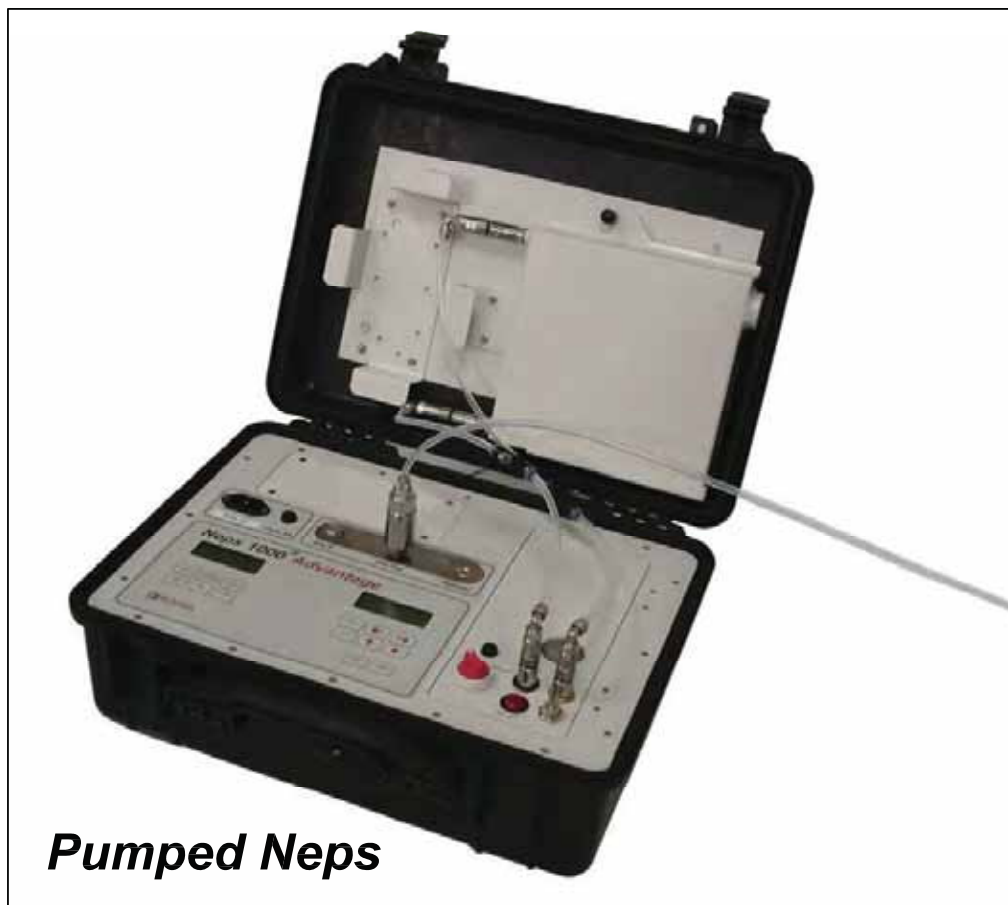


# NEPS 1000 P ADVANTAGE OPERATORS MANUAL



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## SCOPE OF PUBLICATION

This publication covers the Nitrogen Enhanced Purge System NEPS 1000 P ADVANTAGE.

The purging system has a positive/positive dry gas purge facility which may be pre-set at three levels, 0.3 lb f/in<sup>2</sup> (2.0 KPa) to 1.5 lb f/in<sup>2</sup> (10.5 KPa), 0.3 lb f/in<sup>2</sup> (2.0 KPa) to 2.5 lb f/in<sup>2</sup> (17.5 KPa) and 0.3 lb f/in<sup>2</sup> (2.0 KPa) to 5 lb f/in<sup>2</sup> (35.0 KPa). Additionally, the purging system may be used as a monitoring unit to measure the dewpoint temperature of the purge gas, etc.

An optional extra is the use of a remote sensor which may be either screwed into the equipment to be conditioned or mounted in an adaptor block that is fitted close to the purge point on the equipment. This enables the actual dewpoint temperature within the equipment being conditioned to be monitored directly, making this the most efficient purge method.

## WARNINGS AND CAUTIONS

The NEPS 1000 P ADVANTAGE is a dry air purge system that is simple and easy to operate. However, like all such equipment, the safety of personnel and the serviceability of the equipment can be affected if the basic safety precautions are not observed and specific operating instructions are ignored. Potential hazards associated with operation and maintenance and the necessary precautionary actions are summarized below.

**LETHAL VOLTAGES ARE PRESENT. ALWAYS ENSURE THAT THE INPUT SUPPLY IS SWITCHED OFF EXTERNALLY BEFORE CONNECTING OR DISCONNECTING OR MAINTAINING THE NEPS 1000 EQUIPMENT.**

## CAUTION

1. Always check the dewpoint temperature of the gas before using the purging system in its conditioning function.
2. Under no circumstances should the connecting tubing be removed before the purging equipment has stopped operating, otherwise the specified dewpoint temperature will not be achieved.
3. Ensure that all connecting tubing are securely fixed in position, otherwise a possible leakage could affect the efficiency of the NEPS 1000 P ADVANTAGE system.

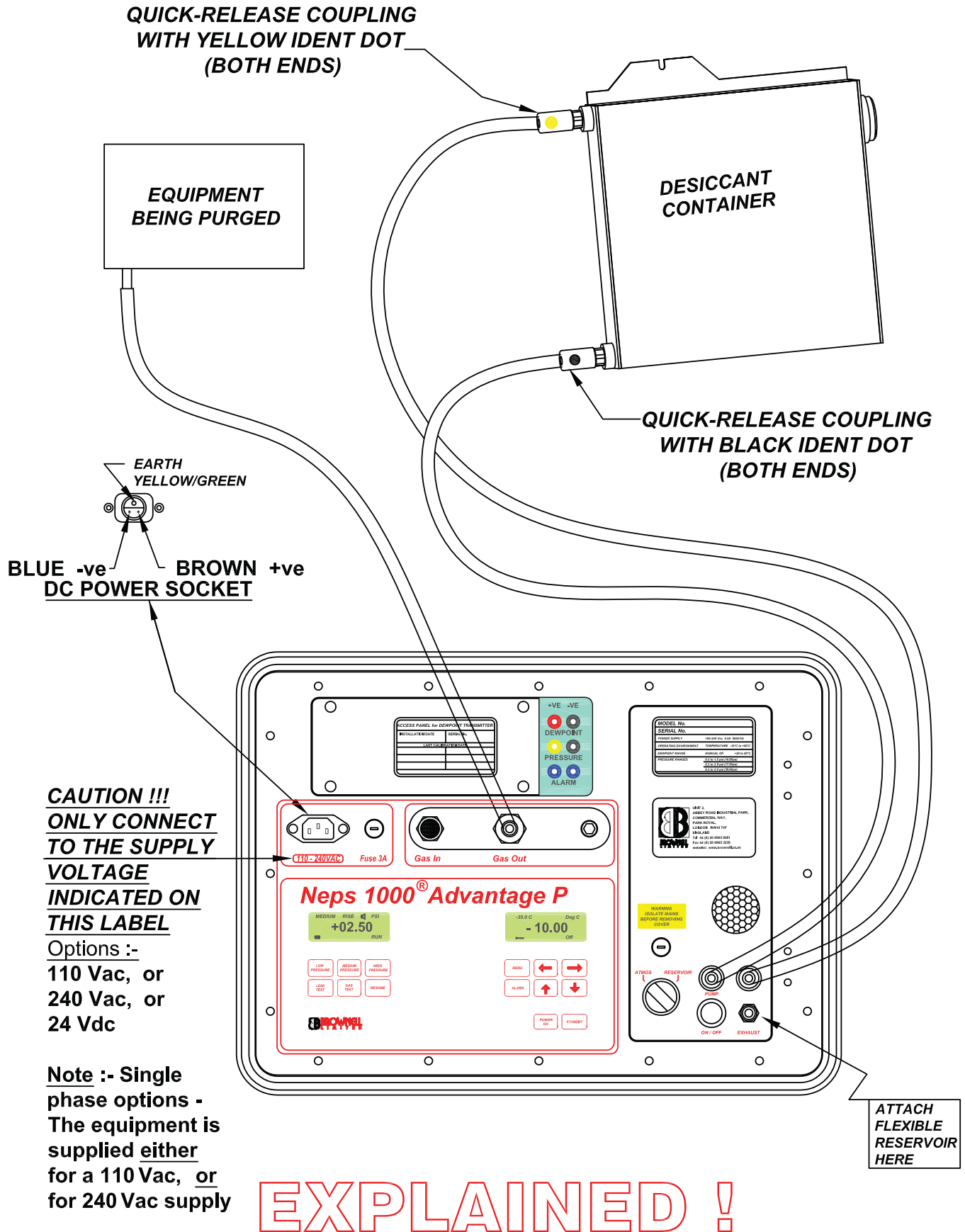
## MODIFICATION RECORD

## Dry Air Purge System

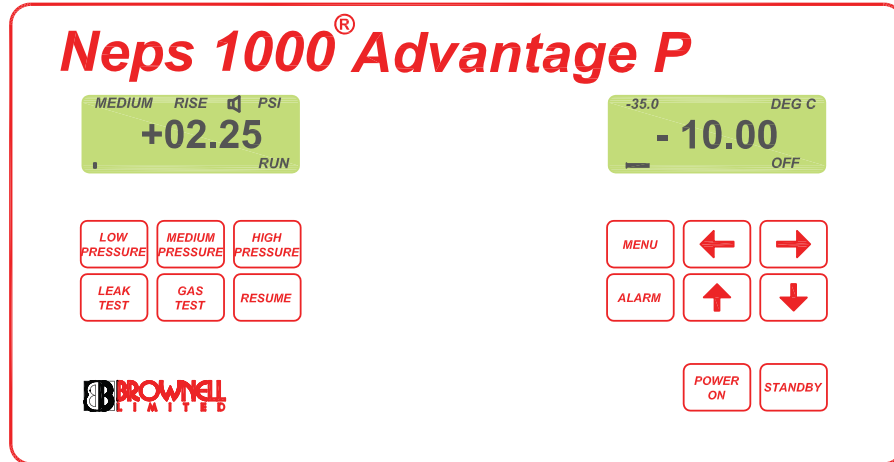
Type NEPS 1000 P Advantage

[illegible]

