner must obtain information about the applicable occupational safety regulations, and - in the context of a risk assessment - must determine any additional dangers resulting from the specific working conditions at the usage location of the system. The owner must then implement this information in a set of operating instructions governing operation of the system.
- During the complete operating time of the system, the owner must assess whether the operating instructions issued comply with the current status of regulations, and must update the operating instructions if necessary.
- The owner must clearly lay down and specify responsibilities with respect to installation, operation, troubleshooting, maintenance and cleaning.
- The owner must ensure that all personnel dealing with the system have read and understood this manual. In addition, the owner must provide personnel with training and hazards information at regular intervals.
- The owner must provide the personnel with the necessary protective equipment.

Furthermore, the owner is responsible for ensuring that the system is always in a technically faultless condition. Therefore, the following applies:



- The owner must ensure that the maintenance intervals described in this manual are observed.
- The owner must ensure that all safety devices are regularly checked to ensure full functionality and completeness.

2.2 Personnel requirements

2.2.1 Qualifications



WARNING!

Danger of injury if personnel are insufficiently qualified

If unqualified personnel perform work on the system or are in the system's danger zone, hazards may arise which can cause serious injury and substantial damage to property.

- Therefore, all work must only be carried out by appropriately qualified personnel.
- Unqualified personnel must be kept away from the danger zones.

This manual specifies the personnel qualifications required for the different areas of work, listed below:

Forklift driver

The forklift driver must be at least 18 years old and, based on his physical and intellectual attributes and character, suited to driving industrial trucks with a driver's seat or driver's platform.

Furthermore, the forklift driver has been trained to drive industrial trucks with a driver's seat or driver's platform.

The forklift driver has provided the owner with evidence of his skills in driving industrial trucks with a driver's seat or driver's platform and has therefore been authorised in writing by the owner to drive the forklift.

Instructed person (operator)

has been informed by the operating company about the assigned tasks and possible hazards in case of incorrect behaviour.

Manufacturer (service centre)

Certain types of work may only be performed by our professionals. Any other personnel is not authorised to perform this work. To schedule the corresponding work, contact our Service department, see address on page 2.

Qualified Electrician

Based on his technical training, knowledge, experience and knowledge of the applicable standards and regulations, the Qualified Electrician is able to perform work on electrical systems and recognise and avoid potential hazards himself.

Safety

Personnel requirements > Unauthorised persons



The Qualified Electrician is specially trained for the area of responsibility he is involved with and knows the relevant standards and regulations.

The Qualified Electrician must comply with the requirements of the applicable legal regulations for accident prevention.

Qualified personnel

Qualified personnel is able to carry out assigned work and to recognize and prevent possible dangers self-reliantly due to its professional training, knowledge and experience as well as profound knowledge of applicable regulations.

The workforce must only consist of persons who can be expected to carry out their work reliably. Persons with impaired reactions due to, for example, the consumption of drugs, alcohol, or medication are prohibited.

When selecting personnel, the age-related and occupation-related regulations governing the usage location must be observed.

2.2.2 Unauthorised persons



WARNING!

Risk to life for unauthorised persons due to hazards in the danger and working zone!

Unauthorised persons who do not meet the requirements described here will not be familiar with the dangers in the working zone. Therefore, unauthorised persons face the risk of serious injury or death.

- Unauthorised persons must be kept away from the danger and working zone.
- If in doubt, address the persons in question and ask them to leave the danger and working zone.
- Cease work while unauthorised persons are in the danger and working zone.



2.2.3 Instructions

The personnel must receive regular instruction from the owner. The instruction must be documented to facilitate improved verification.

[illegible]

2.3 Intended use

The pumps are exclusively designed and constructed for the intended use described herein.

The pumps are intended for use in the food and chemical industry, environmental technology for domestic and industrial wastewater, mines and in the petroleum industry.

The pump serves exclusively for the delivery of media according to technical data sheets & Chapter 11 „Appendix“ on page 103.

Intended use also includes compliance with all information contained in this manual.

Any use other than the one intended or any other type of use, is considered incorrect.



WARNING!

Risk due to incorrect use!

Any use beyond the intended one, or other use of the equipment, can result in dangerous situations.

- Use device only as intended.
- Strictly follow the information contained in these operating instructions.
- Do not use device in potentially explosive atmospheres.
- Refrain from delivery of flammable liquid.
- Refrain from altering, converting or modifying the construction or individual pieces of equipment, aimed at changing the area of application or the use of the device.
- Never operate device outside the technical application and operating limits.

Claims of any kind for damages due to incorrect use are excluded.

Safety

Principal hazards



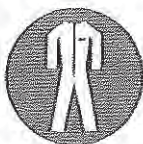
2.4 Personal safety equipment

Personal protective equipment is used to protect the personnel from dangers which could affect their safety or health while working.

The personnel must wear personal protective equipment while carrying out the different operations at and with the system. This equipment will be indicated separately in the individual chapters of this manual. This personal protective equipment is described below:

- It is mandatory to put on the personal protective equipment specified in the different chapters of this manual before starting work.
- Always comply with the instructions governing personal protective equipment posted in the work area.

Description of the personal protective equipment



Protective clothing

Protective clothing are tight fitting working clothes with low tear resistance, with tight sleeves and without any parts sticking out. These clothes primarily protect against getting caught by moving machine parts. Do not wear rings, chains, necklaces, and other jewellery.



Protective helmet

The protective helmet provides protection against falling and flying parts and materials.



Safety boots

Safety boots are intended to protect against slipping hazards or foot hazards like heavy gear.



Safety gloves

Safety gloves are intended to protect hands against friction, abrasion, stabs or deeper wounds and against direct contact with hot surfaces.

2.5 Principal hazards

The following section specifies the residual risks determined on the basis of a risk assessment.



Safety

Principal hazards

In order to reduce health risks and avoid dangerous situations, observe the safety instructions listed here and the safety instructions contained in other chapters of this manual.

Electrical current



DANGER!

Life-threatening hazard from electric shock!

There is an imminent life-threatening hazard from electric shocks from live parts. Damage to insulation or to specific components can pose a life-threatening hazard.

- Only a qualified electrician should perform work on the electrical equipment.
- Immediately switch off the power supply and have it repaired if there is damage to the insulation.
- Before beginning work at live parts of electrical systems and resources, cut the electricity and ensure it remains off for the duration of the work. Comply with the five safety rules in the process:
 - cut electricity;
 - safeguard against restart;
 - ensure electricity is not flowing;
 - earth and short-circuit; and
 - cover or shield neighbouring live parts.
- Never bypass fuses or render them inoperable. Always use the correct amperage when changing fuses.
- Keep moisture away from live parts. Moisture can cause short circuits.

Impeller



WARNING!

Risk of injury from rotating parts!

Impeller of pump can cause severe injuries.

- Never reach into impeller while in operation.
- Observe delay time: Before performing any maintenance, ensure that parts have come to a complete stop.

Safety

Principal hazards



Highly inflammable substances



WARNING!

Danger to life in the event of fire due to highly inflammable substances!

Highly inflammable substances, liquids or gases may catch fire, causing serious or fatal injuries.

- Do not smoke within or around the danger zone. Do not handle open flames, fire or ignition sources of any kind.
- Ensure availability of suitable extinguishing agents (fire blanket, fire extinguisher).
- Immediately report suspicious substances, liquids or gases to the person in charge.
- Cease work immediately in the event of fire. Leave the danger zone until the all-clear is sounded and notify the fire brigade.

Risk of entanglement caused by submersible pump



WARNING!

Risk of entanglement caused by submersible pump!

During operation of the submersible pump there is a risk of entanglement at the side of the pump's suction inlet. This can cause severe injuries.

- Do not enter hazardous area during operation.
- Prior to any set-up and maintenance work as well as troubleshooting measures, switch off power supply and protect against restart.

Lubricants, preservatives



WARNING!

Fire hazard due to lubricants and preservatives!

Oil and grease can ignite after contact with ignition sources.

- No open fire when working on devices.
- No smoking.
- Remove oil and grease residues from device and floor.



Safety

Safety devices

Hot surfaces



WARNING!

Danger of injury from hot surfaces!

Component surfaces may heat up greatly during operation. Skin contact with hot surfaces will cause severe skin burns.

- Always wear heat-resistant protective work clothing and protective gloves as a matter of principle when working in the vicinity of hot surfaces.
- Before carrying out any work, make sure that the surfaces have cooled down to the ambient temperature.

Poisoning hazard



CAUTION!

Poisoning hazard from oil, grease and preservatives!

Contact with oil and grease can be harmful to health.

- Avoid skin contact with oil and grease.
- Remove oil and grease immediately from skin.
- Do not inhale oil and grease vapours.

2.6 Safety devices



WARNING!

Mortal danger due to non-functioning safety devices!

Safety is only guaranteed if safety devices are faultless.

- Always maintain safety components in good order.
- Never disable safety devices.
- Do not bypass or modify safety components.
- Ensure that safety devices, such as emergency-stop buttons, ripcords, etc. are always accessible.

The operating company must retrofit the following safety devices:

Integration in an emergency-stop concept required

The device is intended for use within a system. It has no separate emergency-stop function.

Before initial use of the device, install emergency-stop devices and main switch, and integrate into safety chain of system control.

Safety

Securing to prevent restart



Connect emergency-stop devices so as to prevent situations that could endanger human life or property in case of energy supply interruption or energy supply activation after an interruption.

The emergency-stop devices must be freely accessible at all times.

Time-lag fuses or circuit breakers

Time-lag fuses or circuit breakers must be installed in each supply phase.

Lightning protection

Overcurrent circuit breakers must be installed in each supply phase if there is a risk of lightning damage.

Motor starting switch

A magnetic contact starter, designed for full voltage, must be installed and dimensioned according to applicable local regulations, based on motor power rating.

Quick trip overcurrent circuit breakers

They must be selected based on the power consumption indicated on the type plate. In case of locked rotor (approximately 6 times the full-load current) they must switch off within 6 seconds to sufficiently protect the motor windings. Check "switch-off curve" of circuit breaker to ensure that this requirement is met.



The warranty for the immersible motors applies only if quick trip overcurrent circuit breakers are installed in all phases. For repair of motors under warranty, provide documents proving that the correct overcurrent circuit breakers were installed.

2.7 Securing to prevent restart



WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply, there is a danger of serious injuries or death for persons in the danger zone.

- Observe all instructions in the chapters of this manual relating to preventing a restart
- Always comply with the sequence described below to prevent a restart.



Safety

Behaviour in the event of fire or accidents

Securing to prevent restart

Switch secured with lock
on: at o'clock.
DO NOT SWITCH ON
The lock may be removed
only by:
after making sure that no
persons are in the hazardous
area.

Fig. 1: "Switch secured using a lock" sign

Switched off
on: at o'clock.
DO NOT SWITCH ON
Switching on may be performed
only by:
after making sure that no
persons are in the hazardous
area.

Fig. 2: "Switched off" sign

1. ➤ Switch off the power supply.
2. ➤ If possible, secure the switch using a lock and attach a corresponding sign Fig. 1 to the switch ensuring high visibility.
3. ➤ Place the key in the safekeeping of the personnel specified on the sign.

4. ➤ If it is not possible to secure a switch using a lock, an appropriate sign Fig. 2 should be attached.
5. ➤ After all work has been completed, ensure that the danger zone has been cleared of people.
6. ➤ Ensure that all safety and protective devices are installed and completely functional.
7. ➤ Only then should the sign be removed.

2.8 Behaviour in the event of fire or accidents

Precautions

- Always be prepared for accidents or fire!
- Ensure that first aid supplies (box of dressings, blankets etc.) and fire extinguishers are completely functional and ready to hand.
- Ensure that personnel are familiar with accident reporting, first aid and rescue equipment.
- Keep access routes clear for emergency service vehicles.

Actions in the event of accidents

- Immediately use the emergency stop device to trigger an emergency stop.
- Rescue people from the danger zone.
- Initiate first aid measures.
- Notify the rescue services.
- Notify those responsible at the place of use.
- Clear access routes for emergency service vehicles.

Safety

Labelling



2.9 Environmental protection



NOTICE!

Danger to the environment from incorrect handling of pollutants!

Incorrect handling of pollutants, particularly incorrect waste disposal, may cause serious damage to the environment.

- Always observe the instructions below regarding handling and disposal of pollutants.
- Take the appropriate actions immediately if pollutants escape accidentally into the environment. If in doubt, inform the responsible municipal authorities about the damage and ask about the appropriate actions to be taken.

The following pollutants are used:

Lubricants, preservatives

Lubricants, such as greases, oils and preservatives, contain poisonous substances. Do not allow them to enter the environment. Disposal must be carried out by a professional disposal company.

2.10 Labelling

The following symbols and information signs can be found in the work area. They refer to their immediate surroundings.



WARNING!

Danger of injury from illegible symbols!

Stickers and signs can become dirty or otherwise obscured over time, with the result that dangers cannot be recognised and the necessary operating instructions cannot be complied with. This, in turn, poses a risk of injury.

- All safety, warning and operating instructions must always be maintained in a completely legible condition.
- Damaged signs or stickers must be replaced immediately.



Safety

Labelling

Electrical voltage



Only qualified electricians are permitted to work in a work room marked by this sign.

Unauthorised persons must not enter the workplaces thus marked and must not open the marked cabinet.

Information label on motors with PTC thermistors

All motors equipped with PTC thermistors have the following information label at the cable end:

"CAUTION! PTC thermistor! Voltage larger than 2,5 V destroys the winding!"

Technical data

Operating materials



3 Technical data

3.1 General information



For technical data (dimensions, weights, performances, connected loads, etc.) refer to enclosed delivery drawings and data sheets. ↗ Chapter 11 „Appendix“ on page 103.

3.2 Type code



Explanation of type code (motor code and hydraulic designation) ↗ Chapter 11 „Appendix“ on page 103).

3.3 Operating conditions

Environment

Data	Value	Unit
Temperature of medium	up to 40	°C
Ambient temperature	up to 40	°C



Minimum values for medium and ambient temperature depend on operating conditions. For additional information ↗ Chapter 7.5 „Special conditions“ on page 65.

Duration

Data	Value
Maximum operating time	designed for continuous operation

3.4 Operating materials

Operating material	Characteristic	Value	Unit
STABURAGS NBU 8EP from Klüber-Lubrication (lubricant)	Colour	beige	
	Apparent dynamic viscosity	6000	mPas
	Range of operating temperature	-30...150	°C



Technical data

Type plate

Operating material	Characteristic	Value	Unit
	Max. temperature (short-term)	170	°C
	Viscosity grade (NLGI)	2	
	Penetration, DIN ISO 2137 (0.1 mm)	280	
	Dropping point DIN ISO 2176, minimum	220	°C
	Corrosion protection DIN 51802	0	
	RPM parameters (n x d m)	5 x 10 ⁵	
Hydraulic fluid no. 856 or equivalent oil (cooling and sealing liquid)	Specific gravity at 20 °C	0,812	g/ml
	Viscosity at 40 °C	3,5	mm ² /s (cst)
	Pour point	-38	°C
	Flash point	132	°C
	Fire point	142	°C
	Heat of vaporization	251	kJ/kg
	Water solubility	none	
Corrosion protection No. 846 (Preservative)	Boiling point/boiling range	148	°C
	Flash point	30	°C
	Ignition temperature	260	°C
	Lower explosive limit	0,5	Vol. %
	Upper explosive limit	6,5	Vol. %
	Density at 20 °C	0,87	g/cm ³

3.5 Type plate

The type plate is located on the motor casing.

Technical data

Type plate



Type plate

Fig. 3

The type plate includes the following information:

Explanation	Designation	Example	Unit
Name and address of manufacturer	Manufacturer		
CE marking	CE		
Hidrostal motor code	TYP (TYPE)		
Order number	O.NR. (O.No.)		
Serial number	M.NR. (M.No.)		
Rotating electrical machines	VDE 0530		
Insulation class	I.CL.		
Degrees of protection (based on overall design)	IP Code	68	
Mains frequency		50	Hz
Nominal voltage (operating voltage)		400	V
Nominal motor current			A
Power input	P1		kW
Power factor	cos φ		
Nominal speed	RPM 1/min		rpm
Nominal output	P2		kW
Phase circuits	Con. Schalt. (Con. circuit)		
Weight			kg
Flow rate	Q		l/s



Technical data

Type plate

Explanation	Designation	Example	Unit
Delivery head	H		m
Ambient temperature	Umg. Temperatur (Amb. temperature)		°C

Structure and function

Overview



4 Structure and function

4.1 Overview

The pump is used for the delivery of media according to technical data sheets.

- 1 Cable part
- 2 Electric motor
- 3 Hydraulic part
- 4 Suction flange
- 5 Pressure flange

The medium is sucked via the suction inlet (4) by means of the impeller of the hydraulic part (3) and delivered to the pressure line.

The pump may be installed horizontally or vertically.

Depending on type of electric motor, the pump is suitable for wet or dry installation & Chapter 4.2 „Electric motors“ on page 27.

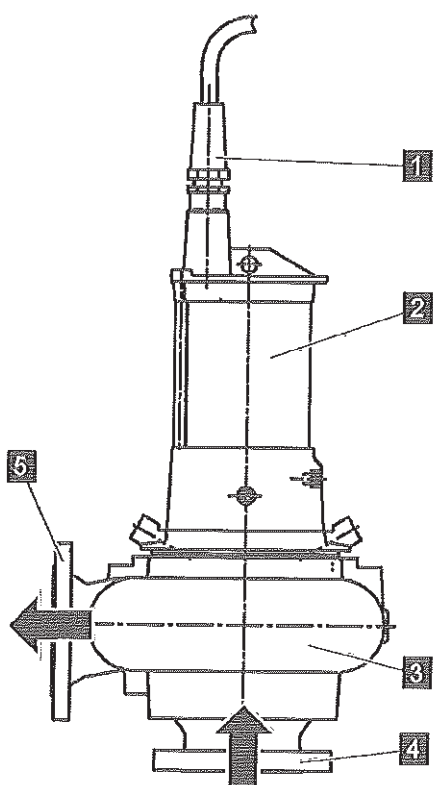


Fig. 4



Structure and function

Electric motors

If pump (2) is sump-mounted, it is equipped with guide rail (1) (optional) and slide shoe (4). This ensures that pump is precisely positioned on the automatic coupling on the discharge outlet (3).

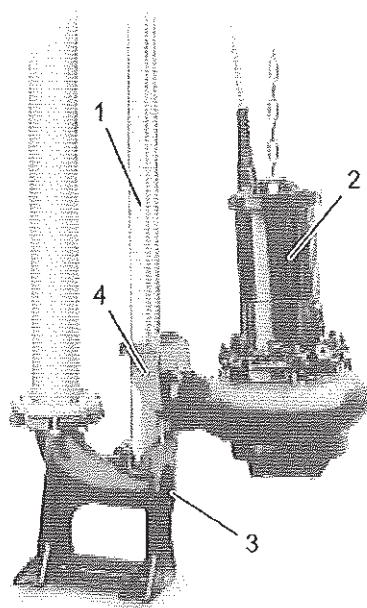


Fig. 5

4.2 Electric motors

Cooling methods for electric motors

Depending on motor size and application, various cooling methods can be applied (second digit of motor code):

- Submersible motors for sump installation (cooling method "N")
The pump is fully submerged during operation, but it can emerge.
- Immersible electric motors for dry installation in immersed area (cooling method "E", "K", "F") The pump is installed dry, but can be immersed.

Structure and function



Electric motors > Immersible electric motors (cooling method "E"...

4.2.1 Submersible motors (cooling method "N")

Immersion cooling (cooling method "N")

On this type, the waste heat of the motor is transferred directly to the surrounding liquid via the stator housing (1).

- 1 Stator housing
- 2 Oil drain opening
- 3 Stator housing opening
- 4 Flushing connection

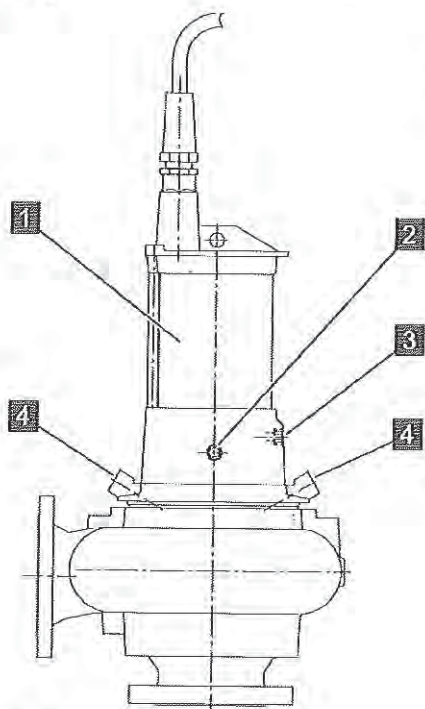


Fig. 6

4.2.2 Immersible electric motors (cooling method "E", "K", "F")

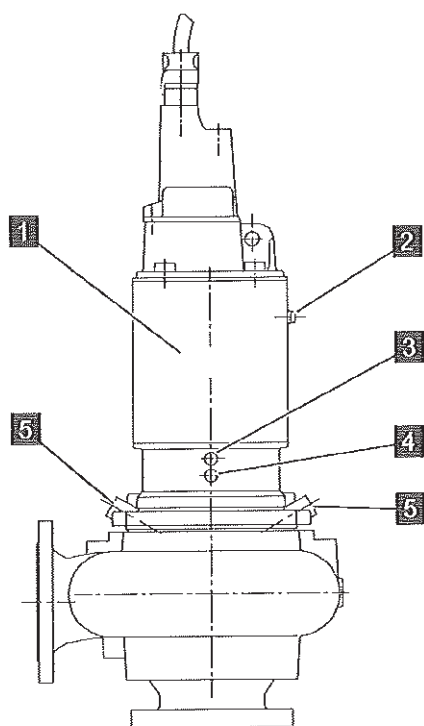
Self-cooling (cooling method "E")

On this type, the pump is equipped with an oil jacket (1) with forced circulation.



Structure and function

Electric motors > Immersible electric motors (cooling method "E"...



- 1 Cooling jacket of stator housing
- 2 Oil filler opening
- 3 Stator housing opening
- 4 Oil drain opening
- 5 Flushing connection

The waste heat of the motor is transferred to the cooling oil, which circulates in the cooling jacket. The oil discharges the waste heat through the sealing part of the motor (serves as heat exchanger). The oil is circulated by an impeller on the motor shaft.

Fig. 7

Structure and function

Electric motors > Immersible electric motors (cooling method "E"...



Convection cooling (cooling method "K")

On this type, the waste heat of the motor is transferred directly to the surrounding liquid (pump submerged) or the air (pump not submerged) via the stator housing (1).

- 1 Stator housing
- 2 Stator housing opening
- 3 Oil drain opening
- 4 Flushing connection

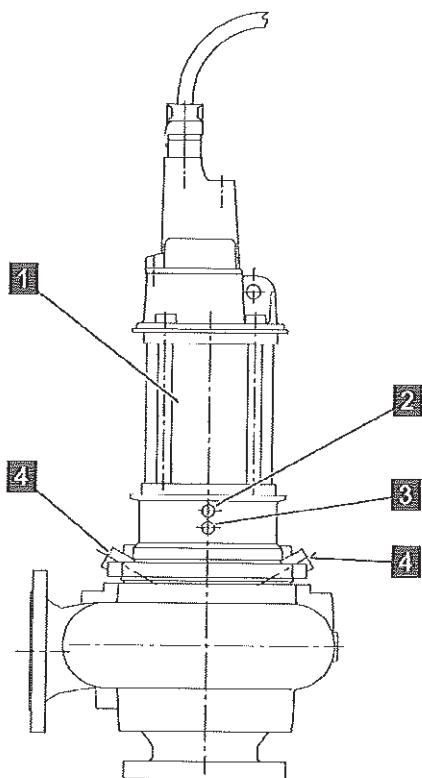


Fig. 8

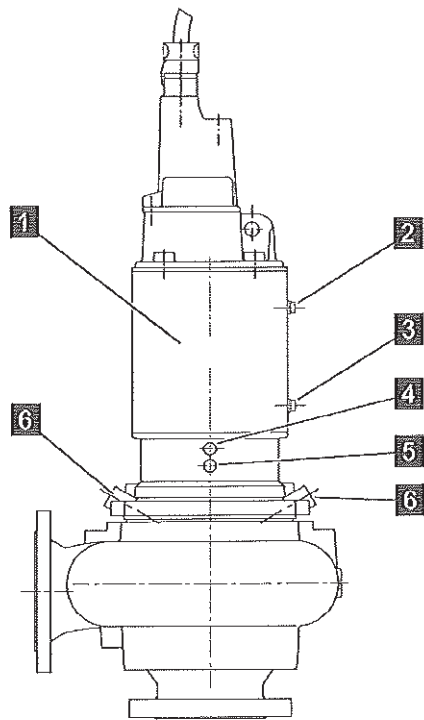
Forced cooling (cooling method "F")

On this type, the waste heat of the motor is transferred from the stator to a cooling liquid. It circulates in the cooling jacket (1), which encloses the stator housing. The cooling liquid transfers the waste heat to an external heat exchanger. It must be circulated by an external pump system.



Structure and function

Electric motors > Immersible electric motors (cooling method "E"...



- 1 Cooling jacket of stator housing
- 2 Coolant outlet
- 3 Coolant inlet
- 4 Stator housing opening
- 5 Oil drain opening
- 6 Flushing connection

This type is suitable for applications where self-cooling is not sufficient, particularly when the temperature of the delivered medium is too high for an effective cooling.

Fig. 9

Structure and function

Operational safety components



4.3 Operational safety components

The following components are installed:

- 1 Cable protection
- 2 Bearing temperature probe in upper bearing (optional)
- 3 Winding head with built-in temperature limiter
- 4 Bearing temperature probe in lower bearing (optional)
- 5 Float switch (optional)
- 6 Moisture probe (optional)

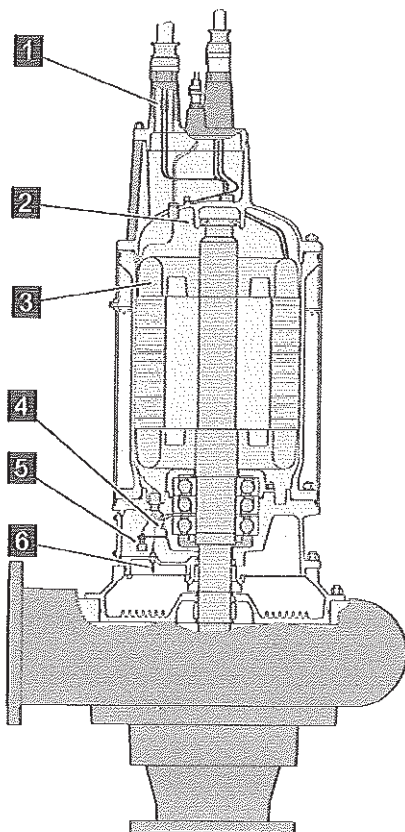


Fig. 10

Cable protection (1)

The cable inlet prevents moisture from entering the interior of the motor. The cables are sealed with epoxy resin; the wires are fed into separate conductors, which also form the connection to the motor, thus completely sealing the interior space between the cable sheathing and the wires.

Temperature limiter - circuit with temperature controller built into the winding (3)

The motors are made with temperature limiters, which are installed in the winding head (conductor connection 1 and 2). When trigger temperature of limit switch is reached, operation is interrupted. They are bimetallic switches (similar to Klixon). They can be directly connected to the motor's control circuit at 220/240 volt, with a maximum load of 2.5 A.

A temperature controller (conductor terminal 1 and 3) ensures that operation is interrupted 12 to 15 °C before reaching the trigger temperature of the limit switch.



Structure and function

Connections

Overtemperature protection of windings (when in inverter mode)

Overtemperature protection takes place via PTC thermistor and PTC thermistor triggering device. PTC thermistor sensors protect against excessive temperatures in case of blocking rotors, heavy start-ups, counter-current operation, undervoltage and phase failure, increased ambient temperature and impaired cooling.

Bearing temperature probe in lower bearing (optional) (4); in upper bearing (optional) (2)

The bearing temperatures of the lower and upper bearings of the electric motor are monitored by temperature probes. Thus, bearing damage can be detected at an early stage and necessary measures can be taken.

Float switch (5) (optional)

Leakage monitoring of upper seal is performed by means of a float switch, which is installed in the oil chamber. If water enters the drying chamber, it reacts before the water reaches the lower bearing. This prevents lubricating grease from washing out and damage to the bearing.

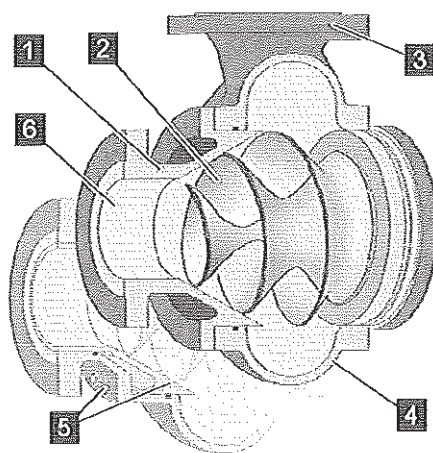
Moisture probe (6) (optional)

Moisture is monitored by means of a moisture probe. If a certain water content is exceeded in the oil chamber of the electric motor, the integrated moisture probe triggers an alarm.

Operating hours counter (optional)

The operating hours counter is used to keep track of operating hours.

4.4 Hydraulics



- 1 Suction cone
- 2 Screw centrifugal impeller (impeller)
- 3 Outlet
- 4 Spiral casing
- 5 Clearance adjustment
- 6 Inlet

The standard hydraulic system consists of a spiral casing (4), an impeller (2) and a suction cone (1). The impeller - suction cone clearance can be adjusted (5).

Fig. 11

4.5 Connections

The pump is connected to the energy supply by means of an electric cable.

Structure and function

Operating elements



Each cable set has three or six power current leads per rotational speed, a ground conductor and additional conductors for overtemperature protection and leakage monitoring.

4.6 Operating elements



The device has no separate operating elements. Operation is performed via a separate control & separate operating manual.



Transport, packaging and storage

Safety instructions for transport

5 Transport, packaging and storage

5.1 Safety instructions for transport

Industrial trucks



WARNING!

Danger to life from industrial trucks!

Objects and other loads may fall from industrial trucks during transport in an uncontrolled manner, causing serious injuries or death. There is also a danger that the vehicle driver will fail to see persons and may run over them.

- Industrial trucks should only be operated by trained drivers (e.g. forklift operators).
- Only pass an industrial truck once the driver has signalled that he has seen the persons.
- Only use approved industrial trucks with sufficient load-bearing capacity.
- Never drive material transports around people or areas where people gather.

Eccentric centre of gravity



WARNING!

Danger of injury from falling or tipping packages!

Packages may have an eccentric centre of gravity. Incorrect attachment may cause the package to tip and fall. Falling or tipping packages may cause serious injury.

- Observe the markings and specifications on the packages relating to the centre of gravity.
- When transporting with a crane, attach the crane hook so that it is above the package's centre of gravity.
- Lift the package carefully and observe whether it tips. Change the attachment position if necessary.

Transport, packaging and storage

Transport inspection



Suspended loads



WARNING!

Danger of fatal injury from suspended loads!

During lifting operations, loads may swing out and fall down. This may result in serious injury or death.

- Never step under suspended loads, and do not step within their pivoting range.
- Only move loads under supervision.
- Only use approved hoists and lifting gear with a sufficient load-bearing capacity.
- Do not use torn or abraded hoists such as ropes and straps.
- Do not place hoists such as ropes and straps against sharp edges or corners and do not knot or twist them.
- Set the load down when leaving the workplace.

Improper transport



NOTICE!

Damage to property due to improper transport!

Transport units may fall or tip over as a result of improper transport. This can cause a significant level of property damage.

- Proceed carefully when unloading transport units at delivery and during in-house transport; observe the symbols and instructions on the packaging.
- Only use the attachment points provided.
- Only remove the packaging shortly before assembly.

5.2 Transport inspection

On receipt, immediately inspect the delivery for completeness and transport damage.

Proceed as follows in the event of externally apparent transport damage:

- Do not accept the delivery, or only accept it subject to reservation.
- Note the extent of the damage on the transport documentation or the shipper's delivery note.
- Initiate complaint procedures.



Transport, packaging and storage

Transport



Issue a complaint in respect of each defect immediately following detection. Damage compensation claims can only be asserted within the applicable complaint deadlines.

5.3 Transport

Attachment points

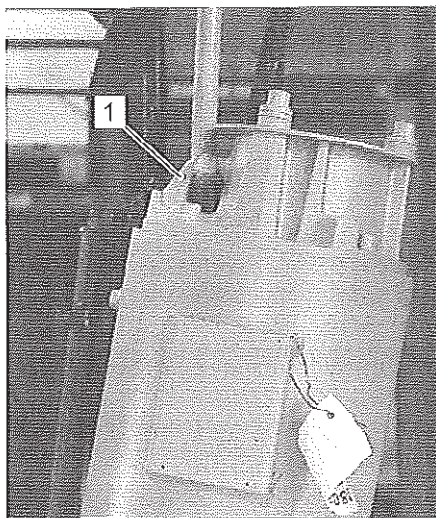


Fig. 12

The following attachment points are provided:

- Attachment lugs (1) on electric motor and on pump

Transporting packages with a crane

Packages with lifting eyes can be transported directly with a crane subject to the following conditions:

- The crane and hoists must be designed for the weight of the packages.
- The operator must be authorised to operate the crane

Attachment

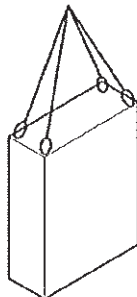


Fig. 13: Transport with a crane

Protective equipment: ■ Protective helmet

1. ▸ Attach ropes, straps or multi-point suspension gear in accordance with Fig. 13.
2. ▸ Ensure that the package hangs straight; if necessary, take account of eccentric centre of gravity.
3. ▸ Start transport.

Transport, packaging and storage

Symbols on packaging



Transporting pallets with a crane

Packages fixed to pallets can be transported directly with a crane subject to the following conditions:

- The crane and hoists must be designed for the weight of the packages.
- The operator must be authorised to operate the crane.

Protective equipment: ■ Protective helmet

Attachment

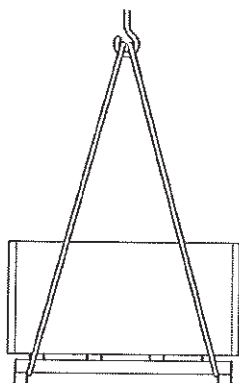


Fig. 14: Attaching the hoist

1. ▶ Attach ropes, straps or multi-point suspension gear in accordance with Fig. 14 to the pallet and secure the pallet to prevent slippage.
2. ▶ Check that the packages are not damaged by the lifting gear. Use different lifting gear if necessary.
3. ▶ In the event of an eccentric centre of gravity, ensure that the pallet cannot tip over.
4. ▶ Start transport.

Transporting pallets with a forklift

Packages fixed to pallets can be transported with a forklift subject to the following conditions:

- The forklift must be designed for the weight of the packages.
- The package must be securely fixed to the pallet.

Transporting

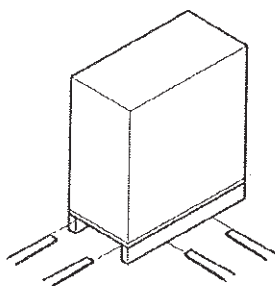


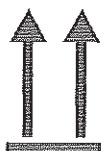
Fig. 15: Transport with a forklift

Personnel: ■ Forklift driver

1. ▶ Drive the forklift with the forks between or beneath the pallet struts.
2. ▶ Drive the forks in to such an extent that they protrude from the opposite side.
3. ▶ In the event of an eccentric centre of gravity, ensure that the pallet cannot tip over.
4. ▶ Lift the pallet with its package and start the transport.

5.4 Symbols on packaging

Top



The arrow tips on the sign mark the top of the package. They must always point upwards; otherwise the content could be damaged.



Transport, packaging and storage

Packaging

Attach here



Lifting gear (lifting chain, lifting strap) must only be attached to points bearing this symbol.

Centre of gravity



Marks the centre of gravity of packages.

Note the location of the centre of gravity when lifting and transporting.

Weight, attached load



Indicates the weight of packages.

Handle the marked package in accordance with its weight.

Permitted stacking load



Indicates packages which are partially stackable.

Do not exceed the maximum load-bearing capacity specified in the symbol in order to avoid damaging or destroying the content.

Do not stack



Indicates packages that cannot be stacked.

5.5 Packaging

About packaging

The individual packages are packaged in accordance with anticipated transport conditions. Only environmentally-friendly materials have been used in the packaging.

The packaging is intended to protect the individual components from transport damage, corrosion and other damage prior to assembly. Therefore do not destroy the packaging and only remove it shortly before assembly.

Handling packaging materials

Dispose of packaging material in accordance with the relevant applicable legal requirements and local regulations.

Transport, packaging and storage

Storage



NOTICE!

Danger to the environment due to incorrect disposal!

Packaging materials are valuable raw materials and in many cases can continue to be used or can be properly processed and recycled. Incorrect disposal of packaging materials may pose risks to the environment.

- Dispose of packaging materials in accordance with the environmental regulations.
- Observe locally applicable waste disposal regulations. If necessary, outsource the disposal to a specialist company.

5.6 Storage



NOTICE!

Damage to property due to incorrect storage!

Incorrect storage can cause considerable damage to property.

- Always observe the following instructions on storage:

Storage of packages

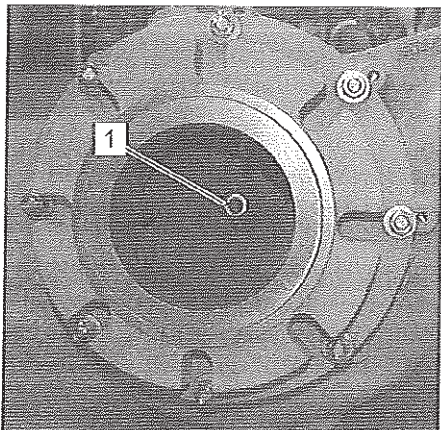


Fig. 16

Store packages under the following conditions:

- Do not store outside.
- Keep dry and dust-free.
- Do not expose to aggressive media.
- Do not expose to any mechanical agitations and vibrations.
- Turn shaft of impeller via front screw (1) every two weeks to prevent oxidation and rust.
- Storage temperature: -10 to 40° C.
- Relative humidity: max. 60 %.
- If storage exceeds 3 months, check general condition of all parts and of packaging in regular intervals. If necessary, refresh or renew preservation Φ Chapter 3.4 „Operating materials“ on page 22.



It is possible that the packages contain storage instructions that go beyond the requirements mentioned here. Please follow them.



Installation and initial commissioning

Safety

6 Installation and initial commissioning



Installation and initial commissioning shall only be performed by employees appointed by the manufacturer, or by individuals authorised by him. In the event of non-compliance, all warranty claims against manufacturer or his representative shall be forfeited.



WARNING!

Danger due to faulty installation and initial commissioning!

Installation and initial commissioning require trained professionals with adequate experience. Errors during installation can result in fatal situations or considerable property damage.

- Ensure that installation and initial commissioning is performed exclusively by trained professionals or specialist department.

After set-up, completion of installation, initial commissioning and performance of recorded test runs by manufacturer or his representatives, the equipment is handed over to the operating company.

After this, the operating company is allowed to carry out operation as intended in compliance with the information contained in these operating instructions.

6.1 Safety

Electrical system



DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components can be subject to uncontrolled movements and may cause grave injury or death.

- Switch off the power supply before starting work and make sure that it cannot be switched on again.

Installation and initial commissioning

Safety



WARNING!

Risk of injury and damage to property due to potentially explosive atmosphere!

Use of devices in potentially explosive atmosphere that are not approved for Ex atmospheres can result in severe injuries, even death.

- Operate pump only after exclusion of potentially explosive atmosphere.

Securing to prevent restart



WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply during installation, there is a danger of serious injuries or death for persons in the danger zone.

- Switch off all power supplies before starting work and make sure they cannot be switched on again.

Improper installation and initial commissioning



WARNING!

Danger of injury from an improper installation and initial commissioning!

Improper installation and initial commissioning can result in serious injury and significant damage to property.

- Ensure sufficient assembly space before starting work.
- Handle exposed, sharp-edged components with caution.
- Pay attention to orderliness and cleanliness in the assembly location! Loosely stacked or scattered components and tools could cause accidents.
- Assemble the components properly. Comply with the specified bolt tightening torques.
- Secure components so that they cannot fall down or topple over.
- Before the initial commissioning, ensure that
 - all installation work has been carried out and completed in accordance with the specifications and instructions in this manual.
 - no persons are in the danger zone.



Installation and initial commissioning

Preparations > Pipeline requirements

6.2 Preparations

6.2.1 Set-up location requirements

Prior to installing the device ensure that set-up location meets the following requirements:

- Ensure observance of applicable local safety regulations.
- Ensure that there is no potentially explosive atmosphere.
- The set-up location of the pump must be as close to the liquid source as possible.
- Ensure that pump room has sufficient ventilation.
- Ensure that length of supplied cable is sufficient for local requirements.
- The device must not be subject to any vibrations or agitations of adjacent machines or systems. Under no circumstances is the generation of resonance oscillations by the foundation/ fastening structure allowed.
- There must be sufficient space for assembly, maintenance and cleaning work.



Manufacturer recommends that a minimum operating space of 1 metre around the device is kept clear for maintenance and servicing work.

For sump installation

In addition to above requirements, observe the following:

- When installing submersible pump in sump, ensure that sump floor is level and smooth.
- For installation and service work above the pump sump, a pulley or chain hoist must be installed. The load capacity of the lifting gear must be at least twice that of the pump weight.
- A water connection with a pressure of about 4 bar (70 psi) must be available to hose down pump when pulling it out of the sump.

