The PrimeComm Electronic Commissioning Unit

The PrimeComm electronic commissioning unit has been developed in response to demand from discerning commissioning engineers requiring an improvement in measuring techniques for differential pressures in heating and air conditioning systems.

The PrimeComm unit utilises state-of-the-art technologies in the field of electronics, software and hydraulic protection for the sensitive measuring element.

Health and Safety

Hattersley takes every reasonable precaution to ensure that PrimeComm commissioning units are designed, constructed, calibrated and tested for safe and trouble-free operation when used in accordance with the operating instructions.

For safe operation, it is important that commissioning engineers read and understand the instructions contained within this manual. It is also very important that those employed in the function of commissioning are aware of the general hazards associated with the systems being commissioned.

When working with the PrimeComm unit, it is the user's responsibility to ensure that any Personal Protective Equipment (PPE) or clothing is worn as appropriate to the hazards potentially present.

It is also the user's responsibility to understand the Health and Safety issues relating to high pressure systems; high temperature systems; and systems containing flushing agents, cleaning agents and/or antifreeze agents. This list is, however, not exhaustive.

Description of Unit

The PrimeComm unit comprises the following:

Hand-held electronic manometer in a removable rubber protector.
Quick-connect tubing set, complete with manually-operated isolation valves.
Pair of angle-pattern Binder-style adaptors.
Pair of straight-pattern Binder-style adaptors.
Toolkit including a set of hex keys (3mm, 4mm, 5mm, 6mm & 8mm) and a screwdriver.
Lanyard for attachment of the PrimeComm unit to pipework, etc.
Spare battery.
Operating Instructions, Quick-Start Guide & Calibration Certificate.

All the above are incorporated in a sturdy, lightweight, carrycase.

Connection and Set-up

General Navigation Buttons

Press the **MENU** button to switch the unit on. Once switched on, use the **MENU** button to enter the menu screens.

Use the ⮌ button for cancelling entries or for returning to previous screens. The ⮌ button also allows the PrimeComm to be switched off.

Press the **?** button for context-sensitive help. Use the ▲ ▼ buttons to scroll through the help files.

When in a Menu screen or a Help screen, pressing the **MENU** button will give language options.

System Defaults

The PrimeComm unit has been set up with default values for all the editable functions as follows:

Language = English	**Flow Alerts = Disabled**
Pressure = kPa	**Back Light Timer = 5 minutes**
Flow = l/s	**Auto-off Timer = 5 minutes**
Specific Gravity = 1.00	**Update Time = 1 second**
Design Flow = 0 l/s	**Sample Time = 3 seconds**
Target Flow = 0%	**View Size As = mm**

Details of how to change these settings are provided in the various sections of this manual.

Automatic Alerts

Some automatic alerts may, on occasion, be displayed on the message bar at the top of the screen as follows:

Zero DP	**SG (when specific gravity is not set to 1.0)**
Low Battery	**High Temp (when internal temp. is high)**
Change Battery	

Connection

Note: each connection tube is fitted with an isolating valve and it is a matter of personal preference whether the tubes are used with the isolating valves adjacent to the PrimeComm unit or adjacent to the subject measuring valve.

1. Before starting, ensure that:
   a. Neither tube is connected to the PrimeComm unit, and
   b. Both isolating valves on the connection tubes are in the **CLOSED** position.
2. Select the correct connection adaptors for the device being measured and attach them to the connection tubes.
3. Attach the connection adaptor on the red connection tube to the high-pressure test point on the subject measuring valve.
4. Attach the connection adaptor on the blue connection tube to the low-pressure test point on the subject measuring valve.
5. Ensure that the equalising valve on the PrimeComm unit is **OPEN** (turn anti-clockwise) and then attach the PrimeComm to the free ends of the red and blue connection tubes.
6. Open the isolating valves on the connection tubes. The differential pressure across the subject measuring valve will generate flow through the connection tubes – from the high-pressure side to the low-pressure side – and expel any air from inside the tubes.
7. Close the isolating valves on the connection tubes.
8. Press the **ZERO** button to set the datum at zero (if the unit is being subjected to an extreme temperature change at this point, the datum may drift from zero as the internal temperature of the unit changes and, in these circumstances, it will be necessary to repeat this process until the internal temperature stabilises and a zero datum is maintained).
9. Open the isolating valves on the connection tubes.
10. Close the equalising valve.
11. The PrimeComm unit will now be reading differential pressure.

Please remember that the default setting for the Auto-Off Timer is 5 minutes i.e. the PrimeComm will automatically switch off after 5 minutes of inactivity. If this happens, simply press the **MENU** button to switch the unit on again.

