

ADDENDUM NUMBER ONE

To the Project Manual

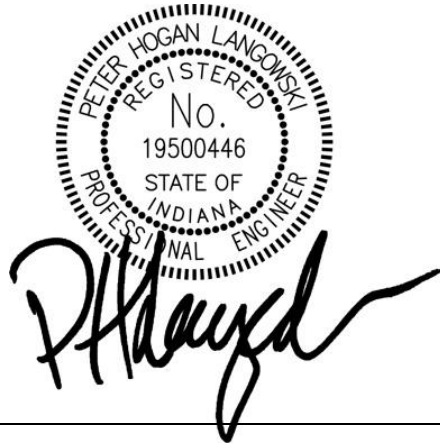
Dated: 15 April 2025

Entitled:

INDIANA UNIVERSITY
Indiana University Indianapolis
20240658 – IN345 – Biotech & Research
Replace Clg Tower Condenser Pumps Water Softener
BSA LifeStructures #00360479

Prepared By:

BSA LIFESTRUCTURES
9365 Counselors Row
Indianapolis, IN 46240



Peter Langowski
Indiana Registration No. 19500446

Addendum Dated: 28 April 2025

CHANGES TO THE PROJECT MANUAL

1. Specification Section 230906 Control Installation Contract:
 - a. Paragraph 1.1.A.5.b: The 230906 Control Supplier Drawings (provided by Johnson Controls) are attached to this Addendum.

Attachments:

1. Control Supplier Drawings.

IU Indy BRTC Cooling Tower Design

5N20-0400



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

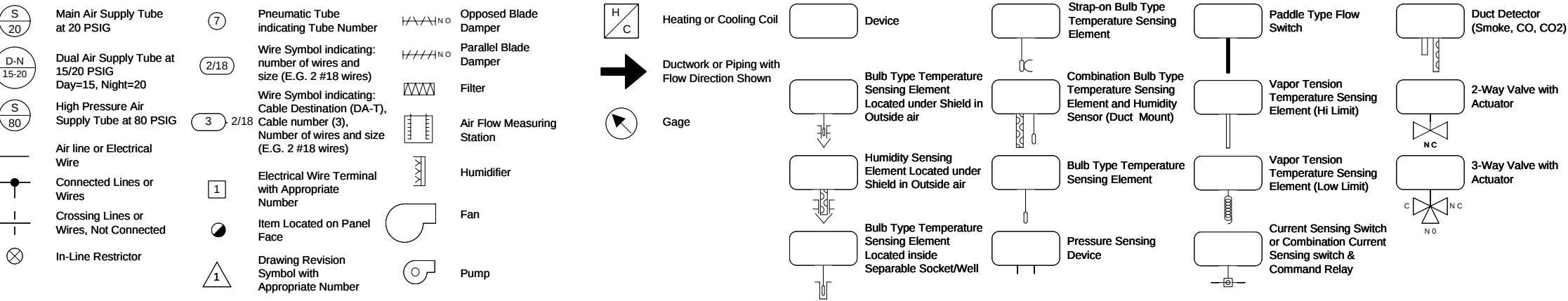
Air Conditioning
Heating
Diagnostic Services
Coil Cleaning
Refrigeration
Automatic Temperature Controls
Facility Management Systems
Fire Management
Security Management
Building Operations and Management
Water Treatment
Electrical Equipment
Emergency Generator / Lighting Equipment
Industrial Controls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

PROJECT TITLE
IU Indy BRTC Cooling Tower Design

ARCHITECT			ENGINEER			
Phone:			Phone:			
MECHANICAL CONTRACTOR			ELECTRICAL CONTRACTOR			
Phone:			Phone:			
REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
Johnson Controls		Branch Information BSNA - INDIANAPOLIS, IN 5920 Castleway West Dr, Indianapolis, Indiana 46250 Phone: 3176387611				
SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DATE	CONTRACT NUMBER		
JG	BS	DG	4/15/2025	5N20-0400		

Page	Description
0.0	Title Page Drawing
0.1	Riser Communications Drawing
1.1	CHWS - Sequence
1.2	CHWS - Panel Detail & BOM
1.3	CHWS - Point Schedule
1.4	CHWS - Point Schedule 2
1.5	CHWS - Power Wiring Details
1.6	CHWS - Wiring Details 2
1.7	CHWS - Wiring Details 3

LEGEND



X

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

H

C

Heating or Cooling Coil

Device

H

C

Parallel Blade Damper

Filter

Air Flow Measuring Station

Humidifier

Fan

Pump

Opposed Blade Damper

Parallel Blade Damper

Heating or Cooling Coil

Ductwork or Piping with Flow Direction Shown

Gage

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)

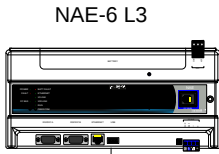
Vapor Tension Temperature Sensing Element (Low Limit)

Current Sensing Switch or Combination Current Sensing switch & Command Relay

Duct Detector (Smoke, CO, CO2)

2-Way Valve with Actuator

3-Way Valve with Actuator



MSTP TRUNK

DEVICE TAG	ADDRESS	TRUNK
CHWS	4	FC-2

Drawing Title Riser Drawing						
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer JG	Project Manager BS	Application Engineer DG	BY DRG	DATE 4/15/2025	APPROVED BY DATE
Project Title IN345 BRTC Cooling Tower Design	Johnson Controls			Branch Information BSNA - INDIANAPOLIS, IN 5920 Castleway West Dr, Indianapolis, Indiana 46250 Phone: 3176387611		CONTRACT NUMBER 5N20-0400
						DRAWING NUMBER 0.1

CHWS - SEQUENCE

System Start / Stop: Chilled water plant operation for CH-1 and CH-2 is automatically energized, after enabling, above 55 degf OAT. and deenergized below 53 degf OAT. Chiller is manually started to fall into automatic "enable" status from OWS or DDC panel. Any chiller may be locally manually locked out for service.

