

NATUS

INDUSTRIAL SOLUTION SYSTEMS

NATUS ENERGON Draw-out Type Low Voltage Switchgear System

Geared to the future thanks to innovation and quality



Energon



NATUS switchgear systems – safe and versatile

- ◆ type, arc fault and earthquake tested in accordance with IEC
- ◆ internal separation up to form 4b type 7
- ◆ with interlocked operating / disconnected / test position
- ◆ innovative due to ARC SAFE, DTS and CONTINUOUS LATCH



NATUS low voltage switchgears: ENERGON is setting new innovative standards

NATUS switchgear systems offer you professional, top quality solutions based on the highest safety standards. In our more than 50 year company history, NATUS has been building and delivering draw-out type switchgears since 1978.

Innovative developments

We are making the distribution of power in low voltage networks even safer with our own developed, type-tested switchgear assembly (TTA) certified switchgear system ENERGON. ENERGON switchgears have taken low voltage

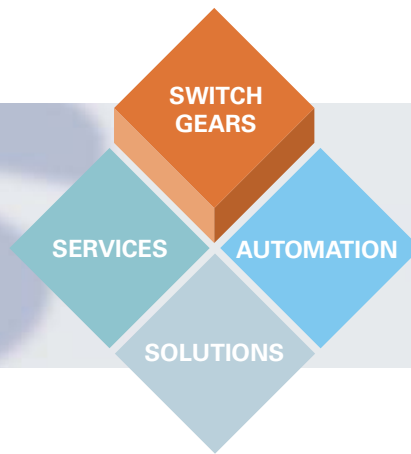
systems to a new safety level through a withdrawable system that had only till then been reached by medium voltage switchgears.

With the patented contact mechanism DTS, we very quickly set the standard on the market of MCC-systems. Since then, we have regularly enhanced the system with the help and advice of our customers. A globally unique ergonomic latch, the one-handed safety latch CONTINUOUS LATCH, closes the door "arc safe" without the use of tools.

Since 2004, the certified arc fault distribution busbar ARC SAFE has been built into the systems as a standard.

Low voltage – geared to the future

Numerous innovations and constant further developments are our guarantee for a reliable and geared to the future switchgear. We provide our customers with experienced engineering teams. That is how we guarantee an optimal design and the shortest possible delivery time.



Demanding customers across the world have put their faith in NATUS switchgear systems, and thus also in the quality and safety of our solutions.

The ENERCON-Highlights

ENERCON has taken low voltage switchgears to a new level of safety and technology

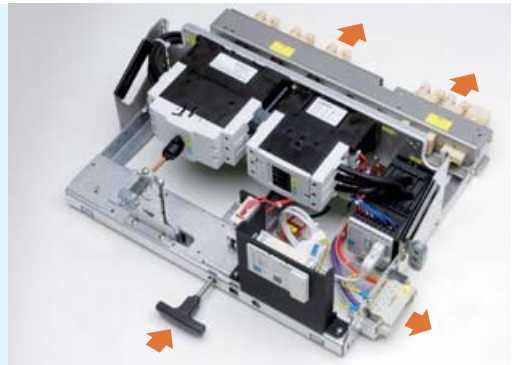
ARC SAFE – Safety against arc faults

With this vertical distribution busbar, the replacement and addition of functional units can take place while the switchgear is live. The “Automatic Shutter” is mechanically interlocked, is a positively driven contact and can additionally also be padlocked. The bus duct provides the highest level of protection through insulated encapsulation and separation between the phases. Accredited testing laboratories have certified the bus duct as “arc safe”.



DTS – Double Transfer System

The term Double Transfer System stands for our **patented contact mechanism**. The system stands out thanks to the safe and mechanical separation of the main circuits and control circuits during the point of disconnection and the testing point. It also has coloured indicators for the disconnected position (green), test position (blue) and operating position (red).



CONTINUOUS LATCH – Design meets functionality

The new door locking mechanism is setting the standard in safety and ease of use worldwide. This progressive functional design offers maximum security by means of the easy and simple one-hand use.





ENERGON – Types of cubicles

Versatile functions

Benefit from the range of low voltage cubicles NATUS has to offer you. The cubicles have multiple functions:

- ◆ in example for:
 - the incoming supply
 - the power distribution with air circuit breakers (ACB's), molded case circuit breakers (MCCB's) or fuse blocks
 - the mounting of converters, soft starters or a partially fixed-mounted design for small consumer's as well as a programmable logic controller (PLC)
- ◆ motor starters either as withdrawable or semi-withdrawable units

PD-cubicle

Withdrawable or fixed mounted circuit-breakers (bus-compatible)

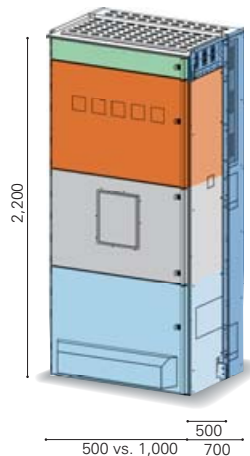
Used for:

- ◆ incoming supply
- ◆ outgoing feeders
- ◆ coupler

Cubicle features:

- ◆ air circuit breaker (ACB)
- ◆ design/construction according to requests
- ◆ measuring technique according to customer's specifications
- ◆ 3-pole or 4-pole
- ◆ up to 6,300 A
- ◆ up to 690 V
- ◆ separation up to form 4b (IEC)
- ◆ cable connection possible from the top or from the bottom
- ◆ compact coupler busraiser possible (width of 200 mm)

PD-cubicle



- cross-wiring compartment
- control-circuit voltage compartment
- main busbar compartment
- circuit-breaker compartment
- cable terminal compartment



- ◆ main distribution board with high rated currents and short-circuit currents
- ◆ electrical equipment make according to customer's requests
- ◆ bus-compatible for the direct integration of control systems

Construction options for PD-cubicle

rated current

circuit breaker (A) ¹⁾	cubicle depth (mm) ²⁾			cubicle width (mm) ³⁾					main busbar							
	500	700	1,000	3-pole circuit breaker					4-pole circuit breaker				position ⁵⁾		rated current (A)	
				500	600	800	1,000	1,200	500	600	800	1,000	1,200	top		back ⁴⁾
630	◆			◆							◆	◆	◆	◆	◆	1,600
800	◆			◆	◆						◆	◆	◆	◆	◆	1,600
1,000	◆			◆	◆						◆	◆	◆	◆	◆	1,600
1,250	◆			◆	◆						◆	◆	◆	◆	◆	1,600
1,600	◆			◆	◆						◆	◆	◆	◆	◆	1,600
2,000	◆			◆	◆						◆	◆	◆	◆	◆	2,500
2,500	◆				◆	◆	◆				◆	◆	◆	◆	◆	2,500
3,200	◆					◆	◆	◆			◆	◆	◆	◆	◆	3,200
4,000		◆					◆	◆				◆	◆	◆	◆	4,000
5,000			◆					◆				◆	◆	◆	◆	2 x 2,500
6,300			◆					◆				◆	◆	◆	◆	2 x 3,200

1) derating depends on make, frame size, installation status, degree of protection, ambient temperature

2) if cable department is downwards (if upwards min. 700 mm), without cabinet offset

3) depends on make, frame size and required space in control compartment

4) if cable departure is downwards

5) special constructions possible, i.e. busbars on bottom



- ◆ utmost personal safety
- ◆ operation, test and disconnected position behind closed doors

ENERGON – Types of cubicles

MD-cubicle

Multifunctional outgoing cubicle

Used for:

- ◆ motor starters
- ◆ power feeder

Design

- ◆ draw-out type
- ◆ semi-withdrawble type

Any combination in one cubicle is possible.

Construction

- ◆ the cubicle has 31 units of height (U), 27 U can be used for modules
- ◆ main busbar: 2 U
- ◆ N-Type withdrawable units in different compartments with their own doors: 2–12 U
- ◆ 4 Q-Type withdrawable units in the same compartment: 4 U
- ◆ PE, N, PEN busbar: 2 U
- ◆ cabling room 400 mm wide (optional 600 mm), cable entry point from top (depth of 700 mm is necessary) and bottom possible

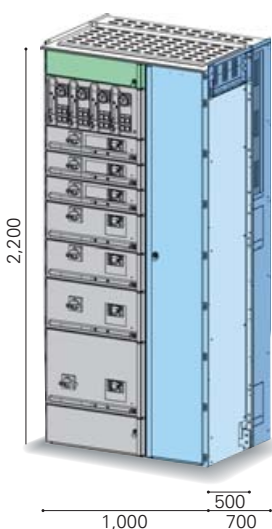
- ◆ withdrawable unit is mechanically codable (protection against mix-up of units)
- ◆ separation up to form 4b (IEC) as well as form 4b type 7 (BS) (W=1200 mm) (without Q-Type withdrawable units)

Vertical distribution busbar

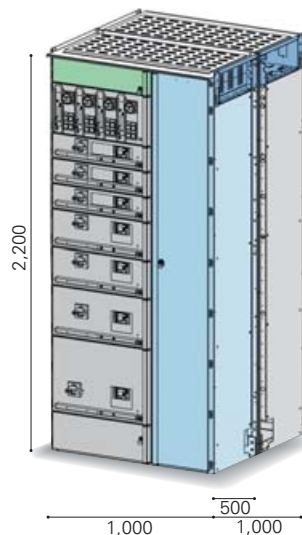
ARC SAFE

- ◆ automatic protection (shutter) against contact with distribution busbar when withdrawable unit is withdrawn, shutter can be padlocked
- ◆ rated current up to 1,000 A
- ◆ L1, L2, L3, optionally also with N-busbar (4-pole switching)

