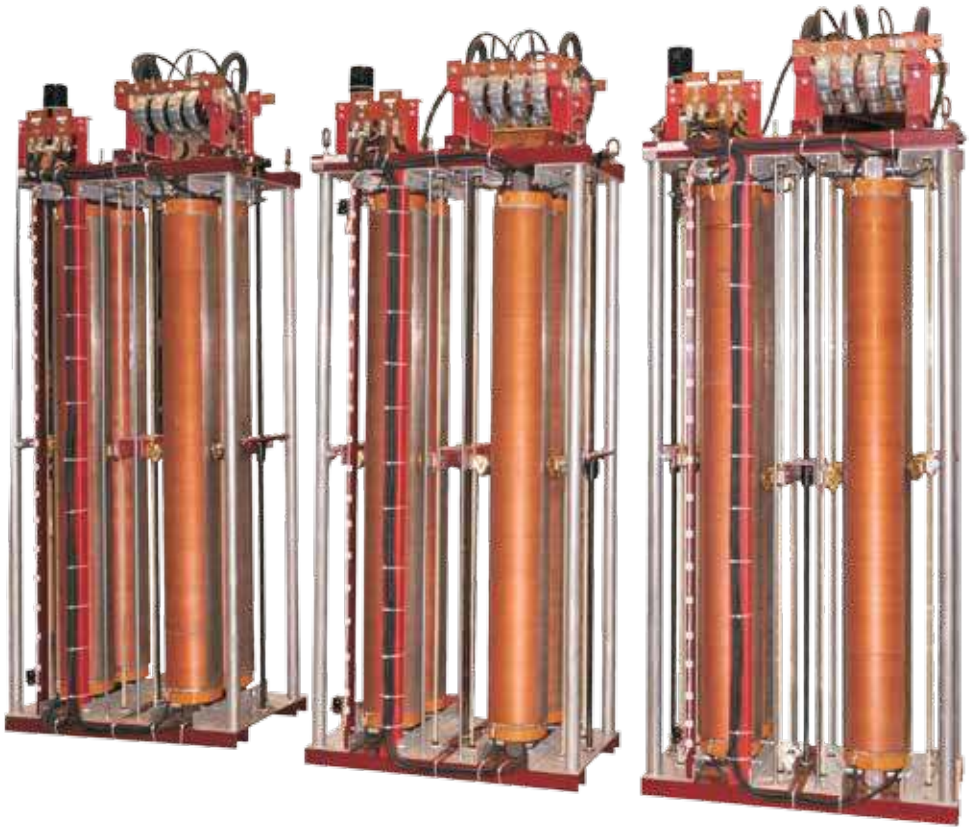
Voltage Regulators

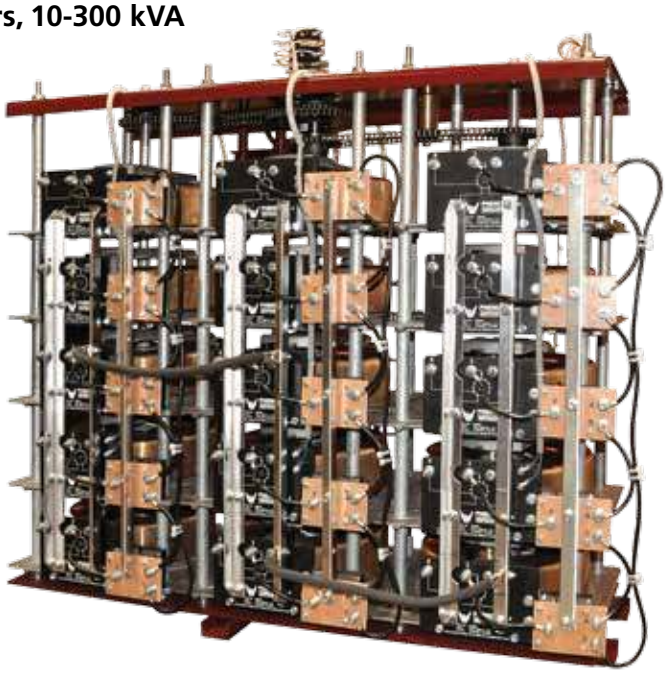
PHENIX TECHNOLOGIES

Phenix Technologies offers an extensive line of voltage regulators to accommodate the enormous variety of electrical equipment in use today. Variable transformers provide an adjustable output voltage whenever a continuous regulation of AC voltages with load is necessary. With standard input voltages and different transformer designs to choose from, we are sure to have a regulator that meets your specific application.

