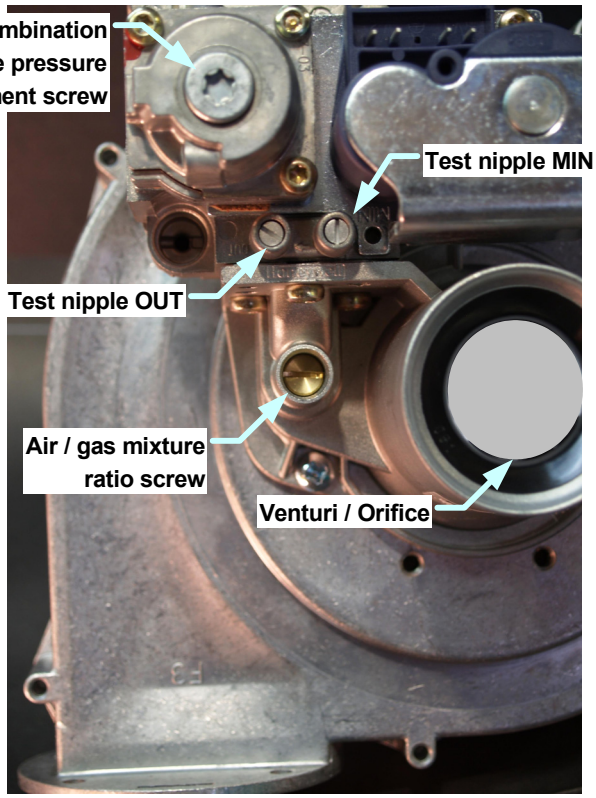
Combustion field adjustment instructions

How SKG gas fired humidifier operates…

The Gas burner blower and the combination gas valve are factory calibrated and pre-adjusted for optimum humidifier performance at all firing rates through a non-mechanical, pneumatic modulating link between combustion air and gas flows. Blower speed is automatically increased or decreased based on heat demand thereby regulating the amount of combustion air drawn. The pneumatic modulating link between air and gas introduces the required amount of gas for correct combustion to meet the current humidity demand, based on a linear relationship between ΔP air and ΔP gas.

Combination gas valve, venturi & burner blower



(fig. 1)

Measure static pressure

1. Close external gas shutoff valve (supplied by others).
2. Loosen screw in test nipple **''MIN''** on the gas combination valve, do not remove completely. Connect manometer.
3. Open external gas shutoff valve.
4. Measure static pressure. Values must be:

Natural gas	*Propane gas*
3.0 kPa (30 mbar) [12''w.c.] MAXI	**6.0 kPa (60 mbar) [24''w.c.] MAXI**

5. If value is correct, you can start up the Humidifier.
   If value is not correct, verify gas installation (regulator) and/or call gas utility.

Combustion field adjustment instructions

Measure running pressure

Note:

For a multiple module SKG Neptronic® gas fired humidifier, these pressure verifications have to be done for each module separately. We do advise to start verifying last module first.

6. Start-up humidifier, using the (On/Off) push button located on the control panel.
7. Measure the running pressure, after ignition of burner.
   Use suitable measuring instruments calibrated with a minimum resolution of 0.04'' w.c.

Natural gas	*Propane gas*	*Action*
Under 1.5 kPa [6.0'' w.c.]	**Under 3.2 kPa [12.8'' w.c.]**	Do not attempt adjustment – Verify gas installation (regulator) or call gas utility to increase pressure
1.5 to 2.0 kPa [6.0'' to 8.0''w.c.]	**3.2 to 3.7 kPa [12.8'' to 14.8''w.c.]**	Let the humidifier operate – You can proceed to the next step.
Over 2.0 kPa [8.0'' w.c]	**Over 3.7 kPa [14.8'' w.c]**	Do not attempt adjustment. Verify gas installation (regulator) or call gas utility to decrease pressure

Important:

Burner is automatically ignited and starts operation after a safety time has elapsed. This time correspond to a pre-purge of combustion chamber and flue venting.

