

**INTERFACE HVAC CONTROL PANEL HCP-101**  
 THE HVAC SYSTEM FOR WET WELL ROOM IS CONTROLLED AND MONITORED BY LOCAL FIELD PANEL HCP-101 IN EXISTING PUMP ROOM.

**PILOT LIGHTS TO INDICATE ON STATUS:**  
 MAU-101 HIGH SPEED ON. MAU-101 LOW SPEED ON.  
 EF-102 HIGH SPEED ON. EF-102 LOW SPEED ON.  
 HEATING STAGE.

**PILOT LIGHTS TO INDICATE ALARM:**  
 MAU-101 VFD FAULT.  
 EF-102 VFD FAULT.  
 MAU-101 LOW TEMPERATURE SHUTDOWN.  
 MAU-101 HIGH TEMPERATURE SHUTDOWN.

**PILOT LIGHTS TO INDICATE DIRTY FILTER: (50% LOADING)**  
 MAU-101 FILTER CHANGE.

**TEMPERATURE SET POINT ADJUSTMENT DIALS FOR THE FOLLOWING:**  
 MAU-101 DISCHARGE TEMPERATURE.  
 WET WELL ROOM TEMPERATURE.

**DIGITAL READOUT METERS FOR THE FOLLOWING:**  
 WET WELL ROOM TEMPERATURE.

**MISCELLANEOUS:**  
 PILOT LIGHT LAMP TEST SWITCH.  
 PORTABLE OPERATOR INTERFACE DEVICE PLUG-IN JACK.

**SEQUENCE OF OPERATION**

**OPERATING SET POINTS**  
 THE SET POINTS FOR THE OPERATING SEQUENCE ARE AS FOLLOWS:  
**OCCUPIED PERIOD:**  
 -DISCHARGE TEMPERATURE: 18°C (ADJUSTABLE)  
 -SPACE HEATING TEMPERATURE: 15°C (ADJUSTABLE)

**UNOCCUPIED PERIOD:**  
 -DISCHARGE TEMPERATURE: 10°C (ADJUSTABLE)  
 -SPACE HEATING TEMPERATURE: 5°C (ADJUSTABLE)  
**SPEED SET POINT:**  
 -HIGH SPEED: 2832 L/S (ADJUSTABLE)  
 -LOW SPEED: 944 L/S (ADJUSTABLE)

**CONTROL SEQUENCES**  
 EXECUTE THE FOLLOWING SEQUENCES BASED ON THE FOLLOWING HOA SWITCH POSITIONS:  
**OFF:** EXHAUST FAN IS OFF AND ITS DAMPER IS CLOSED. MAKE UP AIR IS OFF AND ITS DAMPER IS CLOSED.

**HAND:** EXHAUST DAMPER OPEN AND EXHAUST FAN IS ON HIGH SPEED, SUPPLY DAMPER IS OPEN AND SUPPLY FAN IS ON HIGH SPEED.

**AUTO:** THE MAKE UP AIR UNIT AND EXHAUST FAN ARE DDC CONTROLLED USING ELECTRIC ACTUATION. DDC SYSTEMS WILL ENABLE OR DISABLE THE UNITS.

WHEN MAU-101 AND EF-102 ARE COMMANDED TO RUN, THE FANS SHALL START ONLY AFTER THE RESPECTIVE MOTORIZED DAMPERS ARE OPEN. WHENEVER THE MAU-101 IS TURNED ON, IT WILL GO THROUGH PURGE CYCLE TO CLEAR THE DUCTWORK FOR 10 MINUTES BEFORE THE BURNER IS IGNITED.

WHEN MAU-101 AND EF-102 ARE COMMANDED TO STOP OR ARE IN FAILURE MODE, ALL RESPECTIVE MOTORIZED DAMPERS ARE CLOSED.

DDC SYSTEMS SET ROOM TEMPERATURE SET POINT AND RESET THE DISCHARGE TEMPERATURE SET POINT TO MAINTAIN THE ROOM TEMPERATURE SETPOINT.

IN WINTER DDC SYSTEMS SHALL MAKE SURE THAT, THE BURNER IS ON AT LEAST AT ITS MINIMUM FIRE POSITION TO MAINTAIN DISCHARGE AIR TEMPERATURE AT 4°C EVEN IF THE SPACE TEMPERATURE SET POINT IS SATISFIED.