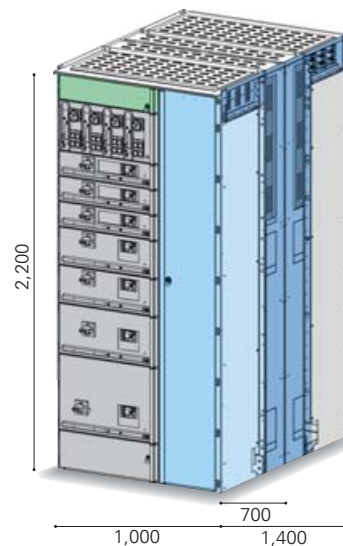
MD-Cubicle single front



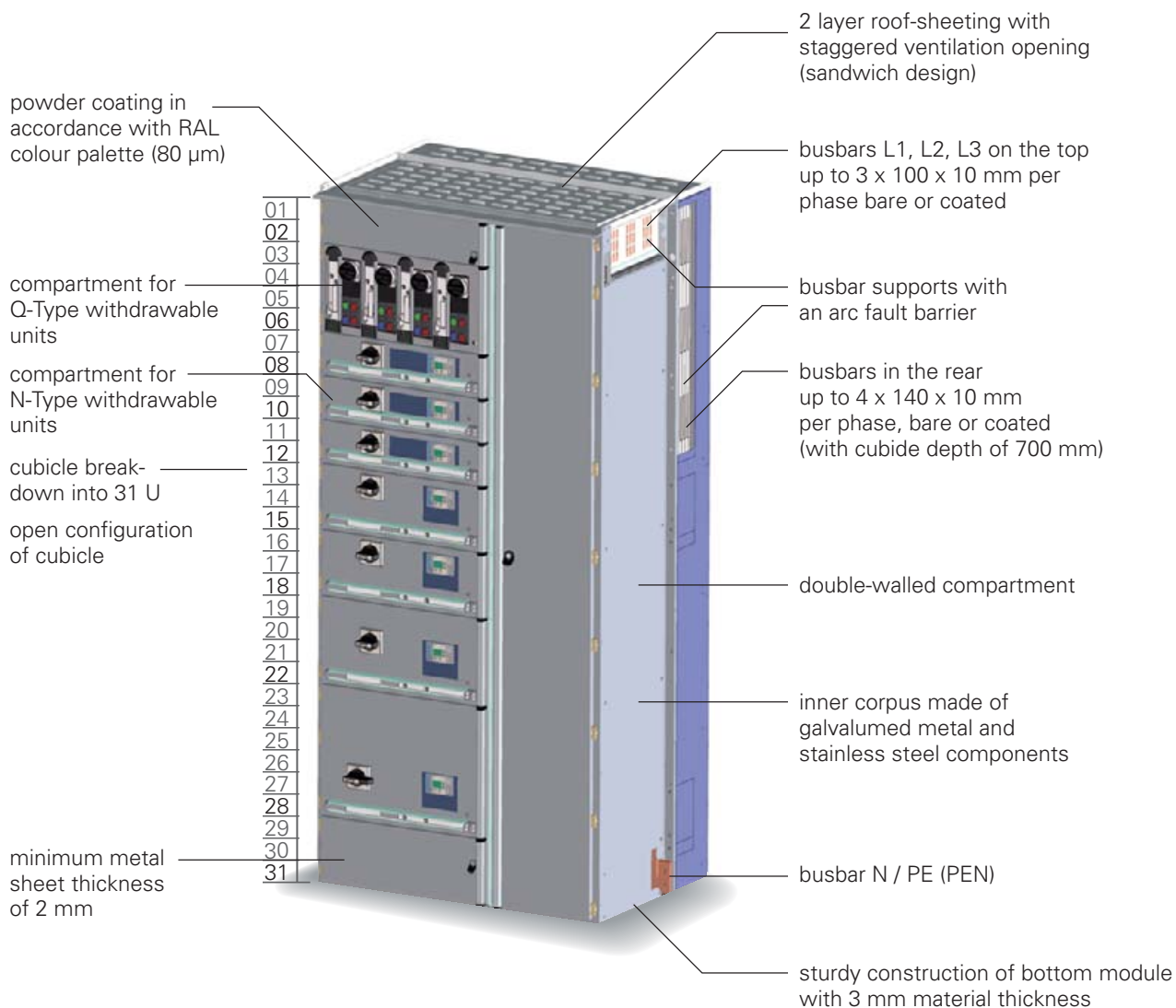
MD-cubicle double front (busbars on top)



MD-cubicle double front (busbars in rear)



- cross-wiring compartment
- main busbar compartment
- withdrawable unit compartment
- cable terminal compartment





ENERGON – Types of cubicles

FD-cubicle

The fixed mounted cubicle is a multifunctional cubicle that provides the reception of the following:

- ◆ control voltage distribution
- ◆ outgoing feeders in fixed mounting
- ◆ soft starter
- ◆ frequency converter
- ◆ automation equipment

SD-cubicle

The in-line fuse switch unit for power distribution with switch fuses:

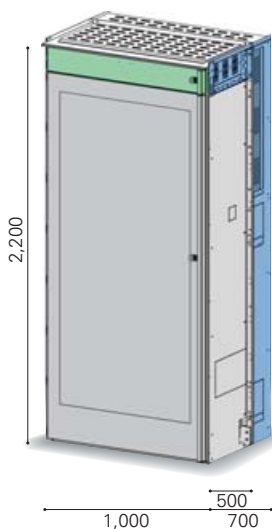
- ◆ assembly of different makes
- ◆ horizontal and vertical installation possible with in-line fuse switch size 3 (630 A)
- ◆ vertical distribution busbar up to 2,000 A
- ◆ large cable compartment (400 mm or 600 mm)

