KWE Technologies Group

VIESSMANN

VITOTALK

K-W Electronic Service Inc. and Viessmann, partners in heating technology. Controls newsletter, November 2004, Issue 7

For those of you who remember the Introduction in issue 6, we mentioned that summer was just around the corner. After a long, typical winter we all enjoy the nice weather of summer and welcome all that it brings. Well, summer never really showed up and it seemed as if spring turned into fall in a blink of an eye.

What also appeared to fly by was the time since the last issue of Vitotalk.

Thank you to those who have been reading and referring to the individual issues when need be. It is our most sincerest wish that this forum provides you with answers to your questions and questions things you already know.

Look for the Communication Issue of Vitotalk 8 to be out shortly. There was just too much information for one issue, so planning another was easy.

Please read on. v

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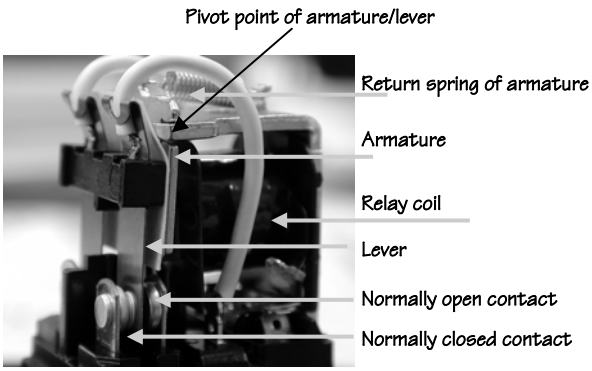
Behind the Front Page:

When interfacing a BMS system to boiler/system controls, it is sometimes necessary to provide a dry contact signal. Inevitably, the question of "what do you mean by a dry contact?" is asked. We can assure you it is not magic, but rather a simple matter of electro-mechanics…or otherwise known as relays.

Any control, whether it be mechanical or electronic, requires input information for proper output control. This information can take the form of either an analog or digital signal. The input signal guides the operation of the control by providing feedback from the output device (which is also connected to the control). Imagine for a moment, a mixing valve control that modulates a valve to maintain a specific temperature. To perform this task, the control must know what the current temperature is. If it doesn't know this information, the control would not know how to operate the mixing valve actuator to meet the set point demand.



Picture showing a DPDT relay with protective cover removed

Providing the mixing valve control with the input information it requires, a RTD (Resistance Temperature Detector) is used. The RTD is a resistive sensor which changes its resistance based on temperature and for this reason may have an unlimited number of operating states. This is one example of an analog input.

A digital input, unlike a analog input, has only two operating states: ON or OFF, Open or Closed, High or Low, 1 or 0… Generally, digital input signals are used to provide the control with operational status information. It should be understood that there are no "maybes" when it comes to digital signals.

Returning to the original question as to what a dry contact is, when a voltage output (such as a pump or valve) is turned ON the connected device operates. If it is necessary to view whether a pump or valve was called ON, we need to take the voltage output and make it friendly for a control system to "see". The easiest way to do this is to add a relay.

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Continued from Page 1

In issue number 3 of Vitotalk, the topic of relays was discussed. If you recall, all relays or contactors are made up of two mechanical devices that work together with one another. The two devices are: a solenoid (coil) and a lever mechanism with contact points attached.

The relay coil causes a mechanical movement to occur. Similar to that of the solenoid, when voltage is applied to the coil, a magnetic field is established. Where a solenoid causes the movement of a iron core or armature, the relay creates a field, which causes a pulling force on an armature. The armature pivots on one end, which causes contact movement on the other end. When voltage is removed from the relay, a spring causes the armature to return to its resting position.

For those visual thinkers out there, go home and take your door bell apart. In it, you may find two solenoids, one for the front door and one for the back door. When the button is pushed for the front door, there is usually a dual tone. The reason for this is the core/armature is allowed to hit one tuned bar and when the door bell button is released, a return spring causes it to hit the second tuned bar when traveling in the opposite direction. When the side door button is pushed, only one of the tuned bars is hit. The reason for this that there is a mechanical stop which prevents the core/armature from hitting both bars.

The coil of a relay is rated for a specific voltage rating. The most common of these are 120VAC and 24VAC relays. It is very important to realize if a 120VAC output is connected to a 24VAC relay, the relay will work for a short period of time...then the smoke comes out. At this point, the solenoid or coil part of the relay is damaged beyond use.

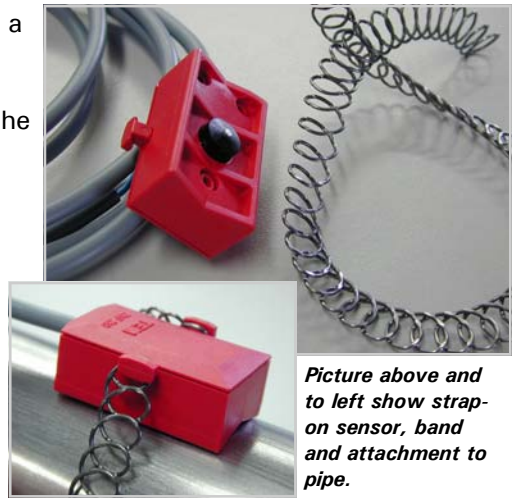
On the flip side, if a 24VAC output is connected to a 120VAC relay, not much damage is going to occur.

Please continue reading on page V8

Cascade Control: Part Deux! Revisited

Having fielded a number of telephone calls regarding the Cascade Control, in conjunction with Vitodens boilers and mixing valve controls, we are revisiting this article from Vitotalk 6. Now, don't stop reading just because you may have read this from the last issue, because this is not just a regular reprint!!!

There have been a number of misconceptions with respect to the Cascade Control when connected with multiple Vitodens boilers. As the saying goes, "*the truth shall set you free*", so here you go.



