PRODUCT GROUP

INTRODUCTION

SAFETY PROCEDURES WITH HOT LINE TOOLS

The Hot Line Tools shown on this catalogue must be handled, operated and stored only by trained personnel, who must also be acquainted with the operational procedures and follow all the applicable safety standards.

The information available herein and any other information found on bulletins and instruction manuals, shall under no circumstances, replace recommended training and required experience related to the applicable safety procedures. Also, they do not describe all details and situations, nor do they describe all existing tools installation, operation and maintenance situations.

For additional information or any special request, not on this catalogue, contact Terex to assist you in the development of feasible solutions.

Terex continuously improves its products and services, therefore the information presented herein can be modified without previous notice, always having in mind the total safety of the linemen involved in the electrical system maintenance activities.

HOT LINE WORK METHODS

In order to avoid or minimize the need to shutdown electrical networks for maintenance services, developing safety and practical techniques that would allow the continuous electrical power supply, became urgent, in order to reduce the risks and minimize the costs for the electrical generation, transmission and distribution companies.

The most diversified works to be performed on the several voltage levels and on the several electrical systems, such as transmission lines, substations and distribution networks have demanded the development of appropriate tools, as well as different work methods, according to each application, based on specific works to be performed, taking into consideration the specific criteria adopted by each company.

There are three different methods to work on live electrical systems, which can be applied on the main voltage levels, as long as the team is properly trained and has all the necessary tools, personal and collective protection equipment.

First Method - HOT STICK METHOD

This was the first method to be developed. The crew performs the works using auxiliary tools attached to the end of insulating hot sticks. This method provides for works to be performed at any voltage level.

For voltages up to 69 kV, as the distance between phases is smaller, the conductors are moved over from their original position using insulating poles, snatch blocks etc.

All Hot Line Tools were developed and designed to ease the job when working on the structures, with absolute safety.

Here the crew must rigorously observe and respect the minimum phase-to-ground and phase-to-phase safety distances, according to the chart below.

Rated Voltage (kV)	Phase-to-Ground Distance		Phase-to-Phase Distance	
	m	ft	m	ft
0.05 a 1.0	Contact is not allowed		Contact is not allowed	
1.1 a 15	0.64	2.10	0.66	2.17
15.1 a 36	0.72	2.40	0.77	2.50
36.1 a 46	0.77	2.50	0.85	2.80
46.1 a 72.5	0.90	2.95	1.05	3.40
72.6 a 121	0.95	3.10	1.29	4.20
138 a 145	1.09	3.60	1.50	4.90
161 a 169	1.22	4.00	1.71	5.60
230 a 242	1.59	5.20	2.27	7.45
245 a 326	2.59	8.50	3.80	12.50
500 a 550	3.42	11.20	5.50	18.00
765 a 800	4.53	15.00	7.91	26.00

The safety distances listed above are according to the USA Standard, OSHA - Occupational Safety and Health Administration, published in 1994.

Second Method - RUBBER GLOVE METHOD

This method consists in protecting the lineman by means of insulating gloves and sleeves, working with auxiliary equipment such as platforms, scaffolds, ladders or insulated aerial devices, providing for works to be performed directly with protected hands.

The entire working zone is also protected with insulating blankets and, while performing, the minimum necessary area remains uncovered. Thus, the possibility for the lineman or the components used (conductors, tools etc) to touch two points on different potentials is eliminated, preventing short-circuits from happening.

This method shall be only used on distribution networks and substations of voltage class up to 35 kV.

Third Method - BAREHAND METHOD

This method aims at easing the maintenance process, specially when working on high voltage transmission lines, where the safety distances are larger and on 60 kV substations and above.

The barehand method is based on Faraday's Principle, which consists in putting the lineman in direct contact with the energized conductor.

In order to shield the man against the electromagnetic field effects, a conductive suit made of special material must be used. Only the face of the lineman remains uncovered.

As he approaches the energized conductor, the lineman connects the suit to the conductor in order to be on the same potential of the system's.

For guaranteed insulation when shifting from ground potential to the energized network potential, Terex offers several insulating equipment suitable for each type of work, such as: Ladders, Chairs, Scaffolds, Crane Extensions, Aerial Devices and others.

Before using the mentioned equipment, it is necessary to perform the applied voltage test, deriving the power from the energized conductor. The leakage current must be monitored by a micro ammeter - Micro-Tester (RC402-0288) installed between the bottom of the equipment and the ground point, ensuring that the insulating characteristics are preserved, according to the leakage current values established by the applicable standard.

It is also recommended to use the Hot Stick Tester (RITZ Tester), to field test equipment such as Ladders, Scaffolds, Sticks etc. This is an important test procedure to verify the insulating conditions of the equipment before work.

The Bare-Hand Method also requires minimum phase-to-phase and phase-to-ground safety distances to be strictly observed, specially in substation maintenance, where such distances are reduced.

HISTORY - TEREX

In October 2011, the Terex Corporation, manufacturer of a wide range of equipment for clients in various branches, such as construction, infrastructure, manufacturing, shipping, transportation, refining, energy, utilities, quarrying and mining, acquired the control of the company Ritz of Brazil S.A., offering a complete portfolio of aerial devices and safe solutions of tools to de-energized and energized lines that meet the distribution areas, transmission and substations.

In 1971 the Brazilian company Ritz Comércio e Indústria Ltda, which was the predecessor of Ritz do Brasil S.A., developed its own reinforced fiberglass pole for hot line maintenance. The new product was called VMR - sectional hot stick based on its previous experience in low oil volume circuit breakers. In 1972, Ritz launched a complete set of hot line tools. In 1973, there was an association with an American company, world leader in the sector for hot line tools.

In 1989, the participation of the North American partner in the company was repurchased by the Ritz family and the company became Ritz do Brasil S.A.

Hot line maintenance works were used for the first time in 1913, when wooden hot sticks were used for opening energized short-circuit protection switches. The techniques of maintenance in energized overhead lines developed according to the following

1937 - Works performed up to 34.5 kV

1948 - Insulator replacement at 287 kV

1954 - Insulator replacement at 330 kV

1957 - Insulator replacement at 500 kV

1964 - Works performed at 735 kV

All works described above were performed with wooden hot sticks. As the voltage levels were increasing over the years and with the need for continuous maintenance works, the wooden tools were getting heavier and harder to be handled. Thus, in 1950, in the United States, a research program envisioned an alternative material, which was lighter and offered high mechanical and electrical reliability. By 1959, a new product had been developed, a reinforced fiberglass pole, which at first, was used for maintenance works above 500 kV.

Terex reinforced fiberglass poles are named Ritzglas®. The products developed and manufactured by Terex are recognized worldwide for its quality and reliability.

The Ritzglas® insulating pole is an important part of the majority of Hot Line Tools manufactured by Terex. The pole is provided with a polyurethane foam core which prevents humidity and dust absorption and condensation. Its outside construction consists of highly treated fiberglass, disposed both in longitudinal and circumferential directions, also impregnated with special epoxy resin, ensuring high dielectric and mechanical strength, which are both essential features for Hot Line Tools.

The orange color adopted for the Ritzglas® poles offers high visibility enhancing the crew's safety.

The poles are submitted to several tests at Terex laboratory according to the ASTM F-711 and IEC 60855 standards and are approved for work only after complying with all standard requirements.

NOTE
Terex acceptable dimensional tolerance: ± 1.5%

MAINTENANCE AND HANDLING OF LIVE LINE TOOLS

Live line tools require specific care for their protection and also to let their availability for immediate use. Besides that, the proper care with tools result in the extension of their use and also increase safety and reliability of the users.

Live line tools should be kept dry and they should never be placed on the ground without protection. They must be kept inside a vehicle or live line truck if they are not being used. During the use, the tools must be placed on a clean and dry canvas to keep them free of dust and humidity which usually come from the ground.

Due to the particular nature of live line tools and also the variation and severe conditions which they are submitted, we suggest the following procedures of maintenance

a) visual inspection before use the tools;

b) mechanical tests applying the nominal working load for the tools. The period of the tests should be determined by the user considering how severe are the conditions which the tools will be submitted.;

c) regular electrical tests according to international standards and also by the Brazilian standard NR-10.

Severe conditions means exposition of the tools to excessive load, unbalanced load, contamination by chemical substances, impacts, wrong maintenance (non-correction of gaps, bad lubrication, non-replacement of components or replacement of components non-authorized by the manufacturer which could damage a whole set of tools, etc…), inadequate storing of tools for transportation, etc.

BASIC MAINTENANCE OF LIVE LINE TOOLS

Hot-sticks under perfect conditions of use require the following periodic care:

- **Cleaning the Hot-sticks**

Most of impurities are removed by a dry piece of cloth. In case there is grease, clean the stick with a piece of cloth soaked in isopropyl alcohol or EcoThinner without any residues. After the stick is clean and dry, use a wiping cloth to finish the cleaning process. Finally, apply RITZ-TESTER device to test electrically the stick. This procedure should be adopted to make sure all impurities were removed.

- **Hot-stick repair**

The gloss restorer set should be applied in case the hot-stick varnish presents bad condition. Before apply the gloss restorer, make sure the stick is dry. After that, use a thin sand paper to remove the residues of the old gloss restorer. The stick should be cleaned again using a clean and dry piece of cloth soaked in solvent before apply the gloss restorer.

- **Rupture repair**

In case it is identified more severe damages, a bond patching set is recommended to fill the damaged area. After its use, apply a thin sand paper to remove the surplus of the product. To proper use the bond patching set, please check our Owners guide for Hot-sticks and grip-all clampsticks.

CHARACTERISTICS OF LIVE LINE TOOLS

Live line tools are basically Ritzglas® sticks and metallic pieces made of especial aluminum-bronze alloy. Due to their particular application regulated by safety standards and work standards, these tools are manufactured under a very strict quality control which starts at the first manufacturing stage of live line tools which is the selection of raw material until the last stage which is the application of final tests before the use.

Ritzglas® Hot-sticks are electrically tested during its manufacturing process. It is applied 100kV to each foot on each stick according to the standard ASTM F-711.

The aluminum pieces are submitted to a thermal treatment under a strict temperature control to preserve their physical proprieties.

A tool is available in the market only after destructive tests are performed to guarantee its constructive and operational characteristics.

IMPORTANT
The maintenance of live line tools should be considered a critical process. Therefore, any recommendation by the manufacturer should be strictly followed

USE OF LIVE LINE TOOLS

Before use a live line tool, you must check it visually and apply the electrical test. Both procedures can be performed by the user himself. Before work, the tools should be cleaned using a dry piece of cloth and after that a silicone-soaked hot stick wiping cloth. During the cleaning process a visual inspection of metallic and insulating parts can be performed.

GLOSSARY

For a better understanding of the definitions, measurement units, symbols and abbreviations adopted herein, a summarized description of the main terminology is presented below:

DEFINITIONS

- Extra-strengh laminated aluminum
Aluminum plates used to manufacture yokes, in order to make them lighter and resistant. Such yokes are unique due to their plate construction.

- Jaws Opening Capacity
Minimum and maximum ratings adopted for the grounding clamps and hot sticks, compatible with cables and conductors sizes.

- Rated Current Capacity
Electrical conductor current capability during a determined period of time. It refers to the capacity of cables used for temporary grounding purposes and hot line jumpers.

- Work Load Capacity
Maximum work load value established for the Hot Line Tools (in daN).

The values for the referred loads are specified in this Catalog.

- Balanced Maximum Load
Characterized by the traction forces or the load weights that are uniformly distributed over the sustaining equipment.

- Unbalanced Maximum Load
Characterized by the non-uniform distribution of the forces over the sustaining equipment, thus reducing its rated capacity.

- Shear
Whenever one part is subject to two forces in convergent opposite directions and perpendicularly to the axis, so that they tend to divide it in two parts.

- Catenary
It is the curve shape that is generated by a long body (for example, a cable) when it is supported at two different points (a pole, a tower etc).

- Work Length
Distance between the tool's connection points (energized side and grounded side).

- Insulating Length
Safe length of the hot line tool. Normally this length is determined by the distance between the point in touch with the energized side of the system and the grounded part.

- Total Length
Distance between the ends of the Hot Line Tools.

- Phase-to-phase distance
Minimum distance between two phases of different potentials in a single circuit.

- Phase-to-ground distance
Minimum distance between the energized part and the de-energized part of any electrical system.

- Tracking Effect
Irreversible degradation effect caused by path formations that are initiated and developed on the surface of insulating materials, allowing the electrical current to be conducted through, even when it is dry.

- Structures
These are constructions such as: towers, wooden, iron or concrete poles for supporting the electrical cables, in order to transport electricity to long distances.

- Bending
Generated when external forces are applied to a body perpendicularly to its axis, which is supported at two points.

- Faraday's Principle
Developed by Michael Faraday (1791-1867), the Faraday's Principle says that inside a conductive closed chamber, the electrical field is null. With the goal of protecting the lineman against the effects of an electrical field when in contact with the potential, a special conductive suit (made of NOMEX® cloth and stainless steel filaments) and conductive boots must be used.

- Electrical Works
All maintenance works performed on electrical systems with the goal of preserving the continuous supply of electricity, using specific procedures and trained personnel.

- To handle
Perform/use manually the Hot Line Tools and other instruments.

- Jaws
Movable part of the grounding clamps and insulating hot sticks with the purpose of grabbing conductors or other parts. Normally these jaws are triggered by eye-screws (grounding clamps) or hot sticks. (pole-mounted clamps)

- To operate
To use hot line equipment and tools for live line work, according to the procedures and characteristics of each product.

- Low Voltage Networks (LV)
Circuits with voltage greater than 50 V and equal or lower than 1 kV, between phases or between phase and ground.

- Medium Voltage Networks (MV)
Energized structures with voltages from 1 kV up to 60 kV, that normally distribute the power delivered by transmission systems to small, medium and big end users.

- High Voltage Networks (HV)
Energized structures with voltages from 60 kV up to 345 kV, responsible for the transportation of power from the production centers to the end users.

- Extra High Voltage Networks (EHV)
Energized structures with voltages above 345 kV, also responsible for the power transportation from the production centers to the end users, normally to longer distances.

- Dielectric Strength
Corresponds to the maximum electrical field value that can be supported by an insulating tool, before conducting.

This dielectric strength varies from tool to tool, e.g.: the air, its dielectric strength is around 3.0 kV/mm. Hence, when an electrical field surpasses this value, it becomes conductive and loses its insulating characteristics.

- Rated Voltage
The maximum voltage value an insulating tool is safe to be used to.

- Traction
Application of external forces acting perpendicularly to the transverse section of a body, in opposite directions, tending to stretch it.

- Torsion
Whenever a force is applied to a normally long body end, which tends to deform it.

- Torque
Vectorial parameter defined as a fraction of the force applied to an object, which is effectively used to make the object turn around an axis or a middle point, known as pivot point. e.g. for grounding clamps the torque is applied to the tightening screws, which reference values are defined in this Catalog and shown in daN.m.

- Thermal treatment
Process by which the parts and components made of cast aluminum are subject to treatment at high temperatures, in order to increase their mechanical resistance.

- Using Tools in line
When two or more tools are used together, with the purpose of increasing insulation, when performing maintenance works. E.g. using a nylon strap hoist connected to an insulating pole and rope blocks.

MEASUREMENT UNITS

- Ampere (A)
Electrical current measurement unit that, with an electromotive force of 1-Volt, flows through a circuit of 1-Ohm of resistance.

- AWG
American Wire Gauge, North American designation used for wiring and electrical cables size.
In Brazil the metric system is adopted (mm^2).

- CA
Brazilian Identification unit for aluminum bare cable sections without steel core (equivalent to ASC).

- CAA
Brazilian identification unit adopted for bare cable sections with steel core (equivalent to ACSR).

- Kcmil ACSR (circular mil)
Unit adopted for the transverse section of wires or cables. It is the area of a circle with diameter of one-thousandth of an inch.

- daN (decaNewtons)
Unit adopted by ABNT (Brazilian Technical Standards Association) for the forces applied to Hot Line Tools. (according to ABNT, 1 daN is defined as 1 kgF or kilogram-force).

- Kilovolt (kV)
Electrical voltage unit equivalent to $1x10^3$ V.

- Volt (V)
Electrical voltage unit, potential difference or electromotive force. Correspondent to the voltage that, applied to an 1-Ohm resistance, produces a current of 1 A.

SYMBOLS / ABBREVIATIONS

- Ø (diameter)
Geometrical figure with the same average points as those of the parallel lines, used to designate the size of a round tool.

- ®
company's trade-mark of a product or process.

- ATR
Abbreviation used by Terex when referring to temporary grounding equipment.

- FLV
Abbreviation used by Terex when referring to Hot Line Tools.

- BIL (Basic Insulation Level)
It is the value (in kV) that an equipment shall support during the application of a voltage impulse, during a determined time, however with no modification to its insulating characteristics.

- Ritzglas®
Terex trademark for insulating fiberglass poles, which are essential components of all Terex Hot Line Tools and equipment.

TEREX

GROUP A

LOAD LIFTING TOOLS AND ACCESSORIES

GROUP A

LOAD LIFTING TOOLS AND ACCESSORIES

MANUAL HOISTS

Manual hoists are used in various construction and maintenance works performed on electrical systems. They have locking devices and a gradual load control, provided for use in two different positions (left or right of the load application axis).

Hoists with Nylon Straps

01 and 02-ton hoists are offered with two different handle options:

- plastic end cap for manual work using the rubber glove method
- steel butt-swivel, for work being done by the hot stick method, using an insulating hot stick.

The nylon straps can be ordered separately as replacement parts.

WARNING
These hoists shall not be used as insulating tools for live line works. For that purpose, the nylon straps shall be used with the insulating link sticks for hoists and rope blocks, according to the recommended safety distances.

Handle with plastic cap for manual operation

Handle with butt-swivel for Hot Stick operation

RC309-0323

HOISTS WITH NYLON STRAP - ONE TON

Cat. No.	Description	Approx. Weight	
		kg	lb
RC309-0323	Hoist with nylon strap and regular handle, work load up to 1 ton	6.30	13.89
RC309-0467	Hoist with nylon strap and hot stick handle, work load up to 1 ton	7.20	15.87

RC309-0468

HOISTS WITH NYLON STRAP - TWO TONS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC312-0000	Hoist with nylon strap and regular handle, work load up to 2 tons	7.80	17.20
RC309-0468	Hoist with nylon strap and hot stick handle, work load up to 2 tons	8.80	19.40

CONVERTIBLE STRAP HOISTS

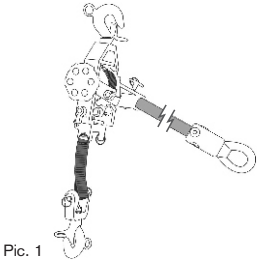
Cat. No.	Description	Approx. Weight	
		kg	lb
RC309-0451	Convertible strap hoist, handle with plastic cap	5.30	11.68

LOAD CONVERSION

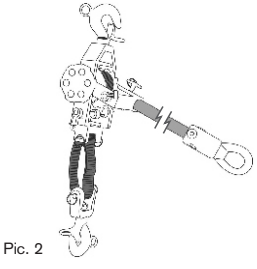
These models allow the work load conversion to be either 0.75 ton or 1.5 ton, simply by modifying the nylon straps arrangements, as follow:

For load capacity of 0.75 ton, attach the load hook sheave to the loop at the loose end of the strap (Pic. 1).

For load capacity of 1.5 ton, attach the load hook sheave to the center of the strap when folded with the strap end fixed to the hoist body (Pic. 2).



Pic. 1



Pic. 2

Distances between hooks	Rated at 0.75 ton.	Rated at 1.5 ton.
Minimum	546 mm (1.79 ft)	546 mm (1.79 ft)
Maximum	2740 mm (8.99 ft)	1370 mm (4.49 ft)

Chain Ratchet Hoists

Light weight and practical, these hoists provide for higher productivity when working in confined areas. The handle system is suitable for operations in all load positions.

In order to ease the load attachment and alignment, the hoist is provided with forged steel hooks with safety lock system and 360° operation.

For safety purposes, the chains are released for freewheel operation only under no-load condition.

These hoists have two control levers: the first one to coordinate the movement and direction. The second one to activate the safety lock system.

The control levers are easy to operate, even with the use of rubber gloves.

750E

CHAIN RATCHET HOISTS

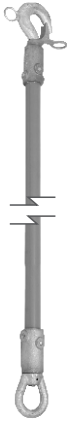
Cat. No.	Rated Work Load (ton.)	Approx. Weight	
		kg	lb
750E	0.75	7.30	16.09
1500E	1.50	11.50	25.35
3000E	3.00	17.00	37.48

3000E

HOIST LINK STICKS

The Ritzglas® link sticks for hoists and rope blocks permit converting a strap hoist or rope block into insulating equipment, hence allowing its use on energized systems.

The hoist link stick has a forged steel safety hook on one end and a butt-swivel on the other. The butt-swivel can be attached to the hoist hook or rope block to ensure insulation from the structure's grounded parts.



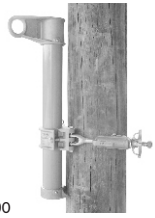
HOIST LINK STICKS

Cat. No.	Ø		Insulating Length		Rated Work Load		Approx. Weight	
	mm	in	m	ft	daN	lb	kg	lb
RC400-1175	32	1.25"	0.38	1.25	2000	4410	2.00	4.41
RC400-2399			0.46	1.51			2.05	4.52

GIN POLE FOR LOAD LIFTING

Light-weight, mechanically resistant and easy to install tools. The gin poles provide excellent gain in safety and productivity to lift equipment and material in general, in construction or maintenance works, for medium voltage overhead networks.

Composed of aluminum parts and insulating Ritzglas® pole.



RC400-0090

IMPORTANT NOTES

- Gins are not designed for applications involving side pull of the hand rope or misaligned lifting load. The pulling force direction shall always be parallel to and aligned with the gin pole.
- For work load calculation it is recommended to consider a 10% loss, due to the friction applied to the pulling ropes. E.g.: using a lifting system with a double rope block, the maximum load to be lifted will be 635 daN (1400 lb) - a snatch block must be attached to the base of the structure for the hand rope of the rope block.

  Using a simple lifting system, the maximum load will be 408 daN (900 lb) the lifted load plus the pulling force and the friction is equal to the gin capacity.

- RC400-0090

Can be mounted only on free areas of the pole, for it is not provided with a base extension.

RC400-0440

- RC400-0440

This gin has the same application as those mentioned before, however it is larger and equipped with two wheel tighteners and chain units. It is provided with a top eye casting which can be swivelled to by-pass secondary networks.

WARNING
This head was not designed to rotate under load.

RC400-0578

- RC400-0578

This gin has the advantage of being used as multiple tools when used as a lifting system for a variety of equipment and materials, as well as a mast for the auxiliary cross arm.

The attachment to the double T concrete pole is done using two steel galvanized screws with wing-nuts and the existing holes of the pole.

For the round concrete pole, the attachment is performed by conventional metal straps. Due to its length, the mast provides an additional length in the pole top part, facilitating handling of the lifted equipment.

Considering that this tool has 4 different attachment positions, the following work load capacities shall be observed:

1ST hole: .....100 daN (220 lb) - base side

2ND hole: .....150 daN (330 lb)

3RD hole: .....200 daN (440 lb)

4TH hole: .....250 daN (550 lb) - top side

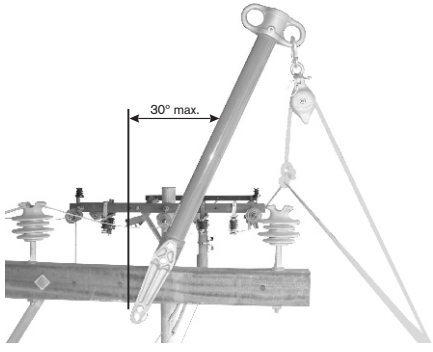
GINS FOR LOAD LIFTING

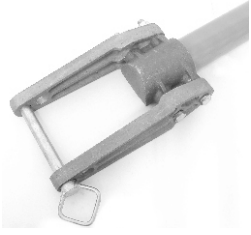
Cat. No.	Description	Rated Work Load		Ø		Length				Approx. Weight	
						Insulation		Total			
		daN	lb	mm	in	m	ft	m	ft	kg	lb
RC400-0090	With saddle for attachment to poles using 0.92 m (3.00 ft) chain	907	2000	76	3"	0.54	1.77	0.68	2.23	7.10	15.65
RC400-0440	With two 0.13 m (0.50 ft) base extensions for attachment to poles using 0.92 m (3.00 ft) chain	907	2000	76	3"	1.06	3.48	1.24	4,07	16.40	36.16
RC400-0578	Attachment to double "T" concrete poles using two bolts with wing-nuts or round concrete pole using conventional metal straps	100 to 250	250 to 550	64	2.5"	1.05	3.44	1.83	6.00	12.20	26.90

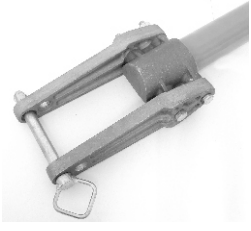
CROSSARM GIN

Provided with a clevis-type saddle to fit over distribution crossarms, allowing the use of blocks or ropes to lift the conductors from the insulators.

Saddles of RH20 can be inverted and have a removable galvanized steel pin for better adjustment on the crossarm.







CROSSARM GIN

Cat. No.	Description	Crossarm Dimensions (mm) / (ft)	Rated Work Load Max. angle 30°		Insulating Length		Approx. Weight	
			daN	lb	m	ft	kg	lb
RH20	Convertible	89 x 114 up to 121 x 146 0.29 x 0.37 up to 0.40 x 0.48	340	750	0.71	2.33	7.70	16.96

INSULATED GIN POLE / CARGO BOOM

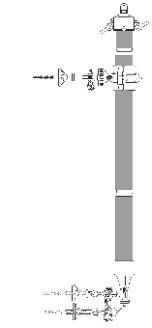
The gin pole for heavy load lifting is built with a Ritzglas® square pole and has three chain tighteners with the respective adapters for attachment to the structures.

The square head on the top of the mast has two eye-hooks to facilitate load fixing. When a pole clamp is used at the top of the pole, it is possible to use a wire tong for better stabilization.

The cargo boom has a square pole clamp (RE400-0434) installed next to the pole end. This clamp can be adjusted in three different positions for a better load lifting and retention to the structure.

The base saddle allows pivoting the cargo boom up to 90°, i.e. from horizontal to vertical position and vice-versa, as well as 180° rotation. The top head is similar to the one of the gin pole.

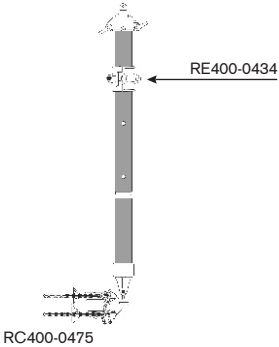
NOTE
The rated work loads do not include the pulling force.



RC400-0470

GIN POLE

Cat. No.	□ Ø (mm / in)	Insulating Length		Rated Work Load		Approx. Weight	
		m	ft	daN	lb	kg	lb
RC400-0470	100 x 100 4" x 4"	2.28	7.5	2268	5000	33.20	73.19
RC400-0472		3.50	11.5			40.40	89.07



RC400-0475

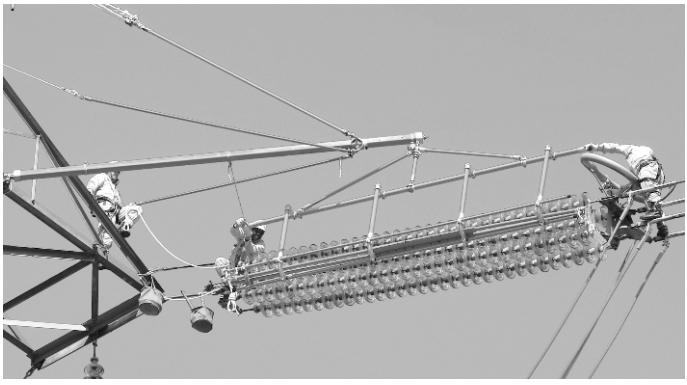
CARGO BOOM

Cat. No.	□ Ø (mm / in)	Insulating Length		Rated Work Load		Attachment	Approx. Weight	
		m	ft	daN	lb		kg	lb
RC400-0475	100 x 100 4" x 4"	5.00	15.50	454	1000	Pole	45.60	100.53
RC400-0483						Tower	45.00	99.21

REPLACEMENT PART

Cat. No.	Description	Approx. Weight	
		kg	lb
RE400-0434	Square pole clamp for cargo boom	4.00	8.82

SWIVEL BOOM WITH MAST



The swivel boom with mast was designed for heavy duty live works on high voltage structures, particularly for removal of insulator strings in conjunction with the Insulator Cradle.

Swivel booms with mast RC400-0469 and RH1973/H-10 include two saddles (R070496), for pole mounting; one at the top and the other one at the bottom. These saddles have chain tighteners with adapters.

Swivel booms with mast RC400-0464, RC400-0465, and RH1973-814 were designed for tower mounting and use two hardware models: one saddle (RC400-0602) mounted at the bottom which is attached to the tower with two sets of screws and jaws for tower bracket and an included triple fork (FLV01644-1), installed at the top for attachment of the trolley poles.

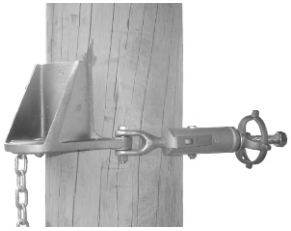
When the mast is not required, the included adapter (FLV18133-1) shall be used for attachment of the boom to the saddle (RC400-0602).

The attachment of the mast to the metallic structure is done with the use of three trolley poles (RH4721-112) and saddles for metallic structure (RM4742-3). These items must be specified separately.

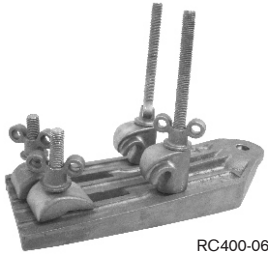
Trolley poles heads are made from heat treated aluminum alloy and butt-swivels are made from forged steel.

For all models, the connection of the boom to the mast is made through a strain link stick (RC400-0816) and a hoist (1500E), to be specified separately.

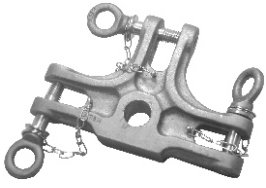
RC400-0464, RC400-0465, and RC400-0469 have a movable pole clamp on the square boom which can be adjusted in three different positions to facilitate the operation of the entire set at different angles of the insulator strings. The boom has an auxiliary head with two shackles on its end which it could be supported from, or for support of additional loads, tools etc.



R070496

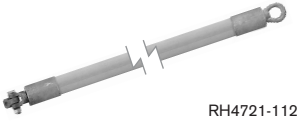


RC400-0602



FLV01644-1

FLV18133-1



RH4721-112

RC400-0464

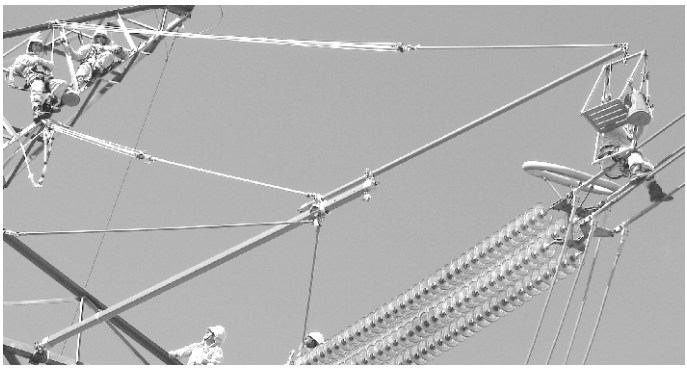
SWIVEL BOOM WITH MAST

Cat. No.	Composition of the Set									Approx. Weight	
	Ø 76 mm (3") Mast Insulating Length		□ Boom Insulating Length		Rated Work Load		RC400-0602	FLV01644-1	R07496		
	m	ft	m	ft	daN	lb				kg	lb
RC400-0464*	2.30	7.50	4.72	15.50			01	01	-	58.50	128.97
RC400-0465*	2.91	9.50	5.33	17.50	454	1000	01	01	-	63.90	140.88
RC400-0469**	2.91	9.50	5.33	17.50			-	-	02	63.90	140.88

* For tower mounting | ** For pole mounting

NOTE

The set composed of boom pole and mast pole has the working load increased only if it is assembled by a triple stick-set made by 03 Trolley poles, 01 Roller link stick and 01 hoist capable to withstand 2 tons (purchased separated).



The boom extension was designed for the lineman's access to the line potential, using the bare-hand chair (FLV12563-1).

It is provided with two Ø 76 mm (3") cooper alloy clamps (FLV00196-5) for attachment to the head and square pole clamp of the boom. Also, one head with two eye links is available, being one for attachment of the chair and the other for guying purposes, using insulating pole and rope blocks.

BOOM EXTENSION

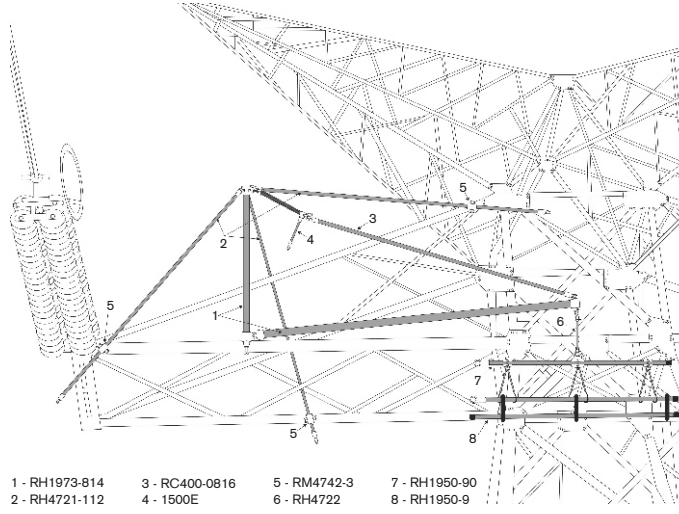
Cat. No.	Ø		Insulating Length		Rated Work Load		Approx. Weight	
	mm	in	m	ft	daN	lb	kg	lb
FLV18617-1	76	3"	4.00	13.00	140	309	16.64	36.68

FLV18617-1

SWIVEL BOOM WITH MAST

Cat. No.	Composition of the Set									Approx. Weight	
	Ø 76 mm (3") Mast Insulating Length		Ø 76 mm (3") Boom Insulating Length		Rated Work Load		RC400-0602	FLV01644-1	R07496		
	m	ft	m	ft	daN	lb				kg	lb
RH1973-814*	2.30	7.50	4.09	13.50	227	500	01	01	-	38.80	85.54
RH1973/H-10**	2.91	9.50	2.87	9.50			-	-	02	27.60	60.85

* For tower mounting | ** For pole mounting



1 - RH1973-814
2 - RH4721-112
3 - RC400-0816
4 - 1500E
5 - RM4742-3
6 - RH4722
7 - RH1950-90
8 - RH1950-9

(items from 2 to 8 to be specified separately)

NOTE
For loads greater than 272 daN (600 lb), the use of the saddle for metallic structure is recommended (RM4742), with a Ø 76 mm (3") cooper alloy pole clamp (FLV00196-5) plus an identical clamp for back-up, to avoid the slipping of the trolley pole, used in the tripod for support of the mast.

ACCESSORIES FOR SWIVEL BOOM WITH MAST

Cat. No.	Description	Approx. Weight	
		kg	lb
R070496	Saddle	7.00	15.43
RC400-0602	Saddle for Tower Bracket	10.30	22.70
FLV01644-1	Triple Fork	1.95	4.30
FLV00196-5	Ø 76 mm (3") cooper alloy pole clamp	2.62	5.78
FLV18133-1	Swivel Boom adapter	1.00	2.20

ROPE

Polypropylene ropes have as their main features, high mechanical strength, reduced stretching and light weight.

These ropes, like any other ropes for works on energized systems must be kept in clean an dry places.

Even considering that the ropes have a good dielectric strength when new, they are not considered insulated for works on energized system, therefore when in contact with energized parts, it is necessary to use an insulated pole in line with the rope.

The ropes are supplied in white color, with polypropylene strands, three-leg-braided, in rolls of 220 m (720 ft).

ROPE

Cat. No.	Ø (in)	Rated Work Load		Tensile Strength		Approx. Weight	
		daN	lb	daN	lb	kg/m	lb/m
RM1895-1	1/4"	107	236	537	1184	0.02	0.04
RM1895-2	3/8"	230	507	1153	2542	0.04	0.09
RM1895-3	1/2"	402	886	2010	4430	0.07	0.15
RM1895-4	5/8"	582	1283	2910	6415	0.12	0.26
RM1895-5	3/4"	734	1618	3670	8090	0.17	0.37

This bag is used for transportation and storage of ropes used in live line works to prevent contamination. Bags are also essential for easy handling of ropes during the tasks.

Made of waterproof canvas, it is provided with metallic rings and tightening rope around the top border for proper closing.

ROPE BAG

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV16364-1	Bag for transportation and storage Ø 300 x 400 mm (0.98 x 1.31 ft) deep	1.90	4.19

ROPE INSULATING STICK

The rope insulating stick is used in line with the polypropylene rope to avoid direct contact with energized parts of electrical systems.

The Ritzglas® pole is fitted with heat treated aluminum heads and forged steel butt-swivel.

ROPE INSULATING STICK

Cat. No.	Ø		Insulating Length		Rated Work Load		Approx. Weight	
	mm	in	m	ft	daN	lb	kg	lb
FLV04803-2	25.4	1"	1.04	3.50	800	1764	0.95	2.09
FLV04803-3			1.54	5.00			1.15	2.54

ROPE BLOCKS

Housing and sheaves are made of thermoplastic material and assembled with forged hooks that have safety locks. Hooks spin freely for easy attachment and alignment of load.

When only blocks are purchased, a pair is formed by having one block with becket and one without becket.

Common Rope Blocks

Equipped with eye-hooks for application by the hot stick method.

Different lengths of rope are available upon request.

Example of a customized length:

RC400-0914/50

Two double blocks, complete, mounted with 50 m (164 ft) of Ø 1/2" polypropylene rope (RM1895-3).

NOTE
The number added behind the Catalog No. indicates the special length of the rope.

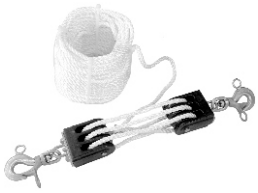
Dielectric strength: 30 kV

Light Rope Blocks

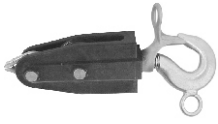
Light-weight, compact and resistant, these blocks are intended for use on electrical and telecom systems for load lifting, cable pulling, mast guying etc.
Provided with 15 m (49 ft) of polypropylene white rope, Ø 3/8" (RM1895-2).

ROPE BLOCKS

Cat. No.	Description	Rated Work Load		Approx Weight	
		daN	lb	kg	lb
RC400-0914	Two double blocks, complete, mounted with 38 m (124 ft) of rope (RM1895-3)	1588	3500	7.20	15.87
RC400-0915	Two triple blocks, complete, mounted with 45 m (147 ft) of rope (RM1895-3)	1588	3500	7.90	17.42
RC400-0916	Single block (1 reel), without becket	907	2000	0.96	2.12
RC400-0917	Single block (1 reel), with becket	907	2000	1.05	2.31
RC400-0918	Triple block (3 reels), without becket	1588	3500	2.00	4.41
RC400-0919	Double block (2 reels), without becket	1588	3500	2.00	4.41
FLV07777-1	Light double blocks, complete, mounted with 15 m (49 ft) of rope (RM1895-2)	400	880	2.10	4.63



RC400-0915



RC400-0917

RC400-0918

SNATCH BLOCKS

The snatch block is a very useful tool for lifting and handling loads when working on construction / maintenance of electrical and telecommunication systems.

The two versions of hooks available (forged steel or steel meat hook) make it easy to connect the snatch block to the system.

The housing and the sheave are made of heat treated aluminum alloy, with a hinged device, allowing the service rope introduction in a fast manner.

RC417-6067 and R2230-1 have hooks made of forged steel and safety lock.

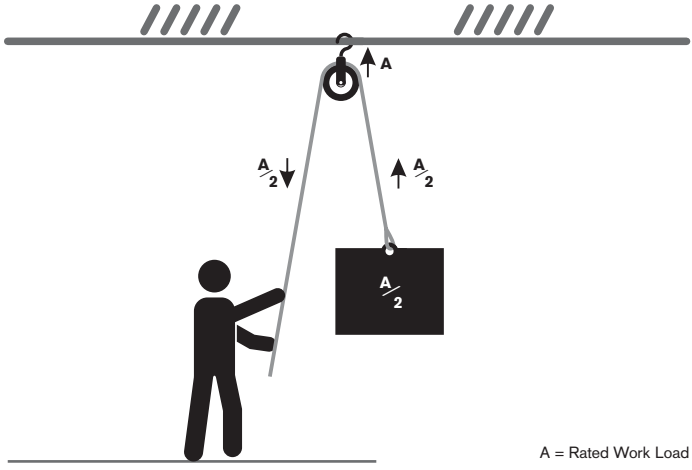
The handline hook is made of stainless steel and was designed to ease the lifting of loads or tools. It has two holes for the rope fixation and the sharp end is slightly curved to ease the introduction of tools.

FLV07777-1

NOTE
For safety reasons, the lifted equipment shall be always housed in the hook base for transportation purposes.

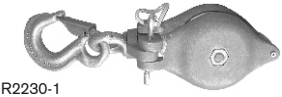
The snatch block support is built of a bracket, forged steel eye-link with continuous rotation for sustaining the snatch block, jaws made of cooper alloy, two steel screws and wing-nuts for attachment to the metallic structure.

The five existing holes of the snatch block support allow the adjustment to metallic structures of different sizes.



A = Rated Work Load

RC417-6067



R2230-1

SNATCH BLOCKS

Cat. No.	Description	Rated Work Load		Approx Weight	
		daN	lb	kg	lb
RC417-6067	For ropes up to Ø 5/8", with forged steel and safety lock	1134	2500	2.60	5.73
R2230-1	For ropes up to Ø 5/8", with forged steel and safety lock	567	1250	1.10	2.43

RM1849

RM1979

ACCESSORIES FOR SNATCH BLOCKS

Cat. No.	Description	Rated Work Load		Approx Weight	
		daN	lb	kg	lb
RM1849	Stainless steel handline hook with two holes for attachment of the rope	227	500	0.26	0.57
RM1979	Aluminum snatch block support with attachment to metallic structures with 76 x 76 mm (0.25 x 0.25 ft) brackets and total length of 475 mm (1.56 ft)	567	1250	6.00	13.23

WEBBING SLINGS

The webbing slings (non-insulating) have been designed for securing loads to the corresponding tools or pulling equipment and such equipment/tools to the working structure. For that reason, they are largely applied for load transportation and electrical / telecommunication cable stringing. The models made with no metal component are easy to handle and store, due to the flexibility.

Available in two basic types:

RC417-0133

Return Eye Style

One size only. This model has been designed primarily for use in chocker hitch, although it can also be used with hooks in vertical and basket applications.

RC417-0134

Endless Model

Available in 5 different sizes. This model is the most versatile as it can be used in vertical, choker or basket arrangement, and adapts well to any load shape. It also offers good gripping and holding power in the vertical position. Since there are no “eyes”, no wearing points are generated.

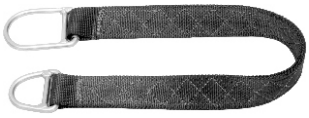
POLYESTER WEBBING SLINGS

Cat. No.	Width		Length		Rated Work Load Lifting Type										Types
					Basket		Chocker		Vertical		up to 45°		from 45° to 60°		
	mm	in	m	ft	daN	lb	daN	lb	daN	lb	daN	lb	daN	lb	
RC417-0133	60	2.35"	1.83	6.0	4000	8818	1600	3527	2000	4410	2800	6173	2000	4410	Return eye
RC417-0134	30	1.20"	0.92	3.0	2000	4410	800	1764	1000	2205	1400	3086	1000	2205	Endless
RC417-0141	60	2.35"	1.52	5.0	4000	8818	1600	3527	2000	4410	2800	6173	2000	4410	
RC417-0142	60	2.35"	1.83	6.0	4000	8818	1600	3527	2000	4410	2800	6173	2000	4410	

The slings with rings are made of 50 mm (0.16 ft) nylon straps, providing more adherence and being more malleable, causing no damages to the object to be transported.

They are supplied in three different lengths with the same maximum load in the three configurations: basket, choker and vertical.

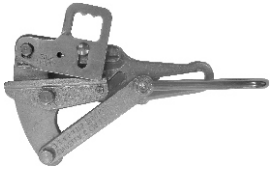
At the end there are D-shape steel buckles which provide for easy installation using insulating hot sticks.



FLV06619-2

NYLON SLINGS WITH RINGS

Cat. No.	Width		Insulating Length		Rated Work Load		Approx Weight	
	mm	in	m	ft	daN	lb	kg	lb
FLV06619-1	50	2"	0.50	1.65	670	1477	0.55	1.21
FLV06619-2			0.80	2.60			0.65	1.43
FLV06619-3			1.20	3.90			0.75	1.65



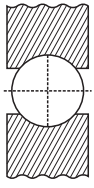
WIRE GRIPS

The wire grips are intended for conductors straining on live lines.

The movable grip on top provides its installation to the conductor by using an insulating hot stick and also, when loose, it can be used as a locking device, preventing it from falling off accidentally.

LIVE LINE WIRE GRIPS

Cat. No.	Conductor Ø				Load Capacity				Gripper		Approx. Weight	
	Minimum		Maximum		Working		Rupture					
	mm	in	mm	ft	daN	lb	daN	lb	Type	Material	kg	lb
51.E07.D20-CE	5.08	0.2"	10.16	0.4"	800	1764	2000	4409	DC	Bronze	1.48	3.26
51.E07.D30-CE	7.87	0.3"	13.50	0.5"	800	1764	2000	4409			1.90	4.19
51.E07.D40-CE	13.41	0.5"	18.80	0.7"	1700	3748	3600	7937			3.50	7.72
51.E07.D50-CE	18.80	0.7"	21.80	0.9"	1700	3748	3600	7937			3.50	7.72



DC Gripper

The double round shape gripper is suitable for aluminum and cooper cables.

TOOL BUCKETS

The molded plastic bucket is very useful for storing and lifting live line tools, providing protection and safety for the service to be performed.

Made of waterproof canvas, it is provided with reinforced bottom and rope lifting handle fixed to the bucket by metal eyeholes.

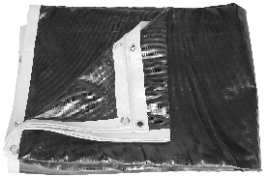
TOOL CANVAS BUCKET

Cat. No.	Ø		Deep		Approx. Weight	
	mm	in	mm	ft	kg	lb
RC417-0144	305	12"	380	1.25	0.49	1.08

TARPAULIN FOR LIVE LINE TOOLS

The tarpaulin is used to prevent the live line tools from getting contaminated and to preserve the insulating properties of the live line tools. Besides protecting the tools against contamination, it is possible to handle and inspect the equipment that will be used.

This tarpaulin is made of twofold special vinyl, impregnated in orange/black colors.



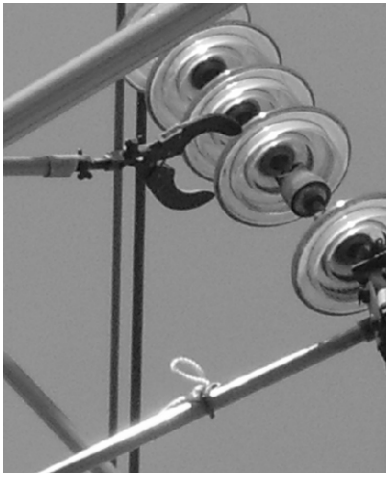
TARPAULIN FOR LIVE LINE TOOLS

Cat. No.	Dimensions		Approx. Weight	
	m	ft	kg	lb
RT306-0014	4 x 3	13 x 10	9,15	20,17

TEREX®

GROUP B

HOT STICKS AND UNIVERSAL TOOLS



GROUP B

HOT STICKS AND UNIVERSAL TOOLS

POLE HANDLING TOOLS

Ritzglas® pole tongs were designed to rotate wooden, concrete or metal round poles or other geometric cross sections (square, hexagonal etc), with the purpose of guiding poles into place during application.

Model RC305-0021 is provided nylon strap with a 48 mm (1.9") width and 1.83 m (6 ft) length with a maximum tensile strength of 3402 daN (7500 lb) and firmly grips poles of up to Ø 480 mm (19"), even smooth surface ones.

POLE HANDLING TOOLS (Ø 51 mm - 2")

Cat. No.	Description	Insulating Length		Approx. Weight	
		m	ft	kg	lb
RC305-0021	With nylon strap to move posts	1.22	4.0	2.90	6.39

RC305-0021

GRIP-ALL CLAMPSTICKS

Pic. 1

The grip-all clampstick is a very versatile tool. It has a sliding hand grip mechanism that opens the hook to grasp a clamp and retracts it into the tool head. A thumb latch must be pressed to release the locked hand grip so it can open the hook.

Intended for multiple applications, the equipment is primarily used for installing live line and grounding clamps, as well as live line protective cover-up and test instruments etc.

The use of the grip-all clampstick may be extended by fitting an adapter RM1867, or with a head attached to its bottom end (see pic. 1). Both solutions allow it to convert into a universal stick.

In order to purchase the universal head to be used with the stick, simply add the “A” - suffix to its Catalog No., e.g.:

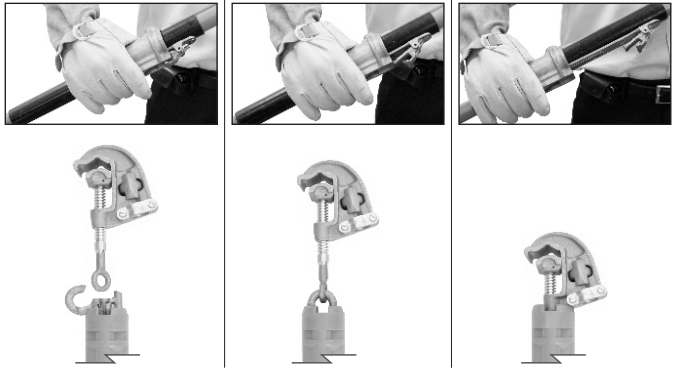
Standard model - RC403-0295

Model with universal head - RC403-0295A

The rated working capacity (traction) is: 133 daN (293 lb)
(for all models).

NOTE
Cleaning the plastic hook eye with solvent is not recommended.

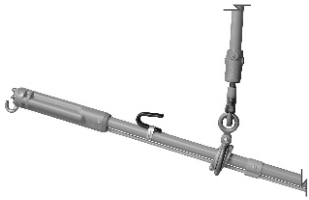
OPEN	**CLOSED**	**RETRACTED**
Position to grip the grounding clamp eye-ring or other tools.	Hook grasps the grounding clamp eye ring, keeping it firm, but free to articulate, allowing torsion movements, inclusive in angle.	The hook is retracted into the head, keeping the grounding clamp connected to the stick, in the suitable position for its installation and removal.



The pole clamp (RE403-2543P) can be used with any hot stick, particularly those which are longer, requiring additional efforts to support it, especially when used in the horizontal position.

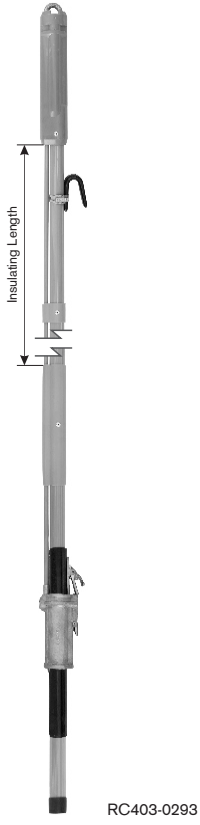
The pole clamp attachment is possible by fastening the two halves of the ring and tightening them with screws (such ring is provided with a central bed for its pole and control rod, not interfering on its operational mechanism).

In order to keep a rather than the safe insulating distance when working on energized systems, it is necessary to use a strain link stick of suitable insulating length, in line with the polypropylene rope.



RE403-2543P

STORAGE
Canvas bags for storage and transportation are supplied separately.



RC403-0293

REGULAR MODELS

Cat. No.	Dimensions						Max. Voltage (kV)	Approx. Weight	
	Ø		Total Length		Insul. Length				
	mm	ft	m	ft	m	ft		kg	lb
RC403-0291	32	1.25"	1.43	4.5	0.54	2.0	15	2.40	5.29
RC403-0292			2.04	6.5	0.74	2.5	35	2.70	5.95
RC403-0293			2.65	8.5	1.30	4.5	138	3.20	7.05
RC403-0294			3.26	10.5	1.86	6.0	230	3.60	7.94
RC403-0295			3.87	12.5	2.42	8.0	345	4.10	9.04

HINGED MODEL

Cat. No.	Dimensions								Maximum Voltage (kV)	Approx. Weight	
	Ø		Folded		Extended		Insulating Length				
	mm	in	m	ft	m	ft	m	ft		kg	lb
RC403-0296	32	1.25"	1.01	3.5	2.00	6.5	0.95	3.0	36	3.30	7.28
RC403-0297			1.32	4.5	2.59	8.5	1.37	4.5	138	3.60	7.94
RC403-0298			1.60	5.0	3.20	10.5	1.98	6.5	230	4.00	8.82
RC403-0299			1.93	6.5	3.81	12.5	2.59	8.5	345	4.40	9.70
RC403-0342			2.23	7.5	4.42	14.5	3.20	10.5	450	4.80	10.58
RC403-0343			2.54	8.5	5.03	16.5	3.81	12.5	500	5.20	11.46

RE403-2543P

RM1867

ACCESSORIES

Cat. No.	Description	Approx. Weight	
		kg	lb
RE403-2543P	Auxiliary Pole Clamp with lifting eye-ring	0.42	0.93
RM1867	Universal adapter	0.14	0.31

GRIP-ALL CLAMPSTICK EXTENSION

The extensions can easily adapt to the head of any Ritzglas® grip-all clampstick model and are intended to extend the length of the clampsticks, without compromising its performance.

GRIP-ALL CLAMPSTICK EXTENSION

Cat. No.	Ø		Total Length		Approx. Weight	
	mm	in	m	ft	kg	lb
RC403-0291	32	1.25"	1.22	4.0	2.00	4.41
RC403-0292			1.83	6.0	2.60	5.73

RC403-0377

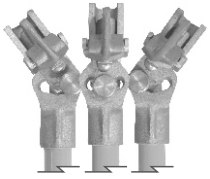
WIRE-HOLDING STICK

The wire-holding stick is used on energized systems, observing the hot stick method procedures, to hold and position conductors and jumper cables, especially during splicing operations. Also, this tool is used to disconnect/ connect cables to pin insulators.

The control lever on the stick is used for gripping the conductor into the holding jaws. By using the threaded nut, it is possible to pre-adjust the wire-holding jaws opening, according to the conductor size.

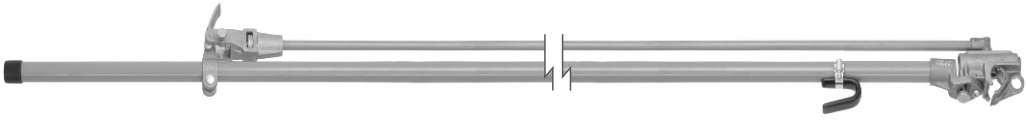
The two threaded bolts have been designed to provide the control lever locking, after gripping the conductor.

The head of the tool locks in three different positions (left, middle and right) allowing the lineman to handle the conductor from any angle. The gripper is suitable for 6 AWG (Ø 4 mm - 0.2") solid copper cables through 1590 MCM ACSR (Ø 38 mm - 1.5") aluminum cables.



WIRE-HOLDING STICK

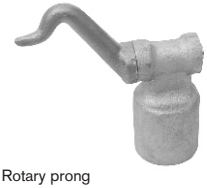
Cat. No.	Dimensions						Conductor Ø				Approx. Weight	
	Ø		Total Length		Insulating Length		Minimum		Maximum		kg	lb
	mm	in	m	ft	m	ft	mm	in	mm	in		
RC403-3068	32	1.25"	1.95	6.5	1.37	4.5	4	0.2"	38	1.5"	3.30	7.28
RC403-3069			2.56	8.5	1.98	6.5					3.70	8.16



TIE STICKS

The tie sticks are made with a variety of heads to meet specific needs or the lineman's preference.

The hook sticks (rotary or not) are quick and easy to operate for handling of wire-formed loops. The rotary blade stick is used to handle wire-formed loops, which are not provided with eyes at its ends.



Rotary prong

Rotary blade

TIE STICKS

Cat. No.	Description	Dimensions						Approx. Weight	
		Ø		Total Length		Insul. Length		kg	lb
		mm	in	m	ft	m	ft		
RH1855-19	With rotary prong and universal head	32	1.25"	2.51	8.23	2.36	8.0	2.00	4.41
RH1855-25	With rotary prong and rotary blade			2.48	8.14			1.90	4.19
RH1855-26	With rotary blade and universal head			2.51	8.23			1.90	4.19

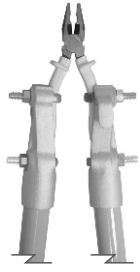
RH1855-26

INSULATED HANDLES

The insulated handles allow for use of different types of cutters when carrying out maintenance by using the hot stick method on energized systems.

They are available in two versions: with clamps or without clamps (handles only).

Insulated Handles are supplied with a head for attachment of pliers or other similar tools.



RH1861-1

INSULATED HANDLES

Cat. No.	Description	Dimensions				Approx. Weight	
		Ø		Insul. Length		kg	lb
		mm	ft	m	ft		
RH1861-1	Handles and pliers	32	1.25"	1.18	4.0	2.00	4.41

ALL-ANGLE COG WRENCH

The articulated gears mechanism of the insulated wrenches allows linemen to adjust the tool socket to suitable angles, when working on high voltage systems, by the hot stick method.

The fiberglass control rod is responsible for the gear head stabilization, keeping it aligned, even when the pole rotates.

The ½" sq. drive is attached to the gear and enables attachment of sockets to operate nuts.

The angle of the wrench must be previously adjusted within a range of up to 140° in relation to the pole, through the two wing-nuts at the head.

The wrench head is made of cooper alloy and wrenches are made of a special heat treated steel. This versatile set is attached to the Ritzglas® pole, in order to guarantee necessary insulation.

RC403-0184

WARNING

This tool has been mechanically rated only for adjustment of nuts, with max. torque of 2.0 daN.m (15 ft-lb). Tightening nuts, with proper torque, must be done with a flexible insulated wrench.

ALL-ANGLE COG WRENCH

Cat. No.	Dimensions						Approx. Weight	
	Ø		Total Length		Insulating Length		kg	lb
	mm	in	m	ft	m	ft		
RC403-0184	38	1.5"	1.83	6.0	0.80	2.5	2.40	5.29
RC403-0185			2.44	8.0	1.41	4.5	2.90	6.39
RC403-0186			3.05	10.0	1.98	6.5	3.40	7.50

FLEXIBLE INSULATED WRENCHES

Flexible Insulated wrenches accept tools for tightening nuts on HV systems hardware.

