VAKUUMSKA DISTRIBUCIJSKA STIKALNA APARATURA (RING MAIN UNIT)

VDA 24

ZA NOTRANJO VGRADITEV

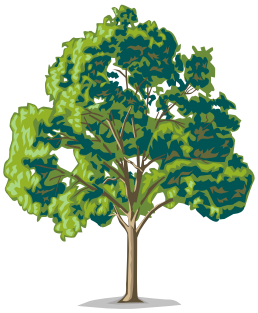
VACUUM DISTRIBUTIVE COMPACT SWITCHGEAR (RING MAIN UNIT)

VDA 24

FOR INDOOR INSTALLATION

ENVIRONMENT FRIENDLY!

EKOLOŠKI PROIZVOD!



OSNOVNE LASTNOSTI IZVEDBE

- **Kompaktnost**
- **Enostavnost**
- **Vakuumski odklopnik v trafo-polju**
- **Vakuumska ločilna stikala v vodnih poljih**
- **Plin SF_6 za izolacijo delov pod napetostjo**
- **Izolacijske pregrade med kabelskimi priključki posameznih polj**
- **Visoka zanesljivost pogona**
- **Varnost pogonskega osebja**
- **Možnost daljinskega upravljanja vseh aparatov**
- **Mikroprocesorski rele za zaščito energetskeg transformatorja do 2,5 MVA**
- **Kabelski priključki v skladu z IEC 60502/DIN47363**

BASIC CHARACTERISTICS

- ***Compactness***
- ***Simplicity***
- ***Vacuum circuit breaker in transformer feeder***
- ***Vacuum load break switches in ring main feeders***
- ***SF_6 gas - insulation between live parts***
- ***Insulation bariers between cable connectors of the ring main feeders***
- ***High reliability***
- ***High personnel safety***
- ***Possibility of remote control for each apparatus***
- ***Microprocessor protective relay for power transformer protection (up to 2,5 MVA)***
- ***Cable connectors in accordance with IEC 60502/DIN 47363***

1. SPLOŠNO

Novi kompaktni stikalni moduli serije VDA se izdelujejo za nazivne napetosti 12, (17,5) i 24 kV. Uporabljajo se za razvod električne energije v transformatorsii postajah do 2500 kVA, 10(20)/0,4 kV.

Moduli serije VDA so predvideni za vgradnjo v notranje prostore z normalnimi obratovalnimi pogoji, v skladu z standardi IEC 62271-200 i IEC 60694.

Vakuumske distribucijske kompaktne aparature serije VDA se odlikujejo z visoko zanesljivostjo pogona, popolno neodvisnostjo na zunanje vplive, in večkratnim zmanjšanjem prostornine v primerjavi s klasičnimi zračno izoliranimi stikalnimi bloki z ločilnimi stikali in zbiralkami..

Vodna polja so opremljena s tripoložajnimi vakumskimi ločilnim stikalom, trafo polja pa z vakumskim odklopnikom. Stikalni procesi v aparatih (odklopniku in ločilnimih stikalih) se izvaja v vakuumskih komorah, plin SF6 z minimalnim tlakom polnjenja od 1,3 bara pa služi izključno kot izolacijski medij med zbiralkami in proti ohišju, oziroma zemlji. Pri tem so vse električne karakteristike ohranjene tudi pri tlaku SF6 plina od 1 bara, to pomeni pri tlaku zraka okolja.

Zaščito energetskega transformatorja omogoča vakuumski odklopnik krmiljen s samonapajajočim mikroprocesorskim relejem serije Sigma XS. Zaščitni releji serije Sigma XS varujejo pred preobremenitvijo in kratkim stikom. Karakteristike releja se usklajujejo z energetskim delom in načinom upravljanja aparaturom, te z zahtevami uporabnika.

Na spodnji prednji strani ohišja je priključni kabelski prostor s skoznjimi izolatorji v eni vrsti. Posamezni kabelski prostori so med seboj ločeni s kovinskimi pregradami, s sprednje strani pa zaprti pokrovom s stopnjo zaščite IP3X. Priključni kabelski prostor je opremljen standardnimi kabelskimi priključki - IEC 60502 / DIN 47363.

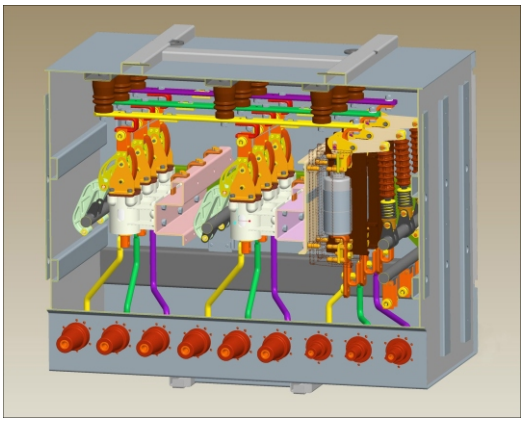
Glede na to pa je žvepleni heksafluorid v tej izvedbi popolnoma inerten in se ne uporablja za gašenje električnega obloka, ne prihaja do osvobajanja škodljivih snovi, kar ta izdelek uvršča med popolnoma ekološko sprejemljive.

Glede na zahtevao uporabnika, obstajata dve osnovni varijanti pogonskih mehanizmov: pogonski mehanizem za ročno upravljanje, in pogonski mehanizem za daljinsko upravljanje vseh funkcij v vseh poljih.

