7. Operating mode

7.1 Slave proportional mode

7.1.1 Applications

Control from external controller or manually controlled potentiometer.

7.1.2 AC fan control

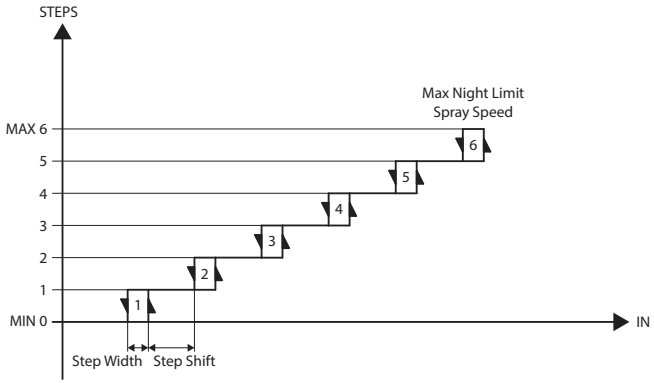
The active step value, and **OUT1** and **OUT2** output values, increases or decreases in proportion to the prevalent input **IN** based on the status of the **S1** input. The minimum speed limit Lo and the maximum speed limit **Hi** are active.

If the maximum night limit **LNight** is activated (input **S**5 = closed), **LNight** prevails over **Hi** only if the value is lower. If constant speed forcing is activated with the spray activated (input **S6** = closed), **Step** is equal to **LSpray**. If both functions are active, the lower value between **LNight** and **LSpray** prevails.

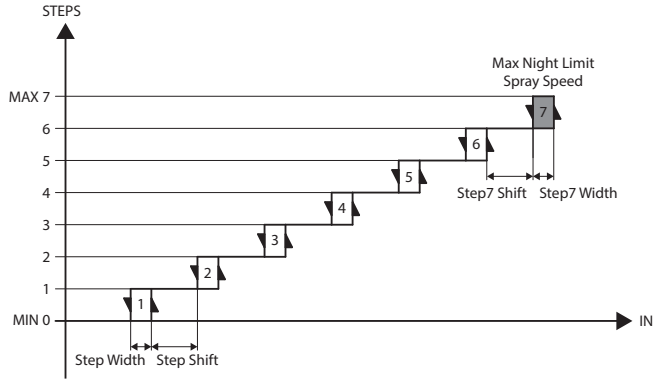
The total number of steps that can be used for control depends on the input configuration chosen, see para. 10.1. You can choose between No. 6, No. 7, or No. 8: sax in voltage plus null voltage, and two for the ON/OFF command of the external remote controls.