They offer linemen more ability when working at extremely acute angles.

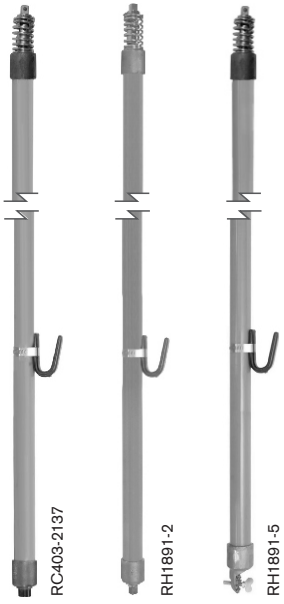
Square shank at one end of RH1891-2 and RH1891-3 provides for attachment of the Ratchet Wrench R066780, for proper tightening torque.

The universal head at one end of the insulated wrenches (RH1891-5 and RH1891-6) provides for attachment of all universal tools.

Maximum Torque: 5.5 daN.m (40 ft-lb)

Flexible Insulated Wrenches RC403-2136 and RC403-2137 are provided with a 1/2" square shank at one end and a standard square socket at the other, also suitable for the ratchet wrench (R066780) operation. That provides for a quite versatile tool, since it takes advantage of both types of connections.

Maximum Torque: 10 daN.m (75 ft-lb)



FLEXIBLE INSULATED WRENCHES

Cat. No.	Stick	Dimensions				Approx. Weight	
		Ø		Insul. Length		kg	lb
		mm	in	m	ft		
RC403-2136	Flexible shank and fixed socket	38	1.5"	2.36	7.5	2.30	5.07
RC403-2137	Flexible shank and fixed socket			1.75	5.5	2.70	5.95
RH1891-2	Flexible shank and fixed sq. shank			1.75	5.54	2.20	4.85
RH1891-3	Flexible shank and fixed sq. shank			2.36	7.5	2.60	5.73
RH1891-5	Flexible shank and universal head			1.75	5.5	2.30	5.07
RH1891-6	Flexible shank and universal head			2.36	7.5	2.70	5.95

ACCESSORIES

Hex socket sets can be supplied with 11 pieces in American standard size or 10 pieces in Metric standard size and are intended to fit square-shank wrenches to work on energized systems.

Square sockets fit a variety of tools, such as all-angle cog wrenches and flexible insulated wrenches.

Hex socket sets are supplied in cases, displayed orderly for easy selection.

All sockets are made from steel.

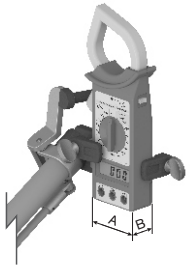
RC403-1085M

R066780

By removing the ½" square shank,this tool is converted into a socket wrench

ACCESSORIES

Cat. No.	Description	Approx. Weight	
		kg	lb
R066780	Ratchet wrench for 1/2" sq. shank and socket attachment	0.50	1.10
RC403-1085	Set with 11 long steel sockets: 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16", 1", 1-1/16", 1-1/8" (includes storage case)	2.16	4.76
RC403-1085M	Set with 10 long steel sockets: 10 mm (0.39 in), 11mm (0.43 in), 12 mm (0.47 in), 13 mm (0.51 in), 14 mm (0.55 in), 15 mm (0.59 in), 16 mm (0.63 in), 17 mm (0.67 in), 18 mm (0.71 in), 19 mm (0.75 in) (includes storage case)	2.40	5.29



VOLT-AMMETER STICK

The insulating pole of the Volt-Ammeter Stick is provided with a head at the top end that can be adjusted to accept a variety of volt-ammeters with trigger located at its left side.

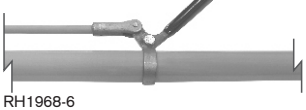
The head plastic coating offers safe accommodation to the instrument and prevents possible damages to its surfaces. When attached to the pole, the volt-ammeter is triggered using the stick lever at the gripping area of the stick, hence it can be used with total safety, ensured by the insulation of the Ritzglas® pole and rod.

Volt-Ammeters are also offered in hinged style, which is much easier to transport, performing the same jobs with same efficiency.

INSULATING VOLT-AMMETER STICKS

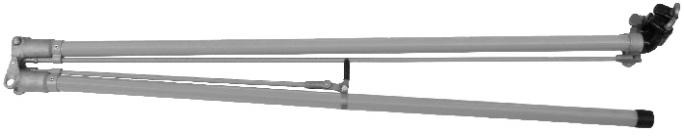
Cat. No.	Dimensions								Approx. Weight	
	Ø		Total Length		Insul. Length		Instrument			
	mm	in	m	ft	m	ft	A	B	kg	lb
							mm / in	mm / in		
RH1968-6	32	1.25"	1.90	6.0	1.80	6.0	38 to 115 1.5" to 4.5"	23 to 60 0.9" to 2.4"	2.20	4.85
RH1968-8			2.51	8.0	2.41	8.0			2.35	5.18
RH1978-6*			1.90	6.0	1.80	6.0			2.50	5.51
RH1978-8*			2.51	8.0	2.41	8.0			2.80	6.17

* hinged style



RH1968-6

RH1978-6



UNIVERSAL POLES

Ritzglas® Universal Poles are intended for use with the universal tools introduced later herein. Composed of two universal heads, which provide easy, quick and safe connection of all tools through this unique fitting, allowing linemen to have tools attached to the poles, in angles of up to 90°.

Depending on the universal tool, a universal adapter may be added (RM4455-84), to provide the necessary angle for works to be performed.

Universal poles with rubber storm skirts are intended for use under wet, i.e. emergency situations. Rubber skirts offer additional leakage distance by modifying the water path, avoiding tracking through the pole surface.

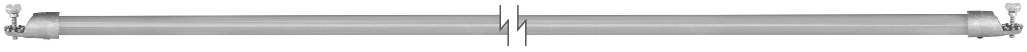
The hinge-type connection and rigid splice are used with some universal pole models, providing for easy transportation and keeping lengths suitable for the types of work to be performed.

All models are provided with Pole Hanger (RH1760-5).

Bags for conditioning and transport of all universal poles are available and should be ordered separately.

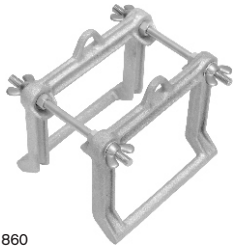
Rigid Splice

Hinge



UNIVERSAL POLES

Cat. No.	Description	Dimensions				Approx. Weight	
		ø		Insulating Length		kg	lb
		mm	in	m	ft		
RH1760	Universal pole with one spline, tie wire assist and rubber cap	32	1.25"	2.40	8.0	1.75	3.86
RH1760-1	Universal pole with one spline and rubber cap	32	1.25"	1.79	6.0	1.30	2.87
RH1760-2	Rigid splice pole, two sections with spline at top end and rubber cap at base end and tie wire assist	32	1.25"	2.29	7.5	2.10	4.63
RH1760-3	Universal pole with two splines and tire wire assist	32	1.25"	1.76	5.5	1.70	3.75
RH1760-4	Universal pole with two splines and tie wire assist	32	1.25"	2.37	8.0	2.00	4.41
RH1760-10	Pole with two splines and pole hanger	32	1.25"	2.98	10.5	2.20	4.85
RH1760-12	Pole with two splines and pole hanger	32	1.25"	3.59	12.0	2.50	5.51
RH1760-14	Pole with two splines and pole hanger	32	1.25"	4.20	14.0	2.85	6.28
RH1770	Hinged pole with one spline, pole hanger and rubber base cap	32	1.25"	2.30	7.5	2.00	4.41
RH1790-8	Universal stick with 2 splines	38	1.5"	2.36	7.5	3.00	6.61
RH1790-10	Universal stick with 2 splines	38	1.5"	2.97	9.5	3.30	7.28
RH1790-12	Universal stick with 2 splines	38	1.5"	3.58	11.5	3.70	8.16
RH1790-14	Universal stick with 2 splines	38	1.5"	4.19	13.5	4.10	9.04
RT403-0752	Sectional Universal Pole, two sections: 3 m (10 ft) top section	32	1.25"	5.93	19.5	4.75	10.47
	3 m (10 ft) bottom section	38	1.5"				
	with rigid splice, universal spline at top and rubber base cap						



RM1860

TOOL RACK AND CROSSARM TOOL HANGER

Crossarm tool hangers are very useful in providing safe support for sticks under operation.

Adjustable to crossarms from 95 through 114 mm (4.5"t) wide (depth is not important). Made of aluminum alloy with heat-treated iron bolts and aluminum alloy wing-nuts.

The tool rack for poles should be used in pairs and it is an alternative / complement to be used with our tarpaulin, preventing contamination out of possible contact with the soil.

Arms and mast are coated with plastic material to protect tools against abrasion. Rack suitable for up to 12 hot sticks of Ø 76 mm (3") max.

Tripod provides adjustment in two different positions to better fit the linemen's needs, besides being completely retractable, hence facilitating transport and storage.

RM4660

TOOL RACK AND CROSSARM TOOL HANGER

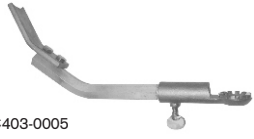
Cat. No.	Description	Approx. Weight	
		kg	lb
RM1860	Crossarm tool hanger	0.95	2.09
RM4660	Tool Rack	3.70	8.16

UNIVERSAL TOOLS

The universal tools presented in this section were rigorously selected to perform various works on energized systems, using universal insulating hot sticks.

These tools are provided with universal heads, providing perfect connection to universal hot sticks, when working by the Hot Stick Method, with absolute accuracy.

Each tool has its own characteristics and is intended to replace manual work, even when angles and working positions are not very satisfactory.



RC403-0005

- RC403-0005

Cotter Key Replacer

Tool used for pin type insulators disconnection.

Approx. weight: 0.38 kg (0.84 lb)

- RC403-0006

Cotter Key Replacer

Tool used for pin type insulator connection.

Approx. weight: 0.35 kg (0.77 lb)

RC403-0006

- RC403-0011

Knocker

Due to the impact generated by the spring, this tool eases the pin extraction, when used with pin pullers, especially when the spaces are reduced and fitting is difficult.

Approx. weight: 0.27 kg (0.60 lb)

RC403-0011

- RM4455-87

Ball Socket Adjuster

Allows to position the insulator ball during its installation or removal. Used also as an auxiliary tool during the cradle installation in “V” strings.

Approx. weight: 0.30 kg (0.66 lb)

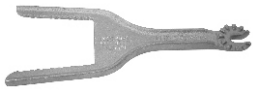
RM4455-87

- RC403-0126

Ball Socket Adjuster

Similar to the RM4455-87 ball socket adjuster, this tool is designed to handle socket adapters up to 69 mm (0.23 ft) wide.

Approx. weight: 0.32 kg (0.71 lb)



RC403-0126

- RC403-0175

Plastic Insulator tool

The plastic coating of this tool prevents damage to cold end insulators during handling.

Approx. weight: 0.35 kg (0.77 lb)

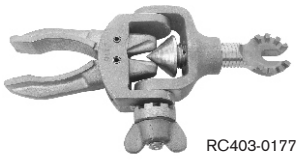
RC403-0175

- RC403-0177

All-angle Pliers

Designed to hold nuts or any other movable part during an intervention. Its wing-nut allows previously adjusting it to the desired angle.

Approx. weight: 0.88 kg (1.94 lb)



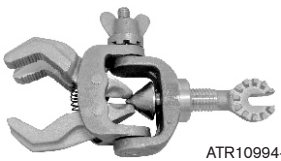
RC403-0177

- ATR10994-1

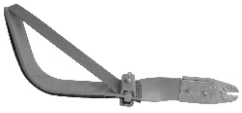
All-angle Pliers with Double Jaw

Designed for the same purpose as the RC403-0177. However, the tool has a double jaw.

Approx. weight. 1.00 kg (2.20 lb)



ATR10994-1



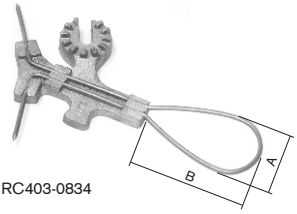
RC403-0314

- RC403-0314

Conductor Sander

Developed to clean energized conductors surface before applying clamps, especially abraded cooper conductors, where cleaning by other methods is difficult.

Approx. weight: 0.29 kg (0.64 lb)



RC403-0834

- RC403-0834
- RC403-1071

Hot Rodder Tool

Ideal for applying line ties and other formed wire products on energized lines. The loop type work end allows rotational control, which is not possible with other tools. Due to its small size, the RC403-1071 model is recommended for top ties works.

Approx. weight: 0.10 kg (0.22 lb)

HOT RODDER TOOL

Cat. No.	Ø A		Ø B	
	mm	in	mm	in
RC403-0834	17.5	0.7"	76.0	3"
RC403-1071	13.5	0.5"	44.5	1.7

RC403-1416

- RC403-1416

Tie Wire Claw

For application of tie wires, both factory formed and field-formed. Claw controls wires with grip equal to pliers, permits securely wrapping tight coils onto conductors.

Approx. weight: 0.22 kg (0.49 lb)

RC403-1417

- RC403-1417

Utility-head

This head is used in the most diversified live line interventions such as: placing and removing blocks, slings, circuit-breakers, line hooks etc.

Approx. weight: 0.24 kg (0.53 lb)

RC403-2270

- RC403-2270

Aerosol can Holder

Intended for safe application of paint and lubricant to energized equipment in hard-to-reach places or insecticide to bee and wasp nests, on poles and crossarms.

Approx. weight: 0.21 kg (0.46 lb)

- RM4455-2

Pin Holder

This tool is used for replacing pins and bolts. The bolt head fits into a slot and is held tight by spring action. It can take bolts or pins up to Ø 15 mm (0.05 ft).

Approx. weight: 0.21 kg (0.46 lb)

RM4455-2

- RM4455-5

Cut-Out Tool

This tool can be used for removing and replacing the doors of enclosed cut-outs, due to its finger-like grasp and plastic covered hooks.

Rating: max. 75 mm (0.25 ft) | max. Ø 45 mm (0.15 ft)

Approx. weight: 0.78 kg (1.72 lb)

RM4455-5

- RM4455-6

Ratchet Wrench

Used for tightening bolts and nuts on energized systems. Provided with a universal rotation screw at one end to be used with universal hot sticks.

Approx. weight: 0.69 kg (1.52 lb)

RM4455-6

- RM4455-9 - VMR01479-2

Disconnect

Used for opening and closing switches, enclosed cut-outs etc. made of aluminum (RM4455-9) or cooper alloy (VMR01479-2).

Approx. weight: 0.06 kg (1.46 lb) 0.17 kg (0.37 lb)

RM4455-9

- RM4455-10

Chuck Blank

Screw drivers, hack saws and other tools may be inserted in this device and secured by soldering.

Approx. weight: 0.12 kg (0.26 lb)

RM4455-10

- RM4455-12

Snapout Cotter key Remover

Hammer-like action makes it extremely useful in pulling out stuck cotter keys on energized systems, when the head is directed to the structure.

Approx. weight: 0.17 kg (0.37 lb)

RM4455-12

- RM4455-13

Snapout Disconnect

Imparts a hammer blow to the pulling ring of a cut-out door or disconnect switch.

Approx. weight: 0.20 kg (0.44 lb)

RM4455-13


RM4455-15

- RM4455-15

Locating Pin

Used as a drift pin in aligning bolt holes as an aid in bolt and pin insertions.

Approx. weight: 0.32 kg (0.71 lb)


RM4455-16

- RM4455-16

Folding Rule

Suited for obtaining measurements near live conductors in congested areas.

Approx. weight: 0.26 kg (0.57 lb)


RM4455-17

- RM4455-17

Fixed Prong Tie Stick Head

Used for manipulating tie wires which have looped ends. It is very useful where loose ends of tie wire must be rolled up to prevent contact with crossarm or hardware while untying.

Approx. weight: 0.18 kg (0.40 lb)


RM4455-18

- RM4455-18

Cotter Key Installing Tool

Used for replacing cotter keys in insulator fittings or in fittings which are out of reach of linemen or near energized lines.

Approx. weight: 0.12 kg (0.26 lb)


RM4455-19

- RM4455-19

Cotter Key Pusher

For ball and socket insulator coupling. Straight end of the tool enters the socket opening to force cotter key out. Curved end forces cotter key back into the position.

Approx. weight: 0.33 kg (0.73 lb)


RM4455-22

- RM4455-22

Ball Socket Adjuster

Useful in controlling the adapter between clevis clamps and ball and socket insulator pins.

Approx. weight: 0.34 kg (0.75 lb)

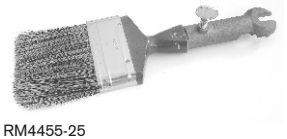

RM4455-23

- RM4455-23

Hack Saw

Excellent for use at various angles, it cuts components near energized conductors.

Approx. weight: 0.42 kg (0.93 lb)


RM4455-25

- RM4455-25

Paint Brush

Used for painting around live apparatus, it is also useful for cleaning insulator heads and painting various pieces of equipment.

Approx. weight: 0.22 kg (0.49 lb)

- RM4455-26A

Pruning Saws

Used for cutting trees that are near energized installations.

Approx. weight: 0.36 kg (0.79 lb)

RM4455-26A

- RM4455-28

Screw Driver

For installation and removal of slotted flat head screws and bolts on energized systems.

Approx. weight: 0.12 kg (0.26 lb)

RM4455-28

- RM4455-29B

152 mm (0.5 ft) Clamp Stick Head

Universal clamp stick head for installation and removal of eye-screw grounding clamps on energized or de-energized systems.

Approx. weight: 0.30 kg (0.66 lb)

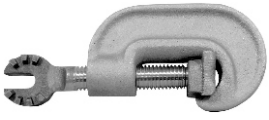
RM4455-29B

- RM4455-36

Link Stick Head

To be used with light conductors, when performing maintenance on energized systems. Opening range from 6 (0.02 ft) to 19 mm (0.06 ft). Jaws have rounded edges to avoid conductor damage.

Approx. weight: 0.36 kg (0.79 lb)



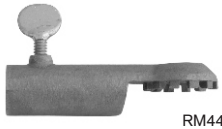
RM4455-36

- RM4455-37

Chuck Blank

Used for a variety of applications, such as inserting screw drivers, saws etc. The wing nut tightens the insulated tool.

Approx. weight: 0.14 kg (0.31 lb)



RM4455-37

- RM4455-38

Clear Vision Mirror

Used for energized systems inspection, as the angle adjustment enables the operator to inspect hard-to-see areas. The angle can be pre-adjusted.

Approx. weight: 0.37 kg (0.82 lb)

RM4455-38

- RM4455-39

Shepherd Hook

The self-aligned shepherd hook is designed for pulling and lifting insulator strings. Swivel action allows it to rotate and to keep a good alignment with the insulator.

Also used as a support when performing live line works, such as installation of strain poles and yokes.

Approx. weight: 0.30 kg (0.66 lb)

RM4455-39


RM4455-40

- RM4455-40

Fixed Blade Tie Stick Head

Used for manipulating tie wires with or without looped ends. It has a V-notched blade that is set at 60° angle from the pole when attached.

Approx. weight: 0.20 kg (0.44 lb)


RM4455-46

- RM4455-46

Flexible Wrench Head

Made to fit standard wrench sockets. The standard is 1/2".

Approx. weight: 0.42 kg (0.93 lb)


RM4455-50

- RM4455-50

Skinning Knife

For cutting and scraping insulation, cleaning conductors etc, prior to making splices near energized lines with safety.

Approx. weight: 0.11 kg (0.24 lb)


RM4455-63

- RM4455-63 - RM1889

Conductor Cleaning Brush

Steel brushes in "V" position gives good 2-sided cleaning action. Available in different models: RM4455-63 with universal fitting for hot stick operation and RM1889 with hand grip, for rubber glove operation.

Replacement brushes are also available upon request RM1899 (10 pcs).

Approx. weight: 0.17 kg (0.37 lb) 0.36 kg (0.79 lb)


RH4455-64

- RH4455-64

Storm Tool

Provided with rubber skirts, this tool is intended to assist in emergency situations.

Insulating length: 0.5 m (1.64 ft)

Approx. weight: 1.10 kg (2.43 lb)


RM4455-67

- RM4455-67 - RT403-1101

Insulator Forks

With a pre-adjusted angle and by rotating screw, jaws adjust from 76 to 108 mm (3" to 4-1/4") (RM4455-67) or from 57 to 89 mm (2-1/4" to 3-1/2") (RT403-1101).

Approx. weight: 1.06 kg (2.34 lb)

- RM4455-69

Rotary Prong Tie Stick Head

For placing insulator ties with looped ends on energized systems. Prong swivels freely, allowing a full turn on the tie wire without releasing contacts.

Approx. weight: 0.30 kg (0.66 lb)

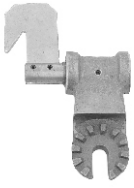
RM4455-69

- RM4455-70

Rotary Blade Tie Stick Head

“V” notched carbon steel blade grasps tie wire securely. Body design allows a swivel action. Used for manipulating tie wires with or without looped ends on energized systems.

Approx. weight: 0.26 kg (0.57 lb)



RM4455-70

- RM4455-71

Pointed Disconnect

Used for disconnect switches operation.

Approx. weight: 0.09 kg (0.20 lb)

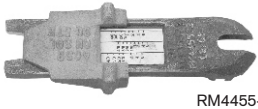
RM4455-71

- RM4455-72

Conductor Gauge

This aluminum gauge allows a quick and accurate check on the gauge of ACSR, solid or stranded copper conductors, from 4 Cu up to 4/0 ACSR.

Approx. weight: 0.08 kg (0.18 lb)



RM4455-72

- RM4455-77

Fuse Puller

Used to install, keep or pull out fuses from Ø 13 to 38 mm (0.04 to 0.12 ft) on energized lines.

The puller can be preset to any position desired and locked by tightening the wing-nut.

Approx. weight: 0.97 kg (2.14 lb)

RM4455-77

- RM4455-78

Fuse Puller

Similar to model RM4455-77. Opening range: 25 to 64 mm (0.08 to 0.21 ft).

Approx. weight: 1.0 kg (2.20 lb)

RM4455-78

- RM4455-79

Spiral Disconnect

Very useful for opening switches and removing and installing cut-out doors. Also called ‘pigtail’ disconnect.

Approx. weight: 0.18 kg (0.40 lb)

RM4455-79

RM4455-80

- RM4455-80

Tree and Hope Hook

Made of aluminum allow. Used to push tree limbs out of the way near energized lines or to clear tangled ropes.

Approx. weight: 0.15 kg (0.33 lb)

RM4455-82

- RM4455-82

All Purposes Cotter Key Tool

Used for pulling and replacing hump-type cotter keys, particularly suitable for use on clevis pins and ball socket insulators.

Provided with contoured slot and raised eye pin that guides the cotter key during its installation.

Approx. weight: 0.09 kg (0.20 lb)

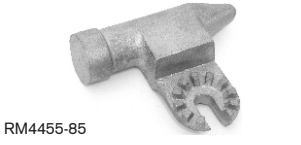
RM4455-84

- RM4455-84

Universal Adapter

When mounted on a universal pole with any universal tool mounted on the adapter, it can be set at almost any angle to the stick.

Approx. weight: 0.11 kg (0.24 lb)



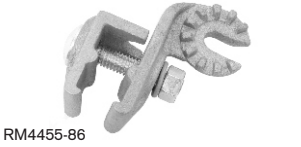
RM4455-85

- RM4455-85

Hammer

Used for many operations requiring a forceful blow to move pieces of hardware.

Approx. weight: 0.42 kg (0.93 lb)



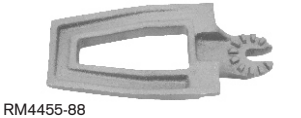
RM4455-86

- RM4455-86

Vise Grips Holder

Used for many operations, this tool allows the operator to install bolts and other hardware and move or suspend cut conductors during maintenance operations.

Approx. weight: 0.13 kg (0.29 lb)



RM4455-88

- RM4455-88

Bolt Head Wrench

Used on heads of Ø 3/4" and 5/8" bolts to keep bolt from turning as nut is tightened. It can be used with the ratchet wrench RM4455-89 and multi-angle sockets RC403-1085 and RC403-1085M.

Approx. weight: 0.42 kg (0.93 lb)

RM4455-89

- RM4455-89

Ratchet Wrench

Used for tightening square nuts on 5/8" pole line hardware, regardless of the length of the bolt running beyond it.

Approx. weight: 1.19 kg (2.62 lb)

- RM4455-92

Conductor Cleaning Brush

Ø 64 mm semi-tubular shape and swivel head with universal fitting allow linemen to clean the entire circumference of the energized conductor.

Approx. weight: 0.53 kg (1.17 lb)

RM4455-92

- RM4455-93

Conductor Cleaning Brush, without Universal Fitting

Similar to model RM4455-92 (Ø 64 mm - 2.5") for rubber glove operation.

Approx. weight: 0.18 kg (0.40 lb)

RM4455-93

- RC403-0320 - RC403-0450

Conductor Cleaning Brush with Clip

Similar to model RM4455-92 and provided with this plastic coated steel clip for better grip, still requiring the use of rubber gloves.

RC403-0320 external Ø: 64 mm (2.5") and
RC403-0450 external Ø: 76 mm (3").

Approx. weight: 0.22 kg (0.49 lb) 0.45 kg (0.99 lb)

RC403-0320

- RM4455-96

Cotter key Puller

Used to partially withdraw a ball-socket cotter key, so that the insulator can be removed from another insulator hanger.

Approx. weight: 0.28 kg (0.62 lb)

RM4455-96

- RM4455-97

Tool for “W” keys

Used for handling “W” shaped keys used in suspension insulators, which are popular in western Europe and Japan.

Approx. weight: 0.22 kg (0.49 lb)

RM4455-97

- RM4455-100

Flexible Universal Adapter

Allows rotating another tool connected in line with it, even in angles, when attached to sectional hot sticks or grip-all clamp sticks.

Approx. weight: 0.72 kg (1.59 lb)

RM4455-100

- RM4455-102

Pin Installer

Positive grip, spring loaded three-finger device allows pins to be placed in semi-recessed areas of EHV hardware and insulators.

Approx. weight: 0.40 kg (0.88 lb)

RM4455-102

- RM4455-103

Cotter Key Holder

Used to install cotter keys at different angles in insulator strings, using its multi-socket device.

Approx. weight: 0.26 kg (0.57 lb)

RM4455-103

FLV16148-1

- FLV16148-1

Universal Hook

This tool is used for handling any items of up to Ø 64 mm (2.5").

Approx. Weight: 0.34 kg (0.75 lb)

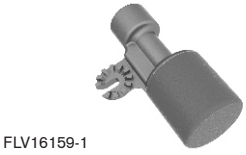
FLV16165-1

- FLV16165-1

Universal Extension Device

This tool provides an extension, in certain situations, to other universal tools, when working on hard to reach places.

Approx. Weight 0.15 kg (0.33 lb)



FLV16159-1

- FLV16159-1

Rubber Coated Hammer

For displacing equipment on electrical systems when necessary.

Approx. Weight: 0.40 kg (0.88 lb)

FLV11042-1

- FLV11042-1

Boat-hook Tool

Commonly used by firemen to break glasses, roofs etc, in order to access buildings, houses, hangars etc in the event of fire.

Approx. Weight: 0.85 kg (1.87 lb)

LEVER TYPE WIRE CUTTERS

Used for cutting aluminum ACSR, ASC and copper wires, these cutters are assembled with Ritzglas® insulating poles.

Also available a hinged-type lever cutter, six different traditional models with lever-type system and two models with the innovative system of lever combined with adjustable ratchet.

FLV02818-1 is only used for light-duty applications and must be used exclusively for tasks performed by rubber glove method.

Lever-type models are provided with a special reinforced fiberglass rod which operates the blades.

Levers are plastic-coated and their quick action offers linemen added cutting force to cut conductors sizes according to the below table.

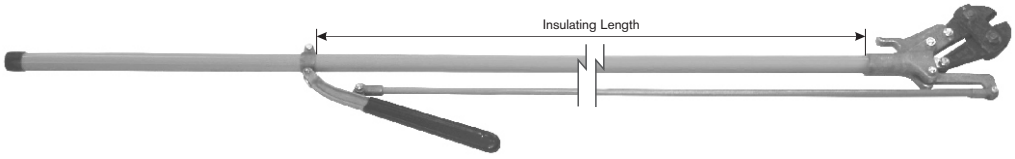
FLV02818-1

HINGED-TYPE LEVER CUTTER

Cat. No.	Maximum Conductor Size	Dimensions				Approx. Weight	
		Ø		Total Length			
		mm	in	m	ft	kg	lb
FLV02818-1	1/0 ACSR Ø 10.11 mm (0.5")	32	1.25"	0.76	2.5	2.50	5.51

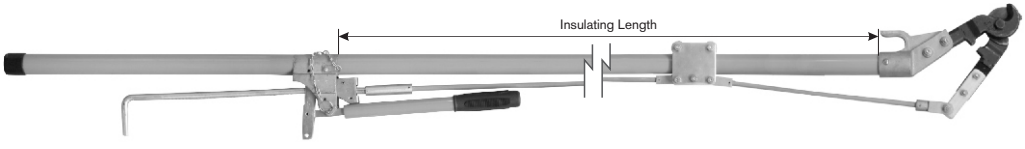
LEVER TYPE WIRE CUTTERS

Cat. No.	Maximum Conductor Size	Stick Dimensions						Approx. Weight	
		Ø		Total Length		Insul. Length			
		mm	in	m	ft	m	ft	kg	lb
RH1871-6	1/0 ACSR Ø 10.11 mm (0.4")	32	1.25"	2.00	6.5	1.16	4.0	4.00	8.82
RH1873-4	4/0 ACSR Ø 14.31 mm (0.5")	38	1.5"	1.45	4.5	0.71	2.5	5.40	11.90
RH1873-6	4/0 ACSR Ø 14.31 mm (0.5")	38	1.5"	2.00	6.5	1.16	4.0	6.00	13.23
RH1875-4	336.8 MCM ACSR Ø 18.83 mm (0.75")	38	1.5"	1.45	4.5	0.71	2.5	6.20	13.67
RH1875-6	336.8 MCM ACSR Ø 18.83 mm (0.75")	38	1.5"	2.00	6.5	1.16	4.0	6.80	15.00



RATCHET CABLE CUTTERS

Cat. No.	Maximum Conductor Size	Stick Dimensions						Approx. Weight	
		Ø		Total Length		Insul. Length			
		mm	in	m	ft	m	ft	kg	lb
RC403-1382	556 MCM ACSR Ø 23.5 mm (0.08 ft)	38	1.5"	1.97	6.5	0.79	2.5	5.20	11.46
RC403-1384	556 MCM ACSR Ø 23.5 mm (0.08 ft)	38	1.5"	2.58	8.5	1.40	4.5	5.50	12.13



These cutters construction with a plastic rotating system, allows the action mechanism to run smoothly over the Ritzglas® pole and a soft hinging movement of the fiberglass rod.

TREE TRIMMERS

Tree Trimmers are designed to cut tree branches, especially those near the electrical systems in hard-to-reach places.

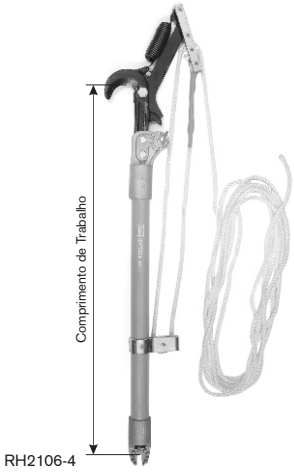
The sharpened blades are stationary and movable, made of forged steel. The rope and pulley arrangement gives the operator a mechanical advantage of 3 to 1 ratio, e.g.: a 4.5 daN (10 lb) pull on the rope will exert a 13.5 daN (30 lb) force on the cutter head lever.

Ball bearing pulleys are used for easy operation.

Tree trimmers are provided with 7.60 m (25 ft)of rope (Ø 1/4").

RH2106-4 allows connection to complementary sticks by universal heads.

A universal pruning saw can be added to the universal fitting at the side on the headmount.



TREE TRIMMERS

Cat. No.	Stick with	Dimensions				Approx. Weight	
		Ø		Work Length		kg	lb
		mm	in	m	ft		
RH2106-4	Ritzglas® tree trimmer, with universal fitting	32	1.25"	0.66	2.0	1.70	3.75

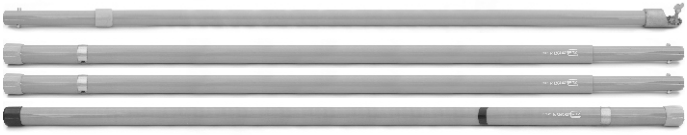
ACCESSORIES

Cat. No.	Description	Approx. Weight	
		kg	lb
RM4455-26A	Universal Pruning Saw	0.36	0.80
VMR-I	Middle section (Sectional Hot Stick type)	1.20	2.65
VMR-P	Handle section (Sectional Hot Stick type)	1.45	3.20

TROUBLE SHOOTER KIT

RC403-1612

Item	Qty.	Unit.	Cat. No.	Description
01	01	set	VMR-70	Ritzglas® Sectional Hot Stick, standard model, length: 5.20 m, composed of:
	01	pc	VMR-S	Ø 32 mm x 1.25 m (1.25" x 4.1 ft) Ritzglas® Sectional Hot Stick end element with Universal head
	02	pc	VMR-I	Ø 38 mm x 1.25 m (1.5" x 4.1 ft) Ritzglas® Sectional Hot Stick intermediary element
	01	pc	VMR-P	Ø 38 mm x 1.45 m (1.5" x 4.8 ft) Ritzglas® Sectional Hot Stick base element
02	01	pc	RH2106-4	Ritzglas® tree trimmer, with universal fitting
03	06	pc	RM4455-26A	Universal Pruning Saw
04	01	pc	RM4455-66	Pistol Grip Saw Handle for rubber glove method tasks
05	01	pc	RM4455-9	Disconnect head, for opening and closing switches
06	01	pc	RM4455-29B	152 mm (0.5 ft) Clamp Stick Head
07	01	pc	VMR21120-1	Non-metallic disconnect head
08	01	pc	FLV26103-1	Conditioning Canvas bag for kit



VMR-70

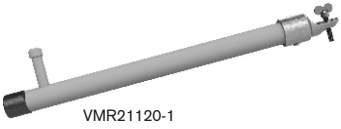
RM4455-26A

RM4455-9

RM4455-66

RM4455-29B

RH2106-4



VMR21120-1

UNIVERSAL TOOL HEAD FOR CUTTING WIRES

FLV17844-1

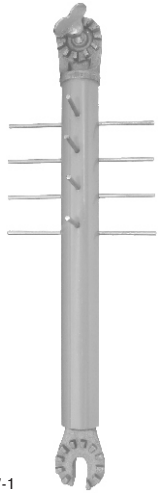
This tool is used for cutting off backdoor wires, or defaulter's service when meters are not accessible.

Head is 15 mm (0.6 ft) wide to accept up to Ø 35 mm² (0.05"²) wires and is to be used with a hot stick, with no need of ladders.

UNIVERSAL TOOL HEAD FOR CUTTING WIRES

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV17844-1	Universal Tool Head for Cutting Wires	0.30	0.66

KITE BUSTER TOOL AND ACCESSORIES



FLV13907-1

FLV09311-1

The Kite Buster is a very practical tool for removing kites and tangled wires on electrical systems, mainly on urban areas, causing serious hazards to the system, as well as polluting the view.

This tool can be attached to any hot stick, using the universal fitting.

Main body is a Ø 25 mm x 0.30 m (0.9" x 0.98 ft) Ritzglas® pole and features transversal steel pins to capture tangled wires.

Other types of heads could be attached to the top end of this tool to cut and remove objects from electrical systems.

The sharp blade head (FLV09311-1) features a cooper alloy universal fitting and sharp cutting blades. Upper side blade and downside blade for enhanced performance.

KITE BUSTER TOOL AND ACCESSORIES

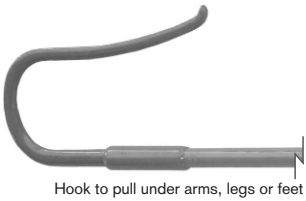
Cat. No.	Description	Approx. Weight	
		kg	lb
FLV13907-1	Kite Buster Tool	0.31	0.68
FLV09311-1	Sharp blade head	0.11	0.24

RESCUE HOOKS

Ritzglas® Rescue Hooks use the same pole used to put live line tools together. Reduced weight, high mechanical strength and excellent dielectric strength, for easy and safe operation.

Ideal for electrical accident situations on energized systems up to 34.5 kV, hooks were anatomically designed to guarantee the required safety distance and insulation, on emergency interventions requiring quick and safe action.

Ritzglas® Rescue Hooks should be used to rescue victims out of energized areas. Victims should be shifted to a safe location before performing first-aid procedures.

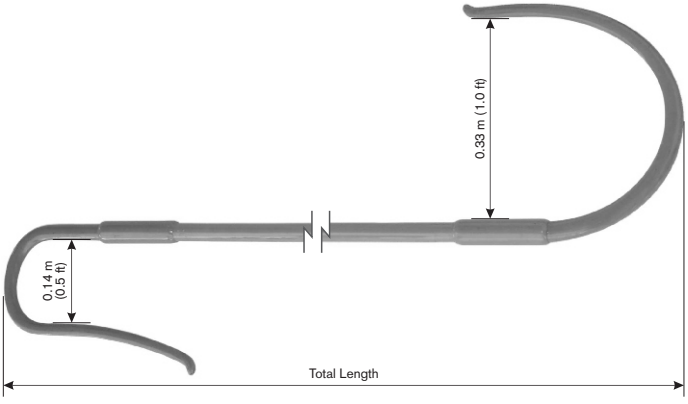


Hook to pull under arms, legs or feet

RESCUE STICK

Cat. No.	Ø		Rated Work Load		Length				Approx. Weight	
					Folded		Total			
	mm	in	daN	lb	m	ft	m	ft	kg	lb
FLV09429-1	32	1.25"	200	440	-	-	2.28	7.5	2.30	5.07
FLV18759-1					1.17	4.0	2.28	7.5	2.90	6.39

Hook to pull from the victims back



MEASURING STICK AND EXTENSION

The measuring stick is ideal for measuring lengths and spans of up to 3 m (10 ft) on energized systems, where the recommended minimum safety distances are difficult to keep.

Ritzglas® insulating rods sport 10 cm (0.35 ft) black and orange striped marks alternately and are provided with hooks and universal fittings, made of aluminum and cast cooper alloy.

Its versatile design enables performing angular measurements.

Easy to handle, both on rubber glove and hot stick operations.

When measuring lengths over 3 m (10 ft), extension FLV16146-1 should be attached to the set.

MEASURING STICK AND EXTENSION

Cat. No.	Description	Ø		Total Length		Approx. Weight	
		mm	in	m	ft	kg	lb
FLV16140-1	Measuring Stick	9.50	0.35"	3.00	10.0	0.80	1.76
FLV16146-1	Extension	16.00	0.6"	2.00	6.5	1.00	2.20

FLV16140-1

FLV16146-1

TEREX®

GROUP C

CONDUCTOR SUPPORT EQUIPMENT

GROUP C

CONDUCTOR SUPPORT EQUIPMENT

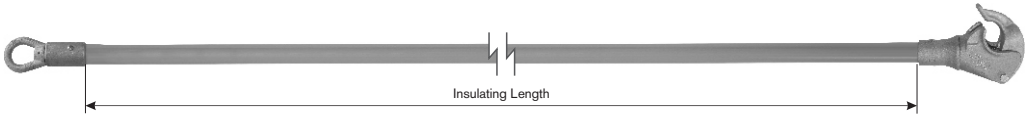
WIRE TONGS

Wire Tongs are generally used to hold and keep conductors away from their original position. They allow linemen to perform maintenance on crossarms, insulators, removal and replacement of poles and hardware, as well as the installation of new components such as: lightning arresters on overhead lines.

Wire tongs are generally used in pairs or together with other additional tools such as: saddles, pole bands, blocks, specially designed for a quick and safe work.

The wire tongs are manufactured with Ritzglas® poles. Cast aluminum alloy fittings receive thermal treating, making them lighter and resistant. Forged-steel butt-swivel rotates on bearing, for a perfect and smooth rotation.

Wire tong jaw range allows for fixing onto conductors firmly and safely, by rotating the pole till the jaw is completely closed.

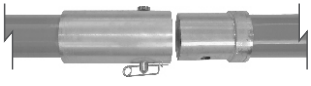


C

WIRE-TONGS

Cat. No.	Ø		Insul. Length		Conductor Ø (mm / in)		Work Load		Approx. Weight	
	mm	in	m	ft	Min.	Max.	daN	lb	kg	lb
RH4645-6	38	1.5"	1.74	5.70	4.10 0.2"	57.00 2.25"	680	1500	3.30	7.28
RH4645-8	38	1.5"	2.35	7.70			680	1500	3.80	8.38
RH4645-10	38	1.5"	2.96	9.70			680	1500	4.20	9.26
RH4646-6	51	2.0"	1.70	5.50			907	2000	4.60	10.14
RH4646-8	51	2.0"	2.33	7.60			907	2000	5.30	11.68
RH4646-10	51	2.0"	2.92	9.60			907	2000	6.00	13.23
RH4646-12	51	2.0"	3.53	11.60			907	2000	7.50	16.53
RH4647-8	64	2.5"	2.29	7.50			1134	2500	7.30	16.09
RH4647-10	64	2.5"	2.90	9.50			1134	2500	8.40	18.52
RH4647-12	64	2.5"	3.51	11.50			1134	2500	9.40	20.72
RH4647-14	64	2.5"	4.12	13.50			1134	2500	10.40	22.93
RH4647-16*	64	2.5"	4.73	15.50			1134	2500	13.90	30.64
RC400-0171	76	3.0"	3.47	11.40			1360	3000	12.70	28.00
RC400-0172	76	3.0"	4.08	13.40			1360	3000	14.90	32.85

* Spliced wire tong



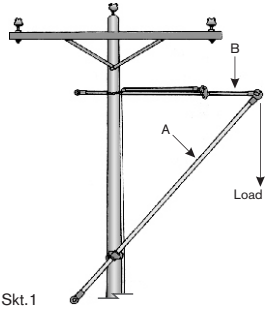
The RC400-0289 is spliced wire tongs, for easy transportation. The two sections are connected by a galvanized steel splice and fixed by a steel through pin and a click-type counter pin.

The diagrams figure correct orientations for the use of the wire-tongs, through four of the most used configurations and their respective work loads.

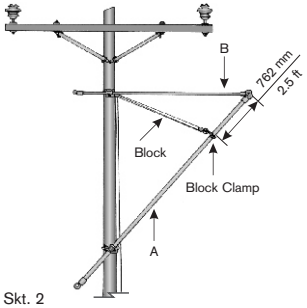
The linemen must observe rigorously the safety distances during the use of the live line poles, according to the respective recommended voltages on the table at the beginning of this catalogue.

Skt. 1 - Wire tong with saddles, wire tong band and blocks for conductors straining.

Skt. 2 - Wire tong with saddles, blocks band and blocks for conductor straining.



Skt.1



Skt. 2

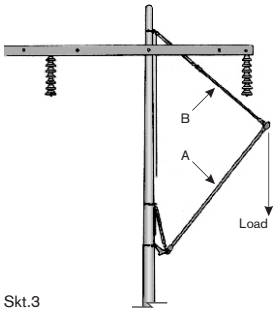
MAXIMUM WORK LOADS*

Sketch No.	RITZGLAS® Pole Dimensions Ø (mm - in) / Length (m - ft)		Support Type	Work Load (Conductor)		Maximum Wire Size and Span (m) (ft)			
						ACSR		Copper	
	A	B		daN	lb	Size	Span	Size	Span
1	51 x 3.55 2" x 11.70	38 x 2.96 1.5" x 9.70	Lever lift Saddles	125	276	4/0	213 699	4/0	91 299
	64 x 3.51 2.5" x 11.50			215	474		366 1200		152 499
2	54 x 3.55 2.1" x 11.70	38 x 2.96 1.5" x 9.70	Lever lift Saddles	125	276	4/0	213 699	4/0	91 299
	64 x 3.51 2.5" x 11.50			215	474		366 1200		152 499

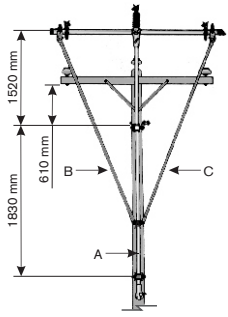
* Based on the fully horizontal wire-tong. The bottom the top saddle is placed below the conductor level, the greater the strain on Tong “A”, therefore the lesser is the load it can support.

Skt. 3 - Wire-tongs, lever lifts, strain link sticks and rope blocks used on heavy conductors.

Skt. 4 - Three phases lift set where all three wires are lifted at once.



Skt.3



Skt. 4

MAXIMUM WORK LOAD

Sketch No.	RITZGLAS® Pole Dimensions Ø (mm - in) / Length (m - ft)			Support Type	Work Load (Conductor)		Maximum Wire Size and Span (m) (ft)			
							ACSR		Copper	
	A	B	C		daN	lb	Size	Span	Size	Span
3	51 x 3.55 2" x 11.70	38 1.5"	-	Lever Lift saddles	160	353	4/0	259 850	4/0	114 374
	64 x 3.51 2.5" x 11.50				454	1000	397.5	350 1148	250	259 850
4	64 x 3.51 2.5" x 11.50	51 x 2.33 2" x 7.60	51 x 2.33 2" x 7.60	Pole saddles	102	225*	4/0	168 551	4/0	70 230

* With max. lift of 1.52 m above the saddle, max. unbalance of 102 daN / 225 lb on one side.

WARNING

WORK LOAD - for the correct selection of the tools, refer to the loading information of the structure and if such details are not available, the entire working structure must be analyzed before the load is applied.

Whenever such calculation is not possible, that is, when a pole is slightly higher than its adjacent pole, consider the weight of the adjacent spans as the maximum work load. This does not apply to installed structures in high places, requiring special analysis to determination of the work load.

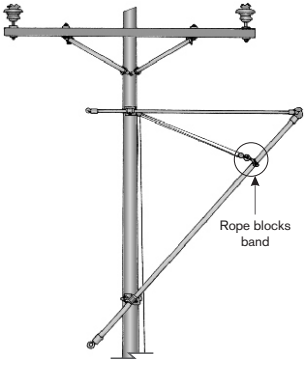
If the work load for the specified tong happens to be higher than what is indicated on the chart, two wire tongs must be used with the dual saddle lift, or a wire tong of larger diameter.

WIRE TONG BAND

The wire tong bands are attached to the wire tongs to be used as a straining point by the rope blocks, allowing therefore the articulation of the wire tongs when opening clear from their original position and returning them again to that position.

In order to ensure an effective insulation between the rope block and the energized conductors, the wire tong band must be attached to the pole at a minimum required distance, according to its voltage class or further.

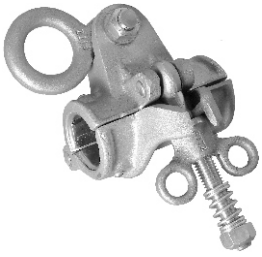
The wire tong bands are manufactured in 4 different diameters. An aluminum alloy ring in direct contact with the pole, allowing free rotation of the pole when fixed to it by 2 bolts. The lifting eye is made of cooper alloy and has an articulation to follow the straining tool in relation to the wire tong.



WIRE TONG BAND

Cat. No.	Ø		Work Load		Approx. Weight	
	mm	in	daN	lb	kg	lb
RM1729	51	2.0"	680	1500	0.61	1.34
RM1729-1	64	2.5"			0.65	1.43
RM1729-2	76	3.0"			0.70	1.54
RM1729-3	38	1.5"			0.33	0.73

WIRE TONG BLOCKS CLAMP



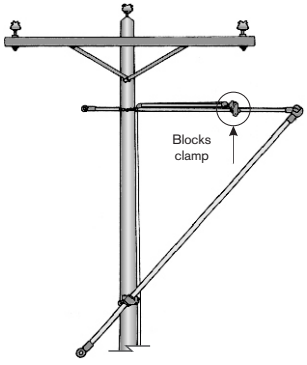
The wire tong blocks clamp is used as a fixing point for straining the wire tong using a rope block, connected to the eye-ring of the blocks clamp. Such assembly aligns the straining loads with the wire tong, helping to lift heavy conductors back to their original position.

The blocks clamp is manufactured in aluminum alloy. The eye-ring, tightening threaded bolt and wing-nut are manufactured in cooper alloy.

The inner walls of the clamp are covered with a stainless steel layer, in order to protect the surface of the pole from mechanical damages.

The clamp is composed of two parts which open up to fix onto the pole, by tightening the wing nut, located on one of the sides of the clamp.

Spring action wing-nut and threaded bolt assembly makes the clamp operation easier, quicker and safer.



WIRE TONG BLOCKS CLAMP

Cat. No.	Ø		Work Load		Approx. Weight	
	mm	in	daN	lb	kg	lb
RM4743	38	1.5"	560	1235	1.10	2.43
RM4743-1	51	2.0"			1.20	2.65
RM4743-2	64	2.5"			1.20	2.87

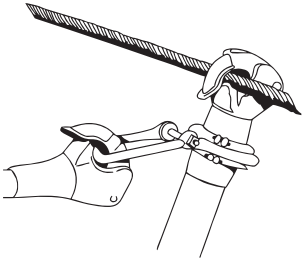
WIRE TONG SWIVEL

The wire tong swivel is an important tool for the assembly of two wire tongs when handling the conductor.

It is installed straight onto the wire tong head attached to the conductor. The other wire tong is attached to the grip of the wire tong swivel, providing thus an articulating set. The wire tong swivel is important to prevent two wire tongs attached to the same conductor, from twisting or even breaking.

This Tool is provided in four diameters. The ring touching the pole is manufactured in aluminum alloy, allowing free rotation of the pole when fixed to it, by 04 bolts and nuts.

The round grip is manufactured in cooper alloy and the square grip is manufactured in aluminum alloy and they are inter-connected through a steel bolt to follow the articulations of the poles.



WIRE TONG SWIVEL

Cat. No.	Ø		Work Load		Approx. Weight	
	mm	in	daN	lb	kg	lb
RM4745	51	2.0"	680	1500	0.90	1.98
RM4745-1	64	2.5"			0.98	2.16

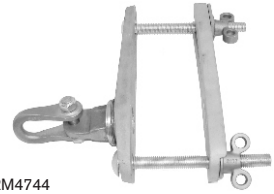
WIRE TONG SADDLES AND COMPONENTS

Pole saddles are intended for connection among poles, blocks or masts, to keep the wire tongs clear from the poles and, when necessary, they allow additional clearance by using the wire tong saddle extension. (RC400-0073).

Saddles are attached to poles using the chain tightener, final adjustments are possible by using the tightening wheel.

The wire tong saddles are made of special heat treated aluminum alloy, meeting the load resistance and light-to-handle requirements.

The following models are available: saddle with clamp, saddle with extension and clamp, saddle with hook and saddle with extension and hook.



RM4744

The pole type saddle without extension is rated for work load of up to 454 daN (1000 lb) and the saddle with extension is rated for working only up to 363 daN (800 lb).

The crossarm type saddle (RM4744) is used when the working clearance is reduced or when one (or more) pole type saddle is also there attached.

The hook connected to the saddle allows for free movements, enabling the wire tong to move freely towards any direction.

It can be used in crossarms from 76 x 108 mm (3" x 0.35 ft) to 102 x 203 mm (4" x 0.65 ft), with maximum work load of 227 daN (500 lb).

The chain wheel tightener (RM1848-W) provides easy installation of the saddles, preventing it from sliding down or moving excessively, keeping it firm to its location.

RM4760-W

The length of this wheel tightener chain can be made longer by using a chain extension (RM1847, RM1847-3, RM1847-4, RM1847-6) to be used in poles of bigger diameters.

The single type lever lift (RM4760-W) is intended for “H” frameworks, or whenever the working clearance is too limited. This saddle is provided with a handle and pin for the connection of the rope block and wire tong respectively, allowing the free movement of both.

Whenever necessary, two saddles, one on each side, can be attached to the pole practically at the same height.

Also, an adapter (RM4760-2) is available to convert the single type lever lift into a double type lever lift, enabling two wire tongs to be used.

These saddles are manufactured of special aluminum alloy, therefore they are very light and easy to handle. They allow up to 527 mm (170 ft) lift of the conductors and accept all wire tongs models.

RC400-1016

The single type lever lift RC400-1016 (with insulating Ritzglas® pole), is for the same application as that of the aluminum alloy saddle, but it is normally used on higher transmission voltages, where more space is required to lift the conductors.

This tool provides a total conductor lift of 915 mm (3 ft).

Such tool comprises a Ø of 51 x 915 mm (2" x 3 ft) Ritzglas® pole, of the same load capacity of the lever lifts in aluminum: 454 daN (1000 lb) for the single type and 340 daN (750 lb) for the double type.

The arbor adapter (RM4760-2) is also available for this saddle.

The Bracket with wheel tightener and chain (RM1846-W) is a practical and easy-to-handle tool, to prevent undesired rope snarls. It is attached to the pole using the wheel tightener and chain assembly and possesses six different rings, for the attachment of the ropes. It is manufactured with light aluminum alloy and is supplied with a 915 mm (3 ft) steel chain. It has a maximum total work load of 454 daN (1000 lb).

RM1846-W

The Wire Tong Saddle Clevis (RM4740-14) is used to attach the Wire Tong butt-ring to a Wire Tong Saddle, when used as an arm for the Dual Auxiliary Arm, allowing the wire tong to rotate and attach to the Stirrup of the Dual Auxiliary Arm.

The wire tong saddle bolt (RM4740) has the same purpose as the wire tong saddle clevis (pole saddle), however it is used exclusively for mast connection to the double “T” concrete poles.

Practical and simple, it bolts through one hole in the pole and is fixed with a wing nut. The body is manufactured in galvanized steel, the connector and wing nut are manufactured in cooper alloy. Available in a total length of 295 mm (0.95 ft).

Pole clamps are versatile and very useful in distribution and transmission, allowing the fixation of the wire tongs with other tools previously fixed to the structure.

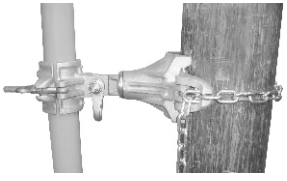
The two assembled parts are made of aluminum alloy. Tightening bolt and wing nut are made of cooper alloy.

Pole clamp internal walls are covered with galvanized steel, to protect the pole's surface from getting damaged.

SADDLES

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RM1846-W	Wheel tightenet assembly	454	1000	3.40	7.50
RM4740-3W	Saddle with 38 mm (1.5") pole clamp	454	1000	4.90	10.80
RM4740-4W	Saddle with 51 mm (2.0") pole clamp	454	1000	5.00	11.02
RM4740-5W	Saddle with 64 mm (2.5") pole clamp	454	1000	5.10	11.24
RM4740-10W	Saddle and tightener less clamp	454	1000	4.10	9.04
RM4740-16W	Saddle, tightener, 1 ½" (38 mm) clamp & extension	363	800	5.40	11.90
RM4740-18W	Saddle, tightener, 2 ½" (64 mm) clamp & extension	363	800	5.60	12.35
RM4740-20W	Saddle, tightener, extension less clamp	363	800	4.60	10.14
RM4744	Crossarm typ Saddle 3" x 4 1/2" to 4" x 8" (76 x 108 to 102 x 203 mm) (0.25 x 0.35 to 0.33 x 0.67 ft)	227	500	2.50	5.51
RM4760-W	Single type lever lift	454*	1000*	5.83	12.85
RM4760-1W	Double type lever lift	340*	750*	6.40	14.11
RC400-1016	Ritzglas® lever lift	454*	1000*	8.50	18.74

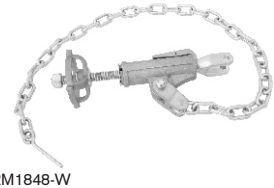
* For each wire tong



RM4740-5W

RM4740-10W

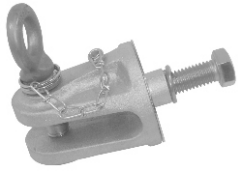
RC400-0073



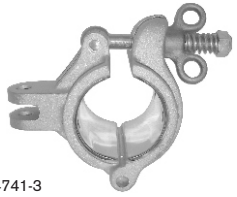
RM1848-W

RM1847

RM4740



RM4740-14



RM4741-3

RM4760-2

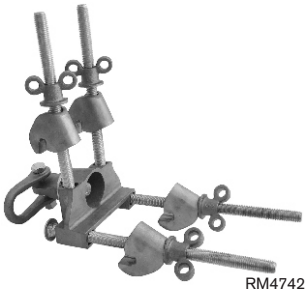
COMPONENTS FOR SADDLE

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RC400-0073	Wire tong saddle extension	363	800	0.50	1.10
RM1848-W	Wheel tightener assembly 36" (915 mm) chain	1134	2500	2.45	5.40
RM1847	18" (457 mm) extension chain	1134	2500	0.80	1.76
RM1847-3	36" (915 mm) extension chain	1134	2500	1.15	2.54
RM1847-4	48" (1.22 m) extension chain	1134	2500	1.40	3.09
RM4740	Concrete pole wire tong saddle bolt, 0.290 m (0.95 ft) long	-	-	0.82	1.81
RM4740-14	Wire tong saddle clevis	-	-	0.35	0.77
RM4741-1	1 1/2" (38 mm) pole clamp	-	-	0.80	1.76
RM4741-2	2" (51 mm) pole clamp	-	-	0.90	1.98
RM4741-3	2.5" (64 mm) pole clamp	-	-	1.00	2.20
RM4741-5	3" (76 mm) pole clamp	-	-	1.08	2.38
RM4760-2	Arbor adapter	-	-	0.55	1.21

TOWER TYPE SADDLES

Tower type saddles are used to support wire tongs, masts, rope blocks or hoists for insulator string displacement on towers.

These saddles are firmly fastened to the brackets of the metallic structure, by four wingnut tightened hooks.



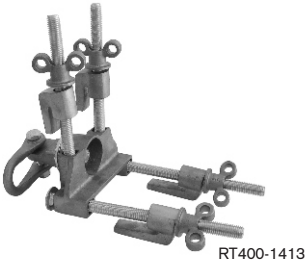
RM4742

Common Saddles

The RM4742 saddle possesses a bronze clevis attached to its body allowing rope blocks to be fastened, through a pivot connecter.

The (RM4742-1 a RM4742-4), models possess pole clamps of various diameters for a firm and proper attachment to the poles, at any angle

The RT400-1413, is similar to the RM4742 model, differing only on the length of the hooks, designed for lager angle-iron tower legs in larger towers.

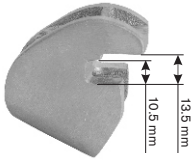


RT400-1413

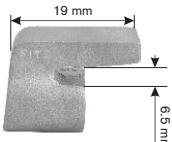
Light saddles

Light saddles have the same characteristics as the common ones. Yet are manufactured in aluminum alloy, which makes them practical and easy to instal.

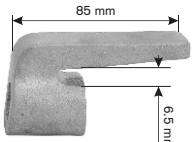
Common saddles may be integrally replaced by light saddles.