CD-cubicle

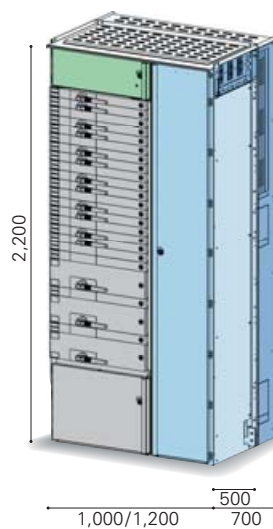
The power factor compensation unit

- ◆ each cubicle up to 400 kVar (incl. chokes)
- ◆ modular construction
- ◆ connection of the distribution busbars via upstream fuse switch disconnectors – with or without separate ventilation
- ◆ with controller

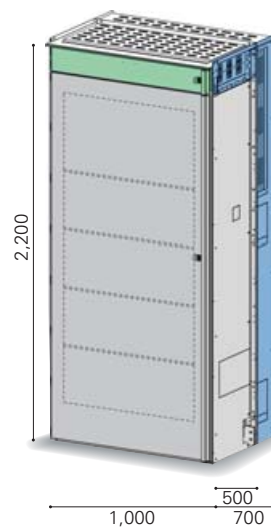
FD-cubicle



SD-cubicle



CD-cubicle



- cross-wiring compartment
- main busbar compartment
- switching devices compartment
- cable terminal compartment



- ◆ effortless interlocking
- ◆ consistent operating philosophy
- ◆ universal operation key

ENERGON – Types of withdrawable units

N-Type withdrawable unit

Patented contact mechanism

DTS:

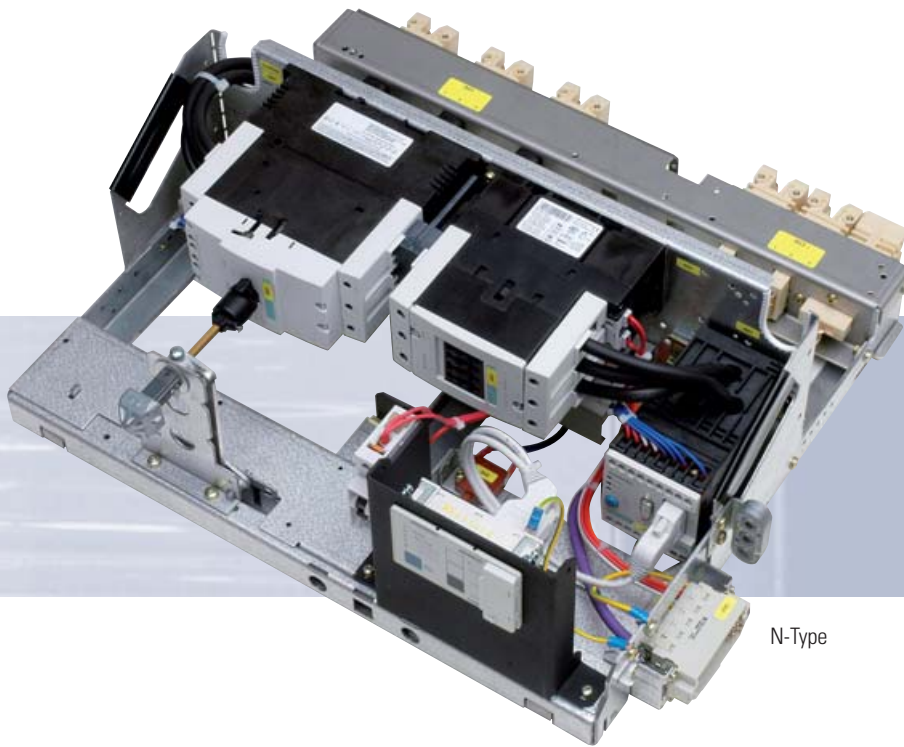
safe connection, user-friendly, bus-compatible

- ◆ main switch can only be operated when the door is closed
- ◆ cubicle door only opens in the disconnected position (can be overridden)
- ◆ unit can only be withdrawn in disconnected position
- ◆ unit can only be withdrawn if the main switch is disconnected

- ◆ disconnection contact for incoming and outgoing circuits on both sides
- ◆ compartments can be padlocked to prevent insertion of withdrawable units
- ◆ both withdrawable units and subsections can be exchanged or converted while the board is live
- ◆ mechanical encoding ensures protection against mix-up of units
- ◆ coloured display that can be seen through a window on the units door indicates the switching status

Disconnected and test position


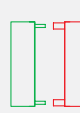
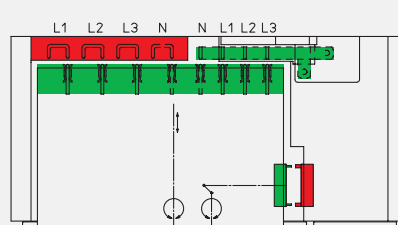


