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

BRISBANE CITY COUNCIL

SINNAMON ROAD SPS181

SEWAGE SUBMERSIBLE PUMP STATION

MECHANICAL & ELECTRICAL EQUIPMENT

OPERATION AND MAINTENANCE MANUAL

BY
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INDEX

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

592 05 02

WARNING!

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

FLYGT

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

Flygt 592 05 02

Svep Reklam, Emmaboda

FLYGT

3126/3140/3152/ 3170/3201/3300

INSTALLATION, CARE AND MAINTENANCE

ITT Flygt

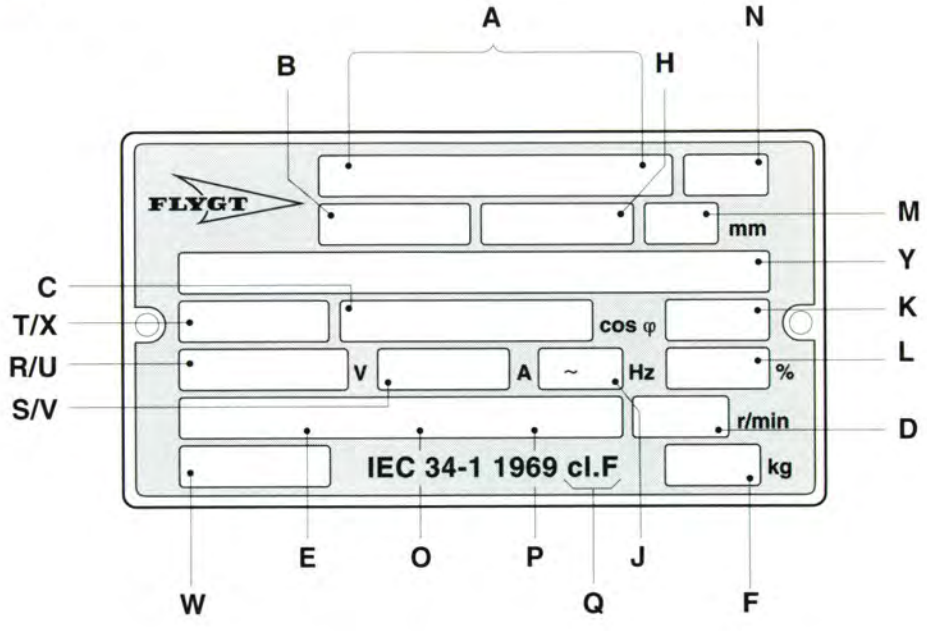
An ITT Industries company

892616/02

CONTENTS

DATA PLATE INTERPRETATION

General data plate



A		Product No.
B		Serial No.
C		Shaft power
D		Rated speed
E	*	Propeller speed
F		Weight
H		Curve code, first digit = Number of poles
J		Number of phases, type of current, frequency
K		Power factor
L		Operating duty, cont./int.
M		Impeller/propeller diam.
N		Factory code
O	*	Gear ratio
P	*	Direction of rotation: L=left, R=right
Q		Temperature class
R/U		Rated voltage
S/V		Rated current
T/X		Stator connection
W		Special order No.
Y		Motor No.

* For mixers

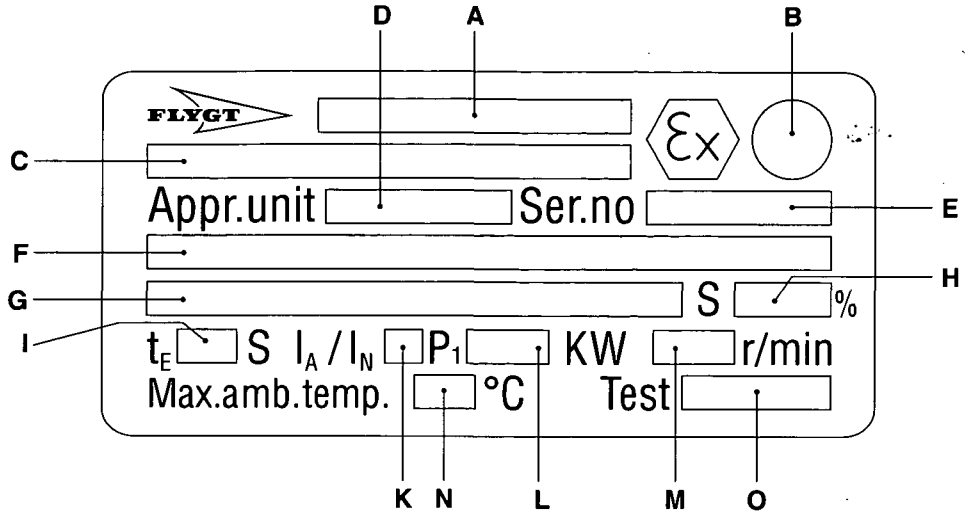
The pictures in this manual may differ somewhat from the delivered pump depending on the hydraulic end configuration.

DATA PLATE INTERPRETATION

Approval plates

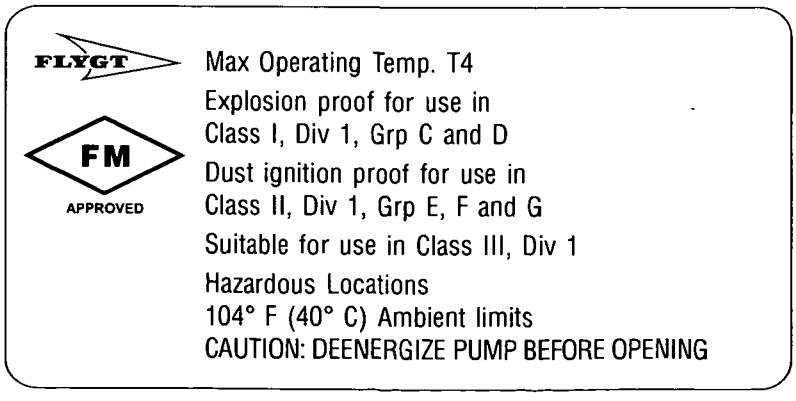
These approval plates apply to an explosion-proof submersible Flygt pump. The plates are used together with the general data plate on the pump.

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



A	Approval	I	Stall time
B	For Class I approval	K	Starting current/Rated current
C	Approval no.	L	Input power
D	Approved drive unit	M	Speed
E	Serial no.	N	Max. ambient temp.
F, G	Additional information	O	Controller
H	Operating duty, cont./int.		

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^3 (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, 1969.

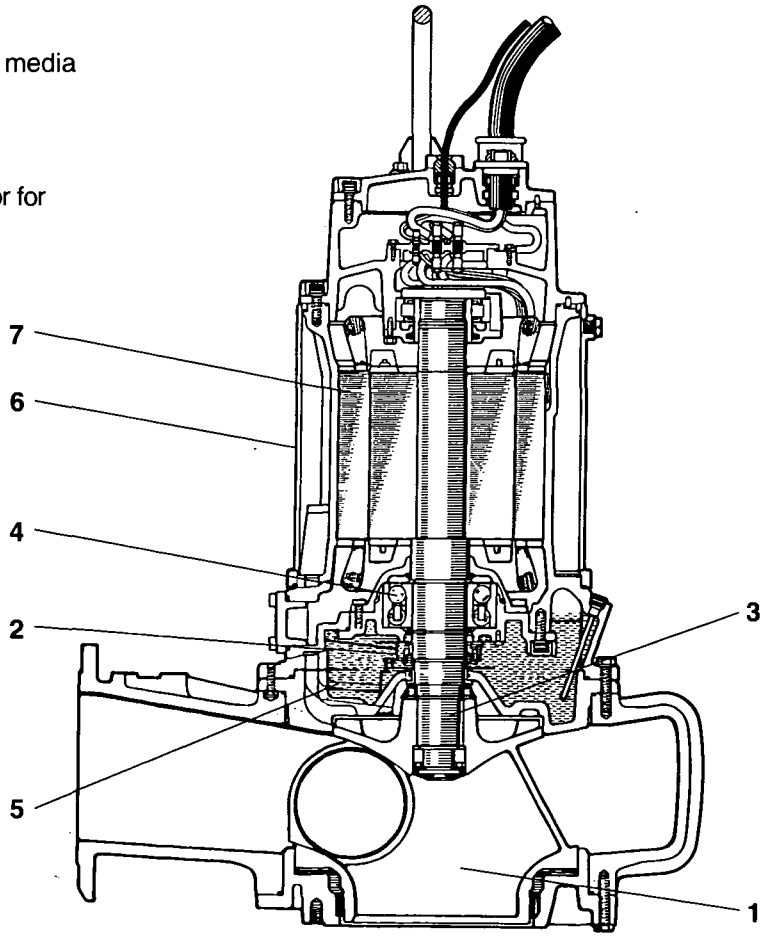
The stator is insulated in accordance with class F (155°C, 310°F). The motor is designed to deliver its rated output at ± 5% variation from the rated voltage. Without overheating the motor, ± 10% variation from the rated voltage can be accepted provided that the motor does not run continuously at full 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 athmosphere.

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 representive 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.

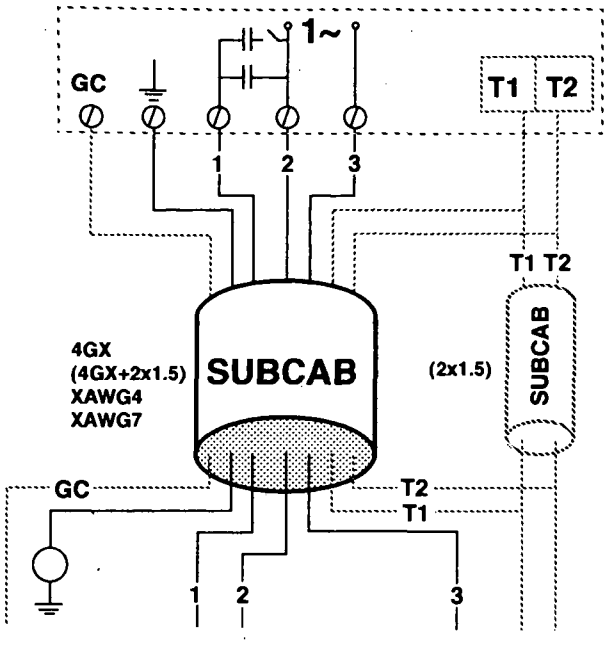
Check:

— signals and tripping function.

— that relays, lamps, fuses and connections are intact.

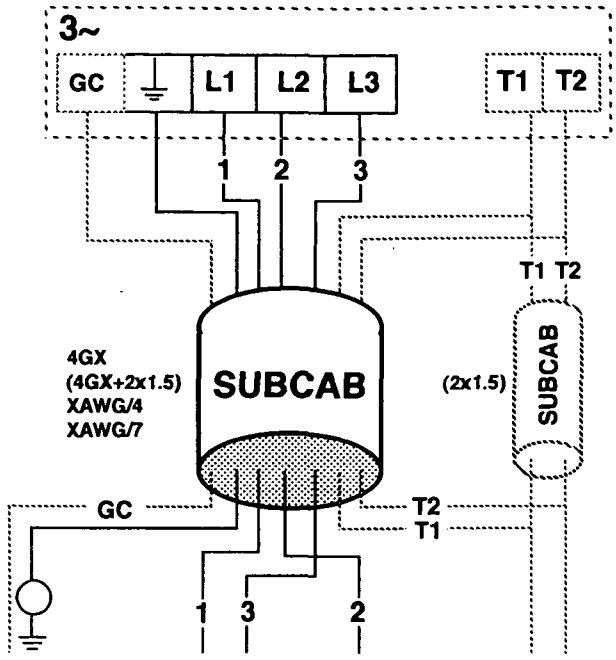
Replace defective equipment.

