SMA Medium Voltage Power Platforms

Medium Voltage Transformers - 4-Winding Design

Technical Description

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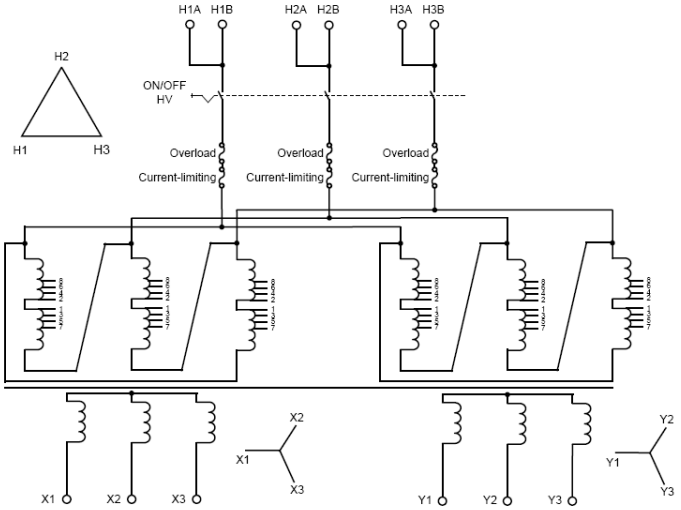
1 Scope and Summary

1.1 General

This document serves as the general Technical Desription for the Medium Voltage step-up Transformers (henceforth MVT) integrated in SMA's Medium Voltage Power Platforms.

1.2 Summary of Design

The MVTs described herein are of a padmount design, using a four-winding, double story construction, providing galvanic isolation between the inverter ourput circuits, as shown below. They are constructed with two individual low voltage windings, and two medium voltage windings, with the medium voltage windings paralled to the output bushings.



For reference only, Dy1y1 vector group shown with 5 position tap changer

SMA has established a configurable product, harmonized to the Medium Voltage Power Platform product portfolio.

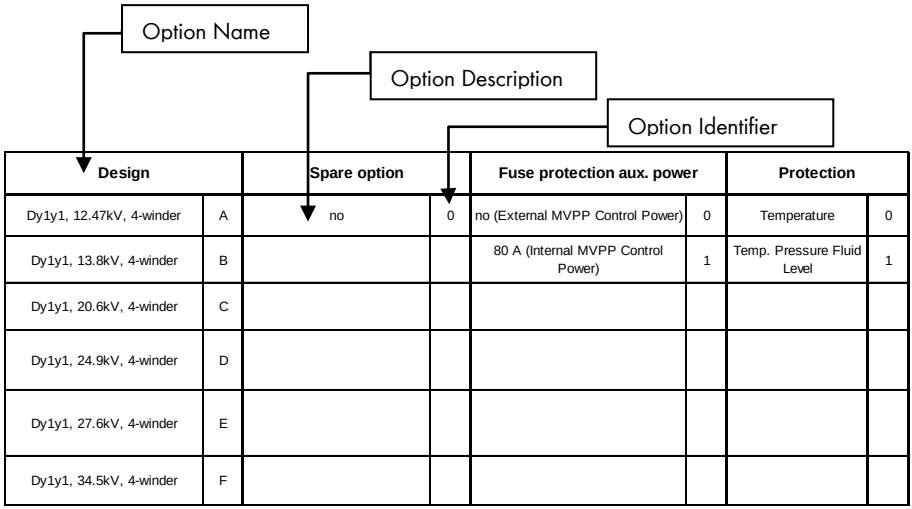
The MVTs are designed for a minimum service life of 25 years, and are suitable for outdoor applications.

1.3 Power Classes and Option Codes

A unique SMA Material Number represents the MVT power class, and inverter application, which mirrors the Medium Voltage Power Platform product portfolio.

SMA Material Number	Power Class / Inverter Type
TR-1000HE-US	1000kVA / SC500HE-US
TR-1000CP-10	1000kVA / SC500CP-10, SC500CP-US
TR-1260CP-10	1260kVA / SC630CP-10, SC630CP-US
TR-1500CP-10	1500kVA / SC720CP-10, SC720CP-US, SC760CP-10, SC750CP-US
TR-1600CP-10	1600kVA / SC800CP-10, SC800CP-US

Furthermore, the parameters of the transformers are defined by selection of Option Codes, summarized as follows.



