“Kele is the best place to buy HVAC peripherals such as power supplies and perforated panels for mounting HVAC controls.”

POWER SUPPLIES

MADE IN USA

Products manufactured in the United States

NEW

Products that are new to the catalog

XFMR Series pg. 817

DCP-1.5-W
pg. 837

T-PB Series pg. 829

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MODEL/SERIES — PAGE

Power Supplies

Transformers

Indicates New Products

POWER SUPPLIES

CONTROL TRANSFORMERS
XFMR SERIES

Value Line

NEW!

DESCRIPTION

The **XFMR Series** of voltage transformers provide nominal 24 VAC control voltage. These transformers are intended for NEMA 1 installation and should be installed in compliance with all national and local electrical codes.

FEATURES

- ***VA ratings from 40 VA to 500 VA***
- ***Low cost***
- ***One-year warranty***
- ***UL Listed (File #E223965) (#E223966 for HD models)***

XFMR50JA

XFMR75HB

XFMR100HC

XFMR150FA

XFMRHD300E

WIRING

Primary Wires*

480 VAC	Gray	**120 VAC**	White
277 VAC	Brown	**Common**	Black
240 VAC	Orange		
208 VAC	Red		

Secondary Wires**

24 VAC Brown or Blue

*XFMR40FC isolation tranformer features red 24 VAC primary wires

**XFMR40HA, XFMR50HA feature secondary terminals

SPECIFICATIONS

Model	VA Rating	Primary Voltage	Secondary Voltage	Frequency	Circuit Breaker	Mounting
XFMR50HA	50 VA	120/208/240 VAC	24 VAC	50/60	No	1 Hub + Foot
XFMR50JA	75 VA	120/208/240 VAC	24 VAC	50/60	No	1 Hub + Foot
XFMR40FB	40 VA	120 VAC	24 VAC	50/60	No	2 Hub + Foot
XFMR40FC	40 VA	24 VAC	24 VAC	50/60	No	1 Hub + Foot
XFMR50FA	50 VA	120 VAC	24 VAC	50/60	No	2 Hub + Foot
XFMR150FA	150 VA	120 VAC	24 VAC	50/60	Yes, 10A trip point	1 Hub + Foot
XFMR175FA	175 VA	208/240 VAC	24 VAC	50/60	No	2 Hub + Foot
XFMR240FA	240 VA	120 VAC	24 VAC	50/60	No	1 Hub + Foot
XFMR375FA	375 VA	120 VAC	24 VAC	50/60	No	1 Hub + Foot
XFMR40HA	40 VA	120/208/240 VAC	24 VAC	50/60	No	1 Hub + Foot
XFMR50HB	50 VA	120/208/240/277/480 VAC	24 VAC	50/60	Yes, 2.5A trip point	1 Hub + Foot
XFMR75HB	75 VA	120/208/240/277/480 VAC	24 VAC	50/60	Yes, 4A trip point	1 Hub + Foot
XFMR75HC	75 VA	120/208/240/277/480 VAC	24 VAC	50/60	Yes, 4A trip point	2 Hub + Foot
XFMR100HC	100 VA	120/208/240/480 VAC	24 VAC	50/60	Yes, 4A trip point	2 Hub + Foot
XFMRHD100E	100 VA	120/240 VAC	24 VAC	50/60	No	Foot
XFMRHD150E	150 VA	120/240 VAC	24 VAC	50/60	No	Foot
XFMRHD300E	300 VA	120/240 VAC	24 VAC	50/60	No	Foot
XFMRHD500E	500 VA	120/240 VAC	24 VAC	50/60	No	Foot

NEW!

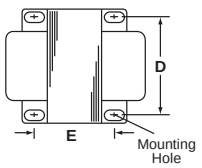
POWER SUPPLIES

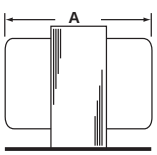
CONTROL TRANSFORMERS

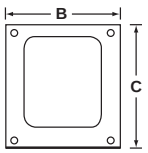
XFMR SERIES

DIMENSIONS

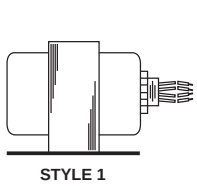
in
(cm)







MODEL	DIMENSIONS in (cm) A	B	C	D	E	WIRES	WEIGHT lb (kg)	STYLE
XFMR50HA	2.79 (7.09)	2.17 (5.5)	2.88 (7.3)	1.81 (4.6)	2.01 (5.1)	8.0 (20.3)	2.56 (1.16)	6
XFMR75JA	3.88 (9.85)	2.5 (6.35)	3.04 (7.62)	2 (5.08)	2.3 (5.84)	8.0 (20.3)	1.73 (0.79)	1
XFMR40FB	2.48 (6.3)	2.17 (5.5)	2.88 (7.3)	1.81 (4.6)	1.75 (4.4)	8.0 (20.3)	1.73 (0.79)	7
XFMR40FC	2.48 (6.3)	2.17 (5.5)	2.88 (7.3)	1.81 (4.6)	1.75 (4.4)	8.0 (20.3)	1.56 (0.71)	1
XFMR40HA	2.48 (6.3)	2.17 (5.5)	2.88 (7.30)	1.81 (4.6)	1.75 (4.4)	8.0 (20.3)	4.32 (1.95)	6
XFMR50FA	2.79 (7.09)	2.17 (5.5)	2.88 (7.3)	1.81 (4.6)	2.01 (5.1)	8.0 (20.3)	3.86 (1.75)	4
XFMR150FA	3.55 (9.01)	3.79 (9.6)	3.2 (8.1)	3.14 (7.76)	2.48 (6.30)	8.0 (20.3)	5.16 (2.45)	3
XFMR175FA	4.12 (10.46)	3.8 (9.7)	3.2 (8.13)	3.14 (7.98)	3.19 (8.10)	8.0 (20.3)	7.28 (3.09)	4
XFMR240FA	3.72 (9.4)	3.8 (9.7)	4.52 (11.4)	3.18 (8.1)	3.242 (8.2)	8.0 (20.3)	8.60 (3.91)	1
XFMR375FA	4.315 (11.0)	3.8 (9.7)	4.52 (11.4)	3.18 (8.1)	3.83 (9.7)	8.0 (20.3)	12.57 (5.71)	1
XFMR40HA	2.47 (6.27)	2.17 (5.51)	2.9 (7.37)	1.81 (4.59)	1.74 (4.42)	8.0 (20.3)	4.32 (1.96)	9
XFMR50HB	3.45 (9.3)	2.5 (6.4)	3.06 (7.8)	2.03 (5.2)	1.91 (4.9)	8.0 (20.3)	3.31 (1.50)	2
XFMR75HB	2.79 (7.09)	2.17 (5.50)	2.88 (7.30)	1.81 (4.60)	2.01 (5.1)	8.0 (20.3)	3.86 (1.75)	2
XFMR75HC	3.87 (9.8)	2.5 (6.4)	3.06 (7.80)	2.03 (5.2)	2.31 (5.9)	8.0 (20.3)	3.86 (1.75)	5
XFMR100HC	4.05 (10.29)	2.5 (6.4)	3.06 (7.80)	2.03 (5.2)	2.51 (6.38)	8.0 (20.3)	4.85 (2.20)	5
XFMRHD100E	3.35 (8.50)	2.89 (7.33)	3.38 (8.58)	2.93 (74.5)	2.81 (7.15)	Terminals	4.20 (1.91)	8
XFMRHD150E	3.60 (9.15)	3.78 (9.60)	3.22 (8.18)	3.43 (8.72)	3.12 (7.93)	Terminals	6 (2.73)	8
XFMRHD300E	4.80 (12.20)	4.49 (11.40)	3.88 (9.68)	3.13 (7.95)	3.74 (9.51)	Terminals	9 (4.10)	8
XFMRHD500E	5.93 (13.70)	4.49 (11.40)	3.88 (9.68)	4.13 (10.50)	3.74 (9.51)	Terminals	12.5 (5.68)	8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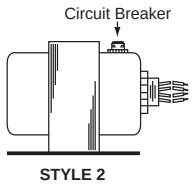

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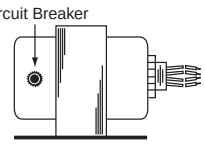

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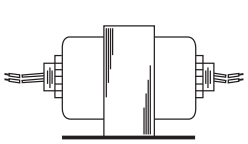
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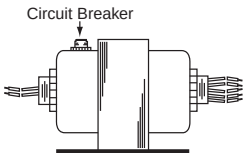

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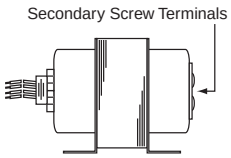

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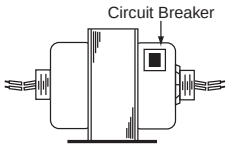

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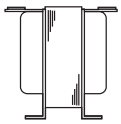
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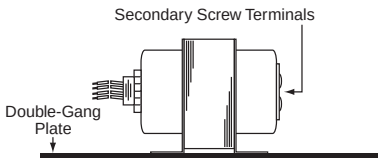


STYLE 9

ORDERING INFORMATION

MODEL	DESCRIPTION
XFMR50HA	Transformer 120/208/240:24 V 50 VA
XFMR50JA	Transformer 120/208/240:24 V 75 VA
XFMR40FB	Transformer 120:24 VAC 40 VA
XFMR40FC	Transformer 24:24 VAC 40 VA
XFMR50FA	Transformer 120:24 VAC 50 VA
XFMR150FA	Transformer 120:24 VAC 150 VA
XFMR175FA	Transformer 208/240:24 VAC 175 VA
XFMR240FA	Transformer 120:24 VAC 240 VA
XFMR375FA	Transformer 120:24 VAC 375 VA
XFMR40HA	Transformer 120/208/240:24V 40VA
XFMR50HB	Transformer 120/208/240/277/480:24 VAC 50 VA
XFMR75HB	Transformer 120/208/240/277/480:24 VAC 75 VA
XFMR75HC	Transformer 120/208/240/277/480:24 VAC 75 VA
XFMR100HC	Transformer 120/208/240/480:24 VAC 100 VA
XFMRHD100E	Transformer 120/240:24 V 100 VA
XFMRHD150E	Transformer 120/240:24 V 150 VA
XFMRHD300E	Transformer 120/240:24 V 300 VA
XFMRHD500E	Transformer 120/240:24 V 500 VA

POWER SUPPLIES

KELE CONTROL TRANSFORMERS
691 SERIES

DESCRIPTION

The **691 Series** of stepdown voltage transformers provide nominal 24 VAC control voltage from 120 VAC primary supply. These transformers are designed for NEMA 1 locations. They should be installed in compliance with all national and local electrical codes.

FEATURES

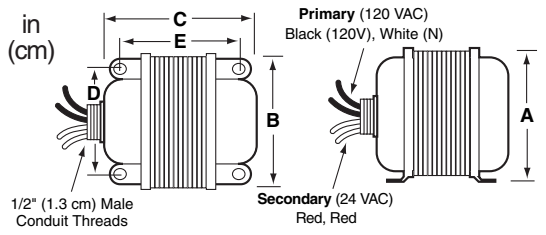
- ***Low cost***
- ***Hub or foot mounting***
- ***Fully enclosed with metal end bells***
- ***Compact size***

691 Series

SPECIFICATIONS

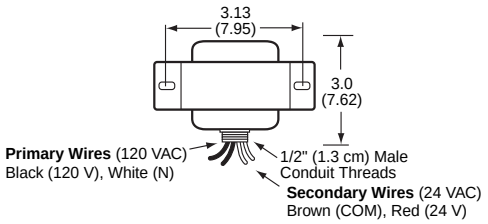
Model	691-K0A	691-K1A	691-K2A
Primary Voltage	120 VAC	120 VAC	120 VAC
Secondary Voltage	24 VAC	24 VAC	24 VAC
Frequency	60 Hz	50/60 Hz	50/60 Hz
VA Rating	40 VA	100 VA	170 VA
Mounting	Hub or foot	Hub or foot	Hub or foot
Conduit Connection	1/2" (1.3 cm) male threads	1/2" (1.3 cm) male threads	1/2" (1.3 cm) male threads
Wire Length	8" (20.3 cm)	8" (20.3 cm)	8" (20.3 cm)
Weight	2.1 lb (0.95 kg)	3.5 lb (1.6 kg)	6.3 lb (2.9 kg)
Warranty	1 year	1 year	1 year
Approvals	UL1585, UL5085-1 & 3 listed, Class 2 File #E99227	UL1585, UL5085-1 & 2 listed, (not class 2) File #E250952	UL1585, UL5085-1 & 2 listed, (not class 2) File #E250952

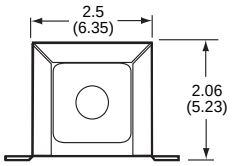
DIMENSIONS / WIRING



MODEL	DIMENSIONS				
	A	B	C	D	E
691-K1A	2.6 (6.7)	3.0 (7.7)	3.2 (8.2)	2.5 (6.4)	2.2 (5.7)
691-K2A	3.1 (8.0)	3.8 (9.6)	4.1 (10.3)	3.3 (8.3)	2.4 (6.1)

691-K1A/691-K2A Transformers





691-K0A Transformer

ORDERING INFORMATION

MODEL	DESCRIPTION
691-K0A	Control transformer, 120:24 VAC, 40 VA, Class 2
691-K1A	Control transformer, 120:24 VAC, 100 VA
691-K2A	Control transformer, 120:24 VAC, 170 VA

POWER SUPPLIES

KELE CLASS 2 CONTROL TRANSFORMER

691-U100

DESCRIPTION

The **691-U100** is a UL listed, Class 2, 96 VA stepdown transformer designed to provide nominal 24 VAC from a 120 VAC primary supply. The **691-U100** is ideal for heating/cooling control systems where a large capacity Class 2 control transformer is needed.

691-U100

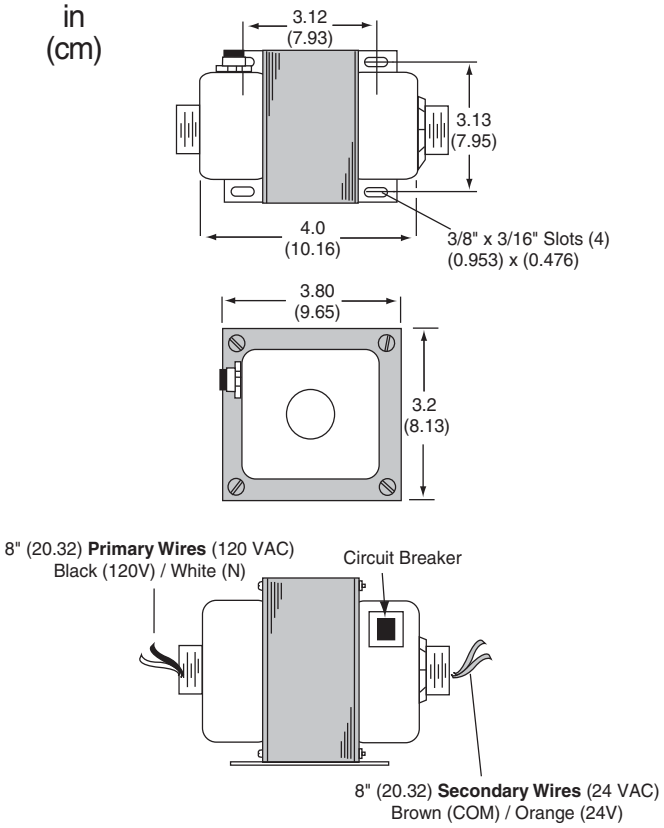
FEATURES

- ***UL listed, Class 2***
- ***Resettable secondary circuit breaker***
- ***Metal end bells***
- ***Dual threaded hubs***
- ***Foot or hub mounting***

SPECIFICATIONS

Primary Voltage	120 VAC
Secondary Voltage	24 VAC
Frequency	60 Hz
VA Rating	96 VA
Circuit Breaker	Manual reset, 4A trip
Configuration	Metal end bells with dual threaded hubs
Operating Temperature	32° to 104°F (0° to 40°C)
Conduit Connection	Two 1/2" (1.27 cm) male connections
Dimensions	4.0" H x 3.2" W x 3.80" D (10.16 x 8.13 x 9.65 cm)
Approvals	UL1585 listed, Class 2, File #E316704
Weight	4.9 lb (2.2 kg)
Warranty	3 years

DIMENSIONS



ORDERING INFORMATION

MODEL	DESCRIPTION
691-U100	Class 2 control transformer, 120:24 VAC, 96 VA

POWER SUPPLIES

CLASS 2 CONTROL TRANSFORMERS

AT87A, AT140A, AT150A

Honeywell

DESCRIPTION

These General-purpose transformers provide power to nominal 24 VAC control circuits. They are typically used in heating/cooling control systems but can be used in any application that does not exceed the load ratings. All models are UL listed or recognized and meet NEC Class 2 "not wet" and Class 3 "wet" requirements.