Picture above and to left show strap-on sensor, band and attachment to pipe.

As most of you know, the Vitocontrol-S is capable of communicating with up to 4 Vitodens boilers. It does not matter whether a Vitocontrol S or C is used, the Cascade Control can be connected to 2, 3 or 4 boilers. The number of boilers is programmed into the Cascade Control, in the ***Configuration*** menu option during start up of the Vitocontrol panel.

It must be understood that each boiler is responsible for it's own operation internal workings. Operation of the burner modulation, temperature limits, flue gas adaptation and so on are not controlled by the Cascade Control.

Cascade Sensors

The Cascade Control has it's own unique strap-on supply and outdoor sensor. These two sensors cannot be interchanged with any other Viessmann sensor. Both the supply and outdoor sensor govern the operation of the Cascade Control and subsequently, the Vitodens boilers.

Since the boilers and Cascade Communicate using the 145 KM-BUS, it is not necessary to connect the Vitodens outdoor sensors to the individual boiler.

When the boilers are powered up, you may see an Outdoor Temperature Sensor fault displayed on the Comfortrol. This fault will only be present as long as the boiler has not established communication to the Cascade Control.

Operation

Once all of the settings have been programmed into the Cascade Control (explained further in Vitotalk), operation of the control is a function of set point or target temperature. The set point temperature is a function of outdoor temperature in relation to a corresponding supply temperature point on the heating curve. This set point is referenced to the unique Low Loss Header Sensor. This sensor is located on the outlet supply connection of the

Picture above shows parts of outdoor sensor: sensor body, cover and strain relief. Outer cover not shown in picture.

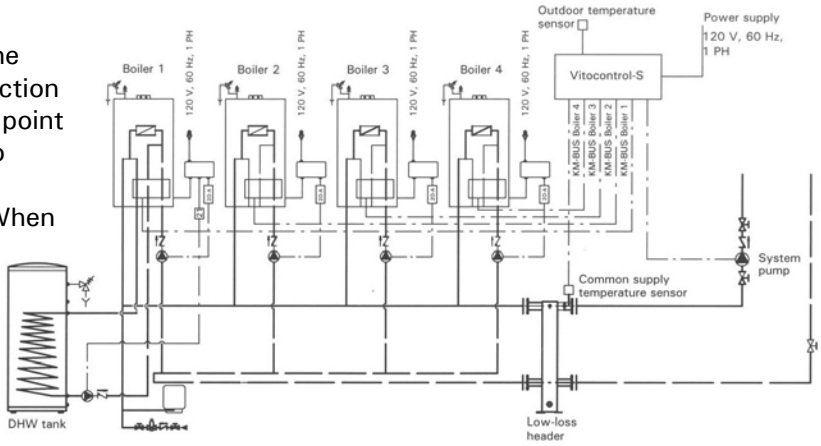
Please continue reading on page V3

Continued from previous page V2

Cascade Control: Part Deux! Revisited

Low Loss Header (LLH). It is strapped on to the supply pipe with a spring type strap as close as possible to the LLH.

Operation of the boilers is a function of the LLH set point with respect to actual LLH temperature. When the LLH temperature drops below the set point, the Cascade Control will provide a boiler temperature set point demand. This set point demand temperature can be viewed on the Cascade Control in the Operation Data menu choice in programming level 3.



Drawing showing DHW tank connected to one boiler for DHW production

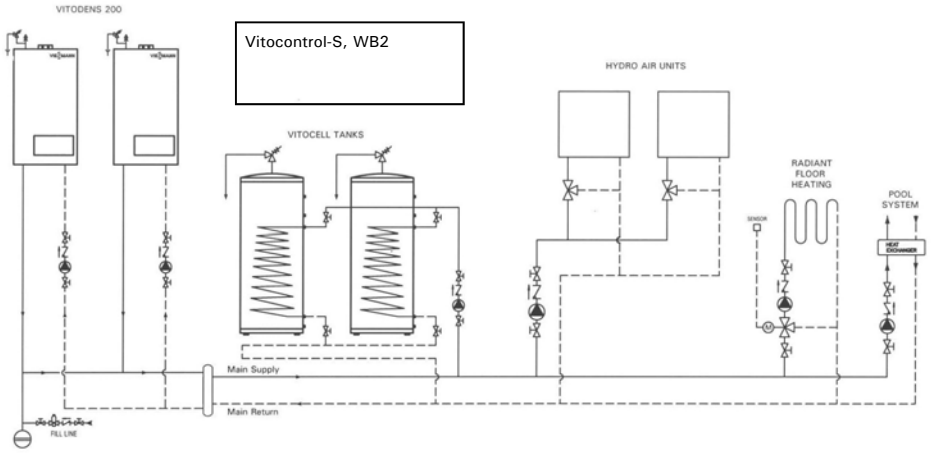
The boiler set point temperature can also be viewed in the Operating Status menu of the Comfortrol. You will note, that there is a 3 degree Celsius difference between the Cascade Control and the boiler. In other words, if the Cascade Control is looking for 50°C (122°F), then the calculated boiler temperature will be 53°C (127.4°F).

Staging of the boilers occurs when the Cascade Control "sees" how the LLH temperature is responding to the set point demand. Each subsequent boiler is brought ON in the same manner as the first boiler. The Cascade provides each boiler with the same boiler temperature set point as the first boiler. The boiler is responisible for modulating to the given boiler temperature set point.

As the LLH temperature aproaches the set point and possibly surpases it, the boiler temperature set point will be gradually decreased. The greater the actual LLH temperature is above the set point, you may see the boiler set point drop as much as 15 degrees C. As the boiler set point decreases, the boilers that are currently operating will modulate down. Each boiler then looses its call from the Cascade Control and shut down. Once the red indicator lamp is off on the front of the Cascade Control, the boiler (pump and burner) should be off

In the ***Nominal Values*** selection in the Cascade menu, it is possible to adjust the time delay when each subsequent boiler is brought on. This timer setting can be set to a minimum of 1 minute to a maximum of 30 minutes. The boilers being staged on is also a function of the difference between actual and set point LLH temperatures. In other words, if the timer setting is set to one minute and there is only a degree or two between set point and actual, the subsequent boiler may not necessarily come on.

