

NEPS 1000 ADVANTAGE OPERATORS MANUAL



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Scope of publication

Modification record

Controls explained *Liquid Crystal Displays*
Leak Test
Power On & Standby
Selecting the pressure
Leak Test (Alternative procedure)
Gas Test
Cable sockets - communication cables
Menu 1 to 5

Operating hints

Applications..... *Single Point Purge*
Through Purge
Multiple Purge
Drycab Purge
MINTeC - moisture intrusion test

Accessories &

Optional extras *Dewpoint Function Check*
Continuous Air Dryer

Terminology &

Conversion Factors *Pressure Terms*
Pressure unit conversion constants

SCOPE OF PUBLICATION

This publication covers the Nitrogen Enhanced Purge System NEPS 1000.

The purging system has a positive/positive dry gas purge facility which may be pre-set at three levels, 0.3 lb f/in² (2.0 KPa) to 1.5 lb f/in² (10.5 KPa), 0.3 lb f/in² (2.0 KPa) to 2.5 lb f/in² (17.5 KPa) and 0.3 lb f/in² (2.0 KPa) to 5 lb f/in² (35.0 KPa). Additionally, the purging system may be used as a monitoring unit to measure the dewpoint temperature of the purge gas, etc.

The major feature available 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 dewpoint stat, if fitted, to be used to control the actual dewpoint temperature within the equipment being conditioned.

Although primarily designed for dry nitrogen, the purging system may be used with any other dry, non-corrosive gas, requiring accurate monitoring and control.

WARNINGS AND CAUTIONS

The NEPS 1000 is a nitrogen 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.

WARNING

HIGH PRESSURE GAS AT UP TO 150 ATMOSPHERES IS USED IN CONJUNCTION WITH THE NEPS 1000 AND CARELESSNESS CAN BE FATAL.

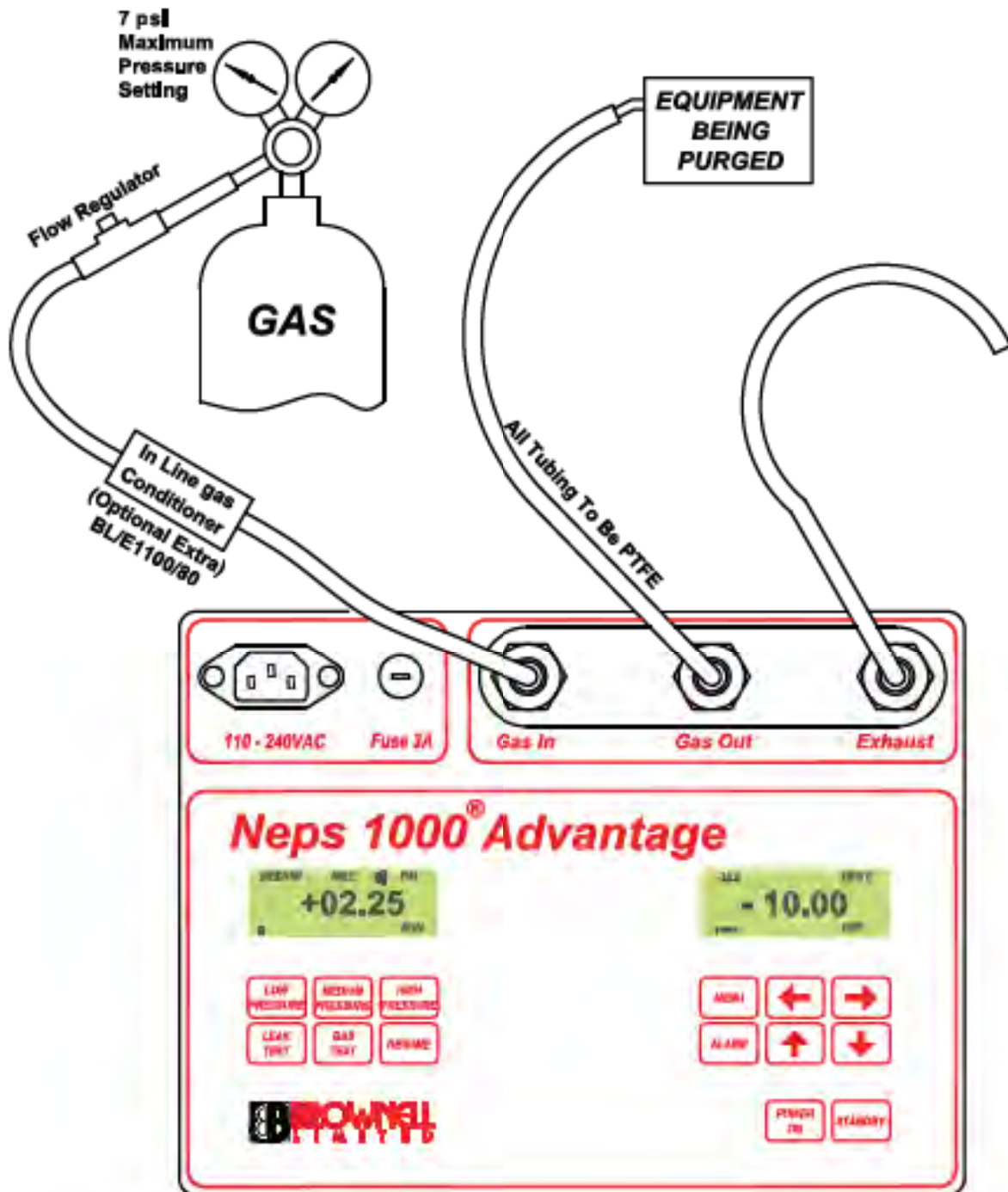
ALWAYS ENSURE THAT THE PRESSURE IS REDUCED TO ZERO BEFORE DISCONNECTING THE GAS SUPPLY OR CARRYING OUT MAINTENANCE ON THE PURGING SYSTEM.

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 pipes be removed before the purging equipment has stopped operating, otherwise the specified dewpoint temperature will not be achieved.
3. Ensure that all connecting tubing is securely fixed in position, otherwise a possible leakage could affect the efficiency of the NEPS 1000 system.

NEPS 1000 CONTROLS



EXPLAINED !

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



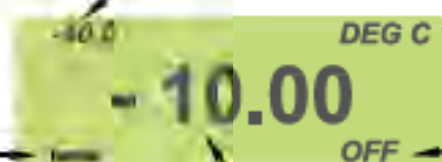
PRESSURE UNITS
 SEE MENU 7

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

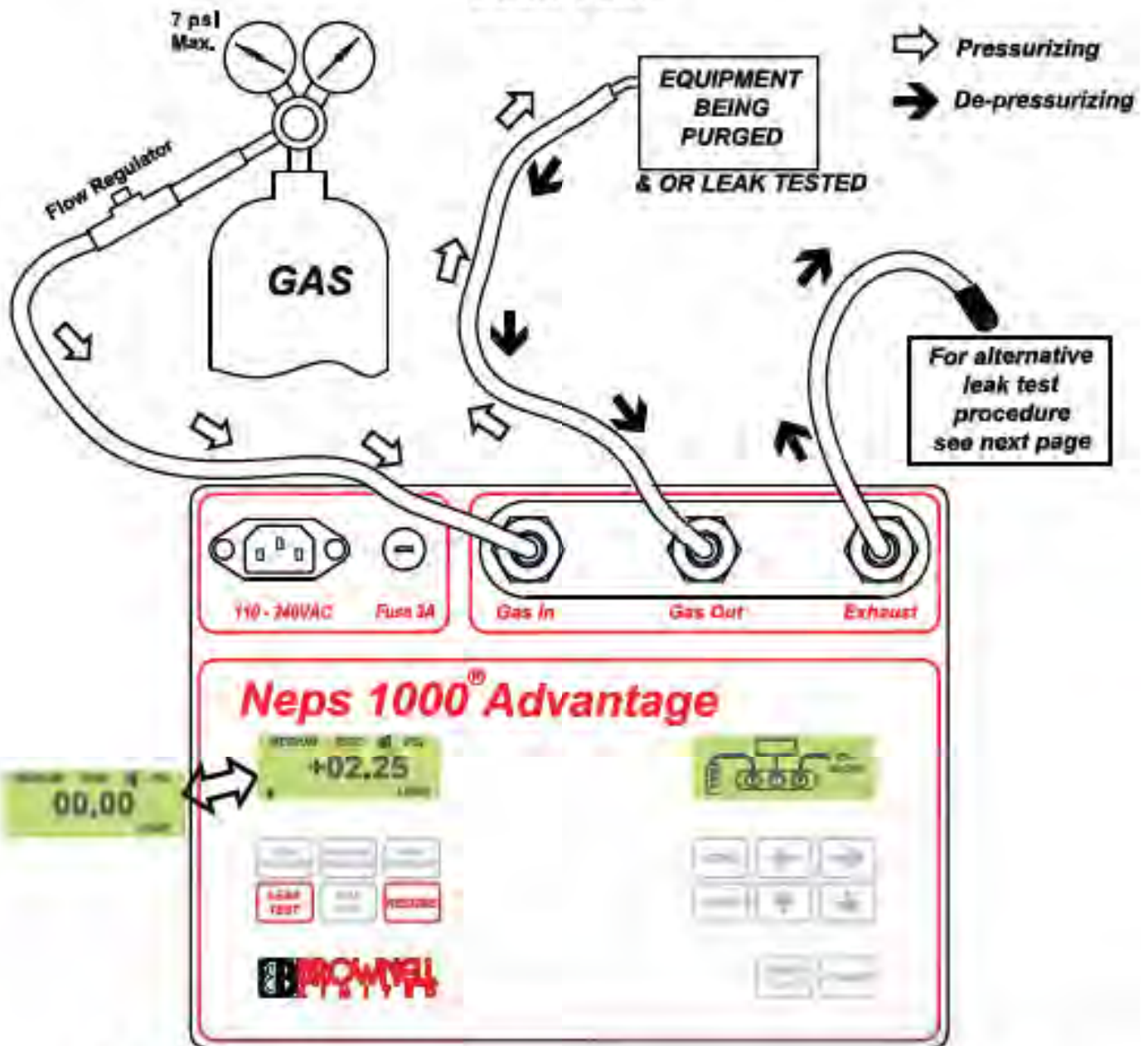


DEWPOINT CONTROL
 SEE MENU 1

■ **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) Block exhaust tube,

(B) press "Leak Test," 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".