8. Switch off the humidifier. Close external gas shutoff valve, remove the manometer and re-tighten the test nipple **''MIN''** with the screw.
9. Check proper action of the gas combination valve:
   - Loosen screw in test nipple **''OUT''**, do not remove completely. Connect manometer.
   - Start up Humidifier.
   - After opening of the valve (ignition of the burner) the manometer should indicate **0.0 kPa [0.0''w.c.]** pressure
   - Turn off the humidifier
   - The orifice pressure (negative pressure) should drop to a **negative pressure within 1 second**.

   If the orifice pressure drops **more slowly than the specified 1 second**, or if **pressure at opening of the valve is different from 0** replace the combination gas valve.
10. Switch off the humidifier. Close external gas shutoff valve, remove the manometer and re-tighten the test nipple **''OUT''** with the screw.
11. Open external gas shutoff valve and check that the test nipple **''MIN''** and **''OUT''** and all gas connections are gas tight.

Combustion analysis

SKG gas fired humidifier is factory preset for operation with natural gas or propane. A O_2 or CO_2 check must be performed at the humidifier vent pipe as part of the initial start-up / maintenance procedure.

Important:

A CO measurement must be taken before and after working on gas appliances to eliminate risks to health and to guarantee the satisfactory condition of the system.

Combustion analysis should be performed by using an electronic flue gases analyser. Flue gases analyser probe should be installed through the flue pipe as close as possible from the humidifier.

For a multiple modules SKG gas fired humidifier, it may be necessary to verify and adjust combustion for each module separately.

O_2 or CO_2 as well as CO and NOx (at 3% O_2) values measured must be compared with the following applicable tables.

Combustion field adjustment instructions

Flue gases composition

Table 1 - Flue gases composition for SKGE3 - European model

Humidifier Model	No of Modules	Module model number & quantity							
		SKG100		*SKG150*		*SKG180*		*SKG200*	
SKGE3-0501 N	1	x1							
SKGE3-0701 N	1			x1					
SKGE3-0801 N	1					x1			
SKGE3-1001 N	1							x1	
SKGE3-1202 N	2	x1		x1					
SKGE3-1502 N	2			x2					
SKGE3-1702 N	2			x1				x1	
SKGE3-2002 N	2							x2	
SKGE3-2503 N	3			x1		x1		x1	
SKGE3-2703 N	3			x1				x2	
SKGE3-3003 N	3							x3	
SKGE3 3504 N	4			x1		x1		x2	
SKGE3-3704 N	4			x1				x3	
SKGE3-4004 N	4							x4	
Flue gases	**Unit (Limits)**	**Natural gas**	***Propane***	**Natural gas**	***Propane***	**Natural gas**	***Propane***	**Natural gas**	***Propane***
CO_2	% (+/-0.3)	**9.0**	*9.9*	**9.6**	*10.6*	**9.6**	*10.6*	**9.6**	*10.6*
O_2	% (+/-0.3)	**5.0**	*5.5*	**4.2**	*4.6*	**4.2**	*4.6*	**4.2**	*4.6*
CO	ppm (max)	**35**	*25*	**35**	*25*	**35**	*25*	**35**	*25*
NOx at 3% O_2	ppm (max)	**45**	*45*	**45**	*45*	**45**	*45*	**45**	*45*

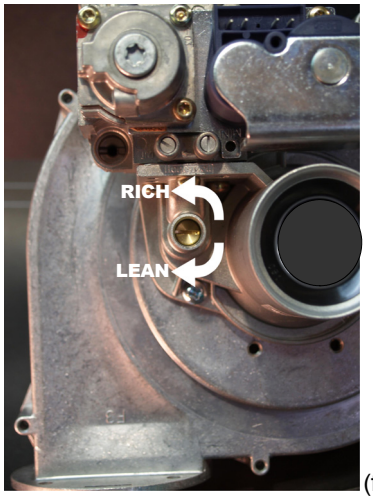
Table 2 - Flue gases composition for SKG3 – North American model