Slika 1. 3d-Model aparature VDA 24 - 2VT

Fig. 1. 3d-Model of ring main unit VDA 24 - 2VT

1. GENERALLY



Slika 2. 3d-Model glavne tokovne poti- VDA 24 - 2VT

Fig. 2. 3d-Model of main current path - VDA 24 - 2VT

New compact ring main units series VDA are available for rated voltages 12 (17,5) and 24 kV. Their purpose is distribution of electrical energy in transformer substation up to 2500 MVA; 10(20)/0,4 kV.

The ring main units series VDA are intended for indoor instalation under normal operation conditions, in accordance with IEC 62271-200 i IEC 60694.

Vacuum distributive compact ring main units series VDA have high reliability and availability. They are completely independent on environment conditions and their overall dimensions have been minimized in comparison to classic air-insulated switchgear equipped with load break switches

The current breaking in circuit breaker (transformer feeder) and load break switches (ring main feeders) takes place in vacuum interrupters. SF6 gas (filling pressure 1,3 bar) is only an insulation medium between phases and to earthed parts. In case of gas loss all electrical parameters remain the same under the gas pressure 1 bar which equals environment pressure.

Power transformer protection is performed by vacuum circuit breaker controlled by self-powered microprocessor relay series Sigma XS. Protection relays series Sigma XS enable overload protection and short-circuit protection. The characteristics of electronic relay can be adjusted to fit power transformer, mode of operation and special requirements.

The bushings for cable connectors are in line, at lower side of the container. Metal shields separate the cable compartments of each feeder. Front side of cable compartments has a lids (degree of protection IP 3X). The bushings for cable connectors comply IEC 60502 / DIN 47363.

SF6 gas is completely inert in these series - it is not used as arc-quenching medium, which prevents release of undesirable substances. Therefore this series is fully environment friendly product. In accordance with customers requirements we developed two basic variants of operating mechanisms: manual operating mechannism (for local operation only, no possibility of remote control) and sofisticated operating mechanism for remote control of each apparatus.

2. IZVEDBE MODULA

Nerazširljive izvedbe modulov imajo eno, dva, tri ali štiri vodna polja opremljena tripoložajnim vakuumskimi ločilnimi stikali, ter eno ali dva transformatorska polja z vakuumskim odklopnikom za zaščito energetskga transformatorja. Dostopna je tudi nerazširljiva izvedba modula z merilnim poljem, katera ima dve vodni, merilno, spojno in transformatorsko polje.Vsaki nerazširljivi modul ima zasebno plinonepropustno ohišje (stopnja zaščite IP 65) iz nerjaveče jeklene pločevine, v kateri so spravljeni sklopni in preostali elementi tokovne poti, ter plin žvepleni heksafluorid (SF6),ki služi za izoliranje med elementi tokovne poti in proti ozemljenem ohišju.

Razširljive izvedbe se sestavljajo iz dveh ali več posameznih modulov ki se medsebojno spajajo z izoliranimi zbiralkami.Razširljive izvedbe (opisane v poglavjih 3in4) ponujajo veliko večjo fleksibilnost izvedb enopolnih shem.

2. BASIC VERSIONS

***Basic versions** of comact ring main units have the folowing combinations: One incoming feeder and one transformer feeder, two ring main and one transformer feeder, three ring main and one transformer feeder, four ring main and one ring main feeder, two ring main and two transformer feeders and finally three ring main and two transformer feeders.*

Non-extensible version with metering is also available. It consists of two ring-main feeders, one transformer feeder, one coupler and set of instrument transformers.

Each of six available variants have gas-tight container filled with SF6 gas (degree of protection IP 65) in which are placed all apparatus and current path elements. The SF6 gas is insulation medium between live parts ant to earth.

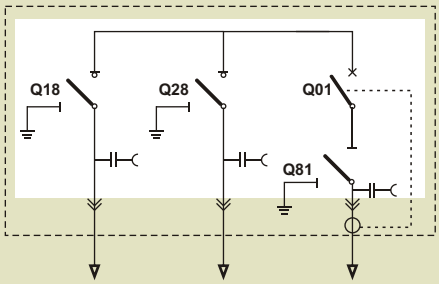
***Extensible versions** (see. Chapters 3 and 4) enable flexibility in creating various single-line diagrams, depending on customers' needs.*

3. NAZIVNE KARAKTERISTIKE

3. NOMINAL DATA

		TRIPOLOŽAJNO VAKUUMSKO LOČILNO STIKALO *THREE-POSITIONAL VACUUM LOAD BREAK SWITCH*		VAKUUMSKI ODKLOPNIK *VACUUM CIRCUIT BREAKER*	
Nazivna napetost *Rated voltage*	**kV**	12	24	12	24
Zdržna napetost mrežne frekvence 50Hz/1min. *Rated power frequency withstand voltage 50Hz/1min.*	**kV**	28	50	28	50
Zdržna atmosferska udarna napetost *Rated lightning impulse voltage*	**kV**	75	125	75	125
Nazivni tok *Rated current*	**A**	630	630	630	630
Nazivna izklopna zmogljivost *Rated breaking capacity*	**kA**	0,63	0,63	20	16
Nazivna vklopna zmogljivost *Rated making capacity*	**kA**	50	40	50	40
Nazivni kratkotrajni zdržni tok 1s. *Rated short time withstand current 1 sec.*	**kA**	20	16	20	16
Izklopni čas (kratek stik) *Switch-off time (short circuit)*	**ms**	-	-	45	45

VDA 24 - 2VT

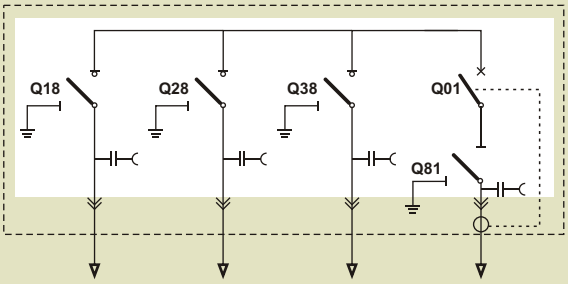


Q18, Q28 - tripoložajna ločilna stikala/*3-pos. Ibs*
Q01 - odklopnik/*circuit breaker*
Q81 - tripoložajni ločilnik/*3-pos. disocnnector*

