

POWER CENTER

Withdrawable · Plug-in · Fixed mounting technology



ENERGOLINE[®]
8PU Premium

FEAG
... die intelligente Lösung ...

Product family

With the patent-protected brand name



registration number 304 078 42 (German Patent and Trade-mark Office), a product family has been developed for power supply at low and medium-voltage levels for AC/DC voltages. All the latest developments and innovations have been incorporated into these products.

A new generation,

INDUSTRIAL-SWITCHGEAR-SYSTEM



which is economical, needs-based and type-tested (TTA), has been developed for low-voltage applications for the following performance levels:

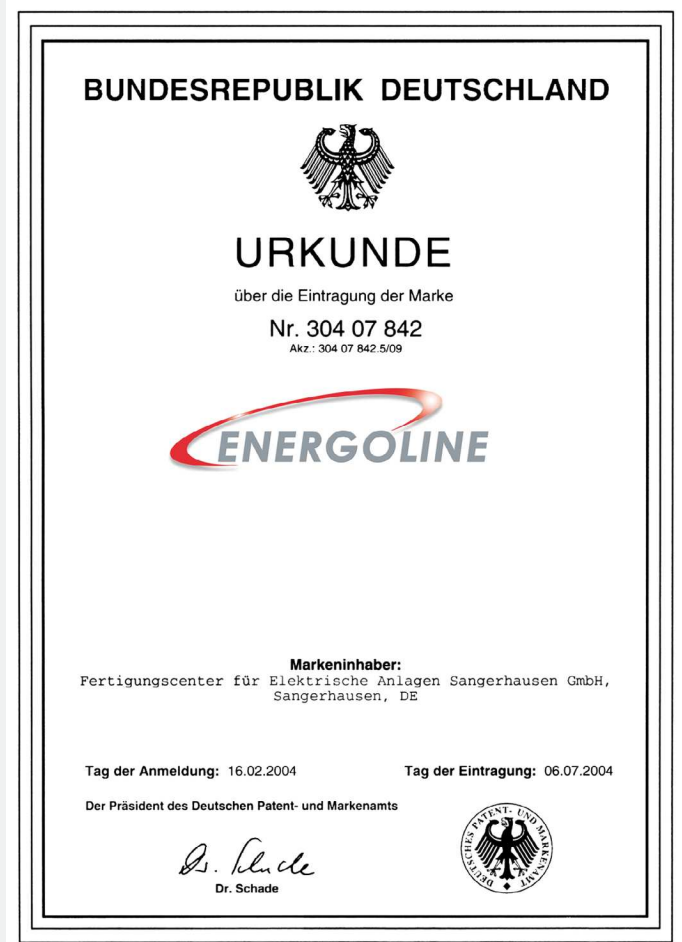
- » POWER CENTER up to 8500 A
- » MOTOR-CONTROL-CENTER up to 8500 A
- » Building distributors up to 4000 A
- » Drive and automation technology.

It is available in fixed mounting, plug-in and slide-in modular systems for power plant technology, the processing industry, and infrastructure. The technical basis for this product was developed at Siemens AG.

Additional arc fault tests in accordance with IEC 61641, VDE 0660 Part 500, Supplement 2 guarantee the highest possible level of plant and operator safety.

The low-voltage switchgear forms a link between equipment used for power generation (generators), its transportation (cables, overhead power lines), the conversion of energy (transformers) on the one hand, and consumers, such as motors, gears, motor-integrated drive systems, pumps, lighting, etc. on the other.

Type-tested modules, coordinated products and standardized connections within the **ENERGOLINE** family help create consistency across the entire portfolio.



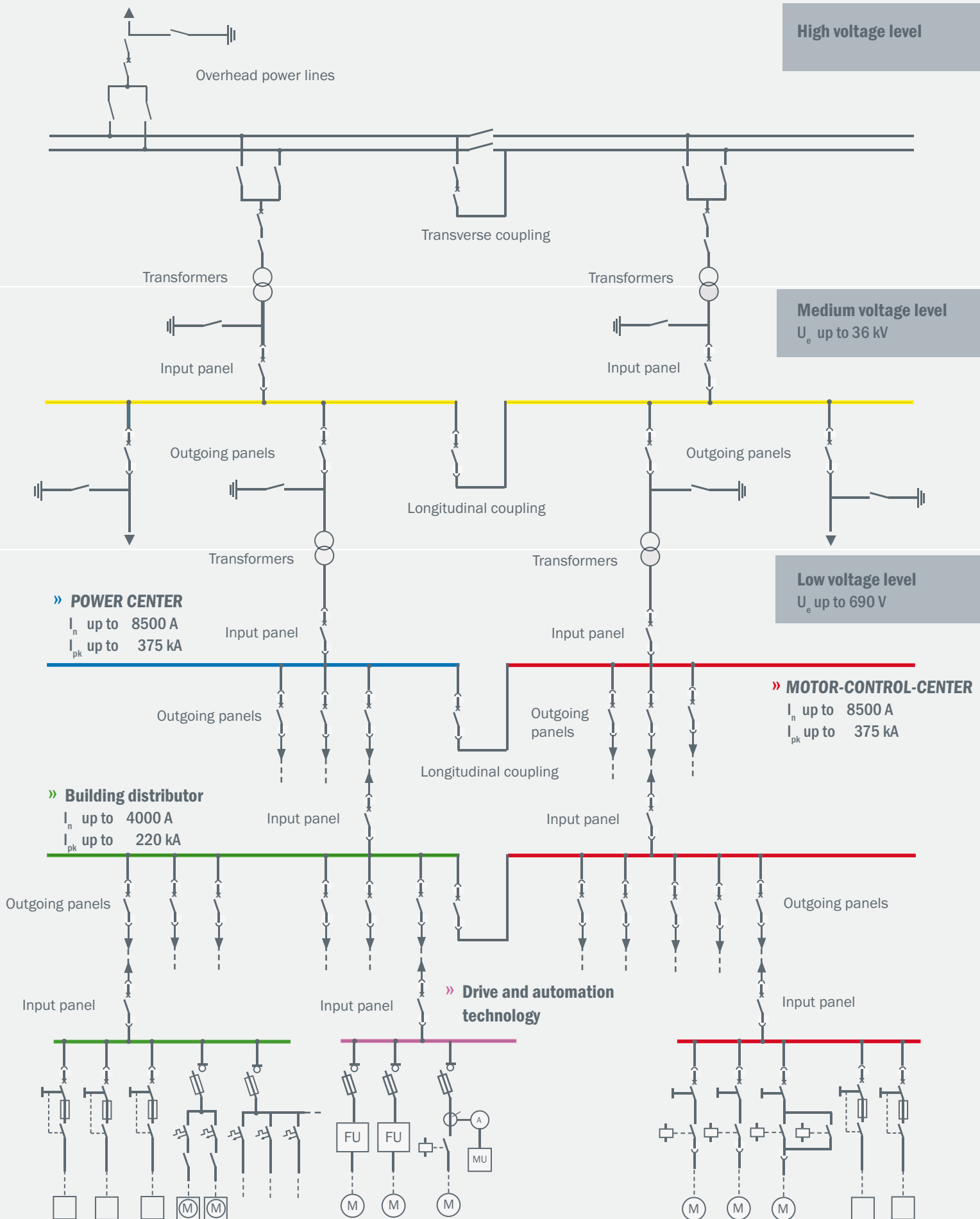
Power plant technology / Infrastructure



Processing industry



Applications in high, medium and low-voltage networks



Safe, reliable and versatile

The type-tested **INDUSTRIAL-SWITCHGEAR-SYSTEM**



POWER CENTER is a sophisticated modular product for flexible applications and high-performance requirements in power plants and process-oriented production plants. It is available in the following designs:

- » Fixed-mounting technology,,
- » Plug-in technology and
- » Withdrawable technology,.

The POWER CENTER can be used anywhere where low-voltage electrical energy needs to be distributed safely. It is suitable for any switching, separating, distribution and control tasks required of a switchgear device.

The POWER CENTER is particularly suitable as a ground network distributor for medium and high outputs for a voltage range up to 690 V AC and 1000 V DC. The control panels for supplying, coupling, outgoing feeders and power factor correction are designed exclusively on the basis of type-tested and standardised modules. The exclusive use of high-quality switchgear devices ensures a long service life, selective protection for your supply units and seamless integration into all normal management and control systems..

POWER CENTERS are compatible with all other low-voltage switchgears in **ENERGOLINE** - range.

For many applications in the industry, a space-saving design is necessary, on both technical and economic grounds. Thanks to the consistent modular construction method in the electrical and mechanical design of our switchgear, it is possible to choose the design, protection type and interior fittings to suit individual requirements. This means that different installation technologies and functional units can be combined in one panel, e.g. applications for power distribution combined with MCC modules.

The POWER CENTER has been proven to provide operating and personnel safety through testing under arc conditions. Type testing ensures optimum operational and personnel safety. On page 6, you will find the certificates that were drawn up in close co-operation with accredited test institutes.

Ensuring the quality of our products and services is a top priority for our company. Continuous checking through internal quality management guarantees our customers a consistently high product quality.


