Addendum #: 1

KBSO Project #: 25142
Project Name: IU #20250569 – Replace AHU-5 and Update Controls
Issue Date: 2/12/2026

This Addendum number 1 to the drawings and specifications shall supplement, amend, and become a part of the bidding documents, plans, and specifications. All bids and construction contracts shall be based on these modifications to the original contract documents.

Part 1. General Clarification Items

1.01 Demolition of the existing AHU can start June 1st, 2026.

1.02 Owner will assist contractor for a Pre-Demolition max CFM reading of AHU in full cooling mode.

1.03 Contractor to provide filter media over all existing air diffusers and outlets for initial unit start up.

i. See owner provided drawings attached for quantity of air outlets and zones served by AHU-5.

1.04 Approved Haakon submittal is in the appendix at the end of the project manual.

1.05 The pre-purchase AHU will be shipped to the CS4 Building (1830 W. 16th St. Indianapolis, IN 46202) and the contractor will be responsible to move AHU parts from CS4 to the jobsite.

Part 2. SPECIFICATIONS

2.01 N/A

Part 3. DRAWINGS

3.01 M301 – MECHANICAL SECTIONS

a. Drawing reissued in its entirety.
b. Heat Recovery Coil condensate added to both sides of unit.
c. Condensate Drain piping size increased for Chilled Water Coils.

3.02 M901 – CONTROLS – MECHANICAL

a. Drawing reissued in its entirety.
b. Economizer mode sequence added to sequence of operation.
c. Low limit temp sensor relocated to be after the chilled water coil.
d. End Switches removed from all dampers.
e. Automatic Reset with Latching Relay removed for High Static and Low Static pressure sensors.

3.03 JCI Shop Drawing

a. Drawings added to set of Documents.

ATTACHMENTS:
Owner Provided Existing Ductwork Drawing
Owner Provided Existing Mechanical Zoning Drawing
M301 – MECHANICAL SECTIONS
M901 – CONTROLS – MECHANICAL
JCI Shop Drawing
Pre-Bid Walk Thru Sign-In Sheet
END OF ADDENDUM

PLAN NOTES

1.) ALL RECTANGULAR LOW PRESSURE DUCT IS TO BE INTERNALLY LINED. DIMINSIONS INDICATED ARE CLEAR INSIDE DIMINSIONS.

2.) ALL LOW PRESSURE DUCT TAPS REQUIRE A MANUAL VOLUME DAMPER.

3.) REFER TO DETAIL # 2 SHEET M-19 FOR SPACE ALLOCATION IN INTERSTITIAL SPACE.

SECOND INTERSTITIAL PLAN - HVAC

SCALE 1/8" = 1'-0"

NORTH

PLUS 4

DATE

JOB NO.

COMPOSITE | OVERLAY | SCREEN

SCIENCE ENGINEERING TECHNOLOGY BUILDING PHASE III
INDIANA UNIVERSITY PURDUE UNIVERSITY @ INDIANAPOLIS

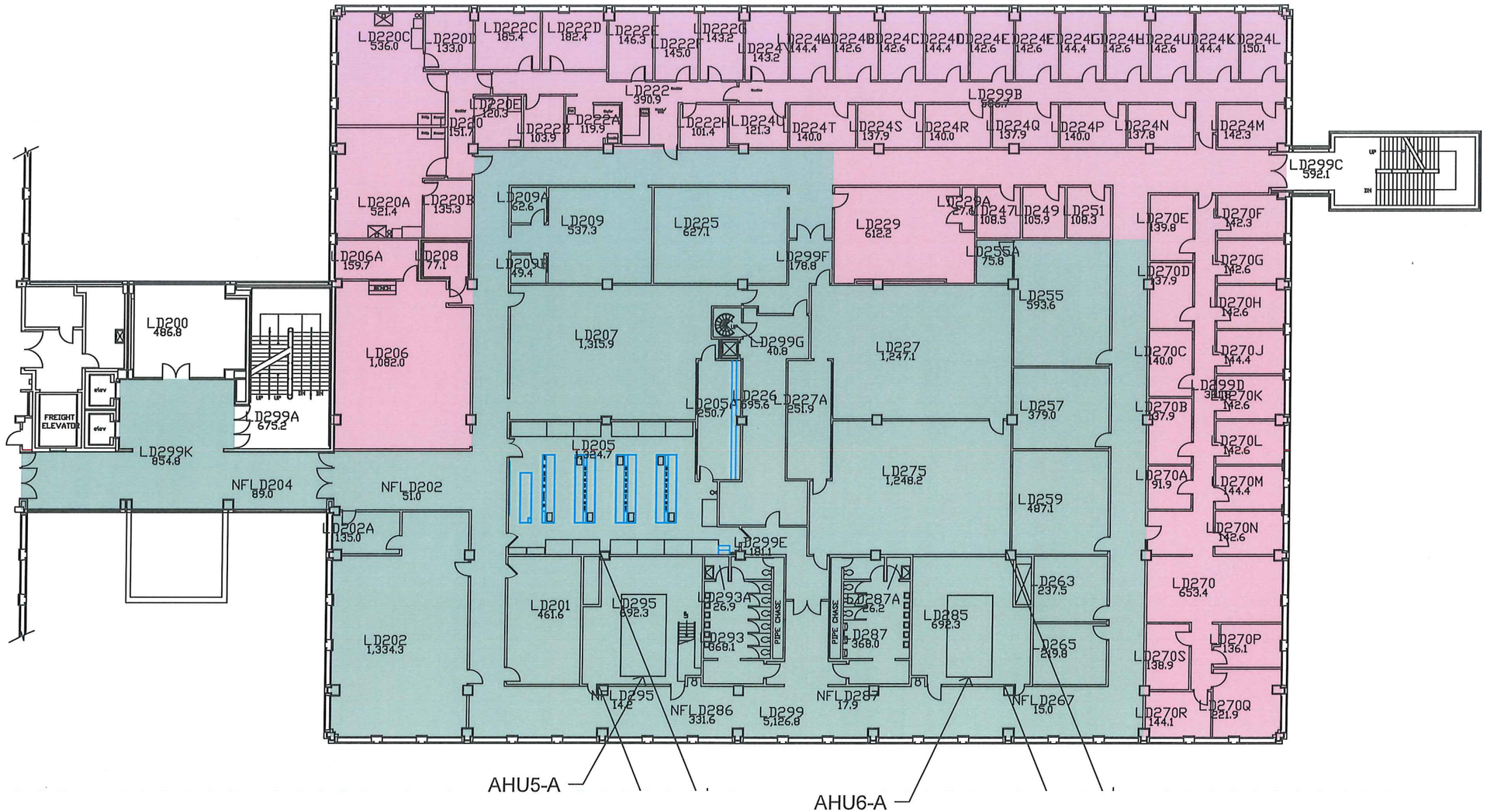
PLUS 4 ARCHITECTS, P.C. — ARCHITECT
EDWARD LARRABEE BARNES / JOHN M.Y. LEE & PARTNERS — ARCHITECTURAL CONSULTANT
FINK ROBERTS & PETRIE, INC. — CIVIL / STRUCTURAL ENGINEER
MOORE ENGINEERS — MECHANICAL & ELECTRICAL ENGINEER

I.U.P.U.I. JOB NO. 903-3602

NO.	DATE	DESCRIPTION
11-21-90		ISSUED FOR BIDS

SHEET: HVAC INTERSTITIAL DUCT PLAN

SHEET NO. M-9



SECOND FLOOR PLAN

NOT TO SCALE

AHU #

IN073–295–AHU5–A

IN073–285–AHU6–A

IUPU

INDIANA UNIVERSITY- PURDUE UNIVERSITY IN

Campu
Facility
Service
Engineerir

PHYSICAL PLANT
1220 WISHARD BLVD
INDIANAPOLIS, IN 46202

PROJECT TITLE:

SCIENCE BUILDING

SHEET TITLE:

SECOND FLOOR F

REVISIONS:

DRAWN BY:	W.S. HIE
CHECKED BY:	W.S.HIET
DATE:	5/9/2016
CAD FILE NAME:	073-LD
BLDG. #:	073
CAMPUS:	IN

DRAWING NO.

M3

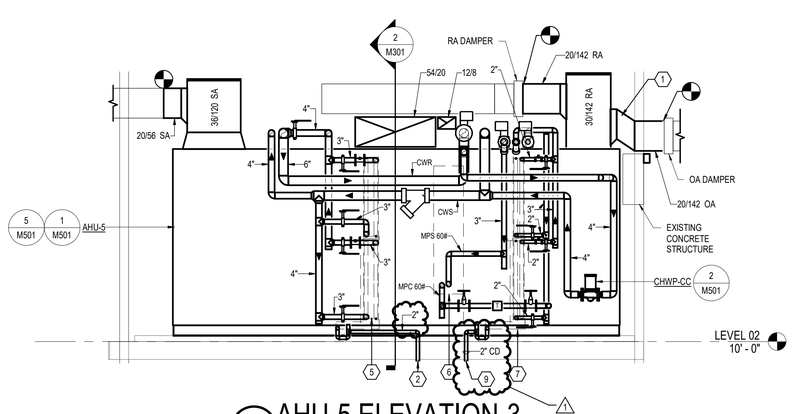
SHEET 3 OF 5 SHEETS

GENERAL NOTES

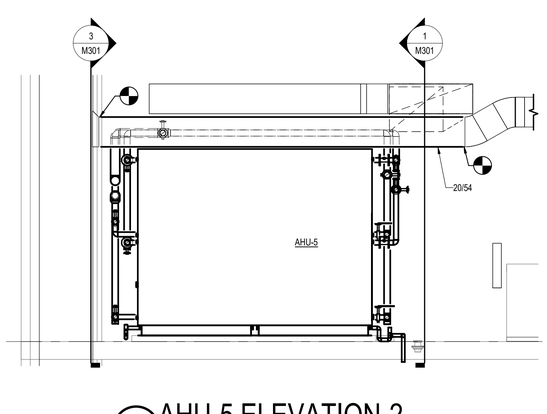
A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.
B REFER TO DRAWING M-500 SERIES FOR MECHANICAL DETAILS.
C REFER TO DRAWING M-600 SERIES FOR MECHANICAL SCHEDULES.

SHEET KEYNOTES

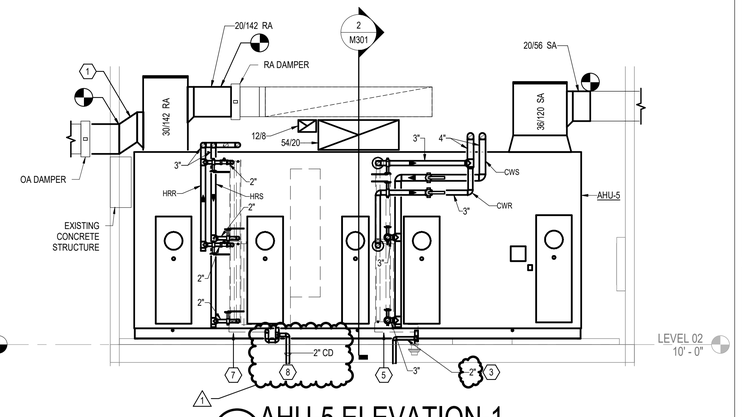
1 OFFSET OUTSIDE AIR DUCTWORK AS REQUIRED TO TAP INTO VERTICAL MIXED AIR DUCT.
2 COOLING COIL CONDENSATE DOWN THRU PENETRATION IN 2ND FLOOR MECHANICAL ROOM FLOOR. TERMINATE CONDENSATE AT FLOOR DRAIN LOCATED IN MECHANICAL ROOM ON FLOOR BELOW.
3 COOLING COIL CONDENSATE DOWN THRU EXISTING PENETRATION IN 2ND FLOOR MECHANICAL ROOM FLOOR. TERMINATE CONDENSATE AT FLOOR DRAIN LOCATED IN MECHANICAL ROOM ON FLOOR BELOW.
5 CHILLED WATER COIL CONNECTIONS.
6 IFB STEAM COIL CONNECTIONS.
8 HEAT RECOVERY COIL CONDENSATE DOWN THRU EXISTING PENETRATION IN 2ND FLOOR MECHANICAL ROOM FLOOR. TERMINATE CONDENSATE AT FLOOR DRAIN LOCATED IN MECHANICAL ROOM ON FLOOR BELOW.
9 HEAT RECOVERY COIL CONDENSATE DOWN THRU PENETRATION IN 2ND FLOOR MECHANICAL ROOM FLOOR. TERMINATE CONDENSATE AT FLOOR DRAIN LOCATED IN MECHANICAL ROOM ON FLOOR BELOW.