CABLE CHART



Single-phase

	Conductors	Connection starter
SUBCAB/SUBCAB AWG*		
	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

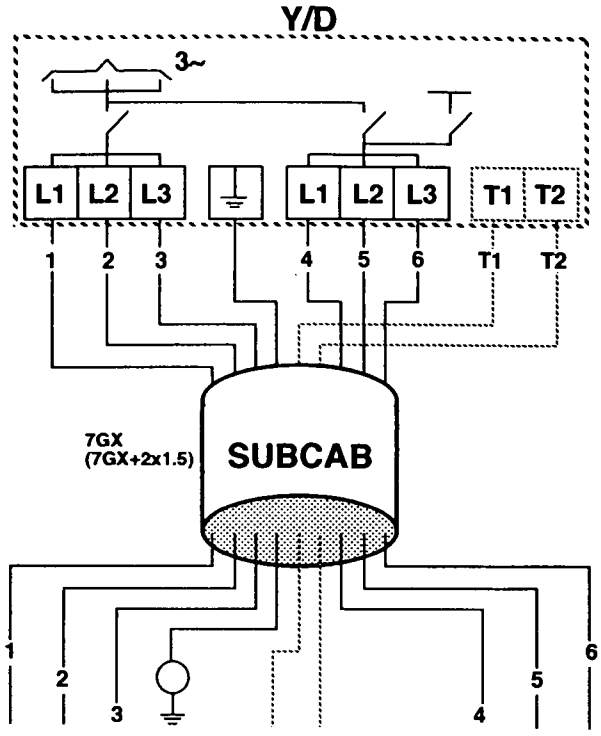
	Conductors	Connection starter
SUBCAB/SUBCAB AWG*		
	Brown (Red*)	1
	Blue (White*)	2
	Black (Black*)	3
	Yellow/green	Earth
	Yellow*	GC**
	Black T1/orange*	T1
	Black T2/Blue*	T2

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

** GC = Ground Check

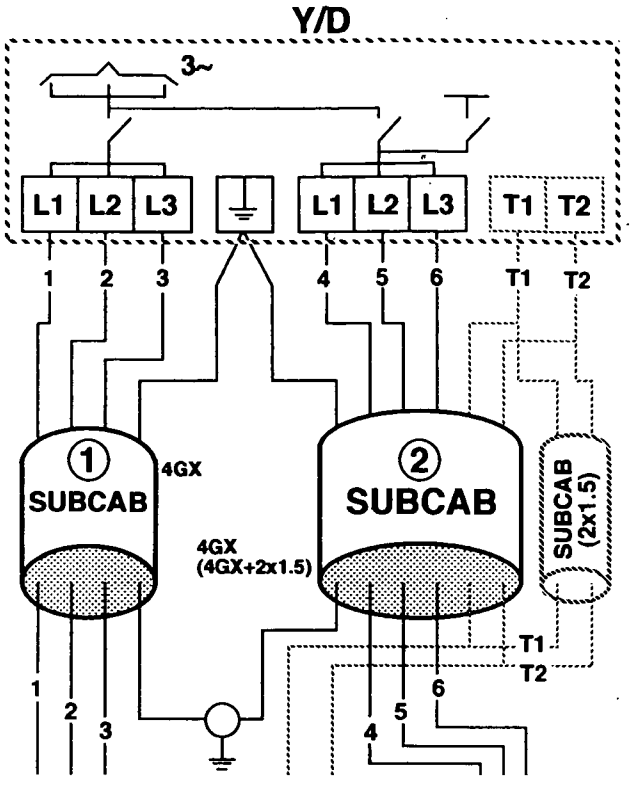
SUBCAB is a registered trademark of ITT Flygt AB for electrical cables.

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.

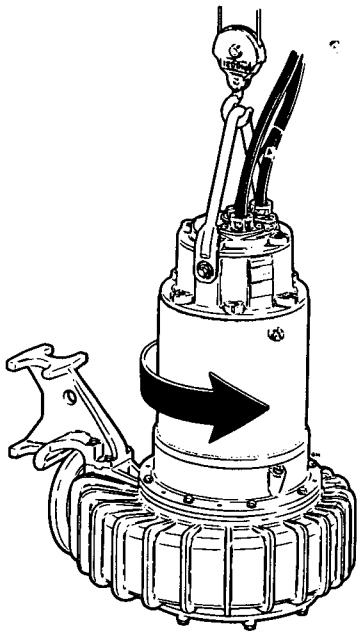
Check the direction of rotation. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. See the figure.

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.

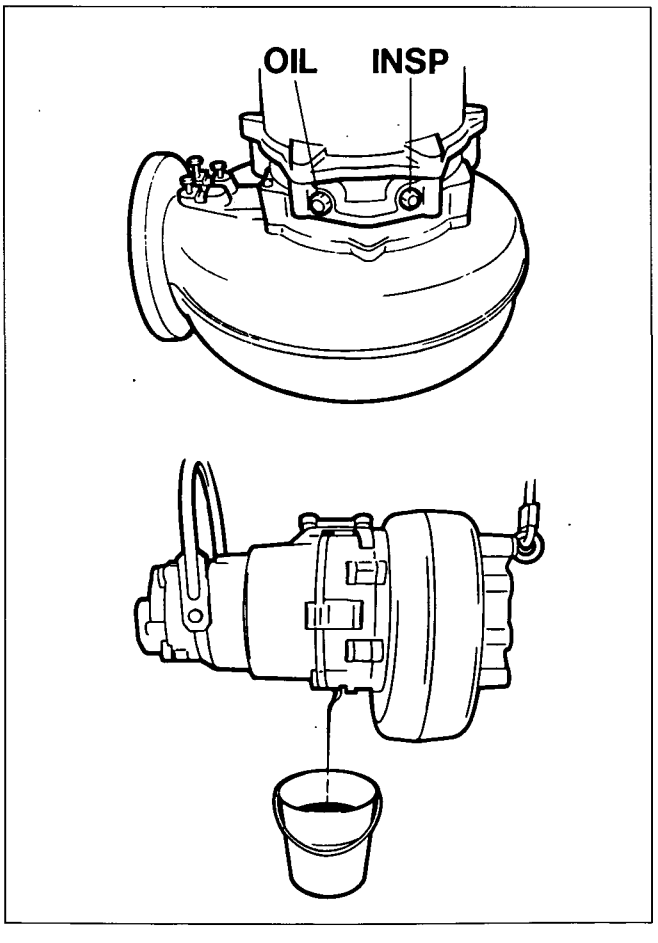
Insert a tube (or hose) into the oil hole. Cover the top end of the tube and take up a little oil from the bottom.

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.

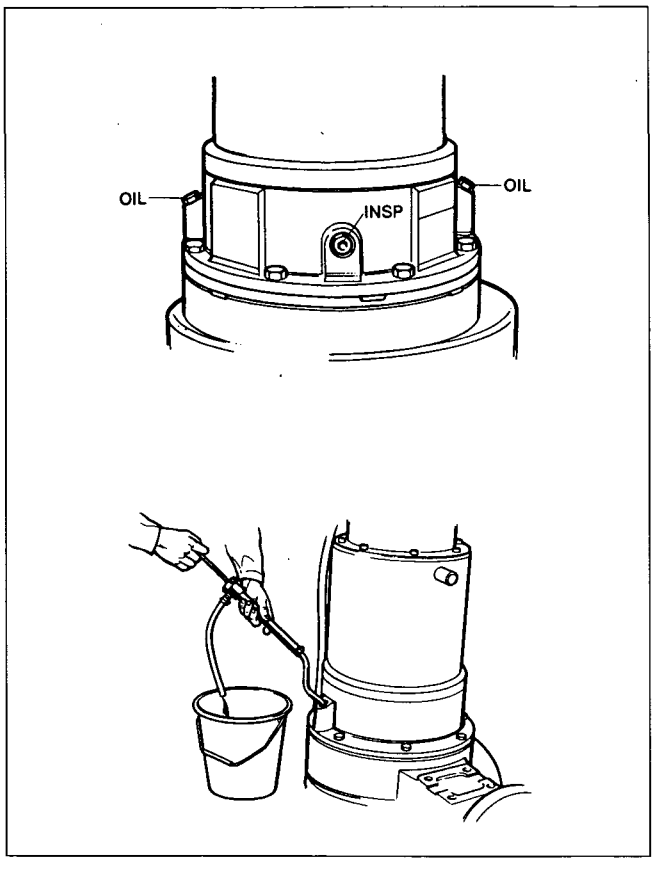
3126 / 3140 / 3152

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

An ITT Industries company

Printed in Sweden KT 980401

3126/3140/3152/3170/3201/3300.01.02. Eng. 5M. 05.98 © ITT FLYGT AB

892616

FLYGT

FLYGT SUBMERSIBLE PUMP

PARTS LIST CP 3152 HT

SERIAL NO 3152.181 9940396

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

PARRMAATTA NSW 2124
AUSTRALIA
TELEPHONE NO: 2-92020600

Flygt

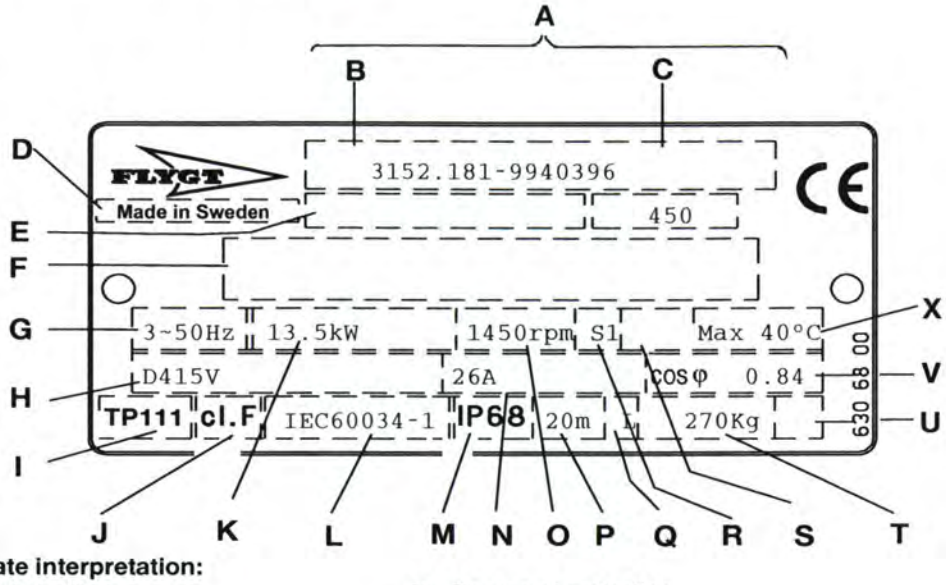
ITT Industries

DATAPLATE

FLYGT CP 3152 HT

DATE: 1999-06-23

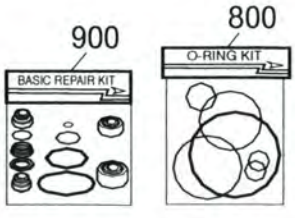
SERIAL NO: 3152.181 9940396



Dataplate interpretation:

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

(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 9940396

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	2
122	82 77 30	AB	O-ring 28,17X3,53-1 NBR	4
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

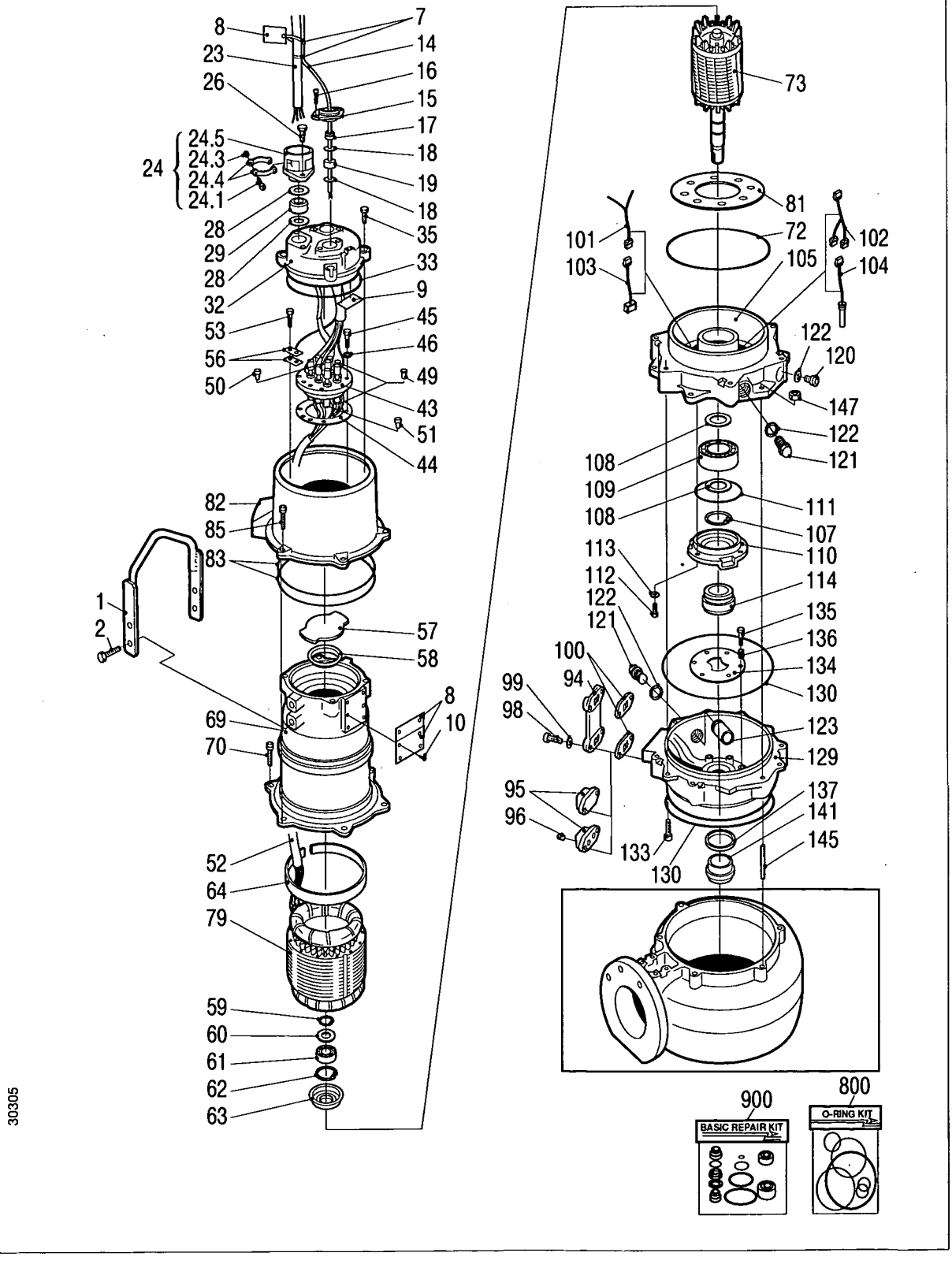
Item no	Part no	Rec	Denomination	Qty/ord.
141.3	82 81 00		O-ring	1
141.8	574 25 00		Cuff	1
141.9	82 61 05		Retaining ring	1
145	80 95 37		Stud 12X90-A2-70	6
147	82 23 59		Hexagon nut M12-A2-70	6
148	80 70 10	B	Parallel key 10H7X8H11X45	1
158	381 06 00	B	Impeller unit	1
158.1	345 25 06	AB	Wear ring	1
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:

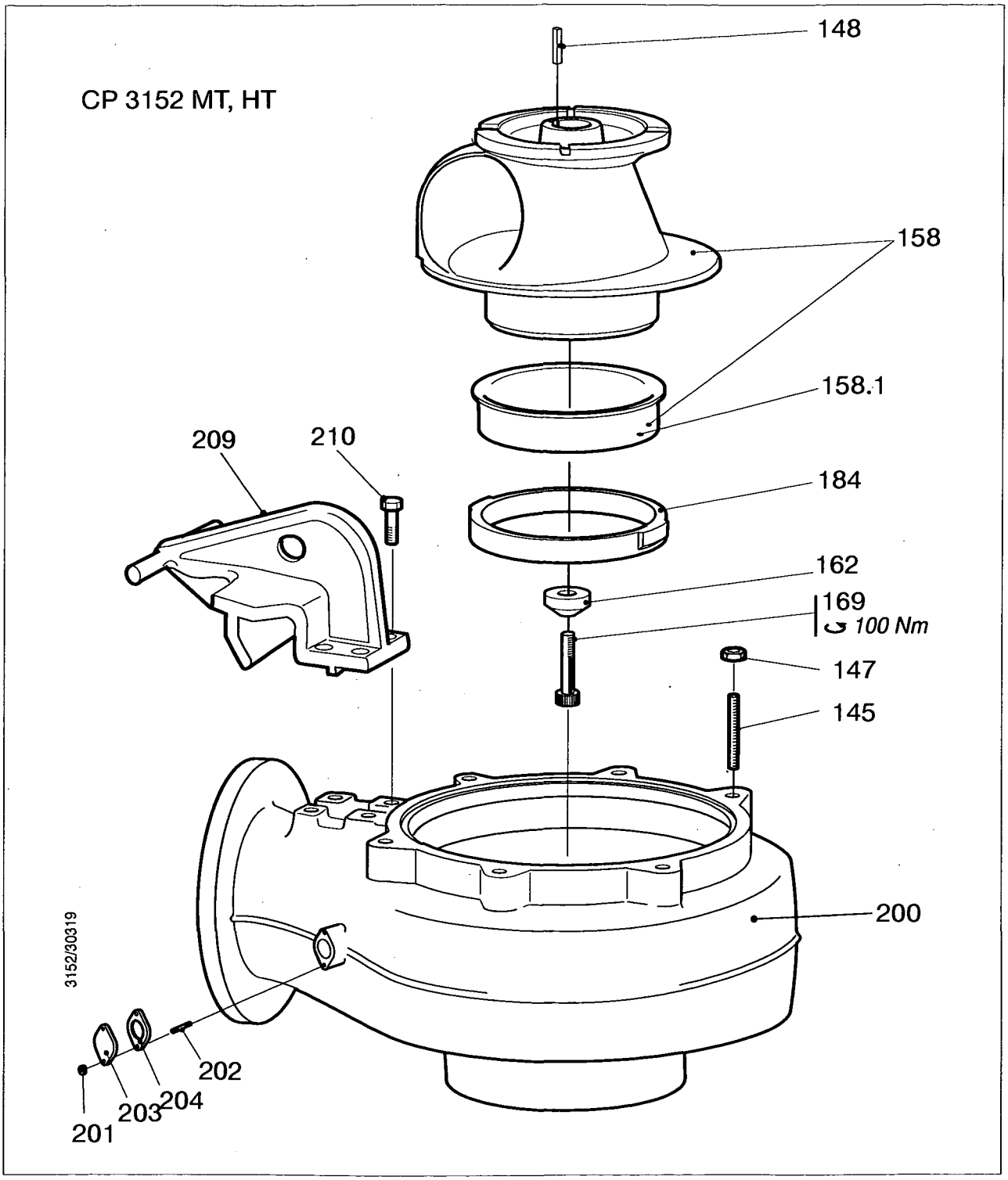
Company:.....Ref:.....Tel:.....Date:.....

EXPLODED VIEW

3152.181

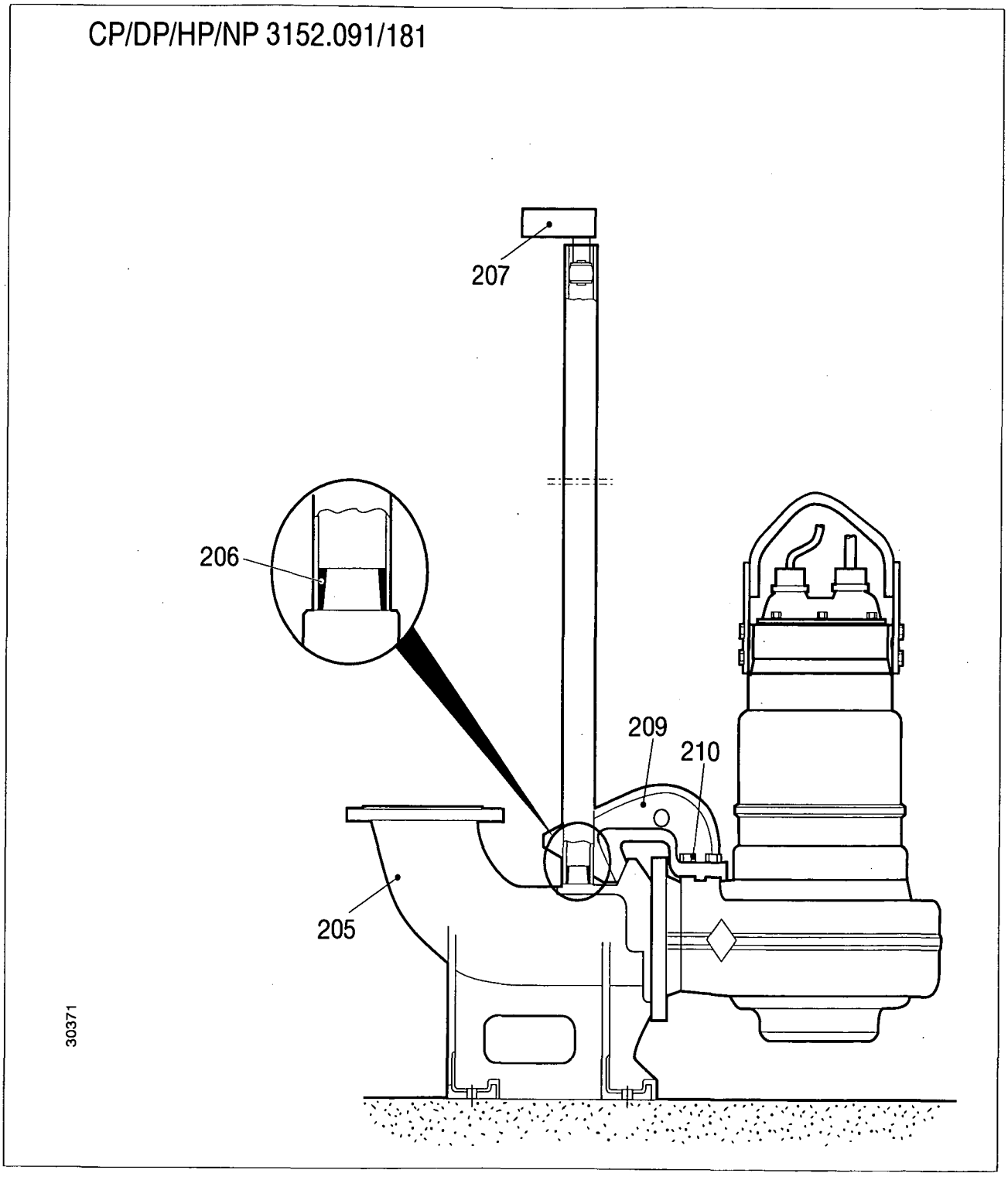


HYDRAULIC PARTS

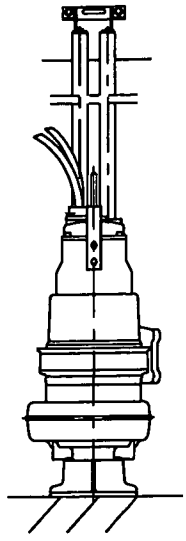


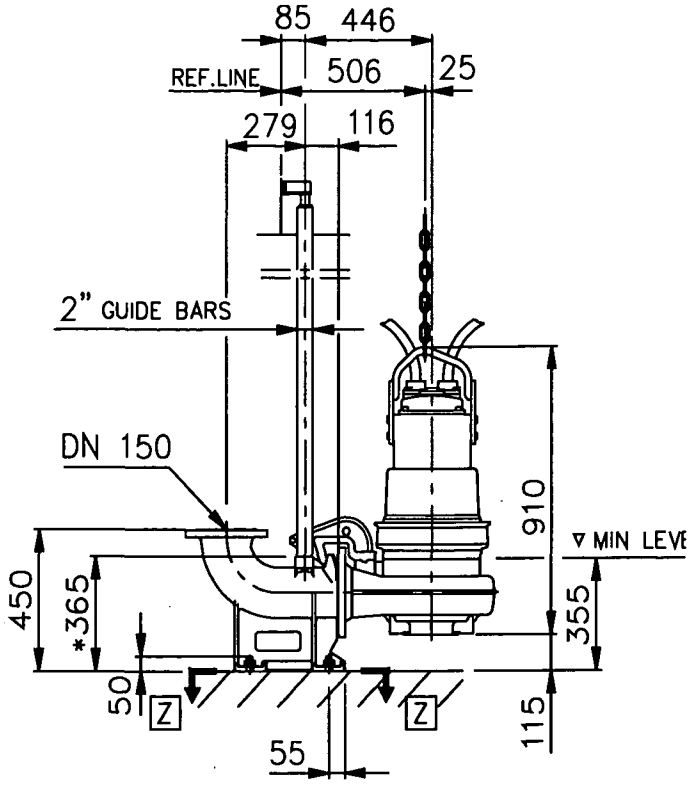
CONNECTION

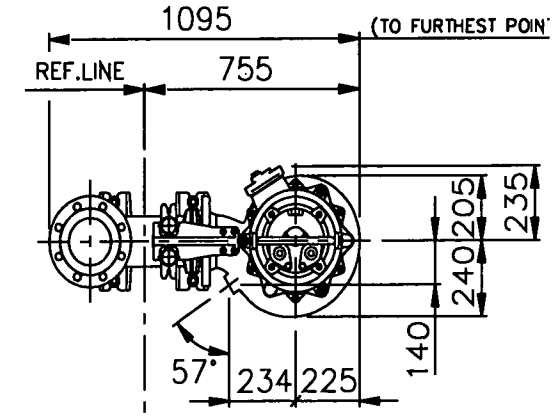
CP/DP/HP/NP 3152.091/181

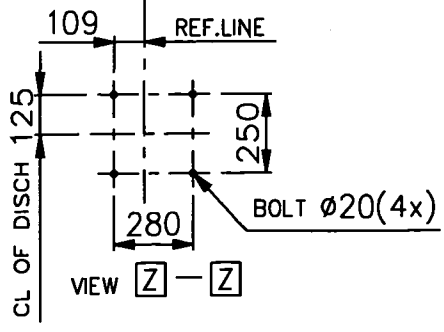


DIMENSIONAL DRAWING



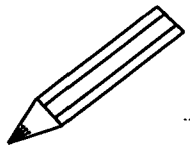


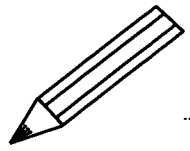




5391600B

* DIMENSION TO ENDS OF GUIDE BARS





2.0 TEST SHEETS

FLYGT

TEST REPORT

PRODUCT

Serial No.		Performance curve No.		Motor module/type	Voltage (V)
3152.181	9940283	53- 450-00-5360		153	415
Base module	**Impeller No.**	**Gear type**	**Gear ratio**	**Imp.diam/Blade angle**	**Water temp °C**
060	381 06 00				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 η(%)
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	Test facility	Test date	Time	Chief tester
ISO2548C	FAUS Australia 1	00-01-24	14:38	PETER KELLY