6.2.2 Pipeline requirements

- Irrespective of the pump, suction and pressure lines must be supported so as not to place additional load on the pump.
- Temperature or pressure expansion of pipelines are not to affect the pump.

Installation and initial commissioning

Preparations > Pipeline requirements



6.2.2.1 Suction line



NOTICE!

Property damage and loss of suction due to air or gas pockets in suction lines!

Air or gas pockets in suction lines can result in property damage and loss of suction.

- Install suction lines in such a way that pump is never operated with positive suction head (pump higher than suction point) and the liquid carries air or gas.
- Do not install any check valves in suction line.
- Install gate valve with horizontal spindle in suction line to prevent air or gas pockets.

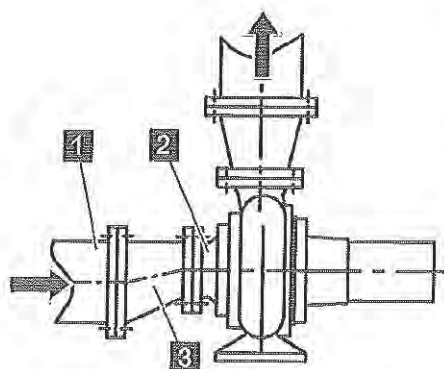


Fig. 17: Horizontal pump installation

- To achieve maximum available suction head, the suction line must be as direct and short as possible and without any bends. If bends are unavoidable, they should preferably have large radii.
- The suction line must be free of counter bores. They result in air accumulations and loss of suction.
- Ensure that suction line is airtight if the medium is to be lifted by suction.
- Install suction line in such a way as to prevent formation of air pockets.

In doing so, observe the following:

- The suction line (1) must point towards the suction inlet (2) of the pump (Fig. 17) or upward (Fig. 18).

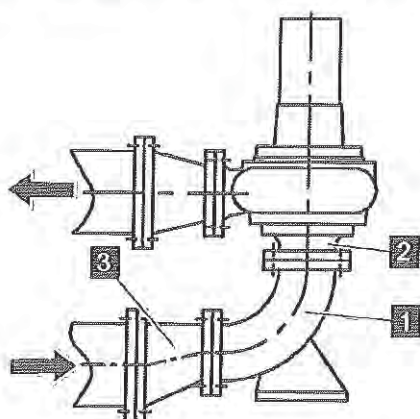


Fig. 18: Vertical pump installation



Installation and initial commissioning

Preparations > Pipeline requirements

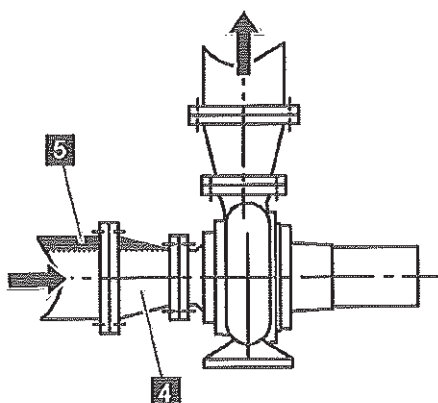


Fig. 19: Air pocket when installing pump horizontally

- Use only eccentric reducers (Fig. 17/3 and Fig. 18/3), whose flat part must be on top. Centric reducers (Fig. 19/4 and Fig. 20/4) result in the air pockets (Fig. 19/5 and Fig. 20/5).

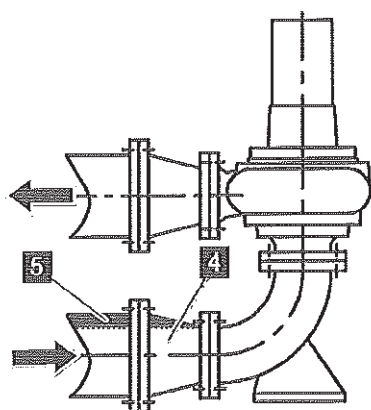


Fig. 20: Air pocket when installing pump vertically

Dimensioning

- To prevent excessive losses, the suction line diameter must be one nominal size larger than the diameter of the pump's suction inlet.

Unusual suction conditions

Unusual suction conditions, such as high liquid temperature, altitude from sea level and high specific gravity, must be compensated by proper planning and adequate dimensioning of the suction line.

Installation and initial commissioning



Initial set-up > Installing pump in sump

6.2.2.2 Pressure line

- Use as few fittings as possible. If the medium is pumped up, guide the line vertically upward starting from the pump, and then horizontally to the outlet point.
- Do not exceed maximum permitted speed if using check valves in the pressure line. The maximum speed for simple check valves in waste water is 3.5 m/s. Exceeding these values can result in pressure shocks when closing check valve: Sealing error by lifting of the surface of the mechanical seal, or coolant loss.

6.3 Initial set-up

The pump may be installed horizontally or vertically.

6.3.1 Installing pump in sump

Personnel: ■ Qualified personnel

Protective equipment: ■ Protective clothing
 ■ Safety gloves
 ■ Protective helmet
 ■ Safety boots

Special tool: ■ Pulley or chain hoist

1. ► Ensure that there is no potentially explosive atmosphere.
2. ► Ensure that the sump floor at installation site of pump is level and smooth.



Installation and initial commissioning

Initial set-up > Installing pump in sump

Installing pump guide rail system:

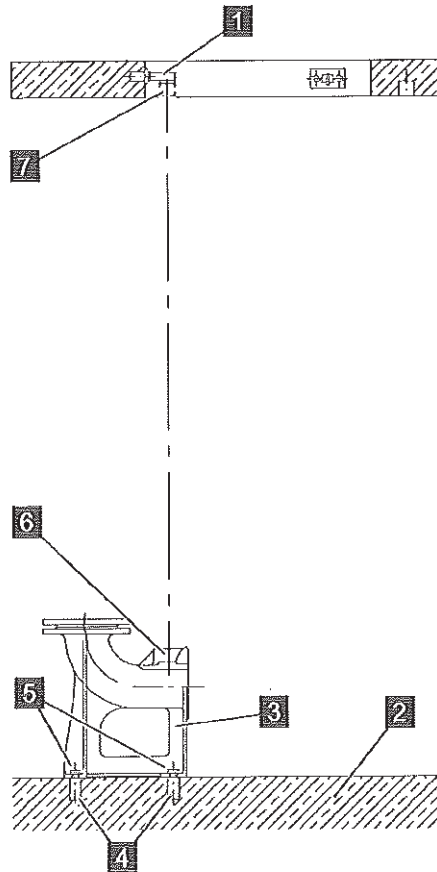


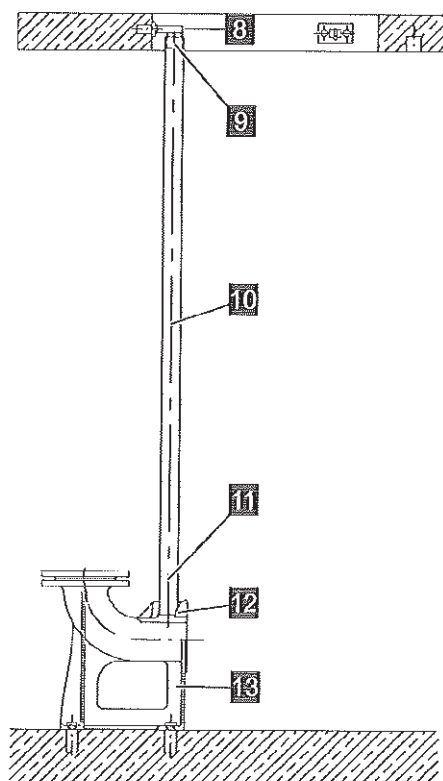
Fig. 21

3. ➤ Complete foundation (2).
4. ➤ Wait until foundation has hardened (if cast-in sleeves (4) are used).
5. ➤ Fasten pipe bracket (1). Make sure that there is enough space available for the slide shoe.
6. ➤ Attach outlet bracket (3) with cast-in sleeves (4) or expansion anchors and nuts (5) to sump floor.
7. ➤ Ensure that guide tube bolts or recesses (6) of outlet bracket (3) are vertically aligned with the guide tube bolts (7) of the pipe bracket (1).

Installation and initial commissioning



Initial set-up > Installing pump in sump



8. ▶ Produce guide tube (10) from galvanized steel pipe (or stainless steel).
9. ▶ Cut guide tube (10) to correct length.
10. ▶ Push lower pipe end (11) over guide tube bolts or into recesses (12) of outlet bracket (13).
11. ▶ Unscrew pipe bracket (8) and insert into upper pipe end (9).
12. ▶ Attach pipe bracket (8) again.
13. ▶ Ensure that guide tube (10) is vertical and parallel.

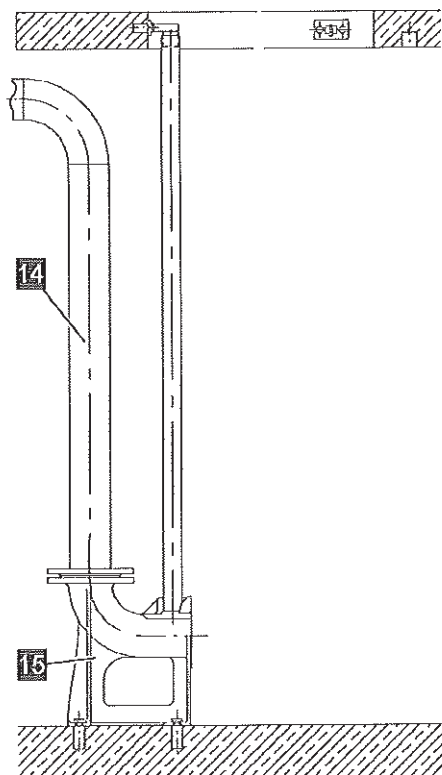
Fig. 22



Installation and initial commissioning

Initial set-up > Installing pump in sump

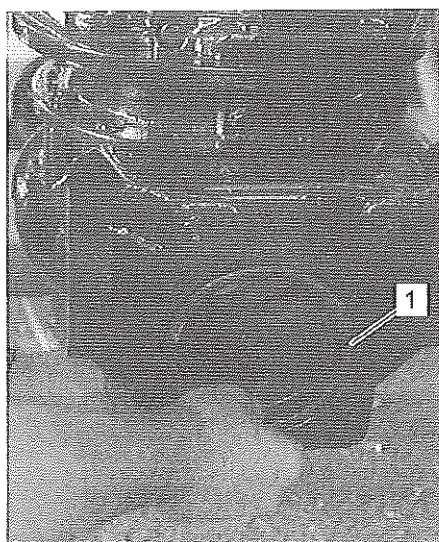
Installing pressure line:



- 14.▶ Install pressure line (14) to outlet bracket (15) .
- 15.▶ Ensure that pressure line (14) is connected to outlet bracket (15) without any tension or misalignments.
- 16.▶ Connect pump to energy supply & Chapter 6.3.3 „Connecting to energy supply“ on page 53.

Fig. 23

Lowering pump into sump:



- 17.▶ Carefully remove old construction waste and other solid parts from sump floor.
- 18.▶ Check rubber seal (1) at pump outlet for damages and correct position in the groove.
- 19.▶ Using a brush, lubricate rubber seal with standard grease.

Fig. 24

Installation and initial commissioning

Initial set-up > Installing pump in sump

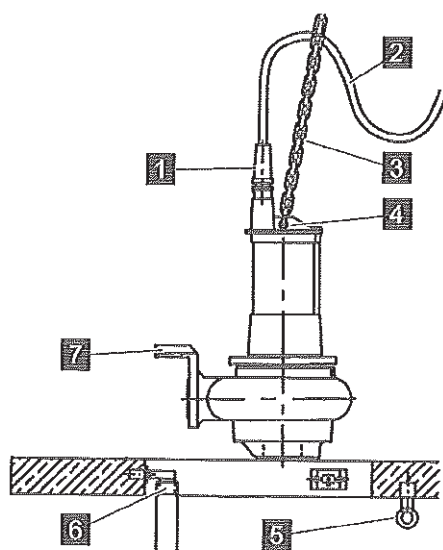


Fig. 25

- 20.▶ Correctly attach hoisting chain or steel hoisting rope (3) to suspension lugs (4).

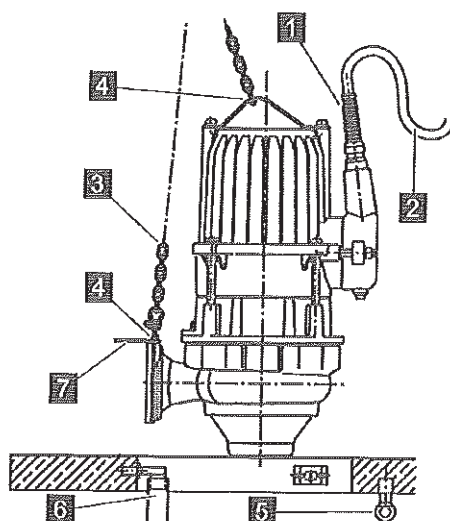


Fig. 26

- 21.▶ Check cable inlet (1) for damage.
 22.▶ Ensure that the cable (2) is firmly clamped in the cable inlet (1).
 23.▶ Feed cable (2) through the cable bracket (5). Make sure that cable is long enough to follow the pump.
 24.▶ Lift pump with crane and move directly over the guide rail (6) until the slide shoe (7) engages.



Installation and initial commissioning

Initial set-up > Installing pump in sump

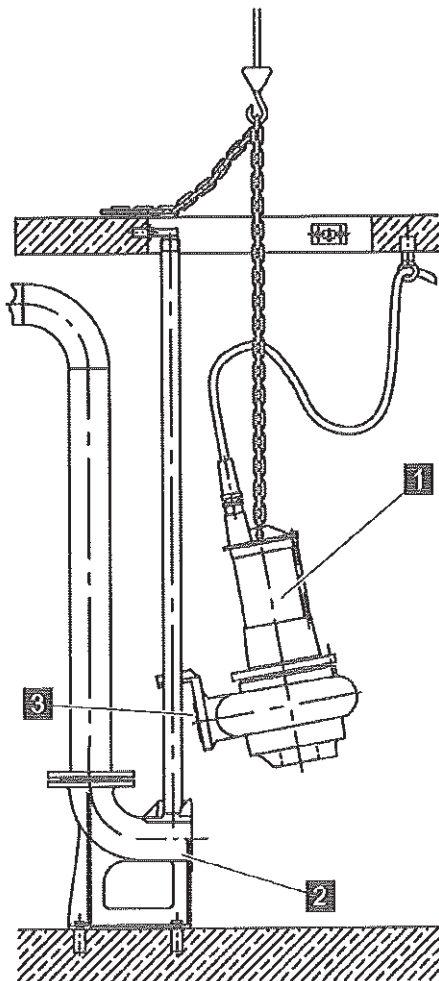


Fig. 27

25. Lower pump (1) until it rests against the outlet bracket (2). The fitting surfaces are sealed by means of the rubber seal (3) that is installed in the slide shoe at the outlet flange. The empty weight of the pump pushes it onto the outlet bracket (2) (as soon as the pump is in its place).

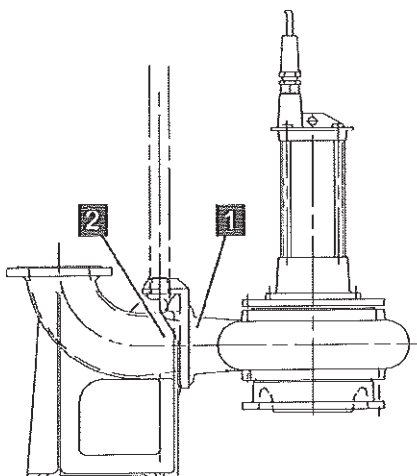
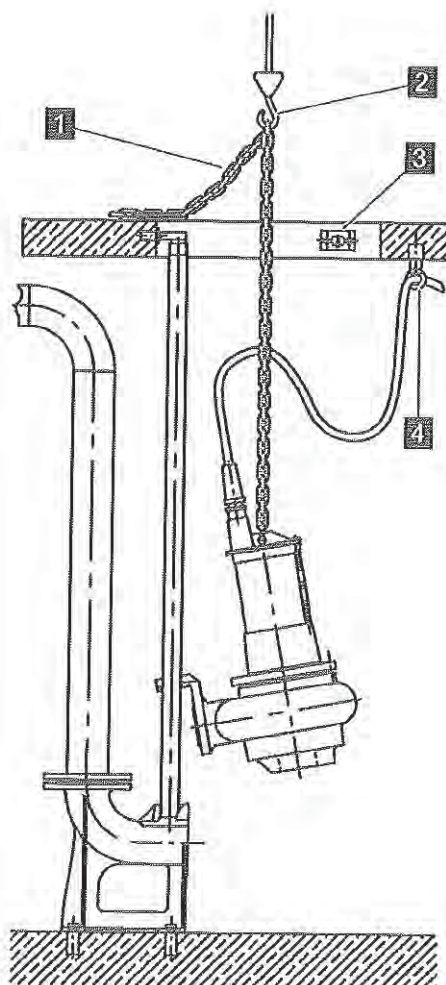


Fig. 28

26. Ensure proper connection between pump (1) and outlet bracket (2).

Installation and initial commissioning

Initial set-up > Installing pump dry



27. Release hoisting chain (1) from crane (2) and firmly fasten to chain bracket (3).



WARNING!

Risk of injury and damage to property due to loose hoisting chain and cable!

Loose hoisting chain or cable can be drawn into the suction inlet of the pump. This can result in considerable personal injury and property damage.

- Always fasten cable to cable bracket (4).
- After installation and maintenance work, always fasten hoisting chain to chain bracket (3).

6.3.2 Installing pump dry

- | | |
|-----------------------|-----------------------|
| Personnel: | ■ Qualified personnel |
| Protective equipment: | ■ Protective clothing |
| | ■ Safety gloves |
| | ■ Protective helmet |
| | ■ Safety boots |



If a pulley or chain hoist is used for pump installation, perform the steps according to chapter "Installing pump in sump".

1. Ensure that there is no potentially explosive atmosphere.
2. Complete foundation.
3. Wait until foundation has hardened (if cast-in sleeves are used).
4. Install suction and pressure lines.



Installation and initial commissioning

Initial set-up > Connecting to energy supply

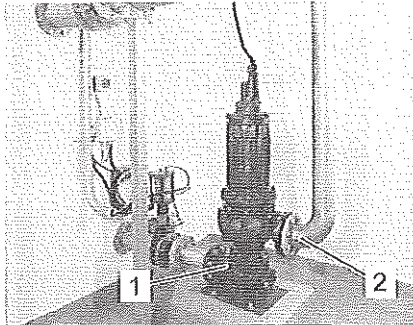


Fig. 29

5. ➤ Connect pump to energy supply & Chapter 6.3.3 „Connecting to energy supply“ on page 53.
6. ➤ Remove all construction waste from pump basin.
7. ➤ Mount pump to foundation.
8. ➤ Ensure that suction and pressure lines are equipped with all seals.
9. ➤ Mount suction line (1) and pressure line (2) to pump flange and tighten screws evenly.



NOTICE!

Property damage due to pipeline pressure!

Pipeline pressure can cause considerable damage to property.

- Never expose pump casing to pipeline pressure.
- When connecting the pipelines, always tighten screws evenly and ensure a solid fit.
- Ensure that flanges are parallel.
- Ensure that base plate or suction bend are fastened to the foundation.

6.3.3 Connecting to energy supply

- | | |
|-----------------------|-------------------------|
| Personnel: | ■ Qualified Electrician |
| Protective equipment: | ■ Protective clothing |
| | ■ Protective helmet |
| | ■ Safety boots |



WARNING!

Risk of injury and property damage due to improper connection to power supply!

Improper connection to the power supply can result in severe injuries and considerable property damage.

- Any work on electrical system must be performed by authorized electricians.
- Make sure that cable ends never get in contact with water during connection to power supply. This could cause a short circuit.
- Never open motor to connect power supply. Opening the motor can damage the hermetic seal applied in the factory.

Connection table

Installation and initial commissioning



Initial set-up > Connecting to energy supply

Each cable set has three or six power current leads per rotational speed, a ground conductor and additional conductors for overtemperature protection and leakage monitoring.

The power current leads of the motor are marked according to the following table:

Motor type	Number of revolutions	Number of conductors	Speed	Winding connection	Designation at cable end, according to standard DIN VDE 0530
up to 4 kW, direct start	1	3 + C + E		Y	U1 V1 W1
via 4 kW star delta start	1	6 + C + E		Δ	U1 V1 W1 W2 U2 V2
Dahlander pole changing Y/YY for two speeds, direct start	2	6 + C + E	N	Y	1U 1V 1W
			H	YY	1U 1V 1W 2U 2V 2W
Pole-changing motor, all speeds with direct start	2	6 + C + E	N	Y	1U1 1V1 1W1
			H	Y	2U1 2V1 2W1
Pole changing motor, low speed: Direct start, high speed: Star delta start	2	9 + C + E	N	Y 1)	1U1 1V1 1W1
			H	Δ	2U1 2V1 2W1 2U2 2V2 2W2
Pole changing motor, low and high speed with star delta start	2	12 + C + E	N	Δ	1U1 1V1 1W1 1U2 1V2 1W2
			H	Δ	2U1 2V1 2W1 2U2 2V2 2W2

The following abbreviations are used in the table:

Designation	Abbreviation	Explanation
Number of conductors	E	Earthing (yellow-green)
	C	Control conductor
Speed	N	Low speed
	H	High speed
Winding connection	Y/YY	Direct start (Dahlander)
	Δ	The starting current at this speed is lower than the starting current at high speed during star delta start
	1)	Star delta start possible



Installation and initial commissioning

Initial set-up > Connecting to energy supply

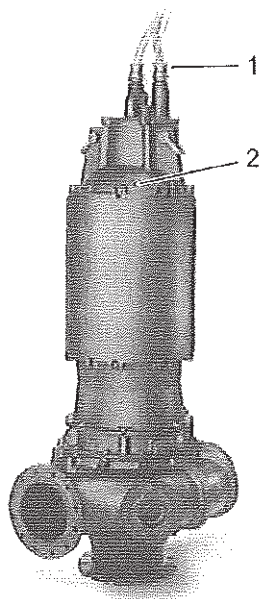


Fig. 30

When establishing connection to power supply, observe the following:

Electrical controls and junction boxes

Lowest threshold value (temperature controller)

Highest threshold value (temperature limiter)

Temperature sensor

- The electrical controls and junction boxes of the pump's power supply cable must be installed above the anticipated flood level. They should be adequately sealed and/or ventilated to prevent interior condensation.
- Connect control conductors 1 and 3 in such a way to allow automatic restart of motor after it has cooled down and circuit is closed again. An overheated motor can resume operation as soon as it is submerged again in cooling water.
- Connect control conductors 1 and 2 in such a way to prevent automatic restart of motor. In case of malfunction it must be determined why the temperature control circuit did not switch off first. The malfunction must be corrected before motor is started up again.
- Motor is only deenergized by the temperature sensors if it gradually overheats due to an electrical malfunction. This device does not provide protection against fast temperature increase caused by overload, such as a locked rotor. They are therefore no adequate substitute for the specified overcurrent circuit breakers (e.g. for pump stations with several pumps).



Seal monitoring is located in a separate cable, which is led through the motor.

1. ▶ Turn impeller by hand to ensure free rotation.
2. ▶ Check motor cover (2) and cable inlet (1) for visible damage.
3. ▶ Ensure that the cable is firmly clamped in the cable inlet (1).
4. ▶ Perform electrical connections according to electrical diagram & Chapter 11 „Appendix“ on page 103.
5. ▶ Ensure that PTC thermistor is connected in such a way that motor is deenergized without delay in case of overheating & Information label on motors with PTC thermistor.



Non-observance results in forfeiture of all warranty claims.

6. ▶ Check rotational direction & Chapter 6.3.4 „Check rotational direction“ on page 56.
7. ▶ Ensure that the options are installed correctly. & Chapter 6.3.5 „Requirements on installation of options“ on page 57.

Installation and initial commissioning

Initial set-up > Check rotational direction



6.3.4 Check rotational direction

- Personnel: ☐ Qualified Electrician
- Protective equipment: ☐ Protective clothing
☐ Protective helmet
☐ Safety boots



WARNING!

Risk of injury and damage to property due to incorrect rotational direction!

Incorrect rotational direction can result in serious injuries or property damages.

- In case of incorrect rotational direction, switch only the pump's cable conductors or speed with wrong rotational direction at the corresponding starting switch in the control panel.
- Never switch the primary feeders to the control panel. This reverses the rotational direction of all pumps at all speeds.

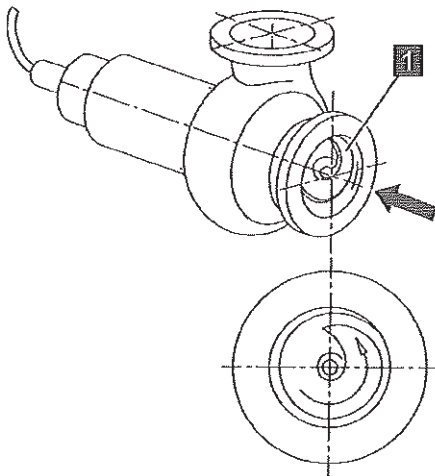


Fig. 31

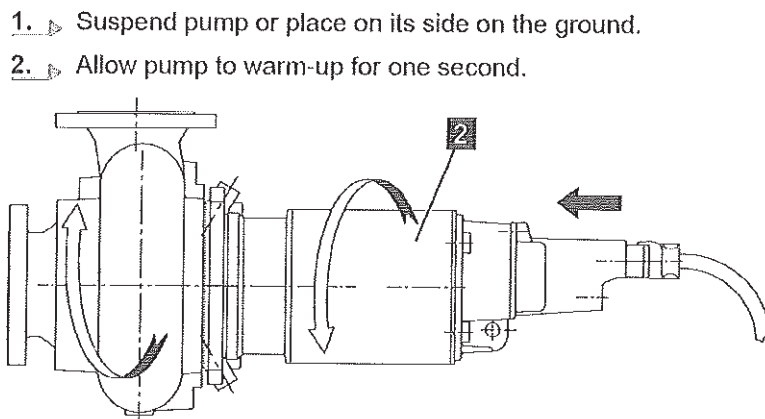


Fig. 32

1. ▶ Suspend pump or place on its side on the ground.
2. ▶ Allow pump to warm-up for one second.
3. ▶ Ensure that rotational direction of impeller (1) is counter clockwise as seen from suction end (Fig. 31). The starting jerk must act counter clockwise as seen from the drive end of the motor (2) (Fig. 32).
4. ▶ On pump units with several speeds, repeat points 2 to 3 for each speed.



In case of incorrect rotational direction on systems with several speeds or pumps, switch speed with wrong rotational direction at the corresponding starting switch in the control panel.



Installation and initial commissioning

Initial set-up > Requirements on installation of options

6.3.5 Requirements on installation of options

It is recommended to install the following options:

- "Manual – Off – Automatic" switch
- Low voltage terminals for level switch
- Signal lamps "Pump on" and "Pump defective"
- Operating hours counter ☞ „Operating hours counter (optional)" on page 33
- Changeover switch for pump stations with several pumps
- Alarm system for high sump level with separate power supply. This ensures uninterrupted protection in case of main power supply failure.
- Moisture probe ☞ „Moisture probe (6) (optional)" on page 33
- Float switch ☞ „Float switch (5) (optional)" on page 33
- Bearing temperature probe ☞ „Bearing temperature probe in lower bearing (optional) (4); in upper bearing (optional) (2)" on page 33

When installing the options, observe the following:

Level switch

- For the level switches (switching on and off), use control systems that are suitable for the liquid that is being delivered.
- Use float switches for the high level alarm, even if another type is used for the pump control.
- To prevent wrong alarm, arrange float switches for the alarm at reasonable distance.

Level control

- Set level switches "ON" and "OFF" in such a way to allow for sufficient sump volume in between. This prevents that the pump is switched on more than 10 times per hour. More starts can cause damage to the controls in the control panel. This also increases power consumption. The minimum sump volume is calculated with the following formula:

$$V = \frac{0,9 \times Q_p}{Z}$$

Fig. 33: Formula minimum sump volume

- V = Capacity or sump volume between switch-on and switch-off level (in cubic metres)
- Q_p = Flow rate of a pump (litres per second)
- Z = Number of starts per hour (Z = max. 10)

Installation and initial commissioning



Initial set-up > To be done prior to starting the pump

6.3.6 To be done prior to starting the pump

- Personnel: ☐ Instructed person (operator)
- Protective equipment: ☐ Protective clothing
☐ Protective helmet
☐ Safety boots

1. ▶ Ensure that all level controls are set correctly. The switch-off level must be high enough to prevent air from entering the pump part.
2. ▶ Ensure that all inlet and outlet valves on suction and pressure side are completely open.
3. ▶ Immerse pump sump.
4. ▶ Calculate sump in such a way as to prevent pump from running dry under normal conditions & Chapter 7.4 „Required submersion depth“ on page 63.
5. ▶ Ensure that there is no potentially explosive atmosphere.



WARNING!

Risk of injury and damage to property due to potentially explosive atmosphere!

Use of devices in potentially explosive atmosphere that are not approved for Ex atmospheres can result in severe injuries, even death.

- Operate pump only after exclusion of potentially explosive atmosphere.

6. ▶ Vent air between pump and check valve if necessary.



Installation and initial commissioning

Initial set-up > Starting the pump

Vent air between pump and check valve

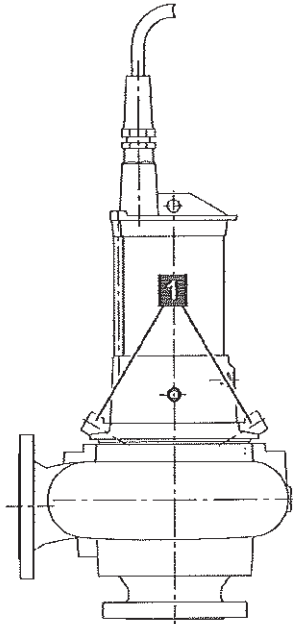


Fig. 34

Personnel: ■ Instructed person (operator)

1. ➤ If a check valve is installed near the pump, air can collect between pump and check valve. To allow pump to prime, the air must be vented from the casing or pressure line (upstream of check valve) during initial commissioning.
2. ➤ Maintain flush water pressure via pressure regulator at 0,5 to 1 bar (7 to 14 psi) above outlet pressure.
3. ➤ Flush pump for 60 seconds. The water is controlled by means of a solenoid valve and a timer, and drained via flush water connections (1).
 - The flush water rate fluctuates depending on pump size and application. Usually flow rates of 6-8 litre per minute are adequate.



If pump is operating with positive suction head (pump above suction level), it can be evacuated via jet or vacuum pump. Vertically installed HIDROSTAL solids handling pumps are self-priming when the impeller tip is submerged into the liquid to be pumped and an automatic vent valve is connected to the pump casing or the pressure line (between pump and check valve).

6.3.7 Starting the pump

Personnel: ■ Qualified Electrician

Protective equipment: ■ Protective clothing
 ■ Protective helmet
 ■ Safety boots

1. ➤ Ensure that no persons are in the danger zone.
2. ➤ Switch on pump in manual mode.
3. ➤ Measure power input separately in each phase.
4. ➤ Write down measured values and compare to information on type plate.



If power input is more than 5% higher, shut down pump, determine cause and correct malfunction.

5. ➤ Switch pump to automatic mode.
6. ➤ Allow basin to be emptied several times.
7. ➤ Ensure that level switch is set correctly and functions properly.

Installation and initial commissioning



Initial set-up > Starting the pump

8. ➤ Ensure that alarm system and changeover switch (if installed in control panel) function correctly.
9. ➤ Record date and operating hours to determine the actual operating hours for maintenance.



7 Operation

Improper operation



WARNING!

Danger of injury from improper operation!

Improper operation can result in serious injury and significant damage to property.

- Carry out all operating steps in accordance with the specifications and instructions in this manual.
- Before starting work, ensure that
 - all covers and safety devices are installed and functioning properly.
 - no persons are in the danger zone.
- Never disable or bypass safety devices during operation.

7.1 Switching on

Personnel: ■ Instructed person (operator)

Protective equipment: ■ Protective clothing

■ Safety boots

1. ➤ Ensure that all inlet and outlet valves on suction and pressure side are completely open.
2. ➤ Ensure that there is no potentially explosive atmosphere.
3. ➤ Ensure that no persons are in the danger zone.
4. ➤ Place main switch of system in „On“ position.

7.2 Switching off

- Place main switch of system in „Off“ position.

7.3 Standard operation

„Automatic mode“ is the pump's standard operating mode.

Operation

Standard operation



NOTICE!

Property damage and loss of suction due to improper operation!

Improper operation of device can result in property damage and loss of suction.

- Never operate pump with positive suction head (pump above suction point). This prevents that air or gas is entrained in the liquid.
- Avoid vortex formation.
- Keep medium from drying out.
- Never operate pump with closed or clogged suction and pressure line.
- Do not operate pump in continuous operation in duty points that are outside the outlet pressure - flow rate curve: High outlet pressure at low flow rate or low outlet pressure at high flow rate.

The duties and responsibilities of the operator are restricted to the following activities during operation:

- Flushing of pump in case of high concentrations of dirt or sludge
- Draining of pump when shut down for more than 14 days
- Reaction to malfunctions & Chapter 9 „Malfunctions“ on page 94



Operation

Required submersion depth > Submersible motors (cooling method "N")

Flushing of pump

Personnel: ■ Instructed person (operator)

Protective equipment: ■ Protective clothing

■ Safety boots

In special cases, e.g. high concentrations of dirt or sludge, accumulated solids (between impeller and mechanical seal on pump side) can be periodically flushed away.

1. ▶ Maintain flush water pressure via pressure regulator at 0,5 to 1 bar (7 to 14 psi) above outlet pressure.
2. ▶ Flush pump for 60 seconds. The water is controlled by means of a solenoid valve and a timer, and drained via the flush water connection (1).

The flush water rate fluctuates depending on pump size and application. Usually flow rates of 6-8 litre per minute are adequate.

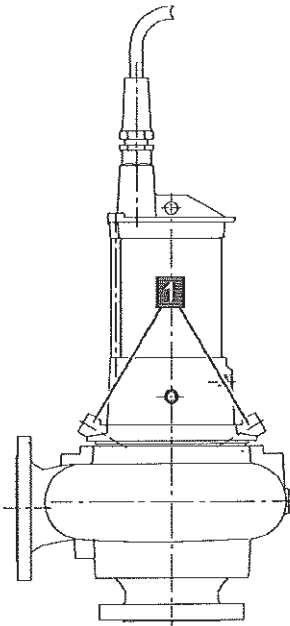


Fig. 35



The frequency of flushing must be determined individually for each system.

Draining of pump

- When shut down for more than 14 days, drain pump completely. This prevents movable parts from being stuck due to corrosion.
- Turn pump every 14 days (by hand or by switching impulse) to lubricate mechanical seal.

7.4 Required submersion depth

7.4.1 Submersible motors (cooling method "N")

Submersible motors perform at their maximum level when staying submerged in liquid.

However, on submersible motors it is permitted to install the switch-off level below the upper edge of the motor.

Dry run times

The possible dry run time of a pump depends on ambient temperature and liquid temperature, hydraulic load of motor and duty point on pump curve.

Operation



Required submersion depth > Immersible electric motors (cooling method "E"...

The following times are maximum operating times for a fully loaded motor, which is first fully submerged in a liquid of 15 °C and then suddenly operates in 40 °C air:

Size of motor	Dry run time
B, Y, 002, 003	5 minutes
Z, X, 004, 006, 007	7 minutes
4/W, 5/V, 6/U, 7/T, 014, 020, 030, 090, 130	9 minutes
300/S	15 minutes

If motor operates in air for a longer time, it is shut down by the overtemperature fuse circuit and suffers no damage. The sump must have sufficient volume to hold the inflowing liquid until motor has cooled down and can be restarted.

Cool-down periods

Approximate cool down periods for the various motor sizes at maximum liquid temperature of 15 °C:

Size of motor	Cool down period to restart
B, Y, 002, 003	3 minutes
Z, X, 004, 006, 007	4 minutes
4/W, 014, 020	5 minutes
5/V, 030	8 minutes
6/U, 090, 130	11 minutes
7/T	15 minutes
300/S	20 minutes



If sump construction requires that motor runs for an extended period while not fully submerged, use immersible electric motors with independent cooling & Chapter 7.4.2 „Immersible electric motors (cooling method "E", "K", "F")“ on page 64.

7.4.2 Immersible electric motors (cooling method "E", "K", "F")

Dry run times

Immersible electric motors can operate continuously in fully submerged condition or in completely dry environment.

Cool-down periods

For cooling purposes, the motors must not be continuously immersed.

To start the pump, the "ON" level must be at least as high as the impeller tip.



Operation

Emergency shutdown

7.5 Special conditions

Operation around the freezing point



WARNING!

Risk of injury and damage to property due to ice formation and bursting construction!

Ice formation and bursting construction when operating pump around the freezing point can result in severe injuries.

- When operating pump around the freezing point, drain all hollow spaces filled with medium by opening the according plugs.

Pump operation in food sector



WARNING!

Hazard due to deposition of harmful substances and bacteria!

Lack of hygiene can cause diseases and infections.

- Drain and clean pump on a regular basis. Intervals of cleaning work & *separate operating instructions for food system*.

7.6 Emergency shutdown

Emergency shutdown

In a danger situation, it is vital to stop components moving as quickly as possible and to switch off the power supply.

Proceed as follows in an emergency:

1. ➤ Immediately use the emergency stop device to trigger an emergency stop.
2. ➤ Rescue people from the danger zone.
Initiate first aid measures.
3. ➤ Notify a doctor and the fire brigade.
4. ➤ Notify those responsible at the place of use.
5. ➤ Switch off the main switch and secure to prevent a restart.
6. ➤ Keep access routes clear for emergency service vehicles.
7. ➤ If warranted by the gravity of the emergency, notify the responsible authorities.
8. ➤ Delegate specialist personnel to rectify the fault.

After rescue measures have been taken

Operation

Emergency shutdown



WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply, there is a danger of serious injuries or death for persons in the danger zone.

- Before a restart, ensure that there are no persons still in the danger zone.

9. ➤ Before the restart, check the system and ensure that all safety devices are installed and fully functional.



8 Maintenance

8.1 Safety

Electrical system



DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components may be subject to uncontrolled movements and may cause grave injury.

- Switch off the power supply before starting work and make sure that it cannot be switched on again.

Securing to prevent restart



WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply during maintenance, there is a danger of serious injuries or death for persons in the danger zone.

- Switch off all power supplies before starting work and make sure they cannot be switched on again.

Improperly executed maintenance work



WARNING!

Danger of injury from improperly executed maintenance work!

Improper maintenance may result in serious injury and significant damage to property.

- Ensure sufficient assembly space before starting work.
- Pay attention to orderliness and cleanliness in the assembly location! Loosely stacked or scattered components and tools could cause accidents.
- If components have been removed, pay attention to correct assembly, refit all fixing elements and comply with bolt tightening torques.
- Before the restart, ensure that
 - all maintenance work has been carried out and completed in accordance with the specifications and instructions in this manual.
 - no persons are in the danger zone.
 - all covers and safety devices are installed and functioning properly.

Maintenance

Maintenance schedule



8.2 Maintenance schedule

The sections below describe the maintenance work required to ensure optimal and smooth operation of the system.

If increased wear is found during regular checks, the required maintenance intervals should be shortened in accordance with the actual wear occurrences. Contact the manufacturer in the event of queries regarding maintenance work and intervals; see the service address on page 2.

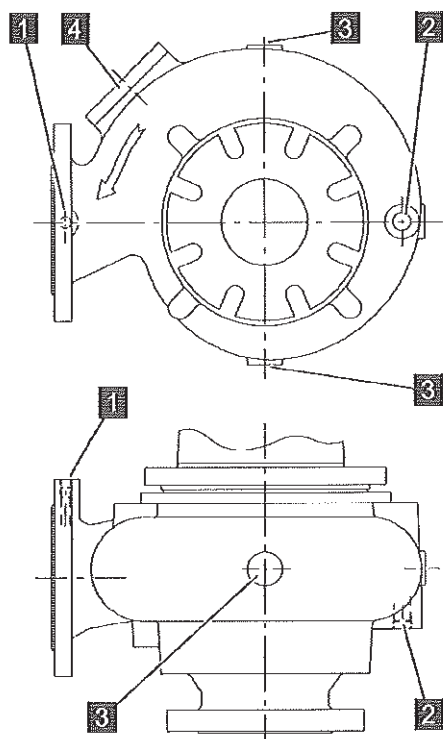
Interval	Maintenance work	Personnel
Weekly	Check pump for damages	Instructed person (operator)
Monthly	Check function of level control, correct if necessary ↳ Chapter 6.3.5 „Requirements on installation of options“ on page 57	Instructed person (operator)
Initially after about 1000 oh (operating hours)	Check oil level ↳ Chapter 8.4.4 „Check oil level“ on page 85	Qualified personnel
Semi-annual	Check flow rate and outlet pressure according to flow rate – outlet pressure curve ↳ <i>Technical data sheets</i> , readjust impeller clearance if necessary ↳ Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Instructed person (operator)
Annually	Check electric motor and cable for damage	Qualified Electrician
	Check overcurrent relay, fuses and time relay (if available) for accurate setting, correct if necessary	Qualified Electrician
	Check insulation resistance of motor winding and cable ↳ Chapter 8.4.3 „Check insulation resistance“ on page 84	Qualified Electrician
	Check mechanical seal on motor side in motor casing	Manufacturer (service centre)
	Check mechanical seals on pump side	Manufacturer (service centre)
	Check oil level ↳ Chapter 8.4.4 „Check oil level“ on page 85	Qualified personnel
	Check oil quality ↳ Chapter 8.4.5 „Check oil quality“ on page 87	Qualified personnel
	Check impeller clearance, readjust if necessary ↳ Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Qualified personnel
If needed	change oil ↳ Chapter 8.4.6 „Change oil“ on page 89	Qualified personnel
	Revision work	Manufacturer (service centre)



Maintenance

Service connections and inspection openings

8.3 Service connections and inspection openings



- 1 Connection at pressure flange
- 2 Connection as drain opening for horizontally installed pumps with vertical outlet
- 3 Position of additional connections for horizontally installed pumps with horizontal outlet
- 4 Inspection opening on casing for checking hydraulics (starting at hydraulic size E05Q/E125)

The service connections (1), (2) and (3) are for transport of the pump.