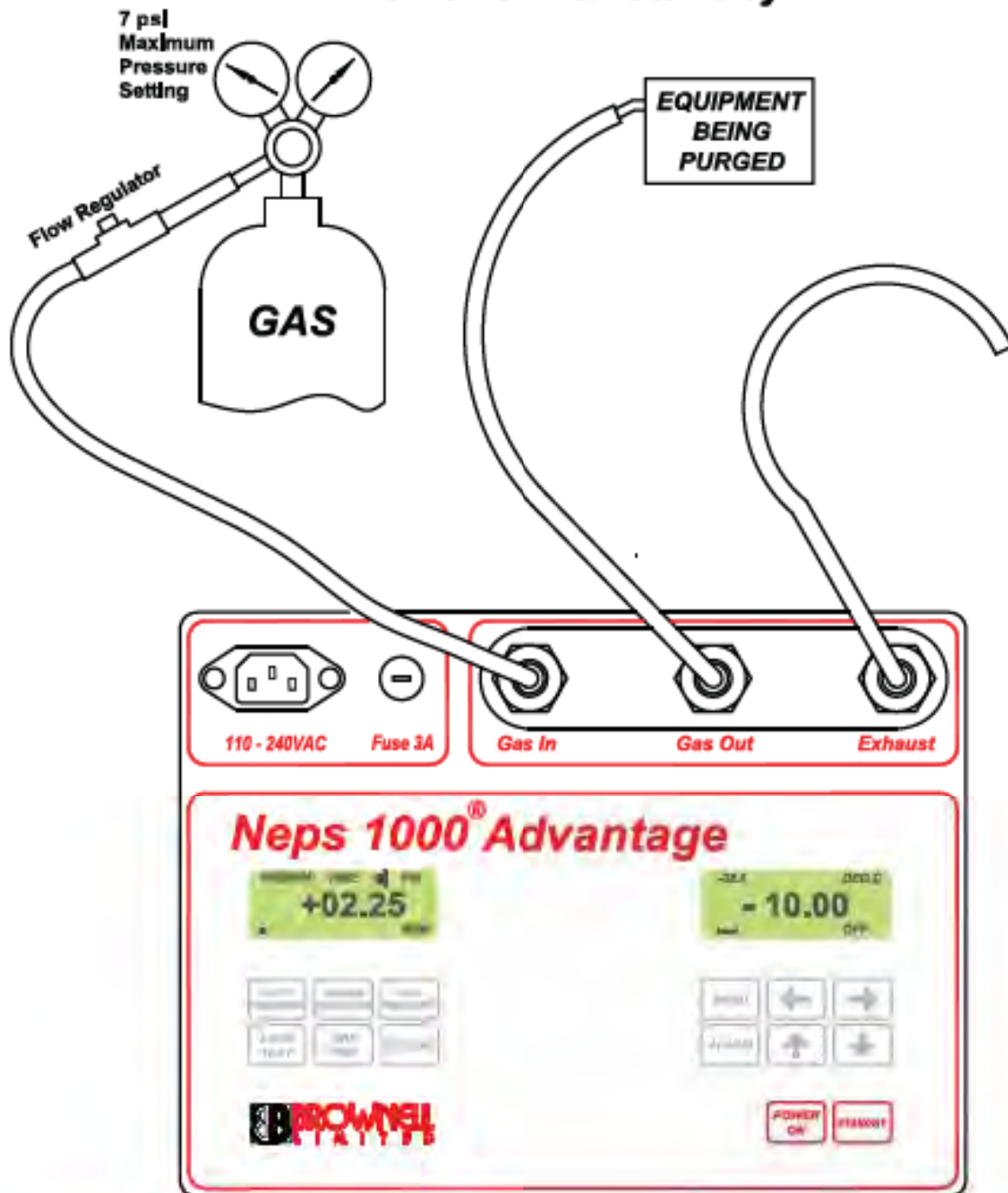
The gas pressure will rise until reaching 2.5 p.s.i., whereupon the cycle will be suspended for a dwell period, the duration of which has been set (See Menu 4), then the gas supply will be switched off and the pressure reading in the L.H. display will reset to zero.

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

(C) When the test is satisfactorily completed, press "resume" and,
 (D) to commence purging - go to section "Power On & Standby".

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

Power On & Standby

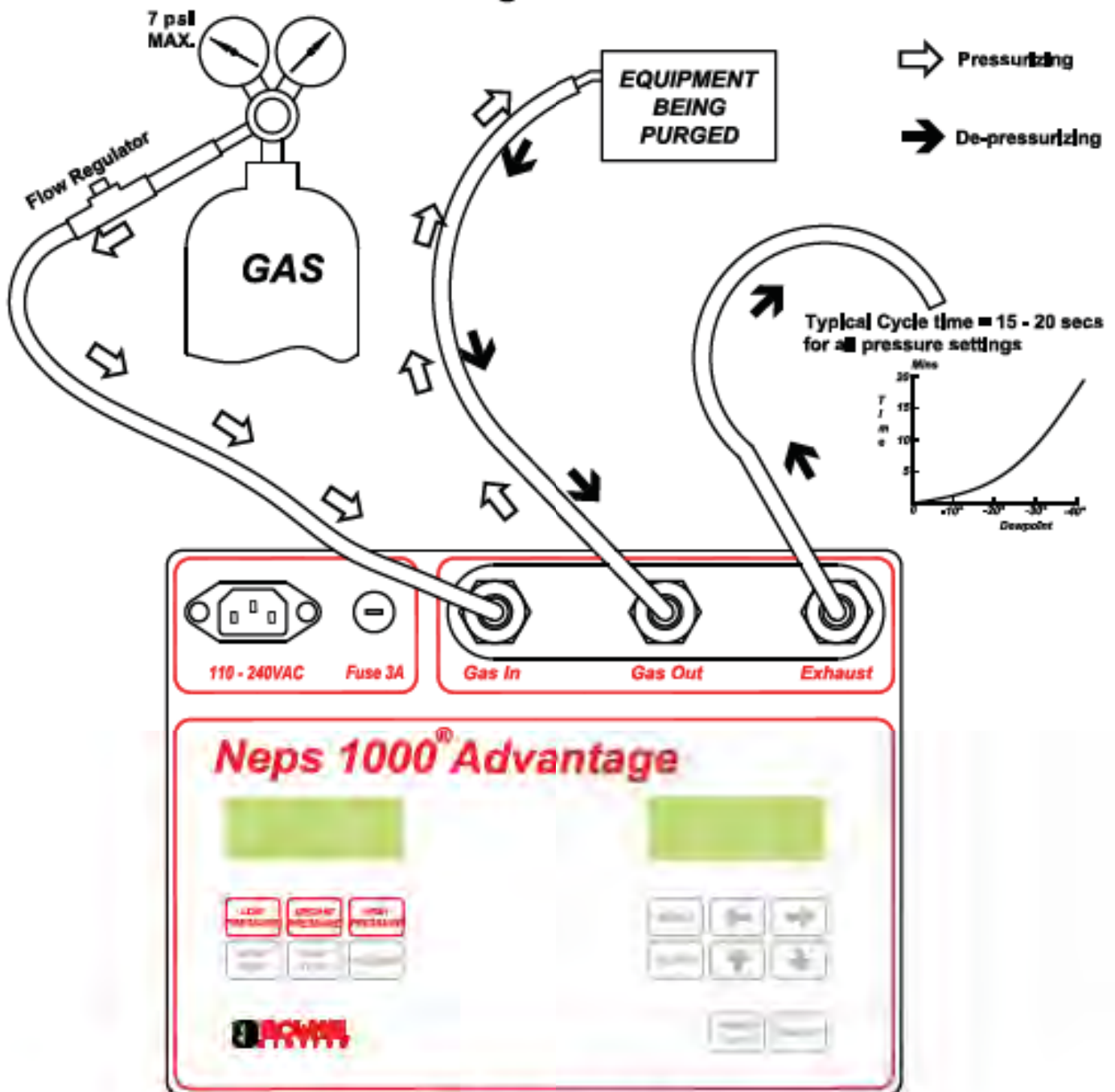


With the gas tubes and electrical connections made, the NEPS 1000 is in "Standby" mode. To commence purging, press "Power On."



When purging has been satisfactorily completed, press "Standby" to end the purging cycle.