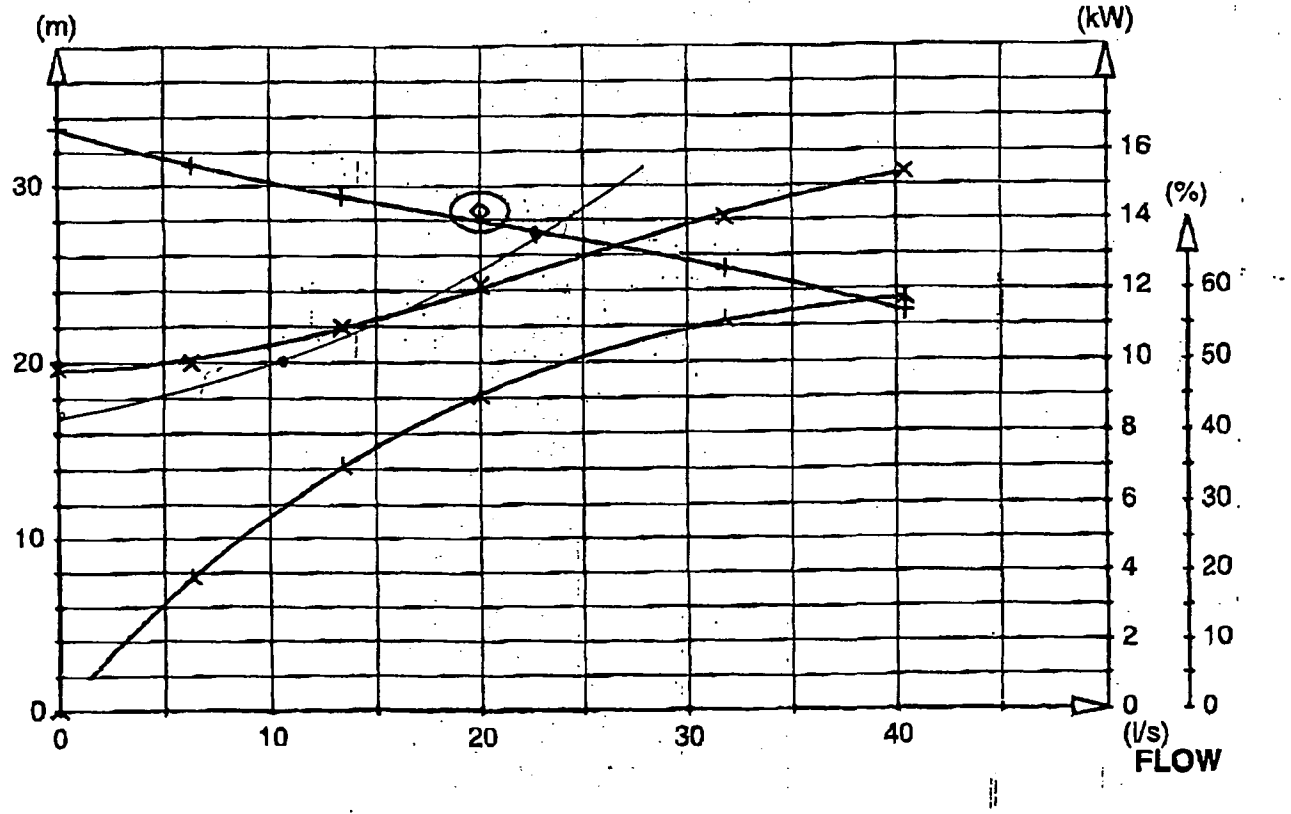
J&P RICHARDSON

PLOTTED TEST RESULTS

Measured point: + = Q/H, × = Q/P Duty point: ◇ = Q/H, □ = Q/P, △ = Q/ETA overall Calculated point: 人 = Q/ETA overall

4

TOTAL HEAD **INPUT POWER**



FLYGT

TEST REPORT

PRODUCT

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

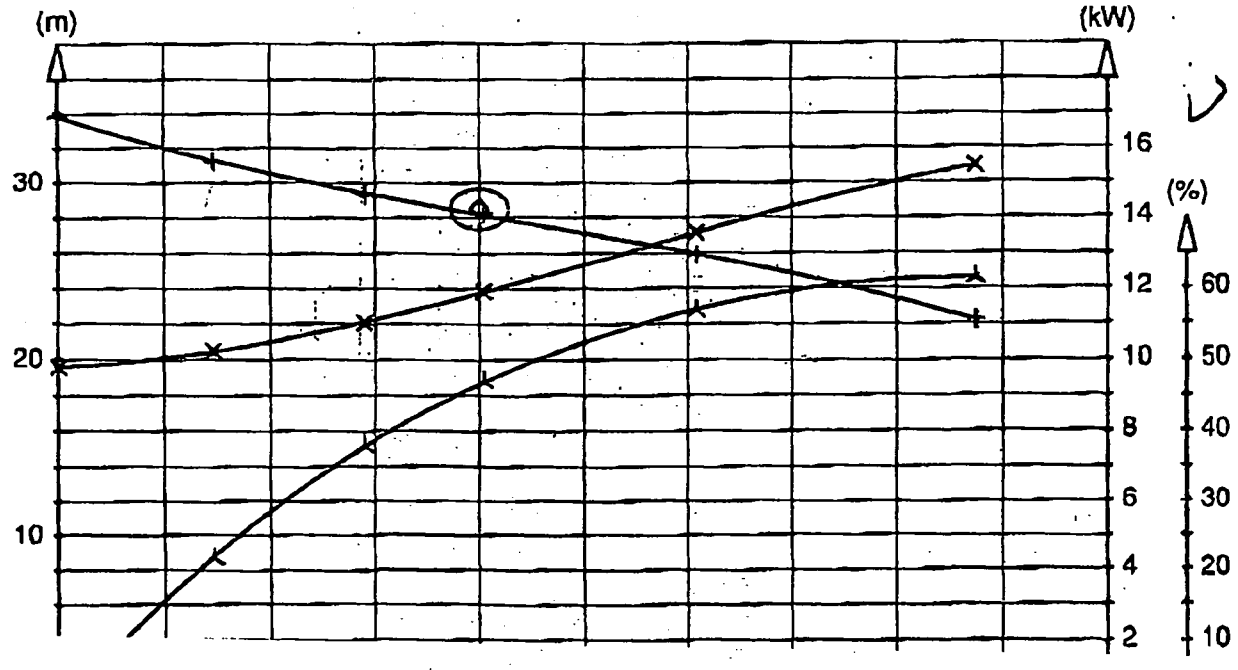
Accepted after	Test facility	Test date	Time	Chief tester
ISO2548C	FAUS Australia 1	00-01-25	09:21	PETER KELLY

J&P RICHARDSON

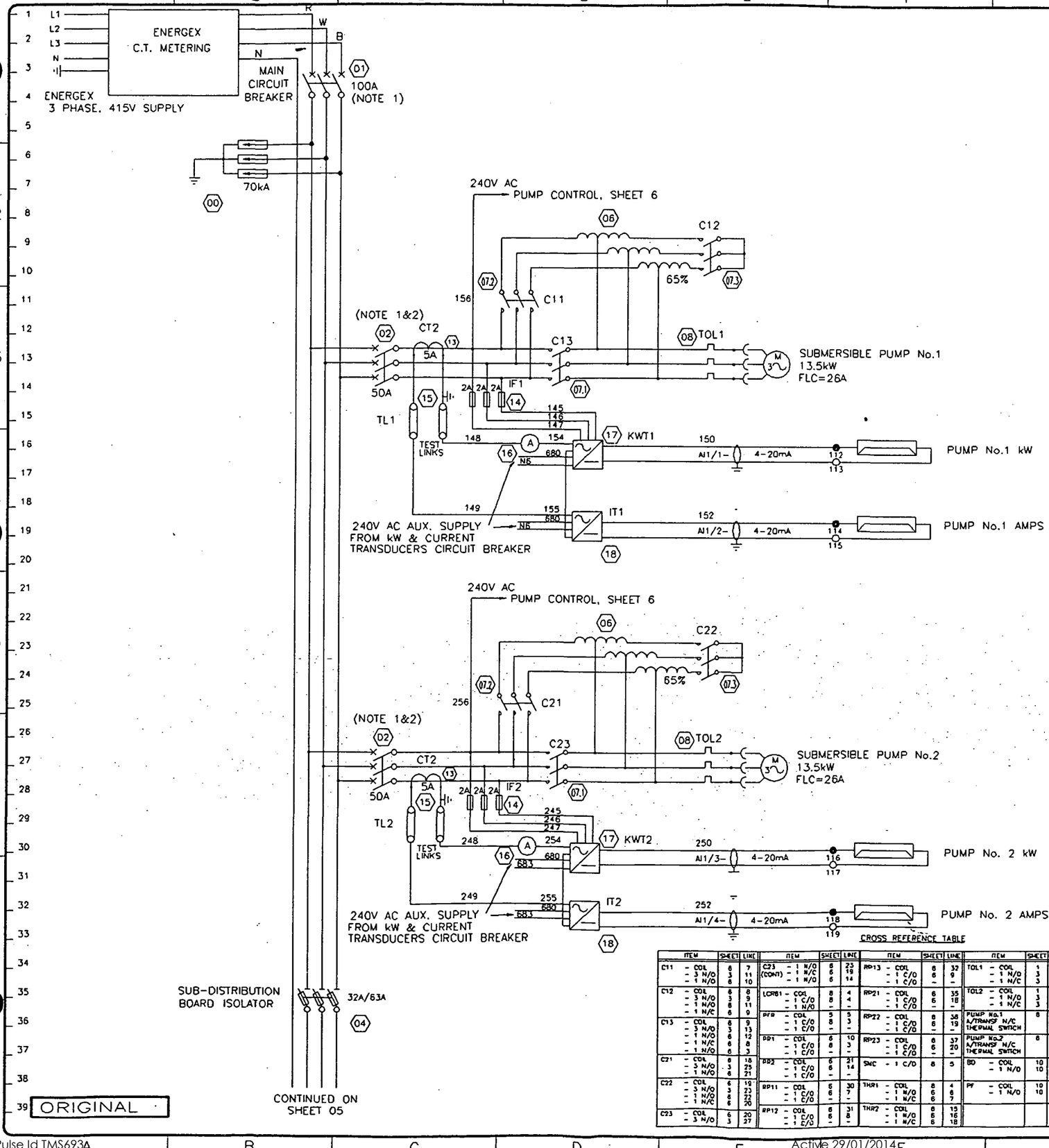
PLOTTED TEST RESULTS

Measured point: + = Q/H, × = Q/P Duty point: ◇ = Q/H, □ = Q/P, △ = Q/ETA overall Calculated point: 人 = Q/ETA overall 4

TOTAL HEAD **INPUT POWER**



3.0 "AS CONSTRUCTED" DRAWINGS



NOTES

1. INCOMING & PUMP CIRCUIT BREAKERS SHALL HAVE LINE SIDE SHROUDED.
2. CIRCUIT BREAKERS RATINGS TO SUIT LOAD & ENSURE TYPE 2 COORDINATION WITH CONTACTORS & OVERLOADS TO IEC 947-4-1.
3. TERMINAL NUMBER SHOWN EITHER IMMEDIATELY BELOW, RIGHT, OR LEFT OF TERMINAL.
4. FUSE TERMINALS ARE TO BE FITTED WITH 100mA FUSE LINKS UNLESS OTHERWISE SHOWN.

AUTOTRANSFORMER NOTES

1. WITH PUMP OFF ALL CONTACTORS ARE OPEN.
2. UPON RECEIVING START SIGNAL, STAR & TRANSFORMER CONTACTORS CLOSE.
3. AFTER A PRE-DETERMINED DELAY THE STAR CONTACTOR OPENS & THE LINE CONTACTOR CLOSES.
4. THE TRANSFORMER CONTACTOR THEN OPENS IMMEDIATELY.
5. THE PUMP IS NOW ON LINE AT RATED VOLTAGE & SPEED.