# NEPS 1000 P CONTROLS



# Liquid Crystal Displays



## Left Hand Display

RISE = RISING GAS PRESSURE  
FALL = FALLING GAS PRESSURE  
DWELL = LEAK TEST DWELL PERIOD

SELECTED PURGING  
PRESSURE - See  
Selecting the pressure

■ MOVING BAR INDICATES  
RISING OR FALLING  
GAS PRESSURE

+ or - RUNNING GAS PRESSURE

AUDIBLE BEEP - OFF  
AUDIBLE BEEP - ON  
SEE MENU 9

MEDIUM RISE PSI  
**+02.25**  
RUN

PRESSURE UNITS  
SEE MENU 7

RUN = PURGE CYCLE RUNNING, OR  
LEAK = LEAK TEST OPERATIONAL

## Right Hand Display

-40.0 = DEWPOINT LEVEL, OR  
GAS TEST = operational

DEWPOINT UNITS  
SEE MENU 8

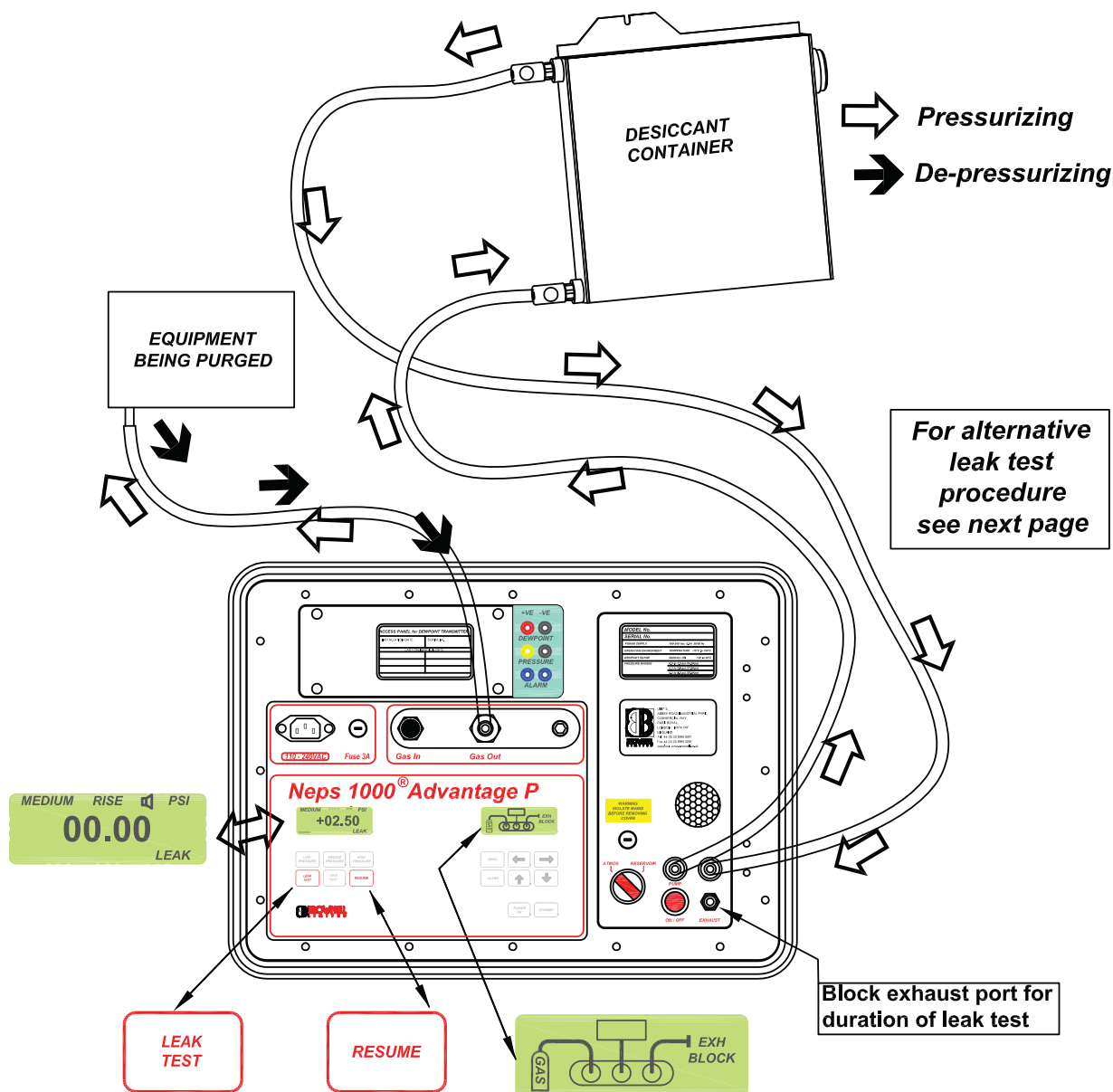
-40.0 DEG C  
**- 10.00**  
OFF

DEWPOINT CONTROL  
SEE MENU 1

■ = DISPLAY CONTRAST  
SEE MENU 10, OR  
DURING PURGE CYCLE, THE  
MOVING BAR INDICATES RISING  
OR FALLING DEWPOINT LEVELS

RUNNING DEWPOINT VALUE, OR  
DEWPOINT LEVEL - SEE MENU 2

## Leak Test



(A) Switch "**pump on**", (B) select "**atmos**" and with purging cycle underway, and as the pressure is rising, (C) press "**leak test**", then (D) block exhaust port. The diagram will appear in the R.H. display window confirming the activation of the Leak Test program, and in the L.H. display "leak" will replace "run".

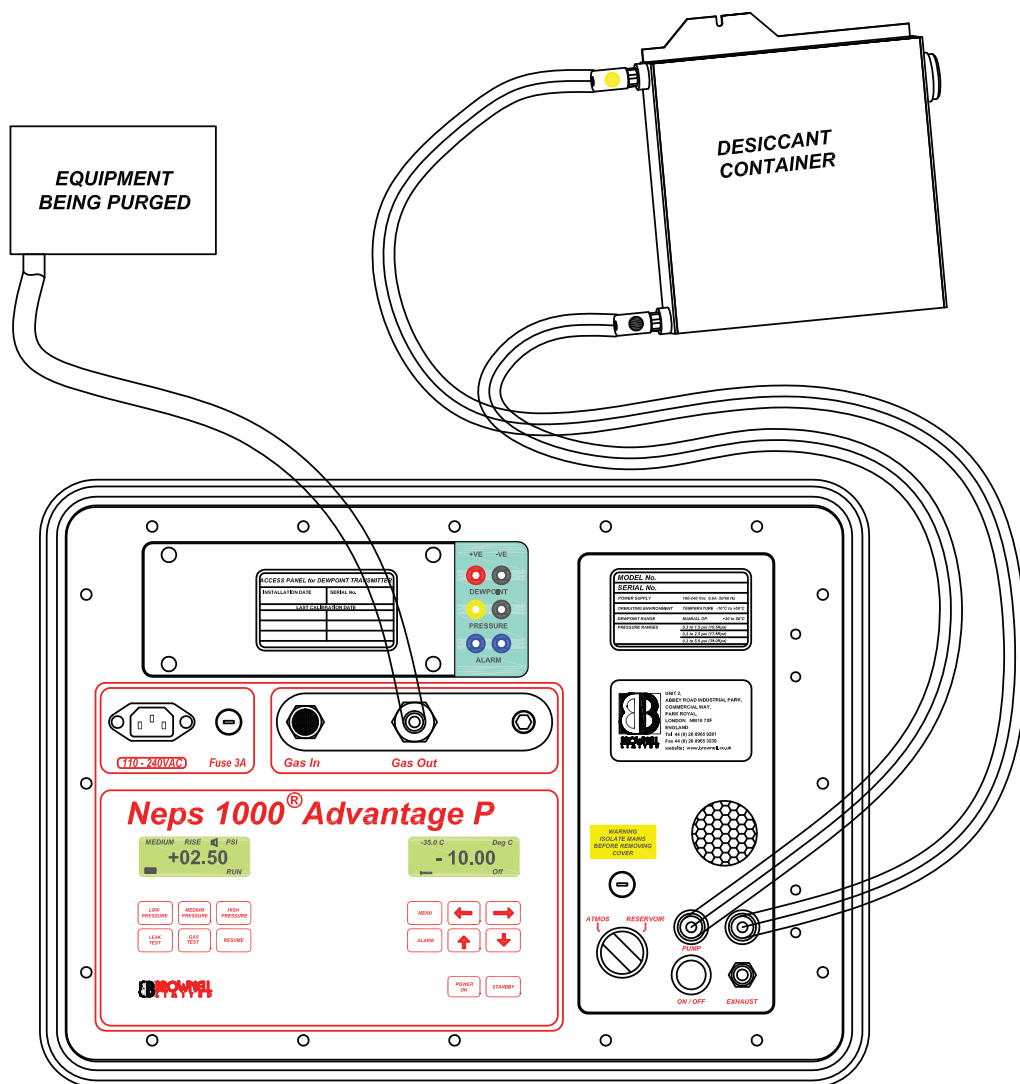
The gas pressure will rise until reaching 2.5 psi, whereupon the cycle will be suspended for a dwell period, the duration of which has been set (see Menu 4), then the gas supply will be switched off and the pressure reading in the L.H. display will reset to zero.

Any degradation of the pressure now confined in the system will now be displayed as a positive reading in the L.H. window.

When the test is satisfactorily completed, (F) unblock the exhaust, (G) switch to "**reservoir**", (H) press "**resume**", and (J) commence purging - go to "Power On & Standby".

**Note:** For test programs of a long duration, fluctuating ambient conditions may cause false results.

# Power On & Standby



With the gas tubes and electrical connections made, the NEPS 1000 P is in "Standby" mode. To commence purging, press "Power On".



Select "ATMOS", connect flexible reservoir to "Gas Out" port. (temporarily disconnect gas out to equipment tube).



Switch "Pump On" - the switch will illuminate & the flexible reservoir will inflate, when the reservoir is about 2/3 full, remove from "Gas Out" port and connect to "Exhaust" port.