The inspection opening (4) is used to check the hydraulic system during repair work.

Inspection openings are only to be opened at complete standstill and with power supply switched off and protected against restart.

The inspection openings can only be opened with tools. After completion of work and before restart, the inspection openings must be closed and all fasteners properly mounted again.



Refer to the following table for the size of connection thread for connections (1) and (2).

Fig. 36

Hydraulic type designation	Size of connection thread		Diameter
	Connection (1)	Connection (2)	
B02Q	G 1/2"	-	-
B050	G 1/2"	G 1/4"	-
B0BQ/B065	G 1/2"	-	30
C0CQ	-	-	-
C080/C03Q	G 1/2"	G 1/4"	-
D0DQ	-	-	-
D03Q/D04Q/D080/D100	G 1/2"	G 1/4"	35
D03R/DE3R/D04R/DE4R	G 1/2"	G 1/4"	40
D03H/DE3H/D03M/DE3M/D04M/DE4M	-	G 1/4"	40
D03U/DE3U/D04U/DE4U	G 1/2"	G 1/4"	40
D06M	-	G 1/2"	40
D06U/E03Q/E080	G 1/2"	G 1/2"	35
E0EQ	-	-	-
DE5Q/E05Q/E125/E08Q/E06U/E08U/E200	G 1/2"	G 1/2"	50

Maintenance

Maintenance work > Visual condition check



Hydraulic type designation	Size of connection thread		Diameter
	Connection (1)	Connection (2)	
E06M/E08M	-	G ½"	40
F06Q/F150	G ½"	G ½"	60
H125/H08Q/H200	G ½"	G ½"	35
L12Q/L300/L20Q/L500	G 1"	G ½"	60
M16Q/M400	G 1"	G ½"	60
M28Q/M700	G 2"	G ½"	60

8.4 Maintenance work

Preparations



WARNING!

Risk of injury and property damage due to improperly performed preparatory work!

Improperly performed preparatory work can result in most severe injuries and property damage!

- When unfastening the power supply cable at the control panel, make sure that cable ends never get in contact with water. This could cause a short circuit.
- Place protective plastic tube on cable ends or wrap cable ends in a plastic sack and seal with tape.
- Never open motor. This can damage the hermetic seal applied in the factory.

8.4.1 Visual condition check

Personnel: ☒ Instructed person (operator)

Protective equipment: ☒ Protective clothing

☒ Safety gloves

☒ Safety boots

1. ▶ Turn off pump or system and protect against restart.
2. ▶ If pump is submerged in sump, pull pump from sump with pulley or chain hoist.
3. ▶ Hose down pump with water.
4. ▶ Check pump and motor for mechanical damages.
5. ▶ Check motor cover and cable inlet for visual damages.



Maintenance

Maintenance work > Check/readjust impeller clearance

6. ➤ Ensure that cables are firmly clamped in the cable inlet.

8.4.2 Check/readjust impeller clearance

Personnel: ■ Instructed person (operator)

Protective equipment: ■ Protective clothing

■ Safety boots

Special tool: ■ Feeler gauge

1. ➤ Turn off pump or system and protect against restart.
2. ➤ If pump is submerged in sump, pull pump from sump with pulley or chain hoist.
3. ➤ If necessary, hose down pump with water and lay on side (Fig. 37).

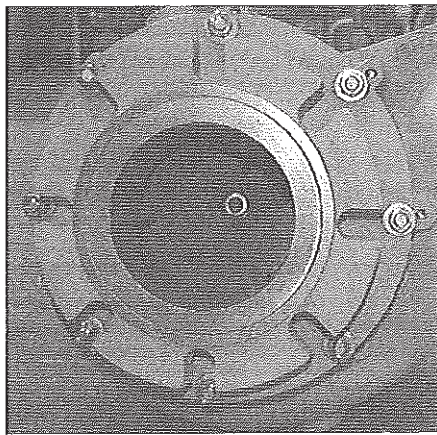


Fig. 37

8.4.2.1 Check impeller clearance "C"

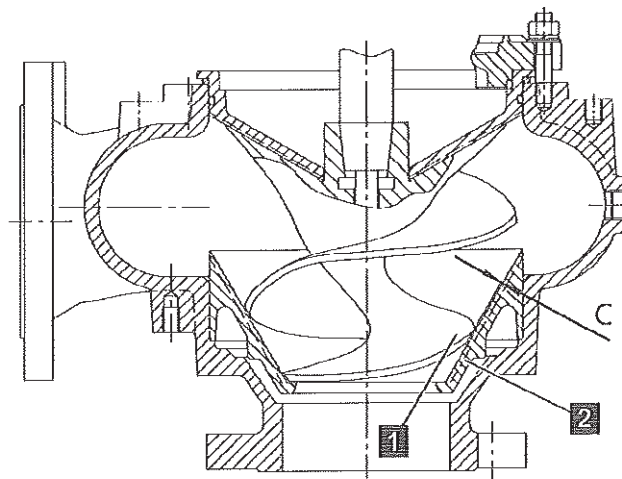


Fig. 38

Maintenance



Maintenance work > Check/readjust impeller clearance

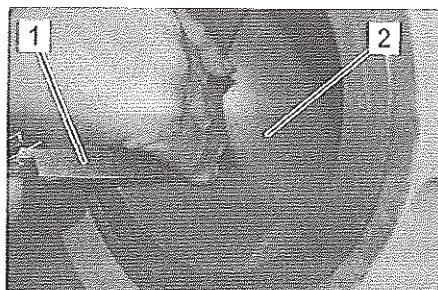


Fig. 39

Impeller clearance "C" is clearance between impeller (1) and inlet cone (2).

1. ➤ Measure clearance between impeller (2) and inlet cone with feeler gauge (1) after 0, 1/4, 1/2 and 3/4 impeller rotations.
2. ➤ Compare measured values with value specified in the following table.

Hydraulic size	Impeller clearance "C"
B	0,2 mm
C, D	0,3 mm
E	0,4 mm
F	0,6 mm
H	0,8 mm
I	1,0 mm
L, M	1,5 mm

3. ➤ If the measured values do not match the specified values, readjust impeller clearance & Chapter 8.4.2.1 „Check impeller clearance "C" on page 71.

8.4.2.2 Readjust impeller clearance "C"

8.4.2.2.1 Adjustable pump with three adjusting screws

The impeller clearance is set via three adjusting screws (arrows) on the casing.

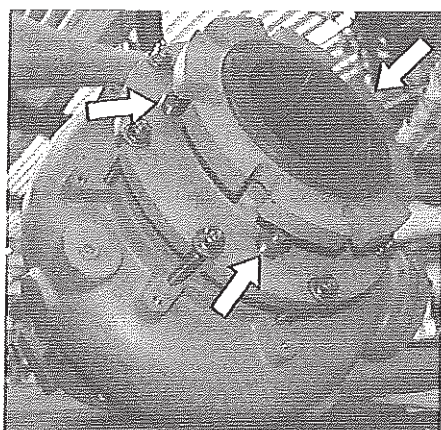


Fig. 40

1. ➤ Perform chapter "Check impeller clearance "S" on page 82.



Maintenance

Maintenance work > Check/readjust impeller clearance

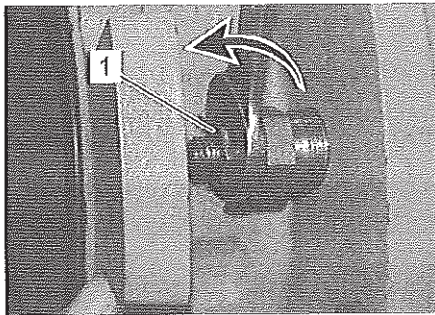


Fig. 41

2. ➤ Loosen locknut (1) counter clockwise and turn back.



Pump types L500 and M700 have two locking screws beside the adjusting sleeves. Loosen them before setting the clearance, then tighten them again.

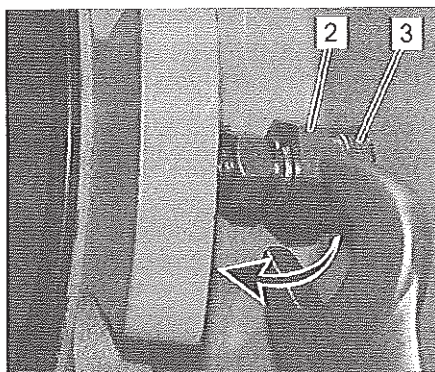


Fig. 42

3. ➤ Slowly and evenly tighten all three adjusting sleeves (3) clockwise by means of hexagon nut (2), until inlet cone is blocked by pump shaft. Ensure that the same amount of rotations are performed on each adjusting sleeve, allowing inlet cone to remain concentric to the impeller.

The clearance between impeller and inlet cone is cancelled.

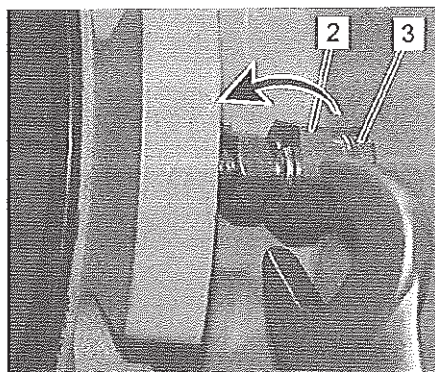


Fig. 43

4. ➤ Turn back all three adjusting sleeves (3) evenly via hexagon nut (2) counter clockwise (e.g. by $\frac{1}{3}$ rotation).

Maintenance

Maintenance work > Check/readjust impeller clearance

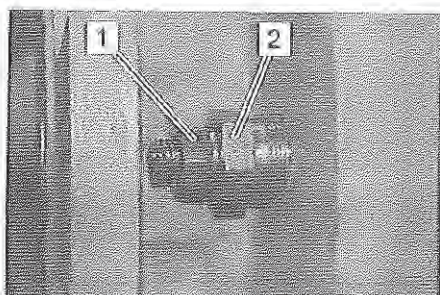


Fig. 44

5. ➤ Hold locknut (2) with spanner and tighten hexagon nuts (1) clockwise.

The inlet cone is pulled back from the impeller by the required clearance and the adjusting sleeves (3) are firmly clamped again.

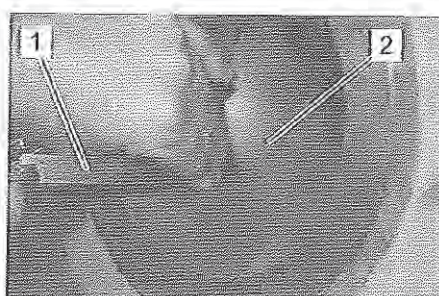


Fig. 45

6. ➤ Check clearance between impeller (2) and inlet cone with feeler gauge (1) after 0, 1/4, 1/2 and 3/4 impeller rotations & Table from chapter 8.4.2.1 Check impeller clearance "C" on page 71.

In case of non-uniform clearance



In case impeller clearance is irregular or too large, have wear parts of pump checked for wear by a service centre.

In case of uniform clearance

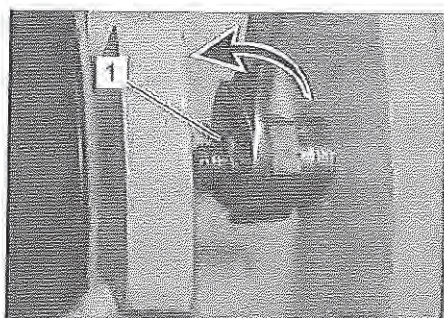


Fig. 46

If the impeller clearance is uniform and deviates from value in table, proceed as follows:

1. ➤ Loosen locknut (1) counter clockwise and turn back.



Maintenance

Maintenance work > Check/readjust impeller clearance

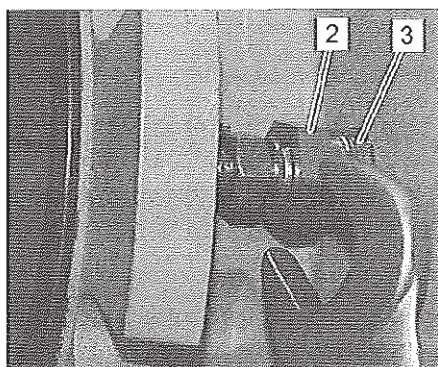


Fig. 47

2. ➤ Tighten all three adjusting sleeves (3) via hexagon nut (2) with the same number of clockwise rotations (in case of excessive clearance), or counter clockwise (in case of insufficient clearance).

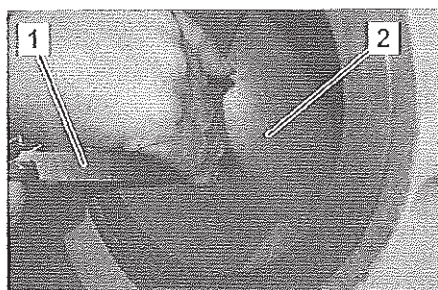


Fig. 48

3. ➤ Check clearance between impeller (2) and inlet cone with feeler gauge (1) after 0, $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ impeller rotations ↻ *Table from chapter 8.4.2.1 Check impeller clearance "C" on page 71.*
4. ➤ Repeat steps 2 to 3 until clearance between impeller and inlet cone is correctly set.

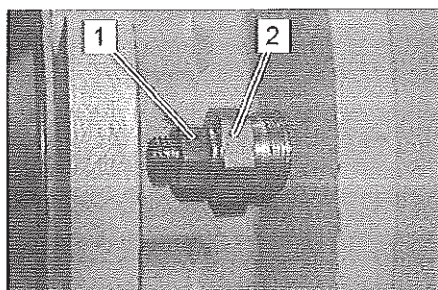


Fig. 49

5. ➤ Hold locknut (2) with spanner and tighten hexagon nuts (1) clockwise.

Maintenance

Maintenance work > Check/readjust impeller clearance



8.4.2.2.2 Adjustable pump with two adjusting screws

The impeller clearance is set via two adjusting screws on the casing.

1. ▶ Perform chapter "Check impeller clearance "S"" & Chapter 8.4.2.3 „Check impeller clearance "S"" on page 82.
2. ▶ Loosen locknut (1) and turn back.
3. ▶ Turn back adjusting screw (2) by several mm.

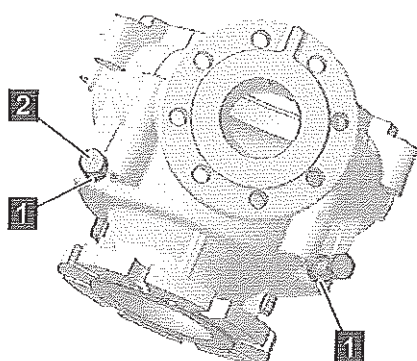


Fig. 50

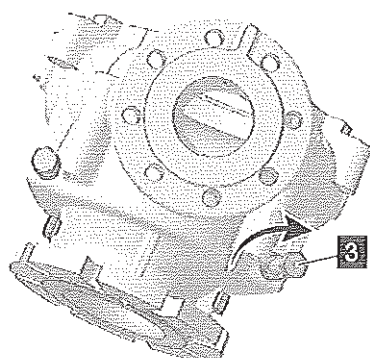


Fig. 51

4. ▶ Slowly insert adjusting screw (3) until inlet cone is blocked by pump shaft. The clearance between impeller and inlet cone is cancelled.



The cast-in arrow beside the adjusting screw indicates the direction in which the inlet cone is moved when the corresponding screw is inserted.

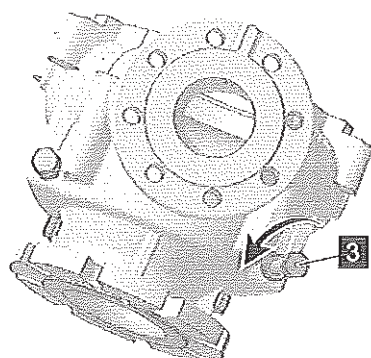


Fig. 52

5. ▶ Turn back adjusting screw (3), e.g. by a quarter rotation.



Maintenance

Maintenance work > Check/readjust impeller clearance

6. ▶ Tighten adjusting screw (2) with small torque. The inlet cone is pulled back from the impeller by the required clearance and the adjusting sleeve firmly clamped.

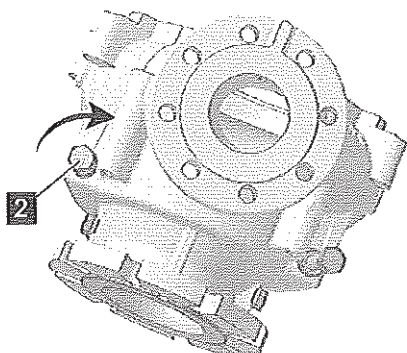


Fig. 53

7. ▶ Tighten locknut (1) again.

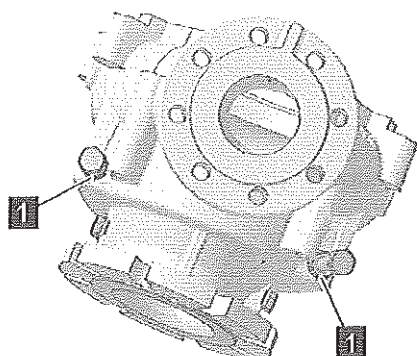


Fig. 54

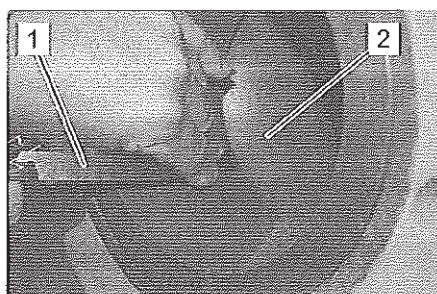


Fig. 55

8. ▶ Check clearance between impeller (2) and inlet cone with feeler gauge (1) after 0, $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ impeller rotations ↗ Table from chapter 8.4.2.1 Check impeller clearance "C" on page 71.

In case of non-uniform clearance



In case impeller clearance is irregular or too large, have wear parts of pump checked for wear by a service centre.

Maintenance

Maintenance work > Check/readjust impeller clearance



In case of uniform clearance

If the impeller clearance is uniform and deviates from value in table, proceed as follows:

1. ▶ Loosen locknut (1) and turn back.

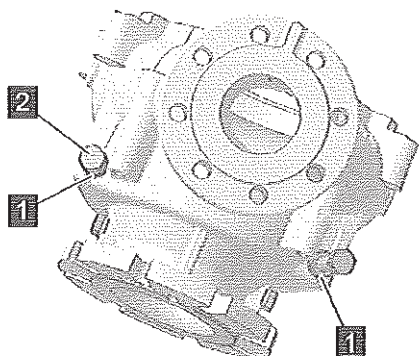


Fig. 56

2. ▶ Tighten adjusting screw (3) clockwise (in case of excessive clearance) or turn back adjusting screw (2) counter clockwise (in case of insufficient clearance).

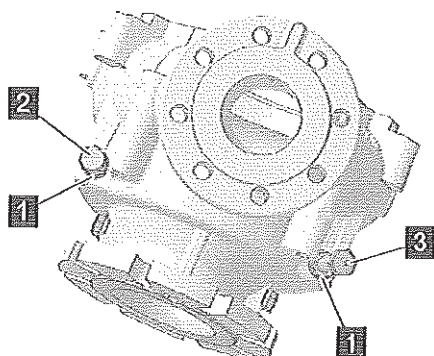


Fig. 57

3. ▶ Check clearance between impeller (2) and inlet cone with feeler gauge (1) after 0, $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ impeller rotations & Table from chapter 8.4.2.1 Check impeller clearance "C" on page 71.
4. ▶ Repeat steps 2 to 3 until clearance between impeller and inlet cone is correctly set.

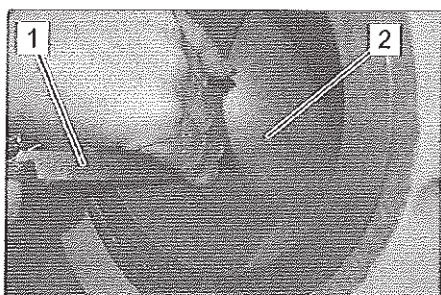


Fig. 58



Maintenance

Maintenance work > Check/readjust impeller clearance

5. ➤ Tighten locknut (1) again.

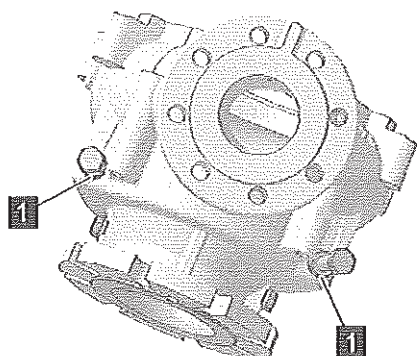


Fig. 59

8.4.2.2.3 Non-adjustable pump

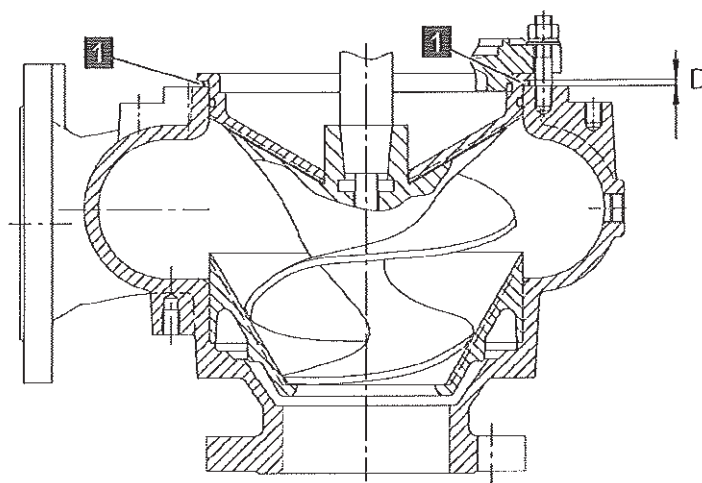


Fig. 60

On non-adjustable pumps, the impeller clearance is adjusted via adjustment spacers D (1).

1. ➤ Loosen and remove all hexagon nuts (1) on casing.

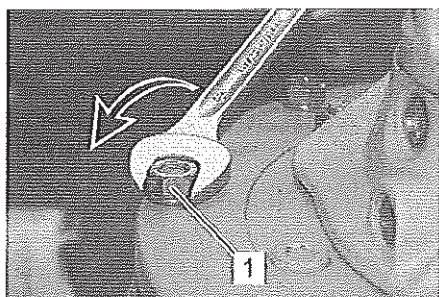


Fig. 61

Maintenance

Maintenance work > Check/readjust impeller clearance

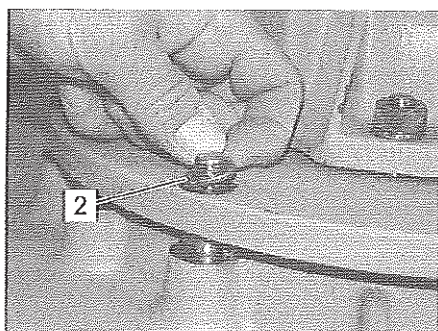


Fig. 62

2. ➤ Remove all washers (2).

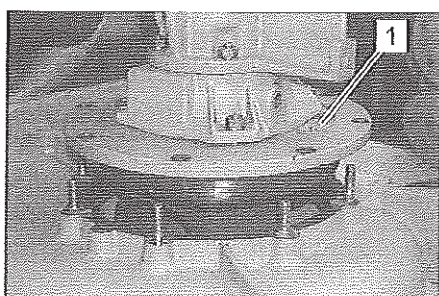


Fig. 63

3. ➤ Lift drive unit of pump (1) with lifting gear.

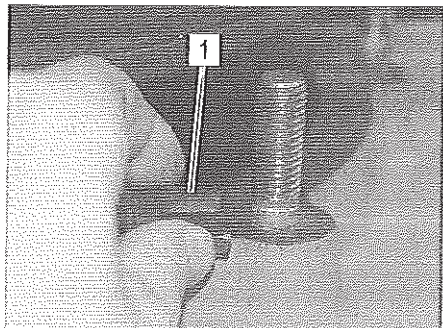


Fig. 64

4. ➤ Remove all adjustment spacers (1).

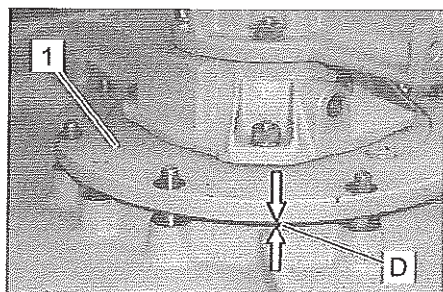


Fig. 65

5. ➤ Lower drive unit of pump (1) again with lifting gear.
 6. ➤ Perform chapter "Check impeller clearance "S"" & Chapter 8.4.2.3 „Check impeller clearance "S"" on page 82.
 7. ➤ Measure gap D between drive unit and pump casing at several points in the circumference and use to calculate mean value.
 8. ➤ Add about 0,5–1,0 mm to measured value. The result is the required thickness of the adjusting spacer to obtain clearance "C" & Table from chapter 8.4.2.1 Check impeller clearance "C" on page 71 .



Maintenance

Maintenance work > Check/readjust impeller clearance

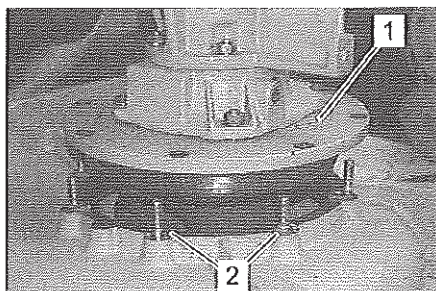


Fig. 66

9. ➤ Lift drive unit of pump (1) again with lifting gear.
10. ➤ Insert adjusting spacers (2) with calculated thickness at each fastening.

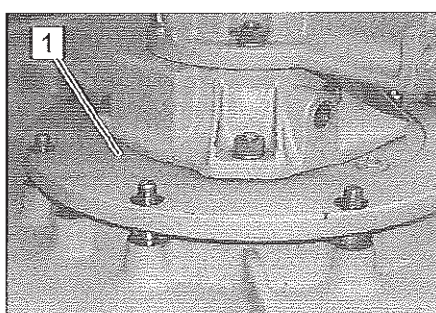


Fig. 67

11. ➤ Lower drive unit of pump (1) again with lifting gear.

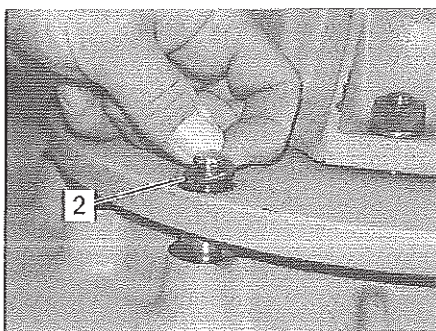


Fig. 68

12. ➤ Put all washers (2) in place again.

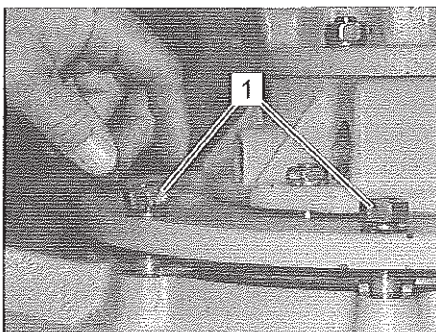


Fig. 69

13. ➤ Position all hexagon nuts (1).

Maintenance

Maintenance work > Check/readjust impeller clearance

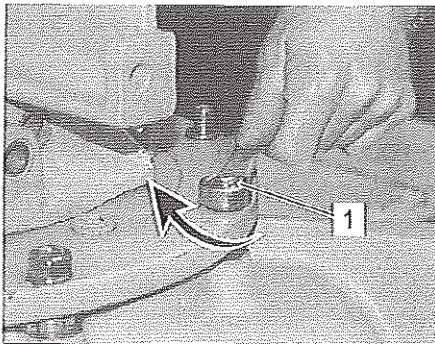


Fig. 70

14. ➔ Tighten all hexagon nuts (1).



On hydraulic type B0BQ/B065, the impeller clearance is adjusted via a spacer ring that is located on the fastenings between pump and suction cover.

8.4.2.3 Check impeller clearance "S"

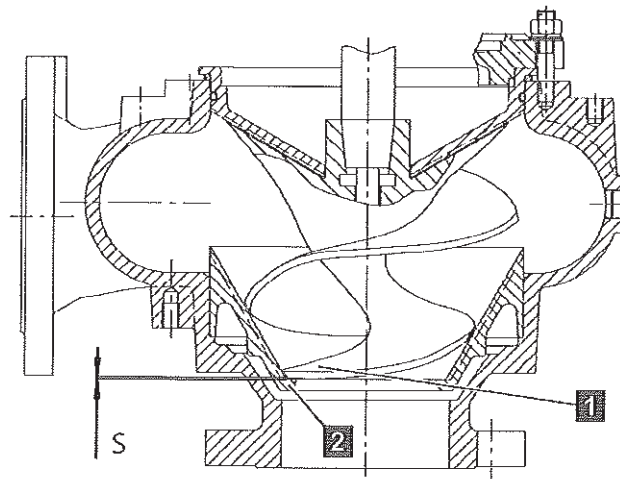


Fig. 71

Impeller clearance "S" is clearance between impeller tip (1) and wear ring (2).

➔ Check clearance between impeller tip (1) and wear ring (2) with a feeler gauge. The clearance must be about 1 to 2 mm.



Contact Service Centre if clearance is too small or impeller tip touches wear ring & Chapter 1.6 „Customer Service“ on page 9.



Maintenance

Maintenance work > Check/readjust impeller clearance

8.4.2.4 Check impeller clearance "B"

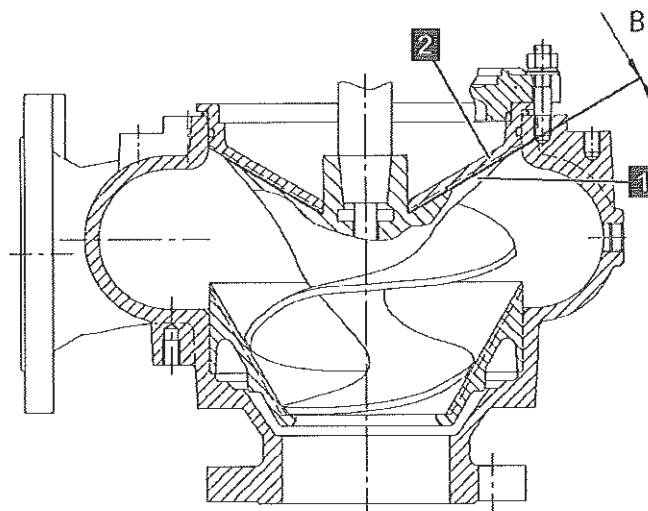


Fig. 72

Impeller clearance "B" is clearance between impeller (1) and rear cone (2) or seal.

Clearance "B" must be kept as small as possible to hinder fibres or solids from entering the seal space. Due to abrasive media, the clearance can increase over time.

1. ➤ Perform steps 1 to 3 ☞ Chapter 8.4.2.2.3 „Non-adjustable pump“ on page 79.
2. ➤ Measure clearance "B" (Fig. 72) between impeller and rear cone or seal via feeler gauge at several points in the circumference.
3. ➤ Compare the smallest measured value with the value listed in the following table:

Hydraulic size	Impeller clearance "B"
B, C, D, E	0,2–0,5 mm
F, H	0,3–0,8 mm
I, L, M	0,5–1,5 mm



Contact Service Centre in case of excessive or insufficient clearance ☞ Chapter 1.6 „Customer Service“ on page 9.

Maintenance

Maintenance work > Check insulation resistance



8.4.3 Check insulation resistance

- Personnel: ☐ Qualified Electrician
- Protective equipment: ☐ Protective clothing
☐ Safety boots

Check insulation resistance of motor windings and cable with a high-voltage ohmmeter.



NOTICE!

Damage to property due to excessive voltage!

Voltages above 2,5 volt destroy motors with built-in PTC thermistor.

- Never perform tests with a high-voltage ohmmeter on motors with built-in triple PTC thermistor.

1. ▶ Attach cable at starter switch of motor.
2. ▶ Measure resistance of winding conductors among themselves.
3. ▶ Check earth resistance of each conductor.
4. ▶ Compare the measured resistance values with the values in the following insulation table.

Resistance in ohm	Resistance in mega ohm	Assessment of motor condition and cables
$\geq 2\,000\,000$	2	New motor
$\geq 1\,000\,000$	1	Used motor, which can be reinstalled in pit
500 000–1 000 000	0,5–1,0	Motor in pit. The ohm values apply to the cable and motor. Motor is in good condition.
20 000–500 000	0,02–0,5	Motor, which possibly was damaged by lightening or conductor damages. Do not pull out pump.
10 000–20 000	0,01–0,02	Motor with wet or damaged cable or windings. Motor will not fail due to this reason alone, but will not continue operation for long.
$\leq 10\,000$	0–0,01	Defective motor, or motor with completely destroyed cable insulation. Motor must be replaced.
0	0	<ul style="list-style-type: none"> – Motor will not remain operational for long – Motor is defective



Each reading below 1,0 mega ohm can be an indication for cable or winding damage. If a defect is suspected, have pump repaired by a service centre.



Maintenance

Maintenance work > Check oil level

8.4.4 Check oil level

Personnel: ■ Qualified personnel

Protective equipment: ■ Protective clothing

■ Safety boots

1. ▶ Let pump run several minutes to evenly distribute contaminations in the oil.
2. ▶ Turn off pump or system and protect against restart.
3. ▶ If pump is submerged in sump, pull pump from sump with pulley or chain hoist.
4. ▶ Hose down pump with water.

8.4.4.1 Cooling method "N", "K" and "F"



Fig. 73

1. ▶ Place the pump vertically.
2. ▶ Loosen screw plug (1) of oil drain opening and remove.

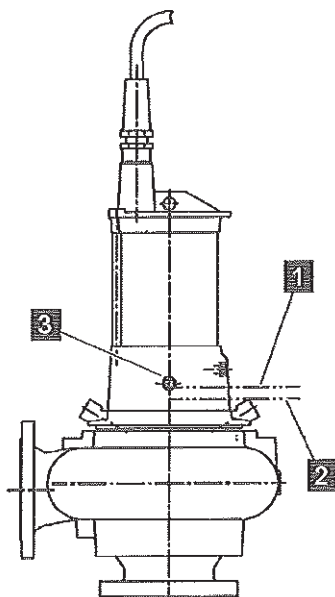


Fig. 74

3. ▶ Check level. Level must reach to bottom edge (1) of oil drain opening (3). If level (2) is only slightly lower, add new oil via opening (3) and check again after 200-500 hours.



A significantly lower level could be caused by a leak in the pump-side seal, which must be replaced by the Service Centre.

4. ▶ Close oil drain opening (3) with screw plug.
5. ▶ Tighten screw plug (1).

Maintenance

Maintenance work > Check oil level



8.4.4.2 Cooling method "E"

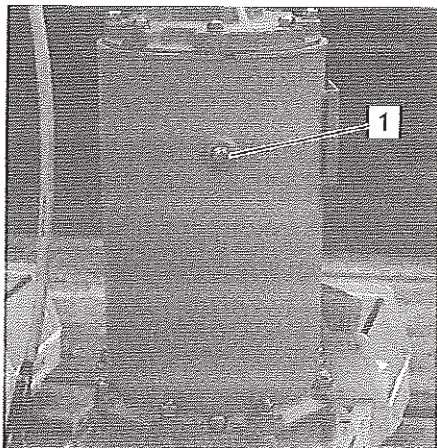


Fig. 75

1. ▶ Place the pump vertically.
2. ▶ Loosen screw plug (1) of oil filler opening and remove.

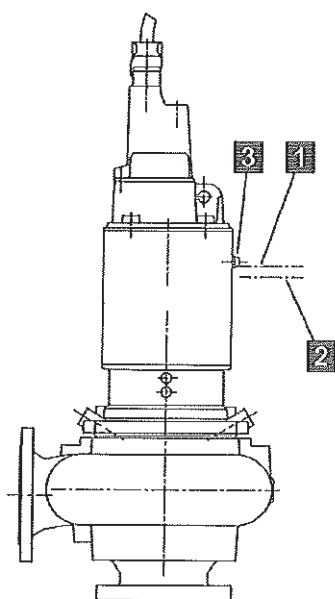


Fig. 76

3. ▶ Check level. Level must reach to bottom edge (1) of oil drain opening (3).

If level (2) is only slightly lower, add new oil via opening (3) and check again after 200-500 hours



A significantly lower level could be caused by a leak in the pump-side seal, which must be replaced by the Service Centre.



Maintenance

Maintenance work > Check oil quality

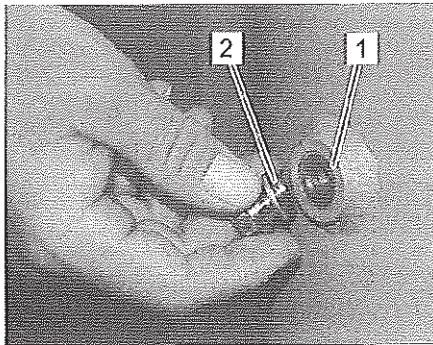


Fig. 77

4. ➤ Close oil drain opening (1) with screw plug (2).

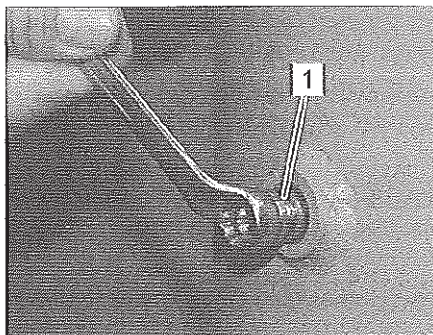


Fig. 78

5. ➤ Tighten screw plug (1).

8.4.5 Check oil quality

- Personnel: ☒ Qualified personnel
- Protective equipment: ☒ Protective clothing
☒ Safety boots



Fig. 79

1. ➤ Place pump horizontally. The oil drain opening must be on top.
2. ➤ Loosen screw plug (1) and remove.
3. ➤ Insert pipette into oil drain opening and remove a small amount of oil.
4. ➤ Place oil from pipette into a glass bowl.
5. ➤ Repeat steps 3 to 4 until an adequate amount is available for observation.
6. ➤ Assess oil quality as follows:

Maintenance

Maintenance work > Check oil quality



Clear oil

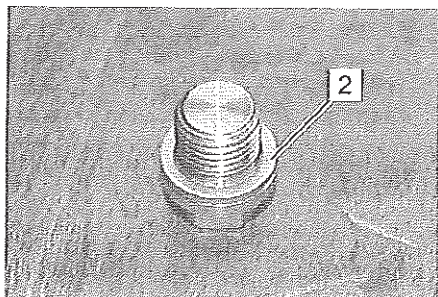


Fig. 80

- If oil is clear, add oil to level (Fig. 74/1). Close oil drain opening with screw plug with new, annealed copper seal (2).

Clear oil with a small amount of water

Oil with a small amount of water has a milky appearance.

- Drain oil, remove water from oil and refill or add new oil. Close oil drain opening with new annealed copper seal (Fig. 80/2).

Too much water in oil

If too much water enters the oil, the viscosity is much higher. The oil is as thick as motor oil, or even thicker.



If oil contains too much water and smells like waste water, the pump-side seal must be repaired or replaced by the Service Centre.



Maintenance

Maintenance work > Change oil

8.4.6 Change oil

- Personnel: ■ Qualified personnel
- Protective equipment: ■ Protective clothing
■ Safety boots



Replace oil only if it is heavily contaminated. Otherwise, just separate the water from the oil and reuse. On the characteristics of the required oil ↗ Chapter 3.4 „Operating materials“ on page 22.

8.4.6.1 Cooling method "N", "K" and "F"

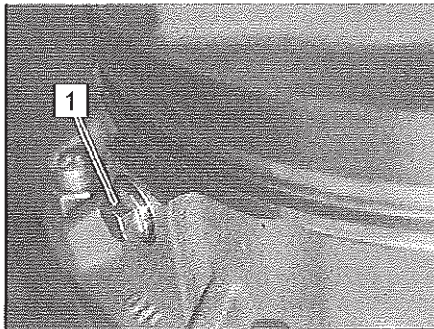


Fig. 81

1. ➤ Loosen screw plug (1) of oil drain opening and remove.

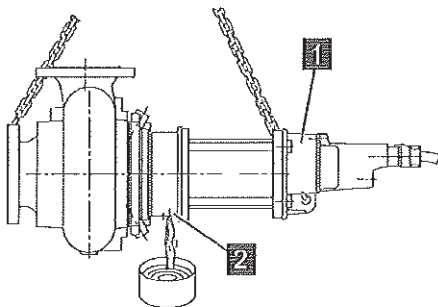


Fig. 82

2. ➤ Lift and turn pump (1) with lifting gear until oil drain opening (2) points downward.
3. ➤ Completely drain oil chamber casing.



Some larger motors are equipped with a second screw plug, positioned directly below the oil drain opening at the seal. By removing this screw plug it is possible to drain even the last oil residues.