An increase in time allows for the boiler to modulate to the given set point. Because the Vitodens takes into consideration the history of operation, the time required for each boiler to modulate may vary. If you find that the following boiler(s) is/are coming on too early or too late, make an adjustment to the delay setting.



Drawing showing DHW tanks on secondary side of LLH. External demand from DHW control

DHW Demand

Like most of the projects we do with controls, a common answer given to a specific question is "*it depends*". For some odd reason, people don't seem to like this answer. *Well*, **how** is DHW production done with Vitodens when connected to a Cascade Control?...it depends.

There are two fundamental ways of doing DHW: directly from a Vitodens boiler or connected to the Vitocontrol. This cannot be decided by anybody else than the person designing the system.

DHW Vitodens Connection

The primary consideration for connecting the tank, to an individual boiler, is the amount of stored DHW required as well as the recovery rate. When connecting the tank to one Vitodens, it must be understood that only that specific boiler will come on to satisfy the DHW load.

The DHW sensor is inserted into the tank well and then is plugged into terminal X7 (X7.1 and X7.2). The DHW pump is wired into the Power Pump Module of that specific boiler on plug 21. Because the Vitodens is not connected to a Low Loss Header

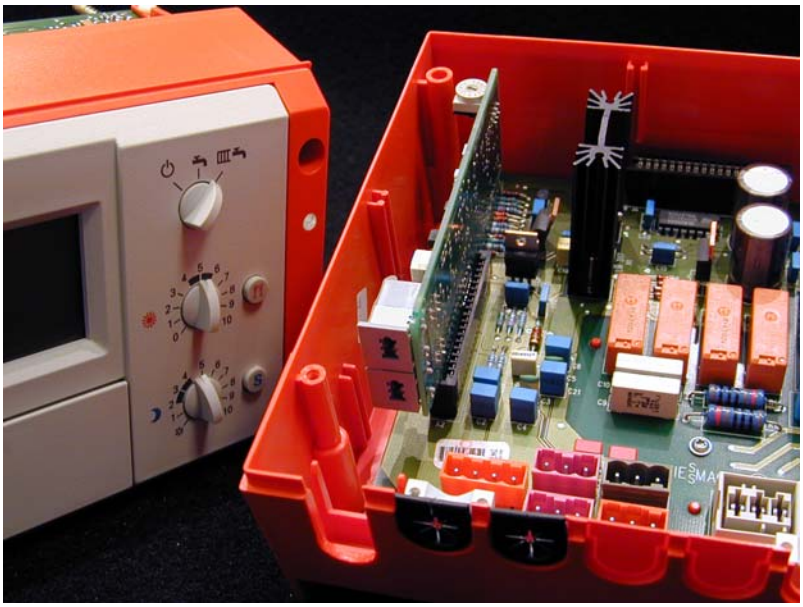
Please continue reading on page V4

Continued from previous page V3

Cascade Control: Part Deux! Revisited

temperature sensor, the DHW Recirculation pump output can be utilized. This pump is wired to the 20 plug. The boiler pump is connected to the 20A plug.

The DHW set point temperature is programmed on the Comfortrol of the boiler that the sensor is connected to. Timer functions for both DHW production and recirculation pumps also can be used via the Comfortrol interface.



Above: HK1 shown with communication board at left of unit plugged into motherboard

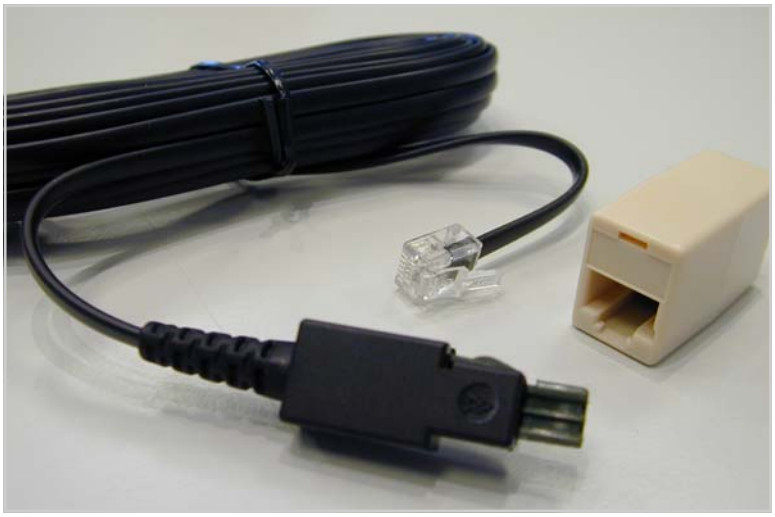
When there is a DHW call, only the Vitodens that the sensor is plugged into will come on to satisfy the call. It is possible to view on the Cascade Control when the boiler is operating for DHW production. As well, you have the option of selecting priority options. If priority is selected, the 20A boiler pump is disabled for the duration of DHW production. If it is decided that priority is not needed, change address 003 to a value of 000.

Pros:
Ready DHW pump output
DHW timer
Comfortrol based set point
Relay test from Comfortrol

Cons:
Only one boiler to satisfy DHW load

DHW Vitocontrol Connection
The second option for controlling a DHW demand is to connect the DHW tank(s) to the secondary side of the LLH. The primary consideration for this method is based on the number of tanks and having the entire boiler bank satisfy the load. This configuration requires an external set point control to be able to provide the call for heat when the tank temperature drops. The DHW control will also control the operation of the DHW pump.