IMPORTANT SAFETY NOTE:

For safe removal of the PrimeComm unit, ensure that the equalising valve is OPEN before CLOSING the isolating valves on the connection tubes. The PrimeComm unit and the connection tubes can now be safely removed from the subject measuring valve.

Menu System

The PrimeComm unit has been designed with five menus for ease of use.

Main Menu	Units Menu	Display Menu	Damping Menu	Advanced Menu
Select Valve	Pressure	Flow/Pressure	Update Time	Flow Alerts
Valve Position	Flow	Multi display	Sample Time	Back-Light Timer
Design Flow		Pressure		Auto-Off Timer
Target Flow		About		View Size As
Pipe Size				
User Kvs				
Change SG				

The menu system is accessed using a single press of the **MENU** button. Then use the ◄► buttons to scroll through the available menus.

When the correct menu is shown on the screen, use the ▲ ▼ buttons to select the correct function, which is then accepted using the ✓ button.

Menu functions that require a numeric value to be added use a system which is best described using the following example:

Example – Setting the design flow to 1.05 l/s.

> **MENU** selects the Main Menu option
> ▼ ▼ moves the cursor down to the Design Flow option
> ✓ accepts the Design Flow option
> ▲ will change the value of the first column to 1
> ► selects the next column
> ▼ selects a decimal point
> ► selects the next column
> ► selects the next column
> ▲ ▲ ▲ ▲ ▲ changes the digit to 5
> ✓ accepts the selected value of 1.05
> ↺ returns to the main display

To enter a negative number, use the **ZERO** button before any number is added.

To enter a decimal point, use the ▼ button when the zero digit is showing.

MAIN MENU
There are seven options within the MAIN menu.

```
MAIN
SELECT VALVE
VALVE POSITION
DESIGN FLOW
TARGET FLOW
PIPE SIZE
USER Kvs
CHANGE SG
```
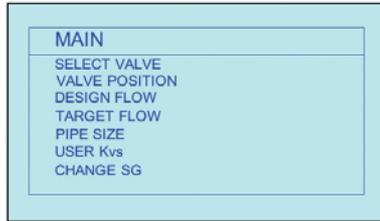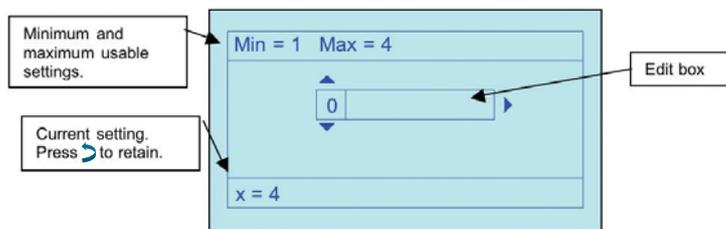
Select Valve
To select the manufacturer, use the ◄► buttons. To select the valve type, the valve fig. no. and the valve size, use the ▲▼ buttons followed by the ◄► buttons for individual selections.

Important: Select __all__ items on screen before using the ✓ button to accept them.

```
⬍ Valve maker                    ◄►

     Valve Type

     Valve Fig. No.

     Valve Size
```
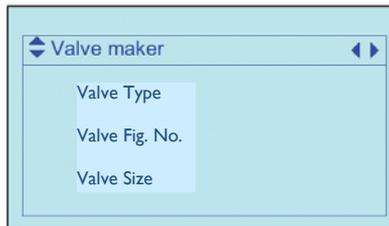
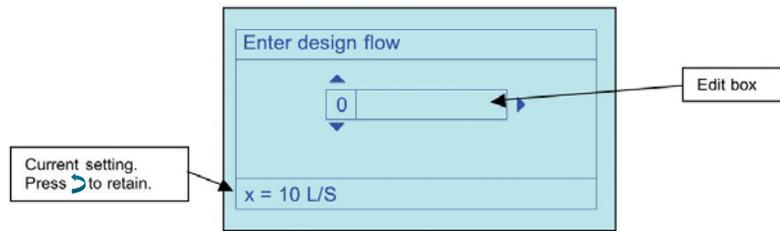### *Valve Position (handwheel position)*
When variable orifice valves are being measured, the handwheel position must be entered so that the correct value of Kvs is used for the derivation of the flowrate.