Maintenance

Maintenance work > Change oil

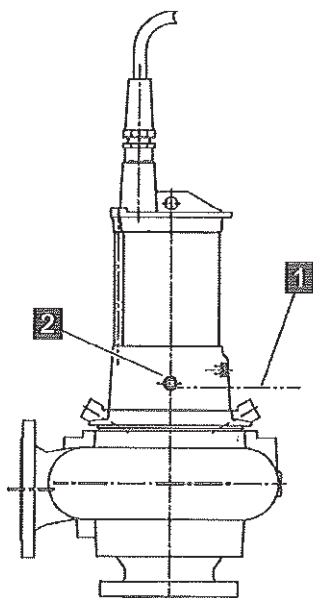


Fig. 83

4. ▶ Place pump vertically onto the suction flange.
5. ▶ Add dewatered or new oil via oil drain opening (2) until correct level (1) (bottom edge of oil drain opening) is reached.

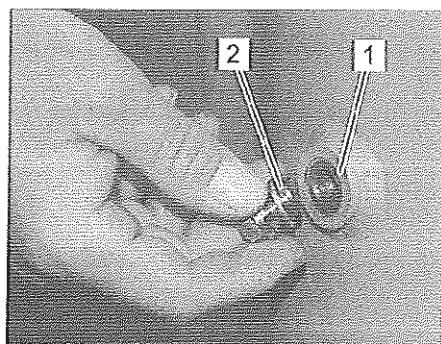


Fig. 84

6. ▶ Close oil drain opening (1) with screw plug (2) with the annealed copper seal.

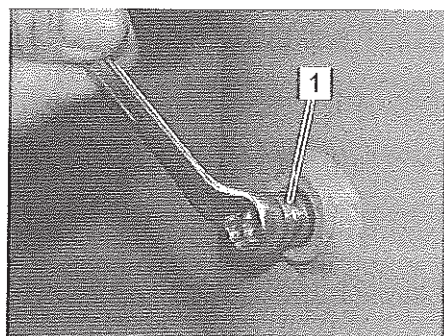


Fig. 85

7. ▶ Tighten screw plug (1).



Maintenance

Maintenance work > Change oil

8.4.6.2 Cooling method "E"

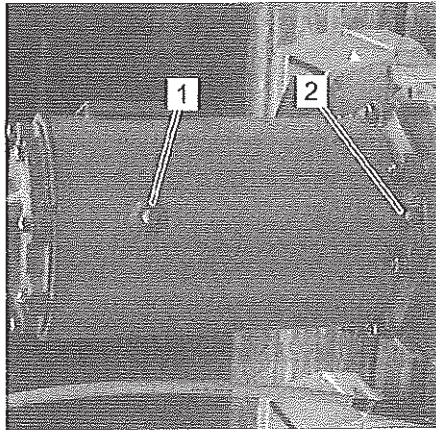


Fig. 86

1. ➤ Loosen and remove screw plug of oil filler opening (1) and oil drain opening (2).

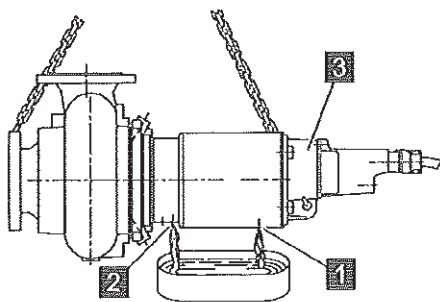


Fig. 87

2. ➤ Lift and turn pump (3) with lifting gear and turn until oil drain openings (1) and (2) point downward.
3. ➤ Completely drain oil chamber casing.

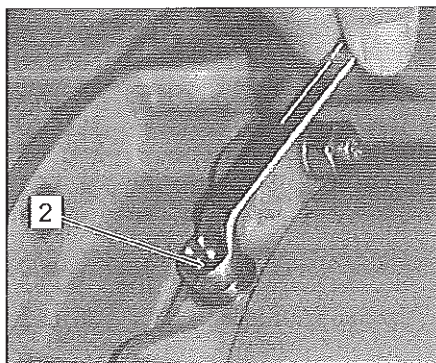


Fig. 88

4. ➤ Close oil drain opening (2) with screw plug with the annealed copper seal.

Maintenance

Maintenance work > Change oil

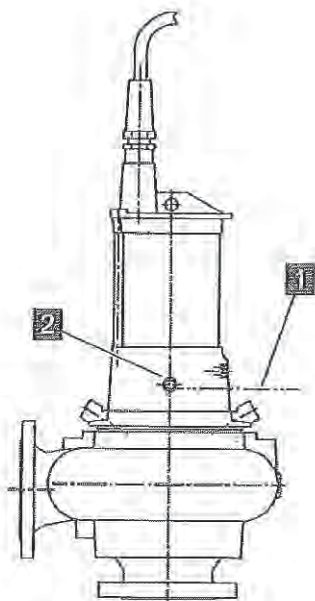


Fig. 89

5. ➤ Place pump vertically onto the suction flange.
6. ➤ Add dewatered or new oil via oil drain opening (2) until correct level (1) (bottom edge of oil drain opening) is reached.

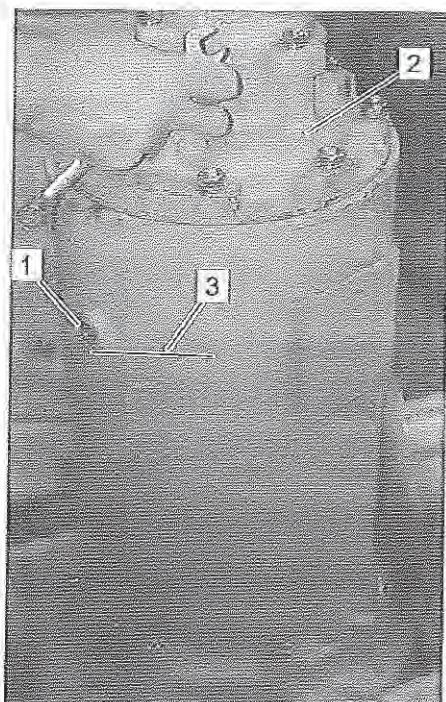


Fig. 90

7. ➤ Place the pump (2) vertically.
8. ➤ Add dewatered or new oil via oil drain opening (1) until correct level (3) (bottom edge of oil drain opening) is reached.



Maintenance

Actions after maintenance has been completed

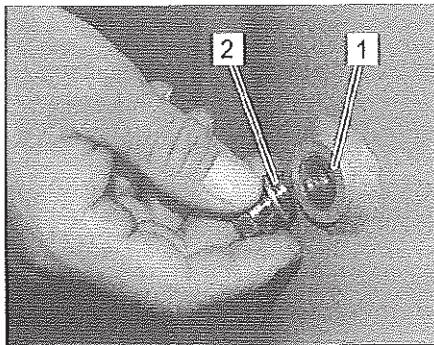


Fig. 91

- 9.** ➤ Close oil drain opening (1) with screw plug (2) with the annealed copper seal.

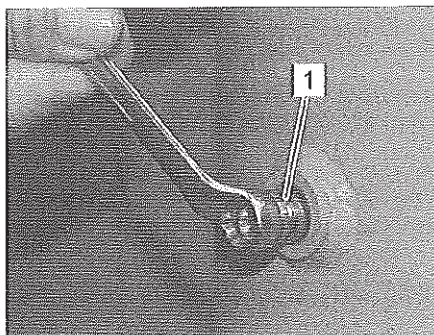


Fig. 92

- 10.** ➤ Tighten screw plug (1).

8.5 Actions after maintenance has been completed

After completing the maintenance work and before switching on the system, carry out the following steps:

- 1.** ➤ Check that all previously loosened threaded connections are tight.
- 2.** ➤ Check that all previously removed protective devices and covers have been replaced properly.
- 3.** ➤ Check that all tools, materials and other equipment used have been removed from the work area.
- 4.** ➤ Clean the work area and remove any substances which may have escaped, such as liquids, processing material or similar.
- 5.** ➤ Ensure that all the system's safety devices are completely functional.

Malfunctions

Safety



9 Malfunctions

The following chapter describes possible causes for malfunctions and what needs to be done to correct them.

If malfunctions occur more frequently, shorten maintenance intervals according to actual load.

If malfunctions cannot be corrected by the following information, contact manufacturer or service partner, see service addresses in appendix.

9.1 Safety

Electrical system



DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components may be subject to uncontrolled movements and may cause grave injury.

- Switch off the power supply before starting work and make sure that it cannot be switched on again.

Securing to prevent restart



WARNING!

Danger to life from an unauthorised restart!

In the event of an unauthorised restart of the power supply while tracking down and rectifying a fault, there is a danger of serious injuries or death for persons in the danger zone.

- Switch off all power supplies before starting work and make sure they cannot be switched on again.

Behaviour in the event of faults

The following applies in principle:

1. ▶ Immediately initiate an emergency stop in the event of faults posing an immediate danger to people or property.
2. ▶ Ascertain the cause of the fault.
3. ▶ If fault rectification requires work in the danger zone, shut down the system and secure to prevent restarting.
Immediately notify those responsible at the place of use about the fault.
4. ▶ Depending on the nature of the fault, have it rectified by authorised specialised personnel or rectify it yourself.



Malfunctions

Malfunction table



The fault table below provides information about who is authorised to rectify the fault.

9.2 Malfunction table

Fault description	Cause	Remedy	Personnel
No delivery	Pump not sufficiently submerged or not vented	Check required submersion depth & Chapter 7.4 „Required submersion depth“ on page 63 or vent pump	Instructed person (operator)
	Speed too low	Check speed, increase if necessary	Instructed person (operator)
	Air entering suction line	Check suction line	Instructed person (operator)
	Pressure line clogged / gate valve closed	Check pressure line/gate valve	Instructed person (operator)
	Air or gas in delivery medium	Check delivery medium for air or gas	Instructed person (operator)
	Delivery head too high (exceeds calculation)	Check delivery head	Instructed person (operator)
	Suction pipe insufficiently submerged	Check submersion depth of suction pipe	Instructed person (operator)
	Impeller or suction line clogged	Check pump and suction line for obstruction	Instructed person (operator)
	Wrong rotational direction	Check rotational direction, make correction if necessary & Chapter 6.3.4 „Check rotational direction“ on page 56	Qualified Electrician
Insufficient flow rate	Air or gas on back side of impeller	Check delivery medium for air or gas	Instructed person (operator)
	Air entering suction line	Check suction line	Instructed person (operator)

Malfunctions

Malfunction table



Fault description	Cause	Remedy	Personnel
	Air or gas in delivery medium	Check delivery medium for air or gas	Instructed person (operator)
	Delivery head too high (exceeds calculation)	Check delivery head	Instructed person (operator)
	Insufficient suction pressure for hot liquids	Check suction pressure, increase if necessary	Qualified personnel
	Suction pipe insufficiently submerged	Check submersion depth of suction pipe	Instructed person (operator)
	Solids concentration higher than assumed	Check solids concentration	Instructed person (operator)
	Impeller or suction line clogged	Check pump and suction line for obstruction	Instructed person (operator)
	Wrong rotational direction	Check rotational direction, make correction if necessary & Chapter 6.3.4 „Check rotational direction“ on page 56	Qualified Electrician
	Excessive impeller clearance	Check impeller clearance & Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Instructed person (operator)
	Impeller damaged	Check impeller for damage, replace if necessary	Manufacturer (service centre)
Insufficient delivery pressure	Voltage too low	Check voltage	Qualified Electrician
	Speed too low	Check speed, increase if necessary	Instructed person (operator)



Malfunctions

Malfunction table

Fault description	Cause	Remedy	Personnel
	Air or gas in delivery medium	Check delivery medium for air or gas	Instructed person (operator)
	Suction pipe insufficiently submerged	Check submersion depth of suction pipe	Instructed person (operator)
	Solids concentration higher than assumed	Check solids concentration	Instructed person (operator)
	Wrong rotational direction	Check rotational direction, make correction if necessary & Chapter 6.3.4 „Check rotational direction“ on page 56	Qualified Electrician
	Excessive impeller clearance	Check impeller clearance, readjust if necessary & Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Instructed person (operator)
	Impeller damaged	Check impeller for damage, replace if necessary	Manufacturer (service centre)
	Voltage too low	Check voltage	Qualified Electrician
	Impeller too small	Check impeller, replace if necessary	Instructed person (operator) Manufacturer (service centre)
Decrease in flow rate or loss of pressure after startup	Air or gas on back side of impeller	Check delivery medium for air or gas	Instructed person (operator)
	Air entering suction line	Check suction line	Instructed person (operator)
	Air or gas in delivery medium	Check delivery medium for air or gas	Instructed person (operator)
	Suction head too high	Check suction head	Instructed person (operator)
Vibrations	Suction pipe insufficiently submerged	Check submersion depth of suction pipe	Instructed person (operator)
	Speed too high	Check speed, reduce if necessary	Instructed person (operator)

Malfunctions

Malfunction table



Fault description	Cause	Remedy	Personnel
	Air entering suction line	Check suction line	Instructed person (operator)
	Pressure line clogged / gate valve closed	Check pressure line/gate valve	Instructed person (operator)
	Air or gas in delivery medium	Check delivery medium for air or gas	Instructed person (operator)
	Delivery head too high (exceeds calculation)	Check delivery head	Instructed person (operator)
	Suction head too high	Check suction head	Instructed person (operator)
	Insufficient suction pressure for hot liquids	Check suction pressure, increase if necessary	Qualified personnel
	Suction pipe insufficiently submerged	Check submersion depth of suction pipe	Instructed person (operator)
	Impeller or suction line clogged	Check pump and suction line for obstruction	Instructed person (operator)
	Impeller damaged	Check impeller for damage, replace if necessary	Manufacturer (service centre)
	Motor damaged	Check motor, repair if necessary	Qualified Electrician Manufacturer (service centre)
	Loose fastening	Check fastening, make correction if necessary	Qualified personnel
	Worn bearing	Check bearing for damage, replace if necessary	Qualified personnel Manufacturer (service centre)
	Impeller out-of-balance	Check impeller, replace if necessary	Instructed person (operator)
	Impeller touches suction cover	Check impeller clearance, readjust if necessary & Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Instructed person (operator)
Motor overloaded	Speed too high	Check speed, reduce if necessary	Instructed person (operator)
	Pressure line clogged / gate valve closed	Check pressure line/gate valve	Instructed person (operator)
	Solids concentration higher than assumed	Check solids concentration	Instructed person (operator)
	Specific gravity of delivery medium higher than assumed	Check specific gravity of delivery medium	Qualified personnel
	Motor damaged	Check motor, repair if necessary	Qualified Electrician



Malfuncions

Malfuncion table

Fault descrip- tion	Cause	Remedy	Personnel
			Manufacturer (service centre)
	Voltage too low	Check voltage	Qualified Electrician
	Loss of coolant	Check coolant level or oil level, add if necessary & Chapter 8.4.4 „Check oil level“ on page 85	Qualified personnel
	Impeller touches suction cover	Check impeller clearance, readjust if necessary & Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Instructed person (operator)
	Thick sludge and small impeller clearance	Increase impeller clearance & Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71	Instructed person (operator)
Motor does not start	Main switch is off	Place main switch in „On“ position.	Instructed person (operator)
	Thermal overcurrent trip has responded	Check overcurrent trip	Qualified Electrician
	Motor damaged	Check motor, repair if necessary	Qualified Electrician Manufacturer (service centre)
	Voltage too low	Check voltage	Qualified Electrician
	Switch-on level not reached; defective probe or switch	Check fluid level; check level switch for function, replace if necessary	Qualified personnel
Noise	Speed too high	Check speed, reduce if necessary	Instructed person (operator)
	Air entering suction line	Check suction line	Instructed person (operator)
	Air or gas in delivery medium	Check delivery medium for air or gas	Instructed person (operator)
	Suction head too high	Check suction head	Instructed person (operator)
	Insufficient suction pressure for hot liquids	Check suction pressure, increase if necessary	Qualified personnel
	Suction pipe insufficiently submerged	Check submersion depth of suction pipe	Instructed person (operator)
	Motor damaged	Check motor, repair if necessary	Qualified Electrician

Malfunctions

Startup after fault has been rectified



Fault description	Cause	Remedy	Personnel
	Loose fastening	Check fastening, make correction if necessary	Manufacturer (service centre) Qualified personnel
	Impeller touches suction cover	Check impeller clearance, readjust if necessary <i>↳ Chapter 8.4.2 „Check/readjust impeller clearance“ on page 71</i>	Instructed person (operator)

9.3 Startup after fault has been rectified

After repair of malfunction, perform the following steps to restart:

1. ▶ Check if all protective devices and covers that were previously removed are properly installed again.
2. ▶ Check all screw connections that were previously loosened for tightness.
3. ▶ Ensure that all tools, materials and other equipment used have been removed from working area.
4. ▶ Clean device and remove any escaped substances, such as liquids, processing material or the like.
5. ▶ Ensure that all safety devices of the system function properly.
6. ▶ Ensure that no persons are in the danger zone.
7. ▶ Start according to the information in chapter "Operation".



Disassembly

Dismantling

10 Disassembly

Following the end of its useful life, the system must be dismantled and disposed of in accordance with the environmental regulations.

10.1 Safety

Electrical system



DANGER!

Danger to life from electric power!

Contact with live parts may prove fatal. When switched on, electric components may be subject to uncontrolled movements and may cause grave injury.

- Before starting the dismantling, switch off the electric power supply and disconnect completely.

Improper dismantling



WARNING!

Danger of injury due to improper dismantling!

Stored residual energy, angular components, points and edges on or in the system or on the tools needed can cause injuries.

- Ensure sufficient space before starting work.
- Handle exposed, sharp-edged components with care.
- Pay attention to orderliness and cleanliness in the workplace! Loosely stacked or scattered components and tools could cause accidents.
- Dismantle the components properly. Note that some components may have a high intrinsic weight. Use hoists if necessary.
- Secure components so that they cannot fall down or topple over.
- Consult the manufacturer if in doubt.

10.2 Dismantling

Before starting dismantling:

- Shut down the system and secure to prevent restarting.
- Physically disconnect the power supply from the system; discharge stored residual energy.
- Remove consumables, auxiliary materials and other processing materials and dispose of in accordance with the environmental regulations.

Disassembly

Disposal



Then clean assemblies and parts properly and dismantle in compliance with applicable local occupational safety and environmental protection regulations.

10.3 Disposal

If no return or disposal agreement has been made, send the dismantled components for recycling.

- Scrap metals.
- Send plastic elements for recycling.
- Sort and dispose of other components in accordance with their material composition.



NOTICE!

Danger to the environment due to incorrect disposal!

Incorrect disposal may pose risks to the environment.

- Electrical scrap, electronic components, lubricants and other auxiliary materials must be disposed of by authorised specialist companies.
- If in doubt, obtain information about disposal in accordance with the environmental regulations from the local municipal authorities or specialised waste disposal companies.



11 Appendix

- Technical data sheets
- Technical drawings
- CE Declaration of Conformity
- Spare parts list
- Connection diagram
- Explanation of type code
- Transfer protocol
- List of applied standards

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	INSTRUCTION MANUAL ACCESSORIES - Vertical installation with suction stand	
Dat.: 24.01.06	No: 99-BA 6052E/a	File: ZUBEHÖR_E
<div data-bbox="215 300 335 331" data-label="Section-Header"> <h2>General</h2> </div> <div data-bbox="215 365 1442 461" data-label="Text"> <p>As a standard we will mount the suction flange of the suction stand (635) and the pressure flange of the pump casing (400) in the same direction. If another mounting is required you must indicate the direction of mounting in your order.</p> </div> <div data-bbox="215 459 1442 530" data-label="Text"> <p>The permissible ground load has to be compared with the total weight of the pump. The concrete foundation must correspond to the guidelines of the strength of foundation and the resistance to pressure.</p> </div> <div data-bbox="134 566 210 642" data-label="Image"> </div> <div data-bbox="215 562 386 593" data-label="Section-Header"> <h3>ATTENTION:</h3> </div> <div data-bbox="215 593 1441 627" data-label="Text"> <p>Please consider the exact length of the foundation screws! Please refer to the detailed description below.</p> </div> <div data-bbox="215 656 1442 719" data-label="Text"> <p>HIDROSTAL AG recommends the use of chemical anchor screws which are secured with a 2 part Epoxy resin.</p> </div> <div data-bbox="215 750 1362 790" data-label="Section-Header"> <h2>1. Mounting of accessories and premounting of the pump to the suction stand</h2> </div> <div data-bbox="215 817 1442 1142" data-label="Text"> <p>The dimension sheet (97-M5502) shows which pump types need a support (670) between the suction stand (635) and the pump casing (400). The following description relates to mounting with the support. Pay attention to the correct position of the pump outlet to the suction stand. The pump can be mounted in any of the normal 90° positions (some pumps can be mounted at 45° positions). However the support (670) can only be mounted on the suction stand (635) in one position. Therefore great care must be taken to ensure that the support (670) is positioned correctly. The correct position can be achieved by aligning the outer mounting holes of the support (670) with the mounting holes of the suction stand (635). Attach the support (670) to the suction side of the pump casing (400) with the fastening set (671) using the ring of tapped holes provided. Insert O-ring (672) into the groove on the upper flange of the suction stand (670). Fasten suction flange of the pump to the suction stand with fastening set (673).</p> </div> <div data-bbox="215 1140 1442 1207" data-label="Text"> <p>There is now a resultant clearance between the machined 'Gauge' faces on the support (670) and the suction stand (635). See below for the description for the fitting of the wedge blocks (677, 678).</p> </div> <div data-bbox="215 1236 809 1272" data-label="Section-Header"> <h2>2. Fastening the support to the ground</h2> </div> <div data-bbox="215 1303 1442 1370" data-label="Text"> <p>See dimension sheet (97-M5502) and data sheet (99-TU6050) for the needed space for the suction stand and length of the foundation screws. The pump must be aligned and in the correct position!</p> </div> <div data-bbox="134 1400 210 1476" data-label="Image"> </div> <div data-bbox="215 1400 384 1433" data-label="Section-Header"> <h3>ATTENTION:</h3> </div> <div data-bbox="215 1433 1442 1500" data-label="Text"> <p>The suction stand has to be supported on all 4 edges. If necessary, differences of dimension could be compensated by 2-part flow concrete epoxy resin (self leveling epoxy grout)!</p> </div> <div data-bbox="215 1529 1442 1626" data-label="Text"> <p>Mark and drill the holes for the foundation screws. Place the foundation screws. Pay attention to the correct length of the threaded rod. Allow the required length of time for the epoxy to harden! Now screw down the suction stand.</p> </div> <div data-bbox="134 1655 210 1731" data-label="Image"> </div> <div data-bbox="215 1655 371 1688" data-label="Section-Header"> <h3>DIRECTION:</h3> </div> <div data-bbox="215 1688 1442 1753" data-label="Text"> <p>Foundation screws have to be tightened with the prescribed torque! Check this torque during operation occasionally!</p> </div> <div data-bbox="215 1783 978 1821" data-label="Section-Header"> <h2>3. Final mounting of the pump to the suction stand</h2> </div> <div data-bbox="215 1848 1442 1982" data-label="Text"> <p>Screw down the delivered threaded rods and extension nuts (674) according data sheet (99-TU6050). Insert wedge blocks (677+678) between the machined gauge surfaces at the threaded rods and tap them in lightly at all 4 positions with the same expenditure of energy. When the clearance is compensated on all 4 supporting surfaces, screw down the support to the suction stand with fastening set (674).</p> </div>		



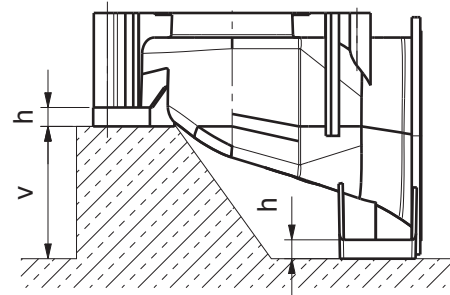
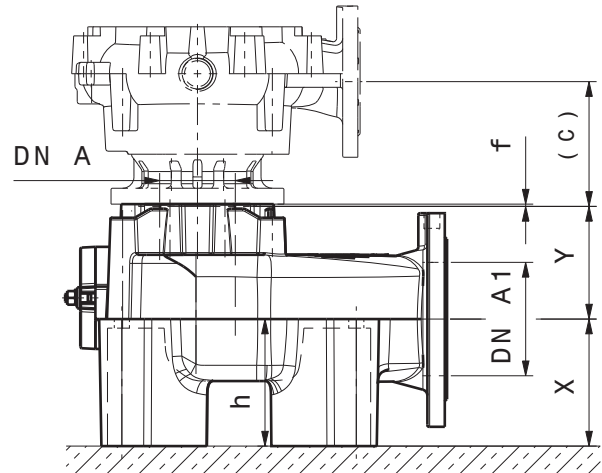
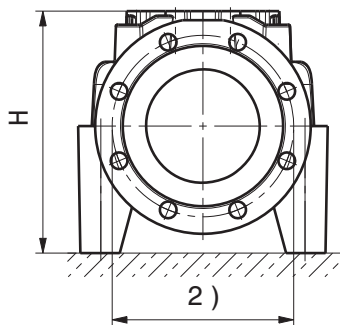
SUCTION STAND

FUSSBOGEN

B0 - MOUNTING

BO - AUFSTELLUNG

SUCTION- STAND FUSSBOGEN 6BB-	HYDRAULIC HYDRAULIK	WEIGHT GEWICHT (B0-) ~kg	A	A1	B	D	d	e	e1	e2	f	H	h	I	L	v	X	Y
D100 ¹⁾	C/D	34	100	100	300	240	16	120	80	160	0	212	12	90	380	0	120	92
100X100	C/D	50	100	100	330	330	20	135	100	210	3	244	120	100	505	0	120	121
100X150	C/D	52	100	150	330	330	20	135	100	210	3	320	168	100	505	0	168	149
E150 ¹⁾	E	53	150	150	400	330	20	160	160	160	0	270	60	90	540	0	160	110
150X150	E	135	150	150	440	460	25	185	160	320	3	311	160	100	660	0	160	148
150X200	E	160	150	200	440	460	25	185	160	320	3	363	190	125	720	0	190	170
200X250	E	180	200	250	545	550	25	230	160	370	3	423	202	150	850	0	230	190
	F	220																
250X300	F	310	250	300	680	660	42	275	200	420	3	503	260	150	1000	0	260	240
	H	360																
300X400	H	530	300	400	870	880	42	370	370	640	4	605	320	165	1315	0	320	281
	I	630																
400X500	I	1160	400	500	1150	1200	50	470	470	885	4	770	370	225	1770	0	370	396
	L	1380																
500X700	L/M	2080	500	700	1450	1400	50	650	660	740	4	1000	100	250	2135	400	500	496
500X1000	L/M	1850	500	1000	1450	1000	50	650	660	740	4	1300	100	250	1735	700	650	646
700X1000	M	1900	700	1000	1450	1000	50	650	660	740	10	1300	100	250	1735	700	650	640



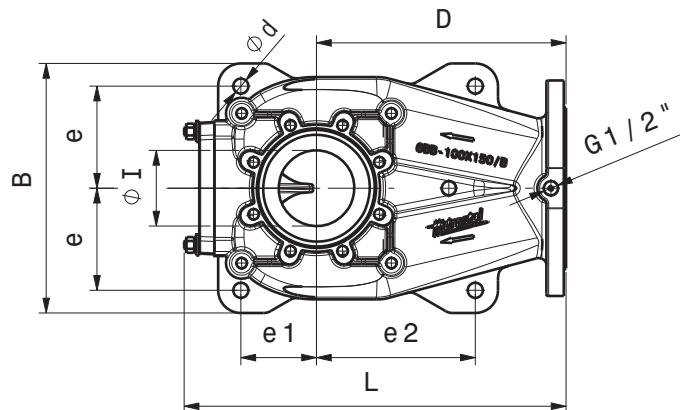
IMPORTANT:
additional support may be required; refer to:
08-TU7390 or 05-TU6816

WICHTIG:
Eventuell Pumpen-Abstützung notwendig;
siehe: 08-TU7390 oder 05-TU6816

1) OBSOLETE TYPES
1) AUSLAUFENDE TYPEN

2) OPTION:
A1 ≥ DN200 = possible to be drilled
PN16 accord. to 'DIN EN 1092'
A1 ≥ DN200 = Flanschanschluss PN16
nach 'DIN EN 1092' möglich

A1,A2 ≥ DN150/PN16 DIN EN 1092
≥ DN200/PN10 DIN EN 1092



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Modifications réservées sans préavis

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Approved by/Gepr. Dat. Vis.: 21.08.12

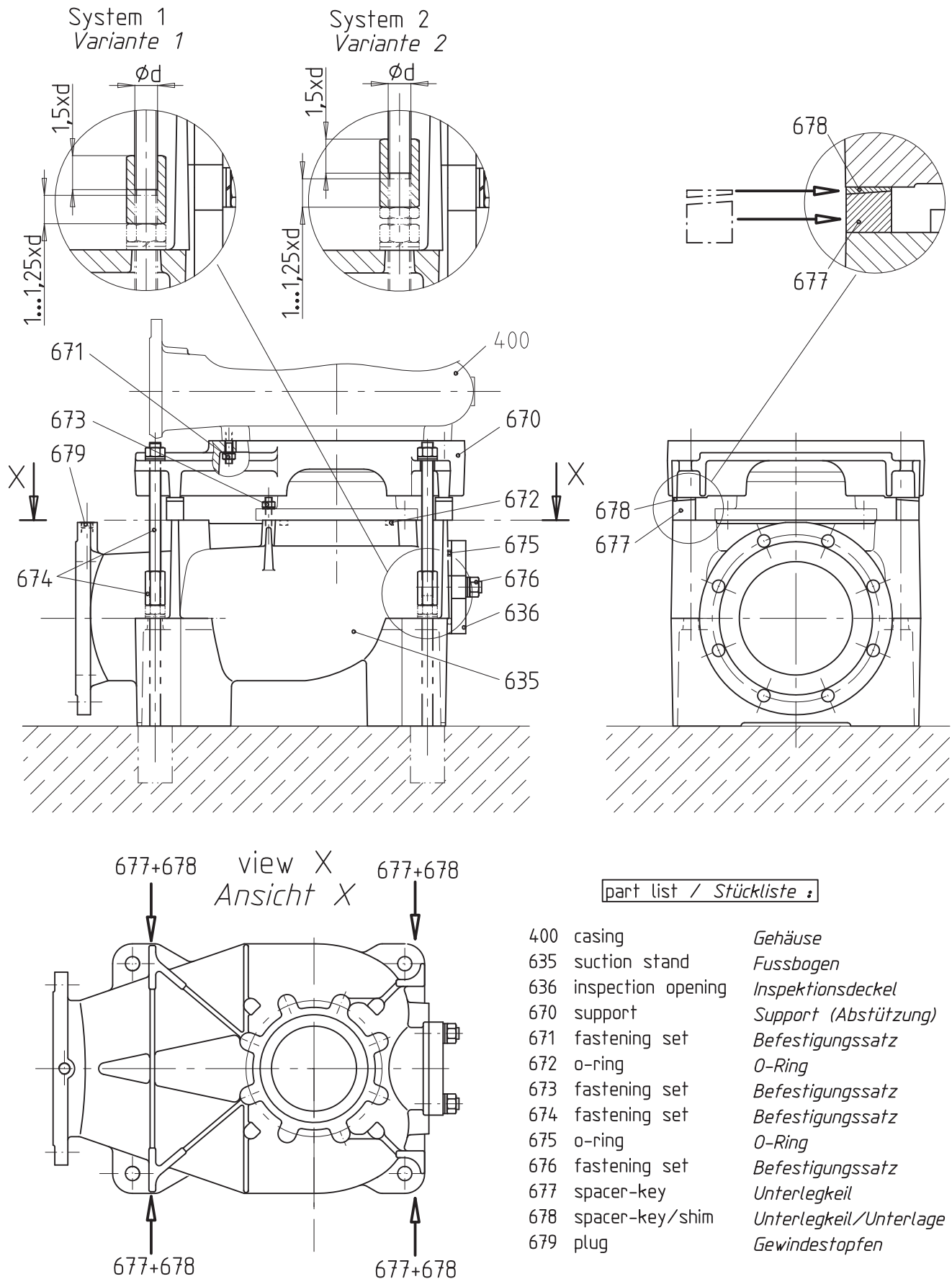
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ACCESSORY TO SUCTION STAND ZUBEHÖR FUSSBOGEN

B0-MOUNTING B0-AUFSTELLUNG



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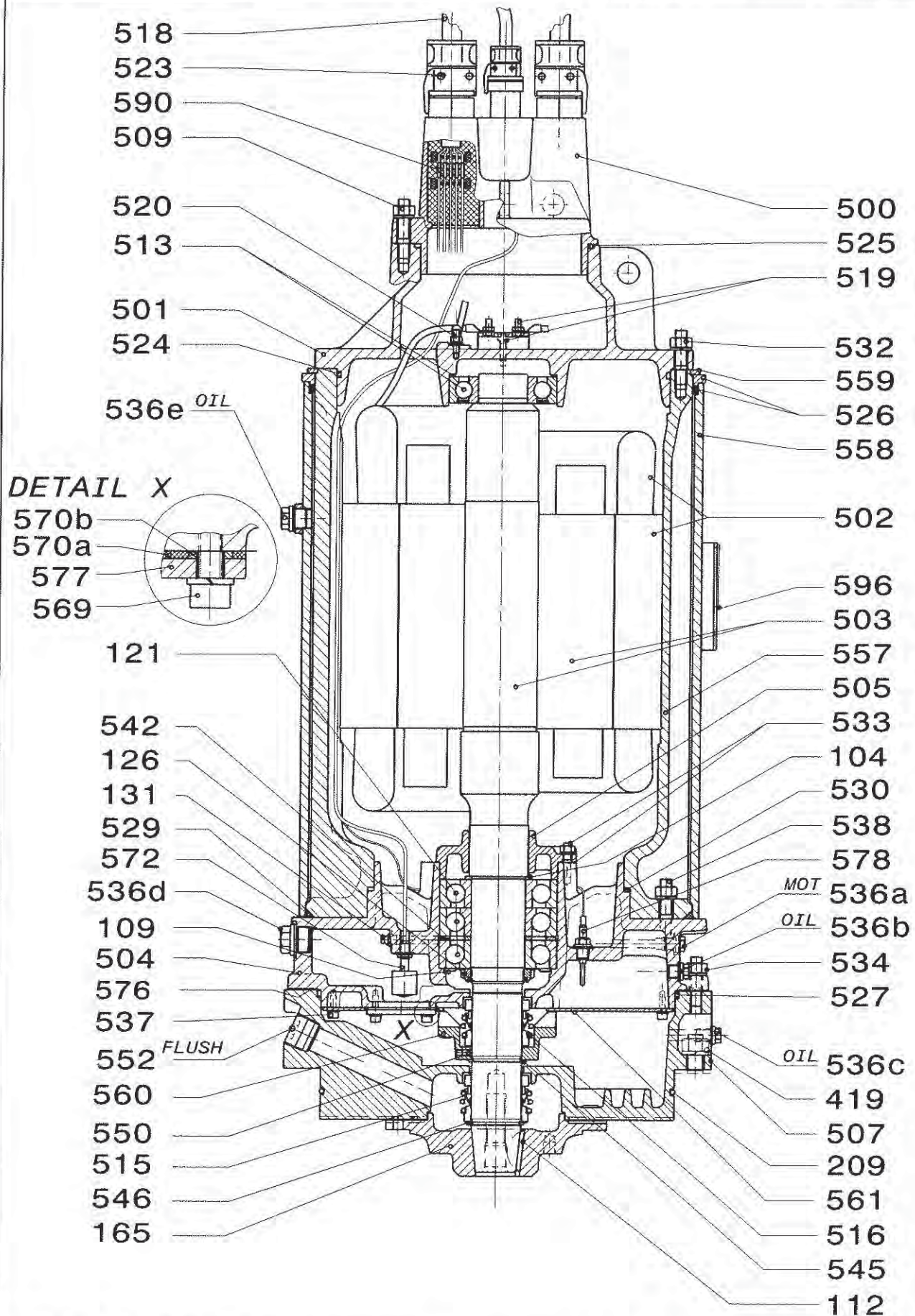
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SECTIONAL DRAWING MOTOR
SCHNITTZEICHNUNG MOTOR

FE030X4
FE030X6



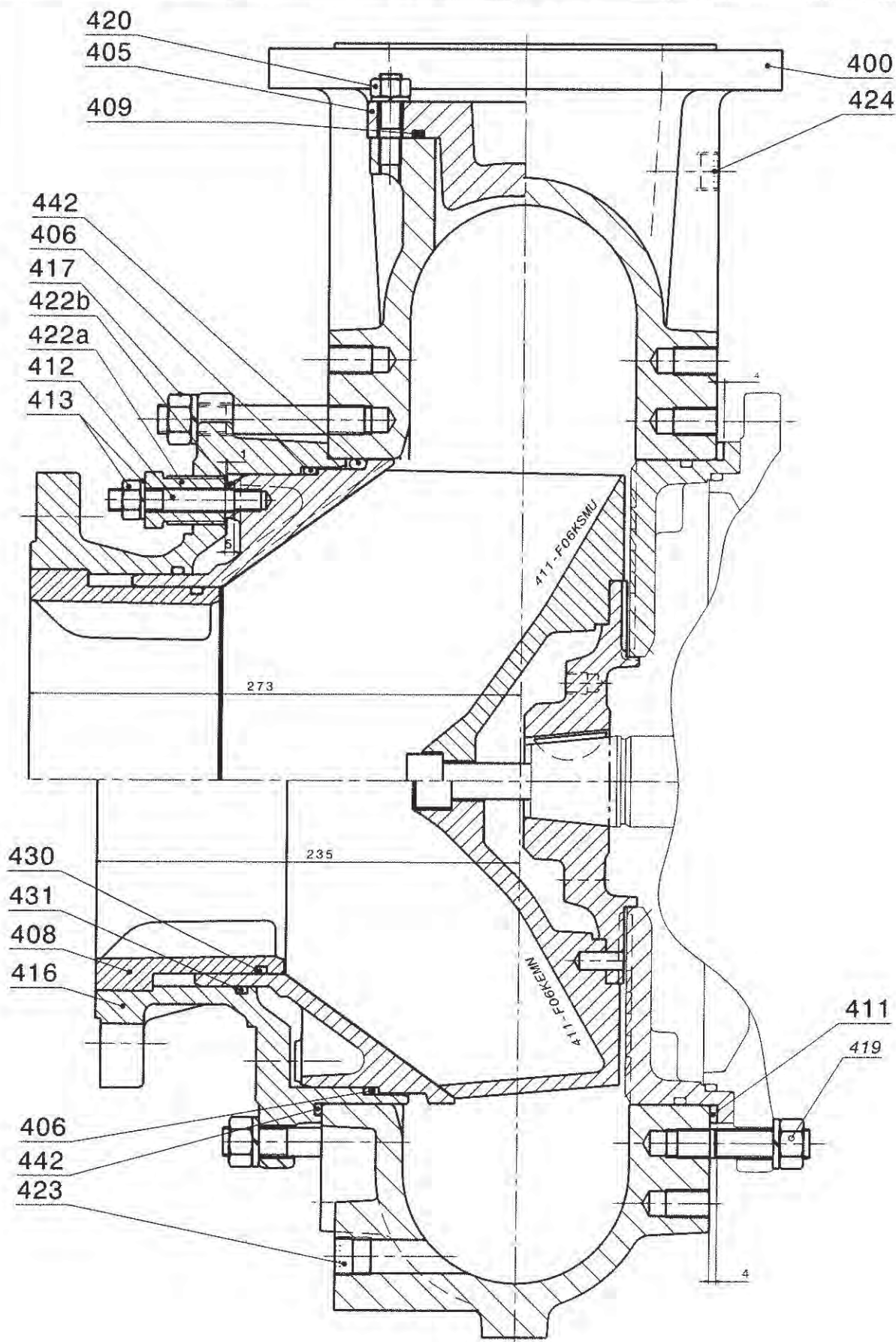
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Approved by/Gepr. Dat. Vis.: 29.04.08 pda

No: 04-S6739b



SECTIONAL DRAWING HYDRAULIC
SCHNITTZEICHNUNG HYDRAULIK
F06G-SMU.R / -EMN.R



Drawn by/Bearb. Dat. Vis.: 02.03.06 pda
Approved by/Gepr. Dat. Vis.: 29.02.12 pda

