



SOFTWARE RELEASE NOTES

MCS-MAGNUM

Version 8.05V

08/15/2011

Updates from previous versions:

New Features and Bug Fixes:

1. Fixed bug where the Oil Differential Temperature field (a Control Logic offset parameter) was not being initialized unless English units were selected. If mixed or metric was selected in the config the value for the Oil Differential Temperature is random.
2. Corrected the reciprocal compressor logic to look at other compressors in the same suction group when in a pumpdown state.
3. Changed the time to bypass the start of a 2nd compressor relay (for a wye delta or part wind start) from a fixed 2 seconds to use the entry in the 'Window to Extend Safety Time (sec)' cell. If this value is 0 then use a delay of 2 seconds, else use the value specified.
4. Corrected the problem with the alarm message text that was being passed to MCS-Connect from the Magnum. It was not resetting after being sent, causing the alarm to be persistent. This feature is for use in touchscreens, where an alarm message will cause a detailed pop-up to appear.
5. Corrected bug where the "OFF-NO FLOW" state was not being entered when the flow switch is off.

CENT ONLY:

6. Changed Condenser Liquid Level Control (CLLC) function to set the valve to 100% (if AO type) when in OFF state.

HVAC ONLY:

7. Added a second bank of chiller pumps/fans. Now there are 2 banks each with their own individual primary and secondary pumps/fans, flow switch, and pump rotation. Both banks will operate independent of each other, and the unit will not lockout until both flow switches have tripped. A pump/fan from each bank will turn on with the run/stop switch.

Screenshot from MCS-Config showing the dual pump/fan banks:

Pump/Fan	
Pump/Fan #1A PUMP 1A	Pump/Fan #1B PUMP 1B
Pump/Fan #2A PUMP 2A	Pump/Fan #2B PUMP 2B
Flow Switch A FLOW A	Flow Switch B FLOW B

Any questions regarding this release, contact:

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8. Changed the Pump Failure logic. Now the circuit will safety will not trip unless the primary and secondary pumps both fail to engage the flow sensor.
9. Corrected the EXV logic that was making incorrect adjustments when using the EXV Load and Unload Adjust % instead of the Nominal Tonnage of step (there was a problem when converting to percentage).
10. Added Boiler/Pump logic:

Boiler/Pump Control

Boiler/Pump control logic has been added to the standard HVAC software. This will provide similar but limited pump control that is provided in Loop Water Control (LWC) software. This will enable boilers and their associated pumps to be controlled without the need to add an additional MCS Magnum with LWC software to control these functions.

MCS-Config Requirements

The following panel has been added to the Magnum HVAC V8 Information screen as the setup for the Boiler/Pump information.

The screenshot shows the 'Magnum HVAC V8 Information Screen' with the 'Boiler Info' tab selected. The 'Enable Boiler Logic?' section has 'Yes' selected. The 'General' section includes 'Run/Stop Switch' (B-RUN/STOP), 'Alarm Relay' (B-ALARM), 'Control On' (Water In), and 'Water In' (CTL T-IN) and 'Water Out' (CTL T-OUT) sensors. The 'Pumps' section includes 'Pump Control' (Always On, Cycled On Temp), '# of Pumps' (2), 'Max Pumps Allowed' (1), 'Starting Pump RO' (B-PUMP1), 'Pump VFD' (B-PUMP %), 'Pump In PSI' (BPmpSuct), 'Starting Pump Proof' (Not Used), 'Pump VFD Fault' (VFDFlt 1), 'Pump Out PSI' (BPmpDis), 'Starting Pump Fault' (PUMP.FLT1), and 'Pump Amps' (B-PMPamp1). The 'Boiler' section includes '# of Boilers' (4), 'Starting Boiler RO' (BOILER1), 'Max Boilers Allowed' (4), 'Starting Boiler Proof' (BoilerOFF1), and 'Starting Boiler Fault' (BoilerFLT1).