3 AHU-5 ELEVATION-3
1/4" = 1'-0"



2 AHU-5 ELEVATION-2
1/4" = 1'-0"



1 AHU-5 ELEVATION-1
1/4" = 1'-0"

KBSO CONSULTING
275 VETERANS WAY
SUITE 300
CARMEL, IN 46032

REPLACE AHU-5 AND UPDATE CONTROLS
IU INDIANAPOLIS IN073 SCIENCE BLDG
CONSTRUCTION DOCUMENTS

IU #20250569

402 N Blackford St, Indianapolis, IN 46202

KBSO #25142
OLUWASEUN ODUKOMAIYA
REGISTERED
No. 11300632
STATE OF INDIANA
PROFESSIONAL ENGINEER

SCALE:	SEE SHEET
DRAWN BY:	ACB
DESIGNED BY:	ACB
CHECKED BY:	SO
DATE:	1/22/2026
PROJECT #:	25142

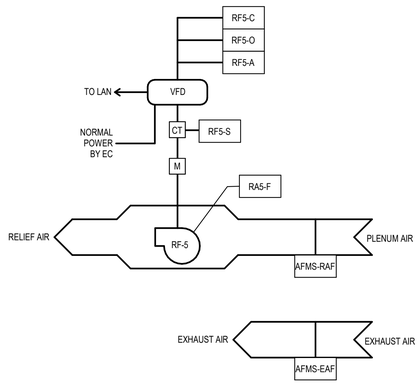
REVISIONS:

#	DESCRIPTION	DATE
1	ADDENDUM #1	2/12/2026

MECHANICAL SECTIONS

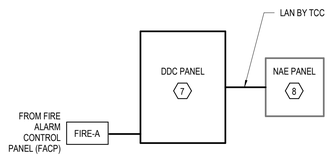
M301

EXISTING POINTS TO REMAIN AND TIED INTO NEW AHU-5 CONTROL SYSTEM



SETUP ALL TRENDS IN 15 MINUTE INTERVALS AND STORE FOR MINIMUM 30 DAYS.

INCLUDE TRENDS FOR THE ASSOCIATED COMMAND AND/OR SETPOINT IN ADDITION TO POINT LISTED ABOVE.
PROVIDE CHANGE OF VALUE AND INTERVAL TRENDS FOR BI AND BO POINTS.

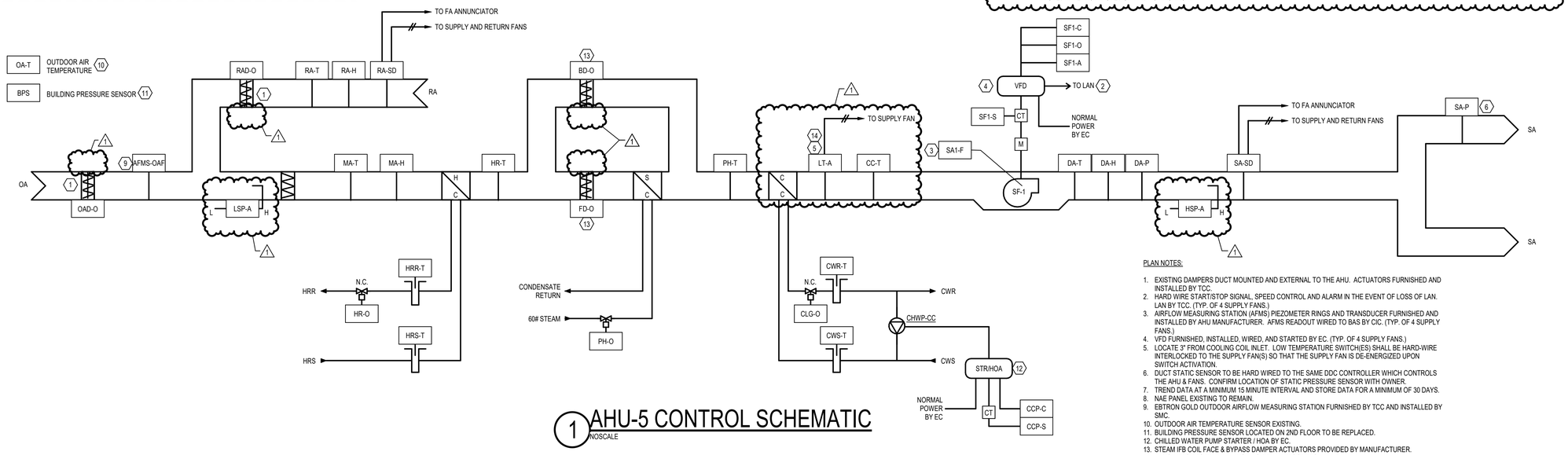


SEQUENCE OF OPERATION:

1. ALL SETPOINTS TO BE ADJUSTABLE.
2. AIR HANDLING UNIT TO BE STARTED BY DDC PANEL OR FROM BUILDING AUTOMATION SYSTEM OR OPERATOR WORKSTATION. AIR HANDLING UNIT TO RUN BASED ON SCHEDULE OCCUPANCY, 24/7. FINAL SCHEDULE SHALL BE SET BY OWNER.

AHU – AIR HANDLING UNIT

1. SAFETIES AND ALARMS *(NOTE ALARMS SHALL BE GENERATED AT THE BAS AND SEND NOTIFICATIONS TO STAFF AS SPECIFIED BY CLIENT)*:
   - A. THE COOLING COIL FREEZE PROTECTION PUMP WILL BE STARTED WHEN THE COOLING COIL INLET TEMPERATURE DROPS BELOW 40F (ADJ). PUMP WILL REMAIN ENERGIZED UNTIL THE TEMPERATURE RISES ABOVE 45F (ADJ).
   - B. UPON A SIGNAL FROM THE FIRE ALARM CONTROL PANEL RELAY, THE SUPPLY FAN(S) SHALL BE DE-ENERGIZED THROUGH HARDWIRE INTERLOCKS. SASSOCIATED RELIEF FAN SHALL ALSO BE DE-ENERGIZED.
   - C. LOW LIMIT THERMOSTAT (AT COOLING COIL INLET ONLY) SHALL DE-ENERGIZE THE SUPPLY FAN(S) THROUGH HARDWIRE INTERLOCK SHOULD ANY 1 FT LENGTH OF THE ELEMENT FALL BELOW THE THERMOSTAT SETPOINT OF 40°F (ADJ).
     a. ANNUNCIATE AN ALARM ANY TIME A LOW LIMIT THERMOSTAT IS ACTIVATED.
     b. AFTER THE TEMPERATURE RISES BY 10°F (ADJ) AND A MANUAL RESET HAS OCCURRED, A NORMAL START UP SEQUENCE SHALL BE INITIATED.
     c. FULLY OPEN THE CHILLED WATER CONTROL VALVE.
     d. THE PRE-HEAT COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN THE PRE-HEAT TEMPERATURE SETPOINT.
   - D. ANNUNCIATE AN ALARM AND SHUT DOWN ON SAFETY WHEN HIGH STATIC PRESSURE LIMIT ON DISCHARGE SIDE OF SUPPLY FAN(S) EXCEEDS 3.5 IN WC (ADJ).
   - E. ANNUNCIATE AN ALARM AND SHUT THE UNIT DOWN ON SAFETY WHEN LOW STATIC PRESSURE LIMIT ON SUCTION SIDE OF SUPPLY FAN(S) EXCEEDS (-)3.0 IN WC (ADJ).
   - F. ANY SMOKE DETECTED BY SUPPLY OR RETURN SMOKE DETECTOR SHALL DE-ENERGIZED THE SUPPLY FANS. OA DAMPER TO REMAIN OPEN. INITIATE ALARM AT OWS.
   - G. ALL AHU'S SHALL INCORPORATE A FAN STARTUP DELAY FOR 3 MINUTES (ADJ) TO REDUCE RISK OF DUCTWORK COLLAPSE FOLLOWING RESET OF A CLOSED FIRE OR SMOKE DAMPER.
   - H. ANNUNCIATE AN ALARM IF FAN OPERATION IS NOT CONFIRMED BY STATIC PRESSURE SENSOR WITHIN 2 MINUTES (ADJ) AFTER COMMANDED TO RUN.
   - I. ANNUNCIATE AN ALARM IF A DAMPER IS CALLED TO OPEN AND NOT PROVED OPEN BY END SWITCH.
2. NORMAL OCCUPIED OPERATION:
   - A. FOR COLD WEATHER STARTUP ANYTIME OUTDOOR AIR TEMPERATURE IS LESS THAN 40°F (ADJ), RUN SUPPLY FANS AT 25 HZ (ADJ) FOR 7 MIN (ADJ) BEFORE RAMPING FAN UP TO MAINTAIN STATIC PRESSURE. ACTIVATE SUPPLY AIR TEMPERATURE CONTROL LOOP WHILE DISABLING ECONOMIZER FOR 7 MIN (ADJ) BEFORE BEING ENABLED. THE PREHEAT CONTROL LOOP SHALL OPERATE IN FACE AND BYPASS MODE AS SOON AS THE AHU IS CALLED TO RUN AND SET TO 65°F (ADJ). ONCE SUPPLY FAN(S) STATUS IS PROVEN ON, THE PREHEAT SETPOINT WILL DECREASE 1°F (ADJ) EVERY 2 MINUTES (ADJ) UNTIL THE CONTROL SETPOINT IS REACHED.
   - B. FOR STARTUP ANYTIME OUTDOOR AIR TEMPERATURE IS 40°F (ADJ) OR GREATER, SUPPLY FAN START AND RAMP UP OVER A PERIOD OF 5 MINUTES (ADJ.) TO CONTROL STATIC PRESSURE.
   - C. OUTDOOR AIR DAMPER TO OPEN TO MINIMUM AIRFLOW POSITION (ADJ) AFTER STARTUP AND STATIC PRESSURE CONTROL ARE ENGAGED.
   - D. OUTDOOR AIR DAMPER POSITION TO MODULATE TO MAINTAIN 0.020" W.G. (ADJ) BUILDING PRESSURE SENSOR SETPOINT. BUILDING PRESSURE SENSOR LOCATED ON 2ND FLOOR OF IU SCIENCE BUILDING.
   - E. THE SUPPLY AIR TEMPERATURE CONTROL LOOP SHALL OPERATE AS DESCRIBED BELOW. THE SUPPLY AIR SETPOINT SHALL BE 55°F (ADJ). THE COOLING COIL SETPOINT SHALL BE THE SUPPLY AIR SETPOINT MINUS 2°F (ADJ). THE PREHEAT COIL SETPOINT SHALL BE THE SUPPLY AIR SETPOINT MINUS 4°F (ADJ). THE FINAL OFFSETS SHALL BE SET BY THE TCC TO ACCOUNT FOR FAN HEAT AND TO PREVENT SIMULTANEOUS HEATING AND COOLING.
   - F. HEAT RECOVERY CONTROL:
     a. THE HEAT RECOVERY COIL CONTROL VALVE SHALL FULLY OPEN WHEN OAT IS <50°F (ADJ) OR WHEN OAT IS >70°F (ADJ). THE HEAT RECOVERY COIL CONTROL VALVE SHALL BE SHUT WHEN OAT IS WITHIN THE RANGE ABOVE.
   - G. STEAM FACE AND BYPASS CONTROL:
     a. IF THE HEAT RECOVERY COIL DISCHARGE AIR TEMPERATURE IS EQUAL TO OR BELOW 40°F, THE IFB STEAM COIL VALVE TO BE OPEN 100% AND THE FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN THE PREHEAT COIL TEMPERATURE SETPOINT.
     b. IF THE HEAT RECOVERY COIL DISCHARGE AIR TEMPERATURE IS BETWEEN 40°F AND 50°F, IFB STEAM COIL VALVE TO BE OPEN 65% AND THE FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN THE PREHEAT COIL TEMPERATURE SETPOINT.
     c. IF THE HEAT RECOVERY COIL DISCHARGE AIR TEMPERATURE IS ABOVE 50°F, IFB STEAM COIL VALVE TO BE CLOSED 100% AND OPERATE IN FULL BYPASS.
   - H. COOLING CONTROL:
     a. MODULATE THE COOLING VALVE TO MAINTAIN THE COOLING COIL TEMPERATURE SETPOINT.
   - I. SUPPLY FAN SPEED SHALL BE DETERMINED BY STATIC PRESSURE SENSOR LOCATED 90% THROUGH THE SUPPLY DUCTWORK SYSTEM IN CONJUNCTION WITH THE UNIT DISCHARGE STATIC PRESSURE. SUPPLY FAN VFDs CONTROL LOOP TO MODULATE FAN SPEED TO ACHIEVE A DUCT STATIC PRESSURE SET AT INITIALLY 1.5" W.G. (ADJ), WHILE NOT EXCEEDING A UNIT DISCHARGE PRESSURE OF 3.0" W.G. (ADJ). TEST AND BALANCE CONTRACTOR TO DETERMINE FINAL SETPOINT AND APPROVE WITH ENGINEER.
   - J. ON AHU SHUTDOWN, SUPPLY FAN STOP, OUTDOOR AIR AND RELIEF AIR DAMPERS FULLY CLOSE, AND RETURN AIR DAMPER FULLY OPENS. THE COOLING COIL CONTROL VALVE IS FULLY CLOSED, EXCEPT ON LOW LIMIT SAFETY. MODULATE THE PREHEAT COIL CONTROL VALVE TO MAINTAIN THE PREHEAT AIR SETPOINT.
3. UNOCCUPIED OPERATION:
   - A. TRANSITIONING TO UNOCCUPIED MODE THE SUPPLY FAN AND DAMPERS SHALL OPERATE IN THE SEQUENCE DESCRIBED ABOVE.
   - B. STRANSITION TO OCCUPIED MODE IS BASED ON A SCHEDULE OR TERMINAL UNIT SEQUENCE.
4. ECONOMIZER MODE:
   - A. BELOW 70°F (DRY BULB) AMBIENT (ADJ) OUTDOOR AIR DAMPER AND RETURN AIR DAMPER TO MODULATE TO MAINTAIN 55°F (ADJ) MIXED AIR TEMPERATURE.
     a. AS THE RETURN AIR ENTHALPY RISES ABOVE THE OUTSIDE AIR ENTHALPY, THE OUTSIDE AIR DAMPER SHALL BE MODULATED TO CONTROL THE MIXED AIR TEMPERATURE AT THE MIXED AIR TEMPERATURE SETPOINT (ADJ). UPON A DROP IN THE RETURN AIR ENTHALPY BELOW THE OUTSIDE AIR ENTHALPY, THE OUTSIDE AIR DAMPER SHALL RETURN TO ITS MINIMUM POSITION.
     b. SUPPLY AIR TEMPERATURE SHALL BE RESET FROM 55°F TO 60°F (ADJ) AS OUTDOOR AIR TEMPERATURE VARIES FROM 70°F TO 30°F (ADJ). IF RETURN AIR HUMIDITY EXCEEDS 55% RH (ADJ), RESET THE UNIT SUPPLY TEMPERATURE TO 53°F (ADJ) AND NOTIFY OWNER ON BAS/OWS. INCREASE SUPPLY TEMPERATURE 1°F (ADJ) EVERY 10 MINUTES AFTER 15 MINUTES OF THIS NOTIFICATION.



