Enerswit+

Gas-insulated Ring Main Unit

40.5kV, 630A, ...31.5kA

User Manual

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Contents

Please read this manual carefully before installing and using the switchgear

Safety first

■Only install the switchgear indoor to make it suitable for electrical equipment to work
■Ensure that installation, operation and maintenance are carried out by full-time electrical personnel
■Ensure the applicability and safety of connection conditions and working procedures of on-site electrical equipment
■Operate the switchgear in strictly accordance with this manual
■Pay special attention to the precautions marked with danger signs in this manual

Caution

■The normal running load of switchgear shall not exceed the values specified in this manual
■This manual shall be placed so that all personnel involved in installation, operation and maintenance can easily access it
■The full-time staff of user shall be responsible for all matters affecting work safety and correctly manage the switchgear
■If you have any questions about this manual, we will be pleased to provide further information

Note

■The Company reserves the right to change the data and diagrams without prior notice. We will provide the latest version on request if necessary.
■We assume no liability for any information obtained from other sources

1. Overview

XGN102 (Enerswit+) -40.5kV fixed type AC metal-enclosed SF_6 insulated switchgear (hereinafter referred to as: Enerswit+) is the latest version of switchgear developed by Leistung Energie. This series of products introduce international advanced design concepts and production equipment. By taking advanced processing technology, Enerswit+ has the characteristics of small size, user-friendly, excellent performance, safe and reliable, etc.

Enerswit+ is a three-phase AC 50Hz, rated voltage 40.5kV power system indoor and outdoor switchgear, it conforms to the regulations of IEC 62271-100, IEC 62271-102, IEC 62271-103, IEC 62271-200 and other standards. Under normal conditions, Enerswit+ can ensure its safe, reliable operation in the power grid with corresponding voltage level as long as it is within the range of technical parameters of gas-insulated switchgear.

1.1 Product model, name and definition

Model	Rated voltage (kV)	Rated short-time withstand current (kA)	Rated Current (A)	Function module	Description
Extendable Enerswit+ -E	40.5	-	630	R	Cable/bus-riser function module
		25/31.5		D	Vacuum circuit breaker function module
		20		C	Load break switch function module

1.2 Main purpose and application scope of products

Enerswit+, mainly used in the secondary power distribution system in the distribution network, is a kind of electrical equipment that can improve the power supply reliability of the public power grid system. Enerswit+ is widely applied to medium/low voltage distribution switching stations, box-type substation, wind generator tower, industrial power distribution, and outdoor kiosks

1.3 Environmental conditions for use

1.3.1 Normal environmental conditions for normal operation

- Ambient air temperature: upper limit of +40℃ and lower limit of -25℃;
- Humidity: Daily average relative humidity not exceeding 95%, and saturated water vapor pressure not exceeding 2.2kPa; Monthly average relative humidity not exceeding 90%, and saturated water vapor pressure not exceeding 1.8kPa;
- Altitude: Highest altitude for installation of the equipment is 1000m;
- Ambient air environment shall be free from such obvious pollution as corrosion, flammable gases, and water vapor;
- No serious contamination and frequent violent vibration;

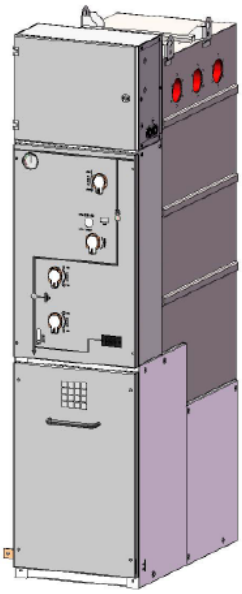
1.3.2 Special conditions of use

For special environmental conditions, the users need to obtain the approval of the manufacturer. The manufacturer must take into account each particular operating condition in advance, take measures and make recommendations to meet the requirements of the buyer.

2. Structure

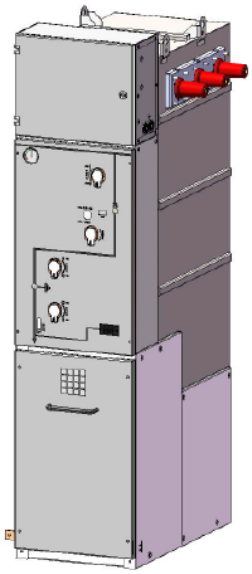
Enerswit+ -E-D series

(single gas tank, external cone bushing)



Enerswit + -E-D series

(single gas tank, internal cone bushing)



3. Technical data

3.1 Technical data

Enerswit+ technical parameter		
Name	Unit	Data
Rated voltage	kV	40.5
Rated busbar current	A	630
Rated power frequency withstand voltage (Phase-earth, phase-phase) 1min	kV	95
Rated power frequency withstand voltage (Across isolation)		118
Rated lightning impulse withstand voltage (Phase-earth, phase-phase)		185
Rated lightning impulse withstand voltage (Across isolation)		215
Power frequency withstand voltage of auxiliary circuit and control circuit		2

