



**J. & P. RICHARDSON INDUSTRIES PTY. LTD**  
**A.C.N. 001 952 325**

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**BRISBANE CITY COUNCIL**

**SINNAMON ROAD SPS181**

**SEWAGE SUBMERSIBLE PUMP STATION**

**MECHANICAL & ELECTRICAL EQUIPMENT**

**OPERATION AND MAINTENANCE MANUAL**

**BY**  
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## I N D E X

1.0 PUMPS

2.0 TEST SHEETS

3.0 "AS CONSTRUCTED" DRAWINGS

u



## 1.0 PUMPS

SUPPLIER: ITT FLYGT LTD  
14A DEVLAN STREET  
MANSFIELD QLD 4122

PH: (07) 3849 7477  
FAX: (07) 3849 7633

MODEL:

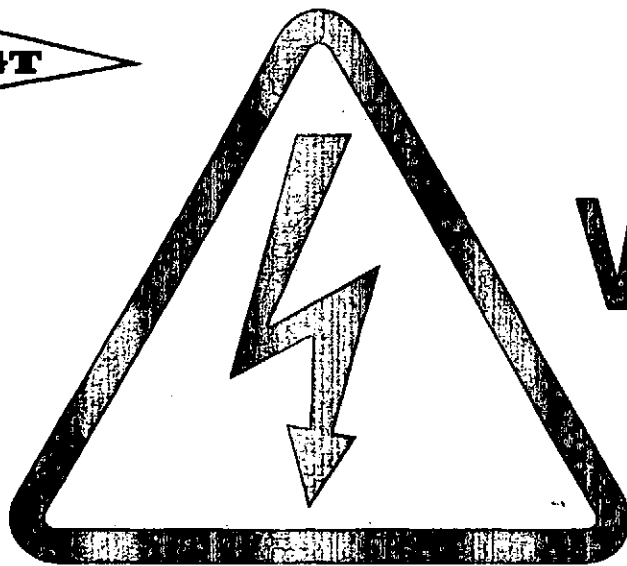
SERIAL NUMBERS: 9940283 & 9940396

MOTOR KW RATING: 13.5

MOTOR SPEED: 1450 RPM

FULL LOAD CURRENT: 26.0Amps

VOLTAGE: 415V



**WARNING!**

592 05 02

***Turn off and lock the isolating switch  
before working on the machine.***



**Position the sign  
so that it is easily visible at the  
connection to the power supply.**

**Flygt 592 05 02**

**Svep Reklam, Emmaboda**







**3126/3140/3152/  
3170/3201/3300**

## **INSTALLATION, CARE AND MAINTENANCE**



892616/03

Flygt



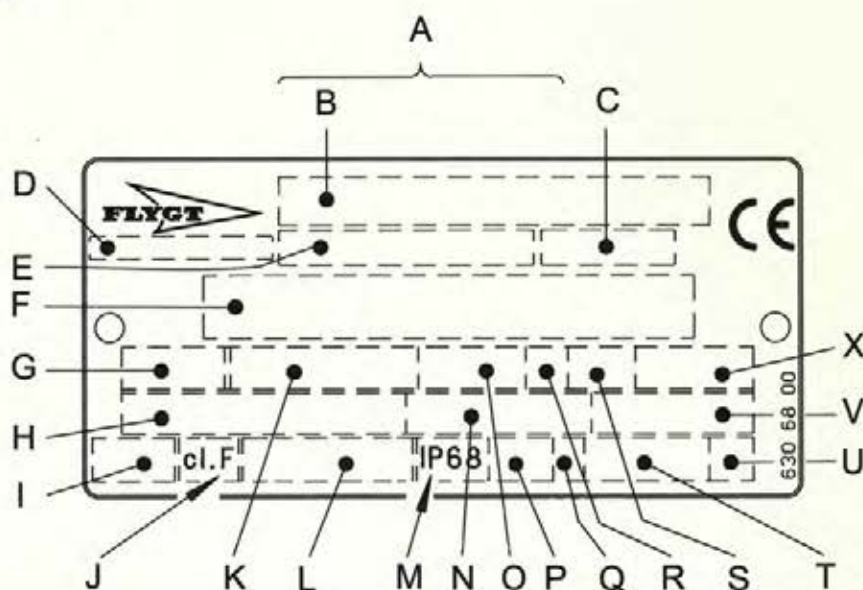
ITT Industries

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## DATA PLATE INTERPRETATION

### General data plate



A	Serial number	M	Degree of protection
B	Product code + Number	N	Rated current
C	Curve code / Propeller code	O	Rated speed
D	Country of origin	P	Max. submergence
E	Product number	Q	Direction of rotation: L=left, R=right
F	Additional information	R	Duty class
G	Phase; Type of current; Frequency	S	Duty factor
H	Rated voltage	T	Product weight
I	Thermal protection	U	Locked rotor code letter
J	Thermal class	V	Power factor
K	Rated shaft power	X	Max. ambient temperature
L	International standard		

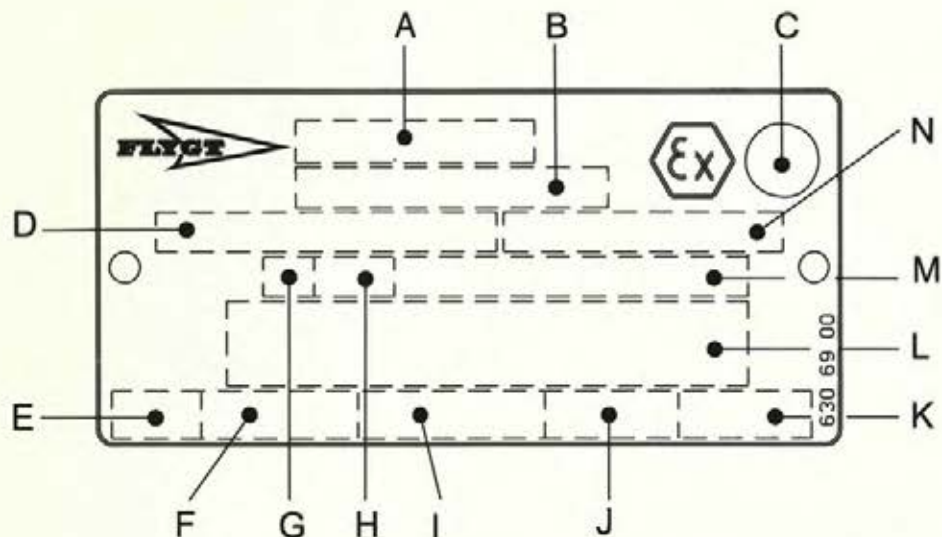
The pictures in this manual may differ somewhat from the delivered pump depending on the hydraulic end configuration.

# DATA PLATE INTERPRETATION

## Approval plates

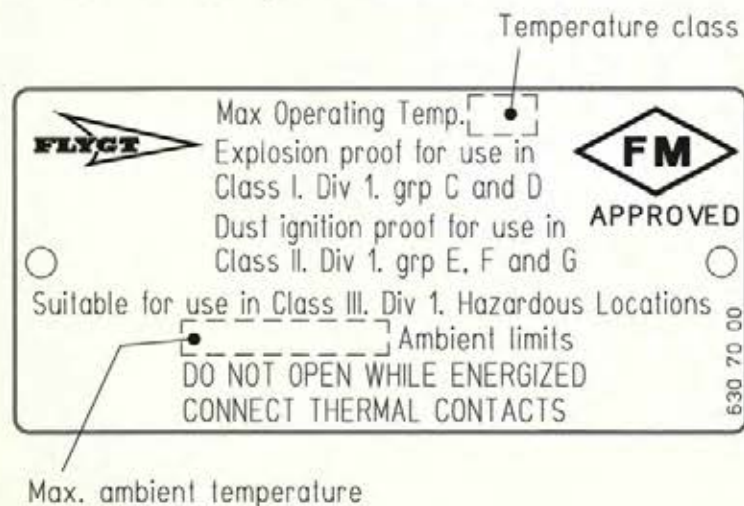
These approval plates apply to an explosion-proof submersible Flygt pump.  
The plates are used together with the general data plate on the pump.

**EN:** European Norm  
EN 50014, EN 50018, EEx dII T4



- |  |                            |
|--|----------------------------|
| A Approval                             | H Duty factor              |
| B Approval authority + Approval Number | I Input power              |
| C Approval for Class I                 | J Rated speed              |
| D Approved drive unit                  | K Controller               |
| E Stall time                           | L Additional information   |
| F Starting current / Rated current     | M Max. ambient temperature |
| G Duty class                           | N Serial number            |

**FM:** Factory Mutual  
Class I Div. I Grp C and D  
Class II and III Div. I Grp E, F and G





# PRODUCT DESCRIPTION

## Introduction

Thank you for buying a submersible Flygt pump. In this Installation, Care and Maintenance manual you will find general information on how to install and service the 3126, 3140, 3152, 3170, 3201 or 3300 pump to give it a long and reliable life. In the Parts List you will find all the specific technical data for your pump.

## Application

This Installation, Care and Maintenance manual applies to a submersible Flygt pump. If you have bought an Ex-approved pump (please see approval plate on your pump or Parts List) special handling instructions apply as described in this document.

Depending on the hydraulic end, the pump is intended to be used for:

- pumping of waste water
- pumping of light liquid manure and urine
- pumping of sludge
- pumping of ground water
- pumping of sewage if the solids need to be cut into small pieces.

The pumps must not be used in highly corrosive liquids. See pH limits below.

The pump is available for permanent installation in a sump or portable installation with hose connection and stand.

In some applications, the pump is also available for a dry stationary installation on a base stand directly connected to the inlet and outlet lines.

For further information on applications, contact your nearest Flygt representative.

## Specific technical data

For specific technical data regarding your pump, please see Parts List.

## General technical data

**Liquid temperature:** max. 40°C (104°F). If the pump is not equipped with cooling jacket, the pump can be operated at full load only if at least half the stator housing is submerged.

The pump can be equipped for operation at temperatures up to 90°C (195°F). At increased temperatures, the pump must be completely submerged when operated at full load.

Higher temperatures than 40°C (104°F) are not permitted for Ex-approved pumps.

**Liquid density:** max. 1100 kg/m<sup>3</sup> (9.2 lb per US gal.)

**The pH of the pumped liquid:** 6—13 (for cast iron pumps).

**The pH of the pumped liquid:** 3—14 (for stainless steel pumps).

**Depth of immersion:** max. 20 m (65 ft).



- In some installations and at certain operating points on the performance curve, the noise level of 70 dB or the noise level specified for the actual pump may be exceeded.
- Only Ex-approved pumps may be used in an explosive or flammable environment.

## Warranty claim

Flygt pumps are high quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, please contact your Flygt representative.



# GENERAL DESIGN OF A FLYGT PUMP

## Design

The pump is a submersible, electric motor-driven product.

### 1. Impeller

The pump is available with a wide range of impellers for different applications and capacities.

### 2. Shaft seals

The pump has two mechanical face seals – one inner and one outer, with an intermediate oil housing.

### 3. Shaft

The shaft is delivered with the rotor as an integral part. Shaft material: stainless steel or carbon steel.

### 4. Bearings

The support bearing of the rotor consists of a single-row roller bearing.

The main bearing of the rotor consists of a two-row angular contact ball bearing.

### 5. Oil housing

The oil lubricates and cools the seals and acts as a buffer between the pump housing and the electric motor.

### 6. Cooling

The stator is cooled by either the surrounding media or by forced circulation in a cooling jacket.

### 7. Motor

Squirrel-cage 1-phase or 3-phase induction motor for 50 Hz or 60 Hz.

The motor can be started by direct on-line or star-delta starting.

The motor can be run continuously or intermittently with a maximum of 15 evenly spaced starts per hour.

Flygt motors are tested in accordance with IEC 34-1.

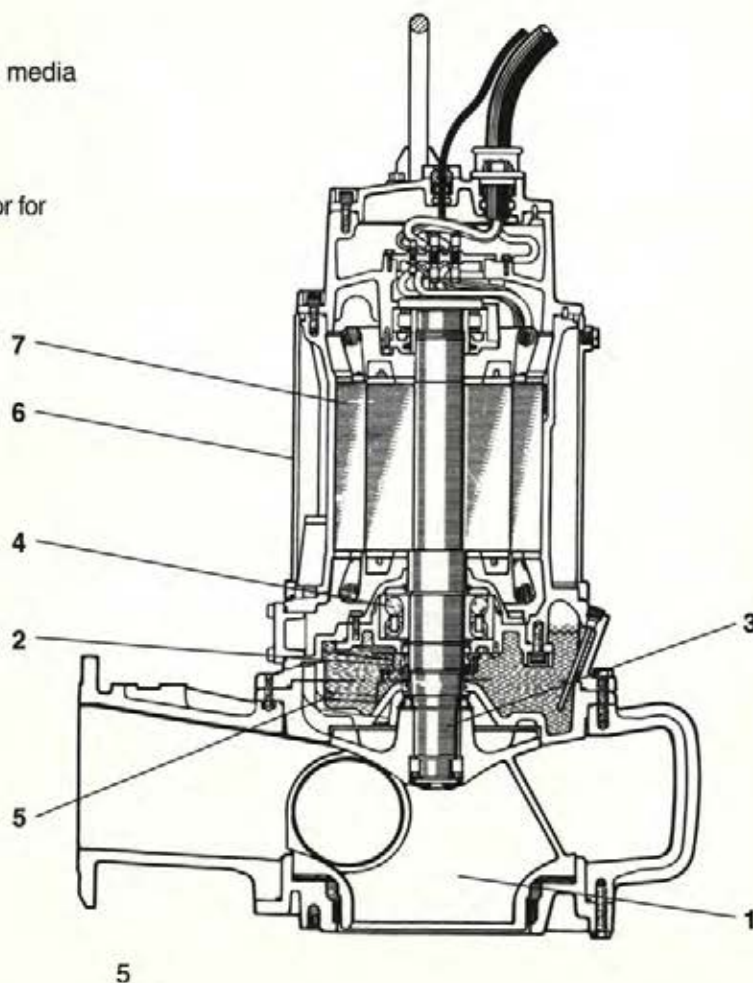
The stator is insulated in accordance with class F (155°C, 310°F). The motor is designed to deliver its rated output at  $\pm 5\%$  variation from the rated voltage. Without overheating the motor,  $\pm 10\%$  variation from the rated voltage can be accepted provided that the motor does not run continuously at full load. The motor is designed to operate at a voltage imbalance of up to 2% between the phases.