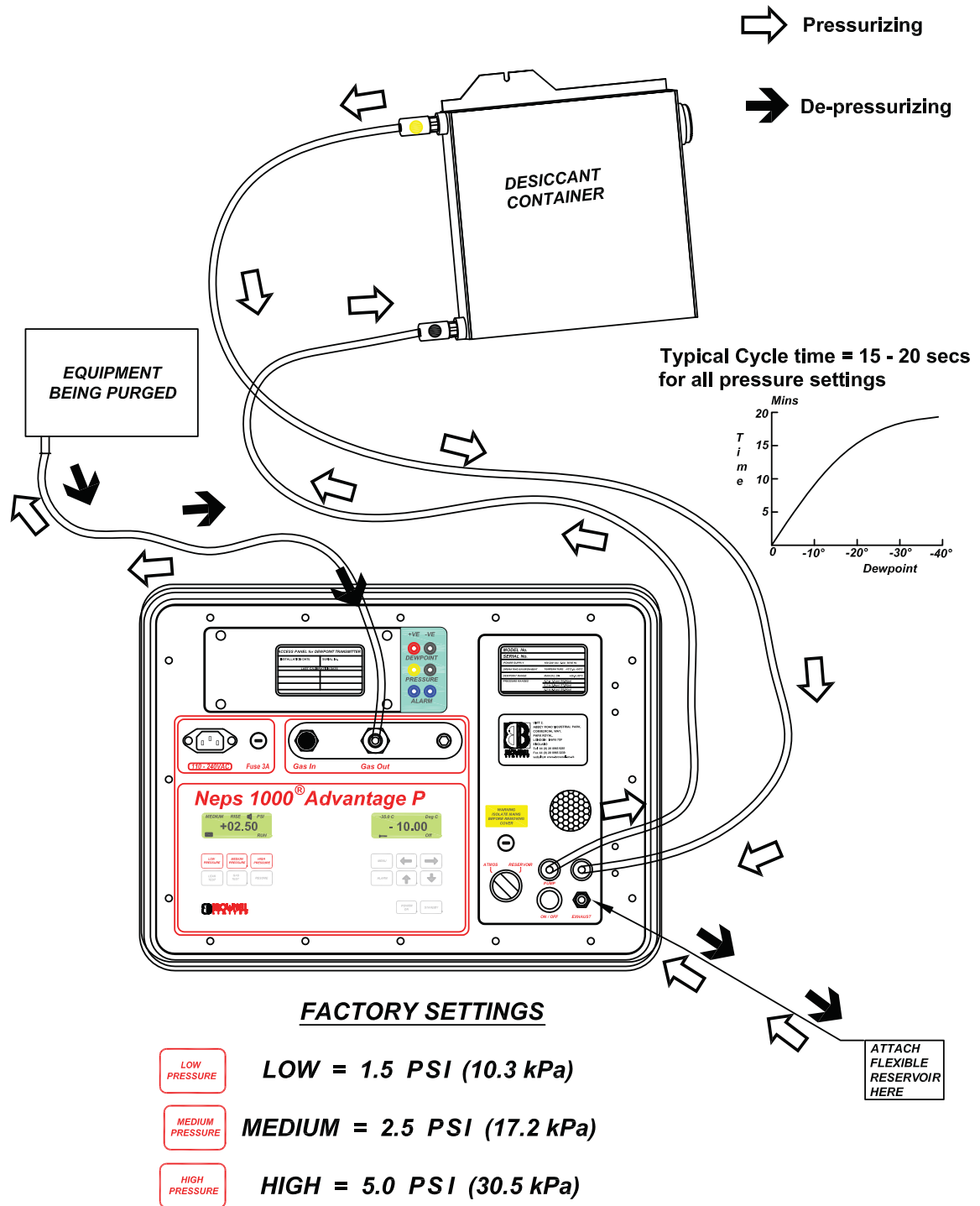
Switch to "Reservoir", re-connect "Gas Out" to the equipment being purged, and the purging cycle will commence.



When purging has been satisfactorily completed, press "Standby" to end the purging cycle, also switch "Pump - Off"



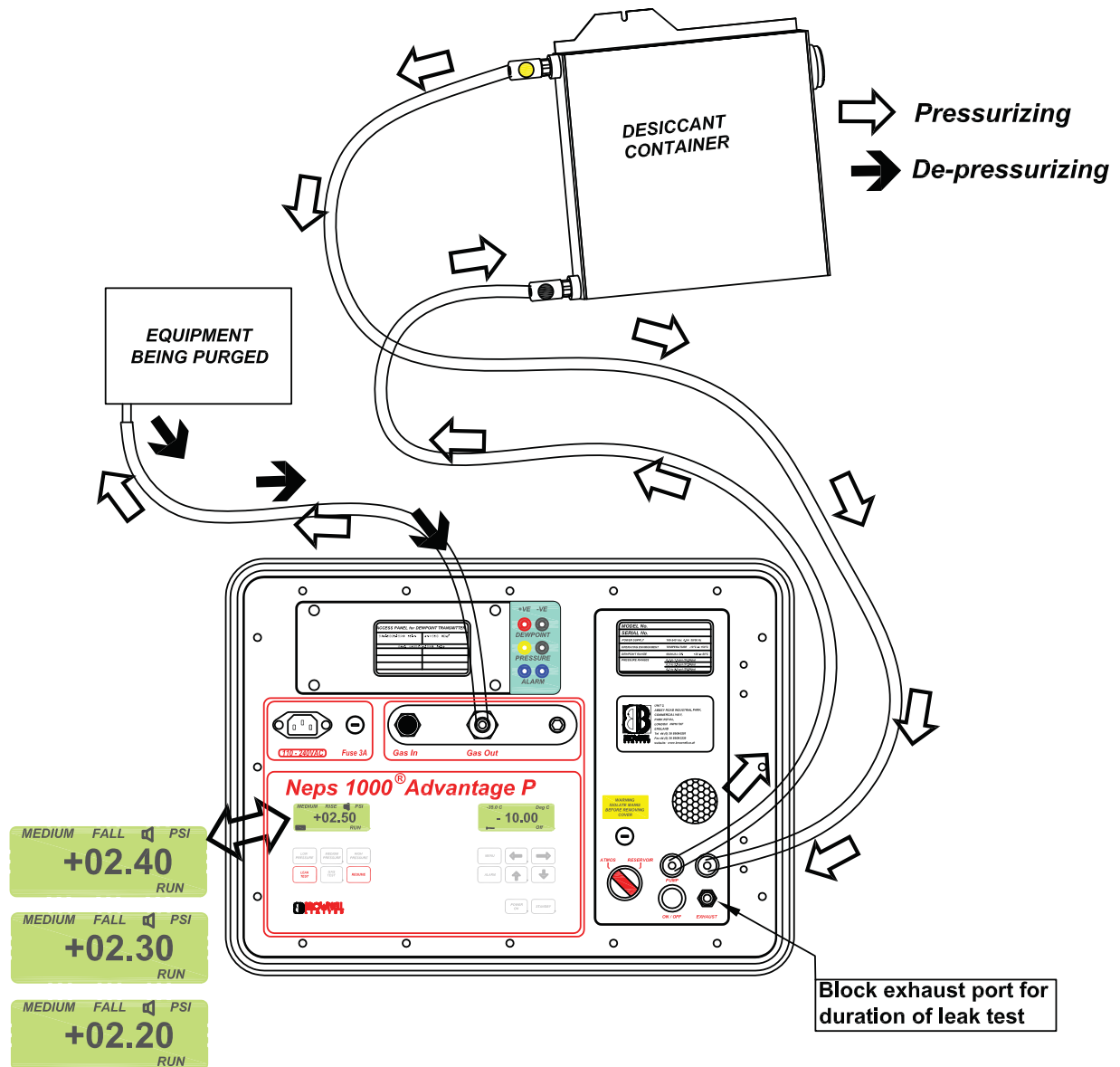
# Selecting the Pressure



The structural strength of the enclosure being purged is the primary consideration when selecting the purge pressure. As the gas pressure rises, it "encourages" the contents of the enclosure to "give up" its moisture, so when the pre-set level is reached, the gas supply is shut off and the exhaust opened.

Under pressure, the gas will evacuate to atmosphere, carrying with it the moisture it has liberated from the contents of the enclosure, passing - en route - through the chamber housing the Dewpoint Sensor, which measures the dewpoint (water vapor pressure) and displays the reading in the R.H. window.

## Leak Test (Alternative procedure)



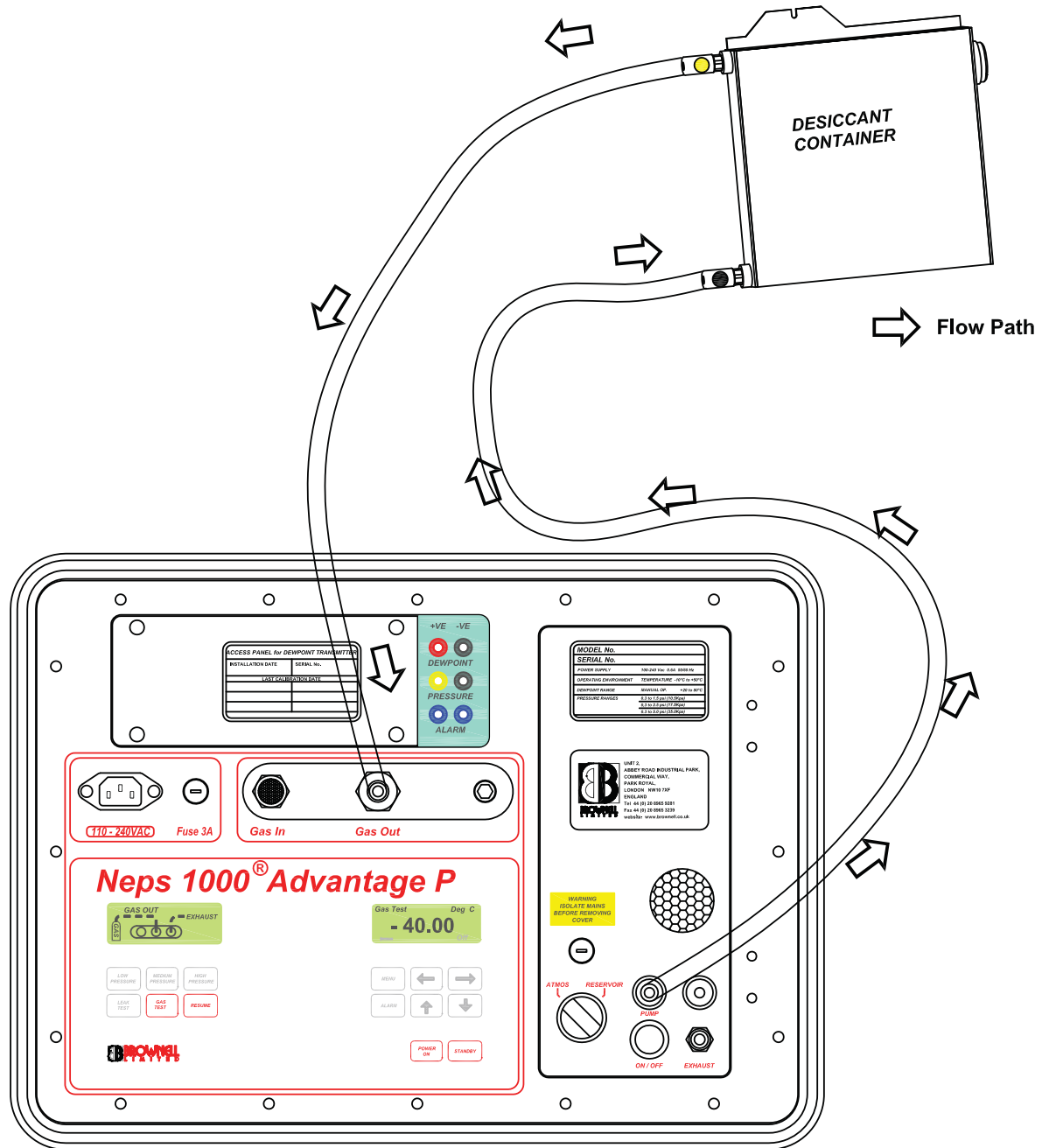
Select "**Atmos**" and with purging cycle underway, remove the flexible reservoir and block the exhaust tube and proceed with a normal purge cycle.