Selecting the Pressure



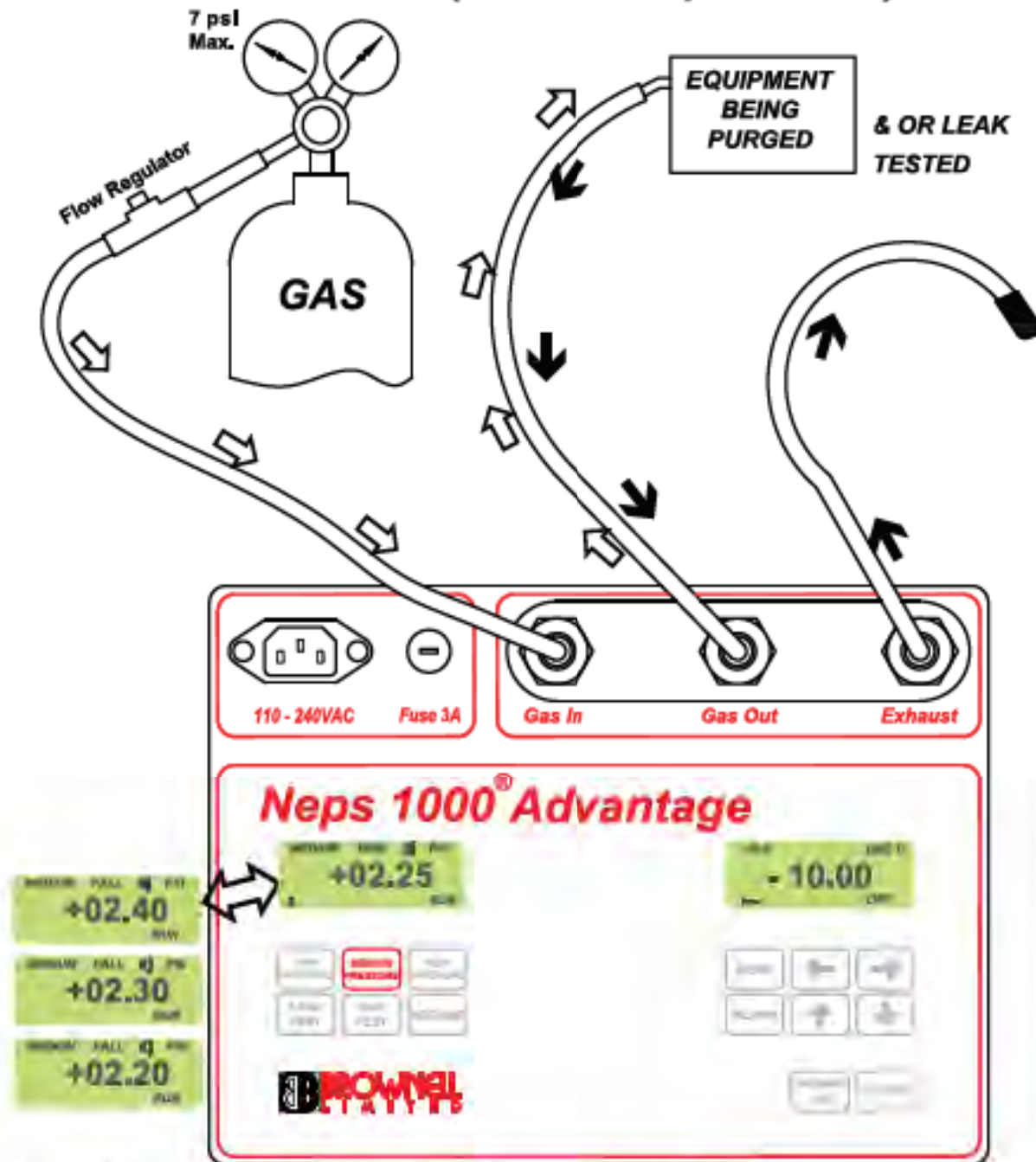
FACTORY SETTINGS

LOW = 1.5 PSI (10.3 kPa)
 MEDIUM = 2.5 PSI (17.2 kPa)
 HIGH = 5.0 PSI (30.5 kPa)

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)



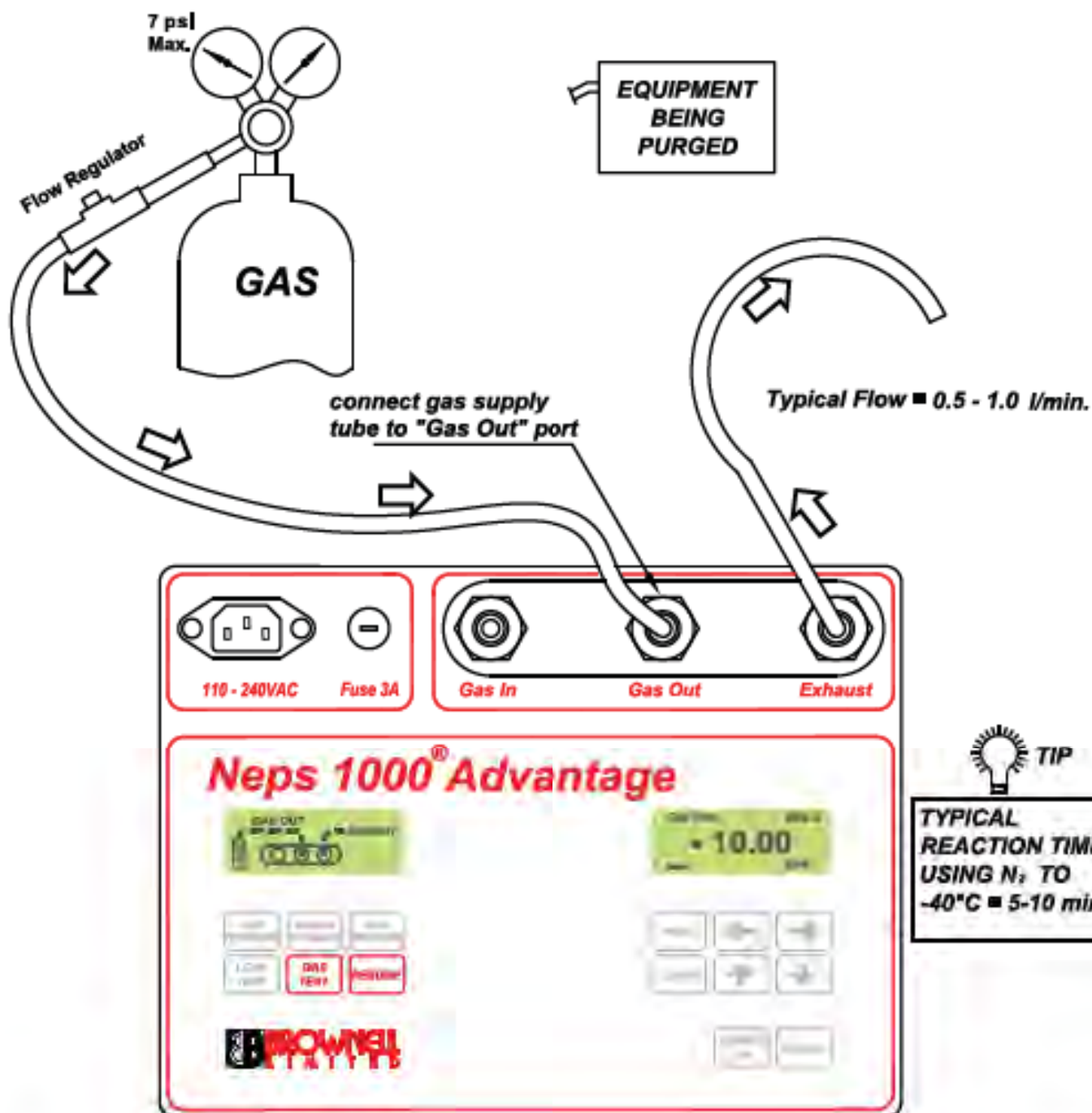
Block exhaust tube and proceed with a normal purge cycle.

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 to continue purging.

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

Gas Test



The "Gas Test" facility is a quality check and should only be used if a problem is perceived. If the target Dewpoint value is not being reached, or if the process is taking longer than expected, then a gas test is an option. Ideally, the gas being used as a purging medium should have a Dewpoint value at least 10°C below the target value.

To operate this function, connect the gas supply tube to the "Gas Out" port and press "Gas Test." The gas will flow directly through the chamber housing the Dewpoint Sensor and its reading will be displayed in the R.H. window. To end the test, press "Resume."

Note : Where the target Dewpoint value, and thereby the test value, is low, this test could be of a long duration and gas will be exhausting to atmosphere. If the source of the gas is suspect, it may be more economically viable to use a gas pipeline dryer.

Communication cable sockets

RATING 0-5 V

FUNCTION	VOLTAGE OUTPUT	DEWPOINT SENSOR OUTPUT (mA)
-99.9°C	■ 0 V	4 mA
-70°C	■ 1.17 V	8 mA
-40°C	■ 2.37 V	12 mA
-10°C	■ 3.57 V	16 mA
20°C	■ 4.77 V	20 mA

RATING 0-5V

0 V - 0 p.s.i.

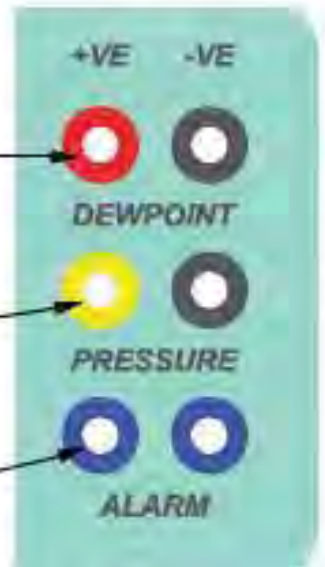
5 V - 15 p.s.i.

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[®] Advantage

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 ↑ ↓



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



Information and Settings

Right Hand Display

Menu 127 Dec 72008
DP Sen 11 Mnths
1 Dewp. Control
Off



Menu 127 Dec 72008
DP Sen 11 Mnths
2 Dewpoint Level
-05.0 C



Menu 127 Dec 72008
DP Sen 11 Mnths
3 Stat Range
12 Degrees



Menu 127 Dec 72008
DP Sen 11 Mnths
4 Dwell In Secs
045 Seconds



Menu 127 Dec 72008
DP Sen 11 Mnths
5 Alarm Set
-18.0 C



Menu 127 Dec 72008
DP Sen 11 Mnths
6 Alarm Polarity
Low



Menu 127 Dec 72008
DP Sen 11 Mnths
7 Pressure Scale
PSI



Menu 127 Dec 72008
DP Sen 11 Mnths
8 Dewpoint Scale
Deg C



Alternative Right Hand Display

Menu 127 Dec 72008
DP Sen 11 Mnths
1 Dewp. Control
Stat



Menu 127 Dec 72008
DP Sen 11 Mnths
2 Dewpoint Level
-05.0 C

See next page for details

Set appropriate Dewpoint level
one press per degree rise or fall

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.

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.