CROSS REFERENCE TABLE

ITEM	SHEET	LINE	ITEM	SHEET	LINE	ITEM	SHEET	LINE	ITEM	SHEET	LINE	ITEM	SHEET	LINE
C11 - COL	6	7	C23 - 1 N/O (CONT)	6	23	RP13 - COL	6	32	TOL1 - COIL	1	8			
- 3 N/O	3	11	- 1 N/C	6	19	- 1 C/O	6	9	- 1 N/O	3	4			
- 1 N/O	8	10	- 1 N/O	6	14	- 1 C/O	-	-	- 1 N/C	3	5			
C12 - COL	6	8	LCR61 - COL	8	4	RP21 - COL	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	14			
- 1 N/O	8	11	- 1 N/O	-	-	- 1 C/O	-	-	- 1 N/C	3	15			
- 1 N/C	6	9	PFB - COL	5	5	RP22 - COL	6	38	PUMP No.1 A/TRANSF N/C THERMAL SWITCH	8	8			
C13 - COL	6	9	- 1 C/O	8	3	- 1 C/O	6	19						
- 3 N/O	3	13	- 1 C/O	-	-	- 1 C/O	-	-						
- 1 N/O	8	12	DB1 - COL	6	10	RP23 - COL	6	37	PUMP No.2 A/TRANSF N/C THERMAL SWITCH	8	19			
- 1 N/C	8	8	- 1 C/O	8	3	- 1 C/O	6	20						
- 1 N/O	6	3	- 1 C/O	-	-	- 1 C/O	-	-						
C21 - COL	6	18	DB2 - COL	6	21	SMC - 1 C/O	8	5	BD - COIL	10	9			
- 3 N/O	3	29	- 1 C/O	6	14				- 1 N/O	10	9			
- 1 N/O	8	21	- 1 C/O	-	-									
C22 - COL	6	19	RP11 - COL	6	30	THR1 - COL	8	4	PF - COIL	10	10			
- 3 N/O	3	23	- 1 C/O	6	7	- 1 N/O	6	6	- 1 N/O	10	10			
- 1 N/O	8	22	- 1 C/O	-	-	- 1 N/C	6	7						
- 1 N/C	6	20	RP12 - COL	6	31	THR2 - COL	8	15						
C23 - COL	6	3	- 1 C/O	6	8	- 1 N/O	6	16						
- 3 N/O	3	27	- 1 C/O	-	-	- 1 N/C	6	18						

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- (NOTE 3) R.T.U. FUSE TERMINAL
- (NOTE 3) R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- CATHODIC PROTECTION TERMINAL
- RTU DIGITAL INPUT
- RTU DIGITAL OUTPUT
- RTU ANALOG INPUT
- EQUIPMENT ITEM No.

No.	DATE	AMENDMENT	INITIALS

DIRECTOR OF P.D. & P.S. — DATE

ENGINEER IN CHARGE — DATE

SUPERVISING ENGINEER — R.P.E.Q. NO. 1021 — DATE 9-4-01

	NAME	DATE
DESIGN	B.E.B.	
DRAWN	P.H.	1-4-00
CHECKED		

Brisbane City

JOB FILE	JOB No.E99-A30982/A0		
AUTOCAD FILE	A30982A0	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water

PROJECT
IDTS
SINNAMON ROAD (SP181)
SEWAGE SUBMERSIBLE
PUMP STATION

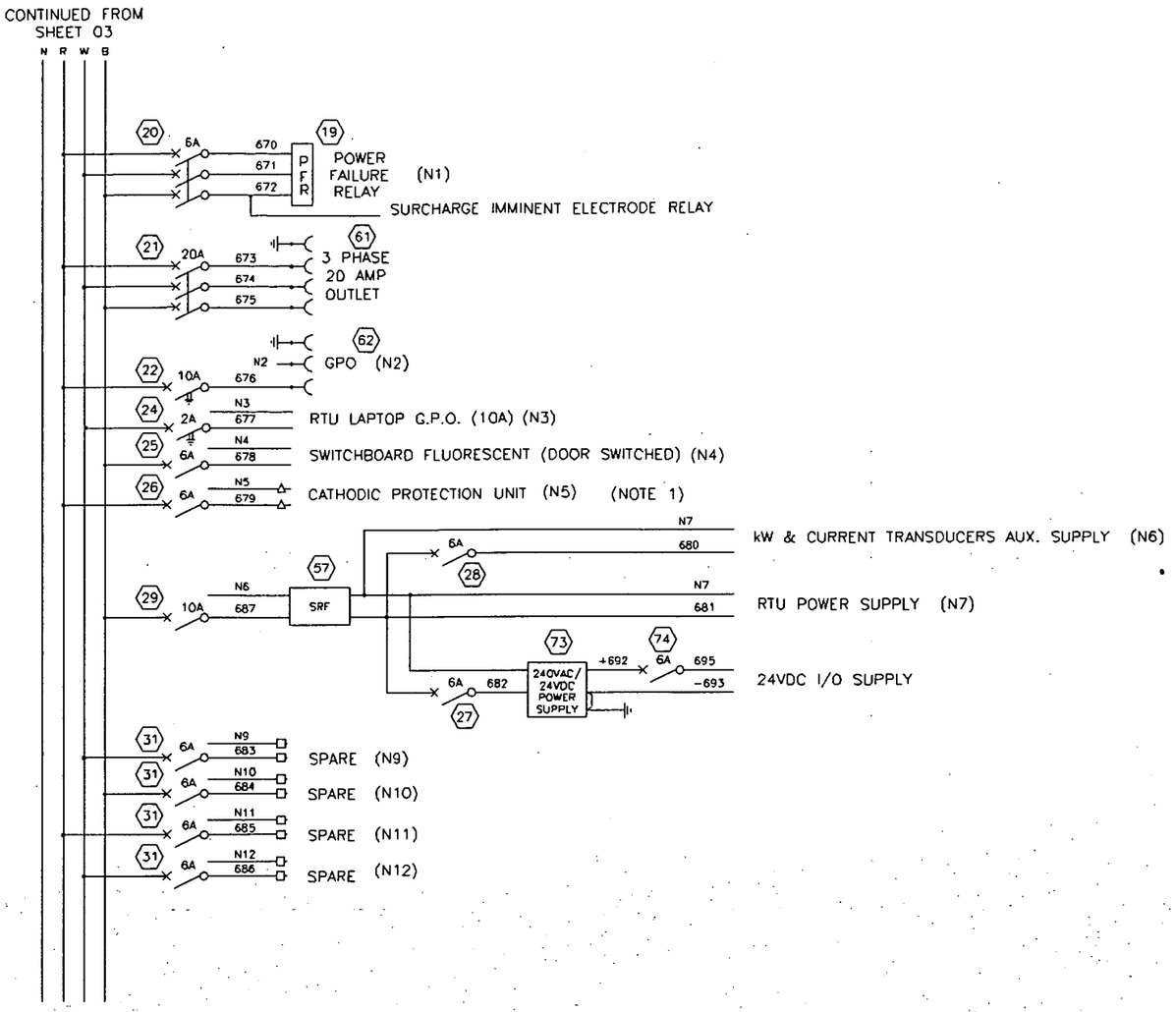
TITLE
PUMP No.1 & No.2, & INCOMER
POWER SCHEMATIC WIRING
DIAGRAM

SCALE: N.T.S. — No.1 OF 6 SHEETS

DRAWING N° 1134-03 — AMEND.

"AS CONSTRUCTED"

CONTINUED FROM SHEET 03



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 NU.BER SHOWN EITHER IMMEDIATELY BELOW, RIGHT, OR LEFT OF TERMINAL.

CROSS REFERENCE TABLE

ITEM	SHEET	LINE
C11 – COIL	6	7
– 3 N/O	3	11
– 1 N/O	6	10
C12 – COIL	6	8
– 3 N/O	3	9
– 1 N/O	6	11
– 1 N/C	6	9
C13 – COIL	6	9
– 3 N/O	3	13
– 1 N/O	8	12
– 1 N/C	6	8
– 1 N/O	8	3
C21 – COIL	8	18
– 3 N/O	3	23
– 1 N/O	8	21
C22 – COIL	6	10
– 3 N/O	3	23
– 1 N/O	8	22
– 1 N/C	6	20
C23 – COIL	6	20
– 3 N/O	3	27
C23 – 1 N/O	6	23
(CONT) – 1 N/C	6	19
– 1 N/O	6	14
LCRB1 – COIL	8	4
– 1 C/O	8	4
– 1 N/O	–	–
PFR – COIL	5	5
– 1 C/O	8	3
– 1 C/O	–	–
PB1 – COIL	6	10
– 1 C/O	6	3
– 1 C/O	–	–
PB2 – COIL	6	31
– 1 C/O	6	14
– 1 C/O	–	–
RP11 – COIL	6	30
– 1 C/O	6	7
– 1 C/O	–	–
RP12 – COIL	6	31
– 1 C/O	6	8
– 1 C/O	–	–
RP13 – COIL	8	32
– 1 C/O	8	9
– 1 C/O	–	–
RP21 – COIL	6	35
– 1 C/O	6	18
– 1 C/O	–	–
RP22 – COIL	8	36
– 1 C/O	8	19
– 1 C/O	–	–
RP23 – COIL	8	37
– 1 C/O	8	20
– 1 C/O	–	–
SMC – 1 C/O	8	5
THR1 – COIL	8	4
– 1 N/O	8	6
– 1 N/C	6	7
THR2 – COIL	8	15
– 1 N/O	8	16
– 1 N/C	6	18
TOL1 – COIL	1	8
– 1 N/O	3	4
– 1 N/C	3	5
TOL2 – COIL	1	22
– 1 N/O	3	14
– 1 N/C	3	15
PUMP No.1 A/TRANSF N/C THERMAL SWITCH	8	8
PUMP No.2 A/TRANSF N/C THERMAL SWITCH	8	19
BD – COIL	10	9
– 1 N/O	10	9
PF – COIL	10	10
– 1 N/O	10	10

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- (NOTE 2) ● R.T.U. FUSE TERMINAL
- (NOTE 2) ○ R.T.U. LINK TERMINAL
- □ SWITCHBOARD TERMINAL
- △ CATHODIC PROTECTION TERMINAL
- RTU DIGITAL INPUT
- RTU DIGITAL OUTPUT
- RTU ANALOG INPUT
- 00 EQUIPMENT ITEM No.

No.	DATE	AMENDMENT	INITIALS

DIRECTOR OF P.D. & P.S.		DATE
ENGINEER IN CHARGE		DATE
SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE

	NAME	DATE
DESIGN	B.E.B.	
DRAWN	P.H.	1-4-00
CHECKED		

Brisbane City

JOB FILE	QPR No.E99-A30982/A1		
AUTOCAD FILE	A30982A1	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water

PROJECT
IDTS
SINNAMON ROAD (SP181)
SEWAGE SUBMERSIBLE
PUMP STATION

TITLE
MISCELLANEOUS LIGHT & POWER SCHEMATIC WIRING DIAGRAM

SCALE: N.T.S.	No.2 OF 6 SHEETS
DRAWING N° 1134-05	AMEND.

AS CONSTRUCTED

ORIGINAL

ELV CONTROL

TO SHEET 08 LINE 8 — (NOTE 1) — RTU INPUTS

PR1-1	I1/00	PUMP No.1 POWER ON	MAIN PUMP No.1 HOURS RUN
TOL1-2	I1/01	THERMAL OVERLOAD	
(47)	I1/02	START	
(48)	I1/03	EMERGENCY STOP	
THR1-2	I1/04	THERMISTOR	THERMISTOR RELAY (AUTO RESET)
	I1/05	AUTOTRANSFORMER THERMAL SWITCH	TRANSFORMER CONTACTOR
(49)	I1/06	LOCAL RESET	
C11-1	I1/07	PUMP STARTED (TRANSFORMER CONTACTOR)	STAR CONTACTOR
C12-1	I1/08	STAR CONTACTOR	LINE CONTACTOR
C13-1	I1/09	PUMP RUNNING (LINE CONTACTOR)	CONTROL CIRCUIT POWER ON

24VDC+ SHT.5 695 — 1 AMP — 11 30

TO SHEET 08 LINE 18

PR2-1	I2/00	PUMP No.2 POWER ON	MAIN PUMP No.2 HOURS RUN
TOL2-2	I2/01	THERMAL OVERLOAD	
(47)	I2/02	START	
(48)	I2/03	EMERGENCY STOP	
THR2-2	I2/04	THERMISTOR	THERMISTOR RELAY (AUTO RESET)
	I2/05	AUTOTRANSFORMER THERMAL SWITCH	TRANSFORMER CONTACTOR
(49)	I2/06	LOCAL RESET	
C21-1	I2/07	PUMP STARTED (TRANSFORMER CONTACTOR)	STAR CONTACTOR
C22-1	I2/08	STAR CONTACTOR	LINE CONTACTOR
C23-1	I2/09	PUMP RUNNING (LINE CONTACTOR)	CONTROL CIRCUIT POWER ON

24VDC+ SHT.5 695 — 1 AMP — 44 63

240V AC CONTROL

240V AC FROM PUMP CONTROL CIRCUIT (SHT.1) — (NOTE 3) — 6A

156 (37) 240V AC 125 C13-3 126 (38) N14

THR1-1 127 TOL1-1 128

MOTOR THERMISTOR 135 136 — THR1 (39) — 125

129 RP11-1 130 — C11 (07.2) — TRANSFORMER CONTACTOR

RP12-1 131 C13-2 132 — C12 (07.3) — STAR CONTACTOR

RP13-1 133 C12-2 134 — C13 (07.1) — LINE CONTACTOR

129 — PR1 (41) — CONTROL CIRCUIT POWER ON

240V AC FROM PUMP CONTROL CIRCUIT (SHT.1) — (NOTE 3) — 6A

256 (37) 240V AC 225 C23-3 226 (38) N15

THR2-1 227 TOL2-1 228

MOTOR THERMISTOR 235 236 — THR2 (39) — 225

229 RP21-1 230 — C21 (07.2) — TRANSFORMER CONTACTOR

RP22-1 231 C23-2 232 — C22 (07.3) — STAR CONTACTOR

RP23-1 233 C22-2 234 — C23 (07.1) — LINE CONTACTOR

229 — PR2 (41) — CONTROL CIRCUIT POWER ON

NOTES

1. ALL WIRES & CABLE CORES TO BE FERRULED WITH GRAFOPLAST COMPATIBLE LABELLING. THE FOLLOWING PREFIXES SHALL BE USED. MAIN PUMP No. 1 = 1 MAIN PUMP No. 2 = 2 COMMON WIRING = 8 (i.e. FLOW, LEVEL, PRESSURE)
2. PUMP CONTROL CIRCUIT BREAKERS RATED AT 9KA FOR 1 SEC.
3. TERMINAL NUMBER SHOWN EITHER IMMEDIATELY BELOW, LEFT OR RIGHT OF TERMINAL.