Design		Spare option		Fuse protection aux. power		Protection	
Dy1y1, 12.47kV, 4-winder	A	no	0	no (External MVPP Control Power)	0	Temperature	0
Dy1y1, 13.8kV, 4-winder	B			80 A (Internal MVPP Control Power)	1	Temp. Pressure Fluid Level	1
Dy1y1, 20.6kV, 4-winder	C						
Dy1y1, 24.9kV, 4-winder	D						
Dy1y1, 27.6kV, 4-winder	E						
Dy1y1, 34.5kV, 4-winder	F						

Option Name:

- Describes the option category, further defined by the Option Description

Option Description:

- Explains the option identified by the Option Identifier

Option Identifier:

- Defines which option is selected

1.3.1 Options Descriptions

Design:

Describes the MVT vector group, medium voltage level, and winding design

Spare:

Not used

Fuse Protection Aux Power:

Identifies if the MVT includes the fuse block providing overcurrent protection to the Medium Voltage Power Platform's low voltage auxiliary services.

Protection:

Identifies if the MVT includes a temperature gage and alarm contacts only, or if it includes gages and alarm contacts for Temperature, Pressure, and Liquid Level.

1.3.2 Example Option Code

Transformer Material Number: TR-1500CP-10

Transformer Option Code: A|0|1|1

Explanation:

TR-1500CP-10 → 1500 kVA power class, for use with SC720CP-10, SC720CP-US, SC760CP10, or SC750CP-US inverters.

A → Delta Primary Windings, Wye Secondary Windings, 30° phase angle, Primary voltage of 12.47 kV

0 → Not used.

1 → Fuse block with 80A fuses included; auxiliary services suppied by PV generated power

1 → Gages and Alarm contacts included for Temperature, Pressure, and Liquid Level

2 Compliance

2.1 List of Standards

The MVTs are compliant to the following Norms and Standards.

Standard	Revision	Description
NEMA TR 1-1993	1993 (R2000)	Transformers, Regulators and Reactors
ANSI C57.12.00	2010	IEEE Standard for Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
ANSI C57.12.34	2004	Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers (2,500 kVA and smaller) - High-Voltage: 34500 GrdY/19920 Volts and Below; Low-Voltage: 480 Volts and Below
ANSI C57.12.28	2005	IEEE Standard for Pad-Mounted Equipment-Enclosure Integrity
ANSI C57.12.70	2000 (R2006)	Standard for Terminal Markings and Connections for Distribution and Power Transformers
ANSI C57.12.80	2002	Standard for Terminology for Power and Distribution Transformers
ANSI C57.12.90	2006	Test Code for liquid-immersed distribution, power, and regulating transformers
ANSI C57.12.91	2006	Guide for Loading Mineral-Oil-Immersed Transformers
ANSI C57.12.29		American National Standard Pad-Mounted Equipment - Enclosure Integrity
ANSI C37.47	2008	Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fused Disconnect Switches, and Accessories
ANSI/IEEE 386	2006	Standard for separable insulated connector systems for Power Distribution Systems above 600 V
UL XPLH	-	Classification of compliance to ANSI standards
UL EOUV	-	Certification category for Dielectric Mediums
UL EOVK	-	Certification category for Transformer Fluids
ASTM A666	2003	Standard Specification for annealed or cold worked austenitic stainless steel sheet, strip, plate, and flat bar