1 AHU-5 CONTROL SCHEMATIC
NOSCALE

PLAN NOTES:

1. EXISTING DAMPERS DUCT MOUNTED AND EXTERNAL TO THE AHU. ACTUATORS FURNISHED AND INSTALLED BY TCC.
2. HARD WIRE START/STOP SIGNAL, SPEED CONTROL AND ALARM IN THE EVENT OF LOSS OF LAN. LAN BY TCC. (TYP. OF 4 SUPPLY FANS.)
3. AIRFLOW MEASURING STATION (AFMS) PIEZOMETER RINGS AND TRANSDUCER FURNISHED AND INSTALLED BY AHU MANUFACTURER. AFMS READOUT WIRED TO BAS BY CIC. (TYP. OF 4 SUPPLY FANS.)
4. VFD FURNISHED, INSTALLED, WIRED, AND STARTED BY EC. (TYP. OF 4 SUPPLY FANS.)
5. LOCATE 3" FROM COOLING COIL INLET. LOW TEMPERATURE SWITCH(ES) SHALL BE HARD-WIRE INTERLOCKED TO THE SUPPLY FAN(S) SO THAT THE SUPPLY FAN IS DE-ENERGIZED UPON SWITCH ACTIVATION.
6. DUCT STATIC SENSOR TO BE HARD WIRED TO THE SAME DDC CONTROLLER WHICH CONTROLS THE AHU & FANS. CONFIRM LOCATION OF STATIC PRESSURE SENSOR WITH OWNER.
7. TREND DATA AT A MINIMUM 15 MINUTE INTERVAL AND STORE DATA FOR A MINIMUM OF 30 DAYS.
8. NAE PANEL EXISTING TO REMAIN.
9. EBTRON GOLD OUTDOOR AIRFLOW MEASURING STATION FURNISHED BY TCC AND INSTALLED BY SMC.
10. OUTDOOR AIR TEMPERATURE SENSOR EXISTING.
11. BUILDING PRESSURE SENSOR LOCATED ON 2ND FLOOR TO BE REPLACED.
12. CHILLED WATER PUMP STARTER / HOA BY EC.
13. STEAM IFB COIL FACE & BYPASS DAMPER ACTUATORS PROVIDED BY MANUFACTURER.
14. AUTOMATIC RESET WITH LATCHING RELAY AT CONTROL PANEL.

kbsd CONSULTING
275 VETERANS WAY
SUITE 300
CARMEL, IN 46032

REPLACE AHU-5 AND UPDATE CONTROLS IU INDIANAPOLIS IN073 SCIENCE BLDG

CONSTRUCTION DOCUMENTS

IU #20250569

402 N Blackford St, Indianapolis, IN 46202

KBSO #25142
OLUWASEUN ODUKOMAIYA
REGISTERED
No. 11300632
STATE OF INDIANA
PROFESSIONAL ENGINEER

SCALE:	SEE SHEET
DRAWN BY:	ACB
DESIGNED BY:	ACB
CHECKED BY:	SO
DATE:	1/22/2026
PROJECT #:	25142

REVISIONS:

#	DESCRIPTION	DATE
1	ADDENDUM #1	2/12/2026

CONTROLS - MECHANICAL

M901

IU Indy LD AHU-5

IU#20250569 JCI#6N200480

Page	***Description***
0.0	Title Page Drawing
0.1	Riser Communications Drawing
1.1	LD AHU-5 - Flow Layout
1.2	LD AHU-5 - BOM Drawing
1.3	LD AHU-5 - Sequence Drawing
1.4	LD AHU-5 - Panel Detail
1.5	LD AHU-5 - Point Schedule
1.6	LD AHU-5 - Point Schedule 2
1.7	LD AHU-5 - Power Wiring Details 1
1.8	LD AHU-5 - Power Wiring Details 2
1.9	LD AHU-5 - Wiring Details 1
1.10	LD AHU-5 - Wiring Details 2
1.11	LD AHU-5 - Wiring Details 3
1.12	LD AHU-5 - Wiring Details 4
V.1	LD AHU-5 - RAC Schedule
V.1	LD AHU-5 - Valve Schedule

Johnson Controls

Creating a better climate for business.

- ☐ **Environmental Control System**
- ■ **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
IU Indy LD AHU-5
IU# 20250569

ARCHITECT	ENGINEER
, **Phone:**	, **Phone:**
MECHANICAL CONTRACTOR	**ELECTRICAL CONTRACTOR**
, **Phone:**	, **Phone:**

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Johnson Controls

Branch Information
Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DATE	CONTRACT NUMBER
JG	JB	DG	2/2/2026	6N20-0480

LEGEND

- S 20 — Main Air Supply Tube at 20 PSIG
- D-N 15-20 — Dual Air Supply Tube at 15/20 PSIG Day=15, Night=20
- S 80 — High Pressure Air Supply Tube at 80 PSIG
- Air line or Electrical Wire
- Connected Lines or Wires
- Crossing Lines or Wires, Not Connected
- In-Line Restrictor
- 7 — Pneumatic Tube indicating Tube Number
- 2/18 — Wire Symbol indicating: number of wires and size (E.G. 2 #18 wires)
- 3 2/18 — Wire Symbol indicating: Cable Destination (DA-T), Cable number (3), Number of wires and size (E.G. 2 #18 wires)
- 1 — Electrical Wire Terminal with Appropriate Number
- Item Located on Panel Face
- 1 — Drawing Revision Symbol with Appropriate Number
- NO — Opposed Blade Damper
- NO — Parallel Blade Damper
- Filter
- Air Flow Measuring Station
- Humidifier
- Fan
- Pump
- H/C — Heating or Cooling Coil
- Ductwork or Piping with Flow Direction Shown
- Gage
- Device
- Bulb Type Temperature Sensing Element Located under Shield in Outside air
- Humidity Sensing Element Located under Shield in Outside air
- Bulb Type Temperature Sensing Element Located inside Separable Socket/Well
- Strap-on Bulb Type Temperature Sensing Element
- Combination Bulb Type Temperature Sensing Element and Humidity Sensor (Duct Mount)
- Bulb Type Temperature Sensing Element
- Pressure Sensing Device
- Paddle Type Flow Switch
- Vapor Tension Temperature Sensing Element (Hi Limit)
- Vapor Tension Temperature Sensing Element (Low Limit)
- Current Sensing Switch or Combination Current Sensing switch & Command Relay
- Duct Detector (Smoke, CO, CO2)
- 2-Way Valve with Actuator — NC
- 3-Way Valve with Actuator — C, NC, NO

COMMUNICATIONS RISER

NAE-8 LD

EXISTING MSTP TRUNK

SYSTEM	BUS	ADDRESS
LD AHU-5	FC-1	5

Drawing Title

Riser Drawing

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 2/3/2026	BY DATE

Project Title

IU Indy LD AHU-5
IU#20250569

Johnson Controls

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER

6N200480

DRAWING NUMBER

0.1

AHU-5 – FLOW LAYOUT

LOCATED IN THE SHADE ON THE NORTH SIDE OF THE BUILDING

OA-T

BLDG-P

EXTERIOR WALL

FIRE ALARM CONTROL PANEL
(BY OTHERS)

FIRE-A
By Others

FIRE CONTROL ALARM MONITORING

EXISTING EXHAUST AND RELIEF AIR CONTROL DEVICES TO REMAIN

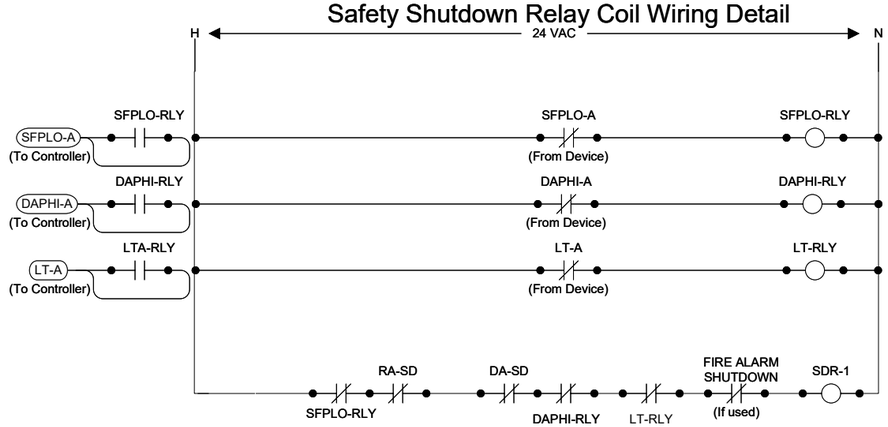
EXISTING DEVICES TO BE WIRED TO NEW CONTROL PANEL

RF VFD
RF-O
RF-C
RF-S
AFMS-RAF
RA
RA
AFMS-EAF
EA
EA

EXHAUST AND RELIEF AIR INTEGRATION

RA-SD
By Others
RA-T
RA-H
RA
NO
RAD-O
OA
OAD-O
NC
AFMS-OAF
SFPLO-A
MA-T
MA-H
HR-T
HRR-T
HR-O
HRS-T
RETURN
SUPPLY
BD-O
By Others
NC
NO
FD-O
By Others
CR
PH-O
STM
NO
PH-T
CWS-T
CWR-T
CLG-O
RETURN
SUPPLY
LT-A
CC-T
SF VFD
SF-O
SF-C
SF-S
SF-A
SDR-1
SF-VP1
CHWP STARTER
CCP-C
CCP-S
DAPHI-A
DA-SD
By Others
DA-T
DA-H
DA-P
SA-P
SA
LOCATED 2/3 DOWN THE LONGEST DUCT RUN
SA

Safety Shutdown Relay Coil Wiring Detail



NEW JCI DEVICE

NEW DEVICE BY OTHERS

EXISTING DEVICE

Drawing Title
AHU-5 - Flow Layout

Project Title
IU Indy LD AHU-5
IU#20250569

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 1/29/2026	BY DATE

Johnson Controls

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER
6N200480

DRAWING NUMBER
1.1

BILL OF MATERIAL

DESIGNATION	QTY.	CODE NUMBER.	DESCRIPTION
CLG-O	1	VALVE	SEE VALVE SCHEDULE
HR-O	1	VALVE	SEE VALVE SCHEDULE
PH-O	1	VALVE	SEE VALVE SCHEDULE
BLDG-P	1	DP140X25B21C	BIDIRECTIONAL + OR -0.25IN. W.C. 24 VDC / 4 TO 20 MA
	1	A-306-K	Outdoor Air Static
	1	RPS	STAINLESS STEEL ROOM PRESSURE SENSOR WITH 1/4 INCH BARB FITTING
	1	SD-01	SURGE DAMPENER
CC-T	1	TE-6328P-1	20', W/TE-6001-8ELEMENTHOLDER
	1	TE-6001-8	AVER ELEMENT HLDR QTY =10
CHWE-T	1	TE-6300W-102	THERMOWELL. 6 STAINLESS STEEL DIRECT MOUNT
	1	TE-635AM-2	WELL INSERTION TEMPERATURE SENSOR 1K OHM PLATINUM 6 IN. PROBE
CHWL-T	1	TE-6300W-102	THERMOWELL. 6 STAINLESS STEEL DIRECT MOUNT
	1	TE-635AM-2	WELL INSERTION TEMPERATURE SENSOR 1K OHM PLATINUM 6 IN. PROBE
CP-C,-S	1	RR20YN	POWER RELAY, 20A, SPDT, GO/NO CURRENT SWITCH
DA1-P	1	DP140005U21C	UNIDIRECTIONAL 0 TO 5IN. W.C. 24 VDC / 4 TO 20 MA
	1	FTG18A-600R	SENSING TUBE KIT FOR P32
DAPHI-A	1	AFS-222	DIFFERENTIAL PRESSURE SWITCH, ADJUSTABLE, 0.05-12 IN WC
	1	FTG18A-600R	SENSING TUBE KIT FOR P32
	1	RIB24P	ENCLOSED RELAY 20 AMP DPDT WITH 24 VAC/DC COIL
DA-T,-H	1	HE-69530NP-0	DUCT PROBE, 3%RH, PT TEMP
HR-T	1	TE-6001-8	AVER ELEMENT HLDR QTY =10
HR-T	1	TE-6328P-1	20', W/TE-6001-8ELEMENTHOLDER
HRR-T	1	TE-635AM-2	WELL INSERTION TEMPERATURE SENSOR 1K OHM PLATINUM 6 IN. PROBE
	1	TE-6300W-102	THERMOWELL. 6 STAINLESS STEEL DIRECT MOUNT
HRS-T	1	TE-635AM-2	WELL INSERTION TEMPERATURE SENSOR 1K OHM PLATINUM 6 IN. PROBE
	1	TE-6300W-102	THERMOWELL. 6 STAINLESS STEEL DIRECT MOUNT
LT-A	2	A70GA-1C	15/55F, DIFF 5 FIXED,1NO/1NC MAIN OPEN LOW,1/8 X 20' BULB,
	1	TE-6001-8	AVER ELEMENT HLDR QTY =10
	1	RIB24P	ENCLOSED RELAY 20 AMP DPDT WITH 24 VAC/DC COIL

