# Square D<sup>™</sup> Resin Encapsulated Low Voltage Transformers

# Sealed, General Purpose, Dry Type

# Catalog

**Class 7400** 

7400CT9601 R01/23







# **Legal Information**

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this guide are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owners.

This guide and its content are protected under applicable copyright laws and furnished for informational use only. No part of this guide may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the guide or its content, except for a non-exclusive and personal license to consult it on an "as is" basis. Schneider Electric products and equipment should be installed, operated, serviced, and maintained only by qualified personnel.

As standards, specifications, and designs change from time to time, information contained in this guide may be subject to change without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this material or consequences arising out of or resulting from the use of the information contained herein.

# **Table of Contents**

Introduction	5
Resin-Filled Transformers	6
Export Model Transformers	9
Stainless Steel Enclosures	10
Enclosure Diagrams and Accessories	11
Wiring Diagrams	18
Application Data	19
Single-Phase Connections—240 x 480 to 120/240 V	19
Three Phase Connections	21
Specifications	23
Dry Type Resin Encapsulated Transformers (Sealed)	23

# Introduction

As the industry leading designer, manufacturer, and supplier of low voltage, general purpose transformers, Schneider Electric has the expertise necessary to meet your increased demands by providing reliable products and outstanding support services.



Single Phase



Three Phase



Single Phase
Sealed Transformers

# **Resin-Filled Transformers**

Resin-filled general purpose transformers are epoxy encapsulated. The enclosure has no openings, making resin-filled transformers ideal for use indoor or outdoor where airborne particles or contaminants could be detrimental to operation. The core-and-coil assembly is embedded in an epoxy resin compound and wall mounted for maximum protection. These units can be used outdoors without accessories. Units are UL® Listed and CSA® Certified.

Public Law 109-58, the 2005 Energy Act, mandates that distribution transformers be energy efficient. However, resin-filled units are not included in this law; they are listed in Section (35)(B)(ii) as "a transformer that is designed to be used in a special purpose application and is unlikely to be used in general purpose application, such as .... sealed and non-ventilating transformer...."

Type 3R STD		Type 3R 304 Stainless			Type 4X 304 Stainless							
kVA	Catalog No.	Weight (Ibs) <sup>1</sup>	Enclo- sure²	Catalog No.	Weight (Ibs) <sup>1</sup>	Enclo- sure	Catalog No.	Weight (lbs)¹	Enclo- sure	Full Capacity Taps <sup>3</sup>	Deg C Temp. Rise	Insula- tion Class
Three Phase—480 Vac Delta Primary 208Y/120 Vac Secondary, 60 Hz; UL/cULus Listed												
3	3T2F	120	12C	3T2SS	120	12C	4X3T2FSS	165	54X	2–5% FCBN	115	180
6	6T2F	145	12C	6T2SS	145	12C	4X6T2FSS	195	54X	2–5% FCBN	115	180
9	9T2F	235	14C	9T2SS	235	14C	4X9T2FSS	290	54X	2–5% FCBN	115	180
15	15T2F	300	14C	15T2SS	300	14C	4X15T2FSS	350	54X	2–5% FCBN	115	180
30	30T2F	660	16C	30T2SS	660	16C	4X30T2FSS	850	55X	2–5% FCBN	115	180
Three	Phase—480	Vac Delta	Primary	240 Vac Delta	Seconda	y, 60 Hz;	UL/cULus Listed					
3	3T5F	120	12C	3T5SS	120	12C	4X3T5FSS	165	54X	2–5% FCBN	115	180
6	6T5F	145	12C	6T5SS	145	12C	4X6T5FSS	195	54X	2–5% FCBN	115	180
9	9T75F	235	14C	9T75SS	235	14C	4X9T75FSS	290	54X	2–5% FCBN	115	180
15	15T75F	300	14C	15T75SS	300	14C	4X15T75FSS	350	54X	2–5% FCBN	115	180
30	30T75F	660	16C	30T75SS	660	16C	4X30T75FSS	850	55X	2–5% FCBN	115	180
Single	Phase—240	) x 480 Va	c Primary	120/240 Vac S	Secondary	, 60 Hz; U	L/cULus Listed					
1	1S1F	21.2	7A	1S1FSS	21.2	7A	4X1S1FSS	48	51X	None	115	180
1.5	1.5S1F	30.1	8A	1.5S1FSS	30.1	8A	4X1.5S1FSS	55	51X	None	115	180
2	2S1F	39.1	9A	2S1FSS	39.1	9A	4X2S1FSS	55	51X	None	115	180
3	3S1F	60	10A	3S1FSS	60	10A	4X3S1FSS	75	52X	None	115	180
5	5S1F	115	13B	5S1FSS	115	13B	4X5S1FSS	125	52X	None	115	180
7.5	7S1F	135	13B	7S1FSS	135	13B	4X7S1FSS	150	52X	None	115	180