No: 06-S6904a



LIST OF PARTS FOR Q-MOTORS POSITIONSNUMMERVERZEICHNIS FUER Q-MOTOREN

POS.	DESCRIPTION	BESCHREIBUNG	CODE	MATERIAL*	
				a	b/c **
104	Spacer ring P.S.	Stützring (Fettring) P.S.	1RD	K	K
106	Bearing spacer	Distanzring	1RD	K	K
112	Woodruff key	Woodruffkeil	2FK	L	F
121	Angular contact ball bearing	Schrägguggellager	8LW	-	-
126	Lock nut for shaft	Mutter SKF für Welle	-	L	L
127	Lock washer for 126	Sicherungsblech zu 126	-	O	O
157	Spacer ring	Stützring aussen	1RD	K	K
165	Impeller flange	Lauftradaufnahme	2SF	B	C
166	Impeller nut	Lauftradmutter	2FM	K	F
167	Impeller locking washer for 165	Sicherungsblech für 165	2FF	K	F
173	Seal cup	Dichtungsdeckel	1DD	A	-
191	O-ring for 173 and 400	O-Ring zu 173 und 400	8DO	Q	Q
209	O-ring for 511 and 400	O-Ring zu 511 und 400	8DO	Q	Q
400	Volute casing	Gehäuse	4G1	A	C
401	Impeller	Lauftrad	411	B/D	C
402	Suction cover	Saugdeckel	421	A	C
403					
404					
405	Inspection opening	Inspektionsöffnung	451	A	-
406	O-ring for 402 or 421	O-Ring zu 402 oder 421	-	Q	Q
407	O-ring for 421 - 462	O-Ring zu 421 - 462	-	-	-
408	Wear ring	Verschleissring	4R	A/D	C
409	O-ring for 405	O-Ring zu 405	-	Q	Q
410					
411	Set of shims or wire 200-400	Regulierunterlagen 200-400	-	K	F
412					
413	Adjusting bolt	Regulierschraube	-	F	F
414	Spacer ring	Distanzring	-	K	F
415	Impeller bolt	Frontschraube	4B	H	F
416	Suction casing	Eintrittskappe	4H	A	C
417	Fastening set	Befestigung	-	H	F
418					
419	Fastening set	Befestigung	-	H	F
420	Fastening set	Befestigung	-	H	F
421	Liner	Eintrittskonus	4K	A/D	C
422	Regulation nut	Regulierhülse	4V1	F	F
423	Plug	Stopfen	-	N	F
424	Plug	Stopfen	-	N	F
425					
426	Fastening set 463-400	Befestigung 463-400	-	-	-
427					
428					
429					
430	O-ring	O-Ring	-	Q	Q
431	O-ring	O-Ring	-	Q	Q
432					
433	Bush impeller/impeller bolt	Uebergangsbüchse Lauftrad/Frontschraube	4BZ	H	F
434	Bush shaft/impeller	Uebergangsbüchse Welle/Lauftrad	4ZW	H	F
462	Guide cone	Leitkonus	4Z1	-	-
463	Guidance sheet	Leitblech	4LB	H	F
464	O-ring	O-Ring	8DO	Q	Q
465	Fastening set 421 - 462	Befestigung 421 - 462	-	-	-
500	Junction box cover	Kabeldeckel	5DK	A	C
501	Upper motor cover	Motordeckel oben	5DM	A	A
502	Motor stator	Wicklung	5ES	-	-
503	Shaft (Rotor)	Welle (Rotor)	5WO(5ER)	H	F/H
504	Oil chamber casing	Ölkammergehäuse	5GO	A	A/F
505	Lower bearing cap P.S.	Lagerdeckel P.S.	5DL	A	A
506	Retaining ring	Fettring	-	K	K
507	Back cover/mech. seal plate	Mech. Dichtteil/Dichtplatte	5GD/1PM	A	C
508	Spacer ring	Stützring	5RS	O	O
509	Fastening set 500-501	Befestigung 500-501	-	H	F
510	O-ring for 557 P.S. ex-proof old type	O-Ring zu 557 P.S. Ex	-	Q	Q
511	Back cone	Rückkonus	1K	A/D	C
512	Lower ball bearing P.S.	Lager für Radialbelastung P.S.	8LW	-	-
513	Upper ball bearing cable side	Lager Kabelseite	8LW	-	-
514	Double row angular contact ball bearing	Lager P.S. (für Pumpe bis 5 kW)	8LW	-	-
515	Mechanical seal P.S.	Mech. Dichtung P.S.	8DM	-	-
516	Mechanical seal M.S.	Mech. Dichtung M.S.	8DM	-	-
517	Humidity relay	Feuchtigkeitsschutz-Relais	5EU	-	-
518	Cable	Kabel	5EK	-	-
519	Terminal board	Klemmenbrett	-	-	-
520	Ground cable connection (earth)	Befestigung für Erdanschlusskabel	-	K	K
521	Terminal connectors ex-proof	Leitungsdurchführung Ex-Schutz	-	-	-
522	Terminal connectors	Leitungsdurchführung	-	-	-
523	Cable entry assembly (intermittent fitting)	Kabeleinführung komplett (Zwischenstück)	5EE (5EZ)	-	-
524	O-ring for 501	O-Ring zu 501	-	Q	Q
525	O-ring for 500	O-Ring zu 500	-	Q	Q

* For material explanations see sheet of section "ENGINEERING DATA"

Für Materialangaben s. Spezifikationsblatt des Kapitels "ENGINEERING DATEN"

a: Standard material execution

a: Standardmassige Materialausführung

b: All internal wetted parts stainless steel

b: Alle intern benetzten Teile rostfrei

c: All wetted parts stainless steel depending on size

c: Alle benetzten Teile rostfrei, grössenabhängig

File : QTLSTPRT

Drawn by / Bearb. Dat. Vis. : 10.02.98 / mf

Approved by / Gepr. Dat. Vis. : 10.02.98 / DB

No. : 93-TU 4531/1c



LIST OF PARTS FOR Q-MOTORS

POSITIONSNUMMERVERZEICHNIS FUER Q-MOTOREN

POS.	DESCRIPTION	BESCHREIBUNG	CODE	MATERIAL*	
				a	b/c**
526	O-ring for 558 on top	O-Ring zu 558 oben		Q	Q
526	Steel ring	Stahlring gerollt		J	F
527	O-ring for 200 M.S.	O-Ring zu 200		Q	Q
528	O-ring for 519	O-Ring zu 519		Q	Q
529	O-ring for 558 bottom	O-Ring zu 558 unten		Q	Q
530	O-ring for 504 M.S.	O-Ring zu 504 M.S.		Q	Q
531	O-ring for 505	O-Ring zu 505		Q	Q
532	Fastening set 557-501 (small Motors)	Befestigung 501-557 (kleine Motoren)	5FB	H	F
533	Fastening set 504-505	Befestigung 505-504		H	F
534	Fastening set 507-557/504	Befestigung 507-557/504		H	F
535	Fastening set 501-519	Befestigung für 519		H	F
536	Plug with gasket	Stopfen		F+C	F
537	Fastening set 561	Befestigung für 561		H	F
538	Fastening set 504-557	Befestigung 504-557		H	F
539	Snap ring for 534 (C-Type)	Seegerring für 534 (Typ C)		O	-
540	Distance bolt for 519	Distanzbolzen zu 519		K	K
541	O-ring for 540	O-Ring zu 540		Q	Q
542	Grease retaining disc P.S	Fettscheibe P.S. + Monobloc M.S.	5SF	K	K
543	Holding ring for 519	Haltering zu 519		K	K
544	Snap ring for 553	Seegerring zu 553		O	O
545	Snap ring for 516 = M.S.	Seegerring zu 516 = M.S.		O	O
546	Snap ring for 515 = P.S	Seegerring zu 515 = P.S.		O	F
547	O-ring for 598 (400-557)	O-Ring zu 598 (400-557)		Q	Q
548	Plug for lubricating hole	Stopfen zu Schmierloch		F+P	F
549	Oil glass	Ölschauglas		-	-
550	Driving pin for 560	Ölradmitnehmer		G	G
551	Fastening 502-400 (A02Q)	Befestigung 502-400 (A02Q)		G	G
552	Plug for flushing connection 581	Stopfen für Spülwasseranschluss 581		N	F
553	Oil seal sleeve	Laufbüchse für Simmerring	5DB	J	J
554	Spacer (if no oil impeller)	Distanzring (wenn kein Kühlrad)	5KD	K	K
555	shaft seal	Simmerring		Q	Q
556	Ring screw	Ringschraube		N	F
557	Stator housing	Statorgehäuse	5GM	A	A/F
558	Cooling jacket	Kühlmantel	5KG	K	F
559	Spring ring for 558	Sprengtring zu 558	5RF	K	F
560	Impeller for circ. of cooling liquid	Kühlrad	5KI	A	A
561	Guidance sheet	Leitblech	5KB	K	K
562	Snap ring for ventilator	Seegerring zu Lüfter		O	O
563	Ventilator cap	Lüfterhaube		-	-
564					
565	O-ring for 566-598	O-Ring zu 566-598		Q	Q
566	Oil elbow	Öelbogen		A	-
567	cable bush	Kabelfülle		Q	Q
568	Fastening set 575	Befestigung 575		H	F
569	Fastening set 577	Befestigung 577		H	F
570	O-ring for 575	O-Ring zu 575		Q	Q
571	Temperature probe	Temperatursonde	5ET	-	-
572	Float switch	Schwimmerschalter	5ES	-	-
573	Snap ring 574	Seegerring zu 574		O	O
574	Cover disc Mot. 6 + 7	Deckscheibe Mot. 6 + 7 5DA		K	K
575	Cable cover (probe, Mot. 6+7)	Kabeldeckel (Sonde, Mot. 6+7)	5DK	A	-
576	Shims for 507-504, 507-511	Regulierunterlagen zu 507-504, 507-511		K	F
577	Probeholding	Sondenblech		K	K
578	Moisture detector	Öelmeßsonde	8EF	-	-
579	Fastening set 593-300	Befestigung 593-300		M	-
580	O-ring for 593 gear side	O-Ring zu 593 getriebeseitig		Q	Q
581	Pipe for 507 old types	Spülrohr zu 507		N	-
582	Inset for 557 ex-proof old types	Einsatz zu 557, Ex-Schutz		A	A
583	Grease disc M.S.	Fettscheibe M.S.		K	K
584	Spacer for 503 standard bearing	Distanzring zu 503, normale Lagerung	5SS	K	K
585	Spacer for 557 standard bearing	Distanzring zu 557, normale Lagerung		K	K
586	Small plate for ground cable (earth)	Plättchen für Erdanschluss		P	P
587	Spacer P.S.	Distanzring P.S.		K	K
588	Grease disc, cable side	Fettscheibe kabelseitig		K	K
589	Snap ring for 588	Seegerring zu 588		O	O
590	Cable connection	Miniklemme	5EV	-	-
591	Carrying plate for 590	Tragschiene zu 590		-	-
592	Winding	Paket		-	-
593	Motor support	Motor Support		A	-
594	Snap ring for 595	Seegerring zu 595		O	-
595	Heat shield	Hitzeschutzschild		-	-
596	Name plate ex-proof	Prüfschild Ex-Schutz		F	F
597	Name plate	Hauptschild		F	F
598	Oil tubes (elbow for oil)	Öelröhrchen (Anschlussbogen)	5KR/5BO	A/P/K	P/F
599	Fastening set 598	Befestigung von 598		H	F
640	Fastening set 646-400	Befestigung 646-400		H	F
642	Rubber seal	Dichtungsgummi	6AD	Q	Q
646	Gliding shoe	Gleitschuh	6AS	A	C

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No. : 93-TU 4531/2c



Connection diagram

12010962 / 10

1-speed

Normal version

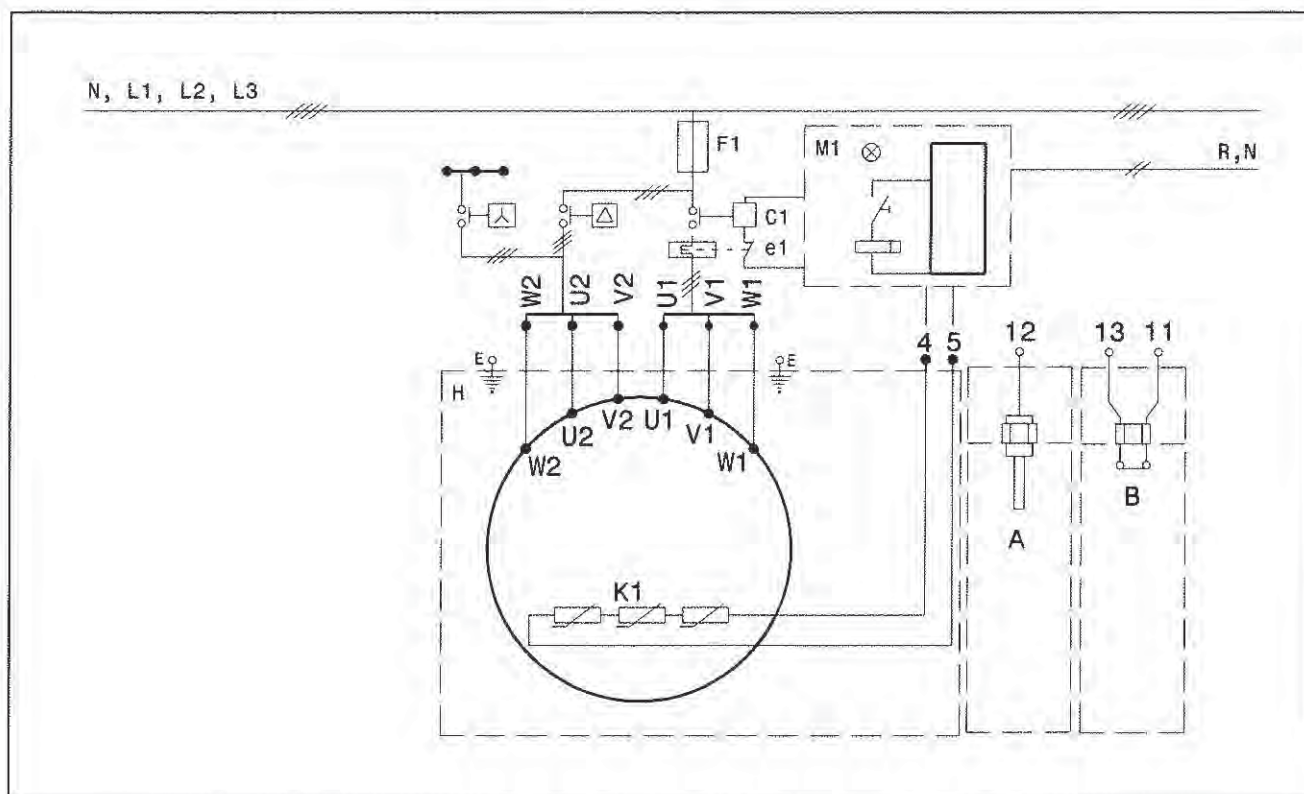


Diagram legend

N, L1, L2, L3	Main circuit	E	Earth
M1, R, N	Motor monitoring unit with power supply	C1, e1	Contact with thermal protection switch
F1	Fuse L1, L2, L3	H	Motor housing
U1, V1, W1	Motor cable		
U2, V2, W2	Motor cable		

Motor protection elements

K1	Winding temperature limiter	No. 4, 5	(PTC) resistor 150°C	Electronic Control Device
A	Moisture probe for oil chamber	No. 12	Probe	Electronic Control Device
B	Float switch for dry chamber	No. 11, 13	Magnetic contact	NC contact, max. 150 VAC/0.5 A/10 W

Operating instructions and information

- Only operate pump with a contactor equipped with a thermoblock which interrupts the power supply to the motor within 6 seconds when the rotor is blocked.
- The controller can be designed so that the pump can be switched on again automatically after the temperature limiter K1 is activated. The cause of the impermissible heat-up should be examined.
- Following a power failure, the pump may switch on again automatically.
- Thermistor resistors (PTC) require a control device. 2.5 VDC (DIN 44082)

Order data

System		Power Pn [kW]	37
Pump	F06G-EMN3R + FE030X4-XVEK1 + NC1B4V-15 + B0-200X250F6KH	Current In [A]	67
Cable	2 4x6mm ² , 7x1,5mm ² PURWIL, EMV	IS/IN	4.7
Serial No	217057 - 217058	Speed [rpm]	1463
Starting method	Mains / YD Start-up	Frequency [Hz]	50
Voltage [V]	400	cos φ	0.89



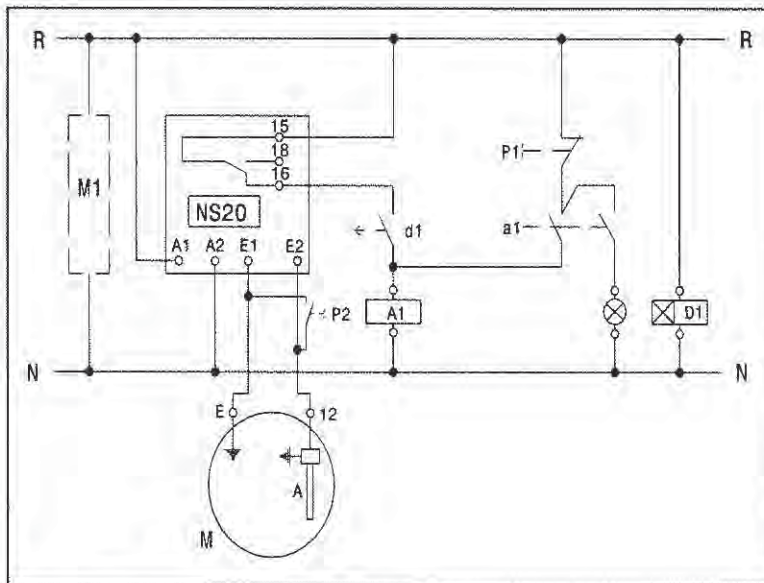
Connection diagram

12010962 / 10

1-speed

Normal version

A Moisture sensor alarm



The monitoring relay must be activated at a resistance of 60 kΩ.

The following monitoring relays have proven themselves in Hidrostat motors:

- Vegator 632
- Ziehl NS20/ NS20K
- Fanal NW
- Warrick
- Chromalock LCA

A	Moisture sensor
M	Motor
R, N	220 VAC – 240 VAC
A1	Auxiliary contactor
D1	Time delay relay
M1	Level/motor checking
P1	Alarm reset button
P2	Self-test button
E/12	Control wires

When the oil chamber is filled with clean oil, the insulation between the moisture sensor (12) and earth is good. As soon as water penetrates the first seal, the resulting oil/water mixture becomes increasingly conductive, i.e. the insulation resistance decreases and the unit triggers an alarm at 60 kΩ and below. Therefore, there is no immediate danger for the motor, i.e. it need not be stopped immediately. On the other hand, maintenance should be planned. A single pulse must be sufficient to trigger the alarm and stop the motor.

The acknowledgement is only to be carried out manually (acknowledgement button P1). As the electronic level monitors generally have a changeover delay (approx. 1 sec.) and the connection between terminal 15 and 16 is closed in the deenergised state, a delayed alarm output is provided in the principle diagram shown with the time-delay relay D1. When switched on again after a power failure, this time-delay circuit (D1) also prevents unnecessary activation of the alarm.

The alarm output can be tested with a button (P2) which bypasses the moisture sensors (E1 and E2).

B Float switch

The upper mechanical seal is usually not liquid-permeable. However, during the run-in phase, some liquid can penetrate the seal. To protect the bearings and the winding against liquid, a float switch was installed so that an alarm is triggered before the liquid reaches the first bearing. In this case, the cover to the chamber of the protection elements is to be opened for cleaning and inspection. This can be carried out without opening the motor interior. The float switch is closed during normal operation and should be connected so that a signal is triggered if liquid enters the chamber, however without shutting down the motor. Normally, it is sufficient to remove the liquid during the next planned maintenance work. The maximum component load is: U= 150 V, I= 0.5 A, P= 10 W, (NC)

Order data

System		Power Pn [kW]	37
Pump	F06G-EMN3R + FE030X4-XVEK1 + NC1B4V-15 + B0-200X250F6KH	Current In [A]	67
Cable	2 4x6mm ² , 7x1,5mm ² PURWIL, EMV	IS/IN	4.7
Serial No.	217057 - 217058	Speed [rpm]	1463
Starting method	Mains / YD Start-up	Frequency [Hz]	50
Voltage [V]	400	cos φ	0.89



Erklärung des Typencodes

de	<u>Erklärung des Typencodes</u> E125 - HL1 + Hydraulik	EEXW4 – GSEQ + Motor	NC1A20 -10 Kabel
cs	<u>Vysvětlení typového kódu</u> E125 - HL1 + Hydraulická	EEXW4 – GSEQ + Elektromotor	NC1A20 - 10 Kabelová
da	<u>Forklaring af typekoden</u> E125 - HL1 + Hydraulik	EEXW4 – GSEQ + El-motor	NC1A20 - 10 Kabel
el	<u>Επεξήγηση του κωδικού τύπου</u> E125 – HL1 + Τμήμα υδραυλικών	EEXW4 – GSEQ + Ηλεκτρικό μοτέρ	NC1A20 - 10 Τμήμα καλωδίου
en	<u>Explanation of type code</u> E125 – HL1 + Hydraulic	EEXW4 – GSEQ + Electric motor	NC1A20 - 10 Cable
es	<u>Explicación del código de tipo</u> E125 – HL1 + Hidráulica	EEXW4 – GSEQ + Motor eléctrico	NC1A20 - 10 Cable
fr	<u>Explication du code de type</u> E125 – HL1 + Hydraulique	EEXW4 – GSEQ + Moteur électrique	NC1A20 - 10 Câbles
fi	<u>Tyyppikoodin selitys</u> E125 – HL1 + Hydrauliikkaosa	EEXW4 – GSEQ + Sähkömoottori	NC1A20 - 10 Johto-osa
hu	<u>Tipuskód magyarázata</u> E125 – HL1 + Hydraulikus	EEXW4 – GSEQ + Elektromos motor	NC1A20 - 10 Kábel
it	<u>Spiegazione del codice modello</u> E125 – HL1 + Idraulica	EEXW4 – GSEQ + Elettromotore	NC1A20 - 10 Cavo
nl	<u>Verklaring van de typecode</u> E125 – HL1 + Hydraulisch	EEXW4 – GSEQ + Elektromotor	NC1A20 - 10 Kabeldeel


Dat. : 15.06.10

No : 10- BA7630 / 1




Erklärung des Typencodes


pl	<u>Objaśnienie pl kodu typów</u> E125 – HL1 + Hydrauliczna	EEXW4 – GSEQ + Silnik elektryczny	NC1A20 - 10 Kablowa
pt	<u>Explicação do código dos tipos</u> E125 – HL1 + Peça hidráulica	EEXW4 – GSEQ + Motor eléctrico	NC1A20 - 10 Peça de cabo
sk	<u>Vysvetlenie typového kódu</u> E125 – HL1 + Hydraulická	EEXW4 – GSEQ + Elektromotor	NC1A20 - 10 Kábová
sl	<u>Razlaga tipske kode</u> E125 – HL1 + Hidravlični	EEXW4 – GSEQ + Elektromotor	NC1A20 - 10 Kabelski
sv	<u>Förklaring av typkoderna</u> E125 – HL1 + Hydraulde	EEXW4 – GSEQ + Elmotor	NC1A20 - 10 Kabeldel

					REVISIONSTABELLE TAUCHPUMPEN OVERHAUL CHART SUBMERSIBLE PUMPS				
Motor Typ	motor- seitige Dichtung	pump- seitige Dichtung	Dicht. Öl Lit.	Nach- schmier- frist Std.	Motor Typ	motor- seitige Dichtung	pump- seitige Dichtung	Dicht. Öl Lit.	Nach- schmier- frist Std.
Motor type	motor- side seal	pump- side seal	seal oil lit.	hours between regreasing	Motor type	motor- side seal	pump- side seal	seal oil lit.	hours between regreasing
BNBA2	25 mm	20 mm	1.0	20'000	HNNT4	3"	3"	19.0	35'000
BNZK2	25 mm	20 mm	1.0	20'000	HNUC4 / HNUT4	95 mm	3"	22.0	20'000
BNZR2	25 mm	20 mm	1.0	20'000	INUT4	95 mm	3"	28.0	20'000
BNZY2	25 mm	20 mm	1.0	30'000	INTZ4	100 mm	100 mm	47.0	18'000
CNBA2	25 mm	20 mm	1.0	30'000					
CNZR2	25 mm	20 mm	1.1	20'000	DNXK6 / DNYS6	1 1/2"	1 1/8"	1.2	35'000
CNZY2	25 mm	20 mm	1.1	20'000	ENYS6 / ENYT6	1 1/2"	1 1/8"	1.2	35'000
CNYS2	1 1/2"	1 1/8"	1.5	20'000	ENXA6 / ENXR7	1 1/2"	1 1/2"	3.8	50'000
CNYT2	1 1/2"	1 1/8"	1.5	30'000	FNXT6 / FNXT7	2"	2"	6.0	50'000
DNYS2	1 1/2"	1 1/8"	1.2	20'000	FNXW6	2"	2"	6.0	50'000
DNYT2	1 1/2"	1 1/8"	1.2	20'000	FNXZ6 / FNXZ7	2"	2"	6.0	50'000
DNXA2	1 1/2"	1 1/8"	3.6	25'000	FNWB6	2 1/2"	2"	12.0	50'000
DNXB2	1 1/2"	1 1/8"	3.6	25'000	HNWB6 / HNWS6	2 1/2"	2"	14.0	50'000
DNXK2 / DNXL2	1 1/2"	1 1/8"	3.6	25'000	HNVB6	3"	3"	19.0	45'000
DNXT2	2"	1 1/2"	4.0	25'000	HNVS6	3"	3"	19.0	45'000
DNXQ2 / DNQ3	2"	1 1/2"	4.0	25'000	INVS6	3"	3"	27.0	45'000
DNXZ2	2"	1 1/2"	4.0	25'000	INN6	3"	3"	27.0	35'000
DNXW2	2"	1 1/2"	4.0	25'000	INUC6	95 mm	3"	28.0	35'000
DNWS2	2 1/2"	1 1/2"	9.0	25'000	LNTT6 / LNTZ6	100 mm	100 mm	49.0	35'000
ENWS2	2 1/2"	2"	9.0	25'000					
ENWS3	2 1/2"	1 1/2"	9.0	25'000	DNXK8 / DNYT8	1 1/2"	1 1/8"	1.2	35'000
ENVT2	3"	2"	13.0	20'000	ENYS8 / ENYT8	1 1/2"	1 1/8"	1.2	35'000
					FNXTW	2"	2"	6.0	50'000
BNBA4	25 mm	20 mm	1.0	30'000	FNXT8 / FNXT8	2"	2"	6.0	50'000
BNZK4	25 mm	20 mm	1.0	30'000	FNXZ9	2"	2"	6.0	50'000
CNBA4	25 mm	20 mm	1.0	30'000	HNWB8/HNWS8	2 1/2"	3"	14.0	50'000
CNZK4	25 mm	20 mm	1.1	30'000	HNVB8	3"	3"	19.0	45'000
CNZY4	25 mm	20 mm	1.1	30'000	INVB8 / INVS8	3"	3"	27.0	45'000
DNBA4	25 mm	20 mm	0.9	30'000	INN8	3"	3"	27.0	40'000
DNXK4	1 1/2"	1 1/8"	1.2	30'000	INUC8	95 mm	3"	28.0	30'000
DNYS4	1 1/2"	1 1/8"	1.2	30'000	LNUC8	95 mm	3"	28.0	30'000
DNYT4	1 1/2"	1 1/8"	1.2	35'000	LNTT8 / LNTZ8	100 mm	100 mm	49.0	30'000
ENYT4	1 1/2"	1 1/8"	1.2	35'000					
ENXA4 / ENXB4	1 1/2"	1 1/2"	3.8	45'000	ENXRA	1 1/2"	1 1/2"	3.8	50'000
ENXK4 / ENXO4	1 1/2"	1 1/2"	3.8	45'000	FNXTA	2"	2"	5.4	50'000
ENXR4 / ENXR5	1 1/2"	1 1/2"	3.8	45'000	HNXTA / HNXZA	2"	2"	8.0	50'000
ENXS4	1 1/2"	1 1/2"	3.8	45'000	HNXZA	2"	2"	9.0	50'000
ENXW4	2"	1 1/2"	4.7	45'000	INVBA / INVSA	3"	3"	27.0	50'000
ENXY4 / ENXY5	1 1/2"	1 1/2"	3.8	40'000	LNUCA	95 mm	3"	43.0	30'000
ENXZ4	2"	2"	4.7	40'000					
ENWB4	2 1/2"	2"	10.0	40'000	HNXTC	2"	2"	9.5	50'000
FNXT4	2"	2"	6.0	40'000	HNXZC	2"	2"	9.5	50'000
FNXW4 / FNXZ4	2"	2"	6.0	40'000	LNUC	95 mm	3"		50'000
FNWB4 / FNWS4	2 1/2"	2"	12.0	40'000					
FNWT4	2 1/2"	2"	12.0	40'000	INVE	3"	3"		50'000
FNVB4	3"	2"	17.0	35'000	LNVE	3"	3"		50'000
HNVC4 / HNVT4	3"	3"	19.0	35'000	LNVE	3"	3"		50'000
File: Excel/Revisionstabelle Tauchpumpen					Drawn by / Bearb. Dat. Vis.: 03.08.10 HPH/mf Approved by / Gepr. Dat. Vis.: 03.08.10 mf				
					No. 10-TU 7621/1				

Motor Typ	motor-seitige Dichtung	pump-seitige Dichtung	Dicht. Öl Lit.	Nach-schmier-frist Std.
Motor type	motor-side seal	pump-side seal	seal oil lit.	hours between regreasing
B03NR02	25 mm	20 mm	0.2	25'000
B03NS02	25 mm	20 mm	0.2	25'000
B03NL02	25 mm	20 mm	0.2	25'000
B03NER2	25 mm	20 mm	0.2	25'000
B03NM02	25 mm	20 mm	0.2	25'000
B03NTR2	25 mm	20 mm	0.2	25'000
B03NH02	25 mm	20 mm	0.2	25'000
DN002X2	25 mm	20 mm	0.25	25'000
DN002X4	25 mm	20 mm	0.25	45'000
DN003X2	25 mm	20 mm	0.25	25'000
DN003X4	25 mm	20 mm	0.25	45'000
DN004X2	1 1/8"	1 1/8"	0.2	25'000
DN004X4	1 1/8"	1 1/8"	0.2	45'000
DN007X2	1 1/8"	1 1/8"	2.0	25'000
DN007X4	1 1/8"	1 1/8"	2.0	25'000
DN011X2	1 1/2"	1 1/8"		25'000
EN011X4	1 1/2"	1 1/2"	3.6	45'000
EN014X2	1 1/2"	1 1/8"	4.0	25'000
EN014x4	1 1/2"	1 1/2"	4.0	45'000
EN020X2	2"	1 1/2"	4.0	25'000
EN020X4	2"	1 1/2"	4.0	45'000
FN020X4	2"	1 1/2"	6.5	45'000
FN020X6	2"	1 1/2"	6.5	45'000
HN020X6	2"	2"	6.5	45'000
EN030X2	2"	1 1/2"	6.5	25'000
FN030X4	2"	2"	11.0	45'000
HN030X6	2"	2"	13.0	45'000
HN030X8	2"	2"	12.0	45'000
FN050X4	3"	3"	18.5	35'000
HN050X4	3"	3"		35'000
HN090X4	3"	3"	21.0	35'000
HN090X6	3"	3"	21.0	45'000
HN090L6	3"	3"	21.0	45'000
HN090X8	3"	3"		45'000

No. 10-TU 7621/2

					REVISIONSTABELLE UEBERFLUTBARE PUMPEN OVERHAUL CHART IMMERSIBLE PUMPS				
Motor Typ	motor- seitige Dichtung	pump- seitige Dichtung	Dicht. Öl Lit.	Nach- schmier- frist Std.	Motor Typ	motor- seitige Dichtung	pump- seitige Dichtung	Dicht. Öl Lit.	Nach- schmier- frist Std.
Motor type	motor- side seal	pump- side seal	seal oil lit.	hours between regreasing	Motor type	motor- side seal	pump- side seal	seal oil lit.	hours between regreasing
BKBA2	25 mm	20 mm	1.0	20'000	EEYT6	1 1/2"	1 1/8"	4.0	35'000
BKZR2 / BKZY2	25 mm	20 mm	1.0	30'000	DKXA6	1 1/2"	1 1/8"	3.7	50'000
BEZR2 / BEZY2	25 mm	20 mm	2.8	30'000	EKXA6 / EKXR7	1 1/2"	1 1/2"	3.8	50'000
CEZR2 / CEZY2	25 mm	20 mm	2.8	30'000	EEXA6 / EEXK6	1 1/2"	1 1/2"	7.0	50'000
CEYS2	1 1/2"	1 1/8"	3.5	30'000	EEXR6 / EEXR7	1 1/2"	1 1/2"	8.0	50'000
CEYT2	1 1/2"	1 1/8"	4.0	30'000	EEXZ6	2"	1 1/2"	9.5	50'000
DEYT2	1 1/2"	1 1/8"	3.8	20'000	FEXQ6	2"	2"	11.0	50'000
DEXB2	1 1/2"	1 1/8"	7.0	25'000	FEXT6 / FEXT7	2"	2"	11.0	50'000
DKXB2	1 1/2"	1 1/8"	3.6	25'000	FEXW6	2"	2"	12.0	50'000
DEXL2	1 1/2"	1 1/8"	7.0	25'000	FEXZ6 / FEXZ7	2"	2"	12.0	50'000
DEXQ2 / DEXT2	2"	1 1/2"	8.0	25'000	FEWA7	2 1/2"	2"	20.0	50'000
DEXW2 / DEXZ2	2"	1 1/2"	8.5	25'000	FEWB6 / FEWB7	2 1/2"	2"	20.0	50'000
DEWS2	2 1/2"	1 1/2"	19.0	15'000	FEWS6 / FEWS7	2 1/2"	2"	20.0	50'000
EEVT2	3"	2"	26.5	20'000	HEWB6	2 1/2"	2"	24.0	50'000
					HEWS6 / HEWS7	2 1/2"	2"	24.0	50'000
BKBA4 / BKZR4	25 mm	20 mm	1.0	30'000	HEVB6 / HEVB7	3"	3"	35.0	45'000
CKBA4	25 mm	20 mm	1.0	30'000	HEVS6 / HEVS7	3"	3"	35.0	45'000
CKZR4 / CKZY4	25 mm	20 mm	1.1	50'000	HEUC7 / HEUT7	95 mm	3"	59.0	35'000
CEZY4	25 mm	20 mm	2.8	50'000	IEVS6	3"	3"	42.0	45'000
CKYT4	1 1/2"	1 1/8"	1.5	40'000	IENT6	3"	3"	53.0	45'000
DKYT4	1 1/2"	1 1/8"	1.2	35'000	IEUC6 / IEUC7	95 mm	3"	68.0	35'000
DEYS4	1 1/2"	1 1/8"	3.0	35'000	IEUT6 / IEUT7	95 mm	3"	68.0	35'000
DEYT4	1 1/2"	1 1/8"	3.8	35'000	IETT6 / IETT7	100 mm	100 mm	99.0	35'000
DEXA4 / DEXA5	1 1/2"	1 1/8"	7.0	45'000	IETZ7	100 mm	100 mm	99.0	35'000
DEXK4	1 1/2"	1 1/8"	7.0	45'000	LETZ6	100 mm	100 mm	106.0	35'000
DKXA4	1 1/2"	1 1/8"	3.7	45'000	LESC6	120 mm	100 mm	119.0	35'000
EEXA4 / EEXA5	1 1/2"	1 1/2"	7.0	45'000	LEST6	120 mm	100 mm	125.0	35'000
EEXK4	1 1/2"	1 1/2"	7.0	45'000					
EEXO4	1 1/2"	1 1/2"	8.0	45'000	DKYT8	1 1/2"	1 1/8"	1.2	35'000
EEXR4 / EEXR5	1 1/2"	1 1/2"	8.0	45'000	DEYS8	1 1/2"	1 1/8"	3.0	35'000
EEXW4 / EEXZ4	2"	1 1/2"	9.5	40'000	EEYT8	1 1/2"	1 1/8"	4.0	35'000
EEXY4 / EEXY5	1 1/2"	1 1/2"	9.5	40'000	EEXR9	1 1/2"	1 1/2"	8.0	50'000
EEWB4 / EEWB5	2 1/2"	2"	17.0	40'000	EKXR8	1 1/2"	1 1/2"	3.8	50'000
EEWS4 / EEWS5	2 1/2"	2"	18.0	40'000	FEXQ8 / FEXT8	2"	2"	11.0	50'000
FEXT4	2"	2"	11.0	40'000	FEXZ8 / FEXZ9	2"	2"	12.0	50'000
FEXW4 / FEXZ4	2"	2"	12.0	40'000	HEWB8 / HEWB9	2 1/2"	2"	25.0	50'000
FEWB4 / FEWB5	2 1/2"	2"	21.0	40'000	HEWS8 / HEWS9	2 1/2"	2"	32.0	50'000
					HEVB8 / HEVB9	3"	3"	35.0	45'000
FEWS4 / FEWS5	2 1/2"	2"	23.0	40'000	HEVS9	3"	3"	35.0	45'000
FEVB4 / FEVB5	3"	2"	31.0	35'000	IEVS8	3"	3"	43.0	45'000
FEVS6	3"	2"	36.0	35'000	IENT8	3"	3"	53.0	45'000
FEVW4	3"	3"	31.0	35'000	IEUC8 / IEUC9	95 mm	3"	68.0	35'000
HEVC4 / HEVT4	3"	3"	35.0	35'000	IEUT8 / IEUT9	95 mm	3"	68.0	35'000
HEVS5	3"	3"	35.0	35'000	IETT9	100 mm	100 mm	99.0	35'000
HENT4	3"	3"	45.0	35'000	IETZ8	100 mm	100 mm	99.0	35'000
HEUC4 / HEUC5	95 mm	3"	59.0	20'000	LETT8	100 mm	100 mm	106.0	35'000
HEUT4 / HEUT5	95 mm	3"	59.0	20'000	LETZ8 / LETZ9	100 mm	100 mm	106.0	35'000
IEUT4	95 mm	3"	68.0	20'000	MEST8	120 mm	120 mm	140.0	50'000
IETT4 / IETT5	100 mm	100 mm	99.0	18'000					
IETZ4 / IETZ5	100 mm	100 mm	99.0	18'000	EEXRA	1 1/2"	1 1/2"	8.0	50'000
IESB4 / IESCA	120 mm	100 mm	109.0	18'000	FEXTA	2"	2"	11.0	50'000
IEST4	120 mm	100 mm	115.0	18'000	HEXTA / HEXZA	2"	2"	13.0	50'000
					IEVCA	3"	3"	47.0	50'000
DEYS6	1 1/2"	1 1/8"	3.0	35'000	IEVSA / IEVSB	3"	3"	47.0	50'000
DKYT6	1 1/2"	1 1/8"	1.2	35'000	LETTA / LETZA	100 mm	100 mm	106.0	40'000
EEYS6	1 1/2"	1 1/8"	3.0	35'000	MESCA	120 mm	120 mm	136.0	35'000
Datei: Excel/Revisionstabelle Ueberflutbare Pumpen					Drawn by / Bearb. Dat. Vis.: 03.08.10 HPH/mf Approved by / Gepr. Dat. Vis.: 03.08.10 mf				
					No. 10-TU 7622/1				

					REVISIONSTABELLE UEBERFLUTBARE PUMPEN OVERHAUL CHART IMMERSIBLE PUMPS				
Motor Typ	motor-seitige Dichtung	pump-seitige Dichtung	Dicht. Öl Lit.	Nach-schmier-frist Std.	Motor Typ	motor-seitige Dichtung	pump-seitige Dichtung	Dicht. Öl Lit.	Nach-schmier-frist Std.
Motor type	motor-side seal	pump-side seal	seal oil lit.	hours between regreasing	Motor type	motor-side seal	pump-side seal	seal oil lit.	hours between regreasing
B03UR02	25 mm	20 mm	0.25	25'000	HE130X4	3"	3"	44.0	35'000
					HE130X6	3"	3"	44.0	45'000
DK002X2	25 mm	20 mm	0.25	25'000	IE130X6	3"	3"	52.0	45'000
DK002X4	25 mm	20 mm	0.25	45'000	IE130X8	3"	3"	52.0	45'000
					LE130X8	3"	3"	52.0	45'000
DK003X2	25 mm	20 mm	0.25	25'000					
DK003X4	25 mm	20 mm	0.25	45'000	IE190X6	100 mm	100 mm		35'000
DK004X2	1 1/8"	1 1/8"	0.2	25'000					
DK004X4	1 1/8"	1 1/8"	0.2	45'000					
DK006X2	1 1/8"	1 1/8"	2.0	25'000					
DK006X4	1 1/8"	1 1/8"	2.0	45'000					
DK007X2	1 1/8"	1 1/8"	2.0	25'000					
DK007X4	1 1/8"	1 1/8"	2.0	45'000					
DE011X2	1 1/2"	1 1/8"	5.7	25'000					
DE011X4	1 1/2"	1 1/8"	5.7	45'000					
EE011X2	1 1/2"	1 1/2"	6.7	45'000					
EE011X4	1 1/2"	1 1/2"	6.7	45'000					
EK014X2	1 1/2"	1 1/8"	4.0	25'000					
EK014x4	1 1/2"	1 1/2"	4.0	45'000					
EE020X2	2"	1 1/2"	11.5	25'000					
EE020X4	2"	1 1/2"	10.0	45'000					
FE020X4	2"	2"	12.0	45'000					
FE020X6	2"	2"	12.0	45'000					
EE030X2	2"	1 1/2"	18.0	25'000					
FE030X4	2"	2"	22.0	45'000					
FE030X6	2"	2"	22.0	45'000					
HE030X6	2"	2"	25.0	45'000					
HE030X8	2"	2"	25.0	45'000					
EE050X2	3"	2"	41.0	25'000					
FE050X4	3"	2"	47.0	35'000					
HE050X4	3"	3"		35'000					
HE050X6	3"	3"		45'000					
HE050X8	3"	3"		45'000					
EE090X2	3"	2"	41.0	20'000					
FE090X4	3"	3"	41.0	35'000					
HE090X4	3"	3"	44.0	35'000					
HE090X6	3"	3"	44.0	45'000					
IE090X8	3"	3"	50.0	45'000					
File: Excel/Revisionstabelle Ueberflutbare Pumpen					Drawn by / Bearb. Dat. Vis.: 03.08.10 HPH/mf Approved by / Gepr. Dat. Vis.: 03.08.10 mf				
					No. 10-TU 7622/2				

