



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

SP280

BRISBANE CITY COUNCIL

LAWSON PLACE

SEWER PUMPING STATION

Nº 280.

## OPERATION AND MAINTENANCE MANUAL

BY  
J & P RICHARDSON INDUSTRIES PTY LTD  
CAMPBELL AVENUE WACOL BRISBANE 4076  
ACN. 001 952 325  
Ph. (07) 3271 2911  
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JPR Ref:- (A19695.001)

Revision 0

March 26, 1999

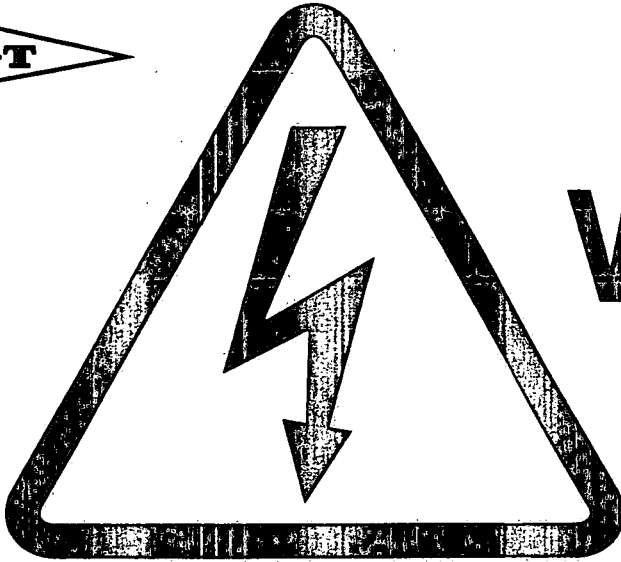


INDEX A4



Ref. No. 35026  
made in germany





**WARNING!**

592 05 02

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

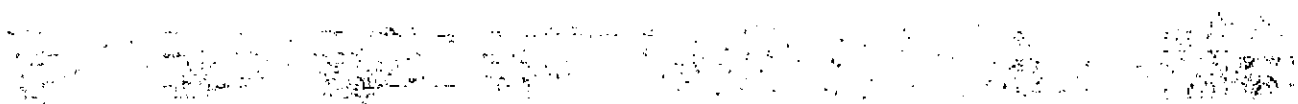


**Position the sign  
so that it is easily visible at the  
connection to the power supply.**

**Flygt 592 05 02**

**Svep Reklam, Emmaboda**





3417L/LB

1.0 PUMPSSUPPLIER:

ITT FLYGT LTD  
14A DEVLAN STREET  
MANSFIELD QLD 4122

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

MODEL

SERIAL NO: 9880020 & 9880022  
MOTOR KW RATING: 25KW  
MOTOR SPEED: 1455RPM  
FULL LOAD CURRENT: 40A  
VOLTAGE: 415V

Original

1/11/04.

86

TO BRISBANE WATER

BUNYA SS

EAGLE FARM

MACQUARIE PARK

SP280 LAWSON PLACE

2 REDUNDANT CP3170

25KW PUMPS

SN° 9880022.

988.0020

2. GET IMPELLERS

for future flows.

→ NEW PN° 11592.

FOR NEW GRUNDOS

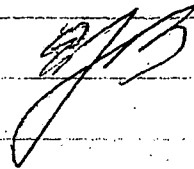
50KW PUMPS INSTALLED

1/11/04.

35L/SEC @ 52m HD.

FROM J+P RICHARDSON P/L.

SIGND



Our flow  
tests indicate  
17 Lts/sec ~~17 Lts/sec~~  
Per pump.

M. Cooper

13/11/2008



**GRUNDFOS****PUMP TEST REPORT**

CUSTOMER DETAILS AND GUARANTEE	
Customer Name	J & P Richardson Industries Pty Ltd
Cust. Order No.	P2485
Guarantee Flow	
Guarantee Pressure	
Guarantee Efficiency	- %

TEST DETAILS	
Test Class	AS2417:2001 Grade 2 Annex A
Water Temp.	14 °C
Tested by	DAVID BLACKWELL
Date	30-Aug-2004
Test Location	Grundfos Pumps Pty Ltd

MOTOR DETAILS	
Serial No.	N/A
Manufacturer	Grundfos
Full Load Current	102 Amps
Power	50.0 kW
Voltage	415/(719) V
Frequency	50 Hz
Phase	3
Motor Speed	1470 rpm
No. of Poles	4

PUMP DETAILS	
Pump Model	S1 504 H1
Pump Serial No.	177802
Shop Order No.	212762
Drawing No.	N/A
Impeller Dia.	323.7/352.0 mm
Pump Inlet Dia.	150 mm
Pump Outlet Dia.	125 mm

Reading	Pressure (metres)	Flow (l/s)	Current (Amps)	Input Power (kW)	Motor Speed (rpm)	Voltage (Volts)	Overall Efficiency (%)	Pump Efficiency <sup>2</sup> (%)
1	44.22	18.51	50.23	20.53	1470	400.00	39.12	45.32
2	43.49	20.75	50.53	20.93	1470	400.00	42.30	48.42
3	43.03	22.97	51.20	21.63	1470	400.00	44.83	49.27
4	42.60	25.40	51.97	22.29	1470	400.00	47.62	52.35
5	42.00	27.67	52.50	22.93	1470	400.00	49.72	54.67
Shut Off Head	48.22	0	45.73	15.91	1470	400.00		

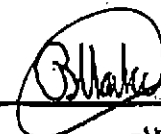
## Notes:

1. This pump has been tested in accordance to AS2417:2001 Grade 2 Annex A. The results obtained in the test show that the pump performance complies with the guarantee and the recommendation is that the pump be accepted
2. Pump Efficiency is calculated from motor type test efficiency points
3. Uncertainty of overall efficiency measurement (AS2417:2001 s6.2.5):
4. Shut off head test is optional and not part of AS2417.

Report Ref: 30-08-04\_212762\_177802.xls

INWARD	OUTWARD
✓	353 ±1.38 %
KC	JRG
	BC
02-08-04	10/12/2014

Signed


  
30-08-04

Page 1

sent By: Grundfos Pumps Pty Ltd  
 to: J & P Richardson  
 At: 0732713623

+61 7 32788735;

2-Sep-04

1:53PM;

Page 1

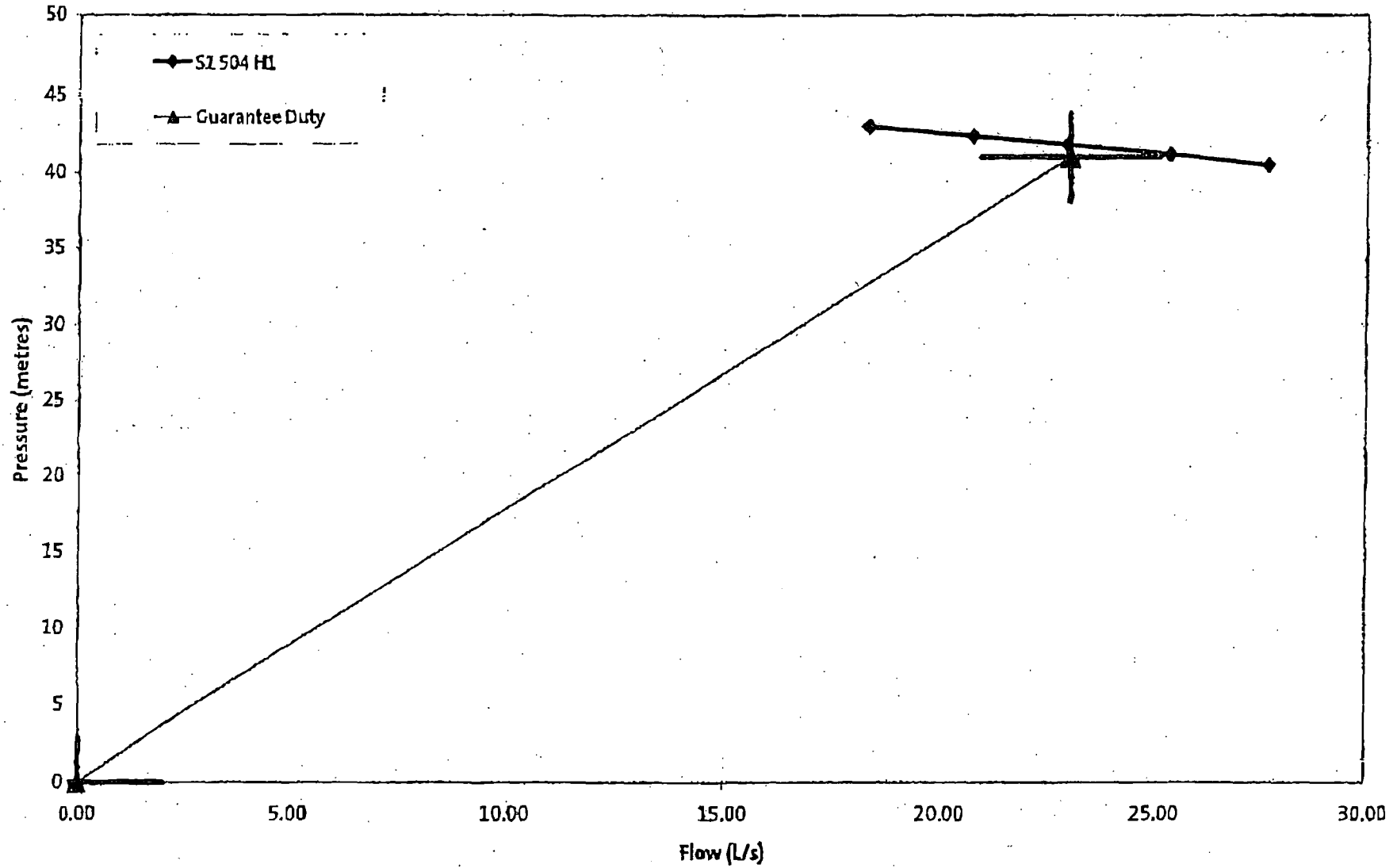
003/003

J & P RICHARDSON

02/12 '04 13:09 FAX 07 32713623



# Pump Performance - A52417:2001 Grade 2 Annex A



Report Ref: 30-08-04\_212762\_177805.xls

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ent By: Grundfos Pumps Pty Ltd;

+61 7 32738735;

2-Sep-04 1:54PM;

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[illegible]





## 2.0 TEST SHEETS

JPR Ref:- (A19695.001)

Revision 0

March 26, 1999



23/08/99

13:28

ITT FLYGT → FLYGT QLD

NO.758

D03

**FLYGT****TEST REPORT**TEST NO 4937  
REVISION A**PRODUCT**

Serial No. 3170.180	9880020	Performance curve No. 53- 461-00-0050	Motor module/type 138	Voltage (V) 415
Base module 050	Impeller No. 384 26 01	Gear type	Gear ratio	Imp.diam/Blade angle Water temp °C 16

**TEST RESULTS**

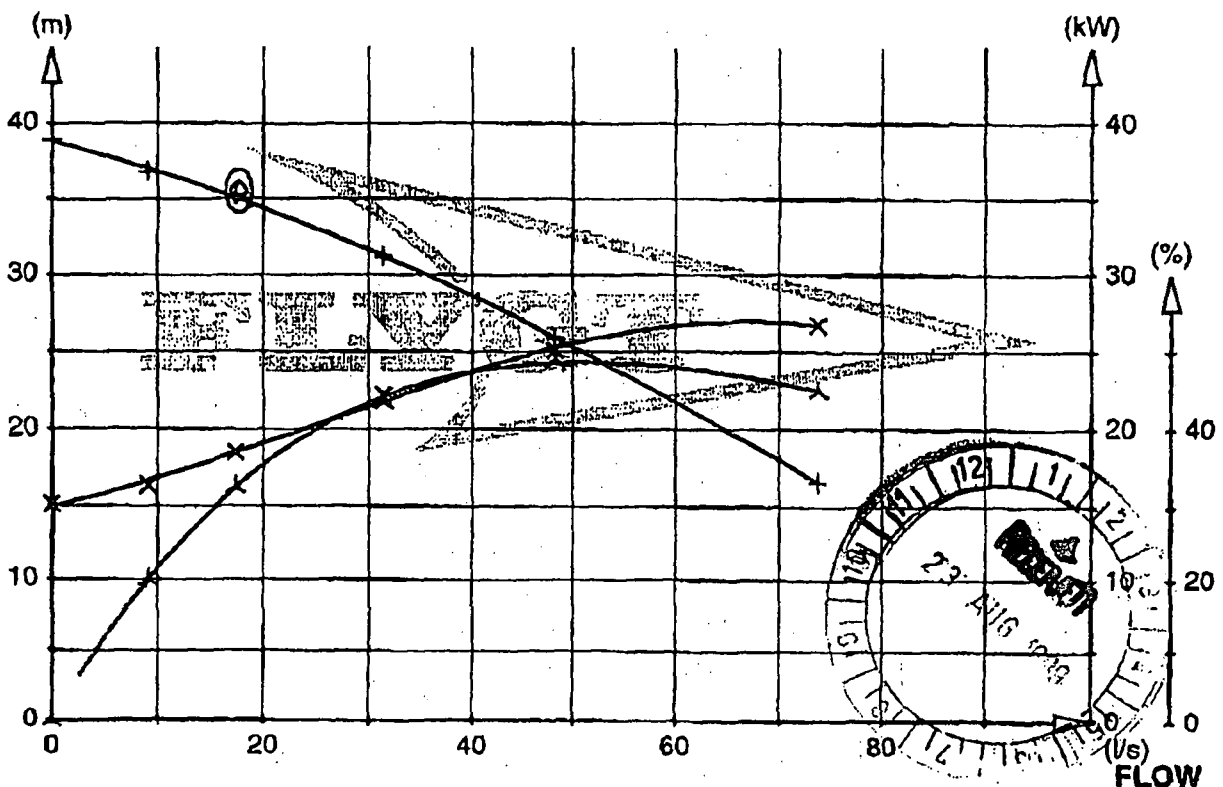
Pump total head H (m)	Volume rate of flow Q (l/s)	Motor input power P (kW)	Voltage U (V)	Current I (A)	Overall efficiency $\eta$ (%)
38.86	0.0	15.09	418	25.8	0.00
36.78	9.1	16.32	418	27.5	20.06
35.20	17.4	18.45	417	30.1	32.56
31.24	31.4	22.13	417	35.0	43.52
25.86	48.3	25.06	418	38.9	48.88
16.56	73.8	26.71	417	41.4	44.89

**BRISBANE CITY COUNCIL**  
**MACQUARIE PARK ESTATE PUMP STATION**

Accepted after ISO2548C	Test facility FAUS Australia	Test date 1 99-08-19	Time 12:48	Chief tester RAY <i>RAY</i>
----------------------------	------------------------------------	-------------------------	---------------	-----------------------------------

J &amp; P RICHARDSON INDUSTRIES

**PLOTTED TEST RESULTS** Measured point: + = Q/H    Duty point:  $\diamond$  = Q/H  
X = Q/P     $\square$  = Q/P    Calculated point:  $\lambda$  = Q/ETA overall  
 $\Delta$  = Q/ETA overall    4

**TOTAL HEAD****INPUT POWER**

23- 8-99;14:50 ;ITT Industries

JP RICHARDSONS

; 61 7 3849 7633

# 3/ 4

23/08/99

13:28

ITT FLYGT → FLYGT QLD

NO.758

D02

FLYGT

## TEST REPORT

TEST NO 4938  
REVISION A

## PRODUCT

Serial No. 3170.180	9880022	Performance curve No. 53- 461-00-0050	Motor module/type 138	Voltage (V) 415
Base module 050	Impeller No. 384 26 01	Gear type	Gear ratio	Imp.diam/Blade angle Water temp °C 16

## TEST RESULTS

Pump total head H (m)	Volume rate of flow Q (l/s)	Motor input power P (kW)	Voltage U (V)	Current I (A)	Overall efficiency $\eta$ (%)
39.59	0.0	14.87	419	25.7	0.00
36.61	11.3	17.17	419	28.4	23.56
34.95	17.7	18.78	419	30.6	32.40
33.07	25.0	20.79	419	33.2	39.39
26.38	46.7	24.94	419	38.9	48.41
16.65	73.6	26.97	419	41.7	44.54

BRISBANE CITY COUNCIL  
MACQUARIE PARK PUMP STATION

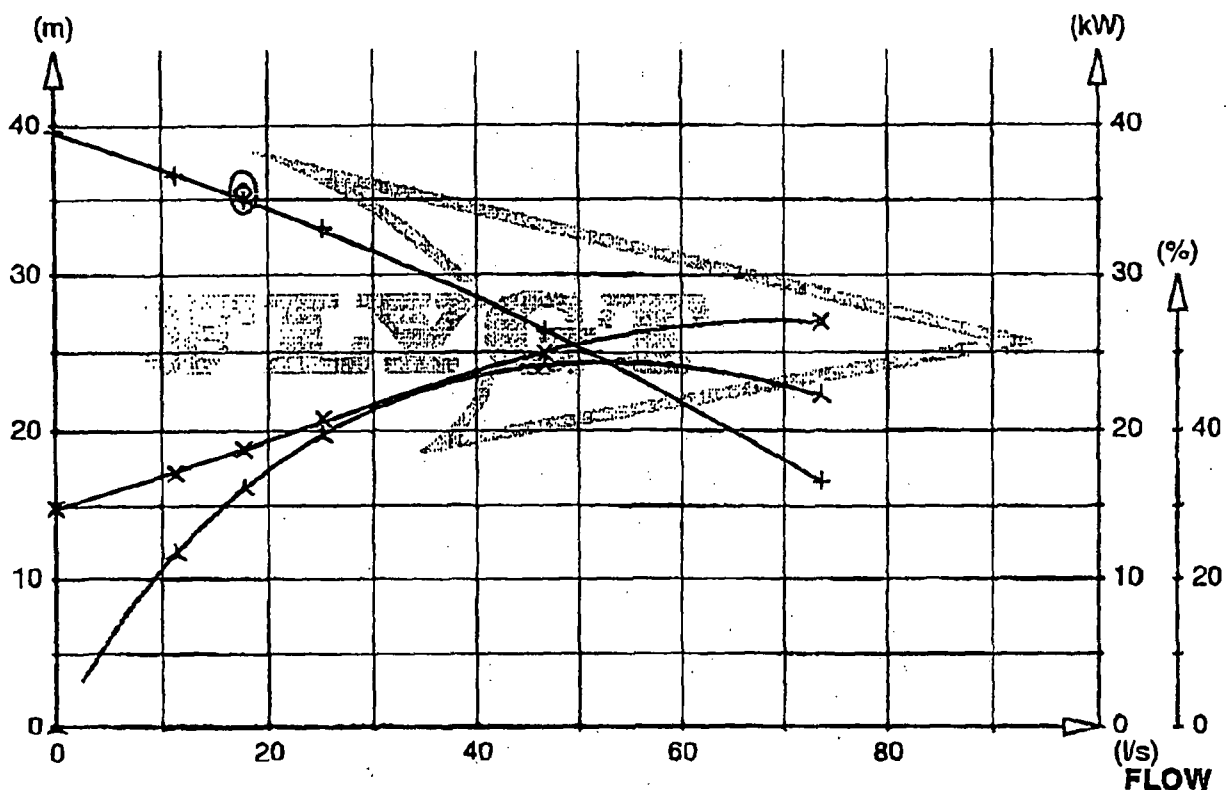
Accepted after ISO2548C	Test facility FAUS Australia	Test date 1	Time 99-08-19 12:11	Chief tester RAY <i>Ray</i>
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J &amp; P RICHARDSON INDUSTRIES

**PLOTTED TEST RESULTS** Measured point:  $\pm$  = Q/H Duty point:  $\diamond$  = Q/H  $\square$  = Q/P  $\Delta$  = Q/ETA overall  
X = Q/P

TOTAL HEAD

INPUT POWER



23/08/99

13:28

ITT FLYGT → FLYGT GLD

NO. 758

001

# BRISBANE CITY COUNCIL

## ITT MACQUARIE

### PARK PUMP STATION.

#### ADDITIONAL TEST REPORT

ITT Flygt Limited

A.C.N. 000 832 822

Unit 31 Slough Estate

Halker Street Silverwater 2128

P.O. Box 6767, Silverwater 2128

Phone (02) 207 0600

Fax (02) 648 4701

PUMP TYPE: 3170-180	DATE: 20-8-99	CUSTOMER: J.P. Richardson
CONTRACT No.:	PROJECT:	ORDER No.: P0463
TESTING OFFICER: <i>R. Egan</i>	WITNESS 1:	WITNESS 2:
PUMP 1 SERIAL No.: 9880022	TEST No.: 4938	REVISION: A
INSULATION: 7000 @ 1000 Volt	WATER IN OIL: OK	RESISTANCE TEST: 6.2
PUMP 2 SERIAL No.: 9880020	TEST No.: 4937	REVISION:
INSULATION: 7000 @ 1000 Volt.	WATER IN OIL: OK	RESISTANCE TEST: 6.2
PUMP 3 SERIAL No.:	TEST No.:	REVISION:
INSULATION:	WATER IN OIL:	RESISTANCE TEST:
PUMP 4 SERIAL No.:	TEST No.:	REVISION:
INSULATION:	WATER IN OIL:	RESISTANCE TEST:
PUMP 5 SERIAL No.:	TEST No.:	REVISION:
INSULATION:	WATER IN OIL:	RESISTANCE TEST:



Head Office in Sydney.

Branches in Adelaide, Brisbane, Melbourne, Mackay, Mt Isa and Perth.