The same external heat demand that DHW is connected to, can also be used for snow melting and pool/spa applications. Multiple dry contact demands are connected in parallel into terminals 7 and 8 of Section X3.



Picture showing 141 communication cable and phone type connector located in upper right of control panel.

When configuring the Cascade Control for an external call for DHW or pool/spa control, the heat demand set point is adjusted at the *Flow Temperature Set Point* menu option in Level 3 of Nominal Values.

When a call for heat is detected by the Cascade Control, the LLH set point is recalculated from the outdoor reset set point value. The boilers will be staged *ON* as they normally would be (as described in earlier paragraphs).

Pros:
- Entire bank of Vitodens used for DHW/Pool/Spa.
- Larger number of tanks.
- Non-dedicated boiler system
- Set point control can be added to Vitocontrol panel making it a Vitocontrol-C, WB2

Cons:
- Extra control required
- Extra wiring with respect to pump and dry contact demand

When determining the best way to connect for DHW, consider what the customers needs and wants are to determine the best method.

DHW Precautions
When connecting a DHW tank on the secondary side the LLH, while still utilizing the number 5 sensor for DHW, it important to realize that the single DHW pump will not be sufficient for heating of the tank. The reason for this is that the boiler pump 20A is not enabled when a call for domestic hot water occurs. A pump will be needed to provide flow from the boiler to the LLH, as well as one to pump from the LLH to the tank. Ensure that the system pump is also not impeding the flow to the tank because of location within the DHW piping system.

Mixing Valve Connection
The first version of the Cascade Control, used in the Vitocontrol-S, did not allow for communication to a Dekamatik HK control. As of fall 2003,

Please continue reading on page V5

Continued from previous page V4

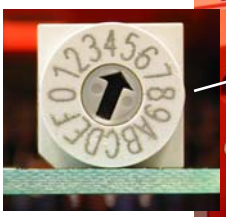
Cascade Control: Part Deux! Revisited

the first Vitocontrol-S, WB2 panels which had the ability to communicate using the 141 BUS were being shipped. Currently all production of Vitocontrol-S and C control panels that use the Cascade Control will have the ability to communicate via 141.

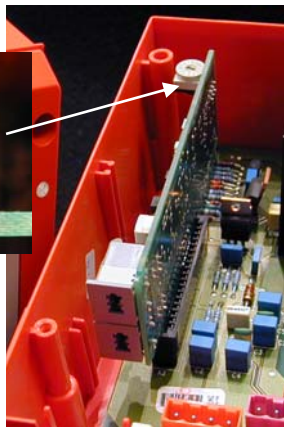
Not sure if a Vitocontrol-S, WB2 can communicate? Here are a couple things to look for. Inside of the Vitocontrol, you may find a bundled black cable. One end is plugged into the Cascade Control while the other end has a RIKO style black plug. Another sign to look for is a "phone" style plug in the upper right hand corner of the cabinet. The last check is to verify the version number of the Cascade Control. Follow the menu structure as described in the Operation Manual. If you have a unit that displays Version 1.1, then you are able to communicate.

Mixing Valve Connections

Now, the inevitable question is "What mixing valve control do I use?". *Well*... it depends.



First of all, it ***must*** be understood that **NO** mixing valve control can be directly connected to an individual Vitodens boiler within a multi boiler installation with a Cascade Control.



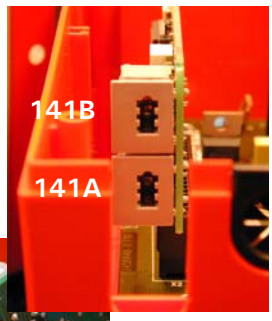
Picture showing rotary dial set to position 5 for second HK1 valve

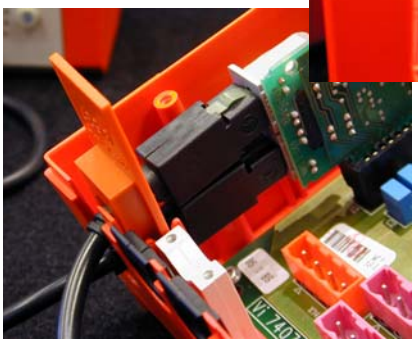
The Vitodens boiler communicates to the Cascade Control by using the 145 KM-BUS connection. If you were to try to connect the mixing valve controller for the Vitotronic 300 (or a stand-alone Vitodens with one mixing valve) and a Cascade Control at the same time, it doesn't work...we've tested it. The only way to communicate to a mixing valve control is to utilize the 141, 2-wire BUS.

Now, you may say to yourself, "Yeah, but **I** know that the 300 MV Extension Kit can be changed to 141 by moving that pink plug". Oh, smart guy(!), that's true, but *what* interface do you use to set the heating curve or look at status information?

You are left with a couple of options: HK1 with the 141 communication board option or Vitocontrol-C with mixing valve control built in.

The first option is part number 7133 369 for the mixing valve mount model and 7133 372 for the wall mounted HK1 (but don't forget the actuator 7133 391).





Pictured above: RIKO plugs inserted into communication board in HK1. Note 141A is bottom plug closest to motherboard. The 141B is above 141A.

Do you have an existing HK1 that you want to add a communication board to? You will need to order part number 7450 560.

How many mixing valves can I communicate to? Well...that depends. Generally, the rule of thumb is two mixing valves. The reasons for this are many, but if you need any more than two, it is probably in your customer's best interest to suggest looking at a Vitocontrol-C.

The Vitocontrol-C will allow you to eliminate wiring problems because of in-field installation issues. Also, there are a number of other features such as Hand/Off/Auto switches, status indicators, quick connection terminal blocks and so on, that make the Vitocontrol-C the intelligent choice.

However, if you are staying with the HK1's, the most important piece of information to remember is the rotary dial. This will determine the addressing between the HK1's. The first unit connected to the Vitocontrol-S is set to 4. This is the factory setting. The second HK1 must be changed from position 4 to position 5.