Vacuum circuit breaker parameter (unit D)		
Name	Unit	Data
Rated current	A	630
Rated cable charging breaking current		50
Rated line charging breaking current		10
Rated three-phase capacitor bank (single) breaking current (C2)		630
Rated three-phase capacitor bank (back-to-back) breaking current (C2)		400
Rated short-circuit current DC component	-	54%
Rated short-circuit breaking current	kA	25/31.5
Rated short-time withstand current (4s)		25/31.5
Rated peak withstand current		63/80
Rated short-circuit closing current		63/80
Rated short-line fault (SLF) breaking current		18.8
Rated wrong-phrase short-circuit breaking current		21.8
Closing and breaking grade	-	E2 (30 times)
Load break switch (unit C)		
Rated current	A	630
Rated short-time withstand current	kA	20(4s)
Rated peak withstand current		50
Rated short-circuit closing current		50
Rated closed breaking current	A	630
Rated active load breaking current		630
Rated cable charging breaking current		21
Rated line charging breaking current		2.1
Rated ground fault breaking current		63
Cable charging breaking current under rated ground fault condition		36
Closing and breaking grade	-	E2 (30 times)

Three-position disconnecting switch			
Name		Unit	Data
Rated current		A	630
Rated short-circuit closing current (peak)		kA	63
Grounding switch closing grade		-	E1 (2 times)
Grounding switch			
Rated current		A	630
Rated short-circuit closing current (peak)		kA	50/63
Closing grade		-	E1 (2 times)
Other technical parameters			
Mechanical life	Circuit Breaker	Times	10000
	Three-position disconnecting switch		5000
	Load break switch		5000
	Grounding switch		3000
Rated closing operating voltage		V	DC: 220 / 110 / 48 / 24
Rated opening operating voltage			
Annual leakage rate		%/year	≤0.01
Rated injecting gas pressure (gauge pressure when 20℃)		Mpa	0.03
Minimal function injecting gas pressure (gauge pressure when 20℃)			0.02
Pressure release unit to release pressure (gauge pressure when 20℃)			0.16
Degree of protection		-	Injecting gas compartment IP68 others IP4X

Caution:

* Relative pressure is 0.03Mpa, namely 0.3bar; absolute pressure is 0.13Mpa, namely 1.3bar

3.2 Mechanical characteristics parameters

3.2.1 Mechanical characteristics parameters of vacuum circuit breaker

Table 3-2 Mechanical characteristics parameters of vacuum circuit breaker

Name	Unit	Data
Opening travel between contacts	mm	18±2
Super stroke		4±1
Center distance between phases		170±1
Allowable wear thickness of contacts		3
Average closing speed	m/s	0.8～1.4
Average opening speed		1.2～2.0
Closing time	ms	≤60
Opening time		18～45
Three-phase contact closing and opening simultaneity		≤2
Bounce time of closing of contacts		≤3
Note: The average closing (opening) speed refers to the average speed within the contact stroke 13mm before (after) the closing (opening) of dynamic and static contacts.		

3.2.2 Mechanical characteristics parameters of load break switch

Table 3-3 Mechanical characteristics parameters of load break switch

Name	Unit	Data
Opening travel between contacts	mm	100±5
Stroke		135±5
Super stroke		32±5
Center distance between phases		170±1
Average closing speed	m/s	6±1
Average opening speed		4.5±1
Closing time	s	≤3
Opening time	-	≤3
Three-phase contact closing and opening simultaneity	ms	≤3
Maximum rated operating force of manual operation	N	≤300
Note: The average closing (opening) speed refers to the average speed within the contact stroke 10ms before (after) the closing (opening) of dynamic and static contacts.		

3.2.3 Three-position disconnecting switch mechanical properties

Table 3-4 Three-position disconnecting switch mechanical properties		
Name	Unit	Data
Center distance between phases	mm	170±1
Disconnecting opening time (rated voltage)	s	≤10
Disconnecting closing time (rated voltage)		≤10
Three-pole closing simultaneity	mm	≤3
Maximum rated operating force of manual operation	N	≤250

3.2.3 Three-position disconnecting switch mechanical properties

Table 3-5 Mechanical characteristics parameters of grounding switch		
Name	Unit	Data
Opening travel between contacts	mm	≥100
Center distance between phases		170±1
Three-pole closing simultaneity		≤3
Average closing speed	m/s	4±1
Maximum rated operating force of manual operation	N	≤250
Note: The average closing speed refers to the average speed within the contact stroke 30 mm after immediate closing the dynamic and static contacts.		

3.3 Technical data of shunt release and operation motor

(1) Technical data of shunt release is shown in Table 3-6

Table 3-6		
Equipment name and code	Rated voltage	Remark
Shunt release	DC 220V / 110V / 48V/ 24V	Optional

(2) Technical data of electric actuator is shown in Table 3-7

Table 3-7		
Item	Unit	Data
Rated voltage	V	DC: 220 / 110 / 48 / 24
Motor power	W	40
Energy storage time	S	≤10

4. Working principles

Enerswit+ structure is composed of 5 main components: gas tank, vacuum circuit breaker or load break switch, three-position disconnecting switch or grounding switch, operating mechanism, and mounting bracket. The reliability of each component ensures excellent performance of Enerswit+.