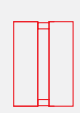
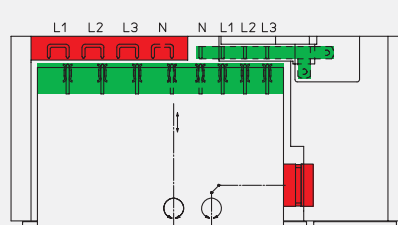



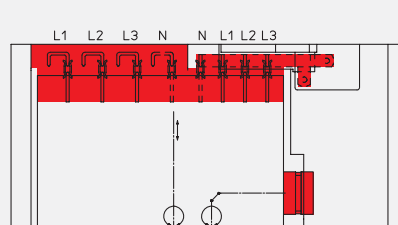

- ◆ Closed door operating / disconnected / and test position. The required isolating distance is provided, besides by the main switch, by the mobile, patented contact mechanism (DTS)
- ◆ control connector adapts to changing needs: up to 40 poles, with additional bus contacting



N-Type

ENERGON – Types of withdrawable units

Switching status of the withdrawable units

<p>Contacting main plug</p> 	<p>Contacting control plug</p> 		<p>module display</p>  <p>Disconnected position</p>	<p>Disconnected position</p> <p>The patented contact mechanism ensures that the withdrawable unit can only be withdrawn in the disconnected position – this maximises the user-friendliness.</p>
<p>Contacting main plug</p> 	<p>Contacting control plug</p> 		<p>module display</p>  <p>Test position</p>	<p>Test position</p> <p>You can safely configure and test the control circuit while the circuit breaker is disconnected in the test position.</p>
<p>Contacting main plug</p> 	<p>Contacting control plug</p> 		<p>module display</p>  <p>Operating position</p>	<p>Operating position</p> <p>Main circuit and control circuit are contacted while the withdrawable unit is mechanically secured against extraction.</p>



Q-Type

Q-Type withdrawable unit

Small, space saving withdrawable unit up to 11 KW or 32 A

- ◆ has the same operating and locking logic as the N-Type
- ◆ mechanical operating / disconnected / test position
- ◆ disconnection contact for incoming and outgoing circuits

- ◆ unit can only be withdrawn in the disconnected position (without overriding insertion forces)
- ◆ compartments can be padlocked to prevent insertion of withdrawable units
- ◆ mechanical encoding ensures protection against mix-up of units
- ◆ control connector adapts to changing needs: up to 40 poles, with additional bus contacting

- ◆ main switch with motor switching capacity
- ◆ operating mechanism can be padlocked in disconnected mode (maximum of three padlocks)
- ◆ common door for 4 Q-Type withdrawable units
- ◆ coloured display that can be seen through a window on the units front panel indicates the switching status

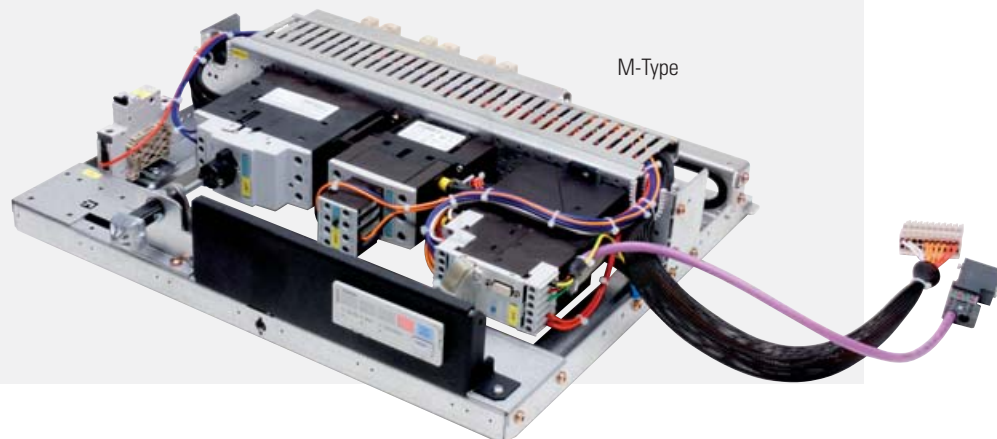
Plug-in type semi-withdrawable unit (M-Type)

The semi-withdrawable unit offers you an economical alternative to the N-Type withdrawable unit while retaining utmost plant safety. Thanks to the plug-in technique ENERCON semi-withdrawable units can be easily built in and removed from the power and control side.