BILL OF MATERIAL

DESIGNATION	QTY.	CODE NUMBER.	DESCRIPTION
MA-H	1	HT-69030NP-0	DUCT TRANSMITTER 3%RH
MA-T	1	TE-6328P-1	20', W/TE-6001-8ELEMENTHOLDER
	1	TE-6001-8	AVER ELEMENT HLDR QTY =10
OAD-O	1	AFB24-SR-S	BELIMO
OA-T	1	TE-6353P-1	OUTDOOR AIR TEMPERATURE SENSOR, 1K OHM PLATINUM, 3 IN. PROBE
OA-VP	1	GTC116e-P+	EBTRON TRANSMITTER W/4 INTERNAL PROBE 4 SENSORS EA. 20" PROBE LENGTH X 140 ADJACENT SIDE 10' CABLES
PH-T	1	TE-6328P-1	20', W/TE-6001-8ELEMENTHOLDER
	1	TE-6001-8	AVER ELEMENT HLDR QTY =10
RAD-O	1	AFB24-SR-S	BELIMO
RA-T,-H	1	HE-69530NP-0	DUCT PROBE, 3%RH, PT TEMP
SA-P	1	DP140005U21C	UNIDIRECTIONAL 0 TO 5IN. W.C. 24 VDC / 4 TO 20 MA
	1	FTG18A-600R	SENSING TUBE KIT FOR P32
SDR-1	1	RIBU1C	ENCLOSED PILOT RELAY 10 AMP SPDT WITH 10-30 VAC
SF-C	1	RIBU1C	ENCLOSED PILOT RELAY 10 AMP SPDT WITH 10-30 VAC
SF-S	1	CSDSC-C50100L0	CURR SW SELF CAL CLMP 0.50A-100A
SFPLO-A	1	AFS-222	DIFFERENTIAL PRESSURE SWITCH, ADJUSTABLE, 0.05-12 IN WC
	1	FTG18A-600R	SENSING TUBE KIT FOR P32
	1	RIB24P	ENCLOSED RELAY 20 AMP DPDT WITH 24 VAC/DC COIL

Drawing Title

AHU-5 - BOM

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 1/29/2026	BY DATE

Project Title

IU Indy LD AHU-5
IU#20250569

Johnson Controls

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER

6N200480

DRAWING NUMBER

1.2

SEQUENCE OF OPERATION

AHU CONTROLS:
All setpoints to be adjustable. Air handling unit to be started by DDC Panel, BAS, or operator workstation. AHU to run based on scheduled occupancy, initially 24/7. Final schedule shall be set by owner.

OCCUPIED MODE:
For cold weather startup anytime outdoor air temperature (OA-T) is less than 40 deg F (adj), run supply fans at 25 Hz (adj) for 7 min (adj) before ramping fan up to maintain static pressure. Activate supply air temperature control loop while disabling economizer for 7 min (adj) before being enabled. The preheat control loop shall operate in face and bypass mode as soon as the AHU is called to run and set to 65 deg F (adj). Once supply fan status (SF-S) is proven on, the preheat setpoint (PHT-SP) will decrease 1 deg F (adj) every 2 minutes (adj) until the control setpoint is reached. For startup anytime outdoor air temperature is 40 deg F (adj) or greater, supply fan start and ramp up over a period of 5 minutes (adj) to control static pressure (DA-P). Outdoor air damper (OAD-O) to open to minimum airflow position (adj) after startup and static pressure control are engaged. Outdoor air damper to modulate to maintain 0.020 in w.c. (adj) building pressure sensor setpoint (BLDG-SP). Building pressure sensor (BLDG-P) located on 2nd floor of IU Science Building. Supply fan speed (SF-O) shall be determined by a static pressure sensor (SA-P) located 90% through the supply ductwork system in conjunction with the unit discharge static pressure (DA-P). Supply fan VFDs control loop to modulate fan speed to achieve a duct static pressure set at initially 1.5 in w.c. (adj) while not exceeding a unit discharge pressure of 3.0 in w.c. (adj). Test and balance contractor to determine final setpoint and approve with engineer. On AHU shutdown, supply fan stop, outdoor air and relief air dampers fully close, and return air damper fully opens. The cooling coil control valve (CLG-O) is fully closed, except on low limit safety. Modulate the preheat coil control valve (PH-O) to maintain the preheat air setpoint.

The supply air temperature control loop shall operate as described below. The supply air setpoint (SAT-SP) shall be 55 deg F (adj). The cooling coil setpoint (CCT-SP) shall be the supply air setpoint minus 2 deg F (adj). The preheat coil setpoint (PHT-SP) shall be the supply air setpoint minus 4 deg F (adj). The final offsets shall be set by TCC to prevent simultaneous heating and cooling.

ECONOMIZER MODE:
Below 70 deg F (dry bulb) ambient (adj) outdoor air damper and return air damper will modulate to maintain 55 deg F (adj) mixed air temperature (MA-T). As the return air enthalpy rises above the outside air enthalpy, the outside air damper shall be modulated to control the mixed air temperature at the mixed air temperature setpoint (MAT-SP). Upon a drop in the return air enthalpy below the outside air enthalpy, the outside air damper shall return to its minimum position. Supply air temperature shall be reset from 55 deg F to 60 deg F (adj) as outdoor air temperature varies from 70 deg F to 30 deg F (adj). If return air humidity (RA-H) exceeds 55% RH (adj), reset the unit supply temperature to 53 deg F (adj) and notify owner on BAS/OWS. Increase supply temperature 1 deg F (adj) every 10 minutes after 15 minutes of this notification.

HEAT RECOVERY CONTROL:
The heat recovery coil control valve (HR-O) shall fully open when OA-T is less than 50 deg F (adj) or when OA-T is greater than 70 deg F (adj). The heat recovery coil control valve shall be shut when OA-T is between 50 and 70 deg F.

STEAM FACE AND BYPASS CONTROL:
If the heat recovery coil discharge air temperature (HR-T) is less than or equal to 40 deg F, the IFB steam coil valve to be open 100% and the face and bypass dampers shall modulate to maintain the preheat coil temperature setpoint. If the heat recovery coil discharge air temperature is between 40 deg F and 50 deg F, IFB steam coil valve to be open 65% and the face and bypass dampers shall modulate to maintain the preheat coil temperature setpoint. If the heat recovery coil discharge air temperature is above 50 deg F, the IFB steam coil valve to be closed and operate in full bypass.

COOLING CONTROL:
Modulate the cooling valve to maintain the cooling coil temperature setpoint.

UNOCCUPIED OPERATION:
Transitioning to unoccupied mode, the supply fan and dampers shall operate in the sequence described above. Transition to occupied mode is based on a schedule or terminal unit sequence.

SEQUENCE OF OPERATION

SAFETIES AND ALARMS:
Alarms shall be generated at the BAS and send notifications to staff as specified by client.

The cooling coil freeze protection pump (CCP-C) will be started when the cooling coil inlet temperature (CCS-T) drops below 40 deg F (adj). Pump will remain energized until the temperature rises above 45 deg F (adj).

Upon a signal from the fire alarm control panel relay (FIRE-A), the supply fan shall be de-energized through hardwire interlocks. Associated relief fan shall also be de-energized.

Low limit thermostat (LT-A) shall de-energize the supply fan through hardwire interlock should any 1 ft length of the element fall below the thermostat setpoint of 40 deg F (adj).
a. Annunciate an alarm any time a low limit thermostat is activated
b. After the temperature rises by 10 deg F (adj) and a manual reset has occurred, a normal start up sequence shall be initiated.
c. Fully open the chilled water control valve.
d. The preheat coil control valve shall modulate to maintain the preheat temperature setpoint.

Annunciate an alarm and shutdown on safety when high static pressure limit (DAPHI-A) on discharge side of supply fan exceeds 3.5 in w.c. (adj).

Annunciate an alarm and shut the unit down on safety when low static pressure limit (SFPLO-A) on suction side of supply fan exceeds -3.0 in w.c. (adj).

Any smoke detected by supply or return smoke detector (DA-SD, RA-SD) shall de-energize supply fan. OA damper to remain open. Initiate alarm at OWS.

All AHUs shall incorporate a fan startup delay for 3 minutes (adj) to reduce risk of ductwork collapse following reset of a closed fire or smoke damper.

Annunciate an alarm if fan operation is not confirmed by static pressure sensor within 2 minutes (adj) after commanded to run.

Annunciate an alarm if a damper is called to open and not proven open by end switch.

Drawing Title
AHU-5 - Sequence

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 2/3/2026	BY DATE

Project Title
IU Indy LD AHU-5
IU#20250569

Johnson Controls

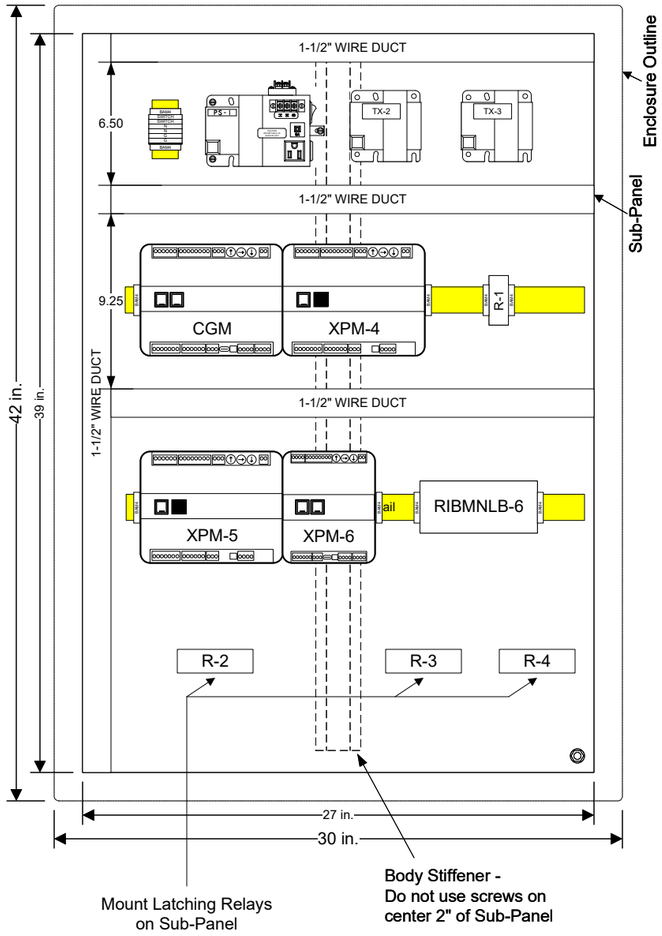
Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER
6N200480

