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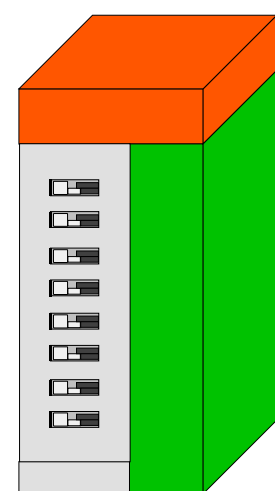
General

The cubicles in plug-in design for motor and outgoing cable feeders represent an economical alternative to withdrawable unit design. Due to the plug-in contact on the supply side, the modules offer a possibility of quick replacement without having to deenergize the switchboard.

Structure and Functions

The switching device compartment has a height of 1700 mm and is intended to accommodate maximum 22 plug-in units. The cable connection compartment is located on the right-hand side.

Cable connection lateral



1000
up to 630 A/feeder
OFPM

OFPM

The plug-in units are equipped with supply-side plug-in contacts with phase spacing of 55 mm. Lateral guides on both sides of the cubicle ensure positive contact onto the plug-on bus system at the rear. Towards the front the cubicle is covered by doors.

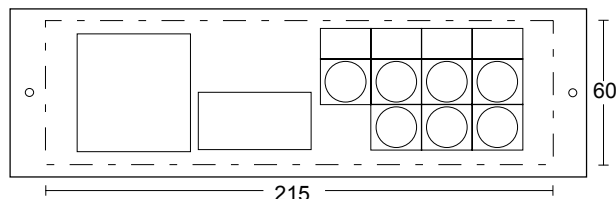
Plug-in units alternatively as:

- Outgoing cable feeders up to 630 A
- Motor feeders up to 250 kW

in fused/non-fused design

Installation of Instruments

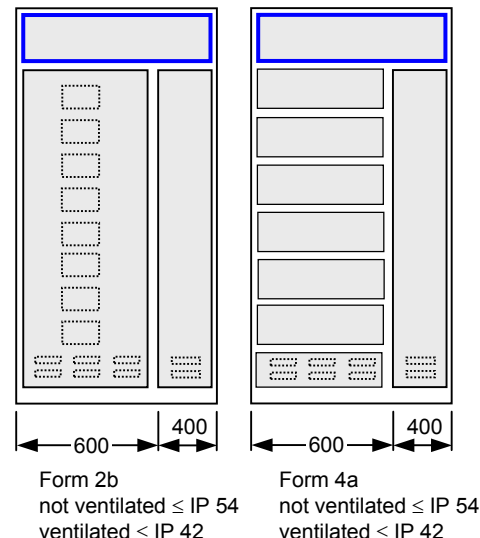
Instrument panels which are installed into the door are intended to be equipped with signaling devices, measuring instruments and actuating devices. The belonging current transformers are mounted on the supply-side of the plug-in unit.



When using compartment doors (Form 4a) the instruments are mounted directly in the compartment door.

Forms of Internal Separation/Doors

According to the form of internal separation and the minimum protection degree the following types can be chosen.



Plug-On Bus System (3- and 4-pole)

The plug-on bus system with the phase conductors L1, L2, L3 (and N) is located on the left of the cubicle. By virtue of the optional protection against electric shock with tap-off openings protection degree IP 20 is achieved. Hence plug-in units can be replaced without having to shut down the system.

Rated Currents of Plug-On Bus System

Cross-section	Rated current I_n as a function of ambient temperature [A]						
	20°	25°	30°	35°	40°	45°	50°
Cubicle non-ventilated							
40x10	755	735	720	700	680	660	640
60x10	1075	1050	1025	1000	975	945	920
Cubicle ventilated							
40x10	880	860	840	820	800	775	750
60x10	1260	1230	1200	1170	1140	1105	1075

Short-circuit strength

40 x 10: $I_{pk} = 125$ kA $I_{cw} = 50$ kA, 1 s
60 x 10: $I_{pk} = 163$ kA $I_{cw} = 65$ kA, 1 s; 50 kA, 3 s

PE-, PEN- and N-bars are installed in the cable connection compartment. In the case of 4 poles switched outgoing feeders, the N conductor is routed in the housing of the plug-on bus system.