24V DC

RTU OUTPUTS

01/00 R	PUMP No.1 PUMP STATUS	
01/01 RP11 (46)	TRANSFORMER CONTACTOR	
01/02 RP12 (42)	STAR CONTACTOR	
01/03 RP13 (43)	LINE CONTACTOR	
01/04 R	PUMP No.2 PUMP STATUS	
01/05 RP21 (46)	TRANSFORMER CONTACTOR	
01/06 RP22 (42)	STAR CONTACTOR	
01/07 RP23 (43)	LINE CONTACTOR	

(44)

ORIGINAL

AUTOTRANSFORMER NOTES

1. WITH PUMP OFF ALL CONTACTORS ARE OPEN.
2. UPON RECEIVING START SIGNAL, STAR & TRANSFORMER CONTACTORS CLOSE.
3. AFTER A PRE-DETERMINED DELAY THE STAR CONTACTOR OPENS & THE LINE CONTACTOR CLOSES.
4. THE TRANSFORMER CONTACTOR THEN OPENS IMMEDIATELY.
5. THE PUMP IS NOW ON LINE AT RATED VOLTAGE & SPEED.

CROSS REFERENCE TABLE

ITEM	SHEET	LINE
C11 - COIL	8	7
- 3 N/O	8	11
- 1 N/O	8	10
C12 - COIL	8	8
- 3 N/O	8	9
- 1 N/O	8	11
- 1 N/C	8	9
C13 - COIL	8	9
- 3 N/O	8	13
- 1 N/O	8	12
- 1 N/C	8	8
- 1 N/O	8	3
C21 - COIL	8	18
- 3 N/O	8	23
- 1 N/O	8	21
C22 - COIL	8	19
- 3 N/O	8	23
- 1 N/O	8	22
- 1 N/C	8	20
C23 - COIL	8	20
- 3 N/O	8	27
C23 - 1 N/O (CONT)	8	23
- 1 N/C	8	19
- 1 N/O	8	14
LCR81 - COIL	8	4
- 1 C/O	8	4
- 1 N/O	8	-
PFP - COIL	5	5
- 1 C/O	8	3
- 1 C/O	8	-
PB1 - COIL	6	10
- 1 C/O	6	3
- 1 C/O	6	-
PB2 - COIL	6	31
- 1 C/O	6	14
- 1 C/O	6	-
RP11 - COIL	6	30
- 1 C/O	6	7
- 1 C/O	6	-
RP12 - COIL	6	31
- 1 C/O	6	8
- 1 C/O	6	-
RP13 - COIL	8	32
- 1 C/O	8	9
- 1 C/O	8	-
RP21 - COIL	6	35
- 1 C/O	6	18
- 1 C/O	6	-
RP22 - COIL	6	36
- 1 C/O	6	19
- 1 C/O	6	-
RP23 - COIL	8	37
- 1 C/O	8	20
- 1 C/O	8	-
SWC - 1 C/O	8	5
THR1 - COIL	8	4
- 1 N/O	8	6
- 1 N/C	8	7
THR2 - COIL	8	15
- 1 N/O	8	16
- 1 N/C	8	18
TOL1 - COIL	1	8
- 1 N/O	3	4
- 1 N/C	3	5
TOL2 - COIL	1	22
- 1 N/O	3	14
- 1 N/C	3	15
PUMP No.1 A/TRANSF N/C THERMAL SWITCH	8	8
PUMP No.2 A/TRANSF N/C THERMAL SWITCH	8	19
BD - COIL	10	9
- 1 N/O	10	9
PF - COIL	10	10
- 1 N/O	10	10

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- (NOTE 2) ● R.T.U. FUSE TERMINAL
- (NOTE 2) ○ R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- CATHODIC PROTECTION TERMINAL
- RTU DIGITAL INPUT
- RTU DIGITAL OUTPUT
- RTU ANALOG INPUT
- (00) EQUIPMENT ITEM No.

No.	DATE	AMENDMENT	INITIALS

DIRECTOR OF P.D. & P.S.		DATE
ENGINEER IN CHARGE		DATE
SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE

	NAME	DATE
DESIGN	B.E.B.	
DRAWN	B.H.	1-4-00
CHECKED		

JOB FILE	IPR No.E99-A30982/A2		
AUTOCAD FILE	A30982A2	SHEET SIZE	A1.
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water

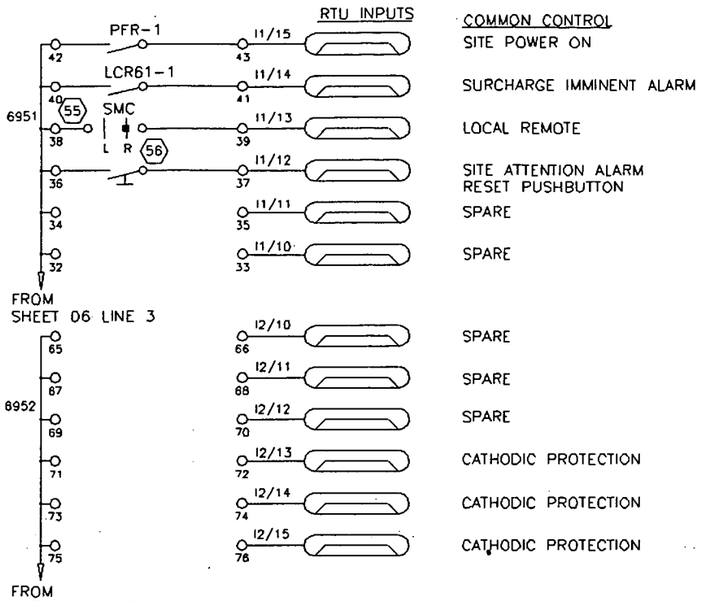
PROJECT
IDTS
SINNAMON ROAD (SP181)
SEWAGE SUBMERSIBLE
PUMP STATION

TITLE
PUMP No.1 & No.2
CONTROL SCHEMATIC WIRING
DIAGRAM

SCALE: N.T.S.	No.3 OF 6 SHEETS
DRAWING Nº 1134-06	AMEND.

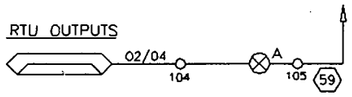
"AS CONSTRUCTED"

ELV CONTROL



RTU 24VDC (SHT.10)

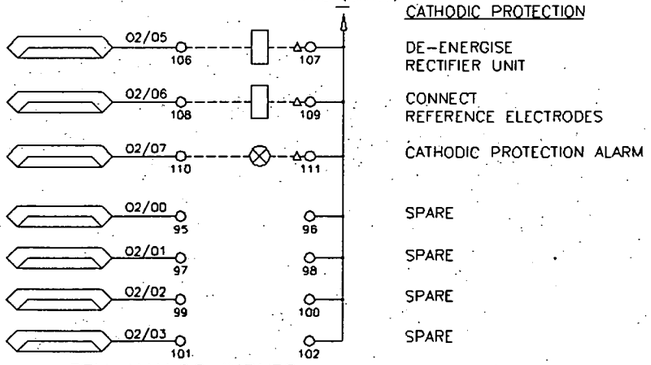
RTU OUTPUTS



(NOTE 3&4)

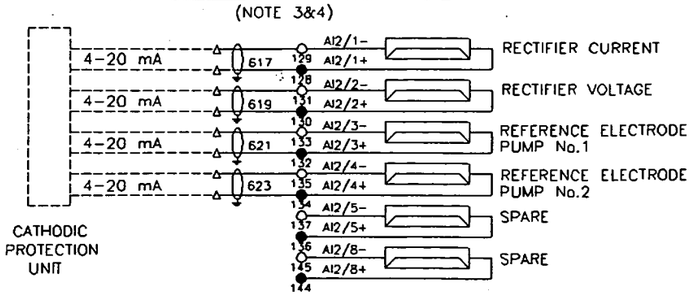
24VDC (SHT.5)

CATHODIC PROTECTION



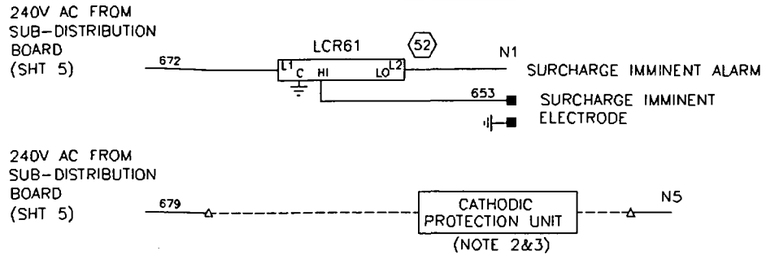
RTU ANALOG INPUTS FOR CATHODIC PROTECTION

(NOTE 3&4)

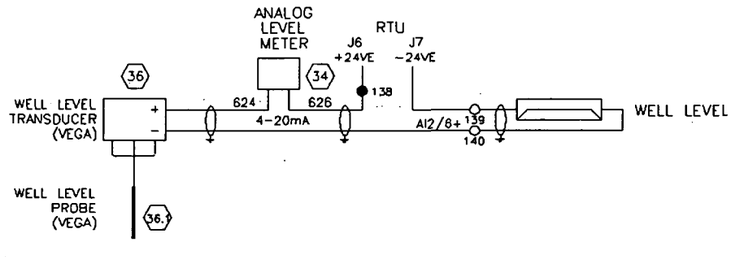


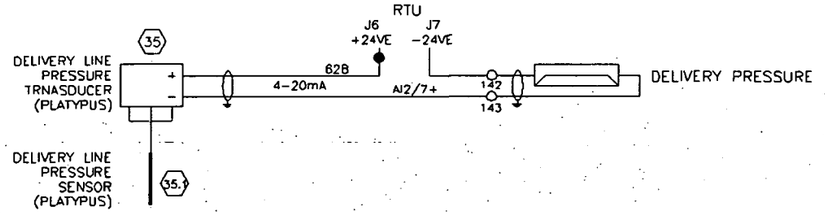
ORIGINAL

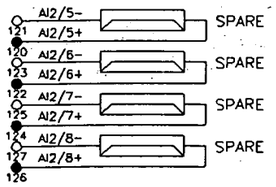
240V AC CONTROL



RTU ANALOG INPUTS FOR INSTRUMENTS







CROSS REFERENCE TABLE

ITEM	SHEET	LINE
C11 - COIL	8	7
- 3 N/O	8	11
- 1 N/O	8	10
C12 - COIL	8	8
- 3 N/O	8	9
- 1 N/O	8	11
- 1 N/C	8	9
C13 - COIL	8	9
- 3 N/O	8	13
- 1 N/O	8	12
- 1 N/C	8	8
- 1 N/O	8	3
C21 - COIL	8	18
- 3 N/O	8	25
- 1 N/O	8	21
C22 - COIL	8	19
- 3 N/O	8	23
- 1 N/O	8	22
- 1 N/C	8	20
C93 - COIL	8	20
- 3 N/O	8	27
C23 - 1 N/O (CONT) - 1 N/C - 1 N/O	8 6 6	23 18 14
LCR61 - COIL	8	4
- 1 C/O	8	4
- 1 N/O	-	-
PFR - COIL	8	5
- 1 C/O	8	3
- 1 C/O	-	-
PP1 - COIL	8	10
- 1 C/O	8	3
- 1 C/O	-	-
PP2 - COIL	8	31
- 1 C/O	8	14
- 1 C/O	-	-
PP11 - COIL	8	30
- 1 C/O	8	7
- 1 C/O	-	-
PP12 - COIL	8	31
- 1 C/O	8	8
- 1 C/O	-	-
RP13 - COIL	8	32
- 1 C/O	8	9
- 1 C/O	-	-
RP21 - COIL	8	35
- 1 C/O	8	18
- 1 C/O	-	-
RP22 - COIL	8	36
- 1 C/O	8	19
- 1 C/O	-	-
RP23 - COIL	8	37
- 1 C/O	8	20
- 1 C/O	-	-
SMC - 1 C/O	8	5
THR1 - COIL	8	4
- 1 N/O	8	6
- 1 N/C	8	7
THR2 - COIL	8	15
- 1 N/O	8	16
- 1 N/C	8	18
TOL1 - COIL	1	8
- 1 N/O	3	4
- 1 N/C	3	5
TOL2 - COIL	1	22
- 1 N/O	3	14
- 1 N/C	3	15
PUMP No.1 A/TRANSF N/C THERMAL SWITCH	8	8
PUMP No.2 A/TRANSF N/C THERMAL SWITCH	8	19
BD - COIL	10	9
- 1 N/O	10	9
PF - COIL	10	10
- 1 N/O	10	10

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- (NOTE 4) R.T.U. FUSE TERMINAL
- (NOTE 4) R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- CATHODIC PROTECTION TERMINAL
- RTU DIGITAL INPUT
- RTU DIGITAL OUTPUT
- RTU ANALOG INPUT
- EQUIPMENT ITEM No.