### Monitoring equipment

The stator incorporates thermal contacts connected in series.

The pump can be equipped with sensors for sensing water in the oil\* and/or stator housing.

\*Not applicable to Ex-approved pumps.



# INSTALLATION

## Handling equipment

Lifting equipment is required for handling the pump.



- **Stay clear of suspended loads.**
- **Always lift the pump by its lifting handle - never by the motor cable or the hose.**

The minimum height between the lifting hook and the floor shall be sufficient to lift the pump out of the sump.

The lifting equipment shall be able to hoist the pump straight up and down in the sump, preferably without the need for resetting the lifting hook.

Oversize lifting equipment could cause damage if the pump should stick when being lifted.

Make sure that the lifting equipment is securely anchored.

## General recommendations

To ensure proper installation, please see the dimensions on the dimensional drawing in the Parts List.

**NOTE!** The end of the cable must not be submerged. It must be above flood level, as water may penetrate through the cable into the junction box or the motor.

Check that the lifting handle and chain are in good condition.

For automatic operation of the pump (level control), it is recommended that the level regulators be used at low voltage. The data sheet delivered with the regulators gives the permissible voltage. Local rules may specify otherwise.

Clean out all debris from the sump before the pump is lowered down and the station is started.



**Special rules apply to installation in explosive atmosphere. Intrinsically safe circuits are normally required (Ex i) for the automatic level control system by level regulators.**

## Safety precautions

In order to minimize the risk of accidents in connection with the service and installation work, the following rules should be followed:

1. Never work alone. Use a lifting harness, safety line and a respirator as required. Do not ignore the risk of drowning!
2. Make sure there are no poisonous gases within the work area.
3. Check the explosion risk before welding or using electric hand tools.
4. Do not ignore health hazards. Observe strict cleanliness.
5. Bear in mind the risk of electrical accidents.
6. Make sure that the lifting equipment is in good condition.
7. Provide a suitable barrier around the work area, e.g a guard rail.
8. Make sure you have a clear path of retreat!
9. Use safety helmet, safety goggles and protective shoes.
10. All personnel who work with sewage systems must be vaccinated against diseases to which they may be exposed.
11. A first-aid kit must be close at hand.
12. Note that special rules apply to installation in explosive atmosphere.

Follow all other health and safety rules and local codes and ordinances.



# ELECTRICAL CONNECTIONS



- Before starting work on the pump, make sure that the pump and the control panel are isolated from the power supply and cannot be energized.
- If the pump is equipped with automatic level control, there is a risk of sudden restart.
- All electrical equipment must be earthed. This applies to both pump equipment and any monitoring equipment.

**Failure to heed this warning may cause a lethal accident. Make sure that the earth lead is correctly connected by testing it.**



## NOTE for Ex version

- Electrical connections on the explosion-proof motor must be made by authorized personnel.  
**Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.**
- The pump may be used only in accordance with the approved motor data stated on the pump's plates.
- Thermal contacts must be connected to protection circuit intended for that purpose according to the approval of the product.

All electrical work shall be carried out under the supervision of an authorized electrician.

Local codes and regulations shall be complied with.

Check on the data plate which voltage supply is valid for your pump.

Check that the main voltage and frequency agree with the specifications on the pump data plate.

If the pump can be connected to different voltages, the connected voltage is specified by a yellow sticker.

Connect the motor cable to the starter equipment as illustrated in the wiring diagrams.

## Conductors that are not in use must be isolated.

The cable should be replaced if the outer sheath is damaged. Contact a Flygt service shop.

Make sure that the cable does not have any sharp bends and is not pinched.

Under no circumstances may the starter equipment be installed in the sump.

**NOTE!** For safety reasons, the earth conductor should be approx. 50 mm (2.0") longer than the phase conductors. If the motor cable is jerked loose by mistake, the earth conductor should be the last conductor to come loose from its terminal. This applies to both ends of the cable.

Thermal contacts are incorporated in the stator. The thermal contacts can be connected to max 250 V, breaking current max 4 A. Flygt recommends that they be connected to 24 V over separate fuses to protect the other automatic equipment.

**NOTE!** If the pump optionally is equipped with thermistors in the stator winding, make sure that the thermistors are never exposed to voltages higher than 2.5 V. If the voltage exceeds this value, e.g. when the control circuit is being checked, the thermistors will be destroyed.

Make sure that the pump is correctly earthed (grounded).

When using a variable-frequency-drive (VFD) special rules have to be followed to avoid clogging and overheating. Contact your Flygt representative and ask your VFD-supplier for electrical limitations.



# ELECTRICAL CONNECTIONS

Remember that the starting current in direct on-line starting can be up to six times higher than the rated current. Make sure that the fuses or circuit breakers are of the proper rating.

The Parts List gives rated current. Fuse rating and cable shall be selected in accordance with local rules and regulations. Note that with long cables, the voltage drop in the cable must be taken into consideration, since the motor's rated voltage is the voltage that is measured at the terminal board in the pump.

The overload protection (motor protection breaker) for direct on-line starting shall be set to the motor rated current as given on the data plate.

Check the phase sequence in the mains with the phase sequence indicator.

If intermittent operation is prescribed (see Data Plate), the pump shall be provided with control equipment that provides such operation.

## Monitoring equipment

A plate in the junction box shows if the pump is equipped with sensors.

**CLS-30** is a leakage sensor for sensing water in the oil housing and initiates an alarm when the oil contains 30% water. Oil change is recommended after the alarm. If the sensor initiates an alarm shortly after the oil is changed, contact your nearest Flygt representative. The CLS sensor is installed in the bearing housing and goes down into the oil housing. The sensor is not applicable to Ex-approved pumps.



**CLS sensor body made of glass.  
Handle with care.**

The **FLS** sensor consists of a small float switch for sensing water in the stator housing. Its design makes it suitable for pumps in vertical installations. The FLS sensor is installed in the bottom of the stator housing.

The two sensors, CLS and FLS, can be used in the same pump. They are connected in parallel. Follow the instructions for monitoring equipment.

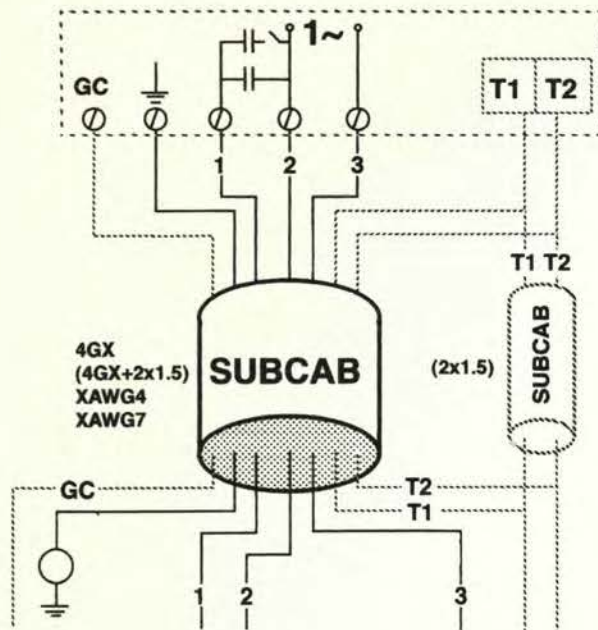
The **MiniCas II** is a monitoring relay to which CLS and/or FLS are connected.

Check:

- signals and tripping function.
- that relays, lamps, fuses and connections are intact.

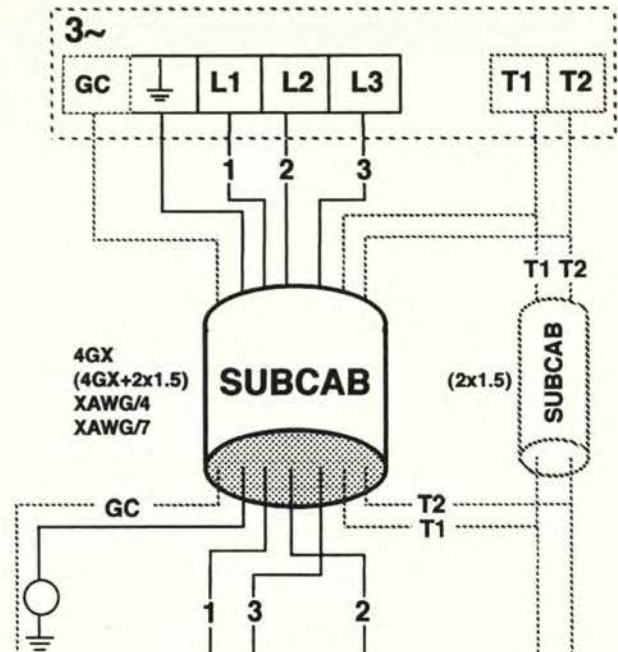
Replace defective equipment.

# CABLE CHART



## Single-phase

Conductors	Connection starter
<b>SUBCAB/SUBCAB AWG*</b>	
Brown (Red*)	1
Black (Black*)	2
Blue (White*)	3
Yellow/green	Earth
Yellow*	GC**
Black T1/orange*	T1
Black T2/Blue*	T2



## 3-phase, direct-on-line starting

Conductors	Connection starter
<b>SUBCAB/SUBCAB AWG*</b>	
Brown (Red*)	1
Blue (White*)	2
Black (Black*)	3
Yellow/green	Earth
Yellow*	GC**
Black T1/orange*	T1
Black T2/Blue*	T2

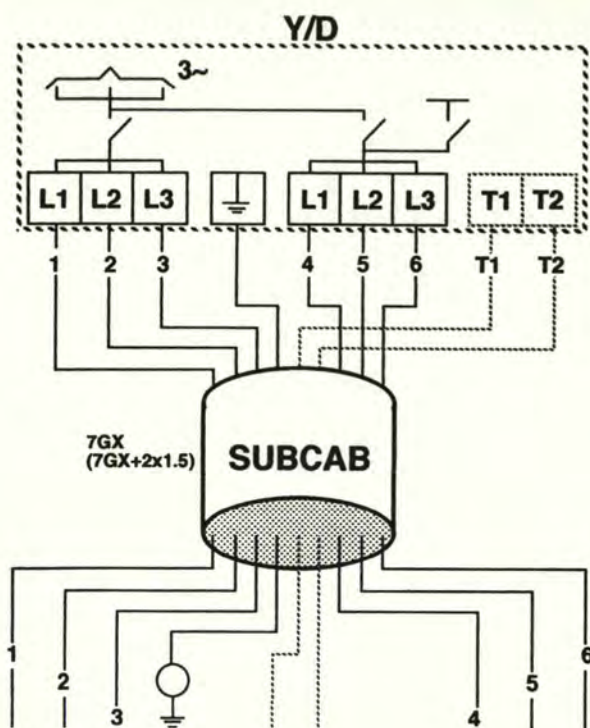
\* Terminal for connection of thermal contacts in the motor and monitoring equipment.

\*\* GC = Ground Check

SUBCAB is a registered trademark of ITT Flygt AB for electrical cables.

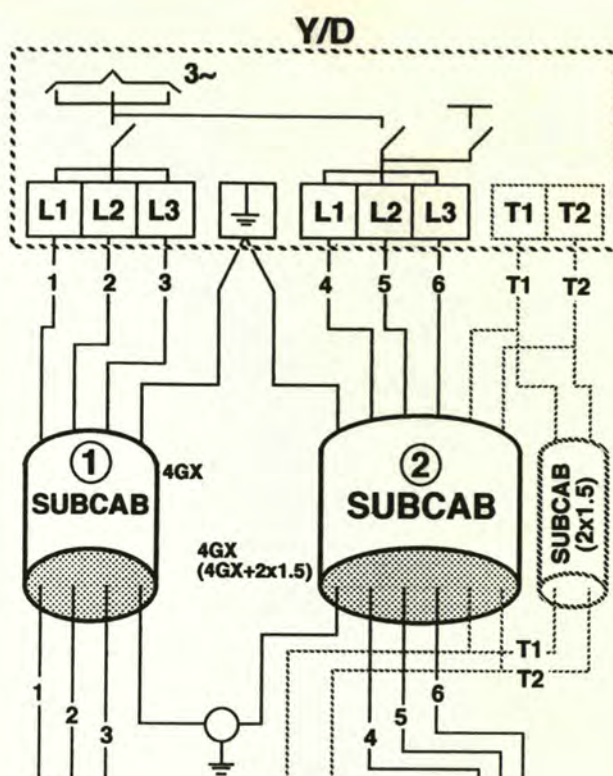


# CABLE CHART



## 3-phase, star-delta starting

	Conductors	Connection starter
SUBCAB	Black 1	1
	Black 2	2
	Black 3	3
	Black 4	4
	Black 5	5
	Black 6	6
	Yellow/green	Earth
	Black T1	T1
	Black T2	T2



## 3-phase, star-delta starting

	Conductors	Connection starter
SUBCAB 1+2	Brown	1/4
	Blue	2/5
	Black	3/6
	Yellow/green	Earth
	Black T1	T1
	Black T2	T2

SUBCAB is a registered trademark of ITT Flygt AB for electrical cables.

## TRANSPORTATION AND STORAGE

The pump can be transported and stored in a vertical or horizontal position.



- **Always lift the pump by its lifting handle – never by the motor cable or the hose.**
- **Make sure that the pump cannot roll or fall over and injure people or damage property.**

The pump is frostproof as long as it is operating or is immersed in the liquid. If the pump is raised when the temperature is below freezing, the impeller may freeze.

The pump shall be run for a short period after being raised in order to discharge all remaining water.

A frozen impeller can be thawed by allowing the pump to stand immersed in the liquid for a short period before it is started. Never use a naked flame to thaw the pump.

