



METAL ENCLOSED

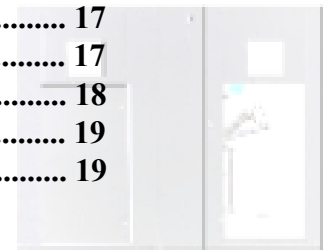
SUBSTATIONS

PP - TYPE



CONTENTS

INTRODUCTION	1
DESCRIPTION	1
APPLICATION	2
CONSTRUCTION AND TESTING STANDARDS	2
CHARACTERISTICS AND FUNCTION.....	3
MAIN ADVANTAGES	4
SPECIFICATIONS	6
CONSTRUCTION	7
ARRANGEMENTS	9
ARRANGEMENT 1	10
ARRANGEMENT 2	10
ARRANGEMENT 3	11
ARRANGEMENT 4	11
ARRANGEMENT 5	12
ARRANGEMENT 6	12
ARRANGEMENT 7	13
ARRANGEMENT 8	13
ARRANGEMENT 9	14
ARRANGEMENT 10	14
ARRANGEMENT 7s	15
ARRANGEMENT 8s	15
ARRANGEMENT 9s	16
ARRANGEMENT 10s	16
MEASURING SECTION	17
INCOMING SECTION	17
HOW TO ORDER YOUR SUBSTATION	18
MAINTENANCE / USE / OPERATING MANUAL	19
WARRANTY	19



INTRODUCTION.

For almost 40 years, **DRIESCHER Y WITTJOHANN, S.A., DRIWISA**, has supplied high voltage equipment to the market, always with the highest quality standards and at reasonable prices. Products such as Non-load and Load Break Switches, Limiting Current Fuses and resin Insulators are some of the products offered, all to be included mainly in medium voltage Substation. Following the market's demands, DRIWISA now also offers standardized Substations. Due to a simple construction, this Substation can easily be assembled under field conditions ("Plug and Play").

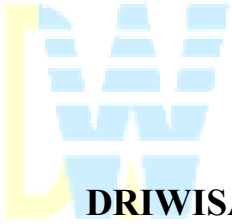
DESCRIPTION

DRIWISA's PP-type Substation can be installed indoors according to NEMA1 and NEMA12 and outdoors according to NEMA3R standards. They are made of cold-rolled steel (12" and 14" gauge) treated with electrostatic paint, and the different sections are screwed on to one another, which allows great versatility when larger configurations are required.

The following equipment will be delivered together with the cabinets:

- Non-Load Switch type DTP,
- Load Break Switch type LDTP,
- Resin Standoff Insulators for bus support type DWA
- Electrolytic copper bus bars for 400 and 630 A,
- Overload Protection with Lightning Arresters,
- Short Circuit protection with Current Limiting fuses type DRS.





DRIWISA PP-type Substation has a blockage system in order to prevent an accidental operation under unsafe conditions, thus protecting equipment and operators.

They also have a blockage system for the doors, which prevents the opening of the Substation when the system is energized.

The Non-Load Switch type DTP is furnished with a quick-make device in order to guarantee perfect closing, not depending on the strength or speed of the operator's maneuver.

APPLICATION

DRIWISA's PP-type Substation is installed in medium voltage distribution nets from 4.16 to 38 kV, to operate together with transformers and distribution panels.

Because of its construction, The PP-type Substation is built as "Dead Front", thus preventing involuntary contact to live parts from the operator.

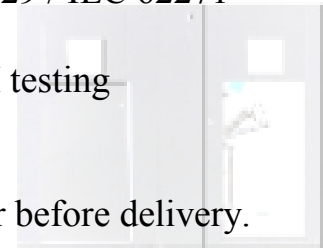
Application voltages are 13.8, 23 and 38 kV at currents of 400 or 630 Amps.

CONSTRUCTION AND TESTING STANDARDS

PP-type Substations are built according to NOM-J-68, NMX-J-323 and NMX-J-356 Mexican standards and meet International standards IEC 60694 / IEC 62271-1, IEC 60265/ IEC 62271-103, IEC 60129 / IEC 62271-102, IEC 60298 / IEC 62271-200, IEC 144, IEC 298 and ANSI C37.20.3.

All Substations have been successfully tested according to international standards at LAPEM testing laboratories.

Routine mechanical and electrical tests assure that all the equipment is in good working order before delivery.