NOTES

1. ALL WIRES & CABLE CORES TO BE FERRULED WITH GRAFOPLAST COMPATIBLE LABELLING. THE FOLLOWING PREFIXES SHALL BE USED:
   MAIN PUMP No. 1 = 1
   MAIN PUMP No. 2 = 2
   COMMON WIRING = 8 (i.e. FLOW, LEVEL, PRESSURE)
2. CATHODIC PROTECTION - FUTURE THIS UNIT IS TO BE SUPPLIED BY OTHERS. RTU I/O CABLING TO BE INSTALLED TO PROPOSED CATHODIC PROTECTION TERMINAL STRIP FOR CONNECTION BY OTHERS.
3. ITEMS SHOWN AS DOTTED ARE FOR FUTURE ONLY.
4. TERMINAL NUMBER SHOWN EITHER IMMEDIATELY BELOW, LEFT OR RIGHT OF TERMINAL.
5. FUSE TERMINALS ARE FITTED WITH 100mA FUSE TERMINALS UNLESS OTERWISE SHOWN.

No.	DATE	AMENDMENT	INITIALS

DIRECTOR OF P.D. & P.S.		DATE
ENGINEER IN CHARGE		DATE
SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE

	NAME	DATE
DESIGN	B.E.B.	
DRAWN	P.H.	1-4-00
CHECKED		

JOB FILE	JPR No.E99-A309B2/A3		
AUTOCAD FILE	A309B2A3	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

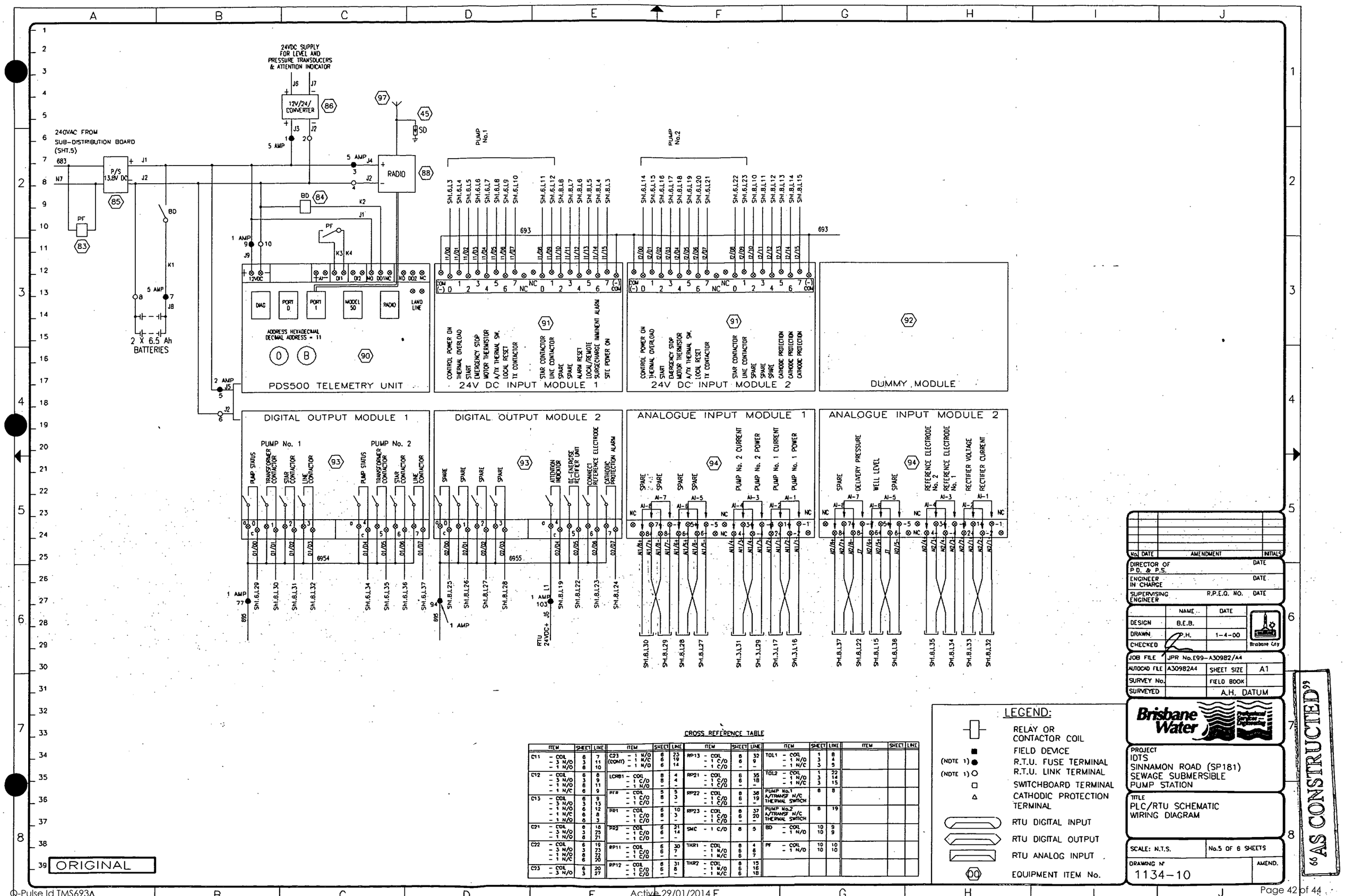
Brisbane Water

PROJECT
IDTS
SINNAMON ROAD (SP181)
SEWAGE SUBMERSIBLE
PUMP STATION

TITLE
COMMON CONTROL, WELL LEVEL, DELIVERY PRESSURE & SURCHARGE IMMINENT ALARM SCHEMATIC WIRING DIAGRAM

SCALE: N.T.S.	No.4 OF 6 SHEETS
DRAWING Nº 1134-08	AMEND.

"AS CONSTRUCTED"



CROSS REFERENCE TABLE

ITEM	SHEET	LINE
C11 – COL	6	7
– 3 N/O	3	11
– 1 N/O	6	10
C12 – COL	6	8
– 3 N/O	3	9
– 1 N/O	6	11
– 1 N/C	6	9
C13 – COL	6	9
– 3 N/O	3	13
– 1 N/O	6	12
– 1 N/C	6	8
– 1 N/O	6	3
C21 – COL	8	18
– 3 N/O	8	23
– 1 N/O	8	21
C22 – COL	6	19
– 3 N/O	3	23
– 1 N/O	6	22
– 1 N/C	6	20
C23 – COL	6	20
– 3 N/O	3	27

ITEM	SHEET	LINE
C23 – 1 N/O	6	23
(CONT) – 1 N/O	6	19
– 1 N/O	6	14
LCR81 – COL	6	4
– 1 C/O	6	4
– 1 N/O	–	–
PF8 – COL	5	5
– 1 C/O	8	3
– 1 C/O	–	–
PP1 – COL	6	10
– 1 C/O	6	3
– 1 C/O	–	–
PP2 – COL	6	21
– 1 C/O	6	14
– 1 C/O	–	–
PP11 – COL	6	30
– 1 C/O	6	7
– 1 C/O	6	2
PP12 – COL	6	31
– 1 C/O	6	8
– 1 C/O	–	–

ITEM	SHEET	LINE
RP13 – COL	6	32
– 1 C/O	6	9
– 1 C/O	–	–
RP21 – COL	6	35
– 1 C/O	6	18
– 1 C/O	–	–
RP22 – COL	6	36
– 1 C/O	6	19
– 1 C/O	–	–
RP23 – COL	6	37
– 1 C/O	6	20
– 1 C/O	–	–
SMC – 1 C/O	8	5
THR1 – COL	6	4
– 1 N/O	6	6
– 1 N/C	6	7
THR2 – COL	6	15
– 1 N/O	6	16
– 1 N/C	6	18

ITEM	SHEET	LINE
TOL1 – COL	1	8
– 1 N/O	3	4
– 1 N/C	3	5
TOL2 – COL	1	22
– 1 N/O	3	14
– 1 N/C	3	15
PUMP No.1 A/TRANSF N/C THERMAL SWITCH	6	8
PUMP No.2 A/TRANSF N/C THERMAL SWITCH	6	19
BD – COL	10	9
– 1 N/O	10	9
PF – COL	10	10
– 1 N/O	10	10

ITEM	SHEET	LINE

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- (NOTE 1) ● R.T.U. FUSE TERMINAL
- (NOTE 1) ○ R.T.U. LINK TERMINAL
- □ SWITCHBOARD TERMINAL
- △ CATHODIC PROTECTION TERMINAL
- RTU DIGITAL INPUT
- RTU DIGITAL OUTPUT
- RTU ANALOG INPUT
- (00) EQUIPMENT ITEM No.

No.	DATE	AMENDMENT	INITIALS

DIRECTOR OF P.D. & P.S.		DATE
ENGINEER IN CHARGE		DATE
SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE

	NAME	DATE
DESIGN	B.E.B.	
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

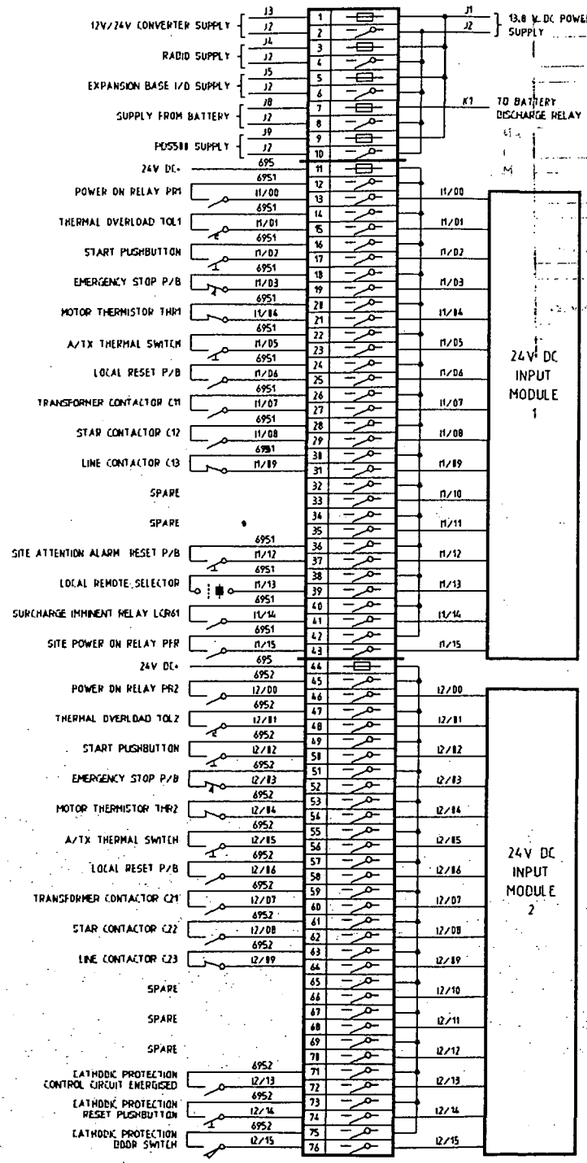
TITLE
PLC/RTU SCHEMATIC
WIRING DIAGRAM

SCALE: N.T.S.	No.5 OF 6 SHEETS
DRAWING N° 1134-10	AMEND.