<sup>1.</sup> Not for construction. Contact your local Schneider Electric representative for certified prints.

<sup>2.</sup> For enclosure styles, see Enclosure Diagrams and Accessories, page 11.

<sup>3.</sup> FCBN=Full Capacity Below Normal.

## Table 1 - Resin Encapsulated Three and Single Phase Transformers (Continued)

	Type 3R STD		Type 3R 304 Stainless			Type 4X 304 Stainless						
kVA	Catalog No.	Weight (lbs)⁴	Enclo- sure⁵	Catalog No.	Weight (lbs)⁴	Enclo- sure	Catalog No.	Weight (lbs)⁴	Enclo- sure	Full Capacity Taps <sup>6</sup>	Deg C Temp. Rise	Insula- tion Class
10	10S1F	165	13B	10S1FSS	165	13B	4X10S1FSS	180	52X	None	115	180
15	15S1F	225	15B	15S1FSS	225	15B	4X15S1FSS	390	53X	None	115	180
25	25S1F	300	15B	25S1FSS	300	15B	4X25S1FSS	450	53X	None	115	180
Single	Phase—480	Vac Prim	ary 120/2	40 Vac Secon	dary, 60 H	z; UL/cUL	us Listed					
1	1S40F	21.2	7A	1S40FSS	21.2	7A	4X1S40FSS	48	51X	2–5% FCBN	115	180
1.5	1.5S40F	30.1	8A	1.5S40FSS	30.1	8A	4X1.5S40FSS	55	51X	2–5% FCBN	115	180
2	2S40F	39.1	9A	2S40FSS	39.1	9A	4X2S40FSS	55	51X	2–5% FCBN	115	180
3	3S40F	60	10A	3S40FSS	60	10A	4X3S40FSS	75	52X	2–5% FCBN	115	180
5	5S40F	115	13B	5S40FSS	115	13B	4X5S40FSS	125	52X	2–5% FCBN	115	180
7.5	7S40F	135	13B	7S40FSS	135	13B	4X7S40FSS	150	52X	2–5% FCBN	115	180
10	10S40F	165	13B	10S40FSS	165	13B	4X10S40FSS	180	52X	2–5% FCBN	115	180
15	15S40F	225	15B	15S40FSS	225	15B	4X15S40FSS	390	53X	2–5% FCBN	115	180
25	25S40F	300	15B	25S40FSS	300	15B	4X25S40FSS	450	53X	2–5% FCBN	115	180
Single	Phase—600	Vac Prim	ary 120/2	40 Vac Secon	dary, 60 H	z; UL/cUL	us Listed					
1	1S51F	21.2	7A	1S51FSS	21.2	7A	4X1S51FSS	48	51X	None	115	180
1.5	1.5S51F	30.1	8A	1.5S51FSS	30.1	8A	4X1.5S51FSS	55	51X	None	115	180
2	2S51F	39.1	9A	2S51FSS	39.1	9A	4X2S51FSS	55	51X	None	115	180
3	3S4F	60	10A	3S4FSS	60	10A	4X3S4FSS	75	52X	2–5% FCBN	115	180
5	5S4F	115	13B	5S4FSS	115	13B	4X5S4FSS	125	52X	2–5% FCBN	115	180
7.5	7S4F	135	13B	7S4FSS	135	13B	4X7S4FSS	150	52X	2–5% FCBN	115	180
10	10S4F	165	13B	10S4FSS	165	13B	4X10S4FSS	180	52X	2–5% FCBN	115	180
15	15S4F	225	15B	15S4FSS	225	15B	4X15S4FSS	390	53X	2–5% FCBN	115	180
25	25S4F	300	15B	25S4FSS	300	15B	4X25S4FSS	450	53X	2–5% FCBN	115	180
Single	Phase—208	Vac Prim	ary 120/2	40 Vac Secon	dary, 60 H	z; UL/cUL	us Listed					
1	1S7F	21.2	7A	1S7FSS	21.2	7A	4X1S7FSS	48	51X	None	115	180
1.5	1.5S7F	30.1	8A	1.5S7FSS	30.1	8A	4X1.5S7FSS	55	51X	None	115	180
2	2S7F	39.1	9A	2S7FSS	39.1	9A	4X2S7FSS	55	51X	None	115	180
3	3S60F	60	10A	3S60FSS	60	10A	4X3S60FSS	75	52X	2–5% FCBN	115	180

