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HSD0012

HSD0011 / HSD0012* Room Sensor

c/w occupancy signal & set point adjustment*

Room sensors optimised for use with HRW DDC controllers and I/O expansion units. Also may be used with controllers of other manufacture.

As well as providing user zone comfort setting the sensor includes communication port for direct access to related HRW DDC devices for program setting or commissioning.

Typical Uses

- Room temperature
- HSD0012 – Zone set point adjustment
- Zone occupancy / after hours signalling
- Controller engineering access point
- Suitable for RJ11 connection, UI1 & UI2, of any HRW HP_0662 device
- With HRW HP_8884 devices HW ver 3.5, available from September 2013

Feature Summary

- Room sensor, 10k NTC, Type2, B25/50 3950 (HRW controller UI1)
- HSD0012: Set point adjuster, 4k7…14k7 potentiometer, absolute set point or +/- shift (set point at mid point), controller program dependant (HRW controller UI2)
- Occupancy button
  - HSD0011 – Press sensor face for momentary closure of HRW controller UI2
  - HSD0012 – Press set point dial for momentary short-circuit of set point potentiometer (press set point dial edge 11 o'clock or 1 o'clock position, HRW controller UI2)
- Internal RJ11 port for plug in connection to associated controller, for control signals (UI1, UI2) and service/engineering
- External RJ11 port for room-level access to related controller for service/engineering (HPECOMU)

Connections, HSD to Controller

- 6 core flat telephone cable
- RJ11 6P6C connector x2
- Fit RJ11 plug to each end of the 6 core cable with identical colour-coding alignment, which results in cross-over configuration. When the cable is laid flat the RJ11 retaining clip at one end of the cable is up and at the other end the RJ11 retaining clip is down
- For connection to third-party controller, RJ11 6P6C at sensor end and screw terminal connection at controller end or adapt wiring sequence for alternative RJ11 connection if suitable facility at third-party controller end

Occupancy Button Note

HRW controllers HPC & HPV from 14th August 2013 have new DL function 9 for single DL block utilisation of the Occupancy button as described on page 4.

Earlier firmware versions require user-creation of a flow of function blocks to achieve the end result. An example is outlined on Page 5.

Setpoint / SP Shift Linearisation (HRW devices with HSD0012)

The action of the set point dial may be programmed to suit the site requirements by download of Linearisation Table configuration text file.

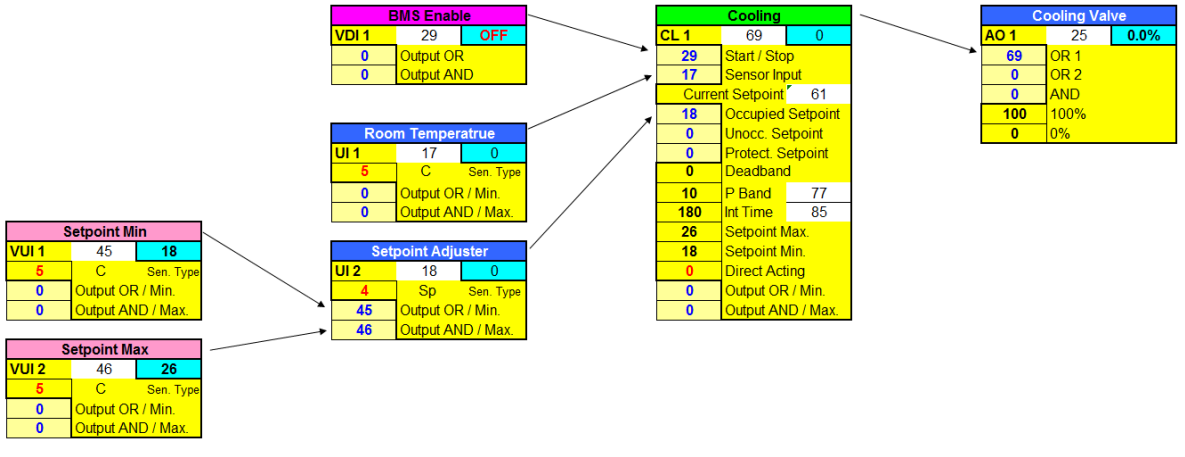
Following are a series of Linearisation Table setting examples based on Sensor Type 4. In all cases the set-point dial mid-point results in Mid-Range set point or Null set point shift.