Column-Type Variable Transformers, 40-1200 kVA

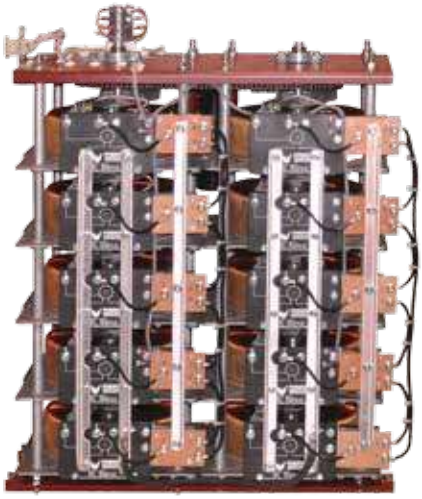


Toroidal Variable Transformers, 10-300 kVA



MOTOR TRANSFORMER

Single Stack



Twin Stack

Triple Stack

Toroidal Variable Transformers (TOVT)

- Continuously adjustable output voltage for inputs ranging from 120 to 600 Volts AC
- Provides output voltage as a percentage of input voltage over a range of either 0-100% or 0-117%
- Applications include test equipment and lab instruments, as well as an enormous variety of power supplies

Description

TOVTs are a simple and efficient auto-transformer distinguished by their unique shape. Copper windings encompass a toroidal, or "doughnut" shaped core, to form a toroidal helix. The outer face of the windings is exposed to provide a path for current collection. A carbon brush traverses the windings by means of output voltage selector, or "swinger". The swinger originates at the center of the toroid and rotates a maximum of 318 degrees about the face of the transformer. The result is an output voltage that varies linearly in proportion to the angle of rotation of the swinger. By stacking multiple transformers on a common shaft and wiring them in series and/or parallel, the line voltage may be doubled and the current and kVA rating increased accordingly.

Mechanical Features

- Single and three phase configurations
- Motorized and manual units available
- Standard rise time for AC units is 60 seconds, DC units is 15 seconds
- Stackable design for wide KVA range
- Precise assembly provides longer life with minimal maintenance
- Individual cooling fans

Electrical Features

- Line voltage inputs from 120 to 600 Volts AC
- Output voltage from 0 to 17% above line voltage
- Parallel configurations include current chokes
- 250% overload capability for 2 minutes
- Wiring diagram conveniently located on terminal plate

Drive

For low KVA applications, TOVT assemblies can be operated manually to provide precise voltage control. For automatic control and larger power ratings a motor drive is required. Motorized units contain a chain and sprocket assembly that can be manipulated to modify the swinger speed with respect to motor rpm, thereby increasing or decreasing regulation time. Limit switches are installed at the upper and lower limits of the windings to prevent over-travel of the voltage selector. Furthermore, DC motor drives can be applied in order to obtain a variable rate of rise.

Enclosure

Each TOVT unit is equipped with lifting points for movement by overhead crane. Also available are IP21 enclosures/cabinets, which provide a protective category designation in accordance with IEC 529. IP21 enclosures protect against penetration of solid objects 12 mm in diameter or larger as well as protect against dripping water. The enclosure is constructed of heavy gauge steel coated with a durable polyurethane based paint. The base of the cabinet rests on steel skids for movement by forklift.