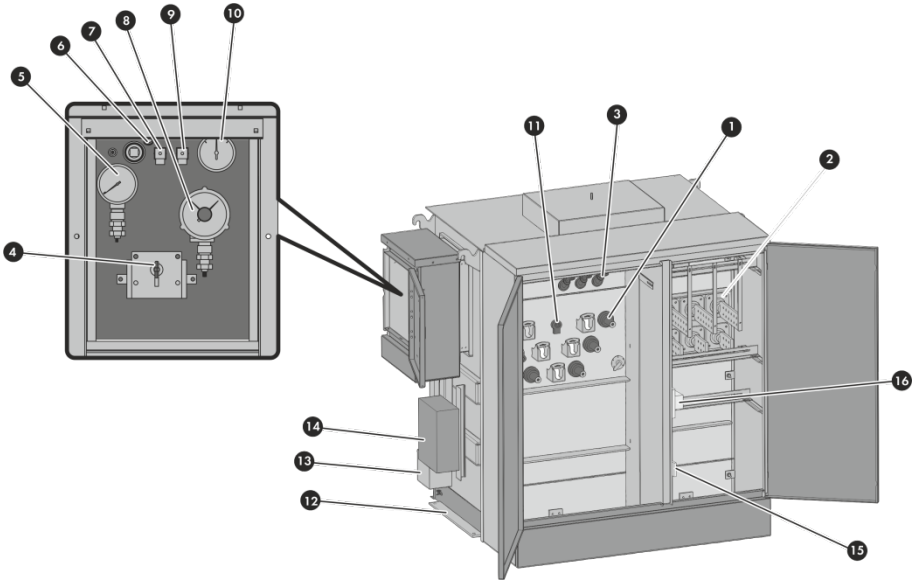
ASTM D877	-	Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids using Disk Electrodes
ASTM D924	-	Standard Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids
ASTM D92	-	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D6871-03	-	Standard Specification for Natural (Vegetable Oil) Ester Fluids Used in Electrical Apparatus
OECD 203	-	OECD GUIDELINE FOR TESTING OF CHEMICALS - Fish, Acute Toxicity Test
OECD 420	-	OECD GUIDELINE FOR TESTING OF CHEMICALS - Acute Oral Toxicity – Fixed Dose Procedure

3 Mechanical Design

3.1 General Construction

The Medium Voltage Transformers are of a pad mount design, with enclosure integrity in accordance to ANSI C57.12.28. The High Voltage and Low Voltage compartments are side by side, and separated by a steel barrier. The HV compartment is on the left side, and the LV compartment to its right.

3.1.1 Components of the MV Transformer



(Example; specific components and locations can vary depending upon the ordered configuration)

Item	Description
1	Primary (MV) Bushings
2	Secondary (LV) Bushings
3	Fuse Holders / Fusess, oil immersed expulsion (for MV<23kV)
4	Medium Voltage Load Break Switch
5	Liquid Level Gage and Alarm Contacts
6	Pressure Relief Valve
7	Vaccuum Switch with Alarm Contacts
8	Liquid Temperature Gage with Alarm Contacts
9	Pressure Switch with Alarm Contacts
10	Pressure Vaccuum Gage
11	Tap Changer
12	Seismic Tie Down Bracket
13	Drain Valve in Padlockable Enclosure
14	Alarm Contact Terminations
15	Grounding Bus Bar
16	Fuse Block (for LV distribution)

The transformer is RAL9016 (white) in color, with natural convection cooling.

3.2 Accessories

3.2.1 Gages and Alarm Contacts

The transformers include as standard accessories, gages with form C, dry alarm contacts, for Overtemperature (8). The Overtemperature alarm contacts are preset for 105°C (Alarm) and 115°C (Trip).

As an available option, additional gages and alarm contacts can be provided for Over-pressure (7,9,10), and Liquid Level (8).

The gages are located in a NEMA 1 enclosure mounted to the left hand side of the transformer tank. The enclosure is able to be locked with a customer-supplied LOTO hasp and lock. The contacts are rated for 230 VAC.

The terminal blocks for the alarm contacts are located in a separate, NEMA 3R control box (14) on the left hand side of the transformer tank.

3.2.2 LV Fuse Block

The transformer, if ordered with option 3_1: 80A Internal MVPP Control Power, will include a 100 A fuse block with 80A, Class J fuses (16).

This fuse block is tapped from one set of low voltage bushings, and provides the overcurrent protection for the supply conductors to the low voltage power distribution of the Medium Voltage Power Platform.

3.2.3 Sampler Valve

A sampling valve for the dielectric fluid is included in a separate external enclosure on the lower left hand side of the High Voltage side of the transformer tank (13).

3.2.4 Medium Voltage Switch

The transformer includes a three phase, under oil, two position load break switch (4).

The switch is located in the same NEMA 1 external cabinet as the gages, on the left hand side of the High Voltage side of the transformer tank.