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

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

Select Pressure units for display

Select Dewpoint units for display



Information and Settings

Right Hand Display

Menu 12 / Dec / 2008
DP Sen 11 Mnths
9 Audio Set
On



Menu 12 / Dec / 2008
DP Sen 11 Mnths
10 LCD Contrast
██████████



Menu 12 / Dec / 2008
DP Sen 11 Mnths
11 Backlight Bri
██████████



Menu 12 / Dec / 2008
DP Sen 11 Mnths
12 Beep In mS
020 mS



Menu 12 / Dec / 2008
DP Sen 11 Mnths
Enter PIN
0 0 0 0



Alternative Right Hand Display

Menu 12 / Dec / 2008
DP Sen 11 Mnths
9 Audio Set
Off

Select an audible beep to sound when keys are operated

Menu 12 / Dec / 2008
DP Sen 11 Mnths
10 LCD Contrast
██████████

Adjust contrast of LH display

Menu 12 / Dec / 2008
DP Sen 11 Mnths
11 Backlight Bri
██████████

Adjust brightness of displays

Menu 12 / Dec / 2008
DP Sen 11 Mnths
12 Beep In mS
020 mS

Adjust duration of Beep (see menu 9)



Press to enter digit 0-9



Press to move to adjacent position

Note :

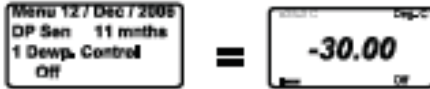
The PIN is only required to revise the Dewpoint Sensor details:

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

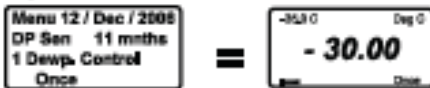
Menu 1

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.

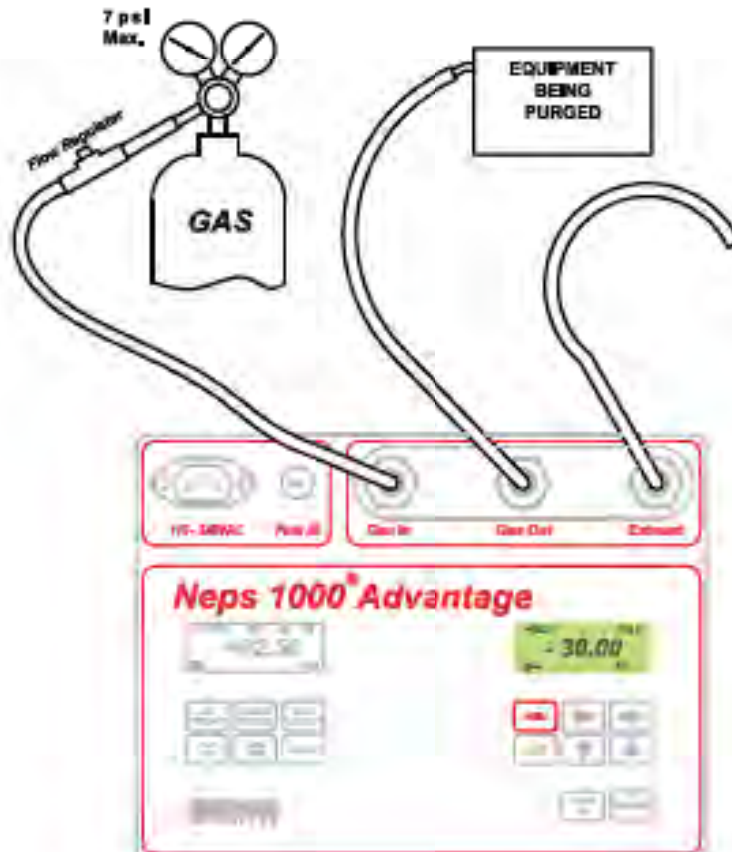
Two further options with the dewpoint sensor fitted remotely, directly into the equipment being purged, are described on the next page.



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.

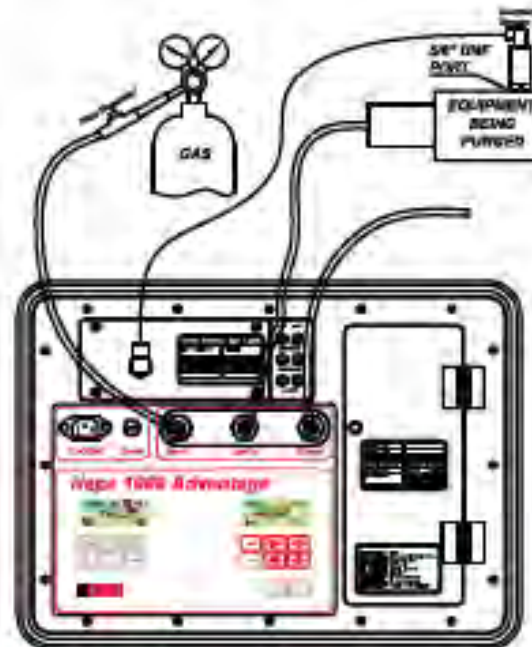
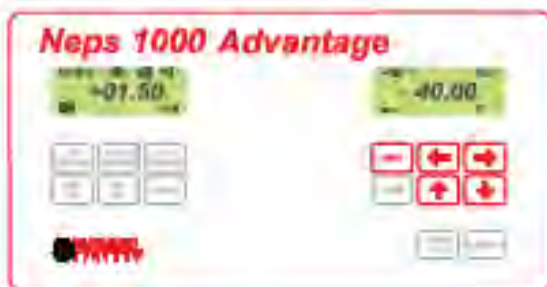


Dewpoint Control - once On the first occasion that the target Dewpoint Level is achieved, the purge cycle will automatically stop and the NEPS will be in "standby" mode. Whilst this cycle will not have completely purged the equipment of moisture, it does require a positive action by the operator to continue,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



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).

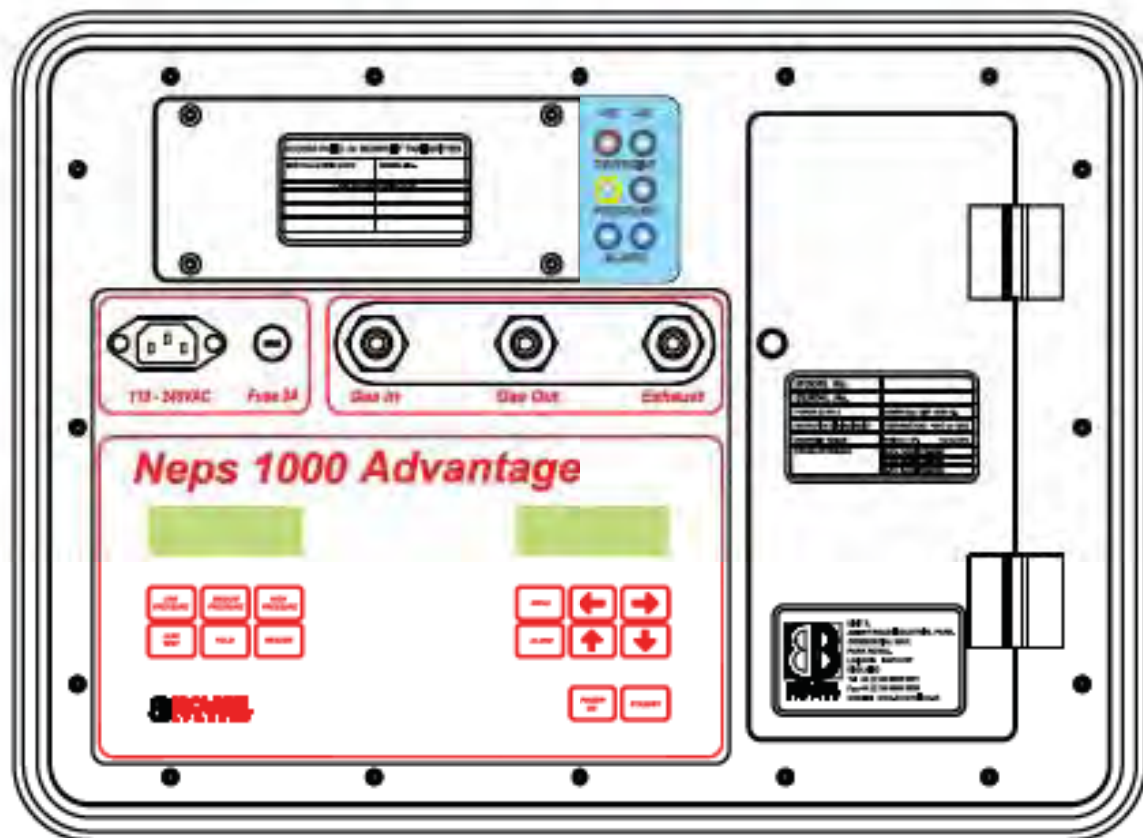
With the 'stat' program selected, an extra level of control - by the DP sensor - is added. On the first occasion that the target Dewpoint Level is achieved the purge cycle is 'suspended' (see menu 3 - Stat Range) whilst leaving the exhaust port open so the gas in the system continues to 'liberate' moisture 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.