The HK1's include a communication cable to assist in wiring between them. The first HK1 is connected with the supplied cable from the Vitocontrol-S. The phone jack style end is plugged into the Vitocontrol and the other end is plugged into the 141A socket of the HK1.

The 141 A socket is shown in the picture above. It is located closest to the motherboard of the HK1. If a second HK1 is also being installed, one end is plugged into 141B of the first HK1 to 141A of the second HK1.

Since the mixing valves communicate, with the Cascade Control, there is no need for an individual outdoor sensor on either of the HK1's. Ensure you follow proper coding practices and select "*No OTS*" in Coding Level 1 of the HK1's. This will take care of that pesky outdoor temperature sensor fault.

HK1 Heating Curves

Heating curve selection is a function of the individual Comfortrols. Keep in mind, the heating curve in the Cascade, is only for the non-mixed LLH temperature. If you do not need a high temperature loop, the HK1's will provide the set point temperature to the Cascade Control. However, remember to adjust down the heating curve settings of the Cascade Control. As always, the highest heating curve setting will always determine the calculated demand.

Please continue reading on page V6

Continued from previous page V5

Cascade Control: Part Deux! Revisited

Mixing Valve Summary

- Up to two HK1's connected to Cascade Control.
- Mixing valve mount 7133 369
- Wall mount mixing valve 7133 372 (actuator 7133 391)
- More than two mixing valves = Vitocontrol-C
- Check rotary dial settings
- Program out the outdoor temperature sensor

Vitocontrol Connections with Vitodens

Each Vitodens is connected to the Vitocontrol panel via the 145 KM-BUS terminals in the boiler and panel. The boiler wiring is terminated at X5.3 and X5.4. This is a hard wired connection since the X5 is a plug connection. Wiring is run to the Vitocontrol-S, WB2 and connected to terminals 9 through 16. The schematic shows the specific locations for each boiler.

Programming Considerations

We are all familiar with the settings that are required on a single Vitodens installation. It is important to keep this in mind when you are connecting four individual boilers to a Cascade Control. Whether one project has two boilers, or another has 4 boilers, the programming is the same as a single, stand alone boiler.

The two essential addresses that must be changed are 000 and 0B8. If you are programming the boilers not to have DHW, then 000 must be 000 and 0B8 must be changed from 006 to 000.

Because the LLH sensor is connected to the Vitocontrol panel, there is no need to connect that sensor to one of the Vitodens. The only consideration is if one of the boilers has the responsibility for DHW. If so, then program that particular boiler for that function. The boiler with DHW production should be changed to address 000:001 and 0B8:001/002. Now, don't forget the timer settings for DHW production.

Suggested Configuration Settings

General Configuration Settings	
English Language Selection	YES
Summer/Winter switch Function	YES
Cascade Configuration Settings	
Outside Sensor	YES
Frost Protection	YES
Time Clock	YES
Holiday Program	YES/NO
Pump	YES
Number of boilers	1-2-3-4
Flue Gas Header	NO
Autochange Sequence	YES
Pump Seizure Protection	YES
Reset Counters	YES

Suggested Nominal Value Settings

Room Temp Normal	20
Room Temp Economy	20
Room Temp Holiday	15
Outside Temp Fixed Point	20
Flow Temp Fixed Point	20
Outside Temp Climazone	-20
Flow Temp Climazone	74
Heating Curve Curvature	1.0
Flow Temp Minimum	20
Flow Temp Maximum	74
Frost Protection Min flow-T	20
Heating Limit Time Response	12
Heating Limit Differential	0
Minimum Preheat	FAC
Maximum Preheat	FAC
Room Pre-Heat Factor	FAC
Outside Pre-Heat Factor	FAC
Flow Temp Set Point	74
Delay Time Boiler Sequence	7
Clock Override Time	0
Building Construction	Med
FlowTP Set Point Differential	20
Diff Reaction Delay	60

FAC = Factory Setting

There is no Vitodens specific programming to code out the outdoor temperature sensor. It is not necessary to install it, but just make sure that the boilers and the Vitocontrol panel are turned on at the same time to avoid an outdoor temperature sensor fault. If the boilers are started up before the Vitocontrol panel is installed, the outdoor sensor fault will disappear when they start to communicate.

If something should happen to the communication connection afterwards, you will see a communication error on both the Vitodens and on the Cascade Control. The Vitodens will display an A3 fault while a 00 fault will be seen on the Cascade Control.

Once communication occurs, any of the heating curve settings (slope, shift, WWSD, electronic high limit) do not effect the operation of the boiler or calculation of boiler set point.

Coding Summary

Boilers

No DHW 000:000, 0B8:000
With DHW 000:001, 0B8:001 or 002

HK1

Coding Level 1: No OTS

Cascade Control Programming

After all the wiring has been checked and double checked, go through the *General Configuration Settings* as well as the *Cascade Configuration Settings*. Common Settings for Configuration menu choice as shown in table. Ensure this step is completed before attempting to operate control.

If a Cascade Control has been programmed for NO time clock, it will not calculate a LLH set point until the Party Mode contact is closed.

Once the General and Cascade Configuration options have been selected, continue on to the setting the specific values in the Nominal Values Menu. These settings are very important to the operation of the Cascade Control.

Please continue reading on page V7

Continued from previous page V6

Cascade Control: Part Deux! Revisited

The tables on the previous page, show some suggested settings to be used in the Cascade Control. It must be understood that these are only base line settings and should NOT be taken as absolutes. Reading over the necessary documentation will assist in determining what values are required for the particular application you are working with.

Relay Tests

A common misconception of the Vitodens/Cascade/HK1 combination is the ability to perform relay tests. It is important to realize that while the three controls communicate, they still retain their own internal logic and functionality.