4.1 Stainless steel gas tank

Enerswit+ gas tank is made of stainless steel plates welded by the robot through automatic welding. It encloses all high-voltage primary electrified components inside the high-strength stainless steel gas tank filled with SF_6 gas. The gas tank contains such components as vacuum circuit breaker or load break switch, three-position disconnecting switch or grounding switch, busbar, and branch busbar. This design achieves a more compact over all size of the device and directly grounds the external housing of the stainless steel gas tank, ensuring the safety and reliability of operation. The advanced robotic laser welding process guarantees the air-tightness of the gas tank, and its annual leak rate≤0.01% per year achieves the maintenance-free for the whole switchgear for 30 years. Moreover, a reliable pressure relief valve is equipped inside the gas tank. When arc fault produces large amounts of gas inside the gas tank, the fast action of the device will quickly release the fault gases, thereby ensuring the safety of personnel and equipment.

4.2 Vacuum circuit breaker unit

4.2.1 Vacuum circuit breaker

The vacuum circuit breaker adopted by Enerswit+ is respectively fixed in the insulating skeleton through the three-phase vacuum interrupter, and integrated with the body of the three-position disconnecting switch in an installation frame, thus ensuring both the centering of the disconnecting opening and grounding contact and the integrity of component assembly, and boosting the reliability of the circuit breaker. Under the working conditions of frequent operation or long service life, the said circuit breaker has reclosing feature, exceedingly high operational reliability and long service life.

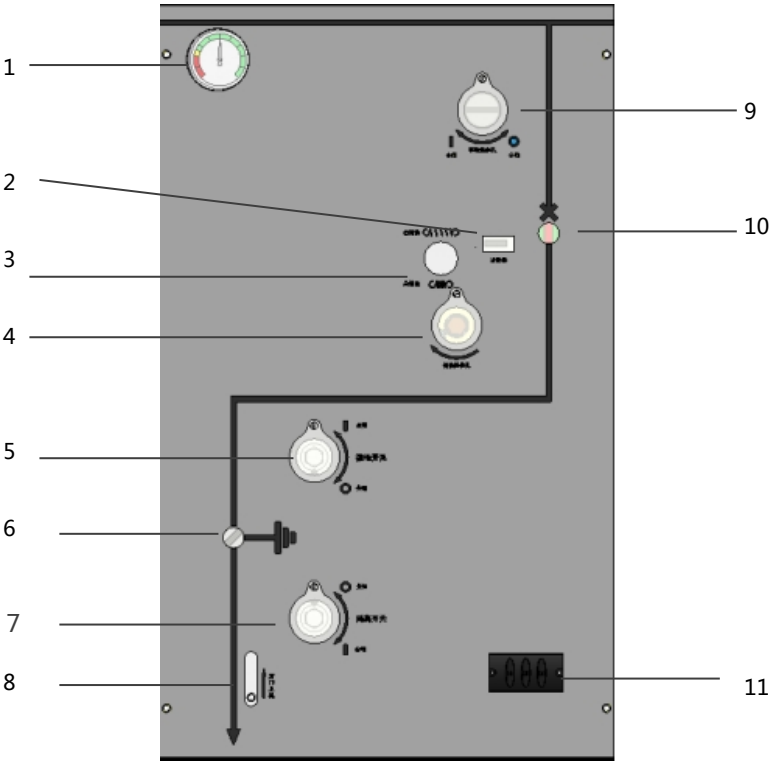
4.2.2 Three-position disconnecting switch

The three-position disconnecting switch adopted by Enerswit+ consists of a disconnecting switch and grounding switch. The disconnecting switch and grounding switch are operated by a set of operating mechanism. The operating mechanism has manual and motor operation functions, and has reliable interlocking to prevent faulty operation, ensuring safe operation. The disconnecting switch has a simple structure and reliable performance and can be easily installed and adjusted, and ease of maintenance and repair.

4.2.3 Operating mechanism

Enerswit + adopts a reliable three-position disconnecting switch operating mechanism (closing, isolation, and grounding) as well as the circuit breaker operating mechanism. The mechanism is mounted in front of the gas tank and behind the operation panel. Enerswit + has a fast operation and reliable mechanical properties.

(1) Operation panel



1. Pressure gauge
2. Circuit breaker mechanism counter
3. Circuit breaker energy storage indicator hole
4. Circuit breaker energy storage operation hole
5. Grounding switch operation hole
6. Three-position switch position indicator hole
7. Grounding switch operation hole
8. Cable compartment operation site interlock pin
9. Circuit breaker opening and closing operation hole
10. Circuit breaker position indicator hole
11. Live display

(2) Operating mechanism of the circuit breaker

Energy storage: When the operating handle is inserted into the energy storage operation hole and turned clockwise to a certain angle, the closing spring stores energy and the mechanism completes energy storage.

Closing: When the manual knot is rotated clockwise to a certain angle, the closing spring action inside the mechanism realizes the rapid closing of the circuit breaker, while the opening spring stores energy.

Opening: When the manual knot is rotated counterclockwise to a certain angle, the opening spring action inside the mechanism realizes the rapid opening of the circuit breaker.

(3) Operating mechanism of disconnecting switch

Closing: When the operating handle is rotated clockwise to a certain angle, the spring action inside the mechanism realizes the rapid closing of the disconnecting switch.