Enable Boiler Logic?

If No is selected the additional Boiler Information will not appear. The Boiler logic is inactive.
If Yes is selected the additional Boiler Information will appear and the Boiler logic is active.

General

Select the Run/Stop Switch and the Alarm Relay from dropdown lists (if applicable).
Select either Water In or Water Out for the control of the boilers.
Select the Water In and Water Out sensors from dropdown lists (if applicable).

Pumps

Select the Pump Control method:

Always On - If the unit is on then a pump will be on.

Cycled On Temp - Pumps will be cycled on and off based temperature of the water.

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of Pumps: Indicates the number of pumps that will be controlled (Maximum of 12).

Max Pumps Allowed: Indicates the maximum number of pumps that can be turned on concurrently.

Starting Pump RO: Select the starting pump Relay Output from a dropdown list. There must be one Relay Output for each pump.

Pump VFD: Select the pumps variable speed Analog Output from a dropdown list (if applicable).

Pump In PSI: Select the sensor from a dropdown list that will display the pressure coming into the pumps.

Pump Out PSI: Select the sensor from a dropdown list that will display the pressure leaving the pumps. If this is provided the system will calculate a pressure differential by subtracting **Pump In PSI** from the value of this sensor. The target setpoint #160 must reflect the target as a differential.

Starting Pump Proof: Select the sensor from a dropdown list that will indicate the status of a pump that has been turned on. If used, there must be one input per pump. If the pump is on and the associated digital input is OFF a boiler fault has occurred.

Pump VFD Fault: Select the sensor from a dropdown list that will indicate when a pump VFD has occurred. If no sensor is selected this safety will not be checked.

Starting Pump Fault: Select the sensor from a drop down list that will indicate the status of a pump that has been turned on. If used, there must be one input per pump. If the associated pump is on and this digital input is ON a fault has occurred.

Pump Amps: Select the sensor from a drop down list that will indicate the amp draw of the associated pump. If selected, there must be one sensor per pump. If no sensor is selected, the amp safety will not be checked.

Boiler

of Boilers: Indicates the number of boilers that will be controlled (Maximum of 12).

Starting Boiler RO: Select the starting boiler relay output from a drop down list. There must be one Relay Output for each boiler.

Max Boilers Allowed: Indicate the maximum number of boilers that can be turned on concurrently.

Starting Boiler Proof: Select the sensor from a dropdown list that will indicate the status of a boiler that has been turned on. If used, there must be one input per boiler. If the associated boiler is on and this digital input is OFF a boiler fault has occurred.

Starting Boiler Fault: Select the sensor from a dropdown list that will indicate the status of a boiler that has been turned on. If used, there must be one input per boiler. If the associated boiler is on and this digital input is ON a fault has occurred.

The following set points are required by the Boiler Logic

#	Name	Typical Value	Description
157	B-PUMP DELAY	30	The time delay expressed as seconds between making decisions as to pump settings.
158	B-STAGE DELY	60	The time delay expressed as seconds between making decisions as to boiler stage settings.