7.1.3 Direct Slave control for AC fans

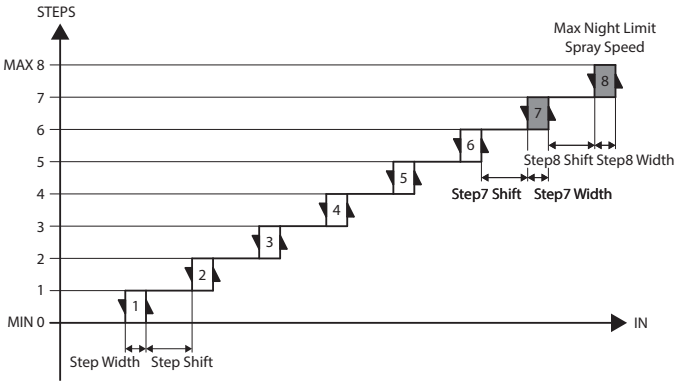
S1 contact = *open*



6 Steps - Slave Control - Default



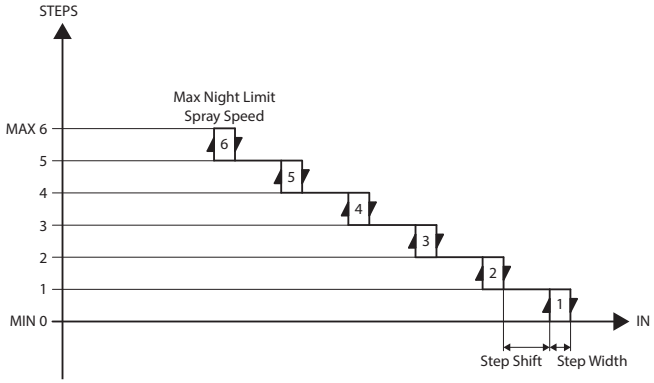
7 Steps - Slave Control



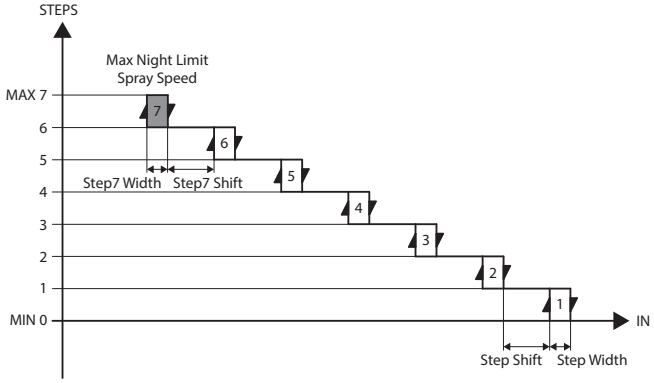
8 Steps - Slave Control

7.1.4 Reverse Slave control for AC fans

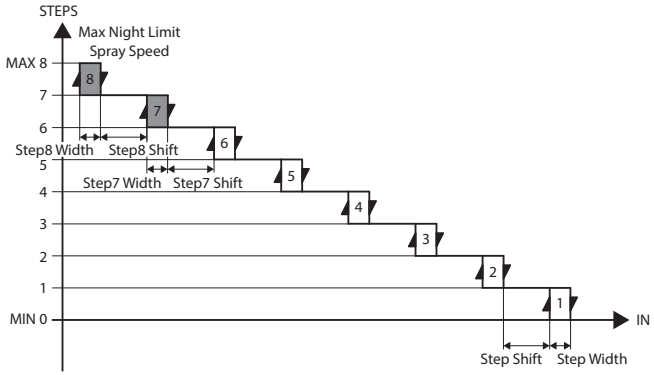
S1 contact = *closed*



6 Steps - Slave Control



7 Steps - Slave Control



8 Steps - Slave Control

7.1.5 Spray unit control

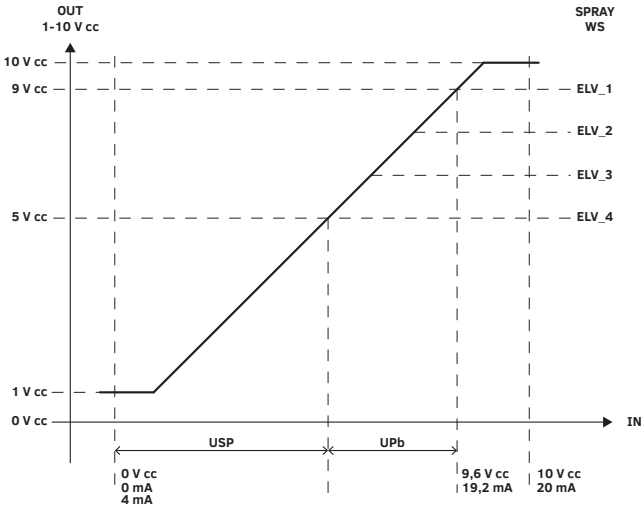
The controller enables a second work zone with independent setpoint **USP** and **UPb** proportional band. The work zone uses the same **IN** input signal and overlaps the fan work zone.

The voltage of output **OUT** varies in proportion to the prevalent input (**IN**). The signal never reaches zero but is always between 1 and 10 V.

The **RL2** relay is On when input **IN** is greater than **USP** + **UPb/2**, it is Off when input **IN** is less than **USP** - **UPb/2**.

7.1.6 Slave control for spray with OUT output

*parameter **C8/C9** = **SPRAY 1-10 V***

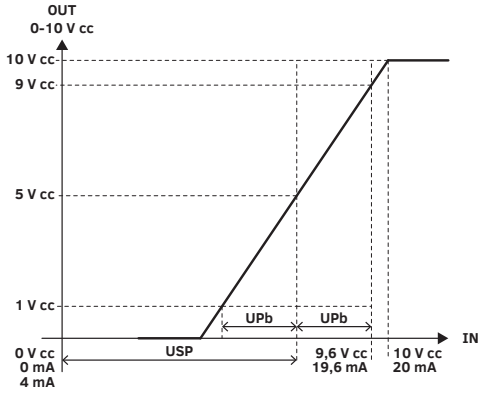


7.1.7 Slave regulation on OUT output to directly control a motorized valve actuator

*parameter **C8/C9**= **USP-DIR 0-10 V***

The controller enables a second work zone with independent setpoint **SP-USP** and proportional band **UPb**. The work zone uses the same **IN** input signal and overlaps the fan work zone.