Opening: When the operating handle is rotated counterclockwise to a certain angle, the spring action inside the mechanism realizes the rapid opening of the disconnecting switch.

(4) Operation mechanism of grounding switch

Closing: When the operating handle is rotated counterclockwise to a certain angle, the spring action inside the mechanism realizes the rapid closing of the grounding switch.

Opening: When the operating handle is rotated clockwise to a certain angle, the spring action inside the mechanism realizes the rapid opening of the grounding switch.

⚠ Matters for attention during operation:

a) The three-position disconnecting switch can only be operated when the circuit breaker is in the opening state;

b) Prevent the mistaken opening or closing of the circuit breaker;

c) The circuit breaker allows the opening and closing operation only when the three-position disconnecting switch reaches a certain location;

d) The cable compartment can only be opened when three-position disconnecting switch is grounded;

e) The operation of grounding position of the three-position disconnecting switch can only be allowed when the cable chamber room is closed;

f) In the three-position disconnecting switch, the interlock operation must be carried out according to the three-position sequence of “disconnecting switch closing ⟷ disconnecting switch opening ⟷ grounding switch opening", and non-procedural operations may not and cannot be operated forcibly;

4.3 Load break switch unit

4.3.1 Load break switch

The Enerswit⁺ load break switch adopts self-energized arc extinction principle. The extinction principle of load break switch: the load break switch has a moving contact and a static contact. A piston rod is installed inside the moving contact to form a relative air-tightness with the moving contact; The moving contact has a nozzle structure. At the time of opening, gas is discharged from the nozzle at high velocity, so as to extinguish the arc. In addition, a gas-generating piece is set on the nozzle. When the opening and closing energy is large, the gas-generating piece can vaporize the gas, increasing the gas blowing pressure, thus can better extinguish the arc. Meanwhile, the load break switch has a observation gap for visual inspection and maintenance, Main features: simple and reliable structure, fast arc extinction, and high electrical performance, etc.

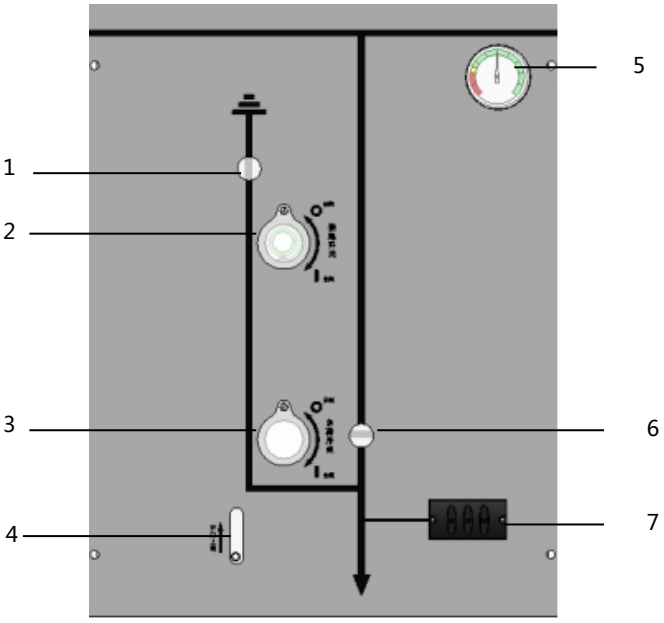
4.3.2 Grounding switch

The grounding switch has a simple structure and reliable performance and can be easily installed and adjusted, facilitating the maintenance and repairing works. The grounding switch and the load break switch are equipped with reliable interlocking to prevent faulty operation, ensuring safe operation.

4.3.3 Operating mechanism

The load break switch and grounding switch of Enerswit⁺-40.5kV gas-insulated switchgear adopt reliable spring operating mechanisms to realize the functions of opening, closing. The mechanism is mounted in front of the gas tank and behind the operation panel. The mechanism is a component that converts operation work into mechanical work. Its performance directly affects the mechanical properties of the load break switch. The mechanism of Enerswit⁺-40.5kV gas-insulated switchgear has a fast operation, without being affected by the operator. The mechanism is divided into two main modules: load break switch module and grounding switch module. Each mechanism has its own function.

(1) Operation panel



1. Instruction for grounding switch position
2. Operation hole of opening and closing of grounding switch
3. Operation hole of opening and closing of load break switch
4. Interlock pin on operation site of cable compartment
5. Gas-pressure meter
6. Instruction for load break switch position
7. Live display

(2) Operation mechanism of load break switch

Closing: When the operating handle is rotated clockwise to a certain angle, the spring action inside the mechanism realizes the rapid closing of the load break switch, but reserves no operation work.

Opening: When the operating handle is rotated counterclockwise to a certain angle, the spring action inside the mechanism realizes the rapid opening of the load break switch, but reserves no operation work.

(3) Operation mechanism of grounding switch

Closing: When the operating handle is rotated clockwise to a certain angle, the spring action inside the mechanism realizes the rapid closing of the grounding switch.

Opening: When the operating handle is rotated counterclockwise to a certain angle, the spring action inside the mechanism realizes the opening of the grounding switch and reserves work.

