



Applications Cookbook

ASHRAE 90.1 2022

Version 7.0

FOR REFERENCE ONLY

ASHRAE 90.1 2022 COOKBOOK NOTES

1. Refer to manufacturer's data sheets and installation instructions prior to installation
2. Line feed 120/230/277 VAC, 60 Hz
3. Ground not shown, ground devices per applicable national and local codes are best practices
4. For emergency power situations, illustrations assume transfer switch by others upstream of shown devices
5. Line voltage load not to exceed contact rating per device specifications
6. Power packs receiving separate feeds for switched loads and self power must have both feeds on the same phase
7. All low voltage devices consume current. Device power budget is estimated for these details—additional power sources may be required. See product literature for power specifications.
8. Maximum run length for analog wiring is 1000' @ #18 AWC
9. Sensors wired in parallel will cause line voltage relay closure when occupancy is detected by any unit
10. Devices in series requiring contact closure from a single device (clock input, demand response, emergency, etc.) must follow these wiring conventions:
 - First device in sequence provides the +V to the triggering relay
 - Signal from closure attached to all devices in sequence input
 - Com from first device in sequence attached to com on all devices in sequence
11. Applications requiring multiple power packs/power supplies at the same VDC:
 - +V must never be tied together between power packs/power supplies
 - Com/DCC must be tied together to all power packs/power supplies and all powered devices
12. Ultrasonic ceiling mount sensors should be located a minimum of six (6) feet from HVAC supply/return vents
13. Ceiling sensors mounted over doorways should be placed one (1) foot inside the threshold
14. Trough-mounted and pendant-mounted indirect lighting sources affect the operation of locally mounted sensors. Contractor is responsible for adjusting sensor locations to allow for proper operation
15. Contractor is responsible for proper sensitivity and time delay settings for non-adaptive products, following the manufacturer's recommended placement, and field verification of circuits with respect to power pack placement

16. Contractor is responsible for coordinating the operational options of sensors and power packs with the specific work requirements
 - Work relevant energy code requirements affect circuits to be controlled and their control characteristics
 - One controlled relay is required for reach controlled circuit
 - Refer to power pack data sheet for power output and installation guide for maximum number of sensors connected to a control device
 - Multiple control circuits may be controlled by a sensor/multiple sensors. Refer to the product installation manuals for interconnection details
17. Up to 100 Mark VII style ballasts may be controlled per daylighting zone by IRC
18. All relays shown in de-energized state
19. Individually cap off unused leads
20. One-line parenthesis use:
 - (X) Function
 - [#] Terminal
21. N-Way Switching
 - Wireless N-Way Switching/Dimming
 - One device is connected for all control, remaining are connected for device power only. Switching and dimming control are coordinated wirelessly between participating devices.
 - High Voltage 3-Way Switching
 - Per industry standards: (2) high voltage travellers plus (1) high voltage line/load per switch. Switch equal to Leviton 1223-W (Toggle) or 5623-2 (Decora) unless otherwise noted
 - Low Voltage Analog Maintained 3-Way Switching
 - (2) #18 AWG source plus (1) #18 AWG signal per switch. Switch equal to Leviton 1223-W (Toggle) or 5623-2 (Decora) unless otherwise noted
 - Low Voltage Analog Momentary N-Way Switching
 - (1) #18 AWG Source plus (1) #18 AWG signal per switch. Quantity of low voltage momentary switches as required. Terminated in parallel.
 - Digital Stations
 - Digital stations are software programmable and should be wired according to their digital communications
22. Plug Load Control - Commercial receptacle P/Ns:
 - Standard Duplex
 - Split control (1 outlet) CR015-1PX, CR020-1PX
 - Full control (2 outlets) CR015-2PX, CR020-2PX
 - Decora
 - Split control (1 outlet) 16252-1PX, 16352-1PX
 - Full control (2 outlets) 16252-2PX, 16352-2PX

Control Receptacle:

- Quantity per applicable codes
- Termination shown split receptacle. Termination per applicable codes
- Receptacle markings per applicable energy codes

ABBREVIATIONS:

LC	LumaCAN
LV	Low voltage
HV	High voltage switch (maintained)
LVM	Low voltage switch (momentary) Equal to Leviton 1081 (toggle) OR Leviton 56081 (Decora)
LVT	Low voltage switch (maintained) Equal to Leviton 12021-2 (toggle) or Leviton 56021-2 (Decora)
LV2	IRC low voltage switch
UON	Unless otherwise noted
BLK	Black
WHT	White
BLU	Blue
YEL	Yellow
ORG	Orange
VIO	Violet
BRN	Brown

SYMBOLS:

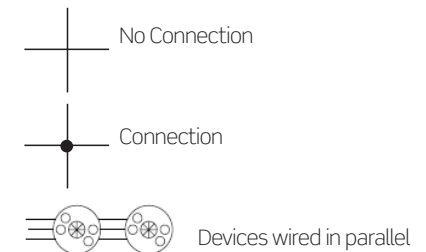
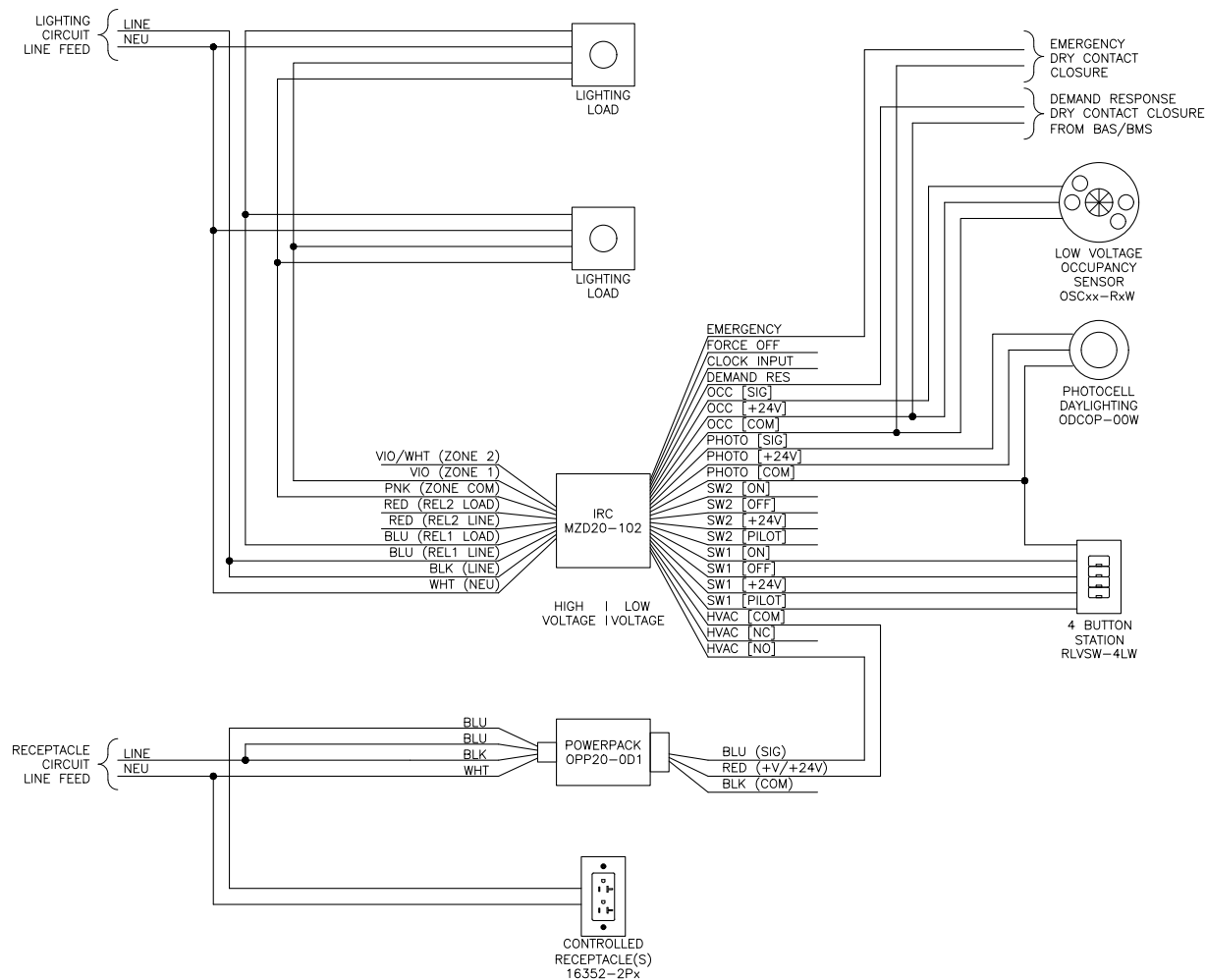