The voltage of output **OUT** increases and decreases in direct proportion to the signal of the input **IN**.

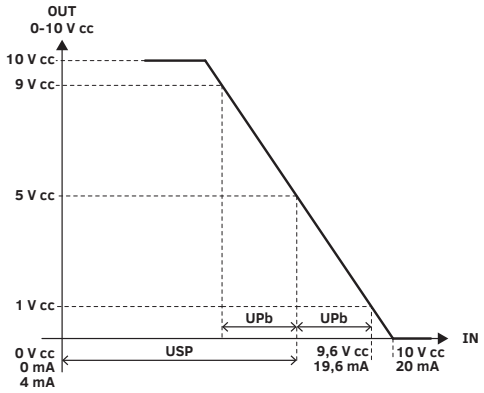


7.1.8 Slave regulation on OUT output to reversely control a motorized valve actuator

*parameter **C8/C9**= **USP-REV 10-0 V***

The controller enables a second work zone with independent setpoint **USP** and **UPb** proportional band. The work zone uses the same **IN** input signal and overlaps the fan work zone.

The voltage of output **OUT** increases and decreases in direct proportion to the signal of the input **IN**.



7.2 Master proportional mode

7.2.1 Applications

Signals from temperature sensors or transducers.

7.2.2 AC fan control

The active step value varies to keep the magnitude measured by the transducer with prevalent signal (**IN**) inside the **Pb** proportional band. Based on the status of input **S1**, the step value increases or decreases proportionally to the prevalent input. The **OUT1** and **OUT2** output voltages vary as a function of the dominant signal (**IN**) according to the specific settings, see para. 7.2.7 to para. 7.2.11.

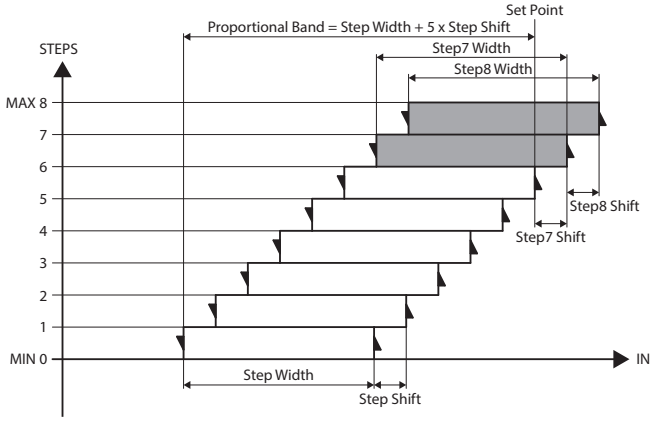
The setpoint **SP** can be at the limit of minimum (**Lo**) or maximum (**Hi**) speed for the control command value (parameter **C4** = **Lo**/**Hi**).

If the maximum night limit **LNight** is activated (input **S5** = closed), **LNight** prevails over **Hi** only if the value is lower. If constant speed forcing is activated with the spray activated (input **S6** = closed), **Step** is equal to **LSpray**. If both functions are active, the lower value between **LNight** and **LSpray** prevails.

The number of steps that can be used is always eight: six for voltage plus the null voltage, and two for the ON/OFF command of the external remote controls.

7.2.3 Direct Master control for AC fans, SP at the maximum limit (default)

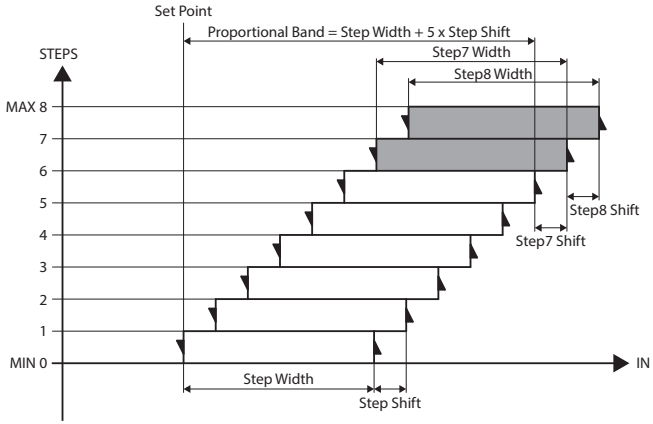
S1 contact *= open*
parameter ***C4*** *=* ***Hi***