NEPS 1000 with REMOTE SENSOR

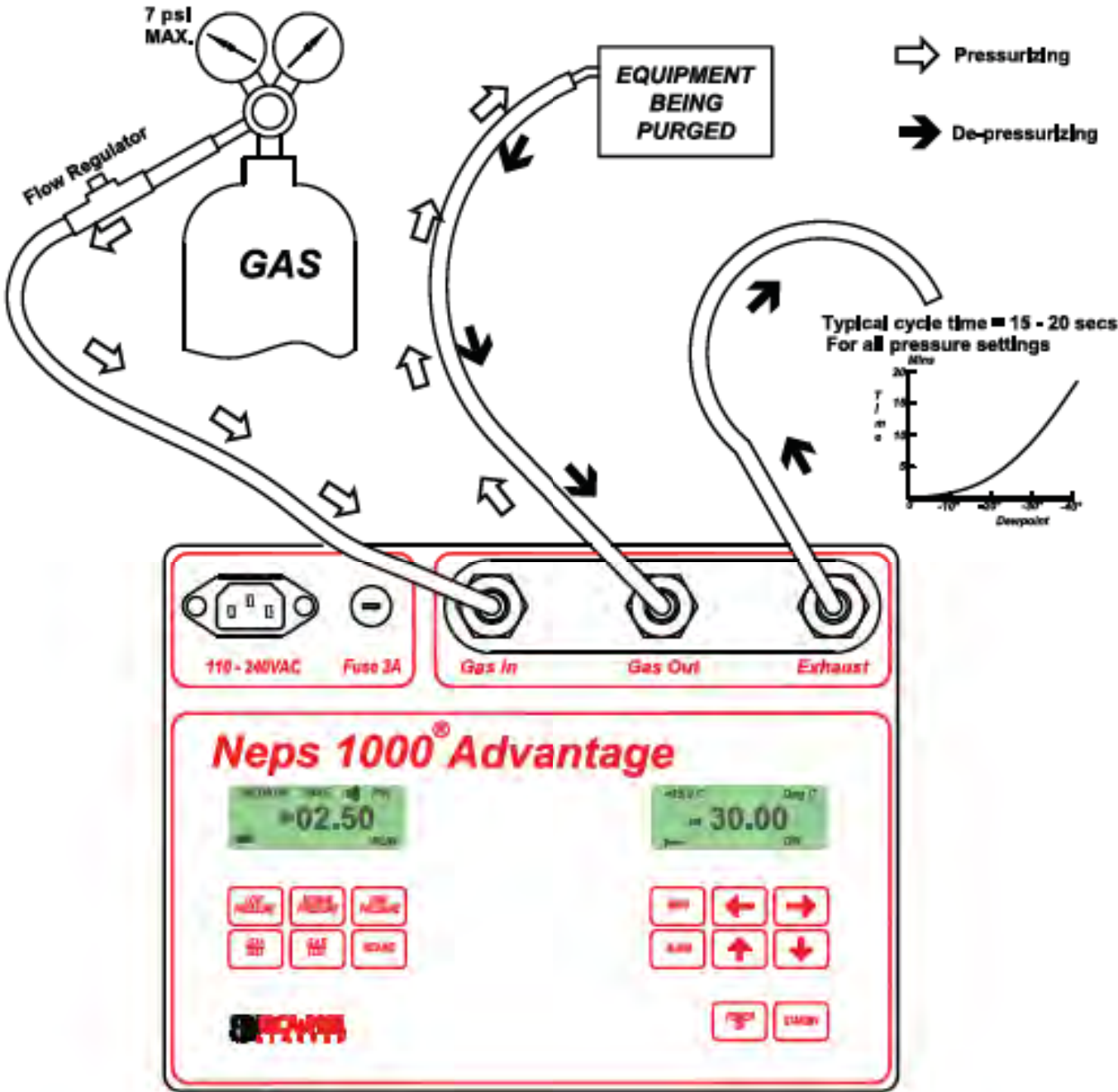
NEPS 1000 Advantage

APPLICATIONS



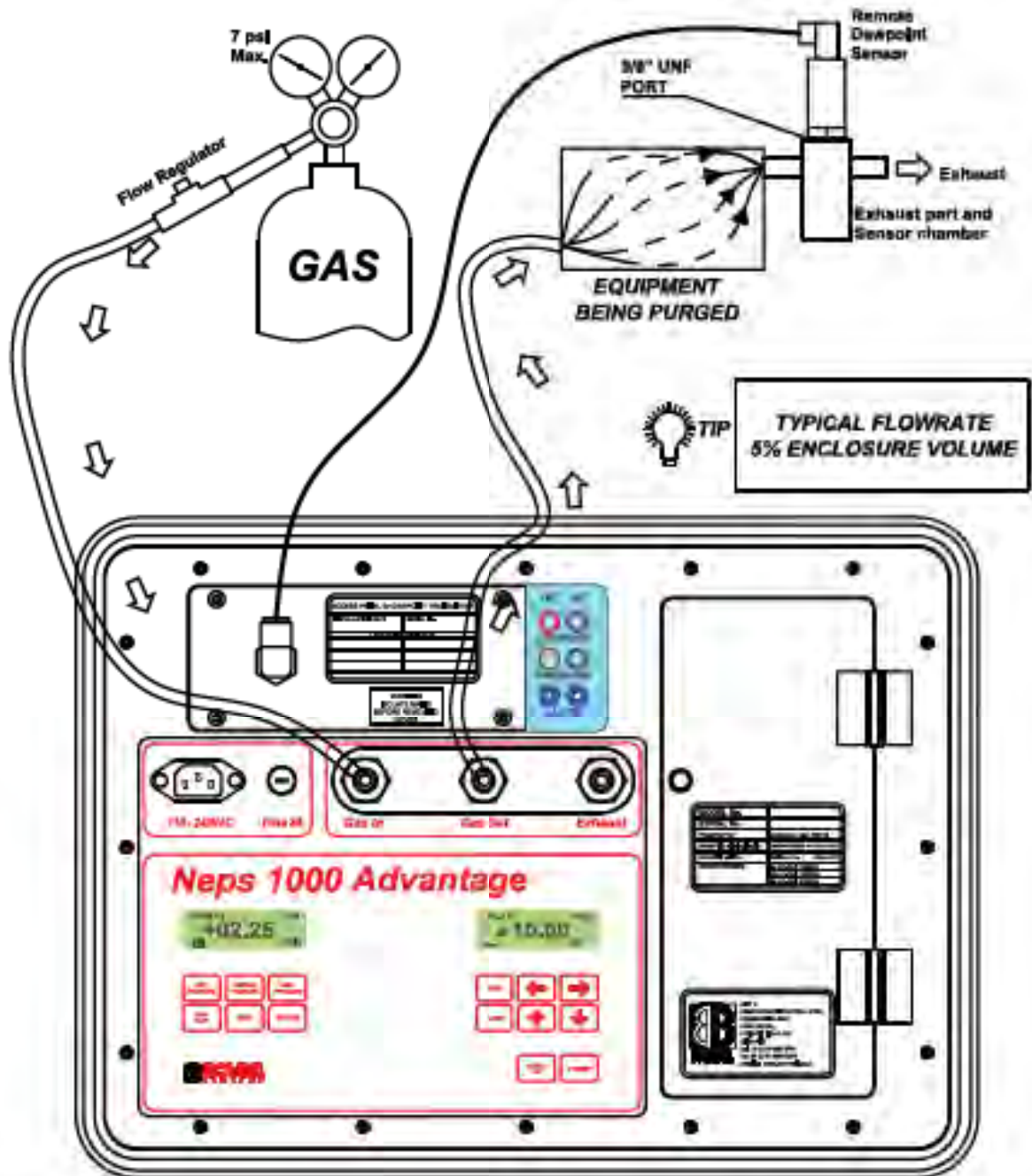
- ◆ **Single Point Purge**
- ◆ **Through Purge**
- ◆ **Multiple Purge**
- ◆ **DRYCAB Purge**
- ◆ **MiNTeC** - *Moisture intrusion test*

