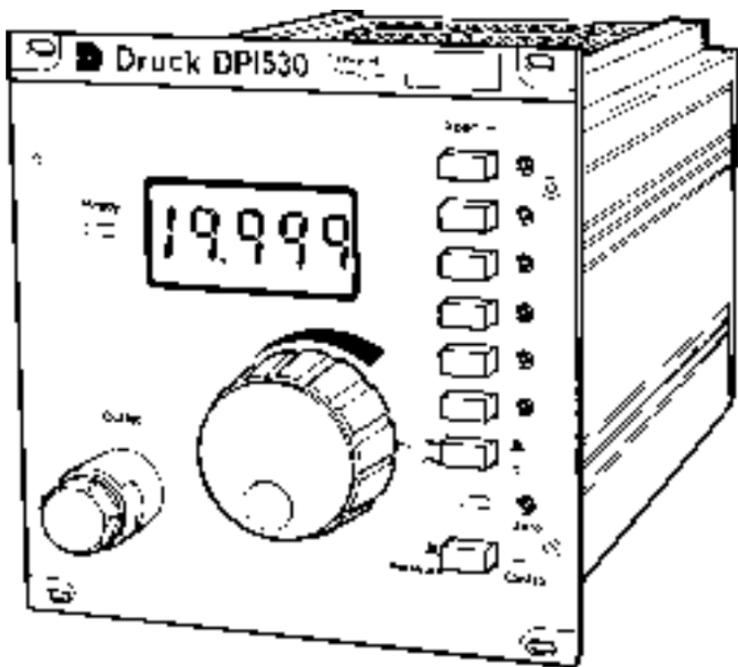


**AvionTEq**

Test with full trust

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

# Druck DPI 530 Sub-Rack Pneumatic Pressure Controller User Manual K162



---

---

---

## Safety

- The manufacturer has designed this instrument to be safe when operated using the procedures detailed in this manual. Do not use this instrument for any other purpose than that stated. Do not apply values greater than the maximum value stated.
- This manual contains operating and safety instructions that must be followed for safe operation and to maintain the instrument in a safe condition. The safety instructions are either warnings or cautions issued to protect the user and the equipment from injury or damage. Use qualified\* personnel and good engineering practice for all procedures in this manual.

### Pressure

Do not apply pressure greater the maximum safe working pressure to the instrument.

### Electrical Safety

This instrument is designed to be safe when using options and accessories supplied by the manufacturer.

### Toxic Materials

There are no known toxic materials used in this instrument.

### Maintenance

The instrument must be maintained using the manufacturer's procedures and should be carried out by authorised service agents or the manufacturer's service departments.

### Technical Advice

For technical advice contact the manufacturer or subsidiary refer to section 5.5.

- \* A qualified person must have attended a product training course given by the manufacturer or appointed agent and successfully completed the training course on this equipment.

## Abbreviations and Symbols

The following abbreviations are used in this manual.

Note: Abbreviations are the same in the singular and plural.

DVM	digital voltmeter
FS	full-scale
IEC	International Electrical Council
inHg	inch of mercury
kg/cm <sup>2</sup>	kilogram per centimetre squared
kPa	kilo Pascal
LCD	liquid crystal display
mA	milli Ampere
mm	milli metre
psi	pound per square inch
V	Volt
VA	Volt amp

### Symbols



Hazard, a warning highlighting a danger that would result in injury. Also a marking on the instrument referring the user to this publication.



Protective conductor terminal



This product meets the essential protection requirements of the relevant EEC directives. Further details of applied standards may be found in the product specification.

## Contents

Section	page
<b>1 Introduction</b> .....	<b>1</b>
1.1 Specification .....	2
<b>2 Installation</b> .....	<b>5</b>
2.1 Mounting .....	5
2.2 Source/Outlet Connections .....	5
2.3 Electrical Connections .....	5
2.4 Pressure Connections .....	11
2.5 Fitting into Euro Rack .....	12
2.6 Applications .....	13
<b>3 Operation</b> .....	<b>19</b>
3.1 Description .....	19
3.2 Controlling a Pressure .....	23
<b>4 Calibration</b> .....	<b>25</b>
4.1 Accuracy Check .....	26
4.2 Pressure Calibration Adjustment .....	28
4.3 Remote Voltage and Current Set-point Calibration Adjustment .....	32
4.4 Assembly .....	34
<b>5 Maintenance</b> .....	<b>35</b>
5.1 Fault Finding .....	35
5.2 Controller Adjustment .....	35
5.3 Leak Check .....	37
5.4 Cleaning .....	38
5.5 Approved Service Agents .....	39

## Illustrations

Figure	page
2-1 Rear Panel Connections .....	6
2-2 Ready Output .....	10
2-3 Euro Sub Rack Fitting .....	12

## Applications

2A Measure or Control Mode .....	14
2B Apply Fixed Set-points .....	14
2C V to P or I to P Conversion .....	15
2D Automatic Pressure Cycling .....	16
2E Pressure Switch Test Cycling .....	17
2F Remote Controller with Ready Signal Interface .....	18
3-1 Schematic Diagram .....	21
3-2 Front Panel .....	22
4-1 Access for Adjustments .....	27
4-2 Printed Circuit Board .....	29
4-3 Units of Pressure Measurement and Switch Positions .....	31
4-4 Units of Pressure Measurement Potentiometers .....	31

## **1 Introduction**

The DPI 530 instrument is a fast response, closed loop, pneumatic pressure controller. It is contained in a Euro sub-rack module that can be mounted in a 3U high sub-rack. A push switch on the front panel enables the instrument to operate in either the pressure measure mode or pressure control mode.

Pressure is sensed by a transducer containing a silicon strain gauge diaphragm with electronic thermal compensation and linearization. One of five units of pressure measurement or percentage of full-scale can be selected by switches on the rear panel of the instrument. A seven segment LCD display shows, in the measure mode, the pressure value and, in the control mode, the set-point value.

In the pressure control mode the set-point can be set by a centrally-located, ten-turn potentiometer or by six independent preset span divider keys. The preset value of each span divider is adjusted by individual potentiometers. Each span divider has full control from the lowest calibrated pressure to the span value. The controller uses pulse width modulation to operate solenoid valves in an analogue control loop.

Remote control can be selected by switches on the rear panel. The instrument can be remotely controlled by an analogue input signal of either 0 to 10 V d.c. or 0 to 20 mA d.c.

A pressure outlet port connection is located on both the front and rear panels; all other connections are on the rear panel.