6+2 Steps - direct Master Control - Setpoint at maximum limit

7.2.4 Direct Master control for AC fans, SP at the minimum limit

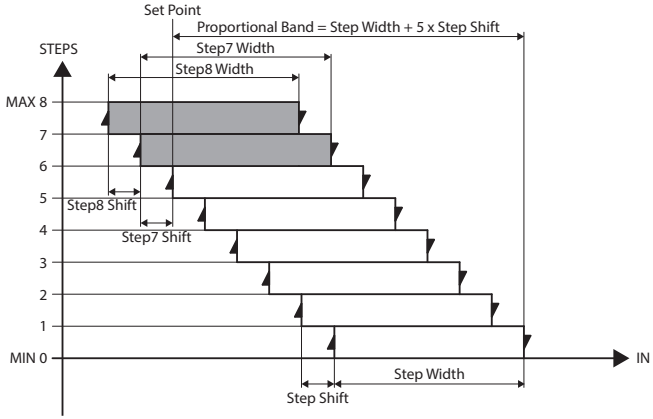
S1 contact = *open*
parameter ***C4*** = ***Lo***



6+2 Steps - direct Master Control - Setpoint at minimum limit

7.2.5 Reverse Master control for AC fans, SP at the maximum limit

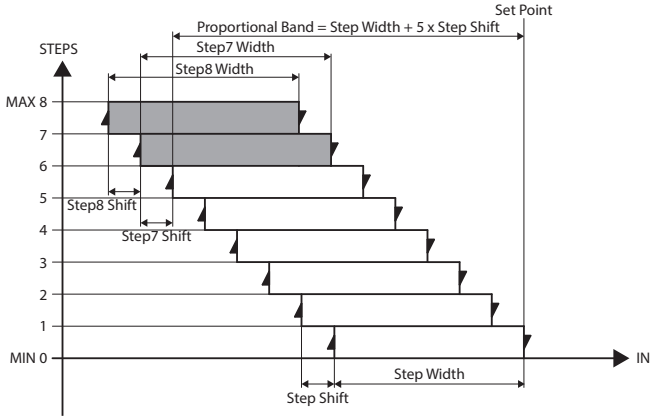
S1 contact = *closed*
parameter ***C4*** = ***Hi***



6+2 Steps - inverse Master Control - Setpoint at maximum limit

7.2.6 Reverse Master control for AC fans, SP at the minimum limit

S1 contact = *closed*
parameter ***C4***= ***Lo***



6+2 Steps - inverse Master Control - Setpoint at minimum limit

7.2.7 Spray unit control

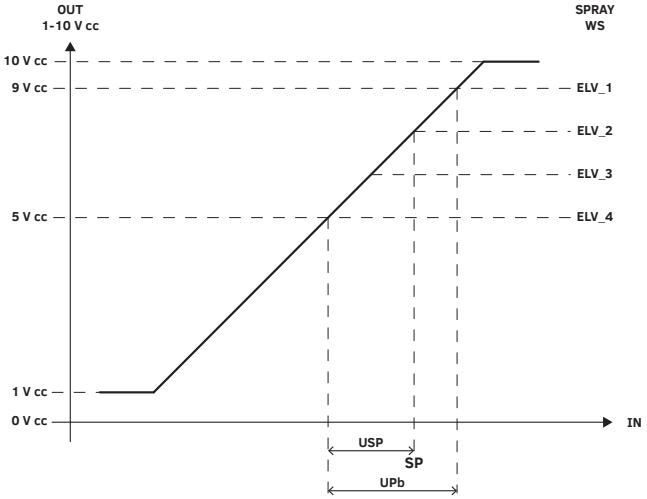
The controller enables a second work zone with independent setpoint **SP-USP** and proportional band **UPb**. The work zone uses the same **IN** input signal and overlaps the fan work zone.

The voltage of output **OUT** varies in proportion to the prevalent input (**IN**). The signal never reaches zero but is always between 1 and 10 V.

The **RL2** relay is On when input **IN** is greater than **SP**+**USP**+**UPb/2**, it is Off when input **IN** is less than **SP+USP** - **UPb/2**.