Perform a relay test on the Vitodens to fire the burner or turn individual pumps on or off.

The Cascade Control allows relay tests of the supply pump, alarm output as well as a number of Cascade specific functions.

The HK1 mixing valve control allows the user to verify operation of the mixing valve and the pump,

Functions specific to the individual controls are not taken over by the Cascade Control specifically.

Failures

The most common failures with multiple Vitodens with Cascade systems are fault codes A3 and 00. They both are centered around communication. Check all wire connections to ensure they are correct.

If you are experiencing a 00 fault on the Cascade Control after you have double checked the wiring, remove the VR20 board and check the X2 and X4 jumpers. Ensure the jumpers are present and jumpering the correct terminals.

Failures viewed on the Cascade Control are generally of a textual nature where faults shown on the boilers and HK1's can be alphanumerical.

Common faults viewed on the HK1's generally are centered around coding and communication. If experiencing an outdoor sensor fault, ensure that the coding has been changed to allow the HK1 to pick up the outdoor temperature from the 141 BUS. If a 2-wire BUS fault is seen, check the wiring between the Cascade and the HK1's.

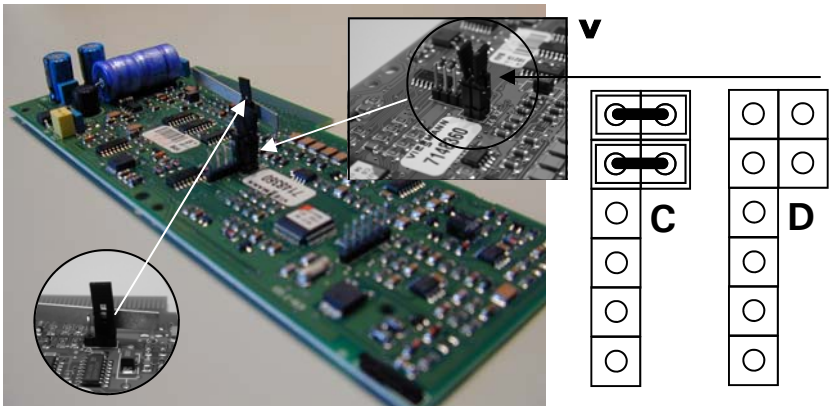
Recap Overview:

Vitodens

- Set address to 000:000 and 0B8:000 w/o DHW or when DHW controlled by external demand into Cascade Control
- Set address to 000:000 and 0B8:001 w/DHW connected to individual boiler

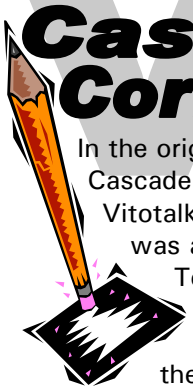
Cascade Control

- Proper communication wiring connections from each of the Vitodens boilers
- Communication connections



Picture Above: Jumpers on VR20 board and proper jumper position

Cascade Corrections



In the original printing of the Cascade control manuals and in Vitotalk, it was said the WWSD was a function of the Outside Temperature Fixed Point. On-going testing has shown that this is not the case.

The WWSD point is controlled by the Normal Room Temperature setting. The WWSD function is also affected by two other variables: Heating Limit Time Response and the Heating Limit Differential.

The Heating Limit Time Response is a time setting that allows the user to program the period of time that the outdoor temperature is averaged. The averaging of outdoor temperature is generally used to compensate for fluctuations in outdoor temperature to maintain a comfortable environment.

The Heating Limit Differential is used as an adjustment of when to enter the WWSD mode. The Cascade control comes with a factory setting of –2K for the Heating Limit Differential.

As an example, if the Cascade control is programmed for a Normal Room Temperature setting of 20 degrees C, a Heating Limit Time Response of 12 hours and a Heating Limit Differential of –2K, WWSD would take place when the average outdoor temperature was 18 degrees C.

Obviously, by adjusting the time setting to 0, the control would enter WWSD as soon as the outdoor temperature reached 18 degrees C. Once the Flow Temperature Desired starts calculating 0 degrees C (32 degrees F), the control enters the WWSD mode. The supply pump will continue operating for a ten minute period and then shut down.

When the outdoor temperature drops below the WWSD point, supply set point calculation and supply pump operation resumes its normal operation.

Continued from previous page V2

All Dried Up!