Not for construction. Contact your local Schneider Electric representative for certified prints. For enclosure styles, see Enclosure Diagrams and Accessories, page 11. FCBN=Full Capacity Below Normal. 4.

5.

6.

	Type 3R STD		Type 3R	304 Stain	less	Type 4X 304 Stainless						
kVA	Catalog No.	Weight (Ibs) <sup>7</sup>	Enclo- sure <sup>8</sup>	Catalog No.	Weight (Ibs) <sup>7</sup>	Enclo- sure	Catalog No.	Weight (Ibs) <sup>7</sup>	Enclo- sure	Full Capacity Taps <sup>9</sup>	Deg C Temp. Rise	Insula- tion Class
5	5S60F	115	13B	5S60FSS	115	13B	4X5S60FSS	125	52X	2–5% FCBN	115	180
7.5	7S60F	135	13B	7S60FSS	135	13B	4X7S60FSS	150	52X	2–5% FCBN	115	180
10	10S60F	165	13B	10S60FSS	165	13B	4X10S60FSS	180	52X	2–5% FCBN	115	180
15	15S60F	225	15B	15S60FSS	225	15B	4X15S60FSS	390	53X	2–5% FCBN	115	180
25	25S60F	300	15B	25S60FSS	300	15B	4X25S60FSS	450	53X	2–5% FCBN	115	180
Single	Phase—277	Vac Prim	ary 120/2	40 Vac Secon	dary, 60 H	z; UL/cUL	us Listed					
1	1S8F	21.2	7A	1S8FSS	21.2	7A	4X1S8FSS	48	51X	None	115	180
1.5	1.5S8F	30.1	8A	1.5S8FSS	30.1	8A	4X1.5S8FSS	55	51X	None	115	180
2	2S8F	39.1	9A	2S8FSS	39.1	9A	4X2S8FSS	55	51X	None	115	180
3	3S61F	60	10A	3S61FSS	60	10A	4X3S61FSS	75	52X	2–5% FCBN	115	180
5	5S61F	115	13B	5S61FSS	115	13B	4X5S61FSS	125	52X	2–5% FCBN	115	180
7.5	7S61F	135	13B	7S61FSS	135	13B	4X7S61FSS	150	52X	2–5% FCBN	115	180
10	10S61F	165	13B	10S61FSS	165	13B	4X10S61FSS	180	52X	2–5% FCBN	115	180
15	15S61F	225	15B	15S61FSS	225	15B	4X15S61FSS	390	53X	2–5% FCBN	115	180
25	25S61F	300	15B	25S61FSS	300	15B	4X25S61FSS	450	53X	2–5% FCBN	115	180

