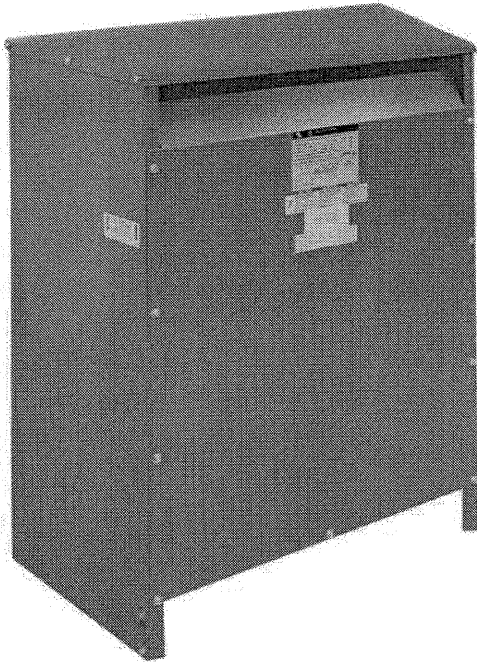


Item No.	Qty.	Catalog Number / Details
<b><u>TRANSFORMERS</u></b>		
273-00	1	<b>Designation:</b> TH-CP HM30T255NCU TRFMR DRY TYPE 30KVA 480-208ZZ120,30D
285-00	1	<b>Designation:</b> TH-ECP HM15T208NCU TRFMR DRY TYPE 15KVA 480D208ZZ120,0DEG
323-00	1	<b>Designation:</b> STHK 1A HM225T255NCU TRFMR DRY TYPE 225KVA 480-208ZZ120,30D
323-01	1	<b>Designation:</b> STHK 2A HM225T208NCU TRFMR DRY TYPE 225KVA 480D208ZZ120,0DEG
324-00	1	<b>Designation:</b> STHK-1C HM30T255NCU TRFMR DRY TYPE 30KVA 480-208ZZ120,30D
325-00	1	<b>Designation:</b> ETH-1B HM15T208NCU TRFMR DRY TYPE 15KVA 480D208ZZ120,0DEG
319-00	1	<b>Designation:</b> THK-1B HM112T208NCU TRFMR DRY TYPE 112.5KVA 480D208ZZ120,0D
327-00	1	<b>Designation:</b> THK-2B HM112T255NCU TRFMR DRY TYPE 112.5KVA 480-208120,30D
328-00	2	<b>Designation:</b> THK- 1A1 / 2A2 HM225T255NCU TRFMR DRY TYPE 225KVA 480-208ZZ120,30D
320-00	2	<b>Designation:</b> THK-2A1 / 1A2 HM225T208NCU TRFMR DRY TYPE 225KVA 480D208ZZ120,0DEG
321-00	2	<b>Designation:</b> THK-RE-2A1/ RW-3A1 HM225T255NCU TRFMR DRY TYPE 225KVA 480-208ZZ120,30D
322-00	1	<b>Designation:</b> THK-RW-4A1 HM150T208NCU TRFMR DRY TYPE 150KVA 480D208ZZ120,0DEG
329-00	1	<b>Designation:</b> THK-RE-1A1 HM225T208NCU TRFMR DRY TYPE 225KVA 480D208ZZ120,0DEG

# Harmonic Mitigating Transformers

Energy Efficient, Dry Type

Catalog  
7400CT0301R7/08  
**2008**  
Class 7400

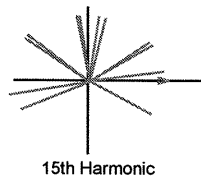
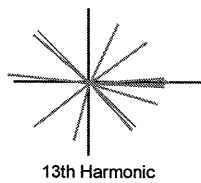
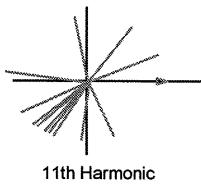
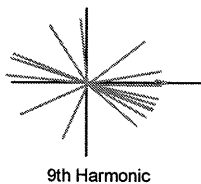
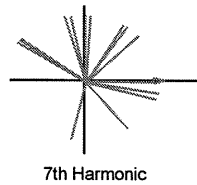
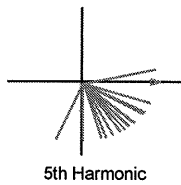
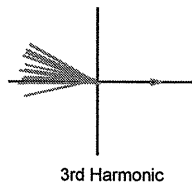


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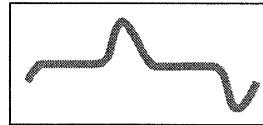
## How Harmonic Mitigating Transformers Address Harmonics

### Office Load Harmonic Phase Angle Patterns

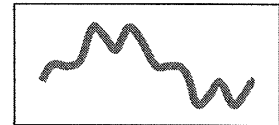


- Add Source Impedance (3-5%)
  - Limits Crest Factor
- Phase Shifting
  - 30° Shift (Delta to Wye or Wye to ZigZag)
    - Cancel – Triplen Harmonics (3<sup>rd</sup>, 9<sup>th</sup>, 15<sup>th</sup>, ...)
  - 0° Shift (Delta to ZigZag)
    - Cancel – Triplen Harmonics (3<sup>rd</sup>, 9<sup>th</sup>, 15<sup>th</sup>, ...)