⚠ Matters for attention during operation:

a) Prevent the mistaken opening or closing of the load break switch.

b) Operation of grounding switch is only allowed when load break switch is at opening state;

c) Opening and closing of load break switch is only allowed when grounding switch is at opening state;

D) Cable chamber can only be opened when load break switch is at opening state and grounding switch is grounded.

e) Operation of grounding switch is only allowed when the door of cable compartment is closed.

4.4 Mounting cabinet

Mounting enclosure plays the role of supporting and fastening the gas tank. The unit also has good strength, corrosion resistance, and grounding performance. The Enerswit+ mounting enclosure adopts imported 2mm aluminized zinc plate processed by CNC machine tools and double bending process so that mounting bracket has such features as good corrosion resistance, high strength, lightweight, and a high degree of protection. It can be easily assembled. Mounting brackets of different heights are provided according to the user requirements.

5. Installation

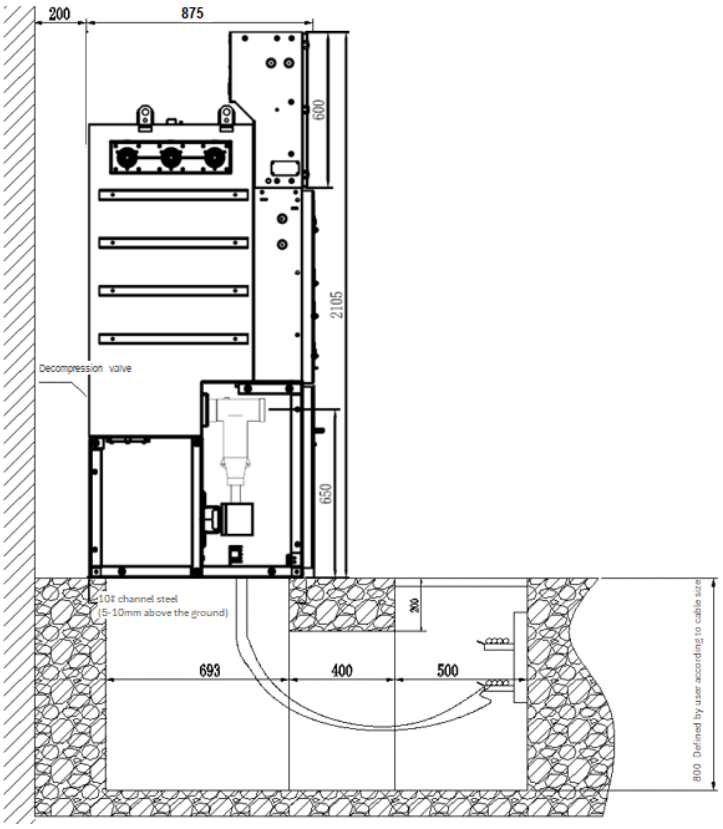
5.1 Design of foundation and cable trench

■ The construction of the installation foundation of switchgear should comply with the provisions of Electric Power Construction and Technical Specifications for Acceptance.

■ The installation foundation of switchgear generally adopts the secondary placement of concrete. The first is for the foundation of the installation of angle steel, channel steel or square steel of switchgear. The second placement of concrete is for the supplementary layer of the ground floor. It generally has a thickness of 60mm. For the placement of concrete for the supplementary layer, the thickness is generally 60mm. During the placement of concrete for the supplementary layer, the height of concrete should be lower than the plane of the component by 1-3mm.

■ During the design of civil engineering, the foundation elevation of switchgear shall allow for the height of channel steel of the base cabinet. The embedded reinforcement steel plates are arranged vertically along with the framework based on the switchgear at a gap of 1 to 1.5 meters.

■ The basic framework is welded by channel steel and angle iron. The basic size requirements of the framework and the layout of the cable trench have no strict requirements for the height of channel steel. 10# channel steel is allowed. The extendable distance of channel steel of the base frame is consistent with the size of the switchgear framework.



5.2 Installation of switchgear

5.2.1 Packaging removal

■ Packaging of the switchgear shall be removed at the installation site.

■ Tools required:

- Cutter for removing packaging.
- Crowbar for removing packaging.

■ When transporting the device, please wear gloves for construction purposes.

■ After removal of the packaging, the waste materials such as wooden boxes, and plastic enclosures and so on shall be categorized and recycled for recovery processing.

5.2.2 Inspection and placement before installation

After unpacking the switchgear, first check whether the product nameplate, certification, etc. are consistent with the orders, and whether the packing list is consistent with the physical objects. If it is correct, then remove dust from the surface of the product and arrange the product for installation.

5.3 Installation of cable head

5.3.1 Specifications of the external cone sleeve of Enerswit+-40.5kV series gas-insulated switchgear:

Function program code	R	C	D
Bolt 630A external cone bushing	●	●	●
Bolt 1250A external cone bushing	●	●	●

5.3.2 Selection of touch-type cable head

■ General touch-type cable head commercially available can be adapted to the Enerswit+ -40.5kV series gas-insulated switchgear.

■ Specifications of supporting touch-type cable head:

Function program code	R	C	D
Bolt cable head (630A/1250A)	●	●	●

Bolt cable head (630A)

⚠ Please read carefully the instruction manual of the cable head provided by the supplier of cable head before installing the cable head.

