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BRISBANE CITY COUNCIL BRISBANE WATER

SP306 – Coronation Drive Pump Station

Operation & Maintenance Manual Contract No. BW30079-02/03

Volume No. 2 Sections 1 to 3

BRISBANE CITY COUNCIL
Brisbane Water
SP306 Coronation Drive Pump Station

BCC Contract No. BW30079-02/03

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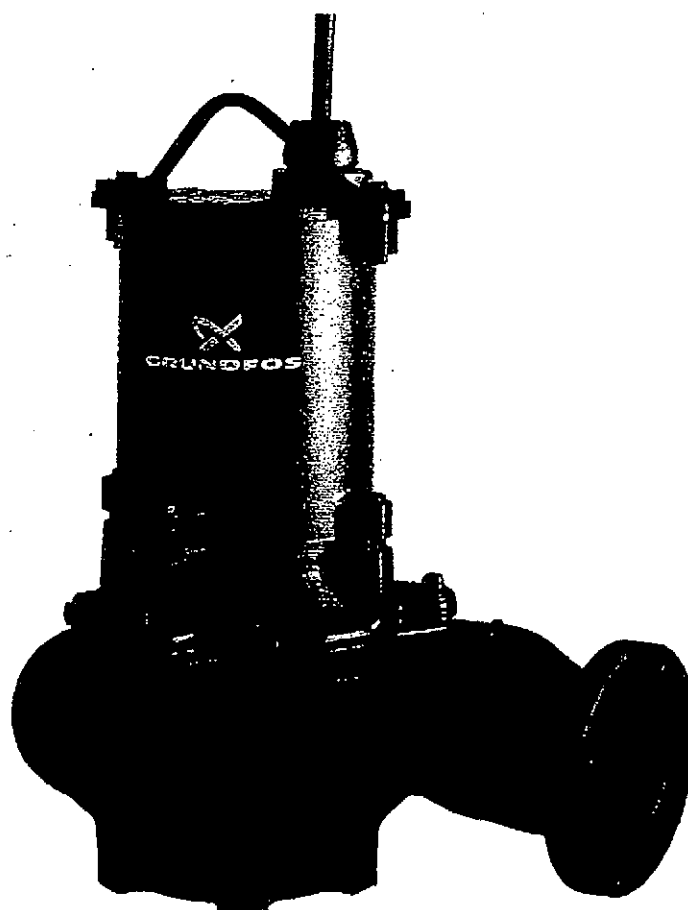
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GRUNDFOS INSTRUCTIONS

S1, S2, S3, SA, SV

7.5 - 155 kW

- ⓖⓑ Installation and operating instructions
- ⓓ Montage- und Betriebsanleitung
- ⓕ Notice d'installation et d'entretien
- ⓔ Istruzioni di installazione e funzionamento
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GRUNDFOS

Declaration of Conformity

Wir GRUNDFOS erklären in alleiniger Verantwortung, daß die Produkte S1, S2, S3, SA, SV, 7,5 - 155 kW, auf die sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-Mitgliedstaaten übereinstimmen:

- Maschinen (98/37/CE).
- Standard verwendet wurde: EN 292.
- Elektromagnetische Verträglichkeit (89/336/EEG).
- Normen, die verwendet wurden: EN 61 000-6-2 und EN 61 000-6-3.
- Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (73/23/EEG) [95].
- Normen, die verwendet wurden: EN 60 335-1 und EN 60 335-2-41.
- ATEX 94/9/EC.
- Standards used: EN 50 014, EN 50 018, EN 13 463-1 and pr EN 13 463-5.

Konformitätserklärung

Wir GRUNDFOS erklären in alleiniger Verantwortung, daß die Produkte S1, S2, S3, SA, SV, 7,5 - 155 kW, auf die sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-Mitgliedstaaten übereinstimmen:

- Maschinen (98/37/EG).
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- Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (73/23/EEG) [95].
- Normen, die verwendet wurden: EN 60 335-1 und EN 60 335-2-41.
- ATEX 94/9/EG.
- Normen, die verwendet wurden: EN 50 014, EN 50 018, EN 13 463-1 und pr EN 13 463-5.

Déclaration de Conformité

Nous GRUNDFOS déclarons sous notre seule responsabilité que les produits S1, S2, S3, SA, SV, 7,5 - 155 kW auxquels se réfère cette déclaration sont conformes aux Directives du Conseil concernant le rapprochement des législations des Etats membres CE relatives à

- Machines (98/37/CE).
- Standard utilisé: EN 292.
- Compatibilité électromagnétique (89/336/CEE).
- Standards utilisés: EN 61 000-6-2 et EN 61 000-6-3.
- Matériel électrique destiné à employer dans certaines limites de tension (73/23/CEE) [95].
- Standards utilisés: EN 60 335-1 et EN 60 335-2-41.
- ATEX 94/9/EC.
- Standards utilisés: EN 50 014, EN 50 018, EN 13 463-1 et pr EN 13 463-5.

Dichiarazione di Conformità

Noi GRUNDFOS dichiariamo sotto la nostra esclusiva responsabilità che i prodotti S1, S2, S3, SA, SV, 7,5 - 155 kW, ai quali questa dichiarazione si riferisce, sono conformi alle Direttive del consiglio concernenti il ravvicinamento delle legislazioni degli Stati membri CE relative a

- Macchine (98/37/CE).
- Norme di riferimento: EN 292.
- Compatibilità elettromagnetica (89/336/CEE).
- Norme di riferimento: EN 61 000-6-2 e EN 61 000-6-3.
- Materiale elettrico destinato ad essere utilizzato entro certi limiti di tensione (73/23/CEE) [95].
- Norme di riferimento: EN 60 335-1 e EN 60 335-2-41.
- ATEX 94/9/EC.
- Norme di riferimento: EN 50 014, EN 50 018, EN 13 463-1 e pr EN 13 463-5.

Declaración de Conformidad

Nosotros GRUNDFOS declaramos bajo nuestra única responsabilidad que los productos S1, S2, S3, SA, SV, 7,5 - 155 kW a los cuales se refiere esta declaración son conformes con las Directivas del Consejo relativas a la aproximación de las legislaciones de los Estados Miembros de la CE sobre

- Máquinas (98/37/CE).
- Norma aplicada: EN 292.
- Compatibilidad electromagnética (89/336/CEE).
- Normas aplicadas: EN 61 000-6-2 y EN 61 000-6-3.
- Material eléctrico destinado a utilizarse con determinados límites de tensión (73/23/CEE) [95].
- Normas aplicadas: EN 60 335-1 y EN 60 335-2-41.
- ATEX 94/9/EC.
- Normas aplicadas: EN 50 014, EN 50 018, EN 13 463-1 y pr EN 13 463-5.

Declaração de Conformidade

Nós GRUNDFOS declaramos sob nossa única responsabilidade que os produtos S1, S2, S3, SA, SV, 7,5 - 155 kW aos quais se refere esta declaração estão em conformidade com as Directivas do Conselho das Comunidades Europeias relativas à aproximação das legislações dos Estados Membros respeitantes à

- Máquinas (98/37/CE).
- Norma utilizada: EN 292.
- Compatibilidade electromagnética (89/336/CEE).
- Normas utilizadas: EN 61 000-6-2 e EN 61 000-6-3.
- Material eléctrico destinado a ser utilizado dentro de certos limites de tensão (73/23/CEE) [95].
- Normas utilizadas: EN 60 335-1 e EN 60 335-2-41.
- ATEX 94/9/EC.
- Normas utilizadas: EN 50 014, EN 50 018, EN 13 463-1 e pr EN 13 463-5.

Δήλωση Συμμόρφωσης

Η GRUNDFOS δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα S1, S2, S3, SA, SV, 7,5 - 155 kW συμμορφώνονται με την Οδηγία του Συμβουλίου επί της σύγκλισης των νόμων των Κρατών Μελών της Ευρωπαϊκής Ένωσης σε σχέση με τα

- Μηχανήματα (98/37/ΕΚ).
- Πρότυπο που χρησιμοποιήθηκε: EN 292.
- Ηλεκτρομαγνητική συμβατότητα (89/336/ΕΟΚ).
- Πρότυπα που χρησιμοποιήθηκαν: EN 61 000-6-2 και EN 61 000-6-3.
- Ηλεκτρικές συσκευές σχεδιασμένες για χρήση εντός ορισμένων ορίων ηλεκτρικής τάσης (73/23/ΕΟΚ) [95].
- Πρότυπα που χρησιμοποιήθηκαν: EN 60 335-1 και EN 60 335-2-41.
- ATEX 94/9/ΕΚ.
- Πρότυπα που χρησιμοποιήθηκαν: EN 50 014, EN 50 018, EN 13 463-1 και pr EN 13 463-5.

Overeenkomstigheidsverklaring

Wij GRUNDFOS verklaren geheel onder eigen verantwoordelijkheid dat de producten S1, S2, S3, SA, SV, 7,5 - 155 kW waarop deze verklaring betrekking heeft in overeenstemming zijn met de Richtlijnen van de Raad inzake de onderlinge aanpassing van de wetgevingen van de Lid-Staten betreffende

- Machines (98/37/EG).
- Norm: EN 292.
- Elektromagnetische compatibiliteit (89/336/EEG).
- Normen: EN 61 000-6-2 en EN 61 000-6-3.
- Elektrisch materiaal bestemd voor gebruik binnen bepaalde spanningsgrenzen (73/23/EEG) [95].
- Normen: EN 60 335-1 en EN 60 335-2-41.
- ATEX 94/9/EC.
- Normen: EN 50 014, EN 50 018, EN 13 463-1 en pr EN 13 463-5.

Försäkran om överensstämmelse

Vi GRUNDFOS försäkrar under ansvar, att produkterna S1, S2, S3, SA, SV, 7,5 - 155 kW, som omfattas av denna försäkran, är i överensstämmelse med Rådets Direktiv om inbördes närmande till EU-medlemsstaternas lagstiftning, avseende

- Maskinell utrustning (98/37/EC).
- Använd standard: EN 292.
- Elektromagnetisk kompatibilitet (89/336/EEC).
- Använda standarder: EN 61 000-6-2 och EN 61 000-6-3.
- Elektrisk material avsedd för användning inom vissa spänningsgränser (73/23/EEC) [95].
- Använda standarder: EN 60 335-1 och EN 60 335-2-41.
- ATEX 94/9/EC.
- Använda standarder: EN 50 014, EN 50 018, EN 13 463-1 och pr EN 13 463-5.

Vastaavuuksvakuutus

Me GRUNDFOS vakuutamme yksin vastuullisesti, että tuotteet S1, S2, S3, SA, SV, 7,5 - 155 kW, jolla tämä vakuutus koskee, noudattavat direktiivejä jotka käsittelevät EY:n jäsenvaltioiden koneellisia laitteita koskevien lakien yhdenmukaisuutta seur.

- Koneet (98/37/EY).
- Käytetty standardi: EN 292.
- Elektromagneettinen vastaavuus (89/336/EY).
- Käytetyt standardit: EN 61 000-6-2 ja EN 61 000-6-3.
- Määrätyjen jännitearajoitusten puitteissa käytettävät sähköiset laitteet (73/23/EY) [95].
- Käytetyt standardit: EN 60 335-1 ja EN 60 335-2-41.
- ATEX 94/9/EC.
- Käytetyt standardit: EN 50 014, EN 50 018, EN 13 463-1 ja pr EN 13 463-5.

Overensstemmelseerklæring

Vi GRUNDFOS erklærer under ansvar, at produkterne S1, S2, S3, SA, SV, 7,5 - 155 kW, som denne erklæring omhandler, er i overensstemmelse med Rådets direktiver om indbyrdes tilnærmelse til EF medlemsstaternes lovgivning om

- Maskiner (98/37/EF).
- Anvendt standard: EN 292.
- Elektromagnetisk kompatibilitet (89/336/EØF).
- Anvendte standarder: EN 61 000-6-2 og EN 61 000-6-3.
- Elektrisk materiel bestemt til anvendelse inden for visse spændingsgrænser (73/23/EØF) [95].
- Anvendte standarder: EN 60 335-1 og EN 60 335-2-41.
- ATEX 94/9/EC.
- Anvendte standarder: EN 50 014, EN 50 018, EN 13 463-1 og pr EN 13 463-5.

Bjerringbro, 1st June 2003



Kenneth Hvid Nielsen
Technical Manager

S1, S2, S3, SA, SV

7.5 - 155 kW

Installation and
operating instructions

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Before beginning installation procedures, these installation and operating instructions should be studied carefully. The installation and operation should also be in accordance with local regulations and accepted codes of good practice.

1. General description

This booklet includes instructions for installation, operation and maintenance of GRUNDFOS submersible wastewater pumps, types S1, S2, S3, SA and SV, fitted with motors of 7.5 to 155 kW. The booklet also includes specific instructions for the explosion-proof pumps.

1.1 Applications

The S1, S2, S3, SA and SV pumps are designed for the pumping of wastewater in a wide range of municipal, private and industrial applications.

Depending on version, the pumps can be used for submerged or dry installation.

Maximum solids size: 145 mm.

1.1.1 Potentially explosive environments

In potentially explosive environments, the explosion-proof S1, S2, S3 and SV pumps must be used, see sections 1.5.1 *Ex certification and classification* and 7.3 *Explosion-proof S1, S2, S3 and SV pumps*.

Note: The explosion classification of the pump is EEx dIIB T3 or EEx dIIB T4. The installation must in each individual case be approved by the local fire-fighting authorities.

1.2 Operating conditions

1.2.1 pH value

All pumps can be used for pumping liquids with a pH value between 4 and 10.

1.2.2 Liquid temperature

0°C to +40°C.

1.2.3 Ambient temperature

-20°C to +40°C.

1.2.4 Density and viscosity of pumped liquid

Maximum density: 1000 kg/m³.

Maximum kinematic viscosity: 1 mm²/s (1 cSt).

Note: When pumping liquids with a density and/or a kinematic viscosity higher than the values stated above, motors with correspondingly higher outputs must be used.

1.2.5 Level of pumped liquid

In the case of submerged pump installation, the lowest stop level must always be above the pump housing.

The pump must always be filled with the liquid to be pumped.



An additional level switch must be installed to ensure that the pump is stopped in case the stop level switch is not operating.

To ensure adequate cooling of the motor during operation, the following minimum requirements must be met:

- **Versions 1 and 4:**
The pump must always be covered by the pumped liquid to the middle of the motor.
- **Versions 2 and 5:**
The pump housing must always be covered by the pumped liquid.
- **Versions 3 and 6:**
No special requirements.
- **Version 7:**
The liquid level must be at least 350 mm above the pump inlet, see fig. 7.

1.2.6 Operating mode

The pumps are designed for continuous operation or for intermittent operation with the maximum number of starts per hour stated in the table below:

Motor size	Starts per hour
7.5 - 21.0 kW, 2- and 4-pole	20
15.0 kW, 12-pole 16.0 kW, 6-pole 22.0 - 155 kW	15

1.2.7 Enclosure class

IEC IP 68.

1.3 Sound pressure level

The sound pressure level of the pump is lower than the limiting values stated in the EC Council Directive 98/37/EC relating to machinery.

1.4 Type key

All S1, S2, S3, SA and SV pumps described in this booklet are identified by the type code stated in the confirmation of order and other documentation supplied with the pump. The code consists of 14 items as shown in the table below.

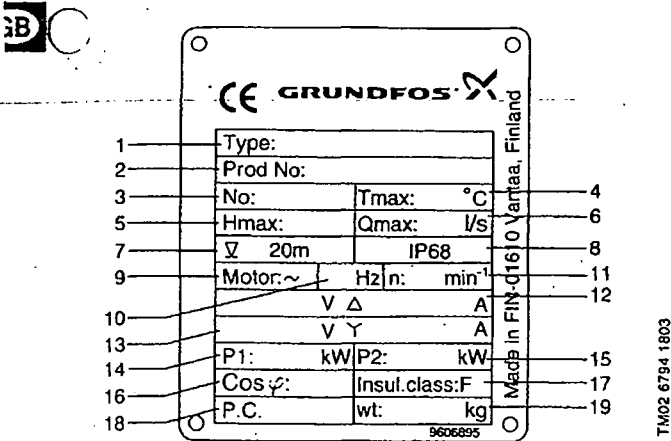
Please note that the pump types described in this booklet are not necessarily available in all variants. The shaded code items are stated on the pump nameplate.

S	1	X	17	4	M	1	A	S	11	Z			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Code item		Description											
1. Pump type		S	GRUNDFOS submersible wastewater pumps, type S										
2. Impeller type		1	Single-channel										
		2	Two-channel										
		3	Three-channel										
		V	SuperVortex										
		A	Axial										
3. Motor specification		[]	Standard, not certified										
		X	Explosion-proof motor										
		A	In conformity with the ATEX directive										
4. Motor power		Motor power in kW											
5. Motor pole number		Motor speed at											
					50 Hz		60 Hz						
					min ⁻¹		min ⁻¹						
		2	2-pole		3000		3600						
		4	4-pole		1500		1800						
		6	6-pole		1000		1200						
		8	8-pole		750		900						
		10	10-pole		600		720						
6. Pump generation		[]	1st generation										
		A	2nd generation										
		B	3rd generation, etc.										
		The generation code distinguishes between structurally different pumps which have the same power rating											
7. Head		[]	No classification										
		E	Extra-low										
		L	Low										
		M	Medium										
		H	High										
		S	Super-high										
8. Installation version		1	Submerged installation on auto-coupling										
		2	Submerged installation on auto-coupling. Pump with cooling jacket.										
		3	Vertical dry installation with base stand. Pump with cooling jacket.										
		4	Submerged installation, portable										
		5	Submerged installation, portable. Pump with cooling jacket.										
		6	Horizontal dry installation with base stand and bracket. Pump with cooling jacket.										
		7	Vertical column installation										
9. Interchangeability		The letter (A, B, C...) indicates the interchangeability of parts between otherwise identical pumps. Pumps with no or the same letter have full interchangeability of parts and use the same spare parts catalogue.											
10. Number of phases		[]	Three-phase										
11. Frequency		5	50 Hz										
		6	60 Hz										
12. Voltage and starting		50 Hz						60 Hz					
		01	400 V, DOL					01	460 V, DOL				
		11	400 V, star-delta					11	460 V, star-delta				
		02	230 V, DOL					03	500 V, DOL				
		12	230 V, star-delta					13	500 V, star-delta				
		03	415 V, DOL					05	380 V, DOL				
		13	415 V, star-delta					15	380 V, star-delta				
		04	500 V, DOL					07	220 V, DOL				
		14	500 V, star-delta					17	220 V, star-delta				
		06	690 V, DOL										
		13. Special equipment		U	Flanges sized according to ANSI specifications								
14. Non-standard parts		Z	See confirmation of order for further details										

1.5 Nameplates

All pumps can be identified by means of the nameplate on the motor top cover, see fig. 1. If the nameplate is missing or damaged, the pump can be identified by the serial number stamped under the nameplate.

Fig. 1



Pos.	Description
1	Type designation
2	SAP code
3	Serial number
4	Maximum liquid temperature
5	Maximum head
6	Maximum flow
7	Maximum installation depth
8	Enclosure class
9	Number of phases
10	Frequency
11	Rated speed
12	Voltage/current, delta connection
13	Voltage/current, star connection
14	Power input
15	Shaft power
16	Power factor
17	Insulation class
18	Production code, year/week
19	Weight of the pump

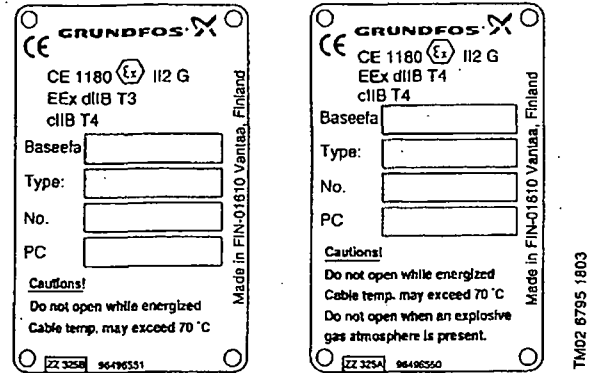
1.5.1 Ex certification and classification

Explosion-proof pumps have been approved by Baseefa (2001) Ltd. in conformity with the essential health and safety requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Council Directive 94/9/EC (ATEX).

The certified pumps (Ex-pumps) are supplied with an approval plate fixed in the visible place close to the nameplate.

Fig. 2 shows the approval plates for the pumps equipped optionally with the motors classified to T3 or T4 temperature class.

Fig. 2



The approval plate gives the following details:

- CE CE mark.
- 1180 Number of Quality Assurance notified body.
- Ex EU ex-symbol.
- II Equipment group (II ≠ non-mining).
- 2 Equipment category (high protection).
- G Type of explosive atmosphere.
- EEx Motor explosion-proof according to European standard.
- d Motor withstands explosion pressure.
- IIB Gas Group.
- T3 Maximum surface temperature of the motor is 200°C.
- T4 Maximum surface temperature of the motor is 135°C.
- c Constructional safety.
- Baseefa Certificate number.
- No. HA.
- PC Production code.

2. Safety



Pump installation in pits must be carried out by specially trained persons.



Persons should not enter the installation area when an explosive atmosphere is present.

For safety reasons, all work in pits must be supervised by a person outside the pump pit.

Pits for submersible wastewater pumps contain wastewater with toxic and/or disease-causing substances. Therefore, all persons involved must wear appropriate personal protective equipment and clothing and all work on and near the pump must be carried out under strict observance of the hygiene regulations in force.

3. Transportation and storage

The pump is supplied from the factory in proper packing in which it should remain until it is to be installed.

Make sure that the pump cannot roll or fall over.

All lifting equipment must be rated for the purpose and checked for damages before any attempts are made to lift the pump. The lifting equipment rating must under no circumstances be exceeded. The pump weight is stated on the pump nameplate.



Always lift the pump by its lifting bracket or by means of a fork-lift truck, **never** by means of the motor cable or the hose/pipe.

Note: Do not remove the protection from the free end of the supply cable until the electrical connections are to be made. The free cable end must never be exposed to moisture or water, whether it is protected or not. Non-compliance may involve the risk of damage to the motor.