3.2.5 Grounding

A grounding bus bar of tin plated copper is included in the low voltage compartment of the transformer (15). It is mounted to the lower left hand side of the sidewall of the low voltage compartment.

This grounding bus receives the equipment grounds of the components on the Medium Voltage Power Platform (MVPP), and has terminations for the conductors which connect to the exterior ground pads of the MVPP, as detailed in the MVPP circuit diagrams.

3.3 Mechanical Properties

Item	Description	Value
1	Cabinet	30 inch deep cabinet
2	Cabinet Hardware	Penta-head cabinet door bolts
3	Coatings	RAL9016 White topcoat
4	Cover	Bolted cover with handhole
5	Strain Relief	Removable supports are provided for each set of low voltage bushings in the low voltage compartment, to provide strain relief for the incoming conductors.
6	Equipment Door Grounding	The doors of the HV compartment, LV compartment, and Gage Enclosure are grounded with grounding conductors, to the compartment wall.
7	Nameplate	Conforming to ANSI C57.12.00

4 Routine Testing

In addition to robust design type tests, every Medium Voltage Transformer undergoes end-of-line production testing. Routine testing is in accordance to ANSI / IEEE C57.12.00 and C57.12.90.

These tests include:

Item	Test
1	Impulse Test
2	Resistance Measurement
3	Ratio Test
4	Polarity and Phase Relation
5	No-load losses @ 20C
6	Losses @ 85C
7	Impedance Voltage
8	Applied Voltage (hi-pot) Test
9	Induced Voltage Test
10	Continuity Test
11	Leak Test

5 Electrical Data

5.1 General Design

- The MVTs are suitable for operation with pulsed inverters.
- The MVTs are designed for voltages on the low voltage windings, that can exhibit a voltage gradient dU/dt of up to 500 V/µs to ground.
- A shield winding is included between the low voltage and high voltage windings, grounded to the tank, which serves as an additional dU/dt filter.
- The MVTs are designed to tolerate the voltages that arise during pulsed operation of the inverters. These voltages can exceed the RMS voltages, and are considered in the design of the insulation.

5.2 Datasheet of 1MVA Transformer using SC500HE-US Inverters

Item	Description	Value
1	Output Power	Nominal apparent power of 1,000 kVA
2	Overload Capacity	No
3	Primary Voltage (kV)	12.47 / 13.8 / 20.6 / 24.9 / 27.6 / 34.5
4	Primary Taps	2% ... 2.5% taps above and 2% ... 2.5% taps below nominal
5	Nominal Current, Primary (A)	46.3 / 41.9 / 28.1 / 23.2 / 21 / 16.8
6	Secondary Voltage (V)	200Y : 200Y
7	Secondary Current (A)	1,444
8	Primary BIL (kV)	95 / 95 / 125 / 125 /150 / 150
9	Secondary BIL (kV)	30
10	Vector Group	Dy1y1
11	Frequency (Hertz)	60
12	Impedance Voltage Z HV-(LV1 + LV2) (%)	5.0 ... 10.0
13	Impedance Voltage Z HV-LV1 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
14	Impedance Voltage Z HV-LV2 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
15	Impedance Voltage Z LV1-LV2 (%) Base: Half of Nominal Power (kVA)	> 9.0
16	No Load Losses (Watts, @20C)	1,100 ± 10%
17	Short Circuit Losses (Watts, @85C)	9,000 ± 10%
18	Tap Changer	No load, 5 position tap changer
19	Primary Bushings	Qty (6) deadbreak, one piece bushings, 600 A
20	Primary Configuration	Dead Front Loop Feed
21	Secondary Configuration	Live front
22	Load Break Switching	Three phase, 2-position loadbreak switch (200 A at 34.5 kV)
23	Cooling Class	KNAN