DRAWING NUMBER
1.3

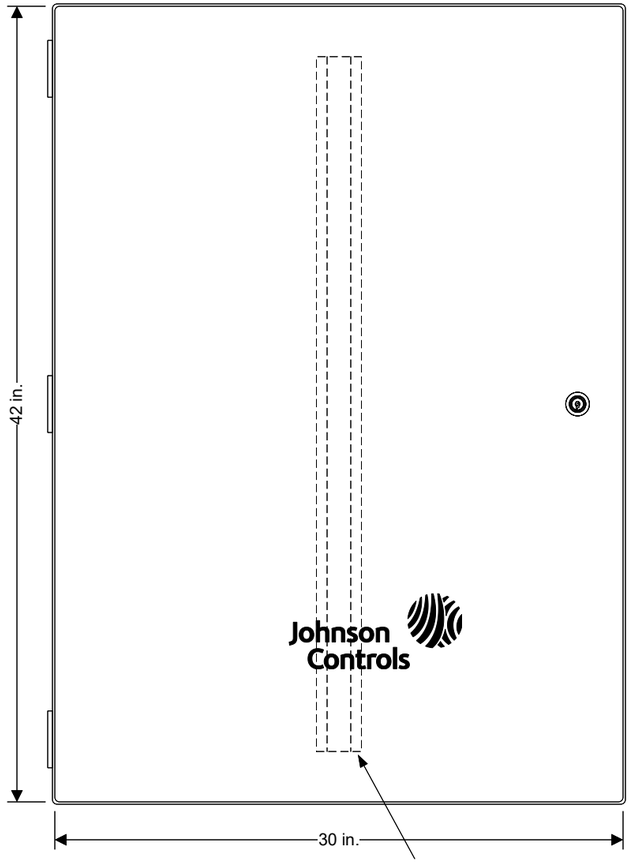
PANEL LAYOUT

SCALE: 1/8" = 1"



FACE LAYOUT

SCALE: 1/8" = 1"



BILL OF MATERIALS

Designation	Qty	Part Number	Description
ENCLOSURE	1	PAN-ENC3042WDP	30X42X9.25 ENCLOSURE, SOLID DOOR, PERFORATED SUB-PANEL, STEEL, UL TYPE 1
CGM	1	M4-CGM09090-0	ADV FIELD CONTRLLR, 18 PTS
XPM-4,-5	2	M4-XPM09090-0	GEN4 I/O EXP MODULE, 18 PTS
XPM-6	1	M4-XPM04060-0	GEN4 I/O EXP MODULE, 10 PTS
PS-1	1	PAN-PWRSP	PWR SPLY 96 VA, 120-24 VAC w 5 A circuit breaker, Two 120 VAC outlets
TX-n	2	PAN-96VAXFR-0	PANEL, 96VA TRANSFORMER K
R-1	1	RH2B-ULAC24V	RH SERIES DPDT PLUG-IN GENERAL PURPOSE RELAY WITH INDICATOR - AC24V
	1	SH2B-05	RELAY SOCKET DIN MOUNT SCREW TERMINAL USED WITH RH2B
R-2,3,4	3	RIBL24SBM	LATCHING RELAY 20AMP WITH OVERRIDE SWITCH
SAFETY	1	RIBMNLB-6	2.75 TRACK MOUNT AHU FAN SAFETY ALARM AND GENERAL PURPOSE LOGIC CIRCUIT
TERM BLK	10	BAM4	END STOP, TERM BLK
	4	DIN-3F	DIN RAIL
	1	FEM6	END SECTION, TERM BLK
	2	M4/6	DIN RAIL TERM BLK, 6MM GRAY
	2	M4/6.P	GROUNDING LUG GREEN/YELLOW, 6MM
	2	M4/6SNBT	120V BLADE SWITCH
WIRE DUCT	2	T1-1530G	WIRE DUCT, 1.5" W x 3" H x 6.5FT, GRAY

Drawing Title

AHU-5 - Panel Detail

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 1/30/2026	BY DATE

Project Title

IU Indy LD AHU-5
IU#20250569

Johnson Controls

Branch Information

BSNA - INDIANAPOLIS, IN
5920 Castleway West Dr,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER

6N200480

DRAWING NUMBER

1.4

LD AHU-5 - POINT SCHEDULE

Electrician/Fitter		Point Information			Controller 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	Termination Out	Wiring /Tubing	Termination In	Device	Termination Out	Wiring /Tubing	Termination In	Device	Ref Detail Shape
		LD AHU-5			CGM09090													
		LD AHU-5			CGM09090	MS/TP	1	4										
	UI IN-1	LD AHU-5	DA-T	Discharge Air Temperature	CGM09090	MS/TP	1	4	UI IN-1	IN1, ICOM1					2/22	TEMP, TEMP	HE-6900(Duct Mnt) - TE	F160
	UI IN-2	LD AHU-5	DA-H	Discharge Air Humidity	CGM09090	MS/TP	1	4	UI IN-2	IN2, ICOM2, +15V					3/22	OUT,GND,PWR	HE-6900(Duct Mnt) - HE	F160
	UI IN-3	LD AHU-5	MA-T	Mixed Air Temperature	CGM09090	MS/TP	1	4	UI IN-3	IN3, ICOM3					2/22	2-Wire	TE	F131
	UI IN-4	LD AHU-5	DA-P	Discharge Air Pressure	CGM09090	MS/TP	1	4	UI IN-4	IN4, +15V					2/22	-, +	DPT2xxx (mA)	F106
	UI IN-5	LD AHU-5	HR-T	Heat Recovery Coil Temperature	CGM09090	MS/TP	1	4	UI IN-5	IN5, ICOM5					2/22	2-Wire	TE	F131
	UI IN-6	LD AHU-5	PH-T	Preheat Coil Temperature	CGM09090	MS/TP	1	4	UI IN-6	IN6, ICOM6					2/22	2-Wire	TE	F131
	UI IN-7	LD AHU-5	CC-T	Cooling Coil Temperature	CGM09090	MS/TP	1	4	UI IN-7	IN7, ICOM7					2/22	2-Wire	TE	F131
	BI IN-1	LD AHU-5	SF-S	Supply Fan Status	CGM09090	MS/TP	1	4	BI IN-1	IN1, ICOM1	2/22	OUT, COM	Current Relay	Motor Lead	Motor Lead	See wiring detail	Motor Status (Contact)	F307
	BI IN-2	LD AHU-5	CCP-S	Cooling Pump Status	CGM09090	MS/TP	1	4	BI IN-2	IN2, ICOM2	2/22	OUT, COM	Current Relay	Motor Lead	Motor Lead	See wiring detail	Motor Status (Contact)	F307
	BO OUT-1	LD AHU-5	SF-C	Supply Fan Command	CGM09090	MS/TP	1	4	BO OUT-1	OUT1, 24V COM	2/22	COIL-,COIL+	Relay	COM, NO	2/14	See wiring detail	VFD (w/ Safety) (Sw Hi, EXT)	F1042
	BO OUT-2	LD AHU-5	CCP-C	Cooling Pump Command	CGM09090	MS/TP	1	4	BO OUT-2	OUT2, 24V COM	2/22	COIL-,COIL+	Relay	COM, NO	2/14	See wiring detail	Motor (Single Phase)	F1030
	BO OUT-3	LD AHU-5			CGM09090	MS/TP	1	4	BO OUT-3									
	CO OUT-1	LD AHU-5	OAD-O	Outdoor Air Damper Output	CGM09090	MS/TP	1	4	CO OUT-1	OUT1, OCOM1,24VAC, COM					2/22 / 2/18	GRY, BLK/BLK, RED	Belimo	F267
	CO OUT-2	LD AHU-5	RAD-O	Return Air Damper Output	CGM09090	MS/TP	1	4	CO OUT-2	OUT2, OCOM2,24VAC, COM					2/22 / 2/18	GRY, BLK/BLK, RED	Belimo	F267
	CO OUT-3	LD AHU-5	SF-O	Supply Fan Output	CGM09090	MS/TP	1	4	CO OUT-3	OUT3, OCOM3					2/22	See VFD Detail	VFD Speed Control (Vdc)	
	CO OUT-4	LD AHU-5			CGM09090	MS/TP	1	4	CO OUT-4	OUT4, OCOM4,24VAC, COM								
	AO OUT-1	LD AHU-5	PH-O	Preheat Output	CGM09090	MS/TP	1	4	AO OUT-1	OUT1, OCOM1,24VAC ,COM					2/22 / 2/18	Gray, Black, Red	VA9310-HGA-2 (Vdc) (Ext Source)	F268
	AO OUT-2	LD AHU-5	CLG-O	Cooling Output	CGM09090	MS/TP	1	4	AO OUT-2	OUT2, OCOM2,24VAC, COM					2/22 / 2/18	GRY, BLK/BLK, RED	M92xx-GGx-x (Vdc) (Ext Source)	F267
		LD AHU-5			XPM09090													
		LD AHU-5			XPM09090	SA Bus	1	4										
	UI IN-1	LD AHU-5	OA-T	Outdoor Air Temperature	XPM09090	SA Bus	1	4	UI IN-1	IN1, ICOM1					2/22	2-Wire	TE	F131
	UI IN-2	LD AHU-5	BLDG-P	Building Static Pressure	XPM09090	SA Bus	1	4	UI IN-2	IN2, +15V					2/22	-, +	DPT2xxx (mA)	F106
	UI IN-3	LD AHU-5	CWS-T	Chilled Water Supply Temperature	XPM09090	SA Bus	1	4	UI IN-3	IN3, ICOM3					2/22	2-Wire	TE	F131
	UI IN-4	LD AHU-5	CWR-T	Chilled Water Return Temperature	XPM09090	SA Bus	1	4	UI IN-4	IN4, ICOM4					2/22	2-Wire	TE	F131
	UI IN-5	LD AHU-5	HRS-T	Heat Recovery Supply Temperature	XPM09090	SA Bus	1	4	UI IN-5	IN5, ICOM5					2/22	2-Wire	TE	F131
	UI IN-6	LD AHU-5	HRR-T	Heat Recovery Return Temperature	XPM09090	SA Bus	1	4	UI IN-6	IN6, ICOM6					2/22	2-Wire	TE	F131
	UI IN-7	LD AHU-5	MA-H	Mixed Air Humidity	XPM09090	SA Bus	1	4	UI IN-7	IN7, ICOM7, +15V					3/22	OUT,GND,PWR	HE-6900(Duct Mnt) - HE	F160
	BI IN-1	LD AHU-5	RF-S	Relief Fan Status	XPM09090	SA Bus	1	4	BI IN-1	IN1, ICOM1					2/22	See wiring detail	Dry Contact	F301
	BI IN-2	LD AHU-5	LT-A	Low Temperature Alarm	XPM09090	SA Bus	1	4	BI IN-2	IN2, ICOM2					2/22 / '2/22 (U	LINE, M1, (LINE,M2)	A70 (NO)	F302
	BO OUT-1	LD AHU-5	RF-C	Relief Fan Command	XPM09090	SA Bus	1	4	BO OUT-1	OUT1, 24V COM	2/22	COIL-,COIL+	Relay	COM, NO	2/14	See wiring detail	VFD (w/ Safety) (Sw Hi, EXT)	F1042
	BO OUT-2	LD AHU-5			XPM09090	SA Bus	1	4	BO OUT-2									
	BO OUT-3	LD AHU-5			XPM09090	SA Bus	1	4	BO OUT-3									
	CO OUT-1	LD AHU-5	BD-O	Bypass Damper Output	XPM09090	SA Bus	1	4	CO OUT-1	OUT1, OCOM1,24VAC, COM					2/22 / 2/18	GRY, BLK/BLK, RED	Belimo	F267
	CO OUT-2	LD AHU-5	FD-O	Face Damper Output	XPM09090	SA Bus	1	4	CO OUT-2	OUT2, OCOM2,24VAC, COM					2/22 / 2/18	GRY, BLK/BLK, RED	Belimo	F267
	CO OUT-3	LD AHU-5	RF-O	Relief Fan Output	XPM09090	SA Bus	1	4	CO OUT-3	OUT3, OCOM3					2/22	See VFD Detail	VFD Speed Control (Vdc)	
	CO OUT-4	LD AHU-5			XPM09090	SA Bus	1	4	CO OUT-4									
	AO OUT-1	LD AHU-5	HR-O	Heat Recovery Coil Output	XPM09090	SA Bus	1	4	AO OUT-1	OUT1, OCOM1,24VAC, COM					2/22 / 2/18	GRY, BLK/BLK, RED	M92xx-GGx-x (Vdc) (Ext Source)	F267
	AO OUT-2	LD AHU-5			XPM09090	SA Bus	1	4	AO OUT-2									

Drawing Title

AHU-5 - Point Schedule 1

Project Title

IU Indy LD AHU-5
IU#20250569

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 1/30/2026	BY DATE

Johnson Controls

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER
6N200480

DRAWING NUMBER
1.5

LD AHU-5 - POINT SCHEDULE (CONT'D)