The benefits for you at a glance

- » Maximum operating and plant safety through type-tested standard modules (TTA)
- » Maximum personnel safety with a design that incorporates arc fault protection (testing under arc conditions)
- » Flexible busbar arrangements above/behind (busbar system 3 to 5-pole)
- » Economies of scale, thanks to the combination of different installation technologies in one panel
- » High availability and flexibility in withdrawable technology through rapid conversion without downtime
- » Modular design of device compartments
- » Compact design, panel depths of 600/800 mm
- » Consistency, thanks to a type-tested trunking busbar system connection
- » Cable/busbar connection from above/below
- » High-quality switchgear devices ensure reliable operation
- » Front-of-board, duplex and back-to-back arrangement



Standards and provisions		Type-tested low-voltage switchgear combination Testing of behavior in the case of internal errors (arc fault) Protection against touching with the fingers or back of the hand in accordance with BGV A3 Protection against electric shock Air and creepage distances	IEC 60439-1 a. DIN EN 60439-1 (DIN VDE 0660 Teil 500) IEC 61641, VDE 0660 Teil 500, Beiblatt 2 DIN VDE 0106 Teil 100 DIN EN 50274, VDE 0660 Teil 514 DIN VDE 0110 Insulation group C for 1000 V
Electrical characteristics	Rated voltages	Rated insulation voltage U_i Rated operating voltage U_e Rated frequency	1000 V 690 V up to 50...60 Hz
	Rated currents I_e	Main busbars Distribution bars L 1/L2 Panel L10/L20 Panel L3/L30 Panel T2/T20 Panel T5/T50 Panel C Panel	up to 8500 A up to 6300 A up to 6300 A up to 2000 A up to 2000 A up to 1900 A up to 500 kvar
	Rated peak withstand current I_{pk}	Main busbars Distribution bars L 1/L2 Panel L10/L20 Panel L3/L30 Panel T2/T20 Panel T5/T50 Panel C Panel	375 kA up to 330 kA up to 330 kA up to 143 kA up to 143 kA up to 143 kA up to 143 kA
	Nominal device current I_n	Air circuit breakers SIEMENS SENTRON 3WL ABB SACE Emax Merlin Gerin Masterpact NT/NW	up to 6300 A up to 6300 A up to 6300 A
		Molded-case circuit breakers Siemens SENTRON 3VL ABB Tmax Merlin Gerin Compact NS	up to 1600 A up to 1600 A up to 3200 A
		In-Line Switch Disconnectors with Fuses Siemens 3NJ4/EFEN/JeanMüller/ABB XLB Siemens 3NJ6/Slime Line/SASIL	up to 1250 A up to 630 A
Mechanical characteristics	Panel dimensions	Cabinets and supporting frames Height Width Depth Preferred dimensions according to DIN 41488 Sheet 2	2200, 2600 mm 400, 600, 800, 900, 1000 mm 600, 800 mm Individual adjustments possible
	Protection classes	nach IEC 60529, EN 60529	IP 20 bis IP 54
	Surface protection	Coating according to DIN 43656, epoxy polyester powder coating Coating thickness Standard Supporting frame Enclosure	65 µm RAL 7035 RAL 7035 Special colors and double coating up to 130 µm also possible

Certificates

INSTITUT „PROFIL FÜR ELEKTRISCHE HOCHLEISTUNGSTECHNIK“ GMBH				
Unabhängiges, akkreditiertes Prüflaboratorium - registriert bei STA und LÖWAG				
<h1>TYPRÜFBEREICH</h1>				
NR. 1090.0082.1.069				
FEAG Fertigungscenter für Elektrische Anlagen GmbH Gewerbegebiet Heime Park Stiftweg 1/2 06526 Sangerhausen		AUFRAGZEIGER 		
FEAG Fertigungscenter für Elektrische Anlagen GmbH Gewerbegebiet Heime Park		HERSTELLER		
Niederspannungs-Schaltgerätekombination (4-feldiges Muster)		PROJEKT		
FEAG 800-40 Feld 1: 3P+N+D+PE 16 SEMENS_VN Feld 2: 3P+N+D+PE 10 ABB E-MAX Feld 3: 3P+N+D+PE 250kVaren/MCCT Feld 4: 3P+N+D+PE 50 MCC		TYP		
4-feldige Musteranlage		FERTIGUNGS-NR.		
Bemessungsspannung	U_n	690 V AC	ANFORDERUNGS-DATEN NACH ANFORDERUNG DES AUFRAGZEIGERS	
Bemessungsschließleistung	I_{sc}	1000 V		
Bemessungsschließleistungsfähigkeit	I_{th}	8 kV		
Bemessungsstrom	I_n	5500 A		
Bemessungskurzschlussleistung	I_{sc}	120 kA		
Bemessungsleistungsfähigkeit	I_{th}	264 kA		
Bemessungskurzschlussdauer	t	1 s	PROJEKT 	
Bemessungsfrequenz	f	50 Hz		
Unschützener Kurzschlussstrom unter Lichtbogenwirkung	I_{sc}	50 kA		
Bemessungskurzschlussfrequenz für Lichtbögen	f_{sc}	0,3 s		
Interne Unterbreitung		Form 4b		
IEC 60439-1:1999 DIN EN 60439-1 VDE 0660 Teil 200: 2000-08		PROJEKTSCHRIFT		
Nachweis der Einhaltung der Grenzwertparameter		UMFANG DER PRÜFUNG		
<ul style="list-style-type: none"> • Einhaltung der Grenzwertparameter • Kurzschlussfähigkeit • Wirkleistung des Schutzstromzertifikates • Prüfung nach Stützstellenabzählungen 		QUALITÄT DER PRÜFUNG		
04 bis 12. April 2001		PRÜFERZEICHEN		
Das Prüfobjekt hat die Typifikationen BESTANDEN				

RONALD BOEKER

INSTITUT „PROFIL FÜR ELEKTRISCHE HOCHSTUHLTECHNIK“ GMBH

IPH
LABOR

Назначение: исследование электрической прочности
и минимального прожига при ULVAG

ОТЧЕТ О ТИПОВОМ ИСПЫТАНИИ

№: 1002080365.138

FEAG Sanghaizen GmbH
Gewerbegebiet Heime Park
Silberweg 102
06528 Sanghaizen

ЗАКАЗЧИК

FEAG Sanghaizen GmbH
Gewerbegebiet Heime Park

ИСТОЧНИК

Комплект коммутирующих аппаратов цепей низкого напряжения
испытываемый объект

Сборная шка ENECORGUO BPJ 025 Premium 4100 A с верным тип

расположением

СЕРИЙНЫЙ

Оптический образчик коммутирующих аппаратуры
(по типу коммутационных шаров)

ПАРАМЕТРЫ

Расчетное рабочее напряжение

U_n 400/500 V

Расчетное рабочее напряжение изоляции

U_i 1000 V

Расчетный ток главной сборной шины

I_n 4100 A

Расчетная устойчивость главной сборной
шины к воздействию кратковременных

I_k 100 kA

токов

I_k 220 kA

Расчетная устойчивость главной сборной
шины к воздействию непрерывного

I_{th} 1 s

тока

f 50 Hz

Расчетная частота

f 50 Hz

Классы защиты

IP 4X

ИСПЫТАНИЯ

IEC 60439-1: 2004

НОМЕР

Подтверждение соответствия нормам:

- предельные значения превышения температуры
- соответствие к короткому замыканию
- эффективность системы защиты

ИСПЫТАНИЯ

с 11 по 20 марта 2008 г.

РЕЗУЛЬТАТ

Расчетные параметры испытываемого объекта были подтверждены
в ходе проведенного испытания.

Испытательный объект ВУДЕКРАТ типовое испытание.

ИСПЫТАНИЯ

ПРОФ. DR. JÜRGEN FRANKE
инженер
Т. 030 691 3058



RONALD BOEKER
инженер, тел. 030 691 3058

ИСПЫТАНИЯ

Настоящий отчет является документом, подтверждающим соответствие испытываемого объекта требованиям стандарта EN 60439-1 в отношении электрической прочности и минимального прожига при ULVAG. Он является частью договора на проведение испытаний и не может быть использован для других целей. Любые изменения в отчете должны быть согласованы с Институтом „PROFIL FÜR ELEKTRISCHE HOCHSTUHLTECHNIK“ GMBH.

IPH
LABOR

DR. P. O.

 	
Unabhängiges, akkreditiertes Prüfzertifikat - registriert bei STA und DVGW	
<h1>PRÜFZERTIFIKATION</h1> <h2>über durchgeführte Prüfungen im angegebenen Umfang</h2>	
FEAG Fertigungszentrum für Elektrische Anlagen GmbH Gewerbegebiet Helme Park Söfling 1/2 05356 Sangerhausen	AUßERPROBGER
FEAG Fertigungszentrum für Elektrische Anlagen	HERSTELLER
Niederspannungs-Schaltgerätekombinationen	PROFIBEST
MCC-Terminaleischilder BU003-1750 Steckleiten - 800	VERFÜGBARKEIT
Prüfmuster	FEAG/STA-ANL
Bemessungsbetriebsspannung	U _N 690 V AC
Bemessungsisolationsspannung	U _I 1000 V
Bemessungsbetriebsspannungsfestigkeit	U _{NS} 8 kV
Bemessungsisolationsspannungsfestigkeit	U _{IS} 5500 A
Bemessungsstromdichte	I _{SN} 1700 A
Bemessungskurzschlussstromfestigkeit Sammelneile	I _{SC} 120 kA
Bemessungsstromfestigkeit Sammelneile	I _{SN} 264 kA
Bemessungskurzschlussstromfestigkeit Verteilneile	I _{SC} 65 kA
Bemessungsstromfestigkeit Verteilneile	I _{SN} 143 kA
Bemessungskurzschlussdauer	t _{SC} 1 s
Bemessungsfrequenz	f _N 50 Hz
Bedingter Bemessungskurzschlussstrom der N-Sicherungsleiter	I _{SC} 50 kA
Schutzart	IP40
Interne Unterteilung	Form 4b
VDE 0660 Teil 501: 2000-08 DIN EN 60949-1: 2000-08 IEC 60439-1: 1999	PRÜFVERFAHREN
Nachweis der <ul style="list-style-type: none"> • Einhaltung der Grenzberührungstemperaturen • Kurzschlussfestigkeit • Wirksamkeit des Schutzleiterstromkreises 	UMFANG DER PRÜFUNG
04 bis 17 April 2001	DATUM DER PRÜFUNG
Die Typenprüfungen sind im PEH-Protokoll Nr. 1380/00871.069 dokumentiert.	PRÜFERBEZUG