Minimum and maximum usable settings.	Min = 1 Max = 4	Edit box
Current setting. Press ⤸ to retain.	▲ 0 ▼ ►	
	x = 4	

The screen shows the maximum and minimum recommended positions for the valve. The minimum position shown ensures that the valve maintains reasonable accuracy.
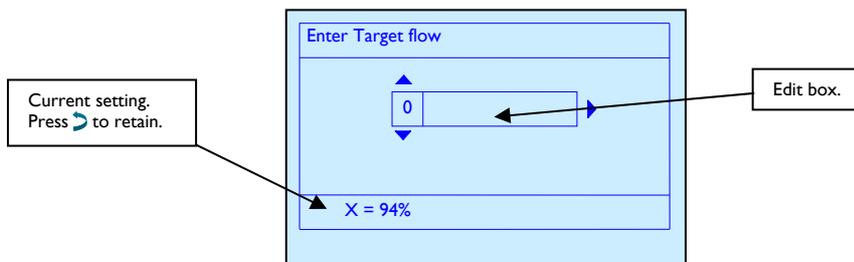
Design Flow

The design flow for the selected valve can be edited in this screen.

```
Enter design flow
        ▲
      [ 0 |        ]  ◄──────── Edit box
        ▼

Current setting.
Press ⟳ to retain. ────► x = 10 L/S
```

When a value is entered, the actual flow will be calculated as a percentage of the design flow and will be displayed on the Multi Display in the design flow box. Design flow can be entered in any of the units selectable in the Units Menu.
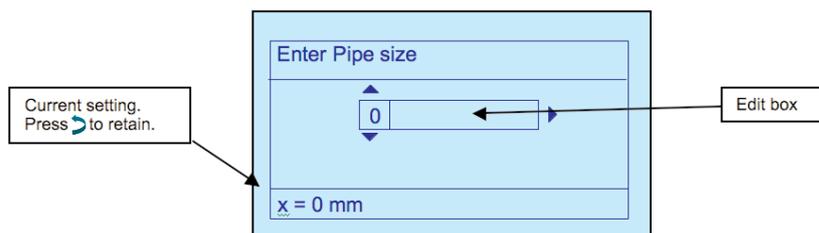
Target Flow

The target flow for the selected valve can be edited in this screen.

```
Enter Target flow
        ▲
      [ 0 |        ]  ◄──────── Edit box.
        ▼

Current setting.
Press ⟳ to retain. ────► X = 94%
```

When a value is entered, it will be displayed on the main display in the target flow box. Target flow must be entered as a percentage and is generally derived when carrying out proportional balancing. Typically, the value used will be the same as the calculated design flow percentage on the index circuit. Balancing to 100% target on subsequent valves will ensure that valves adjacent to the index valve are balanced.

Pipe Size

```
Enter Pipe size
        ▲
      [ 0 |        ]  ◄──────── Edit box
        ▼

Current setting.
Press ⟳ to retain. ────► x = 0 mm
```

Pipe size is entered if the user wishes to use the meter to establish the velocity in the pipe.

To display velocity, choose a velocity unit from the Units Menu.

User Kvs

This screen allows for the user to enter the Kvs value of a valve which is not listed in the database of valves. When a Kvs is required for a variable orifice device, please remember that Kvs values will be different at different handwheel positions.
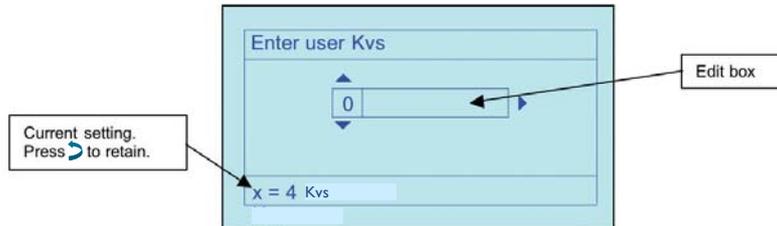

Change SG (specific gravity)

This screen allows the user to enter the value of the specific gravity of the line fluid. Typically, this would be used when glycol (or similar) is being used in the system.

Note: when an SG is set to a value other than 1.0, an advisory note is shown at the top of the screen.

UNITS MENU

This screen gives the user the option of selecting the preferred units for display on the PrimeComm.
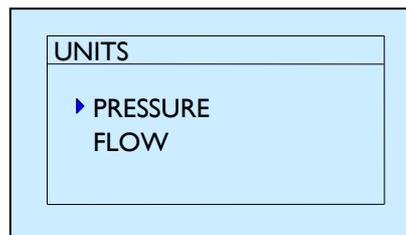
Use the ▲ ▼ buttons to select an option, followed by the ✓ button to accept it.

Pressure

This screen will display differential pressure units. The ► button will change the displayed units to kPa, psi, bar, cmH$_2$O, IWGA (inches water gauge), Ft HD (feet head) or Pa. Use the ✓ button to accept.

Conversion factor from base unit.