Electrician/Fitter		Point Information			Controller 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	Termination Out	Wiring /Tubing	Termination In	Device	Termination Out	Wiring /Tubing	Termination In	Device	Ref Detail Shape
		LD AHU-5			XPM09090	SA Bus	1	5										
	UI IN-1	LD AHU-5	RA-T	Return Air Temperature	XPM09090	SA Bus	1	5	UI IN-1	IN1, ICOM1					2/22	TEMP, TEMP	HE-6900(Duct Mnt) - TE	F160
	UI IN-2	LD AHU-5	RA-H	Return Air Humidity	XPM09090	SA Bus	1	5	UI IN-2	IN2, ICOM2, +15V					3/22	OUT,GND,PWR	HE-6900(Duct Mnt) - HE	F160
	UI IN-3	LD AHU-5	SF-VP	Supply Fan Velocity Pressure	XPM09090	SA Bus	1	5	UI IN-3	IN3, +15V					2/22	-, +	DPT2xxx (mA)	F106
	UI IN-4	LD AHU-5	AFMS-OAF	Outdoor Air Flow	XPM09090	SA Bus	1	5	UI IN-4	IN4, +15V					2/22	See wiring detail	Current Input (2 Wire)	F106
	UI IN-5	LD AHU-5	AFMS-RAF	Relief Air Flow	XPM09090	SA Bus	1	5	UI IN-5	IN5, +15V					2/22	See wiring detail	Current Input (2 Wire)	F106
	UI IN-6	LD AHU-5	AFMS-EAF	Exhaust Air Flow	XPM09090	SA Bus	1	5	UI IN-6	IN6, +15V					2/22	See wiring detail	Current Input (2 Wire)	F106
	UI IN-7	LD AHU-5	SA-P	Supply Air Duct Pressure	XPM09090	SA Bus	1	5	UI IN-7	IN7, +15V					2/22	-, +	DPT2xxx (mA)	F106
	BI IN-1	LD AHU-5	SFPLO-A	Supply Air Low Pressure Alarm	XPM09090	SA Bus	1	5	BI IN-1	IN1, ICOM1	2/22	OUT, COM	Current Relay	Motor Lead	2/22 / '2/22 (UI	See Detail	AFS-460 (NC)	F303
	BI IN-2	LD AHU-5	DAPHI-A	Discharge Air High Pressure Alarm	XPM09090	SA Bus	1	5	BI IN-2	IN2, ICOM2					2/22 / '2/22 (UI	See Detail	AFS-460 (NC)	F303
	BO OUT-1	LD AHU-5			XPM09090	SA Bus	1	5	BO OUT-1									
	BO OUT-2	LD AHU-5			XPM09090	SA Bus	1	5	BO OUT-2									
	BO OUT-3	LD AHU-5			XPM09090	SA Bus	1	5	BO OUT-3									
	CO OUT-1	LD AHU-5			XPM09090	SA Bus	1	5	CO OUT-1									
	CO OUT-2	LD AHU-5			XPM09090	SA Bus	1	5	CO OUT-2									
	CO OUT-3	LD AHU-5			XPM09090	SA Bus	1	5	CO OUT-3									
	CO OUT-4	LD AHU-5			XPM09090	SA Bus	1	5	CO OUT-4									
	AO OUT-1	LD AHU-5			XPM09090	SA Bus	1	5	AO OUT-1									
	AO OUT-2	LD AHU-5			XPM09090	SA Bus	1	5	AO OUT-2									
		LD AHU-5			XPM04060													
		LD AHU-5			XPM04060	SA Bus	1	6										
	UI IN-1	LD AHU-5	DA-SD	Discharge Air Smoke Detector	XPM04060	SA Bus	1	6	UI IN-1	IN1, ICOM1					2/22	See wiring detail	Dry Contact	F301
	UI IN-2	LD AHU-5	RA-SD	Return Air Smoke Detector	XPM04060	SA Bus	1	6	UI IN-2	IN2, ICOM2					2/22	See wiring detail	Dry Contact	F301
	UI IN-3	LD AHU-5	FIRE-A	Fire Control Panel Alarm	XPM04060	SA Bus	1	6	UI IN-3	IN3, ICOM3					2/22	See wiring detail	Dry Contact	F301
	BI IN-1	LD AHU-5			XPM04060	SA Bus	1	6	BI IN-1									
	BO OUT-1	LD AHU-5	LT-RESET	Low Temperature Alarm Reset	XPM04060	SA Bus	1	6	BO OUT-1	OUT1, 24V COM	2/22	COIL (Wh/Yel,Wh/Red)	RIB Relay	COM, NO (Yel, Org)	2/14	See wiring detail	Starter (NO) (Sw Hi, EXT Source)	F502
	BO OUT-2	LD AHU-5	SFPLO-RESET	Supply Fan Low Pressure Alarm Reset	XPM04060	SA Bus	1	6	BO OUT-2	OUT2, 24V COM	2/22	COIL (Wh/Yel,Wh/Red)	RIB Relay	COM, NO (Yel, Org)	2/14	See wiring detail	Starter (NO) (Sw Hi, EXT Source)	F502
	CO OUT-1	LD AHU-5	DAPHI-RESET	Discharge Air High Pressure Alarm Reset	XPM04060	SA Bus	1	6	CO OUT-1	OUT1, 24V COM	2/22	COIL (Wh/Yel,Wh/Rec)	RIB Relay	COM, NO (Yel, Org)	2/14	See wiring detail	Starter (NO) (Sw Hi, EXT Source)	F902
	CO OUT-2	LD AHU-5			XPM04060	SA Bus	1	6	CO OUT-2									
	CO OUT-3	LD AHU-5			XPM04060	SA Bus	1	6	CO OUT-3									
	CO OUT-4	LD AHU-5			XPM04060	SA Bus	1	6	CO OUT-4									

Drawing Title

AHU-5 - Point Schedule 2

Project Title

IU Indy LD AHU-5
IU#20250569

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

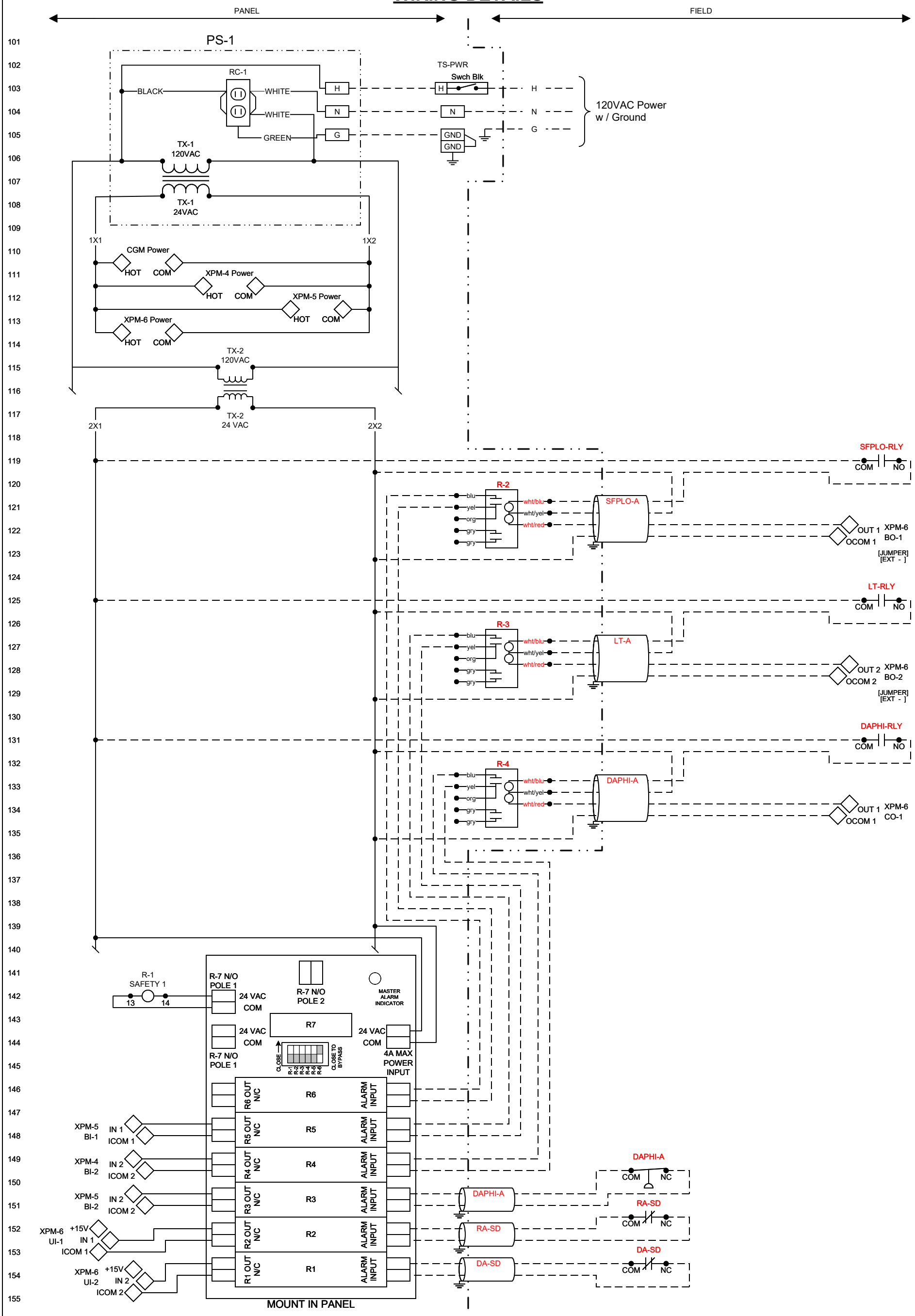
Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 1/30/2026	BY DATE

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER
6N200480

DRAWING NUMBER
1.6

WIRING DETAILS



DRAWING NUMBER **1.7**

CONTRACT NUMBER **6N200480**

APPROVED BY / DATE

DRAWING TITLE
AHU-5 - Power Wiring Details 1

NO.	REVISION-LOCATION	ECN	DATE	BY

FILENAME	REVISION DATE/TIME	SLW	SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DRAWN BY	DRAWN DATE
1.7 LD AHU-5 - POWER WIRING DETAILS 1.VSDX	02/10/26 1:57 PM		JG	JB	DG	DRG	2/2/2026

PROJECT NAME
IU Indy LD AHU-5
IU#20250569

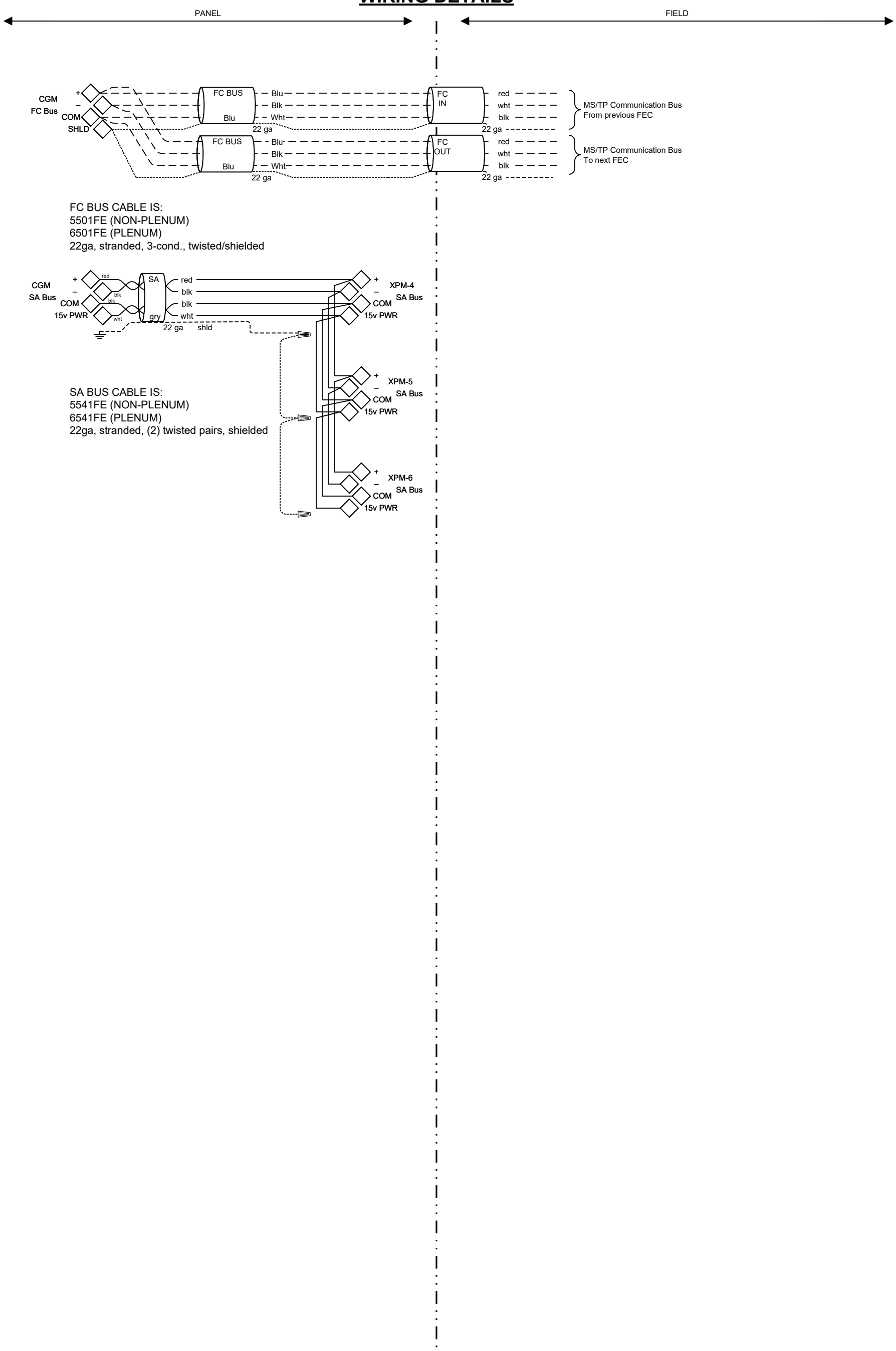
Johnson Controls

BRANCH INFORMATION
Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

Wiring Notes

- nn — Terminal in DDC controller. nn indicates terminal number.
- nn — Shielded cable. Terminate & ground shield within 2 inches of entry into enclosure. Continue shield to last device and tape back. nn indicates cable number (labeled at both ends of cable).
- nn — Cable-no shield. nn indicates cable number (labeled at both ends of cable).
- —nnn— Indicates field-installed wiring. nnn indicates wire number (labeled at both ends of wire).
- —nnn— Indicates factory wiring. nnn indicates wire number (labeled at both ends of wire).
- nnn — Terminal in JCI panel. nnn indicates terminal number.