The gas pressure will rise until reaching the pre-set pressure, whereupon the supply will be switched off and any degradation of the pressure now confined in the system can now be viewed as a diminishing reading in the L.H. window.

When the test is satisfactorily completed, unblock the exhaust port, attach the flexible reservoir to the exhaust port, and select "**Reservoir**" to continue purging.

**Note:** For test programs of a long duration, fluctuating ambient conditions may cause false results.

# Desiccant Condition Check



Connect tubes as shown above.



Select "Atmos".



Press "Gas Test".



Operate "Pump On/Off" illuminated rocker switch to run the pump. The Dewpoint (in the R.H. window) should read below  $-35^{\circ}$  in less than 10 minutes. Desiccant should be changed if this is not achieved.



To end test, press "Resume".

# Communication cable sockets

**RATING** 0-5 V

<b><u>FUNCTION</u> : VOLTAGE OUTPUT</b>		<b>DEWPOINT SENSOR OUTPUT (mA)</b>	
<b>-99.9°C</b>	<b>=</b>	<b>0 V</b>	<b>4 mA</b>
<b>-70°C</b>	<b>=</b>	<b>1.17 V</b>	<b>8 mA</b>
<b>-40°C</b>	<b>=</b>	<b>2.37 V</b>	<b>12 mA</b>
<b>-10°C</b>	<b>=</b>	<b>3.57 V</b>	<b>16 mA</b>
<b>20°C</b>	<b>=</b>	<b>4.77 V</b>	<b>20 mA</b>

**RATING** 0-5V

0 V - 0 p.s.i.

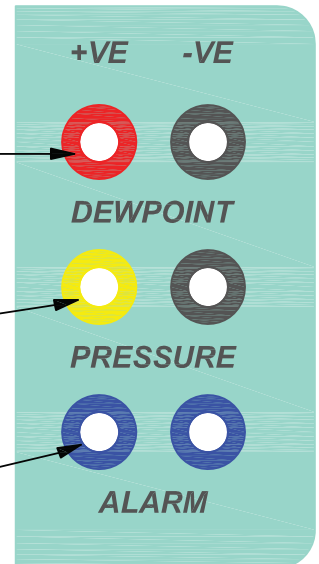
5 V - 15 p.s.i.

**FUNCTION** : PRESSURE OUTPUT

0 - 15 p.s.i.

**RATING** : 0 - 12V

**FUNCTION** : SIGNAL WHEN TARGET  
DEWPOINT IS TRAVERSED



**DEWPOINT** :- When connected to a computer (or data logging device), a graphical representation of the dewpoint against the time of a purging cycle may be viewed and/or recorded.

**PRESSURE** :- When connected to a computer (or data logging device), a graphical representation of the pressure against the time of a purging cycle may be viewed and/or recorded.

**ALARM** :- The alarm function will be activated when,  
a) connected to a suitable warning device e.g. a lamp or klaxon,  
b) Menu : 5 is set for target dewpoint level,  
c) Menu : 6 is set for high or low polarity,  
d) The "ALARM" pushbutton is pressed (deactivate = push "POWER ON")

Typical uses are :- Providing a remote signal, warning an operator that the target dewpoint has been met,  
or, for monitoring several NEP systems, warning that all have met their dewpoint targets.

**MENU**


**Information and Settings**

## **Neps 1000<sup>®</sup> Advantage P**

MEDIUM RISE  PSI  
**+02.25**  
RUN

Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
1 Dewp. Control  
Off

LOW PRESSURE MEDIUM PRESSURE HIGH PRESSURE  
LEAK TEST GAS TEST RESUME

MENU    
ALARM  

 **BROWNELL**  
LIMITED

POWER ON STANDBY

***The internal Dewpoint Sensor has a recommended operational life after which it should be re-calibrated or replaced with an exchange unit.***

***The date which appears in the R.H. Display when the `MENU` button is pressed is the start date of the Sensor's recommended operational span.***

***The number of months, shown on the second line of the display, shows the number of months left before re-calibration is recommended.***

***When the operational lifespan has expired the text changes to `DP Sen Old`.***

***These dates are factory set and require entry of a PIN No. to revise them (see last `MENU` position).***

Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
1 Dewp. Control  
Off

# MENU

## Information and Settings

### Right Hand Display

### Alternative Right Hand Display

Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
1 Dewp. Control  
Off



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
1 Dewp. Control  
Once



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
1 Dewp. Control  
Stat

See next page for details



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
2 Dewpoint Level  
-35.0 C



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
2 Dewpoint Level  
-38.0 C

Set appropriate Dewpoint level  
one press per degree rise or fall



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
3 Stat Range  
12 Degrees



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
3 Stat Range  
14 Degrees

Applicable only with Dewpoint Control set to 'Stat'  
(see following description 'Dewpoint Control-Stat')  
Adjusts the 'Cycle Suspended' period after the  
Dewpoint Sensor has switched from 'Gas In' to  
'Exhaust'. Set the number of DP°C above the  
'Dewpoint Level' setting, (see menu 2)  
One press per degree, rise or fall.



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
4 Dwell in Secs  
045 Seconds



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
4 Dwell in Seconds  
055 Seconds

Applicable during 'Leak Test'. Sets a Dwell  
period, after the gas pressure has reached pre-set  
value, to provide time for the pressure in the system  
to settle.  
This avoids any false results that may be caused by  
the movement of gas within the sealed system.  
One press per second, rise or fall.



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
5 Alarm Set  
-16.0 C



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
5 Alarm Set  
-13.0 C

Set the target Dewpoint value at which the ALARM  
is required to operate a warning device,  
e.g. a lamp or klaxon.



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
6 Alarm Polarity  
Low



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
6 Alarm Polarity  
High

low alarm polarity = relay contacts close when  
dewpoint falls below alarm  
setting (factory default condition)

high alarm polarity = relay contacts close when  
dewpoint rises above alarm  
setting



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
7 Pressure Scale  
PSI



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
7 Pressure Scale  
KPA

Select Pressure units for display



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
8 Dewpoint Scale  
Deg C



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
8 Dewpoint Scale  
Deg F

Select Dewpoint units for display

**Right Hand Display**

**Alternative Right Hand Display**

Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
9 Audio Set  
On



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
9 Audio Set  
Off

Select an audible beep to sound when keys are operated



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
10 LCD Contrast  
█



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
10 LCD Contrast  
██

Adjust contrast of LH display



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
11 Backlight Brl  
█



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
11 Backlight Brl  
██

Adjust brightness of displays



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
12 Beep in mS  
020 mS



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
12 Beep in mS  
030 mS

Adjust duration of Beep (see menu 9)



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
Enter PIN  
0 0 0



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
Enter PIN  
1 2 3 4



Press to enter digit 0-9

Press to move to adjacent position

**Note :-**

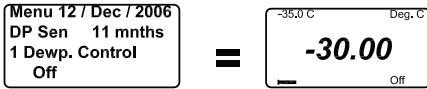
The PIN is only required to revise the Dewpoint Sensor details:

1. The start date of the sensor's recommended operational span, and
2. The number of months left before re-calibration is recommended.

## Menu 1

**The Dewpoint Control program provides four options or purge cycles:**  
**Two as shown below, with the NEPS configured as standard, i.e. in house dewpoint sensor.**

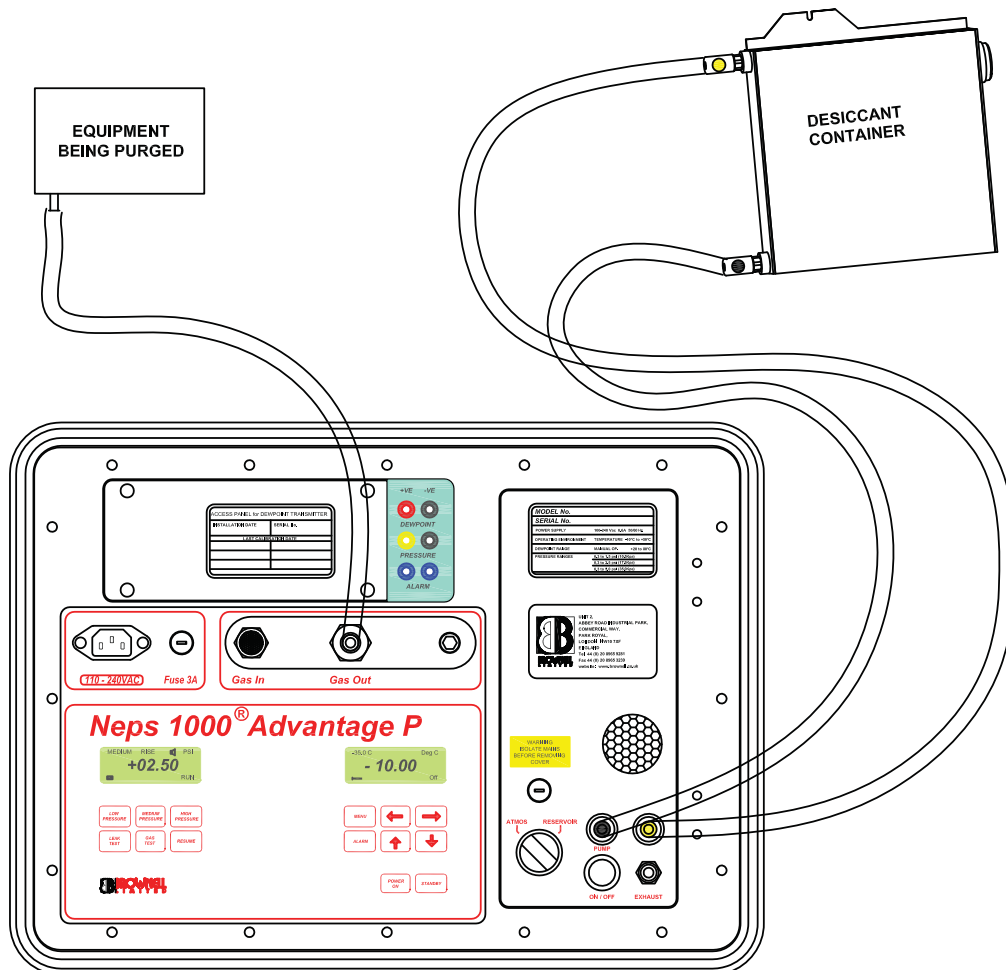
**Two further options with the dewpoint sensor fitted remotely, directly into the equipment being purged, are described on the next page.**



**Dewpoint Control - off** On the first occasion that the target DP value is achieved, the NEPS will have purged the air in the enclosure and the surface moisture on the equipment, but will continue purging until stopped by the operator.