5.3.3 Installation of single cable head

5.3.3.1 Installation of bolt cable head (630A)

■ Open the cover of the cable compartment in the front of the switchgear, and use a dry cloth to clean the external cone bushing.

■ Select the correct cross-sectional area and the corresponding cable head according to the design requirements of the electric system drawing.

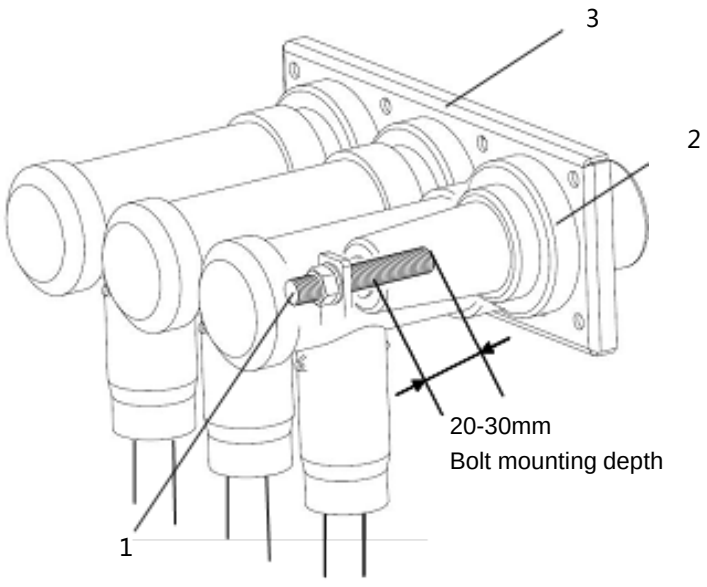
■ Place the three cable heads over the external cone bushing, and use dedicated tightening torque provided by the supplier of cable head to fasten the bolts to the bushing. The force of torque may be adjusted according to the instruction manual provided by the supplier of cable head.

■ Fasten high-voltage cables to the cable support of switchgear, and tighten the cable hoop.

■ Connect the grounding line of the outer shielding layer of cable head to a dedicated grounding copper bar inside the cable chamber.

■ Clean dust and debris from the cable compartment, and check all fastening bolt for tightness.

■ If there is no abnormal situation after checking, install the cover plate of the cable compartment.



1 Fastening bolts of the cable connector

2 Load bushing

3 The lower plate of the load bushing

5.3.3.2 Installation of cable head with lightning arrester

■ Open the cover of the cable compartment in the front of the switchgear, and use a dry cloth to clean the external cone bushing.

■ Select the correct cross-sectional area and the corresponding cable head according to the design requirements of the electric system drawing.

■ Place the three front cable heads over the external cone bushing, and use dedicated tightening torque provided by the supplier of cable head to fasten the bolts to the bushing.

■ After fastening the front cable heads, fasten the rear lightning arrester to the back of the front cable heads.

■ Fasten high-voltage cables to the cable support of switchgear, and tighten the cable hoop.

■ Connect the grounding line of the outer shielding layer of cable head to a dedicated grounding copper bar inside the cable compartment.

■ Clean dust and debris from the cable compartment, and check all fastening bolt for tightness.

■ If there is no abnormal situation after checking, install the cover plate of the cable compartment.

5.3.4 Installation of dual cables

■ Open the cover of the cable compartment in the front of the switchgear, and use a dry cloth to clean the external cone bushing.

■ Select the correct cross-sectional area and the corresponding cable head according to the design requirements of the electric system drawing.

■ Place the three front cable heads over the external cone bushing, and use dedicated tightening torque provided by the supplier of cable head to fasten the bolts to the bushing.

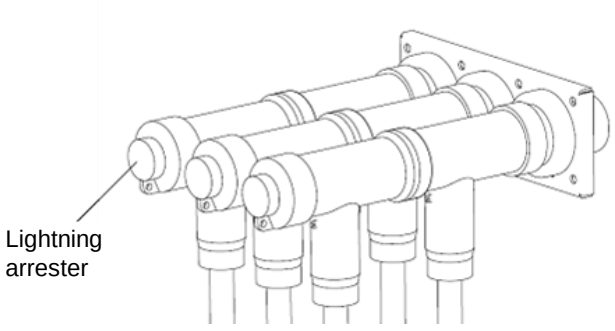
After fastening the front cable heads, fasten the rear cable heads to the back of the front cable heads.

■ Fasten front and rear high-voltage cables to the cable support of switchgear, and tighten the cable hoop.

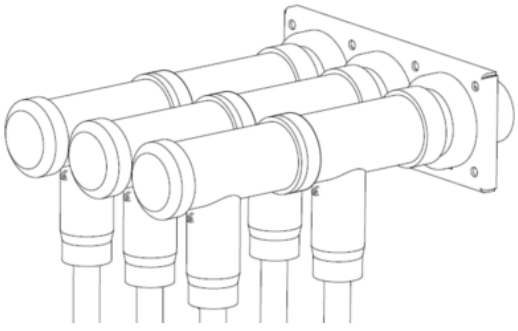
■ Connect the grounding line of the outer shielding layer of cable head to a dedicated grounding copper bar inside the cable compartment.