PE cross-section: 1x40x5
PEN, N cross-section: 1x40x10 or 2x40x10

Contact System

Number of contacts per phase conductor	Rated current I_n [A]	Cut-off current I_D [kA]	I^2t [A ² s]
1	250	≈ 50	≈ 35 • 10 ⁵
2	400	≈ 50	≈ 42 • 10 ⁵
3	630	≈ 65	≈ 54 • 10 ⁵

Cable Connection Compartment

The 400 mm wide cable connection compartment is located lateral at the right hand side of the cubicle. Cables are connected directly at the switching device. Connectable cross-sections correspond with the technical data of device catalogues and operating instructions. The control cables are optionally connected to terminal blocks or to plugs.

Version with plug:

An 18-pole terminal block can be planned for each plug-in unit.
Depending on requirements, one or two 9-pole connectors can be coded to avoid inadvertent swapping. Two adjacent terminals must be jumpered to loop lines through; two lines in one terminal are not possible (cage clamp design).

solid	up to 2.5 mm ² (12 A/250 V)
finely stranded	up to 1.5 mm ² with core end sleeve

Project Planning Rules

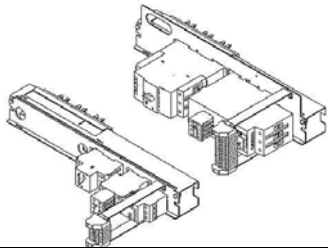
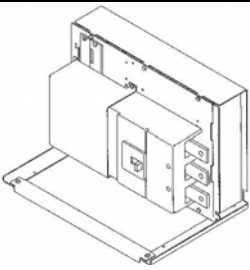
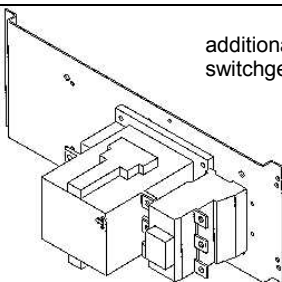
The 1700 mm high switching device compartment may be equipped with any combination of the plug-in units if the space requirement (module heights) and the rated currents are observed. The rated current of the vertical busbars depending on cubicle execution and ambient temperature (see above) and the rated diversity factor according IEC 60439-1 have to be considered.

Attention: The module heights stated in the tables do not consider any compartmentalisation

For compartmentalisation and its own compartment door applies:

Module height + 25 mm, however minimum – module height 200 mm

Mounting Rules for Plug-In Units

Plug-in units	Use		Maximum applicable			Max. mounting rail
			height	width	depth	
	Motor / Cable feeder ≤ 45 kW ≤ 100 A		Module height - 10 mm	500 mm	315 mm	Module height - 10 mm
	Motor feeder > 45 kW dual structure	Cable feeder > 100 A	Module height - 15 mm	450 mm	270 mm	depending on free space
 additional switchgear plate		---	Module height - 10 mm	495 mm	380 mm	

Control voltage tap-off impossible between plugged circuit-breaker and contactor

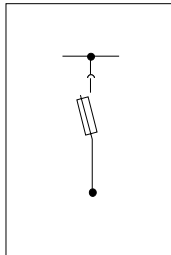
Rated Currents of Outgoing Cable Feeders (Approximate values without type verification)