CHARACTERISTICS AND FUNCTION

DRIWISA's PP-type Substations for indoor and outdoor service are built from 12" and 14" steel gauge plates covered with electrostatic paint. Due to its versatile design PP-type Substations can be assembled completely under field conditions, thus avoiding the following post-sale costs:

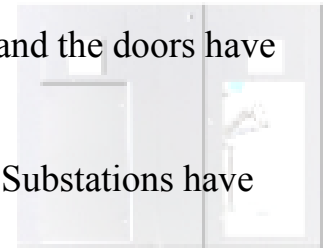
- In-shop assembly through skilled labor force.
- Reduced storage areas.
- Difficult handling of assembled Substation.
- Administrative storage control process.
- Shipping on large platforms.
- Maladjustments due to transport and handling operations.
- Loss of components.
- Post-sale services derived from maladjustments.
- Skilled labor force for installation.
- Maladjustments due to incorrect operations.

Paint : All structural parts, covers and doors are painted with electrostatic paint (epoxy powder) in grey color (ANSI 61), both on the inside and the outside, thus providing ideal protection against corrosion.

Structure : The complete structure of the Substations are made out of cold rolled steel (12 = 2.78mm gauge) and are firmly grounded.

Doors and covers : All doors and covers are made out of cold rolled steel (14 = 2mm gauge) and the doors have a window made out of security glass, in order to protect the operator in case of malfunction. All covers have threaded inserts for easy mounting on the frames.

Due to state of the art cutting devices during manufacturing, all the components of a PP-type Substations have clean and exact edges.

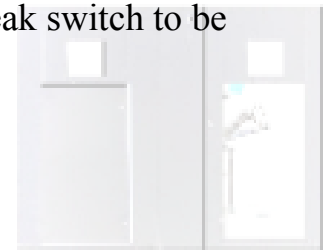




MAIN ADVANTAGES



- Tested according to international standards at LAPEM.
- Mechanical interlocks prevent access to live parts.
- Logical operation sequence that only allows access to live parts when the main switch is in opened.
- Non-load switch with quick-make mechanism in order to guarantee perfect closing even when installed upside down.
- Thanks to the location of the switches and the insulating parts, bus bars present minimum bending, thus eliminating the possibility of partial discharges and overheating.
- In arrangements with a non-load switch together with a load break switch, an interlock shutter is installed that allows opening or closing the non-load switch only when the load break switch is disconnected.
- Another mechanical interlocking device prevents the closing of the load break switch once it has been operated by the action of a fuse after short-circuit has occurred. This forces the operating personnel to remove the damaged fuse and check on the condition of the other fuses and replace them if necessary. After all 3 fuses have been re-installed, the blockage device returns to its original condition, permitting the load break switch to be closed.





CLOSED LOAD BREAK SWITCH.
THE OPERATING HANDLE FOR THE
NON-LOAD SWITCH CANNOT BE
INTRODUCED

OPEN LOAD BREAK SWITCH.
FREE ACCESS TO OPERATE THE
NON-LOAD SWITCH





SPECIFICATIONS.

DRIWISA's PP-type Substations have been successfully tested at LAPEM / CFE laboratories under the following tests:

		LABORATORIO DE PRUEBAS DE EQUIPOS Y MATERIALES LAPEM SUBDIRECCIÓN TÉCNICA <i>Vitalidad e Innovación</i>	
AREA :	DEPARTAMENTO DE DISTRIBUCIÓN OFICINA DE SISTEMAS DE DISTRIBUCIÓN.	Hoja 1 de 5	
INFORME N°: SD-E43B/2005			
SOLICITANTE: DRIESCHER Y WITTJOHANN, S.A. FABRICANTES DE EQUIPOS DE ALTA TENSIÓN San Luis Tlatilco No. 29, Naucalpan, Estado de México. C.P. 53470.			
TITULO: Pruebas Prototipo Parciales a Subestación compacta de media tensión de 23 kV y 630A.			
RESUMEN:			
MUESTRA PROBADA: SUBESTACIÓN COMPACTA DE MEDIA TENSIÓN, SERVICIO INTERIOR, TENSIÓN DE 23 kV, CORRIENTE NOMINAL 630 A, 60 Hz, NBI 125 kV, MARCA DRIESCHER Y WITTJOHANN, SOLICITANTE DRIESCHER Y WITTJOHANN, S.A. FABRICADA EN MÉXICO.			
PRUEBAS REALIZADAS: a) PRUEBA DE ELEVACION DE TEMPERATURA.			
NORMAS APLICADAS: ANSI C37.20.3-2001, "IEEE Standard for Metal-Enclosed Interrupter Switchgear".			
RESULTADO: Satisfactorio			
Nota: - Los resultados expresados en este informe aplican solamente a la muestra probada. Documento confidencial.			
FECHA 15 / 03 / 2005	EXPEDIENTE E-43 TP-28J	ING. JORGE GUZMÁN LÓPEZ JEFE DE OFICINA DE SISTEMAS DE DISTRIBUCIÓN	ING. ENRIQUE BAQUEIRO A. JEFE DE DEPARTAMENTO DE DISTRIBUCIÓN
01001 AV. ANIBERTO OTE. S/N. CD. INDUSTRIAL APDO. PUEBLA, P.O. BOX 3800 TEL. (462) 39400 FAX (462) 39401 PUEBLA, PTO.			
PROHIBIDA LA REPRODUCCIÓN PARCIAL SIN PREVIA AUTORIZACIÓN ESCRITA DEL LAPEM ELECTRICIDAD PARA EL PROGRESO DE MÉXICO			
DESCARTES 60 COL. ANZURES C.P. 11090 MÉXICO, D.F. TEL. (5 551 10 64 FAX (5 551 11 73			

- PEAK CURRENT TEST
- SHORT TIME CURRENT TEST
- DIELECTRIC TEST
- TEMPERATURE RISE TEST





CONSTRUCTION.

Meter section:

This section allows measuring and control equipment from the utility to be installed (current and potential transformers).

Non-load switch section:

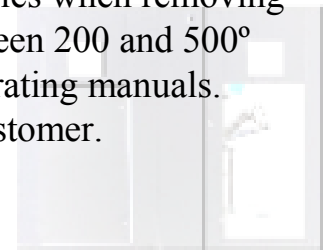
The non-load switch type DTP is installed upside-down on the upper part of the load break switch section, sharing the same connections and space in order to reduce external dimensions of the substation. The function of the non-load switch is the isolation of the load break switch from the other sections, once the load break switch type LDTP has been disconnected, thus permitting safe maintenance.

Due to the position of the non-load switch, this section can also be used as incoming line section, because of sufficient available space to connect the incoming cables.

Load break switch section:

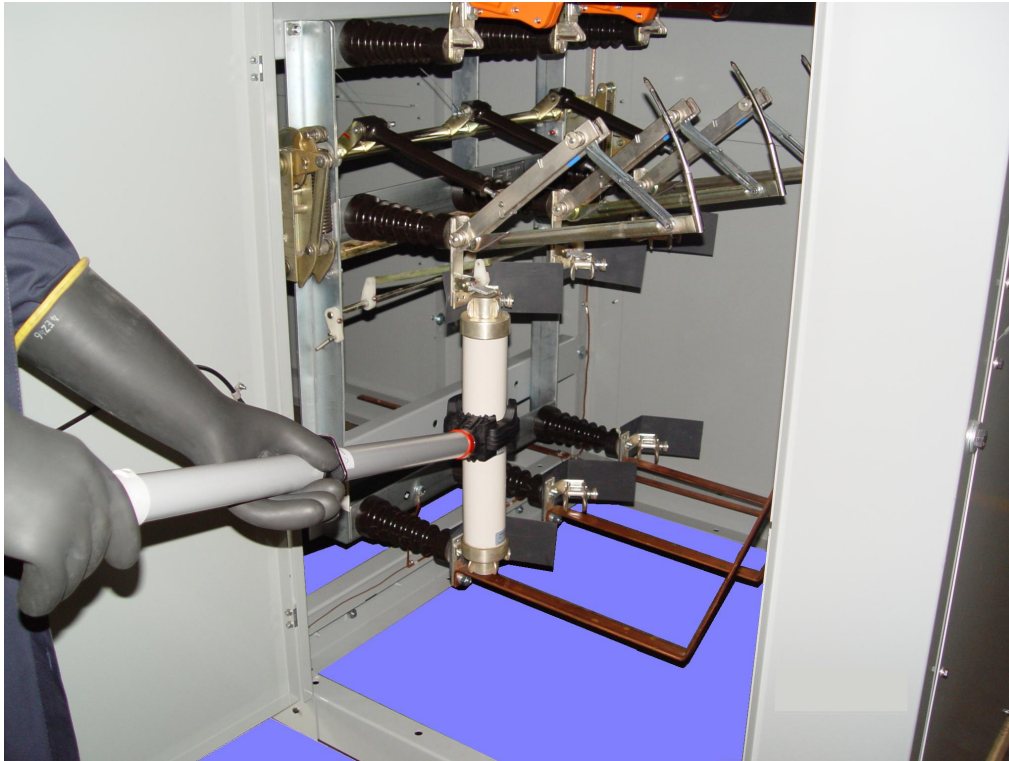
Designed to install a LDTP-type load break switch in a lateral position, with quick make and quick break mechanisms to be directly operated from the front of the Substation. No additional transmission rods or other operating mechanisms are necessary.

