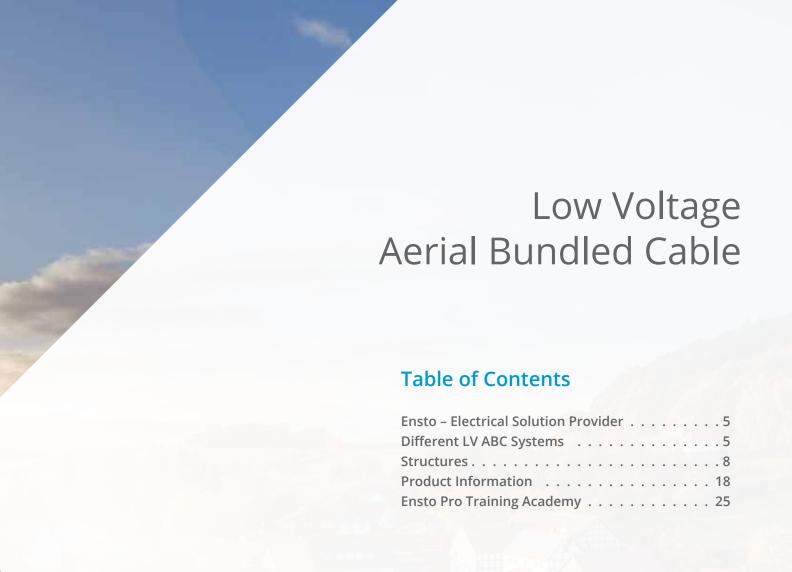
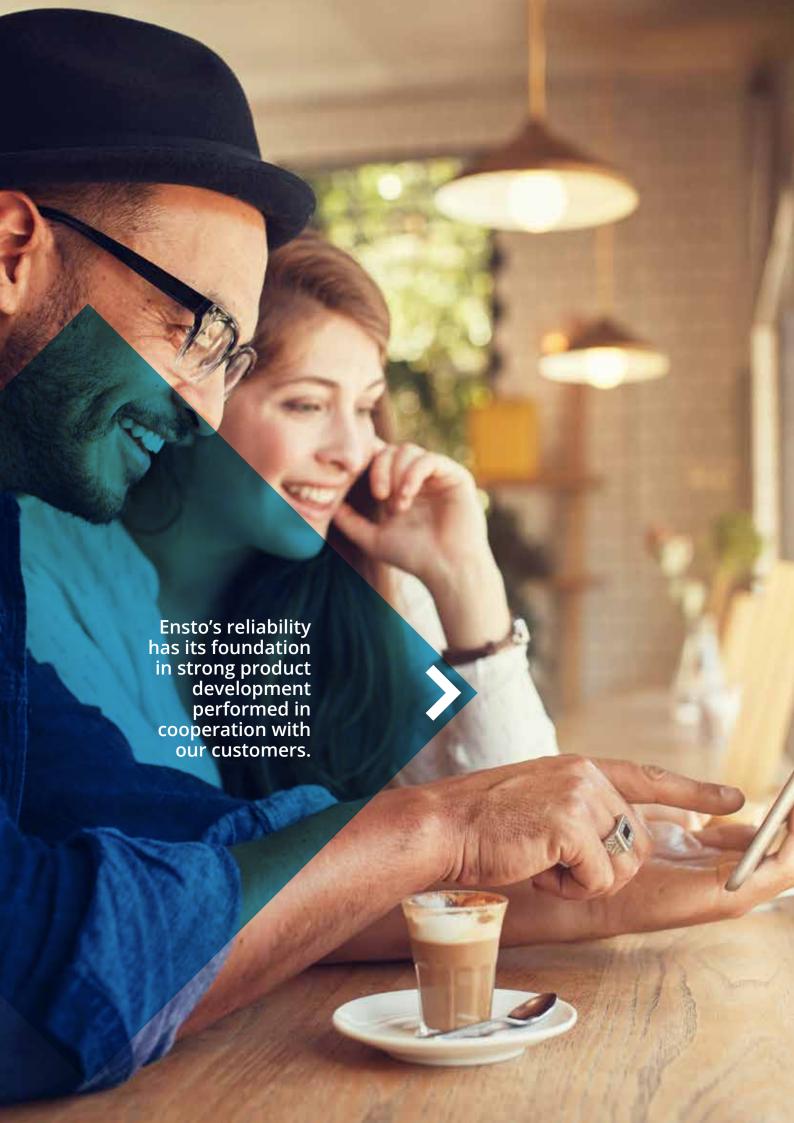
ENSTO











Ensto – Electrical Solution Provider

Ensto is an international family business, which designs and provides smart electrical solutions to improve the safety, functionality, reliability and efficiency of smart grids, buildings and transportation. We want to create Better life. With electricity.

Ensto has committed to provide solutions to achieve excellent network quality. Our products are easy to install and they are tested in accordance with the strictest national and international standards.