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#	Name	Typical Value	Description
159	B-VFD DELAY	30 500 1000	The time delay expressed as seconds between making decisions as to pump VFD setting. 'Sec. to Ignore Safety' field: contains the minimum valve setting. For example if this cell contains 500, the valve will initially be set to 50.0% and it will never be less than this value. 'Window to extend Safety Time(sec)' field: contains the maximum valve setting. This will normally be 1000 for 100.0%.
160	B-VFD TARGET	60.0 120 30 25 30	The target flow that is to be maintained. This can be a differential if both input and output pressures sensors are specified or the actual flow of the input if only sensor specified. 'Time(sec)' field: contains the delay in seconds before another pump can be turned on once the valve gets to 100.0% 'Sec. to Ignore Safety' field: contains high dead band for the control zone. This is added to the value of this set point. In this example the high dead band will be 63.0. 'Window to extend Safety Time(sec)' field: contains low dead band for the control zone. This is subtracted from the value of this set point. In this example the low dead band will be 57.5. 'Safety Time Extension' field: contains the maximum valve adjustment that can be made at one time. In this example the maximum adjustment to the valve will be 3.0%..
161	B-PUMP FLT	0 30	The 'Value' is not used as this set point is set up to check the status of a digital input indicated in the Starting Pump Fault cell. 'Time(sec)' field: contains the delay before the system will place a pump in a failed state.
162	NO USED		
163	B-HEAT TRGT	180.0	The heating target that is to be maintained.
164	B-HEAT ZONE+	3.0	The high dead band for the heating control zone. This value is added to the value of set point #163.
165	B-HEAT ZONE-	3.0	The low dead band for the heating control zone. This value is subtracted from the value of set point #163.
165	B-HEAT ZONE-	3.0	The low dead band for the heating control zone. This value is subtracted from the value of set point #163.
189	B-FLA PUMP	30.0	The expended amp draw of the pump. If active this value is used to calculate the high and the low ampere safeties limits. Refer to set points 75 and 76.
190	B-FLA BOILER	120.0	The 'Value' is not used as this set point is set up to check the status of a digital input indicated in the Starting Boiler Fault cell. 'Time(sec)' field: contains the delay before the system will place a boiler stage in a failed state.

Status of Boiler Logic displayed by MCS Connect

The Boiler status is displayed by clicking on the Boiler tab:

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Pump Capacity State	Time	Step Delay	Rate of Change	Wanted/Actual /Available	Wanted VFD%	VFD% Delay
PUMPS MAX ON	00:05:38	17	0.0	1/1/1	90.0	24
Pumps State	Time	Lead?				
1) PUMP ON	00:05:39	Yes				
2) PUMP OFF	43:17:48					
Pump Capacity State	Time	Step Delay	Rate of Change	Wanted/Actual /Available		
BOILER MAX ON	00:03:44	22	0.0	4/4/4		
Boilers State	Time	Lead?				
1) STP ON	00:05:18	Yes				
2) STP ON	00:04:47					
3) STP ON	00:04:16					
4) STP ON	00:03:45					
⏪ ⏩						
Status	Alarms	SetPoints	Reset/Clear	Schedule	Service	Boiler

Pump General Status:

- **Pump Capacity State:** Pump state.
- **Time:** Time in current pump state.
- **Step Delay:** Seconds remaining before next pump adjustment is checked.
- **Rate of Change:** Rate of change of the controlling sensor. In above example the control on water in has been selected, sensor CTLT-IN.
- **Wanted/Actual/Available:** Pumps wanted on = 1, actual =1, available =1. In above example there are 2 pumps but only 1 can be on at a time. The second pump is back up.
- **Wanted VFD%:** Position of pump VFD if applicable.
- **VFD% Delay:** Seconds remaining before next pump VFD adjustment is checked.

Pump Individual Status:

- **Pumps State:** State of individual pumps.
- **Time:** Time in current individual pump state.
- **Lead?:** Indicates the lead pump.

Boiler Stage General Status:

- **Pump Capacity State:** Boiler state.
- **Time:** Time in current boiler state.
- **Step Delay:** Seconds remaining before next boiler stage adjustment is checked.
- **Rate of Change:** Rate of change of the controlling sensor. In above example the control on water in has been selected, sensor CTLT-IN.
- **Wanted/Actual/Available:** Pumps wanted on = 4, actual =4, available =4. In above example there are 4 boiler stages and all are on.

Boiler Individual Status:

- **Boiler State:** State of individual boiler stages.
- **Time:** Time in current individual boiler stages state.
- **Lead?:** Indicates the lead boiler stage.