Single Point Purge



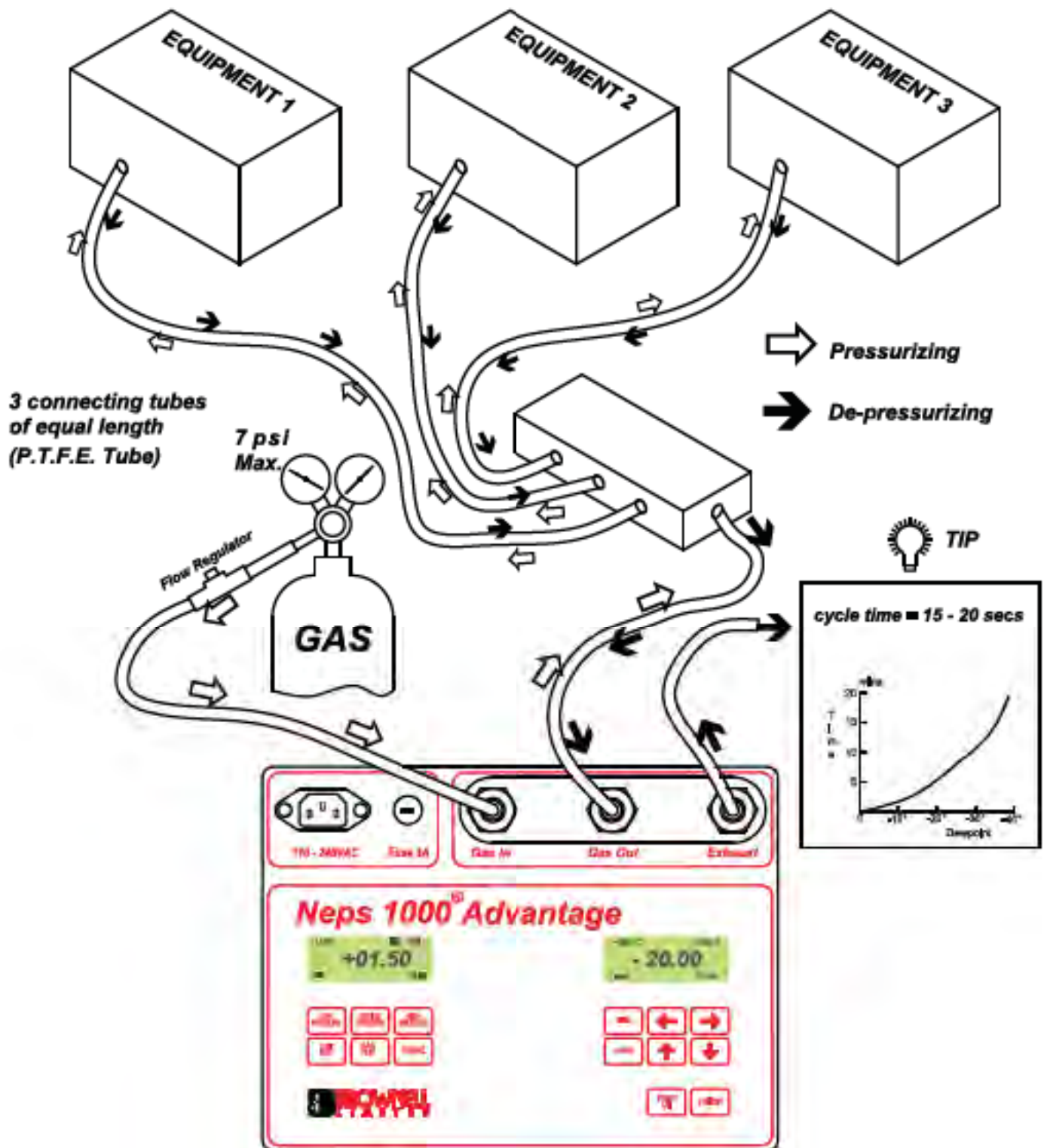
Basic purging procedure

Through Purge



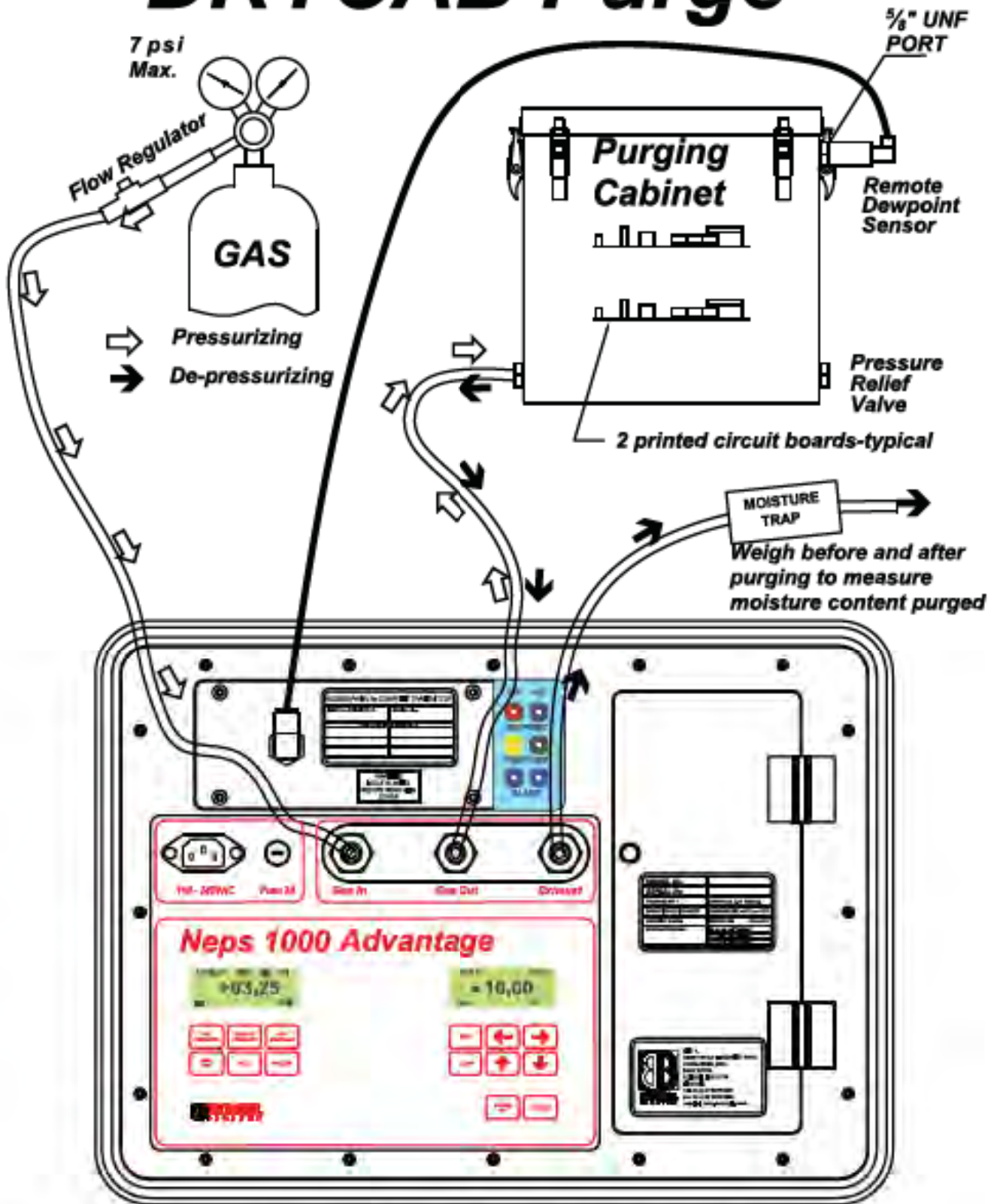
The preferred purging method when the enclosure is of a "light" construction, i.e. likely to deform under 1.5 psi internal pressure.

Multiple Purge



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

DRYCAB Purge



Ideal purging method for dealing with small items

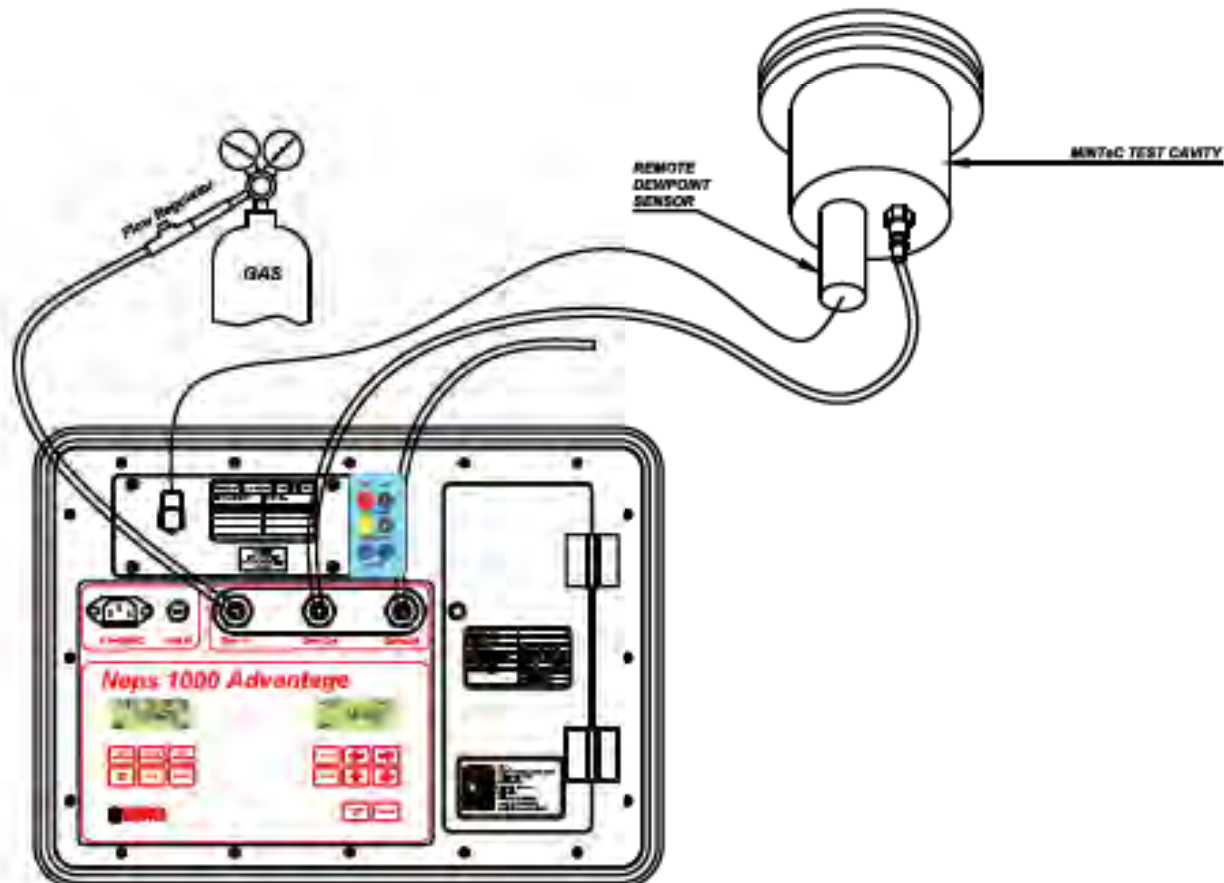
MiNTeC moisture intrusion test

There are two MiNTeC test cavities, one for testing sheet materials, the other for testing seal materials, and the test results obtained may be used to predict when, with the selected materials, the moisture intrusion level reaches a point that will require the equipment to be withdrawn from service to be purged.

The technology is discussed elsewhere, but for operational purposes, the NEPS is configured for use with the dewpoint sensor fitted remotely, directly into the MiNTeC chamber (see below).

*In menu 7, set the dewpoint control to 'ONCE'
In menu 8, set the dewpoint level to -40°C.*