	Stack Height	Phase	Model*	Input (V)	Current (A) Continuous	1 Hr ON / 1 Hr OFF	5 Min ON/ 15 Min OFF	Width inches (mm)	Depth inches (mm)	Height inches (mm)	Weight lbs (kgs)
SINGLE STACK (S)	1	1	VXA__-S1	208-240	35	49	60	14 (356)	18 (457)	16 (406)	76 (35)
	2	1	VXA__-S2P	208-240	70	98	120	14 (356)	21 (533)	22 (559)	138 (63)
	2	1	VXA__-2S2	380-575	35	49	60	14 (356)	18 (457)	22 (559)	138 (63)
	3	1	VXA__-S3P	208-240	105	148	180	14 (356)	21 (533)	28 (699)	202 (92)
	3	3	VXA__-S3Y	380-600	35	49	60	14 (356)	18 (457)	28 (699)	198 (90)
	4	1	VXA__-S4P	208-240	140	197	240	14 (356)	21 (533)	33 (838)	264 (120)
	4	3	VXA__-S4SP	380-575	70	98	120	14 (356)	21 (533)	33 (838)	262 (119)
	5	1	VXA__-S5P	208-240	175	247	300	14 (356)	21 (533)	39 (978)	326 (148)
	6	1	VXA__-S6P	208-240	210	296	360	14 (356)	21 (533)	45 (1130)	388 (176)
	6	1	VXA__-S6SP	380-575	105	148	180	14 (356)	21 (533)	45 (1130)	388 (176)
	6	3	VXA__-S6Y	380-600	70	98	120	14 (356)	21 (533)	45 (1130)	384 (174)
	7	1	VXA__-S7P	208-240	245	346	420	14 (356)	21 (533)	50 (1270)	450 (204)
	8	1	VXA__-S8P	208-240	280	395	480	14 (356)	21 (533)	56 (1410)	512 (232)
	8	1	VXA__-S8SP	380-575	140	197	240	14 (356)	21 (533)	56 (1410)	512 (232)
	9	1	VXA__-S9P	208-240	315	445	540	14 (356)	21 (533)	61(1549)	574 (260)
	9	3	VXA__-S9Y	380-600	105	148	180	14 (356)	21 (533)	61(1549)	574 (260)
TWIN STACK (TW)	4	1	VXA__-TW4SP	380-575	140	197	240	30 (762)	21 (533)	30 (762)	550 (250)
	5	1	VXA__-TW5SP	380-575	175	247	300	30 (762)	21 (533)	36 (902)	670 (304)
	6	1	VXA__-TW6SP	380-575	210	296	360	30 (762)	21 (533)	42 (1054)	795 (360)
	6	3	VXA__-TW6Y	380-600	140	197	240	30 (762)	21 (533)	42 (1054)	795 (360)
	7	1	VXA__-TW7SP	380-575	245	346	420	30 (762)	21 (533)	47 (1194)	920 (417)
	8	1	VXA__-TW8SP	380-575	280	395	480	30 (762)	21 (533)	53 (1334)	1045 (474)
	9	1	VXA__-TW9SP	380-575	315	445	540	30 (762)	21 (533)	58 (1473)	1170 (531)
	9	3	VXA__-TW9Y	380-600	210	296	360	30 (762)	21 (533)	58 (1473)	1170 (531)
TRIPLE STACK (TR)	7	3	VXA__-TR7Y	380-600	245	346	420	42 (1054)	21 (533)	49 (1245)	1375 (624)
	8	1	VXA__-TR8SP	380-575	420	593	720	42 (1054)	21 (533)	55 (1384)	1560 (708)
	8	3	VXA__-TR8Y	380-600	280	395	480	42 (1054)	21 (533)	55 (1384)	1560 (708)
	9	3	VXA__-TR9Y	380-600	315	445	540	42 (1054)	21 (533)	60 (1524)	1745 (792)
	10	1	VXA__-TR10SP	380-575	525	742	900	42 (1054)	21 (533)	66 (1664)	1930 (875)
	10	3	VXA__-TR10Y	380-600	350	494	600	42 (1054)	21 (533)	66 (1664)	1930 (875)

*Criteria required to generate model number

M = Manual drive (available up to and including "-S6" model numbers only, larger power ratings require a motorized drive)

N = 120 VAC, 1 phase (rise time 60 seconds)

O = 230 VAC, 1 phase (rise time 60 seconds)

P = 230 VAC, 3 phase (rise time 15 seconds @ 60 Hz)

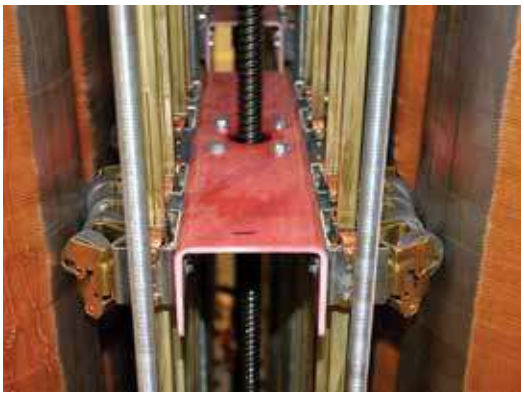
Q = 90 VDC (rise time 15 seconds)

Column-Type Variable Transformers (CTVT)

Carbon Rollers

Roller Holders

Roller Holder Assembly



- Regulate large throughput power with fewer components
- Single and three phase units available providing a continuously adjustable output voltage for inputs from 240 to 600 Volts

Description

The CTVT is constructed of an outer copper coil, as well as a series of internal compensation coils, both encompassing a laminated steel core. The coils are encapsulated using a process known as vacuum pressure impregnation (VPI) to strengthen the column and provide uniform heat transfer. A contact face of the windings is exposed to reveal the individual turns. The face is then nickel-plated to provide a wear-resistant and corrosion-free path for current collection. A combination of aluminum and steel structures support the columns providing a heavy duty and structurally dependable unit.

Mechanical Features

- Single and three phase configurations
- Nickel-plated commutator path
- Rolling carbon current collectors
- Unique plus/minus design available
- Motorized ball-screw drive
- Fixed or variable rate or rise
- Heavy duty construction
- Continuous duty to 40 degrees C ambient
- Upper and lower limit micro switches
- Modular design for extensive kVA capacity

Electrical Features

- Low turn-to-turn voltage difference (.7 volts max)
- Quasi-stepless regulation from 0-100%
- Compensation winding on all columns
- Step-up output available for 0-115% rated input voltage
- Delta and wye auto-winding standard
- Operating frequency range from 50-60 Hz
- Minimal output distortion