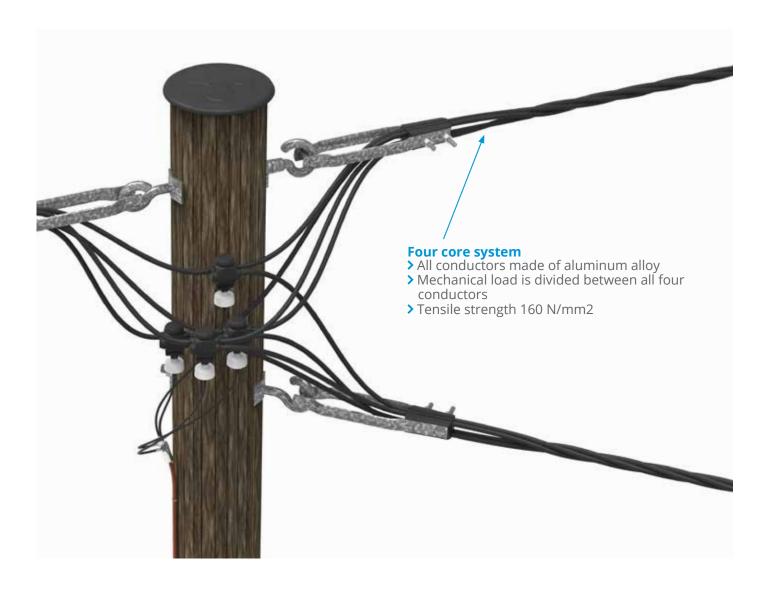
Ensto has thorough experience and knowledge of electricity networks. Our solutions are designed to work even in the most challenging and demanding conditions and environments with high or low temperatures, under strict UV-exposure and stormy surroundings. Our products are developed in close collaboration with our customers. They are designed for a long operation time with little to no need for maintenance. Also the life-cycle impact of the products on environment has been minimized.

Ensto has developed integrated product packages and solutions for low voltage overhead lines. Our high-quality overhead line accessories help in building a distribution network with a life-cycle of 40-50 years.

Different Low Voltage Aerial Bundled Cables (LV ABC) Overhead **Line Systems**

The solutions are designed to meet the international and local standards and take into account the special requirements of the urban, rural and forested areas, density of population, climatic conditions, available investments etc.

Four Core System



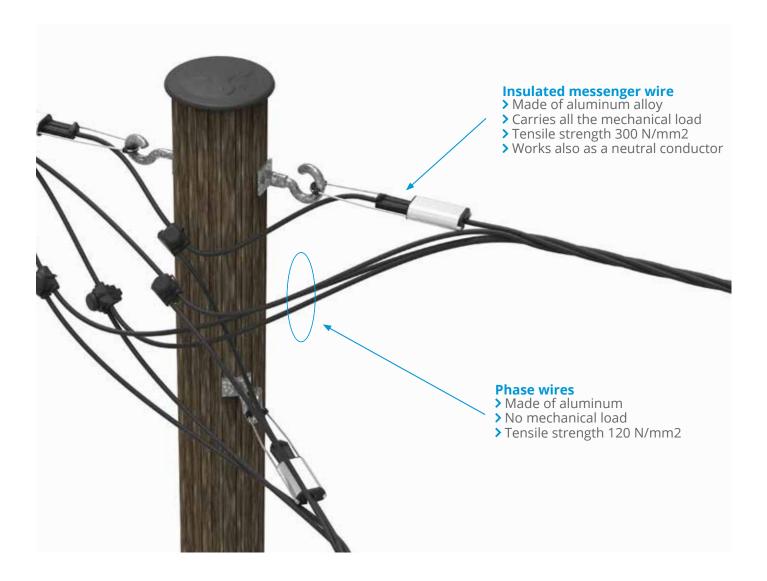
Since the 1970's the Four Core System has been adapted in many Central and North European countries e.g. in Austria, Germany, Ireland, United Kingdom, Poland, Hungary, Russia and Scandinavia.

The four insulated conductors that share the tensile load equally have a size range of 16 to 185 mm². They are made of aluminum with a relatively high tensile strength. Therefore, the breaking load of the cable is relatively high as well.

Insulation of the cores is typically made of XLPE or PE. Additionally, the cable can be supplied with one or two insulated conductors for street lighting.



Insulated Messenger Wire System (IMWS)



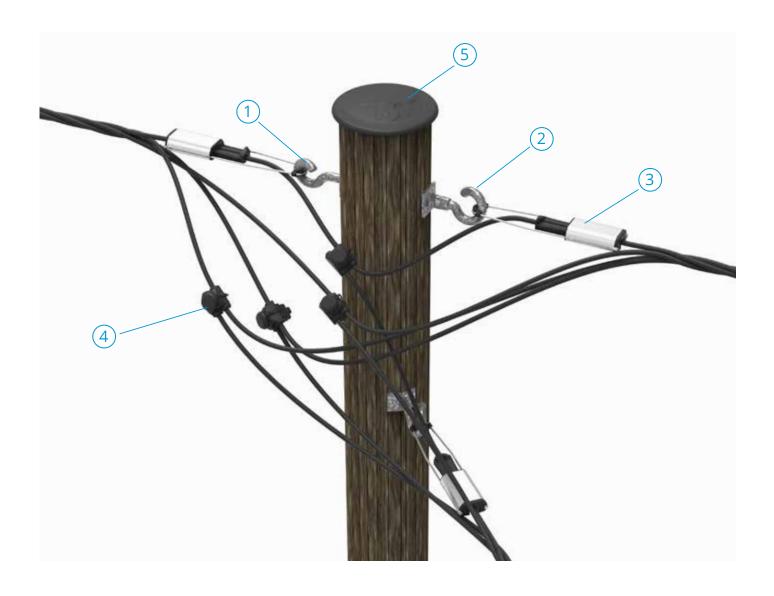
An insulated messenger wire cable consists of one to five black, weather resistant, high density or cross-linked, polyethylene insulated conductors twisted around an insulated aluminium alloy messenger (typical tensile strength 300 N/mm²).