Current Limiting fuses are extracted laterally due to their installation. For this matter, the fixation clips show a 60° angle towards the front of the Substation. It is always recommended to use safety accessories when removing fuses (pliers) to avoid burns because of the high temperature fuses show after operation (between 200 and 500° C). Always follow the protection and safety recommendations described in the respective operating manuals. This section will usually be provided with a lightning arrester, unless told otherwise by the customer.



**Transformer connecting section:**

Because of the design of the Substation, the transformer connecting section is included in the section of the load break switch, thus avoiding an additional section. Therefore, if the customer only requires an outgoing section, the conducting bus bars will not be installed.

**Incoming section:**

This section is included in the non-load switch section. If a non-load switch is not required, cables can be directly connected to the bus bars.

Transition section:

Under the same design scheme as the transformer connecting section, this section is also included within the load break switch compartment.



AVAILABLE VERSIONS.

Due to its design, **DRIWISA's PP-type Substation** sections can be joined together by screws in order to form various arrangements according to the customer's requirements.

The basic arrangements are named with a specific number, according to the following:

NOTE :

- THE ARRANGEMENTS DO NOT INCLUDE FUSES.
- THE ARRANGEMENTS ARE NAMED LOOKING UPON THE FRONT OF THE SUBSTATION, FROM LEFT TO RIGHT.

	LOAD BREAK SWITCH							GENERAL DIM. FOR 15 & 23kV		
	METERING	NON-LOAD SW	LOAD BREAK SWITCH		TRANSFORMER CONNECTING BAR	TRANSITION BUS	INCOMING LINE	DIM. EN NEMA 1 / 12		
			W/ ARRESTERS	WO/ ARRESTERS				ALTO	FRENTE	FONDO
ARRANGEMENT 1	1	1	1					1902	2892	1242
ARRANGEMENT 2	1	1	1		1			1902	2892	1242
ARRANGEMENT 3	1	1	1	2		1		1902	5303	1242
ARRANGEMENT 4	1	2	2					1902	4553	1242
ARRANGEMENT 5	1	2	2		2			1902	4553	1242
ARRANGEMENT 6		1	1		1		1	1902	1687	1242
ARRANGEMENT 7			1		1		1	1902	1687	1242
ARRANGEMENT 7s				1	1		1	1902	1687	1242
ARRANGEMENT 8			1		1			1902	1231	1242
ARRANGEMENT 8s				1	1			1902	1231	1242
ARRANGEMENT 9			1					1902	1231	1242
ARRANGEMENT 9s				1				1902	1231	1242
ARRANGEMENT 10			1				1	1902	1687	1242
ARRANGEMENT 10s				1			1	1902	1687	1242
* THE "s" AT THE END MEANS WITHOUT ARRESTERS										
INDIVIDUAL SECTIONS										
METERING	1							1902	1206	1242
LOAD BREAK SWITCH			1					1902	1206	1242
INCOMING LINE							1	1902	456	1242