## 2.1 PLATYPUS LEVEL TRANSMITTERS

JPR Ref:- (A19695.001)

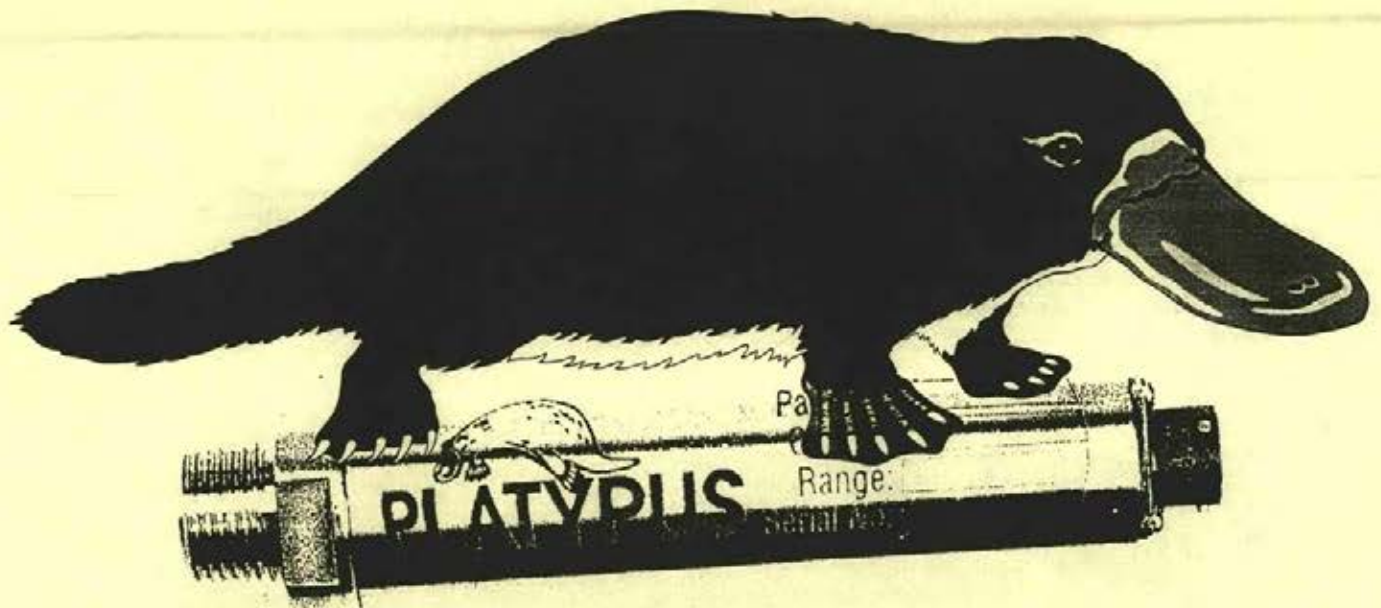
Revision 0

March 26, 1999



# **PLATYPUS**

## **LEVEL TRANSMITTER**



# **OWNERS MANUAL**

SG4-6-8/98-8



## WARRANTY

All goods which are The Company's own or The Company's principals manufacture are guaranteed against faulty workmanship, materials or design for a period of twelve (12) months from the date of dispatch after which all liability on the part of The Company ceases. The Company's liability for any loss, injury or damage attributable thereto shall be limited to making good by replacement or repair of any defect which appears therein under proper use provided that The Company is permitted to inspect the defect before replacement, the defective parts being returned free into The Company's store. Any unauthorised repairs or alterations to the equipment shall invalidate this warranty. In the case of goods not of the manufacture of The Company or its principals, The Company undertakes that it will, if requested in writing by the purchaser, make all reasonable endeavour in assisting the purchaser to obtain from the manufacturer the benefit of any guarantee or warranty which the manufacturer may have expressly given as to the quality or fitness for any purpose of the goods, except as may otherwise be provided for by law. The fulfilment of this undertaking shall constitute The Company's sole liability in respect of any faulty goods not of the manufacture of The Company or its principals. The Company shall not be liable for any loss of profits or any other consequential loss or damage suffered by the purchaser in consequence of any defect in materials or workmanship of the goods (whether of the manufacture of The Company or its principals or other-wise) or the failure of the goods to perform in accordance with any performance figure stated.

This warranty on instruments manufactured and/or sold by Electro Chemical Engineering, or any service provided by us, is expressly in lieu of all other warranties expressed or implied. No warranty is made of merchantability or fitness for any particular purpose. Where manufacturers warranty, as specified in the literature, exceeds the stated warranty, the manufacturers warranty can be claimed by return to the manufacturer at the buyers expense. No agent is authorised to assume any liability for it or to make any written or oral warranties or obligations beyond those set forth herein, unless endorsed, in writing, and signed by an officer of Electro Chemical Engineering Pty.Limited.

This warranty does not exclude any condition or warranty implied by the Trade Practices Act 1974 or separate State Laws and is in addition to any other right that the original purchaser or any subsequent purchasers may have at law.

This warranty shall be rendered null and void when, in the judgement of qualified Electro Chemical Engineering personnel, the equipment has been subjected to abnormal or abusive use or lack of proper care or maintenance by the buyer, or when it has been determined that environmental conditions have exceeded those specified by the manufacturer.\*

## SPECIAL CONDITIONS

\*Electrochemical sensors eg.. pH electrodes will be 100% tested before dispatch and will only subsequently, be replaced if they contain visible physical defects. or statistical life data is supplied with full details of the application,

\*A pressure transducer will be replaced only if it is clearly shown to fail due to a defect of manufacture. No warranty will be applicable to units subject to overpressure demonstrated by open circuit bridge, plastic deformation of the sensor or excessive zero shift.

### Head Office:

ECEFast - 2 Thomas Street Hawthorn Victoria 3122

Ph: (03) 9819 2222 Fax: (03) 9819 2538

### Sydney:

ECEFast - 90 Calder Road Rydalmere New South Wales 2116

Ph: (02) 9684 2499 Fax (02) 9684 2118

### Brisbane:

ECEFast - 170 Hyde Road Yeronga Queensland 4104

Ph: (07) 3848 3833 Fax: (07) 3848 3498

SG4-6-8/98-8

Page 2



*everything in control*



# Installation

## Mechanical Considerations

The PLATYPUS uses a gauge (referenced to atmospheric pressure) type sensor. This requires that the cable end be terminated so that it is open to the atmosphere but protected from moisture ingress. All the PLATYPUS cabling options (including the Standard Nylon Tubing, 6 core vented cable and Military Plug) provide this atmospheric reference for the sensor. When the unit is installed in locations such as pumping stations or tanks inside buildings this is generally easy to achieve. For installations in exposed locations such as reservoirs and locations where there is a high ambient humidity we recommend terminating the cable in a enclosure such as the PL-TERM-SG/TX-E. This provides a entry cable gland for the PLATYPUS cable and another gland for system cabling to exit. There is also a vent that allows atmospheric reference to be maintained but controls water ingress, together with silica gel desiccant inside the enclosure to absorb any moisture that does penetrate.

The standard nylon tubing type cable that is supplied with the PLATYPUS comes with a stainless steel support wire that should be used to mechanically support the PLATYPUS in position. Where cable length is under 5m and the PLATYPUS is not mounted in a position where it is subject to turbulence it is permissible to dispense with the support wire and support the PLATYPUS using the nylon tubing. **UNDER NO CIRCUMSTANCES SHOULD THE INSTRUMENT CABLE DRAWN THROUGH THE TUBING, OR THE 6 CORE VENTED CABLE BE USED TO SUPPORT THE UNIT!**

Manifold mounted units should be protected from pressure spikes such as water hammers, and from freezing of the liquid in the pipe (both these events will damage the diaphragm of the sensor). Another point to note is that any air trapped on installation should be bled off.

The diaphragm of the sensor is extremely delicate and should not be pressed with any object (fingers and screwdrivers included) as these will cause permanent damage to the sensor. We have found that a large proportion of PLATYPUS sensors sent for repair have no faults other than a dented diaphragm suffered during a "test". For trouble shooting procedures please refer to that section of this manual. A pressure spike that can damage the sensor can also be generated by dropping the sensor into a tank or reservoir, the sensor should be lowered into position.

All the components of the PLATYPUS body are constructed of 316 stainless steel and are highly resistant to corrosion. High concentrations of chlorine can cause corrosion of stainless steel so care must also be taken in not locating the unit close to chlorine dosing points.

## Electrical Considerations:

The PLATYPUS uses a strain gauge type pressure sensor that is supplied either with 4 wire strain gauge output or fitted with a internal 4-20mA loop powered transmitter, the PLATYPUS-TX.

### 4 Wire Output (PLATYPUS, PLATYPUS-LP)

The 4 wire strain gauge output version can be used with either an external strain gauge transmitter such as the PL-TX-DIN which provides a loop powered 4-20mA output, or with a strain gauge input indicator/alarm unit such as the PL-IND-7A or GF-2300A-3A. The PLATYPUS-LP Lightning Protected strain gauge version has the LP pcb fitted inside the housing and this is transparent to any transmitter or indicator. Internal lightning protection is only available with the strain gauge version of the PLATYPUS.

These units are supplied calibrated with their transmitter or indicator but the calibration can be altered in the field if required. (see field calibration with PL-TX-DIN page 5)

Units that are to be installed in lightning prone areas should also have some form of surge protection on the 4-20mA loop. The PL-TX-DIN transmitter includes a loop surge protector but if this transmitter is not used then a device such as the PLATYPUS-ELP should be used. On long cable runs loop surge protection should be used on both ends of the loop.



### Internal 4-20mA Transmitter (PLATYPUS-TX)

The PLATYPUS-TX has a 4-20mA loop powered transmitter fitted internally. It is recommended for sensors where the cable length exceeds 20m or where using an external transmitter is unsuitable. This output interfaces directly with telemetry and process control systems. Indicator/Alarm units such as the GF-201-2A can power and monitor the output of the sensor without the need for a separate DC power supply.

The calibration depth must be specified at the time of order and this cannot be changed in the field. If the calibration needs to be changed the unit must be returned to ECEFast where it can be done for a small fee.

If the unit is to be installed in a lightning prone area loop surge protection should be installed as described above, as close as practical to the sensor.

The internal transmitter is reverse polarity protected.

## Quick Installation Guide

### Mechanical:

- Terminate cable in a suitable enclosure such as the PL-TERM-SG/TX-E, open to atmosphere but protected from water ingress.
- For submersible versions use stainless steel support wire to hold sensor.
- If manifold mounting protect against pressure spikes (eg water hammer) and water freezing in pipes.
- DON'T TOUCH DIAPHRAGM!
- Lower the PLATYPUS into position, DO NOT DROP IN.
- Do not mount next to chlorine dosing points.

### Electrical:

- See wiring diagrams for electrical connections.
- The cable should be located away from any power wiring or electrically noisy areas.
- The cable shielding should be connected to a good earth.
- Sites prone to lightning strikes should use the lightning protected sensors and a surge protector at each end of the 4-20mA loop to the transmitter such as the PLATYPUS-ELP. The PL-TX-DIN includes a integral 4-20mA surge protector that requires the male spade connector on the side of the unit to be connected to a good earth.
- Check the output of the sensor (if TX version) or transmitter (if SG or LP version) immediately after installation.

## Configuration Description Build Number:

All PLATYPUS sensors have a build number engraved in the body that describes the physical and electrical configuration of the unit.

**PL-2XXXXX-XX-XX**

**SG** Strain Gauge Output

**LP** Internal Lightning Protected Strain Gauge

**TX** Internal 4-20mA transmitter

**SCW** Standard Cable (Nylon tube) with SS support wire

**PF** Pipe mount with flying lead

**PM** Pipe mount with Military Plug

**-XX** Cable Length in metres

**-XX** Calibration depth in m Water Gauge



# Field Calibration (PL-SG and PL-LP) with PL-TX-DIN Transmitter

## 1. Setting The Dip Switches On The PL-TX-DIN For Gross Range Change Selection

The output of the pressure sensor used in the PLATYPUS is nominally 100mV for full scale output.

The full scales ranges of the sensors used are:

- 1 bar (10m WG) for sensors up to 10m WG
- 2 bar (20m WG) for sensors between 10m-20m WG
- 7 bar (70m WG) for sensors between 20m-70m WG

To calculate the mV output of a sensor at a specific depth:

$$\text{mV Output} = 100\text{mV} \times (\text{Depth}) / (\text{Full Scale Depth of sensor})$$

Then simply select the range DIP switch on the PL-TX-DIN that this output falls into.

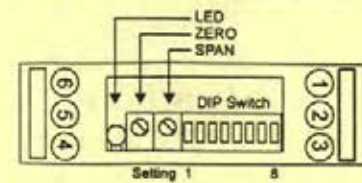
E.g.: A PLATYPUS sensor was supplied by ECEFast with a PL-TX-DIN calibrated to 8m WG. It is now desired to use the unit in a water tank with a max. 4m depth.

The unit was originally scaled to under 10m WG so has a 1 bar sensor installed so the Full Scale Depth of the sensor is 10m.

$$\text{The mV output at 4m} = 100\text{mV} \times (4\text{m}) / (10\text{m}) = 40\text{ mV}$$

This falls into the range covered by DIP switch No:6 on the PL-TX-DIN. Set this switch to the ON position, all other switches OFF.

Configuration (Remove front Cover)



Setting	Span Range
1	5.0...6.5mV
2	6.0...10.5mV
3	10.0...16.0mV
4	15.0...22.0mV
5	21.0...30.0mV
6	29.0...53.0mV
7	52.0...86.0mV
8	85.0...150.0mV

## 2. Adjusting the Zero and Span Pots on the PL-TX-DIN

Connect the Sensor to the PL-TX-DIN transmitter and put a mA meter in series with the output.

With the sensor out of the tank adjust the Zero pot so that the output of the PL-TX-DIN is 4mA.

Lower the sensor into the tank to a known depth and adjust the span so that the output is the correct proportion of the full scale range required.

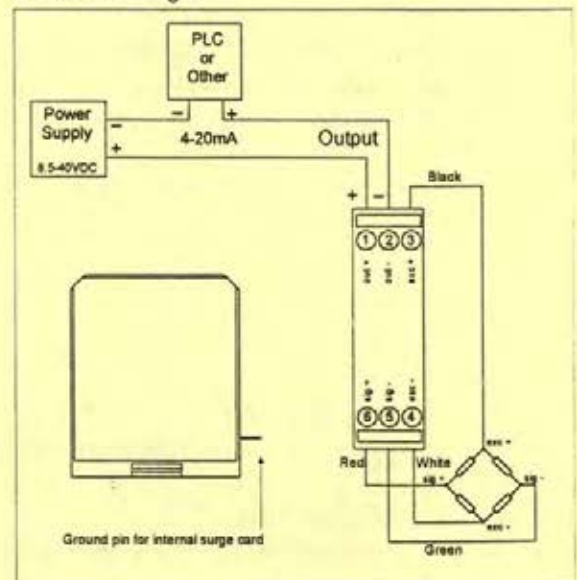
$$\text{mA Output} = 4\text{mA} + (\text{Known Depth}) / (\text{max Depth}) \times 16$$

E.g. The PLATYPUS sensor is lowered gently to a known depth of 3m and the max depth is 4m

$$\text{MA Output} = 4\text{mA} + (3\text{m}/4\text{m}) \times 16 = 16\text{mA}$$

The zero and span adjustment can be repeated if required.

Connection Diagram



## Trouble Shooting

At the first sign of a problem with a PLATYPUS sensor it should be removed from service immediately. Leaving it connected and submerged will inevitably increase the cost of the repair.

1) By far the most common cause of sensor failure is moisture down the cable. A simple test for this is to measure the resistance between any of the output wires and the body of the PLATYPUS with a multi meter (Using a Megger WILL damage the sensor) this should be greater than 20M ohms. If the resistance is less than this then it is certain that there has been moisture penetration down the cable. The unit will need to be returned to ECEFast with its transmitter (if a strain gauge version) for repair.

2) For strain gauge versions the bridge resistance can also be measured. Remove the 4 wires from the transmitter (or indicator) and measure the resistance between the Black and White wires (excitation side of bridge), this should be about 3-4k Ohms. Now measure the resistance between the Red and Green wires (output side of bridge), this should be about 5k Ohms. These readings vary from sensor to sensor but use these values as a guide.



3) If the above readings proved to be OK then it is almost certain that the sensor is in working order and the problem lies elsewhere. Things to check are:

- All connections to transmitter.
- Power supply
- Measure current flowing in 4-20mA loop. This should be 4mA with the sensor connected but not installed.

The tests and checks above will enable you to identify the component at fault. If the PLATYPUS or its transmitter need to be returned to ECEFast for repair the matching sensor + transmitter pair should be returned together where possible.

## Specifications

### PLATYPUS-LP Internal Lightning Protection

- Sensing element : Strain gauge type pressure sensor.
- Ranges Available 1, 2, 7, 17 bar
- Accuracy 0.2% FSO
- FSO at 1mA excitation 100mV (min 70, max 130)
- Over-pressure 2 X sensor rating
- Non-sacrificial multistage lightning protection tested to IEC 1000-4-5
- Housing dimensions 32mmØ X 140mm
- Housing and diaphragm material 316 SS
- O-Ring material Nitrile (Viton available on request)
- Process connection 1/2" BSP, cable connection 1/4" BSP or Bendix 6 pin socket
- Maximum immersion depth 100m water

### PLATYPUS-TX Internal Transmitter

- Supply Voltage 10-40VDC
- Output 4-20mA loop powered
- Input range 4mV-115mV
- Gross range changes link selectable. Zero and Span pots 20% adjustment.
- Accuracy 0.2% FSO
- Operating temperature range 0-70 °C

### PL-TX-DIN External Transmitter

- Supply Voltage 8.5-40VDC
- Output 4-20mA loop powered with integral surge protection tested to AS1768 Category B
- Accuracy <0.3% FSO
- Operating temperature range 0-70 °C
- Input range 5-150mV dip switch selectable

### Standard Cable

- 4 core instrument wire drawn down 8mmØ rigid nylon tube with SS support wire. 10m long.

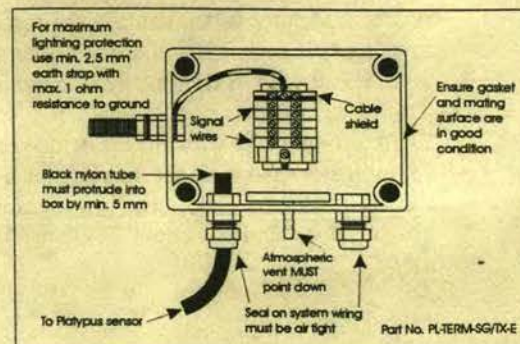
### Cable Options

- Rigid nylon tube with/without support wire to max length of 50m
- 6 core polypropylene vented cable with/without support wire to max length of 500m.
- Non immersible PVC cable used in pipe mount.
- Bendix 6 pin military plug.

## Standard Vented Terminal Box – Part No. PL-TERM-SG/TX-E

- IP65 enclosure
- Fitted cable glands
- Atmospheric reference
- DIN rail terminals
- Contains desiccant to protect sensor

This robust terminal box is designed to match the Platypus range of sensors and fulfills the function of protecting the top of the cable from water entry and providing convenient termination of the cables, as well as venting the sensor to atmosphere effectively.





# Platypus Level Sensor Ordering Code

MODEL				RANGE CODE		CABLE CODE	
P	L	A	T	Y	P	U	S
MODEL				RANGE CODE		CABLE CODE	
4 wire basic sensor	PLATYPUS			1-10 metres WG	1	Standard - nylon tube + stainless steel support wire	S
				8-20 metres WG	2		
4 wire with internal lightning protection	PLATYPUSLP			18-70 metres WG	3	Nylon tube - no support wire	N
				50-170 metres WG	4		
2 wire loop powered with internal 4 - 20 mA transmitter	PLATYPUSTX					6 core + stainless steel support wire	6S
						6 core without stainless steel support wire	6N
2 wire loop powered 4 - 20 mA transmitter plug version (no cable)	PLATYPUSTXP						



e.g. An internal TX version with 2 Bar sensor & nylon tube with support wire would be PLATYPUSTX-2-S

**Note:** Exact calibration range must be specified in metres WG

## Cable Considerations

A 10M cable is included on all models except TXP whether nylon tube or vented 6 core cable is chosen. Only order extra lengths above 10M.

### NYLON TUBE

Additional lengths above 10M can be supplied up to a maximum length of 50M, in 5M increments, using P/N PL-CABLE-05. Add /S if support wire is required. e.g. for 30M cable with SS support wire order Platypus + 4 of PL-CABLE-05/S. (PL-CABLE-05 = 1 X 5 M increment)

### VENTED 6 CORE

If a Platypus is ordered with this cable, there is no maximum length. Cable is available in 1m increments. For additional lengths above 10M use P/N TW-CU24F-PV6L add /S if support wire is required.

## Interface Devices

**PL-TX-DIN** 2 wire DIN rail mount transmitter with loop power & lightning protection

**PL-TX-LON** LON network module. Up to 64 points over 2000M. TX version only

**PL-TX-FIELD** Weather proof ready to mount transmitter. 4 wire version only.

**GF-2300A-3A** Panel mounting indicator with 3 alarms. 2 and 4 wire.

**PL-INDA-7AL**

**GF-2308-2A**

**PLATYPUS-ELP**

**PL-TERM-SG/TX-E**

Panel mounting indicator. 7 alarms. 4 wire only.

8 channel panel mounting indicator. 2 wire only.

DIN rail loop lightning protection. 2 wire only.

Vented terminal box. 2 and 4 wire.