7.2.8 Master control for spray with OUT output

*parameter **C8/C9** = **SPRAY 1-10 V***

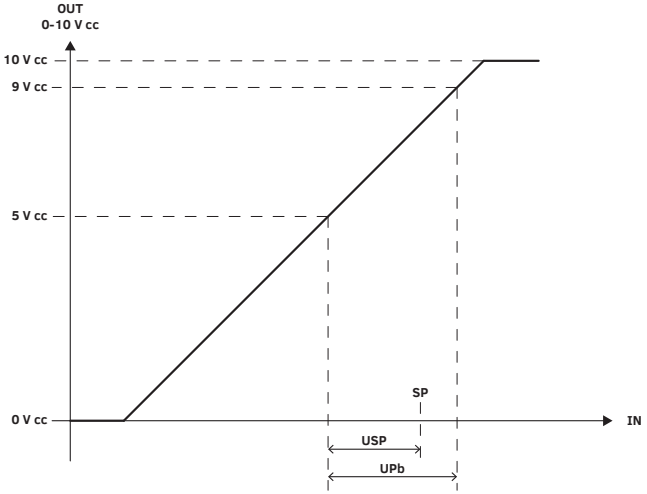


7.2.9 Master regulation on OUT output to directly control a motorized valve actuator

*parameter **C8/C9**= **USP-DIR 0-10 V***

The controller enables a second work zone with independent setpoint **SP-USP** and proportional band **UPb**. The work zone uses the same **IN** input signal and overlaps the fan work zone.

The voltage of output **OUT** increases and decreases in direct proportion to the signal of the input **IN**.

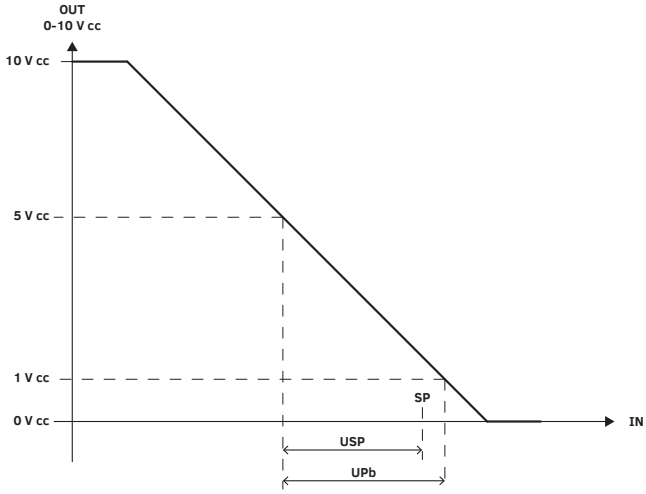


7.2.10 Master regulation on OUT output to reversely control a motorized valve actuator

*parameter **C8/C9**= **USP-REV 10-0 V***

The controller enables a second work zone with independent setpoint **SP-USP** and proportional band **UPb**. The work zone uses the same **IN** input signal and overlaps the fan work zone.

The voltage of output **OUT** increases and decreases in direct proportion to the signal of the input **IN**.



7.3 Overload protection function

7.3.1 Operation

The device reads the value of the effective output current (Ampere RMS) and compares it to two current values: the maximum working current and the maximum pickup current.

The maximum working current is 1.2 times the rated current (In*1.2). When exceeded, the maximum time within which the overcurrent value (I-In) can be distributed is calculated. The higher the overcurrent, the shorter the distribution, and vice versa. The period is the result of an algorithm that takes into account the size of the controller. The relation between the overcurrent (I-In) and time is quadratic.

The maximum pickup current is 1.4 times the rated current (In*4). When exceeded, a fixed 5.0 s timer starts. Once this time passes, it stops distributing.

7.3.2 Controller behavior

When the distributed current...	Then...
is lower than the maximum working current (In*1.2)	distribution is not limited in time. Normal messages (parameter table, etc.) appear on the display and the value of the real-time distributed current for load.
is higher than the maximum working current (In*1.2)	Distribution is not limited in time. If the distributed current remains stable above the maximum working current and exceeds the set maximum I2t value, the device alarm is triggered and the first line of the display shows the message "I2t Current" If the distributed current drops below the working current before the maximum time has been reached, then the calculated time is deducted from the accumulated value until it returns to zero.
Greater than the maximum pickup current (In*1.4)	Distribution is limited in time, it is at most 5 seconds. If the distributed current is above the maximum pickup current for more than 5 seconds, the device alarm stops distribution and the following message is displayed: "Max Current" If the distributed current drops below the threshold before 5 seconds, the residual time is reset.