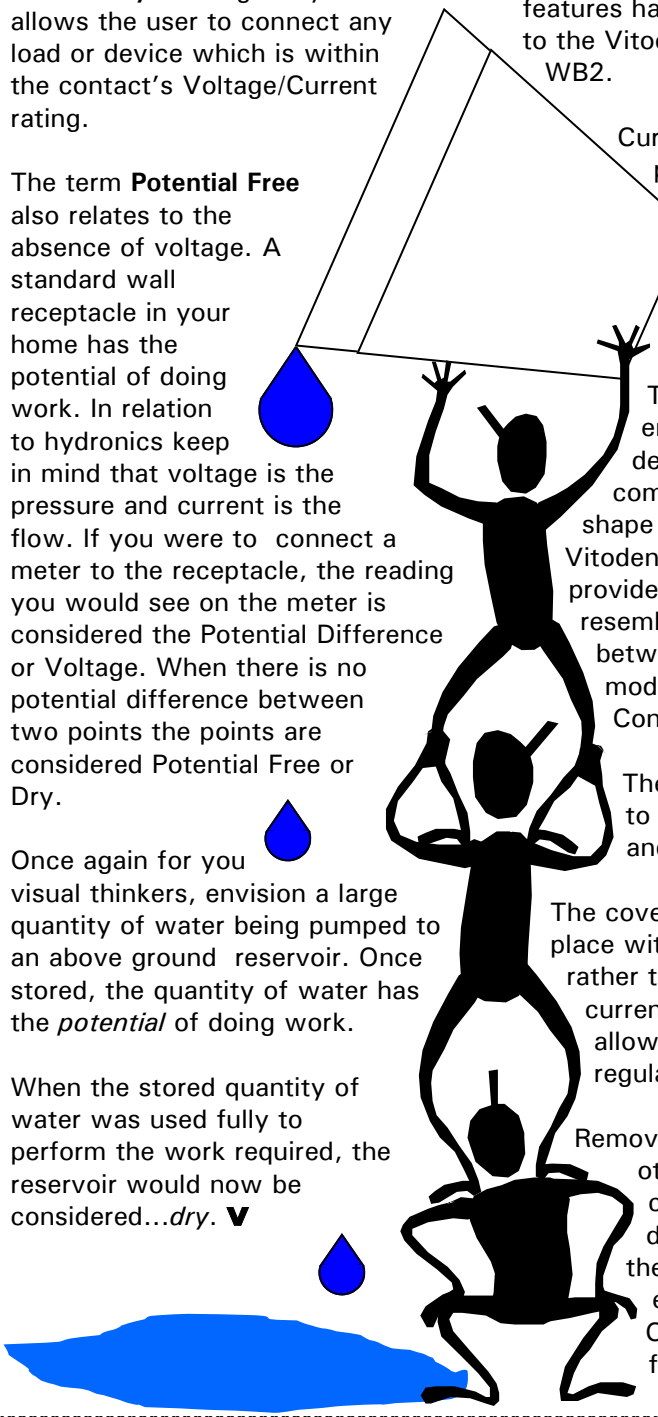
The state of the contact is very important to keep in mind. Some control systems like to see a closed contact to know that a device is ON while others like to see the closed contact to know if the device is OFF.

At this point, you maybe asking yourself "*Where the heck does the dry thing come into play*?". Well, if the relay is not switching a voltage, the contacts are considered to be **Potential Free** or **Dry**. Having a dry contact allows the user to connect any load or device which is within the contact's Voltage/Current rating.

The term **Potential Free** also relates to the absence of voltage. A standard wall receptacle in your home has the potential of doing work. In relation to hydronics keep in mind that voltage is the pressure and current is the flow. If you were to connect a meter to the receptacle, the reading you would see on the meter is considered the Potential Difference or Voltage. When there is no potential difference between two points the points are considered Potential Free or Dry.

Once again for you visual thinkers, envision a large quantity of water being pumped to an above ground reservoir. Once stored, the quantity of water has the *potential* of doing work.

When the stored quantity of water was used fully to perform the work required, the reservoir would now be considered...*dry*. V



Not so Extreme Makeover

In an effort to make the Vitocontrol-S, WB2 more competitive with other control options for controlling multiple Vitodens, the current unit has gone through a little control makeover.

Along with changing the overall appearance of the control, a number of features have been added to the Vitocontrol-S, WB2.

Current production of the Vitocontrol-S unit use a control panel style of enclosure. The new enclosure was designed to compliment the shape of the Vitodens boiler and provide a familial resemblance between the boiler, power pump module and now the Cascade Control.

The edges are rounded similar to both of the Vitodens boiler and Power Pump Module.

The cover of the new box is held in place with a screw type fastener rather than the door lock as is the current model. No key to lose allows the unit to be opened with regular hand tools.

Removing the cover reveals some other changes from within the control. Instead of having a dedicated terminal rail for all the interconnections, the existing terminals on the Cascade Control were used for the wiring terminations.

Other welcomed additions are the six knock-outs located at the bottom of the mounting base. They allow for easy connection for all hard or soft cabling that enters the enclosure. Having the knock-outs available to the installer means no expensive hole-saws or knock-out tools. This feature was in response to the question of access regarding the current style of enclosure. Without the knockouts it seemed installers did know what to do.

The new control also receives a power cord. This allows the installer to plug the Vitocontrol-S directly into a regular 120VAC wall receptacle, similar to that of the Vitodens boilers. This feature will decrease the overall installation time since hard wiring to a power source is no longer required.

There are some other minor changes that have occurred which focus primarily on the relay contact ratings. The power supply has been changed to 120VAC@7A from 120VAC@10A, the supply pump has been lowered to 120VAC@6.3FLA from 120VAC@8FLA, and the dry contact for the alarm output remains at 120/24VAC@5A.

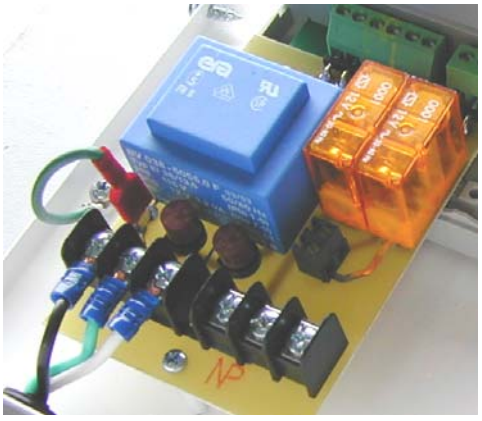
The projected date of release of the new Vitocontrol-S, WB2 is January of 2005. This will of course depend on the depletion of current stock. V

V9

Continued from previous page V8

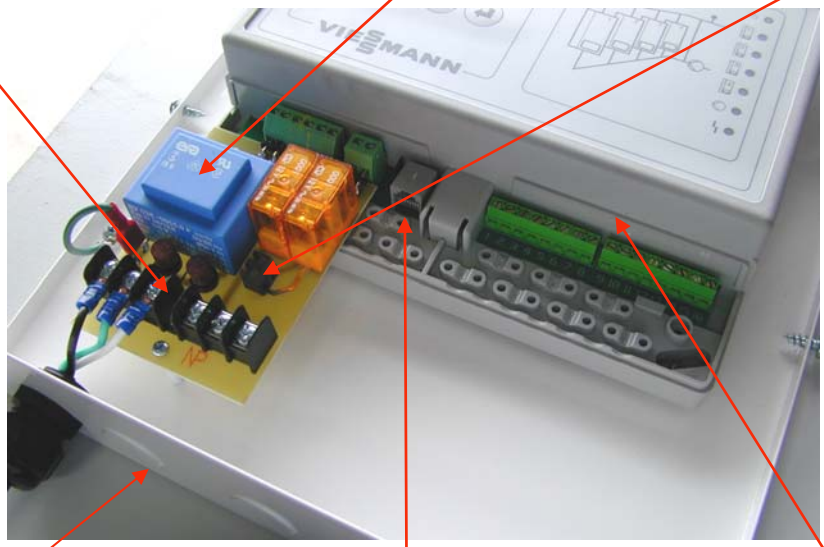
Not so Extreme Makeover

Power Supply Board Connections
Incoming 120VACand connection terminals for system pump.