Corner Claw



Short Claw



Long Claw

TOWER TYPE SADDLES

Cat. No.	Description	Material	connection capacity	Work Load		Approx. Weight	
				daN	lb	kg	lb
RM4742	Saddle without pole clamp	Bronze	3" x 3" a 7" x 7"	454	1000	5.50	12.13
RM4742-1	Saddle with 38 mm (1.5") pole clamp	Bronze				6.25	13.78
RM4742-2	Saddle with 51 mm (2") pole clamp	Bronze				6.30	13.89
RM4742-3	Saddle with 64 mm (2.5") pole clamp	Bronze				6.50	14.33
RM4742-4	Saddle with 76 mm (3") pole clamp	Bronze				6.70	14.77
RT400-1413	Saddle without pole clamp, with small clamps and two big ones.	Bronze				5.80	12.79

DUAL AUXILIARY ARM

The Dual Auxiliary Arm is designed for use where a change of poles, crossarms or insulators is necessary.

The Dual Auxiliary Arm is lightweight and easily assembled. On regular construction, or alley arm construction, this tool can be used as a side arm.

Movable wire holders can be spaced for minimum conductor travel from the crossarm insulators to the temporary arm, yet the arm is long enough for use as a lifting arm with the use of three standard Wire Tongs.

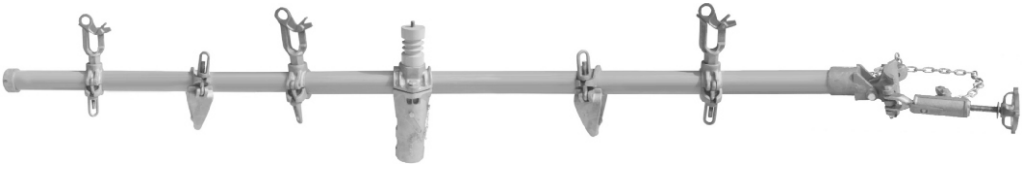
NOTE

When the Dual Auxiliary Arm is used on voltages above 15 kV and the arm is to support energized conductors during unstable weather conditions, it is recommended that insulators (RM4805-7) be added to the wire holders for increased creepage distance, in case of sudden rainfall.

It is also recommended that when the arm is to be left up overnight or during a period of possible rain, the arm should be wiped with a Silicone-Soaked Hot Stick Wiping Cloth (RM1904).

DUAL AUXILIARY ARM

Cat. No.	Description	Insulating Length		Approx. Weight	
		m	ft	kg	lb
RC400-0075	Dual Auxiliary Arm, with Wheel Binder & 1" Fork Wireholder	2.96	9.70	17.50	38.58



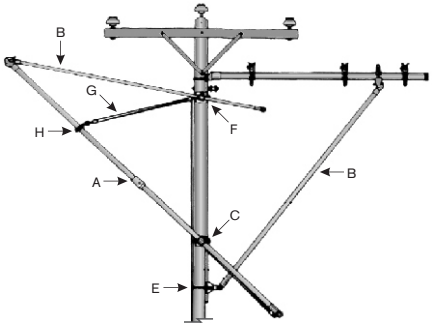
The Dual Auxiliary Arm is composed of the following tools:

- 01 pc Ø 64 mm Ritzglas® pole and pole type saddle, with chain binder;
- 03 pcs RM4805-17 - Fork-type wireholder of 25.4 mm (1") opening, without insulator;
- 02 pcs RC400-0331 Wire tong stirrup;
- 01 pc RC400-0562 Dual Auxiliary Arm "T" with insulator.

Accessory Tools required for these types of applications:

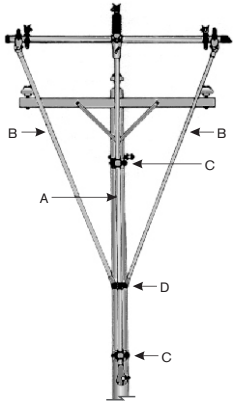
SIDE ARM

- 01 Wire tong RH4647-12 (A)
- 02 Wire tongs RH4646-8 (B)
- 01 Pole type saddles with extension and 64 mm (2.5") RM4740-18W (C)
- 01 Pole type saddle with clevis RM4740-15W (E)
- 01 Saddle, clamp and extension for 51 mm (2") pole RM4740-17W (F)
- 01 Double block RC400-0914 (G)
- 01 Wire tong band RM1729-1 (H)



LIFTING ARM

- 01 Wire tong RH4647-12 (A)
- 02 Wire tongs RH4646-8 (B)
- 02 Pole type saddles with extension and 64 mm (2.5") RM4740-18W (C)
- 01 64 mm (2.5") Wire tong pole clevis RM1728-5 (D)



PARTS AND COMPONENTS

Cat. No.	Description	Approx. Weight	
		kg	lb
RE400-0008	38 mm (1-1/2") Fork-type wireholder without insulator	1.30	2.87
RM4805-17	25 mm (1") Fork-type wireholder without insulator	0.90	1.98
RE400-0009	38 mm (1-1/2") Fork-type wireholder with insulator	1.75	3.86
RM4805-15	25 mm (1") Fork-type wireholder with insulator	1.35	2.98
RC400-0331	Ø 64 mm (2.5") Wire tong stirrup	0.94	2.09
RM1728-5	64 mm (2.5") Wire tong pole clevis	1.50	3.31
RC400-0562	Dual Auxiliary Arm "T" with insulator	2.40	5.29
FLV00714-2	Dual Auxiliary Arm "T" without insulator	1.95	4.30

RE400-0008

RM4805-17

RC400-0331

RM1728-5

FLV00714-2

RC400-0562

TOOLS APPLICATION

- RE400-0008 (1-1/2" without insulator)
- RE400-0009 (1-1/2" with insulator)
- RM4805-15 (1" with insulator)
- RM4805-17 (1" without insulator)

The wireholders feature a 25 mm and 38 mm (1" or 1-1/2") opening. They have a counterbalanced latch which closes automatically behind the conductor to hold it as the conductor is lowered into the wireholder. The latch must be swivelled with an insulated hand tool to release the conductor.

The wireholders are available with or without insulator and are provided with a 64 mm (0.21 ft) pole clamp for attachment to the crossarm of the dual auxiliary arm.

- RC400-0331 (Ø 64 mm - 2.5")

The wire tong stirrup can be ordered separately either as a replacement part or to be used with the existing equipment. It is intended for connection of the wire-tong braces of the dual auxiliary arm, using its pole band. Manufactured in light-weight aluminum alloy, easy to handle.

- RM1728-5

The wire tong pole clevis clamps around the vertical wire-tong supporting an auxiliary crossarm and engages butt rings of the two wire tongs used as side braces.

Manufactured in aluminum alloy, the two parts are assembled together with two eye-bolts, as one single piece.

Nominal working capacity: 1000 kgf (1000 daN)

- RC400-0562
- FLV00714-2

The dual Auxiliary Arm "T" is to be used specifically with the lifting arm application type.

AUXILIARY CROSSARMS

These auxiliary arms are rated at 272 daN (600 lb), with the three balanced conductors and 68 daN (150 lb) at each wireholder, for unbalanced conductors.

The auxiliary arms RH4862-6, RH4862-8 and RH4862-51 are used to change crossarms, insulators or poles on short spans up to and including 15 kV phase-to-phase. Two RM4740-5W saddles can be used to mount the mast to the pole, which must be ordered separately.

Two mast pole lengths are available:

- 1.52 m (5 ft) mast (RH4862-6 and RH4862-8 crossarms) provides a lift of 0.76 m (2.5 ft) above the top saddle when the saddles are mounted at a minimum recommended distance of 0.46 m (1.50 ft) apart.
- 3.05 m (10. ft) mast (RH4862-51 crossarm) provides a lift of 1.17 m (3.80 ft).

The auxiliary crossarm RH4863-10 has a special mast and Ritzglas® arm, for attachment to the insulating boom of aerial devices or similar equipment.

It is used on light construction or maintenance works, during the handling of the conductors.

The mast is built with two supporting poles and attached to an adjustable saddle for square or rectangular booms of 127 x 178 mm (0.40 x 0.6 ft) up to 254 x 254 mm (0.80 x 0.80 ft).

It must be attached only onto equipment of minimum 907 daN (2000 lb) load lifting rating.

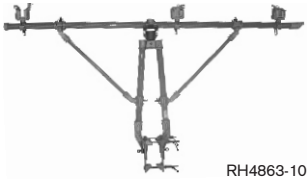
The arm has a balanced load rating of 454 daN (1000 lb) or the maximum load rating of the equipment, whichever is bottom.

The auxiliary crossarm is recommended to be only used with braces and is rated at 90 daN (200 lb) of max. unbalanced load (each wireholder).

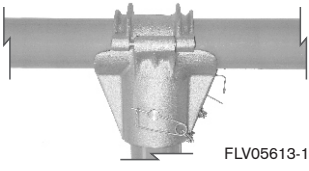
Each roller wireholder (RC400-0268) used with this auxiliary crossarm is rated at 45 daN (100 lb).

RH4862-6

RH4862-51



RH4863-10



FLV05613-1

RH4862-6 - AUXILIARY CROSSARMS

Item	Qty.	Cat. No.	Description	Approx. Weight	
				kg	lb
01	01	FLV21310-1	Long mast Ø 64 mm x 1.43 m (2.5" x 4.7 ft) insulated length	5.10	11.24
02	01	FLV17928-1	Crossarm stick, Ø 64 mm x 1.78 m (2.5" x 5.80 ft) insulated length	2.82	6.22
03	01	FLV05613-1	Eye head to set the connection of the mast with the crossarm stick	1.30	2.87
04	04	RM4805-16	Suspension wireholder without insulator	1.08	2.38

C

RM4805-16

RH4862-8 - AUXILIARY CROSSARMS

Item	Qty.	Cat. No.	Description	Approx. Weight	
				kg	lb
01	01	FLV21310-1	Long mast Ø 64 mm x 1.43 m (2.5" x 4.70 ft)insulated length	5.10	11.24
02	01	FLV21310-2	Crossarm stick Ø 64 mm x 2.39 m (2.5" x 7.80 ft) insulated length	5.10	11.24
03	01	FLV05613-1	Eye head to set the connection of the mast with the crossarm	1.30	2.87
04	04	RM4805-16	Suspension wire holder without ins	1.08	2.38

RH4863-10 - AUXILIARY CROSSARMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4863-10	Auxiliary crossarm to be installed on the aerial basket	54.00	119.05

RH4862-51 - Mast fiberglass stick

Item	Qty.	Cat. No.	Description	Approx. Weight	
				kg	lb
01	01	FLV17928-2	Long Mast Ø 64 mm x 2.87 m (2.5" x 9.4 ft) insulated length	2.82	6.22
02	02	FLV03457-13	Support stick Ø 38 mm x 2.03 m (1.5" x 6.7 ft) insulated length	6.86	15.12
03	02	RM4741-3	Ø 64 mm (2.5") clamp	1.00	2.20
04	01	RM1728-5	Ø 64 mm (2.5") wire-tong pole clevis	1.50	3.31
05	01	FLV05613-1	Eye head to set the connection of the mast with the crossarm stick	1.30	2.87

RC400-0268

RC400-0269

ACCESSORY

Cat. No.	Description	Approx. Weight	
		kg	lb
RC400-0268	Roller wireholder, 2" max. opening, for attachment to the auxiliary arm assembled on Guindauto vehicule or other similar units	1.90	4.19
RC400-0269	Roller wireholder, 2" opening, for attachment to the auxiliary crossarm with RM4805-7 Epoxy insulator	2.50	5.51

EXTENSION ARM

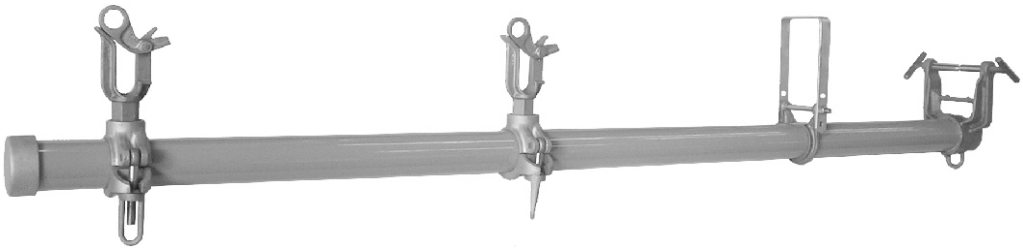
The Extension Arm is designed for use on voltages up to and including 15 kV where reconductoring or insulator replacement is necessary.

The Ritzglas® extension arm can be used on voltages up to 34.5 kV providing wireholders are fitted with RM4805-7 insulators.

The Extension Arm is suspended under the crossarm by brackets, in a way so that approximately 3/4 of its length exceeds the crossarm length, to enable the conductor to be removed from the original crossarm and placed in the wireholder mounted on the Extension Arm.

EXTENSION ARM

Cat. No.	Ø		Insulating Length		Quantity of Wireholders Per Set	Maximum Crossarm Section (mm - ft)	Maximum Vertical Load Rating		Approx. Weight	
	mm	in	m	ft			daN	lb	kg	lb
RH4800-60	64	2.5"	1.43	4.7	1	95 x 120 0.31 x 0.39	68	150	5.80	12.79
RH4800-72	64	2.5"	1.74	5.7	2	95 x 120 0.31 x 0.39	68	150	7.40	16.31



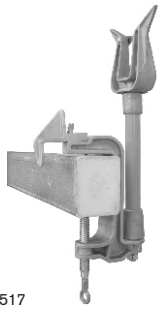
TEMPORARY CONDUCTOR SUPPORT

- RC400-0517

This Support Tool clamps to the crossarm, adjusting to crossarms from 82 mm (3-1/4") x 102 mm (4") to 152 mm (6") x 152 mm (6"). The clamp and wireholder are made of heat treated aluminum and fixed onto the Ritzglas® pole section. It can be installed with a Grip-All clamp stick. Work load: 68 daN (150 lb).

- RC400-1509 / RH4809-W

The Ritzglas® temporary conductor supports are used to hold energized distribution conductors during replacement of poles or repair or replacement of pole tops and support insulators. It is furnished with wheel tightener for poles up to Ø 356 mm (14") and fork-type wireholders, accommodating conductor sizes up to Ø 25 mm (1") (2 pcs with the model RC400-1509 and 1 pc with the model RH4809W).



RC400-0517

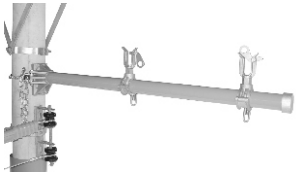
When using the temporary conductor support for voltages above 15 kV or when the tool is to support an energized conductor overnight or during periods of expected rain, RM48057 insulators should be added to the wireholders.

Work load: 68 daN (150 lb) per wireholder.

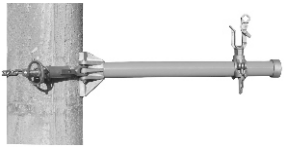
- RT400-1939 / RT400-1940

These two models of temporary conductor supports have the same application as the RC400-1509 and RH4809W, however they are supplied with a strap-type ratchet-action mount, rather than a chain binder.

Same recommendations on the use of the RM4805-7 insulator and work load are valid for these two models.



RC400-1509



RH4809-W

RT400-1940

TEMPORARY CONDUCTOR SUPPORTS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC400-0517	Crossarm Conductor Support, Ø 32 mm x 0.20 m (1.25" x 0.65 ft) of insulating length	2.20	4.85
RC400-1509	Two-conductor support, with wheel tightener for pole attachment, fixed onto a Ø 64 mm x 1.11 m (2.5" x 3.60 ft) Ritzglas® insulating pole. Supplied with two fork-type wireholders	7.70	16.98
RH4809-W	Single conductor support, with wheel tightener for pole attachment, fixed onto a Ø 64 mm (2.5") Ritzglas® insulating pole. Supplied with one fork-type wireholder. Distance between the wireholder and the pole attachment: 0.76 m (3")	6.30	13.89
RT400-1939	Two-conductor support, with strap-type ratchet-action pole mount (T400-2007), fixed onto a Ø 64 mm x 1.11 m (2.5" x 3.60 ft) Ritzglas® insulating pole Supplied with two fork-type wireholders	8.10	17.86
RT400-1940	Single conductor support, with strap-type ratchet-action pole mount (T400-2007), fixed onto a Ø 64 mm (2.5") Ritzglas® insulating pole. Supplied with one fork-type wireholder. Distance between the wireholder and the pole attachment: 0.76 m (3")	6.40	14.11

STRAIN LINK STICK

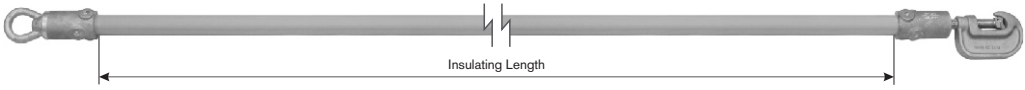
On deadened structures and running corners, a strain link stick is used as insulation between rope blocks and a come-along clamp.

Conductor loads on long spans and H-frame structures are sometimes too high that they could effectively be handled with wire tongs only. To supplement the wire tongs, a strain link stick is attached to the conductor close to the wire tong. Strain link sticks are also used to support the middle conductor on H-frame structures, during insulator or crossarm changes.

Hooks and ferrules are made of heat-treated aluminum alloy, for the best strength to weight ratio. Butt-swivels - for attaching rope blocks or hand lines - are forged of high quality steel and rotate freely on ball thrust bearing.

The edges of the jaws of Terex Link Sticks are rounded to prevent scarring of conductors.

In view of the growing range of works requiring numerous loads or diversity of conductor sizes, link sticks are available in four sizes of heads and several different lengths of poles.



STRAIN LINK STICK

Cat. No.	Dimensions				Jaw Opening				Work Load		Approx. Weight	
	Ø		Insulating Length		Minimum		Maximum		daN	lb	kg	lb
	mm	in	m	ft	mm	ft	mm	ft				
RC400-0814	32	1.25"	1.72	5.60	5.60	0.02	19.00	0.06	1588	3500	2.30	5.07
RC400-0815	32	1.25"	2.33	7.60	5.60	0.02	19.00	0.06	1588	3500	2.60	5.73
RC400-0816	32	1.25"	2.94	9.70	5.60	0.02	19.00	0.06	1588	3500	2.90	6.39
RC400-0817	32	1.25"	3.55	11.70	5.60	0.02	19.00	0.06	1588	3500	3.20	7.05
RC400-0818	32	1.25"	4.16	13.70	5.60	0.02	19.00	0.06	1588	3500	3.60	7.94
RH4715-1	32	1.25"	0.50	1.60	5.60	0.02	19.00	0.06	1588	3500	1.70	3.75
RH4715-2	32	1.25"	1.11	3.60	5.60	0.02	19.00	0.06	1588	3500	2.00	4.41
RH4716-1	38	1.5"	0.46	1.50	11.20	0.04	27.00	0.09	2948	6500	2.90	6.39
RH4716-2	38	1.5"	1.07	3.50	11.20	0.04	27.00	0.09	2948	6500	3.30	7.28
RH4716-3	38	1.5"	1.68	5.50	11.20	0.04	27.00	0.09	2948	6500	3.70	8.16
RH4716-4	38	1.5"	2.29	7.50	11.20	0.04	27.00	0.09	2948	6500	4.15	9.15
RH4716-5	38	1.5"	2.90	9.50	11.20	0.04	27.00	0.09	2948	6500	4.60	10.14
RH4716-6	38	1.5"	3.51	11.50	11.20	0.04	27.00	0.09	2948	6500	5.00	11.02
Rh4717	38	1.5"	1.07	3.50	18.30	0.06	38.00	0.12	2948	6500	3.40	7.50
RH4717-1	38	1.5"	1.68	5.50	18.30	0.06	38.00	0.12	2948	6500	3.80	8.38
Rh4718	38	1.5"	1.07	3.50	25.40	0.08	63.50	0.12	2948	6500	4.30	9.48
RH4718-1	38	1.5"	1.68	5.50	25.40	0.08	63.50	0.12	2948	6500	4.70	10.36
RH4718-2	38	1.5"	2.29	7.50	25.40	0.08	63.50	0.12	2948	6500	5.10	11.24
RH4718-3	38	1.5"	2.90	9.50	25.40	0.08	63.50	0.12	2948	6500	5.60	12.35
RH4718-4	38	1.5"	3.51	11.50	25.40	0.08	63.50	0.12	2948	6500	6.00	13.23

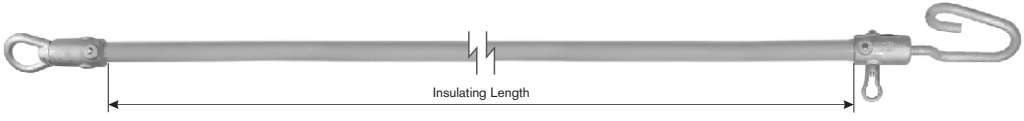
SPIRAL LINK STICK

The Spiral Link Stick is used in place of a strain link stick in close places where the lineman cannot safely install a strain link stick by hand. A lifting eye on the head ferrule enables the lineman to guide the Spiral Link Stick to the conductor with a hotstick. The Spiral Link Stick is composed of a 32 mm (1-1/4") Ritzglas® pole, a spiral shape hook made of special hot galvanized steel. This provides a strong and suitable tool for work loads of conductors up to 1510.5 kcmil ACSR (approx. Ø 38 mm - 1.5"). Ferrule castings are of heat-treated aluminum alloy.

Butt-swivels - for attaching rope blocks or hand lines - are forged of high quality steel and rotate freely on ball thrust bearing.

SPIRAL LINK STICK

Cat. No.	Dimensions				Work Load		Approx. Weight	
	Ø		Insulating Length		daN	lb	kg	lb
	mm	in	m	ft				
RC400-0812	32	1.25"	0.96	3.15	1588	3500	2.30	5.07
RH4722			0.29	0.95			1.00	2.20



ROLLER LINK STICK

Used to spread and hold conductors aside at mid-span, for increased working space, when relocating poles.

Since it is attached to the conductor through the roller head, it may be pulled by the ground man into position by a hand line or rope block attached to the butt ring.

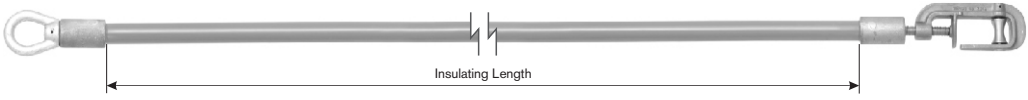
The roller head suitable for conductors of up to 605 kcmi ACSR (Ø 24 mm - 0.95"t approx.).

The Roller Link Stick is composed of a 32 mm (1-1/4") Ritzglas® pole and cooper alloy head and roller, assembled to a threaded pin, for jaw opening and closing operations, to secure conductors.

Ferrules are made of heat-treated aluminum alloy. Butt-swivels - for attaching rope blocks or hand lines - are forged of high quality steel and rotate freely on ball thrust bearing.

ROLLER LINK STICK

Cat. No.	Dimensions				Work Load		Approx. Weight	
	Ø		Insulating Length		daN	lb	kg	lb
	mm	in	m	ft				
RH4714-4	32	1.25"	1.13	3.70	454	1000	2.48	5.47
RH4714-6			1.74	5.70			2.80	6.17



ADJUSTABLE STRAIN POLES

The Ø 51 mm (2") Ritzglas® adjustable strain pole is provided with 6 stainless steel cross-pins (5 working cross-pins and 1 locking cross-pin), located at 152 mm (0.5 ft) intervals, to support the adjustable pole clamp on the hot-end.

The 5 crosspins arrangement enables the lineman to displace the yokes to a maximum length of 608 mm (2 ft).

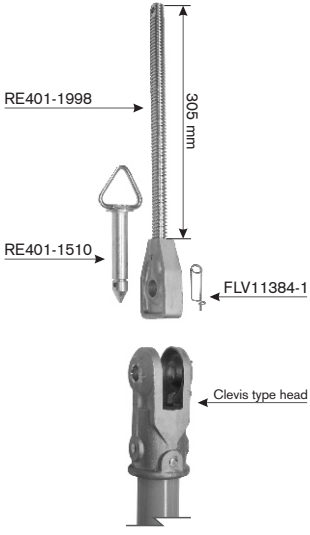
The hot end yokes for suspension and deadened insulator strings are attached to strain poles by adjustable pole clamps. The adjustable pole clamps can be adjusted manually, or with a hot stick and can be used directly on the strain pole to lift conductors, not requiring yokes.

On the cold end, a special 305 mm (1 ft) long high-strength steel strain-jack provides uniform traction of the set, using ratchet wrenches and trunnions.

Customized length strain jacks and adjustable pole clamps can be ordered as separate items or spare parts.

Ratchet wrenches and trunnions can also be ordered as separate items.

This tool is key to many high voltage (HV) and extra-high voltage (EHV) transmission maintenance works. Adjustable strain poles can be used with an adjustable pole clamp (RE401-0138) or an adjustable hook assembly (RM4724-1).

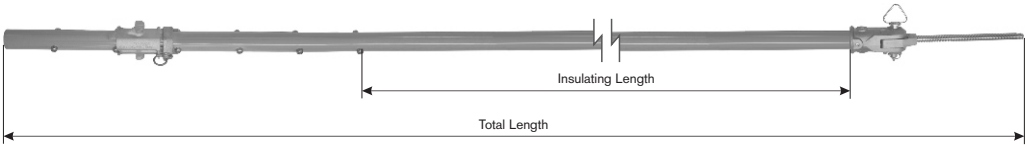


COMPOSITION OF THE SET

Adjustable strain poles (RC401-2144 through RC401-2149 models) are supplied with the following components:

- 01 pc Ø 51 mm (2") Strain pole, with clevis-type head;
- 01 pc Adjustable pole clamp RE401-0138;
- 01 pc 305 mm (1 ft) Strain jack RE401-1998;
- 01 pc Steel through pin RE401-1510;
- 01 pc Counterpin FLV11384-1;

Maximum load rating: 3402 daN (7500 lb)



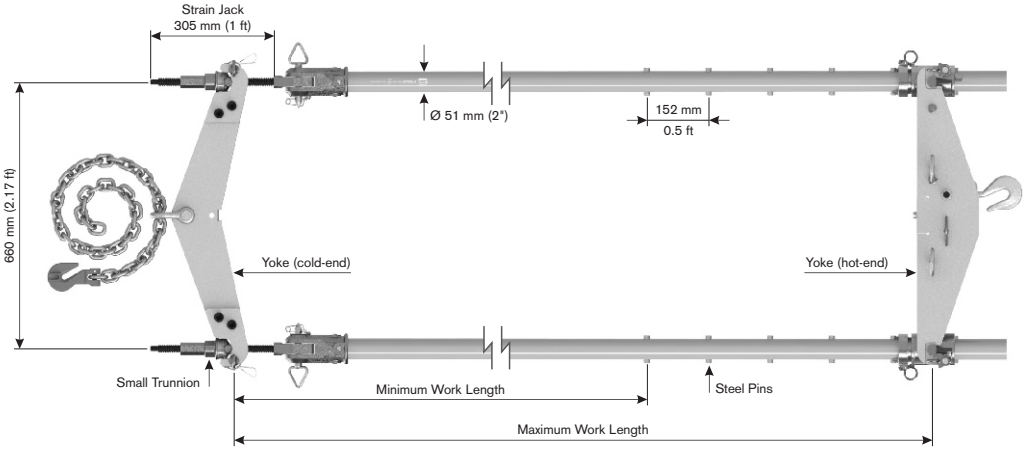
ADJUSTABLE STRAIN POLES

Cat. No.	Maximum Voltage Use (kV)	Total Length		Insulated Length		Approx. Weight	
		m	ft	m	ft	kg	lb
RC401-2144	72.5	2.29	7.50	0.91	3.00	8.50	18.74
RC401-2145	169	2.60	8.50	1.22	4.00	8.90	19.62
RC401-2146	242	2.98	9.80	1.60	5.30	9.30	20.50
RC401-2147	302	3.51	11.50	2.13	7.00	10.00	22.05
RC401-2215	362	3.98	13.00	2.60	8.50	11.30	24.91
RC401-2148	552	4.81	15.80	3.43	11.30	11.50	25.35
RC401-2149	765	5.95	19.50	4.57	15.00	13.00	28.66

ACCESSORY

Cat. No.	Description	Approx. Weight	
		kg	lb
RE401-0138	Ø 51 mm (2") adjustable pole clamp	0.70	1.54
RE401-1998	305 mm (1 ft) long strain jack	1.30	2.87
RV401-0157	610 mm (2 ft) long strain jack	1.80	3.97
RV401-0158	915 mm (3 ft) long strain jack	2.30	5.07
RE401-1510	Steel through pin to hold the strain jack to the clevis-type head	0.30	0.66

TWO-POLE STRAIN CARRIERS



Two-pole Strain Carriers series RC401-2174 through RC401-2179 relieve strain from an insulator string to enable energized replacement work of single or multiple insulator strings, depending on the hardware of the string arrangement.

The strain poles are used with pole clamps and yokes, with proper trunnions and strain jacks.

The hot end yokes for suspension and strain string insulators are attached to strain poles by adjustable pole clamps. The adjustable pole clamps can be adjusted manually or with a hot stick.

Hot-end Yoke includes steel hook.

Yokes are made of high-strength laminated aluminum plate and include a steel chain and hook assembly for anchoring the rear plate to the structure.

Nominal work load: 6084 daN (15000 lb)

Strain poles, adjustable pole clamps, trunnions or yokes can be ordered separately as replacement parts.

TWO-POLE STRAIN CARRIERS

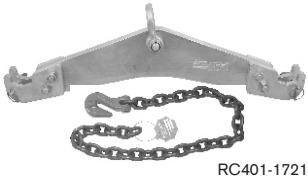
Cat. No.	Adjustable strain poles	Work Lenght				Approx. Weight	
		Minimum		Maximum		kg	lb
		m	ft	m	ft		
RC401-2174	RC401-2144	1.09	3.60	1.88	6.20	33.70	74.30
RC401-2174	RC401-2145	1.40	4.60	2.19	7.20	34.00	74.96
RC401-2176	RC401-2146	1.78	5.80	2.57	8.40	34.50	76.06
RC401-2177	RC401-2147	2.32	7.60	3.10	10.20	35.20	77.60
RC401-2216	RC401-2215	2.78	9.10	3.57	11.70	36.20	79.81
RC401-2178	RC401-2148	3.61	11.80	4.40	14.40	36.70	80.91
RC401-2179	RC401-2149	4.75	15.60	5.54	18.20	38.20	84.22

COMPOSITION OF THE SET

The two-pole strain carriers of the previously mentioned group, are provided with the following components:

- 02 pc Ritzglas® Ø 51 mm (2") Strain poles, with clevis-type heads and proper crosspins and counter-pins;
- 01 pc Yoke RC401-1721 for anchoring to the structure (with chain RM1942);
- 01 pc Yoke RC401-1720 for attachment to the hot end;
- 02 pc Strain jacks RE401-1998 (305 mm - 1 ft);
- 02 pc Adjustable pole clamps RE401-0138;
- 02 small trunnions RE401-2068;
- 01 yoke socket RC401-1720.

NOTE
Yoke socket RC401-1720 is specified according to the hardware to be informed by the customer.

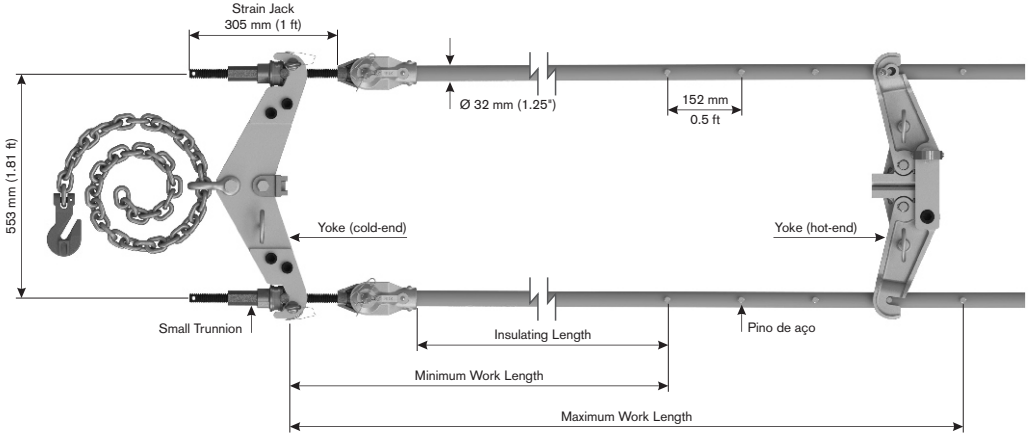


RC401-1721

RM1942

RC401-1720

DISTRIBUTION STRAIN CARRIERS

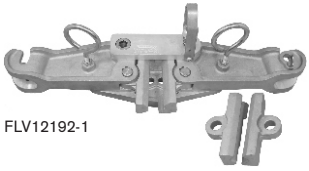


These Distribution Strain Carriers RC401-0411 and RC401-0410 relieve strain while removing a single deadened string of insulators, enabling its removal from the energized line. The distribution strain carrier has a yoke at the hot end, which is equipped with jaws having a compression lever-type action, gripping tighter onto the conductor as the load increases.

The various jaws fit conductors from Ø 7.40 (0.02 ft) through 20.50 mm (0.07 ft) - (2 through 397.5 ACSR). The other end of the set is equipped with a yoke, a chain and hook for anchoring to the structure. Special Steel Strain jacks (305 mm - 1ft long) and small trunnions allow for the uniform straining of the set.

Maximum load rating: 2948 daN (6500 lb), for each distribution strain-carrier assembly from 69 kV through 145 kV.

DISTRIBUTION STRAIN CARRIERS



FLV12192-1

FLV12239-1

RM1942

Cat. No.	Strain Poles	Working Length				Approx. Weight	
		Mínimo		Máximo		kg	lb
		m	ft	m	ft		
RC401-0411	FLV12240-2	1.10	3.61	1.70	5.58	26.70	58.86
RC401-0410	FLV12240-1	1.70	5.58	2.32	7.61	27.30	60.19

COMPOSITION OF THE SET

Distribution strain carriers are supplied with the following components:

- 02 pc Ø 32 mm (0.1ft) (Ritzglas® poles, for yoke adjustment through 05 existing steel pins, every 152 mm (0.5ft) along the pole;
- 01 pc Yoke FLV12192-1 for hot-end installation;
- 01 pc Yoke FLV12239-1 for anchoring of the set to the structure, through the chain (RM1942) supplied along with the set;
- 02 pc Strain jacks RE401-1998 (305 mm - 1ft);
- 02 pc Small trunnions RE401-2068.

Strain jacks, trunnions and yokes can be ordered separately as replacement parts.

LIGHT-WEIGHT STRAIN CARRIER

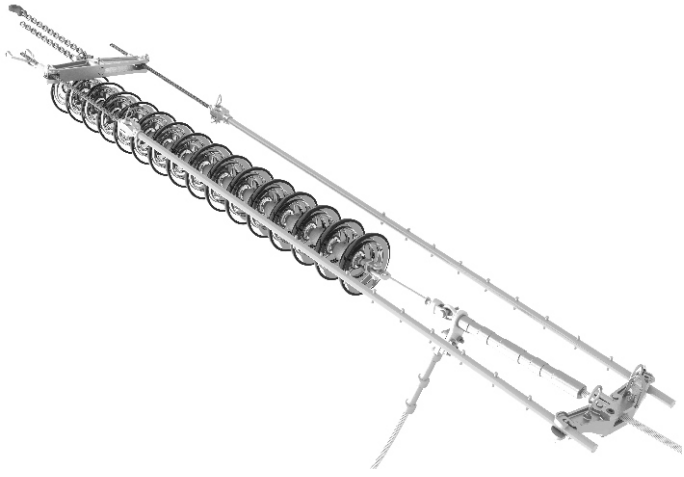
The Light-duty Strain Carrier for cold end and suspension insulator strings has been designed for conductors up to 636 MCM (Ø 25.15 mm - 1") GROSBEAK, for replacement of single deadened insulator strings of 69 kV through 145 kV energized systems and suspension strings of 110 kV through 145 kV energized systems.

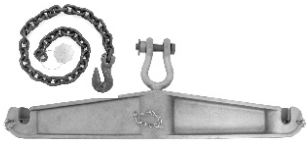
The excellent mechanical characteristics of the Ritzglas® Insulating poles allows for the reduction of the Ø of the strain poles to only 32 mm (1-1/4"), offering thus a proportional reduction of the hardware dimensions, providing for a lighter and more practical equipment, making transportation and handling much easier.

The metallic tools used at the cold-end are used either on deadened or suspension works, offering versatility to the set and making the equipment more economical and attractive, from a cost-benefit perspective.

LIGHT-WEIGHT STRAIN CARRIER

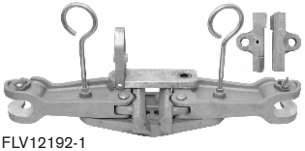
Cat. No.	Description	Work Load	
		daN	lb
FLV17450-1	Light-weight strain carrier, for 69 through 145 kV deadend strings and 110 through 145 kV suspension strings, on energized systems	2948	6500



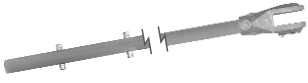


FLV13352-1

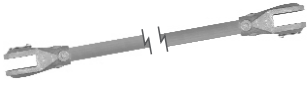
FLV13356-1



FLV12192-1



FLV13780-1



FLV13130-1

APPLICATION OF EACH TOOL

1. Cold-end yoke FLV13352-1

This tool is used on deadened and suspension strings.

On deadened strings, it is attached to the tower structure through clevis-pin and hook-chain assembly, coupled directly to the ball-link extension, with of up to Ø 22 mm (0.9") and rabbet with of up to Ø 38 mm (1.5").

On suspension strings, it is attached to the tower structure using the attachment support (FLV13356-1).

2. Attachment Support FLV13356-1

Attached to the end of the tower structure, it serves as a support and attachment of the cold-end yoke (FLV13352-1) when changing suspension insulator strings.

3. Hot-end Yoke FLV12192-1

Attached directly to the conductor, needing no wire grip for straining when replacing a cold end insulator string.

4. Insulating Strain Pole FLV13780-1

Cold-end clevis for attachment to the strain jack and 10 (ten) pairs of hot-end stainless steel pins are used for support and attachment of the hot end yoke, without the need to use adjustable pole clamps when replacing insulators on cold end structures.

5. Insulating Strain Pole FLV13130-1

Used to support the conductor with the strain jack (RE401-1998) attached to one end and a spiral hook (FLV13006-1, FLV13006-2, FLV13006-3) to the other end, when changing suspension insulator strings.

STRAIN POLES LENGTH

Cat. No.	Insulating Length		Working Length			
			Minimum		Maximum	
	m	ft	m	ft	m	ft
FLV13780-1	1.09	3.60	1.16	3.80	2.53	8.30
FLV13130-1	1.22	4.00	1.45	4.75	1.45	4.75

NOTE

Poles with different lengths can be provided upon request.

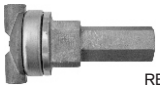
6. Strain jack RE401-1998

To be attached to strain pole (FLV13780-1), through eye-clevis assembly and to cold-end yoke (FLV13352-1), through small trunnions (RE401-2068).

RE401-1998

NOTE

Strain jacks with different lengths are available upon request.



RE401-2068

7. Small Trunnion RE401-2068

To be attached to strain jack (RE401-1998) using a ratchet wrench (RM1948-3), in order to strain the conductor, transferring load from the string to the strain carrier.

FLV13006-1

8. Spiral Hooks FLV13006-1 / FLV13006-2 / FLV13006-3

Attached to strain pole (FLV13130-1), it grips the conductor to support it when changing suspension insulator strings. Different lengths available depending on the length of the hot-end hardware of the insulator string.

FLV13006-2

FLV13006-3

9. Ratchet Wrench RM1948-3

Despite this tool not being included in the strain carrier set, it is recommended for application on the small trunnion (RE401-2068).

RM1948-3

10. Canvas Bag FLV19286-1

Used for transport and conditioning of the strain poles FLV13780-1.

11. Canvas Bag FLV19286-2

Used for transport and conditioning of the strain poles FLV13130-1.

FLV19286-1

12. Multi-purpose Handbag ATR09962-1

For conditioning and transport of distribution carrier components.

ATR09962-1

COMPOSITION OF THE DEADEND SET

Cat. No.	Description	Qty.	Approx. Weight	
			kg	lb
FLV13352-1	Cold-end yoke, made of cast aluminum, with clevis, bolt and chain	01	8.10	17.86
RE401-1998	305 mm (1ft) Strain jack	02	1.30	2.87
RE401-2068	Small trunnions	02	0.83	1.83
FLV13780-1	Ritzglas® Insulating Strain poles, Ø 32 mm (1.25"), overall length: 2.70 m (8.85 ft), with cast aluminum clevis, for attachment of the strain pole and 10 stainless steel pins each, at 152 mm (0.5 ft) intervals, for attachment of the hot-end yoke	02	4.10	9.04
FLV12192-1	Cast aluminum Hot-end yoke, with two pairs of brackets to accept ACSR conductors, min. 2 AWG (Ø 6.6 mm - 0.3"), through max. 1000 MCM (Ø 25.15 mm - 1")	01	6.10	13.45
Total			20.43	45.04

COMPOSITION OF THE SUSPENSION SET

Cat. No.	Description	Qty.	Approx. Weight	
			kg	lb
FLV13352-1	Cold-end yoke, made of cast aluminum, with clevis, bolt and chain	01	8.10	17.86
RE401-1998	305 mm (1 ft) Strain jack	02	1.30	2.87
RE401-2068	Small trunnions	02	0.83	1.83
FLV13130-1	Ritzglas® Insulating Strain poles, Ø 32 mm (1.25"), overall length: 1.46 m (4.8 ft), with cast aluminum clevis at both ends	02	2.60	5.73
FLV13356-1	Cast aluminum alloy attachment support, for attachment to the tower structure, through chain with hook and safety lock	01	3.40	7.50
FLV13006-1	695 mm (2.3 ft) long spiral hook made of heat-treated special steel, with eye-link for attachment of the clevis-clevis strain pole	02	2.30	5.07
FLV13006-2	615 mm (2.0 ft) long spiral hook made of heat-treated special steel, with eye-link for attachment of the clevis-clevis strain pole	02	2.00	4.41
FLV13006-3	555 mm (1.8 ft) long spiral hook made of heat-treated special steel, with eye-link for attachment of the clevis-clevis strain pole	02	1.80	3.97
Total			22.30	49.16

SECTIONAL STRAIN POLE (WITH SPLICE)

The Sectional Strain Pole with splice, together with yokes, has been designed to withstand the mechanical straining of the conductors, when performing maintenance on the suspension or deadened insulator strings, where their lengths differ from the conventional standards.

The Sectional Strain Pole is composed of three parts:

Hot-end Strain pole (energized), Cold-end Strain pole (de-energized) and the fiberglass splice, which is the middle pole, intended for the joint of the hot-end and cold end poles.

These poles are manufactured with Ø 51 mm (2") Ritzglas® poles and each pole has a clevis-type cooper alloy head for connection to the yokes. The fiberglass splice is manufactured with a special manufacturing process, with reinforced fiberglass, outside of Ø 76 mm (3"). It is provided with holes every 100 mm (0.30 ft) enabling the assembly of the hot-end and cold-end poles, within pre-determined lengths.

The strain poles allow for different configurations with the strain jacks of following lengths: 305 mm (1 ft), 610 mm (2 ft) and 915 mm (3 ft), for extended overall length of the set.

Hot-end or cold-end strain poles, fiberglass splice, strain jacks or counter-pins can be ordered separately as replacement parts.

NOTE

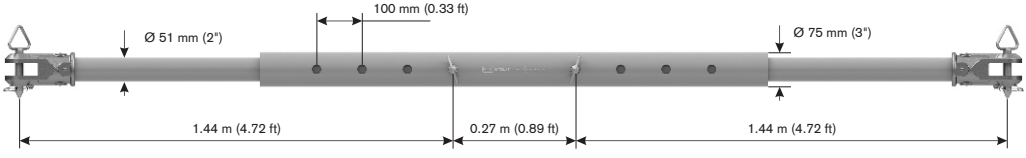
Although the fiberglass splice is manufactured to standard lengths of 1.12 m (3.7 ft), the hot-end and cold-end strain poles can be ordered to special lengths, suitable to types and voltages of each company. For special lengths, which shall be according to the configuration of the strings, technical drawings must be provided to our Terex engineering department, in order to analyze the technical viability of the product.

COMPOSITION OF THE SET

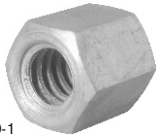
- 01 pc Ritzglas® hot-end strain pole, with clevis-type cooper alloy head, with steel pin and counter-pin;
- 01 pc Ritzglas® cold-end strain pole, with clevis-type cooper alloy head, with steel pin and counter-pin;
- 01 pc 1.12 m long Fiberglass splice and two sets of steel pins and counter-pins.

SECTIONAL STRAIN POLE WITH FIBERGLASS SPLICE

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RC401-0758	Sectional Strain Pole with fiberglas splice, with 8 adjustment holes, minimum length of 3.15 m (10 ft) and maximum length of 3.75 m (12 ft)	4536	10000	13.90	30.64



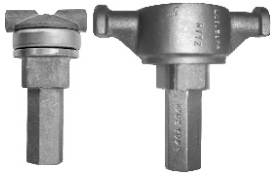
ACCESSORIES FOR STRAIN CARRIERS



FLV10460-1

- FLV10460-1

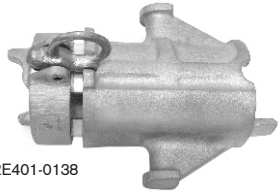
It is highly recommended to provide the installation of the safety nut as soon as the trunnions are installed to the strain jacks. This ensures additional safety during the straining operation as a support to the trunnions.



RE401-2068 / RE401-2066

- RE401-2066 / RE401-2068

The small and large trunnions have been specially designed for the attachment of the yokes to the strain poles. They are made of cooper alloy and provided with ball-thrust bearings to make them easier to operate during the rotation on the strain jacks, using the ratchet wrench (RM1948-3).



RE401-0138

- RE401-0138

Adjustable pole clamps are made of heat-treatment aluminum alloy and have been designed to engage the hot end yoke to the strain poles. The adjustable pole clamps can be easily moved over and positioned between the steel pins located down the pole, either manually or using a hot stick.

RE401-1998

- RE401-1998 / RV401-0157 / RV401-0158

The Tongue type Strain Jacks are used for attachment to the strain poles as an adjustment tool when straining insulator strings.

The Tongue type Strain Jack is attached to the eye of the strain poles through the existing head on one of its ends.

FLV17755-1

- FLV17755-1

Trunnion Gauges, also known as “Go/No Go” (or Pass/Fail), are made of steel and are essential for periodical check of the trunnion threads to ensure that there is no thread wearing.

This gauge is provided with 0.5 mm (0.02") wider threads. Thus, if the trunnion allows the introduction of the gauge, even only partially, the thread wearing of the trunnion is greater than 0.5 mm (0.02") and, therefore, improper for use.

RH4785-1

- RH4785-1 / RH4785-2 / RH4785-3 / RT400-0025

The Clevis Type Strain Jacks are used for attachment to the clevis-eye strain poles (RH1949-113 / RC400-0612 and RC400-0613), as an adjustment tool when straining insulator strings.

The Clevis type Strain Jack is attached to the eye of the strain poles, through the existing head on one of its ends.

RM1948-3

- RM1948-3

The Reversible Ratchet Wrench was specially developed for use on hex-nuts and trunnions on single and double strain carriers.

FLV16054-1

- FLV16054-1

The Reversible Ratchet Wrench was developed for use on hex-nuts and trunnions where more effort is required.

ACCESSORIES FOR STRAIN CARRIERS

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RE401-1998	305 mm (1 ft) Strain Jack Tongue type	4536	10000	1.30	2.87
RV401-0157	610 mm (2 ft) Strain Jack Tongue type	4536	10000	1.80	3.97
RV401-0158	915 mm (3 ft) Strain Jack Tongue type	4536	10000	2.30	5.07
RH4785-1	305 mm (1 ft) Strain Jack Clevis type	4536	10000	1.40	3.09
RH4785-2	457 mm (1.5 ft) Strain Jack Clevis type	4536	10000	1.70	3.75
RH4785-3	610 mm (2 ft) Strain Jack Clevis type	4536	10000	2.00	4.41
RT400-0025	915 mm (3 ft) Strain Jack Clevis type	4536	10000	2.50	5.51
RE401-0138	Ø 51 mm (2") aluminum alloy adjustable pole clamp for strain pole	3402	7500	0.70	1.54
RE401-1510	Steel through pin for the strain pole clevis	-	-	0.30	0.66
R059738	Click safety counter-pin for locking the yoke steel pin	-	-	0.05	0.11
RE401-2066	Large Trunnion	4536	10000	1.40	3.09
RE401-2068	Small Trunnion	4536	10000	0.83	1.83
FLV17755-1	Trunnion Gauge, conditioned in case	-	-	0.37	0.82
RM1948-3	Ratchet Wrench for hex-nuts and trunnions of the strain carrier	-	-	1.05	2.32
FLV16054-1	Prolonged Ratchet Wrench for hex-nuts and trunnions of the strain carriers	-	-	1.20	2.65
FLV10460-1	Safety steel nut for trunnion support	-	-	0.11	0.24

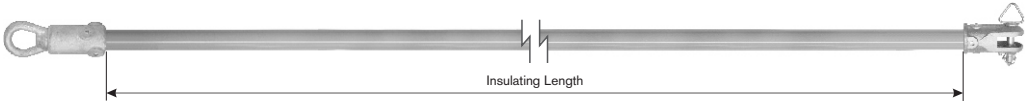
CLEVIS-EYE STRAIN POLES FOR BUNDLE CONDUCTOR YOKE PLATES

Clevis-eye Strain Poles for Bundle Conductor Yoke Plates have been designed to be used with suspension or cold end strings, on single or multiple arrangements. Commonly used on “V” strings, attached directly to the hole of the spreader bar, for strain relief of both strings simultaneously.

Strain Poles for conductor yoke plates accommodate a wide range of extra-strong laminated aluminum yoke plate designs, using cooper alloy clevis heads, with clevis of 25.4 mm (1") wide x 40 or 85 mm (0.13 or 0.28 ft) deep. Both Strain Poles are built of Ø 51 mm (2") Ritzglas® poles and are provided of heat treated aluminum alloy heads and forged steel butt-rings.

STRAIN POLES FOR BUNDLE CONDUCTOR YOKE PLATES

Cat. No.	Description	Insulating Length		Work Load		Approx. Weight	
		m	ft	daN	lb	kg	lb
RC400-0612	Strain pole for bundle conductor yoke plates, with cooper alloy clevis head (fork type), inner spacing of 25.4 mm (1") wide x 40 mm (0.13 ft) deep, and steel through pin for locking	2.58	8.5	5443	12000	6.10	13.45
RC400-0613	Strain pole for bundle conductor yoke plates, with cooper alloy clevis head (fork type), inner spacing of 25.4 mm (1") wide x 40 mm (0.13 ft) deep, and steel through pin for locking	3.11	10.0			6.70	14.77



HOT STICK TENSION PULLER

The Hot Stick Tension Puller is intended for straining and support of energized conductors and can be used during insulators replacement, conductor repair or several other works on energized systems. The Hot stick Tension Puller is complete and versatile, combining basically a Ritzglas® Ø 38 mm (1.5") pole and a straining device.

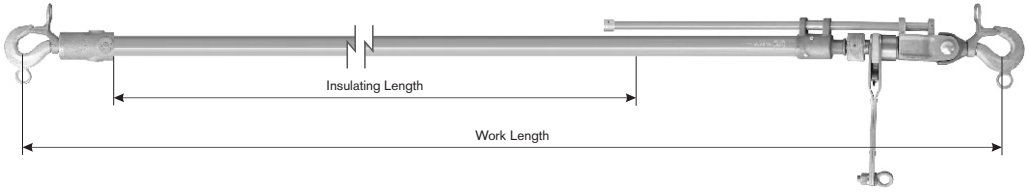
Both models feature non-swiveling forged steel hooks on each end, safety locks and eye-links, for easy and quick installation, manually or using an insulating hot stick.

The safety locks rotate 135 degrees to either left or right from closed position.

The actuation lever is equipped with an eye-link for introduction of the hot stick, enabling operation of the hot stick tension puller from a distance.

HOT STICK TENSION PULLER

Cat. No.	Voltage level (kV)	Work Load		Working length between hooks (m / ft)	maximum displacement (tool)		Insulating Length		Approx. Weight	
		daN	lb		m	ft	m	ft	kg	lb
RC400-0574	34.5	1814	4000	Minimum: 1.64 / 5.5 Maximum: 1.94 / 6.5	0.30	1.0	0.79	2.6	6.40	14.11
RC400-0575	69.0			Minimum: 1.84 / 6.0 Maximum: 2.14 / 7.0			0.99	3.0	6.50	14.33



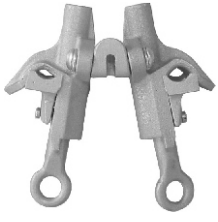
After the conductor has been cut close to the structure, when working with the hot stick tension puller, the Tension Puller Hook Adapter is used to keep the conductor tail out of the work area, to offer total safety during the work performance.

The installation on the conductor is possible with a Grip-all clamp stick.

Conductor range: 4 through 397.4 kcmil ACSR
(6 through 20 mm - 0.02 to 0.07 ft).

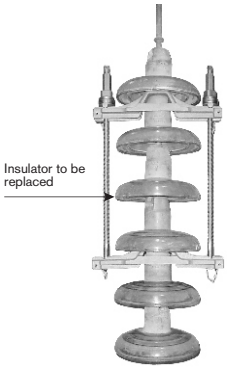
ACCESSORY

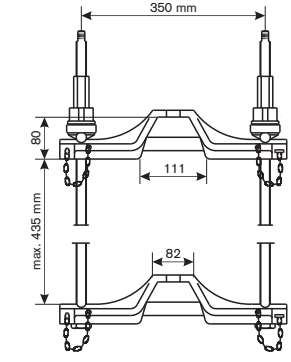
Cat. No.	Description	Approx. Weight	
		kg	lb
RC400-0600	Tie rear clamp	0.66	1.46



RC400-0600

AUXILIARY STRAIN CARRIER





FLV11537-1

The Auxiliary Strain Carrier is a lightweight and portable equipment, designed to ease the replacement of insulator on de-energized suspension strings, especially where the number of damaged insulators does not justify the removal and lowering of the whole string, for replacement of the insulators on ground.

However, the handling of the Auxiliary Strain Carrier requires special attention concerning its installation onto the system, in order to prevent accidents.

Safety procedures:

1. This tool is only used on de-energized systems;
2. Prior to the installation of the Auxiliary Strain Carrier, the lineman must install the complete strain carrier as stated in the previous pages, which is suitable for the insulator string to be maintained, in order to relieve the mechanical strain of the string and enable the release of the insulator.
3. After that, the Auxiliary Strain Carrier will be assembled over the insulator immediately above that to be replaced (the insulators must be replaced one at a time).

WARNING

During the installation, make sure the insulator bell is supported only by the top part of the yoke.

AUXILIARY STRAIN CARRIER

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
FLV11537-1	Auxiliary Strain Carrier for insulator replacement on suspension strings	600	1323	8.15	17.97

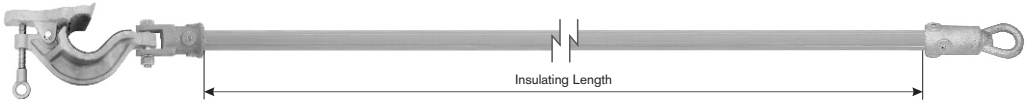
HEAVY-DUTY SUSPENSION LINK STICK

The Heavy-duty Suspension Link Stick has been designed for suspension of conductors from Ø 25 mm (1") through 64 mm (2.5") and can be used with several types of lifting devices, at the structure end.

The Heavy-duty Suspension Link Stick is manufactured with Ø 38 mm (1.5") Ritzglas® poles. The main head in cast aluminum alloy with internal rubber coating (to avoid damages to the conductor) is attached to one of the ends. At the other end, it is provided with an aluminum alloy head with forged steel butt-ring.

HEAVY-DUT SUSPENSION LINK STICK

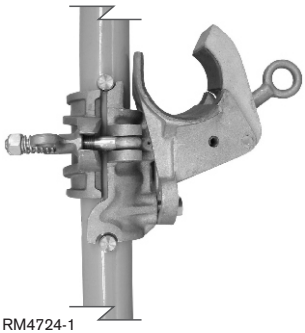
Cat. No.	Heads for Conductors (Ø)	Dimension				Work Load		Approx. Weight	
		Ø		Insulating Length		daN	lb	kg	lb
		mm	in	m	ft				
RH4719-84	3/4" a 1-3/4"	38	1.5"	2.00	6.6	2948	6500	5.00	11.02
RH4719-96				2.31	7.6			5.30	11.68
RH4719-114				2.61	8.6			5.70	12.57
RH4720-84	1" a 2-1/2"			2.00	6.6			5.20	11.46
RH4720-96				2.31	7.6			5.50	12.13
RH4720-114				2.61	8.6			5.90	13.01



REPLACEMENT HEAD

Cat. No.	Description	Approx. Weight	
		kg	lb
RE400-0043	Head for Ø 3/4" through 1-3/4" conductors for replacement on the suspension pole	2.00	4.41
RE400-0044	Head for Ø 1" through 2-1/2" conductors for replacement on the suspension pole	2.50	5.51

RE400-0044



RM4724-1

ADJUSTABLE HOOK ASSEMBLY

The adjustable Hook Assembly can be used with the adjustable strain poles series RC401-2144 through RC401-2149, as a direct method of relieving the load on a suspension string. It has a round shape with a moveable gripper which is adjusted to the conductor with an eye-screw.

It suitable for Ø 28 (1.1") through 64 mm (2.5") (RM4724-1) and Ø 14 (0.5") through 36 mm (1.4") (FLV16193-1), approximately.

The moveable gripper is self-aligning within a range of 45° either to left or right, from vertical.

The hook has a maximum work load of 1688 daN (3720 lb) and can be positioned every 152 mm (0.5 ft) on the strain pole.

ADJUSTABLE HOOK ASSEMBLY

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RM4724-1	Adjustable Hook Assembly (Ø 28 to 64 mm - 1.1" to 0.2 ft)	1688	3720	2.60	5.73
FLV16193-1	Adjustable Hook Assembly (Ø 14 to 36 mm - 0.5" to 0.12 ft)			2.55	5.62

SUSPENSION POLE WITH ADJUSTABLE HOOK

The suspension pole with adjustable hook is made with a Ø 64 mm (2.5") Ritzglas® and is suitable for systems with suspension loads up to 1134 daN (2500 lb).

The position of the conductor hook can be adjusted to any position across the pole, according to the length of the insulator string. Tightening the nuts on each side of the clamp of the adjustable hook ensures firm connection to the pole.

The hook has wide jaws with round edges to avoid damages to the conductor.

The butt-swivel rotates freely and allows using hoists, ropes or strain jacks. The strain hook and base terminal are made of strong thermally treated aluminum alloy.