24	Dielectric Fluid	Biodegradable Fluid
25	Ambient Temperature Range	20°C ... +50°C (−40°C available upon request)
26	Temperature Rise	65 degree average winding rise
27	Duty Cycle	100% continuous operation; designed for step-up operation
28	Coil Material	Aluminum or Copper
29	Electrostatic Shield Winding	Between Pri & Sec Windings
30	Elevation	1,000 m above sea level
31	Sound Level	NEMA TR1 Standard
32	Secondary bushings	Qty (6) integral aluminum 6-hole spade bushings, plus (1) low voltage bushing for the electrostatic shield winding. 1,500 A rated each
33	Gages and Fittings	Thermometer, Dial Type, with Alarm Contacts
	(optional)	Liquid Level Gage with Alarm Contact
	(optional)	Pressure/Vaccuum Gage with Contacts
		Schrader Valve
		Pressure Relief Device, 50 SCFM
		Drain Valve with Sampler
		Nitrogen Blanket
34	Overcurrent Protection	Overload and current limiting fuses in series
35	Arresters	Not Included
36	Certifications	UL Listed
37	Coil Type	4-winding

5.3 Datasheet of 1MVA Transformer using SC500CP-10 / SC500CP-US Inverters

Item	Description	Value
1	Output Power	Nominal apparent power of 1,000 kVA
2	Overload Capacity	Nominal +10% up to 25°C Nominal +4% up to 40°C
3	Primary Voltage (kV)	12.47 / 13.8 / 20.6 / 24.9 / 27.6 / 34.5
4	Primary Taps	2% ... 2.5% taps above and 2% ... 2.5% taps below nominal
5	Nominal Current, Primary (A)	46.3 / 41.9 / 28.1 / 23.2 / 21 / 16.8
6	Secondary Voltage (V)	270Y : 270Y
7	Secondary Current (A)	1,070 (+10% up to 25°C)
8	Primary BIL (kV)	95 / 95 / 125 / 125 /150 / 150
9	Secondary BIL (kV)	30
10	Vector Group	Dy1y1
11	Frequency (Hertz)	60
12	Impedance Voltage Z HV-(LV1 + LV2) (%)	5.0 ... 10.0
13	Impedance Voltage Z HV-LV1 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
14	Impedance Voltage Z HV-LV2 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
15	Impedance Voltage Z LV1-LV2 (%) Base: Half of Nominal Power (kVA)	> 9.0
16	No Load Losses (Watts, @20C)	1,100 ± 10%
17	Short Circuit Losses (Watts, @85C)	9,000 ± 10%
18	Tap Changer	No load, 5 position tap changer
19	Primary Bushings	Qty (6) deadbreak, one piece bushings
20	Primary Configuration	Dead Front Loop Feed
21	Secondary Configuration	Live front
22	Load Break Switching	Three phase, 2-position loadbreak switch rated 200 A at 34.5 kV
23	Cooling Class	KNAN

24	Dielectric Fluid	Biodegradeable Fluid
25	Ambient Temperature Range	−20°C to +50°C (−40°C available upon request)
26	Temperature Rise	65 degree average winding rise
27	Duty Cycle	100% continuous operation; designed for step-up operation
28	Coil Material	Aluminum or Copper
29	Electrostatic Shield Winding	Between Pri & Sec Windings
30	Elevation	1,000 m above sea level
31	Sound Level	NEMA TR1 Standard
32	Secondary bushings	Qty (6) integral aluminum 6-hole spade bushings, plus (1) low voltage bushing for the electrostatic shield winding.
33	Gages and Fittings	Thermometer, Dial Type, with Alarm Contacts
	(optional)	Liquid Level Gage with Alarm Contact
	(optional)	Pressure/Vaccuum Gage with Contacts
		Schrader Valve
		Pressure Relief Device, 50 SCFM
		Drain Valve with Sampler
		Nitrogen Blanket
34	Overcurrent Protection	Overload and current limiting fuses in series
35	Arresters	Not Included
36	Certifications	UL Listed
37	Coil Type	4-winding