For long periods of storage, the pump must be protected against moisture and heat.

Storage temperature: -30°C to $+60^{\circ}\text{C}$.

After a long period of storage, the pump should be inspected before it is put into operation. Make sure that the impeller can rotate freely. Pay special attention to the condition of the shaft seals and the cable entry.

4. Installation

The loose nameplate supplied with the pump should be fixed at the installation site.

All safety regulations must be observed at the installation site, e.g. the use of blowers for fresh-air supply to the pit.



Do not put your hands or any tool into the pump suction or discharge port after the pump has been connected to the electricity supply, unless the pump has been switched off by removing the fuses or switching off the mains switch. It must be ensured that the electricity supply cannot be accidentally switched on.

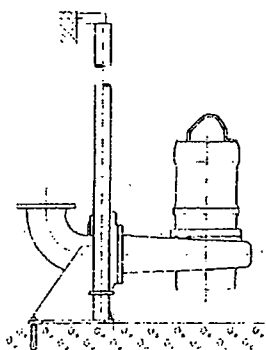
Prior to installation, check the oil level in the oil chamber, see section 7.1 *Oil check and oil change*.

The S1, S2, S3, SA and SV pumps are designed for various installation versions.

Figures 3 to 7 show the possible installation versions.

Fig. 3

Versions 1 and 2:
Submerged installation on auto-coupling

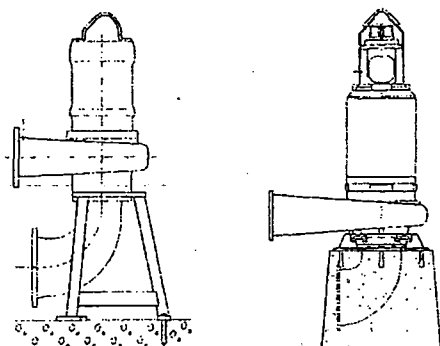


Permanent installation in pit. The pump can easily be pulled out and lowered into the pit by means of the guide rails. The liquid level can be set lower for version 2 than for version 1.

TM02 4000 4601

Fig. 4

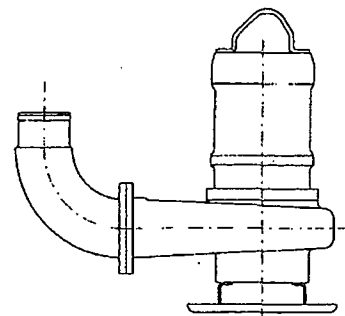
Version 3:
Vertical dry installation with base stand



Permanent installation in a pump room. The pump is bolted to the suction and discharge pipes by means of flange connections. Pumps with DN 500 or DN 600 flange are to be installed on a concrete foundation (see the above figure to the right).

Fig. 5

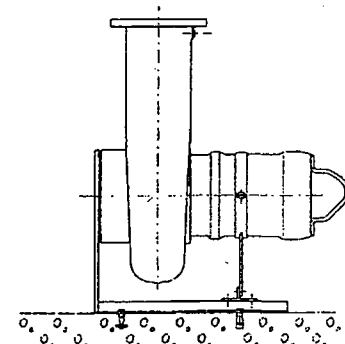
Versions 4 and 5:
Submerged installation, portable



For portable use in pit or temporary installation: The liquid level can be set lower for version 5 than for version 4.

Fig. 6

Version 6:
Horizontal dry installation with base stand and bracket



Permanent installation in a pump room. The pump is bolted to the suction and discharge pipes by means of flange connections.

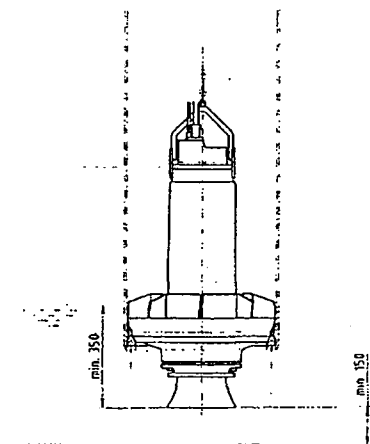
TM02 4001 4601 / TM02 4023 4701

TM02 4002 4601

TM02 4003 4601

Fig. 7

**Version 7:
Vertical column installation**



TM02 2494 4401

Vertical column installation in steel pipe or concrete shaft.

4.1 Submerged installation on auto-coupling

Pumps for permanent installation can be installed on a stationary auto-coupling and operated completely or partially submerged in the pumped liquid.

1. Drill mounting holes for the guide rail bracket on the inside of the pit and fasten the guide rail bracket provisionally with two screws.
2. Place the auto-coupling base unit on the bottom of the pit. Use a plumb line to establish the correct positioning. Fasten the auto-coupling with expansion bolts. If the bottom of the pit is uneven, the auto-coupling base unit must be supported so that it is level when being fastened.

Assemble the discharge pipe in accordance with the generally accepted procedures and without exposing the pipe to distortion or tension.

4. Insert the guide rails into the rings of the auto-coupling base unit and adjust the length of the rails accurately to the guide rail bracket at the top of the pit.
5. Unscrew the provisionally fastened guide rail bracket. Insert the expansion dowels into the guide rails. Fasten the guide rail bracket on the inside of the pit. Tighten the bolts in the expansion dowels.
6. Clean out debris from the pit before lowering the pump into the pit.
7. Fit the guide claw to the pump.
8. Slide the guide claw of the pump between the guide rails and lower the pump into the pit by means of a chain secured to the lifting bracket of the pump. When the pump reaches the auto-coupling base unit, the pump will automatically connect tightly.
9. Hang up the end of the chain on a suitable hook at the top of the pit and in such a way that the chain cannot come into contact with the pump housing.
10. Adjust the length of the motor cable by coiling it up on a relief fitting to ensure that the cable is not damaged during operation. Fasten the relief fitting to a suitable hook at the top of the pit. Make sure that the cables are not sharply bent or pinched.
11. Connect the motor cable and the monitoring cable, if any.

Note: The end of the cable must not be submerged, as water may penetrate through the cable into the motor.

4.2 Dry installation

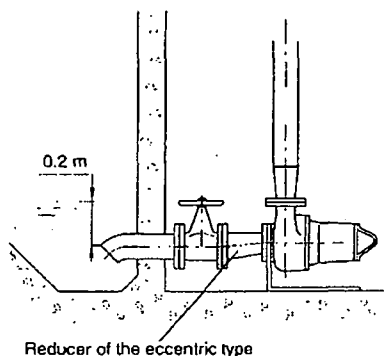
Pumps in dry installation are installed permanently in a pump room.

The pump motor is enclosed and watertight and will not be damaged if the installation site is flooded with water.

1. Mark and drill mounting holes in the concrete floor/concrete foundation.
 2. Fit the bracket or base stand to the pump.
 3. Fasten the pump with expansion bolts.
 4. Check that the pump is vertical/horizontal.
- In order to facilitate service on the pump, isolating valves should be fitted on either side of the pump.
5. Fit the suction and discharge pipes and isolating valves, if used, and ensure that the pump is not stressed by the pipe-work.
 6. Adjust the length of the motor cable by coiling it up on a relief fitting to ensure that the cable is not damaged during operation. Fasten the relief fitting to a suitable hook. Make sure that the cables are not sharply bent or pinched.
 7. Connect the motor cable and the monitoring cable, if any.

Note: It is recommended to use a reducer between the suction pipe and the pump in horizontal installations. The reducer must be of the eccentric type and must be installed so that the straight edge is pointing upwards. In this way, the accumulation of air in the suction pipe is avoided and the risk of disturbance of operation is eliminated, see fig. 8.

Fig. 8



TM02 2396 4201

4.3 Submerged installation, portable

1. Fit the ring stand to the pump suction flange.
 2. Fit a 90° elbow to the pump discharge port and connect the discharge pipe/hose.
- If a hose is used, make sure that the hose does not buckle and that the inside diameter matches that of the discharge port.
3. Lower the pump into the liquid by means of a chain secured to the lifting bracket of the pump. It is recommended to place the pump on a plane, solid foundation. Make sure that the pump is hanging from the chain and not the cable.
 4. Hang up the end of the chain on a suitable hook at the top of the pit and in such a way that the chain cannot come into contact with the pump housing.
 5. Adjust the length of the motor cable by coiling it up on a relief fitting to ensure that the cable is not damaged during operation. Fasten the relief fitting to a suitable hook. Make sure that the cables are not sharply bent or pinched.
 6. Connect the motor cable and the monitoring cable, if any.

4.4 Vertical column installation

1. Weld the ring stand supplied with the pump onto the lower opening of the riser pipe or concrete it into place at the lower opening of the concrete shaft.
2. Fasten a chain to the lifting bracket and uncoil the supply cable.
3. When the ring stand has been positioned in the right place, lower the pump into place in the pump shaft. Make sure that the O-ring seal is positioned correctly in the groove on the outside of the pump housing. Three guide pins on the ring stand will guide the pump into the right position and prevent it from turning in the seat when running.
4. Hang up the end of the chain on a suitable hook at the top of the pit and in such a way that the chain cannot come into contact with the pump housing.
5. Adjust the length of the motor cable by coiling it up on a relief fitting to ensure that the cable is not damaged during operation. Fasten the relief fitting to a suitable hook. Make sure that the cables are not sharply bent or pinched.
6. Connect the motor cable and the monitoring cable, if any.

4.5 Pump controller

The S1, S2, S3, SA and SV pumps can be connected to a separate GRUNDFOS pump controller for level control, which is available as an accessory:

- type LC for one-pump installations and
- type LCD for two-pump installations.

Depending on application, different types of level control equipment can be used.

The LC controller is fitted with two or three level switches:

Two for start and stop of pump. The third level switch, which is optional, is for high-level alarm.

The LCD controller is fitted with three or four level switches:

One for common stop and two for start of the pumps. The fourth level switch, which is optional, is for high-level alarm.

When installing the level switches, the following points should be observed:

1. To prevent air intake and vibrations in submerged pumps, the **stop level switch** must be fitted in such a way that the pump is stopped before the liquid level is lowered below the top of the pump housing.
As a principal rule for pumps in dry installation, the lowest stop level must be at least 20 cm above the opening of the suction pipe, see fig. 8.
2. The **start level switch** should be installed in such a way that the pump is started at the required level; however, the pump must always be started before the liquid level reaches the bottom inlet pipe to the pit.
3. The **high-level alarm switch**, if installed, should always be installed about 10 cm above the start level switch; however, alarm must always be given before the liquid level reaches the inlet pipe to the pit.

Note: The pump controller must not be installed in potentially explosive environments.



Pumps installed in potentially explosive atmosphere must always be filled with the liquid to be pumped.

An additional level switch must be installed to ensure that the pump is stopped in case the stop level switch is not operating.

4.6 Thermal switches

Three bimetallic thermal switches are built into the stator windings, and a contact will open in case of overtemperature, i.e. 150°C.

The supply voltage to the thermal switches must be 12-230 VAC.

The thermal switches are connected to the monitoring cable, see section 5. *Electrical connection*, and must be connected to the safety circuit of the separate pump controller.

Note: The motor starter of the pump controller must include a circuit which automatically disconnects the electricity supply in case the protective circuit for the pump is opened.



The installer/user should provide an automatic device which disconnects the electricity supply in case the thermal switches or the moisture switches are not operating.

4.7 Moisture switches

Non-explosion-proof pumps have one moisture switch, which is fitted in the chamber below the motor top cover.

Explosion-proof pumps have two moisture switches connected in series, which are fitted in the chamber below the motor top cover.

The moisture switch is non-reversing and must be replaced after use.

The moisture switches are connected in series with the thermal switches and connected to the monitoring cable, see section 5. *Electrical connection*, and must be connected to the safety circuit of the separate pump controller.

Note: The motor starter of the pump controller must include a circuit which automatically disconnects the electricity supply in case the protective circuit for the pump is opened.

4.8 Thermistors

Thermistors are available as accessories.

The thermistors are used for the monitoring of bearing and stator temperatures instead of thermal switches and must be connected to the thermistor relay in the control cabinet.

The following limit temperatures are used:

- 90°C – alarm for bearing temperature.
- 130°C – pump stop caused by high bearing temperature.
- 150°C – pump stop caused by high stator temperature.

At room temperature, the thermistor resistance is approx. 100 Ω.



The bearing temperature monitoring is not available in explosion-proof pumps.

4.8.1 Checking after installation of pump

1. Using a multimeter, check whether the circuit resistance is < 150 Ω / thermistor.
2. Using a multimeter, check whether the insulation between circuit and stator housing within the highest range is outside the scale (not measurable ∞).
3. Carry out similar measurements at the end of the supply cable.

4.9 Pt100 temperature sensor

The Pt100 temperature sensor is available as an accessory.

The Pt100 sensor is primarily used for the monitoring of bearing temperature, but it can also be used in the stator.

The sensor resistance is

- 100 Ω at 0°C,
- 138.5 Ω at 100°C and
- approx. 108 Ω at room temperature.



The Pt100 is not available for explosion-proof pumps.

4.9.1 Checking after installation of pump

1. Using a multimeter, check whether the resistance at room temperature is approx. 108 Ω.
2. Using a multimeter, check whether the insulation between circuit and stator housing within the highest range is outside the scale (not measurable ∞).
3. Carry out similar measurements at the end of the supply cable.
4. During pump check, the Pt100 sensor must be connected to a recording device.

4.10 OCT1 water-in-oil sensor

The OCT1 water-in-oil sensor is available as an accessory. The sensor measures the water content in the oil chamber. The sensor consists of a plate capacitor which is immersed in the oil and measures the electronic circuit, emitting a 4-20 mA proportional current signal. Connect the OCT1 sensor as shown in fig. 9.

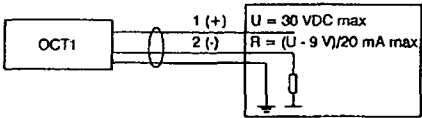
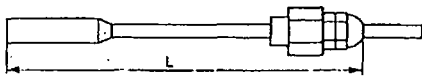
0.1 Fitting the OCT1 sensor

The OCT1 sensor is to be fitted in the filling hole of the oil chamber instead of the oil screw.

- 1. Remove the oil screw.
- 2. Push the sensor into the oil filling hole.
- 3. Push the sensor to a suitable depth in the oil chamber without letting it touch the rotating parts, but so deep that the sensor is completely covered by the oil. Recommended inserting depths for different pump types appear from the table below.
- 4. Screw the bush into the thread for the oil screw.

Note: Before refitting after oil change, the OCT1 sensor must be cleaned with white spirit (mineral turpentine).

Fig. 9



TM02 4024 0802

Motor size	Inserting depths L [mm]
7.5 - 12.5 kW	80
15 - 21 kW	90
22 - 29 kW, 2-, 4- and 6-pole	110
15 kW, 12-pole	
20 - 28 kW, 8-pole	
20 - 50 kW, 4-pole	
22 - 35 kW, 10-pole	
35 - 50 kW, 8-pole	140
58 - 155 kW	

Technical specifications

Measuring range	20-100 pF.
Sensor capacitance in air	9 pF.
Measuring range for water content	0-60% corresponding to 4-20 mA.
Temperature range	0-70°C.
Supply voltage	0-30 VDC max. 23 mA.
Material, supply cable	Polyurethane.
Ex approval	EEEx ia IIB T4, Ui = 34 V, li = 100 m, Ci = 220 nF, Li < 1 uH. In potentially explosive environments, the sensor must be connected via an approved Exi separator.

Electrical connection

The electrical connection should be carried out in accordance with local regulations. The supply voltage and frequency are marked on the pump nameplate. The voltage tolerance must be within ±5% of the rated voltage.

Make sure that the motor is suitable for the electricity supply available at the installation site.



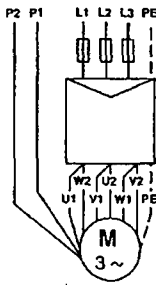
The pump must be connected to an external mains switch with a contact separation of at least 3 mm in each pole.

The pump must be connected to a motor starter. The wiring diagrams for direct-on-line starting and star-delta starting are shown in fig. 10 and fig. 11, respectively.

P1 and P2 are connected in series with the thermal switches and the moisture switches.

Fig. 10

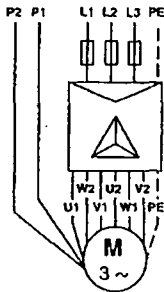
Direct-on-line starting



TM02 2420 4201

Fig. 11

Star-delta starting



TM02 2421 4201



The top cover of explosion-proof pumps is provided with an external earth terminal to ensure the connection to earth. The electrical installation must include an external connection from this terminal to earth. The earth wire must fulfill all electrical safety regulations in force.

Cross section of phase wire (S) of the installation [mm²]	Minimum cross section of earth wire [mm²]
S ≤ 16	S
16 < S ≤ 35	16
S > 35	0.5 * S, max. 70



Before installation and the first start-up of the pump, the cable condition should be checked visually to avoid short circuits.

6. Start-up



Before manual starting or changeover to automatic control, make sure that no persons are working on or near the pump.

Proceed as follows:

- 1. Remove the fuses or switch off the mains switch.
- 2. Check the oil level in the oil chamber. See section 7.1 Oil check and oil change.
- 3. Check whether the impeller can rotate freely.
- 4. Check whether the monitoring units, if used, are operating satisfactorily.

5. Make sure that the pump is submerged in the liquid.
For pumps in dry installation, it must be ensured that there is liquid in the pit.



Make sure that the pump has been filled with the liquid to be pumped.

Pumps in dry installation must be vented by means of the vent plug in the pump housing.

6. Open the isolating valves, if fitted.
7. Check whether the system has been filled with liquid and vented.
8. Check the setting of the level switches.
9. Start the pump and check the pump operation for abnormal noise or vibrations.

Note: In case of abnormal noise or vibrations from the pump or other pump or supply failures, stop the pump immediately. Do not attempt to restart the pump before the cause of the fault has been found and the fault corrected.

10. After start-up, the actual pump duty point must be established as accurately as possible so that it can be checked whether the operating conditions are as desired.

Note: The pump may be started for a very short period without being submerged for checking of direction of rotation.

The operation of the pump should always take place in accordance with established routines with scheduled checks of pump monitoring equipment and accessories (valves, etc.). Make sure that the pump and equipment settings cannot be changed by unauthorized persons.

6.1 Checking the direction of rotation

An arrow cast in the pump housing indicates the correct direction of rotation. The pump must rotate **clockwise** when seen from the drive end. Observe the movement of the pump (jerk) when started. If the pump moves counter-clockwise, the direction of rotation is correct.

As an alternative, the direction of rotation can be checked as follows:

1. Start the pump and check the quantity of liquid or the discharge pressure.
2. Stop the pump and interchange two of the phases to the motor.
3. Restart the pump and check the quantity of liquid or the discharge pressure.
4. Stop the pump.
5. Compare the results taken under points 1 and 3. The connection which gives the larger quantity of liquid or the higher pressure is the correct direction of rotation.

Note: The pump must only run for a short period when suspended from a chain.

7. Maintenance and service



Before starting work on the pump, make sure that the fuses have been removed or the mains switch has been switched off. It must be ensured that the electricity supply cannot be accidentally switched on. All rotating parts must have stopped moving.

Maintenance and service must be carried out by specially trained persons.



The maintenance and service work on explosion-proof pumps must be carried out by GRUNDFOS or a service workshop authorized by GRUNDFOS.

Before carrying out maintenance and service, it must be ensured that the pump has been thoroughly flushed with clean water. Rinse the pump parts in water after dismantling.

Pumps running normal operation should be inspected every 2000 operating hours or at least once a year. If the pumped liquid is very muddy or sandy, the pump should be inspected every 1000 operating hours or every six months.

The following points should be checked:

- **Power consumption**
- **Oil level and oil condition**
When the pump is new or after replacement of the shaft seals, check the oil level after one week of operation. The oil becomes greyish white like milk if it contains water. This may be the result of a defective shaft seal. The oil should be changed if it contains water. See section 7.1 *Oil check and oil change*.
Note: Used oil must be disposed of in accordance with local regulations.
The oil chamber contains 1.9 to 12.4 litres of SAE 10 W 30 motor oil depending on pump size.
- **Cable entry**
Make sure that the cable entry is watertight and that the cables are not sharply bent or pinched.
- **Impeller clearance**
Check the impeller clearance. See section 7.2 *Inspection and adjustment of impeller clearance*.
- **Pump parts**
Check the pump housing, etc. for possible wear. Replace defective parts.
- **Ball bearings**
Check the shaft for noisy or heavy operation (turn the shaft by hand). Replace defective ball bearings.
A general overhaul of the pump is usually required in case of defective ball bearings or poor motor function. This work must be carried out by an authorized service workshop.



The ball bearings must be replaced at least every 25,000 operating hours.

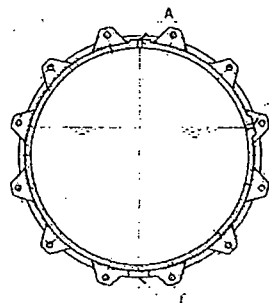
Note: Out of consideration for the heat-conducting ability, the pump should be cleaned on the outside at regular intervals.

7.1 Oil check and oil change

The oil chamber has two screws, A and B, for oil drainage, oil filling and level control. Horizontally installed pumps (version 6) have a third screw, C, for oil drainage.

On horizontally installed pumps (version 6), the oil screws are always positioned as shown in fig. 12.

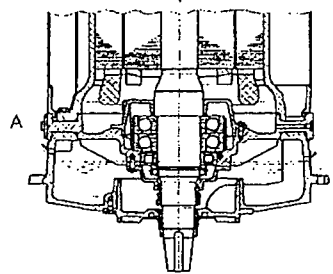
Fig. 12



TM02 4004 4601

In the case of pumps with 8- or 10-pole motors of 22-50 kW and pumps with motors larger than 50 kW, the oil can be changed while the pump is standing upright. The screw B is used for the indication of the oil level in the oil chamber, see fig. 13.

Fig. 13



TM02 4005 4601

Proceed as follows:

1. Place the pump in such a position that the screw A is pointing upwards.



When slackening the screw A of the oil chamber, note that pressure may have built up in the chamber. Do not remove the screw until the pressure has been fully relieved.