The Ensto portfolio for Insulated Messenger Wire System, Ensto IMWS, includes connectors, tension and suspension clamps, pole fuse switches and various pole support and earthing accessories. Our competitiveness is based on long-term customer relations re-

sulting in safe systems for the most demanding circumstances using durable products. We take care of our customers and offer the best solutions on an individual basis.



IMWS Tightening Structure With branch



		IMWS tightening & branch structure
	Product type	
1	Suspension hook	SOT21.01
2	Nut hook	PD2.2
3	Tension clamp	SO250.01
4	Connector	SLIP22.1
5	Pole hat	SP19

IMWS Suspension Structure

With lamp post

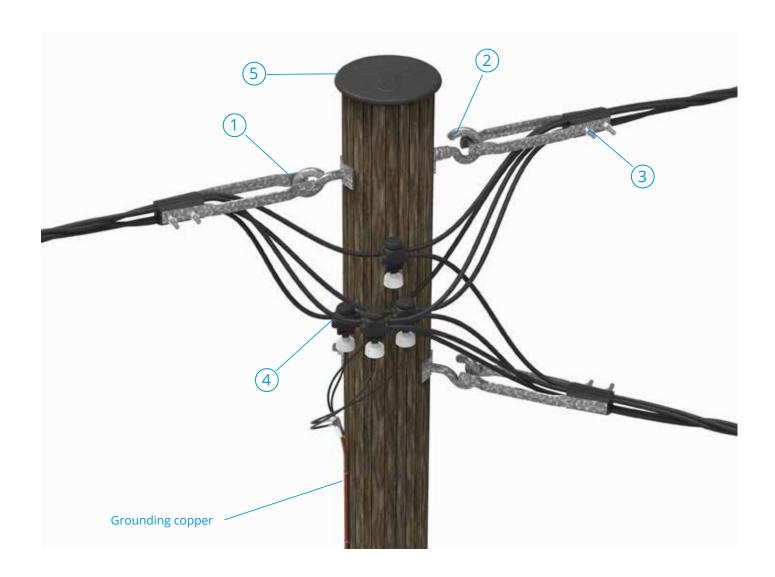


Ensto has a whole range of SLIW50 series insulation piercing connectors for different conductor sizes.

		IMWS suspension structure
	Product type	
1	Suspension clamp	SO260
2	Stud bolt	SOT4.8
3	Connector	SLIW52
4	Pole hat	SP19

Four Core Tightening Structure

With branch and surge arresters



Surge arresters must always be connected to ground.

		Four Core tightening & branch structure
	Product type	
1	Suspension hook	SOT21.01
2	Nut hook	PD2.2
3	Tension clamp	SO276S
4	Surge arrester	SE46.275-15
5	Pole hat	SP19

Four Core Suspension Structure

Suspension structure with lamp post

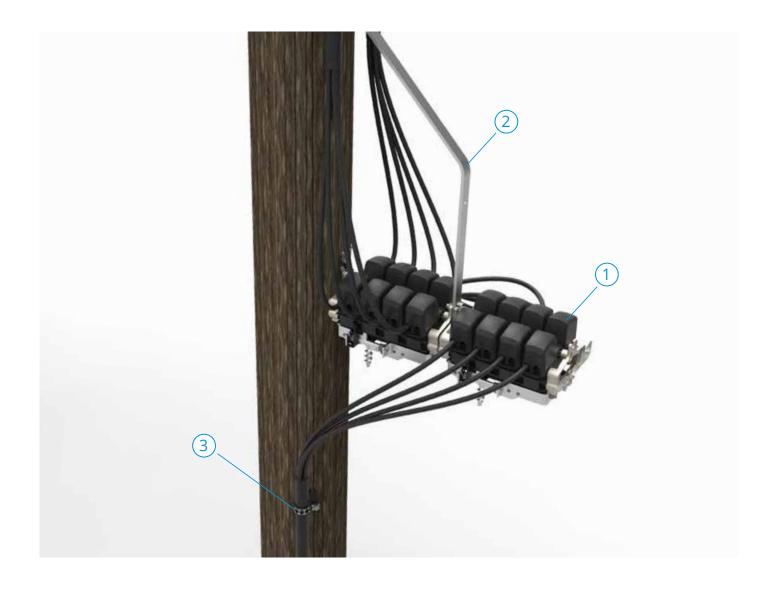


Ensto has a whole range of SLIW50 series insulation piercing connectors for different conductor sizes.