Flow Test Results - SP25 - Scott Street Norman Park - Pump 1							
\SOURCE=Measuring data set from C:\Users\Alan\Documents\My Dropbox\FLOWSERVICES\Demo\RE-PUMP\Ferol Street\FLOW Test for QUU 10-10-13.FLX[16]							
\START :	10/10/2013 11:11						
\PARAMS							
Par.Record :	Par.Record 02						
Meas. Point No. :	A:SP025P01						
Pipe :							
Outer Diameter :	259.0 mm						
Wall Thickness :	5.0 mm						
Roughness :	2.0 mm						
Pipe Material :	Carbon Steel						
c-Material :	3230.0 m/s						
Lining :	Asbestos Cement						
c-Material :	2200.0 m/s						
Liner Thickness :	10.0 mm						
Medium :	Water						
c-Medium MIN :	1482.0 m/s						
c-Medium MAX :	1482.0 m/s						
Kinem.Viscosity :	0.99 mm ² /s						
Density :	1.00 g/cm ³						
Medium Temperat. :	20 C						
Fluid pressure :	1.00 bar						
Transducer Type :	CDM1NZ732358						
Sound Path :	2 NUM						
Transd. Distance :	144.5 mm						
Damping :	10 s						
Storage Rate :	00:00:01 SAMPLES						
Profile corr. :	ON						
Physic. Quant. :	Volume flow						
Unit Of Measure :	[l/s]/[l]						
Numb.Of Meas.Val. :	150						
\DATA							
*DATE_TIME	VELOC	MEASURE					
\#	[m/s]	[l/s]					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					

Flow Test Results - SP25 - Scott Street Norman Park - Pump 1							
\SOURCE=Measuring data set from C:\Users\Alan\Documents\My Dropbox\FLOWSERVICES\Demo\RE-PUMP\Ferol Street\FLOW Test for QUU 10-10-13.FLX[16]							
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0	0					
10/10/2013 11:11	0.1	4.12					
10/10/2013 11:11	0.173	7.13					
10/10/2013 11:11	0.247	10.17					
10/10/2013 11:11	0.322	13.26					
10/10/2013 11:11	0.452	18.62					
10/10/2013 11:11	0.58	23.89					
10/10/2013 11:11	0.716	29.49					
10/10/2013 11:11	0.861	35.46					
10/10/2013 11:11	0.959	39.5					
10/10/2013 11:11	1.159	47.74					
10/10/2013 11:11	1.212	49.92					
10/10/2013 11:11	1.372	56.51					
10/10/2013 11:11	1.583	65.2					
10/10/2013 11:11	1.635	67.34					
10/10/2013 11:11	1.747	71.95					
10/10/2013 11:11	1.761	72.53					
10/10/2013 11:11	1.772	72.98					
10/10/2013 11:11	1.781	73.35					
10/10/2013 11:11	1.791	73.77					
10/10/2013 11:11	1.799	74.1					
10/10/2013 11:12	1.803	74.26					
10/10/2013 11:12	1.818	74.88					
10/10/2013 11:12	1.821	75					
10/10/2013 11:12	1.83	75.37					
10/10/2013 11:12	1.839	75.74					
10/10/2013 11:12	1.84	75.78					
10/10/2013 11:12	1.846	76.03					
10/10/2013 11:12	1.848	76.11					
10/10/2013 11:12	1.846	76.03					
10/10/2013 11:12	1.842	75.87					
10/10/2013 11:12	1.845	75.99					
10/10/2013 11:12	1.843	75.91					
10/10/2013 11:12	1.844	75.95					
10/10/2013 11:12	1.847	76.07					
10/10/2013 11:12	1.847	76.07					
10/10/2013 11:12	1.844	75.95					

Flow Test Results - SP25 - Scott Street Norman Park - Pump 1							
\SOURCE=Measuring data set from C:\Users\Alan\Documents\My Dropbox\FLOWSERVICES\Demo\RE-PUMP\Ferol Street\FLOW Test for QUU 10-10-13.FLX[16]							
10/10/2013 11:12	1.841	75.83					
10/10/2013 11:12	1.844	75.95					
10/10/2013 11:12	1.844	75.95					
10/10/2013 11:12	1.846	76.03					
10/10/2013 11:12	1.844	75.95					
10/10/2013 11:12	1.842	75.87					
10/10/2013 11:12	1.84	75.78					
10/10/2013 11:12	1.838	75.7					
10/10/2013 11:12	1.84	75.78					
10/10/2013 11:12	1.842	75.87					
10/10/2013 11:12	1.842	75.87					
10/10/2013 11:12	1.838	75.7					
10/10/2013 11:12	1.837	75.66					
10/10/2013 11:12	1.84	75.78					
10/10/2013 11:12	1.845	75.99					
10/10/2013 11:12	1.847	76.07					
10/10/2013 11:12	1.848	76.11					
10/10/2013 11:12	1.85	76.2					
10/10/2013 11:12	1.852	76.28					
10/10/2013 11:12	1.852	76.28					
10/10/2013 11:12	1.85	76.2					
10/10/2013 11:12	1.846	76.03					
10/10/2013 11:12	1.844	75.95					
10/10/2013 11:12	1.84	75.78					
10/10/2013 11:12	1.839	75.74					
10/10/2013 11:12	1.832	75.45					
10/10/2013 11:12	1.823	75.08					
10/10/2013 11:12	1.792	73.81					
10/10/2013 11:12	1.755	72.28					
10/10/2013 11:12	1.713	70.55					
10/10/2013 11:12	1.596	65.73					
10/10/2013 11:12	1.496	61.62					
10/10/2013 11:12	1.314	54.12					
10/10/2013 11:12	1.115	45.92					
10/10/2013 11:12	0.917	37.77					
10/10/2013 11:12	0.786	32.37					
10/10/2013 11:12	0.527	21.71					
10/10/2013 11:12	0.397	16.35					
10/10/2013 11:12	0.266	10.96					
10/10/2013 11:12	0.177	7.29					
10/10/2013 11:12	0.169	6.96					
10/10/2013 11:12	0.145	5.97					
10/10/2013 11:12	0.115	4.74					
10/10/2013 11:12	0.1	4.12					
10/10/2013 11:13	0.086	3.54					
10/10/2013 11:13	0.056	2.31					
10/10/2013 11:13	0.04	1.65					

Flow Test Results - SP25 - Scott Street Norman Park - Pump 1							
\SOURCE=Measuring data set from C:\Users\Alan\Documents\My Dropbox\FLOWSERVICES\Demo\RE-PUMP\Ferol Street\FLow Test for QUU 10-10-13.FLX[16]							
10/10/2013 11:13	0	0					
10/10/2013 11:13	0	0					
10/10/2013 11:13	0	0					
10/10/2013 11:13	0	0					
10/10/2013 11:13	0	0					
10/10/2013 11:13	0	0					
\END							

Flow Test Results - SP25 - Scott Street Norman Park - Pump 2							
\SOURCE=Measuring data set from C:\Users\Alan\Documents\My Dropbox\FLOWSERVICES\Demo\RE-PUMP\Ferol Street\FLOW Test for QUU 10-10-13.FLX[15]							
\START :	10/10/2013 11:05						
\PARAMS							
Par.Record :	Par.Record 02						
Meas. Point No. :	A:SP025P02						
Pipe :							
Outer Diameter :	259.0 mm						
Wall Thickness :	5.0 mm						
Roughness :	2.0 mm						
Pipe Material :	Carbon Steel						
c-Material :	3230.0 m/s						
Lining :	Asbestos Cement						
c-Material :	2200.0 m/s						
Liner Thickness :	10.0 mm						
Medium :	Water						
c-Medium MIN :	1482.0 m/s						
c-Medium MAX :	1482.0 m/s						
Kinem.Viscosity :	0.99 mm ² /s						
Density :	1.00 g/cm ³						
Medium Temperat. :	20 C						
Fluid pressure :	1.00 bar						
Transducer Type :	CDM1NZ732358						
Sound Path :	2 NUM						
Transd. Distance :	144.5 mm						
Damping :	10 s						
Storage Rate :	00:00:01 SAMPLES						
Profile corr. :	ON						
Physic. Quant. :	Volume flow						
Unit Of Measure :	[l/s]/[l]						
Numb.Of Meas.Val. :	109						
\DATA							
*DATE_TIME	VELOC	MEASURE					
\#	[m/s]	[l/s]					
10/10/2013 11:05	0	0					
10/10/2013 11:05	0	0					
10/10/2013 11:05	0	0					
10/10/2013 11:05	0	0					
10/10/2013 11:05	0	0					
10/10/2013 11:05	0.054	2.22					
10/10/2013 11:05	0.054	2.22					
10/10/2013 11:05	0.171	7.04					
10/10/2013 11:05	0.29	11.94					
10/10/2013 11:06	0.418	17.22					
10/10/2013 11:06	0.51	21.01					
10/10/2013 11:06	0.7	28.83					
10/10/2013 11:06	0.803	33.07					

Flow Test Results - SP25 - Scott Street Norman Park - Pump 2							
\SOURCE=Measuring data set from C:\Users\Alan\Documents\My Dropbox\FLOWSERVICES\Demo\RE-PUMP\Ferol Street\FLOW Test for QUU 10-10-13.FLX[15]							
10/10/2013 11:06	0.914	37.64					
10/10/2013 11:06	1.138	46.87					
10/10/2013 11:06	1.301	53.58					
10/10/2013 11:06	1.356	55.85					
10/10/2013 11:06	1.52	62.6					
10/10/2013 11:06	1.634	67.3					
10/10/2013 11:06	1.643	67.67					
10/10/2013 11:06	1.669	68.74					
10/10/2013 11:06	1.678	69.11					
10/10/2013 11:06	1.687	69.48					
10/10/2013 11:06	1.701	70.06					
10/10/2013 11:06	1.713	70.55					
10/10/2013 11:06	1.726	71.09					
10/10/2013 11:06	1.742	71.75					
10/10/2013 11:06	1.75	72.08					
10/10/2013 11:06	1.757	72.37					
10/10/2013 11:06	1.756	72.32					
10/10/2013 11:06	1.758	72.41					
10/10/2013 11:06	1.753	72.2					
10/10/2013 11:06	1.746	71.91					
10/10/2013 11:06	1.74	71.67					
10/10/2013 11:06	1.739	71.62					
10/10/2013 11:06	1.738	71.58					
10/10/2013 11:06	1.734	71.42					
10/10/2013 11:06	1.734	71.42					
10/10/2013 11:06	1.73	71.25					
10/10/2013 11:06	1.728	71.17					
10/10/2013 11:06	1.731	71.29					
10/10/2013 11:06	1.737	71.54					
10/10/2013 11:06	1.743	71.79					
10/10/2013 11:06	1.746	71.91					
10/10/2013 11:06	1.754	72.24					
10/10/2013 11:06	1.755	72.28					
10/10/2013 11:06	1.762	72.57					
10/10/2013 11:06	1.767	72.78					
10/10/2013 11:06	1.781	73.35					
10/10/2013 11:06	1.783	73.44					
10/10/2013 11:06	1.786	73.56					
10/10/2013 11:06	1.789	73.68					
10/10/2013 11:06	1.786	73.56					
10/10/2013 11:06	1.786	73.56					
10/10/2013 11:06	1.792	73.81					
10/10/2013 11:06	1.783	73.44					
10/10/2013 11:06	1.778	73.23					
10/10/2013 11:06	1.734	71.42					
10/10/2013 11:06	1.711	70.47					
10/10/2013 11:06	1.609	66.27					



ZENTRIFUGALPUMPEN
CH – 8213 NEUNKIRCH SH Schweiz
www.hidrostal.ch

Hidrostal AG
Gigering 27CH-8213 Neunkirch
Telefon 052 / 687 06 87
Telefax 052 / 681 20 84
Web: www.hidrostal.ch

Hydrostatic Test – **C E R T I F I C A T E**

Hidrostal Order No.:	12010962
Customer's Order No.:	4500574847
Customer:	Weir Minerals Australia Ltd
Pump-Type:	F06G-EMN3R+FE030X4-XVEK1+NC1B4V-15
Serial-Number:	217057 + 217058
Test Pressure:	6 bar
Duration of Test:	30 minutes

**WE HAVE PRESSURE TESTED THE ABOVE MENTIONED PUMP
HYDRAULIC TO THE PRESSURE AND FOR THE DURATION AS
INDICATED ABOVE. WE CONFIRM THAT THE HYDRAULIC WITHSTOOD
THE PRESSURE FOR THE DURATION OF THE TEST PERIOD.**

Date of Test : 05.03.2013
Issued : 07.03.2013
From : A.Schwarz



Pump test record for Submersible/Immersible Pump with Venturi flow measurement

Date: 07. Mrz 13

Test in accordance with ISO 9906 Grade 2 Annex A

General Data				Drive Data				Environment				Constants for Test			
Test No.	217057	P nominal	37	kW	Test Medium	Water	Z1	0.60	m						
Order No.	12010962	n	1463	rpm	Atm. Pressure	951	Z2	0.67	m						
Client	Weir Minerals Australia Ltd	P1 max.	41	kW	Density	998.5418	D1 Suction Pipe	0.25	m						
Client Ref. No.	4500574847	Tension	400	Volts	Vapour Pressure	0.21	D2 Delivery pipe	0.15	m						
Fab No.	217057	Cycles	50		Viscosity	1.054725	Venturi Size	200							
Pump Code	F06G-EMN3R+FE030X4-XVEK1+NC1B4V-15	Current	67	Amps	Medium Temp	18	Coefficient of Discharge	0.9924							
Project		Cos Phi	0.89												
Item No.		n Motor	90.0	%											
Measured Data															
Passing Frequency	Venturi	H1 (Pamb)	H2 (Pamb)	Power P1	Current	n	Q	Velocity Head inlet	outlet	H	Power P1	η Pump	Remarks		
Hz	mb	bar	bar	kW	Amps	rpm	l/s	m	m	m	kW	%			
24.73	232.00	-0.003	2.560	27.34	46.30	1484	87.92	0.10	0.75	28.10	27.34	76.05			
24.73	263.00	-0.005	2.450	27.69	46.67	1484	72.32	0.11	0.85	27.08	27.69	77.06			
24.73	329.00	-0.009	2.230	28.06	47.16	1484	80.89	0.14	1.07	25.06	28.06	78.71			
24.75	359.00	-0.009	2.140	28.19	47.30	1485	84.49	0.15	1.17	24.23	28.19	79.11			
						</									

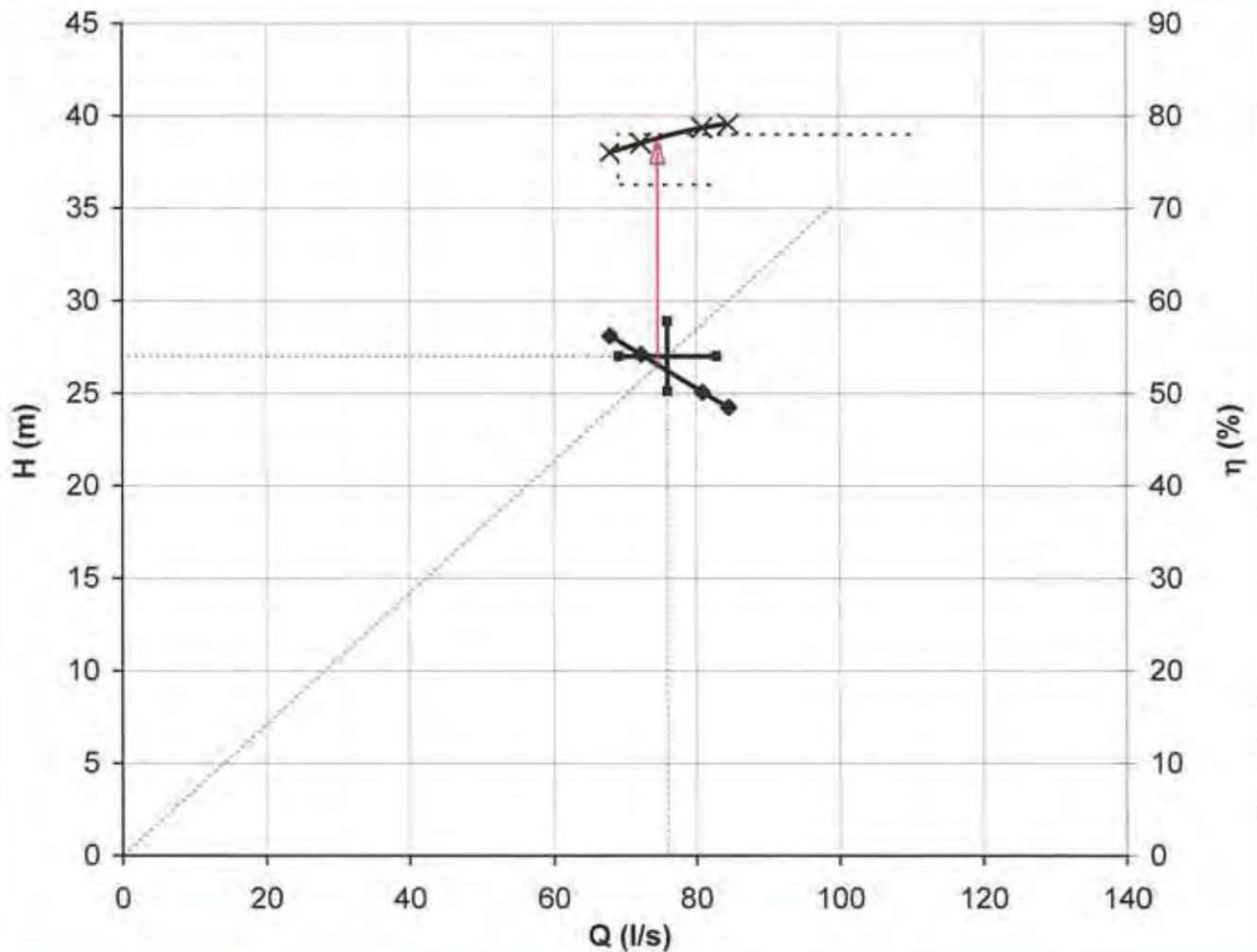


Verification of Guarantee

Test in accordance with ISO 9906 Grade 2 Annex A

Client	Weir Minerals Australia Ltd	Date:	07. Mrz 13
Pump Code:	F06G-EMN3R+FE030X4-XVEK1+NC1B4V-15	Order No.:	12010962
Fab. No.:	217057	Client Ref:	4500574847
Project		Item No.	

Guarantee duty points		Tolerance Factors	
Volumetric flow rate: Q_G	76.0 l/s	t_Q	9.0 %
Pump total head: H_G	27.0 m	t_H	7.0 %
Pump Efficiency η_G	78.0 %	t_η	-7.0 %



Efficiency Line Intersection			The pump efficiency is derived from the measured QH curve where it is intersected by a straight line passing through the guaranty point and the origin of the of the Q & H axis and where a vertical line from this intersection meets the Q η curve.
Q	74.68	l/s	
H	26.53	m	
η	77.57	%	

Test Result Report

	Max Allowable Deviations from GP	Actual Deviations from GP	Comments
ΔQ	6.84	3.32	Intersects curve
ΔH	1.89	0.78	Intersects curve
$\Delta \eta$	-5.46	-0.43	Within Tolerance

Test Result: Test Passed

Notes:	As at least one of the lines of the tolerance cross intersects with the tested pump QH curve and the efficiency is within tolerance, the guaranty has been verified.
--------	--

Test in accordance with ISO 9906 Grade 2 Annex A

Date: 07. Mrz 13

[illegible]

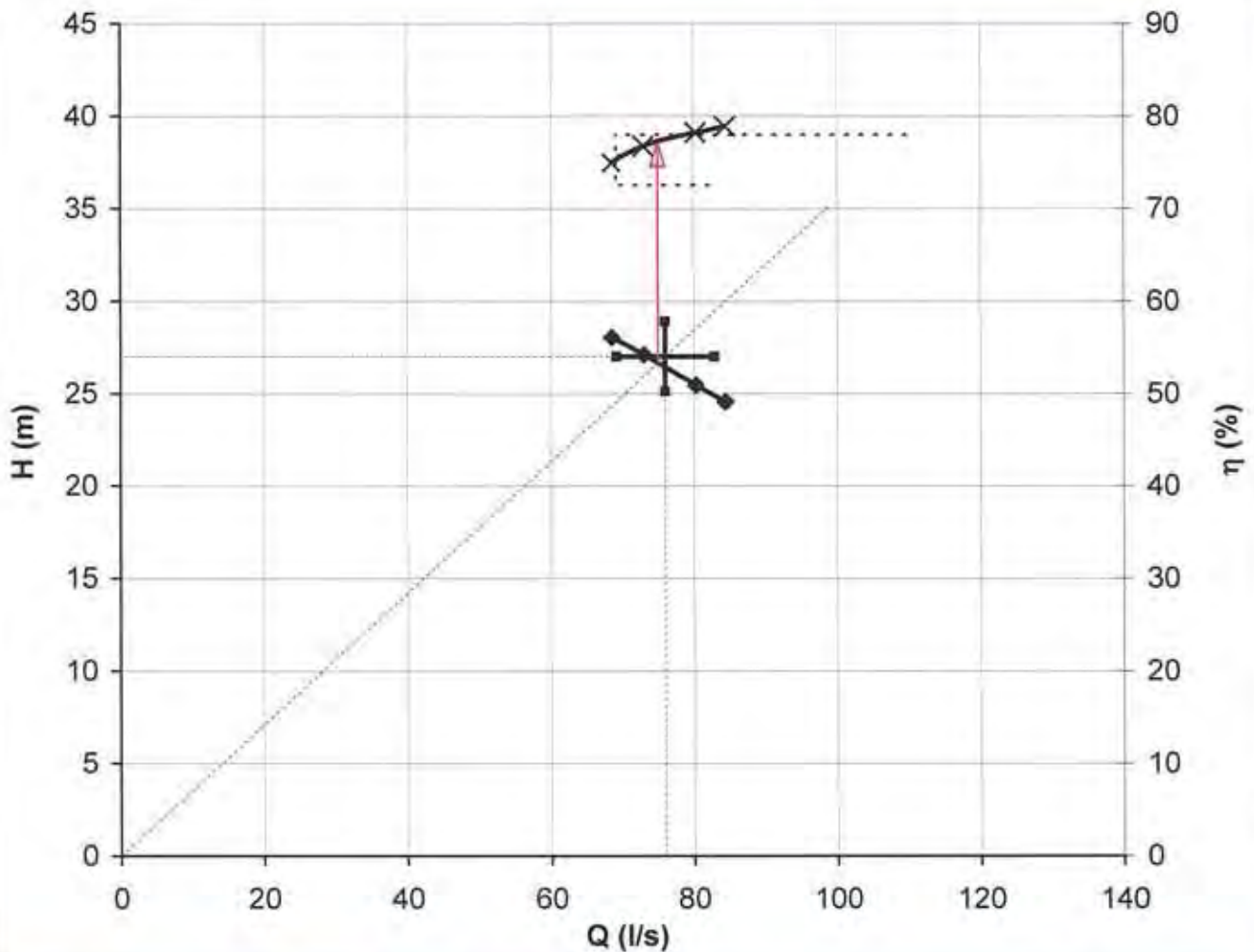


Verification of Guarantee

Test in accordance with ISO 9906 Grade 2 Annex A

Client	Weir Minerals Australia Ltd	Date:	07. Mrz 13
Pump Code:	F06G-EMN3R+FE030X4-XVEK1+NC1B4V-15	Order No.:	12010962
Fab. No.:	217058	Client Ref:	4500574847
Project		Item No.	

Guarantee duty points		Tolerance Factors	
Volumetric flow rate: Q_G	76.0 l/s	t_Q	9.0 %
Pump total head: H_G	27.0 m	t_H	7.0 %
Pump Efficiency η_G	78.0 %	t_η	-7.0 %



Efficiency Line Intersection			The pump efficiency is derived from the measured QH curve where it is intersected by a straight line passing through the guaranty point and the origin of the of the Q & H axis and where a vertical line from this intersection meets the Q η curve.
Q	75.02	l/s	
H	26.65	m	
η	77.27	%	

Test Result Report

	Max Allowable Deviations from GP	Actual Deviations from GP	Comments
ΔQ	6.84	2.55	Intersects curve
ΔH	1.89	0.57	Intersects curve
Δη	-5.46	-0.73	Within Tolerance

Test Result: Test Passed

Notes:	As at least one of the lines of the tolerance cross intersects with the tested pump QH curve and the efficiency is within tolerance, the guaranty has been verified.
--------	--



Job No	3B0001	Contract / PO Number	
Job Name	RePump - Scott St Norman Park SPS		
ITP Description	Install oil in water device for pump 2		
Component	WATER IN OIL RELAY	Item / Tag Number / Panel No	
Drawing Reference	486/5/7-0049-003	Client Document Number	
Drawing Reference			
Technical Ref			
Technical Ref			

[illegible]

Testing Officer Comments & Notes:

Tested By: (Authorised Person)		Witnessed By: (Client if applicable)	
(Name)	<u>Tim Bowman</u>	(Name)	
(Sign)	<u>[Signature]</u>	(Sign)	
Date	<u>27/8/13</u>	Date	<u>/ /</u>

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-500)

Page 138 of 179

Lend Lease's infrastructure services business**SF-606B - Daily Pre-start Briefing and Hazard Assessment**

600 – Safety Management



Project Name: <i>Repump - WATER IN OIL</i>		Project No.	
Work location/Section: <i>SCOTT ST NORMAN</i>		Work Description:	
Supervisors Name: <i>PAUL</i>		Day: <i>Tue</i>	Date: <i>27/8/13</i>
Planned Daily Activities Reviewed:		Applicable SWMS Numbers	SWMS Reviewed Y / N
<i>INSTALL & WIRE WATER IN OIL SENSORS</i>			<i>Y</i> / <i>N</i>
		Client Rep:	Contact No:
Comments			
Permit to Work (for activity i.e. hot work)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<i>Repump ON SITE: BACK</i>
Confined Space (Observer/gas test)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Isolations in place (Tags and Locks)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<i>isolation of pump required (1 as active)</i>
Lifting Equipment Inspection (Check in good condition and tag is current)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Scaffolding (Scaff-tag fitted)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Work Platforms / Boom lifts (Check log books)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Use harness if required
PPE Requirements (Site & special needs)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Eye Protection (Full face shield when grinding)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Double eye protection when cutting / grinding
Clothing (High visibility)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Overhead Power lines	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Underground Services	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Traffic & Traffic Control Plans (approved and deployed by suitably qualified personnel)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Electrical leads (Tagged & fit for use)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
RCD's being used (Check RCD is operational and in test date)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Ladders (Fit for use)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	Check ladder before use. Use correct ladder for job
Emergency Response Phone Number	<input checked="" type="radio"/> Yes	<input type="radio"/> No	000 Mobile 112
Harness & Lanyard (Fit for use & current tag)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Fire Extinguishers (Available & tested)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Barricades	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Housekeeping	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Keep work area clear of obstructions at all times
Incident Reporting (Report All Incidents)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Report all hazards or near misses
Other Hazards Discussed / Employee Feedback:			
Attendee Name: (Inc. subcontractors)	Signature:	Attendee Name: (Inc. subcontractors)	Signature:
<i>Tim Bowman</i>	<i>T Bowman</i>		

Pre-Commissioning / Commissioning Checklist - Sewer Pump Stations

Re-Pump Job No **P1023**

Customer Reference No **C1011-045 DU052**

Client - **QU**

HIDROSTAL F06G-EMN3R + FE030X4-XVEK1 + NC1B4V + BO-200X250F6KH

Commissioning of Pumps and Pipework

Station name: **SP25 SCOTT STREET NORMAN PARK**
 Station number: **SP25 PUMP1 SN 217057**
 Name of authorised person commissioning works: **MATTHEW WEST**
 People present: **PETER OZOLINS & SCOTT TORRENS**

	Yes	No	Date	Initial
Pre-Start Check				
Confirm pump hold down bolts are tight	<input checked="" type="checkbox"/>			
Confirm grout is dry	<input checked="" type="checkbox"/>			
Confirm pipework bolts are torqued securely	<input checked="" type="checkbox"/>			
Open suction and discharge valves (clockwise closing) confirm there are no leaks	<input checked="" type="checkbox"/>			
Bleed air from the pump	<input checked="" type="checkbox"/>			
Confirm well has enough fluid for pumping	<input checked="" type="checkbox"/>			

Electrical				
Confirm overloads are set at motor FLC	<input checked="" type="checkbox"/>			
Mega the motor prior to running	<input checked="" type="checkbox"/>			
Confirm wiring connections from motor cables are tight	<input checked="" type="checkbox"/>			
Confirm sensor wiring is connected	<input checked="" type="checkbox"/>			
Confirm motor power is on	<input checked="" type="checkbox"/>			
Electrical Start Up				
Confirm pump rotation is correct	<input checked="" type="checkbox"/>			
Check Amps during test run	<input checked="" type="checkbox"/>			

THERMISTERS ONLY

47 AMPS

In Operation				
Confirm there is no excessive vibration	<input checked="" type="checkbox"/>			
Confirm there is no excessive noise	<input checked="" type="checkbox"/>			
Confirm there are no leaks	<input checked="" type="checkbox"/>			
Confirm pump flow rate	<input checked="" type="checkbox"/>			

Pre-Commissioning / Commissioning Checklist - Sewer Pump Stations

Re-Pump Job No P1023

Customer Reference No C1011-045 QUV052

Client - QUV

HIDROSTAL F06G-EMN3R + FE030X4-XVER1 + NC164V-15 + BO-200X250F6KH

Commissioning of Pumps and Pipework

Station name: SP25 SCOTT STREET NORMAN PARK
 Station number: SP25 PUMP 2 S/N 217058
 Name of authorised person commissioning works: MATTHEW WEST
 People present: PETER OZOLINS & SCOTT TORRENS

Pre-Start Check	Yes	No	Date	Initial
Confirm pump hold down bolts are tight	<input checked="" type="checkbox"/>			
Confirm grout is dry	<input checked="" type="checkbox"/>			
Confirm pipework bolts are torqued securely	<input checked="" type="checkbox"/>			
Open suction and discharge valves (clockwise closing) confirm there are no leaks	<input checked="" type="checkbox"/>			
Bleed air from the pump	<input checked="" type="checkbox"/>			
Confirm well has enough fluid for pumping				

Electrical	1463 RPM	37 KW
Confirm overloads are set at motor FLC	<input checked="" type="checkbox"/>	
Mega the motor prior to running	<input checked="" type="checkbox"/>	
Confirm wiring connections from motor cables are tight	<input checked="" type="checkbox"/>	
Confirm sensor wiring is connected	<input checked="" type="checkbox"/>	
Confirm motor power is on	<input checked="" type="checkbox"/>	
Electrical Start Up		
Confirm pump rotation is correct	<input checked="" type="checkbox"/>	
Check Amps during test run	<input checked="" type="checkbox"/>	

THERMISTORS ONLY

47 AMPS

In Operation		
Confirm there is no excessive vibration	<input checked="" type="checkbox"/>	
Confirm there is no excessive noise	<input checked="" type="checkbox"/>	
Confirm there are no leaks	<input checked="" type="checkbox"/>	
Confirm pump flow rate	<input checked="" type="checkbox"/>	

SP025 **SEWAGE PUMPING STATION**

SCOTT STREET **NORMAN PARK**

MOISTURE IN OIL **PUMP 1**

ELECTRICAL COMMISSIONING PLAN

In Attendance

Name	Role During Commissioning	Company



SP025 Scott Street SPS - Moisture in Oil - Commissioning Plan Pump 1 V0.1

Page 2 of 4

1 INTRODUCTION

This work involves the addition of Moisture in Oil protection relay to the pump control circuit for each sewage pump. While each pump circuit is modified the other pump will be the duty pump.

1.1 SEQUENCE OF WORKS

The sequence of works shall be:

1. Site establishment
2. Make contact with appointed QUU Control Systems Engineer
3. Moisture in Oil relay installation
4. Site commissioning
5. Post commissioning

1.2 MAINTENANCE CHECK OF EXISTING INSTALLATION

Before the works on site can commence, QUU staff will ensure that both pumps are fully operational and will perform a thorough maintenance inspection of the site.

1.3 PRE COMMISSIONING CHECKLIST

The following checklist is to be completed and signed by the electrical contractor.

1.3.1 Site Establishment

Call the QUU Control Room Operator (CRO) and inform them that you are on site. Record the CRO's Name and Officer Code and record the time of the call. Advise CRO that you are performing a pump shutdown. Give the operator your contact name and number.	Name: _____ CRO: _____ Time: _____
Review current SWMS and complete SF-606B Daily Pre-Start Briefing and Hazard assessment	OK <input checked="" type="checkbox"/>

1.3.2 Pump Station operational checks

Contractor Task	Checked
These are checks that will ensure the pump station is fully operational and that no delays will be incurred due to any pump station problem outside of the contract.	OK <input checked="" type="checkbox"/>
Ensure that the station is fully functional (either pump can run)	OK <input checked="" type="checkbox"/>
Call and confirm with QUU Control System Engineer that the code has been changed to accept the new input DI-07 Moisture in Oil input.	OK <input checked="" type="checkbox"/>

Electrical Contractor's Supervisor

Name: Sean O'L Date:

Signature: [Signature]

QUU Commissioning Manager

Name: Date:

Signature:



SP025 Scott Street SPS - Moisture in Oil - Commissioning Plan Pump 1 V0.1

Page 3 of 4

2 INSTALLATION OF MOISTURE IN OIL PROCEEDURE

The following sequence of change over works is the order in which they must be followed. After each phase has been completed, the commissioning manager will record the results and instruct the commissioning team to commence work on the next phase.

2.1.1 Pump 1


Contractor Task	Outcome
OPEN, LOCK AND TAG Pump 1 MCCB (Q4) (As per DWG No:486/5/7-0049-002 Amd:C)	 Pump 1 OFF <input checked="" type="checkbox"/>
Test for Dead at LOAD side of Pump 1 MCCB (Q4).	Q4 DEAD <input checked="" type="checkbox"/>
It is now safe to start work.	OK <input checked="" type="checkbox"/>
THIS IS A HOLD POINT. Do not proceed until PUMP 2 is confirmed to be fully operational	Signature  TIME : _____

2.1.2 Water in Oil relay wiring

Contractor Task	Outcome
Install new relay and wiring as per DWG No:486/5/7-0049-002 Amd:C	OK <input checked="" type="checkbox"/>
Perform mandatory AS3000 tests.	OK <input checked="" type="checkbox"/>
Complete Lend Lease ITPs.	OK <input checked="" type="checkbox"/>

3 PUMP 1 (MOISTURE IN OIL) COMMISSIONING

3.1.1 Re-energise Pump 1

Contractor Task	Outcome
CLOSE Pump 1 MCCB (Q4)	 QM ON <input checked="" type="checkbox"/>
Test operation of moisture in oil relay, confirm input on PLC illuminates.	OK <input checked="" type="checkbox"/>
Call the QUU Control Room Operator (CRO) and inform him that you have re-established power to Pump 1 and advise that a new moisture in oil fault is now available.	OK <input checked="" type="checkbox"/>

Electrical Contractor's Supervisor

Name:  Date:Signature: 

QUU Commissioning Manager

Name: Date:

Signature:

SP025 Scott Street SPS - Moisture in Oil - Commissioning Plan Pump 1 V0.1

Page 4 of 4

3.1.2 Complete commissioning

Contractor Task	Outcome
Complete Lend Lease electrical ITP documentation.	OK <input checked="" type="checkbox"/>

4 POST COMMISSIONING**4.1.1 Post Commissioning Activities**

Contractor Task	Outcome
Ensure all locks & tags have been removed from pump 1.	OK <input checked="" type="checkbox"/>
Call the QUU Control Room Operator (CRO) and inform him that you are leaving site and all equipment is operational.	Name: _____
Follow directions in SWMS and ensure all rubbish is removed from site.	CRO: _____
	Time: _____

Electrical Contractor's Supervisor

Name: Sean O'C Date:Signature: 

QUU Commissioning Manager

Name: Date:

Signature:

SP025 **SEWAGE PUMPING STATION**

SCOTT STREET **NORMAN PARK**

MOISTURE IN OIL **PUMP 2**

ELECTRICAL COMMISSIONING PLAN

In Attendance

Name	Role During Commissioning	Company



SP025 Scott Street SPS - Moisture in Oil - Commissioning Plan Pump 2 V0.1

Page 2 of 4

1 INTRODUCTION

This work involves the addition of Moisture in Oil protection relay to the pump control circuit for each sewage pump. While each pump circuit is modified the other pump will be the duty pump.

1.1 SEQUENCE OF WORKS

The sequence of works shall be:

1. Site establishment
2. Make contact with appointed QUU Control Systems Engineer
3. Moisture in Oil relay installation
4. Site commissioning
5. Post commissioning

1.2 MAINTENANCE CHECK OF EXISTING INSTALLATION

Before the works on site can commence, QUU staff will ensure that both pumps are fully operational and will perform a thorough maintenance inspection of the site.

1.3 PRE COMMISSIONING CHECKLIST

The following checklist is to be completed and signed by the electrical contractor.

1.3.1 Site Establishment

Call the QUU Control Room Operator (CRO) and inform them that you are on site. Record the CRO's Name and Officer Code and record the time of the call. Advise CRO that you are performing a pump shutdown. Give the operator your contact name and number.	Name: _____ CRO: _____ Time: _____
Review current SWMS and complete SF-606B Daily Pre-Start Briefing and Hazard assessment	OK <input checked="" type="checkbox"/>

1.3.2 Pump Station operational checks

Contractor Task	Checked
These are checks that will ensure the pump station is fully operational and that no delays will be incurred due to any pump station problem outside of the contract.	OK <input checked="" type="checkbox"/>
Ensure that the station is fully functional (either pump can run)	OK <input checked="" type="checkbox"/>
Call and confirm with QUU Control System Engineer that the code has been changed to accept the new input DI-23 Moisture in Oil input.	OK <input type="checkbox"/>

Electrical Contractor's Supervisor

Name: Sean Date: 01/01/2013

Signature: [Signature]

QUU Commissioning Manager

Name: Date:

Signature:


SP025 Scott Street SPS - Moisture in Oil - Commissioning Plan Pump 2 V0.1

Page 3 of 4

2 INSTALLATION OF MOISTURE IN OIL PROCEEDURE

The following sequence of change over works is the order in which they must be followed. After each phase has been completed, the commissioning manager will record the results and instruct the commissioning team to commence work on the next phase.

2.1.1 Pump 2


Contractor Task	Outcome
OPEN, LOCK AND TAG Pump 2 MCCB (Q5) (As per DWG No:486/5/7-0049-003 Amd:C)	 Pump 1 OFF <input checked="" type="checkbox"/>
Test for Dead at LOAD side of Pump 2 MCCB (Q5).	Q4 DEAD <input checked="" type="checkbox"/>
It is now safe to start work.	OK <input checked="" type="checkbox"/>
THIS IS A HOLD POINT. Do not proceed until PUMP 1 is confirmed to be fully operational	Signature: _____ TIME : _____

2.1.2 Water in Oil relay wiring

Contractor Task	Outcome
Install new relay and wiring as per DWG No:486/5/7-0049-003 Amd:C	OK <input checked="" type="checkbox"/>
Perform mandatory AS3000 tests.	OK <input checked="" type="checkbox"/>
Complete Lend Lease ITPs.	OK <input checked="" type="checkbox"/>

3 PUMP 2 (MOISTURE IN OIL) COMMISSIONING

3.1.1 Re-energise Pump 2

Contractor Task	Outcome
CLOSE Pump 2 MCCB (Q5)	 QM ON <input checked="" type="checkbox"/>
Test operation of moisture in oil relay, confirm input on PLC illuminates.	OK <input checked="" type="checkbox"/>
Call the QUU Control Room Operator (CRO) and inform him that you have re-established power to Pump 2 and advise that a new moisture in oil fault is now available.	OK <input checked="" type="checkbox"/>

Electrical Contractor's Supervisor

Name: Sean O'C Date:

Signature: _____

QUU Commissioning Manager

Name: Date:

Signature:

SP025 Scott Street SPS - Moisture in Oil - Commissioning Plan Pump 2 V0.1

Page 4 of 4

3.1.2 Complete commissioning

Contractor Task	Outcome
Complete Lend Lease electrical ITP documentation.	OK <input checked="" type="checkbox"/>

4 POST COMMISSIONING**4.1.1 Post Commissioning Activities**

Contractor Task	Outcome
Ensure all locks & tags have been removed from pump 2.	OK <input checked="" type="checkbox"/>
Call the QUU Control Room Operator (CRO) and inform him that you are leaving site and all equipment is operational.	Name: _____ CRO: _____
Follow directions in SWMS and ensure all rubbish is removed from site.	Time: _____

Electrical Contractor's Supervisor

Name: Sean O'K Date:Signature: 

QUU Commissioning Manager

Name: Date:

Signature:

SP25 SCOTT STREET SEWERAGE PUMP STATION PUMP REPLACEMENT



LOCALITY PLAN
SCALE 1:2000 FULL SIZE A1 SHEET

AS CONSTRUCTED

0 20 40 80 120
Full Size 1:2000 ; Half Reduction 1:4000
SCALE (m)

DRAWING SCHEDULE

DRAWING No	TITLE/DESCRIPTION
486/5/7-0387-030	LOCALITY PLAN AND DRAWING SCHEDULE
486/5/7-0387-031	EXISTING PUMP STATION PLAN
486/5/7-0387-032	EXISTING PUMP STATION SECTION - SHEET 1
486/5/7-0387-033	EXISTING PUMP STATION SECTION - SHEET 2

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 07.05.13

NAME of SIGNATORY: A. THIRIS

RPEQ No. or LICENCE: 3325

COMPANY NAME: ALTRA9

START DATE: 07.05.13 FINISH DATE: 29.07.13



NAME SIGNATURE DATE

QUEENSLAND URBAN UTILITIES DELEGATE
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)



SHEET No. OF
QUEENSLAND URBAN UTILITIES DRAWING No. AMEND.