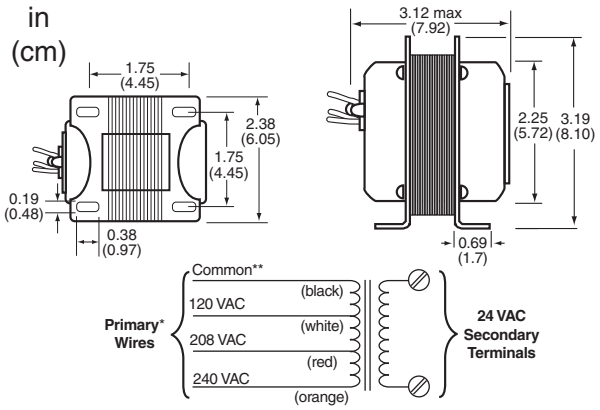
AT140A / AT150A

AT87A

FEATURES

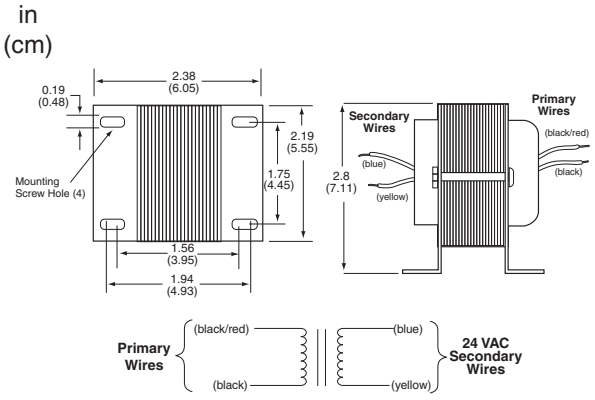
- ***Meets NEC Class 2 "not wet" and Class 3 "wet" transformer requirements***
- ***Color-coded leads***
- ***Screw terminal secondary (AT140A, AT150A)***
- ***Models with multi-tap primary***

DIMENSIONS / WIRING



* Insulate the ends of the unused primary leads by taping or capping with a solderless connector.
** Black is common with respect to the transformer windings only, not the external circuit.

DIMENSIONS / WIRING



SPECIFICATIONS

	MODEL	
	AT140A / AT150A	**AT87A**
Primary voltage	120/208/240 VAC	480 or 277 VAC
Secondary voltage	24 VAC	24 VAC
Frequency	60 Hz	50/60 Hz
VA rating	**AT140A**: 40 VA, **AT150A**: 50 VA	48 VA
Mounting	Foot, knockout, plate (included)	Foot
Wiring connections	Primary: 9" (22.8 cm), colored leads; Secondary: screw terminals	12" (30.5 cm) colored leads
Weight	2 lb (0.91 kg)	1.75 lb (0.79 kg)
Agency approvals	UL1585, UL5085-3 listed, File #E14881; CSA certified NEC Class 2 "not wet", Class 3 "wet"	UL-recognized component, File #E14881; CSA certified; NEC Class 2 "not wet" , Class 3 "wet"
Warranty	1 year	1 year

ORDERING INFORMATION

MODEL	DESCRIPTION
AT140A1018	Control transformer, 120/208/240:24 VAC, 40 VA
AT150A1007	Control transformer, 120/208/240:24 VAC, 50 VA
AT87A1155	Control transformer, 480:24 VAC, 48 VA
AT87A1189	Control transformer, 277:24 VAC, 48 VA

POWER SUPPLIES

CLASS 2 CONTROL TRANSFORMERS WITH BREAKER

AT150F, AT175F

DESCRIPTION

Model AT150F and **AT175F** transformers provide power to nominal 24 VAC circuits in heating/cooling systems. Although the transformers are typically used in heating/cooling systems, they can be used in any application that does not exceed the load ratings. The transformers include a manual reset button for resetting the circuit breaker. They also meet NEC Class 2 "not wet" and Class 3 "wet" requirements and are UL listed under UL1585. These transformers can be foot or hub mounted.

Honeywell

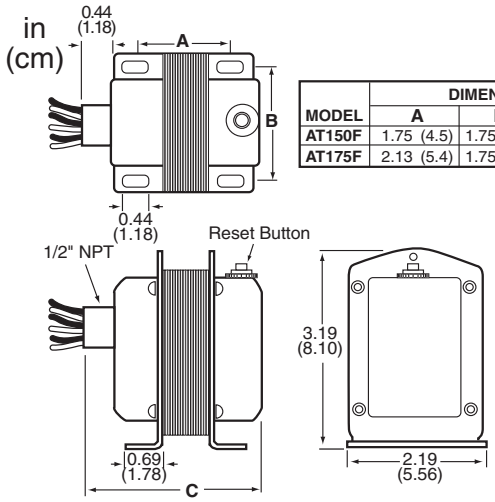
FEATURES

- ***Multi-tap primary connections***
- ***Color-coded lead wires***
- ***Manually resettable circuit breaker***
- ***Meets NEC Class 2 "not wet" and Class 3 "wet" transformer requirements***

SPECIFICATIONS

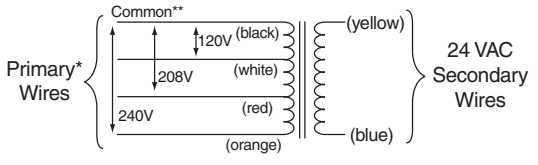
Primary Voltage	120/208/240 VAC, 208/277/240 VAC
Secondary Voltage	24 VAC
Frequency	60 Hz
VA Rating	AT150F: 50 VA, AT175F:75 VA
Mounting	Foot or hub
Conduit Connection	1/2" male NPT
Lead Wires	9" (22.8 cm), color coded
Weight	3 lb (1.36 kg)
Approvals	UL1585, UL5085-3 listed, File #E14881, CSA approved, File #LR95329-18 NEC Class 2 "not wet", Class 3 "wet"
Warranty	1 year

DIMENSIONS

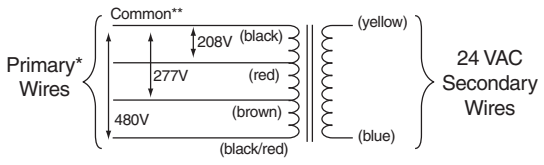


MODEL	DIMENSIONS		
	A	B	C
AT150F	1.75 (4.5)	1.75 (4.5)	3.63 (9.3)
AT175F	2.13 (5.4)	1.75 (4.5)	3.94 (10.2)

WIRING



120/208/240 VAC Models



208/277/480 VAC Models

* Insulate the ends of the unused primary leads by taping or capping with a solderless connector.
** Black is common with respect to the transformer windings only, not the external circuit.

ORDERING INFORMATION

MODEL	DESCRIPTION
AT150F1022	Control transformer, 120/208/240:24 VAC, 50 VA with breaker
AT150F1030	Control transformer, 208/277/480:24 VAC, 50 VA with breaker
AT175F1023	Control transformer, 120/208/240:24 VAC, 75 VA with breaker
AT175F1031	Control transformer, 208/277/480:24 VAC, 75 VA with breaker

POWER SUPPLIES

CLASS 2 CONTROL TRANSFORMERS

Y63, Y65, Y66

DESCRIPTION

Models Y63, Y65, and **Y66 Class 2 Control Transformers** handle 24 VAC power requirements from 40, 50, and 75 VA. These transformers are used on digital controllers, gas controls, ignition systems, motor actuators, staging controls, and other 24 VAC control systems.

FEATURES

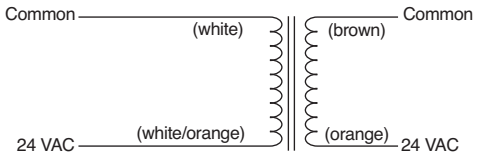
- ***Color-coded leads***
- ***Compact size***
- ***Fully enclosed***
- ***Meets UL1585, UL506, and C22.2 No.66***

Models Y63, Y65, and Y66
Class 2 Control Transformers

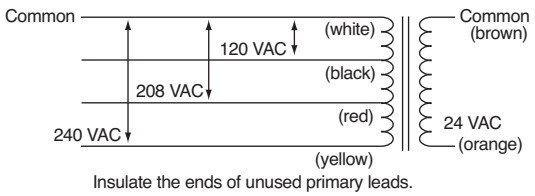
SPECIFICATIONS

	Y65G13-0	Y65T42-0	Y63T22-0	Y66T12-0
Primary Voltage	24 VAC	120/208/240 VAC	120/208/240 VAC	120/208/240 VAC
Secondary Voltage	24 VAC	24 VAC	24 VAC	24 VAC
Frequency	60 Hz	60 Hz	60 Hz	60 Hz
VA Rating	40 VA	40 VA	50 VA	75 VA
Overload Protection	Internal	Internal	Circuit breaker	Circuit breaker
Lead Wires	Primary: 8" (20.3 cm) Secondary: 30" (76.2 cm)	8" (20.3 cm)	8" (20.3 cm)	8" (20.3 cm)
Operating Temperature	-10° to 104°F (-40° to 40°C)	-10° to 104°F (-40° to 40°C)	-10° to 104°F (-40° to 40°C)	-10° to 104°F (-40° to 40°C)
Mounting	Foot, two hubs	Hub, 4" x 4" plate	4" x 4" plate	Foot, hub
Dimensions	2.2" x 2.9" x 3.16" (5.6 x 7.4 x 9.1 cm)	2.2" x 2.9" x 3.16" (5.6 x 7.4 x 9.1 cm)	2.5" x 3.0" x3.5" (6.4 x 7.6 x 8.9 cm)	2.5" x 3.3" x 4.2" (6.4 x 8.4 x 10.7 cm)
Weight	2.0 lb (0.82 kg)	2.0 lb (0.82 kg)	3.0 lb (1.4 kg)	3.0 lb (1.4 kg)
Approvals	UL1585, UL5085-1 & 3 nad ULC listed, Class 2, File #E25482	UL-recognized component, Class 2, File #E25482	UL-recognized component, Class 2, File #E25482	UL-recognized component, Class 2, File #E25482
Warranty	1 year	1 year	1 year	1 year

WIRING



Y65G13-0



Insulate the ends of unused primary leads.

Y65T42-0, Y63T22-0, Y66T12-0

ORDERING INFORMATION

MODEL	DESCRIPTION
Y65G13-0	Isolation transformer, 24:24 VAC, 40 VA
Y65T42-0	Control transformer 120/208/240:24 VAC, 40 VA
Y63T22-0	Control transformer 120/208/240:24 VAC, 50 VA
Y66T12-0	Control transformer 120/208/240:24 VAC, 75 VA

POWER SUPPLIES

CONTROL TRANSFORMERS

E100E, E150E, E300E, E500E

DESCRIPTION

Models E100E, E150E, E300E, and **E500E** are premium performance, epoxy-encapsulated control transformers used in temperature control systems and industrial applications. These transformers are able to meet high inrush loads while providing outstanding voltage regulation, more efficient (cooler) operation, and simple installation and wiring. They are designed to provide 24 VAC control voltage from a 120/240 VAC primary supply.

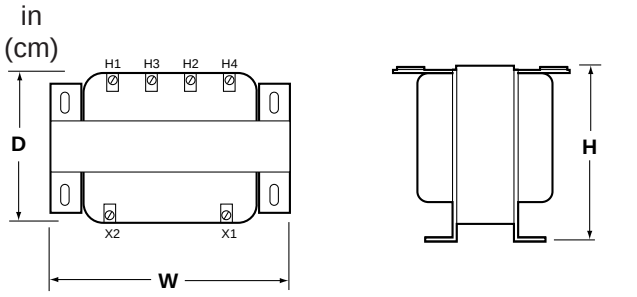
FEATURES

- ***Precise spacing between interleaved windings for maximized voltage regulation***
- ***Oversized copper windings contribute to low temperature rise***
- ***Solid epoxy-encapsulation to dissipate heat efficiently and completely seal coil against moisture, dirt, and other airborne contaminants***
- ***Ten-year warranty***

SPECIFICATIONS

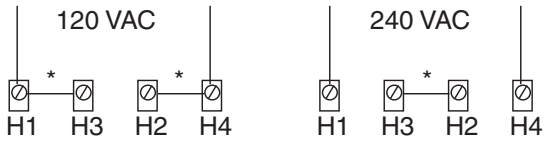
Primary Voltage	120/240 VAC, 50/60 Hz
Secondary Voltage	24 VAC
VA Rating	100 VA, 150 VA, 300 VA, 500 VA
Insulation Class	221°F (105°C)
Terminals	Plated brass binder head screws
Temperature Rise	131°F (55°C)
Mounting	Slotted feet
Weight	**E100E**: 4.2 lb (1.9 kg), **E150E**: 7.0 lb (3.2 kg), **E300E**: 11.8 lb (5.4 kg), **E500E**: 17.6 lb (7.99 kg)
Approvals	UL506, UL5085-1 & 2 listed, File #E77014 CSA certified, File #LR14328-22
Warranty	10 years

DIMENSIONS



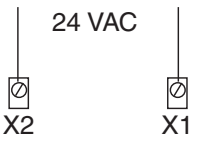
DIMENSION	MODEL			
	E100E	**E150E**	**E300E**	**E500E**
D	4.64 (11.8)	4.48 (11.4)	5.09 (12.9)	6.32 (16.1)
W	3.38 (8.6)	4.50 (11.4)	5.25 (13.3)	5.25 (13.3)
H	2.87 (7.31)	3.82 (19.7)	4.45 (11.3)	4.45 (11.3)

WIRING



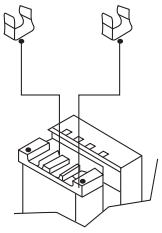
*Jumper clips provided.

Primary Wiring



Secondary Wiring

Recommended Fuses (max amps)
E100E: FLM-5
E150E: FLM-10
E300E: FLM-20
E500E: FLM-30
Secondary fuse holders **(FB2X)** are included with all tranformers.
Use a 13/32" x 1-1/2" cartridge fuse.



ORDERING INFORMATION

MODEL	DESCRIPTION
E100E	Control transformer, 120/240:24V, 100 VA
E150E	Control transformer, 120/240:24V, 150 VA
E300E	Control transformer, 120/240:24V, 300 VA
E500E	Control transformer, 120/240:24V, 500 VA

FUNCTIONAL DEVICES CONTROL TRANSFORMERS

RIB TR SERIES

DESCRIPTION

The **RIB TR Series** offers a complete line of control transformers for use in building automation and temperature control systems. The series includes transformer VA ratings from 20 VA up through 375 VA and primary voltages of 120, 208, 240, 277, and 480 VAC. Isolation transformers for 24 VAC circuits are also included. All RIB TR Series transformers are UL listed and feature split-bobbin construction. Some also have a secondary circuit breaker.