WIRING DETAILS



DRAWING TITLE: **AHU-5 - Power Wiring Details 2**					
	NO.	REVISION-LOCATION	ECN	DATE	BY
FILENAME: 1.8 LD AHU-5 - POWER WIRING DETAILS 2.VSDX	REVISION DATE/TIME: 02/10/26 1:44 PM	SLW	SALES ENGINEER: JG	PROJECT MANAGER: JB	APPLICATION ENGINEER: DG
DRAWN BY: DRG	DATE: 2/10/2026				

DRAWING NUMBER: **1.8**

CONTRACT NUMBER: **6N200480**

APPROVED BY / DATE

PROJECT NAME

IU Indy LD AHU-5
IU#20250569

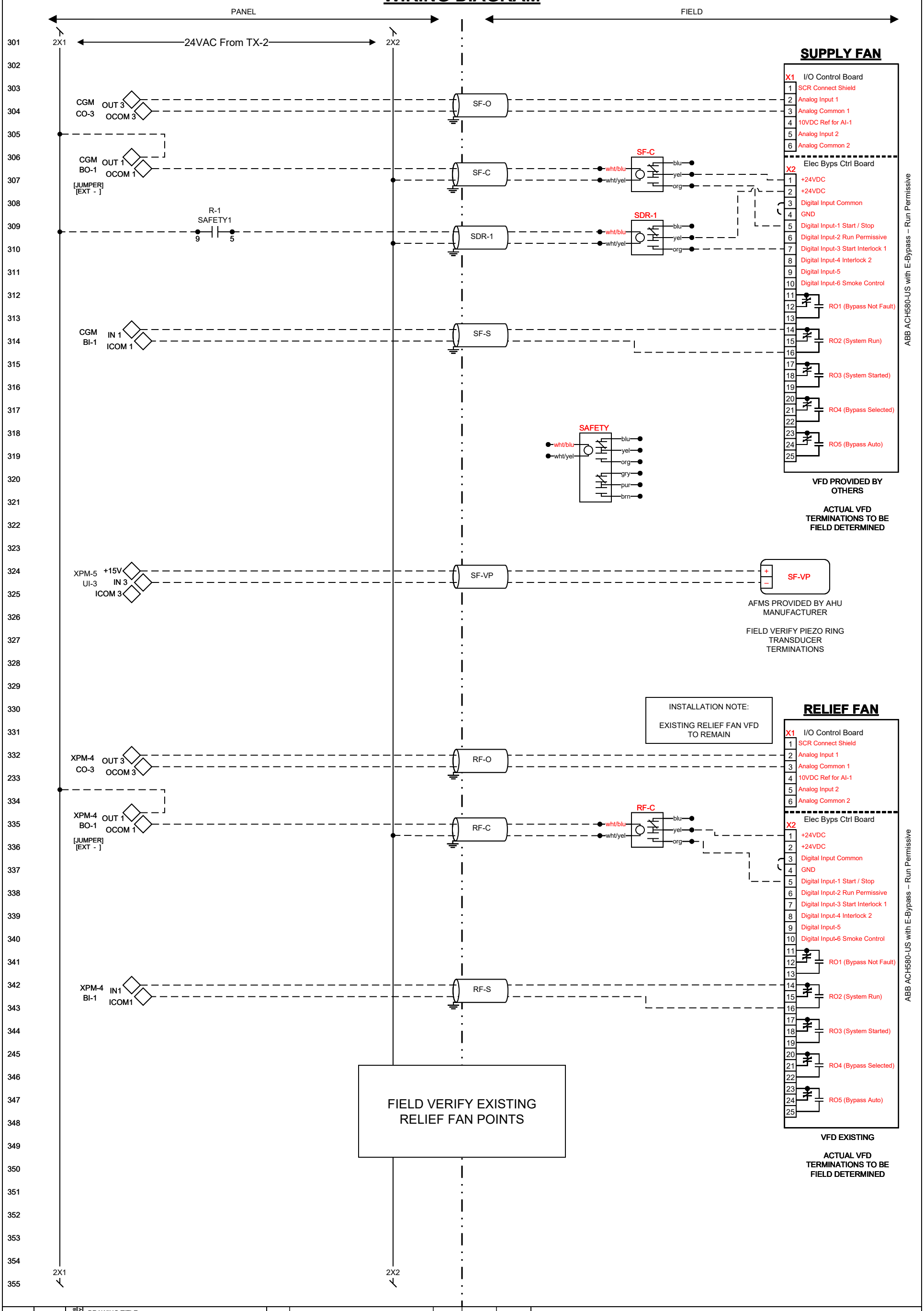
BRANCH INFORMATION

Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

Wiring Notes

- nn — Terminal in DDC controller. nn indicates terminal number.
- nn — Shielded cable. Terminate & ground shield within 2 inches of entry into enclosure. Continue shield to last device and tape back. nn indicates cable number (labeled at both ends of cable).
- nn — Cable-no shield. nn indicates cable number (labeled at both ends of cable).
- — —nnn — - — Indicates field-installed wiring. nnn indicates wire number (labeled at both ends of wire).
- ——nnn—— Indicates factory wiring. nnn indicates wire number (labeled at both ends of wire).
- nnn — Terminal in JCI panel. nnn indicates terminal number.

WIRING DIAGRAM



DRAWING NUMBER **1.9**

CONTRACT NUMBER **6N200480**

APPROVED BY / DATE

DRAWING TITLE
AHU-5 - Wiring Details 1

NO.	REVISION-LOCATION	ECN	DATE	BY

FILENAME	REVISION DATE/TIME	SLW	SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DRAWN BY	DRAWN DATE
1.9 LD AHU-5 - WIRING DETAILS 1.VSDX	02/10/26 1:44 PM	0000040	JG	JB	DG	DRG	2/2/2026

PROJECT NAME
IU Indy LD AHU-5
IU#20250569

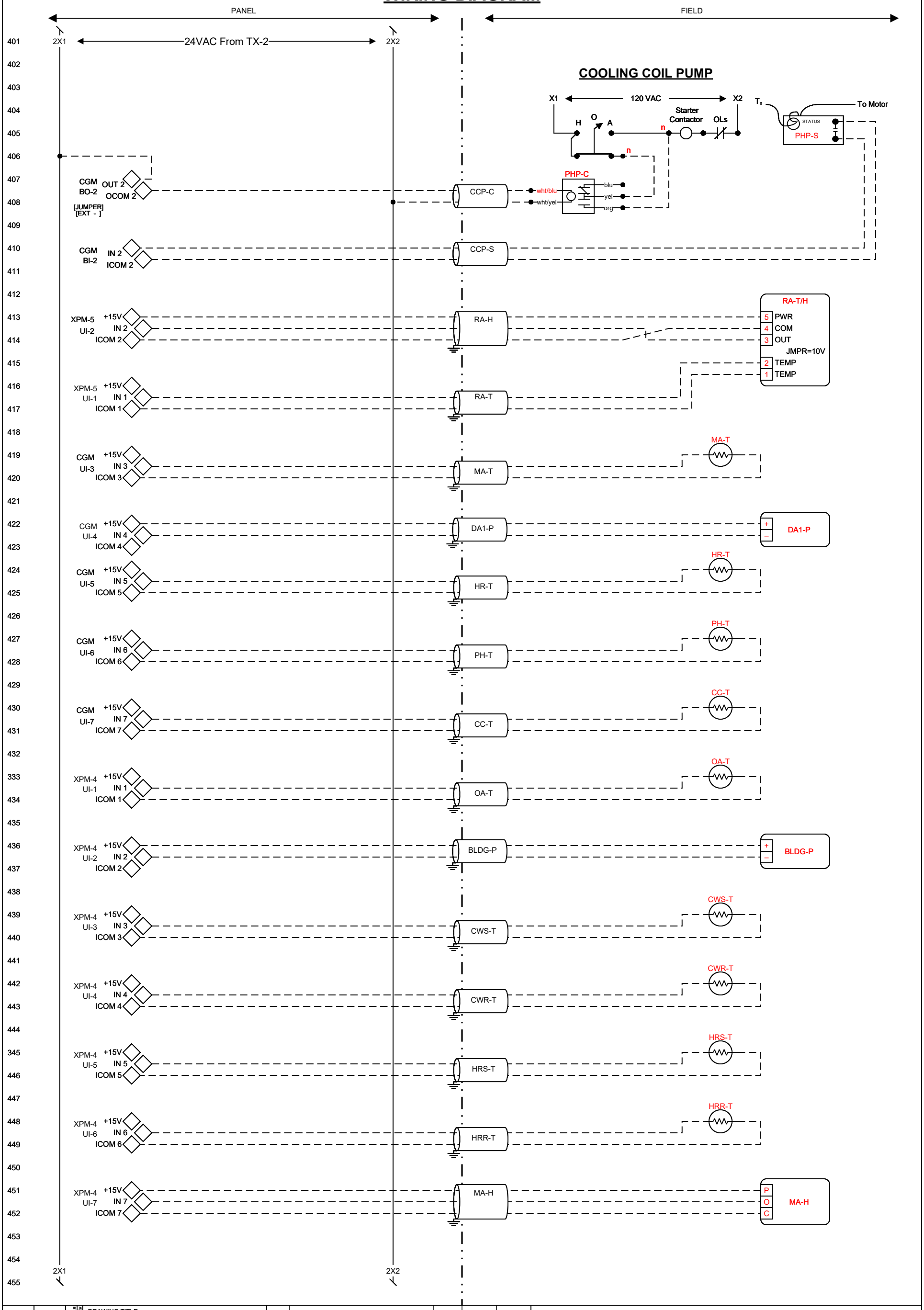
Johnson Controls

BRANCH INFORMATION
Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

Wiring Notes

- nn — Terminal in DDC controller. nn indicates terminal number.
- nn — Shielded cable. Terminate & ground shield within 2 inches of entry into enclosure. Continue shield to last device and tape back. nn indicates cable number (labeled at both ends of cable).
- nn — Cable-no shield. nn indicates cable number (labeled at both ends of cable).
- —nnn— Indicates field-installed wiring. nnn indicates wire number (labeled at both ends of wire).
- —nnn— Indicates factory wiring. nnn indicates wire number (labeled at both ends of wire).
- nnn — Terminal in JCI panel. nnn indicates terminal number.

WIRING DIAGRAM



DRAWING NUMBER **1.10**

CONTRACT NUMBER **6N20480**

APPROVED BY / DATE

DRAWING TITLE
AHU-5 - Wiring Details 2

NO.	REVISION-LOCATION	ECN	DATE	BY

FILENAME	REVISION DATE/TIME	SLW	SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DRAWN BY	DRAWN DATE
1.10 LD AHU-5 - WIRING DETAILS 2.VSDX	02/10/26 1:42 PM	0000040	JG	JB	DG	DRG	2/2/2026