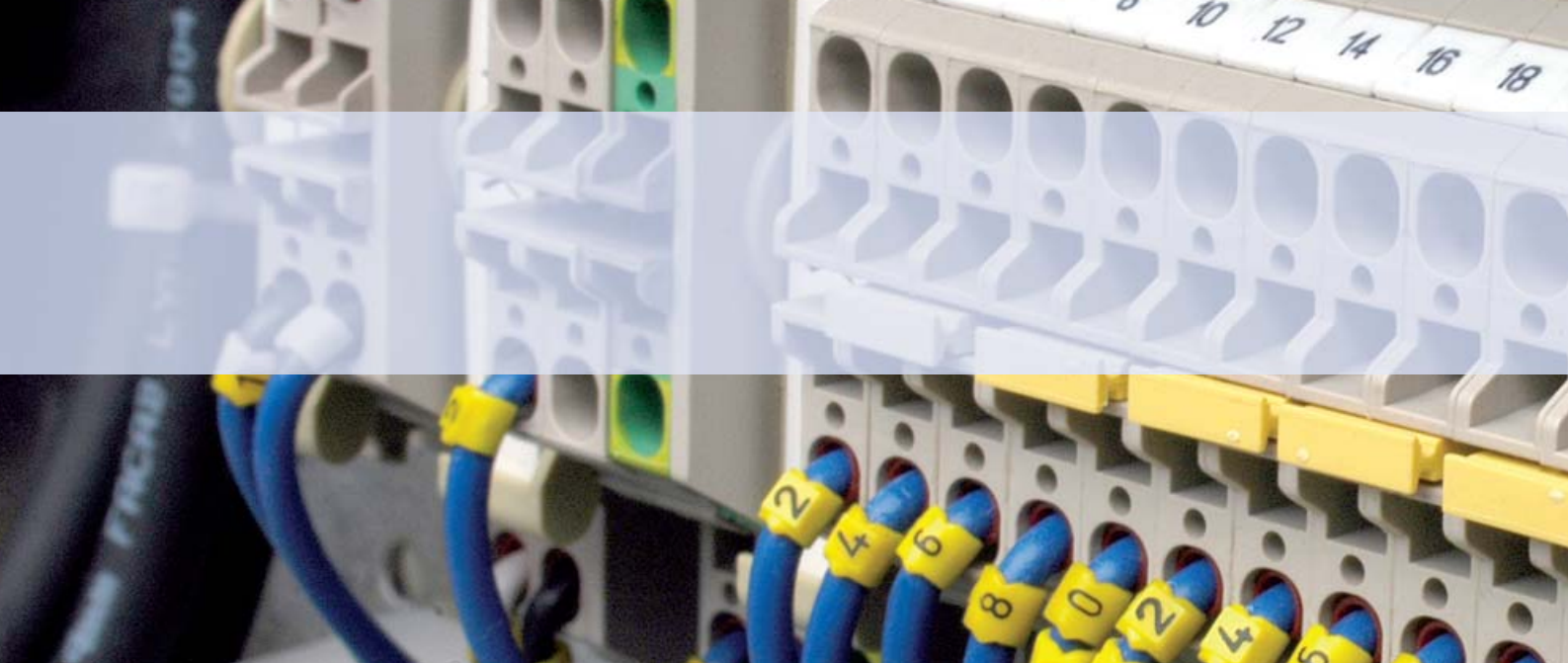
- ◆ the semi-withdrawable unit can be combined with other withdrawable units in the cubicle

- ◆ for motor control units and feeders to subdistribution boards in plug-in-technique up to 630 A
- ◆ for compact power distribution (multiple outgoing feeders)

- ◆ for other components, i.e. generation of control voltage, remote I/O modules, etc.
- ◆ operation and display can be available outside of the unit

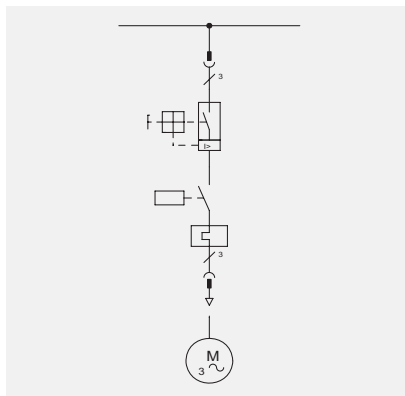


M-Type



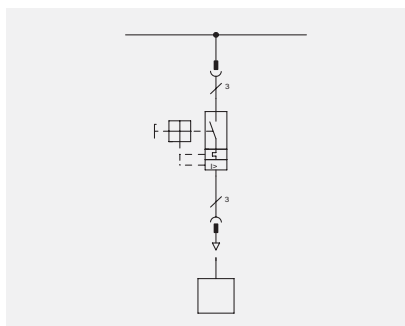
Typical configurations

Motor starters, fuseless, 400 V – 50 kA with SIMOCODE pro



typical	rated data (AC-2/AC-3)		size of withdrawable unit
	P_n	$I_e(A)$	
D3Q0_75A	0.75	1.85	Q4 (N2)
D3Q07_5A	7.5	15.17	Q4 (N2)
D3Q0011A	18.5	21.73	Q4 (N2)
D3N0022A	22	41.09	N3
D3N0045A	45	81.21	N3
D3N0055A	55	100.42	N5
D3N0075A	75	133.91	N5
D3N0090A	90	160.69	N5
D3N0110A	110	196.4	N5
D3N0132A	160	230.52	N8
D3N0250A	250	436.59	N10