## Table 2 - Single-Phase—120/240 Vac Secondary 60 Hz; cULus Listed

kVA	240 x 480 Primary Catalog No.	Weight (Ibs) <sup>7</sup>	Enclo- sure	600 Primary Catalog No.	Weight (Ibs) <sup>7</sup>	Enclo- sure	Full Capacity Taps	Degree C Tempera- ture Rise	Insulation Class
0.05	50SV1A	4.2	1A	50SV51A	4.2	1A	None	55	105
0.1	100SV1A	4.5	2A	100SV51A	4.5	2A	None	55	105
0.15	150SV1A	6.2	3A	150SV51A	6.2	3A	None	55	105
0.25	250SV1B	10.5	4A	250SV51B	10.5	4A	None	80	130
0.5	500SV1B	13.8	5A	500SV51B	13.8	5A	None	80	130
0.75	750SV1F	15.5	6A	750SV51F	15.5	6A	None	115	180

- 7. 8. 9. For enclosure styles, see Enclosure Diagrams and Accessories, page 11. FCBN=Full Capacity Below Normal.

Not for construction. Contact your local Schneider Electric representative for certified prints.

# **Export Model Transformers**

Export model transformers are designed to accommodate voltage systems worldwide.

In addition to being UL Listed and CSA Certified, export model transformers 10kVA and smaller are certified by TUV (file no. E9571881.01) to meet EN standard EN60-742. Original equipment is eligible for the "CE" mark if transformer components meet the EN60-742 standard.

Table 3 - Single-Phase—110/220 Vac Secondary; 50/60 Hz; cULus Listed (240 x 480 Vac Primary to 120/240 Vac Secondary - 60 Hz only)

kVA	220 x 440 Primary Catalog No.	Weight (Ibs)	Enclosure <sup>11</sup> Full Capacity Taps		Degree C Temperature Rise	Insulation Class
1	1S67F	21.2	7A	190/200/208/220 x 380/400/416/440	115	180
2	2S67F	39.1	9A	190/200/208/220 x 380/400/416/440	115	180
3	3S67F	55.2	10A	190/200/208/220 x 380/400/416/440	115	180
5	5S67F	135	13B	190/200/208/220 x 380/400/416/440	115	180
7.5	7S67F	165	13B	190/200/208/220 x 380/400/416/440	115	180
10	10S67F	165	13B	190/200/208/220 x 380/400/416/440	115	180

<sup>10.</sup> Not for construction. Contact your local Schneider Electric representative for certified prints.

<sup>11.</sup> For enclosure styles, see Enclosure Dimensions

# **Stainless Steel Enclosures**

Stainless steel enclosures provide better corrosion resistance than standard painted enclosures. Schneider Electric offers an entire line of resin-filled transformers. They are available with 316 stainless steel enclosures to meet demands for extra protection in environments where harsh chemicals or corrosive materials such as acids, food products, gasoline, organic solvents, or salt water are present.

Square D brand transformers with 316 stainless steel have a higher nickel content than 304 stainless steel, making them even more resistant to harsh environments.

Units are painted with standard ANSI 49 gray and have a NEMA Type 3R rating. Additional voltages are available. Contact your local Schneider Electric representative for details. NEMA Type 4X enclosures are also available; contact your local Schneider Electric representative for price and availability.

See Resin Encapsulated Three and Single Phase Transformers, page 6 for stainless steel options.

# **Enclosure Diagrams and Accessories**



Enclosure 2A—General Purpose Transformer: 0.10 kVA—120/240 V Secondary Current







Enclosure 3A—General Purpose Transformer: 0.15 kVA—120/240 V Secondary



Enclosure 5A—General Purpose Transformer: 0.50 kVA—120/240 V Secondary Current



## Enclosure 7A—General Purpose Transformer: 1.00 kVA—120/240 V Secondary Current







Enclosure 9A—General Purpose Transformer: 2.00 kVA—120/240 V Secondary Current





### Type 3R - 0.56 Dia. 14 14.75 (375) 12.00 (305) 13.50 (343) 0.75–1.00 (19–25) Knockouts ¢ N.P. 0.50 (13)

(229)Side View

 $\bigcirc$ 

0 0

9.00





Enclosure 13B—General Purpose Transformer: 5.00–10.00 kVA—120/240 V **Secondary Current** 