Device		Rated current I _n as a function of ambient temperature [A]													
Type	Rated current [A]	non-ventilated								ventilated					
		20°	25°	30°	35°	40°	45°	50°	20°	25°	30°	35°	40°	45°	50°
Feeders fused 3-pole															
3NP40 10	160														
3NP52 60	250														
3NP53 60	400														
3NP54 60	630														
Feeders non-fused 3 pole / 4 pole															
3RV101	12														
3RV102	25	22	21	20,5	20	19	18,5	17,5	23	22,5	21,5	21	20	19,5	18,5
3RV103	50	41	40	38,5	37,5	36	34,5	33	45,5	44	42,5	41	39,5	38,0	36,5
3RV104	100	82,5	80	77,5	75	72	69,5	66,5	89,5	87	84	81,5	78,5	75,5	72
3VF3	225	135	131	127	122	118	113	109	152	147	143	138	133	128	122
3VF4	250	214	207	201	195	188	180	173	228	221	215	208	201	192	185
3VF5	400	265	260	249	241	232	223	214	315	305	295	285	275	265	255
3VF6	630	455	445	430	415	400	385	365	535	520	505	485	470	450	430
3VL1	160														
3VL2	160														
3VL3	250														
3VL4	400														
3VL5	630														

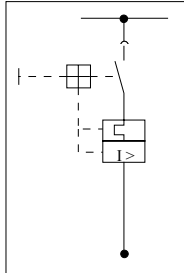
Values for 3VL not available yet
Approximate values as 3VF

Space Requirement for Outgoing Cable Feeders

Fuse switch-disconnector



Circuit-breaker 3- / 4-pole



Rated current [A]	Type	Module height [mm]
Cable feeders fused 3-pole		
160	3NP4010	125
250	3NP5260	275
400	3NP5360	375
630	3NP5460	375
Cable feeders non-fused 3 pole / 4 pole		
12	3RV101	75
25	3RV102	75
50	3RV103	125
100	3RV104	125
225	3VF3	275
250	3VF4	275
400	3VF5	375
630	3VF6	375
160	3VL1	275
160	3VL2	275
250	3VL3	275
400	3VL4	375
630	3VL5	375

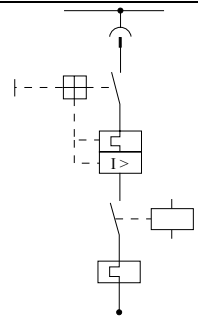
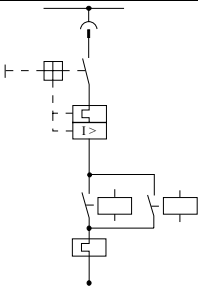
Motor Feeders, Fused 400 V

Connection	Rated data (AC-2/AC-3) P _n [kW]		I _e [A]	Main switch Type	Contactor(s) Type		Y	Overload relay Type	Module height [mm]
Direct on load starting									
	5,5	12	3NP4010	3RT101				3RU111	125
	11	21	3NP4010	3RT102				3RU112	125
	22	43	3NP4010	3RT103				3RU113	125
	45	83	3NP4010	3RT104				3RU114	125
	90	157	3NP52	3RT105				3RB105	575
	160	280	3NP53	3RT106				3RB106	675
	250	420	3NP54	3RT107				3RB106	875
	with contactor type 3TF								
	55	99	3NP52	3TF50				3UA60	475
	75	133	3NP52	3TF51				3UA61	475
	90	157	3NP52	3TF52				3UA62	575
	110	195	3NP52	3TF53				3UA66	575
	132	233	3NP53	3TF54				3UA66	675
	160	280	3NP53	3TF55				3UA66	675
	200	340	3NP54	3TF56				3UA66	875
	250	420	3NP54	3TF57				3UA68	875
Direct on load, reversing									
	5,5	12	3NP4010	3RT101				3RU111	125
	11	21	3NP4010	3RT102				3RU112	125
	22	43	3NP4010	3RT103				3RU113	175
	45	83	3NP4010	3RT104				3RU114	175