- 2 vodna polja opremljena tripoložajnima vakumskima ločilnima stikaloma
- trafo-polje z vakumskim odklopnikom, krmiljenim elektronskim zaščitnim relejem tipa Sigma XS
- tripoložajni ločilnik za odklopnikom

- *2 ring main feeders with vacuum three-positional load break switches*
- *transformer feeder with vacuum circuit breakers controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind the circuit breaker*

VDA 24 - 3VT

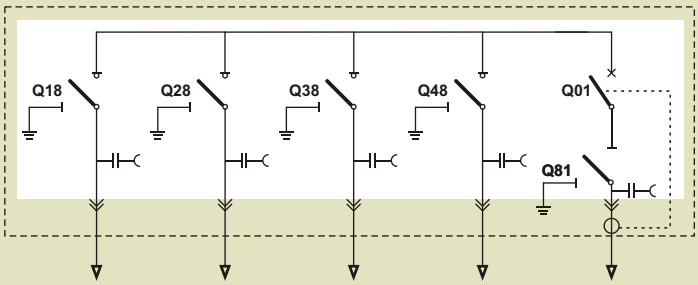


Q18, Q28, Q38 - tripoložajno ločilno stikalo/*3-pos. Ibs*
Q01 - odklopnik/*circuit breaker*
Q81 - tripoložajni ločilnik/*3-pos. disconnector*

- 3 vodna polja opremljena tripoložajnimi vakumskimi ločilnimi stikali
- trafo-polje z vakumskim odklopnikom, krmiljenim elektronskim zaščitnim relejem tipa Sigma XS
- tripoložajni ločilnik za odklopnikom

- *3 ring main feeders with vacuum three-positional load break switches*
- *transformer feeder with vacuum circuit breakers controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind the circuit breaker*

VDA 24 - 4VT

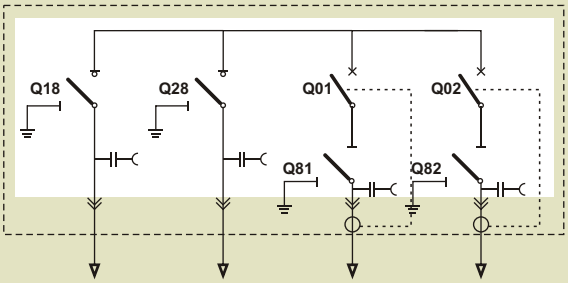


Q18, Q28, Q38, Q48 - tripoložajna ločilna stikala/*3-pos. Ibs*
Q01 - odklopnik/*circuit breaker*
Q81 - tripoložajni ločilnik/*3-pos. disconnector*

- 4 vodna polja opremljena tripoložajnim vakuumskimi ločilnimi stikali
- trafo-polje z vakuumskim odklopnikom, krmiljenim z elektronskim zaščitnim relejem tipa Sigma XS
- tripoložajni ločilnik za odklopnikom

- *4 ring main feeders with vacuum three-positional load break switches*
- *transformer feeder with vacuum circuit breakers controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind the circuit breaker*

VDA 24 - 2V2T

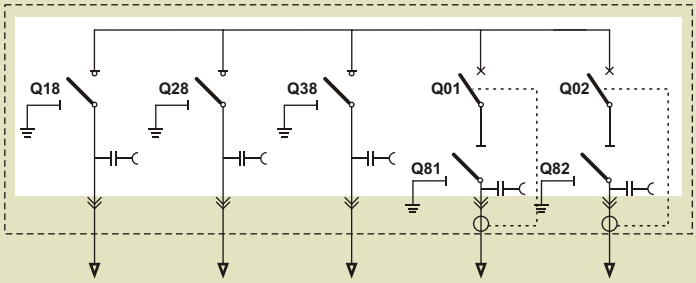


Q18, Q28 - tripoložajna ločilna stikala/*3-pos. Ibs*
Q01, Q02 - odklopnik/*circuit breakers*
Q81, Q82 - tripoložajni ločilnik/*3-pos. disconnectors*

- 2 vodna polja opremljena tripoložajnima vakuumskima ločilnima stikaloma
- 2 trafo-polja z vakuumskima odklopnikoma, krmiljenima z elektronskima zaščitnima relejima tipa Sigma XS
- tripoložajni ločilnik za odklopnikom

- *2 ring main feeders with vacuum three-positional load break switches*
- *2 transformer feeders with vacuum circuit breakers controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind each circuit breaker*

VDA 24 - 3V2T

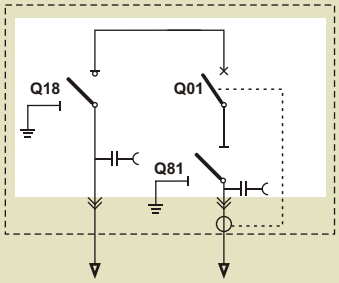


Q18, Q28, Q38 - tripoložajna ločilna stikala/*3-pos. lbs*
Q01, Q02 - odklopniki/*circuit breakers*
Q81, Q82 - tripoložajni ločilnik/*3-pos. disconnectors*

- 3 vodna polja opremljena s tripoložajnimi vakumskimi ločilnimi stikali
- 2 trafo-polja z vakumskima odklopnikoma, krmiljenima z elektronskima zaščitnima relejema tip Sigma XS
- tripoložajna ločilnika za odklopnikom

