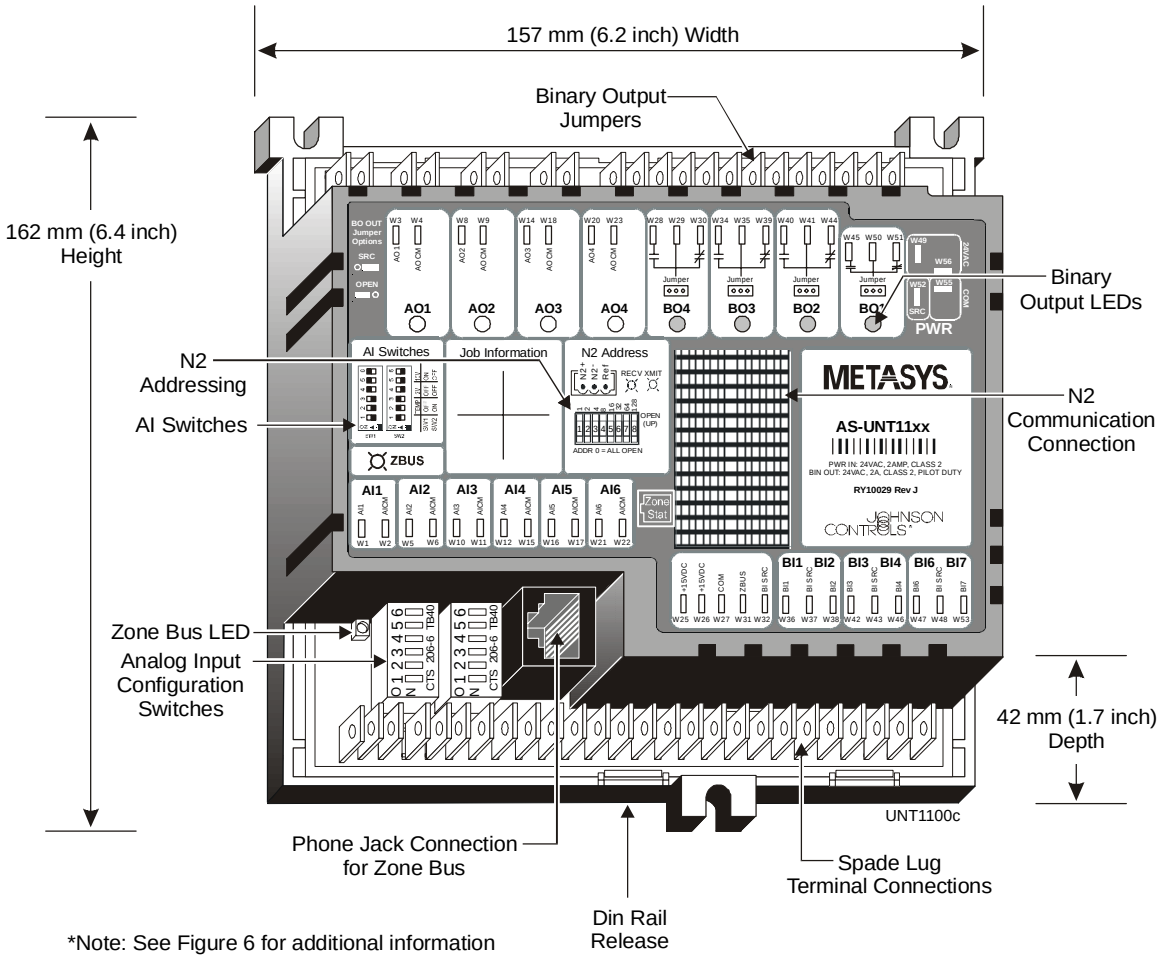
UNT1100 Series

Introduction

The Unitary (UNT) controller (UNT1100 Series) is a digital controller with applications for air handling units, packaged rooftop units, unit ventilators, fan coils, heat pumps, and other terminal units serving a single zone. Figure 1 shows the UNT1100 controller, and Table 1 lists UNT1100 specifications. For information on related literature, see Table 2.