RIB TR Series

FEATURES

- ***Complete line of control transformers from 20 VA to 375 VA***
- ***Foot and hub mounting on most models***
- ***All models UL listed, many are Class 2 rated***
- ***Ambient temp 32° to 104°F (0° to 40°C)***
- ***Color-coded wire leads***
- ***One-year warranty***

SPECIFICATIONS

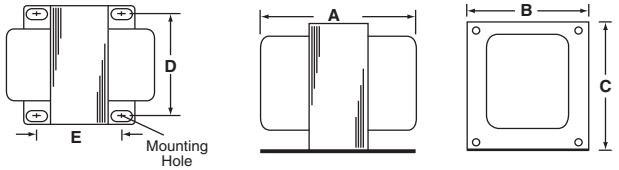
MODEL	VA RATING	PRIMARY: SECONDARY VOLTAGE (VAC)	FREQ (Hz)	CIRCUIT BREAKER	MOUNTING H = Hub	AGENCY APPROVALS
TR20VA001	20	120:24	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR20VA002	20	208:24	50/60	No	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR20VA003	20	24:24 (isolation)	50/60	No	1H + Foot	UL506 listed US/Canada, E197147
TR20VA007	20	277:24	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR40VA001	40	120:24	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR40VA002	40	120:24	50/60	No	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR40VA003	40	24:24 (isolation)	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR40VA004	40	120/208/240/277:24	50/60	No	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR40VA015	40	120/208/240:24	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR40VA040	40	120/208/240:24 (terminals)	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA001	50	120:24	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA002	50	120:24	50/60	No	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA003	50	208/240:24	50/60	No	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA004	50	120/240/277/480:24	50/60	Yes	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA005	50	120:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA006	50	277:24	50/60	No	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA007	50	277:24	50/60	No	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA009	50	120/208/240	50/60	Yes	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA014	50	277:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA015	50	120/208/240/277/480:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA016	50	120/208/240:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR50VA017	50	208/277/480:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR75VA001	75	120:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR75VA002	75	120:24	50/60	Yes	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR75VA003	75	277:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR75VA004	75	120/208/240/480:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR75VA005	75	120/208/240/480:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR85VA002	85	120:24	50/60	No	1H + Foot	UL506 listed US/Canada, E197147
TR100VA001	96	120:24	50/60	Yes	1H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR100VA002	96	120:24	50/60	Yes	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR100VA004	96	120/240/277/480:24	50/60	Yes	2H + Foot	Class 2 UL1585 listed US/Canada, E197146
TR150VA001	150	120:24	50/60	Yes	1H + Foot	UL506 listed US/Canada, E197147
TR175VA001	175	208/240:24	50/60	No	Foot	UL506 listed US/Canada, E197147
TR175VA002	175	120:24	50/60	No	2H + Foot	UL506 listed US/Canada, E197147
TR240VA001	240	120:24	50/60	No	1H + Foot	UL506 listed US/Canada, E197147
TR300VA002	300	120/208/240/480:24	50/60	Yes	Foot	UL506 listed US/Canada, E197147
TR375VA001	375	120:24	50/60	No	Foot	UL506 listed US/Canada, E197147

FUNCTIONAL DEVICES CONTROL TRANSFORMERS

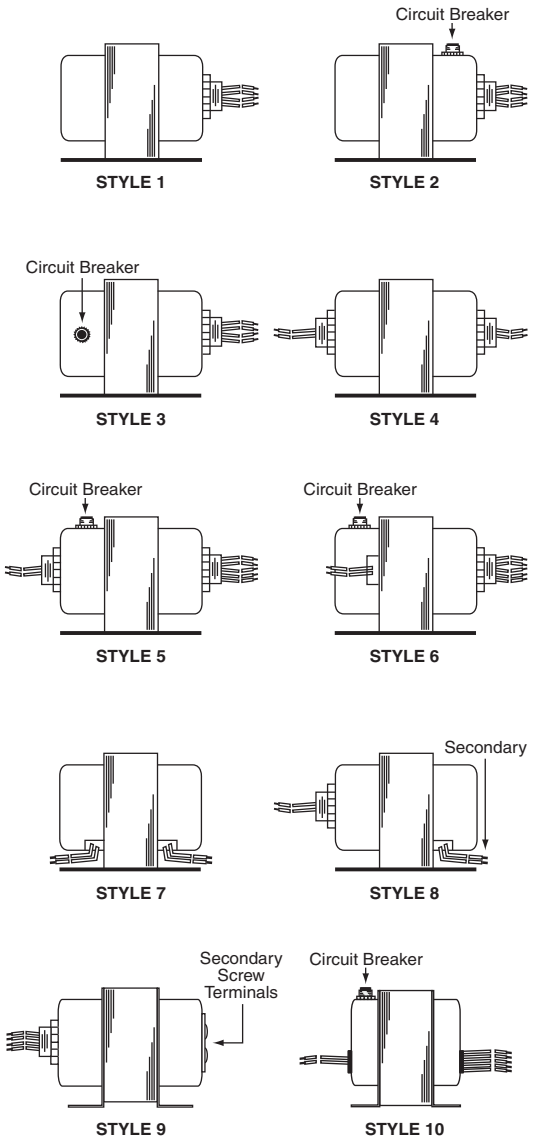
RIB TR SERIES

DIMENSIONS

in
(cm)



MODEL	DIMENSIONS A	B	C	D	E	WIRES	WEIGHT lb (kg)	STYLE
TR20VA001	2.13 (5.4)	1.90 (4.8)	2.6 (6.6)	1.63 (4.1)	1.54 (3.9)	8.0 (20.3)	1.35 (0.61)	1
TR20VA002	2.31 (5.86)	1.89 (4.80)	2.63 (6.68)	1.63 (4.1)	1.54 (3.9)	8.0 (20.3)	1.32 (0.61)	4
TR20VA003	2.13 (5.4)	1.90 (4.8)	2.6 (6.6)	1.63 (4.1)	1.54 (3.9)	8.0 (20.3)	1.39 (0.63)	1
TR20VA007	2.13 (5.4)	1.90 (4.8)	2.6 (6.6)	1.63 (4.1)	1.54 (3.9)	8.0 (20.3)	1.38 (0.63)	1
TR40VA001	2.7 (6.9)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	1.93 (4.9)	8.0 (20.3)	2.02 (0.92)	1
TR40VA002	2.7 (6.9)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	1.93 (4.9)	8.0 (20.3)	2.05 (0.93)	4
TR40VA003	2.7 (6.9)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	1.93 (4.9)	8.0 (20.3)	2.05 (0.93)	1
TR40VA004	2.75 (7.0)	2.2 (5.6)	2.88 (7.31)	1.75 (4.4)	2.06 (5.23)	8.0 (20.3)	2.02 (0.92)	4
TR40VA015	2.7 (6.9)	2.2 (5.6)	2.88 (7.31)	1.75 (4.4)	1.95 (4.95)	8.0 (20.3)	1.96 (0.89)	1
TR40VA040	2.7 (6.9)	2.2 (5.6)	2.88 (7.31)	1.75 (4.4)	1.95 (4.95)	8.0 (20.3)	1.96 (0.89)	9
TR50VA001	2.75 (7.0)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	1.93 (4.9)	8.0 (20.3)	2.14 (0.97)	1
TR50VA002	2.75 (7.0)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	1.93 (4.9)	8.0 (20.3)	2.18 (0.99)	4
TR50VA003	2.75 (7.0)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	2.01 (5.1)	8.0 (20.3)	2.17 (0.98)	4
TR50VA004	3.48 (8.8)	2.52 (6.4)	3.0 (7.6)	2.0 (5.1)	1.95 (5.0)	9.5 (24.1)	3.04 (1.38)	5
TR50VA005	3.5 (8.9)	2.52 (6.4)	3.0 (7.6)	2.0 (5.1)	2.0 (5.1)	9.0 (22.9)	2.6 (1.18)	2
TR50VA006	2.79 (7.1)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	2.01 (5.1)	8.0 (20.3)	2.16 (0.98)	1
TR50VA007	2.79 (7.1)	2.2 (5.6)	2.9 (7.4)	1.75 (4.4)	2.01 (5.1)	8.0 (20.3)	2.17 (0.98)	4
TR50VA009	3.48 (8.8)	2.52 (6.4)	3.0 (7.6)	2.0 (5.1)	1.95 (5.0)	9.5 (24.1)	3.04 (1.38)	5
TR50VA014	3.45 (8.76)	2.5 (6.4)	3.05 (7.74)	2.0 (5.1)	1.95 (4.95)	9.0 (22.9)	2.8 (1.27)	2
TR50VA015	3.475 (8.82)	2.53 (6.42)	3.04 (7.72)	2.0 (5.1)	1.95 (4.95)	9.5 (24.1)	2.98 (1.35)	2
TR50VA016	3.475 (8.82)	2.53 (6.42)	3.06 (7.77)	2.0 (5.1)	1.95 (4.95)	9.5 (24.1)	2.90 (1.32)	2
TR50VA017	3.475 (8.82)	2.53 (6.42)	3.05 (7.74)	2.0 (5.1)	1.95 (4.95)	9.5 (24.1)	2.86 (1.29)	2
TR75VA001, 005	3.9 (9.9)	2.5 (6.4)	3.0 (7.6)	2.0 (5.1)	2.4 (6.1)	9.5 (24.1)	3.66 (1.66)	2
TR75VA002	3.9 (9.9)	2.5 (6.4)	3.0 (7.6)	2.0 (5.1)	2.4 (6.1)	9.5 (24.1)	3.70 (1.68)	5
TR75VA003	3.875 (9.84)	2.5 (6.4)	3.06 (7.77)	2.0 (5.1)	2.4 (6.1)	9.5 (24.1)	3.60 (1.63)	2
TR75VA004	3.9 (9.9)	2.5 (6.4)	3.0 (7.6)	2.0 (5.1)	2.4 (6.1)	9.5 (24.1)	3.78 (1.71)	6
TR85VA002	2.80 (7.1)	3.75 (9.5)	3.18 (8.1)	3.10 (7.9)	2.0 (5.1)	9.5 (24.1)	4.35 (1.97)	1
TR100VA001	4.0 (10.2)	2.5 (6.4)	3.0 (7.6)	2.0 (5.1)	2.55 (6.4)	9.5 (24.1)	4.06 (1.84)	2
TR100VA002	4.0 (10.2)	2.5 (6.4)	3.0 (7.6)	2.0 (5.1)	2.55 (6.5)	9.5 (24.1)	4.13 (1.87)	5
TR100VA004	4.25 (10.8)	2.5 (6.4)	3.0 (7.6)	1.97 (5.0)	2.75 (7.0)	9.5 (24.1)	4.60 (2.08)	5
TR150VA001	3.5 (8.9)	3.75 (9.5)	3.25 (8.3)	3.23 (8.2)	2.0 (5.1)	9.5 (24.1)	4.92 (2.23)	3
TR175VA001	3.8 (9.7)	3.8 (9.7)	3.2 (8.1)	3.1 (7.9)	3.0 (7.6)	9.5 (24.1)	7.05 (3.19)	7
TR175VA002	3.9 (9.9)	3.75 (9.5)	3.18 (8.1)	3.1 (7.9)	3.0 (7.6)	9.5 (24.1)	7.10 (3.22)	4
TR240VA001	3.75 (9.5)	3.75 (9.5)	4.5 (11.4)	3.13 (8.0)	3.23 (8.2)	9.5 (24.1)	9.12 (4.13)	8
TR300VA002	5.4 (13.7)	3.75 (9.5)	4.5 (11.4)	3.18 (8.07)	3.84 (9.75)	8.5 (21.6)	12.1 (5.49)	10
TR375VA001	4.33 (11.0)	3.75 (9.5)	4.5 (11.4)	3.15 (8.0)	3.83 (9.7)	7.0 (17.8)	11.44 (5.18)	7



TRANSFORMER STYLES

WIRING

Primary Wires

480 VAC	Gray	**120 VAC**	White
277 VAC	Brown	**24 VAC**	Black
240 VAC	Orange	**Common**	Black
208 VAC	Red		

Secondary Wires*

24 VAC	Yellow
24 VAC	Yellow or Yellow/White

*Transformer Style 9 has secondary screw terminals.

ORDERING INFORMATION

Order by transformer model as listed under Specifications on the previous page.

POWER SUPPLIES

MULTI-TAP CONTROL TRANSFORMERS WITH BREAKER
694 SERIES

DESCRIPTION

The **694 Series** of industrial-grade multi-tap stepdown voltage transformers with manual resettable current-limiting secondary circuit breakers is ideal for use in temperature control systems. These UL listed transformers provide 24 VAC control voltage from a 120-480 VAC primary supply. The leads are clearly marked for ease of wiring. These foot-mounted transformers are designed for NEMA 1 locations and should be installed in compliance with all national and local electrical codes.

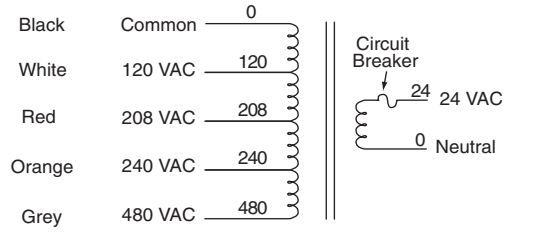
FEATURES

- ***Multi-tap primary from 120-480 VAC***
- ***Manual resettable secondary circuit breaker***
- ***Foot mounting***
- ***UL listed***

SPECIFICATIONS

Primary Voltage	120, 208, 240, 480 VAC
Secondary Voltage	24 VAC
Frequency	60 Hz
VA Rating	**694-M1A**: 75 VA, **694-M2**A: 100 VA, **694-M3A**: 180 VA, **694-M4**: 300 VA
Circuit Breaker	**694-M1A**: Manual reset, 5A trip, **694-M2A**: Manual reset, 6A trip, **694-M3A**: Manual reset, 12A trip, **694-M4**: Manual reset, 16A trip
Insulation Class	356°F (180°C)
Wire Length	10" (25.4 cm)
Temperature Rise	144°F (80°C)
Mounting	Foot
Approvals	UL506 listed, File #E67824, UL506 listed, File #E3210
Weight	**694-M1A, 694-M2A**: 3.8 lb (1.7 kg), **694-M3A**: 6.5 lb (3.0 kg), **694-M4**: 15.0 lb (6.8 kg)
Warranty	1 year

WIRING

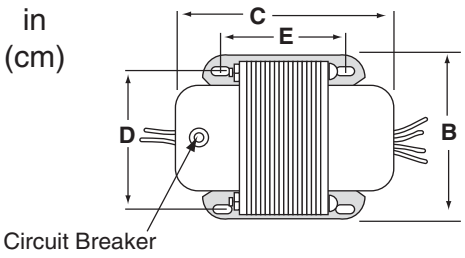


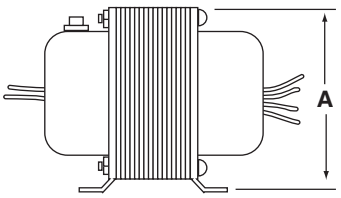
* Insulate the ends of unused primary leads.

Primary Wiring* **Secondary Wiring**

DIMENSIONS

in
(cm)





MODEL	DIMENSIONS				
	A	B	C	D	E
694-M1A	2.50 (6.35)	3.00 (7.62)	4.52 (11.48)	2.50 (6.35)	2.25 (5.72)
694-M2A	2.50 (6.35)	3.00 (7.62)	4.52 (11.48)	2.50 (6.35)	2.25 (5.72)
694-M3A	3.78 (9.60)	3.15 (8.00)	5.05 (12.83)	2.45 (6.22)	3.51 (8.92)
694-M4	4.52 (11.48)	3.75 (9.53)	5.42 (13.77)	3.16 (8.03)	3.8 (9.65)

ORDERING INFORMATION

MODEL	DESCRIPTION
694-M1A	Control Transformer, 120/208/240/480:24 VAC, 75 VA
694-M2A	Control Transformer, 120/208/240/480:24 VAC, 100 VA
694-M3A	Control Transformer, 120/208/240/480:24 VAC, 180 VA
694-M4	Control Transformer, 120/208/240/480:24 VAC, 300 VA

POWER SUPPLIES

120 VAC SECONDARY TRANSFORMERS

33 SERIES

DESCRIPTION

The **33 Series** of industrial-grade control transformers with 120 VAC secondary voltage is ideal for use in building automation and temperature control systems.