- *3 ring main feeders with vacuum three-positional load break switches*
- *2 transformer feeders with vacuum circuit breakers controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind each circuit breaker*

VDA 24 - VT

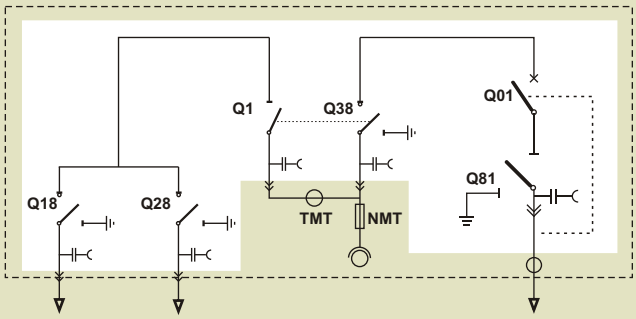


Q18 - tripoložajno ločilno stikalo/*3-pos. lbs*
Q01 - odklopnik/*circuit breaker*
Q81 - tripoložajni ločilnik/*3-pos. disconnector*

- 1 vodno polje opremljeno tripoložajnim vakumskim ločilnim stikalom
- trafo-polje z vakumskim odklopnikom, krmiljenim z elektronskim zaščitnim relejem tipa Sigma XS
- tripoložajni ločilnik za odklopnikom

- *1 ring main feeder with vacuum three-positional load break switch*
- *transformer feeder with vacuum circuit breaker controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind each circuit breaker*

VDA 24 - 2VMST



Q18, Q28, Q38 - tripoložajno ločilno stikalo/*3-pos.lbs*
Q01 - odklopnik*/circuit breaker*
Q1 - dvopoložajni ločilnik/*2-pos. disconnector*
Q81 - tripoložajni ločilnik/*3-positional disconnector*
TMT - tokovni instrumentni transformatorji/*current transformer*
NMT - napetostni instrumentni transformatorji*/voltage transformer*

- 2 vodna polja
- spojno polje s 3-položajnim vak.ločilnim stikalom
- merilno polje s tokovnimi in napetostnimi instrumentnimi transformatorji
- transformatorsko polje z vakumskim odklopnikom krmiljenim z elektronskim zaščitnim relejem tipa Sigma XS
- tripoložajni ločilnik za odklopnikom

- *2 ring main feeders*
- *coupler with 3-positional lbs*
- *metering panel with current and voltage transformers*
- *transformer feeder with vacuum circuit breaker controlled by protective relay type Sigma XS*
- *3-positional disconnector behind the circuit breaker*

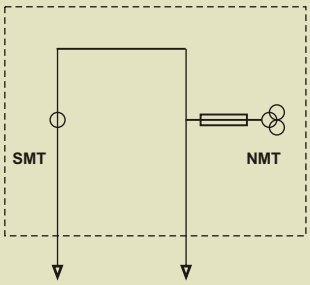
5. ENOPOLNE SHEME IZBRANIH MODULOV ZA RAZŠIRLJIVE IZVEDBE

5. SINGLE LINE DIAGRAMS OF EXTENSIBLE MODULES - CHOICE

Razširljive izvedbe so konstruirane tako da se z uporabo čim manjšega števila tipskih modulov lahko realizira poljubna enopolna shema.

The line of extensible modules has been designed in order to solve each single-line diagram using minimal number of modules/gas insulated housings.

VDA 24 - M

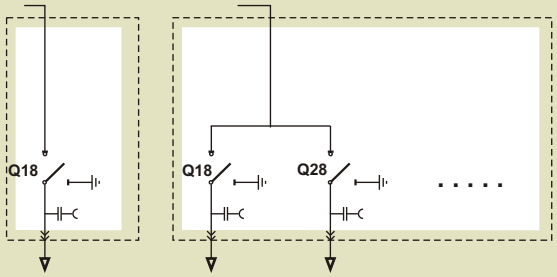


SMT - tokovni instrumentni transformatorji/*current instrumenttransformers*
NMT - napetostni instrumentni transformatorji/*voltage instrument transformers*

- merilno polje opremljeno z napetostnimi in tokovnimi instrumentnimi transformatorji, z zračno izolacijo
- parametri instrumentnih transformatorjev se uskljujejo z zahtevami posameznega projekta

- *air-insulated metering unit, equipped with current and voltage instrument transformers*
- *nominal data of instrument transformers can be delivered in accordance with the project*

VDA 24 - V, 2V, 3V, 4V, 5V

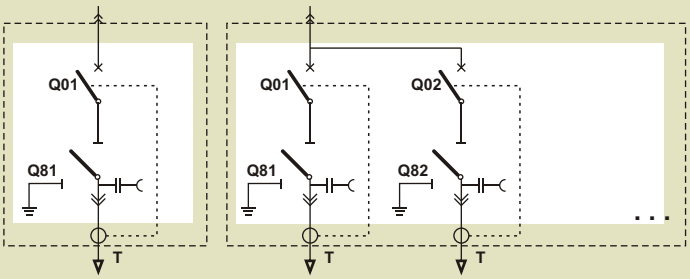


Q18, Q28 ... - tripoložajna ločilna stikala/ 3-pos. lbs

- moduli z 1, 2, 3, 4 ali 5 vodnih polj v enem ohišju
- vsako vodno polje je opremljeno s tripoložajnim vakumskim ločilnim stikalom

- separate modules of 1, 2, 3, 4 or 5 ring-main feeders
- each feeder equipped with