Place a clean container under the pump to collect all the drained-off oil. Slacken the screw B pointing to the side and observe the oil level. The drained-off quantity of oil indicates whether the lower mechanical shaft seal is leaking, which may be normal.

3. Turn the pump or remove the screw C and allow all the oil to drain from the chamber into the container. Pour an oil sample into a glass container and observe the condition of the oil. Clear oil can be reused. Emulsified oil must be changed and disposed of. Note: Used oil must be disposed of in accordance with local regulations. Low oil level may indicate that the upper mechanical shaft seal is defective. Contact an authorized service workshop for further overhaul of the pump and repair, if required.
4. Fill the oil chamber with oil through the top hole A until the oil level reaches the hole B. Replace the O-rings by new rings, insert the screws and tighten securely.



Use viscosity grade SAE 10 W 30.

ONDINA 917 can be used in temperature class T4 applications only.

7.2 Inspection and adjustment of Impeller clearance

Adjustment of the impeller clearance is only relevant for pumps with channel impellers (S1, S2 and S3 pumps).

The correct impeller clearance is 0.7 mm \pm 0.2 mm. The clearance should be adjusted if it is worn to 1.2 mm or more.

The procedures for adjustment of the impeller clearance are different for pumps in submerged installation (versions 1, 2, 4 and 5) and pumps in dry installation (versions 3, 6 and 7).

The various procedures are described in the following sections:

7.2.2 Adjustment of impeller clearance for pumps without inlet funnel in submerged installation,

7.2.3 Adjustment of impeller clearance for pumps with inlet funnel in submerged installation,

7.2.4 Adjustment of impeller clearance for pumps without slide ring in dry installation,

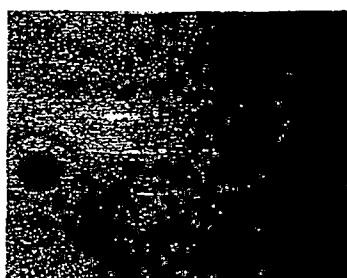
7.2.5 Adjustment of impeller clearance for pumps with slide ring in dry installation,

7.2.6 Adjustment of impeller clearance of axial pumps.

7.2.1 Inspection of impeller clearance for pumps in submerged installation

1. Lay the pump flat on a work bench.
2. Locate the six fixing screws securing the pump housing to the motor and the three adjusting screws, see fig. 14.
3. Check the clearance between impeller and pump housing all the way round using a feeler gauge.
4. Turn the impeller by hand and check at several points, see fig. 15.

Fig. 14



Adjusting screw

Fixing screws

TM02 2393 4201

Fig. 15



TM02 2394 4201

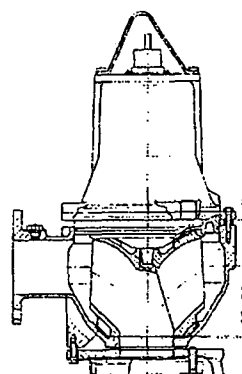
If the impeller clearance needs adjustment, follow one of the procedures described below.

7.2.2 Adjustment of Impeller clearance for pumps without inlet funnel in submerged installation

Procedure:

1. Slacken all fixing screws and adjusting screws between pump housing and motor.
2. Tap on the pump housing at several points using a rubber mallet to loosen the pump housing from the motor.
3. Close the impeller clearance by tightening three of the fixing screws until the impeller touches the pump housing. Do not use unnecessary force.
4. Slacken the fixing screws and open the clearance to 0.7 mm \pm 0.2 mm by tightening the three adjusting screws, see fig. 16. Check that the clearance is equal all around the suction opening.

Fig. 16



TM02 2395 4201

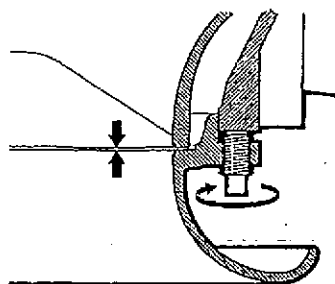
5. Tighten all fixing screws and check that the clearance is still equal all around the suction opening.

7.2.3 Adjustment of impeller clearance for pumps with inlet funnel in submerged installation

Procedure:

1. Slacken all fixing screws and adjusting screws between pump housing and motor.
2. Tap on the pump housing at several points using a rubber mallet to loosen the pump housing from the motor.
3. Close the impeller clearance by tightening three of the fixing screws until the impeller touches the inlet funnel. Do not use unnecessary force.
4. Slacken the fixing screws and open the clearance to 0.7 mm \pm 0.2 mm by tightening the three adjusting screws, see fig. 17. Check that the clearance is equal all around the suction opening.

Fig. 17



TMA02 4089 4B01

5. Tighten all fixing screws and check that the clearance is still equal all around the suction opening.

7.2.4 Adjustment of impeller clearance for pumps without slide ring in dry installation

The impeller clearance can be adjusted while the pump is mounted on the base stand and connected to the pipework, see fig. 16.

Procedure:

1. Slacken all fixing screws and adjusting screws between pump housing and motor.
2. Tap on the pump housing at several points using a rubber mallet to loosen the pump housing from the motor.
3. Close the impeller clearance by tightening three of the fixing screws until the impeller touches the pump housing. Do not use unnecessary force.
4. Measure the distance X between the shaft seal housing and the pump housing at three points using a slide caliper, see fig. 16.
5. Slacken the fixing screws and pull the motor $0.7 \text{ mm} \pm 0.2 \text{ mm}$ out by tightening the three adjusting screws and using the distance X as reference.
6. Tighten all fixing screws and check that the distance X at the three reference points is equal.

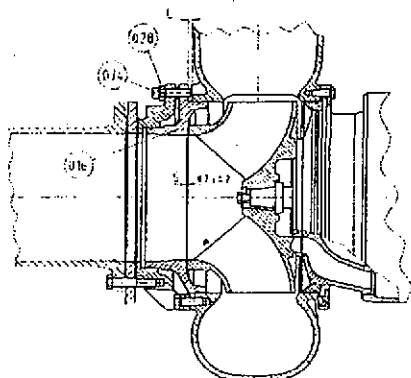
7.2.5 Adjustment of impeller clearance for pumps with slide ring in dry installation

The impeller clearance can be adjusted while the pump is mounted on the base stand and connected to the pipework, see fig. 18.

Procedure:

1. Slacken all fixing screws (028).
2. Close the impeller clearance S by tightening the adjusting screws (074) evenly. Do not use unnecessary force.
3. Measure and note the distance "L" between pump housing and suction cover at the adjusting screws. Use a slide caliper.
4. Slacken the adjusting screws (074).
5. Tighten the fixing screws (028) evenly so that the distance "L" measured at the adjusting screws is increased by $0.7 \text{ mm} \pm 0.2 \text{ mm}$.
6. Tighten the adjusting screws and retighten the fixing screws.
7. Check the distance "L" and readjust, if necessary.

Fig. 18



TMA02 4006 4B01

7.2.6 Adjustment of impeller clearance of axial pumps

The impeller clearance of a new pump is 0.8 mm and it cannot be adjusted. If the impeller clearance is worn to 3 mm or more, the propeller and the suction part must be replaced in order to ensure the original duty point and efficiency.

7.3 Explosion-proof S1, S2, S3 and SV pumps

Overhauled and repaired explosion-proof motors are marked with a repair plate giving the following information:

- The repair symbol R.
- Name or registered trade mark of the repairing workshop...
- Workshop reference number relating to the repair.
- Date of overhaul or repair.

In the event of subsequent repairs, the existing plate should be replaced by a new updated plate and earlier markings are recorded.

The repairing workshop must keep records of performed overhauls and repairs together with records of all previous overhauls, repairs and possible modifications. Copies of the repairing workshop's detailed records should be filed by the owner or operator together with the original type certificate of the explosion-proof motor in question.

7.3.1 Motor cable

Only cables which are approved by the manufacturer and suitable for the cable entry as to diameter, number of leads, conductor cross section and sheath material may be used for the motor.

7.3.2 Cable entry

Only EExd cable entry parts corresponding to the cable diameter may be used. The corresponding cable dimension marking is stamped on the inlet or the cable entry.

Secure the cable entry to the motor top cover by tightening the screws evenly one by one until the cable entry is lying flat against the top cover.

7.3.3 Spare parts

Damaged motor parts, such as top cover and cable entry, should always be replaced by new and approved parts. Motor parts must not be reconditioned by machining, re-tapping, welding, etc.

7.4 Contaminated pumps

Note: If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

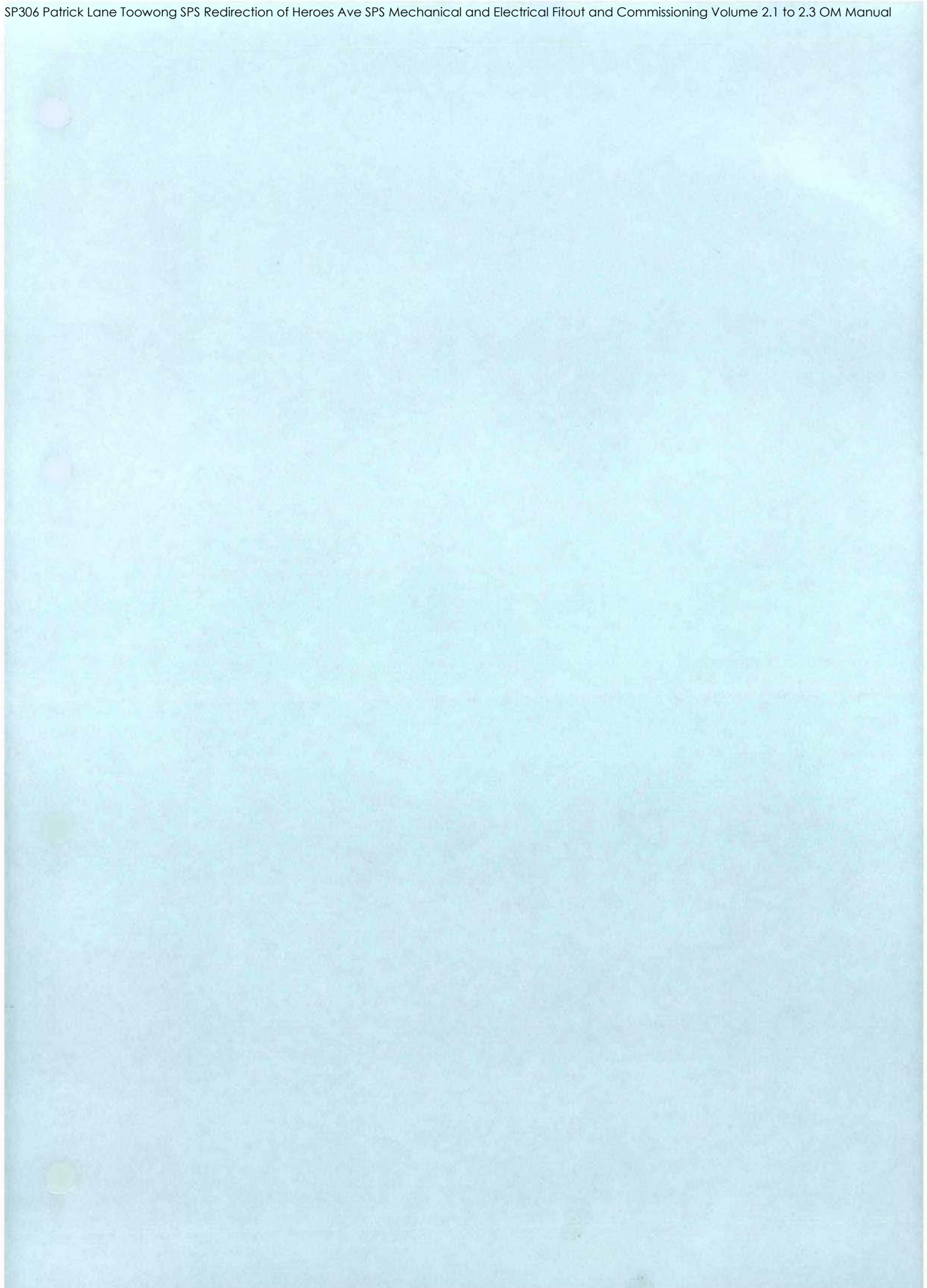
If GRUNDFOS is requested to service the pump, GRUNDFOS must be contacted with details about the pumped liquid, etc. before the pump is returned for service. Otherwise GRUNDFOS can refuse to accept the pump for service.

Possible costs of returning the pump are paid by the customer. However, any application for service (no matter to whom it may be made) must include details about the pumped liquid if the pump has been used for liquids which are injurious to health or toxic.

8. Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:

1. Use the local public or private waste collection service.
2. In case such waste collection service does not exist or cannot handle the materials used in the product, please deliver the product or any hazardous materials from it to your nearest GRUNDFOS company or service workshop.



BRISBANE CITY COUNCIL

ATTACHMENTS - PART A

Contract No. BW.30079-02/03

SCHEDULE C4 PATRICK LANE PUMPS

GUARANTEES: The Contractor agrees to guarantee the following information and figures:

Item No.	Description	Requirement	Offer ("X" Indicates Compliance)
C4.1	Required Performance		
C4.1.1	Testing	AS2417-2001 Grade 1	Head / R+4
C4.1.2	Delivery (l/sec)	150	1.5.0. 9706 Grade 2
C4.1.3	Head (m)	36.5-127.86	150 + 5%
C4.1.4	Max Speed of Pump	50Hz	27.86
C4.1.5	Min Submergence Level	Refer Functional Specifications and drawings	50 Hz
C4.1.6	Hazard Rating of Installation	Class 1 Zone 0 AS3000-2000	800 mm
C4.1.7	Diameter of Sphere Passed	Refer Standard Specification	Zone 1
C4.1.8	Pump Flange Drilling	Full Face to AS4087	100
			Din
C4.2	Materials		
C4.2.1	Baseplate or stool	Refer Standard Spec	CAST IRON
C4.2.2	Casing	Refer Standard Spec	GRS 250
C4.2.3	Sealing Rings	Refer Standard Spec	N/A Sinter Trim
C4.2.4	Shaft	Refer Standard Spec	DIN 17200
C4.2.5	Impeller	Refer Standard Spec	GRP 500
C4.2.6	Shaft Sleeve	Refer Standard Spec	N/A
C4.2.7	Mechanical Seal	Refer Standard Spec	Carbon/Sic & Sic/Sic
C4.2.8	Bolts, Studs and Nuts	Refer Standard Spec	SS SS
C4.3	General Details		
C4.3.1	Name of Pump Manufacturer	Grundfos Pumps P.L.	
C4.3.2	Place of Manufacture of Pump	Finland	
C4.3.3	Type of pump offered	Submersible Sewage Pumps	
C4.3.4	Appropriate mass of each pumping unit (including motor, cables, and lifting chain where applicable)	Approx 950 Kg Pump & Motor	
C4.4	Performance		
C4.4.1	Speed of Pump	1476 RPM	

Name of Tenderer:

Grundfos Pumps P.L.

Signature of Tenderer:

A. R. White

Date:

2/7/04

Name of Witness:

A. R. White

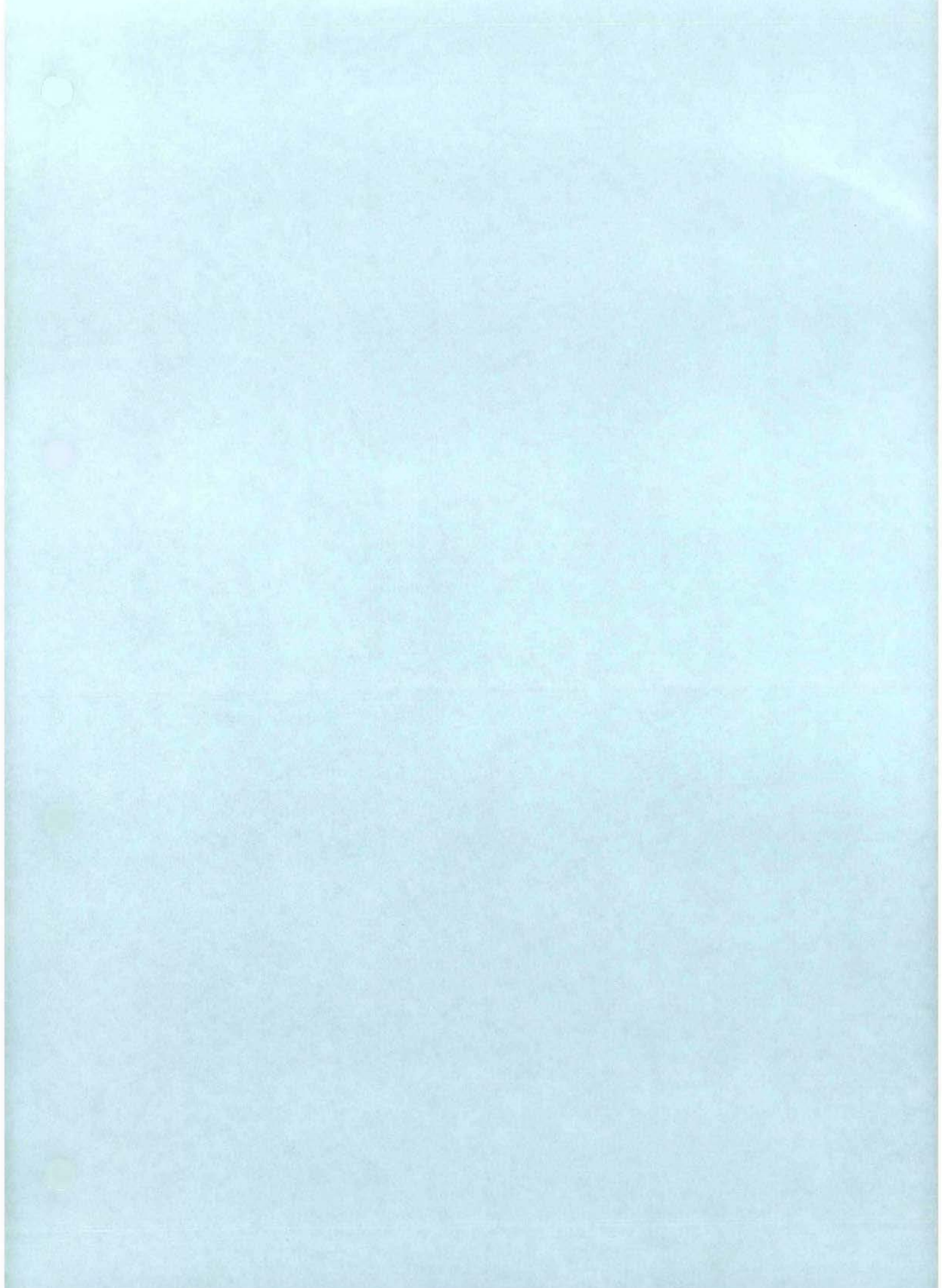
Signature of Witness:

A. R. White

Heroes Ave M & E Fitout

ATTACHMENTS, Page 86

Brisbane City Council SPECIFICATION TECHNICAL SCHEDULES REV 3.00 2004 2004 TENDER DOCUMENTS, POST ISSUED THESE TECHNICAL SCHEDULES



Oy Grundfos Environment Finland Ab

ADDRESS: Kaivokselantie 3-5, FIN-01610 VANTAA

TEL: +358-9-561420



Pump	S2654BM2A513ZB49
SAP	96550916
Duty	150 l/s x 30 m

Test Report for Pump

ISO 9906 Grade 2

Verification of duty point



Customer :

Order No. :

Date of test : 13.10.2004 18:04

Tester : V7186186

Operator : JSA

Serial No. : 96550916B182491

SAP-Code : 96550916

Pump type :

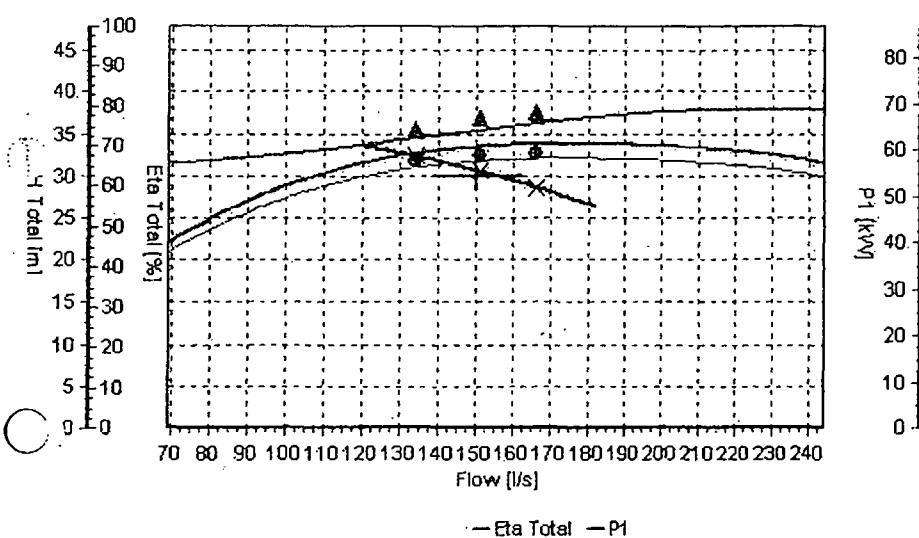
Customer request :

	Flow (l/s)	Head (m)
Duty point	150.00	30.00

Oy Grundfos Environment Finland Ab
 Kaivokselantie 3-5, Vantaa
 P.O. Box 1036
 Fin-00101 Helsinki
 Phone: +358 9 561 420
 Fax: +358 9 563 3989

Test results for serial no. : 96550916B182491

	Flow (l/s)	Head (m)	U1 (V)	U2 (V)	U3 (V)	I avg. (A)	P1 (kW)	Eta (%)
Point 1	134.11	32.35	415	415	415	114.3	64.4	66.1
Point 2	150.96	30.56	414	415	415	118.0	67.1	67.4
Point 3	166.04	28.65	414	414	414	120.2	68.4	68.3