The initial startup step is to open CH-1 chilled water isolation valve CHW-VLV1 and condenser water isolation valves CWS-VLV1. 10 seconds later, pumps CP-1 and PCWP-1 are energized for full flow. Starting CP-1 enables CT-1 for automatic operation by opening its isolation valve CT-VLV1 and putting the tower fans under the automatic control. Each chiller will not be commanded to start until the condenser water and chilled water flow through the chiller have been proven by pump current sensing relays and differential pressure switches, the chiller operates to generate 42 degf chilled water supply. When the building loads exceeds 85% capacity of CH-1, pumps PCWP-2 and CP-2 are energized to provide flow thru the chiller. CH-2 isolation valves open 3 seconds after starting the pumps to insure that CH-1 is not cut out on low flow due to that PCWP-1 and CP-1 pumping to 2 chillers. (The exact delay time is field adjusted such that the isolation valves open rapidly as the pumps reach 75% capacity pumping.) Stating CP-2 opens CT-2 isolation valve CT-VLV2 and put CT-2 fans into the condenser water control loop. When both chillers are operative and the lead chiller decreases to 80% capacity of a single chiller, the second chiller will be indexed to the specified shutdown. Shutdown of a chiller requires that chilled water flow thru the chiller for 10 minutes before the isolation valves close. After that time frame, the isolation valves close and the pump stops. On sump water emergency low level alarms, all condenser water pumps will stop and chillers CH-1 and CH-2 will be rendered unoperative. (Chilled water side of system continues to function.)

Chiller Control: Chillers CH-1 and CH-2 are automatically alternated as lead chiller every 750 hours of operation. Any failure of an operable chiller automatically starts the other chiller while the failed chiller is disable from the sequence.

Condenser Water Pump (CP-1, 2 & 3): The BAS shall display runhours of each pump and designate the pump with the least hours as the lead pump at each pump startup. Failure of any pump shall automatically start the next pump in the sequence.

Secondary Loop Pump Control (SCWP-1, 2 & 3): Anytime any of the primary pumps PCWP-1, PCWP-2 or PCWP-3 operates, secondary pumps SCWP-1, SCWP-2 or SCWP-3 operate with one as stand-by. Secondary pumps SCWP-1, SCWP-2 or SCWP-3 alternate as the operative pumps every 750 hours of operation. Lag pump automatically starts on failure of operative pumps. Pumps to be varied in speed between maximum to minimum. When operating with a single pump

reduced to minimum Hz, any increase in system differential pressure shall gradually open the system bypass valve. As the system pressure differential pressure falls below design setting at the selected system sensing point, lead pump ramps up from minimum to maximum and after running at maximum for 5 minutes, lag pump is energized to operating in parallel with lead pump and lag pump must run a minimum of 10 minutes once energized. As the system pressure differential rises above control point, both lead and lag pumps are gradually reduced in speed to 20 Hz and lag pump is de-energized. Once lag pump is de-energized, it must remain off for a minimum time period of 5 minutes.

Below 35 degf OAT, cooling coil valves on AHU-1, 2 & 3 fully open as one secondary pump SCWP-1, 2 or 3 operates at half speed to provide full water flow through the system as freeze protection.

Primary Loop Pump Control (PCWP-1, 2, 3): Pump PCWP-3 is standby for PCWP-1 and PCWP-2 and is made operative automatically on the failure of PCWP-1 or PCWP-2. PCWP-1 is associated with CH-1 and starts when CH-1 is commanded on, after the chilled water isolation valve CHW-VLV1 is commanded open. PCWP-2 is associated with CH-2 and starts when CH-2 is commanded on, after the chilled water isolation valve CHW-VLV2 is commanded open.

Tower Control: Whenever the lead chiller operates, the lead cooling tower fan shall be enabled to operate three minutes (adj) after flow control is fully established. The BAS shall display runhours of each tower cell fan and designate the fan with the least hours as the lead fan for startup. The fan speed is varied to meet the Condenser Water Temperature Setpoint. With water flowing over both towers and the one fan operating speed reduced to the minimum 18Hz speed (adj) for a period of 2 minutes (adj) and condenser water temperature falls below condenser water temperature setpoint by 1 deg F (adj) for a period of 2 minutes (adj), shut the tower fan off. The tower fan shall be disabled while the tower continues to operate with full water flow. With water flowing over both towers and a single fan operating, when fanspeed reaches 30Hz for a period of 10 minutes (adj), the second tower fan shall be enabled to operate in parallel and the fans will run at the same speed to meet setpoint. When both fans reduce speed to 19Hz (adj) for a period of 1 minute (adj), the fan with the highest runtime will be disabled first and the other fan will continue to run to maintain setpoint. Fans must be disabled for a period of 5 minutes (adj) before being enabled again.

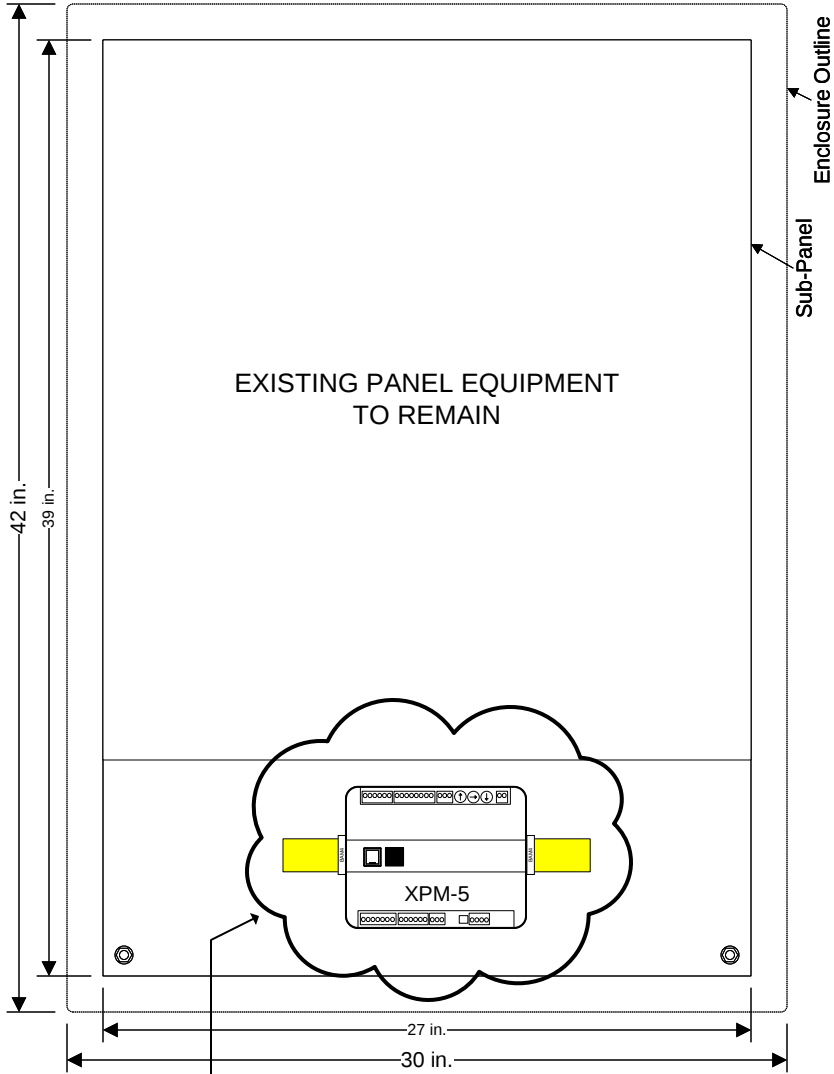
Secondary chilled Water Flow: Magnetic flow meter (CHW-FLOW) is provided in secondary chilled water loop to allow calculation of building chilled water cooling flow and load.