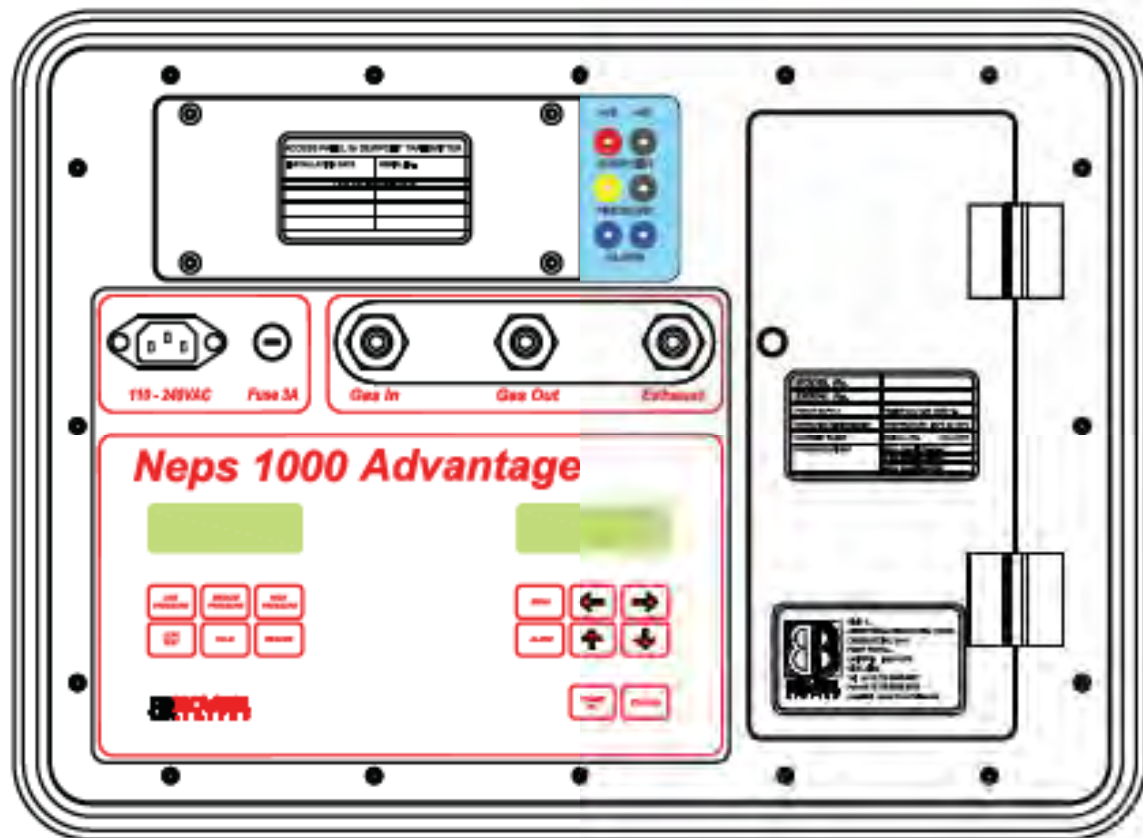
When the NEPS has reduced the dewpoint to -40°C, the purge cycle will stop and the NEPS will set to 'standby' mode. The degradation of the dewpoint will then be monitored facilitating the calculation of the moisture transmission rate for the material under test, i.e. the mass of moisture per unit volume transmitted during a known time.



NEPS 1000 with REMOTE SENSOR

NEPS 1000 Advantage

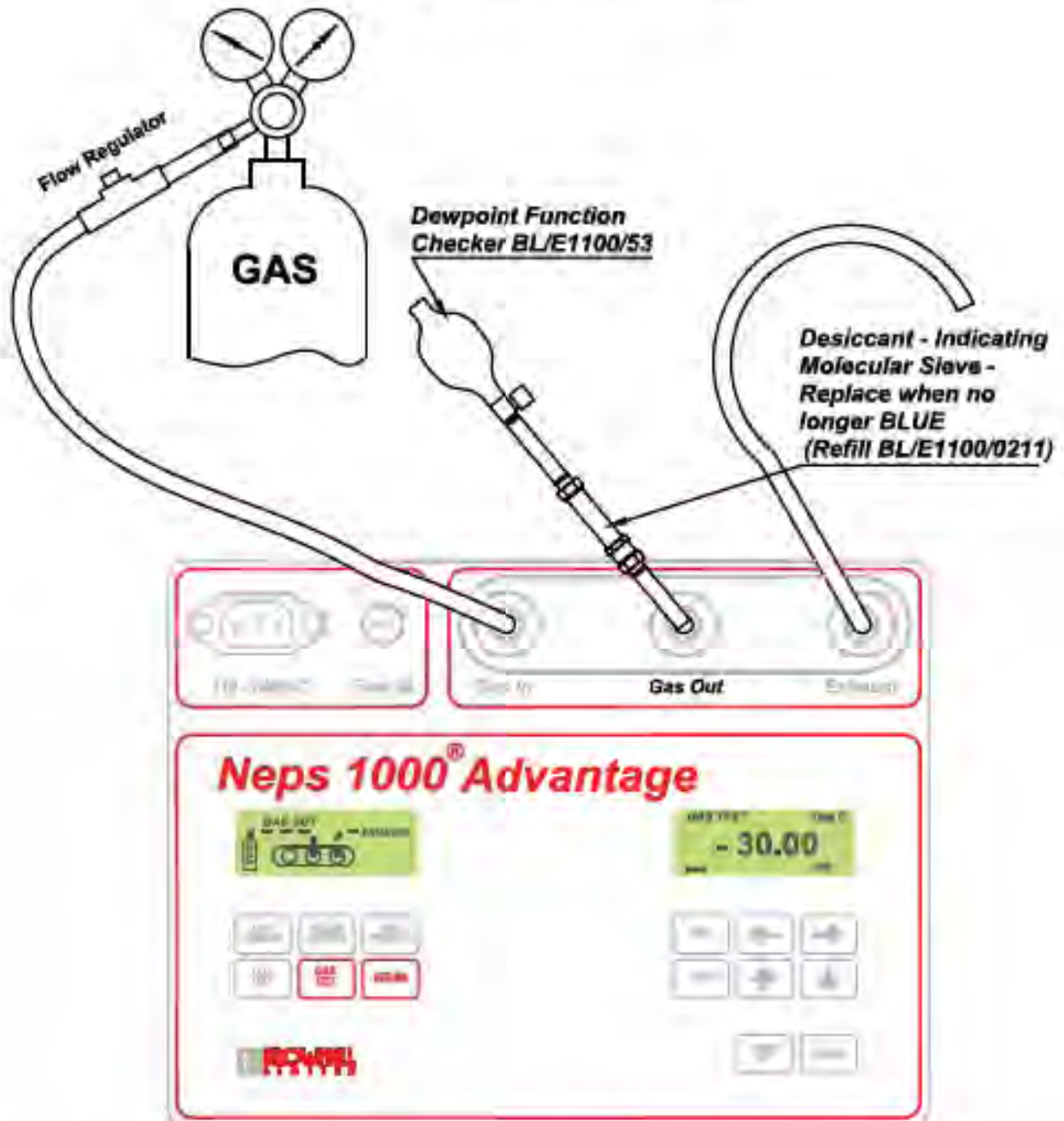
ACCESSORIES & OPTIONAL EXTRAS



- ◆ ***Dewpoint Function Checker***
- ◆ ***Continuous Air Dryer***

Dewpoint Function Check

Operating Mode = Gas Test

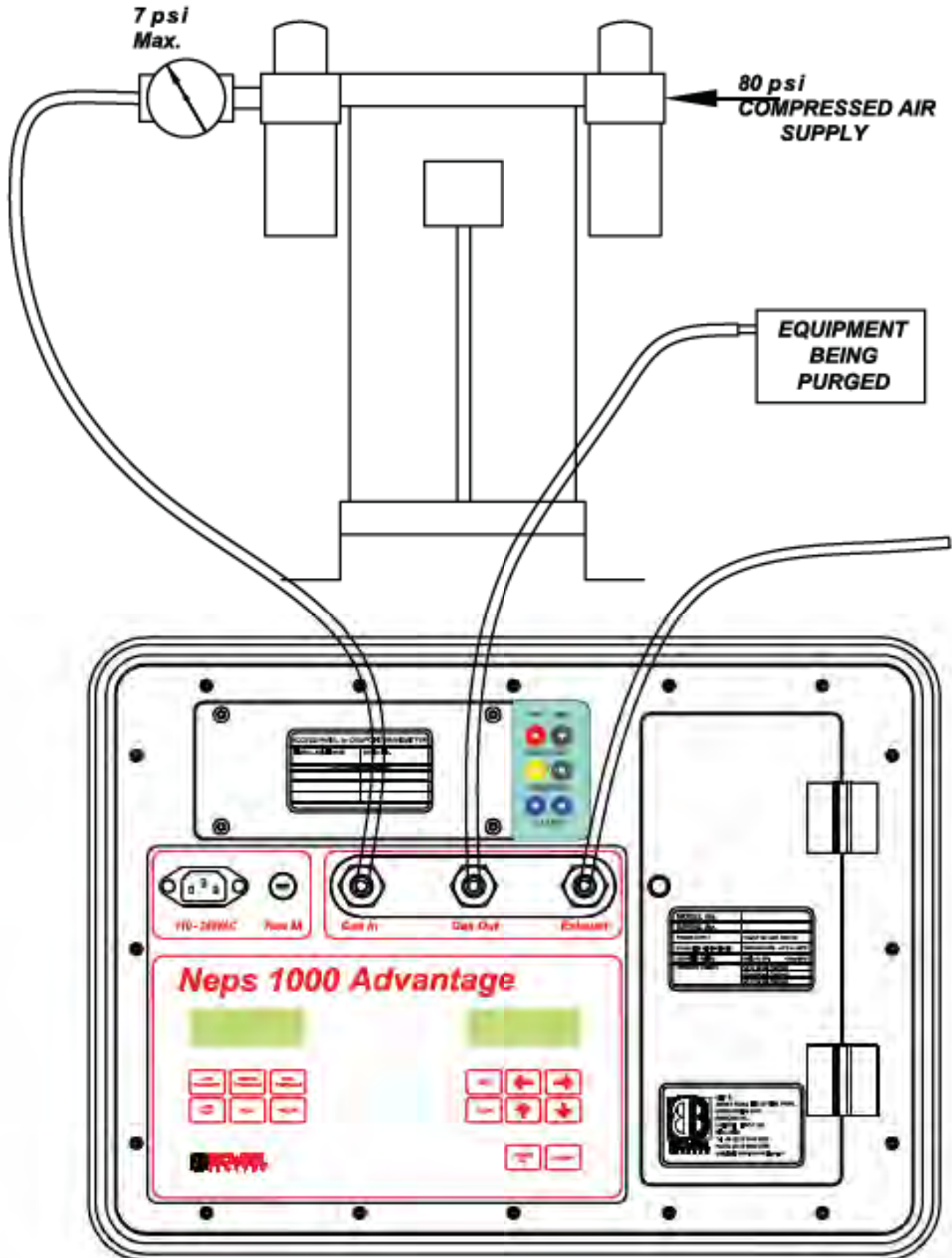


To check that the Dewpoint meter is operating correctly, press the GAS TEST button, whereupon a 'Gas Test' flow diagram will appear in the L.H. display window. Connect the Function Checker to the Gas Out nozzle and squeeze the inflation bulb 5 times.