**OCCUPIED MODE:**  
 BEFORE ENTERING THE WET WELL, OPERATOR HAS TO PRESS OCCUPIED MODE. THIS IS DETECTED BY MONITORING STATUS OF LIGHT SWITCH AT ROOM ENTRANCE IN THIS MODE. MAU-101 AND EF-102 ARE COMMANDED TO RUN AT HIGH SPEED TO SUPPLY 12 AIR CHANGES PER HOUR OF HEATED FRESH AIR TO THE SPACE AND TO TURN ON WET WELL LIGHTING.  
 ALSO OPERATE IN OCCUPIED MODEWHILE THE FOLLOWING CONDITIONS ARE TRUE:  
 - PLANT DCS CALLS FOR HIGH SPEED.  
 - GAS DETECTION SYSTEM SENSES A WARNING LEVEL (CONCENTRATION) OF GAS VAPOURS.

**UNOCCUPIED MODE:**  
 WHEN LEAVING THE WET WELL, OPERATOR HAS TO PRESS UNOCCUPIED MODE. MAU-101 AND EF-102 ARE COMMANDED TO REDUCE SPEED TO LOW SPEED TO PROVIDE 4 AIR CHANGES PER HOUR OF HEATED FRESH AIR TO THE SPACE AND TO TURN OFF WET WELL LIGHTING. IF THE OPERATOR FORGETS TO PUSH UNOCCUPIED SWITCH, MAU-101, EF-102 AND WET WELL LIGHTING ARE ALLOWED TO BE ON AT OCCUPIED MODE FOR MAXIMUM TWO HOURS (ADJUSTABLE) AND THEN VENTILATION SYSTEM AND LIGHTING WILL BE AUTOMATICALLY SWITCHED TO UNOCCUPIED MODE, AT ANY TIME THE OPERATOR MAY PRESS THE OCCUPIED PUSH BUTTON TO CALL FOR TWO MORE HOURS OF LIGHT AND HIGH SPEED OPERATION.

**STATIC PRESSURE CONTROL:**  
 THE EXHAUST FAN SHALL BE INTERLOCKED TO RUN WITH THE MAKE-UP AIR UNIT.  
 THE EXHAUST FAN ADJUSTABLE FREQUENCY DRIVE SHALL BE CONTROLLED BY A STATIC ROOM PRESSURE CONTROLLER AND IT SHALL MODULATE TO KEEP THE SPACE AT SLIGHTLY NEGATIVE PRESSURE.

**SYSTEM ALARMS**

THE DDC SYSTEM SHALL UTILIZE THE VFD STATUS TO CONFIRM THE FANS ARE IN THE DESIRED STATE (I.E., HIGH, LOW OR OFF) AND GENERATE AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL. THE DDC SHALL GENERATE A VFD TROUBLE OR FAULT ALARM INDEPENDENT FROM THE FAN STATUS.

SMOKE DETECTOR, SUPPLY AND EXHAUST FAN VFD FAULT ALARMS SHALL DE-ENERGIZE THE SUPPLY AND EXHAUST FANS UPON ACTIVATION.

**ROOM LOW TEMPERATURE SHUT DOWN:**  
 IF THE ROOM TEMPERATURE FALLS BELOW 4°C (ADJUSTABLE), DE-ENERGIZE THE MAU-101, EF-102 AND INITIATE AN ALARM TO HCP.