486/5/7-0387-030 A

No	DATE	AMENDMENT	DRAFT	APPR
A	26.07.13	AS CONSTRUCTED	S.W	A.T

FUNDING	
DESIGN W.O. No.	
CONSTRUCTION W.O. No.	
FUNDED BY B.C.C. (✓)	EXTERNAL ()

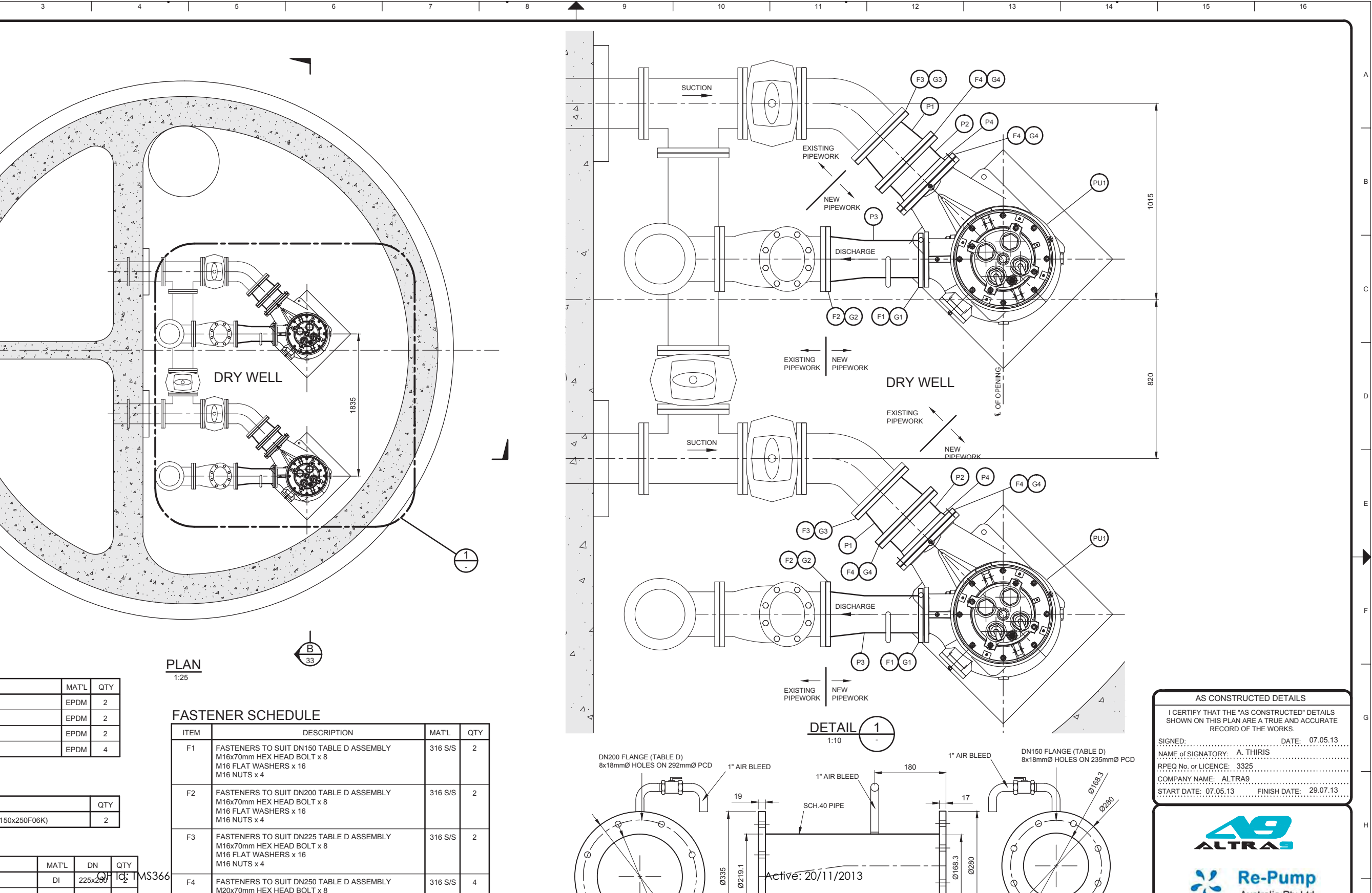
DRAFTED	S.WILKINSON
DRAFTING CHECK	D.DAKIN
CAD FILE	570387030.DWG
B.C.C. FILE No.	486/5/7-0387-030

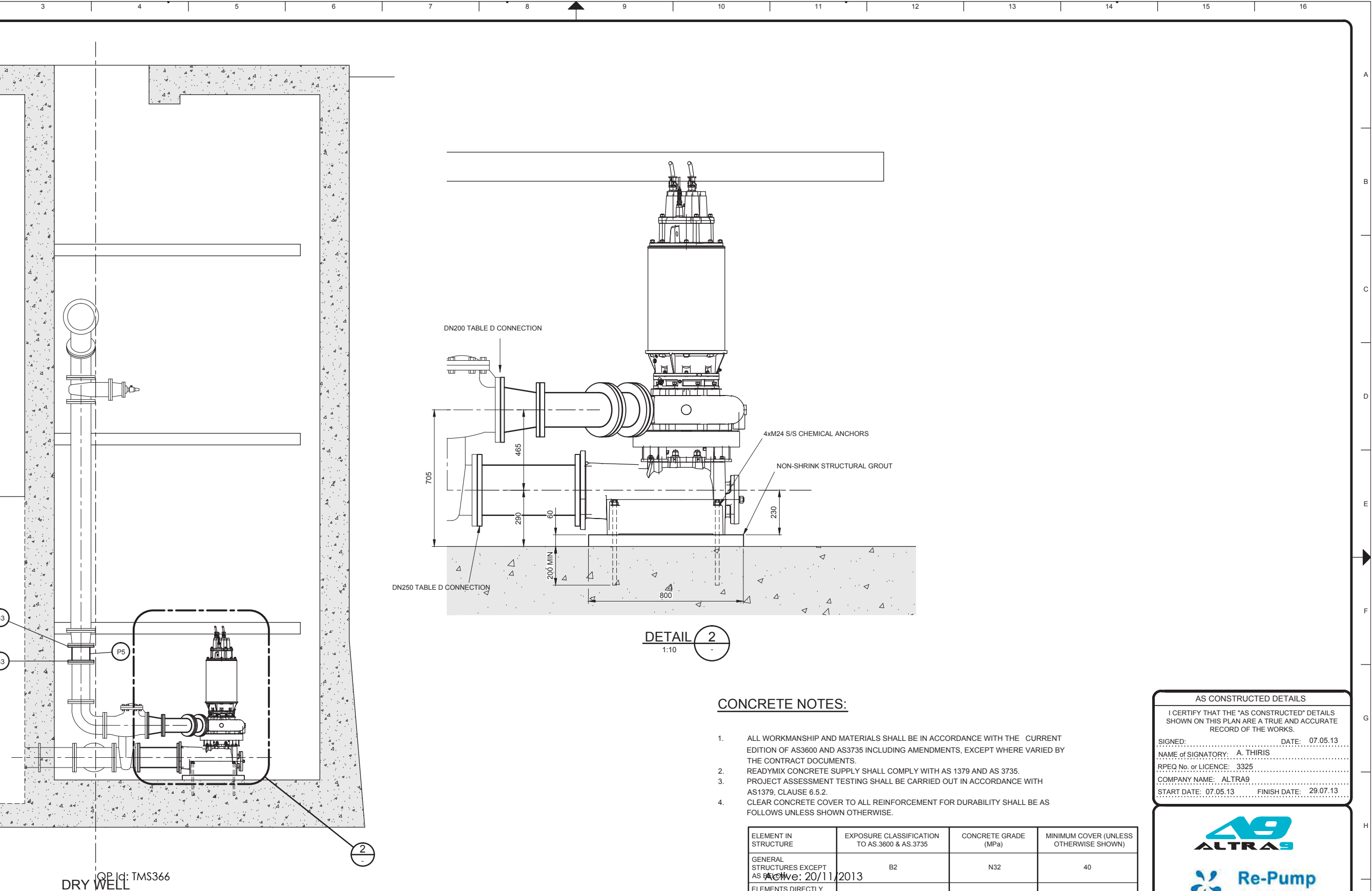
D.DAKIN	
DESIGN	R.P.E.Q. No.
A.THIRIS	3325 12/04/13
DESIGN CHECK	R.P.E.Q. No. DATE

MANAGER ENGINEERING SERVICES	DATE
FIELD SERVICES DELEGATE	DATE

ASSET/PROJECT
SP25 SCOTT STREET NORMAN PARK

DRAWING TITLE
COVER SHEET AND LOCALITY PLAN





CONCRETE NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF AS3600 AND AS3735 INCLUDING AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. READY-MIX CONCRETE SUPPLY SHALL COMPLY WITH AS 1379 AND AS 3735.
3. PROJECT ASSESSMENT TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS1379, CLAUSE 6.5.2.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE.

ELEMENT IN STRUCTURE	EXPOSURE CLASSIFICATION TO AS.3600 & AS.3735	CONCRETE GRADE (MPa)	MINIMUM COVER (UNLESS OTHERWISE SHOWN)
GENERAL STRUCTURES EXCEPT AS NOTED	B2	N32	40
ELEMENTS DIRECTLY	B2	N32	60

AS CONSTRUCTED DETAILS	
I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.	
SIGNED:	DATE: 07.05.13
NAME of SIGNATORY: A. THIRIS	
RPEQ No. or LICENCE: 3325	
COMPANY NAME: ALTRA9	
START DATE: 07.05.13	FINISH DATE: 29.07.13







SP025 SCOTT STREET SEWAGE PUMPING STATION SITE COVER SHEET

ELECTRICAL DRAWINGS INDEX						
TITLE	SHEET	REVISIONS				
SHEET	00	0	A	B	C	
DISTRIBUTION SCHEMATIC DIAGRAM	01	0	A	B	C	
SCHEMATIC DIAGRAM	02	0	A	B	C	
SCHEMATIC DIAGRAM	03	0	A	B	C	
SUMP PUMP SCHEMATIC DIAGRAM	04	0	A	B	C	
RESERVED (GENERATOR CONTROL)	05					
CONTROLS SCHEMATIC DIAGRAM	06	0	A	B	C	
U/I/O SCHEMATIC DIAGRAM	07	0	A	B	C	
DISTRIBUTION SCHEMATIC DIAGRAM	08	0	A	B	C	
AL INPUTS TERMINATION DIAGRAM	09	0	A	B	C	
AL INPUTS TERMINATION DIAGRAM	10	0	A	B	C	
AL OUTPUTS TERMINATION DIAGRAM	11	0	A	B	C	
LOGS & MISCELLANEOUS TERMINATION DIAGRAM	12	0	A	B	C	
CONTROLS TERMINATION DIAGRAM	13	0	A	B	C	
LIST	14	0	A	B	C	
DULE	15	0	A	B	C	
RD LABEL SCHEDULE	16	0	A	B	C	
RD CONSTRUCTION DETAILS	17	0	A	B	C	
RD CONSTRUCTION DETAILS	18	0	A	B	C	
ES AND PRESSURE TRANSMITTER INSTALLATION DETAILS	19	0	A	B	C	
ROTECTION UNIT - CONSTRUCTION AND WIRING DETAILS	20	0	A	B	C	
RESERVED (FIELD DISCONNECTION BOX)	21					
RD GENERAL ARRANGEMENT ELEVATIONS - SINGLE SIDED	22	0	A	B	C	
RD GENERAL ARRANGEMENT ELEVATIONS - SINGLE SIDED	23	0	A	B	C	
GENERATOR CONNECTION CIRCULE	24	0	A	B	C	

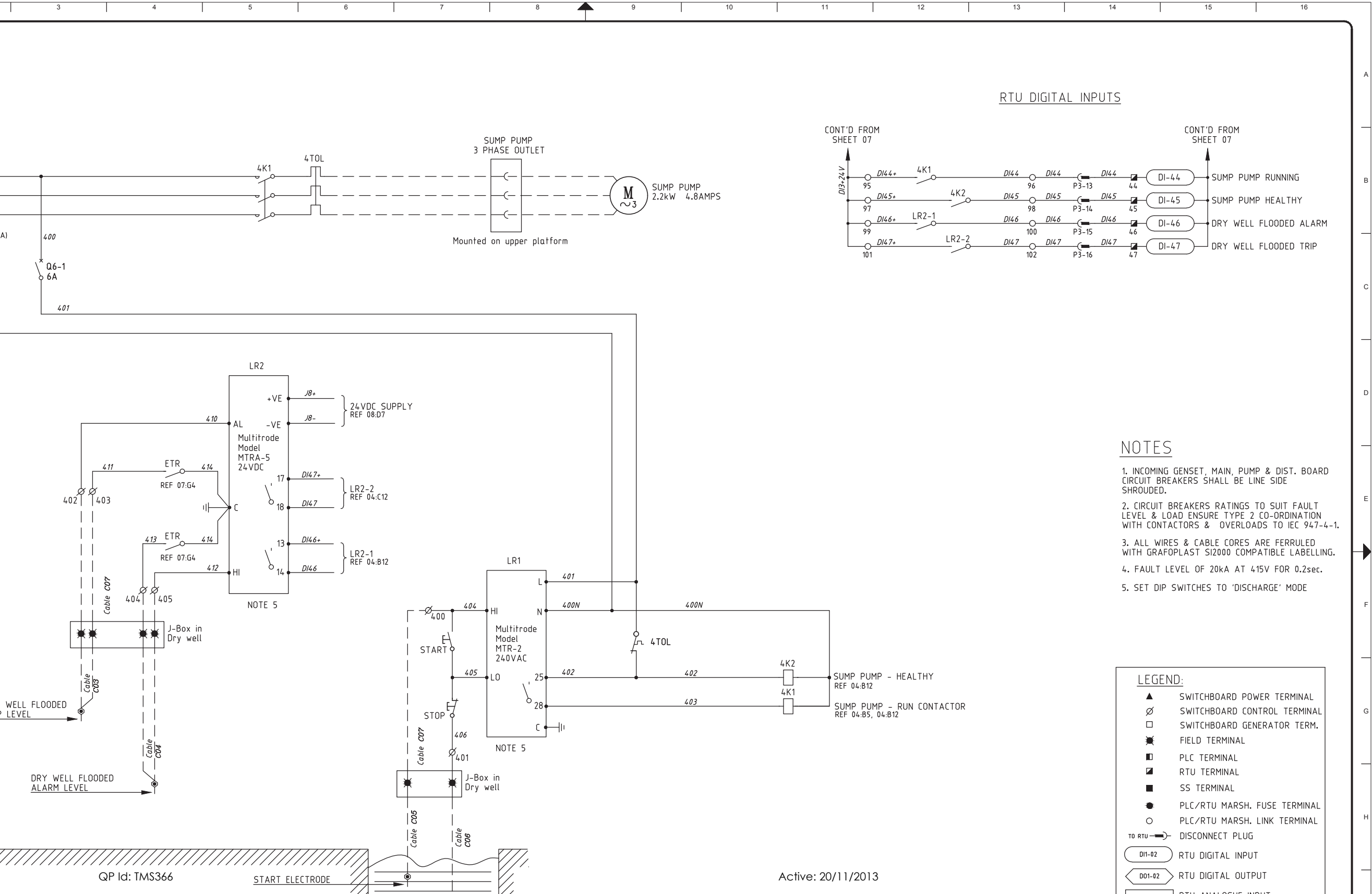
STANDARD VARIABLES		
DESCRIPTION	VALUES	
CT METERING ISOLATOR	250A	SLB 250 3P
NORMAL SUPPLY MAIN SWITCH	250A	S400NE/250
GENERATOR SUPPLY MAIN SWITCH	250A	S400NE/250
PUMP1 CIRCUIT BREAKER	100A	S125GJ/100
PUMP2 CIRCUIT BREAKER	100A	S125GJ/100
DRY WELL SUMP PUMP CIRCUIT BREAKER	20A	S125GJ/20
PUMP SOFT STARTER SIZE	MSF-075 +	
PUMP RATING	37kW	67A
PUMP LINE CONTACTOR	CA7-72	
PUMP BYPASS CONTACTOR	CA7-72	
SUMP PUMP RATING	2.2kW 4.8A	
SUMP PUMP CONTACTOR & TOL	CA7-16	CT7-24-6
PUMP SOCKET OUTLET + INCLINE SLEEVE	NOT APPLICABLE	
PUMP INLET PLUG + HANDLE	NOT APPLICABLE	
WET WELL LEVEL TRANSMITTER	FMX167-A2BME1A3	10m
EMERGENCY STORAGE WELL LEVEL TRANSMITTER	NOT APPLICABLE	
DELIVERY PRESSURE TRANSMITTER	BR74XXGG1FHA2X	50m
WET WELL ULTRASONIC LEVEL SENSOR	NOT APPLICABLE	
FLOWMETER RANGE	NOT APPLICABLE	
RADIO	DR900-07A02-D0	
EMERGENCY PUMPING TIME	300sec	
No of SINGLE POINT PROBES	6	
INCOMING MAINS SUPPLY CABLE	50mm ²	
MAIN EARTHING CABLE	6mm ²	
INCOMING GENERATOR SUPPLY CABLE	NOT APPLICABLE	

Active: 20/11/2013

STANDARD DESIGN OPTIONS		
OPTION	DESCRIPTION	FITTED
A	INDIVIDUAL PUMP MOISTURE IN OIL (MIO) SENSOR AND FAULT RELAY	YES <input checked="" type="checkbox"/>
B	INDIVIDUAL PUMP MOTOR AUX PROTECTION SENSORS AND FAULT RELAYS	<input checked="" type="checkbox"/> NO
C	INDIVIDUAL PUMP REFLUX VALVE PROXIMITY SWITCH	YES <input checked="" type="checkbox"/>
D	STATION MANHOLE SURCHARGE IMMINENT	<input checked="" type="checkbox"/> NO
E	STATION DRY WELL SUMP PUMP AND LEVEL INDICATION SENSORS AND RELAYS	YES <input checked="" type="checkbox"/>
F	STATION PERMANENT GENERATOR - ATS AND CONTROL CONNECTIONS	<input checked="" type="checkbox"/> NO
G	STATION EMERGENCY STORAGE LEVEL SENSOR	<input checked="" type="checkbox"/> NO
H	STATION DELIVERY FLOWMETER	<input checked="" type="checkbox"/> NO
I	BACKUP COMMUNICATION - GSM	YES <input checked="" type="checkbox"/>
J	PUMP CONNECTION (Via Dry Well J-Box)	YES <input checked="" type="checkbox"/>
K		YES NO
L	MOTOR THERMISTORS (Via Dry Well J-Box)	YES <input checked="" type="checkbox"/>
M	ODOUR CONTROL	<input checked="" type="checkbox"/> NO
N	CURRENT TRANSFORMER (CT) METERING	YES <input checked="" type="checkbox"/>
O	PUMPS ELECTRICAL INTERLOCK	<input checked="" type="checkbox"/> NO
P	WET WELL WASHER	<input checked="" type="checkbox"/> NO
Q	AUX PIT SUMP PUMP AND LEVEL PROBE	<input checked="" type="checkbox"/> NO
R	TELEMETRY RADIO	YES <input checked="" type="checkbox"/>
S	WET WELL ULTRASONIC LEVEL SENSOR	<input checked="" type="checkbox"/> NO
T	SINGLE SIDED SWITCHBOARD WITH SEPERATE CT ENCLOSURE	YES <input checked="" type="checkbox"/>
U	DELIVERY PRESSURE TRANSMITTER	YES <input checked="" type="checkbox"/>
V	CHEMICAL DOSING	<input checked="" type="checkbox"/> NO