PROF. DR. JÜRGEN PÄNKE
Geschäftsführer
Berlin, den 10. April 2002

PROF. DR. JÜRGEN VÖGER
Vorsitzender
Vögerle, 10. April 2002

SYSTEME ZERTIFIZIERUNGSGESellschaft

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОСТСТАНДАРТ РОССИИ

СЕРТИФИКАТ СООТВЕТСТВИЯ

PG

№ РОСС DE.A534.001801
Срок действия с 01.10.2009

ISO 90.09.2012

8214427

ОТВЕТНОСТЬ ПО СЕРТИФИКАЦИИ ре: № РОСС RU.0001.114281
ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "СЕРТИФИКАЦИЯ ПРОДУКЦИИ
"СТАНДАРТ-ТЕСТ"
121208, с. Москва, ул. Маршала Тухомовского, д. 4, офис 1, тел. (495) 743-69-32, (499) 726-30-02, факс (499)
726-30-01, info@standart-test.ru

ПРОДУКЦИЯ устройств комбинированных источников электроэнергии и
устройства электрической энергии ENERGOLINE типа МР-Ремонт.

Средний выпуск

КОД ОК ВЕС (ГОСТ):
34 2400

ГОСТ Р 51521.1.3 2007

КОД ТН ВЭД, Россия:
8537

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ

ИЗГОТОВИТЕЛЬ Фирма «FEAG Sangerhausen GmbH»
Sefeweg 1+2 06526 Sangerhausen Bundesrepublik Deutschland, Германия

СЕРТИФИКАТ ВЫДАН Фирма «FEAG Sangerhausen GmbH»
Sefeweg 1+2 06526 Sangerhausen Bundesrepublik Deutschland, Германия




НА ОСНОВании Протокола сертификационных испытаний №3644-111 от 01.10.2009г. Испытаний
лаборатория 1437 "1161" ре: № РОСС RU.0001.211344 от 23.03.2008, адрес: Россия, 125040, с. Москва, ул.
Алешкина, д. 18. Сертификата соответствия системы менеджмента качества издательства «Технический
Словарь» ISO 9001:2008, №71 100 D 21657 от 27.02.2007, по 26.02.2010г., выданного ОС "ТУС СВЕТ"

АДПОЛНАТЕЛНАТА ИНФОРМАЦИЯ Знак соответствия наносится на этикетку, указавшее место с
адресом: Германия, Восточная Германия, в соответствии с действующими. Форма и размеры знака по ГОСТ Р
06640-95. Неиспользуемый сегмент: октябрь 2010г., октябрь 2011г.
Сегмент сертификации 3

Руководитель органа

И.Е. Тарасова
И.Г. Лаврова

П

INSTITUT „PROFIL FÜR ELEKTRISCHE HOCHSTUFTTECHNIK“ GMBH Unabhängiges, akkreditiertes Prüfaboratorium – registriert bei STA und LMAWG		
<h1>PRÜFBEREICHUNG</h1> <h2>über durchgeführte Prüfungen im angegebenen Umfang</h2>		
FEAG Fertigungscenter für Elektrische Anlagen GmbH Cowergebauleite Heime Park Silbweg 1/2 06526 Sangerhausen	AUFRÄGER	
FEAG Fertigungscenter für Elektrische Anlagen GmbH Niederpannenstraße/Schlagelstraßekombination	HERSTELLER	
5-Station 1000 KVA Daimler Chrysler	PROJEKT	
Prüfmuster Trafobus	TYP	
Bemessungsspannung Bemessungsschaltleistung Bemessungsfrequenz Bemessungsfaktorfestigkeit Bemessungsfaktorfestigkeit 1 s Bemessungsstrom der Hauptarmaturenschleife	U_N 400 V S_N 1000 V f_N 50 Hz k_N 176 kA k_{1s} 80 kA I_N 2240 A	BERECHNUNGS- DATEN NACH ANFORDERUNG DES AUFRÄGERS
Nach Vorgaben des Auftragsbes in Anlehnung an DIN EN 60439-1 Bst 2 VDE 0660 Teil 500 Bst 2: 1997-10	PROVYSCHNIT	
Prüfung unter Störlichtbogenbedingungen mit einem umbeinstellten Kurzschlusswechselstrom von 80 kA bei 440 V und einer eingestellten Prüfdauer von 300 ms bei Zündung an der Hauptarmaturenschleife in der	UMFANG DER PRÜFUNG	
1. Juli 2002	DATUM DER PRÜFUNG	
Die Bewertungskriterien 1 bis 5 der DIN EN 60439-1 Bst 2 VDE 0660 Teil 500 Bst 2: 1997-10 wurden erfüllt. Die Prüfung wurde BESTANDEN. Die Prüfergebnisse sind im Prüfprotokoll Nr. 1000205472-205 dokumentiert.	PRÜFERGEBNIS	
<div style="display: flex; justify-content: space-between;"> <div>  <p>H. GLAGATZ Leiter Zertifizierung-Profil</p> </div> <div>  <p>L.M. BÖTTCHER Leiter Prüfmuster-Prüfung</p> </div> </div>		

ASTA

TEST REPORT

Test Report No. 2244

Laboratory Ref. No: 1090.2900366.337

APPARATUS: Low-voltage switchgear assembly consisting of:
- a three-phase and neutral main busbar system,
- a protective busbar,
- an incoming unit with ACB,
- 25 outgoing units

DESIGNATION: ENERGOLINE BP0003 Premium 6300 A

MANUFACTURER: FEAG Sangerhausen GmbH
Gewerbegebiet Heime Park
Siltwang 12
06529 Sangerhausen, Germany

TESTED BY: Institut „Puffert für elektrische Hochleistungstechnik“ GmbH
Landberger Allee 378A
12681 Berlin, Germany

DATE(S) OF TESTS: 14 and 17 March 2008

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this test report has been tested in accordance with Client's instructions.

The test procedure and test parameters were based on

IEC/TR 01641: 2008-01

Tests under conditions of arcing due to an internal fault with a short-circuit current of 65 kA and 85 kA at a rated operational voltage of 650 V and a duration of short-circuit of 300 ms

This is not a certificate of rating.
A certificate of rating was not issued as this test is not a type test or a compulsory test.

The documents forming this Test Report are:

Record of Proving Tests: 1 to 42
Diagram No. 1
Occlagram No. 104, 108 1062, 108 1094, 108 1099 to 108 1101
Photograph Nos. 18
Drawing Nos. 3065597 (9 Pages)

The Record of Proving Tests applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designation with that tested rests with the Manufacturer.


UKAS
CERTIFICATION
010


22.5.2008

ASTA Overseas
R. Bonshart
Certification
Manager

Date

Reproduction of this report without written permission from ASTA BEAD CERTIFICATION
Company, Warrimah, CV21 2DR is strictly prohibited.

ASTA TEST REPORT

Laboratory Ref. No.: 1090.2080365.336 **Test Report No.:** 2243

APPARATUS: Low-voltage switchgear assembly consisting of:

- a three-phase main busbar system,
- a three-phase distribution busbar system,
- a horizontal and vertical protective busbar,
- 12 outgoing units

DESIGNATION: ENERGILINE 8PU003 Premium 4100 A MCC outgoing panel

MANUFACTURER: FEAC Sangerhausen GmbH
 Gewerbetgebiet Heime Park
 Stiftweg 12
 06526 Sangerhausen, Germany

TESTED BY: Institut „Profuor für elektrische Hochleistungstechnik“ GmbH
 Landberger Allee 37/6A
 12651 Berlin, Germany

DATE(S) OF TESTS: 20 March 2008

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this test report has been tested in accordance with Client's instructions.

The test procedure and test parameters were based on

IEC/TR 61641: 2008-01

Tests under conditions of arcing due to an internal fault with a short-circuit current of 85 kA at a rated operational voltage of 690 V and a duration of short-circuit of 300 ms

This is not a certificate of rating.
 A certificate of rating was not issued as this is not a type test or a compulsory test.

The documents forming this Test Report are:

Record of Proving Tests:	Pages 1 to 19
Diagram No.	1
Disclogram No.	102 1137 and 108 1163
Photograph Nos.	1 to 6
Drawing Nos.	300597 (3 Pages)

The Record of Proving Tests applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designation with that tested rests with the Manufacturer.



UKAS
CERTIFICATION

610




**ASTA Observer
Certification
Manager**

Date

Reproduction of this certificate without the written permission from ASTA BEAR CERTIFICATION is prohibited.

Reproduction of this certificate without the written permission from ASTA BEAR CERTIFICATION is prohibited.

PRÜFBESCHEINIGUNG

[illegible]

PRÜFBESCHEINIGUNG

[illegible]

Modular panel design

Modular functional units in the single panel and in the design of the overall system allow optimal adaptation to your requirements.