## 1.1 Specification

Range .....	-1 to 20 bar
Accuracy .....	±0.1 % FS
Temperature effects .....	combined zero and span shifts of <0.5%FS (over 0 - 50°C)
Stability .....	<0.025% rdg per 90 days
Controller stability .....	<0.01% FS
Maximum Safe Working Pressure .....	2 x FS
Pneumatic Supply .....	clean, dry non-corrosive gas
source pressure .....	110 to 140% FS
vent pressure .....	at least 5% FS less than the lowest controlled pressure

## Pneumatic Connection

Outlet .....	front and rear panel G1/8 female
Reference .....	rear panel M5 female
Source .....	rear panel G1/8 female
Vent .....	rear panel G1/8 female

Five selectable units of pressure measurement and percentage of full-scale  
bar, psi, kg/cm<sup>2</sup>, kPa, inHg, 0-100%FS

## Electrical Safety

..... meets EN61010-1 as applicable  
The instrument must be connected to power supply with a protective earth/  
ground conductor.

## Power supply

Voltage .....	88 to 130 or 205 to 260 V (set at manufacture)
Power consumption .....	15 VA
Frequency .....	45 to 65 Hz

Remote controlVoltage ..... 0 to 10 V, input impedance >500 k $\Omega$ Current ..... 0 to 20 mA, 100 $\Omega$  sense

Display ..... 7-segment LCD

read-out ..... 19999

resolution ..... Better than  $\pm 0.005\%$  FS**Electromagnetic compatibility**

This instrument complies with European EMC directive and meets:

..... EN 50081-1 (emissions)

..... EN 50082-1 (immunity)

**Environmental**

## Temperature

Operating ..... 0° to 50° C

Storage ..... -20° to +70° C

Ingress protection ..... front panel to IP40

Dimensions ..... 130 mm x 120 mm x 190 mm  
(3U sub-rack, 24 HP wide)

Weight ..... 2 kg

(blank page)

## 2 Installation



Installation must be carried out by suitably qualified installation personnel.

### 2.1 Mounting

This instrument is a 3U high, Euro sub-rack unit, designed to be mounted in a Euro Sub-rack.

### 2.2 Source/Outlet Connections (Figure 2-1)

The common front and rear pressure outlet ports should have a blanking plug fitted when not in use. All other the connections to the instrument are on the rear panel. Figure 2-1 shows the rear panel pressure and electrical connections.

**Note:** Allow enough cabling and piping for the instrument to be pulled out from the sub-rack for access to the connections.

### 2.3 Electrical Connections (Figure 2-1)

Before connecting the instrument, make sure the DIP switches are set on the rear panel for:

- Units of measurement
- Decimal point position on the display
- Local or remote operation



#### WARNINGS

- 1 **VOLTAGES IN EXCESS OF 30 V (RMS) A.C. OR 50 V D.C. CAN, IN CERTAIN CIRCUMSTANCES, BE LETHAL. CARE MUST BE TAKEN WHEN WORKING ON LIVE, EXPOSED CONDUCTORS.**
- 2 **ISOLATE THE POWER SUPPLY BEFORE CONNECTING THE INSTRUMENT.**
- 3 **ISOLATE THE POWER SUPPLY BEFORE REMOVING THE INSTRUMENT COVERS.**

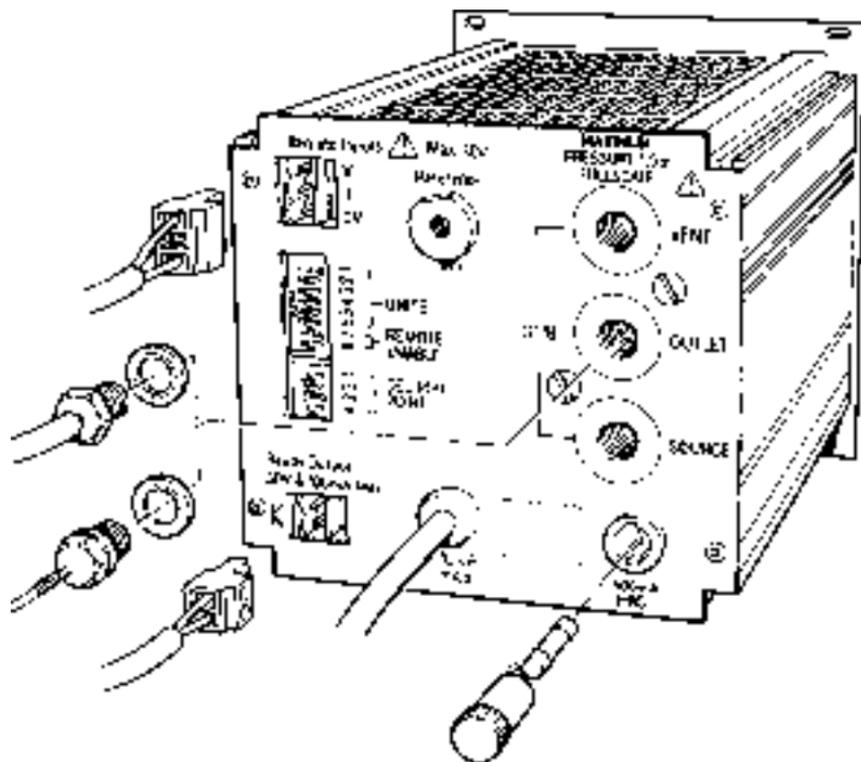


Figure 2-1 Rear Panel Connections

## CAUTIONS

- 1 **USE THE CORRECT POWER SUPPLY SETTINGS. OPERATING VOLTAGE RANGES ARE MARKED ON THE REAR PANEL OF THE INSTRUMENT AND DETAILED IN THE SPECIFICATION.**
- 2 **THE EARTH/GROUND CABLE (COLOURED GREEN/YELLOW) MUST BE CONNECTED TO THE POWER SUPPLY SAFETY EARTH/GROUND.**

## 2.3.1 Setting the Pressure Measurement Units

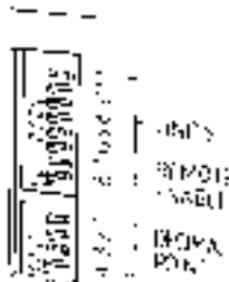
Set the required pressure measurement units by selecting the applicable DIP switches on the rear panel.

**Note:** All other switches in the group (1-6) should be set to OFF (left).

If necessary, change the front panel label to show the new units of pressure measurement. This illustration shows bar selected.

## Switch Pressure

Position	Unit
1	On bar (for instruments <1bar)
1	On mbar (for instruments >1 bar)
2	On psi
3	On kg/cm <sup>2</sup>
4	On kPa
5	On inHg
6	On 0 to 100% F.S.



### 2.3.2 Set-up Decimal Point Position

Set the decimal point position by selecting the switches on the rear panel to on as shown below.

**Note:** All other switches in the (1 to 4) group should be set to OFF.

Switch	Position	Display
4	On	1.9999
3	On	19.999
2	On	199.99
1	On	1999.9

### 2.3.3 Enable Remote Control

- For local control from the front panel potentiometer or span divider keys, set switch 7 to ON and switch 8 to OFF.
- For remote control from either an external voltage or current source, set switch 8 to ON and switch 7 to OFF.

### 2.3.4 Power Supply Connections

A.C. power is supplied to the instrument through a captive power supply cable. Figure 2-1 shows the cable and the related power supply fuse.