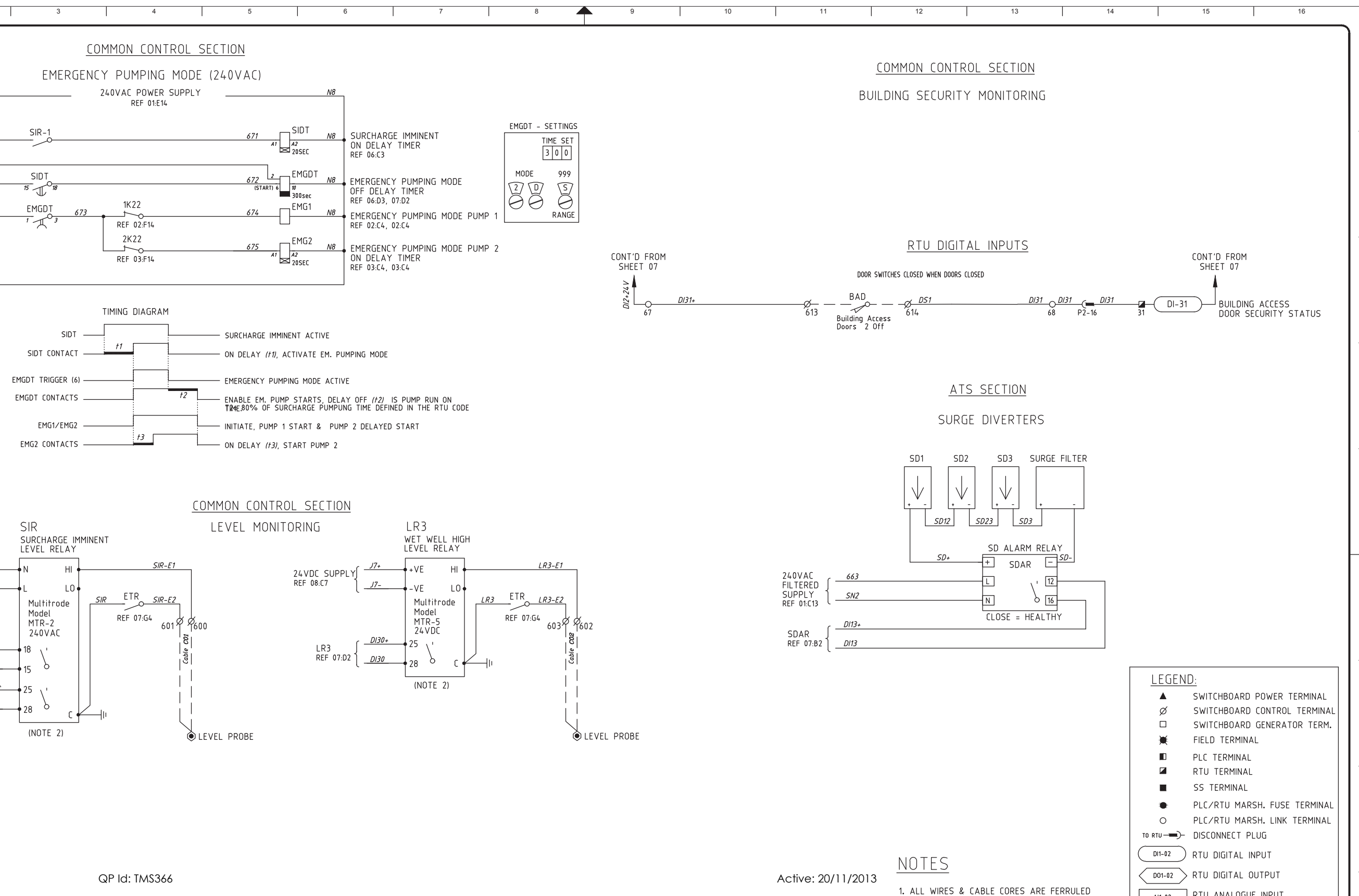
CONT'D ON SHEET 02

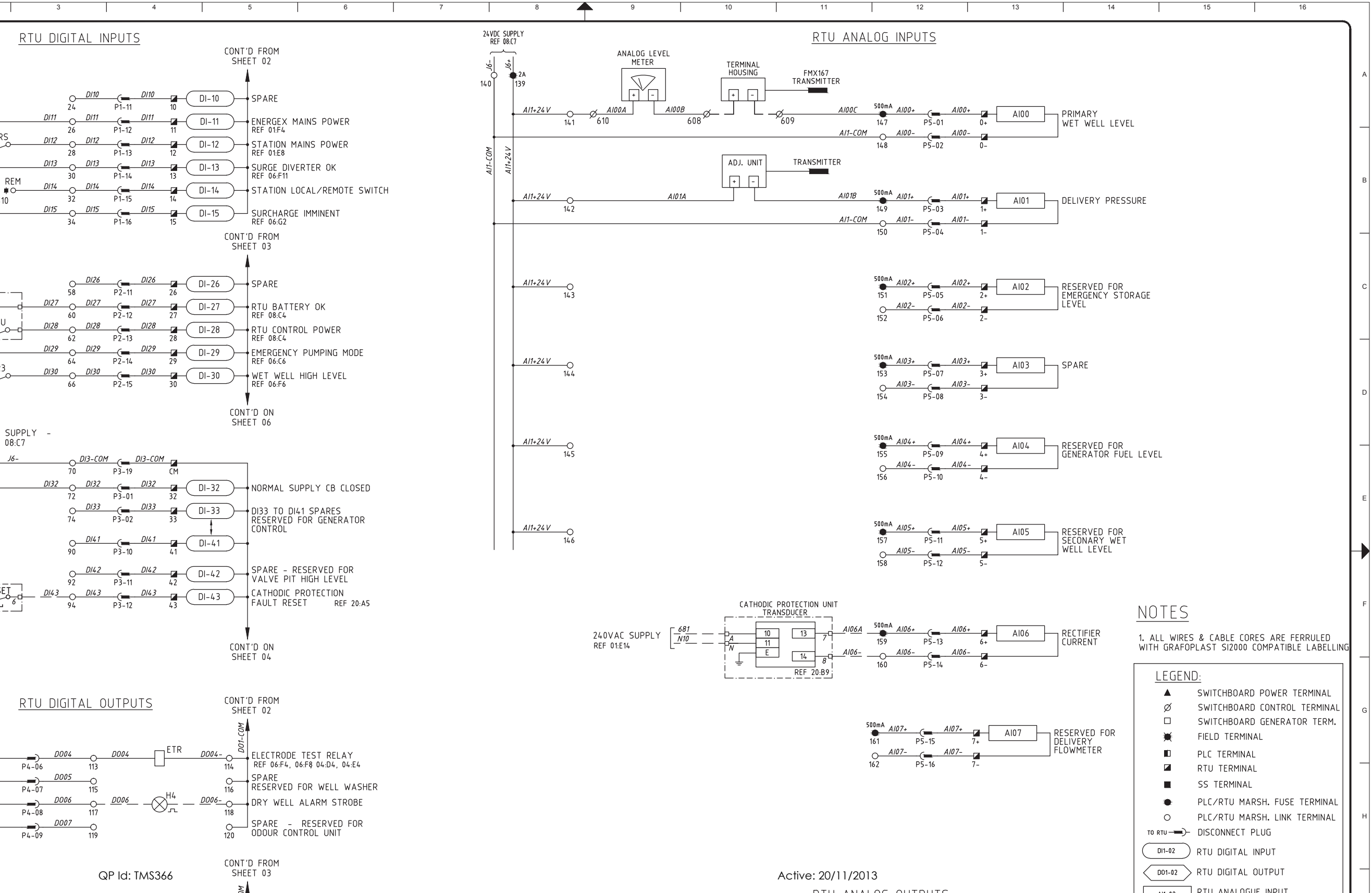


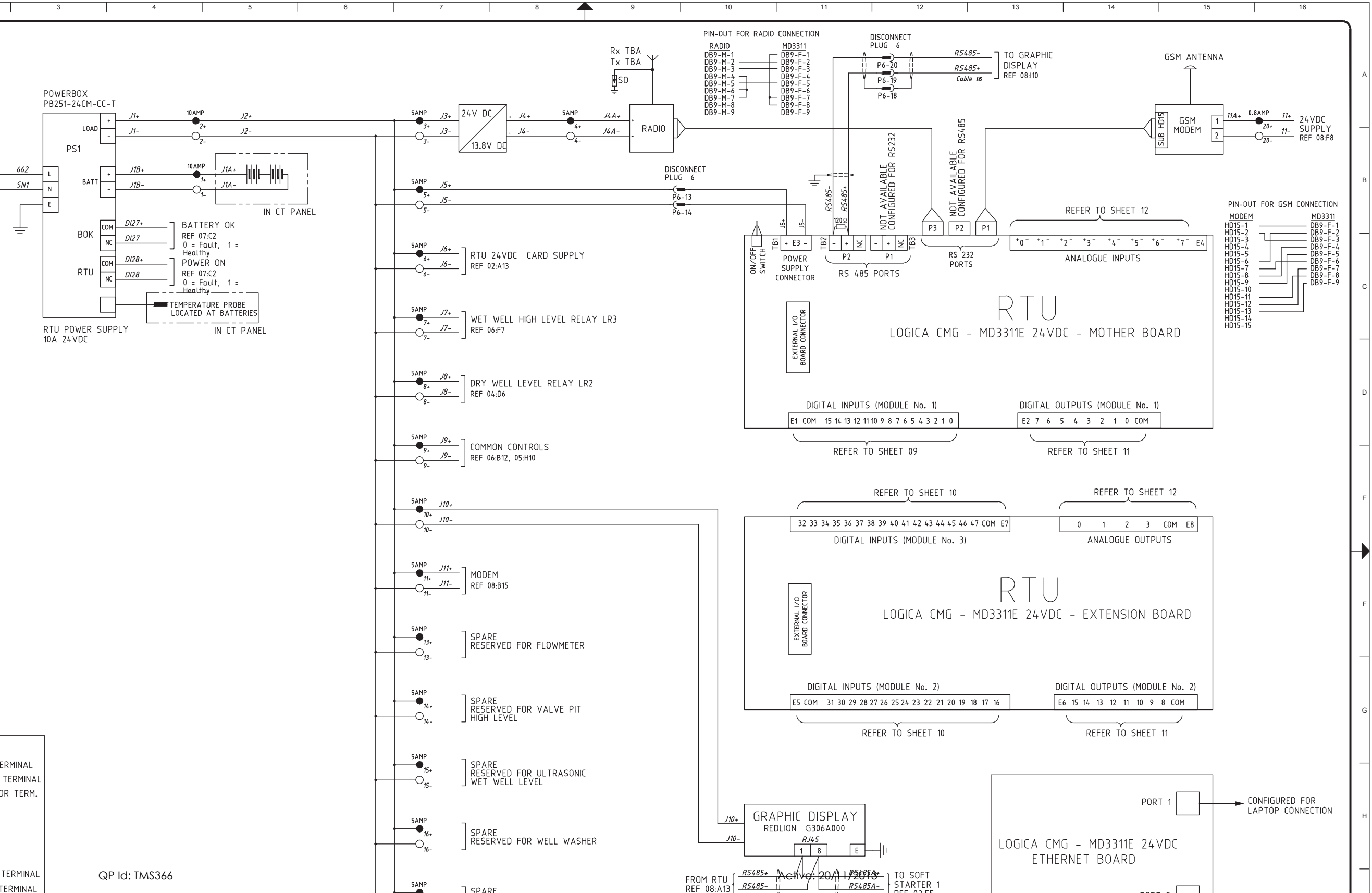


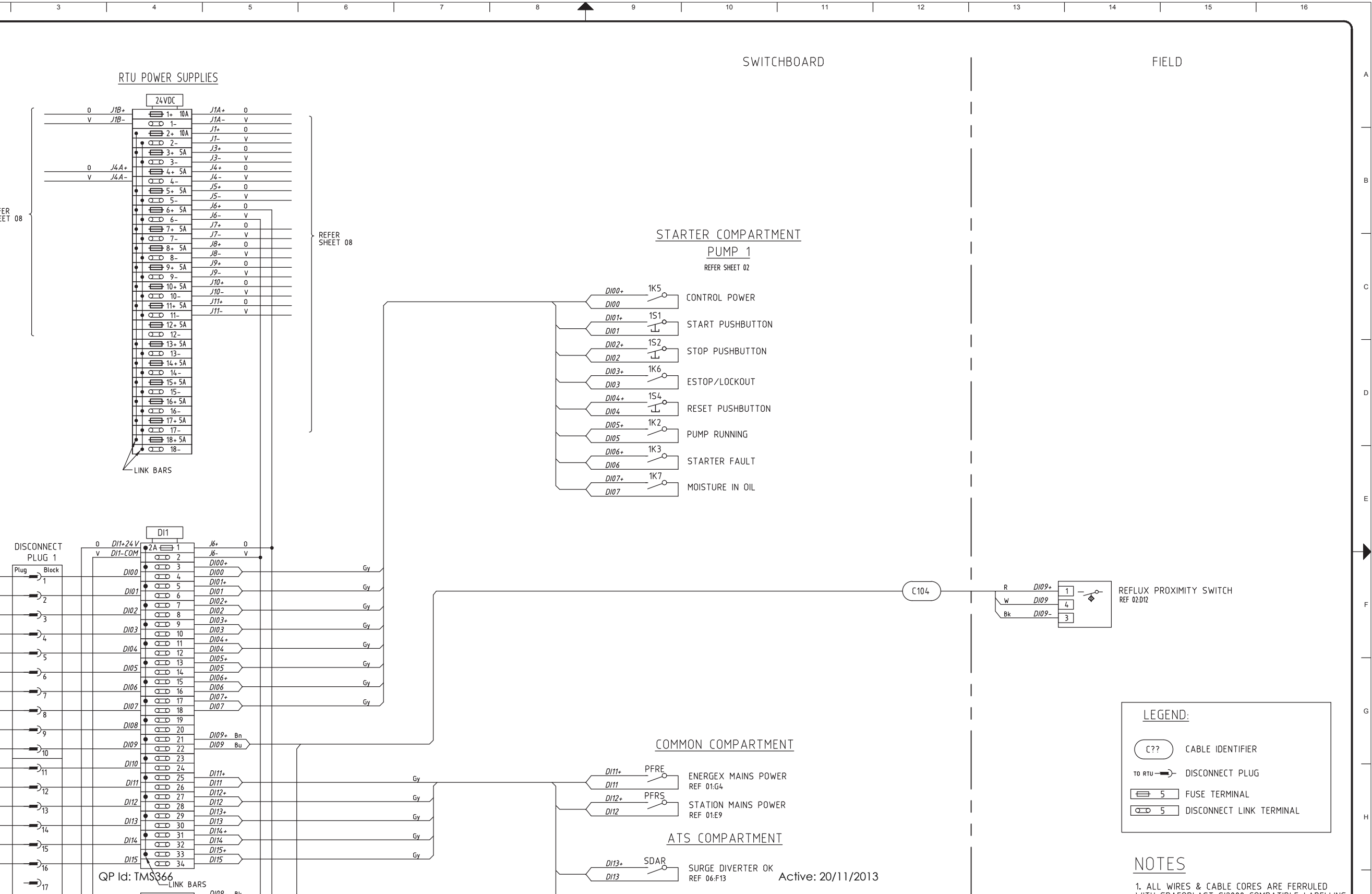
NOTES

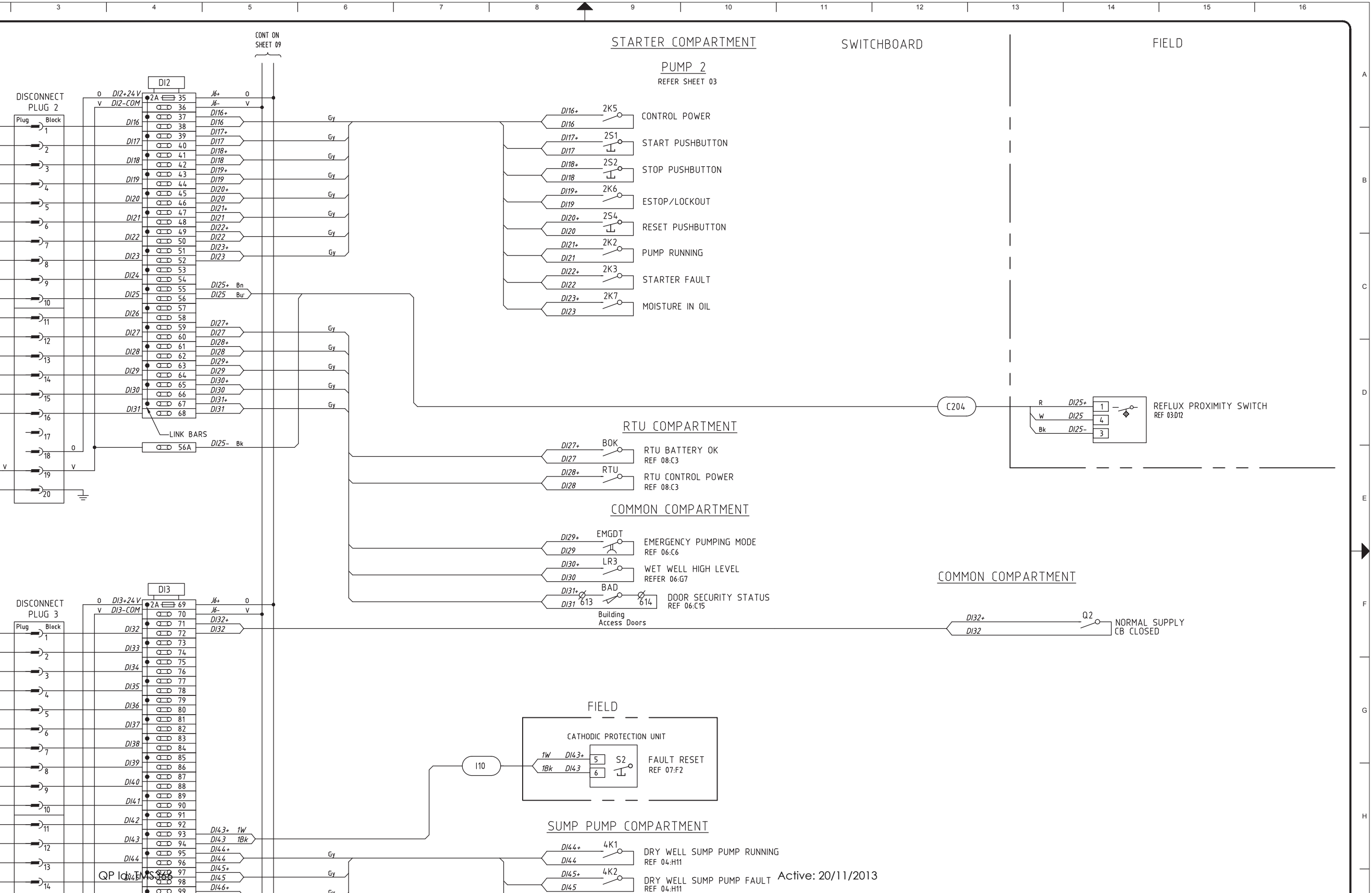
1. ALL WIRES & CABLE CORES ARE FERRUED

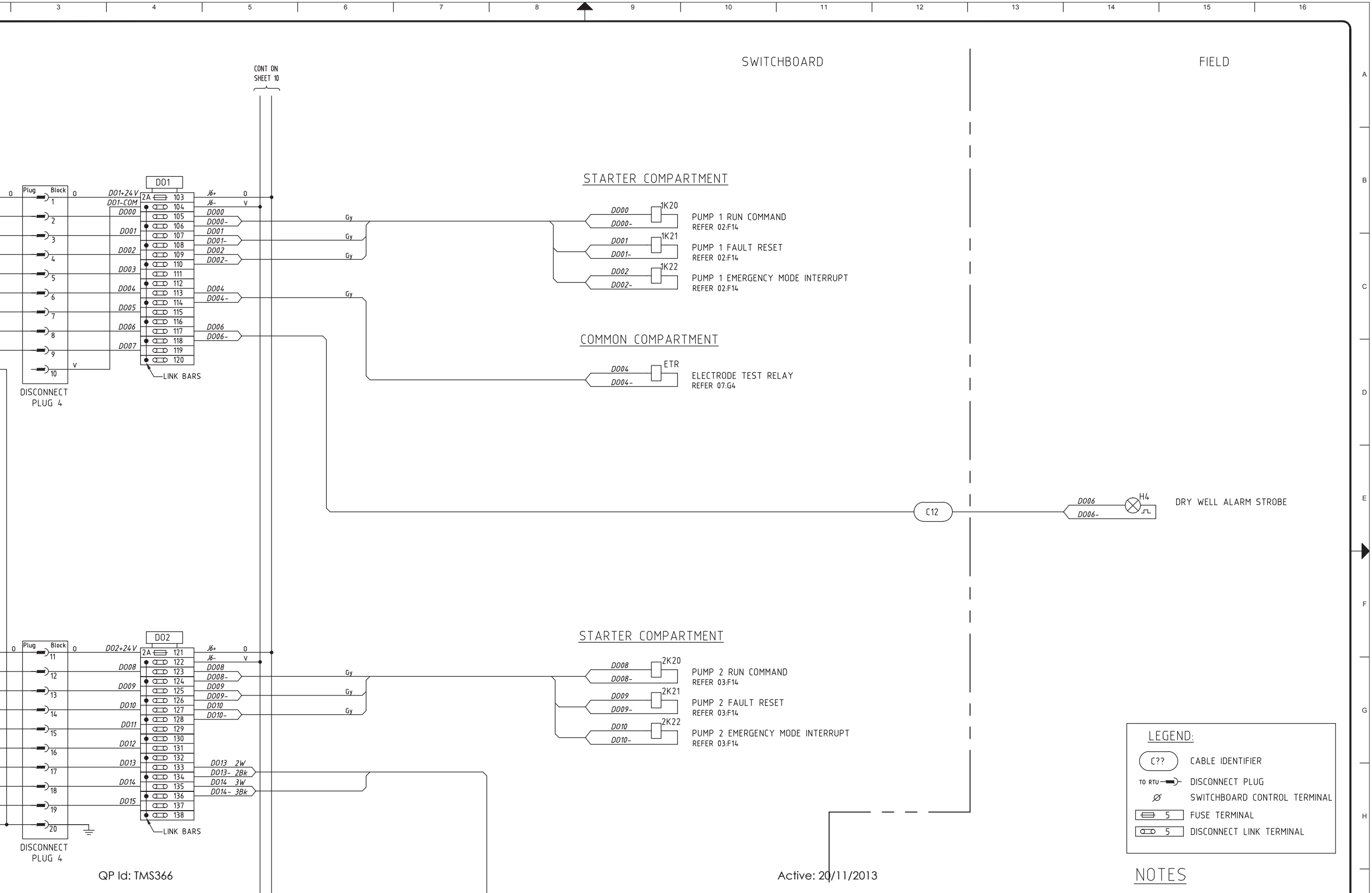


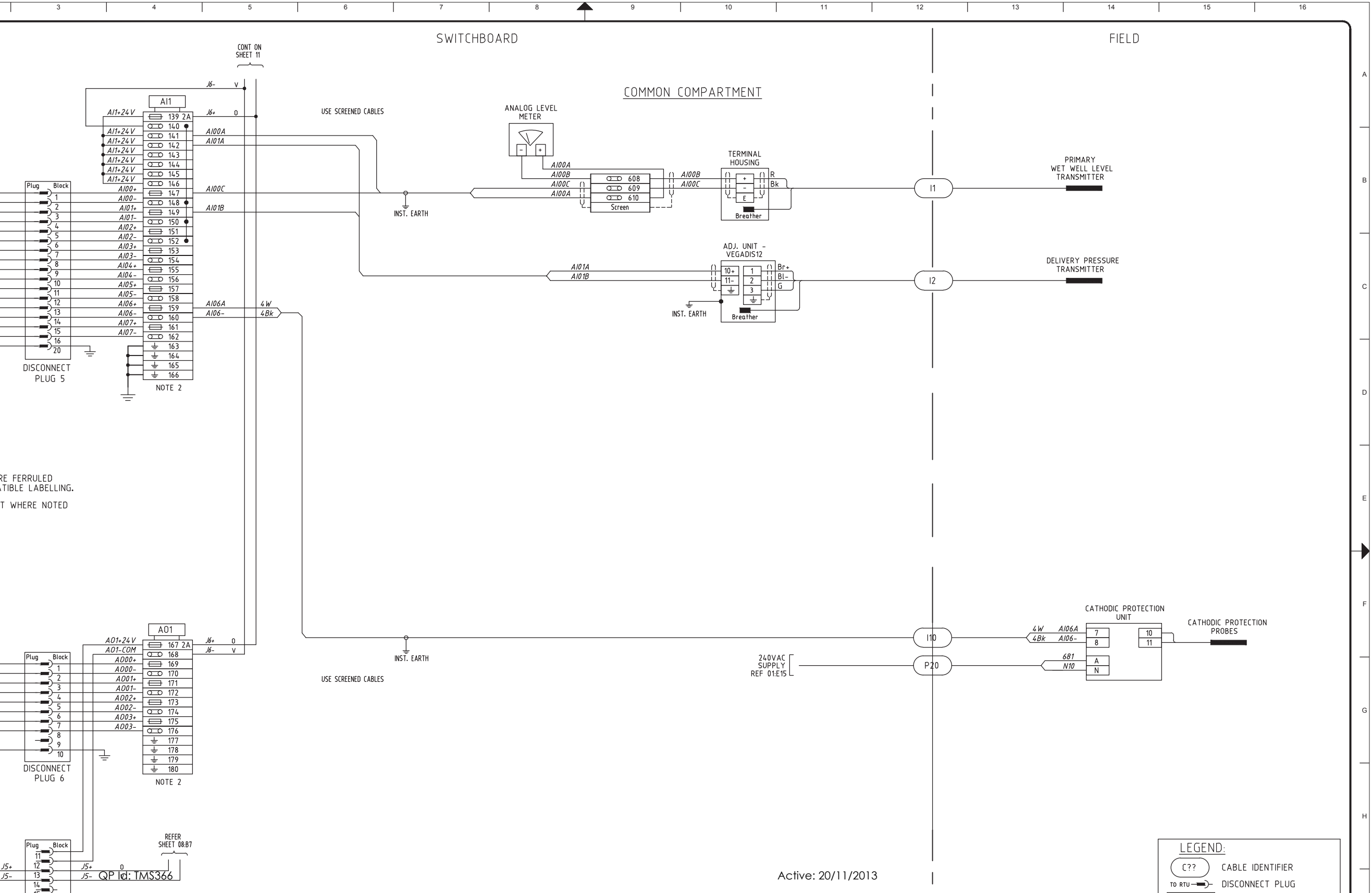


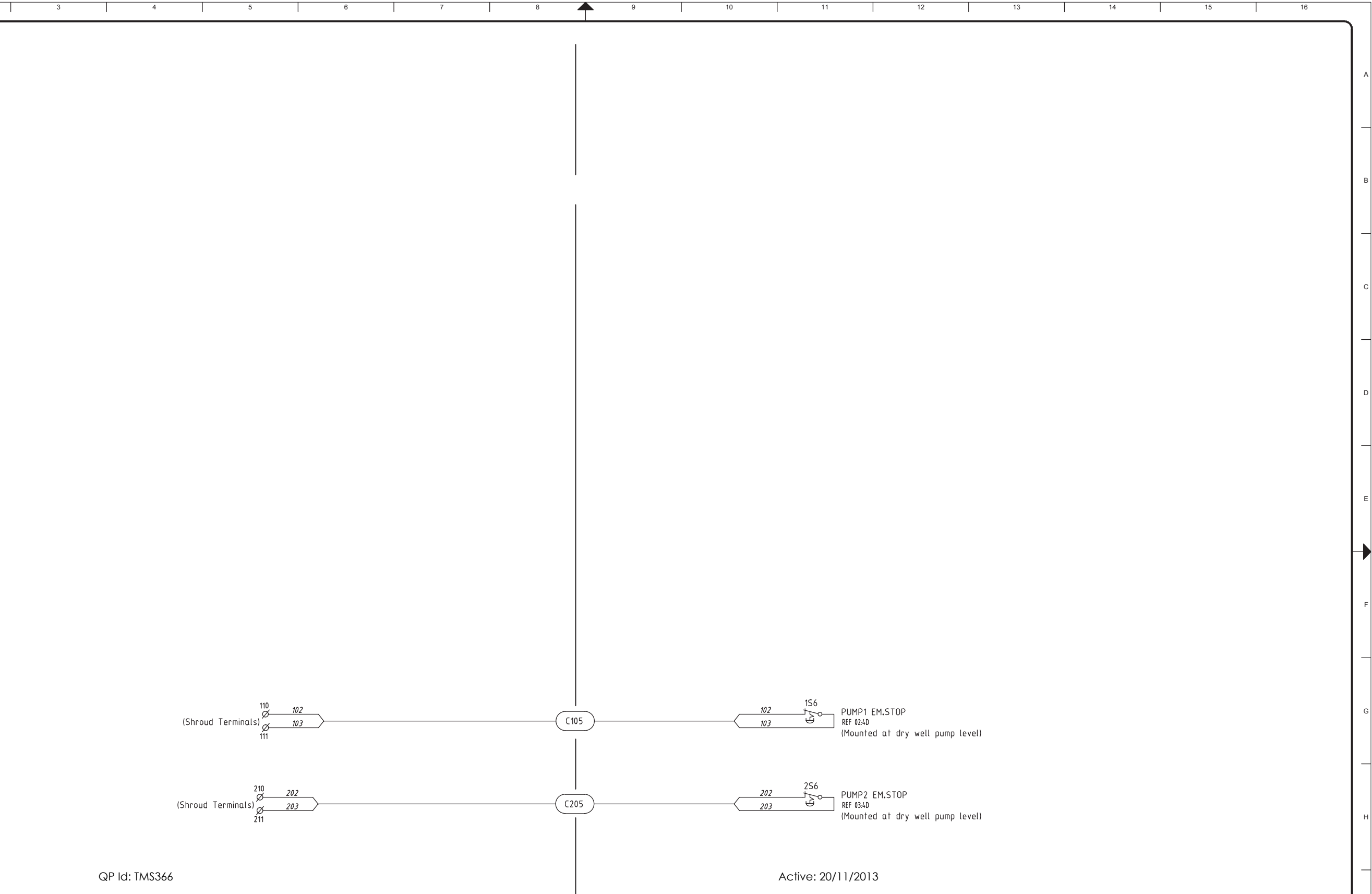












ABCDEFGH

QP	Id: TMS366	4mm	ABS PLASTIC
		4mm	W/B

minium (5251).
Grade Aluminium.
visible seams and joints fully welded, free
ed.
sive neoprene rubber seals.
icated on the drawings.
doors and hinged escutcheons and on

and document holders etc fitted where shown

icent strength to prevent being deformed when
mm S/Steel.
with M8 studs & chrome plated dome nuts.
nium, unless otherwise shown.
m 3mm aluminium.
with M6x1.0 flat head closed end rivet nuts.

side installed within cubicle. (Detail G)
d with seals attached to cubicle.
00mm.
a 50mm clearance from section dividers.
be split.
rthed.
where required.
plated.
c.
rn 1000-U142
cess.

WIRING

All wiring to be PVC V90 HT 0.6/1Kv Grade with tinned conductor.
Control and instrumentation wiring has flexible copper conductors, and is colour
coded as detailed below, numbered each end, and terminated by the use of
appropriate pre-insulated crimp lugs or pins.
Separate lugs or pins shall be used for each conductor.
Use proprietary bridging links when required to common up terminals.
Not more than two wires shall be connected to any terminal.
Not more than one wire shall be connected on one side of any tunnel type
terminal. Where multiple connections are required on tunnel terminals, proprietary
terminal link bars shall be used.
Power wiring to be minimum 2.5sqmm stranded copper conductors, phase colour
coded as detailed below.
Control wiring to be minimum 1.0sqmm flexible copper conductors, colour coded
as detailed below.
Low level control signals to be minimum 0.5sqmm flexible copper conductors,
colour coded as detailed below.
4-20mA analog signals (internal & external) wired in shielded pair minimum size
0.5sqmm, and earthed at one end only. (Switchboard end for external signals)
All 240VAC wiring in the RTU or PLC sections shall be double insulated and all
terminals shall be shouded and labelled- ' Danger 240VAC'
Earth cables minimum 2.5sqmm flexible.
Doors and hinged escutcheons bonded with flexible tinned copper braiding.
Disconnection zone door to be bonded with flexible copper B/Wire. Heat shrink at
lugs.
Switchboard to have dedicated earthing cable bonding directly to main earth bar.
Ensure minimum clearance of 100mm is maintained between cable ducting & gland
plates.
Wire numbering will be equal to Grafoplast SI2000 system.
Terminal strips to be mounted 30mm off equipment panel to aid termination.
Wire numbers are readable left to right, bottom to top as shown.

Refer to sheet 17 for coding details for RTU disconnection plugs.
Coding pins must be fitted to both the disconnect plug and terminal block.

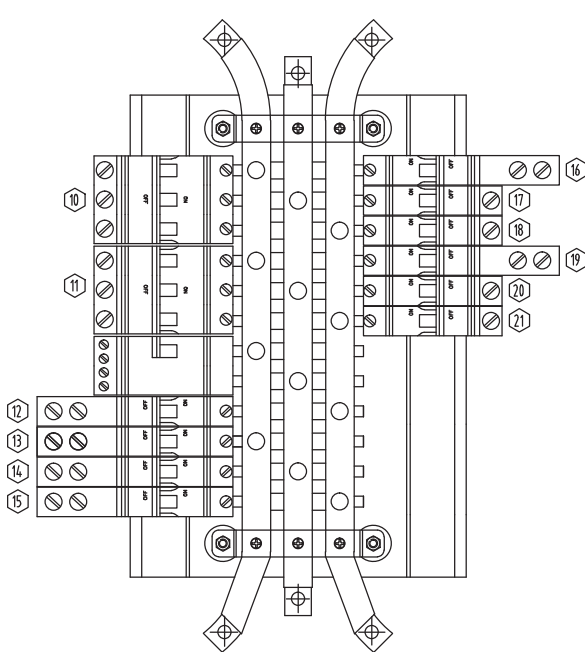
COLOUR CODE

Phase wiring (A,B &C)	Red, White, Blue	2.5sqmm (min)
Potential Metering (240/415 VAC)	Red, White, Blue, Black	1.5sqmm
Current Metering (Secondary)	Red, White, Blue, Grey	2.5sqmm
240 VAC Control Active	Red	1.0sqmm
240 VAC Neutral	Black	1.0sqmm
Extra Low VDC Positive supplies	Orange	1.0sqmm
Extra Low VDC Negative supplies	Violet	1.0sqmm
General Extra Low VDC Wiring	Grey	1.0sqmm
RTU & PLC Wiring	Grey	0.5sqmm
Electrode Wiring	Salmon	1.0sqmm
Intrinsically safe wiring	Light Blue	1.5sqmm
Earth	Green/Yellow	2.5sqmm (min)
Door & Escutcheon Earth Bonds	Green/Yellow	

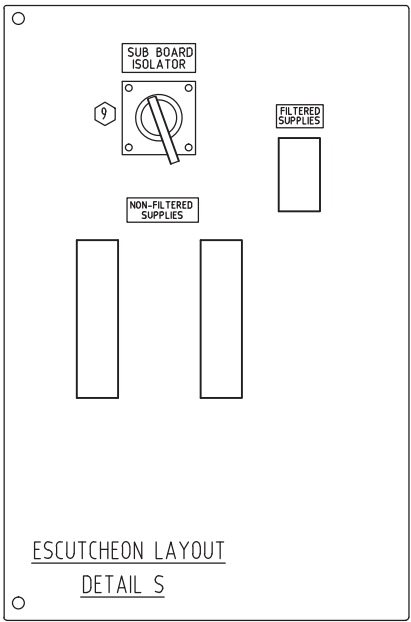
LABELS

Internal labels W/B engraved ABS PLASTIC to label schedule.
Warning labels R/W engraved ABS PLASTIC to label schedule.
E/Stop labels Y/B engraved ABS PLASTIC to label schedule.
First letter = Background colour, Second letter = Lettering colour.

Main switch label	<div>MAIN SWITCH 400A</div>	10mm 4mm	Material ABS PLASTIC Colour B/W
Pump CB labels	<div>PUMP No1 250A</div>	6mm 4mm	Material ABS PLASTIC Colour W/B
Compartment labels	<div>RTU</div>	10mm	Material Stainless Steel
E/Stop labels	<div>EMERGENCY STOP</div>	4mm	Material ABS PLASTIC Colour Y/B
Warning labels	<div>DANGER 415V</div>	7mm	Material ABS PLASTIC Colour R/W

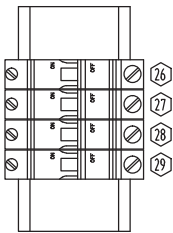


NON-FILTERED SUPPLY ARRANGEMENT
DETAIL M
SUB-DISTRIBUTION BOARD ARRANGEMENT



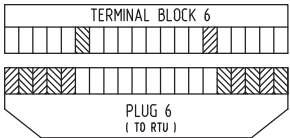
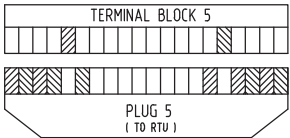
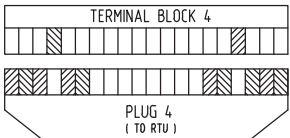
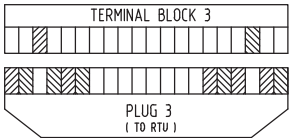
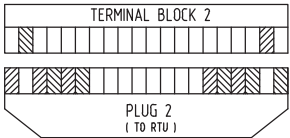
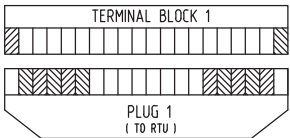
ESCUTCHEON LAYOUT
DETAIL S

FILTERED SUPPLY ARRANGEMENT



RTU DISCONNECT PLUGS

CODING DETAILS



ated

cking rods
each door for clarification.

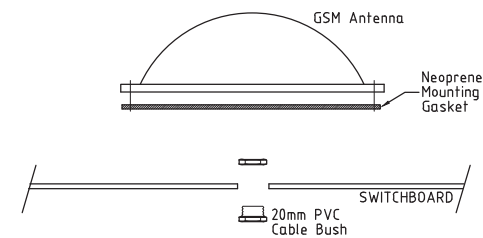
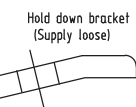
SH-SS-PAD-35.
M-3PL-SET-3B4500-RG006-1

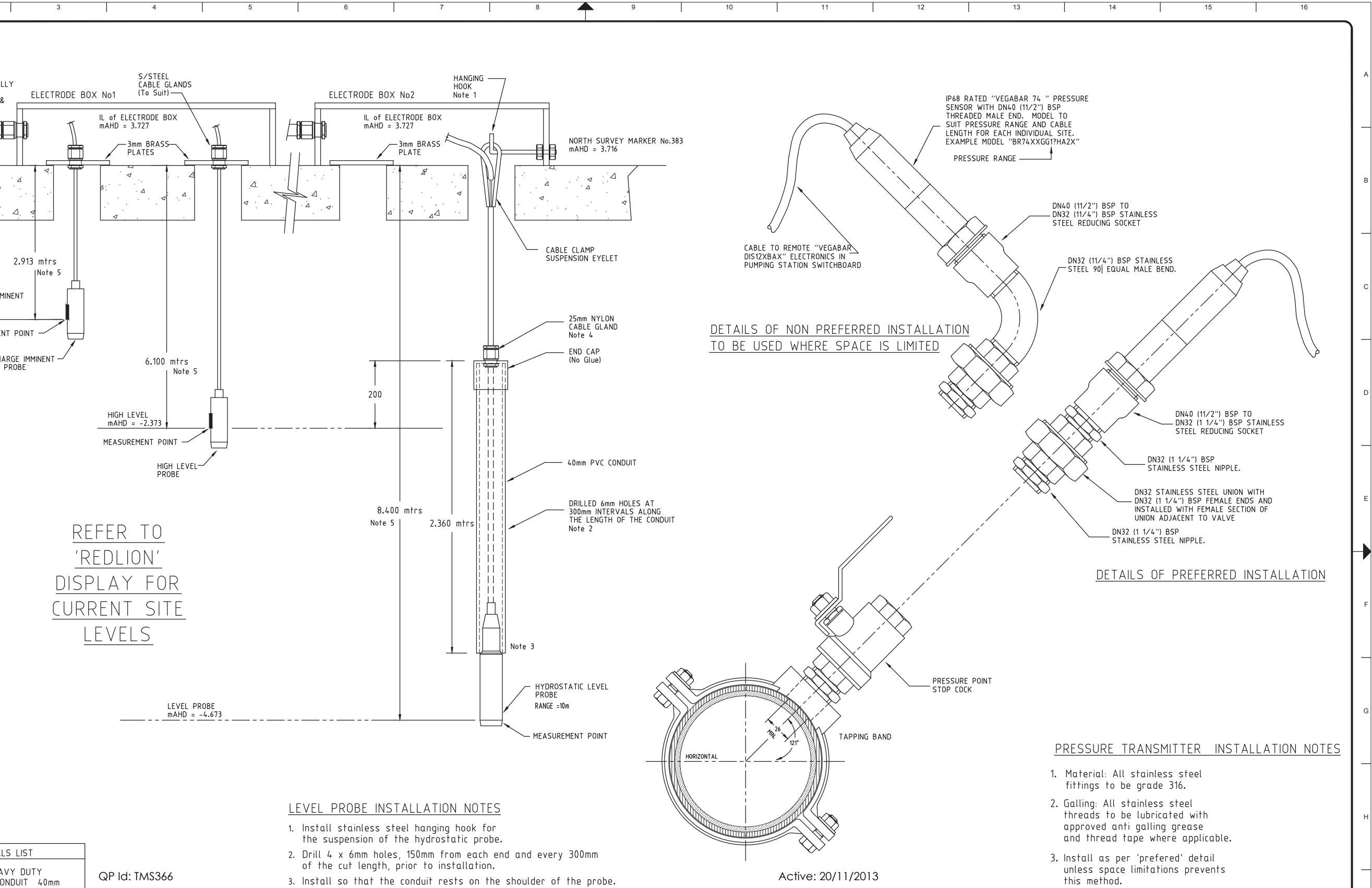
1
5 VAC
50 V
/ 24 VDC
5

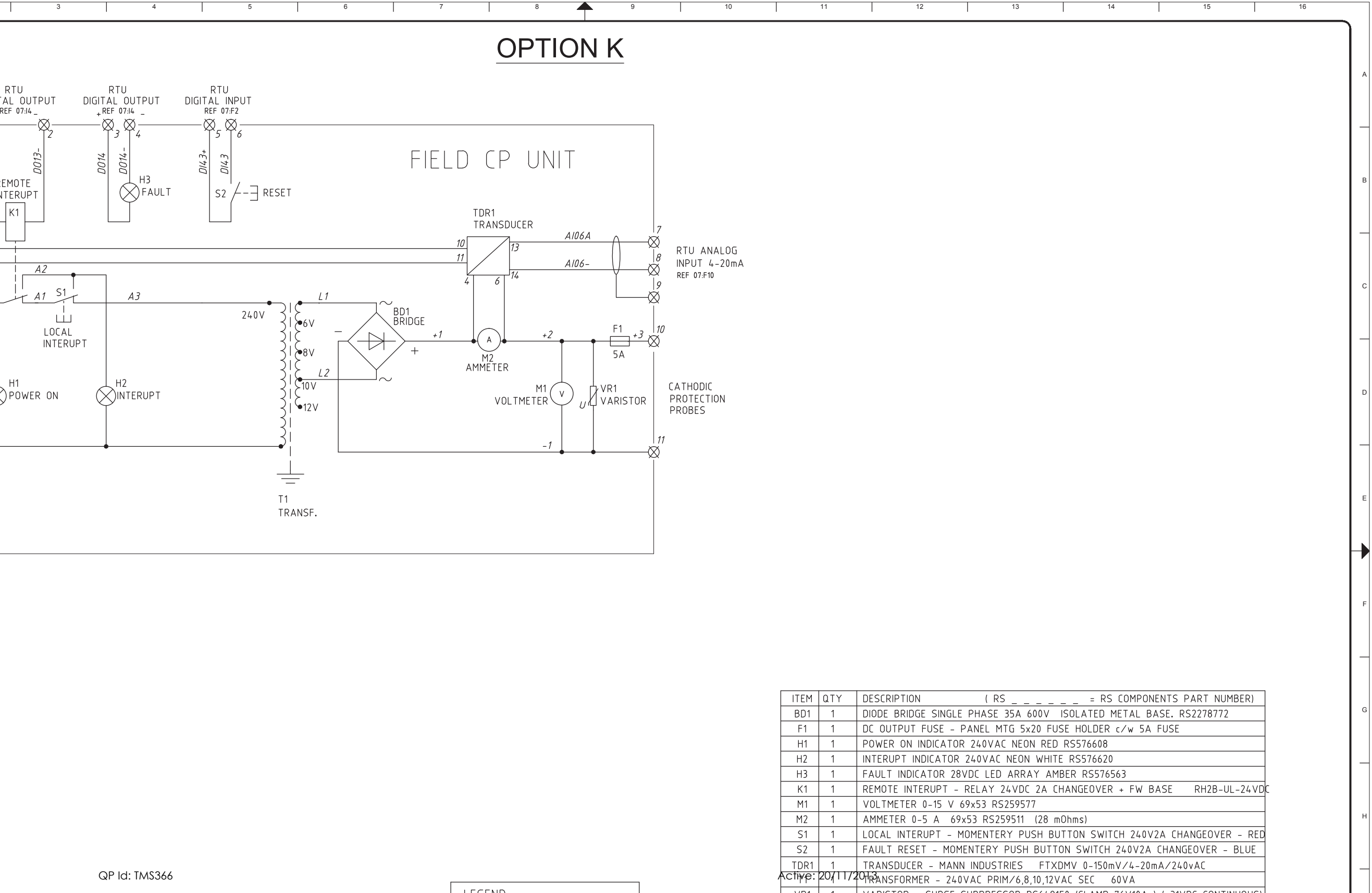
54 to AS 1939

eding 2000kg
orm 1

escale, and degrease all surfaces with TMS366
AS 1580 & AS 3715 using Novox LF acid

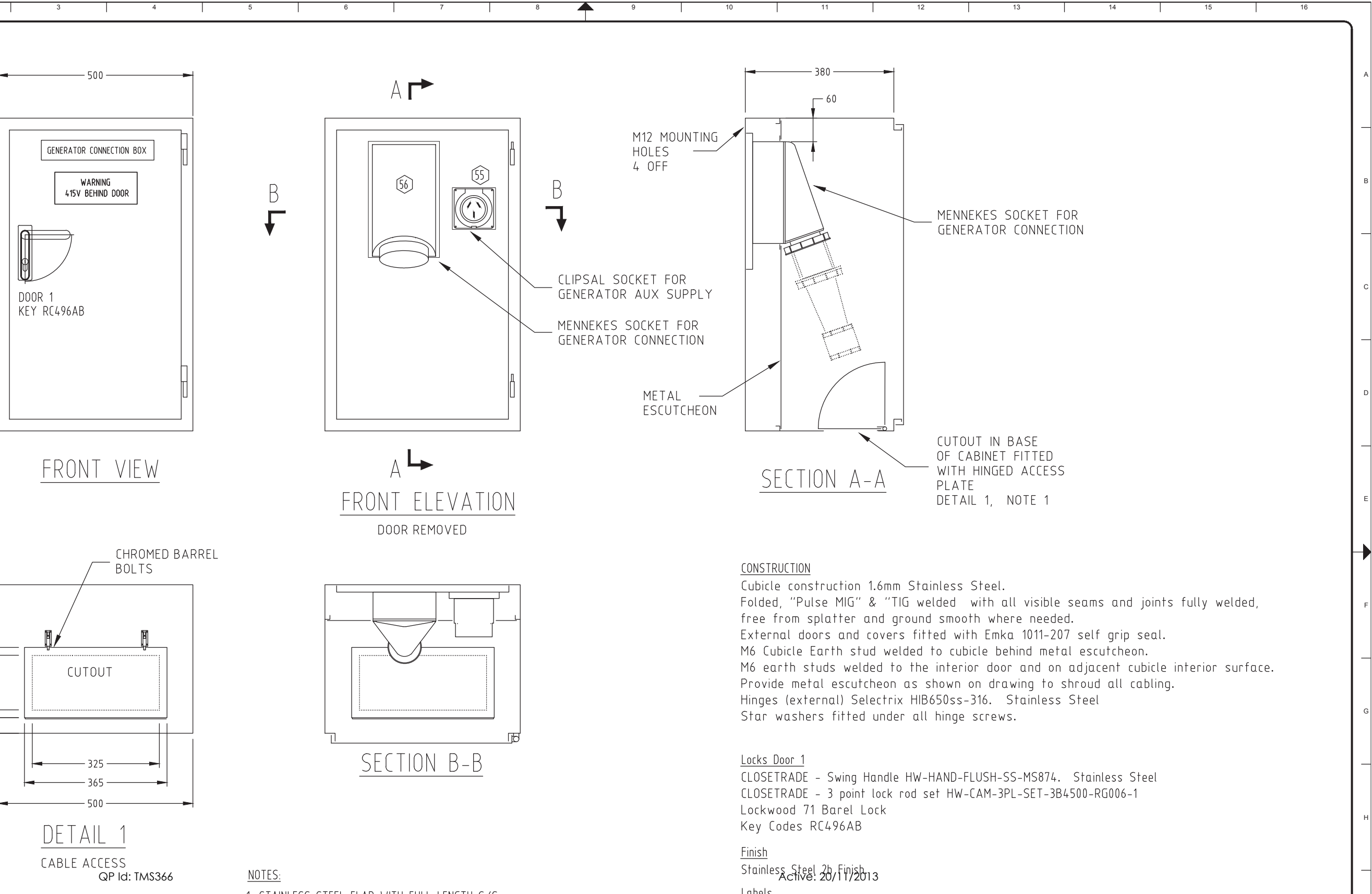


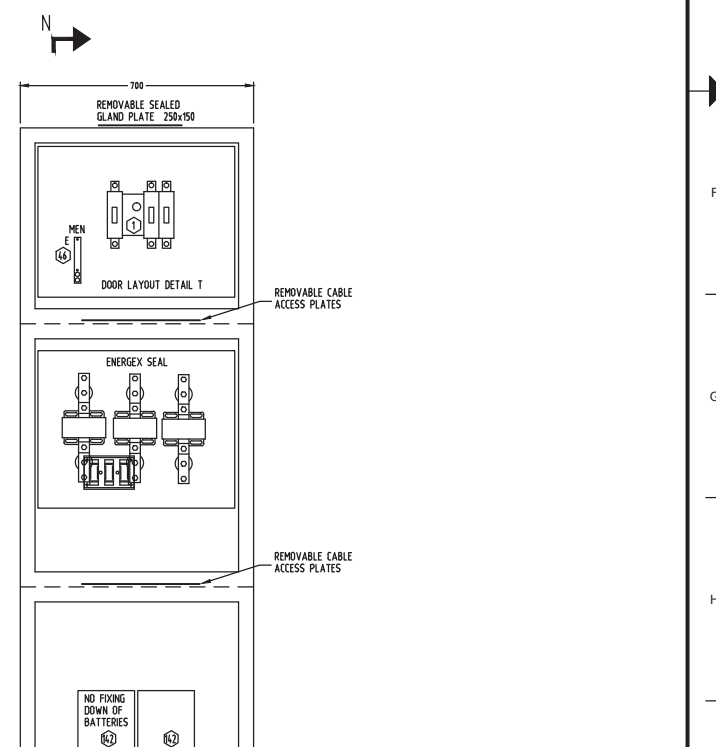
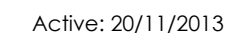


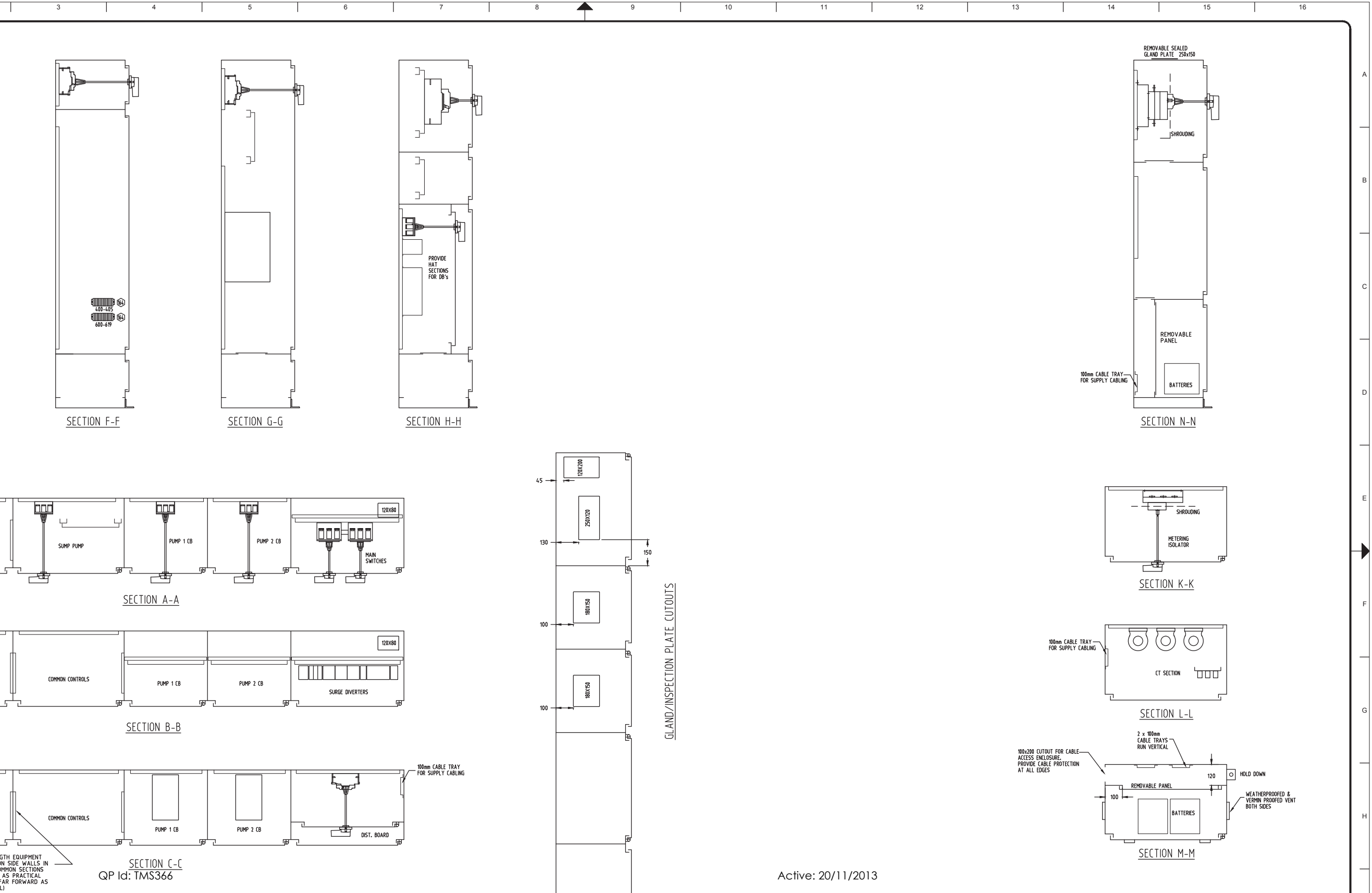


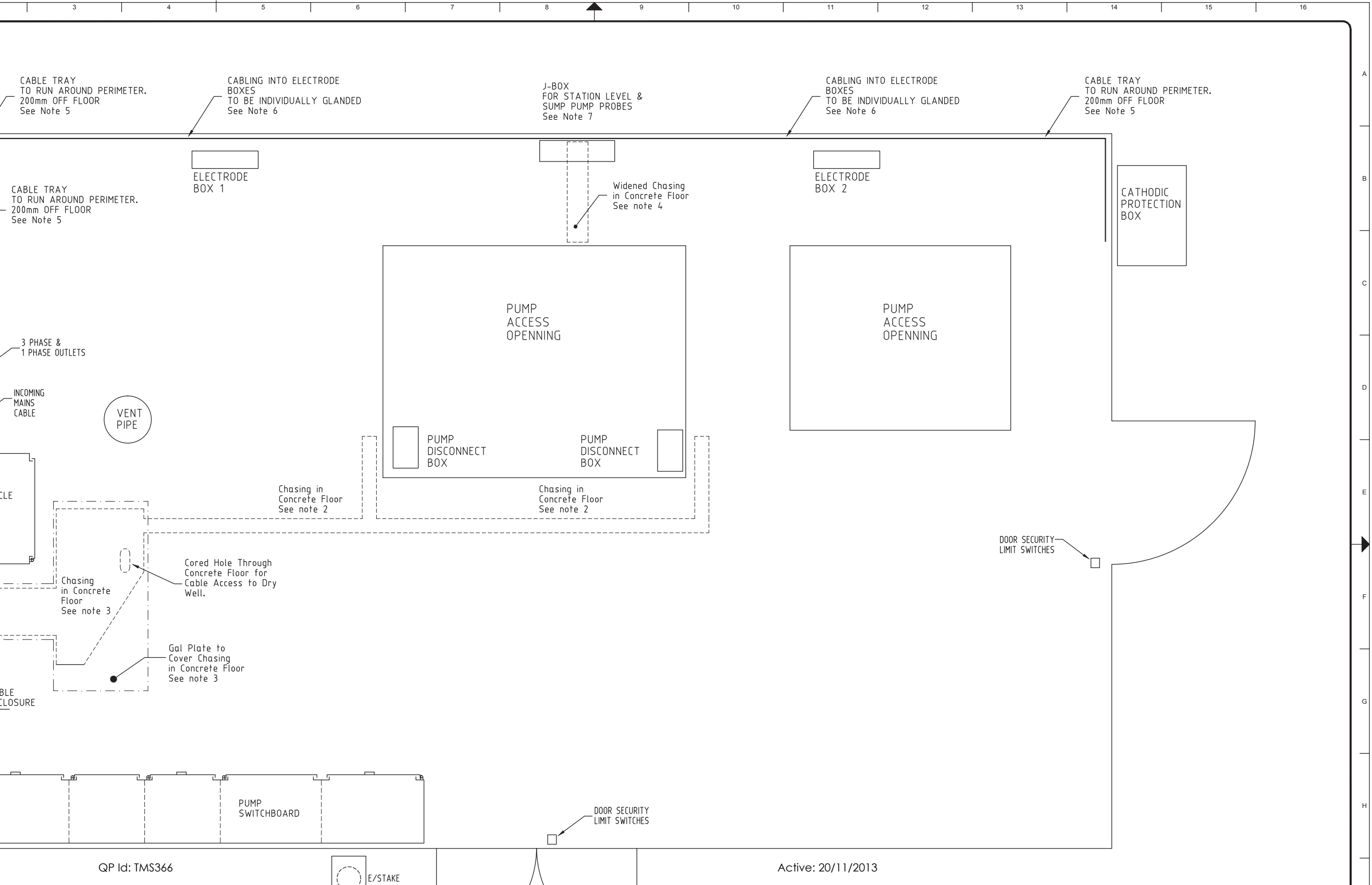
Active: 20/11/2013

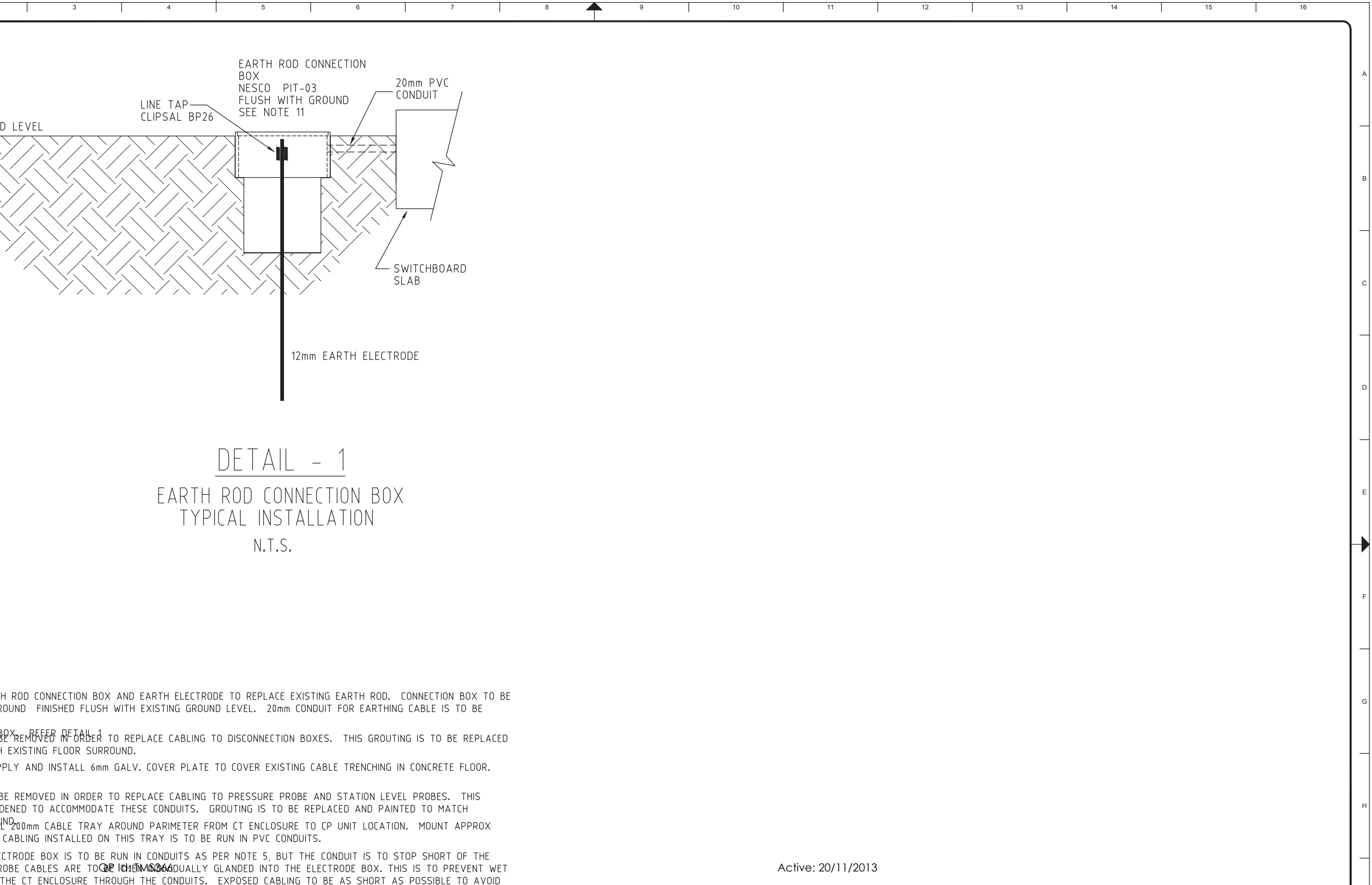
Page 174 of 179











REMOVE EXISTING EARTH ROD CONNECTION BOX AND EARTH ELECTRODE TO REPLACE EXISTING EARTH ROD. CONNECTION BOX TO BE
REMOVED IN ORDER TO REPLACE CABLING TO DISCONNECTION BOXES. THIS GROUTING IS TO BE REPLACED AND PAINTED TO MATCH
EXISTING FLOOR SURROUND.

REMOVE EXISTING EARTH ROD CONNECTION BOX AND EARTH ELECTRODE TO REPLACE EXISTING EARTH ROD. CONNECTION BOX TO BE
REMOVED IN ORDER TO REPLACE CABLING TO DISCONNECTION BOXES. THIS GROUTING IS TO BE REPLACED AND PAINTED TO MATCH
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REMOVED IN ORDER TO REPLACE CABLING TO DISCONNECTION BOXES. THIS GROUTING IS TO BE REPLACED AND PAINTED TO MATCH
EXISTING FLOOR SURROUND.