For longer periods of storage, the pump must be protected against moisture and heat. The impeller should be rotated occasionally (for example every other month) to prevent the seals from sticking together.

After a long period of storage, the pump should be inspected before it is taken into operation. Pay special attention to the seals and the cable entry.

Follow the instructions under the heading "Before starting".

# OPERATION

## Before starting



- Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.
- Make sure that the pump cannot roll or fall over and injure people or damage property.

Check that the visible parts on the pump and installation are undamaged and in good condition.

Check the oil level in the oil housing.

Remove the fuses or open the circuit breaker and check that the impeller can be rotated freely.

Check that the monitoring equipment (if any) works.

Check the direction of rotation. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. See the figure.

In the case of dry installation, check the direction of rotation through the inlet elbow access cover.

Transpose two phase leads if the impeller rotates in the wrong direction (3 ~).



**In some installations the pump surface and the surrounding liquid may be hot. Bear in mind the risk of burn injuries.**

## Starting jerk



**Watch out for the starting jerk, which can be powerful.**



## CARE AND MAINTENANCE



**Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.**

**This applies to the control circuit as well.**



### **NOTE for Ex version**

**All work on the explosion-proof motor section must be performed by personnel authorized by Flygt.**

**Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.**



**Make sure that the pump cannot roll or fall over and injure people or damage property.**

The following points are important in connection with work on the pump:

- Make sure that the pump has been thoroughly cleaned.
- Beware of the risk of infection.
- Follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after dismantling.
- The oil housing may be under pressure. Hold a rag over the oil screw to prevent splatter.

Proceed as follows if hazardous chemicals have splashed into your eyes:

- Rinse your eyes immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- Contact an eye specialist.

On your skin:

- Remove contaminated clothes.
- Wash your skin with soap and water.
- Seek medical attention, if required.

## **Inspection**

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least once a year, but more frequently under severe operating conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop at least every third year for permanent installation and every year for portable pumps. This requires special tools and should be done by an authorized service shop.

If the seals have been replaced an inspection of the oil is recommended after one week of operation.

**NOTE!** Regular check of the condition of the lifting handle and chain is important.

### **Inspection of hot water applications**

Pumps in hot water applications shall undergo inspection or overhaul at a service shop as follows, depending on the time they have been submerged in the hot water:

Temp.	Mode of operation	Inspection	Shop overhaul
≤70°C (160°F)	Continuous	1000 hours	4000 hours
≤70°C (160°F)	Intermittent	twice a year	once a year
≤90°C (195°F)	Cont./Int.	6 times a year	twice a year



# OIL CHANGE

A check of the condition of the oil can show whether there has been leakage. Note! Air/oil mixture can be confused with water/oil mixture.

Insert a tube (or hose) into the oil hole. Cover the top end of the tube and take up a little oil from the bottom.

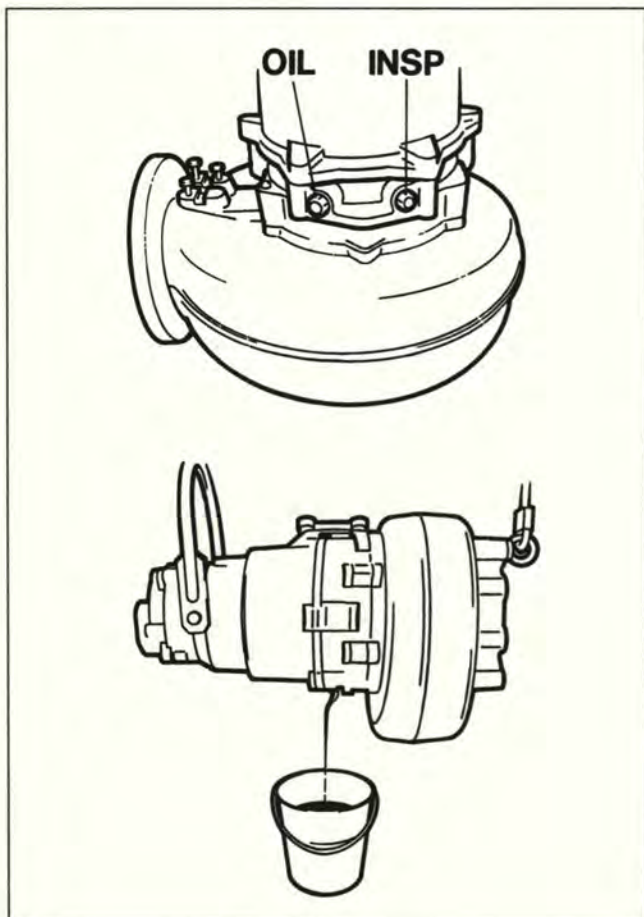
Change the oil if it contains too much water, i.e. if it is heavily emulsified (cream-like), or if the oil housing contains free water. Check again one week after changing the oil.



**The oil housing may be under pressure. Hold a rag over the oil screw to prevent splatter.**

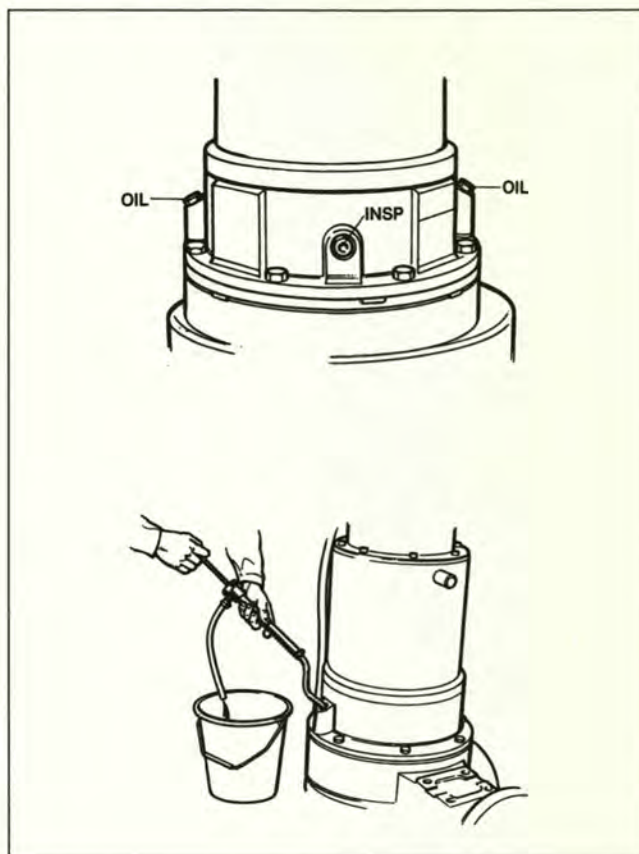
## 3126 / 3140 / 3152

1. Suspend the pump horizontally from an overhead crane.
2. Unscrew the oil housing screw marked "oil out". Emptying the oil must be done through the "oil out" hole. Turn the pump so that the oil hole faces downwards. It is easier to drain the oil if the oil hole screw "oil in" is also removed.



## 3170 / 3201 / 3300

1. Unscrew the oil housing screw marked "oil out". Emptying the oil must be done through the "oil out" hole.
2. Pump out the oil. Using the oil drainage pump 83 95 42 or an equivalent pump. Make sure that the suction tube goes all the way down to the oil housing bottom.



## 3126 / 3140 / 3152 / 3170 / 3201 / 3300

3. Install the "oil out" screw and fill with oil through the other hole. It is important that the oil be added through the hole marked "oil in" since the oil housing must contain some air for pressure equalization. A paraffin oil with viscosity close to ISO VG15 (e.g. Mobile Whiterex 309) is recommended. The pump is delivered from the factory with this type of oil. In applications where poisonous properties are of less concern, a mineral oil with viscosity up to ISO VG32 can be used.

Please see Parts List for the correct volume and tightening torque.

4. Always replace the O-rings under the oil housing screws with new ones.

## SERVICE LOG

Most recent service date	Pump No.	Hours of operation	Remarks	Sign.



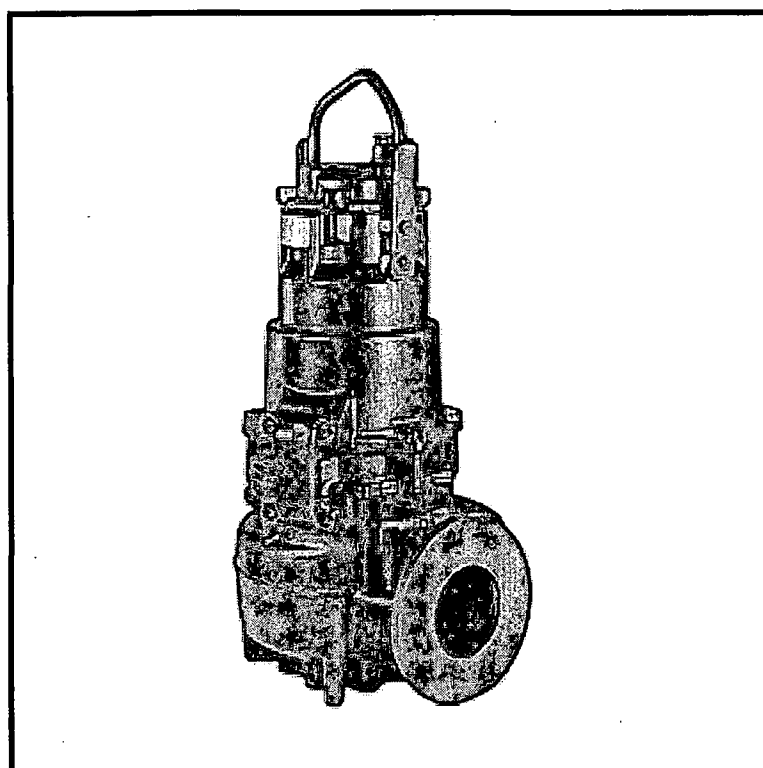




## **FLYGT SUBMERSIBLE PUMP**

### **PARTS LIST CP 3152 HT**

**SERIAL NO 3152.181 9940283**



**ITT FLYGT LTD.  
P O BOX 1425  
LEVEL 4 THE OCTAGON 99 PHILLIP STR**

**PARRMAATTA NSW 2124  
AUSTRALIA  
TELEPHONE NO: 2-92020600**

Flygt



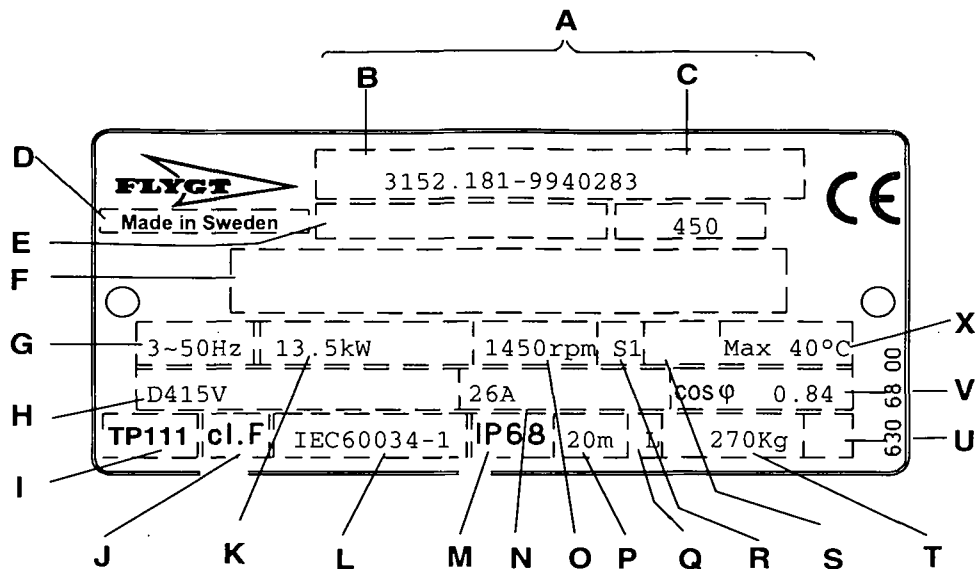
**ITT Industries**

# DATAPLATE

**FLYGT CP 3152 HT**

**DATE: 1999-06-10**

**SERIAL NO: 3152.181 9940283**



## Dataplate interpretation:

- |  |  |
|--|--|
| <b>A</b> Serial number                     | <b>M</b> Degree of protection                  |
| <b>B</b> Product code + Number             | <b>N</b> Rated current                         |
| <b>C</b> Curv code / Propeller code        | <b>O</b> Rated speed                           |
| <b>D</b> Country of origin                 | <b>P</b> Max. submergence                      |
| <b>E</b> Product number                    | <b>Q</b> Direction of rotation R=right, L=left |
| <b>F</b> Additional information            | <b>R</b> Duty class                            |
| <b>G</b> Phase; Type of current; Frequency | <b>S</b> Duty factor                           |
| <b>H</b> Rated voltage                     | <b>T</b> Product weight                        |
| <b>I</b> Thermal protection                | <b>U</b> Locked rotor code letter              |
| <b>J</b> Thermal class                     | <b>V</b> Power factor                          |
| <b>K</b> Rated shaft power                 | <b>X</b> Max. ambient temperature              |
| <b>L</b> International standard            |  |

(1 kg = 220 pound, 1 Lit=0.26 US gallon, 1 l = 0,22 UK gallon)

## Recommended spare parts:

See REC. column: A = Parts for inspection and maintenance

B = Parts for major overhaul

## For service;

To ensure long operating life use Flygt Bearing Grease 90 20 61 (Cartridge).

Lubrication kit 84 15 40 contains two 90 20 61 and one 84 15 30 (Grease gun).

The O-ring kit contains a full set of O-rings. Position no 800.

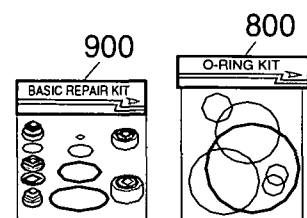
The Basic Repair kits contain both inner and outer Mechanical seals, bearings and a O-ring kit. Position no 900.

A complete set of tools can be ordered for repair and maintenance work, i.e. standard hand tools and special tools for seal change and hydraulic-end use.

