0075-0164

Terrace Office Remodel
Baseball Ops

DRAWING NUMBER	DRAWING TITLE
TITLE	Title Page
PAGE 2	NAE Reference Drawing
PAGE 3	NAE Panel Detail Drawing
PAGE 4	N2 Bus Riser
1.1	RTU-1 Flow
1.2	RTU-1 Wiring Detail - Existing
1.3	RTU-1 Sequence of Operations
1.4	RTU-1 Point Schedule
2.1	VMA-11 Flow
2.2	VMA-11 Wiring Detail
2.3	VMA-11 Sequence of Operations
2.4	VMA-11 Point Schedule
3.1	VMA-13 Flow
3.2	VMA-13 Wiring Detail
3.3	VMA-13 Sequence of Operations
3.4	VMA-13 Point Schedule
RS-1	Room Schedule
VS-1	Valve Schedule

Johnson Controls

Creating a better climate for business.

- [x] Environmental Control System
- [x] Facility Management System
- [ ] Air and Water System Balancing
- [ ] Fire Management System
- [ ] Security System
- [ ] Lighting Services
- [ ] Instrumentation System Installation
- [ ] Building Operations Management
- [ ] Energy Conservation Control
- [ ] Training Programs
- [ ] Performance Contracting
- [ ] Planned Service Agreements

Air Conditioning
Heating
Diagnostic Services
Coil Cleaning
Refrigeration
Automatic Temperature Controls
Facility Management Systems
Fire Management
Security Management
Building Operations and Management
Water Treatment
Electrical Equipment
Emergency Generator / Lighting Equipment
Industrial Controls / Recording / Indication Equipment

PROJECT TITLE
MILLER PARK
TERRACE OFFICE REMODEL
BASEBALL OPS

ARCHITECT	ENGINEER
Phone:	Phone:
MECHANICAL CONTRACTOR	ELECTRICAL CONTRACTOR
Phone:	Phone:

REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY

Johnson Controls

Branch Information
Phone:
Fax:

SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DATE	CONTRACT NUMBER
	KDP	KDP	1/2010	0075-0164

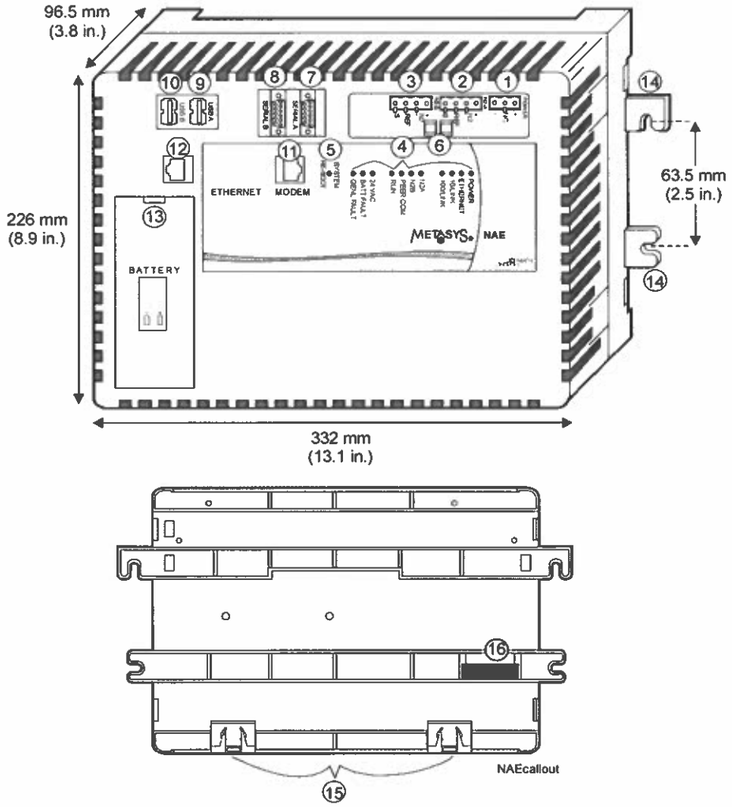
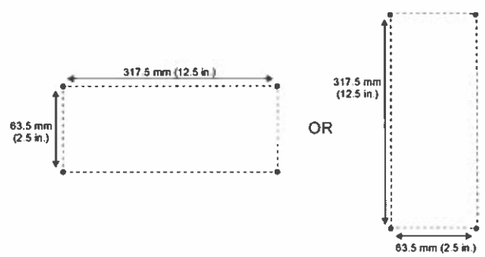
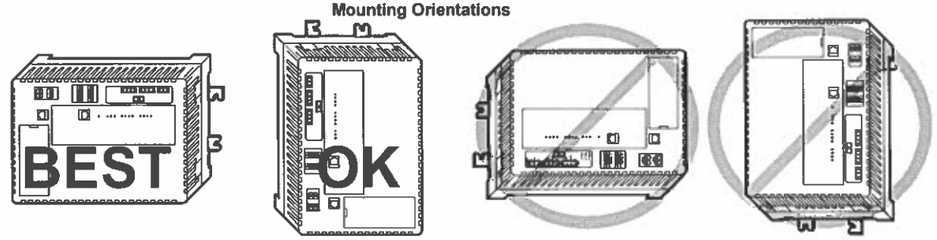


Table 1: NAE/NIE Callouts			
Callout	Description	Callout	Description
1	Pow er Termination	9	USB A connector
2	N2 A Bus termination	10	USB B connector
3	N2 B Bus termination	11	Modem RJ-11 connector
4	Light-Emitting Diodes (LEDs)	12	Ethernet RJ-45 connector
5	System Re-boot sw itch	13	Battery hatch
6	N2 End-of-Line (EOL) sw itches	14	Mounting feet (2 of 4)
7	Serial A RS-232 connector	15	DIN rail clips (2 of 2)
8	Serial B RS-232 connector	16	Battery Strap

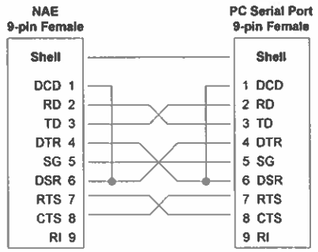


Mounting Hole Spacing

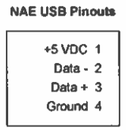
Mounting Orientations



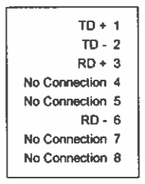
PC Serial Ports (SER A, SER B)

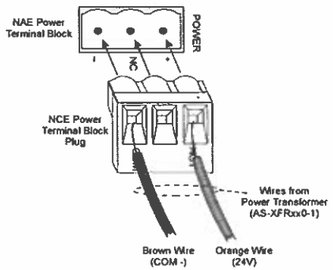


USB Ports (USB A and USB B)