ECEFast

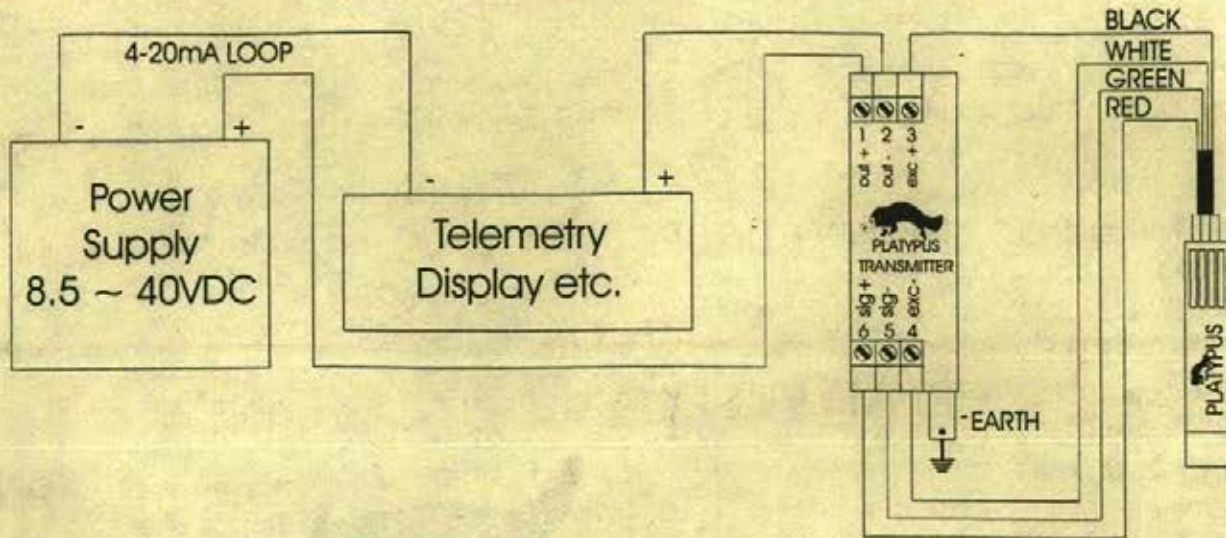
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Page 7

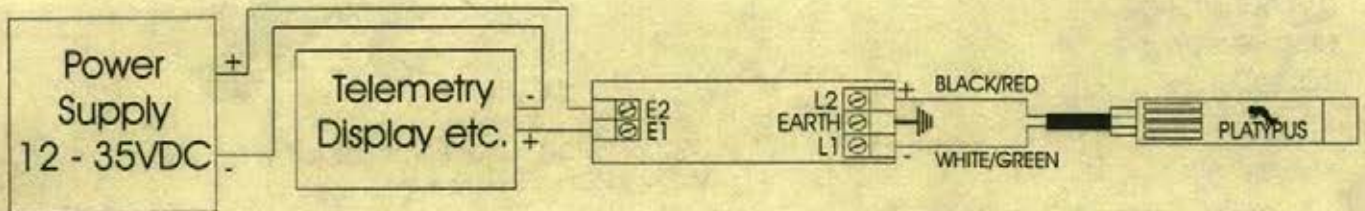


# Platypus Connection Details

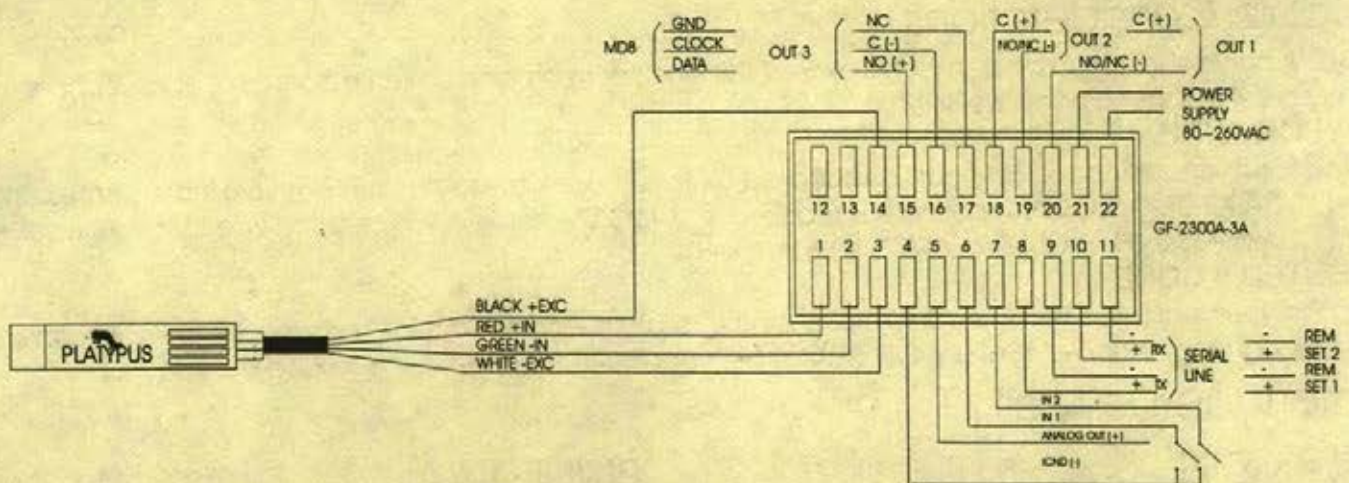
## 4 wire sensor with remote transmitter (PL-TX-DIN)



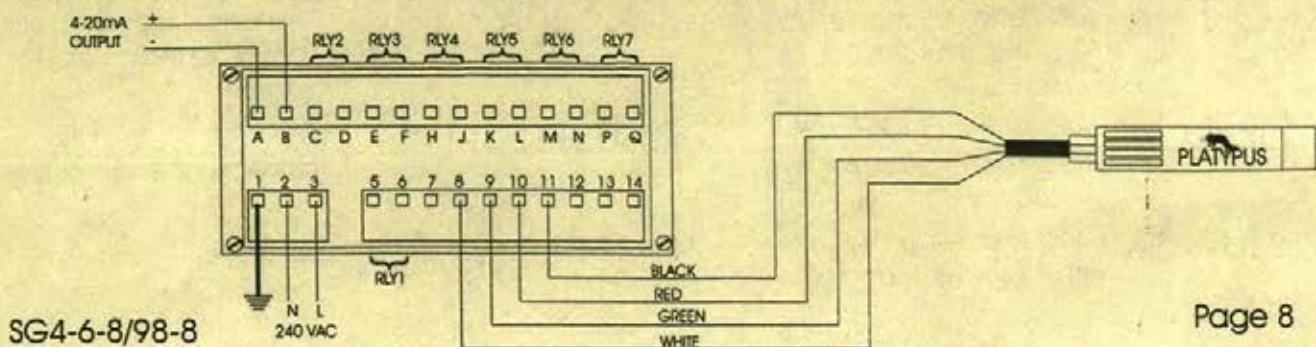
## 2 wire transmitter with remote DIN lightning loop protector (PLATYPUS-ELP)



## 4 wire sensor and panel meter with 32 point linearisation (GF-2300A-3A)






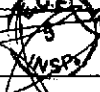




## 4 wire sensor with 7 alarm panelmeter (PL-IND-7AL)



## PLATYPUS QUALITY CHECK LIST





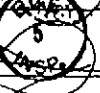

Date 1/9/98 Part Number PLATYPUS-3-5  
 Sensor Serial Number 737-0612 Works Order 11368A  
 Transmitter Serial Number        (if applicable)

Stage	Case Isolation 20 megohm	Overall visual + Gland tension	Calibration to ..... m W.G.	24 hour immers ion under power
Completed				
Approved				

F80-2-2/97-1

## PLATYPUS QUALITY CHECK LIST

Date 2/12/98 Part Number PL-2SGSCW-10-?  
 Sensor Serial Number        Works Order 12567A  
 Transmitter Serial Number        (if applicable)

Stage	Case Isolation 20 megohm	Overall visual + Gland tension	Calibration to ..... m W.G.	24 hour immers ion under power
Completed				
Approved				

F80-2-2/97-1



## 2.2 VEGA PRESSURE TRANSMITTERS

---

JPR Ref:- (A19695.001)

Revision 0

March 26, 1999



# Prüfzertifikat



## für Druckmeßumformer

Test certificate for pressure transmitters



VEGA bestätigt, daß die zu Qualitätsprüfungen des Erzeugnisses eingesetzten Meßmittel gültig kalibriert und auf nationale Standards rückführbar sind.

VEGA confirms, that all instruments used to assure the quality of our products are calibrated and traceable to national standards

VEGA Grieshaber KG, Am Hohenstein 113, 77761 Schiltach, Tel. 0 78 36/50-0, Fax. 0 78 36/50 201

<b>Druckmeßumformer / Pressure transmitter:</b>	D77	<b>Kundennummer / Customer ID</b>	44741
<b>Meßbereich / Measuring range:</b>	0 bis/to 1,0 bar rel.	<b>Auftragsnummer / Order number</b>	831519
<b>Seriennummer / Series no.:</b>	11134667	<b>Auftragsposition / Order position</b>	1
<b>Zulassungen / Approvals:</b>	OHNE		

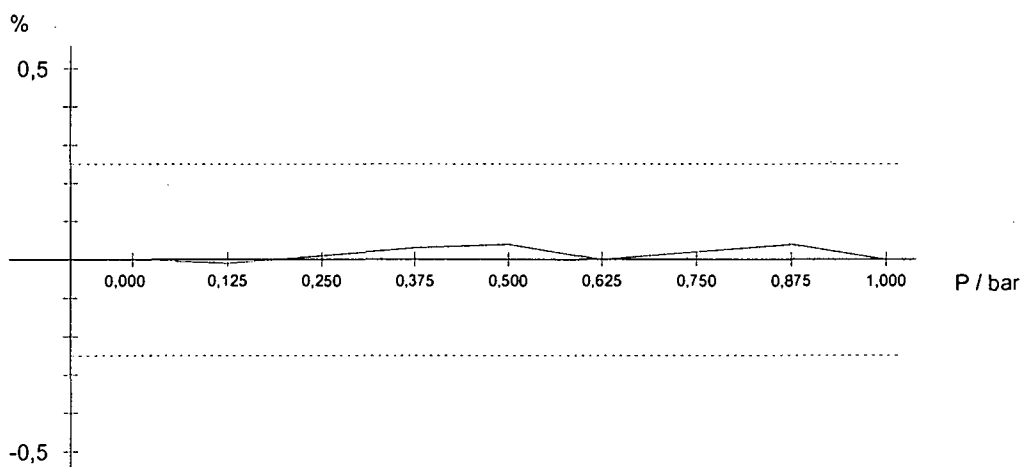
<b>Kennwerte / Characteristics:</b>	0,000 bis/to 1,000 bar rel.
	4,000 bis/to 19,992 mA

### Kennliniencharakteristik / Output characteristics:

max. zul. Abweichung bezogen auf Meßbereich: < 0,25 %

/ Dev. in linearity rel. to measuring range

<b>Ref.-Druck / Ref. pressure [bar]:</b>	0,000	0,125	0,250	0,375	0,500	0,625	0,750	0,875	1,000
<b>Soll-Ausgang / Ideal output [mA]:</b>	4,000	6,004	8,003	10,002	12,001	13,999	15,998	17,997	19,992
<b>Ist-Ausgang / Real output [mA]:</b>	4,000	6,002	8,004	10,006	12,008	14,000	16,001	18,003	19,992
<b>Abweichung / Accuracy [%]:</b>	0,00	-0,01	0,01	0,03	0,04	0,00	0,02	0,04	0,00



### Temperatureinfluß / Temperature influence:

Temperaturfehler bei 0 bar rel.

/ Temperature accuracy at 0 bar rel.

Bezogen auf den Meßbereich / Related to the measuring range

Bezugstemperatur 20 °C / Ref. temperature 20 °C

<b>Temperatur [°C] / Temperature</b>	0	20	40	60	80
<b>Ist-Ausgang [mA] / Real output</b>	3,992	4,000	3,996	3,990	3,993
<b>Abweichung [%] / Accuracy</b>	-0,05	0,00	-0,03	-0,07	-0,04

Datum / Date: 08.09.1998

Unterschrift / Signature:

# Prüfzertifikat



## für Druckmeßumformer

Test certificate for pressure transmitters



VEGA bestätigt, daß die zu Qualitätsprüfungen des Erzeugnisses eingesetzten Meßmittel gültig kalibriert und auf nationale Standards rückführbar sind.

VEGA confirms, that all instruments used to assure the quality of our products are calibrated and traceable to national standards

VEGA Grieshaber KG, Am Hohenstein 113, 77761 Schiltach, Tel. 0 78 36/50-0, Fax. 0 78 36/50 201

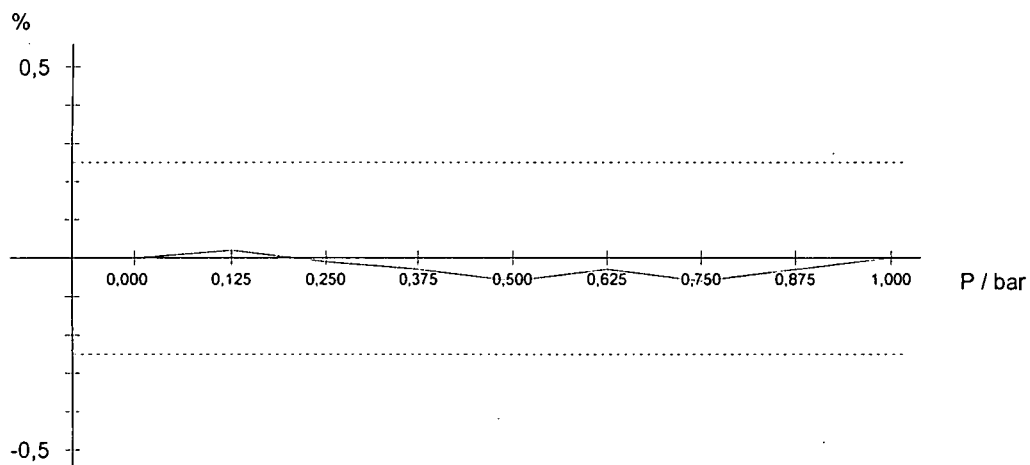
<b>Druckmeßumformer / Pressure transmitter:</b>	D77	<b>Kundennummer / Customer ID</b>	<b>44741</b>
<b>Meßbereich / Measuring range:</b>	0 bis/to 1,0 bar rel.	<b>Auftragsnummer / Order number</b>	<b>831519</b>
<b>Seriennummer / Series no.:</b>	11134699	<b>Auftragsposition / Order position</b>	<b>1</b>
<b>Zulassungen / Approvals:</b>	OHNE		

**Kennwerte / Characteristics:** 0,000 bis/to 1,000 bar rel.  
3,996 bis/to 19,992 mA

### Kennliniencharakteristik / Output characteristics:

**max. zul. Abweichung bezogen auf Meßbereich:** < 0,25 %  
/ Dev. in linearity rel. to measuring range

<b>Ref.-Druck / Ref. pressure [bar]:</b>	0,000	0,125	0,250	0,375	0,500	0,625	0,750	0,875	1,000
<b>Soll-Ausgang / Ideal output [mA]:</b>	3,996	5,999	7,998	9,997	11,996	13,996	15,996	17,995	19,992
<b>Ist-Ausgang / Real output [mA]:</b>	3,996	6,001	7,997	9,992	11,987	13,991	15,986	17,990	19,992
<b>Abweichung / Accuracy [%]:</b>	0,00	0,02	-0,01	-0,03	-0,06	-0,03	-0,06	-0,03	0,00



### Temperatureinfluß / Temperature influence:

**Temperaturfehler bei 0 bar rel.**  
/ Temperature accuracy at 0 bar rel.

**Bezogen auf den Meßbereich / Related to the measuring range**

**Bezugstemperatur 20 °C / Ref. temperature 20 °C**

<b>Temperatur [°C] / Temperature</b>	0	20	40	60	80
<b>Ist-Ausgang [mA] / Real output</b>	3,971	3,996	4,015	3,985	3,974
<b>Abweichung [%] / Accuracy</b>	-0,18	0,00	0,14	-0,08	-0,16

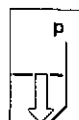
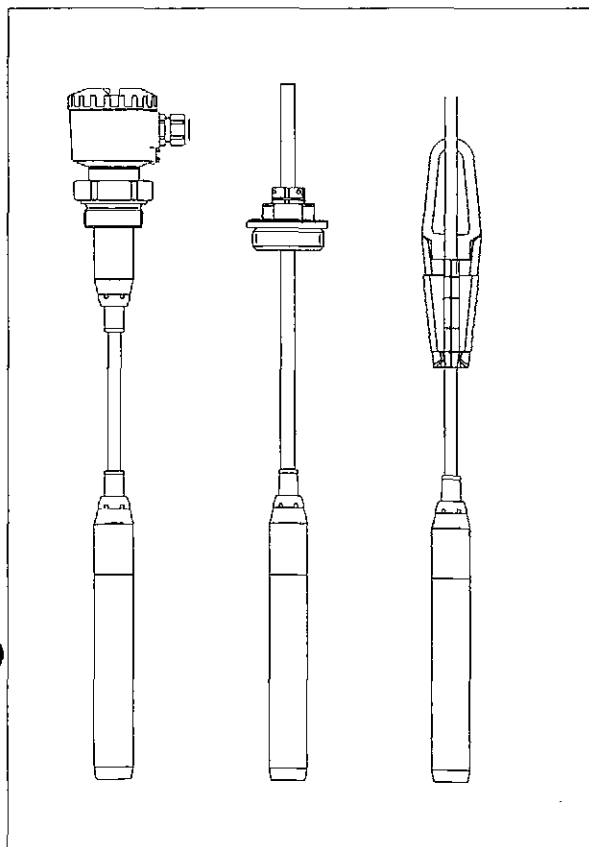
**Datum / Date:** 08.09.1998

**Unterschrift / Signature:**



# Operating Instruction

## Hydrostatic pressure transmitters D76 and D77



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**Safety information**

The described module must only be installed and operated as described in this operating instruction. Please note that other action can cause damage for which VEGA does not take responsibility.



**Contents****4 Electrical connection**

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## 1 Product description

### 1.1 Function and configuration

Pressure transmitters D76 and D77 are efficient, modular instrument series for hydrostatic level measurement. As pressure sensor element, the dry metallic-capacitive or the dry ceramic-capacitive meas. cell CERTEC® is used.

The hydrostatic pressure of the medium effects via a metal or ceramic diaphragm a capacitance change. This capacitance change is detected by an ASIC (Application specific integrated circuit) and converted by the integral oscillator with microcontroller into a pressure proportional signal. The exact, digital meas. data processing with max. resolution ensures excellent technical data.

The sensor is powered by a separate VEGA-signal conditioning instrument (analogue), a stabilized power supply unit or a DCS (active). After the adjustment a standardized 4 ... 20 mA-current signal is available.

To increase the reliability, important electronics components are automatically tested on their function and internal parameters like sensor value, temperature and operating voltage are checked.

The pressure transmitters with ceramic CERTEC®-meas. cell offer the advantage of a continuous selfmonitoring: Meas. and reference capacitance of the meas. cell are in a defined relation over the whole meas. range. Each deviation of these data is a reliable indicator for a failure of the meas. cell. If within these routines, errors or failures are detected, the fault signal is triggered via the 4 ... 20 mA-output (current jump to 3,6 mA or 21,6 mA). If a VEGA-signal conditioning instrument is connected, this instrument goes to failure.