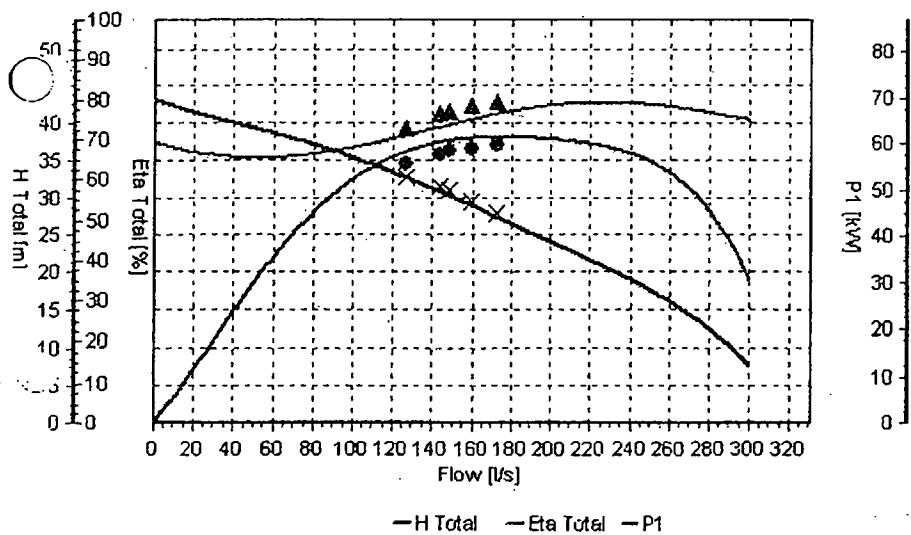
Test Report for Pump

Manual test procedure



No.:		Date of test :	13.10.2004 18:30
Operator :	JSA	Tester :	V7186186
Serial no. :	96550916A182491	SAP-code :	96550916
Pump Type :			

	Flow (l/s)	Head (m)	U1 (V)	U2 (V)	U3 (V)	I avg. (A)	P1 (kW)	Eta (%)
Point 1	126.32	32.81	415	415	416	113.3	63.5	63.8
Point 2	142.85	31.51	414	415	415	117.6	66.4	66.0
Point 3	148.47	30.81	415	415	415	118.4	67.1	67.1
Point 4	159.81	29.39	414	414	414	119.8	68.1	67.8
Point 5	172.44	27.93	415	415	415	121.4	69.2	68.6



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P.O. Box 1036
Fin-00101 Helsinki
Phone: +358 9 561 420
Fax: +358 9 563 3989

Test Report for Pump**ISO 9906 Grade 2****Verification of duty point**

☐ Customer :

Order No. :

Date of test : 13.10.2004 15:36

Tester : V7186186

Operator : JSA

Serial No. : 96550916B182492

SAP-Code : 96550916

☐ Pump type :

☐ Customer request :

	Flow (l/s)	Head (m)
Duty point	150.00	30.00

Oy Grundfos Environment Finland Ab

Kaivokselantie 3-5, Vantaa

P.O. Box 1036

Fin-00101 Helsinki

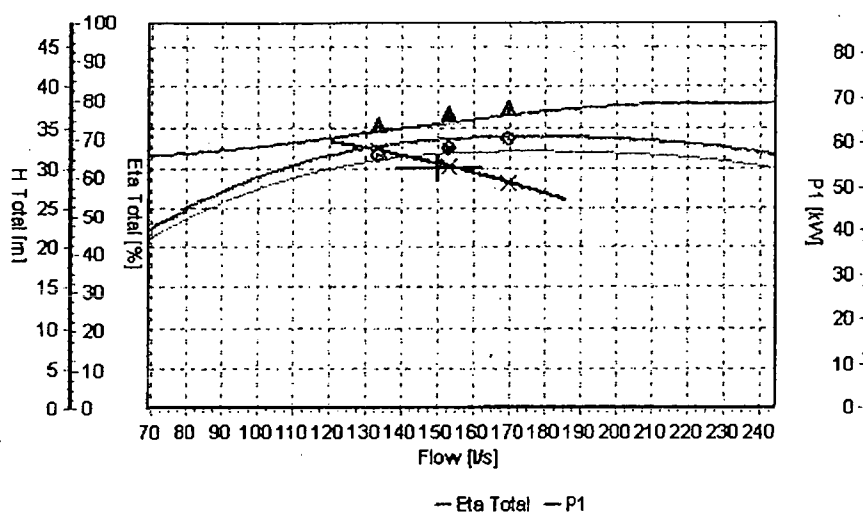
Phone: +358 9 561 420

Fax: +358 9 563 3989

Page 1

Test results for serial no. : 96550916B182492

	Flow (l/s)	Head (m)	U1 (V)	U2 (V)	U3 (V)	I avg. (A)	P1 (kW)	Eta (%)
Point 1	133.65	32.18	415	416	415	114.6	64.2	65.7
Point 2	152.76	30.27	415	416	415	118.0	66.7	67.7
Point 3	169.26	28.26	415	416	416	119.4	67.7	69.8



Test Report for Pump

Manual test procedure



Jer No.:

Date of test : 13.10.2004 15:12

Operator : JSA

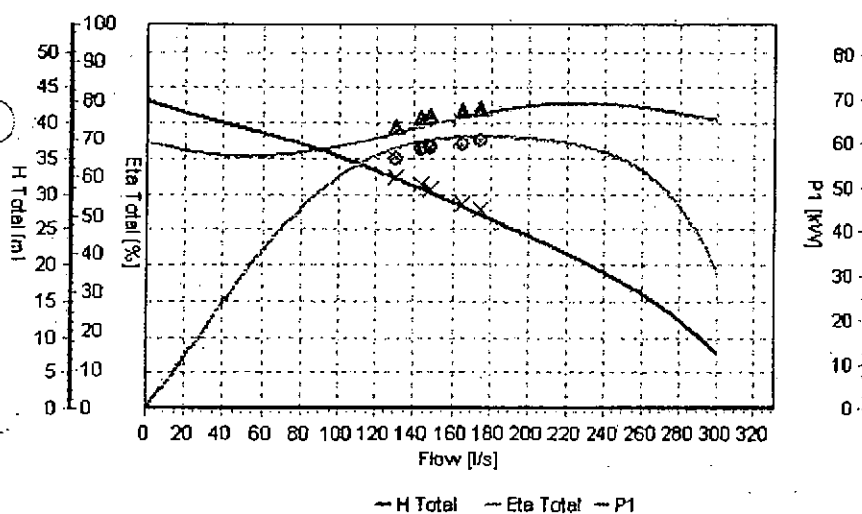
Tester : V7186186

Serial no. : 96550916A182492

SAP-code : 96550916

Pump Type :

	Flow (l/s)	Head (m)	U1 (V)	U2 (V)	U3 (V)	I avg. (A)	P1 (kW)	Eta (%)
Point 1	130.11	32.44	416	416	416	114.1	63.8	65.0
Point 2	143.06	31.43	416	416	417	117.0	65.7	67.1
Point 3	148.12	30.78	415	415	415	117.2	66.1	67.6
Point 4	165.25	28.58	415	415	415	118.9	67.4	68.7
Point 5	174.31	27.76	415	415	415	119.8	67.9	69.6



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Fin-00101 Helsinki

Phone: +358 9 561 420

Fax: +358 9 563 3989



ELECTRIC MOTOR TEST REPORT

Pump manufacturer:	OY GRUNDFOS ENVIRONMENT FINLAND AB
Pump ordered by:	Grundfos Pumps PTY.LTD
Purchase order no:	79353
Manufacturers order no.:	114645
Items:	
Motor:	HU194601A13ZB49
Pump:	S26548M2A513ZB49
Serial no.	182491

This certifies that the motors have been tested in production process as follows:

- Tightness of the motor, testing pressure 0.8 bar
- Dielectric test
- Insulation resistance test
- Earth continuity test
- Idle current test
- Protection device circuit.

Result of work test measurement: Motor has passed the tests

Vantaa, Finland 18/10/2004

OY GRUNDFOS ENVIRONMENT FINLAND AB



ELECTRIC MOTOR TEST REPORT

Pump manufacturer:	OY GRUNDFOS ENVIRONMENT FINLAND AB
Pump ordered by:	Grundfos Pumps PTY.LTD
Purchase order no:	79353
Manufacturers order no.:	114645
Items:	
Motor:	HU194601A13ZB49
Pump:	S2654BM2A513ZB49
Serial no.	182492

This certifies that the motors have been tested in production process as follows:

- Tightness of the motor, testing pressure 0.8 bar
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- Insulation resistance test
- Earth continuity test
- Idle current test
- Protection device circuit.

Result of work test measurement: Motor has passed the tests

Vantaa, Finland 18/10/2004

OY GRUNDFOS ENVIRONMENT FINLAND AB



HYDROSTATIC PRESSURE TYPE TEST CERTIFICATE

Pump manufacturer:	OY GRUNDFOS ENVIRONMENT FINLAND AB
Pump ordered by:	Grundfos Pumps PTY.LTD
Purchase order no:	79353
Manufacturers order no.:	114645
Pump Type:	S2654BM2A513ZB49
SAP Code	96550916
Serial no.	182491

This certifies that the volute casing has been type tested with water as follows:

Pressure:	10.5 bar
Holding time:	5 minutes.

Vantaa, Finland 18/10/2004

OY GRUNDFOS ENVIRONMENT FINLAND AB



HYDROSTATIC PRESSURE TYPE TEST CERTIFICATE

Pump manufacturer:	OY GRUNDFOS ENVIRONMENT FINLAND AB
Pump ordered by:	Grundfos Pumps PTY.LTD
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SAP Code	96550916
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Holding time:	5 minutes.

Vantaa, Finland 18/10/2004

OY GRUNDFOS ENVIRONMENT FINLAND AB



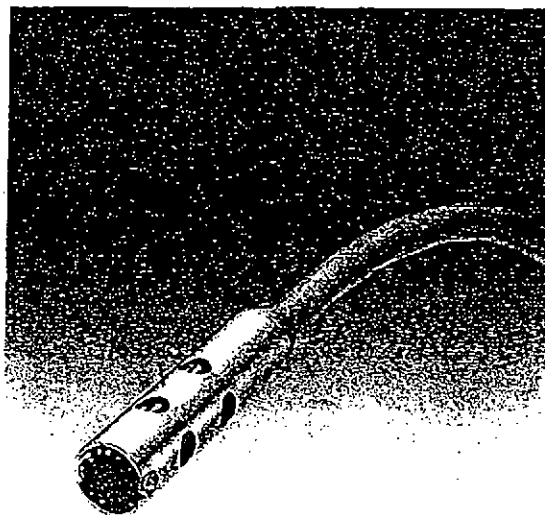
Rev. 2
HSY

5 September 2003

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OCT 1

Oil Condition Transmitter



The OCT 1 Oil Condition Transmitter is a new probe for seal oil water content monitoring in sewage water pumps. This advanced instrument provides more reliable information of the amount of water in the oil chamber.

The OCT 1 Oil Condition Transmitter can be used in explosive environments, because the new design is intrinsically safe complying with EN50020.

Modern submersible pumps normally use a shaft sealing arrangement with double mechanical seals separated by an oil-filled chamber. This construction protects the motor from water intrusion. As some minor water leakage through the primary seal is inevitable, it is very important to detect any increase in the water content. The change indicates wearing of the seal and should be notified well before the alarm level.

Oy Grundfos Environment Finland Ab

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01610 Vantaa, Finland
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Fax +358-9-566 8289

oct1salgr2.doc



Rev. 2
HSY

5 September 2003

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Such an early warning is valuable information for maintenance and enables prediction of the required actions. The improved sensitivity of the OCT 1 makes the monitoring more accurate than ever before.

Operation

The operation of the OCT 1 is based on capacitive measurement of the dielectricity factor of water/oil emulsion. The factor is strongly dependent on the water content in the emulsion.

The probe is located below the oil level. The stainless steel guard tube of the probe is perforated allowing free flow of the emulsion. The integrated electronics is embedded and sealed into the probe providing the standard analog output of 4 ... 20 mA.

Interfaces

As an independent probe with standard analog output, the OCT 1 Oil Condition Transmitter can be connected to various control systems. Grundfos provides both a local stand-alone monitoring device, SARI 2 Monitor, and the more powerful PumpManager 2000 for remote monitoring.

The SARI 2 is a monitoring device for motor insulation resistance and seal oil water content for sewage water pumps. It clearly exceeds the capacity of the standard safety devices, but can also be used for local and automatic stopping of the pump. Separate information of the Monitor is available.

The OCT 1 Oil Condition Transmitter can also be used with the PumpManager 2000 or other suitable telemetry system. The connection can be built via the SARI 2 (digital pulse width modulated input) or directly (analog input).

The PumpManager 2000 continuously receives the measured data, compares them to the pre-set alarm limits and stores to the local memory.

The stored data can be further relayed to the Remote Monitoring system for the trend analysis by the respective software. The values are daily averages of the measurements.

Measurement Range and Calibration

The operation range of the OCT 1 Oil Condition Transmitter is 5...60 % H₂O. A recommended alarm limit is 20...40 %.

The Transmitter is factory calibrated and there is no need for regular recalibration.

Oy Grundfos Environment Finland Ab

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Rev. 2
HSY

5 September 2003

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Explosive Environment

OCT 1 Oil Condition Transmitter is an intrinsically safe apparatus complying with EN50020 and the following input specifications:

EEx ia IIB T4

U_i : 34 V

I_i : 100 mA

L_i : 10 μ H

C_i : 220 nF

When the signal cable and other possible connection components are in the explosive interior the OCT 1 cable shall be connected to a safety barrier complying with EN50020 and the same or better output specifications as shown above. The barrier is installed outside the hazardous environment, normally into the control panel.

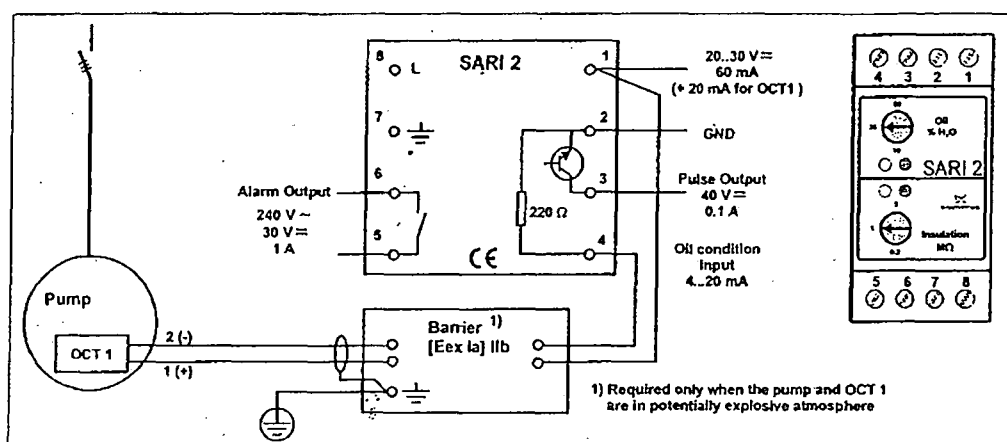


Figure 1. Electrical connections of OCT 1 and SARI 2

Installation

The OCT 1 is normally installed into the oil chamber of the pump through the oil plug. The minimum size of the plug is 3/8 ". See Figure 2.

In Grundfos pumps the OCT 1 can replace the UH-40 probe especially in the above mentioned external installations. In large pumps, where the UH-40 may have been installed internally into the motor flange, see Figure 3, the replacement is individually checked.

Oy Grundfos Environment Finland Ab

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Specifications

Dimensions	length 60 mm x diameter 14 mm
Cable	10 m, longer lengths on request
Output:	4 to 20 mA
Operating temperature	0 ... 70 °C
Enclosure	IP 68
Electromagnetic interference	CE approved

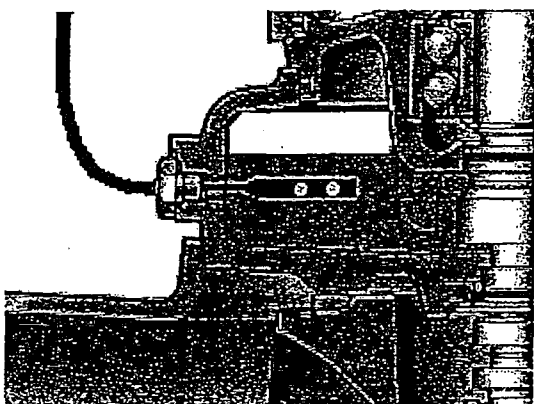


Figure 2. External installation through oil plug

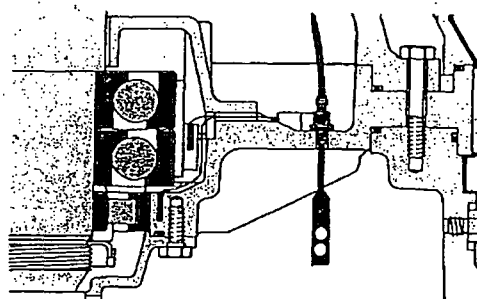


Figure 3. Internal installation (not available for explosive environments)

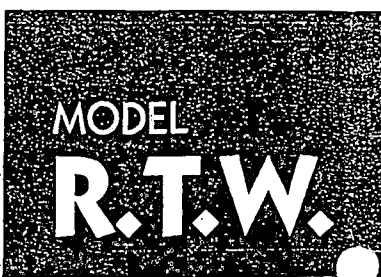
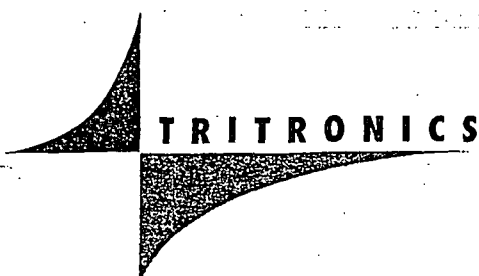
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Pump Seal Failure Protection Relay (Public Works Dept.)

ADDITIONAL DATA

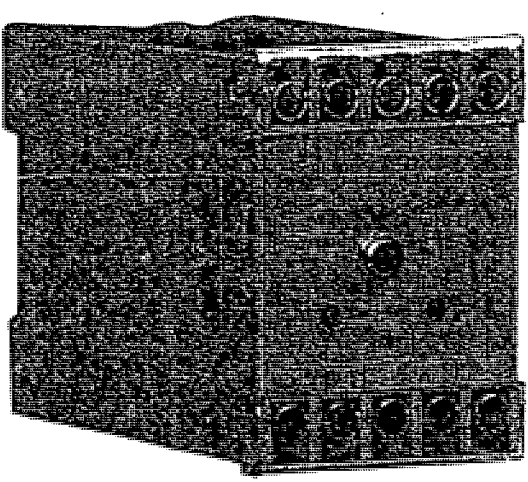
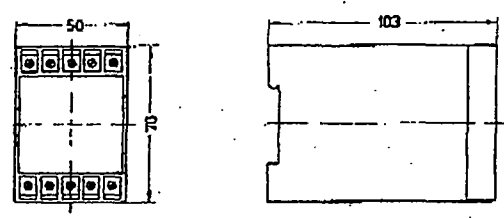
- SUPPLY VOLTAGE 240V A.C
- ELECTRODE VOLTAGE 8 volts A.C.
- FREQUENCY ELECTRODE VOLTAGE 50Hz
- SENSITIVITY 27K
- TEMPERATURE RANGE 0-55C
- RELAY CONTACT DATA
- LIFE 10' Operations 5A (Resistive)

The RTW has one normally closed and one normally opened electrically isolated contact

TERMINAL CONNECTIONS

- A1 240 Volt Supply
- A2
- S1 Sensor
- S2 Pump Earth/Frame
- r1) External Reset Switch
- r2) (normally closed)
- 98) Normally Open Contact
- 97)
- 96) Normally Closed Contact
- 95)

NOTE: Contacts shown in the No Fault (GREEN L.E.D. ON) condition. RTW has screw down terminators on top of unit.



GENERAL DESCRIPTION

The RTW was specially designed for use by the Public Works Department to detect seal failures, primarily in submersible electric pumps. The intrusion of fluids from the pump chamber into the intermediate oil chamber changes the conductivity of the insulating oil, therefore allowing early detection of lower seal failure.

FEATURES

Latching is incorporated in the unit to allow indication to remain. The unit can be reset by the existing reset switch (mounted on the top of the unit) or an externally mounted reset switch.

If latching is not desirable, the external reset connections can be left open circuit and the unit will reset when the fault clears.

External L.E.D.S. indicate operation of unit.

Note: We recommend the use of screened cable to the detector. Care should be taken to avoid running the detector electrode cable too close to the mains cable over long distances, as heavy induction may cause false tripping.

ELECTRODE CHARACTERISTICS

The electrode should be mounted approximately 1cm above the floor of the oil chamber and should be constructed of a non-corrosive material. The electrical leakage caused by the conductive fluid in the oil will form a minute circuit between the electrode and earth.

ELECTRODE VOLTAGES

A.C. voltage is used on the detection electrode. This is to stop electrolysis of the pump casing which would occur if D.C. was used.

SENSITIVITY

Sensitivity is a fixed value and cannot be altered. This setting was developed after extensive field testing and was carried out in conjunction with a large pump manufacturer.

Special sensitivity settings can be obtained at factory level for a particular application.

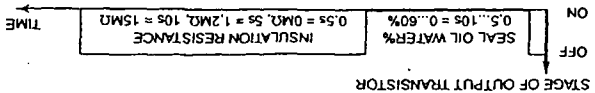
RESPONSE TIME

The R.T.W. has a 10 second delay after detection of fault to when the unit trips.

WARRANTY

Twenty-four months from purchase date.

TRITRONICS (Australia) Pty. Ltd.
A.C.N. 010 081 277
977 Stanley Street East, East Brisbane, Q 4169, Australia
Phone: (07) 3891 9772 Fax: (07) 3891 9336



The transistor output gives pulse width modulated values of the measurements as described in the following figure.

PULSE OUTPUT

The SARI 2 has a local alarm output, which is a potential free, normally open relay contact. The output is common to both controls. This can be used for relaying the alarm and/or for stopping the operation of the pump.

RELAY OUTPUT

Normally, when the pump is fully operational, both the green LEDs are continuously on. In case the OCT 1 is not connected ($I < 3mA$), both the indicator lights for the oil condition measurement are continuously off.