ARRANGEMENT 1

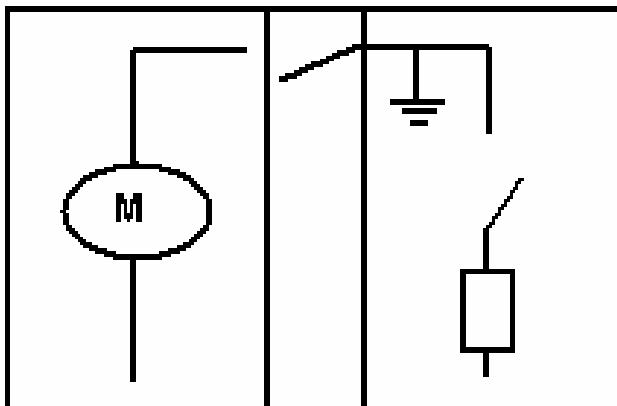
Metering section

Non-load switch section

Load Break switch section w. arresters

Lateral covers

ARRANGEMENT 1



ARRANGEMENT 2

Metering section

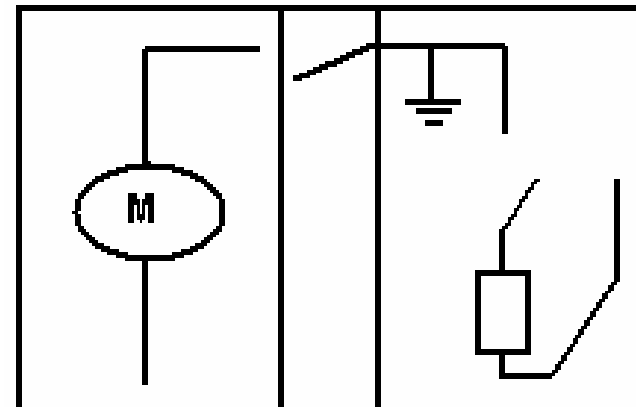
Non-load switch section

Load Break switch section w. arresters

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 2





ARRANGEMENT 3

Metering section

Non-load switch section

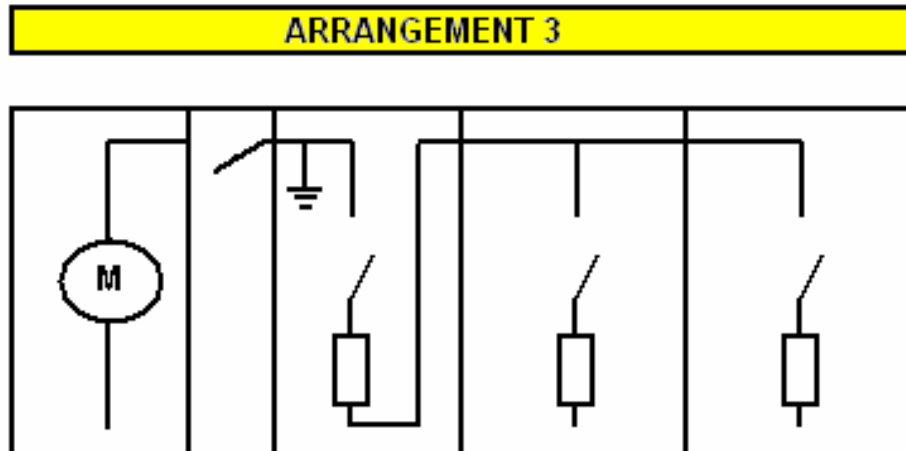
Load Break switch section w. arresters

Transition bus bar

Load Break switch (branch 1)

Load Break switch (branch 2)