### Output signal

An analogue level or pressure proportional signal current is used as output signal:

- 5 ... 19 mA not standardized (in conjunction with VEGA-signal conditioning instrument)
- 4 ... 20 mA standardized

### Adjustment

The sensors can be provided with and without integral adjustment functions:

- without adjustment (version A, adjustment from the signal conditioning instrument)
- without adjustment (version C)
- with integral adjustment (version D)
- with adjustment from the external indicating instrument (version E)

### 1.2 Types and versions

#### Pressure transmitter D76

Meas. cell: dry, ceramic-capacitive

Diaphragm: ceramic

Series: suspension version with ø 32 mm

Standard application: all kind of level measurement in vessels or basins as well as in water and sewage water applications

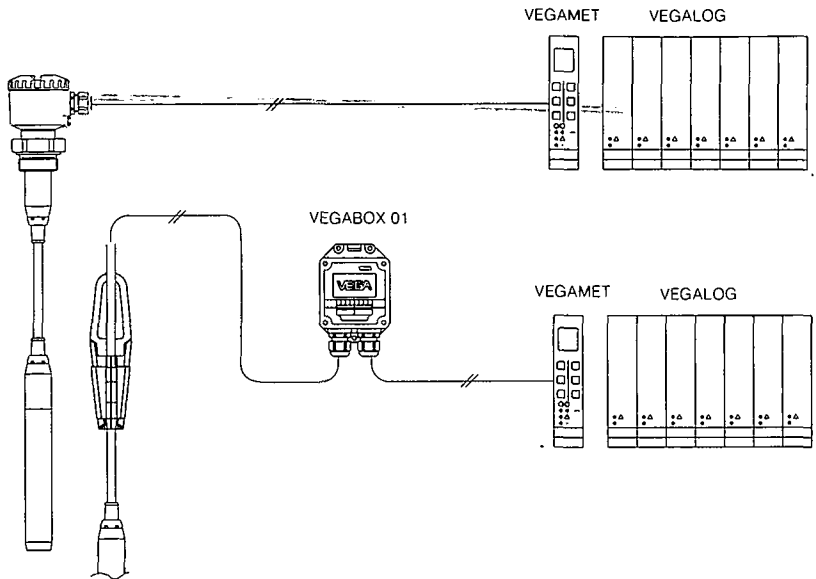
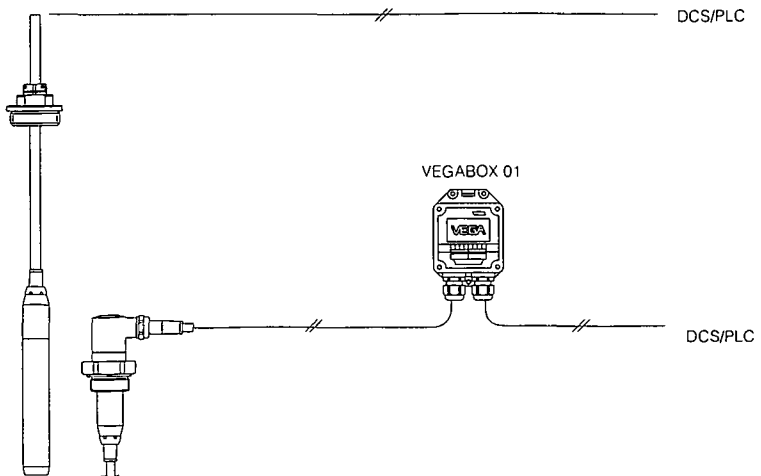
#### Pressure transmitter D77

Meas. cell: dry, metallic-capacitive

Diaphragm: stst (Duratherm 600)

Series: suspension version with ø 32 mm

Standard application: especially economical level measurement for water and sewage water applications

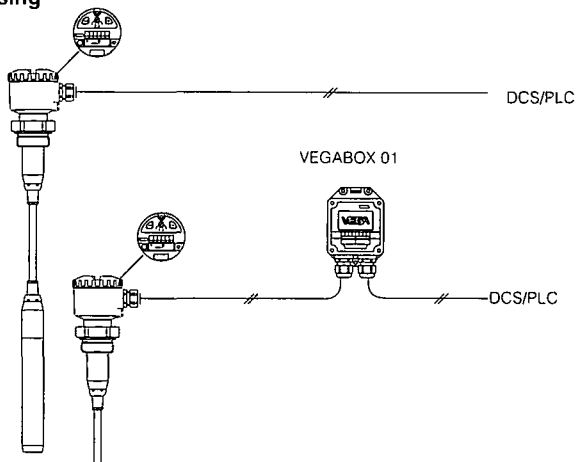
**1.3 Electronics version without adjustment****Electronics version A:****Pressure transmitter for connection to VEGA-signal conditioning instruments****Electronics version C:****Pressure transmitter 4 ... 20 mA**

## 1.4 Electronics version with integral adjustment in connection housing

Electronics version D:

Pressure transmitter 4 ... 20 mA adjustable

Adjustment in connection housing

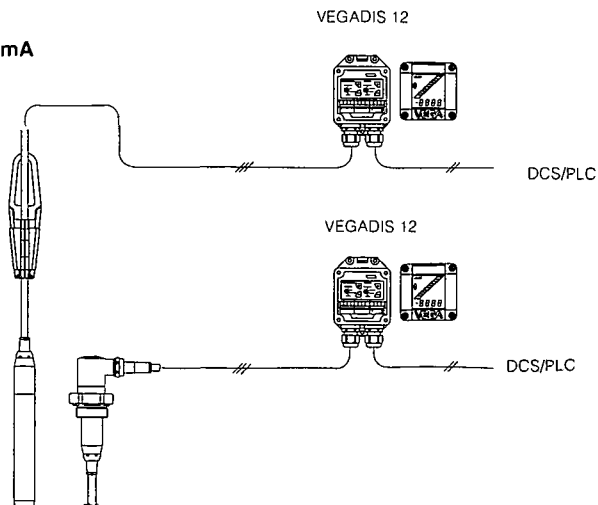


## 1.5 Electronics for connection to VEGADIS 12

Electronics version E:

Pressure transmitter 4 ... 20 mA

Adjustment in VEGADIS 12



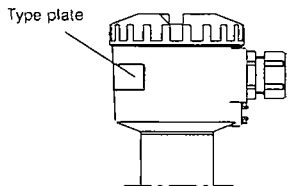
## Product description

## 1.6 Type plate

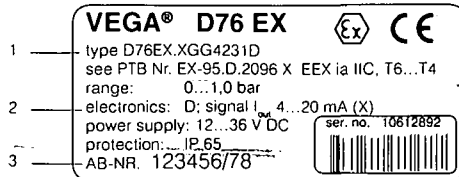
## Type plate

Please check before mounting and electrical connection if you use the suitable instrument. Note the type plate which is located as follows:

### Pressure transmitter with connection housing

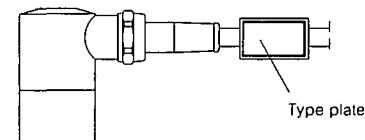


### Configuration of the type plate (example Ex-sensor)



- 1 Master data of the order number
- 2 Data of the electronics
- 3 No. of the order confirmation
- 4 Series number

### Pressure transmitter with direct cable outlet



The type plate contains important data which are required for mounting and connection. The configuration and the parts of the type plate are explained in the following example.

## 2 Technical data

### 2.1 Data

#### Supply and signal circuit (analogue transmission, 4 ... 20 mA)

##### Electronics version A, C and D

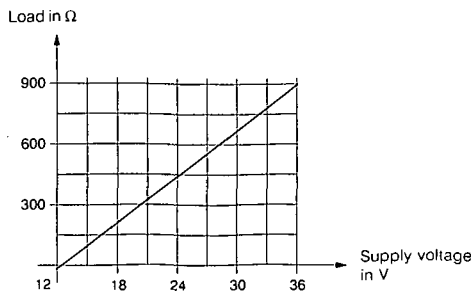
Supply voltage	12 ... 36 V DC
Residual ripple of the supply voltage	no influence at $U_{ss} \leq 1$ V
Output signal	
- terminal insert	analogue transmission (not standardized)
	4 ... 20 mA (factory setting)
- adjustment insert	4 ... 20 mA (adjustable)
Current limitation	approx. 23 mA
Fault signal	> 21,6 mA
Integration time	0 ... 10 s (adjustment time of 10 % ... 90 % of meas. range final value)
Average delay time	150 ms
Connection line	2-wire
Max. permissible load	dependent on the supply voltage see following load diagram

#### Supply and signal circuit (analogue transmission, 4 ... 20 mA),

##### Additional data for electronics version E

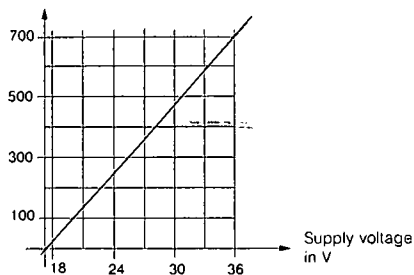
Supply voltage for pressure transmitter in conjunction with VEGADIS 12	
- without indication	12 ... 36 V DC
- with indication	17 ... 36 V DC
Max. input current	150 mA
Range of the current signal	3,5 ... 22 mA
Max. permissible load	dependent on the supply voltage (see load diagram)

Load diagram without indication



## Product description

Load diagram  
in conjunction with VEGADIS 12

Load in  $\Omega$ 

## Integral overvoltage protection (option)

Nominal response DC voltage

- protective diode 40 V
- gas separator 350 V

Nominal discharge current

- gas separator 20 kA

## Meas. ranges

Nominal meas. range	Gauge pressure resistance D76 / D77	Low pressure resistance	Pressure transmitter	
			D76	D77
Gauge pressure				
0 ... 0,1 bar	10 bar / 2,5 bar	-0,1 bar	•	–
0 ... 0,2 bar	15 bar / 5 bar	-0,2 bar	•	–
0 ... 0,4 bar	20 bar / 10 bar	-0,4 bar	•	•
0 ... 1,0 bar	25 bar / 25 bar	-1,0 bar	•	•
0 ... 2,5 bar	35 bar / 25 bar	-1,0 bar	•	•
0 ... 5,0 bar	45 bar / 25 bar	-1,0 bar	•	•
0 ... 10,0 bar	60 bar / 25 bar	-1,0 bar	•	•
0 ... 20,0 bar	90 bar / 25 bar	-1,0 bar	•	•

Zero

-20 % ... +95 % adjustable of nominal range

Span

3,3 % ... 120 % adjustable of nominal range

Turn up

up to +95 %

Turn down

up to 1 : 30

Recommended turn down

 $\leq 1 : 5$ 

Accuracy class

0,25

**Adjustment and indicating elements**

Pressure transmitter	
- terminal insert	without adjustment elements
- adjustment insert	2 keys, 1 rotating switch
VEGADIS 12	
- adjustment insert	2 keys, 1 rotating switch
- adjustment insert (with indication)	2 x 2 keys, 2 rotating switches
- indication	LC-display with
	- bargraph (20 segments)
	- digital value (4-digits)
	- tendency indicator for raising or falling values

**Meas. accuracy (similar to DIN 16 086, DIN V 19 259-1 and IEC 770)****Deviation**

Reference conditions acc. to IEC 770 e.g.	
- temperature	18°C ... 30°C
- humidity	45 % ... 75 %
- air pressure	860 kPa ... 1060 kPa
Determination of characteristics	limit point adjustment acc. to DIN 16 086
Characteristics	linear
Deviation in characteristics <sup>1)</sup>	< 0,25 % with accuracy class 0,25
Hysteresis (repeatability) <sup>1)</sup>	< 0,02 % ceramic meas. cell
	< 0,05 % metal meas. cell

**Influence of the ambient temperature in general**

Average temperature coefficient of the zero signal <sup>1)</sup>	< 0,15 %/10 K with accuracy class 0,25
--	--

**Longterm stability**

Longterm drift of the zero signal <sup>2)</sup>	
- ceramic meas. cell	< 0,1 %/year
- metal meas. cell	< 0,25 %/year
Vibration resistance	mechanical vibrations with 4 g and 5 ... 100 Hz, tested acc. to the regulations of German Lloyd, GL-characteristics 2

**Other influences**

Calibration position	upright, diaphragm points downwards
Influence of the installation position	
- ceramic meas. cell	< 0,2 mbar
- metal meas. cell	< 5,0 mbar

<sup>1)</sup> relating to the nominal meas. range and in the compensated temperature range of 0°C ... +80°C, reference temperature 20°C (see influence of the ambient temperature)

<sup>2)</sup> Acc. to IEC 770 relating to the max. span. The possible longterm drift reduces with lower span.

## Product description

**Operating and ambient conditions****Temperatures**

Ambient temperature	-40°C ... +60°C
Storage and transport temperature	-40°C ... +60°C
Medium temperature	-40°C ... +60°C

**Protective measures <sup>1)</sup>**

Transmitter	IP 68
Housing	IP 65 or IP 67, IP 68 (by fixed connected PE-cable, cable length min. 5 m)
VEGADIS 12	IP 65, IP 67
Protection class	III
Overvoltage category	III

**Ex-technical data****Ex-data of the sensors D76 Ex, D77 Ex**

Flame proofing	ia (in conjunction with a safety barrier or a separator)
Classification	EEx ia IIC T6, T5, T4
Temperature class	ambient temperature <sup>2)</sup>
- T6	-40°C ... +40°C
- T5	-40°C ... +55°C
- T4	-40°C ... +85°C
Ex-approved in category or zone	
- EC-type approval (ATEX)	Zone 1 (II 2G)
- conformity certificate	Zone 1

**Ex-data of the external connection housing VEGADIS 12 Ex**

Classification	EEx ia IIC T6, T5, T4
Temperature class	ambient temperature
- T6	-40°C ... +45°C
- T5	-40°C ... +55°C
- T4	-40°C ... +85°C

<sup>1)</sup> To keep the housing protection IP 65 or IP 67 the use of a suitable seal in the PG is necessary. If the supplied seal does not fit, the customer has to provide a suitable seal.

<sup>2)</sup> in the range of the oscillator



**General data****Connection lines**

Cable entry	
- sensor	2 x M20x1,5 (for cable-ø 5...9mm or 9...12mm)
- external housing VEGABOX 01	Pg 13,5 (for cable-ø 5...9 mm or 9...12 mm)
- external housing VEGADIS 12	Pg 13,5 (for cable-ø 5...9 mm or 9...12 mm)
Screw terminals	
- terminal, adjustment insert	for cross-section areas of conductor up to 2,5 mm <sup>2</sup>
- external connection housing	for cross-section areas of conductor up to 2,5 mm <sup>2</sup>

**Materials, wetted parts**

Pressure transmitter D76	
- transmitter	stst 1.4571
- diaphragm	ceramic (99,5 % Oxydec ceramic)
- suspension cable	PE
- cable bushing	CSM
- meas. cell seal	Viton
- transmitter protection	PE-plastic coating
	stst 1.4571-protective cover
Pressure transmitter D77	
- transmitter	stst 1.4571
- diaphragm	Duratherm 600
- suspension cable	PE
- cable bushing	CSM
- transmitter protection	PE-plastic coating
	stst 1.4571-protective cover

**Materials, wetted parts**

Pressure transmitter D76, D77	
- housing	Alu (sea water resistant) and PE-powder-coated, stst 1.4571
- straining clamp	St galvanized
- closing screw	stst 1.4305

**Weight**

Basic weight without housing	
- D76	approx. 2,2 kg
- D77	approx. 2,2 kg
VEGABOX 01, VEGADIS 12	approx. 400 g
Suspension cable or hose	approx. 0,1 kg/m
Connection tube	approx. 1,0 kg/m

**CE-conformity**

Pressure transmitters D76 and D77 meet the protective regulations of EMVG (89/336/EWG) and NSR (73/23/EWG). The conformity has been judged acc. to the following standards:

EMVG	Emission	EN 50 081 - 1: 1992
	Susceptibility	EN 50 082 - 2: 1995
NSR		EN 61 010: 1993

**NAMUR-regulations**

The NAMUR-regulations NE21, May 1993 had been met.

## 2.2 Approvals

### Ex-approvals

For the use of pressure transmitters in Ex and SiEx-areas, the instruments must be suitable and approved for these explosion zones and application areas. For the use on ships special type approvals are available. The suitability is checked by the approval authorities and certified by approval documents. Note the attached approval documents when using a sensor in Ex-areas.

Pressure transmitters D7, Ex are approved for Ex zone 1.

Pressure transmitters D7, Ex0 are approved for Ex-zone 0 and must be powered by an intrinsically safe circuit for operation in Ex-areas. Safety barrier and separator provide intrinsically safe (ia) circuits.

Following a choice of instruments with which pressure transmitters work reliably.

### Sensors with analogue current output

Separator and signal conditioning instrument:  
- VEGADIS 371 Ex

Separator:

- Stahl 9303/15/22/11
- Knick WG21 A7 (opt. 470, 336)
- CEAG GHG 124 3111 C1206

Safety barrier (supply min. 18 V)

- Stahl 9001/01/280/085/10
- Stahl 9001/01/280/110/10
- Stahl 9001/01/280/165/10
- CEAG GHG 11 1 9140 V0728

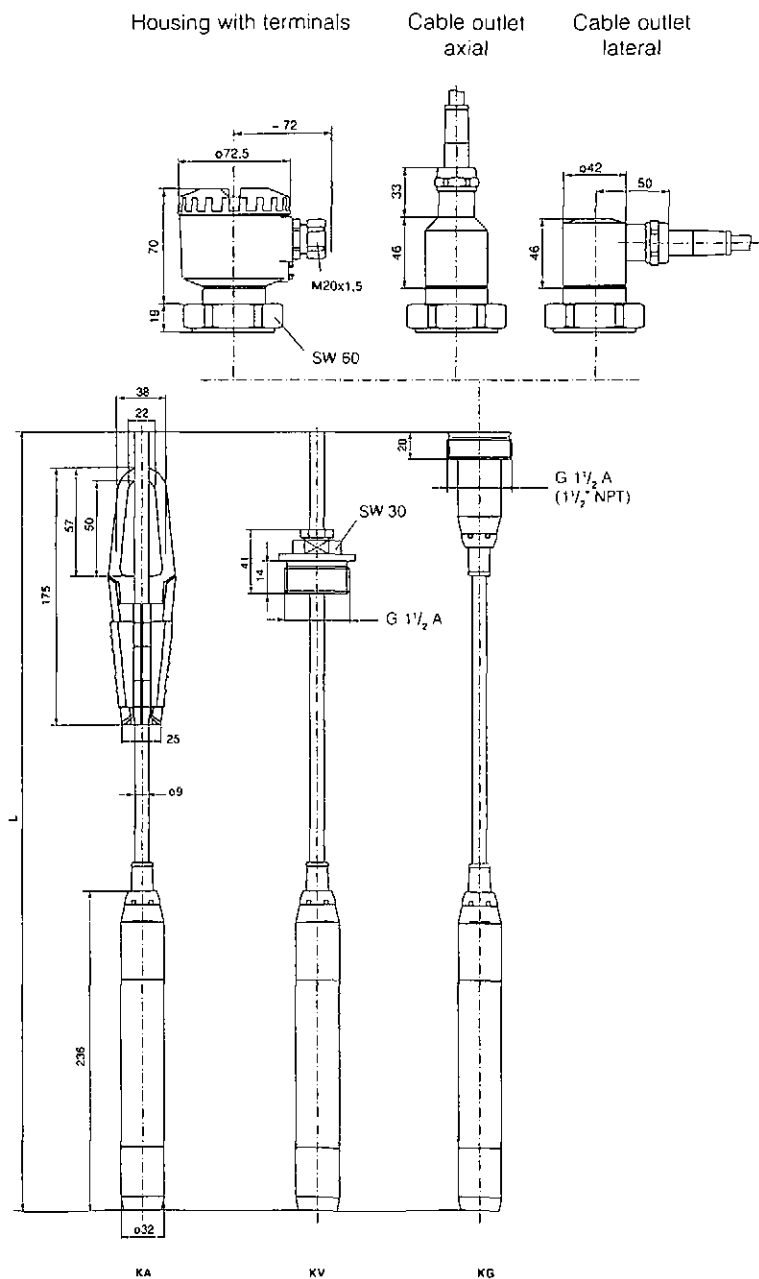
### Sensors with digital output signal

- require for operation in Ex-areas zone 0 the Ex-separator VEGATRENN 548 V Ex or an Ex0-approved signal conditioning instrument VEGAMET 514 V or 515 V.

### Test and approval authorities

The pressure transmitters are tested and approved by the following monitoring, test and approval authorities:

- **PTB**  
(Physikalisch Technische Bundesanstalt - Physical Technical Test Authority)
- **FM**  
(Factory Mutual Research)
- **ABS**  
(American Bureau of Shipping)
- **LRS**  
(Lloyds Register of Shipping)
- **GL**  
(German Lloyd)
- **CSA**  
(Canadian Standards Association)

**2.3 Dimensions****Pressure transmitter D76 and D77**

L: Suspension cable length acc. to order

KA

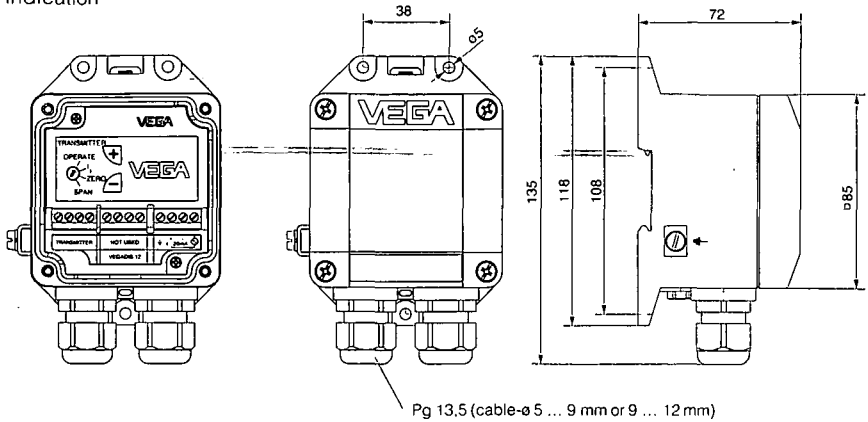
KV

KG

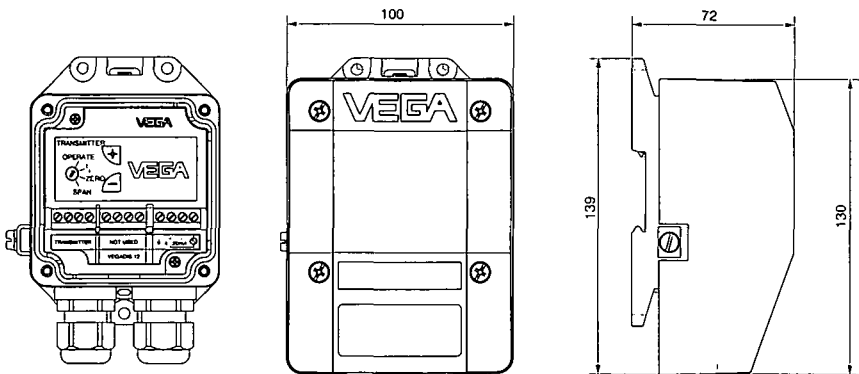
## Product description

**VEGA****VEGADIS 12 (external connection housing with integral adjustment)**

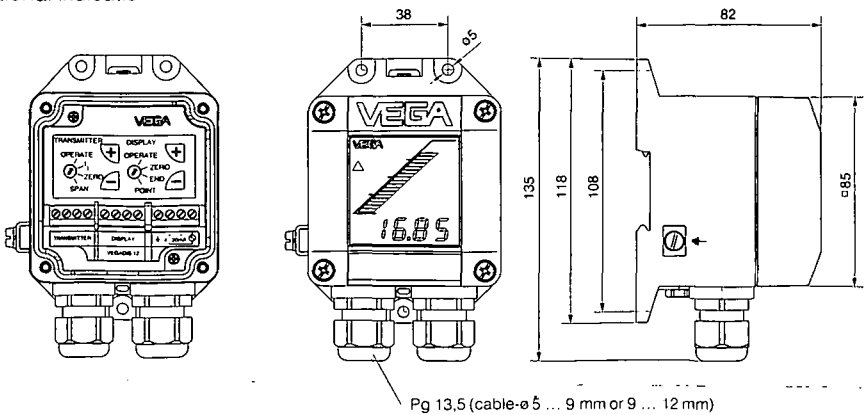
without indication



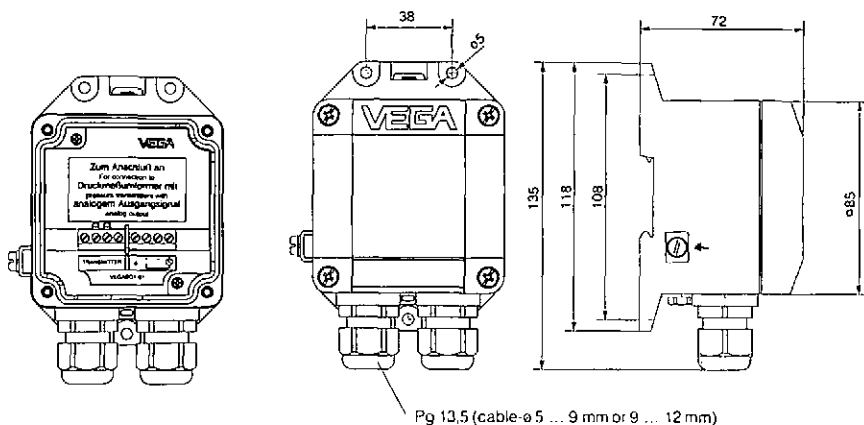
with optional protective cover



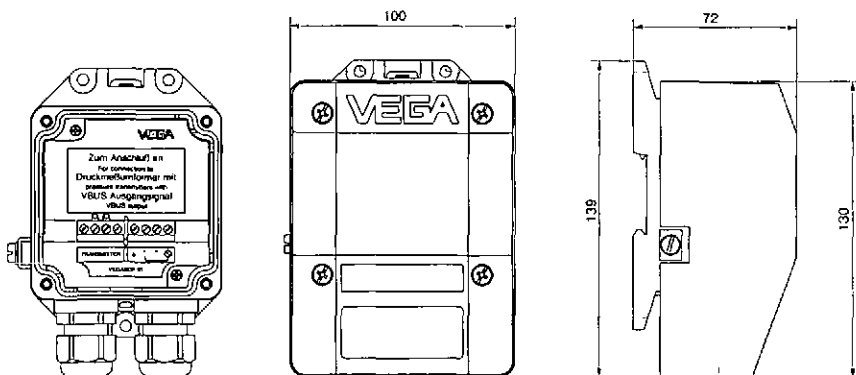
with optional indication



## VEGABOX 01 (connection housing with breather facility)



with optional protective cover



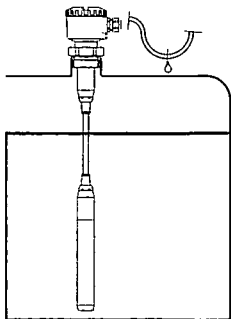
### 3 Mounting

#### 3.1 Mounting instructions

##### Cable entry

Pressure transmitters can be mounted in any individual installation position. However to avoid humidity penetration, the cable entry must point downwards. The connection housing is hence rotational by  $340^\circ (\pm 170^\circ)$  and locked with a small screw below the cable entry or the pressure compensation filter against overwinding. Therefore do not remove this screw.