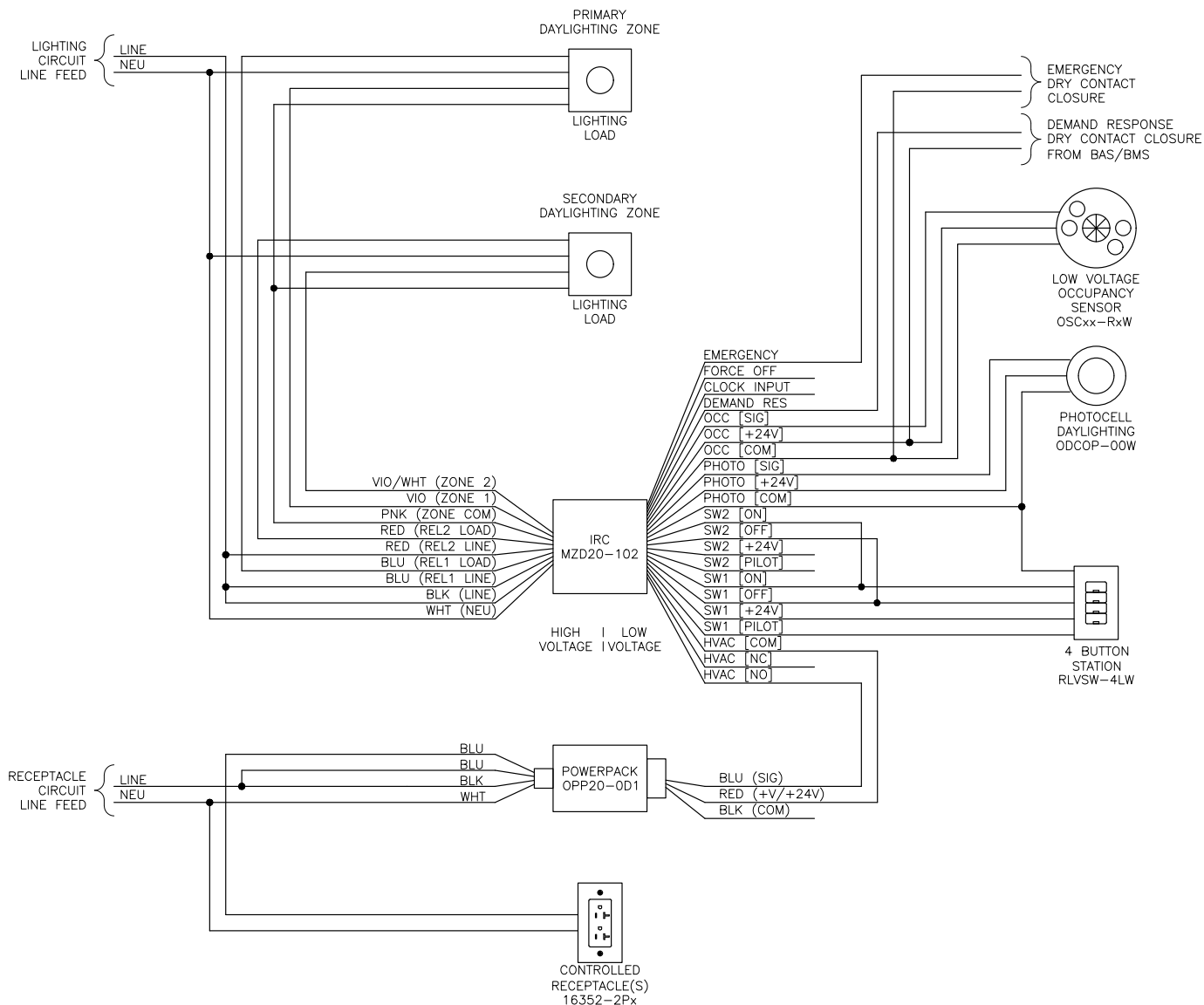
TABLE OF CONTENTS

PAGE	DESCRIPTION
4	Small Office, IRC, Single Zone
5	Small Office, IRC, Dual Zone
6	Small Office, Smart Room Controller (SRC), Single Zone
7	Small Office, Smart Room Controller (SRC), Dual Zone
8	Small Office, GreenMAX DRC Wireless with Intellect-Enabled Fixture and Wireless Devices, Single Zone
9	Small Office, GreenMAX DRC Wireless with Intellect-Enabled Fixtures and Wireless Devices, Dual Zone
10	Open Office, GreenMAX DRC Wireless with Intellect-Enabled Fixture and Wireless Devices
11	Open Office, GreenMAX and GreenMAX DRC Wired
12	Open Office, IRC
13	Conference Room, GreenMAX
14	Conference Room, GreenMAX DRC Wireless with Intellect-Enabled Fixture and Wireless Devices
15	Classroom, IRC
16	Classroom with Demand Response, Smart Room Controller (SRC)
17	Classroom, GreenMAX DRC Wireless with Intellect-Enabled Fixture and Wireless Devices
18	Common Area, IRC
19	Common Area, Smart Room Controller (SRC)
20	Common Area, GreenMAX DRC Wireless with Intellect-Enabled Fixture and Wireless Devices
21	Stairwell, IRC
22	Sidelit Walkway, IRC
23	Warehouse, GreenMAX
24	Warehouse, OSF20-ILW/OSFHP-ILW
25	Parking Garage, GreenMAX
26	Parking Garage, Smart IP66 Integrated Fixture Mount Sensors
27	Site Lighting, Smart IP66 Integrated Fixture Mount Sensors
29	Site Lighting, Occupancy Sensor Per Fixture, Smart IP66 Integrated Fixture Mount Sensors

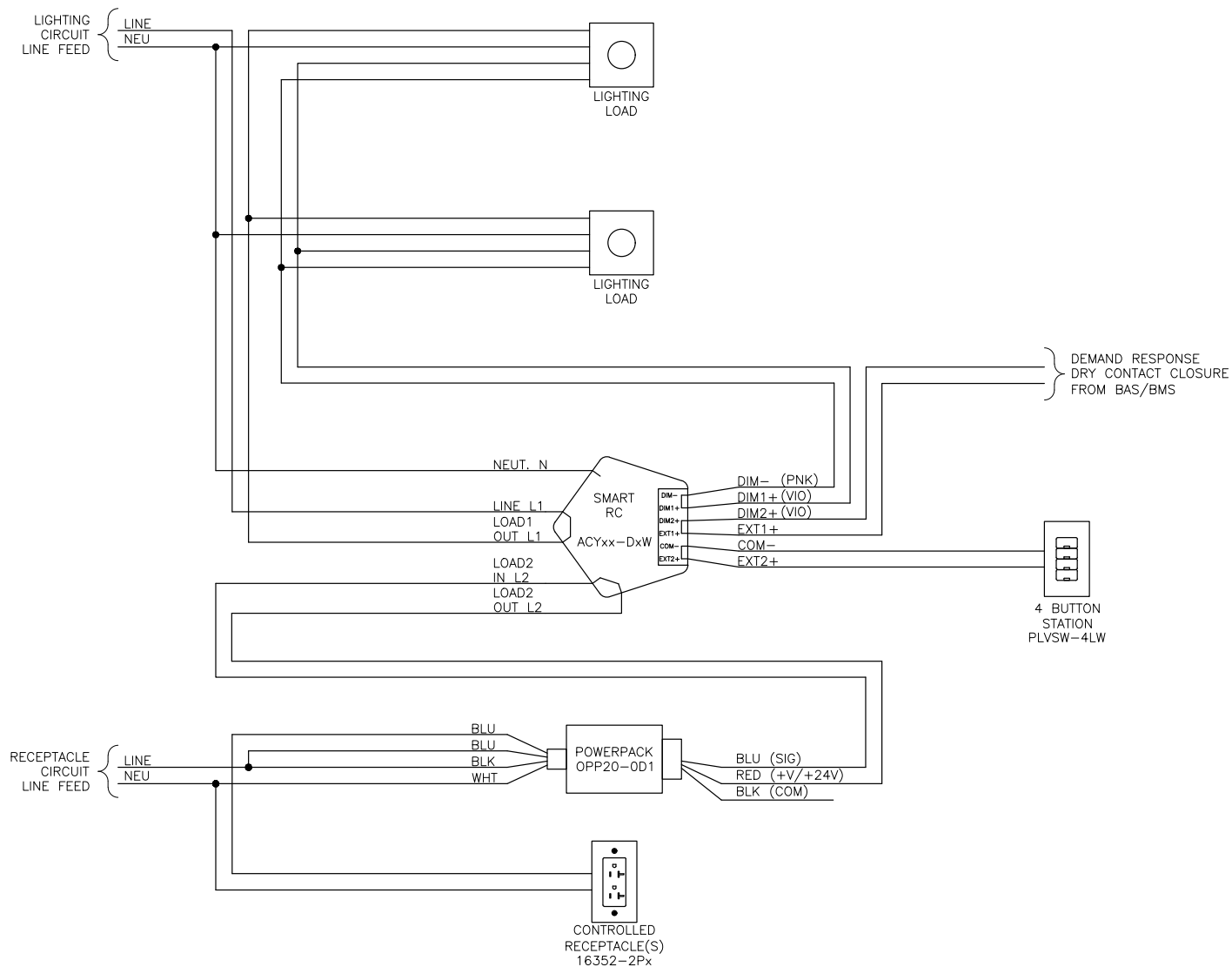
ASHRAE 90.1 2022 SMALL OFFICE, IRC, SINGLE ZONE, TYPICAL



ASHRAE 90.1 2022 SMALL OFFICE, IRC, DUAL ZONE, TYPICAL



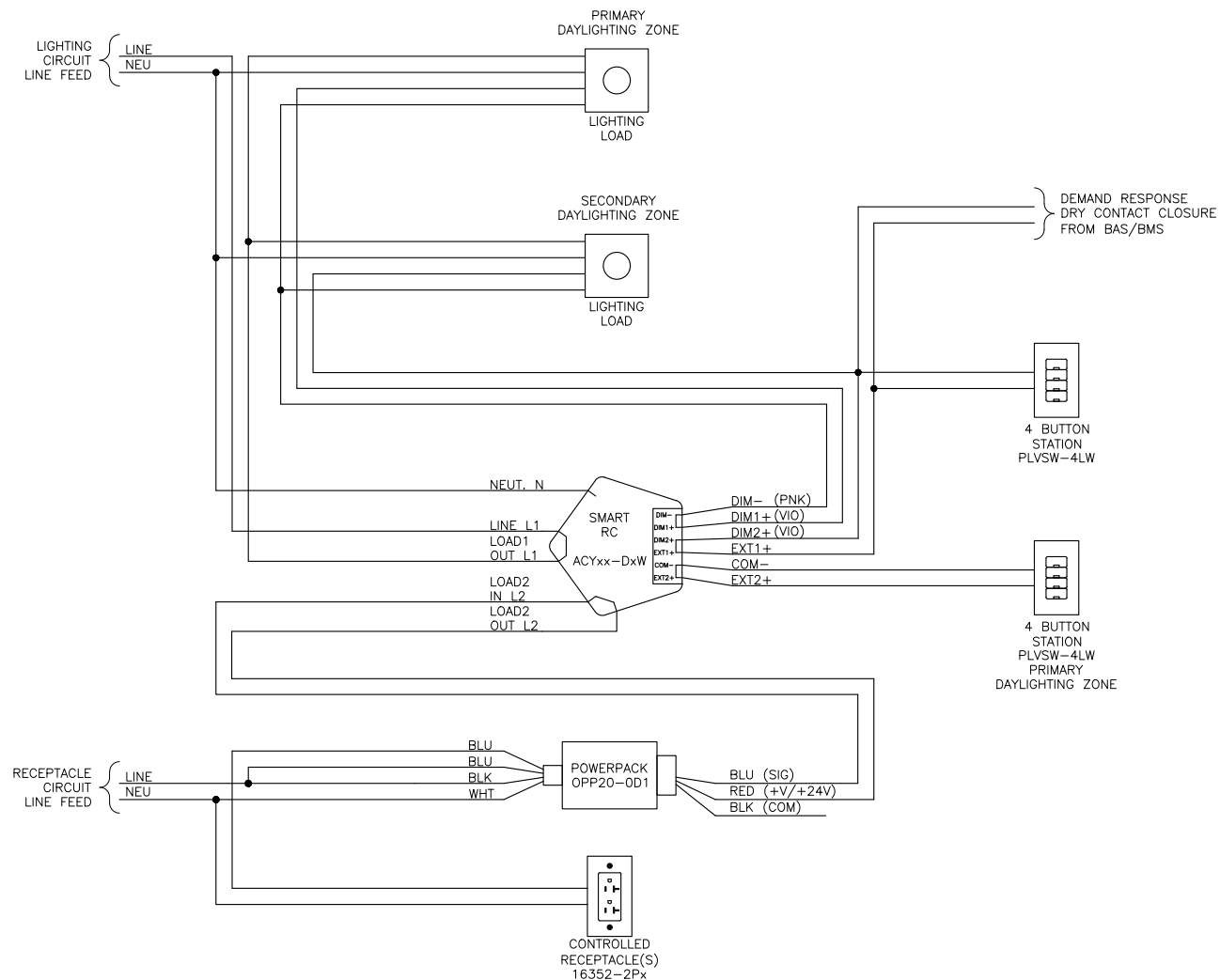
ASHRAE 90.1 2022 SMALL OFFICE, SMART ROOM CONTROLLER (SRC), SINGLE ZONE, TYPICAL