Ethernet Port





24VAC Power Connection

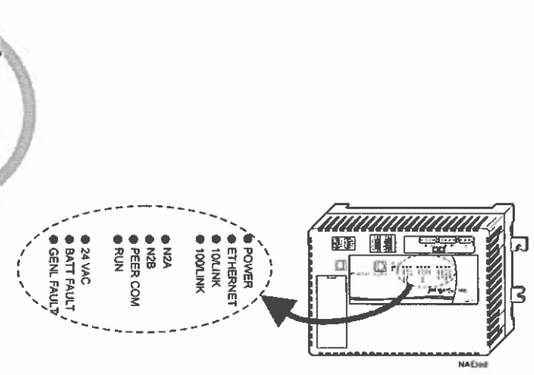


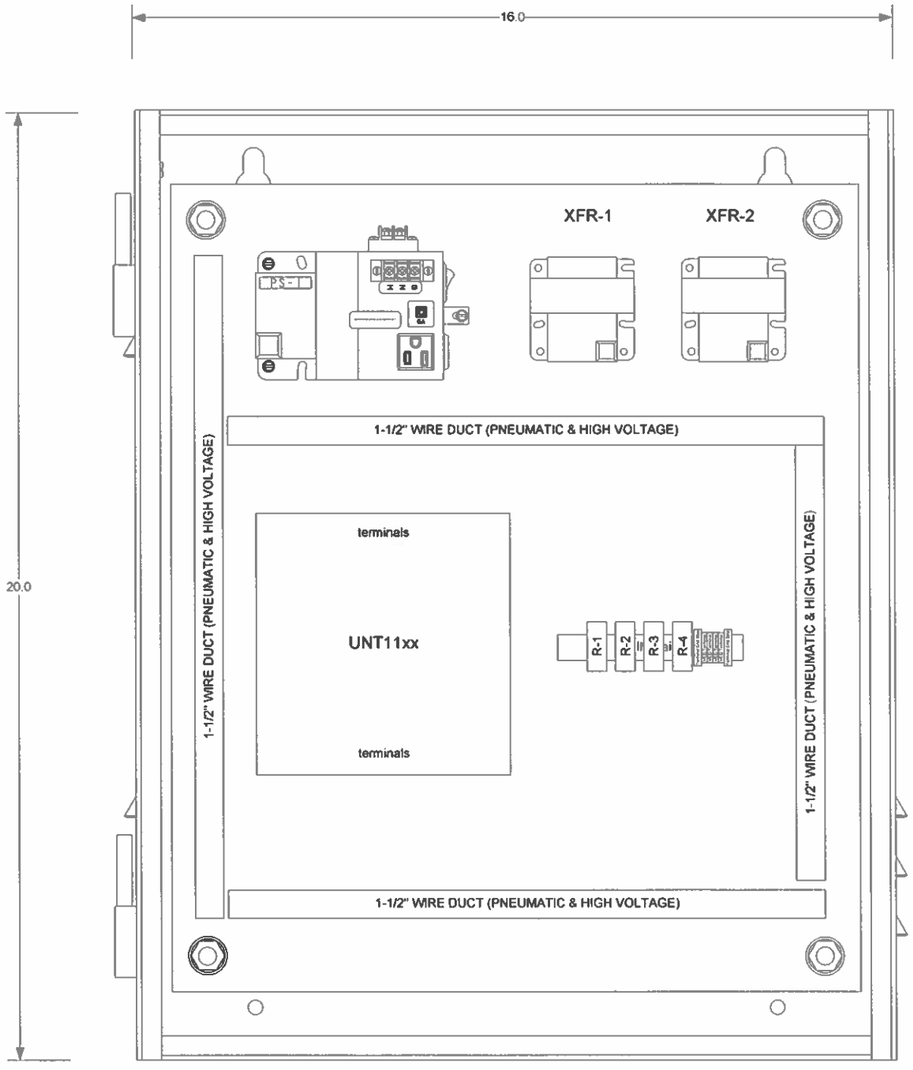
Table 4: NAE / NIE LEDs

LED	Normal	Descriptions / Other Conditions
POWER (GREEN)	On Steady	On Steady = Unit is getting power from either the battery or 24 VAC power. Also see the 24 VAC LED. Off Steady = Unit is shut down.
ETHERNET (GREEN)	Flicker	Flicker = Data is transferring on the Ethernet connection. Ethernet traffic is general traffic (may not be for the NAE / NIE). Off Steady = No Ethernet traffic, probably indicates a dead Ethernet network or bad Ethernet connection.
10/LINK (GREEN)	On Steady	On Steady = Ethernet connection is established at 10 Mb/sec.
100/LINK (GREEN)	On Steady	On Steady = Ethernet connection is established at 100 Mb/sec.
N2 A (GREEN) (NAE Only)	Flicker	Flicker = N2 A port is transmitting or receiving data. Flickers are generally in synch with data transmission, but should not be used to indicate specific transmission times. Off Steady = No traffic.
N2 B (GREEN) (NAE Only)	Flicker	Flicker = N2 B port is transmitting or receiving data. Flickers are generally in synch with data transmission, but should not be used to indicate specific transmission times. Off Steady = No traffic.
PEER COMM (GREEN)	Varies (see next column)	Flicker = Data traffic between NAE / NIE devices. For an NAE / NIE that is not a Site Director, this LED indicates regular heartbeat communications with the Site Director. For a Site Director NAE / NIE, flashes are more frequent and indicate heartbeat communications from all other NAE / NIE devices on the site.
Run	On Steady	On Steady = NAE / NIE software is running On 1 second, Off 1 second = NAE / NIE software is in startup mode. On 4 seconds, Off 1 second = NAE / NIE is in diagnostics mode. On 0.5 seconds, Off 0.5 seconds = NAE / NIE software is shutting down. Off Steady = Operating system is shutting down or software is not running.
24 VAC (GREEN)	On Steady	On Steady = 24 VAC power present. Off Steady = Loss of 24 VAC power. In the Off Steady condition, the NAE / NIE can be running on battery power. Also se the POWER LED.
BATT FAULT (RED)	Off Steady	On Steady = Battery fault. Replace the battery.
GENL FAULT (RED)	Off Steady	On Steady = General Fault. Fault conditions include excessive Central Processing Unit (CPU) flash, or memory use, or excessive CPU or Printed Wire Board (PWB) temperature. In normal operation, the GENL FAULT LED stays on steady for the first half of the startup sequence.

REVISION INFORMATION	Drawing Title: Visio NAE Reference Drawing								
NUMBER									
DATE: 02/02/12									
TIME: 12:24 PM		REFERENCE DRAWING	NO	REVISION-LOCATION		ECN	DATE	BY	
FILENAME: NAE Reference Drawing001.v sd	Project Title: Terrace Remodel	Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE	
		Johnson Controls			Branch Information		CONTRACT NUMBER: 0075-0164		
							DRAWING NUMBER: PAGE 2		

BILL OF MATERIALS

Designation	Qty	Part Number	Description
PNL-1	1	PAUE00001FH0	CONT PANEL UNT1144 NO TB 16X20 HOFFMAN
XFR-x	2	Y64T15-0	TRANSFORMER UL CLASS 2



PNL-1

Drawing Title
RTU Panel Detail Drawing

REFERENCE DRAWING	NO	REVISION LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE

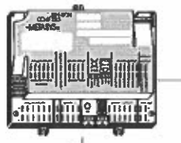
Project Title
Terrace Remodel

Johnson Controls

Branch Information

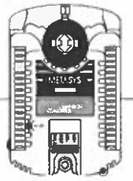
CONTRACT NUMBER
0075-0164

DRAWING NUMBER
PAGE 3

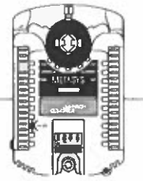


UNT-1

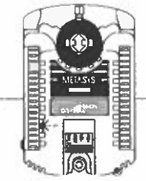
VND-20



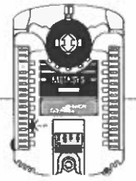
VMA-17



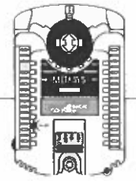
VMA-18



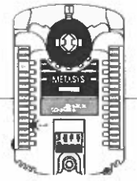
VMA-19



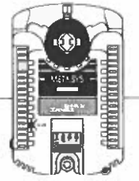
VMA-16



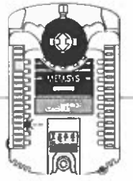
VMA-15



VMA-14



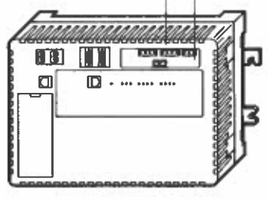
VMA-12



VMA-13

VMA-11

TO EXISTING N2
DEVICES (N2 Trunk 1)



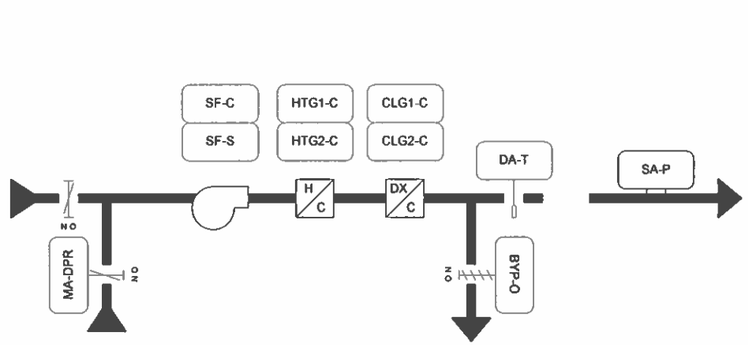
EXISTING MS-NAE5510-1
S1-NAE02
IP: 192.168.55.71
IP Mask: 255.255.255.0
Gateway:

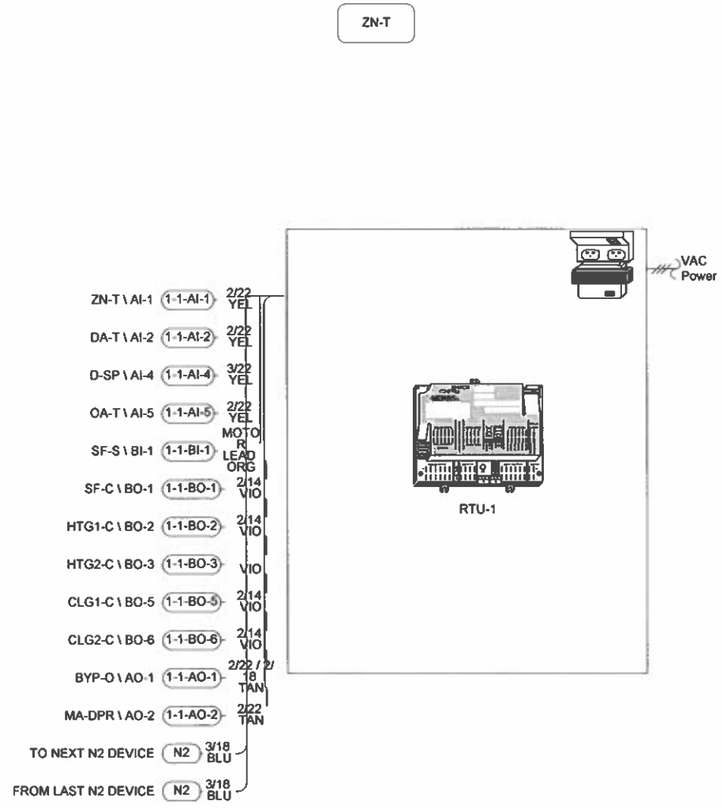
LOCATED IN:
TERRACE SECTOR 8
MECH RM 5804

Drawing Title: N2 Bus Riser							
	REFERENCE DRAWING	NO	REVISION LOCATION		ECN	DATE	BY
	Sales Engineer / Project Manager	Application Engineer	DRAWN BY / DATE	APPROVED BY / DATE			
Project Title: Terrace Remodel		Johnson Controls	Branch Information		CONTRACT NUMBER: 0075-0164		
					DRAWING NUMBER: PAGE 4		

BILL OF MATERIALS

Designation	Qty	Part Number	Description
RTU-1	1	AS-UNT141-1	UNITARY CONTROLLER, SCREW TERMINAL
DA-T	1	TE-6311P-1	TEMP SENSOR, 1000 OHM NI
SA-P	1	PXDXX02S	PRESSURE, DRY, PANEL LCD, 0-10" WC
BYP-O	1	M9210-GGA-3	10 NM SR DPR ACT 0(2)-10 VDC 24 VAC 50/60HZ
HTGx-C, CLGx-C	4	RH2B-ULAC24V	RELAY, DPDT BLADEWLITE
	4	SH2B-05	DIN RAIL SNAP-MT SOCKET
SF-C,SF-S	1	H948	CURRENT SWITCH, SPDT RELAY, SPLIT, N.O.





REFERENCE DRAWING		NO	REVISION-LOCATION	ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN BY / DATE	APPROVED BY / DATE		

Drawing Title

RTU-1 Flow Panel Detail

Project Title

Terrace Remodel

Johnson Controls

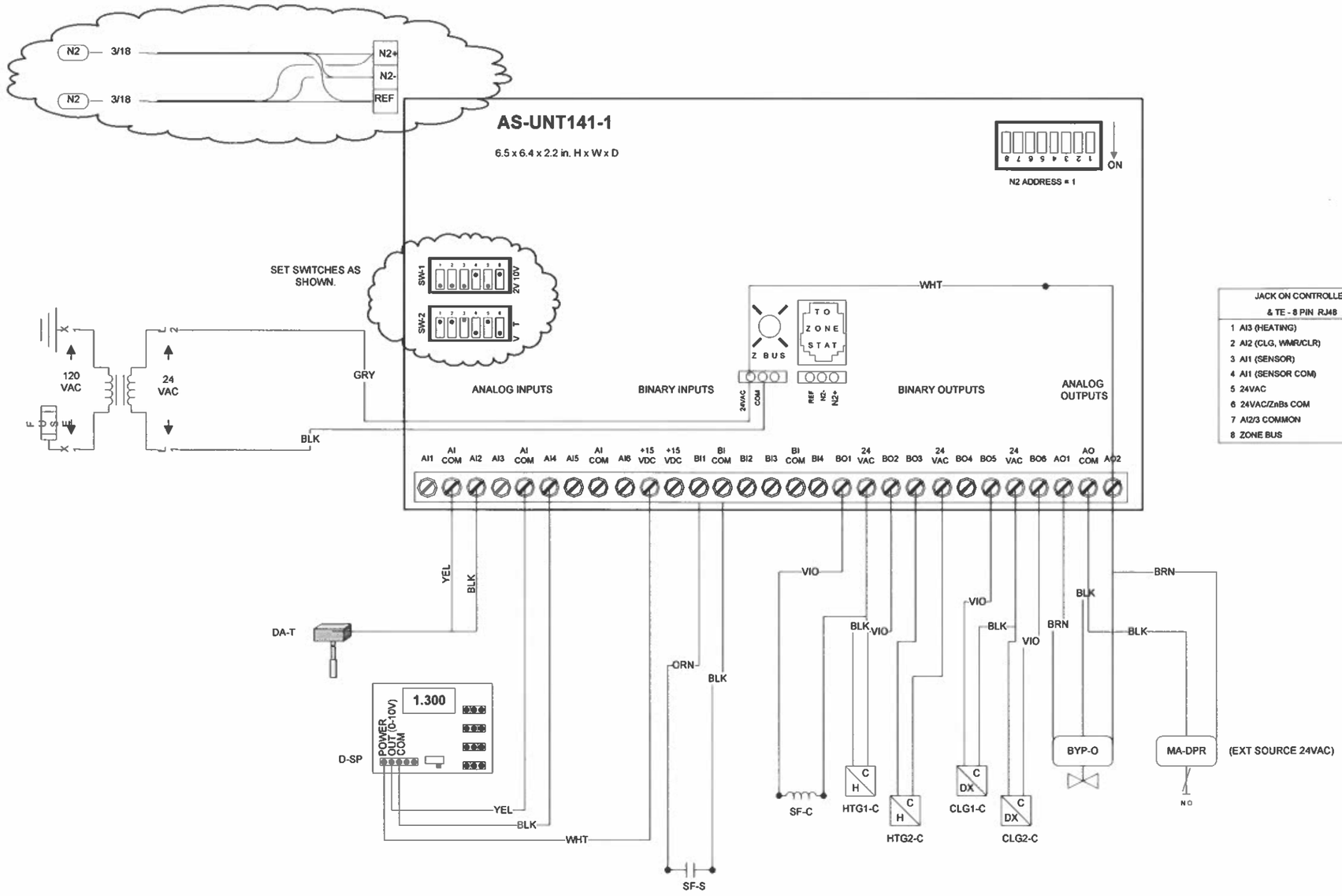
Branch Information

CONTRACT NUMBER

0075-0164

DRAWING NUMBER

1.1



JACK ON CONTROLLER & TE - 8 PIN RJ48	JACK ON TE 6 PIN RJ12
1 AI3 (HEATING)	NOT USED
2 AI2 (CLG, WMR/CLR)	24VAC
3 AI1 (SENSOR)	24VAC/ZnBs COM
4 AI1 (SENSOR COM)	NOT USED
5 24VAC	ZONE BUS
6 24VAC/ZnBs COM	NOT USED
7 AI2/3 COMMON	
8 ZONE BUS	

Drawing Title
RTU-1 Wiring Details

REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer | Project Manager | Application Engineer | DRAWN BY | DRAWN DATE | APPROVED BY | APPROVED DATE

Project Title
Terrace Remodel

Branch Information

CONTRACT NUMBER
0075-0164

DRAWING NUMBER
1.2

Johnson Controls

SEQUENCE OF OPERATIONS

Upon a call for Occupied Mode, the economizer damper will move to its minimum position and the supply fan will be energized.

The supply air volume is modulated via a face/bypass damper based on a static pressure sensor located in the supply air ductwork. The damper will modulate to maintain the duct static pressure setpoint. A manual-reset high static pressure controller is also electrically interlocked with the supply fan to shutdown if duct static pressure reaches 3.0" w.c.

Heating and cooling is staged in sequence to prevent simultaneous heating and cooling, and to maintain zone temperature setpoint. Zone temperature is a result of calculating the average of the nine VAV zones fed by the RTU.