Status of Boiler Logic displayed by the Magnum

The Boiler status is displayed by selecting the Status from the main menu. The Boiler/Pump information is the same as above but it requires the following 4 screens:

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Screen 1

```
20:19 B-Pumps 45/45
PUMPS MAX ON
002:57:01
WTD ACT AVAL DLY ROC
1 1 1 3 0.0
VFD= 90.0 DELAY 11
PG↑ PG↓
```

Screen 2

```
20:19 B-Pumps 45/45
PUMPS MAX ON
+1-PMP ON 002:57:17
2-PMP OFF 046:09:26
PG↑ PG↓
```

If there are more than 4 pumps addition screens will be displayed showing up to the maximum of 12 pumps. The status of 4 pumps will be displayed per screen.

Screen 3

```
20:19 B-Stages 45/45
BOILER MAX ON
002:55:43
WTD ACT AVAL DLY ROC
4 4 4 26 0.0
PG↑ PG↓
```

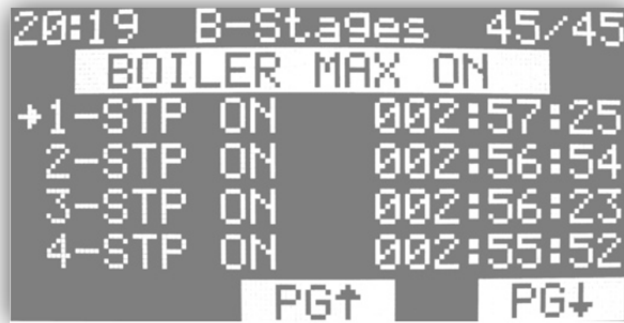
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Screen 4



If there are more than 4 boiler stages additional screens will be displayed showing up to the maximum of 12 boiler stages. The status of 4 boiler stages will be displayed per screen.

Pump States

The general pump states are as follows:

- **PUMPS STOPPED:** The Run/Stop Switch is in the STOP (OFF) position.
- **PUMPS ALL OFF:** The Run/Stop Switch is in the RUN (ON) position but no pumps are required at this time. Control temperature is high and no heating is required.
- **PUMPS HOLDING:** The Run/Stop Switch is in the RUN (ON) position at least one pump is on, no additional pumps are needed. Pump flow is being maintained.
- **PUMPS UNLOADING:** The Run/Stop Switch is in the RUN (ON) position and a pump will be turned off.
- **PUMPS LOADING:** The Run/Stop Switch is in the RUN (ON) position additional pumps are needed.
- **PUMPS MAX ON:** The Run/Stop Switch is in the RUN (ON) position and the maximum number of pumps that are available are on.

The individual pump states are as follows:

- **PMP OFF:** The pump is off and it is ready to be turned on if needed.
- **PMP ON:** The pump is on.
- **PMP FLT:** The pump is off due to the digital input, Starting Pump Fault, associated with this pump being on for a time longer than the safety time in set point #161.
- **PMP LOamp:** The pump is off due to low amp draw.
- **PMP HIamp:** The pump is off due to high amp draw.

Boiler States

The general boiler states are as follows:

- **BOILER STOPPED:** The Run/Stop Switch is in the STOP (OFF) position.
- **BOILER HOLDING:** The Run/Stop Switch is in the RUN (ON) position at least one boiler stage is on, no additional boiler stage are needed. Control temperature is being maintained.
- **BOILER UNLOADING:** The Run/Stop Switch is in the RUN (ON) position and a boiler stage will be turned off as the control temperature is too high.
- **BOILER LOADING:** The Run/Stop Switch is in the RUN (ON) position additional boiler stages are needed as the control temperature is too low.
- **BOILER MAX ON:** The Run/Stop Switch is in the RUN (ON) position and the maximum number of boiler stages that are available are on.

The individual boiler states are as follows:

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- **STP OFF:** The boiler stage is off and it is ready to be turned on if needed.
- **STP ON:** The boiler stage is on.
- **STP FLT:** The boiler stage is off due to the digital input, Starting Boiler Fault, associated with this boiler stage being on for a time longer than the safety time in set point #190.

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