SUSPENSION POLE WITH ADJUSTABLE HOOK

Cat. No.	Total Length		Insulating Length		Work Load		Approx. Weight	
	m	ft	m	ft	daN	lb	kg	lb
RM4724-1	2.00	6.5	1.55	5.0	1134	2500	6.50	14.33

YOKES

Yokes are intended for attachment of the strain poles to yoke plates, extension links or any other types of supports on the structures, in order to relieve the mechanical load on single or multiple insulator strings, on cold end or suspension structures, for damaged insulator replacement.

These yokes and components have been developed to be attached to various structure configurations. Should the models available herein not meet a specific type of structure, technical drawings of the frames or tower supports have to be submitted for evaluation to Terex engineering department to ensure the proper yoke and components will be designed.

The yokes are made of cast aluminum alloy, heat-treated or from high-strength laminated aluminum plate.

NOTE: The safety click counter-pin (R059738) can be ordered separately as a replacement part.

C

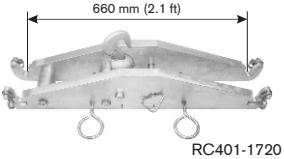
Two-pole strain carrier Yokes

The two former versions of the cast aluminum yokes and aluminum laminated plate yokes have been replaced as follows:

- RC401-1720 replaces former RM2946-1

RM2946-1 yoke includes sockets (RM2945-1, RM2945-3 and RM2945-9)

RC401-1720 yoke includes steel hook and 7/8” x 1-1/2” socket (RC401-1894)

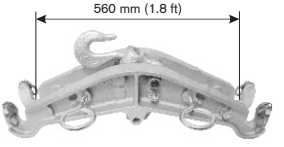


RC401-1720

- RC401-1721 replaces former RM2946-12

Both yokes are supplied with steel hook.

The hot-end and cold-end yokes can be ordered separately as replacement parts of strain carriers types RC401-2174 through RC401-2179.



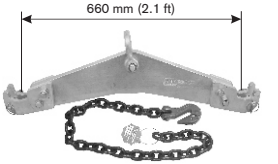
RM2946-1

- RC401-0095

This yoke is used with Two-pole strain carriers, requiring no shoulder or adapter to pull against, since it grips on the compression sleeve of the cold end string.

Shoes have movable device to enable the introduction and locking of the clamp before straining.

Prior to installation, a proper shoe must be defined according to the size of the conductor to be strained.

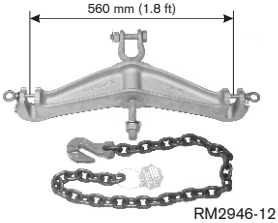


RC401-1721

NOTE

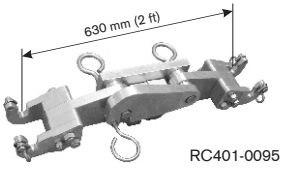
The shoe must be attached directly over the compression sleeve.

This yoke is supplied with 04 interchangeable shoes:

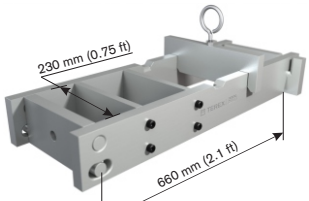


RM2946-12

- 24 AH for conductors from 477 through 556.5 kcmil ACSR Ø 21.7 to 23.4 mm (0.85" to 0.08 ft)
- 30 AH for conductors from 715 through 954 kcmil ACSR Ø 27.4 to 29.6 mm (1" to 0.1 ft)
- 36 AH for conductors from 1192.5 through 1351.5 kcmil ACSR Ø 34 to 36.2 mm (1.3" to 0.12 ft)
- 3/4" through 1" (Ø 19 through 25.4 mm)



RC401-0095



RT401-0935

C

- RT401-0935

Hot-end suspension string yoke, for attachment to triple or quadruple bundle yoke plates, used together with clevis-clevis strain poles.

Made of high-strength laminated aluminum plates.

TWO-POLE STRAIN CARRIERS

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RM2946-1	Hot-end or Cold-end two-pole strain carrier yoke lado morto	(socket) 6804	15000	9.00	19.84
		(hook) 4000	8818		
RM2946-12	Cold-end two-pole strain carrier yoke, with chain	6804	15000	9.70	21.38
RT401-0935	Hot-end two-pole strain carrier yoke for "I" type suspension string (special box type)	6804	15000	7.30	16.09
RC401-1720	Hot-end two-pole strain carrier yoke	6804	15000	12.00	26.46
RC401-1721	Cold-end two-pole strain carrier yoke, with chain	6804	15000	7.50	16.53
RC401-0095	Compression sleeve type yoke for two-pole strain carrier, made of high-strength laminated aluminum plates	4990	11000	21.85	48.17

Single Pole Strain Carrier Yokes

Yokes can be used with adjustable strain poles (series RC401-2144 to RC401-2149) to relieve the mechanical straining from double and multiple insulator strings, both on cold end and suspension structures, during insulator replacement.

These yokes have been designed to fit various types of yoke plates and should be purchased in pairs, according to the structure hardware design. In some situations, they can be used on both the hot and cold end of the insulator string.

For certain applications, some yokes may be used alternatively (refer to table containing the rated work load):

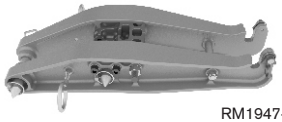
- RC401-1717 yoke may replace RM1947-1 yoke
- RC401-1718 yoke may replace RC401-0003 yoke
- RC401-1719 yoke may replace RC401-0155 yoke

SINGLE POLE STRAIN CARRIER YOKES

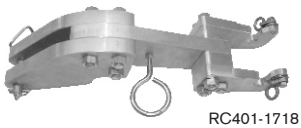
Cat. No.	Application	Work Load		Approx. Weight	
		daN	lb	kg	lb
RC401-0003	Triangular-shape yoke plate	3402	7500	5.20	11.46
RC401-0155	Triangular-shape yoke plate	2268	5000	3.80	8.38
RM1947-1	Rectangular-shape yoke plate	5443	12000	14.00	30.86
RC401-1719	Triangular-shape yoke plate of 3/4" max. thickness	6804	15000	9.40	20.72
RC401-1718	Triangular-shape yoke plate of 1" max. thickness	6804	15000	8.90	19.62
RC401-1717	Rectangular-shape yoke plate of 3/4" max. thickness	6804	15000	13.30	29.32
RT401-0573	Double triangular-shape yoke plate (SADE standard)	4990	11000	4.80	10.58

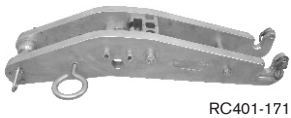

RC401-0003


RC401-0155

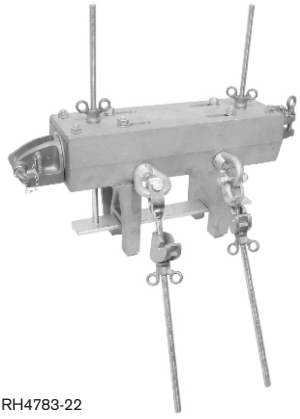

RM1947-1


RC401-1719


RC401-1718


RC401-1717


RT401-0573



RH4783-22

Structure Yokes

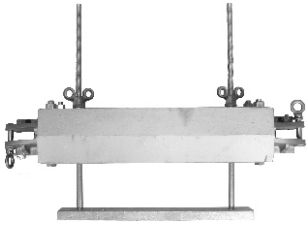
- RH4783-22

The Metallic Structure Yokes are practical and quite versatile when replacing insulator strings. They easily fit over the tower arm, serving as a support for the Strain Poles to relieve straining on the suspension insulator string, together with the strain poles and hot-end yokes.

The supports of the yoke have been designed so that they can be adjusted to fit most tower structure configurations, however, it is recommended that the design drawings of the tower arms are submitted for evaluation by Terex engineering department.

It is composed of a main body part and movable parts made of aluminum alloy.

It can be adjusted from 74 (0.25 ft) through 181 mm (0.6 ft) between the supports and measures 554 mm (182 ft) center-to-center of the swiveling brackets for strain poles.



RC400-0219

- RC400-0219

This yoke is generally used on H-frame crossarms. Design and application is similar to the metallic structure yokes (RH4783-22). In order to fit various crossarm sizes, the two clamp bolts which secure the yoke may be adjusted to three center-to-center positions (230, 280 and 330 mm - 0.75, 0.9 and 1.08 ft), and the height of the crossarm can vary from 230 to 305 mm (0.75 to 1 ft).

RC400-0445

- RC400-0445

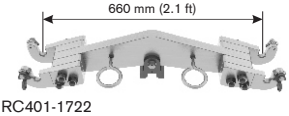
Designed for use on the end of the crossarm and, when necessary, attached through a RT400-0838 bracket. It is provided with swivel castings to ensure proper alignment of the Strain Poles and the hot-end yoke. The load rating is 6804 daN / 15000 lb. When the angle of the end plate on the crossarm is 45°, the load rating is 4082 daN (9000 lb).

RT400-0838

- RT400-0838

The metallic crossarm bracket is used with the steel arm yoke (RC400-0445), where the crossarm is not provided with an end plate for yoke attachment.

The bracket is made of heat-treated aluminum and attached to the metallic crossarm through a wheel binder.



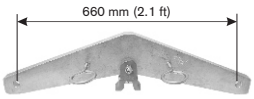
RC401-1722

- RC401-1722

This yoke is made of high-strength aluminum plate and used together with strain poles (series RC401-2144 through RC401-2149). It can normally be attached to the hot end plate of "V" type suspension strings. In some applications, this yoke can be replaced by model RH4794, made of cast aluminum.

- RC401-0168

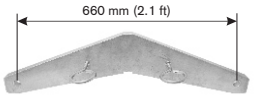
This yoke is used on single "V" type suspension strings and can be attached to yoke plates with the adjustable strain poles or clevis-eye strain poles. It is made of laminated high-strength aluminum plate.



RC401-0168

- RT401-0689

Similar to the RC401-0168 model, but without adapter. Normally used at the hot end of “V” suspension strings and double cold end strings in confined areas.



RT401-0689

- RH4794

This yoke is mostly used on the hot end of the single "I" type insulator strings, on 220 through 345 kV transmission lines with double cables. Made of heat-treated cast aluminum alloy, it is provided with a saddle for duplicator (RH4794-1), attached to its base.


RH4794

NOTE

The model of the support saddle for duplicator RH4794-2 (also used with the RH4794 yoke) can be ordered separately, if necessary.

- RH4794-1 / RH4794-2

The support saddles are used together with the yoke RH4794, with attachment to the insulator string yoke plate. Its mechanism provides 360° continuous rotation.

Available in two sizes: 89 and 305 mm (0.3 and 1.0 ft), for better adjustment to the yoke plate. Both are made of aluminum alloy.


RH4794-1

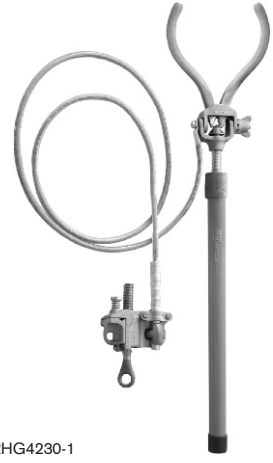

RH4794-2

STRUCTURE YOKES

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RC400-0219	H-frame yoke	5443	12000	17.50	35.58
RC400-0445	Metallic crossarm yoke	6804	15000	8.30	18.30
RT400-0838	Bracket for metallic crossarm	6804	15000	5.30	11.68
RC401-0168	Two-pole strain carrier yoke, for the hot-end of single "V"- type suspension strings	6804	15000	6.50	14.33
RC401-1722	Two-pole strain carrier yoke, for the hot-end of single "V"- type suspension strings	6804	15000	10.30	22.71
RH4783-22	Yoke for metallic structure	5443	12000	23.60	52.03
RH4794	Hot-end yoke for suspension, (3-½") saddle	6804	15000	7.60	16.76
RH4794-1	Support saddle for 89 mm (3-½") duplicator (replacement)	6804	15000	0.69	1.52
RH4794-2	Support saddle for 305 mm (12") duplicator	-	-	1.00	2.20
RT401-0689	Hot-end two-pole strain carrier yoke for “V" suspension string and double cold end string	6804	15000	3.50	7.72

STATIC GROUND

RC600-0000



RHG4230-1

This tool has been designed to eliminate discomforts derived from the electro-static discharge during the connection and disconnection of insulator strings, when performing works on energized systems.

It dissipates the static discharge with the use of a cooper cable (size 16 mm² x 2 m long) and a clamp for connection to the structure framework or conductor cables.

In order to provide grounding of the insulator string at the cold end, the grounding clamp must be connected to the structure bracket and the jaws of the hot stick must be connected to the hardware of the insulator closest to the structure.

When working using barehand method, the clamp must be connected to the energized hardware and the jaws of the hot stick, to the second insulator, at the hot end.

The Static Ground is manufactured with Ø 32 mm x 0.76 m (1.25" x 2.5 ft) overall length Ritzglas® pole.

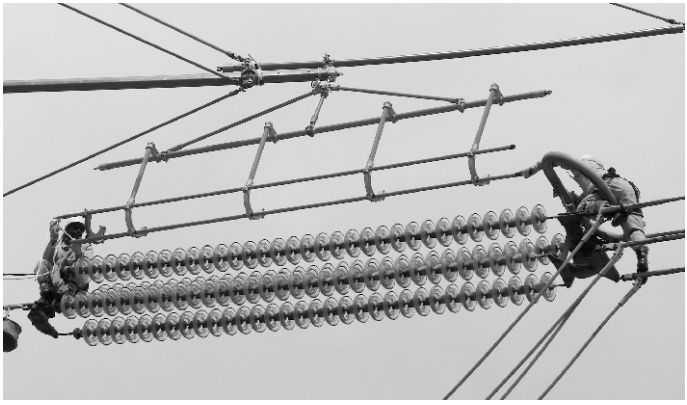
The jaws (“pliers” type) are made of cooper alloy and were designed for insulator fittings of from Ø 64 to 152 mm (2.5" to 6").

The clamps for connection to the structure are available in two versions: with “T”-type screw and with eye-screw. Both are made of cooper alloy and the body of the clamp is made of aluminum alloy.

STATIC GROUND

Cat. No.	Description	Insulating Length		Approx. Weight	
		m	ft	kg	lb
RC600-0000	Static Ground with “T”-type screw connection clamp	0.44	1.5	2.60	5.73
RHG4230-1	Static Ground with eye-screw connection clamp			2.80	6.18

CRADLES



There are three basic solutions for cradles to meet the various insulator maintenance and replacement requirements.

All of them are manufactured with Ritzglas® poles and enable works on cold end or suspension strings from 110 kV through 800 kV.

- Single insulator Cradles

Mostly used on insulator strings from 110 kV through 230 kV. They are supported by a pair of wire tongs or strain link sticks.

- EHV through design insulator Cradles

This cradle is designed to be used on 345 kV through 500 kV combined with cradles supports, providing the displacement of the insulators.

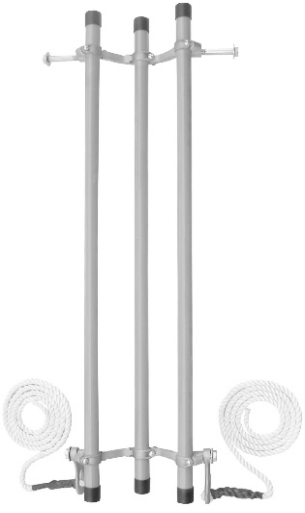
- EHV Side-opening insulator cradles

Used on cold end strings up to 800 kV to provide the removal of single or multiple insulator strings.

Single Insulator Cradles

This cradle is used either for change of insulators on the string or to assist in removing the string and lowering it to the ground. On deadened or running corners, these cradles are used in conjunction with strain carriers. On “I” suspensions, they are used with link sticks and adjustable strain pole assemblies.

They are manufactured with Ø 38 mm (1.5") Ritzglas® poles. Transmission cradles are provided with two steel lugs on the forward end, to support the insulator string with one pair of wire tongs or strain link sticks.



The back end of the cradle is provided with eyes and ropes to tie it up to the structure as hinging points. This way, the string may be raised or lowered to the most suitable position enabling the replacement of the damaged insulator(s). When lowering the insulator cradle is not necessary, the cradle is supported in eyes located on the forward yoke of Two-pole Strain Carriers.

TRANSMISSION INSULATOR CRADLES

Cat. No.	Maximum Capacity	Insulating Length		Approx. Weight	
		m	ft	kg	lb
RH1840-4	(6) Ø 254 mm (10") insulators	1.22	4	5.80	12.79
RH1840-6	(10) Ø 254 mm (10") insulators	1.83	6	7.00	15.43
RH1840-8	(14) Ø 254 mm (10") insulators	2.44	8	8.30	18.30
RH1840-10	(18) Ø 254 mm (10") insulators	3.05	10	12.20	26.90
RH1840-12	(22) Ø 254 mm (10") insulators	3.66	12	14.70	32.41

EHV through design insulator Cradles

This equipment is used for insulator replacement on strings up to 500 kV. It is required when lowering a “V”-type or cold end insulator string and for raising “I”-type suspension insulator strings.

The deep through design is a safe feature to prevent accidental dropping of the insulator strings with the assistance of the Slotted Insulator Retaining Plate to secure the top insulator, keeping it firm during displacement.

The cradle can be lowered or lifted easily for insulators replacement, using the forged steel butt-swivels on one side and the steel bail (R070184) on the other, connected to a strain link stick. They are also provided with an auxiliary hook (R068922).

The steel bail and hook are supplied together with the cradle.

C

EHV THROUGH DESIGN INSULATOR CRADLES

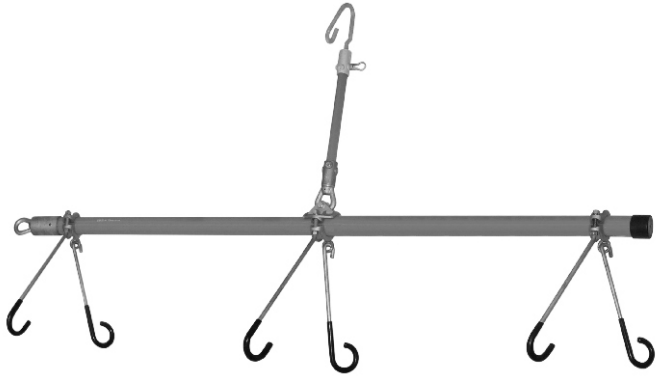
Cat. No.	Maximum Capacity	Insulating Length		Approx. Weight	
		m	ft	kg	lb
RC401-0015	25 pcs of Ø 254 mm (10"t) insulators	3.40	11.0	16.40	36.16
RH1950-9	19 pcs of Ø 254 mm (10") insulators	2.69	9.0	14.90	32.85

Cradle Support

Manufactured with Ø 64 mm (2.5") Ritzglas® poles on its main structure. It is provided with a heat treated aluminum head, forged steel butt-swivel and three pairs of hooks attached to a spiral link stick, used as a support element.

CRADLE SUPPORT

Cat. No.	Maximum Capacity	Insulating Length		Work Load		Approx. Weight	
		m	ft	daN	lb	kg	lb
RH1950-90	Cradle support with three pairs of hooks	2.97	10	227	500	13.40	29.54



EHV Side-opening insulator cradles

The side opening cradles have been designed for selective removal of an insulator string, particularly in double, triple or quadruple cold end bundles. Using this cradle, there is no need of removing top strings to get to the bottom string.

Manufactured with Ø 64 mm (2.5") Ritzglas® poles as its main element and three Ø 38 mm (1.5") poles, it is rated at 227 daN (500 lb) maximum work load, for the 2.69 m (8.8 ft) model and 454 daN (1000 lb) for the 3.91 m (13 ft) and 4.83 m (16 ft) cradles.

Butt-swivels on ends of poles rotate freely.

The 0.38 m (1.25 ft) hook assembly is used for single or double cold end bundles, whereas the 0.79 m (2.6 ft) assembly is used for the removal of bottom strings in quadruple cold end bundles.

The Insulator Retaining Plate has a dual purpose, one side is adaptable to Ø 279 mm (10") insulator bells and the opposite side is adaptable to Ø 324 mm (13") insulator bells.

Sticks for connection to the boom, 01 pc of top insulator retaining plate, hook assembly and metallic brackets are supplied together with the cradles.

EHV SIDE-OPENING INSULATOR CRADLES

Cat. No.	Description	Work Load		Approx. Weight	
		daN	lb	kg	lb
RC401-0354	EHV Side-opening insulator cradles, 4.83 m (16 ft) insulating length, 4 pcs of 0.38 m (1.5"t) support hooks, 2 pcs of metallic brackets and 1 pc of insulator retaining plate	454	1000	62.00	136.69
RC401-0355	EHV Side-opening insulator cradles, 4.83 m (16 ft) insulating length, 4 pcs of 0.79 m (2.6 ft) support hooks, 2 pcs of metallic brackets and 1 pc of insulator retaining plate			64.00	141.10
RC401-0356	EHV Side-opening insulator cradles, 3.91 m (13 ft) insulating length, 4 pcs of 0.38 m (1.5") support hooks, 2 pcs of metallic brackets and 1 pc of insulator retaining plate			58.50	128.97
RC401-0357	EHV Side-opening insulator cradles, 3.91 m (13 ft) insulating length, 4 pcs of 0.79 m (2.6 ft) support hooks, 2 pcs of metallic brackets and 1 pc of insulator retaining plate			60.50	133,38
RC401-0358	EHV Side-opening insulator cradles, 2.69 m (8.8 ft) insulating length, 3 pcs of 0.38 m (1.5") support hooks and 1 pc of insulator retaining plate	227	500	42.60	93.92
RC401-0359	EHV Side-opening insulator cradles, 2.69 m (8.8 ft) insulating length, 3 pcs of 0.79 m (2.6 ft) support hooks and 1 pc of insulator retaining plate			44.00	97.00

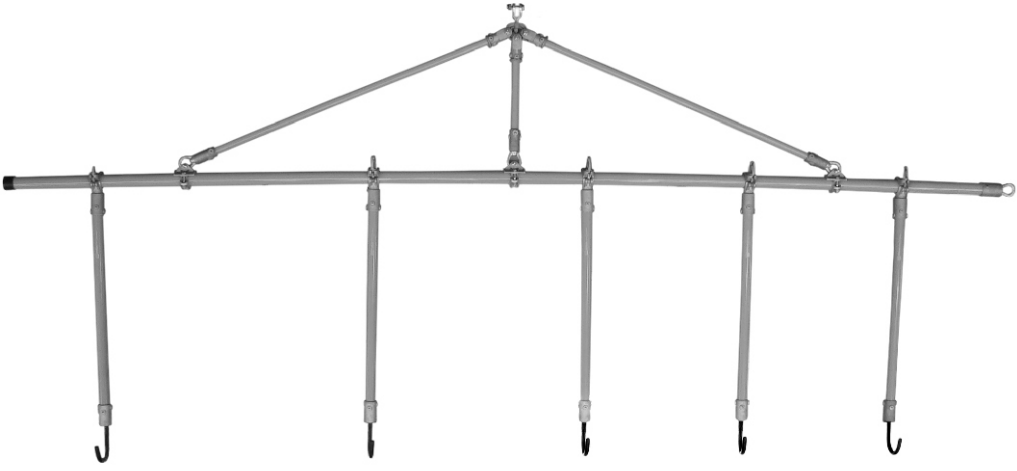
“J”- HOOK ASSEMBLY

Manufactured with Ritzglas® pole, the "J"-Hook Assembly can be used as an efficient alternative solution for removal of the bottom insulators in a triple insulator string.

It is provided with a steel hook at one end of the pole, which swivels freely, for a quick and easy adjustment to the string. In order to ensure protection of the insulators, the hook is fully covered with plastic. For the complete configuration of the insulator cradle with the "J"-Hook Assembly, it is necessary to connect it to the main support set of the cradles series RC401-0354 to RC401-0359.

“J”- HOOK ASSEMBLY

Cat. No.	Ø		Length		Work Load		Approx. Weight	
	mm	in	m	ft	daN	lb	kg	lb
RC402-0790	51	2"	0.91	3.0	113	250	4.00	8.81



* Illustrative photo mount rod with hook type “J” and the mainstay of the cradle, which must be purchased separately.

- Maximum capacity of the set: 454 daN (1000 lb)

TROLLEY POLE

The Trolley Pole Set is used for displacement of the string of suspension insulators to the structure.

Made of Ritzglas® pole and metallic aluminum and steel parts, the trolley pole can be horizontally fastened under the tower arm using tower type wire tong saddles.

The fork suspension tool attachment (RH4723-2), slotted type, for insulators from Ø 267 mm (10.5") through 273 mm (1 ft) properly bolts to the end of the Ø 64 mm (2.5 ft) Trolley Pole. Together with the single trolley wheel (RH4723-4) or the tandem trolley wheel (RC400-0152) used on extremely long or heavy insulator strings, these tools form the complete set of the Trolley Pole Suspension Insulator Tool.

The slotted suspension tool attachment fixed to the pole can be fitted under the top insulator of the string for removal and horizontal displacement for maintenance purposes and return to the original position.

TROLLEY POLE

Cat. No.	Ø		Insulating Length		Approx. Weight	
	mm	in	m	ft	kg	lb
RH4721-112	64	2.5"	3.51	11.5	9.50	20.94
RC400-0546	76	3.0"	3.51	11.5	13.80	30.42

COMPONENTS

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4723-2	Slotted suspension attachment for Ø 64 mm (2.5") trolley pole	6.40	14.11
RH4723-4	Single trolley wheel with Ø 64 mm (2.5") clamp	3.60	7.94
RC400-0152	Tandem trolley wheel with Ø 64 mm (2.5") clamp	7.30	16.09

RH4723-2

RH4723-4

RC400-0152

NOTE

SUSPENSION STRING - The slotted tool attachment, tandem trolley wheel and trolley pole set has been designed for a maximum work load of 400 daN (880 lb), but the following procedures must be observed during its application:

1. always use the tandem trolley wheel with Ø 64 mm (2.5") pole clamp (RC400-0152)
2. We recommend the 64mm dia. trolley sticks RH4721-112 for above load.
3. the maximum distance between the fixing points of the trolley pole and the structure is 2 m (6.5 ft), in order to avoid excessive bending of the pole
4. the attachment of the Ø 64 mm (2.5") pole clamp of the tandem trolley wheel to the slotted tool attachment and pole assembly, must provide maximum clearance of 500 mm (1.65 ft) from the tool attachment center.

C

GROUP D

TEMPORARY JUMPERS

GROUP D

TEMPORARY JUMPERS

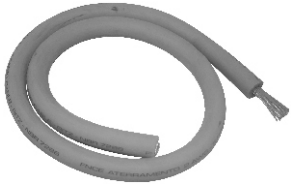
15 kV RATED PROTECTED CABLES

The 15 kV Protected Cables are extremely flexible even in low temperatures and are provided with cover and insulation combinations resistant to abrasion, oil, heat, moisture and ozone effects.

Its orange color is natural of the EPR (Ethylene Propylene) based sheathing.

For easy identification and classification, the voltage and size (AWG) are marked all across the cable surface, regularly spaced.

The conductor is composed of extra-flexible copper filaments.



15 kV RATED PROTECTED CABLES

Cat. No.	Cross Section mm²	Cable Size (AWG)	Nominal Copper Conductor Ø		Max. Current Rating (A)	Approx. Weight / m	
			mm	in		kg	lb
R3641	35	2	8	0.3"	200	0.77	1.70
R3861	50	1/0	10	0.4"	260	1.40	3.09
R3863	70	2/0	12	0.5"	300	1.70	3.75
R3866	95	4/0	15	0.6"	400	2.35	5.18

INSULATED CLAMPS

The clamp with insulating protection for by-pass is suitable for maintenance works on energized systems up to 25 kV, when working with the rubber glove method.

The electric connection with the conductor is possible through manual twisting, for opening and closing of the jaw, which holds onto the conductor in a firm and safe manner.

The connection with the jumper cable is possible through a copper ferrule (series RC600-2598 to RC600-2601), which should be ordered separately. The body of the insulated clamp is built with thermoplastic insulating protection in orange color and the jaws are made of bronze alloy.

This tool is suitable for works with various cable sizes, from 2 AWG through 4/0 AWG.

The nominal current capacity is 400 A.

INSULATED CLAMPS

Cat. No.	Description	Clamp Connection Range		Current Rating (A)	Approx. Weight	
		Minimum	Maximum		kg	lb
RG4765	1 pair of insulated By-Pass clamps	# 6 Copper Ø 4 mm (0.2")	477 MCM ACSR Ø 22 mm (0.9")	400	2.50	5.51
RT601-0039	1 piece of insulated By-Pass clamp	# 6 Copper Ø 4 mm (0.2")	477 MCM ACSR Ø 22 mm (0.9")	400	1.25	2.76

COPPER FERRULE 1kV PROTECTED CABLE

Threaded Unshrouded Ferrules

The Copper Jumper Cable Ferrules are supplied in standard sizes, according to the chart below and are used to connect cables to the insulated clamps (RG4765) and By-Pass clamps (RC600-1743 / RG3622-1).

At one end, the ferrules are provided with 5/8" thread, with nut and washer and at the other end, they are fitted with an internal hole, where the jumper cable will be installed and then pressed.

THREADED UNSHROUDED FERRULES

Cat. No.	Application	Burndy Type Gauge No. Or Equivalent	Compression No.	Approx. Weight	
				kg	lb
RC600-2598	2 AWG cable	U 165	2	0.12	0.26
RC600-2599	1/0 AWG cable			0.12	0.26
RC600-2600	2/0 AWG cable			0.14	0.31
RC600-2601	4/0 AWG cable	U 166	2	0.15	0.33

BY-PASS CLAMPS

The By-Pass Clamps body is made of aluminum alloy. Connectors and eye-screws are made of bronze alloy. These clamps are suitable for works with the Hot Stick Method, using Ritzglas® hot stick.

RG3622-1

RC600-1743

BY-PASS CLAMPS

Cat. No.	Clamp Connectio Range		Approx. Weight	
	Minimum	Maximum	kg	lb
RG3622-1	#6 Copper Ø 4 mm (0.2")	900 MCM ACSR Ø 29 mm (1.1")	0.70	1.54
RC600-1743		1590 MCM ACSR Ø 38 mm (1.5")	0.72	1.59

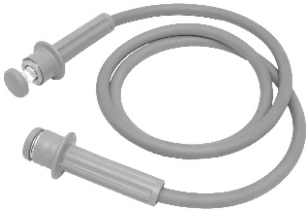
TEMPORARY JUMPER SETS

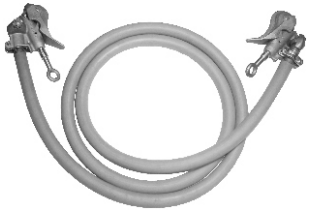
The temporary jumpers are very common when performing maintenance on energized systems up to 15kV and shall be done either by Hot Stick (in this case using a hot stick for support) or Rubber Glove methods.

All Temporary Jumper Sets use two pieces of copper ferrules (series RC600-2598 to RC600-2601), one on each end of the cable for clamp connection.

15 kV TEMPORARY JUMPERS - RUBBER GLOVE INSTALLATION WITH INSULATED CLAMPS RT601-0039

Cat. No.	Cable Size (AWG)	Clamp Connection Range		Total Length (m / ft)	Nominal Current Capacity (A)	Approx. Weight	
		Min.	Max.			kg	lb
RC601-0171	2	#6 Copper Ø 4 mm (0.2")	477 MCM ACSR Ø 22 mm (0.9")	3.70 12.0	200	5.20	11.46
RC601-0172	1/0				260	6.70	14.77
RC601-0173	2/0				300	7.80	17.20
RC601-0174	4/0				400	10.20	22.49





RC600-1584

15 kV TEMPORARY JUMPERS - HOT STICK INSTALLATION WITH INSULATED CLAMPS RG3622-1

Cat. No.	Cable Size (AWG)	Clamp Connectio Range		Total Length (m / ft)	Nominal Current Capacity (A)	Approx. Weight	
		Min.	Max.			kg	lb
FLV17443-1*	2	#6 Copper Ø 4 mm (0.2")	900 MCM ACSR Ø 29 mm (1.1")	3.7 12.0	200	4.80	10.58
FLV17443-5*				4.6 15.0		5.50	12.13
FLV17443-2*	1/0			3.7 12.0	260	7.10	15.65
FLV17443-6*				4.6 15.0		8.40	18.52
FLV17443-3*	2/0			3.7 12.0	300	8.30	18.30
FLV17443-7*				4.6 15.0		9.80	21.61
FLV17443-4*	4/0			3.7 12.0	400	10.70	23.59
FLV17443-8*				4.6 15.0		12.80	28.22

* 02 pcs Threaded connectors (RC600-1584) for connection of the cable ferrules to the clamp, in special situations where the clamp has been designed for connection without thread.

JUMPER SUPPORTS

The temporary jumper support to be installed on poles through wheel binder is manufactured with Ø 64 mm x 1.22 m (2.5" x 4 ft) Ritzglas® pole and is used for lifting jumper cables.

It is composed of 4 wire holders, twisting type, provided with an internal device to prevent the jumper from sliding, avoiding thus its contact with ground.

Each wire holder suitable for cables of from Ø 19 mm (0.75") through 38 mm (1.5").

The nominal load capacity of each wire holder is 34 daN (75 lb).

TEMPORARY JUMPER SUPPORTS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC601-0013	Temporary Jumper Support to be installed on poles	11.30	24.91

TRANSFORMER BUSHING TEMPORARY JUMPERS

The use of the Transformer Bushing Temporary Jumpers is a very common practice in maintenance works on medium voltage energized systems, for replacement and/or repair of components installed between the transformer bushings and the system, which can be carried out with the Hot Stick or Rubber Glove Methods.

This tool is available in two assembly models, according to the descriptions below. (both are manufactured with 15 kV protected cable - 2 AWG)

JUMPERS COMPOSITION

- FLV17448-1

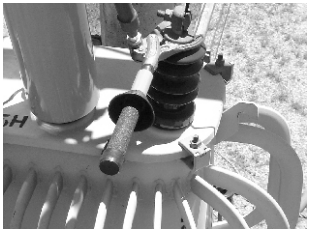
3.50 m (11.5 ft) 15 kV rated protected cable - size 2 AWG (R3641)

01 pc Clamp for Transformer bushing (FLV11179-2)*

01 pc Protection device for Jumper (FLV05784-1)

01 pc Twisting Clamp (RG3622-1)

01 pc Insulating Hanger (RS1600-7)



- FLV17449-1

3.50 m (11.5 ft) 15 kV protected cable - size 2 AWG (R3641)

01 pc Clamp for Transformer bushing (FLV11179-2)*

01 pc Fuse switch (RC600-1895)

01 pc Twisting Clamp (RG3622-1)

NOTES

* On the above arrangements, clamp model FLV11179-2 has been considered (for installation with the Rubber Glove Method). The “T” - screw type clamp FLV11179-3 can also be ordered (also installed with the Rubber Glove Method) or FLV11179-1, with eye-screw, for installation with the Hot Stick Method.

The length of the cable can be modified according to the installation arrangement.

TEMPORARY JUMPER FOR TRANSFORMER BUSHING

Cat. No.	Description	2 AWG Cable		Nominal Current Capacity (A)	Approx. Weight	
		m	ft		kg	lb
FLV17448-1	with protection device (FLV05784-1)	3.50	11.5	100	5.80	12.79
FLV17449-1	with fuse switch (RC600-1895)				8.10	17.86

TRANSFORMER BUSHING CLAMPS

The clamps have been designed to be installed directly to the transformer bushing when carrying out maintenance on energized systems.

They are available in four models, three of which are discerned only by the type of terminal used to tighten its jaws and one has been designed for operation in angle:

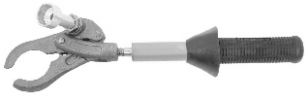
- FLV11179-1

This model is provided with an eye-screw and clamp tightening is done with the Hot Stick Method, using hot sticks.

- FLV11179-2

This model is provided with Ø 25 x 215 mm (1" x 0.71 ft) (insulating handle and rubber storm skirt and its installation is done with the Rubber Glove Method.

FLV11179-1



FLV11179-2

TRANSFORMER BUSHING CLAMPS

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV11179-1	With eye-screw	0.80	1.76
FLV11179-2	With Ritzglas® insulating handle	0.80	1.76

TEMPORARY JUMPER PROTECTION DEVICES

The Temporary Jumper Protection Devices are composed of a fuse-cartridge with aluminum coupling ferrules and are used as components of the temporary jumpers for transformer bushings.

Clamp RG3622-1 is connected to the head located on one end and the 2 AWG jumper cable is connected to the other end.

NOTE
The fuse link is not included and must be specified and installed by the customer. It is recommended to use only fuse-links of proven performance.

TEMPORARY JUMPER PROTECTION DEVICES

Cat. No.	Nominal Current Capacity (A)	Approx. Weight	
		kg	lb
FLV05784-1	100	0.80	1.76

TEMPORARY FUSE SWITCH

The Temporary Fuse Switch up to 27 kV is used to maintain the protection when performing maintenance on conventional fuse switches of distribution systems. It is a component of the temporary jumper for transformer bushing.

The installation and removal of the Temporary Fuse Switch is done using a hot stick.

Bronze stud at the bottom end suitable for clamps on the temporary tap jumper. The Ø 32 mm (1.25") Ritzglas® pole fitted with two rubber storm skirts ensures insulation.

NOTES

- Fuse links are not supplied with the fuse switches and must be obtained from specialized suppliers, with maximum current rating of 100 A.
- It is necessary to use a load buster device to open the fuse switch, through the eye-link of the fuse-cartridge.
- The Pivot-lever type Temporary Fuse Switch allows the closing of the switch from the opposite side of the fuse-cartridge, using a hot stick.

RC600-1895

RC600-1944

TEMPORARY FUSE SWITCH

Cat. No.	Description	Voltage Class	Approx. Weight	
			kg	lb
RC600-1895	standard type	up to 27 kV	4.10	9.04
RC600-1944	pivot-lever type		4.40	9.70

INSULATING HANGER

The insulating hanger is crucial for installation of the temporary jumper on hot lines, so that linemen do not have to hold on to the energized jumper cable, while switching to a different position. It serves as a parking stand for one end of the jumper, without energizing it, so the other end can be handled and installed with total safety.

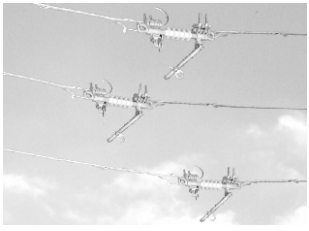
The Insulating Hanger is provided with two Ø 12 x 64 mm (0.5" x 0.20 ft) cooper alloy double stud fitting. Ø 25 x 320 mm (1" x 1 ft) Ritzglas® pole provides the insulation.

Clamp with eye-screw for operation with a hot stick provides installation onto cable.

INSULATING HANGER

Cat. No.	Description	Approx. Weight	
		kg	lb
RS1600-7	Insulating Hanger for temporary jumper up to 34.5 kV	1.00	2.20

TEMPORARY CUT-OUT EQUIPMENT



The Temporary Cut-Out Equipment is a safe and economic solution for the cut-out of distribution systems up to 24 kV, for it allows linemen to de-energize only specific parts of the line for maintenance purposes.

The operation consists in installing this tool on conductors from 1/0 to 336.4 MCM (Ø 10 to 18 mm - 0.4" to 0.7"), observing the live line work procedures, on previously determined locations, hence allowing to carry out maintenance on de-energized sections for a short period of time.

The installation of the equipment for temporary cut-out is always carried out close to the structures, observing all the live line work procedures.

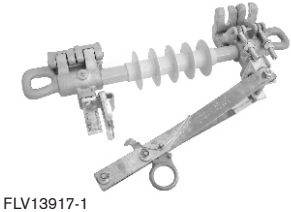
Aiming at providing highest operational safety, one temporary cut-out must always be installed misaligned with regards to the adjacent one.

The Temporary Cut-Out Equipment has been designed with the same technical characteristics as those of a traditional knife-switch, nevertheless it is provided with insulating components that make it suitable for above applications.

This equipment has provisions for opening energized systems under load, using a load buster type device.

The insulating body is composed of a Ø 30 mm x 0.25 m (1.2" x 0.8 ft) rod, polymer insulators and aluminum alloy connectors.

Total length: 0.60 m (2 ft)



FLV13917-1

TEMPORARY CUT-OUT EQUIPMENT

Cat. No.	Descrição	Approx Weight	
		kg	lb
FLV13917-1	Temporary Equipment for sectioning up 24 kV Voltage level	5.20	11.46
FLV17545-1	Handbag to transport one equipment	1.30	2.87

TECHNICAL CHARACTERISTICS

Maximum Nominal Voltage of the switch (U_n)	24.2 kV (effective)
Nominal Frequency (f)	60 Hz
Nominal Withstand Voltage to industrial frequency (1 min.) (U_f)	55 kV (effective)
Nominal Withstand Voltage to environmental impulse (U_i)	140 kV (peak value)
Nominal current (I_n)	630 A
Nominal Withstand Current of short-duration and duration timing (I_t/t)	12.5 kA (effective - 1 sec.) 31.25 kA (peak value)
Recommend torque to the connector screw (T)	3.0 daN.m (22 ft-lb)

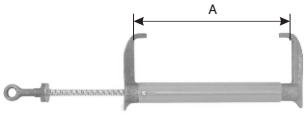
TEMPORARY BY-PASS FOR FUSE SWITCH

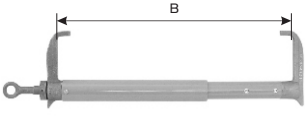
The By-Pass (FLV12409-1) has been designed for temporary release of the cartridge, enabling the replacement of the fuse link. The operation consists in installing the device with a Grip-all Clampstick or Ritzglas® Hot Stick, preventing the interruption of the circuit.

The capacity to open the by-pass allows the installation in fuse switches up to 25kV.

It is provided with an internal metallic busbar rated at maximum 100 A, fixed to the aluminum supports, which establish contact with the metallic parts of the switch of several different manufacturers. A protection system with fiberglass tube, like a cover, protects the shrouded metallic part during the operation, against accidental contacts to the energized points.

The opening and closing of the By-Pass is possible by twisting the threaded part with an eye-link, for installation using hot stick.





TEMPORARY BY-PASS FOR FUSE SWITCH

Cat. No.	Opening Range				Approx. Weight	
	A		B		kg	lb
	mm	ft	mm	ft		
FLV12409-1	280	0.9	442	1.5	1.47	3.24

MOBILE SWITCH-OFF

The Mobile Switch-Off (FLV18171-1) permits insulating and working on lightning arresters and CTs and PTs for maintenance, tests or replacement purposes, on energized systems from 230 kV through 500 kV, using Bare-hand Method live line techniques.

The Mobile Switch-Off provides safety to linemen and uninterrupted power supply. It has been specially designed for easy assembly on field, keeping the same routine of use of an insulating scaffolding and recommended safety distances.

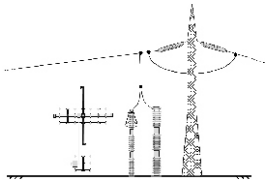
An Insulating Scaffold is necessary to support the Mobile Switch-Off and have to be ordered separately.

MAIN ADVANTAGES

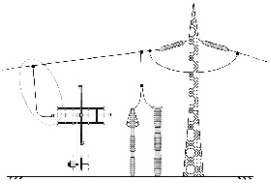
- Increased power availability by utilities
- Increased performance flexibility for the live line crew
- Cost savings in workmanship
- Increased availability of equipment to be used on electrical systems

MOBILE SWITCH-OFF

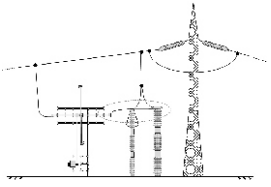
Cat. No.	Description
FLV18171-1	Mobile Switch-Off for works on live lines from 230 through 500 kV



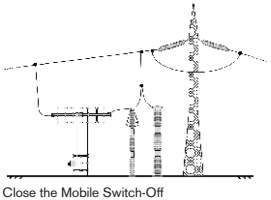
Assembly the Scaffold with the Mobile Switch-Off opened



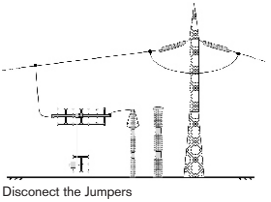
Conect the first Jumper on the Live line



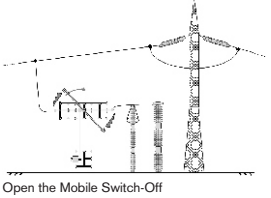
Conect the second Jumper on Live Line



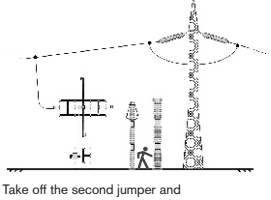
Close the Mobile Switch-Off



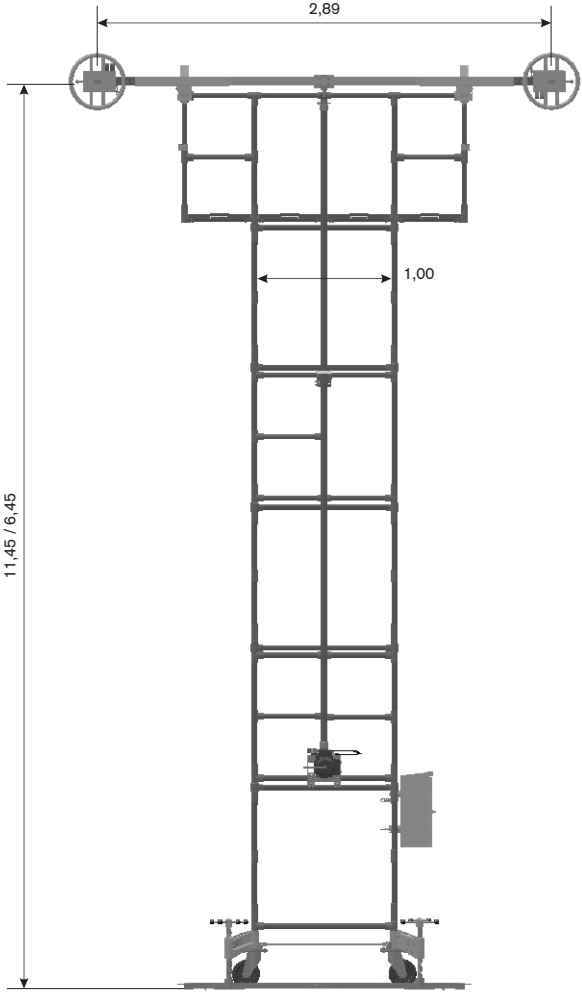
Disconect the Jumpers



Open the Mobile Switch-Off



Take off the second jumper and maintenance tasks can be done



BASIC CHARACTERISTICS

Switching and actuation assembly - Connection of the components of a switch, with following characteristics:

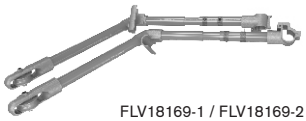
- Rated Capacity: from 230 kV through 500 kV
- Contacts Rated Current: 1200 A
- Max. Atmospheric Impulse Voltage: 1050 kV
- Time of opening and closing: 1.5 s
- Feeding source: 220 V
- Remote opening and closing, using radio-frequency control
- Lever for emergency manual operation

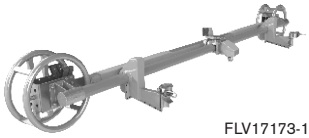
COMPOSITION OF THE SET

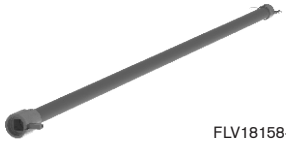
6 m	11 m	Unit.	Cat. No.	Description
Qty.	Qty.			
1	1	pc	FLV18169-1	Lifting Gins
1	1	pc	FLV18169-2	Lifting Gins
1	1	pc	FLV17173-1	Live Work Assembly
1	1	pc	FLV18158-1	Operating Rods
-	2	pc	FLV18158-2	Operating Rods
1	1	pc	FLV18158-5	Operating Rods
2	4	pc	FLV17172-1	Bracket for the operating rod support
1	1	pc	FLV18170-1	Motoreductor
1	1	pc	FLV18161-1	Control box, including wired or wireless remote controls
1	1	pc	FLV21133-1	Box for storing the blades of the Mobile Switch-off
1	1	pc	FLV21130-1	Box for storing the motor of the Mobile Switch-off

ASSEMBLING OPTIONS OF SCAFFOLD FOR MOBILE SWITCH-OFF

6 m	11 m	Unit.	Cat. No.	Description
Qty.	Qty.			
250	250	m	RM1895-3	Rope
2	2	pc	FLV16237-1	Intermediate beam of security
2	5	pc	FLV15444-1	Step removable for scaffolding
4	8	pc	FLV04803-3	String insulating separator
4	8	pc	FLV23916-1	Picket
1	1	pc	FLV17444-1	Platform 1 m x 2 m
2	2	pc	FLV09091-1	Module of 2 m for scaffold
5	10	pc	FLV16241-3	Diagonal beam Ø 38 mm x 1.40 m
4	4	pc	FLV16241-1	Lower side beam Ø 38 mm x 1.00 m
10	20	pc	FLV06052-1	Module of 1 m for scaffold
1	1	pc	FLV11630-1	Rotation for displacement of the scaffolding
1	1	pc	FLV11658-1	Set of rails for the base of the scaffold


FLV18169-1 / FLV18169-2


FLV17173-1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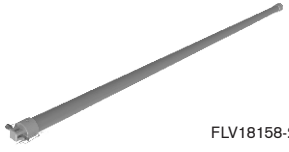
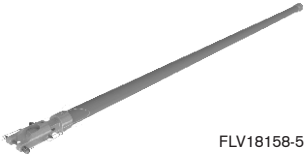
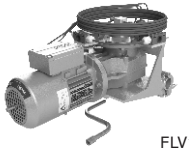

FLV18158-2


FLV18158-5


FLV17172-1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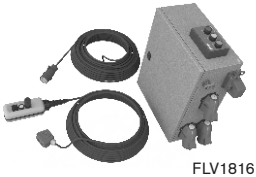

FLV18161-1

D

GROUP E

LADDERS, PLATFORMS AND SCAFFOLDS

GROUP E

LADDERS, PLATFORMS AND SCAFFOLDS

HOT LINE LADDER

Hot Line Ladders are intended for several applications on high voltage hot line works, for they permit the lineman to work in a convenient position and perform line repairs on hard-to-reach places.

All hooks are made of Ø 25.4 mm (1") steel with surface treatment and are of swivel-type for adaptation to the several positions on the structure.

For increased operational safety, the hooks are provided with steel with surface treatment chain and locking system.

The rungs are made of Ø 32 mm (1.25") Ritzglas® poles, with sliding-proof coating.

In addition to the high mechanical strength of the connections between side rails and rungs, the Ladders for Hot Line Work are equipped with reinforcing steel rods close to the ends of the ladders.

Single Ladders with Hooks

The ladders series RH4903-8 through RH4903-12 are built with Ø 38 mm (1.5") Ritzglas® poles and the Ladders series RH4904-8 through RH4904-16 are built with Ø 51 mm (2") Ritzglas® poles, which form the siderails. They are only used for vertical position works.

The ladders (series RH4905-8 through RH4905-20) are built with Ø 64 mm (2.5") Ritzglas® poles, which form the side rails. These ladders are more appropriate for horizontal position works.

LADDERS WITH Ø 38 mm (1.5") SIDERAILS

Cat. No. (8" Hook)	Insulating Length		Distance Between Rungs		Approx. Weight	
	m	ft	m	ft	kg	lb
RH4903-8	2.39	8.0	0.30	1.0	11.00	24.25
RH4903-10	3.00	10.0			12.90	28.44
RH4903-12	3.61	12.0			14.90	32.85

LADDERS WITH Ø 51 mm SIDERAILS

Cat. No. (8" Hook)	Insulating Length		Distance Between Rungs		Approx. Weight	
	m	ft	m	ft	kg	lb
RH4904-8	2.39	8.0	0.30	1.0	20.80	45.86
RH4904-10	3.00	10.0			22.90	50.49
RH4904-12	3.61	12.0			24.40	53.79
RH4904-14	4.22	14.0			26.20	57.76
RH4904-16	4.83	1.0			28.60	63.05

LADDERS WITH Ø 64 mm SIDERAILS

Cat. No. (8" Hook)	Insulating Length		Distance Between Rungs		Approx. Weight	
	m	ft	m	ft	kg	lb
RH4905-8	2.39	8.0	0.30	1.0	28.60	63.05
RH4905-10	3.00	10.0			31.00	68.34
RH4905-12	3.61	12.0			33.00	72.75
RH4905-14	4.22	14.0			37.20	82.01
RH4905-16	4.83	16.0			38.70	85.32
RH4905-18	5.44	18.0			42.00	92.59
RH4905-20	6.05	20.0			43.40	95.68

Add suffix “A” to the catalog No. for 0.36 m (14”) hooks.

Add suffix “B” to the catalog No. for 0.40 m (18”) hooks, except for ladders with Ø 38 mm (1.5") siderails.

Nominal Work Load:

Ladders with 8” (0.20 m) Hooks: 567 daN (1250 lb)

Ladders with 14” (0.36 m) Hooks: 454 daN (1000 lb)

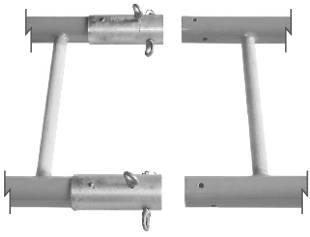
Ladders with 18” (0.46 m) Hooks: 340 daN (750 lb)

Sectional Ladders with Hooks

The Sectional Ladders with Hooks are made of Ø 64 mm (2.5") Ritzglas® poles which form the side rails and provide for combinations up to 9.76 m (32 ft) long.

All sections are interchangeable allowing to reach several different heights with only a few sections, with dimensions suitable for transportation.

The top sections are provided with Ø 25.4 mm (1") and the connection between sections is made of steel splices with surface treatment and cooper alloy counter-pins, for safe locking.



TOP SECTION (Ø 64 mm - 2.5")

Cat. No. (8" Hook)	Insulating Length		Approx. Weight	
	m	ft	kg	lb
RC402-0402	3.61	12.0	33.00	72.75
RC402-0404	4.22	14.0	35.40	78.04
RC402-0407	4.83	16.0	37.80	83.33
RC402-0411	6.05	20.0	42.60	93.92
RC402-0482	3.00	10.0	30.60	67.46

MIDDLE SECTION (Ø 64 mm - 2.5")

Cat. No.	Insulating Length		Approx. Weight	
	m	ft	kg	lb
RT402-0423	2.96	9.5	22.00	48.50

BOTTOM SECTION (Ø 64 mm - 2.5")

Cat. No.	Insulating Length		Approx. Weight	
	m	ft	kg	lb
RC402-0418	2.39	8.0	19.60	43.21
RC402-0421	3.00	10.0	22.00	48.50
RC402-0422	3.61	12.0	24.40	53.79

Sectional Ladders with Three Rails

The Sectional Ladder with Three Rails is provided with higher mechanical resistance and is subject to smaller deflection in order to enhance the efficiency when working with the ladder in the horizontal position.

It is provided with Ritzglas® rails: Ø 51 mm (2") side rails and Ø 64 mm (2.5") middle rail.

The middle rail is also used as a fixing point for the fall protection device of the lineman's safety belt and divides the rungs anatomically, for a better feet support.

Each model below features its own characteristics, according to the description:

- RC402-0119

This ladder has only one section and, therefore, the only one that is not of the sectional type.

- RC402-0512 e RC402-0513

These two models are used as the bottom section, that is, they are provided with Ø 51 mm (2") galvanized steel splices installed to the side rails, for attachment to the top section.

- RC402-0514

This ladder is used as the top section and can be attached to models RC402-0512 and RC402-0513.

Models RC402-0119 and RC402-0514 are provided with steel hooks.

SECTIONAL LADDERS WITH 3 RAILS

Cat. No.	Insulating Length		Section	Approx. Weight	
	m	ft		kg	lb
RC402-0119	6.00	19.5	One section only	51.00	112.44
RC402-0512	2.41	8.0	Bottom	21.60	47.62
RC402-0513	3.63	12.0	Bottom	26.00	57.32
RC402-0514	3.56	11.5	Top	29.50	65.04

One-Siderail Sectional Ladder

Designed to work in a vertical position to allow access to the conductors of electricians on suspension chains de-energized, without the need to be supported by the insulator string, thus avoiding possible accidents by breaking the insulators.

Built with tube Ø 51 mm (2") Ritzglas® how your center siderail and rungs tube Ritzglas® Ø 32 mm (1.25").

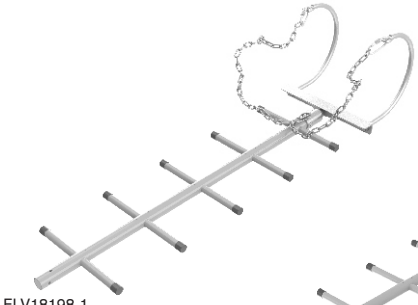
All sections are interchangeable, allowing to reach different heights with 3 sections and whose lengths are suitable for transportation.

The top section has unique swiveling hooks on 14" steel and connections between sections are performed with the aid of gloves steel surface treatment and cotter bronze for the perfect lock.

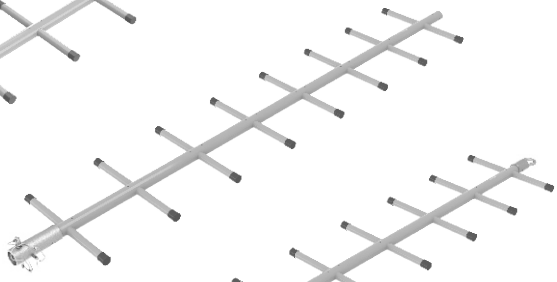
All sections have bag for packing and transportation.

ONE-SIDERAIL SECTIONAL LADDER

Cat. No.	Insulating Length		Section	Conditioning bag	Maximum Load Capacity		Approx. Weight	
	m	ft			daN	lb	kg	lb
FLV18198-1	1.45	5.0	Top	FLV18232-1	120	265	9.30	20.50
FLV18199-1	2.32	8.0	Intermediary	FLV18232-2			8.60	18.96
FLV18200-1	2.24	7.0	Base	FVL18232-2			8.75	19.29



FLV18198-1



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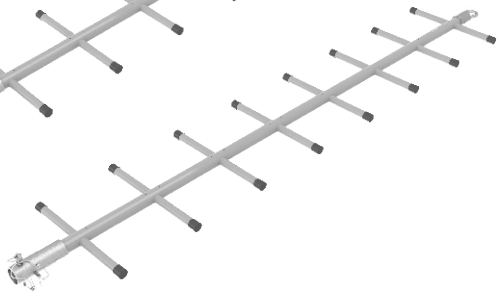


FLV18200-1

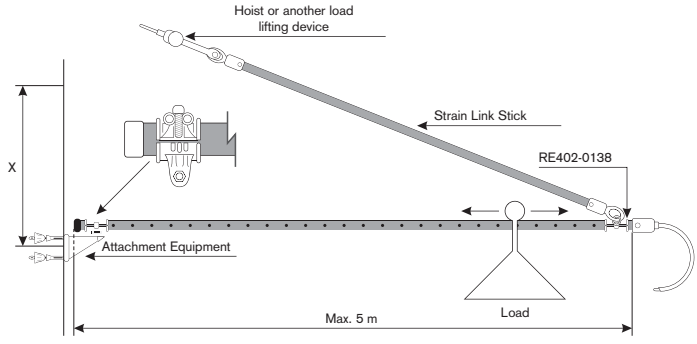
ACCESSORIES FOR LADDER SUPPORT

The ladder supporting accessories provide quick, easy and safe installation of Hot Line Ladders on almost every type of structure.