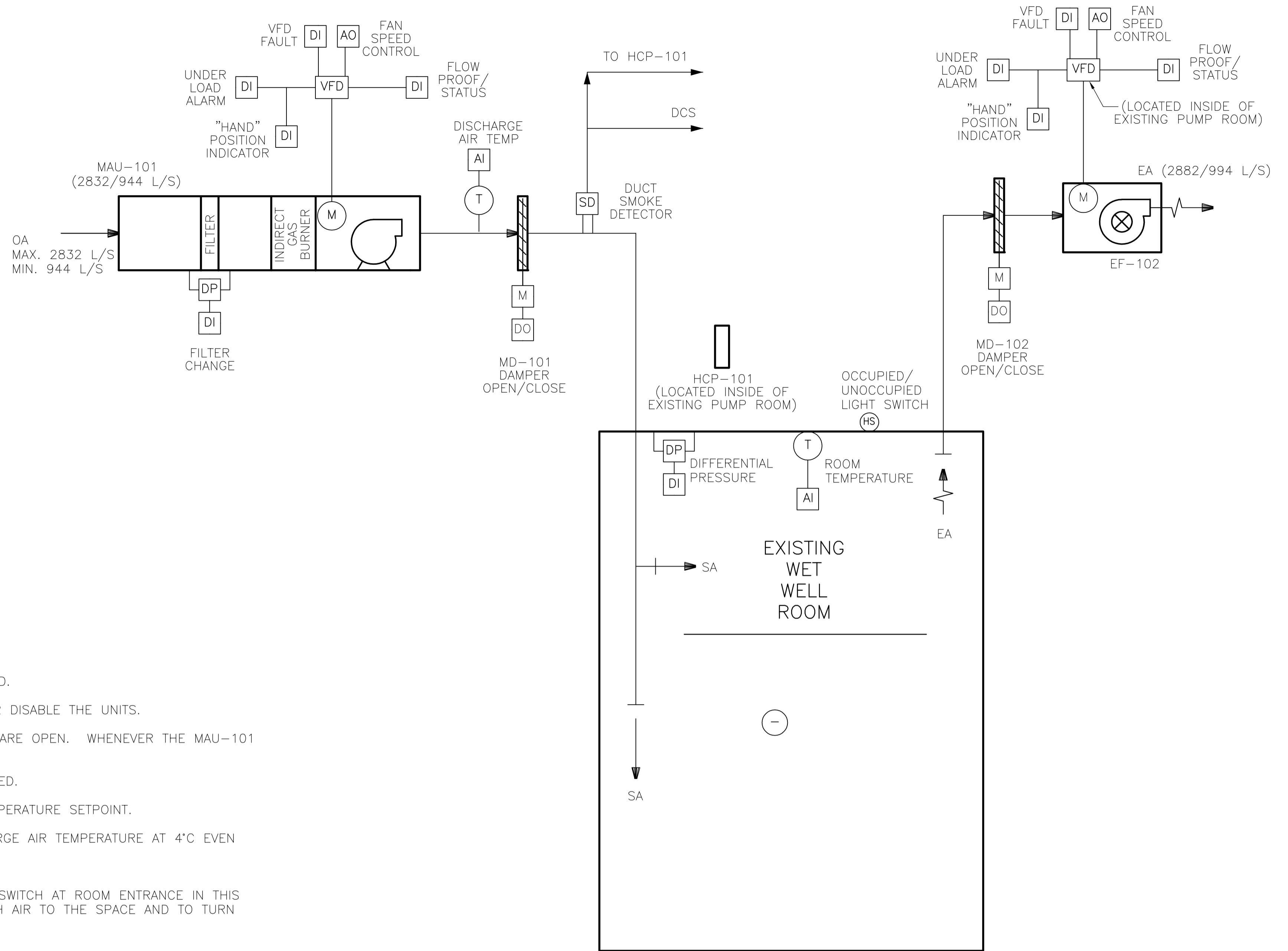
**HIGH TEMPERATURE SHUT DOWN:**  
 IF THE MAU SUPPLY AIR TEMPERATURE IS ABOVE 37°C (ADJUSTABLE), DE-ENERGIZE THE MAU-101, EF-102 AND INITIATE AN ALARM TO HCP.

**FAN FAILURE:**  
 IF THE FANS OF THE MAU-101 OR EF-102 FAIL, INITIATE AN ALARM TO HCP-101.

**DCS INTERFACE SIGNALS:**

INPUT FROM DCS: - FORCE HIGH SPEED / OCCUPIED MODE

OUTPUTS TO DCS: - EF-101 VFD FAULT.  
 - MAU-101 VFD FAULT.  
 - LIGHTS ON / OCCUPIED MODE.  
 - EF-101 HIGH SPEED RUNNING.  
 - EF-101 LOW SPEED RUNNING.  
 - MAU-101 HIGH SPEED RUNNING.  
 - MAU-101 LOW SPEED RUNNING.  
 - SMOKE DETECTED.



**EXISTING WET WELL**

**NOTES:**

1. HCP-101, VFD OF MAU-101 AND EF-102 ARE AT EXISTING PUMP ROOM. REFER TO ELECTRICAL DRAWING FOR LOCATION.
2. OCCUPIED/UNOCCUPIED LIGHT SWITCH IS AT THE ENTRANCE OF WET WELL.
3. HOA SWITCHES OF MAU-101 AND EF-102 ARE AT VFD MOUNTED IN EXISTING PUMP ROOM. REFER TO ELECTRICAL DRAWING FOR LOCATION.
4. REMOVE FILTERS TEMPORARILY IN WINTER WHEN THERE IS A FROST FREEZE PROBLEM.
5. PROVIDE P&ID FOR MAU AT AS BUILT STAGE.



B.M. ELEV.	FIELD BOOK #:		
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NO.	REVISIONS	DATE	BY

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D.L. LE
2007/11/28
PROJECT No.: 358676
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<b>THE CITY OF WINNIPEG</b> WATER AND WASTE DEPARTMENT	
NORTH END WATER POLLUTION CONTROL CENTRE <b>WET WELL REHABILITATION</b> HVAC CONTROL SYSTEM BLOCK DIAGRAM & CONTROL SCHEMATICS	
SHEET <b>14</b> OF <b>24</b>	CONSULTANT DRAWING NUMBER <b>M0004</b>
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