Loop the connection line to the sensor housing downwards so that rain and condensation water can drain off. This is mainly valid for mounting outside, in humid areas (e.g. due to cleaning processes) or on cooled or heated vessels.



*Humidity*

##### Process connection seal

For mounting it is absolutely necessary to use a process connection seal. This seal is supplied with the pressure transmitter or must be provided by the customer (see appropriate table in chapter "2.3 Dimensions").

#### 3.2 Compensation of the atmospheric pressure

On instruments for gauge pressure measurement, the atmospheric pressure is compensated in different ways dependent on the version of the pressure transmitter.

##### Pressure transmitter with housing

- via an integral breather facility below the cable entry (PTFE-insert <sup>1)</sup>), protection IP 65
- via the capillaries of the special cable <sup>2)</sup> used with the pressure transmitter, protection IP 67

##### Pressure transmitter with direct cable outlet

- via the capillaries of the connected special cable <sup>2)</sup>, protection IP 68

We recommend to loop the special cable into the external housing VEGABOX 01 (accessory) and to carry out the pressure compensation via the integral breather facility.

##### External housing VEGABOX 01

Note the following instructions:

- generally there must be the same atmospheric pressure on the external housing VEGABOX 01 than on the pressure transmitter
- the pressure compensation must be made in dry environment
- in case of vertical wall mounting, the cable entries must point downwards to avoid humidity ingress.

<sup>1)</sup> air-permeable and humidity blocking

<sup>2)</sup> cable length min. 5 m

## 4 Electrical connection

### 4.1 Connection instructions

The electronics in the pressure transmitters requires a supply voltage of 12 ... 36 V DC and is designed in two-wire technology, i.e. supply voltage (DC voltage) and meas. signal are transmitted via the same two-wire connection cable.

The supply voltage is provided via a power supply unit, e.g.:

- power supply unit VEGASTAB 690
- processing unit with integral DC voltage source (e.g. active DCS-input)
- VEGAMET, VEGALOG or VEGADIS 371

Note that the supply voltage is reliably separated from the mains circuits acc. to DIN VDE 0106, part 101. VEGA-instruments meet this requirement and protection class III is ensured.

The terminal voltage on the transmitter depends on the following factors:

- output voltage  $U_H$  of the voltage supply under nominal load.
- electrical resistors of the connected instruments in the circuit.

For electrical connection generally note the following instructions:

- the connection must be made acc. to the national installation standards (e.g. in Germany acc. to the VDE-regulations)
- the terminal voltage must not exceed 36 V, to avoid damage of the electronics
- the electrical connection has no polarisation protection
- the pressure transmitter can be connected with standard two-wire cable
- if strong electromagnetic interferences have to be expected, we recommend to use screened cable. The screening must be earthed on one sensor end
- if overvoltages have to be expected, we recommend the pressure transmitters with integral overvoltage protection or the installation of VEGA-overvoltage arresters
- a seal suitable for the cable must be used in the Pg.

### Safety instructions for Ex-applications

Generally disconnect voltage before you start work. Always switch off the power supply before you start any connection work on the sensors. You protect yourself and the instruments.

#### Skilled staff

Instruments used in Ex-areas must only be connected by skilled staff. The skilled staff must note and understand the installation regulations and the attached type approvals and conformity certificates.

In hazardous areas the necessary regulations in the type approvals and conformity certificates of the sensors and the safety barrier or separator must be noted (e.g. DIN VDE 0165). Sensors used in Ex-areas must only be operated on intrinsically safe circuits. The permissible electrical values are stated in the type approval or conformity certificate.

Intrinsically safe circuits with more than one active instrument (delivering electrical energy) must not be switched together. In this case note the special installation regulations (DIN VDE 0165).

Pressure transmitters in certain versions are provided with a warning label informing about measures which must be met to avoid danger of electrostatic discharge. Note the contents of the warning label.

## Electrical connection

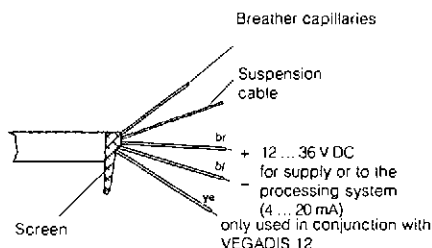
## Connection cable

Note that the connection cables must be specified for the operating temperatures expected in your systems. The cable must have an outer diameter of 5 ... 9 mm. The seal effect of the cable entry will otherwise not be ensured.

Cables for intrinsically safe circuits must be marked blue and must not be used for other circuits.

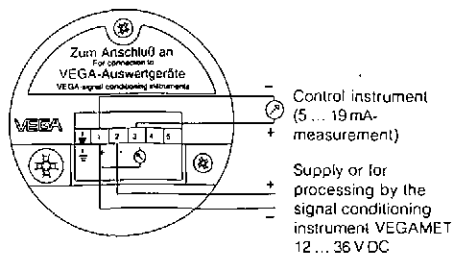
## 4.2 Terminal coordination

## Direct cable outlet



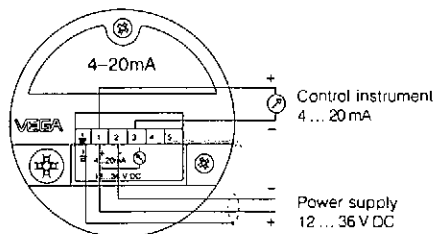
## Electronics version A

5 ... 19 mA-output signal for connection to VEGA-signal conditioning instruments



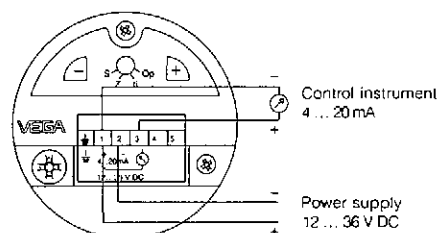
## Electronics version C

4 ... 20 mA-output signal



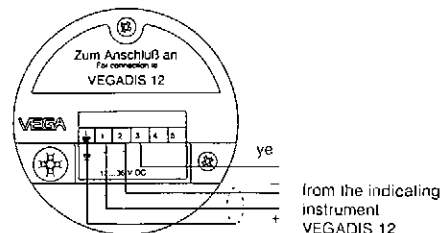
## Electronics version D

4 ... 20 mA-output signal with integral adjustment



## Electronics version E

4 ... 20 mA-output signal adjustable from the external indicating instrument VEGADIS 12



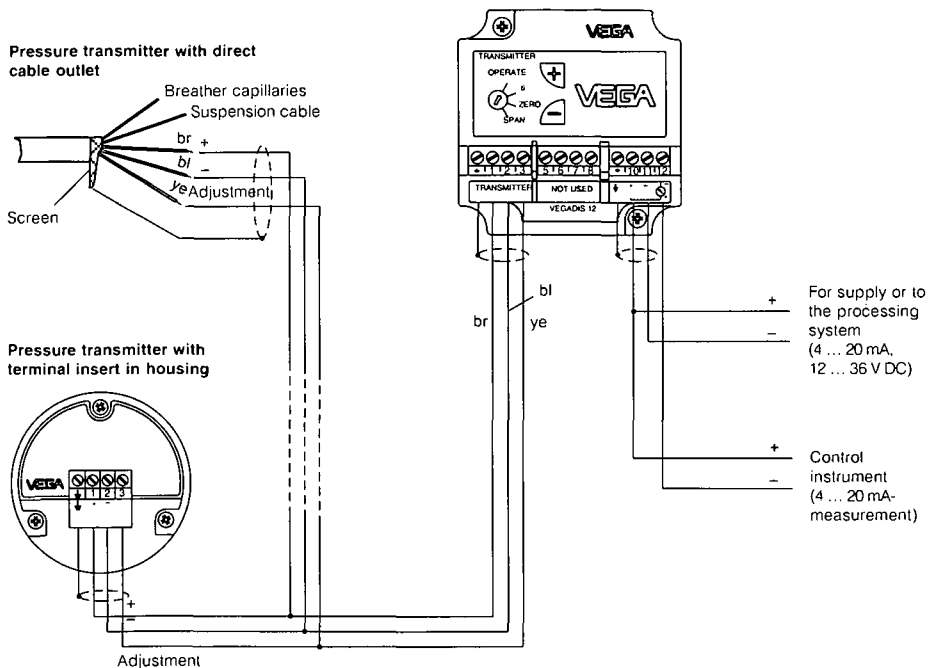
## Terminal coordination

- ≡ Earth, cable screen
- 1 Power supply [+]
- 2 Power supply [-]
- 3 Control instrument [-] / VEGADIS 12
- 4 not coordinated
- 5 not coordinated



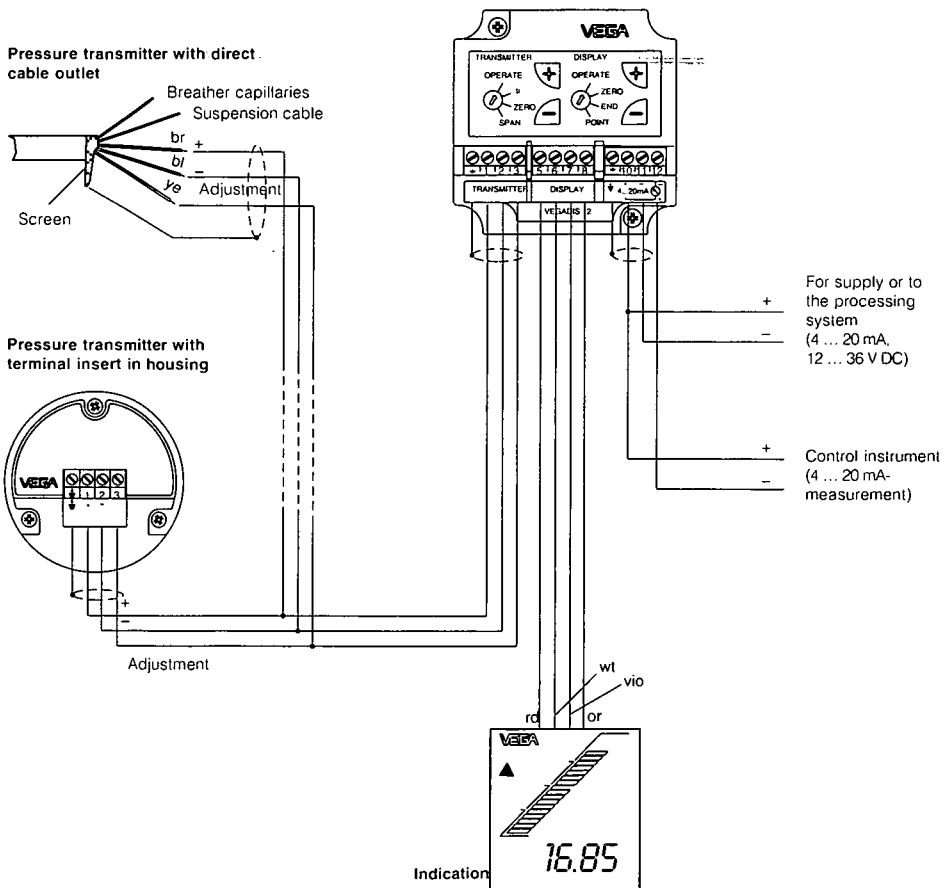
**4.3 Connection to VEGADIS 12 without indication**

Adjustment insert in external connection housing

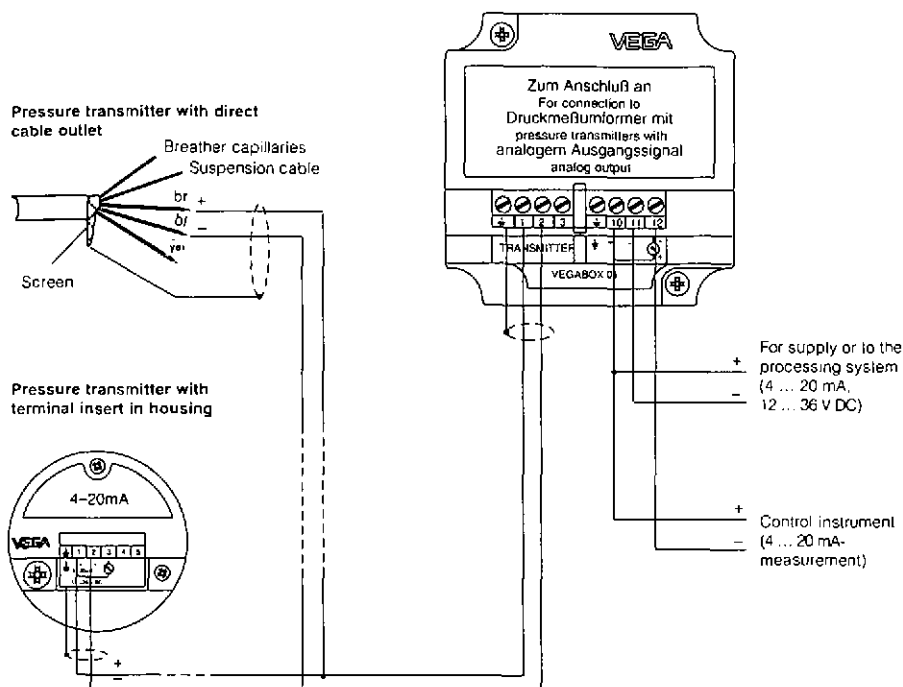


## 4.4 Connection to VEGADIS 12 with indication

Adjustment insert in external connection housing



## 4.5 Connection to VEGABOX 01



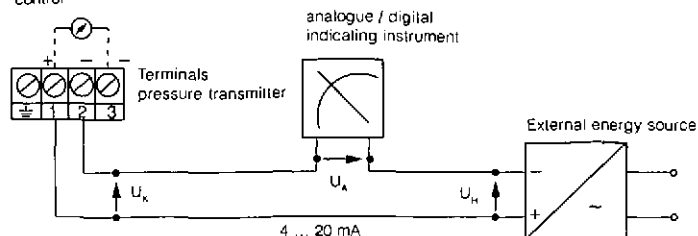
## 4.6 Connection examples

The following connection examples are valid for direct connection to the terminals of the pressure transmitter. When connecting the external connection housing, the connection to the appropriate terminals of the housing is made.

### Oscillator powered via mains

The processing is made via an indicating instrument.

Ohmmeter for local control

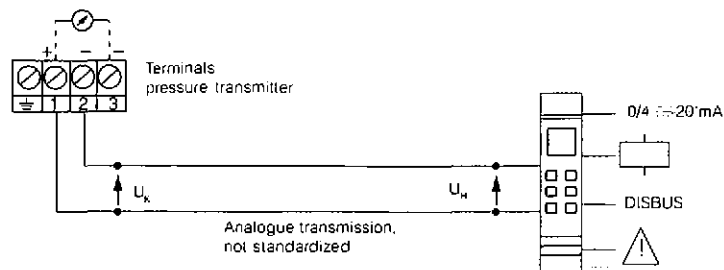


## Electrical connection

## Oscillator powered by a VEGA-signal conditioning instrument

Standard circuit for not standardized output.

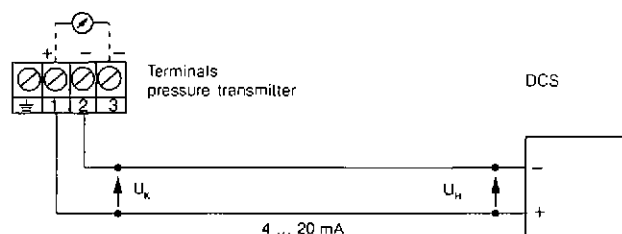
Ohmmeter for local control



## Oscillator powered by a DCS with active input circuit

Processing via DCS.

Ohmmeter for local control

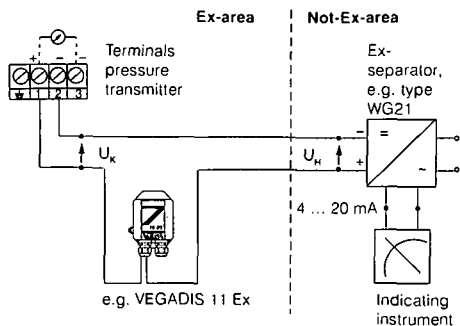
**Note:**

An Ohmmeter for local control of the output current can be connected to terminals 1 and 3. This measurement can be made during operation without interrupting the supply line.

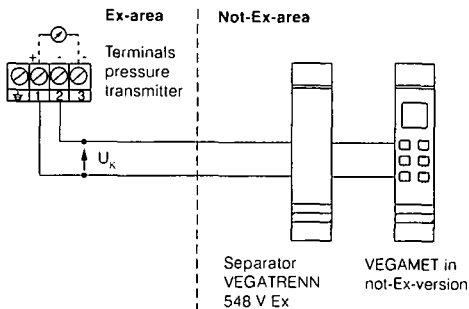
On sensors in HART®-version a HART®-handheld can be connected to the signal line for adjustment. The resistance of the signal circuit must be then at least 250  $\Omega$ . If necessary a resistor must be connected to the signal circuit for adjustment.

## 4.7 Connection examples for Ex-applications

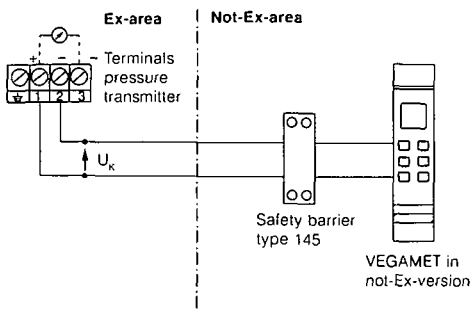
### Supply via Ex-separator, e.g. VEGA type WG21



### Supply via a VBUS-signal conditioning instrument with separator VEGATRENN 548 V Ex



### Supply via a VEGA not-Ex-signal conditioning instrument with safety barrier type 145



#### Note:

- Only carry out adjustment with connected safety barrier. Reason: the current requirement of approx. 300  $\mu$ A is hence considered.

## Set-up

## 5 Set-up

After each connection to the supply voltage, the electronics carries out a selfcheck for approx. 5 secs. The current in the signal circuit takes for this period a value of > 21,6 mA.

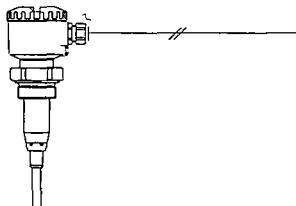
With the rotating switch you choose four switch positions:

- Z - Zero (zero adjustment)
- ti - Time (integration time)
- Op - Operate (operating condition)

### 5.1 Sensor without adjustment

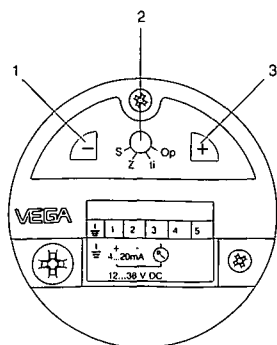
Sensors with electronics version A and C have no adjustment possibility and are fixed adjusted to the stated meas. range.

### 5.2 Adjustment with adjustment insert in sensor



Sensors with electronics version D are equipped with a two-key adjustment insert.

- 1 Reduce value
- 2 Rotating switch
- 3 Increase value



### Procedure

- With the rotating switch you choose the required function.
- With the [+] and [-]-key you modify the signal current to the requested value or adjust the suitable integration time.
- Afterwards set the rotating switch to position "OPERATE". The adjusted values are transmitted into the EEPROM-memory and remain there even in case of voltage loss.

### Adjustment

For adjustment of zero and span, connect first of all terminals 1 and 3 to an ohmmeter. The measured value is identical with the output current.

#### First of all adjust zero (empty vessel)

- Set the rotating switch to "zero". Empty the vessel.
- Adjust a current of 4 mA by pushing the [+] and [-]-key.