These sets have been designed to be attached to metallic, wooden or concrete structures, vertically and horizontally, with Ø 64 mm (2.5") (or larger) siderail ladders.

The components need to be ordered separately or as replace pieces.

The diagram below shows a typical installation and the work loads with the different attachment points.



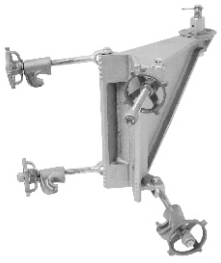
"X"=Distance between the attachment points		Total maximum working load		Overall length of the ladder	
m	ft	kg	lb	m	ft
2.44	8.00	227	500	4.88	16.00
3.66	12.00	182	400	7.32	24.00
4.88	16.00	132	290	9.75	32.00

NOTE
For assemblies requiring ladders longer than 5 m (16 ft), an additional supporting equipment must be installed.

SET FOR VERTICAL ASSEMBLY ON METALLIC STRUCTURE

Cat. No.	Set composed of						Approx. Weight	
	RE402-0525	RE402-0092*	RE402-0099	RE402-0138	RE402-0141*	RE402-0568	kg	lb
RC402-0139	1	1	1	2	2	1	27.64	60.94

* Check for other models.

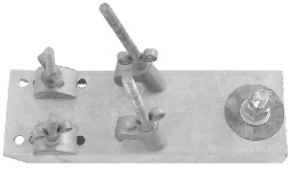


RE402-0525

SET FOR HORIZONTAL ASSEMBLY ON METALLIC STRUCTURES

Cat. No.	Set composed of						Approx. Weight	
	RE402-0087	RE402-0092*	RE402-0099	RE402-0138	RE402-0141*	RE402-0568	kg	lb
RC402-0140	1	1	1	2	2	1	27.89	61.49

* Check for other models.



RE402-0087

COMPONENTS TO SUPPORT THE LADDERS

Cat. No.	Description	Approx. Weight	
		kg	lb
RE402-0525	Saddle for vertical attachment on metallic structure	11.25	24.80
RE402-0087	Saddle for horizontal attachment on metallic structure	11.50	25.35
RE402-0526	Base of the vertical pole attachment saddle	11.09	26.21
RE402-0099	Spreader Bar	3.80	8.38
RE402-0138	64 mm (2.5") ladder clamp	0.79	1.74
RE402-0568	Support ladder with 64 mm (2.5") pole clamp	6.60	14.55
RE402-0569	Support ladder with 51 mm (2") pole clamp	6.50	14.33

RE402-0099

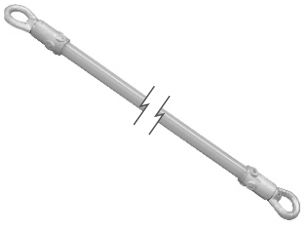
RE402-0138

RE402-0568

DOUBLE CLAMP

Cat. No.	Ø		Approx. Weight	
	mm	in	kg	lb
RE402-0092	64 / 38	2.5" / 1.5"	1.30	2..87
FLV03550-2	64 / 32	2.5" / 1.25"	1.20	2.65
FLV03550-6	64 / 76	2.5" / 3"	1.50	3.31
FLV03550-7	38 / 51	1.5" / 2.0"	1.35	2.98

RE402-0092



Ø 32 mm (1.25") SWIVEL STICK

Cat. No.	Insulating Length		Rated Work Load		Approx. Weight	
	m	ft	daN	lb	kg	lb
RE402-0141	3.54	11.5	1588	3500	3.90	8.60
RT402-0899	1.72	5.5			1.90	4.19
RT402-0900	2.33	7.5			2.50	5.51
RT402-0901	2.90	9.5			3.20	7.05

E

ADJUSTABLE LADDER HOOKS

Adjustable ladder hooks can be easily adapted to the side rails of the Hot Line Ladders and Platform Ladder platform.

This accessory converts a Ø 51 or 64 mm (2" or 2.5") side rail ladder into a hook ladder, or enables the attachment of the ladder to inclined structures.

Hooks are swiveling and installed using clamps, allowing installation at the most convenient position on the structure.

Hooks are made of Ø 25.4 mm (1") galvanized steel and installed on aluminum clamps. Complementary steel chains are provided with a safety locking system.

COMPOSITION OF THE LADDER ADJUSTABLE HOOK

- 01 Steel Hook;
- 01 Steel chain with safety locking system;
- 01 Aluminum alloy clamp.

LADDER ADJUSTABLE HOOK

Cat. No.			Ø Side Rails		Maximum Load Capacity (each pair)		Approx. Weight	
8" Hook (203 mm)	14" Hook (356 mm)	18" Hook (457 mm)	mm	in	daN	lb	kg	lb
RH4904-1	-	-	51	2"	567	1250	4.70	10.36
-	RH4924-1	-			454	1000	5.60	12.35
RH4905-1	-	-	64	2.5"	567	1250	4.80	10.58
-	RH4925-1	-			454	1000	5.70	12.57
-	-	RH4945-1			340	750	6.60	14.55

LADDER WITH DOUBLE SIDERAIL

Available as single or extension models, with double siderails and rungs assembled with Ritzglas® poles, Hot Line Insulating Ladders are suitable for live works up to 500 kV.

The single and extendable ladders are provided with nylon strap covered by rubber and with rubber fixed base..

The “A” Shape ladders are provided with aluminum terminals and 8" hooks for suspension works.

All ladders are supplied with pre-shrunk storage canvas bag, green color.

NOTES

- The extension models are provided with eye-rings for staying purposes, on top of the base section.
- Bending tests, when requested, will be carried out with the maximum extension of 8.50 m (28 ft).

SINGLE LADDER

Cat. No.	Nominal Length		Qty. of Rungs	Approx. Weight	
	m	ft		kg	lb
ES/LV-28-CN-SB	2.80	9.0	8	11.00	24.25
ES/LV-37-CN-SB	3.70	12.0	11	14.00	30.86
ES/LV-46-CN-SB	4.60	15.0	14	20.00	44.09
ES/LV-59-CN-SB	5.90	19.0	18	21.00	46.30

Width between siderails: 293 mm (0.9 ft)
Distance between rungs: 305 mm (1.0 ft)

EXTENSION LADDER

Cat. No.	Nominal Length				Qty. of Rungs	Approx. Weight	
	Retracted		Extended			kg	lb
	m	ft	m	ft			
EE/LV-71-CN-SB	4.10	13.50	6.70	22.00	21	35.50	78.26
EE/LV-83-CN-SB	4.71	15.50	7.92	26.00	25	41.50	91.49
EE/LV-96-CN-SB	5.32	17.50	9.14	30.00	29	45.50	100.31
EE/LV-108-CN-SB	5.93	19.50	10.36	34.00	33	49.50	109.13
EE/LV-120-CN-SB	6.84	22.50	12.19	40.00	39	53.50	117.95

Width between siderails: Bottom - 293 mm (0.9 ft)
Top - 295 mm (0.9 ft)
Distance between rungs: 305 mm (1.0 ft)

INSULATING SPACER FOR LADDERS

Designed to be attached to the double-siderail ladder, providing the appropriate distance from the earthing parts of the pole, mainly for 15 kV maintenance tasks by contact method or hot stick method.

Manufactured with Ritzglas® fiberglass tube, aluminum/bronce connexions. This tool is attached to the pole through the chain tighteners (RT400-2007).

Main dimentions: 550 x 290 mm (1.8 x 0.95 ft)

NOTE
Specific procedures are demanded to use this tool.

INSULATING SPACER FOR LADDERS

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV14717-1	Insulating spacer for ladders	6.60	14.55

PLATFORM

The Platforms have been designed with Ritzglas® poles to offer the lineman a safe and convenient base, in order to perform hot line works with the Rubber Glove or Hot Stick Methods.

It can be quickly assembled to the structures, so the lineman can be well positioned vertically and horizontally.

These platforms are quickly attached to the structure, by means of two assembling options:

- Adjustable type

for works which do not require frequent side changes on the platform position. The platform is attached to the pole using a chain tightener, or to the structure using brackets.

- Pivot-type

it offers a 180° horizontal turn of the assembled platform, with the possibility to install it at intermediary angles, to the left or right.

A The board is 0.25 m (0.82 ft) width and made of fiberglass with sliding-proof surface, preventing the lineman from accidentally sliding.

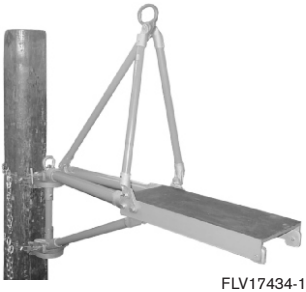
The hand-rails and tripods are ideal as a supporting and fixing point of the fall protection device of the safety harness.

The Platforms are intended for pole attachment. Should the attachment to metallic structures be required, specific saddles must be ordered, according to the Platform Accessories tables.

Insulating Platforms

A solution to add a 0.30 m (0.98 ft) insulating span between the board of the platform and the pole attachment saddle, using two Ø 51 mm (2") Ritzglas® poles. This prepares the insulating platforms for hot line work on systems up to 34.5 kV with the Rubber Glove or Hot Stick Methods.

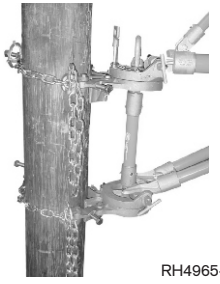
The nominal work load is 227 daN (500 lb)



FLV17434-1

1.20 m (3.9 ft) INSULATING PLATFORMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC402-1042	With adjustable saddle and tripod	17.90	39.46
FLV17434-1	With pivot saddle and tripod	27.90	61.51
FLV19083-1	With adjustable saddle and hand-rails	17.90	39.46
FLV14398-1	With pivot saddle and hand-rails	27.90	61.51



RH4965-14W

ACCESSORIES (1.20 m - 4 ft)

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4965-14W	Pivot saddle for pole mount	12.50	27.56
RM4901-21	Adjustable saddle for tower mount	3.10	6.83
RH4964	Tripod	2.00	4.41

RM4901-21

1.80 m (6 ft) INSULATING PLATFORMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC402-1043	With adjustable saddle and hand-rail	46.90	103.40
FLV17436-1	With pivot saddle and hand-rail	56.20	123.90

FLV17436-1

ACCESSORIES (1.80 m - 6 ft)

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4965-13W	Pivot saddle for pole mount	13.40	29.54
RH4965-15	Pivot saddle for tower mount	11.75	25.90
RM4901-21	Adjustable saddle for tower mount	3.10	6.83

2.40 m (8 ft) INSULATING PLATFORMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC402-1079	With adjustable saddle and hand-rail	51.40	113.32
FLV17438-1	With pivot saddle and hand-rail	60.50	133.38

RH4965-15

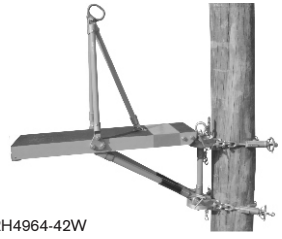
ACCESSORIES (2.40 m - 8 ft)

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4965-13W	Pivot saddle for pole mount	13.40	29.54
RH4965-15	Pivot saddle for tower mount	11.75	25.90
RM4901-21	Adjustable saddle for tower mount	3.10	6.83

Aerial Platforms

Aerial Platforms are intended for hot line work on systems with the Hot Stick Method.

The nominal working load for all models is 227 daN / 500 lb



RH4964-42W

1.00 m (3 ft)AERIAL PLATFORMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4964-42W	With adjustable saddle and tripod	23.10	50.93

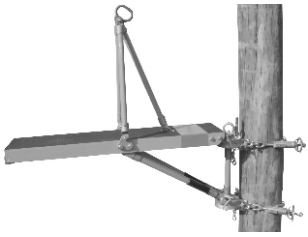
RM4901-21

ACCESSORIES (1.00 m - 3 ft)

Cat. No.	Description	Approx. Weight	
		kg	lb
RM4901-21	Adjustable saddle for tower mount	3.10	6.83

1.20 m (3.94 ft) AERIAL PLATFORMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4964-4W	With adjustable saddle and tripod	25.10	55.34
RH4965-4W	With pivot saddle and tripod	33.00	72.75



RH4965-4W

ACCESSORIES (1.20 m - 4 ft)

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4965-14W	Adjustable saddle for pole mount	12.50	27.56
RM4901-21	Pivot saddle for tower mount	3.10	6.83

E

1.80 m (6 ft) AERIAL PLATFORMS

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4964-6W	With adjustable saddle and hand-rail	34.60	76.28
RH4965-6W	With pivot saddle and hand-rail	43.70	96.34

RH4964-6W

ACCESSORIES (1.80 m - 6 ft)

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4965-13W	Adjustable saddle for pole mount	13.40	29.54
RH4965-15	Adjustable saddle for tower mount	11.75	25.90
RM4901-21	Pivot saddle for tower mount	3.10	6.83

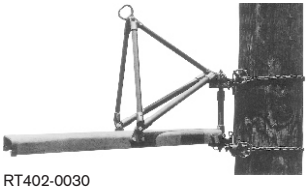
RH4965-6W

Suspension Platform

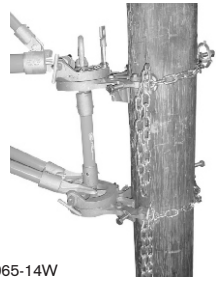
The suspension platform allows a rotation of 180° relative to the horizontal plane, providing a better positioning of the lineman, with no need to disassemble it for new adjustments.

It is normally used on structures with reduced clearance, where the assembly of a conventional Platform would not be possible.

The nominal load capacity is 181 daN (400 lb) in an aligned and perpendicular to the structure position. Such capacity is reduced to 136 daN (300 lb) when positioned at any different angle.



RT402-0030



RH4965-14W

SUSPENSION PLATFORM

Cat. No.	Description	Approx. Weight	
		kg	lb
RT402-0030	With pivot saddle and tripod	28.10	61.95

ACCESSORIES (SUSPENSION)

Cat. No.	Description	Approx. Weight	
		kg	lb
RH4965-14W	Pivot saddle for pole mount	12.50	27.56

Utility Platform

The Utility Platform was designed to be used within limited clearances or in confined working areas, such as distribution poles, telecom poles, or substations, not equipped with hand-rails or tripod. Provided with chain binder for attachment to the pole, braces to be folded underneath the platform fiberglass board which make it compact, easy to transport and store.

Made of the same materials of all other platforms of larger sizes.

Nominal working load: 100 daN (220 lb)

RC402-0426

UTILITY PLATFORM

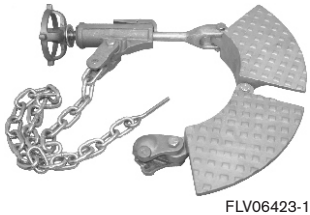
Cat. No.	Description	Approx. Weight	
		kg	lb
RC402-0426	Utility Platform, Length: 0.76 x Width: 0.25m (2.5 x 0.8 ft)	13.10	28.88

Platform Saddle

The Platform Saddle was designed to meet specific requirements, when the lineman needs a foot supporting base on the pole, where the ladder is limited in height.

Made of aluminum alloy and is attached to the pole with a chain binder, for final tightening.

Nominal working load: 340 daN (750 lb)



FLV06423-1

PLATFORM SADDLE

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV06423-1	Platform saddle for the lineman feet support	3.40	7.50

NOTE
The utility platform and the platform saddle, due to their constructive characteristics, are not considered insulated.

Platform Ladder

The Platform Ladder allows the lineman to work either standing or sitting, offering a better positioning on the structure.

Composed of a 1.20 m (3.94 ft) Ritzglas® ladder and a fiberglass platform with a 0.25 x 0.51 m (0.82 x 1.67 ft) sliding proof surface. When supplied with adjustable hooks, they are used for the platform attachment to the structure.

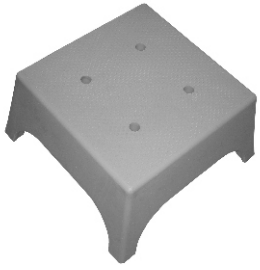
This platform can be folded for easy transportation and storage.

Nominal working load: 227 daN (500 lb)

PLATFORM LADDER

Cat. No.	Description	Approx. Weight	
		kg	lb
RC402-0277	With suspension hooks	28.50	62.83

INSULATING STOOL



Terex Insulating Stool is very useful in insulating linemen from the ground potential.

It provides for a larger standing work area and more protection to linemen, when performing maintenance on substations, cubicles and electrical boards.

- Made from polyethylene
- Reduced weight, for more comfort in transport and shifting through the work area
- Sliding-proof platform
- Rated work load: 120 daN (265 lb)
- Orange color

INSULATING STOOL

Cat. No.	Size				Max. Working Voltage (kV)	Approx. Weight	
	Sliding-Proof Surface		Height			kg	lb
	m	ft	m	ft			
FLV21504-1	0.50 x 0.50	1.5 x 1.5	0.32	1.0	40	4.05	8.93

RITZGLAS® INSULATING SCAFFOLD

Ritzglas® Insulating Modular Scaffold is essential for the performance of hot line work on high and extra-high voltage systems, mainly in substations.

The new Scaffold with Insulating Fittings is provided with modules that are interchangeable with the aluminum fitting modules.

ADVANTAGES

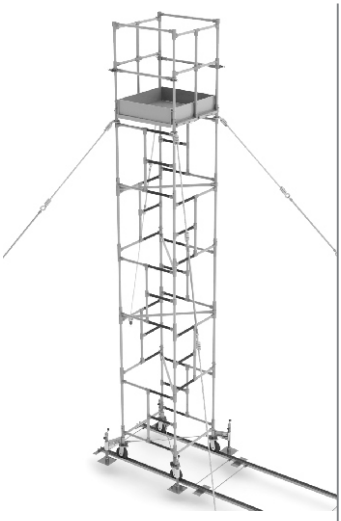
- Lighter weight modules
- Easier assembly
- Insulating components are immune to Corona Effect

The Insulating Scaffold provides for safe and comfortable positioning and access to necessary heights, especially in confined spaces such as substations. This equipment fostered the development of a large number of hot line works, extensively performed by the Hot stick or Bare-hand Methods.

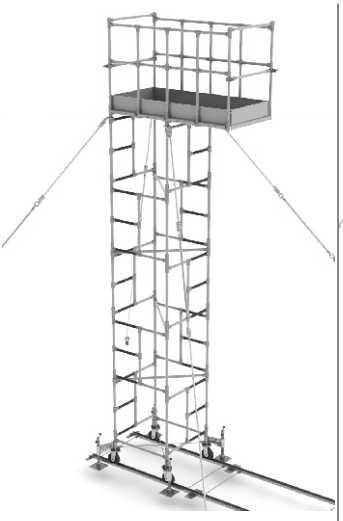
Built with light-weight and interchangeable fittings, the Insulated Modular Scaffold can be easily and quickly assembled by only two linemen, without any additional tools.

Its structure is built with Ritzglas® insulating poles, which electrical and mechanical characteristics are according to IEC-60855 and ASTM F 711 Standards requirements. Its platform boards are made of fiberglass, therefore, the insulating scaffold can be used on energized systems up to 800 kV, with total guarantee of electrical insulation and rated working load of up to 300 daN (660 lb), applied to the center of the platform.

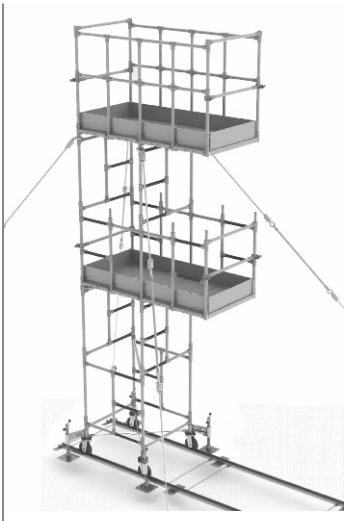
RITZGLAS® Insulating scaffolds - Assembling options



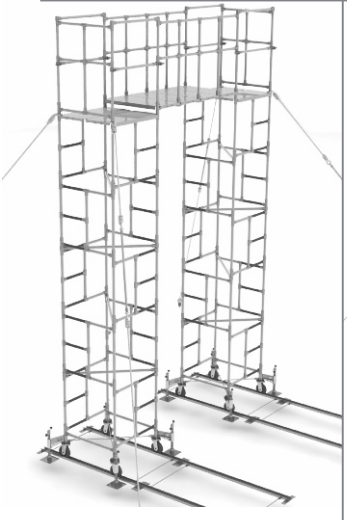
01 Base, Column and Platform: 1.0 x 1.0 m
3.3 x 3.3 ft



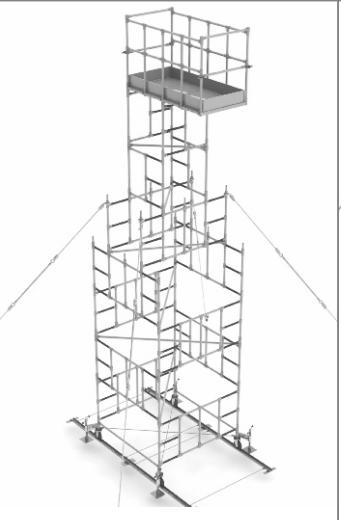
02 Base and Column: 1.0 x 1.0 m (3.3 x 3.3 ft)
Platform: 2.0 x 1.0 m (6.5 x 3.3 ft)



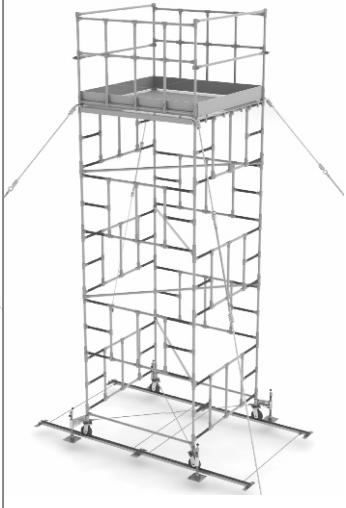
03 Base and Column: 1.0 x 1.0 m (3.3 x 3.3 ft)
Two Platform: 2.0 x 1.0 m (6.5 x 3.3 ft)
Lateral ahead: 1.0 m (3.3 ft)



04 Two Column: 1.0 x 1.0 m (3.3 x 3.3 ft)
Platform: 4.0 x 1.0 m (13.0 x 3.3 ft)



05 Base and Column: 2.0 x 2.0 m (6.5 x 6.5 ft)
Reduced to: 1.0 x 1.0 m (3.3 x 3.3 ft)
Platform: 2.0 x 1.0 m (6.5 x 3.3 ft)
Lateral ahead: 1.0 m (3.3 ft)

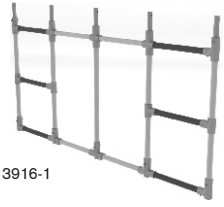


06 Base, Column and Platform: 2.0 x 2.0 m
6.5 x 6.5 ft

MAIN COMPONENTS

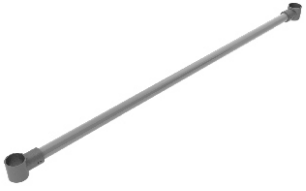
FLV06052-1

FLV09091-1



FLV13916-1

FLV16241-1

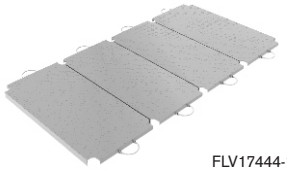


FLV16241-3

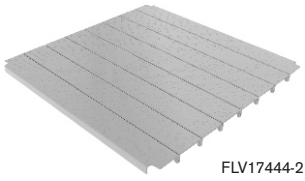
Cat. No.	Description	Approx. Weight	
		kg	lb
FLV06052-1	1.0 x 1.0 m (3.3 x 3.3 ft) module, with cast aluminium connections, built with Ø 38 mm (1.5") Ritzglas® poles, with sliding-proof rungs and counter pins for locking	7.00	15.43
FLV09091-1	1.0 x 2.0 m (3.3 x 6.5 ft) module, with cast aluminum connections, built with Ø 38 mm (1.5") Ritzglas® poles, with sliding-proof rungs and counter pins for locking	12.20	26.90
FLV13916-1	1.0 x 2.0 m (3.3 x 6.5 ft) module, with cast aluminum connections, built with Ø 38 mm (1.5") Ritzglas® poles, with sliding-proof rungs and counter pins for locking. Also, it is provided with 5 top pins, for non-conventional arrangements	13.60	29.98
FLV16241-1	Side Crosspiece. Built with Ø 38 mm x 1.0 m (Ø 1.5" x 3.3 ft) Ritzglas® poles and cast aluminum connections. Intended for closing and locking the modules of 1.0 x 1.0 m (3.3 x 3.3 ft) and 1.0 x 2.0 m (3.3 x 6.5 ft) scaffolds bases	0.89	1.96
FLV16241-2	Side Crosspiece. Built with Ø 38 mm x 2.0 m (Ø 1.5" x 6.5 ft) Ritzglas® poles and cast aluminum connections. Intended for closing and locking the modules of the 2.0 x 2.0 m (6.5 x 6.5 ft) scaffold base	2.20	4.84
FLV16241-3	Diagonal Crosspiece. Built with Ø 38 mm x 1.4 m (Ø 1.5" x 4.5 ft) Ritzglas® poles and cast aluminum connections. Intended for diagonal locking of two modules of the 1.0 x 1.0 m (3.3 x 3.3 ft) scaffold	1.50	3.31
FLV16241-4	Diagonal Crosspiece. Built with Ø 38 mm x 2.2 m (Ø 1.5" x 7.0 ft) Ritzglas® poles and cast aluminum connections. Intended for diagonal locking of two modules of the 2.0 x 1.0 m (6.5 x 3.3 ft) scaffold	2.00	4.41
FLV16241-5	Diagonal Crosspiece. Built with Ø 38 mm x 2.8 m (Ø 1.5" x 9.0 ft) Ritzglas® poles and cast aluminum connections. Intended for diagonal locking of two modules of the 2.0 x 2.0 m (6.5 x 6.5 ft) scaffold	2.40	5.29

MAIN COMPONENTS

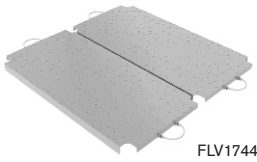
Cat. No.	Description	Approx. Weight	
		kg	lb
FLV17444-1	Platform composed of four fiberglass boards with sliding-proof surface treatment. This model is only used when assembling the 2.0 x 1.0 m (6.5 x 3.3 ft) scaffold base	26.40	58.20
FLV17444-2	Platform composed of eight fiberglass boards with sliding-proof surface treatment. This model is only used when assembling the 2.0 x 2.0 m (6.5 x 6.5 ft) scaffold base	110.60	243.83
FLV17444-3	Platform composed of two fiberglass boards with sliding-proof surface treatment. This model is only used when assembling the 1.0 x 1.0 m (3.3 x 3.3 ft) scaffold base	13.20	29.10
FLV04803-3	Insulated spacer for ropes, manufactured by Ritzglas® Ø 25 mm x 1.70 m (1" x 5.58 ft) tube (1.54 m - 5.05 ft insulating) have an aluminum head and steel swivel eye. This tool is needed to stay the scaffold each 5 meters height. Nominal working capacity 800daN or 1794lb.	1.15	2.54
RM1895-3	Ø 1/2" Polypropylene Rope, white color, 3 legs, supplied in rolls of 220 m (722 ft) Rope is used in conjunction with the insulating guying poles	0.07 (m each)	0.15



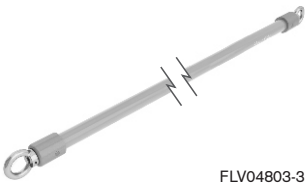
FLV17444-1



FLV17444-2



FLV17444-3



FLV04803-3

RM1895-3

E

MAIN COMPONENTS

FLV11630-1

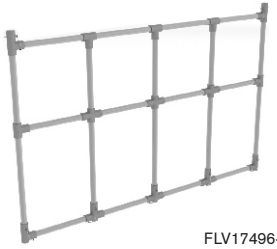
FLV11658-1

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV11630-1	Set of individual wheels for the 1.0 x 1.0 m (3.3 x 3.3 ft) scaffold displacement, provided with stabilizers and two steel rods, for spacing and locking	108.40	238.98
FLV11630-2	Set of individual wheels for the 2.0 x 1.0 m (6.5 x 3.3 ft) scaffold displacement, provided with stabilizers and two steel rods, for spacing and locking	108.40	238.98
FLV11630-3	Set of individual wheels for the 2.0 x 2.0 m (6.5 x 6.5 ft) scaffold displacement, provided with stabilizers and two steel rods, for spacing and locking	110.60	243.83
FLV11658-1	Set hot dip galvanized rails (three pairs of 2 m - 6.5 ft - long rails each). These rails are interconnected using locking pins and correspondent spacing steel rods. It's been designed to ease the horizontal displacement of the 1.0 x 1.0 m (3.3 x 3.3 ft) and 2.0 x 1.0 m (6.5 x 3.3 ft) scaffolds, on uneven surfaces at substations	103.10	227.30
FLV11658-2	Set hot dip galvanized rails (three pairs of 2 m - 6.5 ft - long rails each). These rails are interconnected using locking pins and correspondent spacing steel rods. It's been designed to ease the horizontal displacement of the 1.0 x 1.0 m (3.3 x 3.3 ft) and 2.0 x 2.0 m (6.5 x 6.5 ft) scaffolds, on uneven surfaces at substations	104.30	229.94

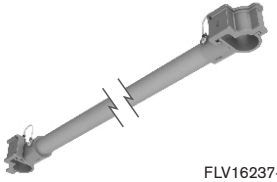
WORKING AREA SAFETY COMPONENTS

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV16238-1	1.0 x 1.2 m (3.3 x 4 ft) Guard module with cast aluminum connections, of same insulating and mechanical characteristics as those of the regular modules, to be used as an additional body protection at the level the platform will be assembled	8.30	18.30
FLV17496-1	2.0 x 1.2 m (6.5 x 4 ft) Guard module with cast aluminum connections, of same insulating and mechanical characteristics as those of the regular modules, to be used as an additional body protection at the level the platform will be assembled	13.80	30.42
FLV16237-1	Intermediary Crosspiece Built with Ø 38 mm x 1.0 m (Ø 1.5" x 3.3 ft) Ritzglas® poles and clamps at the ends, used to box up the guard modules of 2.0 x 1.0 m (6.5 x 3.3 ft) and 1.0 x 1.0 m (3.3 x 3.3 ft) platforms. It is assembled at 0.7 m (2.3 m) above the platform for increased safety	2.30	5.07
FLV16237-2	Intermediary Crosspiece Built with Ø 38 mm x 2.0 m (Ø 1.5" x 6.5 ft) Ritzglas® poles and clamps at the ends, used to box up the guard modules of 2.0 x 2.0 m (6.5 x 6.5 ft) platforms. It is assembled at 0.7 m (2.3 ft) above the platform for increased safety	2.90	6.39
FLV16241-6	Side Crosspiece for Guard Modules Built with Ø 38 mm x 1.0 m (Ø 1.5" x 3.3 ft) Ritzglas® poles and cast aluminum connections. Intended for closing and locking the guard modules of 1.0 x 1.0 (3.3 x 3.3 ft) and 1.0 x 2.0 m (3.3 x 6.5 ft) scaffolds	0.89	1.96
FLV16241-7	Side Crosspiece for Guard Modules Built with Ø 38 mm x 2.0 m (Ø 1.5" x 6.5 ft) Ritzglas® poles and cast aluminum connections. Intended for closing and locking the guard modules of 2.0 x 2.0 m (6.5 x 6.5 ft) scaffolds	2.20	4.48

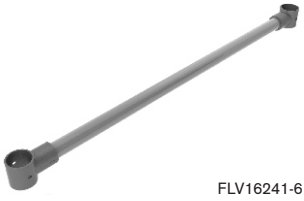
FLV16238-1



FLV17496-1



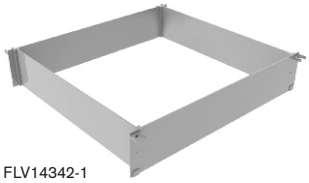
FLV16237-1



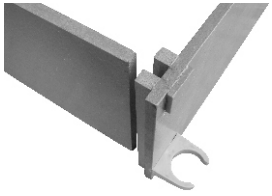
FLV16241-6

E

WORKING AREA SAFETY COMPONENTS



FLV14342-1



Cat. No.	Description	Approx. Weight	
		kg	lb
FLV14342-1	Fiberglass Safety Baseboard To be clamped onto the base of 1.0 x 1.0 m (3.3 x 3.3 ft) platforms, to prevent tools or components from dropping accidentally	8.00	17.64
FLV14342-2	Fiberglass Safety Baseboard To be clamped onto the base of 2.0 x 1.0 m (6.5 x 3.3 ft) platforms, to prevent tools or components from dropping accidentally	12.30	27.12
FLV14342-3	Fiberglass Safety Baseboard To be clamped onto the base of 2.0 x 2.0 m (6.5 x 6.5 ft) platforms, to prevent tools or components from dropping accidentally	16.00	35.37

ACCESSORIES

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV09012-1	0.50 x 1.0 m (1.5 x 3.3 ft) Reduced Height Module With the same insulating and mechanical characteristics as the other modules. Enables assemblies to intermediate heights, suiting workers to a better working position	4.90	10.80
ESC15051-1	Guying Poles Built with a Ø 3/8" x 3.0 m (4 ft) Ritzglas® rod, with one aluminum fork fitting at one end and one eye-ring at the other, making it possible to connect two poles, if necessary. Load capacity: 500 daN (1102 lb)	0.70	1.54
ESC15051-2	Guying Poles Built with a Ø 3/8" x 2.0 m (6.5 ft) Ritzglas® rod, with one aluminum fork fitting at one end and one eye-ring at the other, making it possible to connect two poles, if necessary. Load capacity: 500 daN (1102 lb)	0.55	1.21
ESC15051-3	Guying Poles Built with a Ø 3/8" x 1.0 m (3.3 ft) Ritzglas® rod, with one aluminum fork fitting at one end and one eye-ring at the other, making it possible to connect two poles, if necessary. Load capacity: 500 daN (1102 lb)	0.40	0.88
FLV17648-1	Strap for balance rope, manufactured of casting cooper, with eye for acopling the separating insulating stick, to be installed on the scaffold conexions always.	0.40	0.88
FLV15444-1	Removable Rung Assembly to be attached onto the side of the modules, to provide additional rungs where originally there is no rung	3.70	8.16

FLV09012-1

ESC15051-1

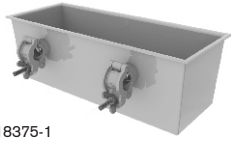
FLV17648-1

FLV15444-1

ACCESSORIES

FLV18169-1

FLV18269-1



FLV18375-1

FLV23916-1

RC402-0288

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV18169-1	Tools lifting Gin Attached to the far right module to ease lifting of heavy components. Axial angle of approx. 40° allows both right and left gins to be used simultaneously to lift materials with larger dimensions. Max. working load: 60 daN (132 lb)	2.00	4.41
FLV18169-2	Tools lifting Gin Attached to the far left module to ease lifting of heavy components. Max. working load: 60 daN (132 lb)	2.00	4.41
FLV18269-1	Tools Lifting Gin Attached to the top module to ease lifting of tools and components during assembly. Max. working load: 40 daN (88 lb)	1.10	2.43
FLV18375-1	Fiberglass Tool Box Provides safe, quick and practical storage of tools, during maintenance works. Made of fiberglass and fitted with two cast aluminum fasteners, for attachment to the module Dimensions: 0.62 x 0.22 x 0.20 m (2.0 x 0.7 x 0.6 ft)	4.90	10.80
FLV23916-1	Galvanized steel stake made of semi-circled rod to be used as a guy rope for scaffolds	1.60	3.50
RC402-0288	Micro Tester A micro-ammeter used to monitor leakage currents, when carrying out field electrical tests on the scaffold. It features a 0 to 200 µA scale and is provided with fasteners, connection cable and storage case	3.26	7.19

GROUP F

INSULATING COVER-UP EQUIPMENT

GROUP F

INSULATING COVER-UP EQUIPMENT

F

APPLICATION, HANDLING AND MAINTENANCE

The Hot Line Covers are among the main protection equipment used when carrying out Hot Line Maintenance works on low and medium voltage systems.

Hot Line Covers are used to electrically protect the entire working area, in order to prevent possible accidental contacts between phases or from phase to ground, while performing the works.

Hot Line Covers are used with the Rubber Glove Method where they are installed manually or with the Hot Stick Method where they are operated using Hot Sticks attached to the existing metallic eye-rings.

Its installation and handling should be done only by linemen duly acquainted with Hot Line works, requiring the following basic rules to be observed:

1. Linemen should never, under any circumstances, touch the Covers on purpose, only if he is wearing rubber gloves, being always conscious about their position relative to the Covers, to avoid touching them accidentally.

This rule is valid for all Cover-Up equipment used to protect energized parts.

2. Pole, Crossarm, Horizontal Support, “C” Support and Round Cover-Up Equipment are intended to avoid the accidental contact of conductors or energized connections with the grounded parts of the structure.

3. The Cover-Up Equipment should be handled with care, to prevent fissures, cracks or scratches and should always be kept clean and dry.
4. Each Cover-Up equipment should be carefully inspected prior to use, making sure it is clean and dry, without cracks, deep scratches or any other damage.

   If necessary, cleaning must be made with a cotton cloth. If this procedure does not completely remove the dirt, water and neutral soap should be used.
5. Differently from other covers for permanent use, mentioned by the last chapter of this group, the Cover-Up Equipment have been designed for temporary use, when performing various Hot Line maintenance works, and have to be removed after finishing the works.

PRECAUTIONS

The Hot Line Cover-Up Equipment have been designed to meet a wide range of maintenance situations on energized systems. Suitable covers are provided for each type of equipment, for increased efficiency and safety.

Before starting the work, the lineman must carefully select the most suitable covers, in the necessary quantities, thus avoiding dangerous improvisations.

The visual inspection of the covers to locate fissures, deep scratches, dirts and other damages, is mandatory for all Hot Line teams, for the safety of the users depends on the perfect maintenance of their equipment. In case of doubt, the covers must not be used and have to be submitted to electrical tests.

TECHNICAL CHARACTERISTICS

The Hot Line Cover-Up Equipment are made of thermoplastic with high dielectric strength, ozone-resistant, and UV-resistant.

The orange color offers excellent visibility of the area under maintenance.

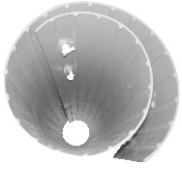
The Cover-Up for hot stick installation are provided with metallic eye-rings where the hot stick can be attached.

POLE COVERS

Used for insulating protection when installing or replacing poles.

Provided with polypropylene rope grips for easy installation and removal, internal ribs, which help to avoid abrasion on its surface during handling and highly contribute to an extended working life.

The 1.20 m and 1.80 m (3.94 and 5.91 ft) models are provided with one nylon button, which enables connecting two or more units to protect a longer section of the pole.



COVER-UP FOR POLES UP TO Ø 150 mm (5.9")

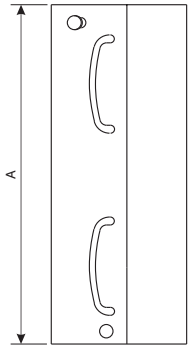
Cat. No.	Dimensions						Approx. Weight	
	A		B		C		kg	lb
	mm	ft	mm	ft	mm	ft		
RC406-0548	300	1.0	150	0.5	~115	~0.4	0.70	1.54
RC406-0549	600	2.0					1.20	2.65

nominal voltage: 36.6 kV (phase-to-phase)

COVER-UP FOR POLES UP TO Ø 300 mm (11.8")

Cat. No.	Dimensions						Approx. Weight	
	A		B		C		kg	lb
	mm	ft	mm	ft	mm	ft		
RC406-0028	300	1.0	300	1.0	~115	~0.4	1.15	2.54
RC406-0029	600	2.0					2.35	5.18
RC406-0030	1200	3.9					4.85	10.69
RC406-0000	1800	5.9					7.20	15.87

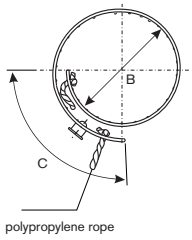
nominal voltage: 36.6 kV (phase-to-phase)



COVER-UP FOR POLES UP TO Ø 230 mm (9")

Cat. No.	Dimensions						Approx. Weight	
	A		B		C		kg	lb
	mm	ft	mm	ft	mm	ft		
RM4937-1	300	1.0	230	0.7	~195	~0.6	1.00	2.20
RM4937-2	600	2.0					1.95	4.30
RM4937-4	1200	3.9					3.95	8.71
RM4937-6	1800	5.9					5.95	13.12

nominal voltage: 36.6 kV (phase-to-phase)



LOCKING DEVICE FOR COVERS


RC406-0547

- RC406-0547

This accessory is used to keep the pole covers firmly attached to the place of installation, including smooth surfaces.

It is very easy to install and remove and is provided with a locking device for the rope. In order to loosen it, simply pull the eye-ring with a hot stick.

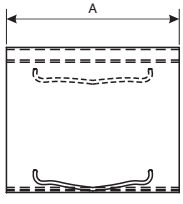
Approx. weight: 0.75 kg (1.65 lb)

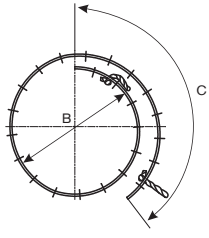
ROUND COVER

Due to its versatility, these covers are used for protection of pole ends, braces, crossarms, lightning arresters, etc.

Since there is no specific application for these covers, special attention must be given in every situation, in order to verify the real protection offered.

Provided with polypropylene rope grips to ease installation and removal with insulating gloves.





Ø 100 mm (3.9") AND Ø 150 mm (5.9") ROUND PROTECTIVE COVERS

Cat. No.	Dimensions						Approx. Weight	
	A		B		C		kg	lb
	mm	ft	mm	ft	mm	ft		
COB11176-1	300	1.0	100	0.3	~196	~0.6	0.40	0.88
COB11176-2	600	2.0					0.80	1.76
COB11176-3	900	3.0					1.20	2.65
COB11176-4	1200	3.9					1.60	3.53
COB04487-1	300	1.0	150	0.5	~135	~0.4	0.50	1.10
COB04487-2	600	2.0					0.90	1.98
COB04487-3	900	3.0					1.30	2.87
COB04487-4	1200	3.9					1.80	3.97

nominal voltage: 26.4 kV (phase-to-phase)

CROSSARM COVERS

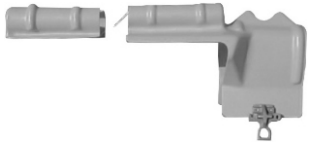
These covers are mainly intended to avoid the contact between the wire formed loops and the crossarm when changing the pin insulator or post insulator.

Can also be used for support of temporary jumpers or conductors over the crossarm. When supporting conductors, the conductor must be protected with a suitable cover.

Available in three models, one for use on crossarms with pin insulators and the others for use on crossarms with post insulators.


RM4933


COB11173-1


COB11173-2

CROSSARM COVER-UP

Cat. No.	Description	Length		Approx. Weight	
		mm	ft	kg	lb
RM4933	With pin insulators	610	2.0	1.45	3.20
COB11173-1	With post insulator	570	1.9	1.50	3.31
COB11173-2	Short-type with post insulator	430	1.4	1.10	2.43

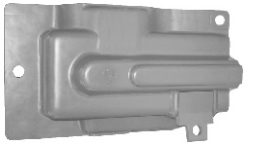
nominal voltage: 36.6 kV (phase-to-phase)

Crossarm End Covers

The covers have been designed to protect the ends of the crossarms to avoid accidental contacts with the wire formed loop, during its installation or removal.

With the Rubber Glove Method, this cover also prevents the lineman in contact with the conductor from establishing contact with a grounded part.

The RC406-0102 can be used on crossarms with pin or post insulators, for they are provided with a slot to allow the insulator bolt to pass through, in assemblies with double crossarms.


RC406-0102

CROSSARM END COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
RC406-0102	Cover-Up for crossarm ends	1.25	2.75
COB10765-1	Cover-up for Knife-Switch Carcass	0.68	1.50

nominal voltage: 36.6 kV (phase-to-phase)


COB10765-1

Pole Top Cover-Up

This cover is intended for protection of the pole top when installing or removing the wire formed loop.

Fits poles up to Ø 254 mm (10") and are provided with elastic band for easy installation.

POLE TOP COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
RC406-0097	Cover-Up for pole top	2.10	4.63

nominal voltage: 36.6 kV (phase-to-phase)

F

FUSE-SWITCH AND KNIFE-SWITCH COVERS

RC406-0009

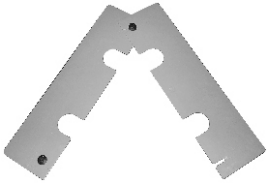
These covers are used for protection on structures where there are Fuse-Switches or Knife-Switches and can be installed with Rubber Glove or Hot Stick Methods.

The Fuse-Switch Cover RC406-0009 is held in place with a pin that slips behind the insulator and is supported by the metallic bracket of the switch.

The Knife-Switch Covers (COB08561-1) are installed by involving the two sheds of the insulator, onto which it is fixed by pressure.

COB08561-1

The knife-switch housing cover (COB13345-1) is used for insulating protection between the housing of the knife-switch and the energized parts during the installation and removal of the jumper or other works performed on the switch. Designed for systems of 15 and 23 kV, they are built with 2 plain sheets, which after being partially open envelop the base of the insulators and are locked with insulating nuts.



COB13345-1

FUSE-SWITCH AND KNIFE-SWITCH COVERS

Cat. No.	Description	Approx. Weight	
		kg	lb
RC406-0009	Cover-Up for fuse-switch	2.80	6.17
COB08561-1	Cover-Up Equipment for knife-switch	2.90	6.39
COB13345-1	Cover-Up for knife-switch housing (365 x 880 mm)	2.00	4.41

nominal voltage: 26.4 kV (phase-to-phase)

CONDUCTOR COVERS, PIN INSULATOR COVERS AND DISC INSULATOR COVERS

Protective Conductor Covers

The Protective Conductor Covers are those offering a larger protection area on energized parts, therefore they are used more often when performing Hot Line works.

Available in several models to meet the requirements of different types of electrical systems with rated voltages up to 48.3 kV, according to the following models.

The ends are built with male and female designs enabling the firm connection of two or more units, or connection to other types of covers, such as pin insulator covers and disc insulator covers.

Specifically the models RP406-0184 / RC406-0181GA / RC406-0514GA allow connection with rubber insulating conductor covers.

The metallic eye-rings are intended for installation of the covers with the Hot Stick Method, therefore some models are supplied with such connectors. Specifically the covers models RP406-0184 and COB03335-1 represent a solution for linemen installing the covers by the Rubber Glove Method.

By using the universal head attached to the end of the pole, it is possible to previously adjust the installation angle of the cover.

Pin Insulator Cover-Up

The pin insulator Cover-Up are intended to protect the energized conductor attached to the pin or post insulator, normally used together with the Conductor Covers to which they can be attached.

Available in several models, varying according to the application and working voltage class.

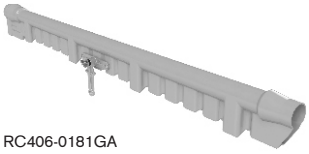
Some of them are provided with metallic brackets for installation with Hot Stick Method and some are provided without metallic brackets, for installation with Rubber Glove Method.

Disc Insulator Cover-Up

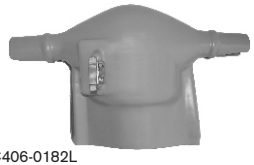
The disc insulator Cover-Up is designed to protect the energized parts connected to the disc insulator on tension strings.

Provided with end connections, one end connects at the insulator and the other connects the Conductor Cover.

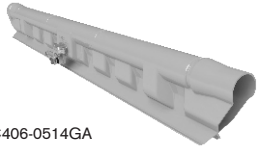
It can be used for both standards insulators and polymeric type.



RC406-0181GA



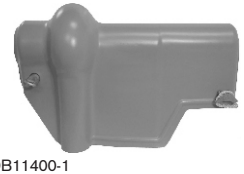
RC406-0182L



RC406-0514GA

RM4946

RM4947



COB11400-1

COB08835-1

RM4948

PROTECTIVE COVER-UP SET
CONDUCTOR / PIN INSULATOR / DISK INSULATOR

Cat. No.	Application	Description	Approx. Weight	
			kg	lb
RP406-0184	Conductor	for conductors up to Ø 25 mm (1"), only method to contact	1.50	3.31
RC406-0181GA	Conductor	for conductors up to Ø 25 mm (1"), method for distance	2.00	4.41
RC406-0182L	Pin Insulator	Height 229 mm (0.75 ft). With metallic bracket for hot stick installation	1.20	2.65

nominal voltage: 26.4 kV (phase-to-phase)

PROTECTIVE COVER-UP SET
CONDUCTOR / PIN INSULATOR

Cat. No.	Application	Description	Approx. Weight	
			kg	lb
RC406-0514GA	Conductor	for conductors up to Ø 25 mm, method for distance	2.15	4.74

nominal voltage: 36.6 kV (phase-to-phase)

PROTECTIVE COVER-UP SET
CONDUCTOR / PIN INSULATOR / DISK INSULATOR

Cat. No.	Application	Description	Approx. Weight	
			kg	lb
RM4946	Conductor	To be installed up to Ø 25 mm (1") conductor by Hot stick method	1.25	2.76
COB03335-1	Conductor	To be installed up to Ø 25 mm (1") conductor by barehand method only	0.90	1.98
RM4947	Pin Insulator	With metallic bracket	0.70	1.54
COB11400-1	Disc Insulator	Dead end, Polymer, Porcelain Rigid and Disc Insulators to Ø 160 mm (6")	1.30	2.87

nominal voltage: 26.4 kV (phase-to-phase)

PROTECTIVE COVER-UP SET
CONDUCTOR / DISK INSULATOR

Cat. No.	Application	Description	Approx. Weight	
			kg	lb
COB08835-1	Conductor	To be installed up to Ø 25 mm (1") conductor by barehand method only	2.50	5.51
RM4948	Pin Insulator	With metallic bracket	1.30	2.87

nominal voltage: 36.6 kV (phase-to-phase)

PROTECTIVE COVER-UP SET
CONDUCTOR / PIN INSULATOR

Cat. No.	Application	Description	Approx. Weight	
			kg	lb
RM4931	Conductor	To be installed up to Ø 45 mm (1.8") conductor by hot stick method	4.20	9.26
RC406-0046	Pin Insulator	With holders for hot stick method	3.90	8.60

nominal voltage: 48.3 kV (phase-to-phase)

RM4931

RC406-0046

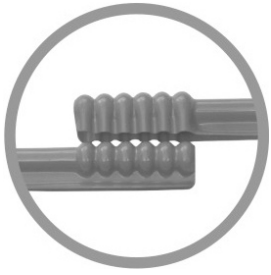
LOW VOLTAGE SECONDARY CONDUCTORS COVERS

F

This cover has been specially designed for temporary installation on secondary systems, aiming at preventing people or tools from accidentally getting in contact with the low voltage conductors, when performing maintenance procedures close to the poles or working on medium voltage systems.

They are light-weight and allow attachment with other covers of the same type using the male-female system at the ends, allowing thus the insulation of a long section of the electrical system.

This cover is provided without connectors, therefore the installation on the line must be performed with the Rubber Glove Method.



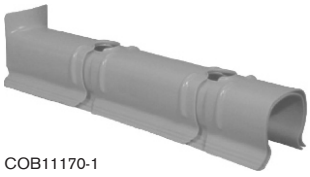
SECONDARY SYSTEM COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
COB03333-1	For LV overhead conductor line up to Ø 25 mm (1")	0.45	0.99

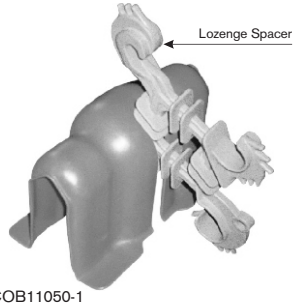
nominal voltage:14.6 kV (phase-to-phase)

COMPACT SYSTEM COVERS

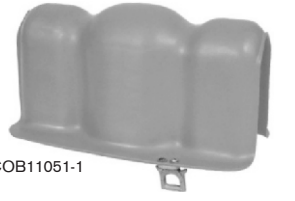
COB11047-1



COB11170-1



COB11050-1



COB11051-1

COB11147-1

They are available in two models: one for horizontal support and the other for “C” type support.

Each model is composed of two pieces which are superposed, offering total protection of the supports.

The cover COB11050-1 is specifically used on CDS (Compact Distribution Systems) and is intended to protect the conductor attached to the lozenge spacer.

Used with the CDS Conductor Covers to which they are attached with the couplings at both their ends.

CDS SUPPORT AND LOZENGE SPACER COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
COB11047-1	Horizontal CDS Support	1.25	2.76
COB11170-1	CDS “C” type Support	1.10	2.43
COB11170-2	To be used as support “C” and Line post insulator	1.25	2.76
COB11050-1	CDS Lozenge spacer	0.70	1.54

nominal voltage: 26.4 kV (phase-to-phase)

CDS PIN INSULATOR COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
COB11051-1	Pin Insulator with metallic bracket	0.80	1.76

nominal voltage: 26.4 kV (phase-to-phase)

CDS CONDUCTOR COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
COB11147-1	CDS Conductor to Ø 25 mm (1")	0.90	1.98

nominal voltage:36.6 kV (phase-to-phase)

INSULATING COVERS FOR MAINTENANCE WORKS ON ENERGIZED SUBSTATIONS

The insulating covers set composed of

- Side barrier
- Cut-out fixed contact cover
- Plain cover for busbar
- Adapter and head for cover installation protects adjacent circuits, fixed cut-out contacts and busbars, providing a safe working condition, preventing accidental contacts with the energized parts.

The versatility of this set allows protecting various types of cut-outs of: 630 A and 1250 A - single-pole and 1250 A - three-pole, among others.

The installation and removal can be done very quickly with a conventional hot stick.

COB11612-1

F

- COB11612-1 / COB22404-1

Lateral barrier

installed on the adjacent bays, which are closer to the substation termination structure to be insulated, providing total protection to the operator and offering total protection to the working area. It is attached to the structure with removable fiberglass hooks, allowing various installation positions.

COB11617-1

- COB11617-1 / COB20663-1

Fixed cut-out contact cover

made of thermoplastic, orange color, used for insulation of the fixed cut-out contact. It is provided with removable and adjustable fixing hooks, allowing its installation on different types of cut-outs, even with different dimensions of the lattices of the structure.

- COB11622-1 / COB20644-1

Plain Cover for busbars

made of thermoplastic, orange color, similar to the conductor covers used on Hot Line maintenance works. It allows a wide range of protection when insulating energized busbars, up to Ø 58 mm (2.3"), close to the working area.

COB11622-1

- RM4455-84

When mounted on a universal pole with any universal tool mounted on the adapter, it can be set at almost any angle relative to the stick.

- FLV11623-1

Aluminum installation head, with fiberglass sticks, used with a universal adapter, for installation and removal of the covers and insulating barriers.

INSULATING COVER FOR MAINTENANCE WORKS IN ENERGIZED SUBSTATION

Cat. No.	Description	Dimensions				Approx. Weight	
		Length		Height		kg	lb
		mm	ft	mm	ft		
COB11612-1	Lateral Barrier for substations	730	2.4	1430	4.7	7.05	15.54
COB22404-1	Lateral barrier for substations	740	2.5	1800	5.9	9.45	20.83
COB11617-1	Cover up for fix contact of Ø 250 mm (9.8") switch gear	620	2.0	500	1.6	2.65	5.84
COB11622-1	Straight cover for busbar	750	2.5	200	0.7	0.70	1.54

nominal voltage: 14.6 kV (phase-to-phase)

F

INSULATING COVER FOR MAINTENANCE WORKS IN ENERGIZED SUBSTATION

Cat. No.	Description	Dimensions				Approx. Weight	
		Length		Height		kg	lb
		mm	ft	mm	ft		
COB11612-1	Lateral Barrier for substations	730	2.4	1430	4.7	7.05	15.54
COB22404-1	Lateral barrier for substations	740	2.5	1800	5.9	9.45	20.83
COB20663-1	Cover up for fix contact of Ø 250 mm (9.8") switch gear	660	2.2	660	2.2	5.98	13.18
COB20664-1	Straight cover for busbar	750	2.5	250	0.8	1.30	2.87

nominal voltage: 26.4 kV (phase-to-phase)

RM4455-84

ACCESSORIES

Cat. No.	Description	Approx. Weight	
		kg	lb
RM4455-84	Universal Adapter	0.11	0.24
FLV11623-1	Installation Head	0.15	0.33

FLV11623-1

INSULATED RUBBER BLANKET

Intended to protect linemen from accidents, when in touch with energized parts of structures, during live line maintenance.

They are versatile and permit linemen to cover typical irregular shaped components, such as: load-break switches, secondary racks, pin insulators, cold end strings, crossarms etc.

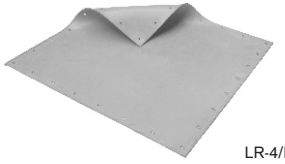
Made from special ozone and corona resistant rubber material.

These blankets are made bright orange, type II (resistant to ozone effects). They are available in three models, for a wider number of applications: Solid Type, Slotted Type and Three-slot Type.

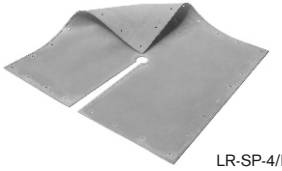
The Solid and Slotted Type have 28 eyelets along their borders and the Three-Slot Type has 11 holes, enabling them to be firmly fixed to the energized parts, using special plastic buttons (LIR-BLR).

Cover Pegs are also available. (refer to specific page of this product).

The Slotted Type has a 26.7 ± 1 mm wide slot from center to border and the Three-Slot Type has 18 mm wide slots, allowing special applications in quite diverse situations which require smaller folds.