## Order:

This partlist can be used as an order form by marking out the number of parts in the Qty/Order column.

Please send or fax the form to your Flygt representative.



## PARTS LIST

### FLYGT CP 3152 HT

**SERIAL NO 3152.181 9940283**

Item no	Part no	Rec	Denomination	Qty/ord.
1	510 79 00		Lifting handle	1
2	81 41 55	B	Hexagon head screw M12X30-A2-70	4
7	83 45 59		Cable tie 200X2,4 PA 6/6 -55+105	1
8	630 68 00		Data plate	2
9	404 12 00		Instruction plate	1
9	426 71 00		Connection plate	1
9	426 75 00		Connection plate	1
9	550 24 00		Connection plate	1
10	82 20 88		Drive screw 4X5-A2-70	10
23	94 20 56	B	Motor cable SUBC 4G6+2X1.5 MM2	20.5 m
24	394 77 90		Cable entry unit	1
26	81 41 55		Hexagon head screw M12X30-A2-70	2
28	82 40 77	AB	Washer 24.5X52X2-A2-70	2
28	82 40 78	AB	Washer 26.5X52X2-A2-70	2
29	84 35 52	AB	Seal sleeve (22)-24 MM	1
29	84 35 53	AB	Seal sleeve (24)-26 MM	1
32	392 00 15		Entrance cover	1
33	82 74 93	AB	O-ring 199.3X5.7-NBR	1
35	82 00 69		Socket head screw M12X30-A2-70	4
43	426 84 00		Terminal board unit	1
44	305 97 02	B	Gasket	1
45	81 41 06		Hexagon head screw M8X25-A2-70	4
46	82 35 16		Washer 8-A2-A 140	4
49	83 42 29	B	End sleeve 4.0MM2; L=10MM	6
49	83 42 30	B	End sleeve 6.0MM2; L=10MM	4
49	83 42 36	B	End sleeve 0.75MM2; L=6MM	2
49	83 42 38	B	End sleeve 1.5MM2; L=7MM	2
52	94 05 17	B	Insulating hose pvc	0.16 m
53	81 41 04		Hexagon head screw M8X20-A2-70	2
56	303 09 00	B	Earthing plate	2
57	395 61 00		Disc	1
58	319 09 01	B	Cover	1
59	82 58 96	B	Retaining ring SGA 25	1
60	82 44 09	B	Supporting washer 25X35X2	1
61	82 46 36	B	Roller bearing NU 206 ECP	1

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

Item no	Part no	Rec	Denomination	Qty/ord.
62	82 62 12	B	Retaining ring SGH 62	1
63	510 85 00	B	Protective washer	1
69	510 80 00		Stator housing	1
70	82 00 71		Socket head screw M12X40-A2-70	3
72	82 74 98	B	O-ring 249,3X5,7-NBR	1
73	510 88 05		Shaft unit	1
79	530 22 44		Stator 25-15-4a	1
82	381 69 00		Outer casing	1
83	82 75 01	B	O-ring 279,3X5,7 NBR	2
85	82 00 73		Socket head screw M12X50-A2-70	3
94	381 71 01		Discharge pipe	1
98	82 00 69		Socket head screw M12X30-A2-70	4
100	381 74 00	B	Gasket	2
105	635 38 00		Bearing housing	1
107	82 59 08	B	Retaining ring SGA 45	1
108	82 44 17		Supporting washer 45X55X3	2
109	83 36 94	B	Ball bearing 3309 C3 45X100X39,7	1
110	510 84 00		Bearing cover	1
111	82 74 12	B	O-ring 99,1X5,7 NBR	1
112	81 41 08		Hexagon head bolt M8X35-A2-70	3
113	82 34 41		Washer 8 200 HV	3
114	337 85 09	B	Mechanical seal	1
114.1	82 74 65		O-ring 59,5X3,0-NBR	1
114.4	82 77 85		O-ring	1
114.5	301 19 11		Tension spring	1
120	428 22 01	B	Inspection screw	1
121	82 70 34	B	Hexagon plug	2
122	82 73 90	AB	O-ring 19.2X3.0 NBR	1
122	82 73 90	AB	O-ring 19.2X3.0 NBR	2
122	82 77 30	AB	O-ring 28,17X3,53-1 NBR	4
122	82 77 30	AB	O-ring 28,17X3,53-1 NBR	2
123	461 77 00		Sleeve	1
129	620 76 00		Oil housing bottom	1
130	82 75 03	B	O-ring 299,3X5,7 NBR	2
133	82 00 71		Socket head screw M12X40-A2-70	3
134	381 61 00		Washer	1
135	306 73 00		Hexagon screw	6
136	302 21 00		Compression spring	6
137	382 83 01	B	Wear protection	1
141	384 00 09	B	Mechanical seal	1
141.1	82 80 89		O-ring	1

Ordered by:

Company:.....Ref:.....Tel:.....Date:.....

## PARTS LIST

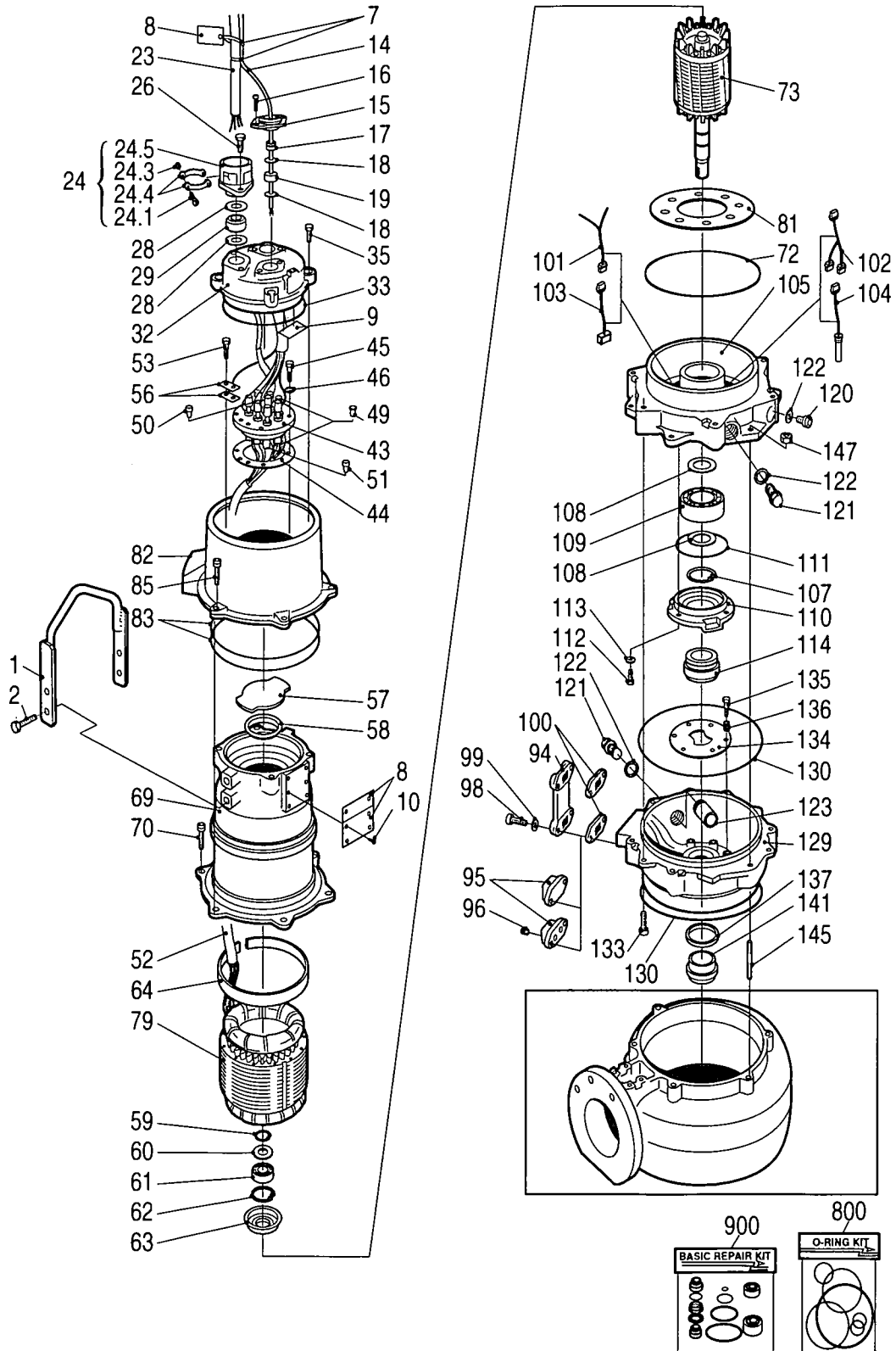
Item no	Part no	Rec	Denomination	Qty/ord.
141.3	82 81 00		O-ring	1
141.8	574 25 00		Cuff	1
141.9	82 61 05		Retaining ring	1
145	80 95 37		Stud 12X90-A2-70	6
147	82 23 59		Hexagon nut M12-A2-70	6
148	80 70 10	B	Parallel key 10H7X8H11X45	1
158	381 06 00	B	Impeller unit	1
158.1	345 25 06	AB	Wear ring	1
162	381 62 00	B	Washer	1
169	84 42 58		Socket head screw MC6S 12X60-2343	1
184	314 88 01	AB	Ring	1
200	408 51 00		Pump housing	1
209	380 91 00		Guiding claw	1
210	81 41 58		Hexagon head bolt M12X45-A2-70	4
800	80 32 35		O-rings kit 3152.090,091,120,180,181	1
900	601 89 20		Basic repair kit 3152.091+181	1
900	601 89 21		Basic repair kit 3152.091+181	1
	90 17 52		Paraffin oil MOBIL OIL WHITEREX 309	4.5 l
	90 20 54		Bearing grease ESSO UNIREX N3	0.035 kg
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....
...	.....		.....	....

Ordered by:

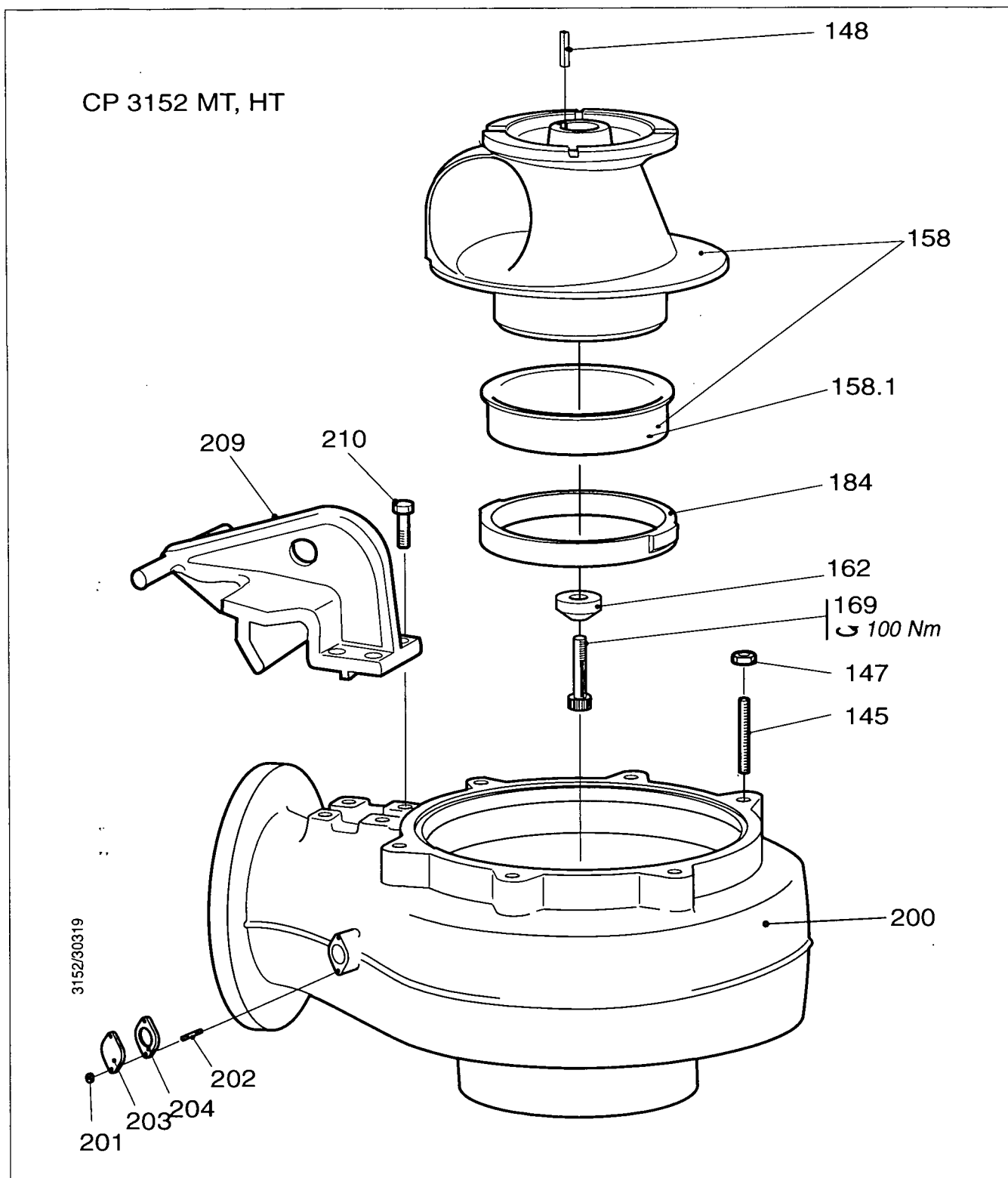
Company:.....Ref:.....Tel:.....Date:.....