The adjustment range of zero can be in the range of -20 % ... +95 % of the nominal meas. range (corresponds to a turn up of up to +95 %).

#### Then adjust the span (full vessel)

- Set the rotating switch to "span". Completely fill the vessel.
- Adjust a current of 20 mA by pushing the [+] and [-]-key.

The adjustment range of the span can be chosen within the range of 3,3 % ... 120 % of the nominal meas. range (corresponds to a turn down 1 : 30).

#### Notes to the adjustment:

- A modification of the span does not influence the adjusted span.
- It is also possible to adjust currents for part fillings, e.g. 8 mA for 25 % and 16 mA for 75 %. The electronics calculates then automatically the current values for 0 % and 100 % (only possible when both values differ by  $\geq 3,3$  %).
- If the current values react on the pushing of the keys with a time delay, this can have two reasons:
  - the last adjustment had been carried out with a level which considerably deviates from the actual level
  - a higher integration time was adjusted.

### Integration time

An integration time  $t_i$  of 0 ... 10 secs. can be adjusted to damp level fluctuations.

#### Adjust integration time

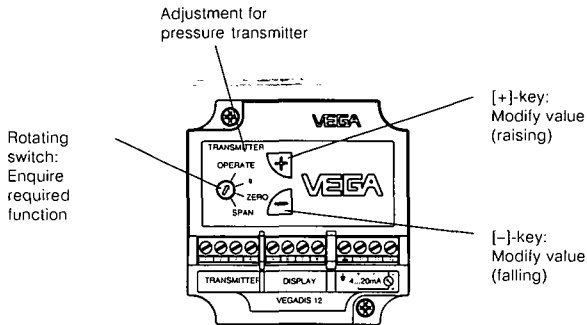
- Set rotating switch to "ti".
- By pushing the [-]-key 10-times ensure first of all, that the integration time is adjusted to 0 sec.
- For every 1 sec. requested integration time, push the [+] -key once.

The integration time is the time required by the current output signal to reach 90 % of the actual height after an erratic level change.



## 5.2 Adjustment in external connection housing VEGADIS 12

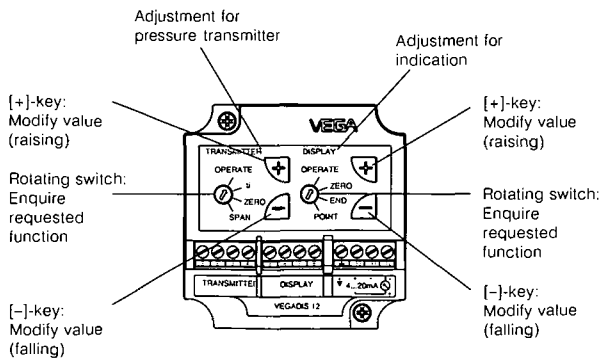
### without indication



#### Adjustment of the pressure transmitter

- Choose the requested function with the rotating switch.
- With the [+] and [-]-key you modify the signal current to the requested values or adjust the suitable integration time.
- Afterwards set the rotating switch to position "OPERATE". The adjusted values are transmitted to the EEPROM-memory and remain there even in case of voltage loss.

### with indication



#### Adjustment of the pressure transmitter

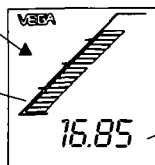
(see above)

#### Adjustment of the indication

- Choose the requested function with the rotating switch.
- With the [+] and [-]-key you modify the digital indication to the requested values or adjust the suitable decimal point.
- Afterwards set the rotating switch to position "OPERATE". The adjusted values are transmitted to the EEPROM-memory and remain there even in case of voltage loss.

Tendency indication

Bargraph



Digital value:  
- 4 digits and decimal point  
- individual scaling from -9999 ... +9999



**Adjustment of the pressure transmitter****Adjustment**

For adjustment of zero and span connect first of all terminals 10 and 12 to an ohmmeter. The measured value is identical to the output current.

**1 Adjust zero (empty vessel)**

- Set the rotating switch to "zero".
- Adjust a current of 4 mA by pushing the [+] and [-]-key.

Adjustment range of zero:

-20 % ... +95 % of nominal meas. range  
(corresponds to a turn up of up to +95 %).

**2 Adjust span (max. level)**

- Set the rotating switch to "span".
- Adjust a current of 20 mA by pushing the [+] and [-]-key.

Adjustment range of the span:

3,3 % ... 120 % of the nominal meas. range  
(corresponds to a turn down 1 : 30)

**Notes to the adjustment:**

- A modification of the span does not influence the adjusted span.
- It is also possible to adjust currents for part fillings, e.g. 8 mA for 25 % and 16 mA for 75 %. The electronics calculates then automatically the current values for 0 % and 100 % (only possible when both values differ by  $\Delta \geq 3,3$  %).
- The modification of the current values is first of all made in 10  $\mu$ A-steps, after approx. 10 secs. pushing in approx. 300  $\mu$ A-steps.
- If the current values react on the pushing of the keys with a time delay, this can have two reasons:
  - the last adjustment had been carried out with a level which considerably deviates from the actual level
  - an integration time was adjusted.

**Integration time**

An integration time  $t_i$  of 0 ... 10 secs. can be adjusted to damp level fluctuations.

**Adjust integration time**

- Set rotating switch to "ti".
- By pushing the [-]-key 10-times ensure first of all, that the integration time is adjusted to 0 sec.
- For every 1 sec. requested integration time, push the [+]key once.

The integration time is the time required by the current output signal to reach 90 % of the actual height after an erratic level change.

**Scaling of the indication**

The indication provides the current values 4 ... 20 mA as bargraph and digital value.

**Bargraph**

At 4 mA no segment of the bargraph appears, at 20 mA all segments appear. This coordination is fixed.

**Digital value**

The digital value is individually scalable via the adjustment insert between -9999 ... +9999.

**1 Adjust zero**

- Set the rotating switch to "zero".
- By pushing the [+] and [-]-key adjust the requested value, e.g. 0.

**2 Adjust end**

- Set the rotating switch to "End".
- By pushing the [+] and [-]-key adjust the requested value, e.g. 1000.

**3 Adjust decimal point (point)**

- Set the rotating switch to "Point".
- By pushing the [+] and [-]-key adjust the requested value, e.g. 8888 (no decimal point).

## 6 Diagnosis

### 6.1 Maintenance

Series 70 pressure transmitters are generally maintenance free.

In very polluted products, such as e.g. sewage water we recommend to clean the diaphragm from time to time with a hair brush. However the diaphragm must not be damaged!

Should the removal of the pressure transmitter (e.g. due to cleaning of the vessel) be necessary, we recommend the use of a new seal when installing the pressure transmitter again. VEGA-original seals should be used exclusively (see chapter "2.3 Dimensions").

### 6.2 Failure removal

Due to the continuous self-monitoring, series 70 pressure transmitters offer maximum reliability. If nevertheless failures occur, check before removing the pressure transmitter:

- the atmospheric pressure compensation (only with gauge pressure measuring ranges),
- the electrical connections.

#### Check atmospheric pressure compensation

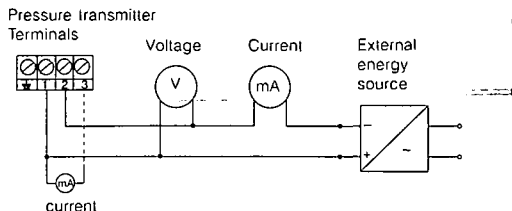
First of all open the cover of the housing where the atmospheric breather facility <sup>1)</sup> is located. The indicated measured value must not change. If the indicated value changes, the compensation of the atmospheric pressure does not function correctly which influences the measured value. Check the complete instrument:

- on the pressure compensation facility on the housing
- on VEGADIS 12 or VEGABOX 01
- the capillaries in the special cable.

#### Note:

On the pressure compensation facility there must always be the same atmospheric pressure like in the open vessel.

### Check electrical connections



#### Check voltage

- The terminal voltage on the pressure transmitter must be at least 12 V DC.
- The terminal voltage on VEGADIS 12 must be at least 12 V DC or 17 V DC with indication.
- The supply voltage for the pressure transmitter by a signal conditioning instrument VEGAMET must be approx. 18 V DC (with VBUS 25 V DC).

#### Check current

- Initial current with uncovered diaphragm of the pressure transmitter: approx. 4 mA (5 mA when operated on a VEGA-signal conditioning instrument)
- Current during operation: 4 ... 20 mA (5 ... 19 mA when operated on a VEGA-signal conditioning instrument)
- Meas. line interrupted or sensor defect: 0 ... 3 mA
- Exceeding or decreasing of the specific meas. range: 3 mA
- Pressure transmitter defect or shortcircuit: Current >23 mA

#### Note for Ex-applications



Deviating from above coordination, terminals 1 and 3 (on VEGADIS 12 terminals 10 and 12) are only used for shortterm connection to a certified active floating meas. instrument (max. value: 470 mW) or an individual passive floating ohmmeter. For connection the regulations for wiring of intrinsically safe circuits (meas. instrument, supply and signal circuit) must be noted.

<sup>1)</sup> Consisting of a plastic screw insert with integral filter element.

## 7 Instrument modification

### 7.1 Refit adjustment insert

Such a refitting can be e.g. necessary when you want to adapt a pressure transmitter with factory setting to modified conditions of the measurement.

For refitting note the following procedure:

- remove available terminal insert
- mount new adjustment insert
- set-up pressure transmitter acc. to chapter "5 Set-up" of this instruction

#### Remove available terminal insert

- 1 Separate pressure transmitter from power supply.
- 2 Unscrew cover of the connection housing or loosen the screws on the cover of the external housing.
- 3 Remove cover.
- 4 Loosen connection lines on the terminal insert.
- 5 Loosen the three screws of the terminal insert.
- 6 Remove terminal insert and separate plug connection (bent locking nose carefully to the housing centre).

#### Mount new adjustment insert

- 7 Provide plug connection to the adjustment insert (must snap-in).
- 8 Insert the adjustment insert into the housing and fasten with the three screws.
- 9 Fasten the connection lines with the terminals.
- 10 Screw socket.
- 11 Connect pressure transmitter to power supply.





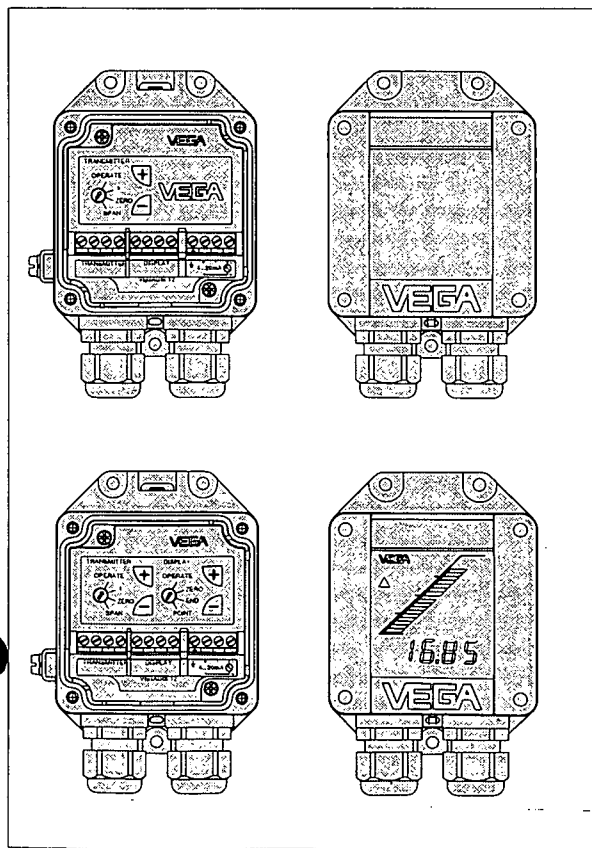


**VEGA Grieshaber KG**  
**Am Hohenstein 113**  
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**Phone (0 78 36) 50 - 0**  
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**e-mail [vega@vega-g.de](mailto:vega@vega-g.de)**



# Operating Instruction

## VEGADIS 12



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<b>5 Diagnosis</b>	
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## Safety information

The described module must only be inserted and operated as described in this operating instruction. Please note that other action can cause damage for which VEGA does not take responsibility.

## 1 Product description

### 1.1 Function and configuration

VEGADIS 12 is an external connection housing with integral adjustment. It is connected to a hydrostatic pressure transmitters D80 ... D 87 or D77 via the VEGA-special cable with breather capillaries or a three-wire standard line. VEGADIS 12 is looped into the supply and signal circuit of the pressure transmitter and does not require a separate external energy. The pressure transmitter must be equipped as follows:

- electronics E, G or H or
- direct cable outlet or
- terminal insert for external adjustment (can be equipped later).

VEGADIS 12 has the following function:

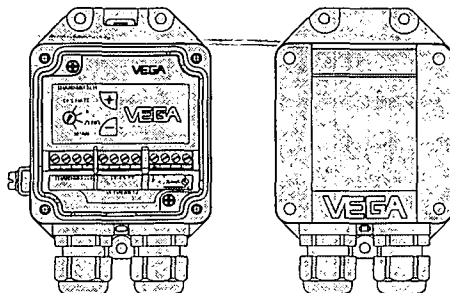
- adjustment of zero, span and  $t_1$
- atmospheric pressure compensation for the pressure transmitter
- indication of measured value (optional).

VEGADIS 12 is provided as a standard feature with an adjustment module for the pressure transmitter. The optional indication is located in the housing cover and is provided with a bargraph and a digital indication. In this version additional adjustment modules for indication scaling are integrated.

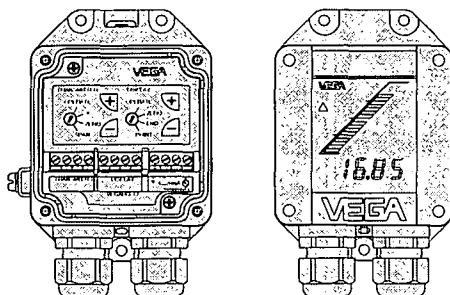
We applied for approval for hazardous areas acc. to CENELEC EEx ia IIC.

### 1.2 Types and versions

#### VEGADIS 12 without indication



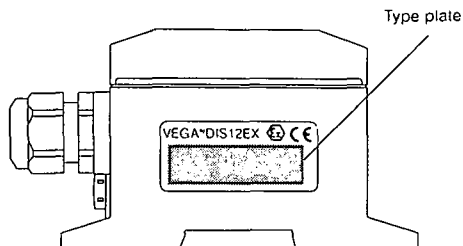
#### VEGADIS 12 with indication





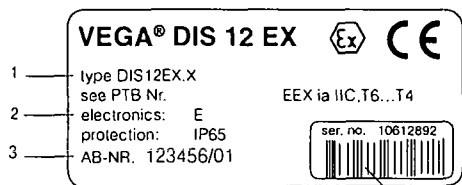
## 1.3 Type plate and order code

Check before mounting and electrical connection that the instrument is suitable. Hence note the type plate which is located as follows:



The type plate contains important data required for mounting and connection. The configuration and contents of the type plate are described in the following example.

### Configuration of the type plate:



- 1 Master data of the order no.
- 2 Data of the electronics  
E = with indication and scaling
- 3 No. of the order confirmation
- 4 Series number

### Configuration of the master data of the order number:

type DIS12EX.X

Approval acc. to  
CENELEC EEx ia IIC  
External housing  
VEGADIS 12

Determine the data of your VEGADIS 12 as shown above by means of the order code in this instruction or in the VEGA-pricelist.

## 1.4 Approvals

When the pressure transmitter or the external housing is used in hazardous areas, approved versions must be used.

For these applications note the appropriate legal documents (test report, test certificates and conformity certificates). These are supplied with the appropriate instrument.

### Survey on applied approvals

CENELEC EEx ia IIC	BVS-Zone 10 StEx	GL (German Lloyd)
•	•	•

## Product description

**1.5 Technical data and dimensions****Standard data****Materials and weight**

Housing	high resistance plastic PBT (Polyester)
Earth terminals	StSt 1.4305
Window of the indication	glass
Breather facility	PTFE-filter element <sup>1)</sup>
Weight	appr. 0,5 kg

**Operating and indicating elements**

Operating elements	2 keys, 1 rotating switch
Operating elements with indication	2 x 2 keys, 2 x 1 rotating switch
Indication (option)	LC-multi-function display
	- bargraph (20 segments)
	- digital value (4-digit)
	- tendency indicator for raising and falling values

**Connection**

Cable entry	2 x Pg 13,5 (for cable-ø 5 ... 10 mm)
Screw terminals	for cross-section area of conductor to 2,5 mm <sup>2</sup>

**Operating circuit**

Connection to	pressure transmitter D80 ... D87, D77 with
	- electronics E, G or H or
	- direct cable outlet or
	- terminal insert for external adjustment (can be equipped later)
Connection line	VEGA-special cable with breather capillaries or 3-wire standard line
Line length	max. 200 m

<sup>1)</sup> air permeable and humidity blocking

## Supply and signal circuit (analog transmission, 4 ... 20 mA)

Supply voltage for pressure transmitter  
in conjunction with VEGADIS 12

- without indication
- with indication

Max. input current

Range for current signal

Max. permissible load

12 ... 36 V DC

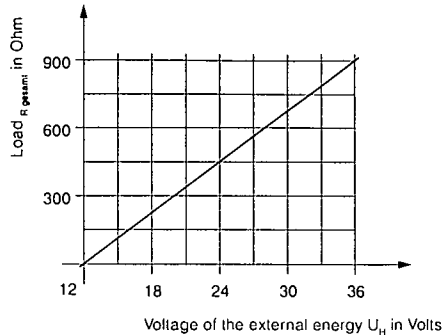
17 ... 36 V DC

150 mA

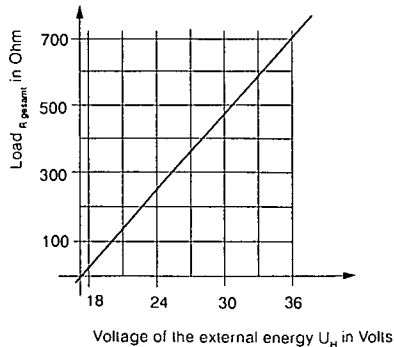
3,5 ... 22 mA

dependent on supply voltage  
(see load diagram)

Load diagram without indication



Load diagram with indication



## Protective measures

Housing	IP 65
Protection class	III
Overvoltage category	III

## CE-protective measures

VEGADIS 12 or VEGADIS 12 Ex external housings meet the protective regulations of EMVG (89/336/EWG) and NSR (73/23/EWG). The conformity has been judged acc. to the following standards:

EMVG	Emission	EN 50 081
	Susceptibility	EN 50 082
NSR		EN 61 010

## Product description

## NAMUR-regulations

The NAMUR-regulations NE21, May 1993 have been met.

## Ambient conditions

Ambient temperature

- VEGADIS 12 -40°C ... +85°C

- VEGADIS 12 with indication -10°C ... +70°C

Storage and transport temperature -40°C ... +85°C

## Ex-technical data, CENELEC



(applied for approval)

## Classification

Classification

EEx ia IIC T6, T5, T4

## Intrinsically safe input VEGADIS 12 Ex

Classification

EEx ia IIC

Internal effective capacitance

$C_{int}$  negligible

Internal effective inductance

$L_{int}$  negligible

## Intrinsically safe indicating circuit

Classification

EEx ia IIC

Max. values

- supply voltage

$U_o = 7,8 \text{ V}$

- current

$I_o = 260 \text{ mA}$

- power

$P_o = 507 \text{ mW}$

Max. permissible outer capacitance

$L_o = 960 \text{ nF}$

Max. permissible outer inductance

$I_o = 0,78 \text{ mH}$

Characteristics

linear

only for connection

of the indication

## Intrinsically safe supply and signal circuit

Classification

EEx ia IIC

Max. values

- supply voltage

$U_o = 60 \text{ V}$

- current

$I_K = 150 \text{ mA}$

- power

$P = 841 \text{ mW}$

Internal effective capacitance

$C_{int} < 300 \text{ pF}$

Internal effective inductance

$L_{int} < 0,1 \text{ mH}$

## Ambient conditions

Ambient temperature

Temperature class

Ignition temperature

-40°C ... +50°C

T6

85 °C

-40°C ... +65°C

T5

100°C

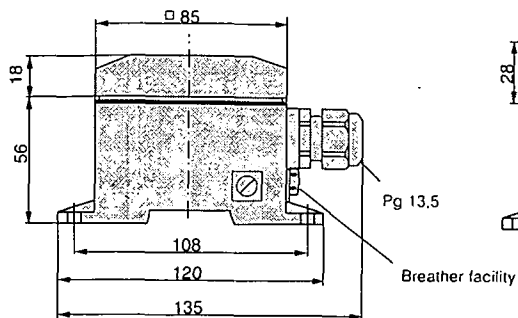
-40°C ... +70°C

T4

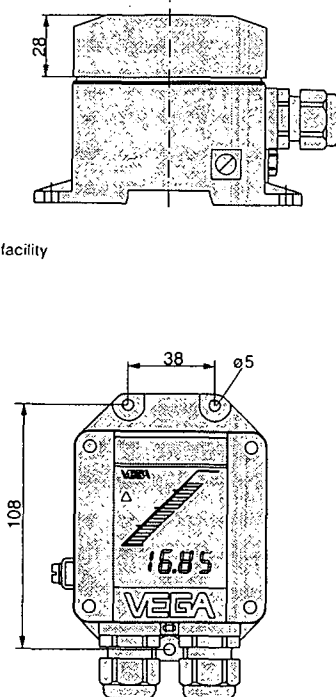
135°C

## VEGADIS 12

without indication



with indication



## 2 Mounting

VEGADIS 12 can be mounted in the following ways:

- on carrier rail 35 x 7,5 acc. to EN 50 022
- on mounting sheet or to the wall.

With vertical wall mounting the cable entries must point downwards to avoid humidity ingress.

If VEGADIS 12 is additionally used for atmospheric pressure compensation for the pressure transmitter, note the following:

- the breather facility must not be polluted.