The single panel is divided into fixed functional compartments (functional units):

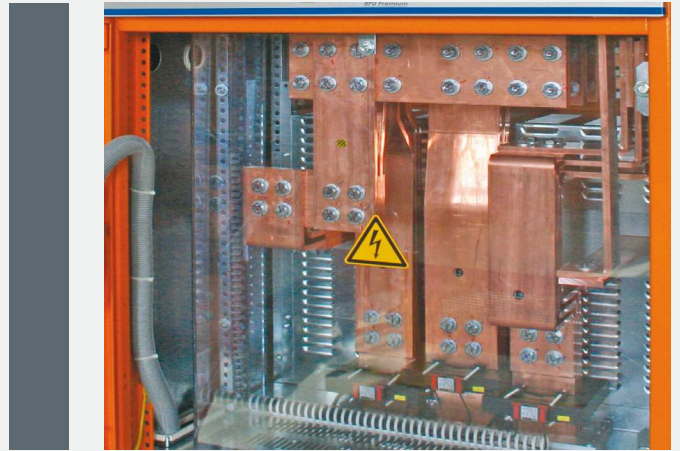
- » Device compartment,
- » Busbar compartment,
- » Cable-connection and busbar-connection compartment,
- » Cross-wiring compartment or auxiliary compartment.

All functional units can be combined in any order and, if necessary, switched among themselves, irrespective of the busbar arrangements and panel depths.

The device compartment is used to attach switchgears and control devices.

The connection compartments provide a convenient space for connecting cables and external busbar systems from all well-known providers. This connection undergoes the same level of type-testing as the POWER CENTER and thus increases safety for the operator. The busbar compartment contains the 3 to 5-pole main busbar and the panel distribution busbars. Cables and busbars can be inserted from above and below. In addition to the outer cables, the dimensions of the cable-connection compartment also allow it to accommodate current and voltage transformers, cable clamp rails and the control voltage busbar system.

Busbar distributor connection

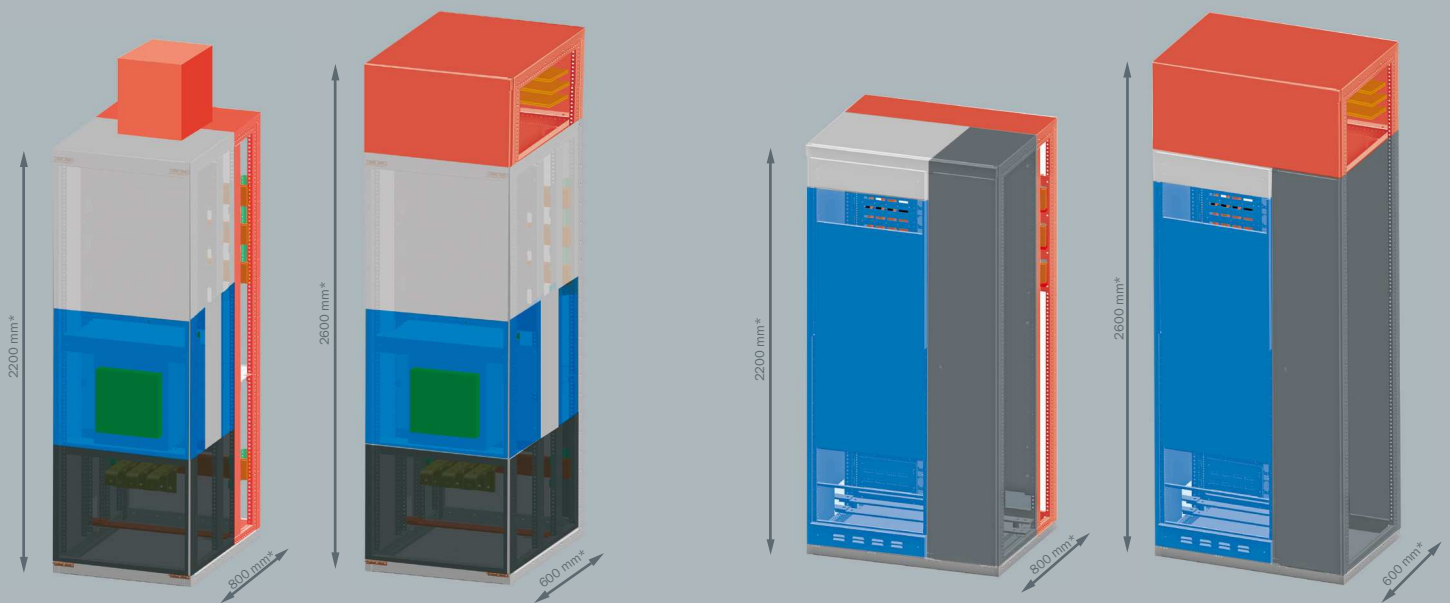


The cross-wiring compartment provides continuity for the bus, control and loop circuits from panel to panel..

The auxiliary device compartment is designed for components that generate control voltage, terminal strips, etc.

The panel width is available from 250 to 1,200 mm, depending on your technical requirements.

The panel depth is 600 or 800 mm as standard. A type-tested version with a 700 mm panel depth is available for transformer load centre substations.



* variable adjustment possible

- Busbar compartment
- Cable-connection and busbar-connection compartment
- Cross-wiring compartment or auxiliary compartment
- Device compartment

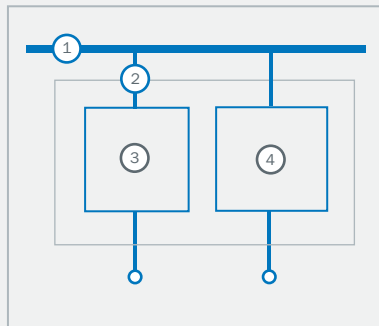
Function of internal division

It is possible to increase personnel and plant protection through a meaningful, needs-based internal division of the single panels in accordance with DIN EN 60439 Part 1. Internal divisions are achieved in the function compartments through dividers, covers or device casings. Bulkhead partitions should be used for arc-proof division of the panel.

What objectives can be reached in terms of protection?

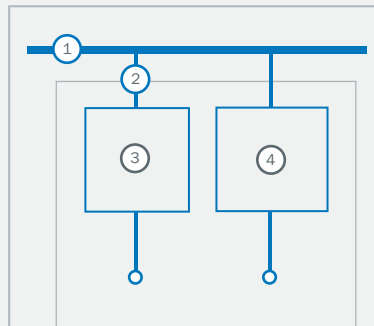
- » Protection against dangerous parts coming into contact with neighbouring functional units
- » Protection against foreign bodies moving from one functional unit to a neighbouring one
- » Protection against dangerous parts accidentally coming into contact with one another within the functional unit.

Arrangement 2 Division between main busbar and functional units









Arrangement 2a

No division between connections and busbars

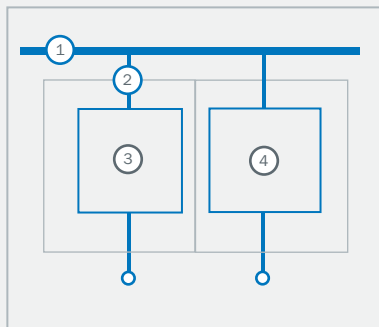


Arrangement 2b

Division between connections and busbars

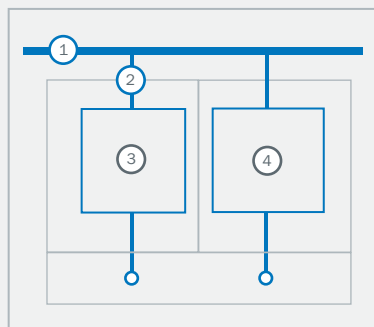
-  Functional unit
-  Cable connection
-  Main busbar
-  Panel distribution busbar
-  Supply
-  Outgoing feeders

Arrangement 3 Division between: - Busbars and functional units - Functional units (amongst themselves) - Connections and functional units



Arrangement 3a

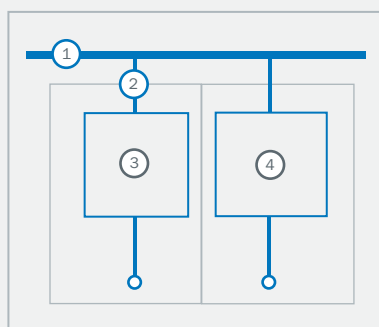
No division between connections and busbars



Arrangement 3b

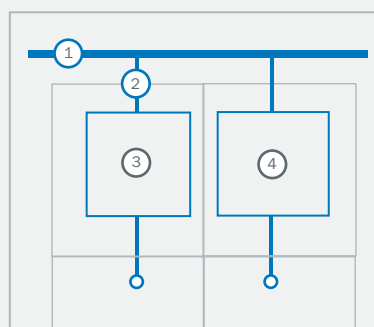
Division between connections and busbars

Arrangement 4 Division between: - Busbars and functional units - Functional units (amongst themselves) - Connections and functional units



Arrangement 4a

Connections in the same division as the connected functional unit



Arrangement 4b

Connections not in the same division as the connected functional unit

Features of the main busbars and panel distribution busbars

Number and dimensions	Material	I_n current carrying capacity at room and ambient temperature (35 °C), Protection type IP 41	I_{cw} $kA_{eff}, 1 s$	I_{pk} Short-circuit strength (peak current, peak value)
Main busbars				
2x40x10	Cu	1700 A	80	176 kA
2x60x10	Cu	2250 A	80	176 kA
2x80x10	Cu	2700 A	80	176 kA
2x100x10	Cu	3200 A	80	176 kA
2x120x10	Cu	3750 A	100	220 kA
2x120x10 sw	Cu	4050 A	100	220 kA
4x100x10	Cu	5500 A	120	264 kA
4x120x10 sw	Cu	6300 A	120	264 kA
Distribution bars				
1x40x10	Cu	600 A	55	120 kA
2x30x10	Cu	1200 A	65	143 kA
2x40x10	Cu	1600 A	65	143 kA
1x100x10	Cu	1900 A	65	143 kA