Cable feeders, fuseless



typical	rated current*	rated current at 35 °C ambient temperature (A)		size of with- drawable unit
		unventilated	ventilated	
F1Q0012A	12	12	12	Q4 (N2)
F1Q0025A	25	18	20	Q4 (N2)
F1N0050A	32/50	26/39	30/43	N2
F1N0100A	100	77	86	N2
F1N0125A	125	95	102	N3
F1N0160A	160	127	138	N3
F1N0250A	250	175	192	N3
F1N0400A	400	285	312	N4
F1N0630A	630	450	510	N6

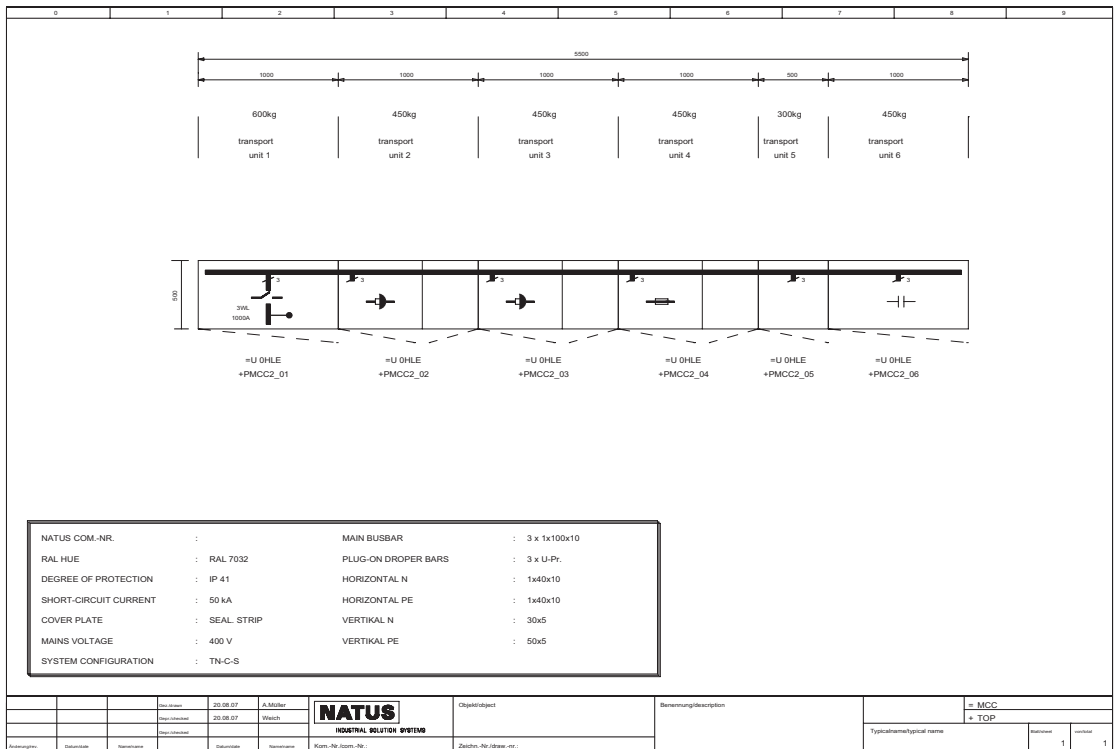
* stated values and withdrawable unit sizes can vary depending on the make used and ambient conditions