Edit box

Select D.P Unit

0.00   ◄   kPa   ►

Pa ＋ 1000   ✓
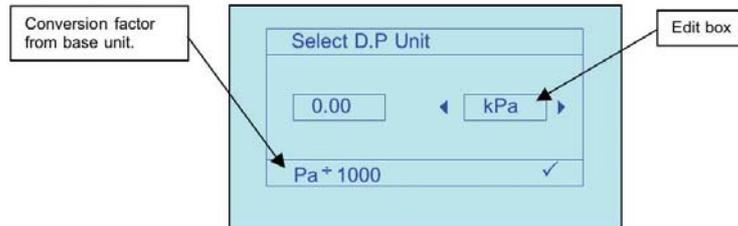
Flow

This screen will display volume flow units. The ► button will change the units through l/s, l/m, l/h, USGPM, UKGPM, m^3/h, m^3/m or m^3/s. Use the ✓ button to accept.

Conversion factor from base unit.

Edit box

Select Flow Unit

0.00   ◄   L/S   ►

L/S X 1   ✓
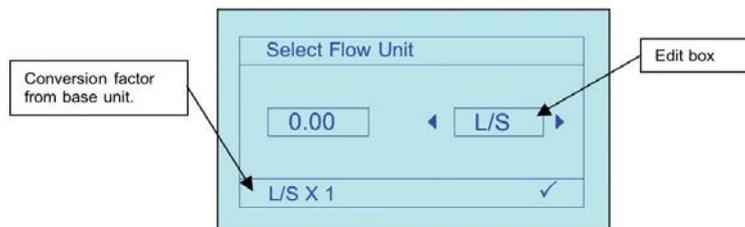
Note: Velocity units are available: m/s (metres per second) and f/s (feet per second)

In order to display the current velocity in the system being measured it will be necessary to select the following:

1. The valve being measured (Main Menu >> Select Valve)
2. The pipe size (Main Menu >> Pipe Size)
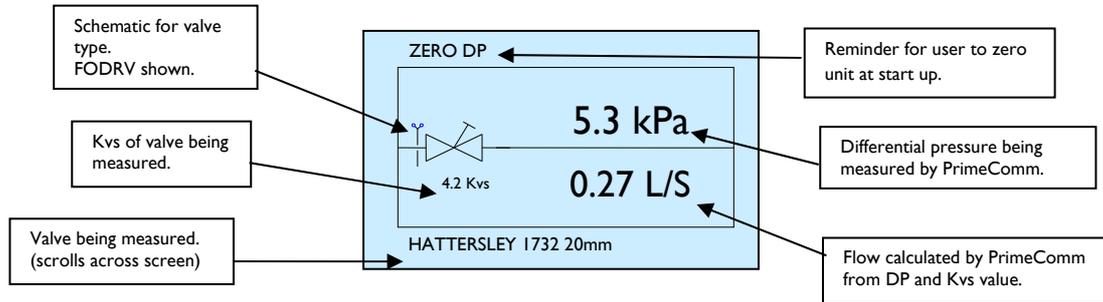3. The velocity units (Units Menu >> Flow)

DISPLAY MENU

There are four options within the Display menu.

DISPLAY

FLOW/PRESSURE
MULTI DISPLAY
PRESSURE
ABOUT
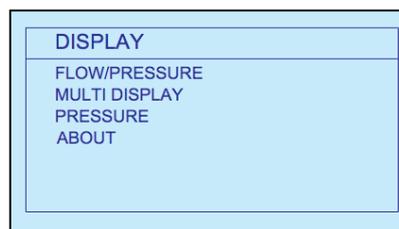
Flow/Pressure Display *when a fixed / variable orifice valve is selected*

The Flow/Pressure display is designed for most general commissioning purposes.

Schematic for valve type. FODRV shown.

Kvs of valve being measured.

Valve being measured. (scrolls across screen)

ZERO DP

Reminder for user to zero unit at start up.

5.3 kPa

0.27 L/S

4.2 Kvs

HATTERSLEY 1732 20mm

Differential pressure being measured by PrimeComm.

Flow calculated by PrimeComm from DP and Kvs value.

The type of valve selected (fixed or variable) is shown as a schematic symbol, with handwheel and Kvs data in accordance with the selected valve.

The differential pressure and flow are displayed and continuously updated according to the signals being received from the valve being measured.