On request: tin-plated copper busbars

Nominal currents of transformers

Rated currents and initial short-circuit alternating currents

of three-phase current distribution transformers with 50 to 3,150 kVA

Rated voltage U_{rT}	400/230 V, 50 Hz			525 V, 50 Hz			690 V, 50 Hz		
Transformer rated power S_{rT}	Rated current I_n	Rated value of short- circuit voltage $U_{kr} = 4\% ^{1)} \quad U_{kr} = 6\% ^{2)}$		Rated current I_n	Rated value of short- circuit voltage $U_{kr} = 4\% ^{1)} \quad U_{kr} = 6\% ^{2)}$		Rated current I_n	Rated value of short- circuit voltage $U_{kr} = 4\% ^{1)} \quad U_{kr} = 6\% ^{2)}$	
		Short-circuit voltage I_k			Short-circuit voltage I_k			Short-circuit voltage I_k	
kVA	A	A (eff.)	A (eff.)	A	A (eff.)	A (eff.)	A	A (eff.)	A (eff.)
50	72	1933	1306	55	1473	995	42	1116	754
100	144	3871	2612	110	2950	1990	84	2235	1508
160	230	6209	4192	176	4731	3194	133	3585	2420
200	288	7749	5239	220	5904	3992	167	4474	3025
250	360	9716	6552	275	7402	4992	209	5609	3783
315	455	12247	8259	346	9331	6292	262	7071	4768
400	578	15506	10492	440	11814	7994	335	8953	6058
500	722	19438	12020	550	14810	9158	418	11223	6939
630	910	24503	16193	693	18669	12338	525	14147	9349
800	1154	-	20992	880	-	15994	670	-	12120
1000	1444	-	26224	1100	-	19980	836	-	15140
1250	1805	-	32791	1375	-	24984	1046	-	18932
1600	2310	-	39818	1760	-	30338	1330	-	22989
2000	2887	-	52511	2200	-	40008	1674	-	30317
2500	3608	-	65547	2749	-	49941	2090	-	37844
3150	4550	-	82656	3470	-	62976	2640	-	47722

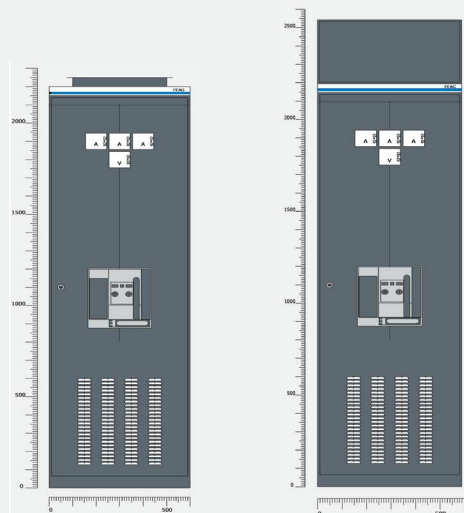
¹⁾ To DIN 42503 for $S_{rT} = 50$ to 630 kVA

²⁾ To DIN 42511 for $S_{rT} = 100$ to 1,600 kVA

³⁾ Unaffected transformer initial short-circuit alternating current when connecting to a network with unlimited short-circuit power, taking into consideration the voltage and correction factor of transformer impedance in accordance with DIN EN 60909/ DIN VDE 102 (07/2002)

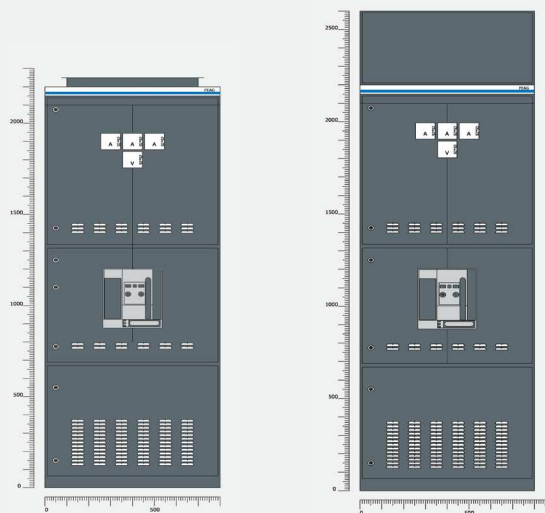
Overview

Circuit-breaker panel L1/L2 panel from 630 A to 6300 A
Fixed-mounting and withdrawable technology



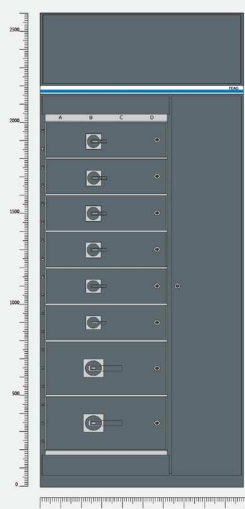
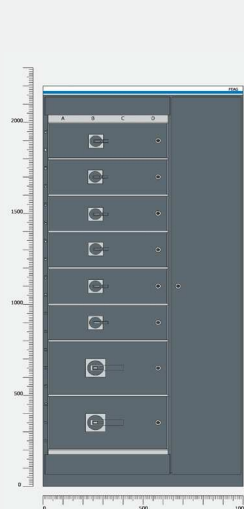
See page 11

Circuit-breaker panel L10/L20 panel from 630 A to 6300 A
Fixed-mounting and withdrawable technology



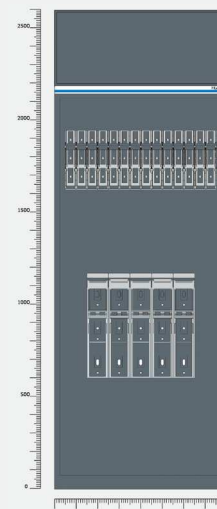
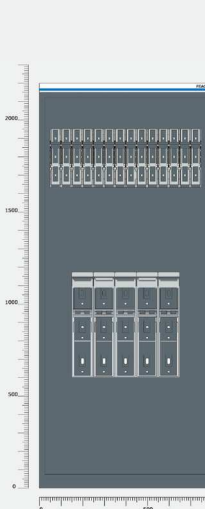
See page 12

Circuit-breaker panel L3/L30 panel
Fixed-mounting, plug-in and withdrawable technology



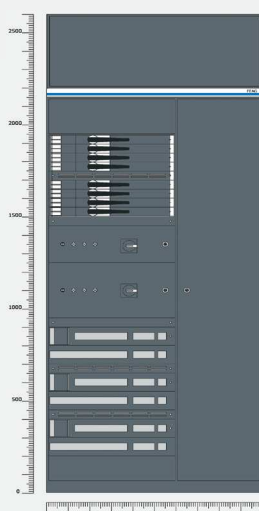
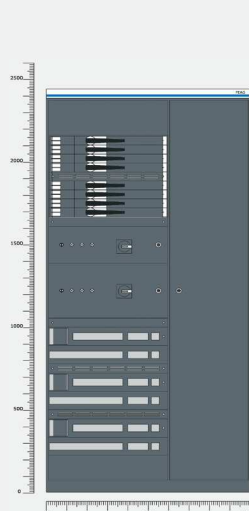
See page 13

POWER CENTER
T2/T20 panel – fixed-mounting technology up to 1600 A



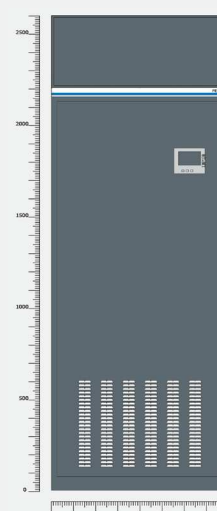
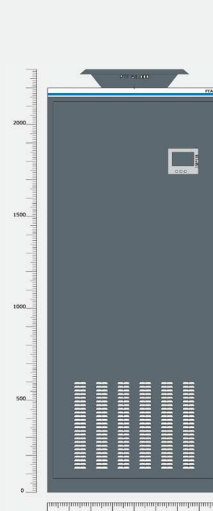
See page 14

POWER CENTER
T5/T50 panel – plug-in technology up to 630 A



See page 15

Power factor correction
C panel



See page 17

Type-tested modules in fixed-mounting and withdrawable technology

Aufbau

- » Needs-based internal subdivision of functional compartments
Form 1 to Form 4b
- » Feed-in possible from above and below
- » Device support plate above or below the circuit breaker to facilitate the addition of a wide range of control systems and locking devices, as well as the control technology connection
- » Incorporation of the measuring devices and touch panels at eye level for the panel-high door
- » Cable connection busbars for:
 - Installing current transformers
 - max. 24 single conductors 300 mm²
- » Consistency, thanks to a type-tested trunking busbar system connection

Device spectrum

- » Air circuit breakers
SIEMENS SENTRON 3WL
ABB SACE Emax
Merlin Gerin Masterpact NT/NW

Dimensions

- » Panel depth: 600/800 mm
- » Panel height: 2200/2600 mm
- » Panel width: according to circuit breaker specifications

Air circuit breakers (TNC networks)

Size	Typ	Nominal current I_n in A	Short-circuit breaking capacity I_{cu} in kA		
			AC 415 V	AC 500 V	AC 690 V
I	3WL11	630	55/66	55/66	42/50
	3WL11	800	55/66	55/66	42/50
	3WL11	1000	55/66	55/66	42/50
	3WL11	1250	55/66	55/66	42/50
	3WL11	1600	55/66	55/66	42/50
II	3WL12	800	66/80/100	66/80/100	50/75/85
	3WL12	1000	66/80/100	66/80/100	50/75/85
	3WL12	1250	66/80/100	66/80/100	50/75/85
	3WL12	1600	66/80/100	66/80/100	50/75/85
	3WL12	2000	66/80/100	66/80/100	50/75/85
	3WL12	2500	66/80/100	66/80/100	50/75/85
	3WL12	3200	66/80/100	66/80/100	50/75/85
	3WL12	4000	66/80/100	66/80/100	50/75/85
III	3WL13	4000	100/150	100/150	85/150
	3WL13	5000	100/150	100/150	85/150
	3WL13	6300	100/150	100/150	85/150
E1	SACE Emax	800	42/50	42/50	42/50
	SACE Emax	1000	42/50	42/50	42/50
	SACE Emax	1250	42/50	42/50	42/50
E2	SACE Emax	1600	42/65/85/130	42/55/65/85	42/55/65/85
	SACE Emax	2000	42/65/85/130	42/55/65/85	42/55/65/85
E3	SACE Emax	2500	75/100/130	75/100	75/85/100
	SACE Emax	3200	75/100/130	75/100	75/85/100
E4	SACE Emax	4000	75/100/150	75/100/150	75/85/100
E5	SACE Emax	5000	100/150	100/130	100
	SACE Emax	6300	100/150	100/130	100

Detailed information on design features, model types, electronic triggers, etc. for the installation devices can be found in the manufacturers' catalogues.