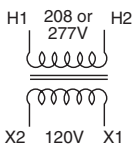
FEATURES

- ***24 or 120 VAC secondary voltage***
- ***Single hub or foot mounting***
- ***Fully enclosed***
- ***Compact size***
- ***Low cost***

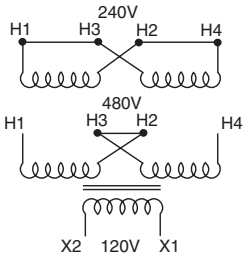
SPECIFICATIONS

Primary Voltage	120 VAC, 208 VAC, 480/240 VAC, 277 VAC
Secondary Voltage	24 VAC, 120 VAC
Frequency	50/60 Hz
VA Rating	50 VA, 100 VA
Insulation Class	221°F (105°C)
Wire Length	8.0" (20.32 cm), labeled
Temperature Rise	131°F (55°C)
Conduit Connection	1/2" (1.27 cm) male threads
Mounting	Hub or foot, NEMA 1
Dimensions	50 VA models: 3.19"H x 3.0"W x 2.5"D (8.10 x 7.62 x 6.35 cm), 100 VA models: 3.63"H x 3.38"W 2.81"D (9.22 x 8.59 x 7.14 cm)
Weight	2.7 lb (1.2 kg), 4.0 lb (1.8 kg)
Approvals	UL 506, UL5085-1 & 2 listed, File #E3210 CSA certified, File #LR560
Warranty	10 years

WIRING

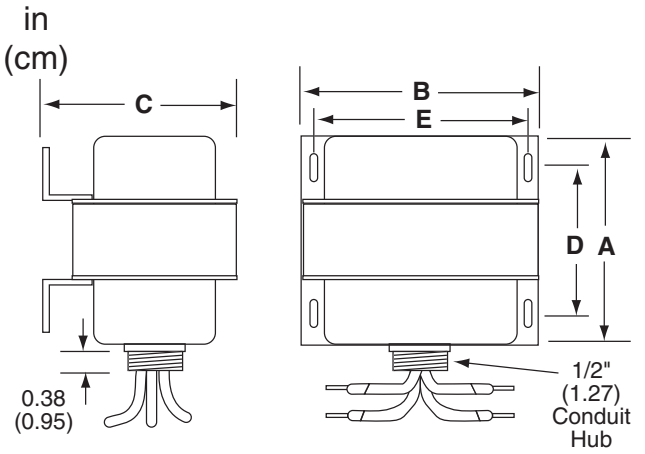


Models -K, 17, 18, 26, 82



Model -HLK, PM

DIMENSIONS



VA	DIMENSIONS				
	A	B	C	D	E
50	3.19 (8.10)	3.0 (7.62)	2.50 (6.35)	1.69 (4.29)	2.50 (6.35)
100	3.63 (9.22)	3.38 (8.59)	2.81 (7.14)	2.13 (5.41)	2.50 (6.35)

ORDERING INFORMATION

MODEL	DESCRIPTION
33-050-17	Control transformer, 208:120V, 50 VA
33-050-18	Control transformer, 208:24V, 50 VA
33-050-82	Control transformer, 277:120V, 50 VA
33-050-HLK	Control transformer, 480/240:24V, 50 VA
33-050-PM	Control transformer, 480/240:120V, 50 VA
33-100-17	Control transformer, 208:120V, 100 VA
33-100-26	Control transformer, 277:24V, 100 VA
33-100-82	Control transformer, 277:120V, 100 VA
33-100-K	Control transformer, 120:24V, 100 VA
33-100-PM	Control transformer, 480/240:120V, 100 VA

AIR PRODUCTS AND CONTROLS ENCLOSED 24 VAC POWER SOURCE

T-PB SERIES

DESCRIPTION

The **T-PB Series** power source provides 24 VAC from a 115 VAC input. Each **T-PB Series** unit contains an LED that illuminates when the 24 VAC output is operational. An on/off switch is provided in the 115 VAC input. This switch disconnects or connects both the hot and neutral of the input power. A convenience outlet is located on the front panel. This convenience outlet is not controlled by the on/off switch and is always hot. A circuit breaker is incorporated in the 24 VAC circuit, which must be manually reset if the rated 3.0A (Class 2) or 4.0A (Class 1) is exceeded and the breaker operates.The **T-PB Series** is available in a metal enclosure (UL Listed) for field applications or without the enclosure (UL Recognized) for panel mounting.

T-PB202-1

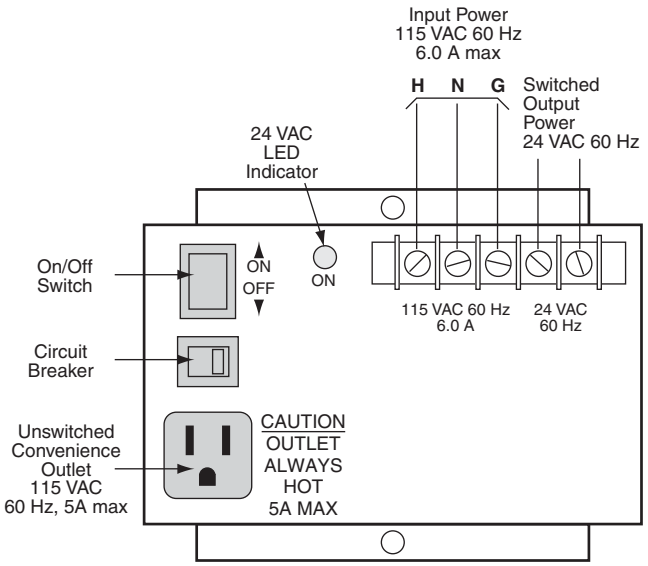
FEATURES

- ***Enclosed and panel-mounted models***
- ***On/Off switch***
- ***Convenience outlet, non-switched***
- ***Circuit breaker***
- ***Enclosure with removable access panel to on/off switch, breaker, and outlet***

SPECIFICATIONS

Primary Voltage	115 VAC
Supply Current	6A maximum
Supply Frequency	60 Hz
Convenience Outlet	115 VAC, 5A
Secondary Voltage	24 VAC
Output Current/VA Rating	
	T-PB202: 4.0A, 96 VA (Class 1),
	T-PB303: 3.0A, 72 VA (Class 2)
Over Current Protection	Circuit breaker
Operating Temperature	-13° to 140°F (-25° to 60°C)
Mounting	Panel mount, Enclosed
Dimensions	4.75"H x 5.0"W x 3.75"D (12.1 x 12.7 x 9.5 cm), 6.12"H x 5.19"W x 4.12"D (15.5 x 13.2 x 10.5 cm)
Weight	5.5 lb (2.65 kg)
Approvals	UL-recognized component File #E160579, UL1012 Listed, File #E160579
Warranty	1 year

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
T-PB202-1	24 VAC Power source, 4A (Class 1) with enclosure
T-PB202-0	24 VAC Power source, 4A (Class 1) panel mount
T-PB303-1	24 VAC Power source, 3A (Class 2) with enclosure
T-PB303-0	24 VAC Power source, 3A (Class 2) panel mount

POWER SUPPLIES

FUNCTIONAL DEVICES ENCLOSED 24 VAC CLASS 2 POWER SOURCE

PSB40AB10, PSB100AB10, PSC40AB10, PSC100AB10

DESCRIPTION

The **PSC40AB10** and **PSC100AB10** are 24VAC Class 2 power sources pre-packaged in a metal enclosure. The panel-mount versions, **PSB40AB10** and **PSB100AB10**, are provided without the metal enclosure. These units are available with either 40VA or 100VA power ratings. All models accept 120VAC input and are provided with a combination on/off switch/circuit breaker to control the output and a combination on/off switch/breaker to control the incoming 120VAC power. Other handy features include a 120VAC convenience outlet, LED indication of the output and terminal strip wiring.

PSB40AB10

PSC40AB10

PSC40AB10, covered

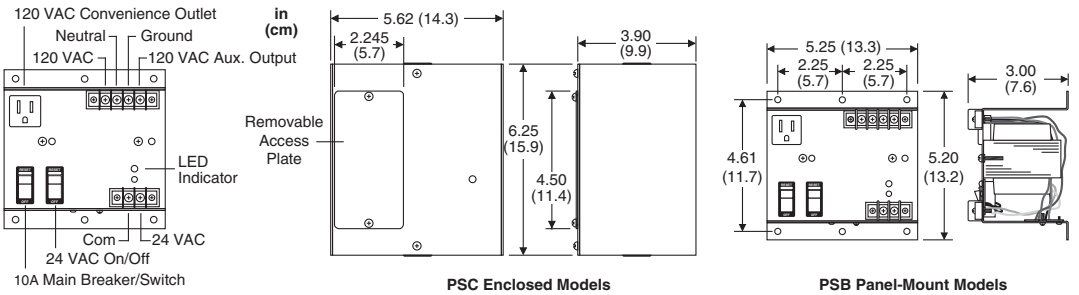
FEATURES

- ***Enclosed or panel mount models***
- ***Combination on/off switch/circuit breakers for the input and output***
- ***Convenience outlet***
- ***Terminal strip wiring***
- ***LED indication of the output***
- ***Class 2 UL Listed***

SPECIFICATIONS

Primary Voltage	120 VAC, 50/60 Hz
Input Control	Combination on/off switch and 10A circuit breaker. Controls input power to entire unit.
Convenience Outlet	120 VAC, 9A
Secondary Voltage	24 VAC
Output Control	Combination on/off switch and circuit breaker (4A). Controls 24 VAC output only., Combination on/off switch and circuit breaker (3A). Controls 24 VAC output only.
Output Indication	Red LED for 24 VAC output
Over Current Protection	4A circuit breaker, 3A circuit breaker
Approvals	UL listed, Class 2, UL916, File E190394, CUL
Weight	
PSC40:	5.31 lb (2.41 kg)
PSC100:	6.70 lb (3.04 kg)
PSB40:	3.21 lb (1.5 kg)
PSB100:	4.51 lb (2.05 kg)
Warranty	1 year

WIRING



PSC Enclosed Models **PSB Panel-Mount Models**

ORDERING INFORMATION

MODEL	DESCRIPTION
PSC40AB10	Enclosed power source, 120 VAC to 24 VAC, 40 VA with enclosure
PSC100AB10	Enclosed power source, 120 VAC to 24 VAC, 100 VA with enclosure
PSB40AB10	Enclosed power source, 120 VAC to 24 VAC, 40 VA, panel mount
PSB100AB10	Enclosed power source, 120 VAC to 24 VAC, 100 VA, panel mount

FUNCTIONAL DEVICES ENCLOSED 24 VAC CLASS 2 POWER SOURCE

PSH SERIES

DESCRIPTION

The **PSH Series** of Power Sources from Functional Devices includes one or two transformers, pre-packaged in a metal enclosure. The transformers are available in 40VA, 75VA and 100VA sizes. A switch/circuit breaker is provided for switching the output of each transformer. An optional switch/circuit breaker is available for controlling power to the entire unit. Other handy features include an LED to indicate the presence of 24VAC at the Class 2 output terminals or wires, an internal high-voltage wiring compartment, and two optional 120VAC grounded convenience outlets.

PSH, Single Transformer Model with Options

PSH, Two Transformer Model with Options

FEATURES

- ***One or two transformers in pre-packaged metal enclosure***
- ***40, 75 and 100 VA Class 2 transformers***
- ***Output switch/circuit breaker and LED indication***
- ***Optional primary switch/circuit breaker***
- ***Optional 120 VAC convenience outlets***

SPECIFICATIONS

Primary Voltage	120 VAC, 50/60 Hz, 120 VAC, 50/60 Hz (40 VA), 480/277/240/208/120 VAC 50/60 Hz (75VA) , 480/277/240/208/120 VAC 50/60 Hz (75 VA), 120 VAC, 50/60 Hz (100 VA)
Input Control	Combination on/off switch and 10A circuit breaker
Convenience Outlet	120 VAC, 15A maximum.
Secondary Voltage	**PSH40A**: 24 VAC, 40VA, **PSH75A**: 24 VAC, 75V, **PSH100A**: 24 VAC, 100V, **PSH40A40A**: Dual 40 24 VAC, 40 VA, **PSH40A75A**: Dual 24 VAC, 40VA and 75 VA, **PSH40A100A**: Dual 24 VAC, 40VA and 100 VA, **PSH75A75A:** Dual 24 VAC, 75 VA, **PSH75A100A**: Dual 24 VAC, 75VA and 100VA, **PSH100A100A**: Dual 24 VAC, 100VA
Output Control	Combination of on/off switch and circuit breaker. Controls 24 VAC output only.
Output Indication	Red LED, one for each 24 VAC output
Dimensions	**Single Transformer Models**: 4.50"H x 5.15"W x 4.50" D (11.4 x 13.1 x 11.4 cm), **Two Transformer models:** 4.50"H x 8.25"W x 4.50" D (11.4 x 20.96 x 11.4 cm)
Approvals	UL listed, Class 2, UL916, File E190394 CUL
Weight	**PSH40A**: 3.1 lb (1.41 kg), **PSH75A**: 4.5 lb (2.04 kg), **PSH100A**: 4.6 lb (2.09 kg), **PSH40A40A**: 5.4 lb (2.45 kg), **PSH40A75A**: 6.8 lb (3.09 kg), **PSH40A100A**: 6.9 lb (3.13 kg), **PSH75A75A**: 8.4 lb (3.86 kg), **PSH75A100A**: 8.5 lb (3.86 kg), **PSH100A100A**: 8.6 lb (3.90 kg)
Warranty	1 Year

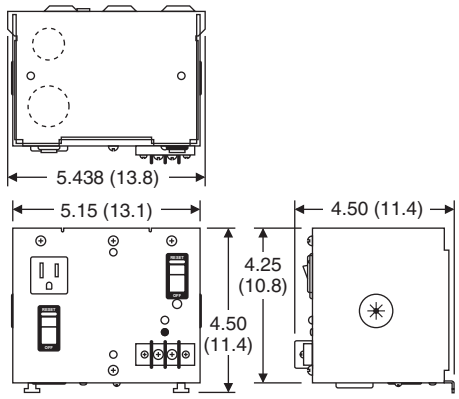
POWER SUPPLIES

FUNCTIONAL DEVICES ENCLOSED 24 VAC CLASS 2 POWER SOURCE

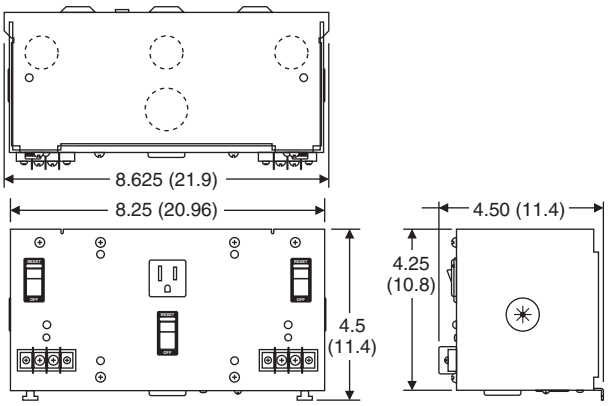
PSH SERIES

DIMENSIONS

in
(cm)