## EXPLODED VIEW

3152.181



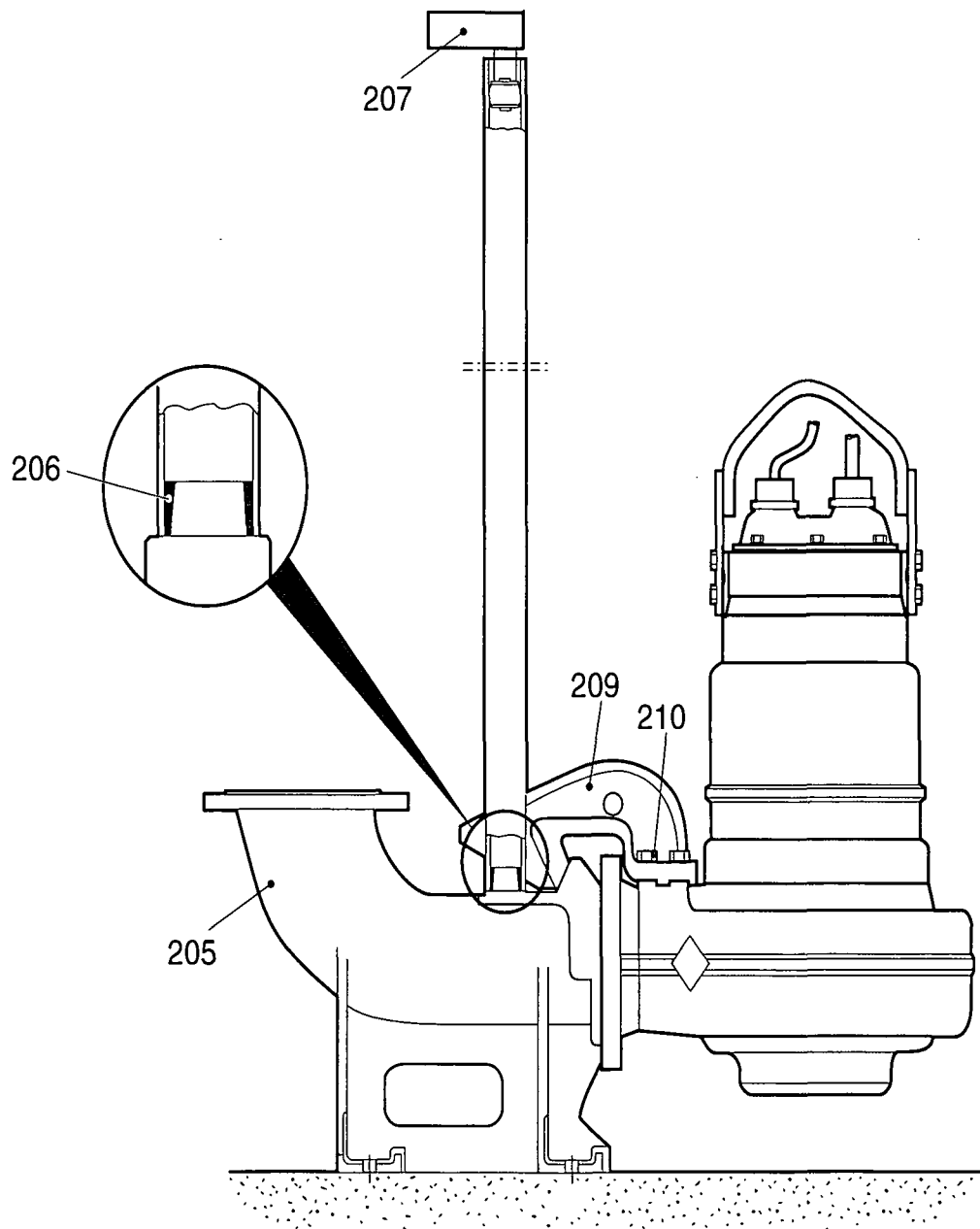
## HYDRAULIC PARTS





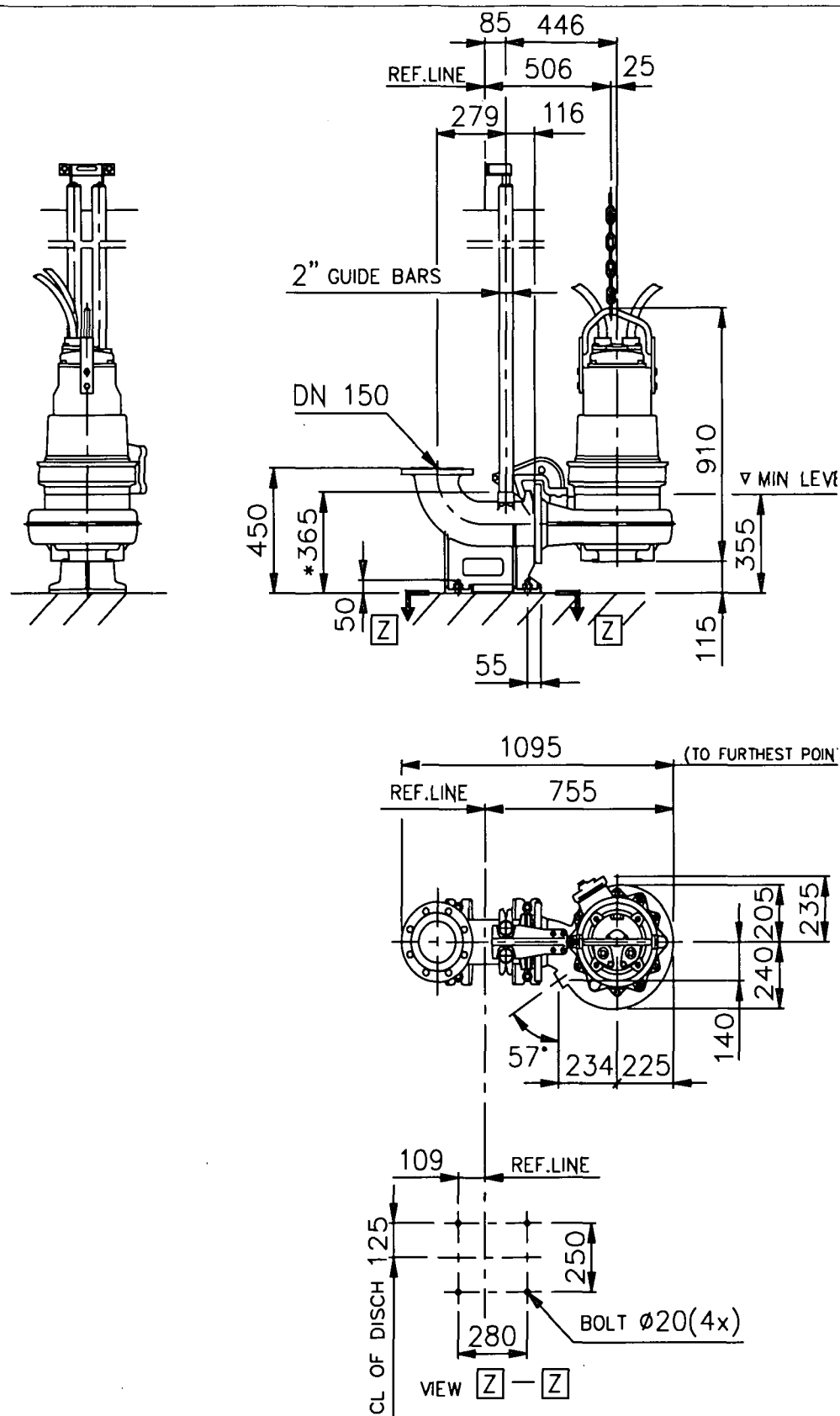
## CONNECTION

CP/DP/HP/NP 3152.091/181



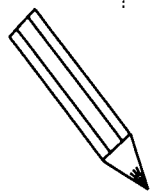
30371

# DIMENSIONAL DRAWING

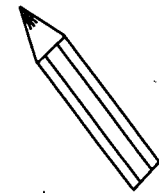


5391600B

\* DIMENSION TO ENDS OF GUIDE BARS



11



**Flygt**



**ITT Industries**

[www.flygt.com](http://www.flygt.com)

## 2.0 TEST SHEETS

3 2-00:13:45 :ITT Industries

:61 7 3849 7633

# 2/ 3

27/01/00

09:04

ITT FLYGT → FLYGT QLD

NO.829

D03



# TEST REPORT

## PRODUCT

Serial No. 3152.181	9940283	Performance curve No. 53-450-00-5360	Motor module/type 153	Voltage (V) 415
Base module 060	Impeller No. 381 06 00	Gear type	Gear ratio	Imp.diam/Blade angle Water temp °C 21.0

## TEST RESULTS

Pump total head H (m)	Volume rate of flow Q (l/s)	Motor input power P (kW)	Voltage U (V)	Current I (A)	Overall efficiency $\eta$ (%)
33.35	0.0	9.83	416	17.9	0.00
31.19	6.3	9.99	416	18.1	19.22
29.37	13.4	10.98	416	19.4	35.29
27.99	20.0	12.15	416	20.7	45.16
25.20	31.8	14.07	415	23.2	55.80
22.75	40.4	15.36	415	24.8	58.64

BRISBANE C.C. SPS 181  
WINDEMERE EST STAGE 6.

Accepted after ISO2548C	Test facility FAUS Australia	Test date 1	Time 00-01-24 14:38	Chief tester PETER KELLY
----------------------------	------------------------------------	----------------	------------------------	-----------------------------

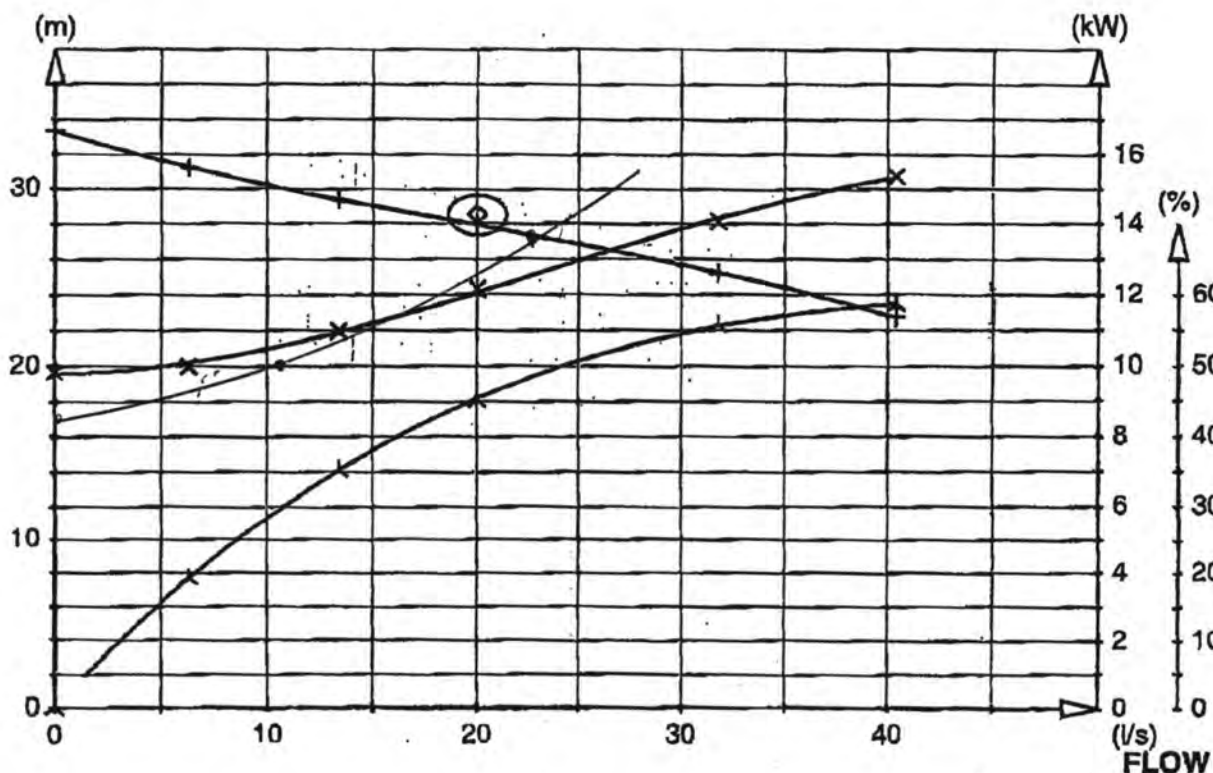
J&amp;P RICHARDSON

## PLOTTED TEST RESULTS

Measured point:  $\circ$  = Q/H  $\times$  = Q/P  
Duty point:  $\diamond$  = Q/H  $\square$  = Q/P  $\triangle$  = Q/ETA overall  
Calculated point:  $\wedge$  = Q/ETA overall 4

TOTAL HEAD

INPUT POWER



27/01/00

09:04

ITT FLYGT → FLYGT QLD

NO.829

002


**FLYGT**

# TEST REPORT

## PRODUCT

Serial No. 3152.181	9940396	Performance curve No. 53-450-00-5360	Motor module/type 153	Voltage (V) 415
Base module 060	Impeller No. 381 06 00	Gear type	Gear ratio	Imp.diam/Blade angle Water temp °C 21.0

## TEST RESULTS

Pump total head H (m)	Volume rate of flow Q (l/s)	Motor input power P (kW)	Voltage U (V)	Current I (A)	Overall efficiency $\eta$ (%)
33.85	0.0	9.79	417	18.5	0.00
31.26	7.3	10.25	417	19.1	21.76
29.36	14.5	11.04	417	20.0	37.92
28.26	20.2	11.91	416	21.0	47.00
25.87	30.4	13.57	416	23.3	56.91
22.20	43.7	15.47	417	25.9	61.48

BRISBANE C. C. SPS 181  
WINDEMERE EST STAGE 6.