Enclosure 12C—Dry Type Transformer: 3.00–6.00 kVA—Encapsulated NEMA









## Enclosure 15B—General Purpose Transformer—Encapsulated NEMA Type 3R

Enclosure 16C—Dry Type Transformer: 30.00 kVA—Encapsulated NEMA Type 3R



# **Wiring Diagrams**



# **Application Data**

**NOTE:** For transformers with non-standard kVA ratings, increase the size to the next largest standard rating.

## Single-Phase Connections—240 x 480 to 120/240 V

## **Primary Connections**

## 240 V Service

## 

Connect H1 and H3 Connect H2 and H4 Connect lines to H1-H3 and H2-H4



Connect H3 and H2 Connect H1 and H4 Connect lines to H1 and H4

## **Secondary Connections**



Connect X1 and X3 Connect X2 and X4 Connect Load to X1-X3 and X2-X4



Connect X3 and X2 Connect Load to X1 and X4

120/240 V 3-Wire Circuit



The junction of X3-X2 may be used as the neutral of a 3-wire system and must be bonded to the nearest earth ground per NEC requirements.

The following diagrams show special ways that standard 240 x 480-120/240 single phase transformers can be connected for special applications.

Single Unit Connected as Auto Transformer	LV
240V to 480V	
kVA Capacity = 2 x Nameplate kVA	Luuuu
Load kVA = kVA Rating of	
2 Transformer Required	×1 X3 480
	HV

Single Unit Connected as Auto Transformer 480V to 600V	LV H1 H3 H2 H
kVA Capacity = 5 x Nameplate kVA Load kVA = kVA Rating of	
5 Transformer Required	HV HV HV

Two unit transformers connected in "Hoppy Hookup" for single phase lighting and single phase power loads from three phase supply.

This connection allows changeover of existing single phase service to three phase service without changing existing lighting panels or secondary neutrals. The neutral current will be the same as with the original single phase service rather than increasing by the factor of 1.73 (=  $\sqrt{3}$ ).



\* Secondary voltage is 120/208 V, 3-wire only, NOT 120/240 V, 3-wire.

**NOTE:** The primary common current will be the  $\sqrt{3}$  x the current in the other two lines. For 480 V primary—Connect H2 to H3 in each unit. For 240 V primary—Connect H3 to H1 and H2 to H4 in each unit. Secondary kVA capacity = Total nameplate kVA of both transformers.

# Three Phase Connections

NOTE: For transformers with non-standard kVA ratings, increase the size to the next largest standard rating, using single phase 240 x 480 to 120/240.

## Three Units Connected Delta-Wye

				H3 H2	Line H4
X1 X3 X2 Neutral	X4 X1 Load	X3 X2 X4	X1	X3 X2	X4 Load

- For 480 V Delta primary—Connect H3 to H2 in each phase
- For 240 V Delta primary—Connect H3 to H1 and H2 to H4 in each phase
- For 416Y/240 V secondary—Connect X3 to X2 in each phase
- For 208Y/120 V secondary—Connect X3 to X1 and X2 to X4 in each phase
- Three phase kVA capacity = Total kVA of three units

## **Three Units Connected Delta-Delta**



- For 480 V Delta primary—Connect H3 to H2 in each phase
- For 240 V Delta primary—Connect H3 to H1 and H2 to H4 in each phase
- For 240 V Delta secondary—Connect X3 to X2 in each phase
- For 120 V Delta secondary—Connect X3 to X1 and X2 to X4 in each phase

## **Two Units Connected Open-Delta**



<u>Load kVA</u> = kVA of Each 1.73

Single Phase Unit

- For 480 V Delta primary—Connect H3 to H2 in each phase
- For 240 V Delta primary—Connect H3 to H1 and H2 to H4 in each phase •
- For 240 V Delta secondary—Connect X3 to X2 in each phase
- For 120 V Delta secondary—Connect X3 to X1 and X2 to X4 in each phase
- Three Phase kVA capacity = Total kVA of Two units x 0.86

Two Units Connected as Open Delta Auto Transformer for Three Phase Operation for 240–480 or 480–240 kVA Capacity = (Total kVA of Both Units x 2) x .86



Two Units Connected as Open-Delta Auto Transformer for Three Phase Operation for 600–480, 480–600, 480–380, or 380–480





# Two Units Connected as Open-Delta Auto Transformer for Three Phase Operation for 575–480 or 480–400

The following diagram shows special ways that standard 600–120/240 single phase transformers can be connected for special applications.