- Connect the power supply cable to the power supply as follows.

Brown	-	Live (L)	
Blue	-	Neutral (N)	
Green/Yellow	-	Ground (Protective Earth)	

*For U.S. Versions*

Black	-	Live (L)	
White	-	Neutral (N)	
Green	-	Ground (Protective Earth)	

- It is recommended that a power supply isolator is fitted between the power supply and the instrument.

- Switch on the a.c. power supply and check that the instrument's display comes on.
- If the instrument's display does not come on, isolate the power supply and check the power supply fuse.

### 2.3.5 Remote Input

To set remote control, proceed as follows.

- Remove the remote connector from the instrument and connect up the remote supply (1) as shown below.
- Ensure that remote control is enabled (refer to Section 2.3.4).
- Insert the remote connector (1) into the remote socket.

Voltage:

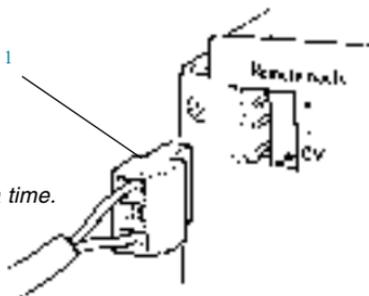
Use V (+ve) and 0V.

Current:

Use I (+ve) and 0V.

**Note:**

*Only one type of remote input can be used at a time.*



### 2.3.6 Ready Output (Figure 2-2)

The ready output connection on the rear panel is an optically isolated open collector transistor. It can be used in control systems to carry a maximum of 30 V at 100 mA e.g., to energize an external relay or indicator.

#### Example

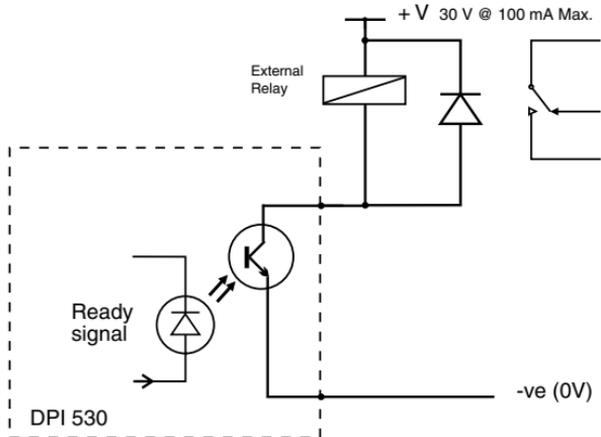
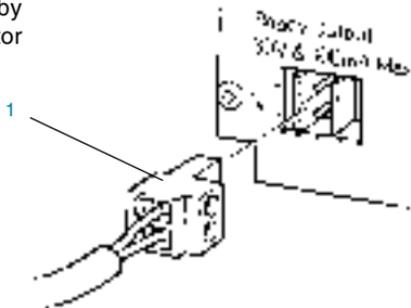


Figure 2-2 Ready Output

Connect the ready output by pushing the two-pin connector (1) into the rear panel socket.



## 2.4 Pressure Connections



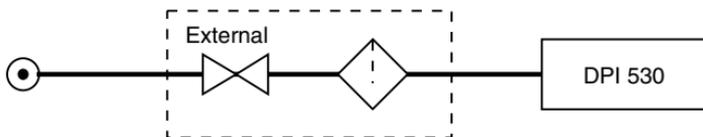
### WARNINGS

1. **BEFORE CONNECTING/DISCONNECTING PRESSURE COUPLINGS, RELEASE THE PRESSURE AND VENT THE PIPES.**
2. **ONLY USE CORRECTLY RATED PRESSURE PIPES AND FITTINGS.**

#### 2.4.1 Procedure (Figure 2-1)

Make sure that the supply source complies with the specification.

- o Make sure the supply pressure is isolated from the supply source pipe. It is recommended that an isolation valve and a 40 micron filter are fitted between the supply pressure and the instrument as shown below.



- o Connect the supply pressure to the **source** port, fitting a bonded seal between the pressure union and the port. All ports use a G 1/8 thread, except the **reference** port (M5). Make sure that each coupling is tight.
- o Fit the outlet pipe to either the front or rear outlet port, using a bonded seal. Fit a blanking plug and bonded seal to the unused port.

### 2.5 Fitting into Euro Rack (Figure 2-3)

When connected, slide the instrument into the Euro rack and secure in position with the four captive fixing screws (1).

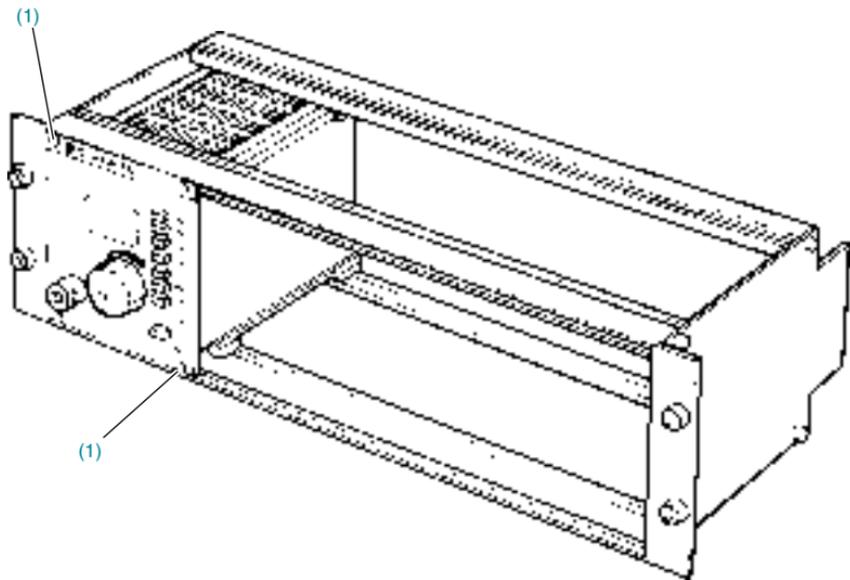


Figure 2-3 Euro Sub Rack Fitting

## 2.6 Applications

The DPI 530 instrument can be used in many ways for carrying out tests and supplying regulated pressure to external systems. Table 2-1 below lists some application examples and the following figures show the instrument configuration.