		Four core suspension structure
	Product type	
1	Suspension hook	SOT21.01
2	Suspension clamp	SO130
3	Connector	SLIW52
4	Pole hat	SP19

Pole Fuse Switch Disconnector Structure

Parallel double switch structure

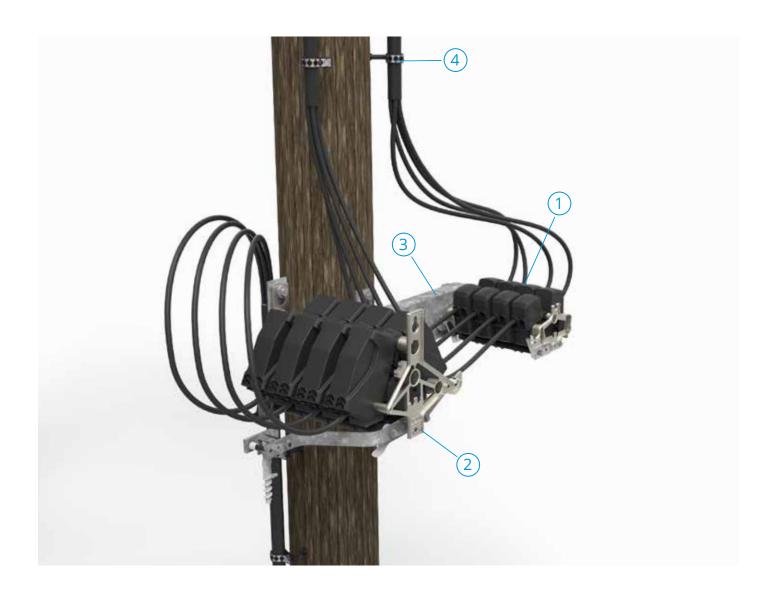


Pole fuse switch disconnectors can be installed in parallel to ease the making of connections and keep the structure compact.

		Pole fuse switch structure
	Product type	
1	Pole fuse switch	SZ160.4
2	Bracket	PEK42
3	Distance nail	SO71

Pole fuse switch disconnector structure

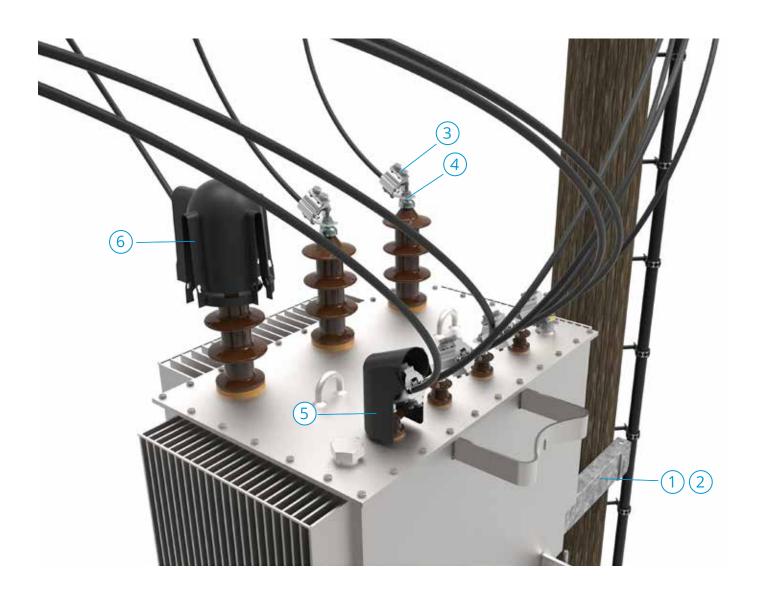
Separated double switch structure



Bracket enables 5x160 A or 2x160 A and 2x400 A switch installation

		Pole fuse switch structure
	Product type	
1	Pole fuse switch, 160 A	SZ160.4
2	Pole fuse switch, 400 A	SZ400.4
3	Bracket	PEK43
4	Distance nail	SO71