LR-4/II



LR-SP-4/II

LR-TP-4/II

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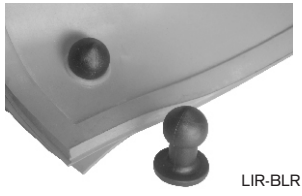
INSULATED RUBBER BLANKETS

Cat. No.	Description	Approx. Dimensions (mm)	Nominal Working Voltage (kV)	Nominal Test Voltage (kV)	Approx. Thickness		Approx. Weight	
					mm	in	kg	lb
LR-4/II	Solid	900 $^{+10}_{-5}$ x 900 $^{+10}_{-5}$	36	40	4.0	0.15"	3.90	8.60
LR-SP-4/II	Slotted	900 $^{+10}_{-5}$ x 900 $^{+10}_{-5}$					3.80	8.38
LR-TP-4/II	Three-slot	900 $^{+10}_{-5}$ x 1100 $^{+13}_{-6}$					4.86	10.71

PLASTIC BUTTON*

Cat. No.	Description
LIR-BLR	Plastic button for fixing of insulated rubber blankets

* order plastic pins separately. They are not supplied with the blankets



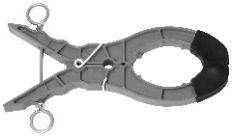
LIR-BLR

COVER PEGS

The Cover Pegs without steel eyes (FLV16886-1) can be installed on blankets and Cover-Up with the Rubber Glove Method.

The Cover Pegs with steel eyes (FLV16886-2) can be installed on blankets and Cover-Up with the Hot Stick Method.

FLV16886-1



FLV16886-2

COVER PEGS

Cat. No.	Description	Length		Approx. Weight	
		mm	ft	kg	lb
FLV16886-1	Manual plastic peg	240	0.8	0.12	0.26
FLV16886-2	Manual plastic peg with steel eyes for installation with hot stick	240	0.8	0.16	0.35

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PERMANENT COVERS

Permanent Covers are made of rigid black color thermoplastic, resistant to UV rays and electrical tracking. Suitable for Hot Line use and are installed with the Hot Stick or Rubber Glove Method.

Covers for Stirrup Connector

COB14959-1

This cover is intended for permanently covering stirrups and protected distribution line clamps, class 14.6 kV.

STIRRUP CONNECTOR AND HOT LINE CLAMP COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
COB14959-1	Cover-up for stirrup conecto and hot line clamp for, black color, permanent use	0.95	2.09

nominal voltage: 14.6 kV (phase-to-ground)

Shunt Connector Cover-Up

COB13559-1

Intended for permanently covering shunt connectors on protected distribution systems, class 14.6 kV. Only installed with the Rubber Glove Method.

SHUNT CONNECTOR COVER-UP

Cat. No.	Description	Approx. Weight	
		kg	lb
COB13559-1	Cover-up for derivation wedge, black color, permanent use	0.10	0.22

nominal voltage: 14.6 kV (phase-to-ground)

Transformer Bushing Cover-Up

The bushing Cover-Up are used for protection of the transformer terminals on distribution systems, preventing short-circuiting, mainly related to birds and other small animals.

- COB11721-1

Can be easily installed with specific plastic fasteners, available in one single model for several brands and models of transformers, class 14.6 kV, with output for surge arrester cable.

- COB18644-1

Can be installed on several sizes of cables.

- COB24863-1

Vertical output for Ø 25 mm (1") and Ø 15 mm (0.6") for cables, simple installation by pins.

COB11721-1

COB18644-1

COB24863-1

TRANSFORMER BUSHING PROTECTIVE

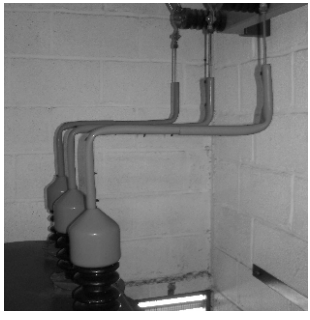
Cat. No.	Basic Dimensions (mm)	nominal voltage phase-to-ground (kV)	Approx. Weight	
			kg	lb
COB11721-1	Ø 114 mm (4.5") total height 157 mm (0.5 ft)	14.6	0.13	0.29
COB18644-1	Base Ø 108 mm (4") Body Ø 87 mm (3.5") total height 211 mm (0.7 ft)	14.6	0.11	0.24
COB24863-1	Ø 73 mm (2.9") total height 200 mm (0.5 ft)	25	0.13	0.29

REUSABLE INSULATING COVERS

Reusable insulating covers are intended for protection of energized circuits, preventing phase-to-phase or phase-to-ground contacts, which can be caused accidentally by small animals, generating possible outages.

Made of flexible plastic and specially customized for the various types and conditions of applications such as connectors, splices, busbars, MV structure bushings, etc. Can be quickly installed on these components and firmly fixed with nylon buttons.

These covers are reusable and can be removed and re-installed whenever conducting inspection of the structure parts.



F

GROUP G

DETECTION DEVICES AND TEST INSTRUMENTS

GROUP G

DETECTION DEVICES AND TEST INSTRUMENTS

G

FASE TESTER

The Fase Tester is a portable device to easily and safely determine the phase rotation and compare the phases. Additionally, it provides AC voltage readings (phase-to-phase or phase-to-ground) on transmission and distribution systems, from 1 kV through 80 kV.

The basic unit is composed of one galvanometer for direct reading from 1 kV through 16 kV, one reel with 6.50 m (21.33 ft) 16 kV rated protected cable, and two Ritzglas® poles, which are high-impedance units, necessary for the measurements.

For voltage classes higher than 16 kV, the use of extension resistors (RH1876-4 for 48 kV setting and RH1876-2 for 80 kV setting) is required. These extensions are attached to the end of the tester pole, using threaded connections. Thus, readings are no longer direct, that is, for 48 kV setting - scale reading must be multiplied by 3 and for 80 kV setting - scale reading must be multiplied by 5.

For 48 kV setting (RH1876-4), a pair of extensions is used and, for 80 kV setting (RH1876-2), two pairs of extensions are used. The length of each extension is 630 mm (2.07 ft).

The Calibration Device (H1876/B-AFT) is intended to calibrate the Fase Tester prior to use, mainly after an extended period of no service. The calibration device sends a digital signal to the Fase Tester so the reading on the galvanometer can be compared with the value indicated on the display of the Calibration Device.

The Calibration Device must be ordered separately.

Power: 9 V Alkaline battery.

RH1876

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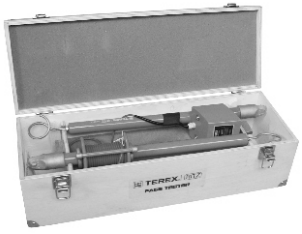
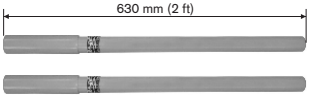


RH1876-1



RH1876-4

H1876/B-AFT

RH1760-1

FASE TESTER

Cat. No.	Description	Approx. Weight	
		kg	lb
RH1876	Complete set to test phases up to 16 kV, including tester, storage case, two universal sticks, canvas storage bag for the universal sticks and user guide	10.90	24.03
RH1876-1	Tester & case only to test phases up to 16 kV	8.35	18.41
RH1876-2	Extension resistor set, for voltages up to 80 kV	2.84	6.26
RH1876-4	Extension resistor set, for voltages up to 48 kV	1.42	3.13
H1876/B-AFT	Calibration Device	1.00	2.20

ACCESSORIES

Cat. No.	Description	Approx. Weight	
		kg	lb
RH1760-1	Ø 32 mm (1.25") Universal Sticks, insulating length: 1.75 m (5.7 ft)	1.30	2.87

ISOLOMETRO

Isolometro is a portable insulator tester enabling linemen to quickly detect a malfunctioning insulator of an insulator string on energized distribution and transmission systems.

The working principle is based on the measurement of the potential difference through the insulator disc under test. A high impedance galvanometer indicates this potential difference, enabling the comparison with other insulator discs of the same system. Therefore, the reading on the faulty insulator disc will be considerably bottom than on the others.

The Isolometro may be used to evaluate pin insulators, single insulators, multipart pin type insulators and disc insulators.

Composed of fiberglass poles and housing with contact probes that can be easily adjusted to various positions, enabling the test of insulators of any sizes, and also providing adjustments for a better view angle.

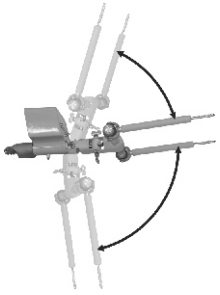
Isolometro features a 3-position switch to adjust its sensitivity so a more adequate probe deflection is obtained.

The Calibration Device is intended to check the Isolometro prior to use, mainly after an extended period of no service.

The calibration device sends a digital signal to the Isolometro so the reading on the galvanometer can be compared with the value indicated on the display of the Calibration Device.

The Calibration Device must be ordered separately.

The set is composed of the tester, case and user guide.



ISOLOMETRO

Cat. No.	Description	Approx. Weight	
		kg	lb
TILV-16/DT	Insulator Tester on distribution and transmission systems up to 500 kV	1.13	2.49
TILV-16/AFT	Calibration Device for Isolometro	1.00	2.20

TILV-16/DT

TILV-16/AFT

RITZ TESTER

Ritz Tester is a portable tester for periodic electrical tests on insulating hot sticks, grip-all clamp sticks, sectional hot sticks, hot line ladders and insulating scaffolds etc, to detect leakage current caused by humidity, cracks and impurities on the surface or inside the insulating poles.


LS-80

Ritz Tester is easy to handle and can be operated by a single lineman, by directly touching the area to be tested. Display reads “APPROVED” or “NOT-APPROVED”, depending on the leakage current through the pole being tested.

Ritz Tester simulates the same kind of test specified on ASTM F-711 Standard. The test performed by Ritz Tester is a guarantee that the equipment is ready for work. This is not valid though, for issuing Test Certificates.

Four models are available:

- LS-80 / LS-81 / RT-110 / RT-220

Models LS-80 and LS-81 (standard size), RT-110 and RT-220 (reduced size) test poles by applying 100 kV to every 30cm, per standard, with poles set up on horses horizontally.


RT-110

- LS-80/WD / LS-81/WD

Models LS-80/WD and LS-81/WD (wet/dry) provide electrical tests on dry and wet sticks (by means of a switch on the front panel of the tester). When switched to Wet, 75 kV is applied to every 30 cm (1 ft) down the pole and when switched to Dry, 100 kV is applied to every 30 cm (1 ft) down the pole.

A DVD with operating instructions is supplied with the Ritz Tester Wet/Dry.

RITZ TESTER

Cat. No.	Description	Dimensions (mm) (ft)	Approx. Weight			
			Tester		Case	
			kg	lb	kg	lb
LS-80	For 110 V	200 x 365 x 310 0.7 x 1.2 x 1.0	5.30	11.68	5.20	11.46
LS-81	For 220 V					
RT-110	Reduced model for 110 V	155 x 250 x 250 0.5 x 0.8 x 0.8	3.40	7.50	2.80	6.17
RT-220	Reduced model for 220 V					
LS-80/WD	Wet/Dry model for 110 V	200 x 365 x 310 0.7 x 1.2 x 1.0	5.30	11.68	5.20	11.46
LS-81/WD	Wet/Dry model for 220 V					

MICRO-AMMETER

Apparatus measuring leakage current in insulating structures which are in direct contact with the hot line.

Used to measure and monitor the leakage current on insulated structures such as ladders, insulating scaffolds, insulating booms of aerial devices, among others.

Analog Micro-Ammeter (RC402-0288)

Performs leakage current measurements up to 200 µA.

Digital Micro-Ammeter (MD800)

Performs leakage current measurements and monitors up to 800 µA.

The maximum leakage current allowed for the structure to be monitored can be configured in MD800 and sound and light signals are emitted when the value of the leakage current exceeds the value configured on the device.

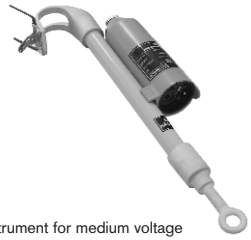
Developed for operate in insulating structures that are in contact with transmission lines up to 500kV.

RC402-0288

MD800

MICRO AMMETER

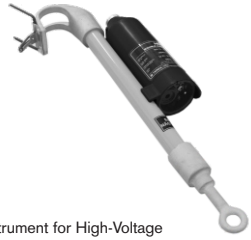
Cat. No.	Description	Approx. Weight	
		kg	lb
RC402-0288	Micro-Ammeter Analog, for leakage current measurements up to 200 µA	1.50	3.30
MD800	Micro-Ammeter Digital, for leakage current measurements and monitoring up to 800 µA	3.12	6.88



Instrument for medium voltage

HOT LINE TESTER

Hot Line Tester has been designed to indicate the absence of voltage in distribution systems, substations and transmission systems during hot line maintenance. This is necessary due to the fact that when the system is re-energized, high voltage peaks are generated so the lineman needs to immediately initiate the required safety procedures while the system is de-energized.



Instrument for High-Voltage

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HOT LINE TESTER

Cat. No.	Voltage Range	Frequency of Operation	Voltage Class	Applicable Standard / Revision	Color of Tester	Approx. Weight*	
						kg	lb
NHL 10-40	10 kV - 40 kV	60 Hz	Medium	IEC61243-1/09	Orange	0,72	1,59
NHL 20-80	20 kV - 80 kV		Medium/High		Orange		
NHL 60-240	60 kV - 240 kV		High		Black		

*Weight without case

CONTACT TESTER SB

Contact Tester is a contact AC voltage detector, which should only be used with a Hot Stick or Grip-All-Stick. The electronic circuit provides reliable and accurate indications through visual and sound warnings.

The Contact Tester is tested according to IEC-61243-1/08.

The Contact Tester provides quick and safe check of the voltage on AC networks of:

- Transmission lines
- Distribution lines
- Substations
- Cubicles

The model CT 0,07-1 has on/off switch, the others are stand by.

Instrument for low and medium voltage

Instrument for High-Voltage

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CONTACT TESTER SB

Cat. No.	Voltage Range	Frequency of Operation	Voltage Class	Applicable Standard / Revision	Color of Tester	Approx. Weight*	
						kg	lb
CT 0,07-1	70V - 1 kV	60 Hz	Low	-	brown	0.29	0.63
CT 2-8/SB	2 kV - 8 kV		Low	IEC61243-1/09	Orange	0.29	0.63
CT 3,8-36/SB	3,8 kV - 36 kV		Medium	IEC61243-1/09**	Orange	0.29	0.63
CT 10-40/SB	10 kV - 40 kV		Medium	IEC61243-1/09	Orange	0.29	0.63
CT 20-80/SB	20kV - 80 kV		Medium/High	IEC61243-1/09	Orange	0.42	0.92
CT 60-240/SB	60 kV - 240 kV		High	IEC61243-1/09	Black	0.42	0.92

*Weight without case
** No answer to item - 4.2.1.2 THRESHOLD VOLTAGE - the standard IEC61243-1. Meets the other requirements of the standard.

CONTACT TESTER - CSU

Contact Testers model CT-CSU are intended to test energized systems for voltage presence. Indication through sound and visual signals. This tester indicates voltage presence only when touching the energized point to be tested with the tester electrode.

Since a universal head is provided at its end, this tester can also be used in other applications such as opening de-energized fuse switches. The pole attached to the tester is submitted to the same tensile test of the Sectional Hot Stick.

CONTACT TESTER - CSU

Cat. No.	Voltage Range	Frequency of Operation	Voltage Class	Applicable Standard / Revision	Cor do Instrumento	Approx. Weight*	
						kg	lb
CT-CSU-3,8-36/SB	3,8 kV - 36 kV	60 Hz	Medium	-	Orange	0.65	1.43
CT-CSU-10-40	10 kV - 40 kV			IEC61243-1/09			

*Weight without case

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CONTACT TESTER - UNDERGROUND SYSTEM

The Contact Tester for underground systems is an AC voltage tester intended to detect voltage presence in underground systems elbow connectors and straight connectors. The contact electrode was developed to enable placing and removing the lid of such connectors in order to perform the tests.

TECHNICAL CHARACTERISTICS

- Voltage Range: 2 kV through 6 kV - or according to customer specification;
- Stand by model;
- Sound and visual signals;
- Built-in functioning and battery load tests;
- Curved contact electrode;
- Universal adapter for Sectional Hot Stick and Grip-All Clamp Sticks.

CONTACT TESTER - UNDERGROUND SYSTEM

Cat. No.	Voltage Range	Description	Approx. Weight	
			kg	lb
CT-RS/C 2-6	350 V to 1 kV	Voltage Tester for capacitive disconnecting terminals Output Ratio of 1/10 or 1/12 of the nominal voltage	0.34	0.75

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DC CONTACT TESTER

The DC Voltage Tester is a bipolar device, having one clamp connected to the ground point and the electrode used to detect voltage at the desired location.

CT-CC 0.5-5

TECHNICAL CHARACTERISTICS

- Voltage range: 500 V - 5 kV
- Provided with ON-OFF-TEST switch
- Visual signals and sound alarm to indicate voltage presence
- Universal adapter for hot sticks
- Built-in self-test circuit and cables test circuit

DC VOLTAGE TESTER

Cat. No.	Description	Approx. Weight	
		kg	lb
CT-CC 0.5-5	DC Voltage Tester, 500 V through 5 kV	1.10	2.43

SUPER TESTER

The Super Tester is a proximity voltage detector which should only be used with a Hot Stick or Grip-All Stick. The electronic circuit provides reliable and accurate indications through visual and sound warnings.

The Super Tester provides quick and safe check of the voltage, starting as low as 1 kV on AC networks, such as: transmission lines, distribution lines, substations, cubicles, etc, which have unshielded conductors.

Using the Super Tester is essential when carrying out maintenance on electrical networks, allowing the lineman to confirm there is no voltage on the system, in order to install the grounding equipment ensuring the required safety to perform the works.

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SUPER TESTER

Cat. No.	Description	Approx. Weight	
		kg	lb
H1990/ST-138	Single-pole Non-Contact high voltage detector, for systems from 1 through 138 kV	1.00	2.20
H1990/ST-800	Single-pole Non-Contact high voltage detector, for systems from 1 through 800 kV		

TECHNICAL CHARACTERISTICS

- Suitable for both indoor and outdoor applications
- Built-in self working test
- Double Indication: extremely bright visual warning LEDs and sound alarm, activated simultaneously
- Encapsulated electronic circuit, immune to temperature variations from -10°C through 60°C
- LED to indicate the perfect working conditions of the electronic circuit and battery load
- Storage: Plastic Case
- Universal adapter model VMR00634-1 for Hot Sticks
- Dimensions: 180 x 180 x 90 mm (0.59 x 0.59 x 0.30 ft)
- Working principle: Proximity to the electro-magnetic field
- Warning signals: Visual - 04 (four) extremely bright front LEDs
  Sound - Electrical Transducer
- Working Frequency: 50 / 60 Hz
- Power: 9 Vdc battery - 15 h average working life

MULTI-USO TESTER

Developed to reliably detect the presence of voltage either by contact or by approximation in AC electrical installations, unshielded conductors. It is ideal for use on distribution lines, substations and cubicles.

DMU (with switch)

DMU (stand by)

MULTI-USO TESTER

Cat. No.	Voltage Range	Model	Approx. Weight	
			kg	lb
DMU-15	110 V - 600 V contact 601 V - 15 kV approach	on/off switch	0,30	0,66
DMU-25	110 V - 25 kV	on/off switch		
DMU-36/SB	127 V - 40 kV	stand by		

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GLOVE TESTER

Glove Tester is a robust, easy-to-handle tester, which can be operated either manually, using a pneumatic pump, or connected to a compressed air source.

Its use is essential for visual inspection of insulating rubber gloves, by fully inflating them and, thus immediately detecting any damages which may adversely affect their insulating properties.

Since the insulating rubber gloves are constantly subject to fissures, perforations, scratches, cuts, etc, they require special care, including periodic visual test prior to every use, in addition to regular dielectric tests.

Glove Tester has been specially designed to allow a safe and complete visual inspection of the insulating rubber gloves, either at the work site or in the laboratory, uniformly inflating them to detect even the slightest damage on the surface.

Ideal for testing gloves of all voltage classes.

GLOVE TESTER

Cat. No.	Description	Approx. Weight	
		kg	lb
FLV11404-1	Complete glove tester	7.75	17.09

GROUP H

BARE-HAND EQUIPMENT

GROUP H

BARE-HAND EQUIPMENT

CONDUCTIVE SUITS

The Conductive Suit has been designed specially for works on EHV transmission systems and substations up to 800 kV.

It allows the lineman to equalize his potential with the electrical field of the energized system where the maintenance works will be performed.

The working principle of the Conductive Suit is based on the Faraday Cage principle, offering safe and comfortable working conditions on energized systems.

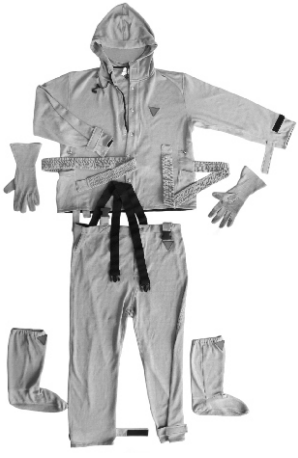
Manufactured in high technology fabric based on polyamide covered with cotton and silver microfibers with reinforced seam.

The Conductive Suits are available in three sizes: medium, large and extra-large.

The anatomic design allows the linemen to use the safety helmet underneath the hood of the Conductive Suit, without limitation of the movements and maintaining the Faraday Cage effect around the head.

The routine tests report is provided together with the Conductive Suit. These test data are extremely important as reference for the continuous monitoring of the quality and performance of the Conductive Suit, even after years of use and many washings.

The conductive suit meet the requirements of standard IEC 60895/2002.



CONDUCTIVE SUITS

Cat. No	Description	Size	Approx. Weight	
			kg	lb
RC402-0533/C	Complete, composed of trousers, jacket, socks, gloves and storage bag	Medium	1.55	3.42
RC402-0534/C	Complete, composed of trousers, jacket, socks, gloves and storage bag	Large	1.65	3.64
RC402-0535/C	Complete, composed of trousers, jacket, socks, gloves and storage bag	Extra Large	1.75	3.86
RC402-0533	Conductive Trousers and Jacket, with storage bag	Medium	1.38	30.04
RC402-0534	Conductive Trousers and Jacket, with storage bag	Large	1.48	3.26
RC402-0535	Conductive Trousers and Jacket, with storage bag	Extra Large	1.58	3.48
RC402-0558	Conductive gloves	Only	0.12	0.26
RC402-0578	Conductive socks	Only	0.05	0.11

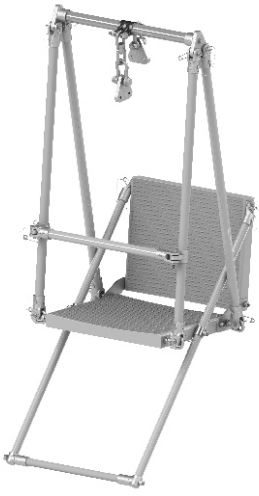
BARE-HAND WORKING CHAIR

Designed to make easier and faster the transport of the lineman from the ground to the maintenance area of the structure or allowing the access to the energized conductor in safe conditions, faster and comfortable.

His conception of anatomical construction, lightweight and sturdy with Ritzglas® fiberglass stick connections and aluminum operations allow vertical and horizontal displacements with absolute precision in the approximation of the potential

It has the swivel device that allows continuous rotation from the point of connection with the spear, thus enabling a better position in the transition from electric chair for the conductor. This device monitors the chair and can optionally be used ..

The chair is mountable and has a bag for easy transport, packaging and storage.



OPTIONAL ACCESSORY

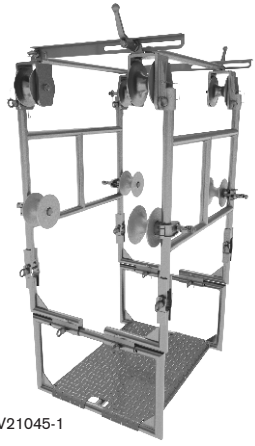
- FLV21078-1

Bag for Bare-hand working chair

BARE-HAND WORKING CHAIR

Cat. No.	Maximum Work Load		Approx. Weight	
	daN	lb	kg	lb
FLV12563-1	120	265	19.80	43.65

METALLIC KART TO MOVEMENT ON THE CONDUCTOR CABLE



FLV21045-1

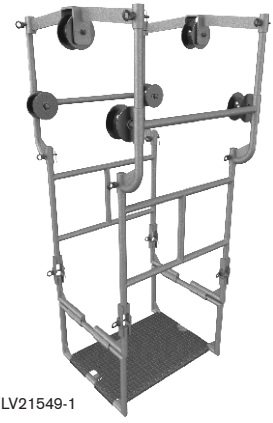
An essential tool for inspection and maintenance in transmission lines.

Through the method of the potential, the electrician has access to conductors, safely and ergonomically. Its advance and retreat is held by a rope from the tower or ground.

Made mostly of aluminum, this unit allows easy handling during transport, installation and use.

METALLIC KART

Cat. No.	Description	Maximum Work Load		Approx. Weight	
		daN	lb	kg	lb
FLV21045-1	two conductors in parallel position	120	265	28.50	62.83
FLV21549-1	four conductors in lozange position			55.50	122.36



FLV21549-1

H

OPTIONS FOR HANDLING

Item	Qty.	Unit.	Cat. No.	Description
01	220	m	RM1895-3	Polypropylene rope
02	06	pc	FLV04803-3	Rope insulating stick

BARE-HAND STICK

The Bare-hand Stick is used for connecting the conductive strap of the Conductive Suit with the energized conductor, to equalize the potential between Conductive Suit and energized conductor. This prevents possible discomfort while performing live works.

Whenever performing maintenance with the Bare-hand Method, the first contact between the Conductive Suit and the energized conductor is made by the Bare-hand Stick. Similarly, at the end of the work, the Bare-hand Stick will be the last component to be disconnected, preventing thus the electrical arch from reaching the lineman.

When returning to ground potential, first the Bare-hand Stick must touch the structure to discharge of the static energy.

FLV02544-1 is made of Ø 32 mm (1.25") Ritzglas® poles, equipped with pole hanger and provisions for connection of the conductive strap of the Conductive Suit.

TYPES OF CONNECTION

Detachable clamp: the clamp also connects to the conductor by twisting the stick, however it allows the lineman to remove the stick, leaving only the clamp attached to the conductor (this clamp is provided with quick connection head, which connects to the clamp eye-ring firmly and safely).

BARE-HAND STICK

Cat. No.	Description	Insulating Length		Clamp Opening Min. Max.		Approx. Weight	
		mm	ft	mm	ft	kg	lb
FLV02544-1	With detachable clamp	340	1.1	12 / 48	0.04 / 0.16	1.60	5.53

FLV02544-1

GROUP I

RESTORATION OF COMPONENTS, CONDITIONING AND TRANSPORT

GROUP I

RESTORATION OF COMPONENTS, CONDITIONING AND TRANSPORT

REPAIRERS AND LUBRICANTS

Prior to the acquisition of these repair sets and lubricants, please contact Sales Department for basic information on the application.

These products can be easily applied by the user.

- RT400-0803

The Gloss Restorer is a colorless resin, specially designed for surface repairs on Ritzglas® hot sticks, when featuring surface wearing and loss in gloss.

These types of damages on the insulating sticks compromise their dielectric strength, caused by moisture and impurity contamination.

- RM1909

Tool Lubricant, made of non-toxic and non-corrosive materials. This material is a highly efficient lubricant, for it offers a durable layer to the parts, preventing oxidation and avoiding friction and wearing of the metallic tools.

RT400-0803

RM1909

I

RH1917

- RH1917

Ritzglas® Bond Patching set is a set of orange color resin and hardener, recommended for repairs of minor fissures, or other surface damages, such as scratches or cracks, either caused accidentally or due to improper use of the equipment. It is also used for replacement of metallic heads on sticks.

RM1904

- RM1904

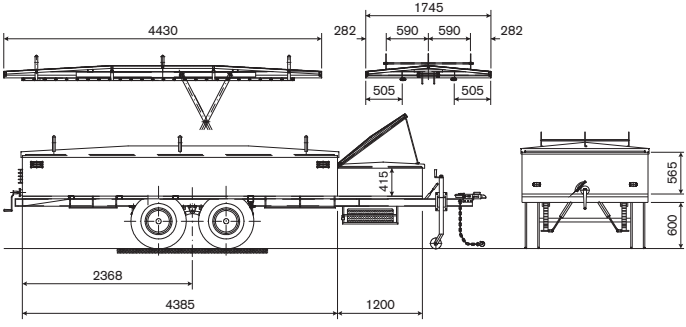
The Silicone-soaked Hot Stick Wiping Cloth for surface treatment of Insulating Hot Sticks is intended for surface applications of a preventive protection on sticks, offering a superficial protection layer.

REPAIR SETS AND LUBRICANTS

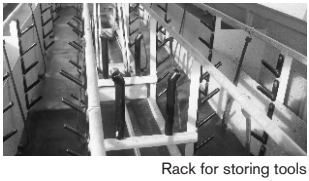
Cat. No.	Description	Approx. Weight	
		kg	lb
RT400-0803	Gloss Restorer set supplied with 12 bottles of 115 ml, being 6 bottles with component A and 6 bottles with component B, stored in plastic case	2.60	5.37
RM1909	Tool Lubricant, for it offers a durable layer to the parts, preventing oxidation	2.10	4.63
RH1917	Ritzglas® Bond Patching set, supplied in two plastic bottles of 125 ml each, containing components A and B	0.32	0.71
RM1904	Silicone-soaked Hot Stick Wiping Cloth for surface treatment of insulating hot sticks, 01 cloth measuring 0.50 x 0.50 m (1.64 x 1.64 ft)	0.08	0.18

TRAILER FOR HOT LINE TOOLS

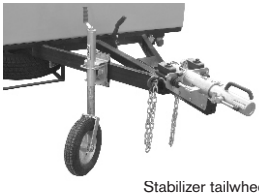
Cat. No.	Description	Max. Load Capacity		Approx. Weight	
		kg	lb	kg	lb
FLV03102-1	Trailer for conditioning and transport of hot line tools	1500	3306	1420	3130



Note: Adapting the trailer in vehicle with traction capacity from 3 ton.



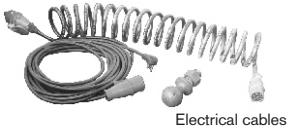
Rack for storing tools



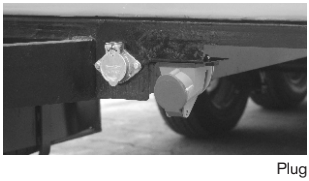
Stabilizer tailwheel

TECHNICAL CHARACTERISTICS

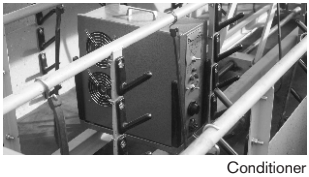
- Chassis structure: Steel profile
- Set of wheels: rim 16, (tire 215 x 80 x16)
- Suspension type
  Set of leaf springs and telescopic shock absorbers
- Suspension with dual axle and balance system with lubrication
- Back cover System Lift
  Type pantograph drive for spindle crank
- 4 ton. Brake assembly inertial
- Stabilizer tailwheel 120 kg (265 lb)
- Supplied with wrench and spare tire
- Type of hitch towing concha-ball
- Electrical power between the vehicle and the trailer
  wiring harnesses, with one 7 poles - 12 V plug
- Internal heating system
  Dual-voltage heater with selecting switch (110 or 220 V)
  Power conditioner with harness (when parked)
- Rubber-coated ladder supports, installed on the rear cover



Electrical cables



Plug



Conditioner

I

GROUP J

DAYLIGHT WARNING SPHERES

GROUP J

DAYLIGHT WARNING SPHERES

The Daylight Warning Spheres for electrical systems are intended for visual warning of aircrafts like helicopters, airplanes, balloons, gliders, etc. preventing thus the collision of these aircrafts with the electrical transmission and distribution systems.

Due to the various situations and places where the installation of the Daylight Warning Spheres is necessary, specific models have been designed, aiming at minimizing the inconveniences caused by hard-to-reach locations, irregular land surface and road crossings, among others.

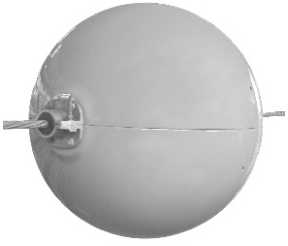
In order to meet the requirements of the electrical utilities, Daylight Warning Spheres are manufactured according to Brazilian Standard NBR 15237 and in-house manufacturing process, ensuring excellent characteristics, such as:

- long service life
- UV resistance
- aeolic vibration resistance
- rotation movement resistance
- sliding resistance
- rain water draining system through radial holes, perpendicular to the cable

SPHERE FOR STANDARD INSTALLATION

Installation and removal of these spheres is done manually on grounding during construction of the transmission line or during its maintenance shutdown.

The conventional system consists of special bearings aluminum alloy, rubber pads unique for each diameter of cable, besides bolts, nuts and washers



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SPHERE FOR STANDARD INSTALLATION

Cat. No.	Connection		Approx. Weight	
	mm	in	kg	lb
ESR19898-1	6 to 8	0.25" to 0.3"	5.60	12.36
ESR19898-2	8.1 to 9.5	0.32" to 0.37"		
ESR19898-3	9.51 to 10.5	0.37" to 0.41"		
ESR19898-4	10.51 to 11.5	0.41" to 0.45"		
ESR19898-5	11.51 to 12.5	0.45" to 0.5"		
ESR19898-6	12.51 to 13.5	0.5" to 0.53"		
ESR19898-7	13.51 to 14.5	0.53" to 0.56"		
ESR19898-8	14.51 to 15.5	0.56" to 0.6"		
ESR19898-9	15.51 to 16.5	0.6" to 0.65"		
ESR19898-10	16.51 to 17.5	0.65" to 0.7"		
ESR19898-11	17.51 to 18.5	0.7" to 0.73"		
ESR19898-12	18.51 to 19.5	0.73" to 0.77"		
ESR19898-13	19.51 to 20.5	0.77" to 0.8"		
ESR19898-14	20.51 to 21.5	0.8" to 0.85"		
ESR19898-15	21.51 to 22.5	0.85" to 0.9"		
ESR19898-16	22.51 to 23.5	0.9" to 0.93"		
ESR19898-17	23.51 to 24.5	0.93" to 0.96"		
ESR19898-18	24.51 to 25.5	0.96" to 1"		

SPHERE FOR ROBOT / ROPE INSTALLATION

Developed to provide greater convenience and productivity, allows installation and removal with live line method, in cables made of steel, aluminum or OPGW from the ground, by using:

- Robot specially designed for this task, triggered by remote control or
- Kit for operation with rope.

SPHERES FOR ROBOT/ROPE INSTALLATION

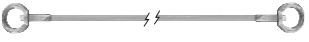
Cat. No.	Connection		Approx. Weight	
	mm	in	kg	lb
ESR19899-1	6 to 8	0.25" to 0.3"	6.06	13.36
ESR19899-2	8.1 to 10	0.32" to 0.39"		
ESR19899-3	10.1 to 12	0.39" to 0.47"		
ESR19899-4	12.1 to 14	0.47" to 0.55"		
ESR19899-5	14.1 to 16	0.55" to 0.63"		
ESR19899-6	16.1 to 18	0.63" to 0.71"		
ESR19899-7	18.1 to 20	0.71" to 0.8"		
ESR19899-8	20.1 to 22	0.8" to 0.87"		

ESR12981-1 - SET FOR ROPE OPERATION

Item	Qty.	Unit.	Cat. No.	Description
01	1	pc	FLV03278-3	Snatch Block, made of aluminum
02	1	pc	ESR12963-1	Snatch Block and Strain link Stick
03	6	pc	ESR11795-1	Ø 6 x 1500 mm (0.25" x 4.9 ft) Rope Insulating Stick
04	1	pc	ESR12591-1	Hooks
05	220 722	m ft	RM1895-1	Polypropylene Rope

FLV03278-3

ESR12963-1



ESR11795-1

ESR12591-1

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ROBOT FOR WARNING SPHERES

The Robot for Daylight Warning Spheres is a high-technology equipment developed by Terex intended for installation and removal of Daylight Warning Spheres on transmission lines.

Endowed command operated by remote control from the ground, the robot performs:

- The placement of the ball on the line in your location;
- The closing engagement of the ball bearings for the conductor;
- Removal of ball for replacement or maintenance

TECHNICAL CHARACTERISTICS

- Maximum displacement speed: 2.5 km/h
- Power: one 12 V - 45A battery (to be ordered separately)
- Battery Life: 1h
- Powering the radio transmitter: 12 V rechargeable battery with charger
- Radio transmitter: Frequency designated with FRS (Family Radio Service)
- Remote control maximum reach: 3 km (no obstacles)
- Approx. weight of the battery: 18 kg (39.68 lb)
- Maximum inclination angle of the robot: 15 degrees

ROBOT FOR WARNING SPHERES

Cat. No.	Description	Approx. Weight*	
		kg	lb
ESR13701-1	Robot for Daylight Warning Sphere ESR19899 installation and removal	31.00	68.34

* with battery.

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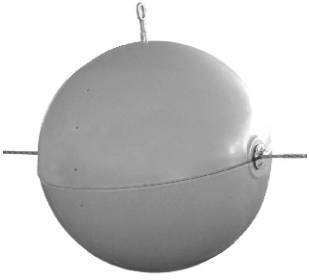
SPHERES FOR HELICOPTER INSTALLATION

These spheres have a special mechanism for opening and coupling to the cable driven from a single screw grommet located in the upper of the grip-all clampstick, for installation of spheres. Provided with a counterweight to maintain the eye bolt on top of the sphere.

The operation of installing and removing the transmission line is performed directly from the helicopter quickly and securely online live.

SPHERE FOR HELICOPTER INSTALLATION

Cat. No.	Connection		Approx. Weight	
	mm	in	kg	lb
ESR19900-1	6 to 8	0.25" to 0.3"	5.57	12.28
ESR19900-2	8.1 to 10	0.32" to 0.39"		
ESR19900-3	10.1 to 12	0.39" to 0.47"		
ESR19900-4	12.1 to 14	0.47" to 0.55"		
ESR19900-5	14.1 to 16	0.55" to 0.63"		
ESR19900-6	16.1 to 18	0.63" to 0.71"		
ESR19900-7	18.1 to 20	0.71" to 0.8"		
ESR19900-8	20.1 to 22	0.8" to 0.87"		



J

J

GROUP L

GROUNDING EQUIPMENT AND SECTIONAL HOT STICK

GROUP L

GROUNDING EQUIPMENT AND SECTIONAL HOT STICK

TEMPORARY GROUNDING EQUIPMENT

Equipment for effective electrical connection, with intentional low impedance to ground, designed to guarantee the equipotentialiality and continuously maintain it during the intervention in the electrical installation, promoting protection of the workers against accidental energization.

The correct specification of the Temporary Grounding Equipment is the first principle which ensures efficiency and safety when performing dead line works, if the system is accidentally energized. The specification must be compatible with the characteristics of the electrical system where the Temporary Grounding Equipment will be installed.

Read carefully the following basic requirements for the correct specification of the Temporary Grounding Equipment, ensuring the use of equipment that will ensure the safety of the linemen.

In order to specify the Temporary Grounding Equipment, it is necessary to be acquainted with the following characteristics of the electrical systems where it will be installed:

a. Type of system and voltage level:
   Overhead line or network (kV)
   Substation (kV)
   Secondary Network (LV) either with bare or protected conductor
   Underground Network (kV)

b. Maximum Short-Circuit Current

c. Response Time of the Protection System

d. Type of structure:
   Metallic
   Concrete
   Wooden

e. Distances between phases / phase-ground

f. Phase and Ground conductors size where the Temporary Grounding Equipment will be installed.

The maintenance on de-energized overhead networks may seem to be, at first, an apparently safe work condition. However, the system can be accidentally energized, due to several common reasons, such as:

- Operational errors
- Accidental contact with other energized networks
- Induced voltage from adjacent lines
- Atmospheric discharges, even if they happen far away from the working place
- Third-party feeding power

Unfortunately, the above reasons are not theoretical facts or impossible happenings, like many maintenance linemen may think. Evidencies have been showing us the truth, given the number of accidents occurring every year at the electrical utility companies.

The Temporary Grounding and Short-Circuiting Equipment is the main protection for the lineman while performing maintenance on de-energized systems and must be therefore, considered the main working tool.

TYPICAL SEQUENCE OF INSTALLATION OF A TEMPORARY GROUNDING EQUIPMENT

1. Make sure the line is de-energized using the Voltage Detector attached to the Ritzglas® Hot Stick.
2. Insert the Grounding Rod into ground and connect the grounding clamp to it. The Grounding Rod must be inserted as deep as possible into ground, only leaving above the surface the necessary section for connection of the clamp.
3. Using a Ritzglas® Hot Stick proceeding exactly the same way as during hot line work, slowly lift the phase clamps and first connect the clamp to the middle phase.
4. Using the Ritzglas® Hot Stick, connect the second and third phase clamps to the lateral phases, concluding the interconnection between phases and ground.
5. The lineman can only access the conductors after concluding the complete installation of the Temporary Grounding Equipment, that is, the system can only be considered de-energized once it is properly grounded.

NOTES

1. The Short-Circuit current capacity is limited to the specified grounding and Short-Circuiting cable size.

   The specification of the cable can be changed regarding size (mm^2) and/or lengths (longer or shorter pieces), according to the Short-Circuit capacity of the electrical system where the set will be used.

2. The Ritzglas® Hot Sticks can be provided in different lengths, according to the operational requirements (refer to the specific Hot Stick section).

3. The storage canvas bag is reinforced on the bordering lines and both ends, and has suitable internal divisions for the storage of the sectional hot stick sections, transportation grip and one additional pocket for the operational heads.

   This bag should be ordered separately, as it is an optional accessory.

   Customized color patterns available upon request.

ATR04514-2

GROUNDING EQUIPMENT FOR LOW VOLTAGE SYSTEMS

Temporary Grounding and Short-Circuiting Stick for Secondary Systems (LV)

- ATR04514-1 / ATR04514-2

The Temporary Grounding and Short-Circuiting Stick for Secondary Systems is intended for maintenance on de-energized low voltage overhead systems.

It offers simultaneous connection of phase conductors to the neutral conductor, establishing the Short-Circuiting between them requiring only a single operation for the lineman.

This stick is manufactured with a Ø 25 mm (1") Ritzglas® pole, aluminum hooks, rubber storm skirt to delimit the handling area.

The fixing hooks are connected to the conductor by spring action, providing more quickness when installing, without damaging the conductors.

The aluminum bar for interconnection of the hooks is provided with a screw on its bottom end, to enable connection of a cable to ground.

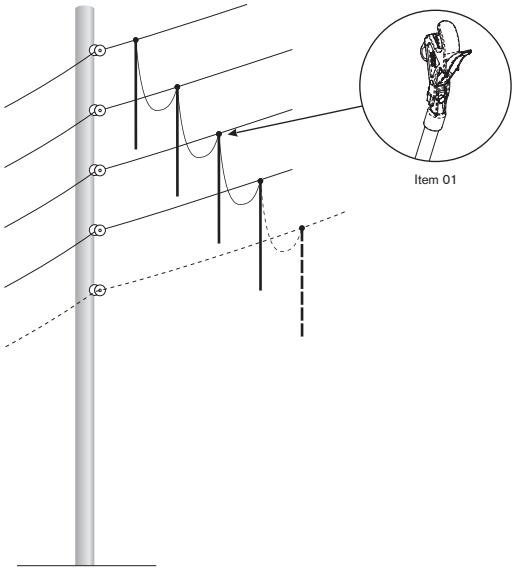
TECHNICAL CHARACTERISTICS

Cat. No.	ATR04514-1	ATR04514-2
Overall length (m / ft)	1.40 / 4.59	1.20 / 3.94
Qty. of hooks	5	4
Max. Range - Ø (mm / in)	19.50 / 0.7"	19.50 / 0.7"
Min. Range - Ø (mm / in)	3.50 / 1.15"	3.50 / 1.15"
Approx. Weight (kg / lb)	1.40 / 3.09	1.10 / 2.43

L

Temporary Short-Circuiting and Grounding Equipment for Conventional Low Voltage Networks (LV)

Maximum Short-Circuit Current: - 30 cycles:8 kA
- 60 cycles:5 kA



ATR17439-1

Item	Qty.	Unit.	Cat. No.	Description
01	04	pc	ATR17348-1	Pressure-type grounding clamp attached to a Ø 25 mm x 0.30 m (1" x 1 ft) Ritzglas® pole, with rubber handle
02	1.20 3.94	m ft	CTC-25	25 mm² extra-flexible copper cable, with PVC clear-vision insulation, being 3 lengths of 0.4 m (1.3 ft)
03	06	pc	ATR26446-2	Tin-plated copper ferrule for 25 mm² cables
04	06	pc	ATR17923-4	Heat Shrink
05	01	pc	ATR16843-7	Canvas Bag for conditioning of items 01 to 03

ATR17439-2

Item	Qty.	Unit.	Cat. No.	Description
01	05	pc	ATR17348-1	Pressure-type grounding clamp attached to a Ø 25 mm x 0.30 m (1" x 1 ft) Ritzglas® pole, with rubber handle
02	1.60 5.25	m ft	CTC-25	25 mm² extra-flexible copper cable, with PVC clear-vision insulation, being 4 lengths of 0.4 m (1.3 ft)
03	08	pc	ATR26446-2	Tin-plated copper ferrule for 25 mm² cables
04	08	pc	ATR17923-4	Heat Shrink
05	01	pc	ATR16843-7	Canvas Bag for storage of items 01 to 03

OPTIONAL ACCESSORIES

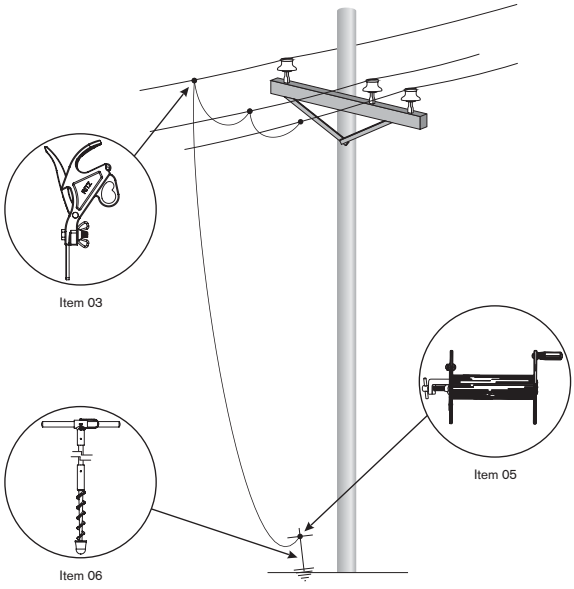
Item	Qty.	Unit.	Cat. No.	Description
06	10 32.8	m ft	CTC-25	25 mm² extra-flexible copper ground cable, for connection to ground point, with connector to connect to phases conductor
07	01	pc	ATR26446-2	25 mm² cable tin-plated copper ferrule
08	01	pc	ATR17923-4	Heat Shrink
09	01	pc	ATR13036-2	25 mm² cable shrouded and unshrouded aluminum ferrules
10	01	pc	ATR17923-1	Heat Shrink
11	01	pc	RG3403T	Grounding Clamp for with "T"-screw for connection to the grounding rod
12	01	pc	ATR00137-2	Ø 17 mm x 1.0 m (0.7" x 3.3 ft) Grounding Rod
13	01	pc	ATR16819-1	Canvas bag for storage of the grounding rod
14	01	pc	ATR16843-4	Canvas bag for storage of the grounding equipment and accessories

NOTE
Should the customer chose to order items 01 to 14 (main set and optional accessories), item 05 shall be disconsidered.

L

Temporary Short-Circuiting and Grounding Equipment for Distribution Networks up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 8 kA
- 60 cycles: 5 kA



ATR03654-1

Item	Qty.	Unit.	Cat. No.	Description
01	01	pc	VMR-45/L	Ritzglas® sectional hot stick, overall length of 3.95 m (13 ft), composed of:
	01	pc	VMR/L-S	Ø 25 mm x 1.25 m (1" x 4.1 ft) Top section, with universal head VMR00634-1
	01	pc	VMR/L-I	Ø 32 mm x 1.25 m (1.25" x 4.1 ft) middle section
	01	pc	VMR/L-P	Ø 32 mm x 1.45 m (1.25" x 4.8 ft) handle section
02	01	pc	VMR00884-1	Head for switch operation
03	03	pc	ATR03653-1	Pressure-type grounding clamp, quick connection, by spring action
04	01	pc	ATR04694-1	Suspension cluster, for clamps installation and removal operations
05	01	pc	ATR03641-1	Metallic reel, with bronze clamps, for connection to the grounding rod and conditioning of the grounding cable
06	01	pc	ATR00137-2	Ø 17 mm x 1 m (0.7" x 3.3 ft) Copper-steel Grounding, with copper tip end
07	16 52.49	m ft	CTC-25	25 mm² extra-flexible copper cable, with PVC clear-vision insulation, being 2 lengths of 2 m (6.6 ft) and 01 length of 12 m (39.4 ft)
08	06	pc	ATR26446-2	Tin-plated copper ferrule for 25 mm² cables
09	06	pc	ATR17923-4	Heat Shrink
10	01	pc	ATR16483-7	Conditioning bag for grounding set
11	01	pc	VMR10484-2	Canvas bag, with inside divisions for storage of the sectional hot stick and grounding rod

Temporary Grounding Equipment for Insulated Secondary Systems (LV) with Multiplex Cables and Conventional Systems with bare conductors

Maximum Short-Circuit Current: - 30 cycles: 10 kA
- 60 cycles: 7 kA

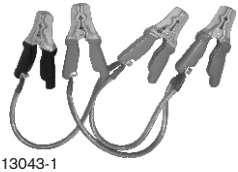
- ATR13043-1

This equipment enables quick, practical and safe installation and innovates the concept of grounding in LV multiplexed-cables insulated systems or conventional systems.

Provided with pressure grounding clamps made of aluminum alloy and handles with rubber coating.

Equipped with tail connectors that can be installed on the system at pre-determined locations, using jumper piercing connectors (refer to note 3 below), enabling the quick connection of the equipment to the system.

In order to increase safety of the installation, these tail connectors are provided with special terminals to protect the exposed connection points after the removal of the grounding set.



ATR13043-1

ATR13043-1

Item	Qty.	Unit.	Cat. No.	Description
01	04	pc	ATR13047-1 ATR13047-2	Pressure-type clamp, body in light cast aluminum-alloy, handle with black color plastic jacket ATR13047-2 (neutral) and red color plastic jacket ATR13047-1 (phases). Capacity: Min. 35 mm² and Max. 120 mm²
02	1.50 4.92	m ft	CTC-35	35 mm² extra-flexible copper ground cable, being 3 lengths of 0.5 m (1.6 ft)
03	06	pc	ATR26446-3	Tin plated copper Ferrule for 35 mm² cable
04	06	pc	ATR17923-5	Heat Shrink
05	01	pc	ATR16818-1	Canvas bag for storage of the set

OPTIONAL ACCESSORIES

Item	Qty.	Unit.	Cat. No.	Description
06	-	pc	ATR13151-1	Tail connector, manufactured with XLPE insulated cable, black color, 600 V, 70 mm², for permanent installation to the LV system, with terminal protective device, for connection of the grounding set
07	01	pc	ATR00137-2	Ground rod, Cooperweld rod, Ø 17 and 1.0 m (0.7" x 3.3 ft) total length, brass thread
08	10 32.8	m ft	CTC-35	35 mm² extra-flexible copper ground cable, for connection to ground point, with connector to connect to phases conductor
09	01	pc	ATR17923-5	Heat Shrink
10	01	pc	RG3403T	Grounding clamp with T screw to connect with the rod
11	01	pc	RC600-2626	Plain shrouded aluminum ferrule
12	01	pc	ATR17923-2	Heat Shrink
13	01	pc	ATR16819-1	Canvas bag for storage of the grounding rod
14	01	pc	ATR14484-1	Canvas bag for storage of the grounding equipment and accessories

NOTES

1. Should the customer choose to order items 01 to 13 (main set and optional accessories), item 05 shall be disconsidered.
2. The jumper piercing connectors are not produced by Terex and should be ordered from another supplier. Quantities and sizes must be compatible with the conductors of the secondary system.
3. The necessary quantity of Tail connectors ATR13151-1 for installation at pre-determined locations of the system, should be ordered separately.

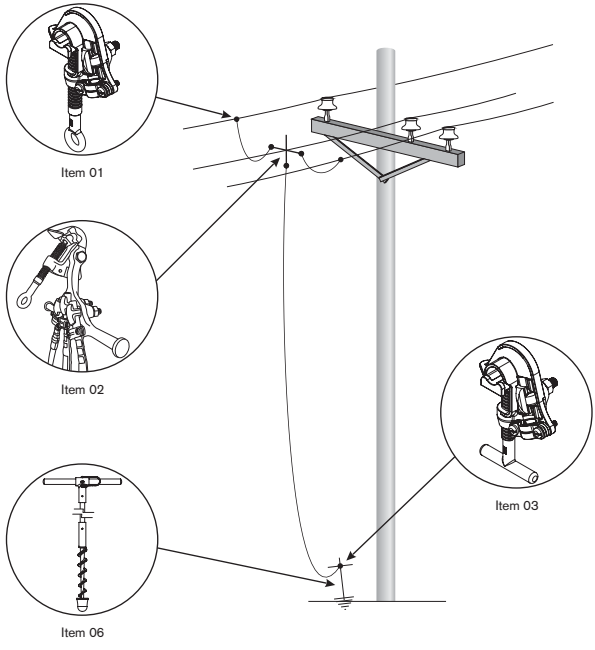
Tycical Connector

ATR13151-1

MEDIUM VOLTAGE GROUNDING EQUIPMENT

Temporary Grounding Equipment for Medium Voltage Systems up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 8 kA
- 60 cycles: 5 kA



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ATR09734-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	RG3403	Twisting Grounding Clamp for overhead, with eye-screw
02	01	pc	ATR04116-1	Suspension cluster, for suspension of the clamps simultaneously
03	01	pc	RG3403T	Twisting Grounding Clamp for overhead, with "T"-screw, for connection of the phase-conductors to the ground
04	16 52.49	m ft	CTC-25	25 mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 2 (two) pieces of 2 m (6.56 ft) and 1 (one) piece of 12.0 m (3.94 ft)
05	06	pc	ATR13036-2	Plain and shrouded Aluminum Ferrule, for 25 mm² cables
06	06	pc	ATR17923-1	Heat Shrink
07	01	pc	ATR00137-2	Ground rod, Cooperweld rod, Ø 17 x 1 m (0.7" x 3.3 ft) total length, brass thread
08	01	pc	VMR07205-1	Head for grounding clamp operation
09	01	pc	VMR00884-1	Hook made for cut-out-fuses and general purpose
10	01	set	VMR-45	Ritzglas® Sectional Hot Stick, standard model, length: 3.95 m (12.96 ft), composed of:
	01	pc	VMR-S	Ø 32 mm x 1.25 m (1.25" x 4.1 ft) Ritzglas® Sectional Hot Stick end element with VMR00634-1 Universal head
	01	pc	VMR-I	Ø 38 mm x 1.25 m (1.5" x 4.1 ft) Ritzglas® Sectional Hot Stick intermediary element
	01	pc	VMR-P	Ø 38 mm x 1.45 m (1.5" x 4.8 ft) Ritzglas® Sectional Hot Stick base element
11	01	pc	ATR10484-2	Canvas bag with inside dividers, for conditioning of the hot stick and grounding rod
12	01	pc	ATR09962-1	Conditioning Canvas Case for the grounding set conditioning

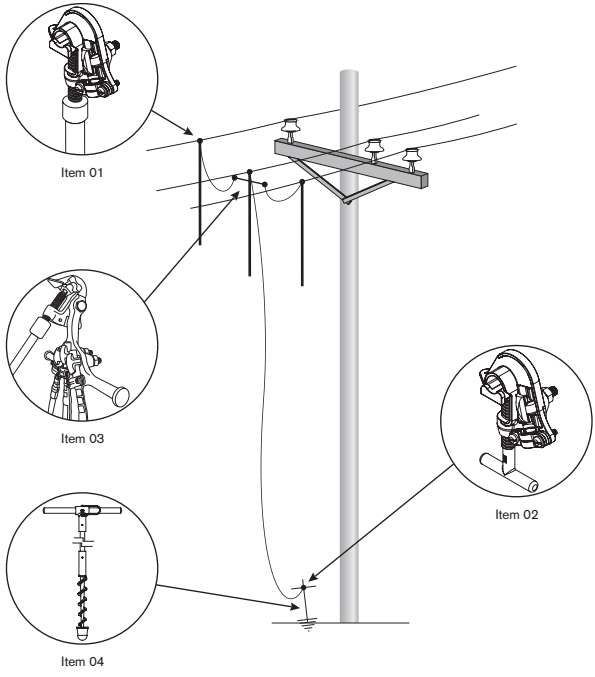
OPTIONAL ACCESSORIES - Hot Stick Option

Item	Qty.	Unit.	Cat. No.	Description
13	01	pc	VTT-3HD/5	Ritzglas® Telescopic Hot Stick, 3 triangular shape design sections, extended length: 4 m (13.12 ft), reduced length: 1.55 m (5 ft)
14	01	pc	SLT-4/5	Storage Canvas bag for VTT Telescopic Hot stick

L

Temporary Short-Circuiting and Grounding Equipment with Telescopic Hot Stick for Distribution Networks up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 8 kA
- 60 cycles: 5 kA

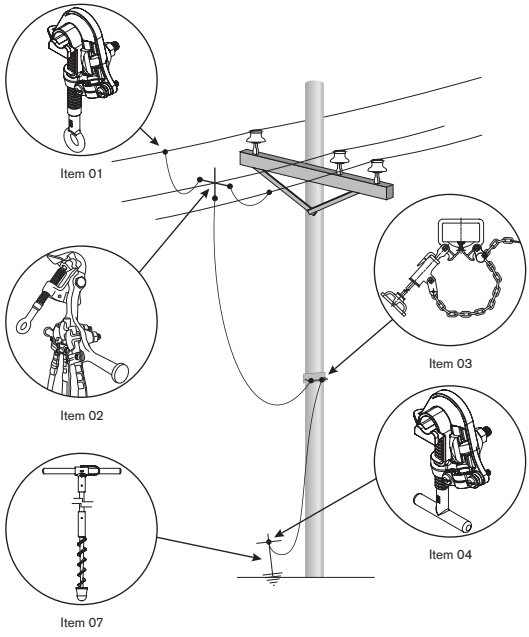


ATR04631-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	ATR17460-1	Twisting-type Grounding Clamp, attached to a Ritzglas® pole of 1.80 m (5.9 ft) of extended length
02	01	pc	RG3403T	Twisting-type Grounding Clamp, with “T” screw
03	01	pc	ATR04116-1	Suspension cluster, for simultaneously lifting clamps
04	01	pc	ATR00137-2	Ø 17 mm x 1 m (0.7" x 3.3 ft) long Copper-steel Grounding rod, with brass tip end
05	04 13.12	m ft	CTC-35	35 mm² extra-flexible copper cable, with PVC clear-vision insulation, being 2 lengths of 2 m (6.6 ft)
06	10 32.80	m ft	CTC-25	25 mm² extra-flexible copper cable, with PVC clear-vision insulation
07	04	pc	RC600-2626	Plain and shrouded aluminum ferrules for 35 mm² cables
08	04	pc	ATR17923-2	Heat Shrink
09	02	pc	ATR13036-2	Plain and shrouded aluminum ferrules for 25 mm² cables
10	02	pc	ATR17923-1	Heat Shrink
11	01	pc	ATR16843-1	Conditioning bag for grounding set

Temporary Grounding Equipment for Medium Voltage Systems up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 10 kA
- 60 cycles: 7 kA



ATR09729-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	RG3403	Twisting Grounding Clamp for overhead distribution systems, with eye-screw
02	01	pc	ATR04116-1	Suspension cluster, for suspension of the clamps simultaneously
03	01	pc	ATR03318-1	Saddle cluster, aluminum body, with steel chain and quick locking system
04	03	pc	RG3403T	Twisting Grounding Clamp for overhead distribution systems, with "T"-screw, for connection of the phase-conductors to the ground
05	17 55.77	m ft	CTC-35	35mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 600 V, 2 (two) pieces of 2 and 1 (one) piece of 12 m (39 ft)
06	08	pc	RC600-2626	Plain and shrouded aluminum Ferrule, for 35 mm² cable
07	08	pc	ATR17923-2	Heat Shrink
08	01	pc	ATR00137-2	Ground rod, Cooperweld rod, Ø 17 x 1 m (0.7" x 3.3 ft) total length, brass thread
09	01	pc	VMR07205-1	Head for grounding clamp operation
10	01	pc	VMR00884-1	Hook for cut-out-fuses and general purpose
11	01	pc	ATR09962-1	Storage conditioning bag for grounding set
12	01	pc	ATR16819-1	Conditioning bag for gounding rod

OPTIONAL ACCESSORIES - First Hot Stick Option

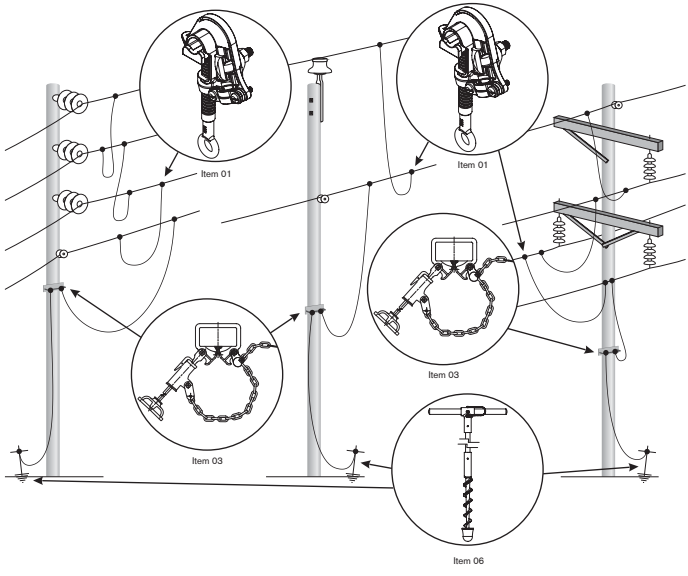
Item	Qty.	Unit.	Cat. No.	Description
13	01	set	VMR-45	Ritzglas® Sectional Hot Stick, standard model, length: 3.95 m (13 ft), composed of:
	01	pc	VMR-S	Ø 32 mm x 1.25 m (1.25 x 4.1 ft) Ritzglas® Sectional Hot Stick end element with Universal head
	01	pc	VMR-I	Ø 38 mm x 1.25 m (1.5" x 4.1 ft) Ritzglas® Sectional Hot Stick intermediary element
	01	pc	VMR-P	Ø 38 mm x 1.45 m (1.5" x 4.8 ft) Ritzglas® Sectional Hot Stick base element
14	01	pc	VMR10484-2	Canvas bag with inside dividers, for conditioning of the hot stick and grounding rod

OPTIONAL ACCESSORIES - Second Hot Stick Option

Item	Qty.	Unit.	Cat. No.	Description
15	01	pc	VTT-3HD/5	Ritzglas® Telescopic Hot Stick, 3 triangular shape design sections, extended length: 4 m (13 ft), reduced length: 1.55 m (5 ft) - HEAVY-DUTY type
16	01	pc	SLT-4/5	Conditioning Canvas bag for VTT Telescopic Hot stick

Temporary Grounding Equipment for Medium Voltage Systems up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 10 kA
- 60 cycles: 7 kA



This Temporary Grounding Equipment model is very versatile, for it provides installation on different system arrengements, such as: vertical and horizontal three-phase distribution and single-phase systems.