NOTES:

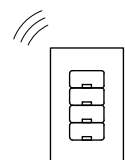
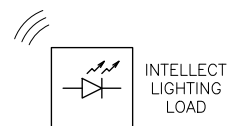
1. 0-10V PINK WIRE MAY BE GRAY.

ASHRAE 90.1 2022 SMALL OFFICE, SMART ROOM CONTROLLER (SRC), DUAL ZONE, TYPICAL

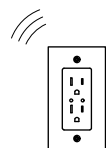


NOTES:
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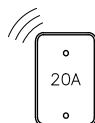
ASHRAE 90.1 2022 SMALL OFFICE, GREENMAX DRC WIRELESS WITH INTELLECT-ENABLED FIXTURE AND WIRELESS DEVICES, SINGLE ZONE, TYPICAL



GREENMAX DRC WIRELESS
KEYPAD ROOM CONTROLLER
DRKDN-U4W



ZIGBEE CONTROLLED
RECEPTACLE
ZSTLR-1HW

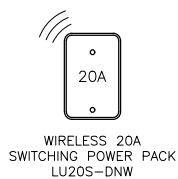
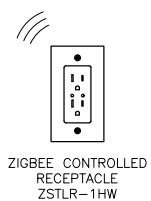
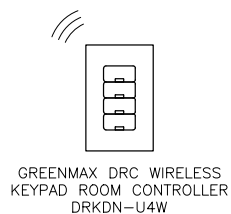
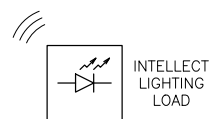
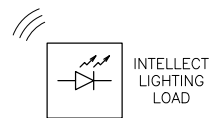


WIRELESS 20A
SWITCHING POWER PACK
LU20S-DNW

NOTES:

1. ALL DEVICES REQUIRE CONSTANT INPUT POWER. REFER TO PRODUCT LITERATURE (DATA SHEETS, INSTALLATION MANUALS, ETC) FOR MORE INFORMATION.

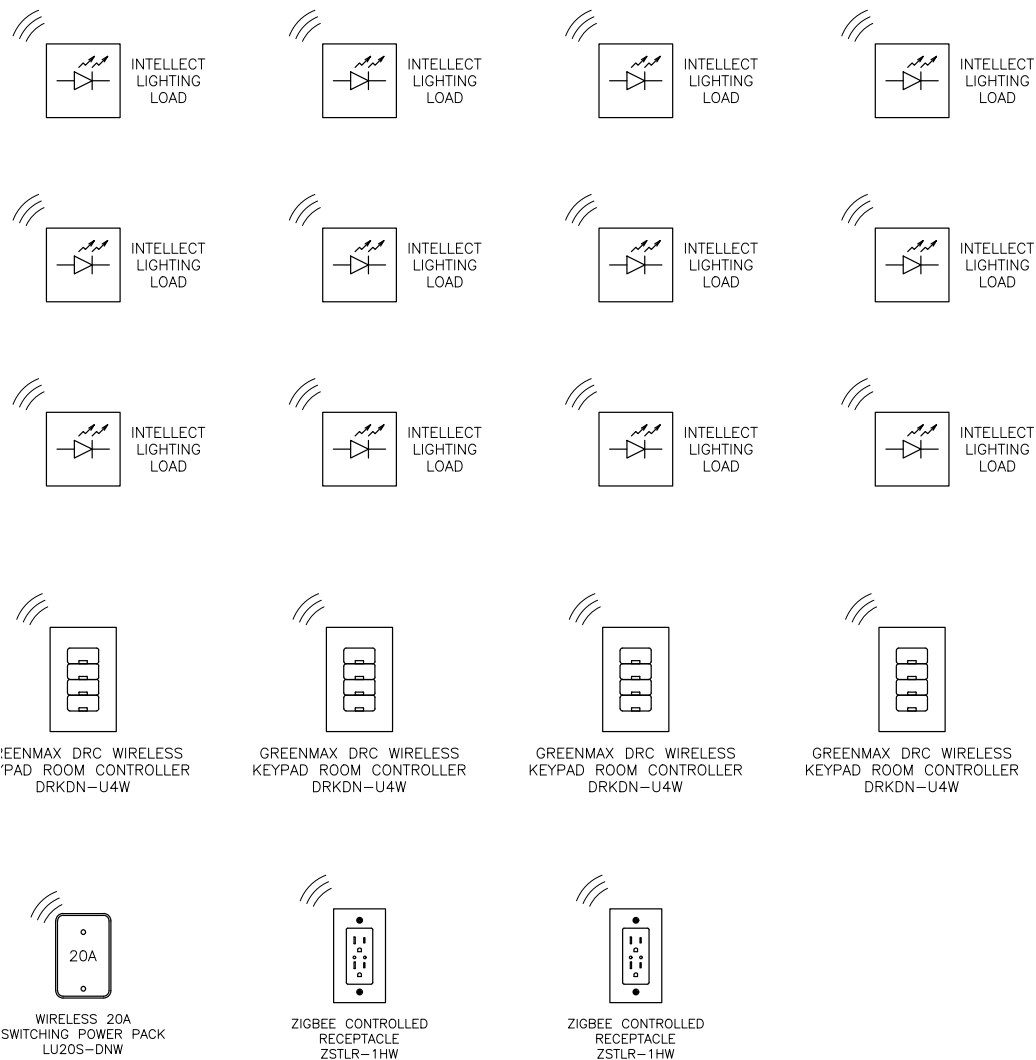
ASHRAE 90.1 2022 SMALL OFFICE, GREENMAX DRC WIRELESS WITH INTELLECT-ENABLED FIXTURE AND WIRELESS DEVICES, DUAL ZONE, TYPICAL



NOTES:

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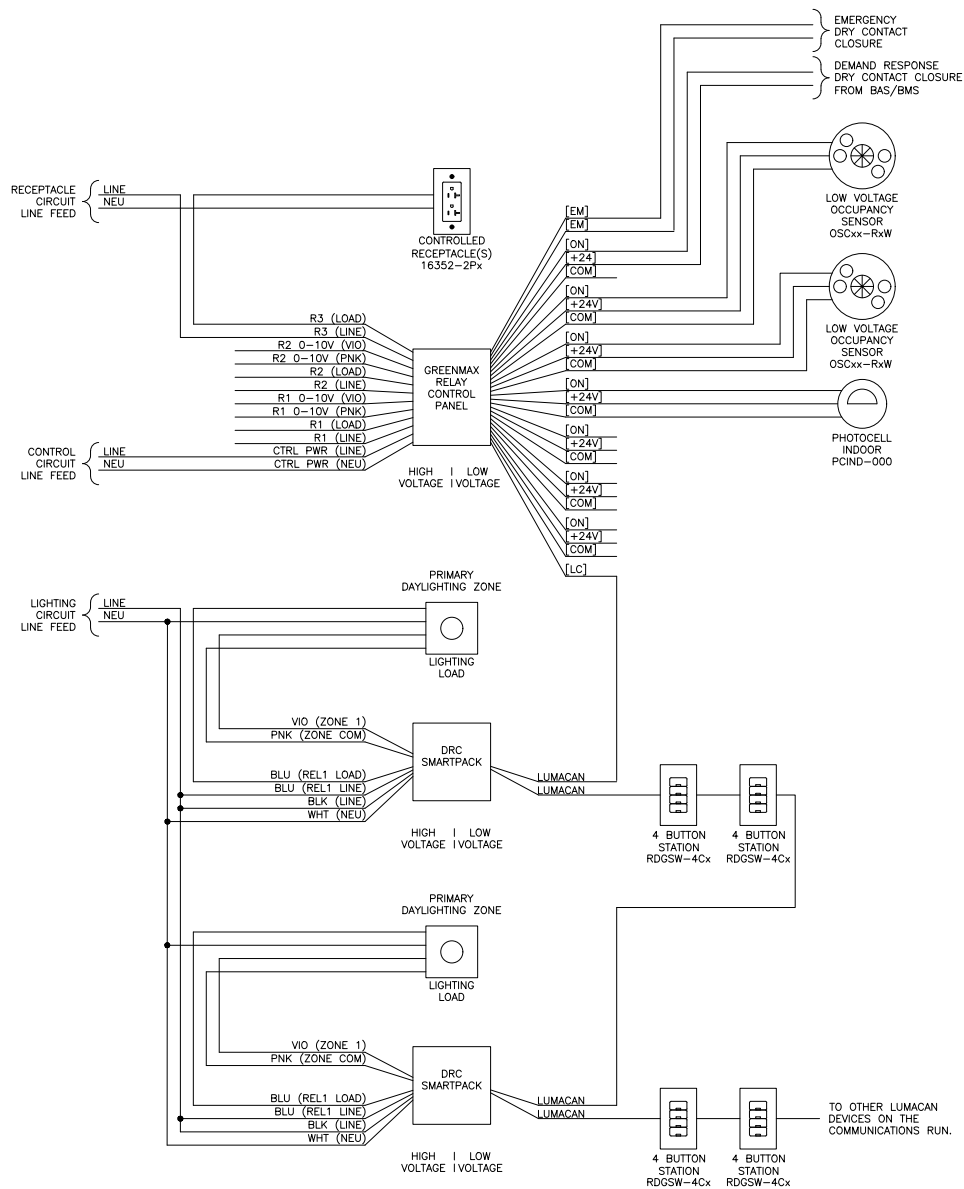
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NOTES:

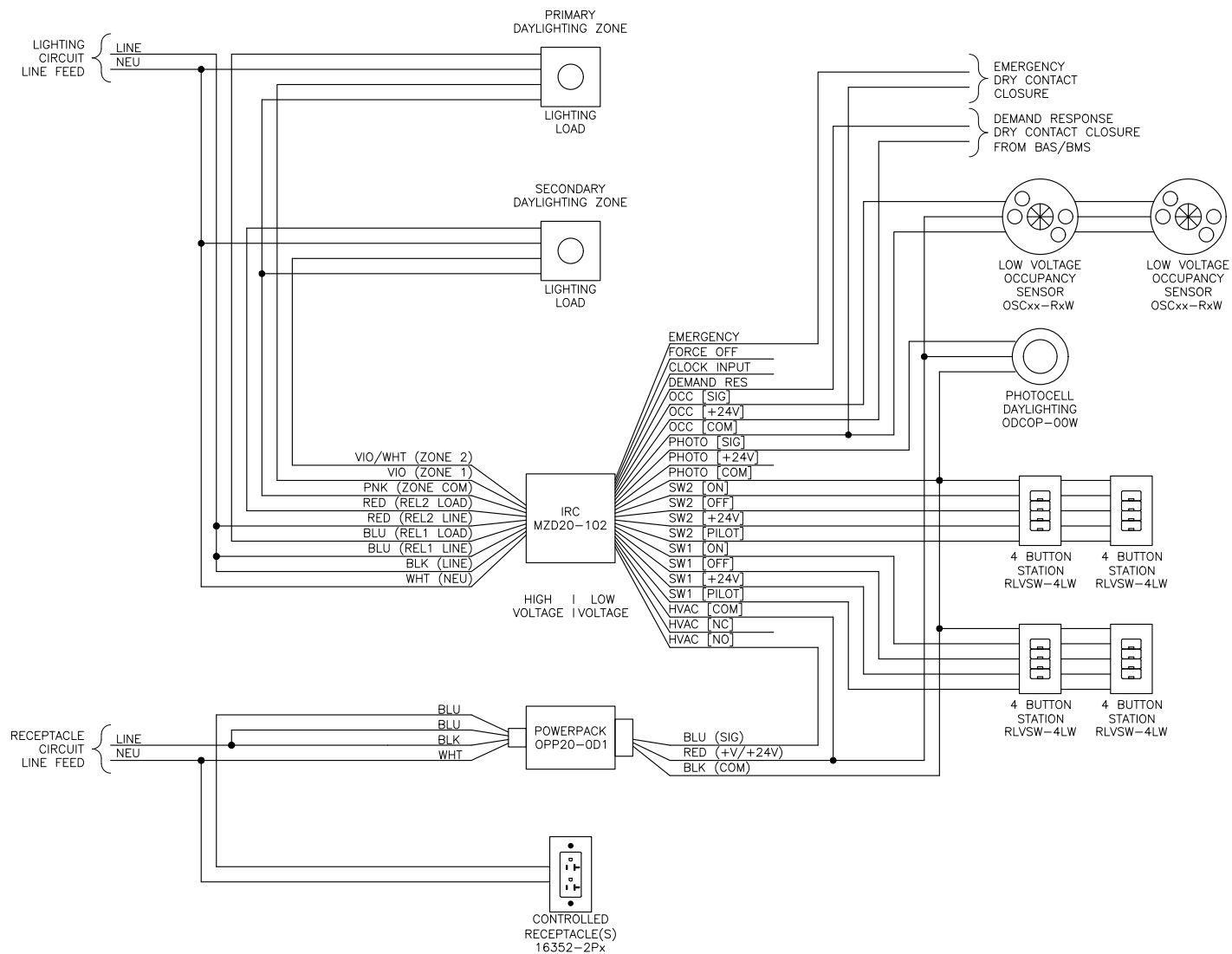
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ASHRAE 90.1 2022 OPEN OFFICE, GREENMAX AND GREENMAX DRC WIRED, TYPICAL

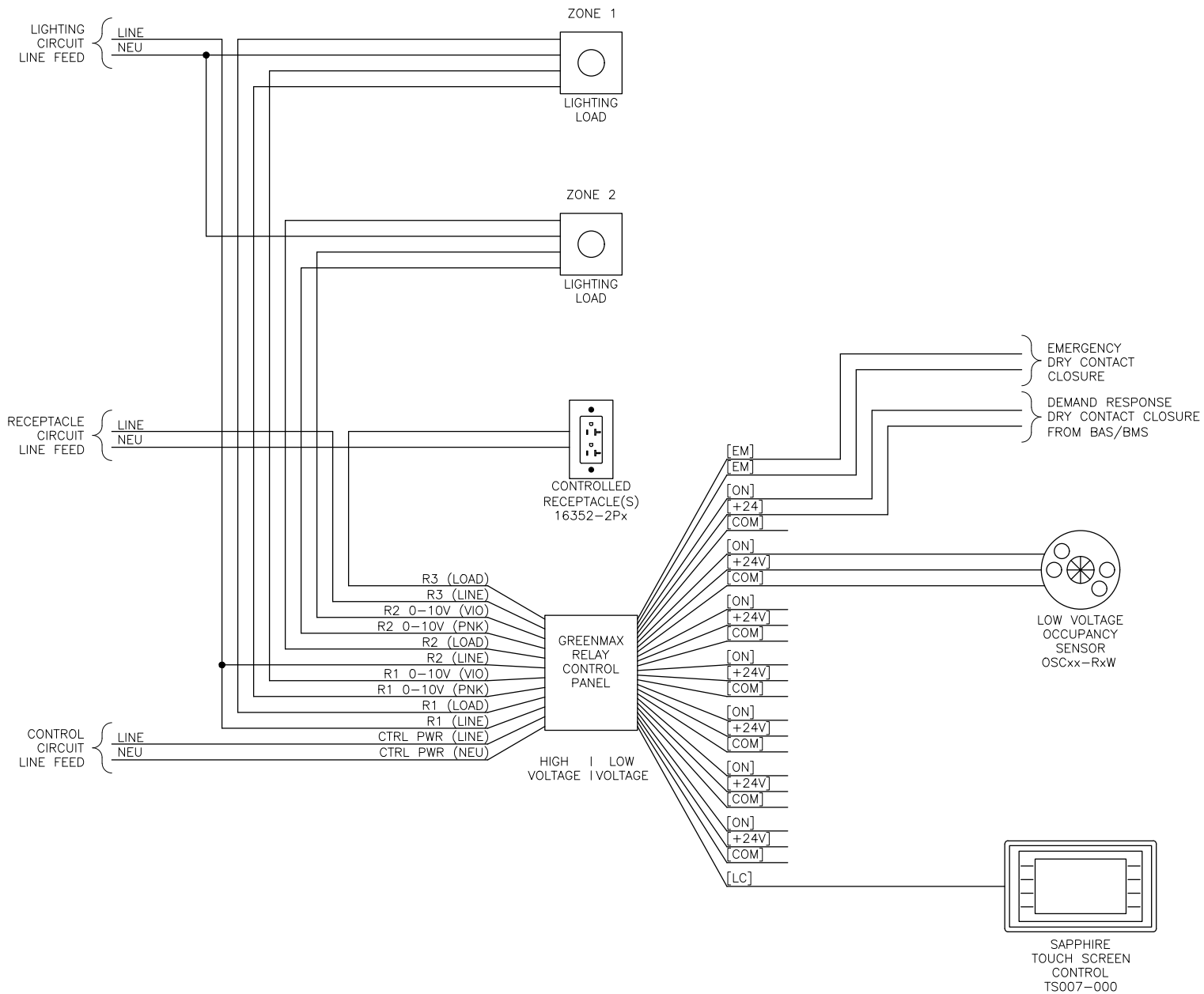


NOTES:
1. 0-10V PINK WIRE MAY BE GRAY.

ASHRAE 90.1 2022 OPEN OFFICE, IRC, TYPICAL

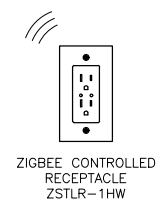
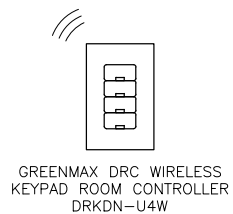


ASHRAE 90.1 2022 CONFERENCE ROOM, GREENMAX, TYPICAL



NOTES:
 1. 0-10V PINK WIRE MAY BE GRAY.