Transformer structure

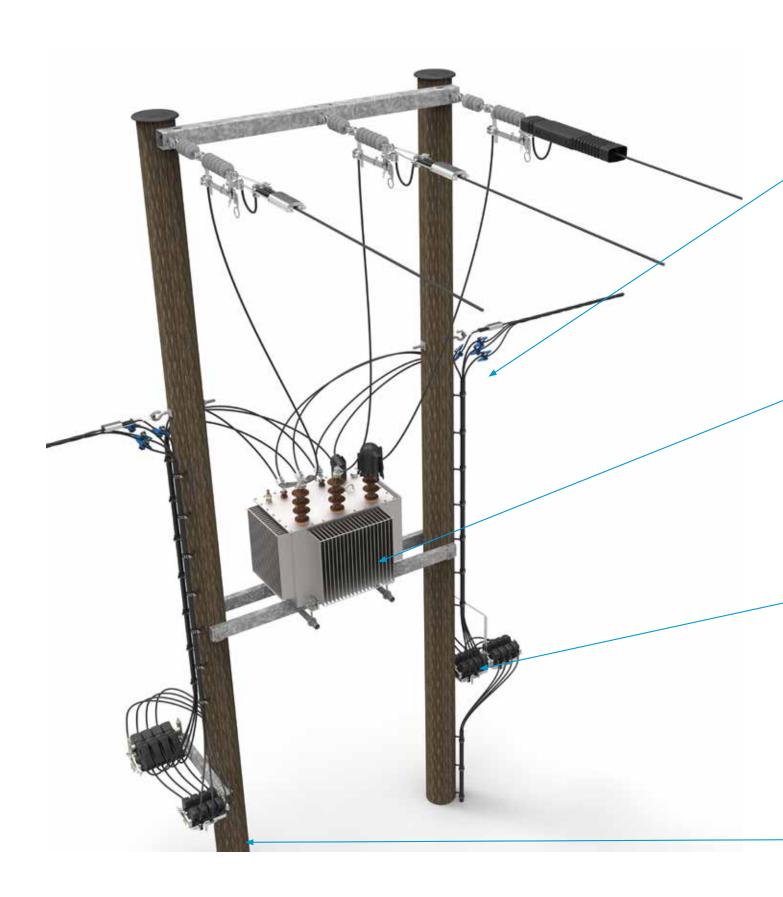


The structure is missing overvoltage protection devices. Ensto offers a wide variety of different protection devices.

		Transformer structure
	Product type	
1	Transformer mounting rack	SH75
2	Transformer fastening set	SH77
3	Busbar connector	KG43
4	Tinned copper bar	PSS10
5	Bird protection	SP38.3
6	Bird protection	SP36.3
-	Surge arrester set	SDI3143.2



Transformer structure





Connections are easy to make with Ensto SLIW50 -series insulation piercing connectors. The connection is watertight, aluminum shear head nut ensures always correct tightening torque and it is quick and easy to tighten with an impact driver.

SLIW50 connectors can be installed on to a live line and isolated structure does not leave parts exposed that have an electrical potential. With SLIW59 it is even possible to connect a sector cable on to a round conductor.



Ensto offers a wide variety of accessories for both low and medium voltage networks. See our website www.ensto.com and contact your Ensto representative to find out more!



Pole fuse switch disconnectors are used for protecting overhead cables and underground cables in low voltage networks. Pole fuse switches include separate terminal covers for in-coming and out-going conductors, thus making installation safer.

The fuse switch family can be operated from the ground by using an operating stick that makes the installation easier and safer.



Pole fuse switch disconnector family has now additions for 400A. Ensto's wide variety of brackets allows the pole fuse switch disconnectors to be installed in various ways on to the pole.

Low Voltage Aerial Bundled Cable Solutions

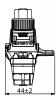
Connectors/ Insulation Piercing Connectors

Insulation piercing connector SLIW50

SLIW50 is for use with insulated aluminium or copper conductors. Fully insulated bolt provides safe live line working. Both main and branch conductor insulations are pierced by single bolt action. Test voltage 6 kV/50 Hz/1 min in water. Connector's design enables hot line installation without peeling insulation from conductor.

Product code	GTIN		Branch conductor mm²	Conductor diameter mm	Weight (kg)	Pack. /pcs
SLIW50	6438100303921	10-50	1.5-10	6.1-12.5/3-7	0.05	120





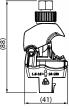


Insulation piercing connector SLIW52

SLIW52 is for use with insulated aluminium or copper conductors. Fully insulated bolt provides safe live line working. Both main and branch conductor insulations are pierced by single bolt action. Test voltage 6 kV/50 Hz/1 min in water. Connector's design enables live line installation without peeling insulation from conductor.

Product code	GTIN	Main conductor mm²	Branch conductor mm²	Conductor diameter mm		Pack. /pcs
SLIW52	6438100312114	16-150	1.5-16	7-18.6/3-7.8	0.062	60



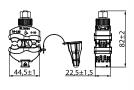




Insulation piercing connector SLIW54

SLIW54 is for use with insulated aluminium or copper conductors. Fully insulated bolt provides safe live line working. Both main and branch conductor insulations are pierced by single bolt action. Test voltage 6 kV/50 Hz/1 min in water. Connector's design enables hot line installation without peeling insulation from conductor.

Product code	GTIN		Branch conductor		Weight	
code		mm²	mm²	diameter mm	(Kg)	/pcs
SLIW54	6438100303785	16-120	6-50	7-17.6/4-12.1	0.085	60

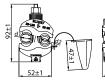




Insulation piercing connector SLIW57

SLIW57 is for use with insulated aluminium or copper conductors. Fully insulated bolt provides safe live line working. Both main and branch conductor insulations are pierced by single bolt action. Test voltage 4 kV/50 Hz/1 min in water. Connector's design enables hot line installation without peeling insulation from conductor.

Product code	GTIN	Main conductor mm²	Branch conductor mm²		Weight (kg)	Pack. /pcs
SLIW57	6438100303686	25-150	75-95	8.4-18.5/ 8.4-15.2	0.113	60







Insulation piercing connector SLIW58

SLIW58 is for use with insulated aluminium or copper conductors. Fully insulated bolt provides safe live line working. Both main and branch conductor insulations are pierced by single bolt action. Test voltage 6 kV/50 Hz/1 min in water. Connector's design enables live line installation without peeling insulation from conductor.