Upon a call for cooling, the mode of cooling operation will be determined. If outside air temperature is lower than the dry bulb switchover setpoint, the economizer dampers will be positioned for maximum free cooling using outside air to meet the cooling demand. Once the outside air temperature is greater than the dry bulb switchover setpoint, and outside air temperature is above the cooling lockout setpoint, the economizer damper will move to its minimum position, and cooling mechanical cooling will stage on and off to maintain the desired zone temperature setpoint.

Upon a call for heating, and outside air temperature is below the heating lockout setpoint, the economizer damper will move to its minimum position, and the gas-fired heating will stage on and off to maintain the desired zone temperature setpoint.

During the Unoccupied Mode, the supply fan and heating and cooling stages will operate intermittently to maintain a minimum space temperature of 60° F, and a maximum space temperature of 80° F

Drawing Title
Sequence of Operations

REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE

Project Title
Terrace Remodel

Johnson Controls

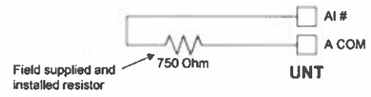
Branch Information

CONTRACT NUMBER
0075-0164

DRAWING NUMBER
1.3

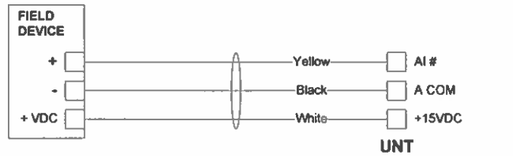
Electrician/Fitter	Point Information			Controller Information						Panel Information					Intermediate Device				Field Device					
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Trunk Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		RTU-1			UNT 141	N2	2	1				EN-1	Mech Room	0	M12											N2 Trunk
	AI-1	RTU-1	ZN-T	Zone Temp	UNT 141	N2	2	1 AI-1			AI1,A COM	EN-1	Mech Room	0	M12	1-1-AI-1						2/22	2-Wire	Analog Input (S/W Mapped)		UT108	
	AI-2	RTU-1	DA-T	Discharge Air Temp	UNT 141	N2	2	1 AI-2			AI2,A COM	EN-1	Mech Room	0	M12	1-1-AI-2						2/22	2-Wire	TE		UT131	
	AI-3	RTU-1			UNT 141	N2	2	1 AI-3				EN-1	Mech Room	0	M12	1-1-AI-3											
	AI-4	RTU-1	D-SP	Duct Static Pressure	UNT 141	N2	2	1 AI-4			AI4,A COM,+15VDC	EN-1	Mech Room	0	M12	1-1-AI-4						3/22	See wiring detail	Voltage Input (Internal Pwr)		UT102	
	AI-5	RTU-1	OA-T	Outdoor Air Temp	UNT 141	N2	2	1 AI-5			AI5,A COM	EN-1	Mech Room	0	M12	1-1-AI-5						2/22	2-Wire	Analog Input (S/W Mapped)		UT108	
	AI-6	RTU-1			UNT 141	N2	2	1 AI-6				EN-1	Mech Room	0	M12	1-1-AI-6											
	BI-1	RTU-1	SF-S	Supply Fan Status	UNT 141	N2	2	1 BI-1			BI1,24VAC	EN-1	Mech Room	0	M12	1-1-BI-1	2/22	OUT, COM	Current Relay	Motor Lead		Motor Lead	See wiring detail	Motor Status		UT301	
	BI-2	RTU-1			UNT 141	N2	2	1 BI-2				EN-1	Mech Room	0	M12	1-1-BI-2											
	BI-3	RTU-1			UNT 141	N2	2	1 BI-3				EN-1	Mech Room	0	M12	1-1-BI-3											
	BI-4	RTU-1			UNT 141	N2	2	1 BI-4				EN-1	Mech Room	0	M12	1-1-BI-4											
	BO-1	RTU-1	SF-C	Fan	UNT 141	N2	2	1 BO-1			BO1,RTN	EN-1	Mech Room	0	M12	1-1-BO-1	2/22	COIL (13,14)	IDEC Relay	COM, NO (9,5)		2/14	See wiring detail	Control Panel (NO) (Sw Low)		UT402	
	BO-2	RTU-1	HTG1-C	Htg Stage 1	UNT 141	N2	2	1 BO-2			BO2,RTN	EN-1	Mech Room	0	M12	1-1-BO-2	2/22	COIL (13,14)	IDEC Relay	COM, NO (9,5)		2/14	See wiring detail	Control Panel (NO) (Sw Low)		UT402	
	BO-3	RTU-1	HTG2-C	Htg Stage 2	UNT 141	N2	2	1 BO-3				EN-1	Mech Room	0	M12	1-1-BO-3											
	BO-4	RTU-1			UNT 141	N2	2	1 BO-4				EN-1	Mech Room	0	M12	1-1-BO-4											
	BO-5	RTU-1	CLG1-C	Clg Stage 1	UNT 141	N2	2	1 BO-5			BO5,RTN	EN-1	Mech Room	0	M12	1-1-BO-5	2/22	COIL (13,14)	IDEC Relay	COM, NO (9,5)		2/14	See wiring detail	Control Panel (NO) (Sw Low)		UT402	
	BO-6	RTU-1	CLG2-C	Clg Stage 2	UNT 141	N2	2	1 BO-6			BO6,RTN	EN-1	Mech Room	0	M12	1-1-BO-6	2/22	COIL (13,14)	IDEC Relay	COM, NO (9,5)		2/14	See wiring detail	Control Panel (NO) (Sw Low)		UT402	
	AO-1	RTU-1	BYP-D	Bypass Damper	UNT 141	N2	2	1 AO-1			AO1,AO COM,24VAC,C	EN-1	Mech Room	0	M12	1-1-AO-1						2/22 / 2/18	GRY, BLK/BLK, RED	M9210/20-GGx (Vdc) (Ext Source)		UT267	
	AO-2	RTU-1	MA-DPR	Mixed Air Damper	UNT 141	N2	2	1 AO-2			AO2,A COM	EN-1	Mech Room	0	M12	1-1-AO-2						2/22	AI#,AICM	0-10V (Output to Input)		UT203	

DETAIL UT108 ANALOG INPUT (Software Mapped)



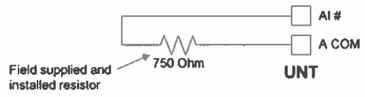
Set SW1 to Position "I" and SW2 to Position "2V"

DETAIL UT102 VOLTAGE INPUT - INTERNAL SOURCE



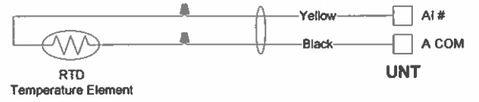
Set SW1 to Position "V" and SW2 to Position "10V"

DETAIL UT108 ANALOG INPUT (Software Mapped)



Set SW1 to Position "I" and SW2 to Position "2V"

DETAIL UT131 TEMPERATURE SENSOR INPUT

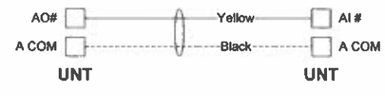


Set SW1 to Position "I" and SW2 to Position "2V"

DETAIL UT203 ANALOG OUTPUT to ANALOG INPUT

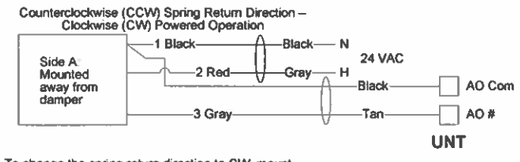
Note that the Analog Output Common and Analog Input Common are the same within a single controller.

If this is used between two controllers, ensure that the controllers have a common 24Vac connection.



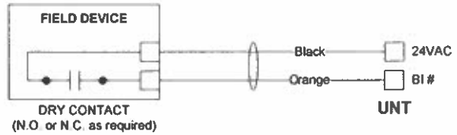
Set SW1 to Position "V" and SW2 to Position "10V"

DETAIL UT267 0-10VDC OUTPUT to M9210/20-GGx and HGx-3



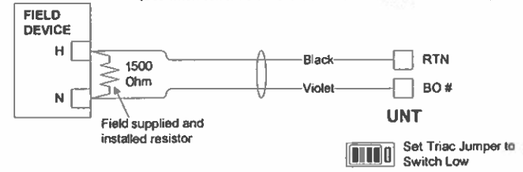
To change the spring return direction to CW, mount the actuator to the damper shaft so that Side B of the actuator is away from the damper. With power applied, the actuator now drives CCW from the 0° position, and spring returns CW.