Setpoint Determination: Condenser Water Temperature Setpoint shall vary per the measured outdoor air wet bulb temperature (utilize global outdoor air temp and global outdoor air humidity to calculate wet bulb). Logic shall reset the condenser water temperature setpoint cooler as ambient conditions merit to allow for cooler condenser water and more efficient chiller operation without utilizing excessive tower fan energy. Condenser water temperature setpoint shall be displayed and trended on the graphics. Setpoint change shall be no greater than 1 deg F (adj) per hour. When average OAT wet bulb is less than 63 deg F (adj), the condenser water temperature setpoint shall be 68 deg F (adj). When average OAT wet bulb is between 63 deg F (adj) and 80 deg F (adj), the condenser water temperature setpoint shall be equal to the average OAT wet bulb plus 5 deg F. When average OAT wet bulb is greater than 80 deg F (adj), the condenser water temperature setpoint shall be 85 deg F (adj)

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	CHWS - Sequence											

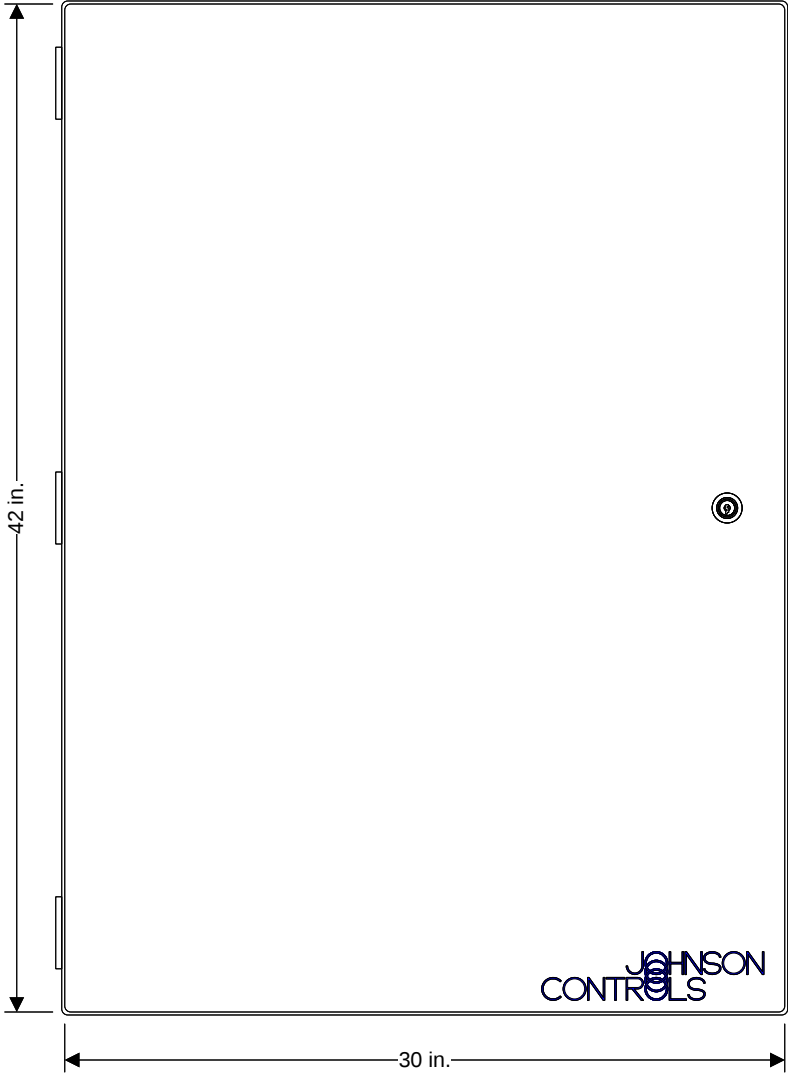
PANEL LAYOUT

SCALE: 1/8" = 1"



FACE LAYOUT

SCALE: 1/8" = 1"



BILL OF MATERIALS

Designation	Qty	Part Number	Description
EXISTING PANEL DEVICES TO REMAIN			
FIELD INSTALL:			
XPM-5	1	M4-XPM09090-0	18 PT INPUT/OUTPUT EXPANSION MODULE, 7 UI, 2 BI, 4 CO, 2
TERM BLK	2	BAM4	END STOP, TERM BLK
	1	DIN-3F	DIN RAIL

NEW DEVICES

Drawing Title CHWS - Panel Layout & BOM									
		REFERENCE DRAWING		NO.	REVISION-LOCATION			ECN	DATE
Sales Engineer JG	Project Manager BS	Application Engineer DG	DRAWN			APPROVED			
			BY	DRG	DATE	4/15/2025	BY	DATE	
Project Title IN345 BRTC Cooling Tower Design		Johnson Controls 			Branch Information		CONTRACT NUMBER		
					BSNA - INDIANAPOLIS, IN 5920 Castleway West Dr, Indianapolis, Indiana 46250 Phone: 3176387611		5N20-0400		
					DRAWING NUMBER		1.2		