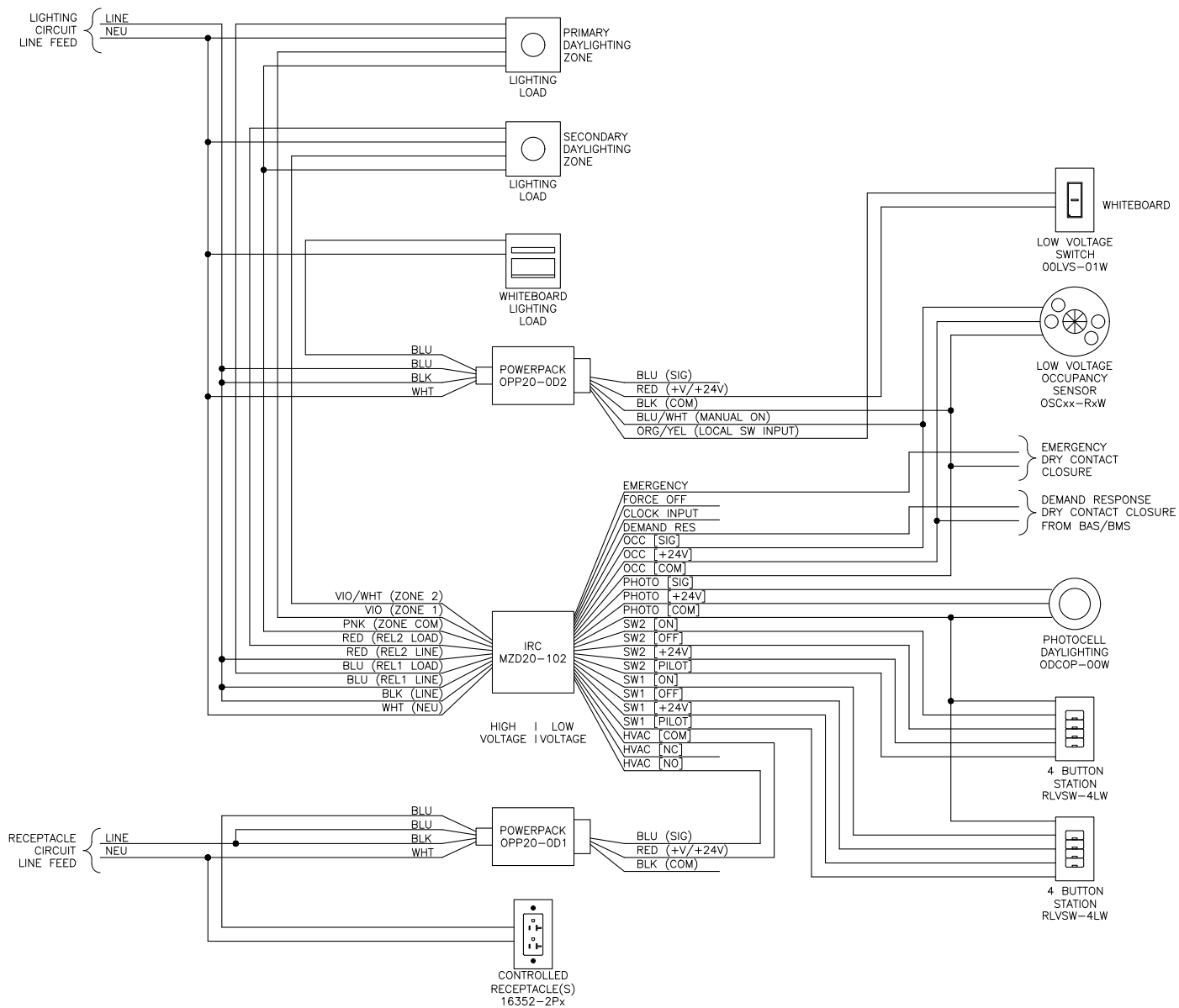
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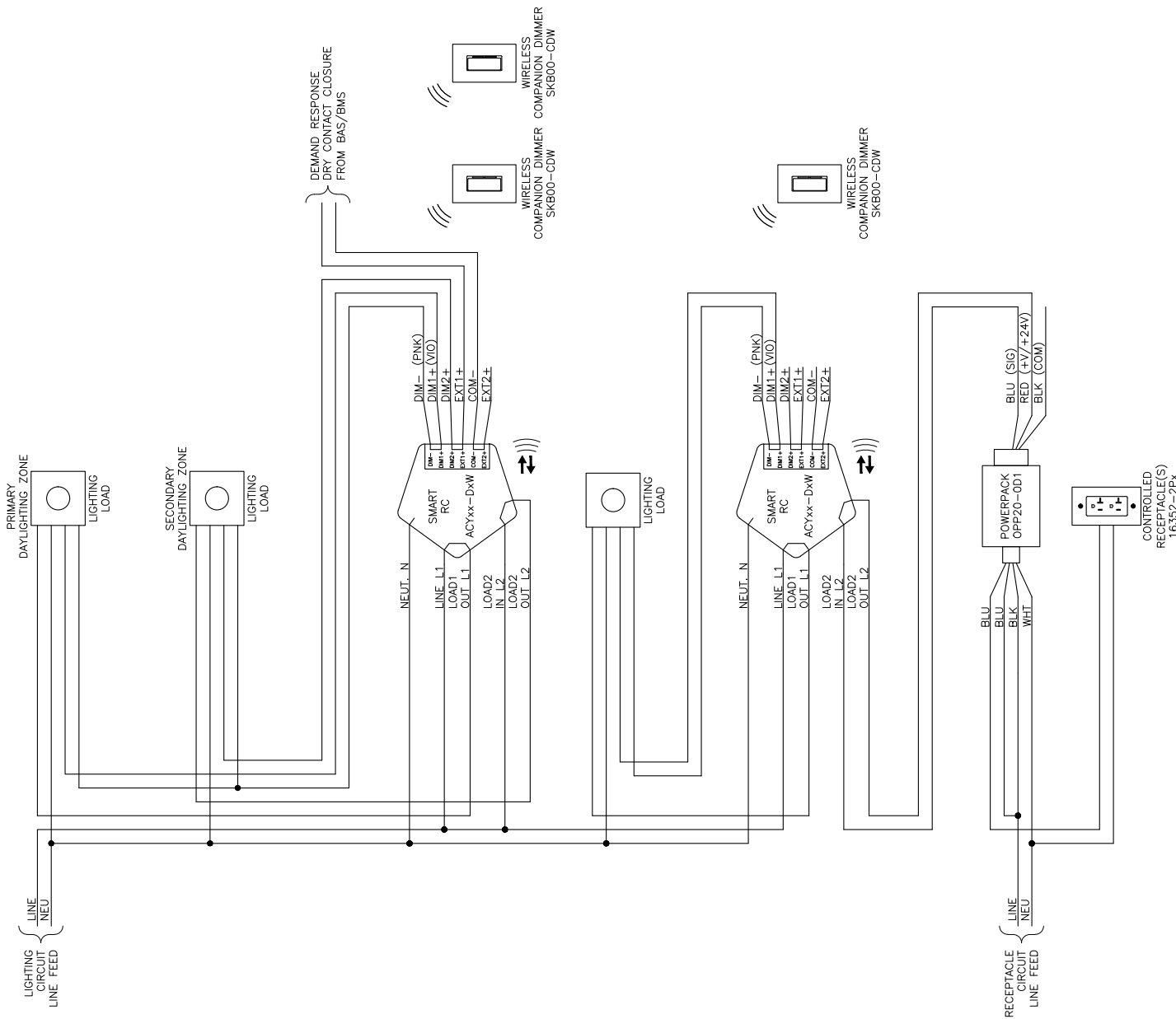
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ASHRAE 90.1 2022 CLASSROOM, IRC, TYPICAL

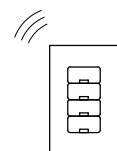
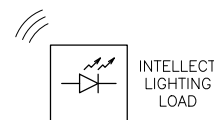
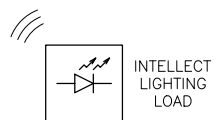
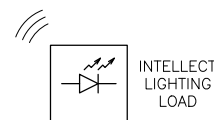
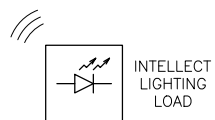


ASHRAE 90.1 2022 CLASSROOM WITH DEMAND RESPONSE, SMART ROOM CONTROLLER (SRC), TYPICAL

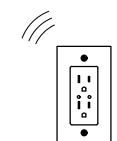


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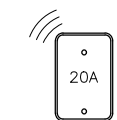
ASHRAE 90.1 2022 CLASSROOM GREENMAX DRC WIRELESS WITH INTELLECT-ENABLED FIXTURES AND WIRELESS DEVICES, TYPICAL