Setpoint 1	Setpoint 2	SP Shift 6	SP Shift 7	SP Shift 8
12…**22.5**...32°C	18…**22.5**…28°C	-5…**0**…+5°K	-10…**0**…+10°K	-20…**0**…+20°K
L16=S	L16=S	L16=S	L16=S	L16=S
L26=P	L26=P	L26=P	L26=P	L26=P
L36=1	L36=2	L36=6	L36=7	L36=8
L46=1024	L46=1024	L46=1024	L46=1024	L46=1024
L56=640	L56=730	L56=1024	L56=1024	L56=622
L66=545	L66=575	L66=670	L66=622	L66=601
L76=250	L76=90	L76=580	L76=580	L76=580
L86=0	L86=0	L86=45	L86=310	L86=445
L96=0	L96=0	L96=0	L96=0	L96=310
L106=0	L106=0	L106=0	L106=0	L106=0
L116=0	L116=0	L116=0	L116=0	L116=0
L126=-100	L126=-100	L126=-475	L126=-500	L126=-550
L136=-1	L136=-1	L136=-1	L136=-1	L136=-1
L146=1	L146=1	L146=1	L146=1	L146=1
10000=15	10000=15	10000=15	10000=15	10000=15

‘Setpoint’ 1 or 2 may be used as an absolute set point ranges, applied directly to a Control Loop function block (CL1…8).

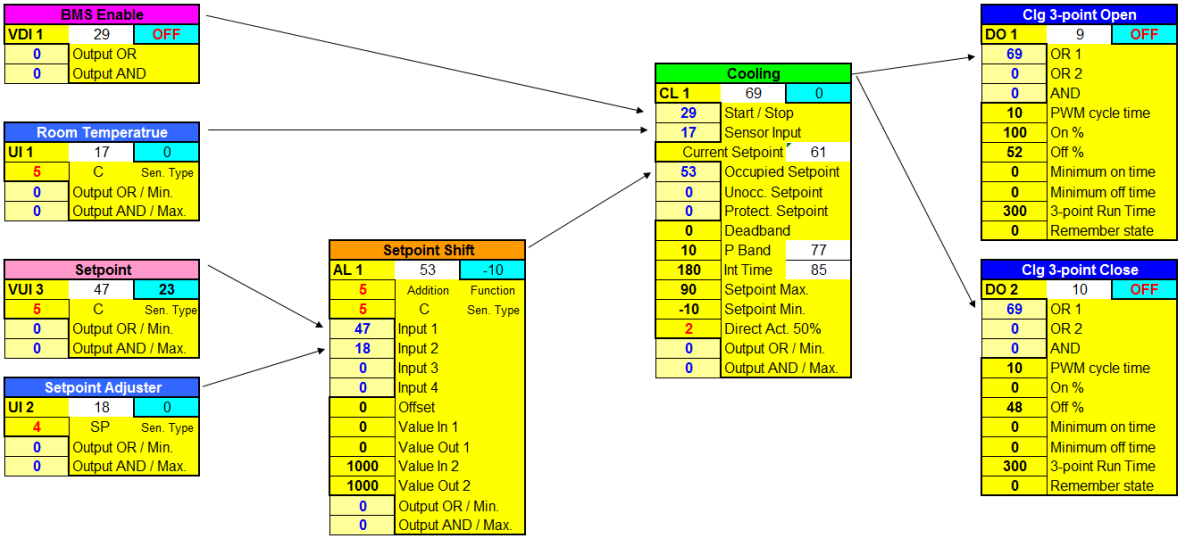
The tabled settings may be copied to a text file (Notepad) and downloaded to an HPC0662 or HPV controller, or HPE0662MR I/O expansion unit. *It is important that the last Line Return after the 10000=15 line is included in the text file to ensure that the download is correctly verified.*

The following is an illustration of how to apply an absolute set point adjustment range:



Further optional limitation of the allowable set point has been applied at VUI1 and VUI2. These limits may be adjusted via the BMS at point 45 and point 46 respectively. Alternatively the same min/max limitations maybe applied directly at the CL parameters 6907 and 6906 respectively. When applied directly at the CL they may only be changed by terminal mode engineering access.

'SP Shift' 6, 7 or 8 maybe used as a set point shift range applied via an Analogue Logic function block (AL1…8) together with a set point set at a Virtual Universal Input function block (VUI1…8).



- A base set point, changeable from the BMS, is applied at VUI3
- The AL block is set as Addition function
- The set point adjuster value is added to the set point as set at VUI3
- At the set point dial anticlockwise limit a –ve shift value is applied
- At the set point dial clockwise limit a +ve shift value is applied
- At the set point dial mid-point zero (null) shift is applied

Supplemental Application Training:

In the above example the CL is controlling a 3-point actuator via DO1 & DO2. The CL control sequence is set as 'Direct Acting 50%' at parameter 6908 which means when the set point is achieved the CL output = 50%. DO1/Open is set to operate with a PWM response as CL1 output rises above 52% (rise in temperature above set point) and DO2/Close to operate as CL1 output falls below 48% (fall in temperature below set point).