VDA 24 - T, 2T, 3T, 4T, 5T

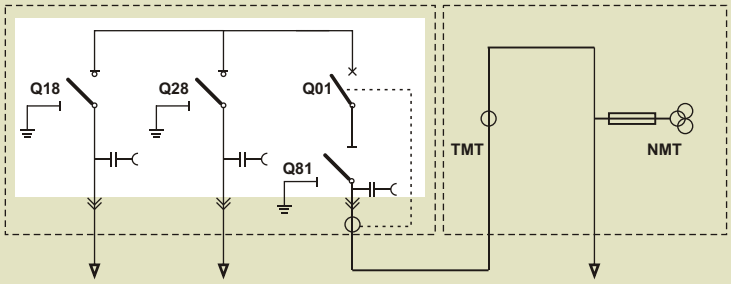


Q01, Q02, ... - odklopniki/circuit breakers
Q81, Q82... - tripoložajni ločilnik/3-pos. disconnector

- moduli z 1, 2, 3, 4 ali 5 transformatorskih polja v enem ohišju
- vsako trafo polje je opremljeno vakumskim odklopnikom krmiljenim z elektronskim zaščitnim relejem Sigma XS
- tripoložajni ločilniki za odklopnikom

- separate modules of 1, 2, 3, 4 or 5 transformer feeders in single housing
- each transformer feeder equipped with vacuum circuit breaker and protective relay Sigma XS
- 3-positional disconnector behind each circuit breaker

VDA 24 - 2VT - M



Q18, Q28 - tripoložajno ločilno stikalo/*3-pos.lbs*
Q01 - odklopnik/*circuit breaker*
Q81 - tripoložajni ločilnik/*3-positional disconnector*

TMT - tokovni instrumentni transformatorji/*current transformer*
NMT - napetostni instrumentni transformatorji/*voltage transformer*

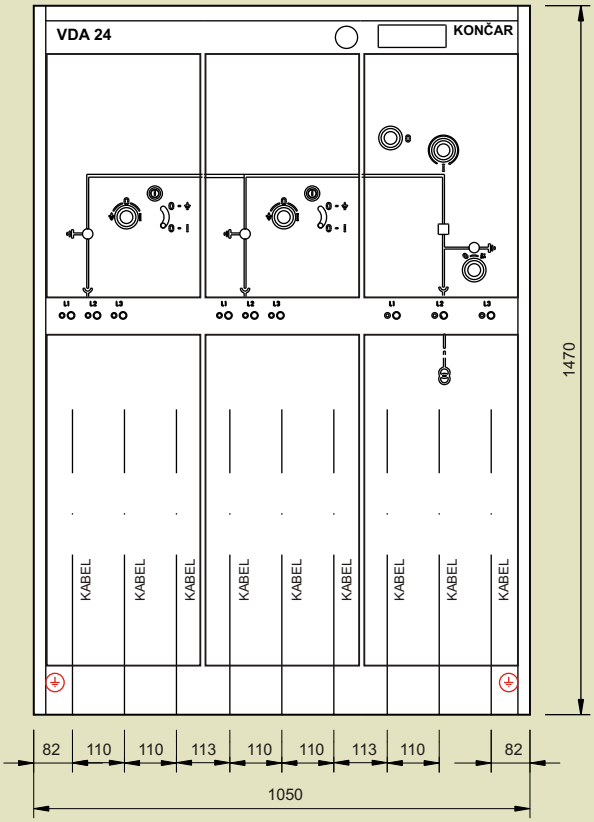
- 2 vodna polja opremljena s tripoložajnimi vakuumskimi ločilnimi stikali
- trafo-polje z vakuumskim odklopnikom, upravljanim elektronskim zaščitnim relejem tipa Sigma XS
- tripoložajni ločilnik za odklopnikom
- merilno polje opremljeno naponskimi in tokovnimi instrumentnumi transformatorji,

- 2 *ring main feeders with vacuum three-positional load break switches*
- *transformer feeder with vacuum circuit breakers controlled by electronic protective relay type Sigma XS*
- *3-positional disconnector behind the circuit breaker*
- *air-insulated metering unit, equipped with instrument transformers*

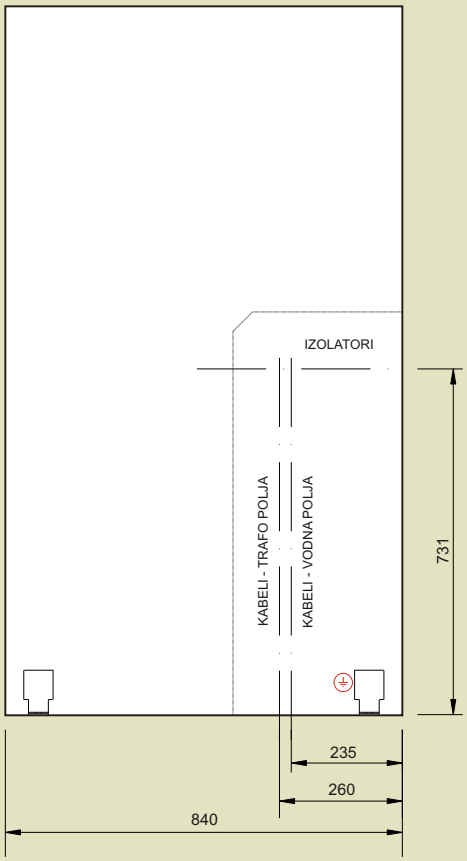
7. DIMENZIJE OSNOVNIH MODULOV VDA (Serija Σ) 7. OVERALL DIMENSIONS OF THE BASIC MODULES

Tip/Type	Širina/*Width (mm)*	Višina/*Height (mm)*	Glbina/*Depth (mm)*
2VT	1050	1470	840
3VT	1383	1470	840
2V2T	1383	1470	840
4VT	1716	1470	840
3V2T	1716	1470	840
VT	717	1470	840
M	924	1470	840
2VMST	1800	1470	840