*Note: See Figure 6 for additional information

Figure 1: UNT11xx

Table 1: UNT1100 Specifications

Product Name	Unitary Controller (UNT1100 Series)		
Product Code Number	**AS-UNT1108-0**	**AS-UNT1126-0**	**AS-UNT1144-0**
Analog Inputs (1K ohm RTD, 0-10 VDC, 0-2 VDC)	6	6	6
Binary Inputs (24 VAC Dry Contact)	6	6	6
Analog Outputs (0-10 VDC @ 10 mA)	0	2	4
Binary Outputs (Class 2 -- 2A relay @ 24 VAC)	8	6	4
Supply Voltage	20-30 VAC at 50 or 60 Hz Class 2 transformer		
Power Consumption	7 VA maximum (relay and valve requirements not included)		
Ambient Operating	-40 to 60°C (-40 to 140°F)		
Ambient Storage Conditions	-40 to 70°C (-40 to 158°F)		
Terminations	1/4 in spade lugs except communications, which are screw terminals		
Optional Terminations	2 or 3 position removable screw terminals that plug over spade lugs		
Controller Addressing	DIP Switch (N2 only) use Addresses 1-253. Addresses 0, 254, 255 reserved.		
Communications Bus	Metasys® N2 between UNT and network supervisory controller (2-wire + ref.). Zone Bus between UNT controller and room sensor (8-pin phone jack or wire to spade lugs)		
Mounting	Surface mount using screws or DIN rail		
Standards Compliance	UL 916 Listed CSA C22.2 No. 205 UL 94-5VB (Enclosure)	CE Directive (89/336/EEC) C-tick Australia/NZ EN 61000-3-2,-3 EN 61000-4-5,-11 EN50081-1: EN 55011 - Class B (emissions) EN 50082-2 (1995): EN 61000-4-2, -4 EN 50140 (1993), EN50204, EN5041 (1993) CFR47: FCC Part 15 Class B (verified) Class A (certified)	

FCC Part 15 Label - Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Table 2: Related Literature

Description	Literature Number
Unitary (UNT) Controller 1100 Series User's Guide	LIT-6363083
UNT Applications Application Note (HVAC PRO™)	LIT-6375100
Unitary Controller (UNT1100 Series) Product Bulletin	LIT-635066

Mounting Instructions

Mount the controller on a flat surface or 35 mm DIN Rail. The overall dimensions of the UNT11xx are 162 x 157 x 42 mm (6.4 x 6.2 x 1.7 in.) H x W x D.

To **surface mount** the UNT1100:

1. Place the UNT1100 in the proper mounting position so the wiring connections are easily accessible.
2. Attach the UNT1100 to the mounting surface using No. 10 Torx® head (or equivalent) screws.

Note: Overtightening can strip screw threads. Make sure screws do not interfere with wiring or access.

To **DIN rail** mount the UNT1100:

1. Attach a 35 mm DIN rail to the panel.
2. Position the UNT1100 along the rail.
3. Snap the lower edge of the UNT1100 into place.

Switches and Jumpers

Configure **Analog Input (AI)** switches for resistance/temperature input, 0 to 2 VDC, or 0 to 10 VDC. Figure 2 shows the two banks of DIP switches to set the configuration.

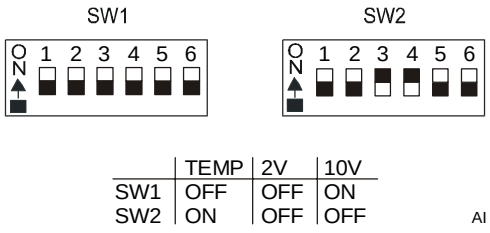


Figure 2: AI Switches

In **N2 applications**, set the address of the controller using the N2 address switches (Figure 3). The numbers are in binary format and horizontally arranged, with the least significant digit on the left. For example, if the desired controller address is 17 (decimal), the binary representation is 10001000. Switches 1 and 5 must be set to the closed (down) position (1+16=17) as shown.

Note: N2 Addresses 0, 254, and 255 are invalid and should not be used.

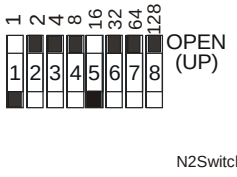


Figure 3: N2 Address Switches

Each **Binary Output (BO)** has both isolated normally open and normally closed contacts available at the terminal. The common point of each relay may be independently jumpered to the SRC terminal, or wired to an external isolated supply. Place the jumper clip to the SRC (right) position to connect the Relay Common (OUTx) to the SRC signal. When the jumper clip is placed in the open (left) position, the relay common must be externally supplied. See Figure 4 for typical binary output connections.