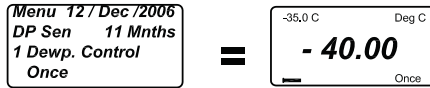
**Dewpoint Control - once** On the first occasion that the target DP value is achieved, the purge cycle will automatically stop and the NEPS will be set in "standby" mode. Whilst this cycle will not have completely purged the equipment of moisture, it does require a positive action by the operator to continue, thus providing a measure of conservation of the supply gas.



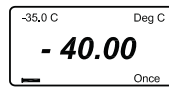


### Menu 1 : continued

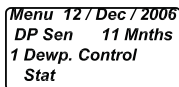
**Additional features available when the Dewpoint Sensor is fitted remotely, directly into the equipment being purged.**



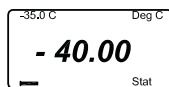
=



**Dewpoint Control - once** On the first occasion that the target Dewpoint Level is achieved, the purge cycle will automatically stop and the NEPS will be set in "standby" mode. Whilst this cycle will not have completely purged the equipment of moisture, it does require a positive action by the operator to continue, thus providing a measure of conservation of the supply gas.

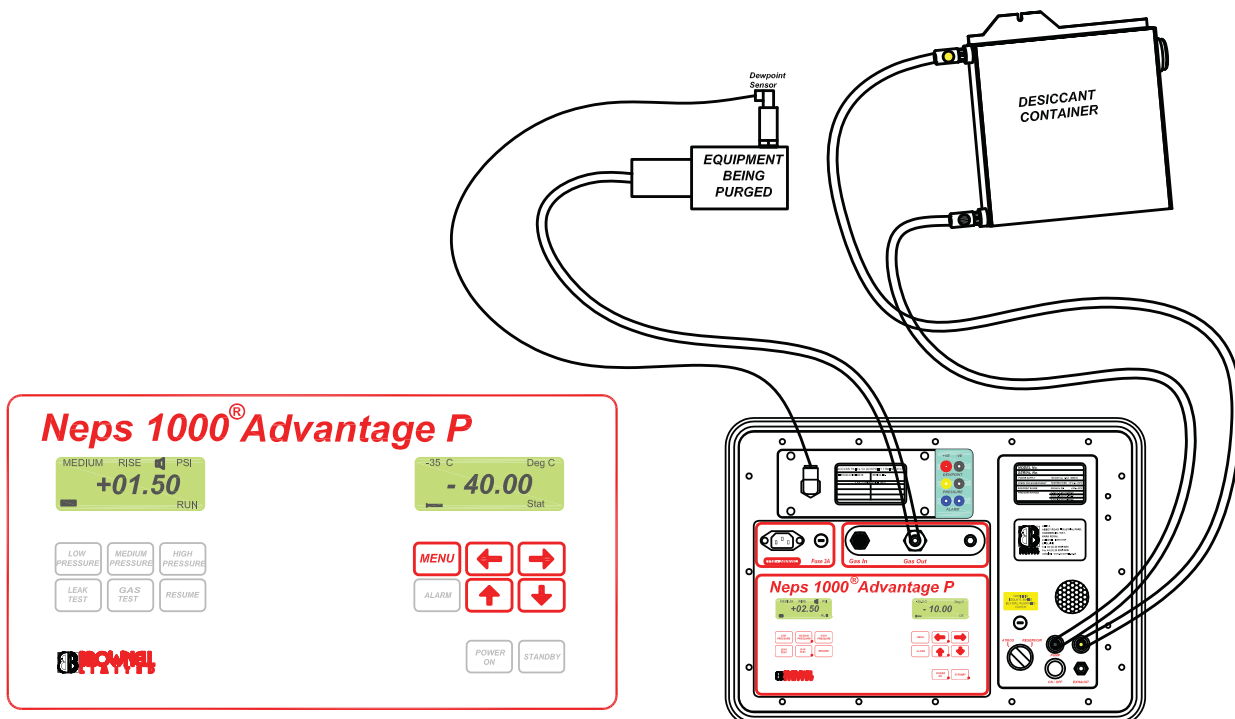


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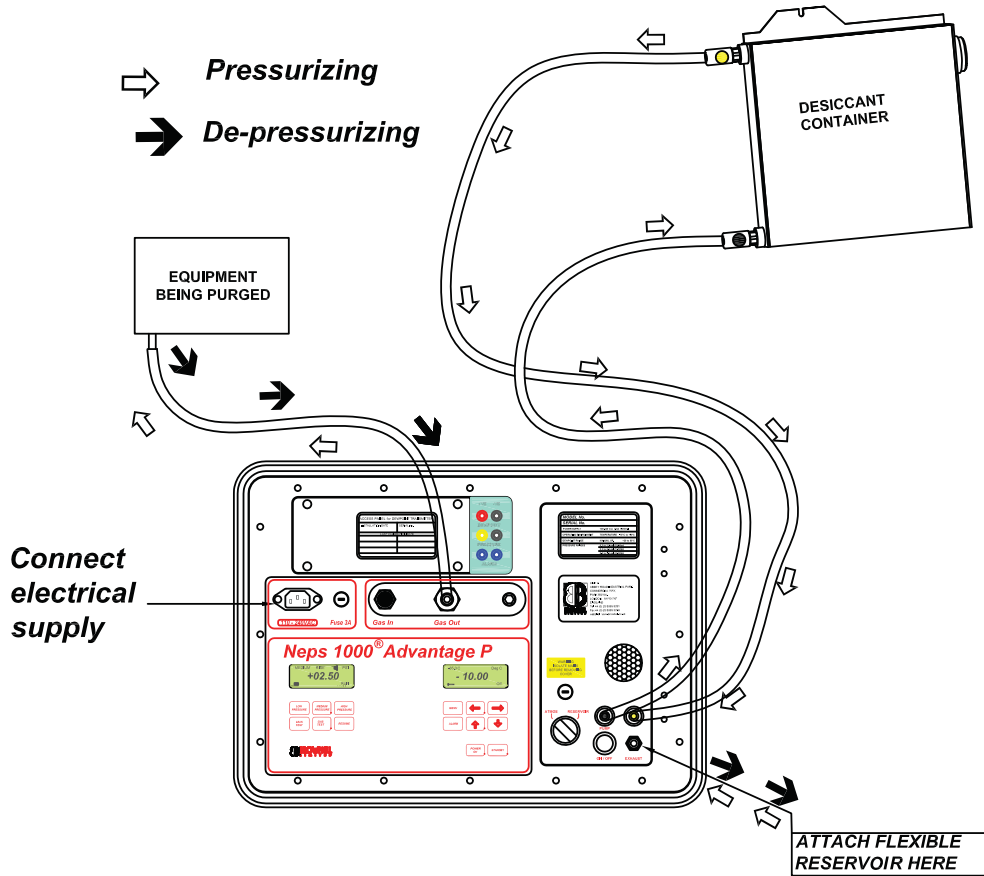
**Dewpoint Control - stat.** This program is only viable if the Dewpoint Sensor is fitted remote from the NEPS 1000, directly into a 'purge port' in the equipment being purged (see below).

With the 'stat' program selected, an extra level of control - by the DP sensor - is added. On the first occasion that the target Dewpoint Level is achieved the purge cycle is 'suspended' (see menu 3 - Stat Range) whilst leaving the exhaust port open so the gas in the system continues to 'liberate' moisture which is carried off by the exhausting gas. When the DP sensor detects the preset Stat Range value, the purge cycle will be re-activated. This process will continue until stopped by the operator, but with the ever decreasing level of moisture, the duration of the 'cycle suspensions' will increase, thus providing a significant conservation of the supply gas.