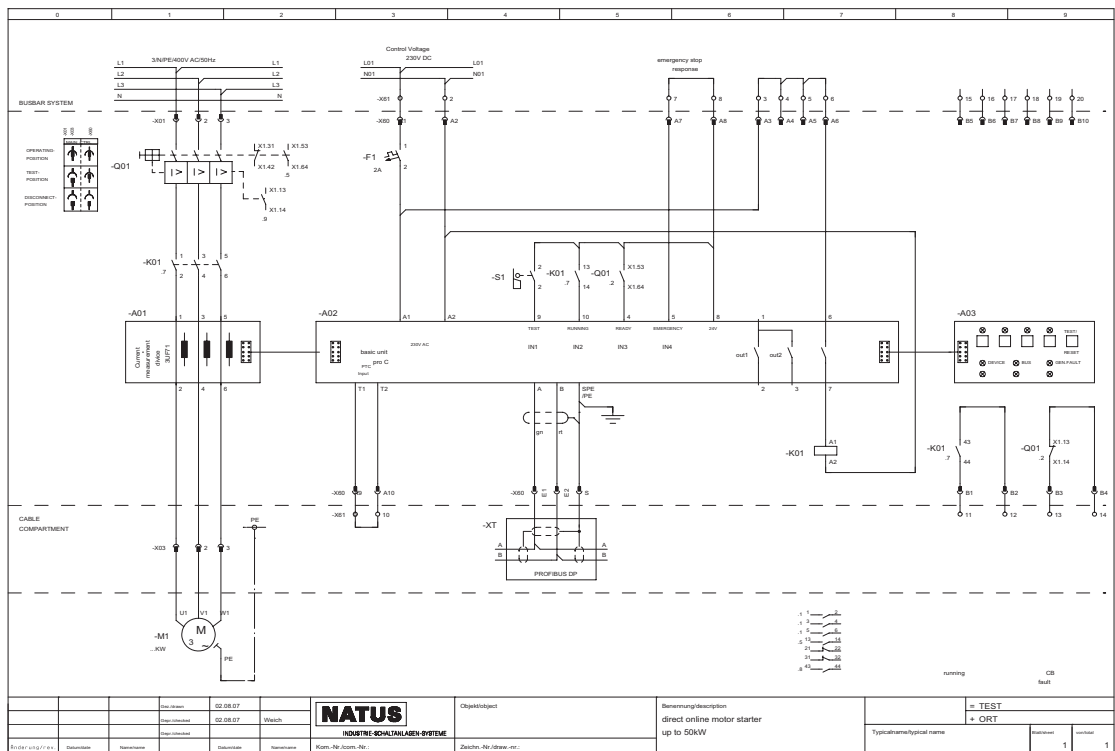
Technical data at a glance

Standards and specifications	type tested low voltage switchgear assembly (TTA)	IEC 60439-1, DIN EN 60439-1 VDE 0660 part 500	
	protection against electric shock	DIN VDE 50274, VDE 0660, part 514	
	testing of the response during internal faults (arc fault)	IEC 61641, DIN VDE 0660 part 500, supplement 2 U_e 725V AC, I_{cw} = 65 kA, t = 300 ms	
	testing during ground motion (earthquake testing)	IEC 68 part 2 and 3, DIN EN 60068	
Creepage distances and clearances	rated impulse withstand voltage (U_{imp})	8 kV (12 kV)	
	overvoltage category	III	
	degree of pollution	3	
Rated insulation voltage (U_i)	busbar system switchgear		1,000 V up to 1,000 V
Rated operational voltage (U_e)			up to 690 V
Busbars	horizontal main busbars installation position: top or rear blank or coated (insulated) material copper Cu-E-F30	rated current rated peak withstand current (I_{pk}) rated short-time withstand current (I_{cw}), 1s	up to 6,300 A up to 220 kA up to 100 kA
	vertical busbar for the multifunctional outgoing cubicle MD single pole, enclosed, insulated material copper Cu-E-F30	rated current rated peak withstand current (I_{pk}) rated short-time withstand current (I_{cw}), 1s	1,000 A 176 kA 80 kA
Rated currents	incoming supply, coupler or outgoing feeder moulded case circuit breaker (MCCB) motor-starter	IEC 947-4-1	up to I_n = 6,300 A up to I_n = 630 A up to I_n = 630 A
Internal separation	form 2b to form 4b up to form 4b type 7	IEC 60439-1 / DIN EN 60439-1, 7.7 DIN VDE 0660, part 500, 7.7 UK National Annex to BS EN 60439-1	
Surface treatment	pieces of frame, roof and rear panel doors, side panels colour of the powder coated parts (coating thickness 80 μ m)	galvalumed powder coating standard RAL 7035, light grey (optional all other RAL tones)	
Degree of protection	IEC 60529, DIN 40050	standard IP41 (optional higher IP)	
Dimensions	height		2,200 mm
	width		500/600/800/1,000/1,200 mm
	depth	single front double front	500/700/1,000 mm 1,000/1,400 mm

Excerpt of our documentation



top view



wiring diagram

Electrotechnical Solutions under one Roof

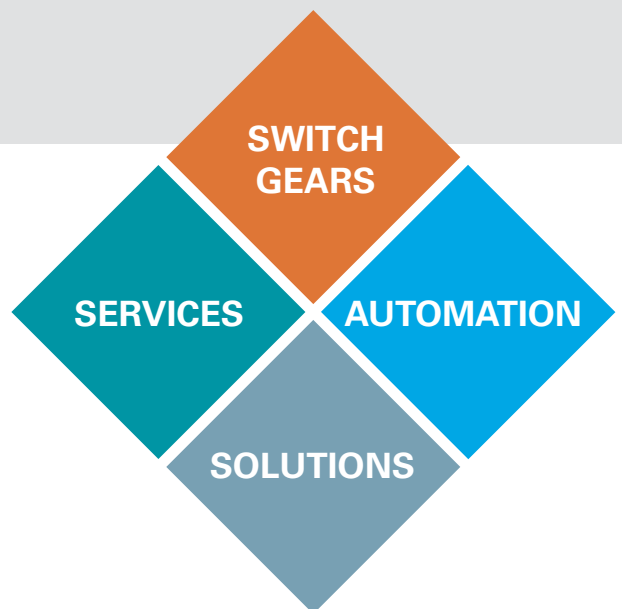
NATUS products and services

SWITCHGEARS For decades we have been setting standards in innovation, safety and quality in our core business of switchgear systems.

SERVICES Our comprehensive service package leaves no wish unanswered – we do everything from assembly to maintenance and a 24-hour emergency service, right through to a comprehensive spare parts service.

AUTOMATION We are constantly developing reliable solutions that are specifically tailored to customers' needs in the field of automation and control systems.

SOLUTIONS We combine the products of selected partners with NATUS services and a comprehensive project management to come up with professional solutions.



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