CHWS - POINT SCHEDULE

Electrician/Fitter		Point Information			Controller Information						
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Trunk Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Comment	Template
		CHWSYS			FEC 26xx					Power to Controller	
		CHWSYS			FEC 26xx	MS/TP	1	4		BacNet FC Bus	
	UI IN-1	CHWSYS	CWS-T	Condenser Water Supply Temperature	FEC 26xx	MS/TP	1	4	UI IN-1		
	UI IN-2	CHWSYS	CWR-T	Condenser Water Return Temperature	FEC 26xx	MS/TP	1	4	UI IN-2		
	UI IN-3	CHWSYS	CH1CWL-T	Chiller 1 CW Leaving Temperature	FEC 26xx	MS/TP	1	4	UI IN-3		
	UI IN-4	CHWSYS	CH2CWL-T	Chiller 2 CW Leaving Temperature	FEC 26xx	MS/TP	1	4	UI IN-4		
	UI IN-5	CHWSYS	CH1CHWL-T	Chiller 1 CHW Leaving Temperature	FEC 26xx	MS/TP	1	4	UI IN-5		
	UI IN-6	CHWSYS	CH2CHWL-T	Chiller 2 CHW Leaving Temperature	FEC 26xx	MS/TP	1	4	UI IN-6		
	BI IN-7	CHWSYS	CH1CHW-DPS	Chiller 1 CHW DP Switch	FEC 26xx	MS/TP	1	4	BI IN-7		
	BI IN-8	CHWSYS	CH2CHW-DPS	Chiller 2 CHW DP Switch	FEC 26xx	MS/TP	1	4	BI IN-8		
	BO OUT-1	CHWSYS			FEC 26xx	MS/TP	1	4	BO OUT-1	CT ISO VALVE REMOVED	
	BO OUT-2	CHWSYS			FEC 26xx	MS/TP	1	4	BO OUT-2	CT ISO VALVE REMOVED	
	BO OUT-3	CHWSYS	CH1CWISOV-C	Chiller 1 CW Isolation Valve Command	FEC 26xx	MS/TP	1	4	BO OUT-3		
	CO OUT-4	CHWSYS	CH2CWISOV-C	Chiller 2 CW Isolation Valve Command	FEC 26xx	MS/TP	1	4	CO OUT-4		
	CO OUT-5	CHWSYS	CH1CHWISOV-C	Chiller 1 CHW Isolation Valve Command	FEC 26xx	MS/TP	1	4	CO OUT-5		
	CO OUT-6	CHWSYS	CH2CHWISOV-C	Chiller 2 CHW Isolation Valve Command	FEC 26xx	MS/TP	1	4	CO OUT-6		
	CO OUT-7	CHWSYS			FEC 26xx	MS/TP	1	4	CO OUT-7		
	AO OUT-8	CHWSYS			FEC 26xx	MS/TP	1	4	AO OUT-8		
	AO OUT-9	CHWSYS			FEC 26xx	MS/TP	1	4	AO OUT-9		
		CHWSYS			IOM 4710					Power to Controller	
		CHWSYS			IOM 4710	SA Bus	1	4		BacNet SA Bus	4,0
	UI IN-1	CHWSYS	PCHWS-T	Primary CHW Supply Temp	IOM 4710	SA Bus	1	4	UI IN-1		
	UI IN-2	CHWSYS	PCHWR-T	Primary CHW Return Temp	IOM 4710	SA Bus	1	4	UI IN-2		
	UI IN-3	CHWSYS	SCHWR-T	Secondary CHW Return Temp	IOM 4710	SA Bus	1	4	UI IN-3		
	UI IN-4	CHWSYS	CWP1-S	Condenser Water Pump 1 Status	IOM 4710	SA Bus	1	4	UI IN-4		
	UI IN-5	CHWSYS	CWP2-S	Condenser Water Pump 2 Status	IOM 4710	SA Bus	1	4	UI IN-5		
	UI IN-6	CHWSYS	CWP3-S	Condenser Water Pump 3 Status	IOM 4710	SA Bus	1	4	UI IN-6		
	BI IN-7	CHWSYS	CH1CW-DPS	Chiller 1 CW DP Switch	IOM 4710	SA Bus	1	4	BI IN-7		
	BI IN-8	CHWSYS	CH2CW-DPS	Chiller 2 CW DP Switch	IOM 4710	SA Bus	1	4	BI IN-8		
	BO OUT-1	CHWSYS	CWP1-C	Condenser Water Pump 1 Command	IOM 4710	SA Bus	1	4	BO OUT-1		
	BO OUT-2	CHWSYS	CWP2-C	Condenser Water Pump 2 Command	IOM 4710	SA Bus	1	4	BO OUT-2		
	BO OUT-3	CHWSYS	CWP3-C	Condenser Water Pump 3 Command	IOM 4710	SA Bus	1	4	BO OUT-3		
	CO OUT-4	CHWSYS			IOM 4710	SA Bus	1	4	CO OUT-4		
	CO OUT-5	CHWSYS			IOM 4710	SA Bus	1	4	CO OUT-5		
	CO OUT-6	CHWSYS			IOM 4710	SA Bus	1	4	CO OUT-6		
	CO OUT-7	CHWSYS			IOM 4710	SA Bus	1	4	CO OUT-7		
	AO OUT-8	CHWSYS			IOM 4710	SA Bus	1	4	AO OUT-8		
	AO OUT-9	CHWSYS			IOM 4710	SA Bus	1	4	AO OUT-9		
		CHWSYS			IOM 4710					Power to Controller	
		CHWSYS			IOM 4710	SA Bus	1	5		BacNet SA Bus	4,0
	UI IN-1	CHWSYS	WD-A-1	Water Detection Alarm	IOM 4710	SA Bus	1	5	UI IN-1		
	UI IN-2	CHWSYS	WD-A-3	Water Detection Alarm	IOM 4710	SA Bus	1	5	UI IN-2		
	UI IN-3	CHWSYS	WD-A-4	Water Detection Alarm	IOM 4710	SA Bus	1	5	UI IN-3		
	UI IN-4	CHWSYS	CT1-S	Tower 1 Fan Status	IOM 4710	SA Bus	1	5	UI IN-4		
	UI IN-5	CHWSYS			IOM 4710	SA Bus	1	5	UI IN-5		
	UI IN-6	CHWSYS	CT2-S	Tower 2 Fan Status	IOM 4710	SA Bus	1	5	UI IN-6		
	BI IN-7	CHWSYS	CH1-A	Chiller 1 Alarm	IOM 4710	SA Bus	1	5	BI IN-7		
	BI IN-8	CHWSYS	CH2-A	Chiller 2 Alarm	IOM 4710	SA Bus	1	5	BI IN-8		
	BO OUT-1	CHWSYS			IOM 4710	SA Bus	1	5	BO OUT-1		
	BO OUT-2	CHWSYS	CT1-C	Tower 1 Command	IOM 4710	SA Bus	1	5	BO OUT-2		
	BO OUT-3	CHWSYS			IOM 4710	SA Bus	1	5	BO OUT-3		
	CO OUT-4	CHWSYS	CT2-C	Tower 2 Command	IOM 4710	SA Bus	1	5	CO OUT-4		
	CO OUT-5	CHWSYS			IOM 4710	SA Bus	1	5	CO OUT-5		
	CO OUT-6	CHWSYS			IOM 4710	SA Bus	1	5	CO OUT-6		
	CO OUT-7	CHWSYS			IOM 4710	SA Bus	1	5	CO OUT-7		
	AO OUT-8	CHWSYS	CT1-O	Tower 1 VFD Output	IOM 4710	SA Bus	1	5	AO OUT-8		
	AO OUT-9	CHWSYS	CT2-O	Tower 2 VFD Output	IOM 4710	SA Bus	1	5	AO OUT-9		
		CHWSYS			IOM 4710					Power to Controller	
		CHWSYS			IOM 4710	SA Bus	1	6		BacNet SA Bus	4,0