Both DO1 & DO2 are set with a maximum run time of 300 seconds, which assumes the valve actuator has a run time of 150 seconds. The run time timer will be active if either DO is at it's extreme point (100% for DO1, 0% for DO2). The timer will reset once the associated DO output moves off it's extreme point.

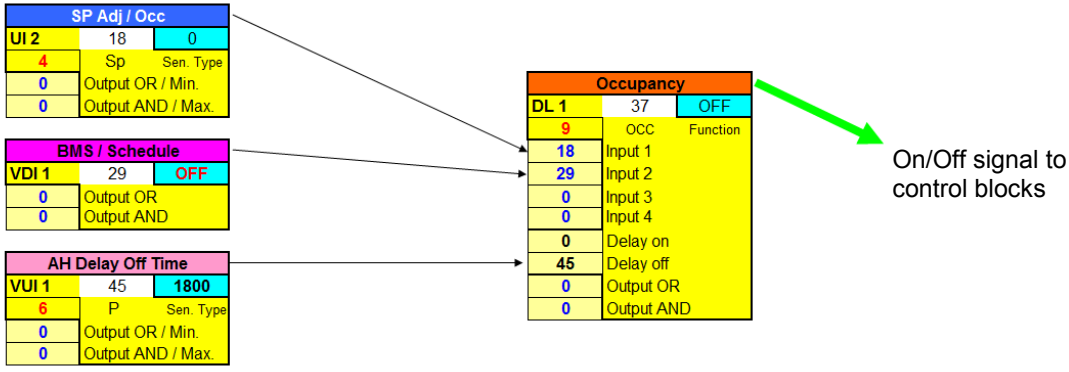
The use of 2 x the actuator running time as the max run time setting provides a synchronisation effect, ensuring that the actuator is certainly fully open (or closed) while at the same time preventing over use of the actuator when it is known to have reached it's end point and no longer need be driven.

Occupancy Button / After Hours (AH)

Behind the set point dial are two buttons connected in parallel across the set point adjustment potentiometer. The placement of the buttons means that pressing the dial edge at the 11 o'clock or 1 o'clock position will operate the occupancy signal. The signal is sensed at the controller as a momentary high value of the set point adjustment signal (UI2).

In controllers manufactured **from 14th August, 2013**, there is now a new DL Function, # 9 (OCCupancy) and there is enhanced choice for use of the Delay Off (and Delay On) time feature which may now use a VUI Function Block as will as fixed time; when a VUI is used then the delay time may be set from the BMS:

- DL Input1 is for the occupancy push-button. This may be any input but in the case of HSD via the controller RJ11 port it will be UI2 (point 18)
- DL Input2 is for the BMS or other scheduling point (normal operating hours release). VDI1 (point 29) is used in the example following
- The DL Delay Off sub-parameter may be a time in seconds, 1…44 or 53…32768, or point 45…52 which allows centrally settable delay off time via a VUI



- Press the occupancy button when BMS schedule on then DL output is on (occupancy start)
- Press the occupancy button when BMS off then DL is on (AH occupancy start) until the delay off time elapses (AH occupancy end)
- Subsequent press of occupancy button while BMS still on then DL output goes off (occupancy end)
- Subsequent press of occupancy button while delay off time still running then DL output goes off (AH occupancy end)
- If DL is on when BMS signal goes off then DL1 will go off (occupancy end)
- If DL is on in AH occupancy when BMS signal goes on then occupancy start (no change of DL state)

DL Function Block Supplement:

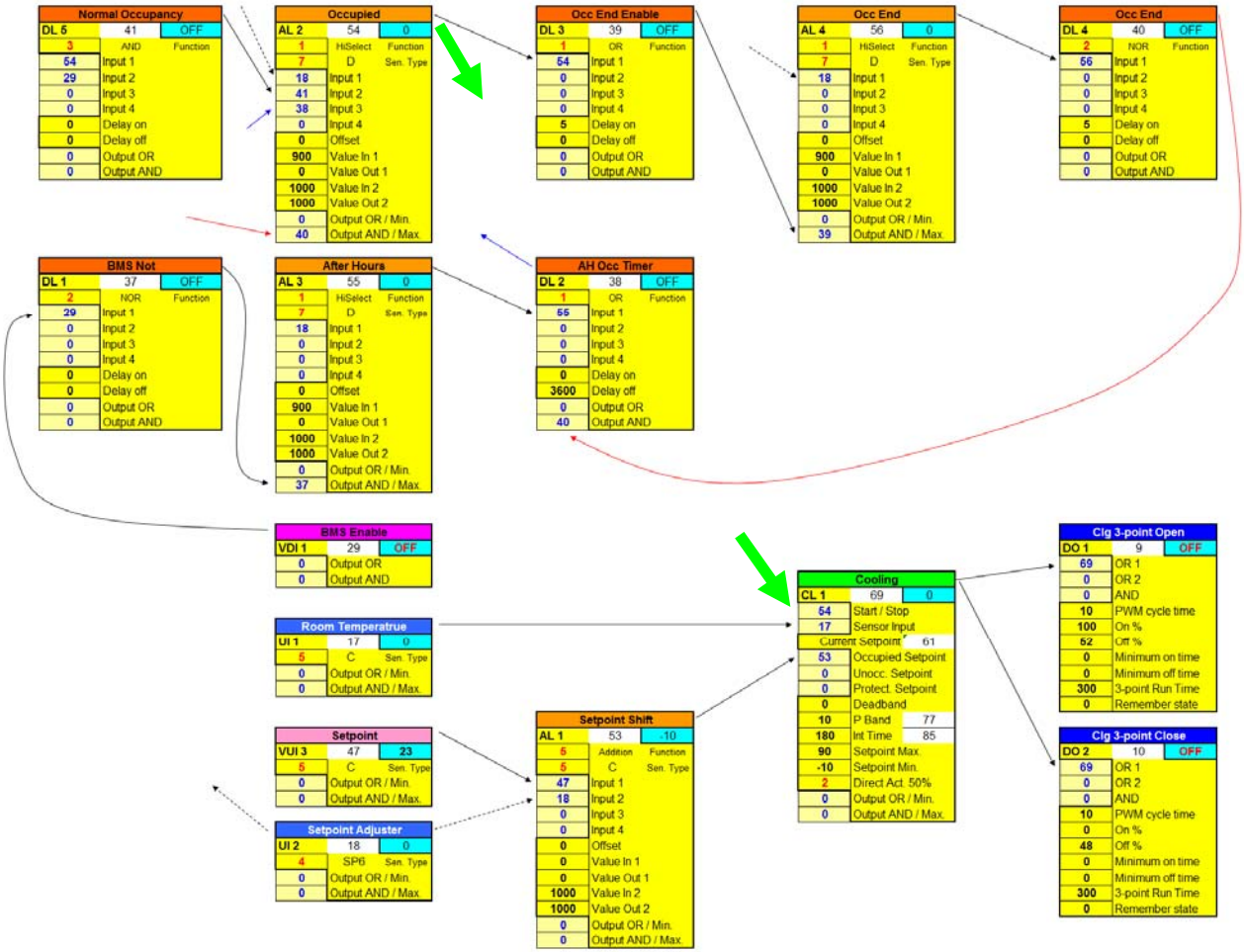
The Delay On feature of a DL is not applicable when the OCCupancy function is selected.

For either Delay On or Delay Off features of a DL set VUI1…8 point number (45…52) in the Delay On or Delay Off sub-parameter if you want to be able to adjust the delay time from a central point (BMS for instance).

If a fixed delay time is acceptable, such as in standalone operation, then you may set the delay time directly at the sub-parameter by setting a time in seconds from 1…44 or 53…32768 (does not include the values 45…52 / the point numbers of VUI1…8).

For controllers manufactured **before** 14th August, 2013, you may use the following function block configuration to achieve the same function as the new DL Function 9:

Results in ON state if the BMS has released the control (VDI1) or After Hours timed operation if the BMS has disabled control. The AL input scaling 900…1000 and output scaling 0…1000 results in each AL output going from OFF to ON when the button is pressed.

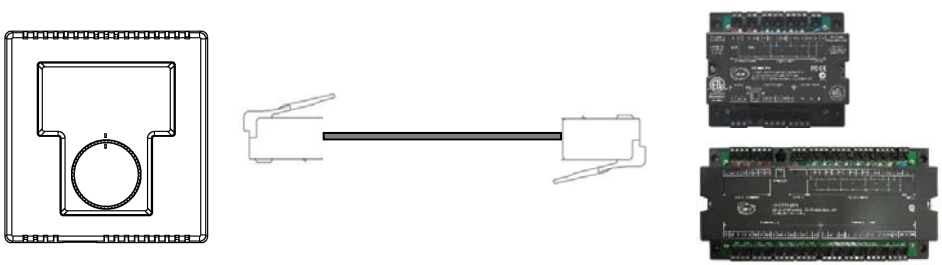


- AL2 gives the final occupancy result to CL1
- DL5 latches AL2 on if the BMS has allowed normal operation
- AL3 will start a Delay Off timer at DL2 for operation of AL2 if the BMS command is OFF as seen at DL1 (n/c)
- DL3, AL4 & DL4 (n/c) logic flow provides a 5 second period before toggling the button operation between ON operation (if status is OFF) and OFF operation (if status is ON)
- When in the ON state it is the DL4 normally-closed (n/c) output going OFF that ends operation – either normal occupancy or After Hours occupancy – by disabling AL2 while simultaneously resetting DL2 Delay Off timer if it is active