# OPERATING HINTS

- ◆ **Connect plastic (P.T.F.E.) gas tubing as shown**



- ◆ **Press**



- ◆ **Select :-**



- ◆ **Select :-**



- ◆ **Press**



- ◆ **Select :-**



- ◆ **Select :-**



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
1 Dewp. Control  
Once

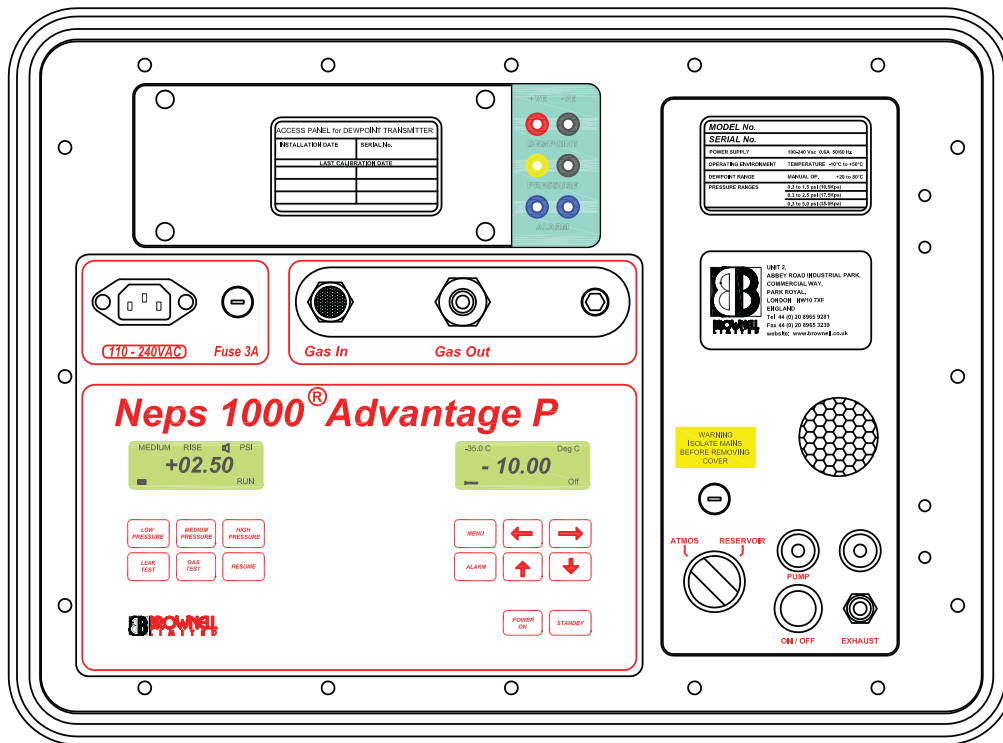
- ◆ **Select :-**



Menu 12 / Dec / 2006  
DP Sen 11 Mnths  
2 Dewpoint Level  
-35.0 C

# NEPS 1000 P Advantage

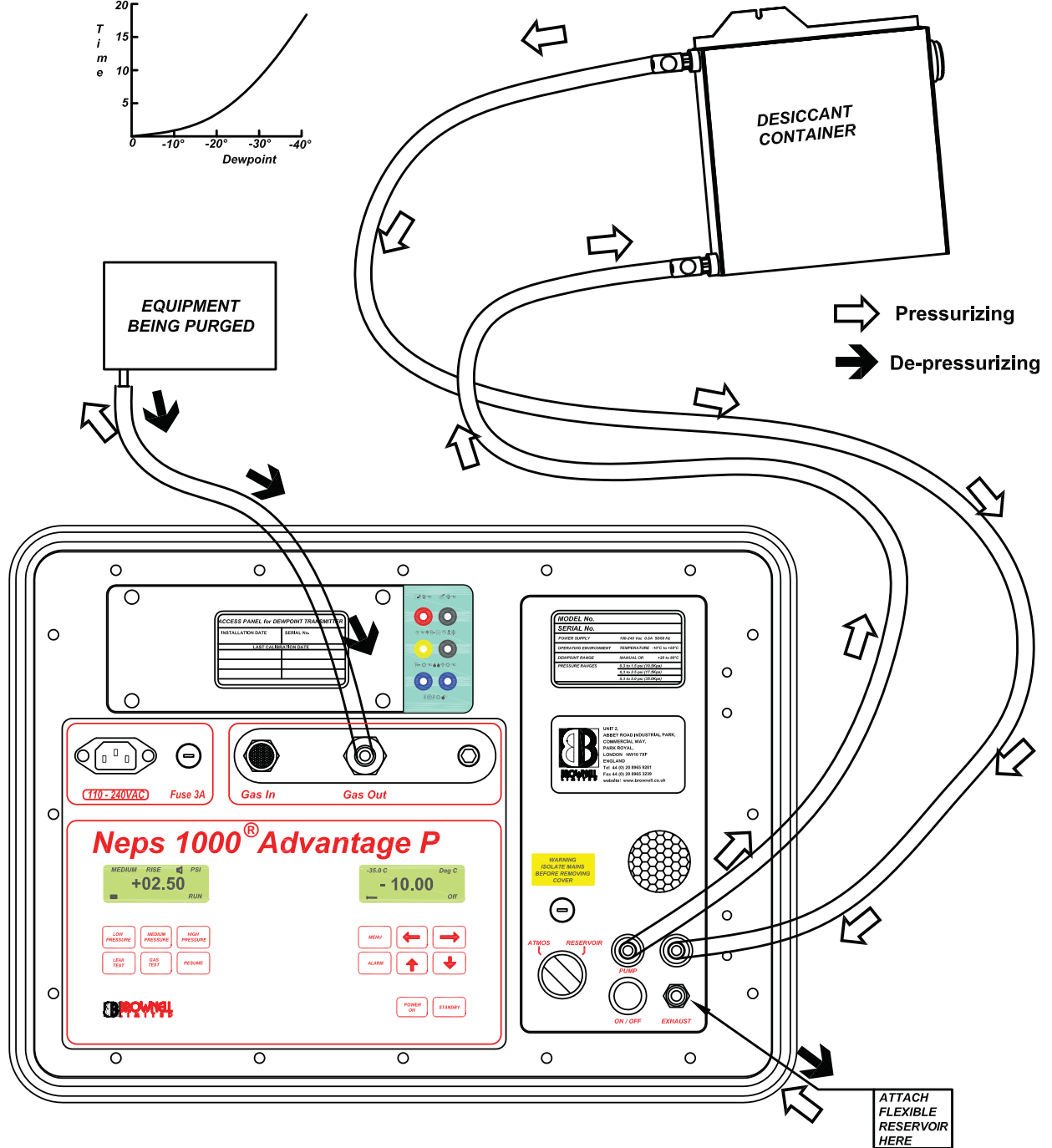
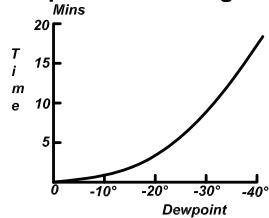
## APPLICATIONS



- ◆ ***Single Point Purge***
- ◆ ***Through Purge***
- ◆ ***Multiple Purge***
- ◆ ***DRYCAB Purge***
- ◆ ***External Gas Check***