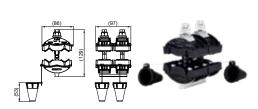
Product code	GTIN	Main conductor mm²	Branch conductor mm²	Conductor diameter mm	Weight (kg)	Pack. /pcs
SLIW58	6438100307387	50-150	50-150	12.5-18.5	0.139kg	60



Insulation piercing connector SLIW59

SLIW59 is for use with insulated aluminium or copper conductors. LV ABC 70-150mm² to Sector cable 70-240 mm² connections. Fully insulated bolt provides safe live line working. Test voltage 6 kV/50 Hz/1 min in water. Connector's design enables live line installation without peeling insulation from conductor.

Product code	GTIN	Main conductor mm²	Branch conductor mm²		Weight (kg)	Pack. /pcs
SLIW59	6438100314637	70-150	70-240	9.3-22.8	0.51	12



Low Voltage Aerial Bundled Cable Solutions

Connector insulated/bare cond. SLIW63

SLIW63 is for all connections of uninsulated aluminium and copper main and insulated branch conductors up to 1000 V AC. Equipped with shear head screw.

Product code	GTIN	For conductor mm ²	Conductor diameter mm	Tightening torque Nm	Weight (kg)	Pack. /pcs
SLIW63	6438100317812	2.5 - 25	4.0-14/3.0-10	10.5±1.5	0.11	60



Connector insulated/bare cond. SLIW64

SLIW64 is for all connections of uninsulated aluminium and copper main and insulated branch conductors up to 1000 V AC. Equipped with shear head screw.

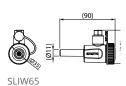
Product code	GTIN	For conductor mm ²	Conductor diameter mm	Tightening torque Nm	Weight (kg)	Pack. /pcs
SLIW64	6438100317799	16-95	4.0-14/ 4.0-16.1	13.5±1	0.12	60



Reusable connectors SLIW65S

Reusable connectors are specially designed for use with universal piercing connectors e.g. SLIW57 up to 1 kV. They allow service line disconnection without removing a main connector. SLIW65S can be used with aluminium or copper conductors

Product code	GTIN	For conductor mm ²	Conductor diameter mm	Tightening torque Nm	Weight (kg)	Pack. /pcs
SLIW65S	6438100312701	1x2.5-35	3.5-11	11±1	0,052	60





Insulation piercing connectors SLIW66 and SLIW67

Multitap connectors is specially designed for use with universal piercing connectors e.g. SLIW57, SLIW58, SL11.118, SLIP22.1, SLIP22.127 and SLIP32.2 up to 1000 V a.c. to facilitate several out-going conductors. Each branch conductor can be connected with a separate screw.

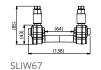
Product GTIN		Branch Conductor conductor mm² diameter mm		Tightening torque Nm	Weight (kg)	Pack. /pcs	
SLIW66	6438100317973	2 x 6-35	4.5-11	10±1	0.1	40	
SLIW67	6438100317980	4 x 6-35	4.5-11	10±1	0.2	20	







SLIW66



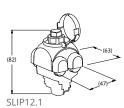




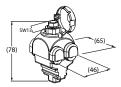
Insulation piercing connector SLIP12.1

The SLIP12.1 is used for all connections of insulated aluminium and copper main and branch conductors up to 1000Vac. The design enables hot line installation. Equipped with shear head screw.

Product code	GTIN	For conductor Conductor Tighte mm² diameter mm torque		Tightening torque Nm	Weight (kg)	Pack. /pcs
SLIP12.1	6418677429033	1.5-50	3 16	23.5±2.5	0.11	50
SLIP22.1	6418677403842	Al 10-95 / Cu 1.5-70	3 16	18.5±1.5	0.12	50
SLIP32.2	6418677442001	Al 16-120 / Cu 16-95	7 19	18.25±1.25	0.15	50









SLIP22.1

SLIP32.2

Low Voltage Aerial Bundled Cable Solutions

Tension Clamps

Tension clamp SO274S

Tension clamp for the termination of 4 core overhead cables. The tension clamp is equipped with shearhead nuts.

Product code	GTIN	Conductor size mm²	Conductor diameter mm	Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO274S	6418677446696	4x(25-50)	7–10.2	47	4x25mm² 13 kN 4x35mm² 17.8 kN 4x50mm² 25 kN	1	10



Tension clamp SO275S

Tension clamp for the termination of 4 core overhead cables. The tension clamp is equipped with shear head nuts.

Product code	GTIN	Conductor size mm²	Conductor diameter mm	Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO275S	6418677446719	4x(50-70)	11.6-13.2	47	4x50 mm ² 25 kN 4x70 mm ² 36 kN	1.22	10



Tension clamp SO276S

Tension clamp for the termination of 4 core overhead cables. The tension clamp is equipped with shear head nuts.

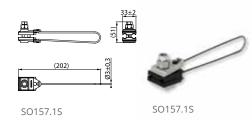
Product code	GTIN	Conductor size mm²	Conductor diameter mm	Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO276S	6438100312008	4x(70-120)	12.7-17.6	47	50 kN	2.355	10



Tension clamps SO157.1S and SO158.1S

SO157.1S is used for the anchoring of a 2-core overhead cable to poles or walls by means of standard hooks. The tension clamp is equipped with shearhead nut. SO158.1S is used for the tensioning of a 4-core overhead cable to poles or walls by means of standard hooks. The tension clamp is equipped with shearhead nut.