Flow/Pressure Display *when an automatic balancing valve is selected*

Current valve setting

Design flow for this setting

Current DP across valve

ZERO DP   0.111 L/S

6.0

5.8 kPa

LOW FLOW   0.069 L/S

Hattersley XXXX

Current flow status
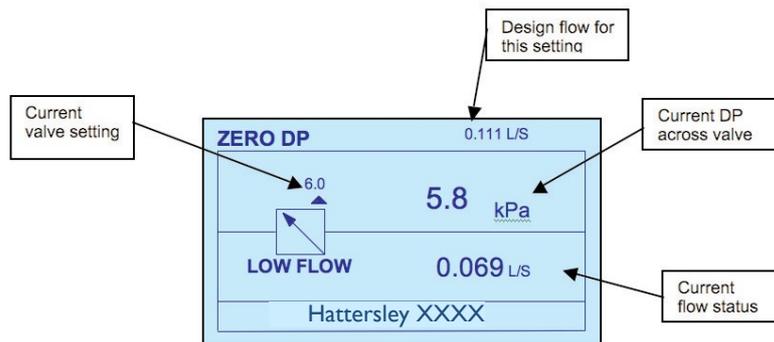
If the design differential pressure is not met, the message LOW FLOW will be displayed. If the design differential pressure is met, the message will be FLOW OK.

Multi Display *when a fixed / variable orifice valve is selected*

For commissioning engineers wishing to carry out commissioning using design and target flow, the Multi Display can be selected.

The Multi Display is the most appropriate display when variable orifice valves are being measured.
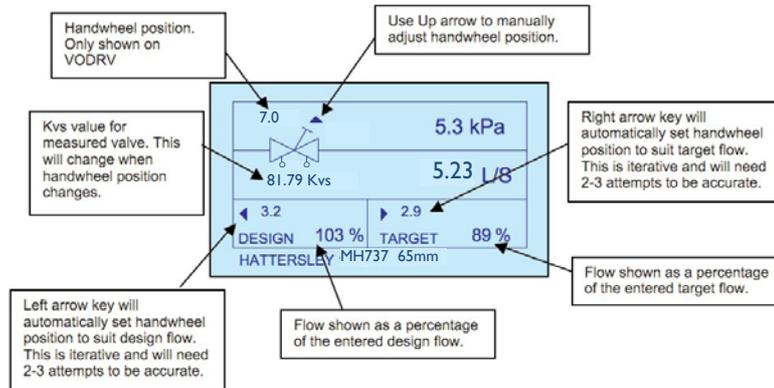
Design flow and target flow are displayed. If the values for these parameters are set to zero, a series of dashes are displayed. The measuring valve selected is described in the scrolling bar at the base of the screen.

When variable orifice balancing valves are selected and the design and target flow have been entered, the PrimeComm automatically uses the predictive handwheel position and displays this above the design or target flow in their respective boxes on the screen. When the valve has been adjusted to the predicted position, use the ◄► buttons to adjust the handwheel setting.
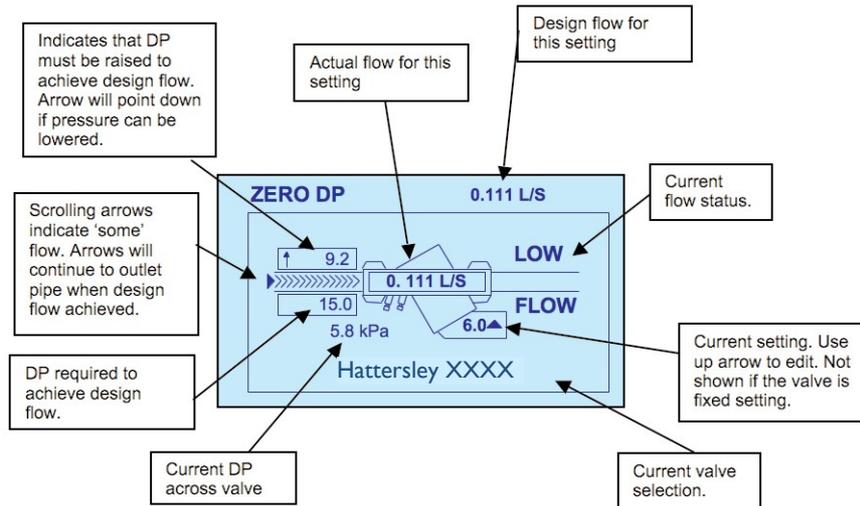
Note: the design flow and target flow could be different values, so it is important to use the correct navigation button.

The predictive process is iterative due to the unknown valve authority in the circuit, so it will be necessary to use this feature more than once.

Multi Display *when an automatic balancing valve is selected*

The PrimeComm unit has the ability to display variables associated with automatic balancing valves. The valve shown is an externally adjustable type.

If a valve is selected that is not adjustable (either internally or externally), the setting tab is not shown on the valve image.

Indicates that DP must be raised to achieve design flow. Arrow will point down if pressure can be lowered.

Actual flow for this setting

Design flow for this setting

Scrolling arrows indicate 'some' flow. Arrows will continue to outlet pipe when design flow achieved.

Current flow status.