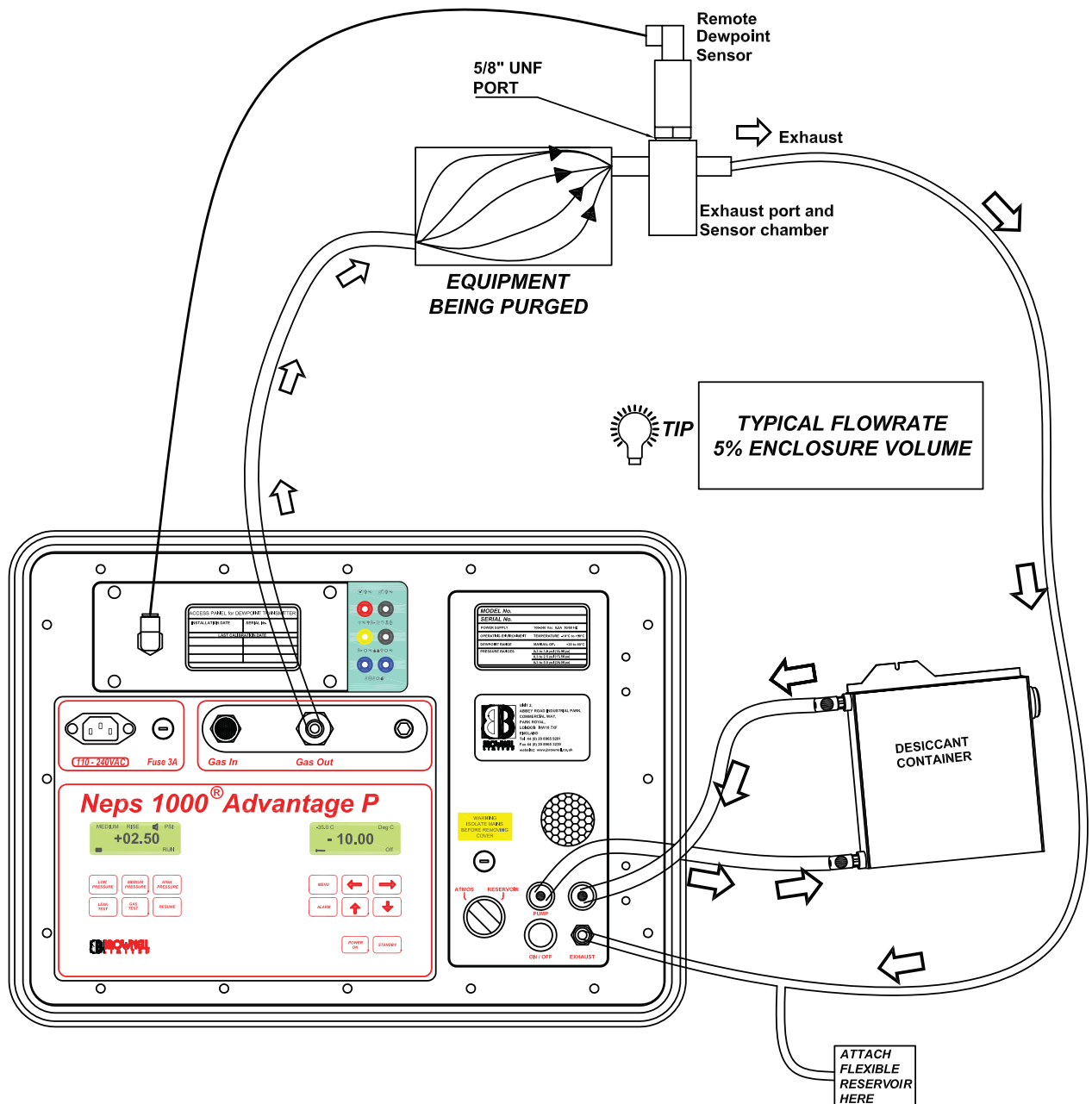
# Single Point Purge

Typical cycle time = 15 - 20 secs  
For all pressure settings



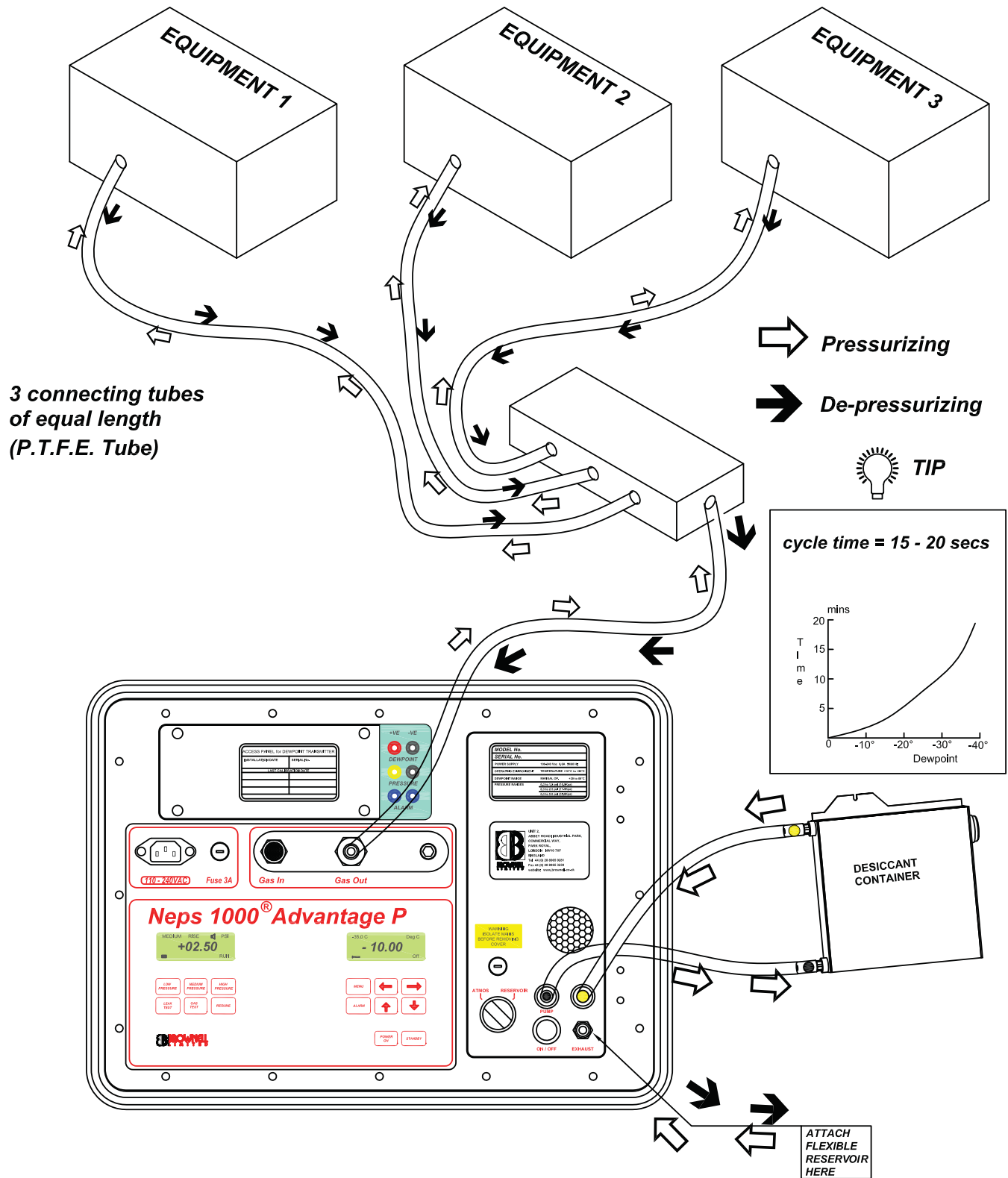
**Basic purging procedure**

# Through Purge



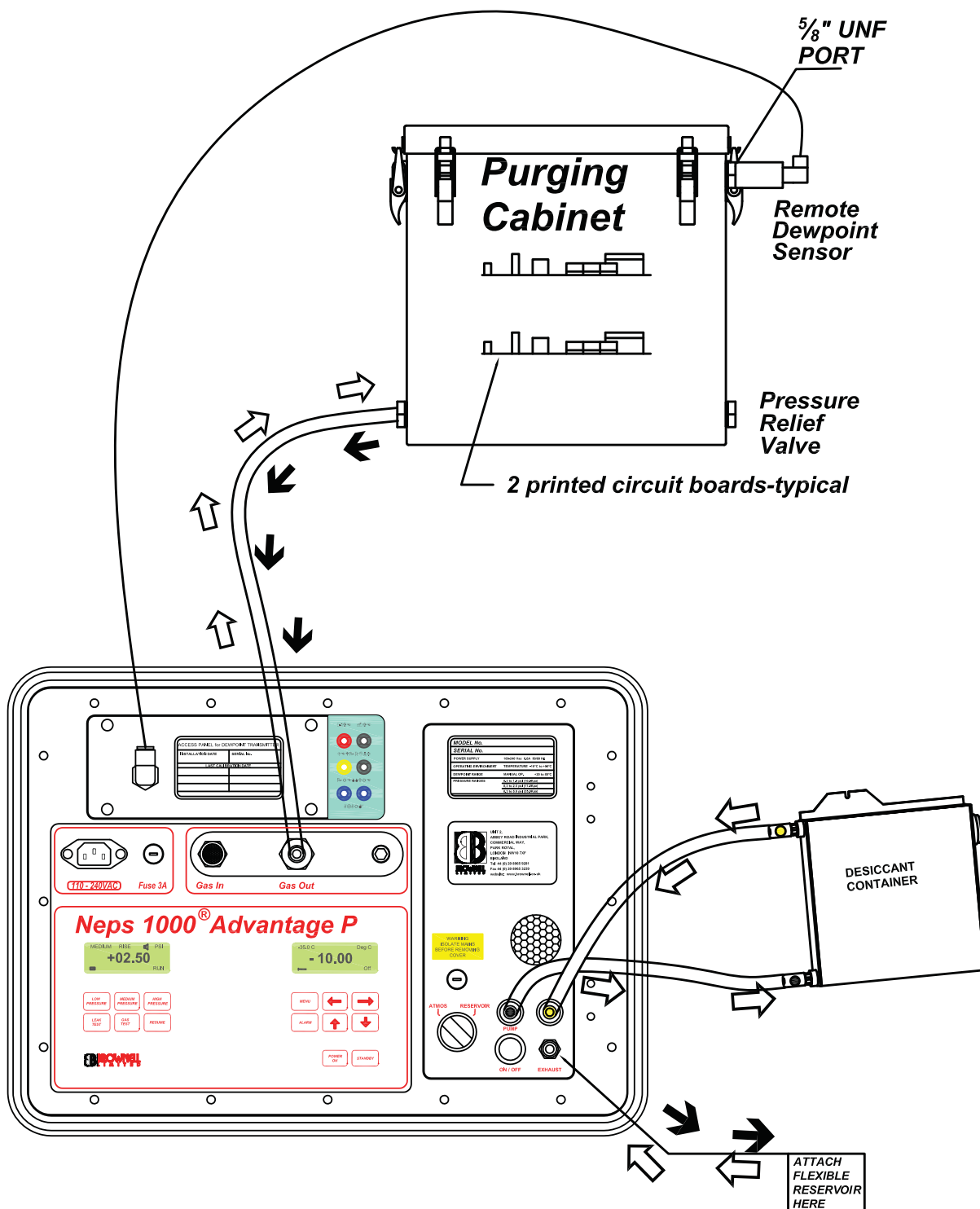
***The preferred purging method when the enclosure is of a "light" construction, i.e. likely to deform under 1.5 psi internal pressure.***

# Multiple Purge



***Ideal purging method where internal volume (air space) is low.***

# DRYCAB Purge



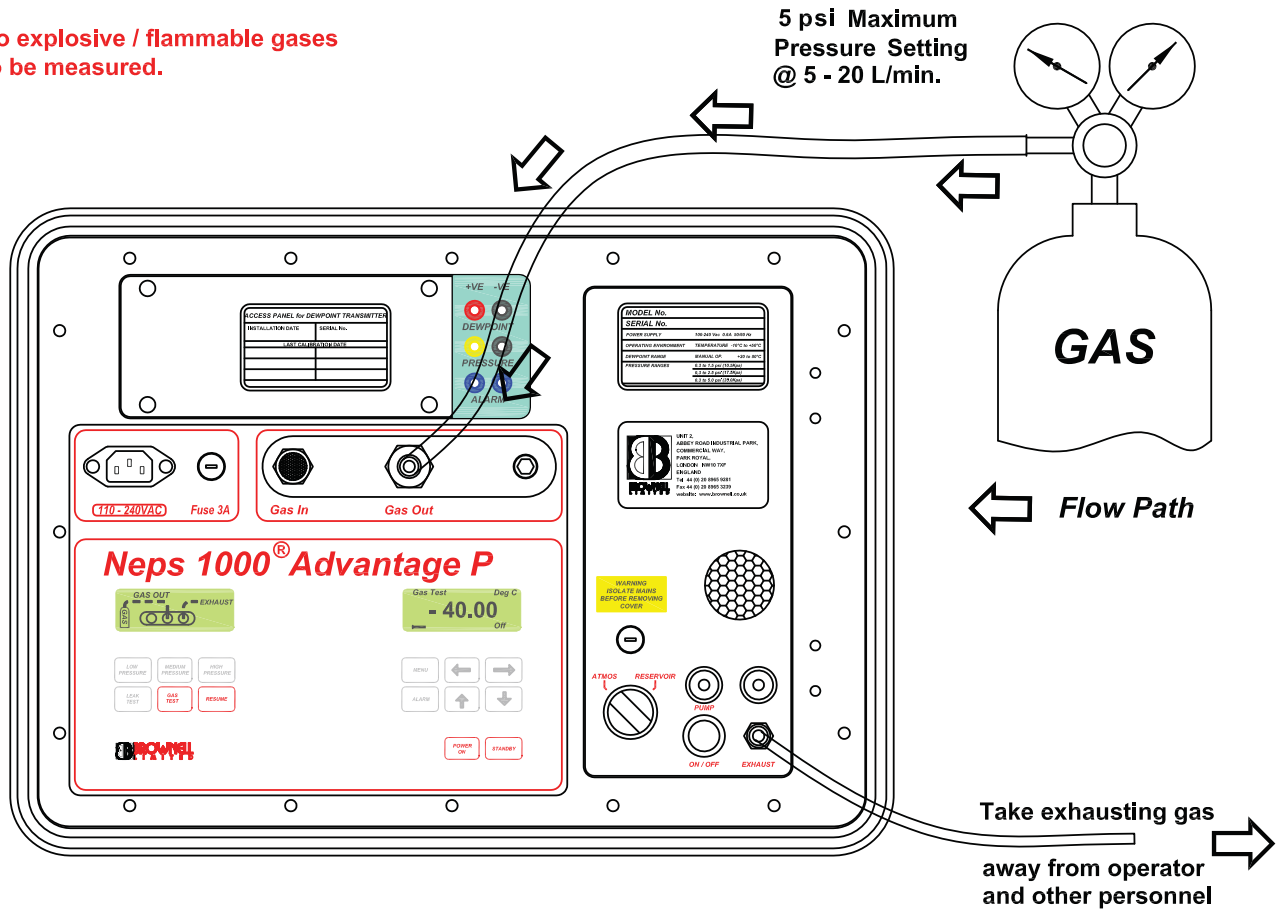
*Ideal purging method for dealing with small items*

# External Gas Check

## Important

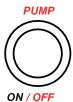
Gas should be clean and oil free.

No explosive / flammable gases to be measured.



**GAS TEST**

Select "Gas Test" - Duration of test is dependent on the gas being tested and its "wetness", i.e. the less moisture, the longer the test.