GREENMAX DRC WIRELESS
KEYPAD ROOM CONTROLLER
DRKDN-U4W



ZIGBEE CONTROLLED
RECEPTACLE
ZSTLR-1HW

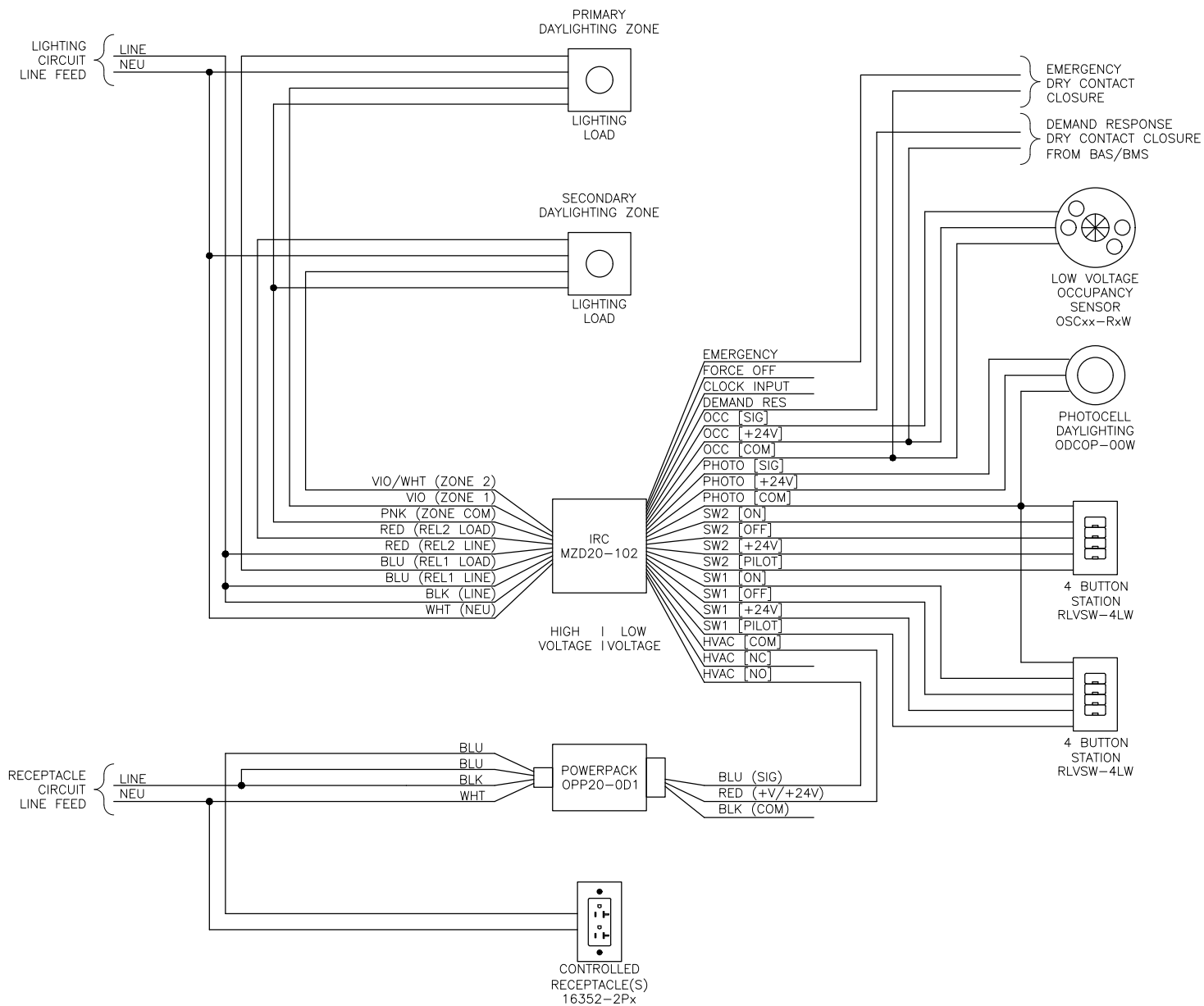


WIRELESS 20A
SWITCHING POWER PACK
LU20S-DNW

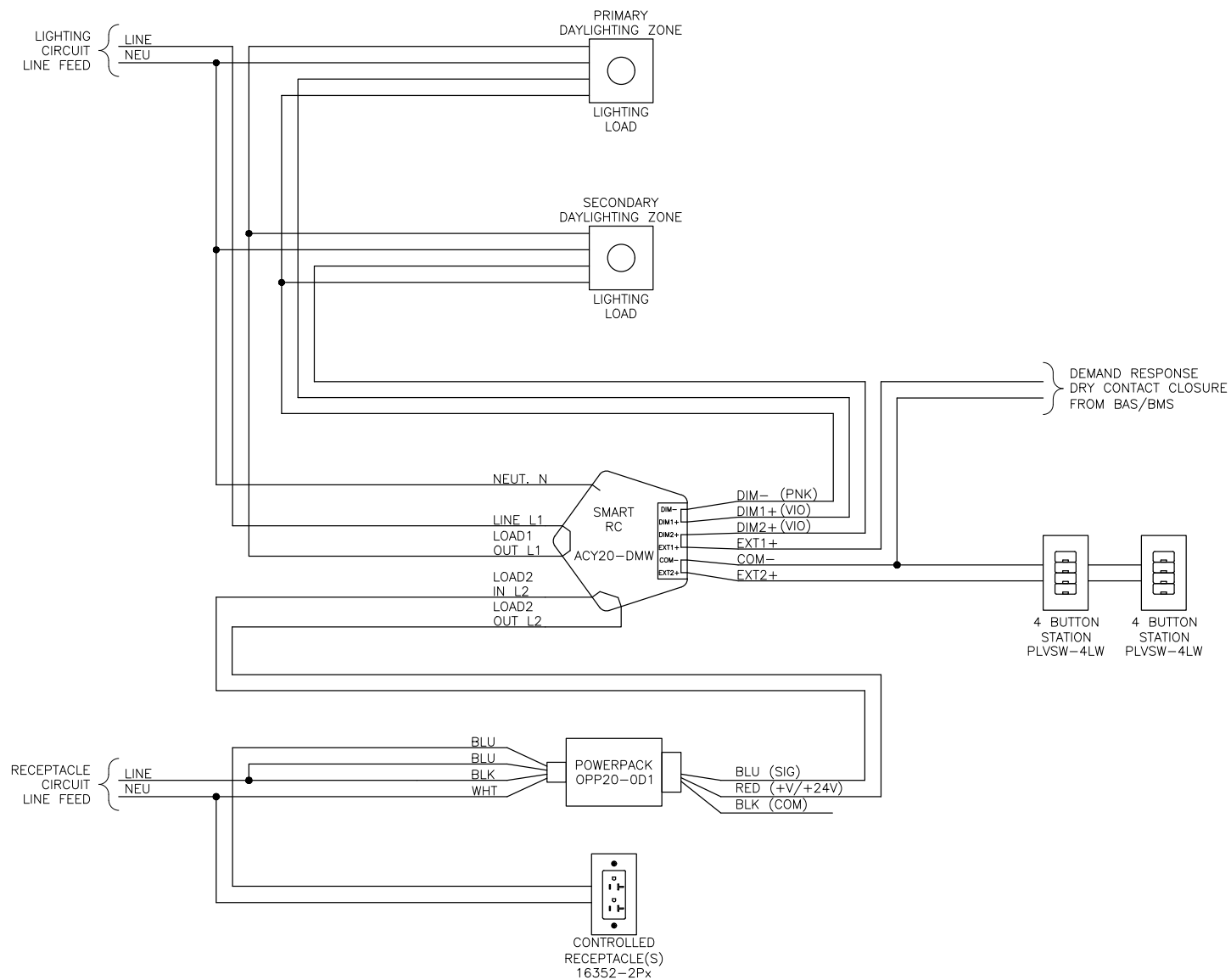
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ASHRAE 90.1 2022 COMMON AREA, IRC, TYPICAL

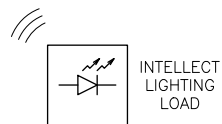


ASHRAE 90.1 2022 COMMON AREA, SMART ROOM CONTROLLER (SRC), TYPICAL

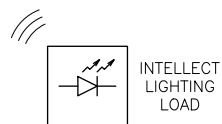


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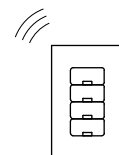
ASHRAE 90.1 2022 COMMON AREA, GREENMAX DRC WIRELESS WITH INTELLECT-ENABLED FIXTURES AND WIRELESS DEVICES, TYPICAL