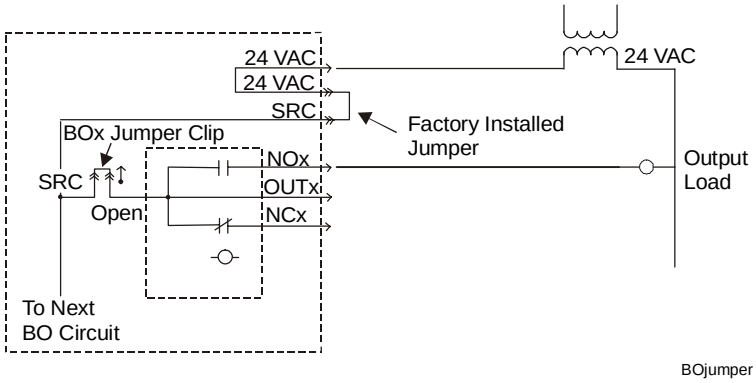


Figure 4: Typical BO Connections

Terminal Identification

Figure 5 shows an example of the UNT1100 front label, which identifies each terminal point. The terminal points are also identified on the circuit board. Label and terminal point identification are different for each UNT1100 model.

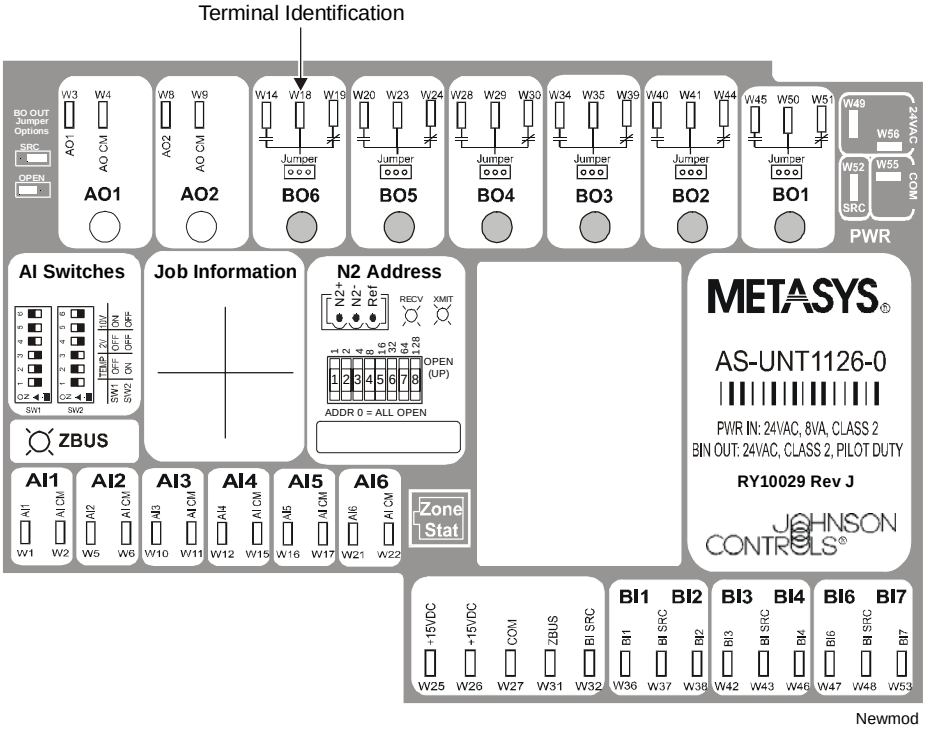


Figure 5: Terminal Identification for UNT1126

LEDs (Light-Emitting Diodes)

Each binary output on the UNT1100 controller connects to a green LED. The LED is on when the relay is energized and the Normally Open contact is closed (and the Normally Closed contact is open).

The Zone Bus transmit line ties to a green LED which is on whenever a high state is transmitted on the Zone Bus. Since the UNT1100 controller continuously transmits, the LED flickers.

The N2 Communication card has two green LEDs, one of which is on whenever a high state is detected on the Bus. The other green LED lights whenever the UNT1100 transmits a reply.

Wiring Precautions

Follow these precautions when wiring:

- Make all wiring connections in accordance with the National Electrical Code (NEC) and local regulations.
- Locate equipment and route wiring so that it is separated from power wiring.
- Make all wiring connections to the UNT1100 using only copper conductors.
- Daisy chain the N2 module. **Do not** use wire smaller than 22 AWG.
- **Do not** run N2 Bus, Zone Bus, Analog Input (AI), Binary Input (BI), Analog Output (AO), or Binary Output (BO) wiring in the same conduit or bundle as line voltage wiring (30 VAC or above).
- **Do not** run N2 Bus, Zone Bus, AI, BI, AO, or BO wiring in the same conduit or bundle as wiring that switches power to highly inductive loads such as contactors, coils, motors, or generators
- Run only **shielded** N2 Bus wiring in the same conduit or bundle as 24 VAC power wiring.
- Run Zone Bus, AI, AO, and BI wiring in the same bundle or conduit. If the binary output wiring is not wired through other switches or contacts and it is powered by a Class 2 transformer, bundle it with other I/O wiring.
- Use either no earth ground connection or one earth ground connection, which **must** be at the transformer secondary common connected to PWR COMMON on the controller (whether one or multiple controllers are powered by the same transformer).