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Drawing Title
CHWS - Point Schedule

Project Title
IN345 BRTC Cooling Tower Design



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

CONTRACT NUMBER
5N20-0400
DRAWING NUMBER
1.3

REFERENCE DRAWING		NO.	REVISION-LOCATION			ECN	DATE	BY	
Sales Engineer	Project Manager	Application Engineer	DRAWN			APPROVED			
JG	BS	DG	BY	DRG	DATE	4/15/2025	BY	DATE	
Johnson Controls 			Branch Information			CONTRACT NUMBER			
			BSNA - INDIANAPOLIS, IN			5N20-0400			
			5920 Castleway West Dr, Indianapolis, Indiana 46250 Phone: 3176387611			DRAWING NUMBER			
						1.3			

CHWS - POINT SCHEDULE (CONT'D)

Electrician/Fitter		Point Information			Controller Information						
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Trunk Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Comment	Template
		CHWSYS			IOM 4710					Power to Controller	
		CHWSYS			IOM 4710	SA Bus	1	6		BacNet SA Bus	4,0
	UI IN-1	CHWSYS	SUMPHI-A	Tower Sump High Alarm	IOM 4710	SA Bus	1	6	UI IN-1		
	UI IN-2	CHWSYS	SUMPLO-A	Tower Sump Low Level Alarm	IOM 4710	SA Bus	1	6	UI IN-2		
	UI IN-3	CHWSYS	SUMPEMERL	Tower Sump Emergency Low	IOM 4710	SA Bus	1	6	UI IN-3		
	UI IN-4	CHWSYS	PCHWP1-S	Primary CHW Pump 1 Status	IOM 4710	SA Bus	1	6	UI IN-4		
	UI IN-5	CHWSYS	PCHWP2-S	Primary CHW Pump 2 Status	IOM 4710	SA Bus	1	6	UI IN-5		
	UI IN-6	CHWSYS	PCHWP3-S	Primary CHW Pump 3 Status	IOM 4710	SA Bus	1	6	UI IN-6		
	BI IN-7	CHWSYS	CH1-S	Chiller 1 Status	IOM 4710	SA Bus	1	6	BI IN-7		
	BI IN-8	CHWSYS	CH2-S	Chiller 2 Status	IOM 4710	SA Bus	1	6	BI IN-8		
	BO OUT-1	CHWSYS	CH1-EN	Chiller 1 Enable	IOM 4710	SA Bus	1	6	BO OUT-1		
	BO OUT-2	CHWSYS	CH2-EN	Chiller 2 Enable	IOM 4710	SA Bus	1	6	BO OUT-2		
	BO OUT-3	CHWSYS	PCHWP1-C	Primary CHW Pump 1 Command	IOM 4710	SA Bus	1	6	BO OUT-3		
	CO OUT-4	CHWSYS	PCHWP2-C	Primary CHW Pump 2 Command	IOM 4710	SA Bus	1	6	CO OUT-4		
	CO OUT-5	CHWSYS	PCHWP3-C	Primary CHW Pump 3 Command	IOM 4710	SA Bus	1	6	CO OUT-5		
	CO OUT-6	CHWSYS			IOM 4710	SA Bus	1	6	CO OUT-6		
	CO OUT-7	CHWSYS			IOM 4710	SA Bus	1	6	CO OUT-7		
	AO OUT-8	CHWSYS			IOM 4710	SA Bus	1	6	AO OUT-8		
	AO OUT-9	CHWSYS			IOM 4710	SA Bus	1	6	AO OUT-9		
		CHWSYS			IOM 4710					Power to Controller	
		CHWSYS			IOM 4710	SA Bus	1	7		BacNet SA Bus	4,0
	UI IN-1	CHWSYS	SCHW-DP	Chill Water Differential Pressure	IOM 4710	SA Bus	1	7	UI IN-1		
	UI IN-2	CHWSYS	SCHW-F	Secondary CHW Flow	IOM 4710	SA Bus	1	7	UI IN-2		
	UI IN-3	CHWSYS			IOM 4710	SA Bus	1	7	UI IN-3		
	UI IN-4	CHWSYS			IOM 4710	SA Bus	1	7	UI IN-4		
	UI IN-5	CHWSYS			IOM 4710	SA Bus	1	7	UI IN-5		
	UI IN-6	CHWSYS	SCHWP1-S	Secondary CHW Pump 1 Status	IOM 4710	SA Bus	1	7	UI IN-6		
	BI IN-7	CHWSYS	SCHWP2-S	Secondary CHW Pump 2 Status	IOM 4710	SA Bus	1	7	BI IN-7		
	BI IN-8	CHWSYS	SCHWP2-S	Secondary CHW Pump 3 Status	IOM 4710	SA Bus	1	7	BI IN-8		
	BO OUT-1	CHWSYS	SCHWP1-C	Secondary CHW Pump 1 Command	IOM 4710	SA Bus	1	7	BO OUT-1		
	BO OUT-2	CHWSYS	SCHWP2-C	Secondary CHW Pump 2 Command	IOM 4710	SA Bus	1	7	BO OUT-2		
	BO OUT-3	CHWSYS	SCHWP3-C	Secondary CHW Pump 3 Command	IOM 4710	SA Bus	1	7	BO OUT-3		
	CO OUT-4	CHWSYS	SCHWP1-O	Secondary CHW Pump 1 Output	IOM 4710	SA Bus	1	7	CO OUT-4		
	CO OUT-5	CHWSYS	SCHWP2-O	Secondary CHW Pump 2 Output	IOM 4710	SA Bus	1	7	CO OUT-5		
	CO OUT-6	CHWSYS	SCHWP3-O	Secondary CHW Pump 3 Output	IOM 4710	SA Bus	1	7	CO OUT-6		
	CO OUT-7	CHWSYS			IOM 4710	SA Bus	1	7	CO OUT-7		
	AO OUT-8	CHWSYS	SCHWBYP-V	Secondary Chilled Water Bypass Valve	IOM 4710	SA Bus	1	7	AO OUT-8		
	AO OUT-9	CHWSYS			IOM 4710	SA Bus	1	7	AO OUT-9		
		CHWSYS			CGM09090					Power to Controller	
		CHWSYS			CGM09090	MS/TP	1	8		BacNet FC Bus	
	UI IN-1	CHWSYS	CT1MH-S	Cooling Tower 1 Motor Heater Status	CGM09090	MS/TP	1	8	UI IN-1	NEW POINTS	
	UI IN-2	CHWSYS	CT1VS-A	Cooling Tower 1 Vibration Switch Alarm	CGM09090	MS/TP	1	8	UI IN-2	NEW POINTS	
	UI IN-3	CHWSYS	CT1OL-A	Cooling Tower 1 Oil Level Alarm	CGM09090	MS/TP	1	8	UI IN-3	NEW POINTS	
	UI IN-4	CHWSYS	CT2MH-S	Cooling Tower 2 Motor Heater Status	CGM09090	MS/TP	1	8	UI IN-4	NEW POINTS	
	UI IN-5	CHWSYS	CT2VS-A	Cooling Tower 2 Vibration Switch Alarm	CGM09090	MS/TP	1	8	UI IN-5	NEW POINTS	
	UI IN-6	CHWSYS	CT2OL-A	Cooling Tower 2 Oil Level Alarm	CGM09090	MS/TP	1	8	UI IN-6	NEW POINTS	
	UI IN-7	CHWSYS			CGM09090	MS/TP	1	8	UI IN-7		
	BI IN-1	CHWSYS			CGM09090	MS/TP	1	8	BI IN-1		
	BI IN-2	CHWSYS			CGM09090	MS/TP	1	8	BI IN-2		
	BO OUT-1	CHWSYS			CGM09090	MS/TP	1	8	BO OUT-1		
	BO OUT-2	CHWSYS			CGM09090	MS/TP	1	8	BO OUT-2		
	BO OUT-3	CHWSYS			CGM09090	MS/TP	1	8	BO OUT-3		
	CO OUT-1	CHWSYS			CGM09090	MS/TP	1	8	CO OUT-1		
	CO OUT-2	CHWSYS			CGM09090	MS/TP	1	8	CO OUT-2		
	CO OUT-3	CHWSYS			CGM09090	MS/TP	1	8	CO OUT-3		
	CO OUT-4	CHWSYS			CGM09090	MS/TP	1	8	CO OUT-4		
	AO OUT-1	CHWSYS			CGM09090	MS/TP	1	8	AO OUT-1		
	AO OUT-2	CHWSYS			CGM09090	MS/TP	1	8	AO OUT-2		