Lateral covers



ARRANGEMENT 4

Load Break switch section w. arresters

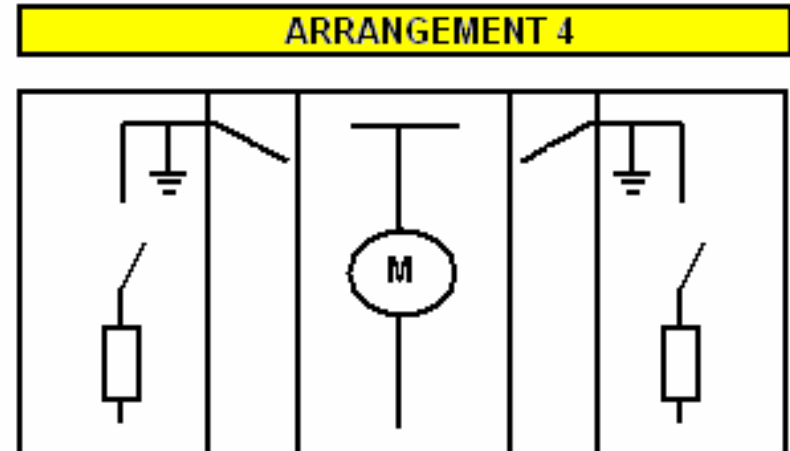
Non-load switch section

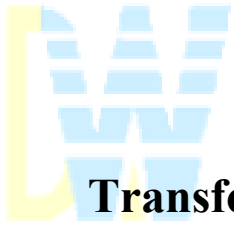
Metering section

Non-load switch section

Load Break switch section w. arresters

Lateral covers





ARRANGEMENT 5

Transformer connecting bus bar

Load Break switch section w. arresters

Non-load switch section

Metering section

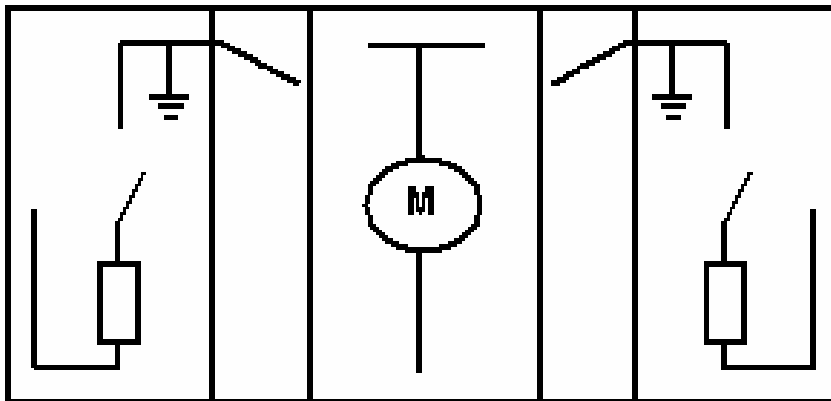
Non-load switch section

Load Break switch section w. arresters

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 5



ARRANGEMENT 6

Incoming line section

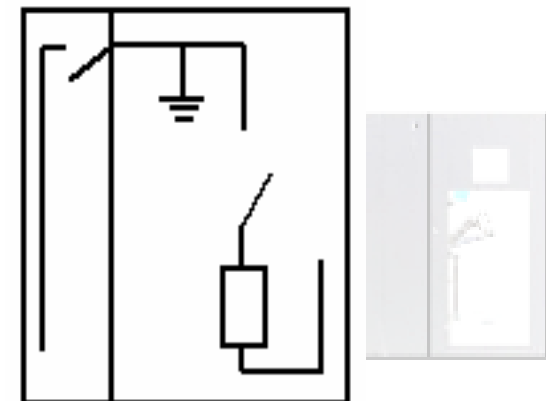
Non-load switch section

Load Break switch section w. arresters

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 6





ARRANGEMENT 7

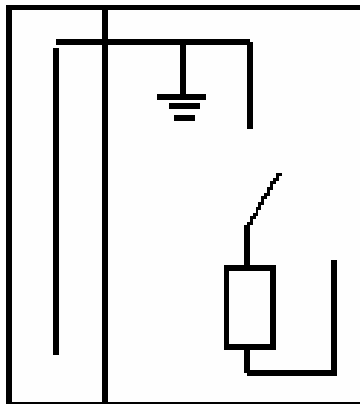
Incoming line section

Load Break switch section w. arresters

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 7



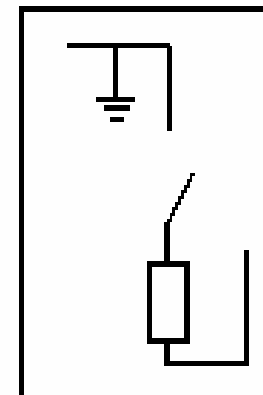
ARRANGEMENT 8

Load Break switch section w. arresters

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 8