Wiring

Table 3: UNT1100 Wiring

Point	Typical Application	Range	Input or Load Impedance (ohms)	Maximum Voltage	Maximum Current	Maximum Cable Length in Meters (ft)	Wire Size AWG (mm^2)
Analog Inputs: AI-1 to AI-6	Temperature and humidity sensing	1k ohm Ni, Si, or Pt 0-10 VDC, 0-2 VDC	—	5 VDC 10 VDC 2 VDC	1.4 mA	150 (500) 30 (100)	18 (1.0) 24 (0.6)
Binary Inputs: BI-1 to BI-6	Occupancy sensor, pressure sensor	0- 30 VAC 0-30 VDC	6.23k (AC) 9.9k (DC)	30 VAC 30 VDC	4.8 mA AC[1] 3.0 mA DC	150 (500) 150 (500)	18 (1.0) 24 (0.6)
Analog Outputs: AO-1 to AO-4[2]	Proportional control: fan, valves, humidity	0-10 VDC at 10 mA	1k minimum	10 VDC	10 mA	150 (500) 60 (200)	18 (1.0) 24 (0.6)
Binary Outputs: BO-1 to BO-8[2]	On-Off: normally open or normally closed valves, motors, lighting relays, electric heat	24 VAC; 5-28 VDC	—	30 VAC 28 VDC	2A (AC)[3,6]	3.8 (12.5) 0.9 (3.1)	18 (1.0) 24 (0.6)
					1A (DC)[6]	7.6 (25.0) 1.9 (6.2)	18 (1.0) 24 (0.6)
N2 Bus	Network communication	0-5 VDC	(100 unit loads)	5 VDC	60 mA	1500 (5000)	20 (0.8)
Zone Bus	Room sensor communication	0-5 VDC	(35 unit loads)	5 VDC	775 mA	1500 (5000)	20 (0.8)
Room Sensor Cable	AI-1, AI-2, AI-3, Zone Bus, and +24 VAC	See AIs, Zone Bus, and Binary Input Source in this table	—	—	—	30 (100)	24 (0.6) eight conductor phone cable
+15 VDC (Output)	DC transducer supply	15-18 VDC	360 minimum	18 VDC	50 mA[4]	—	—
+24 VAC (Input)	AC supply voltage	22-30 VAC, 50/60 Hz	—	30 VAC RMS	(See VA ratings.)	3.2 (10.5)[5,6] 23 (75)[6,7]	18 (1.0)
Binary Input Source[8] (Output)	Binary Input SRC	19.2 to 30 VAC	0.2 maximum	30 VAC RMS	100 mA[9]	150 (500) 30 (100)	18 (1.0) 24 (0.6)

Notes: All field terminals are power limited per Class 2 transformer.

1 Contact clean spike of 300 mA contact close
2 As available to the model
3 15A inrush, 60 VA maximum, 450 VA inrush (inductive PF=0.6, 60 Hz)
4 See Table 4 for maximum current specifications.
5 Assumes 2A of current load on all BOs combined. Shortest wires are recommended.
6 Assumes a 2.8% voltage drop due to length of cable and gauge of wire.
7 Assumes all BO power is wired separately from UNT. Shortest wires are recommended.
8 Maximum combined current of R and 24 VAC at phone jack total $\leq$ 2.4 VA (100 mA)
9 Binary outputs are relay isolated.

Table 4: +15 VDC Output Capacity

Controller	Maximum AO Current (mA)*	Maximum Available +15 V External Current (mA)
UNT1108	0	60
UNT1126	20	37
UNT1144	40	16

* If the maximum AO current is known to be less than the amount shown, the difference can be added to the maximum available +15V external current.

> **!** CAUTION: Disconnect all power services, including 24 VAC before wiring.

To wire the UNT1100:

1. Terminate wiring per engineering drawings.
2. Install the Metasys N2 Bus to the UNT1100.

Grounding and Isolation for UNT1100 with Single Transformer

Power Transformer

24 VAC to 24 VAC isolation transformers for UNT1100 Series controllers are not mandatory.

Load Isolation

UNT1100 Series controllers do not require an isolation relay, however you must connect the jumper wire from the SRC terminal to the adjacent 24 VAC terminal if the contact loads are grounded (via the single earth ground connection at the transformer secondary common). In this case, all loads are configured for high side switching.