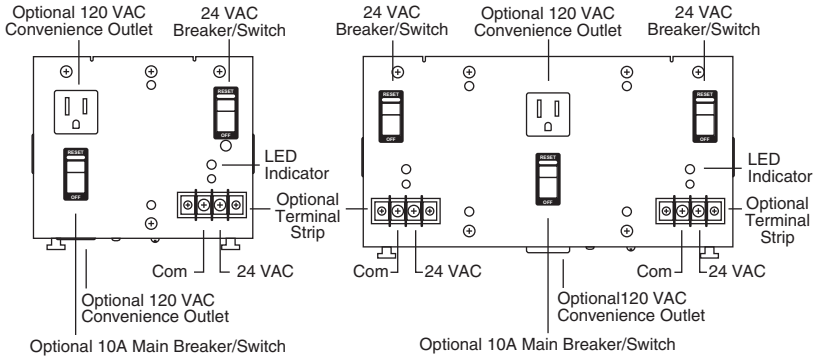


Single Transformer Models



Two Transformer Models

WIRING



INPUT:
Transformer
Primary Wires
40 VA or 100 VA
Black: 120 VAC
White: Common
75 VA
Gray: 480 VAC
Brown: 277 VAC
Orange: 240 VAC
Red: 208 VAC
White: 120 VAC
Black: Common

"B10" Option
Models Only
40 VA, 75 VA, or 100 VA
Black: 120 VAC
White: Neutral
Green: Ground

OUTPUT:
Models with
Terminals
HOT: 24 VAC
COM: Common
"W" Option
Models Only
Yellow/White: 24 VAC
White/Blue: Common
"B10" Option
Models Only
Blue: 120 VAC
auxiliary output

ORDERING INFORMATION

MODEL	DESCRIPTION
PSH40A	Enclosed single 40 VA power source, 120 to 24 VAC
PSH75A	Enclosed single 75 VA power source, 480/277/240/208/120 to 24 VAC
PSH100A	Enclosed single 100 VA power source, 120 to 24 VAC
PSH40A40A	Enclosed dual 40 VA power sources, 120 to 24 VAC
PSH40A75A	Enclosed 40 VA, 120 to 24 VAC, and 75 VA, multi-tap to 24 VAC power sources
PSH40A100A	Enclosed 40 VA and 100 VA power sources, 120 to 24 VAC
PSH75A75A	Enclosed dual 75 VA power sources, 480/277/240/208/120 to 24 VAC
PSH75A100A	Enclosed 75 VA, 480/277/240/208/120 to 24 VAC and 100 VA, 120 to 24 VAC sources
PSH100A100A	Enclosed dual 100 VA power sources, 120 to 24 VAC
	OPTIONS
–	External secondary terminals, 120 VAC convenience outlets
N	External secondary terminals, without 120 VAC convenience outlets
W	Internal secondary wires, 120 VAC convenience outlets
NW	Internal secondary wires, without 120 VAC convenience outlets
	– Without 10A main switch/breaker and without auxiliary output wire
	B10 10A main switch/breaker and auxiliary output wire (75 VA transformers are 120 VAC input only with "B10" option)

POWER SUPPLIES

FUNCTIONAL DEVICES ENCLOSED POWER SOURCE - 100 VA, 24 VAC CLASS 2 OUTPUTS

PSH300A, PSH500A, PSMN300A, AND PSMN500A

DESCRIPTION

The **PSH300A** and **PSH500A** are power sources that are pre-packaged in a metal enclosure and provide isolated, 24 VAC, 100VA, Class 2 outputs. The panel mount versions, **PSMN300A** and **PSMN500A** are provided without the metal enclosure. All models accept 480/277/240/120 VAC input and have combination on/off switch/circuit breakers to control each output. Other handy features include LED indication of each output and terminal strip wiring.

FEATURES

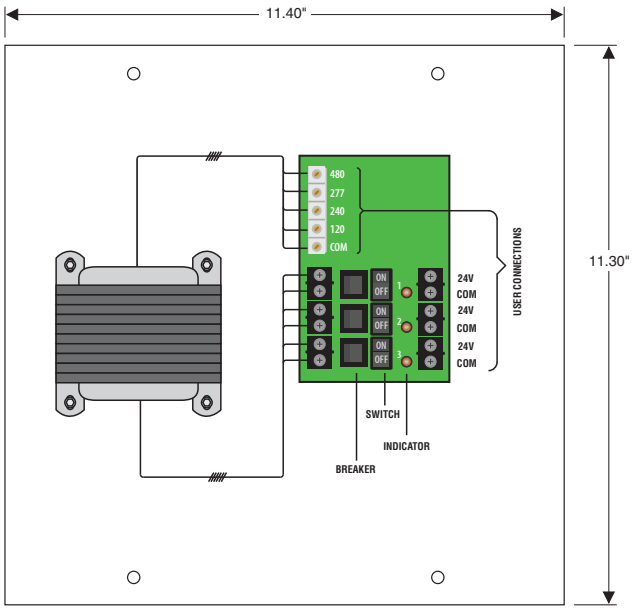
- ***NEMA 1 enclosed or panel mount models***
- ***Combination on/off switch/circuit breakers for each output***
- ***Terminal strip wiring***
- ***LED indication of each output***
- ***Class 2, UL Listed***

PSH300A

SPECIFICATIONS

Primary Voltage	480/277/240/120 VAC 50/60 Hz
Output Voltage	Isolated 24 VAC, 100 VA Class 2
Output Control	Combination on/off switch and 4A circuit breaker for each 24 VAC output
Output Indication	Red LED for each 24 VAC output
Dimensions	**PSH Models**: 12.125"H x 12.125"W x 6.0"D (30.8 x 30.8 x 15.2 cm), **PSMN Models**: 11.33"H x 11.4"W x 7.0"D (22.8 x 28.9 x 17.8 cm)
Approvals	CE, RoHS
Weight	**PSH300A**: 18.0 lb (8.17 kg), **PSH500A**: 30.16 lb (8.17 kg), **PSMN300A**: 12.38 lb (5.62 kg), **PSMN500A**: 20.6 lb (9.4 kg)
Warranty	1 Year

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
PSH300A	Enclosed power source 480/277/240/120 VAC to 24 VAC, three 100 VA outputs with enclosure
PSH500A	Enclosed power source 480/277/240/120 VAC to 24 VAC, five 100 VA outputs with enclosure
PSMN300A	Panel mount power source 480/277/240/120 VAC to 24 VAC, three 100 VA outputs with enclosure
PSMN500A	Panel mount power source 480/277/240/120 VAC to 24 VAC, five 100 VA outputs with enclosure

POWER SUPPLIES

SOLA/HEVI-DUTY UNINTERRUPTIBLE POWER SUPPLIES - UPS

S1K AND SDU SERIES

DESCRIPTION

The Sola/Hevi-Duty **S1K** and **SDU Series** of off-line Uninterruptible power supplies (UPS) provides economical protection from damaging power interruptions and impulses. The S1K units feature three separate outlets for critical devices needing battery backup and surge protection and one surge-protected-only outlet for non-critical devices. Connections are made to the DIN-rail mount **SDU** units on easy-to-wire screw terminals. In addition, RJ-45 connections for phone/data line surge protection are provided with both the **S1K** and **SDU**. UPS monitoring software and cable are included for communication with the protected computer by RS-232 interface. The **SDU** has an optional relay module that can be connected to the model's port.

SOLA/ HEVI-DUTY

S1K and SDU Series

c UL us

SPECIFICATIONS

MODEL		S1K320	S1K520	S1K650	S1K850	S1K1200	SDU500	SDU850
PRIMARY VOLTAGE	Capacity VA/Watts	320/240	520/340	650/390	850/600	1200/720	500/300	850/510
	Voltage (Single phase)	115V ±20%					120V +10%, -20%	
	Frequency	50 or 60Hz ±10% (auto sensing)						
SECONDARY VOLTAGE	Voltage (on battery)	Simulated sine wave						
		115 ±10%		115 ±5%			120V ±5%	
	Frequency (on battery)	50 or 60 Hz						
		±1 Hz		±0.3 Hz			±0.5% autosensing	
	Transfer Time	4 milliseconds, typical						
PROTECTION	Unit Input	Circuit breaker for overload and short circuit protection						
	Overload Protection	UPS automatic shutdown if overload exceeds 105% of nominal at 20 seconds, 120% at 10 seconds, 130% at 3 seconds						
	Short Circuit	UPS output cut off immediately						
BATTERY	Type	Sealed, maintenance-free lead acid batteries						
	Typical Recharge Time (to 90% of full capacity)	4 hours			6 hours		8 hours	
	Backup Time (minutes)	10-20*	15-25*	15-30*	25-40*	30-45*	4**	2**
ALARM	Battery Back-up	Slow beeping sound every 4 seconds						
	Battery Low	Rapid beeping sound every second						
	Overload	Continue beeping sound						
ENVIRONMENT	Ambient operation	0% to 95% humidity non-condensing 0° to 40°C up to 10,000 ft (3000 m)						
	Audible noise	< 40 dBA (1 meter from surface)						
PHYSICAL	Net Weight - lbs (kg)	8.8 (4.0)	11.6 (5.3)	8.1 (3.7)	10.8 (4.9)	10.8 (4.9)	10.7 (4.7)	11.4 (5.0)
	Dimensions - H x W x D (in/cm)	5.3" x 3.8" x 10.4" (13.5 x 9.7 x 26.5)	5.3" x 3.8" x 12.6" (9.7 x 32.0 x 13.5)	5.3" x 3.8" x 10.4" (13.5 x 9.7 x 26.5)	5.3" x 3.8" x 12.6" (9.7 x 32.0 x 13.5)		4.55" x 4.88" x 11.1" (11.6 x 12.4 x 28.2)	
AGENCY APPROVALS		E179213	UL1778 listed				UL recognized	E179213
WARRANTY		1 year						

*For typical 15" monitor **At full load

ORDERING INFORMATION

MODEL	DESCRIPTION
S1K320	Uninterruptible power supply, 320 VA
S1K520	Uninterruptible power supply, 520 VA
S1K650	Uninterruptible power supply, 650 VA
S1K850	Uninterruptible power supply, 850 VA
S1K1200	Uninterruptible power supply, 1200 VA
S1K-PMBRK	Wall/panel mount bracket for S1K UPS
SDU500	Uninterruptible power supply, 500 VA, DIN rail mount
SDU850	Uninterruptible power supply, 850 VA, DIN rail mount
SDU-PMBRK	DIN rail mount bracket for SDU UPS
RELAYCARD-SDU	Form C dry contact relay module for SDU UPS

FUNCTIONAL DEVICES UNINTERRUPTIBLE POWER SUPPLY

PSH550-UPS

DESCRIPTION

The **Model PSH550-UPS Uninterruptible Power Supply** (UPS) provides economical protection from damaging power interruptions and impulses in critical environments such as hospitals, laboratories, research and surgery centers. The **Model PSH550-UPS** features an extra 120 VAC outlet and a 10A circuit breaker on/off switch. The switch controls the incoming line voltage and can be used to verify the functionality of the UPS. The **Model PSH550-UPS** is ideal for those hard-to-install applications and locations where you need a UPS but also must use conduit to run your wiring.

PSH550-UPS

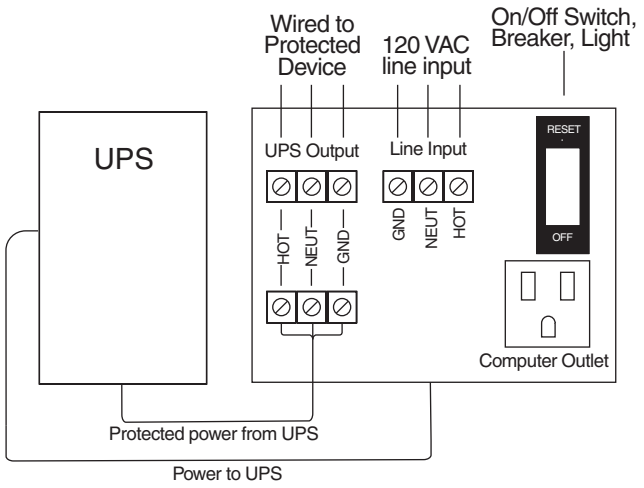
FEATURES

- ***10 Amp circuit breaker***
- ***On/off switch***
- ***Additional 120 VAC outlet***
- ***Metal enclosure***

SPECIFICATIONS

Input	120 VAC, 12 Amp, 50/60 Hz
Output	120 VAC, 4.6A, 330 Watt
VA Rating	330 W, 550VA
Backup Time	3 minutes @ full 550 VA load; 13 minutes at 1/2 load
Circuit Breaker	Combination on/off switch and 10A circuit breaker. Controls input to entire unit.
Convenience Outlet	120 VAC
Housing Type	Metal housing with screw cover
Dimensions	12.0" H x 14.0" W x 6.0"D (30.5 x 35.6 x 15.2 cm)
Approvals	UL listed, UL916,C-UL, CE
Weight	23.6 lb (10.7 kg)
Warranty	1 year

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
PSH550-UPS	Uninterruptible power supply, 120 VAC, 550 VA with enclosure

POWER SUPPLIES

KELE AC / DC POWER SUPPLY

DCPA-1.2

DESCRIPTION

The **DCPA-1.2** universal AC/DC power supply can deliver 30 VA of power. This compact, track-mounted supply accepts 120 VAC and delivers both 24 VAC and regulated 24 VDC power for control circuits.

FEATURES

- ***24 VAC and 24 VDC output from the same power supply***
- ***LED indication of AC input and DC output status***
- ***Overload protection***
- ***Screw terminals with pressure plates***
- ***Snap-track mounted***
- ***Adjustable DC output***
- ***Full-wave rectified***

SPECIFICATIONS

Supply Voltage	120 VAC
Supply Frequency	50/60 Hz
Regulation	1.5% @ full rated current
Output Voltage	24 VAC 24 VDC (regulated) Adjustable 1.3-27 VDC
Output Current	Total combined current from both outputs not to exceed 1.2A @ 24V
Over Current Protection	2.5A for combined outputs (GF-2.5 fuse)
Operating Temperature	32° to 130°F (0° to 55°C)
Operating Humidity	95% RH non-condensing
Mounting	Snap-track (included)
Temperature Stability	1%
Dimensions	3.0"H x 3.25"W (7.62 x 8.26 x 15.24 cm)
Weight	2.3 lb (1 kg)
Warranty	18 months,

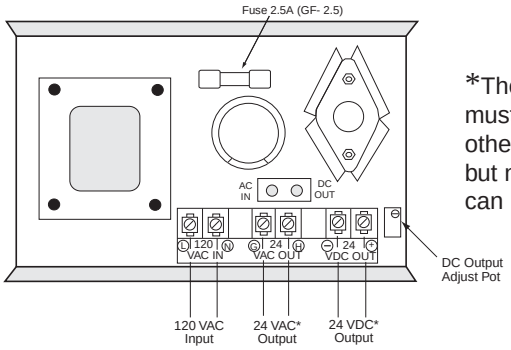
WIRING

DC Voltage Adjustment

1. Apply 120 VAC to 120 VAC IN terminals.
2. Adjust DC output adjust pot until the desired DC voltage is displayed with a voltmeter at the 24 VDC OUT terminals.

Note: Adjusting the DC output voltage will reduce the output current rating by the ratio of the output voltage divided by 24.

Example: 6 VDC output will have a reduced output current of 300 mA.
(6/24) x 1.2 = 300 mA



*The AC and DC load circuits must be isolated from each other. Either may be grounded but not both. Failure to isolate can result in damage to unit.