Do not start pump

Regulate gas supply (5 psi @ 5 - 20 L/min)

**RESUME**

To end test, press "Resume"



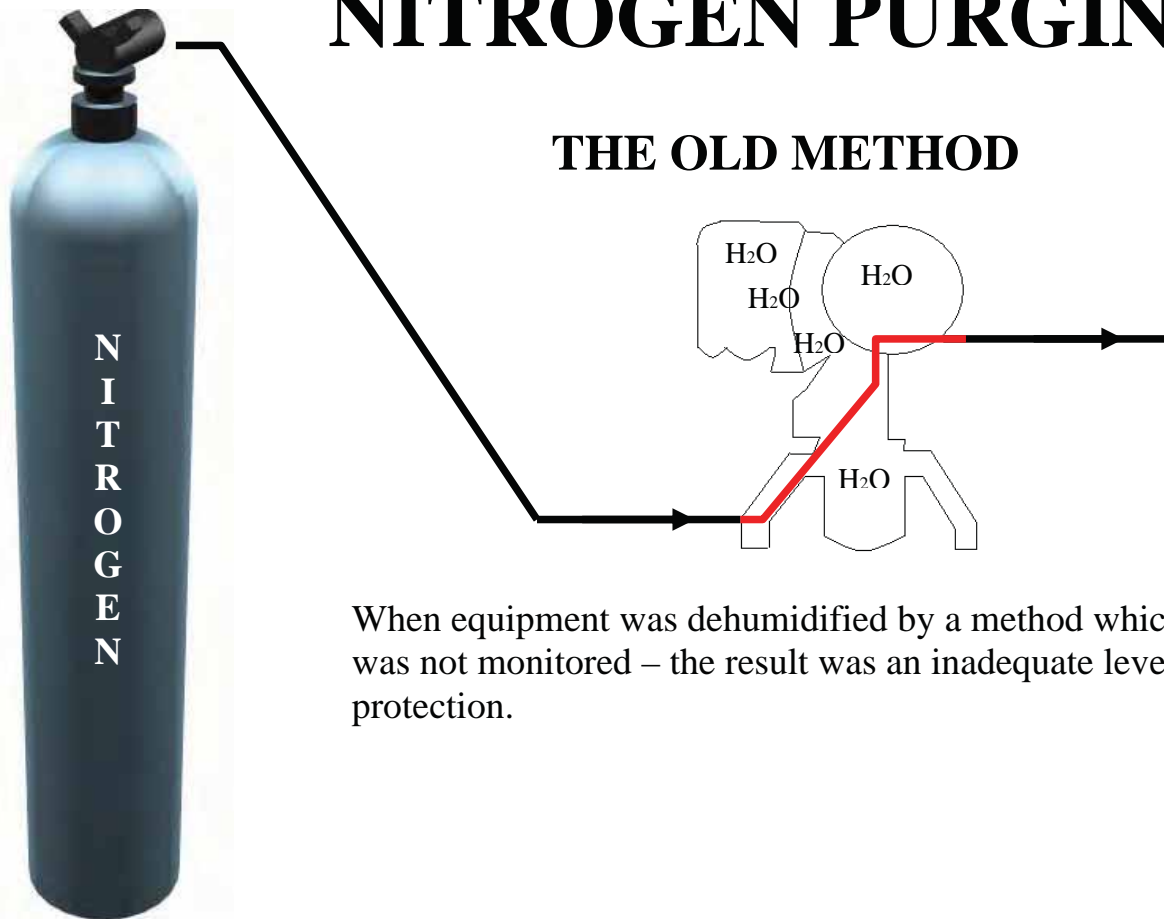


## Accessories

Description	Part Number
Power Lead (UK)	BLE1085/104
Power Lead (EUROPE)	BLE1085/105
Power Lead (USA)	BLE1085/106
Power Lead – 24 Vdc	BLE1100/83
Dewpoint Function Checker (inc. 5 refills)	BLE1100/53
Refills for Dewpoint Function Checker	BLE1100/0211
Inter Connecting Tube - ( 2 meters)	BLE1100/55
Dewpoint Sensor (new)	BLE1100/0155
Dry Cab	BL/E1100/77
Flexible Reservoir	BL/E1000/0082

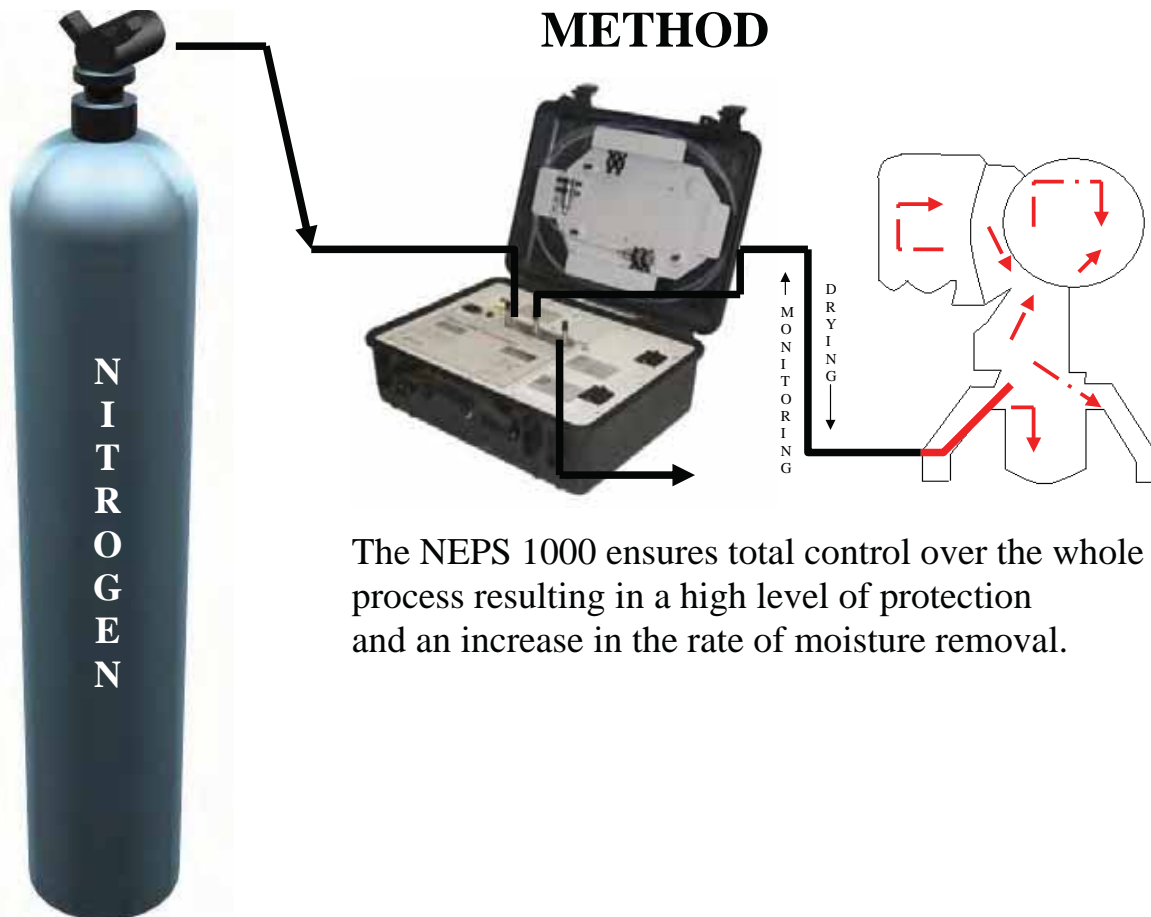
# NITROGEN PURGING

## THE OLD METHOD



When equipment was dehumidified by a method which was not monitored – the result was an inadequate level of protection.

## THE NEW IMPROVED METHOD



The NEPS 1000 ensures total control over the whole process resulting in a high level of protection and an increase in the rate of moisture removal.

## Pressure Terms

**Psig (Gauge Pressure):** a measure of pressure in psi that is referenced to ambient pressure.

**Psia (Absolute Pressure):** a measure of pressure in psi that is referenced to zero absolute pressure.

**Psid (Pressure Differential):** a measure of the difference between two pressures.

**Process Connection:** the size and type of the connection to your system.

## Temperature Conversion Equations

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 0.555$$

## Flow Rate Conversion Data

<b>Multiply</b>	<b>—&gt;</b>	<b>to get</b>
<b>to get</b>	<b>&lt;—</b>	<b>Divide</b>
cc/min	1	mL/min
cfm (ft <sup>3</sup> /min)	28.31	L/min
cfm (ft <sup>3</sup> /min)	1.699	m <sup>3</sup> /hr
cfh (ft <sup>3</sup> /hr)	472	mL/min
cfh (ft <sup>3</sup> /hr)	0.125	GPM
GPH	63.1	mL/min
GPH	0.134	cfh
GPM	0.227	m <sup>3</sup> /hr
GPM	3.785	L/min
oz/min	29.57	mL/min

## Pressure Unit Conversion Constants

To go from	Multiply by	To get
bar	14.50	psi
bar	401.47	" of H <sub>2</sub> O
bar	29.53	" of Hg
bar	100.0	kPa
bar	1000	mbar
bar	1019.73	cm of H <sub>2</sub> O
bar	750.06	mm of Hg
" of H <sub>2</sub> O	0.036127	psi
" of H <sub>2</sub> O	0.073554	" of Hg
" of H <sub>2</sub> O	0.2491	kPa
" of H <sub>2</sub> O	2.491	mbar
" of H <sub>2</sub> O	2.5400	cm of H <sub>2</sub> O
" of H <sub>2</sub> O	1.8683	mm of Hg
kg/cm <sup>2</sup>	14.223	psi
kg/cm <sup>2</sup>	393.7	" of H <sub>2</sub> O
kg/cm <sup>2</sup>	28.96	" of Hg
kg/cm <sup>2</sup>	98.06	kPa
kg/cm <sup>2</sup>	980.6	mbar
kg/cm <sup>2</sup>	1000	cm of H <sub>2</sub> O
kg/cm <sup>2</sup>	735.5	mm of Hg
kPa	0.14504	psi
kPa	4.0147	" of H <sub>2</sub> O
kPa	0.2953	" of Hg
kPa	10.000	mbar
kPa	10.1973	cm of H <sub>2</sub> O
kPa	7.5006	mm of Hg
mbar	0.01450	psi
mbar	0.40147	" of H <sub>2</sub> O
mbar	0.02953	" of Hg
mbar	0.100	kPa
mbar	1.01973	cm of H <sub>2</sub> O
mbar	0.75006	mm of Hg
psi	27.680	" of H <sub>2</sub> O
psi	2.036	" of Hg
psi	6.8947	kPa
psi	68.947	mbar
psi	70.308	cm of H <sub>2</sub> O
psi	51.715	mm of Hg