5.4 Datasheet of 1.26 MVA Transformer using SC630CP-10 / SC630CP-US Inverters

Item	Description	Value
1	Output Power	Nominal apparent power of 1,260 kVA
2	Overload Capacity	Nominal +10% up to 25°C Nominal +4% up to 40°C
3	Primary Voltage (kV)	12.47 / 13.8 / 20.6 / 24.9 / 27.6 / 34.5
4	Primary Taps	2% ... 2.5% taps above and 2% ... 2.5% taps below nominal
5	Nominal Current, Primary (A)	58.4 / 52.8 / 53.4 / 29.3 / 26.4 / 21.1
6	Secondary Voltage (V)	315Y : 315Y
7	Secondary Current (A)	1,155 (+10% up to 25°C)
8	Primary BIL (kV)	95 / 95 / 125 / 125 /150 / 150
9	Secondary BIL (kV)	30
10	Vector Group	Dy1y1
11	Frequency (Hertz)	60
12	Impedance Voltage Z HV-(LV1 + LV2) (%)	5.0 ... 10.0
13	Impedance Voltage Z HV-LV1 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
14	Impedance Voltage Z HV-LV2 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
15	Impedance Voltage Z LV1-LV2 (%) Base: Half of Nominal Power (kVA)	> 9.0
16	No Load Losses (Watts, @20C)	1,350 ± 10%
17	Short Circuit Losses (Watts, @85C)	11,000 ± 10%
18	Tap Changer	No load, 5 position tap changer
19	Primary Bushings	Qty (6) deadbreak, one piece bushings
20	Primary Configuration	Dead Front Loop Feed
21	Secondary Configuration	Live front

22	Load Break Switching	Three phase, 2-position loadbreak switch rated 200 A at 34.5 kV
23	Cooling Class	KNAN
24	Dielectric Fluid	Biodegradeable Fluid
25	Ambient Temperature Range	−20°C ... +50°C (−40°C available upon request)
26	Temperature Rise	65 degree average winding rise
27	Duty Cycle	100% continuous operation; designed for step-up operation
28	Coil Material	Aluminum or Copper
29	Electrostatic Shield Winding	Between Pri & Sec Windings
30	Elevation	1,000 m above sea level
31	Sound Level	NEMA TR1 Standard
32	Secondary bushings	Qty (6) integral aluminum 6-hole spade bushings, plus (1) low voltage bushing for the electrostatic shield winding.
33	Gages and Fittings	Thermometer, Dial Type, with Alarm Contacts
	(optional)	Liquid Level Gage with Alarm Contact
	(optional)	Pressure/Vaccuum Gage with Contacts
		Schrader Valve
		Pressure Relief Device, 50 SCFM
		Drain Valve with Sampler
		Nitrogen Blanket
34	Overcurrent Protection	Overload and current limiting fuses in series
35	Arresters	Not Included
36	Certifications	UL Listed
37	Coil Type	4-winding

5.5 Datasheet of 1.5 MVA Transformer using SC720CP-10 / SC720CP-US / SC760CP-10 / SC750CP-US Inverters

Item	Description	Value
1	Output Power	Nominal apparent power of 1,500 kVA
2	Overload Capacity	Nominal +10% up to 25°C Nominal +4% up to 40°C
3	Primary Voltage (kV)	12.47 / 13.8 / 20.6 / 24.9 / 27.6 / 34.5
4	Primary Taps	(4)-2.5% taps above and (2)-2.5% taps below nominal
5	Nominal Current, Primary (A)	69.5 / 62.8 / 42.1 / 34.8 / 31.4 / 25.1
6	Secondary Voltage (V)	342Y : 342Y
7	Secondary Current (A)	1,267 (+10% up to 25°C)
8	Primary BIL (kV)	95 / 95 / 125 / 125 /150 / 150
9	Secondary BIL (kV)	30
10	Vector Group	Dy1y1
11	Frequency (Hertz)	60
12	Impedance Voltage Z HV-(LV1 + LV2) (%)	5.0 ... 10.0
13	Impedance Voltage Z HV-LV1 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
14	Impedance Voltage Z HV-LV2 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
15	Impedance Voltage Z LV1-LV2 (%) Base: Half of Nominal Power (kVA)	> 9.0
16	No Load Losses (Watts, @20C)	1,600 ± 10%
17	Short Circuit Losses (Watts, @85C)	13,000 ± 10%
18	Tap Changer	No load, 5 position tap changer
19	Primary Bushings	Qty (6) deadbreak, one piece bushings
20	Primary Configuration	Dead Front Loop Feed
21	Secondary Configuration	Live front