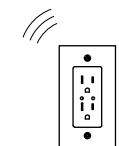
INTELLECT
LIGHTING
LOAD



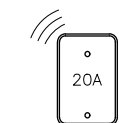
INTELLECT
LIGHTING
LOAD



GREENMAX DRC WIRELESS
KEYPAD ROOM CONTROLLER
DRKDN-U4W



ZIGBEE CONTROLLED
RECEPTACLE
ZSTLR-1HW

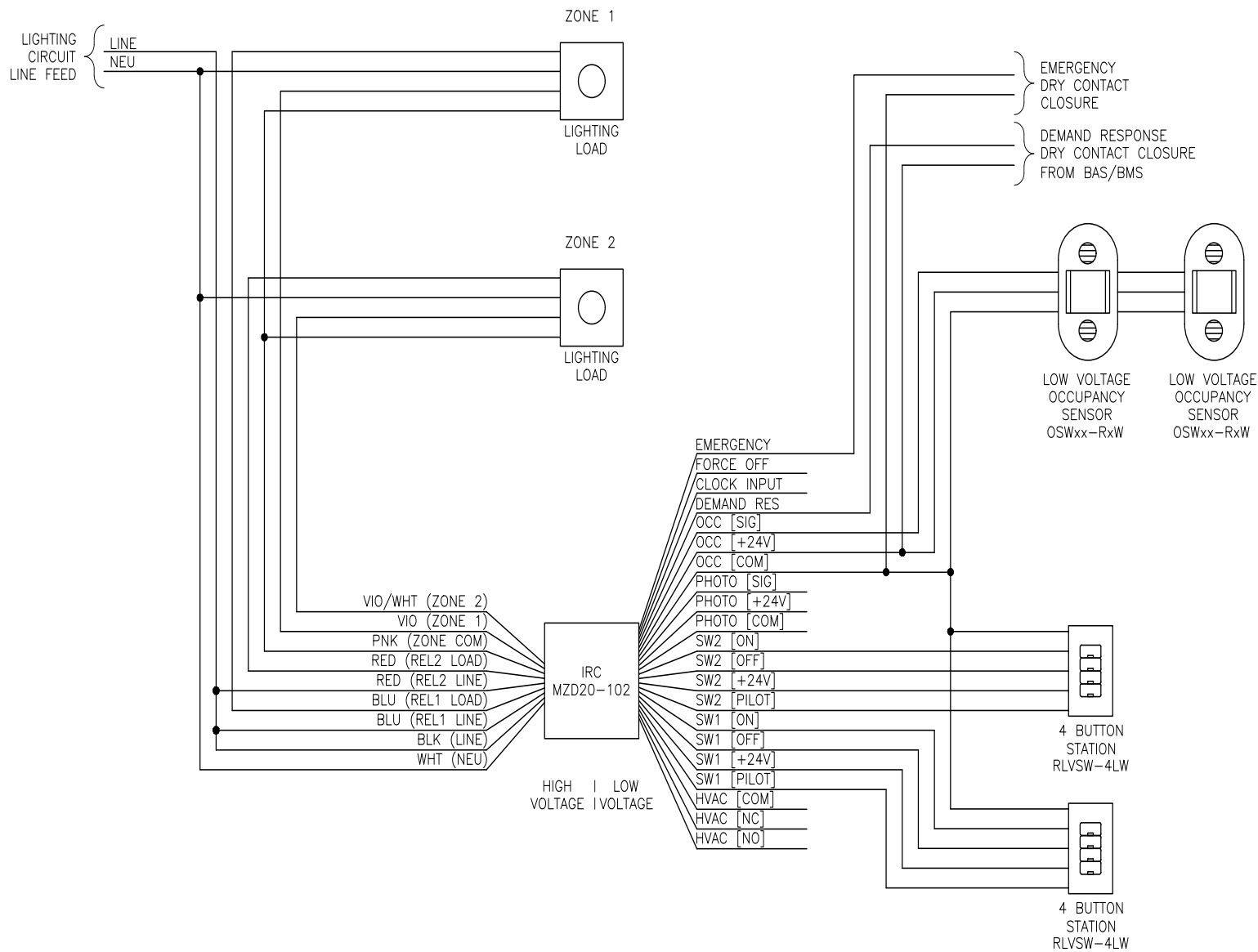


WIRELESS 20A
SWITCHING POWER PACK
LU20S-DNW

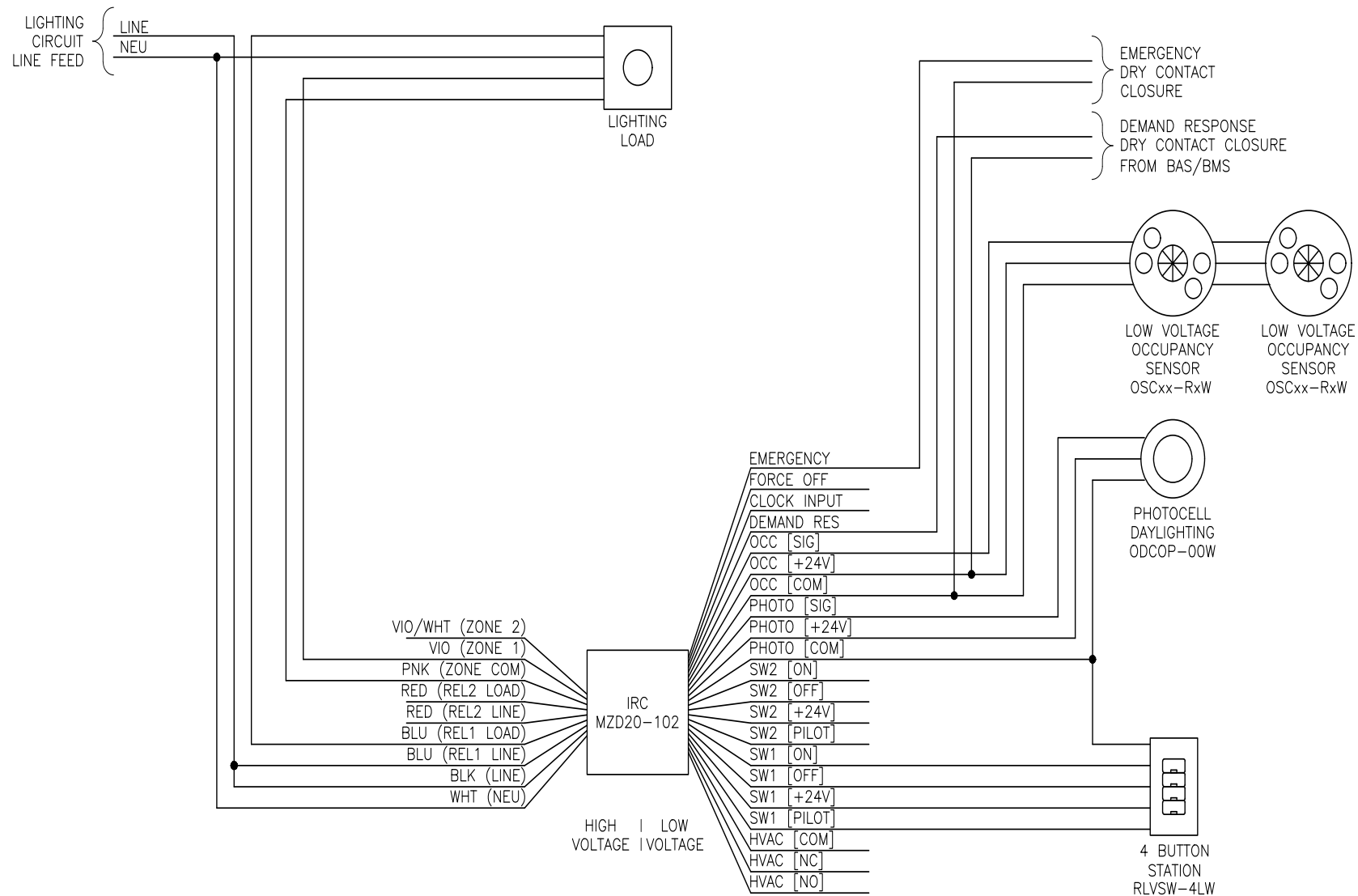
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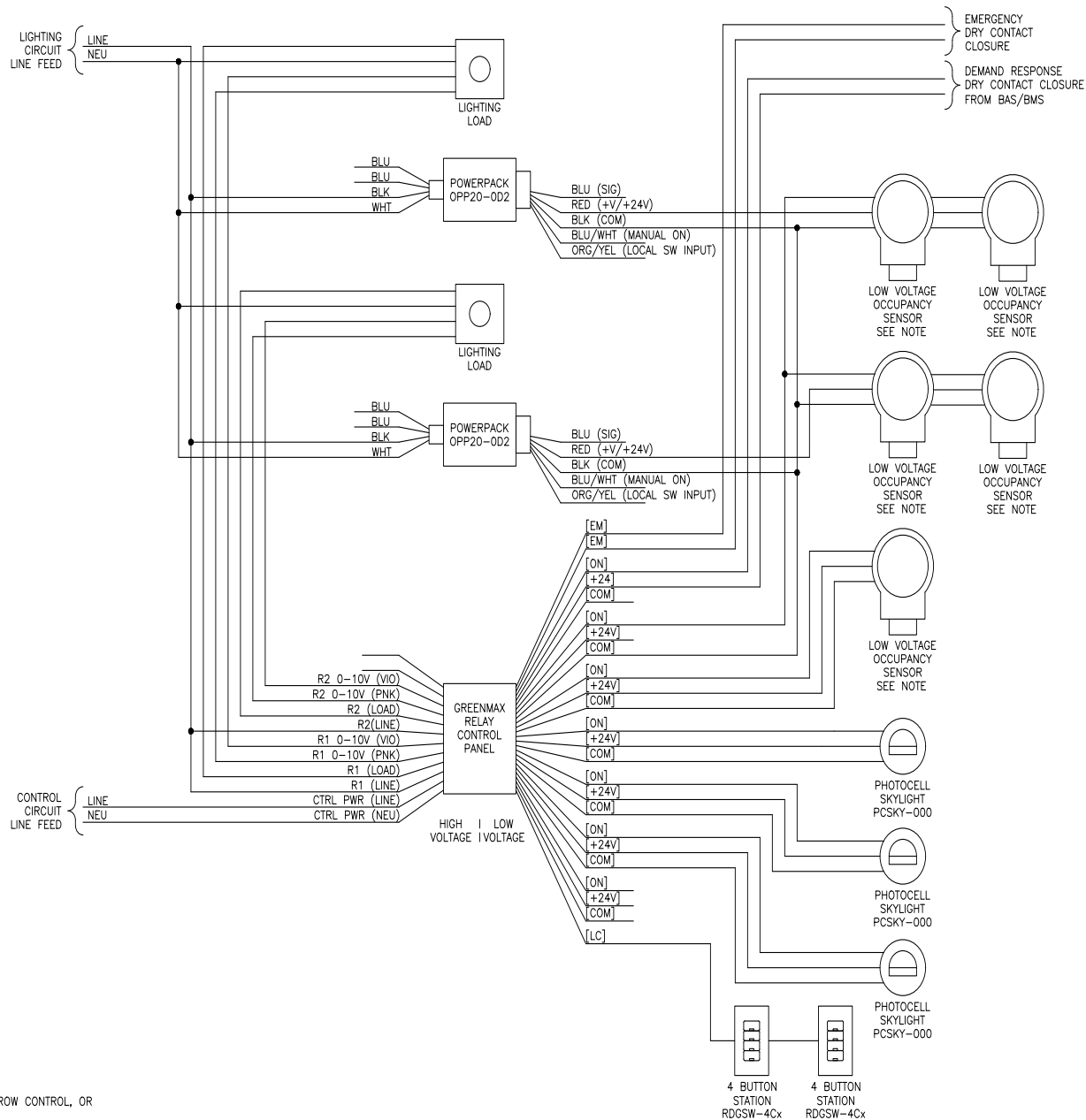
ASHRAE 90.1 2022 STAIRWELL, IRC, TYPICAL



ASHRAE 90.1 2022 SIDELIT WALKWAY, IRC, TYPICAL



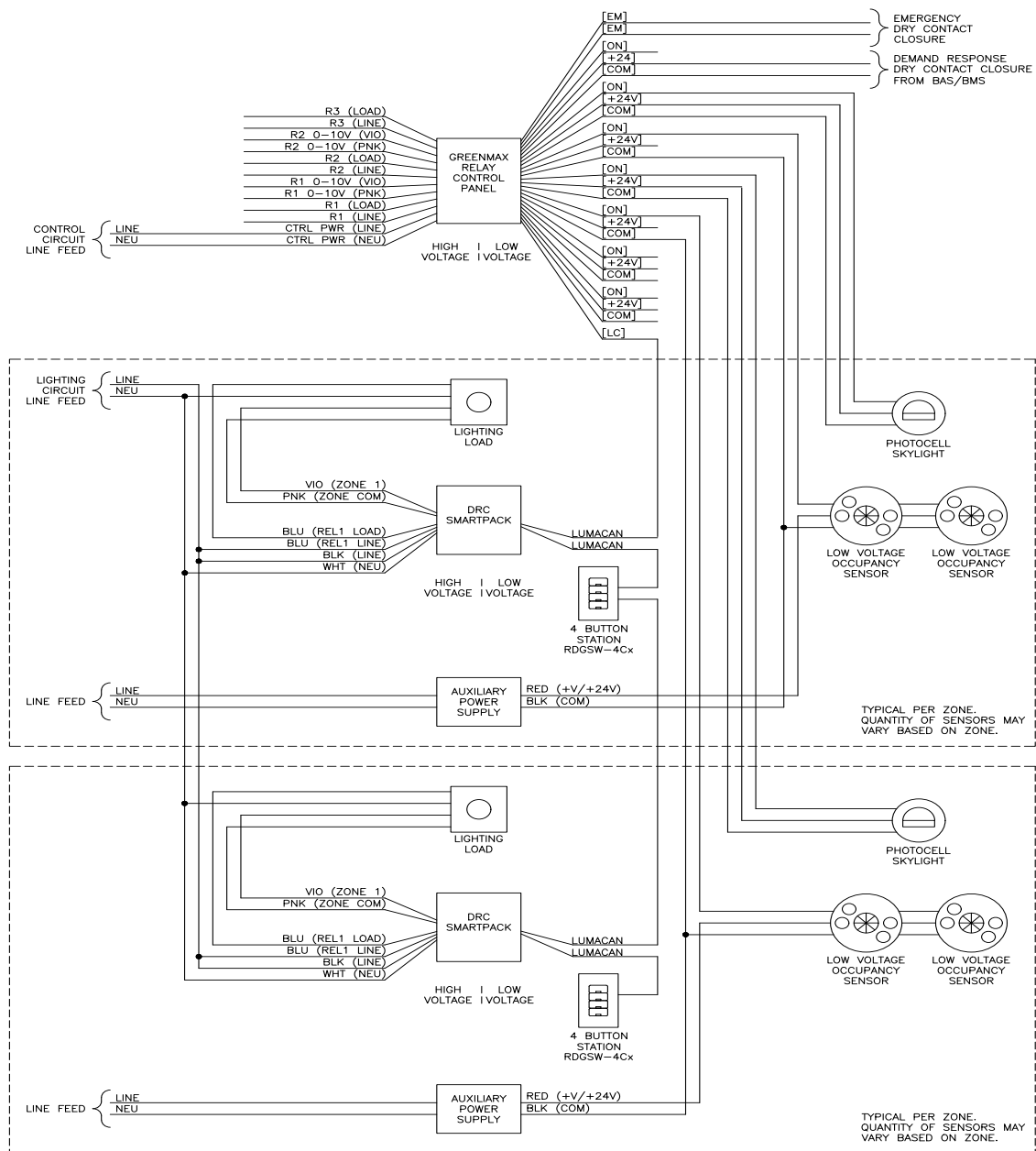
ASHRAE 90.1 2022 WAREHOUSE, GREENMAX, TYPICAL