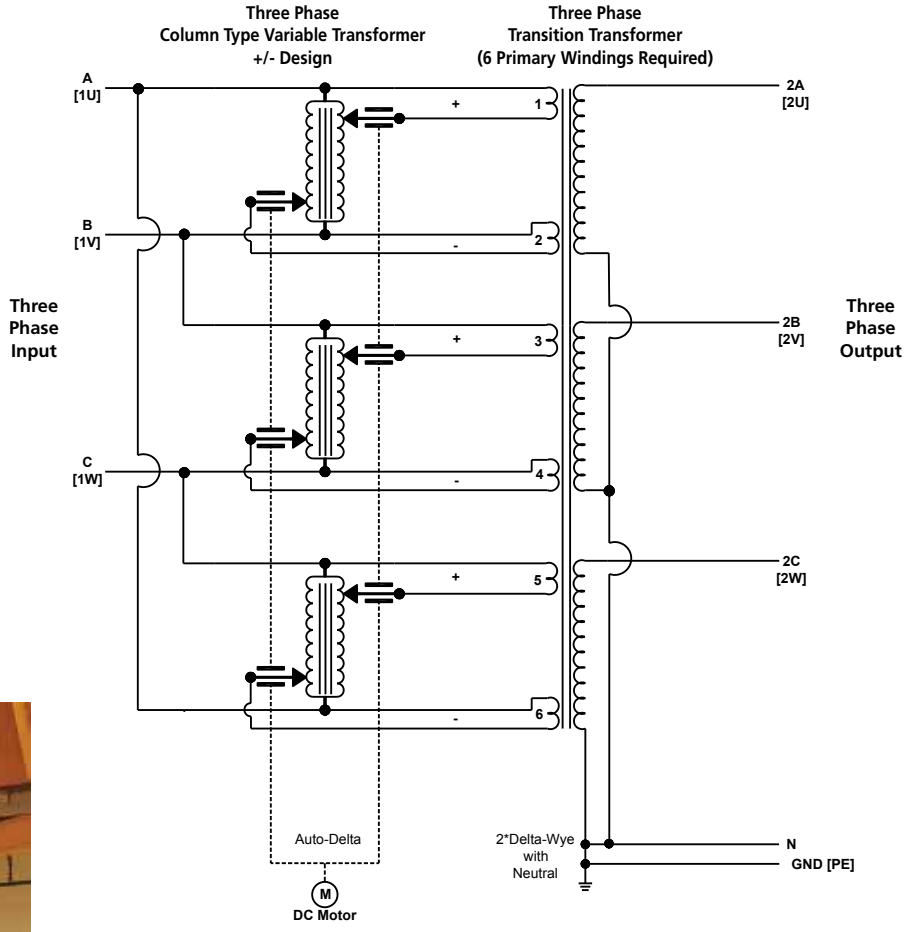
Dependability

The most important feature of the PHENIX CTVT is the low turn-to-turn voltage difference across the transformer windings, (designed to never exceed .7 volts per turn). In order for a variable transformer to yield continuous, uninterrupted output voltage, the current collector must touch the next turn before leaving the previous one. The potential difference across the collector results in current flow, which results in heat dissipation. CTVTs use 35mm diameter carbon rollers as the collector device. In addition to eliminating mechanical problems associated with sliding contacts, the rollers endure greater cycles due to decreased friction. The carbon offers excellent electrical conductivity as well as exceptional thermal withstand capabilities. When the rollers bridge two turns, a combination of the low potential difference and the resistance characteristics of the contact devices limit current flow throughout the roller. These properties make the PHENIX CTVT ideal for applications in which the rollers are stationary or do not experience frequent movement.

Plus/Minus Design

The PHENIX CTVT uses two types of roller holders. Termed three-holder and four-holder; the first holds 3 carbon rollers and the latter 4. With each roller capable of carrying 25 Amps, the face of each column is able to provide up to 100 Amps of current. However, the unique double current collector design termed "plus/minus" allows for higher KVA throughout than conventional auto-transformer designs. A roller assembly is installed on both sides, but at opposite ends of the column providing two output circuits for each column, thus doubling the KVA capacity. The plus/minus design is ideal for stabilizer applications in which a buck-boost transformer requires regulation capable of shifting voltage polarity.

System Diagram of a
Three Phase +/- Column Type Variable Transformer
with a Three Phase Transition Transformer



Compensation Winding

Each CTVT contains a compensation winding located beneath the actual commutating winding. This ensures a uniform current distribution across the length of the column, providing a much improved regulator impedance characteristic. The result is minimum voltage drop and increased efficiency.

Drive

Phenix designs the motion of the current collectors by using a motor drive attached to a ball-screw and miter gear assembly. Fixed or variable rate of rise is achieved through the use of an AC or DC gear motor. Common regulation is 0-100% in 1 minute for AC units, 30 seconds for DC units, with custom speeds available. The use of high quality miter gears and pillow-block ball bearings linked to a ball-screw drive eliminates problems associated with conventional chain drives. The result is a mechanically reliable unit, with a long life and minimal maintenance.