DETAIL UT301 BINARY INPUT (DRY CONTACT)



DETAIL UT402 24 VAC BINARY OUTPUT to LOW CURRENT DRAW DEVICE (Switch Low)

(Use when current draw of the Field Device is less than 50 mA)



Drawing Title
RTU-1 Point Schedule

REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer | Project Manager | Application Engineer | DRAWN BY / DATE | APPROVED BY / DATE

Project Title
Terrace Remodel

Branch Information

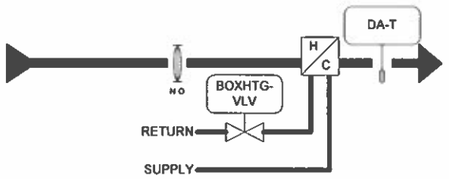
Johnson Controls

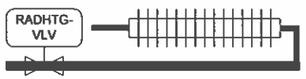
CONTRACT NUMBER
0075-0164

DRAWING NUMBER
1.4

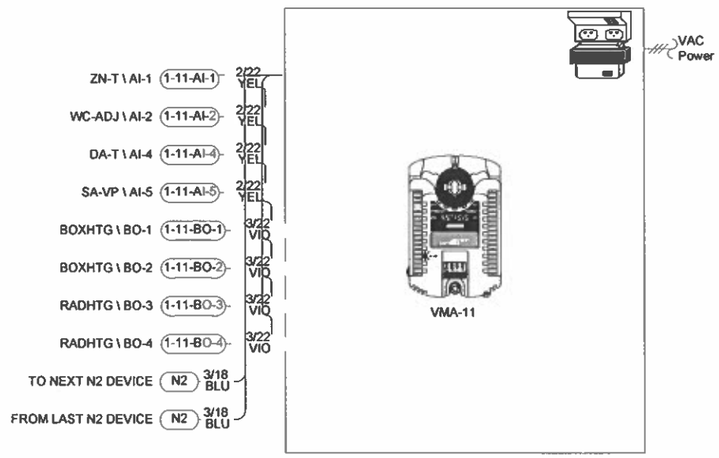
BILL OF MATERIALS

Designation	Qty	Part Number	Description
VMA-11	1	AP-VMA1420-0	ELEC MTR ACT, 35 IN LB/4NM 24VAC PROP.
DA-T	1	TE-6311P-1	TEMP SENSOR, 1000 OHM, NI
ZN-T, WC-ADJ	1	TE-68NT-1NN0S	TE-6800 SENSOR 1000 OHM NICKEL
BOXHTG-VLV	2	VG7241ET+7150G	2W½ NPT 1.8 VA7150 ELEC
RADHTG-VLV			

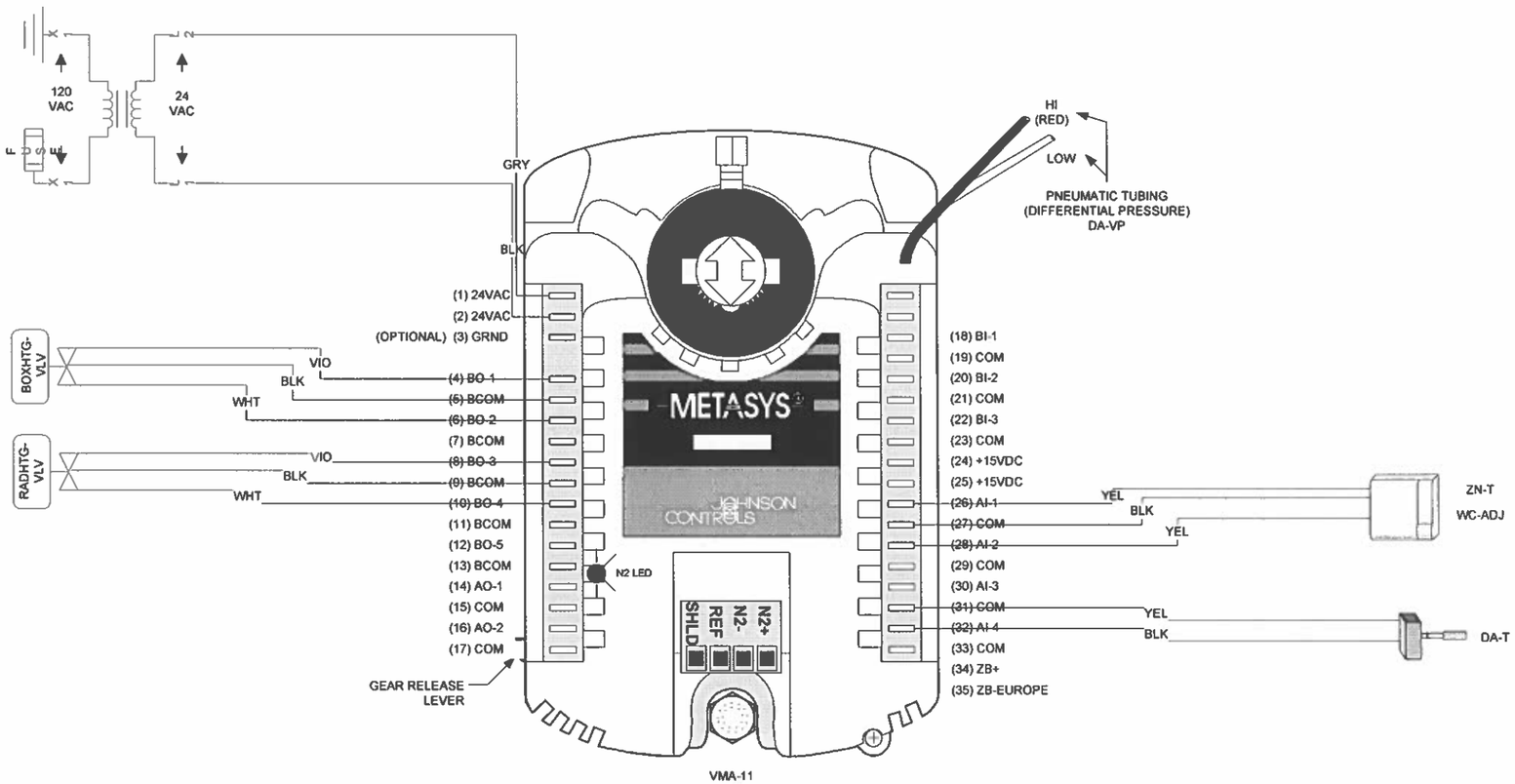




ZN-T
WC-ADJ



Drawing Title: **VMA-11 Flow Panel Detail (Typoical of 6)**						
	REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer / Project Manager / Application Engineer		DRAWN BY / DATE	APPROVED BY / DATE		
Project Title: **Terrace Remodel**	Johnson Controls		Branch Information	CONTRACT NUMBER: **0075-0164**		
				DRAWING NUMBER: **2.1**		



Drawing Title: **VMA-11 Wiring Details**							
	REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY	
	Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE
Project Title: **Terrace Remodel**	Johnson Controls		Branch Information	CONTRACT NUMBER: **0075-0164**			
				DRAWING NUMBER: **2.2**			

SEQUENCE OF OPERATIONS

As space temperature rises above setpoint, the heating valve will move to the closed position and the integrated actuator will move to the minimum cooling flow position. On a further increase of space temperature, the integrated actuator will move to the maximum cooling flow position.

As space temperature decreases below setpoint, the integrated actuator will begin to modulate to its minimum flow position and the heating valve will modulate open. On a further decrease in space temperature, the integrated actuator will move to the maximum heating flow position, and the heating valve will move to the fully open position.

Exterior wall VAV zones are equipped with radiant baseboard heating, and will operate heating in a two-staged approach. If in its fully open position the radiant baseboard cannot maintain the space temperature requirements, the VAV box heating coil will begin to modulate open.