Table 2-1

Application	Figure No.
Measure or Control Mode	2A
Apply fixed Set-points (span dividers)	2B
Voltage or Current to Pressure Conversion	2C
Automatic Pressure Cycling	2D
Pressure Switch Test Cycling	2E
Remote Controller with Ready Signal Interface	2F

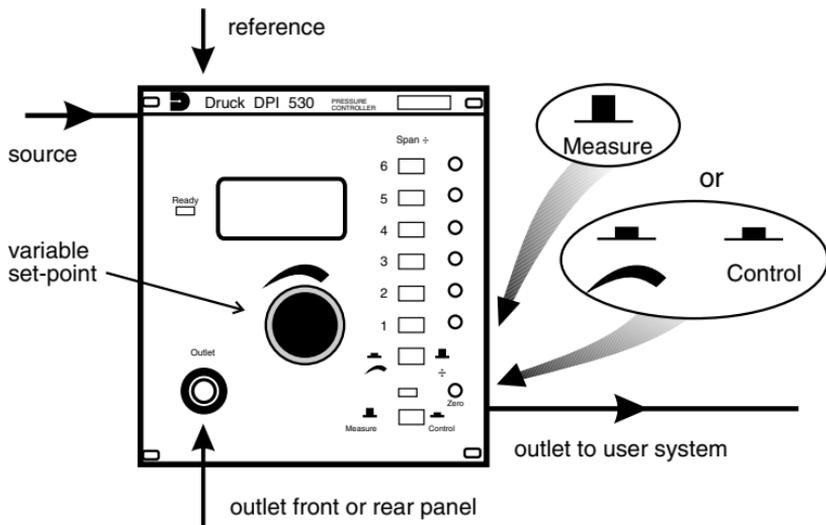


Figure 2A Measure or Control Mode

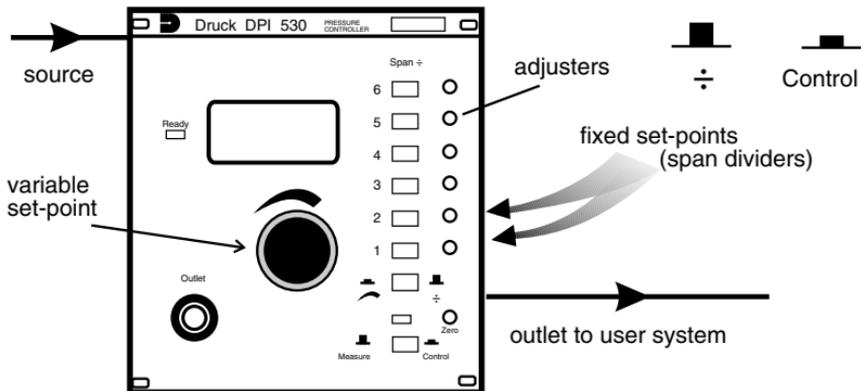


Figure 2B Apply Fixed Set-points (span dividers)

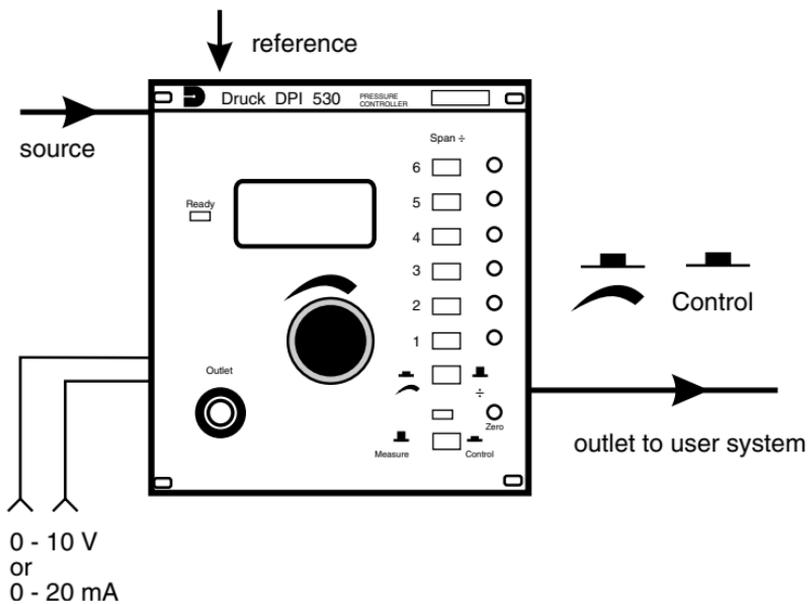


Figure 2C V to P or I to P Conversion

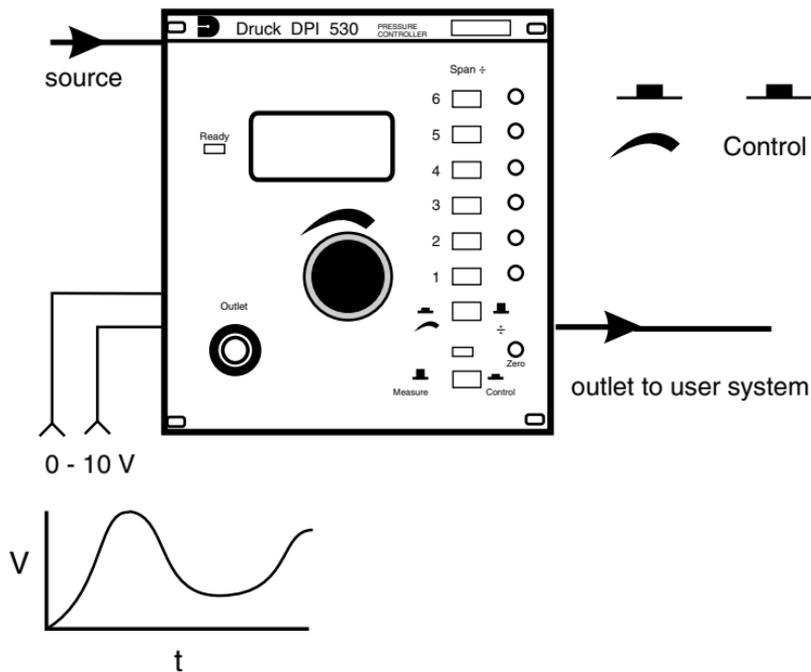


Figure 2D Automatic Pressure Cycling



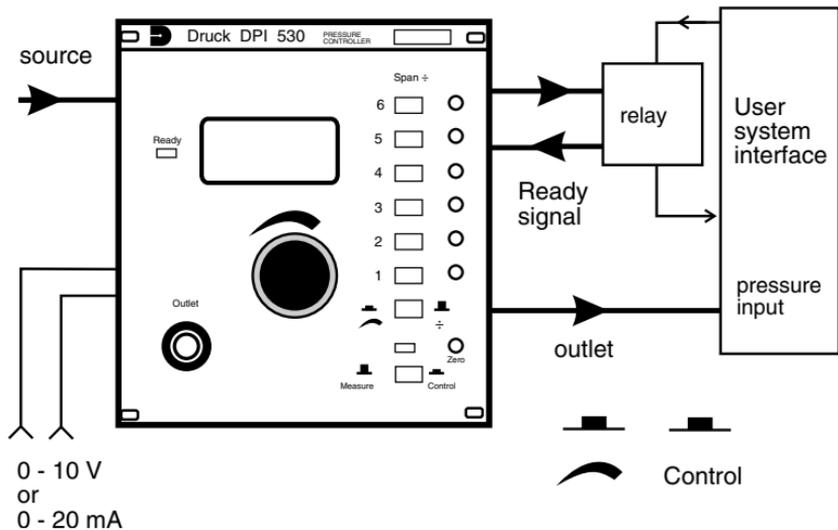


Figure 2F Remote Controller with Ready Signal Interface

## 3 Operation

### 3.1 Description

This instrument operates in two modes, measure and control. A push switch on the front panel switches between the two modes. An LED indicates green for measure mode and red for control mode. A further push switch on the front panel switches between the span divider and the set-point adjuster.