GREEN	RED	SEAL OIL	INS. RESISTANCE
On	Off	< 25% of alarm limit	> 4 x alarm limit
Flashing	Off	25...50% of alarm limit	4...2 x alarm limit
Flashing	Off	50...75% of alarm limit	2...1.4 x alarm limit
Flashing	Off	75...100% of alarm limit	1.4...1 x alarm limit
Off	Flashing	> alarm limit	< alarm limit
Off	Flashing	> alarm limit	< alarm limit

SARI 2
Combined Insulation Resistance
and Seal Oil Monitoring Device

SARI 2
Combined Insulation Resistance
and Seal Oil Monitoring Device

EX SPECIFICATIONS

The SARI 2 is mounted inside the control panel, which normally does not have any special requirements. The OCT 1 is an intrinsically safe apparatus complying with EN50020 standard and the following input specifications:

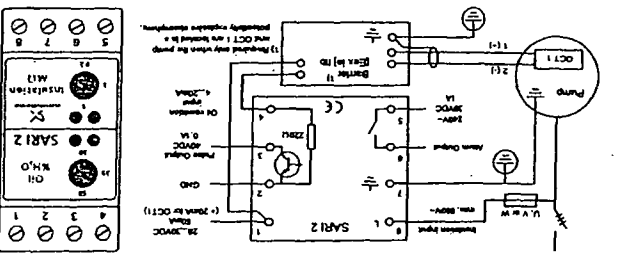
EEx ia IIB T4
 $U_i = 34V$, $I_i = 100mA$, $P_i = 850mW$, $L_i = 10\mu H$, $C_i = 220nF$.

TECHNICAL SPECIFICATIONS

Dimensions (W x H x D)	35mm x 70mm x 75mm
Resistance meas. input	max. 600VAC
Seal oil meas. input	4...20mADC
Outputs	potential free alarm relay: 240VAC / 30VDC, 1A transistor output, PWM: 40VDC, 100mA
Power supply	20...30VDC, 60mA
Operating temperature	0...50°C
Enclosure	IP20
Installation	DIN rail in the control panel
AC-protection	CE approved
Manufacturer	Oy Grundfos Environment Finland Ab
Product number	96 06 16 02

the following table.
the measured value with respect to the alarm limit as described in
the measurements have green and red indication lights showing
recommended alarm limit is 2...5 MΩ.
The setting range for insulation resistance is 100 kΩ...10 MΩ. The
recommended alarm limit is 20...40%.

CONTROLS



The SARI 2 is mounted on an DIN rail inside the control panel. The connections are shown in the figure below.

INSTALLATION

oil monitoring with the OCT 1.
the resistance of the converter. This, however, does not limit the seal
connected to a frequency converter, the measurement may present

SARI 2
Combined Insulation Resistance
and Seal Oil Monitoring Device

SARI 2
Combined Insulation Resistance
and Seal Oil Monitoring Device

OPERATION

The SARI 2 is a combined insulation resistance and seal oil monitoring device for submersible pumps. It measures the insulation resistance between the stator windings and ground when the motor is stopped and disconnected from the mains by a contactor. While the motor is running SARI 2 senses the AC voltage and stops the measurement. The latest measured insulation resistance is valid until the pump stops again.

The seal oil water content measurement requires an optional oil condition transmitter OCT 1 that bolts on to large Grundfos submersible pumps.

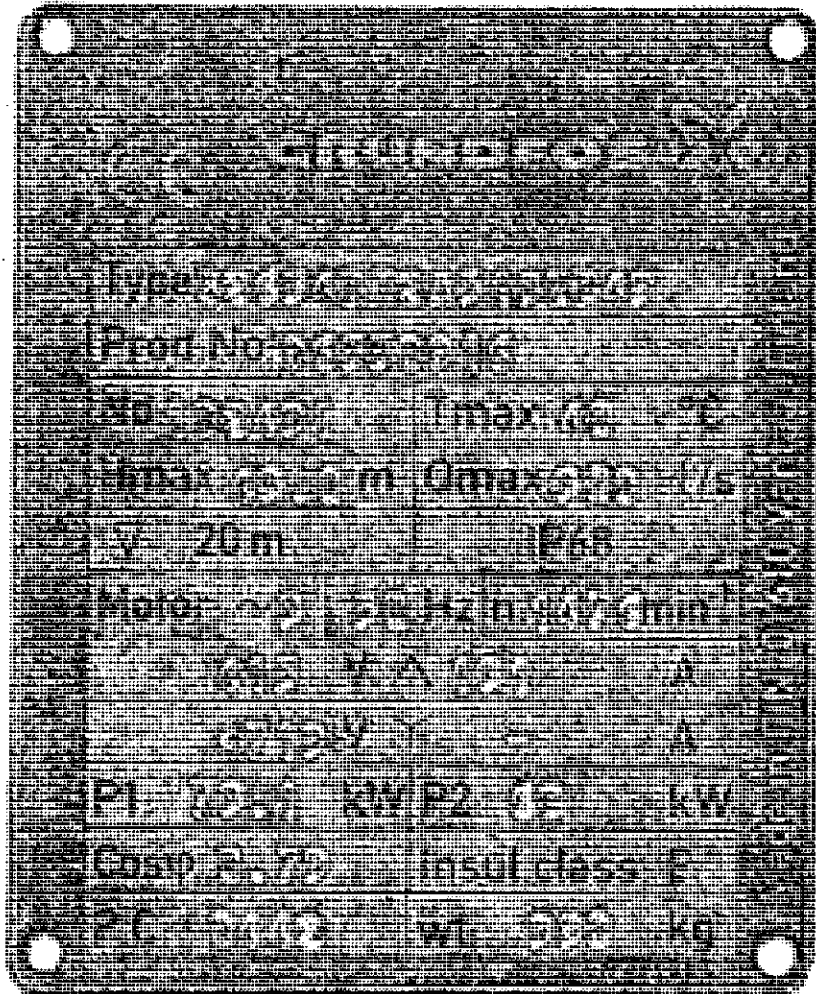
Both the measurements have their own adjustable alarm limits. The alarm output is a potential free normally open relay contact common to both measurements. In case the alarm is on, it is caused by the measurement having the red LED permanently on.

The SARI 2 is intended for stand-alone alarm use or for use with Grundfos PumpManager 2000. SARI 2 has a transistor output giving a pulse width modulated information on both measurements for the PumpManager 2000 or other suitable telemetry system.

FREQUENCY CONVERTER USE

The continuous use of frequency converters prevents motor winding insulation resistance monitoring with the help of the SARI 2 Monitor. The Monitor is wired to one of the mains phases and to the ground. The resistance is measured, when the motor is stopped and disconnected from the mains. Therefore, if the pump is continuously

Grundfos Nameplate Details







GE Fanuc Automation

Series 90™-30 PLCs

The Series 90™-30 PLCs are a family of controllers, I/O systems and specialty modules designed to meet the demand for versatile industrial solutions. With its single overall control architecture, the Series 90-30 has been the PLC of record in over 200,000 applications, such as high-speed packaging, material handling, complex motion control, water treatment, continuous emissions monitoring, mining, food processing, elevator control, injection molding and many more.



Thanks to its modular design, the Series 90-30 offers unmatched versatility. Configure just the system you need, saving critical space and reducing cost.

With over 100 I/O modules, the Series 90-30 PLC can be adapted to a wide range of applications.

- Digital interfaces for push buttons, switches, proximity sensors, relays, contactors and many other devices
- Analog modules with varying degrees of resolution for flow, temperature or pressure applications
- Direct connect wiring or remote termination
- Local or remote I/O systems

Series 90-30 Ethernet communications provide a real-time link between the plant floor and the boardroom. You can begin with an Ethernet-enabled CPU, or at a later date, choose from our selection of rack-mounted Ethernet modules. The Series 90-30 Ethernet module supports both SRTP and Modbus TCP/IP application protocols.

The scalable processing power in the Series 90-30 CPU creates a clear upgrade path. Create the system that's ideal today, while leaving open the option of creating a more powerful system tomorrow — without having to change your application software.

Motion control integrated into the Series 90-30 fosters high performance point-to-point applications.

A variety of Series 90-30 field bus interfaces enables distributed control and/or I/O. Choose from Ethernet EGD, Profibus-DP™, Genius®, DeviceNet™ and Interbus-S™ modules. Field Bus interface modules are easy to install and quick to configure. Plug them into an existing system or design a new system around them.

Ease of programming is a strong suit of the Series 90-30. Choose the programming options that meet your needs: Windows®-based IEC programming, advanced C or State Logic®. Floating point math, PID, indirect addressing, array moves and sequencing are just a few of the over 200 instructions available.

The Series 90-30 stands out among small controls for offering redundancy options. The Series 90-30 is the low-cost solution for high availability applications, with redundant CPUs and power supplies.

Easy trouble shooting and machine setup using a handheld PDA. CIMPLICITY® Machine Edition Logic Developer PDA software allows you to interface a Palm® handheld device to your Series 90-30 controller. With Logic Developer PDA, you can monitor/change data, view diagnostics, force ON/OFF, and configure machine setup — saving you time and increasing productivity.

Ordering Information

Description	Catalog Number		Catalog Number	
Discrete Input Modules	IC693MDL230	120 VAC Isolated Input (8 Points)	IC693MDL646	24 VDC Input, Neg/Pos Logic, 1 msec Filter (16 Points)
	IC693MDL231	240 VAC Isolated Input (8 Points)	IC693MDL648	48 VDC Input, Neg/Pos Logic, 1 msec filter, Neg/Pos Logic (16 Points)
	IC693MDL240	120 VAC Input (16 Points)	IC693MDL653	24 VDC Input, Neg/Pos Logic, 2msec Filter (32 Points)
	IC693MDL241	24 VAC/VDC Input (16 Points)	IC693MDL654	5/12 VDC (TTL) Input, Neg/Pos Logic, (32 Points)
	IC693MDL632	125 VDC Input (8 Points)	IC693MDL655	24 VDC Input, Neg/Pos Logic, 1 ms, (32 Points)
	IC693MDL634	24 VDC Input, Neg/Pos Logic (8 Points)	IC693ACC300	Input Simulator Module (8 Points)
	IC693MDL645	24 VDC Input, Neg/Pos Logic (16 Points)		
Discrete Output Modules	IC693MDL310	120 VAC Output, 0.5 Amp (12 Points)	IC693MDL740	12/24 VDC Output, 0.5 Amp, Positive Logic (16 Points)
	IC693MDL330	120/240 VAC Output, 2 Amp (8 Points)	IC693MDL741	12/24 VDC Output, 0.5 Amp, Negative Logic (16 Points)
	IC693MDL340	120 VAC Output, 0.5 Amp (16 Points)	IC693MDL742	12/24 VDC Output, 1 Amp, Positive Logic (16 Points), Fused
	IC693MDL390	120/240 VAC Isolated Output, 2 Amp (5 Points)	IC693MDL748	48 VDC Output, 0.5 Amps, Positive Logic (8 Points)
	IC693MDL730	12/24 VDC Output, 2 Amp, Positive Logic (8 Points)	IC693MDL750	12/24 VDC Output, Negative Logic (32 Points)
	IC693MDL731	12/24 VDC Output, 2 Amp, Negative Logic (8 Points)	IC693MDL751	12/24 VDC Output, Positive Logic (32 Points)
	IC693MDL732	12/24 VDC Output, 0.5 Amp, Positive Logic (8 Points)	IC693MDL752	5/12/24 VDC (TTL) Output, Negative Logic, (32 Points)
	IC693MDL733	12/24 VDC Output, 0.5 Amp, Negative Logic (8 Points)	IC693MDL753	12/24 VDC Output, Positive Logic (32 Points)
	IC693MDL734	125 VDC Output, (6 Points)		
	IC693MDL930	Relay Output, Isolated, 4 Amp (8 Points)	IC693MDL940	Relay Output, 2 Amp (16 Points)
Relay Output Module	IC693MDL931	Relay Output, 8 Amp Form B/C contacts, Isolated in 2 Groups of 4 (8 Points)		
Mixed Discrete Module	IC693MDR390	Mixed I/O, 24 VDC Input (8 points), Relay Output (8 points)	IC693MAR590	Mixed I/O, 120 VAC Input (8 Points), Relay Output (8 Points)
Analog Input Modules	IC693ALG220	Analog Input, Voltage/Current, 4 Channels	IC693ALG222	Analog Input, Voltage 16 Single/8 Differential Channels
	IC693ALG221	Analog Input, Current, 4 Channels	IC693ALG223	Analog Input, Current, 16 Single Channels
Analog Output Modules	IC693ALG390	Analog Output, Voltage, 2 Channels	IC693ALG392	High Density Analog Output (8 Channels)
	IC693ALG391	Analog Output, Current, 2 Channels		
Mixed Analog Modules	IC693ALG442	Analog Combo Module 4IN/2OUT		
Motion Modules	IC693APU300	High Speed Counter (HSC)	IC693APU305	High Speed Counter with Gray Code Encoder or an A QUAD B Encoder Input
	IC693APU301	Axis Positioning Module (APM), 1 Axis	IC693DSM302	Digital Servo Motion Controller, 2 Axis
	IC693APU302	Axis Positioning Module (APM), 2 Axis	IC693DSM314	Digital Servo Motion Controller, 1-2 Axis of Digital Servo or 1-4 Axis Analog Servo
Specialty Modules	IC693MDL760	Solenoid Valve Output (11 Points)/24 VDC Output, 0.5 Amp, Positive Logic (5 Points)	IC693PTM101	Power Transducer Module, CT and PT Interface 120/240 VAC (1m cable)
	IC693PCM301	Programmable Coprocessor Module, 192 KB (47 KB Basic or C Program), 2 Serial Ports	IC693TCM302	Temperature Control Module, (8) TC In and (8) 24 VDC Solid State Outputs
	IC693PCM311	Programmable Coprocessor Module, 640 KB (640 KB Basic or C Program), 2 Serial Ports	IC693TCM303	Temperature Control Module Extended Temperature Range, (8) TC In and (8) 24 VDC Solid State Outputs
	IC693PTM100	Power Transducer Module, CT and PT Interface 120/240 VAC (0.5m Cable)		
Communications Modules	IC693BEM331	Genius Bus Controller (Supports I/O and Datagrams)	IC693PBM200	Profibus DP Master Module
	IC693CMM302	Communication Module, Genius (1 Kbyte) GCM+ (No Datagram Support)	IC693PBM201	Profibus DP Slave Module
	IC693CMM311	Communications Module, CCM, RTU, SNP, and SNPx Protocols	IC693DNM200	DeviceNet Master Module
	IC693CMM321	Ethernet Interface TCP/IP Module, 10Mbps (Supports SRTP and Modbus TCP/IP, No EGD)	IC693DNS201	DeviceNet Slave Module
Controllers	IC693CPU311	5-Slot Base with CPU in Base (8KBytes User Program), Not Expandable	IC693CPU360	CPU 360 Module (240KBytes Configurable User Memory, 4K I/O, 8 Racks), No Built-In Serial Ports, Logic Execution is 22msec/K
	IC693CPU313	5-Slot Base with Turbo CPU in Base (Logic Execution is .6 msec), 1K Registers, (12KBytes User Program), Not Expandable	IC693CPU363	CPU 363 Module (240KBytes Configurable User Memory 4K I/O, 8 Racks), 2 Built-In Serial Ports, Logic Execution is 22msec/K
	IC693CPU323	10-Slot Base with Turbo CPU in Base (Logic Execution is .6 msec) 12Kbytes User Program, Not Expandable	IC693CPU364	CPU 364 Module (240KBytes Configurable User Memory 4K I/O, 8 Racks), No Built-In Serial Ports, Built-In 10Mbps Ethernet, Supports SRTP, Channels and EGD, Logic Execution is 22msec/K
	IC693CPU350	CPU 350 Module (32KBytes User Memory, 4K I/O, 8 Racks), No Built-In Serial Ports, Logic Execution is 22msec/K	IC693CPU374	CPU 374 Module (240KBytes Configurable User Memory), No Built-In Serial Ports, Built-In 10/100Mbps with Built-In Switch, Ethernet Supports SRTP, EGD and No Channel Support, Logic Execution is 22msec/K
Backplanes	IC693CHS391	Base, CPU, 10 Slots, Use with CPU331/CSE331 and above	IC693CHS397	Base, CPU, 5 Slots (use with CPU331/CSE331 and above)
	IC693CHS392	Base, Expansion, 10 Slots	IC693CHS398	Base, Expansion, 5 Slots
	IC693CHS393	Base, Remote Expansion, 10 Slots (700 ft.)	IC693CHS399	Base, Remote Expansion, 5 Slots (700 ft.)
Power Supplies	IC693PWR321	Power Supply, 120/240 VAC, 125 VDC, Standard, 30 Watts	IC693PWR332	Power Supply, 12 VDC, High Capacity, 30 Watts
	IC693PWR322	Power Supply, 24/48 VDC, Standard, 30 Watts	IC693ACC340	Redundant Power Supply Base (RPSB) with 0.1 meter cable to connect to Power Supply Adapter Module
	IC693PWR328	Power Supply, 48 VDC, Standard, 30 Watts	IC693ACC341	Redundant Power Supply Base with 0.5 meter cable to connect to Power Supply Adapter Module
	IC693PWR330	Power Supply, 120/240 VAC, 125 VDC, High Capacity, 30 Watts	IC693ACC350	Redundant Power Supply Adapter (RPSA) Module. The RPSA replaces the power supply on a CPU base or expansion base and connects to a Redundant Power Supply Base.
	IC693PWR331	Power Supply, 24 VDC, High Capacity, 30 Watts		
Accessories	IC693ACC301	Replacement Battery, CPU & PCM (Qty. 2)	IC693CBL301	Rack to Rack Expansion Cable, 2 Meters
	IC693ACC302	High Capacity Battery Pack	IC693CBL302	Rack to Rack Expansion Cable, 15 Meters
	IC200ACC003	EZ Program Store Flash Device (for CPU374 only)	IC693CBL312	Rack to Rack Expansion Cable, 0.15 Meters, Shielded
	IC693ACC310	Filler Module, Blank Slot	IC693CBL313	Rack to Rack Expansion Cable, 8 Meters
Programming and Trouble Shooting Tools	IC693CBL300	Rack to Rack Expansion Cable, 1 Meter	IC693CBL314	Rack to Rack Expansion Cable, 15 Meters, Shielded
	IC646MPP001	Logic Developer - PLC Professional	IC646MPH101	Logic Developer PDA Software Tool with Cable Adapter
	IC646MPS001	Logic Developer - PLC Standard		



GE Fanuc Automation

GE Fanuc Automation Information Centers

USA and the Americas 1-800-648-2001 or (434) 978-5100

Europe and Middle East (352) 727979-1

Asia Pacific 86-21-3222-4555

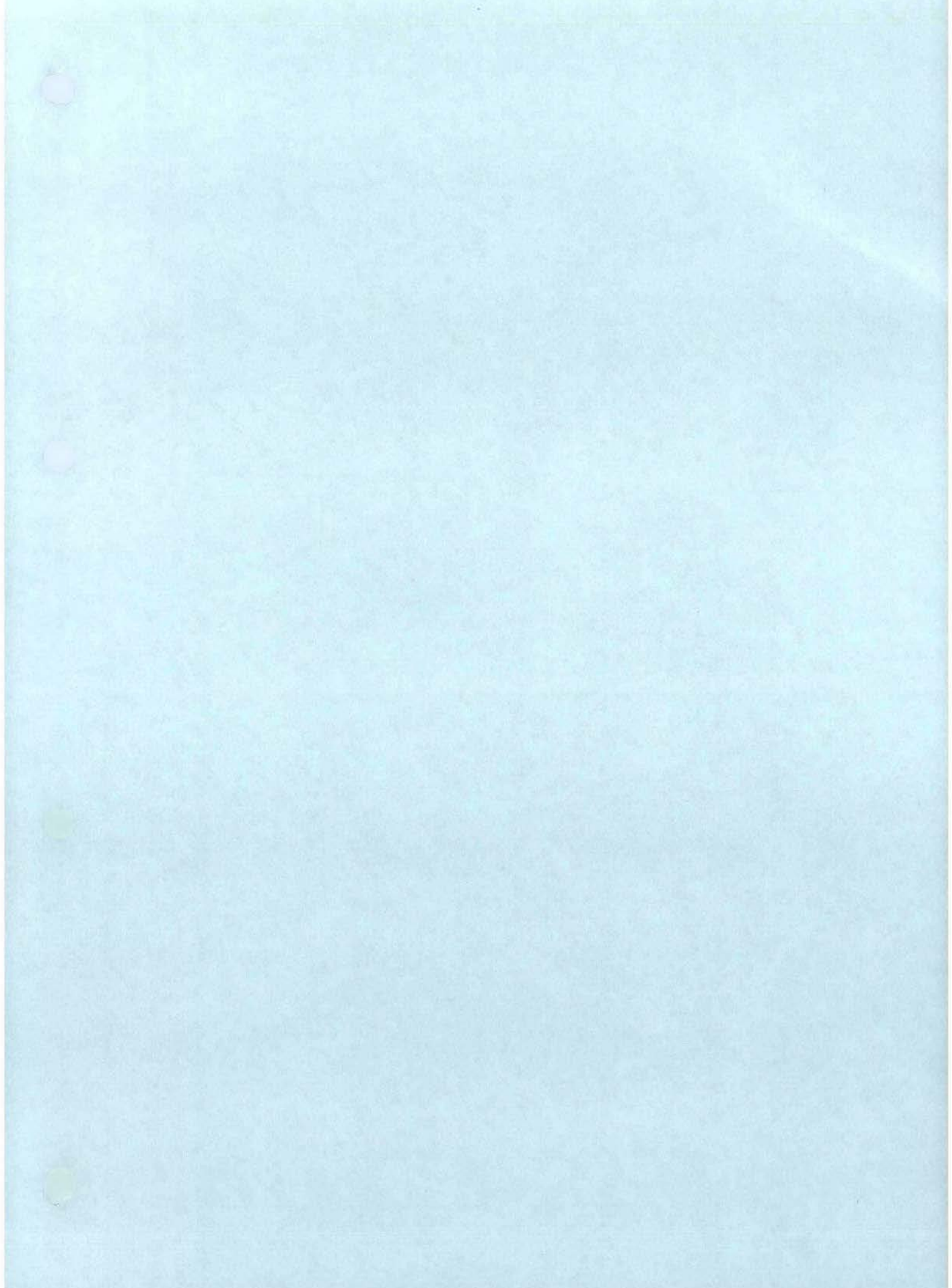
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Additional Resources

For detailed technical specifications and product ordering information, please visit the GE Fanuc e-catalog at:

www.gefanuc.com

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GE Fanuc Automation

Programmable Control Products



GE Fanuc Automation

***P.O. Box 8106
Charlottesville, VA 22906***

GFZ-0085

Series 90TM-30 Programmable Controller

Troubleshooting Guide



GE Fanuc Automation

Programmable Control Products

Series 90TM-30 Programmable Controller Troubleshooting Guide

GFZ-0085

August 1993

Notice

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Series 90	CIMPLICITY 90-ADS	Genius
Modelmaster	Series Three	VuMaster
ProLoop	CIMPLICITY PowerTRAC	Series Five
Workmaster	Genius Power TRAC	

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Safety Considerations

General Warnings When Troubleshooting

Stand clear of controlled equipment when power is applied. If the problem is intermittent, sudden unexpected machine motion could occur, causing injury. Also reference NFPA 70E Part II for additional guidelines for safety practices.