ORDERING INFORMATION

MODEL	DESCRIPTION
DCPA-1.2	Power supply, 120 VAC IN to 24 VAC/24 VDC OUT
DCPA-1.2-C	Power supply, 120 VAC In to 24 VAC/ Special DC output (Specify output voltage when ordering, 1.3-27 VDC)

KELE DC POWER SUPPLY
DCP-1.5-W

DESCRIPTION

The **DCP-1.5-W** is a regulated 1.5A power supply that accepts 24 VAC at the input and provides 24 VDC at the output. The **DCP-1.5-W** can be ordered with any output voltage from 1.5V to 27 VDC. Field voltage adjustments may also be made using only a screwdriver. The power supply is provided with a mounting track for easy field application.This low cost power supply features good regulation and has full overcurrent protection.

FEATURES

- ***Low cost***
- ***Regulated DC output***
- ***Snap-track mounted***
- ***Screw terminals with pressure plates***
- ***Adjustable DC output***
- ***Full-wave rectified***

APPLICATION

In general, the output current rating will be reduced by the ratio of the output voltage divided by the input voltage. For example, a 6 VDC supply powered by a 24 VAC transformer will have a reduced-rated output current of 375 mA. (6/24) x 1.5 = 0.375

To obtain the full-rated output current at reduced output voltages, the standard power supply input voltage must be reduced. It is a good practice to maintain the same AC input voltage as the desired DC output voltage**.**

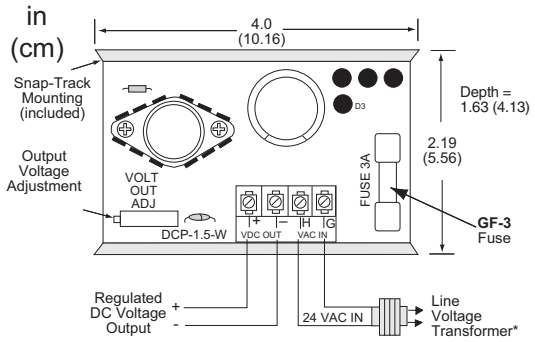
A grounded DC minus terminal and a grounded secondary 24 VAC input transformer will blow the unit's fuse. If this is a problem, there are three possible solutions:

Option 1: Remove the ground on the transformer secondary to float the voltage output, or use a separate ungrounded transformer.

Option 2: Add a Model Y65G13-0 40 VA isolation transformer. This option reduces the power supply capacity to 920 mA.

Option 3: Remove diode D3 (marked on board). Jumper the VDC OUT (-) terminal to the VAC IN (G) terminal. The grounded side of the AC supply should be wired to the VAC IN (G) terminal. This option reduces the power supply capacity to 400 mA.

DIMENSIONS / WIRING



* Input Transformer Required VA Rating @ 24 VAC = 43.2 x Desired DC Output Current
For full 1.5A capacity, use a 75 VA transformer.

SPECIFICATIONS

Supply Voltage	24 VAC
Supply Frequency	50/60 Hz
Regulation	1.5% at full rated current
Output Voltage	24 VDC (full wave rectified and regulated), 1.5 - 27 VDC (full wave rectified and regulated)
Output Current	1.5A (with 75 VA transformer)
Over Current Protection	3A fuse (GF-3)
Operating Temperature	32° to 130°F (0° to 55°C)
Operating Humidity	95% RH non-condensing, 95% RH non-condensing
Mounting	Snap track (included)
Temperature Stability	1%
Dimensions	1.63"H x 2.19"W x 4.0"D (4.13 x 5.56 x 10.16 cm)
Weight	0.4 lb (0.18 kg)
Warranty	18 months

ORDERING INFORMATION

MODEL	DESCRIPTION
DCP-1.5-W	Power supply, 24 VAC IN to 24 VDC OUT
DCP-1.5-W-C	Power supply, 24 VAC In to special DC output (Specify output voltage when ordering, 1.5-24 VDC)

POWER SUPPLIES

KELE ENCLOSED DC POWER SUPPLY

DCP-250

DESCRIPTION

The **DCP-250** is a unique DC power supply that provides regulated 24 VDC power from a 120 VAC input. It is well suited for powering transmitters, transducers, actuators, and other equipment in building automation and temperature control systems. The **DCP-250** can be ordered for hub mounting, surface mounting in a panel, or DIN rail mounting.

DCP-250 Series

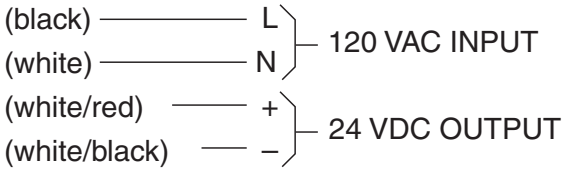
FEATURES

- ***Flexible mounting for hub, panel/surface, DIN rail***
- ***Compact size***
- ***Fully enclosed***
- ***Color-coded wiring***
- ***LED indication***
- ***UL listed***
- ***Transformer isolated***

SPECIFICATIONS

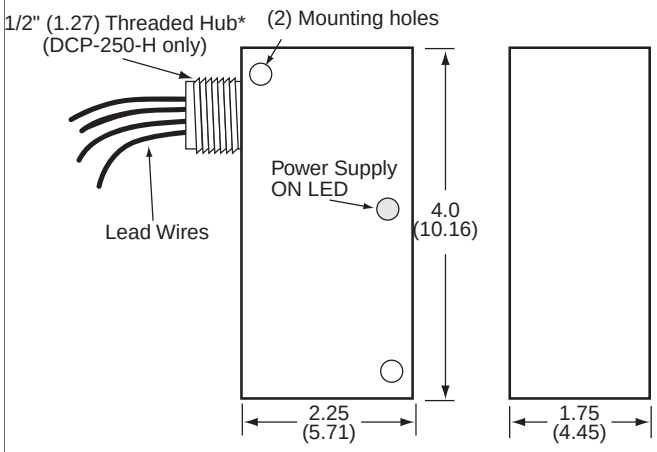
Supply Voltage	110-125 VAC, 10 VA
Supply Frequency	50/60 Hz
Regulation	±0.5V
Output Voltage	24 VDC (regulated)
Output Current	250 mA
Operating Temperature	-22° to 104°F (-30° to 40°C)
Operating Humidity	95% RH non-condensing
Mounting	DIN rail mount, Hub mount, Panel/surface mount
Temperature Stability	1%
Dimensions	4.0"H x 2.25"W x 1.75"D (10.16 x 5.71 x 4.45 cm)
Approvals	UL916 listed, File #E185225
Weight	1.0 lb (0.5 kg)
Warranty	18 months

WIRING



DIMENSIONS

in
(cm)



***Models DCP-250-P** and **DCP-250-D** do not have the 1/2" (1.27 cm) hub. Wires exit through two holes in the top of the enclosure on these models.

ORDERING INFORMATION

MODEL	DESCRIPTION
DCP-250-H	DC power supply, 120 VAC IN to 24 VDC OUT, hub mount
DCP-250-P	DC power supply, 120 VAC IN to 24 VDC OUT, panel/surface mount
DCP-250-D	DC power supply, 120 VAC IN to 24 VDC OUT, DIN rail mount

KELE DC POWER SUPPLY
DCP-524

DESCRIPTION

The **Model DCP-524** is a power supply with dual isolated-outputs. Powered by 24 VAC, it provides 5 VDC and 24 VDC. The outputs are highly regulated, require no field adjustment, and are isolated from each other and the input voltage. The Model DCP-524 is used any time an isolated 5 VDC, 24 VDC, or combination is needed.

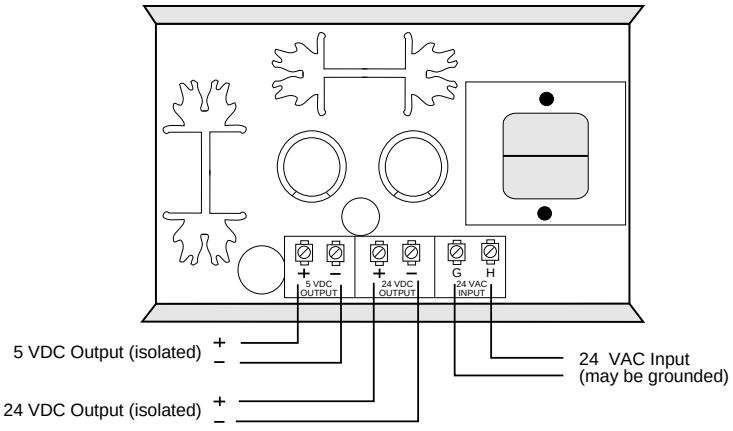
FEATURES

- ***Low cost***
- ***Snap-track mounted***
- ***Dual isolated DC outputs, 5 VDC and 24 VDC***
- ***Requires no field adjustment***
- ***Transformer isolated***

SPECIFICATIONS

Supply Voltage	22-28 VAC @ 630 mA
Supply Frequency	50/60 Hz
Output Voltage	5 VDC (regulated) and 24 VDC (regulated)
Output Current	250 mA maximum @ 5 VDC; 80 mA maximum @ 24 VDC
Operating Temperature	32° to 130°F (0° to 55°C)
Operating Humidity	95% RH non-condensing
Mounting	Snap-track (included)
Dimensions	2.38"H x 4"W x 2"D (6.0 x 10.2 x 5.0 cm)
Weight	0.9 lb (0.4 kg)
Warranty	18 months

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
DCP-524	Power supply, 24 VAC IN to 24 VDC and 5 VDC OUT

POWER SUPPLIES

FUNCTIONAL DEVICES CLASS 2 DC POWER SUPPLIES

PSM SERIES

DESCRIPTION

The **PSM Series of DC Power Supplies** provides an isolated and regulated 24 VDC output from a voltage input of either 120 VAC or 24 VAC. The **PSM Series** is UL listed for use in Class 2 circuits.

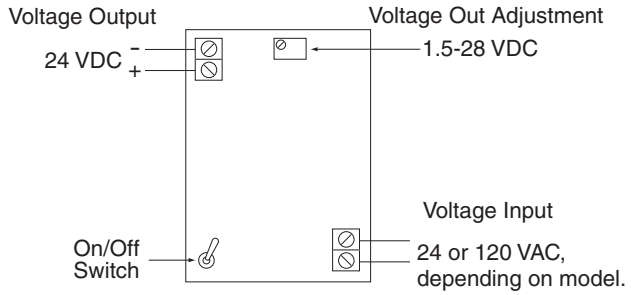
FEATURES

- ***Isolated, regulated 24 VDC output***
- ***UL Listed for Class 2 circuits***
- ***On/Off switch***
- ***LED indication***
- ***Track mounted***
- ***Full-wave rectified***
- ***Class 2 UL916 listed, ULC, File #E68805***
- ***1 Year warranty***

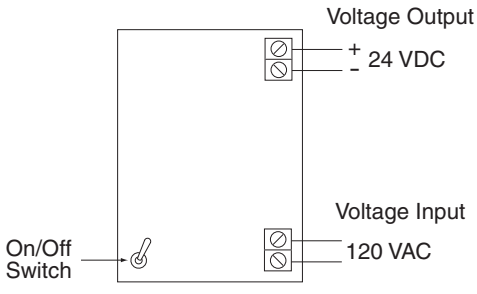
SPECIFICATIONS

Model	Input	Output	Ripple	Line Regulation	Load Regulation	Operating Temperature	Dimensions	Weight
PSM24A24DAS	24 VAC 50/60 Hz 950 mA maximum	300 mA @ 24 VDC, 125 mA @ 12 VDC, 116 mA @ 10 VDC	0.0016%, 24 VDC @ 300 mA	8 mV/V	0.04%	-30° to 140°F (-34° to 60°C)	4"H x 2.75"W x 1.63"D (10.1 x 6.9 x 4.1 cm)	1.1 lb (0.49 kg)
PSM19A24DAS	120 VAC 50/60 Hz 150 mA maximum	300 mA @ 24 VDC, 125 mA @ 12 VDC, 116 mA @ 10 VDC	0.0016%, 24 VDC @ 300 mA	0.625 mV/V	0.04%	-30° to 140°F (-34° to 60°C)	4"H x 2.75"W x 1.63"D (10.1 x 6.9 x 4.1 cm)	1.1 lb (0.49 kg)
PSMN40A24DS	120 VAC 50/60 Hz 400 mA maximum	1A @ 24 VDC	0.0016%, 24 VDC @ 1A	25 mV/V	0.5%	-30° to 140°F (-34° to 60°C)	5"H x 2.75"W x 2"D (12.7 x 6.9 x 5.1 cm)	1.5 lb (0.68 kg)

WIRING



PSM24A24DAS
PSM19A24DAS



PSMN40A24DS

ORDERING INFORMATION

MODEL	DESCRIPTION
PSM24A24DAS	Class 2 DC Power supply, 24 VAC:24VDC, 300 mA
PSM19A24DAS	Class 2 DC power supply, 120 VAC:24 VDC, 300 mA
PSMN40A24DS	Class 2 DC power supply, 120 VAC:24 VDC, 1A

DESCRIPTION

The **SLS Series of DC Power Supplies** from Sola/Hevi-Duty are used to transform various AC voltage inputs into a regulated DC output. Multiple mounting surfaces simplify installation by providing different mounting options. Units have built-in remote sensing capability for better load regulation.

FEATURES

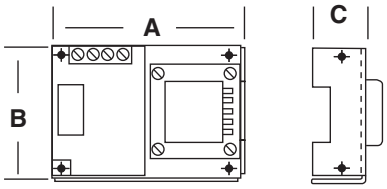
- ***Screw terminal connections, no soldering***
- ***Multiple input voltages***
- ***Regulated 24 VDC output up to 7.2A***
- ***Remote sensing***
- ***Transformer isolated***

SPECIFICATIONS

Supply Voltage	100, 120, 220, 230, 240 VAC ± 10%
Supply Frequency	47-63 Hz
Output Voltage	12 VDC, Adjustable ± 5% of rated voltage, 24 VDC, Adjustable ± 5% of rated voltage
Output Current	1.7A, 1.2A, 2.4A, 3.6A, 4.8A, 7.2A
Line Regulation	± 0.05% for 10% line change
Load Regulation	5% for 50% load change
Ripple	3 mV p-p maximum
Wiring Terminations	Screw terminals, input and output 16-gauge wire maximum
Operating Temperature	32° to 122°F (0° to 50°C)
Approvals	UL1310, CUL-recognized component, File #E137632: CE certified
Weight	2.3 lb (1.10 kg), 4.06 lb (1.84 kg), 7.28 lb (3.30 kg), 7.88 lb (3.57 kg), 14.00 (6.35 kg)
Warranty	1 year

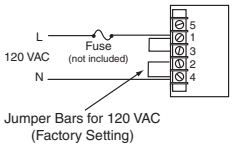
DIMENSIONS

in
(cm)

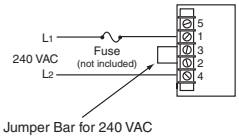


Model		Weight
SLS-12-017T	4.84"H x 4.00"W x 2.07"D (12.57 x 10.16 x 5.25 cm)	2.3 lb (1.10 kg)
SLS-24-012T	4.84"H x 4.00"W x 2.07"D (12.57 x 10.16 x 5.25 cm)	2.3 lb (1.10 kg)
SLS-24-024T	5.62"H x 4.87"W x 2.95"D (14.27 x 12.37 x 7.49 cm)	4.06 lb (1.84 kg)
SLS-24-036T	7.00"H x 4.87"W x 3.20"D (17.78 x 12.37 x 8.13 cm)	7.28 lb (3.30 kg)
SLS-24-048T	9.00"H x 4.87"W x 3.20"D (22.86 x 12.37 x 8.13 cm)	7.88 lb (3.57 kg)
SLS-24-072T	14.00"H x 4.87"W x 3.20"D (35.56 x 12.37 x 8.13 cm)	14.00 (6.35 kg)

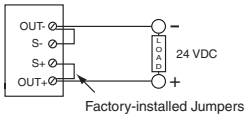
WIRING



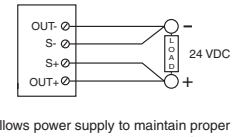
120V Input



240V Input



Without Remote Sensing



(allows power supply to maintain proper voltage at a remote location)

With Remote Sensing

ORDERING INFORMATION

Model	Description	Output Voltage	Output Current	Weight
SLS-12-017T	Power supply, 12 VDC, 1.7A	12 VDC, Adjustable ± 5% of rated voltage	1.7A	2.3 lb (1.10 kg)
SLS-24-012T	Power supply, 24 VDC, 1.2A	24 VDC, Adjustable ± 5% of rated voltage	1.2A	2.3 lb (1.10 kg)
SLS-24-024T	Power supply, 24 VDC, 2.4A	24 VDC, Adjustable ± 5% of rated voltage	2.4A	4.06 lb (1.84 kg)
SLS-24-036T	Power supply, 24 VDC, 3.6A	24 VDC, Adjustable ± 5% of rated voltage	3.6A	7.28 lb (3.30 kg)
SLS-24-048T	Power supply, 24 VDC, 4.8A	24 VDC, Adjustable ± 5% of rated voltage	4.8A	7.88 lb (3.57 kg)
SLS-24-072T	Power supply, 24 VDC, 7.2A	24 VDC, Adjustable ± 5% of rated voltage	7.2A	14.00 (6.35 kg)

RELATED PRODUCTS

6M30 Series Fuse blocks
FLM Series Fuses

POWER SUPPLIES

COMPACT DC POWER SUPPLY
PW2

DESCRIPTION

The **Model PW2** converts unregulated 115 VAC to regulated DC voltage output. This compact, easy-to-mount power supply may be used to power transmitters, transducers, controllers, relays, and other peripheral devices requiring 5, 12, or 24 VDC.