Accepted after ISO2548C	Test facility FAUS Australia	Test date 1	Time 00-01-25 09:21	Chief tester PETER KELLY
----------------------------	------------------------------------	----------------	------------------------	-----------------------------

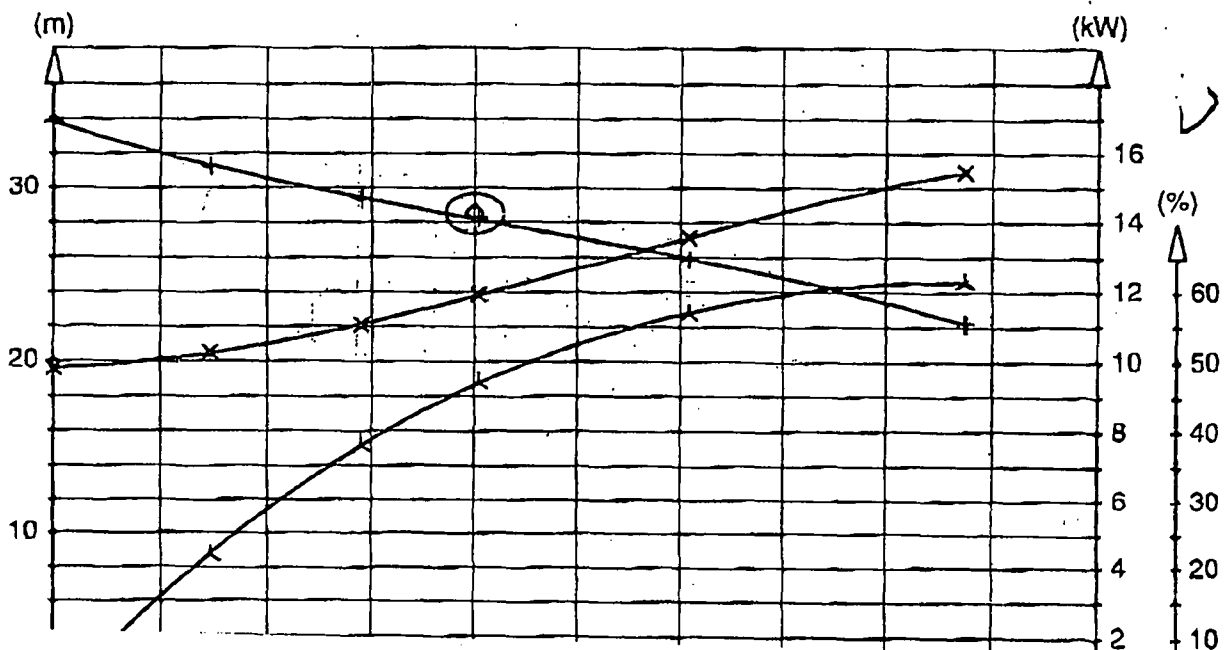
J&amp;P RICHARDSON

## PLOTTED TEST RESULTS

Measured point:  $\pm$  = Q/H  
X = Q/P  
Duty point:  $\diamond$  = Q/H  
 $\square$  = Q/P  
 $\Delta$  = Q/ETA overall  
Calculated point:  $\lambda$  = Q/ETA overall  
4

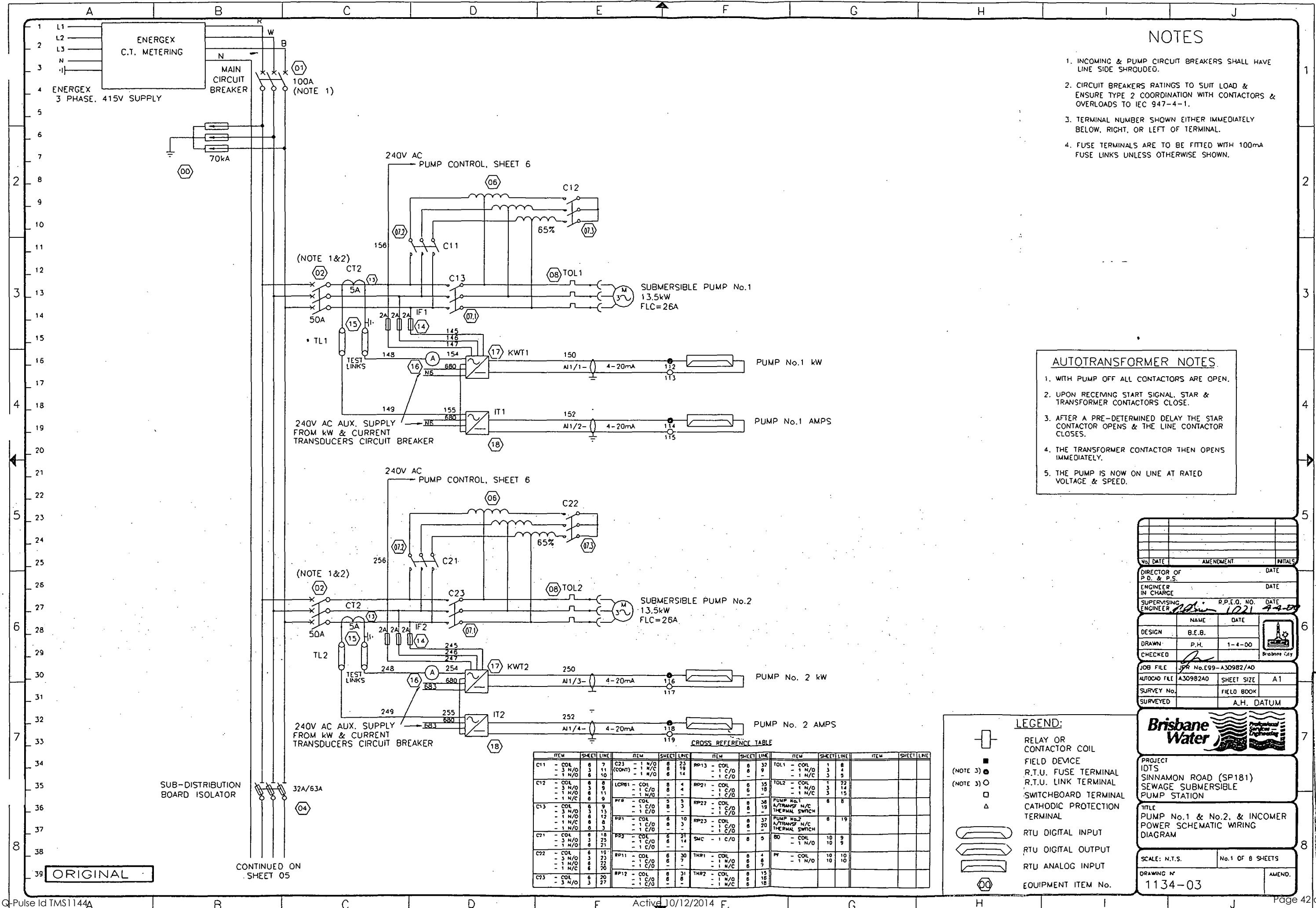
TOTAL HEAD

INPUT POWER



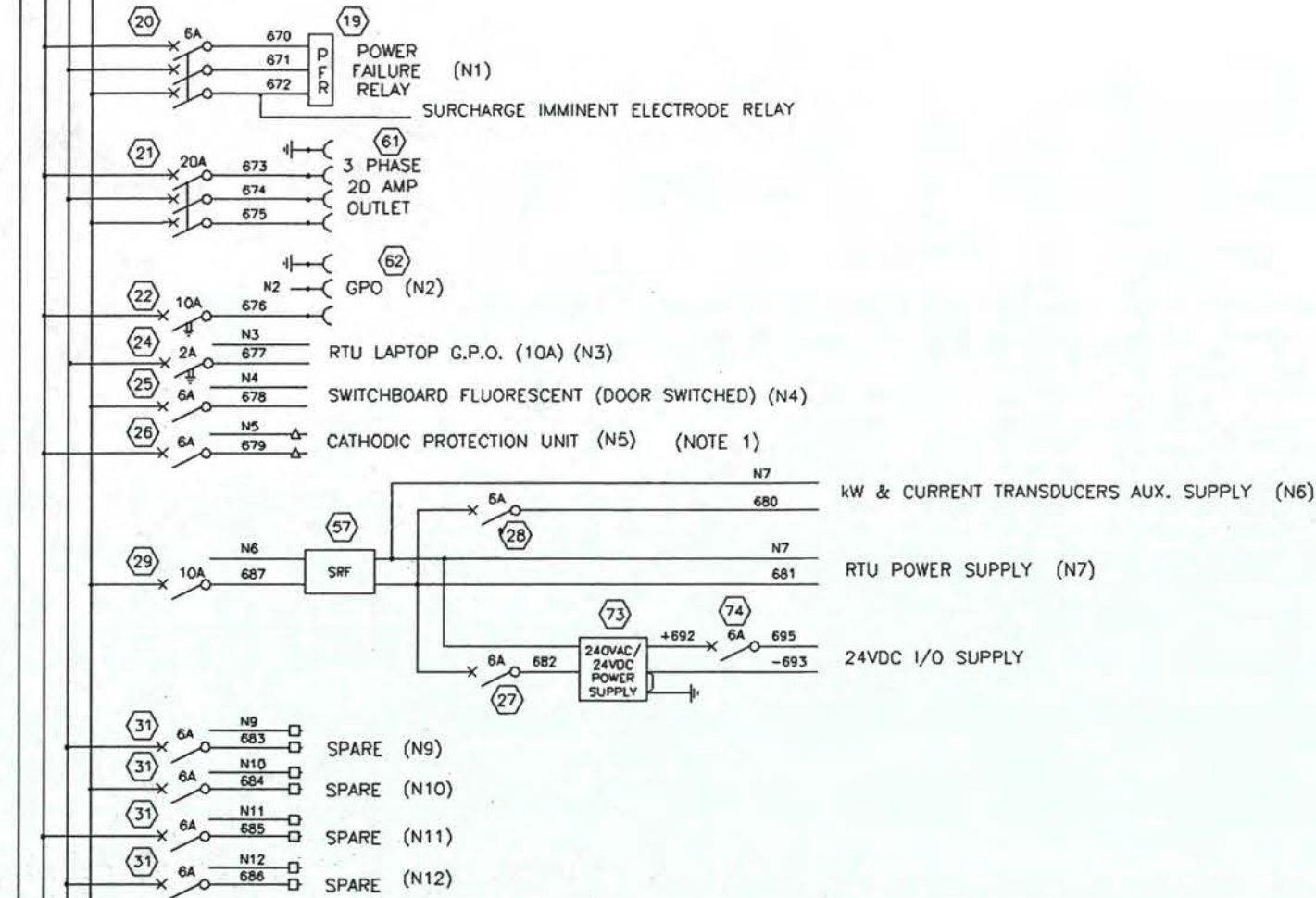


### 3.0 "AS CONSTRUCTED" DRAWINGS



CONTINUED FROM  
SHEET 03

N R W B



## NOTES

1. CATHODIC PROTECTION - FUTURE. THIS UNIT TO BE SUPPLIED BY OTHERS. A 240VAC CABLE TO BE INSTALLED TO PROPOSED CATHODIC PROTECTION AREA TERMINAL STRIP FOR CONNECTION BY OTHERS
2. TERMINAL NUMBER SHOWN EITHER IMMEDIATELY BELOW, RIGHT, OR LEFT OF TERMINAL.

NO.	DATE	AMENDMENT	INITIALS
DIRECTOR OF P.D. & P.S.		DATE	
ENGINEER IN CHARGE		DATE	
SUPERVISING ENGINEER		R.P.E.O. NO. DATE	
DESIGN	NAME	DATE	
DRAWN	B.E.B.	1-4-00	
CHECKED	P.H.		
JOB FILE	APR No. E99-A309B2/A1		
AUTOCAD FILE	A309B2A1	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

## LEGEND:

- RELAY OR CONTACTOR COIL  
 FIELD DEVICE  
 R.T.U. FUSE TERMINAL  
 R.T.U. LINK TERMINAL  
 SWITCHBOARD TERMINAL  
 CATHODIC PROTECTION TERMINAL  
 RTU DIGITAL INPUT  
 RTU DIGITAL OUTPUT  
 RTU ANALOG INPUT  
 EQUIPMENT ITEM No.