Never reach into a machine to operate a switch since unexpected motion could occur, causing injury.

Remove all electrical power at the Main Power Disconnect to ensure total power removal.

Always remove power before inserting or removing modules, or before connecting I/O cabling.

Preface

This guide describes a logical sequence for troubleshooting your Series 90–30 programmable controller. It includes the procedure for changing or adding a EPROM or EEPROM to your CPU. The Series 90–30 PLC is a member of the Series 90™ family of programmable logic controllers from GE Fanuc Automation.

Revisions to this Troubleshooting Guide

This is the first release of this Troubleshooting Guide. Included are models CPU 311, 313, 321, 323, 331 and 341.

Related Publications

Series 90™–30 Programmable Controller Installation Manual (GFK–0356).

Series 90™–30 and 90–20 PLC Hand–Held Programmer User's Manual (GFK–0402)

Logicmaster™ 90 Series 90–30 and 90–20 Programming Software User's Manual (GFK–0466)

Series 90™–30/90–20 Programmable Controllers Reference Manual (GFK–0467)

We Welcome Your Comments and Suggestions

At GE Fanuc Automation, we strive to produce quality technical documentation. After you have used this troubleshooting guide, please take a few moments to write us with your comments and suggestions. Our address is: Manager Technical Publications, GE Fanuc Automation, PO Box 8106, Charlottesville, VA 22906

Drake C. Fink

Sr. Staff Systems Engineer

SYMBOLS USED IN THIS GUIDE

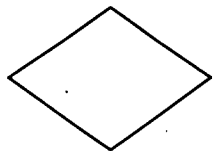


BEGIN AT THIS SYMBOL
ON THE FIRST CHART.

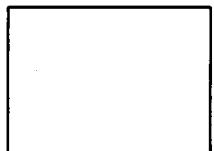


FOLLOW THE PATH WITH
THE CORRECT ANSWER IN
THE DIRECTION OF THE
ARROW

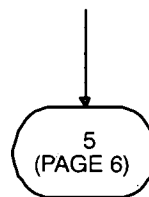
SYMBOLS USED THROUGHOUT THE GUIDE
ARE GEOMETRICALLY CODED



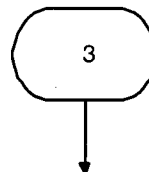
A DIAMOND ASKS A
QUESTION



A RECTANGLE TELLS
YOU TO DO SOMETHING



A NUMBERED BUBBLE WITH
AN ARROW INTO THE BUBBLE
INDICATES THAT THE
PROCEDURE IS CONTINUED
AT A CORRESPONDINGLY
NUMBERED BUBBLE ON THE
INDICATED PAGE NUMBER.



A NUMBERED BUBBLE WITH
AN ARROW OUT OF THE
BUBBLE INDICATES THE
START OF A PROCEDURE ON
THAT PAGE.

Adding or Changing the EEPROM in the 90TM–30

Application programs are normally developed in the CPU's RAM memory and executed from RAM memory. If additional program integrity is desired, or operation of the PLC without a battery is desired, an optional EEPROM or EPROM can be installed in a spare socket (labeled PROGRAM PROM) on the Model 311/313 backplane or in a socket on the model 331/341 CPU module. EEPROMs can be written to and read from. EPROMs can be read when installed in the PLC; however, they must be written to using an external PROM programming device.

Following is the procedure for adding or changing the EEPROM or EPROM. For clarity, the term PROM is used to refer to either an EEPROM or an EPROM.

1. Remove power from the system.
2. If 311/313
 - Remove all modules, including the power supply.
 - Remove the plastic cover.
3. If 331/341:
 - Remove CPU from backplane.
 - Remove front plate and bezel. Unsnap circuit board and remove from case.
4. If the socket is the type which has a screw near the top edge (some versions of 311/331), loosen screw at top of PROM socket (CCW twist;).
5. If present, remove old PROM from socket. Replace with or install new PROM. Orient the PROM so the end with a notch (the top of the prom) is toward the top edge of the backplane. Pin 1 of the prom is the first pin on the left as you move counter-clockwise from the notch. On the 311/331, correct installation orients the notch toward the screw.
6. When present, tighten screw at top of PROM socket (CW twist).
7. If 311/313:
 - Replace the plastic cover.
 - Replace all modules, including the power supply.

8. If 331 CPU:

- Assure jumper JP1, located at the bottom of the PROM socket, is in the 1–2 position for EPROM and the 3–2 position for EEPROM. This informs the CPU firmware which type of device is present.

9. If 331/341 CPU:

- Replace circuit board in case.
- Reinstall front plate and bezel.
- Replace CPU in backplane.

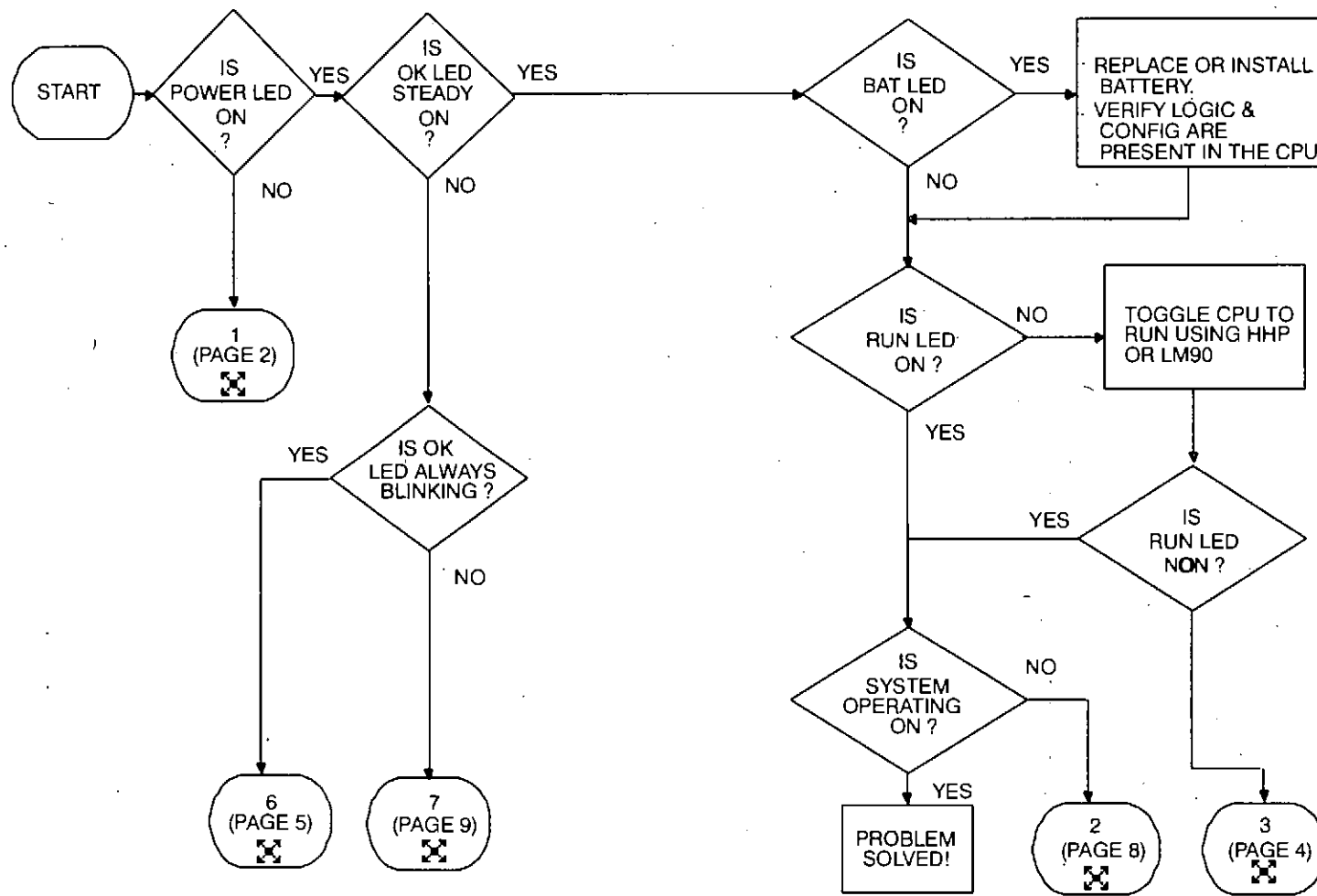
Changing the EEPROM (continued)

10. Apply power. The PLC follows the flowchart found in the "Power-Up Sequence" figure in the Power-Up and Power-Down Section of the *Series 90-30/90-20 Programmable Controllers Reference Manual* (GFK-0467) to determine if a program will be loaded from PROM to RAM.
11. For the EEPROM to be used by the CPU, the CPU configuration must be set to use EEPROM as the "Program Source". You may use the LM90 Configuration software or the HHP to accomplish this.
12. To store the program in RAM, you may use either the Hand-Held Programmer or Logicmaster 90-30, Rev 3.5 or higher. Refer to the instructions in the *HHP User's Manual* (GFK-0402) for HHP. To use Logicmaster 90-30, follow these instructions:
 - Start the LM90-30 Programmer Package
 - Activate the Utilities Menu (F9)
 - Select the EEPROM function (F10)
 - Select the WRITE operation
 - Verify the items you want to write to EEPROM are selected.
 - Press ENTER to start the operation. Refer to the *Logicmaster 90 Series 90-30 and 90-20 Programming Software User's Manual* (GFK-0466) for more information.

Notes and Precautions

1. **WARNING:** Do not discard the lithium–manganese dioxide battery in fire. Do not attempt to discharge the battery. The battery may burst or burn or release hazardous materials. Dispose of the battery as you would any hazardous material.
2. **CAUTION:** After a power fault, the system will come back on in the mode (*STOP, RUN/ENABLED, RUN/DISABLED*) in which it was operating before power loss, unless the power up configuration specifies a particular mode.
3. Not having a battery installed will not prevent the PLC from running. It will generate a PLC fault on power cycle that prevents the PLC from entering *RUN* mode automatically. Clearing this fault will enable the PLC to be placed in *RUN* mode.
4. To short the 'super cap' on a 311/321 PLC:
 - Remove power from the system.
 - Remove all modules, including the power supply.
 - Remove the plastic face plate.
 - Find component C20 along the left edge of the module. This is the 'super cap'. Short the positive (+) and negative (–) leads of this device.
 - Replace the plastic face plate.
 - Replace all modules.
 - Restore power to the system.
5. Supply (input) voltage tolerances for Series 90–30 power supplies:

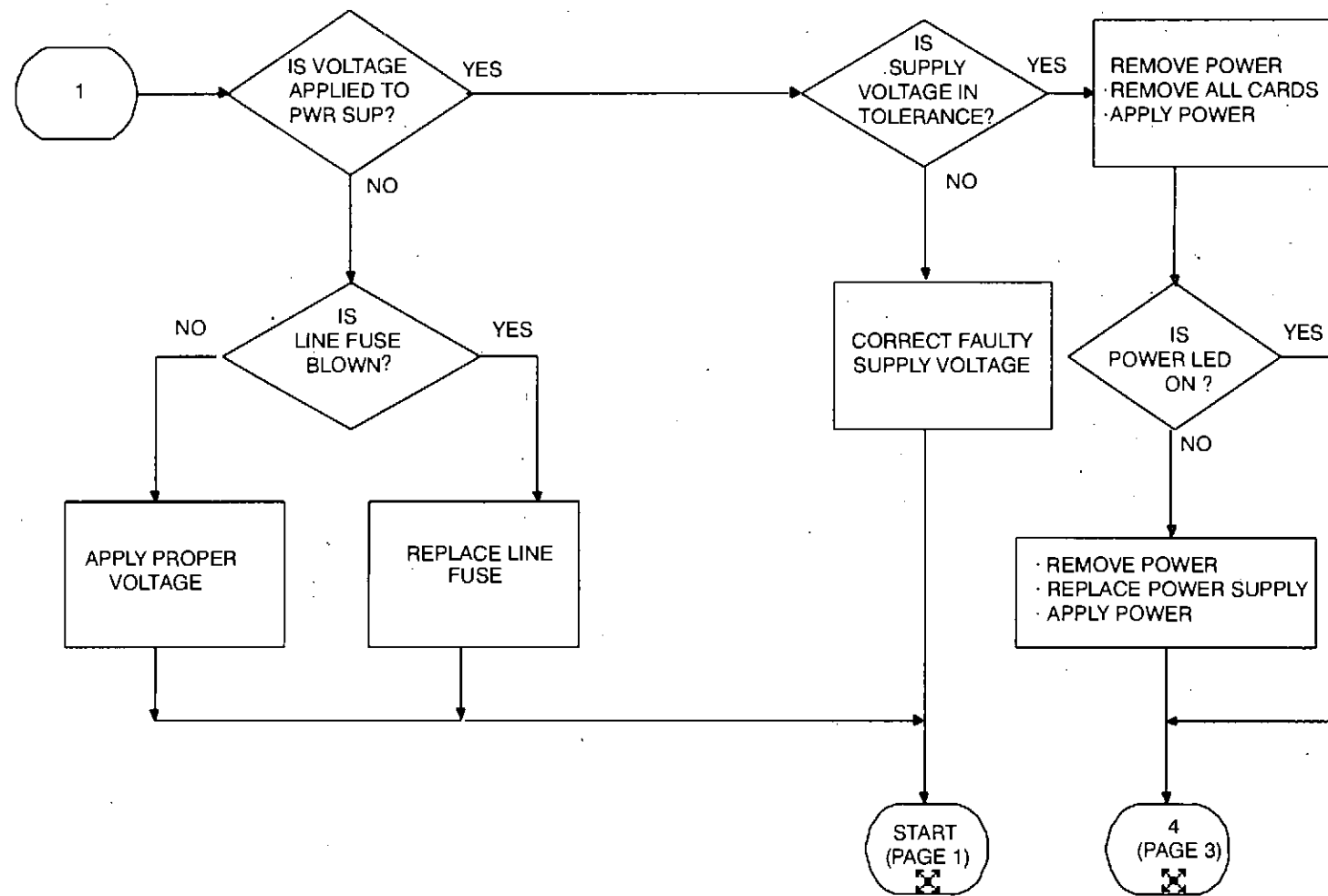
IC693PWR321:	100 to 240 VAC 100 to 250 VDC (125 VDC nominal)
IC693PWR322:	18 to 56 VDC, 21 VDC minimum to start 24 VDC OR 48 VDC nominal
6. Total cable length must not exceed 50 feet between a CPU rack and an expansion rack. Length must not exceed 700 feet between a CPU rack and a remote rack. No termination plug is needed on a one–rack system.



PAGE 1

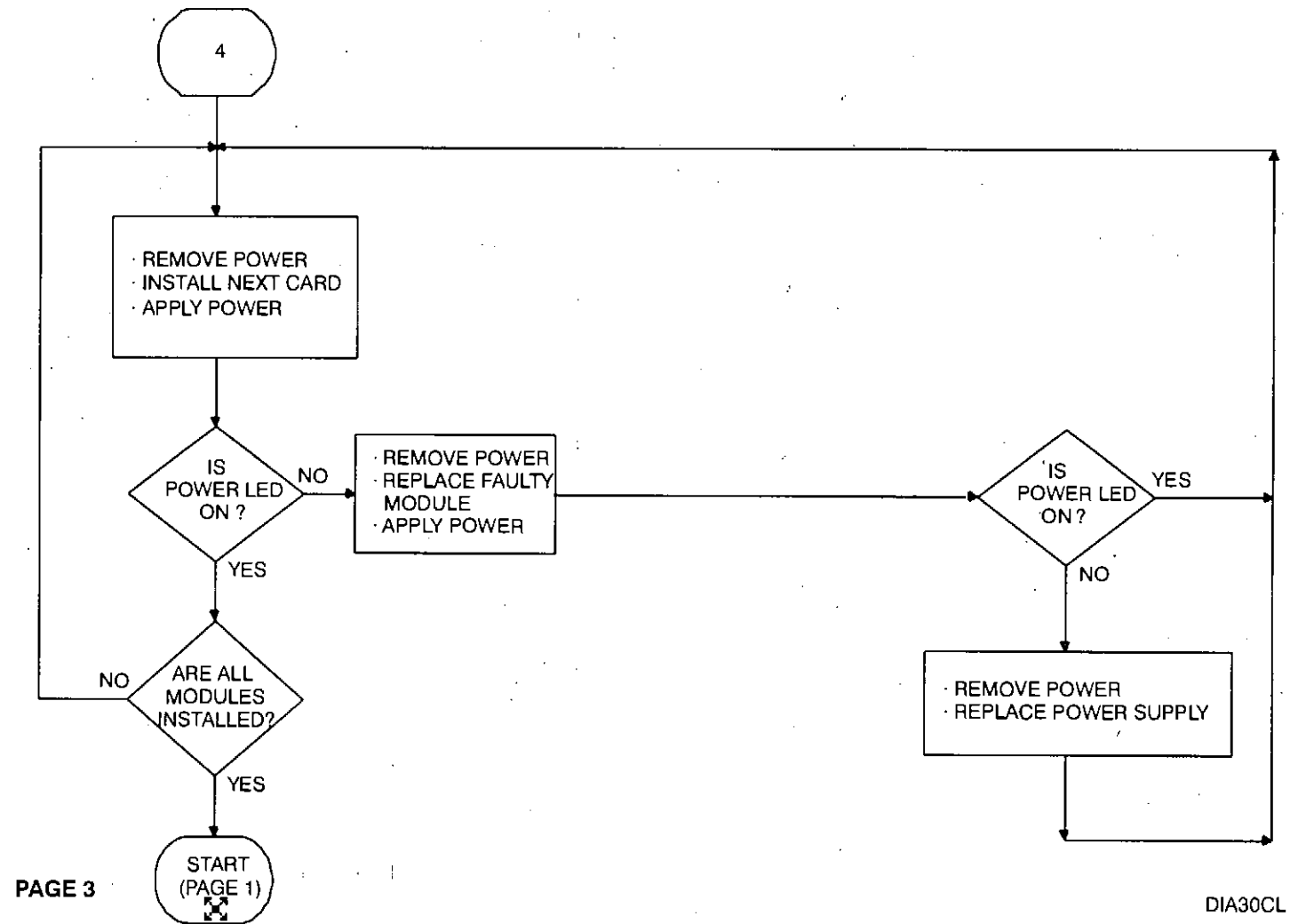
(Refer to the Preface for information on safety considerations, related publications and the symbols used in this guide.)