Panels of application

Incoming and outgoing supply

Longitudinal and transverse coupling

L2 panel: input panel with withdrawable circuit breaker SACE Emax



L2 panel: input panel with withdrawable circuit breaker SENTRON 3WL



Panels of application
Incoming and outgoing supply
Longitudinal and transverse coupling

Type-tested modules in fixed-mounting and withdrawable technology

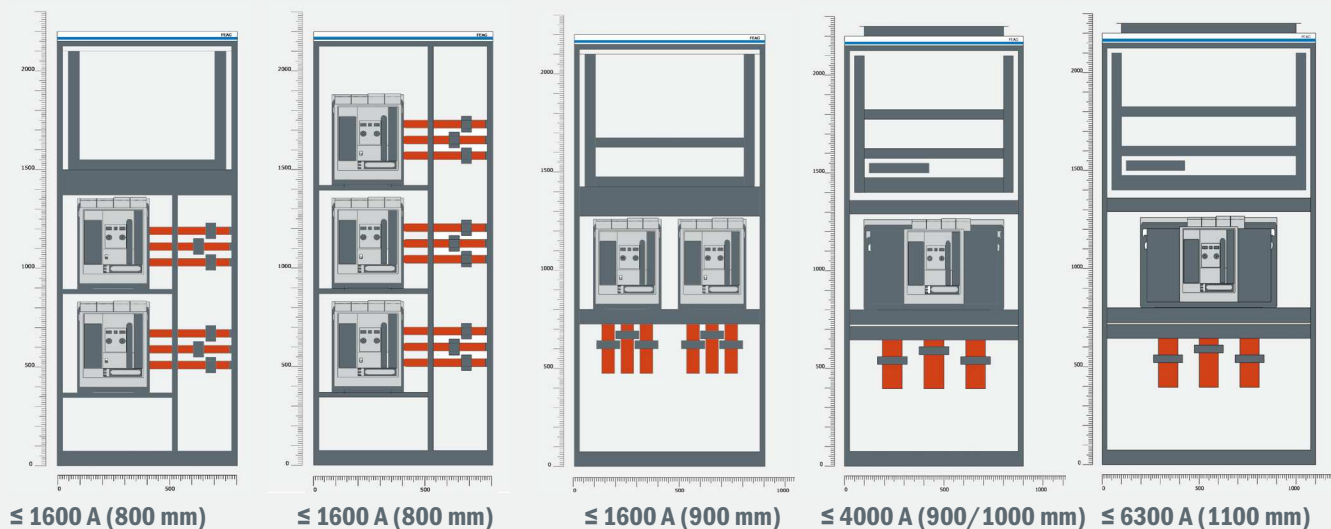
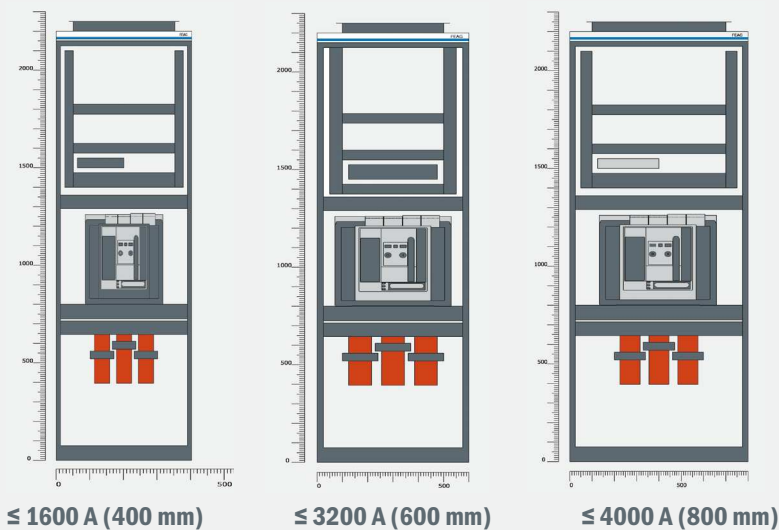
Aufbau

- » Needs-based internal subdivision of functional compartments
Form 1 to Form 4b
- » Feed-in possible from above and below
- » Device support plate above or below the circuit breaker to facilitate the addition of a wide range of control systems and locking devices, as well as the control technology connection
- » Incorporation of the measuring devices and touch panels at eye level for the panel-high door
- » Cable connection busbars for:
 - Installing current transformers
 - max. 24 single conductors 300 mm²
- » Consistency, thanks to a type-tested trunking busbar system connection

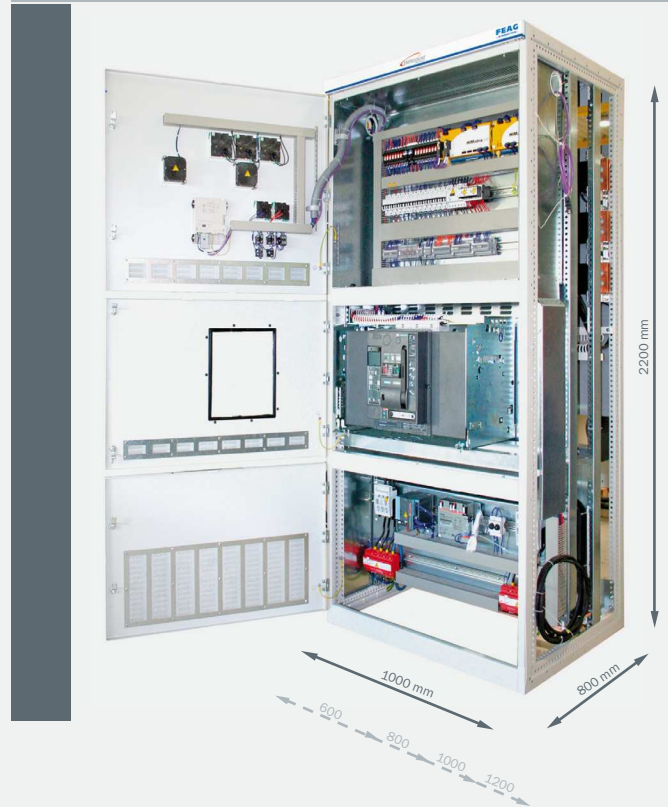
Device spectrum

- » Air circuit breakers
SIEMENS SENTRON 3WL
ABB SACE Emax
Merlin Gerin Masterpact NT/NW

Variations of panel width according to circuit-breaker specification



L20 panel: coupling with withdrawable circuit breaker



Dimensions

- » Panel depth: 600/800 mm
- » Panel height: 2200/2600 mm
- » Panel width: according to circuit breaker specifications

Type-tested modules in fixed-mounting, plug-in and withdrawable technology with compartment doors

For applications in which a strict modular division (arrangement 3 to 4b) is desired, the L3/L30 panel is a safe and variable solution. The individual compartments in the control panel are fitted with compact circuit breakers in withdrawable, plug-in and fixed-mounting design.

Another alternative is to fit the compartments with fuse switches and drive modules in fixed-mounting design. Creating internal divisions in functional compartments up to arrangement 4b ensures protection against busbars and distributor busbars coming into contact with neighbouring functional units when working on a functional unit (device compartment or cable-connection compartment).

Fitting single compartments

Manufacture	Typ	Nominal current in A	Frame height in mm
Siemens AG	3VL1/2	160	200
	3VL3	250	300
	3VL4	400	300
	3VL5	630	500
	3VL6	800	600
ABB	SACE Isomax S1	125	200
	SACE Isomax S2	160	200
	SACE Isomax S3	160-250	300
	SACE Isomax S4	160-250	300
	SACE Isomax S5	400-630	500
	SACE Isomax S6	630-800	600

Construction

- » Fitting single compartments with switchgear and protection devices as well as combinations, control and measuring devices in the respective panel door
- » Needs-based inner division of functional compartments, arrangement 1 to arrangement 4b
- » Conversion, retrofitting and exchange of an outgoing feeder after disconnecting the switchgear
- » Panel distribution busbars (3 and 5-pole) for supply-side circuit-breaker contact
- » Protection against touching the panel distribution busbar with the fingers or back of the hand
- » Cable connection work for power and control lines, as well as lines for PROFIBUS-DP interfaces directly at the switchgear and protection devices or in the separate cable-connection compartment:
 - Standard widths: 400 and 600 mm
 - Bracket with top hat rails for the installation of terminal blocks
 - Variable adjustment possible

Panels of application
Motor and outgoing feeders
Feeders to subdistributions

L30 panel: single compartments with compact circuit breaker



Device spectrum

- » Compact circuit breaker with rocker drive, front rotary drive or door coupling rotary drive:
SIEMENS SENTRON 3VL
ABB SACE Isomax
Merlin Gerin Kompakt

Dimensions

- » Panel depth: 600/800 mm
- » Panel height: 2200/2600 mm
- » Panel width: 1000/1200 mm
varies according to design

Panels of application
Outgoing feeders
Feeders to subdistributions

Type-tested modules in fixed-mounting technology

The panels for cable outlets in fixed-mounting technology are fitted with switchable NH fuse switches. They combine the functions “Load switching” and “Divide” in one system. Thanks to the integrated NH fuse, they also provide reliable protection against overloading and short-circuiting.