Drawing Title
Sequence of Operations

REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE

Project Title
Terrace Remodel

Johnson Controls

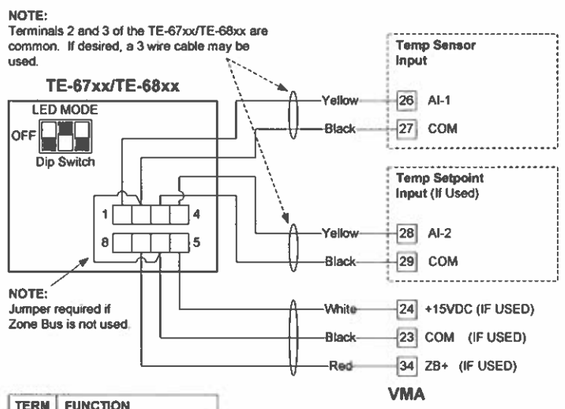
Branch Information

CONTRACT NUMBER
0075-0164

DRAWING NUMBER
2.3

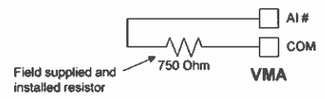
Electrician/Fitter	Point Information				Controller Information							Panel Information					Intermediate Device				Field Device					
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Trunk Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		VMA-11			VMA 1420							EN-1	Mech Room		M12											Power to Controller
		VMA-11			VMA 1420	N2		2	11			EN-1	Mech Room	0	M12											N2 Trunk
	AI-1	VMA-11	ZN-T	Zone Temperature	VMA 1420	N2		2	11 AI-1		AI1,COM	EN-1	Mech Room	0	M12	1-11-AI-1					2/22	1, 2	TE-6800-TE (TB, Led OFF)		VMA138	
	AI-2	VMA-11	WC-ADJ	Remote Adjust	VMA 1420	N2		2	11 AI-2		AI2,COM	EN-1	Mech Room	0	M12	1-11-AI-2					2/22	4, 3	TE-6800-SET (TB, Led OFF)		VMA138	
	AI-3	VMA-11			VMA 1420	N2		2	11 AI-3			EN-1	Mech Room	0	M12	1-11-AI-3										
	AI-4	VMA-11	DA-T	Discharge Air Temp	VMA 1420	N2		2	11 AI-4		AI4,COM	EN-1	Mech Room	0	M12	1-11-AI-4					2/22	2-Wire	TE		VMA131	
	AI-5	VMA-11	SA-VP	Supply Delta P	VMA 1420	N2		2	11 AI-5		AI5,COM	EN-1	Mech Room	0	M12	1-11-AI-5					2/22	2-Wire	Analog Input (S/W Mapped)		VMA108	
	BI-1	VMA-11			VMA 1420	N2		2	11 BI-1			EN-1	Mech Room	0	M12	1-11-BI-1										
	BI-2	VMA-11			VMA 1420	N2		2	11 BI-2			EN-1	Mech Room	0	M12	1-11-BI-2										
	BI-3	VMA-11			VMA 1420	N2		2	11 BI-3			EN-1	Mech Room	0	M12	1-11-BI-3										
	BO-1	VMA-11	BOXHTG	Box Heating Cmd	VMA 1420	N2		2	11 BO-1		BO-a,BO-b,BCOM	EN-1	Mech Room	0	M12	1-11-BO-1					3/22	3, 2, 1	VA-7150 (Incr)		VMA481	
	BO-2	VMA-11	BOXHTG	Box Heating Cmd	VMA 1420	N2		2	11 BO-2		BO-a,BO-b,BCOM	EN-1	Mech Room	0	M12	1-11-BO-2					3/22	3, 2, 1	VA-7150 (Incr)		VMA481	
	BO-3	VMA-11	RADHTG	Suppl Heating Cmd	VMA 1420	N2		2	11 BO-3		BO-a,BO-b,BCOM	EN-1	Mech Room	0	M12	1-11-BO-3					3/22	3, 2, 1	VA-7150 (Incr)		VMA481	
	BO-4	VMA-11	RADHTG	Suppl Heating Cmd	VMA 1420	N2		2	11 BO-4		BO-a,BO-b,BCOM	EN-1	Mech Room	0	M12	1-11-BO-4					3/22	3, 2, 1	VA-7150 (Incr)		VMA481	
	BO-5	VMA-11			VMA 1420	N2		2	11 BO-5			EN-1	Mech Room	0	M12	1-11-BO-5										
	AO-1	VMA-11			VMA 1420	N2		2	11 AO-1			EN-1	Mech Room	0	M12	1-11-AO-1										
	AO-2	VMA-11			VMA 1420	N2		2	11 AO-2			EN-1	Mech Room	0	M12	1-11-AO-2										

DETAIL VMA138 TE-6700/TE-6800 (Terminal Block) - LED OFF

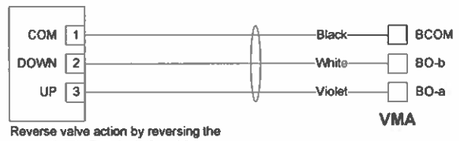


TERM	FUNCTION
1	SENSOR & OVERRIDE
2	SENSOR COMMON
3	SETPOINT COMMON
4	SETPOINT
5	POWER (24Vac or 15Vdc)
6	POWER/ZBUS COMMON
7	ZONE BUS
8	LED & OVERRIDE

DETAIL VMA108 ANALOG INPUT (Software Mapped)

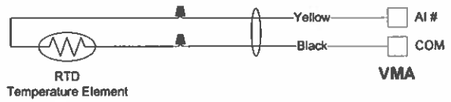


DETAIL VMA481 INCREMENTAL CONTROL to VA-7150 / VA-7200

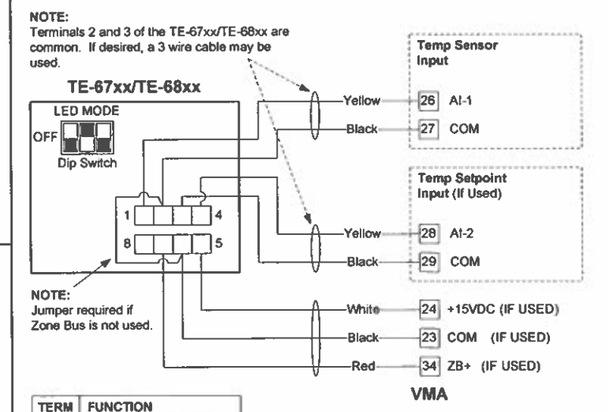


Reverse valve action by reversing the connection to Terminals 2 and 3

DETAIL VMA131 TEMPERATURE SENSOR INPUT



DETAIL VMA138 TE-6700/TE-6800 (Terminal Block) - LED OFF



TERM	FUNCTION
1	SENSOR & OVERRIDE
2	SENSOR COMMON
3	SETPOINT COMMON
4	SETPOINT
5	POWER (24Vac or 15Vdc)
6	POWER/ZBUS COMMON
7	ZONE BUS
8	LED & OVERRIDE

Drawing Title
VMA-11 Point Schedule

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DRAWN DATE	APPROVED BY	APPROVED DATE

Project Title
Terrace Remodel

Johnson Controls

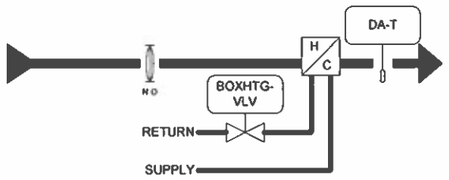
Branch Information

CONTRACT NUMBER
0075-0164

DRAWING NUMBER
2.4

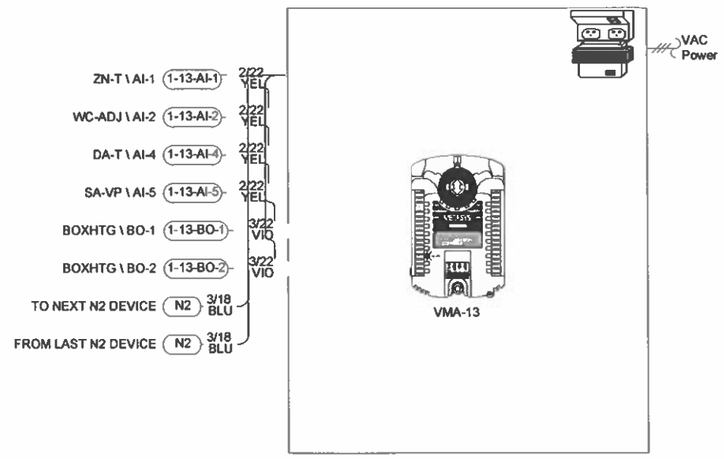
BILL OF MATERIALS

Designation	Qty	Part Number	Description
VMA-13	1	AP-VMA1420-0	ELEC MTR ACT, 35 IN LB/4NM 24VAC PROP.
DA-T	1	TE-6311P-1	TEMP SENSOR, 1000 OHM, NI
ZN-T, WC-ADJ	1	TE-68NT-1NN0S	TE-6800 SENSOR 1000 OHM NICKEL
BOXHTG-VLV	1	VG7241ET+7150G	2W½ NPT 1.8 VA 7150 ELEC