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Drawing Title
CHWS - Point Schedule 2

Project Title
IN345 BRTC Cooling Tower Design

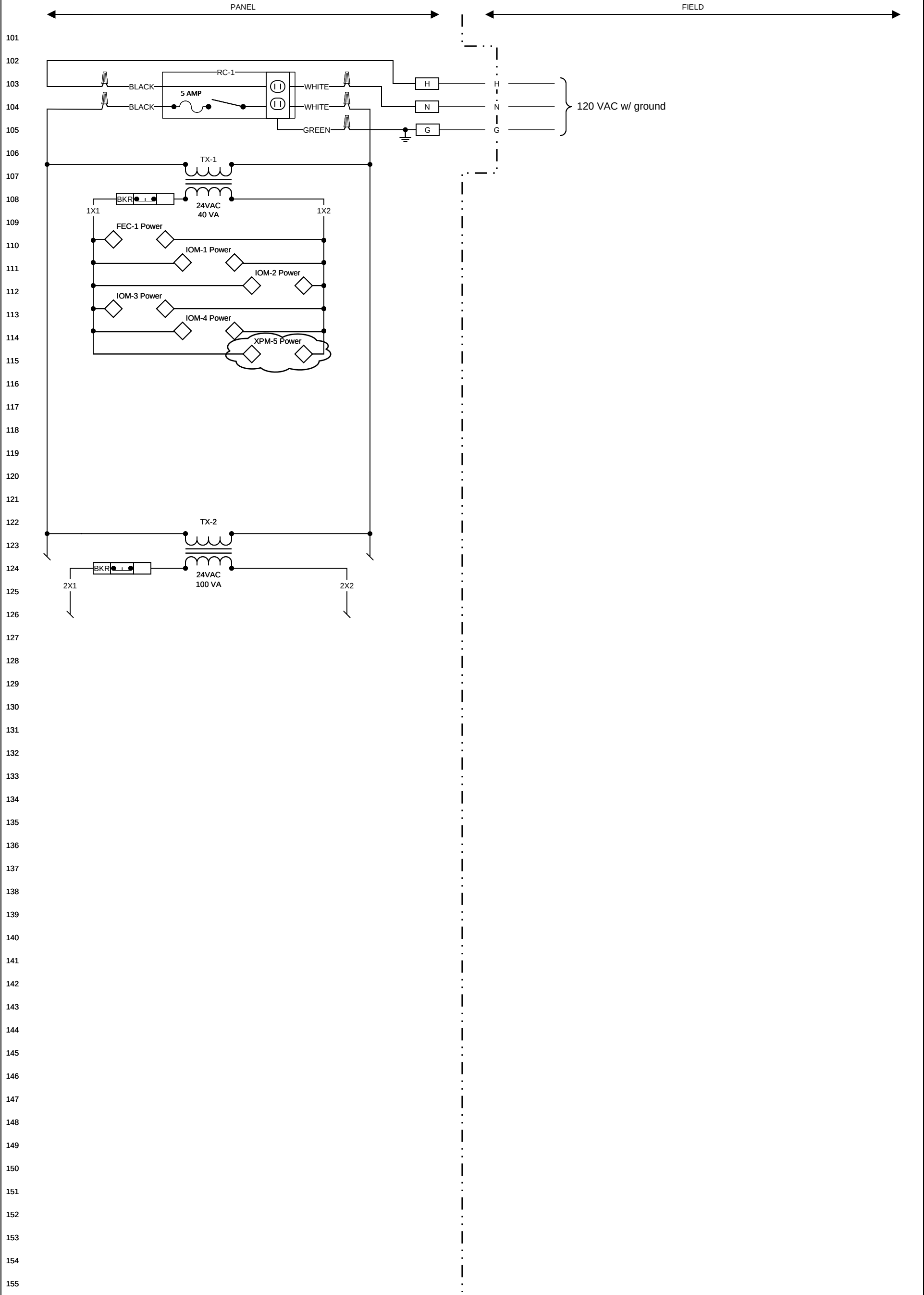


Branch Information
BSNA - INDIANAPOLIS, IN
5920 Castlewary West Dr,
Indianapolis, Indiana
46250
Phone: 3176387611

CONTRACT NUMBER
5N20-0400

DRAWING NUMBER
1.4

WIRING DETAILS



DRAWING NUMBER 1.5	CONTRACT NUMBER 5N20-0400	DRAWING TITLE									
		CHWS - Power Wiring Details									
NO.		REVISION-LOCATION				ECN		DATE		BY	