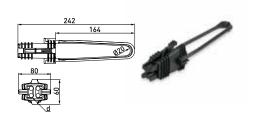
Product code	GTIN	Conductor size mm²	Conductor diameter mm	Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO157.1S	6438100304652	2x(16-35)	7-10.2	22 Nm	6 kN (2x16 mm ² 2,5 kN, 2x35 mm ² 5.6 kN)	0.087 kg	50
SO158.1S	6438100304669	4x(16-35)	7-10.2	22 Nm	8,5 kN (4x16 mm ² 5.0 kN, 4x35 mm ² 8.5 kN)		50



Tension clamp SO243

The SO243 is a tension clamp for four core service connections - made from weather durable and mechanically reliable polymeric plastic. The light weight design of SO243 provides extremely easy and quick anchoring of LV overhead cables - either to poles or walls by means of standard hooks. No tools are required during the installation.

Product code	GTIN	Conductor size mm²	Conductor diameter mm	SMFL kN	Weight (kg)	Pack. /pcs
SO243	6418677437977	2-4x(6-25)	5.3-9.1	2	0.07	50



Insulated Messenger Wire system

Tension clamps SO250

SO250- series consists of clamps for different messenger cross sections suitable for various climatic conditions. The clamps are easy to install without tools and available for both bracket and hook installation to wooden, concrete or steel poles. Clamps are supplied with or without the bracket.

Product code	GTIN	Bracket	Messenger mm²	Messenger dia. mm	SMFL kN	Weight (kg)	Pack. /pcs
SO250.01	6418677418617	without bracket	50-70	11-14	15	0.47	25
SO251.01	6418677418709	without bracket	95	15-15.5	15	0.47	25
SO252.01	6418677418723	without bracket	25-35	8.5-11	12	0.47	25



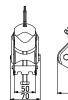
Low Voltage Aerial Bundled Cable Solutions

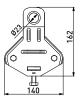
Suspension Clamps

Suspension clamp SO99

Used for the installation and suspension of cables from poles in straight lines and at angles of up to 90° with 4x25 mm² and 4x50 mm² cables or up to 60° with 4x95 mm² cables.

Product code	GTIN	Conductor size mm²		Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO99	6418677405181	4x(25-95)	18-39	12	18	0.825	10



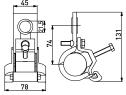


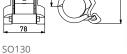


Suspension clamps SO130

SO130 is used for the installation and suspension of LV ABC cables to poles with standard hook attachment. For straight lines and angles up to 30° 4x(25-120 mm²) and 60° 4x(25-50 mm²). Thanks to the integrated construction, no extra parts are needed for the installation. The body is made of corrosion proof aluminium and the inserts of weather resistant plastic.

Product code	GTIN	Conductor size mm ²		Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO130	6418677404306	2-4x(16-120)	12-42	10	18	0.294	25







Suspension clamp SO270

For the installation and suspension of 4- core ABC cables from poles with standard hook attachment. For straight lines and depending on cross section angels up to 15/30 degrees. Structure itself provide installation without any tools. Clamp including composite parts is protected form wearing in hook attachment point.

U	1 1		0		'		
Product code	GTIN	Conductor size mm²	Conductor diameter mm	Tightening torque Nm	SMFL kN	Weight (kg)	Pack. /pcs
SO270	6418677441875	2x(25-35), 4x(16-120)	12-42	5	7	0.150	25





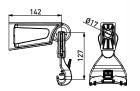


Insulated Messenger Wire system

Suspension clamp SO260

For suspensioning of LV ABC cables in an insulated messenger wire system (IMWS). Suitable for every climatic conditions. Bracket pre installed.

Product code	GTIN	Bracket	Messenger mm²	Messenger dia. mm		Weight (kg)	Pack. /pcs
SO260	6418677418914	with bracket	25-95	8.5-15.5	12	0.37	20

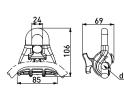




Suspension clamp SO69.95

The suspension clamp is used for the suspension of the insulated messenger in straight lines and at angles up to 90°. Breaking load is 22 kN.

Product code	GTIN	Messenger mm	Tightening torque Nm	Weight (kg)	Pack. /pcs
SO69.95	6418677414572	7-16.5	By hand	0.244	50





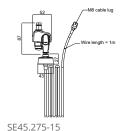
Low Voltage Aerial Bundled Cable Solutions

Surge Arresters with Insulation Piercing Connectors SE45 and SE46

Surge arresters with insulation piercing connectors SE45

SE45 serie includes a new piercing connector specially designed for surge arrester. This connector is used when installing the surge arrester on insulated LV overhead lines. It can be installed on insulated Al/Cu conductors with cross section range 10-150 mm². Continuous operating voltage 280V.

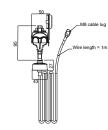
Product code	GTIN	Surge arrester	Disconnector	Weight (kg)	Pack. /pcs
SE45.275-15	6438100326715	SGA275-15	+	0.22	15



Surge arresters with insulation piercing connectors SE46

The design of SE46 serie enables installation on insulated conductor and branch connection, the same connector is used for both. Connector can be installed on insulated Al conductors with cross section range 10 - 95 mm² and Cu conductors with cross section range 1.5 - 70 mm² and branch connection with the same range of conductors.