FEATURES

- ***Compact size***
- ***Regulated power outputs of 5, 12, or 24 VDC***
- ***115 VAC, 60 Hz input***
- ***Screw terminal connections***
- ***Easy-to-mount enclosure***

SPECIFICATIONS

Input	115 VAC ± 5% 60 Hz
Output Voltage	12 VDC ± 0.5 VDC, 200 mA maximum, 24 VDC ± 1 VDC, 100 mA maximum, 5 VDC ± 0.2 VDC, 300 mA maximum
Terminals	22-16 AWG
Operating Temperature	32° to 131°F (0° to 55°C)
Operating Humidity	95% RH maximum, non-condensing
Mounting	Screw slots in base or side of enclosure
Dimensions	3" H x 2.2" W x 1.4" D (7.6 x 5.6 x 3.6 cm)
Weight	0.4 lb (0.2 kg)
Warranty	1 year

ORDERING INFORMATION

MODEL	DESCRIPTION
PW2-12	Enclosed DC power supply, 115 VAC to 12 VDC
PW2-24	Enclosed DC power supply, 115 VAC to 24 VDC
PW2-5	Enclosed DC power supply, 115 VAC to 5 VDC

PLUG-IN CLASS 2 TRANSFORMER
AM-24830A

DESCRIPTION

The **Model AM-24830A** is a UL Listed plug-in Class 2 transformer. Simply plug it into any 120VAC wall outlet and get a 24VAC output with 20VA of available power. Its small size and screw terminal connections make it a convenient and portable source of low voltage for many applications.

FEATURES

- ***Plugs into any 120VAC wall outlet***
- ***Convenient and portable source of low voltage***
- ***Screw terminal connections***
- ***High efficiency, low heat generation***
- ***UL Listed***

SPECIFICATIONS

Supply Voltage	120 VAC
Output Voltage	24 VAC
Output Current	833 mA
Operating Temperature	14° to 104°F (-10° to 40°C)
Operating Humidity	20% to 80% RH
Mounting	Plug in
Dimensions	3.2"H x 2.2"W x 1.9"D (8.1 x 5.6 x 4.8 cm)
Weight	2.2 lb (1 kg)
Approvals	UL listed, File #E112794, Class 2 Not Wet, Class 3 Wet
Warranty	1 year

ORDERING INFORMATION

MODEL	DESCRIPTION
AM-24830A	Plug-in Class 2 Transformer, 120 VAC to 24 VAC, 20 VA

POWER SUPPLIES

IDEC SWITCHING POWER SUPPLIES

PS5R SERIES

DESCRIPTION

The **PS5R Series** of Switching Power Supplies is available with an output of 12 or 24 VDC and output power from 7.5-240W. The output is short circuit protected and regulated. These switching power supplies, which minimize the heat generated in control panels, have a much higher efficiency than linear power supplies. They are small and completely enclosed, and they can be DIN rail or surface mounted.

FEATURES

- ***Universal AC input, 100-240 VAC or 110-340 VDC***
- ***Output power from 7.5-240W***
- ***Small size to save panel space***
- ***DIN rail/surface mount enclosure***
- ***Slim-line models to save valuable panel space***
- ***High efficiency operation for minimizing heat generation in control panels***
- ***Time-saving, spring loaded screw terminals***

PS5R-E24

PS5R-SC

PS5R-A24

PS5R-C24

SPECIFICATIONS

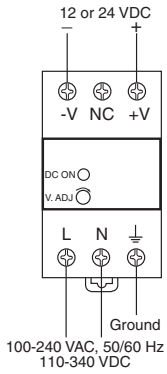
Model	Supply Voltage	Supply Current	Supply Frequency	Output Voltage	Output Current	Dimensions	Weight
PS5R-A12	100-240 VAC nominal, 110-340 VDC	0.17A	50/60 Hz	12 VDC	0.6A, 7.5W	2.95"H x 1.77"W x 2.76"D (7.49 x 4.50 x 7.01 cm)	0.33 lb (0.15 kg)
PS5R-A24	100-240 VAC nominal, 110-340 VDC	0.17A	50/60 Hz	24 VDC	0.3A, 7.5W	2.95"H x 1.77"W x 2.76"D (7.49 x 4.50 x 7.01 cm)	0.33 lb (0.15 kg)
PS5R-B12	100-240 VAC nominal, 110-340 VDC	0.3A	50/60 Hz	12 VDC	1.2A, 15W	2.95"H x 1.77"W x 3.74"D (7.49 x 4.50 x 9.50 cm)	0.37 lb (0.17 kg)
PS5R-SB12	100-240 VAC nominal, 110-340 VDC	0.45A	50/60 Hz	12 VDC	1.2 A, 15W	3.54"H x 0.89"W x 3.74"D (9.0 x 2.25 x 9.50 cm)	0.35 lb (0.16 kg)
PS5R-B24	100-240 VAC nominal, 110-340 VDC	0.3A	50/60 Hz	24 VDC	0.6A, 15W	2.95"H x 1.77"W x 3.74"D (7.49 x 4.50 x 9.50 cm)	0.37 lb (0.17 kg)
PS5R-C12	100-240 VAC nominal, 110-340 VDC	0.68A	50/60 Hz	12 VDC	2.5A, 30W	2.95"H x 3.54"W x 3.74"D (7.49 x 9.0 x 9.50 cm)	0.79 lb (0.36 kg)
PS5R-SC12	100-240 VAC nominal, 110-340 VDC	0.9A	50/60 Hz	12 VDC	2.5A, 30W	3.74"H x 1.42"W x 4.25"D (9.5 x 3.6 x 10.8 cm)	0.55 lb (0.25 kg)
PS5R-C24	100-240 VAC nominal, 110-340 VDC	0.68A	50/60 Hz	24 VDC	1.3A, 30W	2.95"H x 3.54"W x 3.74"D (7.49 x 9.0 x 9.50 cm)	0.79 lb (0.36 kg)
PS5R-SC24	100-240 VAC nominal, 110-340 VDC	0.9A	50/60 Hz	24 VDC	2.5A, 30W	3.74"H x 1.42"W x 4.25"D (9.5 x 3.6 x 10.8 cm)	0.55 lb (0.25 kg)
PS5R-D24	100-240 VAC nominal, 110-340 VDC	1.15A	50/60 Hz	24 VDC	2.1A, 50W	2.95"H x 3.54"W x 3.74"D (7.49 x 9.0 x 9.50 cm)	0.86 lb (0.39 kg)
PS5R-SD24	100-240 VAC nominal, 110-340 VDC	1.7A	50/60 Hz	24 VDC	2.5A, 60W	3.74"H x 1.42"W x 4.25"D (9.5 x 3.6 x 10.8 cm)	0.63 lb (0.29 lg)
PS5R-Q24	100-240 VAC nominal, 110-340 VDC	1.1A	50/60 Hz	24 VDC	3.1A, 7.5W	4.72"H x 3.35"W x 5.51"D (12.0 x 8.5 x 14.0 cm)	1.7 lb (0.8 kg)
PS5R-E24	100-240 VAC nominal, 110-340 VDC	2.5A	50/60 Hz	24 VDC	4.2A, 100W	2.95"H x 3.54"W x 3.74"D (7.49 x 9.0x 9.50 cm)	0.86 lb (0.39 kg)
PS5R-SE24	100-240 VAC nominal, 110-340 VDC	2.3A	50/60 Hz	24 VDC	3.75A, 90W	4.53"H x 1.81"W x 4.76"D (11.5 x 4.6 x 12.1 cm)	0.97 lb (0.44 kg)
PS5R-F24	100-240 VAC nominal, 110-340 VDC	1.8A	50/60 Hz	24 VDC	5A, 120W	2.95"H x 5.7"W x 3.74"D (7.49 x 14.5 x 9.50 cm)	1.3 lb (0.59 kg)
PS5R-SF24	100-240 VAC nominal, 110-340 VDC	1.8A	50/60 Hz	24 VDC	5A, 120W	4.53"H x 1.97"W x 5.1"D (11.5 x 5.0 x 12.9 cm)	1.39 lb (0.63 kg)
PS5R-G24	100-240 VAC nominal, 110-340 VDC	4A	50/60 Hz	24 VDC	10A, 240W	4.72"H x 7.87"W x 5.51"D (12.0 x 19.99 x 14.0 cm)	2.6 lb (1.2 kg)
PS5R-SG24	100-240 VAC nominal, 110-340 VDC	3.6A	50/60 Hz	24 VDC	10A, 240W	4.92"H x 3.15"W x 5.9"D (12.5 x 8.0 x 15.0 cm)	2.21 lb (1.0 kg)

POWER SUPPLIES

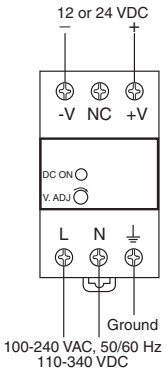
IDEC SWITCHING POWER SUPPLIES

PS5R SERIES

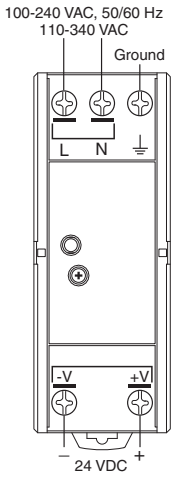
WIRING



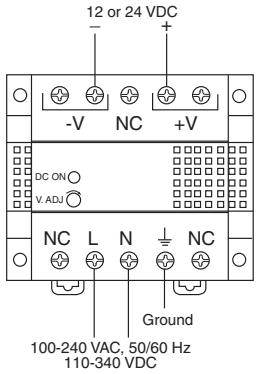
PS5R-A



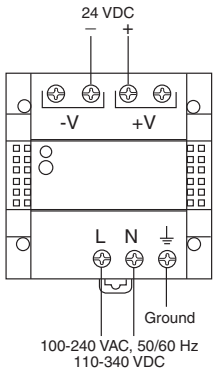
PS5R-B



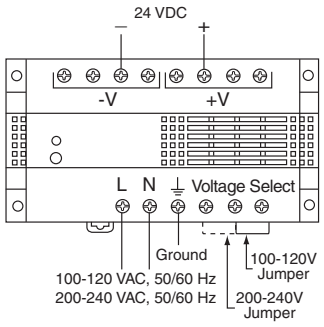
PS5R-SC, -SD, -SE, -SF (slim-line)



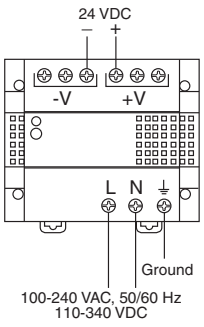
PS5R-C, -D



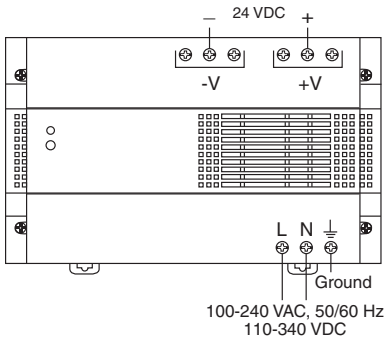
PS5R-Q



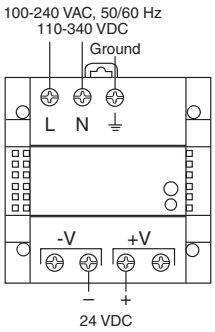
PS5R-E



PS5R-F



PS5R-G



PS5R-SG (slim-line)

ORDERING INFORMATION

MODEL	DESCRIPTION
PS5R-A12	Switching power supply, 12 VDC, 7.5W (0.6A)
PS5R-A24	Switching power supply, 12 VDC, 7.5W (0.3A)
PS5R-B12	Switching power supply, 12 VDC, 15W (1.2A)
PS5R-SB12	Switching power supply, 12 VDC, 15W (1.2A), slim-line
PS5R-B24	Switching power supply, 24 VDC, 15W (0.6A)
PS5R-C12	Switching power supply, 12 VDC, 30W (2.5A)
PS5R-SC12	Switching power supply, 12 VDC, 30W (2.5A), slim-line
PS5R-C24	Switching power supply, 24 VDC, 30W (1.3A)
PS5R-SC24	Switching power supply, 24 VDC, 30W (1.3A), slim-line
PS5R-D24	Switching power supply, 24 VDC, 50W (2.1A)
PS5R-SD24	Switching power supply, 24 VDC, 60W (2.5A), slim-line
PS5R-Q24	Switching power supply, 24 VDC, 75W (3.1A)
PS5R-E24	Switching power supply, 24 VDC, 100W (4.2A)
PS5R-SE24	Switching power supply, 24 VDC, 90W (3.75A), slim-line
PS5R-F24	Switching power supply, 24 VDC, 120W (5A)
PS5R-SF24	Switching power supply, 24 VDC, 120W (5A), slim-line
PS5R-G24	Switching power supply, 24 VDC, 240W (10A)
PS5R-SG24	Switching power supply, 24 VDC, 240W (10A), slim-line

POWERING MULTIPLE DEVICES FROM A COMMON TRANSFORMER

After properly sizing a control transformer for your application, there is an additional step in the selection process that should be considered. Even though the necessary steps have been taken to select a properly-sized transformer to power multiple 24 VAC devices (such as BAS controllers, transducers, actuators, and power supplies) there is a potential, but not so obvious problem that can exist. If not foreseen and corrected, this problem can cause blown fuses and/or physical damage to devices when the system is energized.

Many electronic HVAC controllers and interface devices are designed to take AC power on their input terminal strips. However, because the electronic components on these devices require DC power, the AC power at the terminal strip is converted to DC by use of an internal (onboard) power supply circuit (rectifier/filter/regulator). Two common types of power supply circuits used are called "full-wave bridge rectifier" and "half-wave rectifier." The problem with powering multiple devices from one AC power source stems from some devices using the half-wave circuit and some using the full-wave circuit.