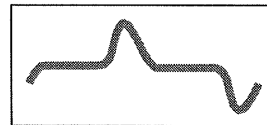
Secondary Current



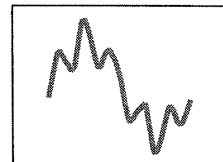
Primary Current



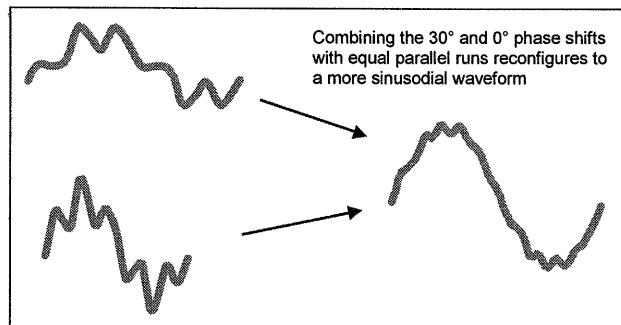
Secondary Current



Primary Current



### Combination of 30° and 0° with Equal Parallel Runs



For maximum benefits from harmonic mitigating transformers, both 30° and 0° phase-shift-equivalent products should be incorporated into the system. When this is not possible due to floor space, load requirements, or economic conditions, either product can be incorporated into the system. To combine even more harmonics, the customer can add the +15° or -15° (45°) products to their application.

Another option to maximize the benefits of harmonic mitigating transformers is by tiering them through the system, for example, by using one harmonic mitigating transformer to feed another one.

Schneider Electric recommends using 30° phase-shift, delta to wye transformers in place of wye-zigzag transformers. 30° phase-shift, delta to wye transformers mitigate harmonics, and are widely recognized and accepted throughout the electrical industry.

# Harmonic Mitigating Transformers

## Ordering Information

### Ordering Information

Refer to Tables 1–16 for three-phase transformer information. All transformers have copper windings and are rated for a 130 °C temperature rise.

**Table 1: 480 V Delta Primary to 208Y/120 V Secondary with a 0° Phase Shift**

kVA	Part Number	Enclosure <sup>1</sup> (Refer to pages 12–23)	Wiring Diagram	Weight Cu (lbs)	Primary Current			Secondary Current	
					Nameplate Rating	NEC Max. Rating 125%	NEC Max. Rating 250%	Nameplate Rating	NEC Max. Rating 125%
15	HM15T208NCU	17D	Figure 1 on page 24	Contact the factory.	18	25	45	41.7	60
30	HM30T208NCU	17D			36.1	45	90	83.3	110
45	HM45T208NCU	18D			54.2	70	125	124.9	175
75	HM75T208NCU	20D			90.3	125	225	208.2	275
112.5	HM112T208NCU	21D			135.5	175	300	312.3	400
150	HM150T208NCU	22D			180.6	225	450	416.4	600
225	HM225T208NCU	24D			271.0	300	600	624.6	800
300	HM300T208NCU	25D			361.3	450	900	832.7	1200

<sup>1</sup> NEMA Type 2 drip-proof enclosure. Weathershields available to upgrade the enclosures to NEMA Type 3R (suitable for outdoor use). Standard transformers up through 75 kVA three-phase and 75 kVA single-phase can be mounted directly on wall via mounting brackets.

**Table 2: 480 V Delta Primary to 208Y/120 V Secondary with a +30° Phase Shift**

kVA	Part Number	Enclosure <sup>1</sup> (Refer to pages 12–23)	Wiring Diagram	Weight Cu (lbs)	Primary Current			Secondary Current	
					Nameplate Rating	NEC Max. Rating 125%	NEC Max. Rating 250%	Nameplate Rating	NEC Max. Rating 125%
15	HM15T255NCU	17D	Figure 2 on page 25	Contact the factory.	18	25	45	41.7	60
30	HM30T255NCU	17D			36.1	45	90	83.3	110
45	HM45T255NCU	18D			54.2	70	125	124.9	175
75	HM75T255NCU	20D			90.3	125	225	208.2	275
112.5	HM112T255NCU	21D			135.5	175	300	312.3	400
150	HM150T255NCU	22D			180.6	225	450	416.4	600
225	HM225T255NCU	24D			271.0	300	600	624.6	800
300	HM300T255NCU	25D			361.3	450	900	832.7	1200

<sup>1</sup> NEMA Type 2 drip-proof enclosure. Weathershields available to upgrade the enclosures to NEMA Type 3R (suitable for outdoor use). Standard transformers up through 75 kVA three-phase and 75 kVA single-phase can be mounted directly on wall via mounting brackets.

# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM30T255NCU

<b>kVA:</b> 30	<b>Phase:</b> 3		<b>Frequency:</b> 60 Hz		
<b>High Voltage:</b> 480 WYE		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 157 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 1089 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 1245.6 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	97.09%	97.22%	96.69%	96.01%	97.53%
<b>Impedance:</b> 4.3%	<b>Regulation:</b>		1.0 pf	0.8 pf	
<b>X/R Ratio:</b> 0.64			3.66%	4.29%	
<b>Sound Level:</b> 45 dB					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage



# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM15T208NCU

<b>kVA:</b> 15	<b>Phase:</b> 3		<b>Frequency:</b> 60 Hz		
<b>High Voltage:</b> 480 DELTA		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 89 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 547 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 636 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	96.82%	97.08%	96.59%	95.93%	97.33%
<b>Impedance:</b> 4.5%	<b>Regulation:</b> 1.0 pf		0.8 pf		
<b>X/R Ratio:</b> 0.74			3.68%   4.54%		
<b>Sound Level:</b> 45 dB					
<b>Inrush:</b> 13.8 x Rated Primary (Peak)					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage



# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM225T255NCU

<b>kVA:</b> 225	<b>Phase:</b> 3		<b>Frequency:</b> 60 Hz		
<b>High Voltage:</b> 480 WYE		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 514 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 5639 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 6153 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	98.48%	98.32%	97.86%	97.34%	98.65%
<b>Impedance:</b> 6.8%	<b>Regulation:</b> 1.0 pf		0.8 pf		
<b>X/R Ratio:</b> 2.53			2.71%   5.87%		
<b>Sound Level:</b> 55 dB					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage



# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM225T208NCU

<b>kVA:</b> 225	<b>Phase:</b> 3			<b>Frequency:</b> 60 Hz	
<b>High Voltage:</b> 480 DELTA		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 621 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 4418 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 5039 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	98.43%	98.49%	98.19%	97.81%	98.67%
<b>Impedance:</b> 6.4%	<b>Regulation:</b> 1.0 pf			0.8 pf	
<b>X/R Ratio:</b> 3.11	2.15%			5.30%	
<b>Sound Level:</b> 55 dB					
<b>Inrush:</b> 15.7 x Rated Primary (Peak)					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage



# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM112T255NCU

<b>kVA:</b> 112.5	<b>Phase:</b> 3		<b>Frequency:</b> 60 Hz		
<b>High Voltage:</b> 480 WYE		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 360 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 2991 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 3351 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	98.09%	98.07%	97.64%	97.11%	98.35%
<b>Impedance:</b> 5.5%	<b>Regulation:</b> 1.0 pf		0.8 pf		
<b>X/R Ratio:</b> 1.80	2.77%		5.02%		
<b>Sound Level:</b> 50 dB					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage



# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM112T208NCU

<b>kVA:</b> 112.5	<b>Phase:</b> 3		<b>Frequency:</b> 60 Hz		
<b>High Voltage:</b> 480 DELTA		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 388 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 2701 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 3089 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	98.06%	98.14%	97.79%	97.33%	98.35%
<b>Impedance:</b> 4.4%	<b>Regulation:</b> 1.0 pf		0.8 pf		
<b>X/R Ratio:</b> 1.56	2.47%		4.18%		
<b>Sound Level:</b> 50 dB					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage



# Square D Company



Date: 23 Sep 08

## Transformer Performance Data

Tested in accordance with NEMA ST 20-1992, TP 2-1996

Catalog Number: HM150T208NCU

<b>kVA:</b> 150	<b>Phase:</b> 3			<b>Frequency:</b> 60 Hz	
<b>High Voltage:</b> 480 DELTA		<b>Low Voltage:</b> 208/120 ZZ			
<b>Core Loss (No Load):</b> 509 watts	<b>Insulation System Class:</b> 200 °C				
<b>Coil Loss (Load):</b> 2390 watts	<b>Average Temperature Rise:</b> 130 °C				
<b>Total Losses:</b> 2899 watts	<b>Hotspot Temperature Rise:</b> 160 °C				
<b>Efficiency:</b>	1/4 Load	1/2 Load	3/4 Load	Full Load	35% Load @ 75°C TP-1
	98.27%	98.55%	98.38%	98.10%	98.59%
<b>Impedance:</b> 3.3%	<b>Regulation:</b>			1.0 pf	0.8 pf
<b>X/R Ratio:</b> 1.82				1.64%	3.02%
<b>Sound Level:</b> 50 dB					

Applied Potential Tests: HV - LV : 2 Seconds (120 cycles) at 4800 Vac  
HV - GND : 2 Seconds (120 Cycles) at 4800 Vac  
LV - GND : 2 Seconds (120 Cycles) at 3000 Vac

Induced Potential Test: 2 Minutes (7200 Cycles) at Twice Rated Voltage