FILENAME 1.5 CHWS - POWER WIRING DETAILS.VSDX		REVISION DATE/TIME 04/18/25 11:50 AM		SLW		SALES ENGINEER JG		PROJECT MANAGER BS		APPLICATION ENGINEER DG	
PROJECT NAME IN345 BRTC Cooling Tower Design						DRAWN BY DRG		DATE 4/15/2025			
BRANCH INFORMATION BSNA - INDIANAPOLIS, IN 5920 Castleway West Dr, 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).

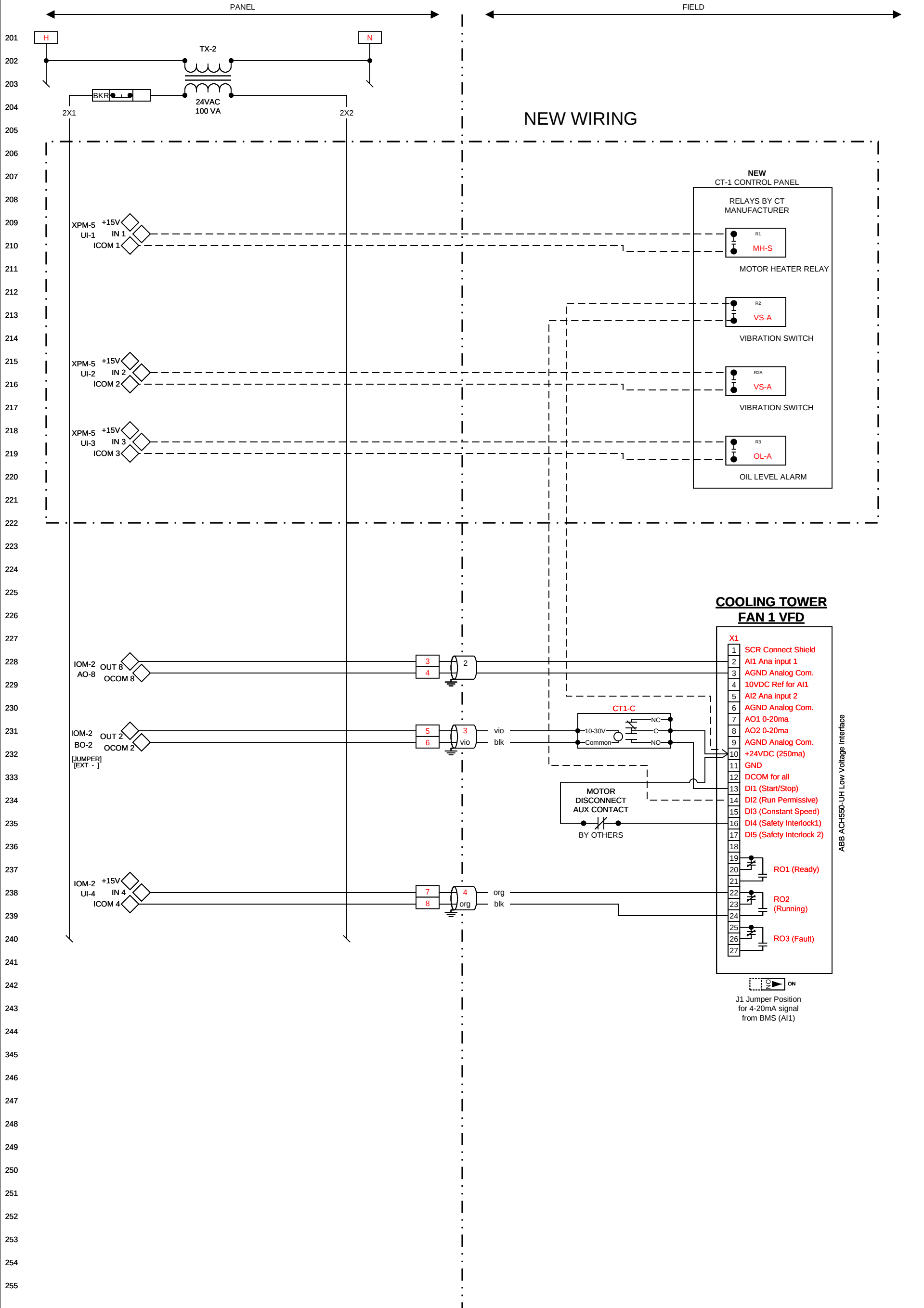
 Cable-no shield.
nn indicates cable number (labeled at both ends of cable).

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.