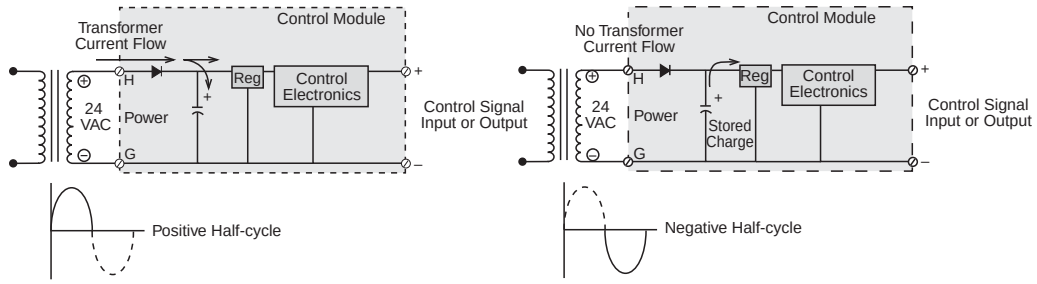
To better understand why mixing half- and full-wave rectifiers on a common AC power source can be a problem, it is important to understand the difference between these two power supply circuits.

The half-wave rectifier is shown in Figure 1. Note that one side of the AC power input is connected directly to the negative side of the DC output. On the transformer's positive half-cycle, the diode conducts. This allows the transformer current to charge the filter capacitor, as well as supply load current. On the transformer's negative half-cycle, the diode turns off. The stored charge in the filter capacitor supplies load current until the next positive half-cycle. The half-wave rectifier only uses transformer current every other half-cycle. It is not very efficient, but it is inexpensive and does a good job for low-current power supplies.

The full-wave bridge rectifier is shown in Figure 2. Note that neither side of the AC power input is connected directly to the negative side of the DC output. On the transformer's positive half-cycle, diodes D1 and D3 conduct. This allows the transformer current to charge up the filter capacitor, as well as supply load current. On the transformers negative half-cycle, diodes D2 and D4 conduct, supplying transformer current to the filter capacitor and load. The full-wave rectifier utilizes the transformer current on both positive and negative half-waves. It is more efficient, and that is why it is often used in higher-current power supplies.

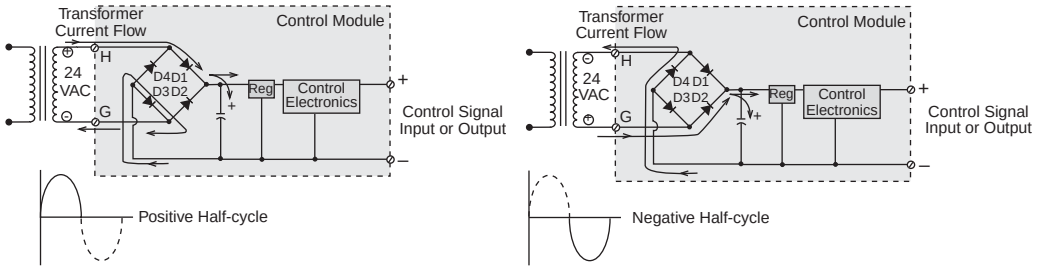
So what is the problem with using a common AC transformer to power a device that has a full-wave rectifier and a second device that has a half-wave rectifier? Consider Figure 3, which shows just such a setup. The control signal "-" terminals on both modules are either directly connected together (as shown) or indirectly connected by a common ground. Looking carefully, you can see that the minus output of the full-wave rectifier is connected directly back to one of its AC inputs via the "pass thru" common connection inside the half-wave device. This connection actually places diode D4 in the bridge directly across the AC transformer winding. Every time the AC voltage goes to the polarity that turns on the diode, the diode shorts out the transformer. In other words, the diode shorts the transformer 50% of the time. There are several symptoms

FIGURE 1. HALF-WAVE RECTIFIER CIRCUIT



Note: AC "G" and Control signal "-" are the same electrical connection.

FIGURE 2. FULL-WAVE RECTIFIER CIRCUIT



Note: AC "G" and Control signal "-" are not the same electrical connection.

POWER SUPPLIES

POWERING MULTIPLE DEVICES FROM A COMMON TRANSFORMER

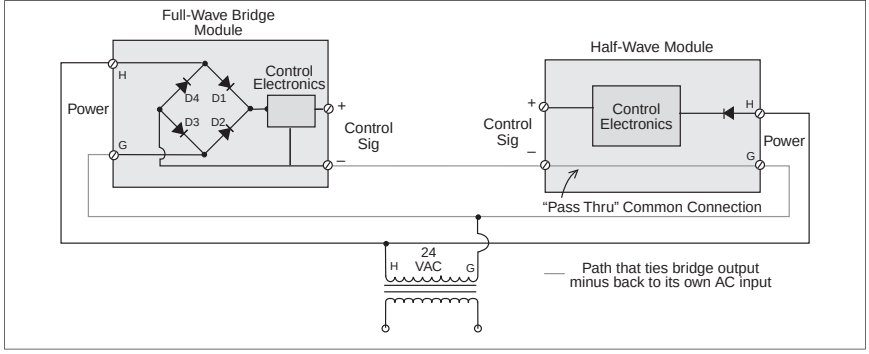
that can occur from this situation:

1) A fuse blows every time the commons of the devices are connected together.
2) The diode shorting the transformer fails open.
3) The diode shorting the transformer fails shorted, and the transformer may burn up.
4) The circuit board foil traces connecting to the diode melt open or are blown off the board.

Now that the problem has been pinpointed, some general guidelines can be given for connecting multiple AC powered devices together.

1) It is okay to connect multiple devices to the same AC transformer and share signal commons if: (a) every device uses a half-wave rectifier; and (b) the same AC lead on every device is used for a common.
2) It is okay to connect the signal common of a device that uses a full-wave rectifier to other signal commons if the full-wave rectifier device has a dedicated isolated AC power transformer connected only to the device's power screws and nowhere else.
3) It is okay to connect the signal common of a device that uses a full-wave rectifier to other signal commons if the device contains its own internal AC isolation transformer.
4) It is okay to power a half-wave rectifier device and a full-wave rectifier device from the same AC transformer if the signal commons are absolutely, positively isolated from each other.
5) If it is absolutely necessary to power a half-wave device and a full-wave device from the same AC source, and their DC control signals have to interact, a signal isolator such as the **DT13E** will be necessary.

FIGURE 3. FULL-WAVE AND HALF-WAVE IN PARALLEL



These guidelines all require that the type of input power circuit (full- or half-wave) be known. Since most devices do not come with detailed schematic diagrams, this may be difficult to determine. Following are a few ideas that may help:

1) If a 24 VAC powered device has three wiring terminals, (power "+", signal "+" and a shared common for power "-" and signal "-"), then a half-wave rectifier is being used.
2) If a 24 VAC powered device has four wiring terminals, (power "+", power "-", signal "+", signal "–"), first check the product's data sheet for any clues. Look for any notes that might indicate that the power "–" and the signal "–" terminals are electrically the same and hence, a half-wave device.
3) If no indication is given on the product's data sheet, try using an ohmmeter to check the resistance between the signal "–" terminal and both of the power terminals. A reading of a couple of ohms or less between the signal "–" and either power terminal would indicate a common connection between these terminals and a half-wave circuit.
4) If no common connection can be found, the device is probably a full-wave rectifier. However, some devices incorporate a built-in isolation transformer that isolates both power terminals from both signal terminals. The differential pressure model **T40** is an example. This type of device can be used with either full- or half-wave (voltage output) devices.
5) Finally, the manufacturer or supplier of the device should be able to provide the required information. Some manufacturers may require that only their products be connected to a common transformer. Others may even require that each of their devices have its own dedicated and isolated transformer.

In summary, many devices (BAS controllers, transducers, actuators, and power supplies) used for the control of HVAC systems can be externally powered from 24 VAC. Because the electronic components of these devices require direct current, the AC power is internally converted to DC. When powering multiple devices from a common 24 VAC source, problems can arise due to different techniques that are used to convert the AC to DC. In other words, it is not as simple as plugging various appliances into an AC outlet in your house. Whenever you have different devices from different manufacturers, be careful to separate those devices that utilize a full-wave rectifier from those using a half-wave rectifier. When any doubt exists, provide a separate transformer. The small expense of an additional transformer or two will more than make up for all of the time and money spent on troubleshooting.

UNDERSTANDING CURRENT SINKING, CURRENT SOURCING, AND GROUND LOOPS

You've just purchased some current to pneumatic (I/P) transducers and are ready to try them. Each transducer has been carefully installed according to the manufacturer's recommendations and wired to its own 4-20 mA analog output. All of the transducers are being powered by a common 24 VDC power supply. Feeling confident with the installation, you decide it is time to test their operation. Individual commands are issued to each unit through the building automation system (BAS) but none of the I/P transducers appear to function properly. A command issued to one unit mysteriously causes all of the other units to react (or perhaps none of the units work at all). After mumbling a few choice words, the installation and all the wiring are verified to be correct. The system is trying to deliver a 4-20 mA signal to a device that is designed to accept a 4-20 mA signal. So what is the problem? Are all of the transducers defective? While this is possible, it is very unlikely. Instead, the problem could be directly related to the fact that all 4-20 mA analog outputs are not created equal.

Different BAS controllers utilize different electronic techniques for generating a 4-20 mA current output. With one method, the analog output typically has its "I+" terminal connected to the "+" side of an internal current loop power supply whose "-" side is connected to "ground." The output has its sensing and regulating electronics between the "I-" terminal and "ground" (See Figure 1). The "I+" terminals are electronically identical. Because the "I-" terminals carry the different current values for each output loop, they must be isolated from each other. They cannot be connected together nor can they be connected to a common or "ground." Connecting a 4-20 mA load from "I+" to "ground" puts the controller's internal current loop power supply directly across the load (See Figure 2). The controller's regulating electronics are completely bypassed, which will usually cause the controller's output fuse to blow, the load to go to full output and remain there or the load to be physically damaged. A computer using this type of 4-20 mA signal is commonly referred to as a "current sinking controller."

Another method used to generate a 4-20 mA signal puts the sensing and regulating electronics between the internal loop power supply and the analog output "I+" terminal. The "I-" terminal is connected to circuit "ground" (See Figure 3). With this method, the "I+" terminals carry the different current values for each loop and, therefore, must be isolated from each other. Since all of the output "I-" terminals are electrically the same, they can be connected together. They may or may not be connected to "ground" depending on the manufacturer's specifications. A controller using this method to generate a 4-20 mA signal is commonly called "current sourcing."

FIGURE 1. CURRENT SINKING CONTROLLER (typical for each output)

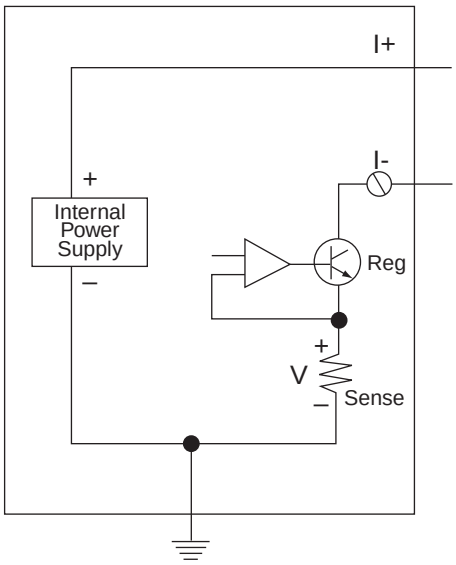
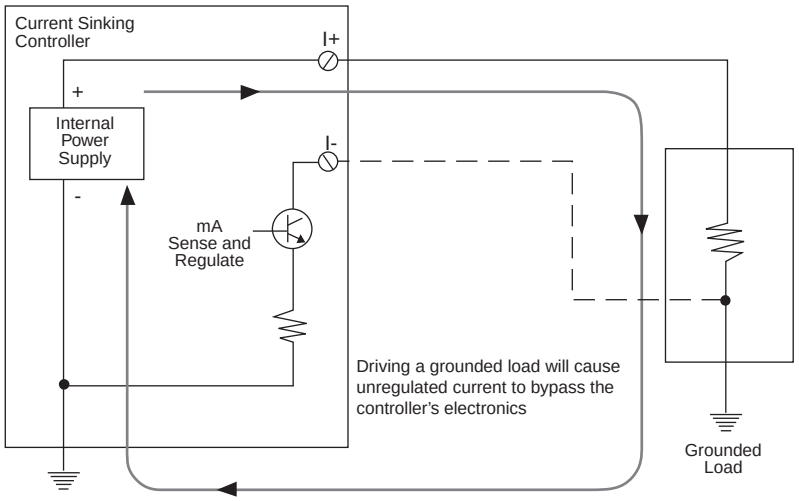


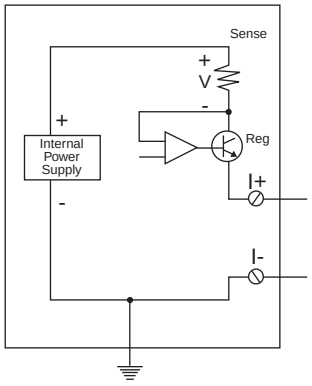
FIGURE 2. DRIVING A GROUNDED LOAD WITH A CURRENT SINKING CONTROLLER



UNDERSTANDING CURRENT SINKING, CURRENT SOURCING, AND GROUND LOOPS

Looking back now at the problem discussed previously, all of the I/P transducers are being powered from a common power supply. After a little research you determine that your controller is current sinking and upon further examination of the I/P transducer, its power input "-" terminal is found to be common with its signal input "-" terminal. Since all of the I/P power input "-" terminals are connected to one common power supply, this effectively ties all of the controller analog output "I-" terminals

FIGURE 3. CURRENT SOURCING CONTROLLER (typical for each output)



together. (A no-no for current sinking controllers.)
One way to solve this problem is to provide a separate isolated (not grounded) power supply for each transducer. This can be costly and, if panel space is at a premium, not very practical. It may also be necessary to isolate the case of a metal transducer from ground for proper operation. Another way to solve this problem is to configure the computer's analog outputs for voltage output. Doing so will typically allow the controller to drive grounded loads as well as multiple loads powered from a single power supply. Transducers that are designed to accept a voltage or that are field selectable for current or voltage should, of course, be used (UCP-422-V, UCP-722, UCP-822). A third solution is to utilize two-wire transducers that are loop-powered and require no external power supply (UCP-422, UCP-242).

Another problem often encountered when interfacing a computer's analog output to external equipment is the corruption of the control signal due to "ground loop" currents. Our instinct would lead us to believe that all "ground" points are at the same potential. In reality, however, there is no such thing as an absolute "ground." Ground potentials at different locations are not equal because current flow in the ground conductors causes small voltage potentials to develop from one ground point to another. Connecting a wire between "grounds" creates a loop, causing "ground loop" currents to flow through the wire. This causes voltage drops in the ground wire due to wire resistance (See Figure 4). Also, since the impedance of the loop is rather low, a few volts potential difference can produce several amps of current, possibly damaging electrical components. Even worse, electrical storms could momentarily cause very large potential differences that would make an extremely large current flow possible. Under these circumstances, the current flow can be high enough to burn cables or destroy electrical interfaces.

One simple way to solve this problem is to isolate or float the "com" connection from ground at either end. However, the equipment often has its "com" terminal internally grounded, making it impractical to float. When this is the case, a signal isolator such as the Model DT13E should be used. The DT13E accepts a current or voltage input and produces a linearly-transferred current or voltage output. The input and output are electrically isolated making the DT13E useful for eliminating ground loops, reducing noise pickup, allowing conversion of the signal type (from current input to voltage output and vice versa) and scaling between the input and output. The DT13E could also be used to solve the problem discussed earlier by allowing current sinking controllers to control grounded loads.

The Model DT13 contains an internal power supply which provides regulated and isolated power to each half of the board. Input conditioning circuitry scales and filters the DC input and drives a precision isolator, which carries the signal across the isolation barrier. The output side of the isolator drives a circuit that reconverts the signal into a duplicate of the input, which can then be scaled as necessary for the application.

FIGURE 4. GROUND LOOP CURRENTS