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Single Phase (conventional) = 2 wire output

	# of columns	# of rollers per column	Current (A) continuous	Current (A) 1 Hr ON/ 1 Hr OFF	Current (A) 5 Min ON/ 15 Min OFF	Input Voltage 400 V continuous kVA	400 V MODEL NUMBER	400 V Height inches (mm)	400 V Weight lbs (kgs)	415 V continuous kVA	415 V MODEL NUMBER	415 V Height inches (mm)	415 V Weight lbs (kgs)	480 V continuous kVA	480 V MODEL NUMBER	480 V Height inches (mm)	480 V Weight lbs (kgs)	600 V continuous kVA	600 V MODEL NUMBER	600 V Height inches (mm)	600 V Weight lbs (kgs)	Width inches (mm)	Depth inches (mm)
Single Phase (conventional) = 2 wire output	2	3	110	140	178	44	CTR400T-44-21	75 (1905)	788 (358)	45	CTR415T-45-21	77 (1955)	814 (370)	52	CTR480T-52-21	85 (2159)	916 (416)	N/A				19 (482)	19 (482)
	2	4	140	178	227	56	CTR400T-56-21	81 (2057)	908 (412)	58	CTR415T-58-21	83 (2108)	936 (425)	67	CTR480T-67-21	91 (2311)	1040 (472)	N/A				20 (508)	19 (482)
	4	3	220	280	356	88	CTR400T-88-41	75 (1905)	1612 (732)	91	CTR415T-91-41	77 (1955)	1663 (755)	105	CTR480T-105-41	85 (2159)	1863 (846)	N/A				19 (482)	35 (889)
	4	4	280	356	453	112	CTR400T-112-41	81 (2057)	1827 (830)	116	CTR415T-116-41	83 (2108)	1882 (855)	134	CTR480T-134-41	91 (2311)	2086 (948)	N/A				20 (508)	35 (889)
	6	3	330	420	535	132	CTR400T-132-61	77 (1955)	2388 (1085)	136	CTR415T-136-61	79 (2006)	2465 (1120)	158	CTR480T-158-61	87 (2209)	2763 (1255)	N/A				19 (482)	52 (1320)
	6	4	420	535	681	168	CTR400T-168-61	83 (2108)	2710 (1231)	174	CTR415T-174-61	85 (2159)	2791 (1268)	201	CTR480T-201-61	93 (2362)	3096 (1407)	N/A				20 (508)	52 (1320)
	8	3	440	560	713	176	CTR400T-176-81	78 (1981)	3161 (1436)	182	CTR415T-182-81	80 (2032)	3263 (1483)	211	CTR480T-211-81	88 (2235)	3661 (1664)	N/A				19 (482)	68 (1727)
	8	4	560	713	908	224	CTR400T-224-81	84 (2133)	3590 (1631)	232	CTR415T-232-81	86 (2184)	3698 (1680)	268	CTR480T-268-81	94 (2387)	4105 (1865)	N/A				20 (508)	68 (1727)
	10	3	550	700	891	220	CTR400T-220-101	78 (1981)	3932 (1787)	228	CTR415T-228-101	80 (2032)	4060 (1845)	264	CTR480T-264-101	88 (2235)	4556 (2070)	N/A				19 (482)	84 (2133)
	10	4	700	891	1134	280	CTR400T-280-101	84 (2133)	4468 (2030)	290	CTR415T-290-101	86 (2184)	4604 (2092)	336	CTR480T-336-101	94 (2387)	5111 (2323)	N/A				20 (508)	84 (2133)
	12	3	660	840	1069	264	CTR400T-264-121	78 (1981)	4692 (2132)	273	CTR415T-273-121	80 (2032)	4845 (2202)	316	CTR480T-316-121	88 (2235)	5439 (2472)	N/A				19 (482)	101 (2565)
	12	4	840	1069	1361	336	CTR400T-336-121	84 (2133)	5334 (2424)	348	CTR415T-348-121	86 (2184)	5496 (2498)	403	CTR480T-403-121	94 (2387)	6103 (2774)	N/A				20 (508)	101 (2565)