Product code	GTIN	Surge arrester	Disconnector	Weight (kg)	Pack. /pcs
SE46.275-15	6438100326685	SGA275-15	+	0.26	20



SF46.275-15

Pole fuse switch disconnectors 160 A 415 V

Pole fuse switch disconnector SZ160.1

Pole fuse switches include separate terminal covers for in-coming and out-going conductors, thus making installation safer.

Product code	GTIN	Number of poles	Conductor size mm ²	Connectors included		Pack. /pcs
SZ160.1	6438100318307	1	Al (16x120)	2xKG45	1.8	1







Pole fuse switch disconnector SZ160.3 and SZ160.32

Pole fuse switches include separate terminal covers for in-coming and out-going conductors, thus making installation safer.

	,					
Product code	GTIN	Number of poles	Conductor size mm²	Connectors included	Weight (kg)	Pack. /pcs
SZ160.3	6438100318314	3	Al 2x(16-120)/ Cu 2x(16-120)	6xKG45.5	3.17	1
SZ160.32	6438100318321	3+PEN	Al 2x(16-120)/ Cu 2x(16-120)	7xKG45.5	3.9	1



SZ160.3





Pole fuse switch disconnector SZ160.4

Pole fuse switches include separate terminal covers for in-coming and out-going conductors, thus making installation safer.

Product code	GTIN	Number of poles	Conductor size mm²	Connectors included	Weight (kg)	Pack. /pcs
SZ160.4	6438100318338	4	Al 2x(16-120)/ Cu 2x(16-120)	8xKG41	4.8	1
SZ160.41	6438100318345	3+PEN	Al 2x(16-120)/ Cu 2x(16-120)	8xKG45.5	4.8	1







SZ160.4

Low Voltage Aerial Bundled Cable Solutions

Pole fuse switch disconnectors 400 A 500 V

Pole fuse switch disconnector SZ400.3

For protecting stranded overhead cables and underground cables in LV-networks. Fuse-switch can be operated from the ground level by using operating rods.

Product code	GTIN	Number of poles	Conductor size mm²	Connectors included	Weight (kg)	Pack. /pcs
SZ400.3	6438100328689	3	Al 2x(50-240)/ Cu2x(50-240)	6xKG43	9.9	1
SZ400.322	6438100328726	3	Al 2x(50-240)/ Cu2x(50-240)	3xKG43	9.1	
SZ400.33	6438100328719	3	Al 2x(50-240)/ Cu2x(50-240)	3xKG43	9,1	1







Pole fuse switch disconnector SZ400.4

For protecting stranded overhead cables and underground cables in LV-networks. Fuse-switch can be operated from the ground level by using operating rods. The fourth pole is there for extra phase conductor. It is opened and closed together with the other phase-poles. Connectors included 8 x KG43, poles 4

Product code	GTIN	Number of poles	Conductor size mm²	Connectors included	Weight (kg)	Pack. /pcs
SZ400.4	6438100328696	4	Al 2x(50-240)/ Cu2x(50-240)	8xKG43	12.5	1
SZ400.41	6438100328702	3+PEN	Al 2x(50-240)/ Cu2x(50-240)	8xKG43	12.8	1



SZ400.4



Temporary earthing bail set ST208.57

ST208.57 is used to prepare a point for temporary earthing in an ABC cable. Comes with an insulation piercing connector SLIW57.

P	roduct code	GTIN	Conductor size mm²	Weight (kg)	Pack. /pcs
S	T208.57	6438100309916	Al/Cu 25-150 mm ² / 25-95 mm ²	0.17	20











Ensto Pro Training Academy

Assuring know-how and reliable installations



Ensto Pro is our technical training concept targeted to customers, partners and own personnel. The aim is to support sales and create loyal customer relations by sharing knowledge.



Our Knowledge at Your Disposal

Customer training sessions are a vital part of our operations. We offer more than products: a complete package with reliable solutions, professional service, and customized support. They allow us to create profitable, long-term relationship of true collaboration.

Ensto has offered technical training to customers for decades. We want to share with you our 60-year experience in electricity network building and making the most of our products in varied, demanding circumstances. At the same time, we wish to learn from your experiences and truly understand your requirements, thereby becoming able to develop our products to best meet those precise needs.

Unique and Customized Training

Training helps to create true connection between us and you, the customer. We get realtime information on what you want, while you can learn about, for instance, products, installation methods, and distribution network design.

Our Ensto Pro service is unique:

- > We give local service in the local language.
- > We customize all Ensto Pro trainings.
- > We are easy-going professionals.
- We enforce our credibility with a consistent and appealing appearance and presentation.
- > We emphasize two-way learning.
- > We keep our promises.

Variety of Training Types

Our customer training ranges from small installation sessions to large lecture-type events. Also, we are ready to teach about a host of topics as customer needs and wishes dictate.

Often, we arrange, or are involved in, sessions attended by professionals from various institutions, such as cable manufacturers and energy-market authorities. By offering all the necessary information in one session, we save time and energy. We care about your success

Memo



ENSTO

Ensto Finland Oy Ensio Miettisen katu 2, P.O. Box 77 FIN-06101 Porvoo, Finland utility.networks@ensto.com

ensto.com