■ Clean dust and debris from the cable compartment, and check all fastening bolt for tightness.

■ If there is no abnormal situation after checking, install the cover plate of the cable compartment.



Schematic diagram of installation of cable head with lightning arrester



Schematic diagram of installation of dual cables

***The above refers to the general steps of installation. For detailed installation, please refer to the instruction manual of installation provided by the supplier of cable head.**

5.4 Installation of busbar-couple connector

The busbar-couple connector is applicable to Enerswit+ scalable gas-insulated switchgear products and can meet the user requirements for multiple loops and multiple functions. Enerswit+ adopts side expansion as the major expanding method.

5.4.1 Installation steps of side expansion (Enerswit+-E series)

■ Place two or more Enerswit+-E series products on the foundation channel steel at a predetermined interval.

■ Before installing the busbar-couple connector “BL-S”, first remove the plug of busbar insulation, and then clean with cleaning detergent the contact surfaces and sealing surfaces of the internal cone bushing of the busbar on the two switchgears requiring combination.

■ Fasten the switchgear (base cabinet) on the foundation to the channel steel with bolts, and fasten the M10 bolts to the four holes for the installation plate of switchgear, ensuring that the switchgear will not move under an external force.

■ Align the switchgear (combined cabinets) requiring a parallel arrangement with the main cabinet through positioning pins.

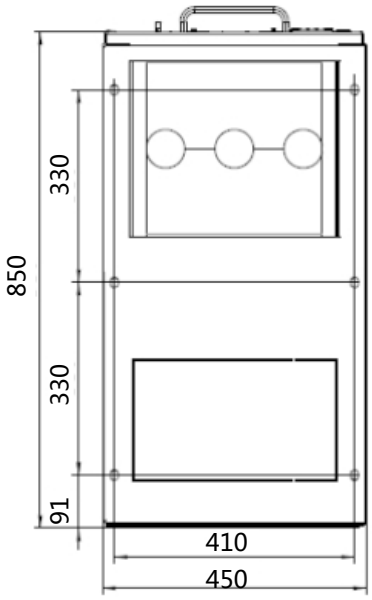
■ Apply the dedicated grease to the surface of busbar coupler “BL-S” (for anti-corrosion and sealing).

■ Place the three “A, B, C” busbar couplers into the internal cone bushings of the base cabinet, and fasten the grounding cable of the busbar coupler to a dedicated grounding hole with bolts.

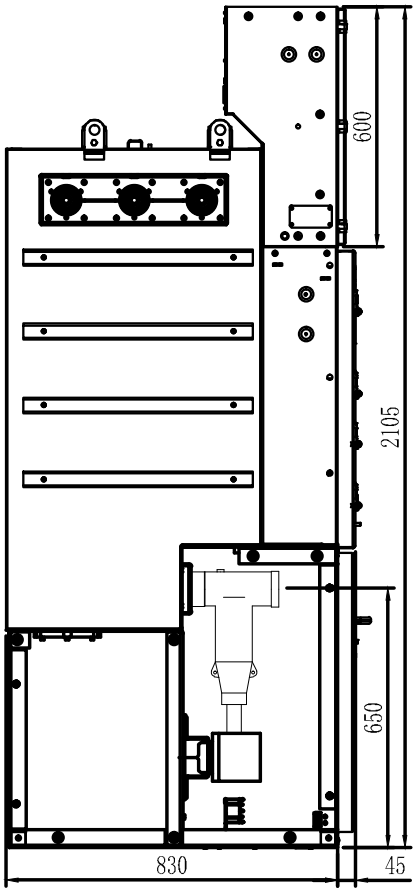
■ Push the parallel cabinet to the base cabinet slowly through positioning pins, so that the position of the three busbar couplers will not shift, and that the connecting holes of the two switchgears are accurately aligned until they closely touch the base cabinet.

■ Connect and fasten the two switchgears with bolts.

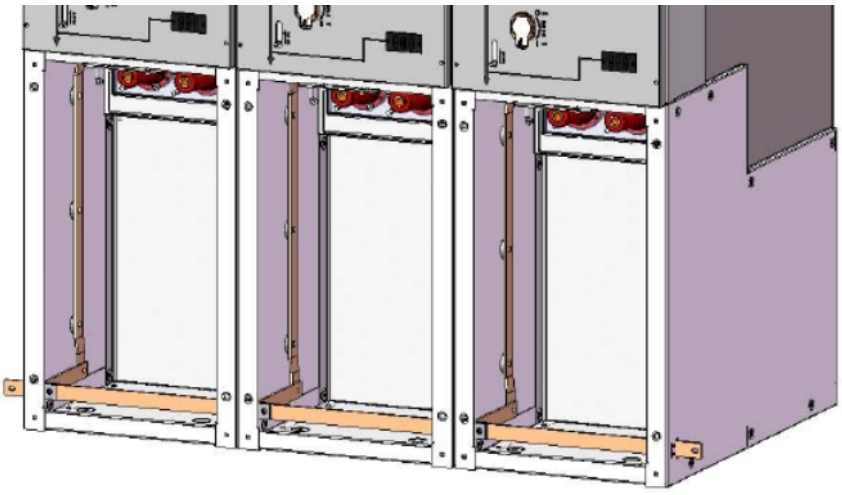
5.5 Design of bottom plate of switchgear



5.6 Design of height of cable chamber of switchgear



5.7 Design of grounding of switchgear



Grounding diagram of switchgear

6. Commissioning

6.1 Opening and closing of the door of the cable compartment

6.1.1 Before opening the door of the cable compartment, insert the operating handle into the operation hole of the load break switch and rotate it counterclockwise, so that the Load break switch is opened.