Single Phase (+/- Design) = 4 wire output

Single Phase (+/- Design) = 4 wire output	2	3	110	140	178	88	CTR400-88P-21	75 (1905)	800 (363)	91	CTR415-91P-21	77 (1955)	830 (377)	105	CTR480-105P-21	85 (2159)	935 (425)	132	CTR600-132P-21	97 (2463)	1095 (497)	19 (482)	19 (482)
	2	4	140	178	227	112	CTR400-112P-21	81 (2057)	980 (445)	116	CTR415-116P-21	83 (2108)	1005 (456)	134	CTR480-134P-21	91 (2311)	1115 (506)		N/A			20 (508)	19 (482)
	4	3	220	280	356	176	CTR400-176P-41	75 (1905)	1638 (744)	182	CTR415-182P-41	77 (1955)	1692 (769)	211	CTR480-211P-41	85 (2159)	1900 (863)	264	CTR600-264P-41	97 (2463)	2213 (1005)	19 (482)	35 (889)
	4	4	280	356	453	224	CTR400-224P-41	81 (2057)	1898 (862)	232	CTR415-232P-41	83 (2108)	1954 (888)	268	CTR480-268P-41	91 (2311)	2166 (984)		N/A			20 (508)	35 (889)
	6	3	330	420	535	264	CTR400-264P-61	75 (1905)	2409 (1095)	273	CTR415-273P-61	77 (1955)	2489 (1131)	316	CTR480-316P-61	85 (2159)	2794 (1270)	396	CTR600-396P-61	97 (2463)	3266 (1484)	19 (482)	52 (1320)
	6	4	420	535	681	336	CTR400-336P-61	81 (2057)	2798 (1271)	348	CTR415-348P-61	83 (2108)	2882 (1310)	403	CTR480-403P-61	91 (2311)	3197 (1453)		N/A			20 (508)	52 (1320)
	8	3	440	560	713	352	CTR400-352P-81	76 (1930)	3193 (1451)	365	CTR415-365P-81	78 (1981)	3300 (1500)	422	CTR480-422P-81	86 (2184)	3706 (1684)	528	CTR600-528P-81	98 (2489)	4335 (1970)	19 (482)	68 (1727)
	8	4	560	713	908	448	CTR400-448P-81	82 (2082)	3712 (1687)	464	CTR415-464P-81	84 (2133)	3823 (1737)	537	CTR480-537P-81	92 (2336)	4244 (1929)		N/A			20 (508)	68 (1727)
	10	3	550	700	891	440	CTR400-440P-101	76 (1930)	3695 (1802)	456	CTR415-456P-101	78 (1981)	4097 (1862)	528	CTR480-528P-101	86 (2184)	4603 (2092)	660	CTR600-660P-101	98 (2489)	5388 (2449)	19 (482)	84 (2133)
	10	4	700	891	1134	560	CTR400-560P-101	82 (2082)	4612 (2096)	581	CTR415-581P-101	84 (2133)	4750 (2159)	672	CTR480-672P-101	92 (2336)	5275 (2397)		N/A			20 (508)	84 (2133)
	12	3	660	840	1069	528	CTR400-528P-121	76 (1930)	4736 (2152)	547	CTR415-547P-121	78 (1981)	4895 (2225)	633	CTR480-633P-121	86 (2184)	5501 (2500)	792	CTR600-792P-121	98 (2489)	6441 (2927)	19 (482)	101 (2565)
	12	4	840	1069	1361	672	CTR400-672P-121	82 (2082)	5512 (2505)	697	CTR415-697P-121	84 (2133)	5678 (2580)	806	CTR480-806P-121	92 (2336)	6306 (2866)		N/A			20 (508)	101 (2565)