ZERO DP   0.111 L/S

↑ 9.2   **LOW**

▷»»»»» 0. 111 L/S

15.0   **FLOW**

5.8 kPa   6.0▲

Hattersley XXXX

Current setting. Use up arrow to edit. Not shown if the valve is fixed setting.

DP required to achieve design flow.

Current DP across valve

Current valve selection.

The design flow for any automatic flow controller will be achieved if the differential pressure across the valve reaches the design value. Each automatic balancing valve (and each setting for the valve) will possibly have a different design DP and the PrimeComm unit has the ability to hold the design DP for each valve/setting.

Many of the automatic balancing valves programmed into the PrimeComm have their actual characteristic in the database. The level of differential pressure across the valve will determine which data is used. Generally, with automatic valves there is a slight fall in flow when the DP reaches high values. This fact is true for most automatic valves but, normally, the fall in flow is within the stated tolerance for the valve.

When the PrimeComm is adjusted to select the correct valve/setting, the design flow is displayed within the valve image. If the DP is not sufficient to create correct flow conditions, the box above the inlet pipe to the valve will display an *up* arrow and a value indicating that the DP will need to be increased to achieve the design flow. The value displayed is the design DP less the actual DP.

In the event of the actual DP being higher than the design DP, the box will display a *down* arrow and a DP value that suggests a reduction in actual DP. On an index circuit this would suggest that the pump speed could be decreased to achieve the correct DP value.

If the design flow is not met, the message LOW FLOW will be displayed. If the design flow is met then the message displayed is FLOW OK.
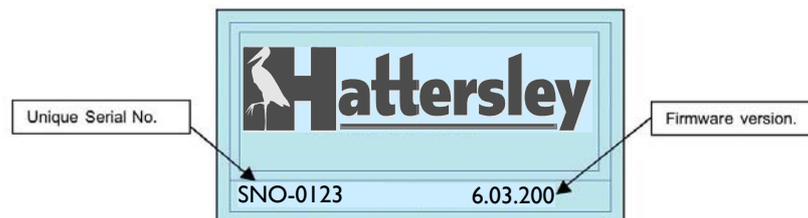
Pressure Display

The differential pressure is displayed in large text. This screen is useful for users wishing to use the PrimeComm as a simple manometer.
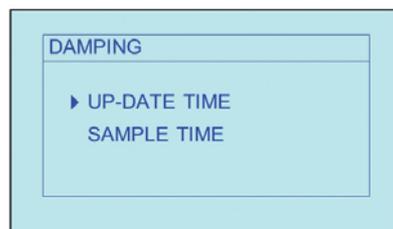

About

The 'About' screen gives the unique serial number of the unit plus the unit's firmware version.


DAMPING MENU

Use the ▲ ▼ buttons to select an option, followed by the ✓ button to accept it.

Update Time

This screen allows the user to change the apparent sensitivity of the PrimeComm unit.

The value can be adjusted by the user to increase or decrease the time delay between each screen update. If the time is short, the screen updates often. A long update time will give the appearance of a steadier reading.
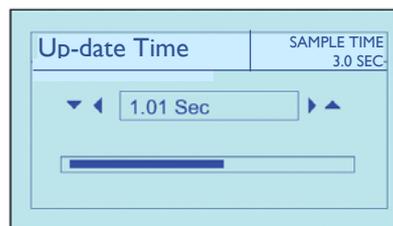
Use the ▲ ▼ buttons for coarse adjustment and the ◄ ► buttons for fine adjustment. A typical setting would be 1 second. Note: increase this time on an unstable system.

Sample time

This screen allows the user to change the period over which the readings are averaged.

Use the ▲▼ buttons for coarse adjustment and the ◄► buttons for fine adjustment. A typical setting would be 3 seconds.

This value can be edited up to a maximum of 11 seconds and it represents the base time over which the readings are taken for the rolling average system. A typical time of 3 seconds allows a large number of readings to be taken before the mean calculation is made.

The averaging system continues to use 3 seconds of measured values, but on a rolling average basis. Increasing the sample time will make the screen appear to update slower, but with a more stable reading.

ADVANCED MENU

Flow Alerts

Flow alerts can be switched between Enabled and Disabled. The alerts relate to the flow through the selected valve. "High Flow" and "Low Flow" mean that the measured flow is outside the range normally expected in the valve.
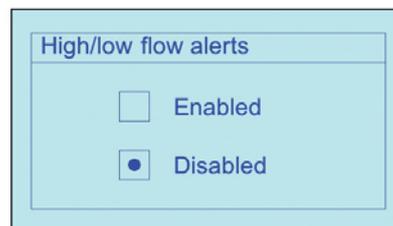
When working on unstable systems or systems that have little regulation, the alerts can sometimes impede commissioning operations and, in these circumstances, they should be temporarily Disabled.