Motor Feeders, Fused, 400 V - with SIMOCODE-DP

Connection	Rated data (AC-2/AC-3)		Main switch Type	Contactor(s)		Overload relay Type	Module height [mm]
	P _n [kW]	I _e [A]		Type	Y		
Direct on load starting							
	2,2	5	3NP4010	3RT101		3UF5001	125
	4	8,8	3NP4010	3RT101		3UF5011	125
	11	21	3NP4010	3RT102		3UF5011	125
	18,5	36	3NP4010	3RT103		3UF5021	125
	45	83	3NP4010	3RT104		3UF5021	125
	90	157	3NP52	3RT105		3UF5031	575
	160	280	3NP53	3RT106		3UF5041	675
	250	420	3NP54	3RT107		3UF5041	875
Direct on load, reversing							
	2,2	5	3NP4010	3RT101		3UF5001	125
	4	8,8	3NP4010	3RT101		3UF5011	125
	11	21	3NP4010	3RT102		3UF5011	125
	18,5	36	3NP4010	3RT103		3UF5021	175
	45	83	3NP4010	3RT104		3UF5021	175

Motor Feeders, Non-Fused, 400 V - Type 1 at 50 kA with Overload Relay (Economical Solution)

Connection	Rated data (AC-2/AC-3)		Main switch Type	Contactor(s)		Overload relay Type	Module height [mm]
	P _n [kW]	I _e [A]		Type	Y		
Direct on load starting							
	5,5	12	3RV132	3RT101		3RU111	75
	11	21	3RV132	3RT102		3RU112	75
	22	43	3RV133	3RT103		3RU113	125
	45	83	3RV134	3RT104		3RU114	125
	55	99	3VF31	3TF50		3UA60	475
	75	133	3VF32	3TF51		3UA61	475
	90	157	3VF32	3TF52		3UA62	475
	110	195	3VF33	3TF53		3UA66	475
	132	233	3VF52	3TF54		3UA66	675
	160	280	3VF52	3TF55		3UA66	675
	200	340	3VF62	3TF57		3UA66	875
250	420	3VF62	3TF57		3UA68	875	
Direct on load, reversing							
	5,5	12	3RV132	3RT101		3RU111	125
	11	21	3RV132	3RT102		3RU112	125
	22	43	3RV133	3RT103		3RU113	175
	45	83	3RV134	3RT104		3RU114	175

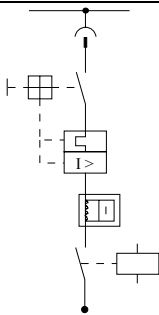
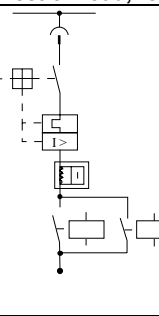
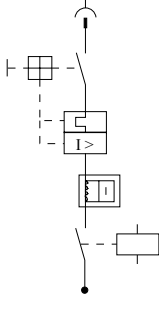
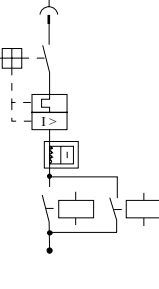
Motor Feeders, Non-Fused, 400 V - Type 2 at 50 kA with Overload Relay (Convenient Solution)

Connection	Rated data (AC-2/AC-3)		Main switch Type	Contactor(s)		Overload relay Type	Module height [mm]
	P _n [kW]	I _e [A]		Type	Y		
Direct on load starting							
	0,55	1,5	3RV132	3RT101		3RU111	75
	7,5	15	3RV132	3RT102		3RU112	75
	22	43	3RV133	3RT103		3RU113	125
	45	83	3RV134	3RT104		3RU114	125
	55	99	3VF31	3RT105		3RB105	475
	90	157	3VF32	3RT105		3RB105	475
	110	195	3VF42	3RT106		3RB106	575
	160	280	3VF51	3RT106		3RB106	675
	250	420	3VF61	3RT107		3RB106	875
	with contactor type 3TF						
	55	99	3VF31	3TF52		3UA62	475
	75	133	3VF32	3TF52		3UA62	475
	90	157	3VF32	3TF52		3UA62	475
	110	195	3VF33	3TF53		3UA66	475
	132	233	3VF52	3TF54		3UA66	675
	160	280	3VF52	3TF55		3UA66	675
	200	340	3VF62	3TF57		3UA66	875
	250	420	3VF62	3TF57		3UA68	875
Direct on load, reversing							
	0,55	1,5	3RV132	3RT101		3RU111	125
	7,5	15	3RV132	3RT102		3RU112	125
	22	43	3RV133	3RT103		3RU113	175
	45	83	3RV134	3RT104		3RU114	175