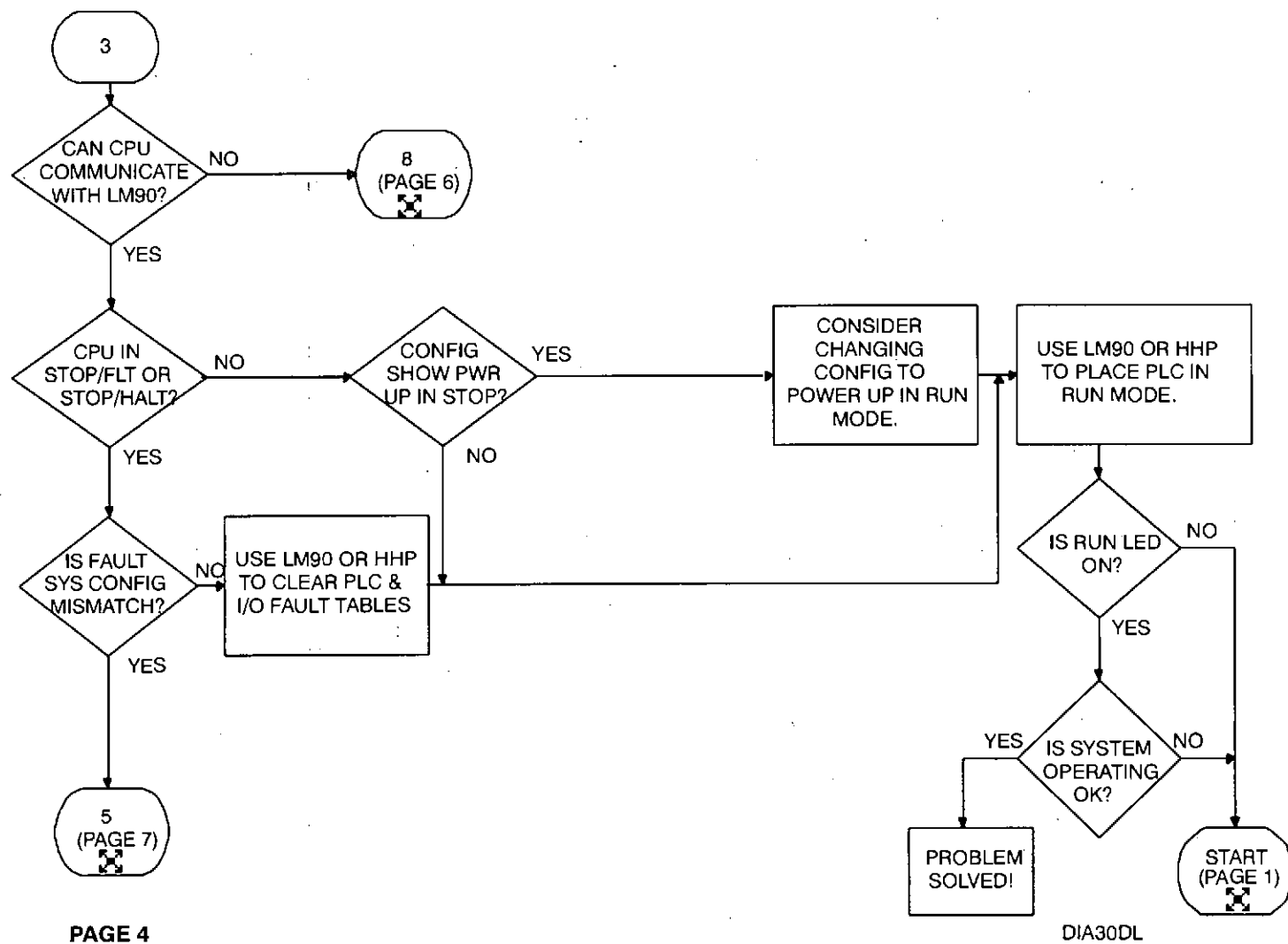
DIA30AL
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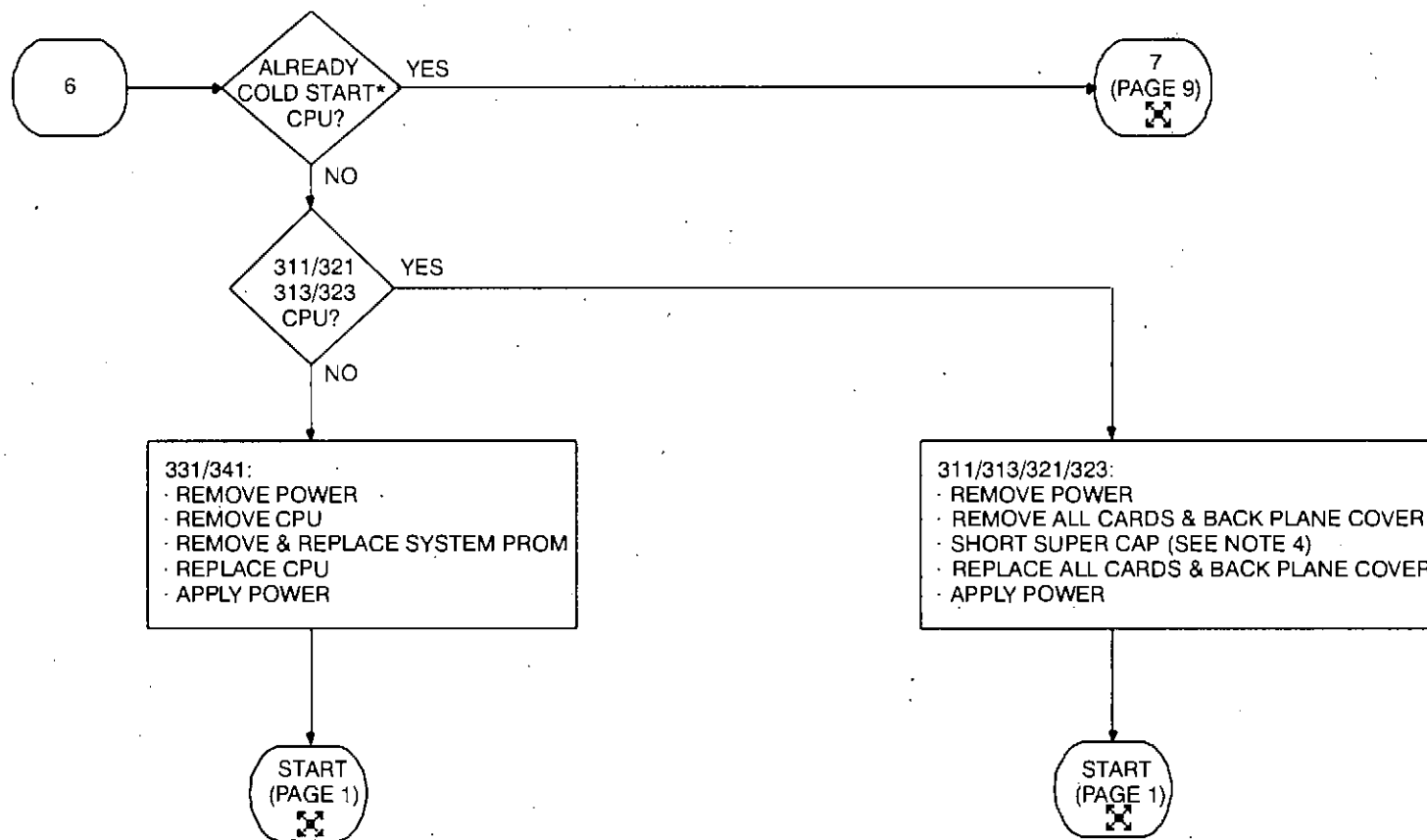


PAGE 2

DIA30BL



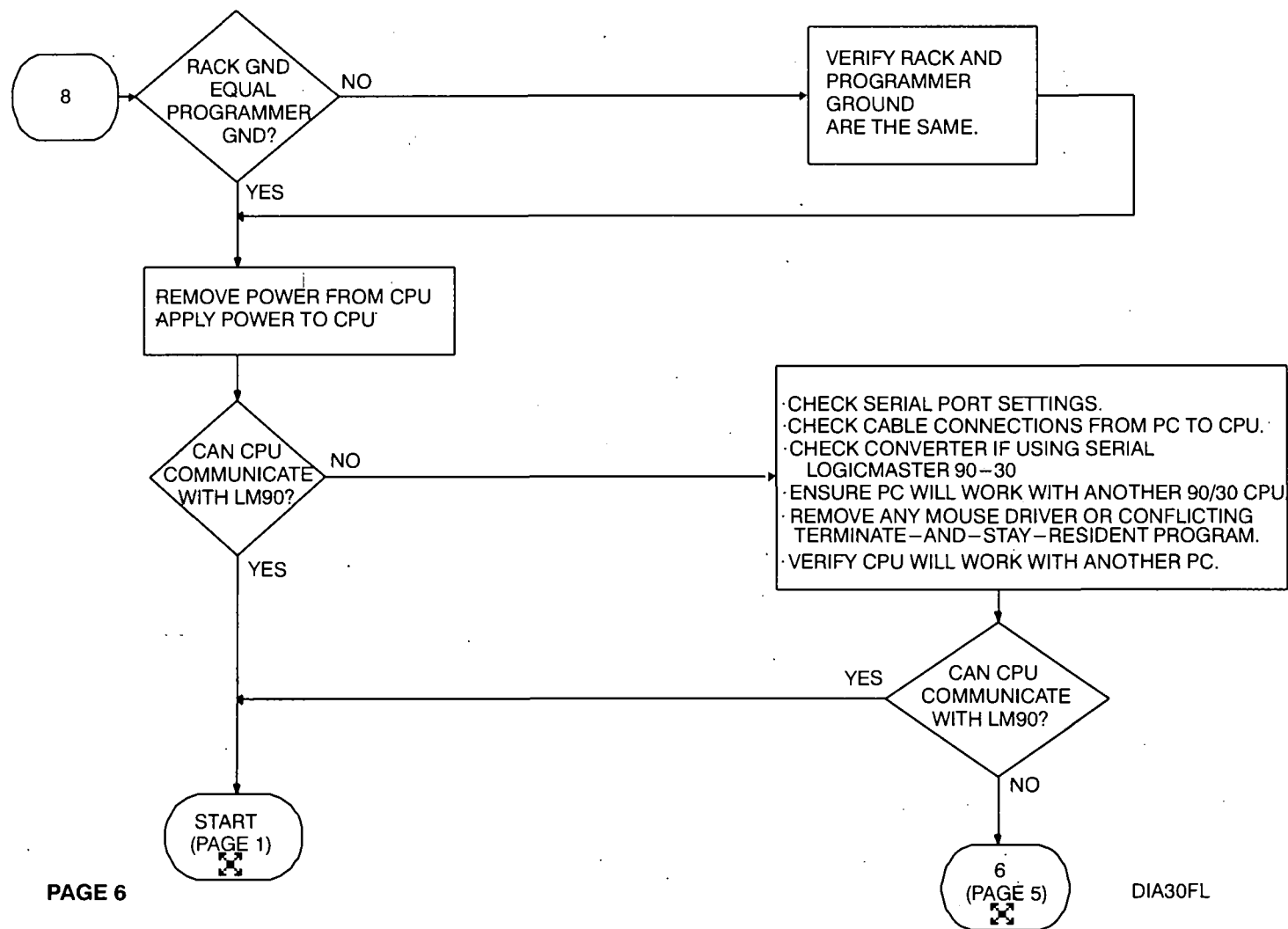




*COLD START DELETES THE CONTENTS OF THE CPU'S MEMORY AND RESTORES COMMUNICATION PARAMETERS (BAUD RATE, PARITY, ETC.) TO THEIR DEFAULT VALUES.

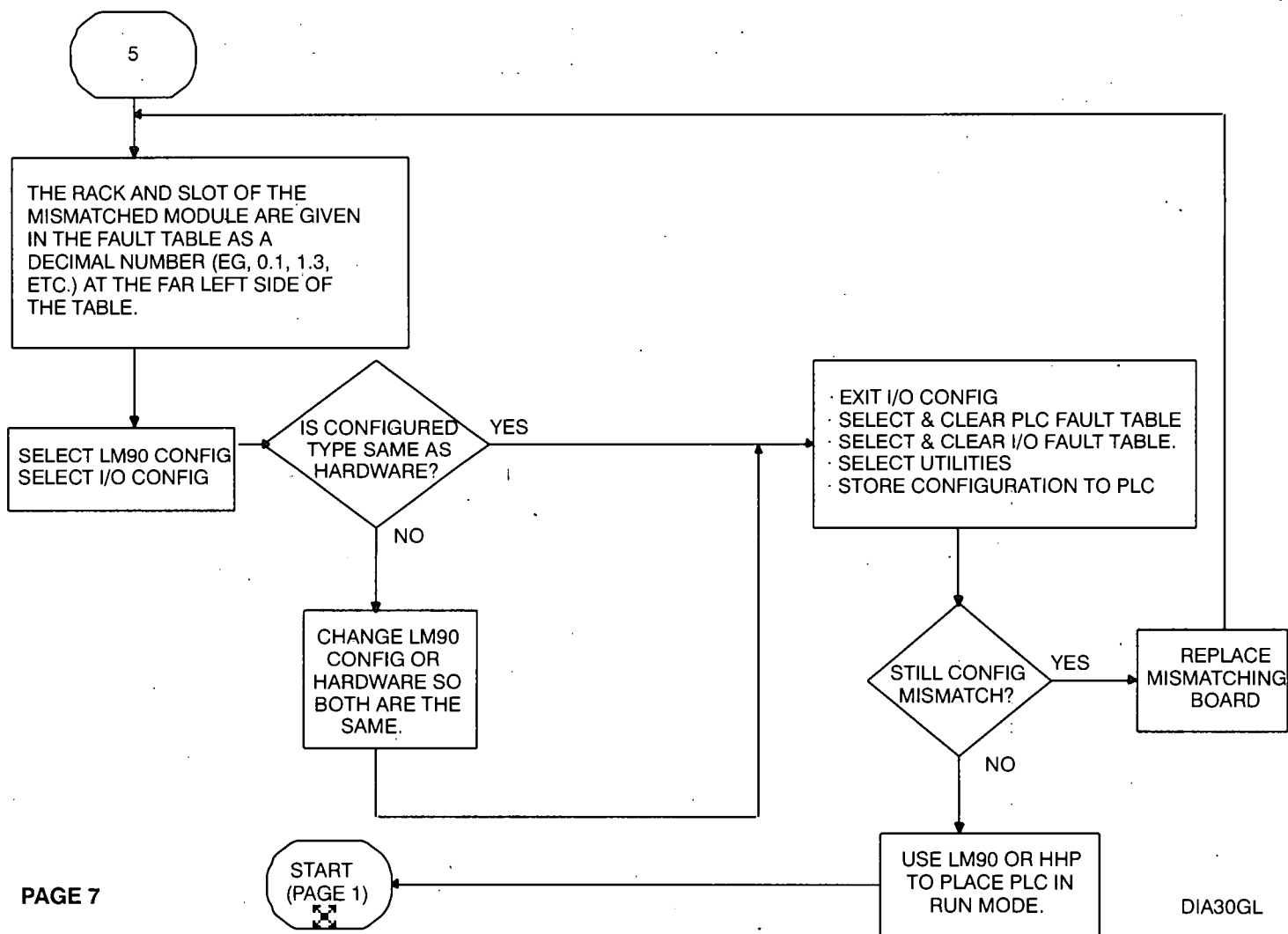
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DIA30EL

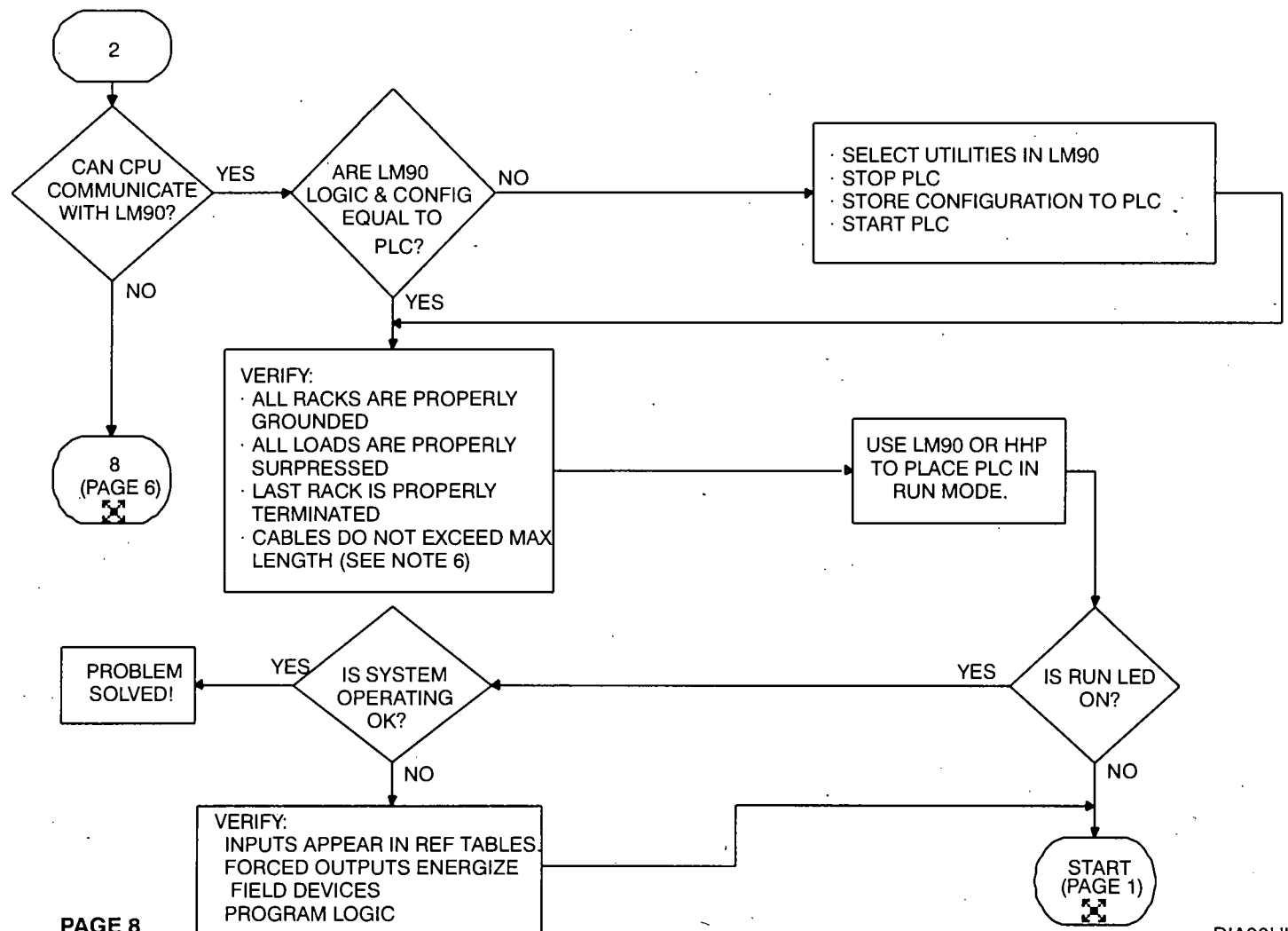


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DIA30FL

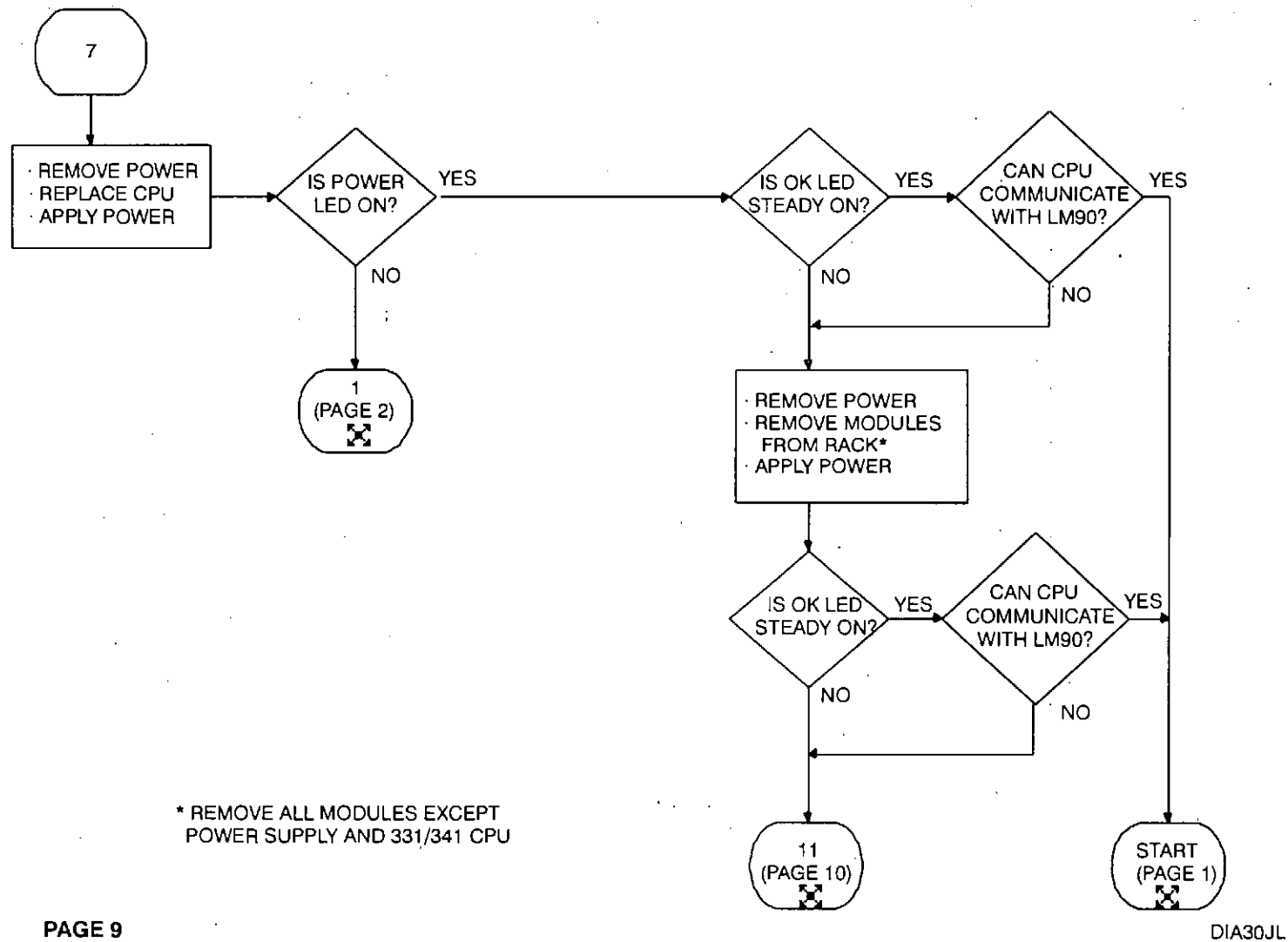


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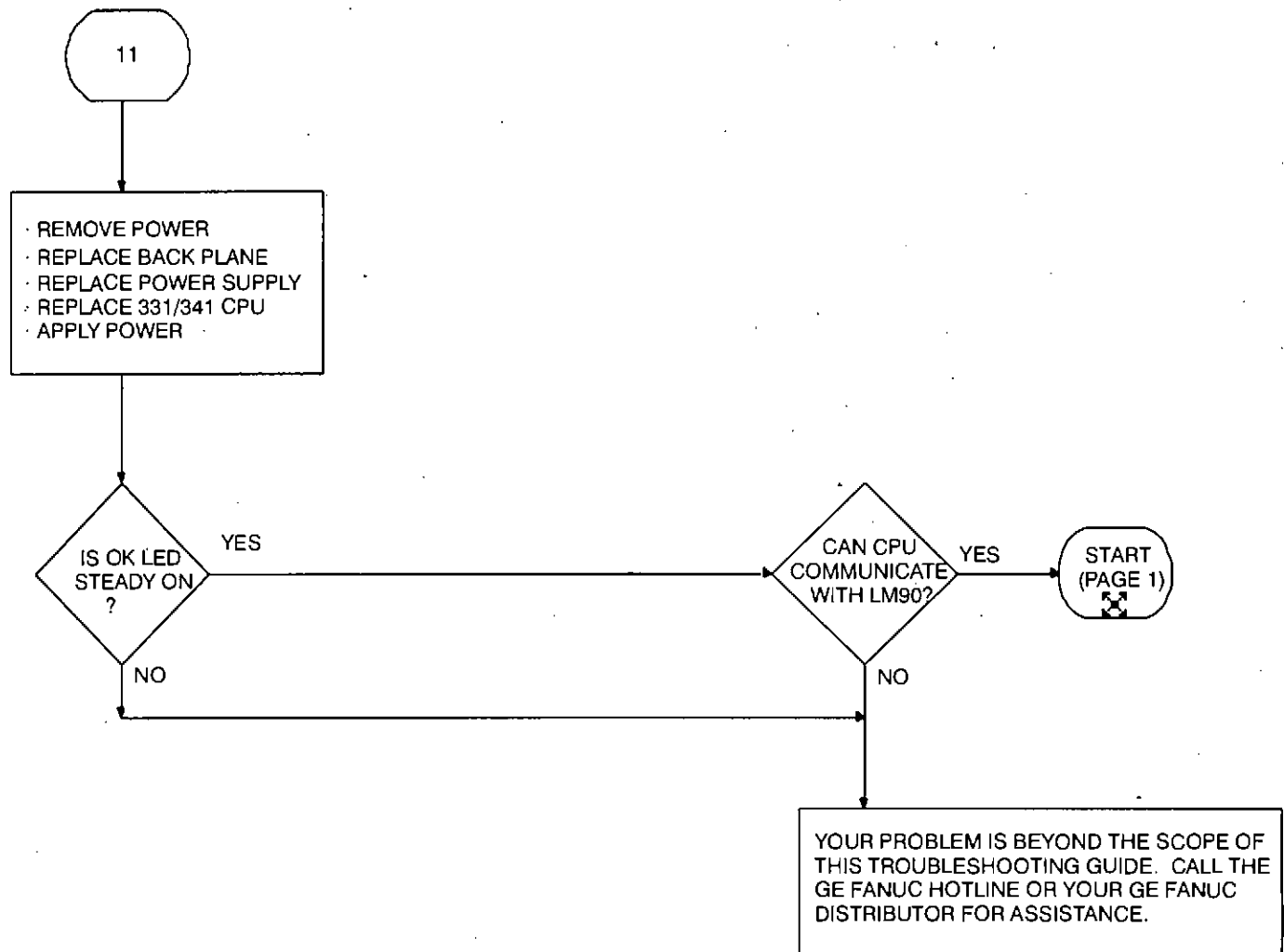