Power Supply Board:
One single board houses all necessary components such as relays, fuses, transformer and power connection.

Alarm Connection:
Dry contact connection for alarm notification.



Knockouts:
A total of six knockouts are formed into bottom housing of control which allow convenient in-field connection without need knockout tools.

Plug-in 141 2-wire BUS Communication:
Supplied cable plugged into control and opposite end is terminated in communication board of HK control

Terminal Connections:
Used to connect the sensors and communications to the Cascade Control, the single terminal strip ensures trouble free connections. Built-in strain relief's allow for a secure without wire's pulling on terminals.

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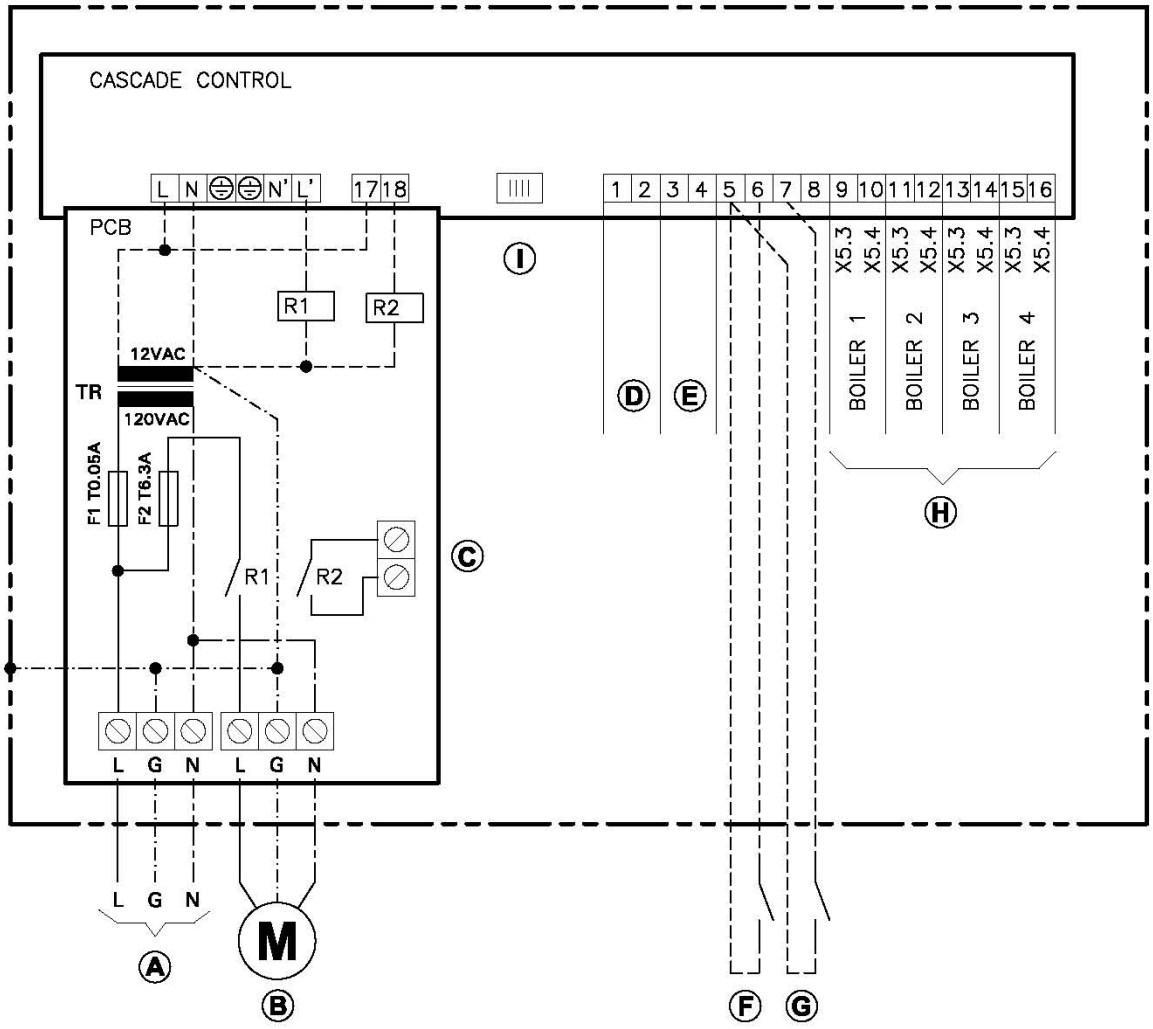
Continued from previous page V9

Not so Extreme Makeover

VITOCONTROL-S, WB2



A- Power supply 120VAC, 7A, 1PH
B- Supply pump 120VAC, 6.3FLA
C- Dry contact 120/24V, 5A- compiled failure alarm
D- Outdoor temperature sensor
E- Supply temperature sensor
F- Party switch (dry contact)
G- External heat demand (dry contact)
H- KM-BUS
I- Viessmann BUS

Look forward to future informative issues of VITOTALK!