Device spectrum

- » Switch disconnectors with fuses in strip form:
SIEMENS 3NJ4, 3NJ5
Jean Müller SL
ABB XLB
EFEN E³

Dimensions

- » Panel depth: 600/800 mm
- » Panel height: 2200/2600 mm
- » Panel width: according to switch disconnectors with fuses in strip form specifications

Construction

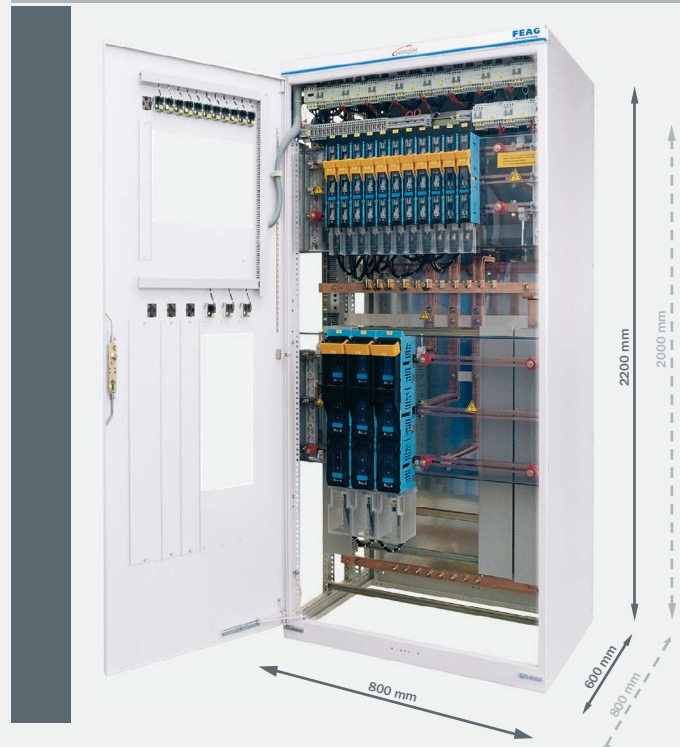
- » Requires little space, owing to compact design
- » Cable outgoing feeders up to 630 A with/without 3-pole current measurement
- » High-density package — up to 16 outgoing feeders per panel
- » State-of-the-art energy management through flexible measuring options: control and measuring devices in the cabinet door or at the switch strip (1-pole)
- » Optional installation of carrier plates that can be freely inserted
- » Protection against touching the panel distribution busbar with the fingers or back of the hand
- » Individual and general malfunction alert through electronic fuse monitoring

Fitting with NH fuse switches

Manufacture	Size	A	rated conditional short-circuit current * in kA	frame width in mm
Siemens	00	160	80/50	50
	1	250	110	100
	2	400	110	100
	3	630	110	100
	4	1250	80	248
EFEN	00	160	50	50
	1	250	80	100
	2	400	80	100
	3	630	80	100
	4a	1250 1600	50	122
Jean-Müller	00	160	50	50
	1	250	110	100
	2	400	110	100
	3	630	110	100
Douple strip	3*	1250	50	200

* on AC 40 Hz up to 60 Hz 690 V (protection to NH fuse switches)

T2 panel: NH fuse load switches in fixed-mounting technology in the sizes NH00, NH1, NH2 and NH3



T2 panel: NH fuse load switches in fixed-mounting technology



Type-tested modules in plug-in technology

With its plug-in technology, the POWER CENTER offers a cost-efficient standard alternative to withdrawable technology. The outgoing power and motor units are subdivided into functional assemblies. MCC plug-in modules and pluggable fuse switches in strip form (SASIL, SlimeLine, 3NJ6) can be combined as required. The pluggable switchgear devices and modules can be exchanged without any downtime.

Construction

- » Fitting the panel with load disconnectors with fuses in strip form as:
 - Switch disconnector with fuses featuring double-break isolation
 - Integrated ammeter (1-pole current measurement)
 - 3-pole current measurement possible
 - Optional: fuse monitoring in the strips
- » Flexibly combinable MCC functional assemblies
- » Fitting plug-in modules with switchgear and protection devices and combinations, installation of control and measuring devices in the swivel-mounted compartment door
- » Conversion, retrofitting and exchange of an outgoing feeder without disconnecting the switchgear
- » Side guiderails to ensure safe docking with the panel rails and plug contacts
- » Protection against touching the panel busbars with the fingers or back of the hand
- » Cable connection work for power and control lines, as well as lines for PROFIBUS-DP interfaces in a separate cable connection compartment:
 - Standard widths: 400 and 600 mm
 - Bracket with top hat rails for the installation of terminal blocks
 - Variable adjustment possible

Device spectrum

- » Switch disconnectors with fuses in strip form:
 - SIEMENS, 3NJ6 125 up to 630 A
 - ABB, SlimeLine 125 up to 630 A
 - Jean Müller, SASIL 125 up to 630 A
- » MCC plug-in modules up to 400 kW / 630 A fitted with high-quality switchgear and protection devices, ideally manufactured by SIEMENS, ABB or Schneider Electric, guarantee reliable operation:
 - Circuit breakers
 - Switch disconnectors
 - Contactors and contactor combinations for switching motors
 - Overload relays
 - Motor and soft starters
 - Motor management, monitoring and control units

Dimensions

- » Panel depth: 600/800 mm
- » Panel height: 2200/2600 mm
- » Panel width: varies according to design

Panels of application

Motor and outgoing feeders

Feeders to subdistributions

T5 panel: outgoing feeder panel with pluggable fuse load switches (3NJ6)



T5 panel: circuit-breaker technology in combination with fuse load switches (SlimeLine)



Type-tested modules in plug-in technology

There is a device compartment height of 1750 mm for the combination of the pluggable fuse-switch-disconnectors and plug-in modules. The distribution bar (plug-in busbar) is installed at the back of the panel and provides sensing apertures in the module grid of 50 mm. Reserve spaces can be provided for future retrofitting.

Fitting with switch disconnectors with fuses in strip form

Hersteller	Size	A	rated conditional short-circuit current in kA	frame width in mm
ABB	00	160	100	50
	1	250	100	100
	2	400	100	200
	3	630	100	200
Siemens	00	160	100	50
	1	250	100	100
	2	400	100	200
	3	630	100	200
Jean-Müller	00	160	$80^1/100^2$	50
	1	250	$80^1/100^2$	75
	2	400	$80^1/100^2$	150
	3	630	$80^1/100^2$	150

¹ on AC 40 Hz up to 60 Hz 690 V (protection to NH fuse switches)

² on AC 40 Hz up to 60 Hz 400 V (protection to NH fuse switches)

Fitting with MCC plug-in modules

Fuseless technology, 400 V/50 Hz, 50 kA, assignment type 2

Module size	DOL starter in kW	reversing circuit in kW	star/delta in kW
100	22	11	-
200	45	45	22
300	110	45	45
400	160	75	55
500	250	132	110
600	250	250	160

Cable connection

- » Input side: power plugged via power contacts to field busbar
- » Feeder side:
 - Outgoing feeders firmly connected – control pluggable via control contacts
 - Outgoing feeders firmly connected – control pluggable via control contacts
 - Outgoing feeders and control lines pluggable via contacts ($\leq 18, 5$ kW)

Panels of application

Motor and outgoing feeders

Feeders to subdistributions

T50 panel: combination of plug-in modules and fuse-switch-disconnectors (SlimeLine)



- » Switch disconnectors with fuses in strip form
Size 00 and size NH1, 2 or 3



- » Plug-in module:
DOL starter 55 kW with soft start and bypass contactor, module height 150 mm



Panels of application
Power factor correction
equitments

Type-tested compensation modules in fixed-mounting design

Providing capacitive reactive power at the centre of an energy distribution network reduces transmission losses, relieves the burden placed on transformers and cables, and reduces energy costs. The C panel offers a high level of power through its unlimited power supply up to 500 kvar in a panel with a degree of choking up to 14%.

Construction

- » Modular plates for fitting capacitor and actuator assemblies
- » Installation of the electronic reactive power regulator in the panel-high door
- » Degree of choking:
 - 5.67 %, 7 %, 12.5 % or 14 % (standard)
- » Special choking for suction effect, 3 to 11 harmoniously
- » Cable connection in the separate cable connection area or power factor correction system is powered via the main busbars in the plant network
- » Fuse load disconnectors: optional for centrally disconnecting the installed capacitor assemblies
- » Protection against touching the panel busbars with the fingers or back of the hand
- » Installation of a filter pad fan from IP54

Device spectrum

- » MKK power capacitors
- » Air contactors for capacitors
- » Thyro modules
- » Fuse load disconnectors
- » Filter reactors
- » Discharge devices
- » Electronic reactive power regulator

Dimensions

- » Panel depth: 600/800 mm
- » Panel height: 2200/2600 mm
- » Panel width: varies according to design

Fitting with compensation modules

Reactance	Rating power/ panel	Panel width
reactor protected	350 kvar	800 mm
without filter reactors	600 kvar	800 mm

C panel: functional assemblies in modular technology



C panel: 5 compensation assemblies, each fitted with 2 x 50 kvar, degree of choking of 7% (Thyro module)



Connection to management and control level

New perspectives are opened up for the implementation of cost-efficient and high-availability **INDUSTRIAL-SWITCHGEAR-SYSTEM** through features such as high system availability, prompt fault alarms and troubleshooting, in conjunction with a high degree of system transparency, all of which helps achieve a permanent reduction in operating costs. This is why intelligent MOTOR-CONTROL-CENTER, whose task is to control and protect motors, are today to be found everywhere in a wide range of industrial applications. In addition to modular motor starters in withdrawable-unit design and equipped with fieldbus-capable intelligent motor protection and control devices, intelligent POWER CENTER also represent state-of-the-art technology.