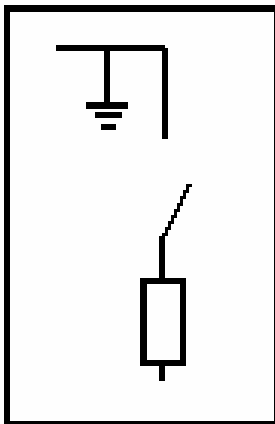


ARRANGEMENT 9

Load Break switch section w. arresters

Lateral covers

ARRANGEMENT 9



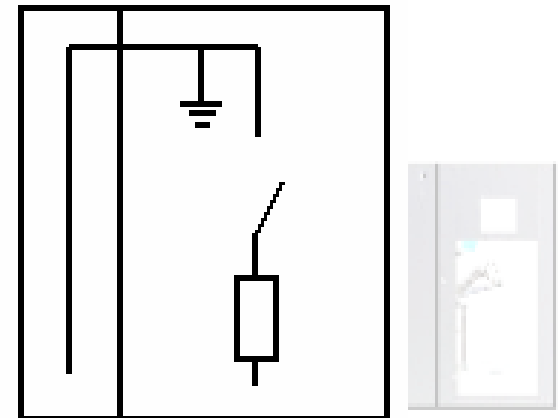
ARRANGEMENT 10

Incoming line section

Load Break switch section w. arresters

Lateral covers

ARRANGEMENT 10





ARRANGEMENT 7s

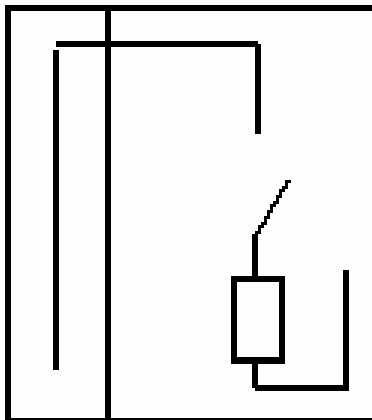
Incoming line section

Load Break switch section

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 7s



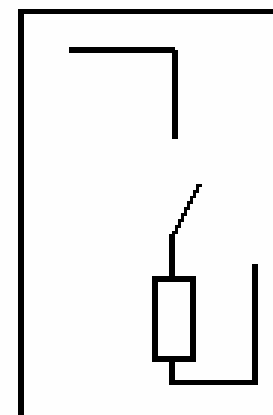
ARRANGEMENT 8s

Load Break switch section

Transformer connecting bus bar

Lateral covers

ARRANGEMENT 8s



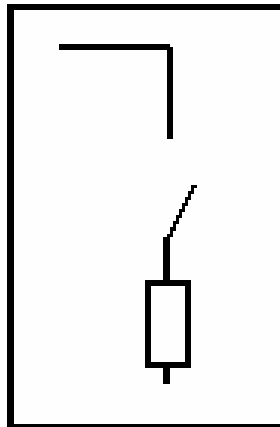


ARRANGEMENT 9s

Load Break switch section

Lateral covers

ARRANGEMENT 9s



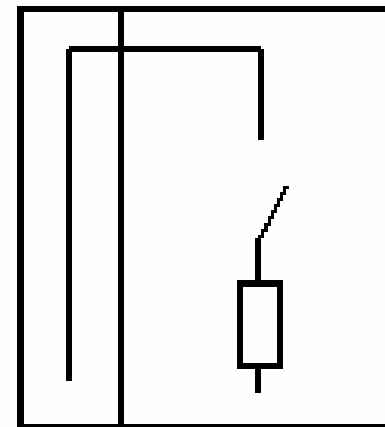
ARRANGEMENT 10s

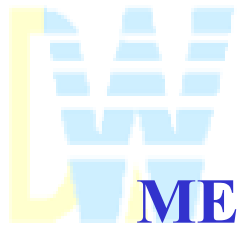
Incoming line section

Load Break switch section

Lateral covers

ARRANGEMENT 10s

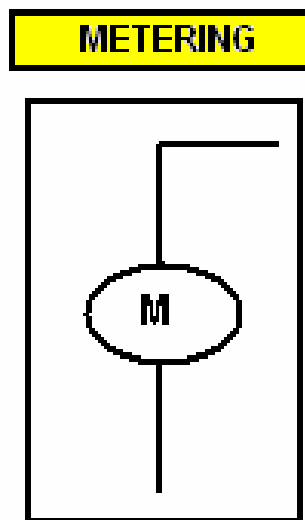




METERING SECTION

Metering section

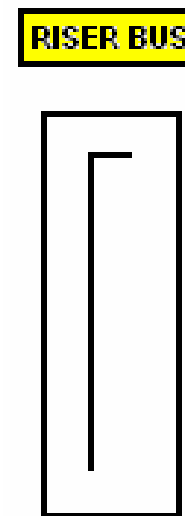
(Lateral covers and Metering equipment are not included)