22	Load Break Switching	Three phase, 2-position loadbreak switch rated 200 A at 34.5 kV
23	Cooling Class	KNAN
24	Dielectric Fluid	Biodegradeable Fluid
25	Ambient Temperature Range	−20°C ... +50°C (−40°C available upon request)
26	Temperature Rise	65 degree average winding rise
27	Duty Cycle	100% continuous operation; designed for step-up operation
28	Coil Material	Aluminum or Copper
29	Electrostatic Shield Winding	Between Pri & Sec Windings
30	Elevation	1,000 m above sea level
31	Sound Level	NEMA TR1 Standard
32	Secondary bushings	Qty (6) integral aluminum 6-hole spade bushings, plus (1) low voltage bushing for the electrostatic shield winding.
33	Gages and Fittings	Thermometer, Dial Type, with Alarm Contacts
	(optional)	Liquid Level Gage with Alarm Contact
	(optional)	Pressure/Vaccuum Gage with Contacts
		Schrader Valve
		Pressure Relief Device, 50 SCFM
		Drain Valve with Sampler
		Nitrogen Blanket
34	Overcurrent Protection	Overload and current limiting fuses in series
35	Arresters	Not Included
36	Certifications	UL Listed
37	Coil Type	4-winding

5.6 Datasheet of 1.6 MVA Transformer using SC800CP-10 / SC800CP-US Inverters

Item	Description	Value
1	Output Power	Nominal apparent power of 1,600 kVA
2	Overload Capacity	Nominal +10% up to 25°C Nominal +4% up to 40°C
3	Primary Voltage (kV)	12.47 / 13.8 / 20.6 / 24.9 / 27.6 / 34.5
4	Primary Taps	2% ... 2.5% taps above, 2% ... 2.5% taps below, +7.5%, +10.0% nominal
5	Nominal Current, Primary (A)	74.1 / 67 / 44.9 / 37.1 / 33.5 / 26.8
6	Secondary Voltage (V)	360Y : 360Y
7	Secondary Current (A)	1,283 (+10% up to 25°C)
8	Primary BIL (kV)	95 / 95 / 125 / 125 /150 / 150
9	Secondary BIL (kV)	30
10	Vector Group	Dy1y1
11	Frequency (Hertz)	60
12	Impedance Voltage Z HV-(LV1 + LV2) (%)	5.0 ... 10.0
13	Impedance Voltage Z HV-LV1 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
14	Impedance Voltage Z HV-LV2 (%) Base: Half of Nominal Power (kVA)	4.0 ... 6.6
15	Impedance Voltage Z LV1-LV2 (%) Base: Half of Nominal Power (kVA)	> 9.0
16	No Load Losses (Watts, @20C)	1,700 ± 10%
17	Short Circuit Losses (Watts, @85C)	14,000 ± 10%
18	Tap Changer	No load, 5 position tap changer
19	Primary Bushings	Qty (6) deadbreak, one piece bushings
20	Primary Configuration	Dead Front Loop Feed
21	Secondary Configuration	Live front
22	Load Break Switching	Three phase, 2-position loadbreak switch rated 200 A at 34.5 kV

23	Cooling Class	KNAN
24	Dielectric Fluid	Biodegradeable Fluid
25	Ambient Temperature Range	−20°C ... +50°C (−40°C available upon request)
26	Temperature Rise	65 degree average winding rise
27	Duty Cycle	100% continuous operation; designed for step-up operation
28	Coil Material	Aluminum or Copper
29	Electrostatic Shield Winding	Between Pri & Sec Windings
30	Elevation	1,000 m above sea level
31	Sound Level	NEMA TR1 Standard
32	Secondary bushings	Qty (6) integral aluminum 6-hole spade bushings, plus (1) low voltage bushing for the electrostatic shield winding.
33	Gages and Fittings	Thermometer, Dial Type, with Alarm Contacts
	(optional)	Liquid Level Gage with Alarm Contact
	(optional)	Pressure/Vaccuum Gage with Contacts
		Schrader Valve
		Pressure Relief Device, 50 SCFM
		Drain Valve with Sampler
		Nitrogen Blanket
34	Overcurrent Protection	Overload and current limiting fuses in series
35	Arresters	Not Included
36	Certifications	UL Listed
37	Coil Type	4-winding

6 Contact

If you have technical problems with our products, please contact our Serviceline. We require the following information in order to provide you with the necessary assistance:

- Inverter type
- Serial number of the Sunny Central
- Type and number of modules connected
- Event number or display message of the Sunny Central
- Type of communication, if applicable
- Type of fault signaling contact connected, if applicable

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