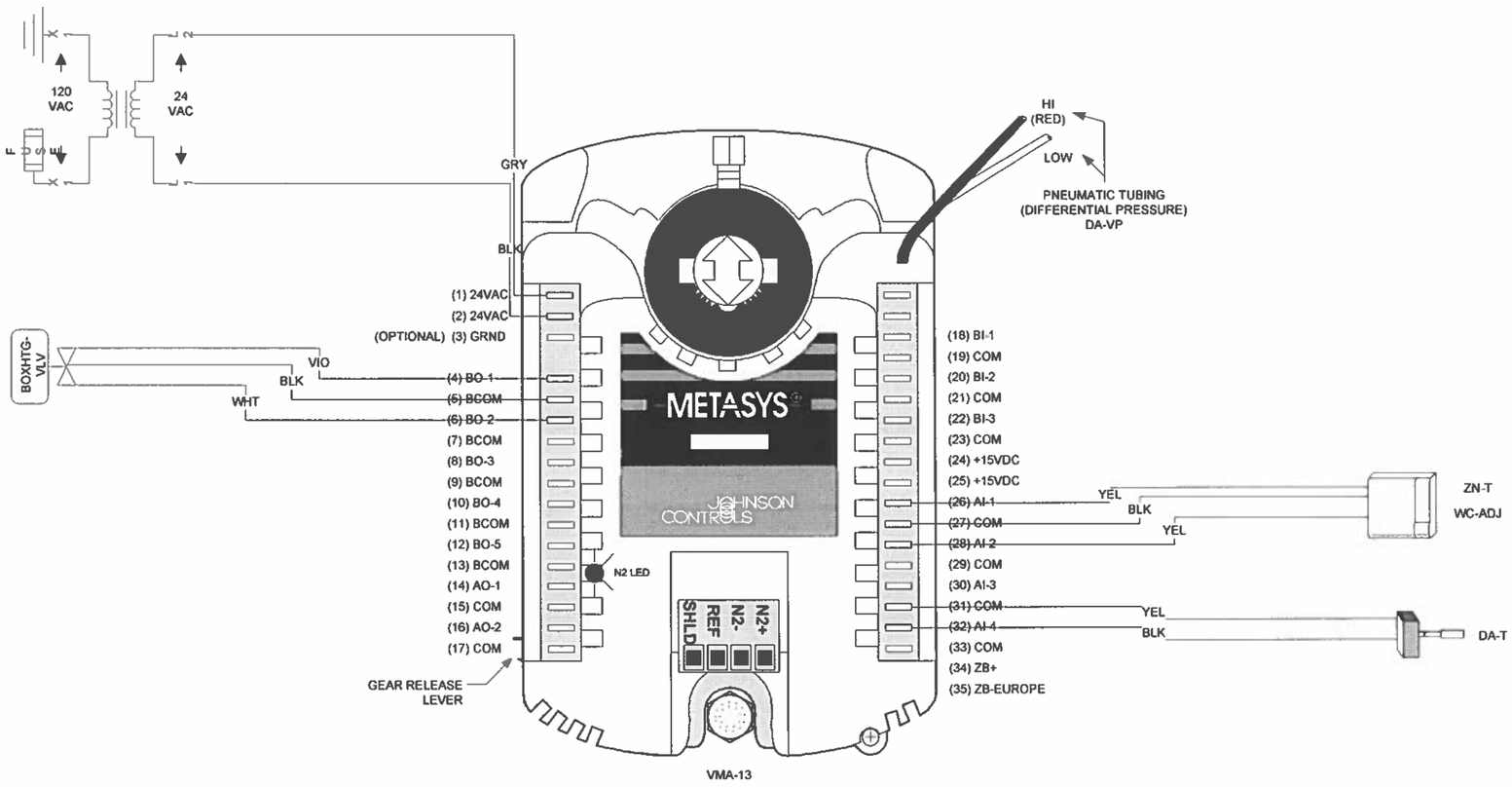


ZN-T

WC-ADJ



Drawing Title: VMA-13 Flow Panel Detail (Typical of 3)						
REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer / Project Manager / Application Engineer			DRAWN BY / DATE		APPROVED BY / DATE	
Project Title: Terrace Remodel	Johnson Controls	Branch Information		CONTRACT NUMBER: 0075-0164		
				DRAWING NUMBER: 3.1		



Drawing Title: **VMA-13 Wiring Details**							
REFERENCE DRAWING	NO	REVISION-LOCATION		ECN	DATE	BY	
Sales Engineer	Project Manager	Application Engineer	DRAWN BY	DATE	APPROVED BY	DATE	
Project Title: **Terrace Remodel**	Johnson Controls	Branch Information			CONTRACT NUMBER: **0075-0164**		
					DRAWING NUMBER: **3.2**		

SEQUENCE OF OPERATIONS

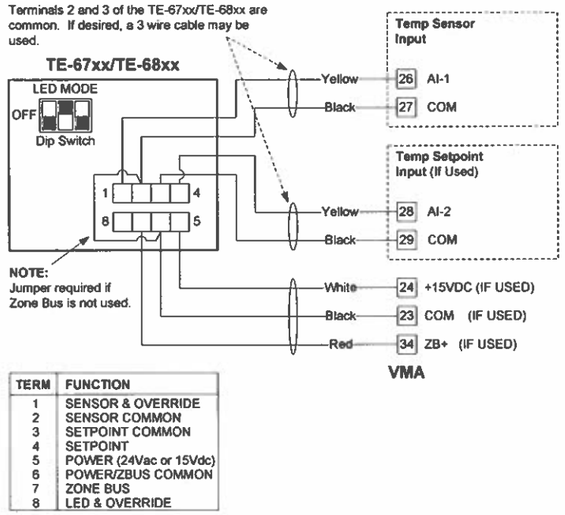
As space temperature rises above setpoint, the heating valve will move to the closed position and the integrated actuator will move to the minimum cooling flow position. On a further increase of space temperature, the integrated actuator will move to the maximum cooling flow position.

As space temperature decreases below setpoint, the integrated actuator will begin to modulate to its minimum flow position and the heating valve will modulate open. On a further decrease in space temperature, the integrated actuator will move to the maximum heating flow position, and the heating valve will move to the fully open position.

Drawing Title: Sequence of Operations							
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY	
	Sales Engineer / Project Manager / Application Engineer		DRAWN BY / DATE	APPROVED BY / DATE			
Project Title: Terrace Remodel	Johnson Controls	Branch Information	CONTRACT NUMBER: 0075-0164	DRAWING NUMBER: 3.3			

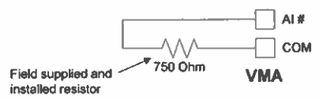
Electrician/Fitter		Point Information			Controller Information							Panel Information						Intermediate Device				Field Device					
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Trunk Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		VMA-13			VMA 1420							EN-1	Mech Room		M12												Power to Controller
		VMA-13			VMA 1420	N2	2		13			EN-1	Mech Room	0	M12												N2 Trunk
	AI-1	VMA-13	ZN-T	Zone Temperature	VMA 1420	N2	2		13 AI-1		AI1,COM	EN-1	Mech Room	0	M12	1-13-AI-1						2/22	1, 2	TE-6800-TE (TB_Led OFF)		VMA138	
	AI-2	VMA-13	WC-ADJ	Remote Adjust	VMA 1420	N2	2		13 AI-2		AI2,COM	EN-1	Mech Room	0	M12	1-13-AI-2						2/22	4, 3	TE-6800-SET (TB_Led OFF)		VMA138	
	AI-3	VMA-13			VMA 1420	N2	2		13 AI-3			EN-1	Mech Room	0	M12	1-13-AI-3											
	AI-4	VMA-13	DA-T	Discharge Air Temp	VMA 1420	N2	2		13 AI-4		AI4,COM	EN-1	Mech Room	0	M12	1-13-AI-4						2/22	2-Wire	TE		VMA131	
	AI-5	VMA-13	SA-VP	Supply Delta P	VMA 1420	N2	2		13 AI-5		AI5,COM	EN-1	Mech Room	0	M12	1-13-AI-5						2/22	2-Wire	Analog Input (S/W Mapped)		VMA108	
	BI-1	VMA-13			VMA 1420	N2	2		13 BI-1			EN-1	Mech Room	0	M12	1-13-BI-1											
	BI-2	VMA-13			VMA 1420	N2	2		13 BI-2			EN-1	Mech Room	0	M12	1-13-BI-2											
	BI-3	VMA-13			VMA 1420	N2	2		13 BI-3			EN-1	Mech Room	0	M12	1-13-BI-3											
	BO-1	VMA-13	BOXHTG	Box Heating Cmd	VMA 1420	N2	2		13 BO-1		BO-a,BO-b,BCOM	EN-1	Mech Room	0	M12	1-13-BO-1						3/22	3, 2, 1	VA-7150 (Incr)		VMA481	
	BO-2	VMA-13	BOXHTG	Box Heating Cmd	VMA 1420	N2	2		13 BO-2		BO-a,BO-b,BCOM	EN-1	Mech Room	0	M12	1-13-BO-2						3/22	3, 2, 1	VA-7150 (Incr)		VMA481	
	BO-3	VMA-13			VMA 1420	N2	2		13 BO-3			EN-1	Mech Room	0	M12	1-13-BO-3											
	BO-4	VMA-13			VMA 1420	N2	2		13 BO-4			EN-1	Mech Room	0	M12	1-13-BO-4											
	BO-5	VMA-13			VMA 1420	N2	2		13 BO-5			EN-1	Mech Room	0	M12	1-13-BO-5											
	AO-1	VMA-13			VMA 1420	N2	2		13 AO-1			EN-1	Mech Room	0	M12	1-13-AO-1											
	AO-2	VMA-13			VMA 1420	N2	2		13 AO-2			EN-1	Mech Room	0	M12	1-13-AO-2											