Three Phase Wye (conventional) = 3 wire + neutral output

Input Voltage

# of columns	# of rollers per column	Current (A) continuous	Current (A) 1 Hr ON/ 1 Hr OFF	Current (A) 5 Min ON/ 15 Min OFF	400 V continuous kVA	400 V MODEL NUMBER	400 V Height inches (mm)	400 V Weight lbs (kgs)	415 V continuous kVA	415 V MODEL NUMBER	415 V Height inches (mm)	415 V Weight lbs (kgs)	480 V continuous kVA	480 V MODEL NUMBER	480 V Height inches (mm)	480 V Weight lbs (kgs)	600 V continuous kVA	600 V MODEL NUMBER	600 V Height inches (mm)	600 V Weight lbs (kgs)	Width inches (mm)	Depth inches (mm)
3	3	55	70	89	38	CTR231T-38-33	53 (1346)	721 (327)	39	CTR240T-39-33	55 (1397)	763 (346)	45	CTR277T-45-33	59 (1498)	834 (379)	57	CTR346T-57-33	69 (1752)	1024 (465)	27 (685)	19 (482)
3	4	70	89	113	48	CTR231T-48-33	57 (1447)	853 (387)	50	CTR240T-50-33	59 (1498)	889 (404)	58	CTR277T-58-33	63 (1600)	967 (439)	72	CTR346T-72-33	73 (1854)	1166 (530)	28 (711)	19 (482)
6	3	110	140	178	76	CTR231T-76-63	53 (1346)	1478 (671)	79	CTR240T-79-63	55 (1397)	1561 (709)	91	CTR277T-91-63	59 (1498)	1701 (773)	114	CTR346T-114-63	69 (1752)	2077 (944)	27 (685)	35 (889)
6	4	140	178	227	96	CTR231T-96-63	57 (1447)	1788 (812)	100	CTR240T-100-63	59 (1498)	1858 (844)	116	CTR277T-116-63	63 (1600)	2013 (915)	145	CTR346T-145-63	73 (1854)	2404 (1092)	28 (711)	35 (889)
9	3	165	210	267	114	CTR231T-114-93	56 (1422)	2294 (1042)	118	CTR240T-118-93	58 (1473)	2417 (1098)	137	CTR277T-137-93	62 (1574)	2627 (1194)	171	CTR346T-171-93	72 (1828)	3189 (1449)	27 (685)	52 (1320)
9	4	210	267	340	145	CTR231T-145-93	60 (1524)	2640 (1200)	150	CTR240T-150-93	62 (1574)	2744 (1247)	174	CTR277T-174-93	66 (1676)	2976 (1352)	218	CTR346T-218-93	76 (1930)	3561 (1618)	28 (711)	52 (1320)
12	3	220	280	356	152	CTR231T-152-123	56 (1422)	3020 (1372)	158	CTR240T-158-123	58 (1473)	3185 (1447)	182	CTR277T-182-123	62 (1574)	3464 (1574)	228	CTR346T-228-123	72 (1828)	4213 (1915)	27 (685)	68 (1727)
12	4	280	356	453	193	CTR231T-193-123	60 (1524)	3481 (1582)	201	CTR240T-201-123	62 (1574)	3620 (1645)	232	CTR277T-232-123	66 (1676)	3929 (1785)	290	CTR346T-290-123	76 (1930)	4709 (2140)	28 (711)	68 (1727)
15	3	275	350	445	190	CTR231T-190-153	55 (1397)	3758 (1708)	197	CTR240T-197-153	57 (1447)	3964 (1801)	228	CTR277T-228-153	61 (1549)	4312 (1960)	285	CTR346T-285-153	71 (1803)	5248 (2385)	27 (685)	84 (2133)
15	4	350	445	566	242	CTR231T-242-153	59 (1498)	4334 (1970)	251	CTR240T-251-153	61 (1549)	4508 (2049)	290	CTR277T-290-153	65 (1651)	4894 (2224)	363	CTR346T-363-153	75 (1905)	5867 (2666)	28 (711)	84 (2133)
18	3	330	420	535	228	CTR231T-228-183	55 (1397)	4478 (2035)	237	CTR240T-237-183	57 (1447)	4724 (2147)	274	CTR277T-274-183	61 (1549)	5141 (2336)	342	CTR346T-342-183	71 (1803)	6262 (2846)	27 (685)	101 (2565)
18	4	420	535	681	290	CTR231T-290-183	59 (1498)	5168 (2349)	301	CTR240T-301-183	61 (1549)	5376 (2443)	349	CTR277T-349-183	65 (1651)	5839 (2654)	436	CTR346T-436-183	75 (1905)	7005 (3184)	28 (711)	101 (2565)

Three Phase Wye (conventional) = 3 wire + neutral output

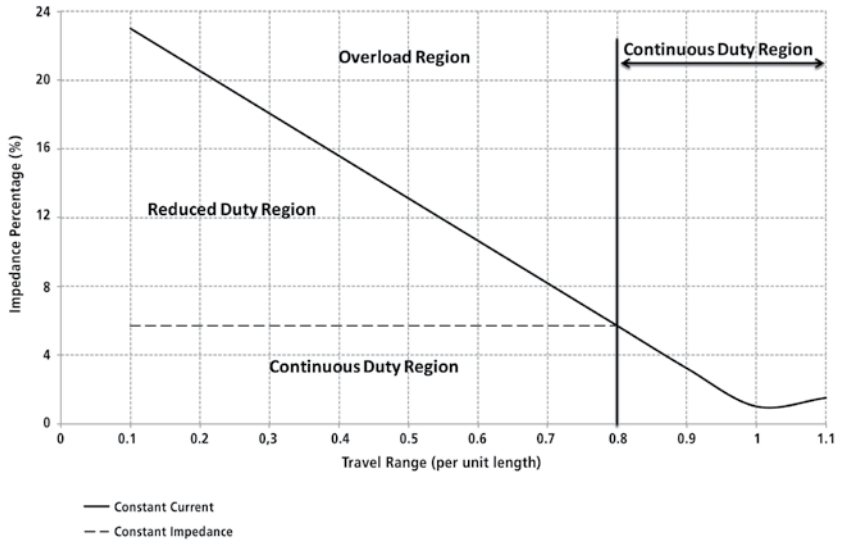
Three Phase Delta (+/- Design) = 9 wire output