Back-Light Timer

The Back-Light Timer sets the period of time that the Back-Light remains on. Pressing any key will reactivate it. Setting the light to a short time will preserve battery life.
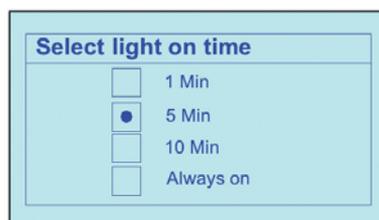
Use the ▲▼ buttons to select an option, followed by the ✓ button to accept it.

Auto-Off Timer
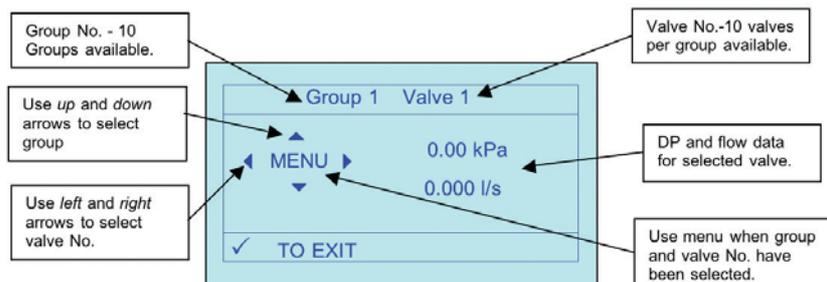
The Auto-Off Timer sets the time the unit remains on. Setting the time to a short time will preserve battery life.

```
Select auto off time
    ☐   1 Min
    ●   5 Min
    ☐   10 Min
    ☐   Always on
```

Use the ▲ ▼ buttons to select an option, followed by the ✓ button to accept it.

View Size As

This screen allows the user to select the preferred units for selecting valve size. The default unit is millimetres.

```
View size as

    ☐   MM

    ●   Inches
```
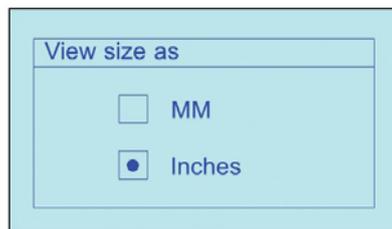
Use the ▲ ▼ buttons to select an option, followed by the ✓ button to accept it.

Quick Valve

This display allows the user to save the data from the current valve to a storage location on the PrimeComm. To use this feature, press the ✓ button whilst viewing any of the display screens.

```
Group No. - 10                              Valve No.-10 valves
Groups available.                           per group available.

                    ▲ Group 1   Valve 1 ◄
Use up and down
arrows to select        ▲
group                                       0.00 kPa        DP and flow data
                    ◄ MENU ►                                for selected valve.
                        ▼                   0.000 l/s
Use left and right
arrows to select
valve No.           ✓   TO EXIT             Use menu when group
                                            and valve No. have
                                            been selected.
```

There are 100 storage locations available: arranged in ten groups, each of up to ten valves. The group number can be selected using the ▲▼ buttons and the valve number can be selected using the ◄► buttons.

The **MENU** button gives the user the SAVE or DELETE options. If the screen is black, a valve is already in the location. However, if the screen is white it is possible to load a valve to this location.

```
            Group 1   Valve 1

        ◄ Load          ► Save

        ▲ Clear         ▼ Exit
```

Using the **SAVE** command will overwrite the location with the current valve data.

The Quick Valve feature allows the user to save the selected valve to a memory location which is quickly accessible without having to use the 'Select Valve' option. The purpose of this is to reduce time when commissioning a system with, for example, three different types of valve. The three types of valve can be saved to the Quick Valve memory including the design flow designated for that valve. When recalled, the valve will be loaded to the unit including the design flow.

Follow the on-screen instructions to save the current selection or delete the existing saved valve.

An additional use for this feature is the ability for the user to save the commissioned data for up to 100 valves for later reference when producing a commissioning report.

When the data for the selected valve has been saved, the following screen appears:
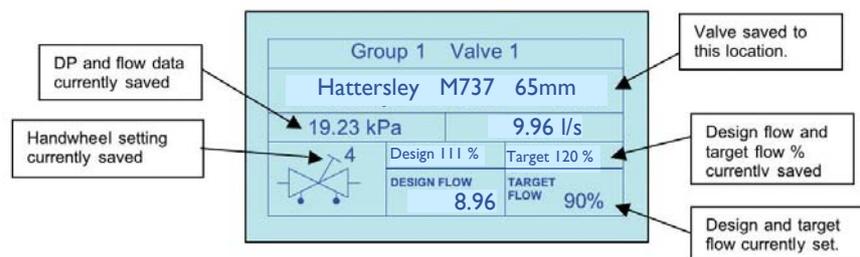
The example shown is for a variable orifice double-regulating valve. All other valve types have a simpler screen.