#### 3.1.1 Measure Mode

In the measure mode the transducer senses the pressure at the outlet port and displays the resulting pressure reading. The controller remains switched off and disabled in measure mode.

#### 3.1.2 Control Mode

In the control mode, the instrument's controller changes the pressure to the value selected by either the span divider or set-point adjuster. When the controller reaches the set-point the 'Ready' LED illuminates.

In the remote control mode an input voltage of 0 to 10 V or 0 to 20 mA controls the pressure. A varying voltage or current may be used to replace the set-point signal from the set-point adjuster or span divider controls. When enabled on the rear panel, the voltage or current can be used to change the set-point over the full-scale of the instrument, including negative pressures to -1 bar.

### 3.1.3 Functional Description (Figure 3-1)

The instrument's controller uses pneumatic valves to control the flow (pressure) of the gas from a source pressure. The valves are energised by a pulse width modulated signal. A transducer mounted on the manifold measures the pressure and produces a feedback signal proportional to the outlet pressure. The error amplifier compares this signal with the set-point signal to produce a bipolar error signal proportional to the difference. The control conditioner buffers the error signal to drive the PWM which, in turn, drives the pneumatic valves to change the output pressure towards the set-point.

As the outlet pressure changes towards the set-point, the transducer output changes and the error signal decreases until the system balances at the set-point. When the system balances a ready signal illuminates the 'Ready' LED. The ready signal also supplies an opto-isolated open collector NPN transistor that can be used to supply an external solenoid or relay.

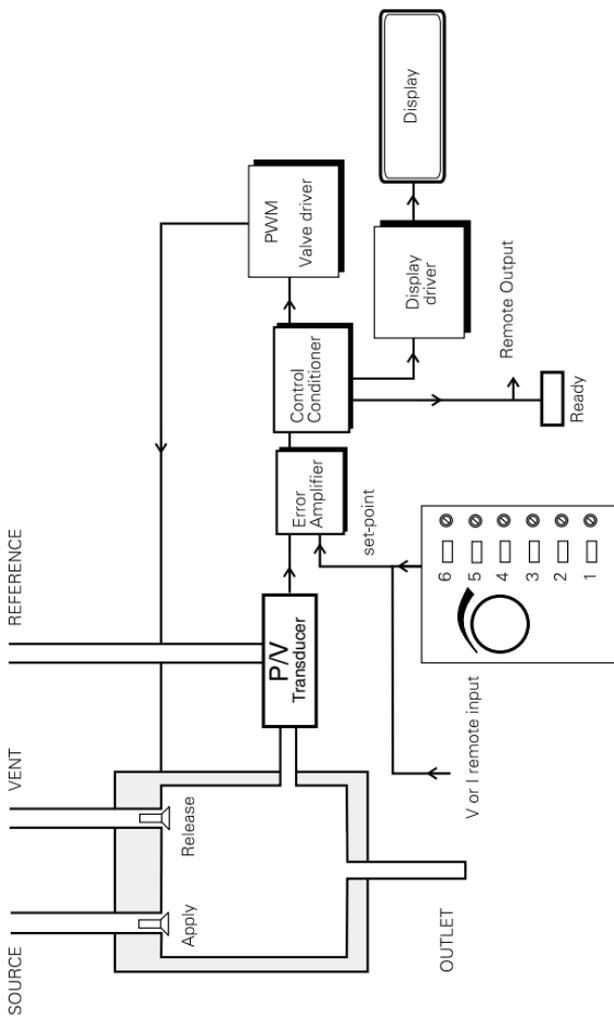


Figure 3-1 Schematic Diagram

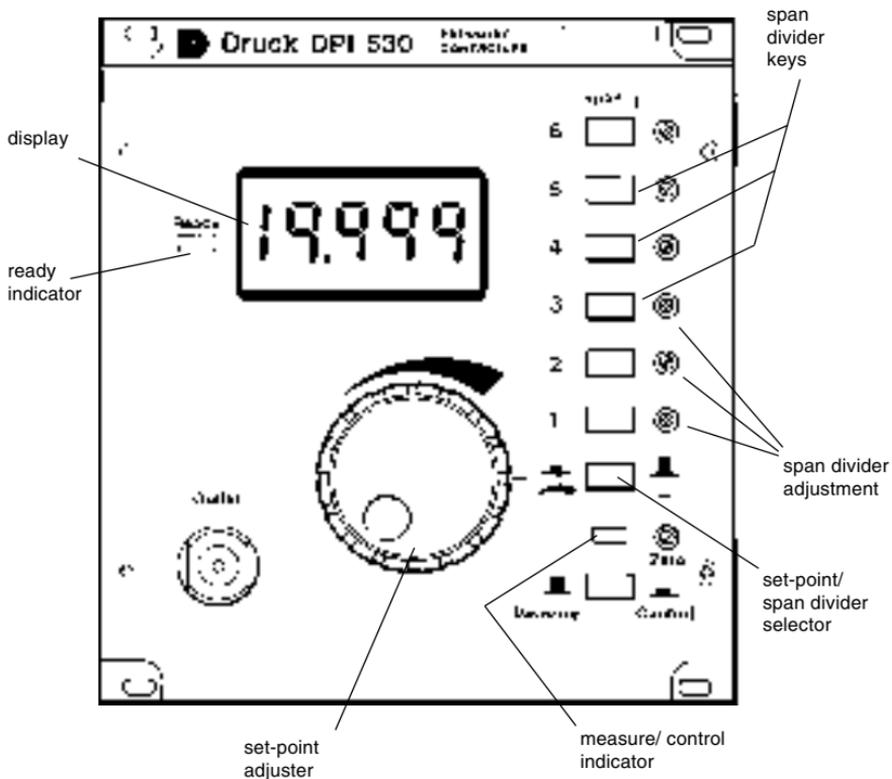


Figure 3-2 Front Panel

### 3.2 Controlling a Pressure (Figure 3-2)

The set-point adjuster controls the output of the instrument and can set a level between 0 and 100% full-scale. The span divider keys, can be set to select a controlled output of between 1 and 100% of the current set-point. Each span divider key can be individually preset by a corresponding potentiometer of the current set-point between 1 and 100%.