# **Specifications**

# Dry Type Resin Encapsulated Transformers (Sealed)

## Dry Type Resin Encapsulated Transformers (Sealed)

- 1.01 Section Includes
- 1. Dry-type resin encapsulated distribution transformers with primary and secondary voltages up to 600 V, and capacity ratings from 3–30 kVA.

NOTE: Paragraphs and words marked in [] are alternates. Select only one.

## 1.02 References

- 1. NFPA 70 National Electrical Code
- 2. NEMA ST20
- 3. UL 1561
- 1.03 Submittals
- Suppliers asking consideration as an approved equal shall submit complete, warranted performance data and physical dimensions for similar transformers. Data shall be submitted for each size specified, and shall be received by the consultant engineer no less than 10 days prior to the bid due date for consideration.
- 1.04 Standards
- 1. Transformers shall be listed by Underwriters Laboratories.
- 2. Transformers shall conform to the requirements of ANSI/NFPA 70.
- 3. Transformers are to be manufactured and tested in accordance with NEMA ST20.

## Part 2 Products

## 2.01 Manufacturers

- 1. Transformers shall be as manufactured by Schneider Electric or an approved equal.
- 2. Approved manufacturers shall be registered firms in accordance with ISO 9001:1994 SIC 3612 (US); which is the design and manufacture of low voltage dry type power, distribution and specialty transformers.
- 2.02 Ratings Information
  - 1. All insulating materials are to exceed NEMA ST20 standards and be rated for a 180°C ULcomponent-recognized insulation system.
  - 2. Transformers shall be [115°C] [80°C] temperature rise above 40°C ambient. [80°C] rise transformers shall be capable of carrying a continuous 15% overload without exceeding 115°C rise in a 40°C ambient. Transformers 25 kVA and larger shall have a minimum of four 2.5% full capacity primary taps. Exact voltages and taps are to be as designated on the plans or the transformer schedule.
- 3. The maximum temperature of the top of the enclosure shall not exceed a 65°C rise above a 40°C ambient.
- The transformer(s) shall be rated as indicated in the following schedule: Identification Number(s) kVA Rating Voltages Phase Frequency

## 2.03 Construction

- 1. All cores are to be constructed of high-grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point.
- 2. Terminations shall consist of wire leads with a minimum insulation rating of 125  $^\circ$  C.
- 3. The transformer enclosures shall be non-ventilated and be fabricated of heavy gauge, sheet steel construction The entire enclosure shall be finished using a continuous process consisting of degreasing, cleaning, and phosphatizing by electrostatic deposition of polymer polyester powder coating, with a baking cycle to provide uniform coating of all edges and surfaces. The coating shall be UL recognized for outdoor use. The coating color shall be ANSI 49.

## 2.04 Sound Levels

1. Sound levels shall be warranted by the manufacturer not to exceed the following:

kVA Rating	dB Level
0–9	37
10–30	42
31–50	45
51–150	50
151–225	55

**NOTE:** Lower sound levels may be desirable for critical areas such as hospitals, schools, or office areas. Contact your local Schneider Electric representative for specific recommendations.

- 2.05 Optional Accessories
- 1. [Provide #316 stainless steel enclosure]
- 2. [Provide #304 stainless steel enclosure]
- 3. [Label for Class 1 Division 2, Temperature Class T3]

## Part 3 Execution

- 3.01 Installation
- 1. Not used

#### Schneider Electric

1010 Airpark Center Drive Nashville, TN 37217 USA

888-778-2733

www.schneider-electric.com

As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

© 1996 – 2018 Schneider Electric. All rights reserved.

7400CT9601R01/23