Motor Feeders, Non-Fused, 400 V - Type 1/Type 2 at 50 kA Overload Protection with Circuit-Breaker

Connection	Rated data (AC-2/AC-3)		Main switch Type	Contactor(s)		Overload relay Type	Module height [mm]	
	P _n [kW]	I _e [A]		Type	Y			
Direct on load starting, Type 1 (economical solution)								
	5,5	12	3RV101	3RT101			75	
	11	21	3RV102	3RT102			75	
	22	43	3RV103	3RT103			125	
	45	83	3RV104	3RT104			125	
	55	99	3VF31	3TF50			475	
	75	133	3VF32	3TF51			475	
	90	157	3VF32	3TF52			475	
	110	195	3VF33	3TF53			475	
	132	233	3VF51	3TF54			675	
	160	280	3VF51	3TF55			675	
	200	340	3VF61	3TF56			775	
	250	420	3VF61	3TF57			775	
Direct on load, reversing, Type 1 (economical solution)								
	5,5	12	3RV101	3RT101			125	
	11	21	3RV102	3RT102			125	
	22	43	3RV103	3RT103			175	
	45	83	3RV104	3RT104			175	
Direct on load starting, Type 2 (convenient solution)								
	0,55	1,5	3RV101	3RT101			75	
	7,5	15	3RV102	3RT102			75	
	22	43	3RV103	3RT103			125	
	45	83	3RV104	3RT104			125	
	55	99	3VF31	3RT105			475	
	90	157	3VF32	3RT105			475	
	110	195	3VF33	3RT106			475	
	160	280	3VF51	3RT106			675	
	250	420	3VF61	3RT107			775	
	with contactor type 3TF							
	55	99	3VF31	3TF52			475	
	75	133	3VF32	3TF52			475	
	90	157	3VF32	3TF52			475	
	110	195	3VF33	3TF53			475	
	132	233	3VF51	3TF54			675	
	160	280	3VF51	3TF55			675	
	200	340	3VF61	3TF56			775	
	250	420	3VF61	3TF57			775	
	Direct on load, reversing, type 2 (convenient solution)							
		0,55	1,5	3RV101	3RT101			125
		7,5	15	3RV102	3RT102			125
		22	43	3RV103	3RT103			175
45		83	3RV104	3RT104			175	

Motor Feeders, Non-Fused, 400 V - Type 1/Type 2 at 50 kA with SIMOCODE-DP

Connection	Rated data (AC-2/AC-3)		Main switch Type	Contactor(s)		Overload relay Type	Module height [mm]
	P _n [kW]	I _e [A]		Type	Y		
Direct on load starting, Type 1 (economical solution)							
	2,2	5	3RV132	3RT101		3UF5001	125
	4	8,8	3RV132	3RT101		3UF5011	125
	11	21	3RV132	3RT102		3UF5011	125
	18,5	36	3RV133	3RT103		3UF5021	125
	45	83	3RV134	3RT104		3UF5021	125
Direct on load, reversing, Type 1 (economical solution)							
	2,2	5	3RV132	3RT101		3UF5001	125
	11	21	3RV132	3RT102		3UF5011	125
	18,5	36	3RV133	3RT103		3UF5021	175
	45	83	3RV134	3RT104		3UF5021	175
Direct on load starting, Type 2 (convenient solution)							
	0,55	1,5	3RV132	3RT101		3UF5001	125
	7,5	15	3RV132	3RT102		3UF5011	125
	18,5	36	3RV133	3RT103		3UF5021	125
	45	83	3RV134	3RT104		3UF5021	125
Direct on load, reversing, Type 2 (convenient solution)							
	0,55	1,5	3RV132	3RT101		3UF5001	125
	7,5	15	3RV132	3RT102		3UF5011	125
	18,5	36	3RV133	3RT103		3UF5021	175
	45	83	3RV134	3RT104		3UF5021	175

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