If the Dewpoint reading in the R.H. display drops 10°, the meter is operating correctly.

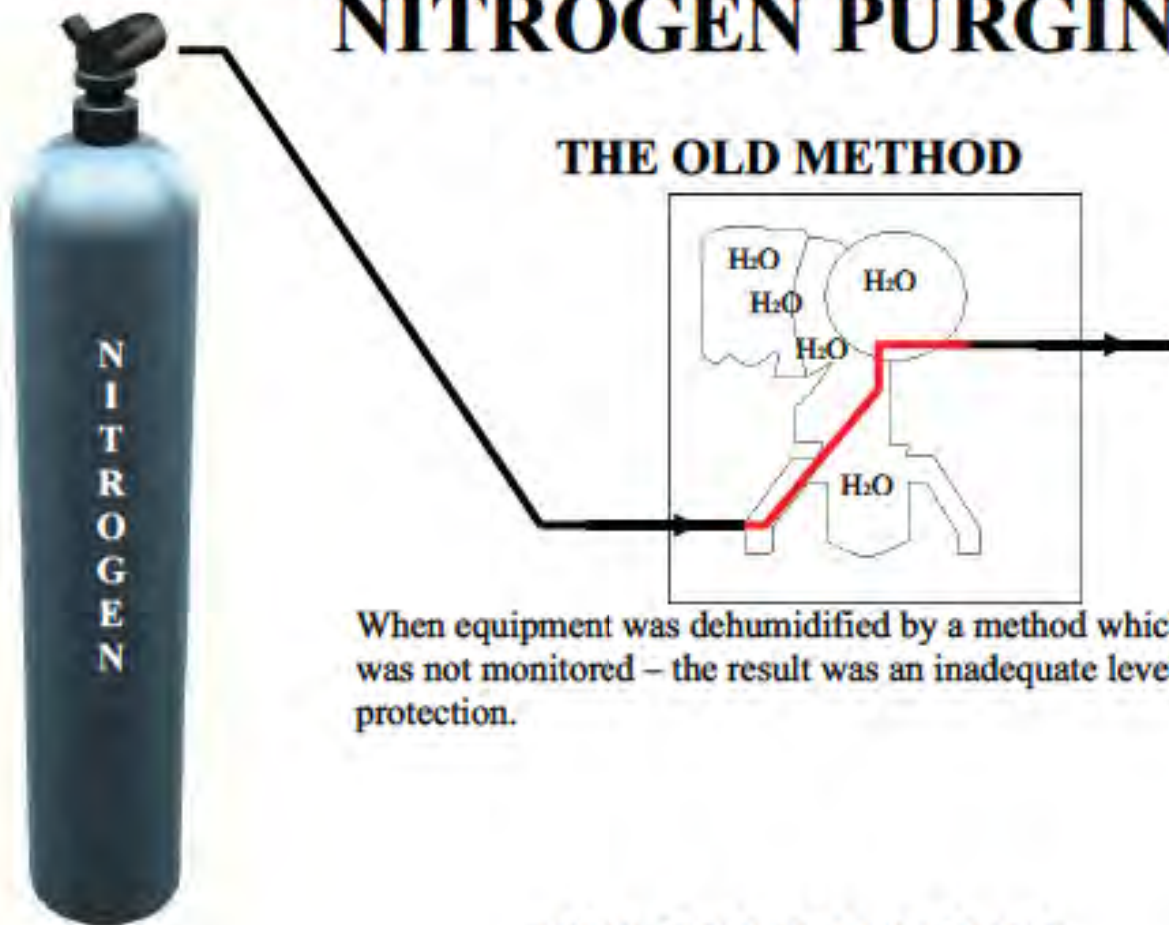
To continue purging, remove the Function Checker, re-connect the 'gas out' line to the equipment being purged and press the RESUME button.

Continuous Air Dryer (BL/E1100/57)



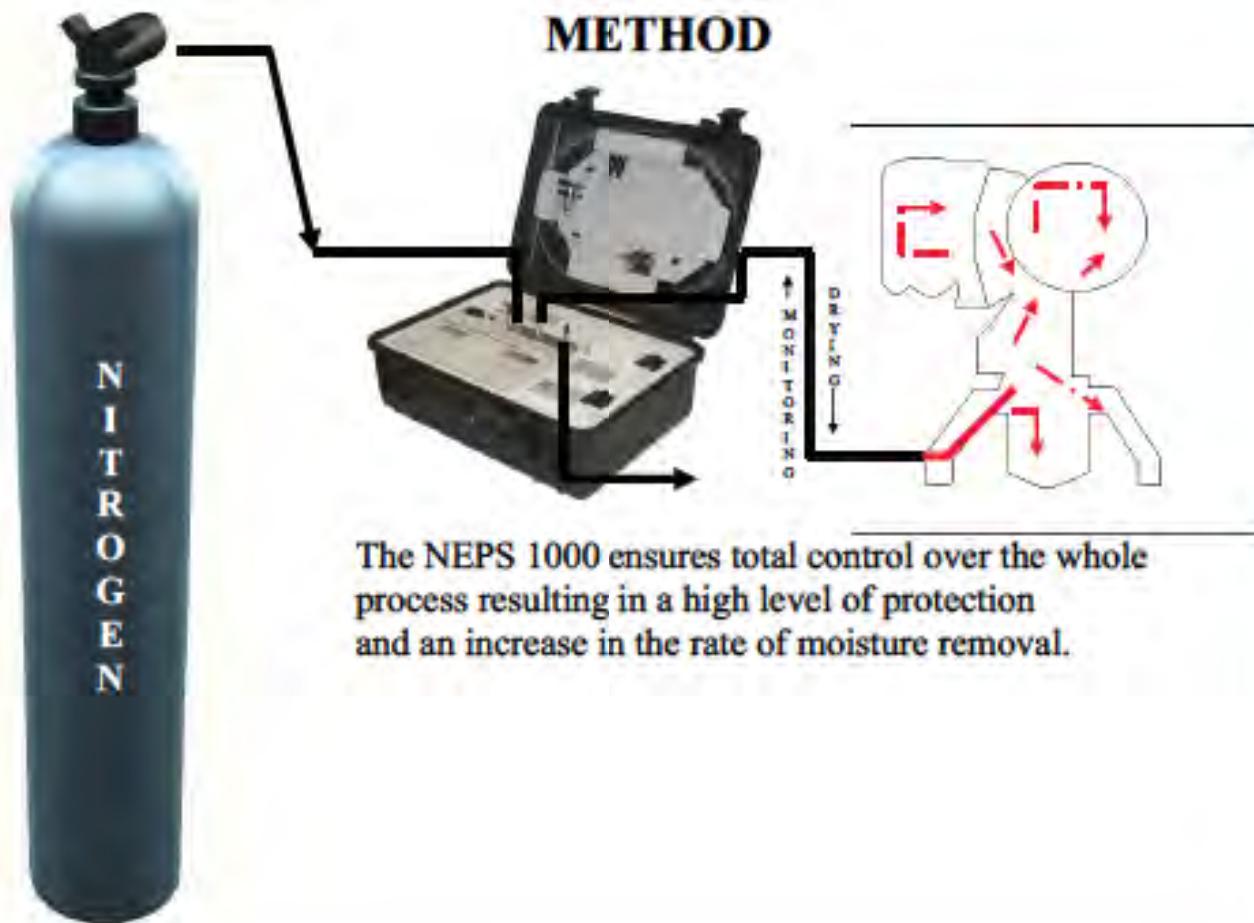
NITROGEN PURGING

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.



Accessories

Description	Part Number
Power Lead (UK)	BLE1085/104
Power Lead (EUROPE)	BLE1085/105
Power Lead (USA)	BLE1085/106
In-Line Gas Conditioner (1kg)	BLE1100/80
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
Continuous Dryer - voltage 230 v 50/60 Hz	BLE1100/57/01
Continuous Dryer - voltage 110 v 50/60 Hz	BLE1100/57/02
Oil Vapor Filter	BLE1100/58
Exhaust Line with Flow Regulator	BLE1100/70/02
Wall Mounting Gas Bottle Holder	BLE1100/73
Moisture Trap	BLE1100/52
Dry Cab	BLE1100/77

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

Multiply	—>	to get
to get	<—	Divide
cc/min	1	mL/min
cfm (ft ³ /min)	28.31	L/min
cfm (ft ³ /min)	1.699	m ³ /hr
cfh (ft ³ /hr)	472	mL/min
cfh (ft ³ /hr)	0.125	GPM
GPH	63.1	mL/min
GPH	0.134	cfh
GPM	0.227	m ³ /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 ₂ O
bar	29.53	" of Hg
bar	100.0	kPa
bar	1000	mbar
bar	1019.73	cm of H ₂ O
bar	750.06	mm of Hg
" of H ₂ O	0.036127	psi
" of H ₂ O	0.073554	" of Hg
" of H ₂ O	0.2491	kPa
" of H ₂ O	2.491	mbar
" of H ₂ O	2.5400	cm of H ₂ O
" of H ₂ O	1.8683	mm of Hg
kg/cm ²	14.223	psi
kg/cm ²	393.7	" of H ₂ O
kg/cm ²	28.96	" of Hg
kg/cm ²	98.06	kPa
kg/cm ²	980.6	mbar
kg/cm ²	1000	cm of H ₂ O
kg/cm ²	735.5	mm of Hg
kPa	0.14504	psi
kPa	4.0147	" of H ₂ O
kPa	0.2953	" of Hg
kPa	10.000	mbar
kPa	10.1973	cm of H ₂ O
kPa	7.5006	mm of Hg
mbar	0.01450	psi
mbar	0.40147	" of H ₂ O
mbar	0.02953	" of Hg
mbar	0.100	kPa
mbar	1.01973	cm of H ₂ O
mbar	0.75006	mm of Hg
psi	27.680	" of H ₂ O
psi	2.036	" of Hg
psi	6.8947	kPa
psi	68.947	mbar
psi	70.308	cm of H ₂ O
psi	51.715	mm of Hg