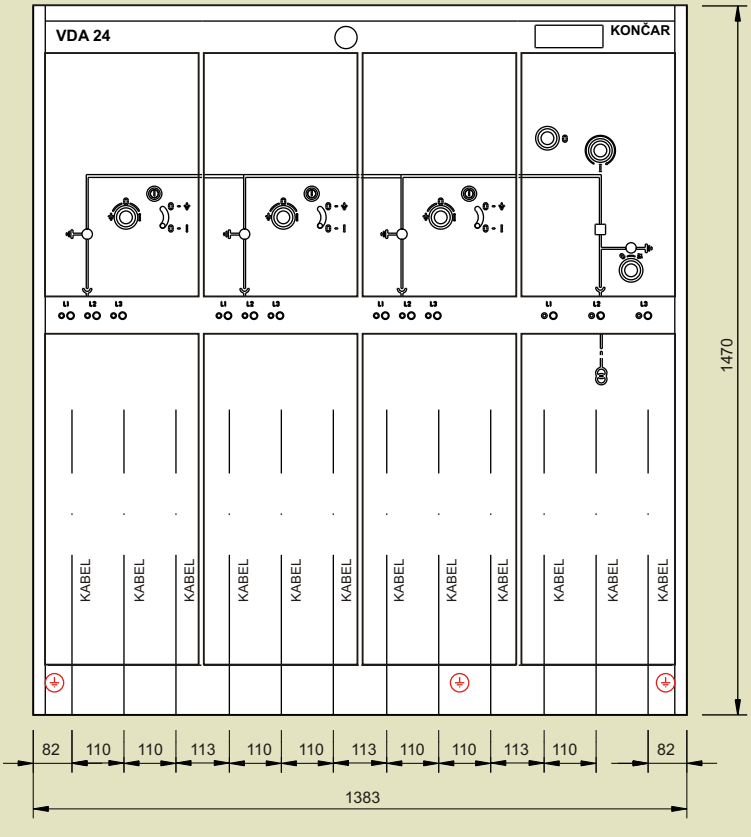
VDA 24 - 2VT, ročno upravljanje z aparati