Grounding and Isolation for UNT1100 with Separate Load Transformer

A separate load transformer may be necessary because of transformer VA limitations or to completely isolate loads from the UNT1100 digital circuitry for noise reduction.

You can connect the separate load power transformer secondary to earth ground as long as doing so is compatible with equipment being controlled. In this case, remove the jumper from SRC to the adjacent 24 VAC terminal, and attach the second transformer to the SRC terminal.

Typical Wiring Connections Examples

Figure 6 shows typical UNT1100 wiring connections for power, analog output, binary output, binary input, voltage analog input, and typical resistive analog input.

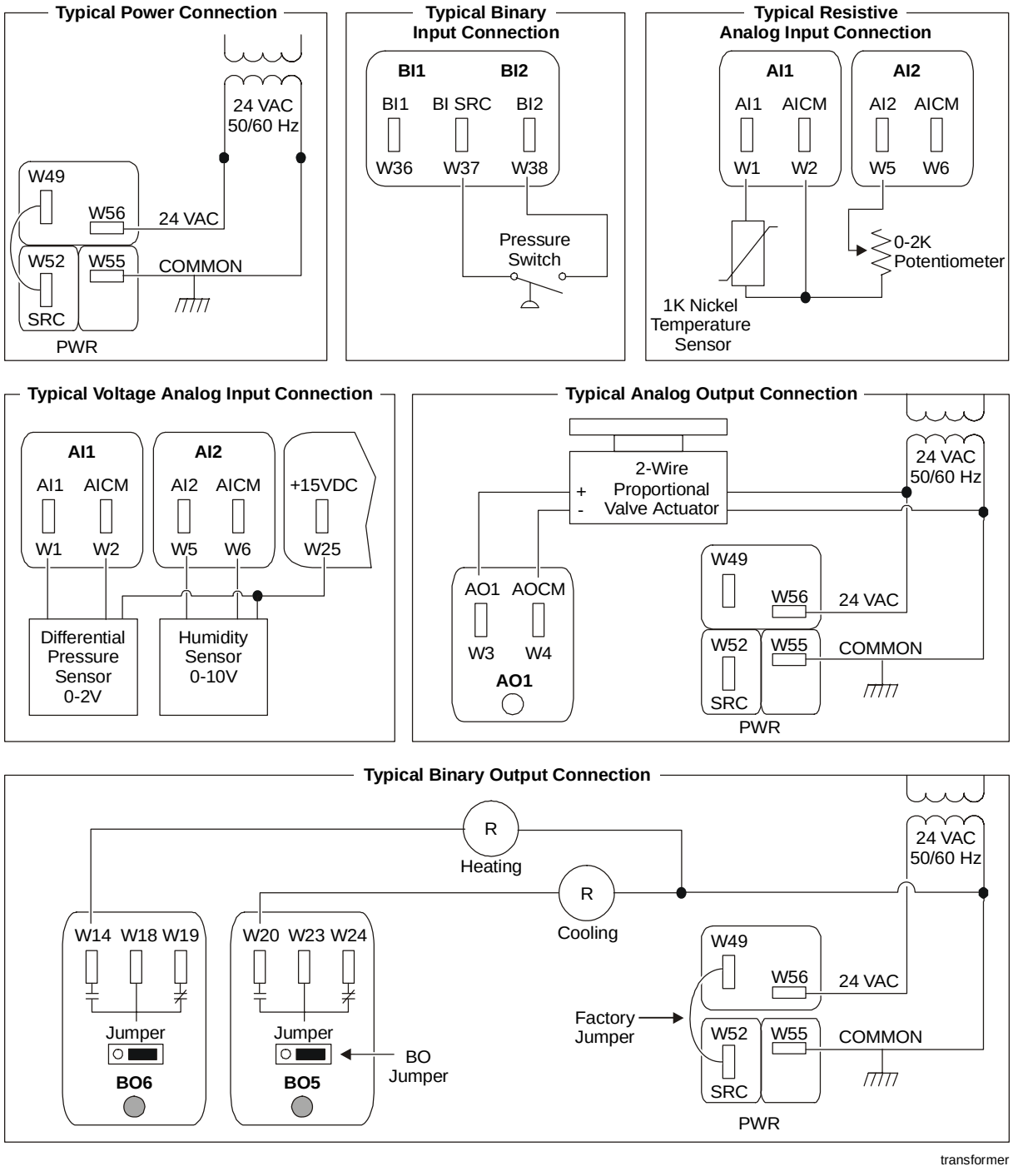


Figure 6: Typical UNT1100 Connections

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