INCOMING LINE SECTION

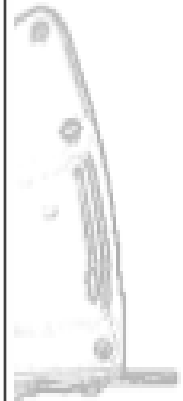
Incoming line section

(Lateral covers and bus bar are not included)





SUBSTATION CODE CONFIGURATION	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">DW</div> <div style="border: 1px solid black; padding: 2px;">PP</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">15</div> <div style="border: 1px solid black; padding: 2px;">4</div> <div style="border: 1px solid black; padding: 2px;">4</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">N1</div> <div style="border: 1px solid black; padding: 2px;">A2</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">D</div> <div style="border: 1px solid black; padding: 2px;">P</div> <div style="border: 1px solid black; padding: 2px;">T</div> </div>	
SUBSTATION TYPE	
DW	DRWISA (A SSEMBLED SUBSTATION)
KT	SUBSTATION KIT (UNASSEMBLED)
SUBSTATION MODEL	
PP	PLUG AND PLAY MODEL
TENSION NOMINAL	
15	13.8 kV
20	23 kV
30	34.5 kV
RATED CURRENT	
4	400 AMP.
6	630 AMP.
FUSE SIZE "e"	
SENCILLO (1 x phase)	
2	292 mm (only in 13.8 kV)
4	442 mm (only in 13.8 y 23 kV)
5	537 mm (only in 23 y 34.5 kV)
DUAL (2 x phase)	
7	292 mm (only in 13.8 kV)
8	442 mm (only in 13.8 y 23 kV)
9	537 mm (only in 23 y 34.5 kV)
NEMA ENCLOSURE TYPE	
H1	NEMA 1
H12	NEMA 12
H3R	NEMA 3R
ARRANGEMENT	
A1	ARRANGEMENT 1
A2	ARRANGEMENT 2
A3	ARRANGEMENT 3
A4	ARRANGEMENT 4
A5	ARRANGEMENT 5
A6	ARRANGEMENT 6
A7	ARRANGEMENT 7
A7s	ARRANGEMENT 7 WITHOUT ARRESTERS
A8	ARRANGEMENT 8
A8s	ARRANGEMENT 8 WITHOUT ARRESTERS
A9	ARRANGEMENT 9
A9s	ARRANGEMENT 9 WITHOUT ARRESTERS
A10	ARRANGEMENT 10
A10s	ARRANGEMENT 10 WITHOUT ARRESTERS
CONFIGURATION	
D	RIGHT
I	LEFT
ACCESSORIES	
P	AUXILIARY CONTACTS (FOR CONTROL AND SIGNALIZATION)
T	GROUNDING SWITCH INTEGRATED
NOTES.-	
- FUSES ARE NOT INCLUDED IN THE ARRANGEMENTS	
- ALL THE SUBSTATIONS ARE SUPPLIED ANSI 61 COLOR	
- ALL THE BUS BARS ARE ELECTROLITIC COPPER	
- ALL THE ELECTRICAL CHARACTERISTICS ARE REFERED TO 0-1000 ma.s.l.	
- THE ARRANGEMENT CONFIGURATION CODE IS BASED DESCRIBING ALWAYS THE CUBICLES FROM THE LEFT TO THE RIGHT.	





MAINTENANCE / USE / OPERATING MANUAL.

For use, operation and maintenance recommendations please turn to the instructions attached to every DRIWISA product:

Operating manual for DRIWISA switches

Operating manual for DRIWISA Substation

Assembly manual (for unassembled Substation kits)

Internal routine test report.

Recommendations for general use:

Before opening the DTP non-load switch it is mandatory to first open the LDTP load break switch.

To close the DTP non-load switch make sure and verify that the LDTP load break switch is in the open position.

Before approaching or touching any internal parts of the Substation such as the load break switch, the non-load switch, fuses, lightning arresters, insulators or conducting bars, make sure that the whole circuit is connected to ground, either by the DEP grounding switch integrated on the load break switch or independently mounted, or through a separate grounding system.

Always follow the safety and protection standards suggested by the Substation manufacturer before handling and manipulating high voltage equipment and Substation.

WARRANTY

DRIWISA PP-type Substations have a one-year-warranty against any manufacturing defect.

To validate this warranty, please have the warranty and the original invoice at hand.