6.1.2 Then open the operation hole of the grounding switch, insert the operating handle into the operation hole of the grounding switch and rotate it clockwise, so that the grounding switch is closed.

6.1.3 Unscrew the bolts on the cover plate of the cable compartment, pull the interlock pin of cable compartment operation site upward, and then pull out the cover plate of the cable compartment.

6.1.4 For closing the cable compartment, the steps are the reverse order of the above.

7. Maintenance

Enerswit⁺ series products are maintenance-free power distribution equipment. The said equipment is maintenance-free for 30 years. After it is properly installed and powered on, it is sufficient to add the lubricating oil to the moving parts of the operating mechanism regularly without the need for maintenance.

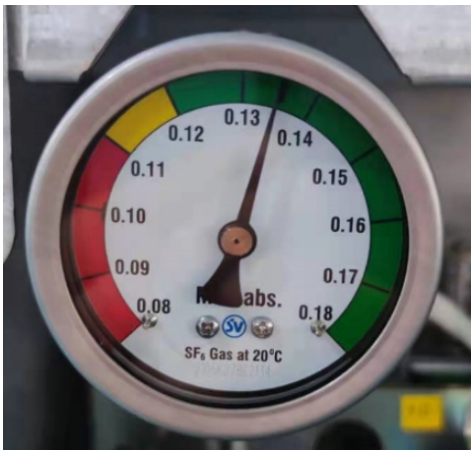
⚠ Note: To prevent accidents, please apply the lubricating oil to the operating mechanism during the time of maintenance.

7.1 Gas pressure and monitoring

Under normal operating conditions, there is no need for a special examination of Enerswit⁺. But before it is put into operation, check the pressure air meter on the panel of switchgear to ensure that the gas inside the gas tank is in a normal state.

The Enerswit⁺ gas tank is made of stainless steel plates welded by the robot through laser welding, so as to guarantee the gas tank strength and airtightness. The annual leak rate of 0.01%/year ensures that there is no need for injecting gas during the entire life cycle of the switchgear. At 20℃, the SF_6 gas meter pressure inside the gas tank is 0.03 Mpa.

The pressure meter of the switchgear assembly is shown below.



■ There are three areas on the meter:
When the pointer is in the green area--it means the pressure inside the gas tank is under normal state;
When the pointer is in the yellow area--it indicates the lock pressure of the gas tank;
When the pointer is in the red area--it means the pressure inside the gas tank is lower than normal;

■ The pressure value corresponding to the temperature change is indicated on the gauge, i.e., the gas tank pressure varies with changes in ambient temperature. Therefore, the scale on the meter can be corrected to correspond to the exact internal pressure of the gas tank.

When installing the density meter, there are two cases: first, relative pressure: density meter pointer points to the rated pressure value 0.03 Mpa (or 0.3bar); second, absolute pressure: the density meter pointer points to the rated pressure value of 0.13 Mpa (or 1.3bar). Moreover, when using the density meter, the pointer does not vary with changes in ambient temperature.

7.2 Environmental protection

90% of the materials used by Enerswit+ are metal materials. After the service life of the product expires, the materials can be recycled, without damaging the environment.
The SF_6 gas can be recycled through the dedicated SF_6 gas recovery unit upon its expiry of the service life, without exerting an adverse impact on the environment.

8. Product dimensions

Table 8.-1 Dimensions of Enerswit+-40.5kV series gas-insulated switchgear:

Unit	C	D	CC	CCC	CCD
Depth(mm)	850	850	850	850	850
Width(mm)	450	450	900	1350	1350
Height(mm)	1600	1800	1600	1600	1800

Note: The D is expressed as Enerswit+/40.5-25/630- D

9. Transportation and storage

9.1 Transportation

• For transport, Enerswit+ must be enclosed and fastened within the packaging box in its entirety.

• When handling the switchgear, it must be ensured that the switchgear does not slide or tip over.

9.2 Storage

The switchgear should be stored upright in a dry, well-ventilated, moisture-proof, and shock-proof indoor environment without the impact of harmful gases. For long-term storage, the moving parts should be coated with grease, and the environment is regularly checked for compliance with requirements.

10. Instructions for order

When placing orders, the users should state:

• Model, name, and scheme of switchgear

• Rated voltage, rated current, quantity required

• Mechanism with manual operation/electric operation and the voltage of electric operation indicated

• Name and quantity of spare parts

• For other special requirements, please explain to us before ordering.

11. Files and attachments

• Accompanying files generally include:

A. product certificate (report of factory inspection)

B. The instruction manual of installation

C. Packing list

• Annex

A. Operating handle

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