DETAIL VMA138 TE-6700/TE-6800 (Terminal Block) - LED OFF

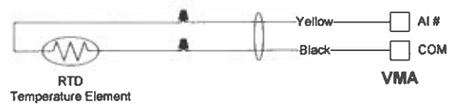


TERM	FUNCTION
1	SENSOR & OVERRIDE
2	SENSOR COMMON
3	SETPOINT COMMON
4	SETPOINT
5	POWER (24Vac or 15Vdc)
6	POWER/ZBUS COMMON
7	ZONE BUS
8	LED & OVERRIDE

DETAIL VMA108 ANALOG INPUT (Software Mapped)



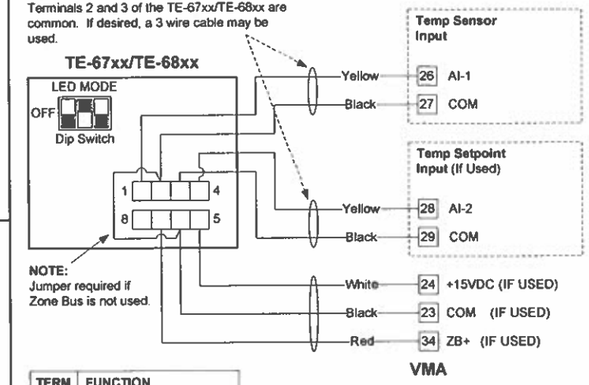
DETAIL VMA131 TEMPERATURE SENSOR INPUT



DETAIL VMA481 INCREMENTAL CONTROL to VA-7150 / VA-7200

Reverse valve action by reversing the connection to Terminals 2 and 3

DETAIL VMA138 TE-6700/TE-6800 (Terminal Block) - LED OFF



TERM	FUNCTION
1	SENSOR & OVERRIDE
2	SENSOR COMMON
3	SETPOINT COMMON
4	SETPOINT
5	POWER (24Vac or 15Vdc)
6	POWER/ZBUS COMMON
7	ZONE BUS
8	LED & OVERRIDE

Drawing Title
VMA-13 Point Schedule

REFERENCE DRAWING	NO	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer | Project Manager | Application Engineer | DRAWN BY DATE | APPROVED BY DATE

Project Title
Terrace Remodel

Branch Information

Johnson Controls

CONTRACT NUMBER
0075-0164

DRAWING NUMBER
3.4

Contract Name
Contract Number

Room Schedule

Box Location								Controller Information						Sensor	Box Information									
	Room							Controller Required									Box Config Required						Required (N2)		
Bldg./Flr.	No.	Name	System Name	Mech. Dwg.	System Serving this Box	Box Mfgr.	Mfgr Box Type	JCI Ctrl Dwg No.	Controller Part No.	NC/ NAE Addr	Trunk ID	Device Addr	PAN Offset	CSModel or Template	Code No.	Box Heat	Supplemental Heat	Config File Name	Inlet Size (Inches)	Inlet Area (Sq. Ft.)	K Factor	Clg Min Flow	Clg Max Flow	VMA Box Config	Comments	Generate Flag
Terrace Sect 8	5825	Tom Flanagan Office	VAV-1		RTU-1	Trane		2.1	AP-VMA1420-0	S1-NAE02	2	11		VAVRHRAD	TE-68NT-1N00S	Yes	Yes	VMA-11	8	0.35	2.3	170	500	VMA-11.cfg		
Terrace Sect 8	5808	Cubicles	VAV-2		RTU-1	Trane		2.1	AP-VMA1420-0	S1-NAE02	2	12		VAVRHRAD	TE-68NT-1N00S	Yes	Yes	VMA-12	10	0.55	2.53	350	1000	VMA-12.cfg		
Terrace Sect 8	5810	Pantry	VAV-3		RTU-1	Trane		3.1	AP-VMA1420-0	S1-NAE02	2	13		VAVRH	TE-68NT-1N00S	Yes	No	VMA-13	8	0.35	2.3	170	500	VMA-13.cfg		
Terrace Sect 8	5820	Zack Minasian Office	VAV-4		RTU-1	Trane		2.1	AP-VMA1420-0	S1-NAE02	2	14		VAVRHRAD	TE-68NT-1N00S	Yes	Yes	VMA-14	4	0.2	1.9	50	150	VMA-14.cfg		
Terrace Sect 8	5819	Scott Martens Office	VAV-5		RTU-1	Trane		2.1	AP-VMA1420-0	S1-NAE02	2	15		VAVRHRAD	TE-68NT-1N00S	Yes	Yes	VMA-15	4	0.2	1.9	50	150	VMA-15.cfg		
Terrace Sect 8	5818	Bruce Seid Office	VAV-6		RTU-1	Trane		2.1	AP-VMA1420-0	S1-NAE02	2	16		VAVRHRAD	TE-68NT-1N00S	Yes	Yes	VMA-16	4	0.2	1.9	50	150	VMA-16.cfg		
Terrace Sect 8	5816	War Room	VAV-7		RTU-1	Trane		2.1	AP-VMA1420-0	S1-NAE02	2	17		VAVRHRAD	TE-68NT-1N00S	Yes	Yes	VMA-17	14	1.07	2.2	800	3000	VMA-17.cfg		
Terrace Sect 8	5815	Reception	VAV-8		RTU-1	Trane		3.1	AP-VMA1420-0	S1-NAE02	2	18		VAVRH	TE-68NT-1N00S	Yes	No	VMA-18	5	0.14	1.35	60	200	VMA-18.cfg		
Terrace Sect 8	5814	Craig Counsel Office	VAV-9		RTU-1	Trane		3.1	AP-VMA1420-0	S1-NAE02	2	19		VAVRH	TE-68NT-1N00S	Yes	No	VMA-19	6	0.2	2.5	150	450	VMA-19.cfg		

Terrace Remodel
Project Number: 0075-0164

Valve Schedule

Tag						Valve Information													Actuator Information				
Item	System	Service	Medium	Qty.	Ref. Dwg.	Code Number	Family	Pipe Cfg.	Fail Position	Inlet Pipe Size (in)	Valve Size (in)	Flow (gpm or lbs/hr)	Design Delta P (psi)	Valve Delta P (psi)	Design Coefficient (Cv)	Valve Coefficient (Cv)	Design Close Off (psi)	Valve Close Off (psi)	Connection Type	Code Number	Control	Control Signal	Piping Detail	Comments
1	VAVRH	BXHTG-VLV	Water	9	3.1	VG7241ET+7150G	Globe Valve	2-Way	Last Position		1/2		0.1		0.1	1.8		345.0	Threaded	VA-7150-1001	Incremental	24VAC		
2	VAVRHRAD	RDHTG-VLV	Water	6	2.1	VG7241ET+7150G	Globe Valve	2-Way	Last Position		1/2		0.1		0.1	1.8		345.0	Threaded	VA-7150-1001	Incremental	24VAC		