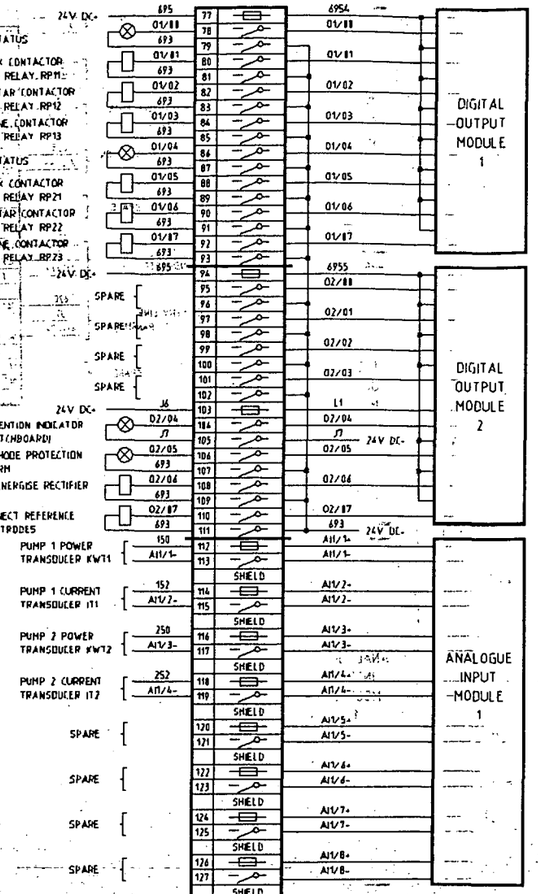
"AS CONSTRUCTED"

ORIGINAL

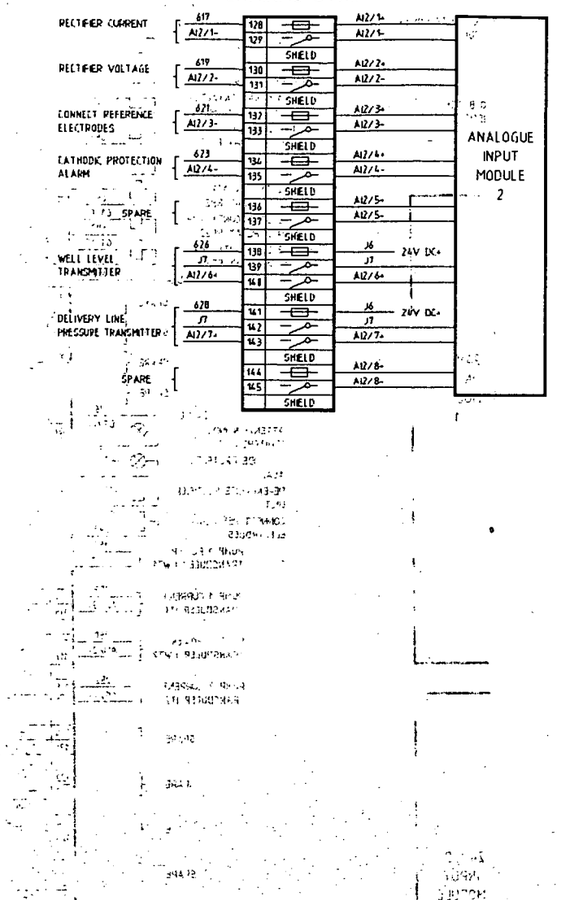
RTU TERMINAL STRIP



RTU TERMINAL STRIP



RTU TERMINAL STRIP



NOTES

No.	DATE	AMENDMENT	INITIALS

DIRECTOR OF P.D. & P.S.		DATE
ENGINEER IN CHARGE		DATE
SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE

	NAME	DATE
DESIGN	B.E.B.	
DRAWN	A.H.	1-4-00
CHECKED		

Brisbane City

JOB FILE	JPR No.E99-A30982/A5		
AUTOCAD FILE	A30982A5	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water

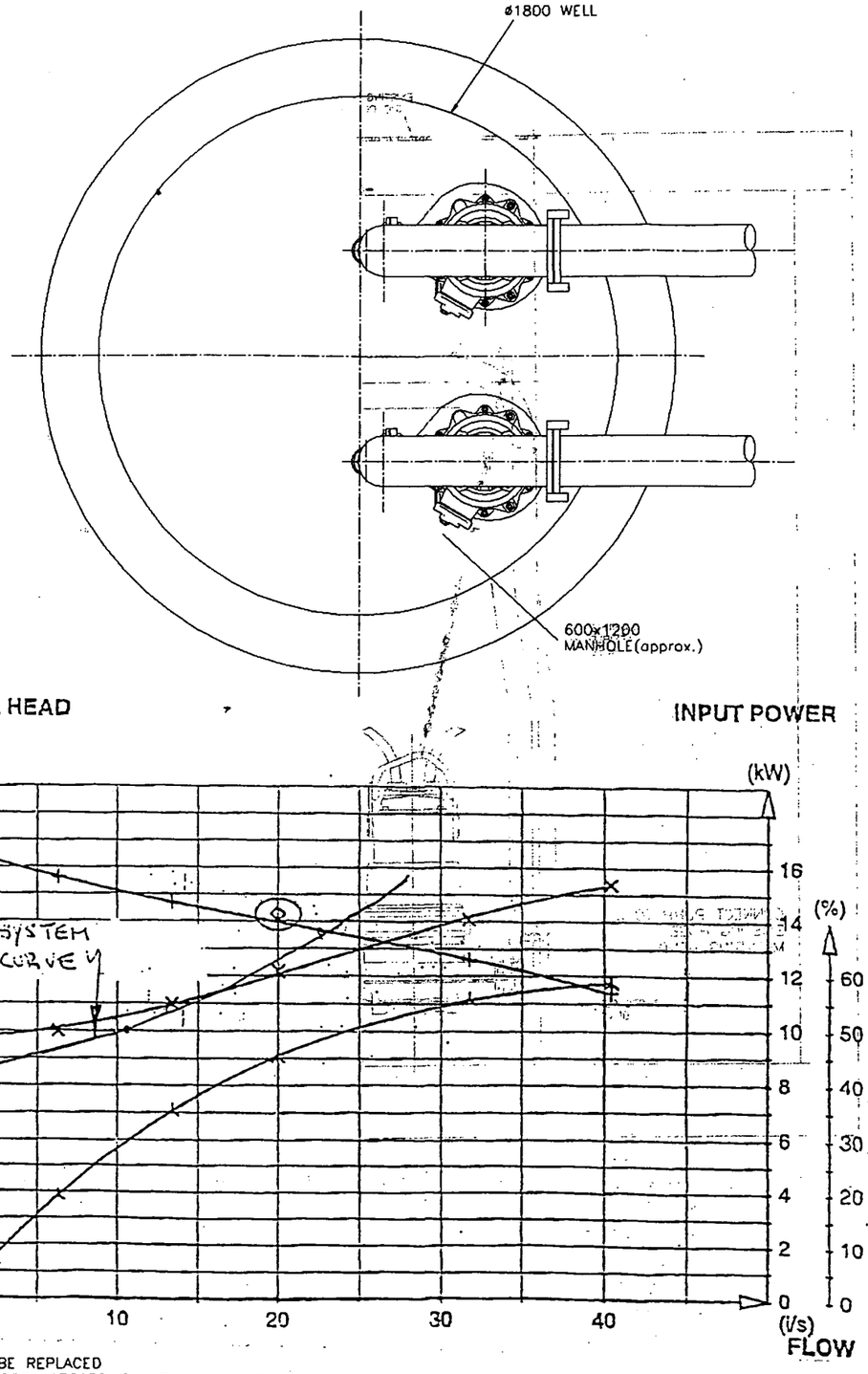
PROJECT
IDTS
SINNAMON ROAD (SP181)
SEWAGE SUBMERSIBLE
PUMP STATION

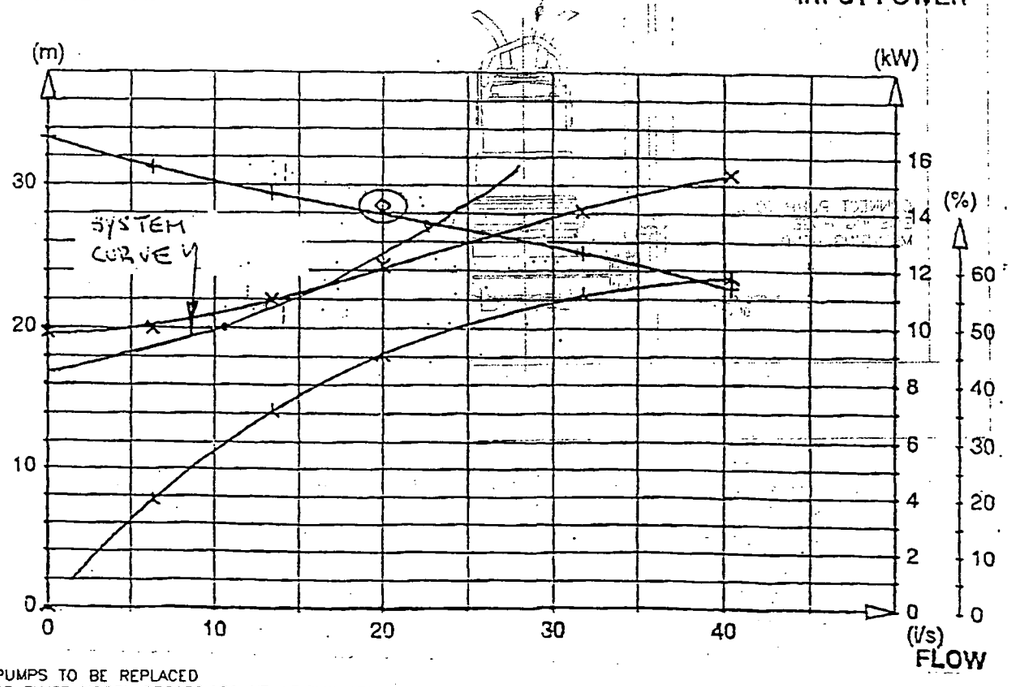
TITLE
RTU TERMINATION DIAGRAM

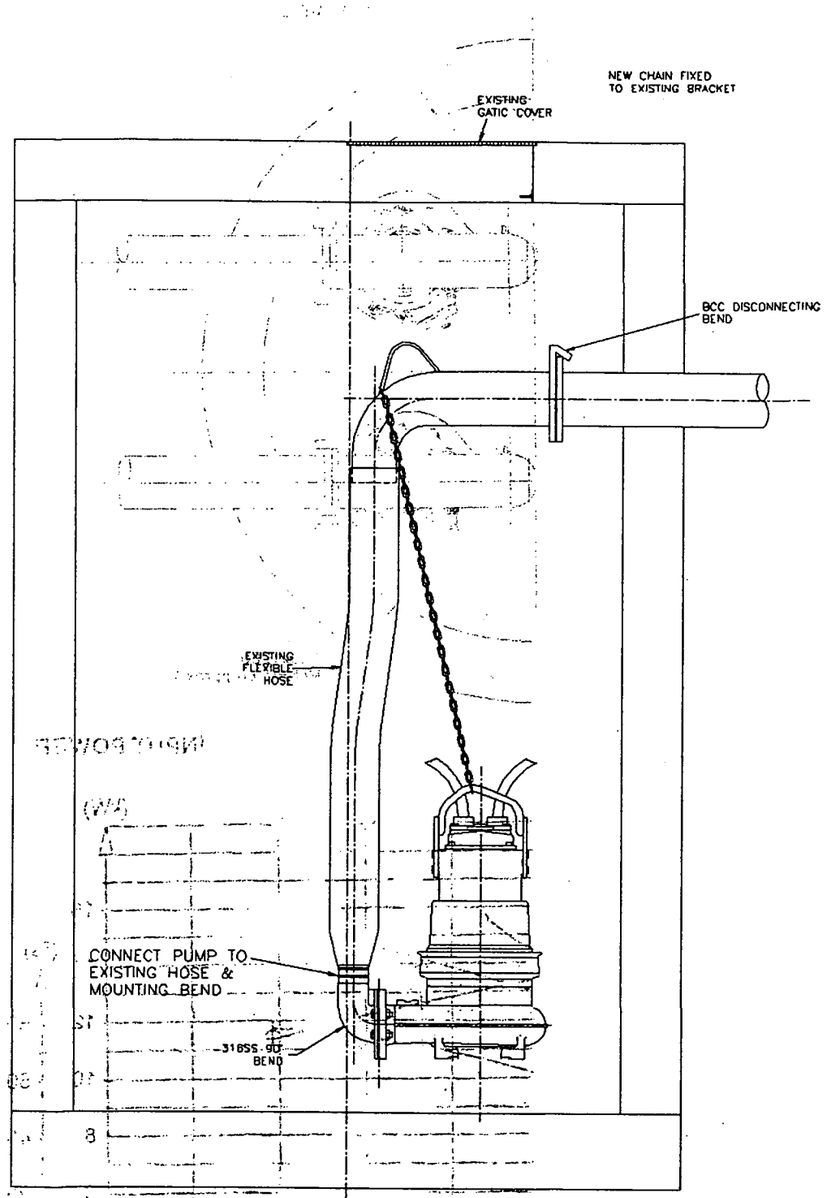
SCALE: N.T.S.	No.6 OF 6 SHEETS
DRAWING N° 1134-15	AMEND.

"AS CONSTRUCTED"

ORIGINAL







NOTE:
1. EXISTING PUMPS TO BE REPLACED
2. 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

"AS CONSTRUCTED"

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	DATE	AM'D BY	CHK'D
B	AMEND PUMP ARRANGEMENT	4-4-00	P.H.	
A	AMEND AS PER B.C.C. FAX DATED 25-2-00	25-2-00	P.H.	

SCALE	1:10 AT A1
DESIGNED	P.H.
TRACED	P.H.
CHECKED	7/12/00
DATE	12-1-00
APPROVED	
CLIENT NAME	CMC PROPERTIES
JOB No	30982

J. & P. RICHARDSON
INDUSTRIES PTY LTD – CAMPBELL AVE WACOL 4076
ELECTRICAL CONTRACTORS & ENGINEERS A.C.N 001 952 325
Ph(07)3271 2911 Fax(07)3271 3823 Email JPRQLD@JPR.COM.AU

TITLE
WINDEMERE ESTATE
PUMPING STATION No.181
SINNAMAON ROAD
PIPEWORK LAYOUT

DRAWING No
486/5/7-JG001
P00-A30982/X0B