WIRING DIAGRAM



DRAWING NUMBER 1.6	CONTRACT NUMBER 5N20-0400	DATE	APPROVED BY	DRAWING TITLE																			
				CHWS - Wiring Details 2																			
				NO.		REVISION-LOCATION		ECN		DATE		BY											
FILENAME 1.6 CHWS - WIRING DETAILS 2.VSDX		REVISION DATE/TIME 04/18/25 11:51 AM		SLW 0000040		SALES ENGINEER JG		PROJECT MANAGER BS		APPLICATION ENGINEER DG		DRAWN BY DRG		DATE 4/15/2025									
PROJECT NAME IN345 BRTC Cooling Tower Design												BRANCH INFORMATION BSNA - INDIANAPOLIS, IN 5920 Castleway West Dr, Indianapolis, Indiana 46250 Phone: 3176387611											



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).

Wiring Notes

— —nnn — —

—nnn—

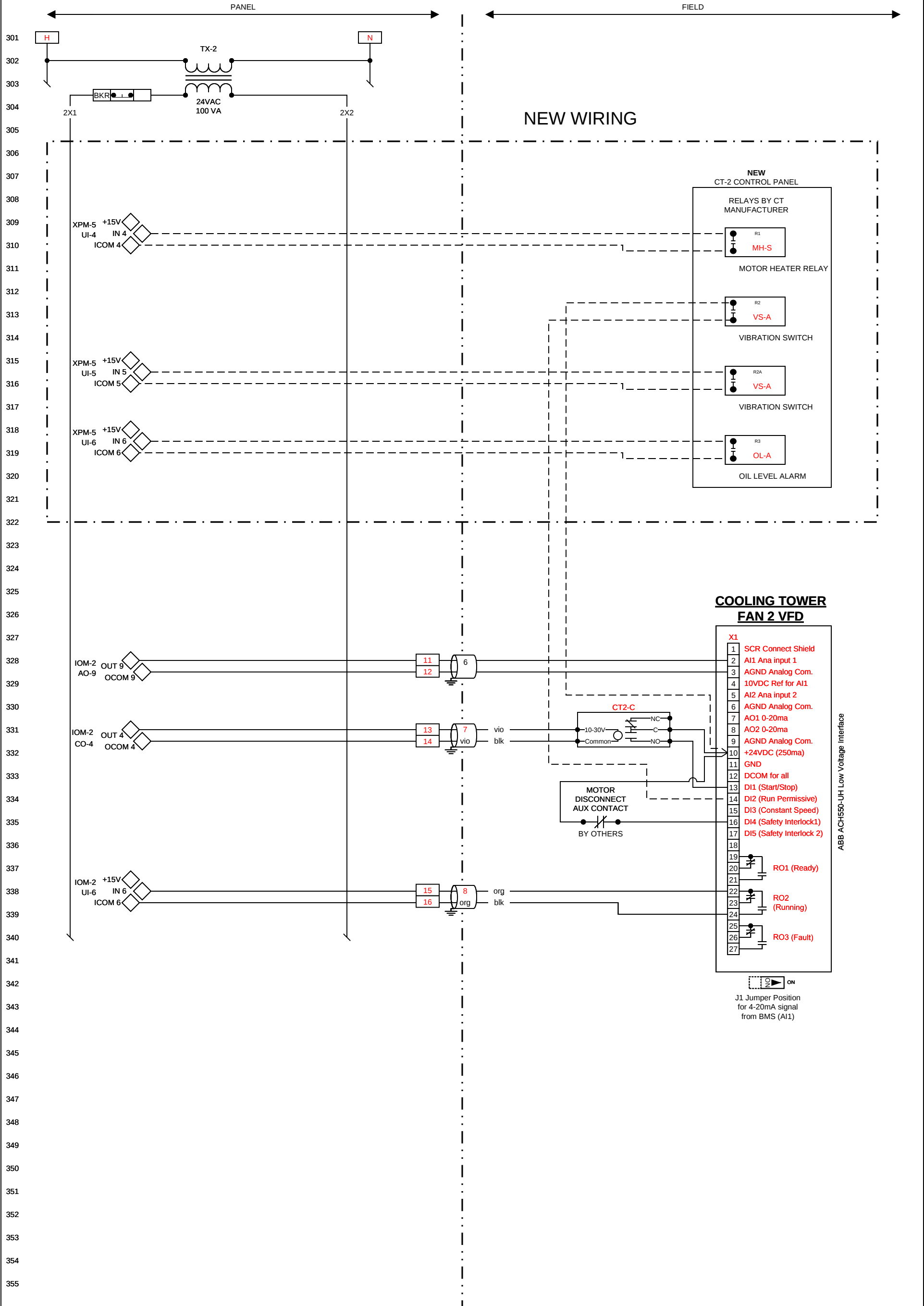
nnn

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

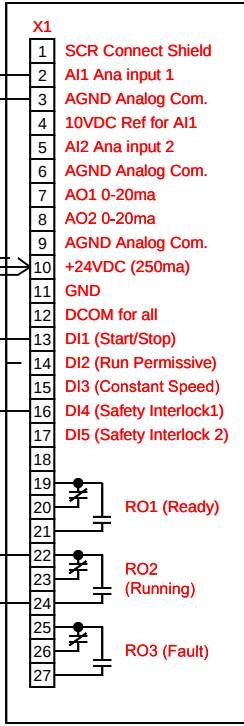
Indicates factory wiring.
nnn indicates wire number (labeled at both ends of wire).

Terminal in JCI panel.
nnn indicates terminal number.

WIRING DIAGRAM



COOLING TOWER
FAN 2 VFD



J1 Jumper Position
for 4-20mA signal
from BMS (AI1)

ABB ACH550-UH Low Voltage Interface

DRAWING NUMBER 1.7	CONTRACT NUMBER 5N20-0400	DRAWING TITLE CHWS - Wiring Details 3											
FILENAME 1.7 CHWS - WIRING DETAILS 3.VSDX		REVISION DATE/TIME 04/18/25 11:51 AM		SLW 0000040		SALES ENGINEER JG		PROJECT MANAGER BS		APPLICATION ENGINEER DG		DRAWN BY DRG DATE 4/15/2025	
PROJECT NAME IN345 BRTC Cooling Tower Design										BRANCH INFORMATION BSNA - INDIANAPOLIS, IN 5920 Castleway West Dr, Indianapolis, Indiana 46250 Phone: 3176387611			

nn

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).

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.