#### 3.2.1 Setting an Output Pressure

To set up an output pressure, proceed as follows:

- Switch the power supply on and check the LED illuminates green.
- Press the set-point/span divider selector to select set-point adjuster.
- Turn the set-point adjuster fully counter-clockwise.
- Connect the pressure output port to the system as required and turn the source pressure ON.
- Press the mode switch to select control mode.
- Check that the display reads zero.
- Turn the set-point adjuster to the required value, the Ready LED extinguishes. When the controller reaches the set-point the Ready LED illuminates.

#### 3.2.2 Use of Span Divider Keys

After setting an output pressure, the set-point can be divided into preset steps by using the span divide keys as follows:

- Press the set point/span selector switch to select span divider keys.
- Press the required span divider key, when the controller reaches the new set-point, the Ready LED illuminates.
- If necessary, use the span adjuster potentiometer to adjust for the required value.
- To set other span divider ratios, press the required key. If necessary, use the appropriate span adjuster potentiometer to adjust for the required value.

### 3.2.3 Remote Operation

For remote operation the instrument correctly configured using the rear panel switches refer to the installation section for details.

- . Control signal required:  
0 - 10 V = 0 - 100% FS  
or 0 - 20 mA = 0 - 100%FS
- . Connect the outlet to the system as required, turn the source pressure on.
- . Press the mode switch to select control mode and set the remote control signal to zero.
- . Switch the instrument on and check the LED illuminates red and the Ready LED illuminates.
- . Check the display reads zero.
- . Set the remote control signal to the required level and check the Ready LED extinguishes and the displayed pressure reading changes.
- . When the controller reaches the set-point, the Ready LED illuminates.

### 3.2.4 Controller Performance (fill rate)

There are many factors affecting the rate that the controller changes pressure to the new set-point. The differential pressure across the valve, the size of pipes in the system and volume of the system are all factors. A **typical** time to set-point would be:

- o For controller volume only - 2 seconds  
zero to full-scale
- o For controller and 1.5 litre volume - 45 seconds  
zero to full-scale

## 4 Calibration

The instrument is supplied with a calibration certificate. For the instrument to stay accurate it is recommended that the instrument is checked every 12 months.

- The use of a Class A compensated deadweight tester is recommended.
- The following procedures should be carried out in a controlled environment by qualified personnel.
- If the accuracy of the instrument is not within the specification, carry out a calibration adjustment procedure.
- A qualified person must have attended a product training course given by the manufacturer or appointed agent and successfully completed the training course on this equipment.
  - The manufacturer offers a comprehensive and, if required, UKAS accredited calibration service.

### • Calibration Check

A calibration check should be carried out at chosen intervals. The readings of the instrument should be compared with a pressure standard and, after any adjustments for accuracy (traced to National Standards), the differences recorded. The adjusted differences can then be compared with the required accuracy for the instrument. If necessary a calibration adjustment can be carried out.

The recommended procedure is to check at increasing and then decreasing intervals of 0, 20, 40, 60, 80 and 100% of full-scale.

## 4.1 Accuracy Check

If the accuracy or stability of the instrument is suspect the following accuracy and temperature performance checks can be carried out.

### Equipment

- Pressure standard with less than 0.025% FS non-linearity and non-repeatability.

### Environment

- The procedure must be carried out at ambient pressure and at a temperature of between +18° to +23°C.

### Procedure

1. Connect the pressure standard to the outlet connector, fit a blank the outlet connection not in use.
2. Select measure mode and switch the instrument on. Wait 1 hour.
3. Adjust the pressure standard to zero pressure, check the display shows zero pressure. If necessary, turn the zero adjuster to show zero.
4. Adjust the pressure standard to a pressure of 50% FS and record the display reading.
5. Adjust the pressure standard to a pressure of 100% FS and record the display reading.
6. Adjust the pressure standard to a pressure of 0% FS and record the display reading.
7. The maximum error for the recorded readings is 0.1%FS. If the error is more than the maximum value carry out a pressure calibration adjustment

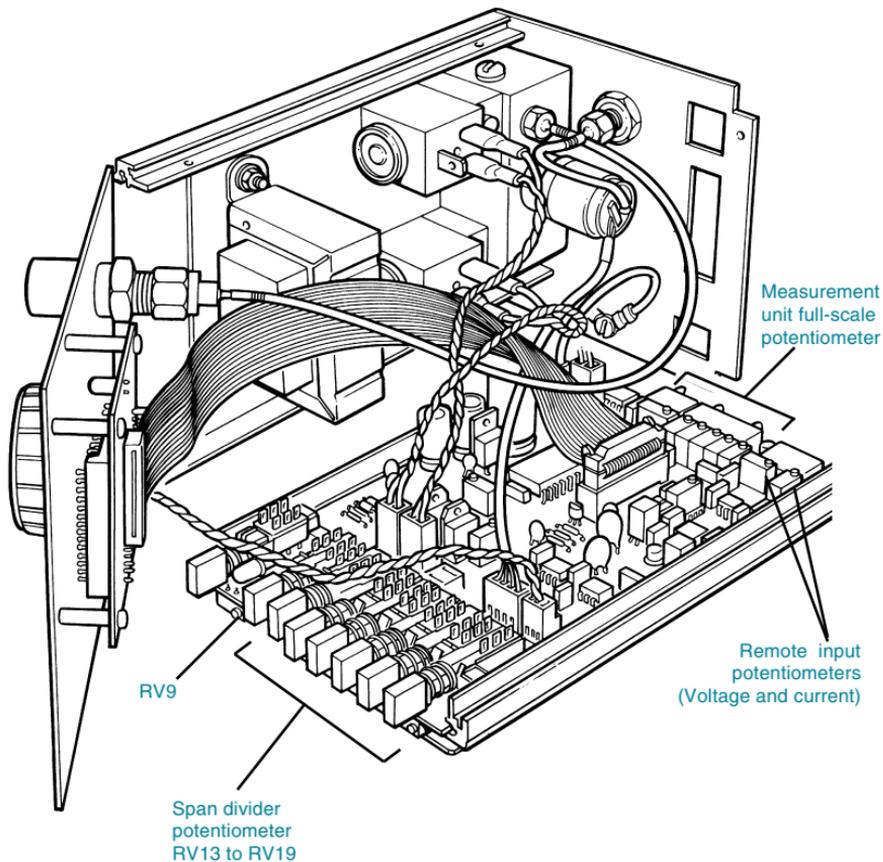


Figure 4-1 Access for Adjustments

## 4.2 Pressure Calibration Adjustment

To carry out this procedure the instrument must be dismantled to access the potentiometers on the PCB.

### Equipment

- Pressure standard of less than 0.025% FS non-linearity and non-repeatability.

### Dismantling (Figure 4-1)

1. Remove the instrument from its installed position.
2. Unscrew and remove the two countersunk screws from the right-hand side of the front panel.
3. Unscrew and remove the four screws securing the rear panel.
4. Carefully position the dismantled instrument to access the potentiometers on the PCB.