### 3 Electrical connection

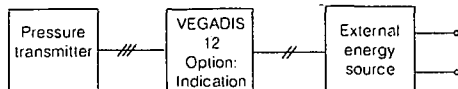
#### 3.1 Wiring instructions

VEGADIS 12 is looped into the supply and signal circuit of the pressure transmitter and does not require a separate external energy.

The external energy source must deliver a terminal voltage of at least 12 V or 17 V to the transmitter. The actual terminal voltage on the transmitter depends on the following factors:

- output voltage  $U_H$  of the external energy source under nominal load.
- load resistors of the instruments in the circuit.

#### Block diagram



The electronics in the pressure transmitter are made in two-wire technology and requires a supply voltage of 12 ... 36 V DC, 17 ... 36 V DC with indication. Supply voltage and current signal are led via the same two-wire connection cable to the terminals. The third line between pressure transmitter and VEGADIS 12 is used for transmission of the adjustment data.

The external energy is provided via a separate supply unit:

- power supply unit, e.g. VEGASTAB 690
- processing unit with integral DC voltage source (e.g. active DCS-input)

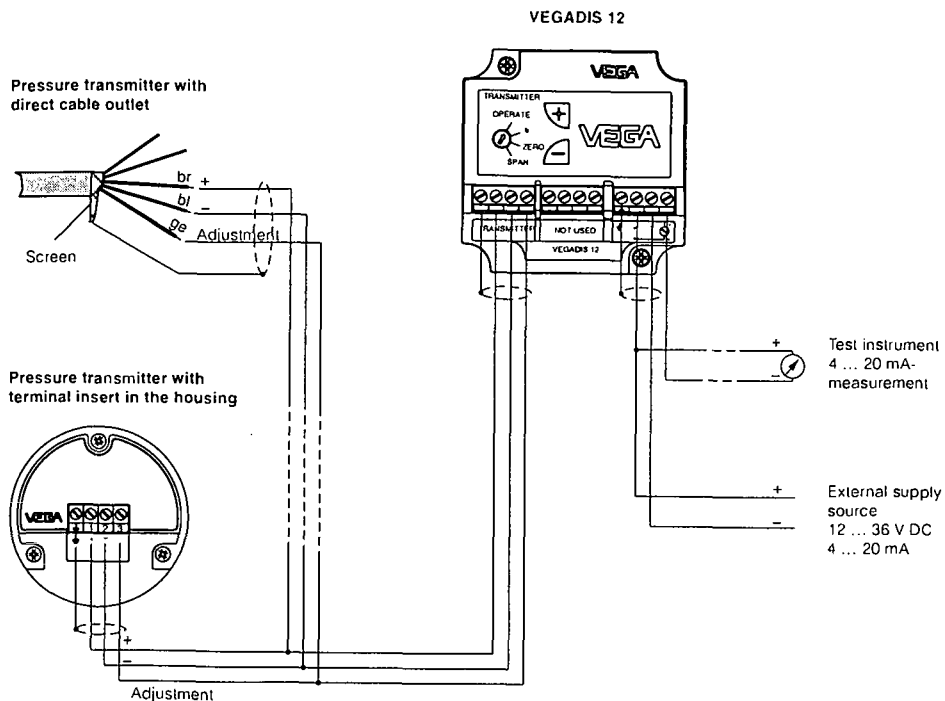
Note that the external energy source is reliably separated from the mains circuits acc. to DIN VDE 0106, part 101. The above mentioned VEGA-instruments meet these requirements and protection class III is therefore guaranteed.

For electrical connection the following instructions must be generally observed:

- The connection must be made acc. to the national standards (e.g. in Germany acc. to the appropriate VDE-regulations).
- The terminal voltage must not exceed 36 V to avoid damage to the electronics.
- The electrical connection has a reverse battery protection.
- The wiring between pressure transmitter and VEGADIS 12 as well as between VEGADIS 12 and power supply can be made with standard three or two-wire cable.
- If strong electromagnetic interference is expected, we recommend use of screened cable. The screening must be earthed at one sensor end.

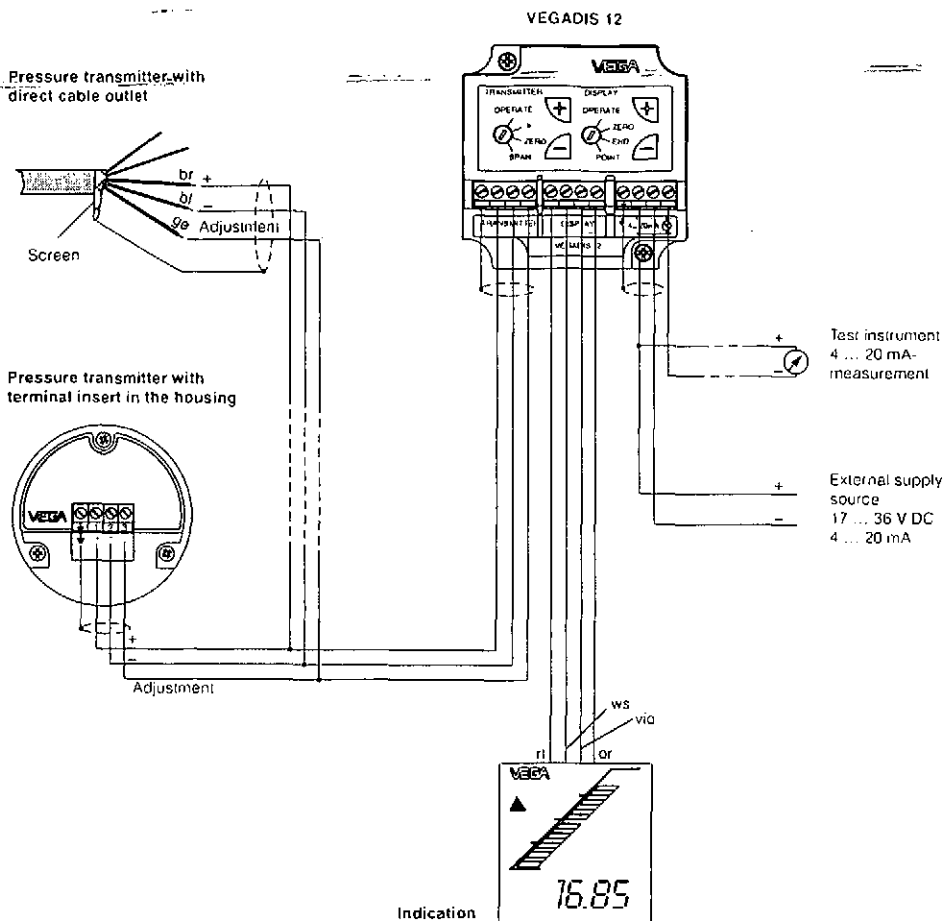
## 3.2 Wiring plan

### VEGADIS 12 without indication



## Electrical connection

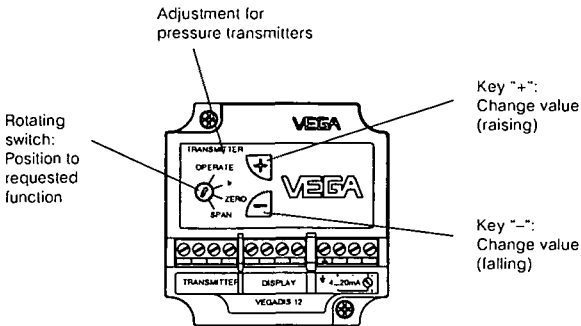
## VEGADIS 12 with indication





## 4 Set-up

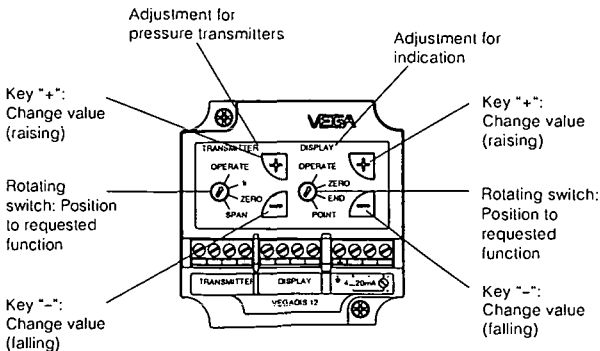
### 4.1 Adjustment elements



#### Adjustment system (transmitter)

- Select the function with the rotating switch.
- With keys + and - change the signal current to the desired values or adjust the suitable integration time.
- Then turn the rotating switch to "OPERATE" position. The adjusted values are transferred to the EEPROM-memory and remain even in the case of voltage failure.

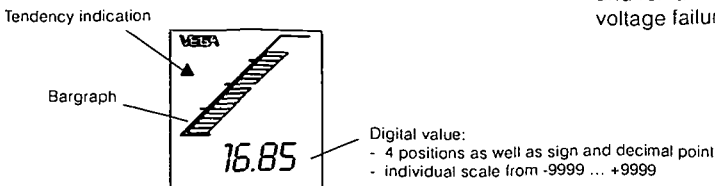
### 4.2 Operating and indicating elements (version with indication)



#### Adjustment system (transmitter) (see paragraph 4.1)

#### Adjustment system (display)

- Select the function with the rotating switch.
- With keys + and - change the digital indication to the desired values or adjust the suitable decimal point.
- Then turn the rotating switch to "OPERATE" position. The adjusted values are transferred to the EEPROM-memory and remain even in the case of voltage failure.



### 4.3 Adjustment of transmitter

#### Adjustment

For adjustment of zero and span first connect terminal 10 and 12 to a current meter. The measured value is identical with the output current.

##### 1 Adjust zero

(vessel empty)

- Set rotating switch to zero.
- Adjust a current of 4 mA by pushing the keys + or -.

Adjustment range of zero:

-20 % ... +95 % of the nominal meas. range  
(corresponds to a turn up to +95 %).

##### 2 Adjust span

(max. vessel level)

- Set the rotating switch to span.
- Adjust a current of 20 mA by pushing the keys + or -.

Adjustment range of measuring range final value:

3,3 % ... 120 % of nominal meas. range (corresponds to turn down 1 : 30)

#### Instructions for adjustment:

- A change of zero does not influence the adjusted span.
- It is possible to adjust currents for part fillings, e.g. 8 mA for 25 % and 16 mA for 75 %. The electronics then calculates automatically the current values for 0 % and 100 % (only possible with a  $\Delta \geq 3,3$  %).
- The modification of the current values is first made in 10  $\mu$ A-steps, after pushing for appr. 10 sec. in appr. 300  $\mu$ A-steps.
- When the current values react on this adjustment with a time delay, there can be two reasons:
  - the last adjustment was carried out with a level, strongly deviating from the actual level,
  - an integration time had been adjusted.

### Integration time

For damping of level fluctuations an integration time  $t_i$  of 0 ... 5 secs. can be adjusted.

Procedure:

- Set rotating switch to  $t_i$ .
- By pushing the - key 10 times ensure that the integration time is set to 0 sec.
- For each 0,5 secs. of the desired integration time push the + key once.

The integration time is the time required by the current output signal to reach 90% of the actual level after a fluctuating level change.

### 4.4 Scaling of the indication

The indication provides the current values 4 ... 20 mA as a bargraph and as digital value.

#### Bargraph

No segment of the bargraph appears at 4 mA, all segments appear with 20 mA. This coordination is fixed.

#### Digital value

The digital value can be individually scaled via the adjustment module between -9999 ... +9999.

##### 1 Adjust zero

- Set the rotating switch to zero.
- Adjust the requested value, e.g. 0 by pushing the keys + or -.

##### 2 Adjust end

- Set the rotating switch to End.
- Adjust the requested value, e.g. 1000 by pushing the keys + or -.

##### 3 Adjust decimal point (point)

- Set the rotating switch to Point.
- Adjust the requested values, e.g. 8888 (no decimal point) by pushing the keys + or -.

## 5 Diagnosis

### 5.1 Maintenance

VEGADIS 12 is maintenance free.

### 5.2 Error removal

In case of failure please check:

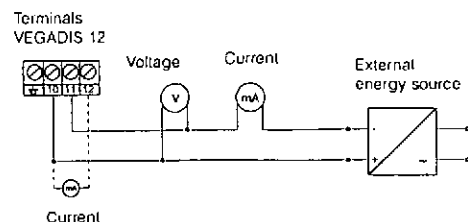
- the atmospheric pressure compensation (only with low pressure ranges),
- the electrical connections and components.

#### Check atmospheric pressure compensation

First open the cover of the housing. The indicated measured value must not change. However if the indicated measured value changes, the compensation of the atmospheric pressure is not ensured (wrong measured value). Therefore check:

- the breather facility on the housing
- the capillaries in the special cable.

#### Check electrical components



#### Instructions for Ex-applications

Deviating from the previous co-ordination, terminals 10 and 12 are here used for short-term connection to a certified active floating (max. value: 470 mW) or an individual passive floating measuring instrument. For connection the regulations for intrinsically safe circuits (measuring instrument, supply and signal circuit) have to be noted.

#### Voltage

- Check the terminal voltage on VEGADIS 12 (must be at least 12 V DC or 17 V DC with indication).

#### Current

Current value	Condition
3,8 ... 20,6 mA	standard range for output current
0 mA	signal line interrupted
< 3,6 mA	adjustment, electronics or pressure sensor element defect
> 21,6 mA	fail-safe, short-circuit in the signal line, adjustment, electronics or pressure sensor element defect

## 6 Instrument modification

### 6.1 Equip terminal insert

If your pressure transmitter is not equipped with the suitable terminal insert for connection of VEGADIS 12, the terminal insert must be fitted:

- remove available terminal insert
- insert new terminal insert
- set-up pressure transmitter

#### Remove available terminal insert

- Disconnect pressure transmitter from the power supply.
- Unscrew cover of the connection housing or loosen the screws on the cover of the external housing.
- Remove cover.
- Loosen connection lines on the terminal insert.
- Loosen the three screws on the terminal insert.
- Remove terminal insert and separate plug connection.

#### Insert new terminal insert

- Provide plug connection to the terminal insert (must snap in).
- Insert the terminal insert into the housing and fasten via the three screws.
- Return the connection lines to the terminals and connect to VEGADIS 12.
- Screw the cover.
- Connect VEGADIS 12 again to the power supply.

#### Set-up the pressure transmitter

see section 4 of this instruction.

**VEGA Grieshaber KG**  
**Am Hohenstein 113**  
**D-77761 Schiltach**  
**Phone (0 78 36) 50 - 0**  
**Fax (0 78 36) 50 - 201**  
**Fax (0 78 36) 50 - 203**



3.0 TELEMETRY

12/14/2014 10:00:00 AM

12/20/2014 10:00 AM

### 3.0 TELEMETRY

JPR Ref:- (A19695.001)

Revision 0

February 23, 1999





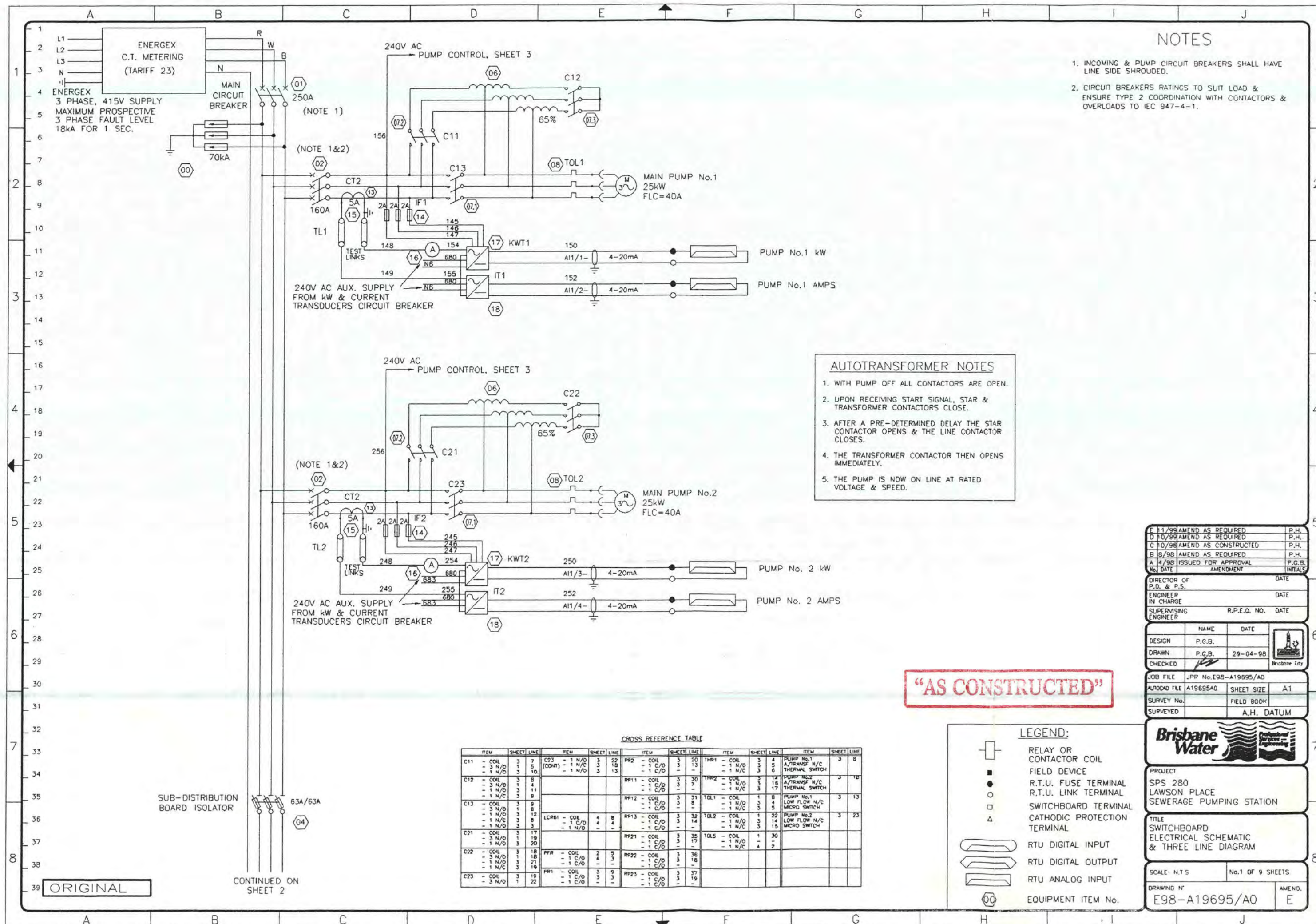


#### 4.0 "AS CONSTRUCTED DRAWINGS"

JPR Ref:- (A19695.001)