## CROSS REFERENCE TABLE

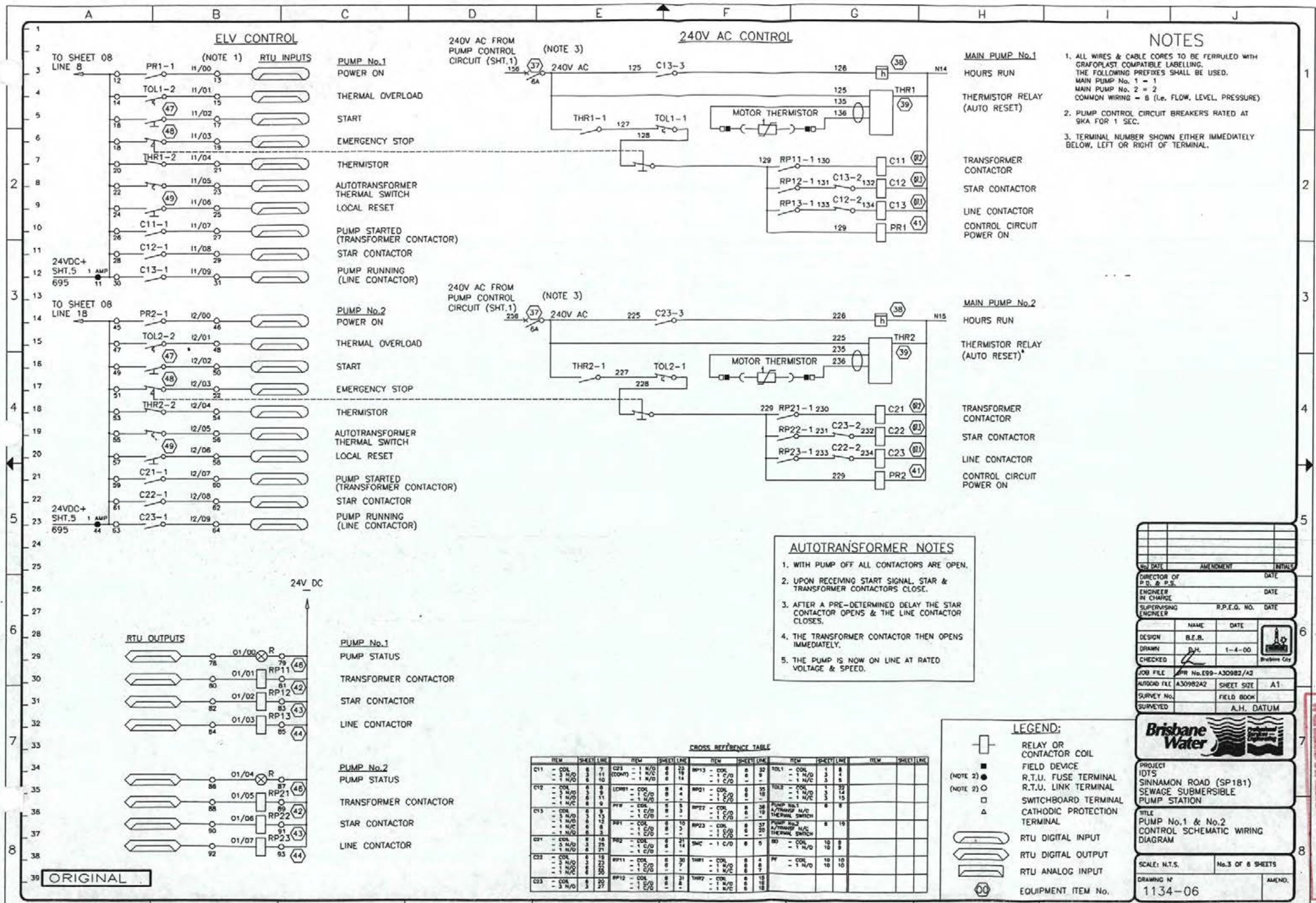
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C11 - COIL	6	7	C23 - 1 N/O	8	23	RP13 - COIL	8	32	TOL1 - COIL	1	8			
- 3 N/O	3	11	(CONT) - 1 N/C	6	19	- 1 C/O	6	9	- 1 N/O	3	4			
- 1 N/O	6	10	- 1 N/O	6	14	- 1 C/O	-	-	- 1 N/C	3	5			
C12 - COIL	6	8	LCR81 - COIL	8	4	RP21 - COIL	6	35	TOL2 - COIL	1	22			
- 3 N/O	3	9	- 1 C/O	8	4	- 1 C/O	6	18	- 1 N/O	3	15			
- 1 N/O	6	11	- 1 N/O	-	-	- 1 C/O	-	-	- 1 N/C	3	15			
- 1 N/C	6	9	PRR - COIL	5	5	RP22 - COIL	8	36	PUMP No.1	8	8			
C13 - COIL	6	9	- 1 C/O	8	3	- 1 C/O	8	19	A/TRANSF N/C	8	8			
- 3 N/O	3	13	- 1 C/O	-	-	- 1 C/O	-	-	THERMAL SWITCH	8	8			
- 1 N/O	6	12	RP1 - COIL	6	10	RP23 - COIL	6	37	PUMP No.2	8	19			
- 1 N/C	6	8	- 1 C/O	6	3	- 1 C/O	6	20	A/TRANSF N/C	8	19			
- 1 N/O	6	3	- 1 C/O	-	-	- 1 C/O	-	-	THERMAL SWITCH	8	19			
C21 - COIL	6	16	PR2 - COIL	6	21	SMC - 1 C/O	6	5	BD - COIL	10	9			
- 3 N/O	3	25	- 1 C/O	6	14	-	-	-	- 1 N/O	10	9			
- 1 N/O	6	21	- 1 C/O	-	-									
C22 - COIL	6	19	RP11 - COIL	6	30	THR1 - COIL	8	4	PF - COIL	10	10			
- 3 N/O	3	23	- 1 C/O	6	7	- 1 N/O	8	6	- 1 N/O	10	10			
- 1 N/O	6	20	- 1 C/O	-	-	- 1 N/C	6	7						
- 1 N/C	6	20	RP12 - COIL	6	31	THR2 - COIL	8	15						
C23 - COIL	6	20	- 1 C/O	6	8	- 1 N/O	8	16						
- 3 N/O	3	27	- 1 C/O	-	-	- 1 N/C	8	18						

ORIGINAL

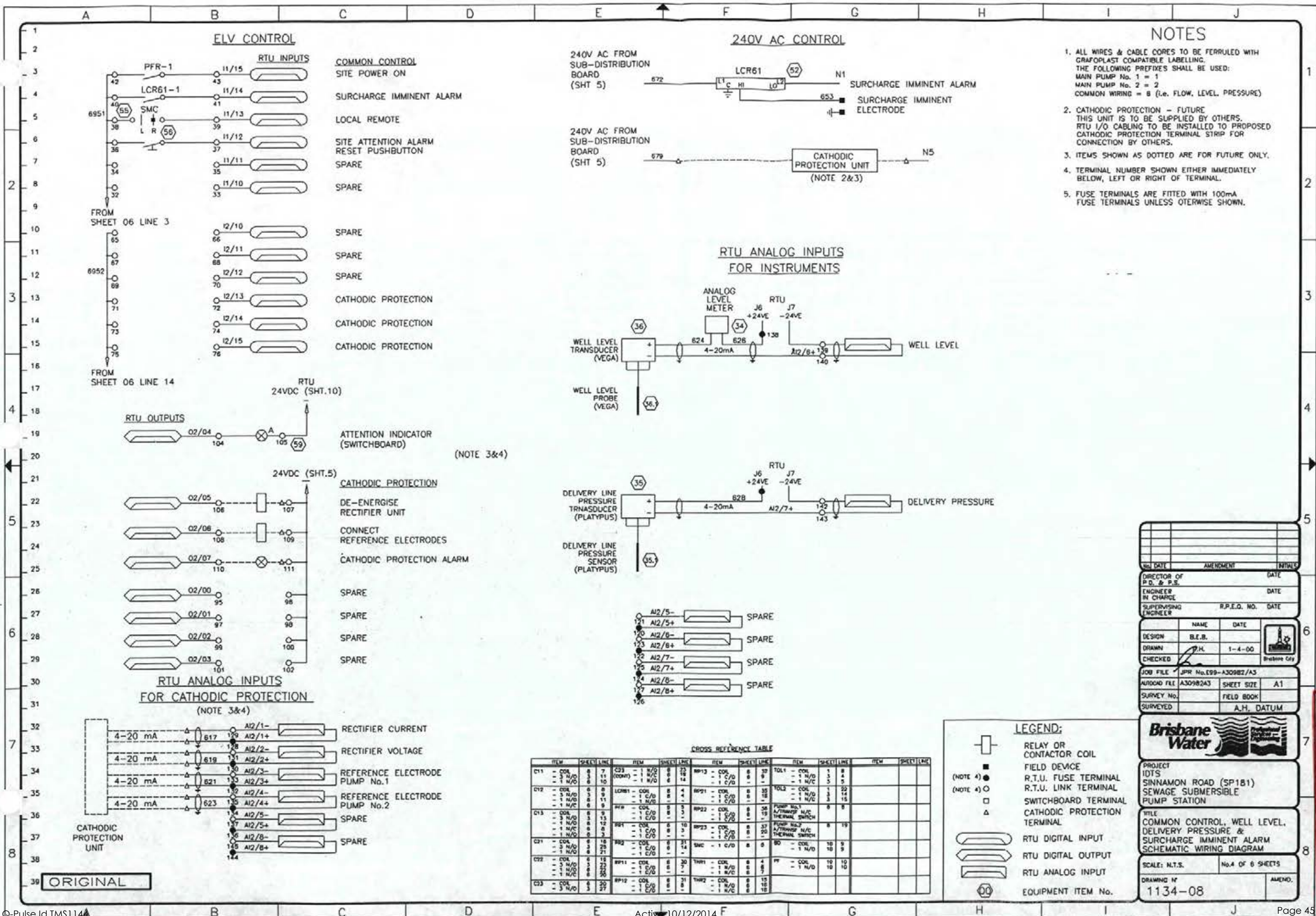
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TITLE MISCELLANEOUS LIGHT & POWER SCHEMATIC WIRING DIAGRAM	
SCALE: N.T.S.	No.2 OF 6 SHEETS
DRAWING No. 1134-05	AMEND.

"AS CONSTRUCTED"

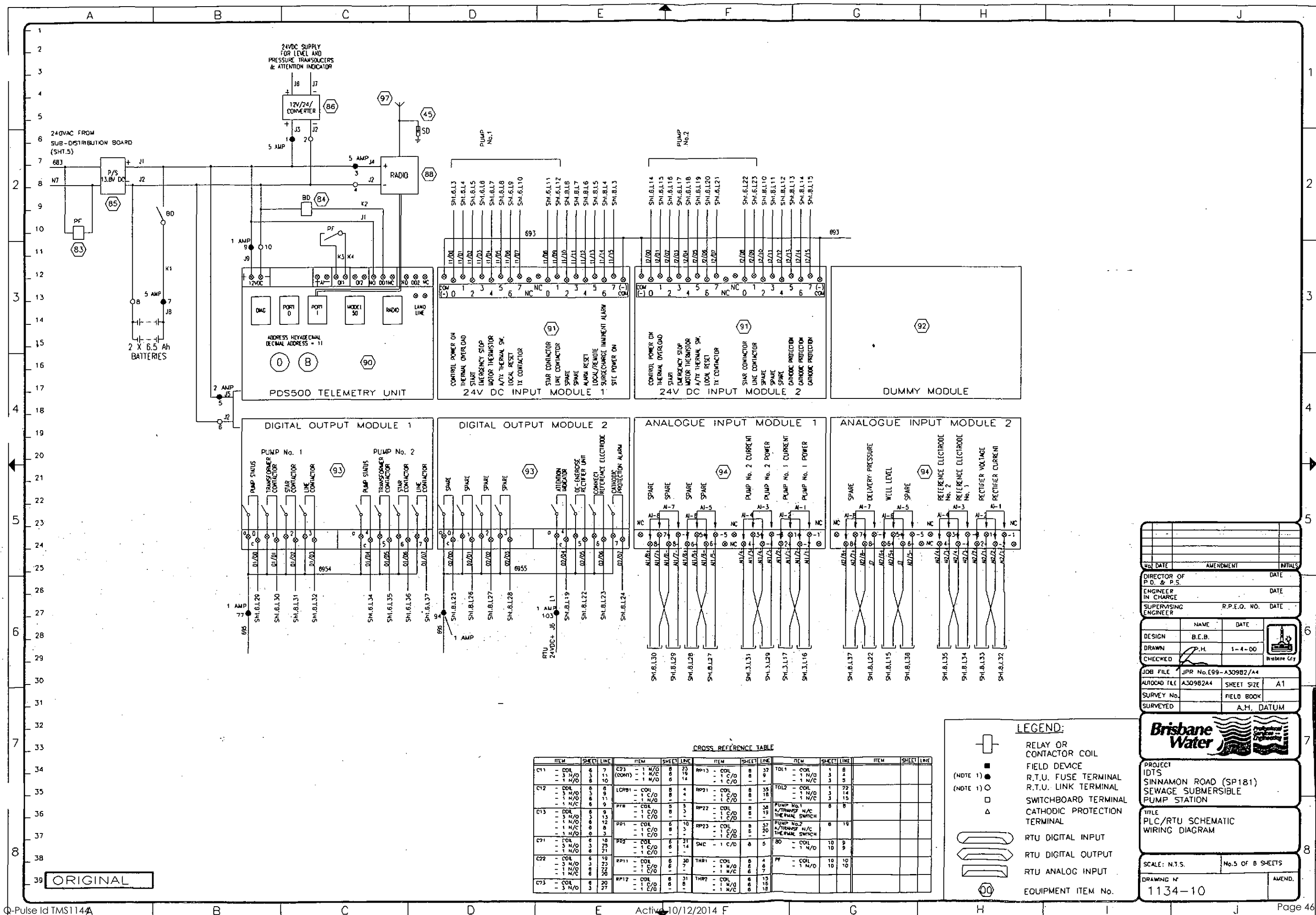








"AS CONSTRUCTED"



NO. DATE	AMENDMENT	INITIALS
DIRECTOR OF P.D. & P.S. DATE		
ENGINEER IN CHARGE DATE		
SUPERVISING ENGINEER R.P.E.O. NO. DATE		
DESIGN	NAME	DATE
DRAWN	P.H.	1-4-00
CHECKED		Brisbane City
JOB FILE	JPR No. E99-A30982/A4	
AUTOCAD FILE	A30982A4	SHEET SIZE A1
SURVEY No.	FIELD BOOK	
SURVEYED	A.H. DATUM	