ATR17456-1

Item	Qty.	Unit.	Cat. No.	Description
01	10	pc	RG3403	Twisting Grounding Clamp for overhead distribution systems, with eye-screw
02	03	pc	RG3626	Clamp resting support - HANGER STUDS, made of aluminum
03	01	pc	ATR03318-1	Saddle cluster, aluminum body, with steel chain and quick locking system
04	18 59	m ft	CTC-35	35 mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 600V, 4 (four) pieces of 2 m and 1 (one) piece of 10 m (32.8 ft)
05	10	pc	RC600-2626	Plain and shrouded aluminum Ferrule, for 35 mm² cable
06	10	pc	ATR17923-2	Heat Shrink
07	01	pc	ATR00137-1	Ø 17 x 1.50 m (0.7" x 3.3 ft) Copper-steel Grounding rod with brass tip end
08	01	pc	VMR07205-1	Head for grounding clamp operation
09	01	pc	ATR09962-1	Conditioning Canvas Case for the grounding set conditioning
10	01	pc	ATR16819-2	Conditioning Canvas Bag for the grounding rod conditioning

OPTIONAL ACCESSORIES - First Hot Stick Option

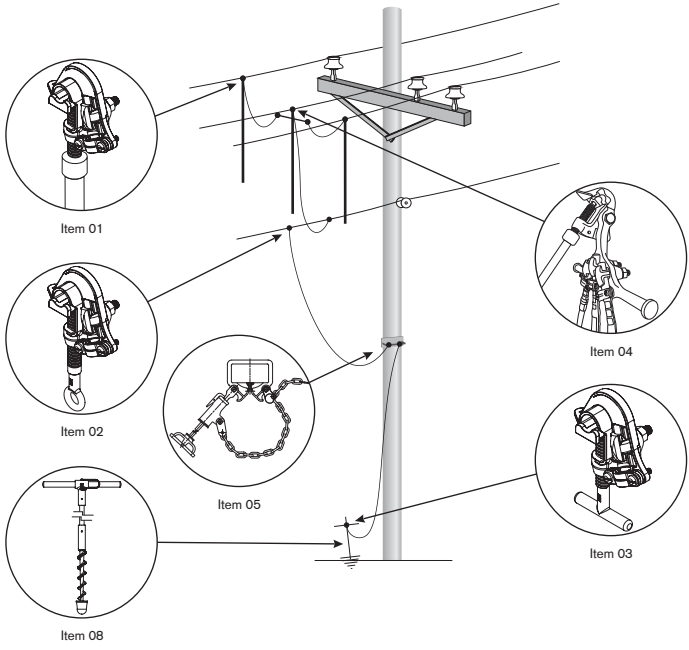
Item	Qty.	Unit.	Cat. No.	Description
11	01	set	VMR-45	Ritzglas® Sectional Hot Stick, standard model, length: 3.95 m (13 ft), composed of:
	01	pc	VMR-S	Ø 32 mm x 1.25 m (1.25" x 4.1 ft) Ritzglas® Sectional Hot Stick end element with VMR00634-1 Universal head
	01	pc	VMR-I	Ø 38 mm x 1.25 m (1.5" x 4.1 ft) Ritzglas® Sectional Hot Stick intermediary element
	01	pc	VMR-P	Ø 38 mm x 1.45 m (1.5" x 4.8 ft) Ritzglas® Sectional Hot Stick base element
12	01	pc	VMR10484-1	Canvas bag with inside dividers, for conditioning of the hot stick and grounding rod

OPTIONAL ACCESSORIES - Second Hot Stick Option

Item	Qty.	Unit.	Cat. No.	Description
13	01	pc	VTT-3HD/5	Ritzglas® Telescopic Hot Stick, 3 triangular shape design sections, extended length: 4 m (13 ft), reduced length: 1.55 m (5 ft) - HEAVY-DUTY type
14	01	pc	SLT-4/5	Conditioning Canvas bag for VTT Telescopic Hot stick

Temporary Grounding Equipment with Telescopic Hot Stick for Medium Voltage Systems up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 10 kA
- 60 cycles: 7 kA

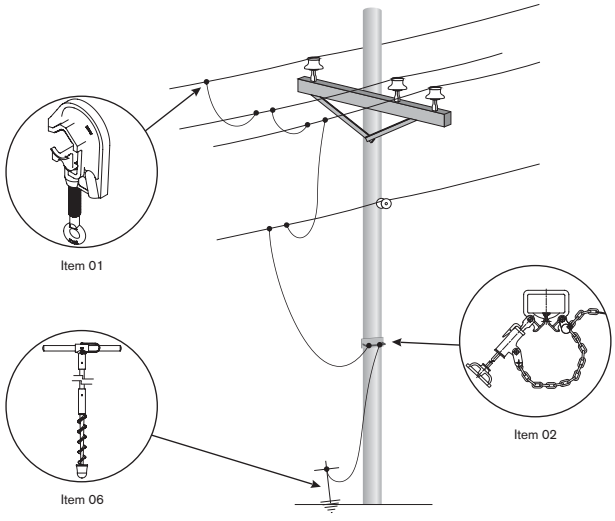


ATR17457-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	ATR17462-1	Twisting Grounding Clamp for overhead distribution systems, fixed onto Ritzglas® telescopic hot stick VTT-1/2, extended length: 2.59 m (8.5 ft)
02	02	pc	RG3403	Twisting Grounding Clamp for overhead distribution systems, with eye-screw, one piece for the phase/neutral conductor and 01 piece for the neutral/saddle conductor
03	03	pc	RG3403T	Twisting Grounding Clamp for overhead distribution systems, with "T"-screw, for connection of conductors to the saddle or the grounding rod
04	01	pc	ATR04116-1	Suspension cluster, for suspension of the clamps simultaneously
05	01	pc	ATR03318-1	Saddle cluster, aluminum body, with steel chain and quick locking system, for grounding intermediary point
06	18 59	m ft	CTC-35	35 mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 600V, 4 (four) pieces of 2 m (6.5 ft) and 1 (one) piece of 10 m (32.8 ft)
07	10	pc	RC600-2626	Plain and shrouded aluminum ferrules for 35 mm² cables
08	10	pc	ATR17923-2	Heat Shrink
09	01	pc	ATR00137-1	Ø 17 x 1.50 m (0.7" x 5 ft) Copper-steel Grounding rod with brass tip end
10	01	pc	ATR16843-2	Conditioning Canvas Bag for the grounding set conditioning

Temporary Short-Circuiting and Grounding Equipment for Overhead Distributions Systems - 7.2 / 69 kV

Maximum Short-Circuit Current: - 30 cycles: 10 kA
- 60 cycles: 7 kA



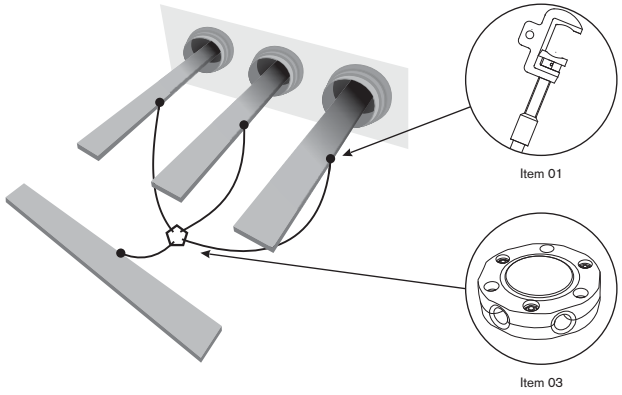
RT600-0641

Item	Qty.	Unit.	Cat. No.	Description
01	10	pc	RC600-0065	Clamp with serrated jaw and threaded terminal
02	01	pc	ATR03318-1	Clamp Suspension Cluster
03	18.2 59.71	m ft	CTC-35	35 mm² extra-flexible copper cable, with PVC clear-vision insulation, being 3 lengths of 1.8 m (5.9 ft), 1 length of 3.6 m (11.8 ft) and 1 length of 9.2 m (30 ft)
04	10	pc	RC600-2618	35 mm² threaded and shrouded ferrule
05	10	pc	ATR17923-2	Heat Shrink
06	03	pc	RC600-0080	Clamp resting support
07	01	pc	ATR00137-1	Ø 17 mm x 1.50 m (0.7" x 5 ft) Copper-steel Grounding rod with brass tip end
08	01	pc	ATR09962-1	Conditioning Canvas Case for the grounding set conditioning
09	01	pc	ATR16819-2	Conditioning Canvas Bag for the grounding rod conditioning

TEMPORARY GROUNDING EQUIPMENT FOR MEDIUM VOLTAGE CUBICLES AND SUBSTATIONS

Temporary Grounding Equipment for Cubicles and Substations up to 15 kV

Maximum Short-Circuit Current: - 30 cycles: 8 kA
- 60 cycles: 5 kA

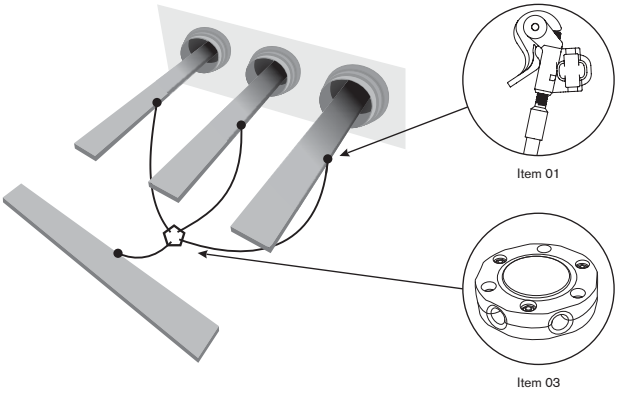


ATR17572-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	ATR08947-1	Twisting grounding clamp made of bronze alloy, attached to a fiberglass rod, with handle, total length: 600 mm (2 ft)
02	07 23	m ft	CTC-25	25 mm² extra-flexible copper cable, with PVC clear-vision insulation, being 3 lengths of 2 m (6.5 ft) and 1 length of 1 m (3.3 ft)
03	01	pc	ATR17574-1	thermoplastic Terminal Block
04	01	pc	RG3363-1	Twisting type grounding clamp with “T” screw for connection to the grounding point
05	07	pc	ATR17423-2	Tin-plated copper ferrule for 25 mm² cables
06	07	pc	ATR17923-4	Heat Shrink
07	01	pc	ATR13036-2	25 mm² cable shrouded and unshrouded aluminum ferrules
08	01	pc	ATR17923-1	Heat Shrink
09	01	pc	ATR16843-6	Bag for conditioning of the grounding set

Grounding Equipment for Cubicles and Substations up to 15 kV

Maximum Short-Circuit Current: - 30 cycles: 8 kA
- 60 cycles: 5 kA

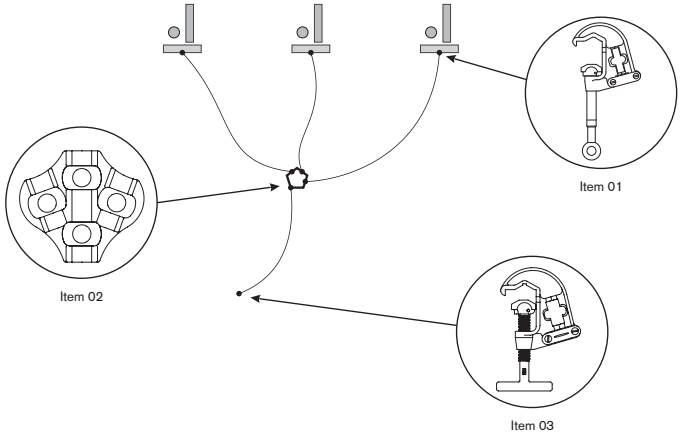


ATR20763-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	ATR09033-1	Twisting Bronze grounding clamp with insulated rod attached, 640 mm (2.1 ft) insulating length
02	07 23	m ft	CTC-25	25mm² extra-flexible cooper cable, with PVC clear-vision insulation, being 3 length of 2 m (6.5 ft) and 1 length of 1 m (3.3 ft).
03	01	pc	ATR17574-1	Thermoplastic block for cables up to 35 mm²
04	01	pc	RG3363-1	Twisting grounding clamp with “T” screw to conect the set with the grounding point
05	04	pc	ATR17423-2	Tin-plated cooper ferrule for 25 mm² cables
06	07	pc	ATR17923-4	Heat Shrink
07	04	pc	ATR13036-2	Plain and shrouded aluminum ferrule for 25 mm² cables
08	01	pc	ATR17923-1	Heat Shrink
09	01	pc	ATR16843-6	Bag for conditioning of the grounding set

Grounding Equipment for Cubicles and Substations up to 15 kV

Maximum Short-Circuit Current: - 30 cycles: 8 kA
- 60 cycles: 5 kA



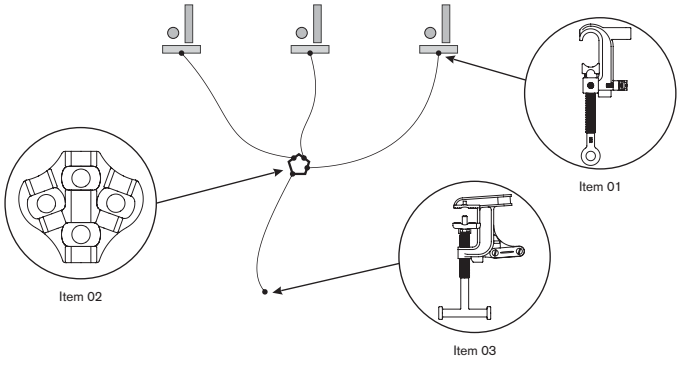
ATR12407-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pç	ATR11627-1	Aluminum alloy Grounding clamp, for vertical 6 mm - 40 mm (0.25" - 1.5") busbars, 16 mm - 40 mm (0.6" - 1.5") horizontal busbars and Ø 6 mm - 35 mm (0.25" - 1.4") round busbars
02	01	pç	RG4754-1	Aluminum Alloy Block, 04 connectors for grounding cables up to 95 mm²
03	01	pç	ATR11627-2	Grounding clamp for connection to ground
04	06	pç	RC600-2627	Unshrouded plain aluminum ferrule (no thread), 1/0 AWG for 50 mm² cables
05	06	pc	ATR17923-2	Heat Shrink
06	02	pç	ATR13036-2	Unshrouded plain aluminum ferrule (no thread), # 2 AWG for 25 mm² cables
07	02	pc	ATR17923-1	Heat Shrink
08	06 19.70	m ft	CTC-50	50 mm² Extra-flexible Copper cable, crystal clear (PVC) insulation, 3 (three) 2 m (6.5 ft) long cables
09	01 3.28	m ft	CTC-25	25 mm² extra-flexible cooper cable, with PVC clear-vision insulation, being 1 length of 1m (3.3 ft)
10	01	pç	VTT-5/1800	Ritzglas® Telescopic Hot Stick, 5 triangular shape sections, extended length: 1800 mm (5.9 ft), retracted length: 600 mm (1.95 ft), with Universal head
11	01	pç	VMR08974-1	Head for switch operation
12	01	pç	VMR02579-1	Grounding clamp head
13	01	pç	ATR10455-3	Metallic case, for grounding equipment and hot stick conditioning

Grounding Equipment for Cubicles up to 36 kV

Maximum Short-Circuit Current: - 30 cycles: 10 kA
- 60 cycles: 7 kA

For specification of the Pin-Balls, essential for the installation of this temporary grounding and Short-Circuiting equipment, consider the most suitable shape and size refer to the specific section in this Catalog, for details.



ATR17455-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	RC600-2316	Grounding clamp for attachment to Pin-Ball or conductor, with eye-screw
02	01	pc	RG4754-1	Aluminum Alloy Block, 04 connectors for grounding cables up to 95 mm²
03	01	pc	RC600-2231	Clamp for connection to ground
04	4.5 15	m ft	CTC-70	70 mm² Extra-flexible Copper cable, crystal clear (PVC) insulation, 3 (three) 1.5 m (4.9 ft) long cables
05	2.5 8.20	m ft	CTC-35	35 mm² Extra-flexible Copper cable, crystal clear (PVC) insulation
06	01	pc	RC600-2602	Unshrouded threaded copper ferrule, # 2 AWG for 35 mm² cables
07	01	pc	RC600-2626	Plain and shrouded aluminum ferrules for 35 mm² cables
08	02	pc	ATR17923-2	Heat Shrink
09	03	pc	RC600-2604	Unshrouded threaded copper ferrule, # 2/0 AWG for 70 mm² cables
10	03	pc	RC600-2628	Plain and shrouded aluminum ferrules for 70 mm² cables
11	06	pc	ATR17923-3	Heat Shrink
12	01	pc	VMR02579-1	Grounding clamp head
13	01	pc	ATR10455-4	Metallic case, for grounding equipment and hot stick conditioning

OPTIONAL ACCESSORY

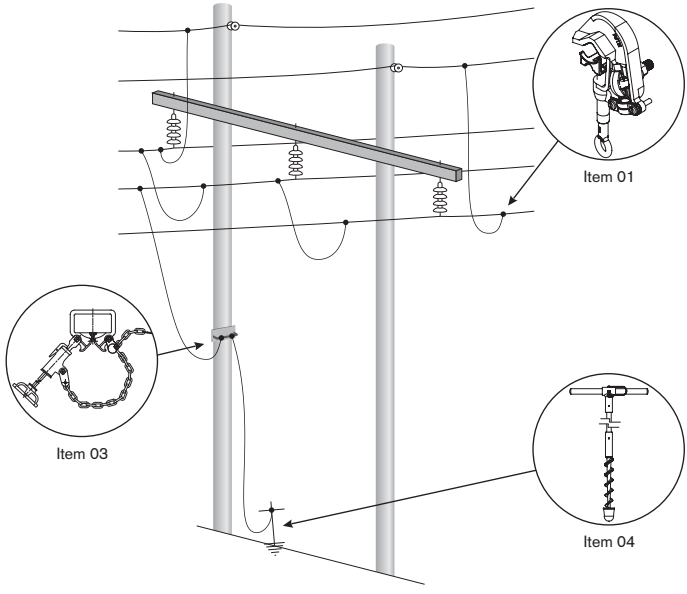
Item	Qty.	Unit.	Cat. No.	Description
14	01	pc	VTT-5/1800	Ritzglas® Telescopic Hot Stick, 5 triangular shape sections, extended length: 1.80 m (5.9 ft), retracted length: 600 mm (2 ft), with Universal head

TEMPORARY GROUNDING EQUIPMENT FOR HIGH VOLTAGE SYSTEMS

Temporary Grounding Equipment for Transmission Lines up to 138 kV

(Wooden, concrete and metallic structures)

Maximum Short-Circuit Current: - 30 cycles: 30 kA
- 60 cycles: 23 kA



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ATR17441-1

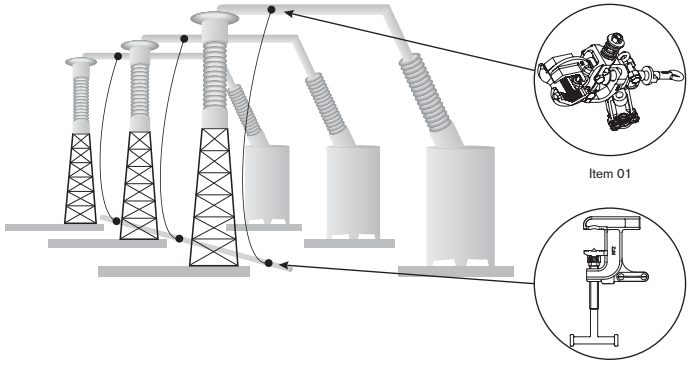
Item	Qty.	Unit.	Cat. No.	Description
01	12	pc	RC600-0965	Grounding clamp for transmission lines, serrated jaw and eye-screw
02	12	pc	RC600-2629	Plain and shrouded Aluminum Ferrule, for 95 mm² cable
03	12	pc	ATR17923-3	Heat Shrink
04	01	pc	ATR03318-1	Saddle cluster, aluminum body, with steel chain and quick locking system
05	01	pc	ATR00137-1	Screw ground rod, Copperweld rod, Ø 17 x 1 m (0.7" x 3.3 ft) and 1.50 m (5 ft) total length, brass-threaded end
06	27 88.5	m ft	CTC-95	95 mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 600 V, 3 (three) pieces of 4 m and 1 (one) piece of 9 m (29.5 ft)
07	01	pc	VMR07205-1	Head for grounding clamp operation
08	04	pc	RG3626	Clamp resting support - HANGER STUDS, made of aluminum
09	02	pc	ATR09962-1	Conditioning Canvas Case for cables and fittings conditioning
10	01	pc	ATR16819-2	Conditioning Canvas Bag for the grounding rod conditioning

OPTIONAL ACCESSORIES

Item	Qty.	Unit.	Cat. No.	Description
11	01	set	VMR-45	Ritzglas® Sectional Hot Stick, standard model, length: 3.95 m (13 ft), composed of:
	01	pc	VMR-S	Ø 32 mm x 1.25 m (1.25" x 4.1 ft) Ritzglas® Sectional Hot Stick end element with universal head
	01	pc	VMR-I	Ø 38 mm x 1.25 m (1.5" x 4.1 ft) Ritzglas® Sectional Hot Stick intermediary element
	01	pc	VMR-P	Ø 38 mm x 1.45 m (1.5" x 4.8 ft) Ritzglas® Sectional Hot Stick base element
12	01	pc	VMR10484-3	Canvas bag with extra-compartment for heads, 3 inside dividers, for conditioning of the hot stick

Temporary Grounding Equipment for Substations up to 138 kV

Maximum Short-Circuit Current: - 30 cycles: 30 kA
- 60 cycles: 23 kA



ATR17454-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pc	RC600-1732	All-angle Grounding clamp for bus-bars, with eye-screw
02	03	pc	RC600-2231	Twisting grounding clamp, with "T"-screw, for connection to ground (cable or angle plate)
03	03	pc	RC600-2621	Shrouded threaded copper ferrule, 4/0 AWG for 95 mm² cables
04	03	pç	RC600-2605	Threaded unshrouded aluminum ferrule for 95 mm² cables
05	06	pc	ATR17923-3	Heat Shrink
06	30 98.5	m ft	CTC-95	95 mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 600 V, 3 (three) pieces of 10 m (32.8 ft)
07	01	pc	VMR02579-1	Grounding clamp head
08	01	pc	VMR00884-1	Hook for cut-out-fuses and general purpose
09	03	pc	ATR14484-1	Canvas Bucket for conditioning of the fittings and grounding cables

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OPTIONAL ACCESSORIES - First Hot Stick Option

Item	Qty.	Unit.	Cat. No.	Description
10	01	set	VMR-90	Ritzglas® Sectional Hot Stick, standard model, length: 6.45 m (21.2 ft), composed of:
	01	pc	VMR-S	Ø 32 mm x 1.25 m (1.25" x 4.1 ft) Ritzglas® Sectional Hot Stick end element with Universal head
	03	pc	VMR-I	Ø 38 mm x 1.25 m (1.5" x 4.1 ft) Ritzglas® Sectional Hot Stick intermediary element
	01	pc	VMR-P	Ø 38 mm x 1.45 m (1.5" x 4.8 ft) Ritzglas® Sectional Hot Stick base element
11	01	pc	VMR16826-1	Canvas bag with extra-compartment for heads, 3 inside dividers, for conditioning of the hot stick

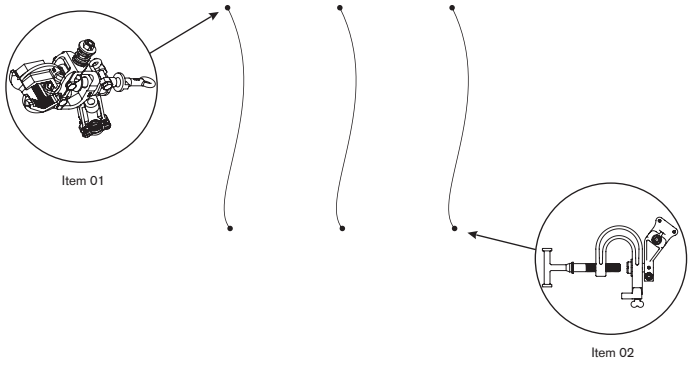
OPTIONAL ACCESSORIES - Second Hot Stick Option

Item	Qty.	Unit.	Cat. No.	Description
12	01	pc	VTT-3HD/7	Ritzglas® Telescopic Hot Stick, 5 triangular shape design sections, extended length: 6.76 m (22 ft), reduced length: 1.65 m (5.4 ft) HEAVY-DUTY type
13	01	pc	SLT-6/7	Conditioning Canvas bag for VTT Telescopic Hot stick

The second Ritzglas® hot stick option must be extended in the vertical position with the grounding jumper previously connected to the head of the Hot Stick.

Temporary Grounding and Short-Circuiting Equipment for Transmission Lines up to 500 kV in Metallic Structures

Maximum Short-Circuit Current: - 30 cycles: 30 kA
- 60 cycles: 23 kA



ATR17442-1

Item	Qty.	Unit.	Cat. No.	Description
01	03	pç	RC600-1732	All-angle Grounding clamp for bus-bars, with eye-screw
02	03	pç	RC600-0085	Twisting grounding clamp, with “T”-screw
03	03	pç	RC600-2621	Shr. threaded AL ferrule 4/0AWG for 95 mm² cables
04	03	pç	RC600-2629	Shrouded plain aluminum ferrule (no thread), 4/0AWG for 95 mm² cables
05	06	pc	ATR17923-3	Heat Shrink
06	24 79	m ft	CTC-95	95 mm² extra-flexible copper grounding cable, crystal-clear (PVC) insulation, 600 V, 3 pieces of 8 m (26 ft)
07	01	pç	ATR16843-1	Canvas bag for conditioning and transportation of the grounding equipment

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OPTIONAL ACCESSORY

Item	Qty.	Unit.	Cat. No.	Description
08	01	pç	RC403-0343	Hinged-style Grip-all clamp stick, Ø 32 mm x 5.03 m (1.25" x 16.5 ft)
09	01	pç	RE403-2543P	Auxiliary band with ring for lifting
10	01	pç	-	Canvas bag for conditioning and transportation of the Hinged-style Grip-all clamp stick

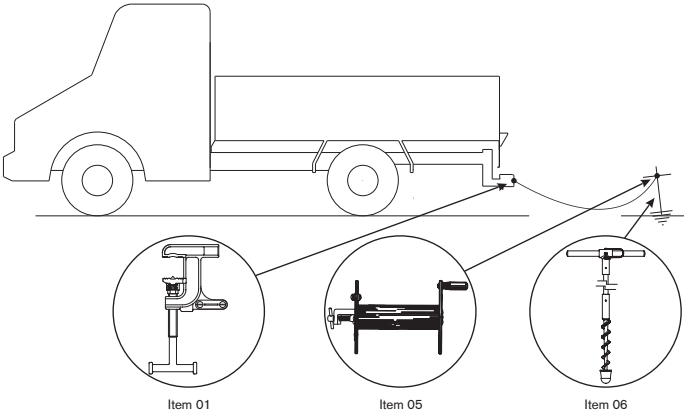
For installation of the grounding equipment using Hot Sticks, refer to the specific Hot Stick section.

Temporary Grounding Equipment for Vehicles

This grounding equipment model provides the discharge of the capacitance or static loads of vehicles with aerial devices or service vehicles.

For safety purposes, the use of this model is limited exclusively to the grounding of vehicles, therefore it cannot be used for different purposes.

Grounding cables with different lengths are available upon request.



ATR17440-1

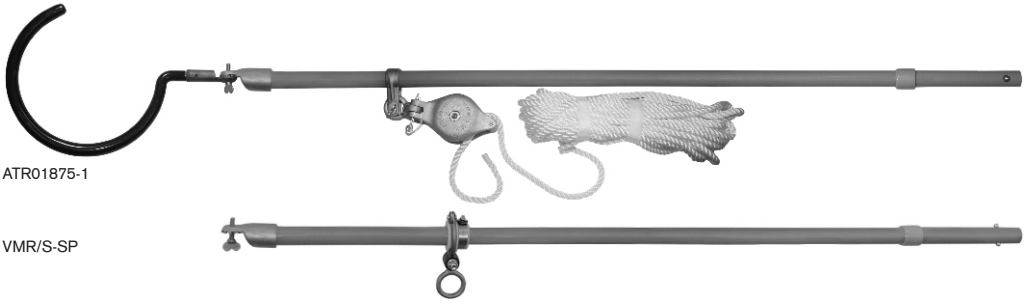
Item	Qty.	Unit.	Cat. No.	Description
01	01	pc	RC600-2231	Twisting grounding clamp, with "T"-screw, for connection to the vehicle
02	01	pc	ATR17185-2	Shrouded threaded aluminum ferrule, for 25 mm² cables
03	01	pc	ATR17923-1	Heat Shrink
04	10 32.80	m ft	CTC-25	25 mm² Extra-flexible Copper cable, crystal clear (PVC) insulation
05	01	pc	ATR17423-2	Tin-plated copper ferrule for 25 mm² cables
06	01	pc	ATR17923-4	Heat Shrink
07	01	pc	ATR03641-1	Metallic reel with bronze clamo fixing, for connection of the cable to the grounding rod, besides providing for the conditioning of the cable during transportation
08	01	pc	ATR00137-2	Ø 17 mm x 1 m (0.7" x 3.3 ft) Copper-steel Grounding rod with brass tip end
09	01	pc	ATR16819-1	Canvas bag for storage of the grounding rod
10	01	pc	ATR16843-7	Bag for conditioning and transportation of the gorunding set

Lifting and Installation Tool Set for Substation Grounding

Special tools set, designed for installation of Temporary Grounding Equipment on overhead busbars of extra-high voltage substations, directly from ground, up to 8 m (26.25 ft).

Top sections (ATR01875-1 and VMR/S-SP) should be attached to intermediary and bottom sections for required height to reach the substation busbar.

The ATR01875-1 section hangs from the busbar, using the plastisol coated hook. VMR/S-SP assists in lifting grounding clamps and cables.



ATR01875-1

VMR/S-SP

ATR23989-1

Item	Qty.	Unit.	Cat. No.	Description	Work Length		Approx. Weight	
					m	ft	kg	lb
01	01	pc	VMR/S-SP	Sectional Hot Stick Top Section, with Universal Head and hinged clamp	1.25	4.10	1.50	2.76
02	01	pc	ATR01875-1	Sectional Hot Stick Top Section, with plastisol coated hook and snatch block	1.25	4.10	3.50	7.72
03	20 65.5	m ft	RM1895-2	Ø 3/8" Polypropylene rope	-		0.05	0.11

L

ACCESSORIES

Item	Qty.	Unit.	Cat. No.	Description	Work Length		Approx. Weight	
					m	ft	kg	lb
04	*	pc	VMR-I	Sectional Hot Stick Intermediary Section	1.25	4.10	1.20	2.65
05	01	pc	VMR-P	Sectional Hot Stick Bottom Section	1.45	4.76	1.10	2.43
06	01	pc	**	Canvas bag for conditioning and transport of the hot stick	-		-	-

* Quantity to be determined based on the height of the busbar
** Bag to be determined based on the quantity of hot stick sections needed

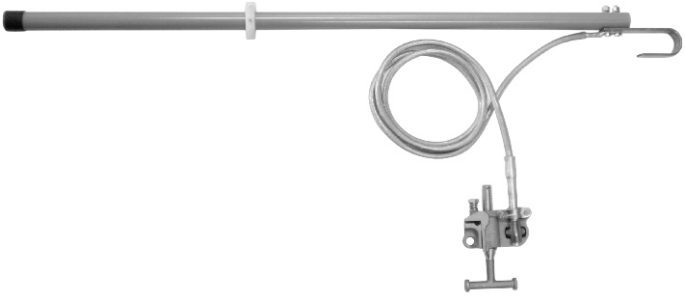
Static Grounding Equipment

The Static Grounding Equipment has been designed for reliable removal of the static discharges on de-energized systems, such as: conductors, connection terminals, transformers or generators.

In order to operate this tool, first connect the grounding clamp to a safe grounding point.

Immediately install the stick to the point where the static discharge will happen, using the copper hook.

When finishing the maintenance procedures, reverse the sequence used for the installation, i.e. first remove the grounding stick attached to the working point, then remove the grounding clamp.



RT600-0891

Item	Qty.	Unit.	Cat. No.	Discription	Approx. Weight	
					kg	lb
01	01	pc	-	Ritzglas® stick Ø 32 mm x 1.07 m (1.25" x 3.5 ft) length, composed of:		
	01	pc	RG3363-4SJ	Twisting grounding clamp with "T" type screw	2.60	5.73
	2.10 7.0	m ft	CTC-25	25 mm² extra-flexible cooper cable, with PVC clear-vision insulation		

L

GROUNDING CLAMP

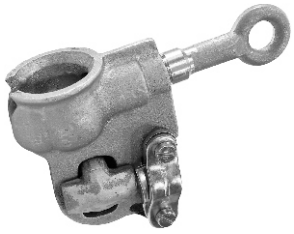
Ball-Stud and Socket Clamps for Temporary Grounding

Ball-Stud and Socket Clamps have been designed to solve several temporary grounding situations, where physical space or contact surfaces are limited.

In cubicles, mainly those with rectangular profile busbars, where conventional grounding clamps dimensions make them unfeasible to be used, these clamps are very convenient, due to their versatile conception and easy operation.

These clamps are quite useful in electrical systems, such as:

- Cubicles
- Indoor and outdoor substations
- Overhead Rolling bridge
- Live line vehicles
- Painted Transmission Lines Structures, where electrical contact is not possible with conventional clamps



RC600-2300

- RC600-2300

Grounding with eye-screw and cable connection using plain ferrule

RT600-2321

- RT600-2321

Grounding with “T”-screw and cable connection using plain ferrule

L

BALL-STUD AND SOCKET CLAMPS FOR TEMPORARY GROUNDING

Electrical and Mechanical Characteristics		Cat. No.	
		RC600-2300	RT600-2321
Nominal Current (A)		400	400
Short-Circuit Current (Isc)	30 cycles (kA)	30	30
	60 cycles (kA)	23	23
Range (mm / ft)		Ø 26 / 1"	Ø 26 / 1"
Cable Ferrule (mm^2)	Maximum	95	95
	Mininum	25	25
Installation Torque (daN.m)		3.0	3.0
ASTM Designation		Type I Class A Degree 5	Type III Class A Degree 5
Approx. Weight (kg / lb)		0.76 / 1.68	0.82 / 1.81

Ball-Studs for Temporary Grounding Points

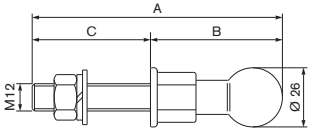
Ball-Studs are intended for permanent installation on busbars, busbars joints, terminals or any other parts of the electrical system, establishing points required for the suitable grounding of those systems. Therefore, it is recommended to order ball-studs in sufficient quantities for such applications.

In order to better suit our customers requirements, Ball-Studs are available in 7 different lengths and designs.

Bronze body and steel threaded 1020, tin-plated, installation torque 3.5 daN.

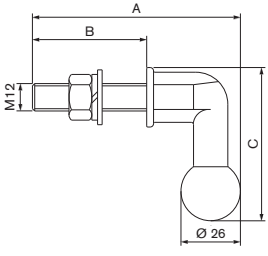
BALL-STUDS (STRAIGHT TYPE)

Cat. No.	A		B		C		Approx. Weight	
	mm	ft	mm	ft	mm	ft	kg	lb
ATR08969-2	118	0.39	58	0.19	60	0.20	0.24	0.53
ATR08969-3	138	0.45	58	0.19	80	0.26	0.25	0.55
ATR08969-4	108	0.35	58	0.19	50	0.16	0.23	0.51



BALL-STUDS ("L" TYPE)

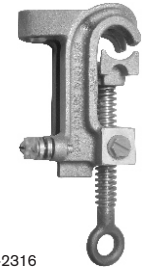
Cat. No.	A		B		C		Approx. Weight	
	mm	ft	mm	ft	mm	ft	kg	lb
ATR13147-1	91	0.30	50	0.16	65	0.21	0.26	0.57



L

Multi-connection Grounding Clamp

The RC600-2316 Grounding Clamp model provides installation on round conductors, rectangular busbars and Pin-Balls. Using the two threaded housings, it is possible attaching Pin-Balls to the body of the clamp for simultaneous lifting of two additional clamps, for a three-phase grounding system.



RC600-2316

MULTI-CONNECTION GROUNDING CLAMP

Electrical and Mechanical Characteristics		Cat. No.
		RC600-2316
Nominal Current (A)		400
Short-Circuit Current (Isc)	**30 cycles (kA)**	30
	60 cycles (kA)	23
Range	**Maximum**	636 MCM ACSR Ø 25 mm (1")
	Minimum	8 Cu Ø 26 mm (1")
Cable Ferrule (mm²)	**Maximum**	95
	Minimum	16
Installation Torque (daN.m)		3.0
ASTM Designation		Type I Class A Degree 5
Approx. Weight (kg / lb)		0.68 / 1.50

L

Grounding Clamps to be used on Low and Medium Voltage Systems

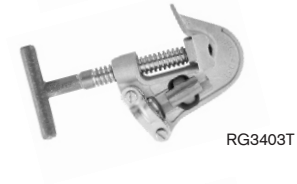
- RG3403

Aluminum body; Plain jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.


RG3403

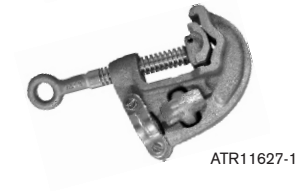
- RG3403T

Aluminum body; Plain jaw; Tightening T-screw in bronze; Bronze cable connectors for plain ferrules.


RG3403T

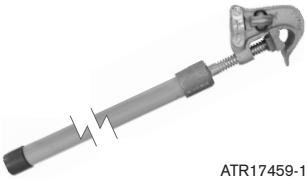
- ATR11627-1

Aluminum body; Plain jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.


ATR11627-1

- ATR17459-1

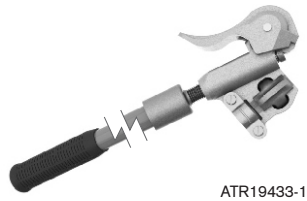
Aluminum body; Plain jaw; Tightening screw in bronze, fixed to a Ø 25 mm x 1.25 m (1" x 4.1 ft) insulating pole; Bronze cable connectors for plain ferrules.


ATR17459-1

- ATR19433-1

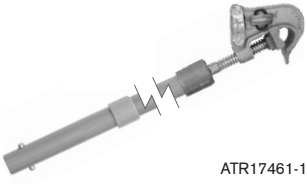
Designed mainly for cubicles with vertical rectangular profile busbars.

Aluminum body, serrated jaw, bronze eye screw fixed in a Ø 25 x 600 mm (1" x 2 ft) insulating stick with rubber handle, bronze cable conexion for plain ferrule.


ATR19433-1

- ATR17461-1

Aluminum body; Plain jaw; Tightening screw in bronze, fixed to the top section of the sectional hot stick Ø 25 x 1.25 m (1" x 4.1 ft), with coupling system; Bronze cable connectors for plain ferrules.


ATR17461-1

- ATR17460-1

Aluminum body; Plain jaw; Tightening screw in bronze, fixed to a triangular-shape top hot stick (Ø 24 mm - 1" top section and Ø 33 mm - 1.3" base section). Retracted length: 1.00 m (3.3 ft); Extended length: 1.80 m (5.9 ft); Bronze cable connectors for plain ferrules.


ATR17460-1

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ATR08947-1

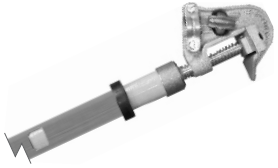
- ATR08947-1

Twisting-type bronze alloy grounding clamp, attached to a Ø 1/2" x 640 mm (2.1 ft) insulating rod, with rubber handle.

ATR09033-1

- ATR09033-1

Twisting-type bronze alloy grounding clamp, attached to a Ø 1/2" x 640 mm (2.1 ft) insulating rod, bronze cable connectors for plain ferrules.



ATR17462-1

- ATR17462-1

Aluminum body; Plain jaw; Tightening screw in bronze, fixed to a telescopic hot stick VTT-1/2, Ø 33 mm (1.3") base section, extended length: 2.59 m (8.5 ft) and retracted length: 1.44 m (4.7 ft); Bronze cable connectors for plain ferrules.

ATR03653-1

- ATR03653-1

Aluminum body; Plain jaw; Spring-action installation to the conductor; Blade for connection to the Cluster (ATR04694-1), in galvanized steel; Type of connections to the cables: tin-plated copper ferrule (not included with the clamp).

- ATR13628-1

Aluminum body; Plain jaw; Spring-action installation to the conductor; Self-connection system for connection to the Cluster (ATR14442-1); Type of connections to the cables: tin-plated copper ferrule (not included with the clamp).

ATR13628-1

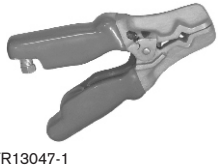
- ATR17348-1

Aluminum body; Plain jaw; Fixed to a insulated pole Ø 25 x 300 mm (1" x 1 ft) with rubber handle; spring-action installation to the conductor type of connections to the cables: tinplated copper ferrule (not included with the clamp).

ATR17348-1

- ATR13047-1 - ATR13047-2

Aluminum body; Spring-action installation to the cord; Plastic handle, red to ATR13047-1 and black to ATR13047-2.



ATR13047-1

GROUNDING CLAMPS TO BE USED ON LOW AND MEDIUM VOLTAGE SYSTEMS

Electrical and Mechanical Characteristics		Cat. No.				
		RG3403	RG3403T	ATR11627-1	ATR17459-1	ATR19433-1
Nominal Current (A)		300	300	-	300	400
Short-Circuit Current (Isc)	30 Cycles (kA)	20	20	30	20	30
	60 Cycles (kA)	15	15	23	15	23
Range	Maximum	477 MCM ACSR Ø 22.5 mm 0.9"	477 MCM ACSR Ø 22.5 mm 0.9"	busbar vertical 40 mm / 1.5" horizontal 44 mm/1.7" and round 35 mm / 1.4"	477 MCM ACSR Ø 22.5 mm 0.9"	20 mm / 0.8" (rectangular busbar)
	Minimum	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	busbar vertical 6 mm / 0.25" and round 6 mm / 0.25"	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	3 mm / 0.12" (rectangular busbar)
Cable Ferrule (mm²)	Maximum	70	70	95	70	95
	Mínimo	16	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0	3.0
ASTM Designation		Type I Class A Degree 3	Type III Class A Degree 3	Type I Class A Degree 5	Type II Class A Degree 3	Type II Class A Degree 5
Approx. Weight (kg / lb)		0.48 / 1.06	0.51 / 1.12	0.65 / 1.43	1.10 / 2.43	0.72 / 1.59

GROUNDING CLAMPS TO BE USED ON LOW AND MEDIUM VOLTAGE SYSTEMS

Electrical and Mechanical Characteristics		Cat. No.				
		ATR17461-1	ATR17460-1	ATR08947-1	ATR09033-1	ATR17462-1
Nominal Current (A)		300	300	200	200	300
Short-Circuit Current (Isc)	30 Cycles (kA)	20	20	8	8	20
	60 Cycles (kA)	15	15	5	5	15
Range	Maximum	477 MCM ACSR Ø 22.5 mm 0.9"	477 MCM ACSR Ø 22.5 mm 0.9"	Ø 30 mm 1.2"	Ø 19 mm 0.75"	477 MCM ACSR Ø 22.5 mm 0.9"
	Minimum	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	Ø 4 mm 0.15"	Ø 4 mm 0.15"	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"
Cable Ferrule (mm²)	Maximum	70	70	25	25	70
	Mínimo	16	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	2.0	2.0	3.0
ASTM Designation		Type II Class A Degree 3	Type II Class A Degree 3	-	-	Type II Class A Degree 3
Approx. Weight (kg / lb)		1.10 / 2.43	1.40 / 3.09	0.75 / 1.65	0.65 / 1.43	1.40 / 3.09

GROUNDING CLAMPS TO BE USED ON LOW AND MEDIUM VOLTAGE SYSTEMS

Electrical and Mechanical Characteristics		Cat. No.				
		ATR03653-1	ATR13628-1	ATR17348-1	ATR13047-1	ATR13047-2
Nominal Current (A)		-	-	-	-	-
Short-Circuit Current (Isc)	30 Cycles (kA)	10	15	10	10	10
	60 Cycles (kA)	7	8	7	7	7
Range	Maximum	336.4 MCM ACSR Ø 19 mm 0.75"	Ø 30 mm 1.2"	336.4 MCM ACSR Ø 19 mm 0.75"	Ø 12.5 mm 0.5"	Ø 12.5 mm 0.5"
	Minimum	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	Ø 5 mm 0.2"	6 AWG Cu 4 AWG CA Ø 4 mm / 0.15"	Ø 6.5 mm 0.25"	Ø 6.5 mm 0.25"
Cable Ferrule (mm^2)	Maximum	35	50	35	35	35
	Mínimo	16	16	16	16	16
Installation Torque (daN.m)		-	-	-	-	-
ASTM Designation		-	-	-	TypeIII Class B Degree 5	TypeIII Class B Degree 5
Approx. Weight (kg / lb)		0.35 / 0.77	0.45 / 0.99	0.36 / 0.79	0.35 / 0.77	0.35 / 0.77

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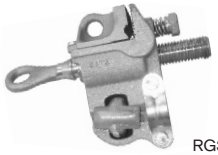
Grounding Clamps for Connection to the Grounding Point

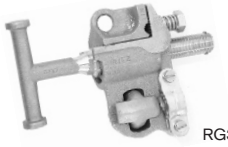
- RG3363-3SJ

Aluminum body; Serrated jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.


RG3363-3SJ

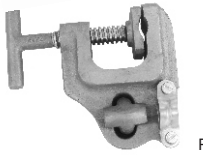
- RG3363-4SJ

Aluminum body; Serrated jaw; Tightening T-screw in bronze; Bronze cable connectors for plain ferrules.


RG3363-4SJ

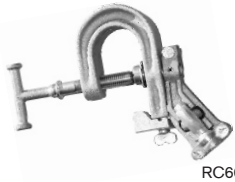
- RG3363-1

Aluminum body; Plain jaw; Tightening T-screw in bronze; Bronze cable connectors for plain ferrules.


RG3363-1

- RC600-0085

Aluminum body; Jaw with Bronze support for better contact with the angle plate surface; Aluminum flange (removable) for fixing to the angle plate. Tightening T-screw in bronze; Bronze cable connectors for plain ferrules.


RC600-0085

- ATR11627-2

Aluminum body; Serrated jaw; Tightening T-screw in bronze; Bronze cable connectors for plain ferrules.


ATR11627-2

- RC600-1617

Bronze body; Movable serrated jaw; Tightening T-screw in bronze; Bronze cable connectors for plain ferrules.


RC600-1617

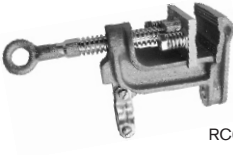
- RC600-2231

Bronze body; Serrated jaw; Tightening T-screw in bronze; Cable connections by threaded ferrules, unshrouded.


RC600-2231

- RC600-2232

Bronze body; Serrated jaw; Tightening eye-screw in bronze; Cable connections by threaded ferrules, unshrouded.


RC600-2232

- RG3622-1T

Aluminum body; Plain jaw; Tightening T-screw in bronze; Cable connections by plain ferrules.


RG3622-1T

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GROUNDING CLAMPS FOR CONNECTION TO THE GROUNDING POINT

Electrical and Mechanical Characteristics		Cat. No.				
		RG3363-3SJ	RG3363-4SJ	RG3363-1	RC600-0085	ATR11627-2
Nominal Current (A)		400	400	400	400	400
Short-Circuit Current (Isc)	30 Cycles (kA)	30	30	30	30	30
	60 Cycles (kA)	23	23	23	23	23
Range	Maximum	38 mm / 1.5" (rectangular busbar)	38 mm / 1.5" (rectangular busbar)	Ø 32 mm 1.25"	51 to 102 mm 0.17 to 4" (rectangular busbar)	busbar vertical 40 mm / 1.5" horizontal 44 mm/ 1.7" and round 35 mm / 1.4"
	Minimum	3.2 mm / 0.13" (rectangular busbar)	3.2 mm / 0.13" (rectangular busbar)	Ø 5 mm 0.2"	-	busbar vertical 6 mm / 0.25" and round 6 mm / 0.25"
Cable Ferrule (mm²)	Maximum	95	95	95	95	95
	Mínimo	16	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0	3.0
ASTM Designation		Type I Class B Grade 5	Type III Class B Grade 5	Type III Class B Grade 5	Type III Class B Grade 5	Type III Class B Grade 5
Approx. Weight (kg / lb)		0.75 / 1.65	0.84 / 1.85	0.79 / 1.75	1.70 / 3.75	0.70 / 1.54

GROUNDING CLAMPS FOR CONNECTION TO THE GROUNDING POINT

Electrical and Mechanical Characteristics		Cat. No.			
		RC600-1617	RC600-2231	RC600-2232	RG3622-1T
Nominal Current (A)		400	400	400	400
Short-Circuit Current (Isc)	30 Cycles (kA)	30	30	30	30
	60 Cycles (kA)	23	23	23	23
Range	Maximum	25.4 mm / 1" (rectangular busbar)	38 mm / 1.5" (rectangular busbar)	38 mm / 1.5" (rectangular busbar)	566 MCM Cu 900 MCM ACSR Ø 29 mm / 1.15"
	Minimum	3 mm / 0.12" (rectangular busbar)	3 mm / 0.12" (rectangular busbar)	3 mm / 0.12" (rectangular busbar)	6 Cu Ø 4 mm 0.15"
Cable Ferrule (mm²)	Maximum	95	95	95	95
	Mínimo	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0
ASTM Designation		Type III Class B Grade 5	Type III Class B Grade 5	Type I Class B Grade 5	Type III Class A Grade 5
Approx. Weight (kg / lb)		1.20 / 2.65	0.90 / 1.98	0.90 / 1.98	0.76 / 1.68

Grounding Clamps for Substations

- RG3368

Aluminum body; Plain jaw; Tightening eye-screw in bronze;
Bronze cable connectors for plain ferrules.

RG3368

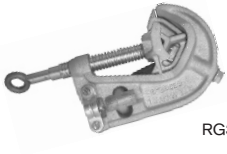
- RG3367-1

Bronze body; Removable and plain jaw; Tightening eye-screw in bronze;
Bronze cable connectors for plain ferrules.

RG3367-1

- RG3367-2

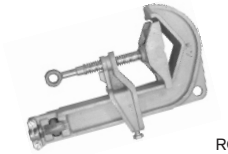
Aluminum body; Removable and plain jaw; Tightening eye-screw in bronze;
Bronze cable connectors for plain ferrules.



RG3367-2

- RG3369

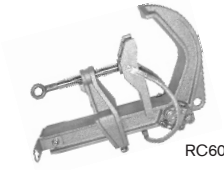
Aluminum body and adjustable bracket; Plain jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.



RG3369

- RC600-0337

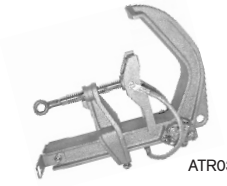
Aluminum body and adjustable bracket; Plain jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.



RC600-0337

- ATR03308-2

Aluminum body and adjustable bracket; Smooth Jaw; Bronze eye-screw terminal; Bronze Connector for plain Ferrule.



ATR03308-2

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GROUNDING CLAMPS FOR SUBSTATIONS

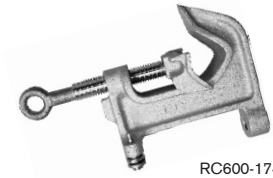
Electrical and Mechanical Characteristics		Cat. No.					
		RG3368	RG3367-1	RG3367-2	RG3369	*RC600-0337	*ATR03308-2
Nominal Current (A)		400	400	400	400	400	400
Short-Circuit Current (Isc)	30 Cycles (kA)	30	30	30	30	30	30
	60 Cycles (kA)	23	23	23	23	23	23
Range	Maximum	Ø 50 mm / 2" or rectangular busbar 12 x 100 mm 0.5" x 4"	Ø 63.5 mm 2.5"	Ø 63.5 mm 2.5"	Ø 100 mm 4"	Ø 160 mm 6"	Ø 235 mm 8"
	Minimum	Ø 5 mm 0.2"	Ø 6 mm 0.25"	Ø 6 mm 0.25"	Ø 10 mm 0.4"	Ø 90 mm 3.5"	Ø 115 mm 3.5"
Cable Ferrule (mm²)	Maximum	95	95	95	95	95	95
	Mínimo	16	16	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0	3.0	3.0
ASTM Designation		Type I Class A Grade 5	Type I Class A Grade 5	Type I Class A Grade 5	Type I Class A Grade 5	Type I Class A Grade 5	Type I Class A Grade 5
Approx. Weight (kg / lb)		1.00 / 2.20	2.12 / 4.67	1.20 / 2.65	2.20 / 4.85	3.20 / 7.05	3.20 / 7.05

* Allows use of 2 cables of (up to) 95 mm² each, simultaneously

Grounding Clamps for High and Extra High Voltage Systems

- RC600-1743

Aluminum body; Plain jaw; Tightening eye-screw in bronze; Cable connection by threaded ferrules.



RC600-1743

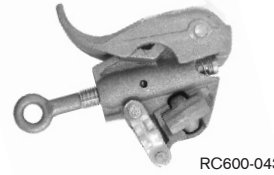
- RG3622-1

Aluminum body; Plain jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.

RG3622-1

- RC600-0434

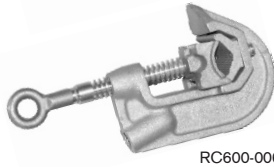
Aluminum body; Serrated jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.



RC600-0434

- RC600-0065

Aluminum body; Serrated jaw; Tightening eye-screw in bronze; Cable connection by threaded ferrules.



RC600-0065

GROUNDING CLAMPS FOR HIGH AND EXTRA HIGH VOLTAGE SYSTEMS

Electrical and Mechanical Characteristics		Cat. No.			
		RC600-1743	RG3622-1	RC600-0434	RC600-0065
Nominal Current (A)		400	400	400	400
Short-Circuit Current (Isc)	30 Cycles (kA)	30	30	30	30
	60 Cycles (kA)	23	23	23	23
Range	Maximum	1000 MCM Cu 1590 MCM ACSR Ø 38 mm 1.5"	566 MCM Cu 900 MCM ACSR Ø 29 mm 1.15"	950 MCM Cu 1510 MCM ACSR Ø 38 mm 1.5"	954 MCM ACSR Ø 30 mm 0.18"
	Minimum	6 Cu Ø 4 mm 0.15"	6 Cu Ø 4 mm 0.15"	6 Cu Ø 4 mm 0.15"	6 Cu Ø 4 mm 0.15"
Cable Ferrule (mm²)	Maximum	95	95	95	95
	Mínimo	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0
ASTM Designation		Type I Class A Grade 5	Type I Class A Grade 5	Type I Class B Grade 5	Type I Class B Grade 5
Approx. Weight (kg / lb)		0.72 / 1.59	0.72 / 1.59	0.92 / 2.03	0.52 / 1.15

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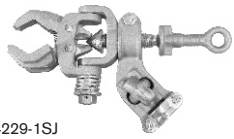
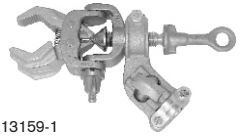
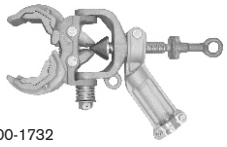


RG4229-1SJ

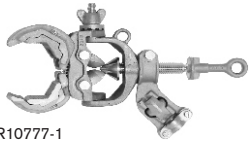


ATR13159-1

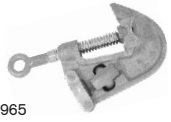


RC600-1732

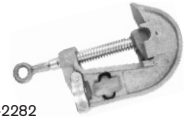
RG4228-10SJ



ATR10777-1



RC600-0965



RC600-2282

RC600-2275

RC600-0197

RG1810-2

Grounding Clamps for Transmission Lines, High and Extra-High Voltage Substations

- RG4229-1SJ

Main body in aluminum; Serrated jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules. Provides operation to continuous angles of up to 75°.