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DIA30KL

GE Tag	GE Address	Isag Tag Name	Short	LOCATION	NETWORK	PLANT	QUANTITY	module_address	slot_number	channel	subcribe_number	time_tagged	point_type	Design	Default	Ndr	Mfg	Aud	Vis	Imp
DIGITAL INPUTS																				
PM010001	PM010001	pm010001	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Mains fail	128 0	0	1	1	0	0	1	1	0	0	0	0	0
PM010002	PM010002	pm010002	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Available	128 0	1	1	1	0	0	1	1	0	0	0	0	0
PM010003	PM010003	pm010003	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Running	128 0	2	1	1	0	0	1	1	0	0	0	0	0
PM010004	PM010004	pm010004	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Inhibit Fbk	128 0	3	1	1	0	0	1	1	0	0	0	0	0
PM010005	PM010005	pm010005	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Emergency stop fault	128 0	4	1	1	0	0	1	1	0	0	0	0	0
PM010006	PM010006	pm010006	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Fault	128 0	5	1	1	0	0	1	1	0	0	0	0	0
PM010007	PM010007	pm010007	SP208	Lytton Rd #3 SP208	SEWER	Variable speed drive	Auto	128 0	6	1	1	0	0	1	1	0	0	0	0	0
PM010008	PM010008	pm010008	SP208	Lytton Rd #3 SP208	SEWER	Variable speed drive	Variable speed drive	128 0	7	1	1	0	0	1	1	0	0	0	0	0
PM010009	PM010009	pm010009	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Blocked	128 0	8	1	1	0	0	1	1	0	0	0	0	0
PM010010	PM010010	pm010010	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Close fault	128 0	9	1	1	0	0	1	1	0	0	0	0	0
PM010011	PM010011	pm010011	SP208	Lytton Rd #3 SP208	SEWER	Reflex valve	Open count check	128 0	10	1	1	0	0	1	1	0	0	0	0	0
PM010012	PM010012	pm010012	SP208	Lytton Rd #3 SP208	SEWER	Reflex valve	Open fault	128 0	11	1	1	0	0	1	1	0	0	0	0	0
PM010013	PM010013	pm010013	SP208	Lytton Rd #3 SP208	SEWER	Reflex valve	Open auto fault reset	128 0	12	1	1	0	0	1	1	0	0	0	0	0
PM010014	PM010014	pm010014	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	VF Drive count check	128 0	13	1	1	0	0	1	1	0	0	0	0	0
PM010015	PM010015	pm010015	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Mains fail	128 0	14	1	1	0	0	1	1	0	0	0	0	0
PM010016	PM010016	pm010016	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Available	128 0	15	1	1	0	0	1	1	0	0	0	0	0
PM010017	PM010017	pm010017	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Running	129 0	1	1	1	0	0	1	1	0	0	0	0	0
PM010018	PM010018	pm010018	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Inhibit Fbk	129 0	2	1	1	0	0	1	1	0	0	0	0	0
PM010019	PM010019	pm010019	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Emergency stop fault	129 0	3	1	1	0	0	1	1	0	0	0	0	0
PM010020	PM010020	pm010020	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Fault	129 0	4	1	1	0	0	1	1	0	0	0	0	0
PM010021	PM010021	pm010021	SP208	Lytton Rd #3 SP208	SEWER	Variable speed drive	Auto	129 0	5	1	1	0	0	1	1	0	0	0	0	0
PM010022	PM010022	pm010022	SP208	Lytton Rd #3 SP208	SEWER	Variable speed drive	Variable speed drive	129 0	6	1	1	0	0	1	1	0	0	0	0	0
PM010023	PM010023	pm010023	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Blocked	129 0	7	1	1	0	0	1	1	0	0	0	0	0
PM010024	PM010024	pm010024	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Close fault	129 0	8	1	1	0	0	1	1	0	0	0	0	0
PM010025	PM010025	pm010025	SP208	Lytton Rd #3 SP208	SEWER	Reflex valve	Open count check	129 0	9	1	1	0	0	1	1	0	0	0	0	0
PM010026	PM010026	pm010026	SP208	Lytton Rd #3 SP208	SEWER	Reflex valve	Open fault	129 0	10	1	1	0	0	1	1	0	0	0	0	0
PM010027	PM010027	pm010027	SP208	Lytton Rd #3 SP208	SEWER	Reflex valve	Open auto fault reset	129 0	11	1	1	0	0	1	1	0	0	0	0	0
PM010028	PM010028	pm010028	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	VF Drive count check	129 0	12	1	1	0	0	1	1	0	0	0	0	0
PM010029	PM010029	pm010029	SP208	Lytton Rd #3 SP208	SEWER	Sewer pump	Mains fail	130 0	1	1	1	0	0	1	1	0	0	0	0	0
PM010030	PM010030	pm010030	SP208	Lytton Rd #3 SP208	SEWER	Valve	Closed	130 0	2	1	1	0	0	1	1	0	0	0	0	0
PM010031	PM010031	pm010031	SP208	Lytton Rd #3 SP208	SEWER	Valve	Open	130 0	3	1	1	0	0	1	1	0	0	0	0	0
PM010032	PM010032	pm010032	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available remote	130 0	4	1	1	0	0	1	1	0	0	0	0	0
PM010033	PM010033	pm010033	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available	130 0	5	1	1	0	0	1	1	0	0	0	0	0
PM010034	PM010034	pm010034	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall close alarm	130 0	6	1	1	0	0	1	1	0	0	0	0	0
PM010035	PM010035	pm010035	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall open alarm	130 0	7	1	1	0	0	1	1	0	0	0	0	0
PM010036	PM010036	pm010036	SP208	Lytton Rd #3 SP208	SEWER	Valve	Closed	130 0	8	1	1	0	0	1	1	0	0	0	0	0
PM010037	PM010037	pm010037	SP208	Lytton Rd #3 SP208	SEWER	Valve	Open	130 0	9	1	1	0	0	1	1	0	0	0	0	0
PM010038	PM010038	pm010038	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available remote	130 0	10	1	1	0	0	1	1	0	0	0	0	0
PM010039	PM010039	pm010039	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available	130 0	11	1	1	0	0	1	1	0	0	0	0	0
PM010040	PM010040	pm010040	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall close alarm	130 0	12	1	1	0	0	1	1	0	0	0	0	0
PM010041	PM010041	pm010041	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall open alarm	130 0	13	1	1	0	0	1	1	0	0	0	0	0
PM010042	PM010042	pm010042	SP208	Lytton Rd #3 SP208	SEWER	Valve	Closed	130 0	14	1	1	0	0	1	1	0	0	0	0	0
PM010043	PM010043	pm010043	SP208	Lytton Rd #3 SP208	SEWER	Valve	Open	130 0	15	1	1	0	0	1	1	0	0	0	0	0
PM010044	PM010044	pm010044	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available remote	130 0	16	1	1	0	0	1	1	0	0	0	0	0
PM010045	PM010045	pm010045	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available	130 0	17	1	1	0	0	1	1	0	0	0	0	0
PM010046	PM010046	pm010046	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall close alarm	130 0	18	1	1	0	0	1	1	0	0	0	0	0
PM010047	PM010047	pm010047	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall open alarm	130 0	19	1	1	0	0	1	1	0	0	0	0	0
PM010048	PM010048	pm010048	SP208	Lytton Rd #3 SP208	SEWER	Valve	Closed	130 0	20	1	1	0	0	1	1	0	0	0	0	0
PM010049	PM010049	pm010049	SP208	Lytton Rd #3 SP208	SEWER	Valve	Open	130 0	21	1	1	0	0	1	1	0	0	0	0	0
PM010050	PM010050	pm010050	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available remote	130 0	22	1	1	0	0	1	1	0	0	0	0	0
PM010051	PM010051	pm010051	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available	130 0	23	1	1	0	0	1	1	0	0	0	0	0
PM010052	PM010052	pm010052	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall close alarm	130 0	24	1	1	0	0	1	1	0	0	0	0	0
PM010053	PM010053	pm010053	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall open alarm	130 0	25	1	1	0	0	1	1	0	0	0	0	0
PM010054	PM010054	pm010054	SP208	Lytton Rd #3 SP208	SEWER	Valve	Closed	130 0	26	1	1	0	0	1	1	0	0	0	0	0
PM010055	PM010055	pm010055	SP208	Lytton Rd #3 SP208	SEWER	Valve	Open	130 0	27	1	1	0	0	1	1	0	0	0	0	0
PM010056	PM010056	pm010056	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available remote	130 0	28	1	1	0	0	1	1	0	0	0	0	0
PM010057	PM010057	pm010057	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available	130 0	29	1	1	0	0	1	1	0	0	0	0	0
PM010058	PM010058	pm010058	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall close alarm	130 0	30	1	1	0	0	1	1	0	0	0	0	0
PM010059	PM010059	pm010059	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall open alarm	130 0	31	1	1	0	0	1	1	0	0	0	0	0
PM010060	PM010060	pm010060	SP208	Lytton Rd #3 SP208	SEWER	Valve	Closed	130 0	32	1	1	0	0	1	1	0	0	0	0	0
PM010061	PM010061	pm010061	SP208	Lytton Rd #3 SP208	SEWER	Valve	Open	130 0	33	1	1	0	0	1	1	0	0	0	0	0
PM010062	PM010062	pm010062	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available remote	130 0	34	1	1	0	0	1	1	0	0	0	0	0
PM010063	PM010063	pm010063	SP208	Lytton Rd #3 SP208	SEWER	Valve	Available	130 0	35	1	1	0	0	1	1	0	0	0	0	0
PM010064	PM010064	pm010064	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall close alarm	130 0	36	1	1	0	0	1	1	0	0	0	0	0
PM010065	PM010065	pm010065	SP208	Lytton Rd #3 SP208	SEWER	Valve	Fall													

SP306 Coronation Dr IDITS 10 Lbl Ver 1.0.xth

Analog

Related GE Tag	GE Address	IsaGraf Tagname	Short	LOCATION	NETWORK	PLANT	QUANTITY	module_type	module_address	slot_number	channel	chassis_number	subcable_number	time_tagged	scan_rate	point_type	Design	Default	Nal	Naz	Nlg	Nlr	Aud	Fu	Naz	rmin	rmax
ANALOG INPUTS																											
Ww01bDtyBStartLevelSP	%R05519	ww1dutyBStrFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Duty_B_start_setpoint_Fbk	flp 101	160	0	1	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bPIDLevelSP	%R05520	ww1PIDLYSPFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	PID_setpoint_Fbk	flp 101	160	0	2	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bDtyAStartLevelSP	%R05521	ww1dutyAStrFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Duty_A_start_setpoint_Fbk	flp 101	160	0	3	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bDtyBStopLevelSP	%R05523	ww1dutyBStopFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Duty_B_stop_setpoint_Fbk	flp 101	160	0	5	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bDtyAStopLevelSP	%R05524	ww1dutyAStopFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Duty_A_stop_setpoint_Fbk	flp 101	160	0	6	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bZero	%R05527	ww1LvZeroMFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Zero MAHD Fbk	flp 101	160	0	7	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bEGU	%R05525	ww1InflowAvg	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Inflow	flp 101	161	0	0	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1levelMAHD	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Level	flp 101	161	0	1	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1surchElapse	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Surcharge duration	flp 101	161	0	2	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1surchTimeEst	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Surcharge_time_remaining	flp 101	161	0	3	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1totalInflow	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Total inflow	flp 101	161	0	4	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1totalInflow1	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Total_inflow_yesterday	flp 101	161	0	5	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1volume	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Volume	flp 101	161	0	6	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Ww01bRange	%R05526	ww1LvRangeFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Level_range Fbk	flp 101	161	0	7	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Pre01bZero	%R05530	pre1elevationFbk	SP298	Lytton Rd #3	SP298	SEWER	Pressure_gauge	Elevation_Rtu	flp 101	162	0	0	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pre1HiLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Pressure_gauge	High_limit_Fbk	flp 101	162	0	1	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pre1LoLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Pressure_gauge	Low_limit_Fbk	flp 101	162	0	2	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Pre01bRange	%R05529	pre1PresRangeFbk	SP298	Lytton Rd #3	SP298	SEWER	Pressure_gauge	Pressure_range_Fbk	flp 101	162	0	3	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pre1PressurePa	SP298	Lytton Rd #3	SP298	SEWER	Pressure_gauge	Pressure_kpa	flp 101	162	0	4	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Pre01bEGU	%R05528	pre1PressureMAHD	SP298	Lytton Rd #3	SP298	SEWER	Pressure_gauge	Pressure_mahd	flp 101	162	0	5	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Flw01bRange	%R05532	flw1DischTime	SP298	Lytton Rd #3	SP298	SEWER	Rtu	Battery_discharge_time	flp 101	162	0	6	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		flw1range	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	Flow_rate_Range_Fbk	flp 101	162	0	7	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
Flw01bEGU	%R05531	flw1flowrate	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	Flow_rate	flp 101	163	0	0	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		flw1volume	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	Volume	flp 101	163	0	1	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		flw1volume1	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	Volume_snap_shot	flp 101	163	0	2	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		flw1flowKL	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	Flow_kl	flp 101	163	0	3	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		flw1HiLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	Low_limit_Fbk	flp 101	163	0	4	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		flw1LoLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Flow_meter	High_limit_Fbk	flp 101	163	0	5	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1HiLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	High_limit_Fbk	flp 101	163	0	6	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		ww1LoLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Wet_well	Low_limit_Fbk	flp 101	163	0	7	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1CurrHiLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Motor_current_high_limit_Fbk	flp 101	164	0	0	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1CurrLoLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Motor_current_low_limit_Fbk	flp 101	164	0	1	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
pmp1Power	SP298	pmp1PowHiLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Motor_power_high_limit_Fbk	flp 101	164	0	2	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1PowLoLimFbk	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Motor_power_low_limit_Fbk	flp 101	164	0	3	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1motorCurrent	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Motor_current	flp 101	164	0	4	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1motorPower	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Motor_power	flp 101	164	0	5	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1kiloWattHrs	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Total_KWHrs	flp 101	164	0	6	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1kiloWattHrs1	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Total_KWHrs_yesterday	flp 101	164	0	7	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1hoursRun	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Hours_run	flp 101	165	0	0	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1hoursRun1	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Hours_run_yesterday	flp 101	165	0	1	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1startCount	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Number_of_starts	flp 101	165	0	2	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1startCount1	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Number_of_starts_yesterday	flp 101	165	0	3	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
pmp1volume	SP298	pmp1volume	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Total outflow	flp 101	165	0	4	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp1volume1	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Total_outflow_yesterday	flp 101	165	0	5	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp12hoursRun	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Hours_run_12	flp 101	165	0	6	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK
		pmp12hoursRun1	SP298	Lytton Rd #3	SP298	SEWER	Sewer_pump	Hours_run_12_yesterday	flp 101	165	0	7	1	1	1	0	ana	1	1	1	1	1	0	0	1	0	OK

SP306 Commission Dr Physical IO List Ver 1.2

MITS AI (0-7)

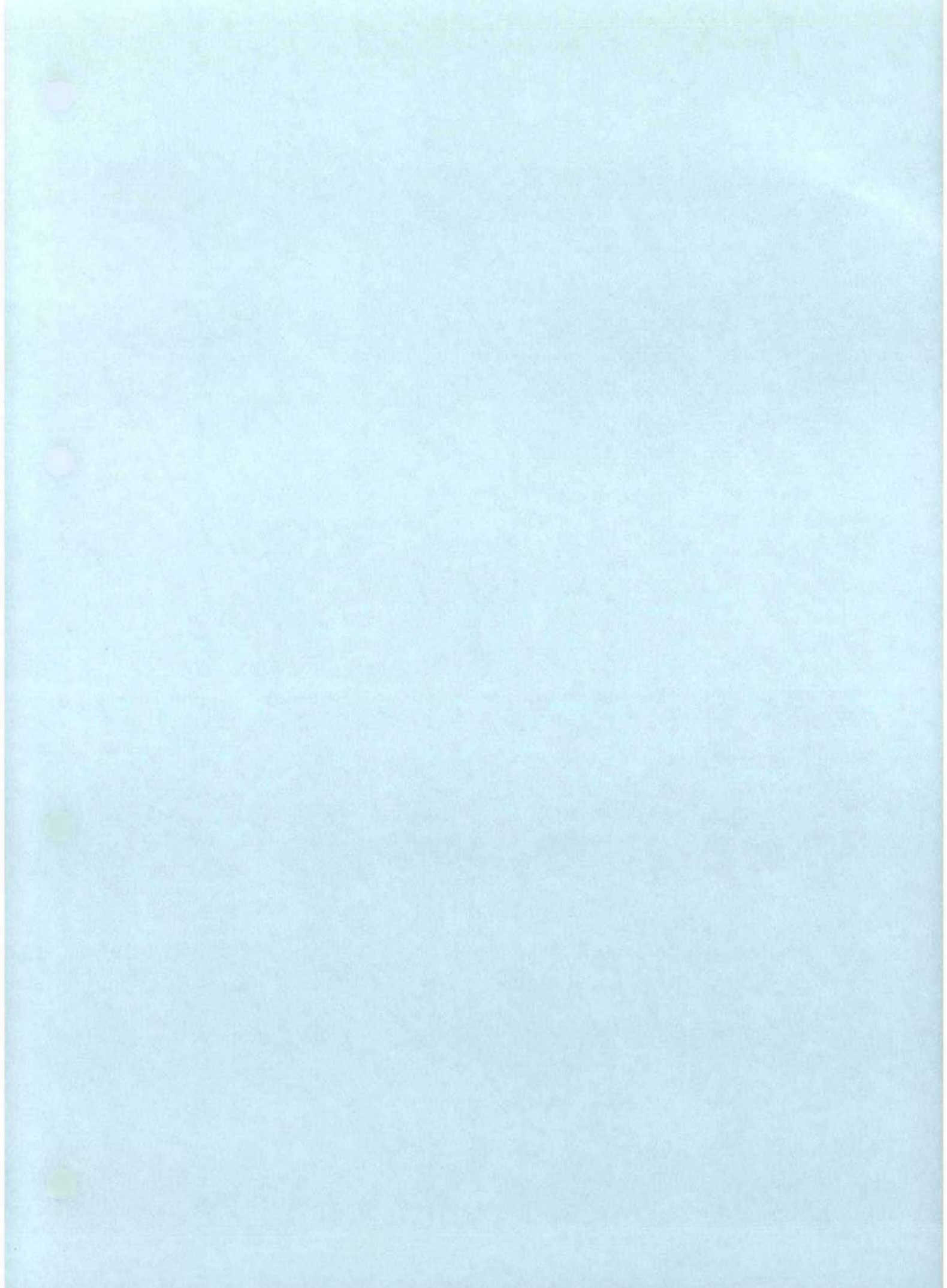


MITS MD3311 EA (Extended I-O)

ANALOG INPUTS (0-7)

SP306 Patricks Lane Sewage Pumping Station

I/O #	Description	MITS Tag	4mA	20mA	Term. #	Wire #	Drawing #	Comment
0	Cathodic Protection Rectifier Current	cp1RectCurrent	Site Specific	Site Specific		AI00 +/-		
1	Wet Well Level	ww1level	0.000 m	???.000 m		AI01 +/-		
2	Gravity Sewer Level	sew1level	0.00 m	????.00 m		AI02 +/-		Added in Ver 1.0
3	Spare	-	-	-		AI03 +/-		
4	Spare	-	-	-		AI04 +/-		
5	Spare	-	-	-		AI05 +/-		
6	Spare	-	-	-		AI06 +/-		
7	Spare	-	-	-		AI07 +/-		



address	<u>192.168.34.95</u>
extio-board	
gateway	192.168.34.1
mbm-tty2-baud	19200
mbm-tty2-parity	even
mbm-tty2-poll	1
mbm-tty2-rtts	
md3000-address	<u>95</u>
s10-address	192.168.39.95
s10-device	slip-port1
s10-pingdst	
s11-address	192.168.34.95
s11-destination	192.168.34.1
s11-device	slip-port3
timezone	-600

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