### Procedure (Figure 4-2)

1. Connect the pressure standard to an outlet connection. Fit a blank to the other outlet connection.
2. Apply electrical power to the instrument. Wait at least 1 hour for the instrument to stabilise.
3. Select measure mode and set the instrument to read bar (see section 2.3).
4. Adjust the pressure standard to zero pressure.
5. If necessary, adjust potentiometer RV9 for a reading of zero  $\pm 3$  counts on the display.
6. Adjust the pressure standard to 80% of full-scale pressure.
7. If necessary, adjust potentiometer RV3 for a reading of 80% FS.

8. Maintain the applied pressure at 80% FS and, if necessary, adjust each unit of pressure measurement potentiometer as follows:

- Set the switch SW to the next unit of pressure measurement.
- Adjust the appropriate potentiometer detailed in Figure 4-3 and shown in Figure 4-4.
- Reset the switch SW to unit 1 and, if necessary, adjust potentiometer RV3 for a reading of 80% FS.



9. Adjust the pressure standard to zero pressure.
10. Adjust the pressure standard in 20% increments up to 100% FS and record the display reading at each pressure.
11. Repeat step 10 for 20% decrements to zero pressure.
12. The difference between the recorded pressure values and the applied pressures must not be more than 0.1%FS.
13. If the readings are still not within tolerance, the transducer must be replaced.
14. Reset the switch SW-3 to the units of pressure measurement required for normal operation.
15. Reassemble the instrument as detailed in section 4.4.

Units	Switch SW3	Potentiometer
bar	Sw3.1	RV3
psi	Sw3.2	RV4
kg/cm <sup>2</sup>	Sw3.3	RV5
kPa	Sw3.4	RV6
inHg	Sw3.5	RV7
0 to 100%	Sw3.6	RV8

Figure 4-3 Units of pressure measurement and switch positions

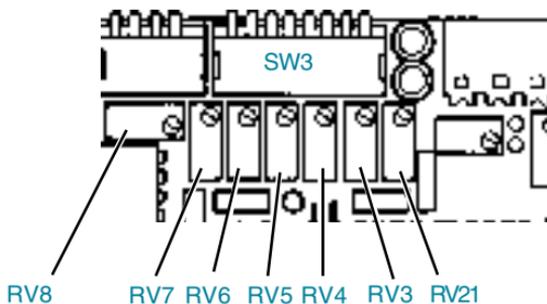


Figure 4-4 Units of pressure measurement potentiometers

### 4.3 Remote Voltage and Current Set-point Calibration Adjustment

The following adjustments can only be carried out with the instrument dismantled.

#### Equipment

- |   |                         |                   |
|---|-------------------------|-------------------|
| ○ | Digital voltmeter       | 0.05% FS accuracy |
| ○ | Variable voltage source | maximum 10 V      |
| ○ | Variable current source | maximum 20 mA     |

#### 4.3.1 Current Input (Figure 4-2)

##### Preparation

1. Select control mode.
2. Set SW3-7 to open and SW3-8 to closed.
3. Connect the remote source current to the remote connector pins 1 and 2.

##### Procedure

1. Switch the instrument on.
2. With zero current flow set on the power source, check the instrument display shows 0 counts  $\pm 2$  counts. If necessary, adjust potentiometer RV22 for this setting.

**Note:** *This adjustment is for voltage and current input.*

3. Set the power source to approximately 20 mA and record the actual input current reading.
4. Calculate the following:  $\text{Instrument reading} = \frac{\text{input current}}{20 \text{ mA}} \times \text{FS}$
5. If necessary, adjust potentiometer RV21 for this value.
6. Switch the instrument off.

**Example**

FS = 350 mbar                      input current = 19.986 mA

Adjust instrument reading to:

$$\frac{19.986}{20 \text{ mA}} \times 350 \text{ mbar} = 349.8 \text{ mbar}$$

**4.3.2 Voltage Input (Figure 4-2)****Preparation**

1. Set SW3-7 to open and SW3-8 to closed.
2. Connect the power source to pin 1 to +ve and pin 3 to -ve.

**Procedure**

1. Switch the instrument on.
2. Select control mode.
3. Set the power source to approximately 10 V and record the DVM reading.
4. Calculate the following:  $\text{Instrument reading} = \frac{\text{DVM reading}}{10\text{V}} \times \text{FS}$
5. If necessary, adjust potentiometer RV20 for this value.
6. Switch the instrument off.

**Example**

FS = 350 mbar                      applied voltage = 9.978 V

Adjust instrument reading to:

$$\frac{9.978}{10 \text{ V}} \times 350 \text{ mbar} = 349.2 \text{ mbar}$$

Reassemble the instrument as detailed in the section 4.4.

#### 4.4 Re-assembly (Figure 4-1)

1. Carefully locate the PCB in the front panel and secure with the two countersunk screws.
2. Locate the top and bottom panels in the grooves of the side panels and then locate the rear panel.
3. Secure the rear panel to the assembled instrument with the four screws.
4. After completion carry out an accuracy check (section 4.1) and a leak check (section 5.3).

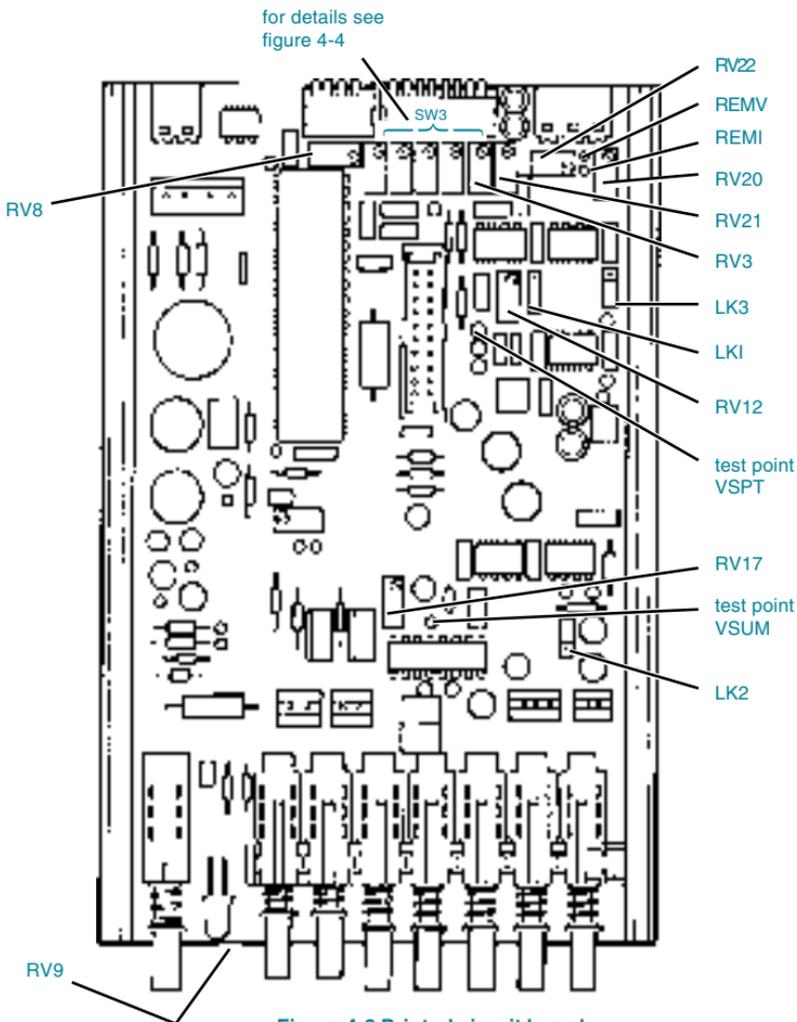


Figure 4-2 Printed circuit board

## 5 Maintenance

There is no routine maintenance on this instrument.