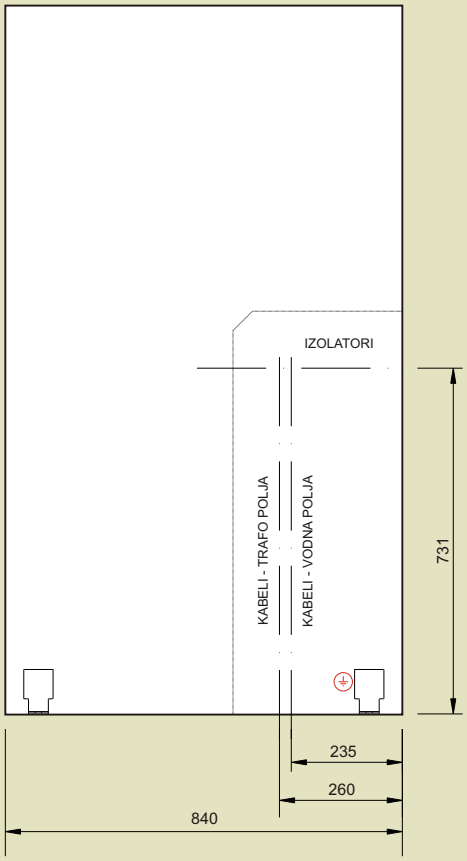
VDA 24 - 2VT, manual operation



VDA 24 - 3VT, ročno upravljanje z aparati

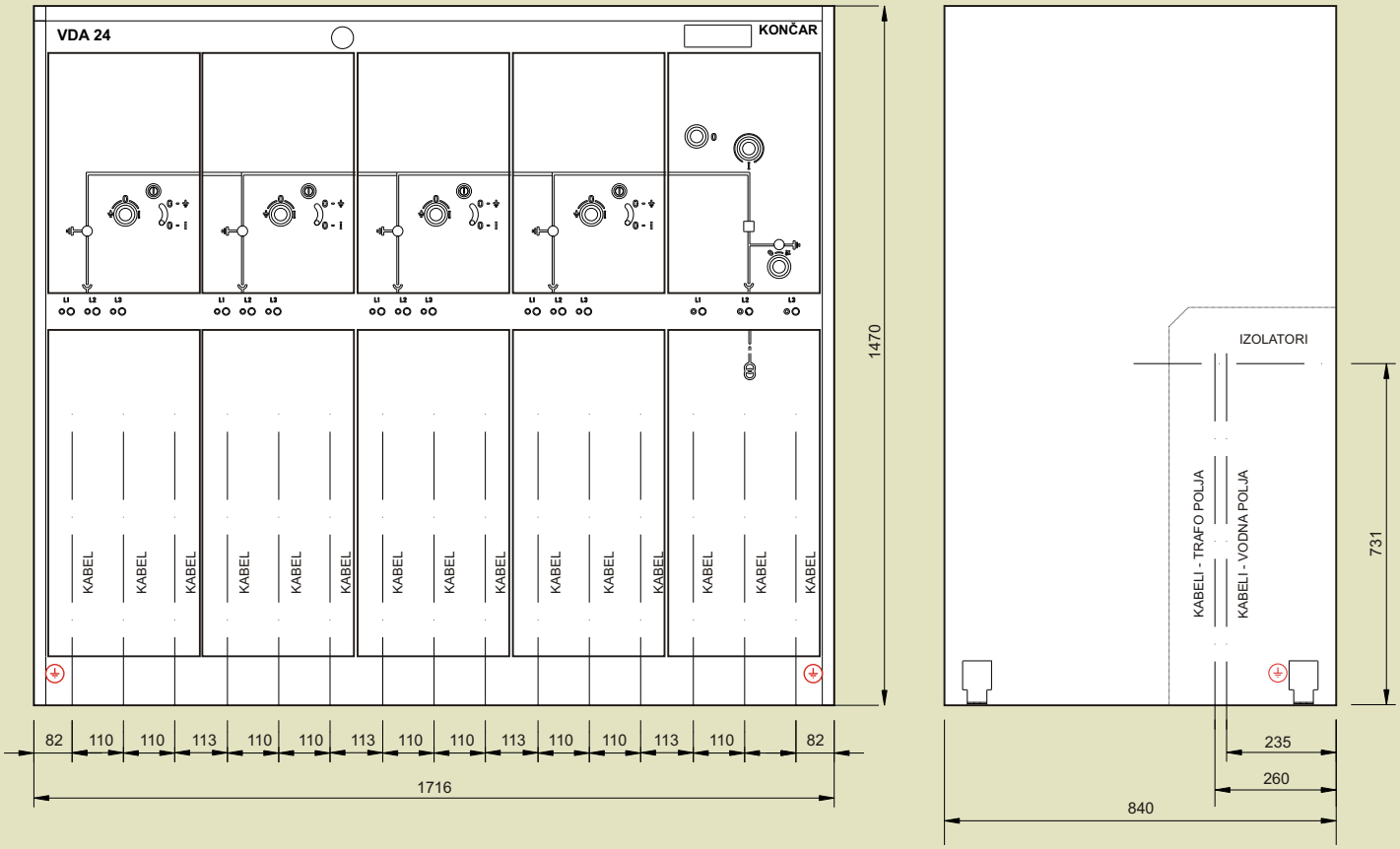


VDA 24 - 3VT, manual operation



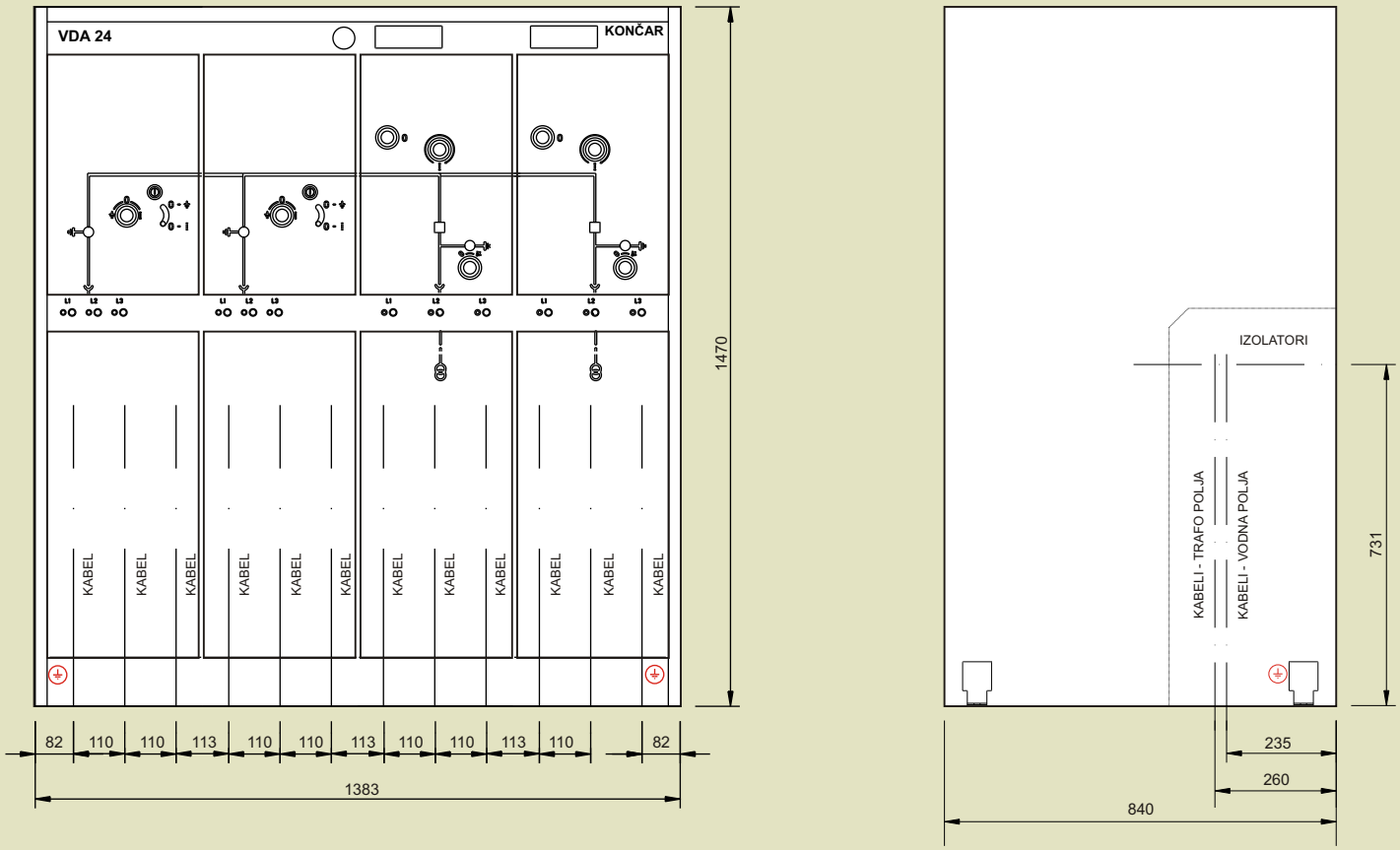
VDA 24 - 4VT, ročno upravljanje z aparati