Humidifier Model	No of Modules	Module model number & quantity							
		SKG100		*SKG150*		*SKG180*		*SKG200*	
SKG3-110-1 N	1	x1							
SKG3-155-1 N	1			x1					
SKG3-180-1 N	1					x1			
SKG3-210-1 N	1							x1	
SKG3-265-2 N	2	x1		x1					
SKG3-310-2 N	2			x2					
SKG3-350-2 N	2			x1				x1	
SKG3-405-2 N	2							x2	
SKG3-505-3 N	3			x1		x1		x1	
SKG3-560-3 N	3			x1				x2	
SKG3-610-3 N	3							x3	
SKG3-710-4 N	4			x1		x1		x2	
SKG3-765-4 N	4			x1				x3	
SKG3-810-4 N	4							x4	
Flue gases	**Unit (Limits)**	**Natural gas**	***Propane***	**Natural gas**	***Propane***	**Natural gas**	***Propane***	**Natural gas**	***Propane***
CO_2	% (+/-0.3)	**9.0**	*9.9*	**9.6**	*10.6*	**9.6**	*10.6*	**9.6**	*10.6*
O_2	% (+/-0.3)	**5.0**	*5.5*	**4.2**	*4.6*	**4.2**	*4.6*	**4.2**	*4.6*
CO	ppm (max)	**35**	*25*	**35**	*25*	**35**	*25*	**35**	*25*
NOx at 3% O_2	ppm (max)	**45**	*45*	**45**	*45*	**45**	*45*	**45**	*45*

Combustion field adjustment instructions

Check CO_2 setting at full output (100% demand)

1. Connect flue gas analyzer to humidifier flue vent pipe.
2. Open the external gas shutoff valve and start-up the humidifier, and trigger a call for humidity.
3. When Flue temperature is stabilized (at least after 15 minutes of operation), take a measure of flue gases,
4. Compare reading to the ones indicated on the above tables.
5. If O_2 or CO_2 value readings is within 1% of the value indicated in the above table. The humidifier module does not require any adjustment.
   If O_2 or CO_2 value readings is more than 1% outside of the value indicated in the above table. The humidifier module does require adjustment.
   - If O_2 value is too low (CO_2 too high), mixture is gas rich, then turn air/gas mixture ratio screw clockwise.
   - If O_2 value is too high (CO_2 too low), mixture is gas lean, then turn air/gas mixture ratio screw counter clockwise.



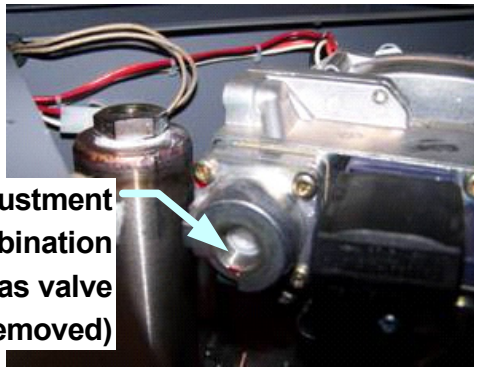
(fig.2)

Note:

A large blade short flat screwdriver is required to access to Air / gas mixture ratio adjustment screw. CW turn will lean the air / gas mixture. CCW turn will enrich the air / gas mixture. 1 complete turn will modify O2 value by 0.5%

Check CO_2 setting at minimum output (10% demand)

6. When air / gas mixture is properly adjusted at full load (100%), lower the humidity demand (and the output) to its minimum: 10%.
7. After stabilization (at least after 10 minutes), take a reading of Flue gases composition
   CO_2 readings should be the same as the reading at full output.
   If this is not the case:
   - Remove the cap of the combination gas valve adjustment screw.
   - Carefully adjust the combination gas valve adjustment screw in order to obtain same CO_2 reading as the one obtained at full output.
   - Adjustment should be done 1/8 turn at a time.



Pressure adjustment screw of combination gas valve (cap removed)

(fig.3)