### 5.1 Fault Finding

Carry out the following general fault location routines in Table 5.1.

### 5.2 Controller Adjustment

This procedure should only be carried out after a leak check (section 5.3) and when the instrument's outlet pressure becomes unstable or there is too much noise or unusual noise from the controller valves. The instrument must be disassembled as described in the calibration procedure.

#### Equipment

- |   |                         |                   |
|---|-------------------------|-------------------|
| o | Digital voltmeter (DVM) | 0.05% FS accuracy |
| o | Source pressure         | 120% FS           |

#### Preparation

1. Turn the set-point adjuster to the fully counter-clockwise position.
2. Select the instrument to measure mode.
3. Make sure that there is no pressure at the outlet connections and fit blanks to both connections.
4. Connect the DVM +ve to TP VSUM and -ve to 0V.
5. Connect source pressure and the power supply.

#### Procedure (Figure 4-2)

1. Switch the instrument on and turn potentiometer RV17 to the fully counter-clockwise position.
2. Select to position B links LK1 and LK3.
3. Carefully adjust potentiometer RV12 for a DVM reading of  $0V \pm 0.1V$ .

**Note:** *In this system there is high gain with a slow time constant.*

4. Check that the Ready LED comes on.

FAULT	CAUSE	ACTION
Display shows: 1-, ., -- -	Over-range condition	Reduce source pressure.
Ready LED illuminated at all times and modes	Source pressure failure.	Re-apply source pressure.
Ready LED never illuminates	Set-point value greater than source pressure.	Reduce set-point value.
Source pressure ok, no Ready LED illuminated	<ol style="list-style-type: none"> <li>Ingress of matter or other contamination.</li> <li>Excessive wear of valves.</li> </ol>	<ol style="list-style-type: none"> <li>Remove matter or contamination.</li> <li>Excessive wear of valves, return to manufacturer.</li> </ol>
Unsteady reading	<ol style="list-style-type: none"> <li>Unsteady source pressure.</li> <li>Electrical noise (especially in remote mode).</li> </ol>	<ol style="list-style-type: none"> <li>Apply stable pressure source.</li> <li>Check for electrical noise and rectify.</li> <li>Carry out temperature performance check.</li> <li>Return to manufacturer.</li> </ol>
No indications	<ol style="list-style-type: none"> <li>Power supply failure.</li> <li>Fuse blown.</li> <li>Voltage setting incorrect.</li> </ol>	<ol style="list-style-type: none"> <li>Check and rectify power supply.</li> <li>Replace fuse.</li> <li>Set correct Voltage.</li> </ol>
No decimal point, no local/remote selection, display drifting.	Incorrect or no settings made on rear panel switches.	Set rear panel switches
Inaccurate reading		Carry out accuracy check.
Controller on - Outlet pressure unstable or noisy valves.	<ol style="list-style-type: none"> <li>Instrument pneumatic leak.</li> <li>Controller out of adjustment.</li> </ol>	<ol style="list-style-type: none"> <li>Carry out leak test</li> <li>Carry out controller adjustment.</li> </ol>

**Table 5.1 Fault Finding**

Further problems contact the manufacturer.

6. Select to position A links LK1 and LK3.
7. Turn the set-point adjuster to the fully clockwise position. Check that the Ready LED goes off.
8. Turn the set-point adjuster to the fully counter-clockwise position. Check that the Ready LED comes on.
9. Select control mode and carefully turn RV17 clockwise. Stop when the control valves start to resonate.
10. Slowly turn the set-point adjuster to 50% FS checking that the controller does not become unstable. If instability occurs, carefully turn RV17 counter-clockwise and then slowly increase the set-point to 90% FS.
11. Select, in turn, the preset span divider keys and check at each selection that the controller remains stable.

### **5.3 Leak Check**

1. Switch the instrument on, select control mode and set-point of 50% FS.
2. Select measure mode and the record the pressure reading.
3. Wait 30 seconds.
4. Record the pressure reading.
5. If the difference between the two readings is more than 0.5%FS/minute there is a leak.
6. To locate the leak separate the system from the instrument.
7. Fit blanking plugs to both outlet ports and repeat steps 1 to 6.
8. If there is a system leak, carry out the appropriate procedures to rectify the leak.
9. If the leak is in the instrument return the instrument, to the manufacturer or agent.

Assemble the instrument as detailed in the section 4.4.

## 5.4 Cleaning

Clean the instrument case with a damp, lint-free cloth and mild detergent.

## 5.5 Approved Service Agents

*The following are approved agents for the servicing of Druck instruments.*

### **FRANCE**

---

Druck SA,  
19 rue Maurice Pellerin,  
92600 Asnières,  
FRANCE.  
Tel: (1) 43 34 24 75  
Fax: (1) 43 34 86 08

### **GERMANY**

---

Druck Messtechnik GmbH.,  
Auf dem Hohenstein 7,  
61231 Bad Nauheim,  
GERMANY.  
Tel: (6032) 93300  
Fax: (6032) 933080

### **HOLLAND**

---

Druck Nederland B.V.,  
Postbus 232,  
Zuideinde 37,  
2991 LJ Barendrecht,  
The Netherlands.

Tel: (01806) 11555  
Fax: (01806) 18131

### **ITALY**

---

Druck Italia Srl.,  
Via Magenta 77, edificio 5,  
20017 Rho Milano,  
ITALY.  
Tel: 00 02 932061  
Fax: 00 02 93206299

### **JAPAN**

---

Japan  
Druck Japan KK,  
Medie Corp Building 8,  
2-4-14 Kichijyoji-Honcho,  
Musashino,  
Tokyo 180,  
JAPAN.  
Tel: (81) 422 20 7123  
Fax: (81) 422 20 7155

### **UK**

---

Druck Limited,  
Fir Tree Lane  
Groby,  
Leicester LE6 0FH,  
England,  
UNITED KINGDOM.

Tel: (0116) 231 7100  
Fax: (0116) 231 7103

### **USA**

---

Druck Incorporated,  
4 Dunham Drive,  
New Fairfield,  
Connecticut 06812,  
USA.

Tel: (203) 746 0400  
Fax: (203) 746 2494