When using automatic balancing valves, the procedure for using 'Quick Valve' is the same as for traditional balancing valves but the screen showing saved data is different as shown below.
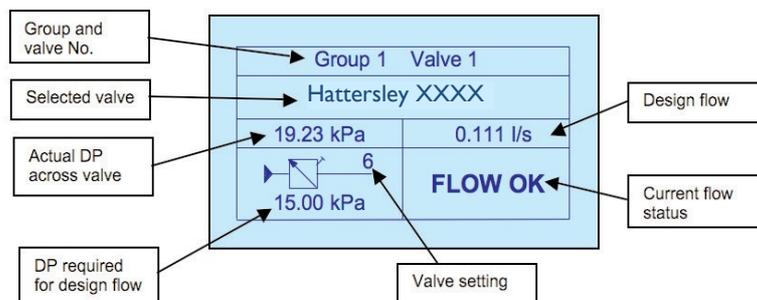
The above example shows that the actual DP is greater than the design DP and so the flow status is displayed as FLOW OK.

Further options for saving valve data are available if PcomPRO Project Application Software is purchased with the PrimeComm unit. PcomPRO gives the user the option of preparing a 'project' on a computer prior to commissioning the system. The data from the commissioning process can be saved to the PrimeComm unit for later use.

Spares and Accessories

Connection tubes.
Binder-style adaptors.
Mechseal-style adaptors.
Temperature gauges.
Pressure gauges.
Replacement strainers.
Carrycases.
Replacement Hex Keys

Please 'Contact Us' for further information and options.

Technical Specification

Measurement Range/Accuracy

0.5-200 kPa Differential Measurement.
10 bar Maximum Static Pressure.

0.5 to 10 kPa, Accuracy = +/- 0.1 kPa.
10 to 200 kPa, Accuracy = +/- 1.0% Reading.

Effective Operating Time

20 hours with standard Alkaline PP3 battery.

Calibration

Factory calibration is carried out in controlled conditions, using calibration equipment which is traceable to National Standards.

Generally, it is recommended that PrimeComm handsets are serviced and calibrated annually. However, this is not a fixed period and more frequent service intervals may be necessary for extremely high-use meters or for meters which are regularly used on very dirty systems or on systems that contain high concentrations of cleaning agents / treatments.

Valve Database

The PrimeComm unit is pre-programmed with more than 4500 valves in its database.

Please note: whilst every effort is made to ensure that the valve data contained within the PrimeComm is correct, valve manufacturers invariably reserve the right to modify their products, without notice, and so Hattersley cannot be held responsible for any inaccuracies or omissions. The user is advised to check the performance data (Kvs values) of specific valves prior to use.

User Interface

The PrimeComm unit is fitted with a memory card for holding data. There is not normally any reason for accessing the data on this card. Contact Hattersley for more information if valve data is to be updated as there are some important procedures to be followed to edit the data correctly.

Statement of Conformity

This is to certify that the Hattersley PrimeComm is manufactured in the EU, has been calibrated in accordance with standards traceable to national standards and conforms to the published specification. It is CE marked in accordance with the relevant EC directives.

Glycol/Water Specific Gravity Chart

Temperature °C	% Glycol Additive										
	0	10	20	30	40	50	60	70	80	90	100
80			0.991	1.003	1.017	1.026	1.036	1.046	1.054	1.062	1.068
70		0.990	1.000	1.010	1.023	1.034	1.042	1.053	1.062	1.069	1.075
60		0.995	1.007	1.017	1.030	1.041	1.050	1.060	1.070	1.076	1.083
50		1.000	1.013	1.013	1.035	1.048	1.057	1.067	1.077	1.084	1.090
40	0.990	1.004	1.018	1.029	1.042	1.054	1.064	1.074	1.085	1.091	1.098
30	0.996	1.007	1.022	1.034	1.047	1.059	1.070	1.080	1.092	1.099	1.105
20	0.999	1.010	1.026	1.038	1.052	1.065	1.076	1.088	1.099	1.106	1.114
10	1.000	1.013	1.028	1.042	1.056	1.070	1.082	1.094	1.105	1.113	1.120
0	1.000	1.015	1.029	1.045	1.061	1.075	1.088	1.100	1.112	1.120	1.128
-10				1.148	1.065	1.079	1.092	1.107	1.118	1.127	1.135
-20					1.068	1.083	1.097	1.113	1.124	1.133	1.136
-30						1.087	1.100	1.118	1.128	1.137	1.137
-40							1.102	1.122	1.133	1.138	1.138