# of columns	# of rollers per column	Current (A) continuous	Current (A) 1 Hr ON/ 1 Hr OFF	Current (A) 5 Min ON/ 15 Min OFF	400 V continuous kVA	400 V MODEL NUMBER	400 V Height inches (mm)	400 V Weight lbs (kgs)	415 V continuous kVA	415 V MODEL NUMBER	415 V Height inches (mm)	415 V Weight lbs (kgs)	480 V continuous kVA	480 V MODEL NUMBER	480 V Height inches (mm)	480 V Weight lbs (kgs)	600 V continuous kVA	600 V MODEL NUMBER	600 V Height inches (mm)	600 V Weight lbs (kgs)	Width inches (mm)	Depth inches (mm)
3	3	55	70	89	132	CTR400-132P-33	75 (1905)	1139 (517)	136	CTR415-136P-33	77 (1955)	1180 (536)	158	CTR480-158P-33	85 (2159)	1334 (606)	198	CTR600-198P-33	97 (2463)	1572 (714)	27 (685)	19 (482)
3	4	70	89	113	168	CTR400-168P-33	81 (2057)	1366 (620)	174	CTR415-174P-33	83 (2108)	1408 (640)	201	CTR480-201P-33	91 (2311)	1568 (712)	N/A				28 (711)	19 (482)
6	3	110	140	178	264	CTR400-264P-63	75 (1905)	2334 (1060)	273	CTR415-273P-63	77 (1955)	2413 (1096)	316	CTR480-316P-63	85 (2159)	2717 (1235)	396	CTR600-396P-63	97 (2463)	3188 (1449)	27 (685)	35 (889)
6	4	140	178	227	336	CTR400-336P-63	81 (2057)	2800 (1272)	348	CTR415-348P-63	83 (2108)	2883 (1310)	403	CTR480-403P-63	91 (2311)	3198 (1453)	N/A				28 (711)	35 (889)
9	3	165	210	267	396	CTR400-396P-93	76 (1930)	3556 (1616)	410	CTR415-410P-93	78 (1981)	3675 (1670)	475	CTR480-475P-93	86 (2184)	4128 (1876)	594	CTR600-594P-93	98 (2489)	4831 (2195)	27 (685)	52 (1320)
9	4	210	267	340	504	CTR400-504P-93	82 (2082)	4135 (1879)	522	CTR415-522P-93	84 (2133)	4259 (1935)	604	CTR480-604P-93	92 (2336)	4730 (2150)	N/A				28 (711)	52 (1320)
12	3	220	280	356	528	CTR400-528P-123	76 (1930)	4705 (2138)	547	CTR415-547P-123	78 (1981)	4864 (2210)	633	CTR480-633P-123	86 (2184)	5468 (2485)	792	CTR600-792P-123	98 (2489)	6405 (2911)	27 (685)	68 (1727)
12	4	280	356	453	672	CTR400-672P-123	82 (2082)	5478 (2490)	697	CTR415-697P-123	84 (2133)	5644 (2565)	806	CTR480-806P-123	92 (2336)	6270 (2850)	N/A				28 (711)	68 (1727)
15	3	275	350	445	660	CTR400-660P-153	75 (1905)	5854 (2660)	684	CTR415-684P-153	77 (1955)	6052 (2750)	792	CTR480-792P-153	85 (2159)	6806 (3093)	990	CTR600-990P-153	97 (2463)	7975 (3625)	27 (685)	84 (2133)
15	4	350	445	566	840	CTR400-840P-153	81 (2057)	6819 (3099)	871	CTR415-871P-153	83 (2108)	7025 (3193)	1008	CTR480-1008P-153	91 (2311)	7807 (3548)	N/A				28 (711)	84 (2133)
18	3	330	420	535	792	CTR400-792P-183	75 (1905)	6994 (3179)	821	CTR415-821P-183	77 (1955)	7231 (3286)	950	CTR480-950P-183	85 (2159)	8135 (3697)	1188	CTR600-1188P-183	97 (2463)	9536 (4334)	27 (685)	101 (2565)
18	4	420	535	681	1008	CTR400-1008P-183	81 (2057)	8151 (3705)	1045	CTR415-1045P-183	83 (2108)	8398 (3817)	1209	CTR480-1209P-183	91 (2311)	9335 (4243)	N/A				28 (711)	101 (2565)

Three Phase Delta (+/- Design) = 9 wire output

The model designation for a CTVT is as follows:
CTR [full load column voltage]
[T=step-up tap] [S=line separation]
[throughput kVA] [P=plus/minus design]
[number of columns] [phase]

Typical Impedance Characteristic for a Variable Transformer Under Constant Current Loading Versus Constant Impedance Loading



Options

Controls

Optional controls and metering are available to accommodate a PHENIX voltage regulator. Each assembly can be custom designed to best match your equipment capabilities and your metering requirements. Optional components include digital voltmeter and ammeter, on/off controls with "zero-start" interlock, raise/lower controls, input circuit breaker, and main contactor.

Enclosure

Each CTVT unit is equipped with lifting points for movement by forklift or crane. Also available are IP21 enclosures, as detailed in the PHENIX Toroidal Variable Transformer section. The structurally solid frame has removable panels for easy access to columns. Cabinets may also include fan assemblies to provide forced air cooling.

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ISO 9001:2008 Compliant