**Brisbane Water**

PROJECT  
IDTS  
SINNAMON ROAD (SP181)  
SEWAGE SUBMERSIBLE  
PUMP STATION

TITLE  
PLC/RTU SCHEMATIC  
WIRING DIAGRAM

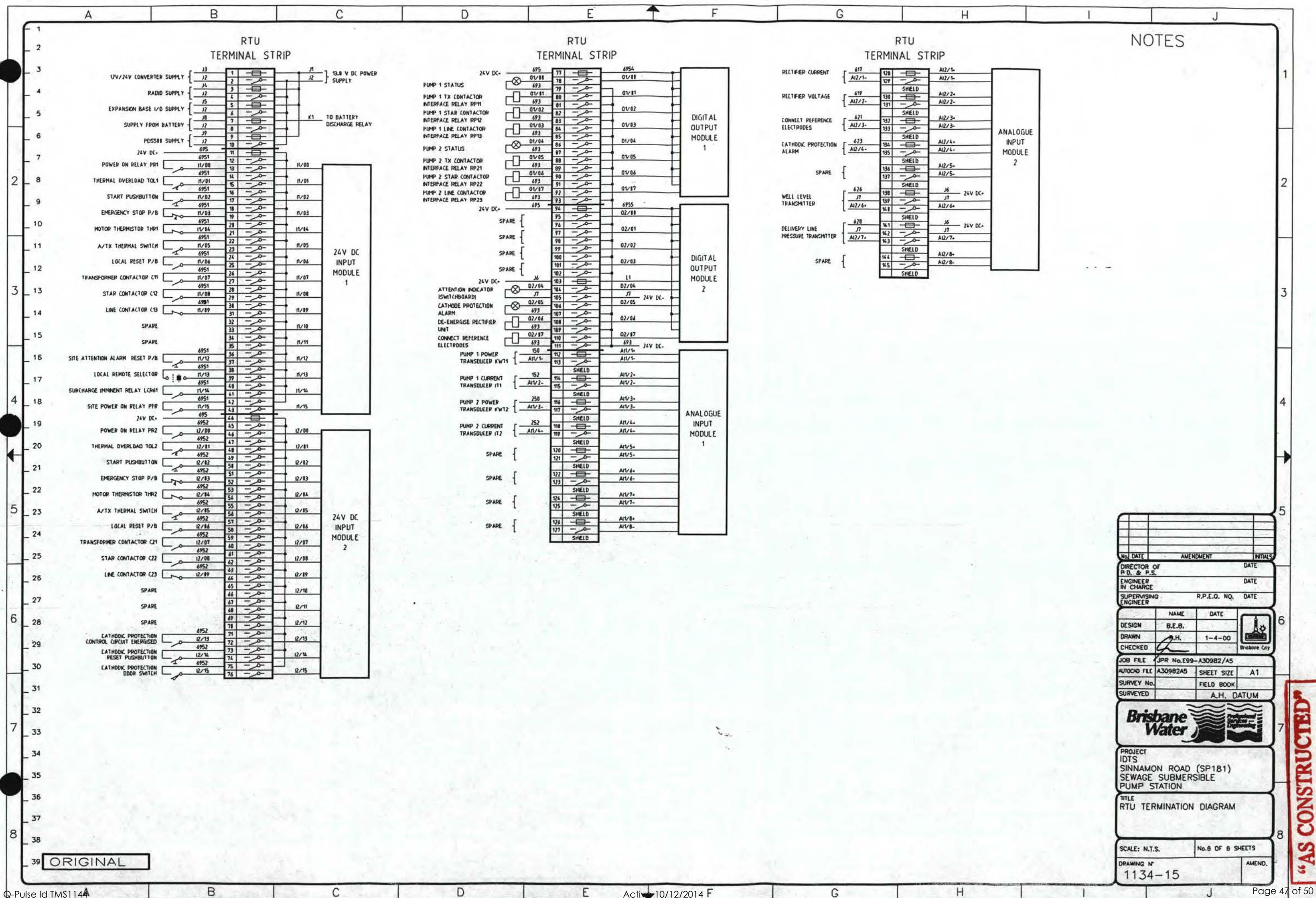
SCALE: N.T.S. No. 5 OF 8 SHEETS

DRAWING No. 1134-10

AMEND.

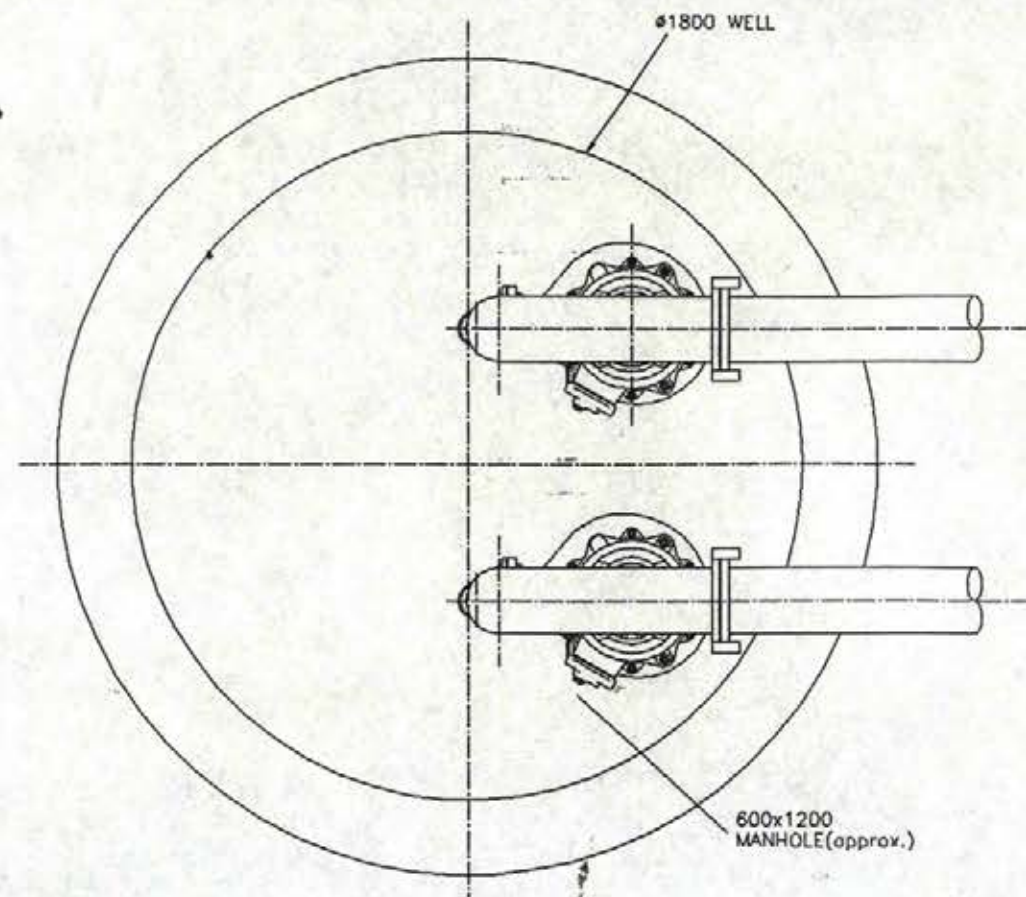
"AS CONSTRUCTED"





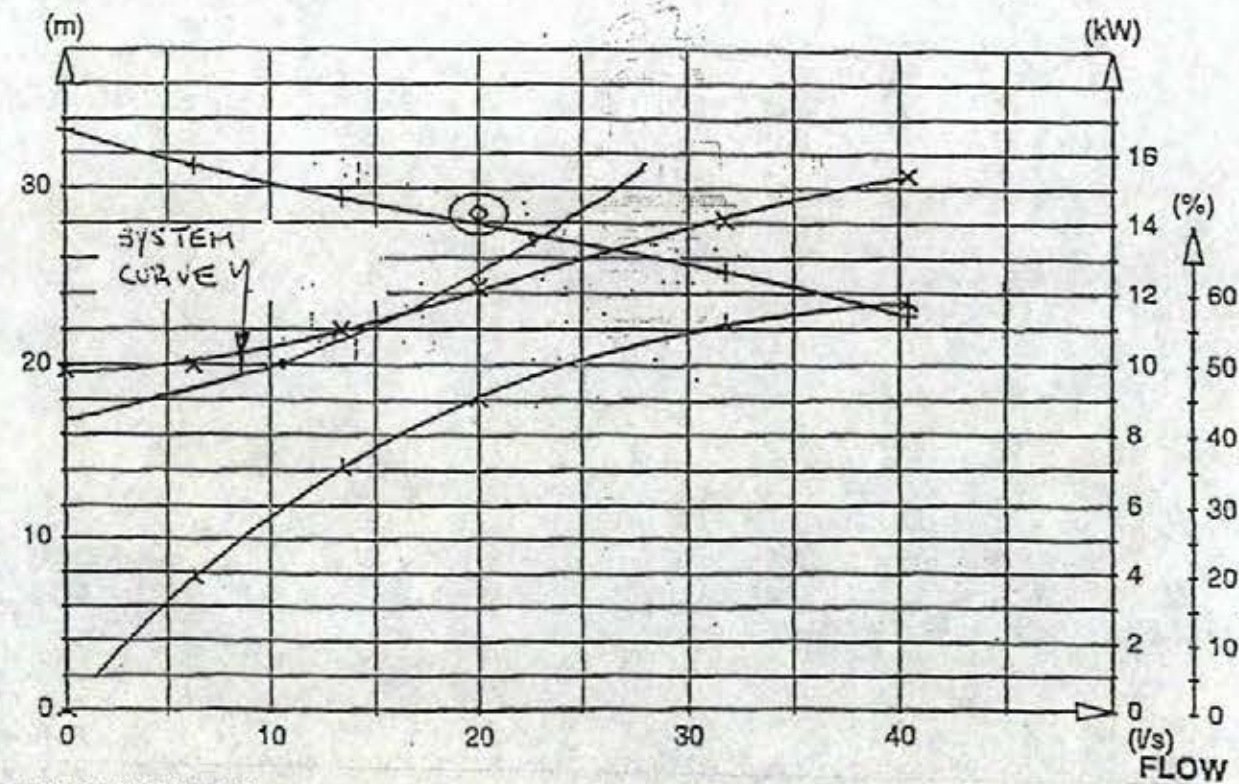






TOTAL HEAD

INPUT POWER



## NOTE:

- EXISTING PUMPS TO BE REPLACED
- NEW PUMPS FLYGT MODEL CP3152.181 HT 13.5kW 4PL  
REFERENCE DWG. STANDARD 6'-0" DIA. PUMPING STATION FOR SUBMERSIBLE PUMPS.  
ROADWAY LOCATION DWG No.3018/1056

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FILE NAME:

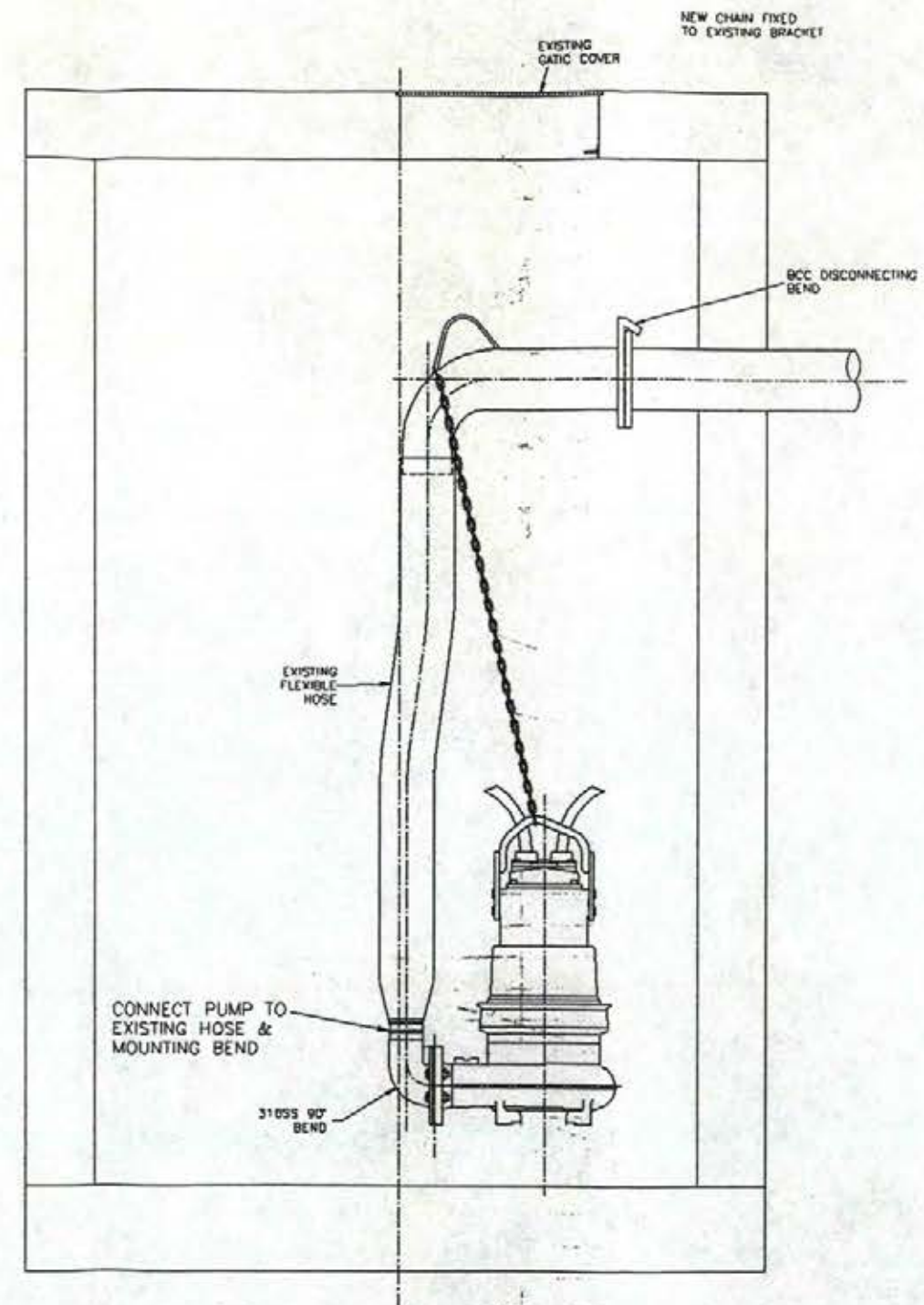
HAVE YOU ASSESSED THE RISK ASSOCIATED WITH THIS WORK? REPORT PROMPTLY ANY CONDITION LIABLE TO CAUSE AN ACCIDENT REMEMBER

YOU ARE RESPONSIBLE

FOR YOUR SAFETY

LAST AMENDMENT DATE:

LETTER	DESCRIPTION
B	AMEND PUMP ARRANGEMENT
A	AMEND AS PER B.C.C. FAX DATED 25-2-00

**"AS CONSTRUCTED"**

SCALE	1:10 AT A1
DESIGNED	P.H.
TRACED	P.H.
CHECKED	J.R. 11/03
DATE	12-1-00
APPROVED	
CLIENT NAME	CMC PROPERTIES
JOB NO	30982

J. & P. RICHARDSON  
WINDERMERE ESTATE  
PUMPING STATION No.181  
SINNAMON ROAD  
PIPEWORK LAYOUT

INDUSTRIES PTY LTD - CAMPBELL AVE WACOL 4078  
ELECTRICAL CONTRACTORS & ENGINEERS - A.C.N. 001 852 325  
PH(07)3271 3911 Fax(07)3271 3823 Email JPR@JPR.COM.AU  
DRAWING NO  
486/5/7-JG001  
P00-A30982/X0B