- ATR13159-1

Main body and Serrated jaw in aluminum; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules. With lock system for pre-adjusted and fixed operation angles, with wing-nut.

- RC600-1732

Main body in aluminum; Serrated jaw; Tightening eye-screw in bronze; Cable adapter in aluminum, for threaded ferrules; Provides operation to continuous angles of up to 75°.

- RG4228-10SJ

Main body in aluminum; Serrated jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules. Provides operation to continuous angles of up to 75°.

- ATR10777-1

Main body and Serrated jaw in aluminum; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules. With lock system for pre-adjusted and fixed operation angles, with wing-nut.

- RC600-0965

Aluminum body; Serrated jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.

- RC600-2282

Aluminum body; Serrated jaw; Tightening eye-screw in bronze; Bronze cable connectors for plain ferrules.

- RC600-2275

Aluminum body; Plain jaw; Tightening eye-screw in bronze;
Bronze cable connectors for plain ferrules.

- RC600-0197

Main body and top jaw in aluminum; Tightening screw in bronze; Cable connector for threaded ferrules, enshrouded.

- RG1810-2

Main body is made of Aluminum; Top jaw and tightening screw are made of bronze; Bronze cable connectors for plain ferrules.

GROUNDING CLAMPS FOR TRANSMISSION LINES, HIGH AND EXTRA-HIGH VOLTAGE SUBSTATIONS

Electrical and Mechanical Characteristics		Cat. No.				
		RG4229-1SJ	ATR13159-1	RC600-1732	RG4228-10SJ	ATR10777-1
Nominal Current (A)		400	400	400	400	400
Short-Circuit Current (Isc)	30 Cycles (kA)	30	30	30	30	30
	60 Cycles (kA)	23	23	23	23	23
Range	Maximum	954 MCM ACSR Ø 30 mm 1.18"	954 MCM ACSR Ø 30 mm 1.18"	954 MCM ACSR Ø 73 mm 2.9"	Ø 73 mm 2.9"	Ø 73 mm 2.9"
	Minimum	2 Cu Ø 6.5 mm 0.25"	2 Cu Ø 6.5 mm 0.25"	2 Cu Ø 6.5 mm 0.25"	2 Cu Ø 6.5 mm 0.25"	2 Cu Ø 6.5 mm 0.25"
Cable Ferrule (mm^2)	Maximum	95	95	95	95	95
	Mínimo	16	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0	3.0
ASTM Designation		Type I Class B Grade 5	Type I Class B Grade 5	Type I Class B Grade 5	Type I Class B Grade 5	Type I Class B Grade 5
Approx. Weight (kg / lb)		1.15 / 2.54	1.90 / 4.19	1.50 / 3.31	1.85 / 4.08	2.60 / 5.73

GROUNDING CLAMPS FOR TRANSMISSION LINES, HIGH AND EXTRA-HIGH VOLTAGE SUBSTATIONS

Electrical and Mechanical Characteristics		Cat. No.				
		RC600-0965	RC600-2282	RC600-2275	RC600-0197	RG1810-2
Nominal Current (A)		400	400	400	400	300
Short-Circuit Current (Isc)	30 Cycles (kA)	30	30	30	30	20
	60 Cycles (kA)	23	23	23	23	15
Range	Maximum	954 MCM ACSR Ø 29.6 mm 1.17"	Ø 51 mm 2"	1033 MCM ACSR Ø 31.7 mm 1.25"	950 MCM Cu 1510 MCM ACSR Ø 38 mm 1.5"	250 MCM Cu 4/0 ACSR Ø 14.5 mm 0.05 ft
	Minimum	6 Cu Ø 4 mm 0.15"	6 Cu Ø 4 mm 0.15"	8 Cu Ø 3.2 mm 0.13"	6 Cu Ø 4 mm 0.15"	6 Cu Ø 4 mm 0.15"
Cable Ferrule (mm^2)	Maximum	95	95	95	95	70
	Mínimo	16	16	16	16	16
Installation Torque (daN.m)		3.0	3.0	3.0	3.0	3.0
ASTM Designation		Type I Class B Grade 5	Type I Class B Grade 5	Type I Class A Grade 5	Type I Class B Grade 5	Type I Class A Grade 3
Approx. Weight (kg / lb)		0.73 / 1.61	0.90 / 1.98	0.60 / 1.32	0.82 / 1.81	0.60 / 1.32

Grounding Clamp for Fuse Switch

RC600-0861

This clamp has been specially designed for temporary grounding of Fuse Switches in medium voltage systems, by installing it to the bottom base of the Fuse Switch, after removal of the fuse cartridge.

This clamp provides the direct installation of a grounding cable or conventional grounding clamps using L or T supports. This clamp is also very useful to avoid the accidental operation of the Fuse Switch, when installed on the system.

The L and T supports and clamp body are made of aluminum alloy and the eye-screw operating screw is made of bronze alloy.

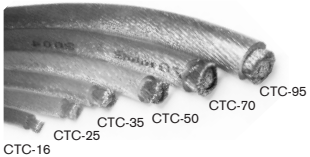
Maximum Short-Circuit Current: - 30 cycles: 20 kA

RC600-0862

GROUNDING CLAMP FOR FUSE-SWITCH

Cat. No.	Description	Approx. Weight	
		kg	lb
RC600-0861	Grounding clamp for fuse switch with T-support	0.73	1.61
RC600-0862	Grounding clamp for fuse switch with L-support	0.67	4.63

COPPER CABLES FOR GROUNDING EQUIPMENT



Extra-flexible electrolytic copper cable, with 750 V insulated protection made of crystal clear PVC, for the visual inspection of the perfect condition of the copper filaments, suitable for grounding equipment and terminals.

For easy identification and specification, the size, application and year of manufacture, are printed over the cable protection.

COPPER CABLE FOR GROUNDING EQUIPMENT

Cat. No.	Nominal Profile (mm²)	AWG Size (mm²)	Isc Cap. (symmetric kA)		Nominal Current (A)	Max. Electrical Resistance to 20°C (ohms/km)	Wires Arrangement	Max. Threads Ø (mm)	Outside Ø (mm)	Sheave Thickness (mm)	Approx. Weight	
			30 Ciclos (1/2 Seg.)	60 Ciclos (1 Seg.)							kg/m	lb/m
CTC-16	16	-	5.0	3.5	100	1.240	19 x 27	0.26	9.10	1.8	0.20	0.44
CTC-25	25	-	8.0	5.0	150	0.795	19 x 42	0.26	11.52	1.8	0.30	0.66
CTC-35	35	2 (33.63)	10.0	7.0	200	0.565	37 x 30	0.31	12.90	2.0	0.40	0.88
CTC-50	50	1/0 (55.48)	15.0	8.0	250	0.386	19 x 52	0.31	14.53	2.0	0.54	1.20
CTC-70	70	2/0 (67.42)	20.0	15.0	300	0.272	61 x 23	0.31	17.00	2.2	0.76	1.68
CTC-95	95	4/0 107.20	30.0	23.0	400	0.210	51 x 31	0.31	19.03	2.2	1.00	2.20

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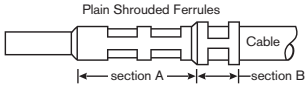
GROUNDING CABLE FERRULES

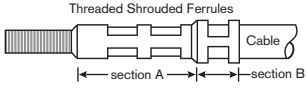
These terminals are attached to the end of the grounding cables, by crimping process, in order to provide a good electrical and mechanical connection between cables and grounding clamps.

Made of aluminum or copper, with inside diameter according to the nominal cable size.

Both the aluminum cables and cooper cables can be selected regarding the type of attachment to the cable: threaded or plain.

Applies a heat-shrink poles that overlap the connection points between the cable and terminal, preventing the penetration of moisture and minimizing the possibility of cable breakage due to handling.





THREADED SHROUDED ALUMINUM FERRULES

Cat. No.	For Copper Cables of Nominal Size (mm²)	Burndy Crimping or Equivalent		Approx. Weight	
		A Section	B Section	kg	lb
ATR17184-1	16	U35C	U26RT	0.07	0.15
ATR17184-2	25	U26RT	U26ART	0.07	0.15
RC600-2618	35	U28RT	U166	0.07	0.15
RC600-2619	50	U29RT	U28ART	0.07	0.15
RC600-2620	70	U167	U32RT	0.08	0.18
RC600-2621	95	U28ART	U34RT	0.08	0.18

PLAIN SHROUDED ALUMINUM FERRULES

Cat. No.	For Copper Cables of Nominal Size (mm²)	Burndy Crimping or Equivalent		Approx. Weight	
		A Section	B Section	kg	lb
ATR13036-2	25	U26RT	U26ART	0.06	0.13
RC600-2626	35	U28RT	U166	0.06	0.13
RC600-2627	50	U29RT	U28ART	0.06	0.13
RC600-2628	70	U167	U32RT	0.07	0.15
RC600-2629	95	U28ART	U34RT	0.07	0.15

PLAIN UNSHROUDED ALUMINUM FERRULES

Cat. No.	For Copper Cables of Nominal Size (mm²)	Burndy Crimping or Equivalent		Approx. Weight	
		A Section	B Section	kg	lb
ATR17184-7	16	U35C	U26RT	0.20	0.44
ATR17184-8	25	U35C	U26ART	0.20	0.44
RC600-2622	35	U28RT	U166	0.20	0.44
RC600-2623	50	U29RT	U28ART	0.23	0.51
RC600-2624	70	U167	U32RT	0.23	0.51
RC600-2625	95	U28ART	U34RT	0.23	0.51

PLAIN SHROUDED COPPER FERRULES

Cat. No.	For Copper Cables of Nominal Size (mm²)	Burndy Crimping or Equivalent		Approx. Weight	
		A Section	B Section	kg	lb
ATR13036-8	25	U26RT	U26RT	0.18	0.40
RC600-2630	35	U28RT	U166	0.18	0.40
RC600-2631	50	U29RT	U28ART	0.20	0.44
RC600-2632	70	U167	U32RT	0.23	0.51
RC600-2633	95	U28ART	U34RT	0.23	0.51

HEAT-SHRINK POLES FOR FERRULES

Cat. No.	Cable (mm²)	Ø	Length (mm)
ATR17923-1*	16	½" / 12.7 mm	127
ATR17923-2	25 - 50	3/4" / 19 mm	
ATR17923-3	70 - 95	1" / 24 mm	

* only for tinned cooper terminal

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TIN-PLATED COPPER FERRULES

ATR26446-4

Cat. No.	For Copper Cables of Nominal Size (mm²)	Burndy Crimping or Equivalent	Approx. Weight	
			kg	lb
ATR26446-1	16	IU-5	0.01	0.02
ATR26446-2	25	IU-4	0.02	0.04
ATR26446-3	35	IU-2	0.02	0.04
ATR26446-4	50	IU-25	0.03	0.07
ATR26446-5	70	IU-26	0.04	0.09
ATR26446-6	95	IU-27	0.06	0.13

These terminals are suitable for attachment to clamps with screw-type connection.

GROUNDING CLUSTER

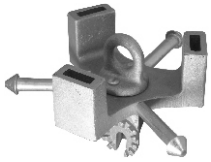
Grounding clusters are intended to lift simultaneously the grounding clamps to the conductors, in a safe operational sequence.

They are normally used in conventional medium voltage overhead systems maintenance.

- ATR04694-1

Made of aluminum, with galvanized steel stud and universal coupling in bronze, this cluster is suitable for installation and removal of the ATR03653-1 model grounding clamps, by pressure application.

Approximate weight: 0.53 kg (1.17 lb)

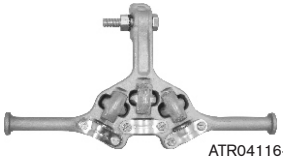


ATR04694-1

- ATR04116-1

Made of aluminum, with bronze connectors for cables up to 70 mm². Suitable for medium size clamps.

Approximate weight: 1.0 kg (2.20 lb)



ATR04116-1

- ATR14442-1

Made of aluminum, with galvanized steel stud, this model is suitable for lifting, installation and removal of the ATR13628-1 model grounding clamps (spring-action mechanism).

Approximate weight: 0.68 kg (1.50 lb)

ATR14442-1

SADDLE-TYPE CLUSTER

The five models of Saddle-type Cluster provide an intermediary grounding point on the working structure.

- ATR03318-1

Made of aluminum, with chain wheel tightener for the perfect electrical contact with the pole.

Approximate weight: 3.17 kg (6.99 lb)

ATR03318-1

- RC600-0152

Built with aluminum plates and a 280 mm (0.9 ft) copper shaft. Provides for connection of plain ferrules, for grounding cables from 16 through 95 mm².

Approximate weight: 4.30 kg (9.48 lb)

RC600-0152

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AUXILIARY EQUIPMENT

Clamp Resting Supports

Accessories for the simultaneous lifting of clamps to be installed.

The clamp resting supports are adaptable to any types of clamps.

RG3625

RG3626

CLAMP RESTING SUPPORTS

Cat. No.	Material	Approx. Weight	
		kg	lb
RG3625	Aluminum	0.13	0.29
RG3626	Aluminum	0.06	0.13

Metallic Reel

ATR03641-1

- ATR03641-1

Metallic Reel with bronze clamp fixing, for connection of the cable to the grounding rod, besides providing for the conditioning of the cable during transportation.

Electrical and Mechanical Characteristics		Cat. No.
		ATR03641-1
Nominal Current (A)		200
Short-Circuit Current (Isc)	30 Cycles (kA)	8
	60 Cycles (kA)	5
Range	Maximum	Ø 19 mm (0.7")
	Minimum	Ø 2 mm (0.1")
Cable Ferrule (mm²)	Maximum	25
	Minimum	16
Installation Torque (daN.m)		2.0
ASTM Designation		-
Approx. Weight (kg / lb)		1.85 / 4.07

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Grounding Rod

- ATR00137-1

It is provided with Ø 17 mm x 1.5 m (0.7" x 4.9 ft) long copper-plated steel rod and bronze threaded end. Handle can be disassembled for easier storage and transportation.
Approximate weight: 3.65 kg (8.05 lb)

- ATR00137-2

It is provided with Ø 17 mm x 1 m long (0.7" x 3.3 ft)copper-plated steel rod and bronze threaded end. Handle can be disassembled for easier storage and transportation.
Approximate weight: 2.60 kg (5.73 lb)


ATR00137-2

CONDITIONING

Cat. No.	Grounding Rod	Dimensions			
		Length		Width	
		m	ft	m	ft
ATR16819-1	ATR00137-2	1.15	3.77	0.12	0.39
ATR16819-2	ATR00137-1	1.57	5.15	0.12	0.39

All bags are manufactured with reinforcements on the bordering lines and both ends, suitable for conditioning and transport of the grounding rods.

Terminal Block

Terminal blocks were designed to allow connection between the line clamp and the ground clamp.

- RG4754-1

Aluminum Block, 04 connectors for grounding cables from 25 through 95 mm².

Approximate weight: 0.51 kg (1.12 lb)


RG4754-1

- ATR17574-1

Thermoplastic Block suitable for up to 5 tin-plated cooper ferrules for grounding cables up to 35 mm².

Approximate weight: 0.32 kg (0.71 lb)

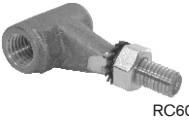

ATR17574-1

Special Connector and Adapter

- RC600-1584

Threaded adapter for fixing of the threaded terminal of the cable to the grounding clamp, in special situations where this clamp has no threaded connection.

Approximate weight: 0.19 kg (0.42 lb)

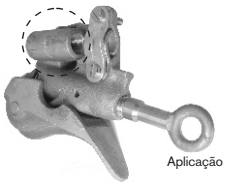

RC600-1584

Double Connector

- ATR26555-1

The double connector allows the assembling of 02 grounding cables in one clamp. One cable should be installed through one plain ferrule and the other one in a threaded ferrule.

Approximate weight: 0.11 kg (0.24 lb)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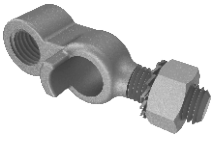
ATR26555-1

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STORAGE

Metallic Case

Made of painted steel plate, this metallic case is used for storage of small grounding sets.

METALLIC CASE

Cat. No.	Dimensions (mm / ft)			Volume (m^3)	Approx. Weight	
	H	W	L		kg	lb
ATR10455-3	205 / 0.7	180 / 0.6	650 / 2.1	0.02	3.00	6.61
ATR10455-4	301 / 1.0	180 / 06	650 / 2.1	0.04	5.10	11.24

Transportation Bags

Due to the light weight, the waterproof bags are practical and safe when transportation grounding equipment. The bags are manufactured according to the following basic models:

- Case Type / Bucket:

Made of reinforced material, with fiberglass bottom, suitable for storage of cables and fittings.

STORAGE CASE

Cat. No.	Dimensions (mm / ft)			Volume (m^3)
	H	W	L	
ATR09962-1	290 / 0.9	240 / 0.8	645 / 2.1	0.04

STORAGE BUCKET

Cat. No.	Dimensions (mm / ft)			Volume (m^3)
	H	W	L	
ATR14484-2	420 / 1.4	270 / 0.9	400 / 1.3	0.04

- Bag Type:

Made of reinforced canvas, suitable for cables and fittings of portable sets.

STORAGE BAG

Cat. No.	Dimensions (mm / ft)			Volume (m^3)
	H	W	L	
ATR16843-4	280 / 0.9	240 / 0.8	1100 / 3.6	0.07
ATR16843-6	150 / 0.5	200 / 0.7	800 / 2.6	0.03

TELESCOPIC HOT STICKS

The Ritzglas® Triangular shape design Telescopic Hot Stick was designed to provide the working distance and the insulation required to perform routine works in overhead electrical systems, being one of the most useful tools in hot line maintenance.

The standard aluminum universal end fitting is suitable for a wide range of attachments so that the stick can be used to disconnect switches, replace cut-outs, change pole covers, prune trees, replace electrical bulbs and perform many other related works.

The VTT-3HD model offer higher mechanical strength with a considerable reduction of flexibility, enabling the performance of works that require a higher strength.

When using VTT Hot Sticks, the use of ladders or platforms is not required, as the works can be performed directly from ground.

Assembled with epoxy-resin reinforced fiberglass poles, the VTT complies with ASTM F-1826/99.

The high visibility color top sections of VTT and VTT-3HD models are manufactured with Ritzglas® poles with polyurethane foam core that ensures full insulation, even when subject to the most rigorous humidity conditions.

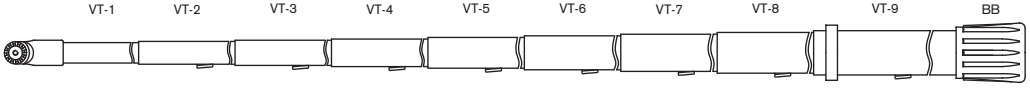
The triangular shape requires no twisting or turning to lock each section, making the opening and closing procedure quick and easy.

Each VTT is supplied with a rubber ring and seal for fixing the end fitting to prevent the sections from sliding and consequently the extension of the VTT, during transportation.

The third section VT-3 of the VTT model can be replaced by the top section VT-3HD, transforming the VTT Hot Stick into a VTT-3HD Hot Stick, with higher mechanical strength, offering the lineman both models in a single set.

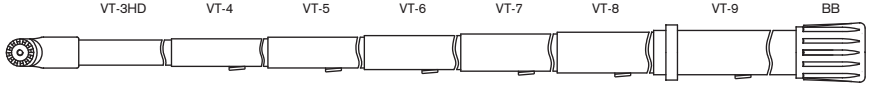
LIGHT-WEIGHT MODEL

Cat. No.	Qty. of Sections	Ext. Length		Retracted Length		Base Section Ø		Canvas Bag Cat. No. (optional)	Approx. Weight	
		m	ft	m	ft	mm	in		kg	lb
VTT-1/2	2	2.58	8.46	1.43	4.69	33	1.3"	SLT-2/3	1.30	2.87
VTT-1/3	3	3.82	12.53	1.48	4.86	37	1.5"	SLT-2/3	1.90	4.19
VTT-1/4	4	5.10	16.73	1.53	5.00	41	1.6"	SLT-4/5	2.50	5.51
VTT-1/5	5	6.43	21.10	1.59	5.22	45	1.8"	SLT-4/5	3.20	7.05
VTT-1/6	6	7.77	25.49	1.63	5.35	49	1.9"	SLT-6/7	3.90	8.60
VTT-1/7	7	9.16	30.00	1.68	5.50	52	2.0"	SLT-6/7	4.70	10.36
VTT-1/8	8	10.59	34.74	1.74	5.70	56	2.2"	SLT-8/9	5.70	12.57
VTT-1/9	9	12.04	39.50	1.77	5.80	61	2.4"	SLT-8/9	6.90	15.21



HEAVY-DUTY MODEL

Cat. No.	Qty. of Sections	Ext. Length		Retracted Length		Base Section Ø		Canvas Bag Cat. No. (optional)	Approx. Weight	
		m	ft	m	ft	m	in		kg	lb
VTT-3HD/4	2	2.74	9.00	1.51	4.95	41	1.6"	SLT-4/5	1.80	3.97
VTT-3HD/5	3	4.07	13.35	1.58	5.20	45	1.8"	SLT-4/5	2.50	5.51
VTT-3HD/6	4	5.43	17.80	1.61	5.30	49	1.9"	SLT-6/7	3.20	7.05
VTT-3HD/7	5	6.81	22.30	1.66	5.45	52	2.0"	SLT-6/7	4.00	8.82
VTT-3HD/8	6	8.24	27.00	1.73	5.70	56	2.2"	SLT-8/9	5.00	11.02
VTT-3HD/9	7	9.71	32.00	1.76	5.80	61	2.4"	SLT-8/9	6.20	13.67



The VTT Telescopic Hot Stick must be extended and retracted vertically, with the base resting on ground.

For safety procedure, the OSHA Standard must be considered.

HEIGHT MEASURING HOT STICK

Models VTT-1/2 through VTT-1/9 are also provided with metric measuring markings, making VTTs also very important for vertical span measurements.

The numerical markings are printed every 10 cm (0.3 ft) and the intermediary markings are printed every 1 cm. In order to obtain height measurements, the hot stick shall be placed on the ground in the vertical position and as the sections are extended up, the operator can read the right measurement at his eye-sight level.

In order to specify the height measuring hot stick, suffix “M” must be added to the Cat. No. of the respective VTT model.

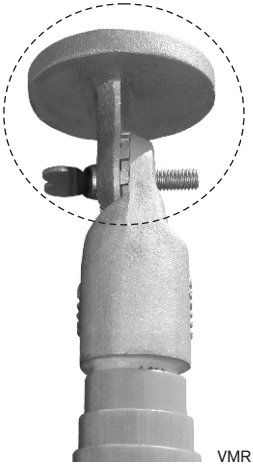
e.g.: VTT-1/7M (length: 9.180 ± 0.01 m)

The Height Measuring Telescopic Hot Stick is supplied with one resting head (VMR14506-1). When attached to the universal head, the resting head allows operators to touch the exact spot to be measured.

The modular system of the VTT hot stick allows using only the number of sections required for each work. By pressing the locking buttons, the unnecessary bottom sections are released and can be removed, making the VTT hot stick lighter and more comfortable for the performance of the works. Any section can be supplied separately, if replacement is required. Customized section lengths are available upon request.

REPLACEMENT PARTS

Complete Section w/ Locking Button	VT-9 Standard HD	VT-8 Standard HD	VT-7 Standard HD	VT-6 Standard HD	VT-5 Standard HD	VT-4 Standard HD	VT-3 Standard	VT-2 Standard	-
RITZGLAS® Tip Section	-	-	-	-	-	-	VT-3HD HD	-	VT-1 Standard



VMR14506-1

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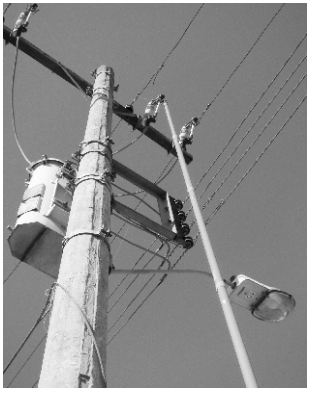
SECTIONAL HOT STICKS



The Sectional Hot Stick is usually supplied with a universal head, which is suitable for the use of tools for operation of cut-out switches, as well as operational heads and several universal tools, specially designed for various applications, such as:

- knife-switches operation
- fuse-switches operation
- fuse cartridge removal and installation
- voltage tester handling
- installation and removal of temporary grounding equipment and live line clamps
- Life wire installation
- Pruning trees
- Cleaning of Networks
- Light bulb replacement, etc

The Sectional Hot Stick is made of Ritzglas® poles.

In order to make the handling, storage and transportation more practical, the Sectional Hot Stick is composed of standardized sectional elements, which are interchangeable, and attached with quick spring-action locking pins.

The total length suitable for each working voltage class can be obtained by adding more sections, which can be up to 5 sections, per the table below:

Two models of different diameters are available:

- standard model: Ø 38 mm (1.5") handle and middle sections and Ø 32 mm (1.25") top section
- light model: Ø 32 mm (1.25") handle and middle sections and Ø 25 mm (1") top section

SECTIONAL HOT STICKS SECTIONS

Cat. No.	Description	Ø (in)	Length (m / ft)		Approx. Weight	
			Working	Total	kg	lb
VMR-S	Top section	1.25"	1.25 / 4.1	1.45 / 4.8	1.15	2.54
VMR/L-S	Light top section	1.0"	1.25 / 4.1	1.45 / 4.8	0.85	1.87
VMR-I	Middle section	1.5"	1.25 / 4.1	1.45 / 4.8	1.20	2.65
VMR/L-I	Light middle section	1.25"	1.25 / 4.1	1.45 / 4.8	0.80	1.76
VMR-P	Handle section	1.5"	1.45 / 4.8	1.45 / 4.8	1.10	2.43
VMR/L-P	Light handle section	1.25"	1.45 / 4.8	1.45 / 4.8	0.70	1.54

VMR-S

VMR-I

VMR-P

SECTIONAL HOT STICKS

Cat. No.	Quantidade de Elementos							Max. Length (m /ft)	Approx. Weight	
	Handle	Ø	Middle	Ø	Top	Ø	Total		kg	lb
VMR-15	1	32 (1.25")	-	-	-	-	1	1.25 / 4.10	0.95	2.09
VMR-15/L	1	25 (1")	-	-	-	-	1	1.25 / 4.10	0.75	1.65
VMR-30	1	38 (1.5")	-	-	1	32 (1.25")	2	2.70 / 8.85	2.25	4.96
VMR-30/L	1	32 (1.25")	-	-	1	25 (1")	2	2.70 / 8.85	1.55	3.42
VMR-45	1	38 (1.5")	1	38 (1.5")	1	32 (1.25")	3	3.95 / 13.00	3.45	7.61
VMR-45/L	1	32 (1.25")	1	32 (1.25")	1	25 (1")	3	3.95 / 13.00	2.35	5.18
VMR-70	1	38 (1.5")	2	38 (1.5")	1	32 (1.25")	4	5.20 / 17.06	4.65	10.25
VMR-70/L	1	32 (1.25")	2	32 (1.25")	1	25 (1")	4	5.20 / 17.06	3.15	6.94
VMR-90	1	38 (1.5")	3	38 (1.5")	1	32 (1.25")	5	6.45 / 21.16	5.85	12.90
VMR-90/L	1	32 (1.25")	3	32 (1.25")	1	25 (1")	5	6.45 / 21.16	3.95	8.71

For safe procedures, the OSHA standards about minimum distances must be considered.

ACCESSORIES

- RH4455-64

Hot stick extension with storm-skirt

This tool has been developed for attachment to insulating hot sticks, to be used in emergency situations, under rain.

Insulating Length: 0.5 m (1.64 ft)

Approx. Weight: 1.10 kg (2.43 lb)

RH4455-64

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STORAGE

The storage canvas bag is manufactured with reinforcements on the bordering lines and both ends, suitable internal divisions for the storage of the sectional hot stick sections, transportation grip and additional pocket for the operational heads.

This bag should be ordered separately, as it is an optional accessory.

Customized color patterns are available upon request.

STORAGE

Cat. No.	Grounding Rod	Internal Divisions		Dimensions			
				Length		Width	
		Grounding Rod	VMR	m	ft	m	ft
VMR10484-1	ATR00137-1	1	3	1.51	4.95	0.38	1.25
VMR10484-2	ATR00137-2	1	3	1.51	4.95	0.38	1.25
VMR10484-3	-	-	3	1.51	4.95	0.26	0.85
VMR16824-1	-	-	1	1.51	4.95	0.11	0.36
VMR16824-2	-	-	2	1.51	4.95	0.19	0.62
VMR16825-1	-	-	4	1.51	4.95	0.34	1.12
VMR16825-2	ATR00137-2	1	4	1.51	4.95	0.42	1.38
VMR16826-1	-	-	5	1.51	4.95	0.42	1.38

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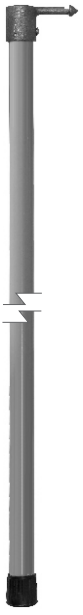
DISCONNECT HOT STICKS

Disconnect Hot Sticks are made of Ritzglas® poles are supplied with fixed operational heads.

LIGHT MODEL

Cat. No.	Ø (mm - in) and Working Length (m - ft)	Approx. Weight	
		kg	lb
RH3046-12	32 x 1.83 (1.25" x 6 ft)	0.90	1.98
RH3046-17	32 x 3.65 (1.25" x 12 ft)	1.80	3.97



RH3046-12

OPERATIONAL HEADS

Heads for Grounding Clamps

The heads for grounding clamps are made of aluminum and are provided with universal coupling systems, adaptable to the hot sticks. They are used when operating the grounding clamps, by locking it with the eye-screw.

- VMR02579-1

Locking system by semi-sphere, with adjustable pressure.

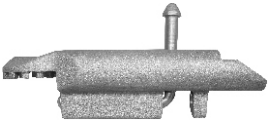
Approx. Weight: 0.19 kg (0.42 lb)

VMR02579-1

- VMR07205-1

Head with steel shaft and spring action for automatic alignment and attachment.

Approx. Weight: 0.25 kg (0.55 lb)



VMR07205-1

- RM4455-29B

Locking and release of the clamp is performed by a twisting operation. It allows the articulation of the clamp, enabling the operation at different angles.

Approx. Weight: 0.31 kg (0.68 lb)

Head with Fall-Protection System

These heads are used for operation of switches, installation and removal of fuse cartridges, preventing them from accidentally falling off.

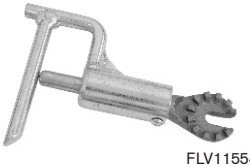
They are provided with automatic safety lock device (fall protection system), aiming at ensuring the safety of the lineman.

RM4455-29B

- FLV11554-1

Main body made of hot galvanized steel, featuring bronze alloy safety lock and universal head.

Approx. Weight: 0.34 kg (0.75 lb)



FLV11554-1

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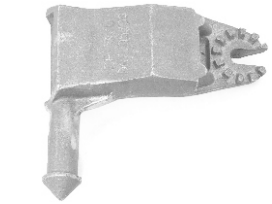


VMR16483-1

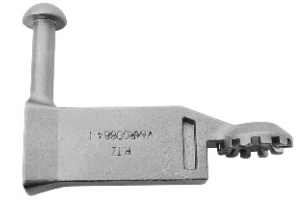
Heads for Operation of Fuse Switches

The heads are standardized with universal coupling, adaptable to the hot sticks.

- VMR16483-1

Aluminum inclined head, with circuit-breaker operation shaft and fitting for cartridge cut-out catch.

Approx. Weight: 0.25 kg (0.55 lb)



VMR00884-1

- VMR00884-1

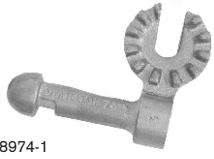
Stainless steel head with circuit-breaker operation shaft and fitting for cartridge cut-out catch.

Approx. Weight: 0.29 kg (0.64 lb)

- VMR08974-1

Bronze head with circuit-breaker operation shaft.

Approx. Weight: 0.11 kg (0.24 lb)

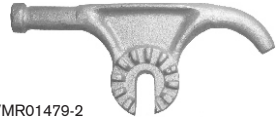


VMR08974-1

- VMR01479-2

Cooper alloy disconnect head.

Approx. Weight: 0.18 kg (0.40 lb)



VMR01479-2

HOT LINE CLAMP

- FLV19192-1

Nominal current capacity: - 230 A

Mainly used for connecting the transformer (equipment) to the medium Voltage overhead line, with/without the stirrup connector.

FLV19192-1

ADVANTAGES

- Body and jaw made of cast aluminum, eye screw and grounding cable connector in Bronze material, light weight in general.
- Connection for shotgun to avoid any movement while lifting and installation.
- Pressure system on the jaw to make easier the clamp installation to the overhead conductor and safe positioning of the shotgun, clamp turning and installation conclusion.
- .Angle for connector way out to the conductor junction (allowing easier installation).

L

TEREX®

GROUP M

SOLUTIONS TO LIFT THE LINEMAN AND REACHING THE ENERGIZED EQUIPMENT

GROUP M

SOLUTIONS TO LIFT THE LINEMAN AND REACHING THE ENERGIZED EQUIPMENT

Reliability, security and return on investment are priorities in the development of lifting equipment's for maintenance of electrical distribution and transmission networks.

The Terex equipment's are the most robust and reliable in the market, transforming challenges into solutions to meet the maintenance staff even when they´re working in the toughest conditions.

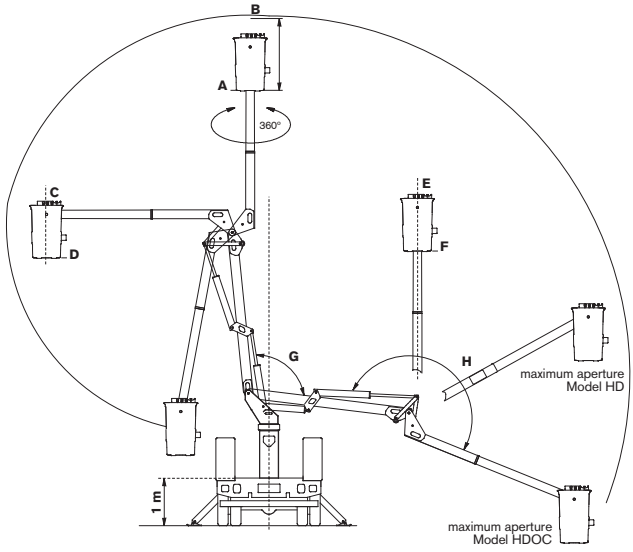
We offer a portfolio that meets the specific requirements of maintenance works on hotlines networks, emergency duty, pruning trees, public illumination, lines of extra-high, high and medium voltage, substations and construction of transmission and distribution lines.

The equipment's are designed, manufactured and tested according to ANSI standards.

SKYRITZ® AERIAL DEVICES

The SKYRITZ Terex aerial devices model has a history of over 30 years in the market offering quality and continuous innovation.

The SKYRITZ are equipment's with a bucket for one person, articulated boom with hydraulic drive, endless spin and qualification voltage for classes C (46 kV) or B (69-138 kV). Suitable for maintenance works in networks of electricity distribution energized and de-energized in its various applications that includes, but not exclusively, hotlines maintenance, emergency duty, pruning trees, public illumination, among others.



CAPACITY AND DIMENSIONS

	SKYRITZ-10	SKYRITZ-10HD	SKYRITZ-10HDOC	SKYRITZ-13
Height to the bottom of the bucket (A)	8,7 m	8,9 m	9,2 m	11,5 m
Work Height (B)	10,2 m	10,4 m	10,6 m	13,0 m
Horizontal reach with boom inferior to 90° (C)	4,1 m	3,7 m	4,3 m	5,3 m
Height to the bottom of the bucket (D)	5,4 m	5,3 m	5,5 m	6,9 m
Horizontal reach with boom inferior to 0° (E)	3,4 m	7,0 m	6,4 m	4,8 m
Height to the bottom of the bucket (F)	5,0 m	3,0 m	5,7 m	6,4 m
Articulation on the lower boom (G)	88°	88°	-7° a 90°	88°
Articulation in the upper boom with the lower boom in horizontal (H)	90°	150°	195°	90°
Articulation in the upper boom with the lower boom in vertical	180°	176°	195°	180°
Capacity of the bucket	136 kg	136 kg	136 kg	136 kg

STANDARD COMPONENTS

- Bucket made of plastic reinforced with fiberglass for 1 person, with external step
- Liner in polyethylene insulation
- Bucket Dust Cover
- Automatic leveling system of the bucket
- System ON/OFF of vehicle engine in the bucket
- Tipping bucket system for cleaning with manual operation for the hydraulic equipment's with 9 to 13 meters exclusive to the HD and HDOC equipment

M

- Insulating section in the upper boom
- Protective cover for isolated booms
- Eyelet in the lower boom for exclusive cargo lifting for HD HDOC equipment's
- Infinite spinning Tower
- Hydraulic lock valve that automatically limit the movement of the boom to safe levels of stability
- Hour meter to control equipment usage time
- Emergency electric manual pump for the hydraulic equipment with 9 to 13 meters exclusive to HD HDOC equipment's
- Support for bucket and for boom

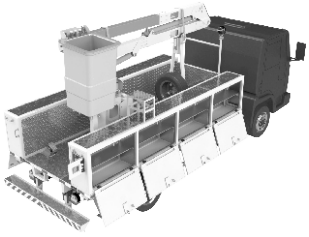
OPTIONAL

- Plug for hydraulic tools (accelerator of the vehicle included) in the bucket
- Insulating section in the lower boom for the model of 13 meters

TRUCK BODIES

The compartmented bodies can be supplied jointly with the models aerial device SKYRITZ, or rotating supports with ladders of the model SKYLADDER.

These are indicated for the usage in general maintenance services in concessionaire companies for electric energy and its service providers, miner companies, concessionaire companies in services and telecommunications, city halls, among other applications.



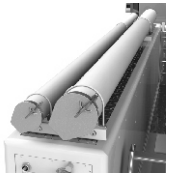
Side access or by ladder from the rear

- Step for access to the bucket (when provided jointly with SKYRITZ)
- Reflexive strip in the bumper and body
- Side protector as for DMV resolution
- Support for the spare tire
- Rear bumpers

  These are designed and manufactured in accordance with the resolutions applicable of the Brazilian management and traffic surveillance bodies.

LOCKERS

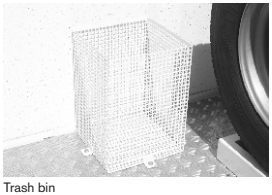
Built in aluminum bond, a rear door (passenger side) and four doors in each side with a horizontal opening facing downwards, with a rod type lock system; fixed reinforced trays splitting the gaps in half and fixed partition splitting the doors compartment in half, which allow the conditioning of the several material necessary to the activities to be carried out.


Case for hot sticks

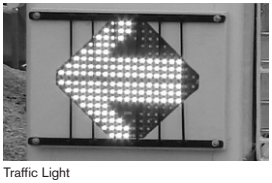

Handling light and LED Auto signaler


High-intensity headlight


Wardrobe


Trash bin


Vise


Traffic Light

OPTIONALS

- Case for hot sticks (Ø100x1800 mm; Ø100x2100 mm; Ø100x3400 mm; Ø150x1800 mm; Ø150x2100 mm; Ø150x3400 mm)

  Case destined for the conditioning and preservation of tools for maintenance of live wires

- Handling light and LED Auto signaler

  Fixed auxiliary light, for night activities in electric grids. The LED Auto signaler ensures the visualization of the vehicle even in daytime operations, ensuring the security of the team

- Handling light

  Portable light to help in nighttime activities such as maintenance and line surveillance (including outlet in the cab + outlet in the rear)

- High-intensity headlight

  Headlight destined to the lighting of the interior of the body, aiming on allowing the moving of materials and operators in a safe way, during nighttime activities

- Wardrobe (Locker)

  Destined to the conditioning of materials, allowing its organization in the interior of the lockers

- Lockers Lighting

  Lighting for the interior of the lockers aiming on easing the nighttime operations

- Trash bin

  Destined for the storage of cable ends deriving from the electric interventions, for later correct destination

- Vise

  Destined to help in operations such as fixing of small objects and cutting of cables (including 4" walrus)

- Water reservoir

  Allows the electrician to make the sanitation of his hands, when necessary

- Traffic Light

  Signaling light which function is to direct the traffic of vehicles that roam in the public ways, ensuring a safer operation for the electricians team (Including outlet in the rear)

- Support for articulate cone

  Destined to the conditioning of cones in the interior of the vehicle's body in a safe way. It can be articulated, allows the removal of the cones from the ground, fasting the removal and conditioning in an ergonomically favorable condition.

- Support for fixed cone

  Destined to the conditioning of cones in the interior of the vehicle's body in a safe way

- Support for bent cone

  Destined to the conditioning of cones in the interior of the vehicle's body in a safe way. Due to being bent, it minimizes the locking effect of the cones, due to their settling during transporting

- Articulated support for auxiliary ladder

  Eases the removal and the conditioning of auxiliary ladder over the lockers, in an ergonomically favorable condition

- Support for horizontal auxiliary ladder with roller

  Allows the conditioning and preservation of the auxiliary ladder during the transport operation. The ladder is transported horizontally, allowing its placement and removal by the rear of the vehicle

- Support for fixed auxiliary ladder

  Allows the conditioning and preservation of auxiliary ladder during the transport operation

- Support for cables

  Destined to organizing the internal space of the body, allowing the cable rolls to be conditioned correctly

- Support for tires shim

  This set allows the vehicle to be immobilized in a safe way, with no improvising, with the resource close to the place of usage (including the tire shim)

- Support for bedplates

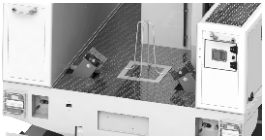
  This set allows the equipment to be established in a safe way, with no improvising, with a resource close to the usage point (including the usage of pads)

- Support for cross head

  Allows the storage and transport of cross heads in a safe way, without damaging this component

- Support for rods (locker)

  Allows the organization and transporting of live wire tools in the interior of the locker, preserving the integrity of the tool

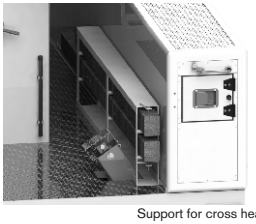


Support for fixed cone

Support for auxiliary ladder

Support for tires shim

Support for bedplates



Support for cross head

Support for rods (locker)

M

SKYLADDER®

SKYLADDER-LV/01

Equipment was specifically conceived for hot line works of up to 500 kV system voltage, mounted on a rotating and tilting base, supplied with two ladder sections (the first one is fixed and the second one can be extended), with the possibility of installing an additional extension at angles 90 ° and 80 °.

The ladder is made of Ritzglas® poles, with an orange color polyurethane enamel finish of high dielectric strength. Rungs are painted black and covered with sliding-proof material.

The rotating and tilting base is made of structural steel finished with synthetic painting.

TECHNICAL CHARACTERISTICS

- Tilting operation assisted with helical spring and counter-weight, requiring less effort for vertical positioning of the ladder.
- Rotation and extension are quick and easy manual operations.
- Safety locking devices to lock the ladder at all working positions and resting/transportation position.
- Base with continuous rotation turret, brass bushings and lubrication pins.
- Adaptable to utility vehicles with the following minimum characteristics:
  - Load capacity: 1000 kg (2205 lb)
  - Inner (free) length of the truck: 1600 mm (5.25 ft)
  - Inner (free) width of the truck: 1600 mm (5.25 ft)
  - Total length of the vehicle: 4500 mm (15 ft)
- Maximum height of the top rung of the ladder in the upright position (90º):
  - with fixed ladder portion + 01 extension: 9 m (30 ft)
  - with fixed ladder portion + 02 extensions (optional): 12.6 m (41 ft)
- Test Voltage: 100 kV / 300 mm (1 ft)
- Load Capacity: 90 -150 kg (198 - 331 lb), depending on the working position
  (refer to table below).
- Approx. weight: 350 kg (772 lb)

IMPORTANT NOTES

The Ritzglas® poles used for the ladder siderails and handrails are manufactured and tested according to ASTM F 711 Standard.

For inquiries, following information about the vehicle on which the equipment will be assembled is necessary: brand; model; year of manufacture; type of cabin; body details.

It is recommended to use a Micro Ammeter for leakage current monitoring. (RC402-0288 Micro-Tester).

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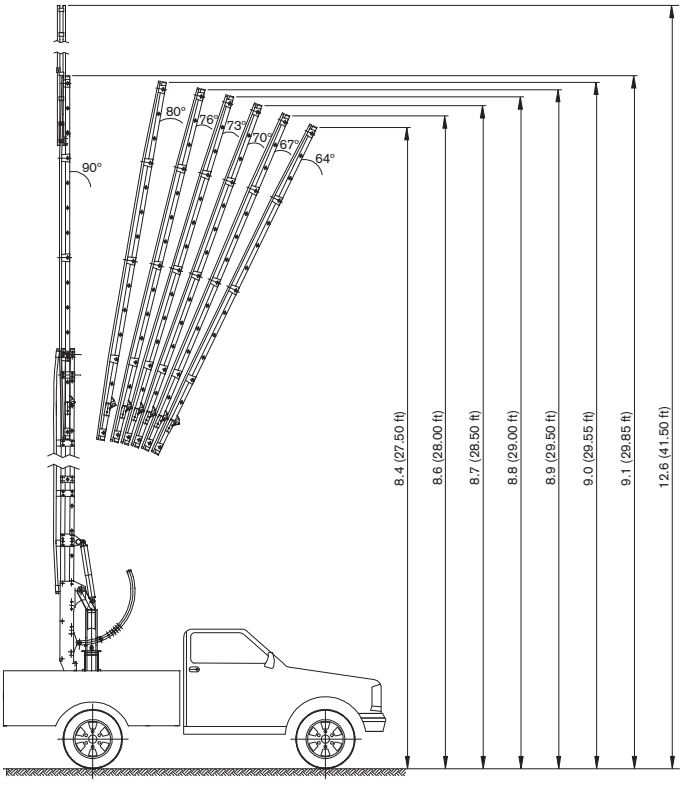


SKYLADDER-LV/01

Working Angle	Max. Load Capacity	
	kg	lb
64°	90	198
67°	100	220
70°	110	242
73°	120	264
76°	135	297
80°	140	308
90°	150	330

* Test has been performed using the second extension and stays.

The vertical reach was defined considering a height of 900 mm (3 ft) (above ground) of the vehicle platform.

M

SKYLADDER-VI

Equipment Suitable for works on Distribution Systems, public illumination, among other works, with ensured safety, provided that all personal protection comprising the relevant standards, mounted on a rotating and tilting base, supplied with two ladder sections (the first one is fixed and the second one can be extended).

The ladder is made of Ritzglas® poles, with an orange color polyurethane enamel finish of high dielectric strength. Rungs are painted black and covered with sliding-proof material.

The rotating and tilting base is made of structural steel finished with synthetic painting.

TECHNICAL CHARACTERISTICS

- Tilting operation assisted with helical spring and counter-weight, requiring less effort for vertical positioning of the ladder.
- Rotation and extension are quick and easy manual operations.
- Safety locking devices to lock the ladder at all working positions and resting/transportation position.
- Base with continuous rotation turret, brass bushings and lubrication pins.
- Adaptable to utility vehicles with minimum load capacity of 1000 kg (2205 lb), provided with a free space around the turret of 600 mm (2 ft) radius for the rotation of the equipment.
- Ladders are made of fiberglass reinforced epoxy resin of high dielectric strength and load capacity of 113 kg (249 lb).
- Provided with supports at both sides to accommodate auxiliary ladders (not included), warning lights and handling lights.
- Approximate weight: 350 kg (772 lb).
- Max. height at the top rung: 8.5 m (28 ft)
- Working angles: 70º, 74º, 78º and 82º (*)

* Equipment to work at 65º can be manufactured, as long as the vehicle on which it will be mounted provides compatible stability and available space.

OPTIONAL

- Metallic body and side bins, made of steel or aluminum plates (refer to the specific page of this product).

IMPORTANT NOTES

- For inquiries, following information about the vehicle on which the equipment will be assembled is necessary: brand; model; year of manufacture; type of cabin; body details

M

DIGGER DERRICK

Terex® is the pioneer in manufacturing the Digger Derrick equipment, has over 70 years of operational excellence and innovation in this segment.

This equipment is developed for drilling and deploying posts. Can be equipped with winch for lifting equipment and with aerial basket for lifting people. Available for operation by commands in the tower or by remote control from a distance.

Model	Maximum Capacity (ton.)	Lift Vertical Reach		Lift Horizontal Reach	
		m	ft	m	ft
Commander 4045	12.5	13.9	45.6	10.8	35.5

LT40

The LT Terex® equipment is a robust product for maintenance of energized power distribution systems, there are hundreds of equipment's in operation in various energy utilities.

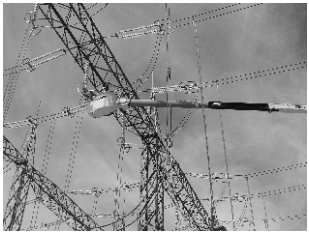
LT line equipment have a bucket capable of lifting 156 kg, articulated booms, telescopic upper arm with hydraulic drive and infinite spinning. Indicated for maintenance work on overhead lines of electricity distribution energized up to 46 kV.

Model	Working Height		Range Side		Articulation of the Boom	
	m	ft	m	ft	Botton	Upper
LT40	13.8	45.3	8.1	26.6	0 to 78°	-14 to 80°

TM

The TM Terex® equipment is an established product in the international market for maintenance of energized transmission systems, there are hundreds of equipment's in operation in various energy utilities.

The TM line of equipment's have a bucket capable of lifting 362 kg, articulated and telescopic boom with fully hydraulic drive, endless spin and equipped with winch for lifting equipment and a jib with hydraulic articulation. Indicated for maintenance work on overhead power lines energized transmission up to 765 kV.



Models	Working Height		Range Side	
	m	ft	m	ft
TM85	26.5	87	14.3	47
TM100	30.5	100	15.5	51
TM125	38.1	125	15.8	52

M

INSULATING CRANE EXTENSION

The Insulating Crane Extension was been specially designed to place the lineman to the energized potential in Substations and Transmission Systems up to 500 kV (IE-500 model), enabling quick and safe maintenance of the system.

COMPOSITION

1. Characteristics and dimensions depend on crane specification. For design purposes, it is necessary to provide complete information about the section of the crane on which the Insulating Crane Extension will be attached.

2. Bottom Insulating Boom
Mechanically attached to the metal sleeve (item 1 above), the Bottom boom has an insulating section with metal band for leakage current reading/monitoring, fitted with a special connection for coaxial cable.

3. Insulating Top Boom
Ritzglas® pultruded profile. Holes enable attachment through axles to the bottom boom and bare-hand chair support.

4. Bare-hand Chair Support
Metallic structure with corona ring for attachment of the Barehand Working Chair.

5. Flexible Cable
30 m long cable is provided with suitable connections for measurement/ monitoring of the leakage current, (special lengths can be provided upon request).

6. Protection Covers
Covers are provided for all insulating parts.

7. Support for storage and transportation
All units are supplied with wooden support for storage and transportation, in order to ensure the integrity of the insulating parts.

8. Bare-hand Chair
Supplied with the Insulating Crane Extensions. FLV12563-1

Items required to perform works with the Crane Insulating Extension

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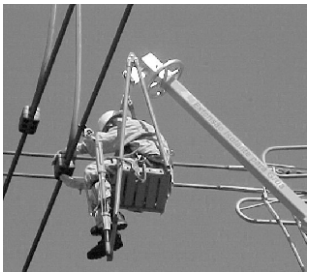
INSULATING CRANE EXTENSIONS



IE-500

Cat. No.	Nominal length of the Insulating Section		Overall length of the Extension		Load Capacity	
	mm	ft	mm	ft	kg	lb
IE-500	4850	16.0	5980	19.5	120	265

Insulating test performed by applying 100 kV on every 300 mm (1 ft) of boom length, according to ASTM F 711 and IEC 60855 standards.

RECOMMENDED ITEMS TO USE WITH THE INSULATING CRANE EXTENSIONS (not included)

A. Micro Ammeter

B. Light Hot Stick

C. 50 mm (0.15 ft) phase clamp Cat. No. RG3368

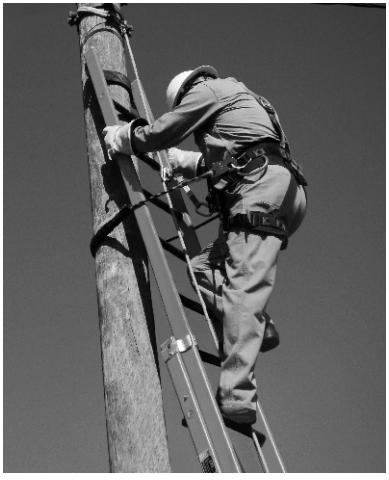
D. Complete Conductive Suit

E. Waterproof Canvas Tarpaulin Cat. No. RT306-0014

M

GROUP N

LADDERS



GROUP N

LADDERS

The stairs of Terex, are extremely strong and durable, can be used indefinitely (since the end user follows the instructions in the manual for best use, maintenance and conservation), portable which enables manual transport.

Stairs on the type and size appropriate to the tasks to be performed and in good condition and conservation, provide carrying out work safely and high productivity.

OBLONG-SHAPE PROFILE

Regular and extension ladders with oblong-shape side-rails and non-slip round rungs made of RITZGLAS® poles and finished with polyurethane painting. Provided with rubber coated nylon supporting band or metallic support, movable or fixed non-slip rubber shoes.

Extension models are provided with nylon reels for smooth sliding of the extension, metallic retaining rings close to the base rungs, steel brackets and plastic coated side-guides.

These ladders are intended for maintenance on de-energized structures or hot stick maintenance on systems up to 15 kV voltage class.

For rubber glove maintenance works up to 15 kV, it is recommended to use our insulating ladder stand-off FLV14717-1 (refer to specific page).

N

ES/PR

REGULAR LADDER

Cat. No.	Work Length		Qty. of Rungs	Approx. Weight	
	m	ft		kg	lb
ES/PR-8/27-CN-SM	2.78	9.10	8	11.00	24.25
ES/PR-8/40-CN-SM	4.03	13.20	12	15.52	34.21
ES/PR-8/46-CN-SM	4.65	15.30	14	17.78	39.20
ES/PR-8/58-CN-SM	5.84	19.15	18	22.30	49.16

Width between siderails: 305 mm (1 ft)
Distance between rungs: 305 mm (1 ft)

EE/PR

EXTENSION LADDER

Cat. No.	Work Lenght				Qty. of Rungs	Approx. Weight	
	Retracted		Extended			kg	lb
	m	ft	m	ft			
EE/PR-12/58-CN-SM	3.45	11.30	5.86	19.20	19	30.00	66.13
EE/PR-12/70-CN-SM	4.05	13.30	7.08	23.20	23	35.50	78.26
EE/PR-12/82-CN-SM	4.64	15.20	8.28	27.20	27	39.00	86.00
EE/PR-15/95-CN-SM	5.25	17.20	9.52	31.20	31	50.00	110.23
EE/PR-15/10-CN-SM	6.28	20.60	10.76	35.30	35	54.00	119.00
EE/PR-15/11-CN-SM	6.88	22.60	11.98	39.30	39	61.00	134.48
EE/PR-15/14-CN-SM *	7.80	25.60	13.84	45.40	45	67.00	147.71

* ladder must be guyed using the eye-rings on top rung of the base section.

Width between siderails: Bottom - 365 mm (1.2 ft)
Top - 305 mm (1 ft)

Distance between rungs: 305 mm (1 ft)

N

“A” SHAPE LADDER

Designed for maintenance on deenergized structures. Consisting of segments hinged together at the upper end, with opening limiter. It has plank at the top end for placement of tools and other objects.
For stairs in "A" heavy category, supplied with Ø 3/8" fiberglass rods with in the center of the stairs, should be added to its cat nº, the suffix" / TR ".

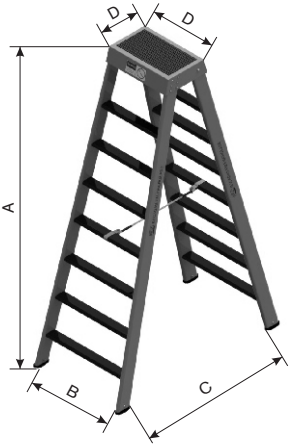
Example: EA/PR-21/PD/TR

Double

Rungs on both sides.

“A” SHAPE LADDER

Cat. No.	Work Lenght (m / ft)				Qty. of Rungs at each side	Approx. Weight	
	A	B	C	D		kg	lb
EA/PR-12/PD	1.22 4.00	0.55 1.80	0.93 3.05	0.42 x 0.25 1.38 x 0.82	03	15.10	32.29
EA/PR-15/PD	1.51 4.95	0.58 1.90	1.16 3.80	0.42 x 0.25 1.38 x 0.82	04	18.60	41.00
EA/PR-21/PD	2.13 7.00	0.62 2.05	1.30 4.30	0.42 x 0.25 1.38 x 0.82	06	25.50	56.22
EA/PR-27/PD	2.73 9.00	0.71 2.30	1.80 5.90	0.42 x 0.25 1.38 x 0.82	08	32.70	72.09
EA/PR-34/PD	3.35 11.00	0.78 2.60	2.12 7.00	0.42 x 0.25 1.38 x 0.82	10	40.30	88.84
EA/PR-40/PD	3.96 13.00	0.85 2.80	2.37 7.80	0.42 x 0.25 1.38 x 0.82	12	48.00	105.82
EA/PR-52/PD	5.17 17.00	0.97 3.20	3.07 10.00	0.42 x 0.25 1.38 x 0.82	16	64.30	141.76



Distância entre degraus: 305 mm

N

N

CROSS REFERENCE CHARTS

Cat. No.	pag.
1500E	15
3000E	15
51.E07.D20-CE	28
51.E07.D30-CE	28
51.E07.D40-CE	28
51.E07.D50-CE	28
750E	15
ATR00137-1	259
ATR00137-2	259
ATR01875-1	238
ATR03308-2	250
ATR03318-1	257
ATR03641-1	258
ATR03653-1	246
ATR03654-1	217
ATR04116-1	257
ATR04514-1	214
ATR04514-2	214
ATR04631-1	222
ATR04694-1	257
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