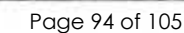
Revision 0

February 23, 1999



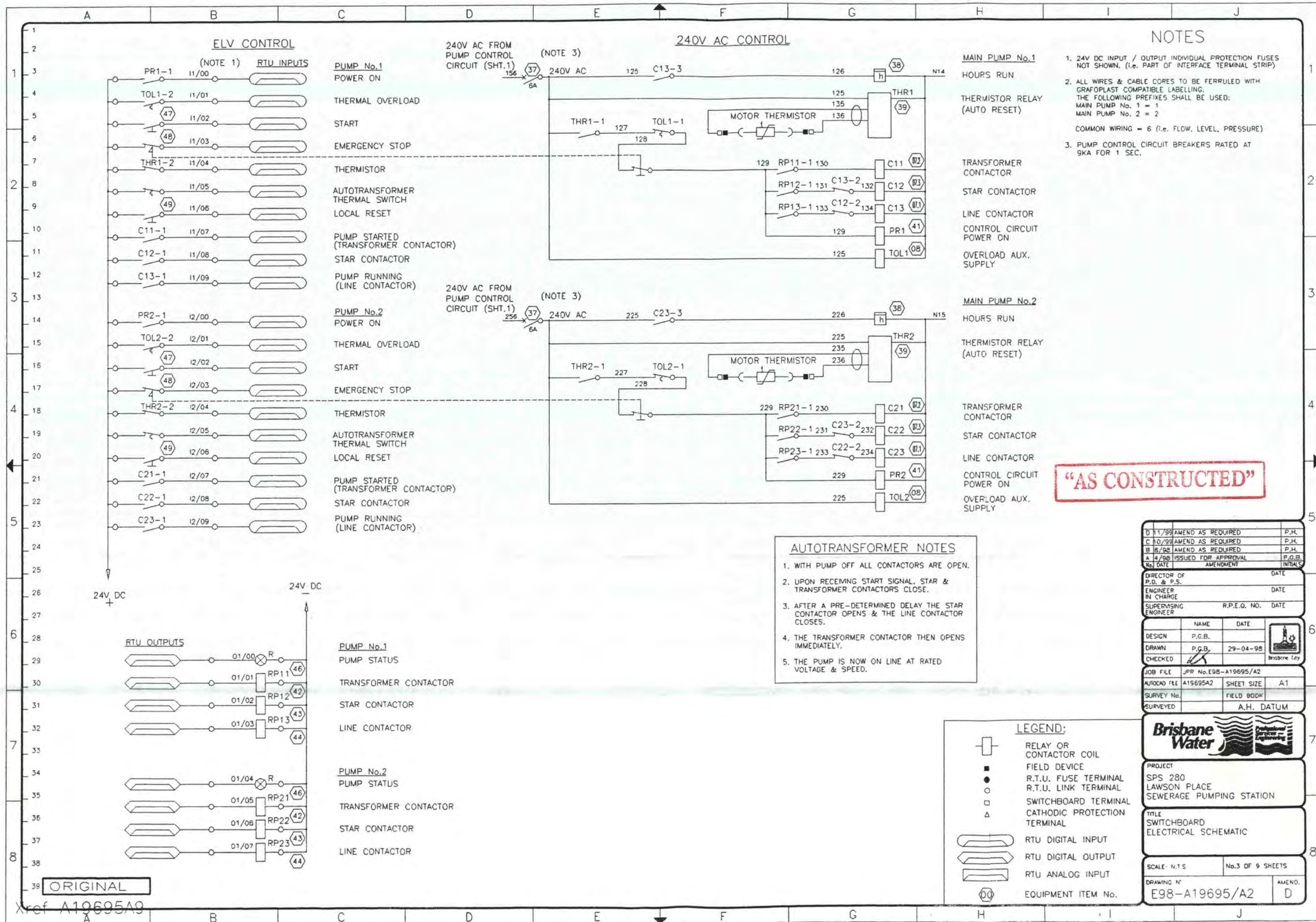




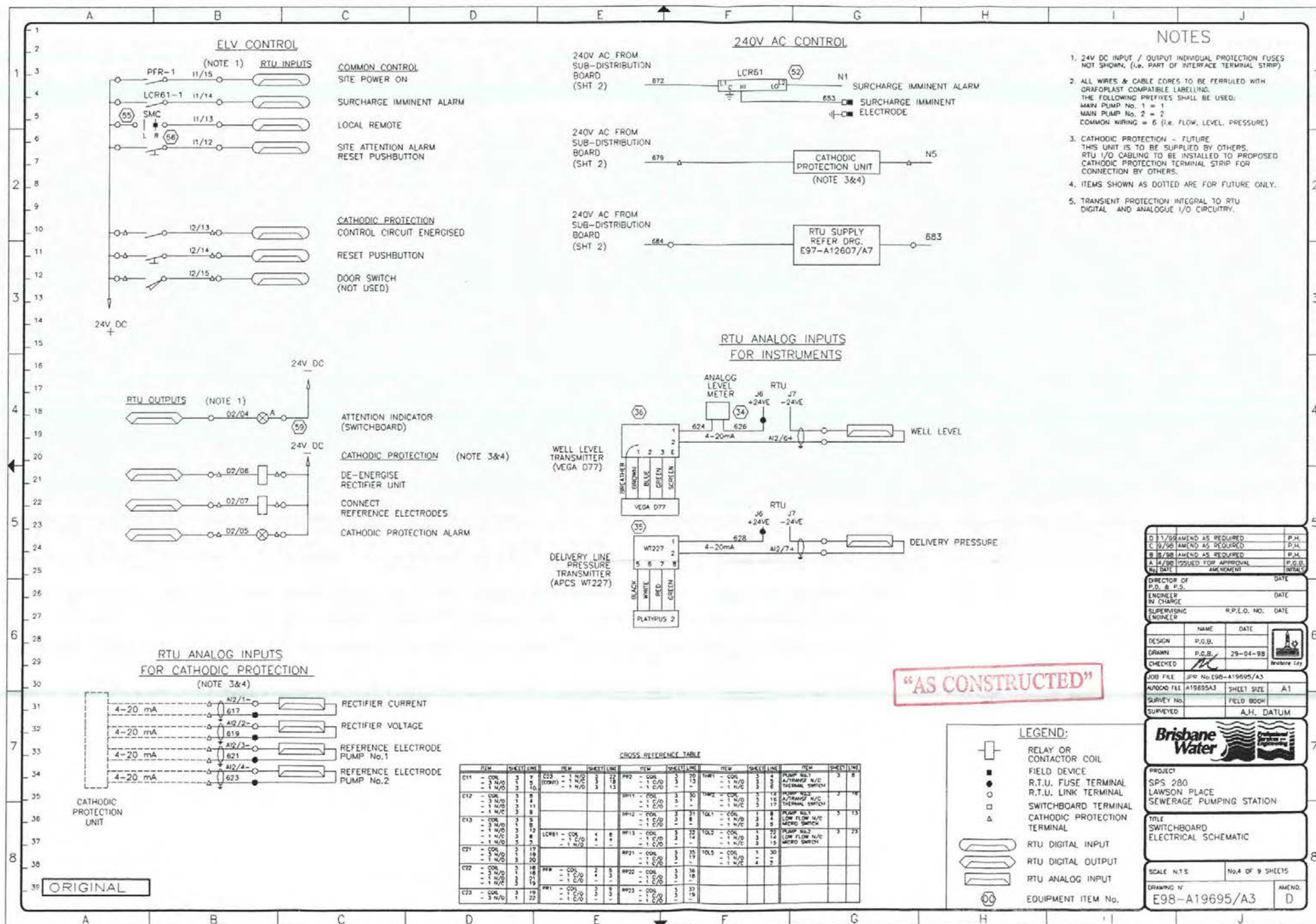








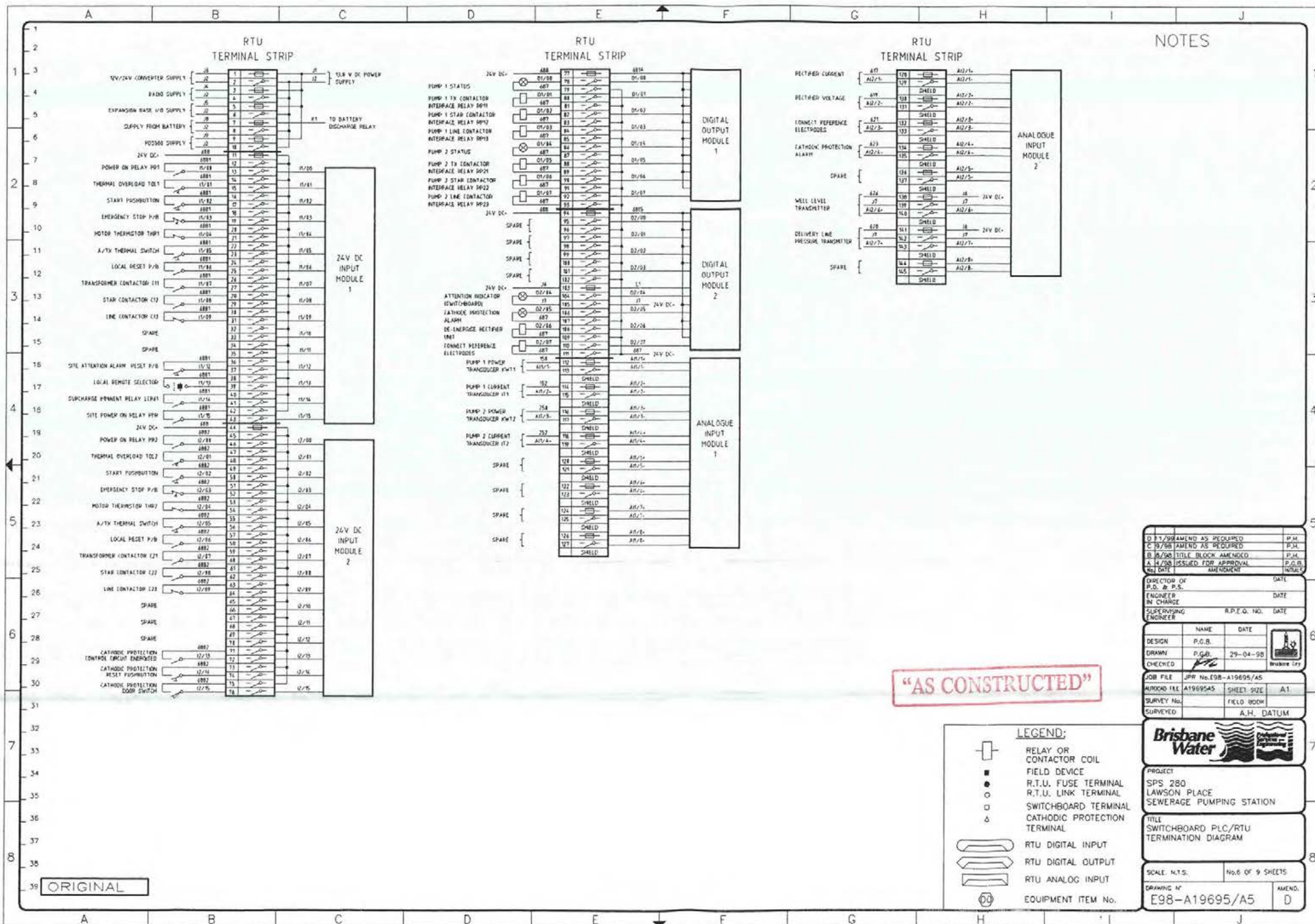
















SWITCHBOARD EQUIPMENT AND LABEL SCHEDULE

NOTES

ITEM QTY MAKE & NUMBER

DESCRIPTION

LABEL

ITEM QTY MAKE & NUMBER

DESCRIPTION

LABEL

00	3	NOVARIS SD1-40N	LIGHTNING ARRESTORS
01	1	TERASAKI VS-400CJ/250 WITH XTHA34 HANDLE	MAIN CIRCUIT BREAKER
02	2	TERASAKI XH-250NL/250 WITH XTHA23 HANDLE	MAIN PUMP No.1 & No.2 CIRCUIT BREAKERS
04	1	NHP DESA83C1 WITH 3 X GEC TIS63L CARTRIDGES	SUB DISTRIBUTION BOARD ISOLATOR
05	1	TERASAKI ICL121 BUSBAR WITH 2 X KLEC ENCAPS	SUB DISTRIBUTION BOARD BUSBAR
06	2	SEAFORD SF3C 55KW WITH 3 N/C MICROTHERMS	MAIN PUMP No.1 & No.2 AUTO TRANSFORMERS
07.1	2	SPRECHER & SCHUH CAB-140E-20-240VAC WITH CWA4-VS2	MAIN PUMP No.1 & No.2 LINE CONTACTORS
07.2	2	SPRECHER & SCHUH CAB-140E-20-240VAC	MAIN PUMP No.1 & No.2 TX CONTACTORS
07.3	2	SPRECHER & SCHUH CA3-37N-11-240VAC WITH CA3-P-S31	MAIN PUMP No.1 & No.2 STAR CONTACTORS
08	2	SPRECHER & SCHUH CEF1-11-240V	MAIN PUMP No.1 & No.2 THERMAL OVERLOADS
13	2	IME TAI 200 120/5	MAIN PUMP INSTRUMENT CURRENT TRANSFORMERS
14	8	GEC SC20H WITH 6 X NS2 CARTRIDGES	MAIN PUMP INSTRUMENT FUSES
15	4	KLIPPON SAKT2/35 TERMINALS (010602)	CURRENT TRANSFORMER TEST LINKS
15	2	DS2 SLIDE LINKS (030730)	
15	8	VH19 SLEEVES (031800)	
15	8	BS SCREWS (033470)	
16	2	IME R072E-ACT 5A5X 0-120A	MAIN PUMP No.1 & No.2 AMMETERS
17	2	CROMPTON 256-TWLW 415V 120/5A 240V 50HZ 86.25KW 4-20mA	MAIN PUMP No.1 & No.2 KILOWATT TRANSDUCEERS
18	2	CROMPTON 253-TALW 5A 240V 50HZ 4-20mA	MAIN PUMP No.1 & No.2 CURRENT TRANSDUCEER
19	1	NHP DWR2-440V	PHASE FAILURE RELAY
20	1	TERASAKI DIN-T10306C	PHASE FAILURE RELAY CIRCUIT BREAKER
21	1	TERASAKI DIN-T10302C	THREE PHASE 20A OUTLET CIRCUIT BREAKER
22	1	TERASAKI DSMC6130	SINGLE PHASE GPO CIRCUIT BREAKER
23	1	TERASAKI DIN-T10106C	24VDC CIRCUIT BREAKER
24	1	TERASAKI DSMC6130	RTU LAPTOP GPO CIRCUIT BREAKER
25	1	TERASAKI DIN-T10106C	SWITCHBOARD FLUORESCENT LIGHT CIRCUIT BREAKER
26	1	TERASAKI DIN-T10106C	CATHODIC PROTECTION UNIT CIRCUIT BREAKER
27	1	TERASAKI DIN-T10106C	RTU POWER SUPPLY CIRCUIT BREAKER
28	1	TERASAKI DIN-T10106C	KW & CURRENT TRANSDUCEER ALX CIRCUIT BREAKER
29	1	TERASAKI DIN-T10106C	FILTERED SUPPLY CIRCUIT BREAKER
30	1	TERASAKI DIN-T10106C	240/24VDC SUPPLY CIRCUIT BREAKER
31	8	TERASAKI DIN-T10106C	SPARE 240VAC CIRCUIT BREAKER
32	3	BURGESS DS3	SWITCHBOARD DOOR SWITCHES
33	2	LANSON L68113	15W SWITCHBOARD FLUORESCENT LIGHT
34	1	CROMPTON 243-01AG WITH SUPPLEMENTARY RED POINTER 4-20mA INPUT SCALE 0-100%	WELL LEVEL INDICATOR
35	1	PLATYPLUS 2 WITH 10m CABLE RANGE 0-60m HEAD WITH APC5-W1227	DELIVERY PRESSURE TRANSMITTER
36	1	VEGA D77XK4X21DC3E8L WITH 10m CABLE RANGE 0-1.0 BAR	WELL LEVEL TRANSMITTER
37	2	TERASAKI DIN-T10106C	MAIN PUMP No.1 & No.2 CONTROL CIRCUIT BREAKER
38	2	IME R048.0 240VAC	MAIN PUMP No.1 & No.2 HOUR RUN METER
39	2	SPRECHER & SCHUH RT3-A-240VAC	MAIN PUMP No.1 & No.2 THERMISTOR RELAY
40	2	TELEMECANIQUE RXN-41G12P7 WITH RXZ-1G BASE	CONTROL CIRCUIT POWER ON RELAY
41	2	TELEMECANIQUE RXN-41G12B0 WITH RXZ-1G BASE	MAIN PUMP No.1 & No.2 TX CONTACTOR CONTROL RELAY
42	2	TELEMECANIQUE RXN-41G12B0 WITH RXZ-1G BASE	MAIN PUMP No.1 & No.2 STAR CONTACTOR CONTROL RELAY
43	2	TELEMECANIQUE RXN-41G12B0 WITH RXZ-1G BASE	MAIN PUMP No.1 & No.2 LINE CONTACTOR CONTROL RELAY

LIGHTNING ARRESTORS  
MAIN SWITCH  
PUMP No.1 / No.2  
SUB-DIST BOARD ISOLATOR  
PUMP No.1 / No.2  
C13/C23  
C11/C21  
C12/C22  
TOL1/TOL2  
PUMP No.1 / No.2  
PUMP No.1 / No.2

45	1	POLYPHASE CORP. 15-50NXX-C2 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	RADIO COAX SURGE PROTECTION
46	2	SPRECHER & SCHUH DSP-P430LO WITH B0 9s-13-24V-2W	MAIN PUMP No.1 & No.2 STATUS INDICATION LAMP
47	2	SPRECHER & SCHUH DSP-F33LX10	MAIN PUMP No.1 & No.2 START PUSHBUTTON
48	2	SPRECHER & SCHUH DSP-MTS343LY02	MAIN PUMP No.1 & No.2 EMERGENCY STOP STOP PUSHBUTTON
49	2	SPRECHER & SCHUH DSP-F63LX10	MAIN PUMP No.1 & No.2 RESET PUSHBUTTON
52	1	MULTIRODE MTR-2 WITH 0.2/1-10M PROBE	SURCHARGE ALARM RELAY
55	1	KRAUS & NAIMER C08-A220-FT2-604 HEADING STATION CONTROL, LABEL LOCAL-REMOTE	STATION CONTROL MODE SELECTOR
56	1	SPRECHER & SCHUH DSP-F63LX10	SITE ATTENTION ALARM RESET PUSHBUTTON
57	1	CRITEC DSF-10A-275V	SURGE REDUCTION FILTER
58	1	COLOURVIEW 9-100 240/24VDC	24VDC POWER SUPPLY
59	1	SPRECHER & SCHUH DSP-P530LO WITH B0 9s-13-24V-2W	SWITCHBOARD ATTENTION ALARM
61	1	CLIPSAL 58C420	THREE PHASE OUTLET
62	2	CLIPSAL 15	SINGLE PHASE OUTLET & RTU
63	2	CLIPSAL 2000SMX SURFACE MOUNTING BLOCK	SINGLE PHASE OUTLET
63	2	CLIPSAL BP165012 WITH 2 X BP195F FEET	NEUTRAL LINKS
64	2	CLIPSAL BP165012	EARTH LINKS
65	50	KLIPPON SAK4/35 (044366)	SWITCHBOARD TERMINALS
65	10	KLIPPON AP(1.5) (011796)	
66	26	KLIPPON ASK 1 (047456)	R.T.U. FUSE TERMINAL
66	26	KLIPPON AP(1.5) (038036)	
66	26	KLIPPON FUSE 1A (043070)	
67	120	KLIPPON SAKT1/35 (010562)	R.T.U. LINK TERMINALS
67	10	KLIPPON TW(3) (024292)	
69	3	CLIPSAL LSP	EARTH BARS
70	2	CLIPSAL 31-94013-172 DECONNECTOR	MAIN PUMP No.1 & No.2 DECONNECTORS
70	2	CLIPSAL 31-9000-027 ADAPTOR	
70	2	CLIPSAL 31-91013-172 PLUG	
83	1	TELEMECANIQUE RXN-41G12P7 WITH RXZ-1G BASE	RTU POWER FAIL RELAY
84	1	TELEMECANIQUE RXN-41G12-12VDC WITH RXZ-1G BASE	RTU BATTERY DISCHARGE RELAY
85	1	POWERBOX P50E-15 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	RTU POWER SUPPLY 13.8VDC
86	1	POWERBOX VIA2645C12 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	RTU 12V/24VDC CONVERTER
88	1	TRIO TP9000R/L (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	RADIO
89	4	HUNTER WATERTECH SYMAX BOOSTER1 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	EXPANSION BASE
90	1	HUNTER WATERTECH PD5500 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	TELEMETRY UNIT
91	2	SYMAX 8005DN116 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	DIGITAL INPUT MODULE
92	1	SYMAX 8005DM11 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	DUMMY MODULE
93	2	SYMAX 8005RT108 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	DIGITAL OUTPUT MODULE
94	2	HUNTER WATERTECH POSBA1 (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	ANALOGUE INPUT MODULE
97	1	HUNTER WATERTECH ANTENNA COMPLETE WITH ACCESSORIES (HUNTER WATERTECH - SUPPLIED BY BRISBANE WATER A.M.P.S.)	ANTENNA

PUMP STATUS  
START  
EMERGENCY STOP  
LOCAL RESET  
LCR61  
ALARM RESET  
SPF  
24VDC SUPPLY  
ATTENTION ALARM  
415VAC  
SUPPLY  
NEUTRAL  
EARTH  
R.T.U. LINK TERMINALS  
EARTH  
RTU POWER FAIL RELAY  
RTU BATTERY DISCHARGE RELAY  
RTU POWER SUPPLY 13.8VDC  
RTU 12V/24VDC CONVERTER  
RADIO  
EXPANSION BASE  
TELEMETRY UNIT  
DIGITAL INPUT MODULE  
DUMMY MODULE  
DIGITAL OUTPUT MODULE  
ANALOGUE INPUT MODULE  
ANTENNA

"AS CONSTRUCTED"

LEGEND:

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

CROSS REFERENCE TABLE

ITEM	SHEET	LINE	ITEM	SHEET	LINE	ITEM	SHEET	LINE	ITEM	SHEET	LINE
C11 - COIL	3	7	C23 - 1 N/O	3	22	RP11 - COIL	3	30	RTU1 - COIL	3	8
- 3 N/D	1	5	(CONT) - 1 N/C	3	18	- 1 C/O	3	13	- 1 N/O	3	5
- 1 N/D	3	10	- 1 N/D	3	13	- 1 C/O	3	13	- 1 N/C	3	8
C12 - COIL	3	8				RP11 - COIL	3	30	RTU1 - COIL	3	16
- 3 N/D	1	4				- 1 C/O	3	30	- 1 N/O	3	12
- 1 N/D	5	11				- 1 C/O	3	30	- 1 N/C	3	17
- 1 N/C	3	9									
C13 - COIL	3	9				RP12 - COIL	3	31	TOL1 - COIL	1	8
- 3 N/D	1	8				- 1 C/O	3	8	- 1 N/O	3	4
- 1 N/D	3	12				- 1 C/O	3	8	- 1 N/C	3	9
- 1 N/C	3	8									
- 1 N/D	3	3	LCR61 - COIL	4	8	RP13 - COIL	3	32	TOL2 - COIL	1	12
			- 1 C/O	4	4	- 1 C/O	3	32	- 1 N/O	3	14
			- 1 N/D	4	4	- 1 C/O	3	32	- 1 N/C	3	15
C21 - COIL	3	17				RP21 - COIL	3	35	TOL5 - COIL	1	30
- 3 N/D	1	19				- 1 C/O	3	35	- 1 N/O	1	2
- 1 N/D	3	20				- 1 C/O	3	35	- 1 N/C	1	2
C22 - COIL	3	18									
- 3 N/D	1	18	PR1 - COIL	2	5	RP22 - COIL	3	36			
- 1 N/D	3	19	- 1 C/O	2	5	- 1 C/O	3	36			
- 1 N/C	3	19	- 1 C/O	2	5	- 1 C/O	3	36			
C23 - COIL	3	19	PR1 - COIL	3	9	RP23 - COIL	3	37			
- 3 N/D	1	22	- 1 C/O	3	9	- 1 C/O	3	37			
			- 1 C/O	3	9	- 1 C/O	3	37			

ORIGINAL

C 11/98 AMEND AS REQUIRED	P.H.
E 18/98 TITLE BLOCK AMENDED	P.H.
A 15/98 ISSUED FOR APPROVAL	P.G.B.
REV DATE	AMENDMENT

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

DESIGN	P.G.B.	DATE
DRAWN	P.G.B.	05-05-98
CHECKED		

JOB FILE	JPR No. E98-A19695/A6
A/FOOD FILE	A19695A6
SURVEY No.	FIELD BOOK
SURVEYED	A.H. DATUM

PROJECT	SPS 280 LAWSON PLACE SEWERAGE PUMPING STATION
TITLE	SWITCHBOARD EQUIPMENT & LABEL SCHEDULE

SCALE: N.T.S.	No.7 OF 9 SHEETS
DRAWING No.	AMEND.

E98-A19695/A6	C
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