PROJECT NAME
IU Indy LD AHU-5
IU#20250569

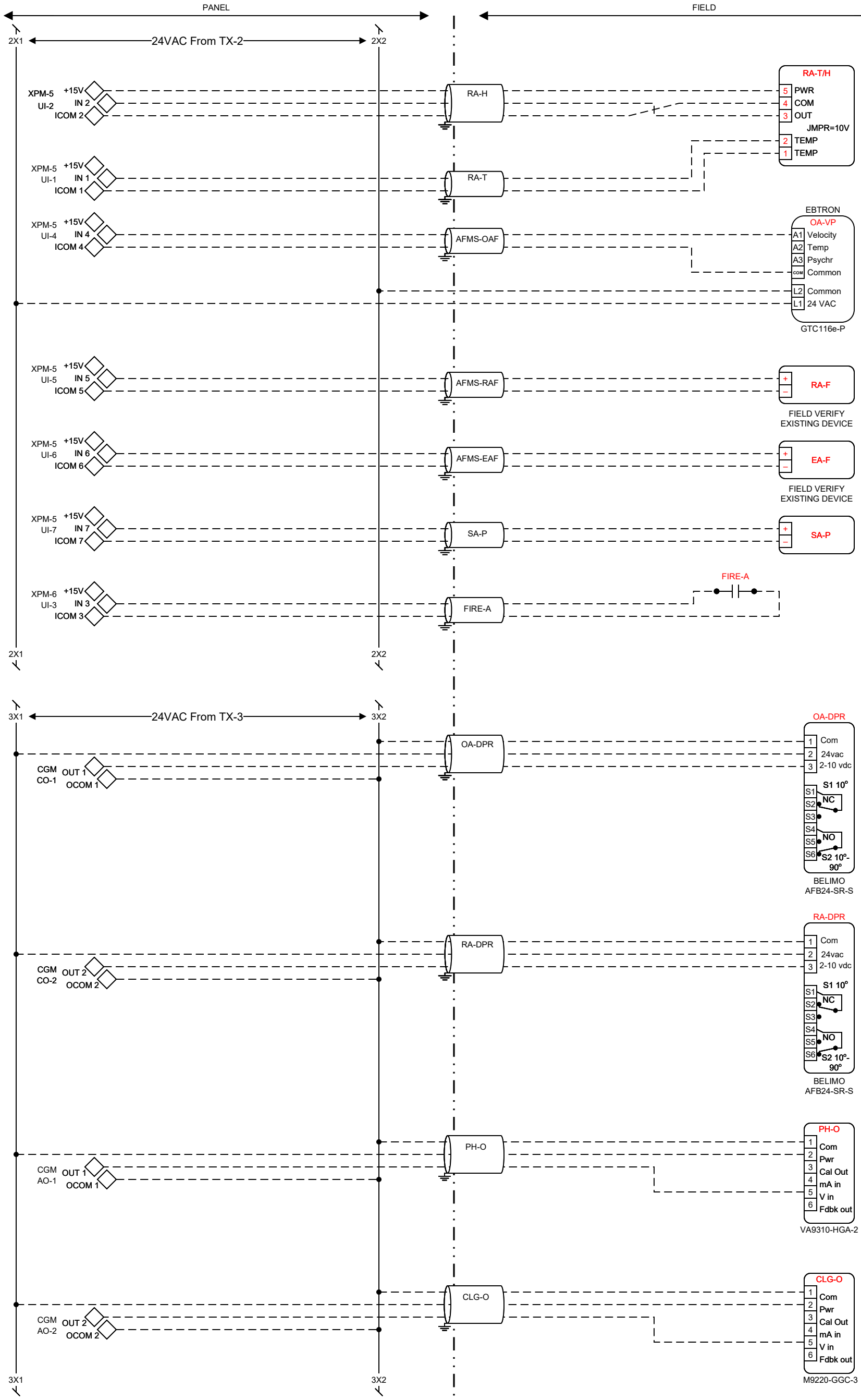
Johnson Controls

BRANCH INFORMATION
Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

Wiring Notes

- nn — Terminal in DDC controller. nn indicates terminal number.
- nn — Shielded cable. Terminate & ground shield within 2 inches of entry into enclosure. Continue shield to last device and tape back. nn indicates cable number (labeled at both ends of cable).
- nn — Cable-no shield. nn indicates cable number (labeled at both ends of cable).
- nnn — Indicates field-installed wiring. nnn indicates wire number (labeled at both ends of wire).
- nnn — Indicates factory wiring. nnn indicates wire number (labeled at both ends of wire).
- nnn — Terminal in JCI panel. nnn indicates terminal number.

WIRING DIAGRAM



DRAWING NUMBER **1.11**

CONTRACT NUMBER **6N200480**

APPROVED BY / DATE

DRAWING TITLE
AHU-5 - Wiring Details 3

NO.	REVISION-LOCATION	ECN	DATE	BY

FILENAME	REVISION DATE/TIME	SLW	SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DRAWN BY	DRAWN DATE
1.11 LD AHU-5 - WIRING DETAILS 3.VSDX	02/10/26 1:43 PM	0000040	JG	JB	DG	DRG	2/3/2026

PROJECT NAME
IU Indy LD AHU-5
IU#20250569

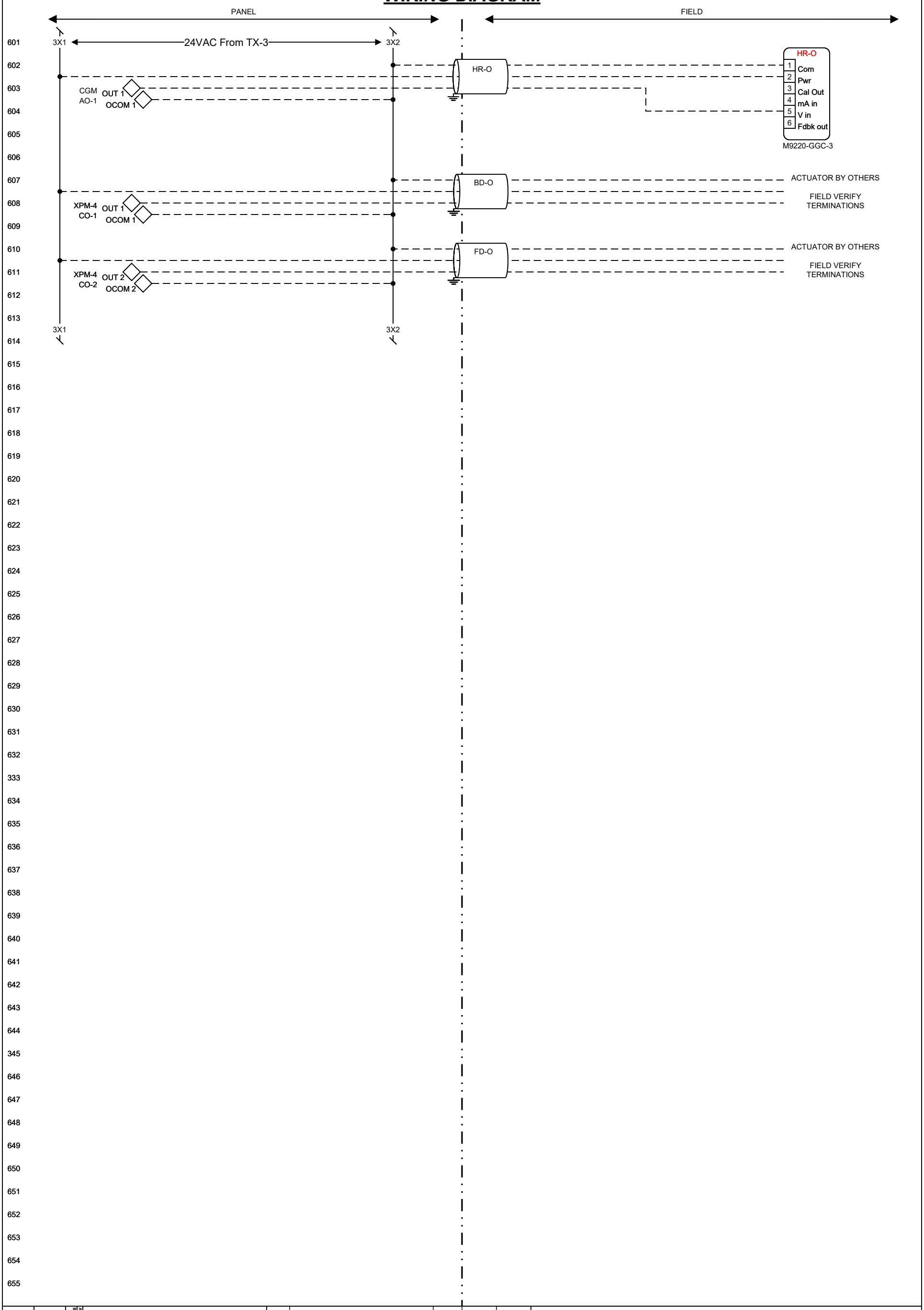
Johnson Controls

BRANCH INFORMATION
Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

Wiring Notes

- nn — Terminal in DDC controller. nn indicates terminal number.
- nn — Shielded cable. Terminate & ground shield within 2 inches of entry into enclosure. Continue shield to last device and tape back. nn indicates cable number (labeled at both ends of cable).
- nn — Cable-no shield. nn indicates cable number (labeled at both ends of cable).
- —nnn— Indicates field-installed wiring. nnn indicates wire number (labeled at both ends of wire).
- —nnn— Indicates factory wiring. nnn indicates wire number (labeled at both ends of wire).
- nnn — Terminal in JCI panel. nnn indicates terminal number.

WIRING DIAGRAM



DRAWING NUMBER **1.12**

CONTRACT NUMBER **6N200480**

APPROVED BY / DATE

DRAWING TITLE
AHU-5 - Wiring Details 4

NO.	REVISION-LOCATION	ECN	DATE	BY

FILENAME	REVISION DATE/TIME	SLW	SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DRAWN BY	DRAWN DATE
1.12 LD AHU-5 - WIRING DETAILS 4.VSDX	02/10/26 1:43 PM	0000040	JG	JB	DG	DRG	2/3/2026

PROJECT NAME
IU Indy LD AHU-5
IU#20250569

Johnson Controls

BRANCH INFORMATION
Johnson Controls
5920 Castleway Drive Suite #130,
Indianapolis, Indiana 46250
Phone: 3176387611

Wiring Notes

Terminal in DDC controller.
nn indicates terminal number.

Shielded cable.
Terminate & ground shield within 2 inches of entry into enclosure. Continue shield to last device and tape back.
nn indicates cable number (labeled at both ends of cable).

Cable-no shield.
nn indicates cable number (labeled at both ends of cable).

Indicates field-installed wiring.
nnn indicates wire number (labeled at both ends of wire).

Indicates factory wiring.
nnn indicates wire number (labeled at both ends of wire).

Terminal in JCI panel.
nnn indicates terminal number.

LD AHU-5 - RAC SCHEDULE

Space Information			Network / Equipment Tree Information						Network Information (MSTP and IP)													
Site/Building/Floor (Required)	Room Number (Optional)	Leaf Space (e.g. Room) (Required)	Device Name (Required)	Device FQR Reference (Required)	Device Description (Optional)	Equipment Name (Required)	Served By Equipment Name (Optional)	Controller Part # (Optional)	Engine Name (Required)	Trunk Name (Required)	Controller Host Name (Future)	JCI MAC Address	IP Controller Number	ZIGBEE PAN Offset	Instance # (BACoid)	N2Address	DHCP Enabled	IP Address	Subnet Mask	IP Router	ETH-1 (Optional)	ETH-2 (Optional)
			Attribute ID																			
			Attribute Type																			
IU Indy / IN073 / Floor 2			LD AHU-5	LD AHU-5	AHU	LD AHU-5		M4-CGM09090-0	NAE-8 LD	FC-1		5			731105							

Drawing Title

AHU-5 - RAC Schedule

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 2/3/2026	BY DATE

Project Title

IU Indy LD AHU-5
IU#20250569

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER

6N200480

DRAWING NUMBER

R.1

LD AHU-5 - VALVE SCHEDULE

Tag					Valve Information															Actuator Information		Piping Detail	Comments
Item	System	Designation	Qty	Ref. Dwg.	Code Number	Valve Family	Configuration	Fail Position	Inlet Pipe Size	Valve Size	Medium	Flow (gpm [US])	Design Delta P (psig)	Valve Delta P (psig)	Design Coefficient (Cv)	Valve Coefficient (Cv)	Design Close Off (psig)	Valve Close Off (psig)	Trim Material	Connection	Code Number	Actuator Control		
1	LD AHU-5	CLG-VLV	1	M901	VG12A5NY+94NGGC	Ball Valve	2-Way	Valve Closed	Field Verify	5	Water	501.00	5.00	2.98	224.05	290.00	0.00	100.00	Stainless Steel	Flanged	M9220-GGC-3	0-10VDC PROP		
2	LD AHU-5	HR-VLV	1	M901	VG12A5KT+92NGGA	Ball Valve	2-Way	Valve Open	Field Verify	2-1/2	Water	135.00	5.00	3.44	60.37	72.80	0.00	100.00	Stainless Steel	Flanged	M9220-GGA-3	0-10VDC PROP		
3	LD AHU-5	PH-VLV	1	M901	VG1245FRH910HGA	Ball Valve	2-Way	Last Position	Field Verify	2	Steam	3237.60	33.61	22.16	24.60	28.90	60.00	200.00	Stainless Steel	Threaded	VA9310-HGA-2	0-10VDC PROP		

Drawing Title

AHU-5 - Valve Schedule

Project Title

IU Indy LD AHU-5
IU#20250569

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JG	JB	DG	BY DRG DATE 2/3/2026	BY DATE

Branch Information
Johnson Controls
5920 Castleway Drive
Suite #130,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER
6N200480

DRAWING NUMBER
V.1

IU#20250569

Date:	1/29/2026
KBSO Project #:	25142
Project Name:	Replace AHU-5 and Update Controls
Project Location:	IN073 - IU Indianapolis Science Bldg

NAME	COMPANY	PHONE	EMAIL
Ken McKnight	IU		kmcknigh@iu.edu
Austin Bickle	KBSO		abickle@kbsoconsulting.com
Bud Tormoehlen	IU		wtormoeh@iu.edu
Aaron Johnson	HFI		ajohnson@harrel-fish.com
David Moran	IES		dmoran@indyelectric.net
Craig Wixson	KW-Services		cwixson@kwservices.com
Charles Rigdon	TP Mechanical		charles.rigdon@tpmechanical.com
Dave Vanhart	Sexson Mechanical		dvanhart@sexsonmechanical.com
Mike Wise	Irish Mechanical		mwise@irishmechanicalservices.com
Tom Hall	Irish Mechanical		thall@irishmechanicalservices.com