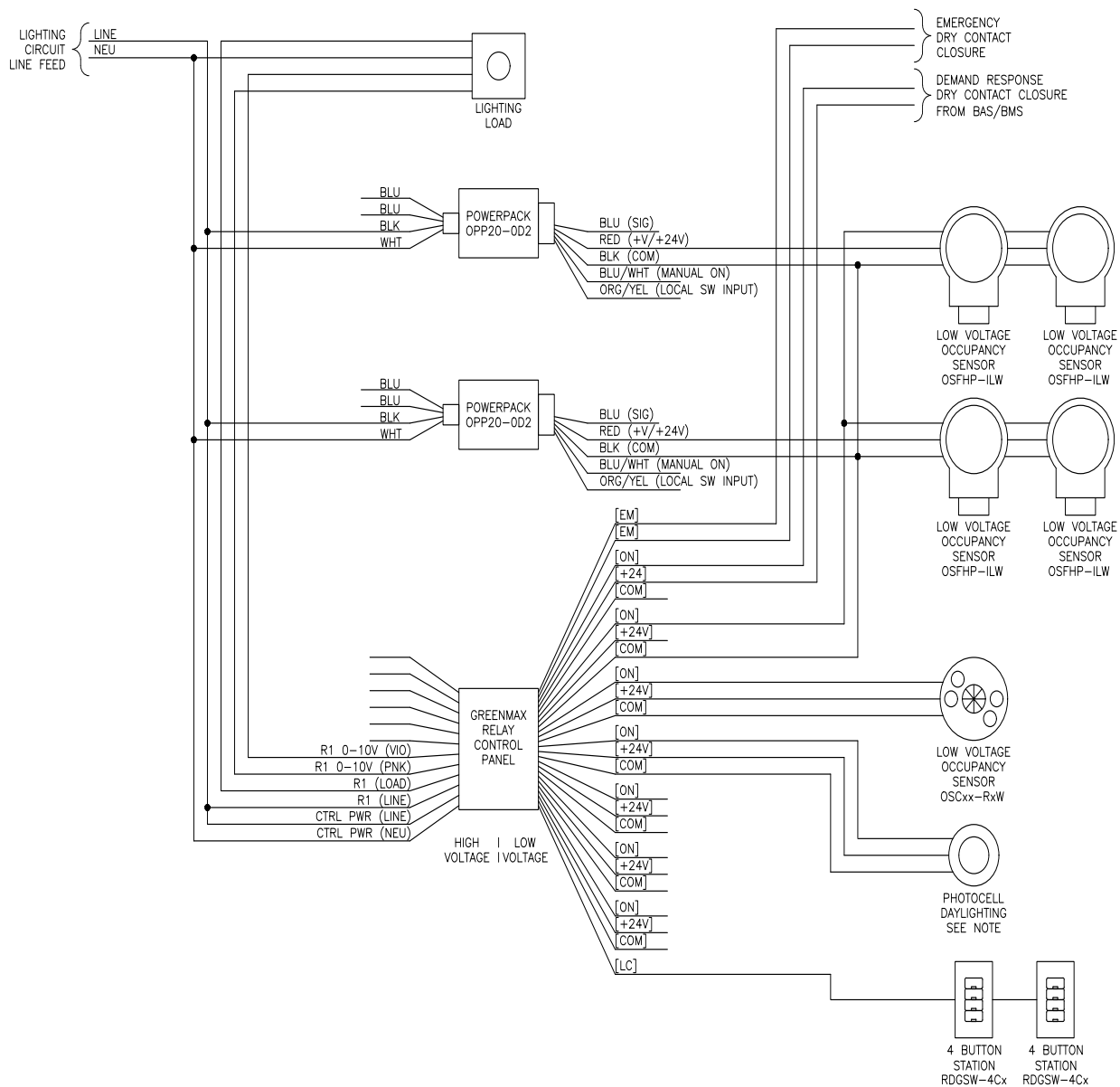
NOTES:

1. OCCUPANCY SENSORS: OSWHB FOR ROW CONTROL, OR OSFHP-ILW FOR FIXTURE CONTROL.
2. 0-10V PINK WIRE MAY BE GRAY.

ASHRAE 90.1 2022 WAREHOUSE, OSF20-ILW/OSFHP-ILW, TYPICAL



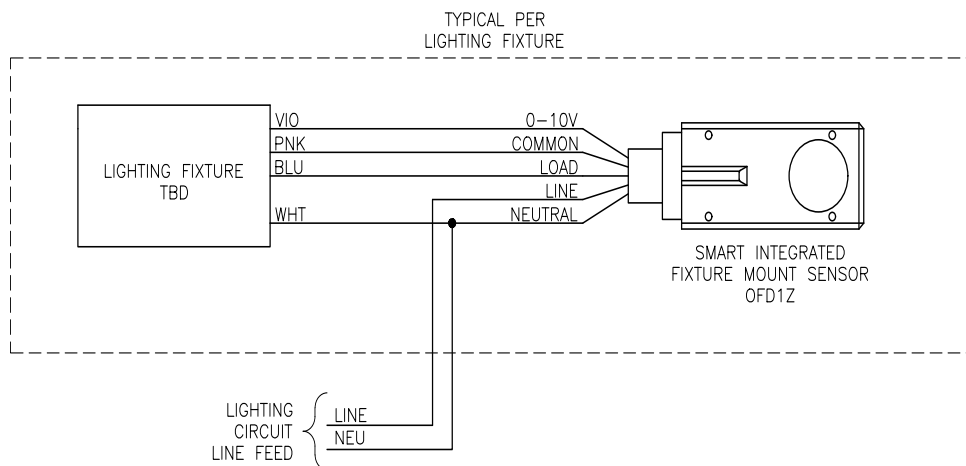
ASHRAE 90.1 2022 PARKING GARAGE, GREENMAX, TYPICAL



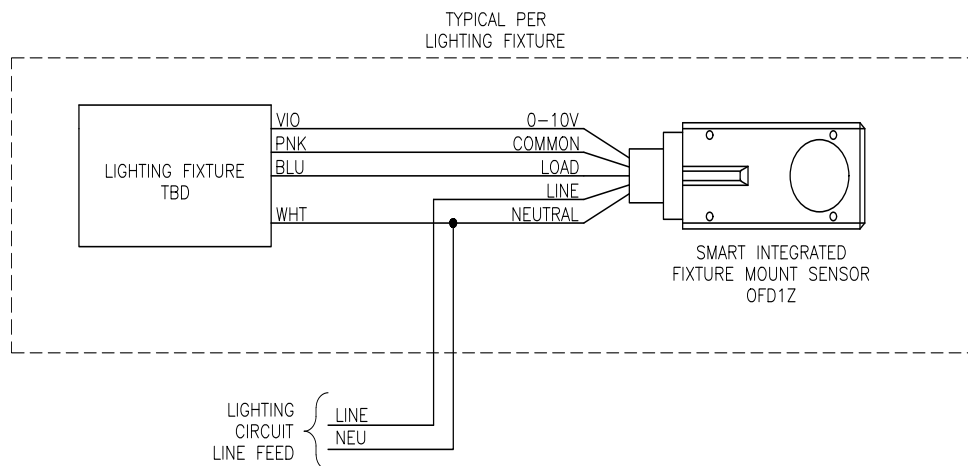
NOTES:

1. PHOTOCELL: ODCOP-00W, PCIND, PCATR, PCOUT, PCSKY.
2. 0-10V PINK WIRE MAY BE GRAY.

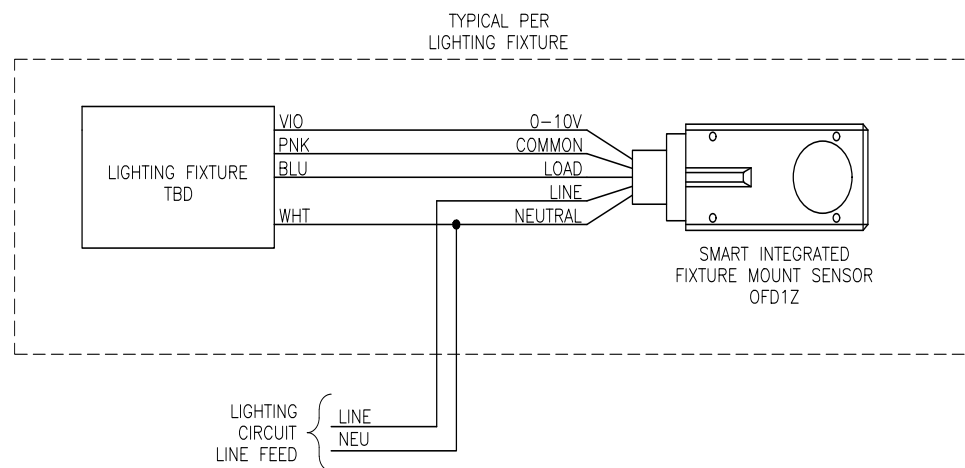
ASHRAE 90.1 2022 PARKING GARAGE, SMART IP66 INTEGRATED FIXTURE MOUNT SENSORS, TYPICAL



ASHRAE 90.1 2022 SITE LIGHTING, SMART IP66 INTEGRATED FIXTURE MOUNT SENSORS, TYPICAL



ASHRAE 90.1 2022 SITE LIGHTING, OCCUPANCY SENSOR PER FIXTURE, SMART IP66 INTEGRATED FIXTURE MOUNT SENSORS, TYPICAL





Leviton Manufacturing Co., Inc. Lighting & Controls

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201 North Service Road, Melville, NY 11747-3138 **tel** 800-323-8920 **tech line** (8:00AM-10:00PM ET Mon-Fri, 9:00AM-7:00PM ET Sat, 9:00AM-5:00PM ET Sun) 800-824-3005

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