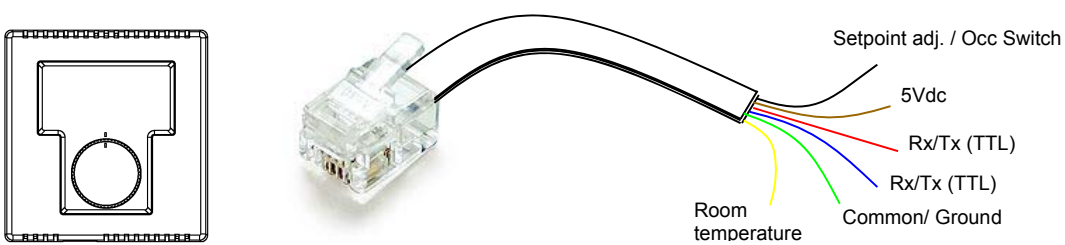
Connections

For connection to HRW devices, UI1, UI2 & HPECOM terminal facility, use 6 core flat cable with RJ11 6P6C at each end. The RJ11 connectors are opposed orientation end to end as pictured below:

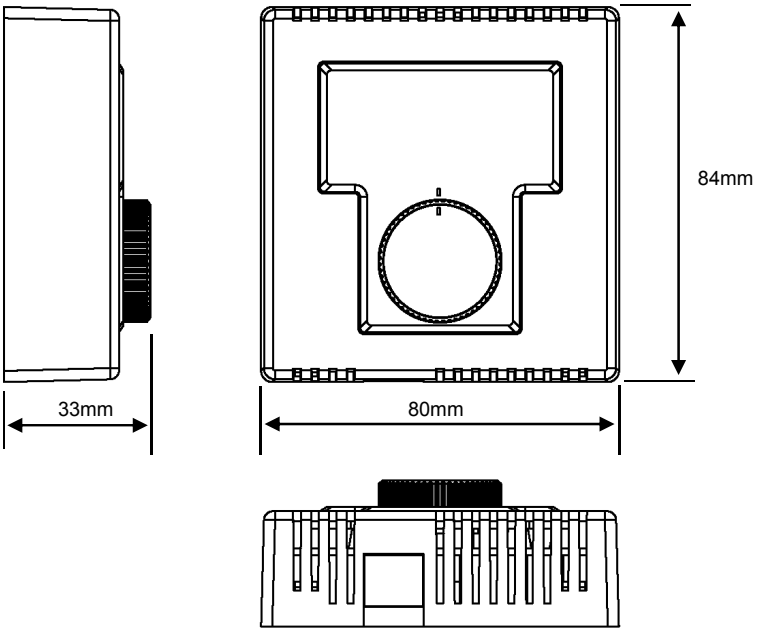
Connect one end of the cable to the RJ11 socket in back of the HSD sensor and the other end to the RJ11 socket of the HRW device (HP_0662 or HP_8884):



For connection of the HSD sensor to third-party devices the following guide assists in selecting the correct cores for screw terminal connection, or alternative RJ11 connection order, to the third-party device. Core colours are for example only:



Dimensions



Technical Data

Outputs	
1 x Passive AO	- Temperature; 10k NTC, Type2, B25/50 3950 RJ11 connection to HP_0662 / HP_8884 UI1
1 x Passive AO/DO	- Setpoint; 4k7…14k7 (HSD0012 only) RJ11 connection to HP_0662 / HP_8884 UI2 - Occupancy; momentary short-circuit of setpoint adjuster
Sensor Wiring	6 core flat telephone cable, RJ11 <> RJ11
Other facilities	External access RJ11 port for HPECOMU connection to related HP_0662 or HP_8884 device
Components & Materials	Conform to UL, RoHS
Operating Temperature Range	0…50ºC (32…122ºF)
Storage Temperature Range	-5…75ºC (-40…167ºF)
Humidity Range	10…95%rH (non-condensing)
Dimensions	84mm H x 80mm W x 33mm D (to dial face)