VDA 24 - 4VT, manual operation



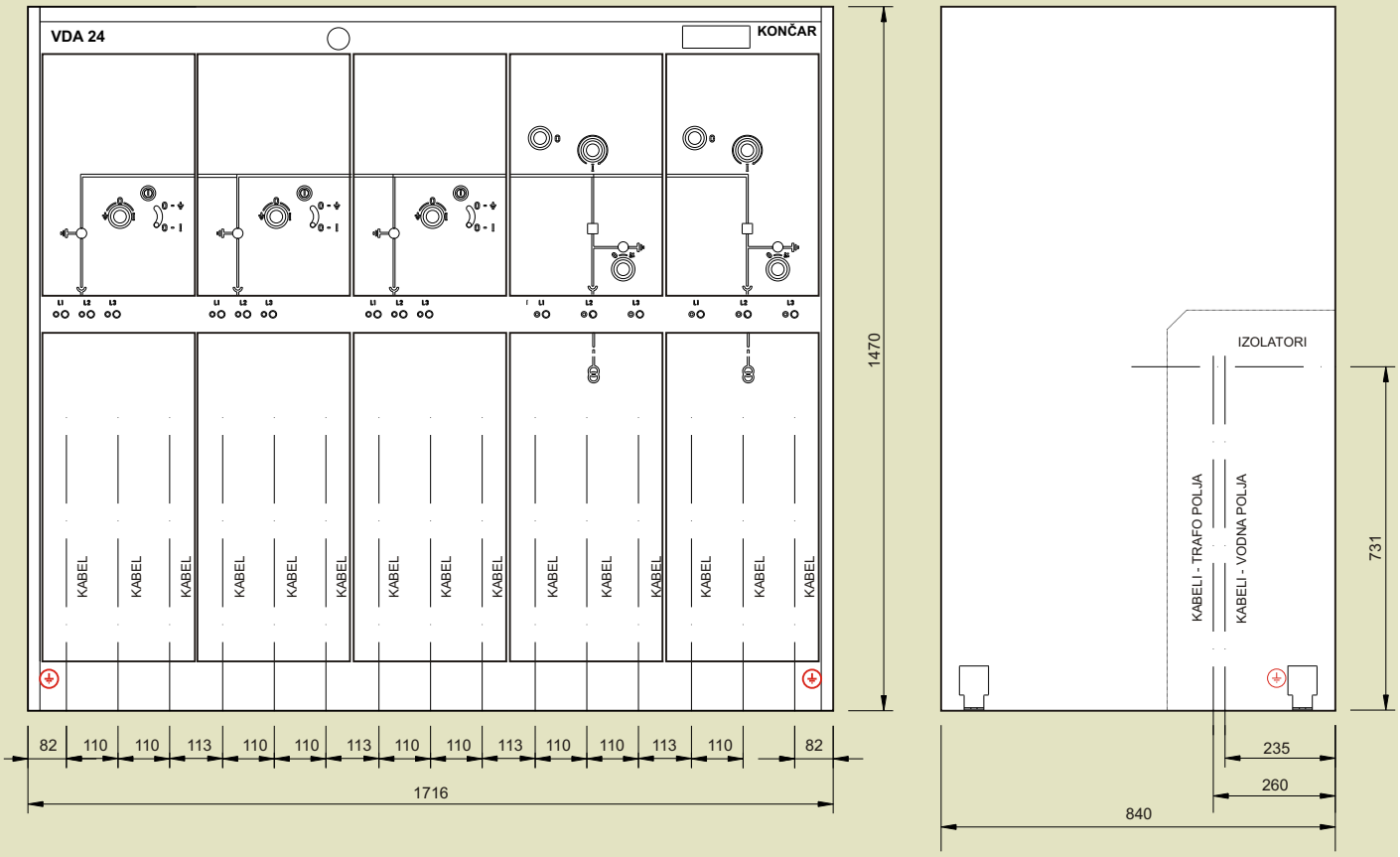
VDA 24 - 2V2T, ročno upravljanje z aparati

VDA 24 - 2V2T, manual operation



VDA 24 - 3V2T, ročno upravljanje z aparati

VDA *24 - 3V2T, manual operation*



8. OSNOVNI PODATKI ZA NAROČANJE

8. BASIC ORDERING DATA

Podatki o ceni, roku dostave, ter obvezna dokumentacija (merske skice, vezalne sheme) so na voljo izključno na zahtevo kupca, ker se usklajujejo s potrebami konkretnega projekta.

V vašem povprševanju, prosimo navedite naslednje podatke:

- nazivna napetost
- konfiguraciju aparature ali enopolno shemo
- način upravljanja (ročno ali daljinsko upravljanje)

Price information, as well as obligatory documentation (dimensional drawings, electrical diagrams) are available on customer's request.

Please, contact us, providing the following data:

- *nominal network voltage*
- *desired configuration (combination of ring main and transformer feeders) or single-pole diagram*
- *desired operation mode (manual or remote control)*

Za morebitna vprašanja in namige glede izbire najbolj primerne kombinacije modulov, smo Vam vedno na razpolago.

If you have any questions regarding the best choice of modules for your needs, do not hesitate to contact us.

OPOMBA:
Vsi podatki navedeni v tem katalogu so informativnega pomena.
Proizvajalec si pridržuje pravico do spremembe.
Obvezne podatke in merske skice dajemo na zahtevo.

NOTICE:
Technical characteristics, dimensional drawings and other relevant data are subject to change.

Obligatory data only on request.