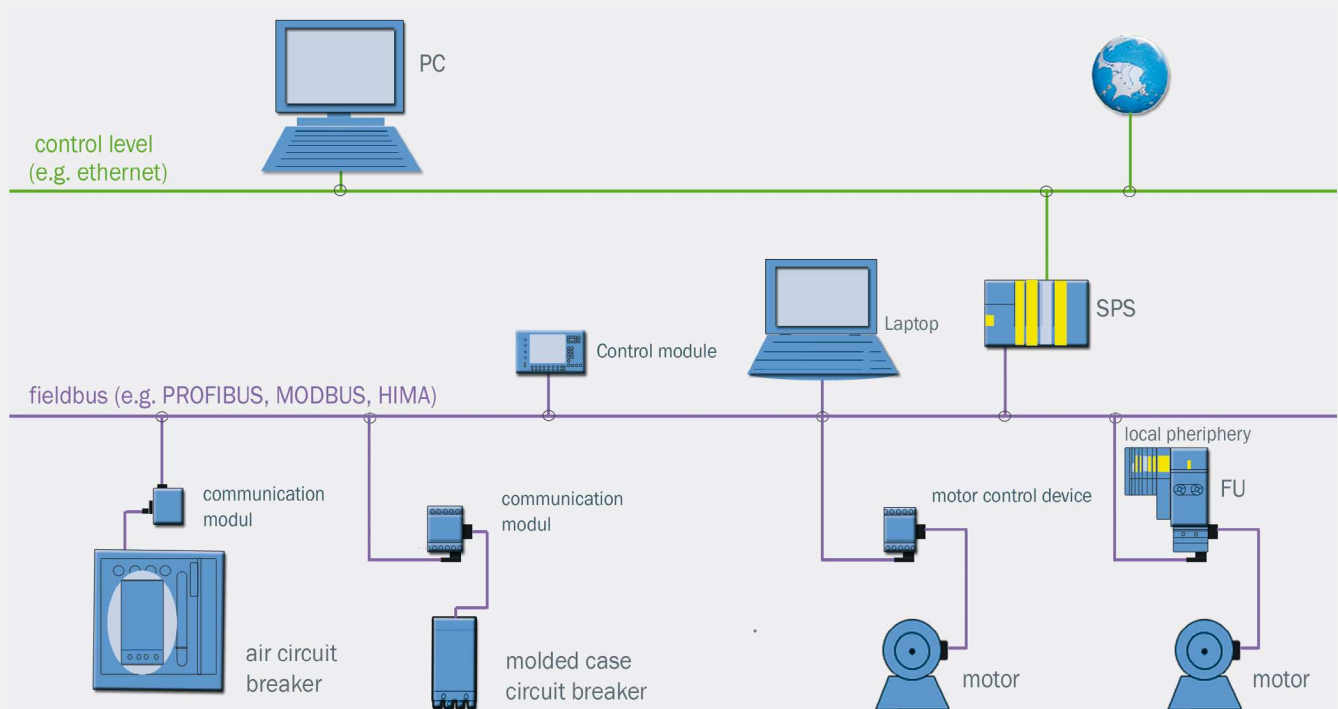
Device spectrum

- » Switchgear and protection devices with communication module
 - fuse load circuit breakers
 - air circuit breakers
- » Communicative soft starter
- » Motor management and control devices with integrated communication function
- » Multimeters with communication interface

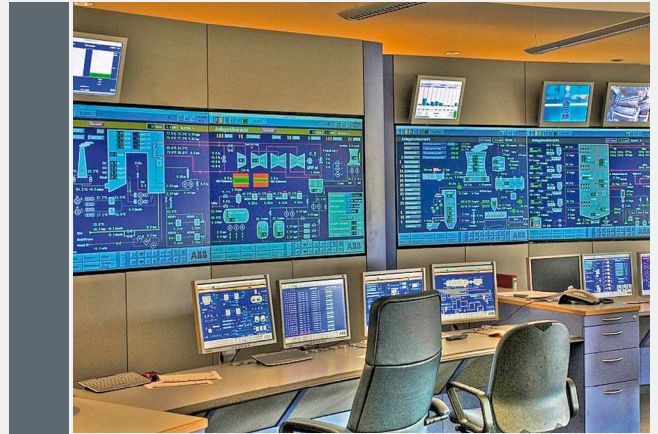
Features

- » Communication module as data interface
 - Connection to the PROFIBUS-DP or MODBUS
 - Remote operation, parameterization, and diagnosis
 - Continuous recording of system and operating data, such as switch status, voltage, power for acyclical data transfer
 - Modification of the switch-on interlock and operating sequence without rewiring

Incorporation into automation level



Measuring station



- » Communicative motor starter with control function
 - Connection to the PROFIBUS-DP or MODBUS
 - Recording of operating, service, and diagnosis data, which is also available for visualization
 - Electronic full motor protection, e.g.
 - Current-dependent electronic overload protection
 - Phase failure detection
 - Earth fault monitoring
 - Integrated control function, e.g.
 - DOL and reversing starter
 - Star/delta starter, also with reversal of rotation

Maximum system and personal protection

The POWER CENTER within the product family



is a type-tested, low-voltage switchgear combination (TTA) whose physical properties have been verified in the accredited testing laboratories for both operating and fault situations.

Type testing

- » Verification by testing of compliance with temperature rise limit
- » Verification by testing of insulation capability
- » Verification of a perfect connection between the assembly components and protective conductor by checking or by resistance measurement
- » Verification by testing the short-circuit strength of the protective conductor circuit
- » Verification of air and creepage distances
- » Verification of mechanical function
- » Verification of IP protection class

Testing under arc conditions

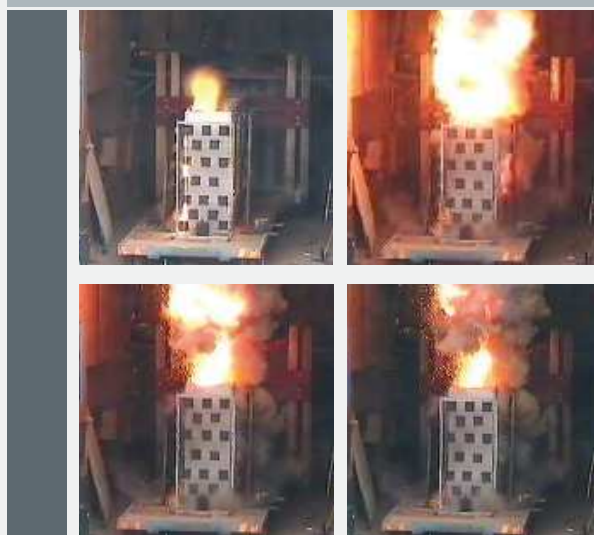
Arc fault safety is today a key feature; indeed, it is an essential requirement for many applications in modern **INDUSTRIAL-SWITCHGEAR-SYSTEMS**.

Arc faults cause an increase in pressure that results from a rapid rise in temperature in the interior of the switching cabinet. Their effects can endanger people working nearby. They can also damage equipment, with partial or complex destruction of the switchgear, along with secondary damage to buildings. No matter what the extent of the damage, the system operator can expect to face long production stoppages and high downtime costs.

Testing under arc conditions is deemed a special test in accordance with IEC 61641 or VDE 0660 Part 500, Supplement 2. The supplement in question relates to design-based arc fault protection.

Based on testing under arc conditions, the POWER CENTER can provide verification of a high level of personal safety in the area of the facility, as well as verification of the safety of the systems themselves.

L panels	726 V up to 65/85 kA 0,3 s
outgoing panel, MCC panels	726 V up to 85 kA 0,3 s



Factory routine testing before delivery

As a general rule, each switching cabinet undergoes routine testing in the factory before it is delivered:

- » Inspection of the switchgear combination or wiring
- » Conformity with the approved documentation
- » Optional electrical functional testing
- » Insulation test
- » Control of protective measures and inspection of the continuous protective conductor connections

Additional safety requirements

These exacting safety standards are backed up by further details:

- » Avoidance of faulty operation with the plug-in and slide-in modular technology, thanks to precisely developed mechanical guide mechanisms and locking devices
- » Use of only a limited number of exclusive, high-quality insulation materials (e.g. for stiffening, rail support, etc.)
- » The use of high-quality switchgear from well-known and reliable manufacturers ensures a long service life and minimum downtimes
- » Safe disconnection with circuit breaker after 70 to 100 ms, even with long delay times, with reduced time selectivity control
- » IT-based project planning ensures accurate selection and placement of equipment
- » Effective quality management

Map / address

Fertigungscenter für Elektrische Anlagen Sangerhausen


Industrial Park (Gewerbegebiet)
»Helme-Park«

Stiftsweg 1/2

06526 Sangerhausen

Fon +49 (0)3464 558-30

Fax +49 (0)3464 558-410

info@feag-sgh.de

www.feag-sgh.de

